



A Montrose Environmental Company

EA Amendment Supporting Information Report

Graymont (NSW) Pty Ltd

Murgon Limestone Quarry

Murgon, Queensland

BAA250072.01

14 October 2025

CONTENTS

1	INTRODUCTION.....	6
1.1	Background.....	6
1.1.1	Approvals Context.....	6
1.2	Proponent Details.....	7
1.3	Application Particulars.....	7
1.3.1	Pre-Lodgement.....	8
2	LEGISLATIVE FRAMEWORK.....	9
2.1	EA Amendment Threshold Criteria.....	16
2.2	Application Requirements for an EA Amendment.....	17
2.3	Assessment Against Criteria for Environmental Impact Statements.....	18
2.4	Requirements for Activities in the Great Barrier Reef Catchment Area.....	19
3	PROJECT DESCRIPTION.....	21
3.1	Location.....	21
3.2	Current Site Activities and Disturbance.....	21
3.3	Proposed Activities.....	22
3.4	Identification of Underlying Landowners and Tenure.....	26
3.5	Surrounding Land Use.....	26
3.6	Sensitive Receptors.....	28
3.7	Authorised Disturbance.....	29
4	PROPOSED AMENDMENTS.....	31
5	PROJECT JUSTIFICATIONS AND ALTERNATIVES.....	32
6	ENVIRONMENTAL VALUES AND POTENTIAL IMPACTS.....	33
6.1	Climate.....	33
6.1.1	Existing Environment.....	33
6.1.2	Greenhouse Gas Emissions.....	35
6.1.3	Potential Impact.....	37
6.2	Land and Tenure.....	39
6.2.1	Existing Environment.....	39
6.2.2	Potential Impact.....	40
6.3	Ecology.....	40
6.3.1	Existing Environment.....	40
6.3.2	Potential Impacts.....	43
6.4	Surface Water and Wetlands.....	45
6.4.1	Existing Environment.....	45
6.4.2	Potential Impacts.....	52
6.5	Groundwater.....	52
6.5.1	Published Environmental Values.....	52

6.5.2	Existing Environment	53
6.5.3	Potential Impact	59
6.6	Air.....	59
6.6.1	Existing Environment	59
6.6.2	Potential Impacts	60
6.7	Noise and Vibration	60
6.7.1	Existing Environment	61
6.7.2	Potential Impact	61
6.8	Waste.....	61
6.8.1	Existing Environment	62
6.8.2	Potential Impact	63
6.9	Social and Economic	63
6.9.1	Existing Environment	63
6.9.2	Potential Impact	64
6.10	Cultural Heritage.....	65
6.10.1	Existing Environment	65
6.10.2	Potential Impact	65
6.11	Summary of Potential Impacts	65
7	RISK ASSESSMENT	68
7.1	Method	68
7.2	Risk Assessment.....	68
8	RELATIONSHIP WITH OTHER APPROVALS.....	74
8.1	Progressive Rehabilitation and Closure Schedule.....	74
8.2	Estimated Rehabilitation Cost	77
9	CONCLUSION.....	78
10	REFERENCES	79
11	ACRONYMS	80
12	LIMITATIONS AND DISCLAIMER.....	81

LIST OF FIGURES

Body Report

Figure 1. Site Location	23
Figure 2. Site Layout and Infrastructure	24
Figure 3. Proposed Exploration Locations	25
Figure 4. Sensitive Receptors.....	30
Figure 5. Mean monthly rainfall (BoM weather stations 40112; Kingaroy Prince Street and Murgon Post Office 40152).....	33
Figure 6. Flood Mapping.....	38
Figure 7. Regional Ecosystem Mapping.....	44
Figure 8. Historic surface water pH values at W1 (upstream background) and W2 (downstream impact) compared to the WQO (range between pH 6.5 and pH 7.5).....	47

Figure 9. Watercourses and Wetlands	48
Figure 10. Historic surface water EC values at W1 (upstream background) and W2 (downstream impact) compared to the EA release limit (<1000 µS/cm).....	49
Figure 11. Historic surface water TN concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<0.25 mg/L).....	49
Figure 12. Historic surface water TSS concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<6 mg/L).....	50
Figure 13. Surface Water and Groundwater Monitoring Locations	51
Figure 14. Water level observations – Onsite bores	55

LIST OF PLATES

Body Report

Plate 1. An aerial photo of the Project area from 1951 (source: https://qimagery.information.qld.gov.au)	27
Plate 2. An aerial photo of the Project area from 1993 (source: https://qimagery.information.qld.gov.au)	27

LIST OF TABLES

Body Report

Table 1. Status of Existing Approvals.....	6
Table 2. Proponent details.....	7
Table 3. EA amendment application particulars.....	7
Table 4. Commonwealth, state and local legislation	9
Table 5. Minor EA amendment (threshold) criteria	16
Table 6. Requirements for amendment applications under the EP Act	17
Table 7. EIS Trigger for resource projects.....	18
Table 8. Criteria for residual impact to GBR catchment area	19
Table 9. Description of the disturbance types and associated activities at Murgon Operations	22
Table 10. Details of the mining tenure for Murgon.....	26
Table 11. Non-residential Sensitive Receptors	28
Table 12. Schedule A – Table A1 – Authorised disturbance	29
Table 13. Project alternatives	32
Table 14. Long-term meant temperature since 1939 (BoM weather station 040112; Kingaroy Prince Street)...	33
Table 15. Liquid fuel GHG emissions factors	36
Table 16. Total estimated GHG emissions.....	36
Table 17. Estimated Project emissions inventory (Scope 1).....	36
Table 18. Conservation Significant Flora Species	41
Table 19. Conservation Significant Fauna Species.....	41
Table 20. Conservation significant reptile species.....	42
Table 21. Water quality guidelines (NHMRC 2011 ANZECC & ARMCANZ 2000)	52
Table 22. Status and data availability of registered bores with water level proximate to Project area	54
Table 23. Registered bores with water level data within the study area	54
Table 24. Analytical results of the water quality measurement.....	57
Table 25. Relevant air quality criteria from EPP (Air)	59
Table 26. Acoustic Quality Objectives	60
Table 27. Summary of XRD results from waste rock dumps.....	62
Table 28. Dispersibility results from waste rock dump sites	62
Table 29. Analytical results of scalps material.....	62
Table 30. Summary of potential environmental impacts	65
Table 31. Categories of likelihood	68
Table 32. Categories of consequence	68
Table 33. Likelihood and consequence matrix	68

Table 34. Risk Assessment 69

Table 35. Proposed PRCP Amendments 74

LIST OF APPENDICES

APPENDIX A PMST / WILDNET SEARCH RESULTS

APPENDIX B COMMUNITY ENGAGEMENT PLAN AND REGISTER

APPENDIX C AMENDED PRCP REHABILITATION PLANNING PART

APPENDIX D AMENDED PRCP SCHEDULE

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1 INTRODUCTION

Graymont (NSW) Pty Ltd (Graymont) own and operate the Murgon Limestone Quarry (the Project), a limestone extraction operation supplying approximately 90,000 tonnes per annum (tpa) of limestone for the industrial and agricultural sectors. The Project is owned and operated by Graymont and is located within the South Burnett Regional Local Government Area (LGA), approximately 70 kilometres (km) southwest of Gympie in southeast Queensland. The Project is located on Haager Drive at the junction of Barambah and Barker Creeks, approximately 5km south-east of Murgon township.

The Project is currently authorised by Environmental Authority (EA) EPML00352613, which permits the undertaking of extraction and processing activities under Environmentally Relevant Activity (ERA) *Schedule 3, 21 – A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20.*

To support the continued operation of the Project, an amendment is required to the existing EA. Epic Environmental Pty Ltd (Epic), on behalf of Graymont, have prepared this EA amendment application supporting information report for the Department of Environment, Tourism, Science and Innovation (DETSI) to provide background information and justification for the amendment of the Project's EA, and to assist DETSI in making a decision under Chapter 5, Part 7, Division 5 of the *Environmental Protection Act 1994* (EP Act).

This report has been prepared in accordance with the requirements set out in Chapter 5, Part 7, Division 2 of the EP Act.

1.1 Background

The Project is comprised of three limestone deposits across an area of approximately 36.4 hectares (ha) and contained within a tenement described as Mining Lease (ML) 50111 (the site).

The site began operations in 1995, when it was established by South Burnett Lime Pty Ltd to extract prescribed minerals, building stone (marble), calcite/aragonite, dolomite, and lime/limestone. Only the Northern Deposit, with an indicated resource of 1.03 million tonnes and minable reserve of 976,000 tonnes of limestone, is currently being worked to 2037. The site was acquired by Graymont in 2019 from Sibelco Lime Pty Ltd (Sibelco).

1.1.1 Approvals Context

The current status of environmental approvals relevant to the Project are provided in **Table 1**.

Table 1. Status of Existing Approvals

Relevant Legislation	Approval Name	Reference	Date	Applicability to the Project
<i>Environmental Protection Act 1994</i> (EP Act)	Environmental Authority (EA)	EPML00352613	29 September 2023	Authorises Environmentally Relevant Activity (ERA) <i>Schedule 3 – ERA 21, A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20</i> to be undertaken at the site. Will require amendment to authorise proposed activities.
EP Act	Progressive Rehabilitation and Closure Plan (PRCP)	PRCP-EPML00352613-V1	27 April 2015	Provides the commitment to progressively close and rehabilitate the disturbance authorised under the EA in accordance with a schedule and to minimum specification. Amendment of the EA will trigger the requirement of a PRCP

Relevant Legislation	Approval Name	Reference	Date	Applicability to the Project
				amendment. An amended PRCP Rehabilitation Planning Part (RPP) and Schedule has been attached to this report for provision to the administering authority.
<i>Environmental Protection Act 1994 & Mineral and Energy Resources (Financial Provisioning) Act 2018</i>	Estimated Rehabilitation Cost (ERC)	ERC0005630	14 July 2021 to 13 July 2026	Provides a surety to the Queensland Government to the value of \$2,711,168.90 for the successful rehabilitation of the Project. An ERC decision re-application will be submitted as required following approval of the EA and PRCP amendment application.

1.2 Proponent Details

The site is owned and managed by Graymont, who acquired the site from Sibelco in 2019. Graymont is a global leader in lime and limestone solutions. Proponent details are outlined in **Table 2**.

Graymont's products are essential in addressing today's most pressing environmental issues while supporting vital industrial processes and agricultural needs. Uses of Graymont products include the purification of air and water, and the production of items essential to a modern economy such as steel, paper, and metals. Headquartered in Canada, Graymont serves markets throughout North America and Asia-Pacific. Graymont is also the strategic partner of Mexican-based Grupo Calidra, the largest lime producer in Latin America.

Professionally managed and family owned; the company has been in operation for over 70 years. Graymont aims to be the preferred supplier, employer, and partner of choice wherever they operate.

For further information, refer to Graymont's website, here: <https://www.graymont.com/en>

Table 2. Proponent details

Details	Proponent
Entity	Graymont (NSW) Pty Ltd
ABN	34 004 776 989
Contact	Maxime Descoteaux
Address	Level 9, 118 Mount Street, North Sydney NSW 2060
Phone	+61 2 8413 8700
Email	mdescoteaux@graymont.com
Registered Suitable Operator	353194

1.3 Application Particulars

Particulars for the EA amendment application (the subject of this report) have been summarised in **Table 3**.

Table 3. EA amendment application particulars

Aspect	Application Details
Applicant	Graymont (NSW) Pty Ltd as a subsidiary of Graymont (Australia) Pty Ltd
Proponent / EA Holder	Graymont (NSW) Pty Ltd
Project Name	Murgon Limestone Quarry
Applicant Contact	Maxime Descoteaux Level 9 118 Mount Street North Sydney NSW 2060 Australia M +61 492 046 603; T +61 2 8413 8700

Aspect	Application Details
Land Description	Lot 7 SP195988 Lot 5 SP195988 Lot 6 SP195988 Lot 50 FY272 Lot 13 SP104351
Site Location	Haager Drive at the junction of Barambah and Barker Creeks, Murgon
Environmental Authority (EA) application type	Application to amend a Joint PRCP Schedule and Environmental Authority EA
EA Number	EPML00352613
Authorised Environmentally Relevant Activities (ERAs)	Schedule 3 21: A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20
Proposed additional ERAs	None

1.3.1 Pre-Lodgement

An application for pre-lodgement services was lodged with the minerals assessment business area of DETSI on 18 August 2025, with a pre-lodgement subsequently scheduled for 8 October 2025. The pre-lodgement meeting was attended by representatives of Graymont, DETSI and Epic.

While the meeting discussed the wider approvals pathway for the site, including subsequent amendments that may be sought in the future, the focus was on the proposed exploration drilling program, in particularly the impact that may result from it and how these changes are to be carried through into the PRCP amendment.

2 LEGISLATIVE FRAMEWORK

Applicable Commonwealth, State, and local legislation is presented in **Table 4**.

Table 4. Commonwealth, state and local legislation

Legislation	Framework	Application to Project
Commonwealth		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	The EPBC Act provides a legal framework to protect and manage nationally and internationally important aspects of the Australian environment including its biodiversity and heritage places.	This is an existing operational site with no new disturbance proposed, therefore no additional impact to MNES is expected. There is no anticipated Significant Residual Impact (SRI) to MNES therefore, no offsets are required.
<i>Great Barrier Reef Marine Park Act 1975</i> (GBRMP Act)	The purpose of the GBRMP Act is to provide long term protection and conservation of the Great Barrier Reef (GBR) region. The Act allows for ecologically sustainable use consistent with the Reef's protection and conservation. This is the governing legislation for the Reef Plan 2050, which is the overarching policy framework for managing the GBR to 2050. The regulation of activities in the GBR catchment area is set out under the EP Regulation.	The site is located in the Burnett River Basin (Basin no. 136) of the GBR catchment area. The Proposed activity does not propose to release water or waste to GBR catchment waters or other coastal waters. Refer to Section 2.4 for an assessment of the Proposed activity against the requirements for activities in the GBR catchment area.
<i>Native Title Act 1993</i> (NT Act)	The objectives of the NT Act include providing for the recognition and protection of native title. The NT Act also provides a mechanism for ensuring that future acts such as the grant of MLs, or the rights to construct and operate under such authorities, are undertaken in accordance with procedural rights given to relevant native title parties.	There is one existing Native Title Determination (NTD) in effect over the Project; awarded to the Wakka Wakka People (Tribunal No: QCD2022/003, Fed Court No: QUD276/2019, Fed Court Name: Bell on behalf of the Wakka Wakka People #3 (No 2) v State of Queensland).
State		
<i>Environmental Protection Act 1994</i> (EP Act)	The EP Act provides the key legislative framework for environmental management and protection in Queensland. The objective of the EP Act is to: "Protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains ecological processes on which life depends" (Section 3 of the EP Act). Under the EP Act, Graymont must comply with the general environmental duty not to undertake an: "Activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm are taken" (Section 319 of the EP Act).	The site operates under an EA in accordance with the EP Act. Activities which cause or are likely to cause environmental harm constitute offences unless authorised through the EA. Amendments to the EA are regulated under the EP Act. Refer to Section 2.1 for an assessment of the Proposed activity against the threshold criteria for EA amendment application listed under the EP Act Guideline <i>Major or Minor Amendments</i> .

Legislation	Framework	Application to Project
	As part of the EP Act framework, the legislation sets out the requirements for EA amendment applications and assessment criteria for triggering an Environmental Impact Statement (EIS)	Refer to Section 2.2 for an assessment of the Proposed activity against the application requirements for an EA amendment application set out in Chapter 5, Part 7, Division 2 of the EP Act. Refer to Section 2.3 for an assessment of the Proposed activity against the criteria for triggering an EIS.
<i>Environmental Protection Regulation 2019 (EP Regulation)</i>	A resource activity is considered to be an ERA and is defined as a mining activity, being an 'authorised activity for a mining tenement' under the <i>Mineral Resources Act 1989</i> (MR Act) (Schedule 2). Such authorised activities include the act of mining, processing, and ancillary activities in support of a mining operation. Schedule 2 of the EP Regulation lists the resource ERAs. The EP Regulation sets out the items that the administering authority must have regard to when making an environmental management decision regarding activities in the GBR catchment area.	EA EPML00352613 approves the relevant ERA for the resource activity occurring onsite, Schedule 3 21: A mining activity that is an ineligible ERA other than a mining activity mentioned in Items 9 to 20. The Proposed activity does not propose to release water or waste to GBR catchment waters or other coastal waters. Refer to Section 2.4 for an assessment of the Proposed activity against the requirements for activities in the GBR catchment area.
<i>Fisheries Act 1994 (Fisheries Act)</i>	The Fisheries Act provides for the management, use, development and protection of fish habitats and resources. This includes waterways potentially used for 'fish passage' (considered as a Matters Environmental Significance (MES)) as mapped within waterways for waterway barrier works mapping administered by the Department of Agriculture and Fisheries (DAF). Environmental offsets may be required where SRI to waterways for fish passage are identified (including permanent, partial and temporary barriers).	One major-risk and one low-risk waterways for waterway barrier works are mapped within the Project area.
<i>Native Title (Queensland) Act 1993 (NT Qld Act)</i>	The NT Qld Act recognises the land rights and interests of Indigenous peoples where they have historically resided and regulates the conduct of 'future acts', including development. The legislation provides for the determination of native title claims, the treatment of 'future acts' that may impact on native title rights and requires consultation and/or notification to relevant claimants. The provisions of the NT Qld Act are administered by the National Native Title Tribunal. The Tribunal is established to work with people to understand Native Title and reach outcomes that recognise everyone's rights and interests in land and waters.	There is one existing Native Title Determination (NTD) in effect over the Project; awarded to the Wakka Wakka People (Tribunal No: QCD2022/003, Fed Court No: QUD276/2019, Fed Court Name: Bell on behalf of the Wakka Wakka People #3 (No 2) v State of Queensland).
<i>Aboriginal Cultural Heritage Act 2003 (ACH Act)</i>	The ACH Act binds all persons to provide recognition, protection, and conservation of Aboriginal cultural heritage. The Cultural Heritage Duty of Care (section 23 of the ACH Act) states: 'a person who carries out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage'.	As part of the community consultation for the (PRCP-EPML00352613-V1) and this EA Amendment, the First Nations Wakka Wakka People will be notified of the

Legislation	Framework	Application to Project
		proposed amendments, rehabilitation activities and closure plans; and invited to provide comment.
<i>Queensland Heritage Act 1992</i> (Heritage Act)	The Heritage Act provides a framework for the conservation of Queensland's Cultural Heritage, with the objective of benefiting the community and future generations.	A search of the Queensland Heritage Register on the 26 June 2025 did not identify any Registered Places within the Project area. The nearest state heritage listed value is the South Burnett Co-operative Dairy Association Factory (former) (602811), which is located approximately 5.5km north west of the Project along Cemetery Road, Clermont, as determined through a review of the Queensland Government Heritage Register and GRC Local Heritage Register
<i>Mineral Resources Act 1989</i> (MR Act)	The MR Act, administered by the Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRRD), provides for the assessment, development, and utilisation of mineral resources. The MR Act establishes a framework to facilitate mining-related activities, through the leasing of prospecting, exploration, mineral development, and mining tenure. The MR Act also sets royalty payments, rents, landholder compensation and notification requirements which the proponent must comply with. Section 4A of the MR Act precludes the application of the <i>Planning Act 2016</i> to activities undertaken for purposes of the mining tenure, with the exception of provisions in relation to the Heritage Act. The MR Act also makes building work controlled under the <i>Building Act 1975</i> self-assessable development within the lease.	The site is operated in general accordance with the provisions set out in the MR Act. No additional considerations are required as a result of this proposed amendment.
<i>Mining and Energy Resources (Financial Provisioning) Act 2018</i> (MERFP Act)	The MERFP Act came into force on 1 April 2019. The MERFP Act replaces the financial assurance arrangements for resource activities under the EP Act with the Financial Provisioning Scheme. The MERFP Act also amended the EP Act to require mining companies to develop PRCPs. The main objectives of the MERFP Act are to: • Provide for holders of mining and resource authorities to pay a contribution to the scheme fund, or give a surety for rehabilitation costs • Manage the risk to the State of incurring costs and expenses of holders failing to complete rehabilitation • Provide a source of funds to the State for costs for residual mining impacts and legacy impacts DETSI will require an ERC and PRCP to be in place to ensure land disturbed by mining activities is rehabilitated to a safe, stable, and non-polluting landform that does not cause	A PRCP (PRCP- EPML00352613 -V1) was approved by DETSI on 6 July 2025. A valid ERC (ERC0005630) is also active for the site until 13 July 2026.

Legislation	Framework	Application to Project
	environmental harm and is able to sustain an approved post-mining land use. Once the EA has been granted, an application for an ERC decision can be lodged with the DETSI	
<i>Nature Conservation Act 1992 (NC Act), Nature Conservation (Animals) Regulation 2020 and Nature Conservation (Plants Regulation) 2020</i>	In broad terms, the objective of the NC Act is the conservation of nature (plants and animals) within Queensland. Specifically, the NC Act seeks to gather relevant information, identify critical habitat areas, manage protected areas, protect wildlife and promote ecologically sustainable development. The NC Act has 10 subordinate regulatory instruments in the form of regulations, conservation plans and notices. Of relevance to the site is the <i>Nature Conservation (Animals) Regulation 2020</i> and <i>Nature Conservation (Plants Regulation) 2020</i> which lists the protected flora and fauna species (Spp) (extinct in the wild, endangered, vulnerable, near threatened) and also international wildlife and prohibited wildlife. Under the NC Act, permits for the movement of protected animals and the clearing of protected plants are required and a Species Management Program must be approved when interfering with protected native fauna habitat and breeding places. The Act also provides legislative guidance in offsets in respect to the conservation and protection of flora and fauna deemed to be of State significance.	This is an existing site with no new disturbance proposed therefore potential impacts to MSES are not likely to occur.
<i>Environmental Offsets Act 2014 (EO Act), Environmental Offsets Regulation 2014 (EO Regulation) and the Queensland Government Environmental Offsets Policy (QGEOP)</i>	The Offsets legislation provide a streamlined framework for environmental offset requirements. Environmental offsets (offsets) provide the flexibility to approve development in one place on the basis of a requirement to make an equivalent environmental gain in another place where there is not the same value to industry. An environmental offset may be required as a condition of approval where the activity is likely to result in a SRI on prescribed environmental matters as identified through the following guidelines: • The State guideline that provides guidance on what constitutes a SRI for a MSES • The Commonwealth Significant Impact Guidelines for what constitutes a SRI on a Matter of National Environmental Significance (MNES) • Any relevant local government significant impact guideline for Matters of Local Environmental Significance (MLES) Offsets may be delivered through a variety of manners, including financial settlement offsets, proponent driven offsets and a combination of these approaches. To avoid duplication of offset conditions between jurisdictions, State and local governments can only impose an offset condition in relation to a prescribed activity, if the same, or substantially the same impact and the same, or substantially the same matter has not been subject to assessment under the EPBC Act.	This is an existing site with no new disturbance proposed therefore potential impacts to MSES, MNES, and MLES are not likely to occur. There is no anticipated SRI to MSES, MNES, and MLES; therefore, no offsets are required.
<i>Water Act 2000 (Water Act)</i>	The Water Act provides a structured system for the planning, protection, allocation and use of Queensland's surface waters and groundwater. Under the Water Act, a person must not take, supply, or interfere with water unless authorised for the taking of water from	The Project maintains minor rain-fed surface water storages utilised for dust suppression and general

Legislation	Framework	Application to Project
	overland flow, groundwater, a watercourse, lake, or spring. Resource tenure holders can access underground water taken in the course of, or as a result of, exercising underground water rights. Thus, no authority is required for the use of water from mine dewatering undertaken to the extent necessary to achieve safe operating conditions.	operations. There is no discharge off site and Graymont does not exercise underground water rights.
<i>Mining and Quarrying Safety and Health Act 1999</i> (MQSH Act)	The MQSH Act applies to all mines, other than coal mines. It imposes safety and health obligations on persons who operate mines or who may affect the safety or health of others at mines, including: • Implementing a safety management system • Site representatives • Worker with adequate competencies • Supervision • Incident reporting • Emergency preparedness. The MQSH Act requires risk to a person from operations to be at an acceptable level, which means within acceptable limits and as low as reasonably achievable (Section 26). There are a number of guidelines specified by the Minister under Section 63(1) which provide ways of achieving an acceptable standard of risk for people working in mineral mines and quarries.	Graymont, as the operator of the site, is required to manage the risk in a way that shows that the mining method used is at least equivalent to the method in the guideline.
<i>Waste Reduction and Recycling Act 2011</i> (WRR Act)	The legislation establishes a framework for waste management and resource recovery practices in Queensland. It promotes waste avoidance and reduction and encourages resource recovery and efficiency through a waste management hierarchy.	The waste management hierarchy has been addressed in the planning for the Proposed activity. No significant additional waste streams are likely to be generated during the undertaking of the Proposed activity.
<i>Regional Planning Interests Act 2014</i> (RPI Act)	The RPI Act identifies and protects areas that are of regional interest throughout Queensland. The RPI Act is supported by the RPI Regulation and aims to: • Manage the impact of resource and regulated activities on areas of regional interest • Support these activities with other activities, such as highly productive agricultural activities • Assist in resolving land use conflict between activities which contribute to the State's economy	There are no declared interest areas within the site footprint or immediate surroundings which require further approvals or management.
<i>Planning Act 2016</i> (Planning Act)	The Planning Act establishes Queensland's planning framework and is supported by other Acts and regulations. The Planning Act also establishes the framework of planning instruments that support the operation of the three main systems: plan-making, development assessment and dispute resolution. Further, the Planning Act provides the Planning Minister with powers that can be enacted in response to matters that relate to state interests. Section 4A of the MR Act precludes the application of the Planning Act to activities undertaken for purposes of mining tenure, with the exception of provisions in relation to	All mining activities occur within ML tenure, therefore, the Planning Act does not apply.

Legislation	Framework	Application to Project
	the Heritage Act. The MR Act also makes building work controlled under the <i>Building Act 1975</i> self-assessable development within the lease.	
<i>Vegetation Management Act 1999</i> (VM Act)	The VM Act regulates the clearing of vegetation in Queensland in a way that conserves remnant vegetation, ensures clearing does not cause land degradation, prevents loss of biodiversity, maintains ecological processes, reduces greenhouse gas emissions and allows for sustainable land use.	No vegetation clearing is required by the Proposed activity.
<i>Land Act 1994</i> (Land Act)	The Land Act administers and manages non-freehold land and deeds of grant in trust, and the creation of freehold land.	The site currently has some infrastructure built upon road reserve related to Wesslings Road and has a current lands lease in place. The remaining area of the site is located on freehold land owned by Graymont and infrastructure does not and will not occupy any state land including lease land, unallocated state land, road reserves or stock routes, the <i>Land Act 1994</i> does not apply.
<i>Biosecurity Act 2014</i> (Biosecurity Act)	The Biosecurity Act provides a consistent, modern, risk-based, and less prescriptive approach to biosecurity in Queensland. The Biosecurity Act provides comprehensive biosecurity measures in relation to pests (e.g. wild dogs and weeds), diseases (e.g. foot-and-mouth disease) and contaminants (e.g. lead on grazing land). Decisions made under the Biosecurity Act will depend on the likelihood and consequences of risk, allowing for more appropriate management of risks.	Graymont have a 'general biosecurity obligation' under the Biosecurity Act (s23) to manage biosecurity risks and threats under their control.
<i>Transport Infrastructure Act 1994</i> (TI Act)	Before any road works (including road access works) can be undertaken within a State-controlled road, written approval is required from the Department of Transport and Main Roads. It is an offence under section 33 of the TI Act to carry out road works on a State-controlled road without written approval.	State-controlled roads are utilised for access and to deliver limestone products to customers off-site for further downstream processing.
Local		
<i>South Burnett Regional Council Planning Scheme 2017</i> (SBRCPs)	The Planning Scheme regulates the use and development of land and describes plans for managing change and growth in the South Burnett Regional Council (SBRC) LGA as well as furthers outcomes presented in the larger <i>Central Queensland Regional Plan 2013</i> , in consultation with the local community.	The site is zoned as rural under the Planning Scheme and is partially within the flood hazard investigation area. The site is partially within the Bushfire Hazard area and buffer zones.
<i>State Planning Policy 2017</i> (SPP)	The SPP provides a framework for planning and development across Queensland. It sets out the government's objectives, principles, and strategies for land use planning, development, and environmental management. It aims to balance economic development with environmental and social considerations. The SPP covers a wide range of topics	The site is not zoned in an KRA area under the SPP.

Legislation	Framework	Application to Project
	including urban growth, housing, transport, infrastructure, natural resource management, and environmental protection. The SPP outlines guidelines and objectives for resource extraction and Key Resource Areas (KRAs). KRAs are regions with significant mineral or energy resources. These areas are prioritized for resource extraction activities while ensuring sustainable land use and environmental protection.	

2.1 EA Amendment Threshold Criteria

The 'Major or minor amendments' guideline (ESR/2015/1684 Version 11.02, dated 11 June 2024) lists the criteria for determining if an EA amendment application is a minor or major amendment application (s4.1.1 of the guideline). The guideline states that a major amendment for an EA is an amendment that is not a minor amendment. An assessment of the proposed EA amendment against the criteria for a minor EA amendment is provided in **Table 5**. Based on this assessment, the proposed amendment is considered a **minor**.

Table 5. Minor EA amendment (threshold) criteria

Section 4.1.1 A minor amendment (threshold) for an EA is an amendment that:	Relevance
(a) is not a change to a condition identified in the authority as a standard condition ¹ , other than - (i) a change that is a condition conversion; or (ii) a change that is not a condition conversion but that replaces a standard condition of the EA with a standard condition for the ERA to which the EA relates; or (iii) a change that will not result in a change to the impact of the relevant activity on an environmental value; and	Proposed changes to the EA involve inclusion of standard conditions relating to the proposed activity only (<i>Eligibility criteria and standard conditions for exploration and mineral development projects</i> , DETSI 2016)
(b) does not significantly increase the level of environmental harm caused by the relevant activity; and	The Proposed activity will not result in a significantly increased level of environmental harm. Refer to Section 6.11 for further details on potential environmental impacts.
(c) does not change any rehabilitation objectives in the EA in a way likely to result in significantly different impacts on environmental values than the impacts previously permitted under the EA; and	The Proposed activity will involve minor changes to the rehabilitation works, however is not expected to impact on overarching rehabilitation objectives. There will be no significantly different impacts on environmental values as a result of the proposed amendments. Refer to Section 6.11 for further details on potential environmental impacts.
(d) does not significantly increase the scale or intensity of the relevant activity; and	The Proposed activity will be within the footprint of areas already authorised for disturbance, or within disturbed areas, no further disturbance is proposed.
(e) does not relate to a new relevant resource tenure for the EA that is - (i) a new mining lease; or (ii) a new petroleum lease; (iii) or a new geothermal lease under the <i>Geothermal Energy Act 2010</i> ; or (iv) a new greenhouse gas injection and storage lease under the <i>Greenhouse Gas Storage Act 2009</i> ; and	The proposed EA amendment does not relate to any new resource tenures.
(f) involves an addition to the surface area for the relevant activity of no more than 10% of the existing area; and	The proposed EA amendment will not increase the surface area for the relevant activity by more than 10%.
(g) for an EA for a petroleum activity: (i) involves constructing a new pipeline that does not exceed 150km in length; or (ii) involves extending an existing pipeline by no more than 10% of the existing length of the pipeline; and	Not applicable. Not related to an EA for a petroleum activity.
(h) if the amendment relates to a new relevant resource tenure for the EA that is an exploration permit or	The proposed EA Amendment does not relate to any new resource tenures.

Section 4.1.1 A minor amendment (threshold) for an EA is an amendment that:	Relevance
greenhouse gas permit - the amendment application seeks an EA that is subject to the standard conditions for the relevant activity, to the extent it relates to the permit.	

Notes:

¹ Under s. 199 of the EP Act, an EA must identify any conditions that are standard conditions.

2.2 Application Requirements for an EA Amendment

The requirements for EA amendment application are set out in Chapter 5, Part 7, Division 2 of the EP Act. An adequacy checklist has been developed to demonstrate how this EA amendment application satisfactorily meets the requirements of a properly made application, as shown in **Table 6**.

Table 6. Requirements for amendment applications under the EP Act

EA Amendment Requirement	Relevant Section / Description
Section 226 Requirements for amendment applications generally	
(1) An amendment application must-	
(a) be made to the administering authority; and	This report has been prepared for DETSI as the administering authority
(b) be in the approved form; and	This report has been made in the approved form and is accompanied by the relevant application form.
(c) be accompanied by the fee prescribed by regulation; and	This report is accompanied by the fee prescribed under the EP Regulation.
(d) describe the proposed amendment; and	Refer to Section 4 .
(e) describe the land that will be affected by the proposed amendment; and	Refer to Section 4 .
(f) include any other document relating to the application prescribed by regulation.	Not applicable
Section 226AA- Requirement for amendment application by holder of environmental authority and PRCP schedule	
(1) This section applies if-	
(a) the holder of an environmental authority and a PRCP schedule for the environmental authority (each a <i>relevant environmental requirement</i>) makes an amendment application; and	The applicant holds an existing EA, and an approved PRCP Schedule. This application relates to both <i>relevant environmental requirements</i>
(b) the application is to amend only 1 of the relevant environmental requirements; and	An amendment to both the EA and the PRCP Schedule is being sought.
(c) the approval of the amendment application would result in the relevant environmental requirement to which the application relates being inconsistent with the other relevant environmental requirement.	Approval of the EA amendment application would result in the EA being inconsistent with the approved PRCP RPP and Schedule.
(2) The holder must make an amendment application to amend both relevant environmental requirements in a way that, if the amendment application were approved, would not result in 1 of the relevant environmental requirements being inconsistent with the other relevant environmental requirement.	An amendment is being sought for both the EA and the PRCP schedule. This application is an <i>Application to amend a PRCP schedule or joint PRCP schedule and environmental authority</i> .
Section 226A Requirement for amendment applications for environmental authorities	
(1) If the amendment application is for the amendment of an environmental authority, the application must also-	
i. describe any development permits in effect under the Planning Act for carrying out the relevant activity for the authority; and	The Proposed activity will occur within ML tenure, therefore, the Planning Act does not apply.
ii. state whether each relevant activity will, if the amendment is made, comply with the eligibility criteria for the activity; and	The Proposed activity meets the eligibility criteria for standard conditions as detailed in " <i>Eligibility criteria and standard conditions for exploration and mineral development projects</i> ".

EA Amendment Requirement	Relevant Section / Description
	Historic mining operations have already caused greater than 10ha of disturbance. However, the Proposed activity does not propose to cause any additional disturbance. The Proposed activity will not be carried out in a Category A, B or C Environmentally Sensitive Area (ESA).
iii. if the application states that each relevant activity will, if the amendment is made, comply with the eligibility criteria for the activity—include a declaration that the statement is correct; and	The Applicant declares the Proposed activity meets the eligibility criteria for standard conditions as detailed above.
iv. state whether the application seeks to change a condition identified in the authority as a standard condition; and	The application seeks to add a standard condition to the authority.
v. if the application relates to a new relevant resource tenure for the authority that is an exploration permit or GHG permit—state whether the applicant seeks an amended environmental authority that is subject to the standard conditions for the relevant activity or authority, to the extent it relates to the permit; and	Not applicable. Not related to a new relevant resource tenure for exploration permit or GHG permit.
vi. include an assessment of the likely impact of the proposed amendment on the environmental values, including— (i) a description of the environmental values likely to be affected by the proposed amendment; and (ii) details of emissions or releases likely to be generated by the proposed amendment; and (iii) a description of the risk and likely magnitude of impacts on the environmental values; and (iv) details of the management practices proposed to be implemented to prevent or minimise adverse impacts; and (v) if a PRCP schedule does not apply for each relevant activity—details of how the land the subject of the application will be rehabilitated after each relevant activity ends; and	 (i) Refer to Section 4 for environmental values (ii) Refer to Section 6.11 for potential impacts (iii) Refer to Section 7 for risk assessment (iv) Refer to Section 7 for management measures (v) Not applicable, a PRCP does apply to the relevant activity
vii. include a description of the proposed measures for minimising and managing waste generated by amendments to the relevant activity; and	Refer to Section 7 for management measures
viii. include details of any site management plan or environmental enforcement order issued under section 362(1) that relates to the land the subject of the application.	The site subject to this application does not have a Site Management Plan (SMP), nor an Environmental Enforcement Order (EEO).

2.3 Assessment Against Criteria for Environmental Impact Statements

The Guideline *Criteria for environmental impact statements for resource projects under the Environmental Protection Act 1994* (ESR/2016/2167, version 3.01, dated 27/06/2024) details EIS triggers for proposals to amend/alter an existing mine. Criteria and responses are provided in **Table 7**. Based on an assessment against the triggers, an EIS is not triggered by this proposed EA amendment.

Table 7. EIS Trigger for resource projects

EIS Trigger	Response
For mines already removing 2–10 million tonnes per year ROM ore or coal, would the application increase the current annual removal rate by more than 100% or 5 million tonnes per year (whichever is the lesser)?	No increase in the current annual removal rate.

EIS Trigger	Response
For mines already removing over 10 million tonnes per year ROM ore or coal, would the application increase the current annual removal rate by more than 50% or 10 million tonnes per year (whichever is the lesser)?	No increase in the current annual removal rate.
For mines already removing more than 20 million tonnes per year ROM ore or coal, would the application increase the current annual removal rate by more than 25%?	No increase in the current annual removal rate.
Would the application involve an extension into and significant impact on a Category A or B environmentally sensitive area, which is not already authorised by the State?	The Proposed activity is within the existing disturbance area, authorised under the EA. No Environmentally Sensitive Areas (ESAs) are mapped within the site.
Would the application involve a substantial change in mining operations—such as from underground to open cut, or (for underground mining) a change in operations from one causing little subsidence to one likely to cause substantial subsidence?	No, the site is currently operating a single limestone quarry and the current EA amendments seek to allow for low-risk exploration drilling and align current activities with modern EA standards.
Would the application introduce a novel or unproven resource removal process, technology or activity?	No introduction of new technology proposed.

2.4 Requirements for Activities in the Great Barrier Reef Catchment Area

Activities proposed within the GBR catchment waters are required to address the provisions under the EP Regulation to determine if reef discharge standards apply. Reef discharge standards aim to achieve no net decline to water quality of the GBR catchment area in line with the commitments under the Reef Plan 2050. The Proposed activity is located within the GBR catchment area, specifically within the Burnett River Basin (basin no. 136), therefore assessment against the provisions under the EP Regulation apply.

The EP Act Guideline Reef Discharge Standards for Industrial Activities (ESR/2021/5627) (DETSI 2024) sets out the criteria for determining if a residual impact to the GBR catchment is likely to occur as a result of a relevant activity and whether further consideration under s41AA of the EP Regulation by the administering authority applies. Each of the criteria need to be fulfilled in order to trigger consideration of s41AA of the EP Regulation. An assessment of this criteria against the Proposed activity is provided in **Table 8**. Based on the assessment, there will be no residual impact as the Proposed activity does not fulfill all the criteria and therefore does not trigger further consideration of section 41AA of the EP Regulation.

Table 8. Criteria for residual impact to GBR catchment area

Criteria	Triggered by	Relevance to Proposed activity
Application type	- A site-specific EA application under Chapter 5 of the EP Act - A major amendment application under Chapter 5 of the EP Act - A standard application is made for a mining activity for a ML, and a properly made submission has been received - A variation application is made, and the variation relates to releases to waters - A decision on a transitional environmental program (TEP) under section 338(1)(a) of the EP Act. See the Transitional Environmental Program guideline (ESR/2016/2277)6 for further information.	Not Applicable. This is an application for a minor amendment, not related to releases to waters.
Activity type	Resource and prescribed ERAs except for the following ERAs as described in Schedule 2 of the EP Regulation: ERA 16 - Extractive and screening activities to the extent the activity is dredging in the coastal waters of the State (as defined in section 41AA) this includes any ancillary activity associated with ERA 16 that is dredging in coastal water of the State such as ERA 50; and	Applicable. This application relates to a prescribed ERA for a resource activity.

Criteria	Triggered by	Relevance to Proposed activity
	ERA 13A - Commercial cropping and horticulture in the Great Barrier Reef catchment.	
Release location	The release is to the GBR catchment waters ¹ .	Not applicable. This application does not propose any release to GBR catchment waters. The disposal of residue material to the residual void will be contained within the catchment of the void.
Release type	An application proposing a point source release to GBR catchment waters and the: - Release is from a point source as the end of pipe and, - Release source is waste water from the relevant activity (excluding stormwater containing sediment only), and - Release event is planned/controlled.	Not applicable. This application does not propose a point source release to GBR catchment waters.
Contaminant type	An application proposing to discharge waste water from a point source release that contains DIN/fine sediment.	Not applicable. This application does not propose to discharge waste water from a point source.

¹ GBR catchment waters is defined under Section 112 of the EP Act and means water in a river in the GBR catchment or a tributary of a river in the GBR catchment.

3 PROJECT DESCRIPTION

3.1 Location

The site is situated approximately 260km north-west of Brisbane, 90km south-west of Gympie and 160km south-west of Maryborough. The site is located on Haager Drive at the junction of Barambah and Barker Creeks, Murgon. The township of Murgon is located approximately 5km to the north-west of the mining lease (**Figure 1**).

The mine is situated 1.5km west of Barambah Road and approximately 3km east of Cherbourg Road in a sparsely populated location, with only two residential dwellings located within 1.5km of the site. Cherbourg Aboriginal Reserve is located approximately 2.2km to the west of the mine and the small village of Moffatdale is located approximately 3.4km to the east/south-east.

The site comprises a series of limestone lenses which occur over a north-south distance of seven km along the valley of Barker Creek. The limestone block dips to the west at various angles and is steepest close to faults.

3.2 Current Site Activities and Disturbance

Mining consists of conventional open cut benching methods currently being performed by Graymont and their respective contractors. Operations are conducted on a single shift basis, normally between the hours of 6.00am to 6.00pm Monday to Friday.

The mine and surrounds of the site are mostly devoid of tree cover due to historical land clearance and cattle grazing activities. Consequently, prior to drilling and blasting, little to no natural vegetation requires removal or grubbing out. Available topsoil is recovered prior to mining for future use in rehabilitation.

The shale overburden on the western side of the mine pit is free-dug by the excavator without blasting. The andesite overburden on the eastern side of the mine pit is drilled and blasted before removal. All overburden and waste rock is currently taken to the waste rock dumps located in the northeast of the site. There is no tailing storage facility (TSF) at Murgon.

Blast activities are generally performed with wet emulsion initiated with NONELs (non-electric). After blasting, limestone ore is loaded into articulated haul trucks by an excavator and/or a front wheel loader and transported to the plant for crushing, milling and screening. Blasting activities are presently conducted between the hours of 9:00 AM and 3:00 PM (Monday to Friday) and 9:00 AM and 1:00 PM (Saturday). Blasting is not conducted on Sunday.

The extraction rate is approximately 150,000 tpa. Quantities of desirable quality limestone product are estimated at around 90,000 tpa.

Once limestone is recovered from the pit it progresses through a scalping screen to the primary jaw crusher. The jaw crusher reduces the scalping oversize to a minus 75 mm size which is then stockpiled as ground limestone (GLS).

GLS is then fed into a Jacques A4 mill, where it is reduced to a minus 4 mm size. This 4 mm size product is fed over a multi-deck Halls screen, with the following products being screened off:

- Oversize return to mill
- Kiln feed 4mm to 1mm
- Aglime <1mm
- Superfine Aglime <0.25 mm
- Neutra-Lime <2mm.

Under current life of mine (LOM) planning, cessation of active mining is scheduled for 2037.

The Site layout and key infrastructure is shown in **Figure 2**.

Table 9 describes the features, disturbance types and associated activities that have historically and currently occurred at site.

Table 9. Description of the disturbance types and associated activities at Murgon Operations

Disturbance type	Details of disturbance types or assets within each type
Fuel storage and service area	Above ground tank HME parking area
Stockpiles	Limestone / product stockpiles
Plant/office	Sheds Silos/bins Plant Laydown area Miscellaneous scrap Small tanks Office (to be retained at end of mine life) Workshop (to be retained at end of mine life) Sheds (to be retained at end of mine life)
Waste Dump No. 2 North-West	Northern overburden dump – rehabilitation works completed Northern overburden dump – under active rehabilitation
Waste Dump No. 1 North-West	North-eastern overburden dump – rehabilitation works completed North-eastern overburden dump – under construction
Topsoil stockpiles	Topsoil stockpiles located within the footprint of the Northern overburden dump – under active rehabilitation Topsoil stockpiles located within the footprint of the North-eastern overburden dump – under construction
Roads and tracks	Tracks (unsealed, gravel) Tracks (to be retained at end of mine life)
Silt traps/Dams	Sediment Dam C (will be decommissioned during mine life) Sediment Dam A (to be retained at end of mine life) Sediment Dam B (to be retained at end of mine life) Sediment Dam D (to be retained at end of mine life)
Open Pit (void)	Residual void

3.3 Proposed Activities

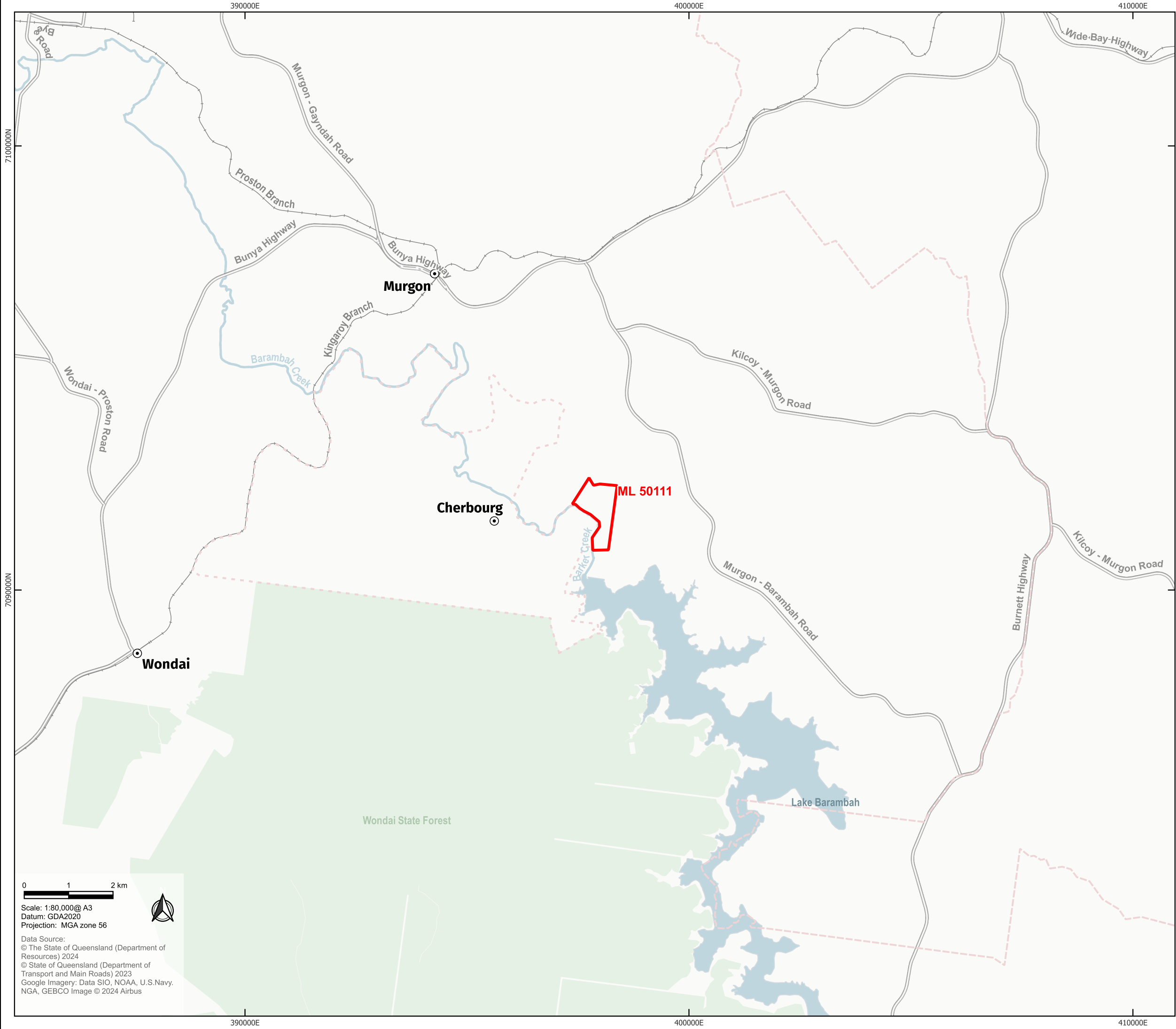
To support continual operation of the Project, the following activities are proposed, noting there is no proposed expansion of disturbance areas already authorised under the existing environmental approvals, rather the inclusion of an alternate disturbance type within areas already disturbed.

With the exception of the below, there are no other changes proposed to the existing activities described in **Section 3.1**.

Authorisation of exploration activities

- Removal of existing hardstand material at targeted locations across the laydown area, workshop area, access tracks, sediment dams and the mine void (as per **Figure 3**)
- Advancement of 100 mm diameter exploration drill holes within the existing disturbance footprint, to a depth of 150 m
- Works to be conducted in accordance with *Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2*
- Collection of samples for analytical testing at nominated strata, or nominally every metre
- Backfill of drill holes to surrounding surface level with drill cuttings and overburden
- Works to be undertaken across an area of 3.21 ha

Filepath: -BAA250072.01 Graymont Murgon PRCP and EA Amendment\Workspaces\1. EA Amendment\Rev 0\Figure 1 Site location.qgz



A Montrose Environmental Company



- Legend**
- Site boundary
 - Reservoirs
 - Protected area
 - Railways
 - State controlled roads
 - Local Government Area
 - Watercourse**
 - Major

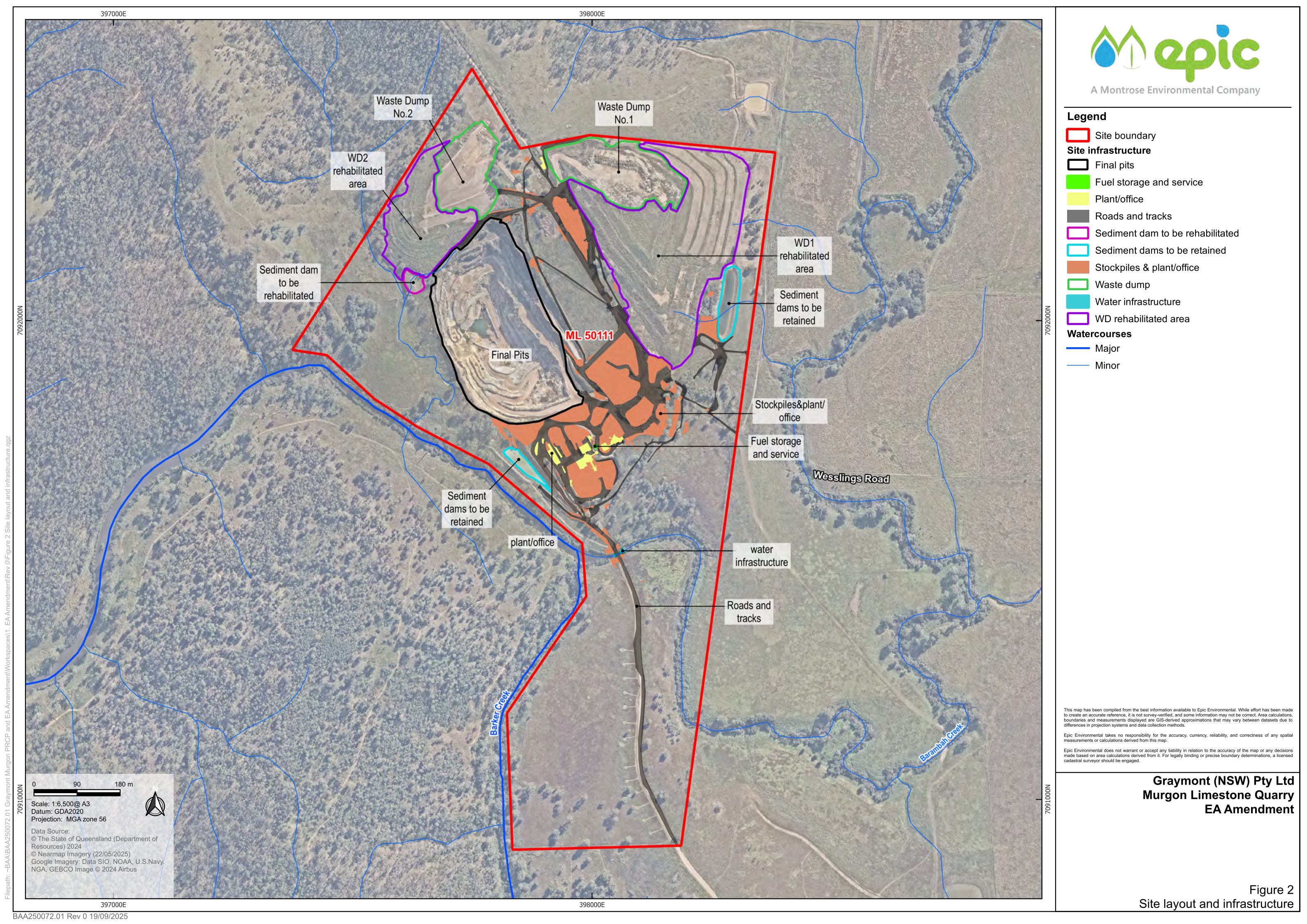
This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

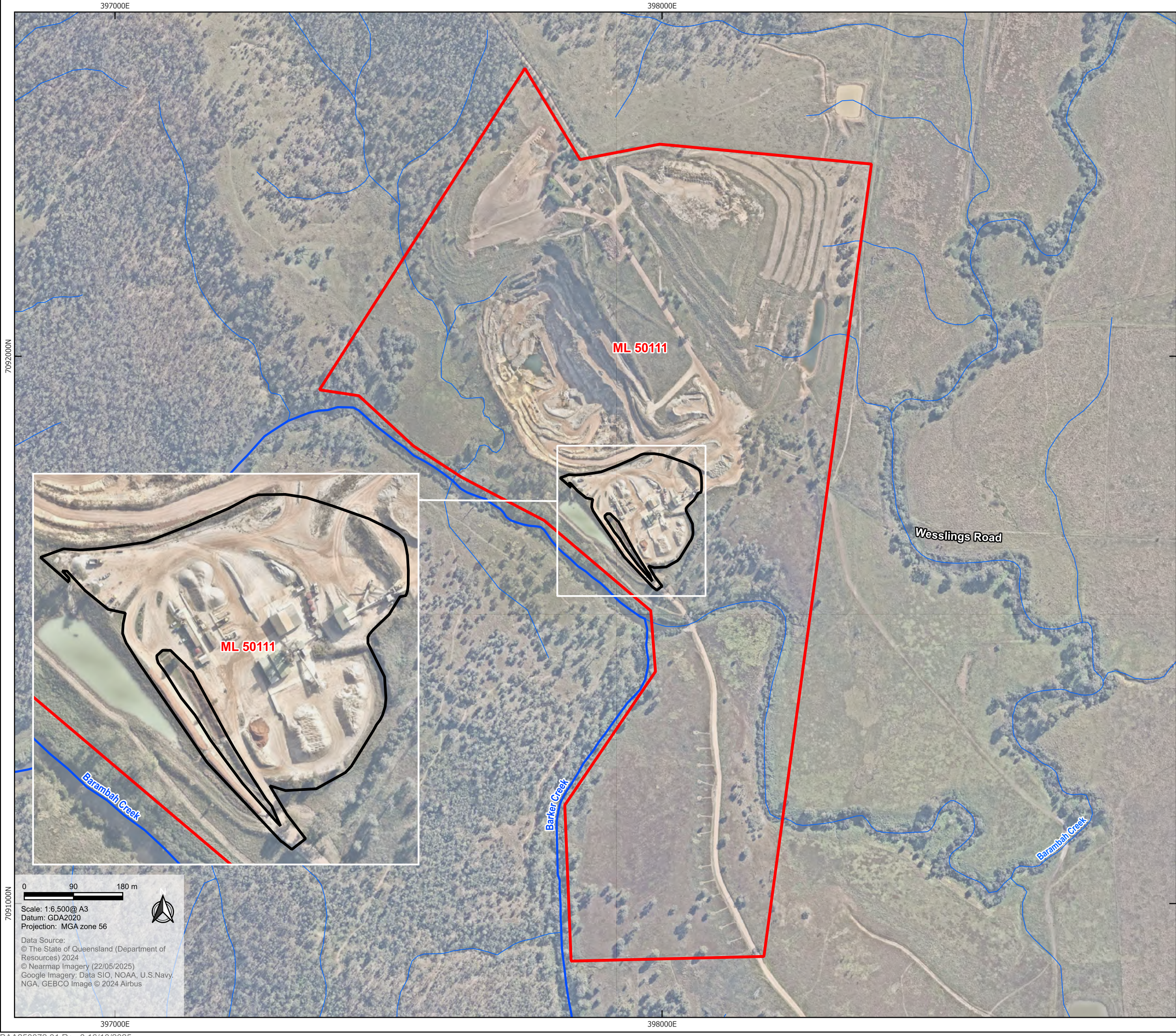
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**Graymont (NSW) Pty Ltd
Murgon Limestone Quarry
EA Amendment**

Figure 1
Site location





Legend

- Site boundary
- Proposed exploration area
- Watercourses**
 - Major
 - Minor

This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

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**Graymont (NSW) Pty Ltd
Murgon Limestone Quarry
EA Amendment**

**Figure 3
Proposed exploration locations**

3.4 Identification of Underlying Landowners and Tenure

ML 50111 lies within the South Burnett Regional Council area. It is on Lot 6 Plan SP195988, Lot A Plan RP210698 and Lot A Plan AP221091 with Graymont as the registered owner. Graymont took ownership of the business on 1 August 2019. All three Lots extend over 83.8 ha of ML 50111, and the land is considered freehold. Details of the mining tenure are provided below in **Table 10**.

Table 10. Details of the mining tenure for Murgon

Permit ID	ML50111
Type	Mining Lease (Mineral)
Status	Granted
Grant Date	14/11/1996
Expiry Date	30/11/2036
Current Term	40 years
Locality	South Burnett Regional Council
Holder	Graymont (NSW) Pty Ltd
Land Description and Tenure	Lot 6 SP195988 (Freehold) Lot A RP210698 (Easement) Lot A AP221091 (Lands Lease)
Landowner	Graymont (NSW) Pty Ltd

3.5 Surrounding Land Use

A number of land-uses have been mapped within and surrounding the Project area. Excluding mining, the dominant land use in the immediately surrounding area is production (agricultural) from relatively natural environments (grazing on native pastures), and a small area of conservation land-uses (Queensland Government 2019).

The land use within the site is zoned under the *South Burnett Planning Scheme* as Rural. A summary of land use immediately adjacent to the site is provided below:

- **North:** The northwest of site is bound by densely vegetated land with pockets of cleared land, utilised for agricultural purposes. The northeast of site is bound by Wesslings Road, beyond which lies an agricultural property, predominantly cleared with a residential dwelling located approximately 350 m north of the Project boundary.
- **South:** To the south of the site lies a narrow band of moderate density vegetation, beyond which lies Lake Barambah, with the Bjelke-Peterson Dam wall located approximately 600 m south of the Project boundary.
- **East:** The east of site is dominated by cleared agricultural land, intersected by Barambah Creek and a thin riparian zone containing established vegetation. A residential dwelling is located approximately 800 m to the east of the Project boundary.
- **West:** To the west of site lies land dominated by moderate density vegetation, interspersed with tributaries of Barambah Creek, beyond which is the township of Cherbourg, approximately 1200 m to the west of the Project boundary.

There are no stock routes located near the site, however, there are two tertiary stock route reserves located approximately 2 km and 400 m from the town centre of Murgon based on Queensland Stock Route Mapping (QGlobe 2025). Historic aerial images show that the site had been predominantly cleared of native vegetation and was being used for agriculture (grazing) as far back as 1951 (see **Plate 1**) and that mineral extraction at the site had started by 1993 (**Plate 2**).



Plate 1. An aerial photo of the Project area from 1951 (source: <https://qimagery.information.qld.gov.au>)



Plate 2. An aerial photo of the Project area from 1993 (source: <https://qimagery.information.qld.gov.au>)

3.6 Sensitive Receptors

Sensitive Receptors found within a five km radius of the site are provided in **Table 11** (with the exception of residential sensitive receptors) and shown in **Figure 4**.

Residential Sensitive receptors within a five km radius of the Project total 350, with the majority (236 homes) located in Cherbourg (two km west) and Moffatdale (four km southeast, 47 homes). All other sensitive receptors not included in **Table 11** are primarily residential homes located on agricultural land for farming crops and cattle.

Protected areas, critical areas and marine parks, as defined under the NC Act, are listed as sensitive receptors under Schedule 1 of the EPP Noise. A review of Queensland Globe data confirms that the site is not located within or near these sensitive receptor types.

Table 11. Non-residential Sensitive Receptors

Sensitive Receptor Type	ID	Latitude	Longitude	LOT/ PLAN	Address
School	TAFE Queensland Nurunderi Campus	-26.295	151.9566	386SP28 0472	4 Collins Road Cherbourg QLD
Community Centre	Les Stewart Snr Sporting Complex	-26.2951	151.9558	387SP28 0472	6 Collins Road Cherbourg QLD
School	Gundoo Day Care Centre	-26.2936	151.9554	252SP28 0472	12-14 Fisher Street Cherbourg QLD
School	Cherbourg State School	-26.2927	151.9546	19SP274 901	15 Fisher Street Cherbourg QLD
Community Centre	Pinangba Ny-Ku Byun Elders Village	-26.2928	151.956	251SP28 0472	10 Fisher Street Cherbourg QLD
Community Centre	Cherbourg Cemetery	-26.2992	151.9546	384SP28 0472	
Hospital	Cherbourg Hospital	-26.2915	151.9565	17SP274 901	8 Fisher Street Cherbourg QLD
Park	Memorial Anzac Park	-26.2909	151.9563	N/A	Barambah Avenue Cherbourg QLD
Community Centre	The Ration She Museum	-26.2906	151.9569	50SP274 901	
Community Centre	Cherbourg Town Hall	-26.2898	151.9545	73SP280 472	23 Barambah Avenue Cherbourg QLD
Commercial/ Retail	SkillCentred Cafe	-26.2896	151.9538	358SP28 0472	25 Barambah Avenue Cherbourg QLD
Church	Peoples Church Aim Peoples	-26.2893	151.9532	86SP280 472	1 Ada Simpson Way Cherbourg QLD
Community Centre	Youth Justice Service Centre	-26.2889	151.9539	83SP280 472	1 Vincent Law Senior Way Cherbourg QLD
Church	Holy Spirit Anglican Church	-26.2893	151.9545	75SP280 472	2 Vincent Law Senior Way Cherbourg QLD
Commercial/ Retail	Cherbourg Police Station	-26.2898	151.9564	41SP274 901	7 Fisher Street Cherbourg QLD
Commercial/ Retail	Cherbourg Aboriginal Shire Council	-26.2902	151.9557	70SP280 472	22 Barambah Avenue Cherbourg QLD
Commercial/ Retail	Cherbourg Council depot	-26.2885	151.957	369SP28 0472	8 Carter Street Cherbourg QLD
Park	Jack O'Chin Oval	-26.2877	151.9553	82SP280 472	14 Carter Street Cherbourg QLD
Commercial/ Retail	Nancy Chambers Lodge	-26.293	151.957	322SP28 0472	1 Collins Road Cherbourg QLD
Commercial/ Retail	Cherbourg Material Recovery Facility	-26.2829	151.9525	351SP28 0472	
Commercial/ Retail	Containers for Change - Cherbourg (Operated by Cherbourg Recycling Centre)	-26.2823	151.9525	350SP28 0472	
Park	Bert Button Lookout	-26.3046	151.9672	397SP28 0472	
Commercial/ Retail	Bjelke-Petersen Dam	-26.3027	151.9752	13SP104 351	Haager Drive Moffatdale QLD

Sensitive Receptor Type	ID	Latitude	Longitude	LOT/ PLAN	Address
Park	Yallakool Tourist Park	-26.3016	151.9937	15SP104 355	3 Rails Road Moffatdale QLD
Commercial/ Retail	Bjelke Petersen Dam Caravan & Recreation Park	-26.3034	151.9949	15SP104 355	3 Rails Road Moffatdale QLD
Commercial/ Retail	Moffatdale Ridge	-26.2898	152.0082	18SP353 024	681 Barambah Road Moffatdale QLD
Commercial/ Retail	Clovely Estate	-26.2978	152.0145	2RP9113 71	91 Steinhardts Road Moffatdale QLD
Commercial/ Retail	Joe Sipple Weir	-26.2687	152.0069	1SP1149 29	148 Stegemanns Road Moffatdale QLD
Commercial/ Retail	Redgate Country Cottage	-26.2776	152.0166	1RP4588 4	892 Barambah Road Moffatdale QLD
Commercial/ Retail	Barambah Buch Caravan Park	-26.2568	151.9807	3RP2212 12	332 Borcherts Hill Road Murgon QLD
Industrial	Hanwood Fish Hatchery	-26.2593	152.0139	11SP177 482	323 Redgate Road Redgate QLD
Commercial/ Retail	McGill Vineyards & Accommodation - Moffatdale	-26.3072	152.0017	131SP22 1464	20 Fork Hill Drive Moffatdale QLD
Commercial/ Retail	Lusso Retreats	-26.3073	152.0054	22SP221 464	17 Fork Hill Drive Moffatdale QLD
Commercial/ Retail	Prendergast's Irish Tavern	-26.3133	152.0013	1RP9034 41	80 Waterview Drive Moffatdale QLD
Commercial/ Retail	Hidden Gold Homestead	-26.3127	152.0058	93SP268 018	59 Waterview Drive Moffatdale QLD
Commercial/ Retail	Dusty Hill Vineyard	-26.3108	152.0032	1RP9034 41	80 Waterview Drive Moffatdale QLD
Commercial/ Retail	Hidden Gold Camp	-26.3168	152.0074	93SP268 018	59 Waterview Drive Moffatdale QLD
Commercial/ Retail	Waterview House - South Burnett Vineyard Accommodation	-26.3063	152.0089	103SP19 1465	5 Waterview Drive Moffatdale QLD
School	Moffatdale State School	-26.3063	152.0115	1RP4588 4	892 Barambah Road Moffatdale QLD
Park	Cherbourg Conservation Park	-26.3137	151.9577	12FTY18 62	Barkers Creek Forestry Road Charlestown QLD
Industrial	Dumping Ground	-26.2539	151.9792	286SP11 8179	Borcherts Hill Road Murgon QLD

3.7 Authorised Disturbance

Authorised disturbance areas within ML50111 are detailed in EPML00352613, *Schedule A, Table A1 – Authorised Disturbance*, and summarised in **Table 12**.

Table 12. Schedule A – Table A1 – Authorised disturbance

Mine Domain	Maximum Disturbance Area (ha)
Open pit	3.22
	4.89
Waste dump No. 1 northwest	11.41
Waste dump No. 2 northwest	2.61
Fuel storage and service area	0.13
Plant / office	2.6
Stockpiles	1.32
Silt traps / dams	0.47
Roads and tracks	1.68
Topsoil stockpiles	0.54
Total	28.87

Legend

- Site boundary
- Reservoirs
- Protected area
- 5km buffer
- Railways
- State controlled roads
- Sensitive receptor
- Watercourses**
 - Major

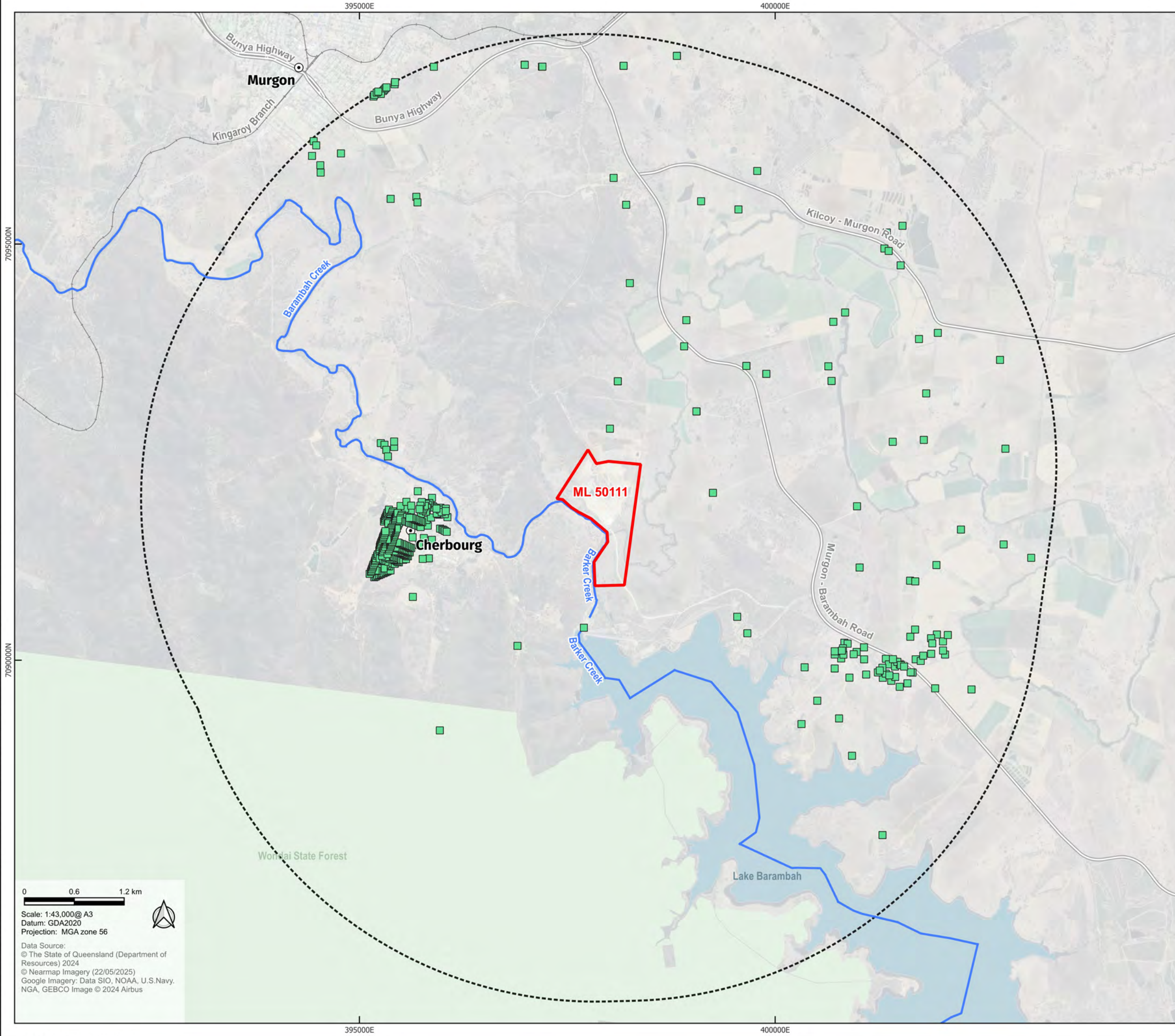
This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

Epic Environmental takes no responsibility for the accuracy, currency, reliability, and correctness of any spatial measurements or calculations derived from this map.

Epic Environmental does not warrant or accept any liability in relation to the accuracy of the map or any decisions made based on area calculations derived from it. For legally binding or precise boundary determinations, a licensed cadastral surveyor should be engaged.

Graymont (NSW) Pty Ltd Murgon Limestone Quarry EA Amendment

Figure 4
Sensitive receptors



Scale: 1:43,000@ A3
Datum: GDA2020
Projection: MGA zone 56
Data Source:
© The State of Queensland (Department of Resources) 2024
© Nearmap Imagery (22/05/2025)
Google Imagery: Data SIO, NOAA, U.S.Navy, NGA, GEBCO Image © 2024 Airbus

4 PROPOSED AMENDMENTS

Graymont proposes the following amendment to the EA EPML00352613 for ML50111:

Authorisation of exploration activities

Graymont is seeking approval for exploration activities to be included as an authorised activity under this EA to allow for exploration programs to commence and to support the continued operation of the Project. This authorisation is being sought via amendment of conditions.

Historical exploration indicated current resource extends beyond the current open cut pits, but the quality and specific dispersal of this resource is unclear. Graymont seeks to use exploration drilling to collect reliable data using modern technology to model the ore body to facilitate the continued operation of Murgon.

There is no specific ERA relating to exploration activities on existing operations. The proposed exploration activities are located within areas that have already been subject to disturbance by mining activities and are located within the authorised extent of the disturbance area.

As such, addition of the following condition is proposed:

Schedule F – Land

Exploration

- (F4 - 1) *The holder of the environmental authority must ensure that all exploration activities undertaken on the mining lease comply with the standard conditions contained within the Eligibility criteria and standard conditions for exploration and mineral development projects - Version 2 (ESR/2016/1985, version 2.00). Where there is an inconsistency between the standard conditions and the conditions of this environmental authority, the conditions of the environmental authority prevail.*
- (F4 - 2) *Land subject to exploration activities must be rehabilitated in accordance with the Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2 (ESR/2016/1985).*

Further, the following addition will be required to **Schedule H - Definitions**

‘exploration activities’ includes exploration drilling, low level clearing, access tracks, excavation, sumps, rehabilitation of boreholes, surface water monitoring and groundwater monitoring/

As exploration activities are considered a ‘mining activity’, all conditions and limits relating to noise and vibration, waste, air quality, etc, will continue to apply to exploration activities without further amendment required to these schedules.

5 PROJECT JUSTIFICATIONS AND ALTERNATIVES

The Murgon Operations is a legacy project where presently only the Northern Deposit, with an indicated resource of 1.03 million tonnes and minable reserve of 976,000 tonnes of limestone, is currently being worked to 2037.

To enable accurate resource forecasting for the Project exploration is required throughout the southern extent of the ore body presently being worked.

A summary of project alternatives is provided in Table 13.

Table 13. Project alternatives

Aspect	Alternative	Justification / Feasibility
Exploration site number	Reducing the number of exploration locations	Exploration drill hole density has been selected to provide detailed analytical information with a high level of confidence. Reducing the number of exploration locations will reduce the confidence Graymont will have in their future planning models. Reducing the number of target locations is not considered a justifiable alternative.
Exploration site location	Relocating exploration locations to an alternative site	Exploration drill holes have been located such that they: • Will close out existing data gaps in a known ore body • Will not impact existing site use/operations • Will not involve unnecessary clearing or ground disturbance • Will provide a high level of detail sufficient to inform future planning Relocating the exploration sites is not considered a feasible alternative.
Do Nothing	The 'do nothing' approach. No change to existing Project components.	Under the 'do nothing' scenario, operations will continue as normal. Works will continue to proceed in areas with a known ore concentration and no further efficiencies will be made possible. Doing nothing is not considered justifiable.

6 ENVIRONMENTAL VALUES AND POTENTIAL IMPACTS

6.1 Climate

6.1.1 Existing Environment

The Murgon Operations are located within Queensland's sub-tropical climatic zone which is characterised by high summer temperatures, warm dry winters, and distinct wet and dry seasons. It lies within the southeast trade wind belt but is too far south to experience monsoonal influence from the northwest and too far north to benefit from higher altitude cold fronts (BoM 2025a).

Climate data for the region has been captured by the Kingaroy Bureau of Meteorology (BoM) weather station (station no. 040112) approximately 30 km away from 1947 to present. Based on the climate data collected from this weather station, the region experiences an annual mean maximum temperature of 24.8°C, a mean minimum temperature of 11.3°C and a mean total annual rainfall of 776.2 millimetres (mm). The long-term mean temperature is provided in **Table 14** and the mean monthly rainfall presented in **Figure 5**.

A less complete set of climate data (rainfall only) for the location has been captured from 1909 to present at the Murgon Post Office BoM weather station (station no. 40152) six km north of the site. It recorded a slightly higher mean total annual rainfall of 790.5 mm (**Figure 5**).

Rainfall data displays distinct wet and dry seasons, with high rainfall from October to March and low rainfall from April to September. Winds are primarily south-easterly; however, during the warmer months there is often a north-easterly sea breeze. The region is subject to the effects of tropical cyclones and tropical lows during the summer months which can produce wind and rainfall events that are typically short-lived and intense. The resulting run-off can cause localised flooding in the region (BoM 2025a).

Table 14. Long-term meant temperature since 1939 (BoM weather station 040112; Kingaroy Prince Street)

Temp (mean; °C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Maximum	29.5	28.8	27.6	25.1	21.6	18.9	18.5	20.1	23.3	26.0	28.1	29.6	24.8
Minimum	17.4	17.5	15.8	12.1	8.6	5.4	4.0	4.8	7.9	11.7	14.4	16.5	11.3

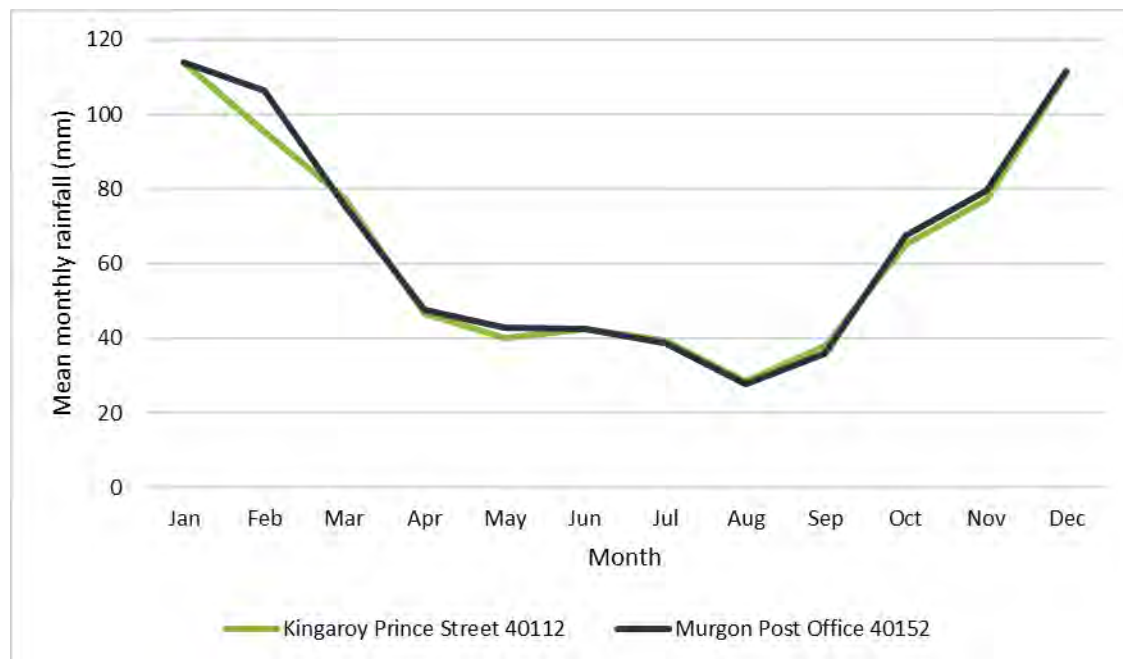


Figure 5. Mean monthly rainfall (BoM weather stations 40112; Kingaroy Prince Street and Murgon Post Office 40152)

6.1.1.1 Storms

Although there is no defined season or period when severe weather events are most likely to occur in Queensland, severe storms tend to frequently occur during summer months (October to April) and periods of heatwave and are most prevalent in the northern and southeast parts of the state (QFES 2023). Severe storms can result in damaging or destructive wind gusts, flash flooding and large hailstones (greater than four centimetres (cm) in diameter). In general, studies indicate that occurrences of thunderstorms are likely to increase due to changing climate conditions (QFES 2023).

6.1.1.2 Cyclones

Tropical cyclones are low pressure systems that form over warm tropical waters usually from early November to late April (QFES 2023). In Queensland, tropical cyclones typically affect the Gulf of Carpentaria, Cape York Peninsula and eastern coastline extending from the north tip of Queensland to central coastal regions. However, there are records where tropical cyclones have moved inland from the north and east of Queensland (QFES 2023).

The number of tropical cyclones making landfall in Australia is influenced by a number of factors, however, tends to be strongly influenced by the El Niño Southern Oscillation (ENSO), with the Queensland coast experiencing three to four times as many cyclones during La Niña years compared to El Niño years (CSIRO 2024).

Impacts from tropical cyclones depend on the category, wind speed, rainfall intensity and duration, and riverine flooding as a result of prolonged deluges (BoM 2025b). In tropical cyclones, wind gusts higher than 90 kilometres per hour (km/h) can be expected around their centre, or eye. In the most severe tropical cyclones, gusts can exceed 360 km/h (Geoscience Australia 2024). Although the potential for cyclone influence to occur exists, the intensity is likely to be a Category 1, with the potential for damage to mine infrastructure considered to be negligible to minor. Category 1 cyclones have a maximum mean wind of 63-68 km/h and typical strongest gusts of <125 km/h (BoM 2025b).

6.1.1.3 Floods

The site is located within the Barker and Barambah Creeks drainage Sub-basin, in the freshwater catchment zone for the Burnett River. The site is situated downstream of the Bjelke-Petersen Dam and is outside of the declared catchment area of Lake Barambah formed by the dam.

The site lease boundaries are located partially within the Barker-Barambah Creek catchment floodplain according to mapping provided by the Queensland Floodplain Assessment Overlay (QFAO²) which represents an estimate of areas potentially at threat of inundation by flooding. The site is also outside the Floodplain Investigation Area on the Floodplain Investigation Area Overlay Map OM-3.1 (South Burnett) of the South Burnett Region Planning Scheme (2017) - Version 2.0 (SBRPS) (SBRPS 2017).

The assessment concluded that the site is expected to be partially flooded during a 1% AEP flood event (refer to **Figure 6**). It may have the potential to affect the void, infrastructure and processing areas on the lower slopes of the north-eastern overburden dump. During more extreme events, that approximate the Probable Maximum Flood (PMF), a broader flood extent across the site is predicted.

The EA has a pre-approved land outcome for a void as such a flood connectivity assessment has been undertaken to understand geotechnical considerations for the void and surrounding waterways. Following communication with DETSI, a flood model will also be undertaken to understand the depth and velocity of flood waters at the Site. This package of work has yet to commence and therefore is not summarised in this PRCP.

The abandonment bund that will be installed around the void will provide flood protection. Additional modelling is planned to determine the likely depth and velocity of floodwaters across the site to help design necessary flood protection and scour protection measures. This will be provided at a later date.

² <http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Queensland%20floodplain%20assessment%20overlay%22>, accessed March 2021

6.1.1.4 Bushfires

Bushfire risk is influenced by a combination of increased temperatures, higher winds, lower rainfall, and woody vegetation and extended hot and dry periods, such as heatwaves and/or droughts, can lead to an increase in dry and highly flammable fuel loads making fires easy to start and harder to control (QFES 2023). The site is mapped as comprising bushfire hazard and buffer area of the western border of the site in ML50111 (SBRPS 2017).

6.1.1.5 Earthquakes

Queensland is considered seismically active, with the highest hazard region lying along the eastern coast and near offshore regions (University of Queensland (UQ) 2025). Between 1977 and 2000, an average of 110 earthquakes per year have been recorded by the Queensland seismic network (UQ 2025); the majority of which were of a very low magnitude. Based on the data provided by the University of Queensland Seismological Observatory, it has been determined that the potential for earthquakes to occur within or surrounding the site is low (UQ 2025).

The last earthquake within the Burnett region occurred in Gayndah at a depth of 15 kilometres (km) in 2015. The site is located within the earthquake zone 3 according to the Queensland State Earthquake Risk Assessment.

The north and south walls are defined by east-west striking faults. These faults have limited the extents of the limestone along strike and have significantly disturbed the rocks in the walls.

6.1.1.6 Droughts

Queensland is particularly vulnerable to natural rainfall variability. Droughts are common in Queensland and generally associated with El Niño conditions. In March 2022, there were a total of 34 councils and three part-council areas drought-declared in Queensland (QG 2022). These declarations represented 64.7 percent of the land area of the state (QG 2022). As of 1 April 2025, there are no drought declared LGAs in Queensland (QG 2024).

6.1.2 Greenhouse Gas Emissions

In accordance with *Guideline: Greenhouse gas emissions* (DETSI 2024) an assessment of potential greenhouse gas emissions likely to be generated by the activities was undertaken.

6.1.2.1 Scope 1 Emissions

Scope 1 emissions relevant to the Proposed activity include:

- Direct emissions from combustion of diesel fuel for energy generation (i.e. generators)
- Direct emissions from combustion of diesel fuel within onsite plant, vehicles and equipment

Noting that the Project area has previously been cleared of vegetation, with minimal weed reestablishment having occurred. Emissions resulting from the clearing of any vegetation across the exploration area is considered to be negligible and has not been considered further.

Diesel fuel will be used by machinery and light vehicles. The diesel consumption used in mobile plant and light vehicles is estimated to be 9.353 kL for the duration of the Project.

GHG emissions factors for liquid fuel consumption are shown in **Table 15**. Note that the emission factors are per kL of fuel. The GHG emissions from fuel usage are calculated by multiplying the fuel consumption by the emissions factor from the right column in **Table 15**.

Table 15. Liquid fuel GHG emissions factors

Fuel Type	Energy content (GJ/kL) ¹	Scope 1 Emissions Factor (kg CO ₂ -e/GJ) Combined gases ^{1,2}	GHG emissions factor (tonnes CO ₂ -e/kL) ³
Diesel oil (mobile plant and light vehicles)	38.6	70.20	2.71

1 Energy content of fuel is sourced from Table 7.

2 Emissions factors include contributions from CO₂, CH₄, N₂O.

3 GHG Emissions Factor is the Energy Content multiplied by Scope 1 Emission Factor.

The total fuel consumption and resultant emissions are presented in **Table 16**, with a total GHG emission of 0.02535 kt CO₂-e from fuel combustion.

Table 16. Total estimated GHG emissions

Activity	Total fuel consumed (kL)	Emission factor (t CO ₂ -e/kL) ¹	Total emissions (kt CO ₂ -e)
Diesel oil (mobile plant and light vehicles)	9.353	2.71	0.02535

1 Emissions factor from **Table 15**.

A summary of the equipment, plant and vehicle likely to be used for the Project, alongside estimated fuel consumption and associated emissions is provided in **Table 17**.

Table 17. Estimated Project emissions inventory (Scope 1)

Plant / equipment / vehicle	Estimated fuel consumption (L/hr)	Usage on project (Hours/day Days)	Energy Content (GJ/kL) ¹	Scope 1 Emissions Factor (kg CO ₂ -e/GJ) ²	GHG Emissions Factor (t CO ₂ -e/kL)	Total Emissions (kt CO ₂ -e)
Bor-Mor drill rig	5	10 14	38.6	69.9	2.71	0.001897
Compressor (truck mounted 900/350)	60	10 14	38.6	69.9	2.71	0.022764
Light truck (Isuzu 4X4)	0.7 ³	1 14	38.6	69.9	2.71	0.00002656
Personnel support vehicle	7.5	2 14	38.6	69.9	2.71	0.0005691
Rig tow-vehicle	1.2 ³	1 14	38.6	69.9	2.71	0.00004553
Compressor tow-vehicle	1.2 ³	1 14	38.6	69.9	2.71	0.00004553
Total						0.02534772

1 Energy content of fuel sourced from DCCEEW (2022)

2 Includes contribution from CO₂, CH₄, N₂O

3 Estimated consumption based on one hour of site usage at low load

6.1.2.2 Scope 2 Emissions

Scope 2 emissions relevant to the Proposed activity are limited to grid electrical consumption. As the Project is likely to involve diesel generators only, Scope 2 emissions are considered negligible and are not considered further.

6.1.2.3 Scope 3 Emissions

Scope 3 emissions include indirect emissions upstream or downstream of the Project. Primarily including emissions associated with production of the equipment involved in the proposed activity. These items are outside the control of the Proponent, and estimated emissions are not available at this time.

Further, Scope 3 emissions are not required to be included where projected Scope 1 and Scope 2 emissions are expected to be less than 25,000 tonnes CO₂-e per annum, therefore are not relevant for the Project.

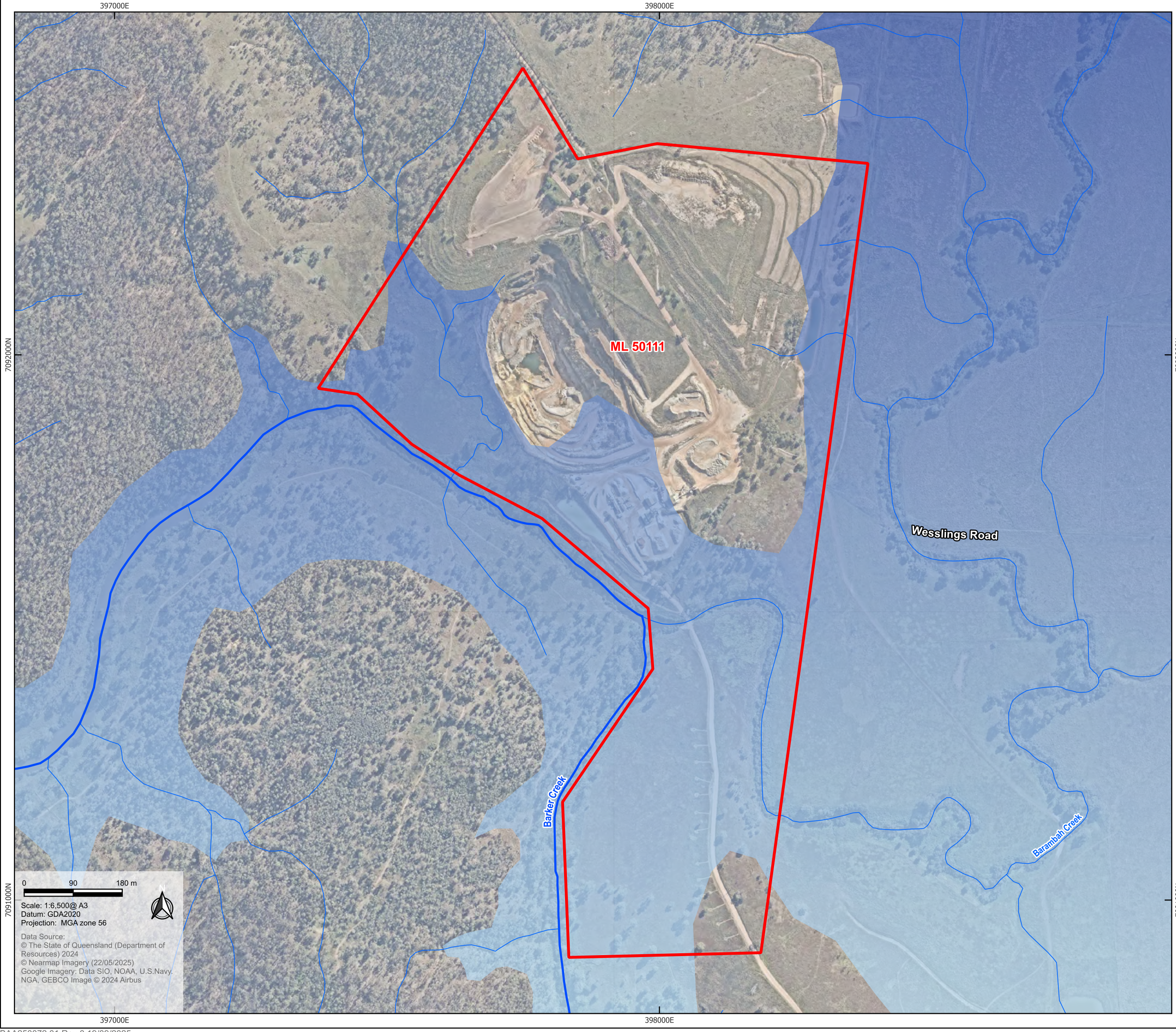
6.1.3 Potential Impact

The proposed amendments are not considered to impact upon the climate. There is no anticipated increase in disturbance extent or severity and no additional clearing required.

GHG emissions associated with the proposed amendment are considered to be negligible, with emissions limited to minor amounts of vehicle/plant/machinery movement on site.

6.1.3.1 GHG reporting requirements

The Project is not likely to exceed the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) scheme thresholds of 25,000 tonnes CO₂-e per annum for a facility, or 50,000 tonnes CO₂-e per annum for a corporation.



Legend

-  Site boundary
-  Floodplain assessment overlay
- Watercourses**
-  Major
-  Minor

This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

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**Graymont (NSW) Pty Ltd
Murgon Limestone Quarry
EA Amendment**

**Figure 6
Flood mapping**

6.2 Land and Tenure

The environmental values of the land to be protected or enhanced include:

- Integrity of undisturbed land and ecosystems
- Integrity of the topsoil as a resource for rehabilitation
- Stability of disturbed land and ensuring it is non-polluting
- Integrity of soil health and function including the physical and chemical attributes relative to vegetation establishment and growth
- Integrity of soil stability and structure for erosion protection
- Suitability of the land for continued agricultural use after rehabilitation

6.2.1 Existing Environment

6.2.1.1 Regional Planning Interests

With reference to State Mapping and the RPI Act, the site is not mapped within any areas of regional interest. The closest mapped area of regional interest is both a Priority Agricultural Area (PAA) and a Strategic Environmental Area (SEA) located approximately 100 m west of the site within Cherbourg Aboriginal Shire LGA.

6.2.1.2 Agricultural land Classification

According to the SBRCPs (SBRCPs 2017), the site is mapped as Agricultural Land Classification (ALC) Class A and B. Much of the site is mapped within AG Land Classification B/D which is designated for limited crop land/Non-agricultural land. However, a portion of the southeast of the site, is mapped as AG Land Classification A1 for Cropland – broadacre and horticulture. No disturbance has been conducted within this area.

6.2.1.3 Environmentally Sensitive areas

No Environmentally Sensitive Areas (ESAs) are mapped within the site. The nearest ESA is a Category C ESA (Dam or Weir) approximately 1.3km south of ML50111, refer to **Figure 7**.

6.2.1.4 Topography

The elevation of the mining lease varies from a low of 283 mAHD near Barambah Creek to a high of 334 mAHD in the north-eastern corner of the lease. The local relief comprises undulating hills, cleared for grazing and forms part of the catchment of Barambah Creek which flows from Bjelke-Peterson Dam/Lake Barambah, located approximately 1.4km to the south (upstream) of the mining lease boundary.

6.2.1.5 Geological Setting

The limestone orebody occurs within a sequence of limestones and mafic andesitic to basaltic volcanics; the latter rocks being referred to collectively as andesites. The rocks are overlain by a thin (5-10 m) deposit of recent alluvium and Tertiary sediments (Meyers 2015). The regional surface geology is shown in Figure 3 based on the Queensland Government's Detailed surface geology – Queensland data layer (Queensland Government 2020a).

The recent alluvial deposits comprise clayey-sands and sandy-clays. The tertiary sediments comprise interlayered clayey and gravelly sands, sandy clays and clays. The sediments also occur as fill within karst features in the top of the limestone.

The Barambah andesite and limestone form the Bjelke-Petersen beds. The beds were previously known as the Wondai Series of rocks. The rocks have been strongly deformed by widespread shearing. They have been faulted against sandstones and siltstones of the Triassic age Esk Formation.

The strikes of the footwall (east) and hanging wall (west) of the pit are defined by limestone/andesite contacts. The contacts are aligned with the structural trends in the Maronghi Creek Beds and the Esk Formation. These trends are predominantly north-northwest with dips of 60° to 75° to the west. The contact behind the west

wall is well defined. The contact behind the east wall, particularly at the north end of the pit, is less well defined.

The north and south walls are defined by east-west striking faults. These faults have limited the extents of the limestone along strike and have significantly disturbed the rocks in the walls.

6.2.1.6 Land Stability

Although descriptions in the land evaluation mapping suggests that soil erosion may be an issue at the Project site, aerial imagery does not indicate widespread soil stability or erosion issues in areas under pasture. Soil analysis conducted for the stockpiled topsoil and used for the rehabilitation of the overburden dumps shows it to be non-sodic and with a low dispersion index. No significant soil stability issues are expected to limit rehabilitation efforts at Murgon.

6.2.2 Potential Impact

All proposed amendments are located within existing authorised disturbance areas. There is no additional disturbance proposed as part of this amendment and there will not be any increased impact to land as a result.

Exploration activities, including rehabilitation works, will be undertaken in accordance with *Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2*, ensuring post mining land use will not be impacted. Details on the rehabilitation requirements and any changes to the existing rehabilitation plan are addressed in the Projects PRCP, as discussed in **Section 8.1**.

6.3 Ecology

The EVs at the site and adjacent areas which are to be protected or enhanced are:

- The integrity of undisturbed ecosystems
- The integrity of bioregions and regional ecosystems (RE) and the habitat values they provide
- Flora, including vegetation communities, endangered, vulnerable, rare or near threatened, special least concern, and pest species
- The integrity of habitat for endangered, vulnerable, or near threatened and special lease concern species
- Category B and C environmentally sensitive areas (ESAs)
- Fauna, including fauna present, protected animal breeding places, endangered, vulnerable or near threatened species, pest species, plants or animals and their habitats, including threatened wildlife, near threatened wildlife and rare wildlife under the relevant legislation including NC Act
- Prescribed environmental matters as defined in Queensland's EP Act
- State and nationally significant biodiversity values
- Areas with high ecological significance values including, but not limited to, nationally threatened ecological communities, large tracts of remnant vegetation and connectivity corridors
- The integrity of movement corridors provided by riparian zone vegetation

6.3.1 Existing Environment

6.3.1.1 Mapped Regional Ecosystems

The site is located within the Southeast Queensland bioregion. The area surrounding the ML is predominantly non-remnant vegetation with scattered patches of remnant vegetation. According to the Queensland Government RE mapping (QGlobe 2025), there is one Category B regrowth vegetation approximately 1.7km north of the Project. There are no mapped areas of mapped remnant vegetation on ML50111.

There is no Essential Habitat or regrowth vegetation is mapped over the Project. A Category C high value regrowth area abuts the southwestern border of the ML. Two watercourses transect the ML and each has associated areas of Category R watercourse and drainage regrowth borders. These areas are currently outside of the disturbance footprint.

6.3.1.2 Conservation Significant Flora Species

A desktop review of conservation significant flora species within three km of the site was undertaken using the WildNet the Protected Matters Search Tool data (**Appendix A**). The search results of threatened flora species listed as *known* or *likely* to occur are provided in **Table 18**.

Table 18. Conservation Significant Flora Species

Scientific name	Common name	Threatened status		Likelihood of occurrence
		NC Act	EPBC Act	
<i>Cossinia australiana</i>	Cossinia	Endangered	Endangered	Likely to occur
<i>Dichanthium setosum</i>	Bluegrass	Least Concern	Vulnerable	likely to occur
<i>Phebalium distans</i>	Mt Berryman Phebalium	Endangered	Endangered	Likely to occur

The remaining threatened flora species identified in database searches are considered *unlikely* to occur within the site.

6.3.1.3 Conservation Significant Fauna Species

A desktop review of conservation significant fauna species within three km of the site was undertaken using the WildNet the Protected Matters Search Tool database (**Appendix A**). The search results of threatened terrestrial fauna species listed as *known* or *likely* to occur are provided in **Table 19**. The remaining threatened fauna species identified in database searches are considered *unlikely* to occur within the site.

Table 19. Conservation Significant Fauna Species

Scientific name	Common name	Threatened status		Likelihood of occurrence (PMST)
		NC Act	EPBC Act	
<i>Apus pacificus</i>	Fork-tailed Swift	Special Least Concern	-	Likely to occur
<i>Dasyurus hallucatus</i>	Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	Least Concern	Endangered	Likely to occur
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Endangered	Endangered	Likely to occur
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Vulnerable	Vulnerable	Known to occur
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Vulnerable	Likely to occur
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Least Concern	-	Known to occur
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	Vulnerable	Known to occur
<i>Maccullochella Mariensis</i>	Mary River cod	Endangered	Endangered	Known to occur
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Least Concern	-	Known to occur
<i>Pandion haliaetus</i>	Osprey	Special Least Concern	-	Likely to occur
<i>Petauroides volans</i>	Greater Glider (southern and central)	Vulnerable	Endangered	Likely to occur
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	Vulnerable	Vulnerable	Likely to occur
<i>Phascogale cinereus</i> ³	Koala	Endangered	Endangered	Known to occur
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	Likely to occur

³ The site is not mapped within a Koala habitat area or Koala priority area.

Scientific name	Common name	Threatened status		Likelihood of occurrence (PMST)
		NC Act	EPBC Act	
<i>Turnix melanogaster</i>	Black-breasted Button-quail	Vulnerable	Vulnerable	Likely to occur

6.3.1.4 Prescribed Environmental Matters

The Queensland *Environmental Offsets Regulation 2014* (QEO Regulation) defines prescribed environmental matters, also known as MSES, which include:

- Regulated vegetation
- Connectivity areas
- Wetlands and watercourses
- Designated precinct in a strategic environmental area
- Protected wildlife habitat
- Koala habitat in Southeast Queensland
- Protected areas
- Highly protected zones of state marine park
- Fish habitat areas
- Waterway providing for fish passage
- Marine plants
- Legally secured offset areas.

Category R regrowth watercourse vegetation is present along the creek banks and overland flow line adjacent to some existing disturbance areas. No other prescribed environmental matters apply to the site, refer to **Appendix A** for the MSES Report. This remnant vegetation is not within the disturbance footprint of the Proposed activity; therefore, the Proposed activity will have no impact to this prescribed environmental matter.

6.3.1.5 Aquatic Ecology

A desktop review of conservation significant fauna species within three km of the site was undertaken using the WildNet the Protected Matters Search Tool database (**Appendix A**). The search results of threatened reptile fauna species listed as *known* or *likely* to occur are provided in **Table 20**. The remaining threatened fauna species identified in database searches are considered *unlikely* to occur within the site.

Table 20. Conservation significant reptile species

Scientific name	Common name	Threatened status		Likelihood of occurrence
		NC Act	EPBC Act	
<i>Eseya albagula</i>	Southern Snapping Turtle, Whitethroated Snapping Turtle	Critically Endangered	Critically Endangered	Likely to occur
<i>Hemiaspis damelii</i>	Grey Snake	Endangered	Endangered	Likely to occur

6.3.1.6 Pest Flora and Fauna

A desktop review of conservation weed and pest species within one km of the site was undertaken using the WildNet database (**Appendix A**). The search results of weed and pest species recorded since 1980 on WildNet includes:

- *Scleropages leichardti* (southern saratoga)
- *Macquaria novemaculeata* (Australian bass)
- *Podiceps cristatus* (Great crested grebe)
- *Amaurornis moluccana* (Pale-vented bush-hen)
- *Danaus plexippus* (monarch)

- *Oryctolagus cuniculus* (rabbit)

Graymont undertakes regular maintenance weed control by engaging a local contractor to spray the weeds as required (typically three to four times per year).

6.3.2 Potential Impacts

The proposed amendments do not involve any additional clearing of vegetation or ground disturbance, and as such is not expecting to significantly impact upon the ecological value of the region.

Secondary impacts on ecological aspects (i.e. acoustic and vibration impacts) are not considered to be significantly different to those currently experienced through existing operations if exploration drilling was to be authorised. Neither artificial lighting nor amendment to the noise and vibration criteria is proposed.

Minor risks on ecological values are limited to the potential degradation of downstream water quality through offsite mobilisation of sediment (from localised erosion areas) or the uncontrolled release of chemicals and fuels (from equipment and plant) resulting in impact on aquatic ecological species.

6.4 Surface Water and Wetlands

There are currently no EVs or Water Quality Objectives (WQOs) scheduled under the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* for Barker and Barambah Creeks Sub-Basin. However, the catchment zone for the Burnett River is included within the *Water Quality Improvement Plan for the Burnett Mary Region* (WQIP) (BMRG NRM 2015) which contains draft WQOs and EVs for surface waters. The EVs for the 'Barambah Ck weir pools below Bjelke-Petersen Dam' area (i.e., those most relevant to the Project area) are as follows:

- Aquatic ecosystems
- Irrigation
- Farm supply
- Stock water
- Aquaculture
- Human consumption of shellfish
- Primary recreation
- Secondary recreation
- Water recreation
- Cultural and spiritual values (Indigenous).

No draft High Ecological Value waters were recognised in the waters surrounding the Murgon Operation lease area and water would be considered Slightly to Moderately Disturbed with respect to WQOs for the protection of aquatic ecosystem EVs. The *Burnett Mary Region WQIP* (BMRG NRM 2015) provides draft WQOs for the Project area (based on the default guidelines for central east coast upland (>150 m elevation) freshwaters from the Queensland water quality guidelines - EPA 2006) as follows:

- Turbidity: <25 NTU
- Suspended solids: <6 mg/L
- Chlorophyll a: <2 µg/L
- Total nitrogen (N): <250µg/L
- Oxidised N: <15 µg/L
- Ammonia N: <10 µg/L
- Organic N: <225 µg/L
- Total phosphorus: <30 µg/L
- Filterable reactive phosphorus (FRP): <15 µg/L
- Dissolved oxygen: 90 – 110% saturation
- pH 6.5 – 7.5.

However, the *Burnett Mary Region WQIP* (BMRG NRM 2015) acknowledged there is insufficient information available to establish WQOs for these upland waters, and local investigations would be required.

6.4.1 Existing Environment

6.4.1.1 Catchment Overview

The site is located within the Parker & Barambah Creeks Sub-basin of the broader Burnett River Basin (no. 136), the freshwater catchment zone for the Burnett River. The Burnett spans 38,370 km², and comprises the following ten main rivers:

- Burnett River
- Barker Creek
- Barambah Creek
- Boyne River
- Stuart River
- Auburn River
- Three Moon Creek

- Kolan River
- Elliott River
- Gregory River
- Isis River

The region's water sources support towns, industry, tourism and agriculture (including sugar cane and macadamia production) and grazing. It also supports habitat for five species of freshwater turtle, platypus and many fish species; and is contributes to 3.8% of all water flow into the Great Barrier Reef.

The site is located on the northern bank of Barambah Creek approximately 1.4 km downstream from the Bjelke-Peterson Dam. Major watercourses within the site and surrounding area include the Barambah Creek and Barker Creek (which is regulated by the Bjelke-Peterson Dam). Additionally, there are minor watercourses from the Burnett River basin which flow southerly towards site. Considering the proximity of waterways, a flood susceptibility model has been developed.

The model was developed by undertaking a review of publicly available flood assessments from The Queensland Globe, The Queensland Department of Resource Flood Check and The Australian Flood Risk Information Portal coupled with site specific catchment analysis. A digital elevation model (DEM) was generated to represent the topography of site and surrounding area compiled from a 1-section DEM from the Australia Government's spatial data hub. Sub-catchments were generated to determine the overland flow paths within the site and surrounding areas. It was determined there are three sub-catchments meeting at confluence of Barambah Creek and Barker Creek adjacent to the site which is considered to be a likely source of localised flooding. Further, the minor watercourse in the north-eastern section of the site diverges and eventually reach Barambah Creek. It is noted this watercourse can indirectly contribute to impacting the site when the creek is in flood. There is also an existing watercourse in the north-western section of the site which flow southerly adjacent the site before reaching Barambah Creek. This can carry water towards site, specifically in bigger events.

The Queensland Floodplain Assessment Overlay (QFAO) represents an estimate of areas potentially at threat of inundation by flooding (Queensland Reconstruction Authority 2013). A map showing this data layer over the Project area is provided in **Figure 6**. This map shows that parts of the Project area, including areas that will be rehabilitated, are potentially subject to flooding.

Through analysing the available flood information, it was concluded the site is expected to be partially flooded during a 1% Annual Exceedance Probability (AEP) flood event (**Figure 6**). This has the potential to affect the void, infrastructure and processing areas and a small section of the toe of the North-eastern Overburden Dump (but not the Northern Overburden Dump). Under a probable maximum flood (PMF), it is expected that site would be extensively flooded with large parts of the site impacted (**Figure 6**). Additionally, under a PMF scenario, the model was run with and without a scenario that included a failure of the Bjelke-Peterson Dam. There was no material difference to the flooding extent for site under the two scenarios.

6.4.1.2 Watercourses and Waterways

The site is located within the Barker and Barambah Creeks drainage Sub-basin, in the freshwater catchment zone for the Burnett River. The site is situated downstream of the Bjelke-Petersen Dam and is outside of the declared catchment area of Lake Barambah formed by the dam.

Two minor watercourses Barker and Barambah Creeks flow adjacent to the lease areas drainage sub-basin occur around the site, namely. Barambah Creek flows around the southern border of ML 50111 with the junction to Barker Creek 120 m South (upstream) of the operation. Barker Creek terminates at the junction with Barambah Creek, while Barambah Creek flows north and drains into the Burnett River near Gayndah, approximately 90 km north of Murgon. Watercourses proximate to the Project are shown in **Figure 9**.

6.4.1.3 Wetlands

Review of Queensland Wetland Mapping (viewed in QGlobe) identifies a lacustrine wetland located approximately 250 m south of the Project, and several riverine wetland lines that correspond with the Barker and Barambah creeks, transecting the Project area.

The site is not located within a Nationally Important Wetland, the closest Nationally Important Wetland is located approximately 110 km to the northeast of the site, which is the Great Sandy Strait.

6.4.1.4 Surface Water Monitoring

Surface water quality data is available from July 2008. Water quality monitoring has included a range of variables specified in the EA. This includes pH, electrical conductivity (EC), total nitrogen (TN) and total suspended solids (TSS). The monitoring program includes a sampling location upstream (W1) of the site and a sampling location downstream of the site (W2) to determine potential impacts. Further details of the locations are provided below:

- W1 – Upstream at the confluence of Barambah and Barker Creeks
- W2 – Downstream at Barambah Creek, 100m downstream of Sediment Dam D.

The trends in water quality over time at the two sampling points are shown in **Figure 8** to **Figure 13** compared to either draft WQOs where applicable, or EA release limits where WQOs have not been nominated. Where outliers were identified, laboratory results were used in place of in situ results.

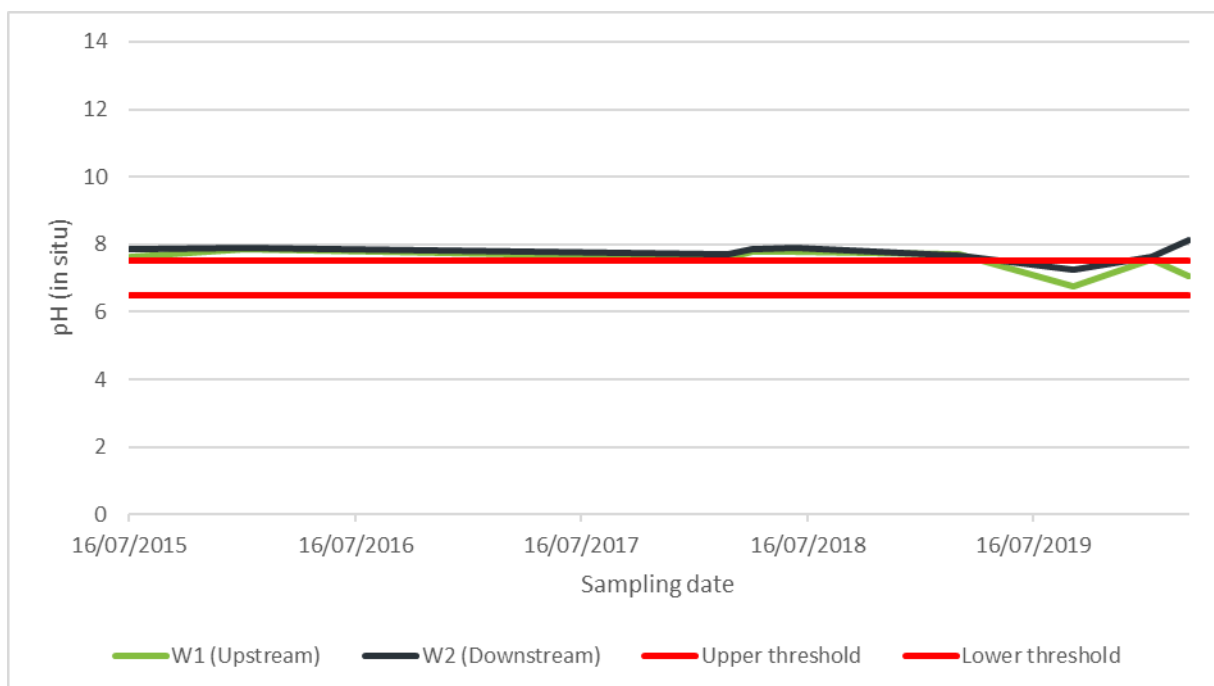
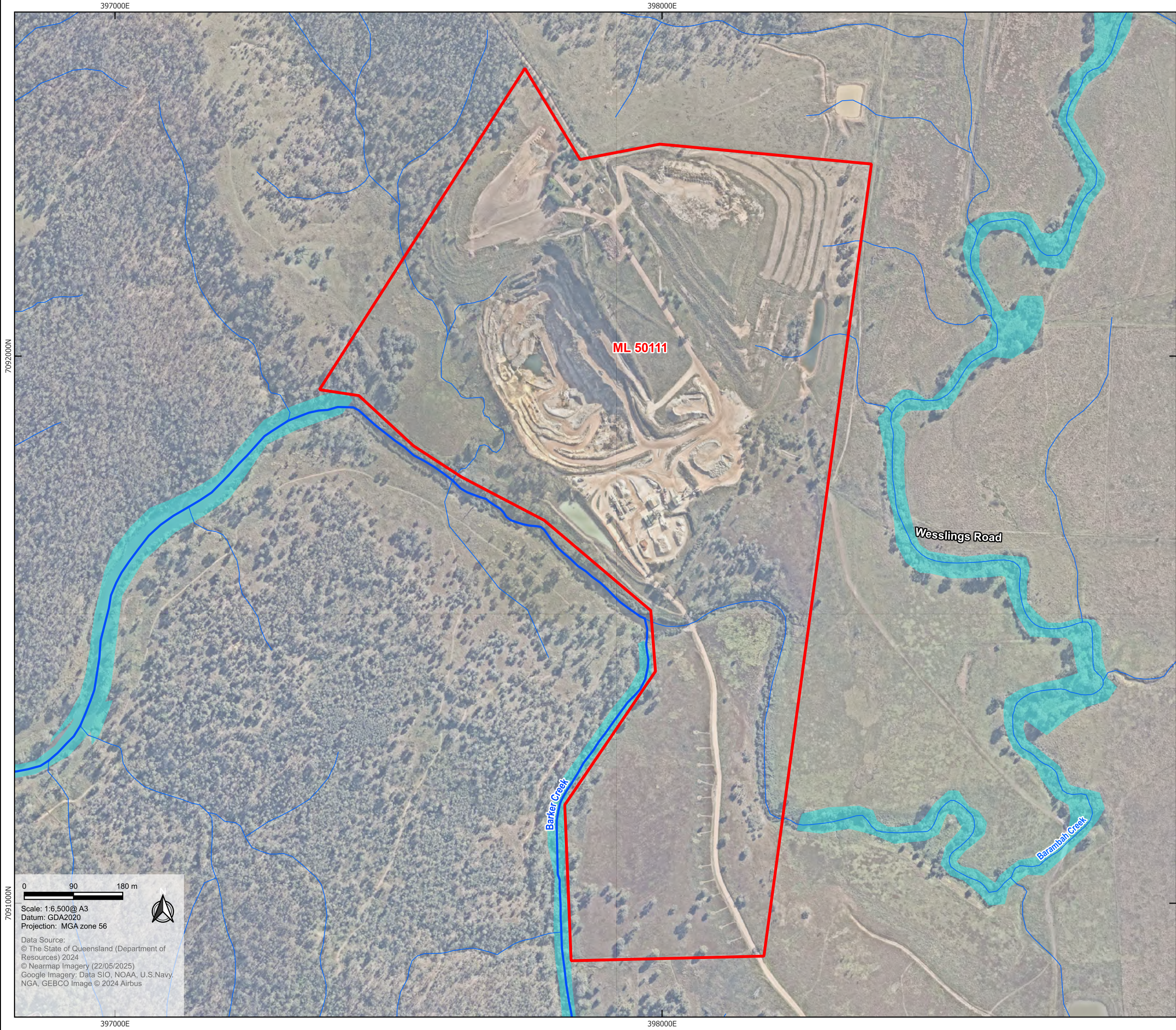


Figure 8. Historic surface water pH values at W1 (upstream background) and W2 (downstream impact) compared to the WQO (range between pH 6.5 and pH 7.5)



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Legend

- Site boundary
- Wetland areas (Qld Wetland Mapping v6.0)**
 - Riverine Wetlands (hydrologically natural)
- Watercourses**
 - Major
 - Minor

This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

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Murgon Limestone Quarry
EA Amendment**

**Figure 8
Watercourses and wetlands**

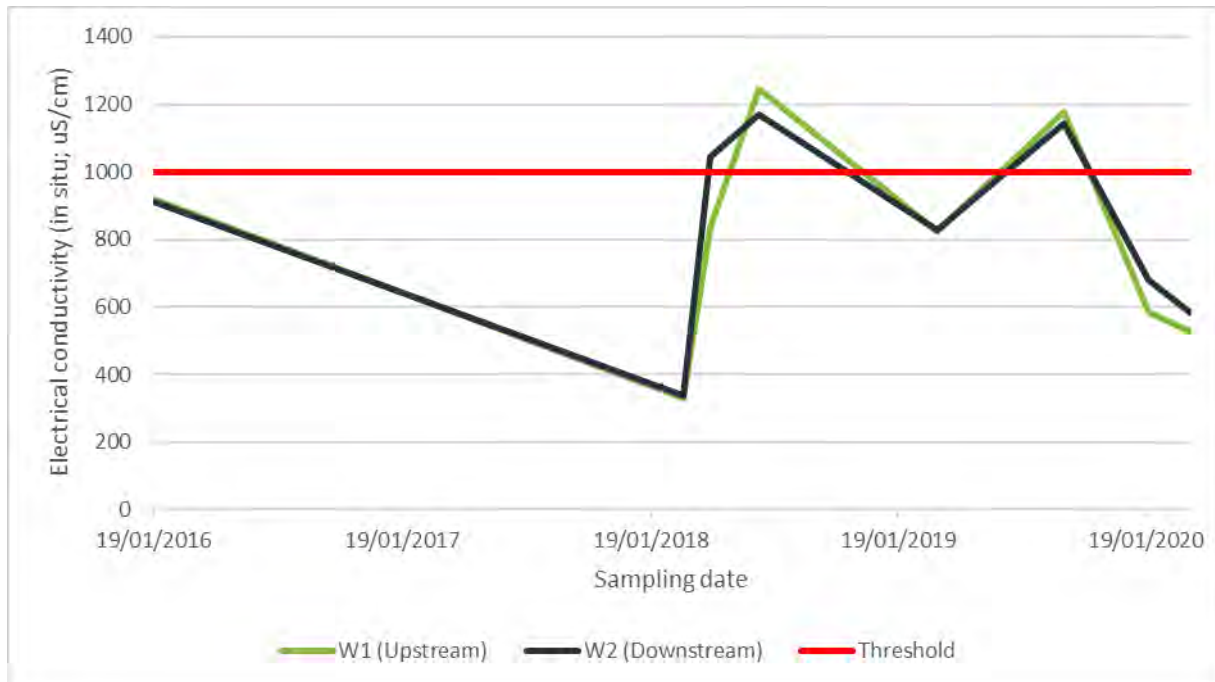


Figure 10. Historic surface water EC values at W1 (upstream background) and W2 (downstream impact) compared to the EA release limit (<1000 $\mu\text{S}/\text{cm}$)

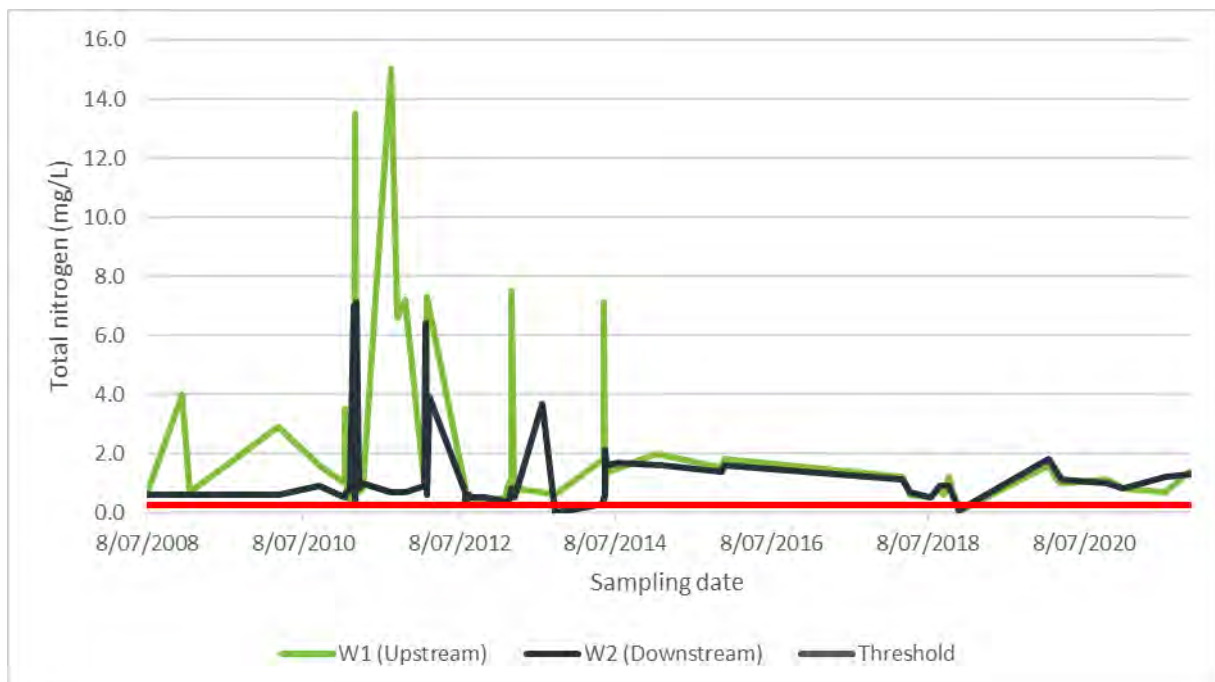


Figure 11. Historic surface water TN concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<0.25 mg/L)

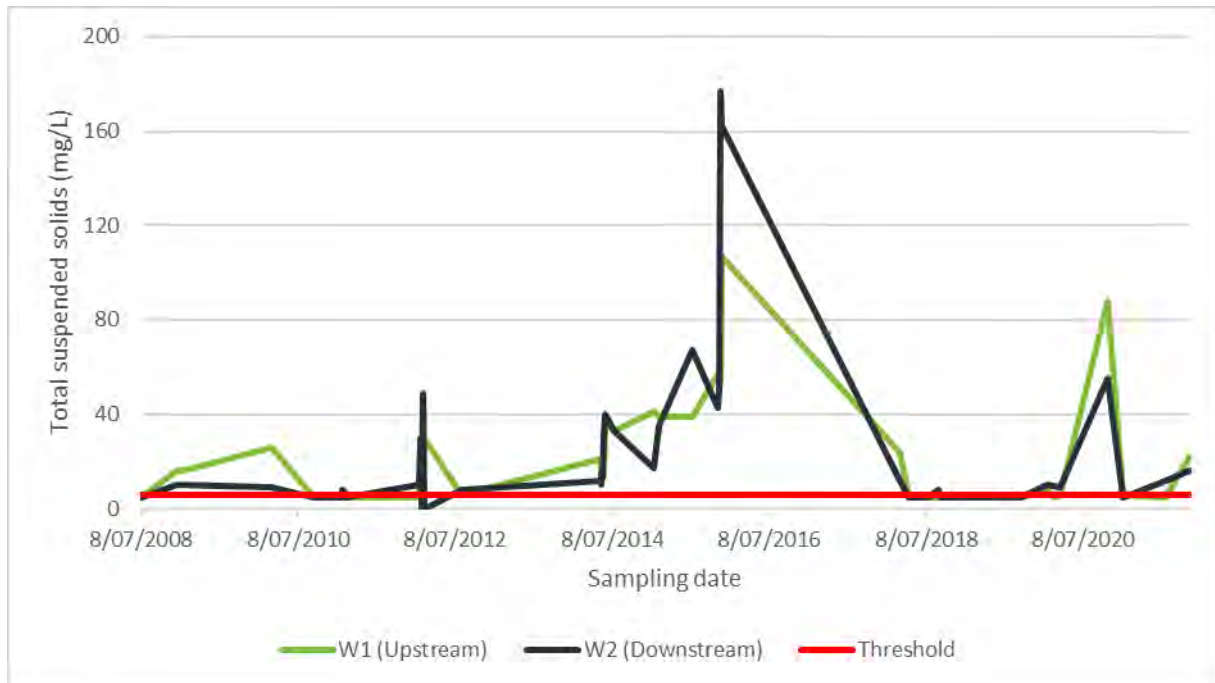


Figure 12. Historic surface water TSS concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<6 mg/L)

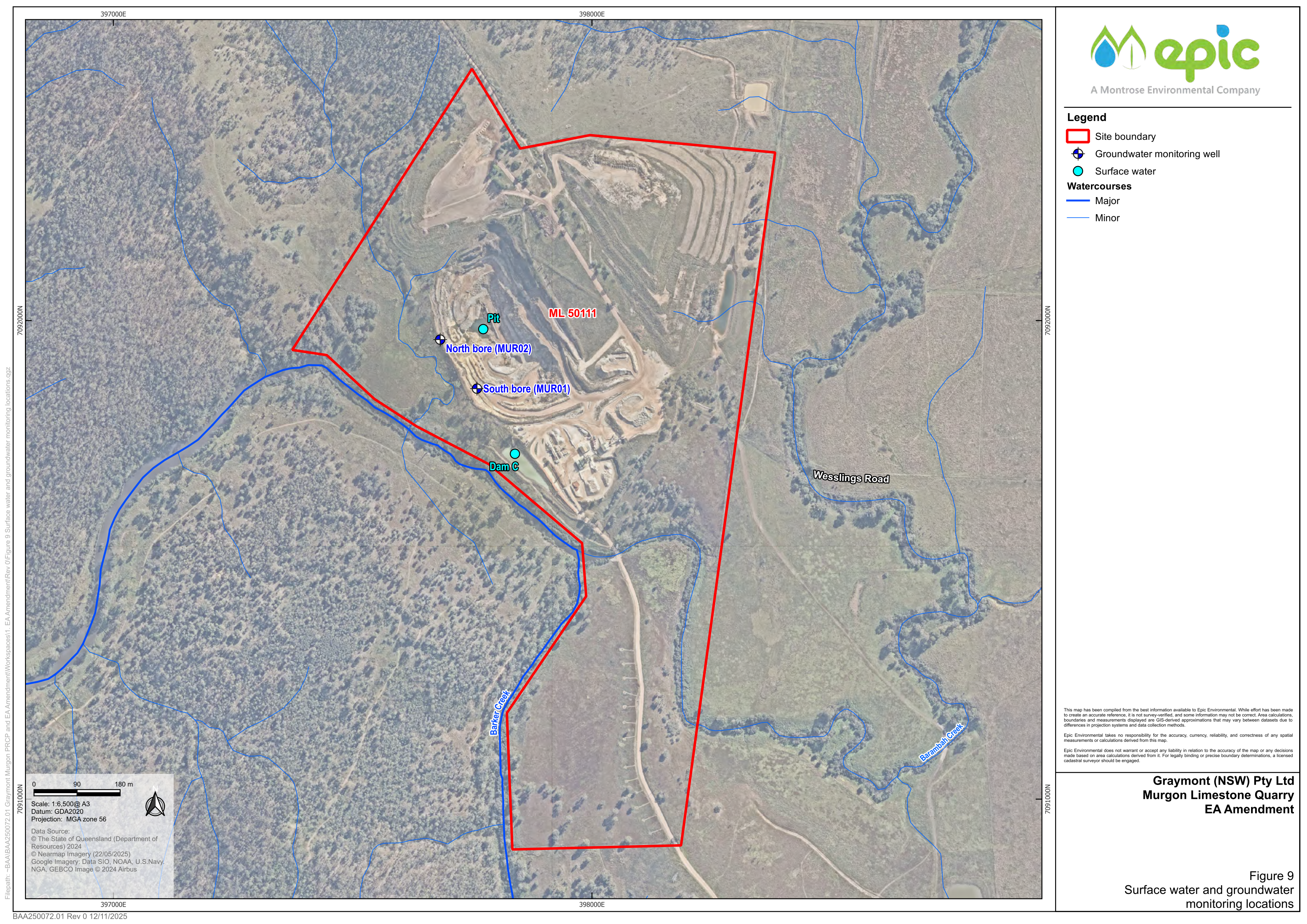
Since July 2015 pH levels have remained relatively consistent, and the downstream pH has closely mirrored the upstream pH with no apparent material influence from the Murgon Operation. The pH upstream of the Murgon Operations is generally above the draft WQO range, but this appears the ambient pH in this part of the catchment.

EC measurements since 2016 have been compared against the EA threshold of <1000 $\mu\text{S}/\text{cm}$. EC has remained below the threshold limit for majority of the monitoring period with only two brief spikes above this threshold in June 2018 and September 2019. On each occasion the EC was lower at the downstream site W2 than upstream. At all other times, EC at the downstream site has closely mirrored the upstream EC with no apparent material influence from the Murgon Operation.

Analysis of total nitrogen (TN) since July 2008 shows that for the majority of the time period, the WQO threshold for TN (<0.25 mg/L) has been exceeded. This is due to upstream water quality and it likely influenced by agricultural activities and regulated flows in the catchment. On only one occasion in July 2013 was the TN markedly higher downstream than upstream. Since 2014, TN concentrations at the downstream site has closely mirrored those recorded upstream with no apparent material influence from the Murgon Operation.

TSS concentrations have fluctuated since July 2008 and may reflect the circumstances under which Murgon is required to undertake monitoring (high rainfall events that may result in discharge). Peak concentrations generally exceed the WQO threshold (<6 mg/L) which is to be expected in an agricultural and high regulate upstream catchment. Prior to 2016, downstream peak TSS concentrations exceeded those at the upstream site for three separate events. However, since 2016, TSS concentrations have been much lower and values recorded at the downstream site have closely mirrored those upstream TSS with no apparent material influence from the Murgon Operation.

After reviewing the water quality from W1 upstream background site against W2 downstream impact site, it has been concluded that there is no material impact due to on-going operations at Murgon and none would be expected following closure.



- Legend**
- Site boundary
 - Groundwater monitoring well
 - Surface water
- Watercourses**
- Major
 - Minor

This map has been compiled from the best information available to Epic Environmental. While effort has been made to create an accurate reference, it is not survey-verified, and some information may not be correct. Area calculations, boundaries and measurements displayed are GIS-derived approximations that may vary between datasets due to differences in projection systems and data collection methods.

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**Graymont (NSW) Pty Ltd
Murgon Limestone Quarry
EA Amendment**

Figure 9
**Surface water and groundwater
monitoring locations**

6.4.2 Potential Impacts

Risks to the surface water EV's is limited to the potential impact resulting from offsite mobilisation of sediment through localised erosion at the exploration drill sites, or from the uncontrolled release of chemicals and fuels from equipment and plant.

Potential impact is considered unlikely and, in the event it does occur, is anticipated to be very minor.

The Proposed activity will not utilise existing water sources as a water supply, and as such no impact is expected to occur on water availability for those recognised users.

6.5 Groundwater

6.5.1 Published Environmental Values

ENVIRONMENTAL PROTECTION (WATER AND WETLAND BIODIVERSITY) POLICY 2019

The EP Act and the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019 — the EPP (Water and Wetland Biodiversity)* — provide the framework for developing EVs, management goals and WQOs for Queensland waters. Schedule 1 of the EPP (Water and Wetland Biodiversity) lists the EVs and WQOs for Queensland waters. These are a part of the legislation and therefore considered by planners and managers when making decisions about waters and/or water quality.

WATER QUALITY IMPROVEMENT PLANS

Water quality improvement plans (WQIPs) for catchments draining to the Great Barrier Reef were initially prepared by Regional natural Resource Management (NRM) Bodies and Councils under the Australian Government's Coastal Catchments Initiative. As part of the development of the WQIPs, stakeholders ensured that the EVs and WQOs established were consistent with the (then) Environmental Protection (Water) Policy 2009 requirements.

Neither the *Water Quality Improvement Plan for the Burnett Mary Region* (WQIP) (BMRG NRM 2015) nor the EPP (Water and Wetland Biodiversity) 2019 contain groundwater-related EVs and WQOs over the site catchment area.

While the updated National Water Quality Guidelines (ANZG 2018) include default guideline values for physical and chemical stressors, local water quality information still applies as the first reference point. In Queensland. However, in the absence of EPP (Water and Wetland Biodiversity) scheduled values, guidance is taken from the Queensland Water Quality Guidelines (DEHP 2009). DEHP (2009) states that "These guidelines do not specifically address groundwater" and direct the reader to the previous version of the National Water Quality Guidelines (ANZECC & ARMCANZ 2000) for guidance of the application of EVs and WQOs to groundwater.,

As the groundwater affected by mining is not connected to surface waters around the operation, the most applicable EVs relate to the protection of raw water supply and primary industries use. The primary industries EV also aligns with the intended PMLU for the operation (water storage for stock water use). The guideline values and WQOs applied to the assessment of ground water quality relate to these EVs.

APPLICABLE WATER QUALITY GUIDELINES

The *Australian Drinking Water Guidelines* (ADWG) (NHMRC 2011) provide a basis for determining the quality of water to be supplied to consumers in all parts of Australia. The Guidelines are not mandatory legally enforceable standards, and the implementation of the guidelines is at the discretion of each state and territory.

A summary of applicable water quality guidelines is presented in **Table 21**.

Table 21. Water quality guidelines (NHMRC 2011 ANZECC & ARMCANZ 2000)

Water quality indicator	Unit	ADWG values		Stock water guidelines
		Health	Aesthetic	
pH Value	-	NA	6.5 – 8.5	NA

Water quality indicator	Unit	ADWG values		Stock water guidelines
		Health	Aesthetic	
Electrical conductivity	µS/cm	NA	938 [#]	5,970
Chloride	mg/L	NA	250	NA
Sulfate (as SO ₄)	mg/L	NA	250	1,000
Nitrate*	mg/L	50	NA	30
Arsenic	mg/L	0.01	NA	5
Cadmium	mg/L	0.002	NA	0.01
Copper	mg/L	2	1	1
Lead	mg/L	0.01	NA	0.1
Nickel	mg/L	0.02	NA	1
Sodium	mg/L	NA	180	NA
Zinc	mg/L	NA	3	20

This is for good quality water and EC > 1,875 µS/cm is considered unacceptable.

* Water quality data related to nitrate plus nitrite N and has been converted.

6.5.2 Existing Environment

6.5.2.1 Hydrogeology

The limestone deposit is hosted by the Late Carboniferous Bjelke Petersen Beds which comprise mudstone, shale, and silicified (chert) containing locally sheared basic metavolcanic lenses and scattered limestone bodies. To the West of the Bjelke Petersen Beds are the Late Devonian to Early Carboniferous Maronghi Creek Beds, which comprise mudstone, shale, arenite, chert, jasper, acid to basic metavolcanics. To the East of the Bjelke Petersen Beds are the older Mid Triassic Esk Formation, consisting of polymictic pebble to boulder conglomerate, feldspathic sandstone, shale, minor acid tuff. To the East of the mining lease, the Esk Formation and sections of the Bjelke Petersen Beds are conformably overlain by Quaternary-age clay rich alluvium (Qa) and clay-rich Tertiary-age sedimentary rocks (Ts). The Quaternary alluvium is also known as The Barambah Creek Alluvium in this area.

Unless substantially fractured, the rock formations (Esk, Maronghi and Bjelke Petersen) are unlikely to host significant volumes of groundwater or allow the transmission of significant groundwater flows. There are localised fractures (joints) exposed in the pit walls that allow small seepages as mentioned in section 3.1.5.2. Furthermore, “overall pit seepage is likely to be governed by flows from all the geological units surrounding the site” (ERM 2008).

ERM (2008) note that “Conservatively assuming that the limestone unit at the site is localised and approximates an area of 20 hectares and that recharge to groundwater ranges between 5 and 15% of average annual rainfall, it can be expected that rainfall recharge into the limestone aquifer system would approximate 20 to 60 m³/day which suggests that pit seepage is likely to be primarily derived from rainfall recharge into the local limestone groundwater system. Due to the shape and dimensions of the limestone deposit being exploited it is likely that there are limited locations (likely to be to the south of the site) where the limestone unit sub-crops beneath the Barambah and Barker Creeks. These zones, while isolated are likely to represent the zones of greatest potential for a direct hydraulic connection between the creeks and groundwater within the limestone deposit”.

The site is located within the Bjelke Petersen Beds. NW-NNW and NE-NNE Faults cross-cut site stratigraphy and are the primary mechanism for the plunge reversals evident in the quarry, Atkinson and further south. The fractured-rock groundwater system at Murgon (which causes minor pit seepage) is hosted by a fracture zone of limited extent and recharged by a localised fracture network.

6.5.2.2 Groundwater Dependent Ecosystems (GDEs)

According to the Queensland Government Wetland Maps database (2022c), two moderately rated GDEs exist within a two km radius of site. When cross-referencing against the GDEs from BoM Atlas (2022), the same GDEs are referenced.

AQUATIC

The Wetland Maps have identified a surface expression GDE with the set name 'permeable geologies including deeply weathered basalt (red soils)' within proximity of the site. The class of GDE is 'surface ecosystem dependent on the surface expression of groundwater'. This classification of the GDE has confidence rating of moderate and is located not within the ML but approximately 380 m from site. Since the site/operation does not sit within the same formation, it may not have the potential to cause harm to this GDE.

TERRESTRIAL

There are no terrestrial GDEs within the ML, however the Wetland Map database has identified derived GDE with moderate confidence rating approximately 1.3 km from the ML. The permeable geologies including deeply weathered basalts (red soils) has been identified as a surface ecosystem dependent on the subsurface presence of groundwater.

SUBTERRANEAN

No Subterranean GDEs have been identified in the ML or surrounding two km buffer distance.

6.5.2.3 Regional Groundwater Water Level

Water level data has been obtained from the BoM Groundwater Explorer database for seven of the 59 bores identified within proximity to the site (**Figure 13**). **Table 22** and **Table 23** presents details of the seven bores including a summary of water levels. There is no applicable data from the BoM Groundwater Explorer database for the remaining 52 bores.

Table 22. Status and data availability of registered bores with water level proximate to Project area

Bore ID	Bore purpose	Status	Start of record	End of record	Distance to Site
13620103	Unknown	Decommissioned	1973	1993	~1.9 km north
13620104	Unknown	Decommissioned	1973	1992	~1.9 km north
13620300	Monitoring	Functional	1975	Ongoing	~3.9 km northeast
13620301	Unknown	Decommissioned	1975	2002	~3.9 km northeast
13620302	Unknown	Decommissioned	1975	2004	~3.9 km northeast
13620335	Monitoring	Functional	2006	Ongoing	~2.9 km northeast
13620336	Monitoring	Functional	2006	Ongoing	~2 km north

Table 23. Registered bores with water level data within the study area

Bore ID	SWL (mbgl)	Bore depth (m)	RSWL (mAHD)	Top aquifer (mAHD)	Measured date	Formation name	Aquifer lithology
13620103	14.22	12.9	Unknown	10.00	01/01/1993	Barambah Creek Alluvium	GRAV - Gravel
13620104	4.80	14.1	Unknown	10.00	12/05/1992	Barambah Creek Alluvium	GRAV - Gravel SAND - Sand
13620300	4.76	11.5	290.88	5.20	20/02/2020	Barambah Creek Alluvium	GRAV - Gravel
13620301	3.20	6.0	Unknown	Unknown	14/02/2002	Unknown	Unknown
13620302	3.76	12.2	Unknown	12.00	27/10/2004	Barambah Creek Alluvium	GRAV - Gravel
13620335	4.04	19.5	294.4	Unknown	07/09/2021	Unknown	Unknown
13620336	5.22	14.3	286.59	Unknown	07/09/2021	Unknown	Unknown

The depth of the bores with recent depth readings ranged from 4.04 to 5.22 (mbgl). All bores were screened with Barambah Creek Alluvium Formation aquifer. Groundwater level readings taken from the alluvial aquifer

system show a range between 286.59 and 290.88 mAHD within the Barambah Creek Alluvium Formation. No flow data was available for these bores.

The existing bores that show water level data, are all screened within the Barambah Creek Alluvium, and are a significant distance (> two km) from the site. No water level data is recorded for bores screened in other rock types or aquifers. The water level data in **Table 23** were collected at the time of drilling and are many years apart in most cases. Therefore, it is not possible to determine water level contours for the site, and for each aquifer type, or the region or derive groundwater flow directions.

6.5.2.4 Onsite Groundwater Levels

Groundwater levels have been recorded at two onsite groundwater bores between 2016 and 2019. Groundwater bores South Bore (MUR 01) and North Bore (MUR 02) are located to the south and west of the mine pit respectively, as shown in **Figure 13**. Groundwater was reported between 8.3 metres Below Top of Casing (mBTC) and 15.4 mBTC, with fluctuations in level reported consistently between MUR 01 and MUR 02 indicating they are likely hydraulically linked. Water level was generally reported between 276 and 291 mAHD, with MUR 01 consistently ~2 m lower than MUR 02.

Water levels reported relative to casing level is displayed in **Figure 14**.

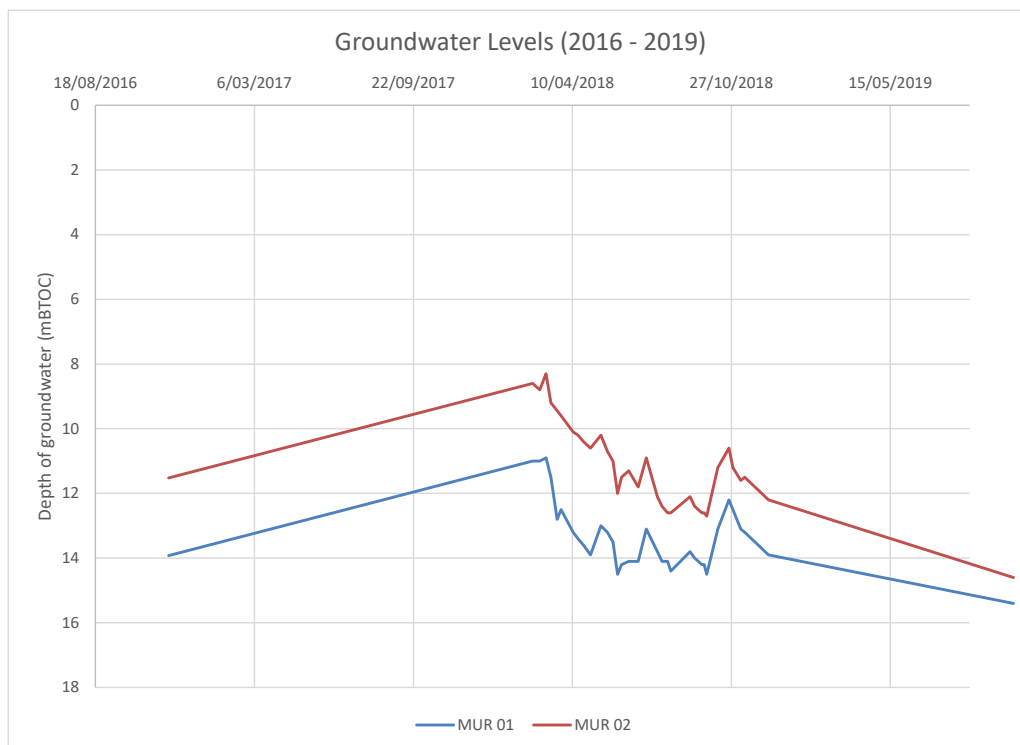


Figure 14. Water level observations – Onsite bores

6.5.2.5 Groundwater Quality

The BoM groundwater explorer (BoM 2020) identified seven bores within the study area screened into the Barambah Creek Alluvium. Water quality data was available for three functional bores. Groundwater salinity (EC) for the three functional bores ranges from 813 to 4,780 $\mu\text{S}/\text{cm}$ and pH ranges between 6.1 and 7.8. Water quality data is available for the North bore (MUR02) and South bore (MUR01) as well as from the Pit (seepage derived) and Dam C (which received pumped pit seepage) shown on **Figure 13**. The results of the quality analysis for two sampling rounds of July 2021 and November 2021 are summarised in **Table 24**. Neither the two bores, Pit nor Dam C sits within a recognised aquifer boundary (**Figure 13**). The results of the quality analysis of a wider range of compounds undertaken in February and March 2022 are summarised in **Table 24**.

Groundwater electrical conductivity for the two bores, Pit and Dam C ranges between 270 and 1,030 ($\mu\text{S}/\text{cm}$) and pH ranges between 7.6 and 8.5.

ERM (2008) previously characterised the water from the mine sump (which is fed by groundwater seepage) as calcium-sodium-chloride-bicarbonate dominated (reflecting the surrounding geology) and the water in Barambah Creek as sodium-magnesium-chloride dominated. ERM (2008) concluded that groundwater seeping into the void is unlikely to be sourced directly from Barambah Creek, rather it reflects water derived from rainfall recharge into the local limestone groundwater system. The water quality results presented in **Table 24** are in broad agreement with these findings.

None of the concentrations of groundwater quality indicators is of concern for the protection of groundwater EVs as presented in **Section 6.5.1**.

Table 24. Analytical results of the water quality measurement

Analyte	Unit	Pit ¹				Dam C ²				North bore				South bore			
		July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022
pH Value	-	8.18	8.09	8.22	7.98	8.55	8.02	8.49	7.54	-	6.19	8.10	8.18	-	7.76	7.64	8.17
Electrical Conductivity	µS/cm	841	599	551	560	435	455	270	247	-	390	323	372	-	314	1030	733
Suspended Solids	mg/L	<5	<5	10	9	11	12	25	10	-	22	<5	8	-	16	6	<5
Hydroxide Alkalinity as CaCO ₃	mg/L	-	-	<1	<1	-	-	<1	<1	-	-	<1	<1	-	-	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	-	-	<1	<1	-	-	10	<1	-	-	<1	<1	-	-	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	-	-	112	117	-	-	85	66	-	-	175	192	-	-	286	182
Total Alkalinity as CaCO ₃	mg/L	-	-	112	117	-	-	96	66	-	-	175	192	-	-	286	182
Sulfate as SO ₄	mg/L	-	-	29	27	-	-	4	6	-	-	1	1	-	-	34	23
Chloride	mg/L	-	-	94	84	-	-	33	15	-	-	5	8	-	-	168	122
Calcium	mg/L	84	60	45	53	24	34	24	25	-	20	26	32	-	20	48	40
Magnesium	mg/L	-	-	13	12	-	-	6	4	-	-	11	12	-	-	26	19
Sodium	mg/L	-	-	56	49	-	-	30	16	-	-	35	34	-	-	145	144
Potassium	mg/L	-	-	1	1	-	-	2	2	-	-	<1	<1	-	-	2	2
Arsenic	mg/L	-	-	<0.001	<0.001	-	-	0.001	0.001	-	-	<0.001	<0.001	-	-	0.002	0.002
Cadmium	mg/L	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001
Chromium	mg/L	-	-	<0.001	<0.001	-	-	<0.001	<0.001	-	-	0.001	0.001	-	-	<0.001	<0.001
Copper	mg/L	-	-	<0.001	0.001	-	-	<0.001	<0.001	-	-	<0.001	<0.001	-	-	<0.001	0.001
Nickel	mg/L	-	-	<0.001	0.001	-	-	0.001	<0.001	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Lead	mg/L	-	-	<0.001	<0.001	-	-	<0.001	<0.001	-	-	<0.001	<0.001	-	-	<0.001	<0.001
Zinc	mg/L	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	<0.005	0.005
Nitrite + Nitrate as N	mg/L	3.67	6.23	3.41	3.53	0.28	2.62	0.11	7.89	-	0.19	1.01	0.60	-	0.19	0.22	0.24
Total Kjeldahl Nitrogen as N	mg/L	<0.5	1.2	0.6	0.7	0.4	0.8	0.6	1.0	-	1.2	<0.1	0.3	-	1.1	0.2	0.2
Total Nitrogen as N	mg/L	3.7	7.4	4.0	4.2	0.7	3.4	0.7	8.9	-	1.4	1.0	0.9	-	1.3	0.4	0.4
C6 - C9 Fraction	µg/L	-	-	<20	<20	-	-	<20	<20	-	-	<20	<20	-	-	<20	<20

Analyte	Unit	Pit ¹				Dam C ²				North bore				South bore			
		July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022	July 2021	Nov 2021	Feb 2022	March 2022
C10 - C14 Fraction	µg/L	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50
C15 - C28 Fraction	µg/L	-	-	<100	<100	-	-	<100	<100	-	-	<100	<100	-	-	<100	<100
C29 - C36 Fraction	µg/L	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50
C10 - C36 Fraction (sum)	µg/L	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50	-	-	<50	<50
Sum of BTEX	µg/L	-	-	<1	<1	-	-	<1	<1	-	-	<1	<1	-	-	<1	<1
Naphthalene	µg/L	-	-	<5	<5	-	-	<5	<5	-	-	<5	<5	-	-	<5	<5

1 The Pit, while technically a surface water body, is understood to be groundwater derived

2 Dam C receives pumped water from the Pit, which is understood to be groundwater derived

6.5.3 Potential Impact

Risks to groundwater includes potential hydraulic connectivity with underlying aquifers resulting from unexpected interaction between the exploration drill holes intersecting groundwater aquifers. Potential risks also include infiltration of uncontrolled release of fuels or chemicals resulting in degradation of groundwater quality.

While the depth of groundwater in the location of the proposed exploration drilling is uncertain, exploration beyond a depth of 10 m below ground level (mbgl) is likely to encounter groundwater.

Given the distance to identified groundwater users (>9 km) it is not expected that any interaction with shallow groundwater aquifers will result in unacceptable draw-down or adversely impact upon groundwater availability for those identified users.

6.6 Air

Queensland *Environmental Protection (Air) Policy 2019* (EPP (Air)) identifies EVs to be enhanced or protected and specifies air quality objectives for indicators to protect these values. These objectives are derived from national and international standards.

Under the EPP (Air), the following EVs are to be enhanced or protected:

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

6.6.1 Existing Environment

The EPP (Air) incorporates most of the goals nominated within the *National Environmental Protection (Ambient Air Quality) Measures* and specifies air quality objectives for pollutant compounds relevant to the site. Air quality objectives from the EPP (Air) are summarised in **Table 25**.

Air quality monitoring is not a requirement for the Project unless requested by DETSI, as such there is no site-specific data available. Additionally, there are no air quality monitoring stations near the Project.

The closest monitoring stations are Nambour, Mountain Creek, and Maryborough have been included in **Table 25**. These stations are approximately 104 km southeast, 120 km southeast and 110 km northeast respectively.

Table 25. Relevant air quality criteria from EPP (Air)

Indicator	Current measurements from nearby air quality stations (µg/m ³)			Averaging period	Objectives (µg/m ³) ^c	'Good' Air Quality ^e category measurement range
	Nambour	Mountain Creek	Maryborough			
Particle PM _{2.5} ^a	1.9	0.9	2.3	24 hours	25 ^c	<50 µg/m ³
	-	-	-	1 year	8	-
Particle PM ₁₀ ^b	6.4	4.1	8	24 hours	50 ^d	<25 µg/m ³
	-	-	-	1 year	25	-
TSP	-	-	-	1 year	90	-

Source: Queensland Government (QG 2025a)

^a Airborne particles less than 2.5 micrometres in diameter, referred to as PM_{2.5}, measured in micrograms per cubic metre (µg/m³)

^b Airborne particles less than 10 micrometres in diameter, referred to as PM₁₀, measured in micrograms per cubic metre (µg/m³)

^c taken from the interim guideline set at twice the enHealth breakpoint between the 'Fair' and 'Poor' categories for PM_{2.5}

^d taken from the enHealth guidance for public health agencies managing prolonged smoke events from landscape fires (Department of Health, Disability and Ageing (DHDA), 2024)

^e taken from the Air quality categories defined in the Air quality monitoring network stations in Qld (QG 2025b)

6.6.1.1 Sensitive Receptors

Air quality sensitive receptors are detailed in **Section 3.6** and shown in **Figure 4**. The EA states that air quality impacts from the Project must not cause environmental nuisance at any sensitive place. As at the time of writing this report, no complaints have been received, indicating the Project is operating within the bounds of the EA.

6.6.2 Potential Impacts

The Proposed activity is in line with existing works presently undertaken on the Project. It is not considered likely to create additional adverse impact upon air quality.

6.7 Noise and Vibration

The *Environmental Protection (Noise) Policy 2019* (EPP (Noise)) identifies EVs to be enhanced or protected relating to the qualities of the acoustic environment that are conducive to:

- Protecting the health and biodiversity of ecosystems
- Human health and wellbeing, including an individuals' ability to have sleep, study or learn, and recreation activities (including relaxation and conversation)
- Protect the amenity of the community

Noise limits for general operation are not defined in the EA, however the following noise and vibration criteria exists for blasting operations:

- The airblast overpressure must be not more than 115dB(linear) peak for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts
- The airblast overpressure must not exceed 120dB(linear) peak for any blast
- The ground-borne vibration must not exceed a peak particle velocity of 5mm per second for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts
- The ground-borne vibration must not exceed a peak particle velocity of 10mm per second for any blast.
- Acoustic quality objectives are outlined in Schedule 1 of the EPP (Noise). The acoustic quality objectives required for sensitive receptors that have been identified in the surrounding area (refer to **Section 3.6**) are listed in **Table 26**.

Table 26. Acoustic Quality Objectives

Sensitive Receptor	Time of Day ¹	Acoustic Quality Objectives (measured at the receptor) dB(A)			Environmental Value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
Dwelling (for outdoors)	Daytime and evening	50	55	65	Health and Wellbeing
Dwelling (for indoors)	Daytime and evening	35	40	45	Health and Wellbeing
	Night-time	30	35	40	Health and Wellbeing and in relation to the ability to sleep
Library and educational institution (including a school, college and university) (for indoors)	When open for business or when classes are being offered	35	-	-	Health and Wellbeing
School or playground (for outdoors)	When the children usually play outside	55	-	-	Health and wellbeing, and community amenity

Sensitive Receptor	Time of Day ¹	Acoustic Quality Objectives (measured at the receptor) dB(A)			Environmental Value
		LAeq,adj,1hr	LA10,adj,1hr	LA1,adj,1hr	
Commercial and retail activity (for indoors)	When the activity is open for business	45	-	-	Health and wellbeing, in relation to the ability to converse
Park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment	Anytime	the level of noise that preserves the amenity of the existing park or garden			Community amenity

¹Where daytime is defined as 7am to 6pm, evening is defined as 6pm to 10pm, night-time is defined as 10pm to 7am.

6.7.1 Existing Environment

The site is located in a regional setting, away from major noise generating activities. Noise generating activities within the site include:

- Operation of vehicles, and mobile and fixed plant
- Noise generated by Project related traffic
- Dumping of rock from plant and heavy vehicles
- Extraction of rock (including blasting and mechanical excavation)

Noise monitoring is to be undertaken when requested by the administering authority upon receipt of a complaint. To date, there have been no complaints received and noise monitoring has not been requested.

In lieu of background noise monitoring data, and in consideration of there being no complaints received, background noise levels are considered to be below the acoustic quality objectives.

6.7.1.1 Sensitive Receptors

Refer to **Section 3.6** for a description of sensitive receptors identified for the Proposed activity.

6.7.2 Potential Impact

No changes are proposed to the site noise limits, it is not expected that there will be any adverse impact resulting from the proposed activities.

Existing site operations include blasting and mechanical excavation, undertaken in adherence to the EA conditions. None of the proposed amendments are considered likely to cause any additional noise when compared to these existing site operations and will therefore not result in any additional impact to the regions noise values.

6.8 Waste

There are no prescribed environmental values relating to waste management under the EP Act. Generally, EVs that can be impacted by waste include:

- Air quality
- Land quality and land use
- Surface and groundwater quality
- Visual amenity
- Biodiversity and ecological processes

6.8.1 Existing Environment

Waste generated from site operations that are relevant to this EA amendment include overburden material and waste rock, processing residue and scalp material. All waste generated is currently disposed of within the onsite waste rock dump (WRD), noting the ongoing management and authority to operate the WRD is subject to a pending EA amendment, not this amendment.

Waste likely to be generated through the undertaking of the Proposed activity includes minor amounts of overburden and waste rock brought to the surface as drilling spoil. All material not required for analysis will be returned to the drilling hole in reverse order where practicable.

Surplus volumes expected to be generated are minor (<1,000 m³) and will be disposed of in line with existing waste management processes.

6.8.1.1 Waste Rock

Graymont commissioned SESL to characterise waste rock within the WRD (SESL 2021); it is considered this material is representative of material likely to be encountered during exploration works. Total element analysis was conducted using X-ray Fluorescence (XRF) methodology, and the presence of minerals was identified using X-Ray Diffraction (XRD).

A summary of the XRD results has been provided in **Table 27**. None of the minerals identified are considered to pose a risk to environmental receptors as they are not acid-generating upon weathering.

Table 27. Summary of XRD results from waste rock dumps

Sample ID	Waste rock dump location	Minerals
SESL_N1	Northern	Quartz, micaceous minerals at rarer alumino-silicates Clay minerals including kaolinite or montmorillonite Iron oxides
SESL_N2	Northern	
SESL_N3	Northern	
SESL_N4	Northern	
SESL_NE1	Northeastern	Quartz, micaceous minerals at rarer alumino-silicates Clay minerals including kaolinite or montmorillonite Iron oxides Calcite
SESL_NE2	Northeastern	
SESL_NE3	Northeastern	
SESL_NE4	Northeastern	
SESL_NE5	Northeastern	
SESL_NE6	Northeastern	
SESL_NE7	Northeastern	

XRF results indicate low concentrations of heavy metals, including those of primary concern. Concentrations of arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), nickel (Ni), and zinc (Zn) were negligible.

The dispersion % (proportion of clay that goes into suspension on mechanical agitation) was classified as 'slight'. A summary of sample results can be seen in **Table 28**.

Table 28. Dispersibility results from waste rock dump sites

Sample ID	Clay dispersion (%)	Rating
Topsoil NE dump north dispersion	7.75	Slight
Topsoil north dump dispersion	13.2	Slight
Topsoil NE dump south dispersion	7.19	Slight
Topsoil NE dump south dispersion	8.06	Slight

SESL concluded that the XRD, XRF, and dispersibility results suggest that there is minimal environmental risk of acid mine drainage or dispersion presented by the mining overburden and that the material is fit for reuse in revegetation works onsite. The results align with water quality results from the void and sediment dam (**Section 6.4.1.4**) receiving mine affected drainage and there is no evidence of acid pH, elevated salt or elevated metals that would indicate the potential for acid, metalliferous or saline mine drainage.

The results of analysis for the scalps is summarised in **Table 29**.

Table 29. Analytical results of scalps material

Analyte	Units	Sample 1	Sample 2	Average
pH (in CaCl ₂)	Units	7.63	7.50	7.57
Electrical Conductivity (EC 1:5 extract)	dS/m	0.14	0.18	0.16
EC _{SE} (estimated saturate paste extract)	dS/m	1.30	1.50	1.40
Textural Class	NA	Sandy clay loam	Fine sandy clay loam	NA
Approximate clay content (low range)	%	20-30	30-35	c.30
Salinity rating	NA	Low	Low	Low
Exchangeable Calcium	cmol+/kg	190.77	96.96	143.87
Exchangeable Magnesium	cmol+/kg	2.70	3.98	3.34
Exchangeable Potassium	cmol+/kg	0.09	0.23	0.16
Exchangeable Sodium	cmol+/kg	0.13	0.13	0.13
Effective Cation Exchange Capacity (ECEC)	cmol+/kg	193.69	101.30	147.50
Exchangeable Sodium percentage (ESP)	%	0.07	0.13	0.10
Sodicity rating	NA	Non-sodic	Non-sodic	Non-sodic
Chloride	mg/kg	26.5	15.2	20.9
Nitrate-N	mg N/kg	7.5	14	10.8
Available phosphorus (P)	mg P/kg	<5	13.5	13.5
Available iron (Fe)	mg/kg	44.3	51	47.7
Available manganese (Mn)	mg/kg	47	51	49.0
Available copper (Cu)	mg/kg	3.8	3.2	3.5
Available boron (B)	mg/kg	0.1	0.4	0.3
Available zinc (Zn)	mg/kg	5.8	4.9	5.4

The scalps material is non-sodic and has a medium soil texture, slightly alkaline pH and low salinity. However, it is low in major nutrients. There is no physical or chemical limitation to this material being used as a subsoil or a soil forming material for manufacture of a topsoil substitute.

The scalps require no amelioration if they are used as a subsoil. If they are used as a topsoil substitute, they will require amelioration with 10% organic material (such as recycled organics) and an application of 200 kg/ha (20 g/m²) of monoammonium phosphate (or equivalent) and 400 kg/ha (40 g/m²) of muriate of potash (potassium sulfate) to improve fertility.

6.8.2 Potential Impact

Waste material anticipated to be generated through the undertaking of exploration works is well characterised. With anticipated volumes generated to be negligible to minimal, and existing waste management processes already in place, there is unlikely to be any adverse impact resulting from the undertaking of the Proposed activity.

6.9 Social and Economic

6.9.1 Existing Environment

The nearest communities to the project are Cherbourg, located around 2 km to the west, and Murgon, located approximately 5 km north-west. The surrounding area is predominantly rural, with agricultural land uses and small localities such as Moffatdale. The closest sensitive receptor (residential) is located approximately 1.4 km south of the Project.

Murgon is the nearest major service centre, with a population of 2,220 people (ABS 2021), and is part of the South Burnett Local Government Area (LGA). The town provides access to essential services, retail, education, and health infrastructure. The local economy is supported by agriculture, small businesses, and service

industries. Murgon has a higher proportion of Indigenous communities (16%) compared to South Burnett (6%) and Queensland (4.6%).

Murgon community is characterised by:

- An older median age (48) compared to Queensland (38)
- A lower median weekly household income (\$984) compared to the South Burnett Region (\$1,045) and Queensland (\$1,675)
- A higher percentage of single-parent families (23.8%) compared to the South Burnett Region (17.2%) and Queensland (16.8%)

Key employment sectors include education and training, aged care residential services, health care services, and retail. The main occupations include community and personal service workers, labourers, professionals, managers, and technicians and trades workers.

Cherbourg is an Aboriginal community administered by the Cherbourg Aboriginal Shire Council (CASC), with a population of 1,194 people (ABS 2021). It is historically significant as a former Aboriginal settlement, established under protectionist legislation. Originally named Barambah, the 7,000 acres was originally gazetted and established as a mission station to 'segregate them from the European population, protecting them from alcohol and opium and providing better medical attention' and 'instruction in industrial habits'. In 1935, following several 'collection' campaigns, it was estimated there were 28 'tribal' groups present within the town. Following a rich history of challenges, the town was renamed 'Cherbourg' and elected their first Cherbourg Community Council in 1966 and then took over management of the community in 1986 from the state under a Deed of Trust.

Cherbourg continues to be home to the Wakka Wakka People, who are the registered Aboriginal cultural heritage party for the region. While there are no native title determinations or claims over the Project area, engagement with the Wakka Wakka People is undertaken in accordance with the *Aboriginal Cultural Heritage Act 2003 (Qld)*. Further discussion of cultural heritage is provided in Section 6.10.

The community is characterised by:

- A younger median age (23) compared to the South Burnett Region (48) and Queensland (38)
- A lower median weekly household income (\$793) compared to the South Burnett Region (\$1,045) and Queensland (\$1,675)
- A higher percentage of single parent families (58%) compared to the South Burnett Region (17.2%) and Queensland (16.8%)

The main occupations in Cherbourg include community and personal service workers (34.1%), labourers (18.9%), professionals (15.7%) and clerical and administrative workers (11.4%), with a higher proportion of these employment categories being represented in Cherbourg in comparison to the broader South Burnett LGA. Cherbourg town also provides a range of community services, infrastructure, a hospital and social and sporting group opportunities for community members.

Moffatdale is a small rural locality located south-east of the Project, with a population of approximately 257 people (ABS 2021). It is primarily agricultural, with limited services beyond a primary school, and residents typically access health, retail, and secondary education services in Murgon.

6.9.2 Potential Impact

The Project currently operates on a single-shift basis and employs approximately five full-time equivalent (FTE) staff, most of whom reside in the Murgon area. The operation also engages contractors for transport, maintenance, mining, fabrication, electrical and plumbing contracts with local and regional businesses, generating indirect employment benefits in the South Burnett region. No change to workforce numbers or operating schedule is currently proposed, however if operations continue beyond scheduled closure, additional employment opportunities will be presented.

Given the nature and scale of the proposed amendment, no significant socio-economic impacts are anticipated. The amendments do not involve any change in production volume, workforce size, or land use

footprint, and are unlikely to generate any measurable off-site effects. As such, there is no expected impact to local employment, service demand, or community wellbeing indicators. No complaints or amenity-related incidents have been recorded to date.

Graymont has been and remain committed to maintaining positive relationships with the local community and stakeholders. The company has a history of engagement in Murgon and the broader South Burnett region and will continue to undertake stakeholder consultation and social due diligence in accordance with good practice.

6.10 Cultural Heritage

6.10.1 Existing Environment

The existing environment as it relates to cultural heritage is described in **Section 6.10.1.1** (Indigenous cultural heritage) and **Section 6.10.1.2** (non-indigenous cultural heritage).

6.10.1.1 Indigenous Cultural Heritage

There is an existing Indigenous Land Use Agreement (ILUA) over the Project area; the Wakka Wakka #2 and Tarong ILUA (Tribunal No: QI2008/027). This ILUA is an area agreement with the Tarong Energy Corporation Limited (Can 078 848 736).

There are no Native Title determinations or claims specific to the Project which is on freehold land. However, Barambah Creek which borders the western boundary of the Project is mapped under the Registered Native Title Bodies Corporate (RNTBC) area for Wakka Wakka Native Title Aboriginal Corporation (Tribunal No: QCD2022/003, QCD2022/004, QCD2023/009).

6.10.1.2 Non-Indigenous Cultural Heritage

Non-indigenous cultural heritage values are protected under the *Queensland Heritage Act 1992* in Queensland and are generally associated with human activities since the beginning of non-indigenous settlement of an area, as well as natural places which have meaning for people of the current day.

There are no non-indigenous Cultural Heritage areas located within the Project area. The nearest state heritage listed value is the South Burnett Co-operative Dairy Association Factory (former) (602811) which is located approximately 5.5km northwest of the Project along Cemetery Road, Clermont, as determined through a review of the Queensland Government Heritage Register and GRC Local Heritage Register (LHR) (QG 2025b).

6.10.2 Potential Impact

Proposed activities will all be undertaken within the areas of disturbance currently authorised. There will be no impact to Indigenous or non-indigenous cultural heritage as a result of the proposed activities being sought under this EA amendment.

6.11 Summary of Potential Impacts

A summary of the potential impacts of proposed amendments (**Section 4**) on EVs is provided in **Table 30**.

Table 30. Summary of potential environmental impacts

Environmental Value	Authorisation of exploration activities
Land	Possible impact on the environmental value. Disturbance associated with exploration activities will occur within areas that have already been disturbed. There is no anticipated increased impact on land resulting from exploration activities. While exploration works are proposed within already disturbed areas, these areas have presently been stabilised to prevent erosion. Through undertaking exploration

Environmental Value	Authorisation of exploration activities
	works small areas will be exposed and may be subjected to minor impact from erosion. Potential impacts include: - Increased risk of sediment mobilisation through localised erosion at the site of exploration drilling - Contamination of land as a result of uncontrolled release of chemicals and fuel from plant and equipment
Surface water and wetlands	Possible impact on the environmental value. Exploration activities are proposed within existing authorised disturbance areas. There are no surface water bodies or wetlands located within proximity of the proposed exploration area. No additional impact is expected as a result of the proposed amendment however there is potential that runoff from exploration activities, if not appropriately managed, could enter downstream watercourses. Potential impacts include: - Mobilisation of sediment from exploration drilling works entering watercourses and impacting water quality - Uncontrolled release of chemicals and fuels entering watercourses and impacting water quality
Groundwater	Possible impact on the environmental value. Exploration activities proposed through this amendment are not expected to significantly impact upon groundwater. There is however, some uncertainty surrounding groundwater levels around the pit extent, with interaction of exploration boreholes and groundwater considered likely. Potential impacts include: - Interaction of exploration boreholes and groundwater providing connectivity between surface and groundwater and exposing groundwater to potential contaminants - Uncontrolled release of chemicals and fuels infiltrating groundwater aquifers
Ecology	Possible impact on the environmental value. The area subject to the proposed amendment is located within an area authorised for disturbance. There is not expected to be any additional impact resulting from the undertaking of exploration activities on terrestrial ecology. Potential impacts include: - Offsite migration of sediment to reduce water quality of downstream watercourses, impacting upon aquatic species - Uncontrolled release of chemicals and fuels entering watercourses and impacting water quality
Air quality	No/Negligible impact on the environmental value. Exploration activities are consistent with works already authorised, and undertaken, at site. No additional impact to air quality is likely to occur as a result of the proposed amendment.
Greenhouse gas / Climate	No/Negligible impact on the environmental value. The Proposed activities are not going to generate significant greenhouse gas emissions. There is no expected impact on the climate as a result of this amendment.

Environmental Value	Authorisation of exploration activities
	Exploration activities are consistent with works already authorised, and undertaken, at site, with no further vegetation clearing required. No additional impact to greenhouse gas emissions is likely to occur as a result of the proposed amendment.
Noise and vibration	No/Negligible impact on the environmental value. Exploration activities are consistent with works already authorised, and undertaken, at site. There is no increase in scale, magnitude or extent of the existing works. No additional impact to noise and vibration is likely to occur as a result of the proposed amendment.
Traffic	No/Negligible impact on the environmental value. There is no predicted impact on traffic values as a result of this proposed amendment
Waste	No/Negligible impact on the environmental value. Only minor changes to waste generated at site will occur as a result of this amendment. There is not expected to be any impact on waste management at the site as a result of this amendment.
Cultural heritage	No/Negligible impact on the environmental value. There is no increased disturbance associated with this amendment. Therefore there is no impact expected on cultural heritage values as a result of this amendment.
Socio economic	No/Negligible impact on the environmental value. Activities required for the proposed amendment align with existing activities undertaken at the site. There is no additional impact on socio-economic values associated with the undertaking of exploration activities.

7 RISK ASSESSMENT

The purpose of this EA application is to identify potential environmental impacts associated with the Proposed activity, describe environmental risks, and assess the likely magnitude of impacts on EVs identified in **Section 6**. This has been achieved through a preliminary environmental risk assessment with a methodology aligned with the AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines.

7.1 Method

A risk assessment was undertaken to determine the potential for the Proposed activity to impact on the environment using a quantitative assessment of the scale and magnitude of risks associated with the activity. A risk matrix was used to determine the likelihood and consequence of potential impacts.

‘Likelihood’ is defined as the chance that something might happen, refer **Table 31**. ‘Consequence’ is defined as the outcome of an event which may have the potential to change the existing EVs, refer **Table 32**. A likelihood and consequence score are generated for each hazard, which combine to determine the category of risk (high, medium, or low), refer **Table 33**. The residual risk score should be as low as reasonably practicable.

Table 31. Categories of likelihood

Value	Category	Description
5	Almost Certain	May occur several times per year or is expected to occur
4	Likely	May occur about once per year or more likely to occur than not occur.
3	Possible	Could occur more than once during a lifetime or more likely to occur as not to occur.
2	Unlikely	Could occur about once during a lifetime or more likely not to occur than to occur.
1	Rare	Unlikely to occur during a lifetime or very unlikely to occur.

Table 32. Categories of consequence

Value	Category	Description
5	Catastrophic	Permanent environmental damage: remediation will take more than 5 years to remediate or remediation costs exceed \$500,000.
4	Major	Long term environmental impact. Remediation between 1-5 years or costs between \$50,000 and \$500,000.
3	Moderate	Medium-term environmental damage. Remediation will be between 2 months and 1 year or cost between \$10,000 and \$50,000.
2	Minor	Short-term environmental impact. Remediation will take less than 2 months or cost less between \$5,000 and \$10,000. No lasting environmental damage.
1	Negligible	No environmental impact. Remediation costs less than \$5,000 or requires minor or no remediation.

Table 33. Likelihood and consequence matrix

		Consequence				
		1	2	3	4	5
Likelihood	5	High	High	Critical	Critical	Critical
	4	Moderate	High	High	Critical	Critical
	3	Low	Moderate	High	High	Critical
	2	Low	Low	Moderate	High	High
	1	Low	Low	Low	Moderate	Moderate

7.2 Risk Assessment

A risk assessment has been undertaken in **Table 34** based on the potential impacts to EVs identified in **Section 6.11**. These environmental risk assessments evaluate the environmental risk associated with the Project.

Table 34. Risk Assessment

Aspect	Amendment Reference	Risk Event	Inherent Risk			Proposed Mitigation / Controls	Residual Risk		
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating
Land	1	Uncontrolled release of chemicals and fuels resulting in contamination of land	2	3	Mod	- Refuelling to be undertaken in a designated refuelling area. - Applicable materials/chemicals will be stored and handled in accordance with relevant legislative requirements and Australian standards.	1	3	Low
		Construction works and ground disturbance resulting in increased erosion	3	3	High	- Works will be stabilised upon completion of works, at end of day and/or when rain is forecast - Works will be undertaken in accordance with <i>“Technical Guidelines for the Environmental Management of Mining and Exploration in Queensland”</i>	2	3	Mod
Surface water and wetlands	1	Mobilisation of sediment from exploration drilling works entering watercourses, impacting water quality	2	3	Mod	- Works will be undertaken in accordance with <i>“Technical Guidelines for the Environmental Management of Mining and Exploration in Queensland”</i> - Erosion and sediment controls will be developed and implemented prior to works commencing - The drilling contractor will prepare and implement a Construction Erosion and Sediment Control Plan for the duration of the Project.	1	3	Low
		Uncontrolled release of chemicals and fuels entering watercourses and impacting water quality	2	4	High	Applicable materials/chemicals will be stored and handled in accordance with relevant legislative requirements and Australian Standards.	1	4	Mod

Aspect	Amendment Reference	Risk Event	Inherent Risk			Proposed Mitigation / Controls	Residual Risk		
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating
Groundwater	1	Degradation of groundwater quality in local aquifers due to infiltration of contaminants	2	3	Mod	Applicable materials/chemicals will be stored and handled in accordance with relevant legislative requirements and Australian Standards.	1	3	Low
Ecology	1	Offsite migration of sediment resulting in reduced water quality impacting aquatic species	2	3	Mod	- Erosion and sediment controls will be developed and implemented prior to the upgrade works commencing. - The construction contractor will prepare and implement a Construction Erosion and Sediment Control Plan for the duration of the Project. - Water quality monitoring will be undertaken during rainfall events as required by the EA	1	2	Low
		Uncontrolled release of chemicals and fuels entering watercourses resulting in degradation of water quality and impact to aquatic species	2	3	Mod	- Refuelling to be undertaken in a designated refuelling area. - Applicable materials/chemicals will be stored and handled in accordance with relevant legislative requirements and Australian standards. - Spill kits to be located in all work areas and be readily accessible	1	2	Low

8 RELATIONSHIP WITH OTHER APPROVALS

8.1 Progressive Rehabilitation and Closure Schedule

The proposed amendment of the EA as documented within this report, if approved, will result in the EA becoming inconsistent with the PRCP RPP and PRCP Schedule. As such a joint PRCP/EA amendment is being sought (the accompanying application).

In accordance with Chapter 5, Part 7, Division 2, Section 226B of the EP Act, an amendment application for a PRCP schedule must be accompanied by an amended Rehabilitation Planning Part (RPP) that complies with Section 126C in relation to the proposed amendment. The amended PRCP Schedule and RPP are provided in **Appendix C** and **Appendix D** respectively.

A summary of amendments made to the PRCP Plan and PRCP Schedule is provided in **Table 35**.

Table 35. Proposed PRCP Amendments

PRCP Reference	Original Wording / Detail	Proposed Wording / Detail
Rehabilitation Planning part		
Section 2.1	“For Murgon, the primary land outcome documents is the EA (MIN100485506 – received 24 April 2008 with an anniversary date 8 August, replacing the previous EA - MIN100485506 approved on 8 August 2007).”	Section 2.1 of the RPP has been updated to include a comment in relation to the EA that is currently being sought for the land outcome document “For Murgon, the primary land outcome documents is the EA (MIN100485506 – received 24 April 2008 with an anniversary date 8 August, replacing the previous EA - MIN100485506 approved on 8 August 2007). The EA is currently the subject of an EA amendment, with a joint EA/PRCP Schedule amendment to be submitted to the administering authority October 2025.”
Section 3.1.9.3 Mining operation	Section 3.1.9.3 of the RPP includes detail of the activities presently undertaken at the site, including vegetation removal, excavation, blasting, crushing, milling and screening. “Mining consists of conventional open cut benching methods currently being performed by Graymont and their respective contractors. Operations are conducted on a single shift basis, normally between the hours of 6.00am to 6.00pm Monday to Friday.”	Section 3.1.9.3 of the RPP was updated to include details on the Proposed activity as described in Section 3.3 of this report. Specifically, the updates to the text included the addition of exploration activities.
Section 3.1.9.4 Mine features and disturbance types	Table 12 in the RPP lists details of disturbance types present across the site, alongside the representative Rehabilitation Areas, including: • RA1 (northern overburden dump, northeastern overburden dump) • RA2 (northern overburden dump – under construction)	Table 12 in the RPP was updated to include exploration drilling, as below. • RA1 (northern overburden dump, northeastern overburden dump) • RA2 (northern overburden dump – under construction) • RA3 (northeastern overburden dump – under construction)

PRCP Reference	Original Wording / Detail	Proposed Wording / Detail
	• RA3 (northeastern overburden dump – under construction) • RA4 (Sediment Dam C) • RA5 (limestone/product stockpiles, sheds, silos/bins, plant, laydown area, miscellaneous scrap, small tanks) • RA6 (residual void) • RA7 (tracks – unsealed) • RA8 Sediment Dam A, Sediment Dam B, Sediment Dam D) • RA9 (above ground tank and heavy mine equipment parking area) • RA10 (office, workshop, sheds)	• RA4 (Sediment Dam C, exploration area) • RA5 (limestone/product stockpiles, sheds, silos/bins, plant, laydown area, miscellaneous scrap, small tanks, exploration area) • RA6 (residual void, exploration area) • RA7 (tracks – unsealed, exploration area) • RA8 Sediment Dam A, Sediment Dam B, Sediment Dam D, exploration area) • RA9 (above ground tank and heavy mine equipment parking area, exploration area) • RA10 (office, workshop, sheds, exploration area)
Section 3.1.11.2 Rehabilitation milestones	• Table 16 (RPP) describes the milestone description for RA4 and RA8. • Table 17 (RPP) describes the milestone description for RA5, RA9 and RA10. • Table 18 (RPP) describes the milestone description for RA6. • Table 19 (RPP) describes the milestone description for RA7 and RA10 • Figure 22 shows the timeline of significant rehabilitation works, with rehabilitation milestones assigned by year.	• Table 16 (RPP) was updated to include exploration area in the disturbance type for RA4 and RA8, and inclusion of an additional rehabilitation milestone (RM10) • Table 17 (RPP) was updated to include exploration area in the disturbance type for RA5, RA9 and RA10, and inclusion of an additional rehabilitation milestone (RM10) • Table 18 (RPP) was updated to include exploration area in the disturbance type for RA6, and inclusion of an additional rehabilitation milestone (RM10) • Table 19 (RPP) was updated to include exploration area in the disturbance type for RA7 and RA10, and inclusion of an additional rehabilitation milestone (RM10) • Figure 22 (RPP) was updated to include reference to RM10 in year 2026
Section 3.3.2.1 Basis for selection of critical milestone completion criteria	Table 22 (RPP) details the milestone completion criteria for all rehabilitation milestones.	Update Table 22 (RPP) was updated to include RM10. This milestone is summarised below: • Disposal of all unused drill chips within the drill hole to a depth of 2 m below ground level • Installation of a clay cap in between 1 and 2 m below ground level • Backfill of the drill hole with soil representative of the surrounding soil • An AQP confirms the exploration drill holes are decommissioned in accordance with this plan
Section 3.5.15	NA	Section 3.5.15 (RPP) has been added to the RPP to document how the exploration drill holes will be remediated. Remediation strategy includes: • Where practical, all unused drill chips will be disposed of within the drill hole

PRCP Reference	Original Wording / Detail	Proposed Wording / Detail
		- The hole will be capped at a depth that is appropriate for the nominated PMLU (at least one metre) - The hole will be backfilled above the cap with soil or material similar to the surrounding soil or material.
Section 3.6	Table 34 (RPP) within Section 3.6 (RPP) describes the outcomes of the risk assessment undertaken for all RA's within the Project area.	Update Table 34 (RPP) has been updated to include risk assessment of exploration drill holes within RA4, RA5, RA6, RA7, RA8, RA9 and RA10.
PRCP Schedule		
(RA4) Rehabilitation Area 4	RA4 currently includes dates for RM1, RM2, RM3, RM4, RM5, RM6, RM7	RA4 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.12 ha.
(RA5) Rehabilitation Area 5	RA5 currently includes dates for RM1, RM2, RM3, RM4, RM5, RM6, RM7	RA5 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 1.78 ha.
(RA6) Rehabilitation Area 6	RA6 currently includes dates for RM1, RM3, RM8	RA6 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.26 ha.
(RA7) Rehabilitation Area 7	RA7 currently includes dates for RM3, RM4, RM5, RM6, RM7	RA7 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.33 ha.
(RA8) Rehabilitation Area 8	RA8 currently includes dates for RM1, RM2, RM8	RA8 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.06 ha.
(RA9) Rehabilitation Area 9	RA9 currently includes dates for RM1, RM2, RM3, RM4, RM5, RM6, RM7	RA9 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.2 ha.
(RA10) Rehabilitation Area 10	RA10 currently includes dates for RM2 and RM9	RA10 updated to include RM10, to be undertaken between 01/06/2026 and 31/12/2026 over an area of 0.46 ha.
Rehabilitation Area Milestones (RM10)	NA	Addition of RM10 RM10 – Decommissioning of exploration drill holes 10. a) Disposal of all unused drill chips within the drill hole to a depth of 2 m below ground level 10. b) Installation of a clay cap in between 1 and 2 m below ground level 10. c) Backfill of the drill hole with soil representative of the surrounding soil 10. d) An AQP1 confirms the exploration drill holes are decommissioned in accordance with this plan

8.2 Estimated Rehabilitation Cost

In accordance with the EP Act, an EA holder must re-apply for an ERC decision when:

- *there is an increase in the likely maximum amount of disturbance to the environment as a result of the environment authority holder carrying out the resource activity; or*
- *there is a change relating to the carrying out of the resource activity that may result in an increase in the ERC for the resource activity*

The amendments to the EA proposed are not likely to increase the maximum amount of disturbance, however the decommissioning of exploration holes will warrant alternative rehabilitation activities to be considered in the ERC amount.

As such, an ERC re-application is proposed to be completed within ten days of approval of the EA amendment.

9 CONCLUSION

This report has been prepared by Epic, on behalf of Graymont, to accompany an application for an EA amendment application under Chapter 5, Part 7, Division 2, Section 226(1) and 226A of the EP Act.

Graymont is seeking an EA amendment to authorise exploration activities across areas of the site previously subjected to disturbance, with the view of refining their knowledge of the underlying ore body.

Potential impacts to environmental values associated with the Project have been assessed, in particular impacts to environmental values associated with land (specifically terrestrial ecology values).

This environmental assessment has found that residual Project impacts to environmental values will be minor and readily mitigated. This includes impacts to terrestrial ecological values, noting that the area on which exploration activities are proposed has previously been cleared and is utilised for site operations currently. There will be no significant residual impacts to MNES or MSES.

The risk assessment has found that following implementation of the proposed management measures, all risks have a residual rating of 'low', or 'moderate' indicating the measures can effectively mitigate the risk of potential impacts associated with this application.

This application meets the definition of a joint EA and PRCP amendment application under s224 of the EP Act and provides justification for the proposed amendment.

10 REFERENCES

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<http://www.bom.gov.au/water/nwa/2021/fitzroy/regiondescription/geographicinformation.shtml>
- Department of Environment and Science (2023) *Guideline: Major and minor amendments, ESR/2015/1684, version 11.00*
- DEHP (2014), *Significant Residual Impact Guideline*. Biodiversity Integration and Offsets, Ecosystem Outcomes, Department of Environment and Heritage Protection, Brisbane.
- QFES 2023, Queensland 2023 State Disaster Risk Report. Queensland Fire and Emergency Services, Brisbane,
<https://www.disaster.qld.gov.au/qermf/Pages/Assessment-and-plans.aspx>
- QGlobe, 2025. *Queensland Globe*, Queensland Government, <https://qldglobe.information.qld.gov.au/>
- QG 2022, *Community Drought Support Program- Grant Application Guidelines*, Queensland Government,
https://www.chde.qld.gov.au/_data/assets/pdf_file/0012/20253/cdsp-grant-application-guidelines.pdf
- QG 2022, *Wetland Maps*, Queensland Government, <https://wetlandinfo.des.qld.gov.au/wetlandmaps/>
- UQ 2025, *Earthquake information for Queensland*, Australia, The University of Queensland,
<http://www.quakes.uq.edu.au/quakeinfo.html>

11 ACRONYMS

Acronym	Description
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i>
Biosecurity Act	<i>Biosecurity Act 2014</i>
DETSI	Department of Environment, Tourism, Science and Innovation
EA	Environmental Authority
EO Act	<i>Environmental Offsets Act 2014</i>
EO Regulation	<i>Environmental Offsets Regulation 2014</i>
EP Act	<i>Environmental Protection Act 1994</i>
EP Regulation	<i>Environmental Protection Regulation 2019</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERC	Estimated Rehabilitation Cost
Epic	Epic Environmental Pty Ltd
Fisheries Act	<i>Fisheries Act 1994</i>
Graymont	Graymont (NSW) Pty Ltd
Ha	hectares
Heritage Act	<i>Queensland Heritage Act 1992</i>
Km	kilometre
Land Act	<i>Land Act 1994</i>
LGA	Local Government Area
ML	Mining Lease
MR Act	<i>Mineral Resources Act 1989</i>
MERFP Act	<i>Mining and Energy Resources (Financial Provisioning) Act 2018</i>
MQSH Act	<i>Mining and Quarrying Safety and Health Act 1999</i>
NC Act	<i>Nature Conservation Act 1992</i>
NT Act	<i>Native Title Act 1993</i>
NT Qld Act	<i>Native Title (Queensland) Act 1993</i>
QGEOP	<i>Queensland Government Environmental Offsets Policy</i>
PMLU	Post Mine Land Use
PRCP	Progressive Rehabilitation and Closure Plan
Planning Act	<i>Planning Act 2016</i>
Report	EA Amendment Report
RA	Rehabilitation Area
RM	Rehabilitation Milestone
RPI Act	<i>Regional Planning Interests Act 2014</i>
SBRCPS	<i>South Burnett Regional Council Planning Scheme 2017</i>
Sibelco	Sibelco Lime Pty Ltd
SPP	<i>State Planning Policy 2017</i>
The Project	Murgon Limestone Quarry
The Site	ML 50111
TI Act	<i>Transport Infrastructure Act 1994</i>
VM Act	<i>Vegetation Management Act 1999</i>
Water Act	<i>Water Act 2000</i>
WRR Act	<i>Waste Reduction and Recycling Act 2011</i>

12 LIMITATIONS AND DISCLAIMER

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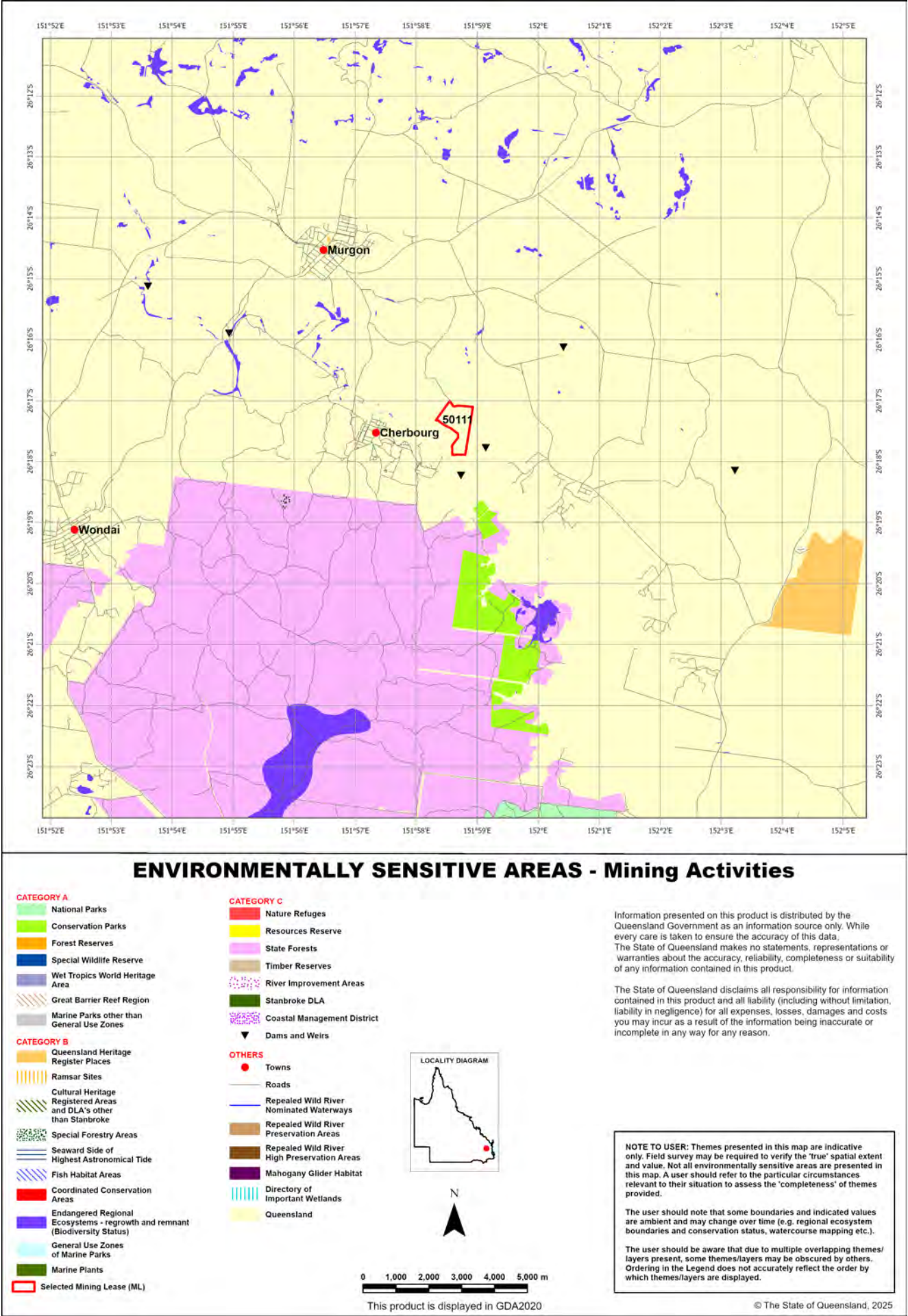
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APPENDIX A PMST / WILDNET SEARCH RESULTS







Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest

ML: 50111

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the Queensland Herbarium & Biodiversity Science's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium & Biodiversity Science's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website <https://www.nrmrdd.qld.gov.au/>

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



Table of Contents

Summary Information	4
Regional Ecosystems	5
1. Introduction	5
2. Remnant Regional Ecosystems	6
3. Remnant Regional Ecosystems by Broad Vegetation Group	7
4. Technical and BioCondition Benchmark Descriptions	8
Maps	9
Map 1 - Location	9
Map 2 - Remnant 2021 regional ecosystems	10
Map 3 - Pre-clearing regional ecosystems	11
Map 4 - Remnant 2021 regional ecosystems by BVG (5M)	12
Map 5 - Pre-clearing regional ecosystems by BVG (5M)	13
Map 6 - Wetlands and waterways	14
Links and Other Information Sources	15
References	15
Appendices	16
Appendix 1 - Source Data	16
Appendix 2 - Acronyms and Abbreviations	17

Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

Table 1: Details for area of interest:
ML: 50111, with area 83.83 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
South Burnett Regional	Burnett	Southeast Queensland	South Burnett
		Southeast Queensland	Brisbane - Barambah Volcanics

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

Table 2: Summary table, biodiversity status of regional ecosystems within the AOI

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.00	0.00
Of concern	less than 0.01	0.01
No concern at present	less than 0.01	less than 0.01
Total remnant vegetation	0.01	0.02

Refer to **Map 2** for further information.

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and may be distinguished by differences in structure or sub-dominant species in the ecologically dominant layer. Vegetation communities with different dominant species in the ecologically dominant layer may be amalgamated into a regional ecosystem if they are not mappable and predictable in the landscape at 1:100 000 scale. Vegetation communities may be mappable at a scale larger than 1:100 000. Vegetation communities within a regional ecosystem are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2023) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium & Biodiversity Science's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website <https://www.nrm.mrd.qld.gov.au/>.

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 percent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 percent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (<1000 ha); or patch size (<100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

*****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.*

2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

Table 3: Remnant regional ecosystems, description and status within the AOI

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
12.11.22	Angophora leiocarpa, Eucalyptus crebra woodland on metamorphics +/- interbedded volcanics	No concern at present	less than 0.01	less than 0.01
12.12.24	Angophora leiocarpa, Eucalyptus crebra woodland on Mesozoic to Proterozoic igneous rocks	No concern at present	less than 0.01	less than 0.01
12.3.7	Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp. fringing woodland	Of concern	less than 0.01	0.01
non-remnant	None	None	83.81	99.98

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

Table 4 provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

Table 4: Remnant regional ecosystems within the AOI, additional information

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
12.11.22	Pre-clearing 22000 ha; Remnant 2021 12000 ha	9h	Not a Wetland	Medium
12.12.24	Pre-clearing 53000 ha; Remnant 2021 19000 ha	9h	Not a Wetland	Low
12.3.7	Pre-clearing 124000 ha; Remnant 2021 68000 ha	16a	Riverine	Low
non-remnant	None	None	None	None

Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

Table 5: Remnant regional ecosystems within the AOI, special values

Regional Ecosystem	Special Values
12.11.22	12.11.22: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
12.12.24	12.12.24: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
12.3.7	12.3.7: Habitat for an extensive range of aquatic flora and fauna. This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.3.7a: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.3.7c: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>). 12.3.7d: This ecosystem is known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).
non-remnant	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at: <https://publications.qld.gov.au/dataset/redd/resource/>

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

Table 6: Broad vegetation groups (1 million) within the AOI

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	83.81	99.98
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded.	less than 0.01	0.01

BVG (1 Million)	Description	Area (Ha)	% of AOI
9h	Dry woodlands dominated by species such as <i>Eucalyptus acmenoides</i> (narrow-leaved white stringybark) (or <i>E. portuensis</i>), <i>E. tereticornis</i> (blue gum), <i>Angophora leiocarpa</i> (rusty gum), <i>Corymbia trachyphloia</i> (yellow bloodwood) or <i>C. intermedia</i> (pink bloodwood), and often ironbarks including <i>E. crebra</i> (narrow-leaved red ironbark) or <i>E. fibrosa</i> (dusky-leaved ironbark). A heathy shrub layer is frequently present. On undulating to hilly terrain.	less than 0.01	less than 0.01

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

The descriptions are compiled using site survey data from the Queensland Herbarium & Biodiversity Science's QBEIS database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2023 (PDF)* section 3.3 of:

https://www.qld.gov.au/_data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

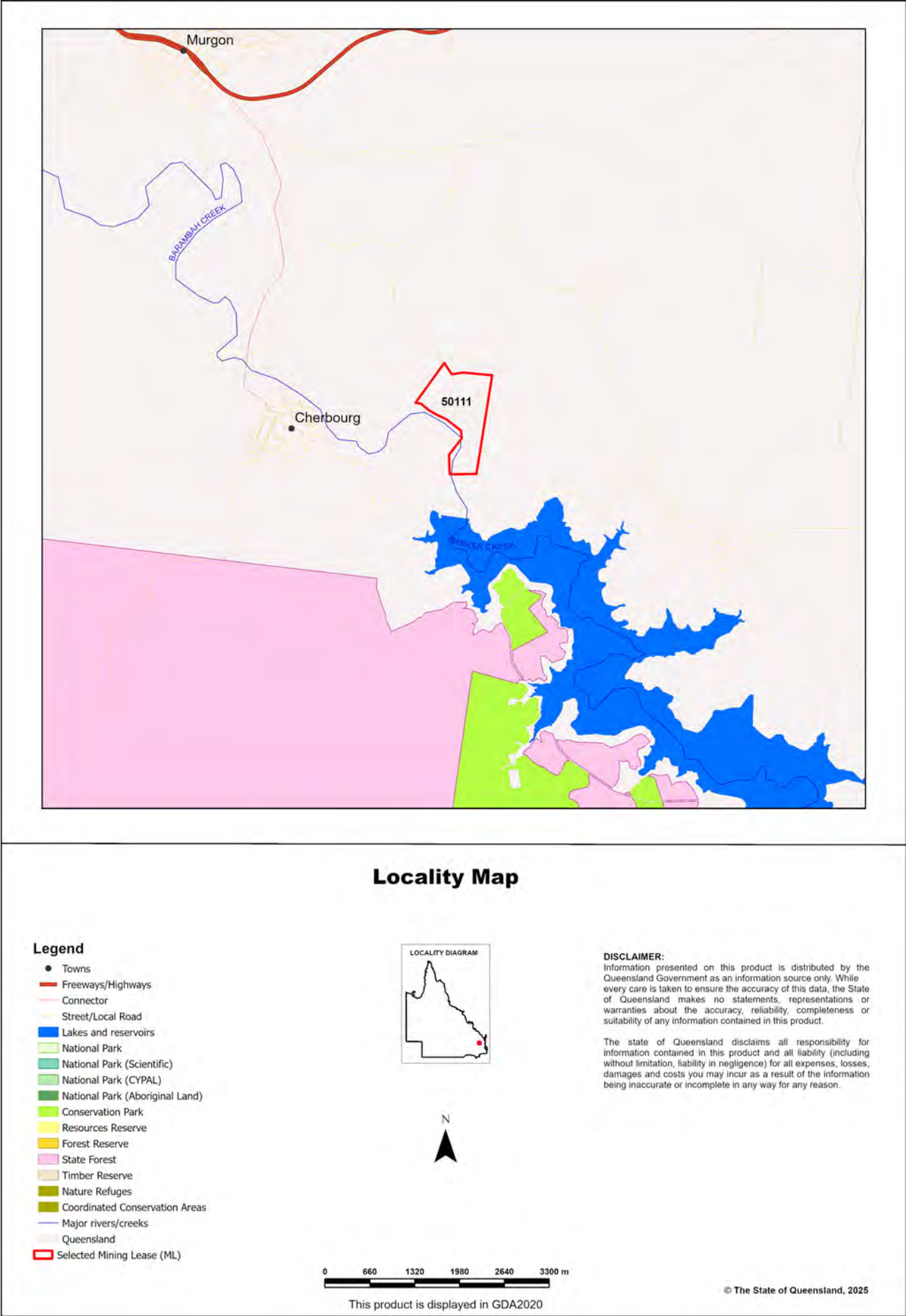
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

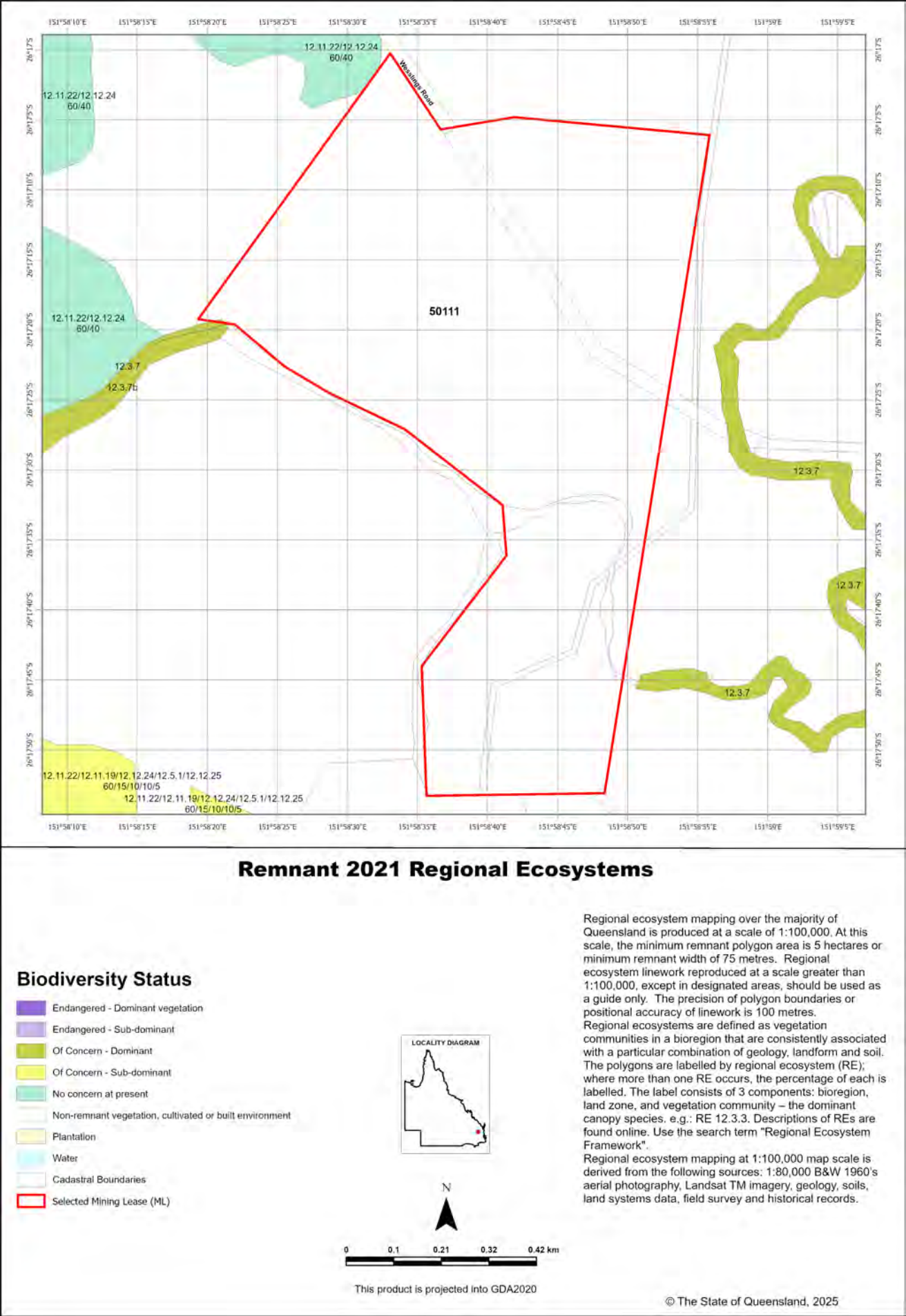
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
12.11.22	Not currently available	Available
12.12.24	Not currently available	Not currently available
12.3.7	Available	Available
non-remnant	Not currently available	Not currently available

Maps

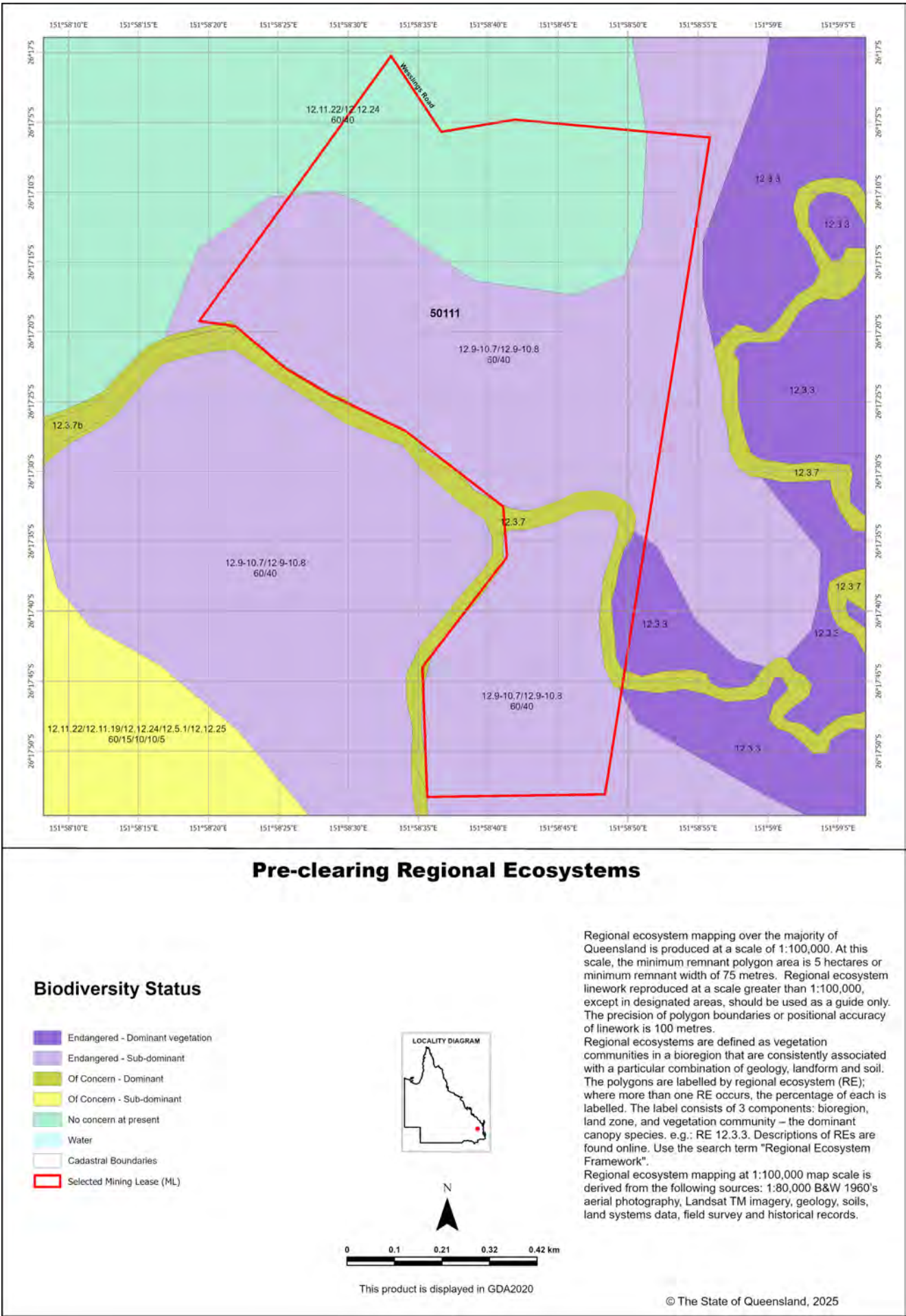
Map 1 - Location



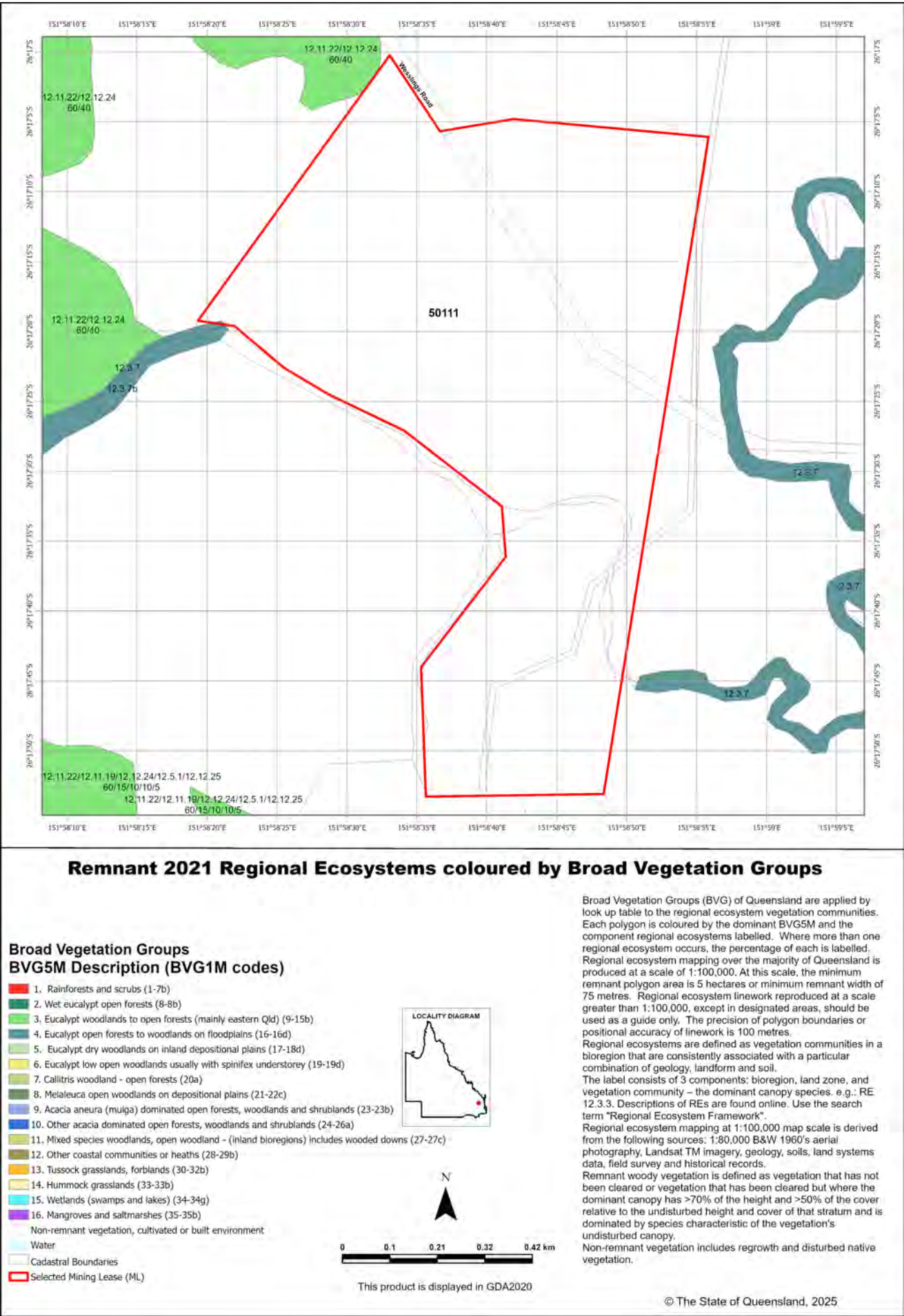
Map 2 - Remnant 2021 regional ecosystems



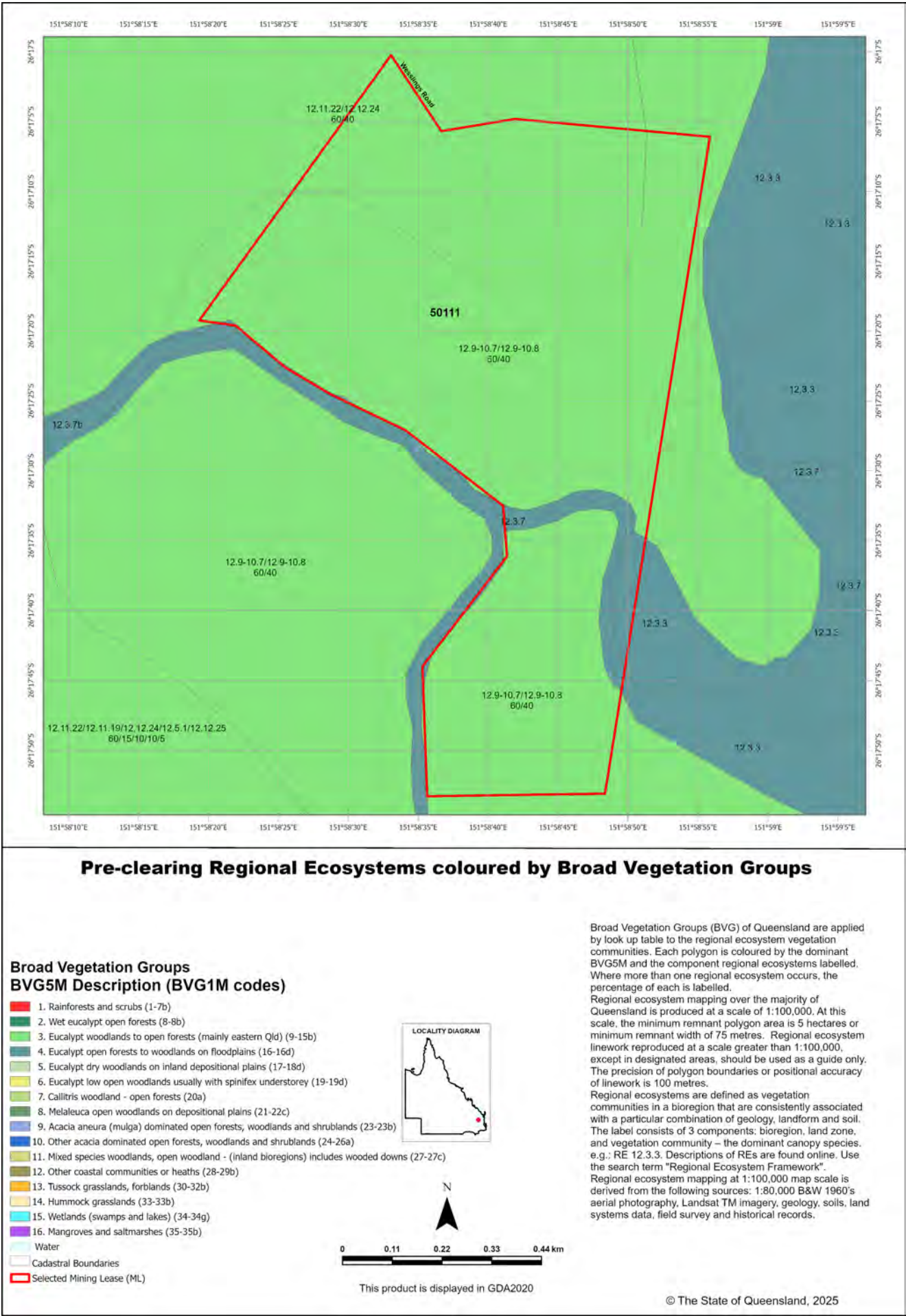
Map 3 - Pre-clearing regional ecosystems



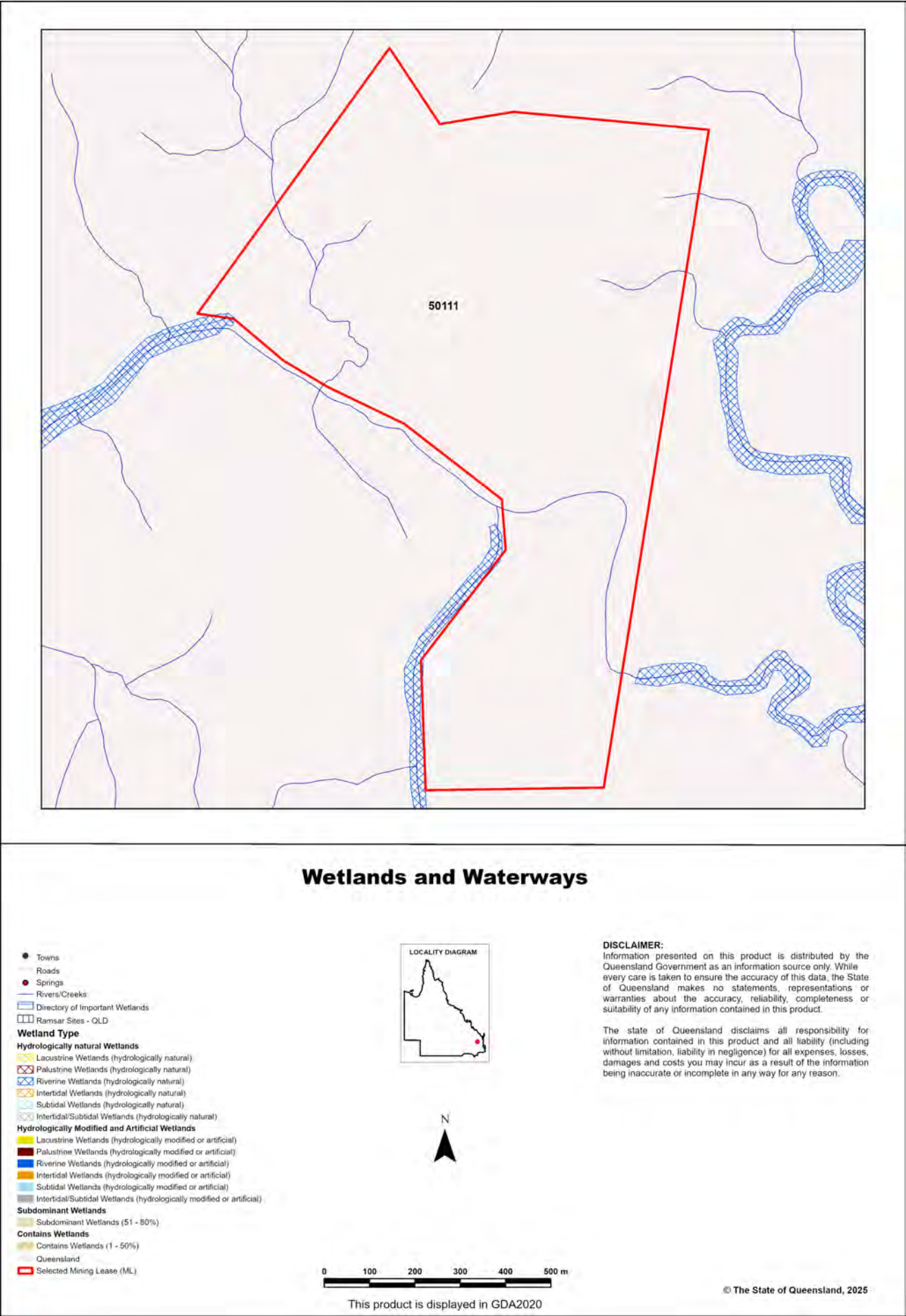
Map 4 - Remnant 2021 regional ecosystems by BVG (5M)



Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of the Environment, Tourism, Science and Innovation's Website -

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/> provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/broad-vegetation>

The methodology for mapping regional ecosystems can be downloaded from:

https://www.qld.gov.au/_data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

Technical descriptions for regional ecosystems can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

Benchmarks can be obtained from: <http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Spatial Catalogue, [Queensland Spatial Catalogue : Queensland Government \(information.qld.gov.au\)](http://www.qld.gov.au/spatial-catalogue)

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

<https://qldglobe.information.qld.gov.au/>

References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2023). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 6.0. Queensland Herbarium, Department of Environment and Science.

<https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086>

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Richter, D., Addicott, E.P. and Appelman, C.N. (2023) Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0. Updated December 2023. Queensland Herbarium, Queensland Department of Environment, Science and Innovation, Brisbane.

https://www.qld.gov.au/_data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/>

- Regional Ecosystem Description Database

The datasets listed below are available for download from:

[Queensland Spatial Catalogue : Queensland Government \(information.qld.gov.au\)](https://www.qld.gov.au/information/spatial/catalogue)

- Biodiversity status of pre-clearing and 2021 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas
- Pre-clearing broad vegetation groups of Queensland
- Remnant 2021 broad vegetation groups of Queensland

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

ML: 50111

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

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Table of Contents

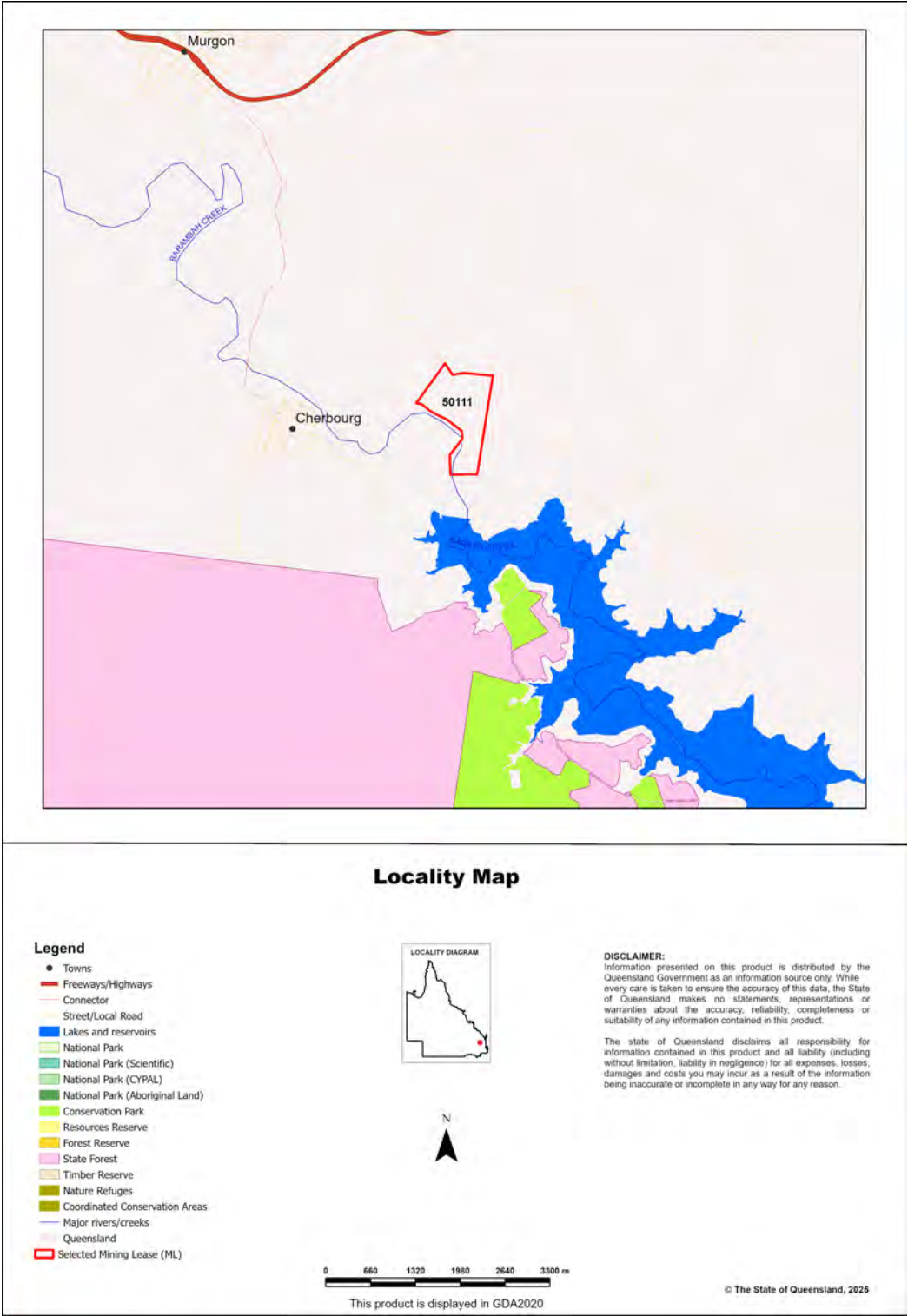
Assessment Area Details	4
Matters of State Environmental Significance (MSES)	5
MSES Categories	5
MSES Values Present	6
Additional Information with Respect to MSES Values Present	6
MSES - State Conservation Areas	6
MSES - Wetlands and Waterways	7
MSES - Species	7
MSES - Regulated Vegetation	10
MSES - Offsets	11
Maps	12
Map 1 - MSES - State Conservation Areas	12
Map 2 - MSES - Wetlands and Waterways	13
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals.....	14
Map 3b - MSES - Species - Koala habitat area (SEQ)	15
Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)	16
Map 4 - MSES - Regulated Vegetation	17
Map 5 - MSES - Offset Areas	18
Appendices	19
Appendix 1 - Matters of State Environmental Significance (MSES) methodology	19
Appendix 2 - Source Data	20
Appendix 3 - Acronyms and Abbreviations	21

Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: ML: 50111, with area 83.83 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
South Burnett Regional	Burnett	Southeast Queensland	South Burnett
		Southeast Queensland	Brisbane - Barambah Volcanics



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992*;
- *Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004* ;
- *Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008*;
- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
 - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
 - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
 - Category R areas on the regulated vegetation management map;
 - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
 - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	0 ha	0.0%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	0 ha	0.0%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.15 ha	0.2%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	15.72 ha	18.8%
8d Regulated Vegetation - Essential habitat	0 ha	0.0%
8e Regulated Vegetation - intersecting a watercourse	1.2 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways**4. Strategic Environmental Areas (SEA)**

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species**7a. Threatened (endangered or vulnerable) wildlife**

Not applicable

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
<i>Boronia keysii</i>	Keys boronia	V	None
<i>Calyptrorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuarium casuarium johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	None
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Euastacus bindal</i>	Mount Elliot crayfish	CR	None
<i>Euastacus binzayedii</i>		CR	None
<i>Euastacus eungella</i>		E	None
<i>Euastacus hystricosus</i>		E	None
<i>Euastacus jagara</i>	Jagara hairy crayfish	CR	None
<i>Euastacus maidae</i>		CR	None
<i>Euastacus monteithorum</i>		E	None
<i>Euastacus robertsi</i>		E	None
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	E	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Macadamia integrifolia</i>		V	None
<i>Melaleuca irbyana</i>	swamp tea-tree	E	None
<i>Macadamia ternifolia</i>		V	None
<i>Macadamia tetraphylla</i>	bopple nut	V	None
<i>Petrogale penicillata</i>	brush-tailed rock-wallaby	V	None
<i>Petrogale coenensis</i>	Cape York rock-wallaby	E	None
<i>Petrogale purpureicollis</i>	purple-necked rock-wallaby	V	None
<i>Petrogale sharmani</i>	Sharmans rock-wallaby	V	None
<i>Petrogale xanthopus celeris</i>	yellow-footed rock-wallaby (Qld subspecies)	V	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Phascolarctos cinereus</i>	Koala - outside SEQ*	E	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Xeromys myoides</i>	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

(No results)

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Not applicable

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
12.9-10.7/12.9-10.8	E-subdom	hvr_end

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	9245

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

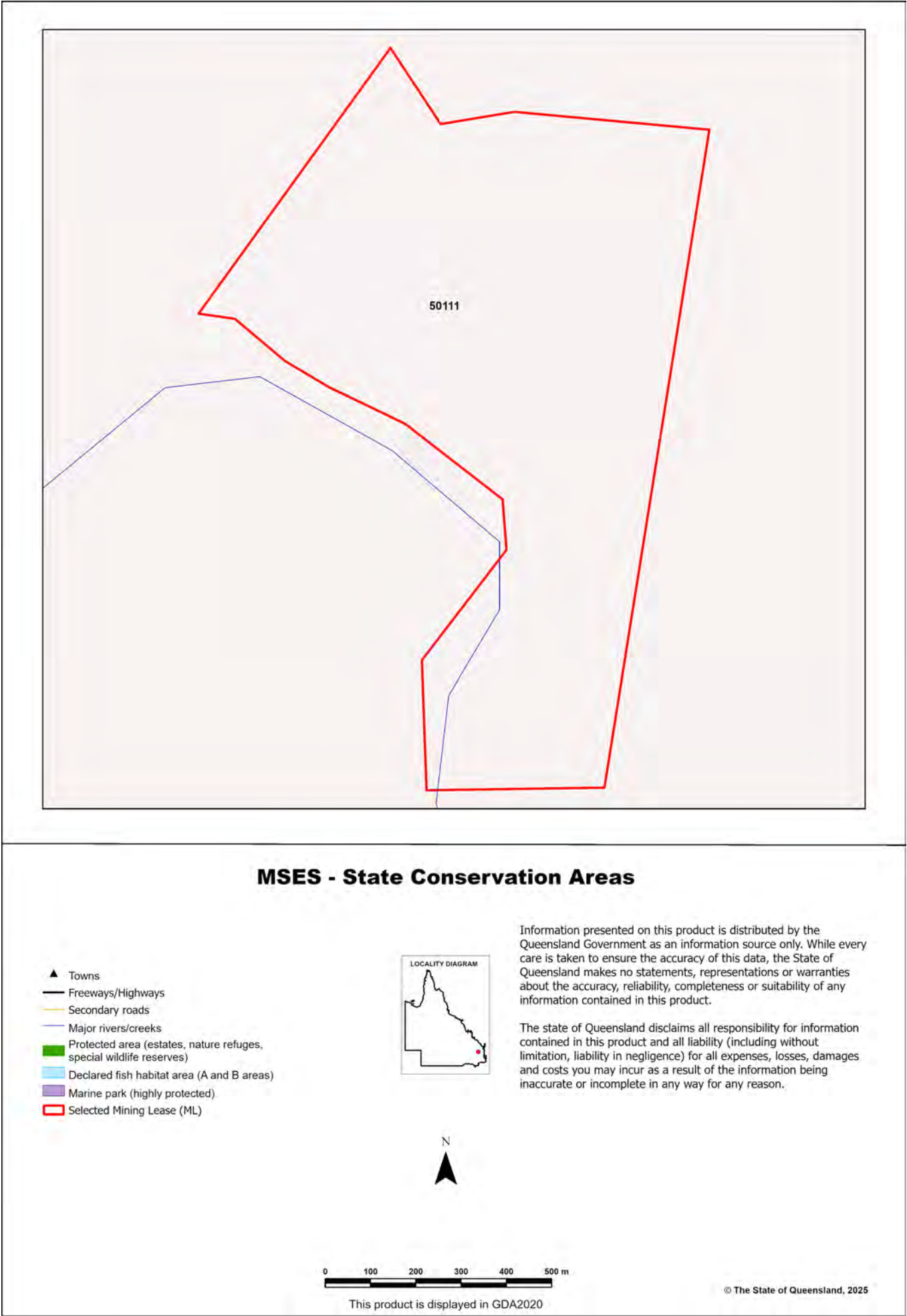
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

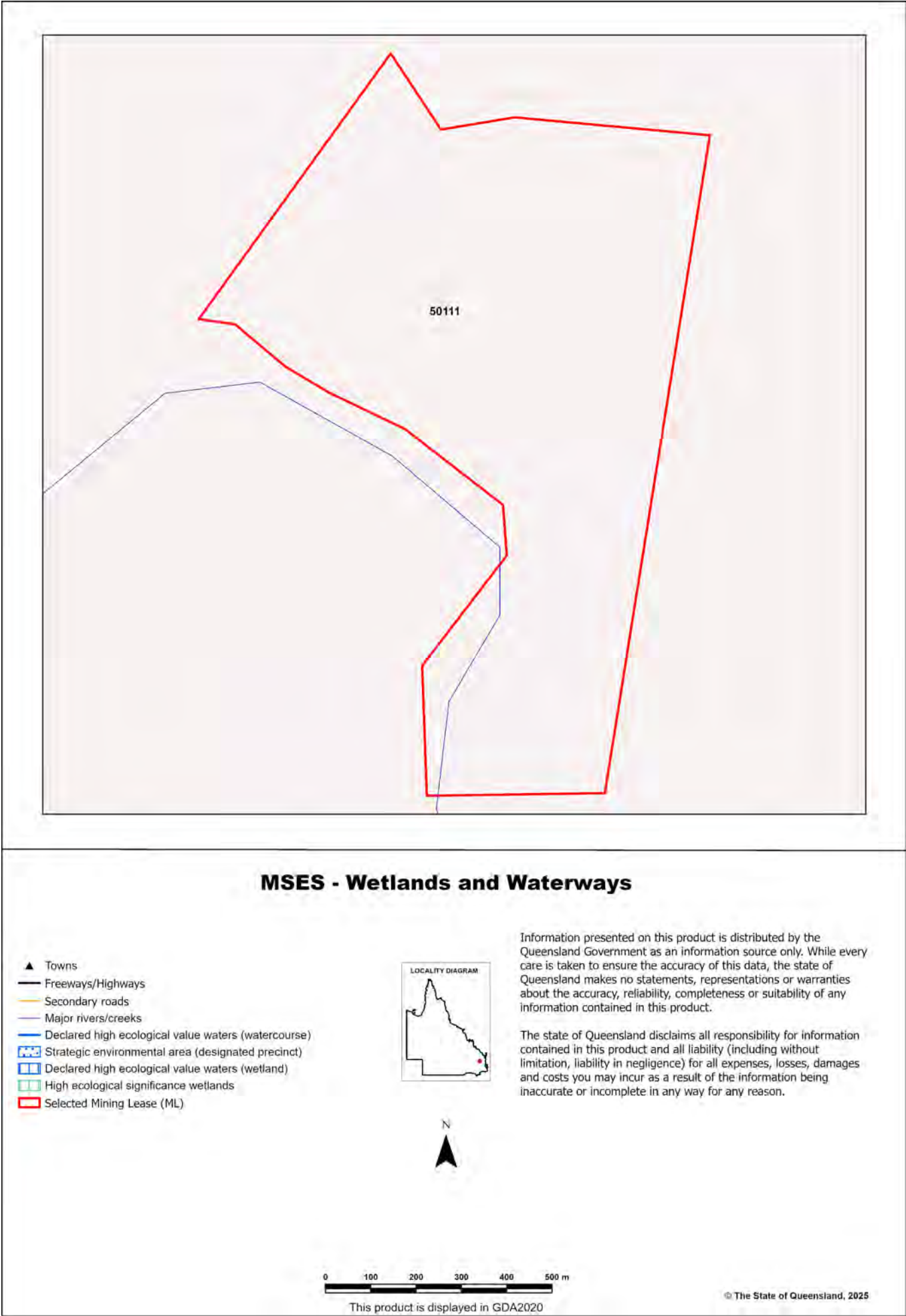
(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

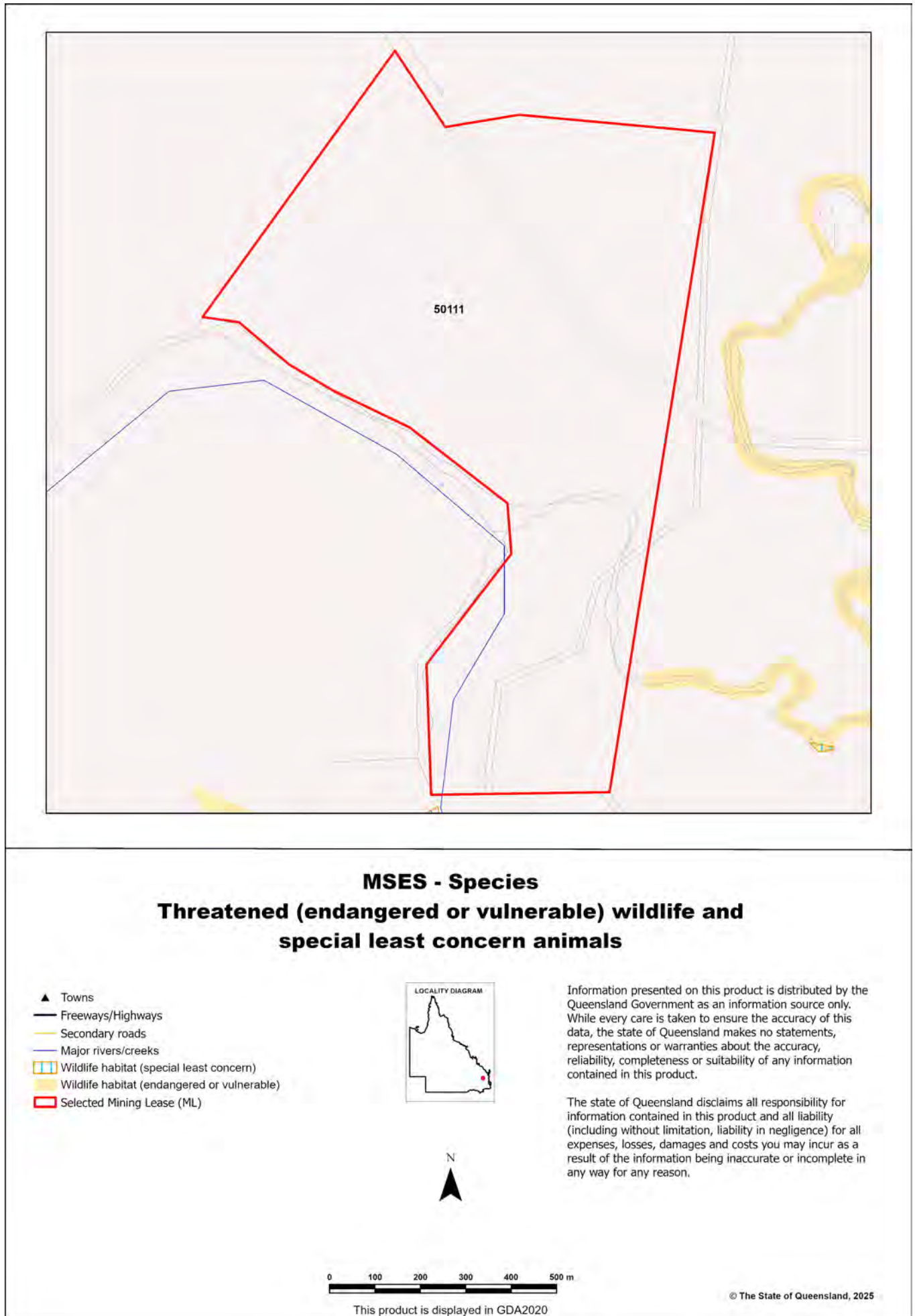
Map 1 - MSES - State Conservation Areas



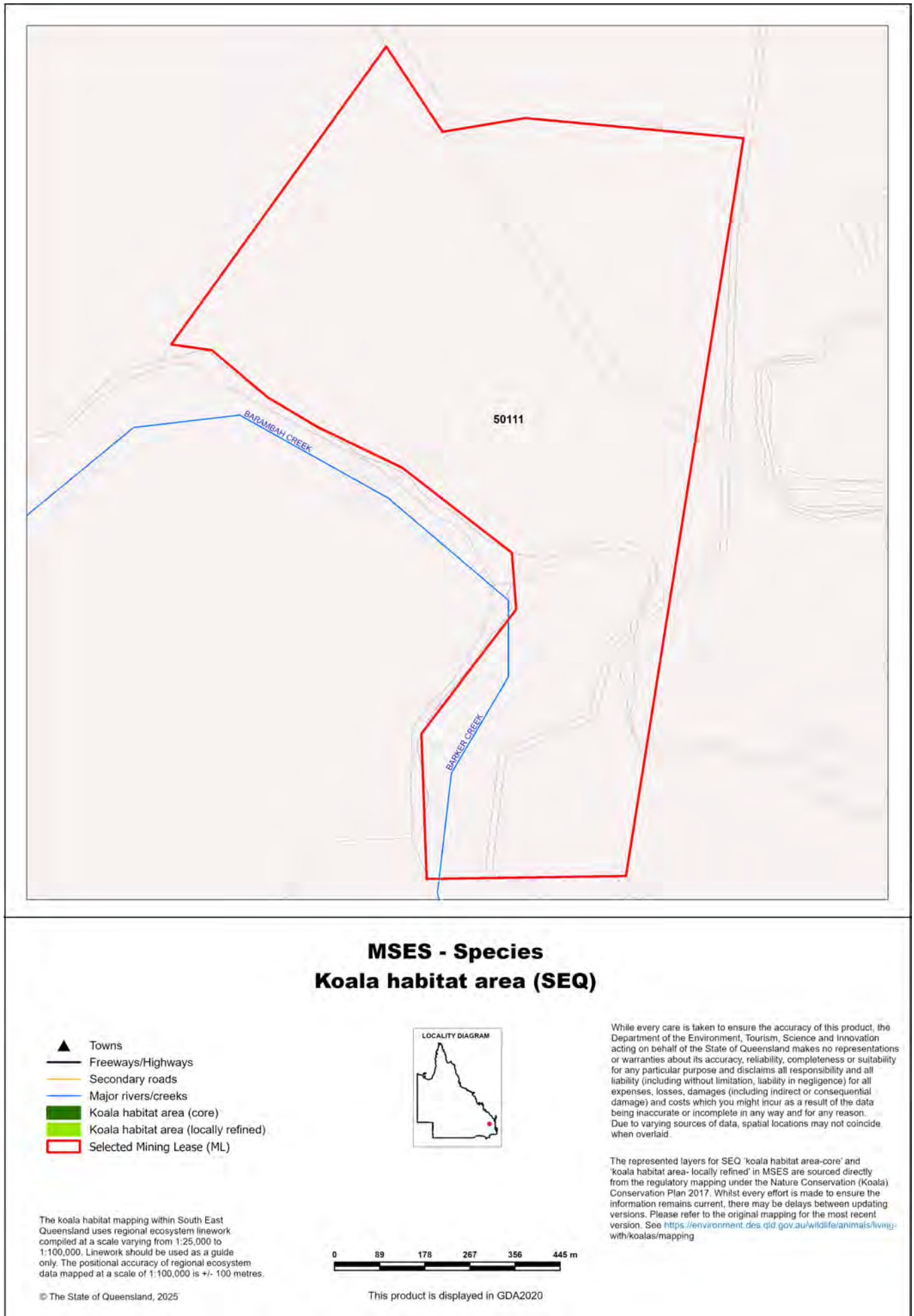
Map 2 - MSES - Wetlands and Waterways



Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



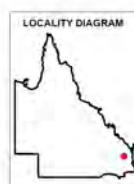
Map 3b - MSES - Species - Koala habitat area (SEQ)



Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)

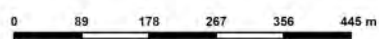
**MSES - Wildlife habitat (sea turtle nesting areas)**

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- ▭ Selected Mining Lease (ML)

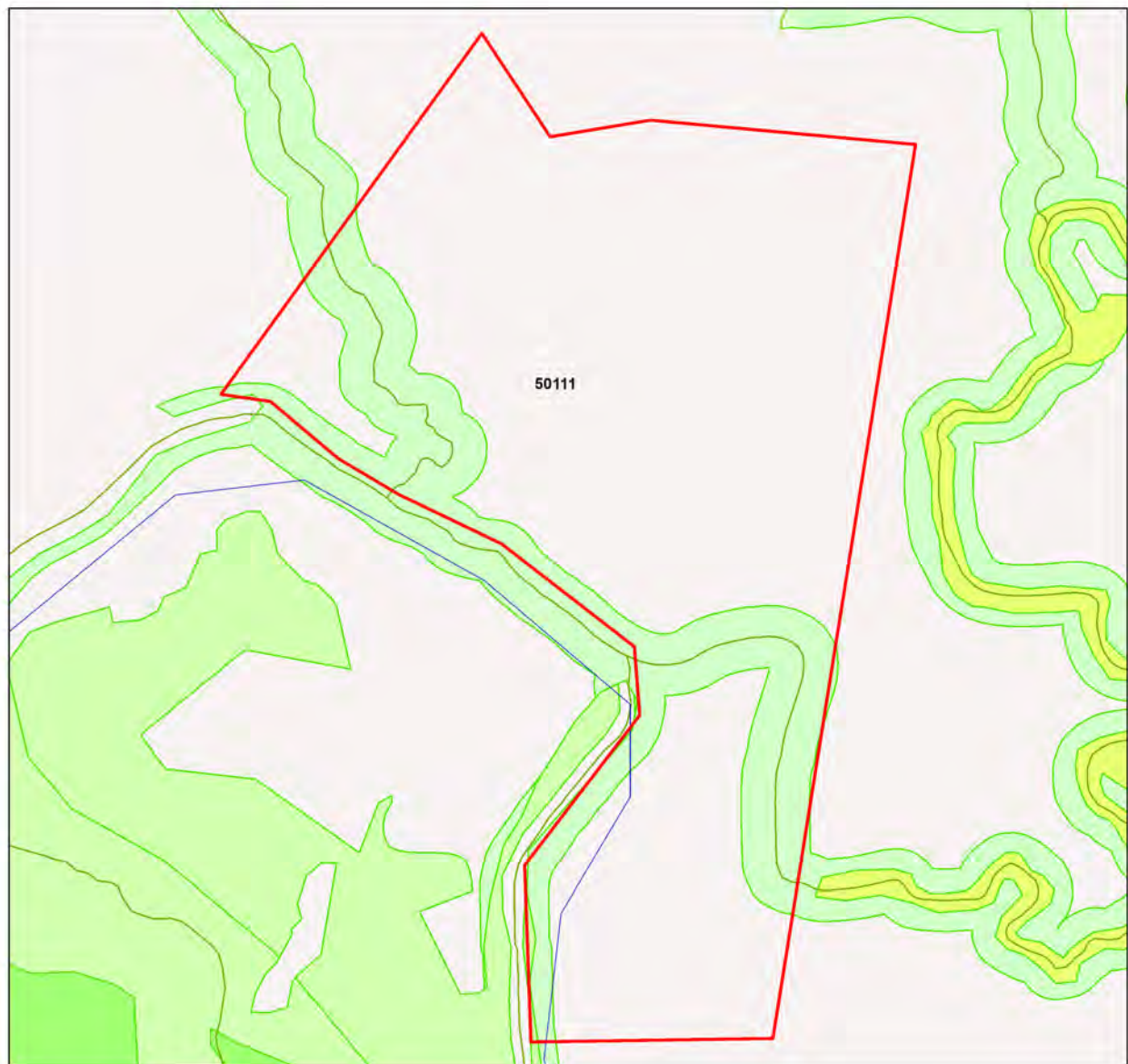


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MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.



Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- Selected Mining Lease (ML)



This product is displayed in GDA2020

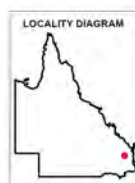
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Map 5 - MSES - Offset Areas

**MSES - Offsets**

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- Selected Mining Lease (ML)



This product is displayed in GDA2020

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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html> .

Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	current QSpatial data (http://qspatial.information.qld.gov.au)
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999



WildNet Records

Conservation Significant Species List

For the selected area of interest ML: 50111
Current as at 26/06/2025 WildNetCSSpeciesList

Summary Information

The following table provides an overview of the area of interest: ML: 50111

Table 1. Area of interest details

Size (ha)	
83.83	
Local Government(s)	
South Burnett Regional	
Catchment(s)	
Burnett	
Bioregion(s)	Subregion(s)
Southeast Queensland	Brisbane - Barambah Volcanics
Southeast Queensland	South Burnett

Protected Area(s)

No estates or reserves are located within the area of interest.

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a conservation significant species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

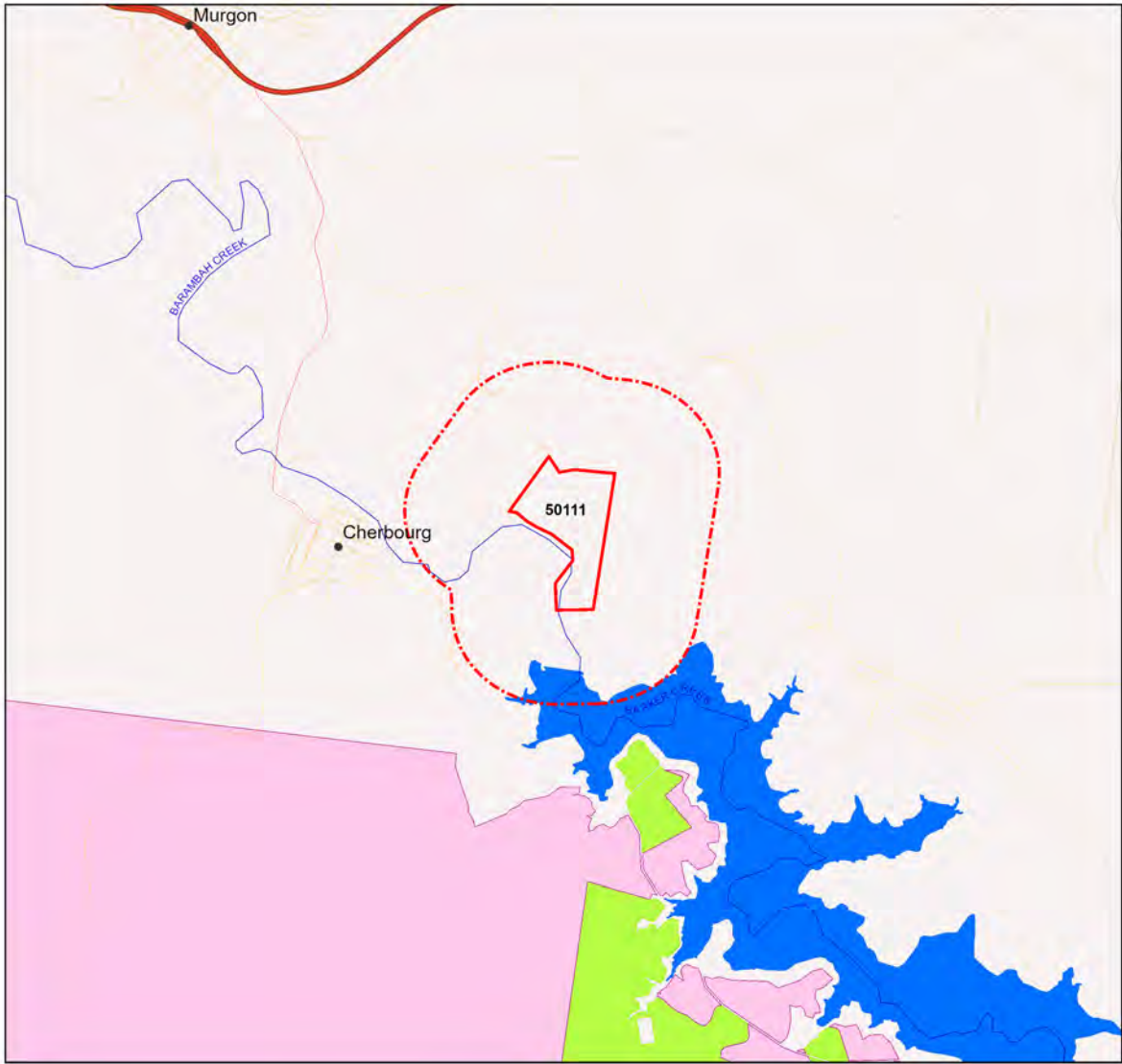
The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Conservation significant species are species listed:

- as threatened or near threatened under the *Nature Conservation Act 1992*;
- as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* or
- migratory species protected under the following international agreements:
 - Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
 - China-Australia Migratory Bird Agreement
 - Japan-Australia Migratory Bird Agreement
 - Republic of Korea-Australia Migratory Bird Agreement

Table 2 lists the species recorded within the area of interest and its one kilometre buffer.

Map 1. Locality Map



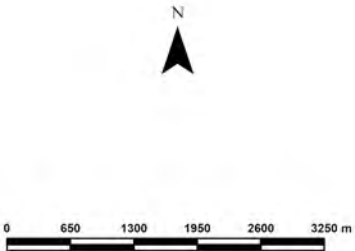
Locality Map

- Legend**
- Towns
 - Freeways/Highways
 - Connector
 - Street/Local Road
 - Lakes and reservoirs
 - National Park
 - National Park (Scientific)
 - National Park (CYPAL)
 - National Park (Aboriginal Land)
 - Conservation Park
 - Resources Reserve
 - Forest Reserve
 - State Forest
 - Timber Reserve
 - Nature Refuges
 - Coordinated Conservation Areas
 - Major rivers/creeks
 - Queensland
 - Selected Mining Lease (ML)
 - 1 kilometre buffer



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Table 2. Conservation significant species recorded within the area of interest and its one kilometre buffer

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
18169	Animalia	Actinopterygii	Percichthyidae	<i>Maccullochella mariensis</i>	Mary River cod	E	E	0	1	10/01/1989
1896	Animalia	Aves	Laridae	<i>Hydroprogne caspia</i>	Caspian tern	SL		0	4	18/04/2012
1857	Animalia	Aves	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe	V	V	0	1	2/03/2014
1825	Animalia	Aves	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis	SL		0	1	2/03/2014
860	Animalia	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala	E	E	0	1	2/03/2014

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [WildNet Application](#) - public interface to find species information and species lists generated from the WildNet database.
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld WildNet Data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the WildNet Team WildNet@detsi.qld.gov.au.

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australasian Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

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Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest

ML: 50111

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: biodiversity.planning@qld.gov.au

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Table of Contents

Summary Information	4
Biodiversity Planning Assessments	6
Introduction	6
Diagnostic Criteria	6
Other Essential Criteria	8
Aquatic Conservation Assessments	11
Introduction	11
Explanation of Criteria	11
Riverine Wetlands	12
Non-riverine Wetlands	13
Threatened and Priority Species	15
Introduction	15
Threatened Species	15
BPA Priority Species	16
ACA Priority Species	16
Maps	18
Map 1 - Locality Map	18
Map 2 - Biodiversity Planning Assessment (BPA)	19
Map 3 - Corridors	20
Map 4 - Wetlands and waterways	21
Map 5 - Aquatic Conservation Assessment (ACA) - riverine	22
Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine	23
References	24
Appendices	25
Appendix 1 - Source Data	25
Appendix 2 - Acronyms and Abbreviations	26

Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

Table 1: Details for area of interest: ML: 50111, with area 83.83 ha

Local Government(s)	
South Burnett Regional	
Bioregion(s)	Subregion(s)
Southeast Queensland	South Burnett
Southeast Queensland	Brisbane - Barambah Volcanics
Catchment(s)	
Burnett	

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Biodiversity Planning Assessment(s)	Aquatic Conservation Assessment(s) (riverine)	Aquatic Conservation Assessment(s) (non-riverine)
Southeast Queensland v4.1	Wide Bay-Burnett Great Barrier Reef Connecting Catchments v2.1	Wide Bay-Burnett Great Barrier Reef Connecting Catchments v.2.1

Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.00	0.00
Of concern	0.01	0.01
No concern at present	0.00	0.00

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of the Environment, Tourism, Science and Innovation's *Biodiversity Assessment and Mapping Methodology* (BAMM).

Table 4: Summary table, biodiversity significance

Biodiversity Status	Area (Ha)	% of AOI
State	0.01	0.01
Regional	0.00	0.00

Table 5: Non-riverine wetlands intersecting the AOI

(No Records)

NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.

Table 6: Named waterways intersecting the AOI

Name	Permanency
BARAMBAH CREEK	Non-perennial
BARKER CREEK	Non-perennial

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of the Environment, Tourism, Science and Innovation's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

Table 7: Summary table, aquatic conservation significance (riverine)

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	13.08	15.61
Medium	70.74	84.39

Table 8: Summary table, aquatic conservation significance (non-riverine)

(No Records)

Biodiversity Planning Assessments

Introduction

The Department of the Environment, Tourism, Science and Innovation (DETSI) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DETSI. Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<https://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

Table 9: Summary table, biodiversity significance

Biodiversity Status	Area (Ha)	% of AOI
State	0.01	0.01
Regional	0.00	0.00

Refer to **Map 2** for further information.

Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the *Environment Protection and Biodiversity Conservation Act 1999*. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in

protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

Criteria C. Tract size: Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

Criteria D. Relative size of regional ecosystems: Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

Criteria F. Ecosystem diversity: Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

Criteria G. Context and connection: Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.

Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
Regional	Remnant contains at least one Of Concern RE (B1)	0.00	0.00
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	0.01	0.01

Assessment of diagnostic criteria with respect to the AOI

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

Table 11: Assessment of individual diagnostic criteria with respect to the AOI

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
B1: Ecosystem Value (Bioregion)	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
B2: Ecosystem Value (Subregion)	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
C: Tract Size	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
D1: Relative RE Size (Bioregion)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
D2: Relative RE Size (Subregion)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
F: Ecosystem Diversity	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
G: Context and Connection	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00

Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant forms part of a bioregional corridor (J)	0.01	0.01

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

Criteria H. Essential and general habitat for priority taxa: Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

Criteria I. Special biodiversity values: areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al.* 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

Table 13: Relative importance of expert panel criteria (H and I) used to assess overall biodiversity significance with respect to the AOI

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ia: Centres of Endemism	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ib: Wildlife Refugia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ic: Disjunct Populations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Id: Limits of Geographic Ranges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ie: High Species Richness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
If: Relictual Populations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ig: Variation in Species Composition	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ih: Artificial Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ii: Hollow Bearing Trees	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ij: Breeding or Roosting Site	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ik: Climate Refugia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).

Criteria J. Corridors: areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes.

Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

- Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;
- Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;
- Maintaining large scale seasonal/migratory species processes and movement of fauna;
- Maximising connectivity between large tracts/patches of remnant vegetation;
- Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

- Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);
- Follow major watershed/catchment and/or coastal boundaries;
- Incorporate major altitudinal/geological/climatic gradients;
- Include and maximise connectivity between large tracts/patches of remnant vegetation;
- Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

- Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI

Biodiversity Significance	Area (Ha)	% of AOI
State	0.01	0.01

NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.

Refer to **Map 3** for further information.

Threatening process/condition (Criteria K) - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI

Decision Number	Description	Panel Recommended Significance	Criteria Values
seqn_I_13	Riparian bioregional corridors	State	Criterion J

Expert panel decision descriptions:

Decision Number	Description
seqn_I_13	The riparian bioregional corridors provide connectivity through lowland areas of SEQ. See Table 4 for list of waterways considered riparian corridors. For further information, refer to sections 2.3.2 and 3.2 of this report.

Aquatic Conservation Assessments

Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in Queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning processes

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at Wetland Info:

<http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<https://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

Criteria 1. Naturalness - Aquatic: This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

Criteria 2. Naturalness - Catchment: The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

Criteria 3. Naturalness - Diversity and Richness: This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

Criteria 4. Threatened Species and Ecosystems: This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

Criteria 5. Priority Species and Ecosystems: Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

Criteria 6. Special Features: Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

Criteria 7. Connectivity: This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

Criteria 8. Representativeness: This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

Table 16: Overall level/s of riverine aquatic conservation significance

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	13.08	15.61
Medium	70.74	84.39

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

Table 17: Level/s of riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	0.00	0.00	0.00	0.00	34.97	41.71	48.86	58.29
2. Naturalness catchment	0.00	0.00	0.00	0.00	83.83	100.00	0.00	0.00
3. Diversity and richness	0.00	0.00	34.97	41.71	48.86	58.29	0.00	0.00
4. Threatened species and ecosystems	0.00	0.00	70.74	84.39	0.00	0.00	13.08	15.61
5. Priority species and ecosystems	0.00	0.00	0.00	0.00	48.05	57.32	35.78	42.68
6. Special features	0.00	0.00	13.08	15.61	0.00	0.00	0.00	0.00
7. Connectivity	0.00	0.00	0.00	0.00	34.97	41.71	48.86	58.29
8. Representativeness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
bu_r_fl_01	Extensive <i>Vallisneria spiralis</i> macrophyte beds	Burnett	6.3.1	3

4 is the highest rating/value

Expert panel decision descriptions:

Decision number	Description
bu_r_fl_01	Where these macrophyte beds occur, they provide significant habitat and food resources for instream fauna including macroinvertebrates, fish and turtles. The aquatic and riparian flora expert panel for the Burnett ACA conducted in 2006 noted <i>Vallisneria spiralis</i> as the most critical aquatic plant for maintaining complex food webs and aquatic ecosystems because of its extensive macrophyte beds and broad geographic coverage of the Burnett catchment. As there are not many macrophyte beds remaining, the panel considered it to be important as a flora decision. Note: This decision was taken from the previous Burnett River ACA (decision number afep_burn_11).

Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

Table 19: Overall level/s of non-riverine aquatic conservation significance

(No Records)

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Naturalness catchment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Diversity and richness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Threatened species and ecosystems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Priority species and ecosystems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Special features	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7. Connectivity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Representativeness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
(No Records)				

4 is the highest rating/value

Expert panel decision descriptions:

Decision number	Description
(No Records)	

Threatened and Priority Species

Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, HerbreCs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

Table 22: Threatened species recorded on, or within 4km of the AOI

Species	Common name	NCA status	EPBC status	Migratory species*	Wetland species**	Identified flora/fauna
<i>Aponogeton elongatus</i> <i>subsp. elongatus</i>		NT			I	FL
<i>Bidyanus bidyanus</i>	silver perch		CE		D	FA
<i>Elseya albagula</i>	white-throated snapping turtle	CR	CE		I	FA
<i>Gallinago hardwickii</i>	Latham's snipe	SL	V	Y	I	FA
<i>Maccullochella mariensis</i>	Mary River cod		E		D	FA
<i>Petauroides volans volans</i>	southern greater glider	E	E			FA
<i>Phascolarctos cinereus</i>	koala	E	E			FA

NB. Please note that the threatened species listed in this section are based upon the most recently compiled DETSI internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.

*JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species.

**I - wetland indicator species; D - wetland dependent species.

BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

Table 23: Priority species recorded on, or within 4km of the AOI

Species	Common name	Identified flora/fauna
<i>Pomatostomus temporalis</i>	grey-crowned babbler	FA

NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.

ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

Table 24: Priority species recorded on, or within 4 km of the AOI - riverine

Species	Common name	Identified flora/fauna
<i>Ardea alba modesta</i>	eastern great egret	FA
<i>Azolla rubra</i>	pacific azolla	FL
<i>Ceratophyllum demersum</i>	hornwort	FL
<i>Eucalyptus tereticornis</i>		FL
<i>Gallinago hardwickii</i>	Latham's snipe	FA
<i>Gelochelidon macrotarsa</i>	gull-billed tern	FA
<i>Hydrilla verticillata</i>	hydrilla	FL
<i>Hydrilla verticillata</i>	water thyme	FL
<i>Hydroprogne caspia</i>	Caspian tern	FA
<i>Juncus usitatus</i>	common rush	FL
<i>Lates calcarifer</i>	barramundi	FA
<i>Macquaria novemaculeata</i>	Australian bass	FA
<i>Melaleuca viminalis</i>	weeping bottlebrush	FL
<i>Nymphoides indica</i>	water snowflakes, star fringe	FL
<i>Persicaria attenuata</i>	slender knotweed	FL
<i>Persicaria decipiens</i>	slender knotweed	FL
<i>Potamogeton crispus</i>	curly or wavy-leaved pondweed	FL
<i>Vallisneria nana</i>	eel-grass, ribbonweed	FL

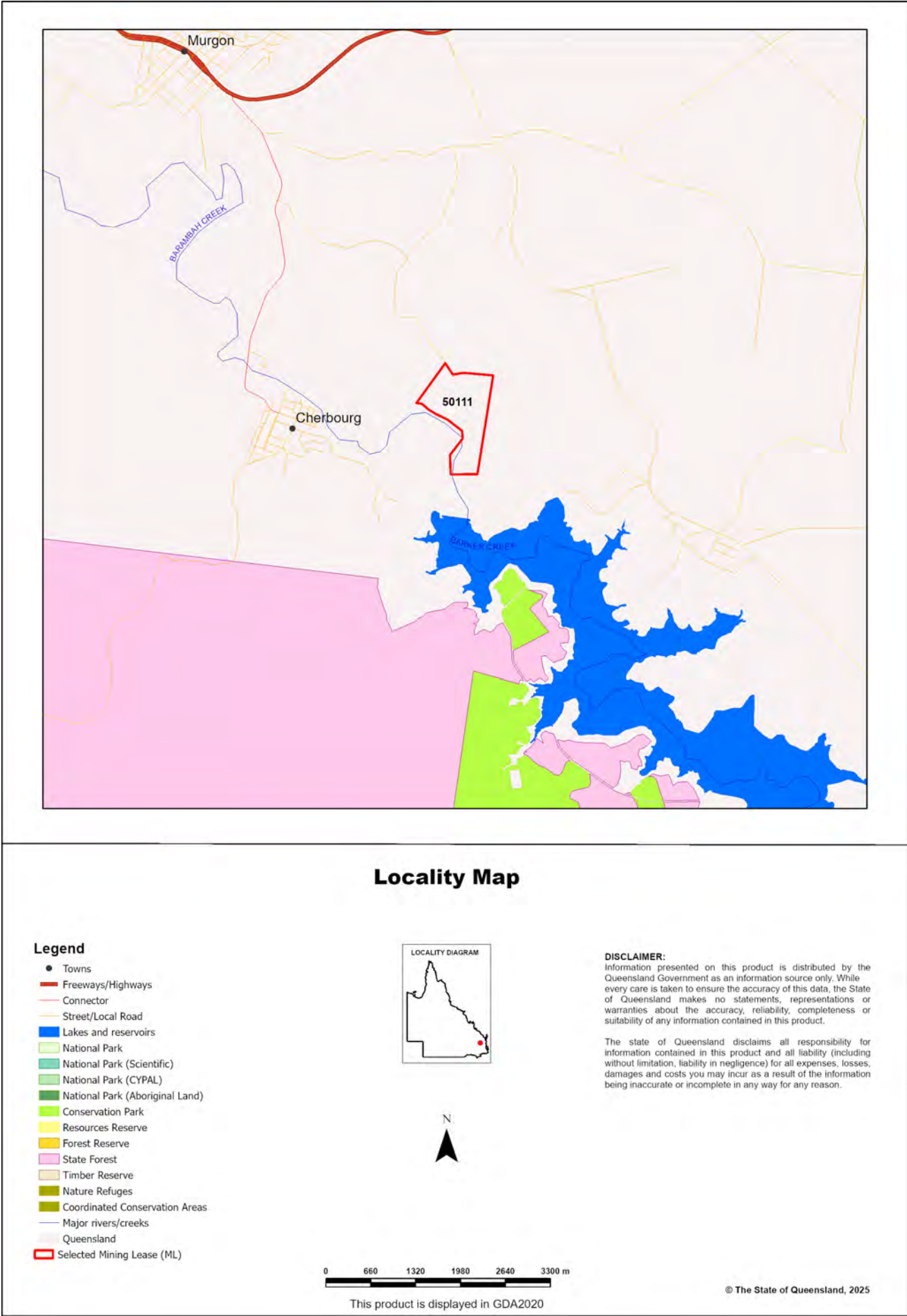
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

Species	Common name	Identified flora/fauna
<i>Ardea alba modesta</i>	eastern great egret	FA
<i>Azolla rubra</i>	pacific azolla	FL
<i>Eucalyptus tereticornis</i>		FL
<i>Gallinago hardwickii</i>	Latham's snipe	FA
<i>Gelochelidon macrotarsa</i>	gull-billed tern	FA
<i>Hydrilla verticillata</i>	hydrilla	FL
<i>Hydrilla verticillata</i>	water thyme	FL
<i>Hydroprogne caspia</i>	Caspian tern	FA
<i>Juncus usitatus</i>	common rush	FL
<i>Lates calcarifer</i>	barramundi	FA
<i>Nymphoides indica</i>	water snowflakes, star fringe	FL
<i>Persicaria attenuata</i>	slender knotweed	FL
<i>Persicaria decipiens</i>	slender knotweed	FL
<i>Plegadis falcinellus</i>	glossy ibis	FA
<i>Potamogeton crispus</i>	curly or wavy-leaved pondweed	FL
<i>Vallisneria nana</i>	eel-grass, ribbonweed	FL

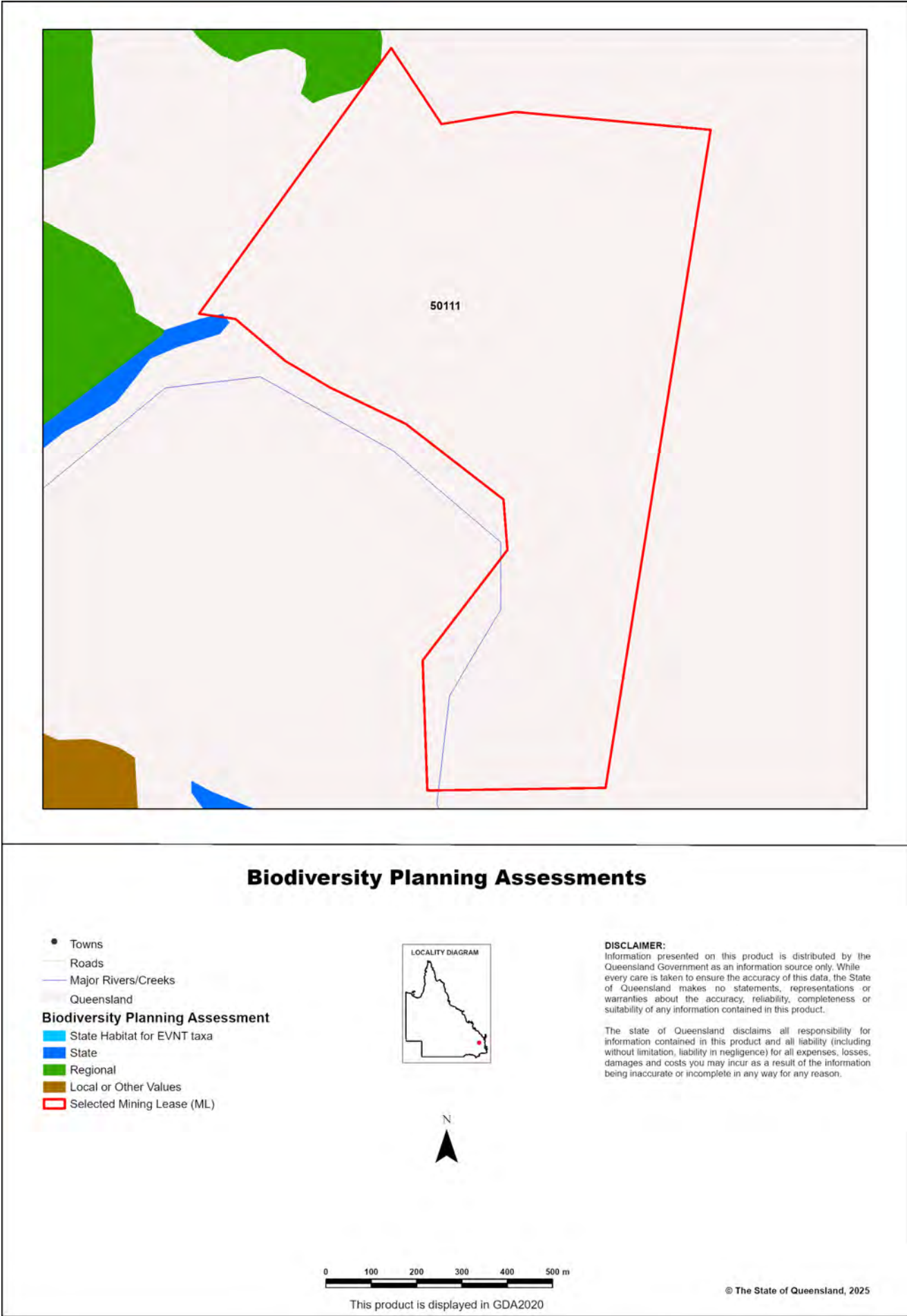
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.

Maps

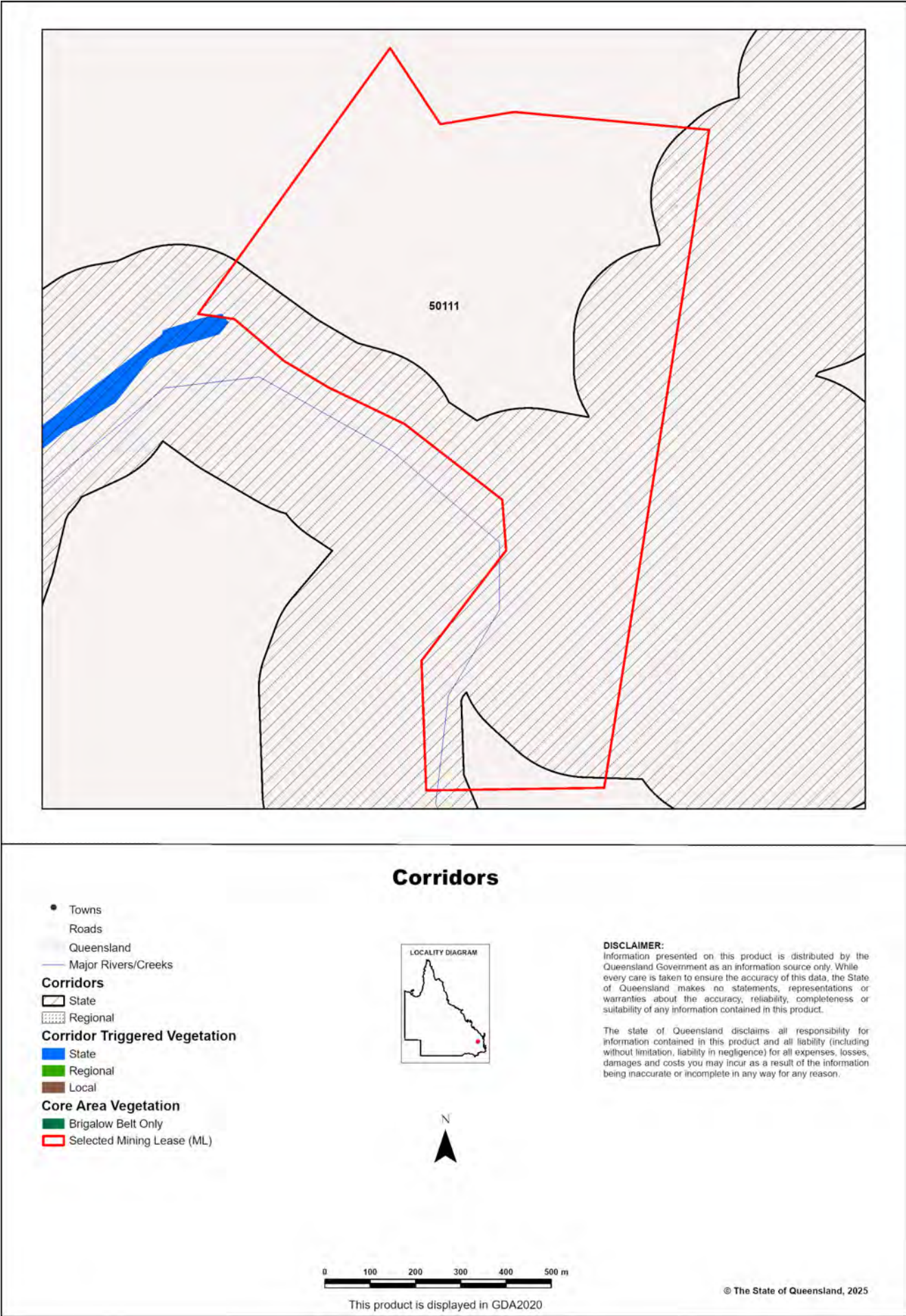
Map 1 - Locality Map



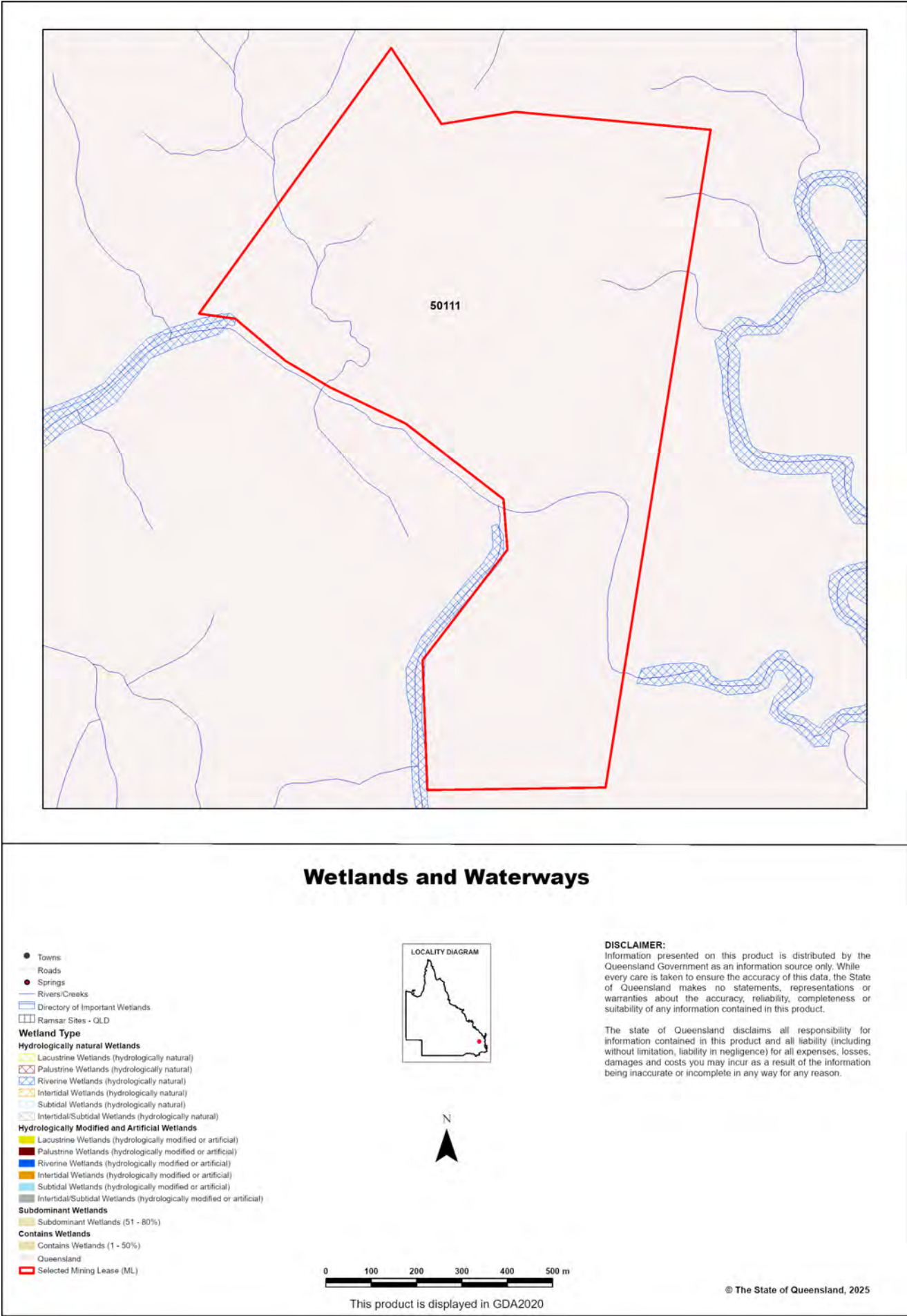
Map 2 - Biodiversity Planning Assessment (BPA)



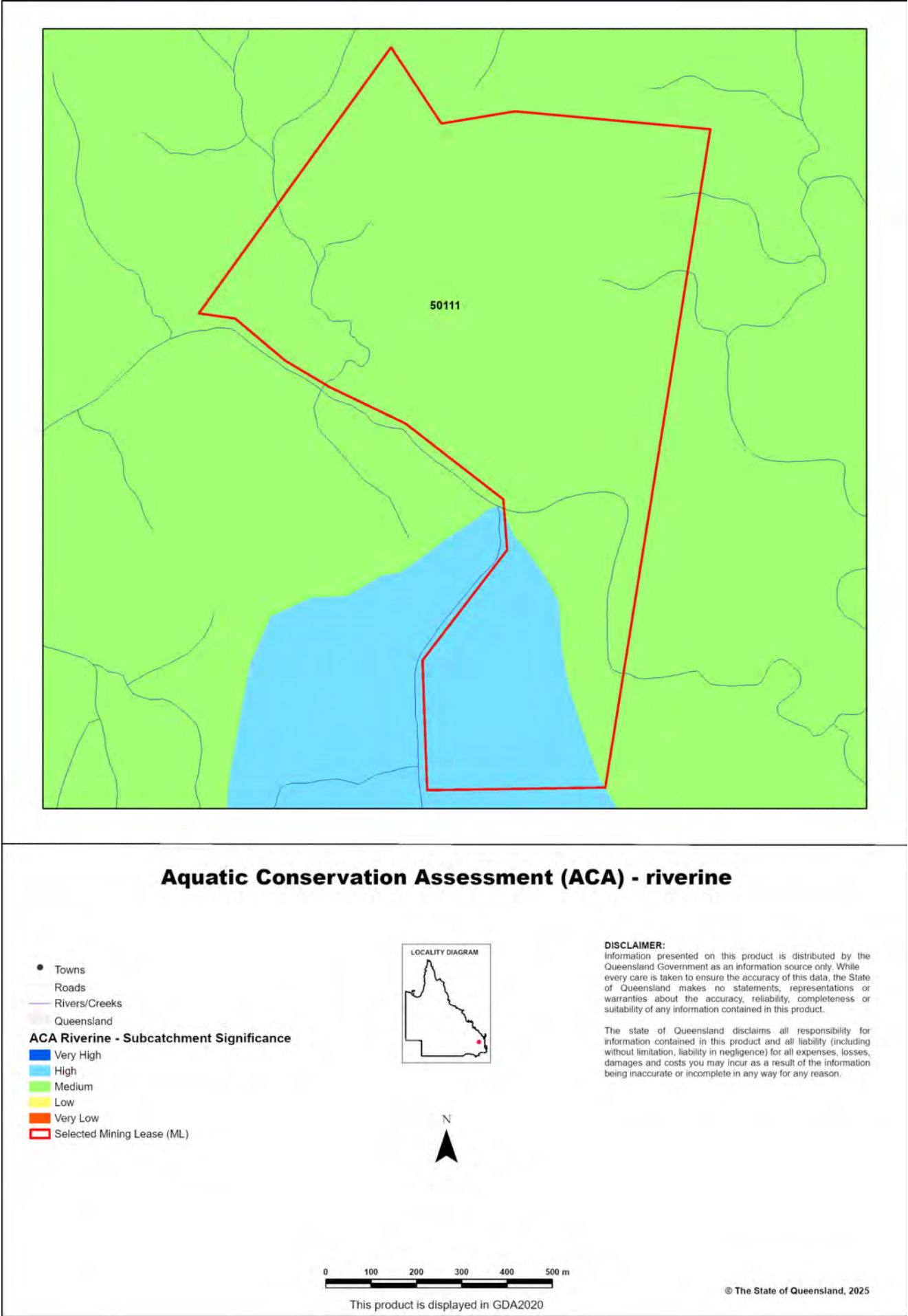
Map 3 - Corridors



Map 4 - Wetlands and waterways



Map 5 - Aquatic Conservation Assessment (ACA) - riverine



Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



Aquatic Conservation Assessment (ACA) - nonriverine

- Towns
 - Roads
 - Rivers/Creeks
 - Queensland
- ACA Non-riverine**
- Very High
 - High
 - Medium
 - Low
 - Very Low
 - Selected Mining Lease (ML)



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Appendices

Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDBB Non-riverine ACA v2.1 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1 WBBGBRCC Non-riverine ACA v2.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDBB Riverine ACA v2.1 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1 WBBGBRCC Riverine ACA v2.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einiasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v3.1 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.7
Threatened Species	An internal DETSI database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DETSI database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DETSI database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.

These datasets are available at:

<http://dds.information.qld.gov.au/DDS>

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DETSI	- Department of the Environment, Tourism, Science and Innovation
EPBC	- <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVNT	- Endangered, Vulnerable, Near Threatened
GDA2020	- Geocentric Datum of Australia 2020
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement



WildNet Records Species List

For the selected area of interest 83.83 ML: 50111
Current as at 26/06/2025 WildNetSpeciesList

Summary Information

The following table provides an overview of the area of interest: ML: 50111

Table 1. Area of interest details

Size (ha)	
83.83	
Local Government(s)	
South Burnett Regional	
Catchment(s)	
Burnett	
Bioregion(s)	Subregion(s)
Southeast Queensland	Brisbane - Barambah Volcanics
Southeast Queensland	South Burnett

Protected Area(s)

No estates or reserves are located within the area of interest.

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Species data

Contextual location information is presented in Map 1.

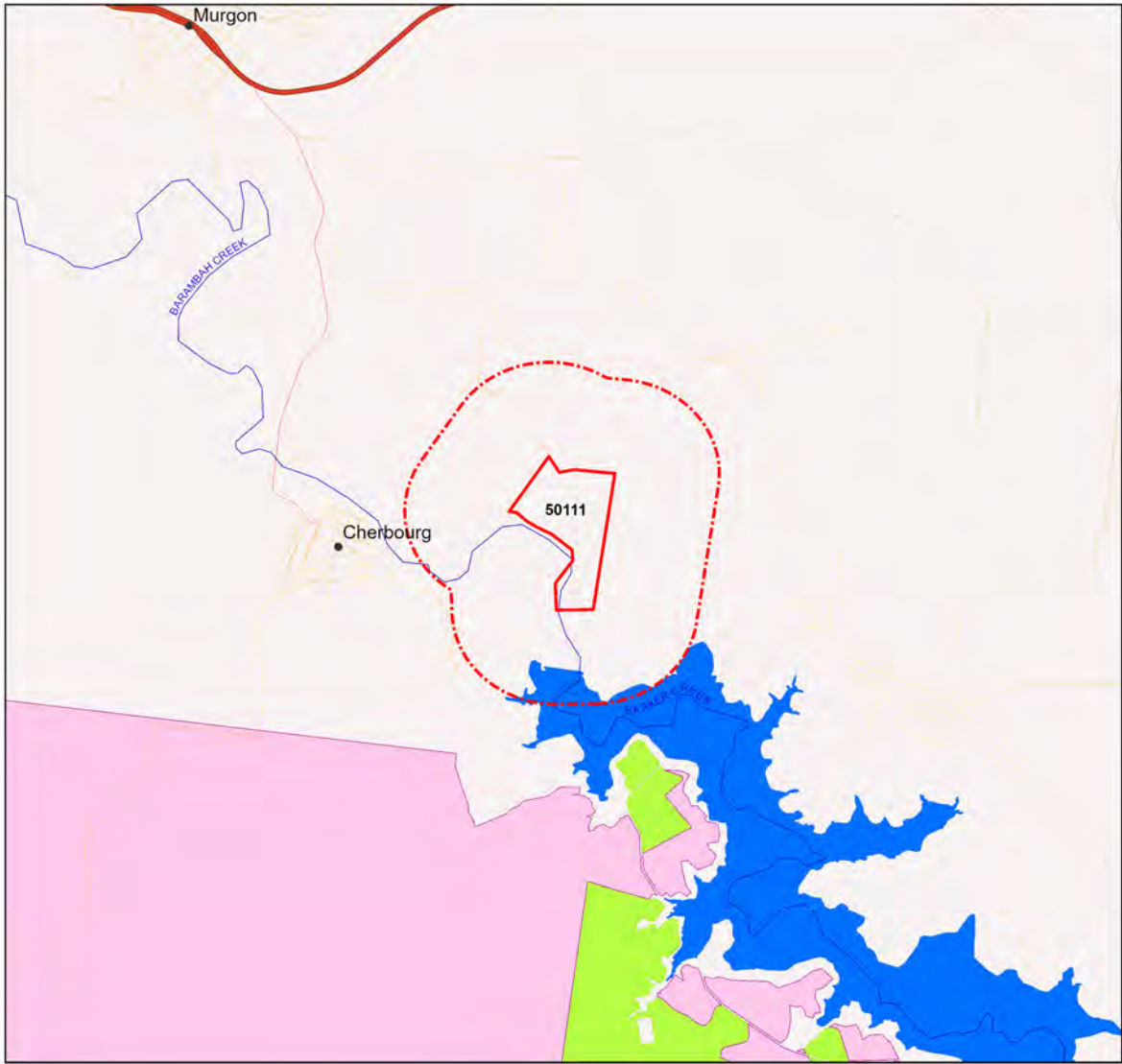
Table 2 lists the animals recorded within the area of interest and its one kilometre buffer.

Table 3 lists the plants recorded within the area of interest and its one kilometre buffer.

Table 4 lists the fungi recorded within the area of interest and its one kilometre buffer.

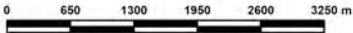
Table 5 lists the other species recorded within the area of interest and its one kilometre buffer.

Map 1. Locality Map



Locality Map

- Legend**
- Towns
 - Freeways/Highways
 - Connector
 - Street/Local Road
 - Lakes and reservoirs
 - National Park
 - National Park (Scientific)
 - National Park (CYPAL)
 - National Park (Aboriginal Land)
 - Conservation Park
 - Resources Reserve
 - Forest Reserve
 - State Forest
 - Timber Reserve
 - Nature Refuges
 - Coordinated Conservation Areas
 - Major rivers/creeks
 - Queensland
 - Selected Mining Lease (ML)
 - 1 kilometre buffer



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Table 2. Animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
27039	Actinopterygii	Osteoglossidae	<i>Scleropages leichardti</i>	southern saratoga			0	1	31/12/1993
18169	Actinopterygii	Percichthyidae	<i>Maccullochella mariensis</i>	Mary River cod	E	E	0	1	10/01/1989
27043	Actinopterygii	Percichthyidae	<i>Macquaria novemaculeata</i>	Australian bass			0	1	10/01/1989
1396	Aves	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	C		0	3	27/10/2003
1725	Aves	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite	C		0	1	27/10/2003
1707	Aves	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite	C		0	5	19/05/2007
1776	Aves	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher	C		0	1	10/12/2000
1766	Aves	Alcedinidae	<i>Dacelo leachii</i>	blue-winged kookaburra	C		0	1	18/04/2012
1767	Aves	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra	C		0	2	27/10/2003
1762	Aves	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher	C		0	2	18/04/2012
1992	Aves	Anatidae	<i>Anas castanea</i>	chestnut teal	C		0	1	15/08/2001
1993	Aves	Anatidae	<i>Anas gracilis</i>	grey teal	C		0	5	9/11/2003
1998	Aves	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		0	8	18/04/2012
1999	Aves	Anatidae	<i>Aythya australis</i>	hardhead	C		0	4	19/05/2007
2003	Aves	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C		0	6	18/04/2012
2005	Aves	Anatidae	<i>Cygnus atratus</i>	black swan	C		0	4	9/11/2003
1982	Aves	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-geese	C		0	1	15/08/2001
1996	Aves	Anatidae	<i>Spatula rhynchotis</i>	Australasian shoveler	C		0	2	25/05/2003
1279	Aves	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter	C		0	7	18/04/2012
1829	Aves	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret	C		0	3	27/10/2003
1831	Aves	Ardeidae	<i>Ardea intermedia</i>	intermediate egret	C		0	1	25/05/2003
1832	Aves	Ardeidae	<i>Ardea pacifica</i>	white-necked heron	C		0	1	15/08/2001
1840	Aves	Ardeidae	<i>Egretta garzetta</i>	little egret	C		0	3	9/11/2003

1826	Aves	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		0	2	15/08/2001
1654	Aves	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird	C		0	4	19/05/2007
1644	Aves	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C		0	7	18/04/2012
1645	Aves	Artamidae	<i>Strepera graculina</i>	pied currawong	C		0	1	25/05/2003
1193	Aves	Cacatuidae	<i>Eolophus roseicapilla</i>	galah	C		0	2	18/04/2012
1636	Aves	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	C		0	4	19/05/2007
27774	Aves	Charadriidae	<i>Vanellus miles</i>	masked lapwing	C		0	5	18/04/2012
1933	Aves	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	C		0	2	15/08/2001
1294	Aves	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola	C		0	6	19/05/2007
1793	Aves	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon	C		0	3	18/04/2012
1609	Aves	Corvidae	<i>Corvus orru</i>	Torresian crow	C		0	7	18/04/2012
1751	Aves	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal	C		0	1	25/05/2003
1738	Aves	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel	C		0	1	27/10/2003
1342	Aves	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch	C		0	1	25/05/2003
1572	Aves	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow	C		0	5	18/04/2012
1585	Aves	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin	C		0	2	27/10/2003
1919	Aves	Laridae	<i>Chlidonias hybrida</i>	whiskered tern	C		0	1	27/10/2003
1912	Aves	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull	C		0	5	19/05/2007
1886	Aves	Laridae	<i>Gelochelidon macrotarsa</i>	Australian tern	C		0	1	9/11/2003
1896	Aves	Laridae	<i>Hydroprogne caspia</i>	Caspian tern	SL		0	4	18/04/2012
1914	Aves	Laridae	<i>Leucophaeus pipixcan</i>	Franklin's gull	C		0	1	2/03/2014
1289	Aves	Locustellidae	<i>Cincloramphus timoriensis</i>	tawny grassbird	C		0	1	15/08/2001
1570	Aves	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren	C		0	1	25/05/2003
18458	Aves	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren	C		0	1	18/04/2012

1558	Aves	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren	C		0	3	9/11/2003
1539	Aves	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater	C		0	5	19/05/2007
1497	Aves	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	C		0	2	15/08/2001
1500	Aves	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	C		0	8	18/04/2012
1507	Aves	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater	C		0	1	19/05/2007
1493	Aves	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird	C		0	2	19/05/2007
1494	Aves	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	C		0	3	19/05/2007
1471	Aves	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater	C		0	2	25/05/2003
1589	Aves	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark	C		0	7	18/04/2012
1600	Aves	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher	C		0	2	19/05/2007
1455	Aves	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	C		0	1	27/10/2003
1680	Aves	Otididae	<i>Ardeotis australis</i>	Australian bustard	C		0	1	12/06/1993
1437	Aves	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	C		0	2	19/05/2007
1392	Aves	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote	C		0	4	19/05/2007
1284	Aves	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	C		0	6	19/05/2007
1261	Aves	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant	C		0	6	18/04/2012
1275	Aves	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant	C		0	6	19/05/2007
1263	Aves	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant	C		0	7	18/04/2012
1264	Aves	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant	C		0	4	2/05/2007
1687	Aves	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail	C		0	1	27/10/2003
1271	Aves	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe	C		0	3	27/10/2003
1249	Aves	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	C		0	6	18/04/2012
1318	Aves	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler	C		0	1	15/08/2001
1136	Aves	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella	C		0	3	25/05/2003

1124	Aves	Psittaculidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet	C		0	2	9/11/2003
1125	Aves	Psittaculidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet	C		0	3	19/05/2007
1682	Aves	Rallidae	<i>Amauornis moluccana</i>	pale-vented bush-hen	C		0	1	10/12/1991
1686	Aves	Rallidae	<i>Fulica atra</i>	Eurasian coot	C		0	5	18/04/2012
1673	Aves	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen	C		0	4	18/04/2012
1662	Aves	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen	C		0	1	15/08/2001
1674	Aves	Rallidae	<i>Tribonyx ventralis</i>	black-tailed native-hen	C		0	1	14/06/1993
1893	Aves	Recurvirostridae	<i>Himantopus leucocephalus</i>	pied stilt	C		0	5	19/05/2007
1576	Aves	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	C		0	5	18/04/2012
1857	Aves	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe	V	V	0	1	2/03/2014
1822	Aves	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill	C		0	1	15/08/2001
1823	Aves	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill	C		0	1	15/08/2001
1825	Aves	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis	SL		0	1	2/03/2014
1812	Aves	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis	C		0	2	27/10/2003
1800	Aves	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis	C		0	2	2/05/2007
19179	Insecta	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer			0	1	18/04/2012
19177	Insecta	Nymphalidae	<i>Danaus plexippus</i>	monarch			0	1	18/04/2012
19172	Insecta	Nymphalidae	<i>Junonia villida villida</i>	meadow argus			0	1	18/04/2012
19074	Insecta	Papilionidae	<i>Papilio demoleus sthenelus</i>	chequered swallowtail			0	1	18/04/2012
19086	Insecta	Pieridae	<i>Eurema hecabe</i>	large grass-yellow			0	1	18/04/2012
834	Mammalia	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit			0	1	2/03/2014
860	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala	E	E	0	1	2/03/2014
62	Reptilia	Chelidae	<i>Chelodina expansa</i>	broad-shelled river turtle	C		0	1	31/12/1998
58	Reptilia	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle	C		0	1	31/12/1998

43	Reptilia	Chelidae	<i>Emydura macquarii macquarii</i>	Murray turtle	C		1	1	19/05/2014
54	Reptilia	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle	C		0	1	31/12/1998
493	Reptilia	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake	C		0	1	2/03/2014

Table 3. Plants recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
10421	Equisetopsida	Poaceae	<i>Chionachne cyathopoda</i>	river grass	C		1	1	18/04/2020

Table 4. Fungi recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Table 5. Other species recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Species table headings and codes

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [WildNet Application](#) - public interface to find species information and species lists generated from the WildNet database.
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld WildNet Data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
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Please direct queries about this report to the WildNet Team WildNet@detsi.qld.gov.au.

Other useful sites for accessing Queensland biodiversity data include:

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- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australasian Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

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WildNet Records

Introduced Species List

For the selected area of interest 83.83 ML: 50111
Current as at 26/06/2025 WildNetIntroducedSpeciesList

Summary Information

The following table provides an overview of the area of interest: ML: 50111

Table 1. Area of interest details

Size (ha)	
83.83	
Local Government(s)	
South Burnett Regional	
Catchment(s)	
Burnett	
Bioregion(s)	Subregion(s)
Southeast Queensland	South Burnett
Southeast Queensland	Brisbane - Barambah Volcanics

Protected Area(s)

No estates or reserves are located within the area of interest.

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

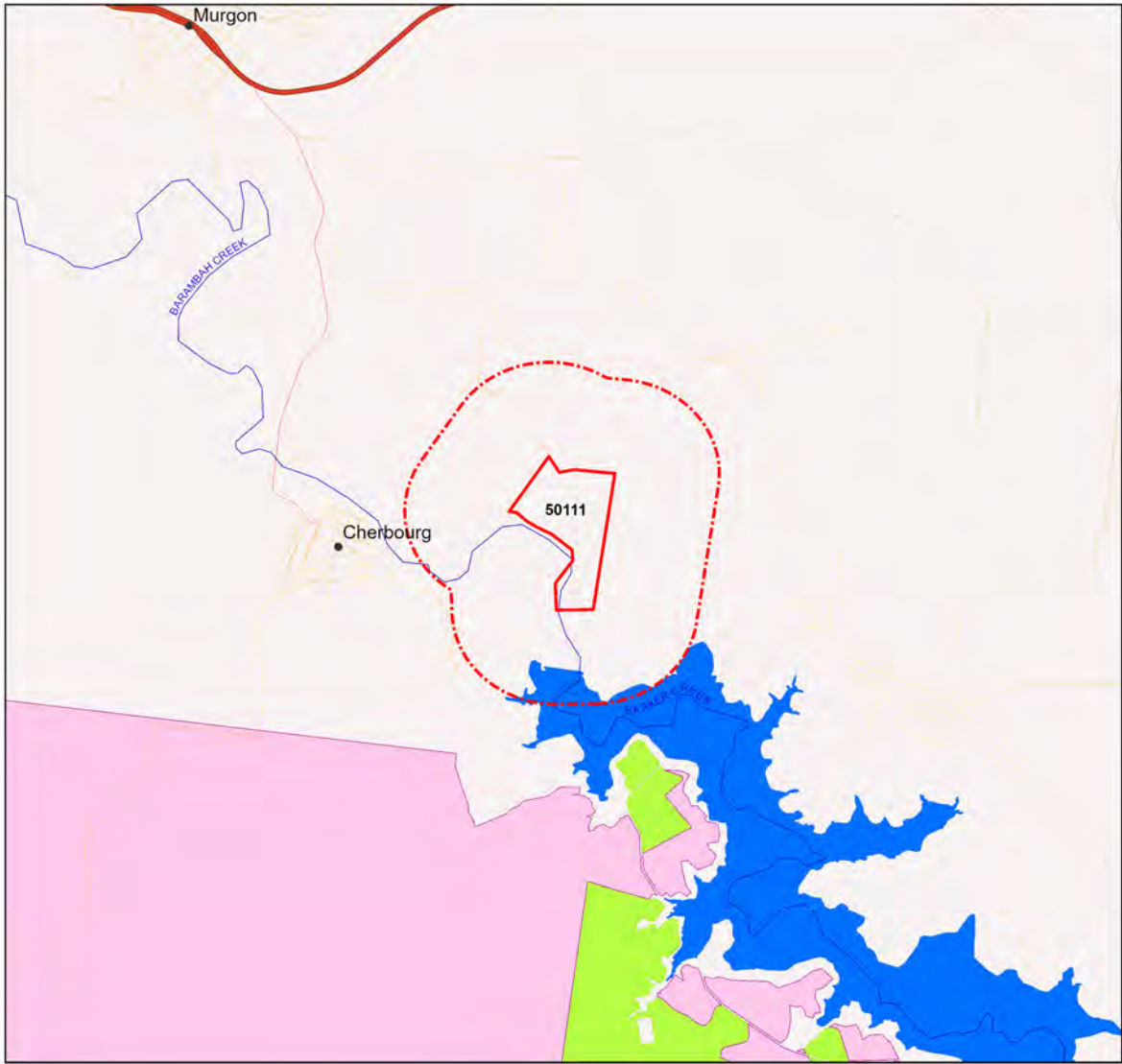
The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Species data

Contextual location information is presented in Map 1.

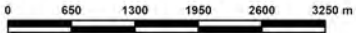
A summary of the Introduced species recorded within the area of interest and its one kilometre buffer is presented in Tables 2 and 3.

Map 1. Locality Map



Locality Map

- Legend**
- Towns
 - Freeways/Highways
 - Connector
 - Street/Local Road
 - Lakes and reservoirs
 - National Park
 - National Park (Scientific)
 - National Park (CYPAL)
 - National Park (Aboriginal Land)
 - Conservation Park
 - Resources Reserve
 - Forest Reserve
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Table 2. Introduced animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	Specimens	Records	Last record	Establishment Code
19177	Animalia	Insecta	Nymphalidae	<i>Danaus plexippus</i>	monarch	0	1	18/04/2012	II
834	Animalia	Mammalia	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	0	1	2/03/2014	II

Taxon Id: Unique identifier of the taxon from the WildNet database.

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Establishment: Code describing how the taxon is established in Queensland. The list of code description can be accessed from the [WildNet Data API](#).

Table 3. Introduced plants recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Taxon Id: Unique identifier of the taxon from the WildNet database.

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

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APPENDIX B COMMUNITY ENGAGEMENT PLAN AND REGISTER





MURGON COMMUNITY AND STAKEHOLDER ENGAGEMENT PLAN

PURPOSE

This Community and Stakeholder Engagement Plan (CSEP) provides a framework to achieve our vision of being **'World Class in everything we do!'** and more specifically:

'We proactively develop and maintain relationships of mutual support with our neighbours and others for the long-term success of Graymont and our communities.'

OBJECTIVES

Building a sustainable future for Graymont involves engaging in a meaningful way with key stakeholders such as governments, non-governmental organizations (NGOs) and communities — including First Nations, Aboriginal and Indigenous peoples — demonstrating that the Company is committed to operating in a responsible manner that creates real value and lasting benefits for all parties.

OPEN, HONEST AND PRINCIPLED

Graymont believes that the foundation of being a good neighbour is open and honest communication. We endeavour to be proactive in communicating our plans and seeking community input so that concerns and potential issues can be identified and addressed early on.

To that end, Graymont locations make a concerted effort to maintain open lines of communication with citizens, local governments and other local businesses.

The Company also has an internal process to track complaints and ensure that community concerns are taken into account.

Everywhere we operate, we try to give back to the communities — large and small — that we call home. In all instances, we strive to operate in accordance with our values and our Stakeholder Relations Guiding Principles.

GUIDING PRINCIPLES

- Stakeholders will be provided with timely and accurate information about Graymont's activities and plans for the future that may impact them.
- Stakeholders will be given ample opportunity to participate in a stakeholder-engagement process, express their views and voice any concerns they might have if and when issues arise.
- Graymont will strive to respect the culture and values of each stakeholder.

COMMUNITY AND STAKEHOLDER ENGAGEMENT REGISTER

The Community and Stakeholder Engagement Register – Appendix A, provides detailed information on the consultation requirements for the Murgon operation including:

- List of key stakeholders
- Contact details
- Consultation approach
- Frequency of engagement
- Potential concerns
- Actual concerns or complaints raised (note: community or stakeholder complaints are entered and managed as an Environmental Incident in JDE)

Completed engagement activities are also recorded in the Community and Stakeholder Engagement Register including:



MURGON COMMUNITY AND STAKEHOLDER ENGAGEMENT PLAN

- Details of the project
- Consultation approach
- Details and/or copies of communications provided
- Records of meeting minutes (if applicable)
- Records of attendance (if applicable)
- Details of commitments or agreed actions, responsible person/s and the status

CONSULTATION APPROACH

Key methods for undertaking engagement and the requirements are detailed in the table below.

- Newsletters/Community Updates
- Letters
- Complaints Register
- Individual/Community Meetings
- Quarry Open Days
- Phone Calls and Emails

The anticipated methods for engagement of each stakeholder group are provided in the Community and Stakeholder Engagement Register.

RELATED DOCUMENTS

Murgon Community and Stakeholder Engagement Register.xlsx

REVIEW AND TRACK CHANGE DETAILS

Date	Description	Reason(s)	People Involved
03/04/2023	Review and update to Graymont branding.	Update as per PRCP requirements.	Michelle Muir

APPENDIX C AMENDED PRCP REHABILITATION PLANNING PART



Murgon Operations Progressive Rehabilitation and Closure Plan

Graymont



GRAYMONT

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Murgon Operations Progressive Rehabilitation and Closure Plan

Version:	4.0
Date of submission:	17 November 2025
Tenure:	ML50111
EA Holder:	GRAYMONT (NSW) PTY LTD
EA reference	EPML00352613

DOCUMENT TRACKING

Project Name	Murgon Operations Progressive Rehabilitation and Closure Plan
Version 2.0	
Prepared by	Paree Shine, Emily Bathgate, Kelvin Olzard, Alireza Pouya, Adam Garthwaite, Andrew Butler (EcoLogical Australia, ELA)
Reviewed by	Andrew Butler (ELA), Andrew Martin (Graymont), Emmanuel Ashong (Graymont) and Donald Cheong (Graymont)
Approved by	Andrew Butler (ELA)
Approved date	18 March 2022
Version 3.0	
Updated by	Garry Davies (ELA), Andrew Butler (ELA)
Reviewed by	Andrew Butler (ELA), Rachel Murray (ELA)
Approved by	Rachel Murray (ELA)
Approved date	6 April 2023
Version 4.0	
Updated by	Kim Hilton-Barber (Epic Environmental, Epic)
Reviewed by	Romin Nejad (Epic), Michael Blyth (Epic), Maxime Descoteaux (Graymont)
Approved by	Michael Dudley (Graymont)
Approved date	20 October 2025
Scope of Update	Updated to align with the Environmental Authority Amendment (dated October 2025)
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Version Number	V4
Last saved on	13 November 2025

This report should be cited as 'Graymont 2025. *Murgon Operations Progressive Rehabilitation and Closure Plan*, v4.0.

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Contents

1. Introduction	8
1.1. Purpose and scope.....	8
2. Regulatory context.....	10
2.1. Queensland rehabilitation regulatory framework.....	10
3. Project Planning Section	12
3.1. Project Planning	12
3.1.1. Site location, regional context and topography	12
3.1.2. Climate	12
3.1.3. Geological setting.....	13
3.1.4. Site hydrology and fluvial networks.....	15
3.1.5. Groundwater.....	22
3.1.6. Pre-mining and current surrounding land use	35
3.1.7. Soil properties and productivity	38
3.1.8. Ecological values.....	41
3.1.9. Project description.....	46
3.1.10. Design for closure (including consideration of voids in flood plains)	49
3.1.11. Rehabilitation planning and progressive rehabilitation.....	51
3.2. Community consultation	59
3.3. Post Mine Land Use	59
3.3.1. Selection of PMLUs.....	59
3.3.2. Rehabilitation objectives and completion criteria	65
3.4. Non-Use Management Areas	73
3.5. Rehabilitation Management Methodology.....	73
3.5.1. Hydrogeological assessment	73
3.5.2. Flooding.....	75
3.5.3. Soil and capping material assessment.....	75
3.5.4. Waste characterisation.....	79
3.5.5. Cover design	80
3.5.6. Landform design.....	80
3.5.7. Water management.....	85
3.5.8. Site preparation and topsoiling.....	89
3.5.9. Revegetation	92
3.5.10. Rehabilitation implementation quality control.....	93
3.5.11. Tailings storage facilities	93
3.5.12. Void	93
3.5.13. Underground mining.....	95
3.5.14. Built infrastructure	95
3.6. Risk Assessment.....	97
3.6.1. Rehabilitation trials	112

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.7. Monitoring and Maintenance	112
3.7.1. Areas with a low intensity grazing PMLU	112
3.7.2. Water quality	113
3.7.3. Monitoring schedule and frequency	113
3.7.4. Reporting	114
3.7.5. Maintenance and contingency measures	114
4. References	116
Appendix A WildNet database output	120
Appendix B PRCP Schedule	128
Appendix C Supporting Land Outcome Documents (EA)	129
Appendix D Inspection and Test Plans	130
Appendix E PRCP spatial data (supplied separately)	140
Appendix F Murgon Community Consultation Plan	141
Appendix G Murgon Landholder Statements	142
Appendix H Rocktest Consulting Report 2022	143

List of Figures

Figure 1 Locality, disturbance types and current areas of disturbance at Murgon Operations..	9
Figure 2 Mean monthly rainfall (BoM weather stations 40112; Kingaroy Prince Street and Murgon Post Office 40152)	13
Figure 3 Regional surface geology (source: Queensland Government, 2020a)	15
Figure 4 Surface water pH values at W1 (upstream background) and W2 (downstream impact) compared to the WQO (range between pH 6.5 and pH 7.5) (Note: Laboratory results were used in place of in situ results where outliers were detected)	17
Figure 5 Surface water EC values at W1 (upstream background) and W2 (downstream impact) compared to the EA release limit (<1000 µS/cm)	17
Figure 6 Surface water TN concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<0.25 mg/L)	18
Figure 7 Surface water TSS concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<6 mg/L)	18
Figure 8 The extent of the Queensland floodplain assessment overlay in relation to the Murgon site	20
Figure 9 Predicted 1% AEP flood extent around the site where variants of blue blocks indicate depth of water	21
Figure 10 Predicted extreme events (approximation of PMF) flood extent where variants of blue blocks indicate depth of water	22
Figure 11 Regional geology and hydrogeology (see Table 3 for more details of the geology referenced in the legend)	24
Figure 12 Changes in the groundwater levels within bores	27
Figure 13 Registered bores within the study area and the groundwater level reading locations	28
Figure 14 Changes in the groundwater levels within bores	32

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Figure 15 An aerial photo of the project area from 1951 (source: https://qimagery.information.qld.gov.au)	36
Figure 16 An aerial photo of the project area from 1993 (source: https://qimagery.information.qld.gov.au)	36
Figure 17 The land-uses surrounding the Murgon ML (Source: Queensland Government (2019))	37
Figure 18 The land systems around the project area (source: Queensland Government 2020b)	40
Figure 19 Regulated vegetation management categories for the Murgon Operation and surrounds	45
Figure 20 The sensitive receptors surrounding the Murgon ML	50
Figure 21 Rehabilitation areas at Murgon	56
Figure 22 Timeline of significant rehabilitation works at Murgon	57
Figure 23 Final life of mine footprint	58
Figure 24 Retained buildings and infrastructure at end of mine life	61
Figure 25 Final PMLU and Rehabilitation Areas	64
Figure 26 Final landform 3D elevation at completion of rehabilitation (Source: Graymont)	83
Figure 27 Final landform section view showing RL on the y axis (Source: Graymont)	84
Figure 28 CMS for the Murgon Operation	85
Figure 29 Operational sediment dams and catchments (Source: Graymont)	86
Figure 30 Location of diversions to be retained at closure	91
Figure 31 Cross section through void at EOML	95

List of Tables

Table 1 EA conditions relevant to rehabilitation	11
Table 2 Long-term mean temperature since 1947 (BoM weather station 40112; Kingaroy Prince Street)	12
Table 3 More information about detailed surface geology shown on Figure 11	25
Table 4 Status and data availability of registered bores with water level within the study area	25
Table 5 Registered bores with water level data within the study area	26
Table 6 Analytical results of the water quality measurement (July and November 2021)	30
Table 7 Analytical results of the water quality measurement (February and March 2022)	30
Table 8 The guideline values for physical and chemical characteristics applicable to groundwater at Murgon (NHMRC 2011 ANZECC & ARMCANZ 2000) compared to the maximum values recorded in analysis conducted in 2022	35
Table 9 Threatened flora likelihood of occurrence assessment	42
Table 10 Threatened fauna that are known to occur, or potentially occur, in or around the project area	43
Table 11 Details of the mining tenure for Murgon	46
Table 12 The Murgon disturbance types as provided in the EA	47
Table 13 Murgon ERAs	49
Table 14 Summary of most recent annual disturbance and rehabilitation activities	51

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 15 Rehabilitation milestones for RAs associated with Northern Overburden Dump (Waste Dump 2), North-eastern Overburden Dump (Waste Dump 1) and Topsoil Stockpiles Disturbance Types	53
Table 16 Rehabilitation milestones for RAs associated with the Silt Traps/Dams Disturbance Type	53
Table 17 Rehabilitation milestones for RAs associated with the Plant/Office, Fuel Storage and Service Area and Product Stockpiles Disturbance Types	53
Table 18 Rehabilitation milestones for RAs associated with the Open Pit (Residual Void) Disturbance Type	54
Table 19 Rehabilitation milestones for RAs associated with the Roads and Track Disturbance Type	54
Table 20 Nominated PMLUs and slope criteria from the disturbance types nominated in the EA for Murgon	60
Table 21 Murgon Operations rehabilitation objectives, milestones and milestone completion criteria for all RAs	67
Table 22: The results of analysis of the topsoil stored in stockpiles	77
Table 23 The results of the analysis of “scalps”	78
Table 24 Topsoil Material Balance	79
Table 25. Summary of the XRD results from the waste rock dumps	79
Table 26. Dispersibility results from waste rock dump sites	80
Table 27 Specifications for the Northern and North-eastern Overburden Dump at end of mine life	81
Table 28 Description of operational sediment dam catchments	86
Table 29 Specifications of void at the end of mine life (Rocktest Consulting 2022)	94
Table 30 Likelihood measures	97
Table 31 Consequence measures	98
Table 32 Risk assessment matrix	98
Table 33 Risk assessment outcomes	99
Table 34: Monitoring schedule	113
Table 35: Contingency measures	114

Abbreviations

Abbreviation	Description
AEP	Annual Exceedance Probability
ALC	Agricultural Land Classification
BMRG	Burnett Mary Regional Group
BoM	Bureau of Meteorology
DAF	Department of Agriculture and Fisheries
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

DEEDI	Department of Employment, Economic Development and Innovation
DEM	Digital Elevation Model
DETSI	Department of the Environment, Tourism, Science and Innovation
DES	Department of Environment and Science
EA	Environmental Authority
EC	Electrical Conductivity
EP Act	Environmental Protection Act 1994
EPBC	Environment Protection and Biodiversity Conservation Act 1999
ERA	Environmental Relevant Activities
ERC	Estimated Rehabilitation Cost
EV	Environmental Value
FRP	Filterable Reactive Phosphorus
GDE	Groundwater Dependent Ecosystem
GLS	Ground Limestone
IAA	Important Agricultural Area
ITP	Inspection and Test Plan
MERFP Act	Mineral and Energy Resources (Financial Provisioning) Act 2018
LOD	Land Outcome Document
LOM	Life of Mine
ML	Mining Lease
NC Act	Nature Conservation Act 1992
NUMA	Non-use management area
PoO	Plan of Operations
PMLU	Post-Mine Land Use
PRCP	Progressive Rehabilitation and Closure Plan
PRCP Schedule	Progressive Rehabilitation and Closure Plan Schedule
QFAO	Queensland Floodplain Assessment Overlay
RA	Rehabilitation Area
RE	Regional Ecosystem
ROM	Run of Mine
RPI Act	Regional Planning Interests Act 2014
TN	Total Nitrogen
TPH	Total Petroleum Hydrocarbons
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WQO	Water Quality Objective
WQIP	Water Quality Improvement Plan



MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

1. Introduction

The Graymont Murgon Limestone Mine and Processing Plant (the site) is situated approximately 260 km north-west of Brisbane, 90 km south-west of Gympie and 160km south-west of Maryborough. The site is located on Haager Drive at the junction of Barambah and Barker Creeks, Murgon. The township of Murgon is located approximately 5 km to the north-west of the Murgon Limestone Mine mining lease (ML 50111) (Figure 1).

The site was acquired by Graymont in 2019 from Sibelco Lime Pty Ltd (Sibelco).

There are three limestone deposits on ML 50111 - the Northern, Central and Southern Deposits. Only the Northern Deposit, with an indicated resource of 1.03 million tonnes and minable reserve of 976,000 tonnes of limestone, is currently being worked to 2037.

This rehabilitation planning part of the Progressive Rehabilitation and Closure Plan (PRCP) has been prepared to meet the requirements of the *Environmental Protection Act* 1994 (EP Act).

1.1. Purpose and scope

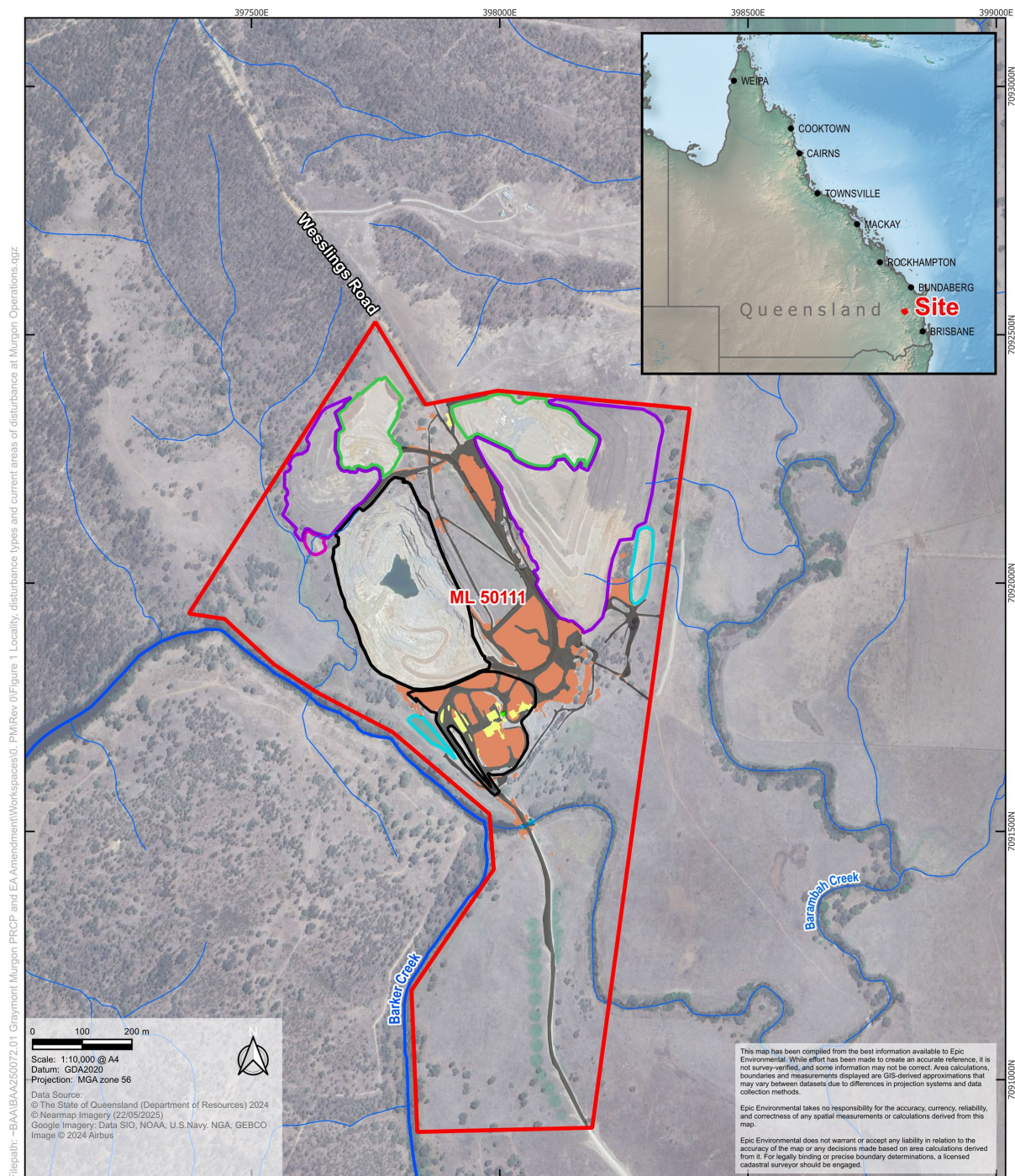
The Murgon Operation PRCP Planning part provides guidance on the progressive rehabilitation of land affected by mining activities and the closure requirements of the mine once operations cease. The main purpose of a PRCP is to enable an EA holder to plan for how and where mining activities will be carried out on land in a way that maximises the progressive rehabilitation of the land to a stable condition; and provide details of the condition to which the EA holder must rehabilitate the land before the EA may be surrendered. This is a critical element of mine closure and ultimate relinquishment of the mining leases.

This PRCP has been prepared with reference to requirements for the preparation of a PRCP as set out in the Queensland Government Department of Environment and Science (DES), *Progressive Rehabilitation and Closure Plans (PRC Plans) Guideline (ESR/2019/4964)* (PCRPP guideline) (DES 2021) effective from 17 March 2021.

The location and current disturbance associated with the site is outlined in Figure 1.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN



BAA250072.01 Rev 0 10/11/2025

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

2. Regulatory context

Rehabilitation at mining operations is regulated under the EP Act and its subordinate legislation including the *Environmental Protection Regulation 2019*. It is Queensland Government policy that land disturbed by mining activities will be rehabilitated progressively as it becomes available, to minimise the risk of environmental impacts and to reduce cumulative areas of disturbed land.

2.1. Queensland rehabilitation regulatory framework

Under amendments to the EP Act resulting from the passing of the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act), all new and existing EA holders for a mining activity relating to a mining lease approved through a site-specific application (DES 2021) are required to prepare a PCRPP following receipt of a Notice from DES.

For existing operations, the transitional arrangements mean that existing “land outcomes” (Post Mine Land Uses (PMLU) and associated completion criteria) secured in a “land outcome document” (LOD) received by DES (and not rejected) before December 2018 can be carried forward (and do not need community consultation or stakeholder agreement). According to Section 750 of the EP Act a ‘land outcome document’ can be:

- a) an EA
- b) a document made under a condition of an EA that:
 - relates to the management or rehabilitation of land (e.g. rehabilitation and closure plan or residual void management plan); and*
 - was provided to the administering authority, and had not been superseded, before 30 November 2018; and*
 - before 15 January 2019, the administering authority had not notified the EA holder that the document was insufficient.*
- c) a document made under a condition of an EA that:
 - i *relates to the management or rehabilitation of land (e.g. rehabilitation and closure plan or residual void management plan); and*
 - ii *was provided to the administering authority between 20 November 2019 and to 30 November 2021; and*
 - iii *within 20 business days after receiving the document, the administering authority had not notified the EA holder that the document was insufficient.*
- d) a report evaluating an EIS under section 34D of the State Development and Public Works Organisation Act 1971
- e) an EIS assessment report
- f) a written agreement between the EA holder and the State that is in force on 30 November 2018.’

The PCRPP guideline (DES 2021) states that the land outcome document list is hierarchical and if there are inconsistencies between these documents on either the final outcomes or details of the outcome, then the document appearing first in the above list will prevail to the extent of the inconsistency.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

For Murgon, the primary land outcome document is the EA (MIN100485506 – received 24 April 2008 with an anniversary date 8 August, replacing the previous EA - MIN100485506 approved on 8 August 2007). The EA is currently the subject of an EA amendment, with a joint EA/PRCP Schedule amendment to be submitted to the administering authority October 2025

The EA for Murgon Operations includes specific conditions relating to rehabilitation outcomes, including the PMLU. These specific conditions are provided in Table 1.

Table 1 EA conditions relevant to rehabilitation

Condition*	Land outcome document to be prepared
C1-2	Water management system
C6-1 & C6-2	A study to determine the recharge sources and connectivity in the open pit including a dewatering monitoring program (to monitor impacts on nearby water users and surface waters)
F2-1	Final Land Use and Rehabilitation Plan #
F3-2	Acceptance criteria to meet the outcomes specified in Condition F3-1 and Schedule F Table 1 (required prior to EA surrender)

* See Table 20 of the PRC Plan for PMLU requirements as provided in Condition F1-1.

This PRC Plan supersedes this document and provides all the information required in Condition F2-1.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3. Project Planning Section

3.1. Project Planning

This section will include background information, site location details, a description of the project and information on rehabilitation planning at Murgon.

The following descriptions satisfy the legislative requirements of the EP Act:

3.1.1. Site location, regional context and topography

The site is situated approximately 260 km north-west of Brisbane, 90 km south-west of Gympie and 160km south-west of Maryborough. The site is located on Haager Drive at the junction of Barambah and Barker Creeks, Murgon. The township of Murgon is located approximately 5 km to the north-west of the mining lease (Figure 1).

The mine is situated 1.5 km west of Barambah Road and approximately 3 km east of Cherbourg Road. The site is located in a sparsely populated location, with only two houses located within 1.5 km of the mine. Cherbourg Aboriginal Reserve is located approximately 2.2 km to the west of the mine and the small village of Moffatdale is located approximately 3.4 km to the east/south-east.

The site comprises a series of limestone lenses which occur over a north-south distance of 7 km along the valley of Barker Creek. The limestone block dips to the west at various angles and is steepest close to faults. The elevation of the mining lease varies from a low of 283 m AHD near Barambah Creek to a high of 334 m AHD in the north-eastern corner of the lease. The local relief comprises undulating hills, cleared for grazing and forms part of the catchment of Barambah Creek which flows from Bjelke-Peterson Dam/Lake Barambah, located approximately 1.4 km to the south (upstream) of the mining lease boundary. The dam is a popular tourism location in the region.

3.1.2. Climate

Climate data for the region has been captured by the Kingaroy Bureau of Meteorology (BoM) weather station (station no. 40112) approximately 30 km away from 1947 to present. Based on the climate data collected from this weather station, the region experiences an annual mean maximum temperature of 24.8°C, a mean minimum temperature of 11.3°C and a mean total annual rainfall of 774.4 mm. The long-term mean temperature is provided in Table 2 and the mean monthly rainfall presented in Figure 2.

A less complete set of climate data (rainfall only) for the location has been captured from 1909 to present at the Murgon Post Office BoM weather station (station no. 40152) 6 km north of the site. It recorded a slightly higher mean total annual rainfall of 790.5 mm (Figure 2).

Table 2 Long-term mean temperature since 1947 (BoM weather station 40112; Kingaroy Prince Street)

Temp (mean; °C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Min	29.5	28.8	27.6	25.1	21.6	18.9	18.5	20.1	23.3	26.0	28.1	29.6	24.8
Max	17.4	17.5	15.8	12.1	8.6	5.4	4.0	4.8	7.9	11.7	14.4	16.5	11.3

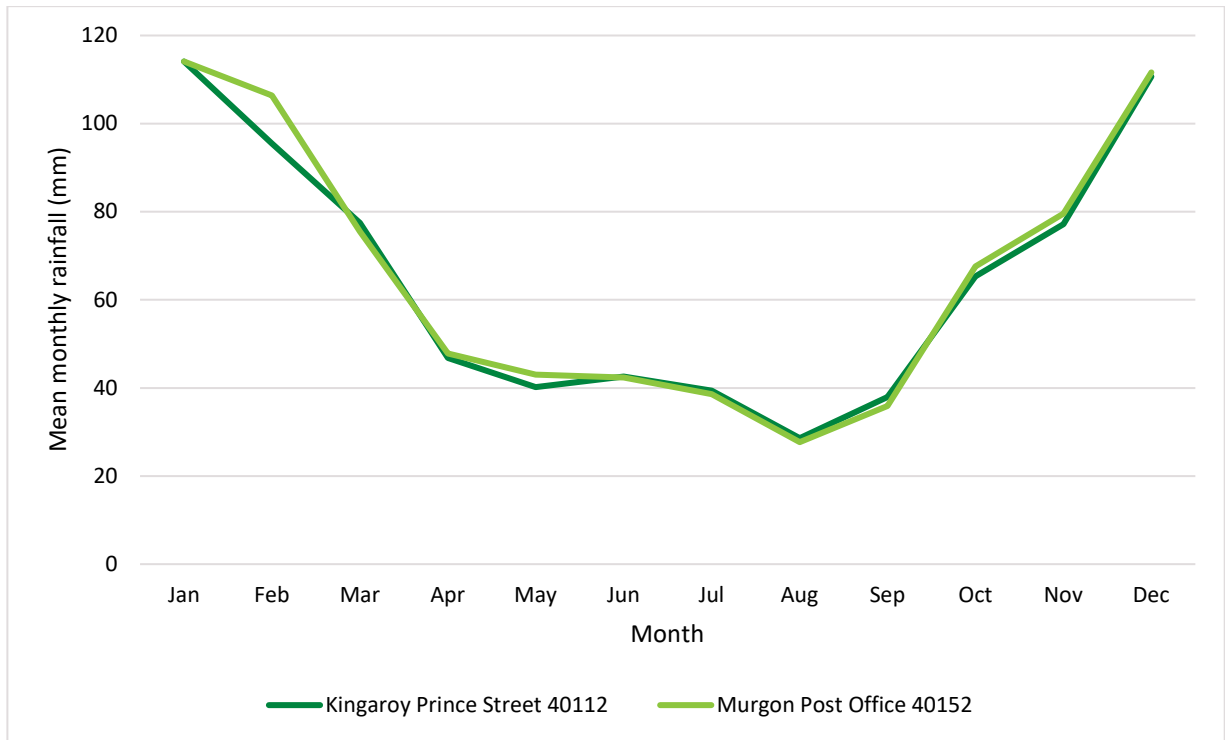


Figure 2 Mean monthly rainfall (BoM weather stations 40112; Kingaroy Prince Street and Murgon Post Office 40152)

3.1.3. Geological setting

The limestone orebody occurs within a sequence of limestones and mafic andesitic to basaltic volcanics; the latter rocks being referred to collectively as andesites. The rocks are overlain by a thin (5-10 m) deposit of recent alluvium and Tertiary sediments (Meyers 2015). The regional surface geology is shown in Figure 3 based on the Queensland Government's *Detailed surface geology – Queensland* data layer (Queensland Government 2020a).

The recent alluvial deposits comprise clayey-sands and sandy-clays. The tertiary sediments comprise interlayered clayey and gravelly sands, sandy clays and clays. The sediments also occur as fill within karst features in the top of the limestone.

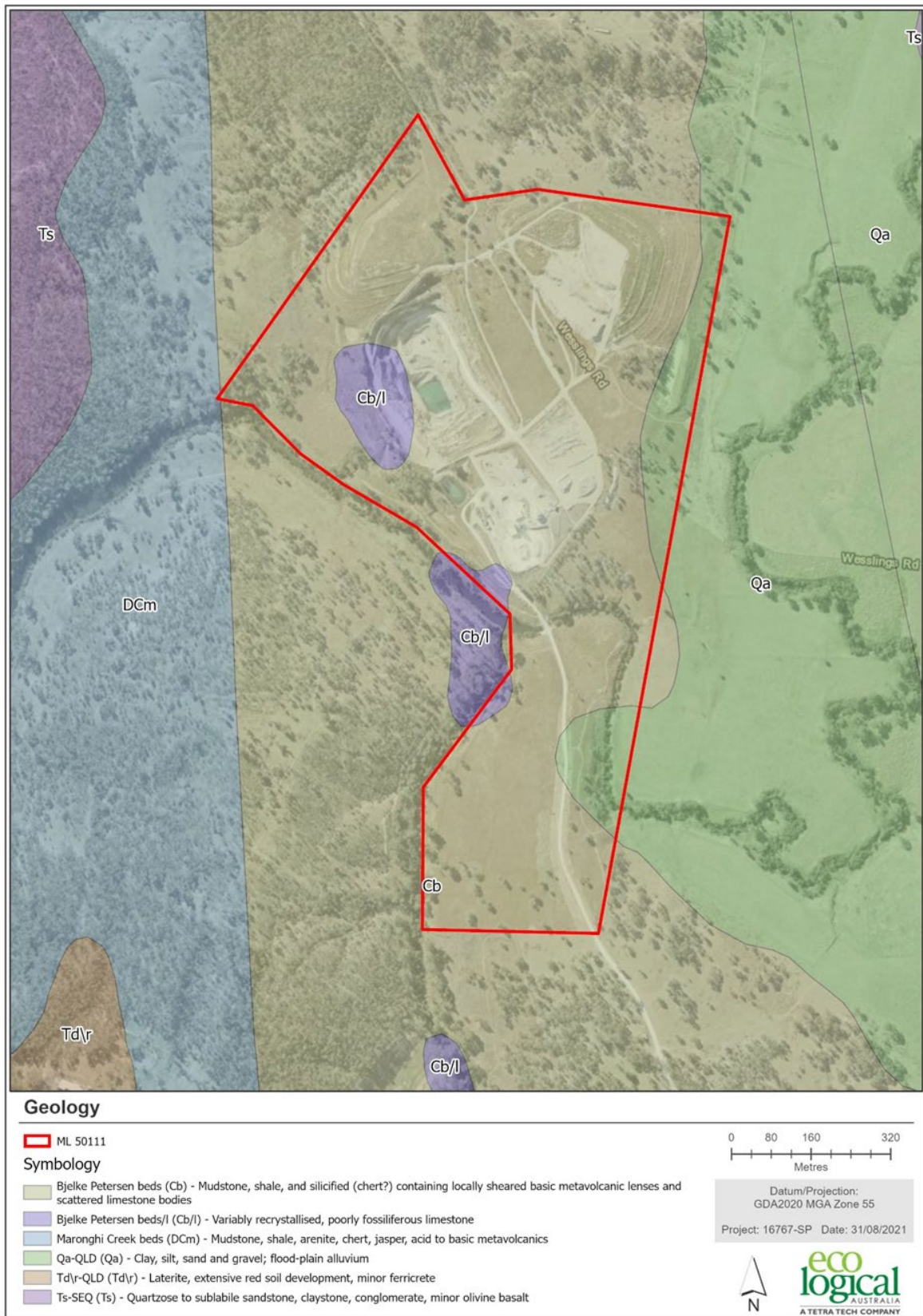
The Barambah andesite and limestone form the Bjelke-Petersen beds. The beds were previously known as the Wondai Series of rocks. The rocks have been strongly deformed by widespread shearing. They have been faulted against sandstones and siltstones of the Triassic age Esk Formation.

The strikes of the footwall (east) and hanging wall (west) of the pit are defined by limestone/andesite contacts. The contacts are aligned with the structural trends in the Maronghi Creek Beds and the Esk Formation. These trends are predominantly north-northwest with dips of 60° to 75° to the west. The contact behind the west wall is well defined. The contact behind the east wall, particularly at the north end of the pit, is less well defined.

The north and south walls are defined by east-west striking faults. These faults have limited the extents of the limestone along strike and have significantly disturbed the rocks in the walls.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN



PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Figure 3 Regional surface geology (source: Queensland Government, 2020a)

3.1.4. Site hydrology and fluvial networks

The site is located within the Barker and Barambah Creeks drainage Sub-basin, in the freshwater catchment zone for the Burnett River. The site is situated downstream of the Bjelke-Petersen Dam and is outside of the declared catchment area of Lake Barambah formed by the dam.

Two minor watercourses Barker and Barambah Creeks flow adjacent to the lease areas drainage sub-basin occur around the site, namely. Barambah Creek flows around the southern border of ML 50111 with the junction to Barker Creek 120 m South (upstream) of the operation. Barker Creek terminates at the junction with Barambah Creek, while Barambah Creek flows north and drains into the Burnett River near Gayndah, approximately 90 km north of Murgon.

3.1.4.1. Environmental value and water quality objectives

There are currently no Environmental Values (EVs) or Water Quality Objectives (WQOs) scheduled under the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* for Barker and Barambah Creeks Sub-Basin. However, the catchment zone for the Burnett River is included within the *Water Quality Improvement Plan for the Burnett Mary Region* (WQIP) (BMRG NRM 2015) which contains draft WQOs and EVs for surface waters. The EVs for the 'Barambah Ck weir pools below Bjelke-Petersen Dam' area (i.e., those most relevant to the project area) are as follows:

- Aquatic ecosystems
- Irrigation
- Farm supply
- Stock water
- Aquaculture
- Human consumption of shellfish
- Primary recreation
- Secondary recreation
- Water recreation
- Cultural and spiritual values (Indigenous).

No draft High Ecological Value waters were recognised in the waters surrounding the Murgon Operation lease area and water would be considered Slightly to Moderately Disturbed with respect to WQOs for the protection of aquatic ecosystem EVs. The *Burnett Mary Region WQIP* (BMRG NRM 2015) provides draft WQOs for the project area (based on the default guidelines for central east coast upland (>150 m elevation) freshwaters from the Queensland water quality guidelines - EPA 2006) as follows:

- Turbidity: <25 NTU
 - Suspended solids: <6 mg/L
 - Chlorophyll a: <2 µg/L
 - Total nitrogen (N): <250µg/L
 - Oxidised N: <15 µg/L
-

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

- Ammonia N: <10 µg/L
- Organic N: <225 µg/L
- Total phosphorus: <30 µg/L
- Filterable reactive phosphorus (FRP): <15 µg/L
- Dissolved oxygen: 90 – 110% saturation
- pH 6.5 – 7.5.

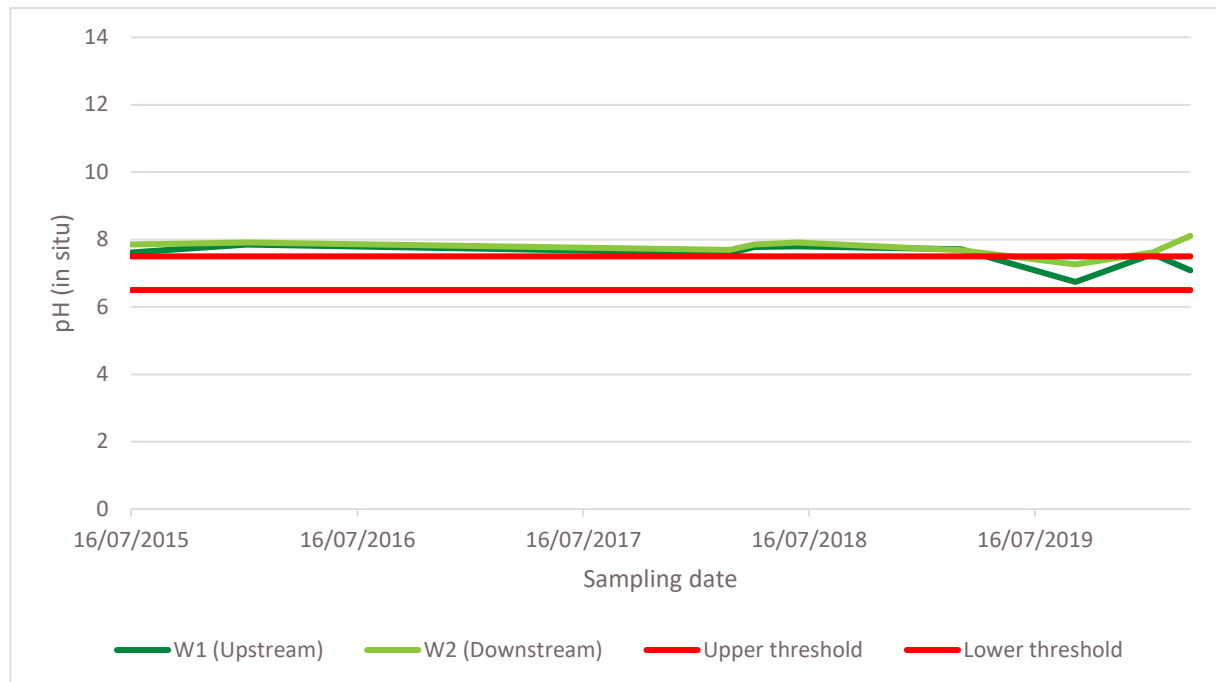
However, the *Burnett Mary Region WQIP* (BMRG NRM 2015) acknowledged There was insufficient information available to establish WQOs for these upland waters, and local investigations would be required.

3.1.4.2. Local water quality and mine influence

Surface water quality data is available from July 2008. Water quality monitoring has included a range of variables specified in the EA. This includes pH, electrical conductivity (EC), total nitrogen (TN) and total suspended solids (TSS). The monitoring program includes a sampling location upstream (W1) of the site and a sampling location downstream of the site (W2) to determine potential impacts. Further details of the locations are provided below:

- W1 – Upstream at the confluence of Barambah and Barker Creeks
- W2 – Downstream at Barambah Creek, 100m downstream of Sediment Dam D.

The trends in water quality over time at the two sampling points are shown in Figure 4 to Figure 7 compared to either draft WQOs where applicable, or EA release limits where WQOs have not been nominated.



PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Figure 4 Surface water pH values at W1 (upstream background) and W2 (downstream impact) compared to the WQO (range between pH 6.5 and pH 7.5) (Note: Laboratory results were used in place of in situ results where outliers were detected)

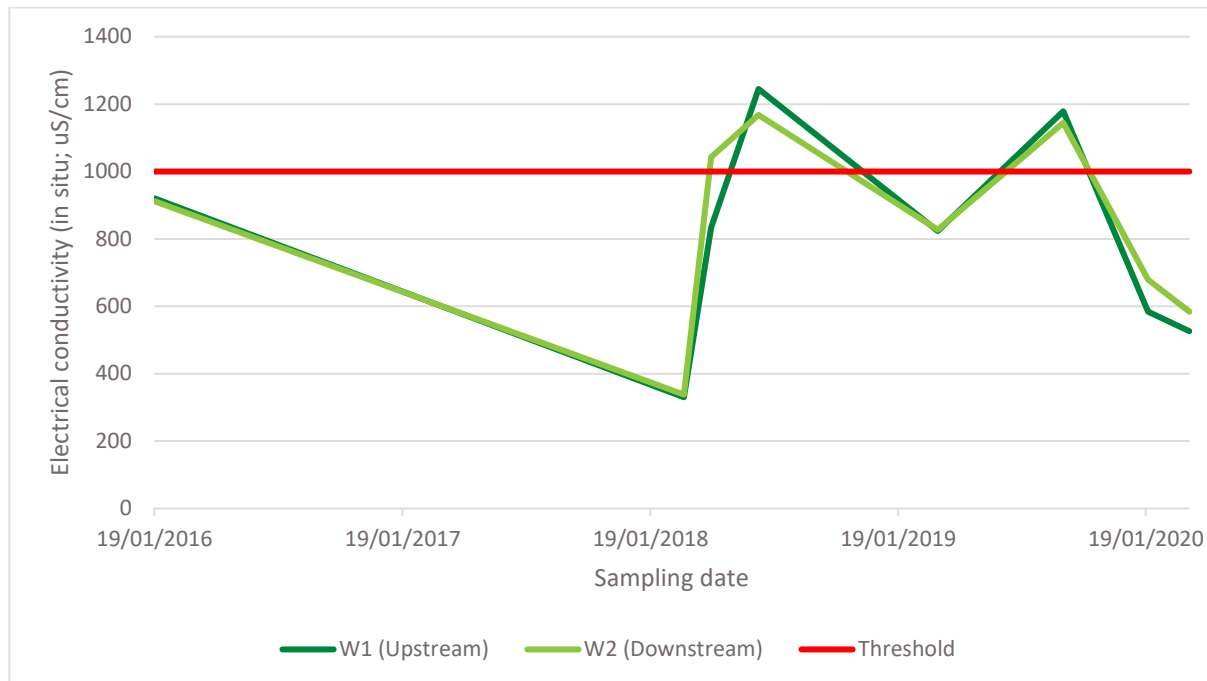
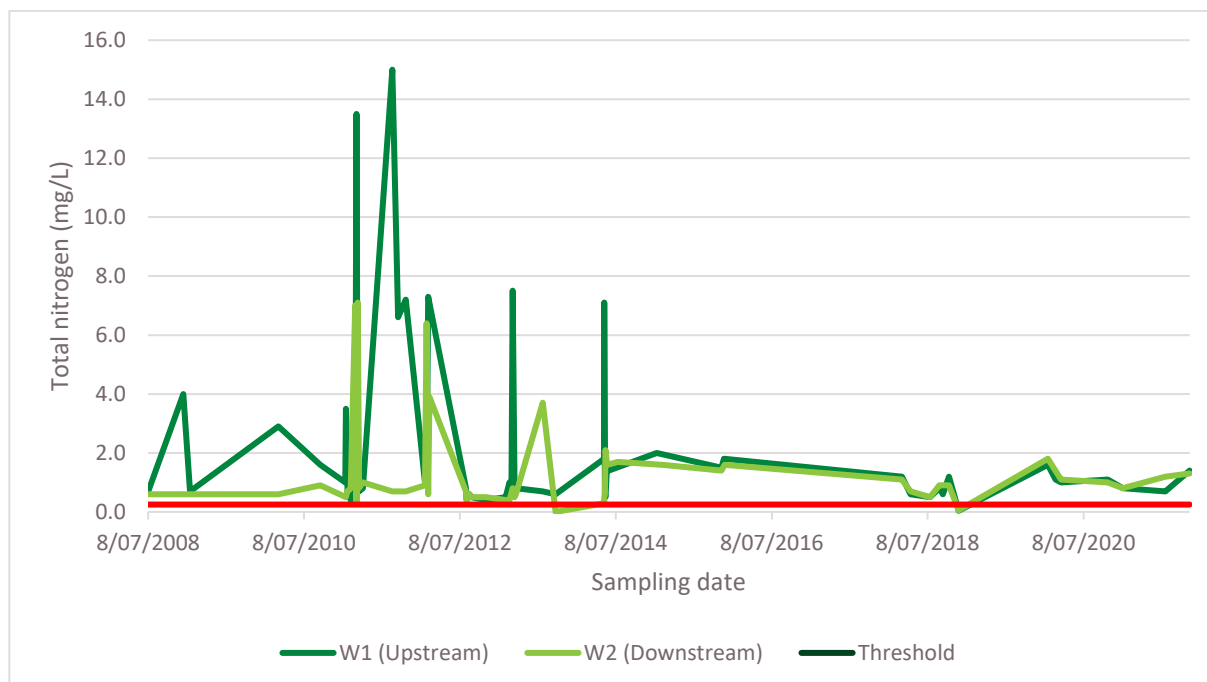


Figure 5 Surface water EC values at W1 (upstream background) and W2 (downstream impact) compared to the EA release limit (<1000 μ S/cm)



PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Figure 6 Surface water TN concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<0.25 mg/L)

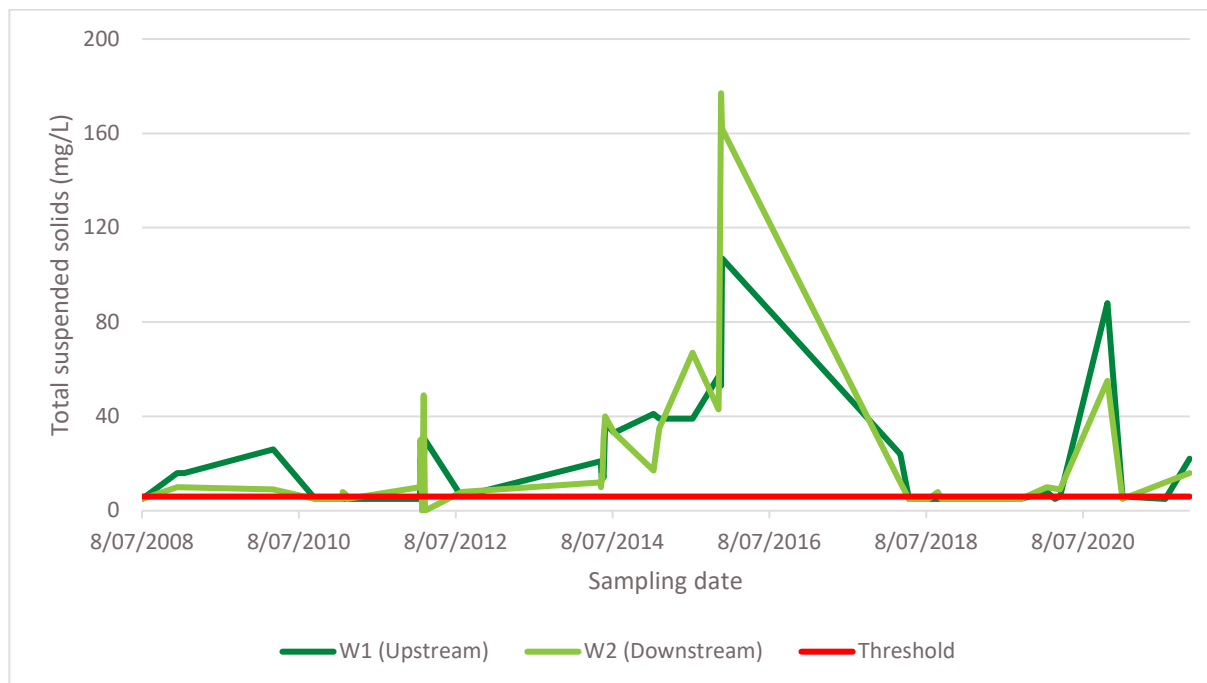


Figure 7 Surface water TSS concentration at W1 (upstream background) and W2 (downstream impact) compared to the WQO (<6 mg/L)

Since July 2015 pH levels have remained relatively consistent and the downstream pH has closely mirrored the upstream pH with no apparent material influence from the Murgon Operation. The pH upstream of the Murgon Operations is generally above the draft WQO range, but this appears the ambient pH in this part of the catchment.

EC measurements since 2016 have been compared against the EA threshold of <1000 $\mu\text{S}/\text{cm}$. EC has remained below the threshold limit for majority of the monitoring period with only two brief spikes above this threshold in June 2018 and September 2019. On each occasion the EC was lower at the downstream site W2 than upstream. At all other times, EC at the downstream site has closely mirrored the upstream EC with no apparent material influence from the Murgon Operation.

Analysis of total nitrogen (TN) since July 2008 shows that for the majority of the time period, the WQO threshold for TN (<0.25 mg/L) has been exceeded. This is due to upstream water quality and it likely influenced by agricultural activities and regulated flows in the catchment. On only one occasion in July 2013 was the TN markedly higher downstream than upstream. Since 2014, TN concentrations at the downstream site has closely mirrored those recorded upstream with no apparent material influence from the Murgon Operation.

TSS concentrations have fluctuated since July 2008 and may reflect the circumstances under which Murgon is required to undertake monitoring (high rainfall events that may result in discharge). Peak concentrations generally exceed the WQO threshold (<6 mg/L) which is to be

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

expected in an agricultural and high regulate upstream catchment. Prior to 2016, downstream peak TSS concentrations exceeded those at the upstream site for three separate events. However, since 2016, TSS concentrations have been much lower and values recorded at the downstream site have closely mirrored those upstream TSS with no apparent material influence from the Murgon Operation.

After reviewing the water quality from W1 upstream background site against W2 downstream impact site, it has been concluded that there is no material impact due to on-going operations at Murgon and none would be expected following closure.

3.1.4.3. Flooding susceptibility

The site is located on the northern bank of Barambah Creek approximately 1.4 km downstream from the Bjelke-Peterson Dam. Major watercourses within the site and surrounding area include the Barambah Creek and Barker Creek (which is regulated by the Bjelke-Peterson Dam). Additionally, there are minor watercourses from the Burnett River basin which flow southerly towards site. Considering the proximity of waterways, a flood susceptibility model has been developed.

The model was developed by undertaking a review of publicly available flood assessments from The Queensland Globe, The Queensland Department of Resource Flood Check and The Australian Flood Risk Information Portal coupled with site specific catchment analysis. A digital elevation model (DEM) was generated to represent the topography of site and surrounding area compiled from a 1-section DEM from the Australia Government's spatial data hub. Sub-catchments were generated to determine the overland flow paths within the site and surrounding areas. It was determined there are three sub-catchments meeting at confluence of Barambah Creek and Barker Creek adjacent to the site which is considered to be a likely source of localised flooding. Further, the minor watercourse in the north-eastern section of the site diverges and eventually reach Barambah Creek. It is noted this watercourse can indirectly contribute to impacting the site when the creek is in flood. There is also an existing watercourse in the north-western section of the site which flow southerly adjacent the site before reaching Barambah Creek. This can carry water towards site, specifically in bigger events.

The Queensland Floodplain Assessment Overlay (QFAO) represents an estimate of areas potentially at threat of inundation by flooding (Queensland Reconstruction Authority 2013). A map showing this data layer over the project area is provided in Figure 8. This map shows that parts of the project area, including areas that will be rehabilitated, are potentially subject to flooding.

Through analysing the available flood information, it was concluded the site is expected to be partially flooded during a 1% Annual Exceedance Probability (AEP) flood event (Figure 9). This has the potential to affect the void, infrastructure and processing areas and a small section of the toe of the North-eastern Overburden Dump (but not the Northern Overburden Dump). Under a probable maximum flood (PMF), it is expected that site would be extensively flooded with large parts of the site impacted (Figure 10). Additionally, under a PMF scenario, the model was run with and without a scenario that included a failure of the Bjelke-Peterson Dam. There was no material difference to the flooding extent for site under the two scenarios.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

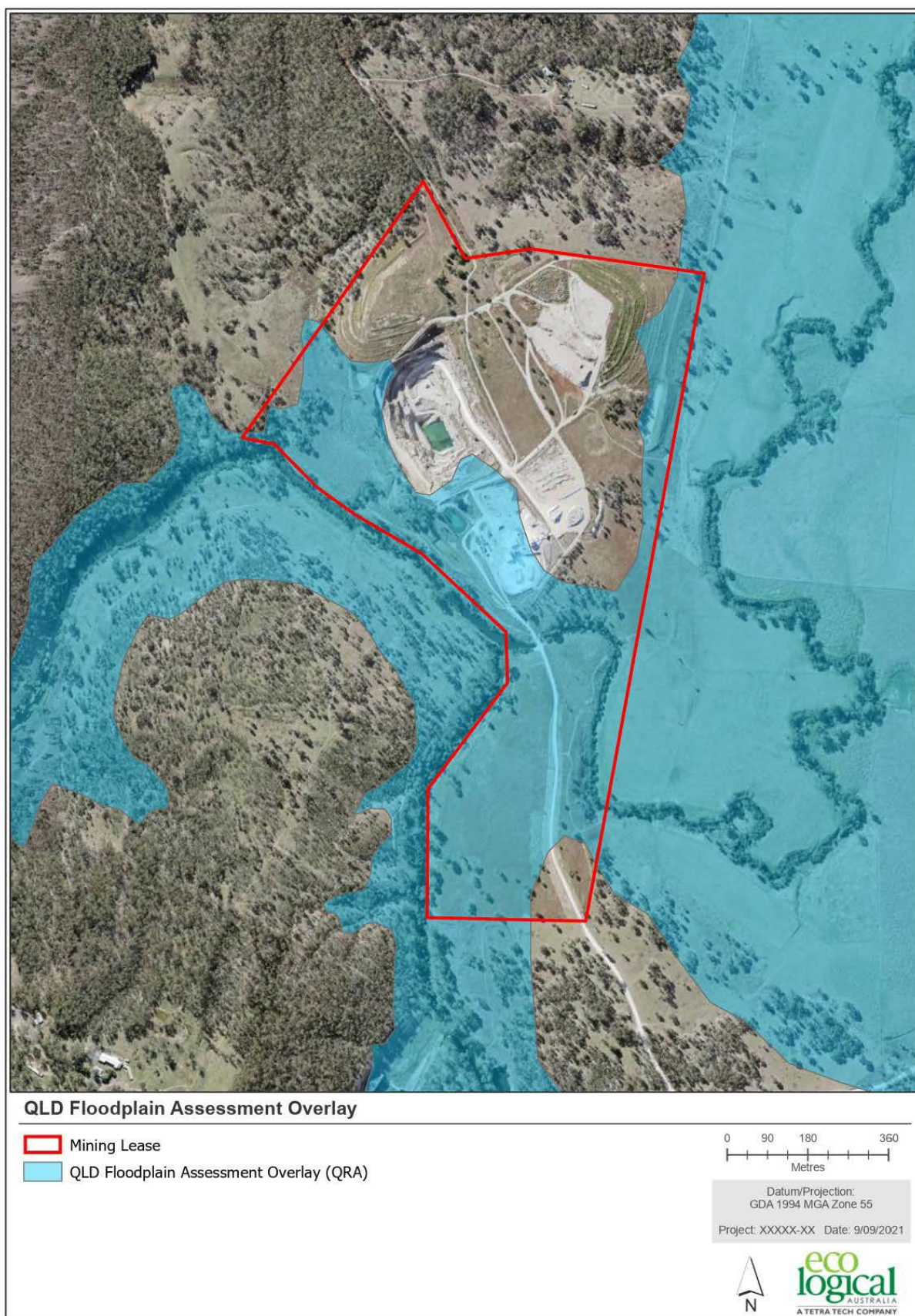


Figure 8 The extent of the Queensland floodplain assessment overlay in relation to the Murgon site

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

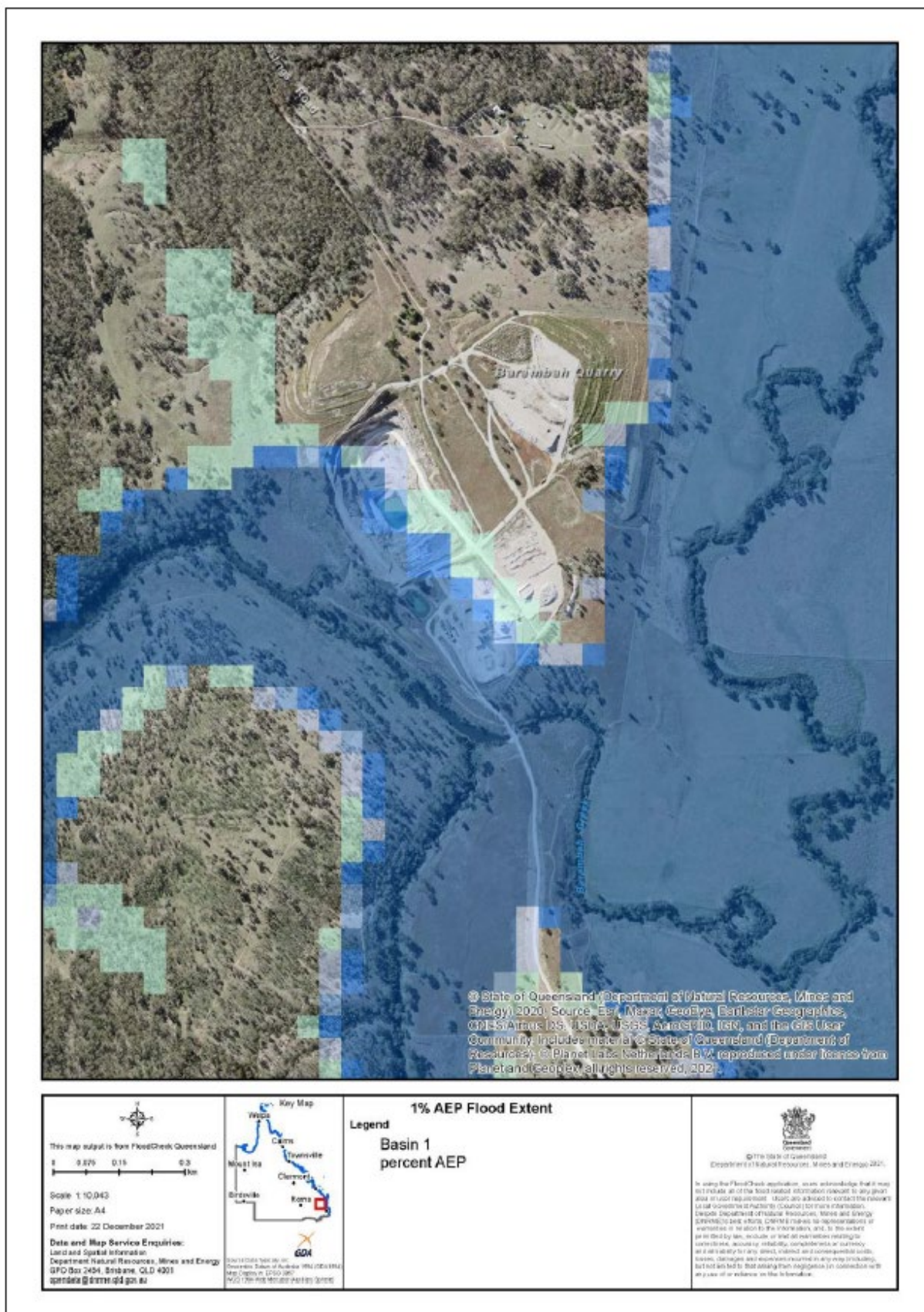


Figure 9 Predicted 1% AEP flood extent around the site where variants of blue blocks indicate depth of water

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

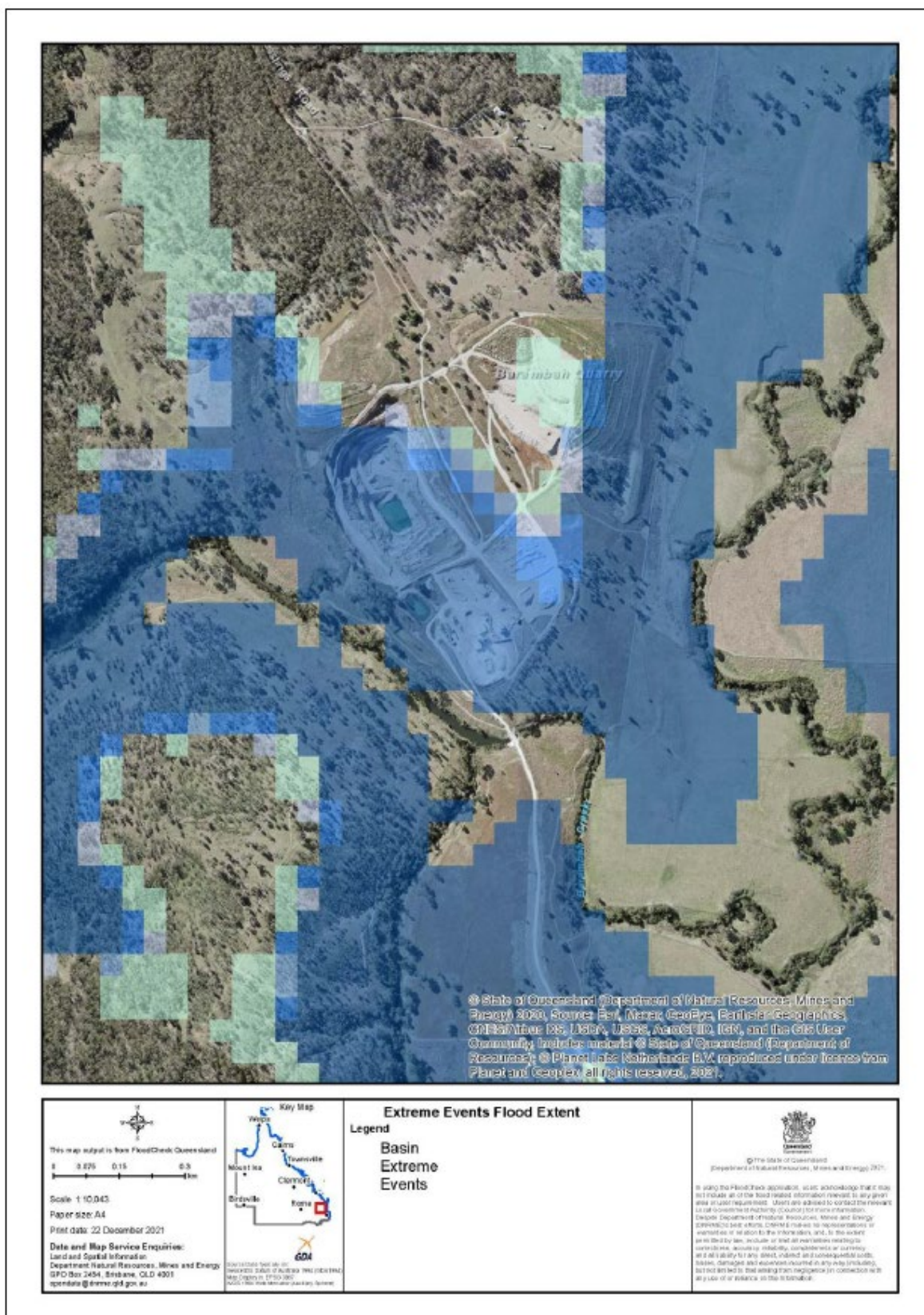


Figure 10 Predicted extreme events (approximation of PMF) flood extent where variants of blue blocks indicate depth of water

3.1.5. Groundwater

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.5.1. Hydrostratigraphy

Figure 11 shows the local geology around the Murgon project.

The limestone deposit is hosted by the Late Carboniferous Bjelke Petersen Beds which comprise mudstone, shale, and silicified (chert) containing locally sheared basic metavolcanic lenses and scattered limestone bodies. To the West of the Bjelke Petersen Beds are the Late Devonian to Early Carboniferous Maronghi Creek Beds, which comprise mudstone, shale, arenite, chert, jasper, acid to basic metavolcanics. To the East of the Bjelke Petersen Beds are the older Mid Triassic Esk Formation, consisting of polymictic pebble to boulder conglomerate, feldspathic sandstone, shale, minor acid tuff. To the East of the mining lease, the Esk Formation and sections of the Bjelke Petersen Beds are conformably overlain by Quaternary-age clay rich alluvium (Qa)) and clay-rich Tertiary-age sedimentary rocks (Ts). The Quaternary alluvium is also known as The Barambah Creek Alluvium in this area.

Unless substantially fractured, the rock formations (Esk, Maronghi and Bjelke Petersen) are unlikely to host significant volumes of groundwater or allow the transmission of significant groundwater flows. There are localised fractures (joints) exposed in the pit walls that allow small seepages as mentioned in section 3.1.5.2. Furthermore, “overall pit seepage is likely to be governed by flows from all the geological units surrounding the site” (ERM 2008).

ERM (2008) note that “Conservatively assuming that the limestone unit at the site is localised and approximates an area of 20 hectares and that recharge to groundwater ranges between 5 and 15% of average annual rainfall, it can be expected that rainfall recharge into the limestone aquifer system would approximate 20 to 60 m³/day which suggests that pit seepage is likely to be primarily derived from rainfall recharge into the local limestone groundwater system. Due to the shape and dimensions of the limestone deposit being exploited it is likely that there are limited locations (likely to be to the south of the site) where the limestone unit sub-crops beneath the Barambah and Barker Creeks. These zones, while isolated are likely to represent the zones of greatest potential for a direct hydraulic connection between the creeks and groundwater within the limestone deposit”.

3.1.5.2. Geological structures

The site is located within the Bjelke Petersen Beds (Figure 11). NW-NNW and NE-NNE Faults cross-cut site stratigraphy and are the primary mechanism for the plunge reversals evident in the quarry, Atkinson and further south. The fractured-rock groundwater system at Murgon (which causes minor pit seepage) is hosted by a fracture zone of limited extent and recharged by a localised fracture network.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

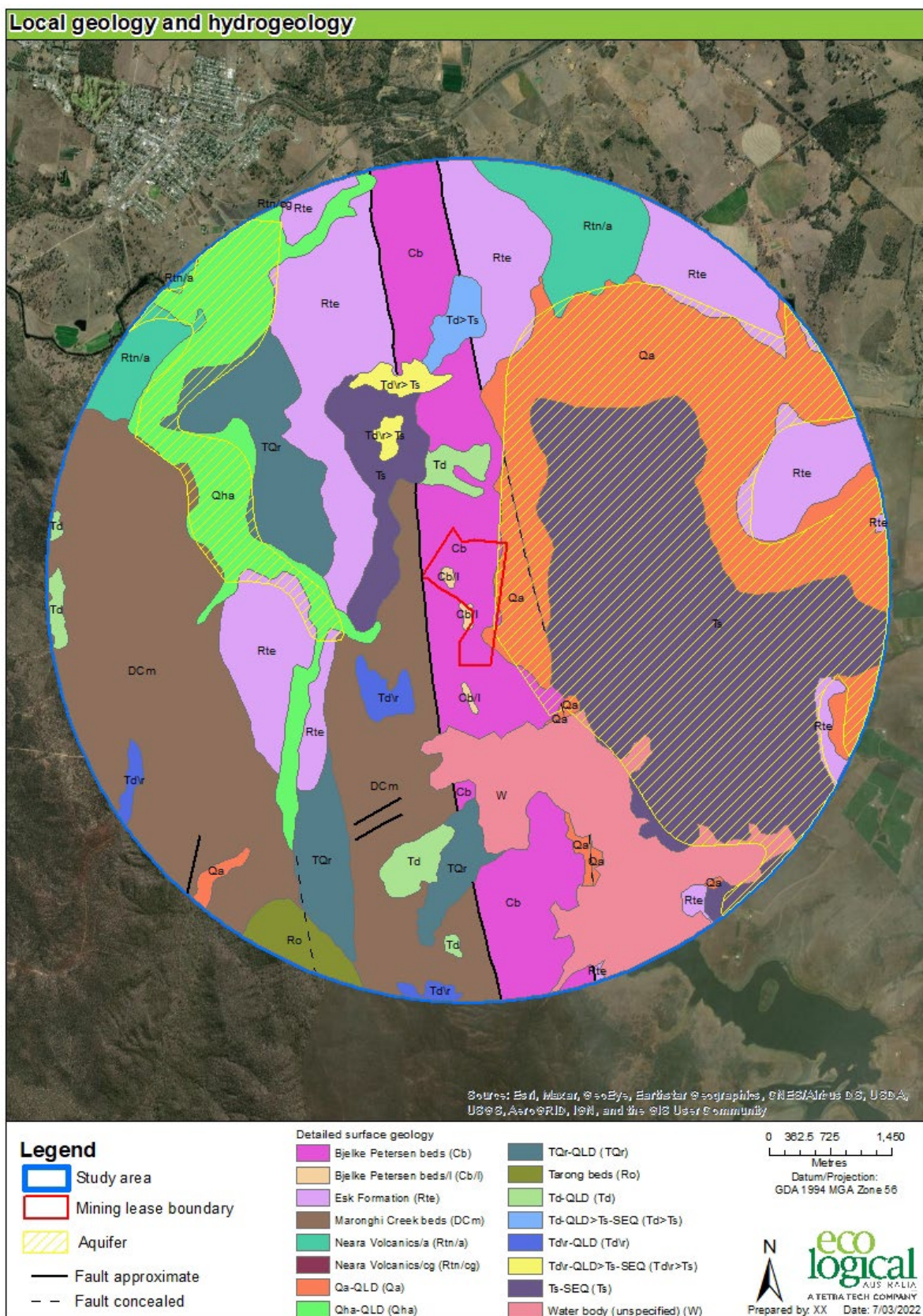


Figure 11 Regional geology and hydrogeology (see Table 3 for more details of the geology referenced in the legend)

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 3 More information about detailed surface geology shown on Figure 11

Legend	Lithological Summary	Dominant Rock	Rock Type	Age
Ts-SEQ (Ts)	Quartzose to sublible sandstone, claystone, conglomerate, minor olivine basalt	Sedimentary rock	Stratified unit (including volcanic and metamorphic)	Tertiary
Qa-QLD (Qa)	Clay, silt, sand and gravel; flood-plain alluvium	Alluvium	Stratified unit (including volcanic and metamorphic)	Quaternary
Bjelke Petersen beds (Cb)	Mudstone, shale, and silicified (chert?) containing locally sheared basic metavolcanic lenses and scattered limestone bodies	Mixed sedimentary rocks and mafites	Stratified unit (including volcanic and metamorphic)	Late carboniferous
Bjelke Petersen beds/l (Cb/l)	Variably recrystallised, poorly fossiliferous limestone	Carbonates (limestone or dolomite)	Stratified unit (including volcanic and metamorphic)	Late carboniferous
Qha-QLD (Qha)	Sand, gravel, silt and clay; active stream channels and low terraces	Alluvium	Stratified unit (including volcanic and metamorphic)	Holocene

3.1.5.3. Registered bores

Interrogation of the Bureau of Meteorology (BoM) Groundwater Explorer online database (BOM 2020) identified 59 bores that were within a 5 km radial extent of the Operation (Figure 13). Each of these bores had an assigned number and associated bore report (Business Queensland 2021). The following sections summarise the information contained in these bore reports.

Two site bores, MUR01 (South Bore) and MUR02 (North Bore) are not registered with the Department of Natural Resources and Mines (DNRM), and there is little data regarding their construction. These bores are used by site personnel to record local water levels and water chemistry.

3.1.5.4. Regional groundwater level

Water level data are available from the BoM Groundwater Explorer database for 7 of the 59 bores (Figure 13). Table 4 and Table 5 presents details of the seven bores including a summary of water levels. There is no applicable data from the BoM Groundwater Explorer database for the remaining 52 bores.

Table 4 Status and data availability of registered bores with water level within the study area

Bore ID	Bore purpose	Status	Start of record	End of record
13620103	Unknown	Decommissioned	1973	1993
13620104	Unknown	Decommissioned	1973	1992
13620300	Monitoring	Functional	1975	Ongoing
13620301	Unknown	Decommissioned	1975	2002
13620302	Unknown	Decommissioned	1975	2004
13620335	Monitoring	Functional	2006	Ongoing
13620336	Monitoring	Functional	2006	Ongoing

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 5 Registered bores with water level data within the study area

Bore ID	SWL (mbgl)	Bore depth (m)	RSWL (m AHD)	Top aquifer (m AHD)	Measured date	Formation name	Aquifer lithology
13620103	14.22	12.9	Unknown	10.00	01/01/1993	Barambah Creek Alluvium	GRAV - Gravel
13620104	4.80	14.1	Unknown	10.00	12/05/1992	Barambah Creek Alluvium	GRAV - Gravel SAND - Sand
13620300	4.76	11.5	290.88	5.20	20/02/2020	Barambah Creek Alluvium	GRAV - Gravel
13620301	3.20	6.0	Unknown	Unknown	14/02/2002	Unknown	Unknown
13620302	3.76	12.2	Unknown	12.00	27/10/2004	Barambah Creek Alluvium	GRAV - Gravel
13620335	4.04	19.5	294.4	Unknown	07/09/2021	Unknown	Unknown
13620336	5.22	14.3	286.59	Unknown	07/09/2021	Unknown	Unknown

The depth of the bores with recent depth readings ranged from 4.04 to 5.22 (mbgl). All bores were screened with Barambah Creek Alluvium Formation aquifer. Groundwater level readings taken from the alluvial aquifer system show a range between 286.59 and 290.88 m AHD within the Barambah Creek Alluvium Formation. No flow data was available for these bores.

The existing bores that show water level data, are all screened within the Barambah Creek Alluvium, and are a significant distance (>2km) from the site. No water level data is recorded for bores screened in other rock types or aquifers. The water level data in Table 5 were collected at the time of drilling and are many years apart in most cases. Therefore, it is not possible to determine water level contours for the site, and for each aquifer type, or the region or derive groundwater flow directions.

In Figure 17, there are six bores located in a line on the Eastern side of the mining lease. These bores intersect clay-rich Barambah Creek Alluvium to depth of about 15 metres. Although alluvium is used as a water source some distance away, no groundwater was recorded during drilling of these six holes. Since the Barambah Creek Alluvium occurs along the Eastern side of the mining lease it is unlikely that the alluvium will contribute to pit inflows. Given the higher elevation of the Barambah Creek Alluvium, compared to historic seepages in the pit, it is certain that the final pit void will not discharge to the alluvium.

Water level readings within groundwater bores MUR 01 (South Bore) and MUR 02 (North Bore) (shown in Figure 13) have been recorded between 18/11/2016 and 17/10/2019.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

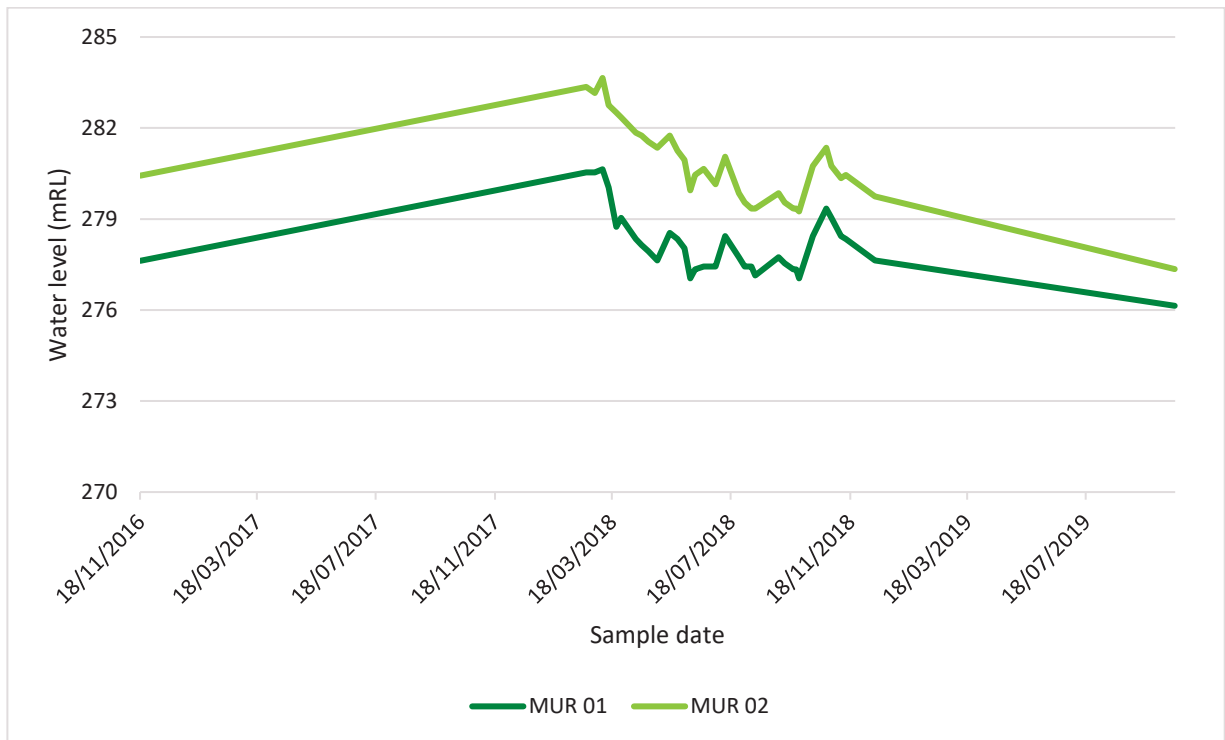


Figure 12 Changes in the groundwater levels within bores

There is no strong seasonal trend in the data and groundwater levels remained reasonably stable through the monitoring period, although there is a slight overall downward trend between 2016 and 2019. The water levels in these two bores are strongly influenced by pumping from the pit sump.

Bores MUR01 and MUR02 are collared on the Western side of the mine pit at similar elevations, although the water level data is different between them by an average of about 3 metres. This is likely to be a calculation error rather than reality given that the two bores are a similar depth and presumably screened in the same fractured-rock aquifer. Water levels would be expected to decline further only if the void is deepened and water continues to be pumped out to small-scale seepages and extracted into Dam C.

According to a report by Rocktest Consulting (2022; Appendix H) water constantly seeps from the 258-270mRL batter on the western wall. The pit is therefore a passive hydraulic sink. Also, at the EOML [end of mine life], inflows will no longer be pumped out of the pit. The level of water within the pit will subsequently increase progressively to form a pit lake. The upper surface of the lake will stabilise at an elevation where its open water surface area is large enough such that the evaporation losses from the surface and other outflows equal the combined inflows. This elevation will likely be below the pre-mining groundwater level. The surface of the [EOML] lake is expected to stabilise at ~275mRL.

The final pit void will likely remain a groundwater sink.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

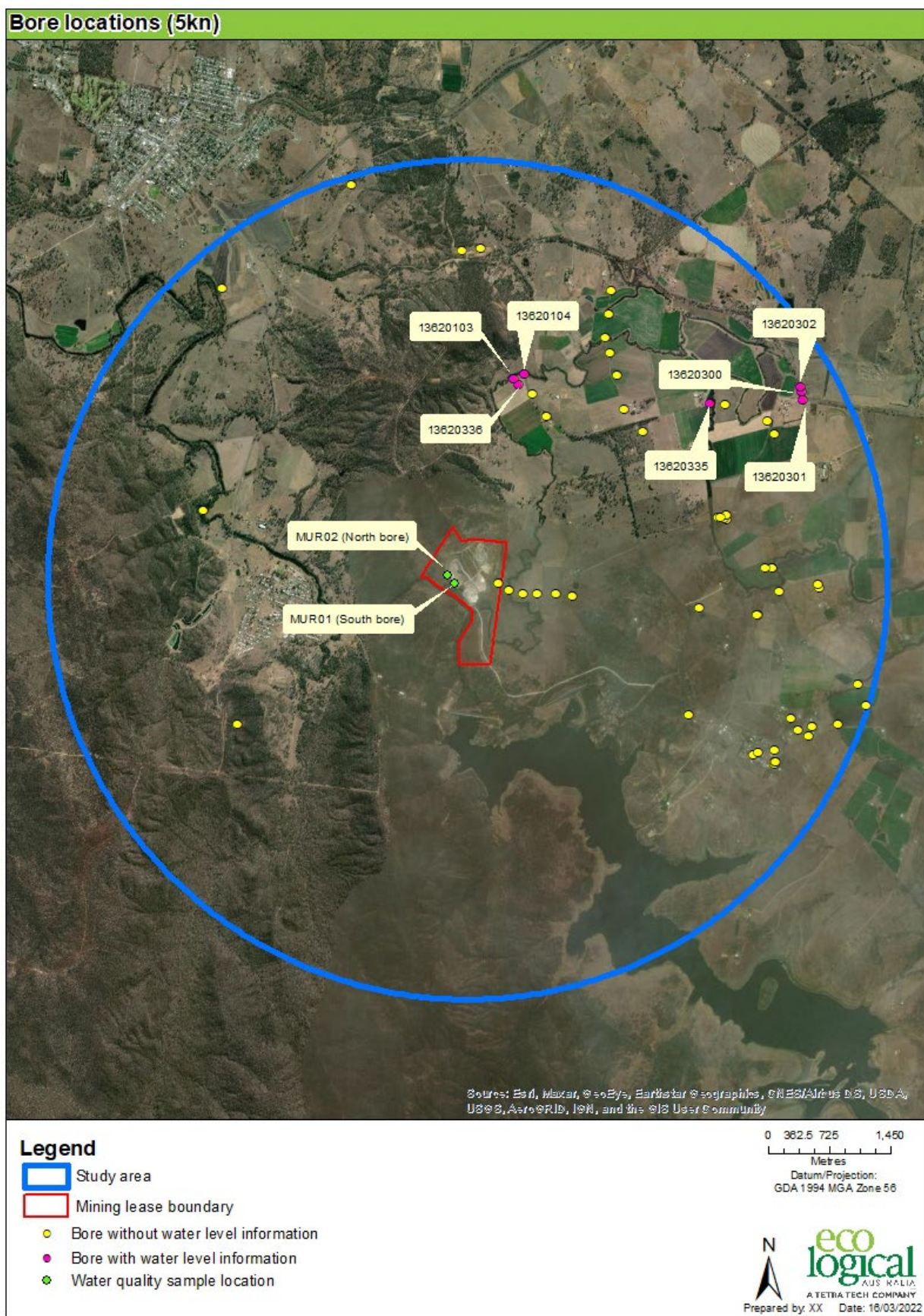


Figure 13 Registered bores within the study area and the groundwater level reading locations

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.5.5. Groundwater quality

The BoM groundwater explorer (BoM 2020) identified seven bores within the study area screened into the Barambah Creek Alluvium. Water quality data was available for three functional bores. Groundwater salinity (EC) for the three functional bores ranges from 813 to 4,780 $\mu\text{S}/\text{cm}$ and pH ranges between 6.1 and 7.8.

Water quality data is available for the North bore (MUR02) and South bore (MUR01) as well as from the Pit (seepage derived) and Dam C (which received pumped pit seepage) shown on Figure 14. The results of the quality analysis for two sampling rounds of July 2021 and November 2021 are summarised in Table 6. Neither the two bores, Pit nor Dam C sits within an recognized the aquifer boundary (Figure 14).

The results of the quality analysis of a wider range of compounds undertaken in February and March 2022 are summarised in Table 7.

Groundwater salinity (EC) for the two bores, Pit and Dam C ranges between 270 and 1,030 ($\mu\text{S}/\text{cm}$) and pH ranges between 7.6 and 8.5.

ERM (2008) previously characterised the water from the mine sump (which is fed by groundwater seepage) as calcium-sodium-chloride-bicarbonate dominated (reflecting the surrounding geology) and the water in Barambah Creek as sodium-magnesium-chloride dominated. ERM (2008) concluded that groundwater seeping into the void is unlikely to be sourced directly from Barambah Creek, rather it reflects water derived from rainfall recharge into the local limestone groundwater system. The water quality results presented in Table 6 and Table 7) are in broad agreement with these findings.

None of the concentrations of groundwater quality indicators is of concern for the protection of groundwater EVs as presented in Section 3.1.5.7.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 6 Analytical results of the water quality measurement (July and November 2021)

Compound	Unit	Pit		Dam C		North bore		South bore	
		July 2021	Nov 2021	July 2021	Nov 2021	July 2021	Nov 2021	July 2021	Nov 2021
pH Value	Ph Unit	8.18	8.09	8.55	8.02	No data	6.19	No data	7.76
Electrical Conductivity	µS/cm	841	599	435	455	No data	390	No data	314
Oil and Grease	mg/L	<5	5	<5	<5	No data	<5	No data	<5
Total Suspended Solids	mg/L	<5	<5	11	12	No data	22	No data	16
Calcium	mg/L	84	60	24	34	No data	20	No data	20
Total Nitrogen as N	mg/L	3.7	7.4	0.7	3.4	No data	1.4	No data	1.3
Nitrite + Nitrate as N	mg/L	3.67	6.23	0.28	2.62	No data	0.19	No data	0.19
Total Kjeldahl Nitrogen as N	mg/L	<0.5	1.2	0.4	0.8	No data	1.2	No data	1.1

Table 7 Analytical results of the water quality measurement (February and March 2022)

Compound	Unit	Pit		Dam C		North bore		South bore	
		July 2021	Nov 2021	July 2021	Nov 2021	July 2021	Nov 2021	July 2021	Nov 2021
pH Value	pH Unit	8.22	7.98	8.49	7.54	8.10	8.18	7.64	8.17
Electrical Conductivity	µS/cm	551	560	270	247	323	372	1030	733
Suspended Solids	mg/L	10	9	25	10	<5	8	6	<5
Hydroxide Alkalinity as CaCO ₃	mg/L	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	10	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	112	117	85	66	175	192	286	182
Total Alkalinity as CaCO ₃	mg/L	112	117	96	66	175	192	286	182



MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

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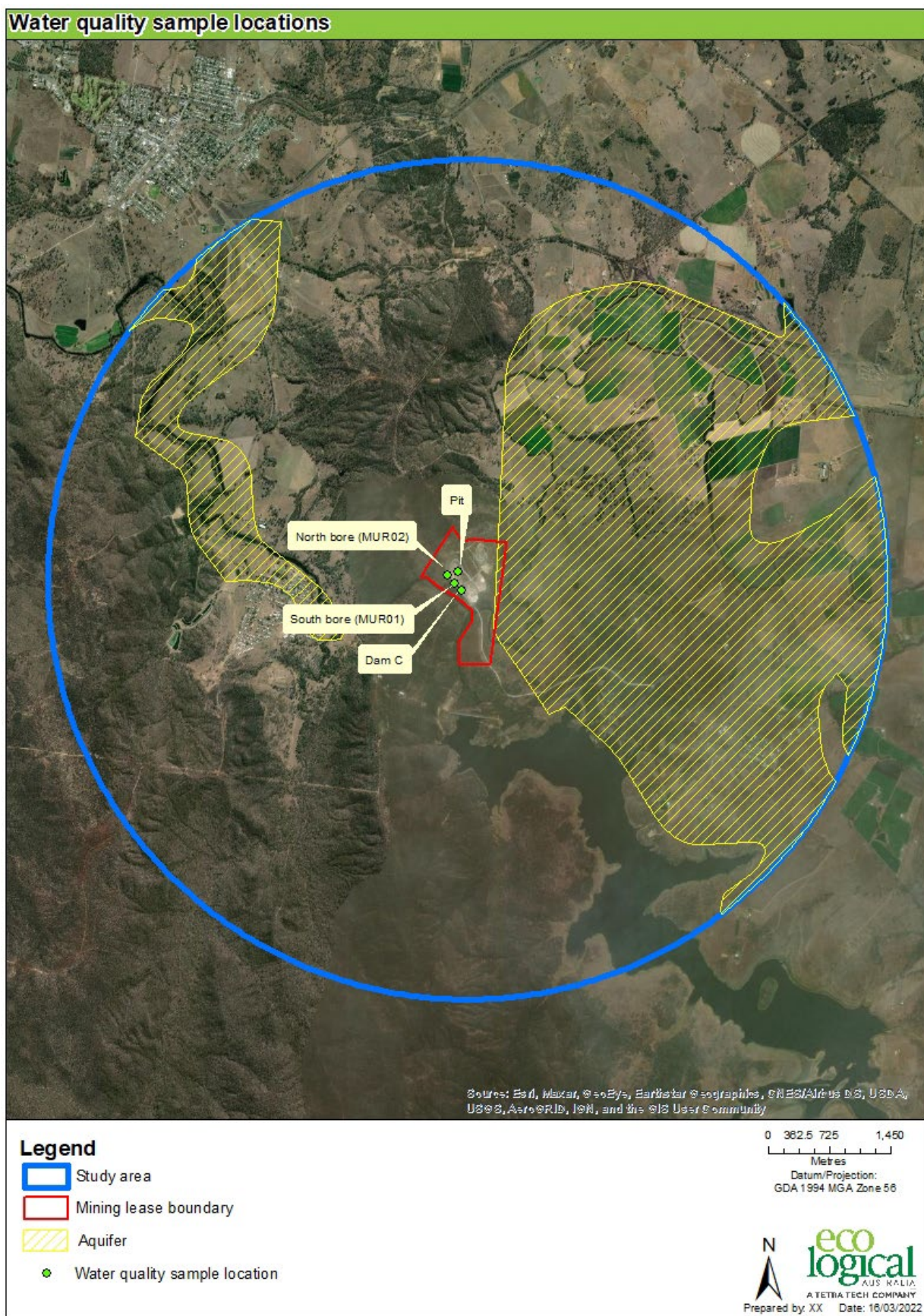


Figure 14 Changes in the groundwater levels within bores

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.5.6. Groundwater Use

ON-SITE

The site's water supply bore is screened within the Barambah Creek alluvium and as such its water elevations are more likely to be hydraulically controlled by flows within Barambah Creek.

Seepage of groundwater occurs on a consistent basis from the surrounding geology into the mine pit. The groundwater seepage into the mine pit void is subsequently pumped from the mine pit to Dam C.

As part of the groundwater hydrology assessment (ERM 2008), measurements were made to quantify the rate of seepage into the mine pit. Four flow tests were completed to obtain an estimate of the pumping rate from the pit, which gave an average and relatively consistent discharge rate of 14.4 L/s. The pump in the pit is generally turned on for two hours every two days. This results in an estimated rate of groundwater seepage into the pit and subsequent discharge to Dam C of 52 m³/day (approximately 0.6 L/s continuously). Additional monitoring of the discharge rates from the mine over an extended period suggests this is a reasonable estimate of seepage rates.

OFF-SITE

There are 59 registered bores within 5 km of the site, of these bores only three of which are still in use. The remainder have been abandoned and/or destroyed. Of the four wells that are currently in use, all are in the vicinity of Barambah Creek and are screened within the Barambah Creek alluvium. The closest well which is still in use (well 191396) is approximately 1.8 km from the mine lease (ML).

Given that the distance to well 191396 from the site, that the well is screened within the Barambah Creek alluvium and that the limestone deposit present at the site is unlikely to extend to this well, it is considered unlikely that there is a hydraulic connection between the well and the mine void.

3.1.5.7. Environmental values and water quality objectives

ENVIRONMENTAL PROTECTION (WATER AND WETLAND BIODIVERSITY) POLICY 2019

The Environmental Protection Act 1994 and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 — the EPP (Water and Wetland Biodiversity) — provide the framework for developing EVs, management goals and WQOs for Queensland waters. Schedule 1 of the EPP (Water and Wetland Biodiversity) lists the EVs and WQOs for Queensland waters. These are a part of the legislation and therefore considered by planners and managers when making decisions about waters and/or water quality.

WATER QUALITY IMPROVEMENT PLANS

Water quality improvement plans (WQIPs) for catchments draining to the Great Barrier Reef were initially prepared by Regional natural Resource Management (NRM) Bodies and Councils under the Australian Government's Coastal Catchments Initiative. As part of the development of the WQIPs, stakeholders ensured that the EVs and WQOs established were consistent with the (then) Environmental Protection (Water) Policy 2009 requirements.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Neither the *Water Quality Improvement Plan for the Burnett Mary Region* (WQIP) (BMRG NRM 2015) nor the EPP (Water and Wetland Biodiversity) 2019 contain groundwater-related EVs and WQOs over the site catchment area.

While the updated National Water Quality Guidelines (ANZG 2018) include default guideline values for physical and chemical stressors, local water quality information still applies as the first reference point. In Queensland. However, in the absence of EPP (Water and Wetland Biodiversity) scheduled values, guidance is taken from the Queensland Water Quality Guidelines (DEHP 2009). DEHP (2009) states that “These guidelines do not specifically address groundwater” and direct the reader to the previous version of the National Water Quality Guidelines (ANZECC & ARMCANZ 2000) for guidance of the application of EVs and WQOs to groundwater.,

As the groundwater affected by mining is not connected to surface waters around the operation, the most applicable EVs relate to the protection of raw water supply and primary industries use. The primary industries EV also aligns with the intended PMLU for the operation (water storage for stock water use). The guideline values and WQOs applied to the assessment of ground water quality relate to these EVs.

APPLICABLE WATER QUALITY GUIDELINES

The Australian Drinking Water Guidelines (ADWG) (NHMRC 2011) provide a basis for determining the quality of water to be supplied to consumers in all parts of Australia. The Guidelines are not mandatory legally enforceable standards and the implementation of the guidelines is at the discretion of each state and territory.

Recent water quality data presented in (Table 7) indicates that physical and chemical characteristics in groundwater (including water in or pumped from the void) within the mining lease currently meets the drinking water and stock water quality guidelines (Table 8) and would be expected to meet the guidelines post-mining.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 8 The guideline values for physical and chemical characteristics applicable to groundwater at Murgon (NHMRC 2011 ANZECC & ARMICANZ 2000) compared to the maximum values recorded in analysis conducted in 2022

Water quality indicator	Unit	ADWG values		Stock water guidelines	Pit	Dam C	North bore	South bore
		Health	Aesthetic					
pH Value	pH Unit	NA	6.5 – 8.5	NA	8.22	8.49	8.18	8.17
Electrical conductivity	µS/cm	NA	938 [#]	5,970	560	270	372	1,030
Chloride	mg/L	NA	250	NA	94	33	8	168
Sulfate (as SO ₄)	mg/L	NA	250	1,000	29	4	1	34
Nitrate*	mg/L	50	NA	30	15	0.5	4.5	1.0
Arsenic	mg/L	0.01	NA	5	<0.001	0.001	<0.001	0.002
Cadmium	mg/L	0.002	NA	0.01	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	2	1	1	0.001	<0.001	<0.001	0.001
Lead	mg/L	0.01	NA	0.1	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L	0.02	NA	1	0.001	0.001	<0.001	<0.001
Sodium	mg/L	NA	180	NA	56	30	35	145
Zinc	mg/L	NA	3	20	<0.005	<0.005	<0.005	0.005

[#] This is for good quality water and EC > 1,875 µS/cm is considered unacceptable.

* Water quality data related to nitrate plus nitrite N and has been converted.

3.1.5.8. Groundwater modelling works

There was insufficient data available to develop a groundwater model or to develop water level contour maps for the Murgon Operation. However, a numerical groundwater model capable of predicting contaminant migration would not necessarily be required at Murgon given the absence of groundwater contaminants in the pit waters and the lack of significant contaminant sources or geochemically reactive minerals in the void walls. Furthermore, the evidence supports relatively low groundwater flows and minimal flows into the mine void. The risk to groundwater quality posed by the presence of the void or a pit lake are negligible.

3.1.6. Pre-mining and current surrounding land use

Historic aerial images show that the site had been predominantly cleared of native vegetation and was being used for agriculture (grazing) as far back as 1951 (see Figure 15) and that mineral extraction at the site had started by 1993 (Figure 16).

A number of land-uses have been mapped within and surrounding the project area as shown in Figure 17. Apart from mining, the dominant land use in the surrounding areas is production

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

(agricultural) from relatively natural environments (grazing on native pastures), and a small area of conservation land-uses (Queensland Government 2019).



Figure 15 An aerial photo of the project area from 1951 (source: <https://qimagery.information.qld.gov.au>)



Figure 16 An aerial photo of the project area from 1993 (source: <https://qimagery.information.qld.gov.au>)

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

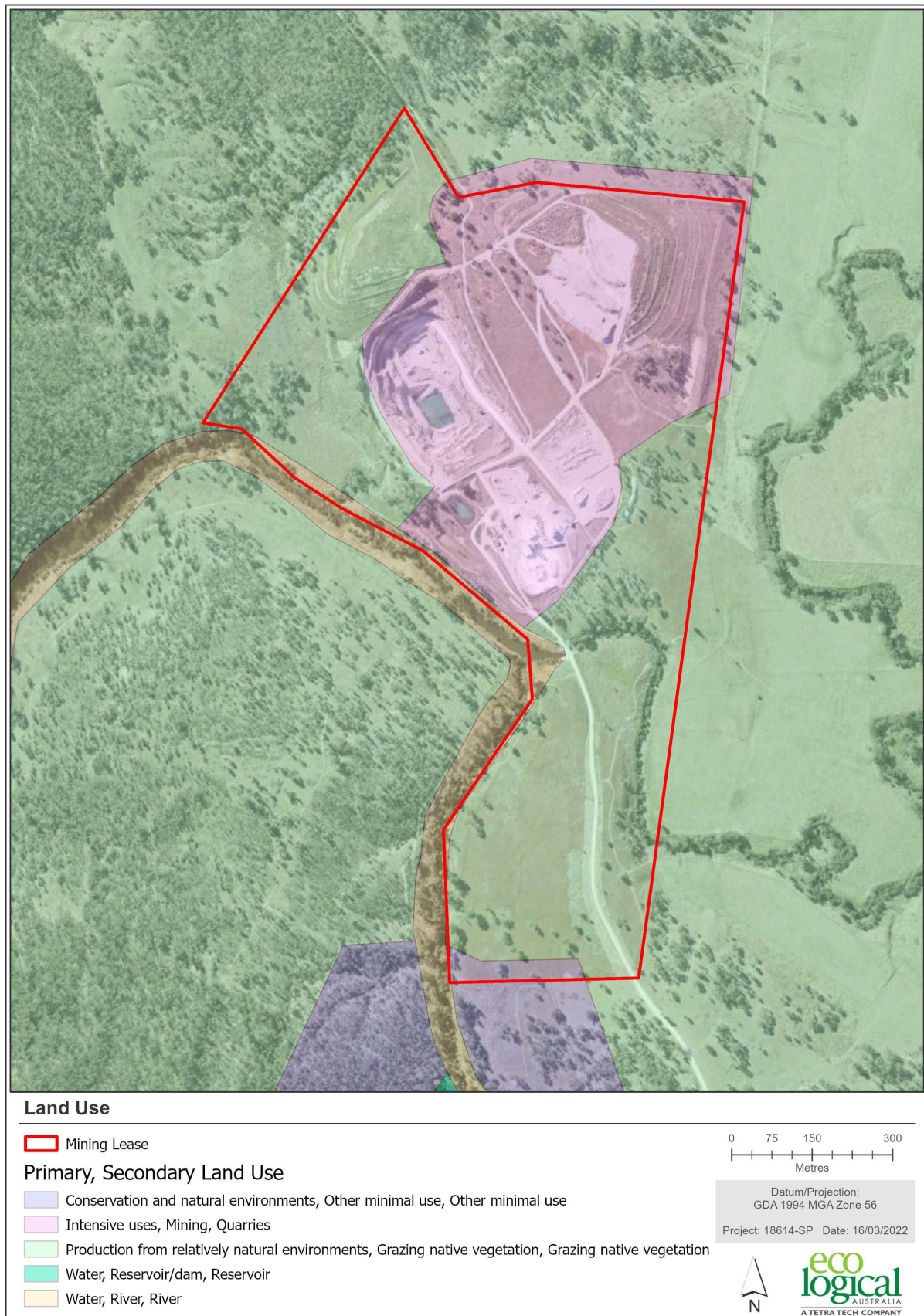


Figure 17 The land-uses surrounding the Murgon ML (Source: Queensland Government (2019))

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.7. Soil properties and productivity

Land system information is available for the project area (DNR 1998) (Figure 18). The majority of the ML area (and the main disturbance footprint) is located on mapping unit Re1 which occupies level to gently undulating terrain on the Esk formation. The major soils are described as shallow to moderately deep texture contrast soils with dark brown to yellowish brown clay subsoils (solodics and soloths, minor prairie soils) with dark cracking clays (black earths) on valley floors. Based on the underlying geology and the descriptions of topsoils used in rehabilitation, the main soils disturbed by mining activities are expected to be 'prairie soils' (Dermosols under the current Australian Soil Classification System).

A small section in the south-east of the ML, where the access road is located, is on unit Qa1 occurs on slightly undulating plains of recent alluvia with associated terraces and swales of rivers and creeks. The major soils are described as deep, dark cracking clays (black earths and alluvial soils) with minor areas of texture contrast soils with brown or yellowish-brown clay subsoils (solodic and solodized solonetz).

A small section of the north-west ML is on unit code Rn1 on gently undulating to low hilly terrain on Neara Volcanics. This has not been and is not expected to be disturbed by mining. The major soils are described as moderately deep to deep, dark and brown cracking clays (black earths and brown clays) with areas of gradational and texture contrast soils with brown clay subsoils (solodics and soloths).

The Land Capability mapping (DPI 1982) indicates that the different land systems mapping units have different qualities and suitability for agricultural use.

- Mapping Unit Re1 (where the majority of rehabilitation will occur) is given a suitability class 6 (equivalent to Land Capability Class V to VI). The main limitations are moderate depth, moisture availability and physical properties. The land is described as having a moderate to severe water erosion risk and minor rockiness and stoniness limitation. Limited areas are suitable for cropping, but the land is suitable for grazing on native and improved pastures (reflected in the existing land use in the area).
- Mapping Unit Rn1 is given a suitability class 2b (equivalent to Land Capability Class II-III). The land has slight to moderate erosion limitations as well as slight workability and microrelief limitations. The land is suitable for annual cropping (with appropriate soil conservation) and grazing on native and improved pastures.
- Mapping Unit Qa1 is given a suitability class 1 (equivalent to Land Capability Class II). The land has slight physical property as well as minor periodic flooding and water logging limitations. The land is suitable for annual cropping (including irrigated cropping) and grazing on native and improved pastures.

The equivalent Land Capability Classes are described below (DSITI & DNRM 2015):

- Class II - Land suitable for all agricultural uses but with slight restrictions to use for cultivation
- Class III - Land suitable for all agricultural uses but with moderate restrictions to use for cultivation
- Class V – Land that in all other characteristics would be arable but has limitations that make cultivation impractical and/or uneconomic

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

- Class VI – Land that is not suitable for cultivation but is well suited to pastoral use and on which pasture improvement involving the use of machinery is practicable.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

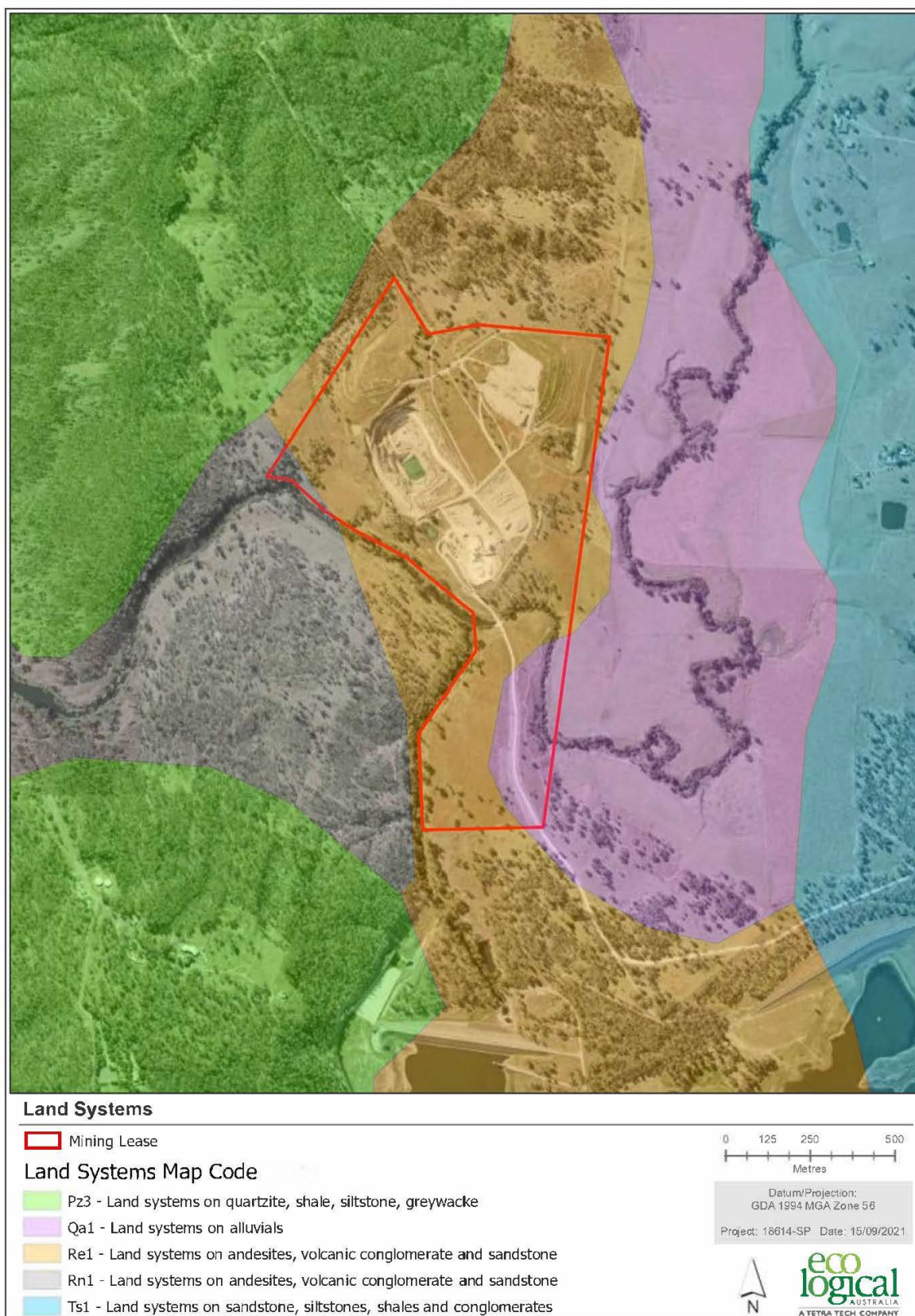


Figure 18 The land systems around the project area (source: Queensland Government 2020b)

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.7.1. Land stability

Although descriptions in the land evaluation mapping suggests that soil erosion may be an issue at the project site, aerial imagery (provided in Section 3.1.6) does not indicate widespread soil stability or erosion issues in areas under pasture. Soil analysis conducted for the stockpiled topsoil and used for the rehabilitation of the overburden dumps shows it to be non-sodic and with a low dispersion index (see Section 3.5.3.1). No significant soil stability issues are expected to limit rehabilitation efforts at Murgon.

3.1.8. Ecological values

The site is located in an area that has been extensively cleared for agricultural activities. The Mine Ecological Assessment (URS 2008) revealed a highly impacted environment with relatively low environmental integrity following the site's long-term use as grazing land. This had resulted in the land being cleared and non-native pastures established. However, a number of significant environmental values were identified in the riparian areas of Barambah and Baker Creeks. Two stands of non-riparian remnant eucalypt woodland were found to be scattered in the north and northwest of the site.

Searches by URS (2008) found records of 95 plant species associated with the three lots over which the mining lease extends. Of these, two were recorded as rare in Queensland at the time:

- *Indigofera baileyi* (Bailey's Indigo) - a perennial herb
- *Callitris baileyi* (Bailey's Cypress Pine) - A pine growing to 18 m in height, found on rocky, hilly or mountainous areas, usually near creeks, and on shallow and often clay soils.

A recent search of the Queensland herbarium have found amended status of *Indigofera baileyi* to "least concern" in reference to the *Nature Conservation Act 1992* and is no longer listed under conservation significance (Queensland Government 2022a). The status of *Callitris baileyi* is now listed as "near threatened" and remains listed under conservation significance (Queensland Government 2022b).

An updated review of conservation values was undertaken for the preparation of the PRCP. According to the Queensland Government Regional Ecosystem (RE) mapping (Queensland Herbarium 2019), there are no areas of mapped remnant vegetation on ML 50111. However, there are patches of Category B remnant vegetation and Category C High Value Regrowth in the surrounding landscape (Figure 19). Additionally, Category R regrowth watercourse vegetation is present along the creek banks and overland flow line adjacent to some existing disturbance areas.

A search of the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act Protected Matters Database (DAWE 2022) identified three threatened ecological communities within 2 km of the site, being:

- Poplar box grassy woodland on alluvial plains (endangered)
- Lowland rainforest on subtropical Australia (critically endangered)
- White box-yellow box-blakely's red gum grassy woodland and derived native grassland (critically endangered).

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Additionally, potential habitat for 11 threatened flora species was also identified within 2 km of the site using the Protected Matters Database. One of these species, *Phebalium distans* (Mt Berryman phebalium), is listed as critically endangered under the EPBC Act and endangered under the NC Act. The species *Cossinia australiana* is listed as endangered under both the EPBC Act and NC Act. The remaining species are listed as vulnerable under both the EPBC Act and NC Act (except *Dichanthium setosum* which is least concern under the NC Act). WildNet database searches were conducted to confirm the presence of these species within 2 km of the site. A likelihood of occurrence assessment was conducted and all of these species are unlikely to occur in or around the project area, as shown in Table 9.

Table 9 Threatened flora likelihood of occurrence assessment

Scientific name	Common Name	EPBC Act Status	NC Act Status	Habitat description	Likelihood	Justification
<i>Anthraxon hispidus</i>	Hairy-joint grass	V	V	In or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Cadellia pentastylis</i>	Ooline	V	V	Occurs in a range of vegetation types including semi-evergreen vine thicket, brigalow-belah, poplar box and bendee communities. Ooline often occurs on the edges of sandstone and basalt escarpments, 200 to 500 m above sea level.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Cossinia australiana</i>	Cossinia	E	E	Prefers ecotonal situations around dry rainforest edges, although it also occurs as scattered individual plants within closed forest communities. It grows in araucarian microphyll vine forest and relict semi-evergreen vine thicket on a variety of soils, including red volcanic soil and black loam.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Denhamia parvifolia</i>	Small-leaved Denhamia	V	V	Found in vineforests and semi-evergreen vine thickets (softwood and brigalow scrub), commonly on basalt-derived, brown or red soils above 300 m altitude.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Dichanthium setosum</i>	Bluegrass	V	LC	Occurs in heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by Acacia (brigalow) and/or Eucalyptus species.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Haloragis exalata</i> subsp. <i>Velutina</i>	Tall velvet sea-berry	V	V	Recorded from eucalypt forests, from rainforest margins and grasslands from near sea-level to 1000 m altitude. The species has been recorded growing on	Unlikely	No WildNet records exist within a 2km radius of the project area.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

				brown heavy clay (Carnarvon National Park), shallow rock loam (Bunya Mountains National Park), and basaltic soils.		
<i>Macadamia integrifolia</i>	Macadamia nut	V	V	The Macadamia Nut grows in remnant rainforest, preferring partially open areas such as rainforest edges.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Paspalidium grandispiculatum</i>	-	V	V	Has been recorded growing in tall woodland, sandy soil over sandstone, dry sclerophyll forest in rocky granite gorge on granite-derived sands, and upper slope below sandstone outcrop.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Phebalium distans</i>	Mt Berryman phebalium	CE	E	Found on red soils in vineforest, semi-evergreen vine thicket and open forest ecosystems and ecotones, generally above 200 m elevation.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Samadera bidwillii</i>	Quassia	V	V	Commonly occurs in lowland rainforest often with <i>Araucaria cunninghamii</i> or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510 m altitude.	Unlikely	No WildNet records exist within a 2km radius of the project area.
<i>Thesium australe</i>	Austral toadflax	V	V	Grows in grassland or woodland, often in damp sites.	Unlikely	No WildNet records exist within a 2km radius of the project area.

A desktop fauna search was conducted within 3 km of the project area using the WildNet database (Queensland Government 2021) (3.6.1). WildNet searches returned the potential presence of 129 birds, nine ray-finned fishes, six reptiles and four mammals. Of these species, only two were listed as threatened under State or Federal legislation, being the koala (*Phascolarctos cinereus*; QLD: Vulnerable; EPBC: Vulnerable) and southern snapping turtle (*Elseya albagula*; QLD: Critically Endangered; EPBC: Critically Endangered). Atlas of Living Australia searches (Atlas of Living Australia 2021) for threatened species were also conducted within the project area. A likelihood of occurrence assessment was conducted which determined only the Koala is likely to occur within the area (Table 10).

Table 10 Threatened fauna that are known to occur, or potentially occur, in or around the project area

Scientific name	Common Name	EPBC Act Status	NC Act Status	Habitat description	Likelihood	Justification
<i>Phascolarctos cinereus</i>	Koala	V	V	Occurs in a range of temperate, tropical and	Likely	ALA records species occur

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

sub-tropical forests as well as woodland and semi-arid communities dominated by *Eucalyptus* species.
within a 3 km radius of the project area.

<i>Elseya albagula</i>	Southern snapping turtle	CE	CR	Occurs in riverine habitat throughout the Fitzroy, Mary, and Burnett catchments. Prefers clear, flowing, well-oxygenated waters. Also occurs in non-flowing waters but in greatly reduced numbers.	Unlikely	No ALA records within proximity of the project area. No suitable habitat occurs within the project area.
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MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

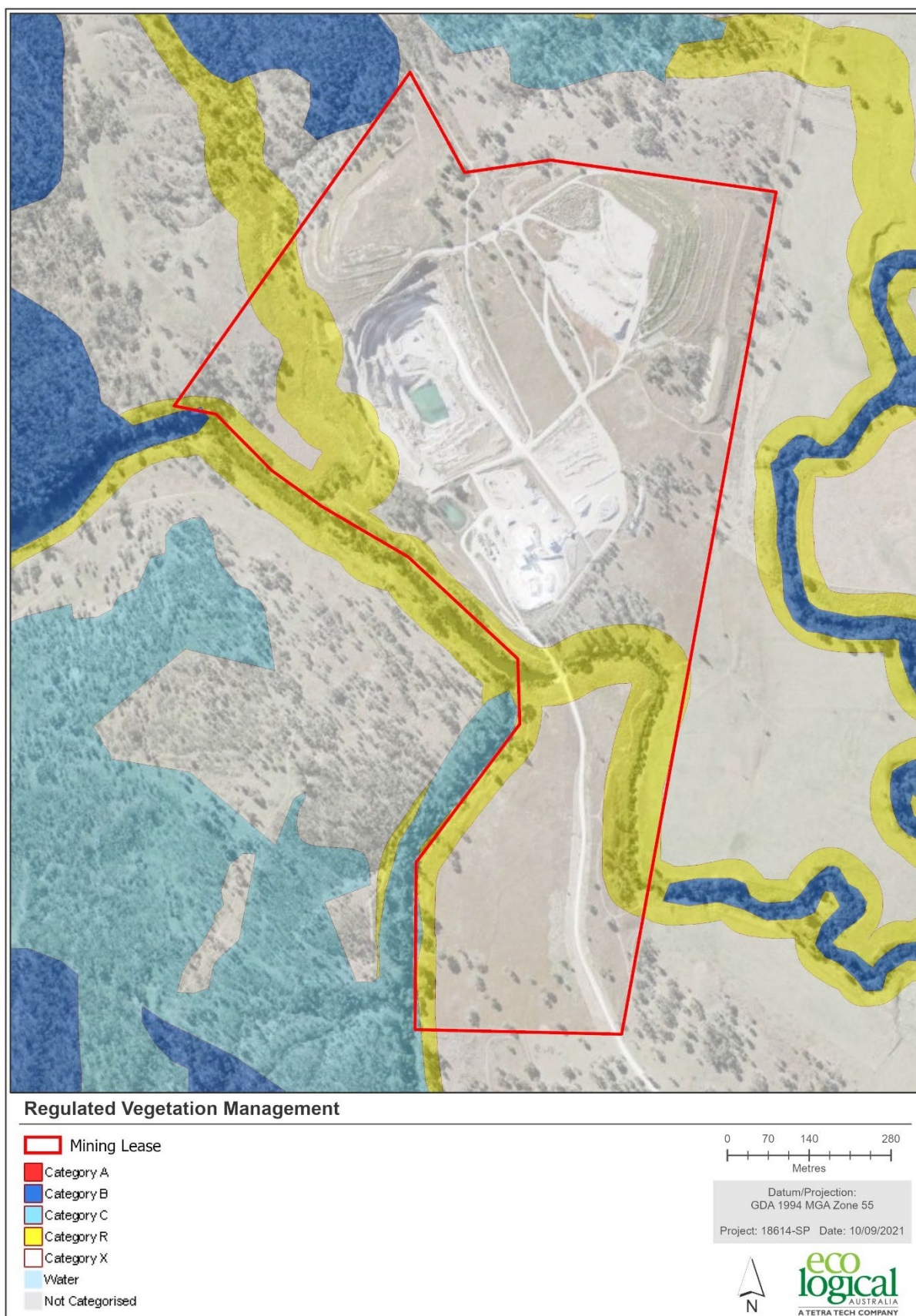


Figure 19 Regulated vegetation management categories for the Murgon Operation and surrounds

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

No significant disturbance is planned outside of that currently in place as part of the rehabilitation and closure activities described in the PRCP. Therefore, existing ecological values are not expected to be significantly impacted. Pre-clearance surveys will be undertaken prior to any disturbance in currently undisturbed areas (void cut back or new drains) to identify regulated vegetation and protected species or communities so that appropriate avoidance or mitigation measures can be employed.

3.1.9. Project description

3.1.9.1. Identification of underlying landholders

ML 50111 lies within the South Burnett Regional Council area. It is on Lot 6 Plan SP195988, Lot A Plan RP210698 and Lot A Plan AP221091 with Graymont (NSW) Pty Ltd listed as the registered owner. Graymont took ownership of the business on 1 August 2019. All three Lots extend over 83.8 ha of ML 50111 and the land is considered freehold.

3.1.9.2. Mining tenure

There are three limestone deposits on ML 50111; the Northern, Central and Southern Deposits. The current EA only authorises mining of the Northern Deposit (EA Condition A1-1). This has an indicated resource of 1.03 million tonnes and minable reserve of 976,000 tonnes of limestone. Details of the mining tenure are provided below in Table 11.

Table 11 Details of the mining tenure for Murgon

Mining Lease number	Lease holder	Date granted	Expiry date	Areas (ha)	Activity
ML 50111	Graymont (NSW) Pty Ltd	14/11/1996	30/11/2036	83.8	Mining limestone

3.1.9.3. Mining operation

Mining consists of conventional open cut benching methods currently being performed by Graymont and their respective contractors. Operations are conducted on a single shift basis, normally between the hours of 6.00am to 6.00pm Monday to Friday.

As part of mining operations Graymont will continue to progress exploration activities within the authorised disturbance area. The exploration activities will be undertaken across an area of 3.21 ha and will include:

- Targeted removal of existing hardstand material at targeted locations across the laydown area, workshop area, and access tracks
- Drilling within the existing disturbance footprint, with each exploration drill hole constructed with a diameter of 100 mm and advanced to a maximum depth of 150 m below ground level
- Samples being collected at nominated strata intervals or nominally every meter to support analytical testing and geological assessment
- Backfilling of boreholes using drill cuttings and overburden, and capped to the surrounding surface level to restore site integrity

The mine and surrounds of the site are mostly devoid of tree cover due to historical land clearance and cattle grazing activities. Consequently, prior to drilling and blasting, little to no

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

natural vegetation requires removal or grubbing out. Available topsoil is recovered prior to mining for future use in rehabilitation.

The shale overburden on the western side of the mine pit is free-dug by the excavator without blasting. The andesite overburden on the eastern side of the mine pit is drilled and blasted before removal. All overburden is taken to the overburden dumps.

Blast activities are generally performed with wet emulsion initiated with NONELs (non-electric). After blasting, limestone ore is loaded into articulated haul trucks by an excavator and/or a front wheel loader and transported to the plant for crushing, milling and screening.

The extraction rate is approximately 150,000 tonnes per annum. Quantities of desirable quality limestone product are estimated at around 90,000 tonnes per annum.

Once limestone is recovered from the pit it progresses through a scalping screen to the primary jaw crusher. The jaw crusher reduces the scalping oversize to a minus 75 mm size which is then stockpiled as ground limestone (GLS).

GLS is then fed into a Jacques A4 mill, where it is reduced to a minus 4 mm size. This product is then fed over a multi-deck Halls screen, with the following products being screened off:

- Oversize return to mill
- Kiln feed 4mm to 1mm
- Aglime <1mm
- Superfine Aglime <0.25 mm
- Neutra-Lime <2mm.

During the life of mine (LOM), the pit will be extended on the western boundary with cessation of active mining scheduled for 2037.

3.1.9.4. Mine features and disturbance types

The current disturbance and disturbance types are shown in Figure 1, with disturbance types listed in the EA (and associated activities and assets) described in Table 12.

To manage the rehabilitation of ground disturbance associated with mining activities, areas with similar rehabilitation requirements have been grouped together into Rehabilitation Areas (RA). These have been used to develop the PRCP Schedule.

The EA has agreed PMLUs for each disturbance type. For each type or RA, a rehabilitation strategy to achieve the nominated PMLU will be provided in Section 3.5.

There is no tailing storage facility (TSF) at Murgon.

Table 12 The Murgon disturbance types as provided in the EA

Disturbance type	Rehabilitation area	Details of disturbance types or assets within each type
Fuel storage and service area	RA9	Above ground tank HME parking area Exploration area

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Disturbance type	Rehabilitation area	Details of disturbance types or assets within each type
Stockpiles	RA5	Limestone / product stockpiles
Plant/office	RA5	Sheds Silos/bins Plant Laydown area Miscellaneous scrap Small tanks Exploration area
	RA10	Office (to be retained at end of mine life) Workshop (to be retained at end of mine life) Sheds (to be retained at end of mine life) Exploration area
Waste Dump No. 2 North-West	RA1	Northern overburden dump – rehabilitation works completed
	RA2	Northern overburden dump – under active rehabilitation
Waste Dump No. 1 North-West	RA1	North-eastern overburden dump – rehabilitation works completed
	RA3	North-eastern overburden dump – under construction
Topsoil stockpiles	RA2	Topsoil stockpiles located within the footprint of the Northern overburden dump – under active rehabilitation
	RA3	Topsoil stockpiles located within the footprint of the North-eastern overburden dump – under construction
Roads and tracks	RA7	Tracks (unsealed) Exploration area
	RA10	Tracks (to be retained at end of mine life) Exploration area
Silt traps/Dams	RA4	Sediment Dam C (will be decommissioned during mine life) Exploration area
	RA8	Sediment Dam A (to be retained at end of mine life) Sediment Dam B (to be retained at end of mine life) Sediment Dam D (to be retained at end of mine life) Exploration area
Open Pit (void)	RA6	Residual void Exploration area

The extent of the RAs at Murgon are shown in Figure 21.

3.1.9.5. Notifiable activities

On ML 50111 there is a 20,000 L diesel above ground fuel tank which is used for operations. However, it does not trigger the volume threshold of a notifiable activity of 25,000L of petroleum products as specified in Schedule 3 (29)(b)(iii) of the EP Act 1994.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

On ML 50111 there is a 20,000 L diesel above ground fuel tank which is used for operations; however, it does not trigger the notifiable threshold of 25,000L in association with the Schedule 3 (29)(b)(iii). Further, there are no kilns, explosive magazines, or sewage treatment plants on site.

ML 50111 is not listed on any Environmental Management Registers or Contaminated Land Registers.

3.1.9.6. *Environmentally relevant activities*

The Environmentally Relevant Activities (ERAs), as described in the *Environmental Protection Regulations 2019*, carried out at Murgon Operations are listed in Table 13. These are included in the EA.

Table 13 Murgon ERAs

Environmentally relevant activity/activities	Location
21: A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20	ML 50111

3.1.10. **Design for closure (including consideration of voids in flood plains)**

The location of the void was designed to maximise the extraction of the resource that has been approved. It has since been identified that the void is located within the potential flooding extent (refer to Section 3.1.4.3).

Following consultation with DES in February 2022 (refer to Appendix F), it was discussed that further modelling could be undertaken to fully understand the depth and velocity of flood events to help inform closure design for the site.

Sensitive receptors have been identified in Figure 20 and are largely unaffected by disturbance. The existing site access track crosses a section of Category R regrowth watercourse vegetation and the void is adjacent to Category R regrowth watercourse vegetation.

There are no geochemically reactive or acid forming wastes, no tailings dams, no heap leach pads, or waste tyre stockpiles that would require selective location selection on the site to mitigate environmental risks.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

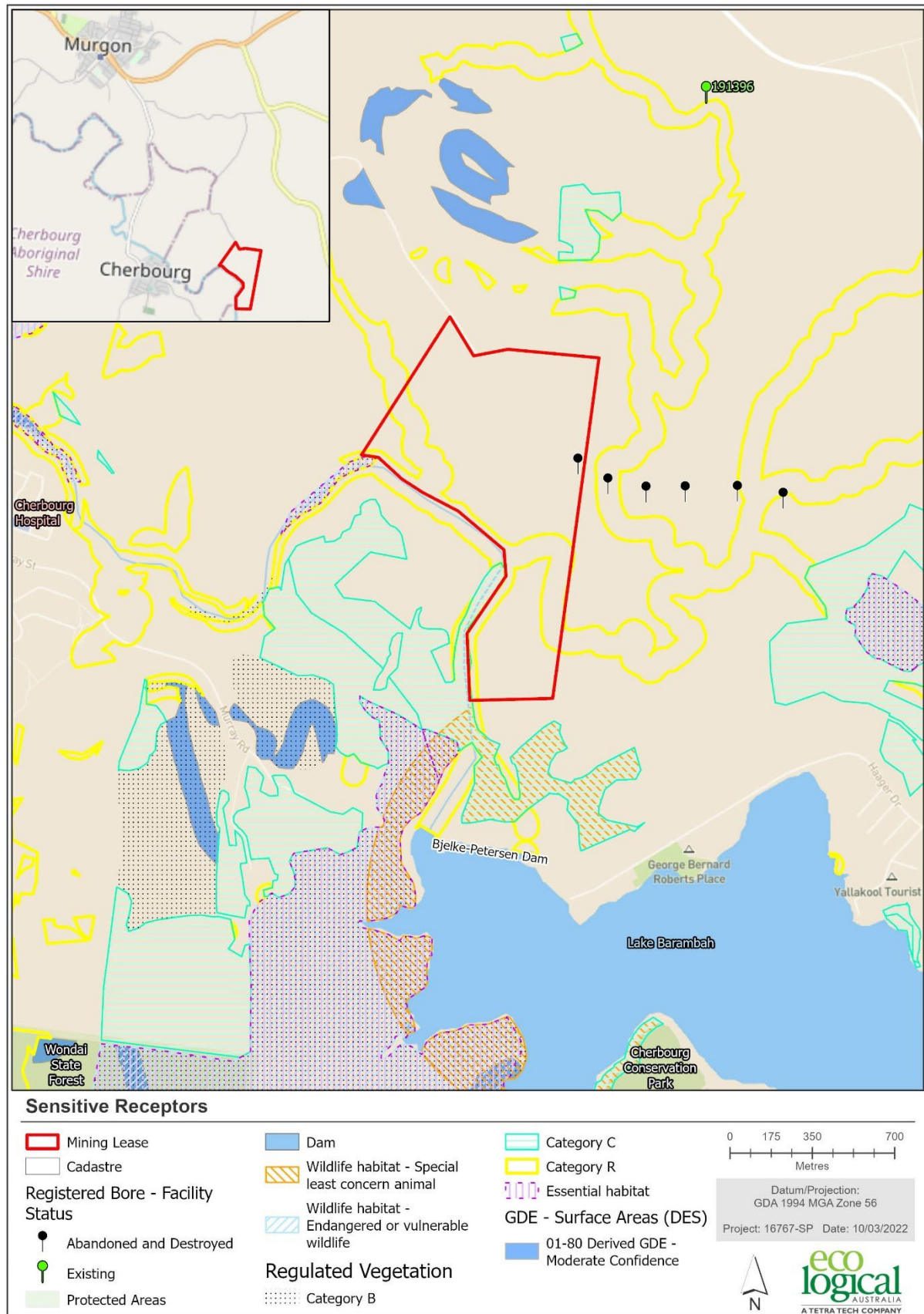


Figure 20 The sensitive receptors surrounding the Murgon ML

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.1.11. Rehabilitation planning and progressive rehabilitation

3.1.11.1. Progressive rehabilitation

Condition F1-2 of the EA states that, “*Progressive rehabilitation must commence when areas become available within the operational land*”. Graymont recognises the importance of progressive rehabilitation in the overall production cycle as it allows for the disturbance area to be minimised as much as practicable.

To date, 8.66 ha of the Northern and North-eastern Overburden Dumps has been rehabilitated. The construction of the Northern Overburden Dump, including all landform development and major earthworks, has been completed and most of the dump has been topsoiled and revegetated. A small section (now nominated as RA2) is awaiting surface preparation, topsoil placement and revegetation (Figure 21). The remainder of the North-eastern Overburden Dump (now nominated as RA3), is still under construction and will continue to receive overburden until 2029 after which it will undergo landform reshaping and will be progressively topsoiled and revegetated until 2031 (refer to schedule in Appendix B).

Progressive rehabilitation of area associated with Plant/Office, Fuel Storage and Service Area and Product Stockpiles disturbance types will not be able to commence until operations have ceased in 2037. This is due to the infrastructure being retained for use in the active mining operation until such time that they are no longer required and can commence decommissioning and removal. Similarly, rehabilitation associated with Silt Trap/Sediment Dams, RA8, will not commence until 2040 as the they will be part of the site erosion and sediment control measures until closure.

Table 14 summarises the annual disturbance and rehabilitation activities for the period of the last Plan of Operations (2016).

Table 14 Summary of most recent annual disturbance and rehabilitation activities

Description	Annual disturbances and rehabilitation area (ha)						
	Prior to 2016	2016	2017	2018	2019	2020	2020 to 2037
Total lease area	83.80	83.80	83.80	83.80	83.80	83.80	83.80
Undisturbed area	62.99	61.71	61.39	61.92	61.64	58.85	47.48
New disturbance		2.86	0.32	0.00	0.81	2.79	11.37
Cumulative new disturbance		2.86	3.18	3.18	3.99	6.78	18.24
Established and active rehabilitation	5.85	1.58	0.00	0.53	0.00	0.00	8.65
Cumulative rehabilitation		7.43	7.43	7.96	7.96	7.96	16.61

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Total area of remaining disturbance	20.81	22.09	22.41	21.88	22.16	24.95	19.71
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A timeline showing important milestones is provided in Section 3.1.11.2 and the PRCP schedule is presented in Appendix B.

3.1.11.2. Rehabilitation milestones

The PCRCP guideline requires the development of rehabilitation milestones and milestone criteria for all rehabilitation areas that have a PMLU (DES 2021). Milestones identify significant events or steps in the rehabilitation process and will be legally enforceable commitments once the PCRCP Schedule is approved. In accordance with the PRCP Plan guideline, Graymont has developed milestones for Murgon, ensuring that the milestones are SMART:

- **S**pecific
- **M**easurable
- **A**chievable
- **R**elevant
- **T**ime bound.

For each milestone, milestone criteria have been developed to determine and demonstrate whether each milestone is achieved. The following rehabilitation site-specific milestones (guided by the examples in Appendix 3 of the PRCP guideline) will be applied to areas that have become available for rehabilitation:

- RM1 - Infrastructure decommissioning and removal
- RM2 - Contaminated land assessment and remediation
- RM3 - Landform development
- RM4 - Surface preparation
- RM5 - Revegetation
- RM6 - Achievement of surface requirements (grazing)
- RM7 - Achievement of post-mining land use to stable condition (grazing)
- RM8 - Achievement of post-mining land use to stable condition (water storage)
- RM9 – Retained Infrastructure
- RM10 – Decommissioning of exploration boreholes

Table 15 to Table 19 outline the applicable RAs, the disturbance types that are covered by each RA and the rehabilitation milestones applicable to each.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 15 Rehabilitation milestones for RAs associated with Northern Overburden Dump (Waste Dump 2), North-eastern Overburden Dump (Waste Dump 1) and Topsoil Stockpiles Disturbance Types

RA #	Size of RA (ha)	Disturbance types or assets	Applicable milestones	Milestone description
RA1	8.66	Existing rehabilitation (on overburden dumps)	RM6 RM7	Rehabilitation monitoring and maintenance Sustainable achievement of PMLU
RA2	0.69	Northern overburden dump (Including part of the topsoil stockpiles located within the footprint of the dump)	RM4 RM5 RM6 RM7	Topsoiling and surface preparation Revegetation Rehabilitation monitoring and maintenance Sustainable achievement of PMLU
RA3	6.4	North-eastern overburden dump (includes part of the topsoil stockpiles located within the footprint of the dump)	RM3 RM4 RM5 RM6 RM7	Landform development and reshaping/reprofiling Topsoiling and surface preparation Revegetation Rehabilitation monitoring and maintenance Sustainable achievement of PMLU

Table 16 Rehabilitation milestones for RAs associated with the Silt Traps/Dams Disturbance Type

RA #	Size of RA (ha)	Disturbance types or assets	Applicable milestone	Milestone description
RA4	0.12	Silt Traps/Dams to be rehabilitated (Sediment Dam C only) Exploration area (boreholes)	RM10 RM1 RM2 RM3 RM4 RM5 RM6 RM7	Decommissioning and backfilling of exploration boreholes Infrastructure decommissioning and removal Remediation of contaminated land Landform development and reshaping/reprofiling Topsoiling and surface preparation Revegetation Rehabilitation monitoring and maintenance Sustainable achievement of PMLU
RA8	1.57	Silt Traps/Dams to be retained (Sediment Dam A, B and D) Exploration area (boreholes)	RM10 RM1 RM2 RM7 RM8	Decommissioning and backfilling of exploration boreholes Infrastructure decommissioning and removal Remediation of contaminated land Sustainable achievement of PMLU Sign-off for retained infrastructure

Table 17 Rehabilitation milestones for RAs associated with the Plant/Office, Fuel Storage and Service Area and Product Stockpiles Disturbance Types

RA #	Size of RA (ha)	Disturbance types or assets	Applicable milestone	Milestone description
RA5	5.04	Miscellaneous sheds Silos/bins Plant and equipment Laydown area Small tanks	RM10 RM1 RM3	Decommissioning and backfilling of exploration boreholes Infrastructure decommissioning and removal

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

RA #	Size of RA (ha)	Disturbance types or assets	Applicable milestone	Milestone description
		Product stockpiles	RM4	Landform development and
		Exploration area (boreholes)	RM5	reshaping/reprofiling
			RM6	Topsoiling and surface preparation
			RM7	Revegetation
				Rehabilitation monitoring and maintenance
				Sustainable achievement of PMLU
RA9	0.2	Above ground fuel tank	RM10	Decommissioning and backfilling of exploration boreholes
		HME parking area	RM1	Infrastructure decommissioning and removal
		Exploration area (boreholes)	RM2	Remediation of contaminated land
			RM3	Landform development and
			RM4	reshaping/reprofiling
			RM5	Topsoiling and surface preparation
			RM6	Revegetation
			RM7	Rehabilitation monitoring and maintenance
				Sustainable achievement of PMLU
RA10	1.61	Workshop	RM10	Decommissioning and backfilling of exploration boreholes
		Office		
		Storage sheds	RM1	Infrastructure decommissioning and removal
		Powerlines		
		Bridge	RM2	Remediation of contaminated land
		Laydown area aprons around retained buildings	RM8	Sign-off of retained infrastructure
		Exploration area (boreholes)		

Table 18 Rehabilitation milestones for RAs associated with the Open Pit (Residual Void) Disturbance Type

RA #	Size of RA (ha)	Disturbance types or assets	Applicable milestone	Milestone description
RA6	9.73	Residual void	RM10	Decommissioning and backfilling of exploration boreholes
		Exploration area (boreholes)	RM1	Infrastructure decommissioning and removal
			RM3	Landform development and reshaping/reprofiling
			RM6	Rehabilitation monitoring and maintenance
			RM7	
				Sustainable achievement of PMLU

Table 19 Rehabilitation milestones for RAs associated with the Roads and Track Disturbance Type

RA #	Size of RA (ha)	Disturbance types or assets	Milestone #	Milestone description
RA7	2.35	Roads and Tracks	RM10	Decommissioning and backfilling of exploration boreholes
		Exploration area (boreholes)	RM3	Landform development and reshaping/reprofiling
			RM4	Topsoiling and surface preparation
			RM5	Revegetation
			RM6	

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

RA #	Size of RA (ha)	Disturbance types or assets	Milestone #	Milestone description
			RM7	Rehabilitation monitoring and maintenance Sustainable achievement of PMLU
RA10	1.61	Roads and Tracks (retained) Exploration area (boreholes)	RM10 RM8	Decommissioning and backfilling of exploration boreholes Sign-off of retained infrastructure

The RAs are displayed in Figure 21 with a broad timeline of significant rehabilitation activities is provided in Figure 22. This is reflected in the PRCP schedule presented in Appendix B which also specifies the nominated duration of each relevant rehabilitation milestone.

Rehabilitation objectives and milestone criteria are presented in Section 3.3. While Figure 23 provides an understanding of the final extent of disturbance at closure.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

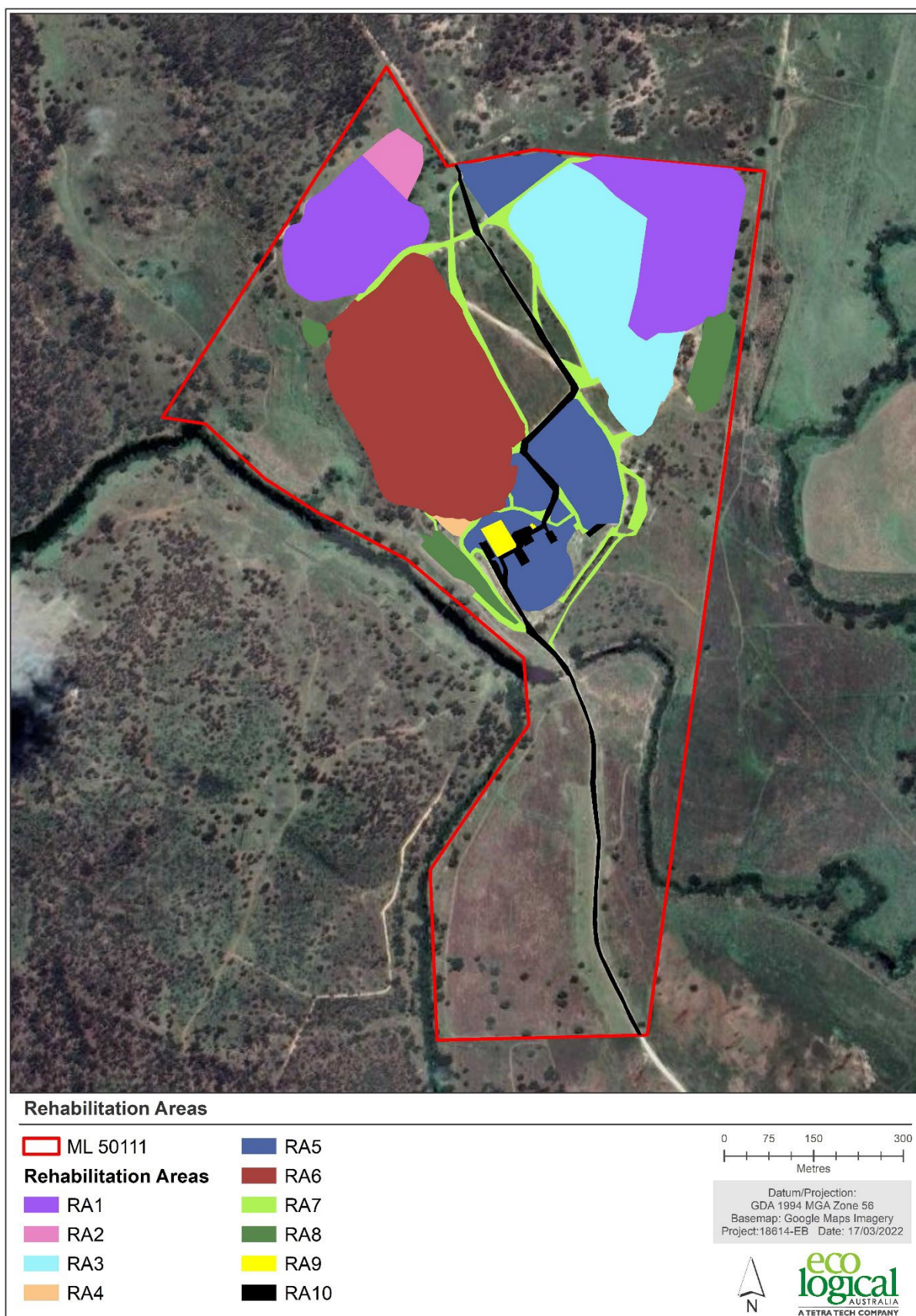


Figure 21 Rehabilitation areas at Murgon

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

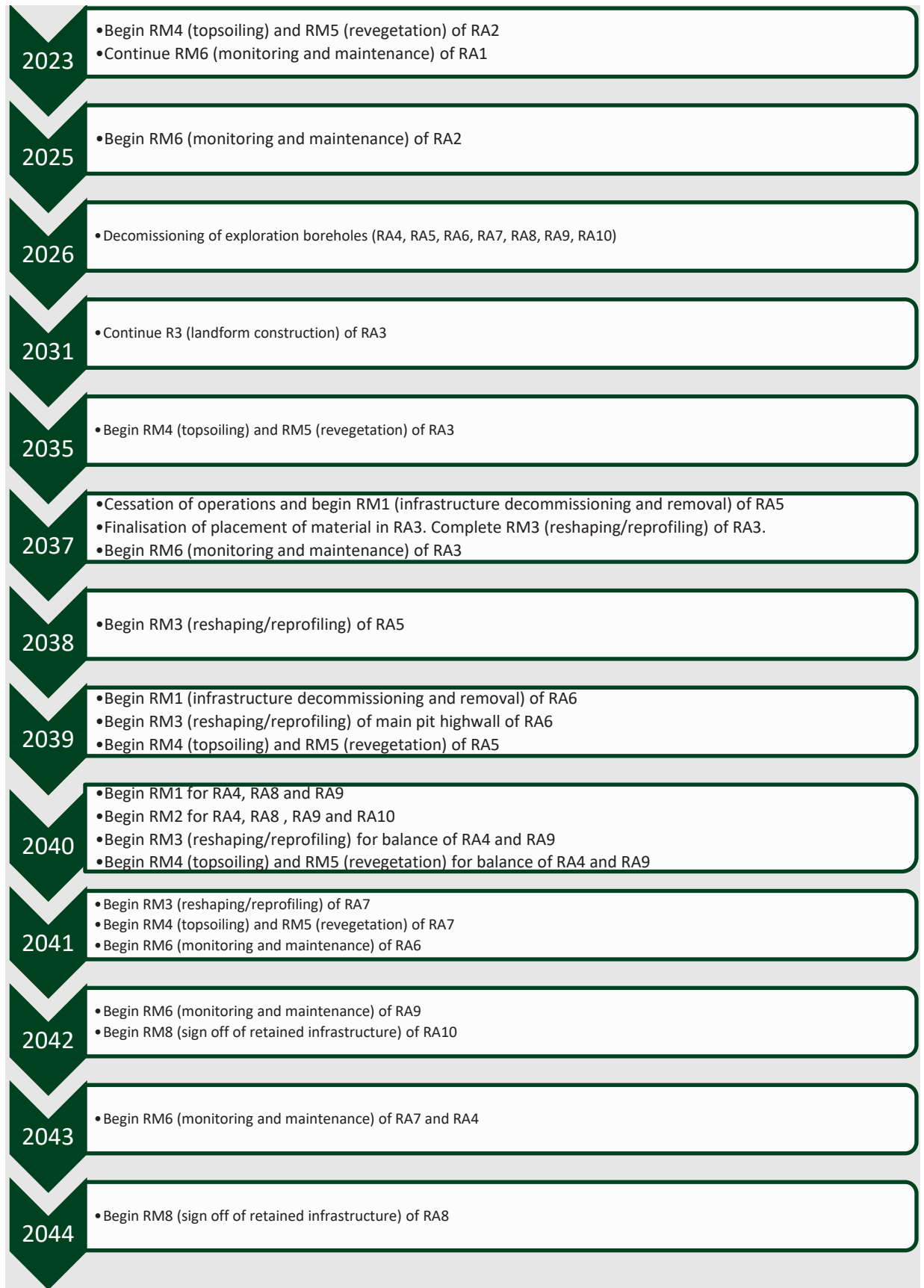


Figure 22 Timeline of significant rehabilitation works at Murgon

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

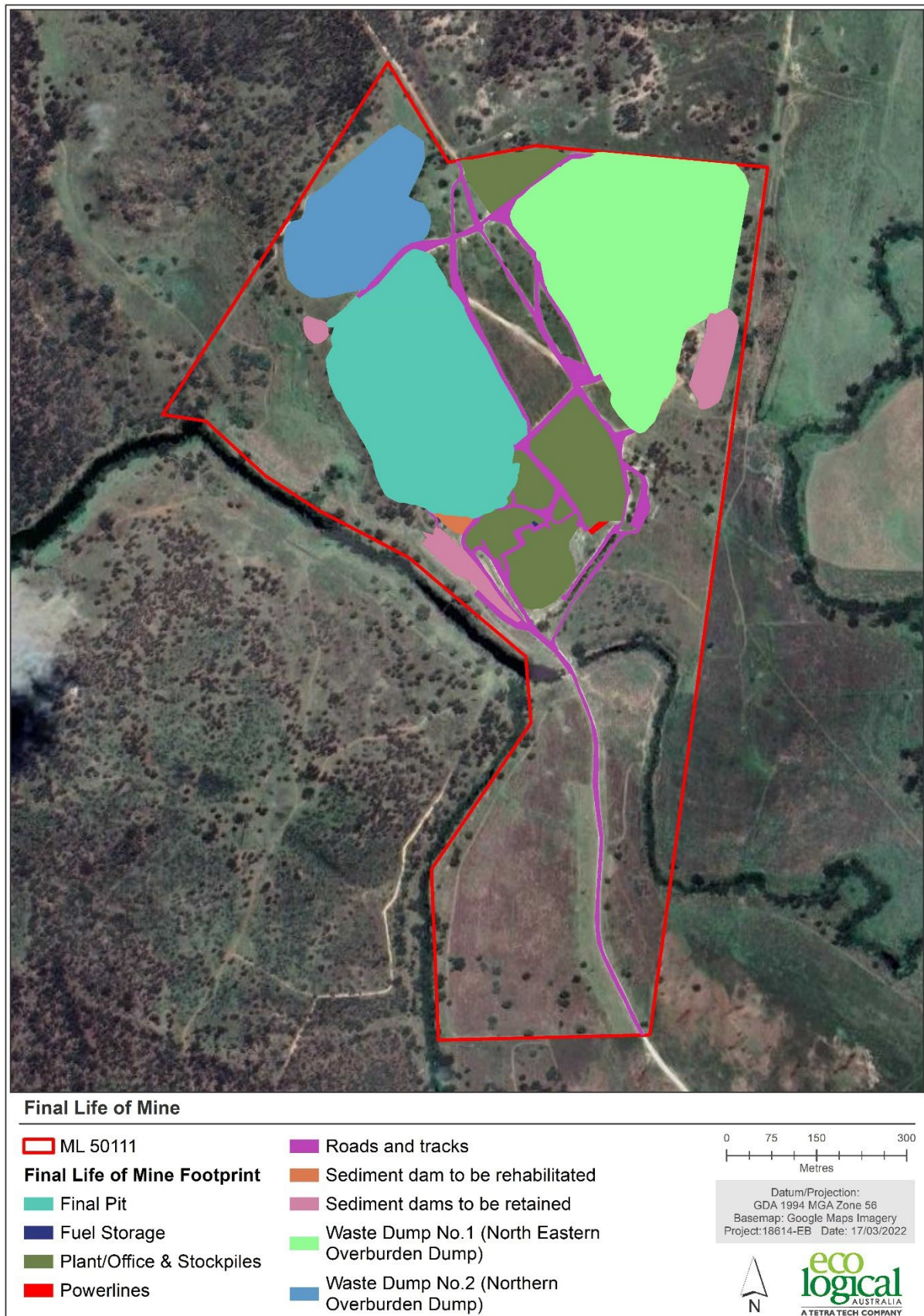


Figure 23 Final life of mine footprint

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.2. Community consultation

The Murgon Community Engagement Plan identifies stakeholder associated with the site. This includes DES, South Burnett Regional Council, Community Leaders (such as the local police and fire brigade) and Sunwater. Engagement methods have been captured and are outlined in the form of a consultation register specified in Appendix F.

The Community Engagement Plan includes:

- The consultation objectives of Graymont
- Engagement methods with stakeholders
- Proposed frequency of engagement
- Information type
- How feedback and comments are considered
- A register summarising all historical engagement inclusive of date, identified community member, consultation type, information provided, issues discussed and how considered, outcomes and commitments.

Graymont have maintained the Community Engagement Register throughout ownership of the site and updated as needed. It is noted no further community consultation is required to establish agreed PMLUs for Murgon. PMLUs have been previously approved through an existing LOD (the EA) and under transitional arrangements have been included in the PRCP. There has been no change to the proposed PMLU for any of the disturbance types.

3.3. Post Mine Land Use

3.3.1. Selection of PMLUs

As described above, the PMLUs for Murgon have previously been approved through an existing LODs (the EA). Condition F1-1 of the EA require that, *“All areas disturbed as a result of mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Schedule F – Table 1 and comply with the maximum distance between erosion control structures specified in Schedule F – Table 2”*. The applicable LOD is presented in Appendix C and the PMLUs and criteria that are to be carried over from the EA for each disturbance type are provided in Table 20. With the exception of the mine void, remaining sediment dams and retained infrastructure, the PMLU for the entire site will be rehabilitated to Grazing Pasture. This is consistent with the pre-mining land use and the land capability for the areas affected by mining operations.

Existing Sediment Dam C will be decommissioned during operations as it will be partially removed during pit cut back and will no longer be in use at closure (i.e., will no longer be part of the sediment dam disturbance area at closure and will be absorbed into the infrastructure area). The remaining footprint of the former sediment dam will be rehabilitated to Grazing Pasture in line with adjacent plant and office areas.

The residual void and the remaining sediment dams have a PMLU of water storage.

There is an agreement in place with the landholder (Graymont) to retain the main access road, bridge, offices and some storage sheds at closure. These will be valuable assets for any post-

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

mine agricultural enterprise. These retained assets are displayed in Figure 24 and accompanied by a Landholder Statement in Appendix G.

Table 20 Nominated PMLUs and slope criteria from the disturbance types nominated in the EA for Murgon

Disturbance Type	Estimated Area (ha)	Maximum Final Slope ¹	Final (Post-Mine) land Use Description
Open pit (residual void)	3.22	Void wall – competent rock max slope = 70°	From the base of the pit to the height of the groundwater table: Water storage with water quality to be suitable for livestock use
		Void wall – incompetent rock max slope = 38°	
	4.89	Void wall – competent rock max slope = 70°	Above the level of the natural groundwater table: Safe access is to be provided to the water for native animals and livestock
		Void wall – incompetent rock max slope = 38°	
Waste Dump No.1 North West	11.41	15° (25%)	Grazing Pasture
Waste Dump No.2 North West	2.61	15° (25%)	Grazing Pasture
Fuel Storage and Service Area	0.13	10° (18%)	Grazing Pasture
Plant/Office	2.6	10°	Grazing Pasture ²
Stockpiles	1.32	10°	Grazing Pasture
Silt Traps/Dams	0.47	N/A	Water Storage
Roads and Tracks	1.68	100	Grazing Pasture except where agreed with the landowner to be left as access tracks ³
Topsoil Stockpiles	0.54	10°	Grazing Pasture

1. Slopes for the void defined in EA Schedule F Table 3
2. Agreement with the landholder is in place to retain some buildings and sheds in accordance with Condition F5-1 regarding retained infrastructure.
3. Agreement is currently in place to retain the main access and some internal tracks.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN



Figure 24 Retained buildings and infrastructure at end of mine life

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.3.1.1. Compatibility with regional, State and National planning

The site is located within the South Burnett Regional Council. Under the *South Burnett Planning Scheme*, the land is zoned as rural (South Burnett Regional Council 2017). Section 6.2.13 of the South Burnett Planning Scheme states the purpose of the rural zone code as follows:

- Provide for rural uses and activities;
- Provide for other uses and activities that are compatible with:
 - Existing and future rural uses and activities; and
 - The character and environmental features of the zone; and
 - Maintain the capacity of land for rural uses and activities by protecting and managing significant natural resources and processes.

The purpose of the zone will be achieved through development in the zone that accommodates predominantly rural uses. The return of mined land to grazing pasture (agricultural use) is therefore consistent with the current zoning.

The planning scheme also states that Non-rural uses may be appropriate where they do not detract from its productivity and can demonstrate a direct relationship with the rural use in the immediate locality; or the potential to make a contribution to primary production or the diversification of rural industries. The retention of water storage (for primary industry use such as stock watering or irrigation) in the residual void and remaining dams, and the retention of access roads and storage sheds is also consistent with the planning scheme.

Regional interests (relating to agricultural land) are designated in the *Regional Planning Interests Act 2014* (RPI Act) and include Strategic Cropping Land. The project area is outside mapped areas of Strategic Cropping Land.

State interests, relating to land areas requiring protection for sustainable agriculture, are recognised by the *State Planning Policy – July 2017* (DILGP 2017). They include Important Agricultural Areas (IAAs) as identified by the Queensland Agricultural Land Audit (DAFF 2013). Designation of land as an IAA is based on Agricultural Land Classification (ALC) (DILGP 2017) with ALC Class A and ALC Class B land protected for sustainable agricultural use. The project area is outside mapped areas of AAs and areas recognised as ALC Class A and B.

The designation of a PMLU of grazing is therefore consistent with State and Regional Interests with respect to the protection of valuable productive agricultural land.

Plans for the rehabilitated areas are compatible with the surrounding land use and broader regional economic priorities. The importance of continued growth in agricultural production is recognised in the *Wide Bay Burnett Economic Development Strategy 2014-2019*, which encompasses the South Burnett region (WBBROC 2014). The Wide Bay Burnett area is recognised as a major 'food bowl' for Queensland, accounting for approximately 10% of Queensland's agricultural production (WBBROC 2014).

The designation of a PMLU of grazing is therefore consistent with Local Government Planning Scheme zoning, State Government State and Regional Planning Interests as well as Regional Economic and Development Strategies.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

The final land use for all areas within the lease boundaries including un-mined areas is shown in Figure 25.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

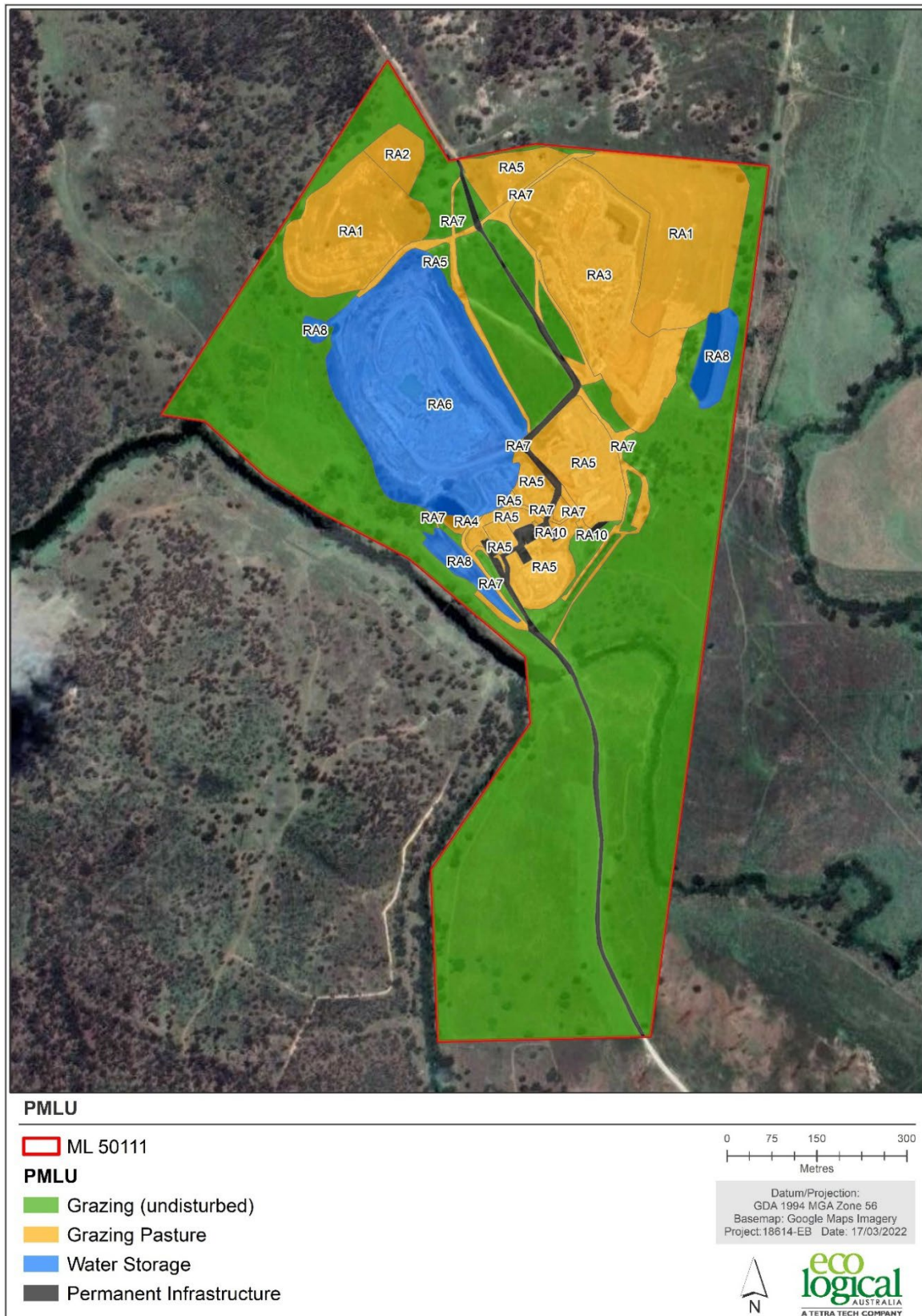


Figure 25 Final PMLU and Rehabilitation Areas

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.3.2. Rehabilitation objectives and completion criteria

Rehabilitation objectives for Murgon have been developed to ensure that the EA approval conditions for rehabilitation are met (see Table 1). They also address the overall rehabilitation aims as described in the PRCP Guidelines that rehabilitated land should be safe, stable, not cause harm to the environment and is able to sustain an agreed PMLU.

Specific rehabilitation objectives and milestone completion criteria have been developed for each RA and milestone described in Table 21 in Section 3.1.11.2 to reflect the activities undertaken within each disturbance type and RA. The following section provides the technical basis for the selection of a number of the critical milestone completion criteria, particularly those related to the creation of stable landforms and the sustainability of the PMLU.

3.3.2.1. Basis for selection of critical milestone completion criteria

MAXIMUM SLOPES FOR GRAZING PMLU

Maximum slopes for the areas with a PMLU of grazing pastures have been nominated in the EA as between 10° to 15° depending on the disturbance type. The suitability of these slopes was reviewed as part of the preparation of the PRCP.

The *Guidelines for agricultural land evaluation in Queensland* (DSITI & DNRM 2015) do not provide maximum slopes for the Land Capability Class VI originally approved in the EA and the Land Suitability Framework for the Inland Burnett area (DNRM & DSITI 2013), which includes Murgon, does not provide land quality requirements for native or improved pasture. Slopes up to c. 15% are suitable for low intensity grazing on rainfed pastures with appropriate land management practices (DME 1995, DNRM & DSITI 2013). The land cleared for grazing surrounding the site is on topography similar to the proposed final landform. The maximum slopes nominated in the EA are therefore suitable for setting completion criteria for the nominated PMLU.

MAXIMUM SLOPES FOR WATER STORAGE PMLU IN THE VOID

The slopes for the residual void wall have been based on the geotechnical assessment and rehabilitation recommendations provided by Rocktest Consulting (2022) (Appendix H). The following batter slopes are required to provide acceptable slope stability:

- Maximum batter angles in unweathered rock 70°
- Maximum batter angles in weathered rock 38°
- Maximum height of benches 10 m
- Minimum widths of berms 8 m

The recommendations from Rocktest Consulting (2022) align with EA conditions for maximum slopes in the void.

FOLIAGE PROJECTIVE COVER FOR MINIMISING EROSION AND ENSURING LONG-TERM STABILITY FOR THE GRAZING PMLU

The EA does not nominate a minimum ground cover for rehabilitated land at Murgon.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

According to The Queensland Government (2013), the critical level for cover in relation to pastures in tussock grasslands is approximately 40% cover and 1000 kg/ha of dry grass which ideally would be existent at the beginning of the summer storm season (prior to November annually). However, further research on post-mine landforms in central and southern Queensland specifies that groundcover of at least 50% would be required to significantly reduce the soil erosion rates (Loch 2000, NRA 2000, So et al. 2018). Further, reductions in erosion rates are seen as cover increases beyond this value. This has formed the basis for the minimum ground cover nominated in the milestone completion criteria.

TOPSOIL DEPTH FOR THE GRAZING PMLU

Topsoil between 150 mm and 300 mm is considered an acceptable (DME 1995) depth for establishment of vegetation, where shallower depths are still adequate with soils that have good water holding capacity and inherent fertility. The assessment of the topsoil stockpiles at site by SESL 2020 has confirmed the soil samples are non-sodic, with a low dispersion index and have moderate to high cation exchange capacity (nutrient retention capacity) (see Section 3.5.3.1).

The nominated topsoil depth of 150 mm is considered suitable for the establishment and maintenance of pasture at Murgon. Further, it is noted there is a surplus of scalps at site which could be used as part of the rehabilitation process as a subsoil material to improve overall growth medium depth and water-holding capacity (see Section 3.5.3.2).

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 21 Murgon Operations rehabilitation objectives, milestones and milestone completion criteria for all RAs

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
The rehabilitated site will not present an unacceptable hazard to persons, stock or native fauna.	RM1	Infrastructure decommissioning and removal	- All services have been disconnected except where agreement has been reached with the landholder for these to remain - North Bore and South Bore decommissioned according to the preferred practices nominated in the Minimum Construction Requirements for Water Bores in Australia (Queensland Government) - Demolish and or remove all buildings, plant equipment, tanks from site that are not to be retained under an agreement with the landholder - Hazardous building materials have been identified, managed and removed by appropriately licenced contractors from buildings that will be either retained or removed as part of mine closure - All infrastructure assets to be removed (excludes those in RA10) have been demolished and demolition waste removed to an appropriately licenced waste facility - All concrete slabs and footings that are less than 0.5 m deep not associated with retained infrastructure have been broken up and removed to an appropriately licenced waste facility - All stockpiled unprocessed raw limestone or graded limestone products remaining at end of mine life have been returned to the base of the void	- Demolition and waste removal records - Inspection and Test Plans (ITPs) (demolition and equipment removal) - ITP hold point (product stockpile removal) - Photographic records
Decommissioning of exploration boreholes	RM10	Decommissioning of exploration boreholes	All unused drill chips are disposed of within the borehole to a depth of 2 metres below ground level, then covered by a 1 meter thick clay plug. Above the clay plug (approximately 1 meter below ground to surface) the borehole will be backfilled with representative soil to maintain landscape integrity	- Record of compliant disposal and cap installation - Signed statement or checklist from suitably qualified persons - Photographic records

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
Contamination associated with RA will not pose a risk to human or ecological receptors in terrestrial or aquatic environments assessed and remediation carried out or site management plan approved and implemented.	RM2	Contaminated assessment remediation land and	- Site Investigation Report prepared by a certified/appropriately qualified person for RA4, RA9 and the workshop in RA10 - If required, remediation is carried out and validated sampling has been complete - If residual contamination can safely remain insitu requiring the site to be placed on a Contaminated Land Register, a Site Management Plan: - Is prepared and certified by an appropriately qualified person - Includes a statement by the underlying landholder accepting responsibility to implement the Site Management Plan	- Site Investigation Report - Records of validation sampling to confirm contaminant removal - ITPs (remediation of contaminated land) - Photographic records - Site Management Plan Document
The rehabilitation areas is reshaped to provide a stable landform. Maximum slopes are suitable for supporting the PMLU as approved by existing LOD. The rehabilitation area is reshaped to provide free drainage. Surface water is managed to maintain landform stability.	RM3	Landform development	- Surface aggregate (limestone) from RA5 and RA7 (laydown areas and tracks) has been removed and placed in the void. - All major earthworks have been completed in accordance with the final engineering and design plans including: - Maximum final slope for RA5, RA7 and RA9 (fuel storage and service area, plant/offices, stockpiles, roads and tracks) does not exceed 10° - Maximum final slope for RA1, RA2 and RA3 (overburden dumps) does not exceed 15° - Maximum slope for RA6 (residual void) sections of non-competent (weathered) rock do not exceed 38° - Maximum slope for RA6 (residual void) sections of competent rock do not exceed 70° - Perimeter abandonment bund and safety signage installed around RA6 (residual void)	- Final survey data - ITPs (landform development) including surface water management sign off. - Geotechnical report and final landform design for overburden dumps and residual void

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
			- Final landform (other than RA6 and RA8) does not contain any low points that may pond water for more than 1 month - Retained water management structures have been certified by an appropriately qualified person as conforming to the design standard and specifications consistent with those in the <i>Best Practice Erosion & Sediment Control series</i> (IECA 2008)	
Land quality and soil quality suitable for establishing vegetation required to sustain the rainfed grazing PMLU	RM4	Surface preparation	- Ripping completed to specifications (depth of 500 mm at 500 – 800 mm spacings) in all RAs except RA6 and RA8. - An assessment of stockpiled soil quality and suitability for rehabilitation has been completed by an appropriately qualified person to confirm soil is suitable for target vegetation establishment - Available, scalps have been applied to 150 mm as a subsoil for RA3 - Topsoil placed to an average depth of 150 mm to RA2, RA3 RA4 RA5, RA7 and RA9 - Topsoil substitute placed to an average depth of 150 mm to RA2, RA3, RA4, RA5, RA7 and RA9.	- ITPs (topsoil and scalps) - Topsoil and subsoil quality assessment (this PRCP) - Rehabilitation records
Agreed PMLU is established and sustainably maintained	RM5	Revegetation	- Applied topsoil will be ameliorated with an establishment dressing of a compound fertiliser containing N, P (low), K and S (such as Crop King 88 or equivalent) at a rate of 300 kg/ha (30 g/m²) - For areas where scalps will be ameliorated to provide a topsoil substitute, they will be ameliorated with 10% organic material 200 kg/ha (20 g/m²) of monoammonium phosphate (or equivalent) 400 (40 g/m²) of muriate of potash. - After incorporation of fertiliser, the seedbed will be prepared using harrows or equivalent	- ITPs (revegetation) - Records of seed purchase - Rehabilitation records

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
			- For RAs with a grazing pasture PMLU the following species and seeding rates have been applied (refer to Section 3.5.9 for further detail): - Black Speargrass (<i>Heteropogon contortus</i>) at 2kg/ha - Forest Bluegrass (<i>Bothriochloa bladhii</i> ssp. <i>Glabra</i>) at 2kg/ha - Lotononis (<i>Lotononis bainesii</i>) at 0.3 kg/ha	
	RM6	Achievement of surface requirements (grazing)	- Rehabilitation monitoring reference sites for grazing pasture PMLU have been selected in unmined pasture areas within the lease area by 2023 (excluding RA6, RA8 and RA10) - Rehabilitation monitoring for grazing pasture PMLU is undertaken annually - Monitoring shows that in rehabilitated areas with grazing pasture PMLU no declared pest plants are recorded in the rehabilitation domain (or if present, the % cover of declared pest plant species is no more than in the surrounding vegetation and is not increasing relative to reference conditions) - Within at least 24 months of revegetation, the average standing biomass of established pasture is no less than 1000 kg/ha at the end of the dry season or no less than 70% of that at the reference sites established on unmined areas within the lease whichever is lower - Within 24 months of revegetation, average groundcover in rehabilitated areas with grazing pasture PMLU is greater than or equal to 50% - Vegetation maintenance and or additional soil amelioration has been undertaken as soon as is practicable where monitoring has shown that groundcover or standing biomass does not meet the milestone criteria within the nominated timeframe	- Annual rehabilitation monitoring reports - Records of repair works

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
			- Within 3 years of revegetation, the ground cover in rehabilitated areas with grazing pasture PMLU will, on average, be dominated by native and introduced grass, legume and herb/forb species recognised as pasture species or known to be palatable and provide forage for livestock - Vegetation maintenance has been undertaken as soon as is practicable where monitoring has shown that pasture composition does not meet the milestone criteria within the nominated timeframe - Declared weeds account for no more than 5% ground cover in rehabilitated areas with grazing pasture PMLU or exceed the groundcover recorded in reference pasture areas (whichever is greater) - No active gully erosion (i.e., >0.3m deep) is present in the rehabilitated areas with grazing pasture PMLU. Repair works have been undertaken as soon as is practicable where active gully erosion >0.3 m deep has been recorded during rehabilitation monitoring	
	RM8	Achievement of post-mining land use to stable condition (water storage)	- Annual visual monitoring of the void batters demonstrates that they have remained stable - Where unacceptable instability is recorded, advice has been sought from a suitably qualified person and remediation works have been undertaken as soon as is practicable. - Water quality monitoring demonstrates that void water quality meets the Australian Water Quality Guidelines for Primary Industries – Stock (cattle) water use and the following standards	- Void wall inspection reports - Water quality data

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Relevant objective	Milestone reference	Rehabilitation milestone	Milestone Completion Criteria	Validation
Retained permanent infrastructure is safe and fit for purpose			- EC <5970 µS/cm - SO₄ <1000 mg/L - Total Ca <1000 mg/L - Total As <0.5 mg/L - Total Cd <0.01 mg/L - Total Cr <1 mg/L - Total Cu <1 mg/L - Total Ni <1 mg/L - Total Pb <0.1 mg/L - Total Zn <20 mg/L	
	RM7	Achievement of post-mining land use to stable condition (grazing)	- All completion criteria have been met on at least three consecutive monitoring events conducted no more frequently than once annually - Certification from an appropriately qualified person that rehabilitated areas with grazing pasture PMLU have achieved a stable condition - Certification from an appropriately qualified person that void has maintained a stable condition	Periodic rehabilitation and monitoring reports
Retained permanent infrastructure is safe and fit for purpose	RM9	Retained infrastructure	All retained permanent infrastructure in RA 10 has been inspected by a suitably qualified person within 6 months prior to application for rehabilitation certification and found to be structurally sound, safe and fit for its intended use	Records of structural reports from suitably qualified persons

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.4. Non-Use Management Areas

No non-use management areas (NUMAs) will be present at Murgon at closure. They have not been considered during the preparation of this PRCP.

3.5. Rehabilitation Management Methodology

The following information contains information on issues that may affect the whole site (Section 3.5.1 to Section 3.5.14) and those relevant to specific areas or rehabilitation activities (remaining Sections).

3.5.1. Hydrogeological assessment

The groundwater setting and information of groundwater depth and characteristics is provided in Section 3.1.5. The following sections provide a hydrological assessment as it relates to the interaction of the void with groundwater resources and the potential for impact on groundwater quality and groundwater levels.

3.5.1.1. Regional groundwater flow

As a result of limited groundwater data within the region it is not possible to determine water level contours and derive groundwater flow directions (refer Section 3.1.5.1). However, considering the geology of the region, it is considered that the limestone deposit was made by North to South fracture zones transporting groundwater.

ERM (2008) specify the fractured rock groundwater system at Murgon is recharged by a localised fracture network that is replenished by annual rainfall. While there is a small amount of seepage seen in the pit, there are no groundwater springs or other potential discharge locations reported within the ML.

3.5.1.2. Mine void groundwater interaction and water quality

Groundwater seepage into the void has been observed to date (ERM 2008, Rocktest Consulting 2022). As specified in Section 3.1.5.1 there are localised fractures (joints) exposed in the pit walls that allow small seepages that ERM (2008) summarise as being derived from rainfall recharge into the local limestone. It is not believed that the void intersects the known aquifer in the area as shown in Figure 14 nor Barambah Creek (ERM 2008).

Water quality testing has been conducted for several water quality parameters listed in the ADWG (NHMRC 2011) and the ANZECC & ARMCANZ (2000) stock water guidelines as summarised in Section 3.1.5.7.

The results indicated that there have been no impacts to water quality to date that would affect the protection of relevant environmental values applicable to the site. Given existing water quality, the nature of the operation and the mineral resources being targeted, the risk of elevated contaminant concentrations being transported from the site via groundwater and impacting on downstream environmental values is negligible.

The water quality data to date indicates that the water quality in the final void at closure is expected to be suitable for use for stock (and safe for native fauna).

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.1.3. Groundwater dependent ecosystems (GDEs)

According to the Queensland Government Wetland Maps database (2022c), two moderately rated GDEs exist within a 2 km radius of site. When cross-referencing against the GDEs from BoM Atlas (2022), the same GDEs are referenced.

AQUATIC

The Wetland Maps have identified a surface expression GDE with the set name 'permeable geologies including deeply weathered basalt (red soils)' within proximity of the site. The class of GDE is 'surface ecosystem dependent on the surface expression of groundwater'. This classification of the GDE has confidence rating of moderate and is located not within the ML but approximately 380 m from site. Since the site/operation does not sit within the same formation, it may not have the potential to cause harm to this GDE.

TERRESTRIAL

There are no terrestrial GDEs within the ML, however the Wetland Map database has identified derived GDE with moderate confidence rating approximately 1.3 km from the ML. The permeable geologies including deeply weathered basalts (red soils) has been identified as a surface ecosystem dependent on the sub-surface presence of groundwater.

SUBTERRANEAN

No Subterranean GDEs have been identified in the ML or surrounding 2 km buffer distance.

3.5.1.4. Groundwater conceptualisation and hydrological summary

There is limited information on the Barambah Creek Alluvial Aquifer and fractured rock aquifers within the Bjelke Petersen Beds and other rock units such as the Esk Formation. Upon review of the regional bore information, the bores are screened within gravel and sand of the Barambah Creek Alluvial Aquifer, with depths ranging from 4.04 to 5.22 (mbgl). Groundwater level readings taken from the alluvial aquifer system show a range between 286.59 and 290.88 m AHD within the Barambah Creek Alluvium Formation.

Recharge of the system is likely to be predominately recharge through direct rainfall or surface water flows.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.2. Flooding

The EA has a pre-approved land outcome for a void as such a flood connectivity assessment has been undertaken to understand geotechnical considerations for the void and surrounding waterways. Following communication with DES, a flood model will also be undertaken to understand the depth and velocity of flood waters at the Site. This package of work has yet to commence and therefore is not summarised in this PRCP.

The flood connectivity assessment reviewed publicly available flood assessments to support the susceptibility for Site. Sources included:

- Queensland Globe (<https://qldglobe.information.qld.gov.au/>)
- Queensland Department of Resources Flood Check Queensland (<https://floodcheck.information.qld.gov.au>)
- Australian Flood Risk Information Portal (<https://afrip.ga.gov.au/flood-study-web/#/search>).

The site and surrounding area contain major watercourses, being the Barambah Creek and Barker Creek. There are also some minor watercourses of the Burnett River which flow southerly towards the site. The assessment concluded that the site is expected to be partially flooded during a 1% AEP flood event (refer to Figure 9). It may have the potential to affect the void, infrastructure and processing areas on the lower slopes of the north-eastern overburden dump. During more extreme events, the site is expected to be extensively flooded during a PMF (refer to Figure 10).

The abandonment bund that will be installed around the void will provide some flood protection. Additional modelling is planned to determine the likely depth and velocity of floodwaters across the site to help design necessary flood protection and scour protection measures. This will be provided in an amended PRCP.

3.5.3. Soil and capping material assessment

3.5.3.1. Topsoil

The recovery of soils ahead of mining disturbance has been optimised for strategic use in rehabilitation. Topsoil will also be recovered from any additional areas that will be disturbed prior to closure (such as the pit extension). Topsoil management includes:

- Maintaining a topsoil resource inventory (mass balance) across the site to ensure topsoil resources are available for rehabilitation and closure.
- The following stripping and stockpiling techniques will be implemented to prevent excessive soil deterioration:
 - Topsoil material should be stripped when moist/friable condition. Material should not be stripped when it is either dry (dusty) or too wet.
 - Where possible stripped topsoil should be direct-placed onto reshaped limestone waste and spread immediately (if mining sequences, equipment scheduling and weather conditions permit).

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

- As a general rule, stockpile will be no more than 3 m in height. Stockpiled greater than 3 m may occur for short periods and with appropriate amelioration during spreading and revegetation process.
- Prior to re-spreading stockpiled soil onto reshaped limestone waste, it will be inspected for weeds or undesirable pasture species. Serious infestations will be treated prior to respreading with appropriate herbicide application and/or “scalping” of surface material to remove the weeds and seed bank.

Graymont commissioned SESL to undertake soil analysis for soil samples taken from topsoil stockpiles (six samples) and from “scalps” (two samples) (SESL 2021). Scalps are a clayey material from the screen on the primary crusher and represent weathered soil forming material that if suitable could be used as part of the rehabilitation process either as a subsoil material or, in the event of a topsoil shortage, as a topsoil alternative subject to appropriate amelioration. The results from SESL have been further reviewed by ELA’s Certified Professional Soil Scientist for this PRCP in line the rehabilitation and revegetation strategy.

The results of analysis of the stockpiled topsoil are presented in Table 22. The results indicate that the available soil resources:

- Are slightly acidic to slightly alkaline (based on pH in CaCl_2) and not limiting to the nominated PMLU
- Have low to slight salinity but very low soluble chloride content which is not limiting to the nominated PMLU
- Have moderate to high cation exchange capacity (nutrient retention capacity)
- Are non-sodic and not at risk of soil dispersion and tunnel erosion
- Generally have good quantities of readily available N
- Are generally low in available phosphorus, potassium and sulfur. Although the available phosphorus levels may be adequate for native species, for productive pasture establishment inclusive of legumes and additional phosphatic fertiliser application would be beneficial. All soils will require some amelioration as part of soil preparation works (Section 3.5.8).

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 22: The results of analysis of the topsoil stored in stockpiles

Analyte	Units	Stockpile 1 sample 1	Stockpile 2 sample 1	Stockpile 2 sample 2	Stockpile 3 sample 1	Stockpile 3 sample 2	Stockpile 4 sample 1	Average
pH (in CaCl ₂)	Units	6.69	7.05	6.8	7.57	7.68	6.29	7.01
Electrical Conductivity (EC 1:5 extract)	dS/m	0.12	0.24	0.21	0.18	0.15	0.14	0.17
Salinity rating	NA	Low	Slight	Slight	Low	Low	Low	-
Exchangeable calcium	cmol+/kg	14.07	19.21	15.92	25.52	27.78	6.43	18.16
Exchangeable magnesium	cmol+/kg	7.37	6.36	4.78	5.84	5.25	12.06	6.94
Exchangeable potassium	cmol+/kg	0.28	0.31	0.30	0.16	0.16	0.16	0.23
Exchangeable sodium	cmol+/kg	0.50	0.45	0.38	0.38	0.38	0.88	0.50
Effective Cation Exchange Capacity (ECEC)	cmol+/kg	22.22	26.33	21.38	31.9	33.57	19.53	25.82
Exchangeable sodium percentage (ESP)	%	2.3	1.7	1.8	1.2	1.1	4.5	2.1
Sodicity rating	NA	Non-sodic	Non-sodic	Non-sodic	Non-sodic	Non-sodic	Non-sodic	-
Chloride	mg/kg	67.1	34.7	43.7	26.5	34.3	43.9	41.7
Nitrate-N	mg N/kg	27	55	65	18	13	53	38.5
Available phosphorus (P)	mg P/kg	12.9	16.3	9.39	11.3	14.1	<5	11.50
Available iron (Fe)	mg/kg	99.6	118	80.8	77.5	60.7	76.8	85.57
Available manganese (Mn)	mg/kg	78	108	81	104	105	50	87.67
Available copper (Cu)	mg/kg	2.9	3.4	2.6	1.3	1.5	1.7	2.23
Available boron (B)	mg/kg	1	1	0.9	0.6	0.7	0.9	0.85
Available zinc (Zn)	mg/kg	<0.65	0.9	<0.65	<0.65	<0.65	<0.65	0.69

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

The results of analysis for the scalps is summarised in Table 23 The results of the analysis of “scalps”.

Table 23 The results of the analysis of “scalps”

Analyte	Units	Sample 1	Sample 2	Average
pH (in CaCl ₂)	Units	7.63	7.50	7.57
Electrical Conductivity (EC 1:5 extract)	dS/m	0.14	0.18	0.16
EC _{SE} (estimated saturate paste extract)	dS/m	1.30	1.50	1.40
Textural Class	NA	Sandy clay loam	Fine sandy clay loam	NA
Approximate clay content (low range)	%	20-30	30-35	c.30
Salinity rating	NA	Low	Low	Low
Exchangeable Calcium	cmol+/kg	190.77	96.96	143.87
Exchangeable Magnesium	cmol+/kg	2.70	3.98	3.34
Exchangeable Potassium	cmol+/kg	0.09	0.23	0.16
Exchangeable Sodium	cmol+/kg	0.13	0.13	0.13
Effective Cation Exchange Capacity (ECEC)	cmol+/kg	193.69	101.30	147.50
Exchangeable Sodium percentage (ESP)	%	0.07	0.13	0.10
Sodicity rating	NA	Non-sodic	Non-sodic	Non-sodic
Chloride	mg/kg	26.5	15.2	20.9
Nitrate-N	mg N/kg	7.5	14	10.8
Available phosphorus (P)	mg P/kg	<5	13.5	13.5
Available iron (Fe)	mg/kg	44.3	51	47.7
Available manganese (Mn)	mg/kg	47	51	49.0
Available copper (Cu)	mg/kg	3.8	3.2	3.5
Available boron (B)	mg/kg	0.1	0.4	0.3
Available zinc (Zn)	mg/kg	5.8	4.9	5.4

The scalps material is non-sodic and has a medium soil texture, slightly alkaline pH and low salinity. However, it is low in major nutrients. There is no physical or chemical limitation to this material being used as a subsoil or a soil forming material for manufacture of a topsoil substitute.

The scalps require no amelioration if they are used as a subsoil. If they are used as a topsoil substitute, they will require amelioration with 10% organic material (such as recycled organics) and an application of 200 kg/ha (20 g/m²) of monoammonium phosphate (or equivalent) and 400 (40 g/m²) of muriate of potash (potassium sulfate) to improve fertility.

3.5.3.2. Material Balance

There are four topsoil (Figure 1) stockpiles on site that have a combined volume of 9,345m³. Additionally, there is approximately 25,000 m³ of scalp product which can be used as a topsoil substitute. Based on the areas to be rehabilitated and the available topsoil resources, the

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

nominal topsoil or topsoil substitute application depth will be 150 mm. Topsoil will be required for RA2 - RA5, RA7 and RA9. The material balance for closure is provided in Table 24 below which shows a small surplus available for contingencies/repairs as required.

Table 24 Topsoil Material Balance

Location	Disturbed Area
RA2	6,900 m ²
RA3	64,400 m ²
RA4	1,200 m ²
RA5	50,400 m ²
RA7	23,500 m ²
RA9	2,000 m ²
Sub-total	148,400 m²
Application depth	0.15 m
Total topsoil required for rehabilitation	22,260 m³
Deficit of topsoil	12,915m³
Available scalps as a topsoil replacement	25,000 m³
Scalps to be used as subsoil on RA3	9,660 m³
Surplus of scalps	2,425 m³

There is sufficient scalps available to provide a subsoil layer to a depth of 150 mm on RA3.

Any surplus of scalps material at closure will be preferentially used in the rehabilitation of the remaining areas of RA3.

3.5.3.3. Capping requirements

No reactive wastes or geochemically unstable materials that require the placement of an engineered capping layer will remain on-site at Murgon at relinquishment. No engineered capping is required and therefore no capping material assessment is necessary.

3.5.4. Waste characterisation

Graymont commissioned SESL to characterise waste rock within the overburden dumps (SESL 2021). Samples were selected to be representative, accounting for areas with clear variability in material. Total element analysis was conducted using X-ray Fluorescence (XRF) methodology, and the presence of minerals was identified using X-Ray Diffraction (XRD). The dispersion percentage was also determined.

A summary of the XRD results has been provided in Table 25. None of the minerals identified are considered to pose a risk to environmental receptors as they are not acid-generating upon weathering.

Table 25. Summary of the XRD results from the waste rock dumps

Sample ID	Waste rock dump location	Minerals
SESL_N1	Northern	

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

SESL_N2	Northern	- Quartz, micaceous minerals at rarer aluminosilicates - Clay minerals including kaolinite or montmorillonite - Iron oxides
SESL_N3	Northern	
SESL_N4	Northern	
SESL_NE1	North-eastern	- Quartz, micaceous minerals at rarer aluminosilicates - Clay minerals including kaolinite or montmorillonite - Iron oxides - Calcite
SESL_NE2	North-eastern	
SESL_NE3	North-eastern	
SESL_NE4	North-eastern	
SESL_NE5	North-eastern	
SESL_NE6	North-eastern	
SESL_NE7	North-eastern	

XRF results indicate low concentrations of heavy metals, including those of primary concern. Concentrations of arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), nickel (Ni), and zinc (Zn) were negligible.

The dispersion % (proportion of clay that goes into suspension on mechanical agitation) was classified as 'slight'. A summary of sample results can be seen in Table 26.

Table 26. Dispersibility results from waste rock dump sites

Sample ID	Clay dispersion (%)	Rating
Topsoil NE dump north dispersion	7.75	Slight
Topsoil north dump dispersion	13.2	Slight
Topsoil NE dump south dispersion	7.19	Slight
Topsoil NE dump south dispersion	8.06	Slight

SESL concluded that the XRD, XRF, and dispersibility results suggest that there is minimal environmental risk of acid mine drainage or dispersion presented by the mining overburden and that the material is fit for reuse in revegetation works onsite. The results align with water quality results from the void and sediment dam (Table 6 to Table 7) receiving mine affected drainage and there is no evidence of acid pH, elevated salt or elevated metals that would indicate the potential for acid, metalliferous or saline mine drainage.

3.5.5. Cover design

No reactive wastes or geochemically unstable materials that require the placement of an engineered capping layer will remain on-site at Murgon at relinquishment. No engineered capping or cover design is required.

3.5.6. Landform design

This section relates to the landform development of the areas outside the Open Pit (Residual Void). The landform development for the Residual Void is discussed separately in Section 3.5.12.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.6.1. Existing landform

The existing landforms in the disturbance areas are broadly described below.

- The northern and eastern portion of the ML disturbance is predominantly occupied by the elevated North and North-eastern Overburden Dumps (RA1, RA2 and RA3), topsoil stockpiles (located on the overburden dumps part of the laydown area (RA5), part of the network of access tracks (RA7) and Sediment Dams A and B (RA8)
- The southern portion of the ML disturbance is level or gently included and consists of Sediment Dam D (RA8), Sediment Dam C (which will be decommissioned as the pit is developed to its full extent) (RA4), HME parking area and fuel tank (RA9), the balance of the network of access tracks (RA7) and laydown areas, stockpiles, offices/buildings and plant (RA5); some of which will be retained at closure (RA10).

3.5.6.2. Final landform design requirements

The most significant reconstructed landform remaining at Murgon will be the overburden dumps. The maximum height, area and shape of the overburden dumps have been designed with regard to the area of land available, and as far as practical, the geometry of the surrounding natural landforms. The overburden dumps abut the natural slopes and have final slopes in keeping with the surrounding landscape (Figure 26). Design has been informed by the Ground Control Management Plan - Murgon Limestone Mine (Sibelco 2016) developed by the previous operator with the input of the current external geotechnical engineering consultant Tony Meyers. To aid stability, during construction, no clays were placed in extensive layers near the base of the dump and only granular material was placed in these areas. Reject material from the processing plant (core, knibs) and clays are contained in cells within the dump rather than spread in thin layers.

Rocktest Consulting (2022) has confirmed that at the end of mine life, the overburden dumps will have met the design intent with the design parameters presented in Table 27.

Table 27 Specifications for the Northern and North-eastern Overburden Dump at end of mine life

Description	Specification	
	Northern Dump	North-eastern Dump
Trend for major axis	048°	350°
Length of major axis footing	290m	480m
Length of minor axis footing	235m	375m
Maximum height of dump	31m	40m
Bench heights	3.5 to 5m	5m
Maximum number of benches	5	8
Berm widths	7.5m	5.5m
Batter angles	12° to 18°	18°
Overall slope angles	15°	14°
Minimum concave grade on upper levels for drainage	2°	2°

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

For final closure, Rocktest Consulting (2022) have recommended the following measures be included to ensure the long-term geotechnical stability and minimise erosion and settlement. Rehabilitation of the north-eastern dump should include:

- Reducing slopes, ramps and haul roads to $<14^{\circ}$
- Grading the upper surface to achieve an overall concave shape (to prevent water draining over the crest of the dump)
- Compact the slopes and surfaces to achieve as high a density of underlying material as practical
- Place a 1 m high edge bund of durable rock 1 m behind the crests of the upper surface to control flows of water and prevent access to the surface by vehicles.

The existing ground surface of the remaining rehabilitation areas dominated by RA5, RA7 and RA9 generally conforms to the pre-existing ground level and does not require specific landform design work. These areas naturally drains to Sediment Dam D and minor earthworks will be required to direct flows away from the void.

All RAs not associated with the residual void will have final slopes consistent with EA condition Schedule F – Table 1 to support achievement of the nominated grazing PMLU.

Permanent water management structures are dealt with in Section 3.5.7.2.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.6.3. Final landform concept design

Figure 26 and Figure 27 display the concept final landform design and cross section across the site at completion of rehabilitation including a cross section through the most significant post mine landform features (residual void and the North-eastern overburden dump).

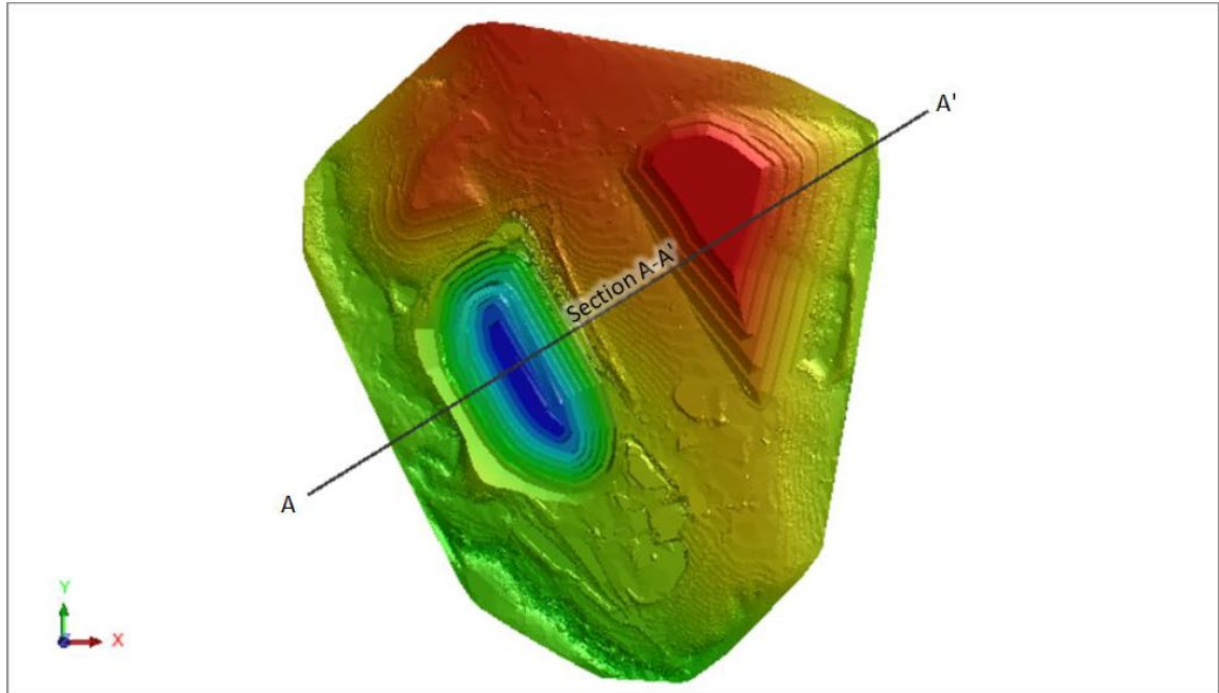


Figure 26 Final landform 3D elevation at completion of rehabilitation (Source: Graymont)

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

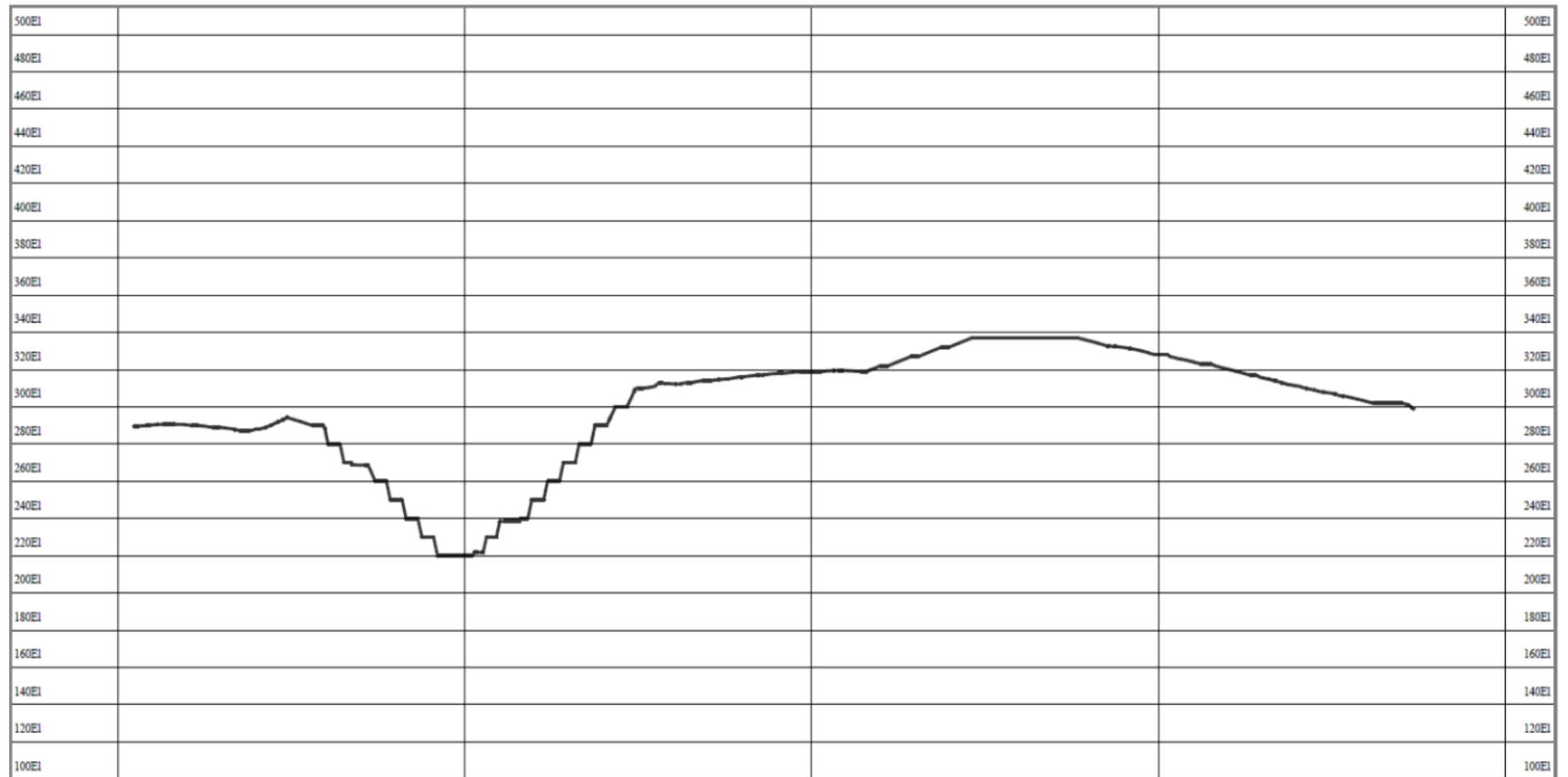


Figure 27 Final landform section view showing RL on the y axis (Source: Graymont)

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.7. Water management

The main potential source of contamination at Murgon is waste petroleum hydrocarbon (from fuel storage or workshop and minor spills). Materials characterisation and water quality monitoring to date has not revealed any significant contamination associated with ore, product or waste material at this site. Based on known and potential risks, a conceptual site model (CSM) has been developed for the site displaying the source, likely significant pathways and environmental and sensitive receptors.

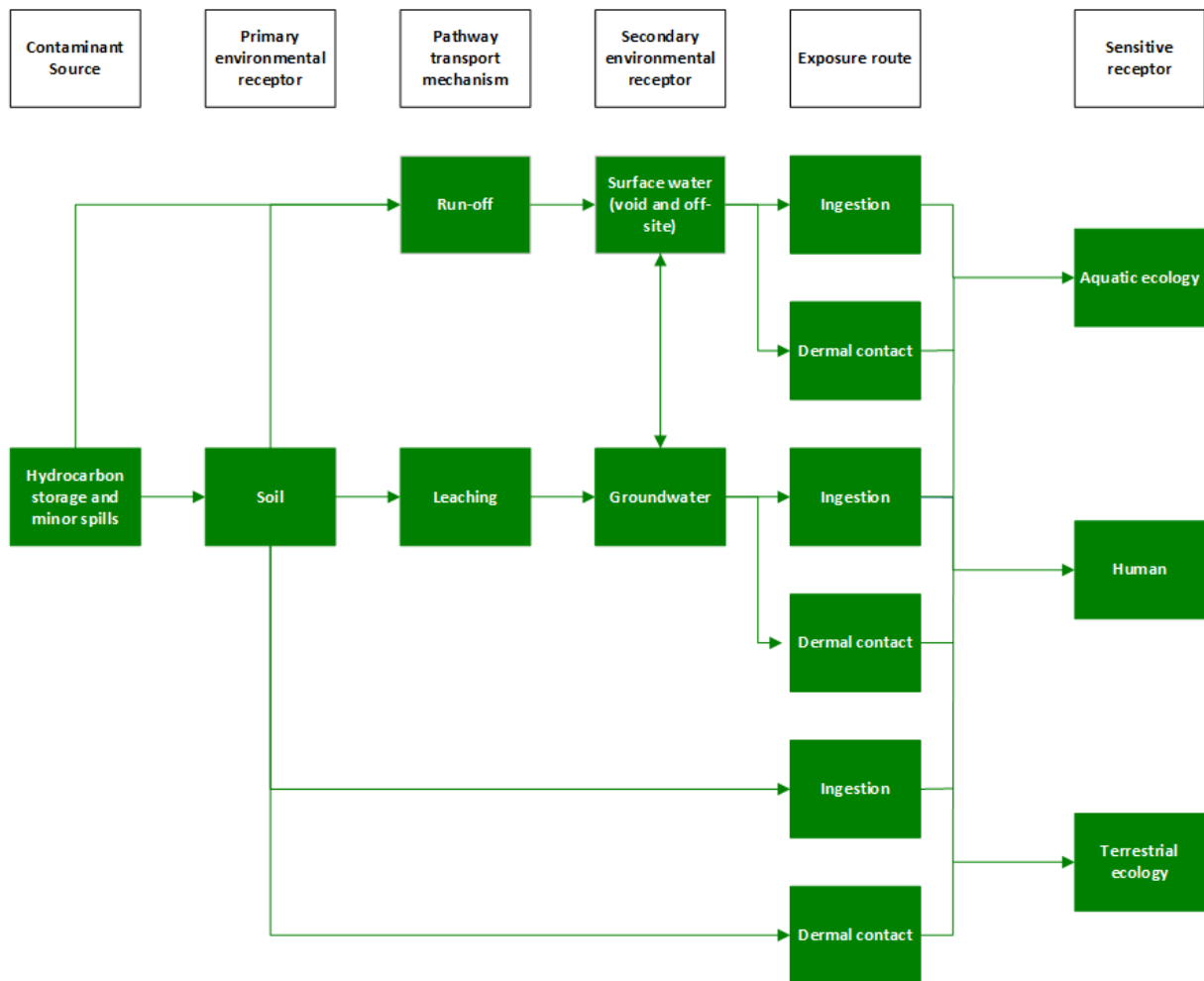


Figure 28 CMS for the Murgon Operation

3.5.7.1. Operational water management

Based on the topography of site, there are currently four catchments, being Catchment A, Catchment B, Catchment C and Catchment D. All four catchments have an associated sediment dam with the purpose to contain any drainage from operational areas associated with the catchment area. As per the EA, sediment dams A, B and D have been designed to hold a 1 in 10-year 24 hour storm ARI event. Sediment dam C does not receive direct run-off and does not need to be designed to a specific design event. It provides only temporary storage for water pumped from the void (used for process make up water etc).

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN



Figure 29 Operational sediment dams and catchments (Source: Graymont)

Table 28 Description of operational sediment dam catchments

Catchment/Sediment Dam	Description	Catchment area	Sediment Capacity	Dam
Catchment A/Sediment Dam A	Drainage area for North eastern overburden dump	156,800 m ²	10.1 ML	
Catchment B/Sediment Dam B	Drainage area for the Northern overburden dump	30,500 m ²	2.74 ML	
Catchment C/Sediment Dam C	Void (pumped to sediment dam C)	81,700 m ²	2 ML	
Catchment D/Sediment Dam D	Drainage area for the Plant offices, laydown and stockpile areas	~35,000 m ²	10.5 ML	

The site water management plan was developed by ERM (2008) for the previous owners (Unimin Australia Limited, renamed Sibelco Australia) and has been adopted by Graymont. Operational water management is described in the following sections.

OBJECTIVES

The objectives of the water management plan are to meet the conditions listed under Schedule C1.1 to C1.5 of the EA.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

TARGETS AND PERFORMANCE INDICATORS

The target is to comply with EA conditions Schedule C, specifically:

- C1-1: There must be no release of contaminants to waters except as authorised by Condition (C1-3)
- C1-3: Releases from the water management system to waters may only occur as a result of heavy or prolonged rainfall (equivalent to that expected from a 24-hour storm with an average recurrence interval of 1 in 10 years), and must comply with the limits prescribed in Schedule C Table 1
- C1-4: Releases from the water management system to waters must be monitored for the parameters and at the locations and frequencies defined in Schedule C Table 1
- C1-5: Notwithstanding the quality characteristic limits specified in Schedule C Table 1, the contaminants released must not have any properties nor contain any organisms or contaminants in concentrations that are capable of causing environmental harm.
- C2-1: All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.

The performance indicators are:

- No contaminants are released from site
- Erosion and sediment controls are in place, maintained and monitored for effectiveness.

CONTROLS MEASURES

Water management controls associated with the site are provided below:

- The extent of disturbed land is kept to a minimum area necessary for works.
- Overflow diversion bunds are installed around site to direct water to the applicable sediment dam.
- Sediment controls dams are regularly monitored and maintained as required.
- Pit water management is considered suitable with direct discharge to Sediment Dam C. Overflow water from the Northern Overburden Dump is directed to Sediment Dam B. Water from the North-eastern Overburden Dump is directed to Sediment Dam A. Water from the plant and stockpile area is directed to Sediment Dam D.
- The site drainage is designed so that clean water from undisturbed areas of the site is directed away from disturbed area catchments.
- Hydrocarbons are stored in self-bunded, above ground tanks, lubricants and waste oil are stored in a self-bunded dangerous goods storage shed. Bunding is compliant with Australian Standards (AS) 1940-2004 the storage and handling of flammable and combustible liquids.
- Spill control equipment is stocked at specific locations around the site for spill response.
- Vehicles are well maintained to avoid fuel or oil leakage.

In general, these controls have been successful in preventing contamination of site drainage and the maintenance of water quality in Barambah Creek (see Section 3.1.4.2).

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

MONITORING AND PERFORMANCE

- Event based monitoring of all on site dam water quality is undertaken to conform with EA criteria. This includes sampling for each release from the water management system and then weekly while flow continues.
- Monitoring points and requirements:
 - W1 - representative water samples must be collected within 20 m of the confluence of Barambah and Barkers Creeks, upstream of the point where runoff from areas of ML 50111 that are being used for mining activities potentially enter these watercourses.
 - W2 - representative water samples must be collected from Barambah Creek, downstream of, but within 100 m of the final discharge point for stormwater for the site to the creek.
 - WS3: (additional site not covered by the EA) main water sedimentation dam on site that captures run-off from the main area of operations (sediment dam D).
 - WS4: (additional site not covered by the EA) mine void sump (sediment dam C).

3.5.7.2. Rehabilitation and closure water management

The objective for rehabilitation and closure water management is to use Best Practice procedures to control the severity and extent of soil erosion and pollutant transport during the rehabilitation to provide long-term stability for closure.

CONTAMINANT MANAGEMENT

The rehabilitation strategy for site ensures that all known sources of potential contaminants that pose a risk to environmental values of the receiving environment will be removed. A contaminated land site investigation will be undertaken at closure and the site remediated to a safe condition. At closure, it is not expected that water stored in the void will require any additional treatment to reduce contaminants.

REHABILITATION CONSTRUCTION EROSION AND SEDIMENT CONTROL

Contractors engaged to undertake rehabilitation works will be required to provide a detailed Erosion and Sediment Control Plan to Graymont as part of contract deliverables. This document must be provided prior to ground disturbance and should include design specifications consistent with *best Practice Erosion and Sediment Control series* (IECA 2008).

Additionally, the following would be expected:

- Where possible, works will be scheduled to occur outside the main wet season.
- Work will be scheduled to minimise the extent of disturbed / exposed areas as much as possible.
- Disturbed land will be revegetated as soon as possible following earthworks.
- Temporary sediment controls to be implemented to minimise off site sediment transport including the use of sediment fencing (or equivalent) or temporary covers for any earthen material temporarily stockpiled onsite.
- Additional temporary sediment controls to be constructed where stormwater leaves the site. Based on the success of operational controls, rock filter dams would be appropriate.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

The EA provides an appropriate target for suspended solids in discharges from site. The quality of water leaving the site will be no more than 10 mg/L above a background value (at W1) where the background value is less than 100 mg/L or 10 percent greater than a background value where the background value is greater than 100 mg/L.

Any non-compliance with agreed performance criteria will be identified and corrective action undertaken as required. All temporary erosion and sediment control structures will be removed from site when vegetation is established, and the risk of erosion and sediment generation has been minimised.

PERMANENT FEATURES FOR CLOSURE

Some of the current diversion bunds used to control water flows across the site and direct water to sediment dams will be retained at closure. This is to:

- Minimise surface run-off to the void to minimise erosion and maintain void wall stability
- Provide additional protection of downstream water quality by directing surface run off from rehabilitated areas to sediment dams
- Maintain the water supply for the sediment dams (dams A, B and D) to be retained for PMLU of water storage (as covered under a Landholder Statement in Appendix G).

The diversions to be retained are shown in Figure 30.

The specifications and condition of the bunds to be retained will be assessed during rehabilitation implementation and repaired and upgraded as required in accordance with the *Best Practice Erosion and Sediment Control Series* (IECA 2008).

3.5.8. Site preparation and topsoiling

All compacted areas will be ripped to a depth of 500 mm at 500 – 800 mm spacings to relieve compaction. On overburden dump slopes, ripping will be undertaken on the contour following the spreading of scalps (subsoil) and topsoil to allow them to be keyed into the surface.

Scalps will be preferentially used to provide subsoil material for the rehabilitation of the remaining section of the North-eastern Overburden Dumps to increase the depth of the available growing medium. Based on a current material balance, there is sufficient material to allow a coverage of 150 mm. This will be placed after reshaping and prior to topsoil application. If scalps volume is higher than current at closure, this depth can be increased accordingly.

Based on the baseline soils information, topsoil for all future rehabilitated areas will be placed to a depth of 150 mm for all areas with a nominated PMLU of grazing (see further justification in Section 3.3.2.1).

No lime or gypsum is required as the soils are not acidic and are non-sodic.

The generic fertiliser rates provided by SESL were reviewed and amended to reflect a suitable initial establishment dressing for the pasture species specifically nominated in the PRCP. Based on the soil test results, soil characteristics and crop requirements, an establishment dressing for areas using stockpiled topsoil of a compound fertiliser containing N, P (low), K and S (such as Crop King 88 or equivalent) will be applied at a rate of 300 kg/ha (30 g/m²). For areas where scalps will be ameliorated to provide a topsoil substitute, they will require amelioration with 10%

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

organic material (such as recycled organics) and an application of 200 kg/ha (20 g/m²) of monoammonium phosphate and 400 (40 g/m²) of muriate of potash (potassium sulfate) to improve fertility. After incorporation of ameliorants, a seedbed will be prepared using harrows.

Fertiliser will only be applied to areas of existing revegetation (RA1) if vegetation appears to be deficient or ground cover is low.

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

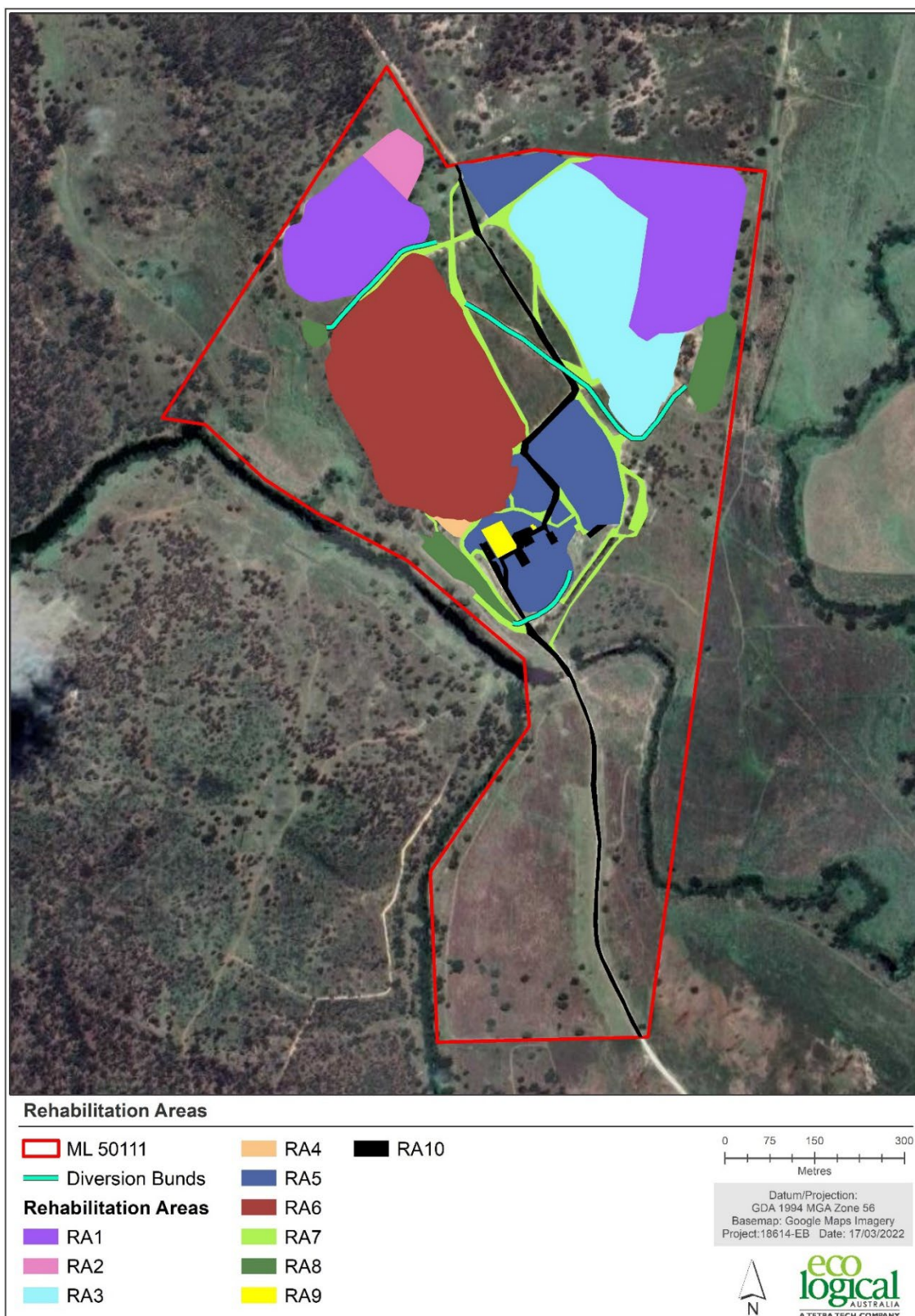


Figure 30 Location of diversions to be retained at closure

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.5.9. Revegetation

Revegetation activities on site are designed to result in the establishment of a grazing pasture consistent with the PMLU and the soil resources available for rehabilitation.

The PMLU is grazing pasture (i.e., for agricultural use). The species mix previously used on RA1 has been reviewed during the preparation of the PRCP. The results of monitoring of reference sites under existing pasture on the Murgon lease areas and existing rehabilitation areas have been considered to identify productive pasture species that are already thriving and known to tolerate site conditions. On advice of Damien O'Sullivan, an Extension Officer in Kingaroy with the Department of Agriculture and Fisheries (DAF), *Pasture Management for the Inland Burnett* (DEEDI 2009) was also referred to identify suitable pasture species for the Murgon region. Further, the species mix has been selected to remain consistent with the species list identified in the agronomist report (Grant Peterson 2020). The species mix that has been selected for pasture establishment for all areas being rehabilitation to a grazing pasture PMLU going forward:

- Black Speargrass (*Heteropogon contortus*). This native species is useful for providing erosion control for slopes up to 20°. It grows on a wide variety of well-drained soils, with surface textures ranging from loamy sand to clay loam, and uniform or texture contrast soils, as well as on very fertile clay loams. While well-adapted to low fertility, it is not tolerant of extremely low fertility, nor poor drainage or high levels of salinity. It is most abundant where the average annual rainfall is 600-1,000 mm, and where there are marked wet and dry seasons. It does tolerate short periods of inundation on otherwise well-drained soils but is not tolerant of prolonged flooding or waterlogging (Cook et al. 2020). This species is the dominant native pasture species in this landscape and present in the Murgon ML at reference sites and in the rehabilitated area (RA1).
- Forest Bluegrass (Swann Forest) (*Bothriochloa bladhii* ssp. *glabra*). Swann forest blue grass is a perennial tussock grass growing to 8- cm, generally with unbranched stems. The seed head is green to purplish that, along with the leaf, has a distinctive odour when crushed. It makes good hay if it is cut before flowering but loses quality after that point. The main flowering is last in the season. It grows well on both fertile and infertile soils but not on soils with high aluminium levels such as red acid soils. Maximum germination is reached 6 – 7 months after maturation. It is palatable, tolerates heavy grazing and survives seasonal frosting (DEEDI 2009).
- Lotononis (*Lotononis bainesii*). This perennial stoloniferous legume well established in the South Burnett (Vandersee and Kent 1983) and present within the Murgon ML. It used as for improving productivity in native pastures is a good companion legume for Black speargrass and Forest bluegrass (Cook et al. 2020). It is tolerant of heavy grazing and drought. It is suited to a wide range of soils except for heavy clays and tolerates poor fertility (Cook et al. 2020, DEEDI 2009). It is an extremely drought-hardy species, occurring in areas with rainfall as low as 350 mm/year although has mainly been used in areas with an annual rainfall of 600-900 mm (Cook et al. 2020).

Seeding rates will be 2 kg/ha for each grass species and 0.3 kg/ha for Lotononis. Lotononis seed will be pre-innucleated. Seeding will be conducted up to mid-November in time for the

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

summer rains. Fertiliser and seeding rates will be adjusted based on monitoring of the performance of revegetation works.

Germination should be visible two to six weeks after seeding (or after the first wetting rains). If it is noted that germination has failed, re-seeding will be undertaken where there is probability of follow-up wet season rain. However, long-range weather forecast should be used to determine if there will be too much rainfall as waterlogged soils should be avoided.

Due to the general lack of feral animals no fencing and protection is considered required at this time. This will be re-evaluated annually.

3.5.10. Rehabilitation implementation quality control

ITPs that include specific witness or hold point have been developed for key rehabilitation milestones at Murgon. They will ensure that records are maintained for verification of completion of critical rehabilitation milestones in Section 3.3.2. These ITPs are provided in Appendix D and cross referenced in the PRPC schedule (Appendix B).

3.5.11. Tailings storage facilities

The site does not have a Tailings Storage Facility.

3.5.12. Void

The design considerations and rehabilitation strategy for the residual void are outlined below to ensure it is safe, stable, does not cause environmental harm and can sustain the agreed PMLU (water storage).

3.5.12.1. Potential for environmental harm

The residual void does not intersect local groundwater aquifers or Barambah Creek. The quality of the surface water stored within the void does not pose a threat to the local groundwater resources and there is no indication that local water quality has been affected by seepage through the void.

WATER BALANCE AND OVERTOPPING

Rocktest Consulting (2022) specify under typical rainfall conditions, inflow to the pit is predominately from pit wall runoff, groundwater inflow and incident precipitation due to rainfall. At the EOML, inflows will no longer be pumped out of the pit and resultantly the water level within the pit will progressively increase forming a pit lake. The upper surface of the lake will stabilise at an elevation where its open water surface area is large enough such that evaporative losses from the surface and other outflows equal the combined inflows. This elevation will likely be below pre-mining groundwater levels.

SEEPAGE AND INFILTRATION

Section 3.1.5 specifies there are localised fractures (joints) exposed in the pit walls that allow small seepages and overall pit seepage is likely to be governed by flows from all the geological units surrounding the site (ERM 2008). It is therefore reasonable to assume that the fractured-rock groundwater system at Murgon (which causes minor pit seepage) is hosted by a fracture zone of limited extent, and recharged by a localised fracture network.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

As part of the groundwater hydrology assessment (ERM 2008), measurements were made to quantify the rate of seepage into the mine pit. Four flow tests were completed to obtain an estimate of the pumping rate from the pit, which gave an average and relatively consistent discharge rate of 14.4 L/s. The pump in the pit is generally turned on for two hours every two days. This results in an estimated rate of groundwater seepage into the pit and subsequent discharge to Dam C of 52 m³/day (approximately 0.6 L/s continuously). Additional monitoring of the discharge rates from the mine over an extended period suggests this is a reasonable estimate of seepage rates.

Given the relatively slow seepage into the void and lack of significant connectivity with Barambah Creek, ERM (2008) considered the potential impacts of mine pit dewatering practices were minor. As a result ERM (2008) did not recommend any water level monitoring as it was not considered necessary.

3.5.12.2. Void safety and stability

The design and construction of the void has been informed by the Ground Control Management Plan - Murgon Limestone Mine (Sibelco 2016) developed by the previous operator with the input of the current external geotechnical engineering consultant Tony Meyers (Rocktest Consulting).

A geotechnical assessment was undertaken by Rocktest Consulting (2022) for the current pit to consider safety measures, stability and rehabilitation recommendations for the design of the residual void at end of mine life (EOML). This conformed that existing design is suitable for closure with some additional battering back required for sections of the weathered or non-competent rock in the upper benches of the void (as per EA slope requirements). The geotechnical assessment including the stability analysis for the final design is provided in Appendix H.

The final engineering design specifications are provided in Table 29. The final design cross sections are in Figure 31 and a 3D concept is shown in Figure 26.

Table 29 Specifications of void at the end of mine life (Rocktest Consulting 2022)

Description	Specification
Trend of major axis	152°
Length of major axis at crest	400 m
Length of minor axis at crest	220 m
Maximum height of walls:	
North	85 m
South	71 m
East	90 m
West	74 m
Maximum height of benches	10 m
Maximum number of benches	10
Maximum width of berms	8 m
Maximum batter angles in unweathered rock	70°
Maximum batter angles in weathered rock	38°

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Maximum interramp angles	41°
Maximum overall slope angles	38°
Ramp type/ minimum width	Spiral/ 10 m
Dip direction of walls	
North (South dip)	150°
South (North dip)	310°
East (West dip)	240°
West (East dip)	060°

To achieve long-term geotechnical stability, the following has been recommended by Rocktest Consulting 2022:

- Reduce the batter angles of sections in the upper benches (above 290 mRL) to <14°. As they are in overburden and weathered rock, ripping the ground along contours, leaving it rough and cover with approximately 0.2m of rock and soil.
- Install abandonment bunds behind the full crest to restrict inadvertent access and divert water around the void. Maintain diversions up contour of the bund to control surface water run-on and erosion of the bund itself.
- Rip the initial 50 m of ramp to reduce accessibility into the void and place a 0.2 m thick cover of soil and rock on all haul roads and disturbed ground beyond the perimeter of the void.
- Install warning signs around the void informing of restricted access. Install approved fencing where required.

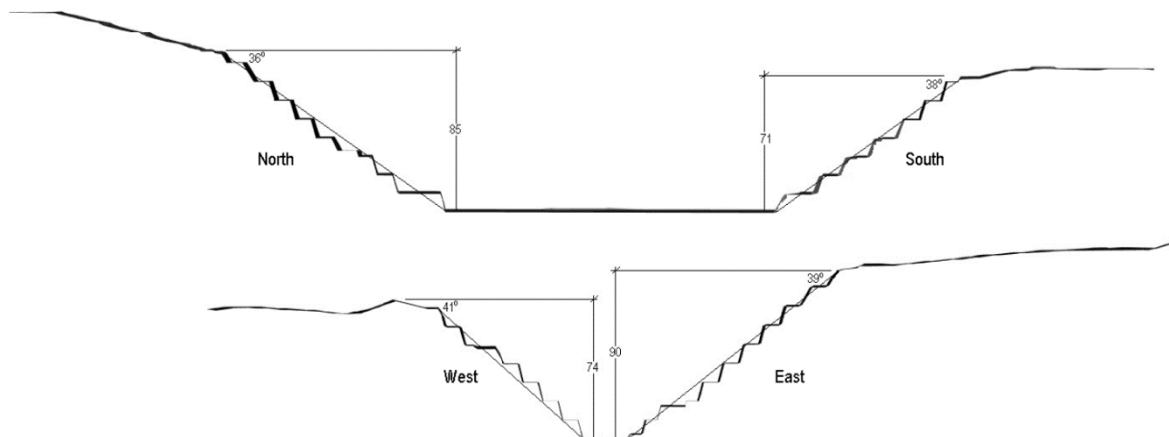


Figure 31 Cross section through void at EOML

3.5.13. Underground mining

The mine is operated by open cut mining methods. No underground workings have been developed nor are any planned for the life of mine.

3.5.14. Built infrastructure

All built infrastructure not covered under a Landholder Statement will be demolished and removed from site. The only built infrastructure which is covered under a Landholder Statement

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

is the bridge and associated access road, a few storage sheds, workshop, associated power supply and the sediment dams.

3.5.14.1. Services

All service connections (aside from electricity) will be disconnected in coordination with service providers and all associated service infrastructure (such as pipework) will be removed from site. Electricity services and infrastructure will be made safe at end of mine life, but be retained under a Landholder Statement to provide power to the remaining storage sheds.

3.5.14.2. Bores

The water licence associated with the on-site bores North and South (MUR01 and MUR02) will be surrendered and the bore decommissioned in consultation with the Queensland Department of Resources according to the preferred practices nominated in the Minimum Construction Requirements for Water Bores in Australia (National Uniform Drillers Licensing Committee 2020). The bore casing will be cut off at least 0.5 m below the surface and decommissioned by fully grouting from the bottom of the bore to the surface.

3.5.14.3. Buildings, plant, and equipment

Existing management plans and registers will be reviewed for the presence of hazardous substances on site (such as equipment containing PCB, lead paint or asbestos building materials). Where information is not available, additional surveys for hazardous materials will be undertaken at the end of mine life to identify any materials that require specialist contractors for removal and disposal. All other works will be undertaken once the site has been cleared of any hazardous materials.

Where possible, serviceable demountable buildings will be sold or provided for community use. Those that cannot be re-used along with all other general buildings, sheds and tanks used to store non-hazardous materials will be emptied, decommissioned, demolished and all waste materials removed from site. All concrete slabs and footings that are less than 0.5 m deep will be broken up and removed. Footings below 0.5 m will not interfere with rehabilitation operations or the nominated PMLU and will remain in situ.

All conveyors and gantries will be dismantled, and their associated waste removed from site.

Fuel storage tanks will be emptied and decommissioned with the remaining fuel removed by a licenced contractor. Plant and infrastructure not retained under a Landholder Statement will be decommissioned and demolished and all waste materials removed from site. All concrete slabs and footings that are less than 0.5 m deep will be broken up and removed.

Areas that may have been affected by notifiable activities (hydrocarbon storage), the workshop area or areas potentially contaminated through the operation of the plant and equipment will undergo a contaminated site investigation and a Site Investigation Report will be prepared by an appropriately qualified person. If the investigation demonstrates that on-site remediation or removal of contaminated material is required, these works will be undertaken, and validation sampling has been completed. Where the Site Investigation Report determines that contamination can safely remain in-situ (under appropriate management), a Site Management

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Plan will be prepared by an appropriately qualified person that will include a statement by the underlying landholder (Graymont (NSW) Pty Ltd) accepting responsibility to implement the Site Management Plan.

3.5.14.4. Roads, tracks, and hardstands

The aggregate used to create the economicable surfaces around the administrations, plant and stockpile areas and on unsealed (gravel) roads will be removed to 300 mm and used to enhance the natural regeneration potential of areas within the void floor.

Following the removal of surface aggregate, these areas will be reshaped to create the final landforms and surface drainage pattern as described in Section 3.5.6, before site preparation, topsoiling (Section 3.5.8) and revegetation (Section 3.5.9).

Unsealed tracks that remain within the void domain will not be stripped of aggregate during rehabilitation, but they will be ripped in preparation for revegetation.

3.5.14.5. General

Vehicle hygiene controls will be implemented to minimise the risk of weeds being transported to the site.

3.5.15. Remediation of boreholes

To ensure minimal environmental impact occurs following the exploration program, and to promote progressive site rehabilitation, all unused drill chips will be disposed of within the borehole wherever practical. The borehole will be securely capped with a clay plug (minimum thickness of one metre) between one and two metres below ground level. Above the cap the borehole will be backfilled using topsoil won during the advancement of the borehole and profiled to align with the surrounding area.

Any surplus material generated through the drilling program that cannot be disposed of within the borehole due to the anticipated 'bulking' of material when disturbed, will be co-disposed with waste rock within the operational WRD.

3.6. Risk Assessment

Potential environmental risks of not achieving a stable condition have been assessed and current and additional risk control measures identified. The residual risk after controls has been assessed according to the criteria presented in Table 30 to Table 32.

The risk assessment outcomes are presented in Table 33.

All control measures identified have been incorporated into the rehabilitation and closure planning outlined in the PRCP.

Table 30 Likelihood measures

Level	Rating	Description	Frequency
5	Almost certain	The event is expected to occur in most circumstances	More than once a year
4	Likely	The event will probably occur in most circumstances	At least once per year

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3	Possible	The event should occur at some time	At least once in 3 years
2	Unlikely	The event could occur at some time	At least once in 10 years
1	Rare	The event may only occur in exceptional circumstances	Less than once in 15 years

Table 31 Consequence measures

Rating (level)	Health	Financial Impact	Environment
Insignificant (1)	Minor injuries not requiring first aid or near miss. No psychological stress	Less than \$10,000	Contained, reversible impact managed by on site response
Minor (2)	First Aid treatment and/or one off counselling	\$10,000 to \$100,000	Contained, reversible impact managed by internal response
Moderate (3)	Medical treatment required and/or psychological intervention/treatment required	\$100,000 to \$1,000,000	Contained, reversible impact managed by external agencies
Major (4)	Serious or extensive injuries and/or significant and long term psychological stress	\$1,000,000 to \$10,000,000	Uncontained, reversible impact managed by a coordinated response from external agencies
Catastrophic (5)	Death or severe permanent physical and/or psychological disablements	Greater than \$10,000,000	Uncontained, irreversible impact

Table 32 Risk assessment matrix

Consequence Likelihood	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost certain (5)	Moderate (5)	High (10)	High (15)	Extreme (20)	Extreme (25)
Likely (4)	Low (4)	Moderate (8)	High (12)	High (16)	Extreme (20)
Possible (3)	Low (3)	Moderate (6)	Moderate (9)	High (12)	High (15)
Unlikely (2)	Low (2)	Low (4)	Moderate (6)	Moderate (8)	High (10)
Rare (1)	Low (1)	Low (2)	Low (3)	Low (4)	Moderate (5)

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Table 33 Risk assessment outcomes

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
Waste Dump 1 (North-eastern) and Waste Dump 2 (Northern)	RA1/RA2 – Northern dump RA1/RA3 – North-eastern dump Topsoil stockpiles on RA2 and RA3	Mine waste landforms provide an ongoing source of pollutants	Mine waste presents a risk to surface and groundwater resources	- Waste dumps geotechnical inspection and stability modelling undertaken by a suitably qualified expert. - Monitoring of groundwater is undertaken to confirm quality of water in respect to possible contamination. - Waste characterisation undertaken which demonstrate low concentrations of heavy metals and minimal environmental risk of acid mine drainage or dispersion presented by overburden dumps. - Additional contaminant assessment of pit water and groundwater undertaken. - Surface Water Monitoring Program has identified no impact from sediment transport off-site.	- The groundwater monitoring program will be restored, and action taken in the event of results indicating the potential for environmental harm. - Sediment Dam A and B to be tested for contaminants prior to final closure to determine management requirements (rehabilitation milestone RA8 RM2).	Rare, Minor, L2
		Waste landform stability	Mine waste landforms are not stable and will result in degradation and off-site impacts	- Waste dumps geotechnical inspection and stability modelling undertaken by a suitably qualified expert. - There is no tailings dam at site which would require a detailed landform design. - Topsoil in stockpiles to be used for rehabilitation has been assessed and results reviewed by a Certified Professional Soil Scientist for this	- Landform development and final landform slopes are consistent with the quality of the soils and the nominated PMLU. - Final maximum slope will be compliant with the EA. - Landform development criteria (including agreed slope outcomes in the EA)	Minor, Unlikely, L4

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
				PRCP. Topsoil will be sourced from the stockpiles on-site or manufactured from scalps material which has been characterised as being a suitable soil forming material. There is no need to import topsoil for rehabilitation activities. - Flood risk and geotechnical assessments undertaken to look at susceptibility of flooding for the waste dumps. If required, slope toes should be protected from inflows associated with floods from Barambah Creek. - Periodic geotechnical assessments to review instability of overburden dumps.	and water management measures provided in milestones. - Minimum ground cover required specified that is known to minimise soil erosion (rehabilitation milestones RA1 RM6, RA2 RM6 and RA3 RM6). - Erosion monitoring requirements, criteria and erosion repair provided in (rehabilitation milestones RA1 RM6, RA2 RM6 and RA3 RM6). - All areas require certification from an appropriately qualified person that it has achieved stable condition (rehabilitation milestones RA1 RM7, RA2 RM7 and RA3 RM7).	
		Flooding threatens stability of landform	The site is in a floodplain and flooding assessment determined that landforms may be affected under extreme events (Section 3.5.2)	- Flood risk assessment has been undertaken to examine the susceptibility of the site to flooding and if this needs specific geotechnical considerations assessments with respect to the overburden dumps. - Modelling to understand the depth and velocity of PMF flooding events	Outcomes from additional modelling will inform rehabilitation management requirements.	Rare, Minor, L2

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
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(including the potential failure of Bjelke-Peterson Dam). The aim of the modelling is to determine any additional measures required to provide landform design that will ensure stability in the long term.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
Fuel storage, service area, plant and offices (including HME) and Stockpiles (product)	RA5	Site contamination and impact to surrounding sensitive receptors	Contamination present poses a threat to human, animal, or ecosystem safety	- Hydrocarbons are stored in self-bunded, above ground tanks with capacity of 20,000 litres. - Lubricants and waste oil are stored in a self-bunded dangerous goods storage shed. - Bunding is compliant with Australian Standards (AS) 1940-2004 the storage and handling of flammable and combustible liquids. - Site captures and manages run-off from disturbed areas within RA5, redirecting into the applicable Sediment Collection Dam. - Monitoring of groundwater is undertaken to confirm quality of water in respect to possible contamination. - Site has orientated stockpiles in direction that reduces exposed surfaces to prevailing winds where possible. - Watering of product stockpile is undertaken to minimise dust generation. - Water quality testing for oil and grease undertaken six monthly. - Water quality monitoring has not indicated contamination of surface or groundwaters related to site activities.	- Site Investigation Report to be prepared by an appropriated qualified person. Remediation and validation sampling undertaken and/ or a Site Management Plan prepared (rehabilitation milestone RA4 RM2, RA9 RM2 and RA10 RM2). - Any residual limestone stockpiles left at closure will be returned to the void (rehabilitation milestone RA5 RM2). - Sediment dam D tested for contaminants prior to closure to determine management requirements (rehabilitation milestone RA8 RM1). - The groundwater monitoring program will be restored, and action taken in the event of results indicating the potential for environmental harm .	Unlikely, Minor, L4

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
		Mining infrastructure	Mining infrastructure poses a threat to human or animal safety	- The rehabilitation strategy is to remove all mine assets and infrastructure, unless otherwise agreed through a Landholder Statement. - Consultation with DES on 24 February 2022 confirmed process and approval from Minister for Mines will be sought upon ML relinquishment.	- Disconnect water and gas services (rehabilitation milestone RA5 RM1). - Electrical services remaining at site to be made safe. - Site bore decommissioned and rehabilitated (rehabilitation milestone RA5 RM1). - Hazardous building materials identified, managed and removed by appropriately licenced contractors (rehabilitation milestone RA5 RM1, RA10 RM1). - All infrastructure (aside from that which is covered under a Landholder Statement) to be removed from Rehabilitation Areas. - Tracks, the access bridge and retained buildings will be left in a condition that is fit for purpose and supported by a Structural Engineering Report prepared by an appropriately qualified person.	Rare, Minor, L2

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
Residual void	RA6	Landform instability in residual void walls	Void landform is not stable and will result in degradation and off-site impacts	- Geotechnical assessments have been conducted to assess the current stability and to inform the rehabilitation strategy for the residual void. - Existing drainage controls around void minimise water flowing from north-east of site. These drainage controls will be retained at closure.	- Slopes requiring stabilisation works will be reshaped according to the agreed geotechnical design and comply with slope specified in the EA (RA6 RM3). - Run off from unmined areas will be directed away from the void crest where practical, and management measures will be informed by flood modelling outcomes (see Section 3.5.7). - Abandonment bund constructed will further minimise run-off to the void. Applicable safety signage will be installed. - Annual visual monitoring of batters to demonstrate that they have remained stable (RA6 RM6).	Rare, Minor, L2
		Flooding threatens stability of landform	The site is in a floodplain and flooding assessment determined that landforms may be affected under extreme events (Section 3.5.2)	- Flood risk assessment has been undertaken to look at susceptibility of flooding in the residual void and inform geotechnical assessments. - Modelling to understand depth and velocity of PMF flooding events (including failure of Bjelke-Peterson Dam). The aim of the modelling is to	Outcomes from additional modelling will inform rehabilitation management requirements	Rare, Minor, L2

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
				determine any additional measures required to provide landform design that will ensure stability in the long term.		
		Void presence, void geochemistry and void water quality	Void presents a risk to surface and groundwater resources	- Review of historical data and literature confirm there is no connection of the void intersecting known aquifer units within the area. - Hydrological assessment confirms negligible risk to regional groundwater resources or EVs. - Previous groundwater and void water quality samples have been taken which demonstrate results achieve the required standards to support the PMLU. - Additional monitoring of contaminant conducted for the preparation of the PRCP shows no elevated TPH, BTEX, metals/metalloids and no extremes of pH or EC.	The void and groundwater monitoring program will be restored and action taken in the event of adverse results. Results to demonstrate accordance with the Australian Water Quality Guidelines for Primary Industries (RA6 RM6).	Unlikely, Minor, L4
		Void water quality unsuitable for stock watering	Inability to achieve and sustain nominated PMLU (water storage) to support grazing	Previous groundwater and void water quality samples have been taken which demonstrate results achieve the required standards to support the PMLU.	- The void and groundwater monitoring program will be restored and action taken in the event of adverse results - Groundwater chemical analysis will comply with EA requirements for PMLU (water quality to be suitable	Unlikely, Minor, L4

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
					for livestock use) (RA6 RM6).	
Silt trap/dams (to be retained)	RA8 Dam A, Dam B, Dam D	– Site contamination	Contamination present poses a threat to human, animal, or ecosystem safety	Site captures and manages run-off from disturbed areas (including waste rock and stockpiles), redirecting into the applicable Sediment Collection Dams.	- Sediment dams to be retained will be inspected prior to closure and tested for contaminants. - Sediment dams will be desilted as required and sediment placed in the void or disposed of off-site at an appropriately licensed waste facility depending on the results of contaminant testing prior to rehabilitation to determine management requirements (rehabilitation milestone RA8 RM2). - Retained water management structures will be certified by an appropriately qualified person as confirming to design standards and specifications consistent with best practice.	Rare, Minor, L2
Silt trap/dams (to be rehabilitated)	RA4 Dam C	– Site contamination	Contamination present poses a threat to human, animal or ecosystem safety.	Site captures and manages run-off from disturbed areas (including waste rock and stockpiles), redirecting into the applicable Sediment Collection Dams.	- Sediment Dam C will be decommissioned as part of the void expansion. - Sediment dam will be desilted, and sediment placed in the void or	Rare, Minor, L2

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
					disposed of off-site at an appropriately licensed waste facility depending on the results of contaminant testing. This will inform rehabilitation management requirements (rehabilitation milestone RA4 RM2). The former sediment dam will be rehabilitated to a stable condition (RA4 RM3-RM7).	
Roads and tracks	RA7	Mining infrastructure	Mining infrastructure poses a threat to human or animal safety	- The rehabilitation strategy is to remove all mine assets and infrastructure, unless otherwise agreed through a Landholder Statement. - Consultation with DES on 24 February 2022 confirmed process and approval from Minister for Mines will be sought upon ML relinquishment (Landholder agreement).	Significant built infrastructure or infrastructure associated with site access will be left fit for purpose and supported by a Structural Engineering Report prepared and certified by an appropriately qualified person (rehabilitation milestone RA7 RM8).	Rare, Insignificant, L1
Areas with grazing PMLU	RA1-RA5 and RA7 and RA9	Insufficient topsoil quantity and quality Soil compaction prevent plant growth	Inability to achieve sustain PMLU (grazing)	- There is sufficient good quality topsoil or soil-forming material for rehabilitation purposes at site (Section 3.5.8) - Topsoil stockpiles are kept no more than 3m high to maintain physical and biological quality.	Prior to re-spreading stockpiled soil onto the reshaped waste dumps, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and/or	Rare, Insignificant, L1

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
				○ Topsoil in stockpiles to be used for rehabilitation has been assessed and results reviewed by a Certified Professional Soil Scientist for this PRCP (Section 3.5.3). ○ Characterisation has been undertaken of available soil forming materials to supplement topsoil resources as needed (Section 3.5.3).	○ scalping prior to topsoil spreading. ● Applied topsoil or topsoil substitute will applied at the required depth and ameliorated as recommended in the PRCP (RM5). ● Ripping will be undertaken to specifications. Criteria requiring adherence to the nominated species mix and seeding rate is specified in the Revegetation Section of the PRCP (RM5).	
	RA1-RA5 and RA7 and RA9	Vegetation selected is not suited to site conditions	Inability to achieve and nominated (grazing)	● The seed mix chosen following ○ recommendations by Department of Agriculture and Fisheries (DAF) Extension Service (Section 3.5.9). ○ species in line with that of reference pastures in un-mined areas and provide erosion protection. ○ adaptive management following a review of the success of species used in existing rehabilitation areas and the species that are present in the un-mined reference areas.	● Monitoring will be undertaken of performance against agreed targets (RM6) ● Maintenance and contingency planning provided in Section 3.7.5.	Rare, Minor, L2

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
				- The species mix is well suited to the available soil resources and site conditions (Section 3.5.9). - Rehabilitation monitoring annually to assess success and adaptive management requirements (Section 3.7).		
		In adequate water supply/ drought	Poor pasture establishment and inability to achieve nominated PMLU (grazing)	- The seed mix chosen was following recommendations by DAF Extension Service and species are tolerant of dry conditions (Section 3.5.9). - Site water storages can be used as a water source for irrigation during periods of drought. - Contingency measures included in rehabilitation monitoring and maintenance program (Section 3.7).	No additional controls required.	Possible, Minor, M6
		Rehabilitation vegetation not suitable for grazing use	Pasture quality not suitable to achieve and sustain nominated PMLU (grazing)	- The seed mix chosen was following recommended by DAF Extension Service and species selected are widely used in the region for productive pasture. Productivity potential has been improved by the selection of a conditions (Section 3.5.9). - Contingency measures included in rehabilitation monitoring and maintenance program (Section 3.7).	- Rehabilitation reference sites for grazing pasture PMLU established in unmined pastures areas within the lease. - Vegetation composition, weed presence and monitoring requirements and vegetation maintenance requirements provided (RA5).	Rare, Insignificant, L1

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
				Refer to report specifying desirable species.		
		Flooding threatens achievement of the grazing PMLU	The site is in a floodplain and flooding assessment determined that landforms may be affected even under extreme events (Section 3.5.2)	- Flood susceptibility model undertaken for site showing that during 1% AEP flood event, it could affect the void, plant/offices and lower slopes of the North-eastern waste dump. During a PMF event, Most areas could be affected. - The species selected are tolerant of periods of inundation and rare flooding events are unlikely to affect the long-term viability of the PMLU.	- Outcomes from additional modelling will inform rehabilitation management requirements. - Undertake a site inspection after a 1 in 10 year ARI 24 hour rainfall event.	Rare, Minor, L2
	RA4,RA5, RA7 and RA9	Landform instability in domains other than the void and waste dumps	Final landforms outside the void are not stable and will result in degradation and off-site impacts	- The landform has not be significantly altered during operations and no specific landform design for closure is required. - The final landform will conform to the existing slopes EA slope requirements. - There is no evidence of land on the lease areas being prone to instability and available topsoils have a low erosivity.	- Landform development and final landform slopes are consistent with the quality of the soils and the nominated PMLU (Section 3.3.2). - Landform development criteria provided in milestones and water management measures specified. - Minimum ground cover required specified that are known to minimise soil erosion (RM6) - Erosion monitoring requirements, erosion criteria and requirements for	Rare, Minor, L2

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Closure domain	RA	Risk / Threat (Aspect)	Impact	Overview of current controls	Additional controls or actions required (and cross reference to rehabilitation milestones or location in PRCP)	Residual risk rating
					- erosion repair provided (RM6) - Adequate monitoring demonstrating no declared pest plants recorded within domain, established biomass and groundcover to meet milestone criteria within nominated timeframe (RM6). - All areas require certification from an appropriately qualified person that the area has achieved a stable condition (RM6)	
Exploration boreholes	RA4, RA5, RA6, RA7, RA8, RA9, RA10	Exploration borehole instability	Exploration boreholes not decommissioned appropriately and resulting in landform instability over time and localised subsidence	- Drilling program to be prepared by an appropriately qualified person - Drilling program to be undertaken by appropriately qualified persons only, and in accordance with the approved drilling program - Decommissioning of boreholes to be completed in line with relevant guidelines and specifications, including <i>Eligibility criteria and standard conditions for exploration and mineral development projects (DEHP 2016)</i>	All areas require certification from an appropriately qualified person that the area has achieved a stable condition (RM10)	

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.6.1. Rehabilitation trials

No rehabilitation trials are planned. The revegetation required is straightforward and does not require specific research.

Lessons learned from rehabilitation monitoring outcomes to date have been incorporated into the rehabilitation strategy outlined in the PRCP.

3.7. Monitoring and Maintenance

Section 3.3.2 contains information on the objectives and completion criteria against which the success of the rehabilitation measures will be assessed and the data required to validate completion of rehabilitation for each rehabilitation milestone nominated in Section 3.1.11.2.

The prescriptive criteria (requiring the completion of an action) will be captured in the QA/QC procedures outlined in the ITPs (Appendix D).

The following sections provide the routine monitoring requirements to determine rehabilitation progress against milestones for the achievement of agreed PMLUs to stable a condition. The data will be used to determine maintenance requirements.

All monitoring will be undertaken by appropriately qualified professionals.

3.7.1. Areas with a low intensity grazing PMLU

3.7.1.1. Vegetation monitoring

Vegetation monitoring will be undertaken by an appropriately qualified expert to gather data to support the milestone completion criteria. Monitoring will include, but may not be limited to, pasture establishment, ground cover, vegetation composition and biomass. Appropriate quality assurance checks on the data will be undertaken throughout the monitoring period.

Photographic records, taken at the same photographic point location, will be kept for each monitoring occasion as a permanent visual record of the development of rehabilitation.

Monitoring will be undertaken at multiple locations throughout the ML within the rehabilitated area in conjunction with reference locations in unmined areas.

3.7.1.2. Erosion, stability, and ponding

The site will be inspected for signs of active erosion and the development of rills and gullies. This can be conducted as a wandering transect with the observer meandering with full width of the rehabilitation area across the slope of RAs. The rehabilitation areas of particular interest for visual monitoring will be the overburden dumps and residual void to assess performance over the medium to long term. This will help ascertain whether the designs continue to perform to an acceptable measure (Rocktest Consulting 2022).

Active erosion will be noted as defined in the Australian Soil and Land Survey Field Handbook 3rd Edition (The National Committee on Soil and Terrain 2009). Areas of slumping or showing evidence of ponding (>10 m²) will also be identified.

Active erosion features, slumping and ponded areas will be photographed and logged with a GPS for repairs as required.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

3.7.1.3. Land management

The wandering transect used to examine erosion and stability could also be used to identify any areas of poor cover and significant declared weed infestations. These will be logged with a GPS and Graymont will follow up repairs as required.

3.7.1.4. Water management structures

Section 3.5.7 provides the recommended monitoring for water management structures.

3.7.2. Water quality

Surface water quality sampling will be undertaken according to the methods presented in the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES 2018). Samples will be collected into appropriate containers supplied by the laboratory and chilled. Holding times specified in the manual (or as advised by the receiving laboratory) will be adhered to and samples will be analysed by a NATA accredited laboratory. Appropriate duplicates and sampling blanks should be taken for assessment of reproducibility and cross-contamination control.

The following analytical suites apply

- Suite A: pH, EC, total suspended solids and major ions (Ca, Mg, K, Na, Cl, SO₄ and alkalinity)
- Suite B: Total metals (As, Cd, Cr, Cu, Ni, Pb, Zn) and PAHs.

Results will be compared to ARMCANZ & ANZECC (2000) guidelines for stock water (cattle).

Groundwater sampling will be undertaken according to the same methods and for the same suite of as above with the addition of total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene and xylene (BTEX). The data will be used to inform the contaminated land investigation to be undertaken at closure.

Results will be compared the WQOs identified in Section 3.1.5.7.

3.7.3. Monitoring schedule and frequency

Table 34 provides the proposed monitoring schedule and frequency for Murgon.

Table 34: Monitoring schedule

Indicator		When monitoring should be initiated	Preferred time of year	Frequency and duration
Photographs PMLUs)	(both	In the year after revegetation has been undertaken	Between February and May	Annually until all milestone criteria have been met on 3 consecutive occasions
Pasture groundcover and standing biomass (%)		In the year after revegetation undertaken	In the dry season (between May and November)	Annually until all milestone criteria have been met on 3 consecutive occasions
Pasture vegetation composition		In the year after revegetation undertaken	Between February and May to provide the best opportunities for grass identification	Annually until all milestone criteria have been met on 3 consecutive occasions

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Pasture dry season carrying capacity	Within at least 5 years after vegetation establishment	In the dry season (between May and November)	Once
Erosion, stability and ponding (pasture areas)	In the year after revegetation has been undertaken	Between February and May	Annually until all milestone criteria have been met on 3 consecutive occasions
Land management (pasture areas)	In the year after revegetation has been undertaken	Between February and May	Annually until all milestone criteria have been met on 3 consecutive occasions
Void vegetation composition	In the year after revegetation has been undertaken	Between February and May to provide the best opportunities for grass identification	Annually until all milestone criteria have been met on 3 consecutive occasions
Void water quality	Within 6 months of the finalisation and approval of the PRCP	Wet season and dry season	Every 6 months for suite A Every 12 months for Suite B Until all milestone criteria have been met on 3 consecutive occasions
Groundwater quality	Within 6 months of the finalisation and approval of the PRCP	Wet season and dry season	Every 6 months for suite A Every 12 months for Suite B and TPH Until the bore is decommissioned

3.7.4. Reporting

Monitoring events will be to recorded, including the results obtained and any immediate performance of land management issues identified will be documented after each event.

An annual report will be prepared after completion of each full round of annual sampling. This will contain details of the methods used, the data collected, quality assurance data. The data will be analysed against the milestone completion criteria and an assessment made of rehabilitation performance. It will also include an assessment of trends (both positive and negative). The report will provide recommendations for repairs or additional management action and any changes required to the monitoring methods or frequency. It will also include a statement regarding the achievement of each PMLU to a stable condition.

3.7.5. Maintenance and contingency measures

Monitoring may indicate that rehabilitation is not meeting the desired rehabilitation outcomes and management intervention may be required as identified in Table 35.

Table 35: Contingency measures

Issue	Maintenance treatment
Poor vegetation cover establishment	Adjust fertiliser / soil ameliorant inputs and reseed during appropriate seasonal conditions. Increase irrigation frequency if rainfall inadequate If issue persists conduct additional soil sampling and seek input from a suitably qualified professional.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Pasture species inconsistent with PMLU	Review rehabilitation strategy and planting lists. Review weed control measures or control frequency. Conduct reseed during appropriate seasonal conditions.
Erosion	Review water management controls and amend as required. Fill erosion features, provide soil surface protection and reseed during appropriate seasonal conditions.
Water quality does not meet requirements for the PMLU	Investigate quality of drainage or seepage inputs. Consider remediation or treatment options. Consider alternative PMLU.

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

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MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN



WildNet species list

Search Criteria: Species List for a Specified Point
Species: Animals
Type: Native
Queensland status: All
Records: All
Date: Since 1980
Latitude: -26.2910
Longitude: 151.9776
Distance: 3
Email: adam.garthwaite@ecoaus.com.au
Date submitted: Friday 10 Sep 2021 09:13:40
Date extracted: Friday 10 Sep 2021 09:20:01

The number of records retrieved = 164

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MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		1
animals	birds	Acanthizidae	<i>Gerygone mouki</i>	brown gerygone		C		2
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		4
animals	birds	Acanthizidae	<i>Smicrornis brevirostris</i>	weebill		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		3
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		1
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		2
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		10
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		1
animals	birds	Anatidae	<i>Anas castanea</i>	chestnut teal		C		2
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		11
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		14
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		8
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		11
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		7
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		2
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		4
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		1
animals	birds	Anatidae	<i>Spatula rhynchotis</i>	Australasian shoveler		C		3
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		14
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		8
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		4
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		1
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		4
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		3
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		7
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird		C		9
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		4
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		13
animals	birds	Artamidae	<i>Strepera graculina</i>	pied currawong		C		3
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		1
animals	birds	Cacatuidae	<i>Calyptrorhynchus funereus</i>	yellow-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		7
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		2
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		8
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		1
animals	birds	Charadriidae	<i>Elseyornis melanops</i>	black-fronted dotterel		C		2
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		8
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		6
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		8
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		2
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		1

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		7
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		2
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		2
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		1
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		3
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		13
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		4
animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		1
animals	birds	Cuculidae	<i>Eudynamis orientalis</i>	eastern koel		C		4
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		3
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		5
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		1
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		1
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		7
animals	birds	Halcyonidae	<i>Todiramphus macleayi</i>	forest kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		5
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		10
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		5
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		1
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		1
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull		C		6
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		2
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		7
animals	birds	Laridae	<i>Leucophaeus pipixcan</i>	Franklin's gull		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		4
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		3
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		5
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		2
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		9
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		5
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		15
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		1
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		4
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		4
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		7
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		7
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		5
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		2
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		14
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		5
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		1
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		4
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		1

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		4
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		8
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		12
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		11
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		11
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		12
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		7
animals	birds	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail		C		2
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		2
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		1
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		3
animals	birds	Podicipedidae	<i>Poliiocephalus poliocephalus</i>	hoary-headed grebe		C		1
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		11
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		5
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		2
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		3
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		8
animals	birds	Psittacidae	<i>Psephotus haematonotus</i>	red-rumped parrot		C		2
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		6
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		8
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		1
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		7
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		8
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		3
animals	birds	Rallidae	<i>Tribonyx ventralis</i>	black-tailed native-hen		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		8
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		12
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		4
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		4
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		5
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		3
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silvereye		C		3
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		1
animals	insects	Hesperiidae	<i>Ocybadistes walkeri</i>	green grass-dart				1
animals	insects	Lycaenidae	<i>Lampides boeticus</i>	long-tailed pea-blue				1
animals	insects	Lycaenidae	<i>Prosotas dubiosa dubiosa</i>	purple line-blue				1
animals	insects	Lycaenidae	<i>Psychonotis caelius taygetus</i>	small green-banded blue				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				1
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				1
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				1
animals	insects	Nymphalidae	<i>Junonia villida villida</i>	meadow argus				2

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Papilionidae	<i>Graphium eurypylus</i>	pale triangle				1
animals	insects	Papilionidae	<i>Papilio demoleus sthenelus</i>	chequered swallowtail				1
animals	insects	Pieridae	<i>Appias paulina ega</i>	yellow albatross				1
animals	insects	Pieridae	<i>Catopsilia pyranthe crokera</i>	white migrant				1
animals	insects	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel				1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				2
animals	insects	Pieridae	<i>Eurema smilax</i>	small grass-yellow				1
animals	mammals	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby		C		1
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Krefft's glider		C		1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		1
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	2
animals	mammals	Pteropodidae	<i>Pteropus sp.</i>			C		1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon				1
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia duboulayi</i>	crimsonspotted rainbowfish				1
animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				1
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		1
animals	reptiles	Chelidae	<i>Elseya albagula</i>	southern snapping turtle		CR	CE	1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		1
animals	reptiles	Chelidae	<i>Emydura macquarii macquarii</i>	Murray turtle		C		1/1
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle		C		1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		2

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN



**Queensland
Government**

WildNet species list

Search Criteria: Species List for a Specified Point
Species: Plants (including other non-animals such as fungi and protists)
Type: Native
Queensland status: Rare and threatened species
Records: All
Date: Since 1980
Latitude: -26.2910
Longitude: 151.9776
Distance: 2
Email: adam.garthwaite@ecaus.com.au
Date submitted: Thursday 10 Mar 2022 11:00:34
Date extracted: Thursday 10 Mar 2022 11:10:02

There were no records retrieved for your selection

Disclaimer

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The State of Queensland disclaims all responsibility for information contained in this product and all liability (including liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason. Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN



Appendix B PRCP Schedule

Provided separately as original Excel table.



MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Appendix C Supporting Land Outcome Documents (EA)

Appendix D Inspection and Test Plans

Rehabilitation Inspection and Test Plan: Product Stockpile Removal

Site: Murgon

Sheet number:

Applied to RA5

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point	or Date	Hold/Witness Point Signature
Infrastructure decommissioning and removal	All stockpiled limestone or graded limestone products remaining at end of mine life have been returned to the base of the void	unprocessed raw limestone			Hold		

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Demolition and Equipment Removal

Site: Murgon

Sheet number:

Applied to RA5-RA6 and RA8-RA10

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point or Date	Hold/Witness Point Signature
Infrastructure decommissioning and removal	All services have been disconnected except where agreement has been reached with the landholder for these to remain				Hold	
	North Bore and South Bore decommissioned according to the preferred practices nominated in the Minimum Construction Requirements for Water Bores in Australia (Queensland Government)				Hold	
	Hazardous building materials have been identified, managed and removed by appropriately licenced contractors from buildings that will be either retained or removed as part of mine closure				Witness	
	Demolish and or remove all buildings, plant equipment, tanks from site that are not to be retained under an agreement with the landholder				Witness	
	All infrastructure assets to be removed (excludes those in RA10) have been demolished and demolition waste removed to an appropriately licenced waste facility				Witness	

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

All concrete slabs and footings that are less than 0.5 m deep not associated with retained infrastructure have been broken up and removed to an appropriately licenced waste facility

Witness

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Remediation of contaminated land

Site: Murgon

Sheet number:

Applied to RA4, RA9 and the workshop in RA10

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point	or Date	Hold/Witness Point Signature
Remediation of contaminated land	Site Investigation Report prepared by a certified/appropriately qualified person for RA4, RA9 and the workshop in RA10				Hold		
	If required, remediation is carried out and validated sampling has been complete				Hold		
	If residual contamination can safely remain insitu requiring the site to be placed on a Contaminated Land Register, a Site Management Plan: - o Is prepared and certified by an appropriately qualified person - o Includes a statement by the underlying landholder accepting responsibility to implement the Site Management Plan				Hold		

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Landform development

Site: Murgon

Sheet number:

Applied to RA1-RA7, RA9

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point	or Date	Hold/Witness Point Signature
Landform development and reshaping/re-profiling	Surface aggregate (limestone) from RA5 and RA7 (laydown areas and tracks) has been removed and placed in the void.				Hold		
	All major earthworks have been completed in accordance with the final engineering and design plans including: • Max. final slope for RA4, RA5, RA7 and RA9 do not exceed 10° • Max. final slope for RA1, RA2 and RA3 does not exceed 15° • Max. slope for RA6 (residual void) sections of non-competent (weathered) rock does not exceed 38° • Max. slope for RA6 (residual void) sections of competent rock does not exceed 70° • Perimeter abandonment bund and safety signage installed around RA6 (residual void)				Hold		

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Retained water management structures have been certified by an appropriately qualified person as confirming to the design standards and specifications consistent with those in the Best Practice Erosion and Sediment Control series (IECA 2008).

Hold

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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Topsoil and scalps

Site: Murgon

Sheet number:

Applied to RA2-RA5, RA7 and RA9

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point or Date	Hold/Witness Point Signature
Topsoiling and surface preparation	Ripping completed to specifications (depth of 500 mm at 500 – 800 mm spacings).				Witness	
	An assessment of stockpiled soil quality and suitability for rehabilitation has been completed by an appropriately qualified person to confirm soil is suitable for target vegetation establishment				Hold	
	Scalps material applied to 150 mm on RA3 prior to application of topsoil				Witness	
	Topsoil or topsoil substitute placed to an average depth of 150 mm to RA2, RA3, RA4, RA5, RA7 and RA9				Witness	

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Revegetation

Site: Murgon

Sheet number:

Applied to RA2-RA5, RA7 and RA9

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point or Date	Hold/Witness Point Signature
Revegetation	Applied topsoil will be ameliorated with an establishment dressing of a compound fertiliser containing N, P (low), K and S (such as Crop King 88 or equivalent) at a rate of 300 kg/ha (30 g/m ²)				Witness	
	Applied topsoil substitute (scalps) amended with 10% organic material and an application of 200 kg/ha (20 g/m ²) of monoammonium phosphate and 400 (40 g/m ²) of muriate of potash (potassium sulfate)					
	After incorporation of fertiliser, the seedbed will be prepared will using harrows or equivalent				Witness	
	For RAs with a grazing pasture PMLU the following species and seeding rates have been applied: - o Black Speargrass (<i>Heteropogon contortus</i>) at 2kg/ha - o Forest Bluegrass (<i>Bothriochloa bladhii</i> ssp. <i>Glabra</i>) at 2kg/ha				Witness	

MURGON

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o Lotononis (*Lotononis bainsii*) at
0.3 kg/ha

MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Rehabilitation Inspection and Test Plan: Retained infrastructure

Site: Murgon

Sheet number:

Applied to RA10

Milestone	Milestone required	Criteria or action	Responsible party	Results, comment or record details	Hold witness point	or Date	Hold/Witness Point Signature
Sign off of retained infrastructure	All retained permanent infrastructure in RA 10 has been inspected by a suitably qualified person no more than 6 months prior to rehabilitation certification and found to be structurally sound, safe and fit for its intended use.				Hold		

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Appendix E PRCP spatial data (supplied separately)

SPATIAL DATA

A separate file is submitted with PRCP containing the required content of spatial information (shapefiles) for the submission of a PRC plan.

The following information is provided:

- Location and maximum extent of disturbance footprint for the mine life
- PMLU for the area within the resource tenure(s) (note there are no NUMAs)
- Rehabilitation areas within the resource tenure(s) (not there are no improvement areas)
- Floodplain
- MSES Wildlife Hab special least concern
- MSES Wildlife Hab endangered
- Regulated Veg category B
- Regulated Veg category C
- Regulated Veg category R
- GDE surface areas
- Protected areas
- 1 m buffer around bores.

File	Spatial information requirements	File name
1	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.CPG
2	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.dbf
3	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.prj
4	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.sbn
5	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.sbx
6	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.shp
7	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.shp.xml
8	PRC plan - polygon	EPML00352613_PRCP_PY_17032022.shx



MURGON

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Appendix F

Murgon Community Consultation Plan



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PROGRESSIVE REHABILITATION AND CLOSURE PLAN

Appendix G Murgon Landholder Statements

APPENDIX D AMENDED PRCP SCHEDULE



Post-mining land uses (PMLU)										
Rehabilitation area				RA1						
Relevant activities				Northern and northeastern overburden dump (rehabilitated)						
Total rehabilitation area size (ha)				8.66						
Commencement of first milestone: RM6				RM6 will commence 1 January 2023. This is a continuation of current monitoring and maintenance measures undertaken for RA1.						
PMLU				Low intensity grazing						
Date area is available	1/01/2023	10/12/2026	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	8.66	8.66								
Milestone completed by	10/12/2026	10/12/2029	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM6	8.66	8.66								
RM7		8.66								

- 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				Northern overburden dump (to be rehabilitated)						
Total rehabilitation area size (ha)				0.69						
Commencement of first milestone: RM4				RM4 will commence 1 January 2023						
PMLU				Low intensity grazing						
Date area is available	1/01/2023	10/12/2024	10/12/2027	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.69	0.69	0.69							
Milestone completed by	10/12/2024	10/12/2027	10/12/2032	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM4	0.69	0.69	0.69							
RM5	0.69	0.69	0.69							
RM6		0.69	0.69							
RM7			0.69							

- 1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
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Post-mining land uses (PMLU)										
Rehabilitation area				RA3						
Relevant activities				Northeastern overburden dump (to be rehabilitated)						
Total rehabilitation area size (ha)				6.4						
Commencement of first milestone: RM3				RM3 will commence 1 January 2023						
PMLU				Low intensity grazing						
Date area is available	1/01/2031	10/12/2032	10/12/2034	10/12/2036	10/12/2037	10/12/2038	10/12/2039	10/12/2040	10/12/2044	10/12/xxxx
Cumulative area available (ha)	1.8	3.6	5.4	6.4	6.4	6.4	6.4	6.4	6.4	
Milestone completed by	10/12/2032	10/12/2034	10/12/2036	10/12/2037	10/12/2038	10/12/2039	10/12/2040	10/12/2044	10/12/2047	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM3	1.8	3.6	5.4	6.4	6.4	6.4	6.4	6.4	6.4	
RM4			2.54	3.81	5.08	6.4	6.4	6.4	6.4	
RM5			2.54	3.81	5.08	6.4	6.4	6.4	6.4	
RM6				1.27	2.54	3.81	5.08	6.4	6.4	
RM7									6.4	

- 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				RA4						
Relevant activities				Former Sediment Dam C						
Total rehabilitation area size (ha)				0.12						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Low intensity grazing						
Date area is available	1/06/2026	1/01/2040	10/12/2041	10/12/2047	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.12	0.12	0.12	0.12						
Milestone completed by	31/12/2026	10/12/2041	10/12/2047	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.12	0.12	0.12	0.12						
RM1		0.12	0.12	0.12						
RM2		0.12	0.12	0.12						
RM3		0.12	0.12	0.12						
RM4		0.12	0.12	0.12						
RM5		0.12	0.12	0.12						
RM6			0.12	0.12						
RM7				0.12						

- 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.
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Post-mining land uses (PMLU)										
Rehabilitation area				RA5						
Relevant activities				Plant, buildings, silos/bins, misc. scrap, laydown areas, small tanks, product stockpiles, exploration drilling area						
Total rehabilitation area size (ha)				5.04						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Low intensity grazing						
Date area is available	1/06/2026	1/01/2037	10/12/2037	10/12/2040	10/12/2042	10/12/2044	10/12/2047	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	1.78	5.05	5.05	5.05	5.05	5.05	5.05			
Milestone completed by	31/12/2026	10/12/2037	10/12/2040	10/12/2042	10/12/2044	10/12/2047	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	1.78	1.78	1.78	1.78	1.78	1.78	1.78			
RM1		5.04	5.04	5.04	5.04	5.04	5.04			
RM2			5.04	5.04	5.04	5.04	5.04			
RM3				5.04	5.04	5.04	5.04			
RM4					5.04	5.04	5.04			
RM5					5.04	5.04	5.04			
RM6						5.04	5.04			
RM7							5.04			

- 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				RA6						
Relevant activities				Residual void						
Total rehabilitation area size (ha)				9.73						
Commencement of first milestone: RM10				RM10 to commence 1 June 2026 with the rehabilitation of exploration boreholes. Rehabilitation of the main void will commence 1 January 2039 with RM1, and RM3 (reshaping) to occur on 0.55 ha of the highwall						
PMLU				Water storage						
Date area is available	1/06/2026	1/01/2039	10/12/2039	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.26	9.73	9.73							
Milestone completed by	31/12/2026	10/12/2039	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.26	0.26	0.26							
RM1		9.73	9.73							
RM3		0.55	9.73							
RM8			9.73							

- 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				RA7						
Relevant activities				Roads						
Total rehabilitation area size (ha)				2.35						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Low intensity grazing						
Date area is available	1/06/2026	1/01/2041	10/12/2042	10/12/2047	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.33	2.35	2.35	2.35						
Milestone completed by	31/12/2026	10/12/2042	10/12/2047	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.33	0.33	0.33	0.33						
RM3		2.35	2.35	2.35						
RM4		2.35	2.35	2.35						
RM5		2.35	2.35	2.35						
RM6			2.35	2.35						
RM7				2.35						

- 1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
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Post-mining land uses (PMLU)										
Rehabilitation area				RA8						
Relevant activities				Sediment dam A, Sediment Dam B, Sediment Dam D (to be retained)						
Total rehabilitation area size (ha)				1.57						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Water storage						
Date area is available	1/06/2026	1/01/2040	10/12/2040	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.06	1.57	1.57							
Milestone completed by	31/12/2026	10/12/2040	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.06	0.06	0.06							
RM1		1.57	1.57							
RM2		1.57	1.57							
RM8			1.57							

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Post-mining land uses (PMLU)										
Rehabilitation area				RA9						
Relevant activities				Fuel storage, HME parking area						
Total rehabilitation area size (ha)				0.2						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Low intensity grazing						
Date area is available	1/06/2026	1/01/2040	10/12/2043	10/12/2047	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.2	0.2	0.2	0.2						
Milestone completed by	31/12/2026	10/12/2043	10/12/2047	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.2	0.2	0.2	0.2						
RM1		0.2	0.2	0.2						
RM2		0.2	0.2	0.2						
RM3		0.2	0.2	0.2						
RM4		0.2	0.2	0.2						
RM5		0.2	0.2	0.2						
RM6			0.2	0.2						
RM7				0.2						

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Post-mining land uses (PMLU)										
Rehabilitation area				RA10						
Relevant activities				Workshop, office, sheds, roads and bridge (to be retained)						
Total rehabilitation area size (ha)				1.61						
Commencement of first milestone: RM10				RM10 will commence 1 June 2026						
PMLU				Retained infrastructure						
Date area is available	1/06/2026	1/01/2049	1/01/2049	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	0.46	1.61	1.61							
Milestone completed by	31/12/2026	1/01/2049	10/12/2050	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
RM10	0.46	0.46	0.46							
RM2		1.61	1.61							
RM9			1.61							
RM										
RM										
RM										

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Non-use management area (NUMA)										
Improvement area				IA1						
Relevant activities										
Total size (ha)										
Commencement of first milestone: <insert milestone reference>										
NUMA										
Date area is available	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)										
Milestone completed by	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	Cumulative area achieved (ha)									
MM										
MM										
MM										
MM										
MM										

- 1) Insert new columns to the yellow table to include further management milestone dates.
- 2) Insert new columns to the blue table 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).

Milestone reference	Rehabilitation milestone	Milestone criteria
RM1	Infrastructure decomissioning and removal	1. a) All services disconnected in coordination with service providers and all associated service infrastructure removed from site. 1. b) All hazardous building materials removed by appropriately licensed contractors. 1. c) All infrastructure (buildings, sheds, fixed assets) demolished, and demolition waste removed from site for recycling or disposal at an appropriately licensed facility, unless otherwise agreed for retention by all stakeholders (RM9). 1. d) All limestone feed stock not used for surface water management structures will be removed from stockpiles in RA1 and placed in the void. 1. f) All bitumen in RA8 removed and disposed of at an appropriately licensed facility. 1. g) Sediment dam (RA4) water quality is analysed for total metals/metalloids (As, Cd, Cr, Cu, Ni, Pb, Se, Zn) and hydrocarbons as per suite B (as documented in Section 3.7.2 of the Murgon Operations Progressive Rehabilitation and Closure Plan) prior to dewatering. Results must comply with ARMCANZ & ANZECC (2000) guidelines for stock water (cattle) prior to dewatering. 1. h) Sediment dam (RA4) dewatered into the residual void (RA6)
RM2	Contaminated land assessment and remediation	2. a) Contaminated land investigation for all areas that are identified as containing a source of contamination undertaken by an AQP¹. 2. b) All contaminated material is to be removed from the site unless onsite remediation is being undertaken. 2. c) Contaminated material removed from site has been removed in accordance with relevant regulations. 2. d) A contaminated land investigation document has been prepared by an AQP, containing a site suitability statement confirming that land is not contaminated and is suitable for the proposed PMLU
RM3	Landform development	3. a) An AQP¹ has confirmed that geotechnical stability of the residual void walls (i.e. a factor of safety value of ≥ 1.3) has been achieved 3. b) Surface aggregate from RA5 and RA7 removed to a depth of 300 mm and placed in the floor of the residual void (RA6). 3. c) All temporary and permanent Erosion and Sediment Control Structures have been designed and installed with reference to Best Practice Erosion & Sediment Control series (IECA 2008 or the most recent version). 3. d) Average slope of areas to be revegetated does not exceed 15% (RA1 – RA3). 3. e) Average slope of areas to be revegetated does not exceed 10% (RA4, RA5, RA7, RA9). 3. f) Unsealed tracks (RA7) graded to conform to the surrounding landform. 3. g) Sediment dam bund pushed onto dam and levelled (RA4) and the final (consolidated) landform surface will be water shedding. 3. h) All bores decommissioned in accordance with the Minimum Construction Requirements for Water Bores in Australia (National Uniform Drillers Licensing Committee 2020) or most recent version.
RM4	Surface preparation	4. a) All areas to be revegetated ripped to a depth of 500 mm at 500-800 mm spacings (RA1 - RA5 , RA7, RA9). 4. b) Haul roads/access tracks within the residual void (RA6) ripped to a depth of 500 mm at 500-800 mm spacings. The exposed void floor (RA6) has been scarified. 4. c) Prior to application, stockpiled topsoil or imported topsoil has been assessed by an AQP1 to confirm it is suitable for target vegetation establishment. All sources and volumes of imported topsoil will be documented and locations where imported topsoil is used onsite recorded for reporting requirements. Source locations will exclude areas known to contain declared weeds (defined as a Category 2, 3, 4 or 5 restricted matter under the Biosecurity Act 2014). 4. d) Topsoil placed to an average depth of 150 mm (RA1 - RA5, RA7, RA9). 4. e) Onsite and imported topsoils quality will be assessed by an AQP¹ and fertiliser / ameliorants applied at recommended rates prior to seeding for RA1 - RA5, RA7, RA9. 4. f) Active³ soil erosion and development of rills and gullies is repaired prior to seeding.
RM5	Revegetation	5. a) Seeding with Black Spear Grass (<i>Heteropogon contortus</i>) and Forest Bluegrass (<i>Bothriochloa bladhii</i> ssp. <i>glabra</i>) at a rate of 2 kg/ha each, and Lotonis (<i>Lotononis bainsii</i>) at 0.3 kg/ha, has been completed (RA1-RA5, RA7, RA9). 5. b) Pasture species germination and establishment have been assessed within 2 months of seeding. If any of the maintenance treatment triggers identified in Section 3.7.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan have occurred, the maintenance treatments nominated in Section 3.7.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan have been applied as required.
RM6	Achievement of surface requirements (grazing)	6. a) The rehabilitation monitoring program has been implemented in accordance with section 3.7 of the Murgon Operations Progressive Rehabilitation and Closure Plan . 6. b) Bare ground % is equivalent to at least a "fair condition as defined by Future Beef (https://futurebeef.com.au/resources/land-condition/). 6. c) Native or introduced desirable palatable and productive species trending towards at least 50% of the vegetative ground cover. 6. d) Pasture standing biomass is >45% and trending towards 75% of average standing biomass of reference areas selected according to Section 3.7.1.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan. 6. e) The cover of declared plant pest species will be no more than one rating² greater than the average cover class recorded in reference areas selected according to Section 3.7.1.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan. 6. f) No active³ gullies >1.0 m depth. 6. g) Any gullies <1.0 m >0.3m to have shown progressive stabilisation (i.e., have become partly stabilised or stabilised)⁴ over successive annual monitoring events. 6. h) Temporary Erosion and Sediment Control Structures removed
RM7	Achievement of post-mining land use to stable condition (grazing)	7. a) An assessment of carrying capacity by an AQP¹ demonstrates a sustainable grazing outcome has been achieved. 7. b) No active³ gullies >0.3 m depth. 7. c) Bareground % is equivalent to at least a "fair" condition as defined by Future Beef (Land condition - https://futurebeef.com.au/resources/land-condition/). 7. d) Native or introduced desirable palatable and productive species trending towards at least 50% of the vegetative ground cover. 7. e) Pasture standing biomass is ≥75% of reference areas selected according to Section 3.7.1.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan. 7. f) The cover of declared plant pest species will be no more than one rating² greater than the average cover class recorded in reference areas selected according to Section 3.7.1.5 of the Murgon Operations Progressive Rehabilitation and Closure Plan. RM8 Achievement of post-mining land use to
RM8	Achievement of post-mining land use to stable condition (water storage)	8. a) An AQP¹ has confirmed that geotechnical stability of the residual void walls (i.e. a factor of safety value of ≥ 1.3) has been achieved. 8. b) Access to the residual void is restrcted by the installation of an appropriate abandonment barrier (bund and/or fence) located at least 10 m beyond the area potentially affected by void wall instability as specified in Section 3.5.12.3 of the Murgon Operations Progressive Rehabilitation and Closure Plan. 8. c) Safety signage designed in accordance with relevant Australian Standards erected at a minimum of 100 m intervals. 8. d) An AQP¹ confirms that the residual void walls drain internally to the residual void. 8. e) RA6 and RA8 water quality physico chemical indicators do not exceed the trigger values for livestock (beef cattle) drinking water defined in Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 3 Primary Industries – Rationale and Background Information Sections 9.3.4 & 9.3.5 (ANZECC and ARMCANZ 2000) (RA6, RA8).
RM9	Retained infrastructure	9. a) Infrastructure to be retained has been signed off by an AQP¹ as being safe, stable and non-polluting 9. b) A formal agreement is in place for transfer of liability associated with retained infrastructure.
RM10	Decommissioning of exploration boreholes	10. a) Disposal of all unused drill chips within the borehole to a depth of 2 m below ground level 10. b) Installation of a clay cap in between 1 and 2 m below ground level 10. c) Backfill of the borehole with soil representative of the surrounding soil 10. d) An AQP¹ confirms the exploration boreholes are decommissioned in accordance with this plan

1. AQP (appropriately qualified person) means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.
2. Where Ratings are defined in the State Rural Leasehold Land Strategy: Guidelines for determining land condition prepared by the Department of Natural Resources and Mines (DNRM). Version 3.0 July 2013.
3. Active as defined in the Australian Soil and Land Survey Field Handbook (3rd Edition), The National Committee on Soil and Terrain published by CSIRO Publishing 2009.
4. Partly stabilised and stabilised as defined in the Australian Soil and Land Survey Field Handbook (3rd Edition), The National Committee on Soil and Terrain published by CSIRO Publishing 2009.

1) Insert new rows below the table to record more Rehabilitation Area Milestones for the project

2) Ensure all Rehabilitation Milestones recorded in this table align with those included in the RA sheets in this form.

3) See the PRCP guideline before developing site-specific Rehabilitation Area Milestones

Milestone reference	Management milestone	Milestone criteria
MM1		
MM2		
MM3		
MM4		
MM5		
MM6		
MM7		
MM8		
MM9		
MM10		

- 1) Insert new rows below the table to record more Improvement Area Milestones for the project
- 2) Ensure all Management Milestones recorded in this table align with those included in the IA sheets in this form.
- 3) See the PRCP guideline before developing site-specific Improvement Area Milestones



A Montrose Environmental Company

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