Application form

Environmental Protection Act 1994

Submission of a progressive rehabilitation and closure plan

This is the approved form for a progressive rehabilitation and closure plan (PRC plan) under section 126C of the Environmental Protection Act 1994 for a site-specific application for a mining activity relating to a mining lease.

Only use this application form if you are required to submit a PRC plan, where:

- You are applying for a new site-specific environmental authority for a mining activity relating to a mining lease.

  OR

- The administering authority has included the requirement to submit a proposed PRC plan in an information request for a new site-specific environmental authority for a mining activity relating to a mining lease.

  OR

- You completed a PRC plan as part of an EIS process and are submitting the PRC plan in the approved form as required under section 126C.

  OR

- You have an existing site-specific environmental authority for a mining activity relating to a mining lease and have received a transition notice from the administering authority[1] in accordance with section 754 of the *Environmental Protection Act 1994* (EP Act).

Before completing this application form it is recommended that you:

- Read the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964[2]), which explains the information you are required to provide with this application.
- Have a pre-lodgement meeting. To request a pre-lodgement meeting, please fill out and lodge the form Application for pre-lodgement services (ESR/2015/1664).

If you require assistance in answering any part of this form, or have any questions about your application, please contact the relevant business centre. Contact details are at the end of this form (Section 10).

Privacy statement

The administering authority is collecting the information on this approved form to process your application for a PRC plan. The collection of information is authorised under Chapter 3 and Chapter 5 of the EP Act. Some of the information may be disclosed to the Department of Resources and Queensland Treasury for the purpose of processing this application.

[1] The Department of Environment and Science is the administering authority under the *Environmental Protection Act 1994*.
[2] This is the publication number. The publication number can be used as a search term to find the latest version of a publication at **www.qld.gov.au**.

Please note that the administering authority is required to keep this application on a register of documents open for inspection by members of the public under section 541 of the EP Act, and must permit a person to take extracts from the register pursuant to section 542 of the EP Act.

Your personal information will not be otherwise disclosed to any other parties unless authorised or required by law. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

Definitions of terms used in this form	
(Where there is inconsistency between the definition of terms used here and the terms used in the EP Act, the terms in the EP Act apply)	
Available for improvement	In relation to land in an improvement area for a non-use management area, means land in the improvement area that is not being mined, other than land to which any of the following applies– a) the land is being used for operating infrastructure or machinery for mining, including, for example, a dam or water storage facility; b) the land is identified in the PRCP schedule or the application for an environmental authority relating to the schedule as containing a probable or proved ore reserve that is to be mined within 10 years after the land would otherwise have become available for improvement; c) the land is required for the mining of a probable or proved reserve mentioned in paragraph (b).
Available for rehabilitation	For a rehabilitation area, means land in the area is not being mined, unless– a) the land is being used for operating infrastructure or machinery for mining, including, for example, a dam or water storage facility; or b) the land is identified in the PRCP schedule or the application for an environmental authority relating to the schedule as containing a probable or proved ore reserve, under section 126D(6) of the EP Act, that is to be mined within 10 years after the land would otherwise have become available for rehabilitation; or ba) the land is required for the mining of a probable or proved reserve mentioned in paragraph (b); or c) the land contains permanent infrastructure identified in the proposed PRCP schedule as remaining on the land for a post-mining land use.
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 of the EP Act 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 environmental authority holder 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 has 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 of the EP Act 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 three years after the assent date; and iv. the administering authority does not, within 20 business days after receiving the document, give the environmental authority holder a notice that the document is insufficient in a material particular relevant to a matter 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.
Improvement area	For a non-use management area, means an area of land in the non-use management area to which a management milestone relates.
Management milestone	For a non-use management area, means each significant event or step necessary to– a) achieve best practice management of the area; and b) minimise risks to the environment.
Non-use management area	Means an area of land the subject of a 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.
Post-mining land use	For land the subject of a PRC plan, means the purpose for which the land will be used after all relevant activities for the PRC plan carried out on the land have ended.
PRC plan	For land the subject of a mining lease, means a progressive rehabilitation and closure plan for the land that consists of – a) the rehabilitation planning part of the PRC plan; and b) the PRCP schedule for the PRC plan, including any conditions imposed on the schedule.
PRCP schedule	For a PRC plan, means a schedule of the plan that – a) complies with section 126D of the EP Act; and b) is approved under chapter 5, part 5, division 2 of the EP Act, with or without conditions.
Proposed PRC plan	For an application, a proposed PRC plan means a PRC plan proposed for land the subject of a mining lease that: (a) complies with Chapter 5, part 2, division 3; and

	(b) either – accompanies the application; or is submitted for the application after the application is made
Rehabilitation area	For land the subject of a post-mining land use, means an area of the land to which a rehabilitation milestone for the post-mining land use relates.
Rehabilitation milestone	For the rehabilitation of land, means each significant event or step necessary to rehabilitate the land to a stable condition.

The fields marked with an asterisk * are mandatory. If they are not completed then your application may be considered not properly made under section 128 of the EP Act.

Section 1 – Environmental authority details		
Does this application relate to an existing environmental authority for a mining activity relating to a mining lease approved through a site-specific application? *	☐ No – Provide the reference number for your environmental authority application:	AR Insert.
	☒ Yes – Provide your environmental authority number:	EPML00443913

Section 2 – Applicant details	
Details of the applicant are to be provided in this section. If there is an agent acting on behalf of the applicant, details of the agent are to be provided. An agent could be a consultant or contractor for the environmental authority holder. The person nominated as the application contact will receive correspondence relating to this application.	
NAME / COMPANY NAME* Taroom Coal Pty Ltd	TRADING NAME (*IF AN ORGANISATION) Taroom Coal Pty Ltd
REGISTERED BUSINESS ADDRESS / RESIDENTIAL ADDRESS (NOT A POST OFFICE BOX) * Level 16, 175 Eagle St, Brisbane, QLD, 4000	POSTAL ADDRESS (*WHERE DIFFERENT) GPO Box 2440, Brisbane, QLD, 4001
ABN / ACN (*IF AN ORGANISATION) 16 079 251 442 / 079 251 442	NAME OF APPLICATION CONTACT* Ashley Sizeland
EMAIL* ASizeland@newhopegroup.com.au	TELEPHONE* 07 3418 0575
☒ INDICATE IF YOU WANT TO RECEIVE CORRESPONDENCE VIA EMAIL ☐ INDICATE IF THIS FORM IS BEING COMPLETED BY AN AGENT FOR THE ENVIRONMENTAL AUTHORITY HOLDER* **NOTE: If an agent is nominated, please provide evidence of appointment by the authority holder/s.**	

Section 3 – Website address	
If this application relates to an application for a new site-specific environmental authority for a mining activity, would	☒ No – Provide details below.
	☐ Yes – Go to next section.

you like to use the details on the environmental application form?		
Provide the website address for the application notice and application documents.	Insert.	
Provide details of the contact person if technical assistance is required.	NAME Insert.	TELEPHONE Insert.
	EMAIL Insert.	

Section 4 – Non-use management areas (new EA applications only)	
Does this application for a proposed PRC plan include a NUMA justified under section 126D(2)(b) of the EP Act? *	☐ No – Go to next section.
	☐ Yes
Has a public interest evaluation been carried out by a qualified entity for the NUMA(s)? *	☐ No – Go to next section.
	☐ Yes
Has the proposed NUMA(s) changed since the public interest evaluation was carried out in the EIS? *	☐ No – Go to next section.
	☐ Yes – Provide details below.
How has the proposed NUMA(s) changed since the public interest evaluation was carried out?	Please provide details below.

Section 5 – PRC plan structure	
The PRC plan must be prepared in accordance with the structure/format shown in Appendix 1 of this application form.	
Requirement	**Requirement met?**
Include a cover page that complies with Appendix 1 of this application form.	☒ Yes
Include a table of contents that complies with Appendix 1 of this application form.	☒ Yes

Section 6 – PRC plan Checklist *			
The PRC plan must meet the information requirements stated in section 3 of the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964), and sections 126C and 126D of the EP Act (note there is a limited exception for transitional PRC plans). All PRC plan requirements are mandatory. For each requirement, insert a reference to the section of the PRC plan which satisfies the requirement. Justification must be provided for any requirement for which the response is Not Applicable (NA). If more space is required, please attach a separate sheet.			
PRC plan Requirement	**Requirement met? (Yes / NA)**	**PRC Plan Section No.**	**Justification**
Rehabilitation planning part of the PRC plan The rehabilitation planning part of the PRC plan must include the information required under section 126C the EP Act, including information requirements described in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964) in accordance with section 126C(1)(j) of the EP Act.			
Project description *Note: For existing mines transitioning to the PRC plan framework, pre-disturbance information collected as part of an EIS process or original environmental authority application should be included. If this information is unable to be provided, or cannot be developed because of the mine's life stage, this should be clearly explained in this section of the rehabilitation planning part of the PRC plan.*			
Describe the following:			
• each resource tenure, including the area of each tenure, to which the application relates;	Yes	3.1.1	ML 50254, ML 50270, and ML 50271.
• the relevant activities to which the application relates;	Yes	3.1.1	Mining Black Coal.
• the likely duration of the relevant activities	Yes	3.1.1.2	Estimated whole-of-project life is approximately 40 years.

Include a detailed description, including maps, of how and where the relevant activities are to be carried out.	Yes	3.1.1	Insert.
Consultation			
Include details of the consultation undertaken by the applicant in developing the proposed PRC plan.	Yes	3.2.1	Insert.
Include details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.	Yes	3.2.3	Insert.
Post-mining land use			
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with the outcome of consultation with the community in developing the PRC plan.	Yes	3.3	Post mining land uses were informed by the pre-mining and historical land uses within and surrounding the Elimatta coal mine mining leases.
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	Yes	3.3.1	The PMLUs align with the outcomes of the Western Downs Regional Council Planning Scheme (2019).
Non-use management area *Note for Transitional PRC plans: The holder is not required to comply with a requirements under section 126C(1)(g) or (h) or 126D(2) or (3) for the proposed PRCP schedule for the plan in relation to land if a land outcome document identifies the outcome for the land as the same, or substantially similar to, the outcome for the land if it were a non-use management area.*			
State the extent to which each proposed non-use management area identified in the PRCP schedule for the plan is consistent with the outcome of consultation with the community in developing the PRC plan.	Yes	3.4	The NUMAs proposed in the PRCP are consistent with the approved NUMAs described within the EIS assessment report. It can be inferred that the NUMAs remain consistent with outcomes of past

			consultation processes (undertaken as part of the EIS, EA and ML approvals)
State the extent to which each non-use management area identified in the PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	NA	Insert.	Under the relevant transitional provisions, as the NUMAs are pre-approved and described within a land outcome document, Taroom Coal Proprietary Limited is not required to justify the proposed NUMA
For each proposed non-use management area, state the reasons the applicant considers the area cannot be rehabilitated to a stable condition because of a matter mentioned in section 126D(2).	NA	Insert.	Under the relevant transitional provisions, as the NUMAs are pre-approved and described within a land outcome document, Taroom Coal Proprietary Limited is not required to justify the proposed NUMA
For each matter mentioned in the requirement above, include copies of reports or other evidence relied on by the proponent for each proposed non-use management area.	Yes	Insert.	Elimatta EIS Assessment Report (Approved NUMA), Environmental Authority (Approved void)
Rehabilitation and management methodology *Note: Section 3.5 of the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964) outlines the range of information that must be included as appendices to the rehabilitation planning part of the PRC plan.*			
For each post-mining land use, state the applicant's proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP schedule.	Yes	3.5	The proposed PMLUs for the Elimatta Coal Mine are low intensity cattle grazing on modified pastures and low intensity cattle grazing on native riparian vegetation. Methods to be employed included landform reshaping, designed drainage, topdressing and soil amelioration, species selection, seeding, fertiliser application, and ongoing monitoring.

For each non-use management area, state the applicant's proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP schedule for the area.	Yes	3.5.11	Insert.
Risk assessment			
Identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the applicant intends to manage or minimise the risks.	Yes	Appendix H	Appendix H: Rehabilitation Risk Assessment outlines the triggers that may prevent stable landforms from being achieved and controls that will be implimented to minimise and address risk scenarios.
PRCP Guideline			
Include any other information prescribed by the administering authority in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964).	NA	Insert.	Insert.
Include the spatial information required in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964). See Attachment 1 of this form for details on how spatial information must be submitted.	Yes	Insert.	Insert.
Other information			
Include the other information the administering authority reasonably considers necessary to decide whether to approve the PRCP schedule.	NA	Insert.	Insert.
PRCP Schedule The proposed PRCP schedule must comply with section 126D of the EP Act, and be written in accordance with the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964).			

The administering authority will assess the proposed PRCP schedule in conjunction with the rehabilitation planning part of the PRC plan and other application documents, and decide whether to approve the proposed PRCP schedule, with or without conditions, or refuse the proposed PRCP schedule.			
Include a PRCP schedule prepared using the PRCP schedule template (ESR/2019/5103[3]).	Yes	Appendix A	Appendix A
Include maps showing all of the land mentioned in the PRCP schedule, as it relates to being progressively rehabilitated.	Yes	Appendix B	Appendix B

Section 7 – Non-use management areas (transitional applications only)	
Does this application for a proposed PRC plan include a NUMA? *	☐ No – Go to next section.
	☒ Yes
Does the relevant environmental authority or any other land outcome document identify an outcome for the land that is the same, or substantially similar, to the outcome for the land if it were a NUMA under a PRCP schedule?	☐ No – Go to next section.
	☒ Yes
Does the environmental authority or any other land outcome document state sufficient detail to identify either the location or the area of the land to which the outcome relates?	☐ No – Provide details below.
	☒ Yes – Provide the document name(s) in Section 8.
If the area is not identified – how will the total area of the land to which the outcome relates be minimised? *	The area and locations of NUMAs are identified within the Elimatta Environmental Impact Statement and EIS Assessment Report. The maximum area for NUMAs is identified in within the EIS Assessment Report is 230 ha. The Conceptual Final Landform Design is contained within the EIS Section 3: Rehabilitation and Decomissioning Figures 3.80 & 3.81.

[3] This is the publication number. The publication number can be used as a search term to find the latest version of a publication at www.qld.gov.au.

If the location is not identified – how will the EA holder ensure the location of the land to which the outcome relates minimises risks to the environment? *	Not applicable. See above.

Section 8 – Transitional PRC plan requirements (transitional applications only)

In accordance with transitional provisions in the EP Act, an applicant with an existing EA is able to transition aspects of the PRCP schedule from existing land outcome documents. Indicate below any information that is being transitioned from a land outcome document.

PMLU/NUMA	Rehabilitation /Improvement area	Milestone Reference	Identify which of the below is being transitioned from a land outcome document		Land outcome document	Page No.
			Land outcome	Milestone criteria		
PMLU - Low intensity cattle grazing (modified pastures)	RA2a Water management infrastucture, RA3 Mine infrastructure area, RA4 Waste disposal, RA5 In-pit and out-of-pit spoil dumps	1, 2, 3, 5, 6, 8, 10	☒	☐	EIS assessment report contains the land outcomes and criteria Land outcome for waste disposal are found within the Environmental Impact Statement	EIS assessment report: Table H1 on page 83 & 84, Table H2 on page 85. EIS: section 5 EM Plan Table 5.67 on page 5-214
PMLU - Low intensity cattle	RA1 Permanent	1, 3, 5, 7, 9, 11	☒	☐	As above	As above

grazing (native riparian vegetation)	creek diversion					
PMLU - Retained infrastructure	RA6 Rail loop and services corridor	1, 2, 12	☒	☐	As above	As above
PMLU – Low intensity cattle grazing (modified pastures)	RA2b Retained flood levee	1, 3, 5, 6, 8, 10	☒	☐	As above	As above
NUMA – Residual voids	IA1 Residual voids	MM1, MM2, MM3	☒	☐	As above	As above
Each land outcome document must be submitted with this approved form						
☒ All land outcome documents identified above have been attached to this approved form.						

Section 9 – Declaration*

Note: If you have not told the truth in this application you may be prosecuted.

I declare that:

- I am the holder of the environmental authority, or authorised signatory for the holder of the environmental authority.
- The information I have provided is true and correct to the best of my knowledge. I understand that it is an offence under section 480 of the *Environmental Protection Act 1994* to give to the administering authority or an authorised person a document containing information that I know is false, misleading or incomplete in a material particular.
- I understand that failure to provide sufficient information may result in the application being refused. I understand that an incomplete application may be invalid. Invalid applications will be returned without processing and will only be processed if resubmitted with all invalidating issues addressed.
- I understand that all information supplied on or with this application form may be disclosed publicly in accordance with the *Right to Information Act 2009* and the *Evidence Act 1977.*
- I will comply with all conditions and milestones of my approved PRCP schedule as well as any relevant provisions in the *Environmental Protection Act 1994*.
- I understand that I am responsible for managing the environmental impacts of these activities, and that approval of this application is not an endorsement by the administering authority of the effectiveness of management practices proposed or implemented.

Where an agreement is in place between all holders of the environmental authority, one holder can sign on behalf of the other joint holders. Please tick the checkbox below.

☒ I HAVE AUTHORITY TO SIGN THIS FORM ON BEHALF OF ALL THE JOINT HOLDERS OF THE ENVIRONMENTAL AUTHORITY.

Applicant's signature

APPLICANT'S NAME	POSITION	COMPANY / ORGANISATION
Dominic O'Brien	Director	Taroom Coal Pty Ltd
APPLICANT'S SIGNATURE		DATE 29/03/2023

Joint holder(s) signature if applicable

NAME, POSITION AND COMPANY NAME	SIGNATURE	DATE
Insert.		Select.
Insert.		Select.

OR ☐ I HAVE ATTACHED A DOCUMENT THAT PROVIDES THE REQUIRED INFORMATION FOR ALL JOINT HOLDERS.

Where the environmental authority holder is a company, this form must be signed by an authorised person for that company. Where there is more than one holder of the environmental authority, this declaration is to be signed by all holders, unless there is an agreement between all holders that one can sign on behalf of the other(s).

If you are signing on behalf of the environmental authority holder(s) you must provide a letter of authorisation.

Section 10 - Submission

Please submit your completed application form and supporting material to the Department of Environment and Science office that services the industry applicable to your environmental authority.

A list of business centres can be found at www.des.qld.gov.au using the words 'business centres' as a search term.

Enquiries:

Minerals Business Centre
PO Box 7230
Cairns QLD 4870
Phone: 07 4222 5352
Fax: 07 4222 5070
Email: ESCairns@des.qld.gov.au

Coal Business Centre
PO Box 3028
Emerald QLD 4720
Phone: 07 4987 9320
Email: CRMining@des.qld.gov.au

The latest version of this publication and other publications referenced in this document can be found at **www.qld.gov.au** using the relevant publication number (ESR/2019/4957 for this form) or title as a search term.

Appendix 1–PRC plan structure

Appendix 1 describes the formatting/structural requirements for a completed PRC plan. This includes the information required in a PRC plan cover page and table of contents, and the structure of a PRC plan.

A PRC plan must include the following sections in the order listed:

1. **Cover page**
2. **Table of contents**
3. **Rehabilitation planning part**
   - 3.1. **Project planning**: This section will include baseline information, site location details, a description of the project and information on rehabilitation/improvement planning.
   - 3.2. **Community consultation**: This section will include information on stakeholder consultation including a community consultation register and community consultation plan.
   - 3.3. **Post-mining land use**: This section will include the assessment of PMLU options, methodology for determining PMLU options, and details of each nominated PMLU.
   - 3.4. **Non-use management areas (if applicable)**: This section will include the justification for the NUMA and details of each nominated NUMA.
   - 3.5. **Rehabilitation management methodology**: This section will include information describing how the proposed rehabilitation and management methodology have been develop and will be implemented.
   - 3.6. **Risk assessment**: This section will include a risk assessment that identifies the risk of a stable condition for land not being achieved and a risk treatment plan outlining how the applicant will manage or minimise the risk.
   - 3.7. **Monitoring and maintenance**: This section will include a monitoring and maintenance program that identifies and describes the monitoring systems that will be undertaken to demonstrate a milestone and milestone criteria have been achieved.
4. **Appendices and attachments**: The completed PRCP schedule and any relevant required reports/plans are to be included in this section.

A PRC plan must contain a cover page including the following information:

- Title of the project
- Document title
- Version number
- Document ID number
- Date of submission
- Tenure number(s)
- EA holder name
- EA holder contact details

A PRC plan must contain a table of contents including the following information:

- Sections of PRC plan
- Sub-sections of PRC plan
- Figures, tables and maps (as applicable)

Attachment 1—Spatial data requirements for PRC plan

Attachment 1 provides guidance on the required content of spatial information (shapefiles) for the submission of a PRC plan. This attachment should be read in conjunction with the department's guideline: Spatial Information Submission (ESR/2018/4337). To obtain a copy of the guideline, the spreadsheet containing the schema (in Table 2) and a shapefile template for PCR plans are available on the Queensland Government's website at www.qld.gov.au, using the search term "submission of spatial information'. The following sections provide information about the required fields and attributes for datasets.

Required files—Table 1

The applicant must submit shapefiles detailing the following:

- the location and maximum extent of disturbance footprint for the mine life
- the PMLU and NUMAs for the area within the resource tenure(s)
- the rehabilitation and improvement areas within the resource tenure(s)
- any sensitive receptors
- extent of a floodplain
- existing rehabilitation (if the PRC plan is for an existing EA)

A minimum of one (1) shapefile must be submitted for a PRC plan, detailing the above-listed information, as outlined within Table 1. Each file must be named in accordance with the requirements outlined within the department's guideline: Spatial Information Submission (ESR/2018/4337).

Where the PRC plan relates to a site where a NUMA or floodplain are not present, this should be stated in the spatial information submission email to which the relevant spatial files are attached.

Table 1: Shapefile checklist

File	Spatial information requirement	Schema	Example file name (e.g. using submission date of 30 June 2020)
1	PRC plan – polygon	Table 2	EPPR00372556_PRCP_PY_30062020

Where:

- PRCP = PRC plan
- PY = polygon (geometry)

Table 2: Schema for PRC plan

Field Name	Type	Length	Definition	Domain Values[4]	Domain Value Description	Mandatory/ Optional
FID	Object ID	N/A	The unique identifier for the spatial feature.			Mandatory
SHAPE	Geometry	N/A	Allowed Geometry: Polygon			Mandatory
PERMIT_REF	TEXT	50	The alpha-numeric environmental authority number relevant to the spatial information (if this PRC plan does not relate to an existing EA, please provide the relevant application number instead).			Mandatory
PROCESS	TEXT	4	The relevant process spatial data is being submitted for	PRCP	Progressive rehabilitation and closure plan	Mandatory
SITE_NAME	TEXT	254	Site name relating to the environmental authority.			Mandatory
SITE_ID	TEXT	20	This field contains a unique identifier for the spatial feature, which has been generated by the applicant.			Mandatory
FEATURE	TEXT	10	This field contains the land use feature on site which this polygon or point is describing. Select the relevant option of either post-mining land use, rehabilitation area, non-use management area, improvement area, maximum disturbance footprint, sensitive receptor, existing rehabilitation or floodplain using the codes specified.	PMLU	Post-mining land use	Mandatory
				REHAB_AREA	Rehabilitation area	Mandatory
				NUMA	Non-use management area	Mandatory if the PRCP schedule proposes or changes a non-use management area
				IMPRV_AREA	Improvement area	Mandatory if the PRCP schedule proposes or changes a non-use management area
				FOOTPRINT	Maximum disturbance footprint over mine life	Mandatory
				SR	Sensitive receptor	Mandatory

[4] If blank, populate based on Attribute type and definition.

Field Name	Type	Length	Definition	Domain Values[4]	Domain Value Description	Mandatory/ Optional
				EX_REH	Existing rehabilitation	Mandatory if the application is for an existing EA and there is existing rehabilitation undertaken
				FLDP	Floodplain	Mandatory if there is a floodplain located within the EA boundary
FEAT_DESC	TEXT	254	Feature description		This field provides a description of the feature identified in 'FEATURE'.	Mandatory
PMLU_TYPE	TEXT	10	This field provides a description of the post mining land use type.	GRAZ	Grazing	Mandatory for each PMLU.
				NAT_ECO	Native ecosystem	
				WTR_ST	Water storage	
				REC	Recreation	
				HB_ECS	Habitat and ecosystem services	
				AGRI	Agriculture	
				FOR	Forestry	
				CROP	Cropping	
				PERM_INFRA	Permanent infrastructure	
				IND	Industrial	
				LNDFL	Landfill	
				Oth	Other	
DATE_	DATE	dd/mm/ yyyyy	Date of submission. This field identifies the date the spatial information was submitted.			Mandatory
SOURCE	TEXT	5	This field identifies the source of the spatial information and the capture methodology for the spatial information provided.	DIG	Digitising (Tracing over Ortho Imagery)	Mandatory
				GPSD	GPS Differential Survey	

Field Name	Type	Length	Definition	Domain Values[4]	Domain Value Description	Mandatory/ Optional
				GPSND	GPS Non Differential Survey	
				RTK	Real-Time Kinematic (RTK) Survey	
				UK	Un Known	
AREA_HA	DOUBLE	N/A	This field indicates the area in Hectares. (Polygon only)			Mandatory if GEOMETRY = polygon.
COMMENTS	TEXT	254	A free text field has been provided to include any additional information the proponent wishes to provide in relation to the data.			Mandatory if PMLU_TYPE = Oth

Environmental Impact Statement Assessment Report under the *Environmental Protection Act 1994*

for the Elimatta Project
proposed by Taroom Coal Pty Ltd

Prepared by: Statewide Environmental Assessments, Department of Environment and Heritage Protection

If you need to access this document in a language other than English, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Library Services on +61 7 3170 5470.

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July 2014

Contents

1 Introduction

This report provides an evaluation of the environmental impact statement (EIS) process pursuant to Chapter 3 of the *Environmental Protection Act 1994* (EP Act) for the Elimatta Project (the project) proposed by Taroom Coal Proprietary Limited (Taroom Coal), a wholly owned subsidiary of Northern Energy Corporation Limited (NEC).

Taroom Coal is seeking approval to establish a green field open-cut thermal coal mine project, south-west of Taroom in Southern Queensland, within the Western Downs Regional Council area.

The EIS process was initiated by an application made by the Taroom Coal on 15 June 2009 for an Environmental Authority (EA) (Mining Activities) for a Non-code Compliant Level 1 mining project. On 26 June 2009 the former Department of Environment and Resource Management (DERM), now the Department of Environment and Heritage Protection (EHP) decided that the application would be assessed as a Non-code Compliant Level 1 mining project and an EIS would be required.

On 1 May 2008, the Commonwealth decided (EPBC Referral Number 2008/4130) that the proposed action was not a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

EHP as the administering authority has coordinated the EIS process for the project under the EP Act. This assessment report has been prepared pursuant to sections 58 and 59 of the EP Act. Section 58 of the EP Act lists the criteria that EHP must consider when preparing an EIS assessment report and section 59 states that the content of the report must:

- address the adequacy of the EIS in addressing the final terms of reference (TOR)
- address the adequacy of the environmental management plan (EM plan)
- make recommendations about the suitability of the project
- recommend any conditions on which any approval required for the project may be given
- contain another matter prescribed under a regulation.

This report summarises the key issues associated with the potentially adverse and beneficial environmental, economic and social impacts of the project. It discusses the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project. It notes those issues of particular concern that were either unresolved or require specific conditions in order for the project to proceed.

The giving of this report to Taroom Coal will complete the EIS process under the EP Act.

2 Project description

The project is for development of a greenfield open-cut coal mine producing up to 8.2 million tonnes per year (Mt/yr) run-of-mine (ROM) coal to produce 5Mt/yr of thermal coal for export.

Taroom Coal proposes to commence construction and mine development activities early in 2017 and would complete the construction stage of the project some 22-24 months later. Open cut-mining and coal processing are planned to commence in 2019, and would continue for approximately 32 years. The whole of project life including, construction through to decommissioning is estimated at 40 years.

The project is sited over three Mining Lease Applications (MLA) (MLA50254, MLA50270 and MLA50271) covering approximately 3975 hectares (ha). The main elements of the project would include:

- open-cut pit areas (MLA50254) over approximately 2287ha
- out-of-pit stockpiling of spoil over approximately 183ha
- a series of water storage dams over approximately 57ha
- two final voids would remain at the end of mine life covering approximately 380ha
- construction and operation of a coal handling and preparation plant (CHPP), rail load-out facility and associated mine infrastructure, including tailings storage facilities (TSF) and accommodation village over approximately 339ha (MLA50270)
- transport and services corridor for the transportation of ROM coal from the pit to the CHPP using trucks on a dedicated haul road (ML50271)
- development of a new 36 kilometre (km) ‘common user’ rail line and service corridor, to be known as the Western Surat Link (WSL) rail and services corridor, to connect the project to the planned Surat Basin Rail (SBR), north of Wandoan
- diversion of Horse Creek within MLA50254

- relocation of Perretts Road from within MLA50254 and a number of temporary public road closures, realignments and upgrades adjacent to the MLAs and the WSL rail and services corridor
- progressive rehabilitation during operations until final rehabilitation at the mine decommissioning stage.

The common user rail line and service corridor would be required for the transport of product coal to port facilities at Gladstone and for routing of power and water supply infrastructure to the mine. The EIS included two possible alignments for connection to MLA50270 at the western end of the WSL rail and services corridor, only one option is intended to be developed. The preferred option would be dependent on other potential rail users.

The total project area is approximately 4460ha which includes the MLA areas and the WSL rail and services corridor.

At full production the project would employ approximately 300 full-time staff.

2.1 Location

The project is located in the Surat Basin, approximately 45km south-west of Taroom and 380km north-west of Brisbane within the upper catchment of the Fitzroy Basin, approximately 45km upstream of the Dawson River and wholly within the Western Downs Regional Council (WDRC) local authority area.

2.2 Mine and rail infrastructure

The EIS considered a number of options to support mine infrastructure and concluded that the most feasible option would be to locate the mine infrastructure area (MIA), CHPP and accommodation village on MLA 50270 to minimise sterilisation of the identified coal resource. During the construction stage of the project temporary office buildings would also be located on the MIA.

Civil and earthworks would involve clearing vegetation for infrastructure construction including:

- the MIA (including CHPP and rail load-out facility) on MLA 50270
- the accommodation camp site on MLA 50270
- spoil dumps, Horse Creek diversion and pit areas on MLA 50254
- the TSF areas on MLA 50270
- road and infrastructure corridors on MLAs 50254, 50270 and 50271.

The EIS stated that earthworks associated with construction of the WSL rail and services corridor would initially include site set out and pegging, vegetation and land clearing, and ground improvement measures. This would then be followed by bulk earthworks which would require major cut and fill operations and the winning of suitable construction material for use in the railway embankment using dozers, scrapers and truck and shovel operations. The EIS also stated that Nathan Road and Leichhardt Highway crossings would require significant earthworks. The EIS provided indicative batter slopes (1V:3H) and associated earthwork volumes for the rail alignment design. Actual slopes and earthwork volumes are expected to vary based on the material encountered with cutting or materials being used within the embankment.

The infrastructure to support the mining operations would include:

- an administration office complex including training rooms, meeting rooms, crib facilities and bathhouse
- heavy mining machinery equipment workshop including maintenance bays, tyre bays, local stores area and offices
- drum store for storing drums and containers of specialty oils, hydrocarbons and flammable liquids
- emergency vehicle shed to garage emergency vehicles and store emergency equipment and supplies
- fire training area for fire training, located adjacent to raw/firewater storage tanks
- bus shelter including covered standing space and pathways
- fuel and oil facility for diesel, oil lubricants and coolants delivery and storage
- heavy and light vehicle wash facilities
- on-site accommodation facilities.

Fuel and oil facilities would include tanks for:

- 7 x 150,000L horizontal diesel fuel
- 1 x 35,000L hydraulic oil
- 1 x 35,000L engine oil

- 1 x 35,000L waste oil
- 1 x 20,000L transmission oil
- 1 x 15,000L gear oil
- 1 x 15,000L final drive oil
- 1 x 15,000L premixed coolant
- 1 x 10,000L waste coolant
- 2 x 150,000L vertical fuel storage tanks
- 2 x 25,000L oil storage tanks.

Refuelling, hardstand and wash bay area design would direct any contaminated surface water runoff to sumps for the recovery and treatment of waste materials.

The ROM coal would be transported from the pit area by dump trucks and either dumped directly into a 500 tonne (t) ROM hopper at the CHPP or stockpiled at 3 x 20,000t dumps. The EIS provided a detailed description of the CHPP and its operation. ROM coal would be processed at the CHPP located on MLA 50270 in the MIA. At full production, the CHPP would process up to 8.2Mt/yr of ROM coal whilst operating for 7,000 hours/yr to produce 5Mt/yr of thermal coal. Product coal from the CHPP would be conveyed to two separate product stockpiles with a 50,000-100,000t capacity. From the stockpiles ,coal would then be conveyed to a 250t train load-out bin. Product coal would be transported on 11,000t capacity trains, via the proposed rail connections, to the Wiggins Island Coal Export Terminal (WICET) at Gladstone for export.

2.3 Tenures and tenements

The EIS provided real property descriptions and cadastral boundaries of properties underlying the project (MLA50254, MLA50270 and MLA50271) and the WSL rail and services corridor. The EIS stated that that the project and associated infrastructure would potentially affect 33 land parcels, six regional council roads, two stock routes and one State road. The EIS stated that the majority of properties underlying the project site are freehold and three parcels are leasehold. A camping and water reserve on ML50254, held as a Reserve by Trustees (currently Minister for Natural Resources and Mines as the Minister responsible for administering the *Land Act 1994*), would be affected by the project.

The EIS stated that five petroleum tenements are adjacent to or underlie the project area. Provisions under the *Mineral Resources Act 1989* (MR Act) require that the ML applicant make reasonable attempts to consult with the petroleum tenement holders and enter into a coordination arrangement that would facilitate the coordinated future development of both coal and petroleum resources. The EIS stated that Taroom Coal has been negotiating a Co-Development Agreement and its attendant Coordination Arrangement protocol with the relevant petroleum tenement holders since mid-2009. However the EIS did not provide an update of the status of those negotiations. The MR Act coal seam gas provisions do not apply to the project transport corridor MLA 50271 as the MLA would be for transportation purpose under section 316 of the MR Act, subject to section 318AY of the MR Act.

The EIS stated that mining tenure over the MLA areas would be sought under provisions of the MR Act while tenure over, or acquisition of, the land required to develop the WSL rail and services corridor would be available via a number of options. The EIS stated that the options are:

- compulsorily acquire the land pursuant to the *State Development and Public Works Organisation Act 1971* (SDPWO Act), including by the approval of the corridor as a ‘private infrastructure facility’
- acquire the land under the *Transport Infrastructure Act 1994* (TI Act)
- obtain registered easements over the land.

The EIS also investigated options:

- private acquisition of the land
- mining tenure under the MR Act.

It concluded that these later options may prove difficult to implement.

The EIS did not identify a preferred tenure or acquisition of land option for pursuing to development of the WSL rail and services corridor.

2.4 Resource base and mine life

The EIS stated that the project mine plan was designed to extract all of the economically viable resource to the limits of the MLA50254 tenure boundary to the east and south-east over a planned operational mine life exceeding 32 years.

The EIS stated that coal resources were estimated in accordance with the Joint Ore Reserves Committee (JORC) Code and estimated the total *in-situ* coal resource was 259Mt. The depth of the coal varied from an estimated 161Mt at a depth of less than 50m, 95Mt between 50m and 100m depth and 4Mt at a depth greater than 100m but less than 150m.

The EIS stated that no known resources would be sterilised by the proposed mining activities.

The EIS proposed that mine operations would target the lowest strip ratio (approximately 20m of overburden) of coal in the initial years of the project, then move to other areas of increased strip ratio.

2.5 Mining methods and equipment

Vegetation clearing and stripping of up to 300mm of topsoil and subsoil would be undertaken before civil works. Topsoil and subsoil would be stockpiled and stored in separate stockpiles, shaped to reduce erosion, for later use in rehabilitation works.

The initial stage of installation of the MIA and accommodation village would be completed then earth moving equipment would excavate areas for the open-cut pit, spoil dumps, TSFs and internal transport corridors. Subsequent stages of the construction program would involve the development of remaining infrastructure including, the WSL rail and services corridor, water infrastructure, CHPP, accommodation village, roads and other associated infrastructure.

Mine operations would be continual (365 days per year and 24 hours per day) employing an estimated 300 people. All mining would be open-cut by drill and blast methods with a fleet of excavators and trucks to transfer waste rock to dumps and coal to the CHPP for processing along a dedicated haul road. Equipment would be diesel-powered earthmoving equipment including excavators, haul trucks, front end loaders, overburden drills, dozers, graders, water trucks, service trucks and light vehicles and buses.

Blasting would be conducted within relevant Queensland guidelines and the blasting procedures would be progressively refined as mining in the pits advanced.

The CHPP would process 8.2Mt/yr of ROM coal to produce an average 5Mt/yr of product coal. Overburden and interburden would be placed in both in-pit and out-of-pit spoil dumps. Processing through the CHPP would involve crushing, screening and washing to separate the coal from waste materials. Fine waste rejects would be partially dewatered, and when thickened pumped to dedicated TSFs for disposal. Recovered water would be recycled to the processing plant. Coarse rejects would be disposed in spoil dumps.

2.6 Creek diversion

The EIS stated that Horse Creek posed a significant surface constraint for mining activities in MLA 50254. Horse Creek is a tributary of the Dawson River and traverses the project from south to north. Horse Creek is defined as a ‘watercourse’ under the *Water Act 2000* and meanders centrally through MLA50254 and to the east of MLAs 50271 and 50270. Horse Creek has a significant catchment area including 539km^2 upstream of the mine, increasing to 746km^2 by the downstream boundary of the mine site. During a 1:50 year flood event Horse Creek breaks its banks and spills onto an approximately 1km wide flood plain.

The EIS stated that Horse Creek would have to be diverted around the mining operations to allow full exploitation of all coal resources. The EIS noted that the shallowest coal resource was underneath Horse Creek and that these resources would be targeted in the early stages. The EIS described the mining sequence and included a temporary and permanent diversion of Horse Creek. The mining sequence is described further in section 2.7 of this report.

The EIS stated that the diversion of Horse Creek would occur in four stages with the temporary diversions expected to be in place for less than three years and the final permanent diversion established within six years of mining commencing. The EIS stated that the final diversion would be constructed partly through placed spoil/fill and the overall plan would allow approximately 25–30 years for:

- monitoring the performance and stability of the diversion
- monitoring channel development
- making any necessary repairs to the diversion
- developing vegetation
- minimising of erosion and sediment runoff.

This is prior to the diversion being confirmed as a long-term stable landform before the end of mine operations.

The EIS stated the Horse Creek diversion functional design was undertaken in accordance with the DNRM Manual titled Works that interfere with water in a watercourse: watercourse diversions and considered the following outcomes as the basis for an EA approval:

- watercourse diversions incorporate natural features (including geomorphic and vegetation) present in the landscape and local watercourses
- watercourse diversions maintain the existing hydrologic characteristics of surface water and groundwater systems
- hydraulic characteristics of the watercourse diversion are comparable with other regional watercourses and are suitable for the region in which the diversion is located
- watercourse diversions maintain a sediment transport, and water quality regime that allows the diversion to be self-sustaining and not result in material or serious environmental harm to upstream and downstream reaches
- watercourse diversions and associated structures maintain stability and functionality and are appropriate for all substrate conditions they encounter.

The EIS summarised the comparison between the natural features of Horse Creek and the final creek diversion landform as follows:

- the diversion is shorter: Horse Creek valley length is approximately 9.52km long and stream length 11.45km, compared to the diversion valley length approximately 7.25km and stream length 8.15km
- the average grade of the diversion is steeper: Horse Creek average grade being replaced is 0.00114m/m, the diversion would be 0.00158m/m
- the diversion is straighter: Horse Creek stream sinuosity is approximately 1.2, the diversion sinuosity would be 1.12
- the diversion would have a narrower floodplain
- calculated flow characteristics of the diversion are higher than for Horse Creek for all flows due to the significantly steeper bed grade and narrower floodplain.

The EIS stated that the revegetation objectives and strategies for the temporary and permanent diversions were developed to meet the specific operational requirements for each stage of the diversion project. Further details regarding rehabilitation are discussed in section 4.22 of this report.

2.7 Mine sequencing

The EIS stated that the mine plan was designed to extract all of the economically viable coal resource with the limits of MLA50254, that mine sequencing was estimated for more than 32 years and that processing of stockpiles would continue beyond the estimated mine life.

The EIS stated that the mine schedule chose to mine the coal resources in the central part of ML50254 first based on their low strip ratio. The relatively shallow depth of first coal, under approximately 20m of overburden, would require only a short period of time to establish an initial box cut, working face and working room to mine the coal resource. The amount of mine equipment employed throughout the project would vary, including based on strip ratio and the number of active working sections.

The EIS stated that the mine plan would allow for mining of all coal to the MLA's south and east boundaries, subject to profitability and market conditions later in the mine life.

Initial out-of-pit spoil dumps would be located in a cleared zone to the north and a high strip ratio area to the southwest.

The EIS estimated that from initial operations it would take approximately 36 months to ramp up to the full processing rate of approximately 8.2Mt/yr of ROM coal.

The EIS presented staged plans showing the coal face positions and the sequence of operations for Years 1, 2, 3, 4, 5, 8, 10, 15, 20 and End of Mining. The plans showed the physical extent of excavations, location of stockpiles of topsoil and overburden, proposed progressive backfilling of excavations, water management infrastructure and the area disturbed at each major stage of the project. Infrastructure developments within MLA50270 and MLA50271 would be completely developed prior to the commencement of mining operations and are further discussed in section 2.2 of this report.

2.8 Waste management

2.8.1 Waste rock

The EIS stated that excavated waste rock (overburden and interburden material extracted to get to the coal) would be made up of sandstone, siltstone, claystone, and mudstone rock and it would be disposed of into:

- two out-of-pit dumps: one in the south-western corner and one in the northern section of the southern mining lease area (ML50254)

- the in-pit space behind the mining void, after the initial box-cut becomes available.

The out-of-pit spoil dumps would be constructed in 15m lifts to a maximum height of 50-70m above the natural ground level. Their walls would have a maximum final slope of 1V:6H and the new landform would cover approximately 183ha. The EIS stated that the outer slope geometry, adjacent drainage and proposed surface treatment would ensure adequate geotechnical stability and safe accessibility, while minimising the catchment and erosion potential of the slope.

According to the mine plan 1,152,535,104 bank cubic metre (bcm) (i.e. a cubic metre of rock or material *in situ* before it is excavated) of waste rock material would be excavated for the project. When excavated, the waste volume is expected to swell by a factor of 1.05–1.3. Due to that swelling effect, in-pit dumps would be elevated above the natural surface level to a maximum height of 40-50m. The in-pit waste rock dump final landform slope and lift height design parameters would be the same as those for out-of-pit dumps.

The EIS stated that waste rock, including overburden, interburden, floor and ceiling material, washery waste and coal would not likely be acid producing nor release significant salinity, metals or metalloids. It concluded therefore that special handling or management measures such as mine material segregation, selective placement and engineered covers for acid rock drainage (ARD) or neutral drainage control would not be required.

The EIS did note that overburden and interburden would be sodic and dispersive and be subject to surface crusting and high erosion rates if placed in the surface of spoil dumps or exposed directly to rainfall. Management measures proposed therefore included preferential placement of spoil material with sodic and dispersion potential away from dump surface areas. In particular, the EIS committed that stripped subsoil clay texture or heavier soils, or any dispersive soil, would not be mixed with topsoil for reuse and that dump surface materials or materials used in engineered structures (i.e. TSFs) would be treated with gypsum or lime if erosion could not be controlled.

On closure the two waste rock dump out-of-pit final landforms would project 50-70m above the natural ground surface and they would be designed to be water shedding, with rock lined drains directing surface flows to sediment dams to manage surface runoff

2.8.2 Tailings storage facility

The EIS stated that the tailings dams would be designed and constructed in accordance with the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland and would have sufficient capacity to store all the waste produced by the project.

The EIS stated that coarse rejects would be transported from the CHPP to the rejects stacking conveyor that would transport the material to a rejects bunker located on the ROM pad. Rejects discharged to the bunker would be taken by truck to the spoil dump for disposal. Fine rejects would be thickened then pumped along twin 1.8km pipelines to the TSFs for disposal. Tailings return water would be pumped to the industrial water dam for reuse.

The EIS stated that fine tailings from the CHPP would be initially deposited into two surface TSFs and from around year 10, once mining was completed within the northern void, the residual void would thereafter be used as a tailings dam to dispose fine rejects (Tailings Dam Pit (TDP)). The EIS noted that the disposal of tailings into the two surface TSFs would be cycled intermittently in lifts of approximately 1m to allow consolidation/drying of tailings, to improve their shear strength and lower the overall rate of fill of the TSFs. Supernatant water from surface TSFs would be recycled back to the CHPP.

The EIS stated that the two proposed TSFs would have capacities of 11.6 and 9.9 million m^3 which would include a final freeboard of 2m for temporary stormwater storage and future rehabilitation purposes. Together the TSFs would accommodate approximately 16 years of projected tailings production. The EIS stated that the surface TSF containment walls would be designed, constructed and supervised by a suitably qualified, experienced and Registered Geotechnical Engineer and built in a series of stages of variable height to a maximum of 16m above the natural ground level. The slope ratio of their wall surfaces would be 1V:3H for erosion and stability. The TSFs would be capped (slope ratio of 1V:100H) and their surface rehabilitated.

The proposed in-pit TDP has a modelled capacity of 38.3 million m^3 and once available would be used for tailings disposal until the end of mine life in year 32. At that time it would have a final landform level approximately 11m below ground level. The EIS stated that this would mean that the tailings would therefore be deposited into more porous weathered natural material which is estimated to be at about 25m below ground. The EIS concluded that the clay-rich nature of the pit walls would minimise tailings leachate seeping through the pit walls. The EIS proposes that on site clay would be a suitable liner for the surface TSFs.

The EIS described the risks associated with the TSFs as including rise in surrounding groundwater, potential seepage, decreased groundwater quality and geotechnical stability of bund walls. It proposed a groundwater monitoring program, including leakage detection system to manage potential hazards and risks. The EIS also stated that any release from surface TSFs that is unable to be contained within the ML boundary would flow into Horse Creek and impact on downstream environmental and social values.

2.8.3 General waste

The EIS adequately addressed the management of general and recycled waste generated by the project. The EIS noted that the preferred option was for general mine wastes that could not be recycled or reused to be removed from site by a licenced contractor and appropriately disposed of at suitably licenced landfill facilities. However, the EIS also stated that some general mine waste would be disposed of into the TSFs.

2.8.4 Regulated waste

The EIS adequately addressed the management of regulated waste generated by the project. All regulated waste generated by the project would be segregated, stored and managed in accordance with relevant legislation and then collected by an appropriately licensed contractor and either disposed of or recycled at a licensed waste management facilities.

2.8.5 Mine water management, supply and storage

The EIS adequately addressed the mine water management system including water usage, supply, storage, management and required approvals.

The EIS stated that approximately 800 Megalitres per year (ML/yr) of raw water would be required during the construction stage of the project, based on 200ML/yr for dust suppression, 500ML/yr for earthworks moisture adjustment, 80ML/yr for potable water and 20ML/yr for concrete mixing.

The EIS calculated the maximum water usage demands for the project would be 3,566 ML/yr in Year 20 including:

- 87ML/yr for potable water demands
- 2,300ML/yr for CHPP make up water demands
- 293ML/yr for dust suppression water demands (north water fill point)
- 886ML/yr for dust suppression water demands (south water fill point).

The EIS stated that the project's water supply would be sourced from connection to SunWater Limited's water distribution network; this would include a dedicated pipeline within the WSL rail and services corridor. The expected water supply would initially be treated groundwater from CSG dewatering operations and could later include a supply from Nathan Dam if that were completed. The EIS made no assessment of the reliability of any external water supply other than to state that details of sourcing the external water supply would be the responsibility of SunWater as the commercial water supplier.

The EIS stated that the externally supplied water would be pumped to a raw water dam within the MIA and it would be suitable for use in the CHPP and for dust suppression on the mine site. The external water supply is expected to have a total dissolved solids (TDS) in the order of 200mg/L and salinity (electrical conductivity (EC)) of 300µS/cm.

The EIS stated that the potable water demands would require on-site treatment of the raw water to meet appropriate standards for human consumption. A water filtration system was proposed rather than a reverse osmosis (RO) plant, however the EIS did not provide detail of the design of the plant nor any associated waste streams.

The EIS stated that it was not feasible to provide a water supply option for the mine site which is 100% reliable for all water usage demands, under all possible climate conditions. The EIS concluded that that the required sizes of the raw water dams required to achieve 100% reliability for all water usage demands, under all possible climate conditions, would be too expensive. Consequently, to manage this shortfall the EIS water management strategy was to ensure that the potable and CHPP water demands were provided with 100% reliability, but that the water supply would not be available for dust suppression in some scenarios. For example the EIS stated that for some points on the mine dust suppression water would be inadequate for between 23-200 days per year. It was not clarified what this lack of water meant for air emission management.

The EIS water management strategy described management measures to minimise the potential impact on downstream watercourses and environmental values.

2.8.6 Sewage treatment

The EIS stated that a minimum of a 50 equivalent person capacity sewage treatment plant (STP) would be required to treat the project's effluent from the proposed accommodation village, MIA and CHPP. The EIS provided sufficient information on the STP design for the purpose of the EIS assessment. The STP would be designed to achieve Class A effluent quality and consist of a permanent module with capacity of 135kL/day and a temporary module with capacity of 50kL/day during the construction phase of the project. The treatment plant is anticipated to produce approximately 240L/capita/day during peak operation. Temporary storage facilities for effluent, such as portaloos, would be required at major construction site and WSL rail and services corridor construction site camps.

These would be scheduled to be replaced every 2–3 days for disposal at an authorised off-site sewage treatment plant.

The EIS stated that the treated effluent would be monitored for pH, BOD, TSS, N, P, faecal coliforms and E-coli prior to being irrigated via low height sprays at a 133m^2 designated effluent irrigation area. An effluent disposal system would be implemented to ensure that spray drift does not occur to any sensitive or commercial place and no surface runoff from the effluent disposal area takes place. The area would be fenced-off, sign-posted, and would exclude entry of unauthorised persons or livestock.

2.9 Rehabilitation and decommissioning

Rehabilitation of disturbed areas would be carried out progressively throughout the life of the project. The stated objective of the rehabilitation strategy is to return areas affected by mining activities to a stable, non-eroding, and safe condition with biologically sustainable ecosystems, requiring minimum long-term management. The EIS proposed that post-mining land use should be reinstated to the previous pre-mining land use on mine site (i.e. low intensity grazing) except for residual voids where lower land value is expected at the end of mine life. A mine closure plan was not developed as part of the EIS. The EIS included a commitment to develop a mine closure plan that included the specifics of rehabilitation and decommissioning. However this would be provided during the operational stage of the project.

2.9.1 Final voids

The EIS identified that, at mine closure, at least two final voids of approximately 230ha and 150ha would remain in the south-eastern and south-western parts of MLA 50254. The EIS stated that, in addition, depending on the volume of tailings placed in the in-pit TSF, there could be a third final void. The EIS stated that final voids would only have direct rainfall inputs which would accumulate in the void with groundwater. Surface water would be prevented from entering the voids by installation of interceptor drainage channels and drains directing surface water flows away. As part of the final creek diversion, levees would be constructed along the eastern side, southern side, and part of the western side of the south-western mining void. The EIS stated that the levees would be built from competent material, including rock armouring, to provide hard erosion protection until vegetation could provide adequate stabilisation protection; this was stated as sufficient to prevent inundation of the void by flood water from up to a probable maximum flood (PMF) event.

The EIS noted the risk of large volumes of surface water leaking from the diverted Horse Creek channel through the placed mining spoil and then into the final voids. The south-western final would be located approximately 700m from the diverted Horse Creek channel and the eastern void approximately 3500m. Consequently, the EIS noted that the diversion channel would be designed and constructed to minimise the potential for leakage into the underlying spoil material. This would require the selection of competent bedding material which is relatively impermeable for the diversion channel bed and suitable construction techniques applied to achieve reliable compaction of that bedding material to minimise any potential leakage.

The EIS estimated that water levels in the final voids would not stabilise for about 750 years post mining.

The EIS stated that safety bund walls would be constructed around each final void from suitable rock or the voids would otherwise be fenced, depending on final landform, to limit access to people, wildlife and livestock. The safety bund would be constructed in accordance with the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, including with a minimum height of 2m and be located at least 10m beyond the area potentially affected by any instability of the pit edge. Clearly the final voids would result in a lower land use value than existed prior to mining.

The EIS did not adequately discuss the expected long-term water quality of the final voids, however did provide an estimate of the predicted water level below the final formed landform ground level, the time period required for the water level in the voids to reach equilibrium and how this compares to the pre-mining groundwater level. The EM plan would be required to be updated to include further information on water quality characteristics (e.g. modelled end-of-mine TDS) for the residual voids.

2.10 Transport

The project is centrally located between the Leichhardt Highway and the Roma-Taroom Road. Access to the mine site from these major transport corridors is via a network of local roads. The existing State and local road network is used for a variety of purposes including general traffic for private and commercial purposes and movement of agricultural and farm equipment and stock.

During the project’s projected 24 month construction period, heavy road transport vehicles would transport sand, gravel and crushed rock from local quarries to the project site along with bitumen, cement, pre-cast concrete structures, pre-fabricated buildings, structural steel and reinforcing and oversized specialised and miscellaneous items. The EIS estimated approximately 26,344 truckloads of plant and bulk material would be transported to the project site from Brisbane, Gladstone and from within the local area.

During operations road transport would be required to move materials such as diesel fuel, explosives, mine products, supplies and mine workers to and from the site.

Transport infrastructure used during the operation stage of the project would include:

- the local rood network managed by WDRC including Nathan, Booral, Grosmont, Perretts, Kabunga, Goldens, Ryals and Bundi Roads
- State Controlled Road (SCR) Network managed by the Department of Transport and Main Roads (DTMR) including Roma-Taroom and Jackson-Wandoan Roads, Leichhardt, Warrego and Burnett Highways
- rail networks including the proposed West Surat Link (WSL) and Surat Basin Rail Project, and Aurizon Central Queensland Coal Network Moura System and Aldoga Connection
- airports including at Taroom, Maryborough and Hervey Bay
- port facilities including the WICET at Gladstone.

For the project to be fully developed, it would require temporary road closures, new sections of road, road-rail interfaces and road relocations within and adjacent to the MLA's and along the WSL rail and services corridor.

The mine service road network would be constructed during the construction stage to form heavy vehicle ROM coal haul roads and light vehicle mine service roads.

The EIS stated that Perretts Road is a significant surface constraint to mining and that design and construction approval from the DTMR and WDRC would be required for the public road relocations and closures to proceed.

Construction of the WSL rail and services corridor would require alteration of the existing road network, including one crossing on the Leichhardt Highway and five crossings at Nathan, Booral, Grosmont, Kabunga and Perretts Roads. Detailed crossing locations were not provided in the EIS as they would be subject to further rail alignment development and approvals from the DTMR and WDRC.

The EIS noted that construction of the WSL rail and services corridor would require alteration of an existing travelling stock route crossing (AAP14857) and 17 private landholder and public crossings. Commitments in the EIS included that crossings would be designed to allow for vehicles, oversized farm machinery and stock movement via either underpasses or bridges at rail line level. Clearances for rail over road crossings would allow for oversized vehicles such as those used for loading houses and mine equipment.

All final upgrades would be designed in accordance with DTMR and WDRC guidelines and requirements. The EIS committed to providing the necessary information to DTMR and WDRC in the detailed design stage of the project.

The EIS estimated that during operations an average of four train movements would be required each day, two trains to WICET at Gladstone and two back to the mine. The EIS anticipated that third parties would also use the WSL rail and services corridor to transport their coal to port. The EIS committed to minimise coal dust emissions from rail wagons by profiling the surface and sealing it with a polymer coating at the rail load-out facility.

2.11 Energy

The EIS stated that during the early construction phase, the project's on-site power needs (MIA, accommodation village and STP) would be provided by mobile diesel generators. The EIS estimated that approximately 759 MegaWatt hours (MWh) per month would be needed at that time. Mobile generators would be subsequently replaced with a permanent grid connection to either the Wandoan or Wandoan South substations.

At full production, during the operational phase, electrical power demand for the accommodation village, CHPP, MIA, water management system and train load-out facility was estimated at 17,000MWh per year.

The permanent power supply to the project would be via a 66 kilovolt (kV) high voltage connection. The EIS stated that the Wandoan South substation is the preferred option based on initial advice from Ergon Energy and that some mobile generator units would remain on-site as back-up for emergency use.

The approvals, regulation and potential impacts of the permanent connection to the mine site were discussed in the EIS.

2.12 Workforce and accommodation

The project would employ a peak construction and commissioning workforce of approximately 500 employees. It would then scale down to an operational workforce of approximately 300 full-time staff at full production, with the potential for additional employees during major operations and special tasks. The construction period shift rotation proposed is a 10 days on, 4 days off, 10 hour shift roster with the bulk of works taking place during daylight hours. The operational workforce would work a shift rotation of two 12 hour shifts per day, rotating seven days on then seven days off all year round.

The EIS stated that the project's employment strategy was developed on a Fly-In Fly-Out (FIFO) basis and that 95% of the workforce would be sourced and transported on chartered flights to Taroom airport, or an alternative unspecified transport hub, from the Fraser Coast Region and from there bussed-in bussed-out (BIBO) to the mine site. The EIS stated that the 5% of the workforce would be sourced from within the local and wider Wandoan-Taroom WDRC region. These workers would likely travel daily in private vehicles to the mine site, from local towns within an approximate 1 hour drive of the project area.

The accommodation village for the project would be located on the northern MLA50270 approximately 1.7km north of the MIA and CHPP. The village would initially service the construction workforce for a 22-24 month period before being converted to a full operational village. The majority of the construction workforce would be accommodated in the initial 300 bed village, increasing during the project life to accommodate workforce increases, and mine maintenance operations such as CHPP shut down. The village would be constructed using mostly relocatable buildings that would be manufactured offsite.

The EIS stated that no overnight accommodation facilities would be required during the construction of the WSL rail and services corridor. The WSL rail and services corridor construction workforce would be located within the mine accommodation village and BIBO to the construction camp or alternatively accommodated at third party owned and operated accommodation facilities in the Wandoan and Taroom area.

3 The EIS process

3.1 Timeline of the EIS process

On 31 March 2008 the project was referred to the Australia Government to determine whether the proposed action would need assessment and approval under the Commonwealth EPBC Act. On 1 May 2008, the Commonwealth decided (EPBC 2008/4130) that the proposed action was not a controlled action under the EPBC Act.

On 15 June 2009 Taroom Coal applied to the (then) DERM, now the EHP for an EA (Mining Activities) for a Non-code Compliant Level 1 mining project. On 26 June 2009 EHP decided that the application would be assessed as a Non-code Compliant Level 1 mining project and an EIS would be required. Taroom Coal was advised on 29 June 2009 to submit a draft TOR which would commence the EIS process. Consequently, this EIS assessment process is covered under the transitional arrangements under the *Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012*.

On 30 September 2009 EHP received a copy of the draft TOR, an updated Initial Advice Statement (IAS) dated September 2009 and list of interested and affected persons. EHP prepared the draft TOR notice under section 42(1) for public notification on 24 October 2009. On 22 October 2009 Taroom Coal formally requested a withdrawal of the draft TOR, stating that the withdrawal was due to an unforseen change in the timing of a mining lease application for the project.

On 29 October 2009 EHP received a resubmitted draft TOR, IAS and list of interested and affected persons which recommenced the EIS process. On 18 November 2009 EHP notified Taroom Coal of it's decision to publish the draft TOR in: The Brisbane Courier-Mail and Toowoomba Chronicle on Saturday 21 November 2009; and the Chinchilla News and Murilla Advertiser on Thursday 26 November 2009. Copies of the draft TOR were circulated to all advisory bodies. The comment period for the draft TOR was from Monday 23 November 2009 until close of business on Tuesday 19 January 2010.

EHP received comments on the draft TOR from six advisory bodies and stakeholders during the comment period and three other comments after the comment period. All comments, including one from EHP, were forwarded to Taroom Coal on 3 February 2010. On 22 February 2010 Taroom Coal requested, and EHP agreed to, a longer period to respond to comments received on the draft TOR. Taroom Coal responded to the comments on 24 March 2010 and EHP published the final TOR on 23 April 2010, taking into account all comments and Taroom Coal's response to those comments.

On 16 April 2012 Taroom Coal submitted an EIS for EHP's review and decision under section 49(1) of the EP Act whether to allow the EIS to proceed to the notification stage. On initial review EHP advised Taroom Coal that critical elements were missing from the EIS. Consequently, on 14 May 2010 Taroom Coal requested that EHP extend its decision period by eight months before considering the EIS and deciding whether to allow it to proceed. At that time Taroom Coal also sought a longer period of eight months for its submission of the EIS under section 47(1)(b) of the EP Act. On 15 May 2012 EHP decided to extend the period under section 49(1) of the EP Act until 16 January 2013 on the condition that Taroom Coal makes its amendments to the EIS by 4 December 2012. EHP's reason for the extension was to allow time for:

- Taroom Coal to amend the EIS to adequately address the final TOR, in particular by providing additional information about the WSL rail and services corridor
- EHP to consider the amended EIS and to make a decision on whether the EIS may proceed under section 49(1) of the EP Act.

An initially incomplete revised EIS was submitted to EHP for review on 29 November 2012 and the complete revised EIS was provided to EHP on 30 November 2012. On 7 January 2013 EHP decided that the submitted EIS with the required updates could proceed to public notification and that the submission period would be from 8 February 2012 to 21 March 2012. Taroom Coal published the EIS notice in The Brisbane Courier-Mail on 2 February 2012 and the Chinchilla News on 7 February 2012. On 8 February 2012 the EHP website noted the start of the submission period for the EIS.

On 15 February 2013 EHP received an incomplete statutory declaration from Taroom Coal for the purposes of section 53 of the EP Act. That declaration did not include the addresses of each interested and affected person to whom the EIS notice was given, nor the date the EIS notice was provided to them. On 19 February 2013 Taroom Coal resubmitted another statutory declaration which included the address of, and the date the EIS notice was provided to each interested and affected person.

Twenty eight submissions on the EIS were received by EHP, including four that, despite being received outside the comment period, were accepted as properly made submissions. EHP provided those and its own submission to Taroom Coal on 5 April 2013 and advised Taroom Coal that it's response to all submissions and relevant amendments to the EIS was due on or before 6 May 2013.

Submitters included 18 State government departments and agencies, the Banana Shire Council, Western Downs Region Council, Skills Queensland, The Fitzroy Basin Association Inc., Wildlife Preservation Society of Queensland, Powerlink Queensland, Ergon Energy, Aurizon, Xstrata Coal Queensland Pty Ltd and a landholder.

On 2 May 2013 Taroom Coal sought an extension of time within which to make the response to submissions. On 6 May 2013 Taroom Coal was granted until 28 April 2014 within which to submit the response to submissions and an amended or replaced EIS.

On 28 April 2014 Taroom Coal submitted an amended EIS responding to submissions and an EIS amendment notice as required under section 66 of the EP Act.

On 26 May 2012, under section 56A of the EP Act, EHP decided that the submitted EIS could proceed to the assessment report phase. A notice of that decision was given to Taroom Coal on 10 June 2012.

This assessment report is the final action and giving it to Taroom Coalcompletes the EIS process.

3.2 Approvals

Table 1 - Project approvals

Approval	Legislation (Administering Authority)
Environmental Protection Regulation 2008, activities that would otherwise be ERAs <u>Schedule 2</u> Chemical storage (ERA 8), Fuel burning (ERA 15), Extractive and screening activities (ERA 16), Mineral processing (ERA 31), Crushing, milling, grinding or screening (ERA 33), Bulk material handling (ERA 50), Regulated waste storage (ERA 56), Waste disposal (ERA 60), Sewage treatment (ERA 63) <u>Schedule 2A</u> Mining black coal Offset management plan	*Environmental Protection Act 1994* (Department of Environment and Heritage Protection)
Permit for clearing remnant vegetation. WSL rail	*Vegetation Management Act 1999* (Department of

Approval	Legislation (Administering Authority)
and services corridor	Natural Resources and Mines)
The project requires leases to be approved for mining lease application 50254, 50270 and 50271	*Mineral Resources Act 1989* (Department of Natural Resource and Mines)
Strategic cropping land approval – trigger mapping identified that ML has potential SCL – Validation application identified the land is within a Management Area	*Regional Planning Interests Act 2013* (RPI Act) (commenced on 13 June 2014) (Department of State Development, Infrastructure and Planning / Department of Natural Resource and Mines) Section 96 of the RPI Act repeals the *Strategic Cropping Land Act 2011*(SCL Act).There are transitional provisions in the RPI Act for the repealed SCL Act: • transitional provisions begin at section 97 (definitions) • section 98 - validation applications not yet decided will, at the commencement of the RPI Act, continue to be dealt with and decided on under the SCL Act.
Water licences (taking or interfering with water, other than diversion of a defined watercourse)	*Water Act 2000* (Department of Natural Resource and Mines) Section 20 of the *Water Act 2000* states under General authorisations: (4) A person may interfere with water if - (a) the interference is a diversion of a watercourse and is associated with a resource activity; and (b) the impacts of the interference were assessed as part of a grant of an environmental authority for the resource activity; and (c) the environmental authority was granted with a condition about the diversion of the watercourse. (5) In this section - resource activity see the *Environmental Protection Act 1994*, section 107.
Interfere with forest products or quarry material – WSL rail and services corridor	*Forestry Act 1959* (Department of Agriculture, Fisheries and Forestry)
Infrastructure on unallocated State Land or reserves - Reserve for traveling stock includes: camping and water reserve, pasture reserve and trucking reserve	*Land Act 1994* (Department of Natural Resources and Mines)
Road diversion/infrastructure approvals	*Transport Infrastructure Act 1994* (Department of Transport and Mains Roads) *Local Government Act 2013* (Western Downs Regional Council)

Approval	Legislation (Administering Authority)
Camping reserve (on MLA) and stock route crossings on WSL rail and services corridor	*Land Protection (Pest and Stock Route Management) Act 2002* (Department of Agriculture Fisheries and Forestry)
Permits for the clearing of protected plants, to take wildlife and damage mitigation permit	*Nature Conservation Act 1992* (Department of Environment and Heritage)
Road diversions and development of the WSL rail and services corridor	*Transport Infrastructure Act 1994* (Department of Transport and Main Roads)
Use, possession, storage, transportation of explosives	*Explosives Act 1999* (Department of Natural Resources and Mines)
Operational works approval for the construction or raising of a waterway barrier works outside the MLA. Other assessable development for which a development application is required for the WSL rail and services corridor	*Sustainable Planning Act 2009* (Department of State Development, Infrastructure and Planning) *Fisheries Act 1994 (*Department of Agriculture Fisheries and Forestry)
WSL rail and services corridor tenure or land acquisition options: a. compulsorily acquire the land pursuant to the *State Development and Public Works Organisation Act 1971*, including by the approval of the corridor as obtaining a declaration of ‘private infrastructure facility’ b. acquire the land under *the Transport Infrastructure Act 1994* c. obtain registered easements over the land. d. private acquisition of the land e. mining tenure under the *Mineral Resources Act 1989*	*State Development and Public Works Organisation Act 1971* *Transport Infrastructure Act 1994* *Mineral Resources Act 1989*

Note: *Table 1 does not necessarily list all possible legislative approvals that may be required.*

3.2.1 Mineral Resources Act 1989

An exploration permit issued under chapter 4 of the *Mineral Resources Act 1989*, allows the holder to undertake exploration activities on the permit land. Exploration permits act also as a prerequisite for acquiring higher forms of tenure. Taroom Coal holds mining lease applications (MLA) over the proposed mine area, namely for mining lease application 50254, 50270 and 50271. To implement the project these applications would require approval.

3.2.2 Environmental Protection Act 1994

The conduct of proposed project activities within the MLA would require an EA under chapter 5 of the EP Act. This approval would cover mining and the activities listed as environmentally relevant activities (ERA) under schedules 2 and 2A of the Environmental Protection Regulation 2008 (EP Reg) that are directly associated with, or facilitate or support, the mining activities. Relevant ERAs for the project include: Mining black coal; Chemical storage (ERA 8); Fuel burning (ERA 15); Extractive and screening activities (ERA 16); Mineral processing (ERA 31); Crushing, milling, grinding or screening (ERA 33); Bulk material handling (ERA 50); Regulated waste storage (ERA 56); Waste disposal (ERA 60); and Sewage treatment (ERA 63).

The EIS identified and listed the following notifiable activities under Schedule 3 of the EP Act that would apply to the project:

- Notifiable Activity 24, Mine wastes
    - (a) storing hazardous mine or exploration wastes, including, for example, tailings dams, overburden or waste rock dumps containing hazardous contaminants; or
    - (b) exploring for, or mining or processing, minerals in a way that exposes faces, or releases groundwater, containing hazardous contaminants.

The EIS also identified that Notifiable Activity 22, Livestock dip or spray race operations - operating a livestock dip or spray race facility has occurred on Lot 38 on AB188 and that contaminated soil was identified. The land was subsequently listed on Environmental Management Register (EMR) on 28 August 2012. The EM plan should be updated to ensure the identified contaminated land is clearly delineated, contamination remediated and/or management strategies proposed to ensure the risks to human health and the environment with regard to contaminated land matters are adequately managed during construction and operational phases of the project.

The project would be required to provide notification to the EMR for all notifiable activities and the identified notifiable activities should be clearly identified and listed in the EM plan. Any notifiable activity, as defined under Schedule 3 of the EP Act would be a relevant mining activity if it is directly associated with, or supports or facilitates, the mining or processing of coal on the project's tenures. For potential contaminated land on-site (e.g. landfill), Taroom Coal is required to address the following:

- any disturbance or work associated with contaminated land (including hazardous contaminants and notifiable activities) should be undertaken in consultation with a suitably qualified person in accordance with section 564 of the EP Act and management should be in accordance with provisions under part 8 Contaminated Land of the EP Act
- should Taroom Coal become aware of any contaminant present on-site, they have an obligation under section 371 of the EP Act to notify EHP as the administering authority
- the administering authority should be advised of any notifiable activity occurring on the MLA
- if it is confirmed that land has been contaminated, regardless of whether or not a notifiable activity is occurring, EHP should be advised in accordance with section 371 of the EP Act.

At the time of the preparation of the EIS a water licence to interfere under the *Water Act 2000* was required for the diversion of Horse Creek. However this authorisation is currently being transitioned to the EP Act. The assessment of the diversion has been undertaken on the basis that this change would be in place by the time the draft EA is notified.

3.2.3 Water Act 2000

The *Water Act 2000* provides for the sustainable management of water and other resources and the establishment and operation of water authorities. The act enables the granting of various water licences and permits.

The EIS stated that Taroom Coal is not seeking a water allocation from the Fitzroy Basin under the Water Resource (Fitzroy Basin) Plan 2011 rather it is seeking to source its external water supply through an agreement with SunWater. The EIS stated that ownership of the water entitlement and the associated rights to supply would remain with SunWater.

However, a water licence under the *Water Act 2000* would be required to take or interfere with groundwater for pit dewatering purposes for the project.

The EIS stated that Raw Water Dams RW2, RW3 and RW4 would take overland flow as they are required to prevent runoff from overflowing into the operating pits. The EIS stated that they would have a design capacity of no more than 50ML and they would therefore not trigger the taking of overland flow criteria in the Water Resource (Fitzroy Basin) Plan 2011.

3.2.4 Aboriginal Cultural Heritage Act 2003

A cultural heritage management plan (CHMP) would be required under the *Aboriginal Cultural Heritage Act 2003* (ACH Act) prior to approvals being issued for the project. The EIS stated that a CHMP between Taroom Coal and the Traditional Owners, the Iman #2 People was approved under Part 7 of the ACH Act on 13 February 2014, and that details of the plan are included on the Cultural Heritage Register maintained by the Cultural Heritage Unit of the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA). The EIS stated that, in accordance with the CHMP, Taroom Coal intends to engage the Iman #2 People to conduct cultural heritage surveys over the project site and infrastructure areas ahead of any disturbance. Taroom Coal commited to manage any potential impact to Indigenous cultural heritage values in accordance with the CHMP.

3.2.5 Nature Conservation Act 1992

Taroom Coal would need to comply with the *Nature Conservation Act 1992* (NC Act), particularly in regard to obtaining the following approvals for the project:

- where there is a requirement for the clearing of plants protected under the NC Act, clearing of protected plants must only occur in accordance with an exemption under the NC Act.
- where activities may cause disturbance to animal breeding places, Taroom Coal must prepare a species management program and obtain approval from EHP.
- a spotter catcher employed by the project must be in possession of a rehabilitation permit (spotter catcher endorsement) for managing fauna during clearing activities
- if it is necessary to remove animals posing a threat to human health or property, a damage mitigation permit would be required.

3.2.6 Queensland Heritage Act 1992

The EIS stated that a Non-Indigenous Cultural Heritage Assessment was undertaken to identify and assess the nature and significance of cultural heritage within the project area. From a Non-Indigenous cultural heritage perspective surveys of the project site found low levels of local European cultural heritage significance, representing the cattle industry, transport and communication, closer settlement patterns dating from the 1950s and the mixed cultivation industry. In accordance with the *Queensland Heritage Act 1992*, Taroom Coal would need to notify EHP if an archaeological artefact is discovered and provide information on the location and description of the discovery. A Historical Heritage Management Plan (HHMP) was provided in the EIS and included procedures for reporting discoveries of artefacts and burials and recommendations for handling impacted heritage values potentially impacted by the project.

3.2.7 Transport Infrastructure Act 1994

To ensure compliance with the *Transport Infrastructure Act 1994* and *Transport Operations (Road Use Management) Act 1995* Taroom Coal would need to consult with the DTMR on all matters concerning:

- road impacts assessments
- road-use management plans
- investigation of potential road safety hot spots.

Taroom Coal would need to apply for permits for over-dimension loads and road corridor permits. Section 4.15 of this assessment report provides further information on transport related approvals.

3.3 Consultation program

3.3.1 Public consultation

Taroom Coal undertook the statutory requirements for advertising the TOR, EIS and notices to interested and affected parties. The EIS carried out a social impact assessment (SIA) to collect and analyse information about key social and cultural issues, population change and communities and social relationships that are likely to occur as a direct or indirect result of the project. Information collected for the SIA was through a desktop review and direct consultation and engagement with individuals, affected and interested persons, key community leaders, organisations, stakeholders and local and State government representatives by:

- organising and conducting face-to-face meetings and information sessions
- preparing and distributing a postal questionnaire to affected and interested community members to identify priority community issues that may affect the project
- producing a questions and answers document in response to feedback to ensure consistency when communicating with stakeholders
- producing an information package, including mailing a fact sheet to affected landholders and stakeholders
- presenting to gatherings of stakeholders and other interested groups
- facilitating Landholder Agreements.

Taroom Coal organised face-to-face meetings with affected landholders and key community members in December 2011 and further community information sessions were held in Wandoan and Taroom in February 2012.

During the public submission period of the EIS, Taroom Coal conducted briefings on the project for State government advisory agencies in Brisbane, Toowoomba and Rockhampton in late February and early March 2013. A regional advisory body briefing session and site visit were scheduled for 5 March 2013 but were cancelled due to poor weather.

The EIS listed the stakeholders, engagements completed including stakeholders, landholders and number of community members consulted and the resources applied. The EIS stated that the issues raised were then responded to in follow up sessions and regular newsletter circulated locally and to interested persons. A summary of stakeholders key issues raised during the pre EIS consultation program was provided in the EIS. The issues included, dust, clearing, rehabilitation, traffic, noise, water, light, blasting, cultural heritage, employment, training and community and economic impacts. Those issues were also subsequently discussed in the relevant sections of the EIS.

3.3.2 Advisory bodies

EHP invited a range of organisations to assist in its assessment of the TOR and EIS by participating as members of the EIS advisory body including (original names per 2009):

- Department of Communities
- Department of Infrastructure and Planning
- Department of Employment, Economic Development and Innovation
- Department of Transport and Main Roads
- Department of Education and Training
- Department of Emergency Services
- Department of Public Works
- Department of Tourism, Regional Development and Training
- Queensland Health
- Queensland Police Service
- Queensland Treasury
- QR National
- Skills Queensland
- Western Downs Regional Council
- Ergon Energy
- Powerlink Queensland
- Fitzroy Basin Association Inc.
- Wildlife Preservation Society Queensland Inc.
- Construction, Forestry, Mining & Energy Union

State Government changes

During the EIS process, a significant number of those parties were restructured and or changed names and in accordance with the Public Service Departmental Arrangements Notice (No.1) 2012, the changes noted in Table 1 became effective on 3 April 2012 to the Queensland Government Departments referred to in this report.

Table 1 Changes to Queensland Government Departments

New Department (as of 3 April 2012)	Previous Department(s) / Amalgamations
Department of State Development, Infrastructure and Planning	Department of Employment, Economic Development and Innovation
Queensland Treasury and Trade	Queensland Treasury / Department of Employment, Economic Development and Innovation
Department of Science, Information Technology, Innovation and the Arts	Department of Employment, Economic Development and Innovation / Department of Housing and Public Works / Department of Environment and Resource Management
Department of Natural Resources and Mines	Department of Employment, Economic Development and Innovation / Department of Environment and Resource Management
Department of Agriculture, Fisheries and Forestry	Department of Employment, Economic Development and Innovation / Department of Environment and Resource Management
Department of Environment and Heritage Protection	Department of Environment and Resource

	Management
Department of National Parks, Recreation, Sport and Racing	Department of Environment and Resource Management
Department of Aboriginal and Torres Strait Islander and Multicultural Affairs	Department of Environment and Resource Management
Department of Education, Training and Employment	Department of Education and Training
Department of Housing and Public Works	Department of Communities
Department of Communities, Child Safety and Disability Services	Department of Communities

3.3.3 Public notification

In accordance with the statutory requirements, public notices of the draft TOR and EIS and public comment periods were published in the Brisbane Courier Mail, Toowoomba Chronicle, Chinchilla News, Murilla Advertiser and on EHP's website.

The draft TOR and EIS were placed on public display at the following locations during their respective public comment and submission periods:

- EHP website (draft TOR only)
- EHP, Customer Service Centre, 400 George Street, Brisbane
- EHP, 173 Hume Street, Toowoomba
- Wandoan Library, 6 Henderson Road, Wandoan
- Dalby Library, 107 Drayton Street, Dalby
- New Hope Corporation Office, 3/22 Magnolia Drive, Brookwater.

3.4 Matters considered in the EIS assessment report

Section 58 of the EP Act requires that an EIS assessment report consider the following matters:

- the final TOR for the EIS
- the submitted EIS (including Taroom Coal's response to submissions and replacement of the original EIS and EM plan dated April 2014)
- all properly made submissions and any other submissions accepted by the chief executive
- the standard criteria
- another matter prescribed under a regulation.

These matters are addressed in the following subsections.

3.4.1 The final TOR

The final TOR published on 23 April 2010 were considered when preparing this EIS assessment report. Although compiled to include all the likely significant issues the TOR stated that if other significant matters arose during the preparation of the EIS then such issues should be fully included in the EIS. All such matters have been considered in the EIS assessment report.

In deciding to allow the EIS to proceed to the preparation of an assessment report, EHP was required to consider the submitted EIS documents and determine if the information provided in this documentation adequately met the requirements of the TOR.

3.4.2 The submitted EIS

The submitted EIS was considered when preparing this report, it comprised:

- the EIS dated November 2012 that was made available for public submissions on 8 February 2013
- properly made submissions

- the response to submissions and the replaced EIS dated April 2014 including a draft EM plan that were received by EHP on 28 April 2014.

3.4.3 Properly made submissions

EHP accepted 27 submissions on the EIS from the following organisations:

- Aurizon
- Banana Shire Council
- Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
- Department of Agriculture, Fisheries and Forestry
- Department of Communities, Child Safety and Disability Services
- Department of Community Safety
- Department of Energy and Water Supply
- Department of Education, Training and Employment (Infrastructure Strategy)
- Department of Education, Training and Employment (Skills and Employment)
- Department of Local Government, Community Recovery and Resilience
- Department of Housing and Public Works
- Department of National Parks, Recreation, Sport and Racing
- Department of Natural Resources and Mines
- Department of State Development, Infrastructure and Planning
- Department of Tourism, Major Events, Small Business and the Commonwealth Games
- Department of Transport and Main Roads
- Ergon Energy
- Fitzroy Basin Association
- Office of the Coordinator-General
- Powerlink Queensland
- Queensland Health
- Queensland Police Service
- Queensland Treasury and Trade.
- Skills Queensland
- Western Downs Regional Council
- Wildlife Preservation Society of Queensland, Upper Dawson Branch
- Xstrata Coal Queensland.

One submission from the public was also received and EHP made its own submission on the EIS.

All submitters were also given the opportunity to provide a follow-up response to EHP on the suitability of Taroom Coal's response to their submissions. All submissions and other comments made by submitters were considered when preparing this EIS assessment report.

3.4.4 The standard criteria

Section 58 of the EP Act requires that, among other matters, the standard criteria listed in Schedule 3 of the EP Act must be considered when preparing the EIS assessment report. The standard criteria are:

a. the principles of ecologically sustainable development as set out in the National Strategy for Ecologically Sustainable Development
b. any applicable environmental protection policy
c. any applicable Commonwealth, State or local government plans, standards, agreements or requirements
d. any applicable environmental impact study, assessment or report
e. the character, resilience and values of the receiving environment
f. all submissions made by the applicant and submitters
g. the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows
    I. an environmental authority
    II. a transitional environmental program
    III. an environmental protection order
    IV. a disposal permit
    V. a development approval
h. the financial implications of the requirements under an instrument, or proposed instrument; mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument
i. the public interest
j. any applicable site management plan

k. any relevant integrated environmental management system or proposed integrated environmental management system
l. any other matter prescribed under a regulation.

EHP considered the standard criteria when assessing the project.

3.4.5 *Environment Protection and Biodiversity Conservation Act 1999*

On 28 March 2008, Taroom Coal referred the project to the (then) Commonwealth Department of Sustainability, Environment, Water, Population and Communities for consideration on the project's likelihood to cause a significant impact on Matters of National Environmental Significance (MNES) in accordance with the EPBC Act (EPBC Referral Number: 2008/4130). On 1 May 2008, the delegate of the Commonwealth Minister determined that the proposed project was not a controlled action and would not require assessment nor approval under the EPBC Act.

Water was introduced as a new MNES in 2013, however that amendment does not apply to actions that the Minister has already determined not a controlled action. Consequently, the project was not subject to the new water trigger either.

4 Adequacy of the EIS

This section of the assessment report discusses in more detail the adequacy of the EIS, taking into account key matters of concern identified in the EIS and particularly those of significant concern raised in submissions. The level of detail of the assessment takes some account of the significance of the potential impacts of the project, particularly having regard to the affected environmental values. Where possible, outstanding matters that need further assessment prior to statutory decisions are identified, particularly to address State policy and legislative requirements.

The following aspects are now addressed for each topic:

- a brief outline of the assessment methodology
- a brief outline of the environmental values identified
- an overview of impacts identified in the EIS documents, as well as the adequacy of the assessment
- an overview of the avoidance, minimisation and management measures proposed, as well as their adequacy
- an evaluation of how adequately Taroom Coalhas responded to significant issues raised in public and agency submissions on the EIS
- summary of the overall adequacy of the EIS section, including any outstanding issues identified and any recommendations to address these issues. Recommendations are listed as either EM plan requirements or as general recommendations that Taroom Coal should address.

4.1 Introduction

The EIS provided an adequate introduction to the project, its objectives and scope. The various sections are adequately set out and guidance about the structure of the EIS was provided.

4.2 Project need and alternatives

This section of the EIS adequately described the project need and alternatives in the context of the TOR. It briefly outlined the project's related social, community, economic and environmental benefits and costs, which were addressed in more detail in later sections of the EIS.

The positive and negative impacts, appropriate mitigation and management measures and environmental protection commitments proposed by Taroom Coal were addressed in later sections of the EIS.

Alternatives were considered and discussed and included consideration of alternative mining methods. The advantages of the preferred open-cut method were highlighted in the context of the proximity of the identified coal deposit to the surface, while noting that deeper coal seams are currently considered uneconomic. The EIS stated that concept and feasibility studies also considered options for:

- alternate scale of mine operations (3Mt/yr to 7Mt/yr of product coal)
- mining methods (dragline and/or truck and shovel)
- mining sequencing (east to west or shallower to deeper)
- reconfiguration of the pit lay-out and mining direction based on geology and geometry of the coal deposit
- redesign of the retiming of the staged diversion of Horse Creek
- ROM coal processing

- coal product handling, including transporting product coal via road or conveyor to the proposed SBR connection
- rail infrastructure alignment and connection
- port facilities, logistics and capacity
- design, location and extent of out-of-pit spoil dumps
- coarse and fine reject disposal (TSFs), including co-disposal
- location and layout of the MIA, CHPP and water management system
- water supply
- alignment of the creek diversion
- sourcing workforce and location, layout and requirements of the accommodation village
- on-site stand-alone diesel fuel generation and grid connected power supply.

The EIS did not address the potential impacts from the power infrastructure corridor route nor propose alternate options. It stated that the power infrastructure corridor impact assessment, approvals and regulation would be undertaken separately to this EIS.

4.3 Impact assessment approach

The impact assessment approach in the EIS documentation was typically presented for each key matter in the TOR as follows:

- legislative and policy context
- assessment method
- environmental protection objectives
- existing environment and environmental values
- issues and potential impacts
- avoidance, mitigation and management measures
- residual impacts
- inspection and monitoring requirements.

4.4 Regulatory approvals

The methodology and objectives of the EIS process, key approvals required for the project and relevant policies, guidelines, planning policies and planning schemes to be considered in assessing and regulating the project were adequately described in the EIS. These are summarised in section 3.2 of this report.

4.5 Consultation

The consultation carried out by Taroom Coal as part of the EIS preparation, including its objectives, activities undertaken, stakeholders consulted, stakeholder issues and the way in which these issues were addressed was adequately described in the EIS. A summary of the key issues raised during the consultation program and specific responses to the 29 public and agency submissions, including EIS updates where Taroom Coal considered it necessary, were provided in the EIS. A summary of the consultation process undertaken by Taroom Coal as part of the EIS process is summarised in section 3.3 of this report. Matters raised in submissions that have not been adequately resolved have been identified in the relevant sections of this report and collated at section 6.

4.6 Description of the project

The EIS adequately described the location, scope, scale and schedule for the project works. An adequate discussion on all aspects of the project was provided, including: the resource base, construction, proposed mining activities and handling, processing and disposal of mine wastes, operations, workforce accommodation and rehabilitation and decommissioning. Aspects of the project that were not addressed in the EIS include water supply and electricity supply alignment route.

A summary of the project is provided in section 2 of this report.

4.7 Climate

4.7.1 Existing values

The local and regional climatic conditions in the vicinity of the project area and climatic extremes in relation to natural and other hazards were adequately described and identified in section 4 of the EIS. The EIS used local (Taroom Post Office weather station) and regional (Bureau of Meteorology) weather station data to describe monthly and annual averages of weather parameters such as rainfall, wind and evaporation.

Climate information and in particular regional rainfall patterns, air temperature, wind direction and speed were used in relevant sections of the EIS, for example air and noise, to underpin predictions about the impacts of the project as well as inform mitigation and management measures. The potential impacts of climatic extremes on hazards and risks were adequately described in the EIS. Hazard and risk are discussed further in section 4.21 of this assessment report.

The EIS described the climate of the site as subtropical continental and subject to hot summers (average maximum of 33.6 degrees Celsius (℃)) and cold winters (average minimum 5.1℃). Regional average annual rainfall is approximately 676mm, falling mainly during the summer wet season from November to February (average of 87.9mm per month) and dry season winter rainfall from April to September (average 34.9mm per month). Wind direction in the mornings is predominately from the north, but also the east and south, and predominately from a south-east direction in the afternoons.

Evaporation data presented in the EIS was not locally derived but sourced from about 110km away at the Narayen Research Station. Average annual evaporation was estimated at 1807mm; approximately 2.7 times the average annual average rainfall. The EIS stated that the impact of tropical cyclones would be minimal given the location of the site; rather it is more likely to be subject to intense thunderstorms and heavy rainfall events.

The effects of drought on the project were addressed in the EIS. High evaporation rates, variable seasonal rainfall and in particular the failure of the wet season to deliver significant rainfall could pose problems for available surface water supplies of the mine site. The project does not propose to be reliant on the collection of rainfall for construction and operational mine use purposes, rather it proposes to secure a water supply by connection to SunWater's external water supply distribution network.

While no on-site historical flood data was presented in the EIS, historical flood records from the Fitzroy River catchment area and significant flood events from flows in the Dawson River were presented in the EIS. Mine site flood models were used to determine flood events following heavy rainfall events within the upstream catchment of Horse Creek.

4.7.2 Impacts

The EIS concluded that the principal climatic risks to the project were the effect of variable seasonal rainfall and flooding events on site water management and the principal climate driven management actions were to prevent the release of unauthorised contaminants from the site, appropriate design for flood protection and the effect of wind on dust and noise. Climatic aspects that could affect the potential for environmental impacts and risks and the management of operations at the site were primarily addressed in the water resources and hazards and risk sections of the EIS.

Significant potential impacts identified included risk of flooding of Horse Creek, operation of the diversion and flood immunity of the MIA, TSFs, active operating pits and final voids.

The EIS provided a satisfactory assessment of the influence of climate on potential impacts arising from the project as a result of climate change using data published from the (then) Queensland Office of Climate Change. The EIS stated that the WDRC area is likely to experience a decline in rainfall (annual rain fall is expected to decrease by between 4% and 7% based on modelled low and high emission scenarios by 2050), increased temperatures (between 1.2℃ to 2℃ based on modelled low and high emission scenarios by 2050), increased rates of evaporation and more frequent extreme weather scenarios (based on a high emissions scenario, an increase in annual potential precipitation of up to 9% is predicted with the best estimate being 7%).

The EIS considered the project area would be subject to a low to moderate bushfire risk because of extensive clearing of the site for cattle grazing; fires are generally expected to be grass fires during periods of drought.

4.7.3 Avoidance, mitigation and management measures

The modelled PMF level was considered in the EIS as the mitigation bench mark for the southern MLA50254 to avoid inundation of active pits and final voids. According to the EIS elements of the staged Horse Creek diversion, in particular flood levees, would be constructed to protect operating mine pit areas, and in the longer term would be required to protect the final voids after mining. Infrastructure located within the northern MLA would be designed to achieve immunity from an average recurrence interval (ARI) 1 in 100 year flood event.

4.7.4 Conclusions and recommendations

The EIS adequately described the local climate and how it could affect the potential for environmental impacts and the management of operations at the site. The EIS identified the risks associated with the inundation of active mine pits and long-term protection of the residual voids from flood flows along Horse Creek. Provided the proposed flood protection mitigation measures (i.e. levees) and the staged Horse Creek diversion are designed and constructed to appropriate engineering standards to meet the specified outcomes, the proposed protection measures should be acceptable.

4.8 Air

4.8.1 Existing values

The EIS provided adequate information on air quality objectives and goals to protect air environmental values. The EIS stated that the air quality environmental values to be protected by the project were based on the Environmental Protection Policy (Air) 2008 (EPP Air) including protection of the following:

- the health and biodiversity of ecosystems
- human health and wellbeing
- the aesthetics of the environment, including the appearance of buildings, structures and other property
- agricultural use of the environment.

The project would be located about 45km south-west of Taroom and approximately 380km north-west of Brisbane in a sparsely populated rural area. The EIS described the existing air quality at the project site as good with localised or periodic degradation of air quality by dust from vehicle traffic on unsealed roads, dust and smoke from bushfires and controlled burns. The EIS did not mention that dust generated from dust storms during drought periods may also impact on air quality values. The EIS identified 60 sensitive receptors in the vicinity of the project area and the WSL rail and services corridor. The closest sensitive receptor was identified approximately 1000m from the mine site and 60m from the WSL rail and services corridor.

The EIS stated that the project would result in the emission of fine particulates, which could be assessed in terms of total suspended particulate matter (TSP), particulate matter with equivalent aerodynamic diameters of 10µm or less (PM_{10}), and particles with equivalent aerodynamic diameters of 2.5µm and less ($PM_{2.5}$). These particulates would mainly be generated as fugitive dust emissions from open-cut mining operations.

In the absence of suitable background air quality data from the project site, the EIS stated that background air quality levels were based on other similar locations in central Queensland, such as Dysart and Charters Towers and these levels were considered to be a reasonable estimate of existing air quality in the project area.

Meteorology for the site was simulated using The Air Pollution Model (TAPM). Monitoring data from Toowoomba for nitrogen dioxide (NO_2) and TSP were used in modelling, while dust deposition data were sourced from Wandoan, Dysart and Charters Towers. The EIS modelled air quality along the proposed WSL rail and services corridor using the Cal3QHCR air quality dispersion model.

4.8.2 Impacts

The EIS stated that it adopted industry-standard methods for the assessment of air quality impacts, used conservative assumptions or inputs to address data deficiencies and provided a generally reliable basis for assessing impacts on air quality. Air quality impacts from the project were assessed on the basis of estimations of emissions from project activities under typical operating conditions in combination with dispersion modelling of emissions relative to the identified sensitive receptors within the local area.

The EIS stated that emissions from the combustion of diesel fuel would produce sulphur dioxide (SO_2), NO_2, and trace quantities of volatile organic compounds (VOC). However the EIS stated that emissions of dust from construction, mining, haulage and processing activities as well as stockpiles and spoil dumps, NO_2 and carbon monoxide (CO) would be the major sources of air quality impacts from the project.

The key sources of emissions to air identified in the EIS from the project would include:

- fugitive exhaust emissions including carbon dioxide (CO_2), CO, SO_2, NO_2, VOC and PM_{10} from diesel locomotives, mining vehicles, heavy earthmoving mining equipment and electricity generators
- dust emissions from:
  - drilling, blasting, extracting and grading an estimated 1.1 billion bcm of overburden and interburden
  - transporting and stockpiling waste rock, fill material and coal in the construction and operational stages
  - construction equipment
  - transport of coal product via rail
  - crushing, processing and stockpiling of coal product
  - wind erosion from stockpiles and waste rock emplacement areas
  - vehicle movements on unsealed haul roads.

The EIS presented air quality results using the CALPUFF airborne pollutant dispersion model to estimate ground level concentrations and depositions of pollutants.

The air pollutant impacts from the project were assessed against the frequently used dust deposition limit of 120mg/m^2/day and the EPP Air goals.

The Cal3QHCR air quality dispersion results indicated that during construction of the WSL rail and services corridor and operational stage coal train emissions (diesel exhaust and coal dust) dust deposition fallout would be short-term and within EPP Air goals at sensitive receptor locations.

The EIS provided sufficient information on emissions associated with the diesel fuelled electricity generation for the construction stage of the project.

The EIS concluded that maximum 24-hour average PM_{10} ground level concentrations from construction and operation activities would not be compliant with the EPP Air objectives in all years at two sensitive receptors and one sensitive receptor in Year 27 of operations. In addition, the EIS stated that maximum 24-hour average $PM_{2.5}$ concentrations would be exceeded at one sensitive receptor in Year 27 of operations.

Two of these sensitive receptors are located on the project site within the MLAs, are owned by Taroom Coal and unoccupied, while the third is currently unoccupied. The EIS stated that should at any stage the third sensitive receptor be occupied, Taroom Coal would consider applying air quality mitigation measures.

The EIS stated that the air quality assessment modelling of the WSL rail and services corridor demonstrated compliance with air quality objectives in accordance with EPP Air goals.

The EIS stated that a cumulative impact assessment of air quality impacts from adjoining projects (i.e. Glencore Coal Queensland Pty Ltd's Wandoan Coal Project and the Elimatta Project) and the WSL rail and services corridor indicated that short and long-term impacts would be compliant with EPP Air air quality objectives at all sensitive receptors and that the proposed 50m buffer for the WSL rail and services corridor would be sufficient to protect the air quality at sensitive receptors.

4.8.3 Avoidance, mitigation and management measures

The EIS concluded that while emissions from the combustion of diesel fuel would produce SO_2, NO_2, and trace quantities of VOCs, the emissions of dust from construction and mining operations, NO_2 and CO were the major sources of air quality impacts from the project. Notwithstanding the exceedances noted at sensitive receptors located on the MLAs, the EIS concluded that emissions from the project would comply with air quality guidelines for TSP, PM_{10}, $PM_{2.5}$, NO_2 and CO. The project would be required to meet EHP's limit of 120mg/m^2/day for dust deposition at sensitive receptors.

An Air Quality Management Plan, including a coal dust management plan (CDMP) for the project's construction and operational stages has not been finalised in the EIS. However Taroom Coal has committed to a range of control strategies and mitigation measures in the EIS and EM plan to manage dust and gaseous emissions from the project including:

- a register of dust complaints would be maintained on site
- all complaints about dust would be investigated and appropriate action taken to reduce dust nuisance including recording a summary of the investigations completed and any management actions taken and the status of the concern
- dust suppression by regular water spraying (i.e. water sprinkling of ROM stockpiles and internal unsealed haul roads to reduce dust generation)
- compaction of the mine construction site to minimise the area of exposed soil that may generate dust
- limit vegetation and soil clearing to active mine areas to minimise the amount of exposed soil that may generate dust at any one time
- progressive rehabilitation and revegetation of disturbed areas would occur with the aim to reduce wind generated dust
- limited vehicle speed within infrastructure areas and mine access roads to minimise dust generation
- regular maintenance of vehicles, heavy earthmoving equipment and dust suppression equipment
- notification of nearby residents 48 hours prior to undertaking major railway maintenance activities
- implementation of a residential buffer zone of 50m either side of the WSL rail and services corridor
- implementation of a 15m buffer (cropping land exclusion zone) from the WSL rail and services corridor to minimise dust deposition on vegetation
- veneering and profiling of loaded coal wagons at the CHPP to reduce dust lift-off from moving trains
- monitoring of life of mine dust deposition and daily predictions of meteorological conditions for use in a dust forecasting system
- ongoing air quality monitoring to ensure compliance with EPP Air objectives and to determine potential nuisance impacts
- reporting regularly to ensure dust suppression measures are effective

- developing and implementing an adaptive air quality management system that would include further mitigation strategies following air quality monitoring and research of contemporary dust minimisation strategies during the life of the project
- implementing a proactive stakeholder engagement program with landholders and near neighbours providing advice on suitable measures that should be undertaken to maintain healthy buffers between crops and the proposed WSL rail and services corridor
- auditing of the air quality management plan to monitor the performance of dust control measures during coal transport.

4.8.4 Outstanding issues

The EIS addressed most aspects specified by the TOR. However, it is not clear from the EIS why different background air quality concentrations were used in the assessment for the mine site and WSL rail and services corridor when it is noted that the mine and proposed railway components of the project are located in the same region. The EIS noted that the background values are:

- coal mine background concentrations:

  PM_{10} = 20µg/m^3, TSP = 25µg/m^3 and dust deposition = 67mg/m^2/day

- WSL rail and services corridor background concentrations:

  PM_{10} = 23µg/m^3 TSP = 30µg/m^3 and dust deposition = 40mg/m^2/day.

It is not clear how dust deposition from the coal train line was estimated in the EIS. In particular, how the loss over path-length concentration values were converted to loss within zones and dust deposition fallout when the EIS stated that it was calculated using the difference in concentrations based on predicted annual average TSP concentrations with and without dust deposition.

The model should be revised including appropriate referencing to demonstrate the accuracy of this method for predicting dust deposition for the near field receptors.

4.8.5 Conclusions and recommendations

The EIS has adequately established that the main air quality concern is the emission of fine particulates from various project sources, including construction, mining, haulage and processing activities. While some inconsistencies in modelling inputs have been noted, the EIS concluded that two sensitive receptors are likely to be exposed to exceedances of EPP Air objectives. Sensitive receptor 14 located near the WSL rail and services corridor would need specific attention in relation to particulate emissions during construction.

It is recommended that documentation in the EM plan be revised for construction and operation of the mine and the WSL rail and services corridor to provide:

- updated air quality modelling using consistent and justified input parameters
- specification of monitoring and priority mitigation measures to ensure compliance with applicable air quality objectives at sensitive receptors.

Recommended conditions for management of air emissions are provided in Appendix 1.

4.9 Greenhouse gas emissions

4.9.1 Existing values

The EIS included a satisfactory assessment of potential greenhouse gas (GHG) emissions using estimated data for mine operations and GHG emission factors published by the former Commonwealth Department of Climate Change.

4.9.2 Impacts

The direct and indirect GHG emissions generated from the project would include:

- fuel (diesel) burning in heavy mining earthmoving equipment, light vehicles, locomotives at the mine site and WSL rail and services corridor
- diesel fuel burning for power generation during the construction and operations stages of the project (including WSL rail and services corridor)
- use of explosives (combustion of Ammonium Nitrate Fuel Oil) for blasting for the development of the open cut mine including initial box cut
- methane emissions (fugitive) from coal seam gas

- on-site electricity consumption from purchased electricity.

The total annual emissions for mine operations were assessed in the EIS as being 314.1 kilotonnes (kt) of carbon dioxide equivalent per year (kt CO_2-e/yr). These emissions were reported as equivalent to 0.006% of Australian emissions for 2008.

The total annual emissions for construction and operational stages of the WSL rail and services corridor were assessed in the EIS as being 19.388kt CO_2-e/yr and 15.572kt CO_2-e/yr respectively. These emissions were reported in the EIS as 0.005% (construction) and 0.035 % (operation) of the Australian emissions for 2008.

The EIS included a satisfactory assessment of potential impacts due to climate change using data published from the (then) Queensland Office of Climate Change. This topic is further discussed in section 4.7 of this report.

4.9.3 Avoidance, mitigation and management measures

The EIS stated that Taroom Coal is committed to adopting and implementing best practice measures and policies to reduce GHG emissions over the life of the project.

The EIS identified management objectives to reduce GHG emissions including:

- use of load and haul truck equipment fleet with fuel efficient diesel engines
- design and construction of the project best practice technologies, including energy efficient indoor and outdoor lighting, use of timers and or motion sensors on air-conditioning units, and installation of ceiling fans in common areas of the accommodation village
- fitting insulation in all ceiling and wall spaces in the accommodation village
- setting GHG intensity targets for each major processing or mining activity
- measuring, monitoring, auditing, reviewing and reporting the effectiveness of GHG reduction strategies and identifying further opportunities to improve the efficiency of energy use on site.

The EIS prepared an energy and greenhouse gas management plan that set out strategies for optimising energy efficiency and complying with external obligations (e.g. under the Commonwealth's *National Greenhouse and Energy Reporting Act 2007*) associated with energy use and GHG emissions.

4.9.4 Outstanding issues

The EIS did not propose any offset opportunities for the project's GHG emissions, as had been required by the TOR. This is not considered a significant issue because of changing Commonwealth and State policy.

4.9.5 Conclusions and recommendations

The EIS adequately address the impact of the contribution of the project to GHG emissions.

4.10 Land

4.10.1 Existing values

The EIS described those aspects of the site and project related to the existing and proposed qualities and characteristics of the land including the landscape, topography, Indigenous cultural heritage, land use tenure and values of the project site, WSL rail and services corridor and surrounding local area.

The EIS described the topography of the mine site and WSL rail and services corridor as similar and typical of the surrounding region. The mine site has an average elevation of 250m Australian Height Datum (AHD), with very gentle to moderate undulating hills, dissected by Horse Creek and its tributaries. A hill rising to 292m is the highest natural landform on the northern MLA50270, while the lowest existing landform (228m) feature is a small alluvial plain adjacent to Nine Mile Creek. The topography within the WSL rail and services is also gently undulating rises and low hills, dissected by drainage lines with narrow, alluvial plains including Horse and other creeks and tributaries.

The EIS provided an adequate soils and land suitability assessment of the mine site, surrounds and WSL rail and services corridor. The EIS stated that six soil management units were identified on the mine site and WSL rail and services corridor. The EIS stated that the dominant land use within the project area is low to medium intensity beef cattle grazing on native and introduced pasture grasses, along with some dryland broadacre forage cropping and local transport of goods and services on roads. The EIS stated that cropping in the area is limited by soil nutrient deficiencies, plant available water capacity and erosion potential (i.e. sodic and dispersive surface soil characteristics), and that no land within the WSL rail and services corridor was assessed as suitable for rainfed cropping. An area of State land (113ha on Lot 43 on AB222) is designated as a camping reserve and contributes to the stock route network and a further stock route (AAP14857) transects the proposed WSL rail and services corridor.

4.10.2 Impacts

The project would result in significant land disturbance resulting in changes to the local topography and surface water drainage patterns on the project site. Approximately 4460ha of land would be directly disturbed by clearing for the project. A range of above ground infrastructure would be constructed and would influence the visual amenity and landscape character of the mine and WSL rail and services corridor. Topsoil would be removed from construction surfaces to build the haul road, MIA building foundations and initial box cut and stored in appropriately managed stockpiles for rehabilitation purposes. All rehabilitated areas would aim to provide a stable landform. The steep TSF containment wall slope angles (i.e.1V:3H or 33.33%) and the final voids that would make-up approximately 380ha would be unsuitable for cattle grazing due to the steepness of residual slopes. The EIS stated that approximately 9 million m^3 of topsoil would be stripped and available for re-use in post-mining rehabilitation over the life of the project. The EIS stated that five of the six soil management units over the project area demonstrate sodic and dispersive characteristics and would be subject to erosion unless effectively managed on site. Progressive and final rehabilitation measures would aim to provide stable final landforms supported by native and pasture grass species to support grazing post-mining. The EIS stated that the Horse Creek alluvium soil management unit (covering 837ha) would contribute about half of the required topsoil for rehabilitation purposes on the mine site.

Land Suitability Classes 3, 4 and 5 (for beef cattle grazing) and 4 and 5 (for broadacre cropping) were identified on the proposed project site. Good Quality Agricultural Land (GQAL) mapping identified Class A (Crop land) on the site. The EIS, however, concluded that the mapping overstated the values and quality of the land as an agricultural resource and concluded, from its own assessment, that no Class A and minimal Class B (Limited crop land) were identified on site. The EIS stated that the most common land classification on the site was Class C (Pasture land) suitable only for improved (Class C1) or native pastures (Class C2). Furthermore, the EIS concluded that the mine area is not considered likely to have an impact on any major resources of GQAL crop land within the central western region of Queensland.

Land Suitability Classes 3, 4 and 5 (for beef cattle grazing) and 4 and 5 (for broadacre cropping) were identified within the proposed WSL rail and services corridor. GQAL mapping identified Class A (Crop land) and Class B (Limited crop land) on the WSL rail and services corridor. The EIS stated that from its own land suitability assessment 95% of land within the WSL rail and services corridor was Class B or C1 and is therefore considered GQAL. Some 5% of the WSL rail and services corridor was identified as shallow rocky sand and loam soils that are not considered GQAL. The EIS considered that the GQAL mapping overstated the values and quality of the land as an agricultural resource and the land within the WSL rail and services corridor would be mostly suitable for improved pasture and not cropping.

The EIS undertook a preliminary assessment of potential Strategic Cropping Land (SCL) under the *Strategic Cropping Land Act 2011* and identified 2715.8ha within the MLA areas as SCL. During the EIS process no formal validation application was made to DNRM in accordance with the *Strategic Cropping Land Act 2011* (now incorporated in the *Regional Planning Interests Act 2014* (RPI Act)) to confirm the status of the 2715.8ha mapped as potential SCL. The EIS also identified that all of the WSL rail and services corridor was within the Western Cropping Zone SCL trigger mapping area and was therefore potential SCL.

Construction of the WSL rail and services corridor would sever existing land titles, disrupt cattle movement across the corridor and stock access to watering points. The project proposes to establish underpasses for stock and farm machinery movements and establish alternative watering points in consultation with affected landholders.

The EIS stated that the WSL rail and services corridor is proposed to be retained post-mining as an infrastructure of beneficial use for proposed surrounding resource projects and land users.

In summary, the EIS stated that the potential impacts on land from the project would include:

- sterilisation of coal resources (at depths greater than 150m)
- land instability from construction of raised landforms (e.g. TSFs and out-of-pit dumps covering at least 183ha) and final voids (covering approximately 380ha)
- land clearing resulting in: a reduction in habitat for flora and fauna; loss of or alterations to areas of cultural heritage significance or nature conservation; topsoil removal including loss, compaction and viability; soil erosion; unauthorised vegetation clearing; a reduction in pre-mine land suitability
- land contamination: a risk of spillage of chemicals, fuels, or stormwater runoff from coal processing, tailings, process water, concentrate or windblown dust from the mining and processing area
- spills from the TSF or other contaminated water storages
- effluent from the STPs
- leachate and windblown rubbish from the waste disposal site
- acid mine drainage waste rock materials brought to the surface

- visual amenity impacts associated with mine infrastructure
- increased erosion of disturbed land
- disruption to agricultural activities
- exposure of saline subsoil.

4.10.3 Avoidance, mitigation and management measures

The project would result in the permanent alienation of approximately 380ha of grazing land (the final void areas) from the pre-mining land use. In addition approximately 317ha of unsuitable steep slopes and tops of the TSF containment areas, retained water storages and roads that would remain at the end of the mine operations. The EIS stated that all available mine disturbed land would be rehabilitated. The EIS stated that all rehabilitated areas would aim to provide stable, gently undulating free draining landforms, with a self-sustaining pasture vegetation cover at end of mine life. The EIS did not identify if there would be a loss of grazing from the otherwise suitable areas on the tops of the TSFs, given that the containment wall slopes are likely to be too steep to allow stock access to the level tops. Unless treated, that barrier would further limit grazing on significant areas of otherwise suitable land. The EIS stated the project would not be returned for the land use of nature conservation as this inconsistent designation would contrast the pre-mining land use.

DNRM advice on the EIS stated that the proposed spoil dumps batter slopes of 1V:6H (i.e. 16.67%) may be too steep given the identified sodic and dispersive characteristics of the waste rock material and significant erosion potential. DNRM advice suggested that dump slope angles of 1V:12H (i.e. 8.33%) would be more appropriate. In response, Taroom Coal committed to a further review out-of-pit waste rock dump slope angles with the view potential flattening of the angle to ensure slope stability and achieve rehabilitation outcomes. EHP notes the Australian Coal Association Research Program (ACARP) Final Report titled Development of Rehabilitation Completion Criteria for Native Ecosystem Establishment on Coal Mines in the Bowen Basin (May 2004) recommends slopes to be kept to less than 1V:8H (i.e. 12%). The revised EM plan would need to be updated to ensure the stability of waste rock dumps slope angles would achieve the proposed rehabilitation and water quality outcomes.

The EIS stated that management strategies to minimise disturbance to land would include:

- minimising the amount of land cleared at any one time
- progressive rehabilitation of all disturbed land to reduce erosion and dust emissions in accordance with the Plan of Operations for the project
- soil erosion control strategies
- topsoil stripping and stockpiling management.

The EIS stated that the WSL rail and services corridor would impact on existing farm/agricultural soil conservation works such as soil contour banks, sediment trap dams and grassed waterways. The EIS stated that new soil erosion works would be constructed to replace disturbed structures to mitigate soil erosion in consultation with adjoining landholders.

The EIS stated that the project MLA areas overlie an established Exploration Permit for Petroleum (EPP) held by BG International (Aus.) Pty Ltd. Taroom Coal is currently negotiating a Co-Development Agreement with the petroleum tenement holder and an attendant coordination arrangement for the entire project. Provided the parties are able to reach a suitable agreement, this would ensure no significant gas reserves would be sterilised as a result of the project.

4.10.4 Outstanding issues

DNRM advised that trigger mapping confirms that the project impacts potential SCL. DNRM advised that this would need to be addressed under the requirements of the RPI Act.

The revised EM plan would need to be updated to ensure the stability of waste rock dumps slope angles would achieve the proposed rehabilitation outcomes.

It is recommended that Taroom Coal continue to liaise with the Planning Services, South Region DNRM and EHP to discuss and resolve these outstanding issues.

4.10.5 Conclusions and recommendations

The project would result in significant land disturbance and interrupt existing cattle grazing on the mine site over the life of the mine. The rehabilitation aim for the majority of the site is to reinstate a land condition similar to the pre-mining land use of low intensity cattle grazing. Riparian vegetation and habitats would be re-established along the full length of the permanent Horse Creek diversion consistent with the specified outcomes for the diversion. Confirmation of the rehabilitation success of the mine site and creek diversion would be assessed at the end-of-mine life. The WSL rail and services corridor would sever existing land titles and disrupt cattle movement across the corridor and stock access to existing watering points. Rail underpasses would be constructed to allow safe access for stock and farm machinery and new stock water points would be provided in consultation with affected landholders. The WSL rail and services corridor would be retained post-mining for other planned resource project and land users.

Recommended land management conditions are provided in Appendix 1.

4.10.6 Resource utilisation

The EIS adequately described the extent of the coal resource, defined the resource base and production schedule and mining sequence and stated that the mine plan and design were developed to ensure that no coal resource was sterilised by the project. The EIS stated that in future coal reserves identified at depths below 150m not targeted by this project may still be accessible in future.

4.11 Waste management

4.11.1 Existing values

The EIS stated that the relevant environmental values to be considered for waste management of the project include:

- the life, health and wellbeing of people
- the diversity of ecological processes and associated ecosystems
- land use capability.

The project is located in a rural area with cattle grazing as the principal land use. The EIS stated that the ecological, community and land use values applying to the project are directly affected by mining and petroleum development activities.

4.11.2 Impacts

The EIS stated that solid, liquid and atmospheric wastes would be generated during construction, operations and decommissioning stages. These waste streams have the potential to impact on environmental, social and community values if they are not suitably managed. The EIS identified that the project's major sources of waste with the potential to cause impacts include:

- land, surface water and groundwater contamination from:
    - landfill leachate runoff/seepage
    - mine waste that may produce poor quality, contaminated runoff or seepage from overburden, spoil dumps, TSFs and contaminated water storages
    - sewerage effluent
- excavated waste rock and overburden from the pits and MIA (approximately 1.1 billion bcm over the life of the mine)
- course rejects and fine tailings (approximately 81.5Mt of dry plant rejects for the life of the mine) as waste by-products from the CHPP process
- liquid waste including waste oil, solvents and grease
- regulated wastes including, hydrocarbon contaminated wastes and materials, batteries, tyres, oils and oil drums, flammable liquids, lubricants, grease, potable water treatment plant residues
- chemical wastes including emulsions and coolants, cleaning chemicals, paints and resins, vehicle wash down waters and detergents and solvents from workshop activities
- litter and windblown rubbish from the waste disposal site
- GHG emissions from burning fuels, coal dust, TSP, PM_{10}, $PM_{2.5}$ and metals contained in fugitive dust and gaseous odour emissions
- general waste including, timber, trees and other vegetation from land clearing, non-biodegradable material, packaging material, green waste and domestic waste.

The EIS identified that the inappropriate management and disposal of wastes could lead to the contamination of land and water with potential adverse impacts on human, environment and ecosystem health.

Sewage effluent at the accommodation village would be treated by two packaged STPs designed to produce Class A effluent, one a permanent STP with capacity of 135kl/day and a temporary STP with capacity of 50kl/day. At peak operation the permanent STP would produce approximately 240L/capita/day.

The EIS provided a suitable waste inventory of predicted wastes and details of waste types, estimated quantities and project design features and processes relevant to waste management. The EIS estimated project waste would be:

- total suspended particulate matter:
  - MLAs: 4,600,981kg/yr
  - WSL rail and services corridor operation: 473t/yr
- PM_{10}:
  - MLAs: 1,377,865kg/yr
  - WSL rail and services corridor operation: 172t/yr
- $PM_{2.5}$: project area:149,657kg/yr
- greenhouse gas:
  - MLAs: 314.1kt CO_2-e/yr
  - WSL rail and services corridor operation:15.877kt CO_2-e/yr
  - WSL rail and services corridor construction: 19.388kt CO_2-e/yr
- tailings and coarse rejects: 81,423Mt of dry plant rejects
- excavated waste: 1,152,535,104bcm
- domestic waste: 225t/yr
- sewerage and grey water: 13ML/yr
- waste oil, waste solvents, grease, batteries, scrap steel: 50-100t/yr
- tyres: 439t/yr.

The EIS noted significant quantities of hard waste would be generated at decommissioning including, general waste, concrete, steel, timber, tyres, chemical and fuel storages, workshops, CHPP, accommodation units, offices, administration buildings, ablutions and recreational buildings, gas and water pipelines, and conveyors. These decommissioning wastes and building structures would be demolished and scrap materials would be sold, recycled, sent to landfill or removed from site. Roads would remain at the end of mine life at the discretion and agreement of the landholder. The EIS stated that should site or access roads not be needed post decommissioning the concrete or bitumen base at creek crossings would be removed and the area would be ripped, topsoiled and revegetated.

The EIS noted that the project would require waste disposal on site including: landfill for hard waste, an STP for sewage, two out-of-pit spoil dumps approximately 50-70m high, in-pit spoil dumps 40-50m high and three TSFs 16m high.

The EIS stated that the overburden and interburden material would be removed to two out-of-pit dumps during the construction of the initial box cut and early years of mining. These spoil dumps would be located in the south-west corner and in the northern section of southern MLA50254. As mining progresses and space becomes available in the mine pits, excavated waste would be used to partially backfill the remaining voids. The EIS stated that two final voids of 380ha size would remain at the end of mine life.

The EIS stated that waste characterisation indicated that the overburden and interburden, floor, ceiling, washery waste and coal materials are unlikely to be acid producing or release high salinity, metals or metalloids, and would not require special handling (such as mine material segregation, selective placement and engineered covers) for acid rock drainage or neutral drainage control, and therefore no acid mine drainage is expected from the generated waste materials.

The EIS stated that sodicity testing results of the overburden and interburden shows the material exhibits sodic and dispersive characteristics and would be subject to surface crusting and high erosion rates if dumped in the surface area of waste emplacement dumps and exposed directly to rainfall.

According to the EIS, from the CHPP approximately 1.2Mt/yr of tailings and fine reject coal wash tailings, rejects and dewatered fine rejects would be pumped and deposited into the two out-of-pit TSFs until the northern void in-pit TSF becomes operational. This waste is likely to be non-acid forming and have significant excess acid buffering capacity.

4.11.3 Avoidance, mitigation and management measures

The EIS committed to incorporating a program of best practice waste management. It committed for the life of the project to investigate and implement cleaner production processes and opportunities and waste minimisation programs to manage waste generated by the project. The project would manage waste in accordance with the waste management hierarchy (i.e. avoidance, re-use, recycling, waste to energy and disposal) and relevant legislation.

The EIS stated that accumulated waste hydrocarbons and contaminants would be managed as a regulated waste. If approved, the project would be required to incorporate a waste tracking system for any trackable waste in accordance with the regulatory requirement and applicable Australian standards to ensure any regulated waste would be removed off-site by an appropriately licensed contractor and disposed of to an approved disposal facility able to accept that waste.

The EIS stated that the landfill, if required, would be designed and constructed in accordance with EHP Guideline

Landfill Siting, Design, Operation and Rehabilitation.

The EIS stated that both STPs would be designed to produce Class A effluent in accordance with EHP's Planning Guidelines for Water Supply and Sewerage and the Queensland Water Recycling Guidelines. Effluent would be disposed of on-site via irrigation sprays to a designated minimum area of $133m^2$. The EIS stated to mitigate the risk of contamination from the release of treated effluent the effluent irrigation area would be fenced and would install more than the recommended number of low pressure spray nozzles to ensure no runoff from the site occurs.

The EIS stated that solvents and oils would be stored and managed in accordance with relevant Australian Standards in order to minimise contamination and hazards.

The EIS stated the preferred hierarchy of waste management for the project was avoid, minimise, reuse, recycle, energy recovery and disposal.

Taroom Coal committed to:

- implementing an ongoing monitoring program to confirm that excavated waste rock was low salinity and low risk of acid mine drainage as presented in the EIS
- ongoing testing to determine the full distribution and extent of sodic and dispersive materials in the overburden and interburden materials
- preferential placement of spoil with known sodic and or dispersion potential away from dump surface areas, and that dump surface materials would be treated with of gypsum or lime or use other mitigation methods such as use of jute mesh and compost blankets to control potential erosion.

The EIS stated that the final landform design of out-of-pit and in-pit dumps would achieve a stable and safe slope to minimise erosion. Contoured slopes with rock lined drains would be constructed to shed water, minimise infiltration and control erosion. Final landform slopes would be rehabilitated.

The two out-of-pit TSFs containment walls would be a maximum of 16m high with a slope angle of 1V:3H (i.e. 33.33%). Containment wall surfaces would be rock armoured for erosion protection and control and the soil content would provide a suitable medium to establish a vegetation cover for rehabilitation purposes. Excess rainfall runoff from remediated TSF surface areas would be directed to purpose-built drains flowing to sediment dams to avoid water flowing freely over containment wall slopes thereby minimising the potential impacts and erosion of the structure.

The EIS stated that modelling suggests that the in-pit TSF would be filled to capacity at the end of mine life and would be available for rehabilitation. Otherwise a third residual void would remain. The EIS stated that an estimated 2.0m engineered separation cover over the tailings would be required in the base of the tailings filled void. Specific surface treatment would be required to provide a suitable cover to support vegetation.

The EIS stated that the TSFs were assessed as 'significant consequence' dams and would be constructed by embankments. The TSFs would be designed and constructed in accordance with the Tailings Management Guideline of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, Australian National Committee on Large Dams Guidelines (1999 and 2012) and the EHP Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (EHP, 2012b).

The EIS also described additional mitigation and control strategies including:

- directing clean rainfall runoff around the surface TSFs and pits
- construction of flood levees along the mining lease boundaries to protect against flooding from the old Horse Creek during the first five years of operation, prior to the final diversion of the creek
- deposition of tailings away from the containment wall
- minimising the rate of rise of the tailings to allow efficient settling out of suspended fines, and recycling supernatant back to the CHPP to assist consolidation and desiccation
- regular monitoring and inspections of containment walls including surveys and installation of suitable instrumentation to monitor the structures, seepage and groundwater quality
- construction of bunds and temporary storage ponds along the tailings pipeline route to contain spilled tailings in the event of pipeline failure
- treatment of sewage effluent to Class A quality.

4.11.4 Outstanding issues

A mine closure plan (MCP) is not fully developed, as it does not specifically address waste minimisation and disposal at the decommissioning stage. This matter should be addressed in a revised EM plan.

The EIS did not provide a Waste Management Plan (WMP) but committed to developing it. It is recommended that the WMP be developed and implemented prior to construction commencing on the project site.

If approved, the project should maintain a register of all chemicals stored at the project site including the storage and handling of all flammable and combustible liquids in accordance with relevant Standards.

4.11.4.1 Conclusions and recommendations

The waste management approach is consistent with industry practices and was addressed in sufficient detail by the EIS. It is recommend that the MCP specifically address waste minimisation and disposal for the decommissioning stage of the project and that a WMP be developed and implemented prior to construction commencing on the project site.

Recommended waste management conditions have been provided in Appendix 1..

4.12 Surface water

4.12.1 Existing values

The project is located in the Fitzroy River catchment. Horse Creek is the main watercourse which flows through the mine site, flowing from south to north. Horse Creek is described as an ephemeral tributary waterway that flows following rainfall events and then joins Juandah Creek approximately 20km downstream of the project site. Stream flows in these watercourses are highly variable with flows most likely to occur during the period from December to March. Juandah Creek, Mud Creek, Spring Creek and Horse Creek are the four major watercourses that traverse the WSL rail and services corridor.

The EIS stated that environmental values of surface waters in the local catchment have been characterised by significant changes to the land use of the catchment. Extensive and widespread vegetation clearing within the catchment has occurred due to past and current agricultural use. It concluded that the aquatic ecosystem was a moderately disturbed system.

The EIS listed the surface water environmental values and water quality objectives for waterways in the project area including aquatic ecosystem values, agricultural stock watering and crop irrigation values. It noted that the nearest downstream water entitlement was for stock and irrigation purposes and approximately 20km downstream of the mine site on Juandah Creek close to the Horse Creek confluence.

The EIS did not use the 75^{th} percentile reference data for salinity to derive local water quality objectives as recommended by the Queensland Water Quality Guidelines 2009. Nor did it fulfil quality and quantity requirements as per the reference based guideline approach. The default water quality objective for salinity that should therefore apply to this project is the scheduled water quality objectives for the Upper Dawson. This water quality objective should be used because local water quality data collected as part of a baseline study for the EIS did not fulfil data quality and quantity requirements.

The EIS did not adequately account for the potential variability of salinity with flow or seasonality. This information is useful in understanding the variability in the regional salinity levels, which are known to be strongly affected by flow. Flows in Horse Creek would be different from those in the Dawson River and the EIS did not discuss how the flow salinity relationships determined in the Dawson River may relate to Horse Creek. An extrapolation from Dawson River flows back to expected flows in Horse Creek would have provided an improved interpretation of the data presented in the EIS.

The EIS stated that one large water body is located directly adjacent and downstream to the southern ML50254. This palustrine wetland is classified on EHP's WetlandMaps database as a referable wetland or Wetland Protection Area (WPA) and is mapped as a Great Barrier Reef Catchment wetland of High Ecological Significance (HES). The EIS adequately described changes in water levels in the wetland, however, it did not state the significance in the increases in water level in the wetland, in terms of ecological outcomes for the wetland. Any proposed water release conditions would need to take into consideration instream flows when Horse Creek (into which discharge from RP3 and RP2 would occur) and the wetland are connected.

The EIS provided the results of one ecological (riparian vegetation) and one water quality survey conducted during the dry season. That survey effort is considered inadequate to accurately describe the characteristics and values of the wetland. The EIS, without appropriate evidence stated that the characteristics of the wetland were not typical of a wetland of high ecological significance. Further survey work (riparian, aquatic, water quality) would be required to appropriately describe the wetland, particularly, during the periods where the wetland contains water.

The EIS did not provide adequate information on water flow in Horse Creek at the time of sampling for the aquatic ecology surveys. Measuring water flow rate at each sampling site during future aquatic ecology or water quality surveys is required. This information is essential for assessing characteristics and values, and for interpreting the data collected as there are strong relationships between aquatic ecosystem health and flow conditions and certain water quality parameters and flow.

The EIS and EM plan did not adequately describe all potential mine affected water release points and sources. The

EIS and EM plan stated that salinity levels in sediment dams are predicted to be low and median total dissolved solids (TDS) concentrations of 1,194mg/L, 1,566mg/L and 1,220 mg/L for sediment dams 1, 2 and 3, respectively. Given these concentrations they should be listed as mine affected water release points and sources. Furthermore, the EIS noted that a raw water dam has a proposed controlled release point and indicates high total dissolved solids (629mg/L) level when compared to 80th percentile background of Horse Creek (250mg/L). The EIS did not provided sufficient information to determine whether water from the raw water dam could be released to Horse Creek.

4.12.2 Impacts

There is a potential for significant impacts to surface water quality and aquatic ecosystem health from the project if appropriate measures are not in place to prevent or reduce those impacts. The EIS did not adequately address all sensitive surface receptors that could be impacted by the mine or rail and services corridor (construction, operation or decommissioning) such as the palustrine wetland located off Horse Creek adjacent to MLA50254 or any semi-permanent or permanent waterholes downstream of the mine site. The release of mine affected water during low and no flow periods (i.e. when there is no or limited dilution of mine discharge) would need to be restricted to good water quality only (i.e. water that achieves water quality objectives at end-of-pipe) in order to protect the environmental values of Horse Creek. Any mine or sediment affected water released during high flow events could be of lower quality than water released during low flow periods, but would still need to be sufficiently diluted so as to protect environmental values in the wetland, which is connected to Horse Creek during rainfall periods, and is identified as one of the nearest sensitive receptors to mine affected water release. Any release of mine affected water would also need to account for semi-permanent or permanent waterholes downstream of the mine discharge.

The project proposes to divert clean water from undisturbed parts of the catchment around the project in order to minimise the amount of surface runoff impacted by mining operations. The SunWater supplied recycled water supply allocation and, some on-site collected and recycled mine impacted water would be stored in proposed mine water storages to meet the water requirements for mine operations.

Potential impacts as a result of the diversion of Horse Creek and overland flow would need to be closely monitored, particularly in the palustrine wetland just off Horse Creek adjacent to MLA50254. Modelling results indicated potential changes to water levels in the wetland from changes to runoff and water flows from the mine catchment.

Flood protection measures including rock mulching and levees would be constructed to protect the working pits and waste rock dumps from flood events during mine operations. PMF was used to assess the flood immunity of the active and final voids. The EIS included a commitment to protect final voids from the PMF level at the end of mine life. The EIS stated that infrastructure areas within the northern MLA50270 would be designed to achieve a 100 year ARI flood immunity to mitigate the risk of flooding.

The EIS noted the potential for erosion and sediment mobilisation were identified as risks to surface water quality. The main project activities identified that would have the potential to increase sedimentation in surface water included the construction and operational stage infrastructure including MIA, CHPP, TSF's, out-of-pit spoil dumps, accommodation village and Horse Creek diversion and levees. The highest risk period would be during land clearing and topsoil stripping, impacting on land stability and before mitigation measures were applied to infrastructure areas to stabilise and minimise erosion sediment mobilisation. Mitigation measures were proposed including minimising land clearing and construction of contour banks and sediment detention basins.

The ephemeral Horse Creek, a tributary of Juandah Creek that joins into the Dawson River, flows centrally through the southern MLA50254 in a north-east direction from south to north. The EIS has identified the watercourse as a significant restraint to mining activities. A staged diversion of the creek is proposed, allowing for mining of coal from beneath the creek bed. The diversion would be constructed over four stages and completed within the first six years of mining operations. The EIS summarised impacts on the natural features of Horse Creek and the final creek diversion landform as follows:

- the diversion is shorter: Horse Creek valley length is approximately 9.52km long and stream length 11.45km, compared to the diversion valley length approximately 7.25km and stream length 8.15km
- the average grade of the diversion is steeper: Horse Creek average grade being replaced is 0.00114m/m, the diversion would be 0.00158m/m
- the diversion is straighter: Horse Creek stream sinuosity is approximately 1.2, the diversion sinuosity would be 1.12
- the diversion would have a narrower floodplain
- calculated flow characteristics of the diversion are higher than for Horse Creek for all flows due to the significantly steeper bed grade and narrower floodplain.

According to the EIS the watercourse diversion design has considered the geomorphologic, hydrologic and ecological components of a watercourse as well as its hydraulic and engineering components. Taroom Coal's management strategy is that the creek diversion would be in operation for at least 25 years to allow the geomorphic, hydraulic and ecological function and performance of the diverted creek channel to be monitored and make any repairs that may be required before the end of mine life.

The Horse Creek diversion design, operation and monitoring is expected to be based on current engineering practice and other relevant guiding principles from past research such as the Australian Coal Association Research Program (ACARP) Projects – Stream Diversions within the Bowen Basin. The Horse Creek diversion should be designed and operated to ensure that it is stable, self-sustaining and does not impact on the adjoining upstream and downstream reaches of the existing watercourse.

4.12.3 Avoidance, mitigation and management measures

The EIS and EM plan provided general statements on objectives of mitigation measures for surface water impacts.

The EIS water management strategy described management measures to minimise the potential impact on downstream watercourses and environmental values, including:

- limit the mine disturbance landform and pit foot print at any one time
- capture all groundwater and contaminated runoff from operating pits and MIA and pump to dedicated mine water storages
- ensure all mine water storages including tailings dams were appropriately sized to accommodate fine tailing and rejects and contaminated mine affected waters
- separation of clean and mine-affected waters
- reinstate disturbed landforms to allow:
    - finished surface slopes that would minimise erosion and runoff
    - construction of localised sediment capture dams
    - rehabilitation and revegetation of disturbed areas to develop a stabilised vegetative cover
- controlled release of mine affected water in accordance with EA conditions
- re-use and recycling of water to satisfy mine water demands, such as potable water, CHPP and dust suppression.

The EIS identified the residual significance of impacts, following the implementation of avoidance, mitigation and management measures. All residual impacts were assessed as having low residual significance, with the exception of the operation of the TSF wall stability and failure (moderate to high), spoil dump slope stability (moderate) which could lead to contamination of surface water and stream bed sediment quality through contaminated TSF wall failure and subsequent discharge of tailings and other contaminants downstream. The EIS stated that the mitigation measures proposed to reduce the occurrence of identified hazardous risk would be implemented and updated over the project life.

The EIS did not fully assess surface water quality in Horse Creek and the watercourses intersected by the WSL rail and services corridor. The EIS did not provide sufficient information on the full range of potential impacts including data on contaminants, particularly metals from mine affected water and the potential impacts on the palustrine wetland located adjacent to ML50254. Taroom Coal should further investigate and assess through a thorough hazard assessment, other chemicals of potential concern and monitor end-of-pipe and receiving environment monitoring of metals, metalloids, halogens (fluoride) and hydrocarbons.

The EIS was unclear on the criteria used to decide the spatial extent (10km) of the receiving environment monitoring program (REMP). Furthermore, the receiving water quality should be compared with water quality objectives and upstream or unimpacted site data rather than the prescribed EA contaminant release limits, which are designed to take a mixing zone into account.

The EM plan flow release triggers would be better informed by a suitable risk assessment. In setting the release conditions Taroom Coal must consider sensitive receptors downstream of the release such as the wetland (when it is connected to Horse Creek), as well as any semi-permanent or permanent waterholes and users.

The EIS did not adequately discuss the expected long-term water quality of the final voids, however it did provide an estimate of the predicted water level below the final formed landform ground level, the time period required for the water level in the voids to reach equilibrium and how this compares to the pre-mining groundwater level. The EM plan would be required to be updated to include further information on water quality characteristics (e.g. modelled end-of-mine TDS) for the residual voids.

Taroom Coal committed to install stream monitoring stations on Horse Creek – a reference site and a site downstream of the project area, to monitor surface water flows. Monitoring would occur in conjunction with a wider surface water monitoring program and inspection regime for the project. The project would be required to implement a receiving environment monitoring program consistent with the conditions of the EA approval. Site water quality data would be used to prepare local water quality objectives in accordance with the Queensland Water Quality Guidelines (DERM, 2009) and to protect the approved environmental values.

The EIS stated that sediment generation and mobilisation to watercourses would be minimised through design features and sequencing of construction activities, in particular for the TSF and waste rock dumps. For example, mine infrastructure would be constructed such that it becomes internally draining as soon as possible.

Sediment detention dams would be constructed to collect runoff to minimise mobilised sediment to receiving waters e.g. from out-of-pit spoil dumps, MIA and TSF. Suitable sediment and erosion control measures were described in the EIS to manage the potential impacts from land clearing, stripping and ground disturbance.

The EIS stated that erosion risk would be minimised through appropriate revegetation and stabilisation measures. Flooding modelling identified risks to operational pits and the final voids. The EIS stated that the risk would be mitigated through design measures such as the construction of levees and rock armouring for the relevant sections of the Horse Creek diversion. These commitments are consistent with the stated performance outcomes for the diversion.

According to the EIS the Horse Creek diversion functional design was undertaken in accordance with the Manual – Works that interfere with water in a watercourse: watercourse diversions (Consultation Draft) (DNRM 2013). According to the EIS the diversion would be designed, constructed, operated and maintained according to an engineering standard appropriate to meet the following outcomes:

- incorporate natural features (including geomorphic and vegetation) present in the landscape and in local watercourses
- maintain the existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse diversion is located
- maintain the hydraulic characteristics of the permanent watercourse diversion that are comparable with other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance
- maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream reaches
- maintain stability and functionality and are appropriate for all substrate conditions they encounter.

DNRM considers that the information provided is sufficient to identify the potential risks associated with developing the proposed watercourse diversion (including a functional design). Responsibility for ensuring the accurate assessment, documentation of the design and the adequate performance of watercourse diversion rests with the holder of the EA and its consultants (i.e. the suitably qualified and experienced person (SQEP)). In deciding to issue an EA the administering authority will rely on the certification(s) given by the SQEP. EHP would require a Design Plan certified as appropriate for achieving relevant conditions of the EA before commencing construction of the creek diversion.

4.12.4 Outstanding issues

The EIS did not provide detailed information on the full range of potential impacts including data on contaminants, particularly metals from mine affected water and the potential impacts on the referable wetland adjacent to ML50254. Taroom Coal should further investigate and assess through a through hazard assessment other chemicals of potential concern and commit to monitor end-of-pipe discharge of metals, metalloids, halogens (fluoride) and hydrocarbons.

Further survey work (riparian, aquatic, water quality) would be required to appropriately describe the wetland, particularly, during the periods when the wetland contains water.

The EM plan should be refined to more accurately reflect proposed mine affected water release limits and trigger values. In particular the EM plan did propose release limit for turbidity, and the EC release limit should be removed as there are flow triggered release limits for this water quality indicator.

The EM plan would require amendment including:

- referable wetland
    - impact to wetland from mine affected water releases to Horse Creek
    - impact of predicted water level changes (increase and decrease)
    - propose a monitoring program (ecosystem health) for the wetland
- mine affected water releases:
    - provide details of site accessibility during periods of high rainfall and capacity to effect releases during this period
- sediment dams – to be included as mine affected water release points because of predicted TDS levels.

The water management plan for the project would need to be amended prior to the issue of a draft EA. A water management plan should identify sound water management practices for the operation of the mine including:

- clearly identify all potential impacts
- minimise the potential risks of contaminants being released to the environment

- include water quality monitoring for all storages, release points and receiving waters.

4.12.5 Conclusions and recommendations

The EIS concluded that impacts of mobilisation of sediment and contaminants to the receiving environment would be minimal with the proposed implementation of management measures. However, the EM plan should be revised and updated to include sufficient information on the full range of potential impacts including:

- data on contaminants, particularly metals from mine affected water and the potential impacts on the referable wetland adjacent to ML50254
- site accessibility during high rainfall events
- potential impacts including changes to water levels and monitoring of the wetland
- all mine affected water release points.

Taroom Coal should further investigate and assess through a thorough hazard assessment other chemicals of potential concern and the need for end-of-pipe and receiving environment monitoring of metals, metalloids, halogens (fluoride) and hydrocarbons.

4.13 Groundwater

4.13.1 Existing values

The removal of overburden and coal seams would require the localised dewatering of aquifers. The EIS assessed and modelled the groundwater resource of the project and surrounding area to predict changes in groundwater quality and quantity and the potential impacts of dewatering on local and regional groundwater values.

The EIS identified three aquifer systems in the project area would be potentially impacted by the project including:

- sedimentary aquifers of the GAB
  - contained within the confined Hutton Sandstone formation, a depth of about 825m, providing high yields of good quality water
  - Precipice Sandstones formations, at a depth of about 400m, providing reasonable to high yields and good quality water
- relatively permeable coal seam aquifers of the Juandah Coal Measures
- unconsolidated alluvial sediments.

The EIS stated that groundwater recharge to coal seam aquifers is from infiltration of incident rainfall and via intersection of the coal seam outcrops or shallow overburden with surface water sources.

The EIS did not measure recharge volume of the shallow alluvial aquifers or sandstone beds of the GAB but concluded that due to the relatively low annual rainfall, high evaporation rates and low permeability overburden, recharge at the mine site is considered to be very low.

The EIS did not undertake groundwater monitoring of the GAB Hutton Sandstone or Precipice Sandstone aquifers. It stated that these aquifers provide the main source of water for the area. The EIS identified deep water bores in the landholder census including the Wandoan Town Bores and other community bores (Juandah, Bimbadeen and Grosmont Bores). Landowners and the grazing industry throughout the district maintain a high level of dependence on these deep aquifers.

The EIS measured groundwater levels and flow direction within constructed bores. Results indicated that flows generally reflect the surface topography with groundwater flow from south to north.

The EIS stated that groundwater quality in the overburden and coal seam aquifers are generally poor, varying from brackish to saline brine. EC was generally lower within the alluvial deposits and typically higher in the Walloon Coal Measures. The EIS concluded that groundwater in the overburden and coal seams was not suitable for drinking and was generally more suited for stock watering purposes and that no known users of groundwater were identified for industrial or recreational purposes within the project area.

The EIS stated that as groundwater quality is generally brackish to saline and that it is unlikely that any vegetation is dependent on this groundwater and no natural springs were found or observed in the project area.

Stygofauna and subterranean ecological values are described in section 4.14 of this report.

4.13.2 Impacts

The potential impacts to groundwater from the project identified by the EIS include:

- dewatering during mining may result in drawdown and depressurisation of the sedimentary aquifers of the

GAB, Juandah Coal Measures and unconsolidated alluvial sediments
- groundwater contamination from chemical and hydrocarbon spills, overburden and reject material, stormwater/process water dams, the TSFs and sewage effluent
- significant reduction in the extent of Stygofauna habitat within the Horse Creek alluvium from draw down and removal of the aquifer.

The EIS assessed and modelled the groundwater resource of the project and surrounding area to predict changes in groundwater quality and quantity, standing water levels and the potential impacts of dewatering on the local and regional groundwater values. The EIS concluded that mine dewatering operations would reduce both water-table levels and groundwater flows.

The aquifers that would be impacted by mining are those associated with the coal seams of the Juandah Coal Measure and the alluvial aquifers of Horse Creek. The EIS stated that the GAB aquifers (contained within the Hutton and Precipice Sandstones formations on the project site) are located at significant depth below the proposed mining to not be impacted.

The EIS stated that the Horse Creek diversion would have a negligible impact on groundwater resources due to the lack of alluvial sediments and shallow, connected aquifers in the area of the proposed diversion. The EIS stated that aquifers underlying the coal measures receive limited recharge contribution from existing alluvial sediments within the project area along Horse Creek. The EIS concluded that groundwater did not contribute to Horse Creek baseflow in its existing alignment and it is unlikely that groundwater would contribute to the baseflow of the proposed diversion.

The EIS stated that groundwater inflow into active mining operations would occur directly from the mined coal seams. It also stated that the expected groundwater inflow (seepage) to the pits would be relatively low. Estimated modelled inflow volumes are predicted to be less than 1ML/day for the northern and western pits and up to 2.5ML/day for south-eastern open-cut pit.

Groundwater seepage, direct rainfall and evaporation would contribute to the final water levels in the voids. Pit voids would remain a groundwater sink post-mining and groundwater and rainfall inflows would cause a lake to form within the final pit voids. The EIS groundwater modelling concluded that void water levels would not stabilise until approximately 750 years after the end of mine life. The EIS did not forecast the probable water quality of the final voids. Water quality in the residual voids would be expected to deteriorate (become hypersaline) over time due to high evaporation rates, low rainfall and the ongoing input of saline groundwater.

The EIS assessed the cumulative groundwater impacts of the proposed adjacent Wandoan Coal Mine Project mining at the same time as the Elimatta Project. Post mining, the modelling indicated the zone of the depressurisation generated by both mining projects would continue to expand as groundwater flows back into and refills the pits. Modelling in the EIS indicated that the zones of depressurisation generated by both projects join up and create a narrow zone to the north-east of the project site where cumulative impacts may persist for up to several decades post-mining. The EIS concluded that due to the uncertainties regarding aquifer properties and faulting in undisturbed areas, the groundwater model developed for the project would be reviewed after ten years of mining to determine if the predicted zone of depressurisation and impacts are accurate. The EIS stated that this review and recalibration of the groundwater model would be undertaken as required by the conditions of the project's Water Licence under the *Water Act 2000*.

The water from mine dewatering, including groundwater inflows would be stored in the raw water dams for use in mining operations. Taroom Coal would require an approval under the *Water Act 2000* to take or interfere with water through mine dewatering operations.

The EIS stated that the proposed excavations for the WSL rail and services corridor alignment are unlikely to intersect the water table and are unlikely to be at risk from groundwater seepage. The EIS concluded that as the cuttings traverse areas of high topography, any water would naturally drain along the surface towards the creeks or percolate to the water table aquifer.

The EIS stated that as groundwater quality is generally brackish to saline it concluded that it is unlikely that any vegetation is dependent on this groundwater and no natural springs were found or observed in the project area.

4.13.3 Avoidance, mitigation and management measures

The EIS stated that impacts of the project on groundwater include drawdown of aquifers associated with mining and the potential for seepage of contaminants to the aquifers from waste dumps, TSFs or accidental spills.

The EIS stated that semi-permanent environmental monitoring devices are located throughout the Project site, including groundwater monitoring bores. New monitor bores would be commissioned and others decommissioned as mining progresses.

The EIS stated that specific monitoring of the surface TSFs would be required to ensure the stability of the wall is maintained. Regular inspections would be required and instrumentation, including survey monuments, piezometers and boreholes for sampling groundwater for water quality testing, would be installed and regularly monitored.

The EIS included a range of mitigation and management measures to minimise the potential impact on groundwater resources including:

- bunding all chemical storage and handling areas to contain accidental spills
- loading and unloading bulk petroleum products in a designated area and incorporating spillage management features into the design
- monitoring a network of groundwater monitoring bores on a regular basis
- development of a deep bore monitoring program
- effective capture of all saline groundwater and runoff intercepted by the mining pits during operations while ensuring the minimal extraction of groundwater necessary to safely undertake mining to avoid over abstraction that could lead to lower than expected groundwater levels.

The EIS concluded that management strategies to mitigate groundwater impacts and are sufficient to protect the existing groundwater resource environmental values.

A groundwater monitoring program (GMP) was not provided in the EIS. Taroom Coal committed to prepare a groundwater monitor program which would:

- collect baseline and background data prior to mining, during operation and after mine closure
- provide a means of early detection and management of groundwater related impacts
- assess the progress of de-watering due to bores and seepage into the mine pit to inform the mines water supply and storage management
- identify any seepage from dams, spoil and stockpile areas
- identify any changes in groundwater quality as a result of de-watering or seepage from dams, spoil and stockpile areas to check for acid rock drainage generation and assess the performance of management strategies
- provide data for review of the groundwater model
- satisfy regulatory reporting requirements under the *Water Act 2000*.

The GMP should also include details of the following:

- the location of groundwater monitoring sites and the location of aquifers the sites are monitoring
- the frequency at which sampling would be undertaken
- the groundwater contaminant trigger values
- the groundwater monitoring reporting requirements
- the management measures to effectively mitigate and mange potential impacts on aquifers and existing groundwater users.

4.13.4 Outstanding issues

The EIS did not suitably assess and report on all aspects of groundwater water quality that may be affected by the project. Information on groundwater quality that includes the full range of potential contaminants would support a hazard assessment for potential ground contamination of the coal seam aquifers of the Juandah Coal Measures and unconsolidated alluvial sediments. Monitoring could inform the hazard assessment for surface water (i.e. where groundwater inflows are transferred to water storage dams and may be subject to controlled release to Horse Creek).

The EIS did not provide quantified estimate of the expected groundwater inflow to the pits, only qualified estimates.

4.13.5 Conclusions and recommendations

The EM plan should be revised and updated to include a groundwater monitoring program that would identify the full range of potential contaminants for groundwater. This information would allow Taroom Coal to assess the effectiveness of proposed water management strategies for protecting water quality values. The groundwater model should be recalibrated to confirm aquifer properties, any faulting and impacts on groundwater users. Taroom Coal should also commit to make good arrangements for groundwater users potentially impacted by the project.

4.14 Ecology

4.14.1 Biodiversity values

4.14.1.1 Overview

The EIS stated that the majority of the vegetation within the project area has been extensively modified as a consequence of past clearing for beef grazing activities, resulting in the loss of, or significant alteration to, the majority of vegetation communities including the displacement of native species and the homogeneity of the grass layer. Consequently, only small remnants of native vegetation remain along roads, creeks and elsewhere in fragmented patches. Watercourses within the project area act as linear, well-connected ecological corridors with habitat values. The EIS stated that Non-Remnant Grassland covers an area of 3741.8ha (93.1%) within the project area, is a dominant landscape feature and is of low nature conservation value. Exotic plant species such as Buffel Grass have been introduced for cattle grazing on the project site. Three declared weed species and five pest animals were recorded in the study area.

4.14.1.2 Mine site – flora values

The EIS stated that eight vegetation communities made up of 187 flora species were identified on the mine site, on the basis of both desktop studies and field surveys. The EIS stated that no flora species of conservation significance were identified on the project site and 34 species were identified as introduced.

The EIS drew upon the Brigalow Belt Biodiversity Planning Assessment (BPA) to assess the environmental values of the project areas. BPA mapping identified a vegetation corridor along Horse Creek and a small patch of remnant Brigalow on the eastern boundary of the southern MLA. The vegetation along Horse Creek also contains areas of State biodiversity significance (Endangered REs) and Regional biodiversity significance (Of Concern REs). The ecosystem value of parts of these areas is ranked as being very high in a bioregional context. The BPA identified the vegetation along Horse Creek and on the eastern boundary of the southern MLA as wildlife refugia.

The EIS identified that of the eight vegetation communities, six communities were classed as remnant vegetation. The Queensland Herbarium RE classifications for each of the described remnants are:

- Blue Gum Riparian Woodland (RE 11.3.25, listed as ‘Least Concern’ under the VM Act but as ‘Of Concern’ under the EHP Biodiversity Status; covering 16.39ha representing 0.4% of the MLA areas)
- Blue Gum Riparian Woodland with Interspersed Poplar Box community (RE 11.3.25 and 11.3.2, Poplar Box community is listed as ‘Of Concern’ under the VM Act and the EHP Biodiversity Status; covering 187.9ha representing 4.7% of the MLA areas)
- Brigalow Open Forest (RE 11.9.5, listed as ‘Endangered’ under the VM Act and the EHP Biodiversity Status, is included the Brigalow Woodlands’ Threatened Ecological Community listed under the EPBC Act; covering 25.9ha, representing 0.6% of the MLA areas)
- Brigalow Open Forest with Associated Poplar Box (RE 11.9.10, is listed as ‘Of Concern’ under the VM Act and as ‘Endangered’ under the EHP Biodiversity Status; cover 12.1ha representing 0.3% of the MLA areas)
- Poplar Box and Cypress Pine Open Forest (RE 11.10.11, listed as ‘Least Concern’ under the VM Act but as ‘No Concern at present’ under the EHP Biodiversity Status; 5.6ha representing approximately 0.1% of the MLA areas)
- Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions (REs 11.3.2 and 11.3.2b, is listed as ‘Of Concern’ under the VM Act and the EHP Biodiversity Status; covering 31.3ha and 1.2ha occurs east and outside of the MLA areas).

In addition to the extensive Non-Remnant Grassland, there is 28.2ha of Regrowth Vegetation (comprising 0.7%) within the MLA areas.

The EIS identified four areas of Category B Environmentally Sensitive Areas (ESA) under the EP Act as Endangered Regional Ecosystems (ERE) in the south-western corner and north of the southern MLA50254. Parts of Horse Creek located adjacent to the eastern boundary of the MLA areas were also mapped as Category B – ERE.

The EIS reported that one vegetation community (Brigalow and/or Belah Open Forest) found on the MLAs was listed as ‘endangered’ under the EHP Biodiversity Status and the *Vegetation Management Act 1999* and is also included within the Brigalow (*Acacia harpophylla* dominant and co-dominant) woodlands Threatened Ecological Community listed under the EPBC Act.

Three communities; Blue Gum Riparian Woodland with interspersed Poplar Box; Brigalow Open Forest with associated Poplar Box; Blue Gum Palustrine Wetland/Poplar Box Wetland in Drainage Depressions, are listed as ‘Of Concern’ under the *Vegetation Management Act 1999* (VM Act).

While desktop searches identified the potential for species of conservation significance to occur within the MLA areas, the EIS stated that these species were not detected in targeted searches. The EIS concluded that: ‘As the Project site has been extensively cleared and grazed, it is considered unlikely to provide suitable habitat for most threatened species’.

4.14.1.3 Mine site – fauna values

The EIS stated that 120 vertebrate fauna species were identified on the proposed MLA areas, including nine amphibians (including one exotic species), 13 reptiles, 24 mammals (including 10 exotic species) and 72 birds.

The EIS stated that one species of cultural significance, that is the Echidna (*Tachyglossus aculeatus*), as well as the Little Pied Bat (*Chalinolobus picatus*) a micro-bat species of conservation significance that is listed as 'Near Threatened' under the Nature Conservation Wildlife Regulation 2006, were recorded on the project site.

The EIS stated that two bird species, the Whistling Kite (*Haliastur sphenurus*) and the Sacred Kingfisher (*Todiramphus sanctus*), listed as Marine under the EPBC Act were recorded on MLA areas. The EIS stated that these bird species are highly mobile and commonly found throughout mainland Australia.

4.14.1.4 WSL rail and services corridor – flora values

The EIS stated that the WSL rail and services corridor traverses three vegetation corridors that are identified in the BPA. These vegetation corridors contain areas of State and Regional biodiversity significance including 'Of Concern' REs and one area of 'Endangered' RE. The EIS stated that while these REs are mostly of High or Very High conservation value, they are poorly conserved.

The EIS identified eight vegetation communities within the WSL rail and services corridor, including six remnant communities four of which are of conservation significance, specifically:

- Poplar Box Open Woodland with Brigalow/Belah Elements on Undulating Hill Slopes (RE 11.9.10 - listed as 'Endangered' under the EHP Biodiversity Status and 'Of Concern' under the VM Act)
- Brigalow and/or Belah Dominant Woodland (RE 11.9.5 - listed as 'Endangered' under the VM Act and the EHP Biodiversity Status)
- Poplar Box Woodland with Brigalow/Belah Elements on Alluvial Plains (dominant RE 11.3.2 - listed as 'Of Concern' under the EHP Biodiversity Status and VM Act; and sub-dominant RE 11.3.17 - listed as 'Endangered' under the EHP Biodiversity Status)
- Myall Dominant Woodland (RE 11.9.6 - listed as 'Endangered' under the VM Act and the EHP Biodiversity Status and corresponds with the EPBC listed Endangered Ecological Community 'Brigalow (*Acacia harpophylla*) dominant and co-dominant').

Two remnant communities that are not of particular floristic significance, but which can provide important fauna habitat for birds and reptiles were found within the WSL rail and services corridor. They are:

- River Red Gum/Blue Gum Riparian Woodland (RE 11.3.25) which forms linear strands along watercourses including Horse Creek
- Silver-leaved Ironbark Open Woodland on Undulating Hill Slopes (RE 11.9.2 – listed as 'Least Concern' under the VM Act and as 'No Concern at Present' under the EHP Biodiversity Status).

The EIS also identified two non-remnant communities within the WSL rail and service corridor. They were Derived Native and Mixed Exotic-Native Grassland and Regrowth Vegetation, which are not listed under the VM Act, EHP Biodiversity Status or the EPBC Act.

The EIS identified three areas of Category B – EREs that would intersect the proposed WSL rail and services corridor. These areas correspond with vegetation associated with Horse Creek, Juandah Creek and the stock route to the east of Juandah Creek.

A total of 125 flora species were identified within the eight vegetation communities found in the WSL rail and services corridor. One flora species, Yarran (*Acacia melvillei*), is listed as being regionally significant.

No threatened plant species were identified on the WSL rail and services corridor during the various surveys undertaken. Twenty-seven exotic plants were identified including three declared weed species including Prickly Pear (*Opuntia stricta*), Velvety Tree Pear (*Opuntia tomentosa*) and Harrisia Cactus (*Harrisia martini*).

4.14.1.5 WSL rail and services corridor – fauna values

The EIS stated that 136 vertebrate terrestrial fauna species were observed on along the proposed WSL rail and services corridor, including 10 amphibian species, 11 reptiles, 24 mammal species and 91 bird species.

The EIS stated that one bat species of conservation significance (Little Pied Bat (*Chalinolobus picatus*)) was recorded within the WSL rail and services corridor and two bird species (Black-necked Stork (*Ephippiorhynchys asiaticus*) and Cotton Pygmy-goose (*Nettapus coromondaliensis*)) were recorded immediately adjacent to the WSL rail and services corridor. These species of conservation significance are listed as 'Near Threatened' under the *Nature Conservation Act 1992* (NC Act). The two waterbird species are likely to utilise the habitat with in WSL rail and services corridor.

The EIS also identified suitable habitat along the WSL rail and services corridor area for the Rough Collared Frog

(*Cyclorana verrucosa*), listed as 'Vulnerable' under the NC Act. The potential for the Golden-tailed Gecko (*Strophurus taenicauda*) and Brigalow Scaly-Foot (*Paradelma orientalis*) and six other reptiles listed under the NC Act and/or the EPBC Act to occur along the corridor was also noted.

The EIS also noted evidence of the regionally significant Yellow-bellied Glider (southern subspecies) (*Petaurus australis australis*) in the form of scarring on Red Gums and identified the common Brush-tailed Possum (*Trichosurus vulpecula*), listed as a high priority taxon within the southern Brigalow Belt Bioregion.

The EIS stated that under the EPBC Act one listed Migratory species (Eastern Great Egret (*Ardea modesta*)) and one listed Marine species (Whistling Kite (*Haliastur sphenurus*)) were recorded within the WSL rail and services corridor.

The EIS stated that ten introduced fauna species were recorded within the MLA areas and WSL rail and services corridor. Of the ten pest species, five are declared pest animals including the Feral Cat (*Felis catus*), Feral Pig (*Sus scrofa*), European Rabbit (*Oryctolagus cuniculus*), European Fox (*Vulpes vulpes*) and Feral Dog and or Dingo (*Canis familiaris*).

4.14.1.6 Road corridor – flora and fauna values

The flora and fauna values for the road diversions were not adequately described in the EIS and no flora and fauna field survey work for the proposed road diversions were undertaken. The assessment presented in the EIS relied on evaluation of database searches. No validation or ground-truthing was undertaken despite the desktop assessment identifying the potential for 'Endangered', 'Vulnerable' and 'Near Threatened' species under the NC Act and 'Vulnerable', 'Endangered' and 'Marine' species under the EPBC Act to occur.

4.14.1.7 Mine site - aquatic ecology values

The EIS stated that three lacustrine wetlands and five palustrine wetlands including one large palustrine water body located near to Horse Creek downstream of the southern ML50254 occur on or adjacent to the project site. The large palustrine wetland, identified above as 'Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions', is classified on the EHP WetlandMaps database as a referable wetland or Wetland Protection Area (WPA) and is mapped as a Great Barrier Reef Catchment wetland of High Ecological Significance (HES). The EIS stated that the characteristics of this wetland were not considered typical of a wetland of high ecological significance. However, this conclusion is unsupported as the wetland was not surveyed during the wet season to fully characterise the wetland characteristics and values of the site.

The project area experiences variable rainfall patterns and is characterised by highly ephemeral waterways. Aquatic ecology field surveys and assessment were undertaken and reported in the EIS. Aquatic surveys recorded a relatively diverse assemblage of macroinvertebrates (15 families and two sub families from the Insecta class; four orders from the Crustacea class; one order from class Arachnidae) and a low abundance and diversity of native fish species ((Spangled Perch (*Leiopotherapon unicolour*), Glass Perch (*Ambassis agassizi*) and Rainbow Fish (*Melanotaenia splendida*)).

4.14.1.8 WSL rail services corridor - aquatic ecology values

The EIS stated that the WSL rail and services corridor would intersect watercourses, creeks, tributaries, drainage channels, lacustrine and palustrine wetlands. The EIS stated that waterways intersected by the WSL rail and services corridor ranged from ephemeral to semi-permanent. Riparian vegetation occurs along some of the waterways and where it has been cleared, this has contributed to local watercourse erosion and weed infestation.

The EIS identified 26 macroinvertebrate taxa including Diving Beetles (Coleoptera: Dytiscidae) and Bloodworms (Diptera: Chironominae), Marsh Beetles (Coleoptera: Scirtidae), Mosquito Wrigglers (Diptera: Culicidae), Baetids (Ephemeroptera: Baetidae), Water Boatmen (Hemiptera: Corixidae) and Water Striders (Hemiptera: Veliidae) along the WSL rail and services corridor. Four fish species including Agassiz's Glassfish (*Ambassis agassizii*), Empire Gudgeon (*Hypseleotris compressa*), Midgely's Carp Gudgeon (Hypseleotris sp.) and Spangled Perch (*Leiopotherapon unicolor*) were found along the WSL rail and services corridor, with Horse Creek exhibiting the greatest diversity of aquatic vertebrates. The EIS recorded Crustacean species including the Common Yabby (*Cherax destructor*), Orange-fingered Yabby (*Cherax depressus*) and a Juvenile Yabby (Cherax sp.) along the WSL rail and services corridor. The Common Yabby (*Cherax destructor*) was recorded in high abundance.

The EIS identified four obligate groundwater species (stygobites) mainly in the Quaternary alluvium deposits including three previously undescribed species of Crustacea and two Copepods within the mine area including:

- *Bathynellidae* sp. (order Syncarida)
- *Dussartcyclops* sp. (subclass Copepoda)
- *Parastenocaris* sp. (subclass Copepoda)
- *Dussartstenocaris* sp. (subclass Copepoda).

The EIS stated that two of the stygobite species (*Parastenocaris* sp. and *Dussartstenocaris* sp.) were recorded outside the project area, however two species (*Bathynellidae* sp. and *Dussartcyclops* sp.) were only recorded inside the project area.

The EIS considered it likely that, assuming connectivity of the groundwater habitat within the Horse Creek alluvial aquifer, the distribution of the other two stygobitic species would also extend outside the proposed area of impact both upstream, downstream and along the course of the Horse Creek alluvial aquifer.

4.14.2 Impacts

4.14.2.1 Mine, road and rail corridor impacts - flora

The EIS provided a high-level assessment of potential impacts on flora arising from the proposed works. The following impacts are identified:

- the EIS acknowledges that land clearing and mining activities may reduce and fragment the current extent of vegetation communities and available habitat for native flora species on the MLA areas, including areas identified by the BPA as State and Regionally significant with High to Very High bioregional Ecosystem Value
- notwithstanding that the project area and WSL rail and services corridor have been substantially cleared for grazing and related uses, there are substantial remnants that would be directly affected by the proposed works. The clearing of the MLA areas including the relocation of a section of Horse Creek would result in the loss of more than 200ha of Blue Gum Riparian Woodland (with or without Interspersed Poplar Box). The significance of this loss arises from both the local habitat values and the importance of riparian remnants and aquatic habitats as wildlife corridors. As a consequence, impacts due to the mine as well as the WSL rail and services corridor would cause fragmentation of key habitat links that are identified in the BPA and also recognised as endangered regional ecosystems (ERE)
- the project would also impact on a significant area of Endangered Brigalow Open Forest
- while some of the most affected remnant vegetation communities have been substantially affected by grazing and weed invasion, and hence have limited habitat value in terms of conservation of individual flora species, they retain substantial value in terms of fauna habitat
- there is potential for a substantial indirect impact on the extensive Blue Gum Palustrine Wetland and Poplar Box Woodland in Drainage Depressions to the east and outside of the southern MLA area, due to long-term changes to the flow regime and water quality in Horse Creek as well as changes in the quality and quantity of overland flow from adjoining areas
- while the EIS noted that the vegetation communities directly affected by project works occur elsewhere in the region, with varying extents of conservation within the protected area estate of the Taroom Downs subregion, there is little consideration in the EIS as to what the cumulative impacts of resource projects in the region could be on the vegetation communities
- project activities have the potential to cause a variety of offsite impacts on flora, including the spread of weeds, dust and contaminants, erosion and siltation, as well as increased fire risk and microclimatic changes
- the rail and services corridor would impact on an area Yarran (*Acacia melvillei*) a bioregionally significant wattle species.

4.14.2.2 Mine, road and rail corridor impacts - fauna

While a number of surveys of flora and fauna were conducted under varying seasonal conditions for the EIS, limited detail on fauna occurrences and potential impacts is provided in the EIS. In addition to direct loss of fauna habitat due to clearing, key threats to fauna identified in the EIS include:

- death or injury of fauna as a direct result of construction activities
- interference with fauna movement patterns and breeding places
- noise and lighting disturbance of fauna, especially at the MIA, CHPP, active mining areas, rail loading and turning area
- erosion and siltation of waterways
- increased population numbers of pest animals.

The EIS suggested that two bird species of conservation significance that occur near the project area (i.e. the Black-necked Stork and Cotton Pygmy-goose) are unlikely to be significantly affected because of their large ranges, locally dispersive behaviour and the limited availability of suitable aquatic habitat within the project area. The EIS acknowledged that the locally resident Whistling Kite is vulnerable to mortality from scavenging off road kill, but suggests that the project is unlikely to have a significant impact on the regional population because of the widespread availability of breeding habitat in the area as well as the extensive range of the species.

The EIS noted that the WSL rail and services corridor would remove a small area of suitable riparian habitat for the Eastern Great Egret, Whistling Kite and Little Pied Bat. It further noted that habitat suitable for the South-eastern

Long-eared Bat exists both within and outside the project site and is well connected through the Horse Creek riparian corridor. The EIS concluded that the project would impact on approximately 7% of the potentially suitable habitat for the South-eastern Long-eared Bat within the broader region, however claimed without suitable justification that this was unlikely to form important habitat for the species.

4.14.2.3 Mine, road and rail corridor impacts - aquatic

While aquatic taxa have been surveyed, the EIS does not provide a clear characterisation of the aquatic ecology of potentially affected waterways and wetlands. While the general types of impacts that may result from the project are identified in the EIS, a detailed assessment of potential impacts has not been provided. General potential impacts that are identified include:

- clearing within riparian zones leading to habitat fragmentation and weed invasion
- the diversion of Horse Creek would result in fragmentation of a valuable wildlife corridor, especially affecting smaller terrestrial species and potentially impede the movement of some fish species, unless a wholly successful hydrological and ecological restoration is achieved
- development of the WSL rail and services corridor would involve the clearing of small areas of waterway REs including habitat from three riparian corridors of recognised refugia value, two of which are recognised in the BPA as of State and Regional Significance
- clearing of large trees within riparian zones may impact on the Little Pied Bat, which roosts in tree hollows near water
- surface runoff in the vicinity of the WSL rail and services corridor, as well as from access roads, would have potential to generate local erosion and sediment input to waterways
- any releases of mine affected water, particularly if contaminated or with altered physio-chemical characteristics or involving excessive flows, could affect water quality and hence aquatic ecosystem functions
- sediment-laden runoff causing elevated turbidity and thereby affecting light penetration as well as possible nutrient release, and leading to changes in aquatic plant ecology and invertebrate populations, especially of less mobile fauna
- reduction of aquatic invertebrate diversity and abundance associated with aquatic habitat changes may in turn contribute to reduced populations of vertebrates utilising aquatic habitats
- rail bridges and culverts associated with construction of the WSL rail and services corridor could alter natural flow conditions and impede fish passage, particularly in the short-term
- creation of artificial ponds due to construction works could provide suitable breeding habitats for Cane Toads.

The EIS stated that the large palustrine wetland located adjacent to MLA50254 and near to Horse Creek would be vulnerable to off-site and project impacts. Flood modelling for the EIS indicated that some changes to inundation regimes are expected.

The EIS noted that Stygofauna are poorly known both taxonomically and ecologically and that although there are likely to be a reduction in the populations of Stygofauna species in the impact zone, this is unlikely to be to such a great extent to cause a long-term and continuous decline in Stygofauna populations provided further survey work and assessment confirms connectivity of the Stygofauna groundwater habitat outside the area of impact both upstream, downstream and along the course of the Horse Creek alluvium.

4.14.2.4 Avoidance, mitigation and management measures

The EIS provided a very high-level statement of proposed avoidance, mitigation and management measures with respect to ecology impacts:

- minimising vegetation clearance to the extent consistent with safe and efficient operation, while retaining remnant vegetation along the WSL rail and services corridor alignment, particularly at creek crossings, bioregional corridors and stock routes
- providing vegetation offsets in accordance with policy requirements (see section 4.14.5)
- implementing appropriate erosion and sediment control practices
- undertaking effective rehabilitation of disturbed areas, using appropriate, locally endemic native species, favouring species that would encourage the return of native fauna
- where practicable, retaining and reinstating coarse woody debris to provide micro-habitat, including for threatened Brigalow reptile species
- restoring habitat corridors between remaining and replanted patches of vegetation where possible, and in particular rehabilitation of the Horse Creek diversion is intended to restore connectivity, functionality and intactness values relative to Baseline BioCondition surveys that have been conducted
- designing the Horse Creek diversion to support the hydrological and ecological functioning of Horse Creek as well as the large palustrine wetland
- designing rail bridges and culverts associated with the WSL rail and services corridor to minimise impacts

on fish passage, habitat values and natural flows
- controlling the discharge of waters from the mine site in accordance with the Model Mining Conditions for Coal Mines in the Fitzroy Basin
- avoiding the creation of permanent shallow water areas in the vicinity of infrastructure that might provide habitat for Cane Toads
- applying appropriate management strategies to control the occurrence of pest fauna and weed species, in accordance with statutory requirements
- applying speed limits on the MLA areas that would reduce the risk of collisions with fauna
- monitoring of water quality, sediment quality, stream flow, riparian vegetation and macroinvertebrates would be undertaken as part of a Receiving Environment Monitoring Program to detect environmental changes potentially resulting from the project, including within the large palustrine wetland off Horse Creek; monitoring would be conducted within 10km downstream of project release points
- restricting the access of wildlife to the TSFs and final voids through fencing and safety bund walls.

4.14.3 Outstanding issues

The EIS has addressed the matters relating to ecological impacts set out in the TOR but it is deficient in detail, clarity and integration in describing potential impacts. This is especially so in relation to impacts on terrestrial and aquatic ecosystems (and their interaction), as well as the regional context of cumulative pressures and the conservation status of affected species and ecosystems. The EM plan should be revised to fully address the potential impacts on flora and fauna and aquatic ecosystem and health values and develop suitable and effective management measures to mitigate the potential impacts. Further assessment of the potential impacts on the following fauna and their habitats is warranted:

- Little Pied Bat and South-eastern Long-eared Bat, especially in the context of habitat corridors
- Rough Collared Frog, Golden-tailed Gecko, Brigalow Scaly-Foot and other listed reptiles that may be present along the WSL rail and services corridor
- listed reptile species in Brigalow vegetation communities
- stygofauna in alluvium and groundwater.

While the avoidance, mitigation and management measures for ecological impacts put forward in the EIS (and summarised above) are generally appropriate, greater specificity is needed prior to project approval in relation to:

- objectives, environmental performance criteria, accountabilities and compliance incentives (e.g. financial security) for the rehabilitation and maintenance of Horse Creek in both the diverted and downstream sections, as well as for the maintenance of the ecological values of waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works
- salvage of fish that might be affected by the diversion of Horse Creek.

Development of species management programs (SMP) for all listed threatened fauna species affected by project works (e.g. Little Pied Bat and South-eastern Long-eared Bat) would be required in accordance with the requirements of the Nature Conservation (Wildlife Management) Regulation 2006.

4.14.4 Conclusions and recommendations

While the mine site and WSL rail and services corridor have been largely cleared of native vegetation, remnant vegetation in the project area retains important ecological values, especially along Horse Creek and other waterways and associated wetlands. These values have been broadly characterised in the EIS but further detail is needed.

It is recommended that EM plan be updated to include:

- management plan(s) that incorporate objectives, performance criteria, accountabilities and compliance incentives for:
    - the rehabilitation and maintenance of Horse Creek in both the diverted and downstream sections, as well as for the maintenance of the ecological values of waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works
    - the rehabilitation and maintenance of terrestrial ecosystems to enhance fauna habitat values
- the need for species management programs (SMP) for listed threatened fauna species that would be affected by project works.

4.14.5 Biodiversity offsets

4.14.5.1 Environmental offset plan

A specific offset plan was not developed as part of the EIS although an environmental offset strategy was provided as an appendix to the EIS. Taroom Coal has committed to providing a refined environmental offset strategy. The offsets would be required to be provided in accordance with the requirements of the Queensland Environmental Offsets Policy.

4.14.5.2 Outstanding issues

The environmental offset strategy proposed in the EIS did not provide sufficient information to identify and quantify all matters of State environmental significant (MSES) values. The Environmental Offset Strategy lacked specific detail including:

- whether the delivery of the offset strategy would be staged or as a single direct offset
- whether the offset strategy as presented covers the entire project or whether separate plans would be developed for each stage
- delivery timeframes
- connectivity values of riparian vegetation.

Since the EIS was submitted to EHP, a new framework for environmental offsets in Queensland commenced with the introduction of the *Environmental Offsets Act 2014* (Offsets Act). The Offsets Act was passed with amendments on 22 May 2014 and commenced on 1 July 2014. It is supported by the Environmental Offsets Regulation 2014, the Queensland Environmental Offsets Policy and the Financial Settlement Offset Calculation Methodology. Proponents can elect to provide either a proponent-driven offset or a final settlement offset, or some combination of these two.

Offset requirements for the project would now need to be determined in accordance with the Queensland Environmental Offsets Policy. Offset delivery plans would need to be agreed for relevant parts of the project, which might involve separate plans for the MLA area, road realignment and for the WSL rail and services corridor.

4.14.5.3 Conclusions and recommendations

The environmental offset strategy proposed is not adequate. Offsets required would be in accordance with the Queensland Environmental Offsets Policy and would be regulated through conditions of an EA for the mining lease. Offsets would also be required for any significant residual impact on MSES.

Recommended EA offset conditions are provided in Appendix 1.

4.15 Transport

4.15.1 Existing values

The project is located about 25km west of the Leichhardt Highway (Hwy) and 33km east of the Roma-Taroom Road, and may be accessed from either of these major transport routes via the local road network.

Project traffic is expected to access the State Controlled Road (SCR) network at three existing intersections at:

- Jackson-Wandoan Road/Bundi Road
- Leichhardt Hwy/Booral Road
- Roma-Taroom Road/Canal Clifford Road.

The Leichhardt Hwy is a major State Strategic Road linking southern and central Queensland.

The existing rail network in the region comprises both the Moura System operated by Aurizon, which connects Moura to Gladstone, and the Western System of the Queensland Rail Network, which extends from Quilpie to Rosewood and north to Wandoan. The various proposals for coal development in the Surat Basin have led to recognition of the need to link the Western and Moura Systems. The Surat Basin Rail Project would connect the Western System near Wandoan to the Moura System near Banana, and would provide multi-user open access enabling export of coal and freight through the Port of Gladstone, as an alternative to the capacity-constrained Port of Brisbane.

Whereas Surat Basin Rail Pty Ltd is the proponent for the Surat Basin Rail Project, the WSL rail and services corridor is to be developed for Taroom Coal by Northern Energy Corporation Ltd. The Wiggins Island Coal Export Terminal is being developed in Gladstone by a consortium of existing and potential coal exporters.

Taroom Aerodrome, located 22km south of Taroom, is owned and operated by the Banana Shire Council. Other, larger regional airfields may also play a role in FIFO transport for the project but were not specified in the EIS.

4.15.2 Impacts

4.15.2.1 Road impacts

During the expected 24-month construction period, an estimated 26,344 truckloads of plant and bulk material would be transported to the project site, either from the local area or from Brisbane. Most loads (98%) would be raw materials sourced from local quarries, particularly crushed rock, gravel and sand as well as railway ballast. Taroom Coal proposes to source materials from:

- Warrians Quarry (Boral) located about 100km southwest of the mine site at Euthulla
- Knob Hill Quarry (Ostwald Bros) located about 120km northeast of the mine site at Bungaban.

However, according to the EIS both Boral and Ostwald Bros. are exploring development opportunities for quarries in the region to supply the construction needs of this and other projects.

During the operational phase, expected to exceed 32 years, regular deliveries of fuel, explosives, tyres, perishables and other goods would be required. The project would require in excess of 1000 deliveries of diesel per year and up to 900 deliveries of other dangerous goods per year.

The EIS described the specific routes to be used for the transport of materials to the site during the construction and operations phases. Materials would be transported by road to the site using a mix of vehicles, including three-axle and four-axle trucks, B doubles, semi-trailer and road trains.

A number of public, formed roads across and around the proposed mine would be directly affected by the project, through temporary and permanent closures, relocation and new sections of roads adjacent to the MLA. The redesign of the local road network to facilitate the mine operations would disrupt existing road users and traffic movement until works are complete. Local roads which would be directly affected by the project include:

- the section of Perretts Roads between Bundi Road and Ryals Road would be relocated from the southern MLA to an alignment to the east outside the MLA, and part of the existing alignment of Perretts Road between Ryals Road and Cattle Camp Road be upgraded
- part of Ryals Road across Horse Creek to Perretts Roads be upgraded
- Cattle Camp Road be upgraded
- Goldens Road be closed to facilitate development of the mine haul road
- a section of new road, linking Goldens Road to Cattle Camp Road, be developed to maintain access between the western side of the MLA areas and Perretts Roads.

According to the EIS, the proposed public road developments have been designed in accordance with the relevant AUSTROADS Guides and would be constructed as unsealed gravel roads with imported base and sub-base material. Perretts Roads has a design speed of 50km/hr while the other roads have a design speed of 40km/hr.

A Road Impact Assessment (RIA) was undertaken for the EIS, in accordance with the Guidelines for Assessment of Road Impacts of Development (GARID), and as required by the TOR. In the RIA a traffic impact assessment and a pavement impact assessment were prepared for the construction and representative operational years.

During construction, only the Roma-Taroom Road was found to be subject to a significant increase in traffic (more than 5%) above background levels, attributed to the carriage of materials from local quarries to the site. However, the EIS stated that despite the increase in traffic ranging from 5.9 to 17%, no change in the level of service (i.e. free flowing traffic) would result during either the construction or operational periods.

In terms of pavement impact assessment, it was found that project-related increases in equivalent standard axle (ESA) loads during construction, i.e. relative to forecast background ESA loads, would only exceed the specified 5% threshold on segments of the Leichhardt Highway (Hwy) and the Roma-Taroom Road. None of the roads investigated showed a significant increase in ESA levels during the operational period. According to the EIS, the results of analysis indicate that the reduction on pavement life would not exceed one year on any of the road segments forming the study area, and therefore no rehabilitation contributions would be required. However, maintenance cost contributions in relation to pavement impacts on the Leichhardt Hwy and the Roma-Taroom Road due to the project have been estimated to be in excess of $1 million on the basis of the ‘Fitzroy methodology’.

Significant impacts on the local road network are expected, in terms of both traffic and ESAs, notably including the route from Ostwald Bros Quarry during the construction period, and on Perretts Road and Bundi Road during the operational period. Impacts on interchanges between local roads and the SCR network from project vehicle movements have also been assessed. Major impacts on the Roma-Taroom Road/Canal Clifford Road, Leichhardt Hwy/Nathan Road and Leichhardt Hwy/Booral Road intersections are expected during the construction period. The EIS proposed that the need for upgrading of intersections, in particular along the Leichhardt Hwy, Jackson-Wandoan Road and the Roma-Taroom Road, be addressed during the detailed design stage for the project.

The EIS noted that the proposed Glencore Wandoan Coal Project to the east of the project would entail extensive changes to the local road network, and hence cumulative impacts would need to be considered in due course particularly for transport safety management. The EIS acknowledged that issues related to movement of hazardous materials and the potential for interaction with school bus routes would need further consideration.

4.15.2.2 Rail impacts

During the development of the WSL rail and services corridor, it would be necessary to establish suitable crossings at the Leichhardt Hwy and five local roads, as well as occupational crossings within private properties and stock crossings. It is proposed that the crossing of the Leichhardt Hwy and four local roads would be grade separated as road over rail. It is also proposed to construct an access track along the length of the WSL rail and services corridor to facilitate the movement of construction vehicles.

During the operational phase, for the expected average production rate of 5Mtpa, rail transport of the coal is expected to require 1.17 trains per day, each with 5 diesel locomotives hauling 140 wagons of 106 gross tonnes each. Coal would be transported initially via the WSL rail and services corridor and then the Surat Basin Rail link, connecting with the Moura System and onwards to the Port of Gladstone. It is not expected that the daily train movements for the project would negatively impact on the rail network. Similarly, since the project has been factored into planning for the Wiggins Island Coal Export Terminal, if this port project proceeds, the project would not negatively impact on other port facility users.

The EIS acknowledged that rail might be used for the delivery of some operational supplies originating in Rockhampton or Brisbane, but noted that this scenario has not been assessed in order to focus on the worst case road-based scenario.

4.15.2.3 Airfield impacts

During the construction and operational phases, locally sourced staff would be transported to the mine site by mini-bus and or van transfers. However, most (95%) of the project workforce is expected to travel from the Fraser Coast on a FIFO basis to an airfield within the Taroom area via Dash 8 or similar aircraft. While airports on the Fraser Coast have adequate capacity to cater for increased FIFO demand, the options of either upgrading of the Taroom airstrip or developing a greenfield airfield at Wandoan are being considered by Taroom Coal. An aligned approach with Glencore Coal Queensland is expected.

4.15.2.4 Stock route impacts

Parts of the State's Stock Route Network (SRN) overlap with the project area, including a Camping Reserve within the southern MLA and a designated Stock Route which the WSL rail and services corridor transects. While the loss of the Camping Reserve would be mitigated by alternative reserves in the area, continuity of the Stock Route would require appropriate stock crossings to be established, probably on a grade-separated basis.

4.15.3 Avoidance, mitigation and management measures

The EIS concluded that significant impacts on the SCR road network would be limited to the Leichhardt Hwy near Wandoan township and the Roma-Taroom Road. It noted that the specific requirements for mitigation and compensation would need to be resolved with DTMR. Similarly, the EIS stated that 'while the impact to local roads has not been quantified, negotiations will be undertaken with the WDRC to reach a suitable agreement which will include, where required, provisions for any necessary upgrades and on-going maintenance and rehabilitation.'

In response to several submissions about cumulative impacts, a draft Road Use Management Plan (RUMP) has been developed—though not part of the EIS—to identify objectives and strategies to mitigate and manage traffic risks and road impacts for the SCR, local roads and other roads including site roads. It is proposed that the RUMP would be finalised in negotiation with DTMR and WDRC prior to the start of construction of the project and remain a 'living' operational document in response to the evolving needs of the project and interacting projects. In accordance with the draft RUMP, it is intended that detailed Traffic Management Plans would be developed for road reserve crossings along the WSL rail and services corridor.

While submissions from the WDRC and Banana Shire Council called for detailed impact assessments, a RUMP for local roads and an Infrastructure Agreement with WDRC. Taroom Coal responded that its intended approach, as outlined above, would be appropriate.

4.15.4 Outstanding issues

Overall, the EIS has adequately addressed the TOR with respect to transport impacts.

DTMR has responded to the final EIS by expressing its general satisfaction with Taroom Coal's responses to issues previously raised by DTMR. At the same time DTMR has stressed the need for timely action on several matters before significant project traffic occurs, namely: a final RIA based on appropriate traffic data, including a revised pavement impact assessment, further intersection analysis, a refined RUMP, development of Traffic Management Plans, and further measures to address driver fatigue. Importantly, DTMR is not satisfied with the level of assessment and response to road safety risks from project traffic, particularly in the context of intersections that may be used for trucks hauling material from quarries. Taroom Coal's has committed to undertake further assessment and mitigation measures to address transport-related issues raised by DTMR.

4.15.5 Conclusions and recommendations

The EIS has provided an adequate assessment of transport impacts subject to further action to address the matters identified by DTMR.

Further consultation with DTMR is required during detailed mine planning and well-prior to the commencement of construction.

Recommended road traffic conditions provided by DTMR are provided in Appendix 1, Attachment C.

4.16 Noise and vibration

4.16.1 Existing values

The EIS identified the environmental values to be protected with respect to noise, in accordance with the Environmental Protection Policy (Noise) (EPP Noise), as being the protection of: the health and biodiversity of ecosystems, human health and well-being and the amenity of the community. In terms of human receptors, the EIS identified 54 sensitive receptors that could be affected by noise from the project.

Background noise monitoring was undertaken in February 2008 at five locations surrounding the MLAs, and to the south of the WSL rail and services corridor rail loop. High maximum noise levels of up to 71dB(A) were recorded but were attributed to insects and other natural sources, rather than anthropogenic sources, and were characterised as being 'typical of the summer noise environment'. Background noise levels, determined on the basis of the minL90dB(A) measure, were much lower being in the range of 22 to 30+dB(A) during the day. Noting the seasonal influence, the EIS suggested that in winter the background noise level during the day, evening and night would be 25dB(A) minL90 or less.

4.16.2 Impacts

The EIS has considered appropriate noise limits for mining operations in the context of the EHP EcoAccess Guidelines Planning for Noise Control. It proposed that a night-time noise limit of 35dB(A) Leq,adj,T be applied to the project, on the basis of achieving an internal sleep disturbance criterion of 30dB(A). A day-time and evening noise limit of 40dB(A) Leq,adj,T is proposed, in order to enable the EHP objective of 35dB(A) to be achieved inside dwellings. The EIS noise consultant suggests that application of the latter criterion would also enable the 50 dB(A) Lmax limit for sleep disturbance to be met.

Noise modelling for the mine operations considered outcomes under various metrological conditions as well as with both standard and noise-attenuated equipment. Attention focused on sensitive receptors that could be subject to noise levels in excess of proposed limits. The two worst affected sensitive receptors are located within the project MLAs areas and are understood to have been acquired by Taroom Coal and would be unoccupied during mining.

Noise limits are expected to be achieved at several sensitive receptors off the mining leases under neutral weather conditions, but exceedances of night-time limits could occur under adverse weather conditions. One residence on Bundi Road near the southern MLA could be subject to excessive noise under some conditions. Use of noise-attenuated equipment is proposed to limit exceedances.

The EIS combined available noise estimates for the Wandoan project with modelling for the project to identify the potential for cumulative exceedances at sensitive receptors. In addition to one residence within the northern MLA, two residences within the Wandoan Coal Project MLA could be affected. While the EIS notes that two underground mines have been proposed in adjoining areas, the respective EISs have yet to be lodged and hence it has not been possible to consider further cumulative impacts.

For the WSL rail and services corridor, in the absence of statutory noise criteria for construction activities, the EIS put forward criteria derived from the EPP Noise for construction activities. Construction is proposed only to occur during the day, when a limit of 50dB(A) Leq would apply. Operational noise criteria for residences adjacent to the WSL rail and services corridor are proposed to be taken from the Queensland Rail Code of Practice – Railway Noise Management (2007), which comprise a weighted 24-hour equivalent measure of 65dB(A) Leq(24hr) and a maximum level of 87dB(A) Lmax (interpreted as the arithmetic average of the highest 15 maximum noise measurements per 24 hour period).

In view of the potential for night-time noise levels to cause sleep disturbance, it is appropriate to also consider appropriate night-time noise criteria. The noise limits for the WSL rail and services corridor are based on the Queensland Rail Code of Practice – Railway Noise Management (2007). In the context of new rail developments, the New South Wales (NSW) Rail Infrastructure Noise Guideline (2013) sets a useful night-time 'trigger' of 55dB(A) Leq(9hr) and a 80dB(A) Lmax 'trigger' for single events, in terms of requiring 'feasible and reasonable mitigation measures' to be considered. EHP recommends that the NSW EPA guideline be applied. These limits are needed to protect amenity values at all sensitive receptors. With reference to the NSW EPA derived limits, it is recommended that Taroom Coal re-run the noise modelling. The reasoning is that the EIS modelling indicated that one residence (ID14: Lot 41 on CP857459) would receive noise above the criteria. Given the differing parameters in the NSW guideline, it may be that other sensitive receivers would receive noise above the modelled noise levels. It is recommended that the EM plan provide appropriate mitigation measures for Lot 41 on CP857459 and others if modelling proves necessary.

The impacts of operation of the WSL rail and services corridor were modelled on the basis of noise calibration measurements from passing coal trains near Chinchilla. Two rail usage scenarios were modelled, based on use of the WSL rail and services corridor for the mine only (5Mt/yr, 1.35 trains a day, 330 days a year) and its use for the mine as well as other mines (30Mt/yr, 8.2 trains a day). The model suggested that the noise criteria under the Code of Practice – Railway Noise Management could be achieved in both scenarios, although the most exposed receptor – located only 60m from the railway centreline-would be impacted above the 87dB(A) Lmax criterion.

A separation of 600m of rail construction activities from sensitive receptors is expected to be needed in order to comply with the proposed noise objectives. Five residences fall within this distance of the current rail alignment. However, any impacts would be limited to the daytime and would affect individual receivers for only between four and six weeks. The EIS also noted that where the rail line is constructed in cut or otherwise shielded from sensitive receptors, the noise levels could be lower than modelled estimates, while an elevated alignment could raise the noise level marginally.

For impacts of ground vibration and airblast, the EIS has used standard formulae to estimate the separation distances needed for compliance with relevant blasting standards. On the basis of blasting parameters provided by Taroom Coal, compliance with peak particle velocity limits (5mm/s) for ground vibration is anticipated at 800m distance. Since the nearest dwelling is approximately 1km from the proposed pit, there is a reasonable prospect that compliance could be achieved in practice. On the basis of indicative blasting parameters provided by Taroom Coal, the general limit of 115dB(A) would be achieved at a separation of 1.2km while a separation of 1.8km would be needed to ensure compliance with the maximum limit of 120dB(A). The EIS noted the need for 'the blasting parameters to be designed accordingly' and to achieve compliance suggested that this would be possible, though any practical implications were not identified.

4.16.3 Avoidance, mitigation and management measures

The EIS indicated that it is likely that noise-attenuated equipment would need to be used for mining operations as well as rail construction to avoid exceedances, however this would need to be confirmed.

Taroom Coal commits to conducting periodic noise monitoring 'as required, at the worst affected sensitive receivers throughout the mine life', as well as to conduct additional noise monitoring if noise complaints are received. Noise mitigation measures are to be investigated (e.g. further attenuation or restrictions on mobile equipment) where noise limits are exceeded.

The EIS acknowledged that one residence near the rail centre line would be subject to a high level of operational noise, the proposal that an 'agreeable solution between the property owner and the proponent be explored' with respect to mitigation measures is insufficient to resolve this. Noise mitigation and management is needed for residences within the 600m buffer for rail construction.

The EIS proposed that vibration and airblast monitoring during initial blasts would be used to ensure that blast parameters comply with applicable standards. If this proves problematic, it is possible that acquisition of some additional residences would be necessary.

4.16.4 Outstanding issues

The EIS provided a generally satisfactory response to the TOR, describing existing environmental values and potential impacts for to noise and vibration. The major uncertainty is the potential cumulative impacts that could arise from multiple mine developments in the area, including use of the WSL rail and services corridor.

One submitter challenged the credibility of the EIS assessment of the noise impacts of the railway operations and called for an independent review. It is accepted here that the noise assessment at the current level of design for the WSL rail and services corridor can only be regarded as preliminary and some refinement of applicable noise criteria is needed. Importantly, if mutually satisfactory agreements with any significantly affected landholders cannot be achieved then independent expert assistance may be needed to resolve appropriate mitigation responses.

Overall, the EIS lacks specificity on how the achievement of objectives for noise and vibration would be monitored, audited and managed, although it does propose that the EA for the project require compliance with the appropriate noise standards.

4.16.5 Conclusions and recommendations

With a few qualifications, the EIS has provided an adequate assessment of noise and vibration impacts arising from the project, especially having regard to unavoidable uncertainties with respect to cumulative impacts from multiple mine developments in the area.

It is recommended that:

- an EA for development and operation of the WSL rail and services corridor incorporate night-time noise limits that are reflective of the NSW limits of 55dB(A) Leq(9 hr) and 80dB(A)Lmax
- documentation in support of required EAs must provide satisfactory proposals for:
    - resolving mitigation measures to address any likely potential or observed exceedances of noise or airblast limits at sensitive receptors, including in the context of possible future expansions of rail operations using the WSL rail and services corridor
    - monitoring, auditing and managing noise and airblast performance.

Recommended noise and vibration EA conditions have been provided in Appendix 1.

4.17 Economics

4.17.1 Existing values

The EIS recognised that the Western Downs is a long-established agricultural area. It identified the role of Wandoan in serving the surrounding wheat and cattle industries, including as a major cattle trucking centre. At the same time, the EIS observed that oil, gas and coal exploration and exploitation would be key drivers of economic growth in this region in the future. It noted that there are currently more than 47 existing, planned or proposed resource production projects in the Western Downs local government area. However, the feasibility of any future coal projects in the region is seen to be contingent on the Surat Basin Rail connection and the Wiggin Island Coal Export terminal being established.

4.17.2 Impacts

The EIS stated that during construction of mine facilities and railway the project would contribute $725 million to the Gross State Product (GSP). During the expected mine life of 32 plus years, it is forecast that it would contribute $564 million annually to the State's GSP. In terms of discounted, net present value, taking account of the attributed non-market value of environmental impacts, the project is expected to deliver $1.92 billion in net economic benefits. Associated regional economic impacts are expected to include increases in regional economic activity, income and population, as well as creating employment opportunities in the Wide Bay region.

While local business would have an opportunity to provide services to the project, these opportunities would be limited in as much as the workforce is to be largely accommodated on-site. The only stakeholder group identified as subject to negative economic impacts is the local graziers who would forego income from grazing on the project site.

The EIS further stated that the State Government is not expected to be exposed to costs associated with new required regional infrastructure, which would be paid for by the private developers. More specifically, it stated that 'no significant impact on regional road infrastructure is expected'.

4.17.3 Avoidance, mitigation and management measures

In the context of neutral impacts on public infrastructure as well as expected positive economic impacts in the region, no mitigation actions are seen to be necessary.

4.17.4 Outstanding issues

In general, the EIS has adequately addressed the TOR with respect to economic impacts. Some aspects that have not been clearly addressed are the potential for indirect costs affecting local landholders, incremental costs associated with local services provision and road maintenance.

4.17.5 Conclusions and recommendations

The EIS has provided an adequate assessment of economic impacts raised in the TOR subject to clarification of the outstanding issues identified above.

4.18 Social

4.18.1 Existing values

The EIS has largely relied on available statistical data to describe the broad profile of the nearest townships of Wandoan and Taroom as well as the wider regional community, in order to characterise the existing social environment within which the project is proposed. There is much reliance on a combination of general observations about rural communities and broad outcomes of consultation with local stakeholders to qualitatively characterise the social context The strong priority given to family and friendship networks and a quiet rural lifestyle is highlighted. Little specific information is provided about local landholders, although their affinity with the land in their holdings and the area is noted.

The EIS noted that the populations of Wandoan and Taroom have declined over last 10 years, but comprised 654 and 1093 people respectively at the 2011 Census. Across the region, the demographic profile is distinguished by a relatively low representation of 15-34 year-olds and a high representation of middle-aged adults. As the population has declined and there has been an out-migration of younger persons, there has been a corresponding fall in the level of participation in sporting clubs and community organisations, affecting their viability.

A high proportion of people in the two towns were born in Australia and hence there is relatively low ethnic diversity. The proportion of Indigenous persons is below the State average in Wandoan but equal to the State average in Taroom. Consistent with the high levels of socio-economic disadvantage in the region, education and income levels in Wandoan and Taroom are relatively low, although there is also low unemployment.

While home ownership rates have historically been high in Wandoan and Taroom, the EIS noted that there are an increasing number of rental properties in response to demand from resources sector. In early 2012 about 30% of houses in Wandoan were privately rented. The EIS stated that although rents had been low, they have recently begun to escalate. Moreover, high property sales in Wandoan over past three years have led to a dearth of available houses, while there have been dramatic increases in median land and house prices in both Wandoan and Taroom since 2006. As Wandoan is surrounded by Crown land, there is limited scope for new housing development.

4.18.2 Impacts

The EIS assumed that the construction workforce of about 500 people would all reside in the mine accommodation village, while a majority of the approximately 300 people in the operational workforce would also reside in the village. The workforce residing in the mine village would be FIFO on a 10/4 day roster. The EIS also assumed that only a limited number of staff, possibly with families, would reside in the local townships. An associated implication is that the project would not have a significant impact on local community and health services. However, especially if a high proportion of staff members do relocate with their families, some increased pressure on local services seems likely. This could be positive in terms of the viability of local schools. In contrast, existing childcare services are at capacity in Wandoan and non-existent in Taroom.

The EIS acknowledged that there is likely to be a substantial demand for short-term accommodation in the townships during both the construction and operational phases, potentially in combination with demand arising from other, overlapping resource projects. In the WDRC local government area, 67.5% of non-resident workers resided in camps.

While the EIS suggested that the project would not cause significant changes on residential occupancy patterns in Wandoan and Taroom, it also acknowledged that the cumulative effects of resource projects and associated property speculation are significantly impacting on the availability and affordability of accommodation in the area. It is recognised that the probable effect of reduced housing availability and affordability is to force some local people to relocate.

The project workforce is expected to be predominantly young and 95% male during construction phase, while more females and families are expected during the operational phase. Only about 5% of employees are expected to be sourced locally. Taroom Coal expects to draw their project workforce largely from the Fraser Coast area, because of both its strong presence in Wide Bay-Burnett area and the high unemployment levels in the Fraser Coast area. Taroom Coal proposes to offer a number of traineeships and apprenticeships to attract unskilled and semi-skilled employees. The EIS notes that ‘experience in other mining regions has shown that demand for skilled tradespersons in the resources sector has impacted negatively on other industry sectors, as people move across to mining jobs …’, but on the other hand, ‘the equal opportunity policies practiced by the resources industry will also provide more job and training opportunities for women'.

The EIS draws upon a review by the Australian Centre of Excellence for Local Government of the impact of FIFO and Drive-In Drive-Out (DIDO). Some of the issues identified include:

- difficulties in planning, supplying and pricing the supply of infrastructure and services where a high proportion of the population is FIFO and DIDO
- increased vehicle traffic
- housing shortages and high rents
- increased lifestyle and safety impacts
- long-term loss of social capital in rural and regional communities.

There are also positive impacts including boosting local economies of rural and regional towns such that they can function as places of origin or 'home' communities for a FIFO workforce.

The EIS reports the concerns of some local residents about increased crime rates resulting from influxes of resources personnel. However, statistics cited in the EIS indicate that levels of crime and traffic offences have fluctuated in Wandoan and Taroom in recent years. Contradicting this, a submission from the Queensland Police Service suggests that an increase in local crime is attributable to resource projects. Taroom Coal has responded that it would apply strict protocols to minimise antisocial behaviour by employees.

Local police have expressed concerns about the safety hazards associated with increased traffic volumes from the project, as well as speed and fatigue on major highways, in the context of poor road conditions.

As well as having potential impacts on the receiving communities, FIFO practices also have implications for the workers involved and their families. According to the EIS:

'Like any additional stress on family life or relationships, FIFO can magnify existing social problems at home or in some cases help to hide them, only for the problems to reappear at a later date. On the positive side, FIFO enables people to take advantage of better wages and conditions in the mining industry, without the need for family to change houses or schools or to form new social networks.'

The EIS emphasised the potential for cumulative social impacts from a number of resource and infrastructure projects that would potentially utilise housing, infrastructure and community services in Wandoan and Taroom, while noting that many of these projects are still in an evaluation stage:

'Local community leaders have indicated their concern about the management of cumulative impacts … and community members are apprehensive that if proponents do not collaborate for the benefit of the region, a piecemeal approach will be taken, resulting in little benefit for Wandoan, Taroom and their surrounds. Many residents in the Miles-Wandoan and Banana Statistical Areas can see positive potential in the planned coal mines and coal seam gas projects but want the proponents to give something back to their communities in the form of better infrastructure and services, as well as sustainable jobs and business opportunities.'

While noting submissions calling for further attention to be given to cumulative impacts, Taroom Coal's response stresses the uncertainty regarding the timing of the project proceeding as well as for other projects in the vicinity that could entail cumulative impacts.

The EIS commented that the majority of directly affected landholders are concerned about the projects' potential impact on their land value, due to noise and dust as well as diminished visual amenity. The EIS noted that directly affected landholders are the most likely group to experience psychological stress, possibly including a 'palpable sense of dislocation and loss when they perceive changes to their local environment as harmful'. The EIS noted that:

'Community consultation revealed that a number of landholders were anxious about their future and frustrated about delays, uncertainty and 'their lives being kept on hold', as various proponents make decisions about project viability. Specific stated concerns that have the potential to create personal mental stress and anxiety include:

- displacement of families from the district
- the need to relocate businesses (cattle fattening) elsewhere
- retirement plans disrupted; loss of income, decreased property value
- increased local housing costs (and decreased availability)
- road safety risks for residents and their families
- noise, vibration, dust, lighting and visual amenity impacts
- destruction of good grazing and cropping land.'

4.18.3 Avoidance, mitigation and management measures

A draft Social Impact Management Plan (SIMP) was prepared in conjunction with the EIS. While this is no longer a requirement under the Social Impact Assessment Guideline (2013), the associated mitigation and management strategies are still relevant. The EIS provided a table of 'mitigation or opportunity strategies' to address identified social impacts. Although the status or priority of individual strategies as either commitments or possible opportunities is not made clear. Some key strategies appear to be:

- implementation of the EM plan
- a project-specific Workforce Accommodation Strategy
- a Land-Access Management Plan to reduce impacts on adjoining landholdings
- a Community Investment Program
- a Traffic Management Plan.

An enquiries and complaints management process is identified as a key commitment. Taroom Coal proposes to substantially rely on monitoring and evaluation of community perception surveys as well as reporting of enquiries and complaints to determine the effectiveness of actions designed to deliver positive outcomes for affected communities. It committed in the EIS to work with stakeholders to 'finalise a mutually agreeable monitoring and evaluation process' within six months of project start-up.

The EM plan prepared for the project refers to the draft SIMP, which highlights the intended appointment of a Community Relations Coordinator who, with Project Management, is to engage with local councils, State agencies and other stakeholders to facilitate collaborative responses to project-related issues.

Taroom Coal responded to a submission from the Department of Housing and Public Works by clarifying that the Workforce Accommodation Strategy would detail how Taroom Coal would engage with stakeholders and potential partners in addressing cumulative impacts on housing. Further changes were not deemed necessary in response to submissions from Department of State Development, Infrastructure and Planning (DSDIP), Queensland Police Service and Queensland Health that expressed reservations about the adequacy of the assessment of and response to housing issues. The EIS responded to a submission from DSDIP by clarifying how positive outcomes would be achieved by affected communities including through the Community Investment Program.

A submission from the WDRC has called for the project to contribute to the augmentation of local infrastructure and services; Taroom Coal has responded by highlighting both the potential contribution to discrete infrastructure from its Community Investment Program and the role of the State's Royalties for the Regions program.

4.18.4 Outstanding issues

The EIS has broadly addressed the TOR, with some gaps, noting the reduced expectations that apply under the 2013 Social Impact Assessment Guideline. Its main limitation is that it does not present a systematic assessment of potential social impacts or examine relevant scenarios in depth. For example, the EIS does not examine different scenarios in terms of the implications of different proportions of workers, staff and contractors residing in the mine village, rental or purchased accommodation, or short-term accommodation in the townships. Nor is there a clear assessment of project impacts of the distinct stages identified by the TOR.

As noted above, limited information is provided on potential impacts affecting local landholders. In general the evidence base for the qualitative assessment of impacts is not well described. While a commitment to ongoing consultation with stakeholders is made, the likely effectiveness of this is not clear and a mechanism to resolve disputes with stakeholders is not provided.

4.18.5 Conclusions and recommendations

The EIS has provided an adequate assessment of social impacts subject to clarification of Taroom Coal's commitments, in particular to measures to:

- facilitate resolution of any concerns of or disputes with local landholders, in particular to protect their amenity, well-being and productive use of land
- develop a Workforce Accommodation Strategy in conjunction with stakeholders to address the potential for cumulative impacts on local accommodation markets during the project life cycle.

4.19 Cultural heritage

4.19.1 Indigenous cultural heritage

4.19.1.1 Values

There is currently an active Native Title application over an area including the project site and the WSL rail and services corridor by the Iman #2 People. A Cultural Heritage Management Plan (CHMP) is required for the project before an EA can be issued. A CHMP prepared by Taroom Coal was approved in February 2014.

4.19.1.2 Conclusions and recommendations

The EIS has provided a satisfactory response to the TOR for Indigenous cultural heritage.

4.19.2 Non-Indigenous cultural heritage

4.19.2.1 Values

The EIS outlined the history of ‘frontier’ European settlement in the Taroom-Wandoan area, including the associated displacement of the Indigenous population, the development of roads and rails and the period of ‘closer settlement’.

A search of relevant statutory registers, i.e. including the Queensland Heritage Register and the former Taroom and Murilla Shire Council planning schemes, found no listed sites or places of non-Indigenous cultural heritage significance within either the MLA area or the WSL rail and services corridor. Field surveys undertaken for the EIS located 20 sites of low local significance, including earthen dams, homesteads, and other vestiges of telegraph lines, farming and stock routes. While there is some potential for further sites to be found, these are likely to relate to pastoral activities. The EIS noted the contribution of the identified sites to the cultural landscapes of the cattle industry, mixed cultivation, closer settlement, as well as transport and communication.

4.19.2.2 Impacts

The 14 non-Indigenous cultural heritage sites identified within the MLA are expected to require removal as part of the project. However, there would be some scope to avoid sites within the WSL rail and services corridor. Three of the MLA area sites were deemed to warrant further recording before their removal.

4.19.2.3 Avoidance, mitigation and management measures

In relation to non-Indigenous cultural heritage, it is proposed to avoid cultural heritage sites where practicable and otherwise to implement a Historical Heritage Management Plan (HHMP) to guide the identification and management of sites. A HHMP has been developed for the project, as required under the TOR; it is included as an appendix to the EIS. It incorporates procedures for reporting discoveries of artefacts and burials, which would assist compliance with the *Queensland Heritage Act 1992*.

4.19.2.4 Outstanding issues

The EIS has provided a satisfactory response to the TOR with respect to non-Indigenous cultural heritage.

4.19.2.5 Conclusions and recommendations

The HHMP provides an appropriate framework for managing impacts on non-Indigenous cultural heritage.

Three of the MLA area sites were deemed to warrant further recording before their removal.

4.20 Landscapes and visual amenity

4.20.1 Existing values

The project site is located within a rural landscape within which remnant vegetation has been largely cleared since the mid twentieth century. Open grasslands and improved pastures now predominate, with sparse patches of remnant vegetation. The primary land use of the surrounding area is low intensity cattle grazing and cropping. The topography of the area, formed on clayey sediments, consists of very gently to moderately undulating hills rising 20 to 30m above the surrounding landscape, dissected by Horse Creek and its tributaries and their alluvial and riparian corridors.

The WSL rail and services corridor comprises flat grazing land with occasional gentle undulating hills, which have a cover of introduced grassland with scattered remnant vegetation.

There are no outstanding landscape features or notable scenic viewpoints in the vicinity of the project area. The Leichardt Hwy is, however, a significant tourist and transport route in close proximity to the mine site and crosses the proposed WSL rail and services corridor.

According to the EIS, ‘visual values have been assessed … in terms of the extent … and significance of the changed skyline as perceived from places of residence, work and recreation, from transport routes, … during all stages of the project as it relates to the surrounding landscape’.

4.20.2 Impacts

The visually important components of the project include: the progressive development of the mine pit and spoil dumps, continuous mining units which feed a mobile conveyor system to transport coal and waste, the CHPP, the 36km WSL rail and services corridor to transport processed coal, the diversion of a section of Horse Creek, and the diversion of Perretts Roads to the east and south of the pit.

The EIS identified existing landscape conditions that could give rise to significant impacts as the presence of residences in close proximity to project works, remnant woodland vegetation with a relatively intact appearance, and riparian vegetation. While mining would entail the removal of some woodland and riparian vegetation, this would have limited visibility from public roads or thoroughfares. Residents are therefore identified as the most sensitive receptors.

The EIS acknowledged that the final mining void would create a large depression and water body which are uncharacteristic of the area, but suggested that the final void would only be visible in the immediate proximity and would not affect the broader landscape character, in part due to the low bund that is to surround the void and to be rehabilitated. Similarly, the suggestion is made that the permanent diversion of Horse Creek would result in a minimal impact on landscape character once the waterway is revegetated with local flora species.

The visual assessment for the EIS has chiefly relied on photographic perspectives from a modest number of viewpoints, mainly from road sides selected on the basis that they are representative or within the line-of-sight of the project. There are no markedly elevated viewpoints overlooking the project site. The EIS suggested that vegetation around the site and on existing properties as well as topographic screening are the key factors reducing the potential for visual impacts.

According to the EIS, the receptors most likely to be exposed to visual amenity impacts are residences located close to the mine site and WSL rail and services corridor and road users on Perretts Road. There are 13 residences within 1km of the WSL rail and services corridor and another 19 between 1 and 3km, but only 2 and 8 within equivalent distances from project activities within the MLAs. Impacts on these receptors are rated as being of moderate significance.

The EIS suggested that road users would be exposed intermittently to visual intrusions from the project, particularly within 1km from the MLA boundary and that tourists and local road users with a high sensitivity or expectation with respect to visual amenity are not a significant component of road users.

The EIS commented that many of the existing roads surrounding the project site have only a small number of users and their exposure to mining related activities would only be intermittent. The impacts of new roads constructed for the project are also expected to be mitigated by their low vertical profile and the limited disturbance involved.

The EIS suggests that the WSL rail and services corridor is likely to be visible from residences in the vicinity of Perretts Road where it approaches Cattle Downs Road and on Kabunga Road where it approaches the WSL rail and services corridor. The visual impact of rail infrastructure and operations is likely to be most significant for residences within 1km, although scattered vegetation and uneven topography provide some screening. A school is located along the WSL rail and services corridor, about 20km from the proposed project site and approximately 1000m from the proposed WSL rail and services corridor, but visual screening is provided by a gentle ridgeline and scattered vegetation. The EIS suggested that at the eastern end of the WSL rail and services corridor, the proximity of sensitive receptors to the Surat Basin Rail (SBR) may desensitise them to the development of the WSL rail and services corridor. While the Leichhardt Hwy has a high number of ‘short term or intermittent receivers’, the EIS considered that the WSL rail and services corridor would have limited impacts on the visual amenity of highway users.

Because of their visual prominence, the spoil dumps in the southern MLA50254 would be potentially visible at residences at separations over 1km. The out-of-pit dumps are expected to be a maximum 70m above natural level, while in-pit spoil dumps may reach between 40m and 60m above the natural surface. Although visual impacts in the surrounding area would increase as extractive operations and the spoil dumps develop, they are screened to varying degrees by topography and existing vegetation. According to the EIS, out-of-pit spoil dumps have been located where landscape aspects provide buffering of visual impacts. The spoil dumps would mainly be visible when looking east and west towards the northern portion of the southern MLA50254. Residences and road users to the east have some vegetation buffering along Ryals Road, but those to the west have only sparse buffering as the landscape is predominantly non-remnant grassland.

While the diversion of Horse Creek would involve a major visual change to its physical form there would be limited visual exposure to the creek once Perretts Road is realigned. The transport corridor joining the northern and southern MLAs would be visible from Perretts Road and, in places with minimal vegetation buffering, along Ryals Road. Although no static mine infrastructure is proposed within the transport corridor, there would be visual intrusion by the large machinery used continually to transport ROM coal.

According to the EIS, the MIA within the northern MLA50270 would potentially be visible from Goldens and Perretts

Road, although existing vegetation would provide some visual buffering. Some areas of elevated topography looking south-west towards the northern MLA would provide some views of the mining infrastructure. However, the MIA is not expected to have a significant impact as it is not close to surrounding residences. While the TSFs may be visible from residences to the west of the northern MLA50270, they are not expected to exceed 16m in height and are expected to blend in with the existing landscape once revegetated with local species. The EIS recognises that artificial lighting at night, primarily within the MIA, could affect residences within 1km of the mine.

4.20.3 Avoidance, mitigation and management measures

The EIS indicated that the siting of the spoil dumps has taken some account of landscape aspects that obscure external views. There is a strong recognition of the importance of retaining existing vegetation surrounding the project site to reduce potential visual impacts as well as for further screening through planting of sections of the project boundary, particularly on the western side of the southern MLA50254. In view of the extended duration of the project, early plantings and regeneration would have some potential to screen mining activities after about 10 years, as the area of impact expands. The EIS also identifies progressive rehabilitation and then revegetation of the spoil dumps with local species as key strategies to reduce visual and landscape impacts.

While rehabilitation of created landforms would reduce the duration and magnitude of impacts on visual values, the presence of an extensive water-filled void and the success of rehabilitation of final landforms would be the key influences on long-term impacts.

In relation to the potential exposure of residents to night lighting, the EIS proposes the use of some combination of directional lighting, lighting hoods and vegetative screening to mitigate impacts on individual receptors within 1km of the project and in direct line of sight of light sources.

4.20.4 Outstanding issues

The EIS has not identified specific priorities for vegetation planting and regeneration to achieve optimal visual screening at sensitive receptors. A methodology for this should be addressed in the final EM plan.

The EIS acknowledged, but did not consider in any depth, the potential impact on visual amenity of fugitive dust. Effective strategies to control dust are needed because of its health, nuisance and visual amenity impacts and should be updated in the final EM plan.

4.20.5 Conclusions and recommendations

The EIS has provided an adequate though somewhat general response to the TOR with respect to the assessment of existing values and impacts on landscape character and visual amenity.

As the EIS noted, there are a number of exploration and mining leases surrounding the project. While it is suggested that other coal mining in the region could ‘desensitise certain viewers to the project’, the cumulative impact of landscape disruption from different mines also has the potential to affect landscape quality and visual amenity at a regional scale. However, at a local level, the potential development of mines to the east and west of the project site could reduce the number of residents overlooking or otherwise exposed to the site.

It is recommended that the final EM plan include specific actions to further develop vegetation buffers to mitigate visual amenity impacts at any residences within 1km of the mine boundary and WSL rail and services corridor, as well as more distant sensitive receptors with particular exposure to visual intrusion from the project.

4.21 Hazard and risk

4.21.1 Existing values

In accordance with the TOR, the EIS has assessed the environmental values related to people and property that could be affected by any hazardous materials and activities associated with the project.

4.21.2 Impacts

Hazards associated with project activities have been identified as part of the EIS. Man-made hazards associated with the operational phase include aspects such as transport, dangerous goods storage, blasting and waste disposal.

The associated risks from project activities during the construction, operational and rehabilitation and closure stages have been qualitatively assessed, including whether any significant risks would remain after project design factors and mitigation measures are considered. The evaluation of risks has had regard to their environmental, legal, public and media attention and financial consequences, although the EIS focuses on the risk of environmental impacts. Risks arising from normal operating practices and accidents, emergencies and natural disasters have been considered.

The EIS stated that although 60 properties are sensitive receptors within the vicinity of the project, only eight of these are expected to be impacted by air or noise emissions from operations within the MLA areas, only one would be significantly impacted by operation of the WSL rail and services corridor and five may be impacted by construction of the WSL rail and services corridor.

The potential impacts of climatic extremes on hazards and risks were adequately described in the EIS. In particular natural hazards such as droughts flooding, cyclones, bushfires, landslides and anthropogenic hazards on surrounding land uses during the construction, operation and decommission stages of the project were adequately considered in the EIS. Natural hazards have also been considered, of which floods are the primary concern. Flood modelling of the northern MLA indicated that flood depths for a 100 year ARI event would not exceed 2m, and hence mine infrastructure has been designed to address this risk.

4.21.3 Avoidance, mitigation and management measures

While the potential risk that erosion, dust and noise arising from various project activities could affect people living locally was variously rated as being between 'low' and 'extreme', once mitigation measures were taken into account all related risks were reduced to 'low'. For example, vegetation clearance and topsoil stripping during the construction phase could entail 'extreme' risks, but limitation of work to daylight hours, haul road watering and speed limits are said to reduce the risk to 'low'.

After risk control strategies were taken into account, seven sources of risk associated with the TSFs that had been rated as 'extreme' still retained a 'high' rating. These relate to the potential for both overflow and wall failure of the TSFs, and involve potential impacts of contamination of land, surface water and groundwater as well as community property damage. The unmitigated risk of wall failure was seen to be 'possible' and to involve 'catastrophic' impacts. Actions, including an engineered design incorporating a spillway, appropriate operational procedures, and regular inspections including annual inspections by an engineer, were identified as reducing both the magnitude of impacts and their likelihood.

Several hazards also retained a 'moderate' risk rating after mitigation was applied, including pit stability, acid mine drainage from spoil dumps and TSFs, and tailings pipeline rupture.

The EIS proposes that mitigation measures to reduce the occurrence of hazardous activities would be incorporated into a Safety and Health Management System, which would be progressively updated.

Levees are proposed to be constructed to mitigate the risk of flooding of the mine void relative to the estimated probable maximum flood level within the Horse Creek catchment.

4.21.4 Outstanding issues

The EIS provided an adequate assessment of project hazards at the current stage of project design, in response to the TOR. While other sections of the EIS provide further details on matters such as air quality and noise, further detail on some other aspects would be needed before the project proceeds, including the design for long-term management of the TSFs and the on-site management of chemicals and waste.

The conclusion in the relevant appendix to the EIS that 'the application of further mitigation strategies is unlikely to reduce the risk ranking further' for the TSFs is not compelling, in light of both the limited detail provided in the current risk assessment and the extent of the residual risk. The potential for contingency measures as well as management of long-term risks need more attention.

4.21.5 Conclusions and recommendations

The EIS has provided an adequate assessment of hazards and risks in relation to people and property, subject to addressing the outstanding issues identified above.

4.22 Rehabilitation and decommissioning

4.22.1 Approach

The EIS stated that rehabilitation strategies and methods for the Project have been developed in accordance with the Guideline 18: Rehabilitation Requirements for Mining Projects (DERM, 2011) and having regard to other relevant technical and best practice guidance. The Guideline 18: Rehabilitation Requirements for Mining Projects sets out a generic six-level hierarchy of actions for rehabilitation of mining sites in order to prevent or minimise environmental harm. The EIS concluded that reinstatement of a 'natural' ecosystem and achievement of an outcome higher economic value than the previous land use are generally impractical options. The key exception is the intention to establish riparian habitats along the length of the Horse Creek diversion. Over most of the site, Taroom Coal's efforts would be primarily directed towards reinstatement of the previous land use, i.e. low to medium intensity cattle grazing. At the same time, it is recognised that for some areas such as the final voids it would only be feasible to achieve a land use of lower value. This latter option is intended to avoid the unacceptable outcomes of leaving the site either in an unusable condition or with a potential to generate environmental harm.

The EIS stated that the goals of rehabilitation are to return the project site to a condition that is: safe to humans and wildlife; non-polluting; stable; and able to sustain the agreed post-mining land use. These goals are seen to enable long-term maintenance of essential ecological processes for the site.

In order to implement the rehabilitation goals, Taroom Coal divided the mine site into six mine domains based on land management units with similar characteristics, i.e. the final voids, exploration areas, dams, diversions, infrastructure, and waste disposal. Specific rehabilitation objectives and associated rehabilitation indicators and completion criteria have been developed for each mine domain. Confirmation of rehabilitation success would make use of 'analogue' monitoring sites that are representative of pre-mining ecosystems, including for riparian habitat along Horse Creek and native and improved pastures in the area.

The EIS assumed the WSL rail and services corridor infrastructure would be retained after decommissioning of the mine site, on the basis of its expected utility for other resource developers and users. Hence rehabilitation of the WSL rail and services corridor need not be considered until its decommissioning is a likely prospect.

4.22.2 Impacts

Taroom Coal has committed to progressive rehabilitation of the mine site as areas become available for rehabilitation, in order to minimise the overall extent of disturbance at any point in time. Identified benefits include minimising erosion, dust, ecological impacts of clearing as well as visual amenity impacts.

4.22.3 Mitigation and management measures

Rehabilitation of disturbed areas would initially involve surface contouring to resemble the original local topography, with spoil dumps shaped to resemble low hills, and to minimise erosion and maximise water retention. Ripping of the surface and topsoil spreading are then to occur, i.e. prior to the establishment of vegetation. Areas to be rehabilitated are to be seeded with appropriate plant species known to occur in the local area to achieve proposed future land use as well as the local habitat conditions. Species that would encourage the return of native fauna would be favoured.

The EIS provided details on the specific rehabilitation techniques to be applied in individual mine domains. With the exception of alluvium along Horse Creek, the soils of the project site are considered to have limitations for stripping, stockpiling and rehabilitation, i.e. in terms of their nutrient status and depth, and hence the ability of stockpiled topsoils to maintain soil biota and a viable seed bank. The EIS stated that the Horse Creek alluvium soil management unit (covering 837ha) would contribute about half of the required topsoil for rehabilitation purposes on the mine site. The proposed rehabilitation techniques respond to these limitations. The EIS highlighted that the permanent Horse Creek diversion would be in place within six years of mining commencing and hence there would be 'ample opportunity … to monitor the performance of the channel development' prior to the mine closure. Equally, there would be an opportunity to monitor and address the success of re-establishment of self-sustaining riparian vegetation and restoration of habitat connectivity with the remaining portions of Horse Creek.

A submission from Fitzroy Basin Association Inc., (FBA) called for the project to source seed from endemic flora species of local provenance to ensure the areas being rehabilitated reflect as closely as possible the surrounding vegetation. Taroom Coal committed to revegetation of the site using appropriate flora specimens which are known to occur in the local area. FBA recommended that that a seed collection program be undertaken before clearing takes place. Should appropriate sources of seed not be found, then addition seed could be sourced from neighbouring properties. FBA also suggested that tubetock grown for locally-occurring specimens should be used to accelerate revegetation efforts and improving the rate of establishment of rehabilitated areas.

The EIS proposed that both progressive maintenance and failure mitigation maintenance would be carried out. The former involves planned measures for repairs after initial rehabilitation works, whereas the latter approach is to be applied when rehabilitation objectives are not being achieved and may be necessary for some years after decommissioning.

The EM plan proposed EA conditions including performance criteria for rehabilitation, including for: stable landforms and their land suitability; residual voids and the quality of enclosed water; and the design, integrity and water quality of regulated dams.

4.22.4 Outstanding issues

The EIS provided an adequate response to the TOR rehabilitation and decommissioning for the current stage of project design.

In terms of submissions on the finalised EIS, DNRM has not raised concerns regarding the proposed approach to rehabilitation, while EHP has noted a residual concern that the proposal to only partially backfill the Western Void would depend on a flood protection levee along the Horse Creek diversion. EHP requested further information on the potential to backfill the Western Void to the PMF level.

The identification of rehabilitation indicators and completion criteria in the EIS, as well as proposed conditions for the EA, recognise the need in due course for safety and/or geotechnical assessments of potentially hazardous final landforms as well as contaminated land assessments of parts of the project area that have been subject to notifiable activities or are likely to contain contaminated land.

4.22.5 Conclusions and recommendations

The EIS provided a comprehensive outline of the intended approach to rehabilitation and decommissioning of the mine site. The exclusion of the WSL rail and services corridor at this stage from consideration of rehabilitation and decommissioning requirements is accepted.

Recommended rehabilitation and decommissioning EA conditions have been provided in Appendix 1.

5 Adequacy of the Environmental Management Plan

The environmental management plan (EM plan) for the project was provided with the EIS and updated with supplementary information during the EIS assessment process. For the purposes of this report EHP expects Taroom Coal to consider the outstanding issues outlined in this report and make the necessary amendments to the EM plan prior to submitting the amended EM plan to EHP for final assessment. The EM plan stated that it was prepared in accordance with the former section 203 of the EP Act. At this stage the draft EM plan is not complete nor adequate for the purposes of section 203 of the EP Act and an amended EM plan would need to be assessed by EHP after the EIS process is completed and would need to adequately address the content requirements of the former section 203 of the EP Act, prior to EHP finalising the conditions of the draft EA.

The conditioning requirements for the draft EA are set out in further detail in Appendix 1.

The EM plan generally included the expected range of information on the proposal including:

- tenure description
- the operational aspects and rehabilitation proposed
- consultation
- notifiable activities
- approvals
- environmental values of the site
- potential impacts
- management strategies
- proposed conditions.

The EM plan was proposed for the combined operation of the mine and the proposed WSL rail and services corridor expansion. The EM plan, in conjunction with the EIS main reports, did provide sufficient information to describe the impacts of the proposal and the means of managing and minimising those impacts and was therefore suitable for this EIS process.

Many of the outstanding matters identified in this report are focused on resolving aspects of the EM plan, consequently the EM plan will require significant changes before it is suitable and before a decision could be made to grant an EA for the project. Guidance on the content of an EM plan is available at the former section 203 of the EP Act and in departmental guidelines.

6 Outstanding matters

The project is located in a region that has been historically used for grazing and mixed cropping and is now subject to various coal mining and petroleum and gas proposals. As a result, while the region has already been subject to major ecological changes from pre-settlement conditions, it is now subject to further major environmental changes– in terms of topography, hydrology, ecology, land use, infrastructure and local amenity and the social profile and well-being of the community.

The implementation of individual projects such as the Elimatta Project would need to address both their potential for immediate impacts on local environments and their longer-term implications for a sustainable regional landscape.

The EIS has broadly addressed the TOR but is deficient in detail on some important aspects needed to provide a sound basis for project implementation, within the framework of a final EM plan and EA. Key aspects Taroom Coal would need to take into consideration in the planning and implementation of the project, including detailed design, identified in this assessment report, are:

1. The potential quality and flow rates of surface water discharges from the mine site during the construction, operational and post-closure phases, under varying seasonal and climatic conditions, as well as proposed management strategies and their likely effectiveness.

   Specific attention needs to be given to:

   - a water management plan for the mine site
   - the potential concentrations of contaminants and physio-chemical parameters under different seasonal and rainfall conditions, and the impact on Horse Creek and the downstream wetland
   - the applicability of the Model Mining Conditions for the Fitzroy River Basin in protecting the environmental values of Horse Creek and wetlands
   - the design and effectiveness of the Receiving Environment Monitoring Program.

   The risks to surface water and associated environmental values from both the possible failure of the TSF walls and the on-site management of chemicals and wastes need further attention for the design of facilities, contingency measures and management of long-term risks.

2. The risks to groundwater and associated environmental values (including Stygofauna) arising from project interference with both shallow aquifers in Quaternary unconsolidated alluvium and deeper aquifers in the Juandah Coal measures and the Hutton and Precipice Sandstone formations, as well as the proposed risk mitigation strategies.

   The potential for cumulative impacts arising from other coal mining projects needs to be further assessed and monitored, and progressively evaluated to guide implementation of the EM plan.

3. The potential exposure of ‘at risk’ sensitive receptors to exceedances of relevant air quality, noise and airblast criteria during construction or operation of the mine and WSL rail and services corridor, including cumulative impact pressures, and strategies for resolving appropriate risk mitigation.

   The potential risks associated with the Horse Creek diversion, including erosion, sedimentation, seepage and flood.

   Assessments of potential impacts need to be refined on the basis of updated input information to ensure a consistent and credible approach.

   Further attention needs to be given to specifying how:

   - mitigation measures are to be resolved for particular sensitive receptors that are exposed to likely or observed exceedances
   - project performance would be monitored, audited and managed
   - processes to resolve any concerns of or disputes with local landholders, in particular to protect their amenity, well-being and productive use of land
   - vegetation buffers are to be either established or augmented to maintain the visual amenity of affected sensitive receptors.

4. The potential for significant ecological impacts and effective management measures for:
   - remnants of regional ecosystems that are significant in a bioregional context and either are poorly represented in the protected area estate or could be significantly affected by the cumulative impacts of different mining projects in the region
   - aquatic ecology values in both the diverted and downstream sections of Horse Creek, as well as waterways and stock routes crossed by the WSL rail and services corridor and all wetlands affected by project works
   - listed threatened fauna species whose habitat could be affected by the mine or WSL rail and services corridor works, including the Little Pied Bat, South-eastern Long-eared Bat, Rough Collared Frog, Golden-tailed Gecko and Brigalow Scaly-Foot.

5. Cumulative pressures on infrastructure and housing particularly for:
   - upgrading and/or enhanced maintenance of local roads and intersections with State-controlled roads
   - an Accommodation Strategy for short and long-term accommodation needs.

6. A strategic plan for mine closure and decommissioning that incorporates clear performance objectives and assessment criteria for:
   - landform and soil stability, in the context of geotechnical and safety assessments
   - runoff control and discharges to waterways, including in the context of contaminated land assessments
   - hydrological, geomorphic and ecological function of the Horse Creek diversion and other affected waterways and wetlands (i.e. encompassing both engineering and ecological health aspects), especially for the proposed use of alluvium from Horse Creek for rehabilitation of other areas
   - management of potentially sodic or dispersive saline overburden and waste rock materials and the management of those materials as part of the creek diversion
   - water quality in the residual mine voids
   - rehabilitation strategies and methods, including for medium-term maintenance, to support sustainable post-closure land uses of:
     - grazing over the majority of the mine site
     - cropping, where practicable in the context of Strategic Cropping Land
     - habitat, including links between remnant habitats.

The following matters identified in this assessment report would also need to be addressed in a revised EM plan:

- development and submission of a blast monitoring program, commitment to be made in revised EM Plan
- development and submission of a water management plan, commitment to be made in revised EM plan
- development and submission of an erosion and sediment control plan, commitment to be made in revised EM plan
- development and submission of a waste management plan
- the proposed conditions contained in the EM plan as they relate to regulated dams and levees should be replaced with those conditions contained in the EHP Guideline (EM634) Structures which are dams or levees constructed as part of environmentally relevant activities
- details of the design of the waste rock dumps and rehabilitated landform that would be stable, non-eroding under grazing conditions (the preferred post mine land use)
- the noise limits for the WSL rail and services corridor are based on the Queensland Rail Code of Practice – Railway Noise Management (2007). EHP recommends that the New South Wales (NSW) Environmental Protection Authority (EPA) Rail Infrastructure Noise Guideline (2013) be applied. Refer to guideline Table 1, Airborne heavy rail noise trigger levels for residential use, new rail line development. These limits are needed to protect amenity values at all sensitive receptors. With reference to the NSW EPA derived limits, it is recommended that Taroom Coal re-run the noise modelling. The reasoning is that the EIS modelling indicated that one residence (ID14: Lot 41 on CP857459) would receive noise above the criteria. Given the differing parameters in the NSW guideline, it may be that other sensitive receivers would receive noise above the modelled noise levels. It is recommended that the EM plan provide appropriate mitigation measures for Lot 41 on CP857459 and others if modelling proves necessary.

7 Recommended conditions of approval

Throughout this EIS process a number of environmental impacts and relevant mitigation measures have been identified. Where the EIS has shown that such impacts are likely and where legislation, policy or guidelines dictate, some activities associated with the project would need to be constrained to achieve acceptable environmental outcomes through conditions of approval. In the absence of detail about a particular matter the EIS has made certain commitments to achieve suitable outcomes.

7.1 Environmental Protection Act 1994

Outstanding matters that need to be addressed under the EP Act include the completion of the EM plan. These requirements are described in section 6 of this report.

To suitably implement the project and as required under section 59 of the EP Act, this report includes a set of recommended conditions for approval at Appendix 1.

The conditions are not considered complete nor finalised and are provided for consideration in developing final conditions if an environmental authority is granted for the project. They are based largely on EHP's model mining conditions and are provided for consideration in developing draft EA conditions for the project under the EP Act. The administering authority will decide specific conditions that are necessary, desirable and considered appropriate by the delegate when the decision is made.

7.2 Water Act 2000

The *Water Act 2000* provides for the sustainable management of water and other resources and the establishment and operation of water authorities.

The mine water from mine dewatering, including groundwater inflows would be stored in the raw water dams for use in mining operations. A water licence (taking or interfering with water, other than diversion of a defined watercourse) under the *Water Act 2000* would be required to take or interfere with groundwater for pit dewatering purposes for the project.

At the time of the preparation of the EIS a water licence to interfere under the *Water Act 2000* was required for the creek diversion. However this authorisation is currently being transitioned to the EA. The conditions recommended here are consistent with the outcomes considered as part of the EIS process, however specific wording may change as a result of legislative differences between the *Water Act 2000* and the EP Act and the status of the DNRM guideline as draft at the time of the EIS production.

7.3 Nature Conservation Act 1992

A clearing application must be made for plants that are listed as 'endangered', 'vulnerable' or 'near threatened' (EVNT), unless otherwise authorised under the protected plant exemption.

Section 332(1) of the Nature Conservation (Wildlife Management) Regulation 2006 states that a person must not, without a reasonable excuse, tamper with an animal breeding place that is being used by a protected animal to incubate or rear the animal's offspring. This includes 'least concern' wildlife. It does not apply to a person removing or otherwise tampering with the breeding place if:

- the removal or tampering is part of an approved species management program for animals of the same species or
- the person holds a damage mitigation permit for the animal and the permit authorises the removal or tampering.

7.4 Queensland Environmental Offsets Policy 2014

Taroom Coal has committed to provide offsets in accordance with the policy in place at the time of offset delivery. Any offsets proposal must be developed in accordance with the Queensland Environmental Offset Policy. The policy is to compensate for unavoidable negative environmental impacts resulting from an activity or a development. On 1 July 2014, a new environmental offsets framework was introduced in Queensland. The new framework streamlines environmental offsets by providing an outcome-based approach to offsets.

The new policy provides greater flexibility in relation to how offsets can be delivered including:

- financial settlement
- land-based offsets
- offsets delivered as actions in a Direct Benefit Management Plan.

Or a combination of these approaches where offset conditions specify staged offsets can also be delivered.

An offset plan needs to be developed and implemented to address the objectives of State legislation and policy requirements for environmental offsets. This strategy should be included in a revised EM plan for the project.

7.5 Fisheries Act 1994

DAFF submission on the EIS noted that there would be road and waterway crossings along the alignment of the WSL rail and services corridor. Fisheries Queensland's self-assessable codes, guidelines and fact sheet for waterway barrier works would apply to the WSL rail and services corridor alignment. The codes are to be considered for works within waterways which trigger a waterway barrier works approval under the *Sustainable Planning Act 2009*. DAFF also recommends that Taroom Coal consider the codes as guidelines for works within natural waterways within the boundaries of the MLA.

The following Fisheries Queensland's self-assessable codes, guidelines and fact sheet for waterway barrier works that would apply to the WSL rail and services corridor include:

- DAFF Code for self-assessable development – WWBW01 Minor Waterway Barrier Works Part 1; low impact dams and weirs, January 2013
- DAFF Code for self-assessable development - WWBW01 Minor Waterway Barrier Works Part 3; culvert crossings, April 2013
- DAFF Code for self-assessable development – WWBW01 Minor Waterway Barrier Works Part 4; bed level

crossings, April 2013.

7.6 Transport Infrastructure Act 1994

As outlined in section 3.2 of this report and discussed within section 4.4 of this report, a number of licences and permits for works within the state-controlled road network associated with the transport route and intersection upgrades under the *Transport Infrastructure Act 1994* would be necessary for the project. Furthermore, excess mass, over-dimensional loads or non-standard vehicle movements on state-controlled roads would require a permit under the *Transport Operations (Road Use Management) Act 1995* (TO (RUM).

To maintain the ongoing safety, condition and efficiency of the State-controlled road network and in accordance with the objectives and provisions of the *Transport Infrastructure Act 1994*, the TO(RUM) and other relevant legislation, policies and guidelines, Taroom Coal must address the outstanding matters, before DTMR would support the project proceeding. Once further design and construction details of the project including traffic generation become available, Taroom Coal is required to finalise the road impact assessment (RIA), road-use management plan (RMP) and any traffic management plan(s) (TMP) to clearly identify and undertake any necessary improvement works, rehabilitation and maintenance and road-use management strategies to mitigate the impacts of project traffic.

It is recommended that Taroom Coal continue to liaise with DTMR's Planning Management Section to discuss and resolve the outstanding issues. DTMR has advised that a RIA, RMP, TMP and any necessary permits for excess mass or over-dimensional loads would be required prior to the commencement of project traffic.

In order to address outstanding issues, Taroom Coal is required to prepare in consultation with DTMR and prior to the commencement of project traffic the following:

- provide an updated RIA based on finalised estimates, e.g. when choice of quarries is known
- update the draft RMP including the summary spreadsheet of RMP commitments previously provided by DTMR
- provide the Pavement Impact Assessment (PIA) using DTMR's methodology especially for quarry traffic during the construction phase

  further assessment and proposals for any required mitigation to address the potential increased road safety risks from project traffic especially during the construction phase. Further reviews of any road safety 'hotspots' such as intersections of State-controlled with local roads along key transport routes need to be undertaken in consultation with regional DTMR contacts, before commencement of project traffic.

Recommended road and rail transport related conditions are provided in Appendix 1, Attachment C.

8 Suitability of the project

The department has considered the submitted EIS, all submissions and the standard criteria. The project is assessed here as being suitable, noting that the recommendations of this EIS assessment report should be fully implemented and provided the EM plan is refined and completed in the manner directed in this report and the subsequent environmental authority, if granted, being conditioned suitably to implement the specific environmental protection commitments set out in the EIS and summarised in this EIS assessment report.

Consequently, the project is considered suitable to proceed to the next stage of the approval process.

Approved by

P. Rowland.	18 July 2014

Signature	Date
Philip Rowland	Enquiries: EIS Coordinator
A/Director, Statewide Environmental Assessments	Ph. (07) 3330 5596
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Appendix 1

Proposed environmental authority conditions

Schedule A - General

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 The holder of this environmental authority 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 and efficient condition

c) operate such measures, plant and equipment in a proper and efficient manner

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.

Monitoring

A3 Except where specified otherwise 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 5 years.

Financial assurance

A4 The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.

A5 The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.

Risk management

A6 The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, by 3 months from date the environmental authority takes effect.

Notification of emergencies, incidents and exceptions

A7 The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.

A8 Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following:

a) results and interpretation of any samples taken and analysed

b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm

c) proposed actions to prevent a recurrence of the emergency or incident.

Complaints

A9 The holder of this environmental authority must record all environmental complaints received about the mining activities including:

a) name, address and contact number for of the complainant

b) time and date of complaint

c) reasons for the complaint

d) investigations undertaken

e) conclusions formed

f) actions taken to resolve the complaint

g) any abatement measures implemented

h) person responsible for resolving the complaint.

A10 The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.

Third-party reporting

A11 The holder of this environmental authority must:

a) within 1 year of the commencement of this environmental authority, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority

b) obtain further such reports at regular intervals, not exceeding 3 yearly intervals, from the completion of the report referred to above; and

c) provide each report to the administering authority within 90 days of its completion.

Schedule B - Air

Dust and particulate matter monitoring

B1 The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place:

a) Dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method.

b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than 5 exceedances recorded each year, when monitored in accordance with the most recent version of either:

   1. Australian Standard AS3580.9.6 Methods of sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet; or

   2. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} low volume sampler – Gravimetric method.

c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method.

Schedule C - Waste management

C1 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.

C2 The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.

Tailings disposal

C3 Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for:

a) containment of tailings

b) the management of seepage and leachates both during operation and the foreseeable future

c) the control of fugitive emissions to air

d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings

e) maintaining records of the relative locations of any other waste stored within the tailings

f) rehabilitation strategy

g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

Schedule D - Noise

Noise limits

D1 The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the criteria in **Table D1 – Noise limits** to be exceeded at a sensitive place or commercial place.

Table D1 – Noise limits

Noise Limits for Activities on the Mining Lease Leq,adj,T (T= 15 minutes to 1 hour), dB(A)*		
Daytime 7am – 6pm	**Evening 6pm – 10pm**	**Night-time 10pm – 7am**
40	40	35

Notes: *To be achieved under the majority of adverse meteorological conditions

Airblast overpressure nuisance

D2 The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in **Table D2 – Blasting noise limits** to be exceeded at a sensitive place or commercial place.

Table D2 – Blasting noise limits

Blasting noise limits	Sensitive or commercial Blasting noise limits 7am to 6pm
Airblast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 bB (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

Monitoring and reporting

D3 Noise monitoring and recording must include the following descriptor characteristics and matters:

a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins)

b) background noise LA90

c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels

d) atmospheric conditions including temperature, relative humidity and wind speed and directions

e) effects due to any extraneous factors such as traffic noise

f) location, date and time of monitoring

g) if the complaint concerns low frequency noise, Max LpLIN,T and one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.

Schedule E – Groundwater

Monitoring and reporting

E1 All determinations of groundwater quality and biological monitoring must be performed by an appropriately qualified person.

E2 Groundwater quality and levels must be monitored at the locations and frequencies defined in **Table – E1 Groundwater monitoring locations and frequency** and for quality characteristics identified in **Table E2 - Groundwater quality triggers and limits**.

E3 If quality characteristics of groundwater from compliance bores identified in **Table E1 - Groundwater monitoring locations and frequency** exceed any of the trigger levels stated in **Table E3 - Groundwater contaminant trigger levels**, the holder of this environmental authority must compare the compliance monitoring bore results to the reference bore results and complete an investigation in accordance with the ANZECC and ARMCANZ 2000.

E4 Results of monitoring of groundwater from compliance bores identified in **Table E1 - Groundwater monitoring locations and frequency** must not exceed any of the limits defined in **Table E2 - Groundwater quality triggers and limits**.

Table E1 - Groundwater monitoring locations and frequency

Monitoring Point	Lithology / Aquifer Monitored	Location (MGA94 – Zone 55)		Surface RL (m)[3]	Monitoring Frequency
		Easting (m)	Northing (m)		
MB1A	Walloon Coal Measures	760997	7120002	TBA	Six monthly
MB1B	Alluvium	761001	7120001	TBA	Six monthly
MB2	Walloon Coal Measures	760367	7117880	TBA	Six monthly
MB3A	Walloon Coal Measures	763091	7117998	TBA	Six monthly
MB3B	Horse Creek Alluvium	763093	7118002	TBA	Six monthly
MB4A	Walloon Coal Measures	760348	7116954	TBA	Six monthly
MB4B	Horse Creek Alluvium	760351	7116954	TBA	Six monthly
MB5	Walloon Coal Measures	762400	7116429	TBA	Six monthly
MB6	Walloon Coal Measures	761432	7114842	TBA	Six monthly
MB7A	Walloon Coal Measures	760017	7115207	TBA	Six monthly
MB7B	Horse Creek Alluvium	760020	7115206	TBA	Six monthly
MB8A	Walloon Coal Measures	759277	7112983	TBA	Six monthly
MB8B	Horse Creek Alluvium	759278	7112979	TBA	Six monthly
MB9	Walloon Coal Measures	761753	7112704	TBA	Six monthly
MB10	Walloon Coal Measures	763543	7115939	TBA	Six monthly
MB11	Walloon Coal Measures	763493	7113179	TBA	Six monthly
MB12	Walloon Coal Measures	759272	7115706	TBA	Six monthly
MB13[1]	Alluvium	765191	7124165	TBA	Six monthly
MB14[1]	Horse Creek Alluvium	765229	7123665	TBA	Six monthly
MB15[1]	Horse Creek Alluvium	764461	7122489	TBA	Six monthly
MB16[1]	Horse Creek Alluvium	756901	7102939	TBA	Six monthly
MB17[1]	Alluvium	763008	7125369	TBA	Six monthly
MB18[1]	Horse Creek Alluvium	758802	7109229	TBA	Six monthly

Monitoring Point	Lithology / Aquifer Monitored	Location (MGA94 – Zone 55)		Surface RL (m)[3]	Monitoring Frequency
		Easting (m)	Northing (m)		
MB19[1]	Horse Creek Alluvium	758487	7107668	TBA	Six monthly
RN58968[2]	Hutton and Precipice Sandstone	757387	7123967	TBA	Six monthly
RN58285[2]	Hutton and Precipice Sandstone	667389	706954	TBA	Six monthly
RN58306[2]	Hutton and Precipice Sandstone	761758	7131366	TBA	Six monthly

1 - Coordinates determined using hand held GPS – surveyed coordinates pending

2 - Deep groundwater monitoring bores not indicated on Figure (TBA). Monitoring is not required where a bore has been removed as a direct result of the mining activity

3 - RL must be measured to the nearest 5cm from the top of the bore casing

Table E2 - Groundwater quality triggers and limits

Parameter[1]	Units	Minimum	Maximum	Limit type
pH	pH	6	9	Range
TDS	mg/L	N/A	4000 or 95th percentile of reference data whichever is higher	Maximum
Sulphate	mg/L	N/A	1000 or 95th percentile of reference data whichever is higher	Maximum
Aluminium	mg/L	N/A	5 or 95th percentile of reference data whichever is higher	Maximum
Arsenic	mg/L	N/A	0.5 or 95th percentile of reference data whichever is higher	Maximum
Boron	mg/L	N/A	5 or 95th percentile of reference data whichever is higher	Maximum
Cadmium	mg/L	N/A	0.01 or 95th percentile of reference data whichever is higher	Maximum
Chromium	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Cobalt	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum

Parameter[1]	Units	Minimum	Maximum	Limit type
Copper	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Fluoride	mg/L	N/A	2 or 95th percentile of reference data whichever is higher	Maximum
Lead	mg/L	N/A	0.1 or 95th percentile of reference data whichever is higher	Maximum
Mercury	mg/L	N/A	0.002 or 95th percentile of reference data whichever is higher	Maximum
Molybdenum	mg/L	N/A	0.15 or 95th percentile of reference data whichever is higher	Maximum
Nickel	mg/L	N/A	1 or 95th percentile of reference data whichever is higher	Maximum
Selenium	mg/L	N/A	0.02 or 95th percentile of reference data whichever is higher	Maximum
Zinc	mg/L	N/A	20 or 95th percentile of reference data whichever is higher	Maximum

1 – Contaminant limits based on ANZECC (2000) Livestock drinking water quality and are analysed as Total Metals (unfiltered).

Table E3 - Groundwater contaminant trigger levels

Parameter	Units	Minimum	Maximum	Trigger type
pH[1]	pH	6.0	8.0	Range
TDS[2]	mg/L	N/A	3200	Maximum
Sulphate[2]	mg/L	N/A	800	Maximum
Aluminium[2]	mg/L	N/A	4	Maximum
Arsenic[2]	mg/L	N/A	0.4	Maximum
Boron[2]	mg/L	N/A	4	Maximum
Cadmium[2]	mg/L	N/A	0.008	Maximum
Chromium[2]	mg/L	N/A	0.8	Maximum
Cobalt[2]	mg/L	N/A	0.8	Maximum
Copper[2]	mg/L	N/A	0.8	Maximum
Fluoride[2]	mg/L	N/A	1.6	Maximum
Lead[2]	mg/L	N/A	0.08	Maximum
Manganese[3]	mg/L	N/A	1.9	Maximum
Mercury[2]	mg/L	N/A	0.0016	Maximum
Molybdenum[2]	mg/L	N/A	0.12	Maximum
Nickel[2]	mg/L	N/A	0.8	Maximum
Selenium[2]	mg/L	N/A	0.016	Maximum
Zinc[2]	mg/L	N/A	16	Maximum

1 - *Contaminant trigger limits are based on Table 3.3.4 and 3.3.5 of Aquatic Ecosystems ANZECC (2000)*

2 - *Contaminant trigger limits are based on 80% of the contaminant limits defined in the ANZECC (2000) Livestock Drinking Water and are to be analysed as Total Metals (unfiltered)*

3 – reference TBA

Bore construction and maintenance and decommissioning.

E5 The construction, maintenance and management of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.

Schedule F - Water (Fitzroy model conditions)

Contaminant release

F1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.

F2 Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** and depicted in Figure 1 (TBA) attached to this environmental authority.

F3 The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F28 is permitted.

Table F1 - Mine affected water release points, sources and receiving water

Release Point (RP)	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
Dam EV1 RP	TBA	TBA	Dam EV1	Within dam	Horse Creek
Dam EV2 RP	TBA	TBA	Dam EV2	Within dam	Horse Creek
Dam EV3 RP	TBA	TBA	Dam EV3	Within dam	Horse Creek
Dam EV4 RP	TBA	TBA	Dam EV4	Within dam	Horse Creek
Dam SD1 RP	TBA	TBA	Dam SD1	Within dam	Horse Creek
Dam SD2 RP	TBA	TBA	Dam SD2	Within dam	Horse Creek
Dam SD3 RP	TBA	TBA	Dam SD3	Within dam	Horse Creek

Note – Sediment dams SD1, SD2 and SD3 are to be included in Table F1 for the following reasons: sediment dams form part of the Water Management System with controlled releases to Horse Creek, and have identified potential high salinity levels

F4 The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in (Table 5.51) **Table F2 - Mine affected water release limits** when measured at the monitoring points specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** for each quality characteristic.

Table F2 - Mine affected water release limits

Quality Characteristic	Release Limits	Monitoring frequency	Comment
Electrical conductivity (µs/cm)	Horse Creek <700	Daily during the release, with first sample taken within the first 2 hours of the release	
pH (pH unit)	6.5-9.0	Daily during the release, with first sample taken within the first 2 hours of the release	
Turbidity (NTU)	TBA	Daily during the release, with first sample taken within the first 2 hours of the release	Turbidity is required to assess ecosystems impacts and can provide instantaneous results
Suspended solids (mg/l)	700	Daily during the release, with first sample taken within the first 2 hours of the release	Suspended solids are required to measure the performance of sediment and erosion control measures
Sulphate SO_4 (mg/l)	250	Daily during the release, with first sample taken within the first 2 hours of the release	Drinking water environmental values from NHMRC 2006 or ANZECC guidelines

F5 The release of mine affected water to waters from the release points must be monitored at the locations specified in (Table 5.50) **Table F1 - Mine affected water release points, sources and receiving waters** for each quality characteristic and at the frequency specified in **Table F2 - Mine affected water release limits** and **Table F3 - Release contaminant trigger investigation levels, potential contaminants**.

Note: the administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response in the event condition F5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.

Table F3 - Release contaminant trigger investigation levels, potential contaminants

Quality Characteristic	Trigger Levels (µg/l)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	*For aquatic ecosystem protection, based on SMD guideline*	Commencement of release and thereafter weekly during release
Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	4	*For aquatic ecosystem protection, based on SMD guideline*	
Mercury	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	*For aquatic ecosystem protection, based on SMD guideline*	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	2.8	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	

Quality Characteristic	Trigger Levels (µg/l)	Comment on Trigger Level	Monitoring Frequency
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	

Notes:

1. *All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.*
2. *The quality characteristics required to be monitored as per **Table F3 - Release contaminant trigger investigation levels, potential contaminants** can be reviewed once the results of 2 years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from **Table F3 - Release contaminant trigger investigation levels, potential contaminants** by amendment.*
3. *SMD – slightly moderately disturbed level of protection; guideline refers ANZECC & ARMCANZ (2000).*
4. *LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.*

F6 If quality characteristics of the release exceed any of the trigger levels specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** during a release event, the environmental authority holder must compare the down-stream results in the receiving waters to the trigger values specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** and:

a) where the trigger values are not exceeded then no action is to be taken; or

b) where the down-stream results exceed the trigger values specified **Table F3 - Release contaminant trigger investigation levels, potential contaminants** for any quality characteristic, compare the results of the down-stream site to the data from background monitoring sites and

1. if the result is less than the background monitoring site data, then no action is to be taken; or
2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 90 days of receiving the result , outlining
   (i) details of the investigations carried out
   (ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 b)2 of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

F7 If an exceedance in accordance with condition F6 b)2 is identified, the holder of the environmental authority must notify the administering authority in writing within 24 hours of receiving the result.

Mine Affected Water Release Events

F8 The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in **Table F4 - Mine affected water release during flow events**.

F9 Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in **Table F4 - Mine affected water release during flow events** for the release point(s) specified in **Table F1 - Mine affected water release points, sources and receiving waters**.

F10 The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in **Table F4 - Mine affected water release during flow events** when measured at the monitoring points specified in **Table F1 - Mine affected water release points, sources and receiving waters**.

Note: The release influence period is the period during which the downstream monitoring points are influenced by mine affected water releases and includes both the duration of release and any lag time between release point/s and downstream monitoring points.

Table F4 - Mine affected water release during flow events

Receiving waters	Release Point (RP)	Gauging station	Gauging Station (MGA94-Z55)	Receiving Waters Flow Recording Frequency	Receiving Waters Flow Criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical Conductivity and Sulphate Release Limits
Horse Creek	Dam EV1 RP Dam EV2 RP Dam EV3 RP Dam EV4 RP Dam SD1 RP Dam SD2 RP Dam SD3 RP	SM1	Easting 759214 Northing 7112663	Continuous (minimum daily)	Low Flow >1.0 m^3/s for a period of 28 days after natural flow events that exceed 1.0 m^3/s	0.6 m^3/s	Electrical conductivity <400 µs/cm Sulphate (SO_4) 250 mg/L
					Medium Flow >1.0 m^3/s	0.6 m^3/s	Electrical conductivity <1500 µs/cm Sulphate (SO_4) 250 mg/L
					Medium Flow >2.0 m^3/s	0.4 m^3/s	Electrical conductivity <3500 µs/cm Sulphate (SO_4) 250 mg/L
					High Flow >4.0 m^3/s	0.2 m^3/s	Electrical conductivity <8000 µs/cm Sulphate (SO_4) 250 mg/L

F11 The daily quantity of mine affected water released from each release point must be measured and recorded.

F12 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Notification of Release Event

F13 The environmental authority holder must notify the administering authority as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information:

a) release commencement date/time

b) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume)

c) release point/s

d) release rate

e) release salinity

f) receiving water/s including the natural flow rate.

Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email or facsimile.

F14 The environmental authority holder must notify the administering authority as soon as practicable and nominally no later than 24 hours after cessation of a release event of the cessation of a release notified under Condition F13 and within 28 days provide the following information in writing:

a) release cessation date/time

b) natural flow rate in receiving water

c) volume of water released

d) details regarding the compliance of the release with the conditions of Department Interest; Water of this environmental authority (i.e. contaminant limits, natural flow, discharge volume)

e) all in-situ water quality monitoring results

f) any other matters pertinent to the water release event.

Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F13 and F14, provided the relevant details of the release are included within the notification provided in accordance with conditions F13 and F14.

Notification of Release Event Exeedance

F15 If the release limits defined in **Table F2 - Mine affected water release limits** are exceeded, the holder of the environmental authority must notify the administering authority within 24 hours of receiving the results.

F16 The environmental authority holder must, within 28 days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority detailing:

a) the reason for the release

b) the location of the release

c) the total volume of the release and which (if any) part of this volume was non-compliant

d) the total duration of the release and which (if any) part of this period was non-compliant

e) all water quality monitoring results (including all laboratory analyses)

f) identification of any environmental harm as a result of the non-compliance

g) all calculations

h) any other matters pertinent to the water release event.

Receiving Environment Monitoring and Contaminant Trigger Levels

F17 The quality of the receiving waters must be monitored at the locations specified in **Table F6 - Receiving water upstream background sites and down-stream monitoring points** for each quality characteristic and at the monitoring frequency stated in **Table F5 - Receiving waters contaminant trigger levels**.

Table F5 - Receiving waters contaminant trigger levels

Quality Characteristic	Units	Trigger Level	Trigger Type	Monitoring Frequency
pH	pH units	6.5-9.0	Range	Daily during the release
Electrical Conductivity (µS/cm)	µS/cm	750 - 1000[2]	Range	
Suspended solids (mg/l)	mg/L	30[3]	Maximum	
Sulphate[1] (SO_4^{2-}) (mg/l)	mg/L	1000	Maximum	

1 - Trigger level based on ANZECC (2000) stock water quality guidelines.

2 - In-stream EC triggers based on Model Water Conditions for Coal Mines in the Fitzroy Basin (EHP 2013)

3 - Trigger level based on EPP (Water) WQOs for Aquatic Ecosystems.

Table F6 - Receiving water monitoring points

Monitoring Point	Type	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
SM1	Background / Impact	759214	7112663
SM2	Background	760166	7117140
SM3	Background / Impact	763163	7118127
SM4	Background / Impact	764382	7122044
SM5	Background / Impact	765474	7123777
SM6	Background / Impact	765432	7124455

F18 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in **Table F5 - Receiving waters contaminant trigger levels** during a release event the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or

b) where the down-stream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining

1. details of the investigations carried out
2. actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F18 b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

F19 All determinations of water quality and biological monitoring must be performed by an appropriately qualified person.

Receiving Environment Monitoring Program (REMP)

F20 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site. For the purposes of the REMP, the receiving environment is the waters of Horse Creek, the palustrine wetland and connected or surrounding waterways within 10km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

F21 A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administrating authority upon request.

F22 A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and made available on request to the administrating authority. 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.

Water reuse

F23 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority 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 (with the consent of the third party).

Annual Water Monitoring Reporting

F24 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format:

a) the date on which the sample was taken

b) the time at which the sample was taken

c) the monitoring point at which the sample was taken

d) the measured or estimated daily quantity of mine affected water released from all release points

e) the release flow rate at the time of sampling for each release point

f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority

g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Water Management Plan

F25 A Water Management Plan must be developed by an appropriately qualified person and implemented.

Stormwater and Water sediment controls

F26 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

F27 Stormwater, other than mine affected water, is permitted to be released to waters from:

a) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F26

b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F25, for the purpose of ensuring water does not become mine affected water.

Schedule G - Sewage treatment

G1 The treated sewage effluent is permitted to be released to land in compliance with the release limits stated in **Table G1 - Contaminant release limits to land.**

Table G1 - Contaminant release limits to land

Contaminant	Release Limits	Units	Limit type	Frequency
5 day Biochemical oxygen demand (BOD)	20	mg/l	Maximum	Monthly
Total suspended solids	30	mg/l	Maximum	Monthly
Nitrogen	30	mg/l	Maximum	Monthly
Phosphorus	15	mg/l	Maximum	Monthly
pH	6.5 – 9.0	pH units	Range	Monthly
E-coli	1000	Organisms/ 100ml	Maximum	Monthly

G2 Treated sewage effluent may only be released to land in accordance with the conditions of this approval at the following locations:

a) within the nominated area east of the accommodation village access road on MLA50270

b) other land for the purpose of dust suppression and/or firefighting.

G3 The application of treated effluent to land must be carried out in a manner such that:

a) vegetation is not damaged

b) there is no surface ponding of effluent

c) there is no run-off of effluent.

G4 If areas irrigated with effluent 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.

G5 All sewage effluent released to land must be monitored at the frequency and for the parameters specified in **Table G1 - Contaminant release limits to land**.

G6 The daily volume of effluent release to land must be measured and records kept of the volumes of effluent released.

G7 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.

G8 A minimum area of 133 m^2 of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial reuse of treated sewage effluent.

G9 Odours or airborne contaminants which are noxious or offensive or otherwise unreasonably disruptive to public amenity or safety must not cause nuisance to any sensitive place or commercial place.

Schedule H - Land and rehabilitation

H1 All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Table H1 and Table H2.

H2 Rehabilitation must commence progressively in accordance with the plan of operations.

Table H1 - Final Land Use and Rehabilitation Approval Schedule

Domain	Mine areas included	Total area (ha)	Location	Pre-Mining		Post-Mining	
				Land use	Suitability Class	Land use	Suitability Class
Final void	Final voids	230	ML50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
	In-pit Tailings Storage Facility (TDP)	150	ML50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
Exploration	Exploration areas	40	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Dams	Environmental Dam – EV1	2	ML50254	Low intensity cattle grazing	4	Low intensity cattle grazing	4
	Environmental Dam – EV2	10	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3 – 4
	Environmental Dam – EV3	4	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Environmental Dam – EV4	15	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Sediment Dam – SD1	5	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3
	Sediment Dam – SD2	5	ML50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3
	Sediment Dam – SD3	6	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Raw Water Dam – RW1	10	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Diversion	Horse Creek Diversion	160	ML50254	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 - 4
Infrastructure	Workshop and Offices	35	ML50270	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 – 4
	Chemical / Fuel Storages						
	Sewage Treatment						

Domain	Mine areas included	Total area (ha)	Location	Pre-Mining		Post-Mining	
				Land use	Suitability Class	Land use	Suitability Class
	Plant						
	CHPP						
	Light Vehicle Access Roads	15	ML50254, ML50270, ML50271	Low intensity cattle grazing	3 - 4	Low intensity cattle grazing	3 - 4
	Rail Loadout Facility	2	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Haul Roads	40	ML50254, ML50270, ML50271	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Mining Village	10	ML50270	Low intensity cattle grazing	3	Low intensity cattle grazing	3 - 4
	Rail and Services Corridor and Rail Balloon Loop*	216	ML50270, Rail and Services Corridor	Low intensity grazing; minor areas of unsuitable land	3 – 5	N/A**	N/A**
	Conveyor Trace	1	ML50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
	Topsoil Stockpiles	20	ML50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 - 4
Waste Disposal	In-pit Spoil Dumps	1820	ML50254	Low intensity cattle grazing	3 - 4	TBA	TBA
	Out-of-pit Spoil Dumps	200	ML50254	Low intensity cattle grazing	3 - 4	TBA	TBA
	Surface Tailings Storage Facilities (TDN & TDNA)	317	ML50270	Low intensity cattle grazing	3 - 4	TBA	TBA

** - Assumed maximum disturbance width of 60m within 100m corridor*

*** - Assumed that the Rail and Services Corridor infrastructure will be retained post decommissioning of the Elimatta Project as it will continue to offer a significant benefit to resource developers, other land users and the general public.*

Residual Voids

H3 Residual voids must comply with the Landform Design criteria in Table H2.

Table H2 – Landform Design

Disturbance Type		Slope (Ratio)
Residual Voids	Void Wall Competent Rock Maximum Slope	1V : 0.5H
	Void Wall Incompetent Rock Maximum Slope	1V : 1H
Surface Tailings Storage Facilities (TDN & TDNA)	Top	1V : 100H
	Walls	TBA
Spoil Dumps		TBA

Note: The final slope (ratio) of final TSFs and spoil dumps requires consideration of sodic / dispersive soils, geotechnical slope stability, and post-mining land use (Table H1)

H4 Water quality in mining voids and final voids must be monitored at the locations and frequencies defined in Table H3 and for the parameters detailed in Table H4.

H5 In the event that water quality within the mining voids or final voids does not comply with the contaminant limits defined in Table H4, measures must be implemented to prevent access by all livestock and minimise access by fauna to the void.

Table H3 – Void Monitoring Locations and Frequency

Monitoring Point	Monitoring Frequency
Northern Pit	Annually
Void East	Annually
Void West	Annually

Note – monitoring to occur subsequent to pit development only – Once the northern pit receives fine tailings rejects material, it is thereafter referred to as Dam TDP, a dam containing hazardous waste, and the conditions in Table H3 and H4 are no longer applicable.

Table H4 – Void Water Quality Limits

Parameter	Units	Limit	Trigger Type
pH	pH	6 – 9	Range
TDS	mg/l	4,000	Maximum
Aluminium	mg/l	5	Maximum
Arsenic	mg/l	0.5	Maximum

Parameter	Units	Limit	Trigger Type
Boron	mg/l	5	Maximum
Cadmium	mg/l	0.02	Maximum
Chromium	mg/l	1	Maximum
Cobalt	mg/l	1	Maximum
Copper	mg/l	1	Maximum
Fluoride	mg/l	2.5	Maximum
Lead	mg/l	0.1	Maximum
Mercury	mg/l	0.002	Maximum
Molybdenum	mg/l	0.15	Maximum
Nickel	mg/l	1	Maximum
Sulphate	mg/l	1,000	Maximum
Selenium	mg/l	0.02	Maximum
Zinc	mg/l	20	Maximum

Regulated Dams

Note: This schedule of conditions for Regulated Dams (below) is to be updated in the revised EM Plan to be consistent with Attachment A - Conditions for regulated dams and levees.

H6 The following regulated dams are to be constructed and used in accordance with Table H5.

Table H5 – Size and Purpose of Regulated Dams

Hazardous Dam	Maximum Storage Volume (ML)	Maximum Surface Area (ha)	Overall Storage Depth (m)	Depth Above Ground Level (m)	Purpose of Dam
Dam EV1	50	1.1	7.5	3	Receive pit water dewatered from Pit N
Dam EV2	600	6.5	7.5	5	Receive pit water dewatered from Pits E1 and E2
Dam EV3	200	1.9	7.5	4	Receive pit water dewatered from Pit W
Dam EV4	380	10.1	7	7	Receives runoff from the Mine Industrial Area
Dam TDN	13,060	129	19	19	Receives fine tailings rejects output from the CHPP
Dam TDNA	11,770	111	23	23	Receives fine tailings rejects output from the

Hazardous Dam	Maximum Storage Volume (ML)	Maximum Surface Area (ha)	Overall Storage Depth (m)	Depth Above Ground Level (m)	Purpose of Dam
					CHPP
Dam TDP	51,700	145	65	0	Receives fine tailings rejects output from the CHPP

H7 Regulated dams are to be located within the control points defined in Table H6

Table H6 – Location of Regulated Dams

Location	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
Dam EV1	761379	7120037
	761938	7120002
	761902	7119775
	761421	7119889
Dam EV2	762511	7117979
	763098	7117993
	763147	7117618
	762503	7117632
Dam EV3	758577	7114541
	758988	7114428
	759066	7114095
	758556	7114173
Dam EV4	764463	7124748
	764682	7124734
	764753	7123178
	763883	7122428
	763812	7123723
Dam TDN	762111	7125239
	764081	7125307
	764024	7123698
	762097	7123730
Dam TDNA	762162	7127390
	763614	7127263
	763622	7125371

Location	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)
	762127	7125144
Dam TDP	760339	7120034
	761976	7120002
	761945	7118654
	760321	7118640

H8 The spillway for any regulated dam constructed and operated within the operational land must be designed and maintained to withstand the peak flow from the spillway critical design storm defined in Table H7.

H9 The design storage allowance on 1 November of each year for any regulated dam constructed or operated within the operational land must comply with Table H7.

Table H7 – Storage Design for Regulated Dams

Hazardous Dam	Design Storage Allowance	Spillway Critical Design Storm	Mandatory Reporting Level
Dam EV1	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV2	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV3	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam EV4	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDN	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDNA	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event
Dam TDP	1:20 year ARI, 4 month west season	1,5000 year ARI	1:100 year ARI, 72 hour event

H10 Water quality in dams containing regulated waste must be monitored at the locations and frequencies defined in Table H8 and for the parameters detailed in Table H9.

H11 In the event that water quality within the dams containing regulated waste does not comply with the contaminant limits defined in Table H8, implement measures to prevent access by all livestock and minimise access by fauna.

Table H8 – Regulated Dam Monitoring Locations and Frequency

Monitoring Point	Easting (MGA94 – Z55)	Northing (MGA94 – Z55)	Monitoring Frequency
Dam EV1	TBA	TBA	Annually
Dam EV2	TBA	TBA	Annually
Dam EV3	TBA	TBA	Annually
Dam EV4	TBA	TBA	Annually
Dam TDN	TBA	TBA	Annually
Dam TDNA	TBA	TBA	Annually
Dam TDP	TBA	TBA	Annually

Table H9 – Regulated Dam Water Quality Limits

Parameter	Units	Limit	Trigger Type
pH	pH	4 - 9	Range
Electrical conductivity	µs/cm	5,970	Maximum
Aluminium	mg/l	5	Maximum
Arsenic	mg/l	0.5	Maximum
Cadmium	mg/l	0.01	Maximum
Cobalt	mg/l	1	Maximum
Copper	mg/l	1	Maximum
Fluoride	mg/l	2	Maximum
Lead	mg/l	0.1	Maximum
Nickel	mg/l	1	Maximum
Sulphate (SO_4)	mg/l	1,000	Maximum
Zinc	mg/l	20	Maximum

Note: Contaminant limits based on ANZECC (2000) Livestock Drinking Water and are to be analysed as Total Metals (unfiltered). pH range based on ANZECC & ARMCANZ (2000)

Regulated Dams – Annual Inspection and Report

H12 Regulated dams containing hazardous waste shall be inspected by a suitable qualified and experienced person in accordance with the conditions of this environmental authority.

H13 The annual inspection must be conducted no later than 1 November each year, or at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.

H14 At each inspection the condition of each regulated dam must be assessed, including the structural, geotechnical and hydraulic adequacy of the dam and the adequacy of the works with respect to dam safety.

H15 At each inspection the adequacy of the available storage against the design storage allowance must be assessed and a mandatory reporting level must be determined and marked on each regulated dam.

H16 For each inspection two copies of a report certified by a suitable qualified and experienced person, including any recommendations to ensure the integrity of each regulated dam, must be provided to the administering authority within 28 days of the inspection.

Decommissioning of Regulated Dams

H17 Regulated dams must not be abandoned and must be decommissioned to a situation where water can no longer be stored in dams. The dams and their contained waste(s) must be stable, thereafter the dams are no longer dams and they become landforms on the operational land and must comply with the rehabilitation requirements of this environmental authority.

H18 Decommissioning activities for dams must be documented in detail in the plan of operations under which the activities are to occur. Where the detailed documentation is not already contained in the Design Plan for the dam, the detailed documentation is considered to be an amendment to the design plan and must be submitted to the administering authority as a proposed amendment to the regulated dam design.

Infrastructure

H19 All infrastructure constructed by or for the environmental authority holder during the mining activity, including water storage structures, must be removed from the site prior to mining lease surrender except where agreed to in writing by the post mining landowner/holder.

Note - This is not applicable where the landowner/holder is also the environmental authority holder.

Contaminated Land

H20 Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.

H21 Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition H2.

Biodiversity offsets

H22 The authority holder may carry out the prescribed activity in stages and deliver an environmental offset for each stage of the activity, with the total extent of impact on prescribed environmental matters across the life of all stages of the prescribed activity to not exceed:

a) Insert matters and extent

H23 Before the authority holder starts any part of the prescribed activity mentioned in Condition H22, the holder must:

a) elect, by notice in the approved form given to the administering agency, to deliver the offset condition for each stage of the staged activity by:

1. A proponent-driven offset; or
2. A financial settlement offset; or
3. A combination of a proponent-driven offset and a financial settlement offset

b) agree with the administering agency about the delivery of the offset condition for the stage of the staged activity though both parties endorsing an 'agreed delivery arrangement'.

H24 To the extent that the notice of election for a stage under Condition H23 involves a proponent-driven offset, the notice must be accompanied by an offset delivery plan that meets the requirements of s18 of the *Environmental Offsets Act 2014*.

H25 To the extent that the 'agreed delivery arrangement' for a stage:

a) requires the authority holder to deliver a proponent-driven offset, the authority holder must comply with the agreed delivery arrangement, including the agreed offset delivery plan; and

b) requires the authority holder to deliver a financial settlement offset, the authority holder must pay the amount:

1. required by, and in the way stated in, the agreed delivery arrangement to the department; and
2. before the authority holder starts any part of the prescribed activity to which the offset condition relates.

H26 An analysis of the anticipated extent of impact on the prescribed environmental matters for a stage is to:

a) accompany the notice of election for that stage

b) be agreed to by the administering authority before the notice of election for that stage is provided to the department

c) be agreed to by the administering authority before the notice of election for that stage is agreed to by the department

H27 The authority holder must not carry out any prescribed activity in a legally secured offset area if:

a) a delivery or management plan or agreement (however described under the *Environmental Offsets Act 2014* or another Act) to all or part of the offset area; and

b) carrying out the prescribed activity will delay, hamper or stop the delivery of the conservation outcome for a prescribed environmental matter as stated in the delivery or management plan or agreement.

Schedule I – Watercourse Diversions

Permanent Watercourse Diversions

I1 Permanent diversions, or the re-establishment of a pre-existing watercourse where a temporary watercourse diversion is being replaced, must be designed and constructed to:

a) incorporate natural features (including geomorphic and vegetation) present in the landscape and in local watercourses

b) maintain the existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse is located

c) maintain the hydraulic characteristics of the watercourse diversion that are comparable with other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance

d) maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream reaches.

e) maintain stability and functionality and are appropriate for all substrate conditions they encounter.

Temporary Diversions

I2 Temporary diversions must be designed and constructed to:

a) Maintain the existing hydrologic characteristics of surface water systems for the area in which the watercourse diversion is located

b) Maintain the hydraulic characteristics of the watercourse diversion that are comparable with other local watercourses and are suitable for the region in which the diversion is located. Where structures that require on-going maintenance are used, they must not compromise the stability and performance of the temporary watercourse diversion and adjoining watercourses.

c) Maintain sediment transport and water quality regimes that minimise any impacts to upstream and downstream reaches.

d) Maintain stability and functionality and are appropriate for all substrate conditions they encounter.

Design Plan – All Diversions

I3 A certified Design Plan that achieves Condition I1 for permanent diversions and Condition I2 for temporary diversions must be submitted to the administering authority before commencing construction of the diversion.

I4 The design plan for any temporary or permanent watercourse diversion must be conceptually consistent with the functional design/s that formed a part of the application documents for this authority.

Construction and Operation – All Diversions

I5 A set of 'as constructed' drawings and specifications, together with certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority within 60 business days form the completion of construction, or re-establishment, of the watercourse diversions, These drawings and specifications must state:

a) That the 'as constructed' drawings and specifications meet the original intent of the design plan for the watercourse diversion; and

b) Construction of the watercourse diversion is in accordance with the design plan.

Monitoring and Inspections – All Diversions

I6 The watercourse diversion must be inspected by a suitable qualified and experienced person who must prepare an inspection report in accordance with the operation and monitoring plan contained within the certified design plan. The timing and frequency of inspections must be in accordance with those specified in the operation and monitoring plan contained within the certified design plan.

Note: inspection requirements included in the operation and monitoring plan do not prevent the authority holder undertaking additional inspections.

I7 The holder must, within 20 business days of preparing an inspection report in accordance with the operation and monitoring plan, provide the administering authority:

a) The recommendations section of the inspection report; and

b) If applicable, a report on any actions being taken in response to those recommendations.

If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

Register – All Diversions

I8 The details of watercourse diversions authorised under an environmental authority must be recorded on the Register of Watercourse Diversions kept by the holder of the environmental authority and an electronic copy provided to the administering authority on request. It is the responsibility of the holder of the authority to ensure and Register of Watercourse Diversions is accurately maintained.

End of conditions

Definitions

Words and phrases used throughout the environmental authority are defined below. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the EP Act 1994 or subordinate legislation, the definition in the EP Act or subordinate legislation must be used.

'acid rock drainage' means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.

'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).

'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 relating to the subject matter using the relevant protocols, standards, methods or literature.

'background', with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

'certification', 'certifying' or **'certified'** by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, 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.

'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.

'chemical' means:

a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and *Veterinary Chemicals Code Act 1994* (Commonwealth); or

b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or

c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;

d) 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

e) 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

   (v) a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or

   (vi) manufacture of plastic or synthetic rubber.

'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.

'construction' or **'constructed'** in relation to a regulated structure includes building a new regulated structure and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

'disturbance' of land includes:

a) compacting, removing, covering, exposing or stockpiling of earth;

b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion;

c) carrying out mining within a watercourse, waterway, wetland or lake;

d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls;

e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or

f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of 'disturbance':

a) areas off lease (e.g. roads or tracks which provide access to the mining lease);

b) areas previously disturbed which have achieved the rehabilitation outcomes;

c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);

d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner.

e) disturbance that pre-existed the grant of the tenure.

'EC' means electrical conductivity.

'effluent' treated waste water released from sewage treatment plants.

'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 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams'.

'infrastructure' means water storage dams, levees,, roads and tracks, buildings and other structures built for the purpose of the mining activity.

'land' in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the *Environmental Protection Act 1994*. For the purposes of the *Acts Interpretation Act 1954*, it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

'land use' –means 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.

'licensed place' means the mining activities carried out at the mining tenements detailed in Table # (page #) of this environmental authority.

'm' means metres.

'mine affected water':

a) means the following types of water:
   i) pit water, tailings dam water, processing plant water;
   ii) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity;
   iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
   iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
   v) groundwater from the mine's dewatering activities;
   vi) a mix of mine affected water (under any of paragraphs i)-v) and other water.

b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:
   i) land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or
   ii) land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
      a. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;

b. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or

iii) both.

'measures' includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

'NATA' means National Association of Testing Authorities, Australia.

'natural flow' means the flow of water through waters caused by nature.

'non polluting' means having no adverse impacts upon the receiving environment.

'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 (mm/s).

'protected area' means – a protected area under the *Nature Conservation Act 1992*; or

a) a marine park under the *Marine Parks Act 1992*; or

b) a World Heritage Area.

'receiving environment' in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

a) a watercourse;

b) groundwater; and

c) an area of land that is not specified in Schedule # – Table # (Authorised Activities) of this environmental authority.

The term does not include land that is specified in Schedule # – Table # (Authorised Activities) of this environmental authority.

'receiving waters' means the waters into which this environmental authority authorises releases of mine affected water.

'rehabilitation' the process of reshaping and revegetating land to restore it to a stable landform

'release event' means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.

'RL' means reduced level, relative to mean sea level as distinct from depths to water.

'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.

'saline drainage' The movement of waters, contaminated with salts, as a result of the mining activity.

'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.

Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under *Nature Conservation Act 1992* as a critical habitat or an area of major interest, marine park under *Marine Parks Act 2004*, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

'the Act' means the *Environmental Protection Act 1994*.

'µS/cm' means micro siemens per centimetre.

'watercourse' has the same meaning given in the *Water Act 2000*.

'water quality' means the chemical, physical and biological condition of water.

'waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), storm water channel, storm water drain, and groundwater and any part thereof.

Attachment A

Conditions for regulated dams and levees

Reference: *Structures which are dams or levees constructed as part of environmentally relevant activities* (EHP, 2014); *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EHP, 2014).

Note: The EM Plan is to be revised to incorporate the conditions referred to below.

All structures

Assessment of consequence category

A1 The consequence category of any structure must be assessed by a suitable qualified and experienced person in accordance with the *Manual for Assessing Categories and Hydraulic Performance of Structures* (EM635) at the following times:

a) Prior to the design and construction of the structure, if it is not an existing structure; or

b) If it is an existing structure, prior to the adoption of this schedule; or

c) Prior to any change in its purpose or the nature of its stored contents.

A2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence for more than one structure.

A3 Certification must be provided by the suitable qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

Design and construction of a regulated structure

A4 Condition A5 to A9 inclusive do not apply to existing structures

A5 All regulated structures must be designed by and constructed under the supervision of a suitable qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

A6 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitable qualified person for the design and the design plan and the associated operating procedures in compliance with the relevant condition of this authority.

A7 Certification must be provided by the suitable qualified and experienced person who oversees the preparation of the design plan set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635), and must be recorded in the Regulated Dams/Levees register.

A8 Regulated structures must:

a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635);

b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

1. floodwaters from entering the regulated dam from any watercourse or drainage line:; and

    2. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

  c) (only for regulated dams associated with a failure to contain seepage) have the floor and sides of the dam designed and constructed to prevent of 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.

A9 Certification by the suitable 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;

  b) Construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

A10 Operation of a regulated structure, except for and existing structure, is prohibited unless the holder has submitted to the administering authority:

  a) One paper copy and one electronic copy of the design plan and certification of the ‘design plan’ in accordance with condition (TBA)

  b) A set of ‘as constructed’ drawings and specifications, and

  c) Certification of those ‘as constructed drawings and specifications’ in accordance with condition (TBA), and

  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 has entered the details required under this authority into a Register of Regulated Dams; and

  g) There is a current operational plan for the regulated structures.

A11 For existing structures that are regulated structures:

  a) Where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purposes of sharing DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and

  b) There must be a current operational plan for the existing structures.

A12 Each regulated structure just be maintained and operated for the duration of its operational life until decommissioned and rehabilitated in a manner that is consistent with the current operational plan and if applicable the current design plan and associated certified ‘as constructed’ drawings.

Mandatory reporting level

A13 Conditions A14 to A17 inclusive apply to Regulated Structures which have not been certified as low consequence category for ‘failure to contain – overtopping’.

A14 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of the dam it is clearly observable.

A15 The holder must, as soon as practical and 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.

A16 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence on any unauthorised discharges from the regulated dam.

A17 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

A18 The holder 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.

A19 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 of the dam (or network of linked containment systems).

A20 The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment system) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

A21 The holder 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.

Annual inspection report

A22 Each regulated dam must be inspected each calendar year by a suitable qualified and experienced person.

A23 At each inspection the condition and adequacy of all components of the regulated structure must be assessed and a suitable qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.

A24 The suitable qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (EM635).

A25 The holder must:

a) Within 20 business days of receipt of the annual inspection report provide to the administering authority:

    1. The recommendations section of the anneal inspection report; and

    2. If applicable, any actions being taken in response to those recommendations; and

b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this information to the administering authority within 10 business days of receipt of the request.

Transfer arrangements

A26 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to and Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and rehabilitation (refer explanatory notes to item 7)

A27 Dams must not be abandoned but be either:

a) Decommissioned and rehabilitated to achieve compliance with condition (TBA); or

b) Be left in-situ for a beneficial use(s) provided that:

1. It no longer contains contaminants that will migrate into the environment; and
2. It contains water of a quality that is demonstrated to be suitable for the intended beneficial use(s); and
3. The administrating authority, the holder of the environmental authority and the landholder agree in writing that the dam will be used by the landholder following cessation of the resource activity.

A28 After decommissioning, all significantly disturbed land caused by carrying out of the resource activity must be rehabilitated to meet the final acceptance criteria:

a) The landform is safe for humans and fauna;

b) The landform is stable with no subsidence of erosion gullies for at least three (3) years;

c) Any contaminated land (e.g. contaminated soils) is remediated and rehabilitated;

d) Not allowing for acid mine drainage; or

e) There is no ongoing contamination to waters (including groundwater);

f) Rehabilitation is undertaken in a manner that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the *Instructions for the treatment and management of acid sulfate soils* (2001);

g) All significantly disturbed land is reinstated to the pre-disturbed suitability class;

h) For land that is not being cultivated by the landholder:

1. Groundcover, that is not a declared pest species is established and self-sustaining;
2. Vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining; and
3. The maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out of the resource activity.

i) For land that is cultivated by the landowner, cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of resource activities being completed.

Register of Regulated Dams

A29 A Register of Regulated Dams must be established and maintained by the holder for each regulated dam

A30 The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.

A31 The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition A10 and A11 has been achieved.

A32 The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.

A33 All entries in the Register of Regulated Dams must be approved by the chief executive offices for the holder of this authority, or the delegate, as being accurate and correct.

A34 The holder 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 Dams, in the electronic format required by the administering authority.

Definitions (for regulated dams and levees)

Affected person is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life can be put at risk due to dwellings or workplaces being in the path of a dam break flood.
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);

g) for evidence of conformance with the current operational plan.

Annual exceedance probability or AEP the probability that at least one event in excess of a particular magnitude will occur in any given year.
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 an environmental authority or a development approval.
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'
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 in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
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 (EM635)*.
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 is 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 (EM635)* 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 *Integrated Planning Act 1997* or the *Sustainable Planning Act 2009* 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 downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.

Existing structure means a structure that was in existence prior to the adoption of this schedule of conditions under the 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 (EM635)* published by the administering authority

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.

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 (EM635)*.

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 (EM635)*; and

Mandatory reporting level or MRL means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Manual means the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Modification or modifying (see definition of 'construction')

Operational plan includes:

a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);

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.

Register of Regulated Dams includes**:**

a) Date of entry in the register;

b) Name of the dam, 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 (EM635);

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;

n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

Regulated dam means any dam in the significant or high consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Regulated structure includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

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.

Structure means dam or levee.

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

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 excavation in the ground.
Watercourse has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means a river, creek or stream in which water flows permanently or intermittently—

a) in a natural channel, whether artificially improved or not; or

b) in an artificial channel that has changed the course of the watercourse.

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.

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.

Attachment B

Conditions – WSL rail and services corridor

Noise

Table 1 – Noise limits

Noise Limits – Rail noise trigger levels dB(A) for residential land use	
Day **(7am – 10pm)**	**Night** **(10pm – 7am)**
60 L_{Aeq} (15h) 80 L_{Amax}	55 L_{Aeq} (9h) 80 L_{Amax}
80 dB(A), assessed as a single event maximum sound pressure level (Lmax)	

Note: EHP recommends that the New South Wales (NSW) Environmental Protection Authority (EPA) Rail Infrastructure Noise Guideline (2013) be applied. Refer to guideline Table 1, Airborne heavy rail noise trigger levels for residential use – new rail line development. These limits are needed to protect amenity values at all sensitive receptors.

Attachment C

Standard Requirements under the *Transport Infrastructure Act 1994*

Outcome to be achieved:

At all times and for each stage of the project, the proponent must maintain the safety, condition and efficiency of state-controlled roads.

Road impact assessment and road-use management plan

To demonstrate compliance with the above outcome requirement, the proponent, in consultation with the Department of Transport and Main Roads (DTMR), must:

(a) Prepare a road impact assessment (RIA) for the project to describe impacts on the safety, condition and efficiency of state-controlled and local roads. The RIA must:

- (i) be developed in accordance with the DTMR *Guidelines for Assessment of Road impacts of Development (2006)* (GARID)[1] and include a completed DTMR 'Transport Generation proforma'[2] detailing project-related traffic and transport generation information or as otherwise agreed in writing with DTMR,
- (ii) use DTMR's *Pavement Impact Assessment tools*[3] or such other method or tools as agreed in writing with DTMR,
- (iii) clearly indicate where detailed estimates are not available and document the assumptions and methodologies that have been previously agreed in writing with DTMR, prior to RIA finalisation,
- (iv) detail the final impact mitigation proposals, including any contributions to road works/maintenance and summarising key road-use management strategies, specifically at intersections of State-controlled and local roads :
- (v) mitigation strategies be approved in writing by DTMR no later than six (6) months prior to the commencement of significant construction works[4], or as otherwise agreed between the proponent and DTMR.

(b) Update the road-use management plan (RMP) for all stages of the project. The RMP must:

- (i) be developed in accordance with DTMR's *Guide to Preparing a Road-use Management Plan*[5], with a view to also optimising project logistics and minimising road-based trips on all state-controlled and local roads,
- (ii) include a table[6] listing RMP commitments and provide confirmation that all works and road-use management strategies have been designed and/or will be undertaken in accordance with all relevant DTMR standards, manuals and practices[7], and

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[1] Available at http://www.tmr.qld.gov.au/business-industry/Technical -standards-publications.aspx

[2] Available from Planning Management Section, Brisbane.

[3] Available from DTMR Regional Offices.

[4] Significant construction works means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project.

[5] Available from DTMR Regional Offices or Planning Management Section, Brisbane.

[6] Available from DTMR Regional Offices or Planning Management Section, Brisbane.

[7] Available at: http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications.aspx

(iii) be approved in writing by DTMR no later than six (6) months prior to the commencement of significant construction works, or as otherwise agreed between the proponent and DTMR.

(c) Prior to the commencement of significant project-related construction works, the proponent must upgrade any necessary intersection/accesses and undertake any other required works and other impact mitigation strategies as required by the RIA and RMP in state-controlled road reserves, in accordance with the current TMR road planning and policies and standards, unless otherwise agreed in writing with the TMR.

(d) Provide to the relevant DTMR Regional offices "as constructed" plans of the pipeline/s within the state-controlled road corridor.

DTMR is designated as the agency responsible for this recommendation.

Permits, approvals and traffic management plans relating to state-controlled roads – Advice Only

The proponent is responsible for obtaining the relevant licenses and permits for the works required above, for example, under the *Transport Infrastructure Act (Qld) 1994* for works and project facilities/infrastructure within the state-controlled road corridor. To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three (3) months prior to the commencement of significant construction works or project-related traffic, or such other period agreed in writing with DTMR:

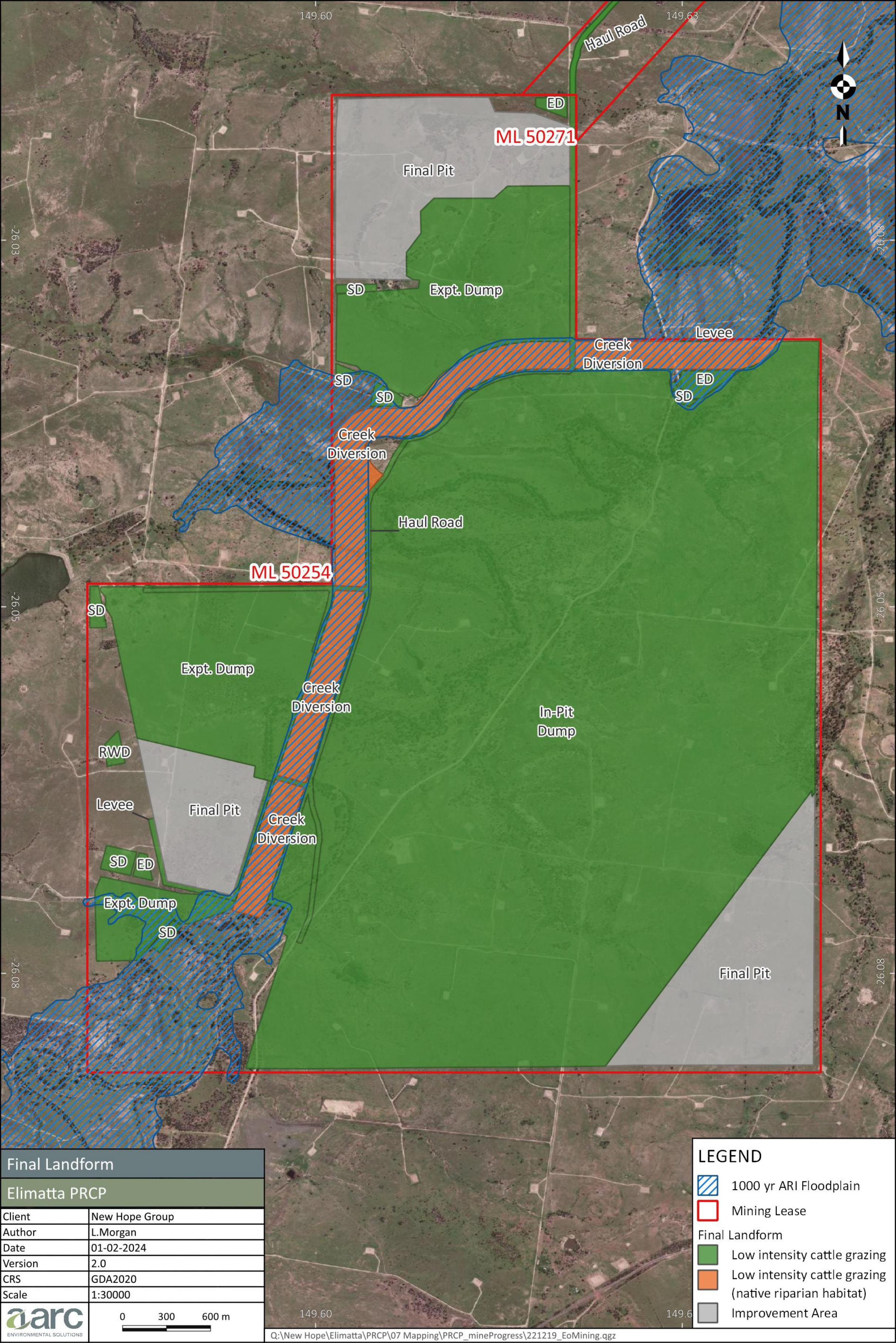
(a) submit detailed drawings of any works required to mitigate the impacts of project-related traffic for DTMR review and approval,
(b) consult with DTMR Downs South West Region specifically regarding the detailed design of the pipeline within state-controlled road reserves and maintenance access requirements for the pipeline within/from state-controlled roads including any permanent and temporary accesses,
(c) obtain all relevant licenses and permits required under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor (s33 for road works approval, s62 for approval of location of vehicular accesses to state-controlled roads and s50 for any structures or activities to be located or carried out in a state-controlled road corridor),
(d) obtain a conditional non-objection letter under sections 79 and 80 of the *Transport Infrastructure Act 1994* for public utility plant within the state-controlled road corridor,
(e) prepare a Heavy Vehicle Haulage Management Plan for any excess mass or over-dimensional loads for all phases of the project in consultation with DTMR's Heavy Vehicles Road Operation Program Office, the Queensland Police Service and the relevant LGA, and
(f) prepare Traffic Management Plan/s (TMP) in accordance with DTMR's *Guide to preparing a Traffic Management Plan*[8]. A TMP must be prepared and implemented during the construction and commissioning of each site where road works are to be undertaken, including site access points, road intersections or other works undertaken in the state-controlled road corridor.

Agreements relating to railway corridor – Advice Only

To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three (3) months prior to the commencement of construction, submit applications to Queensland Rail as the railway manager for relevant agreements required under the *Transport Infrastructure Act 1994* for any works that constitute "interfering with a railway". Information about the application is available on the Queensland Rail website (http://www.queenslandrail.com.au/NetworkServices/ThirdPartyCorridorAccess/Pages/ThirdPartyCorridorAccess.aspx).

Please note that, during the design of the project, the proponent should notify Queensland Rail of any project-related impact on known or potential areas containing protected plant species under Commonwealth and State legislation within the rail corridor.

[8] Available from TMR Regional Offices of Planning Management Section, Brisbane.



Final Landform

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
Scale	1:30000

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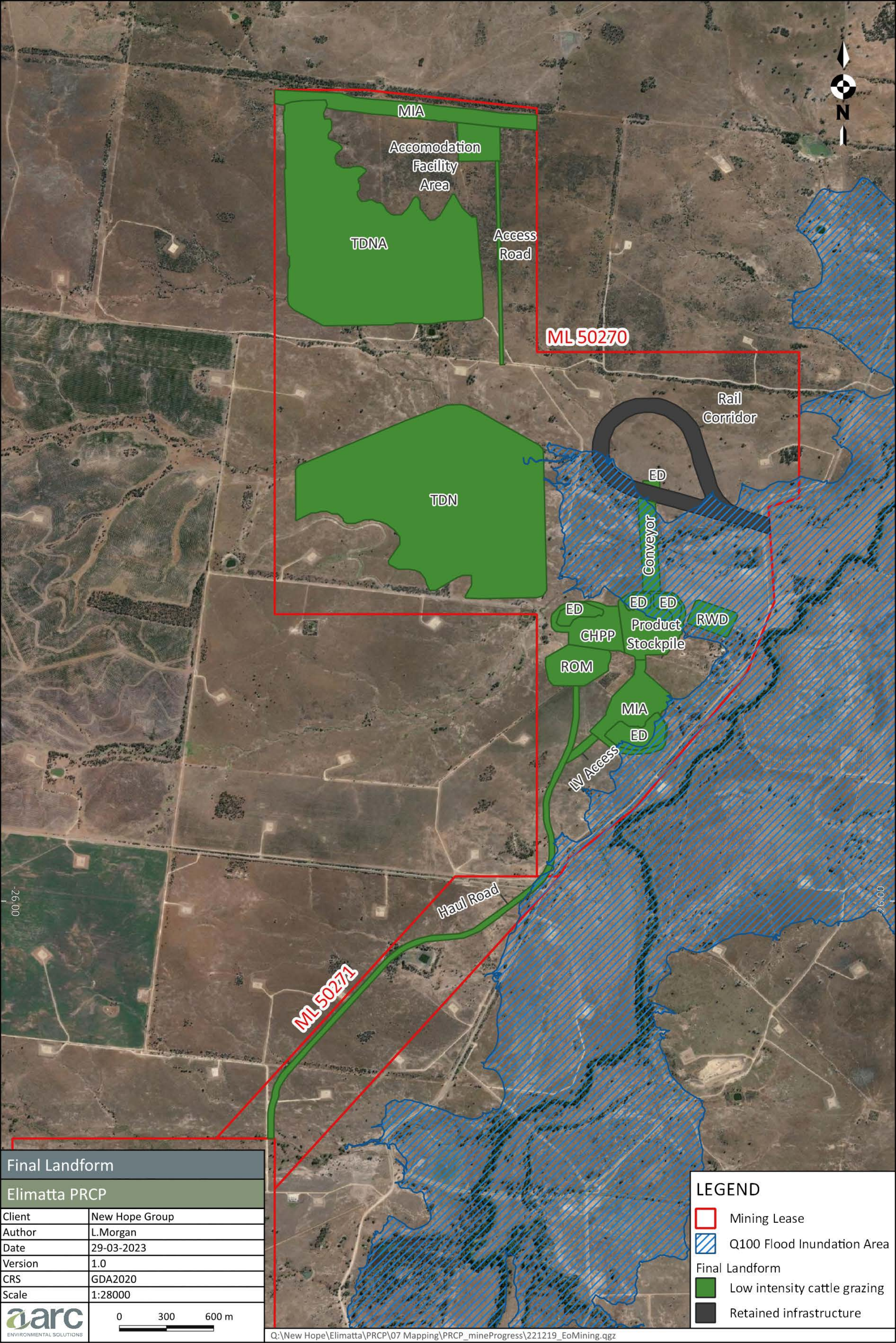
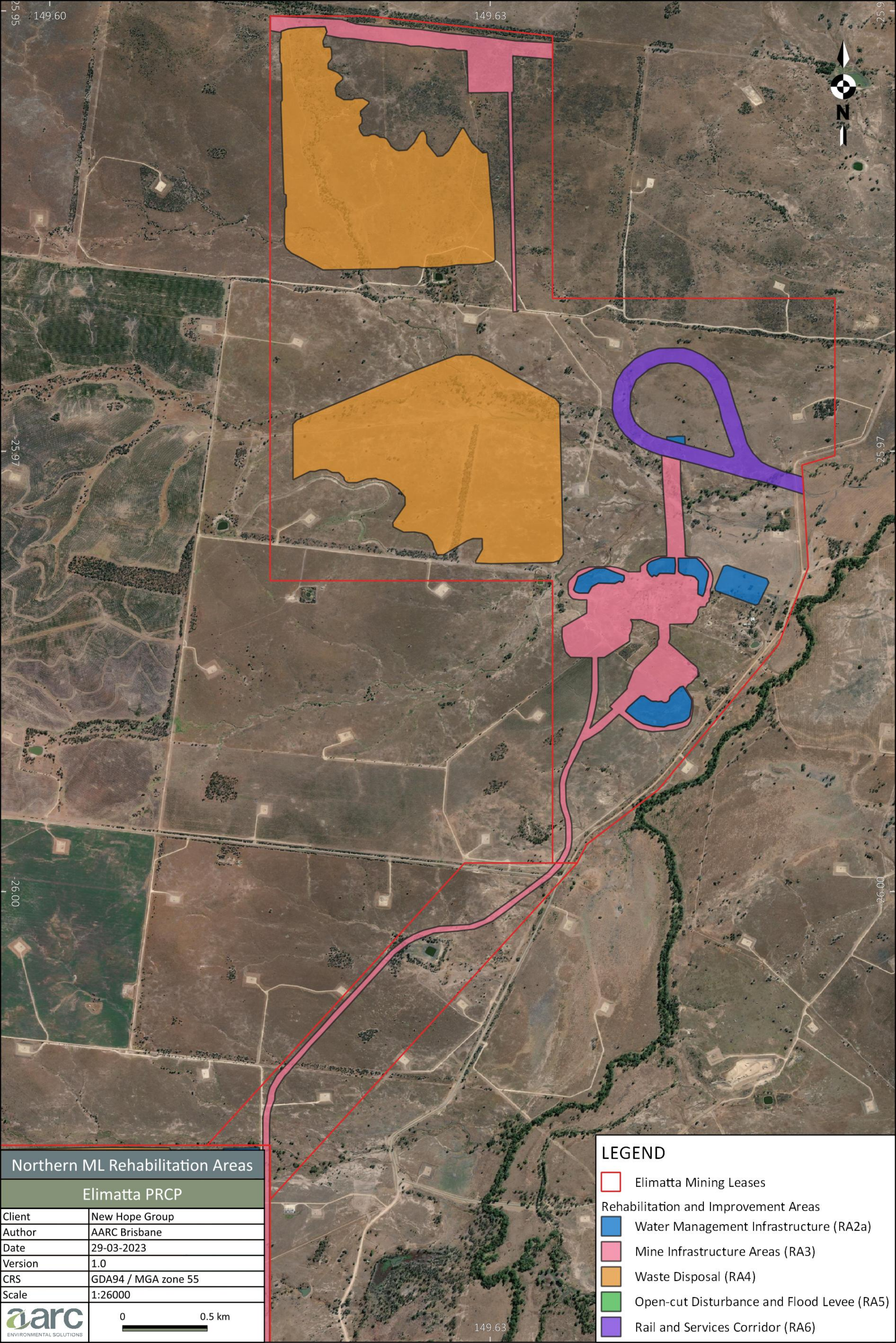
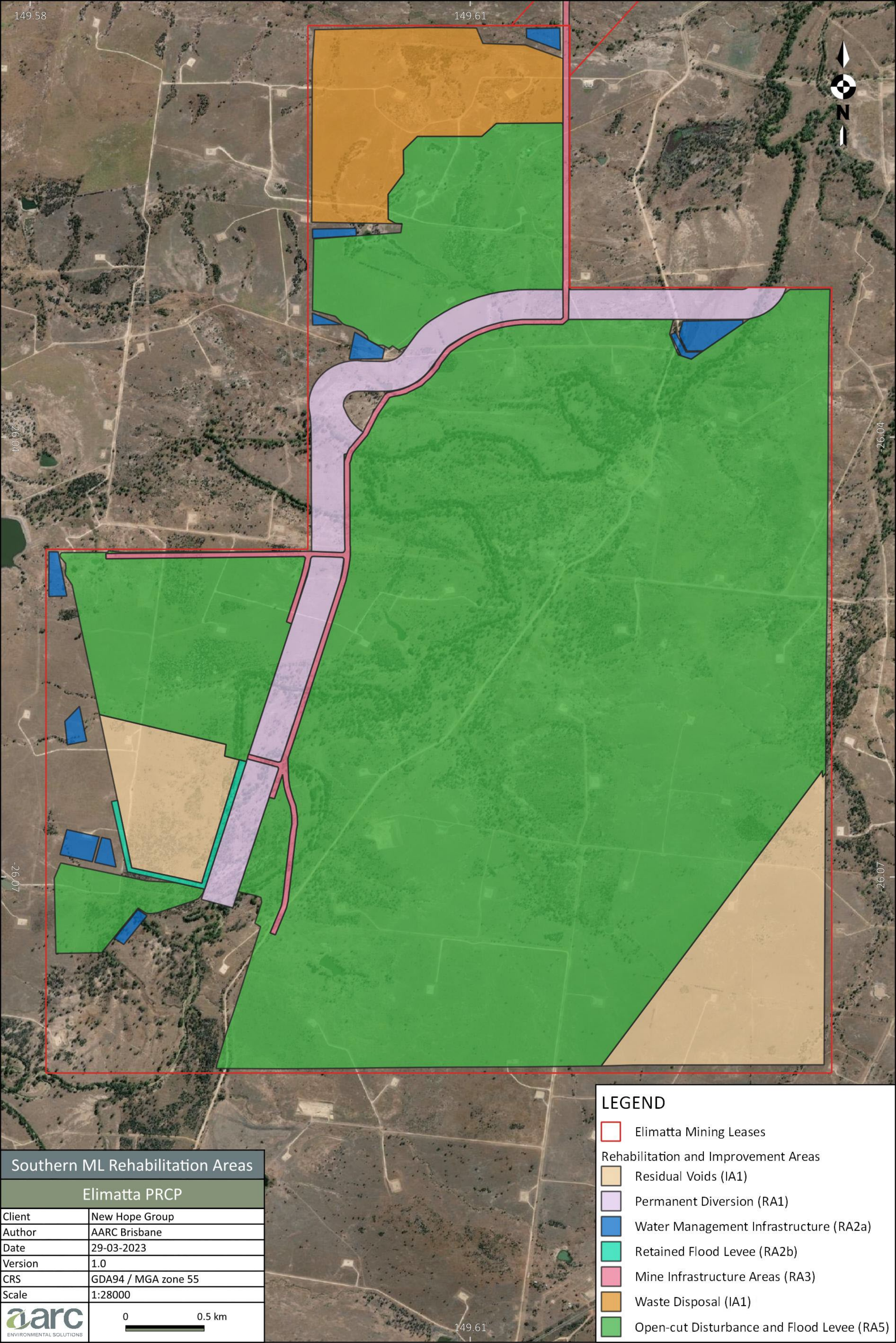

MIA
Accomodation Facility Area
Access Road
TDNA
ML 50270
Rail Corridor
ED
TDN
Conveyor
ED
ED
ED
RWD
CHPP
Product Stockpile
ROM
MIA
ED
LV Access
Haul Road
ML 50271
N
26.00
26.00
Final Landform
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
arc ENVIRONMENTAL SOLUTIONS
0 300 600 m
LEGEND
Mining Lease
Q100 Flood Inundation Area
Final Landform
Low intensity cattle grazing
Retained infrastructure
Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz



149.60
149.63
25.95
25.97
26.00
N
Northern ML Rehabilitation Areas
Elimatta PRCP
Client
New Hope Group
Author
AARC Brisbane
Date
29-03-2023
Version
1.0
CRS
GDA94 / MGA zone 55
Scale
1:26000
0
0.5 km
aarc
ENVIRONMENTAL SOLUTIONS
LEGEND
Elimatta Mining Leases
Rehabilitation and Improvement Areas
Water Management Infrastructure (RA2a)
Mine Infrastructure Areas (RA3)
Waste Disposal (RA4)
Open-cut Disturbance and Flood Levee (RA5)
Rail and Services Corridor (RA6)



Southern ML Rehabilitation Areas

Elimatta PRCP

Client	New Hope Group
Author	AARC Brisbane
Date	29-03-2023
Version	1.0
CRS	GDA94 / MGA zone 55
Scale	1:28000

TRANSITIONAL PROGRESSIVE REHABILITATION AND CLOSURE PLAN

ELIMATTA COAL MINE

PREPARED FOR
NEW HOPE GROUP
on behalf of TAROOM COAL PROPRIETARY LIMITED

1 FEBRUARY 2024

aarc
ENVIRONMENTAL SOLUTIONS

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Cover Page

Project Name:	**Elimatta Coal Mine**
Report Title:	Progressive Rehabilitation and Closure Plan
Client:	New Hope Group
Project Manager:	Stuart Richie
Document ID/Ref.	20240201_Taroom Coal Elimatta PRCP_FINAL_V4.0.pdf
Date of Submission:	2 February 2024
Tenure Nos.:	ML 50254, ML 50270, ML 50271
EA Reference:	EPML00443913
EA Holder Name:	Taroom Coal Proprietary Limited
EA Holder Contact Details:	Level 16, 175 Eagle Street, Brisbane, Qld 4000 Ph. 07 3418 0575

Version	**Comments**	**Author**	**Reviewer**	**Date**
Draft issued for client review		NW	SR	24 February 2023
Final issued to client		NW	SR	28 March 2023
Final submitted to DESI	Includes updates addressing Request for Information	NW	SR	1 February 2024

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ANC	Acid neutralising capacity
ARD	Acid Rock Drainage
CEC	Cation Exchange Capacity
CHPP	Coal Handling and Processing Plant
DES	Department of Environment and Science
EA	Environmental Authority
EC	Electrical conductivity
EHP	Environment and Heritage Protection
EIS	Environmental Impact Statement
EP Act	*Environmental Protection Act 1994*
ERA	Environmentally relevant activity
ESP	Exchangeable Sodium Potential
EV	Environmental Dam
GAB	Great Artesian Basin
GQAL	Good Quality Agricultural Land
IA	Improvement Area
LOD	Land outcome document
LOM	Life of Mine
MDL	Mineral Development Licence
MIA	Mine Infrastructure Area
ML / MLs	Mining Lease / Mining Leases
MSES	Matter of State Environmental Significance
NAF	Non-acid forming
NAG	Net acid generation
NAPP	Net acid producing potential
NUMA	Non-use management area
OEL	Occupational Exposure Level
OII	Occupational Injury/ Illness
PI	Permanent Impairment
PL	Petroleum Lease
PMLU	Post-mining land use
PoO	Plan of Operations
PRCP	Progressive Rehabilitation and Closure Plan
PRCP Guideline	Progressive Rehabilitation and Closure Plan Guideline
RA	Rehabilitation Area
RE	Regional Ecosystems
ROM	Run-of-Mine
RUSLE	Revised Universal Soil Loss Equation
RW	Raw Water Dam
SD	Sediment Dam
SIA	Social Impact Assessment
SILO	Scientific Information for Landowners
SEP	Stakeholder Engagement Plan
SMART	Specific, measurable, achievable, realistic and timely
SMUs	Soil Management Units
Taroom Coal	Taroom Coal Proprietary Limited
TDN / TDNA	Surface TSFs
TDP	In-pit TSF
TDS	Total Dissolved Solids
The Planning Guideline	Planning Guideline –The Identification of good quality agricultural land
The Project	Elimatta Project
TSF	Tailings Storage Facilities
VM Act	*Vegetation Management Act 1999*
WSL	West Surat Link
WQO	Water Quality Objectives

1 Introduction

The proponent for the Elimatta Project (the Project) is Taroom Coal Proprietary Limited (Taroom Coal) which is a wholly owned subsidiary of New Hope Corporation Limited (New Hope).

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by New Hope to develop a Progressive Rehabilitation and Closure Plan (PRCP) for the Project in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act).

The Project is a proposed open cut coal mine located approximately 45 km southwest of the township of Taroom in southern Queensland and approximately 380 km northwest of Brisbane (Figure 1). The Project is planned to mine up to 8.2 million tonnes per annum (Mtpa) of ROM coal to produce on average 5 Mtpa of product coal for export.

Based on an assessment of the available resource for the Environmental Impact Statement (EIS) (AARC 2014), the expected production life of the Project is in excess of 32 years. Including construction through to decommissioning, the whole-of-Project life is expected to be approximately 40 years.

This PRCP is applicable to mining lease (ML) 50254, ML 50270, and ML 50271. The current version of the Environmental Authority EPML00443913 (EA) for the Project was issued on 12 May 2020 to Taroom Coal Propriety Limited.

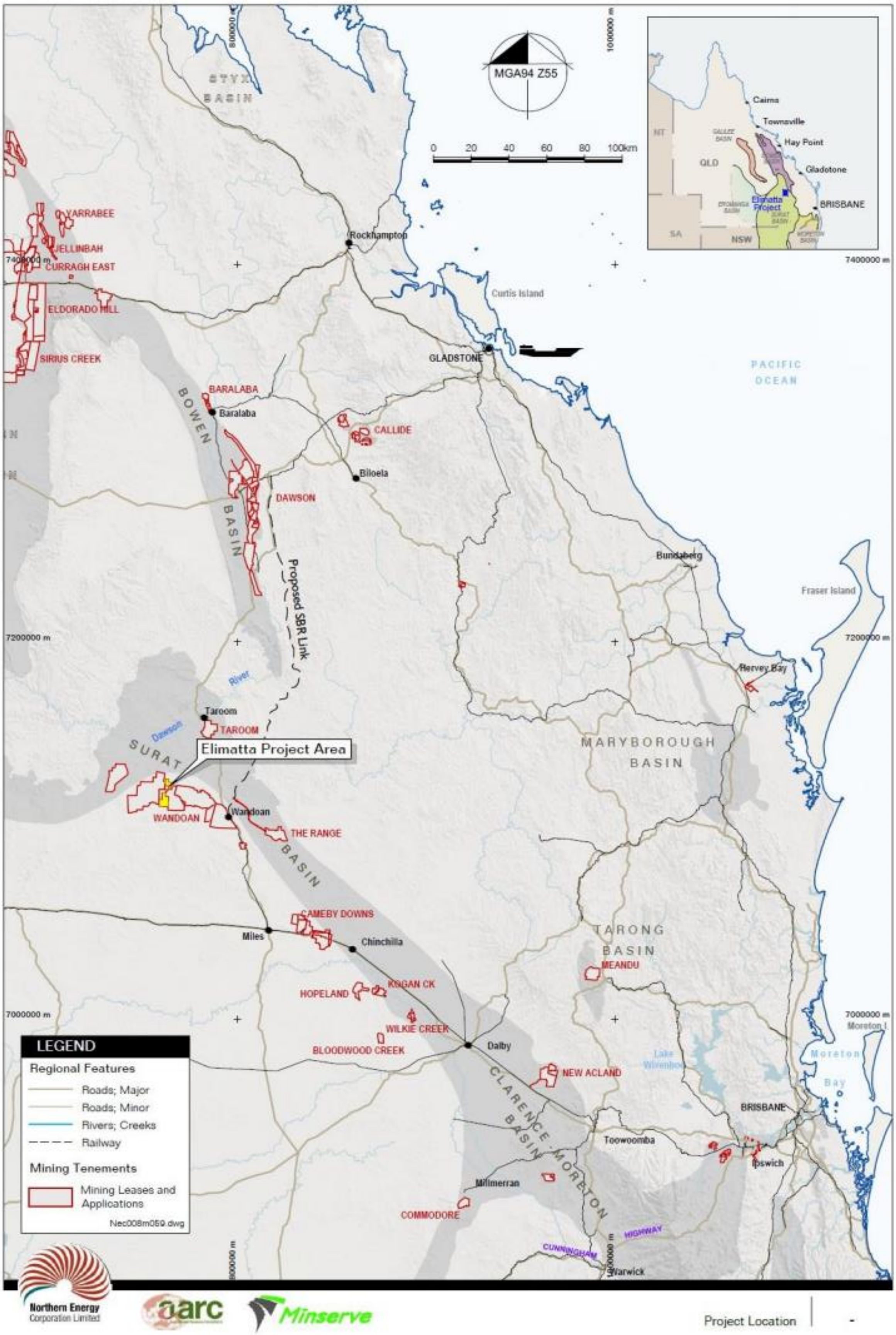


Figure 1: *Project locality*

2 Scope and objective

The purpose of this PRCP is to describe how progressive rehabilitation will be carried out at the Project. The Project does not yet have a planned commencement however, as the EA application for the Project was made prior to the commencement of the Progressive Rehabilitation and Closure (PRCP) provisions of the EP Act, neither the EA application, nor the EIS, was required to be accompanied by a draft PRCP. Instead, the proponent is required to separately prepare a PRCP for the Project in accordance with the timeframes stated in a notice issued by the Department of Environment and Science (DES) after the grant of the EA.

This PRCP has been prepared to align with the requirements of the EP Act, PRCP and other relevant guidelines to demonstrate that the relevant performance outcomes for land rehabilitation will be met. The PRCP has been developed in accordance with the requirements of the 'Progressive Rehabilitation and Closure Plan Guideline' (the Guideline; DES 2021), which states that the PRCP must include the following parts:

1) Rehabilitation Planning part:

The purpose of the rehabilitation planning part of the PRCP is to support and justify the development of the proposed PRCP schedule. This part must detail how progressive rehabilitation and closure will be carried out over the entire Project site and on both a rehabilitation area basis and improvement area basis. The key components of the rehabilitation planning part for the Project are:

- community consultation information (refer section 3.2);
- post-mining land use (PMLU) and/or non-use management area (NUMA) determination (refer section 3.3);
- rehabilitation and management methodology (refer section 0);
- risk assessment (refer section 3.6); and
- a monitoring and maintenance program (refer section 3.7).

2) Rehabilitation Schedule part:

The rehabilitation schedule is a required element of a PRCP. Once approved, the schedule becomes a legally binding and enforceable instrument with which the Project must comply. The schedule must include:

- nomination of either a PMLU or NUMA for all land within the relevant resource tenures, including land uses for undisturbed land;
- identification of when land becomes available for rehabilitation or improvement;
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes;
- milestone criteria that demonstrate when each milestone has been completed;
- completion dates for each milestone to be achieved; and
- any conditions considered necessary or desirable.

The administering authority may impose a condition on a draft PRCP schedule or a PRCP schedule if it considers the condition is necessary or desirable (section 4.2 of the PRCP Guideline). Two deemed conditions are to be included in all PRCP schedules in accordance with section 206A of the EP Act. The first condition states that when carrying out a relevant activity under the PRCP schedule, the holder must comply with a requirement stated in the EA relevant to carrying out the activity.

The second condition states that the holder must comply with the following matters stated in the schedule:

- each rehabilitation milestone and management milestone, and
- when each rehabilitation milestone and management milestone is to be achieved.

3 Project planning part

3.1 Project planning

3.1.1 Project description

The Project activities will be undertaken across three MLs including ML 50254, ML 50270, and ML 50271; shown in Figure 3. ML 50254 will contain the proposed open cut pit areas and stockpiles, encompassing a total area of 2,774 ha. ML 50270 will consist of the Coal Handling and Processing Plant (CHPP), rail load-out facility and other associated mine infrastructure including tailings storages and an accommodation village. ML 50270 encompasses a total area of 1,073 ha. Linking these two areas, ML 50271 will serve as a transport and services corridor for the transportation of Run-of-Mine (ROM) coal from the pit to the CHPP and has a total area of 128 ha. The maximum area proposed to be disturbed across all MLs is 3,313 ha.

Two out-of-pit dumps are planned for the Project. Overburden and interburden will be transported and disposed of in these dumps during the initial box cut and early years of mining. Thereafter, the open cut pit behind the advancing operations will be progressively backfilled and rehabilitated to minimise the total disturbance at any point in time and consequent risks to the environment. A conventional CHPP will be constructed at the Project site for coal washing. Tailings is proposed to be piped to one of two ex-pit tailings storage facilities or to an in-pit tailings dam while coarse rejects will be trucked to the waste rock emplacements. Processed wastewater will be recovered for recycling through the CHPP. Other associated infrastructure will include offices, crib rooms, warehouses, workshops, wash down bay, refuelling facility and laboratory.

A rail and services corridor is also included as part of the Project. This corridor will be a common user corridor and encompass the development of the West Surat Link (WSL) railway, as well as service infrastructure to support the Project. Product coal is to be transported via the WSL to join the Surat Basin Rail northeast of the Wandoan township. Product coal will be railed to the planned Wiggins Island Coal Export Terminal (WICET) at Gladstone for export. The development of the rail and services corridor will extend approximately 36 km, with an assumed width of 100 m, covering a total area of approximately 360 ha (Figure 2).

The principal disturbance footprints for the Project are:

- open cut mining pits covering approximately 2,287 ha (ML 50254);
- development of an out-of-pit spoil dump over approximately 183 ha (ML 50254);
- the diversion of Horse Creek and relocation of Perretts Road from within the mining area (ML 50254);
- the development of a common user rail and services corridor to service the Project;
- construction and operation of a CHPP and associated mine infrastructure, including tailings storages and an accommodation village requiring approximately 340 ha (ML 50270);
- transportation of ROM coal from the pit to the CHPP via a dedicated haul road (ML 50271); and
- rail loading of coal at the Project site and transportation of product coal to the WICET in Gladstone.

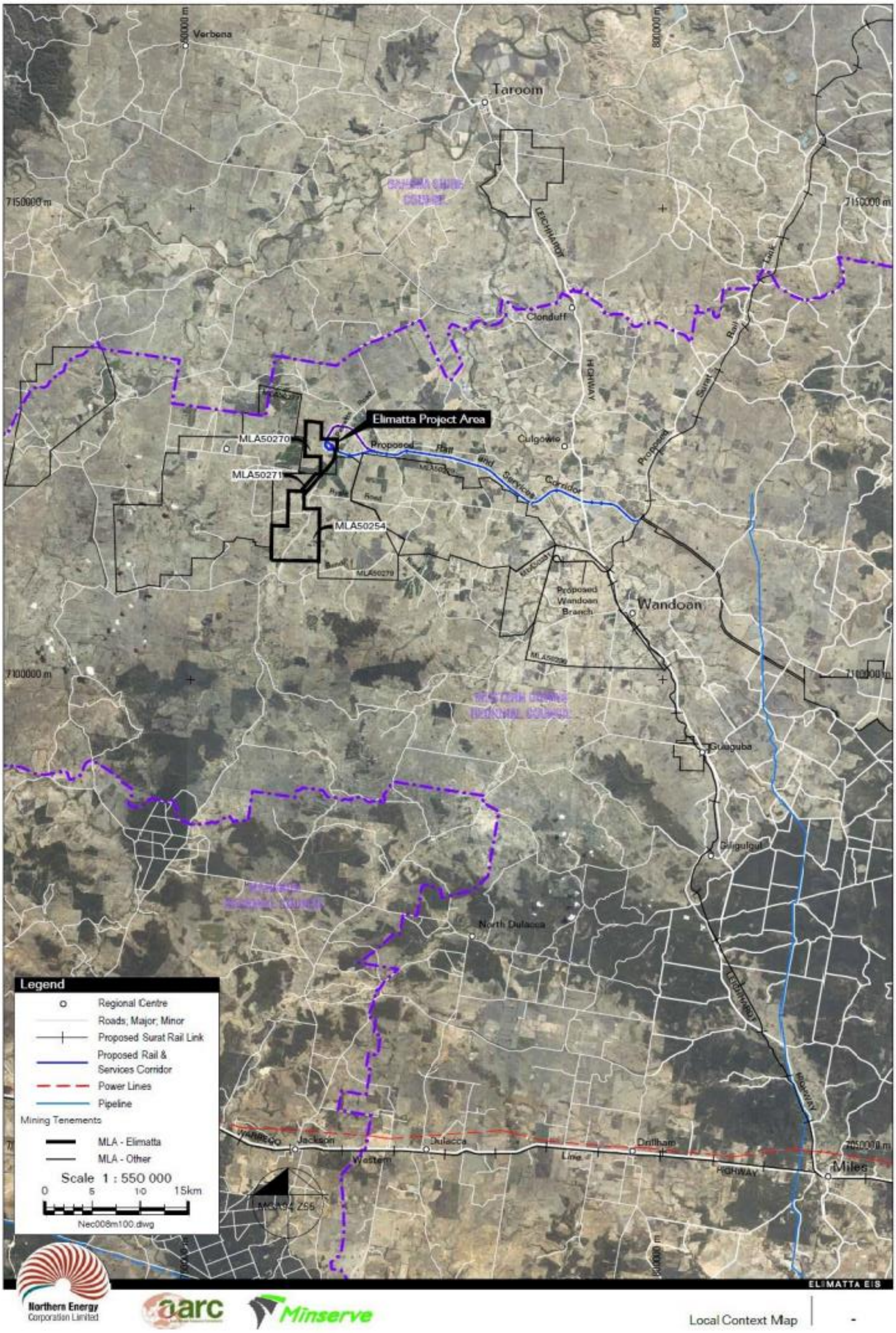


Figure 2: Regional context of the Project

3.1.1.1 Resource tenements

Taroom Coal Pty Ltd (Taroom Coal) holds the underlying exploration permit for coal (EPC) 1171. The coal and petroleum resource tenements that overlap, or are adjacent to the Project are listed in Table 1 and shown in Figure 3 and Figure 4.

Table 1: Regional coal and petroleum tenements

Authorised holder name	Tenement number	Location description
QGC Pty Limited	Petroleum Lease (PL) 277	South of ML boundaries
QGC Upstream Holdings Pty Ltd	PL 299	Within ML 50254
	PL 397	Encompassing ML 50270
	PL 1008	Northeast of MLs
	PL 498	South of ML 50270 and encompassing ML 50254 and ML 50271
	PL 507	Northwest of MLs
	PL 506	North of MLs and bordering boundary of ML 50270
	PL 505	West of ML boundaries
	PL 467	Southeast of ML boundaries
	PL 401	East of ML boundaries
	PL 464	Southern boundary of ML 50270
Australia Pacific LNG Pty Ltd	PL 408	Southwest of ML boundaries
Wandoan Holdings Pty Limited	ML 50229	West of MLs
	Mineral Development Licence (MDL) 222	West of ML 50254
	MDL 411	Bordering the eastern side of MLs
	MDL 449	Bordering the western side of MLs
	EPC 1615	West and bordering ML 50270
	EPC 1699	Northwest of MLs
	EPC 27204	Northeast of MLs
Taroom Coal Proprietary Limited	ML 50254, ML 50270, ML 50271	Project MLs
	EPC 1171	Encompassing ML 50270
Stanmore Surat Coal Pty Ltd	EPC 1274	West of MLs
	EPC 1276	North of MLs
New Acland Coal Pty Ltd	EPC 1603	Southwest border of ML 50270

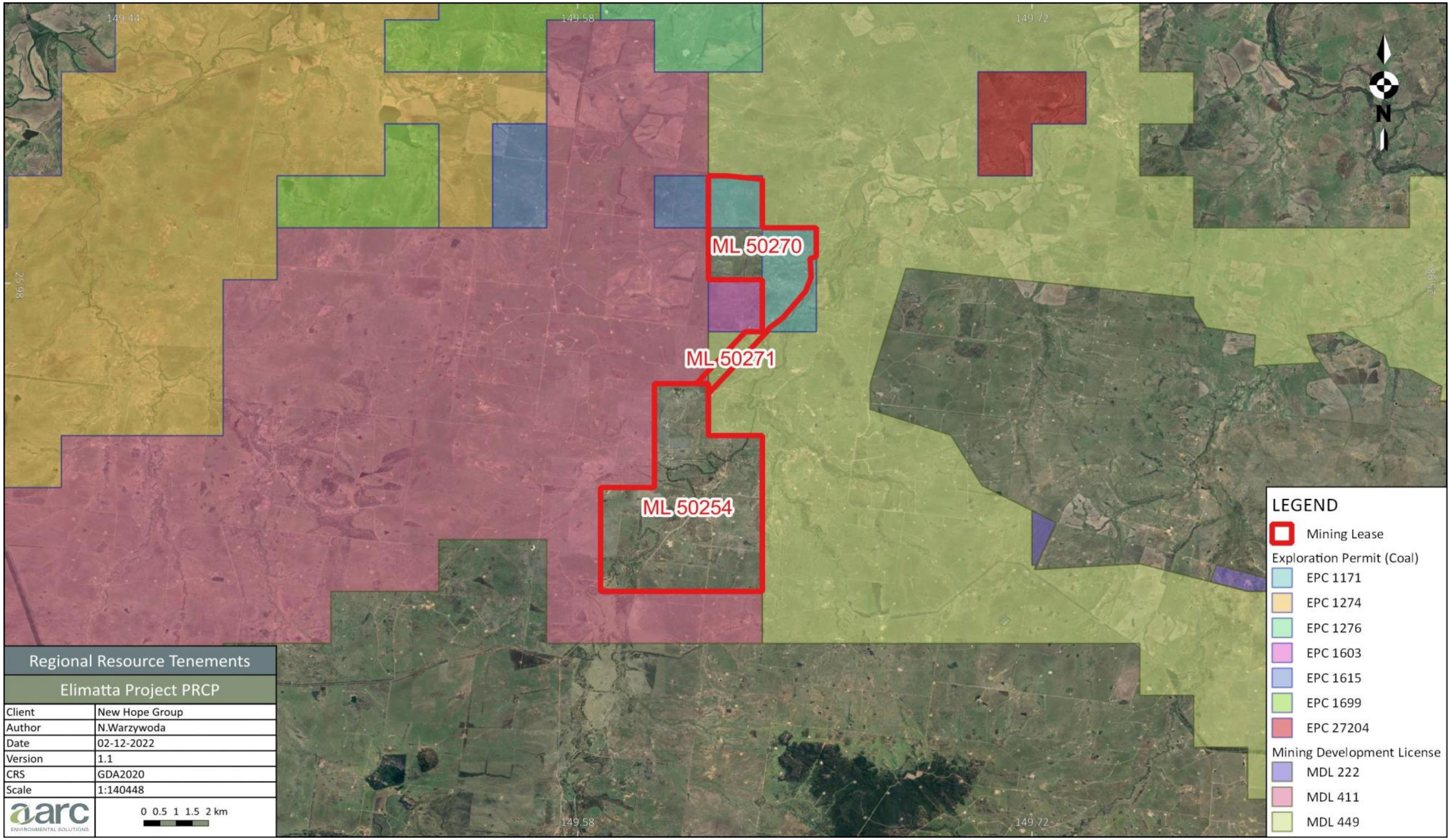
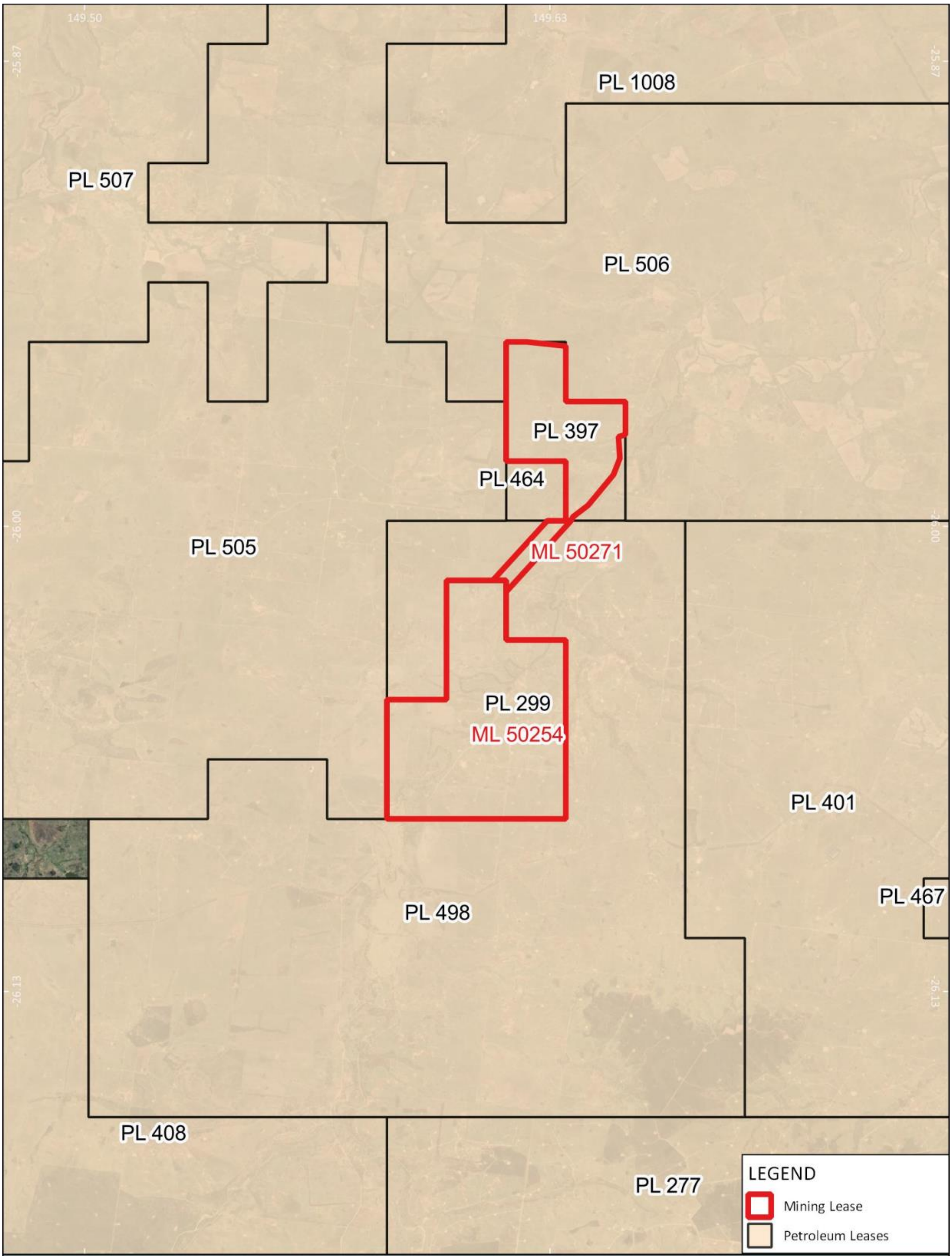


Figure 3: Adjacent and overlapping resource tenements



Petroleum Leases

Elimatta Project PRCP

Client	New Hope Group
Date	02-12-2022
Author	N.Warzywoda
Projection	GDA2020
Scale	1:130000

0 1 2 3 4 km

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Figure 4: Adjacent petroleum tenements

3.1.1.2 Mining operations

The construction period for the Project is anticipated to span approximately 22–24 months, with operations employees on site after 13 months. The initial construction stage requires earthworks to create a platform suitable for infrastructure development and the staged installation of the accommodation village. Following the preliminary clearing of the site, earthmoving equipment will excavate areas for the initial open cut pit, spoil dumps and tailings storage facilities (TSFs), as well as clearing the mine infrastructure area (MIA) and internal transport corridors. Topsoil stripped prior to mining will be stockpiled for later use in rehabilitation. Subsequent phases of the construction program will involve the development of remaining infrastructure including the WSL, water infrastructure, CHPP, accommodation village, roads and other associated infrastructure.

The operational phase of the Project will involve open cut mining using truck and excavator methods. Overburden and interburden will be disposed of in both in-pit and in out-of-pit waste rock emplacements located on site and contiguous with the pit excavation. ROM coal will be hauled from the pit area to the CHPP for processing via a dedicated private haul road within ML 50271. Processing will involve crushing, screening and washing to separate coal from waste materials. Fine waste rejects will be partially dewatered, with water recycled to the processing plant, and pumped thickener underflow to the dedicated TSFs. Coarse rejects will be dried and disposed of within spoil dumps.

As space becomes available, waste will be returned to in-pit dumps within the mined-out void. The in-pit dumps will similarly be connected to the sidewall access road and will contain a network of ramps constructed as required. Progressive rehabilitation will be carried out when waste rock placement has been finalised for a given area and that area is no longer required for mining operations. At this point, the area will be classified as available for rehabilitation and a sequence of rehabilitation activities will commence (refer to section 0).

The development of the proposed mine will result in a number of temporary public road closures, realignments and upgrades within and adjacent to the ML areas and along the rail and services corridor. The purpose of these public road works is to allow for mine operations to occur with minimum disruption to existing transport patterns and to ensure community safety.

Mining operations will commence following the construction period. The resource supports an optimal mine life in excess of 32 years, although various factors, including engineering optimisation, market conditions and environmental factors, may result in a total operational life of between 30–40 years. Including construction through to decommissioning, the estimated whole-of-Project life is approximately 40 years.

3.1.2 Climate

To describe the climatic conditions of the Project area, long-term meteorological data has been obtained from weather stations proximal to the Project as per Table 2. A summary of long-term average rainfall, temperature and humidity for the region is provided in Table 3.

Table 2: Meteorological weather stations proximal to the Project

Database	Weather station	Latitude	Longitude	Approximate distance to Project
Bureau of Meteorology	Taroom Post Office	25.64	149.79	37 km northeast
	Miles Constance Street	26.66	150.18	82 km southeast
Scientific Information for Landowners (SILO)	The Canal	25.93	149.42	24 km west

3.1.2.1 Rainfall and evaporation

The climate of the Project region is subtropical with a distinctly dry winter. The wet season generally aligns with the November to March period which accounts for over 65% of the region's average rainfall (Figure 5). Annual rainfall records for between the period of 1889-2022 are as follows.

- Taroom Post Office recorded 668 mm;
- SILO (The Canal) recorded 598 mm; and
- Miles Constance Street recorded 545 mm.

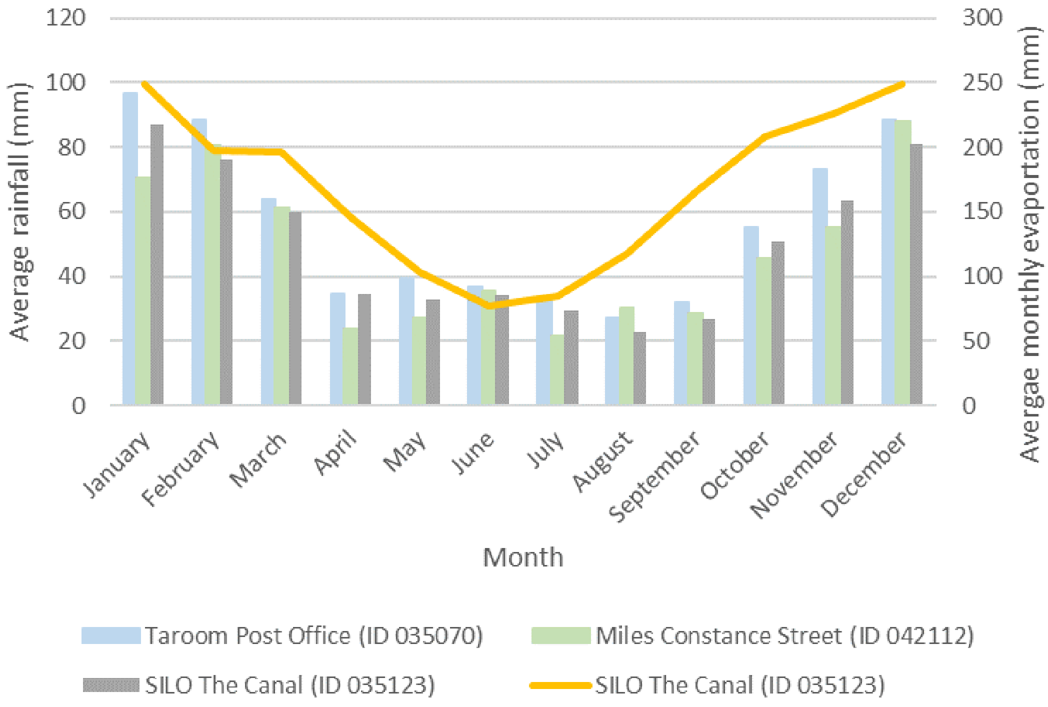

Figure 5: Regional average monthly rainfall and evaporation

Table 3: Meteorological long-term summary

Period of record	**Average monthly rainfall (mm)**			**Average monthly temperature (°C) (minimum – maximum)**			**Average monthly humidity (%) (9 am – 3 pm)**		**Average Monthly Evaporation (mm)**
	Taroom Post Office (ID 035070)	Miles Constance Street (ID 042112)	SILO The Canal (ID 035123)	Taroom Post Office (ID 035070)	Miles Constance Street (ID 042112)	SILO The Canal (ID 035123)	Taroom Post Office (ID 035070)	Miles Constance Street (ID 042112)	SILO The Canal (ID 035123)
	1952 – 2022	1997 - 2022	1889 - 2022	1952 – 2022	1997 - 2022	1889 - 2022	1952 – 2022	1997 - 2022	1889 - 2022
January	96.7	70.3	87.0	20.8 - 33.9	20.5 - 33.9	20.4 – 34.2	64 – 41	56 – 34	249.2
February	88.5	80.5	75.9	20.4 - 33.0	19.9 - 32.8	19.9 – 33.1	67 – 46	61 – 39	197.4
March	63.7	61.4	60.0	18.4 - 31.8	18.0 - 31.3	17.7 – 31.7	66 – 42	59 – 35	195.9
April	34.5	23.5	34.5	14.1 - 28.9	13.3 - 27.9	13.2 – 28.5	67 – 40	60 – 35	145.8
May	39.3	27.0	33.0	9.8 - 24.7	8.3 – 23.8	8.8 – 24.4	72 – 43	64 – 35	103.8
June	36.6	35.6	34.4	6.4 - 21.6	5.9 – 20.5	5.7 – 21.0	76 – 45	73 – 42	77.7
July	33.1	21.6	29.3	5.3 - 21.2	4.4 – 20.2	4.3 – 20.6	74 – 42	69 – 37	85.1
August	27.4	30.3	22.8	6.6 - 23.3	5.3 – 22.8	5.6 – 22.9	67 – 38	58 – 30	117.5
September	32.1	28.6	26.6	10.5 - 27.0	10.0 – 26.7	9.5 – 26.6	59 – 34	52 – 29	165.3
October	55.0	45.7	50.6	14.7 - 30.1	13.9 – 29.7	13.9 – 30.0	56 – 34	48 – 28	208.6
November	73.2	55.1	63.4	17.6 - 32.1	17.1 – 31.5	17.1 – 32.4	57 – 37	52 – 33	226.1
December	88.5	88.0	80.9	19.7 - 33.6	19.2 – 33.1	19.2 – 33.9	60 – 38	53 – 34	248.7
Annual Average	668.0	545.0	598.4	13.7 - 28.5	13.0 – 27.8	12.9 – 28.3	65 - 40	59 - 34	2021.2

Evaporation records are available from SILO (The Canal ID 035123) which recorded a potential annual average evaporation (Class A pan) of approximately 2,021 mm, approximately three times the average rainfall (Figure 5). Based on the available datasets, measured, monthly average potential evaporation is approximately three times higher than the average rainfall.

3.1.2.2 Temperature and humidity

Annual temperature records available from the Taroom Post Office (ID 035070), Miles Constance Street (ID 042112) and SILO (The Canal ID 035123) between 1889–2019 recorded average temperatures of approximately (Table 3):

- 13.7 °C (min.) to 28.5 °C (max.);
- 12.9 °C (min.) to 28.3 °C (max.); and
- 13.0 °C (min.) to 27.8 °C (max.) respectively.

Average monthly minimum and maximum relative humidity has been measured at 9:00 am and 3:00 pm at the Taroom Post Office (ID 035070) and SILO (The Canal ID 035123) with a range of 65%–40% and 59%–34% respectively (Table 3).

3.1.2.3 Long-term climate projections

In Australia, climate change is generally expected to result in a shift towards more arid conditions, warmer temperatures, and reduced rainfall. According to the Queensland Government (2019), rainfall in central Queensland is predicted to decrease due to climate change. By 2050, median annual rainfall is projected to decrease by:

- 2% under a lower emissions scenario (with emissions reduced from 'business as usual'); and
- 8% under a high emission, or 'business as usual' scenario.

Long-term climate projections predict that conditions will become warmer, with hotter and more frequent hot days. Rainfall events are predicted to become more intense, and tropical cyclones are predicted to become less frequent but more intense.

3.1.3 Geological setting

The geological setting of the Project indicates the chemical and structural integrity of the material that will be used in the construction of the final landform. The Project is located within the northern Surat Basin, near the axis of the Mimosa Syncline, a major north–south trending regional feature. The Surat Basin is one of the major sedimentary sub-basins of the Great Artesian Basin. Surficial geology of the Project site corresponds to Jurassic sedimentary formations of the Injune Creeks Group with the unconsolidated Quaternary alluvium of Horse Creek dissecting the Project area.

The coal seams that make up the resource are restricted to the Juandah Coal Measures. The Juandah measures, along with the underlying Tangalooma Sandstone, Taroom Coal Measures and Durabilla Formation make up the Walloon sub-group. Stratigraphic bedding within the Juandah Coal Measures dips gently towards the axis of the Mimosa syncline. Seam dips are generally less than 3° but steepen locally due to seam splits.

Previous geotechnical assessments conducted for the Project EIS revealed five main groups of rock types within the overburden, coal seams, interburden and floor, as follows.

- Sandstone, quartzo-feldspathic and lithic, fine to coarse-grained, pale grey to grey;
- Siltstone, variably sandy, dark grey;

- Sandstone/Siltstone, variably interbedded to interlaminated, fine to medium grained sandstone, grey/dark grey;
- Carbonaceous Mudstone/Siltstone, with thin lenses of stony coal, dark brown/black; and
- Coal, dull with bright bands, black.

Geotechnical drilling programs have identified some faulting on the Project site. Predicted faults are described as being aligned predominantly northeast-southwest in the southern part of mining areas and northwest-southeast in the northern part (Insite Geology 2010). If the fault locations, orientations and extents prove accurate, then some of the mining strip highwalls and endwalls may require special stabilisation measures when reached, as may the southern end of ‘boxcut south’.

3.1.4 Topography and surface hydrology

3.1.4.1 Topography

The topography of the area consists of very gently to moderately inclined undulating hills which are dissected by Horse Creek and its tributaries. The Project site has an average elevation of approximately 250 mAHD. There are multiple hillcrests throughout the Project area with the highest elevation of 292 mAHD in the far northwest of the Project area and the lowest point at 228 mAHD occurring on a small alluvial plain at the north-eastern boundary. The topography on the site reflects that of the surrounding region.

3.1.4.2 Hydrology

Horse Creek flows from the south-west of the Project area to the north-east, while many of its tributaries cross the Project landscape in an east–west direction. Horse Creek flows to Juandah Creek and ultimately, to the Dawson then Fitzroy Rivers. The alignment of Horse Creek and its catchment in the vicinity of the Project is shown in Figure 7.

The catchment area of Horse Creek at the upstream boundary of the mine site is 539 km^2 increasing in size to 746 km^2 at the downstream boundary of the mine site. The headwaters of the catchment run along the Great Dividing Range at the southern boundary of the catchment, with elevations ranging between 350 mAHD and 400 mAHD. The eastern and western catchment boundaries are defined by a lower divide, with elevations also ranging between 350–400 mAHD. The topography in the vicinity of the Project site is typically at about 250 mAHD, with the Horse Creek invert bed levels being approximately 5 m lower than the surrounding general ground levels.

Horse creek water quality

Water quality monitoring was conducted along Horse Creek as part of the EIS in February 2008, February 2010, and May 2011 (Figure 6 and Table 4). Several sites were selected both upstream and downstream of the MLs. The sampling results were compared with ANZECC (2000) Aquatic Ecosystems Guidelines for 95% species protection for lowland river systems in southeast Queensland, the ANZECC (2000) Livestock Drinking Water Guidelines for beef cattle, and the EPP (Water) Water Quality Objectives (WQOs) for aquatic ecosystems and drinking water environmental values of the Dawson River Sub-basin.

Overall, water quality within Horse Creek was good, however, some parameters did exceed the ANZECC (2000) Livestock Drinking Water Guidelines and the ANZECC (2000) Aquatic Ecosystems guidelines at some sites. Results shown in Table 4 in bold red text indicate an exceedance of the ANZECC Aquatic Ecosystems maximum trigger value for that parameter. Results shown in Table 4 in bold black text indicate an exceedance of the ANZECC (2000) Livestock Drinking Water Guidelines for that parameter. Results shown in Table 4 in red shading indicate an exceedance of WQOs for drinking water, while blue shading indicates an exceedance of WQOs for aquatic ecosystems.

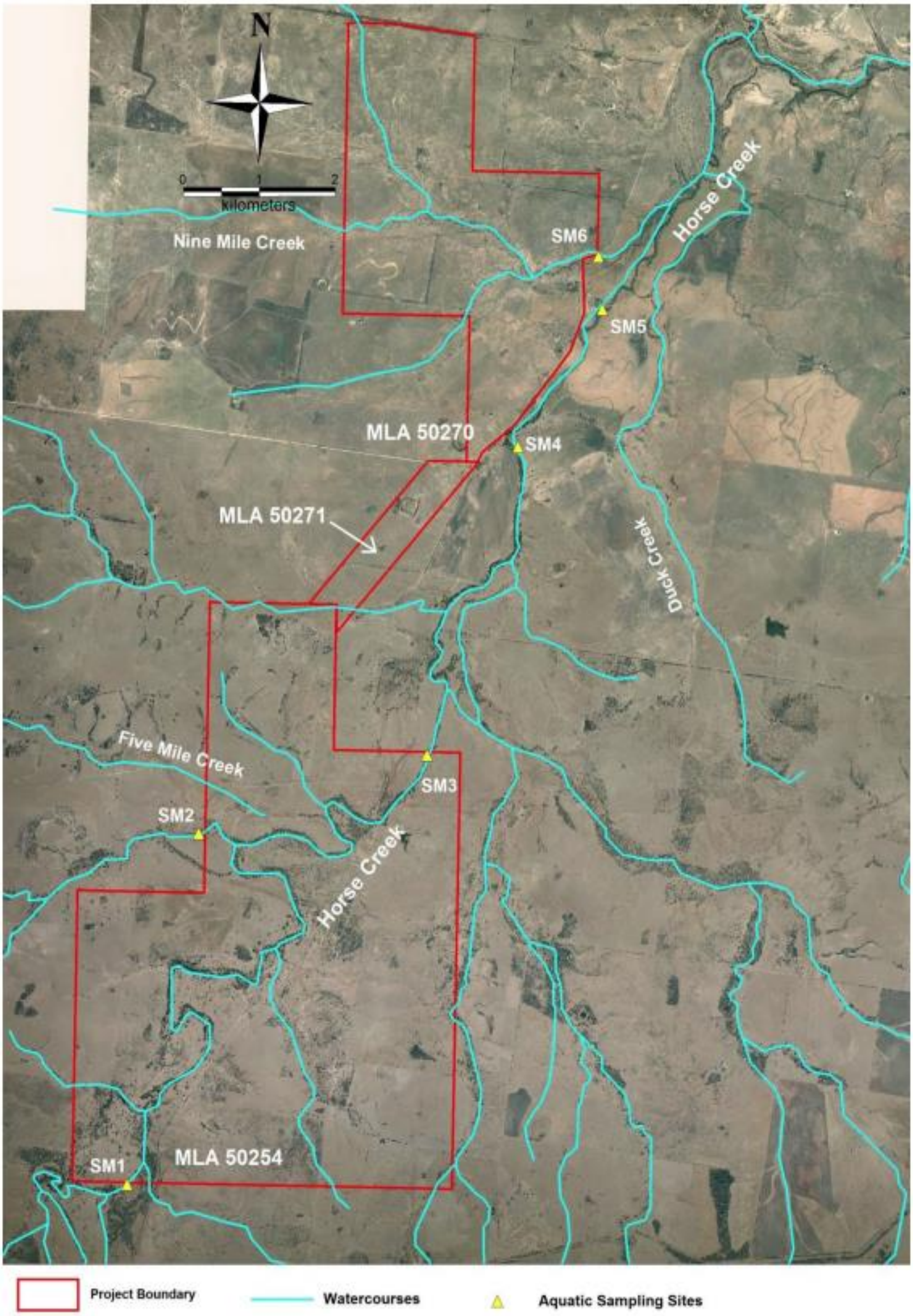

Figure 6: *Horse Creek water quality monitoring locations*

Table 4: Horse Creek water quality data

Parameter	Units	LOR	Trigger Limits ANZECC (2000)		EPP (Water) WQO		Feb 2008					Feb 2010				May 2011				
			Aquatic Ecosystems	Livestock Drinking Water	Aquatic Ecosystem	Drinking Water	SM1	SM2	SM3	SM4	SM5	SM1	SM3	SM4	SM5	SM1	SM3	SM4	SM5	Wetland
pH	pH Unit	0.01	6.0 – 8.0	n/a	6.5 – 8.5	6.5 – 8.5	7.8	7.36	7.46	7.65	7.9	7.57	7.53	7.46	7.41	**8.31**	**8.02**	**8.08**	**8.06**	7.37
Conductivity (EC) at 25ºC	µs/cm	1	125 – 2,200	n/a	Baseflow: <370 High flow: <210		202	178	229	192	393	213	206	211	210	878	668	682	719	151
Dissolved Oxygen (DO)	%	n/a	85 - 110	n/a	85 - 110	< 4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Alkalinity (CaCO3)	mg/L	1	n/a	n/a	n/a	>150	77	75	90	83	179	88	84	89	90	311	244	248	258	64
Total Dissolved Solids	mg/L	1	n/a	4,000	n/a	n/a	653	168	201	234	218	321	297	316	338	532	407	409	426	64
Total Suspended Solids	mg/L	1	n/a	n/a	<30	n/a	116	26	54	36	23	112	66	114	130	11	15	20	12	12
Turbidity	NTU	n/a	6 - 50	n/a	<50	> 500	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sulphate (SO_4^{2-})	mg/L	1	n/a	1,000	<5	200	4	2	2	2	6	4	4	4	5	21	14	14	16	<1.0
Total Chloride	mg/L	1	n/a	n/a	n/a	n/a	16	13	17	13	17	11	11	11	11	87	55	60	68	8
Dissolved Major Cations																				
Calcium	mg/L	1	n/a	1000	n/a	n/a	9	15	14	14	32	14	13	14	14	57	48	48	50	9
Sodium	mg/L	1	n/a	n/a	n/a	30	28	13	24	22	41	22	22	22	22	112	80	83	89	17
Magnesium	mg/L	1	n/a	n/a	n/a	n/a	2	3	3	3	6	3	3	3	3	12	10	10	10	2
Potassium	mg/L	1	n/a	n/a	n/a	n/a	7	12	12	11	12	9	9	9	9	12	10	10	10	10

Parameter	Units	LOR	Trigger Limits ANZECC (2000)		EPP (Water) WQO		Feb 2008					Feb 2010				May 2011				
			Aquatic Ecosystems	Livestock Drinking Water	Aquatic Ecosystem	Drinking Water	SM1	SM2	SM3	SM4	SM5	SM1	SM3	SM4	SM5	SM1	SM3	SM4	SM5	Wetland
Dissolved Metals																				
Boron	mg/L	0.1	0.370	n/a	0.370	n/a	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	0.07	0.05	<0.05	0.05	<0.05
Iron	mg/L	0.05	n/a	n/a	n/a	n/a	0.10	0.27	0.12	0.13	0.10	0.10	0.09	0.10	0.08	<0.05	<0.05	<0.05	<0.05	0.62
Aluminium	mg/L	0.01	0.055	n/a	0.055	n/a	**0.10**	**0.11**	**0.10**	**0.13**	0.04	0.03	0.04	0.03	**0.06**	<0.01	<0.01	<0.01	<0.01	0.04
Arsenic	mg/L	0.001	0.024	n/a	0.024	n/a	0.002	0.004	0.004	0.003	0.004	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.002
Cadmium	mg/L	0.0001	0.0002	n/a	0.0002	n/a	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	0.001	n/a	0.001	n/a	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.001	n/a	n/a	n/a	n/a	<0.001	0.004	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.001	0.0014	n/a	0.0014	n/a	**0.003**	**0.002**	**0.002**	**0.002**	**0.003**	**0.002**	**0.002**	**0.002**	**0.003**	<0.001	0.001	0.001	0.001	<0.001
Lead	mg/L	0.001	0.0034	n/a	0.0034	n/a	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	0.001	1.9	n/a	1.9	n/a	0.029	0.356	0.091	0.016	0.078	0.011	0.003	0.015	0.011	0.130	0.179	0.120	0.144	0.027
Nickel	mg/L	0.001	0.011	n/a	0.011	n/a	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001
Selenium	mg/L	0.010	0.011	n/a	0.011	n/a	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	0.008	n/a	0.008	n/a	<0.005	<0.005	<0.005	**0.017**	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005
Total metals																				
Boron	mg/L	0.1	n/a	5.0	5.0	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	0.07	0.05	0.05	0.05	<0.05
Iron	mg/L	0.05	n/a	n/a	n/a	n/a	16.9	2.68	4.30	4.10	0.55	3.32	3.46	4.47	3.25	0.27	0.91	0.56	0.54	1.48
Aluminium	mg/L	0.01	n/a	5.0	5.0	n/a	**17.5**	1.86	3.83	4.08	0.49	**6.77**	4.76	**7.04**	**8.13**	0.22	0.70	0.35	0.28	0.54
Arsenic	mg/L	0.001	n/a	0.5	0.5	0.01	0.005	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.002	<0.001	0.001	0.002	<0.001	0.002

Parameter	Units	LOR	Trigger Limits ANZECC (2000)		EPP (Water) WQO		Feb 2008					Feb 2010				May 2011				
			Aquatic Ecosystems	Livestock Drinking Water	Aquatic Ecosystem	Drinking Water	SM1	SM2	SM3	SM4	SM5	SM1	SM3	SM4	SM5	SM1	SM3	SM4	SM5	Wetland
Cadmium	mg/L	0.0001	n/a	0.01	0.01	0.002	<0.0001	<0.0001	<0.0001	**0.001**	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	n/a	1.0	1.0	0.05	0.008	<0.001	0.002	0.002	<0.001	0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.001	n/a	1.0	1.0	n/a	0.007	0.004	0.003	0.002	0.001	0.003	0.002	0.003	0.003	<0.001	0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.001	n/a	1.0	1.0	2	0.008	0.002	0.004	0.003	0.003	0.004	0.004	0.005	0.004	0.002	0.002	0.002	0.001	0.001
Lead	mg/L	0.001	n/a	1.0	1.0	0.01	0.008	0.001	0.002	0.002	<0.001	0.003	0.002	0.003	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	0.001	n/a	n/a	n/a	0.5	0.604	0.355	0.312	0.137	0.098	0.156	0.100	0.195	0.198	0.198	0.244	0.178	0.194	0.052
Nickel	mg/L	0.001	n/a	1.0	1.0	0.02	0.011	0.004	0.005	0.004	0.002	0.005	0.005	0.005	0.005	0.002	0.002	0.002	0.002	0.002
Selenium	mg/L	0.010	n/a	0.02	0.02	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	Mg/L	0.005	n/a	20	20	n/a	0.064	0.019	0.028	0.012	0.012	0.011	0.012	0.014	0.012	0.005	<0.005	<0.005	<0.005	<0.005

Notes: **1.0** - value is greater than the ANZECC (2000) Aquatic Ecosystems Guideline Maximum Trigger Value

1.0 - value is greater than the ANZECC (2000) Livestock Drinking Water Maximum Trigger Value

n/a - not applicable / insufficient data to determine

- value exceeds the EPP (Water) WQOs for drinking water environmental values in the Dawson River Sub-basin

- value exceeds the EPP (Water) WQOs for aquatic ecosystems environmental values in the Dawson River Sub-basin

3.1.5 Groundwater

The Project area is on the eastern edge of the Surat Basin and is underlain by over 1,000 m of shallow-dipping sediments. The Surat Basin is a structural subdivision of the Great Artesian Basin (GAB).

The waterways of the Project area fall within the southern tributaries of the Upper Dawson River Sub-basin, which is within the broader Fitzroy Basin. The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 nominates the *Environmental Protection (Water) Policy 2009 Dawson River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Dawson River Sub-basin except the Callide Creek Catchment* (State of Queensland 2011) as setting out the environmental values for this catchment.

The Water Resource (Fitzroy Basin) Plan 2011 sets out the allocation and sustainable management of water resources in the Fitzroy Basin. The Water Resource (Fitzroy Basin) Plan 2011 identifies outcomes for sustainable management of water, including outcomes for the water plan area, general outcomes, specific surface and groundwater outcomes, as well as general and specific ecological outcomes. Also included in the Water Resources (Fitzroy Basin) Plan 2011 are performance indicators and objectives.

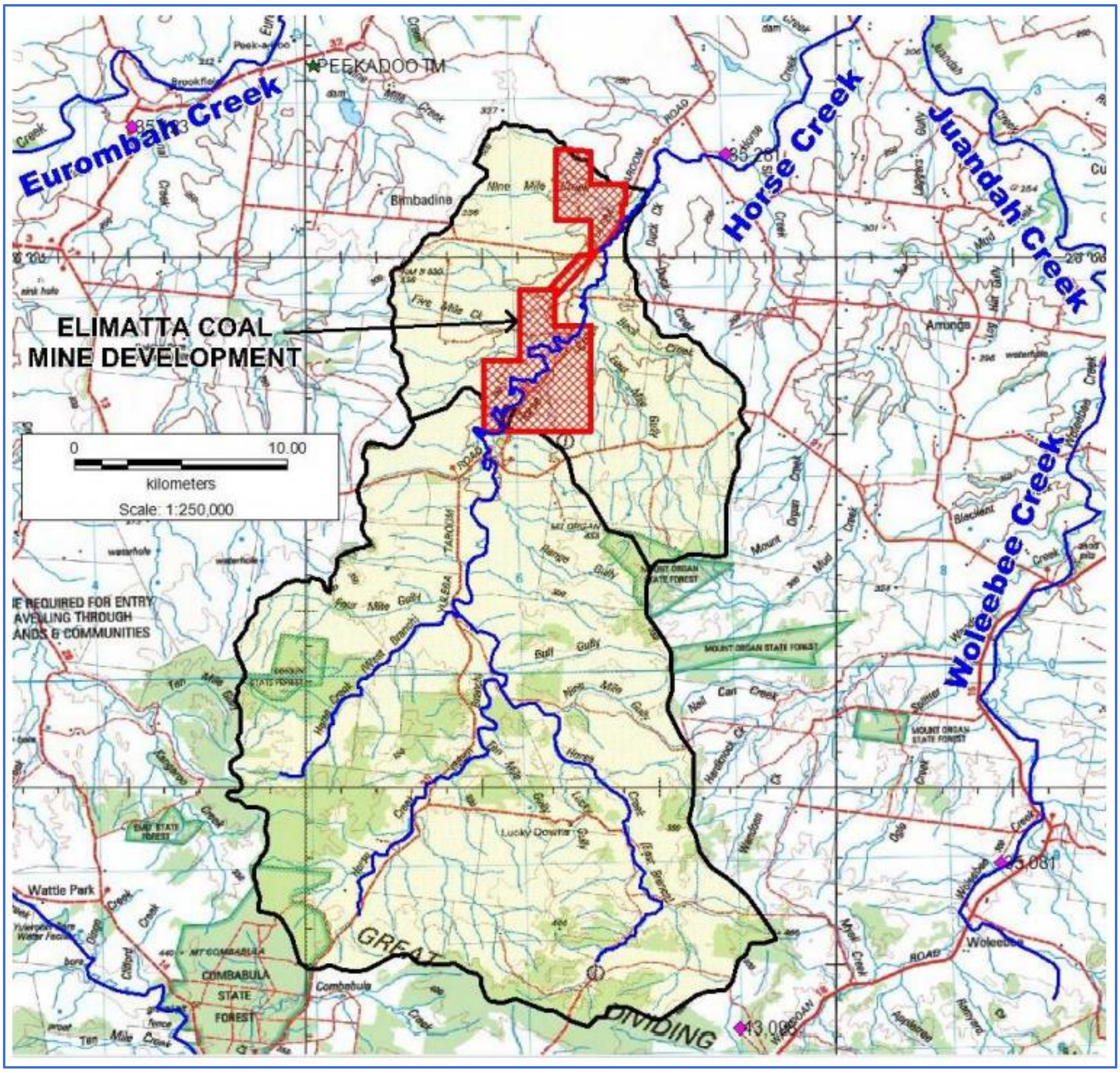

Figure 7: Horse Creek catchment showing the Project MLs

The GAB is a hydrogeological basin comprising various parts of other geologic basins. Within the Project area, the GAB includes the Surat Basin and the upper sedimentary sequences of the Bowen Basin. The main aquifer systems in the GAB in the Project area are the Gubberamunda Sandstone, Springbok Sandstone, Hutton Sandstone and Precipice Sandstone.

The Gubberamunda Sandstone is remote from the Project site, and the Hutton and Precipice Sandstones are located at significant depth below the proposed mining sequence. While the Springbok Sandstone is shown on geological maps as being present in the Project area, exploration drilling within the MLs did not detect an upper sandstone unit that could be classified as an aquifer.

The Precipice Sandstone forms a significant aquifer of the GAB, providing high yields of good quality water. In the Project area it occurs at a depth of about 825 m. It is a confined aquifer, that is, it is separated and hydraulically isolated from the overlying formations, and the potential impact from mining, by substantial thicknesses of fine-grained, essentially impermeable sedimentary rocks that include the Evergreen Formation, mudstone and siltstone units within the Hutton Sandstone and lower sections of the Walloon Coal Measures.

The Hutton Sandstone is also a major confined aquifer system which provides reasonable to high yields and good quality water. In the Project area it occurs at a depth of about 400 m; however, it is also hydraulically isolated from overlying aquifers and the potential for impact from the proposed mine sites by large thicknesses of intervening mudstones and siltstones.

The Gubberamunda Sandstone can form a productive aquifer. It outcrops about 5 km to the south of the Project in a long east–west trending ridge line and is not present in the proposed mining area. It provides supplies of low salinity water for both stock and domestic purposes.

The Walloon Coal Measures form a moderate to poor aquifer system. The main water bearing strata are the coal seams with individual seams being confined by overlying siltstone and mudstone beds. As discussed they sub-crop to the north and become deeper to the south-west.

3.1.5.1 Groundwater bores

A current search of the registered groundwater bores surrounding the Project site showed 85 registered bores within approximately 15 km of the Project, of which 36 are abandoned and destroyed and three are abandoned but still usable (Table 5 and Figure 8).

Table 5: Registered groundwater bores

Registered bore number	Coordinates		Description
	Latitude	Longitude	
11590	-26.08	149.53	Existing
14618	-25.96	149.54	Existing
14632	-26.05	149.61	Existing
14648	-25.99	149.50	Existing
14743	-26.11	149.59	Existing
15838	-25.99	149.72	Existing
16598	-25.89	149.57	Existing
17753	-25.99	149.70	Existing
33821	-26.12	149.58	Existing
34709	-26.11	149.66	Existing

Registered bore number	Coordinates		Description
	Latitude	Longitude	
34718	-26.09	149.73	Existing
34929	-26.09	149.70	Existing
43380	-25.99	149.69	Existing
44246	-26.04	149.64	Existing
58022	-25.92	149.55	Existing
58079	-26.05	149.68	Existing
58242	-25.94	149.53	Existing
58282	-26.08	149.72	Existing
58301	-25.97	149.72	Existing
58302	-25.96	149.68	Existing
58306	-25.92	149.59	Existing
58600	-26.05	149.53	Existing
58850	-26.04	149.71	Existing
58968	-25.98	149.57	Existing
123300	-26.13	149.53	Existing
123504	-26.09	149.63	Existing
123533	-26.00	149.54	Existing
123653	-26.03	149.62	Existing
123654	-26.03	149.63	Existing
123655	-26.03	149.63	Existing
123656	-26.03	149.63	Existing
123674	-26.03	149.66	Existing
160508	-25.91	149.54	Existing
160509	-25.91	149.54	Existing
160510	-26.11	149.73	Existing
160511	-26.11	149.72	Existing
160512	-26.12	149.70	Existing
160576	-26.12	149.73	Existing
160577	-26.12	149.69	Existing
160579	-26.11	149.71	Existing
160714	-26.02	149.65	Existing

Registered bore number	Coordinates		Description
	Latitude	Longitude	
160722	-26.09	149.63	Existing
160863	-26.03	149.66	Existing
160883	-25.91	149.54	Existing
168270	-26.14	149.58	Existing
180018	-26.09	149.62	Existing
180062	-26.03	149.62	Existing
180066	-25.95	149.69	Existing
180068	-26.07	149.52	Existing
58537	-26.04	149.65	Abandoned but Still Usable
192518	-26.06	149.60	Abandoned but Still Usable
192541	-26.10	149.54	Abandoned but Still Usable
11714	-25.94	149.51	Abandoned and Destroyed
14595	-25.98	149.65	Abandoned and Destroyed
14596	-26.00	149.64	Abandoned and Destroyed
14631	-26.03	149.64	Abandoned and Destroyed
14633	-26.03	149.60	Abandoned and Destroyed
14744	-26.08	149.59	Abandoned and Destroyed
14745	-26.13	149.58	Abandoned and Destroyed
14889	-25.95	149.67	Abandoned and Destroyed
15856	-26.10	149.70	Abandoned and Destroyed
15898	-25.99	149.51	Abandoned and Destroyed
15989	-26.09	149.59	Abandoned and Destroyed
16119	-26.00	149.53	Abandoned and Destroyed
16298	-26.10	149.67	Abandoned and Destroyed
16789	-26.12	149.69	Abandoned and Destroyed
26300	-26.14	149.70	Abandoned and Destroyed
32259	-26.14	149.57	Abandoned and Destroyed
33435	-26.15	149.61	Abandoned and Destroyed
34708	-26.10	149.66	Abandoned and Destroyed
34951	-25.99	149.66	Abandoned and Destroyed
37949	-25.99	149.55	Abandoned and Destroyed

Registered bore number	Coordinates		Description
	Latitude	Longitude	
44605	-26.08	149.66	Abandoned and Destroyed
48810	-26.01	149.54	Abandoned and Destroyed
48965	-26.15	149.64	Abandoned and Destroyed
58064	-25.99	149.66	Abandoned and Destroyed
58077	-26.00	149.58	Abandoned and Destroyed
58297	-26.07	149.69	Abandoned and Destroyed
58320	-26.04	149.50	Abandoned and Destroyed
58462	-25.98	149.65	Abandoned and Destroyed
58541	-25.99	149.59	Abandoned and Destroyed
58612	-25.99	149.55	Abandoned and Destroyed
58768	-26.09	149.63	Abandoned and Destroyed
58967	-26.15	149.63	Abandoned and Destroyed
192520	-26.04	149.64	Abandoned and Destroyed
192521	-25.93	149.71	Abandoned and Destroyed

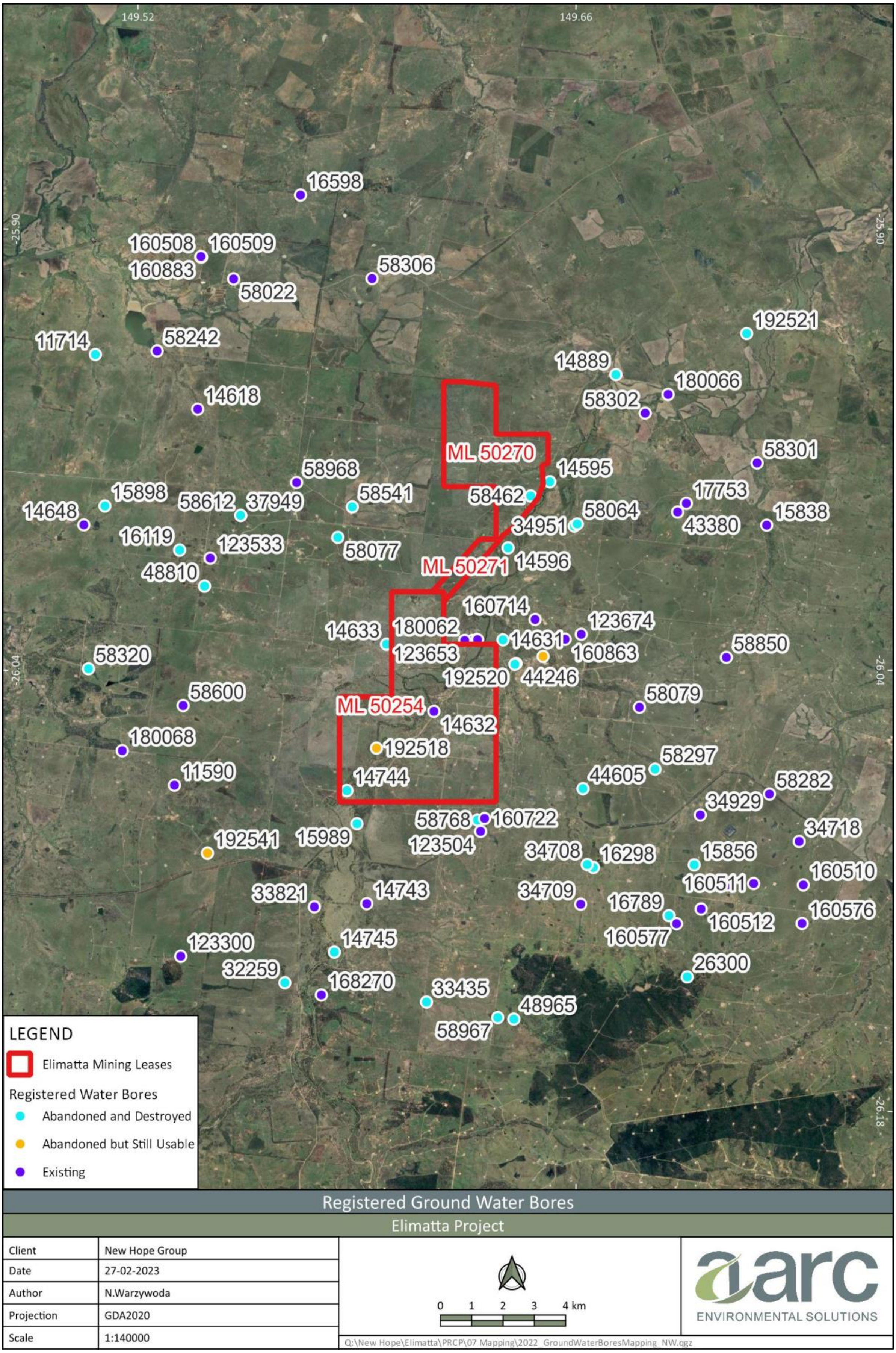

Figure 8: Registered groundwater bores in the vicinity of the Project

3.1.5.2 Water levels and flow

Groundwater levels within the constructed bores were measured during four baseline monitoring events that were undertaken between October 2009 and July 2011. The measured levels generally indicate the potentiometric surface is a subdued reflection of the surface topography with groundwater flow generally from south to north.

Regional scale studies in the Surat Basin support baseline monitoring results and generally report groundwater flow occurs from the recharge areas (that outcrop in an arc from Warwick to Roma) to the south, south-west and west (QWC 2012). The exception to this is the northern portion of the Surat Basin which is located within the Fitzroy River catchment and north of the Great Dividing Range. In the Wandoan region (north of the Great Dividing Range), available data indicates groundwater generally flows towards the north-northeast. Hodgkinson *et al.* (2009), noted that topography controls hydraulic gradients in shallow systems with groundwater flow from recharge areas towards the south, south-west and west, but with a minor northern flow component in some aquifers. Water level measurements in the monitoring bore network installed in the Walloon Coal Measures for the Project confirm this northerly groundwater flow direction. Asia Pacific LNG (2012) assessed flow directions in the deeper underlying Hutton Sandstone and reported a northerly flow direction in the region north of the Great Dividing Range.

Along the alignment of Horse Creek, groundwater levels in the coal measures fall from about 240 mAHD to 223 m AHD, a gentle gradient of 13 m over 6.3 km (or 1 in 484).

Paired bores are present at several sites constructed in the alluvium and coal measures. Several of these sites indicate the water head in the alluvium is higher than in the coal measures, indicating that the Horse Creek alluvium likely recharges the underlying coal measures during periods of sustained rainfall.

3.1.5.3 Aquifer properties

Falling head permeability tests were conducted in each of the monitoring bores. The tests evaluated the hydraulic conductivity of aquifer material surrounding the bore screen. The data suggests that the coal seam has a permeability of around 0.05 m/day to 1.4 m/day, which is relatively permeable for coal.

Topography to the north has the most obvious influence on the groundwater levels and flow directions, not the dip of the coal seams which is generally to the south.

Insite Geology (2009) assessed the geotechnical conditions at the Project site and identified five main faults interpreted from various exploration programs. All faults were inferred to be sub-vertical normal faults with the distance of throw from 1 m to 35 m.

The faults generally trend down-dip and will be gradually removed by mining. During the mining process, the faults will be exposed in the highwall and are likely to drain and depressurise along the fault plane. Features of such fault zones include the undamaged rock, the damaged (fractured) zone and the core (gouge) zone. The hydraulic properties of these zones will control the magnitude of the drainage and depressurisation. The water pressures and the cross-sectional area of the fractured material around the fault plane control the volume and rate of water transferred through the fault. The cross-sectional area of a fault plane is typically much less than the cross-sectional area of other strata exposed by mining (including the coal seams). This implies then that faults typically only contribute in a minor way to the depressurisation and drainage induced by mining.

However, it is only when mining commences and depressurisation of the coal seams and overlying strata occurs that the influence of structure or hydraulic conductivity variability may become apparent.

3.1.5.4 Groundwater recharge

Groundwater recharge to coal seam aquifers is derived from two sources:

- infiltration of incident rainfall; and
- via intersection of the coal seam outcrops or shallow overburden with surface water sources.

The actual volume of rainfall that recharges is a function of rainfall intensity, evaporation rates, topography and the permeability of the surficial soils. Limited data is available on the annual recharge volume of the shallow alluvial aquifers or sandstone beds of the GAB.

The calibrated recharge rates used in the groundwater model for the Project were based on the percentage of incident rainfall that infiltrates as deep drainage, using a long-term average annual rainfall of 653.8 mm per year (AGE, 2012). On this basis, calibrated recharge rates from the model were 0.00131 mm/year for the Walloon Coal Measures, and 1.08116 mm/year for the Gubberamunda Sandstone.

While the increased coarse fraction of sediments from the proposed spoil dumps are expected to increase recharge rates at 10% of the average annual rainfall, it is unlikely that this increase will result in adverse impacts on groundwater recharge within the Project region (AGE, 2012).

3.1.5.5 Groundwater quality

Groundwater quality is described in the AGE (2013) Groundwater Assessment report which is provided in Appendix G. Groundwater salinity varies across the Project area from fresh to saline. Salinity is generally lower within the alluvial deposits than within the Walloon Coal Measures which are typically more saline in nature. This higher salinity is most likely a result of lower recharge rates to the coal measures and greater groundwater residence times increasing water/rock interaction and mineral dissolution.

Four monitoring events were conducted in October 2009, November 2009, January 2010, and July 2011. Water samples were collected from up to 21 bores located throughout the Project area. Nine of the bores screened were within the Horse Creek alluvium, with the remaining 12 located across coal horizons within the Walloon Coal Measures. A total of 39 samples were collected from bores screened across the coal measures and 18 from bores screened across alluvium. Additionally, 16 duplicate samples were collected for quality assurance purposes.

Groundwater quality parameters tested include:

- pH;
- EC;
- Temperature;
- Dissolved Oxygen;
- Oxidation-Reduction Potential;
- Total Dissolved Solids (TDS);
- Major anions (CO_3, HCO_3, Cl, SO_4);
- Major cations (Ca, Mg, Na, K);
- Trace elements - (Al, Sb, As, Be, Ba, Cd, Cr, Cu, Ni, Pb, Zn, Li, Mn, Mo, Se, Ag, U, V, B, Fe); and
- Nutrients – nitrite, nitrate, TKN, TN.

Salinity is generally lower within the alluvial deposits than within the Walloon Coal Measures which are typically saline in nature. The higher salinity in the Walloon Coal Measures when compared to the alluvium is most likely a result of lower recharge rates to the coal measures that concentrate the rainfall recharge and greater groundwater residence times increasing water/rock interaction and mineral dissolution.

Figure 9 shows the major ions plotted on a piper diagram which shows that groundwater within the Walloon Coal Measures can be classified as a sodium-chloride type water. The composition of groundwater within the alluvial deposits is more variable; sodium is the dominant cation; however, the dominant anion ranges from bicarbonate to chloride to no-dominant type.

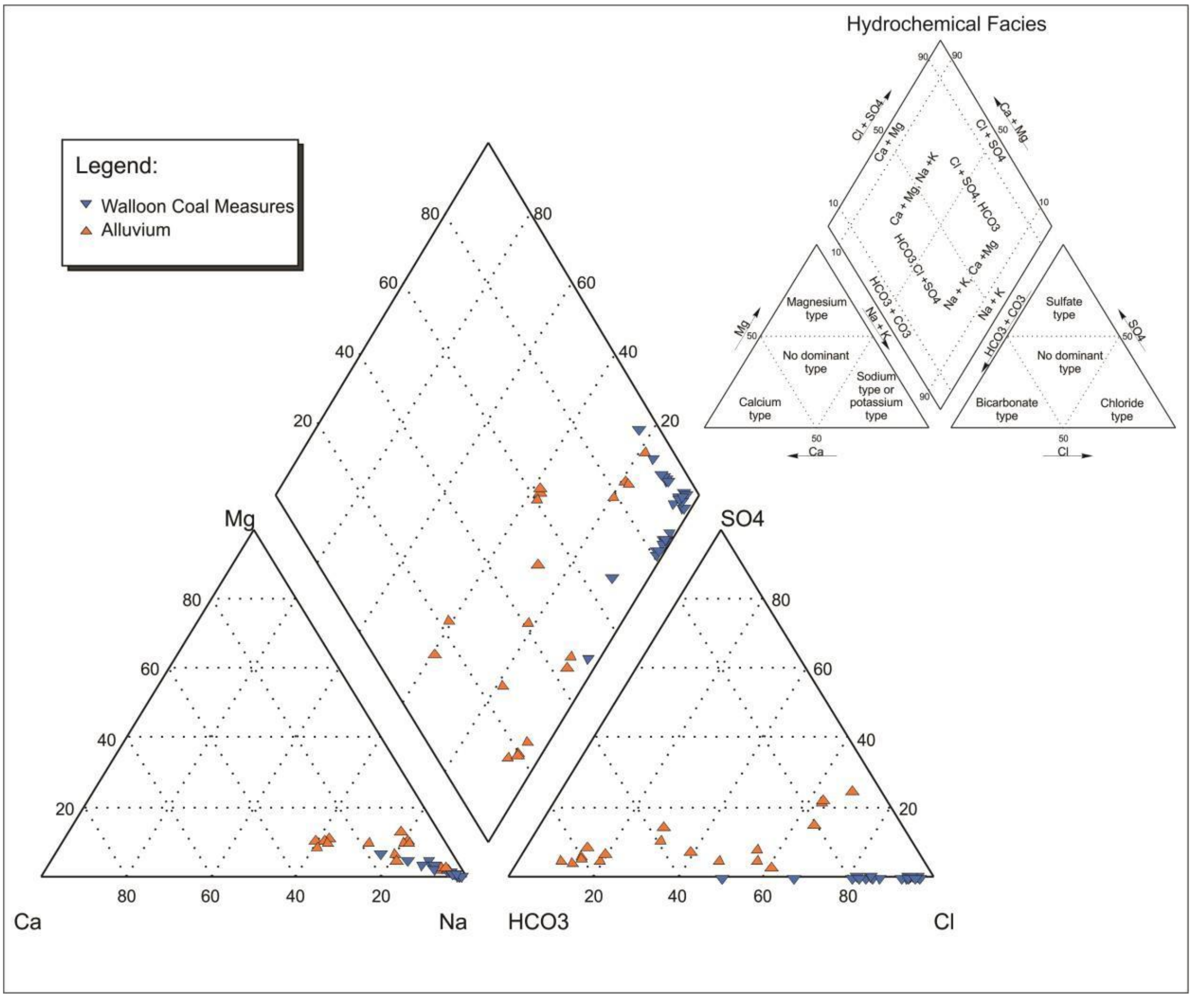

Figure 9: Piper diagram

pH ranges between 6.6 and 8.4 for all samples. TDS show a high variability and ranges between 418 mg/L to 13,400 mg/L. TDS values are higher for those bores screened within the Walloon Coal Measures. In general, pH and TDS show a reasonable correlation within the Walloon Coal Measures whereby TDS concentrations increase with decreasing pH and vice versa. The Walloon Coal Measures are also characterised by lower sulphate, and higher chloride and sodium concentrations than the alluvium.

The full groundwater quality dataset is provided as Appendix I.

3.1.5.6 Groundwater resource use

The Hutton and Precipice Sandstone aquifers are both aquifers in the GAB. These deep aquifers provide the main source of water for the area including the Wandoan town bores and other community bores (Juandah, Bimbadeen and Grosmont bores). The pastoral landowners and the grazing industry throughout the district maintain a high level of dependence on these deep aquifers, which are therefore of high environmental value.

Groundwater is generally suitable for stock use, which is also the most common use of groundwater in the region surrounding the Project. Typically, the groundwater within the Walloon Coal Measures and alluvium is suitable for horses, pigs, sheep and beef cattle. However, in some instances the salinity of the water could cause a loss of production. The water is generally unsuitable for watering of poultry and dairy cattle.

There are no known users of groundwater for industrial or recreational purposes within the Project area.

3.1.6 Land and soil

3.1.6.1 Native title

Native Title claimants over the wider region are the Iman People #2 (claim number QC97/55). This claim is for an area covering approximately 14,025 km^2 in central and southwest Queensland. The approximate extent of this area is from Wandoan in the south-east, to Pony Hills in the west, to Glenhaughton in the north. The Project is situated in the central southern part of this claim.

Iman People #2 are also Native Title claimants over the area encompassing the rail and services corridor (Claim Number QC97/55).

3.1.6.2 Underlying landholders

A cadastral map of the Project site is shown in Figure 10 and details of the properties underlying the ML areas (excluding the rail corridor) are provided in Table 6. The EIS Assessment report identified that the rail loop and services corridor infrastructure would likely be retained after decommissioning of the mine site, on the basis of its expected utility for other resource developers and users. Rehabilitation of the rail loop and services corridor has, therefore, not been considered with this PRCP and will be determined when decommissioning is a likely prospect. The rail loop and services corridor overlaps the northern ML (ML 50270) on lot 60 plan FT900 and lot 1 plan SP317347 (Figure 10). The majority of the rail loop and services corridor is not located within the Elimatta MLs as discussed in Section 3.1.1.

It should be noted that, given no commencement date has been identified for this Project, no land disturbance has occurred and no infrastructure exists on site. At such point in time that the operation commences, and should underlying landholders identify any mining related infrastructure of value to their future grazing operations, a landholder agreement will be developed identifying infrastructure and any associated liability thereto.

Table 6: Land and landholders underlying the Project

Mining Lease	Lot plan	Plan	Tenure
ML 50254	3	SP291123	Freehold
	33	SP277380	Freehold
	3	SP317347*	Freehold**
	37	AB180	Freehold
	43	AB222	Reserve**
	2	SP317347	Freehold
	1	SP317347*	Freehold
	A	AB840860	Easement
	043	AB222	Lands Lease**
	1	SP103977	Freehold
ML 50271	3	SP317347*	Freehold
	1	SP317347*	Freehold
ML 20270	132	SP316822	Freehold
	1	SP317347*	Freehold
	60	FT900	Freehold
	46	FT64	Freehold

* denotes a property underlies more than one tenement
** denotes tenures that are within the same area

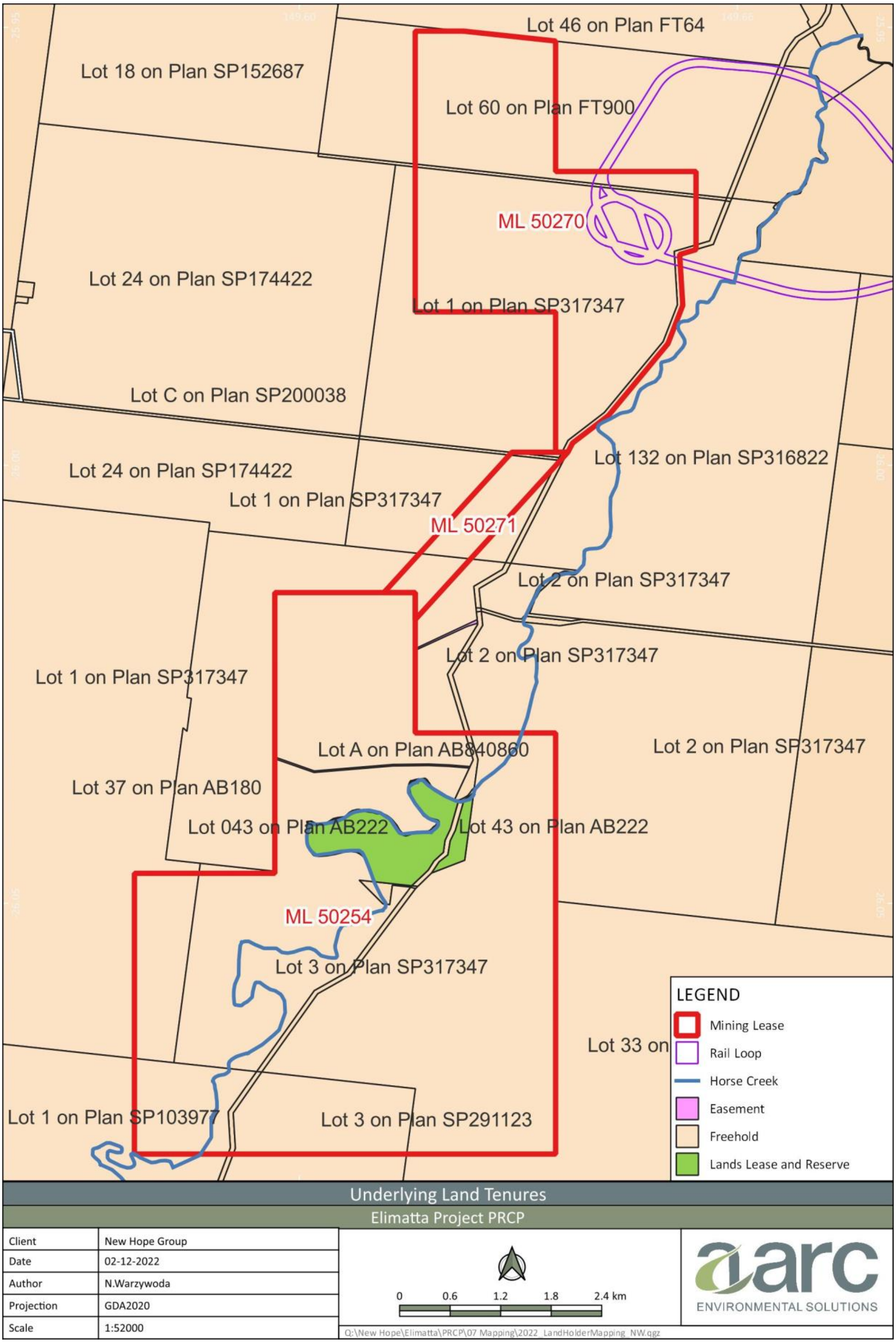

Figure 10: Land tenure associated with the Project MLs

3.1.6.3 Sensitive receptors

The noise impact assessment (ASK Consulting Engineers 2014) developed for the Project EIS identified 12 sensitive receivers within 5 km of the southern lease boundary; albeit buffered by various degrees of vegetation. Sensitive receivers south of ML 50254 are subject to significant visual impacts associated with mining operations and stockpiles.

The northern lease (ML 50270) consists of the MIA, two surface TSFs, and the anticipated mining village. There are three sensitive receivers surrounding this ML.

3.1.6.4 Land use

The dominant current land use within the ML areas is low to medium intensity cattle grazing on native and improved pastures, along with the less common dryland forage cropping. Other land uses common in the region surrounding the Project area include dryland cereal cropping.

The current land use within the rail and services corridor is predominantly grazing. Approximately 40% of the corridor length has been cropped several times in the last 15 years, however, there are no areas where cropping has occurred every year.

The Queensland Land Use Mapping (ALUM) provides classifications for the various land uses that occur within the Project area (ABARES 2016), and are presented in Table 7.

Table 7: Australian land use and management classification (ABARES 2016)

Current land use	ALUM classification	Description
Cattle grazing on native pastures	Grazing native vegetation	Land uses based on grazing by domestic stock on native vegetation where there has been limited or no deliberate attempt at pasture modification.
Cattle grazing on improved pastures	Grazing modified pastures	Pasture and forage production, both annual and perennial, based on significant active modification or replacement of the initial vegetation.
Dryland forage cropping	Cropping	Land that is under cropping and in a rotation system such that different areas will be cropped while others are left available. These are classified by the primary use (i.e. pasture).
Dryland cereal cropping		

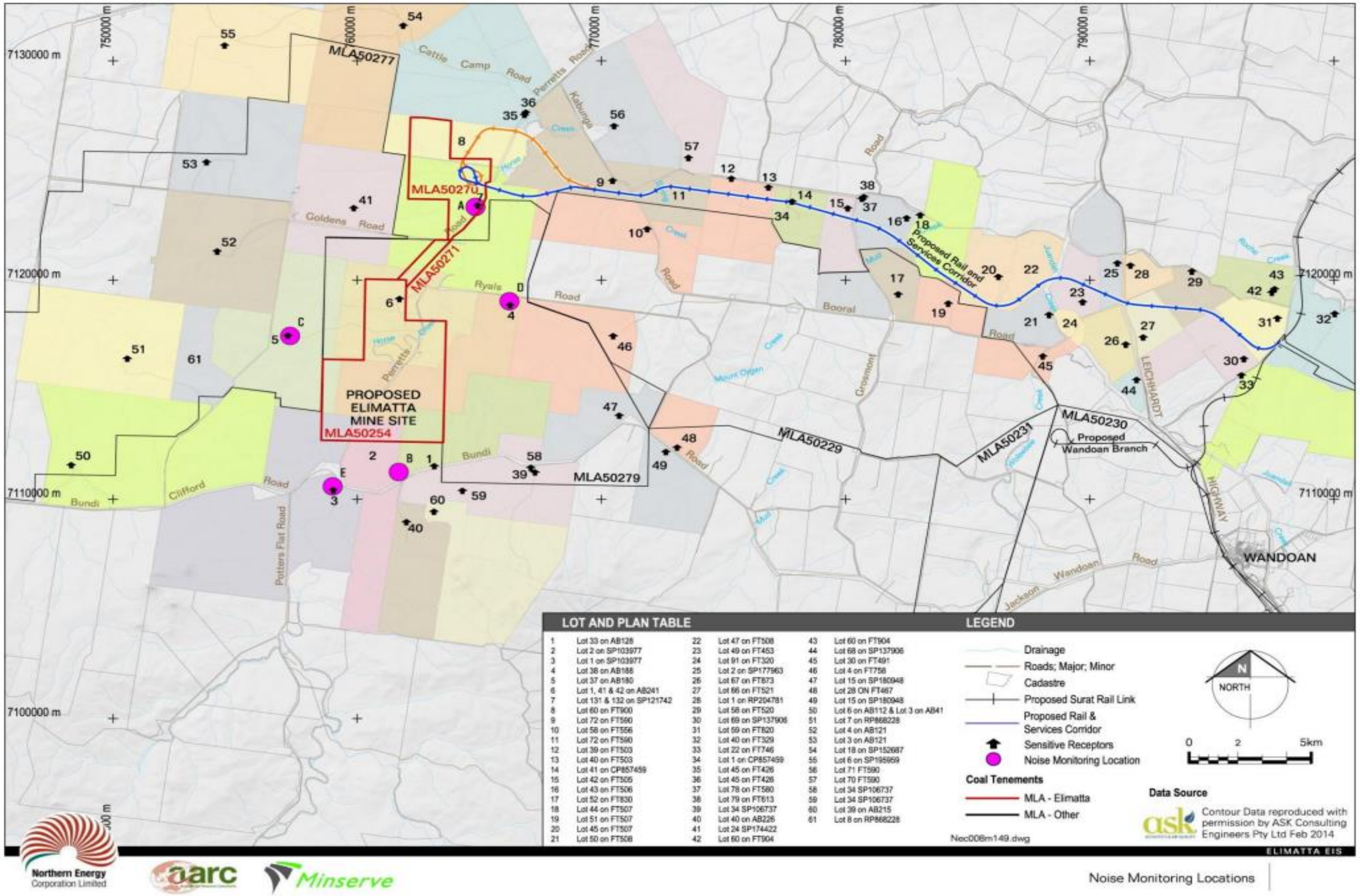

Figure 11: Baseline noise monitoring locations and sensitive receptors

3.1.6.5 Soil types and properties

Baseline condition soil resources at the Project site were assessed for the EIS (AARC 2014A) through the classification, testing and mapping of soils and description of the terrain.

Based on field and laboratory assessments, six Soil Management Units (SMUs) were identified within the Elimatta ML areas. These were classified as the Downfall, Kinnoul, Cheshire, Rolleston, Juandah and Horse Creek Alluvium SMUs, consistent with descriptions provided in the *Land Management Field Manual – Wandoan District* (Gray and Macnish 1985). Table 8 provides a description of the six SMUs identified on the Project site. The distribution of each SMU within the Project ML areas is shown in Figure 12.

Table 8: Soil Management Units associated with the Project area

Soil management unit (SMU)	Australian soil classification	Description
Downfall	Grey Vertosol	The Downfall SMU consists of a brownish grey medium to heavy clay with self-mulching characteristics. The soil is generally alkaline, decreasing to acid with depth, and sodic and saline below 600 mm. Soil chemistry indicates low to moderate levels of major soil nutrients at the surface and a relatively good physical stability. The depth of usable soil resources extends to approximately 200 mm before sodicity and salinity potentially constrains usability. Landscapes of the Downfall SMU consist primarily of gently broad ridge crest and upper slopes. Soils of the Downfall SMU are distributed over approximately 405 ha of the Project site.
Kinnoul	Brown Dermosol	The Kinnoul SMU consists of primarily shallow light to medium non-cracking clay to 600 mm. pH generally increases slightly with depth from moderately to strongly alkaline. Surface soils are considered non-sodic at shallow depths of less than 100 mm. However, sodicity increases rapidly throughout the profile to levels considered sodic by 100 mm. This soil has moderate fertility, although decreasing with depth. Due to high levels of sodicity, the depth of the usable soil resource is limited to the surficial 100 mm. The distribution of the Kinnoul SMU is typically to areas within the hillcrest and upper slopes within the Project ML. These areas have been mostly cleared for grazing and have moderate slopes. Soils of the Kinnoul SMU are distributed over approximately 862 ha of the Project site.
Cheshire	Brown Dermosol	The Cheshire SMU comprises of brown to black non-cracking clay with a profile similar to Kinnoul, but with depths exceeding 600 mm. Soil chemistry indicates a soil which is mildly to moderately alkaline in pH. At the surface the soil has mostly low levels of major soil nutrients and organic carbon but has a high to very high cation exchange capacity (CEC) and is well structured and stable. Surface soils are non-saline and non-sodic before becoming sodic at 300 mm. The depth of usable soil resources extends to approximately 300 mm before sodicity and salinity potentially constrains usability. Landscapes of the Cheshire SMU consist of the upper to mid-slopes of gently undulating plains which have been extensively cleared for agriculture. Soils of the Cheshire SMU are distributed over approximately 966 ha of the Project site

Soil management unit (SMU)	Australian soil classification	Description
Rolleston	Grey Vertosol	The Rolleston SMU consists primarily of a cracking brownish black to brownish grey clayey medium to heavy textured upper horizon with an abrupt change at approximately 600 mm to a saline and sodic B horizon. The soil's chemical properties demonstrate increasing sodicity, salinity and decreasing organic carbon throughout the profile. Surface soils exhibit moderate fertility with low levels of major soil nutrients, particularly nitrate nitrogen and phosphorous. Due to increasing levels of sodicity, the depth of the usable soil resource is limited to the surficial 200 mm. These soils are restricted in distribution across the upper to lower slopes of the area. These areas have been mostly cleared for grazing and exhibit signs of erosion. Soils of the Rolleston SMU are distributed over approximately 137 ha of the Project site.
Juandah	Grey Vertosol	The Juandah SMU consists of strongly coloured, often black, silty heavy alluvial clay. Generally soils of this management unit have depths exceeding 1,000 mm with noticeably higher clay/silt content than the soils found in adjacent areas. A high CEC and exchangeable sodium potential (ESP) are common characteristics of this soil type. The soil resource is not considered usable due to physiochemical variability and high levels of sodicity. These soils are restricted in their distribution to the narrow valley floors of the Elimatta ML and often only occur in small localised areas. These areas are often sparsely vegetated with Eucalypt vegetation. Soils of the Juandah SMU are distributed over approximately 778 ha of the Project site.
Horse Creek Alluvium	Brown Tenosol	The Horse Creek Alluvium SMU comprises of a light, brown coloured sandy clay loam material of varying depth. This soil type presents no limitation to usability throughout the profile. Soils tend to be non-sodic throughout the profile and have poor fertility and very low levels of major soil nutrients. These soils are most commonly restricted to the immediate alluvia areas close to active waterways and older sandy alluvial areas. Soils of the Horse Creek Alluvium SMU are distributed over approximately 837 ha of the Project site.

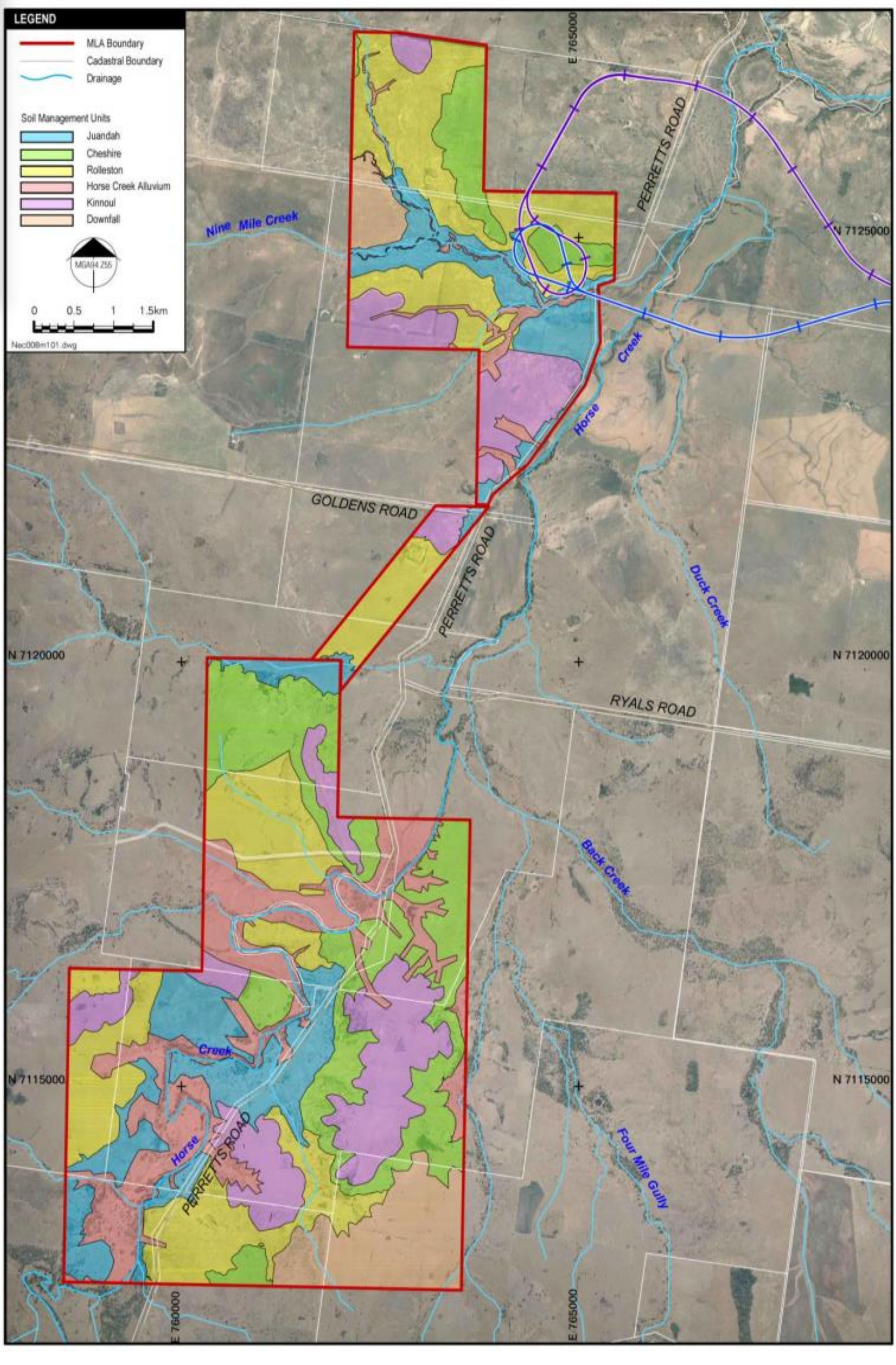

Figure 12: Distribution of Soil Management Units within the Project MLs

3.1.7 Flora and fauna

3.1.7.1 Field surveys

Five terrestrial ecology surveys were undertaken for the Project EIS across the three ML areas between 2007 and 2013. The findings of these surveys are detailed in the following sub-sections. No recent field surveys of the Project site have been undertaken, however, a desktop study was conducted and is also presented.

3.1.7.2 Wetland habitats

Previous database searches conducted for the EIS (AARC 2014A) revealed that no mapped palustrine or lacustrine wetlands occurred within the Project area. However, a palustrine wetland was identified to the east of the southern Project site boundary. Palustrine wetlands can provide nesting sites for birds, roosting sites for bats, food sources for migratory species, and filtration of the water moving through them by removing contaminants and nutrients. These wetlands were targeted for assessment of conservation values during the field surveys. Due to the location of this wetland in relation to the Project, it was targeted in the flora and fauna assessment.

A riverine wetland was identified on the Project site, fringing Horse Creek. The Wetland*Maps* (2019) database describes the wetland area as encompassing the natural channel of the river and the immediate riparian vegetation. This riparian wetland was also targeted as part of the flora and fauna assessment for the Project.

3.1.7.3 Flora

Remnant vegetation

Previous surveys identified eight vegetation communities within the Project site with a total of 187 flora species identified. At that time, no flora species identified were listed as being of conservation significance and 34 species were introduced. Six of the eight vegetation communities were classed as Remnant Vegetation as defined in the *Queensland Vegetation Management Act 1999*.

The eight vegetation communities include:

- Community 1 – Blue Gum Riparian Woodland (RE 11.3.25);
- Community 2 – Blue Gum Riparian Woodland (with Interspersed Poplar Box) (RE 11.3.25 / 11.3.2);
- Community 3 – Brigalow Open Forest (RE 11.9.5);
- Community 4 – Brigalow Open Forest with Associated Poplar Box (RE 11.9.10);
- Community 5 – Poplar Box and Cypress Pine Open Forest (RE 11.10.11);
- Community 6 – Blue Gum Palustrine Wetland / Poplar Box Woodland in Drainage Depressions (RE 11.3.2 / 11.3.2b);
- Community 7 – Non-Remnant Grassland; and
- Community 8 – Regrowth Vegetation.

As part of PRCP development, a desktop search of version 12.0 Queensland Government Vegetation management regional ecosystem mapping (DES 2022) was conducted to determine current vegetation mapping, listings, and occurrence within the Project site. This search identified six (6) regional ecosystems (REs) within the Project site; as listed in Table 9. One remnant RE has been listed as 'least endangered', two are listed as 'of concern', and three are listed as 'least concern' under the Vegetation Management Regulation and *Vegetation Management Act 1999* (VM Act). The distribution of REs in the vicinity of the Project are shown in Figure 13.

Table 9: Remnant regional ecosystems

Regional ecosystem	Short description	VM class	Biodiversity status
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks	Endangered	Endangered
11.3.25 / 11.3.2	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines / *Eucalyptus populnea* woodland on alluvial plains	Least concern / Of concern	Of concern / Of concern
11.10.11	Eucalyptus populnea, E. melanophloia +/- Callitris glaucophylla woodland on coarse-grained sedimentary rocks	Least concern	No concern at present
11.9.10	*Eucalyptus populnea* open forest with a secondary tree layer of *Acacia harpophylla* and sometimes *Casuarina cristata* on fine-grained sedimentary rocks	Of concern	Endangered
11.3.25 / 11.9.7 / 11.9.10	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines / *Eucalyptus populnea, Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks / *Eucalyptus populnea* open forest with a secondary tree layer of *Acacia harpophylla* and sometimes *Casuarina cristata* on fine-grained sedimentary rocks	Least concern / Of concern / Of concern	Of concern / Of concern / Endangered

Given that the watercourse that runs through ML 50254, (Horse Creek) is a relevant watercourse or drainage feature as identified on the vegetation management watercourse and drainage feature map, an RE within the defined distance of a defining bank of these watercourses is a Matter of State Environmental Significance (MSES) (regulated vegetation defined watercourse)(Figure 14).

The mapped vegetation across ML 50254 includes REs with a VM Act class of 'endangered' and 'of concern'. These REs are an MSES and as such, the vegetation within ML 50254 could be an MSES (further vegetation mapping at an appropriate spatial resolution would be required to confirm this).

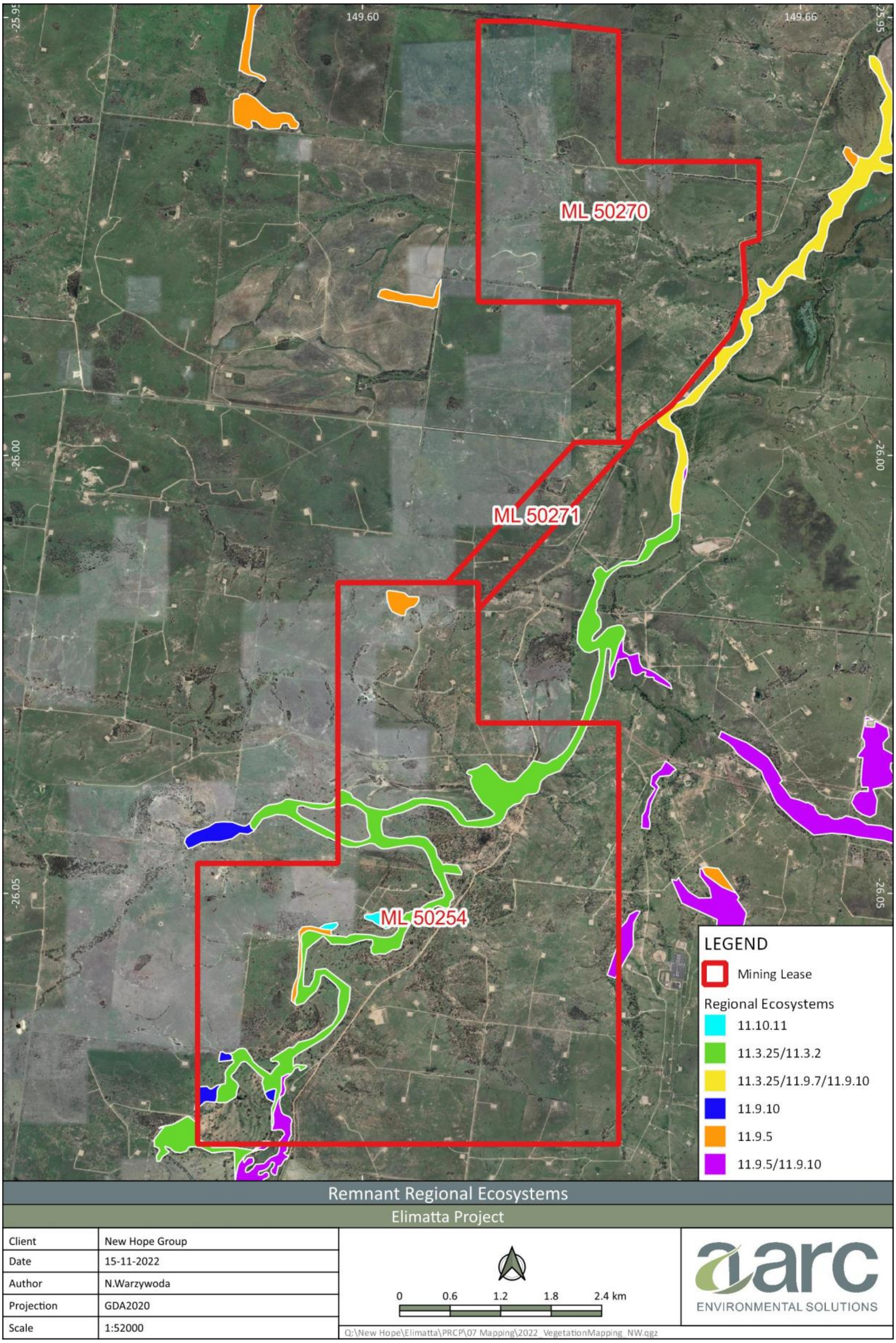

Figure 13: Remnant Regional Ecosystem communities at the Project site (DES 2022)

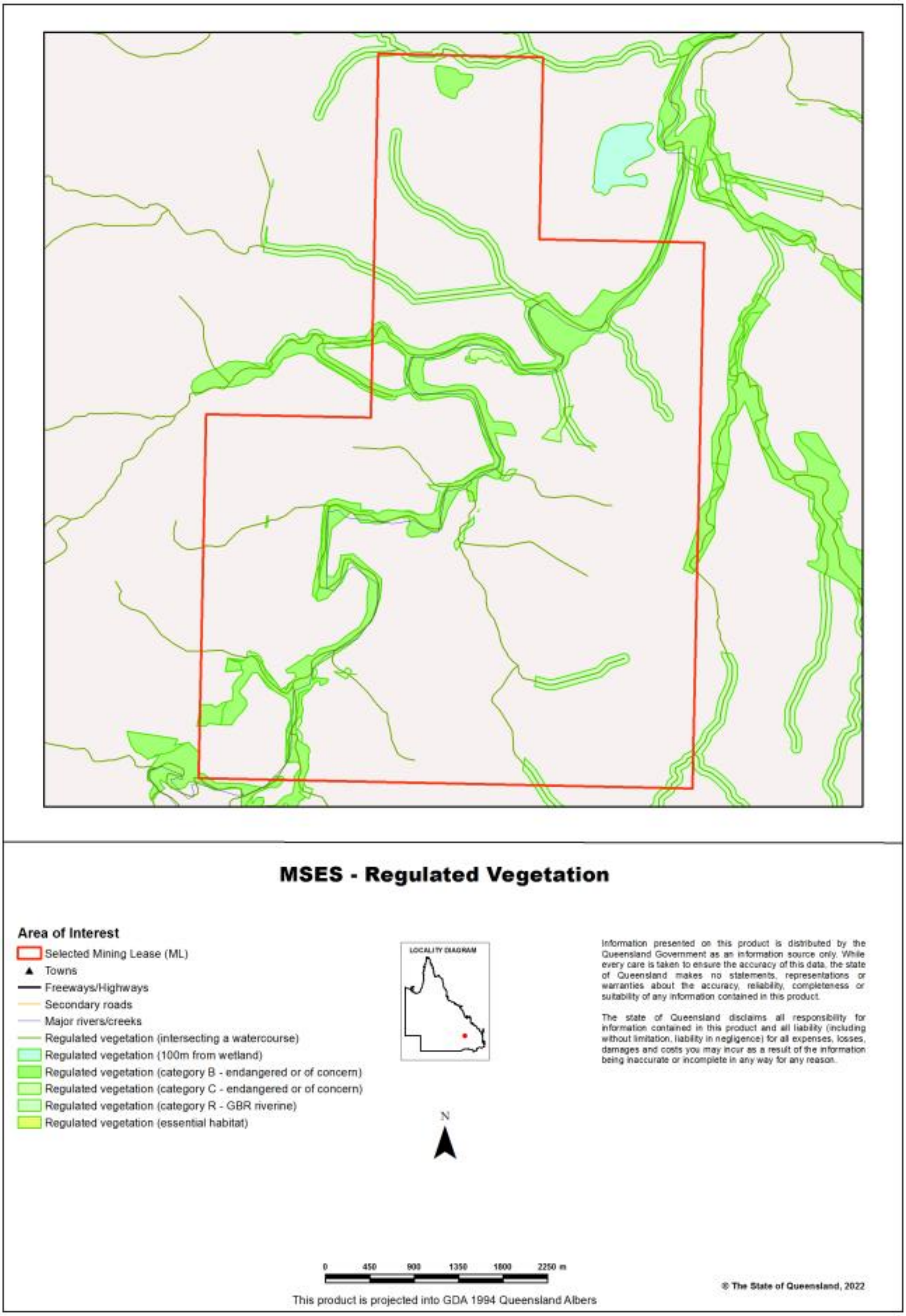

Figure 14: Regulated vegetation mapping

Threatened ecological communities

A number of flora species of conservation significance were identified in the desktop searches for the Project EIS (AARC 2014A) as having a moderate potential to occur on the Project site. Targeted searches did not detect any flora species of conservation significance on site. Despite the survey effort employed, there is the potential that threatened flora species could occur in parts of the Project site. As the Project site has been extensively cleared and grazed, it is considered unlikely to provide suitable habitat for most threatened species.

The field surveys undertaken for the EIS (AARC 2014A) identified three communities with the potential to be Threatened Ecological Communities.

- Community 3 (Brigalow open forest) - RE 11.9.5, Brigalow and/or Belah Open Forest is listed as 'Endangered' under the VM Act and the EHP Biodiversity status due to less than 10% of the community's pre-clearing area remaining in Queensland. This RE is also included within the 'Brigalow (*Acacia harpophylla* dominant and co-dominant) woodlands' Threatened Ecological Community listed under the EPBC Act.
- Community 4 (Brigalow Open Forest with Associated Poplar Box) - RE 11.9.10, Brigalow Open Forest with associated Poplar Box is 'Of Concern' under the VM Act and 'Endangered' under the EHP Biodiversity status with only 10-30% of the community's pre-clearing area remaining in Queensland. This RE is also included within the 'Brigalow (*Acacia harpophylla* dominant and co-dominant) woodlands' Threatened Ecological Community listed under the EPBC Act.
- Community 8 (regrowth vegetation) - is mapped as High Value Regrowth containing Endangered REs. However, the majority of this community is RE 11.10.11 regrowth, which is 'Least Concern' under the VM Act. Only the two small Brigalow patches are High Value Regrowth containing Endangered REs. Brigalow is also listed as a Threatened Ecological Community under the EPBC Act. The majority of the community is High Value Regrowth that is a Least Concern RE and is not listed under the EPBC Act.

A current desktop search of the Protected Matters Search Tool (with a 10 km buffer applied) identified five ecological communities as occurring or potentially occurring on the Project site. These are listed as Matters of National Environmental Significance and include:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- Poplar Box Grassy Woodland on Alluvial Plains;
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions; and
- Weeping Myall Woodlands.

3.1.7.4 Fauna

Terrestrial fauna

Previous field surveys identified a combined total of 120 vertebrate fauna species on the ML areas during the dry and wet season surveys, comprising nine amphibians (including one exotic species), 13 reptiles, 26 mammals (including 10 exotic species), and 72 birds.

One mammal species, the Little Pied Bat (*Chalinolobus picatus*), was identified on site during field surveys and was previously listed as Near Threatened under the NC Act. Its listing has now been updated to Least Concern.

Two bird species listed as Marine under the EPBC Act were observed on the Project site, the Whistling Kite (*Haliastur sphenurus*) and Sacred Kingfisher (*Todiramphus sanctus*). Although common throughout their respective ranges within Australia, they are protected under international agreements incorporated by the EPBC Act.

Eleven introduced fauna species were recorded within the Project site. Of these, seven are declared pest animals under the *Land Protection (Pest and Stock Route Management) Act 2002*. These include the Cane Toad (*Bufo marinus*), House Mouse (*Mus musculus*), Feral Cat (*Felis catus*), Feral Pig (*Sus scrofa*), European Rabbit (*Oryctolagus cuniculus*), European Fox (*Vulpes vulpes*) and Dingo (*Canis familiaris dingo*).

Based on an assessment of the likelihood of species occurring on the site, a further 17 fauna species of conservation significance have the potential to utilise the Project site or surrounding area. Although the species were not identified on the Project site during the seasonal surveys, database searches indicate moderate to high potential that these species could inhabit or utilise the Project in the future.

A current desktop search of the Protected Matters Search Tool (with a 10 km buffer applied) identified 30 listed threatened species, 10 listed migratory species, and 15 listed marine species as occurring or potentially occurring on the Project site.

Aquatic fauna

The fish species identified during the aquatic study for the Project EIS (AARC 2014A) included Spangled Perch (*Leiopotherapon unicolour*), Glass Perch (*Ambassis agassizi*), and Rainbowfish (*Melanotaenia splendida*). No aquatic species of conservation significance were identified within the ML areas.

Stygofauna

Four stygofauna surveys were conducted for the Project EIS. The Phase 1 (2009) and phase 2 (2011) surveys identified stygofauna occurring within the ML areas. Additional sampling (Phases 3 and 4) was undertaken in 2012 to investigate the presence of *Bathynellidae sp*. ELIM, *Parastenocaris sp*. ELIM and *Dussartcyclops sp.* ELIM outside the Project's area of influence.

The survey results suggest that the Quaternary alluvial sediments (where saturated) are the primary habitat for stygofauna, although occupation of the sandstone/coal seam aquifer (or bores tapping this aquifer) cannot be precluded.

Following the four rounds of sampling, four obligate groundwater species (stygobites) were identified:

- *Bathynellidae sp*. ELIM (order Syncarida);
- *Dussartcyclops sp*. ELIM (subclass Copepoda);
- *Parastenocaris sp*. ELIM (subclass Copepoda); and
- *Dussartstenocaris sp*. ELIM (subclass Copepoda).

3.2 Community consultation

3.2.1 Previous stakeholder and community engagement activities

Community consultation activities were undertaken for the Project to inform the preparation of the EIS, Social Impact Assessment (SIA) and the development of Stakeholder Management Plans (Appendix D). These consultation activities have provided the opportunity to discuss PMLU and mine closure activities. Local community members and landholders have indicated they would prefer to see the land rehabilitated to an agricultural land use post-mining.

Although community consultation has not been undertaken since the EIS approvals process was completed, a consultation plan has been developed and will be updated and implemented prior to the commencement of the Project and updated thereafter as needed.

The main methods of community engagement undertaken have included:

- conducting face-to-face meetings with directly affected landholders;
- conducting face-to-face meetings with key community leaders and organisations;
- conducting face-to-face meetings with key council and government representatives in Wandoan, Taroom, Dalby and Toowoomba;
- conducting community information sessions;
- preparing and distributing a Project fact sheet;
- distributing a survey to elicit feedback on community issues; and
- producing a 'questions and answers' document to ensure consistency when communicating with stakeholders.

Given the operational status of the Project, no community consultation has been undertaken since the EIS process. Responses to comments received during the EIS public notice period were responded to within the *Taroom Coal – Elimatta EIS 2014 Response to Comments* (AARC 2014b) rather than within the stakeholder register. The SIA (2012) prepared for the EIS detailed individual consultation that occurred to inform the developed of the Elimatta Coal Mine and allow for stakeholders to provide concerns regarding operational and rehabilitation aspects of the Project. The main concerns raised through consultation regarding rehabilitation related to:

- progressive rehabilitation to return the area to cattle grazing;
- lack of confidence in rehabilitating the area to a productive purpose;
- rehabilitation not occurring in a timely manner;
- visual amenity; and
- returning to a productive land use with palatable pasture species present.

The concerns raised were addressed throughout the EIS and were used to inform the layout and design of the mine (i.e. visual amenity). Any disturbance is to be progressively rehabilitated as soon as possible once land becomes available and rehabilitated land will be returned to farmers for cattle grazing when the MLs are relinquished. Consultation also informed land outcomes with grazing being the clearly preferred outcome. Once mining is completed, the majority of land underlying the MLs will be rehabilitated to provide for agricultural enterprise (i.e. cattle grazing).

3.2.2 Stakeholder management plan

To meet the requirements of section 126C(1)(c)(iv) of the EP Act, and the PRCP Guideline, New Hope has developed a stakeholder engagement plan (SEP) that aims to build upon previous engagement activities conducted as part of the EIS (Appendix D). The SEP is intended to act as a framework to guide consultation and ensure stakeholders are provided the opportunity to engage on, among other things, rehabilitation and closure matters relating to the Project.

The SEP will be reviewed prior to the commencement of mining and any Project changes and community consultation will be undertaken where practicable to inform Project changes.

3.2.3 Ongoing consultation

Ongoing consultation will occur at key stages of the Project life and where any significant milestones are reached or changes in Project activities proposed. The following methods will be used to maintain contact with the local community throughout the life of the Project.

- Creating a contact telephone number for inquiries and complaints.
- Communicating with stakeholders throughout the life of the Project via site visits, mine open days, regular meetings of the community discussion group and newsletters.

- Annual sustainability reporting undertaken by independent consultants to gauge the mine's reputation among the community and community satisfaction with consultation methods.
- Consulting with the community closer to the closure and decommissioning of the mine concerning requirements for mine closure, potential land uses and post-mining monitoring.

Feedback from the consultation process will continue to be entered into the consultation register. The relevant Project team member will review the feedback that has been entered into the consultation register for action and implementation of appropriate mitigation strategies where required. This process will ensure that mitigation strategies are developed for the potential adverse environmental and socioeconomic impacts that have been identified through consultation.

Ongoing monitoring of the local environment is a requirement in the EA conditions for the Project. Results of regular monitoring events will be made available to interested and affected persons if requested.

3.2.4 Community consultation register

A community consultation register was developed for the Project EIS to inform PMLU outcomes (including rehabilitation strategies) and will be updated during ongoing consultation with stakeholders (see Appendix E). In accordance with section 126C(1)(c)(iii) of the EP Act, the community consultation register is required to include information on how issues have been considered and the decisions/outcomes of engagement. Although this was not included in the original 2013 stakeholder consultation register, this information was provided in the SIA undertaken for the Project's EIS (AARC 2014a), as well as within the *Taroom Coal – Elimatta EIS 2014 Response to Comments* (AARC 2014b) report (both supplied within Appendix G).

On commencement of detailed Project commencement planning, the consultation register used for ongoing consultation will be updated to record the following information:

- consultation date(s);
- identification of each community member;
- description of consultation type (workshop, quarterly meetings, etc.);
- information provided to the community;
- issues raised/discussed by the community;
- how issues have been considered;
- decisions/outcomes of engagement; and
- commitments made by the applicant.

The consultation register will be used to record ongoing consultation date(s), engaged community member(s), consultation type, information provided, key issues raised, response actions and/or outcomes and any commitments made by New Hope. All complaints received will be included in the community consultation register. The community consultation register will also inform ongoing development of the mining activities and will continue to be maintained to document each stakeholder consultation event, including meetings, presentations, feedback, phone calls and written submissions.

3.3 Post-mining land uses

This section of the PRCP describes and discusses the PMLUs proposed for the Project in accordance with section 126C(1)(d) of the EP Act. In accordance with the objectives of the Queensland Government as defined in the *Mined land rehabilitation policy* (Queensland Government 2018), the general rehabilitation goals for the Project are to leave the area safe, stable, not causing environmental harm and able to sustain an agreed PMLU.

The further site-specific goals for the Project include:

- minimising the loss of pre-existing agricultural land value by reinstating, where possible, grazing lands at a similar suitability to that existing prior to mining;
- where this cannot be achieved, identifying alternative uses that provide a similar value to the value able to be generated from the land prior to mining or an alternative land use, or uses, able to provide long-term ecological value to the region; and
- minimising or avoiding the potential for post-mining lands having no or little value to the area or region.

Rehabilitation of disturbed areas will aim to reinstate land to a condition as similar as possible to the pre-mining landscape. For a majority of the Project area, the proposed post-mining land use and condition will be consistent with the current primary land use of low intensity cattle grazing. Riparian habitats will be established along the length of the Horse Creek diversion consistent with the rehabilitation outcomes proposed for the diversion.

3.3.1 Planning scheme conformance

The Western Downs Regional Council Planning Scheme (2019) identifies the Project area as being within the Rural Zone with a defined purpose to:

a) provide for rural uses and activities;

b) provide for other uses and activities that are compatible with:

    i) existing and future rural uses and activities, and

    ii) the character and environmental features of the zone; and

c) maintain the capacity of the land for rural uses and activities by protecting and managing significant natural resources and processes.

The Rural Zone accommodates a range of rural uses, including agriculture, and the Scheme encourages the retention and enhancement of natural features and protection of scenic landscape values.

3.3.2 Land suitability

The Soil and Land Suitability Assessment (AARC 2013) (Appendix G) conducted for the EIS evaluated the suitability of the Project area, prior to mine development, for the land uses of beef cattle grazing and rain-fed broadacre cropping. An interpretation of the data collected with respect to the physical, chemical and nutritional characteristics of the soils was made to rank the land according to the five-class land suitability system provided in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland – Land Suitability Assessment Techniques* (DME 1995). The classes are described as follows.

Class 1	Suitable land with negligible limitations which is well suited to a proposed use.
Class 2	Suitable land with minor limitations which is suited to a proposed use but which may require minor changes in management to sustain use.
Class 3	Suitable land with moderate limitations which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use.
Class 4	Marginal land with severe limitations which is marginally suited for a proposed use and would require major inputs to ensure sustainability. These inputs may not be justified by the benefits to be obtained in using the land for a particular purpose and is hence considered presently unsuitable.
Class 5	Unsuitable land with extreme limitations which preclude its sustainable use for the proposed purpose.

A summary of the outcomes of the land suitability assessment is provided in Table 10. Pre-mining land suitability mapping is provided in the Soil and Land Suitability Assessment (AARC 2013); refer Appendix G. Figure 15 shows the results of the pre-mining condition land suitability assessment for a beef cattle grazing land use.

The outcomes of the Land Suitability Assessment were also compared with the distribution of land classified as 'good quality agricultural land' (GQAL) in the DERM (2010) Land Classification System, in accordance with the Planning Guideline –The Identification of good quality agricultural land (the Planning Guideline) (DHLGP 1993). The classification of GQAL provides an indication of the quality of the land resource to maintain a sustainable level of productivity for a given land use. The Planning Guideline defines GQAL as follows.

Class A	Crop land: Land that is most suitable for current and potential crops with limitations to production which range from none to moderate levels.
Class B	Limited crop land: Land that is marginal for current and potential crops due to severe limitations; and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for cropping.
Class C	Pasture land: Land that is suitable only for improved (Class C1) or native pastures (Class C2) due to limitations which preclude continuous cultivation for crop production; but some areas may tolerate a short period of ground disturbance for pasture establishment. This also includes land suitable for light grazing of native pastures in inaccessible areas (Class C3)
Class D	Non-agricultural land: Land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrop or poor drainage.

A summary of the outcomes of the GQAL assessment is provided in Table 10. GQAL mapping for the Project is provided in the Soil and Land Suitability Assessment (AARC 2013); included as Appendix G.

Table 10: Land suitability and good quality agricultural land assessment outcomes

Soil management unit	Important limitations	Land suitability assessment outcomes		Agricultural land quality assessment outcomes
		Beef cattle grazing	Broadacre cropping	
Downfall	Temporal flooding of gilgai, nutrient deficiency and PAWC deficiencies.	3	4	C1
Kinnoul	Erosion potential and PAWC deficiencies.	3	4	C1
Cheshire	PAWC deficiencies, nutrient deficiency and Erosion potential.	3	4	A1
Rolleston	Erosion potential and nutrient deficiency.	3	4	A1
Juandah	PAWC deficiencies, nutrient deficiency Flooding potential and Wetness issues.	4	5	B2
Horse Creek alluvium	PAWC deficiencies, Flooding potential, poor topography and Wetness issues.	3	5	B2

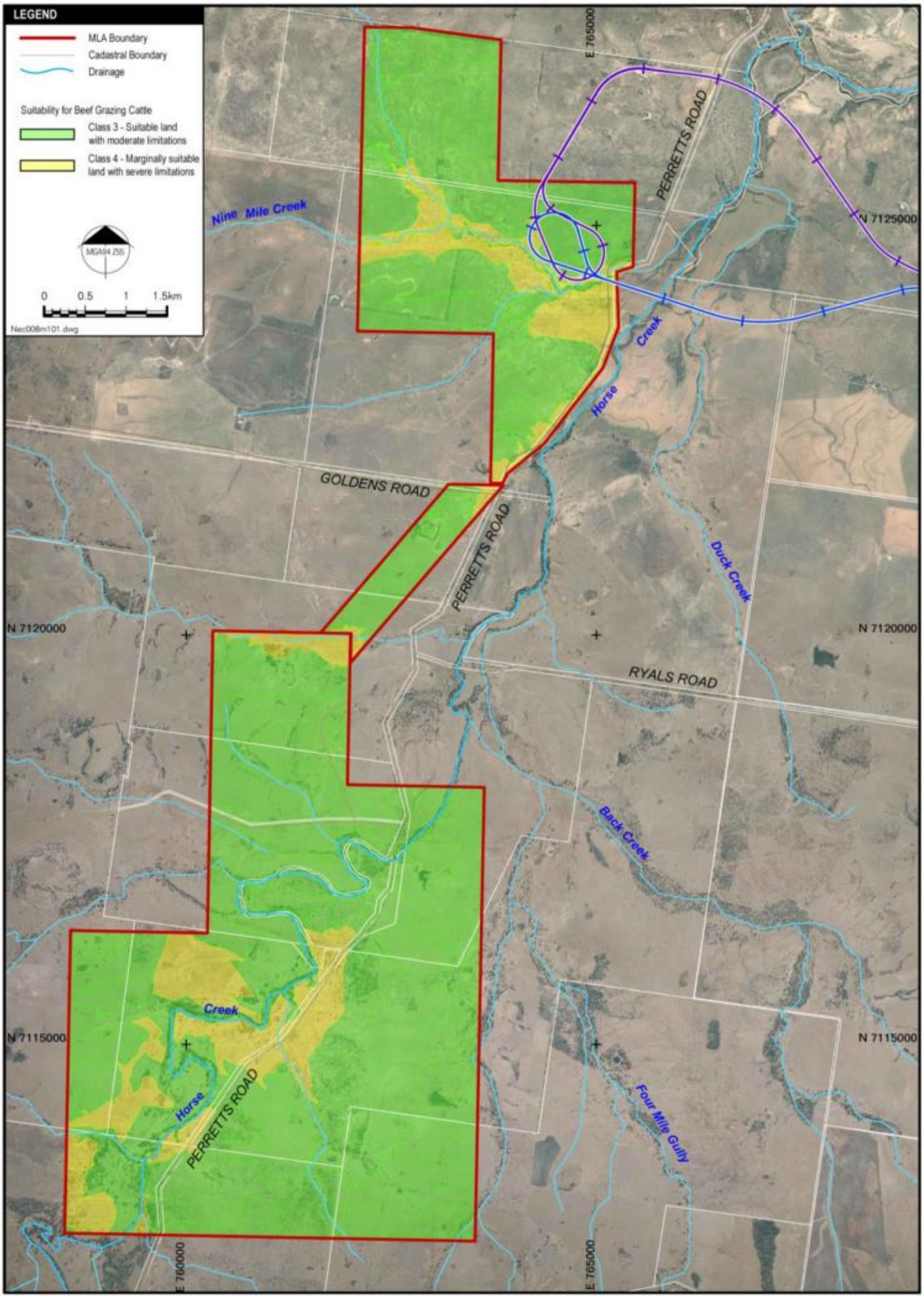

Figure 15: Land suitability class (beef cattle grazing)

3.3.3 Land outcome documents

In 2014, the Project EIS was submitted to DES for the application and approval of mining activities across MLs 50270, 50271 and 50254. The EIS Volume 3 (Chapter 3 – Environmental values, impacts, control strategies and proposed EA conditions) details proposed EA conditions for the final land use and rehabilitation approval schedule which has been detailed in Table 11. The subsequent EIS Assessment report (EHP 2014) replicated the proposed EA conditions presented in the Project EIS. However, the PMLU for the 'Waste Disposal' domain was presented as 'to be advised' or 'TBA'. The Landform Design (Schedule H – Table H2) of the EIS Assessment report was also partially filled with 'TBA' in the Slope (Ratio) column for both the TSFs (Walls) and Spoil Dumps.

Following this, the approved EA detailed PMLUs in Schedule H -Table 1 (Rehabilitation Requirements) and listed all rehabilitation requirements as 'TBA'. Table H2 (Landform Design) was not incorporated into the EA. The current EA requires that Table H1 (Rehabilitation Requirements) be populated and submitted to the administering authority 'prior to commencement of mine construction activities'. For this PRCP, Table 11 has been populated with information from all three LODs in accordance with the order as outlined in Part 27, Schedule 750 of the EP Act.

In accordance with Schedule H – condition H1 of the EA, Table 5.67 (Final Land Use and Rehabilitation Approval Schedule) of the EIS, and the EIS Assessment Report (EHP 2014), all areas disturbed by mining activities must be rehabilitated in accordance with:

- Schedule H – Table 1 of the EA which has been populated with information from the EIS Assessment report and the waste disposal PMLUs determined from the Project EIS (Table 11); and
- Schedule H – Table 2 of the EIS Assessment report which nominates maximum slopes for both the TSFs (walls) and spoil dumps determined from the Project EIS (Table 12).

It should be noted that the while the WSL rail and services corridor is to be developed as part of the Project, it was accepted by the EIS Assessment Report that this should not be considered as infrastructure subject to decommissioning and rehabilitation. Therefore, the WSL is not considered to be a component of this PRCP.

Table 11: Final land use and rehabilitation approval schedule

Domain	Mine areas included	Total area (ha)	Location	Pre-mining		Post-mining	
				Land use	Suitability class	Land use	Suitability class
Residual void	Residual voids	230	ML 50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
	In-pit TSF (TDP)	150	ML 50254	Low intensity cattle grazing	3 – 4	Unsuitable	5
Exploration	Exploration areas	50	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Dams	Environmental dam – EV1	2	ML 50254	Low intensity cattle grazing	4	Low intensity cattle grazing	4
	Environmental dam – EV2	10	ML 50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3 – 4
	Environmental dam – EV3	4	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Environmental dam – EV4	15	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Sediment dam – SD1	5	ML 50254	Low intensity cattle grazing	3	Low intensity cattle grazing	3
	Sediment dam – SD2	5	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Sediment dam – SD3	6	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Raw water dam – RW1	10	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Diversion	Horse Creek diversion	160	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Infrastructure	Workshop and offices	35	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Chemical / fuel storages						
	Sewage treatment						
	Plant						
	CHPP						

Domain	Mine areas included	Total area (ha)	Location	Pre-mining		Post-mining	
				Land use	Suitability class	Land use	Suitability class
	Light vehicle access roads	15	ML 50254, ML 50270, ML 50271	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Rail load-out facility	2	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Haul roads	40	ML 50254, ML 50270, ML 50271	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Mining village	10	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Rail and services corridor and rail balloon loop*	216	ML 50270	Low intensity cattle grazing	3	N/A**	N/A**
	Conveyor trace	1	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Topsoil stockpiles	20	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
Waste disposal	In-pit spoil dumps	1820	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Out-of-pit spoil dumps	200	ML 50254	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4
	Surface tailings Storage facility (TDN and TDNA)	317	ML 50270	Low intensity cattle grazing	3 – 4	Low intensity cattle grazing	3 – 4

* Assumed maximum disturbance width of 60m within 100m corridor

** Assumed that the rail and services corridor infrastructure will be retained post-decommissioning of the Project as it will continue to offer a significant benefit to resource developers, other land users and the general public.

Table 12: Landform design parameters (Schedule H – Table H2)

Disturbance type		Slope (Ratio)
Residual voids	Void wall Competent rock Maximum slope	1V : 0.5H
	Void wall Incompetent rock Maximum slope	1V : 1H
Surface tailings Storage facilities (TDN and TDNA)	Top	1V : 100H
	Walls	1V : 3H
Spoil dumps		1V : 6H

3.4 Non-use management areas

A NUMA is an area of land that cannot be rehabilitated to a stable condition after all rehabilitation activities have been carried out (DES 2021).

3.4.1 Land outcome documents

The residual voids on the western and eastern side of ML 50254 are described as NUMAs within both the Project EIS and the EIS Assessment report. This is reflected in condition H6 of the EA which states:

Condition H6 Residual void Outcome

Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.

While condition H1 specifies that all landforms significantly disturbed by mining be rehabilitated, condition H6 identifies residual voids as having a separate post-mining outcome. The outcome determined for the residual voids within the EA is '*must not cause any serious environmental harm*'. Given the voids have been determined as unsuitable for a PMLU within the Project EIS and EIS Assessment report (Table 11), the residual voids have been determined to be NUMAs.

The relevant land outcome documents applicable to this PRCP are:

- the Project EA;
- the EIS Assessment report (EHP 2014).

The existence of LODs outlining the location of NUMAs for the Project results in objective assessments not being required to be undertaken for the PRCP in accordance with section 213, Schedule 8A, Part 3, Table 1 (Final site design assessment) and Table 3 (Non-use management area assessment) of the EP Regulation. This outcome is also in accordance with section 754(3) of the EP Act, where the designation of the residual voids as NUMAs has been identified within LODs and is therefore not required to comply with section 126C(1)(g) or (h) or 126D(2) or (3) for the proposed PRCP schedule.

In relation to the *Progressive Improvement* component of Table 3, this PRCP will:

- describe how non-use areas will undergo improvement to a safe and stable condition post-closure;
- illustrate how improvement will commence at the Project;
- identify risks and discuss their incorporation within the improvement schedule; and
- detail the timeframe for Improvement Areas (IAs) to progress through management milestones.

The combination of the EA, EIS Assessment report and EIS provide for a transition of pre-approved NUMAs into this PRCP. The EIS and EIS assessment reports are key documents that identify the location of all the Project's NUMAs. In accordance with Table 5.67 (Final Land Use and Rehabilitation Approval Schedule) of the Project EIS and the EIS Assessment Report, all areas disturbed by mining activities must be rehabilitated in accordance with:

- Schedule H – Table 1 of the EIS Assessment report with the Waste Disposal PMLUs determined from the EIS (Table 11); and
- Schedule H – Table 2 of the EIS Assessment report with the Slope (Ratio) for both the TSFs (Walls) and Spoil Dumps determined from the EIS (Table 12).

3.4.2 Proposed non-use management areas

As per the EIS Assessment Report (EHP 2014), the residual voids have been nominated as NUMAs (Table 11 and Figure 22).

Modelling suggests that the TDP will become almost completely filled with tailings by the end of the mine life and could be covered with a soil cover for rehabilitation. This is the preferred outcome for the TDP. However, if the tailings fill occurs to a level lower than the surrounding ground level, it is possible that the TDP will subsequently become a residual void in which case it will be managed as a NUMA with a nominal footprint area of 150 ha. This was provided for in the EIS Assessment Report (EHP 2014) which nominated the TDP as being 'unsuitable' for a land use (refer Table 11).

Both the location and size of the residual voids as described in the land outcome documents are consistent with the NUMAs proposed for this PRCP (refer Figure 21 and Figure 22). Design parameters for the NUMAs are presented in Table 13.

Table 13: Residual void design (excluding TDP)

Void name	Coordinates (GDA 2020 MGA zone 55)		Void wall – competent rock max slope	Void wall – incompetent rock max slope	Approximate depth (AHD)	Void maximum surface area (excluding TDP) (ha)
	Easting	Northing				
Eastern void	149.63	-26.08	1V : 0.5H	1V : 1H	190	230
Western void	149.59	-26.07	1V : 0.5H	1V : 1H	185	

3.5 Rehabilitation management methodology

3.5.1 Rehabilitation objectives

In Queensland, mine rehabilitation is required under the EP Act. Amendments to the EP Act in late 2018 implemented key elements of the State Government's Mined Land Rehabilitation Policy (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (section 111A of the EP Act).

These three objectives are the general rehabilitation goals for all areas disturbed by mining in Queensland. For the Project, the rehabilitation goals and objectives can be summarised as follows:

- Long-term safety:
  - the site is safe for humans and animals now and in the foreseeable future.
- Stable:
  - Landform design and vegetation cover to minimise erosion; and
  - landforms certified as geotechnically stable.
- Sustainable land use:
  - soil properties that support and will continue to support the nominated PMLUs; and
  - establishment of the specified PMLUs.
- Non-polluting:
  - any hazardous materials appropriately managed.

3.5.2 Rehabilitation areas and improvement areas

To allow the development of a PRCP schedule that satisfies the requirements of the PRCP Guideline, discrete rehabilitation areas (RAs) and IAs have been defined for the Project. As defined within the EP Regulation 2019:

- an RA is an area of land in the PMLU to which a rehabilitation milestone for the post-mining use relates; and
- an IA is an area of land in the NUMA to which a management milestone relates.

RAs and IAs have been nominated for the various areas of disturbance associated with the Project considering both the type of disturbance type and the proposed PMLUs as per Table 14 and shown in Figure 16 and Figure 17.

Table 14: Nominated rehabilitation and improvement areas

Rehabilitation Area reference	Mining domain	Description	PMLU
RA1	Creek diversion	Horse Creek diversion (permanent)	Low intensity cattle grazing (native riparian vegetation)
RA2a	Water management infrastructure	• Environmental dams • Sediment dams • Raw water dams	Low intensity cattle grazing (modified pasture)
RA2b		• Retained flood levee	
RA3	Mine infrastructure areas	• Buildings, including foundations • Roads • Chemical/fuel storages • CHPP • Laydown yard • Access/coal haul road and infrastructure corridor • infrastructure corridor linking the MIA to the electrical substation • Pit access road	
RA4	Waste disposal	• Surface TSFs (TDN and TDNA)	
RA5	In-pit and out-of-pit spoil dumps	• Out-of-pit waste rock emplacements • In-pit waste rock emplacements	
RA6	Rail and services corridor	• Rail and services corridor and rail balloon loop	Retained infrastructure
IA1	Residual voids	• Residual voids (eastern and western voids) • In-pit TSF	Unsuitable

3.5.2.1 Changes to total surface area disturbance

The EIS Assessment report identified the maximum area proposed to be disturbed across all MLs as 3,313 ha. A review of the disturbance areas (ha) listed for the mining domains allocated for the Project (Table 11) results in a relevant total disturbance of 3,057 ha when the disturbance associated with the rail and services corridor (not included within this PRCP), exploration areas (overlapped by mining disturbance) and the retained flood levee (already included within the water management domain) are excluded (refer Table 15).

The designation of RAs and re-creation of a spatial dataset for the development of this PRCP has resulted in some differences to the equivalent areas nominated in the EIS Assessment report. The re-assessment has resulted in the disturbance areas (in ha) listed for the mining domains within Table 11, now being a total of 2,912 ha; a difference of 142 ha to the relevant disturbance area stated in the EIS Assessment report.

It was identified that several water management structures (i.e. dams) that are within the EIS Assessment report, and not considered to be within other disturbance areas or RAs as shown in Figure 17, were not included within Table 11 (Section 3.3.3). Several dams have been added to the total disturbance area to include a total of two raw waters dams, four environmental dams, and seven sediment dams. The total disturbance area for the dams has been determined as 46 ha, which was calculated to be 11 ha less than previously determined.

The areas shown in Table 15 will be used for the PRCP schedule for the RAs shown.

Table 15: Total rehabilitation areas

Rehabilitation Area reference	Mining domain	EIS Assessment report total areas (ha)	Current mapping total areas (ha)	Difference (ha)
RA1	Creek diversion	160	143	-17
RA2a	Water management infrastructure	57	46	-11
RA2b[1]		N/A	7	7
RA3	Mine infrastructure areas	123	132	9
RA4	Waste disposal	317	272	-45
RA5	In-pit and out-of-pit spoil dumps	2,020	1,925	-95
RA6[2]	Rail and services corridor	216	28	-188
IA1	Residual voids	380	362	-18
Exploration[3]	Exploration areas	50	N/A	-
	TOTAL	**3,057[4]**	**2,915[5]**	**-142**

1 Retained flood levee is not included within the original Table 11 outlining the areas for each mine domain. It has been included within the total disturbance for Water Management Structures and compared with previous areas.

2 The total area encompassed in the EIS Assessment report includes the total rail corridor. For the Purposes of the PRCP only the section overlapping the ML is included as an RA.

3 Not included within the PRCP as these areas are all incorporated within the total disturbance of the other RAs, therefore has not been included within the calculated total disturbance.

4 The total area calculated from the EIS assessment has not included the Rail and Services Corridor as this domain is to be retained post-closure. The Exploration areas have also not been included as they are incorporated into other RAs.

5 The total area calculated based on mapping for the site excluding Exploration areas but including the Rail and Services Corridor areas overlapping the northern ML.

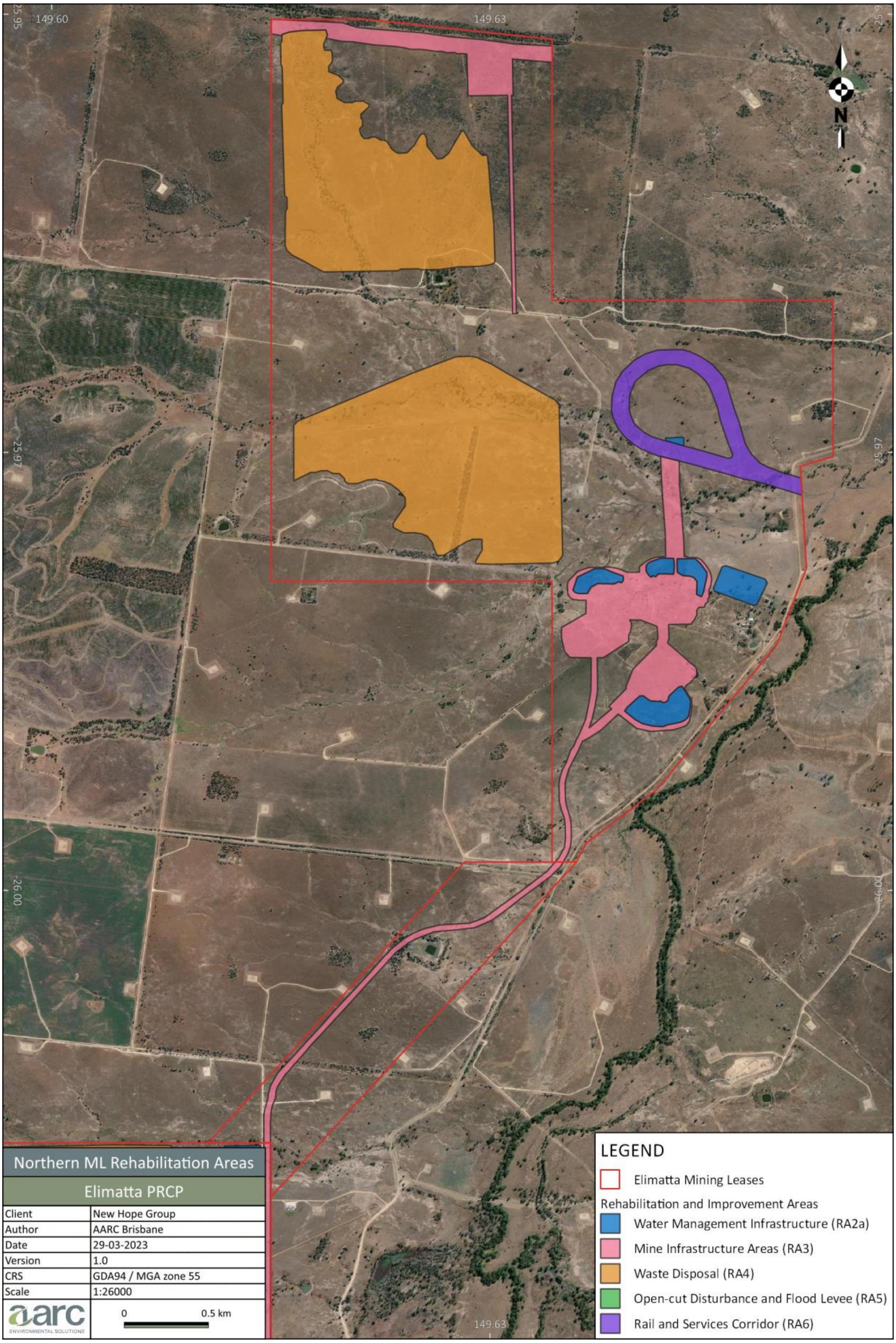

Figure 16: Northern MLs rehabilitation areas – ML 50270 and ML 50271

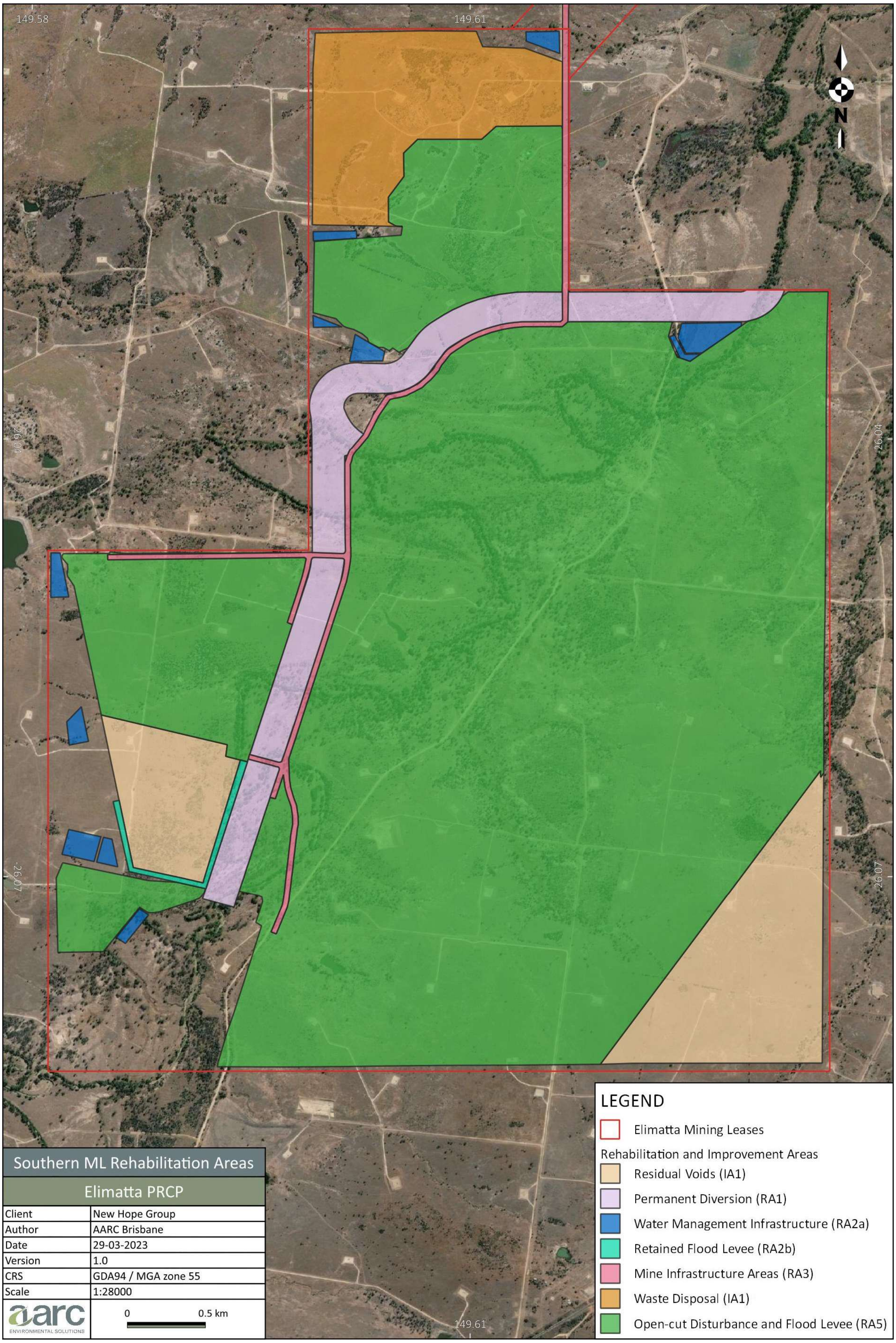

Figure 17: Southern ML rehabilitation areas – ML 50254

3.5.3 Rehabilitation milestones, indicators and milestone criteria

Rehabilitation milestones are defined as each significant event or step necessary to rehabilitate an area of land to a stable condition (section 112, EP Act). They generally constitute the completion of a discrete activity, being one of a sequence of activities, required to complete rehabilitation of an RA.

Key to assessing the success of rehabilitation is the definition of milestone criteria. Milestone criteria must be consistent with the SMART (specific, measurable, achievable, realistic and timely) principles. They should:

- be outcome-based (i.e. linked to the end land use);
- be flexible to adapt to changing circumstances;
- be able to evolve as the mine life progresses;
- include metrics (rehabilitation indicators) suitable to demonstrate that rehabilitation is trending positively;
- undergo periodic review; and
- include a measurement approach that details how the criterion will have been met (CoA 2016, ANZMEC and MCA 2000).

Rehabilitation indicators and final completion criteria were originally nominated as part of the development of the Project EIS to provide measures and standards of achievement to be able to assess and determine rehabilitation success and completion. The rehabilitation indicators and completion criteria proposed as part of the Project EIS were not included within the EIS Assessment report (EHP 2014) or the current EA; but provide a useful basis for development of milestone criteria. The EA does include an applicable table (Table H1 – Rehabilitation Requirements) but with all content marked as ‘to be advised’.

The original EIS completion criteria have been reviewed and, where applicable, proposed as milestone criteria for this PRCP to provide a clear definition of milestone completion and successful rehabilitation for each rehabilitation area. The nominated rehabilitation milestones considered relevant to the Project are outlined Table 16. It should be noted that not all rehabilitation milestones are applicable to all RAs; the applicability of rehabilitation milestones to the various RAs is also indicated in Table 16.

Data relevant to assessing performance against the completion criteria will be collected as part of the rehabilitation monitoring program (see section 3.7). The individual RAs of the Project will be deemed to be successfully rehabilitated when all of the milestone criteria have been met for each milestone.

Table 16: Rehabilitation milestone criteria

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM1	Infrastructure decommissioning and removal	All RAs	• All services disconnected and removed • All concrete, bitumen and gravel roads removed • All fencing that is not part of PMLU requirements removed • All buildings and footings demolished and/or removed off-site • All machinery and equipment removed • All rubbish removed • Decommissioning of water management infrastructure (e.g. pipes, pumps, dams) has occurred and includes: ○ All surface water drainage and infrastructure (e.g. pipes and pumps) removed ○ Water storages have been dewatered in accordance with Section 3.5.15.4 which includes: ▪ Water is used for dust suppression or evaporated ▪ Pumping of water between water storages or to the residual voids ○ Liners have been removed from dams and disposed of appropriately (where applicable)
RM2	Management of contaminated land status	RA2a, RA3, RA4, RA5, RA6	• Contaminated material either remediated in situ or removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted • Contaminated land assessment undertaken by an appropriately qualified person[1]. If required, a site investigation report including a site suitability statement prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act • Records confirm desilting of water management structures (sediment and mine affected water dams) has occurred where required and where applicable contaminated silt removed for licensed disposal or excavated material transferred to residual void

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM3	Landform development (re-profiling / reshaping) of land affected by disturbance	RA1, RA2a, RA2b, RA3, RA4, RA5	• All earthworks and landform reshaping /re-profiling works completed to design specifications • Geotechnical assessment by an appropriately qualified person[1] confirms that long-term geotechnical stability has been achieved • Certification provided by an appropriately qualified person[1] confirms that drainage features are constructed to design specifications • Sediment and mine water dams are backfilled using their embankments • Landform constructed to the following design parameters, where relevant: • Waste rock emplacement: o slopes ≤10° (17%) o stable berms or bunds (≥5 m wide) • Flood levee slopes ≤10° (17%) • Diversions: o average grade of 0.00158 m/m o valley length of 7.25 km and stream length of 8.25 km o stream sinuosity of approximately 1.12

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM4	Capping	RA4	• The construction and maintenance design of the capping material has been certified by an appropriately qualified person that is consistent with the cover design • All earthworks and landform reshaping /re-profiling works completed to design specifications • Certification provided by an appropriately qualified person[1] confirms that drainage features are constructed to design specifications • Geotechnical assessment by an appropriately qualified person[1] confirms that long-term geotechnical stability has been achieved • The surface has been shaped to a grade of approximately 1% to prevent ponding and concentration of surface water flow • Monitoring equipment has been installed at an appropriate frequency as determined by an SQP to confirm appropriateness of cover system design and placement, this can include but is not limited to: o Weather monitoring system o Piezometers o Temperature sensors • A cover system is installed with appropriate QA/QC measures to achieve: o outer slope angles in the order of 1(V) in 3(H) (18°) o cover placement over the tailings (2 m) o placement of non-sodic cover materials (50 mm) o topsoil (250–300 mm)

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM5	Surface preparation (topdressing, contour ripping, soil amelioration)	RA1, RA2a, RA2b, RA3, RA4, RA5	• Prior to each rehabilitation event, soil health and suitability are assessed and documented by an appropriately qualified person[1], and a recommendation made for ameliorants to ensure sodicity, salinity, pH and fertility levels are suitable to achieve the relevant PMLU • Topsoil suitability will be conducted for relevant parameters and indicators to determine suitability for revegetation, including: o pH, electrical conductivity, soluble chloride, moisture content, Emerson aggregate stability test, exchange acidity, o exchangeable cations (calcium, magnesium, potassium, sodium and aluminium), CEC, calcium : magnesium ratio (Ca: Mg), exchangeable sodium percentage (ESP); o total nitrogen, nitrite and nitrate, sulphate, extractable potassium and phosphorous (Colwell); o total organic carbon and organic matter; and o trace elements (arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc). • Topsoil suitability will be compared to parameters in *Table 24: Topsoil Suitability* which includes: o pH of between 6 – 8.5; o EC_{SAT} (dS/m) of ≤ 4; and o ESP (%) of < 6 • Records of ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person[1] • Records of topsoil origin and placement of a target depth of 250–300 mm • Ripping undertaken along the contour of slopes in accordance with *Table 27: Design of ripping operations for post-disturbance surface preparation* which includes: o A minimum ripping depth of 200m for all slope angles (>10%, 1-10%, and <5%); and o Tyne spacing of <1.5 m for a >10% slope; o Tyne spacing of <2.5 m for a 5-10% slope; and o Tyne spacing of <5 m for a <5% slope.
RM6	Revegetation (seeding and / or planting) – grazing	RA2a, RA2b, RA3, RA4	• Records demonstrate seeding of target species and/or planting of tube stock (where relevant) specified in: o *Table 28: Current indicative species and sowing rates for low intensity grazing PMLU;* and o *Table 29: Current indicative species and sowing rates; shade trees in a low intensity grazing PMLU*
RM7	Revegetation (seeding and / or planting) – Native (riparian) vegetation	RA1	• Records demonstrate seeding of target species and/or planting of tube stock (where relevant) specified in: o *Table 30: Current indicative species and sowing rates for native riparian habitat PMLU*

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM8	Achievement of grazing PMLU to stable condition	RA2a, RA2b, RA3, RA4, RA5	• No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at representative analogue sites[4] • Target percentage vegetation ground foliage cover of ≥50% of that of representative analogue sites with similar landform parameters • Land capability assessment undertaken by an appropriately qualified person[1] confirms that land has achieved a minimum class 3 or 4 as compared to the pre-mining suitability for beef cattle grazing (refer to Figure 15) • Erosion classification[3] is comparable with erosion classifications[3] from nearby equivalent land uses with similar landform parameters, determined using analogue sites • Certification from an appropriately qualified person that the capping system of the TSF is functional, there is no evidence migration of contaminants to groundwater • There is no evidence of water ponding on the surface of the TSFs (applicable to RA4) • No active erosion present as demonstrated by no increase in erosion classification[3] over time • Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use • Runoff water quality monitoring conducted at a minimum of three locations across the ex-pit and in-pit dumps and with a frequency target of 3 samples per year; conform to the following values: o pH of between 6 – 9.0; o Salinity, measured as EC of ≤ 5,970 µS/cm; and o Sulphate, as SO_4 of ≤ 1,000 mg/L • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values.

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM9	Achievement of native vegetation PMLU to stable condition	RA1	• Downstream water quality complies with water quality objectives or upstream / reference data • No erosion classified[3] as 'severe' nor 'extreme' gully erosion or washout features • No active erosion present as demonstrated by no increase in erosion ratings over time • Assessed as geotechnically stable by an appropriately qualified person[1] • No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at representative analogue sites • Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use • Runoff water quality monitoring conducted at a minimum of three locations across the ex-pit and in-pit dumps and with a frequency target of 3 samples per year; to conform to the following values: o pH of between 6 – 9.0; o Salinity, measured as EC of ≤ 5,970 µS/cm; and o Sulphate, as SO4 of ≤ 1,000 mg/L • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values.
RM10	Achievement of target pasture productivity criteria for grazing PMLU	RA2a, RA2b, RA3, RA4	• Pasture productivity is consistently[2] similar to or exceeding analogue[4] sites • Vegetation structure and condition is consistent[2] with analogue[4] sites
RM11	Achievement of native vegetation PMLU to a sustainable condition	RA1	• Evidence of native fauna utilisation in the form of tracks, scats, and opportunistic observations • Evidence of flora recruitment from rehabilitation monitoring data • Vegetation structure and condition is consistently[2] similar to or exceeding analogue sites • Field-based monitoring data provided in the final rehabilitation report demonstrates vegetation monitoring meets the 50% biocondition benchmark (refer Section 3.3.2 of the Rehabilitation Monitoring and Maintenance Plan (Appendix F) for RE 11.3.25, including: ○ tree canopy height >7m ○ tree species richness >2 ○ shrub species richness >2 ○ grass species richness >4 ○ tree canopy cover >6% ○ shrub canopy cover ≥ 3% o groundcover ≥ 30%

Milestone reference	Rehabilitation milestone	Applicable RAs	Milestone criteria
RM12	Achievement of retained infrastructure PMLU to stable condition	RA6	• Hazard and Safety Assessment completed by an appropriately qualified person[1] demonstrates hazards in RAs are consistent with the type and severity of hazards typical of neighbouring equivalent land use. Remaining hazards are considered to be low risk with no significant increase in risk expected over time • Final landform survey confirms no built structures remain other than those that form part of a landholder agreement • No erosion classified[3] as 'severe' nor 'extreme' gully erosion or washout features • No active erosion present as demonstrated by no increase in erosion ratings over time

1. 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 relating to the subject matter using the relevant protocols, standards, methods, or literature.
2. Consistently means that the criterion is met for a minimum of three consecutive years.
3. Erosion classification framework:

Erosion classification	Minor	Moderate	Severe	Extreme
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.	Loss of surface horizons; root exposure, etc.
No. of rills/ gullies	< 15	15 – 30	31 – 50	> 50
Greatest observed depth (cm)	<10	10 – 30	30 – 60	>60
Tunnel erosion	-	-	Present	Present
Mass movement	-	-	Present	Present

[4]. Grazing reference sites will be determined prior to the commencement of mining

3.5.4 Rehabilitation timeframes

Rehabilitation milestones are required to be achieved as soon as practicable after land becomes available for rehabilitation. Land is considered to become available for rehabilitation at the completion of mining, except where land is being used for operating infrastructure or topsoil stockpiles or is identified as being retained infrastructure post-closure. From the scheduling work completed for the Project EIS, the period following the commencement of mining that a given RA would become available was identified and is provided in Table 17.

Rehabilitation milestone timeframes have been developed with consideration for the size of the rehabilitation area, the activities applicable to the milestone and interim rehabilitation activities that are scheduled to occur or anticipated to be required prior to the area becoming available for rehabilitation. Milestones that involve revegetation activities, including monitoring of revegetation, make provision for unfavourable growing seasons and unforeseen extreme events such as droughts or storms that could negatively impact vegetation establishment; requiring longer timeframes for the milestone to be achieved. The nominated rehabilitation timeframes considered for scheduling the rehabilitation milestones are shown in Table 18.

New Hope has not as yet identified a commencement date for the Project. Therefore, it is not possible to nominate any definitive milestone completion dates for use within a PRCP schedule. For this reason, the time frames provided in Table 17 and * commencement is defined as the date when topsoil stripping occurs at the Project

Table 18 are based on either durations (in years) from the commencement of mining or durations between milestones. For clarity, the commencement date has been defined as the date of commencement of disturbance (topsoil stripping) within the pit area (i.e. the start of the mining phase). The PRCP schedule would be required to have a commencement date inserted through an amendment once this was known with the Project unable to be commenced prior to this.

Table 17: Land availability timing for rehabilitation

Rehabilitation area		Land available (year after commencement* of mining)	Justification
Creek diversions	Stage 1	2	Each stage of the creek diversion will be progressively rehabilitated as each stage becomes available. The final diversion will be in place by year six with the final rehabilitation works commencing by year seven of mining operations.
	Stage 2	4	
	Stage 3	7	
Retained flood levee	Retained flood levee	7	Retained flood levees on the eastern, southern and western side of the southwest void will be retained to prevent inundation of the residual void. These are expected to be in place following completion of the permanent creek diversion and will therefore be available for rehabilitation by year 7.
Out-of-pit spoil dumps	Southwest (including flood levee)	5	It is estimated that the southwest spoil dump will be in place by year 4 of mining activities with rehabilitation works beginning by year 5. The flood levee on the southern end of the western void is expected to be completed by year 4 and incorporated into the spoil dump final landform.
	West	15	As the western void will be operation until year 32 of mining, the western spoil dump is expected to be required until the end of mine life. Rehabilitation will commence progressively from the most northern part as the western void moves south. It is expected that land will become available from year 15 in most northern end of the spoil dump.
	North	15	As the eastern and western voids progress further south, the in-pit and west out-of-pit spoil dumps will be utilised and the north dump will be become available for rehabilitation.
In-pit spoil dump	In-pit spoil dump	20	By year 20 the eastern pit will have progressed further southeast and land closest to the diversion (the north-western side of the opencut disturbance) will become available for rehabilitation. As mining continues to progress to the southeast, land will progressively become available, and rehabilitation works started.
Tailings storage facilities (TSFs)	TDN	11	Tailings dams will receive fine tailings rejects from the CHPP which will be operational until the end of mine life. As areas are decommissioned, they will be left for several years to consolidate and allow evaporation until they are able to be rehabilitated. Together, the TDN and TDNA will accommodate 16.7 years of Project tailings. The TDN will be decommissioned from year 6 when it has reached capacity and TDNA will be decommissioned from year 10 as the TDP becomes available.
	TDNA	15	

Rehabilitation area		Land available (year after commencement* of mining)	Justification
	TDP	36	Once the TDP is operational (by year 10), it will be utilised until the end of mining and decommissioned from year 30. The TDP will not be available for rehabilitation until several years post-mine closure as the tailings needs to consolidate and dry out prior to rehabilitation activities being carried out. All tailings dams will be available for rehabilitation 5 years after decommissioning.
Rail and services corridor	Retained infrastructure	32	The rail and services corridor will be available once for rehabilitation after mining operations cease in year 32.
MIA	Roads	52	Provided the roads are not retained under a landholder agreement, they will facilitate the movement of personnel throughout the site for rehabilitation purposes and will be one of the last areas decommissioned as part of rehabilitation activities.
	Built infrastructure	32	Mining activities are expected to be completed by year 32 and infrastructure areas will be available for decommissioning and removal from year 32 as these areas will no longer be needed for processing materials or accommodating personnel.
Dams	Sediment dams: SD1 SD2 SD3 SD4 SD5 SD6 SD7	30	Sediment and runoff from mining areas will be collected in the sediment dams throughout the MLs. They will be used for the duration of the mine life and decommissioned from year 30.
	Raw water dams: RW1 RW2	30	The Raw Water Dams will be used to capture runoff from the local catchment for all mining years.

Rehabilitation area		Land available (year after commencement* of mining)	Justification
	Environmental dams: EV1 EV2 EV3 EV4	EV1 is decommissioned by year 10 when the north pit transitions to the TDP All others – 30	Pit sumps will collect contaminated pit water and groundwater inflows, these sumps are then dewatered to local Environmental Dams EV1, EV2 and EV3 adjacent to the pit areas for the duration of pit operations. Potentially contaminated catchment areas within the MIA report to the five environmental dams within the MIA and train load-out footprint which form Environmental Dam EV4 for the duration of the mine life.

* commencement is defined as the date when topsoil stripping occurs at the Project

Table 18: Rehabilitation milestone timeframes justification

Rehabilitation Milestones (RM)	Applicable RAs	Summary rehabilitation methodology	Associated risks	Risk level assigned*	Nominated time frame (years)	Justification for assigned timeframe
RM1: Infrastructure decommissioning and removal	All RAs	• Infrastructure decommissioning and disposal	• No risks were associated with infrastructure decommissioning	N/A	1	Some mine infrastructure (e.g. haul road) will be required to facilitate rehabilitation activities and will therefore not become available for rehabilitation for several years post-closure. Decommissioning activities are considered low risk, therefore decommissioning is expected to take less than 1 year.
RM2: Management of contaminated land status	RA2a, RA3, RA4, RA5, RA6	• Remediation or removal of contaminated material (where applicable) • Determination of contaminated land status by appropriately qualified person	• Contaminated land • Surface water impacts • Groundwater impacts	Moderate	1	A contaminated land assessment will be undertaken by an appropriately qualified person. If contaminated land is identified, remediation works will be undertaken promptly. Given the moderate risk classification associated with this activity, the timeframe assigned is 1 year.

Rehabilitation Milestones (RM)	Applicable RAs	Summary rehabilitation methodology	Associated risks	Risk level assigned*	Nominated time frame (years)	Justification for assigned timeframe
RM3: Landform development (re-profiling / reshaping) of land affected by disturbance	RA1, RA2a, RA2b, RA3, RA4, RA5	• Installation of drainage features • Bulk earthworks reshaping • Final re-profiling • Geotechnical assessment of stability	• Surface cracking • Erosion • Increased slope steepness	Moderate	1	As land becomes available, all bulk earthworks and installation of drainage features will be completed to design specifications and assessed as geotechnically stable by a suitability qualified person. The timeframe assigned is 1 year.
RA4: Capping	RA4	• Geotechnical assessment by an appropriately qualified person • Landform constructed to design parameters	• Erosion • Localised settlement • Acid mine drainage • Insufficient topsoil resources	Moderate	1	After consolidation of the TSFs the land will be promptly capped to design specifications. The timeframe assigned is 1 year.
RM5: Surface preparation (topdressing, contour ripping, soil amelioration)	RA1, RA2a, RA2b, RA3, RA4, RA5	• Surface preparation (e.g. topsoiling, contour ripping, soil amelioration activities as required)	• Surface roughness in excess of that expected for the PMLU • Erosion • Insufficient density/diversity of vegetation	Moderate	1	Subsoil and topsoil amelioration and prompt vegetation establishment are key processes to minimise the identified risks. The timeframe assigned is 1 year.
RM6: Grazing revegetation (seeding and / or planting)	RA2a, RA2b, RA3, RA4	• Revegetation with seed and / or tube stock consistent with the PMLU	• Erosion • Insufficient density/diversity of vegetation	Moderate	1	The seeding and / or planting of suitable target species is classified as Low Risk. The assigned timeframe of 1 year allows time for vegetation establishment.
RM7: Riparian habitat (native vegetation) revegetation (seeding and / or planting)	RA1	• Revegetation with seed and / or tube stock consistent with the PMLU	• Erosion • Insufficient density/diversity of vegetation	Moderate	1	The seeding and / or planting of suitable target species is classified as Low Risk. The assigned timeframe of 1 year allows time for vegetation establishment.

Rehabilitation Milestones (RM)	Applicable RAs	Summary rehabilitation methodology	Associated risks	Risk level assigned*	Nominated time frame (years)	Justification for assigned timeframe
RM8: Achievement of grazing PMLU to stable condition	RA2a, RA2b, RA3, RA4, RA5	• Vegetation monitoring and maintenance as required • Erosion monitoring	• Pests and weeds • Erosion • Vegetation failure (e.g. disease, drought)	High	10	Achievement of target vegetation and erosion criteria is dependent on climatic conditions and soil preparation. Allowance is made adverse climatic conditions such as droughts or storms that will negatively impact vegetation establishment and subsequently affect erosion characteristics. This also include repair and maintenance activities that may be required as a result. Given these factors and the 'High' risk classification, the timeframe assigned is 10 years.
RM9: Achievement of native vegetation PMLU to stable condition	RA1	• Vegetation monitoring and maintenance as required • Erosion monitoring	• Pests and weeds • Erosion • Does not achieve geomorphic stability • Vegetation failure (e.g. disease, drought)	High	20	Monitoring of the permanent diversion and surrounding rehabilitated area will be ongoing throughout the mine life to determine geomorphic stability of the diversion. The timeframe assigned is 20 years.
RM10: Achievement of target pasture productivity criteria for grazing PMLU	RA2a, RA2b, RA3, RA4	• Pasture productivity consistently similar to analogue sites	• Insufficient density/diversity of vegetation • Insufficient pasture productivity	High	10	Achievement of target revegetation criteria is dependent on good climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the 'High' risk classification, the timeframe assigned is 10 years.

Rehabilitation Milestones (RM)	Applicable RAs	Summary rehabilitation methodology	Associated risks	Risk level assigned*	Nominated time frame (years)	Justification for assigned timeframe
RM11: Achievement of native vegetation PMLU to a sustainable condition	RA1	• Vegetation structure is consistent with analogue sites	• Insufficient density/diversity of vegetation • Insufficient recruitment	Moderate	10	Achievement of target revegetation criteria is dependent on good climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the 'Moderate' risk classification, the timeframe assigned is 10 years.
RM12: Achievement of retained infrastructure PMLU to stable condition	RA6	• Safety and geotechnical assessments	• Erosion • Pests and weeds	Moderate	1	Given the minimal active rehabilitation work required to achieve a stable condition for retained infrastructure, the timeframe assigned is 1 year.

* See section 3.6 for risk determination.

3.5.5 Management milestones

In an equivalent manner to the Project's rehabilitation milestones, management milestones are required for all improvement areas identified as a NUMA. These identify each significant event or step necessary to achieve best practice management of the area and to minimise risks to the environment.

The nominated management milestones for the Project NUMAs (IA1) are outlined in Table 19, while the proposed milestone criteria are detailed in Table 20.

Table 19: Management milestones and their applicability to improvement area IA1

Milestone reference	Description
MM1	Achievement of final landform design
MM2	Achievement of surface and safety requirements
MM3	Achievement of sufficient improvement

3.5.6 General rehabilitation practice

The rehabilitation practices used at any mining site inevitably evolve as a result of increasing knowledge gained from experience in the following areas:

- early rehabilitation successes and failures;
- weather, subsoils, soils, local flora and fauna and revegetation species; and
- site preparation, seeding practices, the maintenance and repair of previously rehabilitated areas and/or local agricultural practices.

For this reason, the rehabilitation practices outlined in the following subsections should not be interpreted as the precise method that will be utilised for the Project, but rather as a record of current rehabilitation knowledge and intent at the time of writing; and with the expectation that rehabilitation practices will likely evolve and develop over time.

While rehabilitation objectives, performance indicators and completion criteria for the Project are detailed in sections 3.5.1 and 3.5.2, from the perspective of operational rehabilitation planning and practice, the following overarching principles are considered key.

- Ensuring that reshaped areas proposed for rehabilitation meet the required landform design principles, that prepared areas meet the rehabilitation design specification for the area, and that local site drainage has been considered and surrounding areas graded to mitigate any rainfall runoff from adjacent areas to run-on to prepared rehabilitation areas.
- Topdressing materials, final surface preparation methods and soil amelioration activities have the objective of supporting vegetative growth.
- Revegetation species selection, seeding and/or planting methods, and fertiliser applications target rapid vegetative ground cover effective at mitigating soil erosion, during the period of initial revegetation when areas are most at risk.
- Ongoing monitoring and maintenance are to be used both to assess rehabilitated area performance against completion criteria as well as to feedback to, and update rehabilitation practices; and to identify maintenance or modification requirements such that RA are proceeding along a trajectory towards the designated PMLU.

Table 20: Management milestone criteria

Management milestone	Applicable improvement areas	Milestone criteria	Nominated time frame (years)	Management indicators
MM1 -Achievement of final landform design	IA1	• Residual void highwall with the following angles: o ≤70° for competent rock; and o ≤45° for incompetent rock. • Predictive modelling undertaken by a suitably qualified person[1], confirming that the voids will remain as a groundwater sink and that there is no risk of contaminant release to surface or groundwaters post-mining. • Voids are assessed to be geotechnically stable by an appropriately qualified person[1]	2	• Slope of void highwall • Water level monitoring and modelling

Management milestone	**Applicable improvement areas**	**Milestone criteria**	**Nominated time frame (years)**	**Management indicators**
MM2 – Achievement of surface and safety requirements	IA1	• Safety infrastructure established around the void, including the following: o adequate bunding in place confirmed to be geotechnically stable by an appropriately qualified person[1]; and o perimeter fencing and signage erected to prevent access to fauna and humans. • Bunding constructed to the following design criteria: o minimum base width of 4 m; o a minimum height of 2 m; and o located at least 10 m beyond the area potentially affected by any instability of the pit edge. • Void water quality monitoring conducted annually at a minimum of3 locations across the void water surfaces for the following parameters: o depth; o pH; o EC; o DO; and o turbidity • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values.	5	• Safety infrastructure established around the void

Management milestone	Applicable improvement areas	Milestone criteria	Nominated time frame (years)	Management indicators
MM3 – Achievement of sufficient improvement	IA1	• Assessment by a suitably qualified person[1] that no serious environmental harm will occur outside of the relevant tenure boundary. • Certification from an appropriately qualified person[1] that the residual voids are safe to humans and livestock. • Certification from an appropriately qualified person[1] that the water quality and levels in the voids will not cause serious environmental harm to the surrounding environment. • Water quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan show no contamination from the landform to surface waters • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values. • Void water quality monitoring is conducted for parameters specified in the Rehabilitation Monitoring and Maintenance Plan to provide a comparison to groundwater and surface water quality data to show no serious environmental harm to surface water or any recognised groundwater aquifer.	5	• Geotechnical stability of void • Geotechnical study completed by a suitably qualified person[1] assessing the factor of safety for all final landforms • No indication of the residual void causing serious environmental harm to land, surface waters or any recognised groundwater aquifer

[1] 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 relating to the subject matter using the relevant protocols, standards, methods, or literature.

There may be circumstances when rehabilitation practices outside of those discussed within this PRCP may be utilised. For example, discrete areas of steeper slopes, rehabilitation failures or other scenarios that may necessitate more intensive rehabilitation practices. These circumstances will be identified, assessed and rehabilitation activities planned for as required.

3.5.6.1 Flooding

Flood studies for the Project have been undertaken by Parsons Brinckerhoff (2014a, 2014b), with a focus on flood extents and risk associated with Spring Creek, Horse Creek and the Horse Creek diversions. The proposed operational levee designs are to a 1 in 1,000 Average Recurrence Interval (ARI) maximum flood level, and are discussed further in Section 3.5.15.6. The Horse Creek diversion is discussed at Section 3.5.15.4.

ARI flood assessments incorporating the final landform were based on detailed hydrologic and hydraulic analysis of waterways in the vicinity of the Project. Parsons Brinckerhoff prepared a specific flood assessment for the Project EIS (PBA 2014a, 2014b) (Appendix G), which draws on previous hydraulic and hydrologic modelling of Horse Creek.

The Project final landform was designed to exclude floodwaters from the residual voids. This outcome is achieved via:

- design of landforms that drain away from the void where practical;
- incorporation of flood levees on the western and southern ends of the eastern pit and on the eastern side of the western pit; and
- design of stable landforms around residual voids to divert catchments away from the void. This design removes the need for operational style levees in the final landform.

To ensure all final landforms within the Horse Creek flood extent remain stable, they have been designed to:

- achieve a low rehabilitation grade on all slopes, to assist the development of vegetative cover to improve stability;
- achieve a minimum total landform width of 90 m; and
- achieve a minimum landform height at least equivalent to the probable maximum flood water level.

Smaller drainage features within and surrounding the Project may present a risk of localised flooding. Where final landforms intersect with this flood extent, the stability of landforms will be ensured by selective placement of non-erosive materials, inclusion of rock mulch protection and increasing the size of landforms to improve structural stability.

The estimated extent of flooding for a 1 in 1,000 ARI flood event for all MLs are shown in Figure 18 (pre-mining) and Figure 19 (including permanent diversion). Modelling shows that the final landform design, including flood levees, will effectively protect the residual voids in such a flood event.

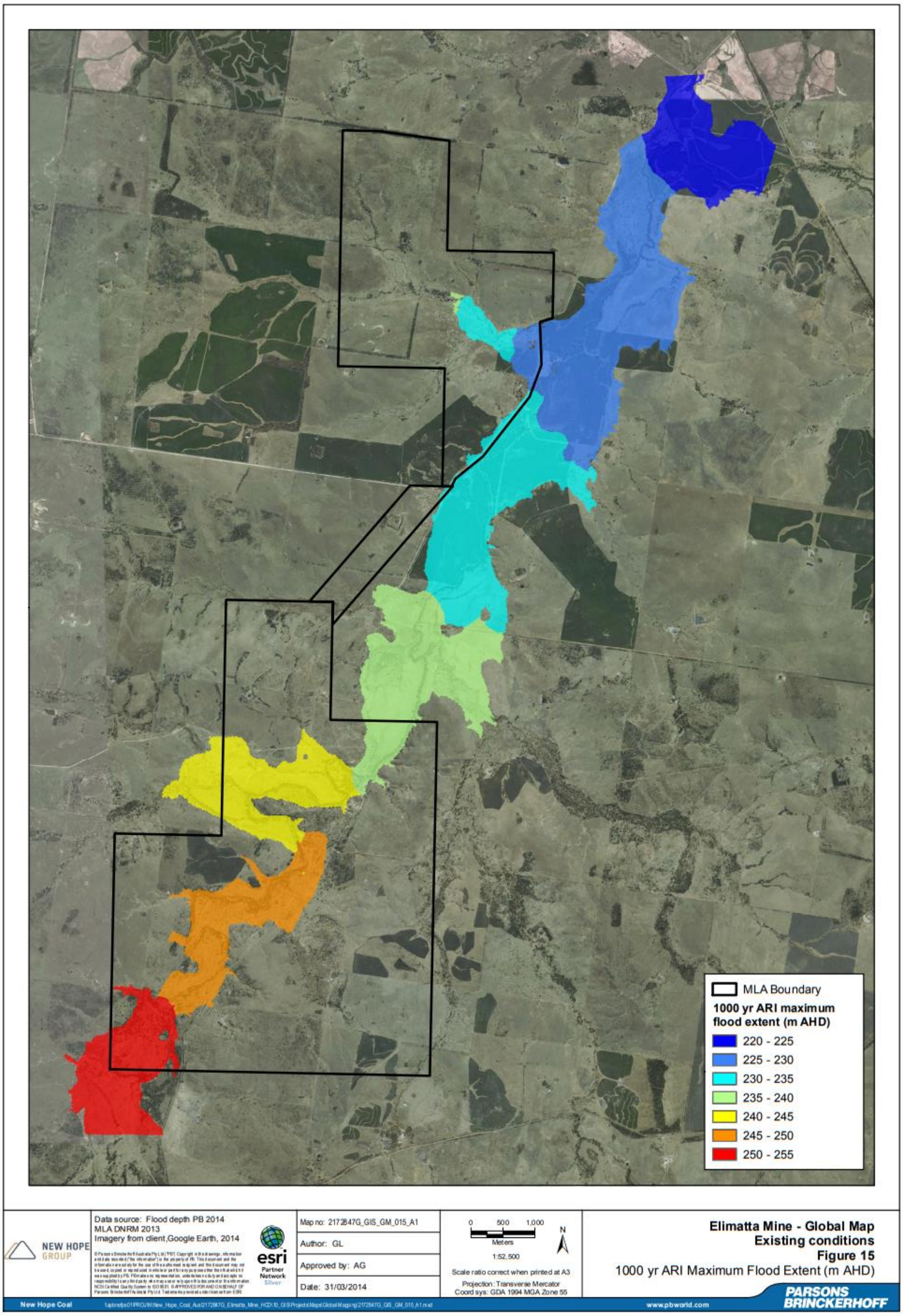

Figure 18: Pre-disturbance 1:1,000-year ARI flood modelling

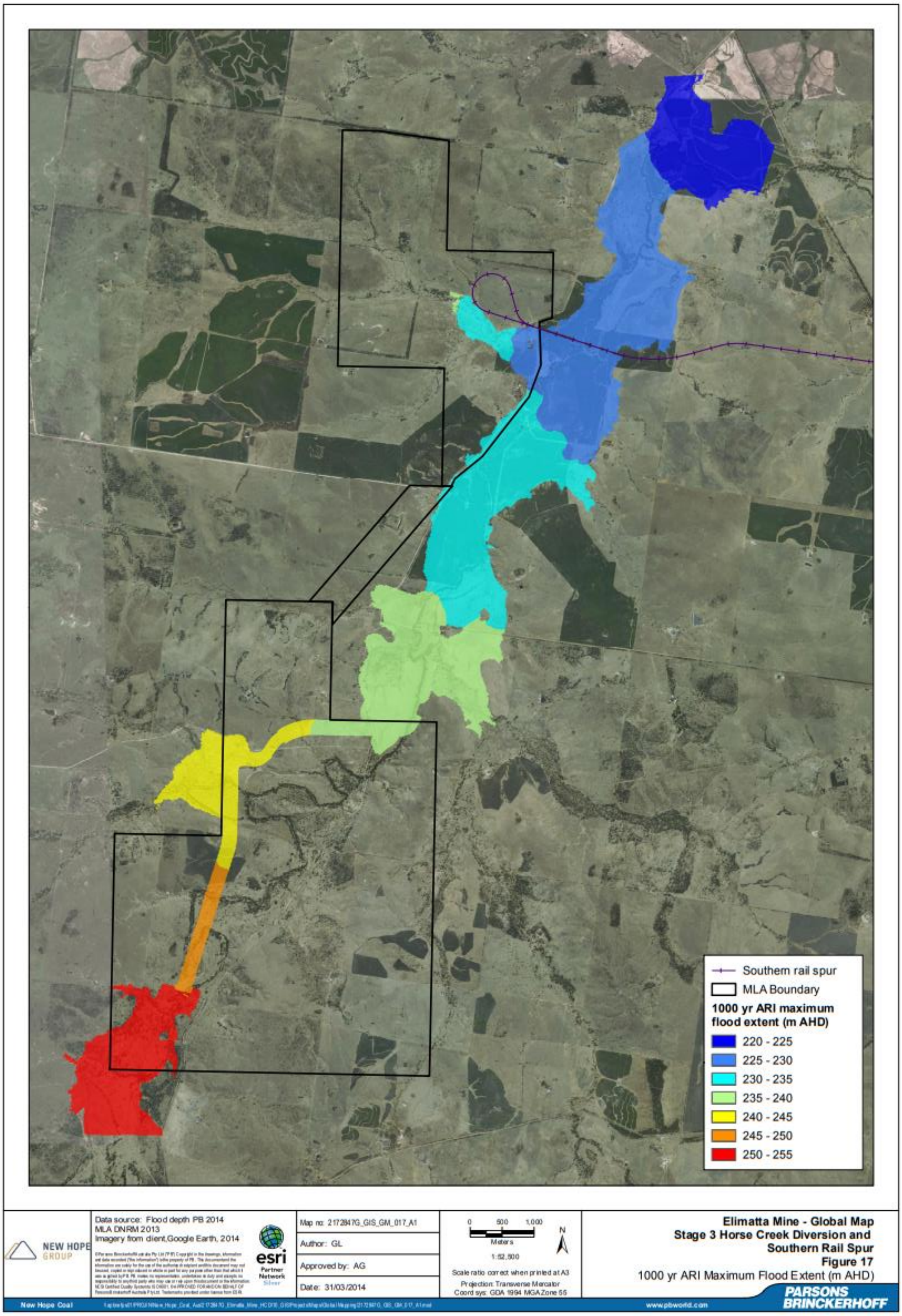

Figure 19: 1:1000-year ARI flood modelling with creek diversion and WSL

Horse Creek diversion hydraulic characteristics

The hydraulic characteristics of the Horse Creek diversion were determined for all diversion stages (permanent and temporary) and are detailed in Parsons Brinckerhoff (2014a, 2014b) flood studies. The findings are summarised below. Hydraulic characteristics of the Horse Creek diversion were assessed against the *Australian Coal Association Research Program (ACARP) Guidelines: Maintenance of Geomorphic Processes in Bowen Basin River Diversions* (2002). The guideline values for velocity, shear stress and stream power under the 1 in 2 year and 1 in 50 year ARI flood scenarios are shown in Table 21.

Flood models developed for the Project were also assessed to identify the impact of the diversion stages in terms of the afflux water levels at the upstream, downstream and western boundaries of ML 50254.

Table 21: ACARP guideline values

Scenario	Velocity (m/s)	Bed shear stress (N/m^2)	Stream power (N/ms or W/m^2)
2 year ARI flood	<1.5	<40	<60
50 year ARI flood	<2.5	<80	<220

The final landform of the permanent Horse Creek diversion demonstrates velocities of below 1.5 m/s for 2 year ARI events and below 2.5 m/s for 50 year ARI events. Velocities are typically below 2.5 m/s for 1,000 year ARI events. Modelling indicates that shear profiles largely remain within the 40 N/m^2 and 80 N/m^2 respective guideline values for 2 year and 50 year ARI events, as does the stream power profile of the final landform. The shear profile is also predominantly below 80 N/m^2 for 1,000 year ARI events. The engineered design of the final landform and the extended lengths of constant bed slope reduce the variation in magnitude.

Afflux modelling

Afflux and flood extents associated with the final alignment of the Horse Creek diversion are detailed in Figure 20. This shows afflux and depth increases associated with the diversion of Horse Creek in a 1 in 1,000 year ARI event. This indicates that while afflux attributed to the altered alignment of Horse Creek adds additional depth in some inundated areas, the areas of additional inundation under a 1 in 1,000 year ARI caused by the Project are limited in their extent.

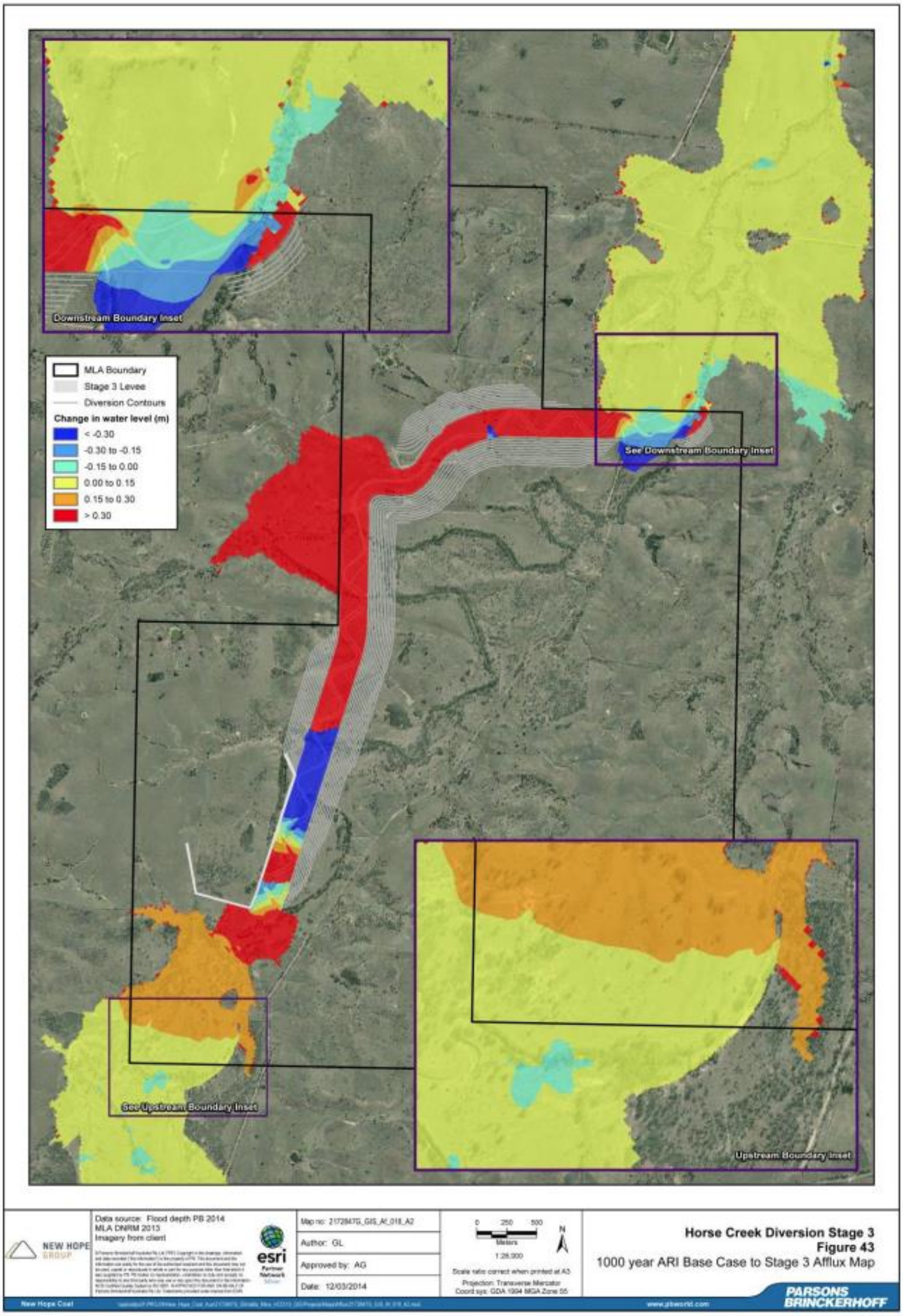

Figure 20: Base Case to Final Diversion 1000 year ARI afflux map

Horse Creek diversion stability

Geotechnical stability of the Horse Creek diversion was assessed using SlopeW for scenarios where the diversion would be constructed through natural ground and spoil. The diversion slopes were assessed for short and long-term stability against the factors of safety of 1.25 and 1.5 respectively. No instability of the embankment was identified in any scenario.

Open cut mine spoil is typically subject to settlement caused by inundation of spoil by groundwater or surface water. Collapse settlement on inundation can occur within 3-4 years with a maximum compression of 2 – 6%. Creep settlement is a slow consolidation of spoil material with the magnitude dependent on the compacted state of backfill. Creep settlement can range from 0.1% for backfill with full compaction to 2.5% for uncompacted backfill. To assess the stability of the Horse Creek diversion with the embankment adjacent to open cut mining backfill, it was assumed that the backfill spoil was partially compacted as most spoil will undergo some degree of compaction during operation and placement. The groundwater levels were also predicted to inundate the spoil to approximately 50%. It is estimated that settlement of approximately 1.12 m will occur below the diversions constructed in spoil over a period of approximately 100 years, with the bulk occurring during and shortly after mining ceases. Several settlement mitigation measures were proposed by Parson Brinckerhoff (2014c) in the Horse Creek Diversion Functional Design Report.

The diversion will be stabilised using vegetation and bed slope optimisation, which promotes normal geomorphic processes such as lateral migration. Enhanced stability may be required in specific circumstances which will be assessed and implemented where required. The Project will require engineering protection methods to provide enhanced stability due to the potential consequences of unrestrained migration of meander bends in close proximity to active mining pits or final voids. To achieve this, rock armouring may be implemented on the outer bank of constructed meander bends to provide hard erosion protection until such time as vegetation can provide adequate stabilisation.

Residual voids in flood plains

The residual voids located on the east and west side of the ML 50254 are pre-approved as identified within the LODs (refer Section 3.4.1). In accordance with the transitional provisions for a PRCP, a NUMA that is identified as being pre-approved within an LOD is not required to comply with sections 126C(1)(g) of (h) or 126D(2) or (3) of the EP Act. Additionally, where the residual void is identified in an LOD with a specific location, floodplain modelling is not required to be undertaken. Where a NUMA is pre-approved and is being transitioned into a PRCP the applicant is not required to comply with the prohibition of voids located within a flood plain.

Flood mapping undertaken for the EIS shows that the residual void will not be impacted by flooding from the Horse Creek diversion (3.5.6.1). A flood levee is proposed to be constructed surrounding the southern, western and part of the eastern sides of the residual void to prevent inundation from flood during a 1 in 1,000 year ARI maximum flood event. Further flood protection will be provided through retention of an out-of-pit waste rock emplacement located on the southern end of the eastern residual void. The location of the residual voids and associated water management (i.e. levee) and safety (i.e. fencing) infrastructure have been designed to minimise risks as far as practicable.

The EIS Assessment report details 380 ha of residual void area which constitute pre-approved NUMAs across the final voids and TDP, all of which are stated as being ‘unsuitable’ for a PMLU (see Table 11). An update of mapping for the Project site, as discussed in Section 3.5.2.1, decreases the total NUMA area across the Project by 12 ha.

As mining progresses, waste overburden material and coarse rejects will be progressively placed back into the already worked pit void to reduce the NUMA area as far as practicable. Through backfilling of the operational pit during mine life, the total NUMA area across the Project site will be reduced to 362 ha. The landforms of the spoil material placed back into the pit void will be shaped and reinstated in a timely manner and the batter slopes of all disturbed surfaces will be worked along the contour to minimise the likelihood of scour down the batter face.

3.5.6.2 Geotechnical and erosional stability

The final landform design has been adopted with a view to ensuring geotechnical stability based on existing knowledge of the surface geology associated with the Project. Key design parameters are included for each of the principal RAs as described in sections 3.5.8 through 3.5.12. For higher risk RAs, geotechnical assessments are included as milestone criteria.

Erosion risk on rehabilitated landforms is greatest during the establishment phase, especially on steeper gradients. The greatest erosional risk is typically observed when >50% of the surface is exposed to rainfall and overland flow. In a study conducted on three open cut coal mines in central Queensland, Carroll, Merton and Burger (2000) found that erosion rates declined rapidly on slopes when vegetation cover was >50%, with erosion rates reduced to negligible levels by Year 6, even on steeper slopes. A literature review of erosion research conducted in the Fitzroy Basin region of Queensland (Carroll *et al.* 2010) also concluded that foliage surface cover of 40–60% reduces erosion to <0.5 t/ha, regardless of slope. Similarly, Loch (2000) found that approximately 50% foliage groundcover was sufficient to limit erosion rates to >0.5 t/ha on <15% slopes, for slopes up to 70 m long.

In areas proposed for the PMLU of low intensity cattle grazing, the target percentage vegetation ground foliage cover (≥50%) is considered sufficient to provide long-term surface stability to rehabilitated landforms. As this level of cover is expected to take 1–3 years to develop, additional erosion control methods will be implemented as necessary until the target cover has been achieved.

3.5.6.3 Waste characterisation and cover design

Geochemistry results from the Project EIS (EGI 2012; Appendix G) indicate that overburden/interburden materials are unlikely to release significant salinity or metals/metalloids and will not require special handling (such as mine material segregation, selective placement and engineered covers) for acid rock drainage (ARD) or neutral drainage control. Consequently, a low permeability or engineered cover system is not required to successfully rehabilitate waste rock materials to create a safe, stable, and non-polluting landform.

The acid forming characteristics of the overburden/interburden materials has been described in the Geochemical Assessment report (EGI 2012; Appendix G). It was determined that the total range of sulphur was from below detection levels to 0.75% with most samples (80%) having less than 0.2% sulphur. Results also showed that 95% of samples were negative for net acid producing potential (NAPP) which indicates that the sample may have sufficient acid neutralising capacity (ANC) to prevent acid generation. Net acid generation (NAG) tests were also used in conjunction with NAPP values to classify samples according to acid forming potential. Results showed that most samples (70%) are non-acid forming (NAF), with six samples being potentially acid forming and 41 samples uncertain. Further testing to remove uncertainty identified that the calculated NAG values for all samples were negative, indicating that all acid generated in the standard NAG test for these samples is organic, and that materials represented by these samples are unlikely to be acid producing under field conditions.

Assessments have indicated a likelihood that interburden/overburden materials will be sodic and dispersive, and may be subject to high erosion rates if left uncovered. Placement of spoil with known sodic/dispersion potential will preferentially avoid dump surface areas. Topsoil will be utilised as a growth medium to facilitate vegetation establishment and growth able to minimise erosion risk. In the unlikely event that potentially sodic/dispersive materials may remain exposed on landform surfaces, they will be assessed and treated (e.g. with gypsum or lime) prior to revegetation if erosion cannot otherwise be controlled.

Coarse rejects produced by the coal washing process at the coal processing plant are to be progressively incorporated in both the in-pit and out-of-pit spoil dumps. At an appropriate frequency, sampling and testing will be undertaken of washery wastes, interburden/overburden and floor materials to confirm the existing assessments of low salinity and low risk of neutral mine drainage and ARD. Coarse rejects will be covered by at least 1 m of overburden materials followed by approximately 250–300 mm of topsoil. Where materials show levels of salinity or potential acid forming characteristics that would impede rehabilitation or revegetation, these materials will be remediated in situ or buried. Any potentially acid forming material significantly adverse to plant growth will be buried under benign spoil of a minimum of 1 m.

Surface water runoff from rehabilitated waste rock emplacements will be monitored as described in Section 3.7 to enable the detection of potential acid or saline mine drainage impacts to water quality.

3.5.6.4 Soil and capping material assessment

The Soil and Land Suitability Assessments for the Project EIS describe six SMUs within the Project area. The six SMUs were classified as the Downfall, Kinnoul, Cheshire, Rolleston, Juandah and Horse Creek Alluvium.

The Downfall, Kinnoul, Cheshire, Rolleston and Juandah SMUs possess sodic subsoils with increasing levels of exchangeable sodium within the upper 900 mm of the profile. Salinity also increases with depth within these profiles, to levels considered moderate to highly saline beyond depths of 900–1,000 mm. An exception to this is the Horse Creek Alluvium SMU, with no signs of sodicity or salinity present within the profile. Table 22 shows the soil units chemical characteristics, it should be noted that higher values were typically recorded deeper in the soil.

With the exception of the Horse Creek Alluvium SMU, the soils of the Project site are all considered to have restrictions for stripping, stockpiling and rehabilitation. All soils present on the Project site are considered moderately deficient of major soil nutrients (Table 22). This deficiency will be addressed as required through appropriate topsoil management practices and fertiliser additions (see Section 3.5.13).

Table 22: Soil chemical characteristics

SMU	pH	Exchangeable sodium (%)	Electrical conductivity (EC) (dS/m)	Chloride (mg/kg)	Potassium (mg/kg)	Nitrate nitrogen (mg/kg)	Phosphorous (mg/kg)	CEC (mEq/100g)

Downfall	6–9	11–35	1.4	2,100	349–565	<1 – 3	5–7.5	31 – 60
Kinnoul	8–9.3	6.9–11.4	0.14–0.35	12–257	153–351	2–13	3–21	25–45
Cheshire	7.2–9.1	6.5–10.6	0.13–0.46	21–208	314–89	<1–15	2–14	26–44
Rolleston	7.9–9	3.5–19.5	0.15–2.61	30–1,137	164–339	<1–15	2–12	28–45
Juandah	8.2–9.2	6.5–21.8	0.44–2.42	4–1,500	196–352	<1–12	4–12	25–48
Horse Creek Alluvium	6.9–7.6	0.81–4.52	0.058–0.087	17–110	125	5–10	22–30	11–14

Table 23 presents the SMUs, recommended stripping depths, and the approximate volumes of topsoil available for rehabilitation.

Table 23: Topsoil available for rehabilitation

SMU	Disturbance area (ha)	Stripping depth (mm)	Approximate volume of topsoil available for rehabilitation (m^3)
Downfall	212	200	424,000
Kinnoul	443	100	443,000
Cheshire	619	300	1,857,000
Rolleston	687	200	1,374,000
Juandah	337	0	0
Horse Creek Alluvium	496	1,000	4,960,000
Totals:	**2,834**	-	**9,058,000**

The topsoil stripping and stockpiling strategy for the Project will target the recommended soil depths for each SMU. In addition, topsoil management will aim to:

- minimise the time soil is stockpiled prior to it being used in rehabilitation;
- minimise the transport distance between topsoil stripping and stockpiling;
- stockpile topsoil up to a maximum of 2 m in height away from drainage areas, roads, machinery, transport corridors, and stock grazing areas;
- define topsoil stockpile areas to minimise the risk of accidental disturbance; and
- rip and seed with a quick establishment pasture, to limit erosion, and maintain a viable seed bank if the period of stockpiling is greater than one growing season or 6 months.

When accounting for a 5% handling loss, approximately 8,605,100 m^3 of suitable topsoil will be available for rehabilitation within the disturbance area. The minimum topsoil spreading depth of 250 – 300 mm requires approximately 8,502,000 m^3 of topsoil for sufficient rehabilitation over the life of the Project.

3.5.6.5 Quality assurance / quality control

Quality assurance and quality control activities are included at various stages of the rehabilitation process. These activities typically include:

- ground survey control of authorised disturbance footprints, waste rock emplacement footprints and elevations, and the locations of water management system components;
- the development of detailed rehabilitation plans and sequence for each area;
- sampling and analysis of placed topsoil to ensure agronomic suitability; and
- requirements for seed supply certification.

Rehabilitation activities will be carried out in accordance with the applicable methods described in this document and records maintained to demonstrate achievement of rehabilitation milestones. The Monitoring and Maintenance Program (as described in section 3.7) has been developed to ensure that rehabilitation progresses towards achievement of milestone criteria and ultimately relinquishment of the mining tenures. Regular rehabilitation monitoring will allow for timely identification of the need for corrective action or maintenance work, and changes to the rehabilitation strategy based on past rehabilitation successes and failures and as new information/techniques becomes available.

3.5.7 Final landform design

The Project's final landform design and the sequencing of landform development (and hence the resultant rehabilitation milestone schedule) are influenced by the nature of the mining practices proposed, including the use and establishment of infrastructure, and the proposed mine progression (Appendix C). The final landform design also takes into consideration the pre-mining landscape, the proposed PMLUs and post-mining visual amenity. The final landform design was determined from:

- analysis of the existing topography of undisturbed areas;
- flood modelling;
- in-pit and out-of-pit waste rock emplacement planning; and
- landform shaping and rehabilitation post-mining.

Figure 21 and Figure 22 present the final landform for the Project. The predicted ARI 1:100 flood levels are included on this map to provide an indication of the location of residual voids and other infrastructure in relation to this flood level. Details of rehabilitation strategies for each mine domain are discussed in the following sections.

3.5.8 Waste rock emplacements

An estimated total of 1,152,535,100 bcm of waste (overburden and interburden) is planned for extraction over the mine life. Excavated waste is to be disposed of initially in out-of-pit dumps, before being backfilled behind the mining void. Spoil dumps will be progressively rehabilitated over the life for the mine, and rehabilitation will commence as soon as possible, within two years of land becoming available (refer Table 17).

Progressive rehabilitation will function to reduce erosion potential and mitigate sediment loads in water runoff from overburden stockpiles. Spoil dumps above the natural surface will be recontoured to achieve a maximum slope of 1V:6H (9°). This outer slope geometry and surface treatment will ensure adequate geotechnical stability and safe accessibility, while minimising the catchment and erosion potential of the slope.

The final landform has been designed to be water shedding to minimise water infiltration. Rock lined drains will be installed, where required, to manage surface runoff and prevent erosion. The slopes and tops of the spoil dumps will be topsoiled and deep ripped to better bind topsoils with subsoils.

Survey control will be utilised to manage the development of waste rock emplacements and bulk pushing of waste rock to the final design slopes. To increase the stability of the spoil backfill adjacent to the Horse Creek diversion, material will be placed in such a way as to increase density, decrease permeability and restrict variability (Parson Brinckerhoff 2014c). It is proposed to limit the placement of layers to a maximum depth of 3 m and compact the zone within 1 m of the design invert of the diversion channel. Based on the limited lateral migration expected in the channel, the width of this engineered compaction layer could be restricted to a corridor incorporating the low flow channel plus 10 m on either side of the channel (to be confirmed during detailed design).

The in-pit and out-of-pit waste rock emplacements will be revegetated in accordance with the methods described in section 3.5.14 to achieve the PMLU of low intensity grazing.

A cross-section of the final landform of a typical Project spoil dump is shown in Figure 23.

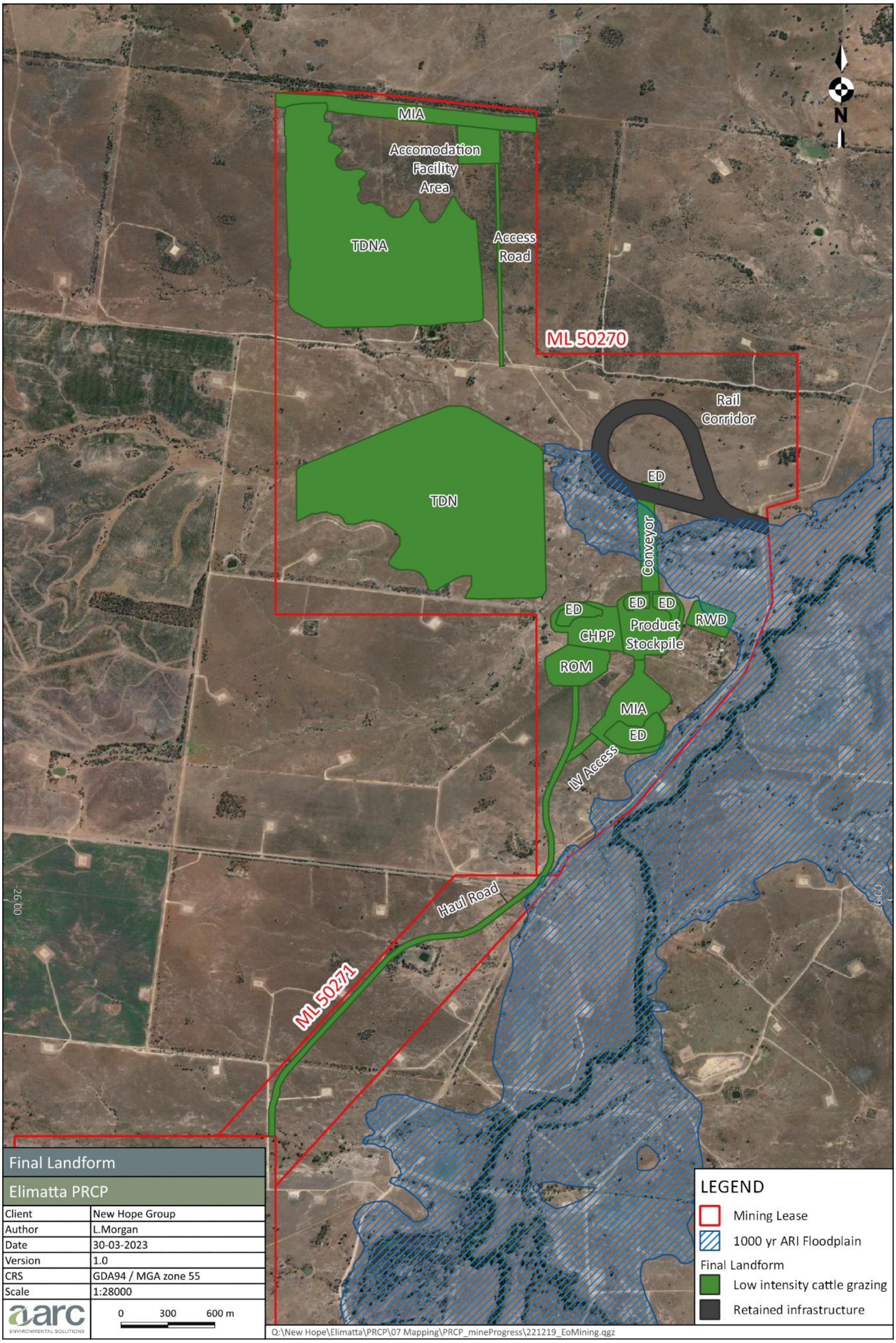

Figure 21: Final landform design (ML 50271 and ML 50270)

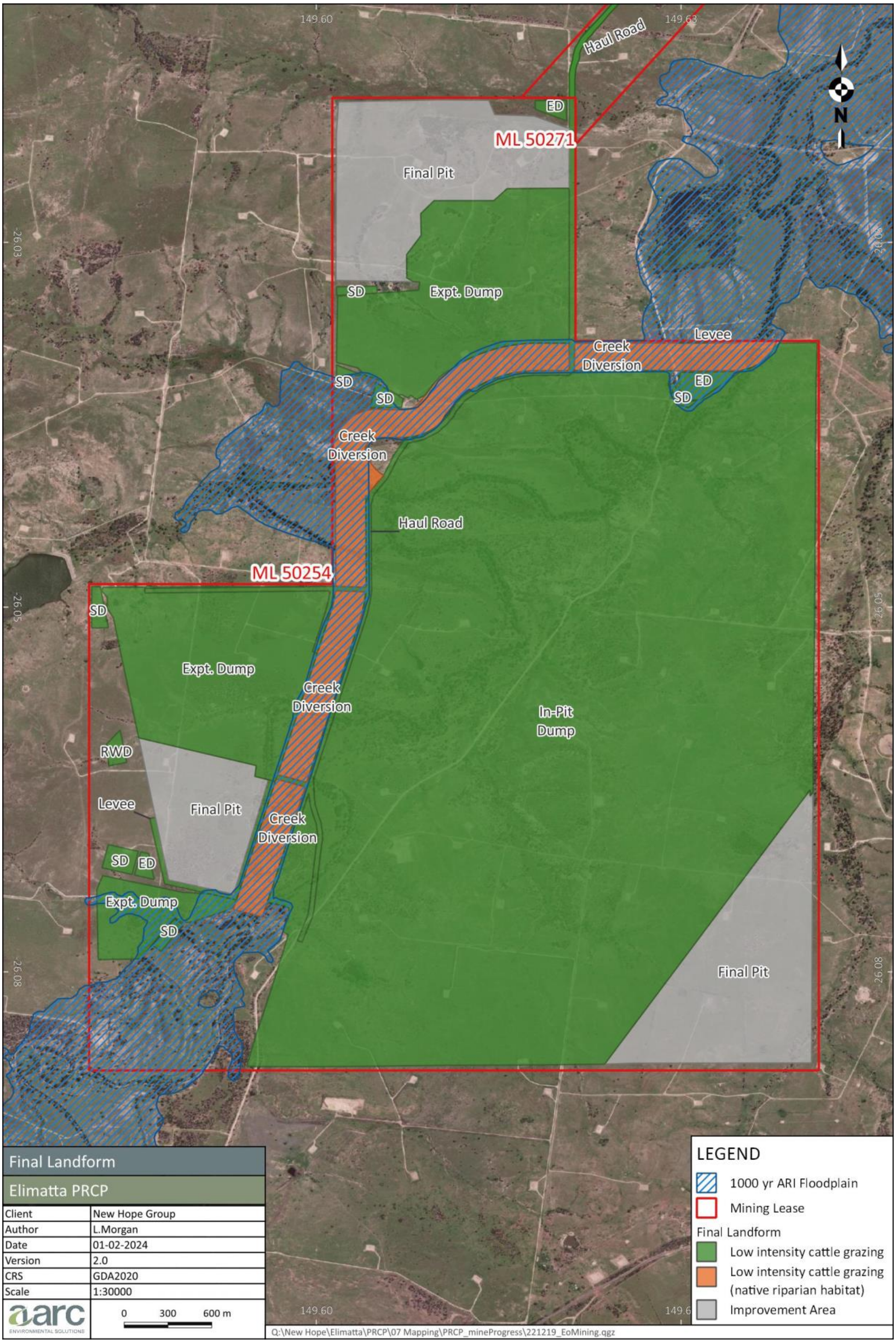

Figure 22: Final landform design (ML 50254)

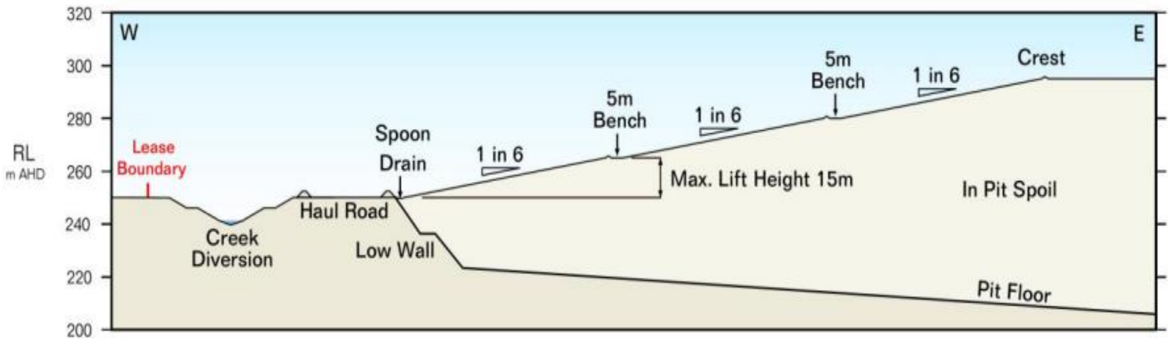

Figure 23: Typical waste dump final landform profile

3.5.9 Tailings storage facilities

3.5.9.1 Tailings characterisation

Physical properties

According to A&B Mylec (2010), it is anticipated that the tailings will comprise the -0.125 mm fraction, making up an estimated 50% of the CHPP rejects averaging 1.2 Mtpa, although consideration has also been given to -0.063 mm fraction tailings (up to about 1 Mtpa). It is estimated that the tailings will be deposited at 25% initial solids.

FL Smith reported (in A&B Mylec 2010) the anticipated specific gravity of the tailings to be 2.18 (compared with about 2.65 for normal mineral matter), implying a carbonaceous content of about 35%. However, this value may be higher than reality and ongoing testing of tailings will be undertaken to determine the physical properties. This information will be used to confirm and develop an appropriate cover design.

Consolidation and water loss estimates

It is anticipated that Project tailings will settle and consolidate to about 48% solids or a dry density in the order of 0.58 t/m^3 in both the surface TSFs and the TDP. Allowing for the amount of water lost to entrainment within the tailings voids, evaporation losses of the order of 0.9 m/m^2/year from ponded water, evaporation from wet and dry exposed tailings on the upper beach, and seepage losses of the order of 0.07 m/m^2/year, the potential recoverable water is anticipated to be in the order of approximately 36% of the total water discharged with the tailings. The tailings would consolidate further 89dessication, with most of the additional water released being lost to evaporation.

Chemical properties

Egi conducted a Geochemical Assessment of the Project (2012) as part of the EIS. The investigation found:

- pH and EC values indicate a lack of significant existing acidity and salinity in tailings and coarse rejects;
- total sulphur is low for both tailings and coarse rejects, reaching a maximum of 0.29%;
- acid base plots show all rejects samples to have a negative NAPP;
- most of the single addition NAG results are less than 4.5 but are affected by organic acids, and are likely to overestimate the acid potential of these samples;
- the calculated NAG values for all samples are negative, indicating that the acid generated in the standard NAG test for these samples is organic, and that materials represented by these samples are not likely to be acid producing under field conditions;
- overall, acid buffering characteristic curve results suggest that the acid buffering minerals within the rejects tested are generally reactive, and that the ANC would be mainly effective; and

- generally, no significant enrichment of metals or metalloids is indicated.

Results indicate that Project tailings, and rejects, represented by the samples tested by Egi (2012), are likely to be NAF, with the rejects also likely to have significant excess buffering capacity. Tailings and rejects were also not significantly enriched in elements of environmental concern and water extracts indicate metals and metalloids are not likely to be mobilised to any significant extent from circum-neutral to slightly alkaline leachates. Further testing of tailings materials will be undertaken during operations and prior to rehabilitation and revegetation to determine alternative cover designs and additional requirements for rehabilitation to a stable landform.

3.5.9.2 Tailings storage facilities: surface TSFs (TDN and TDNA)

Dam TDN is planned to receive fine tailings between mine years 1 and 6, at which stage this tailings dam will have reached its capacity. Tailings will then be deposited at TDNA for years 6 to 10. A depth of at least 3 m will be left between the final tailings surface and the dam's crest level, to facilitate capping and stabilisation of the captured tailings.

The overall objectives of the cover design are to provide a stable landform, limit the risk of seepage and environmental harm, and support vegetation growth. The rehabilitation objectives for the Project are also discussed in Section 3.5.1.

Rehabilitation of outer slopes

The two surface TSF containment walls will be limited to a maximum height of 16 m. To ensure an adequate long-term geotechnical factor of safety, the containment walls will be constructed with an outer slope angle of the order of 1(V) : 3(H) (equivalent to 18°).

Given their modest scale, the containment walls will be constructed as a single slope (without contour banks or down slope drains). The surface treatment of the outer slopes will involve the placement of a rocky soil cover. The rock content will provide erosion protection while the soil content will facilitate moisture retention to support and maintain native vegetation to form a corridor for native fauna and provide visual amenity.

The outer slope geometry and surface treatment will ensure adequate geotechnical stability and safe accessibility, while minimising the catchment and erosion potential of the slope. Excess rainfall runoff from the remediated tops of the surface TSFs will be directed to purpose-built drain structures and not be directed over the TSF outer slopes, to avoid the concentration of rainfall runoff and the heightened potential for erosion that might result.

Rehabilitation of upper surfaces

Rehabilitation will involve the placement of a cover to allow revegetation and achieve the agreed PMLU. The geotechnical stability of the washery wastes and the placement of a cover are to be facilitated by dewatering, desiccation and strengthening of the full depth of the deposit.

It is anticipated that the tailings stored in the surface TSFs will undergo consolidation and desiccation for a number of years before rehabilitation is undertaken. This will assist in the material to achieve sufficient shear strength to allow cover placement using trucks and dozers. Prior to cover placement being attempted, the (peak and remoulded) shear strength profile with depth of the consolidated and desiccated tailings will be assessed by vane shear strength testing. An average vane shear strength of at least 30 kPa (allowing for a low bearing pressure D6 swamp dozer (<35 kPa) and the weight of placed cover material) will be required over the upper 2 m depth of the tailings to ensure that a cover of about 2 m thick can be safely placed.

The cover material will be durable (that is, non-slaking), well-graded including coarse particles up to about 50 mm in size, and non-sodic so as to not inhibit rooting by subsequent vegetation. Suitable material for cover purposes will be sourced from spoil excavated during mining. Weathered sandstone spoil is preferred and will be stockpiled during mining for later use as cover fill. Topsoil will be spread to a nominal 250 – 300 mm thickness to support subsequent vegetation.

Once available for rehabilitation, the cover material will be dumped by trucks in batches on the perimeter of the stored tailings, and left for about 2 weeks to allow the tailings to drain, consolidate and strengthen under the cover material weight. The fill will then be progressively pushed over the tailings along a broad front to a height of about 1 m using a low bearing pressure D6 swamp dozer, ensuring that "bow wave" failures are not generated in the tailings at the leading edge.

A second 1 m lift will then commence in a similar manner to the first. This process will continue progressively until the entire tailings surface is covered by approximately 2 m of fill. Once covered, the shear strength of the consolidated, desiccated and loaded tailings will be sufficient to support a post-mining grazing or native habitat land use.

Once the placed cover material has settled, the completed surface will be contoured to drain gently (at nominal slopes of about 1%) towards the location of a spillway, and then covered with a nominal 250–300 mm of topsoil and seeded to suit the PMLU of low intensity cattle grazing. Any significant drainage channels across the covered tailings will be sheeted with coarse rock for erosion protection, where required.

It is expected that the volume of cover required during rehabilitation of the surface TSFs will be provided from the expansive spoil reserve mined over the 32 year mine life. Over 1 billion bcm of spoil is expected to be excavated and stockpiled during the course of operations. The proposed excavated waste management strategies will assist in identifying the distribution and extent of sodic and dispersive materials.

Figure 24 shows a cross-section of the rehabilitated final landform of a typical surface TSF for the Project.

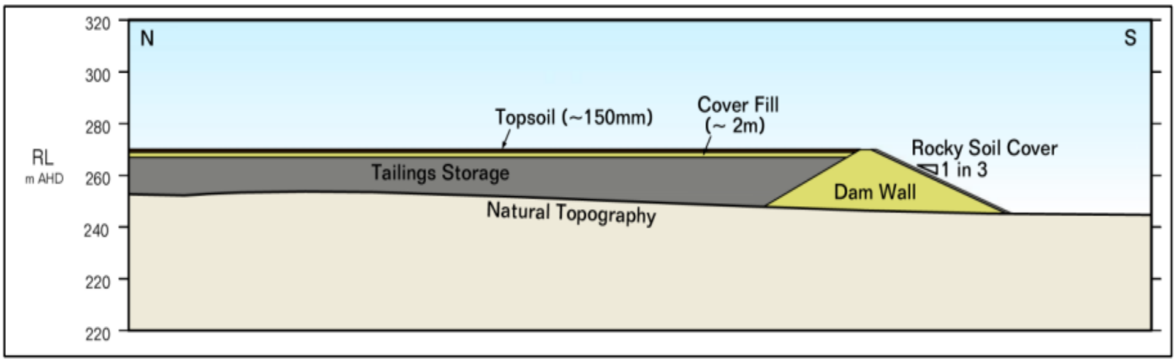

Figure 24: Surface TSF final landform design

3.5.9.3 Tailings storage facilities: in-pit TSF (TDP)

The northern mine pit will cease operations by year 10 and will be transitioned into an in-pit TSF (TDP). The TDP is to be divided into three separate areas with each to be filled with tailings, at which point, each area will be left to consolidate and then capped and rehabilitated. Modelling suggests that TDP will become almost completely filled with tailings by the end of the mine life and could be covered with topsoil for rehabilitation. Each area of the tailings will become available for rehabilitation several years after decommissioning to allow for consolidation and evaporation. The rehabilitation methodology is discussed below.

The overall objectives of the cover design are to provide a stable landform, limit the risk of seepage and environmental harm, and support vegetation growth. The rehabilitation objectives for the Project are also discussed in Section 3.5.1.

Rehabilitation methodology

The first step of rehabilitation of the TDP will occur by placing a separation layer over the exposed tailings surface. This cover will form a capillary break over the underlying tailing surface. It is proposed that the cover will likely need to be placed by hydraulic means. Alternatively, it may be possible to end-dump spoil into wet, uncrusted in-pit tailings. It is anticipated that the in-pit tailings will undergo more limited consolidation than the tailings in the surface TSFs; as TDP will be filled at a higher rate of rise. Given this, the in-pit tailings will be unlikely to achieve sufficient shear strength to allow a cover to be placed by trucks and dozers. Final confirmation of the method of cover placement will depend on the bearing capacity of the tailings at the time of rehabilitation. It is anticipated that the final design for the top surface of the TDP will be 1V : 100H (equivalent to 0.5°) after consolidation and cover placement occurs.

Water will first be drained from the tailings surface to facilitate cover placement, and to facilitate drainage of the cover itself following hydraulic placement to maximise the strength gain in the tailings. Hydraulic placement of the cover will be achieved using a dedicated, small scale, mobile pumping plant, mounted on a skid to allow it to be moved around the perimeter of TDP. Cover placement will commence from the perimeter of the tailings, the cover will be built-up locally to about 2 m depth, and the discharge pipeline will be progressively extended out over the trafficable cover already placed, to complete the cover. This technique was successfully demonstrated at Red Dome Gold Mine in north Queensland for placing a cover of coarse-grained fill over previously submerged, soft, in-pit tailings.

The cover material will be durable (that is, non-slaking), and comprised of well-graded material including coarse particles up to about 50 mm in size, and non-sodic so as to support vegetation. Suitable fill for cover purposes will be sourced from the spoil excavated during mining. Selected spoil will be stockpiled during mining as close to the TSF as practicable for later use as cover material. The volume of cover required during rehabilitation of the TDP will be provided from the spoil reserve to be mined over the 32 year mine life. Over 1 billion bcm of spoil is expected to be excavated and stockpiled during the course of operations. The proposed excavated waste management strategies will assist in identifying the distribution and extent of sodic and dispersive materials.

Gradual covering, by hydraulic means, of the tailings deposited in TDP will promote drainage, consolidation and strengthening of the loaded tailings. This will allow the build-up of a 2 m thickness of fill to form a cover, with sufficient bearing capacity to make the surface trafficable for low bearing pressure equipment such as a D6 swamp dozer. The feasibility of this has been demonstrated at Coppabella Mine in central Queensland, where the upper, coarse-grained, co-disposal beach was successfully developed to a thickness of only 0.5 m on segregated fines, providing adequate bearing capacity for a small scale machinery up to approximately 4 tonnes GVM.

Once the TDP has been covered it will be revegetated (as per section 3.5.14) to a PMLU of low intensity cattle grazing.

Figure 25 shows a cross-section of the final landform design for the TDP.

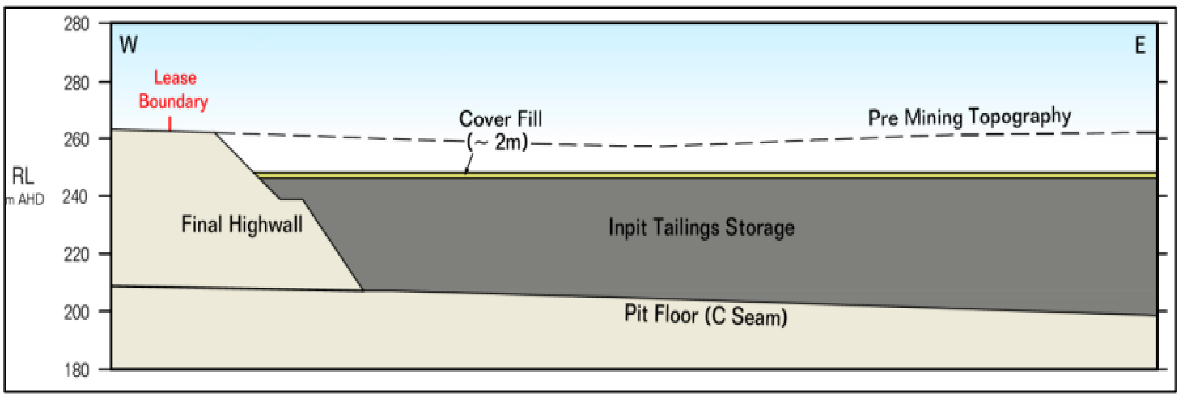

Figure 25: TDP final landform design

3.5.10 Residual voids

3.5.10.1 Final landform design

The Project's residual voids will be left in a safe condition by constructing a safety bund wall around each void from competent rock and/or fencing, depending on the terrain, to limit human and animal access. The safety bund wall will be constructed as described in Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME 1995). This guideline states that the bund wall should be of a minimum height of 2 m, with a minimum base width of 4 m, and be located at least 10 m beyond the area potentially affected by any instability of the pit edge.

To ensure the safety of the residual void, the final highwall and low wall slopes will be assessed by a suitably qualified geotechnical engineer. The eastern and western residual voids will be designed to the achieve a maximum slope of 1V:0.5H (equivalent to 26°) (competent rock) and 1V:1H (equivalent to 45°) (incompetent rock). This design will ensure adequate geotechnical stability and safety.

The following factors will be considered when assessing the geotechnical stability of high walls:

- long-term residual void water levels;
- height and inclination of slope and number and spacing of intermediate benches (as may be required to achieve the final slope);
- shear strength of the highwall soils and rock; and
- density and orientation of fractures, faults, bedding planes, and any other discontinuities, and the strength along them.

The control of surface inflow into the residual void is essential for the long-term management of water quality within the void and will also aid in the control of erosion to low walls and high walls. Surface water flow can cause slope deterioration and ultimate failure. Drainage will be directed away from highwall faces through the construction of interceptor channels / drains around the perimeter of the highwall.

3.5.10.2 Residual void hydrogeology

Groundwater modelling was conducted by AGE (2012) for the Project EIS and the following sub-sections detail their findings. An update to the groundwater modelling was conducted by AGE in November 2015 to assess new groundwater impacts from the adjacent Woleebee coal seam gas fields operated by QGC.

Residual void inflow

Groundwater modelling conducted by AGE in 2012 determined that groundwater inflows into the mining operation will occur directly from the mined coal seams. The simulation of inflow into the residual voids incorporated several conditions including:

- horizontal and vertical hydraulic conductivities of 1,000 m/day;
- recharged was increased to reflect direct capture and runoff from rainfall; and
- evaporation from within the void space.

The simulated volumes were generally less than 1 ML/day for the smaller northern and western pits (Figure 26). The model simulated higher inflows up to 2.5 ML/day for the much larger south-eastern open cut.

Revised ground water modelling conducted by AGE in 2015 to incorporate the adjacent Woleebee coal seam gas fields. QGC's Woleebee gas field is located approximately 20 km to the south of the Project. The revised modelling incorporated the operation of the adjacent Woleebee gas field in the drawdown groundwater level predictions and verified the contribution of spoil recharge in the model.

As recommended by a review of the groundwater model by JBT (2017), the model was also rerun to determine the proportion of groundwater flow from the Walloon Coal Measures in the mine highwall, and the spoils that form the open cut pit low wall.

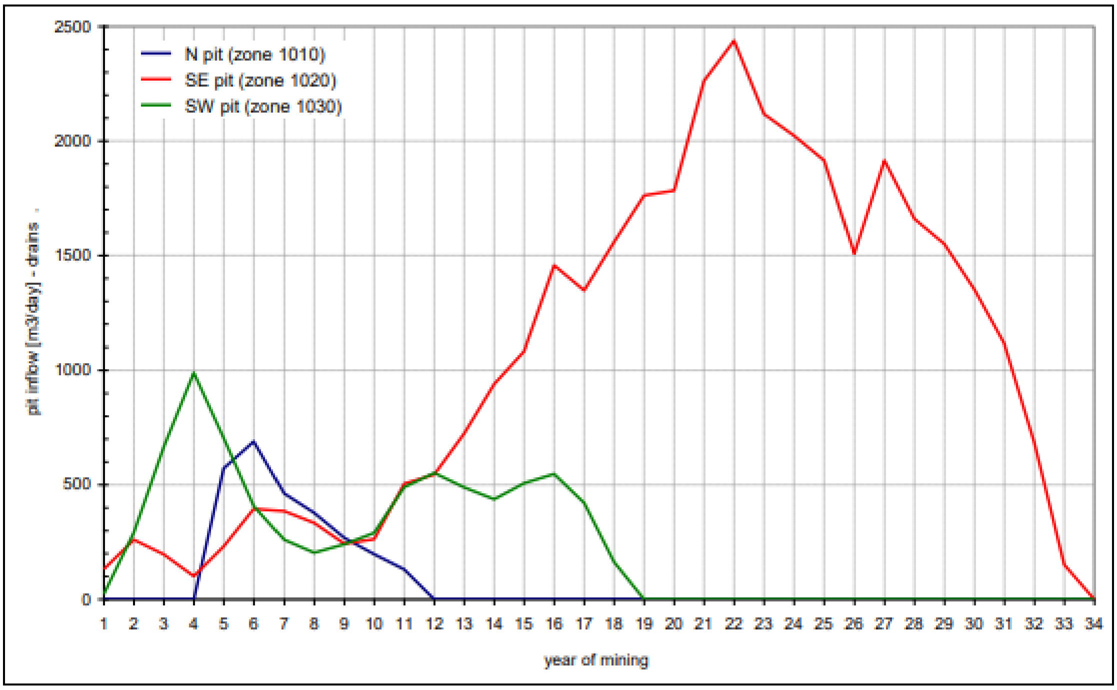

Figure 26: Predicted inflow from coal seams

Revision of the AGE groundwater model found that there is a significant reduction in groundwater flow to the mine pit due to the depressurisation created by the Woleebee gas field. Predicted pit inflow from the updated model reduces the 2012 prediction of 427 ML/year to an average of 206 ML/year over the mine life. The adjusted cumulative groundwater take predicted by this additional modelling is shown in Figure 27.

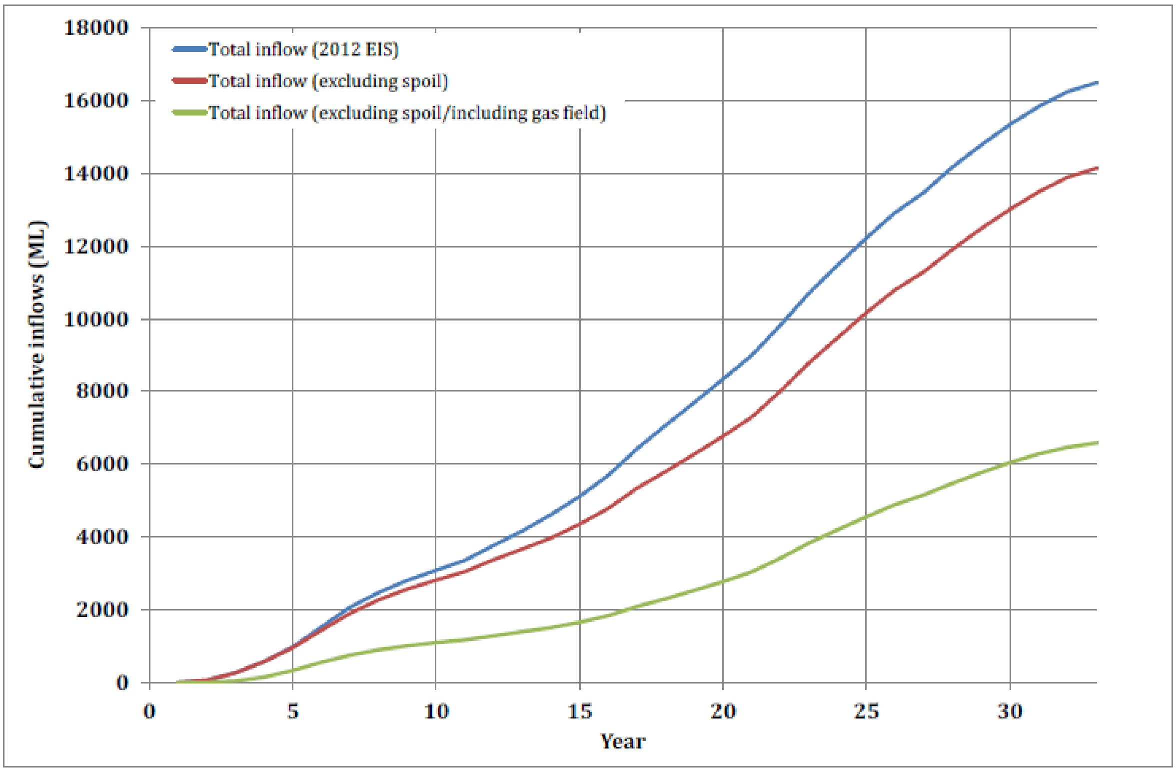

Figure 27: Cumulative groundwater take

3.5.10.3 Residual void hydrology

A water balance model was developed to determine the water levels within the residual voids up to 750 years post-mining (AGE 2012). It is expected that the east and west residual voids will remain as a ground water sink and fill to between 220 mASL and 230 mASL (Figure 28 and Figure 29). Water levels were modelled along three cross-sections of the southern ML and detail the pre- and post-mining landform topography and groundwater levels affected by the Project (refer Figure 30, Figure 31, Figure 32, and Figure 33). The model simulated the recovery of groundwater up to 750 years post-mining and predicted the groundwater and aquifer hydraulic properties. The model also simulated the groundwater recovery levels and the formation of void lakes.

The residual void in the southeast of ML 50254 is 95estimated to have a capacity of 70,000 ML and will have a catchment of approximately 135 ha. This catchment includes the void floor at approximately 190 mAHD and batter slopes. The surrounding land will be graded to drain runoff west into Horse Creek.

The final western void in ML 50254 will have an estimated capacity of 28,000 ML and a catchment area of approximately 102 ha. This catchment will include the void floor at approximately 185 mAHD and batter slopes. The surrounding area will be graded to drain runoff east towards Horse Creek.

The maximum total dissolved solids (TDS) of water stored within the residual voids was set at 35,000 mg/L in the model to correlate with a TDS of sea water (JBT 2017). Long-term TDS in the residual voids was considered to be very high due to the exposure of the pit floor, runoff from the spoil catchment and evaporation. The salinity within the residual voids will continue to increase over time due to groundwater inflows and leaching from the catchment. The residual voids are not intended for a beneficial land use post-mining and have been determined as a NUMA that will remain a groundwater sink in perpetuity. Therefore, the long-term water quality in the residual voids is not considered to impact groundwaters and flood management structures will prevent connection to surface waters. Given these results, long-term void water quality modelling is not expected to provide a different outcome. Monitoring will be conducted as discussed in Section 3.7.

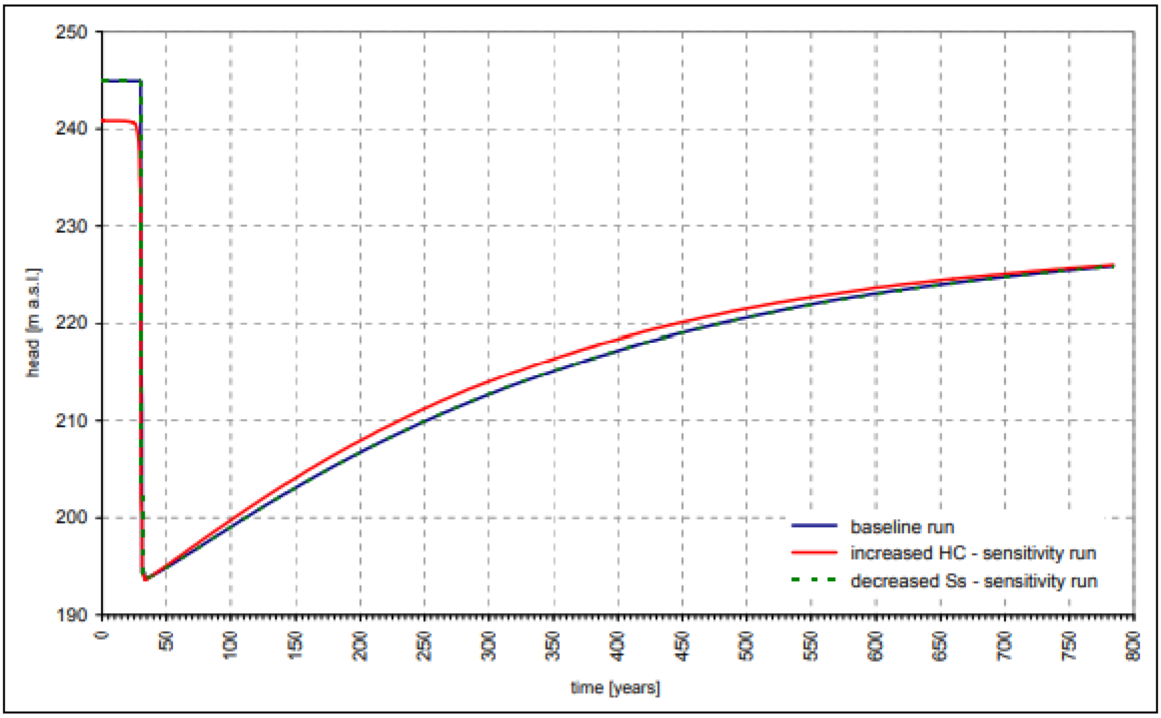

Figure 28: *Predicted water levels in the southeast residual void*

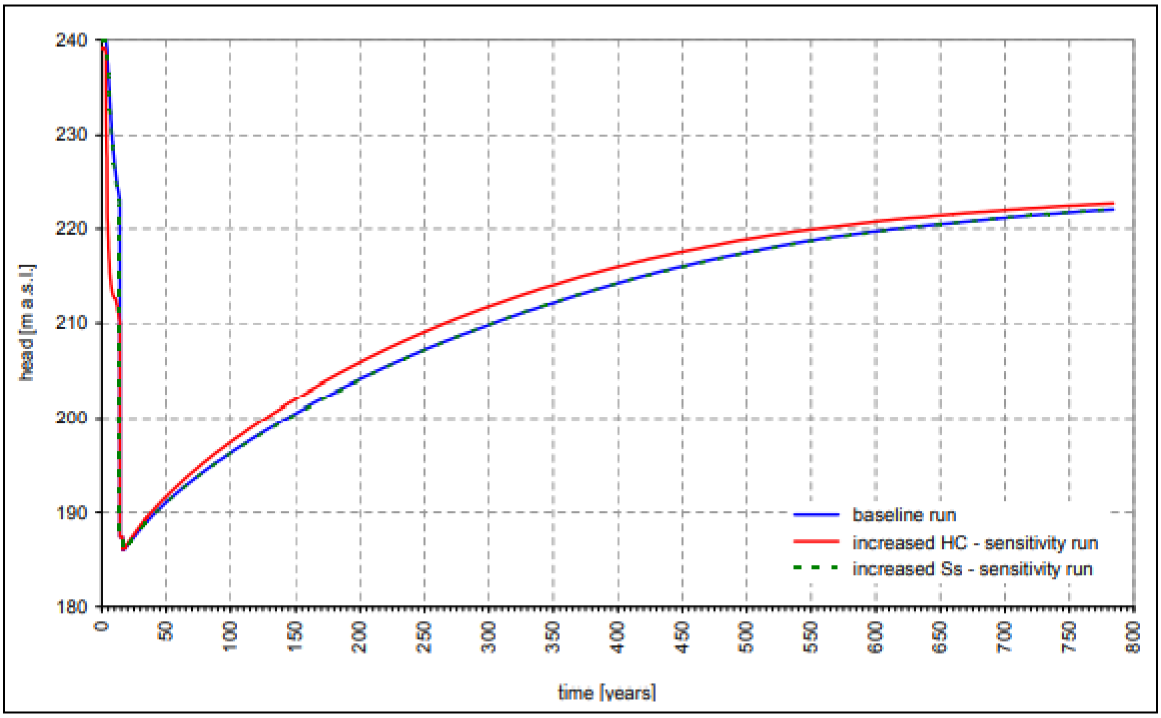

Figure 29: *Predicted water levels in the southwest residual void*

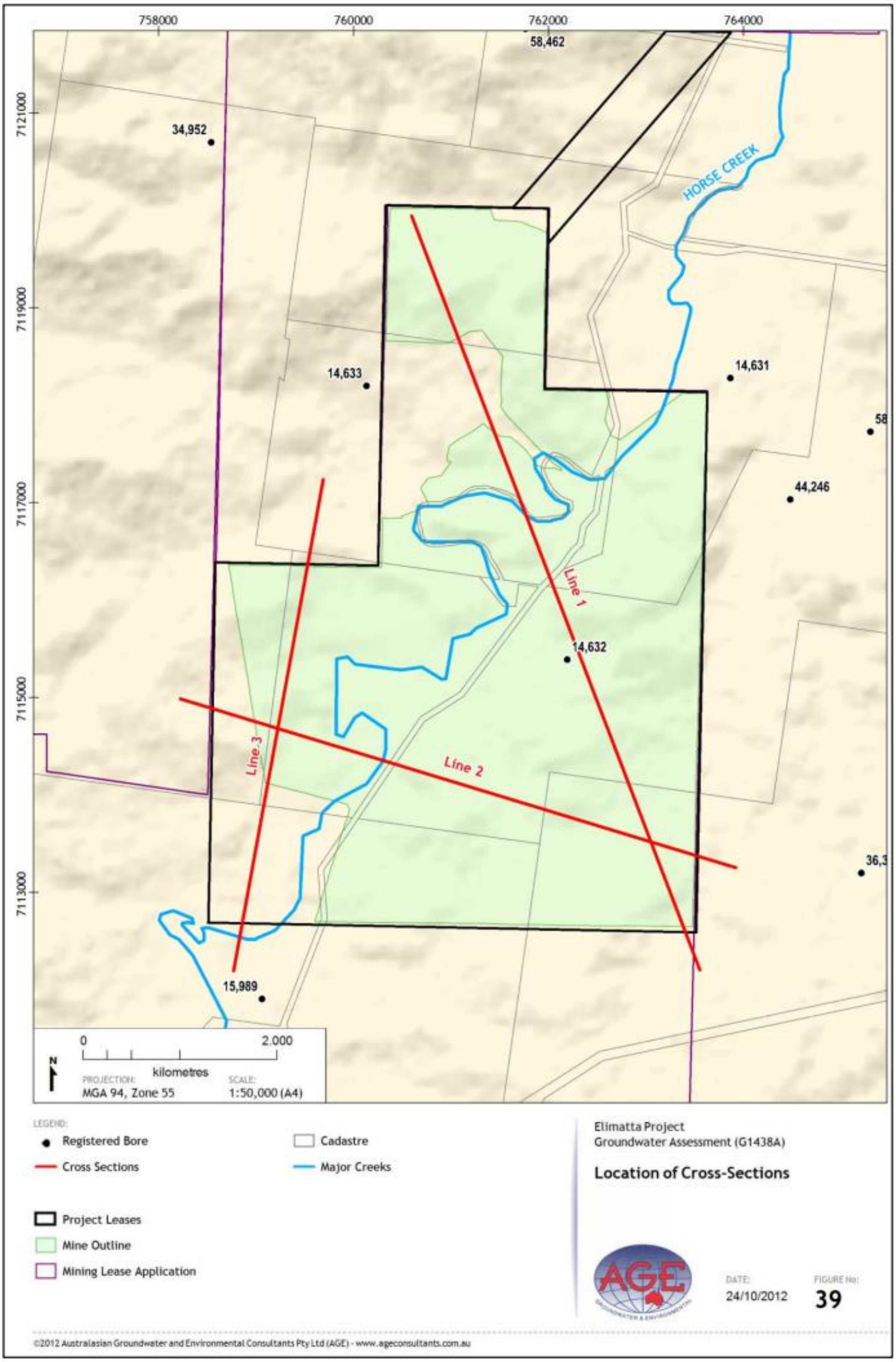

Figure 30: Groundwater level cross-section locations

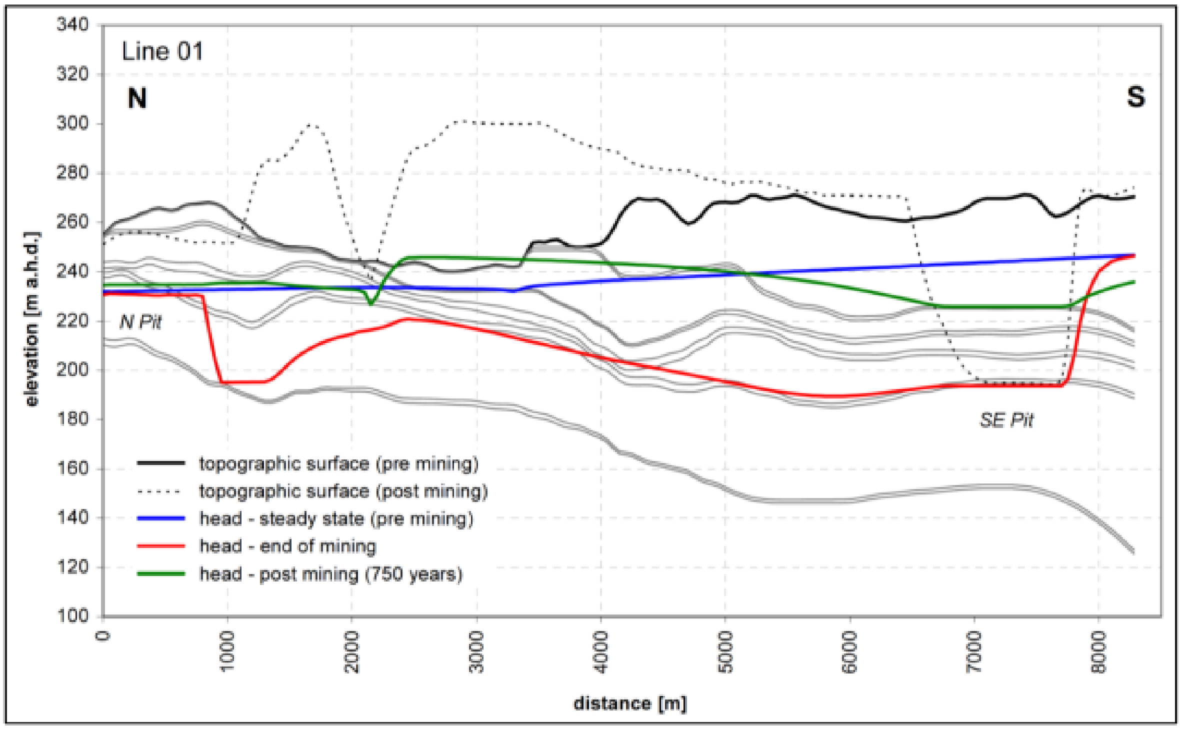

Figure 31: Groundwater cross-section – Line 1

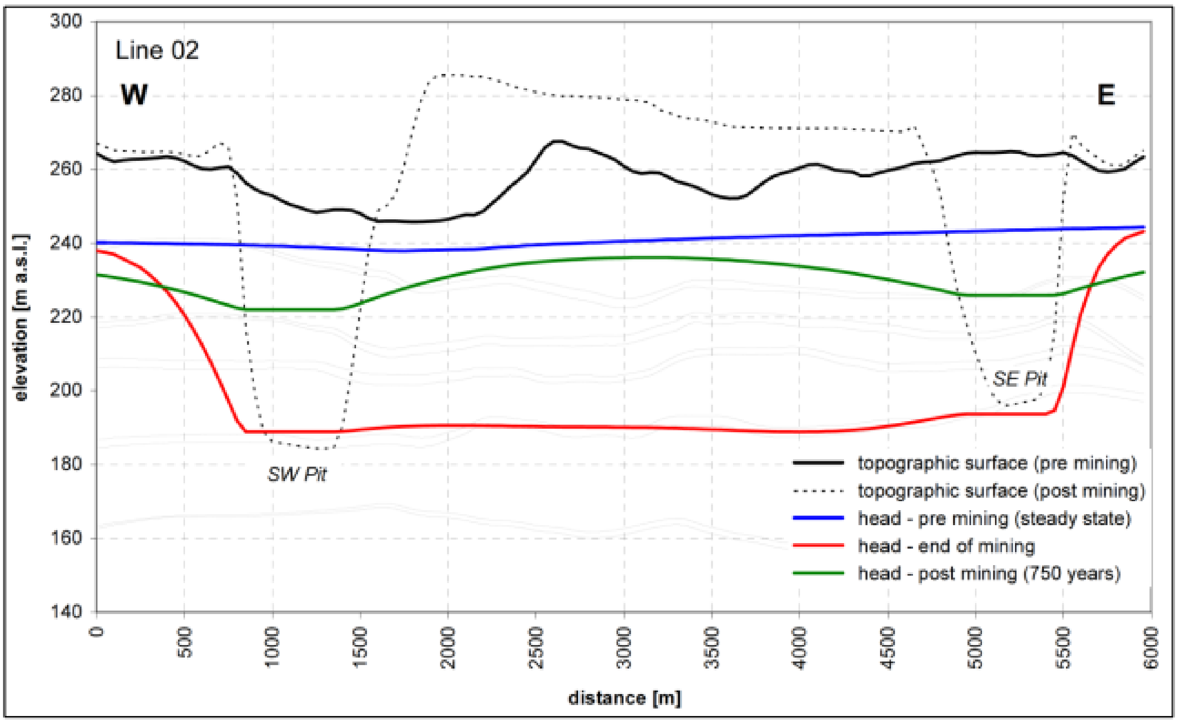

Figure 32: Groundwater cross-section – Line 2

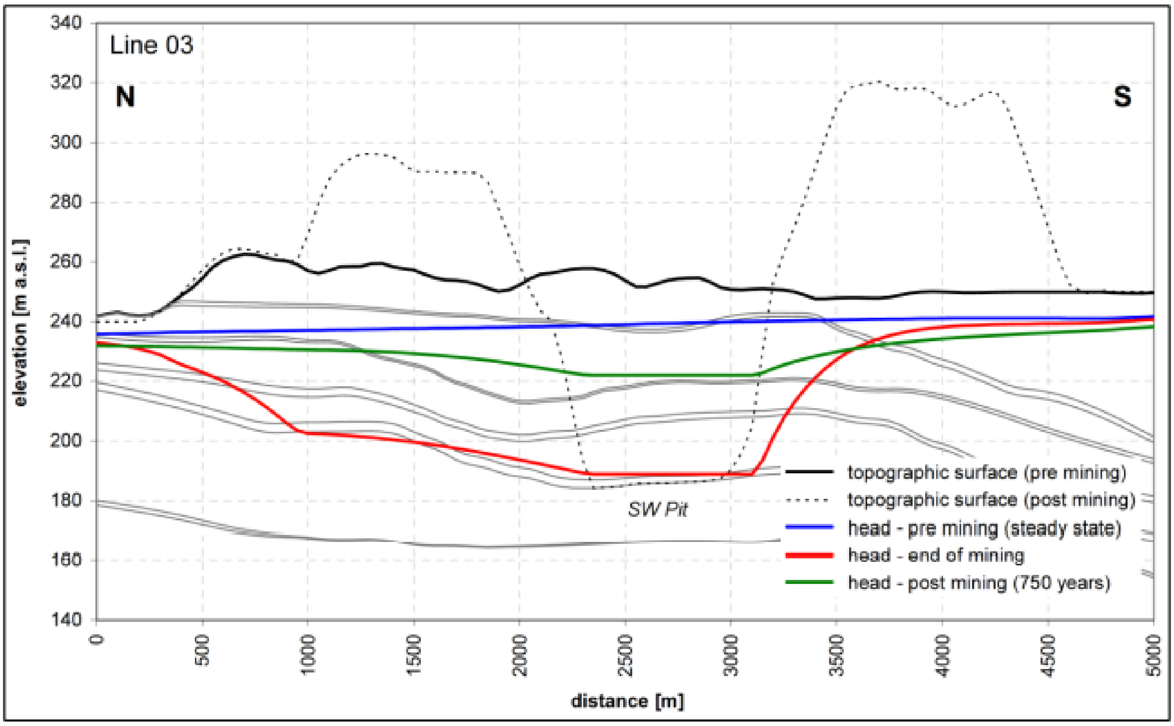

Figure 33: Groundwater cross-section – Line 3

3.5.11 Exploration areas

As a majority of the southern ML (ML 50254) is expected to be disturbed as mining progresses. Any disturbances related to further exploration or grade control works are not expected to require rehabilitation as part of a life of mine (LOM) schedule. Where exploration disturbances are temporarily rehabilitated to mitigate any environmental impact, the following will occur:

- drill holes will be capped; and
- all sample bags and rubbish removed.

3.5.12 Infrastructure areas

Prior to rehabilitation and decommissioning of all Project related infrastructure, any potential future uses for the infrastructure will be assessed in consultation with relevant stakeholders. All infrastructure will be removed unless formal written agreements have been reached with the post-mining landowners/managers for its ongoing use, maintenance, and management. Where agreements have not been reached to retain infrastructure and buildings they will be removed from site in an acceptable and suitable manner.

Plant and equipment footings will be excavated to a depth of at least 1 m below ground level. Disturbed areas will then be recontoured to the approximate pre-mining landform and revegetated (see section 3.5.14).

3.5.12.1 Buildings

In the absence of a continuing use for the Project's buildings post-relinquishment of the mining leases, all buildings and infrastructure (including footings and foundations) will be demolished and either removed from site, or if materials constitute clean construction and demolition waste, it will be buried within the final in-pit spoil dump. All recoverable scrap steel will be sold and recycled, with the remaining non-recyclable wastes disposed of to an authorised landfill. Prior to disposal, all wastes will be assessed and classified in accordance with the Environmental Protection (Waste Management) Regulation 2000. A land contamination assessment will be undertaken where potential contamination exists. Contaminated materials will either be remediated in situ or excavated and disposed of to an appropriately licensed facility.

Areas from which buildings and other infrastructure have been removed will be ripped, recontoured and revegetated.

3.5.12.2 Roads

Roads that are not required post-Project completion will be reshaped, topsoiled, and ripped and seeded. It is likely that access roads may be retained on site as beneficial infrastructure for future use by landholders under a landholder agreement.

3.5.12.3 Workshops, CHPP, chemical and fuel storages

All workshops, chemical and fuel infrastructure will be removed from site at completion of mining and sold, recycled or appropriately disposed of to a facility authorised to accept such waste.

A land contamination assessment will be undertaken on all workshops and chemical/fuel storages. Contaminated materials will either be remediated in situ or excavated and disposed of to an appropriately licensed facility.

Following removal of infrastructure, land will be ripped, recontoured and revegetated.

3.5.12.4 Powerlines

Rehabilitation of powerlines and other associated electrical infrastructure includes dismantling and removal from site. It is likely that power infrastructure may be retained on site as beneficial infrastructure for use by future landholders. This will be determined through consultation with relevant stakeholders and through agreements with local government and relevant power companies.

3.5.12.5 Water supply pipelines

There are three options associated with the decommissioning of the water supply pipelines:

- abandonment – where the pipeline is purged, physically disconnected from the point of supply, and sealed at both ends;
- removal – where the pipeline is purged from removed from its easement in entirety; or
- beneficial re-use – where sale or donation to a third party occurs which sees the pipelines continue to be beneficially used.

International best practice recognises that removal of the pipeline from the easement is rarely a commercially or environmentally viable option for decommissioning. Therefore, it is likely that pipelines will either be abandoned or re-used by a third party.

3.5.13 Surface preparation

Topsoils and ameliorants

Soil assessments have indicated that some of the soils at the Project site may be prone to sodicity and/or present other characteristics that can present limits for their re-use in rehabilitation. These findings can be summarised as follows.

- Horse Creek Alluvium SMU: no chemical limitations.
- Cheshire SMU: below 300 mm salinity (0.290 dS/m), pH (8.82) and sodicity (8.30%) increase to moderate to high levels.

- Rolleston SMU: below 200 mm there is a risk of soil dispersion from sodic subsoils (7.40%), moderate salinity (0.259 dS/m) and strong alkalinity (pH 8.63).
- Downfall SMU: sodicity and salinity risks increasing with depth below 200 mm with an ESP of 18.70% up to 35.60% and salinity of 0.680 dS/m up to 2.060 dS/m.
- Kinnoul SMU: moderate erosion and sodicity occurring below 100 mm with an ESP of 7.36%.
- Juandah SMU: no topsoil stripping recommended. Within the first 20 cm ESP is 6.45% increasing to 16.10%, salinity is variable with maximum levels of 2.420 dS/m, and the soil is strongly alkaline (pH 9.19).

The results show that some of the soils within the Project area may require amelioration either due to the elevated ESP or alkaline characters recorded. Specific management techniques will be employed to areas that require them for successful rehabilitation.

Suitability of both topsoil and spoil then emerges as an important analysis to be done in order to define thresholds parameters of the designed landform and to evaluate amelioration if required. For topsoils used in rehabilitation, typical specifications necessary to achieve success are shown in Table 24.

Table 24: Topsoil Suitability

Parameter	Suitable Range
pH	6 – 8.5
EC_{SAT} (dS/m)	≤ 4
ESP (%)	< 6

The suitability of the subsoil / surface spoil material will be dependent on salinity as well as sodicity as indicated in Table 25 and Table 26. The following adopted thresholds provide guidance for achieving rehabilitation success.

Table 25: Electrical Conductivity effect on spoil suitability

Rating	EC_{SAT} (dS/m)	Suitability
Non-saline	< 2	Suitable
Slightly saline	2-4	Suitable
Moderately saline	4-10	Marginally suitable (no amelioration available)
Highly saline	10-16	Unsuitable
Extremely Saline	> 16	Unsuitable

Table 26: Sodicity effect on spoil suitability

Rating	ESP (%)	Suitability
Non-sodic to sodic	0-14	Suitable
Strongly sodic	14-23	Marginally suitable, with gypsum
Extremely sodic	>23	Unsuitable

For spoils that are marginally suitable, gypsum is generally recommended to be spread over the surface of recontoured spoil prior to topsoil placement.

Contouring

The preparation of disturbed areas prior to the establishment of vegetation will involve surface contouring to minimise erosion and maximise water retention. Recreated landforms will be contoured as per the final landform design with spoil dumps shaped to resemble low hills.

Topsoil spreading

The surface of post-disturbance rehabilitation sites will be topsoiled to a depth of 250 – 300 mm where suitable quantities of topsoil are available, and erosion control structures constructed where they are required.

Ripping

Following contouring, ripping of the surface will be carried out. The design criteria for ripping operations are detailed in Table 27. The spacing between rip lines is determined by the slope of the land, which acts to reduce soil erosion and increase plant establishment rates. Where soils are highly compacted, a more suitable ripping depth of 300 mm or greater will be employed.

Table 27: Design of ripping operations for post-disturbance surface preparation

Slope	Minimum ripping depth	Tyne spacing
>10%	200 mm	<1.5 m
5–10%	200 mm	<2.5 m
<5%	200 mm	<5 m

3.5.14 Revegetation

The key objective of the Project revegetation plan is to ensure that a self-sustaining vegetation community is established. The plant species should aim to complement the agreed PMLU and/or reproduce the pre-existing community composition.

To maximise revegetation success, revegetation activities will be scheduled during spring before the heavy wet season rainfall begins. Seeding may also occur during the summer months, depending on rainfall. Seeds will be sown using direct seeding or tube stock depending on the species, slope gradients and areas to be revegetated.

Seed stocks will be checked for viability upon purchase and seeded as soon as possible. Seeds may be spread by hand, tractor or aerially. Hand seeding is suitable for small areas up to 5 ha, tractor with a rear spreader attached is more suitable for larger areas. Aerial seeding may be used on long or steep slopes (i.e. highwall).

Areas will be seeded at rates indicated in Table 28, Table 29 and Table 30 for the applicable PMLU. A provisional seed selection has been developed from a complete list of identified flora species within the Project area identified during the Terrestrial Flora and Fauna Assessment (AARC 2014A) including the dominant species found within each RE described (see Appendix G). The pasture species included within the species list are considered desirable for beef cattle grazing (Future Beef 2013).

The seed mixes listed are indicative only and are subject to change with season, availability, and following assessment of rehabilitation performance. All species listed are suited to the central Queensland climate and site-specific environmental conditions. In addition to the pasture species selected for grazing PMLUs, a native canopy cover has been selected to provide shade for livestock.

Recommended seed sowing rates have been selected based on recommendations from the Department of Agriculture and Fisheries (2017), relevant guidelines (DAFF 2013; Australian Government 2016), and Future Beef (2022). Where information regarding sowing rates was unavailable, the following equation was used:

$$Sowing\ rate\ (ka/ha) = \frac{target\ plant\ population\ (p/m^2) \times thousand\ grain\ weight\ (g)\ \times 100}{\%\ germination\ \times \%\ emergence}$$

Seeding of target grass species will utilise a total sowing rate of 10–15 kg/ha. Monitoring of rehabilitated areas will commence at the wet season following rehabilitation works and will be carried out in conjunction with the Rehabilitation Monitoring and Maintenance Program (section 3.7.1).

Table 28: Current indicative species and sowing rates for low intensity grazing PMLU

Scientific name	Common name	Indicative rate (kg/ha)
Dicantheum sericeum	Queensland Bluegrass	1-4
Cenchrus ciliarus	Buffel Grass	1-2
Megathyrsus maximus var. trichoglume	Green Panic	3-5
Themeda triandra	Kangaroo Grass	2-4
Chloris gayana	Common Rhodes Grass	2-4
Bothriochloa bladhii	Forest Bluegrass	1-2
Rhynchosia minima	Rhynchosia	2-3
Enteropogon ramosus	Twirly Windmill Grass	2-3
Stipa verticillata	Slender Bamboo Grass	2-3

Table 29: Current indicative species and sowing rates; shade trees in a low intensity grazing PMLU

Scientific name	Common name	Indicative sowing rate (kg/ha)
Canopy		
Acacia harpophylla	Brigalow	0.2
Casuarina cristata	Belah	0.1
Atalaya hemiglauca	Whitewood	0.4
Lysiphyllum cunninghamii	Bauhinia	0.2
Brachychiton populneus	Kurrajong	0.9
Eucalyptus populnea	Poplar Box	0.1
Eucalyptus melanophloia	Silver-leaved Ironbark	0.2
Eucalyptus tereticornis	Blue Gum	0.2
Understorey		
Geijera parviflora	Wilga	0.1
Citrus glauca	Limebush	0.1

Scientific name	Common name	Indicative sowing rate (kg/ha)
Eremophila mitchellii	False Sandalwood	0.2
Melaleuca bracteata	River Teatree	0.1
Callitris glaucophylla	Cypress Pine	0.3

Table 30: Current indicative species and sowing rates for native riparian habitat PMLU

Scientific name	Common name	Preliminary sowing rate (kg / ha)
Canopy		
Eucalyptus tereticornis	Blue Gum	0.2
Casuarina cunninghamiana	River Oak	0.1
Melaleuca trichostachya	Teatree	0.1
Angophora floribunda	Rough-barked Apple	0.3
Corymbia clarksoniana	Long-fruited Bloodwood	0.2
Eucalyptus populnea	Poplar Box	0.2
Eucalyptus melanophloia	Silver-leaved Ironbark	0.2
Understorey		
Eremophila mitchellii	False Sandalwood	0.2
Melaleuca bracteata	River Teatree	0.1
Callitris glaucophylla	Cypress Pine	0.3
Brachychiton populneus	Kurrajong	0.9
Groundcover		
Eragrostis lacunaria	Purple Lovegrass	1-2
Bothriochloa decipiens	Pitted Bluegrass	2-4
Aristida calycina	Dark Wiregrass	1-2

3.5.15 Water management

3.5.15.1 Water release and supply infrastructure

Water management infrastructure within the ML areas has been designed to ensure that separation is maintained between the undisturbed catchments and any potentially contaminated catchments. Water will be managed by utilising the natural topography of the landscape in combination with clean water diversion drains to separate catchments based on their likely water quality. A schematic of the water management system is shown at Figure 34.

The water management system for the Project will include infrastructure for the controlled release of excess water off-site, if required, in accordance with condition F, Table F4 of the Project EA. The outlet pipe will extend over, and beyond the bank of, Horse Creek to minimise the risk of erosion. The locations of the pipeline and release point will be designed to minimise potential impacts to environmental values.

In the event that any water storages were deemed to be complementary to the relevant PMLU, and the landholder requested its retention, then the storage may be retained under a suitable landholder agreement.

3.5.15.2 Potential impacts on surface waters

The Project has the potential to impact surface waters through various means including:

- contamination of surface water from runoff or seepage from overburden, waste, tailings or stockpiles, and runoff from MIA areas;
- runoff from disturbed ML areas that may potentially be contaminated with high levels of sediment, sulphate, and metals, where acid geochemistry exists; and
- sediment laden runoff from the reprofiled landform (including waste rock emplacements) has the potential to cause excess turbidity in watercourses.

The contaminants that pose a risk to the environmental values of the receiving environment, as identified above, are typical for an open cut coal mine and were identified through the EIS and associated technical assessments. These were determined from initial soil and overburden/interburden assessments performed for the Projects EIS. As noted at Section 3.5.6.3, geochemical characterisation of materials suggests that acid generation is unlikely, therefore metals are not considered to pose a risk to the receiving environment.

Landform design, cover design and revegetation will assist in minimising any impact from the Project to surface waters. Further monitoring will be undertaken throughout the LOM and post-closure to determine any impacts to surface waters as a result of the Project.

Refer to Section 3.7 for more information on surface water monitoring.

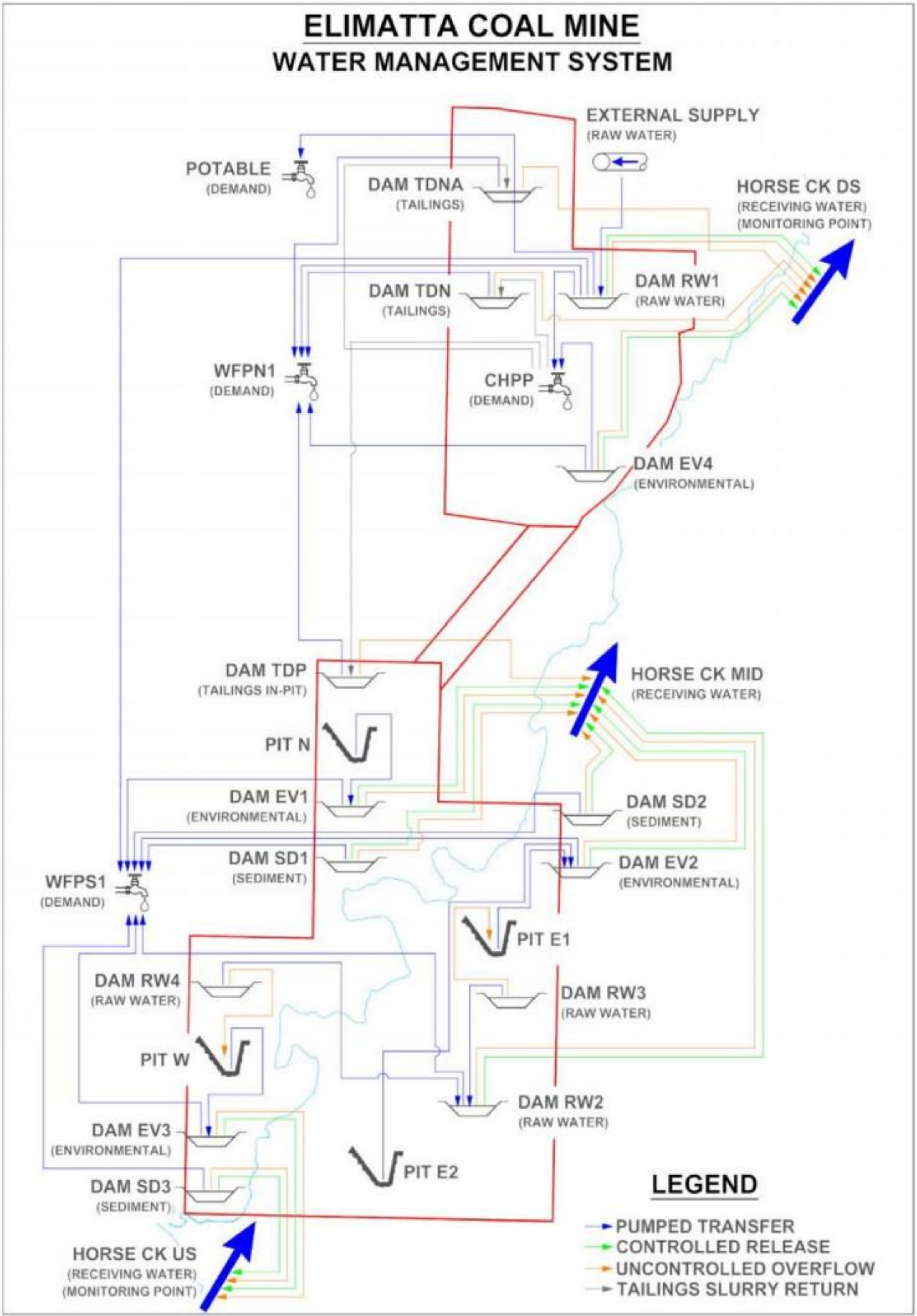

Figure 34: Schematic of site water management system

3.5.15.3 Water dams

Table 31 describes the water storages proposed on site. Figure 35 and Figure 36 show the location of water storages in ML 50270.

Table 31: Project dams

Water storage	Maximum volume (ML)	Description	Regulated structure?	Retained on closure?
Environmental Dam (EV) 1	50	Northern end of ML 50254 – receives pit water dewatered from northern pit	Yes[1]	No
EV2	600	North-eastern end of ML 50254 – receives pit water dewatered from mine pits E1 and E2	Yes[1]	No
EV3	200	South-western end of ML 50254 – received pit water dewatered from pit W	Yes[1]	No
EV4	380	5 smaller linked dams within southern end of ML 50270 – receives runoff from the MIA	Yes[1]	No
Sediment dam (SD) 1	100	North-eastern end of ML 50254 – prevent discharge to Horse Creek of sediment laden runoff from disturbed areas	No	No
SD2	400	North-western end of ML 50254 – prevent discharge to Horse Creek of sediment laden runoff from disturbed areas	No	No
SD3	200	South-western end of ML 50254 – prevent discharge to Horse Creek of sediment laden runoff from disturbed areas	No	No
Tailings Dam TDN	13,060	Mid-portion of ML 50270 – receives fine tailings rejects output from the CHPP	Yes[1]	No
Tailings Dam TDNA	11,770	Northern portion of ML 50270 – receives fine tailings rejects output from the CHPP	Yes[1]	No
Tailings Dam Pit (TDP)	51,700	Northern portion of ML 50254 – receives fine tailings rejects output from the CHPP	Yes[1]	No
Raw Water Dam (RW) 1	200	Northern end of 50270 – capture runoff from the local catchment	No	No
RW2	50	South-eastern end of ML 50254 – capture runoff from the local catchment	No	No
RW3	50	North-eastern portion of ML 50254 – capture runoff from the local catchment	No	No
RW4	50	South-western portion of ML 50254 – capture runoff from the local catchment	No	No

[1] Due to the predicted high salinity (median TDS >2,500 mg/L) of the water stored in the dam, this dam will be classified with a significant consequence category in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (DERM 2016)

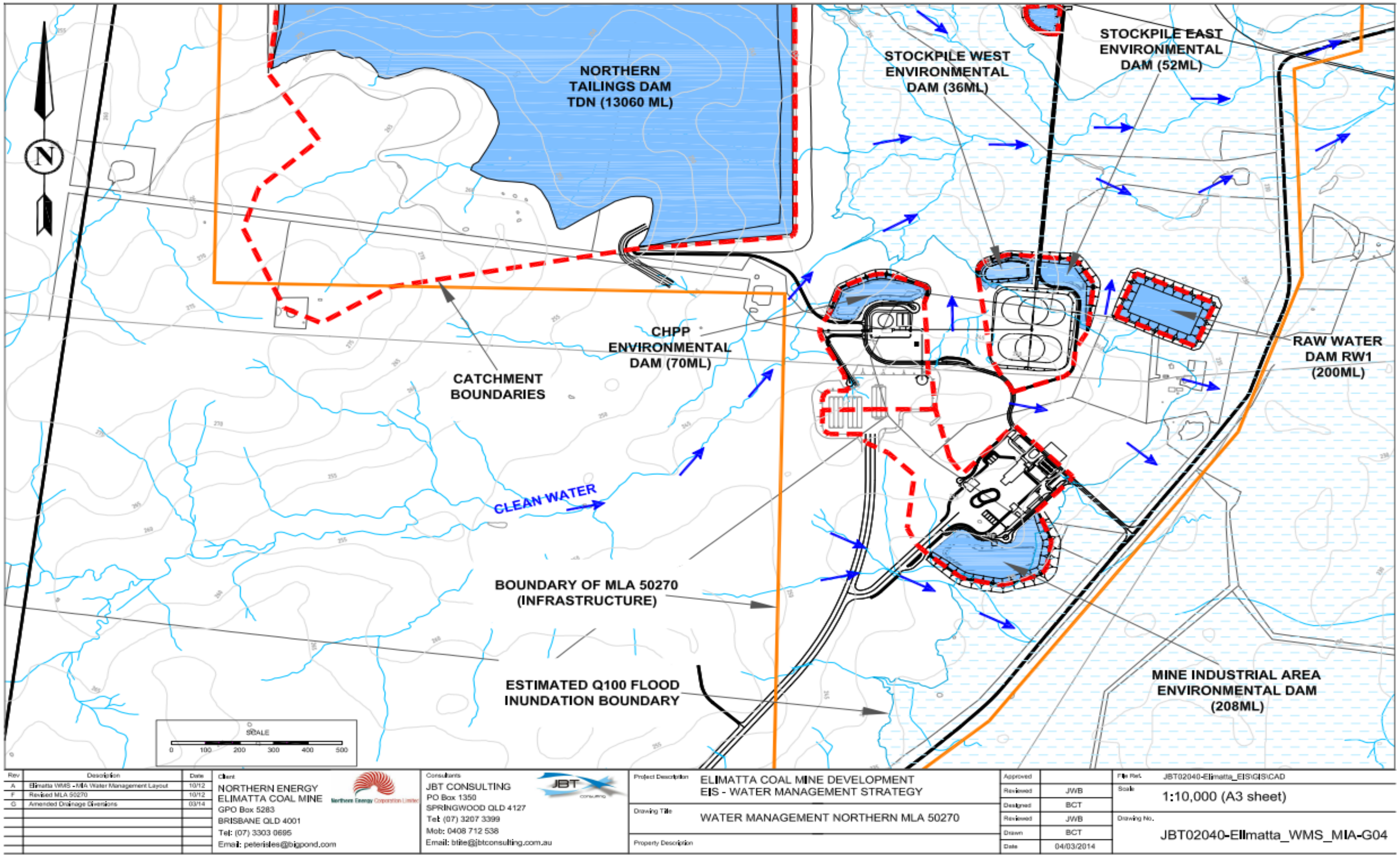

Figure 35: Mine infrastructure area water management (ML 50270)

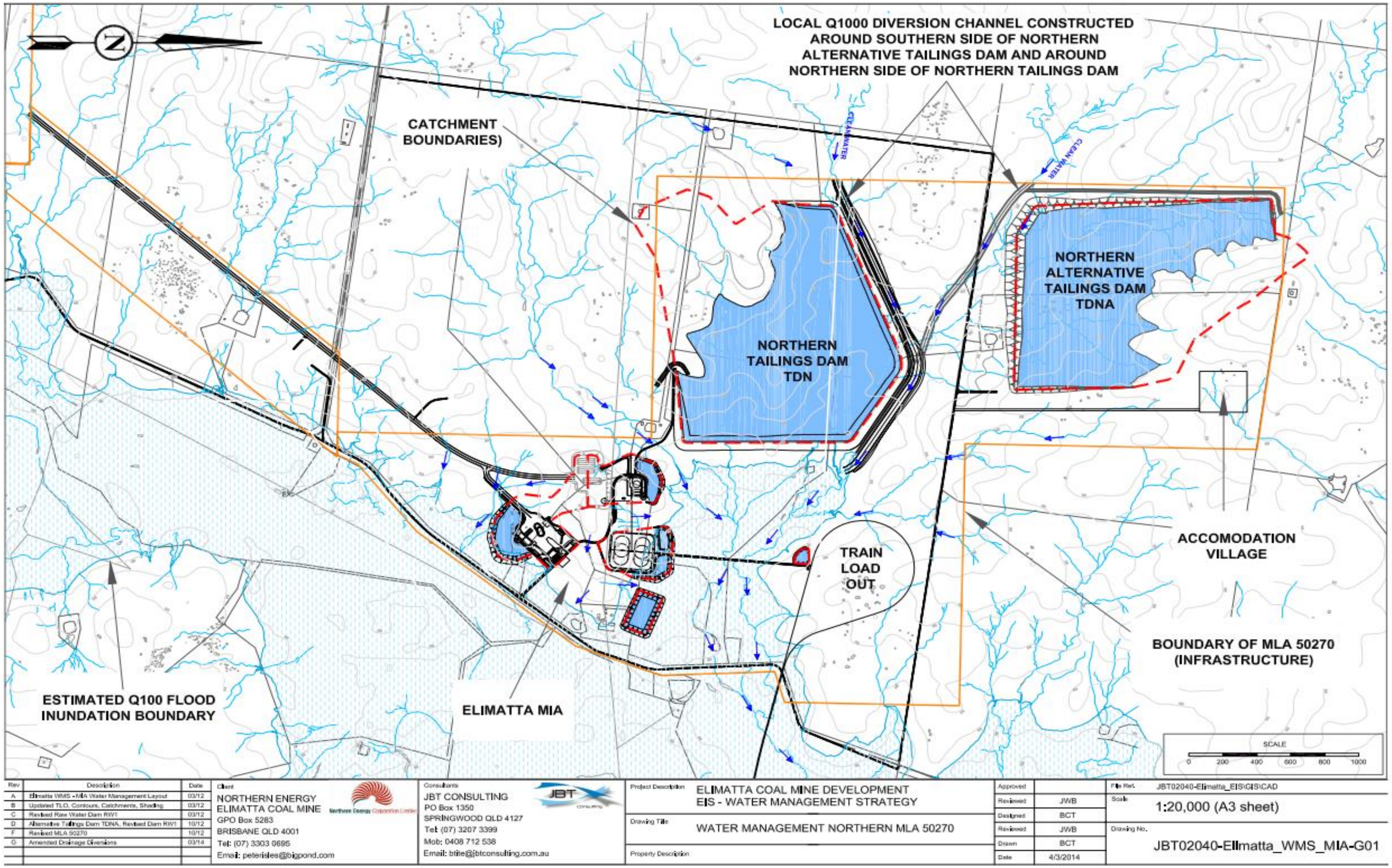

Figure 36: ML 50270 water management infrastructure

3.5.15.4 Dewatering

All the Project water storages are to be decommissioned and rehabilitated in accordance with their final PMLU. Stormwater dams will be allowed to dry through evaporation, pumped to other water storages or used for dust suppression prior to being recontoured and drainage paths restored, where practicable, or new drainage paths established. Water management dams that contained potentially contaminated water as a consequence of catchment activities will have sediments assessed for contaminants prior to rehabilitation activities occurring.

Rehabilitation and treatment of water infrastructure will vary depending on the extent of disturbance or contamination present from mining activities. Where installed, dam liners will be removed and appropriately disposed of, and any contaminated soils will be treated and/or removed where necessary. Contaminated material will be either removed from site or covered with benign overburden material. A land contamination assessment will be undertaken for any hazardous dam sites. Dams will be backfilled, reprofiled, the surface soils will then be topsoiled, ripped, and revegetated and seeded with a pasture seed mix suitable for grazing.

3.5.15.5 Diversions

The planned diversion of Horse Creek within ML 50254 was designed in accordance with the *Draft Manual – Works that interfere with water in a watercourse: Watercourse diversions* (DNRM 2013). A comprehensive diversion proposal is documented in the Horse Creek Diversion Functional Design Report (Parsons Brinckerhoff 2014) (Appendix G).

Stage One involves an initial permanent diversion of the middle segment of Horse Creek with a temporary upstream and downstream link to the existing stream. The initial diversion in natural ground occurs in Year 0, prior to commencement of mining operations, and will be put into use in Year 1. This diversion is outside the pit and dump footprint but within the ML.

Stage Two involves a temporary diversion across a large meander loop upstream of Stage One to facilitate mining under the final upstream diversion footprint. The Stage Two diversion alignment follows a gently meandering planform through the existing alluvial floodplain, cutting off a significant meander bend in the existing Horse Creek thalweg. The diversion will entail the construction of a low flow channel only, with levees to the west to protect the active pits from flood inundation. Stage Two will be constructed in operational Year 2 of the Project.

The Stage Three diversion will be constructed to be operational in Year 4. The diversion will be excavated partially through natural ground, and partially through mine spoil. Stage Three forms part of the final diversion landform, and consists of an engineered floodplain through mine spoil, approximately 200 m wide, containing a meandering low flow channel, as well as a low flow channel constructed through the natural floodplain prior to re-connecting to Horse Creek at the downstream extent of the diversion.

Stage Four consists of a final permanent diversion on fill in the south, termed the permanent upstream diversion. It will be constructed in Year 5 of mining operations. It will be put into use in Year 10, thus having this period to stabilise before being opened to full flows. The complete diversion will have in excess of 15 years until the mine closes to refine the diversion structure to ensure it will be stable post-mining. Stage Four will be constructed to be operational in Year 5 of mining operations and will be constructed entirely through mine spoil. This section completes the final landform of the permanent diversion, which by this time incorporates Stage Four, part of Stages One and Three (Figure 37). The Stage Four diversion will comprise an engineered floodplain, approximately 200 m wide, containing a meandering low flow channel, and will incorporate a 100 m wide fill bund between the engineered floodplain and residual void location.

Due to the fact that diversions will be both temporary and permanent, revegetation outcomes and strategies have been tailored to meet varying operational requirements for each stage of the planned diversions and are described in the following sub-sections.

Temporary diversions

The temporary diversions will be excavated as mining commences and are expected to be in place for up to 3 years. Therefore, the revegetation of these areas will focus on maintaining structural integrity of the diversions and minimising downstream impacts, which includes maintaining a stable landform, providing adequate groundcover to minimise erosion and sedimentation, minimising the spread of weeds and minimising impacts on water quality. The temporary diversions have been included within the relevant RA (section 3.5.2) and include the in-pit and ex-pit waste rock emplacements.

Revegetation of temporary diversions will involve the following actions.

- Mechanically ripping the subgrade of temporary diversion banks in preparation for topsoil application.
- Applying locally stripped topsoil at a minimum depth of 100 mm to minimise impacts of subsoil dispersion and to provide an effective growth medium for revegetation.
- Installing erosion control devices such as jute mesh and compost blankets on the more erosion prone areas of the diversions to minimise scouring. Jute mesh will be used on banks to stabilise the batters after the reapplication of topsoil. It will be installed and pinned as per the manufacturer's installation specifications. Compost blankets will be applied over the jute mesh to provide instant soil surface protection, initiate soil micro-biological processes and help retain soil moisture, allowing for rapid vegetation establishment which is essential for stability.
- Planting of fast growing, hardy, deep rooted shrubs (e.g. Vetiver grass) to provide bank stabilisation.
- Direct seeding of grasses, applied with a bonded fibre matrix hydromulch if required to form an effective groundcover.
- Managing weed infestations through control programs in response to annual monitoring.
- Minimising the spread of weeds from vehicles, machinery and imported fill.
- Establishing physical barriers around diversions to prevent livestock and vehicles from damaging revegetation areas.

Permanent diversions

Following the establishment of the final landform of Horse Creek, the diverted creek will be initially revegetated native grass species (such as Purple Lovegrass. Pitted Bluegrass, and Dark Wiregrass) to provide erosion protection and subsequently vegetated with local native sedges, shrubs and trees. The revegetation of permanent diversions will incorporate geomorphic and riparian vegetation features that are consistent with the pre-mining environment. A key objective for the revegetation of permanent diversions will be to ensure that self-sustaining vegetation communities are achieved. Additionally, revegetation along permanent diversions will aim to restore habitat connectivity with the remaining portions of Horse Creek.

In line with the objectives for permanent diversions, revegetation will involve:

- planting a diverse mix of native trees, shrubs and grasses;
- reinstating woody debris in the diverted landscape;
- weed management;
- ensuring revegetated areas are protected from the impacts of livestock grazing; and
- monitoring diversion stability and revegetation success for a period of at least 20 years to confirm revegetation objectives have been achieved prior to decommissioning of the mine.

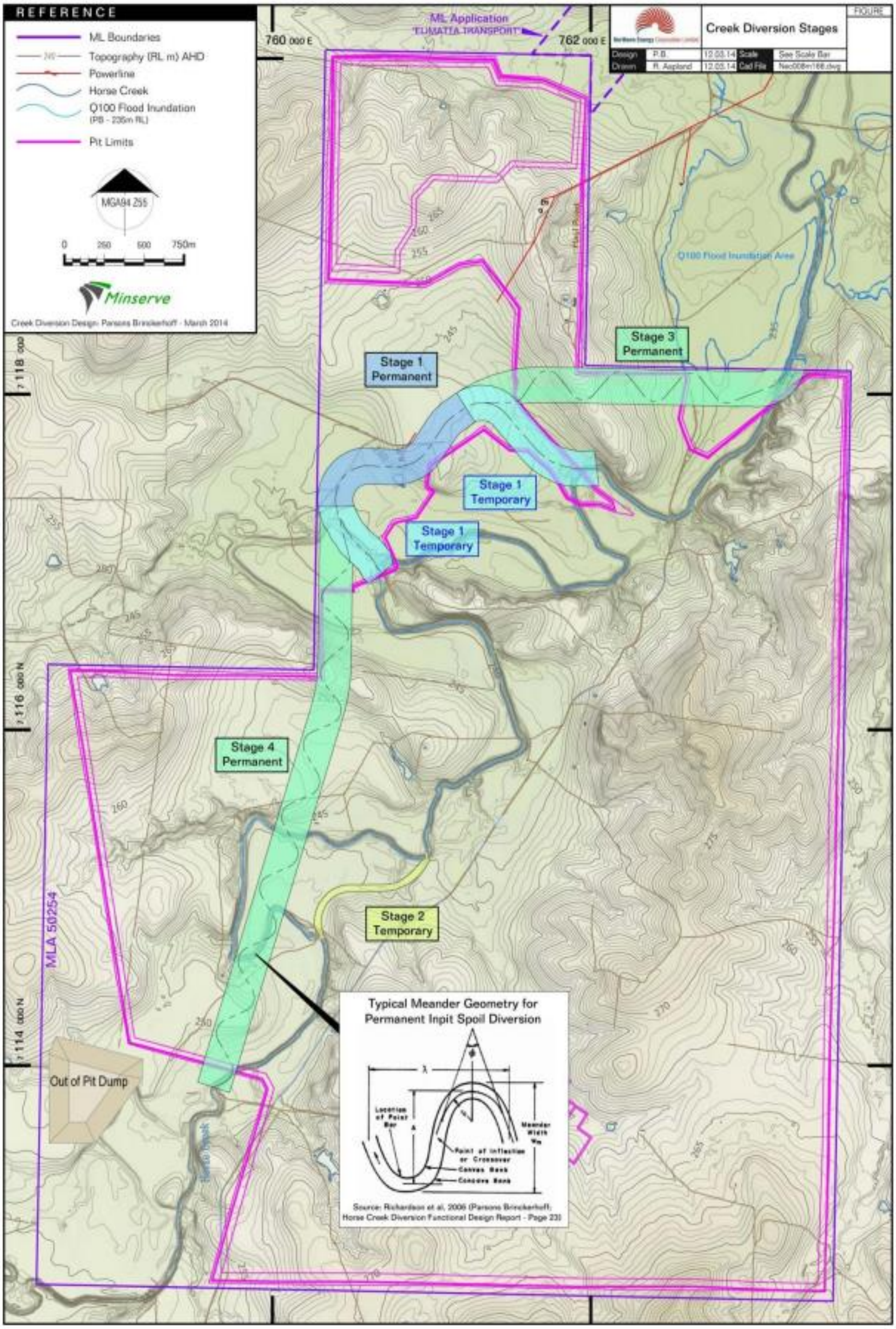

Figure 37: *Horse Creek diversion*

3.5.15.6 Flood levee

Several levees are expected to be in place throughout the LOM and will be constructed as part of the diversion stages. At each stage of the Horse Creek diversion, levees are proposed to protect the mining areas within the southern ML (ML 50254) from inundation, including:

- three levees as part of the Stage 1 diversion to keep flood waters from inundating mine infrastructure on ML 50254 (Figure 38);
- an additional levee as part of the Stage 2 diversion, located on the western side of Horse Creek (Figure 39); and
- as part of the final diversion, a levee along the eastern side, southern side, and part of the western side of the south-western mining void to prevent inundation of flood water into the residual void (Figure 40).

Several of the flood protection levees proposed for the Project will be incorporated into the final landform and will provide flood protection to the post-mining landform, including the residual void. Upon the completion of mining activities, the in-pit and out-of-pit waste rock emplacements will have been constructed up to and integrated with the flood protection levee, and therefore, these areas will become available for rehabilitation at the same time. The southern half of the retained flood levee, on the eastern side of the western void has not been included within the spoil dump RA. The permanent landform structure will provide probable maximum flood protection to the residual void and will be designed with a slope of less than 10° (17%).

Upon completion of the retained flood levee, it will undergo rapid revegetation (see section 3.5.14) to reduce any incidence of erosion and to increase rehabilitation success and landform stability. Similar to the permanent creek diversion, the levee will be monitored throughout the mine life with maintenance and repair works conducted as required. The permanent levee will be retained post-mine closure to prevent flooding and inundation of the southwest residual void.

At closure, the levees will not be required to protect the final landform from flood water ingress, and therefore, will cease to be regulated structures. If the cross-sectional profile of the levee becomes an impediment to the operation of the NUMA or PMLU, works will be undertaken to reprofile the levee in whole or in part.

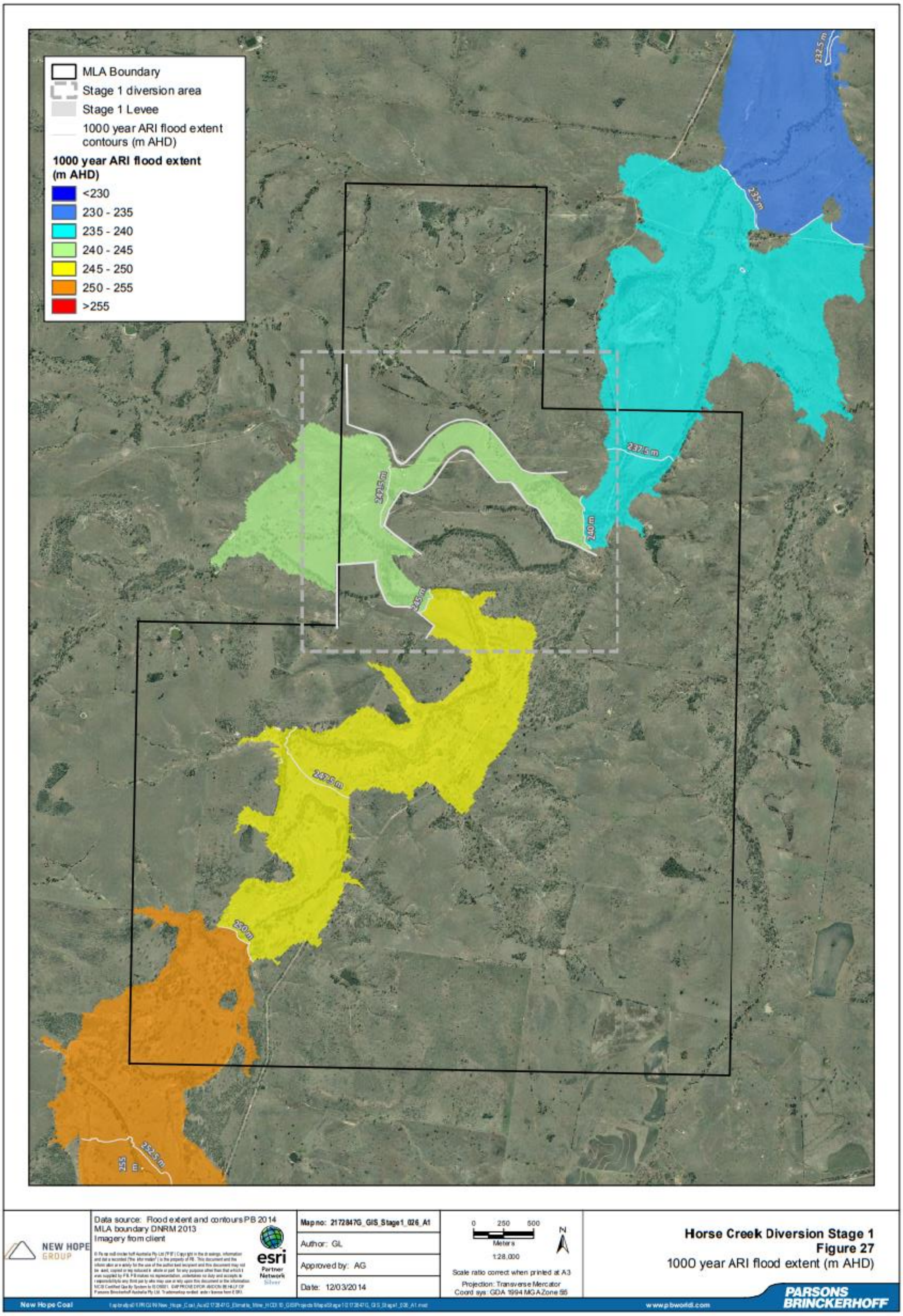

Figure 38: Horse Creek diversion (Stage 1) 1 in 1000-year ARI flood extent (mAHD)

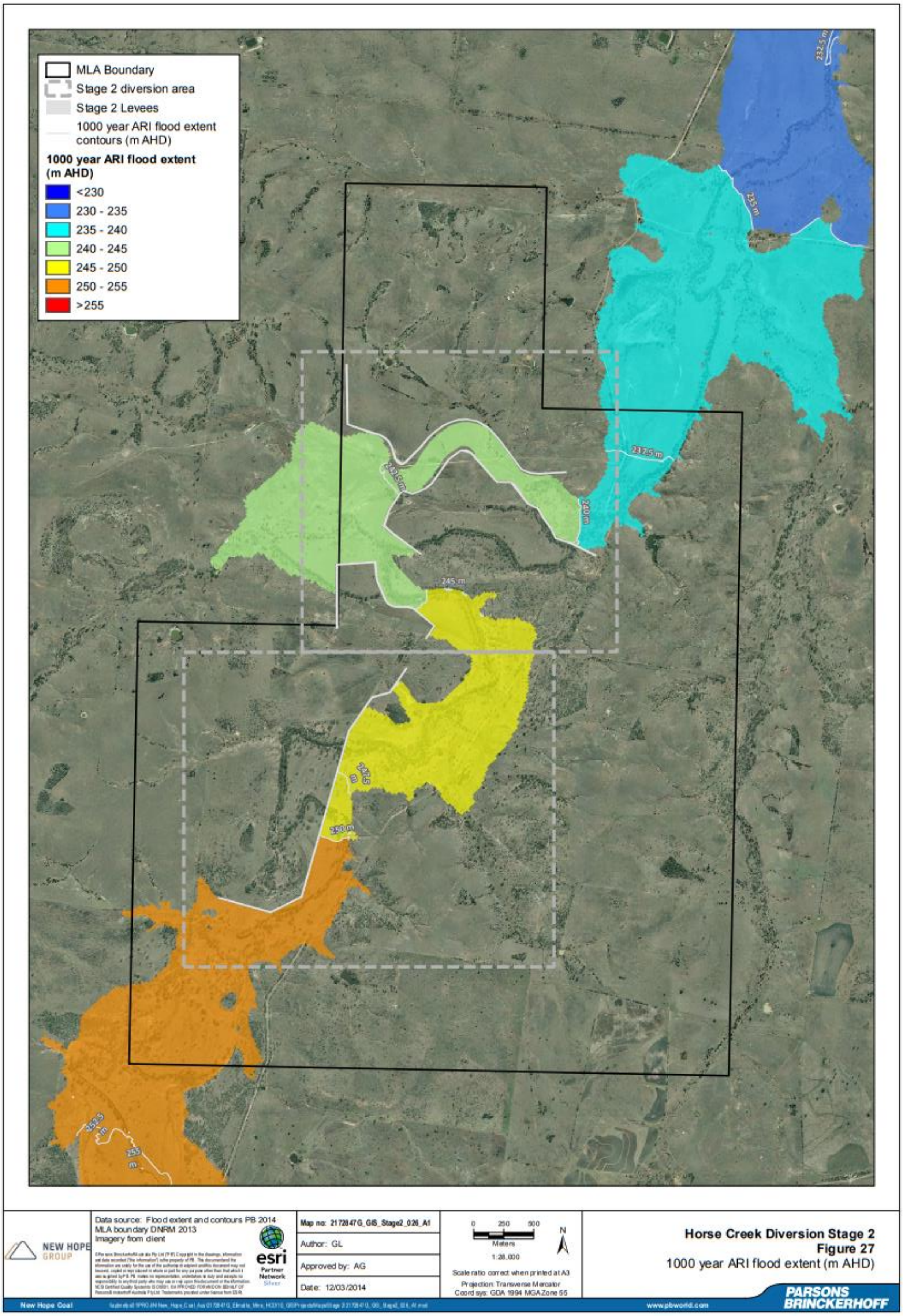

Figure 39: Horse Creek diversion (Stage 2) 1 in 1000-year ARI flood extent (mAHD)

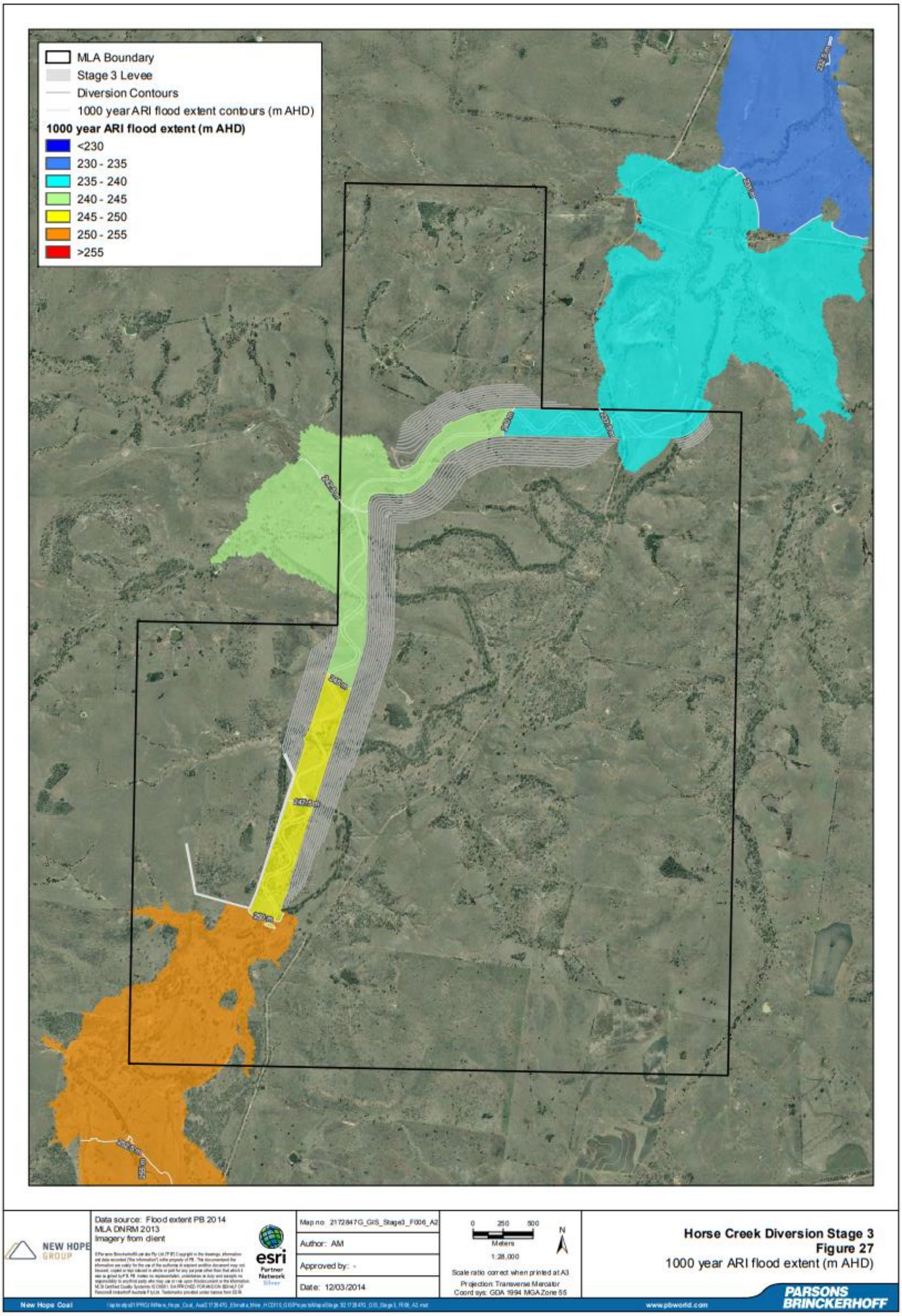

Figure 40: Horse Creek diversion (Stage 3) 1 in 1000-year ARI flood extent (mAHD)

3.6 Risk assessment

3.6.1 Risk assessment requirements

Section 126C(1)(f) of the EP Act requires the PRCP to identify the risks, for each PMLU, of a stable condition not being achieved and how the applicant intends to manage or minimise the risk.

A risk assessment has been carried out for the Project in accordance with the following standards:

- AS/NZS ISO 31000:2018 Risk management – Guidelines; and
- HB203:2012 Managing environment-related risk.

3.6.2 Risk assessment process

Any risk assessment needs to be undertaken with consideration of the scope, context and criteria relevant to the assessment. For this risk assessment, and as per the PRCP Guideline, the following scope and purpose was agreed to:

> *The purpose of this risk analysis is to identify the risks of a stable condition for land not being achieved for the agreed PMLUs nominated, and the approach to be taken by the Project to manage and minimise the risks identified.*

For this risk assessment, risk scenarios (or 'threats') were identified and considered for each rehabilitation area and NUMA associated with the Project. The causes attributable to each risk scenario were documented as well as the potential impacts. Existing controls were noted, defined as those reasonably expected to be in place for a Project of this nature and having appropriate and contemporary management systems. Each risk scenario was then assessed with respect to health, safety, the environment, and compliance against the risk assessment schema outlined in section 3.6.3.

3.6.3 Risk assessment schema

Risks specific to the rehabilitation of the Project were classified using the risk classification schema which is described below. The risk assessment schema used is comparable to those used widely within the mining industry and comprises the following components:

- a control effectiveness ranking (Table 32) used for assessing the operational controls expected to be in place for a project of this type;
- a likelihood classification descriptors table (Table 33); and
- a consequence classification descriptors table (Table 34) intended to guide a consistent assessment of consequence.

Following a consensus determination of likelihood and consequence, the risk level was determined using the matrix shown in Table 35. For any risks classified as 'significant' or above, mitigation and management measures were identified and documented. Mitigation and management measures were also documented for some lower-level risks.

Table 32: Control effectiveness ranking

Control Rank	Description	Guidance
C1	Substantially effective/adequate design	Controls are considered adequately designed and are operating effectively on almost all occasions
C2	Mostly effective/adequate design	Controls are considered adequately designed and are operating effectively on most occasions
C3	Inadequate design/partially effective	Controls are considered inadequately designed or are only operating to partial effectiveness on most occasions
C4	No controls/ineffective	There are no controls designed or the existing controls are operating ineffectively on all occasions

Table 33: Likelihood of exposure to the hazard

Level of Risk Probability	Explanation
5 – Almost certain	Likely to occur in most circumstances multiple times in a year
4 – Likely	Will probably occur in most circumstances every 1-3 years
3 – Possible	Might occur at some time over a 3-10 year period
2 – Unlikely	Could occur at sometime within a 10-50 year timeframe and has occurred in industry
1 – Rare	May only occur in exceptional circumstances within a 50-100 year timeframe

Table 34: Consequence classification descriptors

Impact types	**Consequence Scale**				
	Negligible (1)	**Minor (2)**	**Moderate (3)**	**High (4)**	**Catastrophic (5)**
Health	Exposure to health hazard/agent (subjective symptoms) with potential to result in first aid treatment	Exposure to health hazard/agent reversible health impairment	Exposure to health hazard/agents (exceeding OEL) with the potential to result in days lost due to OII and/or PI >30%	Exposure to health hazard/agents (significantly exceeding OEL) with the potential to result in PI <30% or single fatality	Exposure to health hazard /agents (significantly exceeding OEL) with the potential to result in multiple single fatalities and/or PI <30% of more than one person
Safety	First Aid Injury Report Only included	Medical Treatment Injury or Restricted Work Injury	Lost Time Injury	Single fatality	Multiple fatalities
Environment	Nil to minor remediation (typically a shift). No adverse impact on environment	Near-source confined and short-term reversible impact (typically <week)	Near-source confined and temporary reversible impact (typically a month)	Impact that is unconfined and requiring long-term recovery, leaving residual damage (typically a year)	Impact that is widespread, unconfined and requiring long-term recovery, leaving major residual damage (typically years)

Note: Health impact definitions Used: Occupational Exposure Level (OEL); Occupational Injury/ Illness (OII); Permanent Impairment (PI)

Table 35: Risk level classification matrix

	Explanation		Consequence				
			Negligible	**Minor**	**Moderate**	**High**	**Catastrophic**
Likelihood	Likely to occur in most circumstances multiple times in a year	**Almost certain**	M-5	H-10	H-15	E-20	E-25
	Will probably occur in most circumstances every 1–3 years	**Likely**	M-4	M-8	H-12	E-16	E-20
	Might occur at some time over a 3–10-year period	**Possible**	L-3	M-6	H-9	H-12	H-15
	Could occur at sometime within a 10–50-year timeframe and has occurred in industry	**Unlikely**	L-2	M-4	M-6	M-8	H-10
	May only occur in exceptional circumstances within a fifty-to-hundred-year timeframe	**Rare**	L-1	L-2	L-3	M-4	M-5

3.6.4 Risk assessment outcomes and management

Detailed risk assessment outcomes are provided in Appendix H. For the Project, a total of 79 individual risk scenarios were identified resulting in:

- no risk scenarios classified as 'extreme';
- 11 risk scenarios classified as 'high';
- 62 risk scenarios classified as 'medium'; and
- 6 risk scenarios classified as 'low'.

A summary of risk outcomes is shown in Table 36.

The 11 'high' risks identified from the risk assessment can be grouped into the following categories:

- geotechnical risks;
- erosional risks;
- non-polluting risks; and
- achievement of a sustainable PMLU.

The 62 'moderate' risks identified span the same categories as the 'high' risk group, but add the following two categories:

- safety risks; and
- geochemical risks.

Table 36: Risk assessment outcomes by rehabilitation and management area

Domains	Risk level				
	Low	**Moderate**	**High**	**Extreme**	**Total**
Rehabilitation areas					
In-pit and out-of-pit spoil dumps	0	10	3	0	**13**
Waste disposal (including capped TSFs)	0	10	2	0	**12**
Rehabilitated water management structures	0	9	0	0	**9**
In-pit TSF (TDP) rehabilitated	0	9	3	0	**12**
Mine infrastructure and exploration area	0	10	0	0	**10**
Creek diversions (permanent)	0	5	1	0	**6**
Retained flood levees	1	7	2	0	**10**
Improvement areas					
Residual voids	5	2	0	0	7
Total	**6**	**62**	**11**	**0**	**79**

Safety risks

The safety risks identified relate to surface roughness and slope steepness in excess of that expected for the PMLU, residual void access and failure of retained flood levees. The risks to safety have been addressed within the milestone criteria (see Table 16 and Table 20). The PMLU landform design will be consistent with geotechnical design criteria and will be monitored as discussed in section 3.7. Safety risks in relation to residual void access have also been controlled and monitoring will be conducted to determine long-term safety from the proposed bunding, fencing and signage.

Geotechnical risks

Several final landforms pose geotechnical risks and include the spoil dumps, surface TSFs (TDN and TDNA), in-pit TSFs (TDP), and the retained flood levees. The slopes will be consistent with the geotechnical design criteria described in sections 3.5.9 to 3.5.10 and will be assessed by a suitably qualified person upon completion or mine closure.

Erosional risks

Erosional risks have been identified within all PMLUs including the potential for gully, pipe and/or sheet erosion of rehabilitated areas. The final landform design discussed in section 3.5.7 considers the potential for erosional risks. The erosional stability of rehabilitated landforms will be assessed through rehabilitation monitoring data. Long-term bank stability of the permanent creek diversion is to be achieved through the establishment of riparian vegetation. Proposed management and monitoring measures that relate to erosion are described in section 3.7.

Non-polluting and geochemical risks

The potential for environmental harm arising from contaminants leaving the site relates to the potential for total suspended solids drainage and consequent downstream water quality impacts (including sedimentation) and the potential for contaminant impacted lands. The geochemical risks relate to the potential for acid and saline drainage, and seepage and runoff of contaminated materials into surface waters and groundwater.

These risks were determined as unlikely to occur based on available hydrological modelling, the control measures proposed, and the findings of geochemical assessments into waste rock and tailings materials (refer section 3.5.6.2). The moderate risk rating was due to the 'moderate' or 'high' environmental consequence associated. A water quality monitoring program, land contamination assessment, and remediation activities where necessary, will be required to meet the milestone criteria proposed (refer Table 16 and Table 20).

The risk of achieving a sustainable PMLU

The predominant final land use for the Project is low intensity cattle grazing. The risk of failing to achieve this as a sustainable PMLU is related primarily to the risk of insufficient topsoil resources to allow effective rehabilitation to occur; and consequently, insufficient pasture productivity and/or infestation of weeds. The risk associated with this risk category is considered to be inversely proportional to the length of time allowed to meet milestone criteria.

To minimise this risk, testing and amelioration of soils will occur at placement and before revegetation works occur (see section 3.5.14). Seed mixes have been developed specifically for the Project and the PMLU with a view to maximising rehabilitation success. Ongoing maintenance and monitoring, as well as weed control, will be undertaken (refer section 3.7). Milestone criteria have been developed relevant to this risk.

The risk of insufficient topsoil resources to complete rehabilitation is considered a moderate risk able to be managed. Controls to be implemented include a topsoil management regime requiring regular updates to the LOM topsoil balance and regular in situ testing of materials to ensure suitability for use.

3.7 Monitoring and maintenance

3.7.1 Rehabilitation monitoring

With respect to determining the achievement of the Project's rehabilitation milestones, criteria have been defined for each rehabilitation milestone. Assessment of rehabilitation against milestone criteria will be a key objective of ongoing environmental monitoring undertaken for the Project. When the final rehabilitation milestone applicable to the rehabilitation area is deemed to be satisfied, a final rehabilitation assessment will be undertaken before an application for either progressive certification or an ML surrender application is made.

A detailed Rehabilitation Monitoring and Maintenance Plan has been developed for the Project is included in Appendix F.

Table 37 and Table 38 provide summaries of the measures to be undertaken to determine the achievement of each rehabilitation and management milestone. Determination of the boundary of an area reaching a given rehabilitation milestone at a given point in time, will be done with standard survey techniques, including land based survey and airborne survey at an appropriate frequency – nominally annually – to achieve satisfactory geolocation of areas.

Table 37: Rehabilitation milestone management and monitoring measures

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM1: Infrastructure decommissioning and removal	Applicable to all infrastructure identified to be decommissioned/ removed from site. Considered to be met when the area can be transitioned to the next milestone.	Infrastructure decommissioned/ removed at closure will be subject to strict environment and safety planning requirements including completion inspections. A visual inspection(s) will be conducted to determine that no infrastructure remains that does not form part of any Landholder Agreement.
RM2: Management of contaminated land status	Applicable to the waste rock dump area, mine infrastructure areas, and the tailings dam area (i.e. where notifiable activities have been carried out) and, at a minimum, involves the completion of a Phase 1 contaminated land investigation undertaken by an appropriately qualified person. Considered to be met when contaminated material has been either placed, removed from site, or remediated in situ, a validation report has been completed, and, if required, a site suitability statement has been prepared. Where required, remediation activities will be undertaken and recorded, and notifications completed.	A completed Phase 1 contaminated land investigation report, as well as any consequent reports where required. Visual inspection of potential sites or sources of contaminated material will be conducted, and samples collected as required. The contaminated land investigation will determine the presence of any contaminants. Remediation activities will be undertaken if required following consultation on appropriate remediation activities. A validation report will detail the remediation of contaminated land and, if required, a site suitability statement prepared by an appropriately qualified person that states that the land is suitable for use according to the nominated PMLU.
RM3: Landform development (re-profiling / reshaping) of land affected by disturbance	Applicable to all areas where bulk earthworks and other grading are required to achieve target landform shape and drainage characteristics. Considered to be met when graded banks are installed on waste rock dumps, final landform drainage systems and water storages are formed and any other applicable disturbance areas have been reprofiled to suit the surrounding landform.	Land based and/or remote sensing survey techniques will be employed to confirm that graded slopes meet landform design specifications. Additionally, visual inspections will be done to determine if any future maintenance/repair action is required. A geotechnical assessment will be conducted by an appropriately qualified person to confirm that long-term stability has been achieved for all relevant landforms.
RM4: Capping	Applicable to all TSFs and required to achieve target landform shape and drainage characteristics and demonstrate geotechnical stability.	Survey and geotechnical assessment by an appropriately qualified person of capping construction and completion.

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM5: Surface preparation (topdressing, contour ripping, soil amelioration)	Applicable to all areas requiring revegetation. Includes final profiling and application of topsoil materials, soil testing, and soil amelioration. Considered to be met when surface preparation activities have been completed and soil condition is conducive to plant germination and growth.	A soil assessment will be conducted by an appropriately qualified person prior to each rehabilitation event to determine soil suitability, and recommendations made for ameliorants where required. Records of topsoil origin and placement indicating achievement of a target depth of 200–300 mm. Records to include any ameliorants applied, including types, rates and timing of applications. Visual inspections and documentation of contour ripping, including depth, spacing and machinery used.
RM6: Grazing revegetation (seeding and / or planting)	Applicable to all areas requiring revegetation. Includes seeding and/or planting of target revegetation species. Considered to be met when records demonstrate that seeding and/or planting of target species has been completed, with the understanding that remedial works such as reseeding or infill planting may be necessary to meet target vegetation completion criteria.	Survey of completed areas, and record of revegetation method retained. Records of seeded and/or planted species consistent with the species listed in Table 28: Current indicative species and sowing rates for low intensity grazing PMLU.
RM7: Riparian habitat (native vegetation) revegetation (seeding and / or planting)	Applicable to all areas requiring revegetation. Includes seeding and/or planting of target revegetation species. Considered to be met when records demonstrate that seeding and/or planting of target species has been completed, with the understanding that remedial works such as reseeding or infill planting may be necessary to meet target vegetation completion criteria.	Survey of completed areas, and record of revegetation method retained. Records of seeded and/or planted species consistent with the species listed in Table 30: Current indicative species and sowing rates for native riparian habitat PMLU.

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM8: Achievement of grazing PMLU to stable condition	Final milestone applicable to all rehabilitated areas (excluding RA1). Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	Routine rehabilitation monitoring to be undertaken for the parameters, and at the frequency nominated in the Project Rehabilitation Monitoring and Maintenance Plan (Appendix F) Recommendations for remedial works will be made as and when required, and remedial activities undertaken including: • repair of erosion prone areas; • weed management and control; and • reseeding and/or additional planting when required. Land capability assessment undertaken by an appropriately qualified person (applicable to RA1, RA3, RA4 (TDN, TDNA), RA5). A Hazard and Safety Assessment will be undertaken by an appropriately qualified person.
RM9: Achievement of native vegetation PMLU to stable condition	Final milestone applicable to RA1. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	Routine rehabilitation monitoring to be undertaken for the parameters, and at the frequency nominated in the Project Rehabilitation Monitoring and Maintenance Plan (Appendix F) Recommendations for remedial works will be made as and when required, and remedial activities undertaken including: • repair of erosion prone areas; • weed management and control; and • reseeding and/or additional planting when required. Land capability assessment undertaken by an appropriately qualified person (applicable to RA1, RA3, RA4 (TDN, TDNA), RA5). A Hazard and Safety Assessment will be undertaken by an appropriately qualified person.
RM10: Achievement of target pasture productivity criteria for grazing PMLU	Rehabilitated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use. Considered to be met when land can be transitioned to progressive certification.	Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM11: Achievement of native vegetation PMLU to a sustainable condition	Rehabilitated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use. Considered to be met when land can be transitioned to progressive certification.	Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.
RM12: Achievement of retained infrastructure PMLU to stable condition	Final milestone applicable to all areas nominated as retained infrastructure. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	A Hazard and Safety Assessment will be undertaken by an appropriately qualified person, and a final landform survey will be undertaken to confirm that retained infrastructure forms part of a landholder agreement. Recommendations for remedial works will be made where required, and remedial activities undertaken as soon as practicable.

Table 38: Management milestone management and monitoring measures

Management milestone	Description / criteria	Proposed management / monitoring measure(s)
MM1 – Achievement of final landform design	Improvement areas to be assessed against the landform design completion criteria developed for voids (refer section 3.5.11.1). Considered to be met when void batter slopes are within target slope range and confirmation that voids act as groundwater sinks.	Geotechnical modelling and hydrogeological survey of completed areas by suitably qualified persons.
MM2 – Achievement of surface and safety requirements	Bunding and safety warning signage erected around perimeter of each void. Considered to be met when voids are inaccessible	Survey around perimeter of all voids.
MM3 – Achievement of sufficient improvement	Bunding and safety warning signage erected around perimeter of each void. Considered to be met when voids are inaccessible and improvement areas will not cause environmental harm.	Survey of completed areas and water quality testing shows that voids will not cause environmental harm.

3.7.2 Rehabilitation maintenance

Two types of rehabilitation maintenance will be carried out in rehabilitated areas: progressive maintenance and failure mitigation maintenance. Progressive maintenance is planned and involves repairs after initial construction processes have been completed.

Failure mitigation maintenance will be carried out when the rehabilitated areas are not achieving the rehabilitation objectives. The overall aim of the monitoring and maintenance program is to identify any issues that may result in large scale failure of the rehabilitation goals and objectives.

Maintenance of rehabilitated areas will be required for a number of years after the mine has been decommissioned. Annual rehabilitation monitoring will identify RA that are failing. Rehabilitation maintenance will then be applied as required, and may include the following:

- replanting / reseeding of unsuccessful areas;
- ongoing implementation of the pest and weed management plan;
- fertiliser application;
- gypsum application; and
- erosion maintenance.

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Appendix A. PRCP Schedule

Post-mining land uses (PMLU)										
Rehabilitation area	RA1									
Relevant activities	Creek Diversion									
Total rehabilitation area size (ha)	143 ha									
Commencement of first milestone: RM1	10/12/XXXX* + year**									
PMLU	Low intensity cattle grazing (native riparian vegetation)									
Date area is available	Year 2	Year 7								
Cumulative area available (ha)	35	143								
Milestone completed by	Year 7	Year 10	Year 15	Year 20	Year 21					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	35	143								
RM3	35	143								
RM5	35	143								
RM7	35	35	143							
RM9			35	143						
RM11				35	143					

* XXXX is the year of commencement of the Project and is defined as the date of first topsoil stripping

** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area				RA2						
Relevant activities				Water Management Infrastructure (Environmental, Sediment, Raw water dams)						
Total rehabilitation area size (ha)				46 ha						
Commencement of first milestone: RM1				10/12/XXXX* + year**						
PMLU				Low intensity cattle grazing						
Date area is available	Year 10	Year 15	Year 20	Year 25	Year 30					
Cumulative area available (ha)	2.3				46					
Milestone completed by	Year 15	Year 20	Year 25	Year 30	Year 35	Year 40	Year 45			
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	2.3				46					
RM2	2.3				46					
RM3	2.3				46					
RM6		2.3				46				
RM8		2.3					46			
RM10			2.3				46			

* XXXX is the year of commencement of the Project and is defined as the date of first topsoil stripping

** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the <u>yellow table</u> to include further rehabilitation milestone dates.
2) Insert new columns to the <u>blue table</u> to match rehabilitation milestone dates.
3) Insert new rows to the <u>blue table</u> to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area				RA2b						
Relevant activities				Water Management Infrastructure (Flood Levee)						
Total rehabilitation area size (ha)				7 ha						
Commencement of first milestone: RM1				10/12/XXXX* + year**						
PMLU				Low intensity cattle grazing (modified pasture)						
Date area is available	Year 7	Year 10	Year 15	Year 20						
Cumulative area available (ha)	0.2			7						
Milestone completed by	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35				
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	0.2			7						
RM3	0.2			7						
RM5	0.2			7						
RM6		0.2		7						
RM8			0.2		7					
RM10				0.2		7				

* XXXX is the year of commencement of the Project and is defined as the date of first topsoil stripping
** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area				RA3						
Relevant activities				Mine Infrastructure Areas						
Total rehabilitation area size (ha)				132 ha						
Commencement of first milestone: RM1				10/12/XXXX* + year**						
PMLU				Low intensity cattle grazing (modified pasture)						
Date area is available	Year 32	Year 35	Year 40	Year 45	Year 52					
Cumulative area available (ha)	75 ha				132					
Milestone completed by	Year 35	Year 40	Year 45	Year 52	Year 55	Year 60	Year 65	Year 70		
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	75				125					
RM2	75				125					
RM3	75				125					
RM5		75				125				
RM6		75				125				
RM8			75				125			
RM10				75				125		

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2) Insert new columns to the <u>blue table</u> to match rehabilitation milestone dates.
3) Insert new rows to the <u>blue table</u> to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA4									
Relevant activities	Waste Disposal (Surface and in-pit TSFs)									
Total rehabilitation area size (ha)	272 ha									
Commencement of first milestone: RM1	10/12/XXXX* + year**									
PMLU	Low intensity cattle grazing (modified pasture)									
Date area is available	Year 11	Year 15	Year 20	Year 25	Year 30	Year 36				
Cumulative area available (ha)	145	272								
Milestone completed by	Year 15	Year 20	Year 25	Year 30	Year 36	Year 40	Year 45	Year 50	Year 55	
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	145	272								
RM2	145	272								
RM3	145	272								
RM4		272								
RM5		272								
RM6		145	272							
RM8			145	272						
RM10				145	272					

* XXXX is the year of commencement of the Project and is defined as the date of first topsoil stripping

** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the <u>yellow table</u> to include further rehabilitation milestone dates.
2) Insert new columns to the <u>blue table</u> to match rehabilitation milestone dates.
3) Insert new rows to the <u>blue table</u> to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA5									
Relevant activities	In-pit and out-of-pit spoil dumps									
Total rehabilitation area size (ha)	1925 ha									
Commencement of first milestone: RM1	10/12/XXXX* + year**									
PMLU	Low intensity cattle grazing (modified pasture)									
Date area is available	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 32			
Cumulative area available (ha)	33		275	486	736	1131	1925			
Milestone completed by	Year 10	Year 15	Year 20	Year 25	Year 30	Year 32	Year 40	Year 45	Year 52	
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	33		275	486	736	1131	1925			
RM2	33		275	486	736	1131	1925			
RM3	33		275	486	736	1131	1925			
RM5	33		275	486	736		1925			
RM6		33		275	486	736	1925			
RM8			33		275	486	736	1925		
RM10				33		275	486	736	1925	

* XXXX is the year of commencement of the Project and is defined as the date of first topsoil stripping

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1) Insert new columns to the <u>yellow table</u> to include further rehabilitation milestone dates.
2) Insert new columns to the <u>blue table</u> to match rehabilitation milestone dates.
3) Insert new rows to the <u>blue table</u> to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area				RA6						
Relevant activities				Rail and services corridor						
Total rehabilitation area size (ha)				28 ha						
Commencement of first milestone: RM1				10/12/XXXX* + year**						
PMLU				Low intensity cattle grazing (modified pasture)						
Date area is available	Year 32									
Cumulative area available (ha)	27									
Milestone completed by	Year 35									
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	27									
RM2	27									
RM12	27									

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** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Non-use management area (NUMA)										
Improvement area	IA1									
Relevant activities	Residual voids									
Total size (ha)	362 ha									
Commencement of first milestone: MM1	10/12/XXXX* + year**									
NUMA	Unsuitable									
Date area is available	Year 32	Year 35	Year 40	Year 45	Year 50					
Cumulative area available (ha)	218		362							
Milestone completed by	Year 35	Year 40	Year 45	Year 50	Year 55					
Milestone Reference	**Cumulative area achieved (ha)**									
MM1	218		362							
MM2	218			362						
MM3	218				362					

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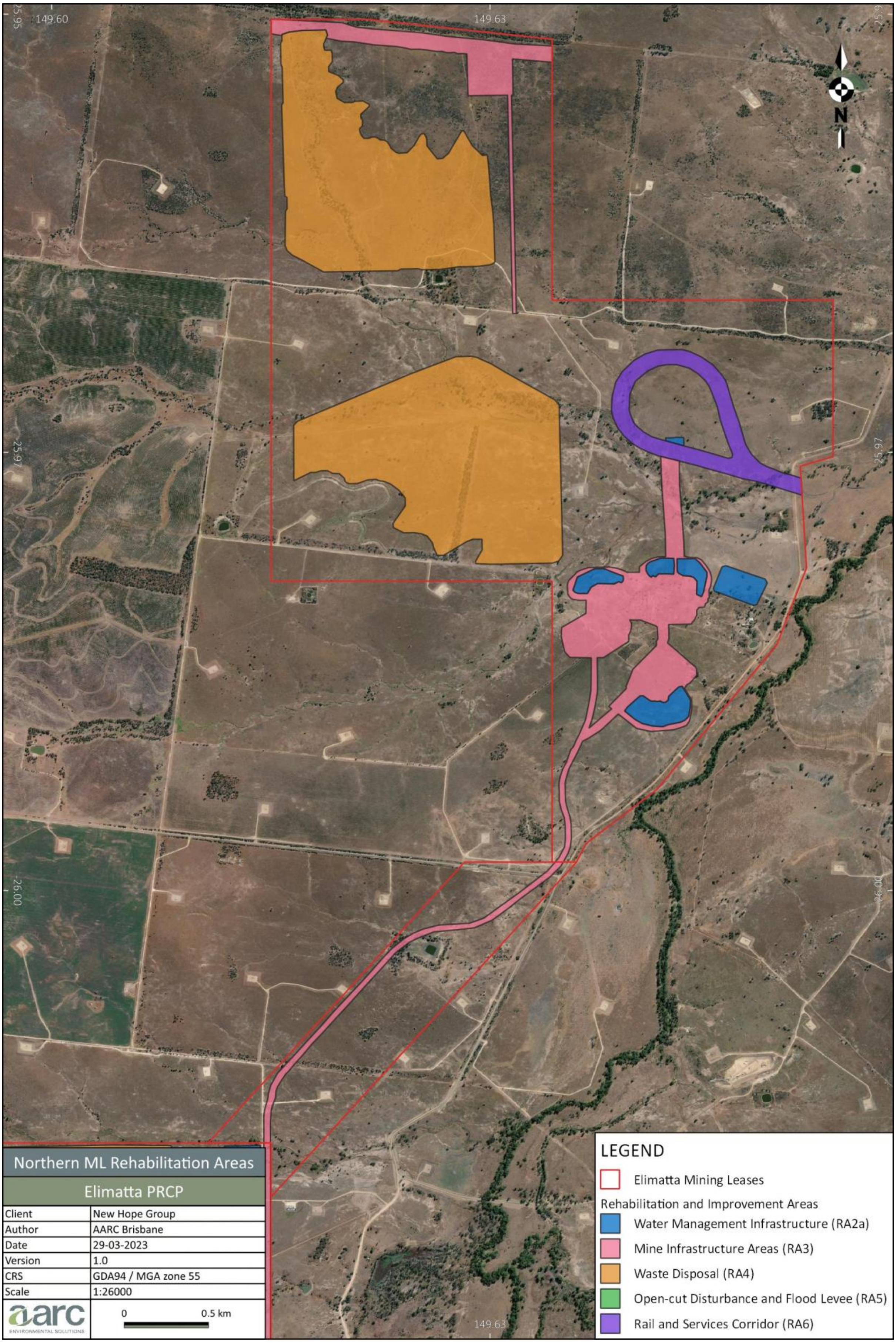
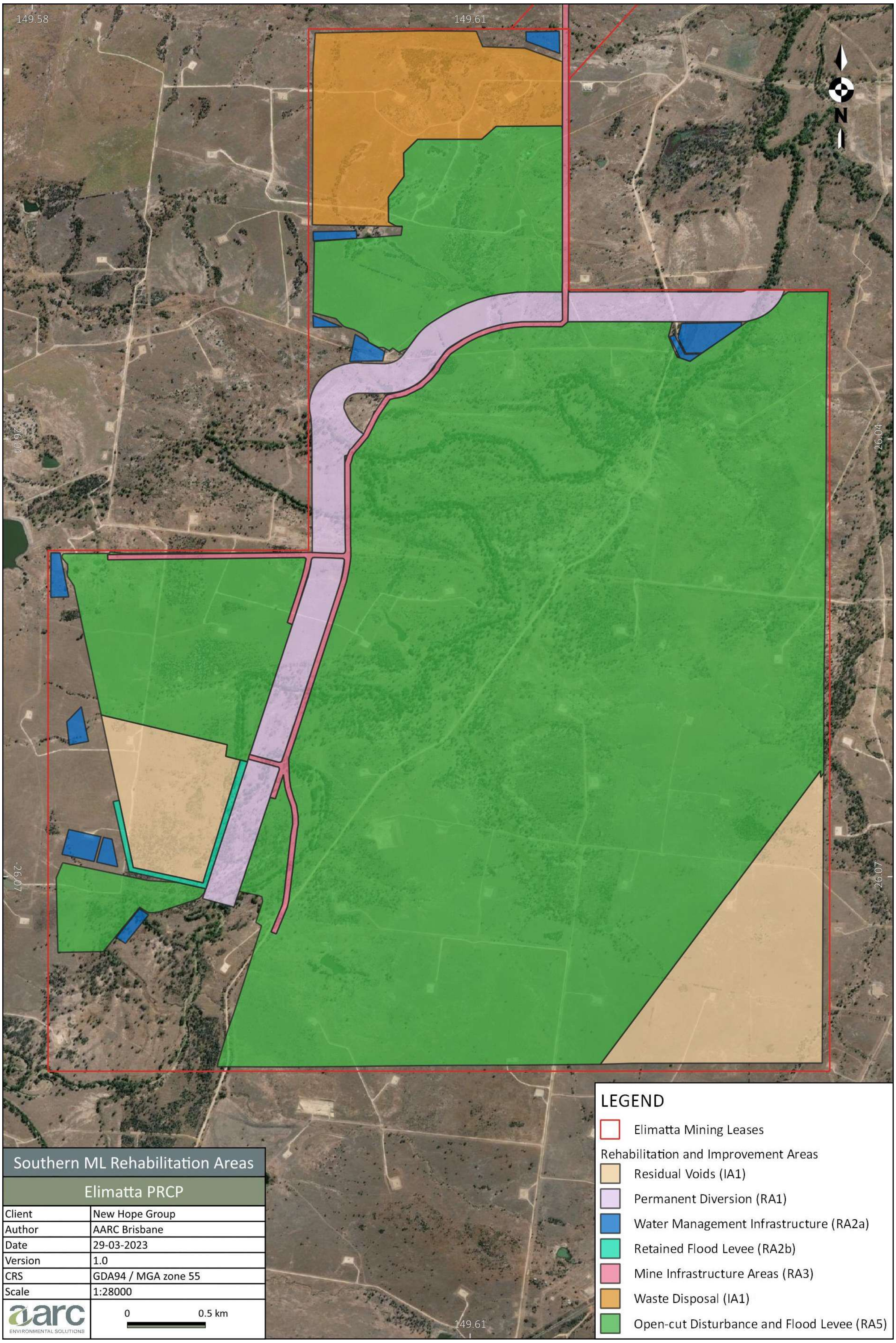
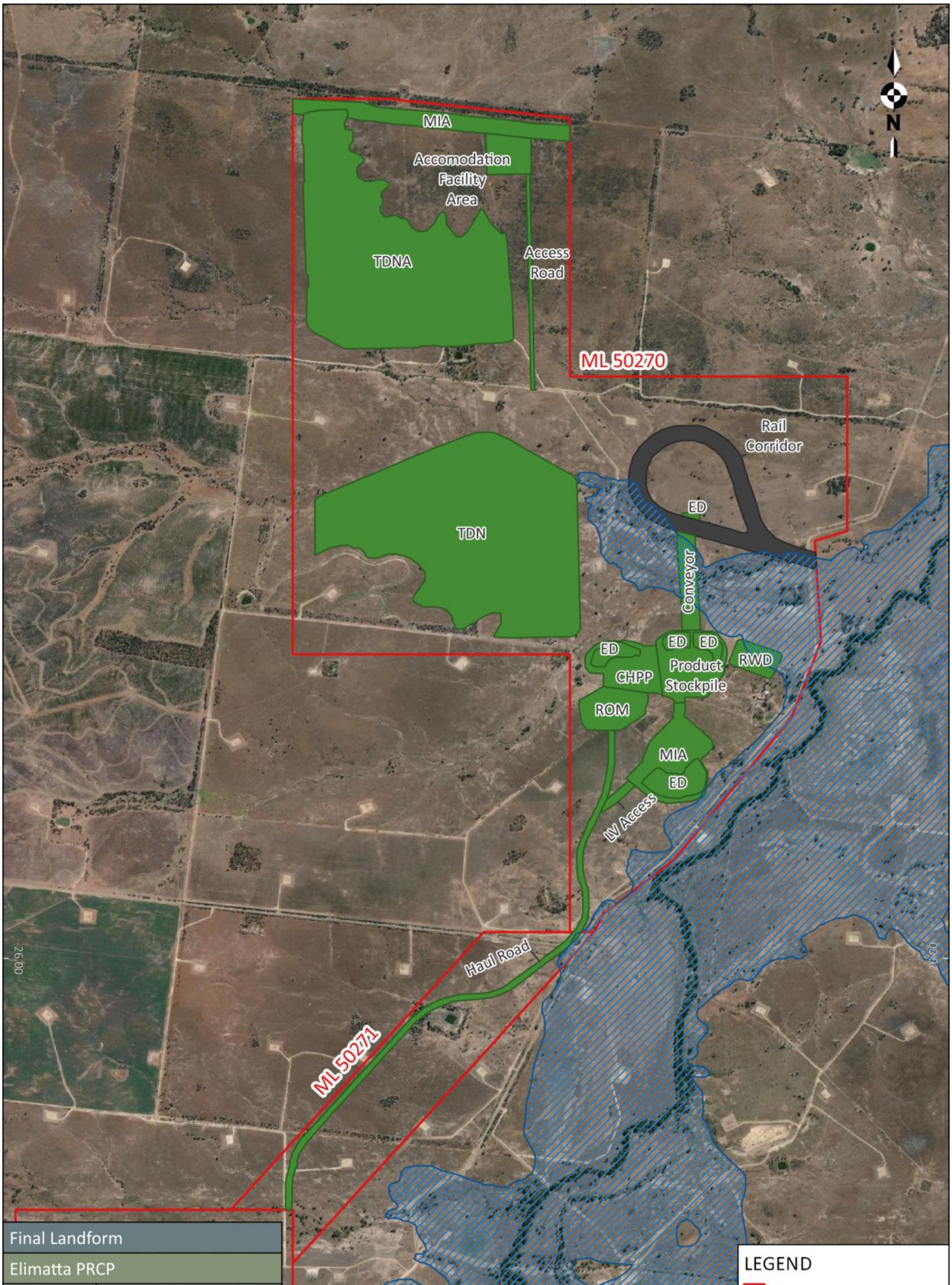
** the year refers to the year at which the land will become available after commencement of the Project and will be added to the commencement year to define the date at which land is available for rehabilitation

1) Insert new columns to the <u>yellow table</u> to include further management milestone dates.
2) Insert new columns to the <u>blue table</u> to match management milestone dates.
3) Insert new rows to the blue table to include additional management milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. MM1).

Appendix B. PRCP Reference Map and Final Site Design


149.60
149.63
25.95
25.97
26.00
N
Northern ML Rehabilitation Areas
Elimatta PRCP
Client New Hope Group
Author AARC Brisbane
Date 29-03-2023
Version 1.0
CRS GDA94 / MGA zone 55
Scale 1:26000
0
0.5 km
LEGEND
Elimatta Mining Leases
Rehabilitation and Improvement Areas
Water Management Infrastructure (RA2a)
Mine Infrastructure Areas (RA3)
Waste Disposal (RA4)
Open-cut Disturbance and Flood Levee (RA5)
Rail and Services Corridor (RA6)


149.58
149.61
N
-26.04
-26.07
LEGEND
Elimatta Mining Leases
Rehabilitation and Improvement Areas
Residual Voids (IA1)
Permanent Diversion (RA1)
Water Management Infrastructure (RA2a)
Retained Flood Levee (RA2b)
Mine Infrastructure Areas (RA3)
Waste Disposal (IA1)
Open-cut Disturbance and Flood Levee (RA5)
Southern ML Rehabilitation Areas
Elimatta PRCP
Client New Hope Group
Author AARC Brisbane
Date 29-03-2023
Version 1.0
CRS GDA94 / MGA zone 55
Scale 1:28000
aarc ENVIRONMENTAL SOLUTIONS
0
0.5 km

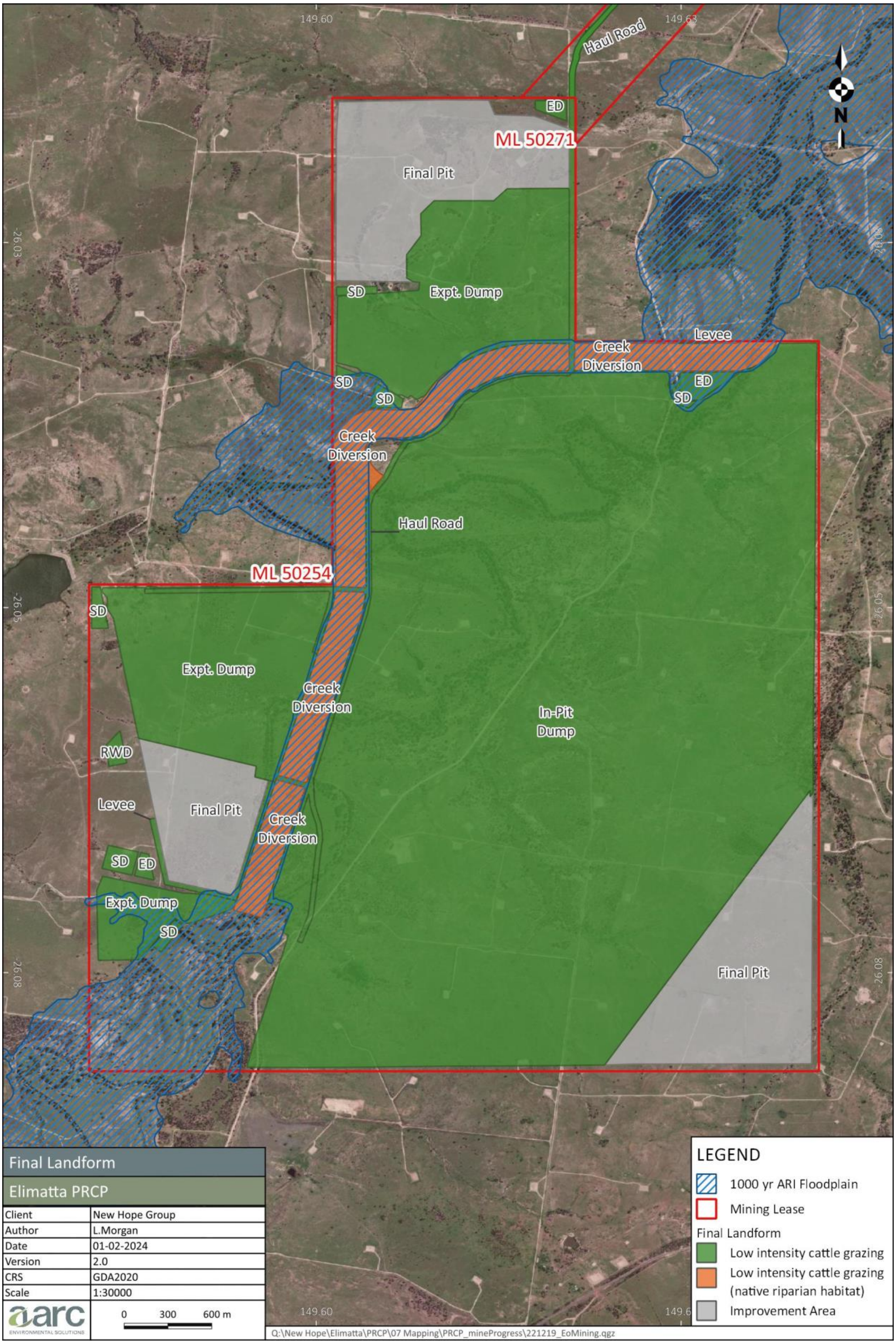


Final Landform

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	30-03-2023
Version	1.0
CRS	GDA94 / MGA zone 55
Scale	1:28000

arc ENVIRONMENTAL SOLUTIONS



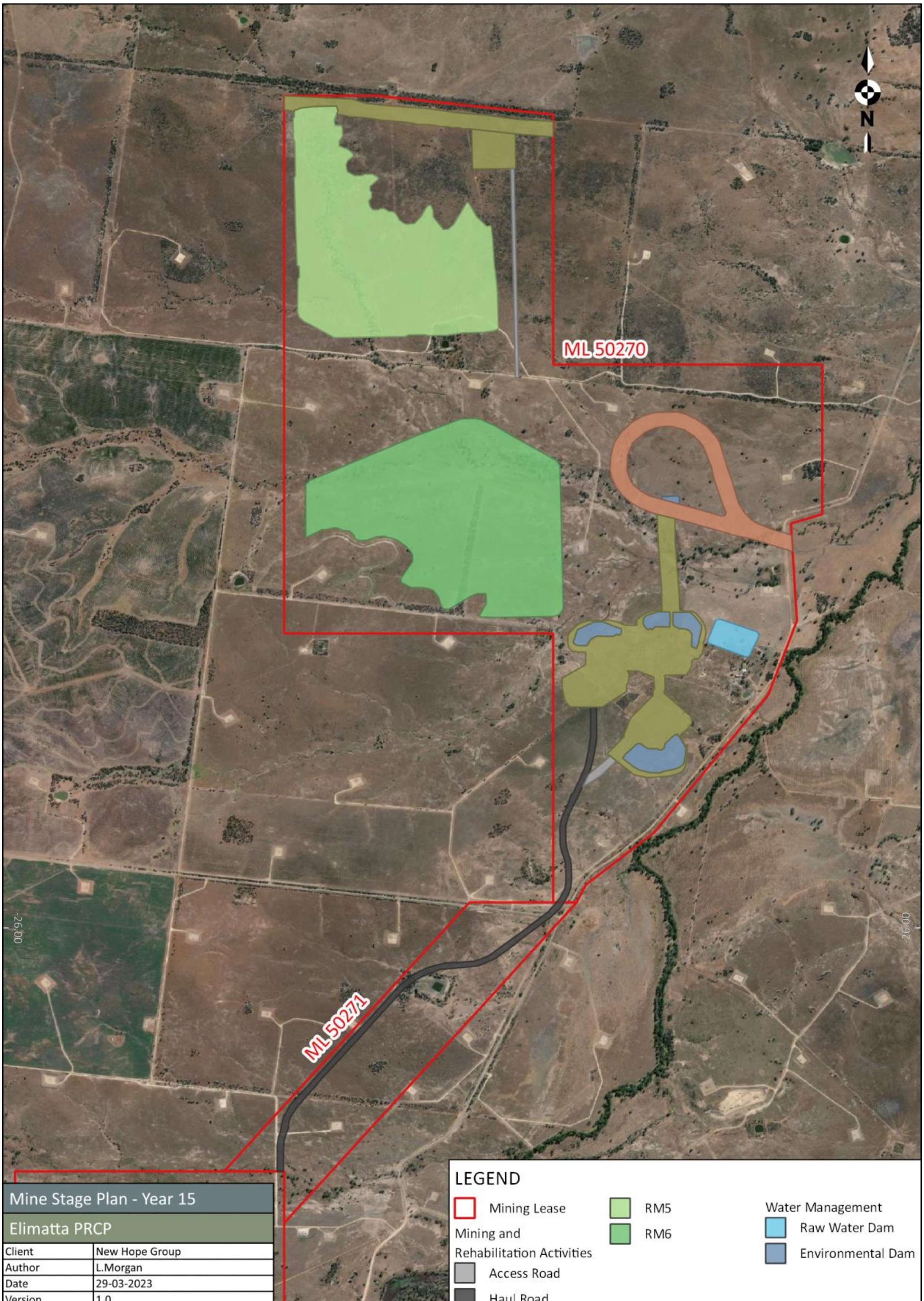
Final Landform

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
Scale	1:30000

arc ENVIRONMENTAL SOLUTIONS

Appendix C. Schedule stage plans


N
ML 50270
ML 50271
-26.00
LEGEND
Mining Lease
Mining and Rehabilitation Activities
Access Road
Haul Road
MIA
Rail Corridor
RM5
RM6
Water Management
Raw Water Dam
Environmental Dam
Mine Stage Plan - Year 15
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
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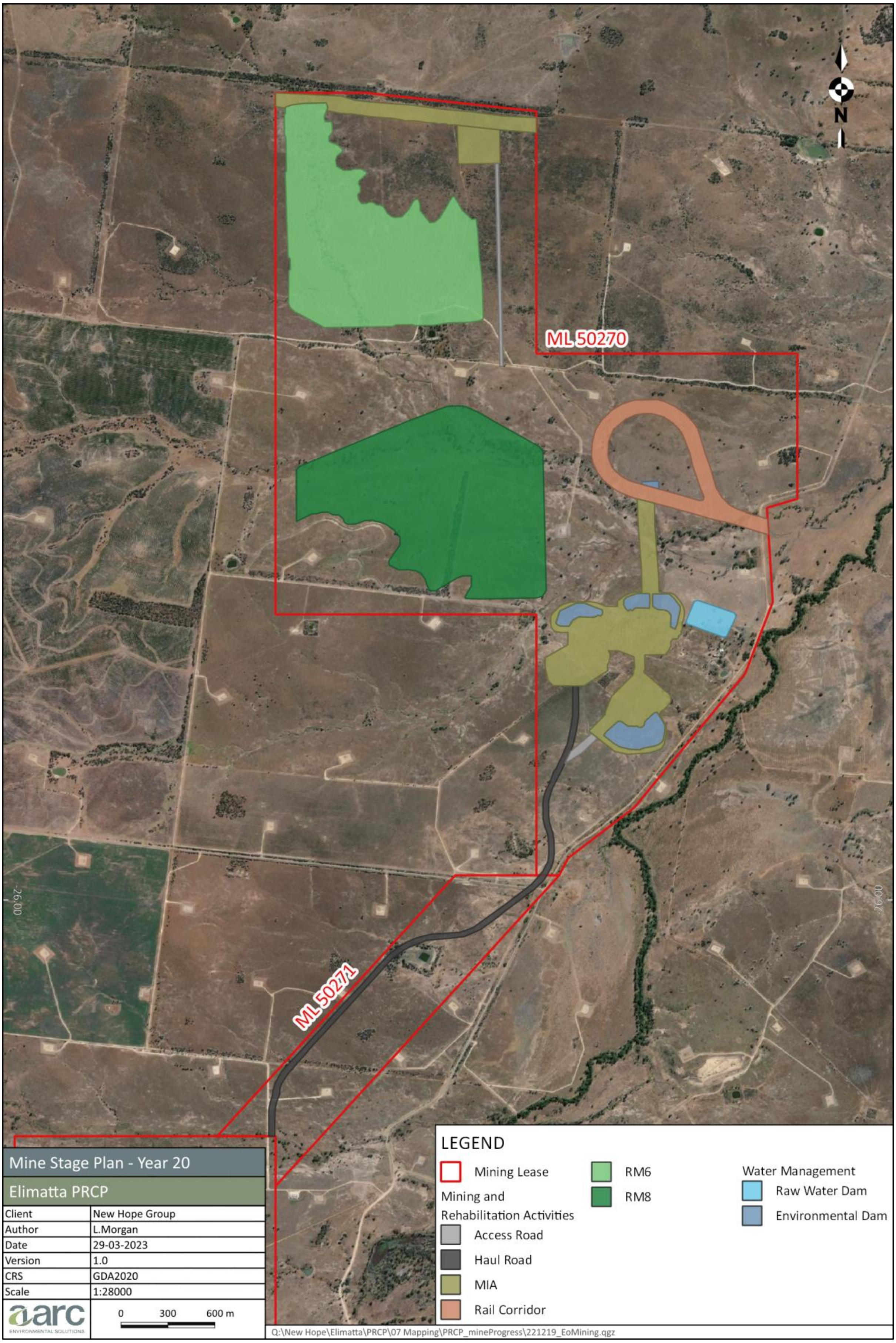
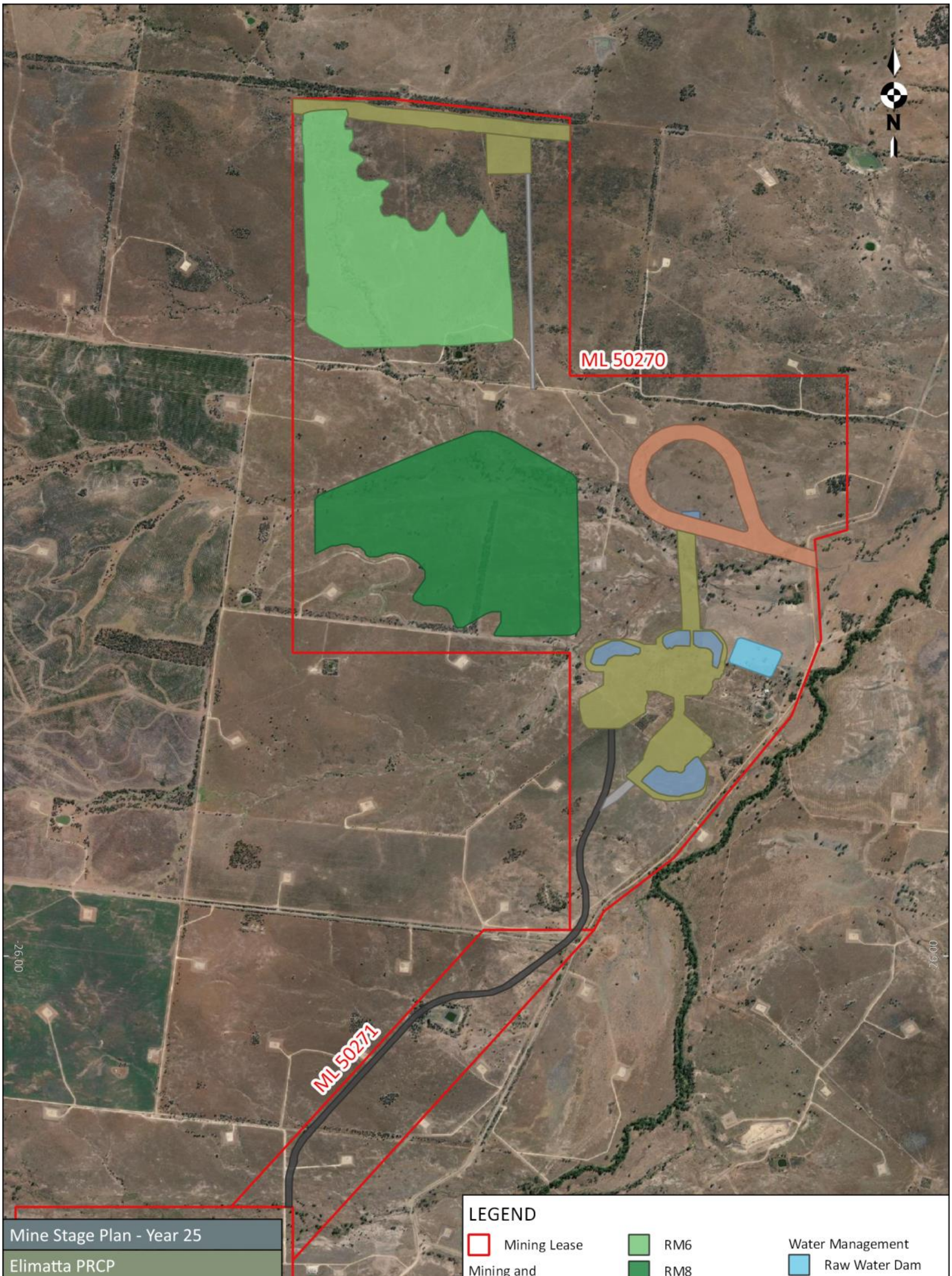


Mine Stage Plan - Year 20

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000



Mine Stage Plan - Year 25

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

0 300 600 m

LEGEND

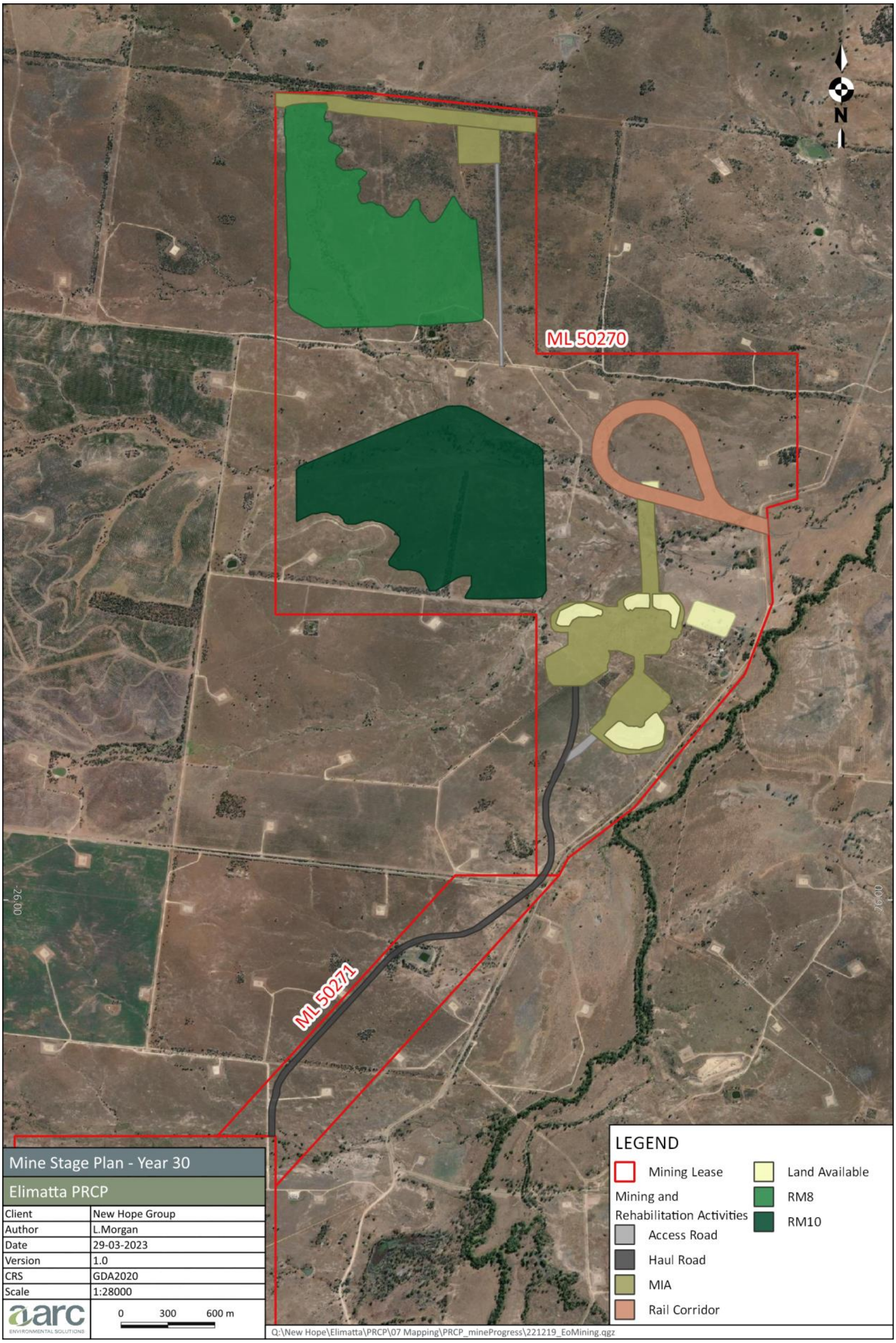
Mining Lease

Mining and Rehabilitation Activities
- Access Road
- Haul Road
- MIA
- Rail Corridor

- RM6
- RM8

Water Management
- Raw Water Dam
- Environmental Dam

Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz


N
ML 50270
ML 50271
-26.00
-26.00
LEGEND
Mining Lease
Land Available
Mining and Rehabilitation Activities
RM8
RM10
Access Road
Haul Road
MIA
Rail Corridor
Mine Stage Plan - Year 30
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
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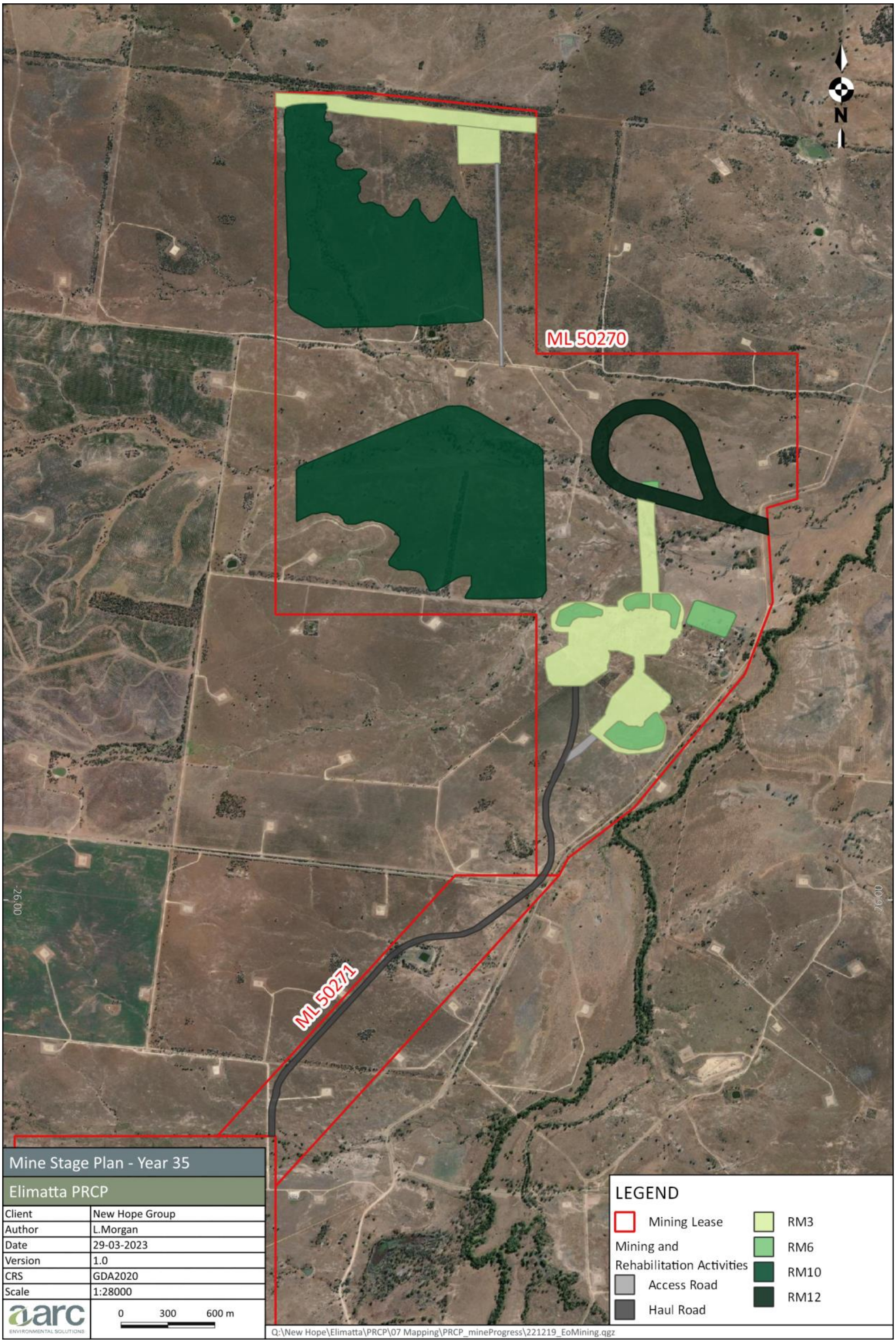
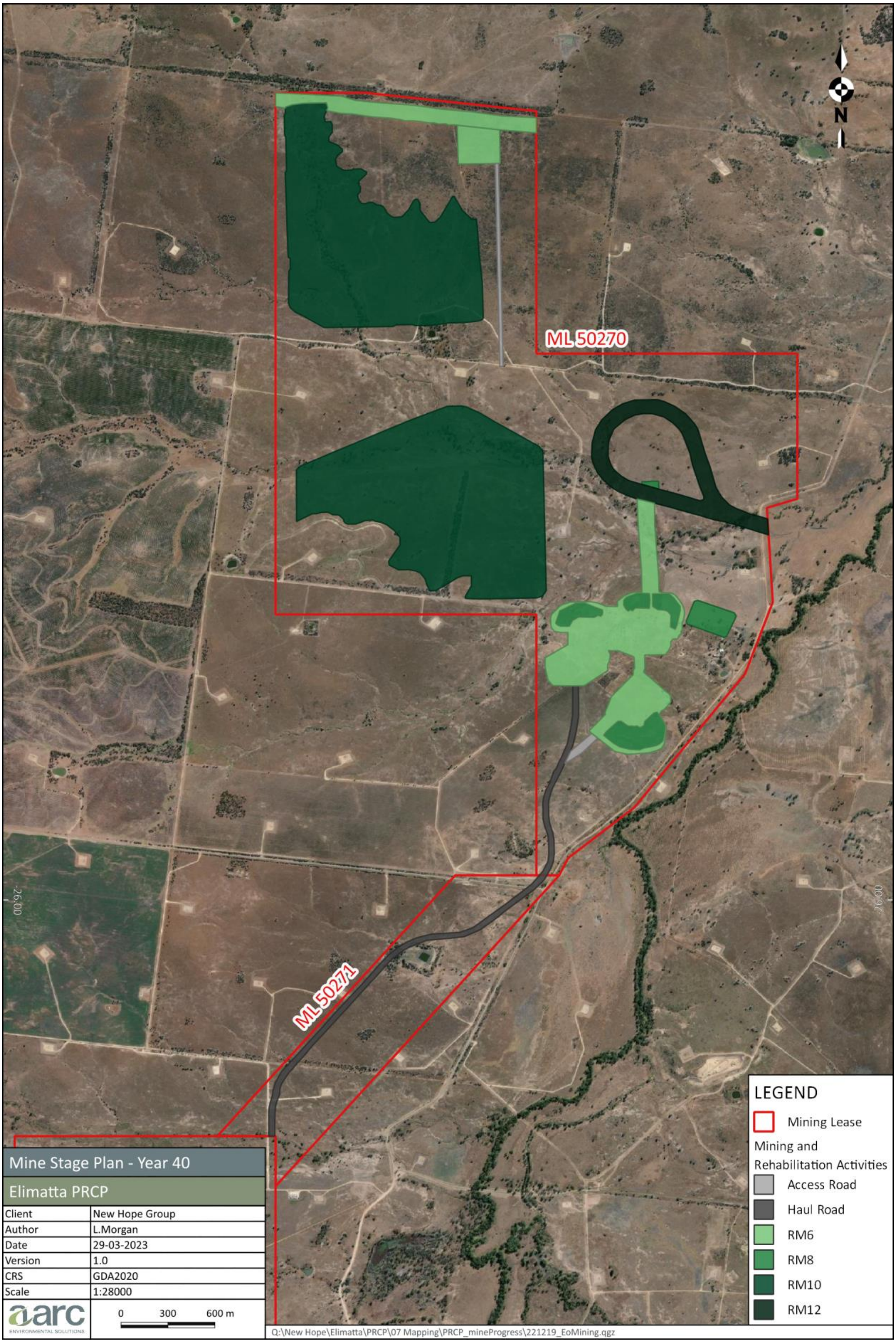


ML 50270
ML 50271
N
-26.00
Mine Stage Plan - Year 35
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
0 300 600 m
LEGEND
Mining Lease
Mining and Rehabilitation Activities
Access Road
Haul Road
RM3
RM6
RM10
RM12
Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz


ML 50270
ML 50271
N
26.00
LEGEND
Mining Lease
Mining and Rehabilitation Activities
Access Road
Haul Road
RM6
RM8
RM10
RM12
Mine Stage Plan - Year 40
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
0 300 600 m
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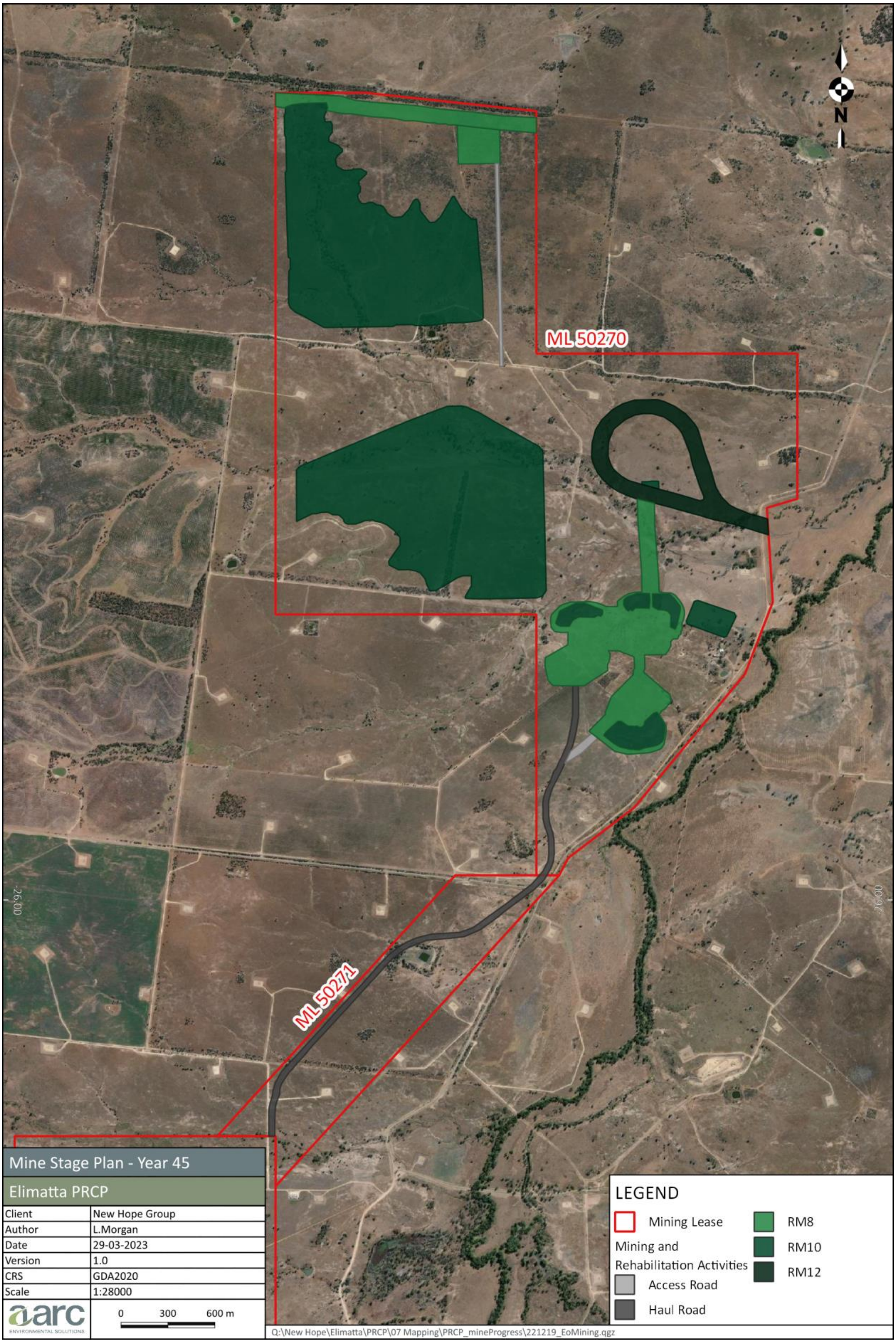


Mine Stage Plan - Year 45

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

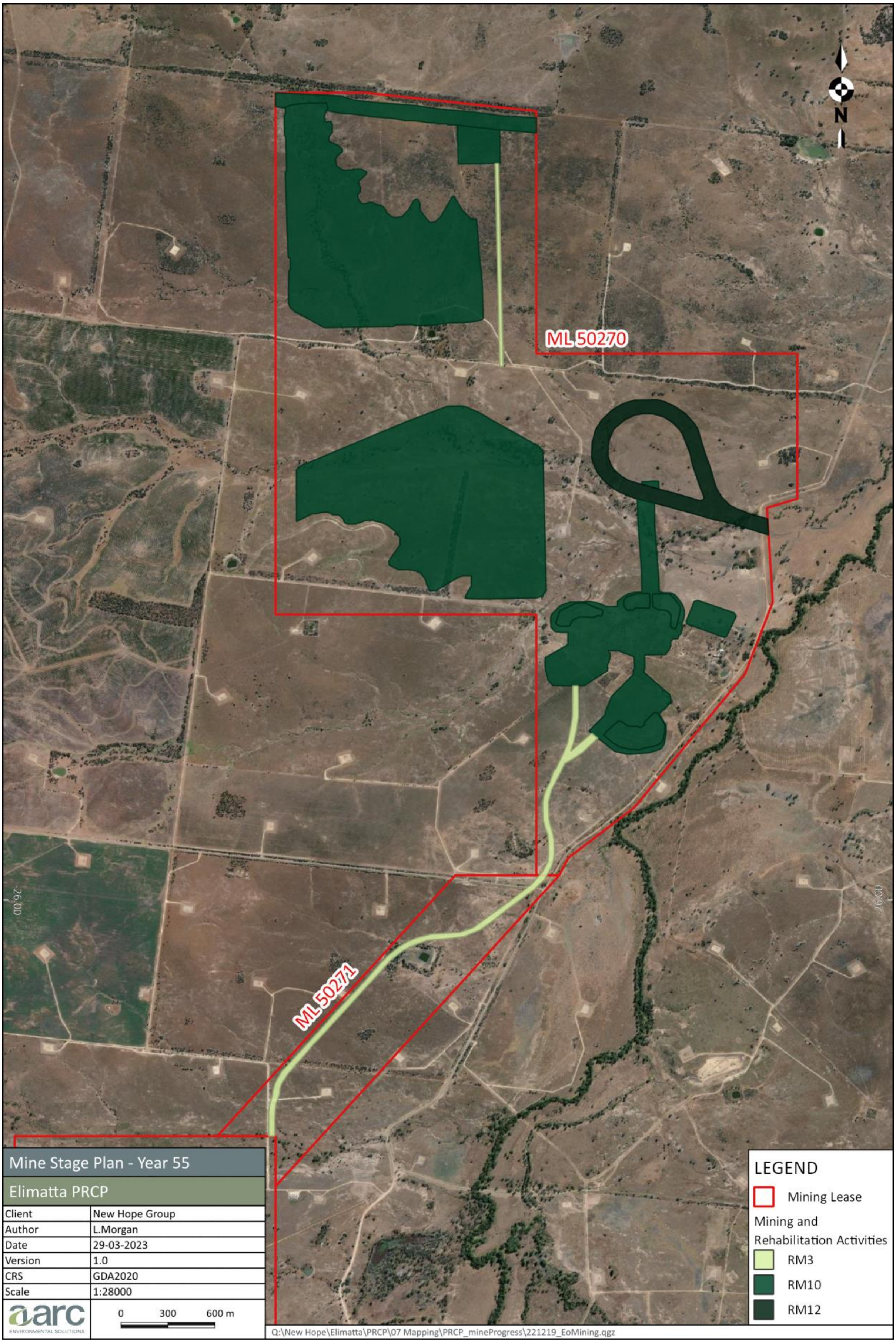
aarc ENVIRONMENTAL SOLUTIONS

Mine Stage Plan - Year 50

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

aarc ENVIRONMENTAL SOLUTIONS


N
ML 50270
ML 50271
26.00
26.00
Mine Stage Plan - Year 55
Elimatta PRCP
Client
New Hope Group
Author
L.Morgan
Date
29-03-2023
Version
1.0
CRS
GDA2020
Scale
1:28000
0
300
600 m
aarc
ENVIRONMENTAL SOLUTIONS
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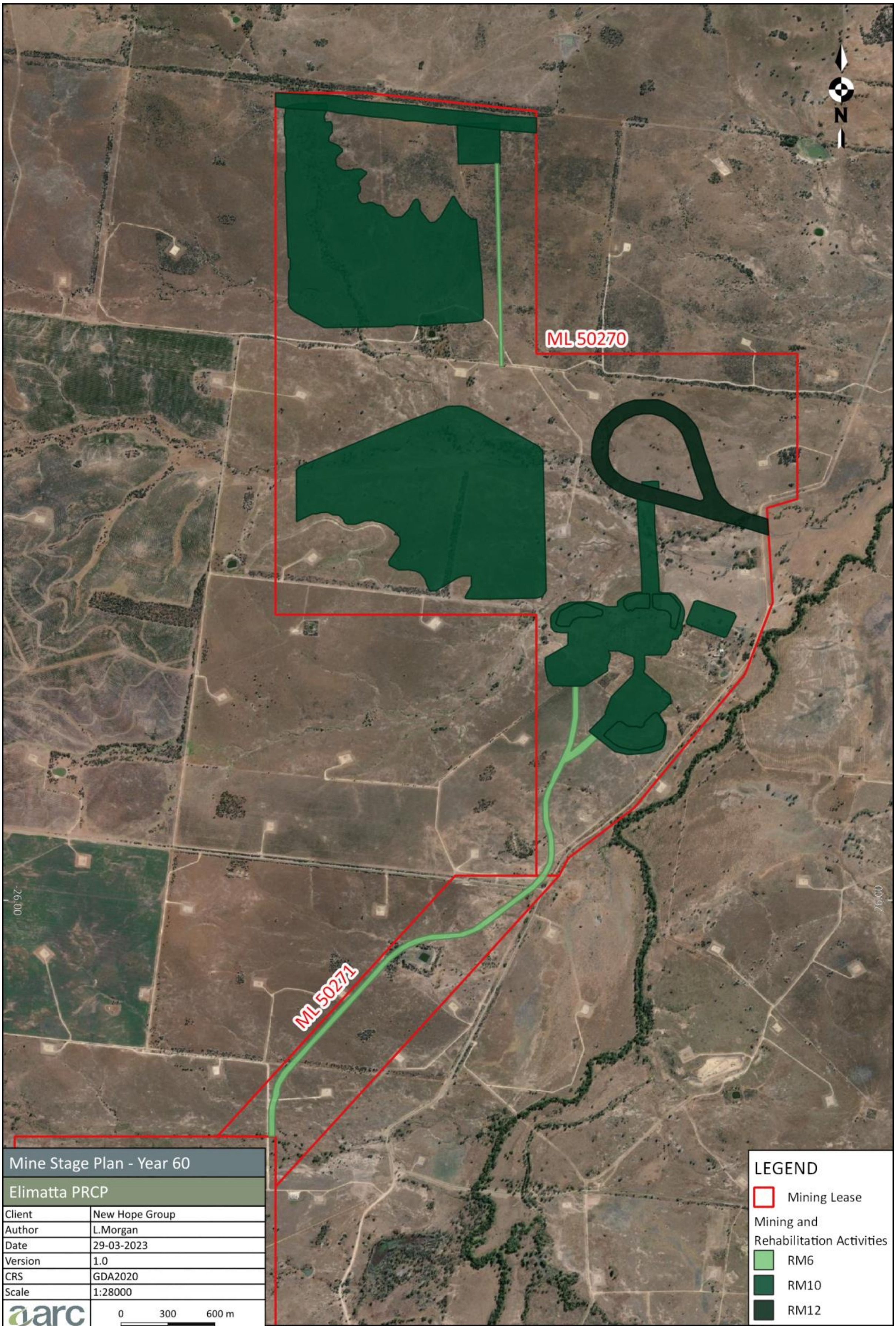
LEGEND
Mining Lease
Mining and Rehabilitation Activities
RM3
RM10
RM12



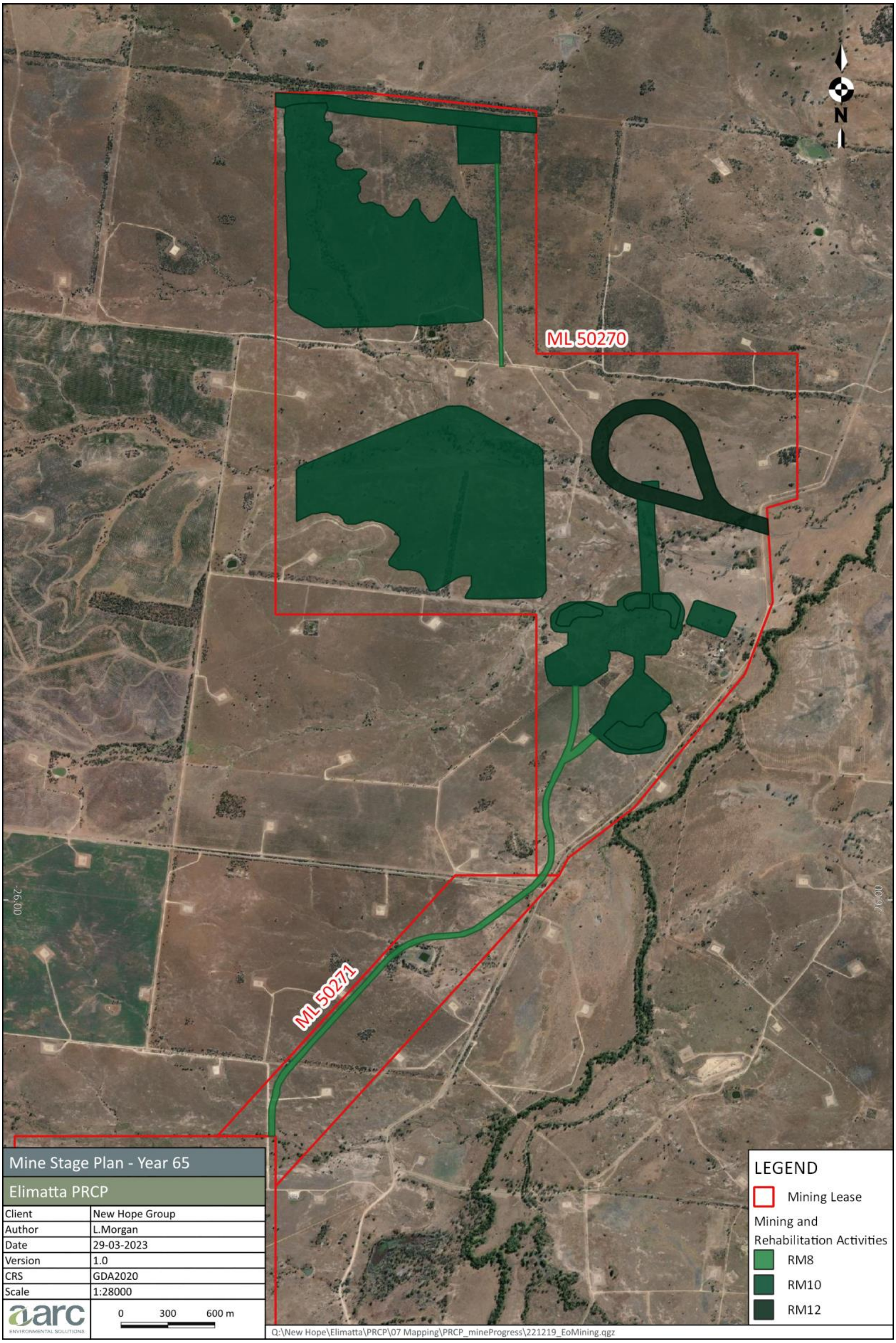
Mine Stage Plan - Year 60

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

aarc ENVIRONMENTAL SOLUTIONS

0 300 600 m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ML 50270
ML 50271
-26.00
-26.00
Mine Stage Plan - Year 65
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
aarc ENVIRONMENTAL SOLUTIONS
0 300 600 m
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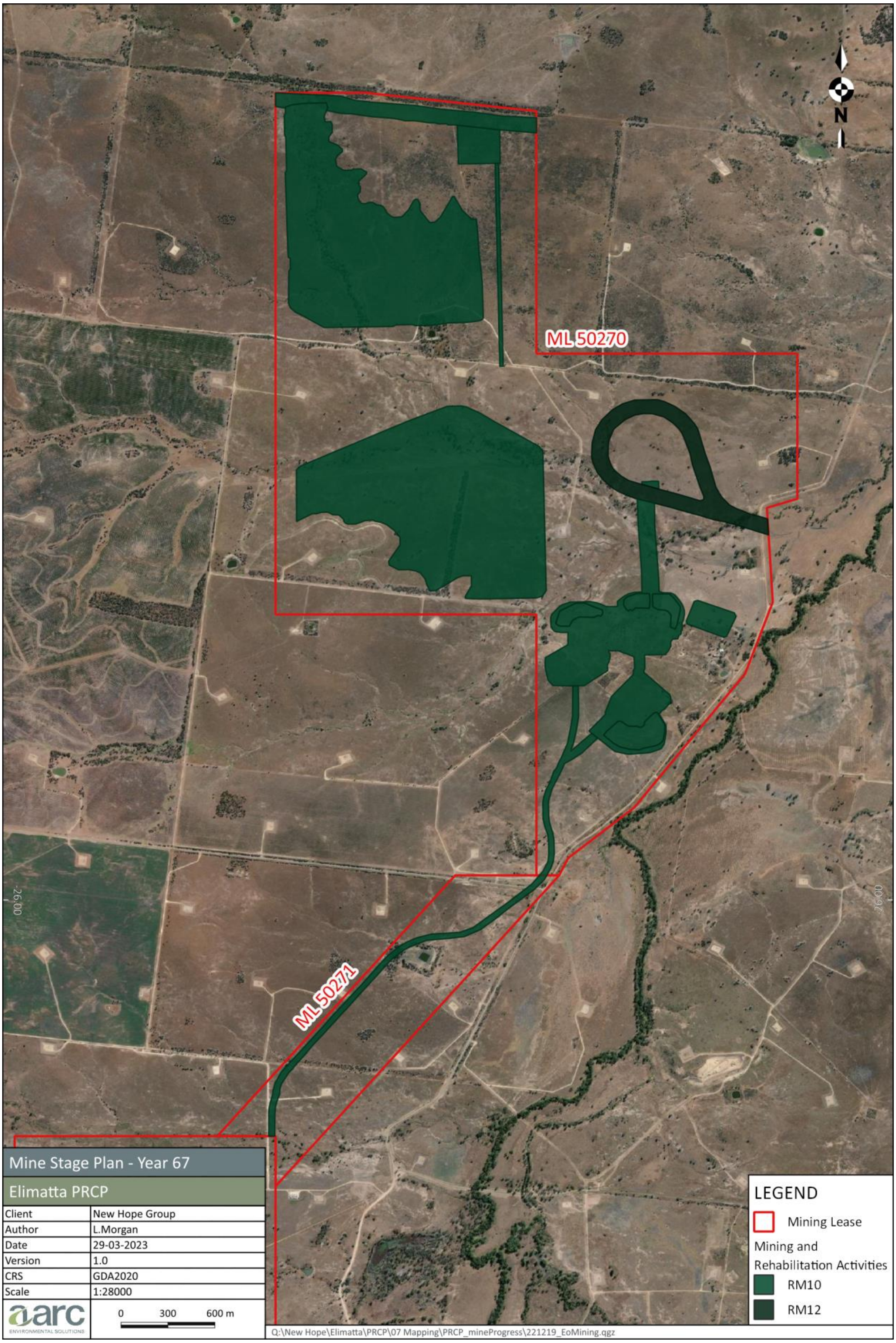
LEGEND
Mining Lease
Mining and Rehabilitation Activities
RM8
RM10
RM12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ML 50270
ML 50271
-26.00
-26.00
Mine Stage Plan - Year 67
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
arc
ENVIRONMENTAL SOLUTIONS
0 300 600 m
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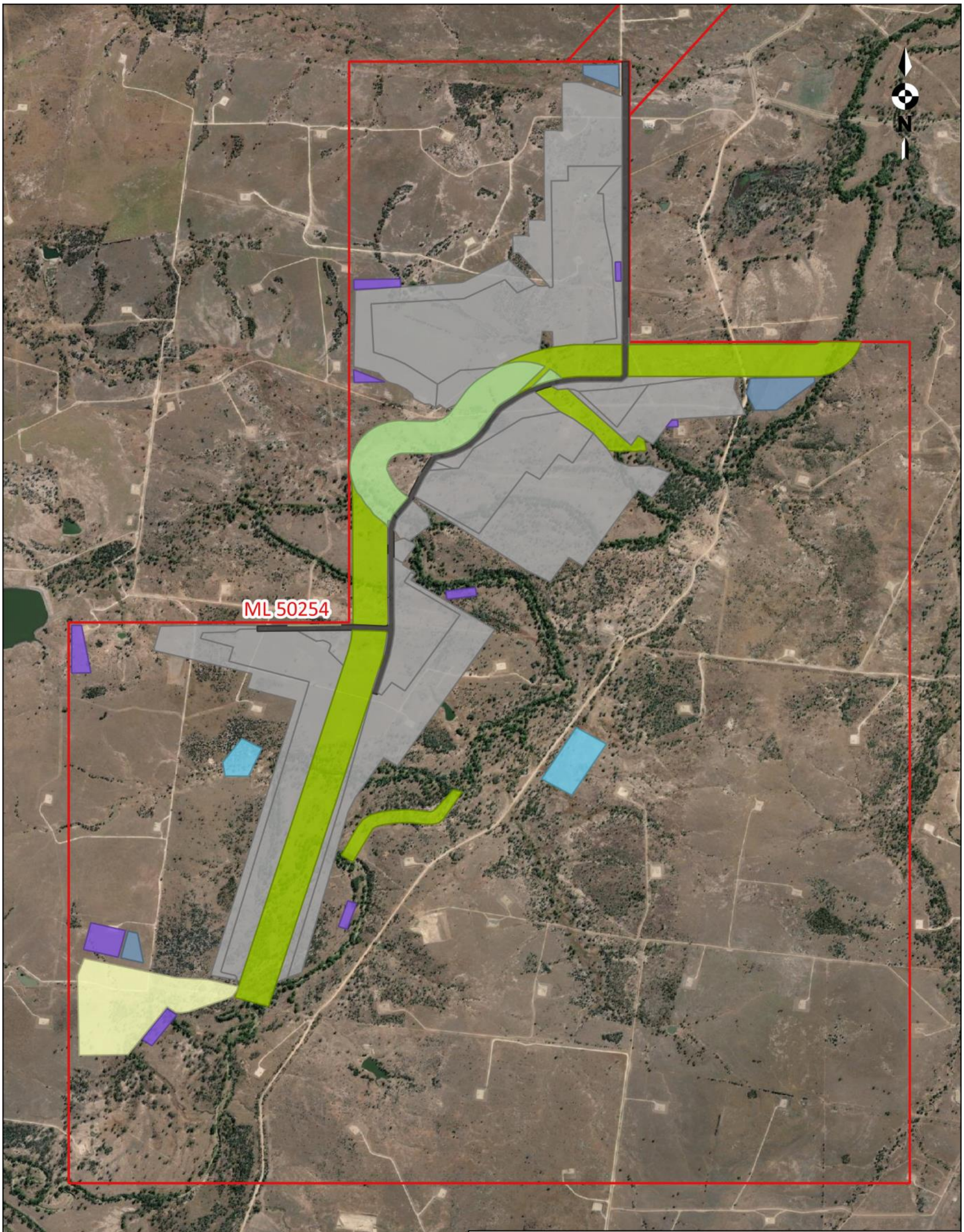
LEGEND
Mining Lease
Mining and Rehabilitation Activities
RM10
RM12



Mine Stage Plan - Year 5

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

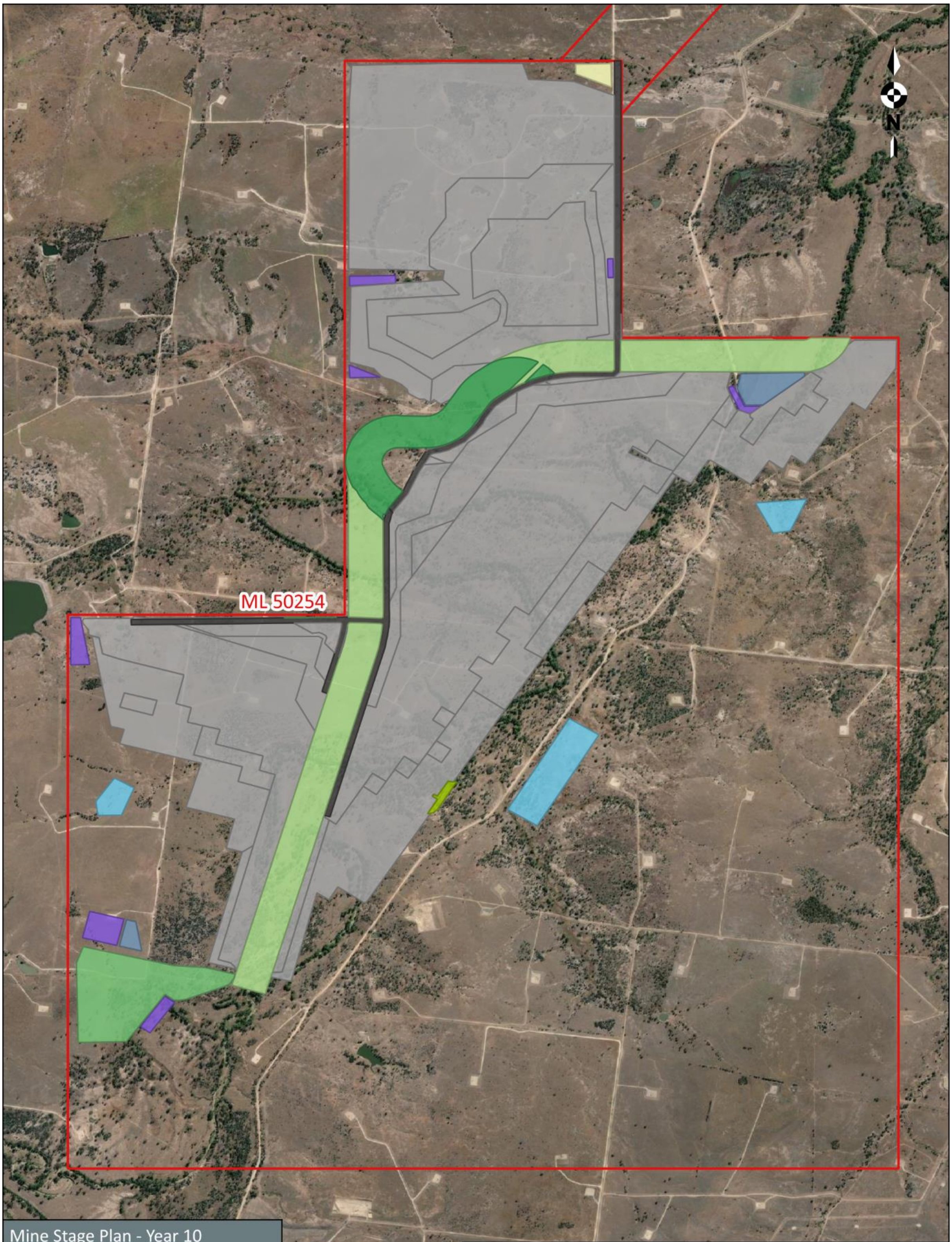
aarc ENVIRONMENTAL SOLUTIONS

0 300 600 m

LEGEND

- Mining Lease
- Mining and Rehabilitation Activities
  - Active Mining
  - Haul Road
- Land Available
- RM5
- Water Management
  - Raw Water Dam
  - Environmental Dam
  - Sediment Dam
  - Creek Diversion
  - Levee

Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz



Mine Stage Plan - Year 10

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

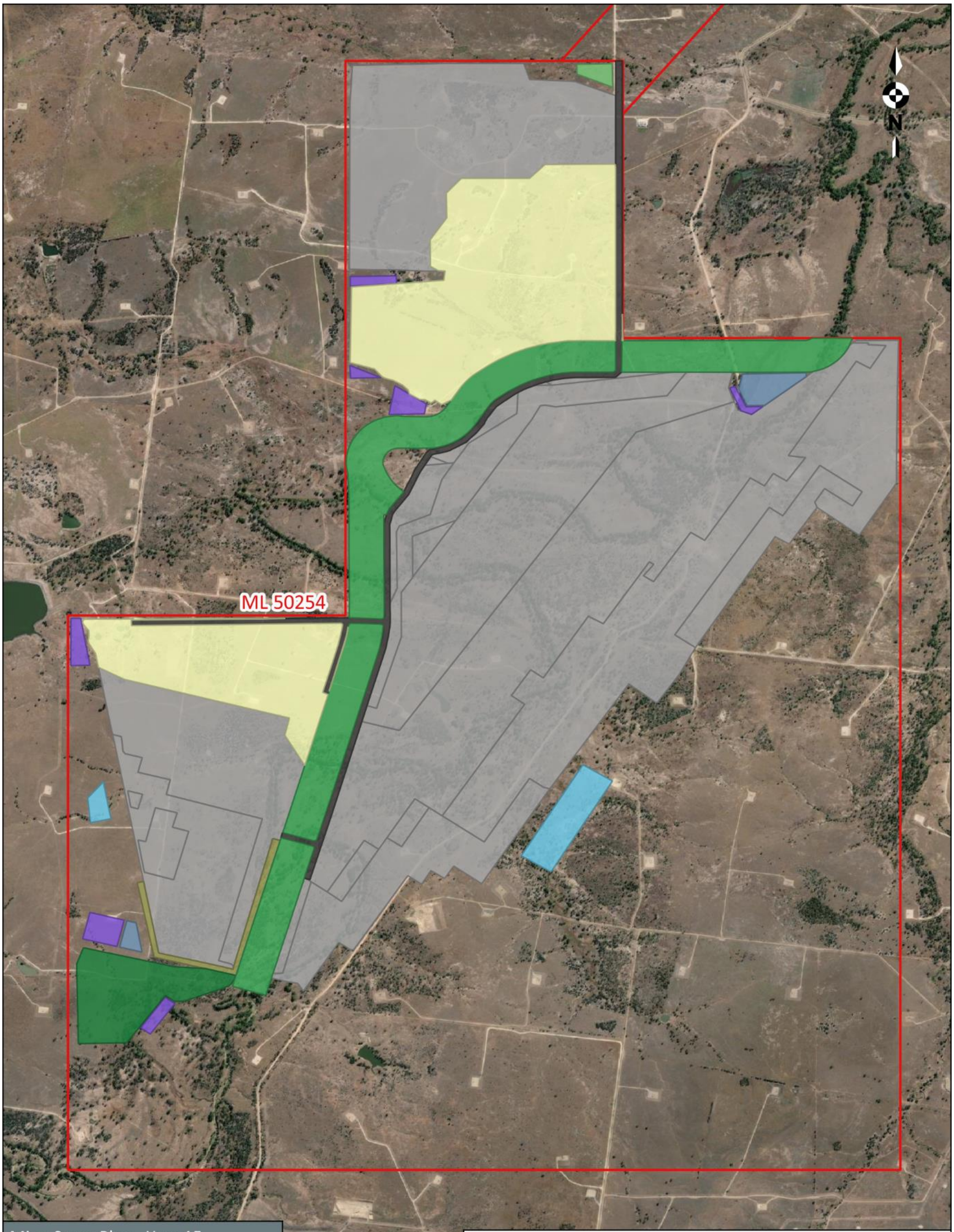
arc ENVIRONMENTAL SOLUTIONS

0 300 600 m

LEGEND

- Mining Lease
- Mining and Rehabilitation Activities
  - Active Mining
  - Haul Road
- Land Available
- RM5
- RM6
- RM7
- Water Management
  - Raw Water Dam
  - Environmental Dam
  - Sediment Dam
  - Creek Diversion

Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz



Mine Stage Plan - Year 15

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

aarc ENVIRONMENTAL SOLUTIONS

0 300 600 m

LEGEND

Mining Lease

Year15
Mining and
Rehabilitation Activities

Active Mining

Haul Road

Land Available

RM6

RM7

RM8

Water Management

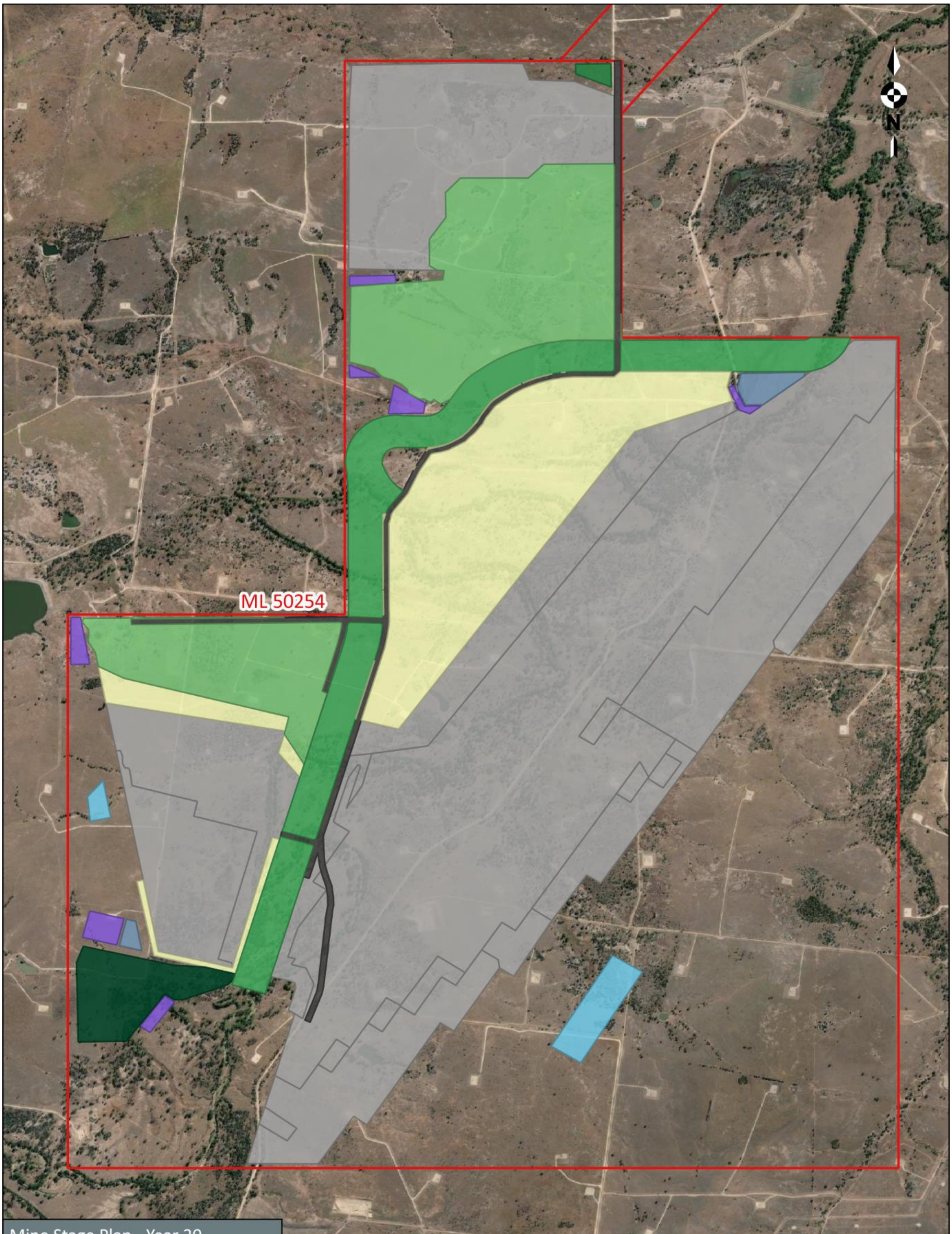
Raw Water Dam

Environmental Dam

Sediment Dam

Levee

Q:\New Hope\Elimatta\PRCP\07 Mapping\PRCP_mineProgress\221219_EoMining.qgz



Mine Stage Plan - Year 20	
Elimatta PRCP	
Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

aarc ENVIRONMENTAL SOLUTIONS

0 300 600 m

LEGEND

- Mining Lease

Mining and Rehabilitation Activities

- Active Mining
- Haul Road
- Land Available
- RM6
- RM7
- RM8
- RM10

Water Management

- Raw Water Dam
- Environmental Dam
- Sediment Dam

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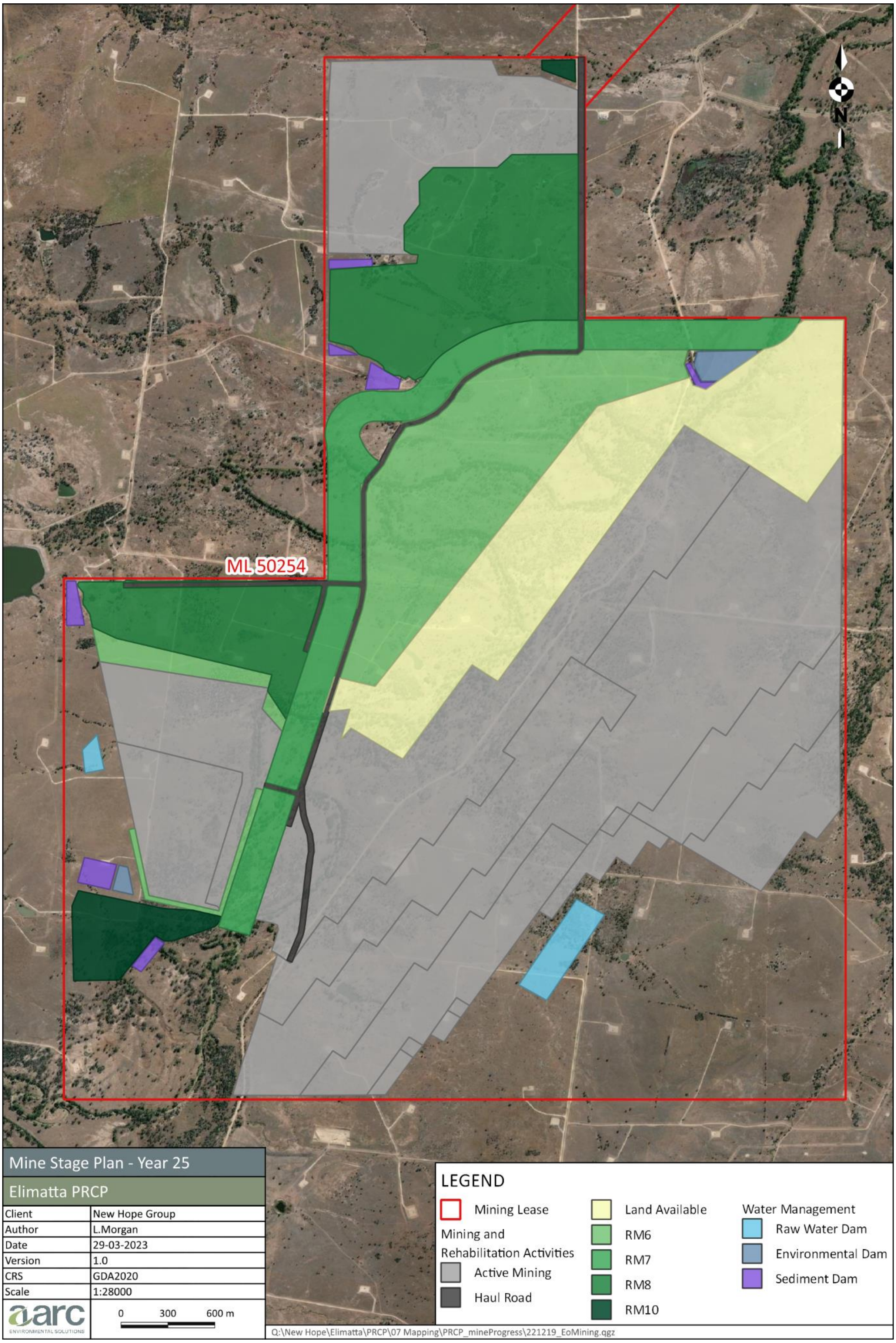
ML 50254
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Mine Stage Plan - Year 25
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 29-03-2023
Version 1.0
CRS GDA2020
Scale 1:28000
0 300 600 m
LEGEND
Mining Lease
Mining and Rehabilitation Activities
Active Mining
Haul Road
Land Available
RM6
RM7
RM8
RM10
Water Management
Raw Water Dam
Environmental Dam
Sediment Dam
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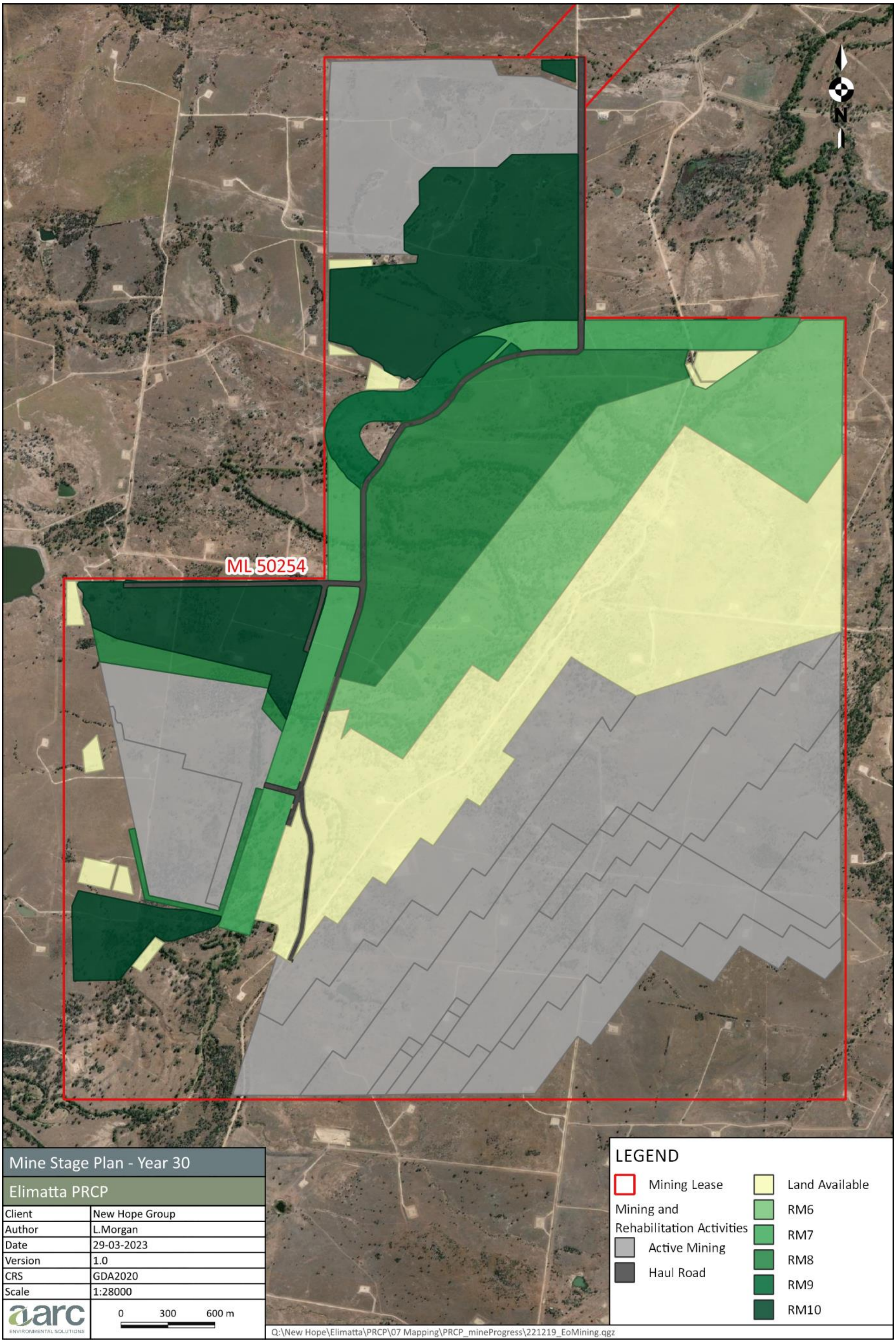
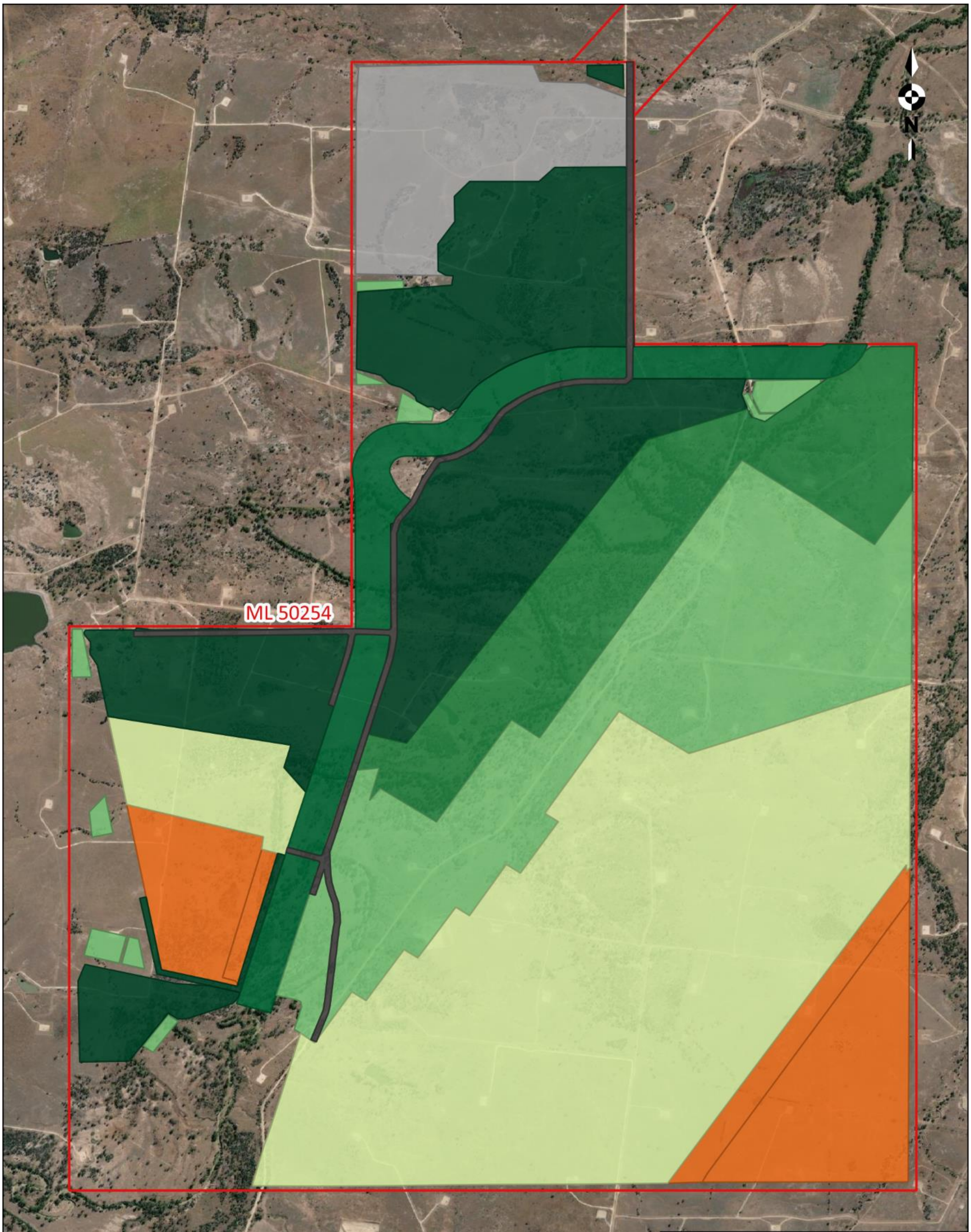


Mine Stage Plan - Year 30

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000



Mine Stage Plan - Year 35

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	29-03-2023
Version	1.0
CRS	GDA2020
Scale	1:28000

arc ENVIRONMENTAL SOLUTIONS

0 300 600 m

LEGEND

- Mining Lease

Mining and Rehabilitation Activities

- Active Mining
- Haul Road
- RM3
- RM6
- RM8
- RM9
- RM10
- MM3

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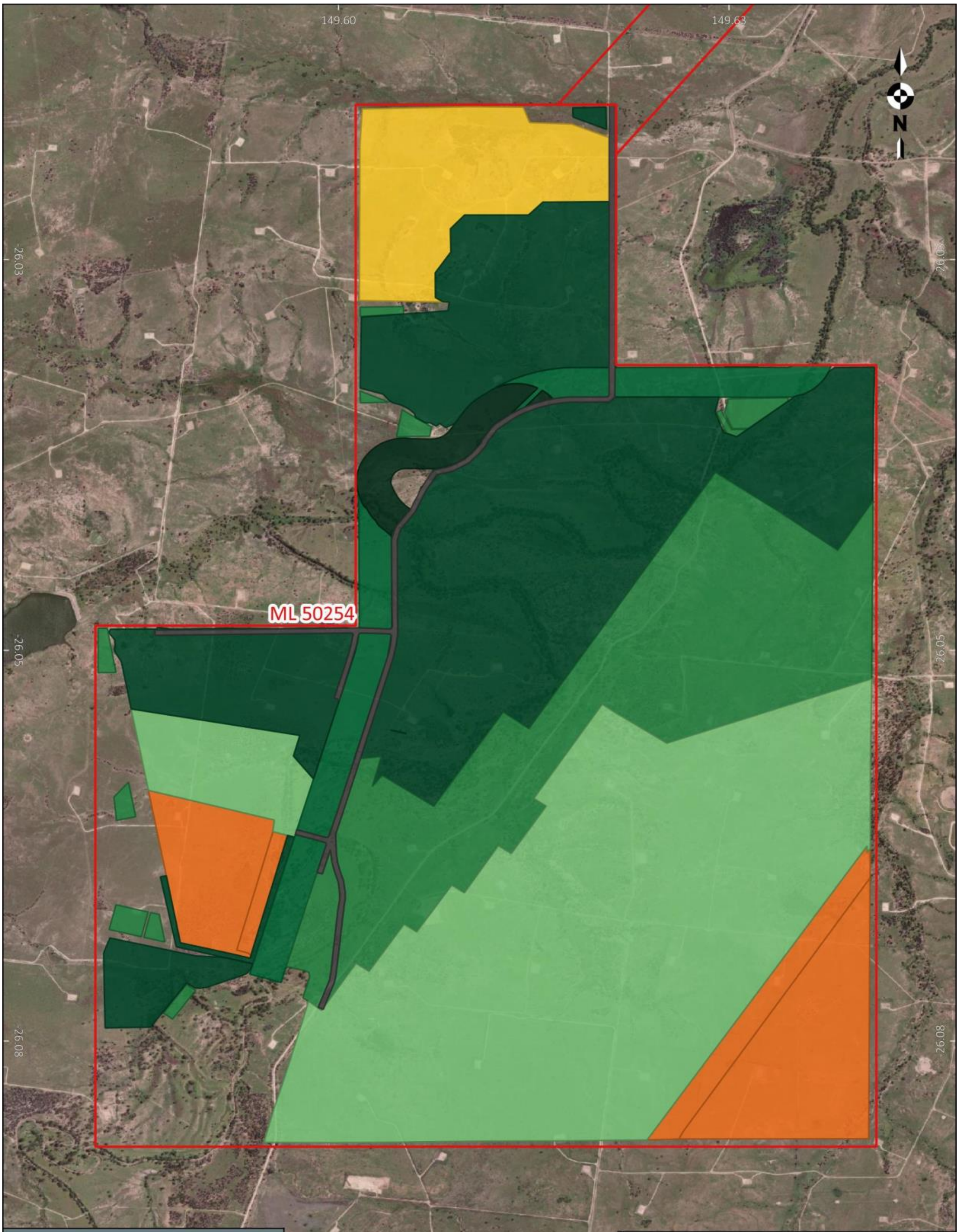

Mine Stage Plan - Year 40

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
Scale	1:30000
arc ENVIRONMENTAL SOLUTIONS	0 300 600 m

LEGEND

- Mining Lease

Mining and Rehabilitation Activities

- Haul Road
- RM6
- RM8
- RM9
- RM10
- RM11
- MM1
- MM3

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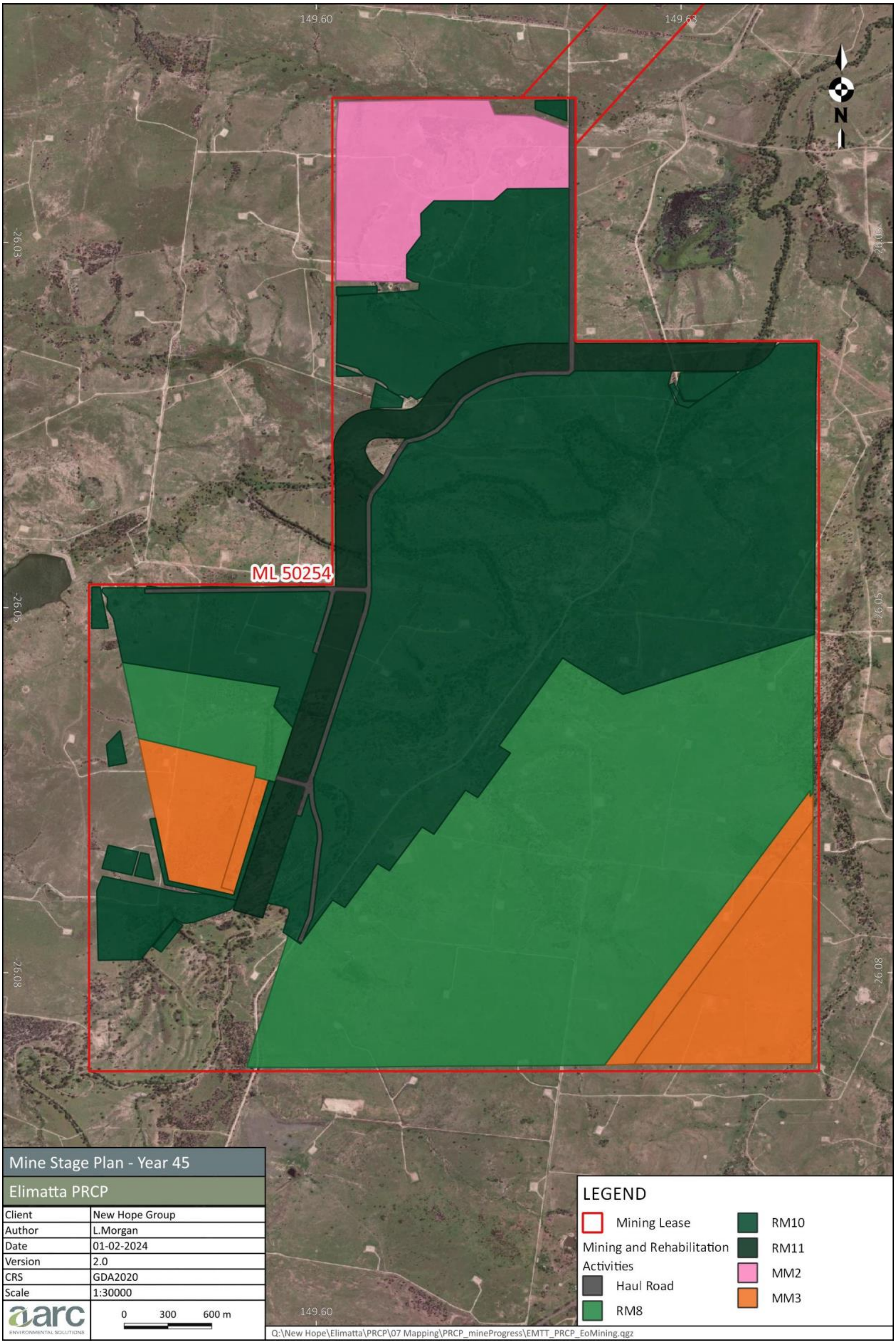

Mine Stage Plan - Year 45

Elimatta PRCP

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Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
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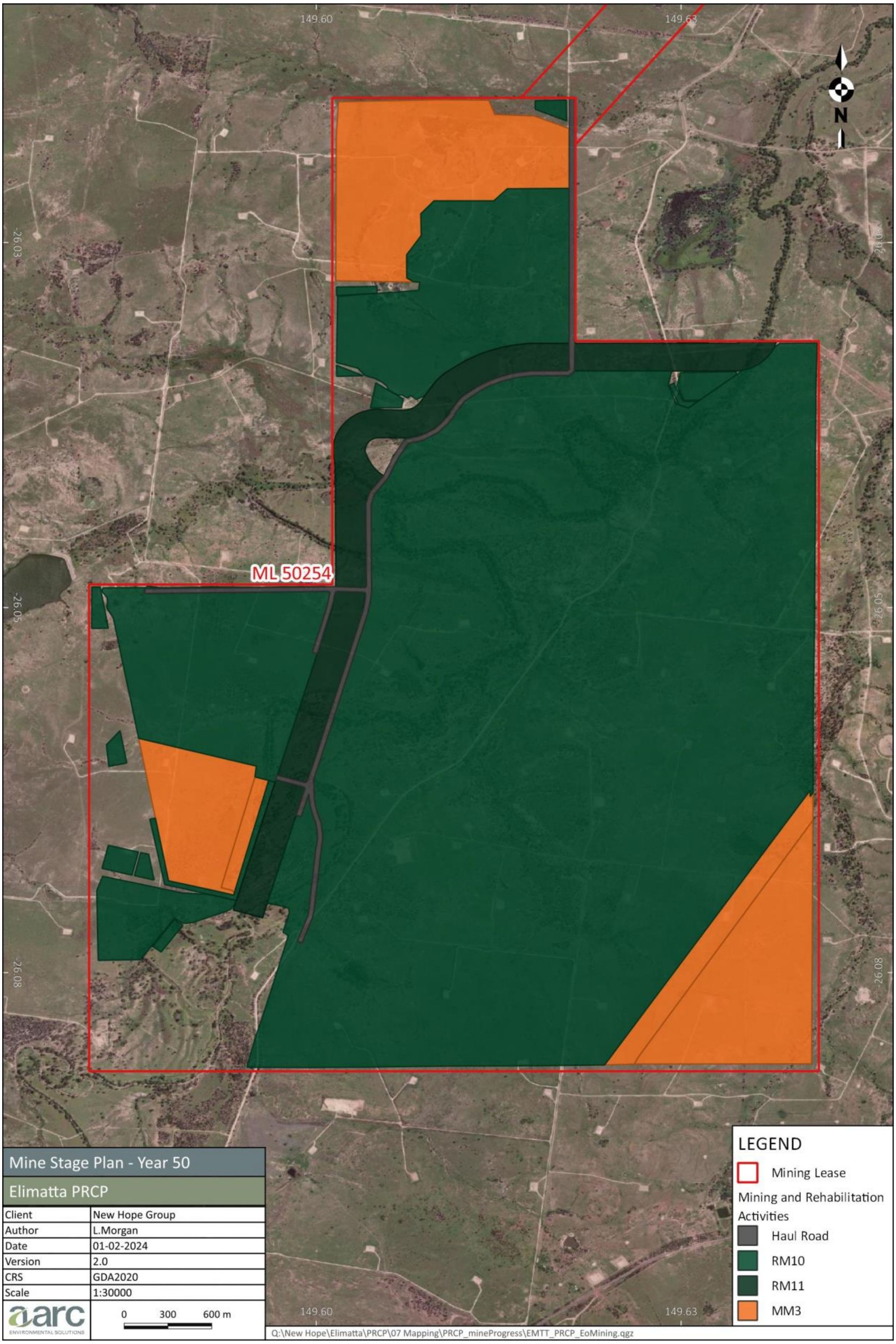
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ML 50254
Mine Stage Plan - Year 50
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 01-02-2024
Version 2.0
CRS GDA2020
Scale 1:30000
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LEGEND
Mining Lease
Mining and Rehabilitation Activities
Haul Road
RM10
RM11
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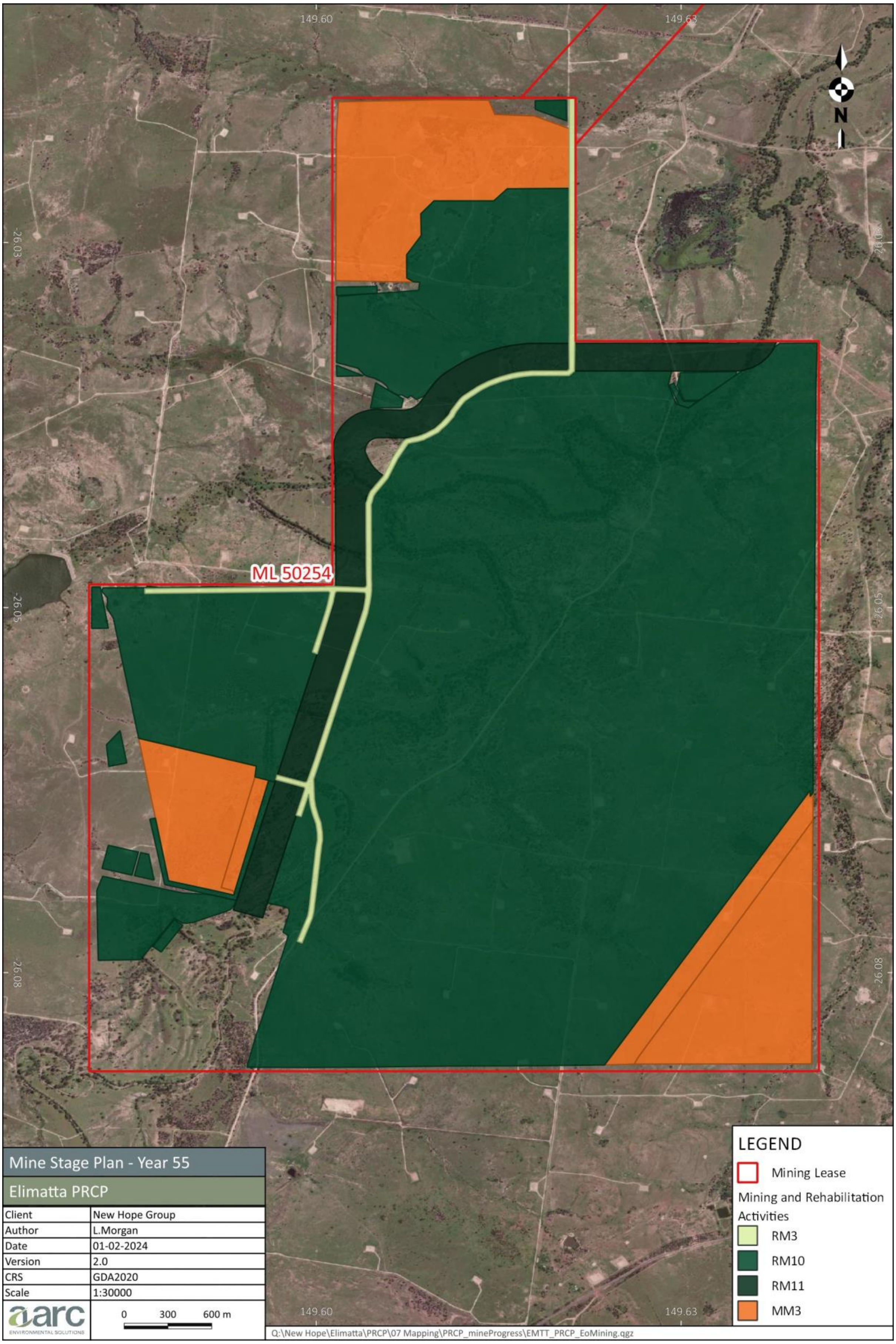
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Mine Stage Plan - Year 55
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 01-02-2024
Version 2.0
CRS GDA2020
Scale 1:30000
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arc
ENVIRONMENTAL SOLUTIONS
LEGEND
Mining Lease
Mining and Rehabilitation Activities
RM3
RM10
RM11
MM3
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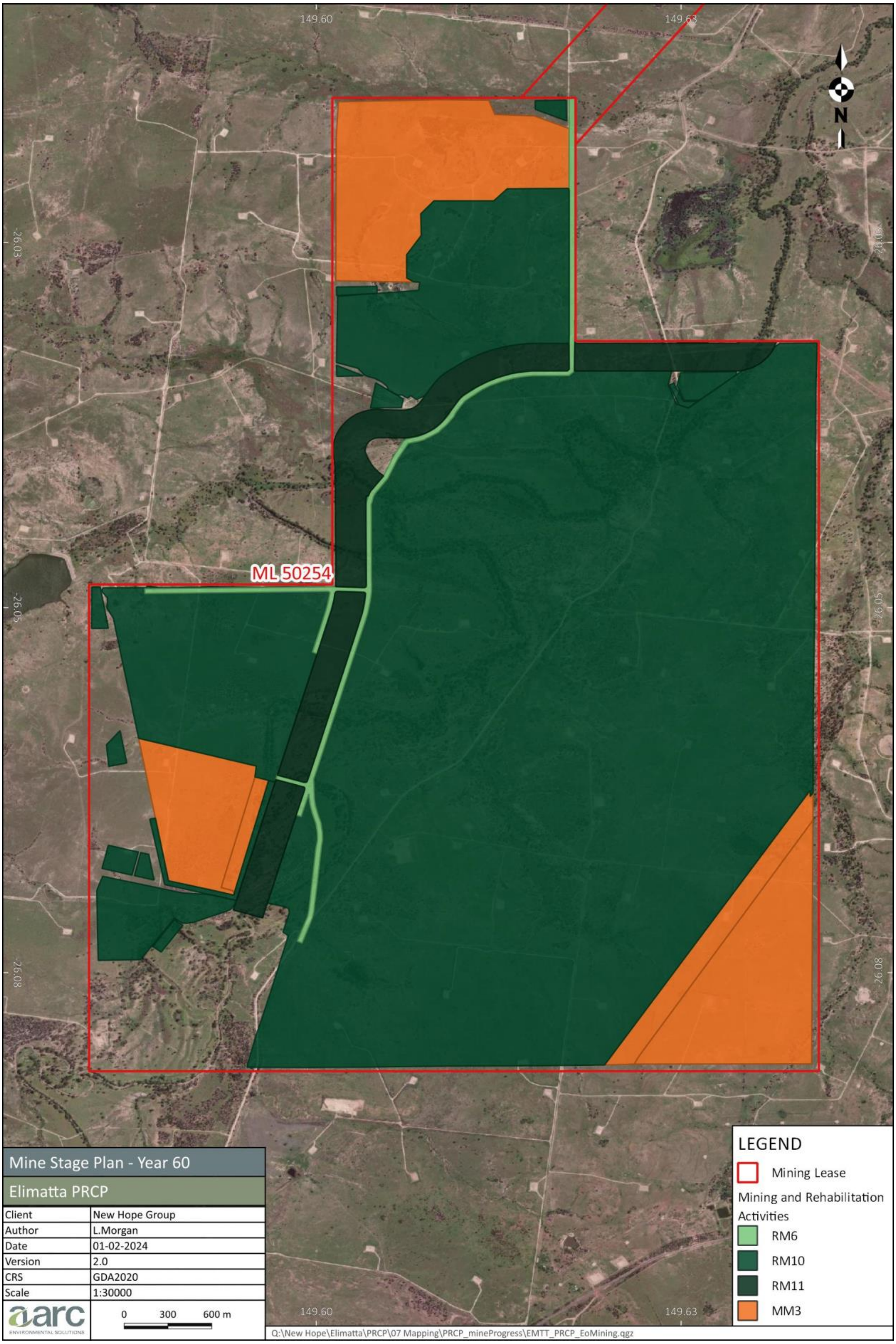

Mine Stage Plan - Year 60

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
Scale	1:30000

arc ENVIRONMENTAL SOLUTIONS

0 300 600 m

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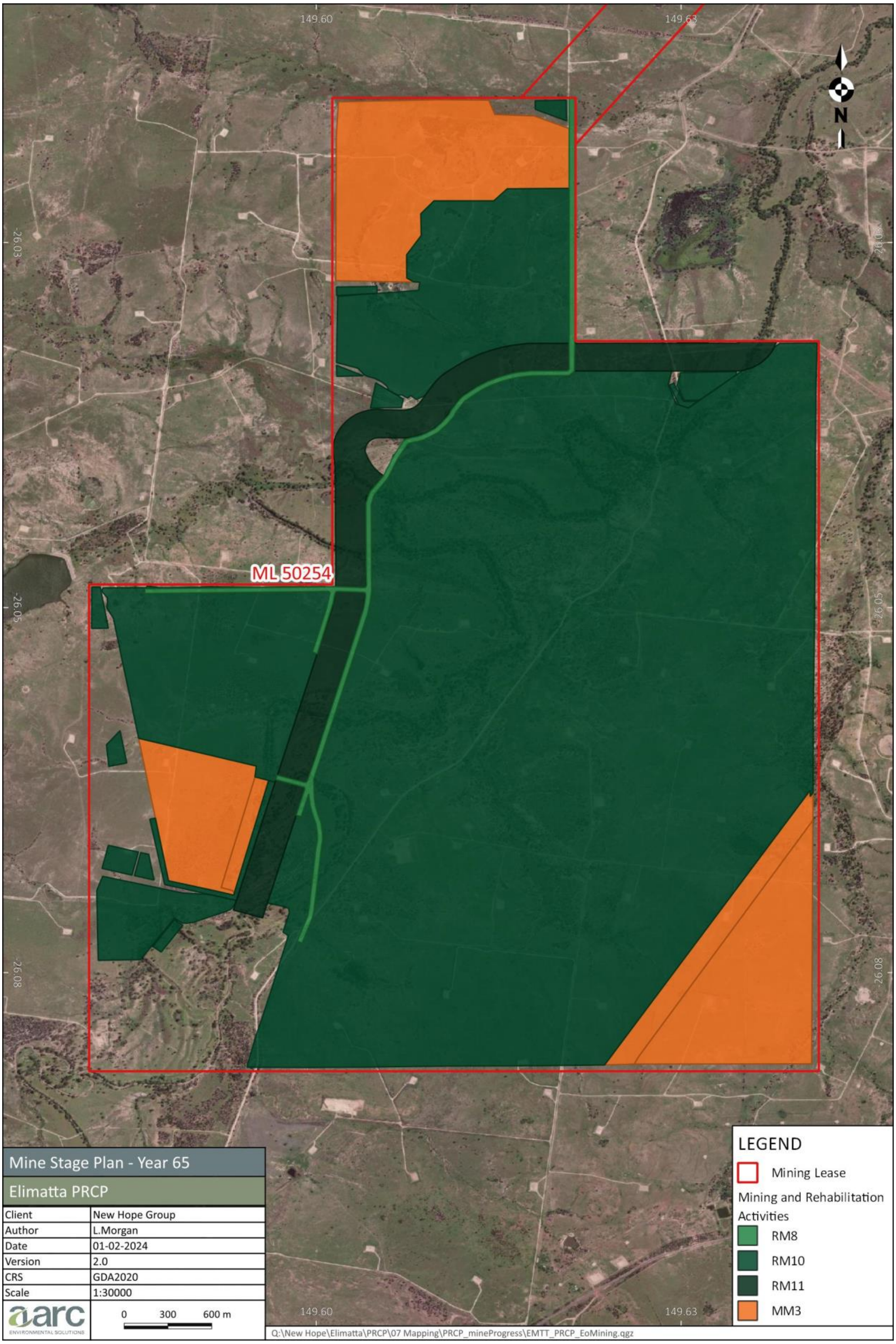
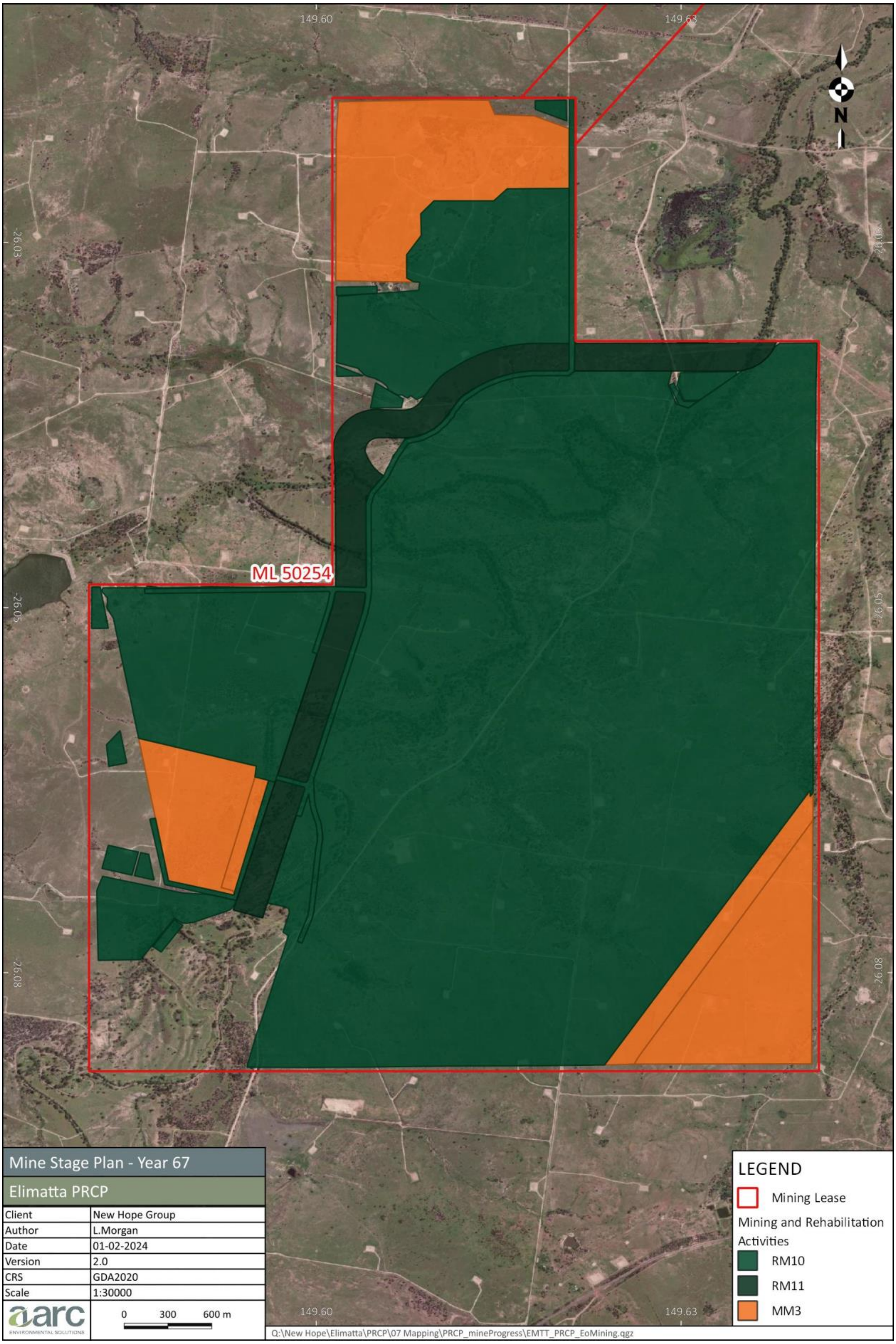


Mine Stage Plan - Year 65

Elimatta PRCP

Client	New Hope Group
Author	L.Morgan
Date	01-02-2024
Version	2.0
CRS	GDA2020
Scale	1:30000

arc ENVIRONMENTAL SOLUTIONS



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N
ML 50254
LEGEND
Mining Lease
Mining and Rehabilitation Activities
RM10
RM11
MM3
Mine Stage Plan - Year 67
Elimatta PRCP
Client New Hope Group
Author L.Morgan
Date 01-02-2024
Version 2.0
CRS GDA2020
Scale 1:30000
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Appendix D. Stakeholder Engagement Plan

Local Stakeholder Management Plan - Elimatta Coal Mine

PREPARED FOR
New Hope Group

NOVEMBER 2022

aarc
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Document Control

Project Name:	**Elimatta Coal Mine**
Report Title:	Local Stakeholder Management Plan
Client:	New Hope Group
Project Manager:	Stuart Ritchie

Version	Comments	Author	Reviewer	Date
Draft issued for client review		NW	SR	18 November 2022
Final issued to client		NW	SR	1 February 2024

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1 Introduction

The New Hope Group (NHG) is committed to developing and maintaining successful partnerships and working relationships with the people impacted both directly and indirectly by our operations. Good communication and stakeholder engagement is crucial to sustaining positive and enduring relationships based on trust and mutual benefit, and in turn building acceptance, support and a 'social licence to operate' within our communities.

To date, the NHG has undertaken significant community and stakeholder engagement as part of the 2014 Environmental Impact Statement (EIS). Stakeholder engagement has included interactive processes, in which stakeholders and the community have been engaged as active partners.

The Local Stakeholder Management Plan (LSMP) is targeted for residents within the vicinity of the Project potentially affected by social and environmental impacts, and includes:

- impacts management;
- consultation strategies; and
- complaints resolution.

The LSMP outlines the NHG's approach to stakeholder engagement and community consultation with its near neighbours, as well as the NHG's complaints handling process. The aim of the LSMP is to ensure that impacts and concerns raised by residents and their suggested mitigation measures are considered, by facilitating open communication and active complaint resolution.

1.1 Objectives

The main objective of community consultation include:

- ensure that the likely affected stakeholders are identified;
- affected stakeholders are provided with enough information and understanding of the Project;
- determine stakeholder interest in the Project and the relevant impacts likely to be experienced;
- consider the views and insights of likely affected stakeholders to inform Project operations and closure;
- provide collaboration opportunities on the Project from construction to closure and rehabilitation;
- help stakeholders understand mitigation and management measures implemented for impact reduction; and
- provide ongoing consultation with relevant stakeholders for the duration of the Project.

2 Project Background

The Elimatta Coal Mine (the Project) is a proposed open cut coal mine located approximately 45 kilometres (km) southwest of the township of Taroom in Southern Queensland and approximately 380 km northwest of Brisbane (Figure 1 and Figure 2). The Project is planned to mine up to 8.2 million tonnes per annum (Mtpa) of ROM coal to produce on average 5 Mtpa of product coal for export.

Based on an assessment of the available resource for the Environmental Impact Statement (EIS) (AARC 2014), the expected production life of the Project is in excess of 32 years. Including construction through to decommissioning, the whole-of-project life is near to 40 years.

The Project encompasses three Mining Leases (MLs), including ML 50354, ML 50270, and ML 50271. ML 50254 will contain the proposed open-cut pit areas and stockpiles, encompassing a total area of 2,779 ha. ML 50270 will consist of the Coal Handling and Processing Plant (CHPP), rail load-out facility and other associated mine infrastructure including tailings storages and an accommodation village. ML 50270 will encompass a total area of 1,075 ha. Linking these two areas, ML 50271 will serve as a transport and services corridor for the transportation of Run-of-Mine (ROM) coal from the pit to the CHPP and will cover a total area of 128 ha. The maximum area proposed to be disturbed across all MLs is 3,982 ha.

A Rail and Services Corridor is also included as part of the Project. This corridor will be a common user corridor and encompass the development of the West Surat Link (WSL) railway, as well as service infrastructure to support the Project. Product coal is to be transported via the WSL to join the Surat Basin Rail (SBR) northeast of the Wandoan township. Product coal will be railed to the planned Wiggins Island Coal Export Terminal (WICET) at Gladstone for export. The development of the Rail and Services Corridor will extend approximately 36 km, with an assumed width of 100 m, covering a total area of approximately 360 ha (Figure 2).

The main disturbance footprints of the Project are:

- Opencut mining over approximately 2,287ha (MLA 50254);
- Out-of-pit stockpiling of spoil over approximately 183ha (MLA 50254);
- Relocation of Horse Creek and Perretts Road from within the mining area (MLA 50254);
- Development of a common user Rail and Services Corridor to service the Project;
- Construction and operation of a CHPP and associated mine infrastructure, including tailings storages and an accommodation village over approximately 340ha (MLA 50270);
- Transportation of ROM coal from the pit to the CHPP via a dedicated haul road (MLA 50271); and
- Rail loading at the project site and transportation of product coal to the WICET in Gladstone.

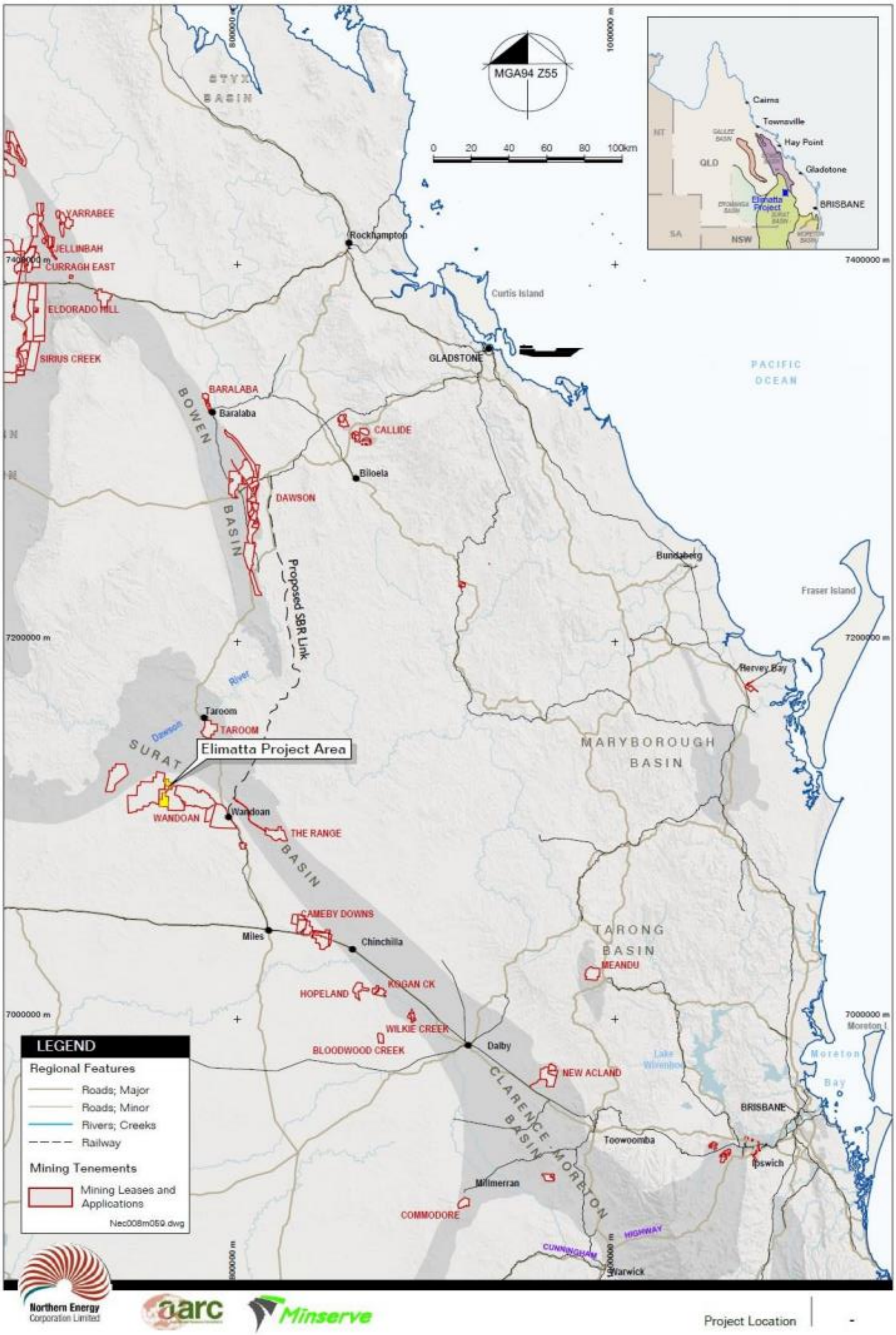

Figure 1: Project locality

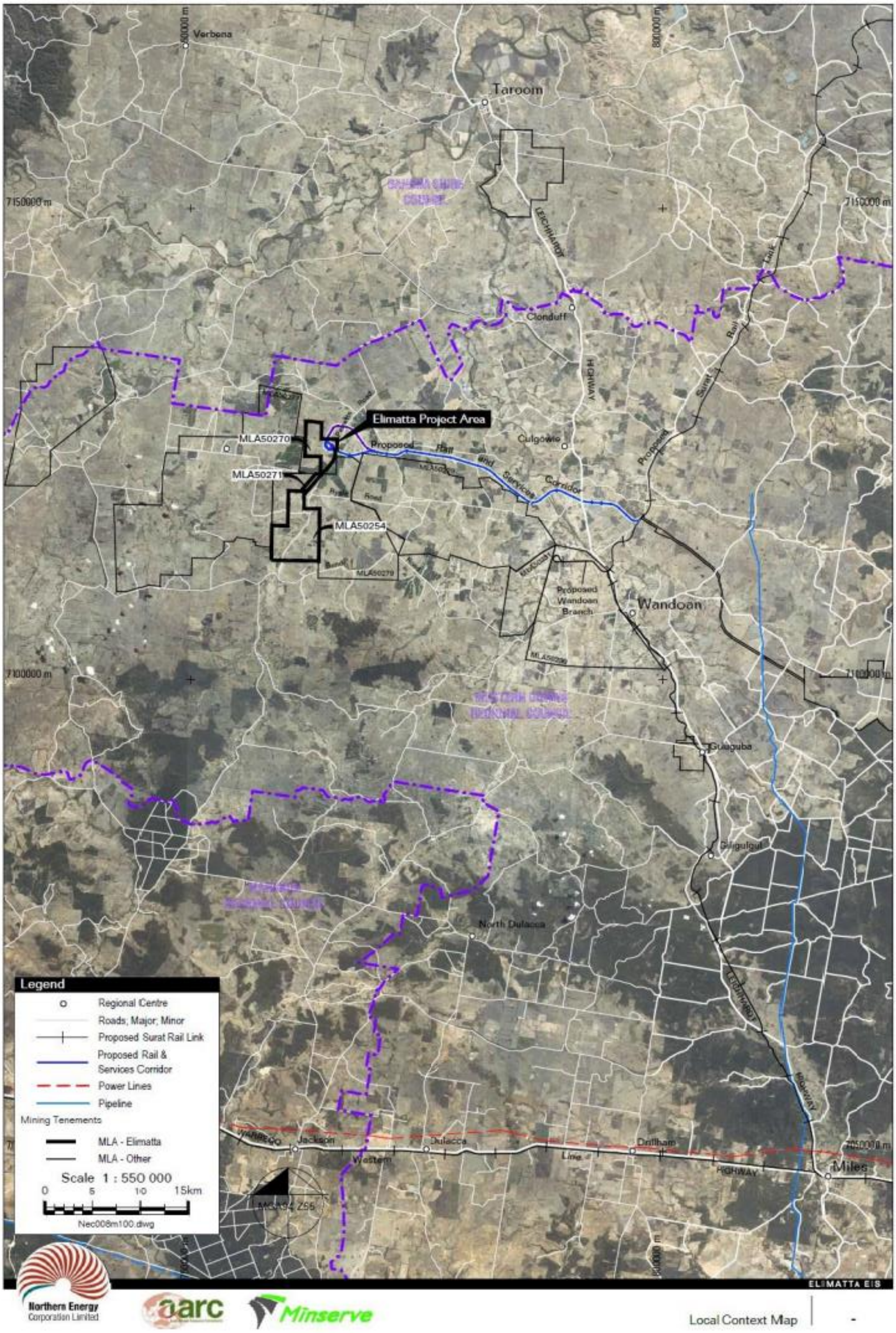

Figure 2: Local context of the Project

3 Local stakeholder engagement

3.1 Engagement approach

The NHG will seek to involve the local community during the planning, construction, operation and decommissioning of the Project. In particular, the NHG will seek to understand and address local community concerns about the environmental and social impacts of the Project's activities. A proactive and open approach to local community engagement will be undertaken as part of the revised Project.

The following key principles will apply to all revised Project engagement and communication:

- a proactive approach to local stakeholder engagement will be applied;
- respect will be shown at all times;
- ensure a two-way conversation between the NHG and the local stakeholders;
- develop local community understanding of the opportunities and benefits of the revised Project;
- maintain regular contact and engagement with the local stakeholders;
- provide feedback to the local stakeholders on how their input has informed decisions; and
- record all significant contact with local stakeholders.

The key local stakeholder groups, their primary interests and the range of engagement mechanisms NHG will use throughout the revised Project are outlined in Table 1.

Table 1: Local stakeholder engagement mechanisms

Stakeholder Group	Primary Interest	Engagement Mechanisms
Local Landholders	• Effects on farming practices and livelihoods • Property acquisition and relocation • Compensation agreements • Community funds and benefits • Property values • Access and connectivity • Social networks and connections • Dust, noise, light & amenity • Traffic • Vegetation clearing • Weeds and Pests	• Individual meetings on affected properties • Community Reference Group • Property acquisition through land valuator • Dedicated Community Liaison Officer • Dedicated project phone number and email address • Oakey Community Information Office • Personal telephone calls, letters, emails • Quarterly newsletters • Results of environmental monitoring • Community information sessions • Community Investment Fund • Community Sponsorship and Donation Fund • Site tours and neighbours open days

Stakeholder Group	Primary Interest	Engagement Mechanisms
Resident Community	• Job and business opportunities • Education and training opportunities • Community funds and benefits • Community cohesion and social values • Dust and noise • Integration of workforce • Access to social services • Traffic and congestion	• Community information sessions • Community Reference Group • Quarterly community newsletter • Oakey Community Information Office • Dedicated project phone number and email address • Website • Participation in local events • Dedicated Community Liaison Officer • Community Investment Fund • Community Sponsorship and Donation Program • Public site tours • Media releases and local media advertising

3.1.1 Engagement frequency and information

The initial proposed engagement frequency for direct consultation or meetings with stakeholders is every 2 months (bimonthly) starting approximately 12 months prior to Project construction. This will be reviewed annually and after each engagement undertaken to determine the appropriate frequency for ongoing consultation. Consultation frequency may be reduced if interest in the Project declines, however, will still be undertaken for any changes relating to construction, development, operations, closure and rehabilitation that may affect stakeholders. This can include information briefings, notices, mail drops, phone calls, emails, and community meetings. The method of engagement will be determine based on the perceived impacts and preferred method of communication by stakeholders. Stakeholders will be provided with information on engagement opportunities to allow all stakeholders the opportunity to participate.

Information that may be released to stakeholders can include, but will not be limited to:

- information relating to Project development and timeframes;
- rehabilitation and closure including final landform and post-mining land uses;
- potential impacts from the Project and proposed mitigation and management measures; and
- any changes to the Project operations, design, decommissioning.

3.2 Reporting

The NHG is focussed on ensuring a two-way conversation with stakeholders and the wider community and will actively seek feedback on the revised Project's impacts and benefits. Where possible, the Project team and those responsible for the technical studies will be directly involved in engagement activities and conversations with stakeholders to encourage a responsive approach to feedback. This method also assists in ground truthing study findings and understanding stakeholder's preferred mitigation and management strategies as they are advised and integration of this feedback into the mine plan, rehabilitation strategy and mine decommissioning where relevant.

Community feedback will be used to monitor the effectiveness of the Project's mitigation strategies and action plans. If feedback indicates a need to adjust the mitigation strategies and action plans the following process will be followed:

- community feedback on the mitigation measure will be reviewed further to better understand the issue;

- the feedback will be investigated further through discussions with stakeholders, community members, government agencies and other groups, field investigations, further technical monitoring or data collection as required; and
- following the investigation, recommendations will be made to the New Hope Operations Manager regarding the appropriate course of action. If necessary, Action Plans will be updated as needed and communicated to the relevant personnel for implementation.

The NHG is focussed on ensuring a two-way conversation with stakeholders and the wider community and will actively seek feedback on the revised Project's impacts and benefits.

3.3 Complaint resolution

To facilitate open communication and active complaint resolution, it is important that local stakeholders are able to raise issues and complaints in a formal way. The Project will provide a dedicated Community Liaison Officer with whom local stakeholders can raise issues and concerns relating to the Project.

The Community Liaison Officer is available to receive complaints and can be contacted in person at the Community Information Centre, by email or telephone. The Community Liaison Officer ensures that all issues are conveyed to the appropriate sectors of NHG, including onsite personnel, in the event an issue relates to operational issues.

Concerns and issues raised are recorded and responded to in a timely and consistent manner, and in accordance with regulatory standards and company policies. The following are key principles adhered to by NHG in responding to issues or concerns raised by local stakeholders:

- timeliness – complaints will be dealt with in a timely and efficient manner;
- sensitivity – ensure that both parties feelings and perspectives are respected;
- fairness and impartiality – both parties will be afforded substantive and procedural fairness in the resolution process; and
- confidentiality – only parties directly involved in the complaint or those involved in decision making about outcomes will have access to information about the complaint.

For issues relating to the operating mine, neighbours will be provided with access to senior site personnel via a telephone number which operates 24 hours a day. The operating mine has a process for responding to issues and concerns raised by local stakeholders, consistent with the four key principles listed above.

3.4 Communication protocols

The following Sections detail the NHGs communication protocols for engaging with local stakeholders.

3.4.1 Local stakeholder protocols

When taking telephone or email enquiries from local stakeholders the process outlined in Figure 3 will be applied. This scheme has been adopted from the NHG New Acland Project and will be updated accordingly prior to Project commencement.

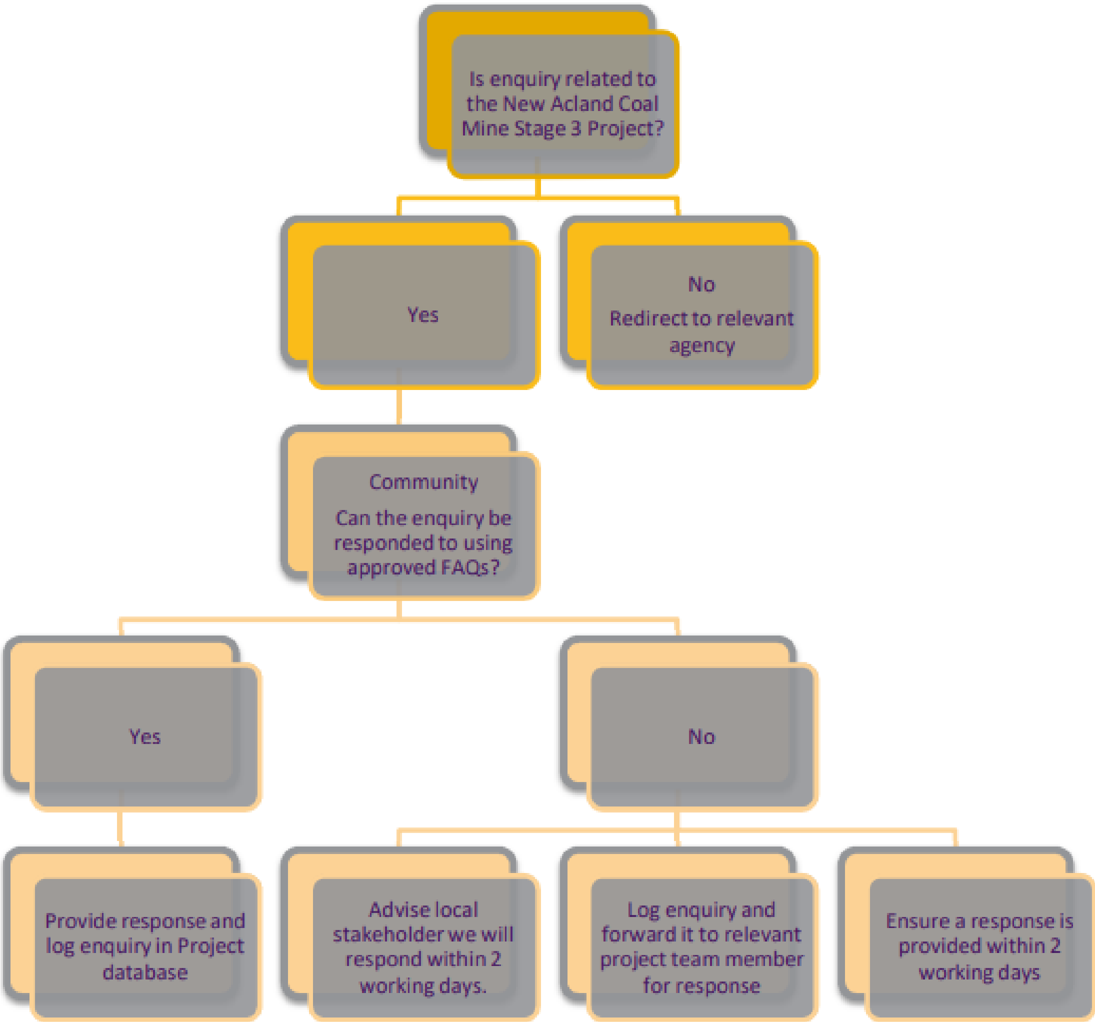

Figure 3: Telephone and email enquiries process

3.4.2 Landowner protocols

Management of local landowner relationships will be managed by the NHG staff. Field staff will be provided with Record of Contact forms for times when informal contact is made. Discussions with landowners will be recorded in Consultation Manager.

4 Evaluation methods

It will be critical to continually monitor and evaluate the effectiveness of the communication and engagement program with the local stakeholders in order to ensure impacts and concerns raised are considered and acted upon where appropriate.

4.1 Evaluation methods

A number of methods will be used to evaluate the effectiveness of the engagement program with local stakeholders. These methods include:

- **Database records**: Database records with an analysis of feedback forms submitted, website hits, telephone calls, incoming emails, tone of enquiries and key issues raised.
- **Benchmarking activities**: Benchmarking activities will be undertaken using questions on any feedback forms and activities to determine changes in local community attitude, knowledge and behaviours.
- **Informal feedback**: All significant informal feedback received from local stakeholders regarding consultation activities will be recorded in the revised Project database and reported and analysed.
- **Observations**: Team members will record their observations during local stakeholder engagement activities. These observations will detail what happened during the activity, who was involved and how they reacted. Team members will also record 'stand out moments' and quotes.
- **Media analysis**: Analysis of negative versus positive media coverage.

4.2 Evaluation criteria

The evaluation criteria for each objective are identified in Table 2.

Table 2: Evaluation criteria

Objective	Method of evaluation	Key indicators
1. Inform the local stakeholders about revised Project benefits and opportunities	• Database records • Benchmarking activities • Informal feedback • Observations • Media analysis	• Level of local stakeholder awareness of the revised Project • Information disseminated as per this strategy
2. Provide open, honest and timely communication with local stakeholders	• Database records • Benchmarking activities • Informal feedback	• Amount of communication with local stakeholders and its effectiveness • Local stakeholders satisfaction levels with the revised Project communication • Response times to local stakeholder enquiries
3. Engage local stakeholders to capture their views and ensure they are understood by the revised Project team and considered in decision making where possible	• Database records • Benchmarking activities • Informal feedback • Observations •	• Amount of feedback received and how it has been acted upon • How and if local stakeholder feedback is successfully communicated to the revised Project team
4. Ensure early identification of potential local stakeholder issues and implementation of appropriate mitigation strategies	• Database records • Benchmarking activities • Observations •	• How feedback has been acted upon • How local stakeholders have influenced Project decisions and mitigation measures

5 Contact

5.1 Community liaison officer

A community liaison officer will be appointed prior to the commencement of the mining activities and contact details provided.

5.2 Corporate land and tenure team

The Corporate Land and Tenure team are based in the NHG offices in Brisbane. Contact details are as follows:

- **Email**: property@newhopegroup.com.au
- **Phone**: (07) 3418 0547

5.3 Corporate community team

The Corporate Community team are based in the NHG offices in Brisbane. Contact details are as follows:

- **Email**: community@newhopegroup.com.au
- **Phone**: (07) (07) 3418 0500 or 1800 882 142

5.4 Elimatta Coal Mine

Contact detailed for the Elimatta Coal Mine will be provided prior to the commencement of the mining activities.

5.5 Media enquiries

For media enquiries, contact details for New Hope's Media Team are as follows:

- **Email**: media@newhopegroup.com.au
- **Phone**: +61 7 3418 0558

Appendix E. Community Consultation Register

Table 3 Consultation Register for the Project

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
11 July 2011	Face to face discussion	Landholder Consultation		The stakeholder has concerns about the land being within 3 mining company's tenements and whether all 3 companies will want different parts of the subject land.	No further action
30 January 2012	Phone call	Invitation to community sessions		The stakeholder was called and messages were left requesting confirmation the stakeholder had received the invitation and to call for further information on the subject.	NEC representative to follow up*
8 March 2011	Face to face discussion	Site conditions for drill program		The stakeholder discussed the site conditions for drill program and the restructure of Northern Energy following the takeover of New Hope.	NEC representative to follow up with a call
1 July 2011	Phone call	Landholder consultation		Arrange an onsite meeting with the stakeholder	No further action
16 August 2011	Face to face discussion	Landholder Compensation and Land Access Agreement		The stakeholder was provided with information on land access rights as a landholder, a map showing boreholes to be rehabilitated by NEC and told monetary compensation will be given at a follow up meeting.	No further action
22 September 2011	Face to face discussion	Landholder consultation		The stakeholder signed the standard compensation agreement and waiver of notice of entry.	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
14 October 2011	Phone call	Rehabilitation and outstanding compensation payment.		The stakeholder called NEC to acknowledge the rehabilitation activities on the property's boreholes were going well and to chase an outstanding quarterly compensation payment. The stakeholder was told the payment would be posted to him and a follow up meeting between stakeholder and NEC representatives will be made at the end of the month.	NEC representative to follow up with a meeting
30 January 2012	Phone call	Arrange meeting to discuss social impact assessment		An appointment was made with the stakeholder to discuss the social impact assessment.	No further action
1 February 2012	Face to face discussion	Landholder consultation		The stakeholder raised concerns about impact of mining in regional area and impacts on their property	No further action
13 September 2011	Stakeholder briefing	Elimatta introduction to Department of Transport and Main Roads		NEC to conduct initial planning review of proposed overpass on Leichhardt Highway.	NEC representative to follow up on progress
23 September 2011	Phone call	Landholder consultation		The stakeholder indicated an unwillingness to cooperate with NEC unless offered payment for any activity. A follow up call was made to the stakeholder to arrange an onsite meeting.	NEC representative to follow up
5 November 2011	Phone call	Onsite meeting		Phone call to arrange an onsite meeting	No further action
5 November 2011	Face to face discussion	Land access		The stakeholder vocalised that access to the property would be negotiated if compensation was offered and additional conditions made by the stakeholder were adhered to by NEC.	NEC representative to follow up on land access issues

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
24 November 2011	Phone call	Arrange a meeting		The stakeholder declined a meeting when requested by a NEC representative. A phone discussion was conducted and issues for the social impact assessment were recorded.	No further action
5 December 2011	Face to face discussion	Land access		The stakeholder verbally agreed to allow access.	No further action
17 January 2012	Phone Call	Arrange a meeting		The stakeholder agreed to a meeting onsite.	No further action
19 January 2012	Face to face discussion	Alignment options		Meeting to discuss alignment options and other matters	No further action
27 September 2011	Phone call/Email	Impact on QPS		The stakeholder requested information on the economic impact the mining project may have in the Taroom area and requested NEC complete a questionnaire sent by email. NEC emailed the completed questionnaire to the stakeholder.	NEC representative to follow up with a call and email response
28 September 2011	Email	Impact on QPS		Issues raised are in relation to the economic – benefit to community and employment.	No further action
13 September 2011	Stakeholder briefing	Elimatta introduction to Western District Regional Council		The stakeholder raised concerns about the social impact the project may have on the region.	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
5 September 2011	Phone call	Landholder consultation		Initial consultation with stakeholder regarding the project.	NEC representative to follow up with a call to arrange a meeting
23 September 2011	Phone call	Arrange meeting		Phone call to arrange an onsite meeting.	No further action
1 October 2011	Face to face discussion	Landholder consultation		The stakeholder raised concerns about noise and dust from the mining operation.	NEC representative to follow up on land access issues
5 October 2011	Face to face discussion	Land access agreement		The stakeholder raised concerns about the access agreement and needed further clarification on certain issues. NEC offered to contact the stakeholder's Land Access Advisor directly to clarify issues.	NEC representative to address stakeholder concerns and discuss further
12 October 2011	Phone call	Land access agreement		The stakeholder declined in signing a land access agreement. NEC arranged another meeting with the stakeholder for further discussions on the land access issue.	NEC representative to arrange meeting
2 November 2011	Phone call	Land access agreement		The stakeholder continues to have concerns over land access and agrees to a further meeting with NEC.	NEC representative to continue discussion with stakeholder on land access issues
7 November 2011	Phone call	Onsite meeting		Phone call to arrange an onsite meeting	No further action

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
8 November 2011	Face to face discussion	Land access agreement		The stakeholder continues to have concerns about the property value and declines access to the property.	NEC representative to continue discussion with stakeholder on land access issues
24 November 2011	Phone call	Social Impact Assessment		A follow up call was made to the stakeholder to arrange a face to face meeting; however the stakeholder declined the meeting but agreed to give feedback over the phone relating to the social impact assessment.	No further action
23 January 2012	Phone call	Realignment of the eastern side of the corridor		The stakeholder discussed concerns of uncertainty for the family and family property as a rumour was circulating that another mining project in the area was possibly being put on hold for 10 years.	No further action
11 July 2011	Face to face discussion	Landholder consultation		Meeting between the stakeholder and the NEC representative was postponed due to time constraints.	NEC representative to reschedule meeting
22 September 2011	Face to face discussion	Landholder consultation		Compensation agreements, land access and land purchasing.	NEC representative to follow up on standard conduct and compensation agreement
27 September 2011	Email	Compensation correspondence		Emailed compensation correspondence	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
11 October 2011	Email	Compensation agreement		NEC emailed compensation agreement to stakeholder with amendments	No further action
21 October 2011	Email	Compensation agreement		Compensation agreement amendments	NEC representative to follow up stakeholders position on compensation agreement changes
26 October 2011	Email	Compensation agreement and land access		Land access denied until compensation agreement changes are sorted between NEC lawyers and stakeholder's lawyers	NEC representative to engage in further discussions with stakeholder
1 November 2011	Email	Conduct and compensation agreement		Email agreement to stakeholder	NEC representative to engage in further discussions with stakeholder
5 November 2011	Face to face discussion	Conduct and compensation agreement		Stakeholder signed standard compensation agreement	No further action
2 December 2011	Phone call	Access for surveying		NEC representative called stakeholder to organise time for work to be carried out on the property	No further action
25 January 2012	Phone call	Rental property		Stakeholder called to discuss offer of rental accommodation to NEC when working on the tenement.	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
30 January 2012	Phone call	Invitation to community session		Phone call to stakeholder to follow up on invitation to community session	No further action
22 September 2011	Phone call	Landholder consultation		Arrange meeting with stakeholder	No further action
27 September 2011	Face to face discussion	Landholder consultation		Amenity – Operation of property	NEC representative to follow up with a call
4 November 2011	Phone call	Landholder consultation		Follow up conversation from previous meeting	NEC representative to follow up with a call and arrange meeting with stakeholder
24 November 2011	Phone call	Social Impact Assessment		Recorded comments and noted issues for Social Impact Assessment (SIA)	No further action
23 January 2012	Face to face discussion	Landholder consultation		Discussion on the possible realignment of the corridor on certain properties	No further action
22 September 2011	Phone call	Landholder consultation		Arrange meeting with stakeholder	No further action
26 September 2011	Face to face discussion	Landholder consultation		Issues raised related to amenity – operation of property	NEC representative to follow up with an onsite meeting
29 September 2011	Face to face discussion	Landholder consultation		Issues discussed related to the operation of property, visual amenity, dust and noise.	NEC representative to arrange for access agreement to be signed

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
15 October 2011	Phone call	Land access		Stakeholder agrees to land access	No further action
21 October 2011	Phone call	Ecological investigation		NEC representative informed stakeholder of the completion of the investigation	No further action
5 November 2011	Phone call	Onsite visit		Discussions in relation to main concerns: operation of property, property values, visual amenity, dust and noise.	No further action
6 December 2011	Face to face discussion	Social Impact Assessment		Discussion on impacts of rail corridor and coal mining on the property	No further action
16 January 2012	Phone call	To arrange a meeting		Organised a meeting	No further action
19 January 2012	Face to face discussion	Landholder consultation		Meeting to outline the alternative corridor option. Issues raiser were amenity: operation of property; amenity: property values; operations: rail safety	No further action
11 July 2011	Face to face discussion	Landholder consultation		Stakeholder expresses concerns over property value	NEC representative to follow up on access
22 September 2011	Face to face discussion	Landholder consultation		Discussed land access for water bore drilling and stygofauna sampling	NEC representative to follow up with stakeholder on the project
28 September 2011	Email	Landholder consultation		Follow up email attaching project layout plan for Elimatta, including the concept rail and services route that connects the mine area to the Surat Basin Rail.	NEC representative to follow up with a further meeting

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
2 December 2011	Phone call	Access for surveying		Land access to granted by the stakeholder	No further action
30 January 2012	Phone call	Arrange meeting		Phone call to stakeholder to arrange a meeting	No further action
1 February 2012	Face to face discussion	Landholder consultation		Discussion on impacts of project on property and surrounding area	No further action
27 October 2011	Face to face discussion	Brief on Elimatta Project		Meeting with stakeholder to discuss the Elimatta project	No further action
27 January 2012	Face to face discussion	Impact on roads and traffic		Discussion on road and traffic statistics for road networks and highways in the Elimatta precinct	No further action
21 December 2011	Phone call	Project impact on property		Discussion on impacts of project on property	No further action
22 September 2011	Phone call	Landholder consultation		Arrange meeting with stakeholder	No further action
26 September 2011	Phone call	Landholder consultation		Stakeholder advised the meeting has to be postponed	Stakeholder to follow up with a rescheduled time
2 October 2011	Face to face discussion	Landholder consultation		The stakeholder raised the issues of operation of property, property values, visual amenity, dust and noise from rail operations	NEC representative to address issues raised at a further date

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
17 October 2011	Face to face discussion	Access agreement and ecological investigations		Deliver the access agreement and explain the ecological investigation to be carried out on the property	No further action
4 November 2011	Phone call	Arrange meeting		Stakeholder agreed to onsite meeting to discuss rail corridor concerns	No further action
5 December 2011	Phone call	Arrange meeting		Discuss concerns about the rail corridor on the stakeholder's property and health issues	No further action
6 December 2011	Face to face discussion	Onsite meeting		Discussion on proposed rail corridor.	No further action
8 December 2011	Phone call	Cancellation of meeting		Stakeholder called to postpone meeting.	NEC representative to follow up with a call and advise when community info sessions would be conducted in Taroom
20 January 2012	Phone call	Arrange meeting		NEC representative phoned and left message requesting the stakeholder call back to arrange a meeting	NEC representative to follow up with stakeholder
21 January 2012	Phone call	Arrange meeting		General discussion on the possibility of a slight alignment adjustment along the eastern end of the corridor	NEC representative to follow up with stakeholder an arrange face to face meeting
29 January 2012	Phone call	Arrange meeting		NEC representative phoned and left message requesting the stakeholder call back to arrange a meeting	NEC representative to follow up with stakeholder

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
30 January 2012	Phone call	Invitation to community session		NEC representative phoned and left message wanting to confirm the invitation was received and invited the stakeholder to return the call for further information.	NEC representative to follow up with stakeholder
30 January 2012	Phone call	Arrange meeting		NEC representative phoned and left message wanting to discuss possible options for crossings and/or land purchase	NEC representative to follow up with stakeholder
31 January 2012	Phone call	Arrange meeting		Stakeholder raised concern s about mining lease boundary and compensation	NEC representative to follow up by sending a map and copy of the land access agreement
22 September 2011	Phone call	Landholder consultation		Phone call to stakeholder to arrange meeting on site	No further action
30 September 2011	Face to face discussion	Landholder consultation		Stakeholder raised the issue of property value	NEC representative to continue keeping stakeholder up to date with progress of project
24 November 2011	Phone call	Arrange meeting		Phone call to stakeholder and left message requesting a meeting	NEC representative to follow up with another phone call
22 January 2012	Phone call	Arrange meeting		The stakeholder was informed of a social impact assessment to be carried out by AARC	No further action
30 January 2012	Phone call	Invitation to community session		Phoned and left message to confirm stakeholder received the invitation to the community session. Invited the stakeholder to return my call for further information	NEC representative to follow up with another phone call

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
31 January 2012	Phone call	Arrange meeting		Discussion on developments and possible corridor options	No further action
8 December 2011	Face to face discussion	Briefing on Elimatta project		The stakeholder is seeking maximum benefit for the region	No further action
27 January 2012	Face to face discussion	Road and traffic impacts		Meeting to discuss road and traffic impacts.	No further action
11 July 2011	Face to face discussion	Landholder consultation		Stakeholder raised issue of property value	NEC representative to follow up with a phone call
30 January 2012	Phone call	Invitation to community session		Spoke to stakeholder to confirm the invitation was received	No further action
17 October 2011	Email	Elimatta TOR document		A copy of the Elimatta TOR document was emailed to the stakeholder	No further action
12 July 2011	Phone call	Arrange meeting		Arrange meeting to discuss the Elimatta project	No further action
27 September 2011	Email	Land access		Explanation of the land access process and the standard conduct and compensation agreement	NEC representative to follow up on agreement
31 October 2011	Email	Conduct and compensation agreement		Copy of conduct and compensation agreement emailed to stakeholder	NEC representative to follow up with phone call

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
22 March 2012	Email	Project status		Stakeholder requested another copy of the map showing proposed works and progress of project	NEC representative to follow up by actioning the requested information
23 September 2011	Face to face discussion	Background of project		Issues raised by the stakeholder were property values and visual amenity	NEC representative to follow up with land access agreement
2 December 2011	Phone call	Land access for rehabilitation		Phone call to stakeholder to discuss access to property to complete rehabilitation	No further action
30 January 2012	Phone call	Invitation to community session		NEC representative attempted to contact stakeholder to confirm invitation was received but the stakeholder was not answering	NEC representative to follow up with another call
22 September 2011	Phone call	Landholder consultation		Phone call to stakeholder to arrange an onsite meeting	NEC representative to call stakeholder the day prior to arranged meeting as a reminder
28 September 2011	Face to face discussion	Landholder consultation		Stakeholder raised issues of operation of property, dust and noise from rail operations	NEC representative to follow up with a phone call regarding a land access agreement
4 October 2011	Phone call	Land access agreement		Phone call to stakeholder to discuss progress of land access agreement	NEC representative to follow up with a phone call regarding a land access agreement
11 October 2011	Phone call	Land access agreement		Phone call to stakeholder to discuss progress of land access agreement	NEC representative to follow up with a phone call regarding a land access agreement

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
19 October 2011	Phone call	Land access agreement		Phone call to stakeholder to arrange a meeting to collect the signed land access agreement	No further action
24 October 2011	Face to face discussion	Land access agreement		Visit onsite to collect the signed access agreement from stakeholder	No further action
30 January 2012	Phone call	Invitation to community session		Phone call to stakeholder to confirm the invitation was received.	No further action
8 November 2011	Phone call	Land access agreement		Arrange meeting with stakeholder to drop of access agreement	No further action
9 November 2011	Face to face discussion	Onsite meeting		Deliver access agreement and discuss stakeholder concerns – operation of property, property values, dust, noise and safety of rail operation	No further action
24 November 2011	Phone call	Arrange meeting		Phone call to stakeholder to arrange meeting – no answer	NEC representative to follow up with a phone call
29 November 2011	Phone call	Arrange meeting		Phone call to stakeholder to arrange meeting – no answer	NEC representative to follow up with a phone call
17 January 2012	Phone call	Arrange meeting		NEC representative called and left a message for the stakeholder to arrange a meeting	NEC representative to follow up with a phone call
21 January 2012	Face to face discussion	Proposed alternative corridor		Meeting to discuss the proposed alternative corridor	No further action

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
7 December 2011	Face to face discussion	Impact on health services		Discussion on impact of mine development on health services	No further action
22 September 2011	Phone call	Landholder consultation		Phone call to stakeholder to arrange meeting	NEC representative to follow up with a reminder call for the meeting
2 October 2011	Face to face discussion	Landholder consultation		Stakeholder raised issues on operation of property, visual amenity, dust and noise from rail operation	NEC representative to continue keeping stakeholder informed on project and supervise access
15 October 2011	Phone call	Land access agreement		Left phone message requesting a meeting to deliver land access agreement	NEC representative to follow up another call
18 October 2011	Face to face discussion	Land access agreement and site visit		Stakeholder signed agreement. Discussion with stakeholder on land access to carry out environmental assessment	NEC representative to follow up with land access agreement changes made by stakeholder
8 November 2011	Phone call	Arrange onsite meeting		Phone call to stakeholder to arrange meeting to deliver access agreement	No further action
8 November 2011	Face to face discussion	Onsite meeting		Deliver amended access agreement. Issues raised were operation of property, property values, visual amenity, dust, noise and safety of rail operation	No further action
7 December 2011	Face to face discussion	Impacts of rail corridor		Discussion on impacts of rail corridor and coal mining on the property	No further action

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
17 January 2012	Phone call	Arrange meeting		Arranged meeting with the stakeholder	No further action
18 January 2012	Face to face discussion	Alignment of corridor		The stakeholder was informed of social impact assessment to be carried out by AARC, proposed alignment options. Issues raised were amenity: operation of property	No further action
27 January 2012	Face to face discussion	Elimatta project update		Meeting with stakeholders to update them on project details and timelines	No further action
13 September 2011	Face to face discussion	Stakeholder briefing		Introduction of project to stakeholder	No further action
22 September 2011	Phone call	Landholder consultation		Phone call to stakeholder to arrange meeting onsite	NEC representative to follow up with a reminder call
28 September 2011	Face to face discussion	Landholder consultation		Issues raised by the stakeholder were: visual amenity, operations - infrastructure dust, operations - infrastructure noise, operations – mine dust, operations – mine noise, operations – rail dust and noise.	NEC representative to follow up with a phone call
5 October 2011	Face to face discussion	Access agreement		Collected the signed access agreement	NEC representative to follow up with access agreement signed by NEC
15 October 2011	Phone call	Access agreement		Phone call to stakeholder to arrange meeting to deliver signed access agreement and discuss environmental investigations to be carried out by AARC	NEC representative to follow up with field work dates

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
7 November 2011	Phone call	Arrange meeting onsite		Phone call to stakeholder to arrange a meeting onsite	No further action
7 November 2011	Face to face discussion	Onsite meeting to discuss concerns		Issued raised by stakeholder were: operation of property, property values, operations – rail dust, noise and safety	No further action
22 November 2011	Phone call	Arrange meeting onsite		Phone call to stakeholder to arrange meeting onsite to discuss concerns or the rail corridor	No further action
7 December 2011	Face to face discussion	Social Impact Assessment		Discussion on impacts of rail corridor and coal mining on property	No further action
16 January 2012	Phone call	Arrange meeting		A message was left inviting the stakeholder to return the NEC representative's phone call to organise a meeting	NEC representative to follow up with a phone call
20 January 2012	Face to face discussion	Proposed alignment option		Issues raised were amenity: operation of property, enmity: visual amenity, operations: rail dust, operations: rail noise.	No further action
14 October 2011	Phone call	Rail corridor		Stakeholder wanted to speak with someone in relation to the proposed railway	NEC representative to follow up with a phone call
19 October 2011	Phone call	Landholder consultation		A message was left inviting the stakeholder to return the NEC representative's phone call or to make contact by email	NEC representative to follow up with a phone call
22 October 2011	Phone call	Landholder consultation		A message was left inviting the stakeholder to return the NEC representative's phone call	NEC representative to follow up with a phone call

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
24 October 2011	Phone call	Landholder consultation		Initial discussion about the Elimatta project and arranged an onsite meeting with stakeholder for the access agreement to be signed	NEC representative to follow up with a phone call to arrange onsite meeting
7 November 2011	Phone call	Arrange meeting onsite		Phone call to stakeholder to arrange an initial onsite meeting. No one was home and a message was left for the stakeholder to call back.	NEC representative to follow up with a phone call to arrange onsite meeting
28 November 2011	Phone call	Arrange meeting onsite		Spoke to stakeholder and arranged an onsite meeting	No further action
7 December 2011	Phone call	Cancel meeting		NEC representative left messages on land line and mobile phone of stakeholder to cancel onsite meeting due to rain and road closures	NEC representative to follow up with a phone call to arrange onsite meeting
28 November 2011	Phone call	Arrange meeting		Phone call to stakeholder to arrange meeting	No further action
7 December 2011	Face to face discussion	Stakeholder briefing		Recorded comments and noted issues for SIA	No further action
7 December 2011	Face to face discussion	Stakeholder briefing		Recorded comments and noted issues for SIA	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
17 August 2011	Face to face discussion	Landholder compensation and access agreement		Discussion on access agreements and compensation	NEC representative to follow up with an onsite meeting
7 September 2011	Face to face discussion	Landholder consultation		Issues raised were: business – ownership of site	NEC representative to follow up on issues raised
30 January 2012	Phone call	Invitation to community session		Phone call to stakeholder to confirm the invitation to community session was received.	NEC representative to follow up with a phone call
12 July 2011	Face to face discussion	Landholder consultation		Discussion on Elimatta project and property value	No further action
6 December 2011	Email	Rental property		Email from stakeholder offering the use of a rental property to NEC	NEC representative to follow up with an email
6 December 2011	Email	Re: Rental property		Further discussion on rental property and process	No further action
22 September 2011	Phone call	Landholder consultation		Phone call to stakeholder to arrange an onsite meeting	No further action
3 October 2011	Face to face discussion	Landholder consultation		Issues raised by the stakeholder were: Amenity – operation of property, property values and visual amenity; operations –infrastructure dust and noise; operations – mine dust and noise; operations – rail dust and noise. Land access agreements	NEC representative to follow up with collecting the signed access agreement

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
15 October 2011	Phone call	Access agreement		Phone call to arrange meeting to deliver signed access agreement and explain access is required for environmental investigations	NEC representative to follow up with a phone call to discuss field schedule
4 November 2011	Phone call	Arrange meeting onsite		Phone call to stakeholder to arrange an onsite meeting	No further action
6 November 2011	Face to face discussion	Onsite meeting		Issues raised by the stakeholder were: amenity – operations of property, property values and visual amenity; operations – rail dust, noise and safety	No further action
7 December 2011	Face to face discussion	Impacts of rail corridor		Discussion on impacts of rail corridor and coal mining on property	No further action
20 January 2012	Phone call	Arrange meeting		NEC representative left message for stakeholder to call and arrange a meeting	NEC representative to follow up with a phone call
21 January 2012	Phone call	Arrange meeting		NEC representative left message for stakeholder to call and arrange a meeting	NEC representative to follow up with a phone call
22 January 2012	Face to face discussion	Proposed corridor		Discussion on the proposed corridor and how it will affect the stakeholder. Stakeholder was informed of the social impact assessment to be carried out by AARC	No further actin

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
6 December 2011	Face to face discussion	Stakeholder briefing		Discussion on impacts of coal mining and gas development	No further action
2 December 2011	Email	Fuel Supply		Stakeholder would like to quote for fuel supply requirements.	No further action
12 July 2011	Face to face discussion	Landholder consultation		Discussion on Elimatta project and concerns about property	No further action
28 November 2011	Phone call	Arrange meeting onsite		Stakeholder currently out of Taroom area. Recorded comments and noted issues for SIA	No further action
30 January 2012	Phone call	Invitation to community session		Attempted to contact stakeholder to confirm the invitation to community session was received	NEC representative to follow up with a phone call
22 September 2011	Phone call	Landholder consultation		Phone call to arrange a meeting onsite with stakeholder when in Taroom	NEC representative to phone call stakeholder to arrange a meeting
26 September 2011	Phone call	Arrange meeting onsite		Phone call to arrange a meeting onsite with stakeholder when in Taroom	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
3 October 2011	Face to face discussion	Initial meeting		Issues raised by the stakeholder were: amenity – operation of property and visual amenity; operations – infrastructure dust and noise; operations – mine dust and noise; operations – rail dust and noise	NEC representative to follow up with a phone call to discuss content of access agreement
13 October 2011	Phone call	Access agreement		Phone conversation with the stakeholder to chase up the access agreement and to discuss possible access for the upcoming environmental investigations	NEC representative to follow up with a phone call to discuss the access agreement
19 October 2011	Phone call	Access agreement		Follow up call to discuss the progress of the access agreement from the stakeholder	NEC representative to follow up with a phone call to discuss the access agreement
21 January 2012	Phone call	Arrange meeting		Left voice message for stakeholder to contact NEC representative to arrange a meeting	NEC representative to follow up with a phone call
22 January 2012	Phone call	Project status and arrange meeting		Discussion on corridor alignment and inform stakeholder of social impact assessment to be carried out by AARC	No further action
12 July 2011	Face to face discussion	Landholder consultation		Discussion on impacts of project on property	No further action
8 December 2011	Face to face discussion	Stakeholder briefing		Briefing on Elimatta project and discussion on stakeholder's expectations of how the project will impact the community	No further action
1 February 2012	Face to face discussion	Landholder consultation		Discussion on impacts of project on property	No further action

Date	Method of Communication	Brief Description of Consultation	**Stakeholders Involved**** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
2 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
6 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
6 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
14 February 2012	Phone call	Stakeholder consultation		Discussion on current policing issues and potential issues from potential expanded resources sector	No further action
14 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
14 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
14 March 2012	Phone call	Stakeholder consultation		Discussion on current policing issues and potential issues from potential expanded resource sector	NEC representative to follow up by sending information on Project background
14 February 2012	Phone call	Stakeholder consultation		Discussion on issues for current regional ambulance services and potential issues from potential expanded resource sector	NEC representative to follow up by sending information on Project background

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
15 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
21 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
22 February 2012	Face to face discussion	Stakeholder consultation		Discussion on impacts of project on the local area	No further action
26 April 2012	Face to face discussion	Regulator Meeting		Discussion of EIS issues particularly the anticipated approval process for the Rail and Services Corridor.	NEC to decide whether the Rail and Services Corridor forms a component of the Project or not.
03 May 2012	Face to face discussion	Regulator Meeting		Discuss approach for extending timelines to allow the Rail and Services Corridor to be included in the EIS.	Consider options for extension.
09 May 2012	Teleconference	Regulator Meeting		Finalise approach for extending timelines to allow the Rail and Services Corridor to be included in the EIS.	Extension of date for decision on whether or not the EIS can proceed (s49). Extension to the Elimatta Project Terms of Reference.
19 June 2012	Face to face discussion	Regulator meeting		Discussion topics included WICET progress & capacity, regional significance status, multi-user agreements for Rail and Services Corridor, land acquisition.	No further action

Date	Method of Communication	Brief Description of Consultation	Stakeholders Involved** (Name of Organisation/ Person & position in organisation)	Issues Discussed and Actions Taken	Further Actions Required
05 July 2012	Face to face discussion	Regulator meeting		EIS progress update	No further action
25 July 2012	Face to face discussion	Regulator meeting		Discussion of the application of water and dam design guidelines to Elimatta Project	No further action
2 August 2012	Face to face discussion	Consultation with Department of Transport and Main Roads (TMR) and Western Downs Regional Council (WDRC)		Presentation of preliminary Road Impact Assessment for the Elimatta Project and West surat Link Rail Crossings Constructability.	TMR and WDRC to review documents presented and provide feedback to AARC.
3 September 2012	Email Correspondence	Consultation with Department of Transport and Main Roads (TMR)		Response to review of preliminary Road Impact Assessment (RIA).	AARC to incorporate comments into comprehensive RIA.

*Northern Energy Corporation (NEC) acting on behalf of Taroom Coal Pty Ltd (Taroom Coal)

** Stakeholder names have been removed for privacy purposes

Appendix F. Rehabilitation Monitoring and Maintenance Plan

REHABILITATION MONITORING PROGRAM

ELIMATTA COAL MINE

PREPARED FOR
NEW HOPE GROUP PTY LTD

6th MARCH 2023

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Document Control

Project Name:	Elimatta Coal Mine
Report Title:	Rehabilitation Monitoring Program
Client:	New Hope Group Pty Ltd
Project Manager:	Stuart Ritchie

Version	Comments	Author	Reviewer	Date
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1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by New Hope Group Pty Ltd (NHG) on behalf of Taroom Coal Proprietary Limited to develop a Rehabilitation Monitoring Program (RMP) to guide the monitoring of rehabilitation performance for the Elimatta Coal Mine (the Project). This RMP is applicable to rehabilitation activities associated with Mining Leases (ML) ML 50354, ML 50270, and ML 50271 in accordance with the Project's Environmental Authority (EA) (EPML00443913).

1.1 Purpose

The purpose of the RMP is to guide assessment of the condition of rehabilitated areas through the collection and comparison of quantitative data from rehabilitated and reference sites. Comparison of data from rehabilitated sites against reference sites and post land-use criteria is used to assess the performance of rehabilitation works.

The program has been designed to meet the rehabilitation goals, objectives, indicators and criteria defined in the Progressive Rehabilitation and Closure Plan (PRCP) for the Project (AARC 2024).

1.2 Scope

This RMP incorporates the following components to ensure sufficient data is collected to assess the progress of the Project's rehabilitation works over time against the identified completion criteria:

- a rehabilitation monitoring design that determines the progress of existing project rehabilitation through quantitative assessments;
- identification of existing reference and rehabilitation monitoring locations and, for all monitoring locations, ensure that adequate spatial and temporal coverage is established to address the RMP objectives;
- a specified frequency for monitoring events and an overall duration for the rehabilitation monitoring program;
- the definition of sampling methods that are repeatable and comparable over time and between different observers;
- analysis techniques suited to the field monitoring data being collected; and
- reporting on the progress of rehabilitation against the identified rehabilitation objectives and completion criteria for the Project.

1.3 Background

The Project is a proposed open cut coal mine located approximately 45 km southwest of the township of Taroom in southern Queensland and approximately 380 km northwest of Brisbane. The Project is planned to mine up to 8.2 million tonnes per annum (Mtpa) of ROM coal to produce on average 5 Mtpa of product coal for export. Based on an assessment of the available resource for the Environmental Impact Statement (EIS) (AARC 2014), the expected production life of the Project is in excess of 32 years. Including construction through to decommissioning, the whole-of-project life is expected to be approximately 40 years.

The Project activities will be undertaken across three MLs including ML 50354, ML 50270, and ML 50271; shown in Figure 1. ML 50254 will contain the proposed open-cut pit areas and stockpiles, encompassing a total area of 2,774 ha. ML 50270 will consist of the Coal Handling and Processing Plant (CHPP), rail load-out facility and other associated mine infrastructure including tailings storages and an accommodation village. ML 50270 encompasses a total area of 1,073 ha. Linking these two areas, ML 50271 will serve as a transport and services corridor for the transportation of Run-of-Mine (ROM) coal from the pit to the CHPP and has a total area of 128 ha. The maximum area proposed to be disturbed across all MLs is 3,313 ha.

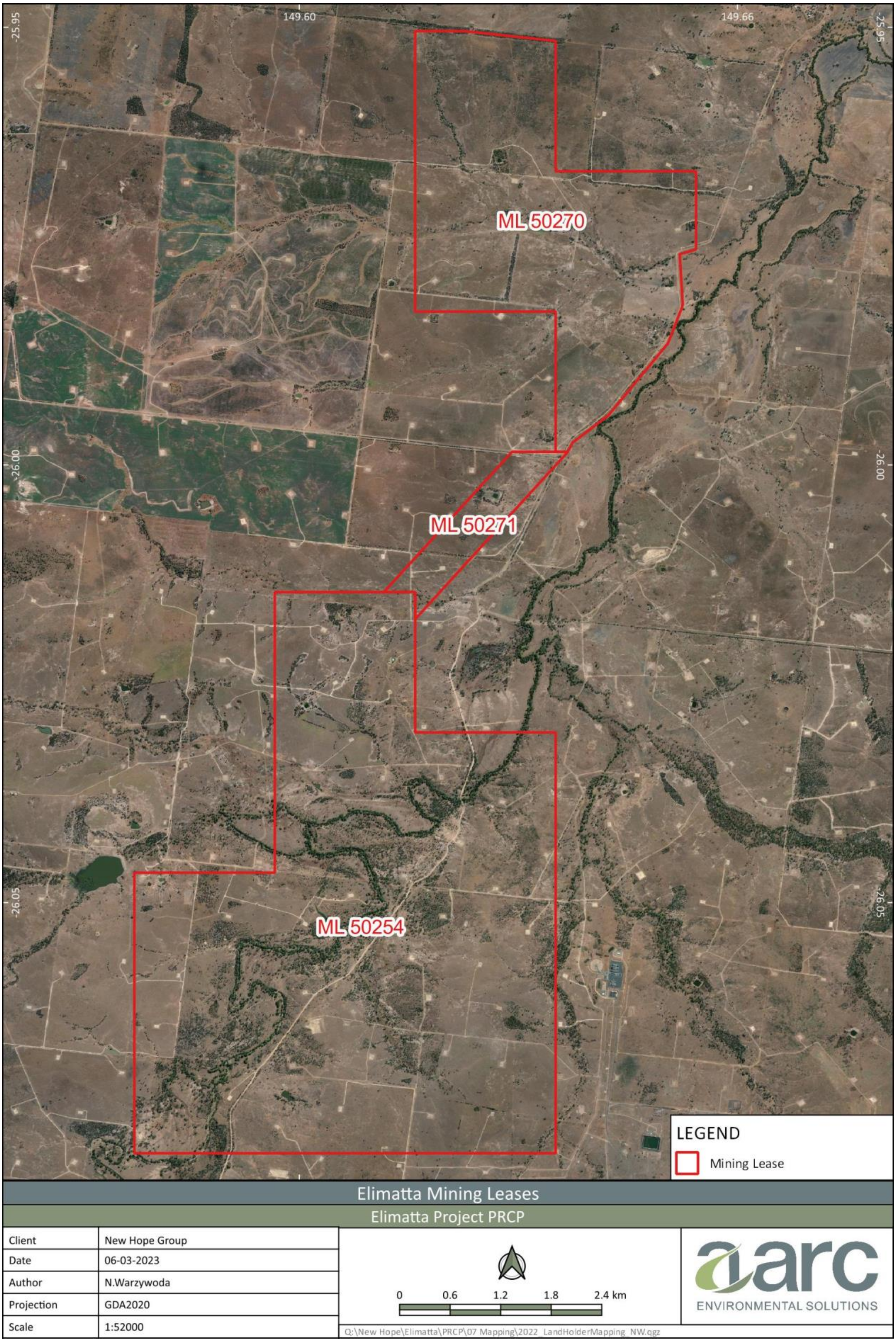

Figure 1: Project MLs

To allow for the development of the PRCP, discrete rehabilitation areas (RAs) and improvement areas (IAs) have been defined for the Project. An RA is defined in the Environmental Protection Regulation 2019 as an area of land in the post mining land use (PMLU) to which a rehabilitation milestone for the post-mining use relates. An IA is defined in the EP Regulation as, for a non-use management area (NUMA), an area of land in the NUMA to which a management milestone for the NUMA relates. Either RAs or IAs have been nominated for areas of disturbance within the Project as shown on Figure 2 and Figure 3, and summarised in Table 1.

Table 1: Rehabilitation and improvement areas

Rehabilitation Area reference	Mining domain	Description	PMLU
Rehabilitation areas			
RA1	Creek diversion	• Horse Creek diversion (permanent)	Grazing native riparian vegetation
RA2a	Water management infrastructure	• Environmental dams • Sediment dams • Raw water dams	Grazing modified pasture
RA2b		• Retained flood levee	
RA3	Mine infrastructure areas	• Buildings, including foundations • Roads • Chemical/fuel storages • CHPP • Laydown yard • Access/coal haul road and infrastructure corridor • infrastructure corridor linking the MIA to the electrical substation • Pit access road	
RA4	Waste disposal	• Surface TSFs (TDN and TDNA)	
RA5	In-pit and out-of-pit spoil dumps	• Out-of-pit waste rock emplacements • In-pit waste rock emplacements	
RA6	Rail and services corridor	• Rail and services corridor and rail balloon loop	Retained infrastructure
Improvement area			
IA1	Residual voids	• Residual voids (eastern and western voids) • In-pit TSF	NUMA

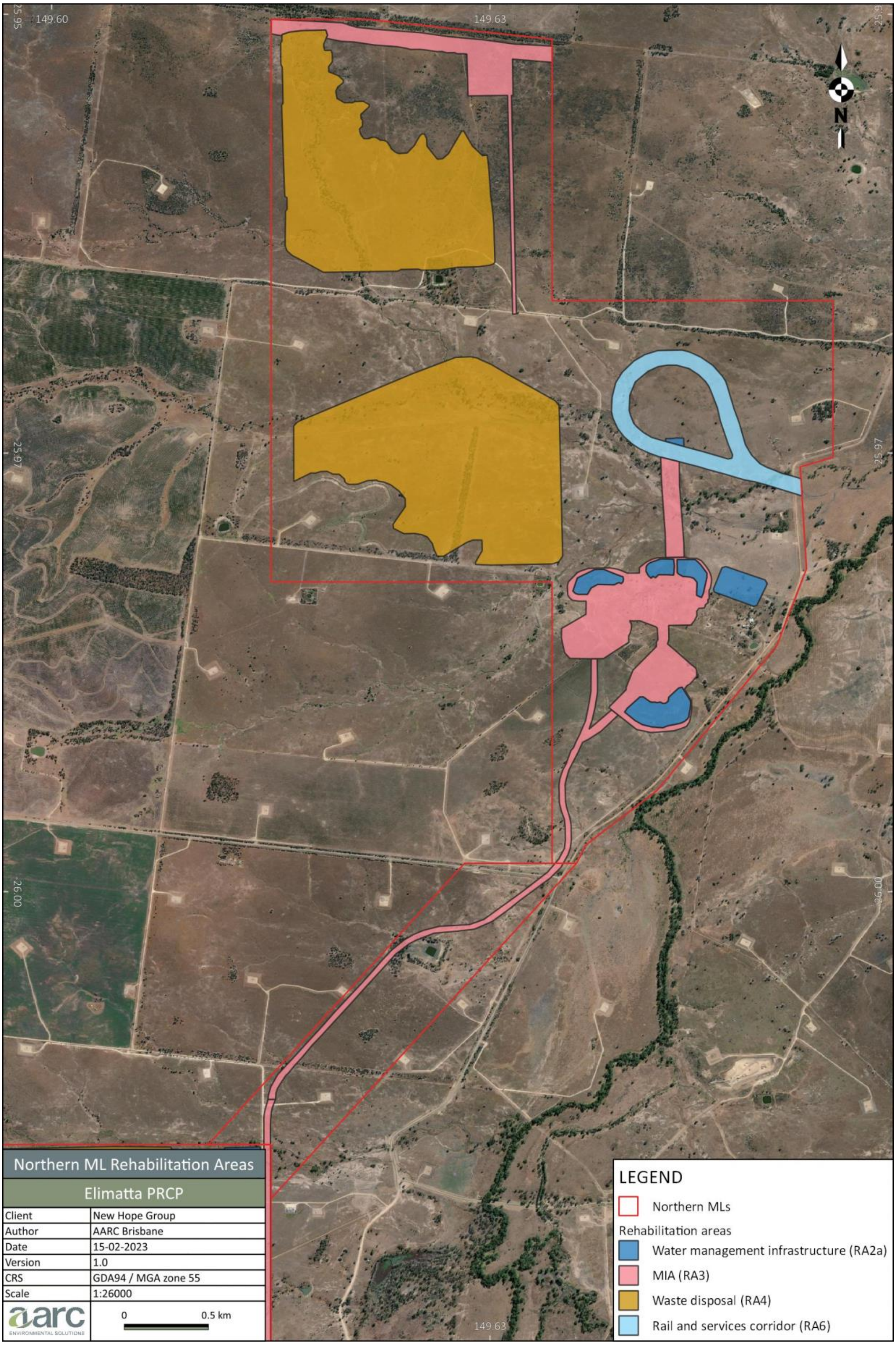

Figure 2: North MLs rehabilitation areas

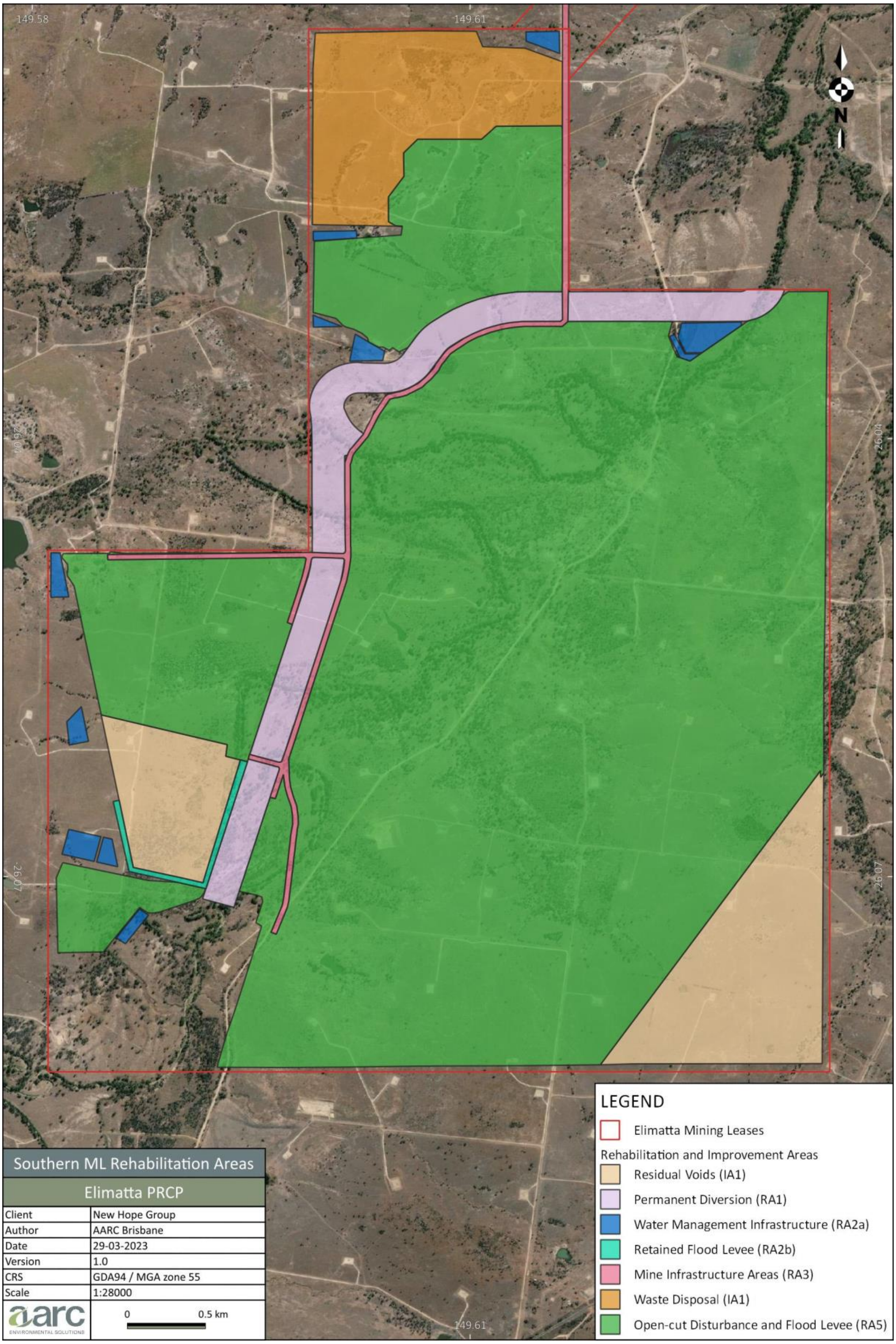

Figure 3: South ML rehabilitation areas

2 Rehabilitation requirements

In accordance with the Project EA, NHG is required to undertake progressive rehabilitation of land disturbed by mining activities. These rehabilitation areas must be monitored at an appropriate frequency to demonstrate that site specific rehabilitation goals are likely to be achieved upon completion of the Project.

2.1 Environmental authority requirements

This RMP is intended to satisfy requirements prescribed in relevant conditions of the Project's EA which are:

C3 Tailings Disposal

Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for:

a) containment of tailings;

b) the management of seepage and leachates both during operation and the foreseeable future;

c) the control of fugitive emissions to air;

d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings;

e) maintaining records of the relative locations of any other waste stored within the tailings;

f) rehabilitation strategy; and

g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

H1 Rehabilitation Landform Criteria

All areas significantly disturbed by mining activities must be rehabilitated to achieve the following rehabilitation goals:

a) safe to humans;

b) stable;

c) non-polluting; and

d) self-sustaining for the post-mining land use.

H2 Rehabilitation must commence progressively in accordance with the plan of operations

H3 A Rehabilitation Plan must be developed and implemented by a suitably qualified person and must include:

a) rehabilitation objectives to achieve the rehabilitation goals for all disturbed areas;

b) detailed rehabilitation methods for each disturbed area;

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 objectives; and *e) details of appropriate monitoring and maintenance of rehabilitation.*

H5 All areas significantly disturbed by mining activities must be rehabilitated in accordance with the Rehabilitation Plan to achieve the final completion criteria.

H6 Residual Void Outcome

Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.

H9 A Mine Closure and Rehabilitation Plan must be developed and implemented by a suitably qualified and experienced person for the mining lease areas that this environmental authority applies to, within twelve (12) months of the commencement of open cut coal mining activities (not including exploration activities).

2.2 Final land use and rehabilitation

The final land uses prescribed for each rehabilitation area will determine the rehabilitation goals, objectives, and performance indicators relevant to the Project. The post mine land descriptions, classifications and rehabilitation schedule for each area of and are included within the Project PRCP (AARC 2024).

The dominant current land use within the ML areas is low to medium intensity cattle grazing on native and improved pastures, along with the less common dryland forage cropping. Other land uses common in the region surrounding the Project area include dryland cereal cropping.

The current land use within the rail and services corridor is predominantly grazing. Approximately 40% of the corridor length has been cropped several times in the last 15 years, however, there are no areas where cropping has occurred every year.

The Queensland Land Use Mapping (ALUM) provides classifications for the various land uses that occur within the Project area (ABARES 2016), and are presented in Table 2.

Table 2: Australian land use and management classification (ABARES 2016)

Current land use	ALUM classification	Description
Cattle grazing on native pastures	Grazing native vegetation	Land uses based on grazing by domestic stock on native vegetation where there has been limited or no deliberate attempt at pasture modification.
Cattle grazing on improved pastures	Grazing modified pastures	Pasture and forage production, both annual and perennial, based on significant active modification or replacement of the initial vegetation.
Dryland forage cropping	Cropping	Land that is under cropping and in a rotation system such that different areas will be cropped while others are left available. These are classified by the primary use (i.e. pasture).
Dryland cereal cropping		

To determine the suitability of land within the Project MLs to support relevant land uses (i.e. beef cattle grazing, rainfed broadacre cropping and conservation uses) prior to and following mining activities, project disturbances were subject to a pre-mining land suitability assessment (AARC 2013). Beef cattle grazing was assigned a land suitability class of 3 - 4 (AARC 2006a).

2.3 Rehabilitation goals, objectives, indicators and criteria

In Queensland, mine rehabilitation is required under the *Environmental Protection Act 1997* (EP Act). Amendments to the EP Act in late 2018 implemented key elements of the State Government's Mined Land Rehabilitation Policy (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (section 111A of the EP Act).

Site specific rehabilitation objectives, indicators and criteria have been developed for the Project to assist in achieving these goals for each rehabilitation area, as outlined in the PRCP (AARC 2023).

Rehabilitation indicators provide measures of progress towards rehabilitation objectives. Completion criteria are the standards which provide a clear definition of successful rehabilitation. Completion criteria take the form of a set of measurable benchmarks against which the rehabilitation indicators can be compared to determine if objectives are being met. Rehabilitation is deemed successful when completion criteria for each rehabilitation goal and objective are consistently met.

The revegetation and landform completion criteria for disturbed and constructed landforms to meet post-mine land use prior to relinquishment are described in Table 3.

Table 3: Rehabilitation completion criteria

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
RM1: Infrastructure decommissioning and removal	• All services disconnected and removed • All concrete, bitumen and gravel roads removed • All fencing that is not part of PMLU requirements removed • All buildings and footings demolished and/or removed off-site • All machinery and equipment removed • All rubbish removed • Decommissioning of water management infrastructure (e.g. pipes, pumps, dams) has occurred and includes: ○ All surface water drainage and infrastructure (e.g. pipes and pumps) removed ○ Water storages have been dewatered in accordance with Section 3.5.15.4 of the PRCP which includes: ▪ Water is used for dust suppression or evaporated ▪ Pumping of water between water storages or to the residual voids ○ Liners have been removed from dams and disposed of appropriately (where applicable)	Applicable to all infrastructure identified to be decommissioned/ removed from site. Considered to be met when the area can be transitioned to the next milestone.	Infrastructure decommissioned/ removed at closure will be subject to strict environment and safety planning requirements including completion inspections. A visual inspection(s) will be conducted to determine that no infrastructure remains that does not form part of any Landholder Agreement.
RM2: Management of contaminated land status	• Contaminated material either remediated in situ or removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted • Contaminated land assessment undertaken by an appropriately qualified person[1]. If required, a site investigation report including a site suitability statement prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act • Records confirm desilting of water management structures (sediment and mine affected water dams) has occurred where required and where applicable contaminated silt	Applicable to the waste rock dump area, mine infrastructure areas, and the tailings dam area (i.e. where notifiable activities have been carried out) and, at a minimum, involves the completion of a Phase 1 contaminated land investigation undertaken by an appropriately qualified person. Considered to be met when contaminated material has been either placed, removed from site, or remediated in situ, a validation report has been completed, and, if required,	A completed Phase 1 contaminated land investigation report, as well as any consequent reports where required. Visual inspection of potential sites or sources of contaminated material will be conducted, and samples collected as required. The contaminated land investigation will determine the presence of any contaminants. Remediation activities will be undertaken if required following consultation on appropriate remediation activities.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	removed for licensed disposal or excavated material transferred to residual void	a site suitability statement has been prepared. Where required, remediation activities will be undertaken and recorded, and notifications completed.	A validation report will detail the remediation of contaminated land and, if required, a site suitability statement prepared by an appropriately qualified person that states that the land is suitable for use according to the nominated PMLU.
RM3: Landform development (re-profiling / re shaping) of land affected by disturbance	• All earthworks and landform reshaping /re-profiling works completed to design specifications • Geotechnical assessment by an appropriately qualified person[1] confirms that long-term geotechnical stability has been achieved • Certification provided by an appropriately qualified person[1] confirms that drainage features are constructed to design specifications • Sediment and mine water dams are backfilled using their embankments • Landform constructed to the following design parameters, where relevant: • Waste rock emplacement: o slopes ≤10° (17%) o stable berms or bunds (≥5 m wide) • Flood levee slopes ≤10° (17%) • Diversions: o average grade of 0.00158 m/m o valley length of 7.25 km and stream length of 8.25 km o stream sinuosity of approximately 1.12	Applicable to all areas where bulk earthworks and other grading are required to achieve target landform shape and drainage characteristics. Considered to be met when graded banks are installed on waste rock dumps, final landform drainage systems and water storages are formed and any other applicable disturbance areas have been reprofiled to suit the surrounding landform.	Land based and/or remote sensing survey techniques will be employed to confirm that graded slopes meet landform design specifications. Additionally, visual inspections will be done to determine if any future maintenance/repair action is required. A geotechnical assessment will be conducted by an appropriately qualified person to confirm that long-term stability has been achieved for all relevant landforms.
RM4: Capping	• The construction and maintenance design of the capping material has been certified by an appropriately qualified person that is consistent with the cover design • All earthworks and landform reshaping /re-profiling works completed to design specifications	Applicable to all TSFs and required to achieve target landform shape and drainage characteristics and demonstrate geotechnical stability.	Survey and geotechnical assessment by an appropriately qualified person of capping construction and completion.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	• Certification provided by an appropriately qualified person[1] confirms that drainage features are constructed to design specifications • Geotechnical assessment by an appropriately qualified person[1] confirms that long-term geotechnical stability has been achieved • The surface has been shaped to a grade of approximately 1% to prevent ponding and concentration of surface water flow • Monitoring equipment has been installed at an appropriate frequency as determined by an SQP to confirm appropriateness of cover system design and placement, this can include but is not limited to: o Weather monitoring system o Piezometers o Temperature sensors • A cover system is installed with appropriate QA/QC measures to achieve: o outer slope angles in the order of 1(V) in 3(H) (18°) o cover placement over the tailings (2 m) o placement of non-sodic cover materials (50 mm) o topsoil (250–300 mm)		
RM5: Surface preparation (topdressing, contour ripping, soil amelioration)	• Prior to each rehabilitation event, soil health and suitability are assessed and documented by an appropriately qualified person[1], and a recommendation made for ameliorants to ensure sodicity, salinity, pH and fertility levels are suitable to achieve the relevant PMLU • Topsoil suitability will be conducted for relevant parameters and indicators to determine suitability for revegetation, including: o pH, electrical conductivity, soluble chloride, moisture content, Emerson aggregate stability test, exchange acidity, o exchangeable cations (calcium, magnesium, potassium, sodium and aluminium), CEC, calcium :	Applicable to all areas requiring revegetation. Includes final profiling and application of topsoil materials, soil testing, and soil amelioration. Considered to be met when surface preparation activities have been completed and soil condition is conducive to plant germination and growth.	A soil assessment will be conducted by an appropriately qualified person prior to each rehabilitation event to determine soil suitability, and recommendations made for ameliorants where required. Records of topsoil origin and placement indicating achievement of a target depth of 200–300 mm. Records to include any ameliorants applied, including types, rates and timing of applications.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	magnesium ratio (Ca: Mg), exchangeable sodium percentage (ESP); o total nitrogen, nitrite and nitrate, sulphate, extractable potassium and phosphorous (Colwell); o total organic carbon and organic matter; and o trace elements (arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc). • Topsoil suitability will be compared to parameters in PRCP Table 24:Topsoil Suitability which includes: o pH of between 6 – 8.5; o EC_{SAT} (dS/m) of ≤ 4; and o ESP (%) of < 6 • Records of ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person[1] • Records of topsoil origin and placement of a target depth of 250–300 mm • Ripping undertaken along the contour of slopes in accordance with PRCP Table 27: Design of ripping operations for post-disturbance surface preparation which includes: o A minimum ripping depth of 200m for all slope angles (>10%, 1-10%, and <5%); and o Tyne spacing of <1.5 m for a >10% slope; o Tyne spacing of <2.5 m for a 5-10% slope; and • Tyne spacing of <5 m for a <5% slope.		Visual inspections and documentation of contour ripping, including depth, spacing and machinery used.
RM6: Grazing revegetation (seeding and / or planting)	• Records demonstrate seeding of target species and/or planting of tube stock (where relevant) specified in: ○ PRCP Table 28: Current indicative species and sowing rates for low intensity grazing PMLU; and ○ PRCP Table 29: Current indicative species and sowing rates; shade trees in a low intensity grazing PMLU	Applicable to all areas requiring revegetation. Includes seeding and/or planting of target revegetation species. Considered to be met when records demonstrate that seeding and/or planting of target species has been completed, with the understanding that remedial works such as	Survey of completed areas, and record of revegetation method retained. Records of seeded and/or planted species consistent with the species listed in **Error! Reference source not found.**.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
		reseeding or infill planting may be necessary to meet target vegetation completion criteria.	
RM7: Riparian habitat (native vegetation) revegetation (seeding and / or planting)	• Records demonstrate seeding of target species and/or planting of tube stock (where relevant) specified in: ○ *PRCP Table 30: Current indicative species and sowing rates for native riparian habitat PMLU*	Applicable to all areas requiring revegetation. Includes seeding and/or planting of target revegetation species. Considered to be met when records demonstrate that seeding and/or planting of target species has been completed, with the understanding that remedial works such as reseeding or infill planting may be necessary to meet target vegetation completion criteria.	Survey of completed areas, and record of revegetation method retained. Records of seeded and/or planted species consistent with the species listed in PRCP Table 30: Current indicative species and sowing rates for native riparian habitat PMLU.
RM8: Achievement of grazing PMLU to stable condition	• No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at representative analogue sites[4] • Target percentage vegetation ground foliage cover of ≥50% of that of representative analogue sites with similar landform parameters • Land capability assessment undertaken by an appropriately qualified person[1] confirms that land has achieved a minimum class 3 or 4 as compared to the pre-mining suitability for beef cattle grazing (refer to PRCP Figure 15) • Erosion classification[3] is comparable with erosion classifications[3] from nearby equivalent land uses with similar landform parameters, determined using analogue sites • Certification from an appropriately qualified person that the capping system of the TSF is functional, there is no evidence migration of contaminants to groundwater • There is no evidence of water ponding on the surface of the TSFs (applicable to RA4) • No active erosion present as demonstrated by no increase in erosion classification[3] over time	Final milestone applicable to all rehabilitated areas (excluding RA1). Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	Routine rehabilitation monitoring to be undertaken for the parameters, and at the frequency nominated in this Project Rehabilitation Monitoring and Maintenance Plan. Recommendations for remedial works will be made as and when required, and remedial activities undertaken including: • repair of erosion prone areas; • weed management and control; and • reseeding and/or additional planting when required. Land capability assessment undertaken by an appropriately qualified person (applicable to RA1, RA3, RA4 (TDN, TDNA), RA5). A Hazard and Safety Assessment will be undertaken by an appropriately qualified person.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	• Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use • Runoff water quality monitoring conducted at a minimum of three locations across the ex-pit and in-pit dumps and with a frequency target of 3 samples per year; conform to the following values: o pH of between 6 – 9.0; o Salinity, measured as EC of ≤ 5,970 µS/cm; and o Sulphate, as SO_4 of ≤ 1,000 mg/L • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values.		
RM9: Achievement of native vegetation PMLU to stable condition	• Downstream water quality complies with water quality objectives or upstream / reference data • No erosion classified[3] as 'severe' nor 'extreme' gully erosion or washout features • No active erosion present as demonstrated by no increase in erosion ratings over time • Assessed as geotechnically stable by an appropriately qualified person[1] • No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at representative analogue sites • Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use • Runoff water quality monitoring conducted at a minimum of three locations across the ex-pit and in-pit dumps and with a	Final milestone applicable to RA1. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	Routine rehabilitation monitoring to be undertaken for the parameters, and at the frequency nominated in this Project Rehabilitation Monitoring and Maintenance Plan. Recommendations for remedial works will be made as and when required, and remedial activities undertaken including: • repair of erosion prone areas; • weed management and control; and • reseeding and/or additional planting when required. Land capability assessment undertaken by an appropriately qualified person (applicable to RA1, RA3, RA4 (TDN, TDNA), RA5).

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	frequency target of 3 samples per year; to conform to the following values: o pH of between 6 – 9.0; o Salinity, measured as EC of ≤ 5,970 µS/cm; and o Sulphate, as SO4 of ≤ 1,000 mg/L • Groundwater quality monitoring conducted at sites and for the parameters detailed in the Rehabilitation Monitoring and Maintenance Plan are to be assessed against the trigger levels until such point as sufficient data is available to develop relevant closure values.		A Hazard and Safety Assessment will be undertaken by an appropriately qualified person.
RM10: Achievement of target pasture productivity criteria for grazing PMLU	• Pasture productivity is consistently[2] similar to or exceeding analogue[4] sites • Vegetation structure and condition is consistent[2] with analogue[4] sites	Rehabilitated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use. Considered to be met when land can be transitioned to progressive certification.	Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.
RM11: Achievement of native vegetation PMLU to a sustainable condition	• Evidence of native fauna utilisation in the form of tracks, scats, and opportunistic observations • Evidence of flora recruitment from rehabilitation monitoring data • Vegetation structure and condition is consistently[2] similar to or exceeding analogue sites • Field-based monitoring data provided in the final rehabilitation report demonstrates vegetation monitoring meets the 50% biocondition benchmark (refer Section 3.3.2 of this RMMP) for RE 11.3.25, including: ○ tree canopy height >7m ○ tree species richness >2 ○ shrub species richness >2 ○ grass species richness >4 ○ tree canopy cover >6% ○ shrub canopy cover ≥ 3%	Rehabilitated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use. Considered to be met when land can be transitioned to progressive certification.	Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.

Rehabilitation milestone	Milestone criteria	Description	Management / monitoring measure(s)
	o groundcover ≥ 30%		
RM12: Achievement of retained infrastructure PMLU to stable condition	• Hazard and Safety Assessment completed by an appropriately qualified person[1] demonstrates hazards in RAs are consistent with the type and severity of hazards typical of neighbouring equivalent land use. Remaining hazards are considered to be low risk with no significant increase in risk expected over time • Final landform survey confirms no built structures remain other than those that form part of a landholder agreement • No erosion classified[3] as 'severe' nor 'extreme' gully erosion or washout features • No active erosion present as demonstrated by no increase in erosion ratings over time	Final milestone applicable to all areas nominated as retained infrastructure. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	A Hazard and Safety Assessment will be undertaken by an appropriately qualified person, and a final landform survey will be undertaken to confirm that retained infrastructure forms part of a landholder agreement. Recommendations for remedial works will be made where required, and remedial activities undertaken as soon as practicable.

1. 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 relating to the subject matter using the relevant protocols, standards, methods, or literature.
2. Consistently means that the criterion is met for a minimum of three consecutive years.
3. Erosion classification framework:

Erosion classification	Minor	Moderate	Severe	Extreme
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.	Loss of surface horizons; root exposure, etc.
No. of rills/ gullies	< 15	15 - 30	31 - 50	> 50
Greatest observed depth (cm)	<10	10 - 30	30 - 60	>60
Tunnel erosion	-	-	Present	Present
Mass movement	-	-	Present	Present

4. Grazing reference sites will be determined prior to the commencement of mining

3 Monitoring program design and methodology

3.1 Monitoring program design

The RMP is designed to assess rehabilitation progress to effect acceptance of rehabilitation by the administering authority and to support surrender of the MLS. A key assessment will be the behaviour of rehabilitated areas in comparison with surrounding non-mind lands, or analogue sites.

3.1.1 Rehabilitation monitoring frequency and coverage

Rehabilitation will be monitored at a frequency appropriate to the stage that rehabilitation is at, generally with the survey period occurring post wet season, as monitoring at this time allows for more accurate identification of the species present and a clearer understanding of species richness on-site.

The rehabilitation monitoring program will be reviewed to ensure that data collection is achieved at sufficient spatial and temporal resolution to ensure statistically valid results.

3.2 Rehabilitation monitoring program

3.2.1 Analogue sites

Rehabilitation completion criteria, described for each mine domain, can be achieved by comparing a number of variables between rehabilitation areas and existing ecosystems (analogue sites) over time.

Pasture and native vegetation analogue or reference transects should provide sufficient replication to allow for statistical testing that is rigorous enough to determine differences between a reference site and rehabilitation values and demonstrate the achievement of completion criteria. It is recommended that a minimum of three transects be established within each representative reference modified pasture grazing area and each representative reference native vegetation grazing area. The frequency and timing of monitoring of reference sites is to coincide with monitoring of rehabilitation areas. Where possible, reference sites should be chosen that replicate the anticipated slopes of rehabilitated areas. Results from analogue sites will be used to compare and assess monitoring results obtained from rehabilitated site transects. Analogue sites will be recorded as GIS files, for replication.

Analogue sites relevant to the proposed Horse Creek Diversion and subsequent re-instatement of a riparian habitat have been established during baseline surveys. The location of these sites is detailed in Table 4. Analogue sites representative of the proposed post-mining land use of low intensity grazing on native and improved pastures will be established prior to the commencement of the Project.

Rehabilitation monitoring will aim to demonstrate that domain specific completion criteria have been continuously met for a period of three years before the rehabilitation is considered successful.

Table 4: Proposed riparian habitat rehabilitation monitoring locations

Site ID	Vegetation community	Location (GDA94, Zone 55)	
		Easting	Northing
BC4	RE 11.3.25	758373.38	7112341.98
BC5	RE 11.3.25	763343.76	7119132.51
BC6	RE 11.3.25	762791.84	7119181.31

3.2.1.1 Baseline riparian vegetation assessments

AustralAsian Resource Consultants (AARC) undertook a Riparian Vegetation Assessment of Horse Creek within the Elimatta Project area (AARC 2013). The purpose of the assessment was to develop targets for the rehabilitation of the diversion channel. The BioCondition methodology was utilised to conduct the assessment. BioCondition is a vegetation condition assessment framework developed by the Queensland Government. It derives a numeric score for vegetation condition based upon a scale ranging from dysfunctional to functional (0 to 1).

Three sites were assessed within the portion of Horse Creek that will be diverted (BC1, BC2, BC3), one site upstream of the diversion (BC4) and two sites downstream of the diversion (BC5, BC6) were assessed in a field survey conducted from the 20–23 August 2013. Sites were located in the riparian vegetation along the creek channel.

In accordance with the BioCondition methodology as set out in the *BioCondition Assessment Manual* (Eyre *et al*. 2011), the following attributes were measured within a 0.5 hectare plot at each site:

- recruitment of woody perennial species;
- native plant species richness;
- canopy cover;
- canopy height;
- shrub layer cover;
- native perennial grass cover;
- number of large trees;
- coarse woody debris;
- weed cover; and
- litter cover.

3.2.1.2 Baseline riparian biocondition

The condition of each site assessed along Horse Creek is described in the following sub-sections.

Site BC1

Site BC1 is located in Horse Creek in the north-east of MLA 50254. The RE at this site is RE 11.3.25 (*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines). Vegetation at the site is dominated by Forest Blue Gum (*Eucalyptus tereticornis*), River She-oak (*Casuarina cunninghamiana*) and Rough-barked Apple (*Angophora floribunda*). The shrub layer is sparse and groundcover is dominated by exotic grasses, including Couch (*Cynodon dactylon*) and Guinea Grass (*Megathyrsus maximus var maximus*). Grazing occurs at this site and the area has been selectively cleared in the past. Scattered weed species such as Mimosa Bush (*Vachellia farnesiana*) and Mexican Poppy (*Argemone ochroleuca*) were observed. BC1 is shown in Image slate 1.

Image slate 1: Site BC1

Site BC2

Site BC2 is located on Horse Creek in the central portion of MLA 50254. BC2 is located in RE 11.3.25. The dominant tree species at this site are Forest Blue Gum (*E. tereticornis*), Rough-barked Apple (*A. floribunda*) and River She-oak (*C. cunninghamiana*), with an understorey of River Paperbark (*M. trichostachya*). Shrub cover at this site is very sparse. Groundcover at this site is dominated by exotic grasses including Couch (*C. dactylon*) and Guinea Grass (*M. maximus var maximus*). A large proportion of the ground is bare. Cattle grazing occurs at this site and the surrounding area has been cleared. A high number of weed species were noted in the shrub and ground layers at this site, including Balloon Cotton Bush (*Gomphocarpus physocarpus*), Mexican Poppy (*A. ochroleuca*), Cobbler's Pegs (*Bidens pilosa*) and Spear Thistle (*Cirsium vulgare*). BC2 is shown in Image slate 2.

Image slate 2: Site BC2

Site BC3

Site BC3 is located in the central portion of MLA 50254 on Horse Creek. The canopy at this site is dominated by Forest Blue Gum (*E. tereticornis*), with occasional Rough-barked Apple (*A. floribunda*) and River She-oak (*C. cunninghamiana*). There is a dense understorey of River Paperbark (*M. trichostachya*). Groundcover at this site is dominated by bare ground and leaf litter. A mixture of native and exotic grasses was recorded, including Slender Bamboo Grass (*Stipa verticillata*), Umbrella Cane Grass (*Leptochloa digitata*), Couch (*C. dactylon*) and Guinea Grass (*M. maximus var maximus*). The ground at this site is highly disturbed (likely due to Cattle and Feral Pig activity) and the surrounding area has been cleared. A number of weed species were noted in the shrub and ground layers at this site, including Paddy's Lucerne (*Sida rhombifolia*), Mexican Poppy (*A. ochroleuca*), Mimosa Bush (*V. farnesiana*) and Burr Medic (*Medicago polymorpha*). The vegetation at BC3 is consistent with RE 11.3.25. BC3 is shown in Image slate 3.

Image slate 3: Site BC3

Site BC4

Site BC4 is located on Horse Creek upstream of the Project site. The vegetation at BC4 is consistent with RE 11.3.25. The riparian vegetation at BC4 is limited to an extremely narrow strip within the creek channel. The dominant tree species are Forest Blue Gum (*E. tereticornis*) and Rough-barked Apple (A. floribunda) with an understorey of Sally Wattle (*A. salicina*) and Ironwood (*A. excelsa*). Shrub cover at this site is very sparse. The ground layer is dominated by exotic grasses including Couch (*C. dactylon*), Feathertop Rhodes Grass (*C. virgata*), Buffel Grass (*Cenchrus ciliaris*) and Guinea Grass (*M. maximus var maximus*). A range of native grass species are also present, including Slender Bamboo Grass (S. verticillata), Umbrella Cane Grass (*L. digitata*) and Black Spear Grass (*Heteropogon contortus*). A large proportion of the ground is bare. Leaf litter was also a large component of groundcover. Cattle grazing occurs at this site and the surrounding area has been completely cleared. Several weed species were noted in the shrub and ground layers at this site, including Paddy's Lucerne (*S. rhombifolia*), Prickly Pear (Opuntia stricta), Mimosa Bush (*V. farnesiana*) and Mayne's Pest (*Glandularia aristigera*). Site BC4 is shown in Image slate 4.

Image slate 4: Site BC4

Site BC5

Site BC5 is located in Horse Creek downstream of the Project site. BC5 is located within a patch of RE 11.3.25. The dominant tree species at this site are River She-oak (*C. cunninghamiana*) and Forest Blue Gum (*E. tereticornis*), with a sparse understorey of River Paperbark (*M. trichostachya*). Groundcover at this site is dominated by exotic grasses including Couch (*C. dactylon*) and Guinea Grass (*M. maximus var maximus*). The majority of the ground is bare. Cattle grazing occurs at this site and the surrounding area has been cleared. A number of weed species were noted in the shrub and ground layers at this site, including Paddy's Lucerne (*S. rhombifolia*), Mexican Poppy (*A. ochroleuca*), Mimosa Bush (*V. farnesiana*) and Burr Medic (*M. polymorpha*). Image slate 5 shows site BC5.

Image slate 5: Site BC5

Site BC6

Site BC6 is a large palustrine wetland located downstream of the Project site. The vegetation at this site is classified as RE 11.3.2b – Palustrine wetland. Eucalyptus camaldulensis (sometimes *E. populnea* and/or *E. tereticornis*) woodland in drainage depressions with a ground layer of grasses or sedges). The wetland was largely dry at the time of the assessment. The dominant tree species at this site is Forest Blue Gum (*E. tereticornis*). No other tree species are present. A dense low shrub layer dominated by the weed Paddy's Lucerne (*S. rhombifolia*) is present. The ground is covered with fallen timber and leaf litter. Cattle grazing occurs at this site and the surrounding area has been cleared. This site is shown in Image slate 6.

Image slate 6: Site BC6

3.2.2 Rehabilitation sites

Rehabilitation sites will be determined during progressive rehabilitation where land becomes available following mining disturbance. These areas will be compared to the predefined analogue sites.

3.3 Rehabilitation monitoring aspects

The following methods are employed at each monitoring site and described in detail in the following sections:

- permanent vegetation monitoring transects (ground cover monitoring and species richness);
- photographic monitoring;
- erosion monitoring; and
- topsoil characterisation (every 2–3 years, or less frequently once sufficient information has been obtained).

In conjunction with walking between transects, rehabilitation areas will be visually assessed to identify signs of fauna utilisation, noticeable issues such as erosion, vegetation cover deficiencies, or weed and / or pest infestations. Satellite imagery technology may also be employed. These observations are incorporated with the results of each rehabilitation progress report.

3.3.1 Vegetation monitoring

Vegetation monitoring will involve the collection of quantitative data for:

- ground cover percentage;
- canopy cover;
- species richness;
- woody stem density;
- recruitment; and
- weeds.

Each monitoring site is demarcated by a 50 m long transect and observations/ measurements are taken at each 5 m interval on either side of the transect, thereby representing an effective plot size of 50 m by 10 m. A plastic delineator post guide will be installed at each end of the transect to ensure the exact location of the permanent transect can be identified, ensuring robust sampling repetition.

The survey methodology outlined has been adapted based on information contained within the *BioCondition Assessment Framework* (Eyre et al. 2015), the *Vegetation Assessment Guide* (DoE 2013), and the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al. 2022).

3.3.1.1 Species richness

To measure species richness, all vascular plants occurring within 5 m of either side of the 50 m transect are recorded. Any species unable to be identified are collected for later identification. Species will be classified into one of the following six groups for reporting purposes:

- native pasture species;
- exotic pasture species;
- trees;
- shrubs;
- forbs; and
- noxious weeds.

This methodology is used to record species richness and the projective foliage cover on the transects to assess against milestone criteria. It should be noted that due to the pastoral nature of rehabilitation sites, the Projective foliage cover is inferred from the vegetation cover measured at each transect.

3.3.1.2 Ground cover

Ground cover monitoring involves the collection of quantitative data on average ground cover (percent) where the percentage of all types of ground cover within ten 1 m x 1 m quadrats is determined. Similar to the transect above, the quadrat shall be placed every 5 m on alternating sides of the transect, commencing at 0 m on the right and the final quadrat at 45 m. In each quadrat the total percentage ground foliage cover of each plant species and the percentage cover of bare soil, rock and organic litter is recorded.

Ground foliage cover incorporates native perennial grass cover, native annual grass cover, native forbs and other species, native shrubs (< 1m height), non-native grass, non-native forbs and shrubs, litter, rock, bare ground and cryptogams.

3.3.1.3 Recruitment

Recruitment is assessed using methodology adapted from Eyre *et al.* 2015 whereby recruitment is assessed over the 10 m x 50 m plot (5 m either side of each 50 m transect) (refer to Figure 4). Within this plot, the proportion of dominant species found to be regenerating are counted. A regenerating individual is identified as a woody stem species with a diameter at breast height of <5 cm. For each dominant canopy species present, at least one individual must be present as a sapling or seedling for the species to be considered as regenerating. The presence of all dominant species in the regenerative state would make up 100% recruitment.

3.3.1.4 Canopy cover

Tree canopy cover can be used to characterise stand productivity and the distribution and abundance of biomass (Eyre *et al*. 2017). It refers to the estimation of the percentage canopy cover of the living, native tree layer along a 50 m transect, using the line intercept method (Greig-Smith 1964). For this attribute, the vertical projection of tree canopy cover of the species making up the tree canopy cover is assessed. The vertical projection of the tree canopy over the 50 m transect is recorded as illustrated in Figure 4. The total length of the projected canopy of each layer is then divided by the total length of the tape to give an estimate of percentage canopy cover on the site.

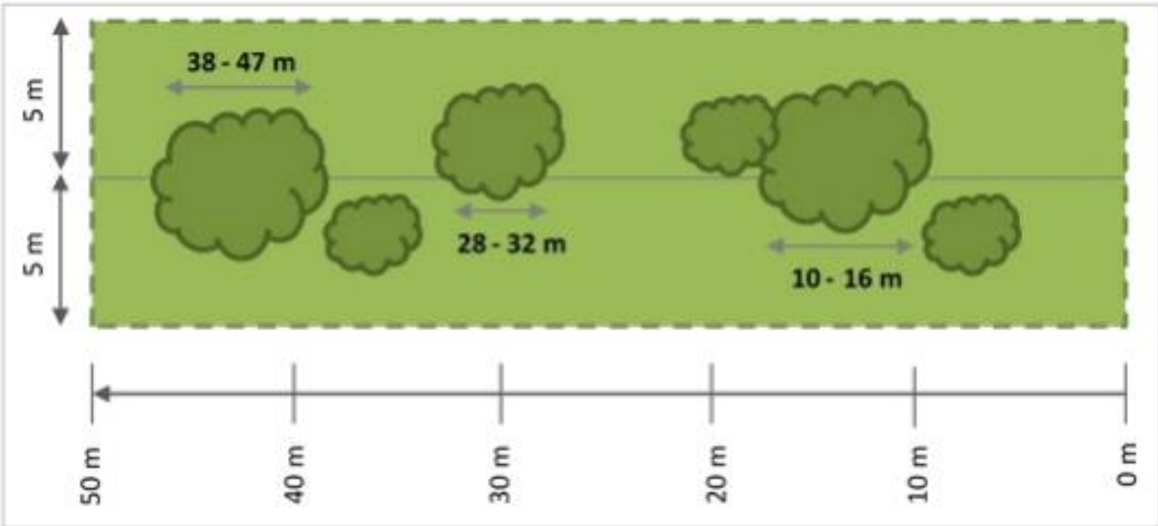

Figure 4: Guide to monitoring canopy cover (after Eyre et al. 2017)

3.3.1.5 Pasture productivity

An assessment of pasture productivity will be undertaken to determine the achievement of the target PMLU. Pasture productivity within rehabilitated areas will be assessed using either manual measurements or satellite imagery. Measurements for pasture productivity should be undertaken at the end of the growing season. Manual measurements of pasture productivity will be undertaken in accordance with relevant industry guidelines. Pasture mass and height are common proxy measurement used for assessing pasture productivity.

To measure pasture mass:

1) A 30 x 30 cm quadrat will be established to measure sample sites.
2) A digital photograph is to be taken of the sample quadrat.
3) Pasture is then cut to ground level and placed in a paper bag.
4) The paper bag is placed on a wet/dry balance and the mass is recorded.
5) The process is then repeated for a minimum of 15 sites across the paddock and up to 20 sites if the paddock has significant variability in cover.

6) Data collected is then used below to calculate the average pasture mass in kilograms of dry matter per hectare (kg DM/ha).

To measure pasture height using the ruler/stick method (Meat and Livestock Australia 2019):

1) A 1 cm thick dowel, 30 cm long is marked 0.5 cm from the bottom, then every 1cm along the stick. Note: readings between 0.5cm and 1.5cm will be recorded as 1cm, readings between 1.5cm and 2.5cm as 2cm etc.
2) To measure the pasture, place the stick vertically on the soil surface at the point where the base of the stick landed.
3) Slide a thumb down the stick until you touch a green leaf and record the cm.
4) Measure the height from at least 50 sites chosen at random as you traverse the paddock. The best way is to throw the stick as you walk across the paddock.
5) Pasture mass is then estimated in kg dry matter DM/ha using the approximate relationship between pasture height and a kg DM/ha chart.

Pending the outcomes of the advancement of the use of remote sensing / satellite imagery currently being undertaken, pasture productivity may be estimated from the use remote sensing or satellite imagery. For example, the CSIRO in partnership with the Western Australian Government has developed a '*Pastures from Space*' program which will utilise satellite imagery to provide real-time data on green pasture biomass and feed on offer. The use of satellite imagery is beneficial in providing a site-wide analysis and comparative analysis with analogue sites.

3.3.2 Biocondition assessment

Biocondition assessments have been proposed by DES for providing measurable criteria through which to compare rehabilitation of a native ecosystem. This includes a modified set of values (i.e. 50% of relevant benchmarking parameter) which is considered a best practice monitoring method.

The intention of rehabilitation incorporating native vegetation within a PMLU, is to recreate a modified community that provides native ecosystem values in an artificial landscape. The technical paper, 'Evaluating methods for assessing native ecosystem mine rehabilitation success', from the Office of the Queensland Mine Rehabilitation Commissioner suggests methods to measure rehabilitation success for post-mine disturbance landscapes.

The paper specifies standard survey techniques for native ecosystems in Queensland, including those most applicable to mine rehabilitation without comparison to reference sites. These include, but are not limited to, the Biocondition assessment and The Queensland Biodiversity and Ecology Information System site data collection method (QBEIS method). Almost all of the components in BioCondition are also in the QBEIS site data collection method. Indicators of success vary depending on the type of modified ecosystem.

The QBEIS method includes a tertiary site level of detail, which is applicable to modified landscapes. This only includes dominant or conspicuous species of the ground layer cover and all woody species, measuring or estimating their height (or height range), cover and abundance in each layer. For modified ecosystem classes with no analogous ecosystems, comparison to similar regional ecosystems (REs) using general structural and compositional data is recommended for benchmarking.

A 50% benchmark for biocondition assessments is proposed for RE 11.3.25 to measure against rehabilitation success for the Horse Creek diversion. Based on this and the technical paper described for the QBEIS method (tertiary site level), the criteria proposed for measuring revegetation achievement for the Horse Creek diversion was based on a 50% benchmark value considering average 2013 biocondition assessment and QBEIS benchmarks defined for RE 11.3.25. Preliminary benchmarks are presented in Table 5.

Table 5: Preliminary biocondition assessment values

Parameter	Benchmark value	Comment
Tree canopy height	> 7 m	Value based on a 50% benchmark of emergent canopy height (14 m) and in consideration of shrub height (7 m)
Tree species richness	> 2	Value based on a 50% benchmark of tree species richness for RE 11.3.25
Shrub species richness	> 2	Value based on a 50% benchmark of shrub species richness for RE 11.3.25
Grass species richness	> 4	Value based on a 50% benchmark of grass species richness for RE 11.3.25
Tree canopy cover	> 6%	Value based on a 50% benchmark of tree sub-canopy cover for RE 11.3.25
Shrub canopy cover	≥ 3%	Value based on a 50% benchmark of shrub canopy cover for RE 11.3.25
Ground cover (%)	≥ 30%	Value based on a 50% benchmark of the average total ground cover assessed for Horse Creek (refer **Error! Reference source not found.**)

3.3.3 Erosion monitoring

An erosion monitoring methodology has been developed by experienced AARC ecologists with consideration to relevant guidelines and research (Neldner *et al.* 2019, Eyre *et al*. 2017 and DSITI 2015). Erosion monitoring is to be conducted across all analogue and rehabilitation monitoring locations. Rehabilitation areas will be inspected to assess the extent of erosion features and an erosion rating for each site will be determined. Erosion features or indicators may include wind or sheet erosion, erosion rills, gullies or tunnels, or signs of slumping.

Erosion at the survey sites is monitored through visual assessment over time. Assessment is undertaken by traversing the 50 m transects described in Section 3.3.1, and recording the number and average depth of any erosion features or rill lines. Table 6 is used to record and classify these observations. The overall classification of the erosion on each transect is determined by the higher classification attributed to either the number of rills/gullies or the average depth. For example, a transect may present only one or two rills but if these are recorded as being 25 cm deep, the transect will be classified as presenting a Moderate erosion classification.

Obvious cases of localised settlement which are not causing any subsequent erosion are not counted as instances of erosion.

Table 6: Erosion classifications

Erosion classification	Minor	Moderate	Severe	Extreme
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.	Loss of surface horizons; root exposure, etc.
No. of rills/ gullies	< 15	15 – 30	31 – 50	> 50
Greatest observed depth (cm)	<10	10 – 30	30 – 60	>60
Tunnel erosion	-	-	Present	Present
Mass movement	-	-	Present	Present

It should be noted that the placement of the permanent transects may not be representative of the level of erosion across the entire rehabilitation area landforms. To compensate for this, general observations undertaken during the survey are also utilised in assessing rehabilitation performance. The location of any severe erosion outside the transect (i.e. tunnels, mass wasting, large gullies) is also recorded and marked with a handheld Global Positioning System (GPS).

The following information is recorded at each site:

- GPS reading of location;
- general description of type of erosion (gully [> 30 cm], rill line [<30 cm], circular failure, tunnelling etc.) and possible causes, refer to the glossary of terms for definitions of erosion types;
- depth of erosion;
- width of erosion;
- length of erosion;
- where eroded material is being deposited; and
- whether the erosion line is being stabilised by vegetation.

3.3.4 Soil monitoring

Topsoil sampling is not considered to be an annual requirement of the rehabilitation monitoring program, but it is recommended to be undertaken at the commencement of rehabilitation monitoring to identify and address any deficiencies in the chemical composition or exceedances in the metal composition of the soil that may be detrimental to vegetation health.

Soil monitoring involves the collection of topsoil samples from a maximum depth of 10 cm to obtain quantitative data on the chemical and physical properties of soil. Soil sampling methodology has been adapted from Monitoring and Sampling Manual Environmental Protection (Water) Policy 2009 (DES 2018). Soil sampling is conducted by collecting approximately 200 g samples with a clean non-metallic shovel and bucket every 10 m along the 50 m transect. The first sample is collected at 0 m. These five samples are mixed in the bucket. The final 200 g soil sample is taken from the mix and placed into plastic sample bag. Samples are sent to a National Association of Testing Authorities (NATA) certified laboratory for analysis of indicators of soil nutrition and land contamination including:

- pH;
- electrical conductivity;
- soluble chloride;
- moisture content;
- Emerson aggregate stability test;
- exchange acidity;
- exchangeable cations (calcium, magnesium, potassium, sodium and aluminium);
- cation exchange capacity;
- calcium : magnesium ratio (Ca: Mg);
- exchangeable sodium percentage (ESP);
- total nitrogen, nitrite and nitrate;
- sulphate;
- extractable potassium and phosphorous (Colwell);
- total organic carbon and organic matter; and

- trace elements (arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc).

Soil moisture content shall be measured for interpretive purposes only and will not be assessed in determining rehabilitation performance.

Ideally, rehabilitation site data should reflect that of analogue sites, though data indicating a trajectory to meet performance criteria may be sufficient in supporting the chosen post-mining land use.

3.3.5 Photographic monitoring

Photographic monitoring provides a visual record of the vegetation, ground cover, erosion and general appearance of each analogue and rehabilitation site, allowing these sites to be compared over time (Eyre *et al.* 2015). A digital camera is used to take the photos so that a permanent record can be kept for each site. The process of taking the monitoring photos is as follows:

6) The person taking the photograph stands at the star picket which marks the beginning of the 50 m.
7) The camera is then aimed directly toward the end of the 50 m transect and a single photograph is taken.
8) The person then stands at the star picket which marks the end of the 50 m transect.
9) The camera is then aimed directly toward the start of the 50 m transect and a single photograph is taken.
10) Steps 1 – 6 are repeated for all terrestrial monitoring sites.
11) The digital photographs are then downloaded and stored for future reference.

3.3.6 Fauna observations

Observations of any fauna species or indicators of fauna presence (e.g., scats, tracks, or other signs of fauna activity) within or in the vicinity of the rehabilitation areas will be noted as part of rehabilitation monitoring.

3.3.7 Water quality monitoring

3.3.7.1 Rehabilitation runoff water quality monitoring

Runoff water quality monitoring from rehabilitation areas will be conducted at a minimum of three locations across the ex-pit and in-pit dumps and with a target frequency of three samples per year. Sites for runoff water quality monitoring will be selected for rehabilitation areas considering the following aspects:

- The rehabilitation area has a suitable drainage line amenable for collecting a representative sample of runoff water quality. It may be necessary to construct a small drainage basin or install a rising stage or falling stage or automatic sampler to collect a suitable sample.
- The rehabilitation area is representative of rehabilitation methodologies described in the PRCP.

Analysis results should be assessed against the following values:

- pH of between 6 – 9.0;
- Salinity, measured as EC of ≤ 5,970 µS/cm; and
- Sulphate, as SO4 of ≤ 1,000 mg/L

Samples will be collected from each of the surface water monitoring sites, where surface water is present in accordance with the methodology specified in the Department of Environment and Science (DES) Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES 2018).

3.3.7.2 Groundwater quality

Groundwater quality monitoring will be undertaken biannually, subject to EA requirements, and will be compared with reference groundwater data. Groundwater monitoring will be undertaken by a competent person and will be in accordance with the latest edition of the administering authorities water quality sampling manual. Groundwater level and quality monitoring will be undertaken at the locations listed in Table 7 and shown in Figure 5 for the parameters listed in Table 8. A groundwater monitoring program will be developed for the Project and will provide for updated and site specific groundwater quality monitoring values. These limits will be updated to site specific values as monitoring is undertaken and when sufficient data is available.

Table 7: Proposed groundwater monitoring locations

Monitoring point	Lithology/Aquifer	Location (MGA94 – Zone 55)		Monitoring frequency
		Easting (m)	Northing (m)	
MBA1	Walloon Coal Measures	760997	7120002	Monthly for the first 12 months and then six monthly thereafter
MB1B	Alluvium	761001	7120001	
MB2	Walloon Coal Measures	760367	7117880	
MB3A	Walloon Coal Measures	763091	7117998	
MB3B	Horse Creek Alluvium	763093	7118002	
MB4A	Walloon Coal Measures	760348	7116954	
MB4B	Horse Creek Alluvium	760351	7116954	
MB5	Walloon Coal Measures	762400	7116429	
MB6	Walloon Coal Measures	761432	7114842	
MB7A	Walloon Coal Measures	760017	7115207	
MB7B	Horse Creek Alluvium	760020	7115206	
MB8A	Walloon Coal Measures	759277	7112983	
MB8B	Horse Creek Alluvium	759278	7112979	
MB9	Walloon Coal Measures	761753	7112704	
MB10	Walloon Coal Measures	763543	7115939	
MB11	Walloon Coal Measures	763493	7113179	
MB12	Walloon Coal Measures	759272	7115706	
MB13[1]	Alluvium	765191	7124165	
MB14[1]	Horse Creek Alluvium	765229	7123665	
MB15[1]	Horse Creek Alluvium	764461	7122489	
MB16[1]	Horse Creek Alluvium	756901	7102939	
MB17[1]	Alluvium	763008	7125369	
MB18[1]	Horse Creek Alluvium	758802	7109229	
MB19[1]	Horse Creek Alluvium	758487	7107668	
RN58968[2]	Hutton and Precipice Sandstone	757387	7123967	
RN58285[2]	Hutton and Precipice Sandstone	667389	706954	
RN58306[2]	Hutton and Precipice Sandstone	761758	7131366	

1 – Coordinates determined using handheld GPS – surveyed coordinates pending

2 – Deep monitoring bores

Table 8: Preliminary groundwater quality limits

Parameter	Units	Trigger limits	Trigger type
pH	pH	6 - 9	Range
TDS	mg/L	4,000 or 95th percentile of reference data whichever is higher	Maximum
Sulphate	mg/L	1,000 or 95th percentile of reference data whichever is higher	Maximum
Aluminium	mg/L	5 or 95th percentile of reference data whichever is higher	Maximum
Arsenic	mg/L	0.5 or 95th percentile of reference data whichever is higher	Maximum
Boron	mg/L	5 or 95th percentile of reference data whichever is higher	Maximum
Cadmium	mg/L	0.01 or 95th percentile of reference data whichever is higher	Maximum
Chromium	mg/L	1 or 95th percentile of reference data whichever is higher	Maximum
Cobalt	mg/L	1 or 95th percentile of reference data whichever is higher	Maximum
Copper	mg/L	1 or 95th percentile of reference data whichever is higher	Maximum
Fluoride	mg/L	2 or 95th percentile of reference data whichever is higher	Maximum
Lead	mg/L	0.1 or 95th percentile of reference data whichever is higher	Maximum
Mercury	mg/L	0.002 or 95th percentile of reference data whichever is higher	Maximum
Molybdenum	mg/L	0.15 or 95th percentile of reference data whichever is higher	Maximum
Nickel	mg/L	1 or 95th percentile of reference data whichever is higher	Maximum
Selenium	mg/L	0.02 or 95th percentile of reference data whichever is higher	Maximum
Zinc	mg/L	20 or 95th percentile of reference data whichever is higher	Maximum
Copper	mg/L	1 or 95th percentile of reference data whichever is higher	Maximum

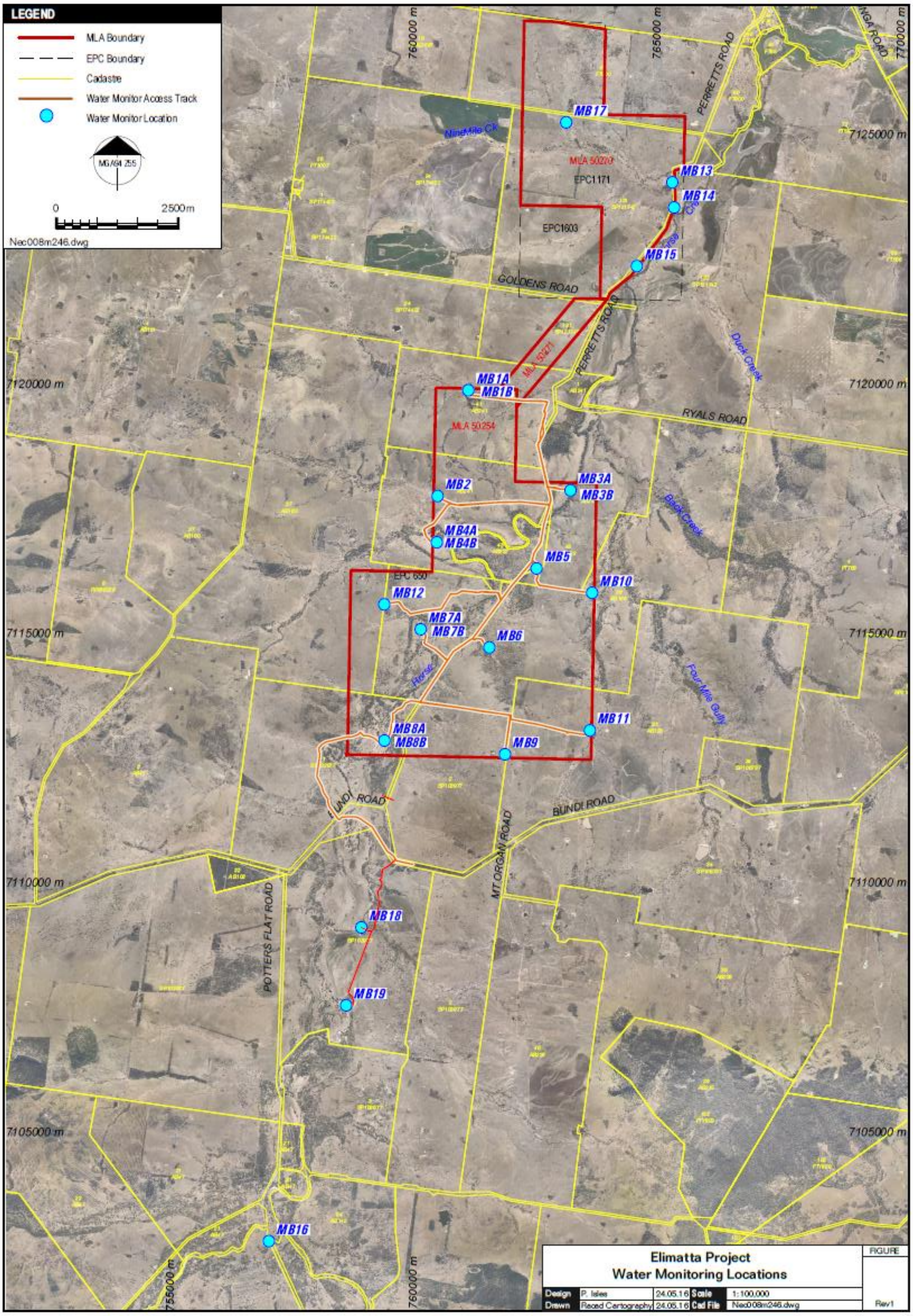

Figure 5: Preliminary groundwater monitoring network (to be confirmed, Racad Cartography 2016)

4 Data analysis, interpretation and reporting

4.1 Laboratory analysis

All soil samples collected during rehabilitation monitoring will be sent to a NATA certified laboratory for analysis of the recommended parameters.

In the event that, any plants cannot be identified in the field, samples will be sent to the Queensland herbarium for identification.

4.2 Progress reporting

A rehabilitation report will be prepared following the collection of monitoring data to provide a detailed analysis of monitoring results and evaluate rehabilitation progress towards completion criteria. This ongoing evaluation will enable the early detection of unfavourable trends in measured indicators and identify any requirements for adaptive management practices to ensure rehabilitation success and certification in the long term.

4.2.1 Interpretation

Rehabilitation monitoring results will be analysed both categorically and temporally. Results obtained from rehabilitation sites will be compared to analogue sites from the same final land use vegetation community. Rehabilitation monitoring results will also be compared with historical data where possible to detect any trends over time. Common variables such as climatic conditions, seasonal variation and other event specific circumstances will also be considered in the analysis of rehabilitation data.

5 References

ABARES 2016, *The Australian Land Use and Management Classification Version 8*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.

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Neldner, V, Wilson, B, Dillewaard, H, Ryan, T, Butler, D, McDonald, W, Addicott E, and Appelman, C 2019, Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 4.0, updated March 2019, Queensland Herbarium, Department of Environment and Science, Brisbane.

Appendix G. Provided technical studies

AARC AustralAsian Resource Consultants (AARC) 2013, Elimatta Project - Soil and Land Suitability Assessment, Prepared for Taroom Coal Pty Ltd.

AARC AustralAsian Resource Consultants (AARC) 2013, Elimatta Project – Terrestrial Fauna and Flora Assessment, Prepared for Taroom Coal Pty Ltd.

Australasian Groundwater & Environmental Consultants Pty Ltd (AGE) 2012, Elimatta Project Groundwater Assessment, Prepared for Northern Energy Corporation Ltd.

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Environmental Geochemistry International Pty Ltd (EGI) 2012, Geochemical Assessment of the Elimatta Coal Project, Prepared for Northern Energy Corporation Ltd.

JBT Consulting 2014, Water Management Strategy, Prepared for Northern Energy Corporation Ltd.

JBT Consulting 2017, Review of CSG-Induced Groundwater Level Drawdown at the Elimatta Project, Prepared for Northern Energy Corporation Ltd.

Parsons Brinckerhoff 2014, Horse Creek Northern MLA Hydraulic Study, Prepared for New Hope Coal.

Parsons Brinckerhoff 2014, Horse Creek Base Case (Natural Conditions) and Diversion Flood Study for Elimatta Mine, Prepared for New Hope Coal.

Parsons Brinckerhoff 2014, Horse Creek Diversion Functional Design Report, Prepared for New Hope Coal.

Appendix H. Rehabilitation Risk Assessment

Ref.				Risk Description					Risk Evaluation							Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Freq	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	A			**In-pit and out-of-pit spoil dumps**														
T	A	01		**Safe**														
T	A	01	01	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to subsoil/ topsoil characteristics/availability, inadequate surface preparation, poor early germination, localised settlement, rock used for erosion control	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure), risk assess controls when designed and placed and modify as required, post-closure monitoring.		P			Mi				M		
T	A	01	02	Slope steepness in excess of that expected for the PMLU	Inappropriate landform design, landform design restrictions	Safety hazard for personnel, stock and wildlife	Landform design criteria appropriate to PMLU, operational slope controls		U			Mo				M		
T	A	02		**Stable - geotechnical risk**														
T	A	02	01	Significant slope failure	Excessive slope steepness, physical material properties, poor drainage, adverse rainfall event	Localised land impacts and downstream water quality impacts	Geotechnical analysis undertaken where appropriate, slope moderation, provision of adequate drainage infrastructure, rapid revegetation		U				Mo				M	
T	A	03		**Stable - erosional risk**														
T	A	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Soil sampling and analysis prior to rehabilitation. Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required, sediment controls during establishment.		P				Mi				M	
T	A	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required		U				Mi				M	
T	A	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Rehabilitation of disturbance area, downstream sedimentation controls, revegetation, monitoring and maintenance		U				Mi				M	
T	A	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events, other	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required		P				Mo				H	
T	A	04		**Non-polluting - geochemical risk**														
T	A	04	01	Acid and saline drainage generation	Adverse waste rock geochemistry, external to site	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	NAPP waste rock materials, low propensity for saline drainage generation, water quality monitoring and assessment		U				Hi				M	
T	A	04	02	Acid and saline drainage generation - impacts to groundwater	Adverse waste rock geochemistry, external to site	Groundwater impacts (incl. GDEs)	NAPP waste rock materials, low propensity for saline drainage generation, water quality monitoring and assessment		U				Hi				M	

Risk Type (T=Threat	Category	Subcategory	Item	Risk Description Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Risk Evaluation Likelihood - Freq	Likelihood - Prol	Health	Safety	Environment	Compliance	Risk Rating Health	Safety	Environment	Compliance
T	**A**	**05**		**Non-polluting - other environmental harm**														
T	A	05	01	TSS in site drainage in excess of that expected for the PMLU	Dispersive materials used in construction of WRDs	Downstream water quality impacts	Soil testing and amelioration and prompt vegetation establishment, revegetation monitoring and management		P				Hi				H	
T	**A**	**06**		**Sustainable - PMLU**														
T	A	06	01	Insufficient pasture productivity/diversity/density for the PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity	Ongoing grazing management, soil amelioration, pasture performance monitoring, revegetation timing		P				Mo				H	
T	A	06	02	Insufficient topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Poor vegetation establishment, insufficient habitat suitable for native fauna, insufficient pasture productivity	Adequate topsoil stockpiling and management strategies		U				Mo	Mi			M	M
T	A	06	03	Pests and weeds	Poor local, regional or site property management practices, weed invasion	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management		U				Mo				M	
T	**B**			**Waste Disposal (including capped surface TSFs)**														
T	**B**	**01**		**Safe**														
T	B	01	02	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Challenging subsoils/ topsoils, inadequate surface preparation, localised settlement, erosion gullies	Safety hazard for personnel and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure)		P			Mi				M		
T	**B**	**02**		**Stable - geotechnical risk**														
T	B	02	01	Significant slope failure	Excessive slope steepness, not constructed to design, adverse rainfall event	Localised land impacts and downstream water quality impacts	Engineered design and inspection, geotechnical assessment, certification that final landform is safe and stable		U				Hi				M	
T	**B**	**03**		**Stable - erosional risk**														
T	B	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts, sedimentation Creek lines	Soil samping and analysis prior to rehabilitation. Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required		U				Mi				M	
T	B	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts, sedimentation Creek lines	Cell design incorporates engineered spillways, avoidance of flow concentration by batter surface preparation, effective revegetation techniques, rehabilitation monitoring and management as required		U				Mi				M	
T	B	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts, sedimentation Creek lines	Downstream sedimentation controls, revegetation, monitoring and maintenance		U				Mi				M	
T	B	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ revegetation disease, climatic events, other	Localised land impacts and downstream water quality impacts, sedimentation Creek lines	Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required		P				Mo				H	

Ref.				Risk Description					Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**B**	**04**		**Non-polluting - geochemical risk**														
T	B	04	01	Acid Mine drainage	Adverse waste rock geochemistry, construction not according to design, inadequate capping	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Routine confirmatory geochemical testing, progressive rehabilitation, surface water/groundwater monitoring programme		U				Hi				M	
T	B	04	02	Acid Mine drainage and seepage	Design failure	Groundwater quality impact	Progressive rehabilitation, surface water/groundwater monitoring programme, groundwater studies, monitoring piezometers		U				Hi				M	
T	**B**	**05**		**Non-polluting - other environmental harm**														
T	B	05	01	Not applicable														
T	**B**	**06**		**Sustainable - PMLU**														
T	B	06	01	Insufficient pasture productivity/diversity/density for the PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Failure to achieve rehabilitation completion criteria targets	Ongoing grazing management, soil amelioration, pasture performance monitoing, revegetation timing		P				Mo				**H**	
T	B	06	02	Pests and weeds	Poor local, regional or site property management practices, weed invasion	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mo				M	
T	B	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Implementation of topsoil management plan, annual review of topsoil inventory.		U				Mo	Mi			M	M
T	**C**			**Rehabilitated water management structures**														
T	**C**	**01**		**Safe**														
T	C	01	01	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to subsoil/ topsoil characteristics/availability, inadequate surface preparation, poor early germination, localised settlement, rock used for erosion control	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure), risk assess controls when designed and placed and modify as required, post-closure monitoring.		U			Mi				M		
T	**C**	**02**		**Stable - geotechnical risk**														
T	C	02	01	Not applicable														
T	**C**	**03**		**Stable - erosional risk**														
T	C	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts	Soil sampling and analysis prior to rehabilitation. Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required.		U				Mi				M	
T	C	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, rehabilitation and water quality monitoring, maintenance and repair activities as required.		U				Mi				M	
T	C	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, rehabilitation and water quality monitoring, maintenance and repair activities as required.		U				Mi				M	
T	C	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ revegetation disease, climatic events	Localised land impacts and downstream water quality impacts	Landform design similar contour to surrounding environment, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required.		U				Mi				M	

Ref.				Risk Description					Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**C**	**04**		**Non-polluting - geochemical risk**														
T	C	04	01	Not applicable														
T	**C**	**05**		**Non-polluting - other environmental harm**														
T	C	05	01	Contaminated land (applicable to environmental and sediment dams)	Inadequate assessment and remediation prior to rehabilitation	Land contamination, surface water impacts, poor vegetation establishment	Contamintated land assessment, water quality monitoring, records of remediation activities		U				Mo				M	
T	**C**	**06**		**Sustainable - PMLU**														
T	C	06	01	Insufficient pasture productivity/density/diversity of vegetation in PMLU	Adverse weather, poor soil characteristics and slopes impacting germination, vegetation establishment and PMLU density/diversity metrics	Reduced pasture production due to unsuitable conditions	Topsoil amelioration, improving rehabilitation methodologies, seeding rates to be finalised with local agronomists prior to seeding, sowing of seeds not to be undertaken in adverse weather conditions management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required.		U				Mo				M	
T	C	06	02	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mo				M	
T	C	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Adequate topsoil stockpiling and management strategies		U				Mo	Mi			M	M
T	**D**			**Residual voids**														
T	**D**	**01**		**Safe**														
T	D	01	01	Void overtopping	Extreme rainfall events beyond design capacity, insufficient water level monitoring	Increased hazard to humans and animals	Void water level monitoring, hydrological modelling, constructed to design criteria		R			Mo				L		
T	D	01	02	Cattle, humans or wildlife access to the residual void	Insufficient warnings, barriers preventing access to hazardous areas, fencing/bunding breaks, unauthorised access	Falls, slips, trips impacting humans, livestock and wildlife. Livestock accessing void water for drinking	Signage, physical barriers, slope moderation, conduct a risk assessment of controls when designed and placed. Modify as required. Post closure monitoring.		R			Hi				M		
T	**D**	**02**		**Stable - geotechnical risk**														
T	D	02	01	Final void highwalls and low walls subject to significant slope failure	Excessive slopes, inadequate design, not constructed to design, inadequate drainage controls, adverse weather event	Localised land impact	Slope moderation, final landform design, maximum slopes subject to engineered design, assessment of construction materials by a suitably qualified person, provision of adequate drainage infrastructure, geotechnical assessment undertaken at closure. Certification by a suitably qualified expert that the final landform is stable and constructed according to design criteria.		P				Ne				L	

Ref.				Risk Description					Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**D**	**03**		**Stable - erosional risk**														
T	D	03	01	Initial/ongoing gully, pipe and/or sheet erosion of the low walls and high walls	Faults and fractures in the underlying geology, adverse weather events	Localised land impacts, water quality impacts (water contained within the pit)	Landform design in accordance with geotechnical assessment of the site, monitoring and management as required.		P				Ne				L	
T	D	03	02	Initial/ongoing gully, pipe and/or sheet erosion of the low walls and high walls	Inadequate design, erodible topsoil and subsoils	Localised land impacts, water quality impacts (water contained within the pit)	Landform including highwalls and site drainage network to be constructed as designed. Monitoring of drainage network performance, prompt remediation. Certification by a suitably qualified person that the final landform is stable and constructed according to design criteria.		P				Ne				L	
T	D	03	03	Initial/ongoing gully, pipe and/or sheet erosion of the low walls and high walls	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts, water quality impacts (water contained within the pit)	Final void designed as to prevent excessive runoff from entering the final void during rainfall events. Prompt remediation, post-weather event monitoring of final void water quality, high walls and low wall.		P				Ne				L	
T	**D**	**04**		**Non-polluting - geochemical risk**														
T	D	04	01	Mine affected water contributes to natural groundwater body	Void longterm water level is above natural groundwater level	Adverse water quality and dependent ecosystem impacts	Final void hydrological assessment shows final voids as a groundwater sink. Monitoring of pit water quality to be undertaken and assessed against model predictions. Geotechnical/geochemical assessment, groundwater monitoring program		U				Hi				M	
T	**D**	**05**		**Non-polluting - other environmental harm**														
T	D	05	01	Not applicable														
T	**F**			**In-Pit Tailings (TDP) rehabilitated**														
T	**F**	**01**		**Safe**														
T	F	01	01	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to subsoil/ topsoil characteristics/availability, inadequate surface preparation, localised settlement, rock used for erosion control	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), design specifications, monitoring, maintenance controls (pre-closure), risk assess controls when designed and placed and modify as required, post-closure monitoring.		P			Mi				M		
T	**F**	**02**		**Stable - geotechnical risk**														
T	F	02	01	Differential settlement	Materials used for capping, capping methodology	Localised land impacts	Extended non-operational drying period, geotech testing, increased depth of capping material		P				Mo				H	
T	**F**	**03**		**Stable - erosional risk**														
T	F	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required.		U				Mi				M	
T	F	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, rehabilitation and water quality monitoring, maintenance and repair activities as required.		U				Mi				M	
T	F	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, rehabilitation and water quality monitoring, maintenance and repair activities as required.		U				Mi				M	
T	F	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ revegetation disease, climatic events	Localised land impacts and downstream water quality impacts	Landform design similar contour to surrounding environment, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required.		P				Mo				H	

Ref.				Risk Description					Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**F**	**04**		**Non-polluting - geochemical risk**														
T	F	04	01	Acid and saline drainage	Adverse geochemical characteristics, inadequate design	Impacts to groundwater and GDEs, downstream water quality impacts	Water quality monitoring program, NAPP tailings materials, design specification (water shedding)		U				Hi				M	
T	**F**	**05**		**Non-polluting - other environmental harm**														
T	F	05	01	Contaminants in seepage and surface water runoff	Adverse geochemical characteristics, inadequate capping design and implimentation	Surface water impacts, groundwater impacts	Groundwater and surface water monitoring program, seal coal seam aquifers, NAPP tailings materials		U				Hi				M	
T	**D**	**06**		**0**														
T	D	06	01	Insufficient pasture productivity or density/diversity of vegetation in PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity, habitat unsuitable for native fauna	Ongoing grazing management, soil amelioration, pasture performance monitoring		P				Mo				H	
T	D	06	02	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mo				M	
T	D	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Implementation of topsoil management plan, annual review of topsoil inventory.		U				Mo	Mi			M	M
T	**G**			**Mine infrastructure and exploration areas**														
T	**G**	**01**		**Safe**														
T	G	01	01	Surface roughness (rockiness, depressions) in excess of that expected for PMLU	Inadequate surface preparation, localised settlement, erosion gullies	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure), rehabilitation monitoring assessment, undertake repairs and maintenance as required		U			Mi				M		
T	**G**	**02**		**Stable - geotechnical risk**														
T	G	02	01	Not applicable														
T	**G**	**03**		**Stable - erosional risk**														
T	G	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques to improve rehabilitaiton success when required, sediment controls during establishment		U				Mi				M	
T	G	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels, adequate and effective revegetation techniques, rehabilitation monitoring and management as required		U				Mi				M	
T	G	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, monitoring and maintenance		U				Mi				M	
T	G	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure / vegetation disease / loss, climatic events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt and effective revegetation establishment, revegetation monitoring and management as required		U				Mo				M	

Ref.				Risk Description					Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**G**	**04**		**Non-polluting - geochemical risk**														
0	0	0	01	Not applicable														
T	**G**	**05**		**Non-polluting - other environmental harm**														
T	G	05	01	Contaminated land	Operational phase industrial use of land	Land contamination, surface water impacts	Appropriate infrastructure management, storage and bunding of hazardous materials, contaminated land assessment at closure, contingent provision for clean-up and proactive spills management, water quality monitoring		U				Mo				M	
T	**G**	**06**		**Sustainable - PMLU**														
T	G	06	01	Insufficient pasture productivity or density / diversity of vegetation PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity, habitat unsuitable for native fauna	Ongoing grazing management, soil amelioration, pasture performance monitoring		U				Mo				M	
T	G	06	02	Pests and weeds	Poor local, regional or site property management practices, weed invasion	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mo				M	
T	G	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Implementation of topsoil management plan, annual review of topsoil inventory.		U				Mo	Mi			M	M
T	**H**			**Creek diversions (permanent)**														
T	**H**	**01**		**Safe**														
T	H	01	01	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Challenging subsoils/ topsoils, inadequate surface preparation, localised settlement, erosion gullies	Safety hazard for personnel and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure).		P			Mi				M		
T	**H**	**02**		**Stable - geotechnical risk**														
T	H	02	01	Not applicable														
T	**H**	**03**		**Stable - erosional risk**														
T	H	03	01	Diversion doesn't achieve geomorphic stability	Erodible topsoils and subsoils, Adverse climatic events and/or climatic sequences beyond design capacity, Rehabilitation failure/ vegetation disease/loss	Ongoing watercourse erosion, water quality impacts, bank stability impacts	Geomorphic diversion design, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, sediment controls during establishment, bank stabilisation if required. Geomorphic monitoring program for at least life of mine		U				Mo				M	
T	**H**	**04**		**Non-polluting - geochemical risk**														
T	H	04	01	Not applicable														
T	**H**	**05**		**Non-polluting - other environmental harm**														
T	H	05	01	Downstream water quality impacts and sedimentation	Erodible topsoils and subsoils, Adverse climatic events and/or climatic sequences beyond design capacity, Rehabilitation failure/ vegetation disease/loss	Water quality impacts, bank stability impacts	Geomorphic diversion design, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, sediment controls during establishment, bank stabilisation if required. Geomorphic monitoring program for at least life of mine		U				Mo				M	

Risk Type (T=Threat)	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectivene	Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
Ref.				Risk Description					Risk Evaluation						Risk Rating			
T	**H**	**06**		**Sustainable - PMLU**														
T	H	06	01	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mi				M	
T	H	06	02	Insufficient riparian habitat (native vegetation) density/diversity and recruitment	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient vegetation productivity	Adaptive rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake revegetation improvement works as required.		P				Mo				**H**	
T	H	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Implementation of topsoil management plan, annual review of topsoil inventory.		U				Mi	Mo			M	M
T	**H**			**Retained flood levees**														
T	**H**	**01**		**Safe**														
T	H	01	01	Failure of retained levees	Extreme flood events, adverse weather conditions	Risk of drowning of personnel, stock or wildlife during flood events	Retained levee design. Ensuring no personnel or stock access to areas protected by retained levees during flood events		R			Hi				M		
T	**H**	**02**		**Stable - geotechnical risk**														
T	H	02	01	Flood levee failure	Structure failure, landform not constructed to design, physical material properties, adverse rainfall event,	Flood and overtopping of the retained southwest void	Retained levee design, geotechnical assessment undertaken at closure.		R				Mo				L	
T	**H**	**03**		**Stable - erosional risk**														
T	H	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques to improve the likelihood of rehabilitation succession rehabilitated slopes when required, sediment controls during establishment.		P				Mi				M	
T	H	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Prompt revegetation, regular (typically annual) review of design parameters, undertake repairs and maintenance as required, prompt remediation and causal feedback loop to water management system review.		U				Mi				M	
T	H	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required		U				Mi				M	
T	H	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events (drought)	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and assessment, modify rehabilitation methods and techniques to improve the likelihood of revegetation success on rehabilitated slopes, undertake repairs and maintenance as required.		P				Mo				**H**	

Ref.				Risk Description				Control Effectivene	Risk Evaluation						Risk Rating			
Risk Type (T=Threat	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls		Likelihood - Frec	Likelihood - Prol	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance
T	**H**	**04**		**Non-polluting - geochemical risk**														
T	H	04	01	Not applicable														
T	**H**	**05**		**Non-polluting - other environmental harm**														
T	H	05	01	Not applicable														
T	**H**	**06**		**Sustainable - PMLU**														
T	H	06	01	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.		U				Mo				M	
T	H	06	02	Insufficient pasture productivity or density / diversity of vegetation PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient vegetation productivity	Adaptive rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake revegetation improvement works as required.		P				Mo				**H**	
T	H	06	03	Insufficient quality topsoil resources onsite available to undertake rehabilitation activities	Poor management practices, shortage of topsoil resources	Increased risk of not achieving PMLU	Implementation of topsoil management plan, annual review of topsoil inventory.		U				Mo	Mi			M	M
				End of record														

Appendix I. Groundwater quality data (AGE 2012)

Analytes	Units	LOR	MB1A				MB2			MB3A				ANZECC 2000	ADWG (2011)	
Aquifer	-	-	Walloon Coal Measures				Walloon Coal Measures			Walloon Coal Measures				Livestock Drinking	Aesthetic	Health
Date Sampled	-	-	10/10/2009	25/11/2009	21/01/2010	08/07/2011	10/10/2009	25/11/2009	21/01/2010	07/10/2009	26/11/2009	20/01/2010	09/07/2011			
Physical Properties																
Field pH Value	pH Unit	0.01	7.05	6.99	7.08	6.93	7.48	7.42	7.18	7.79	7.78	7.77	7.3	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	18600	17100	18100	17700	14500	13000	14000	6490	6620	6260	5030	-	-	-
Total Dissolved Solids @180°C	mg/L	5	**10900**	**10500**	**11000**	**10800**	**8010**	**7390**	**7800**	**3210**	**3480**	**3430**	2910	3000-13000*	600	-
Alkalinity																
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	655	611	643	601	275	249	264	559	573	495	914	-	-	-
Total Alkalinity as CaCO3	mg/L	1	655	611	643	601	275	249	264	559	573	495	914	-	-	-
Major Ions																
Calcium	mg/L	1	218	222	205	210	72	58	62	18	16	16	64	1000	-	-
Chloride	mg/L	1	6070	5860	6190	5930	4700	4330	4730	1720	1870	1710	1090	-	250	-
Magnesium	mg/L	1	97	83	84	83	23	19	20	4	3	3	16	-	-	-
Potassium	mg/L	1	27	29	24	25	16	16	13	6	5	5	7	-	-	-
Sodium	mg/L	1	3400	3740	3740	3480	2880	2910	2830	1440	1510	1300	1050	-	180	-
Sulfate	mg/L	1	32	44	29	49	50	7	2	3	<1	5	4	1000	250	500
Disolved Metals																
Aluminium	mg/L	0.01	0.01	<0.01	0.07	<0.01	0.03	<0.01	<0.01	0.02	0.01	0.01	<0.01	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	<0.001	<0.001	0.001	<0.001	0.002	0.001	0.003	<0.001	0.002	<0.001	<0.001	0.5	-	-
Barium	mg/L	0.001	7.05	6.66	6.25	6.55	2.6	2.54	2.68	0.642	0.621	0.523	1.45	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.22	0.21	0.16	0.16	0.19	0.16	0.13	0.21	0.21	0.14	0.23	5	-	-
Cadmium	mg/L	0.0001	0.0006	0.0002	<0.0001	<0.0001	0.0014	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.01	-	-
Chromium	mg/L	0.001	0.003	0.004	<0.001	0.001	0.003	0.003	<0.001	0.001	0.009	<0.001	<0.001	1	-	-
Copper	mg/L	0.001	0.059	0.032	0.078	0.002	0.026	0.073	0.007	0.001	0.007	0.015	<0.001	0.5	-	-
Iron	mg/L	0.05	0.75	0.78	0.49	1.33	0.11	0.06	0.16	<0.05	0.13	<0.05	0.73	-	-	-
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.002	<0.001	<0.001	0.001	0.002	0.001	0.1	-	-
Lithium	mg/L	0.001	0.322	0.333	0.234	0.266	0.141	0.161	0.137	0.093	0.092	0.062	0.084	-	-	-
Manganese	mg/L	0.001	0.045	0.043	0.03	0.041	0.083	0.046	0.028	0.01	0.011	0.009	0.131	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.013	0.006	0.002	<0.001	<0.001	0.001	0.002	0.15	-	-
Nickel	mg/L	0.001	0.013	0.03	0.005	<0.001	0.008	0.006	0.002	<0.001	0.003	0.006	0.004	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	0.002	0.005	<0.001	<0.001	0.003	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	-	-
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	0.044	0.045	0.012	0.006	0.028	0.034	0.012	0.008	0.006	0.013	<0.005	20	-	-
Total Metals																
Aluminium	mg/L	0.01	-	-	-	0.02	-	-	-	-	-	-	0.02	5	0.2	-
Antimony	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	<0.001	-	-	0.003
Arsenic	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	<0.001	0.5	-	0.01
Barium	mg/L	0.001	-	-	-	6.35	-	-	-	-	-	-	1.52	-	-	2
Beryllium	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	<0.001	-	-	0.06
Boron	mg/L	0.05	-	-	-	0.15	-	-	-	-	-	-	0.22	5	-	4
Cadmium	mg/L	0.0001	-	-	-	<0.0001	-	-	-	-	-	-	<0.0001	0.01	-	0.002
Chromium	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	0.005	1	-	0.05
Copper	mg/L	0.001	-	-	-	0.002	-	-	-	-	-	-	0.002	0.5	1	2
Iron	mg/L	0.05	-	-	-	2.27	-	-	-	-	-	-	1.11	-	0.3	-
Lead	mg/L	0.001	-	-	-	0.005	-	-	-	-	-	-	0.026	0.1	-	0.01
Lithium	mg/L	0.001	-	-	-	0.306	-	-	-	-	-	-	0.098	-	-	-
Manganese	mg/L	0.001	-	-	-	0.044	-	-	-	-	-	-	0.166	-	0.1	0.5
Mercury	mg/L	0.0001	-	-	-	<0.0001	-	-	-	-	-	-	<0.0001	0.002	-	0.001
Molybdenum	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	0.002	0.15	-	0.05
Nickel	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	0.009	1	-	0.02
Selenium	mg/L	0.01	-	-	-	<0.01	-	-	-	-	-	-	<0.01	0.02	-	0.01
Silver	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	<0.001	-	-	0.1
Uranium	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	<0.001	0.2	-	0.017
Vanadium	mg/L	0.01	-	-	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-
Zinc	mg/L	0.005	-	-	-	0.008	-	-	-	-	-	-	0.017	20	3	-
Nutrients																
Nitrite + Nitrate as N	mg/L	0.01	0.09	0.04	<0.01	0.09	0.08	0.04	0.06	0.04	<0.01	0.04	0.06	30-400^	-	3-50#
Total Kjeldahl Nitrogen as N	mg/L	0.1	2.2	1.8	2.7	2.4	1.6	1.4	2	0.7	0.5	1	0.8	-	-	-
Total Nitrogen as N	mg/L	0.1	2.3	1.8	2.7	2.5	1.7	1.4	2.1	0.8	0.5	1	0.9	-	-	-
Total Phosphorus as P	mg/L	0.01	0.02	<0.01	0.47	0.02	0.04	<0.01	0.21	0.06	0.01	0.05	<0.01	-	-	-

Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value.
Exceeds Australian Drinking Water Guidelines (2011) health guideline value.
1000 Exceeds ANZECC (2000) livestock drinking water guideline value.
1000 Laboratory holding time breached.
* Guideline Value depends on type of livestock.
^ ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
\# ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Analytes	Units	LOR	MB4A				MB5			MB6			ANZECC 2000	ADWG (2011)	
Aquifer	-	-	Walloon Coal Measures				Walloon Coal Measures			Walloon Coal Measures			Livestock Drinking	Aesthetic	Health
Date Sampled	-	-	10/10/2009	25/11/2009	21/01/2010	09/07/2011	14/10/2009	26/11/2009	22/01/2010	09/10/2009	26/11/2009	20/01/2010			
Physical Properties															
Field pH Value	pH Unit	0.01	7.46	7.39	7.28	7.59	7.76	7.71	7.58	6.94	7.02	7.05	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	7360	8310	8920	5100	8890	7900	7300	18100	12000	14100	-	-	-
Total Dissolved Solids @180°C	mg/L	5	**4830**	**4240**	**4460**	2660	**4220**	**4060**	**4670**	**13400**	**7290**	**8790**	3000-13000*	600	-
Alkalinity															
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	285	301	281	205	399	418	405	555	503	523	-	-	-
Total Alkalinity as CaCO3	mg/L	1	285	301	281	205	399	418	405	555	503	523	-	-	-
Major Ions															
Calcium	mg/L	1	49	45	44	33	20	19	19	602	224	333	1000	-	-
Chloride	mg/L	1	2810	3060	3090	1480	2670	2420	2090	6310	4580	4940	-	250	-
Magnesium	mg/L	1	18	16	14	9	7	6	6	159	61	84	-	-	-
Potassium	mg/L	1	15	13	11	11	8	6	6	16	11	11	-	-	-
Sodium	mg/L	1	1740	1860	2010	1010	1700	1820	1600	3160	2640	2800	-	180	-
Sulfate	mg/L	1	20	17	20	2	<1	<1	<1	25	10	14	1000	250	500
Disolved Metals															
Aluminium	mg/L	0.01	0.02	0.02	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	0.001	0.002	<0.001	0.001	0.002	0.002	0.002	<0.001	<0.001	0.001	0.5	-	-
Barium	mg/L	0.001	1.54	1.47	1.36	1.04	1.08	1.14	1.06	6.65	4.32	4.64	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.23	0.23	0.16	0.11	0.2	0.21	0.15	0.28	0.27	0.2	5	-	-
Cadmium	mg/L	0.0001	0.0002	0.003	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	-	-
Chromium	mg/L	0.001	0.003	0.008	<0.001	0.001	0.002	0.006	<0.001	0.002	0.01	<0.001	1	-	-
Copper	mg/L	0.001	0.004	0.024	0.003	<0.001	0.002	0.002	0.002	0.003	0.003	0.001	0.5	-	-
Iron	mg/L	0.05	0.09	0.32	0.21	0.42	<0.05	0.17	0.1	1.94	3	2.98	-	-	-
Lead	mg/L	0.001	0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	-	-
Lithium	mg/L	0.001	0.149	0.159	0.115	0.084	0.104	0.111	0.085	0.302	0.23	0.183	-	-	-
Manganese	mg/L	0.001	0.08	0.088	0.063	0.106	0.021	0.014	0.011	0.503	0.262	0.306	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.15	-	-
Nickel	mg/L	0.001	0.009	0.006	0.002	0.002	0.002	<0.001	<0.001	<0.001	0.004	<0.001	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	0.001	0.003	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.002	<0.001	-	-	-
Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	-	-
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	0.027	0.014	0.005	0.006	0.011	0.006	0.005	0.008	0.006	0.008	20	-	-
Total Metals															
Aluminium	mg/L	0.01	-	-	-	0.43	-	-	-	-	-	-	5	0.2	-
Antimony	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	0.003
Arsenic	mg/L	0.001	-	-	-	0.003	-	-	-	-	-	-	0.5	-	0.01
Barium	mg/L	0.001	-	-	-	0.935	-	-	-	-	-	-	-	-	2
Beryllium	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	0.06
Boron	mg/L	0.05	-	-	-	0.09	-	-	-	-	-	-	5	-	4
Cadmium	mg/L	0.0001	-	-	-	<0.0001	-	-	-	-	-	-	0.01	-	0.002
Chromium	mg/L	0.001	-	-	-	0.007	-	-	-	-	-	-	1	-	0.05
Copper	mg/L	0.001	-	-	-	0.007	-	-	-	-	-	-	0.5	1	2
Iron	mg/L	0.05	-	-	-	1.6	-	-	-	-	-	-	-	0.3	-
Lead	mg/L	0.001	-	-	-	0.016	-	-	-	-	-	-	0.1	-	0.01
Lithium	mg/L	0.001	-	-	-	0.086	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.001	-	-	-	0.14	-	-	-	-	-	-	-	0.1	0.5
Mercury	mg/L	0.0001	-	-	-	<0.0001	-	-	-	-	-	-	0.002	-	0.001
Molybdenum	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	0.15	-	0.05
Nickel	mg/L	0.001	-	-	-	0.007	-	-	-	-	-	-	1	-	0.02
Selenium	mg/L	0.01	-	-	-	<0.01	-	-	-	-	-	-	0.02	-	0.01
Silver	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	-	-	0.1
Uranium	mg/L	0.001	-	-	-	<0.001	-	-	-	-	-	-	0.2	-	0.017
Vanadium	mg/L	0.01	-	-	-	<0.01	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.005	-	-	-	0.268	-	-	-	-	-	-	20	3	-
Nutrients															
Nitrite + Nitrate as N	mg/L	0.01	0.07	0.04	<0.01	0.22	0.07	0.01	<0.01	0.37	0.02	0.02	30-400^	-	3-50#
Total Kjeldahl Nitrogen as N	mg/L	0.1	1.2	0.9	1.4	1.2	0.9	0.8	1.1	1.2	0.9	1.7	-	-	-
Total Nitrogen as N	mg/L	0.1	1.3	0.9	1.4	1.4	1	0.8	1.1	1.6	1	1.8	-	-	-
Total Phosphorus as P	mg/L	0.01	<0.01	<0.01	0.11	0.16	0.04	0.02	0.02	<0.01	<0.01	0.22	-	-	-

Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value. (green shading)
Exceeds Australian Drinking Water Guidelines (2011) health guideline value. (red shading)
1000 Exceeds ANZECC (2000) livestock drinking water guideline value.
1000 Laboratory holding time breached. (red text)
* Guideline Value depends on type of livestock.
^ ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
\# ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Analytes	Units	LOR	MB7A				MB8A				MB9	ANZECC 2000	ADWG (2011)	
Aquifer	-	-	Walloon Coal Measures				Walloon Coal Measures				Walloon CM	Livestock Drinking	Aesthetic	Health
Date Sampled	-	-	08/10/2009	27/11/2009	20/01/2010	10/03/2011	11/10/2009	28/11/2009	24/01/2010	10/03/2011	16-Oct-09			
Physical Properties														
Field pH Value	pH Unit	0.01	7.8	7.77	7.86	7.94	7.76	7.72	7.7	7.96	7.52	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	7330	7370	7820	7610	6970	6520	5900	6890	12700	-	-	-
Total Dissolved Solids @180°C	mg/L	5	**4040**	**3960**	**4010**	**3920**	**3730**	**3380**	**3730**	**3490**	**6690**	3000-13000*	600	-
Alkalinity														
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	11	<1	<1	10	<1	<1	<1	15	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	504	537	525	495	635	665	641	513	335	-	-	-
Total Alkalinity as CaCO3	mg/L	1	514	537	525	505	635	665	641	528	335	-	-	-
Major Ions														
Calcium	mg/L	1	18	16	16	17	18	14	14	19	67	1000	-	-
Chloride	mg/L	1	2030	2150	2510	1940	1680	1820	1580	1740	4360	-	250	-
Magnesium	mg/L	1	5	5	5	5	6	4	4	4	16	-	-	-
Potassium	mg/L	1	7	6	6	8	9	5	5	7	14	-	-	-
Sodium	mg/L	1	1600	1650	1740	1600	1400	1500	1410	1470	2600	-	180	-
Sulfate	mg/L	1	2	<1	<1	<1	15	4	2	6	11	1000	250	500
Disolved Metals														
Aluminium	mg/L	0.01	0.01	<0.01	0.03	0.01	0.03	0.02	0.05	0.08	0.01	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	<0.001	0.002	<0.001	<0.001	0.005	0.002	0.004	0.003	<0.001	0.5	-	-
Barium	mg/L	0.001	0.941	1.38	0.832	0.945	0.312	0.436	0.391	0.51	1.79	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.22	0.19	0.16	0.16	0.21	0.21	0.16	0.16	0.24	5	-	-
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	0.0002	<0.0001	0.0001	0.01	-	-
Chromium	mg/L	0.001	0.002	0.005	<0.001	<0.005	0.004	0.009	<0.001	<0.001	0.003	1	-	-
Copper	mg/L	0.001	0.001	0.002	<0.001	<0.001	0.003	0.001	<0.001	<0.001	0.004	0.5	-	-
Iron	mg/L	0.05	0.12	0.14	0.07	0.1	0.09	0.08	0.05	0.18	0.1	-	-	-
Lead	mg/L	0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001	0.071	0.1	-	-
Lithium	mg/L	0.001	0.11	0.146	0.084	0.096	0.065	0.091	0.072	0.083	0.182	-	-	-
Manganese	mg/L	0.001	0.005	0.013	0.004	0.005	0.057	0.027	0.036	0.057	0.045	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	<0.001	0.002	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.004	0.15	-	-
Nickel	mg/L	0.001	0.002	0.002	<0.001	0.001	0.004	0.001	0.001	<0.001	0.007	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	-	-	-
Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.2	-	-
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	0.007	0.005	<0.005	0.008	0.029	0.011	0.006	0.008	0.025	20	-	-
Total Metals														
Aluminium	mg/L	0.01	-	-	-	0.16	-	-	-	**14.9**	-	5	0.2	-
Antimony	mg/L	0.001	-	-	-	0.001	-	-	-	<0.001	-	-	-	0.003
Arsenic	mg/L	0.001	-	-	-	<0.001	-	-	-	0.005	-	0.5	-	0.01
Barium	mg/L	0.001	-	-	-	0.993	-	-	-	1.53	-	-	-	2
Beryllium	mg/L	0.001	-	-	-	<0.001	-	-	-	0.003	-	-	-	0.06
Boron	mg/L	0.05	-	-	-	0.16	-	-	-	0.17	-	5	-	4
Cadmium	mg/L	0.0001	-	-	-	<0.0001	-	-	-	0.0004	-	0.01	-	0.002
Chromium	mg/L	0.001	-	-	-	0.005	-	-	-	0.016	-	1	-	0.05
Copper	mg/L	0.001	-	-	-	0.004	-	-	-	0.02	-	0.5	1	2
Iron	mg/L	0.05	-	-	-	0.49	-	-	-	15.4	-	-	0.3	-
Lead	mg/L	0.001	-	-	-	0.096	-	-	-	0.057	-	0.1	-	0.01
Lithium	mg/L	0.001	-	-	-	0.111	-	-	-	0.103	-	-	-	-
Manganese	mg/L	0.001	-	-	-	0.009	-	-	-	0.34	-	-	0.1	0.5
Mercury	mg/L	0.0001	-	-	-	<0.0001	-	-	-	<0.0001	-	0.002	-	0.001
Molybdenum	mg/L	0.001	-	-	-	<0.001	-	-	-	<0.001	-	0.15	-	0.05
Nickel	mg/L	0.001	-	-	-	0.004	-	-	-	0.042	-	1	-	0.02
Selenium	mg/L	0.01	-	-	-	<0.01	-	-	-	<0.01	-	0.02	-	0.01
Silver	mg/L	0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	0.1
Uranium	mg/L	0.001	-	-	-	<0.001	-	-	-	0.004	-	0.2	-	0.017
Vanadium	mg/L	0.01	-	-	-	<0.01	-	-	-	0.03	-	-	-	-
Zinc	mg/L	0.005	-	-	-	0.026	-	-	-	0.107	-	20	3	-
Nutrients														
Nitrite + Nitrate as N	mg/L	0.01	0.05	<0.01	0.04	0.04	0.18	0.08	0.01	0.08	0.31	30-400^	-	3-50#
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.8	0.2	1.4	1.1	1.5	0.7	0.9	1.1	1.4	-	-	-
Total Nitrogen as N	mg/L	0.1	0.9	0.2	1.4	1.1	1.7	0.8	0.9	1.2	1.7	-	-	-
Total Phosphorus as P	mg/L	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.09	0.07	0.17	<0.01	-	-	-

(green)	Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value.
(pink)	Exceeds Australian Drinking Water Guidelines (2011) health guideline value.
1000	Exceeds ANZECC (2000) livestock drinking water guideline value.
1000 (red)	Laboratory holding time breached.
*	Guideline Value depends on type of livestock.
^	ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
#	ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Analytes	Units	LOR	MB10			MB11			MB12			ANZECC 2000	ADWG (2011)	
Aquifer	-	-	Walloon Coal Measures			Walloon Coal Measures			Walloon Coal Measures			Livestock Drinking	Aesthetic	Health
Date Sampled	-	-	13/10/2009	29/11/2009	22/01/2010	15/10/2009	29/11/2009	23/01/2010	12/10/2009	27/11/2009	23/01/2010			
Physical Properties														
Field pH Value	pH Unit	0.01	7.64	7.67	7.6	7.76	7.66	7.47	7.76	7.69	7.54	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	3690	4200	4120	6950	6570	5930	9470	8850	7950	-	-	-
Total Dissolved Solids @180°C	mg/L	5	2460	2730	2570	**3550**	**3640**	**3830**	**4160**	**4350**	**4540**	3000-13000*	600	-
Alkalinity														
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	18	<1	<1	<1	<1	<1	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	1280	1340	1260	515	545	528	331	347	333	-	-	-
Total Alkalinity as CaCO3	mg/L	1	1280	1340	1280	515	545	528	331	347	333	-	-	-
Major Ions														
Calcium	mg/L	1	16	15	17	17	15	15	28	28	29	1000	-	-
Chloride	mg/L	1	750	803	769	1710	1860	1590	2960	3320	3090	-	250	-
Magnesium	mg/L	1	6	6	6	6	3	3	6	6	6	-	-	-
Potassium	mg/L	1	4	5	4	8	5	5	9	8	7	-	-	-
Sodium	mg/L	1	968	1080	1020	1400	1480	1280	1860	2220	1950	-	180	-
Sulfate	mg/L	1	2	<1	<1	7	1	<1	8	4	3	1000	250	500
Disolved Metals														
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.07	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	0.002	0.001	0.001	0.001	0.002	<0.001	0.5	-	-
Barium	mg/L	0.001	0.645	0.682	0.643	0.313	0.541	0.496	1.26	0.951	1.25	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.31	0.31	0.25	0.25	0.24	0.18	0.18	0.22	0.14	5	-	-
Cadmium	mg/L	0.0001	0.0002	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	-	-
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	0.003	0.001	<0.001	1	-	-
Copper	mg/L	0.001	<0.001	0.002	0.001	0.002	0.002	<0.001	0.003	<0.001	<0.001	0.5	-	-
Iron	mg/L	0.05	0.11	<0.05	<0.05	0.08	0.05	0.08	0.09	0.07	0.07	-	-	-
Lead	mg/L	0.001	0.002	0.009	0.002	0.006	0.003	0.001	0.036	<0.001	<0.001	0.1	-	-
Lithium	mg/L	0.001	0.09	0.103	0.08	0.078	0.098	0.07	0.123	0.12	0.11	-	-	-
Manganese	mg/L	0.001	0.01	0.006	0.005	0.05	0.016	0.014	0.022	0.004	0.012	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.012	<0.001	0.001	0.15	-	-
Nickel	mg/L	0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	0.005	<0.001	<0.001	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	-	-	-
Uranium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.2	-	-
Vanadium	mg/L	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	0.008	0.008	0.006	0.011	0.006	<0.005	0.015	0.008	0.005	20	-	-
Total Metals														
Aluminium	mg/L	0.01	-	-	-	-	-	-	-	-	-	5	0.2	-
Antimony	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	0.003
Arsenic	mg/L	0.001	-	-	-	-	-	-	-	-	-	0.5	-	0.01
Barium	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	2
Beryllium	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	0.06
Boron	mg/L	0.05	-	-	-	-	-	-	-	-	-	5	-	4
Cadmium	mg/L	0.0001	-	-	-	-	-	-	-	-	-	0.01	-	0.002
Chromium	mg/L	0.001	-	-	-	-	-	-	-	-	-	1	-	0.05
Copper	mg/L	0.001	-	-	-	-	-	-	-	-	-	0.5	1	2
Iron	mg/L	0.05	-	-	-	-	-	-	-	-	-	-	0.3	-
Lead	mg/L	0.001	-	-	-	-	-	-	-	-	-	0.1	-	0.01
Lithium	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	0.1	0.5
Mercury	mg/L	0.0001	-	-	-	-	-	-	-	-	-	0.002	-	0.001
Molybdenum	mg/L	0.001	-	-	-	-	-	-	-	-	-	0.15	-	0.05
Nickel	mg/L	0.001	-	-	-	-	-	-	-	-	-	1	-	0.02
Selenium	mg/L	0.01	-	-	-	-	-	-	-	-	-	0.02	-	0.01
Silver	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	0.1
Uranium	mg/L	0.001	-	-	-	-	-	-	-	-	-	0.2	-	0.017
Vanadium	mg/L	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.005	-	-	-	-	-	-	-	-	-	20	3	-
Nutrients														
Nitrite + Nitrate as N	mg/L	0.01	0.04	<0.01	<0.01	0.06	<0.01	0.01	0.04	0.03	0.04	30-400^	-	3-50#
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.5	0.1	0.4	0.9	0.6	1.5	0.9	0.9	1.4	-	-	-
Total Nitrogen as N	mg/L	0.1	0.5	0.1	0.4	1	0.6	1.5	0.9	0.9	1.4	-	-	-
Total Phosphorus as P	mg/L	0.01	<0.01	0.02	<0.01	<0.01	0.03	0.06	<0.01	<0.01	0.04	-	-	-

(green shading)	Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value.
(pink shading)	Exceeds Australian Drinking Water Guidelines (2011) health guideline value.
1000	Exceeds ANZECC (2000) livestock drinking water guideline value.
1000 (red)	Laboratory holding time breached.
*	Guideline Value depends on type of livestock.
^	ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
#	ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Analytes	Units	LOR	MB7B	MB8B	MB14	MB15	MB16	MB17	ANZECC 2000	ADWG (2011)	
									Livestock Drinking	Aesthetic	Health
Aquifer	-	-	Horse Creek Alluvium	Horse Creek Alluvium	Horse Creek Alluvium	Horse Creek Alluvium	Horse Creek Alluvium	Alluvium			
Date Sampled	-	-	10/03/2011	10/03/2011	08/07/2011	08/07/2011	05/07/2011	07/07/2011			
Physical Properties											
Field pH Value	pH Unit	0.01	7.08	7.08	7.51	7.27	7.02	7.32	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	877	840	1740	4850	689	1700	-	-	-
Total Dissolved Solids @180°C	mg/L	5	552	521	1130	2920	418	1040	3000-13000*	600	-
Alkalinity											
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	341	387	525	574	278	573	-	-	-
Total Alkalinity as CaCO3	mg/L	1	341	387	525	574	278	573	-	-	-
Major Ions											
Calcium	mg/L	1	24	52	17	128	42	30	1000	-	-
Chloride	mg/L	1	52	26	222	1040	30	171	-	250	-
Magnesium	mg/L	1	5	9	5	40	9	28	-	-	-
Potassium	mg/L	1	10	10	1	4	4	1	-	-	-
Sodium	mg/L	1	158	117	365	872	94	308	-	180	-
Sulfate	mg/L	1	24	17	57	333	24	82	1000	250	500
Disolved Metals											
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5	0.2	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.003
Arsenic	mg/L	0.001	0.003	<0.001	0.003	0.003	0.001	0.002	0.5	-	0.01
Barium	mg/L	0.001	0.164	0.157	0.034	0.086	0.056	0.059	-	-	2
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.06
Boron	mg/L	0.05	0.16	0.13	<0.05	0.17	0.06	0.06	5	-	4
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	-	0.002
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	-	0.05
Copper	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.5	1	2
Iron	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	-	0.3	-
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	-	0.01
Lithium	mg/L	0.001	0.003	0.016	0.011	0.048	0.011	0.019	-	-	-
Manganese	mg/L	0.001	<0.001	<0.001	0.002	0.102	0.1	0.971	-	0.1	0.5
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	0.001
Molybdenum	mg/L	0.001	<0.001	0.001	0.007	0.004	0.002	0.003	0.15	-	0.05
Nickel	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	-	0.02
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	**0.02**	<0.01	<0.01	0.02	-	0.01
Silver	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.1
Uranium	mg/L	0.001	0.002	0.003	0.005	0.016	0.002	0.004	0.2	-	0.017
Vanadium	mg/L	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	<0.005	0.005	<0.005	0.006	0.007	<0.005	20	3	-
Total Metals											
Aluminium	mg/L	0.01	0.14	**8.91**	0.02	1.47	0.02	0.04	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	0.002	0.001	0.002	0.003	0.001	0.002	0.5	-	-
Barium	mg/L	0.001	0.161	0.225	0.037	0.095	0.059	0.064	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.17	0.13	<0.05	0.16	0.05	0.05	5	-	-
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	-	-
Chromium	mg/L	0.001	<0.001	0.006	<0.001	0.002	<0.001	<0.001	1	-	-
Copper	mg/L	0.001	<0.001	0.005	0.001	0.004	<0.001	0.001	0.5	-	-
Iron	mg/L	0.05	0.16	2.53	<0.05	1.68	<0.05	0.18	-	-	-
Lead	mg/L	0.001	0.019	0.063	<0.001	0.003	<0.001	<0.001	0.1	-	-
Lithium	mg/L	0.001	0.004	0.018	0.012	0.052	0.011	0.02	-	-	-
Manganese	mg/L	0.001	0.004	0.221	0.032	0.135	0.103	1.04	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	<0.001	<0.001	0.007	0.002	<0.001	0.003	0.15	-	-
Nickel	mg/L	0.001	<0.001	0.009	0.001	0.002	<0.001	0.001	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Uranium	mg/L	0.001	0.002	0.004	0.005	0.016	0.002	0.004	0.2	-	-
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Zinc	mg/L	0.005	0.011	0.028	<0.005	0.047	<0.005	<0.005	20	-	-
Nutrients											
Nitrite + Nitrate as N	mg/L	0.01	0.06	0.17	1.11	1.92	0.03	0.06	30-400^	-	3
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.1	0.2	3	0.3	0.3	0.4	-	-	-
Total Nitrogen as N	mg/L	0.1	0.2	0.4	4.1	2.2	0.3	0.5	-	-	-
Total Phosphorus as P	mg/L	0.01	0.51	0.11	0.32	0.21	0.11	<0.01	-	-	-

(green shading)	Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value.
(red shading)	Exceeds Australian Drinking Water Guidelines (2011) health guideline value.
1000	Exceeds ANZECC (2000) livestock drinking water guideline value.
1000 (red text)	Laboratory holding time breached.
*	Guideline Value depends on type of livestock.
^	ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
#	ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Analytes	Units	LOR	MB1B				MB3B				MB4B				ANZECC 2000	ADWG (2011)	
Aquifer	-	-	Alluvium				Horse Creek Alluvium				Horse Creek Alluvium				Livestock Drinking	Aesthetic	Health
Date Sampled	-	-	09/10/2009	25/11/2009	21/01/2010	08/07/2011	07/10/2009	26/11/2009	20/01/2010	09/07/2011	09/10/2009	25/11/2009	21/01/2010	09/07/2011			
Physical Properties																	
Field pH Value	pH Unit	0.01	8.15	7.61	7.58	7.57	6.68	6.73	6.87	6.89	6.98	6.76	6.85	7.43	-	6.5 - 8.5	-
Electrical Conductivity @ 25°C	µS/cm	1	1370	1340	1540	1350	2630	2760	2650	1730	6340	6820	7230	1370	-	-	-
Total Dissolved Solids @180°C	mg/L	5	875	900	1040	925	1610	1820	1540	1020	-	**4450**	**4610**	908	3000-13000*	600	-
Alkalinity																	
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	20	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	626	577	697	610	660	701	580	458	229	663	674	415	-	-	-
Total Alkalinity as CaCO3	mg/L	1	626	597	697	610	660	701	580	458	229	663	674	415	-	-	-
Major Ions																	
Calcium	mg/L	1	11	10	11	14	160	168	147	62	104	127	136	9	1000	-	-
Chloride	mg/L	1	64	60	101	55	557	584	555	261	1370	1610	1590	125	-	250	-
Magnesium	mg/L	1	4	4	4	5	42	38	33	21	82	91	88	5	-	-	-
Potassium	mg/L	1	<1	<1	<1	<1	3	3	2	2	35	28	24	7	-	-	-
Sodium	mg/L	1	327	325	356	314	427	435	366	284	1150	1390	1310	288	-	180	-
Sulfate	mg/L	1	38	31	36	24	114	73	38	36	669	763	747	86	1000	250	500
Disolved Metals																	
Aluminium	mg/L	0.01	0.01	<0.01	0.06	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	5	-	-
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	-	-	-
Arsenic	mg/L	0.001	0.004	0.004	0.004	0.004	0.001	0.001	0.001	<0.001	0.004	0.01	0.005	0.008	0.5	-	-
Barium	mg/L	0.001	0.027	0.025	0.028	0.034	0.238	0.168	0.143	0.109	0.196	0.148	0.087	0.024	-	-	-
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-
Boron	mg/L	0.05	0.2	0.18	0.12	0.07	0.15	0.14	0.1	0.14	0.35	0.35	0.25	0.13	5	-	-
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0015	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.01	-	-
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.011	<0.001	<0.001	0.002	0.009	<0.001	<0.001	1	-	-
Copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	0.002	0.004	0.001	<0.001	0.002	0.5	-	-
Iron	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.56	<0.05	<0.05	0.24	3.17	0.68	<0.05	-	-	-
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.012	<0.001	<0.001	<0.001	0.1	-	-
Lithium	mg/L	0.001	0.006	0.004	0.006	0.009	0.042	0.043	0.029	0.028	0.04	0.047	0.034	0.014	-	-	-
Manganese	mg/L	0.001	0.04	0.007	0.032	<0.001	1.18	1.03	0.236	0.004	1.87	2.03	0.867	0.013	-	-	-
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	-	-
Molybdenum	mg/L	0.001	0.004	0.004	0.004	0.002	0.003	0.002	0.001	0.001	0.003	0.001	0.002	0.002	0.15	-	-
Nickel	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.004	<0.001	<0.001	0.029	0.011	0.013	0.004	1	-	-
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	-	-
Silver	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	-	-	-
Uranium	mg/L	0.001	0.004	0.003	0.003	0.002	0.008	0.007	0.006	0.004	0.005	0.004	0.006	0.001	0.2	-	-
Vanadium	mg/L	0.01	0.02	0.03	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.02	-	-	-
Zinc	mg/L	0.005	0.006	<0.005	0.005	0.013	0.018	0.016	0.012	0.005	0.046	0.01	0.008	0.012	20	-	-
Total Metals																	
Aluminium	mg/L	0.01	-	-	-	**14.3**	-	-	-	0.56	-	-	-	0.57	5	0.2	-
Antimony	mg/L	0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	0.003
Arsenic	mg/L	0.001	-	-	-	0.004	-	-	-	0.002	-	-	-	0.007	0.5	-	0.01
Barium	mg/L	0.001	-	-	-	0.348	-	-	-	0.105	-	-	-	0.033	-	-	2
Beryllium	mg/L	0.001	-	-	-	0.002	-	-	-	<0.001	-	-	-	<0.001	-	-	0.06
Boron	mg/L	0.05	-	-	-	<0.05	-	-	-	0.11	-	-	-	0.11	5	-	4
Cadmium	mg/L	0.0001	-	-	-	0.0002	-	-	-	<0.0001	-	-	-	<0.0001	0.01	-	0.002
Chromium	mg/L	0.001	-	-	-	0.007	-	-	-	0.002	-	-	-	0.003	1	-	0.05
Copper	mg/L	0.001	-	-	-	0.021	-	-	-	0.003	-	-	-	0.007	0.5	1	2
Iron	mg/L	0.05	-	-	-	10.5	-	-	-	0.69	-	-	-	0.79	-	0.3	-
Lead	mg/L	0.001	-	-	-	0.026	-	-	-	0.016	-	-	-	0.018	0.1	-	0.01
Lithium	mg/L	0.001	-	-	-	0.021	-	-	-	0.029	-	-	-	0.016	-	-	-
Manganese	mg/L	0.001	-	-	-	0.669	-	-	-	0.107	-	-	-	0.109	-	0.1	0.5
Mercury	mg/L	0.0001	<0.0001	-	-	<0.0001	-	-	-	<0.0001	-	-	-	<0.0001	0.002	-	0.001
Molybdenum	mg/L	0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	0.15	-	0.05
Nickel	mg/L	0.001	-	-	-	0.014	-	-	-	0.003	-	-	-	0.01	1	-	0.02
Selenium	mg/L	0.01	-	-	-	<0.01	-	-	-	<0.01	-	-	-	<0.01	0.02	-	0.01
Silver	mg/L	0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-	0.1
Uranium	mg/L	0.001	-	-	-	0.002	-	-	-	0.004	-	-	-	0.001	0.2	-	0.017
Vanadium	mg/L	0.01	-	-	-	0.04	-	-	-	<0.01	-	-	-	0.02	-	-	-
Zinc	mg/L	0.005	-	-	-	0.085	-	-	-	0.037	-	-	-	0.014	20	3	-
Nutrients																	
Nitrite + Nitrate as N	mg/L	0.01	2.73	0.18	<0.01	0.14	0.15	0.06	0.2	0.69	0.18	0.06	0.14	0.07	30-400^	-	3
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.3	0.2	0.2	0.5	0.4	0.2	0.5	0.3	0.9	<0.1	0.5	0.3	-	-	-
Total Nitrogen as N	mg/L	0.1	3.1	0.3	0.2	0.6	0.6	0.3	0.7	1	1	<0.1	0.6	0.4	-	-	-
Total Phosphorus as P	mg/L	0.01	0.05	0.09	0.15	0.05	0.05	0.03	<0.01	0.08	0.02	0.16	0.04	0.75	-	-	-

(green)	Transgressed Australian Drinking Water Guidelines (2011) aesthetic guideline value.
(red)	Exceeds Australian Drinking Water Guidelines (2011) health guideline value.
1000	Exceeds ANZECC (2000) livestock drinking water guideline value.
1000	Laboratory holding time breached.
*	Guideline Value depends on type of livestock.
^	ANZECC (2000) livestock guideline is 30 mg/L for nitrite and 400 mg/L for nitrate.
#	ADWG (2011) heath guideline is 3 mg/L for nitrite and 50 mg/L for nitrate.

Permit

Environmental Protection Act 1994

Environmental authority EPML00443913

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

Environmental authority number: EPML00443913

Environmental authority takes effect upon grant of tenure.

Environmental authority holder(s)

Name(s)	Registered address
TAROOM COAL PROPRIETARY LIMITED	Level 16 175 Eagle Street Brisbane, Qld. 4000

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 13: Mining black coal	ML50271
Schedule 3 13: Mining black coal	ML50270
Schedule 3 13: Mining black coal	ML50254
Ancillary 8 (3) Chemical Storage of more than 500m^3 of class C1 or C2 combustiable liquids under AS 1940 or dangerous goods class 3 under subsection (1) (c).	ML50271
Ancillary 31 (2) (b) Mineral Processing >100,000t/year.	ML50271

Environmentally relevant activity/activities	Location(s)
Ancillary 33 Crushing, grinding, milling or screening more than 5000t of materials in a year.	ML50271
Ancillary 60 (1) (a) Waste Disposal – operating a facility for disposing of, less than 50,000t of waste in a year.	ML50271
Ancillary 63 (2) (b) (i) Sewage Treatment operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100EP but no more than 150EP, if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	ML50271
Ancillary 8 (3) Chemical Storage of more than 500m^3 of class C1 or C2 combustiable liquids under AS 1940 or dangerous goods class 3 under subsection (1) (c).	ML50270
Ancillary 31 (2) (b) Mineral Processing >100,000t/year.	ML50270
Ancillary 33 Crushing, grinding, milling or screening more than 5000t of materials in a year.	ML50270
Ancillary 60 (1) (a) Waste Disposal – operating a facility for disposing of, less than 50,000t of waste in a year.	ML50270
Ancillary 63 (2) (b) (i) Sewage Treatment operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100EP but no more than 150EP, if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	ML50270
Ancillary 8 (3) Chemical Storage of more than 500m^3 of class C1 or C2 combustiable liquids under AS 1940 or dangerous goods class 3 under subsection (1) (c).	ML50254

Environmentally relevant activity/activities	Location(s)
Ancillary 31 (2) (b) Mineral Processing >100,000t/year.	ML50254
ERA 33 Crushing, grinding, milling or screening more than 5000t of materials in a year.	ML50254
Ancillary 60 (1) (a) Waste Disposal – operating a facility for disposing of, less than 50,000t of waste in a year.	ML50254
Ancillary 63 (2) (b) (i) Sewage Treatment operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100EP but no more than 150EP, if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.	ML50254

Additional information for applicants

Environmentally 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-on 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 *Sustainable Planning Act 2009* 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.

Juliana McCosker
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Date issued: 12 May 2020

Enquiries:
Coal & Gemstone Mining
Department of Environment and Science

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)

Agency interest: 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 eight million two hundred thousand (8.2 million) tonnes run of mine (ROM) coal per annum.
A3	The holder of this environmental authority 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 and efficient condition; c) operate such measures, plant and equipment in a proper and efficient 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.
A4	The holder of this environmental authority must comply with conditions of this environmental authority during all phases of the project including the construction and decommissioning phases.
A5	**Monitoring** Except where specified otherwise 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 five (5) years.
A6	**Financial Assurance** The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.
A7	The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.
A8	**Risk Management** The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, at least three months prior to the commencement of open cut coal mining activities (not including exploration activities).

A9	**Notification of emergencies, incidents and exceptions** The holder of this environmental authority must notify the administering authority by written notification within twenty-four (24) hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.
A10	Within ten (10) business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: a) results and interpretation of any samples taken and analysed; b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and c) proposed actions to prevent a recurrence of the emergency or incident.
A11	**Complaints** The holder of this environmental authority must record all environmental complaints received about the mining activities including: a) name, address and contact number of the complainant; b) time and date of complaint; c) reasons for the complaint; d) investigations undertaken; e) conclusions formed; f) actions taken to resolve the complaint; g) any abatement measures implemented; and h) person responsible for resolving the complaint.
A12	The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within ten (10) business days of completion of the investigation, or no later than ten (10) business days after the end of the timeframe nominated by the administering authority to undertake the investigation.

A13	**Third Party Reporting** The holder of this environmental authority must: a) within one year of the commencement of open cut coal mining activities (not including exploration activities) obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; b) obtain further such reports at regular intervals, not exceeding three-yearly intervals, from the completion of the report referred to above; and c) provide each report to the administering authority within ninety (90) days of its completion.
A14	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 holder of this environmental authority must: a) comply with the amended or changed standard, policy or guideline within two 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 referred to in conditions X1-X14, the time specified in that condition; 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.

Agency interest: Air	
Condition number	**Condition**
B1	The holder of this environmental authority shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place: a) Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter – Gravimetric method. b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than five exceedances recorded each year, when monitored in accordance with the most recent version of either: 1. Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet – Gravimetric method, or 2. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 low volume sampler—Gravimetric method. c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method.
B2	**Odour nuisance** The holder of this environmental authority shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) generated by the mining activities do not cause an environmental nuisance at any sensitive or commercial place.
B3	**Management Plans** An Air Quality Management Plan must be developed and implemented by a suitably qualified and experienced person during all stages of activities on the mining leases to which this environmental authority applies.

Agency interest: Waste	
Condition number	**Condition**
C1	**Waste Management** 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.
C2	The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.
C3	**Tailings Disposal** Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for: a) containment of tailings; b) the management of seepage and leachates both during operation and the foreseeable future; c) the control of fugitive emissions to air; d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings; e) maintaining records of the relative locations of any other waste stored within the tailings; f) rehabilitation strategy; and g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.
C4	**Storage of Tyres** Tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options, should be stockpiled in volumes less than three (3) metres in height and two hundred (200) metres squared in area and at least ten (10) metres from any other tyre storage area.
C5	All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a ten (10) metre radius of the scrap tyre storage area.

C6	**Disposal of Tyres** Disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided the material is placed as deep in the spoil as reasonably practicable, aids long-term dump stability and does not impede saturated aquifers.
C7	**Management Plans** The holder of this environmental authority must ensure a suitably qualified and experienced person develops and implements prior to commencement of the construction phase, a Waste Management Plan.
Agency interest: Noise	
Condition number	**Condition**
D1	**Noise Limits** The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the criteria in **Table D1 – Noise limits** to be exceeded at a sensitive place or commercial place**.**

Table D1 – Noise limits

Noise Limits for Activities on the Mining Leases Leq, adj, T (T= 15 minutes to 1 hour), dB(A)*		
Daytime 7am-6pm	**Evening 6pm-10pm**	**Night-time 10pm-7am**
40	40	35

Notes: *To be achieved under the majority of adverse meteorological conditions.

D2	**Airblast overpressure nuisance** The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in **Table D2 – Blasting noise limits** to be exceeded at a sensitive place or commercial place.

Table D2 – Blasting noise limits

Blasting noise limits	**Limits for sensitive or commercial receptors**
	7am - 6pm
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

D3	**Monitoring and reporting** Noise monitoring and recording must include the following descriptor characteristics and matters: a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins); b) background noise LA90; c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels; d) atmospheric conditions including temperature, relative humidity and wind speed and directions; e) effects due to any extraneous factors such as traffic noise; f) location, date and time of monitoring; and g) if the complaint concerns low frequency noise, Max LpLIN,T and one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.
D4	The holder of this environmental authority must ensure a suitably qualified and experienced person develops and implements a blast monitoring program to monitor compliance with **Table D2 – Blasting noise limits** prior to any blasting taking place on the mining leases this environmental authority applies to.
Agency interest: Groundwater	
Condition number	**Condition**
E1	The holder of this environmental authority must not release contaminants to groundwater.
E2	All determinations of groundwater quality monitoring must be performed by a suitably qualified and experienced person.
E3	The holder of the environmental authority must implement a groundwater monitoring program which has been developed by a suitably qualified person. The program must be able to detect a significant change to ground water quality values and standing water levels (consistent with the current suitability of the groundwater for domestic and agricultural use) due to activities that are part of this mining project.
E4	The holder of the environmental authority must report the results and analysis of groundwater monitoring to the administering authority on request.
E5	Groundwater affected by the mining activities must be monitored at compliance bores within the nominated geologies and minimum frequencies defined in **Table E1 – Groundwater monitoring locations and frequency.**

Table E1 – Groundwater monitoring locations and frequency

Aquifer [1 and 2]	**Minimum number of monitoring locations** [1 and 2]	**Minimum Monitoring Frequency**[1 and 2]
TBA	TBA	TBA
TBA	TBA	TBA

Note:

[1] To be completed prior to commencement of construction activities.

[2] Relevant aquifer/s, number of bores and monitoring frequencies to be determined by a suitably qualified person.

E6	If the groundwater contaminant trigger levels defined in **Table E2 – Groundwater contaminant trigger levels** are exceeded then the environmental authority holder must complete an investigation into the potential for environmental harm and notify the administering authority within twenty-eight (28) days of receiving the analysis results. An action plan to mitigate potential harm must be developed by a suitably qualified and experienced person.

Table E2 – Groundwater contaminant trigger levels*

Parameter	Unit	Trigger Levels	Limit Type
Groundwater Level	RL	TBA	Maximum
pH	pH Units	6.5 - 9.0	Minimum/Maximum
Electrical Conductivity	µS/cm	TBA	Maximum
Total Dissolved Solids	mg/L	TBA	Maximum
Calcium	mg/L	No limit	Interpretative purposes only #
Magnesium	mg/L	No limit	Interpretative purposes only#
Sodium	mg/L	No limit	Interpretative purposes only#
Potassium	mg/L	No limit	Interpretative purposes only#
Chloride	mg/L	No limit	Interpretative purposes only#
SO4	mg/L	No limit	Interpretative purposes only#
CO3	mg/L	No limit	Interpretative purposes only#
HCO3	mg/L	No limit	Interpretative purposes only#
PO_4	mg/L	TBA	TBA
NO_3	mg/L	TBA	TBA
Iron	mg/L	TBA	Maximum
Aluminium	mg/L	TBA	Maximum
Arsenic	mg/L	TBA	Maximum
Mercury	mg/L	TBA	Maximum
Antimony	mg/L	TBA	TBA
Total Petroleum Hydrocarbons			
TPH (C6-C9)	mg/L	TBA	Maximum
TPH (C10-C36)	mg/L	TBA	Maximum

* Interim trigger levels, final to be provided as per condition E7.
# The measurement of cations and anions are used to interpret the groundwater chemistry and identify the groundwater source e.g. by using piper diagrams.

E7	**Determining Contaminant Trigger Level and Limit Type** The background groundwater quality for each geology must be determined from hydraulically isolated background bore(s) that have not been affected by any mining activities. The groundwater contaminant trigger levels and limit type as per **Table E2 – Groundwater contaminant trigger levels** must be determined and submitted to the administering authority prior to commencement of mine construction activities.
E8	**Bore construction and maintenance and decommissioning** The construction, maintenance and management of groundwater bores (including background and compliance groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring. For all bores constructed after February 2015 construction and decommissioning must be in accordance with the 'Minimum Construction Standard for Water Bores in Australia'.
Agency interest: Water	
Condition number	**Condition**
F1	**Contaminant release** Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.
F2	Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in **Table F1 - Mine affected water release points, sources and receiving waters*** and depicted in Schedule J Figure 1 – Mine affected water release points. **Remaining information to populate Table F1 must be to be submitted to the administering authority prior to the commencement of mine construction activities.*

Table F1 - Mine affected water release points, sources and receiving waters

Release point (RP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Mine affected water source and location	Monitoring point	Receiving waters description
RP 1	TBD	TBD	Dam EV1	Dam spillway	Horse Creek
RP 2	TBD	TBD	Dam EV2	Dam spillway	Horse Creek
RP 3	TBD	TBD	Dam EV3	Dam spillway	Horse Creek
RP 4	TBD	TBD	Dam EV4	Dam spillway	Horse Creek

F3	The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F29 is permitted.
F4	The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in **Table F2 - Mine affected water release limits** when measured at the monitoring points specified in **Table F1 - Mine affected water release points, sources and receiving waters**, for each quality characteristic listed in **Table F2 – Mine affected water release limits.**

Table F2 - Mine affected water release limits

Quality characteristic	Release limits	Monitoring frequency
Electrical conductivity (µS/cm)	Release limits specified in Table F4 for variable flow criteria or condition F11.	Daily during release (the first sample must be taken within two hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within two hours of commencement of release)
Sulphate (SO_4^{2-}) (mg/L)	250	Daily during release (first sample within two hours of commencement of release)

F5	The release of mine affected water to waters from the release points must be monitored at the locations specified in **Table F1 - Mine affected water release points, sources and receiving waters** for each quality characteristic and at the frequency specified in **Table F2 - Mine affected water release limits** and **Table F3 - Release contaminant trigger investigation levels, potential contaminants**.

Table F3 - Release contaminant trigger investigation levels, potential contaminants

Quality characteristic	Trigger levels (μg/L)	Comment on trigger level	Monitoring frequency
Aluminium	55	*For aquatic ecosystem protection, based on SMD guideline*	Commencement of release and thereafter weekly during release
Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	4	*For aquatic ecosystem protection, based on SMD guideline*	
Mercury	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	*For aquatic ecosystem protection, based on SMD guideline*	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	90	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Selenium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Silver	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Uranium	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Vanadium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	

Notes:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The quality characteristics required to be monitored as per Table F3 - Release contaminant trigger investigation levels, potential contaminants can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table F3 - Release contaminant trigger investigation levels, potential contaminants by amendment.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

F6	If quality characteristics of the release exceed any of the trigger levels specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** and: a) where the trigger values are not exceeded then no action is to be taken, or b) where the downstream results exceed the trigger values specified **Table F3 - Release contaminant trigger investigation levels, potential contaminants** for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and: 1. if the result is less than the background monitoring site data, then no action is to be taken; or 2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within ninety (90) days of receiving the result, outlining: (i) details of the investigations carried out; and (ii) actions taken to prevent environmental harm. Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 b (2) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.
F7	If an exceedance in accordance with condition F6 b (2) is identified, the holder of the environmental authority must notify the administering authority in writing within twenty-four (24) hours of receiving the result.
F8	**Mine affected water release events** The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in **Table F4 - Mine affected water release during flow events**.
F9	Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in **Table F4 - Mine affected water release during flow events** for the release point(s) specified in **Table F1 - Mine affected water release points, sources and receiving waters**.
F10	The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in **Table F4 - Mine affected water release during flow events** when measured at the monitoring points specified in **Table F1 - Mine affected water release points, sources and receiving waters**.

Table F4 - Mine affected water release during flow events

Receiving waters/ stream	Release point (RP)	Gauging station	Gauging station latitude (decimal degree, GDA94)	Gauging station longitude (decimal degree, GDA94)	Receiving water flow recording frequency	Receiving water flow and quality characteristics criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical conductivity release limits
Horse Creek	Dam EV1 RP1 Dam EV2 RP2 Dam EV3 RP3 Dam EV4 RP4	SM1	S26.08194	E149.59138	Continuous (minimum daily)	Low Flow > $1.0m^3/s$ for a period of 28 days after natural flow events that exceed 1.0 m^3/s	<0.6 m^3/s Release duration is limited to 28 days after the trigger flow event ceases	Electrical conductivity <380 µS/cm
						Medium Flow > 1.0 m^3/s	<0.6 m^3/s	Electrical conductivity <1500 µS/cm
						Medium Flow > 2.0 m^3/s	<0.4 m^3/s	Electrical conductivity <3500 µS/cm
						High Flow > 4.0 m^3/s	<0.2 m^3/s	Electrical conductivity 8000 µS/cm

F11	The daily quantity of mine affected water released from each release point must be measured and recorded.
F12	Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.
F13	**Notification of release event** The environmental authority holder must notify the administering authority as soon as practicable and no later than twenty-four (24) hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information: a) release commencement date/time; b) details regarding the compliance of the release with the conditions of Agency interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume); c) release point/s; d) release rate; e) release salinity; and f) receiving water/s including the natural flow rate.
F14	The environmental authority holder must notify the administering authority as soon as practicable and nominally no later than twenty-four (24) hours after cessation of a release event of the cessation of a release notified under Condition F13 and within twenty-eight (28) days provide the following information in writing: a) release cessation date/time; b) natural flow rate in receiving water; c) volume of water released; d) details regarding the compliance of the release with the conditions of Agency interest; Water of this environmental authority (i.e. contaminant limits, natural flow, discharge volume); e) all in-situ water quality monitoring results; and f) any other matters pertinent to the water release event. Note: Successive or intermittent releases occurring within twenty-four (24) hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F13 and F14, provided the relevant details of the release are included within the notification provided in accordance with conditions F13 and F14.

F15	**Notification of release event exeedance** If the release limits defined in **Table F2 – Mine affected water release limits** are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.
F16	The environmental authority holder must, within twenty-eight (28) days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority detailing: a) the reason for the release; b) the location of the release; c) the total volume of the release and which (if any) part of this volume was non-compliant; d) the total duration of the release and which (if any) part of this period was non-compliant; e) all water quality monitoring results (including all laboratory analyses); f) identification of any environmental harm as a result of the non-compliance; g) all calculations; and h) any other matters pertinent to the water release event.
F17	**Receiving environment monitoring and contaminant trigger levels** The quality of the receiving waters must be monitored at the locations specified in **Table F6 – Receiving water upstream background sites and downstream monitoring points** for each quality characteristic and at the monitoring frequency stated in **Table F5 – Receiving waters contaminant trigger levels**. Monitoring points are shown in Schedule J Figure 2.

Table F5 - Receiving waters contaminant trigger levels

Quality Characteristic	Trigger Level	Trigger Type	Monitoring Frequency
pH (pH units)	6.5 – 9.0 pH	Range	Daily during the release
Electrical Conductivity (μS/cm)	700	Maximum	
Turbidity (NTU)	TBA (background figure to be provided)	Maximum	
Sulphate (SO_4^{2-}) (mg/L)	250mg/L	Maximum	

Note:
1. In-stream EC triggers based on *Model Water Conditions for Coal Mines in the Fitzroy Basin* (EHP 2013).
2. Trigger level based on EPP (Water) WQOs for Aquatic Ecosystems.
3. Trigger level based on ANZECC (2000) stock water quality guidelines.

Table F6 - Receiving water upstream background sites and downstream monitoring points

Monitoring points	Receiving waters location description	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)
Upstream background monitoring points			
SM1	Horse Creek	S26.081944	E149.591384
SM2	Horse Creek	S26.041388	E149.6
SM4	Horse Creek	S25.996388	E149.641112
Downstream monitoring points			
SM3	Horse Creek	S26.031943	E149.629730
SM5	Horse Creek	S25.980557	E149.651657
SM6	Nine Mile Creek	S25.974443	E149.651108

F18	If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in **Table F5 – Receiving waters contaminant trigger levels** during a release event the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and: a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or b) where the downstream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining: 1. details of the investigations carried out; and 2. actions taken to prevent environmental harm. Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F18 b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.
F19	All determinations of water quality and biological monitoring must be performed by an appropriately qualified person.
F20	**Receiving environment monitoring program (REMP)** The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site. For the purposes of the REMP, the receiving environment is the waters of Horse Creek to the confluence with Juandah Creek, approximately 20km downstream of the mining activity. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water, including but not limited to the referrable wetland of high ecological significance 1km downstream of mining site boundary.
F21	The REMP required under condition F20 must be in accordance with the Receiving Environment Monitoring Program guideline published by the administering authority.
F22	A REMP Design Document must be submitted prior to the commencement of mine affected water releases to receiving waters and describe how the REMP will address the criterion of F21. The REMP Design Document must be updated and resubmitted to the administering authority whenever the release activities change or the program is modified. Due consideration must be given to any comments made by the administering authority on the amended REMP Design Document and subsequent implementation of the program.

F23	A report outlining the findings of the REMP, including all monitoring results and interpretations outlined in condition F21, must be prepared annually and made available on request to the administrating authority. The reports will be due at twelve (12) month intervals following the submission of the initial REMP design document.
F24	**Water reuse** Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority 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 (with the consent of the third party).
F25	**Water Storage Monitoring** The holder of this environmental authority must maintain a register of water storages and must be monitored for water quality characteristics specified in **Table F7 – Water storage contaminant limits** at the monitoring locations and at the specified frequency. Monitoring is required when the period of time in which any water storage, contains water for a period of time that is equal to or greater than the frequency of monitoring listed in **Table F7 – Water storage contaminant limits**.
F26	In the event that water quality within water storages does not comply with the water quality characteristics specified in **Table F7 – Water storage contaminant limits**, the holder of this environmental authority must implement measures to prevent access by all livestock and minimise access by fauna to the water.

Table F7 – Water storage contaminant limits

Quality characteristics	Test value	Contaminant limit	Frequency of monitoring
pH (pH units)	Range	6 – 9	6 monthly
EC(μS/cm)	Maximum	4000	
Sulphate (mg/L)	Maximum	1,000	
Fluoride (mg/L)	Maximum	2.5	
Aluminium (mg/L)	Maximum	5	
Arsenic (mg/L)	Maximum	0.5	
Boron (mg/L)	Maximum	5	
Cadmium (mg/L)	Maximum	0.02	
Chromium (mg/L)	Maximum	1	
Cobalt (mg/L)	Maximum	1	
Copper (mg/L)	Maximum	1	
Lead (mg/L)	Maximum	0.1	
Molybdenum (mg/L)	Maximum	0.15	
Nickel (mg/L)	Maximum	1	
Selenium (mg/L)	Maximum	0.02	
Total Zinc (mg/L)	Maximum	20	

Note: Contaminant limits are based on ANZECC (2000) Livestock Drinking Water and are to be analysed as Total Metals (unfiltered).

F27	**Annual water monitoring reporting** The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format: a) the date on which the sample was taken; b) the time at which the sample was taken; c) the monitoring point at which the sample was taken; d) the measured or estimated daily quantity of mine affected water released from all release points; e) the release flow rate at the time of sampling for each release point; f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.
F28	**Temporary interference with waterways** Destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Mines (or its successor) *Guideline – Activities in a Watercourse, Lake or Spring associated with Mining Activities.*
F29	**Water Management Plan** A Water Management Plan must be developed and implemented by a suitably qualified and experienced person during all stages of activities on the mining leases to which this environmental authority applies.
F30	**Stormwater and Sediment Controls** An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.
F31	Stormwater, other than mine affected water, is permitted to be released to waters from: a) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F30; and b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F29, for the purpose of ensuring water does not become mine affected water.
Agency interest: Sewage	

Condition number	Condition
G1	The only contaminant permitted to be released to land is treated sewage effluent in compliance with the release limits stated in **Table G1 – Contaminant release limits to land**.

Table G1 – Contaminant release limits to land

Contaminant	Unit	Release limit	Limit type	Frequency
5 day Biochemical oxygen demand (BOD)1	mg/L	20	Maximum	Monthly
Total suspended solids	mg/L	30	Maximum	Monthly
Nitrogen	mg/L	30	Maximum	Monthly
Phosphorus	mg/L	15	Maximum	Monthly
E-coli	Organisms/100ml	1000	Maximum	Monthly
pH	pH units	6.0 – 9.0	Range	Monthly

G2	The application of treated effluent to land 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.
G3	If areas irrigated with effluent 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.
G4	All sewage effluent released to land must be monitored at the frequency and for the parameters specified in **Table G1 – Contaminant release limits to land**.
G5	The daily volume of effluent release to land must be measured and records kept of the volumes of effluent released.
G6	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.

Agency interest: Land	
Condition number	**Condition**
H1	**Rehabilitation Landform Criteria** All areas significantly disturbed by mining activities must be rehabilitated to achieve the following rehabilitation goals: a) safe to humans; b) stable; c) non-polluting; and d) self-sustaining for the post-mining land use.
H2	Rehabilitation must commence progressively in accordance with the plan of operations.

H3	A Rehabilitation Plan must be developed and implemented by a suitably qualified person and must include: a) rehabilitation objectives to achieve the rehabilitation goals for all disturbed areas; b) detailed rehabilitation methods for each disturbed area; 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 objectives; and e) details of appropriate monitoring and maintenance of rehabilitation.
H4	The environmental authority holder must notify the administering authority of any changes to the Rehabilitation Plan.
H5	All areas significantly disturbed by mining activities must be rehabilitated in accordance with the Rehabilitation Plan to achieve the final completion criteria.
H6	**Residual Void Outcome** Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.
H7	Complete an investigation into residual voids and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in condition H6 and landform design criteria, within six (6) months of the commencement of mine construction activities, for department review and comment. On acceptance of the criteria proposed in the residual void management plan, the criteria must be specified in the Environmental Authority. The investigation must at a minimum include the following: a) a study of options available for minimising final void area and volume; b) develop design criteria for rehabilitation of final voids; c) 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; d) outline any potential interactions between the final void and any watercourse diversions; e) a pit wall stability study, considering the effects of long-term erosion and weathering of the pit wall and the effects of significant hydrological events; f) a study of void capability to support native flora and fauna; and g) a proposal/s for end of mine void rehabilitation success criteria and final void areas and volumes. These studies will be undertaken during the life of the mine, and will include detailed research and modelling.

H8	Prior to lease relinquishment, a suitably qualified and experienced person must undertake a geotechnical assessment on all final voids. The assessment must investigate final void geotechnical stability and the subsequent report must make recommendations for management of stability and safety.
H9	A Mine Closure and Rehabilitation Plan must be developed and implemented by a suitably qualified and experienced person for the mining lease areas that this environmental authority applies to, within twelve (12) months of the commencement of open cut coal mining activities (not including exploration activities).
H10	**Infrastructure** All infrastructure, constructed by or for the environmental authority holder during the activities on the mining leases to which this environmental authority applies, 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. Note: This is not applicable where the landowner/holder is also the environmental authority holder.
H11	**Contaminated Lands** Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the *Environmental Protection Act 1994*, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.
H12	Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the *Environmental Protection Act 1994*, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder of this environmental authority is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition H1 and the associated **Table H1- Rehabilitation requirements*.** **Information required to populate Table H1 must be determined and submitted to the administering authority prior to commencement of mine construction activities.*

Table H1 – Rehabilitation requirements

Mine domain	Mine feature name	Rehabilitation goal	Rehabilitation objectives	Indicators	Completion Criteria
TBA	TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	TBA	TBA

H13	**Biodiversity Offset** Impacts to prescribed environmental matters are not authorised unless the impacts are authorised in condition H14.
H14	Notwithstanding condition H13, impacts to prescribed environmental matters, are only authorised to occur for the prescribed environmental matters specified in **Table H2 – Authorised impacts to prescribed environmental matters**, the impacts do not exceed the maximum extent of impact specified for that prescribed environmental matter.
H15	An environmental offset must be delivered for each impact specified in **Table H2 – Authorised impacts to prescribed environmental matters** as requiring an environmental offset.
H16	The authority holder may carry out the prescribed activity in stages and deliver an environment offset for each stage of the activity.

Table H2 – Authorised impacts to prescribed environmental matters

Matters of state environmental significance		Maximum extent of impact	Significant Impact	Environmental offset required
Regulated Vegetation				
Endangered RE	*RE 11.9.5*	*18.9ha*	*Yes*	*Yes*
Of Concern RE	*RE 11.9.10*	*12.7ha*	*Yes*	*Yes*
	RE 11.3.2 (10% of RE 11.3.25 / 11.3.2)	*16.9ha*	*Yes*	*Yes*
RE occurring within defined distance of defining banks of a relevant watercourse	*RE 11.9.5*	*4.6ha*	*Yes*	*Yes*
	RE 11.9.10	*5.5ha*	*Yes*	*Yes*
	RE 11.10.11	*0.04ha*	*No*	*No*
	RE 11.3.2 (10% of RE 11.3.25 / 11.3.2)	*12.2ha*	*Yes*	*Yes*
	RE 11.3.25 (plus 90% of RE 11.3.25 / 11.3.2)	*113.9ha*	*Yes*	*Yes*
Protected Wildlife Habitat				
Special least concern species	*Echidna*	*Covered by above residual impacts*	*Yes*	*Yes*

H17	Prior to the commencement of any impacts to a prescribed environmental matter for which an environmental offset is required by condition H15, an analysis of the anticipated maximum extent of impact for each stage to each prescribed environmental matter must be provided to the administering authority.
H18	The analysis of impacts required by condition H17 must be approved by the administering authority before the notice of election is given to the administering authority.
H19	The notice of election must be provided to the administering authority no less than three (3) months before the proposed commencement of the prescribed activities.
Agency interest: Watercourse Diversions	
Condition number	**Condition**
I1	**Permanent watercourse diversions** Permanent watercourse diversions, or the re-establishment of a pre-existing watercourse where a temporary watercourse diversion is being replaced, must be designed and constructed to: a) incorporate natural features (including geomorphic and vegetation) present at the location of the diversion; b) maintain the pre-existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse diversion is located; c) maintain the hydraulic characteristics of the permanent watercourse diversion that are equivalent to other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance; d) maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream water quality, geomorphology or vegetation; and e) maintain equilibrium and functionality in all substrate conditions at the location of the diversion.

I2	**Temporary watercourse diversions** Temporary watercourse diversions must be designed and constructed to: a) maintain the pre-existing hydrologic characteristics of surface water systems for the area in which the watercourse diversion is located; b) maintain the hydraulic characteristics of the watercourse diversion that are equivalent to other local watercourses and are suitable for the area in which the diversion is located. Where structures that require on-going maintenance are used, they must not compromise the equilibrium and performance of the temporary watercourse diversion and adjoining watercourses; c) maintain sediment transport and water quality regimes that minimise any impacts to upstream and downstream water quality, geomorphology or vegetation; d) maintain equilibrium and functionality at all substrate conditions at the location of the diversion.
I3	**Design plan – All diversions** A certified Design Plan that achieves condition I1 for permanent watercourse diversions and condition I2 for temporary watercourse diversions must be submitted to the administering authority at least ten (10) business days before commencing construction of the diversion.
I4	The certified design plan for any temporary or permanent watercourse diversion must be consistent with the functional design/s that formed a part of the application documents for this authority.
I5	**Construction and operation – All diversions** A certified set of ‘as constructed’ drawings and specifications must be submitted to the administering authority within sixty (60) business days from the completion of construction of the temporary or permanent watercourse diversion, or re-establishment of the pre-existing watercourse. These drawings and specifications must state: a) that the 'as constructed' drawings and specifications meet the original intent of the design plan for the watercourse diversion; and b) construction of the watercourse diversion is in accordance with the design plan.
I6	**Monitoring and inspections – All diversions** The watercourse diversion must be inspected by a suitable qualified and experienced person who must prepare an inspection report in accordance with the operation and monitoring plan contained within the certified design plan. The timing and frequency of inspections must be in accordance with those specified in the operation and monitoring plan contained within the certified design plan. Note: Inspection requirements included in the operation and monitoring plan do not prevent the authority holder undertaking additional inspections.

I7	The holder must, within twenty (20) business days of preparing an inspection report in accordance with the operation and monitoring plan, provide the administering authority: a) The recommendations section of the inspection report; and b) If applicable, a report on any actions being taken in response to those recommendations. If, following receipt of the recommendations and (if applicable) actions, the administering authority, requests a full copy of the inspection report from the holder, provide this to the administering authority within ten (10) business days of receipt of the request.
I8	**Register – All diversions** The details of watercourse diversions planned and constructed under an environmental authority must be accurately recorded on the Register of Watercourse Diversions kept by the holder of the authority. An electronic copy must be provided to the administering authority on request.
Agency interest: Regulated Structures	
Condition number	**Condition**
X1	**All dams** The holder of this environmental authority must ensure that each dam is designed, constructed, operated and maintained in accordance with accepted engineering standards and is fit for the purpose in which it is intended.
X2	Where the hazard category of a dam is assessed as significant or high, the holder of this authority must ensure that the requirements of the Manual For Assessing Consequence Categories And Hydraulic Performance Of The Structures (EM635) are met.
X3	**Operation of a regulated structure** Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified ‘as constructed’ drawings.
X4	**Mandatory reporting level** 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.
X5	The holder must, as soon as practical and 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.
X6	The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

X7	**Design Storage Allowance** The holder must, as soon as possible and 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.
X8	**Annual Inspection report** Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
X9	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 recommended actions to ensure the integrity of the regulated structure.
X10	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
X11	The holder must: a) Within twenty (20) business days of receipt of the annual inspection report, provide to the administering authority: 1. The recommendations section of the annual inspection report; and 2. If applicable, any actions being taken in response to those recommendations. b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within ten (10) business days of receipt of the request.
X12	**Register of regulated dams** A Register of Regulated Dams must be established and maintained by the holder for each regulated dam as per conditions X13-X14.
X13	The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
X14	The holder 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 Dams, in the electronic format required by the administering authority.

Schedule J – Figures

Figure 1 – Mine affected water release points

To be provided prior to commencement of release of mine affected water.

Figure 2 – Upstream and downstream monitoring points

To be provided prior to commencement of release of mine affected water.

Definitions

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that 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.

Administering Authority is the agency that administers the environmental authority provisions under the *Environmental Protection Act 1994*.

Affected person is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life can be put at risk due to dwellings or workplaces being in the path of a dam break flood.

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).

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.

Annual exceedance probability or AEP the probability that at least one event in excess of a particular magnitude will occur in any given year.

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 relating to the subject matter using the relevant protocols, standards, methods or literature.

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 an environmental authority or a development approval.

Background, with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

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.

Certification, Certifying or **Certified** by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, 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:

a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and *Veterinary Chemicals Code Act 1994* (Commonwealth), or
b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council, or
c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997, or
d) 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
e) 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
   (v) a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater, or
   (vi) manufacture of plastic or synthetic rubber.

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.

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

Construction or constructed, in relation to watercourse diversions, is the process of building, or modifying an existing diversion, but does not include investigations and testing necessary for the purpose of preparing a design plan.

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 in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.

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 (EM635)*.

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 is a document that contains the design, operation, monitoring and revegetation criteria of a watercourse diversion that addresses the outcomes stated in conditions on the environmental authority relating to the diversion. The document should include, but not be limited to:

a) required information under a functional design;

b) the location, function and description of geomorphic and riparian vegetation features within the proposed watercourse diversion;

c) results from hydrologic, hydraulic and sediment transportation modelling used in the design of the diversion;

d) a revegetation and vegetation management plan (a revegetation plan) for the diversion;

e) engineering drawings depicting the physical attributes and dimensions of the diversion;

f) (if relevant) the staged development of a permanent watercourse diversion including the proposed use of temporary watercourse diversions with identified lifespans;

g) all investigation and other reports relied on by the design; and

h) plans and specifications sufficient to complete construction and revegetation in accordance with the design.

Design plan is 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 (EM635)* 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 *Integrated Planning Act 1997* or the *Sustainable Planning Act 2009* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

Disturbance of land includes:

a) compacting, removing, covering, exposing or stockpiling of earth

b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion

c) carrying out mining within a watercourse, waterway, wetland or lake

d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls

e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased

f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of 'disturbance':

a) areas off lease (e.g. roads or tracks which provide access to the mining lease)

b) areas previously disturbed which have achieved the rehabilitation outcomes

c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions)

d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner

e) disturbance that pre-existed the grant of the tenure.

EC means electrical conductivity.

Effluent treated waste water released from sewage treatment plants.

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 downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact.

Equilibrium: A state where 'balance' is achieved despite changing variables.

Existing structure means a structure that was in existence prior to the adoption of this schedule of conditions under the 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 (EM635)* published by the administering authority.

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.

Functional design is a document that contains 'conceptual' information about the design, operation and revegetation criteria of a watercourse diversion that addresses the outcomes stated in the conditions on the environmental authority relating to the diversion. The document should include, but not be limited to:

a) geomorphic and vegetation assessment of the existing watercourse;

b) hydrologic conditions of the existing watercourse;

c) the proposed watercourse diversion route; and

d) results from hydrologic, hydraulic and sediment transportation modelling used in the design of the diversion.

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 (EM635)*.

Infrastructure means water storage dams, levees,, roads and tracks, buildings and other structures built for the purpose of the mining activity.

Land in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the *Environmental Protection Act 1994*. For the purposes of the *Acts Interpretation Act 1954,* it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

Land use –means 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.

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.

Licensed place means the mining activities carried out at the mining tenements detailed in Table # (page #) of this environmental authority.

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 (EM635)*

'm' means metres.

Mandatory reporting level or MRL means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Manual means the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Mine affected water:

a) means the following types of water:

i. pit water, tailings dam water, processing plant water

ii. water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity

iii. rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water

iv. groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated

v. groundwater from the mine's dewatering activities

vi. a mix of mine affected water (under any of paragraphs i)-v) and other water.

b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:

i. land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success, or

ii. land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:

1. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;
2. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or

iii. both.

Mining activities means the activities**:**
a) authorised as per the definition in section 110 of the *Environmental Protection Act 1994*; and
b) all environmentally relevant activities authorised under this environmental authority.

Minimise is to reduce to the smallest possible amount or degree.

Modification or modifying (see definition of 'construction')

NATA means National Association of Testing Authorities, Australia.

Natural flow means the flow of water through waters caused by nature.

Non-polluting means having no adverse impacts upon the receiving environment.

Operational plan includes:

a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);

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 (mm/s).

Permanent watercourse diversion is a man-made structure that incorporates the geomorphologic, hydraulic, hydrologic and ecological components of a local watercourse and is designed, constructed, operated and maintained according to an engineering standard that ultimately achieves a self-sustaining watercourse able to function without features or characteristics that rely on ongoing maintenance or that impose a financial or other burden on the proponent, government or the community.

Pre-existing watercourse is the section of watercourse from which the flow of water will be diverted as a result of the construction and operation of a watercourse diversion.

Protected area means – a protected area under the *Nature Conservation Act 1992*, or

a) a marine park under the *Marine Parks Act 1992*, or
b) a World Heritage Area.

Receiving environment in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

a) a watercourse;
b) groundwater; and
c) an area of land that is specified in this environmental authority.

Receiving waters means the waters into which this environmental authority authorises releases of mine affected water.

Register of Regulated Dams includes**:**

a) Date of entry in the register;
b) Name of the dam, 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 (EM635);
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 dam means any dam in the significant or high consequence category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

Rehabilitation is the process of reshaping and revegetating land to restore it to a stable landform.

Regulated structure includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

Release event means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.

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.

Revegetation is the re-establishment of vegetation[1] of a species and density of cover similar to surrounding undisturbed areas or the landform that existed before mining activities on soil surfaces associated with the construction or rehabilitation of a watercourse diversion.

RL means reduced level, relative to mean sea level as distinct from depths to water.

Saline drainage the movement of waters, contaminated with salts, as a result of the mining activity.

Self-sustaining means not requiring on-going intervention and maintenance to maintain functional riverine processes and characteristics.

Sensitive place means:

d) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential

[1]Not including a species declared under the Land Protection (Pest and Stock Route Management) Regulation 2003 as a category class 1 pest, category class 2 pest or category class 3 pest.

premises;

e) a motel, hotel or hostel;

f) an educational institution;

g) a medical centre or hospital;

h) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area, or

i) a public park or gardens.

Structure means dam or levee.

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

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*, who has an appropriate level of expertise in the structures, geomechanics, hydrology, hydraulics and environmental impact of watercourse diversions.

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.

An ***appropriate level of expertise*** includes:

- demonstrable competency, experience and expertise in:
  - investigation, design or construction of watercourses diversions
  - operation and maintenance of watercourse diversions
  - geomechanics with particular emphasis on channel equilibrium, geology and geochemistry
  - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology
  - hydraulics with particular reference to sediment transport and deposition and erosion control
  - hydrogeology with particular reference to seepage and groundwater
  - solute transport processes and monitoring thereof, or
- sufficient knowledge and experience to certify that where the **suitably qualified and experienced person** has relied on advice and information provided by other **persons with relevant expertise***:
  - they consider it reasonable to rely on that advice and information
  - the expert providing the advice and information has knowledge, competency, suitable

experience and demonstrated expertise in the matters related to watercourse diversions.

Persons with relevant expertise include:

- Geomorphologist: person who has demonstrated competency and relevant experience in stream geomorphology and watercourse diversions.
- Geotechnical Expert: person who has demonstrated competency and relevant experience in geotechnical assessment of soil characteristics suitable for watercourse diversions.
- Vegetation Expert: person who has demonstrated competency and relevant experience in the identification, role and function of vegetation with watercourses and adjoining floodplains, and has demonstrated competency and relevant experience in revegetation of watercourse diversions and adjoining floodplains. .
- Groundwater Expert: person who has demonstrated competency and relevant experience in groundwater systems.
- Surface Water Expert: person who has demonstrated competency and relevant experience in hydrology.
- Engineer: person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Persons Act 2002* or has similar qualifications under a respected professional registration association, and has demonstrated competency and relevant experience in design and construction of watercourse diversions.
- Soils Expert: person who has demonstrated competency and relevant experience in soil classification including the physical, chemical and hydrologic analysis of soil.

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.

Temporary watercourse diversion is a man-made structure that may incorporate geomorphologic, hydraulic, hydrologic and ecological components of a local watercourse and is designed, constructed, operated and maintained to an engineering standard that ensures the diversion does not compromise the equilibrium and performance of the diversion and adjoining watercourses. A temporary diversion is replaced by a permanent diversion, or the re-establishment of the pre existing watercourse, within the timeframe specified in the design plan.

The Act means the *Environmental Protection Act 1994*.

µS/cm means micro siemens per centimetre.

Void means any constructed, open excavation in the ground.

Water is defined under Schedule 4 of the *Water Act 2000.*

Watercourse has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means a river, creek or stream in which water flows permanently or intermittently—

a) in a natural channel, whether artificially improved or not; or

b) in an artificial channel that has changed the course of the watercourse.

Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

Water quality means the chemical, physical and biological condition of water.

Water year means the twelve (12) month period from 1 July to 30 June.

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.

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.

END OF PERMIT

Attachment 1: Additional information required for proposed PRC Plan

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
Rehabilitation Planning Part				
1	**3.2 Community Consultation**	Section 126C(1)(c)(iii) of the EP Act requires the community consultation register to include certain information, including how issues have been considered, decisions/outcomes of the engagement and commitments made by the applicant. The community consultation register in Appendix E does not provide the information required by the EP Act and the PRCP Guideline. Section 126C(1)(c)(iv) of the EP Act state the requirements for the community consultation plan, which includes proposed consultation frequency and the information that will be released for community consultation.	Provide an updated Rehabilitation Planning Part that includes the following: • Further information to address section 3.5 of the PRCP Guideline. • Further information regarding the frequency for the consultation and the information to be released for consultation.	The stakeholder register was included from the EIS along with information relating to the information provided for consultation. Issues raised will have been considered and addressed in finalising and approving the EA application, with specific responses to comments received during the EIS public notice period detailed within the “Taroom Coal – Elimatta EIS 2014 Response to Comments” (now included within Appendix G). An outline of this process has been incorporated into Section 3.2.4 of the PRCP to also include updated consultation register requirements to capture all information required by Section 126C(1)(c)(iv) of the EP Act and the PRCP guideline. Also note that the SIA (2012) prepared for the EIS detailed individual consultation that occurred, concerns raised, and how these were considered. Section 3.2.1 of the PRCP has been updated to detail the concerns relating to rehabilitation and how these were considered and commitments made. The Stakeholder engagement plan (SEP) and PRCP was updated to include the following information: • the objectives for community consultation – added Section 1.1 to SEP and included in Section 3.2.3 of the PRCP • proposed consultation frequency – added Section 3.1.1 to SEP to discuss preliminary consultation frequency • what information will be released for community consultation – added information to Section 3.1.1 of SEP for potential information released to stakeholders for future engagement
2	**3.1.4 Topography and surface hydrology** **3.1.5 Groundwater**	No receiving environment water quality or groundwater quality data was provided. The land outcome document (EA Permit) references TBAs for receiving waters criteria and groundwater criteria and locations. Background surface water and groundwater is important to determine appropriate site-specific water quality limits for monitoring whether the final landform is stable and non-polluting.	Provide an updated Rehabilitation Planning Part that includes receiving water and groundwater quality background data in Section 3.1.4 and 3.1.5.	Additional information has been included within the PRCP at Section 3.1.4.2 for Horse Creek background water quality data. Additional information has been included to PRCP Section 3.1.5.5 in relation to background groundwater quality. A complete set of groundwater quality data is included as Appendix I.

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
3	**3.1.6.2 Underlying landholders**	It has been identified that the underlying land is freehold and it has been stated that some infrastructure will remain post mining. Section 3.2 of the PRCP Guideline states that a written landholder agreement must be provided for where infrastructure is to remain as part of the PMLU. Underlying landholders and landholder agreements have not been provided for the infrastructure that will remain post mining.	Update s3.1.6.2 of the Rehabilitation Planning Part that describes the built infrastructure proposed to be retained post mining. Include the details about the underlying landholder(s) and attach evidence of any landholder agreements if required. If no landholder agreement is provided, then the rehabilitation of the site will include the removal of all infrastructure and structures.	Section 3.1.6.2 has been updated to reinforce that no commencement date has yet been set, no land disturbance has occurred and no infrastructure exists on site; as justification as to why a landholder agreement does not yet exist. An undertaking is included to develop a landholder agreement at an appropriate time. Please also refer to Section 3.5.12 of the PRCP for further discussion on the potential for infrastructure to be retained on site under landholder agreements.
4	**3.5.6.3 Waste characterisation and cover design**	The planning part describes the interburden/overburden materials will be sodic and dispersive. However, information regarding whether the overburden or waste material includes potential acid generating material has not been provided.	Provide an updated Rehabilitation Planning Part that includes management practices in section 3.5.6.3 to ensure the interburden/overburden materials will be managed in a way to ensure the land is able to sustain a stable landform.	Acid mine drainage is discussed in detail in the EGI geochemical assessment provided in Appendix G. Additional information detailing AMD and interburden/overburden characteristics has been included in Section 3.5.6.3 of the PRCP. Further management practices have also been included in Section 3.5.6.3 of the PRCP to ensure the landform will remain stable.
5	**3.5.6.4 Soil and capping material assessment**	Not all topsoil characteristics have been considered. The interburden/overburden materials have been described as sodic. A topsoil criterion for electrical conductivity and exchangeable sodium percentage needs to be included to ensure that topsoil is stable and suitable for the PMLU.	Provide an updated Rehabilitation Planning Part that includes a revised section 3.5.6.4. to include topsoil characteristics, e.g. electrical conductivity (EC) and Exchangeable sodium percentage (ESP) and justify how they support a stable PMLU.	Section 3.5.6.4 of the PRCP has been updated Including an additional table providing soil chemical characteristics. A cross reference has also been included to Section 3.5.13 which discusses topsoil suitability and amelioration requirements to support a stable PMLU.
6	**3.5.6.1 Flooding**	Section 3.6.1 of the PRCP Guideline requires information regarding the effect of flood flow through the site. The planning part does not provide information on the long-term sustainability of the retained flood levee. The Horse Creek Diversion Functional Design Report appears to consider that the future conditions of the creek are similar to current conditions and therefore the land is stable. However, the report doesn't consider the full creek alignment that receives flood flow (e.g. velocity impacts identified in the Base Case vs Stage 3 of Horse Creek). The geotechnical investigation report (Appendix F of Horse Creek Diversion Functional Design Report) does not seem to adequately consider the range of flood flow events. Flood modelling shows the creek diversion will have no	Provide an updated Rehabilitation Planning Part that includes further detail and clarity in section 3.5.6.1 regarding: 1. changes in flood depth and velocity within the creek diversion for a variety of flood flow events (See Parsons Brinckerhoff 2014, Horse Creek Diversion Functional Design Report in Appendix G Provided Technical Studies). 2. the future conditions of the creek, including the geotechnical assessment against flood modelling velocities, the post mining flood model, and justify how this will form a stable condition. 3. the western void location and ensure that the final proposed location is	Further information has been included in Section 3.5.6.1 of the PRCP discussing Horse Creek diversion flood depth and velocity. Additional information on diversion stability has also been included. A new sub-section within Section 3.5.6.1 has been included to discuss residual voids in flood plains. In accordance with the transitional provisions for a PRCP, a NUMA that is identified as being pre-approved within an LOD is not required to comply with sections 126C(1)(g) of (h) or 126D(2) or (3) of the EP Act. Additionally, where the residual void is identified within an LOD with a specific location, floodplain modelling is not required to be undertaken. In accordance with the transitional provisions of a PRCP, if a land outcome document states the area or location of the proposed NUMA, the PRCP does not need to discuss or state how the total

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
		impact on the size and shape of upstream floodplain. It is not clear why the floodplain is bound so strictly to the levees between the 240-250 maximum flood extent. (Section 3.5.6.1 and Figure 16). The PRCP proposed placement of the western void may be within the floodplain. The map provided shows that the south-eastern corner of the flood levee is inside the floodplain (Figure 18). It is not clear on how the final void size will be minimised and that the location minimises the risk to the environment.	not in the floodplain. 4. how the total area of the land to which the final void relates will be minimised and that it minimises risk to the environment.	area will be minimized or how the location will ensure minimization of risks to the environment (PRCP Guideline ESR/2019/4964 Version 3 Section 6.3.2)
7	**3.5.9 Tailings storage facilities: surface TSFs (TDN and TDNA)**	Further information regarding the characterisation of tailings and the appropriate cover materials for these areas is required to determine whether the final landform will be stable. Information on what to include is listed in section 3.6.1 of the PRCP Guideline.	Update the Rehabilitation Planning Part to include further information in s3.5.9 on the TSF cover and the characteristics of the rocky soil cover to ensure it can support a stable condition of the proposed PMLU.	Further information has been included in Section 3.5.9.1 detailing characteristics (physical and chemical properties) of tailings materials. As per section 3.6.1 of the PRCP guideline the cover design should (as applicable to the TSFs) include: • identification and specification of the objectives of the cover system – included as a statement on the objective of the cover design in sections 3.5.9.2 and 3.5.9.3 • a detailed description of the design including the thickness of each layer – discussed in sections 3.5.9.2 and 3.5.9.3 • a detailed description of construction methodology including any proposed staging of the cover system – discussed in sections 3.5.9.2 and 3.5.9.3 • a quantitative assessment that identifies the location and quantity of proposed capping material available on site – discussed in section 3.5.6.4 • proposed QA/QC for the construction of the cover system including the timely implementation of corrective actions where deviations from the design are identified – discussed in section 3.5.6.5 Further information on monitoring and maintenance is included in Section 3.7.
8	**3.5.11.2 Residual void hydrogeology**	The predicted water quality within the residual voids has not been provided. This information is required to determine the potential risk of the residual voids to the surface water and groundwater receiving environments and the water quality criteria within the PRCP Schedule.	Provide an updated Rehabilitation Planning Part that includes long-term water quality modelling for the residual voids.	Section 3.5.10.3 of the PRCP has been updated to provide further information on residual void long term water quality.

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9	**3.5.15 Revegetation**	In section 3.5.15 of the Rehabilitation Planning Part, the low intensity grazing species proposed to be used to rehabilitate the mine include known weed species. It is possible that weed species will dominate the vegetation cover and may not result in a stable condition being achieved.	Provide an updated Rehabilitation Planning Part that includes a list of species to be used in the revegetation and demonstrates they are appropriate for the PMLU.	As per the definition in the Elimatta EA: *Revegetation is the re-establishment of vegetation of a species and density of cover* ***similar to surrounding undisturbed areas or the landform that existed before mining activities*** *on soil surfaces associated with the construction or rehabilitation of a watercourse diversion.* All pasture species selected for the revegetation list for a grazing PMLU have been based on the species identified within the Project area from baseline ecology studies. These species are considered desirable for beef cattle grazing as identified by Future Beef (Future Beef 2013) and are considered appropriate for a grazing PMLU. The exotic pasture species presumably referred to (i.e. Buffel and Rhodes) are dominant in the surrounding grazing land and are considered desirable species for a grazing PMLU. Buffel grass in particular, is an exotic species that is dominant in the pre-mining grazing landscape. The pasture species is highly productive and palatable for grazing land. The species of Buffel grass (*Cenchrus ciliaris*) proposed in the seed mix is suggested to remain in the PRCP schedule. Additionally, these species assist in stabilising the landscape during initial rehabilitation and can reduce incidence of erosion during landform stabilisation. Section 3.5.14 (revegetation) has been updated to include an additional two native species. Further, the inclusion of a given species in Tables 28–30 does not indicate that any given species must be used. It is appropriate that flexibility is provided to address revegetation concerns that may be raised by neighbouring landholders, or evolving approaches to revegetation.

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10	**3.5.16 Water Management**	In accordance with the PRCP guideline section 3.6.1, the rehabilitation planning part must include a description of the following: • a description of the contaminants that pose a risk to environmental values of the receiving environment. • source, pathway and fate of contaminants that have the potential to impact environmental values. The planning part includes reference to contaminants, however Contaminants of Concern (CoC) from the activity were not identified. This information is required to demonstrate that rehabilitation methodologies will result in the land achieving a non-polluting condition.	Provide an updated Rehabilitation Planning Part that includes a description of potential contaminants of concern from the activity and the methodology used to determine the contaminants of concern.	Section 3.5.15.2 added to identify and discuss contaminants that pose a risk to the environmental values of the receiving environment; determined to be typical for an open cut coal mine and as identified through the EIS and associated technical assessments.
11	**3.5.16.2 Water dams**	It is unclear how contaminated water contained within dams will be removed to enable rehabilitation of the land. Further detail is required about the rehabilitation of the water dams (Section 3.5.16.2). E.g. It is stated that "Water management dams that contained potentially contaminated water during mining will be drained or allowed to evaporate."	Update section 3.5.16.2 of the Rehabilitation Planning Part to clarify how the water contained in the water storages will be removed (i.e. transfer, passive or controlled release) and how contaminated sediment will be removed prior to this land being rehabilitated.	Information regarding dewatering of dams is included in an additional Section 3.5.15.4.
12	**3.5.16.3 Diversions**	In section 3.5.16.2, Japanese millet and couch have been proposed as part of the species mix for the rehabilitation of the creek diversion. Including these species for the creek diversion could result in a downstream impact on land uses that are not grazing and introduce these species where they are not usually found.	Provide an updated Rehabilitation Planning Part that includes further information demonstrating the proposed species will achieve the PMLU and not result in changes in vegetation downstream.	Species have been updated to native species that will form part of the PMLU and were identified during field surveys. The species included for initial revegetation and erosion control are native grasses that are included in the species list for the diversion. This will ensure that species used in revegetation and erosion control will limit any potential downstream impacts.
13	**3.7.1.2 Relevant rehabilitation monitoring aspects**	Water quality monitoring (receiving environment, void and groundwater) is not included as part of the relevant rehabilitation monitoring aspects for 3.7.1.2 of the rehabilitation planning part. Water quality monitoring is required to demonstrate the final landform is stable and non-polluting.	Provide an updated Rehabilitation Planning Part that includes water quality monitoring program for receiving environment, void and groundwater including proposed locations, frequency and parameters to be measured.	Preliminary monitoring locations and trigger levels were developed for the EIS and have been included in Section 3.7.1.3 (surface water), 3.7.1.4 (groundwater), and 3.7.1.6 (residual void). These are intermittent values that will be updated once sufficient monitoring has been undertaken to determine site specific values. To address the concern raised, an additional subsection has been added at section 3.7.1.2.
14	**3.7.1.3 Surface water monitoring**	It is unclear why biological water quality indicators and nutrients are included in the water quality monitoring and how these indicators are related to the CoC and the PMLU.	Provide an updated Rehabilitation Planning Part that includes monitoring frequency and limits for each contaminant of concern (CoC).	The original PRCP section 3.7.1.3 was developed on the basis of operational water quality management. For example, the table titled ‘Proposed water quality indicators, was developed by JBT (2014, 08E2 Elimatta EIS 2014 Section 4.5 Water Resources.pdf, Appendix M - Water Management Strategy.pdf), to constitute

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
		In addition, it is unclear whether the metals listed in Table 35 are CoC. Further, it appears the monitoring frequency and limits are not defined in the Rehabilitation Planning Part.	Provide an updated Rehabilitation Planning Part that includes justification for including biological water quality indicators, nutrients and all metals and whether these are potential CoC from the activity. The limits should consider the Horse Creek Water quality objectives and the ANZG 2018 guidelines. Provide an updated monitoring program that specifies frequency of water quality monitoring at sufficient intervals to be able to gather data to demonstrate a stable condition has been achieved.	release contaminant trigger levels and are not considered relevant in the PRCP context. Therefore much of this section has been removed except for water quality monitoring efforts that also confirm or otherwise any potential impacts to receiving environments from a whole-of-site perspective, including rehabilitation activities. The additional subsection on runoff water quality' at section 3.7.1.2 has been updated to include parameters likely to be of risk to the environment.
15	**3.7.1.4 Groundwater monitoring**	Further detail is required regarding the groundwater quality monitoring proposed to determine whether the final landform is stable and non-polluting. The monitoring locations, monitoring frequency, contaminants of concern (CoC) and limits should be defined in the Rehabilitation Planning Part and consider potential contaminant sources. Section 3.7.1.4 states that "Groundwater quality monitoring will be undertaken biannually and will be compared with reference groundwater data. " Please note, the monitoring locations are not dependent on the Associated Water License.	Provide an updated Rehabilitation Planning Part that includes monitoring locations, monitoring frequency, contaminants of concern (CoC) and limits. Monitoring of the Horse Creek alluvium must be included. Demonstrate how the Horse Creek Water quality objectives and the ANZG 2018 guidelines have been considered. Provide an updated Rehabilitation Planning Part that includes further details regarding the reference groundwater data including monitoring locations and a summary of water quality data for all CoC.	Section 3.7.1.4 has been updated to include monitoring locations, frequencies, contaminants and limits. This includes monitoring bores for Horse Creek alluvium. These are preliminary values to be updated once sufficient monitoring has been undertaken to determine more relevant site specific values. Groundwater quality data has been included within Appendix I.
16	**3.7.1.6 Residual voids**	A list of water quality indicators (based on CoC) has not been included for the void monitoring in Section 3.7.1.6 of the Rehabilitation Planning Part. It is not clear why microbe and phytoplankton analysis in the void is required and how these indicators are linked to the PMLU.	Provide an updated Rehabilitation Planning Part that includes a list of water quality indicators (based on CoC) to be monitored in the residual voids. Provide an updated monitoring program that specifies frequency of water quality monitoring at sufficient intervals to be	As the residual void is a preapproved NUMA, the water quality within the residual will only be monitored to obtain an understanding of changes in parameters and will not be compared with quality criteria nor subject to quality limits. Any potential void interactions with groundwater have been addressed through the approvals stage; the groundwater monitoring program described at section 3.7.1.4 is intended to

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
			able to gather data to demonstrate a stable condition has been achieved. Provide an updated Rehabilitation Planning Part that includes clarification regarding why microbe and phytoplankton analysis in the void is required.	identify any such interactions should they occur. Water quality monitoring of the void serves only to confirm the expected and assessed outcomes identified at Section 3.5.10.3. As such, the key contaminant of concern is salinity which will be measured alongside other parameters for completeness as described in section 3.7.1.6.
17	**Rehabilitation Monitoring Program Appendix F**	The Rehabilitation Monitoring Program does not include an appropriate range of characteristics to demonstrate native vegetation has achieved a stable condition. The Office of the Queensland Mine Rehabilitation Commissioner has published recommendations regarding the monitoring of native vegetation to demonstrate the land has achieved a stable condition and the PMLU has been achieved. It is unclear how the proposed monitoring program is specific, measurable, demonstrates the PMLU has been achieved and is sustainable (resilient to disturbance).	Provide an updated Rehabilitation Planning Part that includes a monitoring program that considers the recommendations of the Office of the Queensland Mine Rehabilitation Commissioner.	There is no native vegetation PMLU per se; only the diversion RA which still retains a 'low intensity cattle grazing' with riparian native vegetation included. Regardless, rehabilitation monitoring program has been updated to include biocondition assessments. Note that section 3.7 has largely been removed as it duplicates the information in the Rehabilitation Monitoring Program at Appendix F. Table 43 has been updated to conform with applicable changes made as part of this RFI response.
PRCP Schedule				
18	**Milestone criteria generally**	Criteria proposed in the schedule do not meet SMART principles and do not include many aspects required to demonstrate a stable condition has been achieved. Examples are provided below.	Provide an updated PRCP Schedule that addresses the items raised below. Revise criteria to ensure SMART principles have been incorporated.	Updated milestone criteria as per SMART principles.
19	**RM1**	Further information on services, buildings or stormwater drainage has been included as being retained. There are currently no landholder agreements in place to retain infrastructure. Criteria regarding the steps needed to decommission the dams have not been included.	Revise criteria to remove reference to retained infrastructure. Revise criteria on decommissioning of water drainage infrastructure and dams to meet SMART principles.	Removed reference to retained infrastructure. Additional criteria on decommissioning of water drainage infrastructure and dams have been included.
20	**RM4**	Groundwater monitoring criteria is lacking details on locations, frequency, limits. Therefore, the criteria are not measurable.	Revise criteria to include further groundwater monitoring details (e.g. locations, frequency, CoC and limits). Include SMART criteria for capping material.	Additional criteria included in RM4 and subsequent RMs to determine capping is appropriate and no seepage of contaminants. Groundwater monitoring is included in a subsequent milestone (RM8) and therefore has been removed from this RM.

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
21	**RM5**	Table 21 indicates topsoil suitability criteria and Section 3.3.3 in the soil monitoring program references a list of indicators for soil monitoring however this has not been included in the criteria. The planning part includes reference to ripping of the surface however no criteria has been included for ripping during surface preparation.	Revise RM5 to include SMART criteria regarding topsoil suitability and indicator parameters for soil monitoring. Revise RM5 to include SMART criteria on ripping, including addressing spacing and depth as per Table 24 of the planning part.	Included additional SMART criteria relating to topsoil suitability, testing and ripping.
22	**RM8 - Achievement of grazing PMLU to stable condition**	Section 3.5.6.2 states that vegetative cover must be >50% to show lowered erosion rates at slopes. The criteria references >50th percentile of analogue sites however the evidence to support this criterion is not present. The criteria references the use of analogue sites. However, the Rehabilitation Planning Part does not include details of the condition of the reference sites including flora cover. Therefore, the criteria are not measurable. The erosion classification does not include reference to measurable factors and therefore the criteria is not measurable. The criteria proposes land class suitability of class 4. This land is marginally suitable for grazing and is not necessarily able to sustain grazing in the long term. Water quality monitoring to demonstrate the land has achieved a stable condition has not been included.	Revise RM8 to ensure the vegetative cover is able to support the PMLU proposes and include information in the planning part to support this. Revise RM8 to include reference to the analogue sites (Table 4 from planning part 3.2.1) and identify the flora quality and quantity from that area to ensure background data is captured. Revise the erosion classification criteria to ensure it is measurable. Revise RM8 to include water quality criteria including parameters, limits, and frequency of monitoring (Table 35 of s3.7.1.3 of the planning part).	RM8 has been updated to remove reference of the 50^{th} percentile and is updated to 50%. Section 3.5.6.2 has also been updated to remove reference to the 50^{th} %ile. Grazing reference sites have not been determined for the Project. Ecological assessments were conducted prior to 2013 and therefore vegetation assessments and ground truthing will need to occur prior to determining appropriate reference site for rehabilitation. Rehabilitation reference sites will be determined prior to mining commencement. This have been included within a footnote as a commitment within the rehabilitation milestones. Table 4 of the RMP details preliminary analogue sites for riparian habitat, these are not suitable for a grazing PMLU and are included in RM9. Erosion classification framework has been updated to provide measurable criteria. This provides an immediate and ongoing assessment of erosion to allow for timely remediation of significant erosion features where they occur. Water quality monitoring conforms to section 3.7.1.2. Groundwater quality criteria cannot yet be determined finally; interim criteria have been nominated; alternatively no groundwater criteria should be set. It would appear more efficient to retain groundwater monitoring conditions within the body of the EA than duplicate these conditions three times within the PRCP schedule. In accordance with Section 3.3.2 of the PRCP, beef cattle grazing suitability has been assessed across the project site and land suitability classes developed. A minimum class 4 was determined for soils across the site. An additional figure has been included in Section 3.3.2 showing the locations of LSC 3 and LSC 4. Milestone

Item	Relevant section (proposed PRC plan)	Matter	Information Requested	Response
				criteria have been updated to include reference to this figure and a minimum suitability class of 3-4.
23	**RM9 - Achievement of native vegetation PMLU to stable condition**	Water quality monitoring to demonstrate the land has achieved a stable condition has not been included.	Revise RM9 to include receiving water quality criteria including parameters, limits and frequency of monitoring (i.e. Table 34 and Table 35 of s3.7.1.3 of the planning part). Revise RM9 to include groundwater quality monitoring. In particular, for Horse Creek Alluvium in the northern ML adjacent to TDN, MIA and rail corridor, and north-east corner of the southern ML.	Updated in line with updated surface water monitoring and groundwater text as per sections 3.7.1.2 and 3.7.1.4. It would appear more efficient to retain groundwater monitoring conditions within the body of the EA than duplicate these conditions three times within the PRCP schedule. Included a new figure to Section 3.7.1.4 showing the locations of the preliminary groundwater monitoring network which includes monitoring bores for Horse Creek Alluvium and locations in the north ML adjacent to the TSFs, MIA, and rail corridor, and in the north-east corner of the southern ML.
24	**RM10**	Reference to analogue sites without providing a description of the current condition renders the criterion not measurable.	Revise RM10 to provide location details for analogue site and specific criteria of these sites.	Analogue sites have not been determined for the Project and will not be until a commencement date is determined. A commitment has been made to provide analogue sites prior to the commencement of mining. The criteria provided within RM10 relates to the current condition of analogues and the comparison at the time of sampling. Therefore, regardless of the identification of analogue sites, the criteria included is measurable.
25	**RM11**	Reference to analogue sites without providing a description of the current condition renders the criterion not measurable. It is recommended that criteria are proposed that follow the BioCondition Assessment Manual (V2, February 2025, Queensland Herbarium).	Revise RM11 to include criteria for a BioCondition assessment.	Updated to include biocondition assessment criteria in accordance with the BioCondition Assessment Manual. (e.g. tree height, species number, woody vegetation, recruitment)
26	**MM3**	Void surface and ground water quality criteria is not included. Results from void and groundwater quality monitoring will be required to demonstrate the proposed NUMA is not causing environmental harm beyond the mining tenure boundary.	Revise MM3 to include surface water and ground water quality criteria and ensure it aligns with SMART principles.	Updated to include surface water, groundwater and void water quality monitoring in accordance with the information provided in the RMP and Sections 3.7.1.3, 3.7.1.4, and 3.7.1.6 or the PRCP. As the residual voids are preapproved NUMAs, the water quality within the residual will only be monitored to obtain an understanding of changes in parameters and to ensure no environmental harm beyond the mining boundary. It would appear more efficient to retain groundwater monitoring conditions within the body of the EA than duplicate these conditions three times within the PRCP schedule.