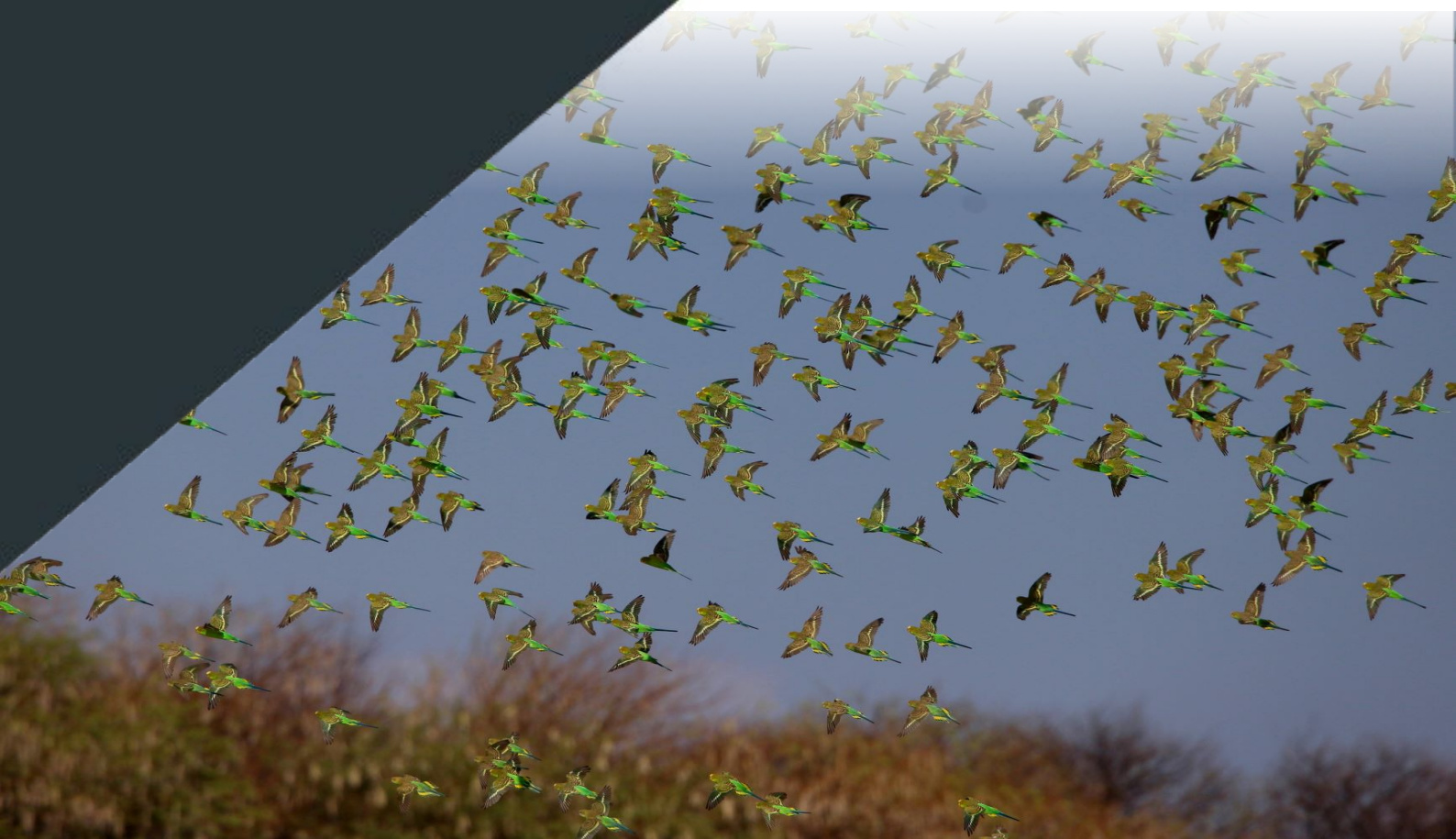




**RICHMOND VANADIUM
TECHNOLOGY PTY LTD**

INITIAL ADVICE STATEMENT





RICHMOND VANADIUM TECHNOLOGY PTY LTD INITIAL ADVICE STATEMENT

9 NOVEMBER 2021

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CONTENTS

1	INTRODUCTION	1
1.1	BACKGROUND	1
1.1.1	Reasons for Seeking Coordinated Project Declaration	2
1.2	PURPOSE AND SCOPE OF IAS	5
2	PROPONENT	6
2.1	RELEVANT PROJECT EXPERIENCE	6
2.2	PRINCIPAL CONSULTANTS	6
2.3	ENVIRONMENTAL RECORD OF THE PROPONENT	6
2.4	CAPABILITY TO COMPLETE EIS	6
3	NATURE OF PROPOSAL	8
3.1	SCOPE OF PROJECT	8
3.1.1	Overview of Key Infrastructure	11
3.2	LAND USE	15
3.2.1	Existing Land Use	15
3.2.2	Intended Land Use (On-lease)	15
3.2.3	Intended Land Use (Off-lease)	15
3.3	PROJECT NEED, JUSTIFICATION AND ALTERNATIVES CONSIDERED	17
3.4	COMPONENTS, DEVELOPMENTS, ACTIVITIES AND INFRASTRUCTURE THAT CONSTITUTE THE PROJECT TO BE DECLARED COORDINATED	18
3.5	EXTERNAL INFRASTRUCTURE REQUIREMENTS	19
3.6	TIMEFRAMES FOR THE PROJECT	19
3.7	CONSTRUCTION AND OPERATIONAL PROCESSES	19
3.8	WORKFORCE REQUIREMENTS DURING CONSTRUCTION AND OPERATION	20
3.9	ECONOMIC INDICATORS	20
3.10	FINANCING REQUIREMENTS AND IMPLICATIONS	21
3.10.1	Costs and Benefits Summary	21
3.10.2	Local, State and National Economies	21
3.10.3	Natural and Social Environments	22
4	APPROVALS REQUIRED FOR THE PROJECT	23
4.1.1	Commonwealth Approvals	23
5	LOCATION OF KEY PROJECT ELEMENTS	27
5.1	LOCATION	27
5.1.1	Regional Context	27
5.1.2	Local Context	27
6	ENVIRONMENTAL CONSIDERATIONS	28
6.1	LAND USE AND BUILT ENVIRONMENT	28
6.1.1	Description of Existing Environment	28
6.1.2	Potential Impacts to Existing Land Use and Built Environment	34
6.1.3	Management and Mitigation Measures	36
6.2	TERRESTRIAL AND AQUATIC ECOLOGY	38

6.2.1	Existing Environment	38
6.2.2	Potential Impacts to Ecology	46
6.2.3	Management and Mitigation Measures	47
6.3	WATER	47
6.3.1	Existing Environment	47
6.3.2	Potential Impacts to Water	54
6.3.3	Management and Mitigation Measures	54
6.4	AIR, NOISE AND VIBRATION	56
6.4.1	Existing Environment	56
6.4.2	Potential Impacts to Air, Noise and Vibration	56
6.4.3	Management and Mitigation Measures	58
6.5	TRAFFIC AND TRANSPORT	59
6.5.1	Existing Environment	59
6.5.2	Potential Impacts to Traffic and Transport	61
6.5.3	Management and Mitigation Measures	62
6.6	SOCIAL AND ECONOMIC	62
6.6.1	Existing Environment	62
6.6.2	Potential Project Impacts	66
6.6.3	Management and Mitigation Measures	67
6.7	CULTURAL HERITAGE	68
6.7.1	Existing Environment	68
6.7.2	Potential Project Impacts	68
6.7.3	Management and Mitigation Measures	68
6.8	HAZARD AND RISK AND HEALTH AND SAFETY	69
6.8.1	Existing Environment	69
6.8.2	Potential Project Impacts	69
6.8.3	Management and Mitigation Measures	70
7	REFERENCES	71
8	GLOSSARY, ACRONYMS AND ABBREVIATIONS	73
	LIMITATIONS AND DISCLAIMER	75

LIST OF FIGURES

Figure 1: Regional Location	4
Figure 2: Project Layout	10
Figure 3: Topography	29
Figure 4: Land Use and Tenure	30
Figure 5: Queensland Agricultural Land Classes	33
Figure 6: Field Verified Regional Ecosystems	40
Figure 7: Queensland Watercourses and Wetland Mapping	50
Figure 8: Queensland Floodplain Assessment Overlay	51
Figure 9: Registered Groundwater Bores and GDEs	53
Figure 10: Existing Transport Network	60

LIST OF TABLES

Table 1: Key Infrastructure Disturbance Footprints	1
Table 2: Proponent Details	6
Table 3: Principal Consultants	6
Table 4: Key Project Infrastructure and Disturbance Footprint	8
Table 5: Approximate Project Timeframes	19
Table 6: Likely Approvals for the Project (State and Local)	25
Table 7: Landholdings Associated with the Project	28
Table 8: Soil Types	31
Table 9: Queensland Agricultural Land Classes (the Project tenure)	32
Table 10: Verified RE Areas Calculated within Study area	38
Table 11: Likelihood of Occurrence of Conservation Significant Plant Species for the Project	41
Table 12: Conservation Significant Fauna Species Likelihood of Occurrence	43
Table 13: Pest Species Identified During Field Survey	44
Table 14: Native Ray-finned Fishes of Richmond Shire LGA	46
Table 15: Watercourses Intersecting the Project Tenure (EPM)	48
Table 16: Richmond Community Services and Facilities	63

LIST OF APPENDICES

Appendix A – EPBC Protected Matters Report
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EXECUTIVE SUMMARY

This Initial Advice Statement (IAS) has been prepared in accordance with Part 4, Subdivision 2, section 27AB of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) for the Richmond – Julia Creek Vanadium Project (the Project).

The Project comprises an open-cut, free-dig mining operation located within an indicative Mining Lease Application area (the indicative MLA area) a 6,401 hectare (ha) area within Exploration Permit for Minerals (EPM) tenement 25164 (the Project tenure) proposed by Richmond Vanadium Technology Pty Ltd (the Proponent).

Key infrastructure that will form the Project and approximate (preliminary) disturbance footprints are detailed in **Table 1**.

Table 1: Key Infrastructure Disturbance Footprints

Project Component	Approximate Disturbance Footprint (ha)
Mine (life of mine pit area)	2,905
mine infrastructure area (includes waste rock dump and tailings dam)	72
internal access roads	1
buffer – 50 m around perimeter of indicative MLA area	161

The Proponent considers that the Project meets the criteria for a Coordinated Project declaration, requiring an Environmental Impact Statement (EIS) under the SDPWO Act as it:

- requires local, State and Commonwealth approvals;
- requires comprehensive environmental impact assessment;
- has significant infrastructure requirements associated with water, electricity, and product transportation; and
- has potential to be of strategic significance to the region, State and Commonwealth including but not limited to social and economic benefits, employment opportunities and capital investment.

The Project is a greenfield site located approximately 45 kilometres (km) (measured from the indicative MLA area access point) northwest of the town of Richmond. It is acknowledged that the Project on EPM25164 is associated with a Greater Project area comprising the following four additional tenements spread over 1,400 square kilometres (km²):

- EPM 25163;
- EPM 25258;
- EPM 26425; and
- EPM 26426.

All five tenements are located between the towns of Julia Creek and Richmond in the North West Minerals Province of Queensland. However, Coordinated Project status is only being sought for the above-mentioned Project at this time. The Greater Project is excluded from the scope of this IAS and would be subject to a separate assessment process should it proceed.

Development of the IAS involved an initial assessment of potential key environmental issues for the Project with investigations into land use, terrestrial and aquatic ecology, water, air, noise, social, economic, cultural heritage, and hazard and risk. At this stage of the Project all environmental investigations have been undertaken at a desktop level; with the exception of terrestrial ecology.

Baseline terrestrial ecology surveys have been completed for the Project. A post wet season five day fauna survey (including trapping and observation) was undertaken from 20 to 24 March 2021 with a flora survey completed over a four day period from 7 to 10 April 2021. A spring survey for both flora and fauna was undertaken from 3 to 7 September 2021. Based on these surveys it was identified that the Project has potential to cause impacts such as introduction / spread of weed and feral animal species, vegetation clearing, direct mortality to fauna through clearing, altered fire regimes and loss of potential habitat for Julia Creek Dunnart.

Although there is no evidence of Julia Creek Dunnart in the ecology survey study area, there is suitable habitat, albeit degraded, and there are two records of the species approximately 20 km south of the Project. An assessment of the Project's potential to cause significant residual impacts to Julia Creek Dunnart has been carried out using the criteria described in the Matters of National Environmental Significance Guidelines. Under the nine-part test it is considered the Project is unlikely to cause a significant residual impact on Julia Creek Dunnart, however this will be assessed further as part of the EIS. As the Julia Creek Dunnart is listed as a Vulnerable species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a referral will be made to the Commonwealth.

Potential impacts that could arise from land use, air, noise, water, cultural heritage and hazard and risk were also assessed as part of the IAS with no major issues identified at this early stage. A Water Supply Options Investigation has been completed by OD Hydrology and Water Resources (2021). The report identifies multiple options that have potential to meet the water supply requirements of the mine, assesses each against a set of criteria relating to their suitability and feasibility for the Project, and recommends preferred options for further development. The two preferred options, based on the outcome of the investigation, were groundwater extraction and surface water harvesting. These two options will now be carried through as the preferred options for further development in the next phase of mine feasibility assessment.

With regards to social and economic impacts, it is recognised that the Project would provide economic benefits to both communities and businesses in the region through:

- direct employment and training opportunities;

- indirect employment for local / regional businesses and supply chain opportunities;
- revenue through taxes and royalties;
- employment and training opportunities during construction and operation; and
- improved population and economic stability in the region.

There are currently no major environmental constraints identified that would preclude the Project from proceeding, however approvals will need to be sought to ensure that any impacts are avoided or minimised where possible.

1 INTRODUCTION

This Initial Advice Statement (IAS) has been prepared in accordance with Part 4, Subdivision 2, section 27AB of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) for the initial stage of the Richmond – Julia Creek Vanadium Project (the Project), proposed by Richmond Vanadium Technology Pty Ltd (the Proponent).

Whilst this IAS has been prepared for the initial stage of the Project, it is acknowledged that the ‘Greater Project’ is comprised of five tenements spread over 1,400 square kilometres (km²). All tenements are located between the towns of Richmond (herein referred to as Richmond) and Julia Creek, in the North West Minerals Province (NWMP) of Queensland. This IAS only applies to the pit and Project infrastructure located within the indicative Mining Lease Application area (the indicative MLA area).

The indicative MLA area is located within Exploration Permit for Minerals (EPM) tenement 25164 (the Project tenure). Coordinated Project status is only being sought for the above-mentioned Project, the Greater Project is excluded from the scope of this IAS. The Greater Project would be subject to a separate assessment process if the Proponent were to pursue development of this in the future.

The Project is located approximately 45 kilometres (km) (measured from the indicative MLA area entrance) northwest of the town of Richmond (refer **Figure 1**). The indicative MLA is approximately 6,401 hectares (ha) in area whilst the EPM covers an area of approximately 29,834 ha and is wholly located within the Richmond Shire Local Government Area.

A number of State and Commonwealth approvals are required to support the Project. Given the complexity of the Project, its value to the State and potential economic, social, and environmental impacts, the Proponent considers the Project meets the criteria for a Coordinated Project declaration, requiring an Environmental Impact Statement (EIS) under the SDPWO Act.

1.1 BACKGROUND

The objective of the Project is to produce vanadium products for emerging vanadium redox flow batteries (VRFB) and the steel manufacturing industry in addition to producing the standard, widely traded form of vanadium, vanadium pentoxide (V₂O₅). Vanadium redox flow batteries function by using electric charge to alter the oxidation state of the electrolyte (containing vanadium pentoxide) when charging and discharging the battery.

The Project would involve the development of an open-cut vanadium mine that could produce up to 4.2 million tonnes per annum (Mtpa) Run of Mine (ROM) ore mined. The ore would then be processed onsite to produce 790,000 tonnes per annum (tpa) of V₂O₅ concentrate over an initial 20 year life of

mine (LOM). **Section 3** provides a more detailed description of the scope of the Project, activities, and infrastructure requirements.

By providing a stable supply of cleaner, lower cost vanadium, the Proponent aims to establish Australia as a core supplier of vanadium and assist grid-scale battery makers unlock the potential of VRFBs in supplying efficient and reliable renewable energy to consumers.

Richmond has been identified as serving an important role in the mining and extractive resources sector. The Project would allow the goals of the regional plan and the strategic blueprint for the NWMP to be met by facilitating continued resources sector development, diversifying the regional economy, creating employment opportunities, and working with local businesses and the community. Growth in mining for base metals in the north west has the potential to produce state-wide social and economic benefits.

1.1.1 Reasons for Seeking Coordinated Project Declaration

The Proponent considers that the Project meets the requirements for declaration as a Coordinated Project under the SDPWO Act as it:

- requires local, State and Commonwealth approvals;
- requires comprehensive environmental impact assessment;
- has significant infrastructure requirements associated with water, electricity and product transportation; and
- has potential to be of strategic significance to the region, State and Commonwealth including but not limited to social and economic benefits, employment opportunities and capital investment.

This is primarily due to the number of facilities / services that would be required to support the Project outside of the Project tenure (e.g. off-lease) inclusive of:

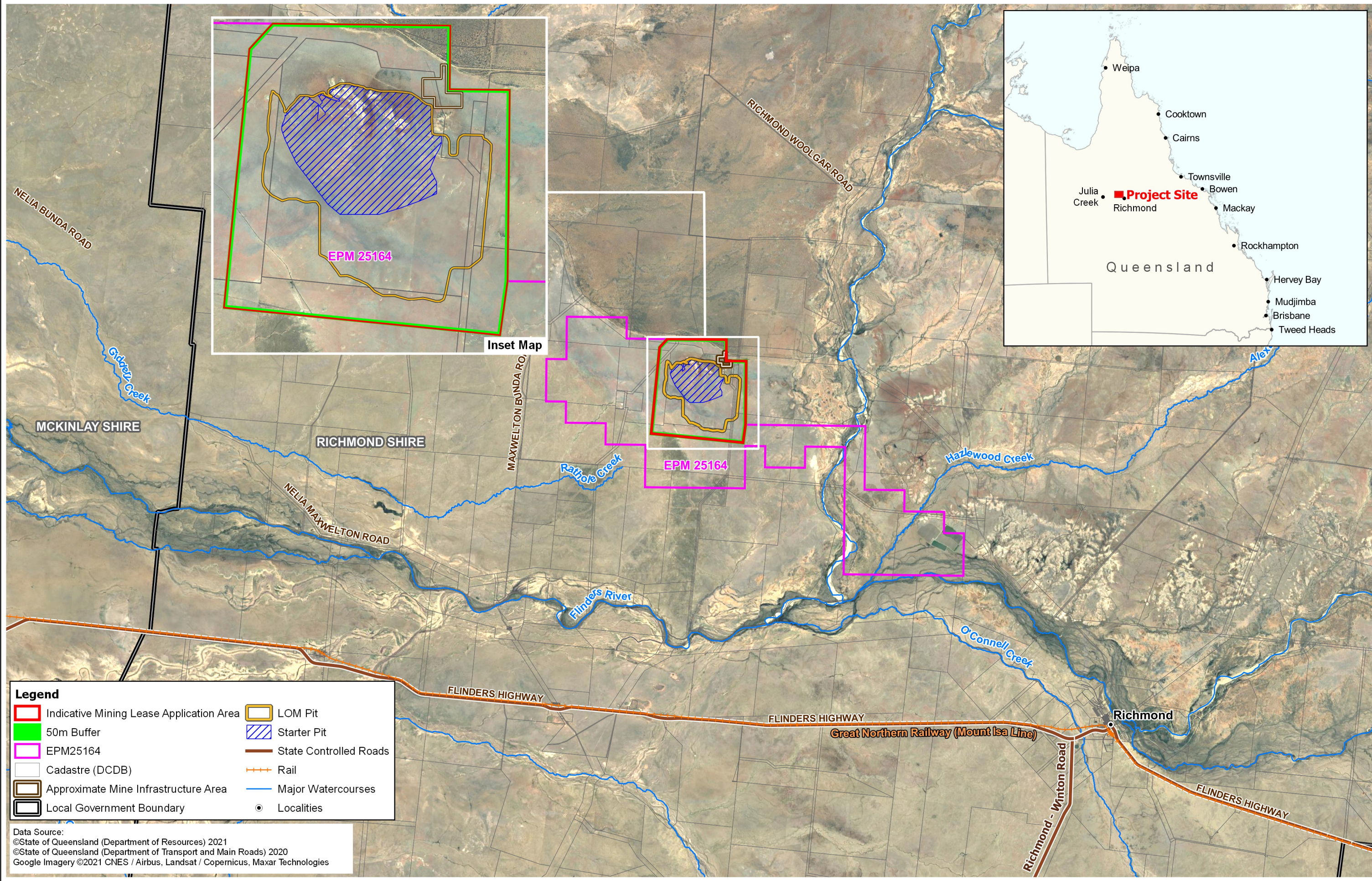
- power lines / grid network;
- road and/or rail network;
- Port of Townsville facilities (or alternative port if not suitable);
- potential water storage facility;
- accommodation village; and
- telecommunications.

Baseline environmental assessments commenced in 2021, with mine planning, engineering and infrastructure design studies also in progress. The Proponent has committed capital funding to the Project's development and is progressing investigations in support of its future assessment, including a commitment to proceed to a Bankable Feasibility Study (BFS) to firm up the various Project components.

Given the scale and characteristics of the Project, the Proponent considers that an EIS assessment process would be appropriate, thereby requiring the Terms of Reference (ToR) to define the general and specific matters that must be addressed when preparing the EIS. The benefits of this process include:

- allowing the public an opportunity to comment and provide input into the ToR;
- having an independent and transparent social, economic, and environmental assessment of the Project undertaken by the Queensland Coordinator General; and
- the opportunity for efficient assessment of EPBC Act matters in accordance with the Queensland and Commonwealth government EPBC Act assessment bilateral agreement (if required).

File Path: G:\GIS\Epic Environmental\Projects\BE2020\BE200088.01 Richmond Vanadium Technology EIS\Workspaces\IAS\Figure 1 Regional Location.qgs
©QGIS 2019



0 5 10 15 20 km
Scale: 1:300,000@ A3
Datum: GDA2020 Projection: MGA54



Richmond Vanadium Technology
Initial Advice Statement (IAS)

Figure 1
Regional Location

1.2 Purpose and Scope of IAS

This IAS has been prepared in line with the *Application Requirements for a 'Coordinated Project' Declaration* and under Part 4, Subdivision 2, section 27AB of the SDPWO Act to support an application to the Coordinator-General, with the intention of:

- assisting the Coordinator-General in deciding whether the Project should be declared a Coordinated Project;
- assisting the Coordinator-General in determining whether an EIS is appropriate;
- informing and enabling stakeholders to determine the nature and relevance of the Project; and
- assisting the Coordinator-General to prepare draft ToR for the EIS if this process is deemed appropriate for the Project.

This IAS provides an overview of the Project to the Coordinator-General, stakeholders and the public, and may also be used to inform the ToR.

2 PROPONENT

Richmond Vanadium Technology Pty Ltd (RVT) is the Proponent for the Project and intends to own and operate the Project. An overview of proponent details is provided in **Table 2**.

Table 2: Proponent Details

Details	Proponent
Entity	Richmond Vanadium Technology Pty Ltd
ABN	63 617 799 738
Contact	Dr Shuang Ren (CEO)
Address	Level 11, 251 Adelaide Terrace Perth WA 6000
Phone	(08) 6141 9500
Website	https://richmondvanadium.com.au/
Email	info@richmondvanadium.com.au

2.1 RELEVANT PROJECT EXPERIENCE

Richmond Vanadium Technology Pty Ltd is a mining company established in 2017. RVT is an innovative exploration company focused on the technological development of the world class vanadium resource prevalent in the Richmond / Julia Creek area. The Project will be RVT's first mining operation, although the shareholders and staff have significant experience in the resources sector.

2.2 PRINCIPAL CONSULTANTS

The Project's anticipated principal consultants are detailed in **Table 3**.

Table 3: Principal Consultants

Consultant	Technical Capability
Epic Environmental	Lead EIS and approvals consultant
Faultzone Consulting Pty Ltd	Pre-feasibility study, project development options
Hunan Research Institute for Nonferrous Metals	Metallurgical testwork
SKR Mining Services Pty Ltd	Mineral exploration and project development specialists
SRK Consulting Pty Ltd	Mining project evaluation
Water Resources Pty Ltd and OD Hydrology Pty Ltd	Water supply / hydrology options study

2.3 ENVIRONMENTAL RECORD OF THE PROPONENT

RVT has never been convicted of an environmental offence under Queensland or other Australian Government legislation. Further, Dr Shuang Ren has not been convicted of any offences under environmental legislation.

2.4 CAPABILITY TO COMPLETE EIS

The Proponent has the financial and technical capacity to complete an EIS and has recruited a highly experienced project team to deliver the required program of works. It is noted that financial and

technical capability statements have been provided to the Coordinator General separately as they contain commercially sensitive information.

3 NATURE OF PROPOSAL

3.1 SCOPE OF PROJECT

The Project is an open-cut, free-dig mining operation. The deposit commences from the surface and is hosted in soft marine sediments within oxidised limestone-rich clay. Initial development work would focus on the upper coquina, a soft sedimentary layer comprised of shell fragments and is expected to involve low-strip, conventional open-pit mining with a potential mine life of over 20 years at a production rate of 4.2 Mtpa ROM ore mined processed on-site (refer **Figure 2**).

The Lilyvale Mineral Resource Estimate (MRE) in accordance with Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC 2012) totals 560 Million tonnes (Mt) grading 0.48 percent V_2O_5 for 2.6 Mt V_2O_5 and 213 g/t Mo and 277 g/t Ni at a 0.30 percent V_2O_5 lower grade cut-off.

The Proponent plans to produce approximately 790,000 tpa of V_2O_5 concentrate. Potential to later refine the concentrate to a high-grade flake would produce 12,701 tpa of V_2O_5 flake.

Mining inventory would be drawing from an indicated MRE of 429 Mt with an average grade of 0.50 percent V_2O_5 . The Project resource is located relatively close to the surface and mining would occur at depths of 1-20 metres (m). The mining method would involve open-cut sequential mining using trucks and excavators.

The IAS includes the indicative MLA area located within the bounds of the Project tenure and initial conceptual locations for key Project infrastructure components. The indicative MLA area was chosen based on exploration drilling and the quality of the resource; however, a Mining Lease (ML) has not yet been applied for by the Proponent as the configuration of this is still being determined. It is noted the final ML will be in the general area of the indicative MLA area shown in **Figure 2** and will not extend beyond the EPM boundary. The commitment by the Proponent to proceed to BFS will further enable confirmation of Project components / infrastructure requirements.

Key Project infrastructure that will form the Mine Infrastructure Area (MIA) and approximate preliminary disturbance footprints are detailed in **Table 4**.

Table 4: Key Project Infrastructure and Disturbance Footprint

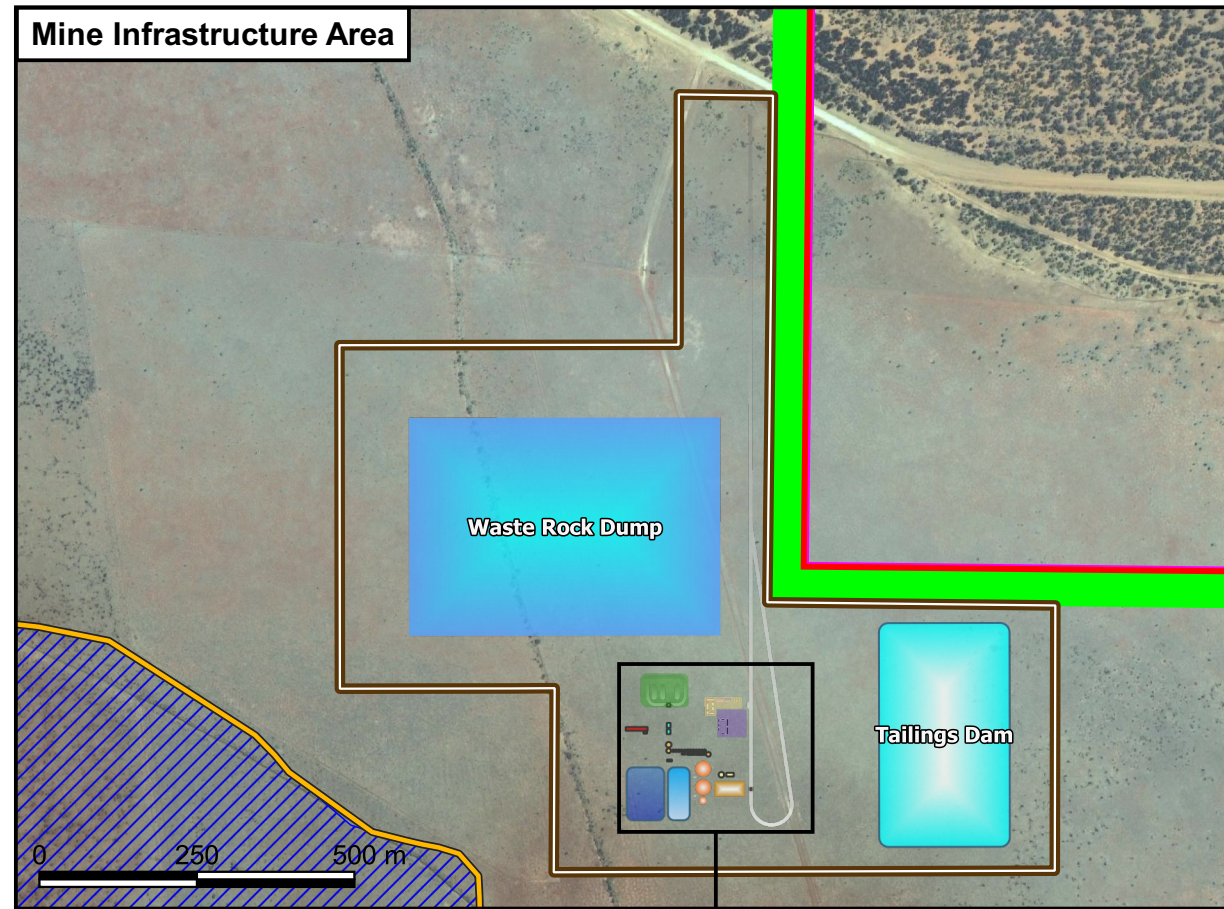
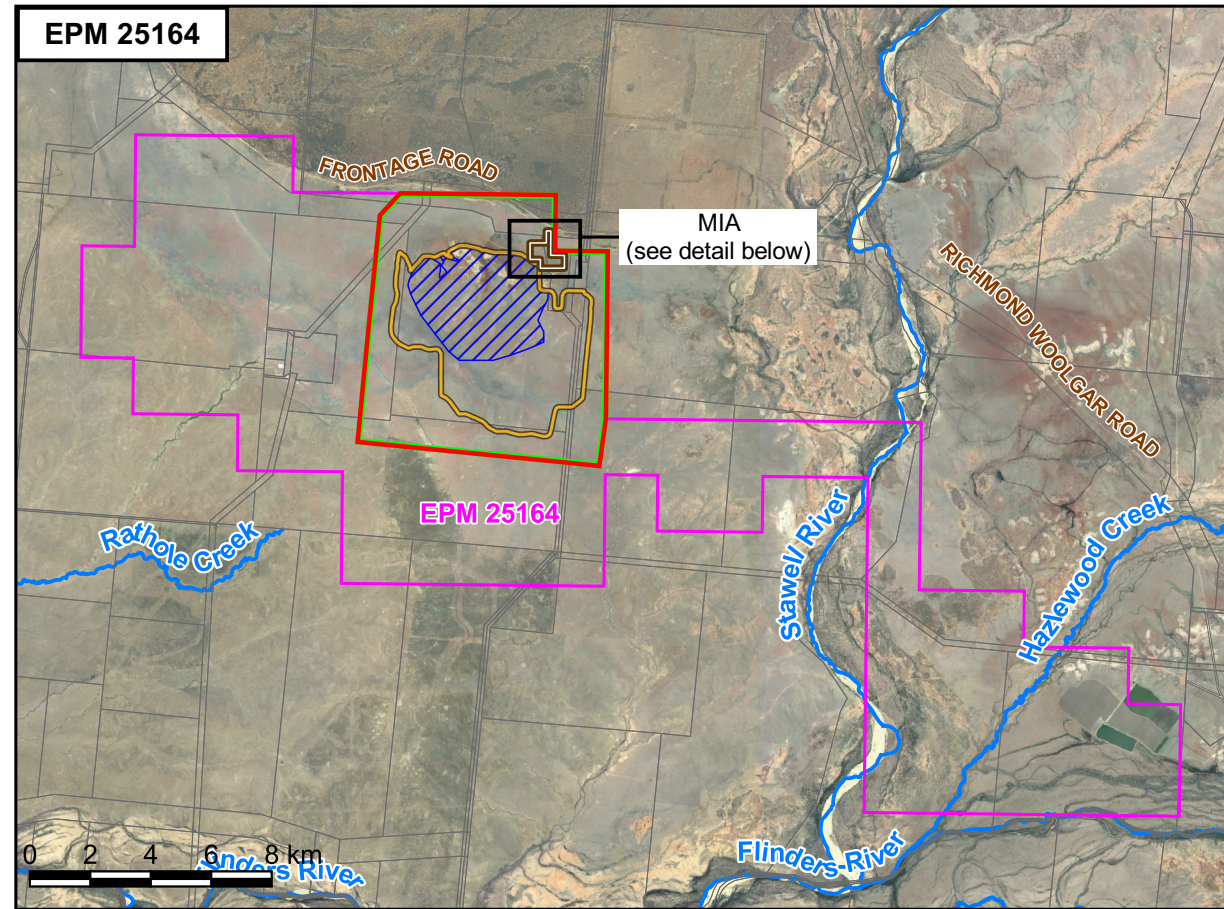
Project Component – within the MIA	Approximate Disturbance Footprint (ha)
waste rock dump	17.0211
tailings dam	7.3340
fuel facilities	0.0161
mine service facilities	0.0140
sewage and wastewater treatment facilities	TBC
ROM pad and stockpiles	0.0572

Project Component – within the MIA	Approximate Disturbance Footprint (ha)
processing infrastructure (e.g. flotation, blending, conditioning, filtration and thickening infrastructure)	0.2788
water supply dams (e.g. raw water dam and process water dam)	0.7684
truck load-out facility	0.0023
internal haul roads and access tracks	0.9727
office buildings, amenities, and laboratory	0.0181
power station	0.0204
LPG storage tanks	0.0012
water supply pipelines	TBC

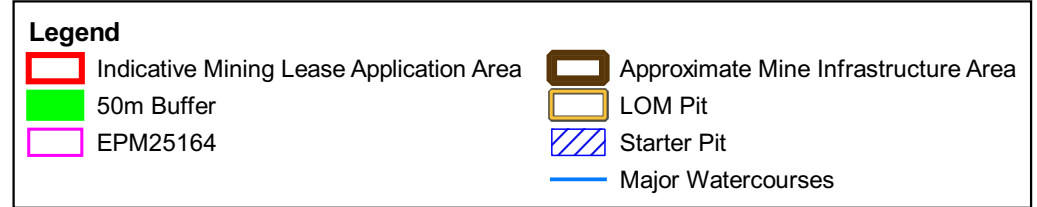
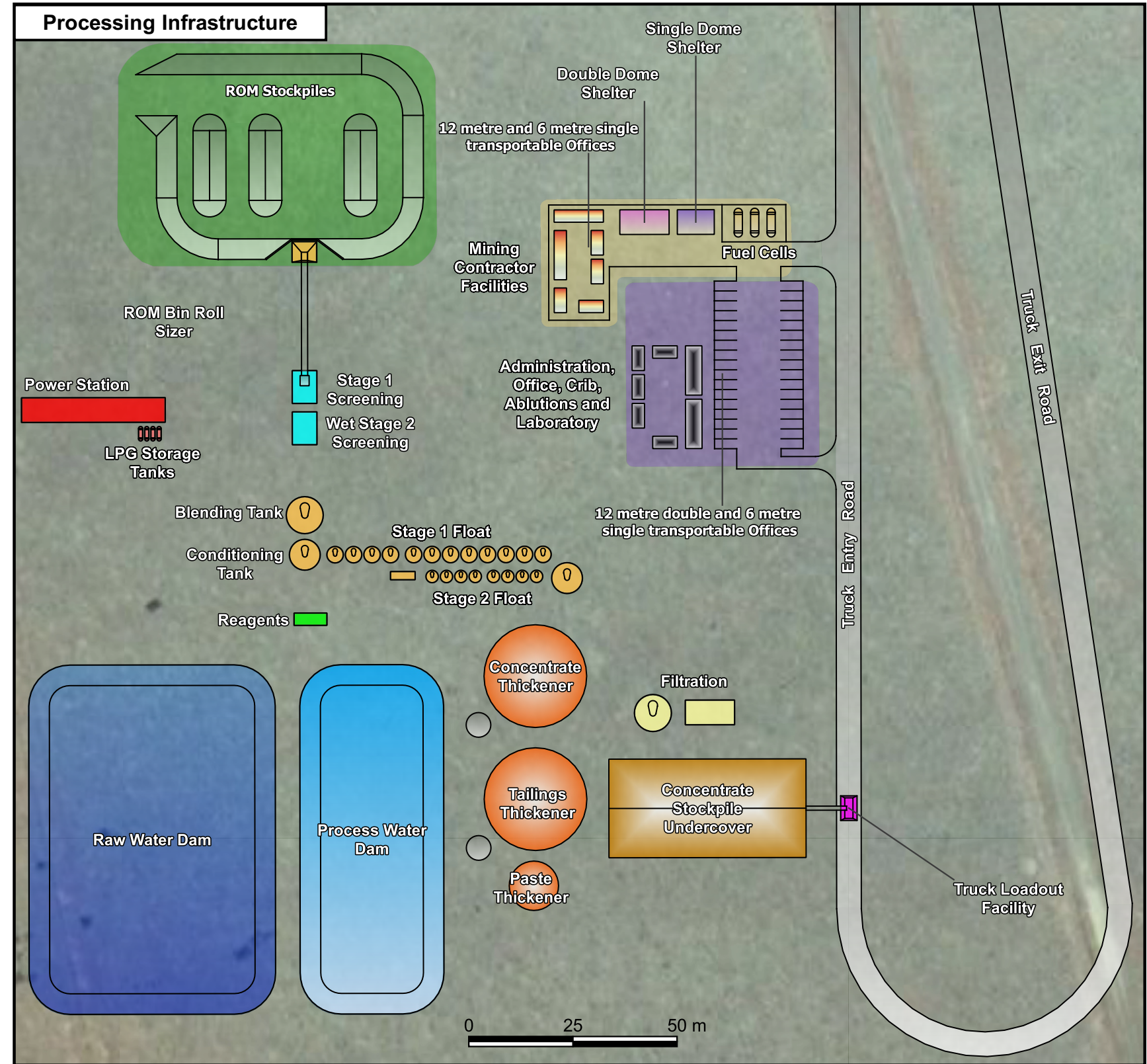
The indicative MLA area does not intercept any mapped watercourses or waterways, however other external Project infrastructure (e.g. haul roads, access roads) may cross drainage lines, creeks and rivers. As the location of these is not finalised at this stage, the final number and location of drainage lines and water features that will be crossed will be determined as part of detailed mine planning and subject to further studies undertaken as part of the EIS.

File Path: G:\GIS\Epic Environmental\Projects\BE2020\BE200088.01 Richmond Vanadium Technology EISW orkspaces\IAS\IAS Rev 1\Figure 2 Project Layout.qgs.qgz

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Data Source:
©State of Queensland (Department of Resources) 2021
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©Richmond Vanadium Plant: C20203-0000-01-04-001 Rev: P2



Scales: AS SHOWN
Datum: GDA2020 Projection: MGA54



**Richmond Vanadium Technology
Initial Advice Statement (IAS)**

Figure 2
Project Layout

3.1.1 Overview of Key Infrastructure

3.1.1.1 Transport

Various road and rail haulage options are being considered for the Project. It is proposed vanadium products would be transported to the Port of Townsville via existing road (Flinders Highway) or rail (Mount Isa Line) networks for shipping to global markets. The volume of freight is not considered large in terms of mining, and as such the differences in cost between rail and road haulage are not vastly different. Transport options being considered are:

- ro-tainers – containers transport and rotary unloading at the Port into bulk carriers;
- road haulage using quad trailers to the port Intermodal facility (own fleet);
- road haulage using quad trailers to the port Intermodal facility (contract haulage); and
- rail using bulk rail cars or containers.

3.1.1.2 Port Facilities

The *Pre-Feasibility Study Richmond-Julia Creek Vanadium Project* (PFS) prepared by Faultzone (2020) investigated the options available for export of product. Currently, it is understood there is limited availability of berths at the Port of Townsville, and it is unknown whether there would be sufficient capacity in future. In lieu of this, the PFS looked at the option of building and operating a purpose-built storage and ship loading facility within the port using an existing berth. Townsville Logistics stated there was an option to utilise this berth as a bulk loading facility by investing capital into the development.

Based on this scenario, the Proponent has commenced looked at building the facility with Townsville Logistics operating the berth under contract. There would be excess availability based on two ships per month that would allow the facility to be contracted for a fee to other potential bulk freight proponents which could offset the ship loading costs. The facility would likely comprise an undercover concentrate storage shed with infeed from the existing material handling infrastructure and rail unloading system at the Port, out-loading would be via front end loaders and a 1,000 tpa Terex ship loading facility. Options such as this will be investigated further during the BFS stage of the Project.

It is noted the Queensland and Federal Government have several infrastructure plans to improve the facilities at the Port of Townsville. The Port Expansion Project, a 30 year development will be implemented in several stages to meet forecast trade demands. Part of the project includes six additional berths. The port upgrade plans require involvement by mining developers to drive the long term options for the port to provide economic handling and ship loading solutions for bulk commodities.

Investigations during the BFS stage will continue to determine the most suitable port options for the Project. Continued engagement with Townsville Logistics and the Queensland / Federal Government's will be undertaken to further progress options.

3.1.1.3 Water Supply

Project water demand for construction will be estimated during the BFS stage. Project water demand during operations will be in the vicinity of 3 gegalitres (GL) per annum, comprising:

- 1.6 GL/a (50.7 L/s) for mining purposes, including dust suppression;
- 1.2 GL/a (31.7 L/s) for the processing facility (based on an expected plant throughput of 6 Mtpa of ore to produce 4.5 Mtpa of tailings and 1.5 Mtpa of concentrate); and
- 0.2 GL/a (6.3 L/s) for the accommodation camp.

Processing water is planned to be largely recycled by the processing plant, refer **Section 6.3.3** for further detail.

The final location of water source/s for the Project is yet to be confirmed. A Water Supply Options Investigation has been completed by OD Hydrology and Water Resources (2021). The purpose of the investigation was to identify and compare water supply options which may be available to supply the Project with a water supply solution. The report identifies multiple options that have potential to meet the water supply requirements of the mine, assesses each against a set of criteria relating to their suitability and feasibility for the Project, and recommends preferred options for further development.

The two preferred options, based on the outcome of the investigation, were groundwater extraction and surface water harvesting. These two options will now be carried through as the preferred options for further development in the next phase of mine feasibility assessment. Both options will also be considered in the context of available water allocations as outlined in **Section 6.3**.

Water Storage / Transport

If surface water harvesting is chosen as a water supply option moving forward then water for the Project would need to be stored in water storage infrastructure which will require associated pipes, pumps / sumps and channels to transport the water. The size, number and location of water storage/s is currently unknown. Once water source locations are confirmed, a water transportation plan may be required to ensure effective transportation of water and supply is maintained throughout the Project.

Further studies will be undertaken to inform site water storage requirements as part of the BFS and EIS processes. An off-lease water storage facility would likely form part of the EIS.

3.1.1.4 Processing Facility

A processing facility has been designed on a 532 tonnes per hour (tph) (4.2 Mtpa) throughput rate to produce 100 tph of concentrate (1 t of product from 5.32 t of feed) using a conventional screening, flotation, thickening and filtration process. A non-toxic slurry of waste sediment (tailings) would be

pumped to a tailings dam where approximately 65 percent would settle to solids. The produced concentrate would then be shipped to overseas markets for further refining into 12,701 t of V_2O_5 flake.

3.1.1.5 Power

Exact power demands are unknown at this stage. Transport links between the Project and both Mount Isa and Townsville are noted with the pre-existing Flinders Highway and Great Northern Rail Line proximate to the Project. The following two power options are currently being considered:

- Build Own Operate (BOO) Liquefied Petroleum Gas (LPG) power station; or
- power from the grid.

Power from the grid is of high cost due to the condition of the existing network. Based on the cost of transmission lines to the indicative MLA area and the relative high cost of power, the two options are comparatively close in cost.

Discussions have been held with Ergon Energy Queensland regarding the ability to draw sufficient power from the Townsville to Mount Isa power grid however, these options would be assessed in more detail as part of the BFS. The BFS will include a technical assessment of the Project, analysis of constraints and impact to network voltages and power quality to determine the optimum connection option.

3.1.1.6 Telecommunications

A mobile tower radio and/or booster system may be constructed at the Project if local reception is insufficient. Fibre optic cable may be run to the indicative MLA area to accommodate data transfer used to coordinate fleet management and plant control systems. Radio communication will be used between heavy machinery and light vehicles traversing the indicative MLA area.

3.1.1.7 Accommodation Village

A 100 person off-lease accommodation village has been allowed for in the PFS (Faultzone 2020). This accommodation village would be constructed as close as practicable to existing residential infrastructure and utilities and would be used by both construction and operations personnel. The accommodation village is proposed to house 50 percent of the total workforce, providing accommodation for Fly-In Fly-Out (FIFO) and Drive-In Drive-Out (DIDO) workers where daily commute would not be practical. Any overflow would be accommodated in local hotels / motels as required.

The Proponent owns approximately 31.5 ha of vacant land (Lot 3 on Plan RT78) on the Flinders Highway west of Richmond which may be used to support Project infrastructure such as the accommodation village or storage area, however options are still under investigation and the final land use for this area will be determined and detailed as part of the BFS and EIS processes.

The accommodation village would be self-sufficient in terms of providing amenities to the workforce whilst not impacting negatively on the local community and still allowing local businesses and service providers to deliver operating and maintenance support.

It is noted that Lot 3 on Plan RT78 is excluded from the scope of this IAS (and subsequent EIS).

3.2 LAND USE

3.2.1 Existing Land Use

The Project tenure is a greenfield site located within both Mitchell Grass Downs and Gulf Plains bioregions. Predominant land use for most of the region (including the Project tenure) is grazing on native vegetation with small areas of irrigated cropping and some residential use.

The Project comprises Freehold, Lands Lease, Reserve and Stock Route (Unallocated State Land) tenures. Adjoining tenure is made up of predominantly Freehold, Lands Lease and Reserve tenures.

3.2.2 Intended Land Use (On-lease)

Intended land use within the Project tenure (e.g. on-lease) will be mining / industrial, and will be comprised of mining activities and the infrastructure identified in **Table 4**, namely:

- active mine pits (progressively rehabilitated);
- Mine Infrastructure Area (MIA):
 - waste rock dump;
 - tailings dam (non toxic);
 - fuel facilities;
 - mine service facilities;
 - sewage and wastewater treatment facilities;
 - ROM pad and stockpiles;
 - processing infrastructure;
 - water supply dams (e.g. raw water dam and process water dam);
 - truck load-out facility;
 - office buildings and amenities;
 - laboratory;
 - power station;
 - LPG storage tanks;
- internal haul roads and access tracks; and
- water storage and supply pipelines.

3.2.3 Intended Land Use (Off-lease)

There are a number of facilities / services that will be required to support the Project. These off-lease land uses include, but are not limited to:

- power lines / grid network;
- road and/or rail network;
- Port of Townsville facilities (or alternative port if not suitable);

- potential water storage facility;
- accommodation village; and
- telecommunications.

3.3 PROJECT NEED, JUSTIFICATION AND ALTERNATIVES CONSIDERED

The Proponent is seeking to develop the Project for the purposes of producing vanadium concentrate to be exported for refining. Based on the available data and information from supporting industries in the region, the PFS (Faultzone 2020) indicates that the Proponent could produce approximately 790,000 tpa of V_2O_5 concentrate which could then be hauled to the Port of Townsville for export. The indicative MLA area was selected based on the outcome of exploration activities and the high-quality resource identified during drilling.

As demand for critical minerals grows, there are substantial economic opportunities for Australia, due to significant geological reserves of minerals deemed critical by Australia and other nations. Vanadium has been identified as a critical mineral of the future (Australian Government Critical Minerals Prospectus 2020). There is an increasing global demand for critical minerals in the manufacture of industrial-scale rechargeable batteries, steel strengthening, as well as for the renewable energy sector including electric cars, with China alone using 60 percent of the world's vanadium internally.

The NWMP is one of the world's richest mineral producing areas containing vanadium, copper, lead, zinc, and major silver and phosphate deposits. The Project proposes to take advantage of the future supply deficit in China, and future demands for vanadium required for:

- VRFBs;
- new reinforcing bar (rebar) standards (increasing the percentage of vanadium in steel);
- increases in infrastructure Projects; and
- general renewable electricity production, supply and demand.

The Queensland and Australian Government's support companies in the critical minerals space, particularly those in areas which are of significant value to overseas markets, such as this Project. Similar projects in the region have been granted Major Project Status which is the Australian Government's recognition of the national significance of a project – for economic growth, employment, or regional Australia. The Project will undoubtedly provide opportunities to boost the local workforce and provide economic benefits for the region through direct and indirect employment. The importance of these minerals is also reflected in current government policies such as the Australian Government's *Australia's Critical Minerals Strategy 2019* and the Queensland Government's *A Strategic Blueprint for Queensland's North West Minerals Province*.

Opportunities also exist to work with the Queensland and Australian Government and government corporations to assist with the long-term development of regional infrastructure including offering direction on the required facilities to support mining prospects throughout the region (i.e. long-term options for the Port of Townsville to provide economic handling and ship loading solutions for bulk commodities and/or water supply issues for the greater NWMP region).

Development of the Project could also help facilitate infrastructure upgrades in the region which would have a positive impact on operating costs and provide a financial / infrastructure boost to the region as well as benefits for local businesses and supporting infrastructure providers.

Alternatives to the Project have been investigated however are not considered feasible due to lack of a high-quality, accessible vanadium resource at other locations. The Proponent considers the Project to be an integral part of their future operations as it contains a high-quality resource and would bring improved social and economic outcomes to the NWMP. The Project tenure specified in this IAS (EPM 25164) was selected as the first tenure to mine due to ability to achieve a lower strip ratio and a higher ore grade in the early pit development period. Further, it is considered that the State is a significant benefactor from mining royalties and were the Project not developed, this economic benefit would not be realised.

3.4 COMPONENTS, DEVELOPMENTS, ACTIVITIES AND INFRASTRUCTURE THAT CONSTITUTE THE PROJECT TO BE DECLARED COORDINATED

Project components warranting a Coordinated Project declaration include the open cut pits and associated mining infrastructure. Accordingly, a coordinated process for the statutory approvals pathway would provide continuity in terms of the assessment approach and ultimately, level of conditioning required in approving the Project.

Other key activities associated with development of the Project include:

- staged construction of production ROM pad, stockpiles and rehabilitation;
- operation and construction of supporting infrastructure including haul roads and access tracks, electricity supply, consumable storage areas and ROM pads;
- construction and operation of processing plant and Mine Infrastructure Area (MIA) including
 - flotation circuit;
 - tailings dam;
 - offices;
 - workshops, laboratory and storage areas;
 - storage for chemicals and explosive products;
- construction of water supply infrastructure and associated pipeline/s;
- progressive development and rehabilitation of product stockpiles;
- construction, operation and maintenance of internal haul roads and access tracks linking the proposed mine, MIA and load-out facility;
- construction and ongoing maintenance of sewage treatment facilities;
- potential installation of an electricity transmission line linked to the existing power network (if this is the preferred option);
- construction and operation of an off-site accommodation village; and

- all other associated infrastructure, plant and activities required to support construction, operation, decommissioning and rehabilitation of the Project.

These aspects would be examined in more detail as the Project progresses.

3.5 EXTERNAL INFRASTRUCTURE REQUIREMENTS

As identified in **Section 3.2.3**, there will be external, ancillary infrastructure requirements required to support the Project. These include, but are not limited to:

- power lines / grid network;
- road and/or rail network;
- Port of Townsville facilities (or alternative port if not suitable);
- potential water storage facility;
- accommodation village; and
- telecommunication services.

Each of the above infrastructure has been examined in greater detail in **Section 3.1.1**, including considerations such as water demands, alternative options and additional permits / approvals.

3.6 TIMEFRAMES FOR THE PROJECT

Should the Project be approved, construction of mine infrastructure is scheduled to commence in 2022, with production proposed to commence in approximately 2023. Operational activities would be carried out over a 20 year period. It is noted that rehabilitation activities would be undertaken on a progressive basis, over the LOM. Estimated timeframes for the Project are detailed in **Table 5**.

Table 5: Approximate Project Timeframes

Project Phase	Approximate Commencement Timeframe
Mine planning and technical studies	2020
Environmental approvals	2021
Infrastructure approvals	2021
Bankable Feasibility Study	2022
Pre-construction	2022
Construction phase	2022 to 2023
Operations commences	2023
First shipment	2023 / 2024
Decommissioning phase	2044 to 2050 (Estimated)

3.7 CONSTRUCTION AND OPERATIONAL PROCESSES

Construction and operation of the Project would involve the following:

- site preparation activities such as vegetation and topsoil removal, earthworks and topsoil stockpiling;

- construction and opening up of starter pit; using scrapers, excavators, dozers, haul trucks and graders;
- development of the LOM open-cut mine pits would be staged with progressive rehabilitation and back-filling where practicable. The sequence of proposed mining is yet to be determined;
- civil works for construction of access roads and building of plant and structures;
- all infrastructure and buildings would be designed and constructed to a standard appropriate for the Project; and
- operational processes would include the use of truck and shovel methods for removal of overburden and waste rock where required as well as for the extraction of the ROM resource.

Rehabilitation would be undertaken on a progressive basis for the LOM with the Proponent likely returning the Project area to a grazing Post Mine Land Use (PMLU) to resemble the vegetation that occurred onsite prior to mining. A Progressive Rehabilitation and Closure Plan (PRC Plan) will be developed to ensure rehabilitation requirements are adequately addressed.

3.8 WORKFORCE REQUIREMENTS DURING CONSTRUCTION AND OPERATION

The Project would be supported by a mix of local workforce, and FIFO or DIDO contractors. Initial estimates for the operational workforce are approximately 200 Fulltime Equivalents (FTEs). The construction workforce is expected to be approximately 50 FTEs with 25 FTEs required for decommissioning.

Throughout the construction and operation phases, the Project will have capacity to provide significant economic benefits to the region through ongoing indirect and direct outputs, household incomes, direct employment, and business turnover.

3.9 ECONOMIC INDICATORS

A number of businesses and service providers are based in nearby townships and the Project would seek to create and maintain ongoing trade and employment opportunities with these businesses, whilst also contributing to Commonwealth tax revenues and State royalties. The potential impact of the Project on current value chains in the region is likely to be significant. Business and service providers in nearby towns with potential to serve the Project include automotive and business services, computer and electronic, construction, industrial services, pumping contractors, and structural and mining services.

Additionally, throughout its construction and operating phases, the Project has capacity to provide significant economic benefits to the region through ongoing indirect and direct outputs, household incomes, direct employment, and business turnover.

3.10 FINANCING REQUIREMENTS AND IMPLICATIONS

Capital cost investment (CAPEX) over the life of the Project is estimated to be in the order of \$242.2 million. The Proponent has the financial capacity to fund the development of the Project. It is anticipated that the Project will be funded by the Proponent and/or associated entities.

3.10.1 Costs and Benefits Summary

The Project has the potential to result in direct and indirect employment opportunities in a range of sectors throughout the region. Development of the Project would provide ongoing employment opportunities, as well as long-term social and economic benefits to North West Queensland local and regional communities.

By providing a stable supply of cleaner, lower cost vanadium, the Proponent aims to establish Australia as a core supplier of vanadium and assist grid-scale battery makers unlock the potential of Vanadium Redox Flow Batteries in supplying efficient and reliable renewable energy to consumers.

An Economic Impact Assessment would be carried out in accordance with the Coordinator-General's Economic Impact Assessment Guideline for Coordinated Projects (April 2017), which provides a standardised methodology and requirements associated with the assessment of a Project's economic impacts, ensuring transparent assumptions and targeted impact management measures are determined.

The EIS would include a Cost-Benefit Analysis (CBA) to assess the net impact of the Project. All impacts resulting from the Project would be identified and compared to a 'without project' scenario to present a net stream of benefits and costs. Potential environmental economic impacts (i.e. impact on ecosystem value, cost of greenhouse gas emissions) would be considered as part of the CBA.

The Proponent would seek to employ a local and regional based workforce where possible, and the establishment and creation of the Project would in turn maintain or stimulate the local, regional, and State economies over the coming decades.

3.10.2 Local, State and National Economies

Local, State and National-level economic impacts from the Project including indicators such as gross regional product, gross state product, value added to the economy and employment indicators would be examined for the EIS.

The Project would maintain and generate opportunities for long and short-term employment during construction, operation, decommissioning and rehabilitation phases. In turn, this could reasonably

maintain or lead to long term economic benefits in local and regional contexts. The Project workforce would be sourced locally and regionally, dependent upon workforce availability and skills.

3.10.3 Natural and Social Environments

Potential economic impacts to social and natural environments would be considered as part of a detailed CBA which would be undertaken as part of the EIS.

4 APPROVALS REQUIRED FOR THE PROJECT

Given the scale of the Project, there would be a need for various approvals from Commonwealth, State and Local Government departments in accordance with relevant legislation, including but not limited to those detailed in **Table 6**. A range of other secondary approvals may be required depending on project activities, and these have been excluded from the IAS.

4.1.1 Commonwealth Approvals

Relevant Commonwealth legislation for the Project includes the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environmental Offsets Policy 2012*.

With regards to matters of National Environmental Significance (MNES) the EPBC Act Protected Matters Report identified the potential for multiple threatened species to occur on or near the proposed Project site. Based on likelihood of occurrence, local knowledge, and field surveys, the main species of concern would be Julia Creek Dunnart *Sminthopsis douglasi*, a species listed as Vulnerable, identified as occurring on or near the proposed Project site.

Although there is no evidence of Julia Creek Dunnart in the ecology survey study area, there is suitable habitat, albeit degraded, and there are two records of the species approximately 20 km south of the Project. An assessment of the Project's potential to cause significant residual impacts to Julia Creek Dunnart has been carried out using the criteria described in the Matters of National Environmental Significance Guidelines. Under the nine-part test it is considered the Project is unlikely to cause a significant residual impact on Julia Creek Dunnart, however this will be assessed further as part of the EIS. As the Julia Creek Dunnart is listed as a Vulnerable species under the EPBC Act, a referral will be made to the Commonwealth.

If the Commonwealth deems that the Project is likely to have a significant impact on any MNES, then the minister must make a decision on whether approval is required under the EPBC Act and on the process of assessment. If deemed a Controlled Action, then the assessment and approval process will commence. The Australian Government has bilateral agreements with all state and territory governments to accredit environment assessment processes that meet set standards. If EPBC Act approval is needed, it may be possible to do a single assessment, avoiding duplication by undertaking a bilateral assessment process.

If for any reason the Project is not conducted under the Bilateral Assessment Agreement, then actions can be assessed using one of the other approved assessment methods, e.g. accredited assessment (case by case), assessment on referral information, assessment on preliminary documentation, assessment by EIS / PER or assessment by public enquiry.

Following the State regulatory approvals, the Commonwealth will assess all relevant material for the Controlled Action and make a decision. This decision may provide specific conditions for the Project to proceed (e.g. offsets), considering the level and types of conditions also applied by the State.

Table 6: Likely Approvals for the Project (State and Local)

Legislation	Approval	Trigger	Relevance to Project	Administering Authority	Within Scope of EIS ¹
State Approvals					
<i>State Development and Public Works Organisation Act 1971</i>	Initial Advice Statement Environmental Impact Statement (EIS)	Where the Project is declared a Coordinated Project by the Coordinator General and the EIS assessment process is determined. This process is an accredited form of assessment for the purposes of the EPBC Act.	Entire Project	Department of State Development, Infrastructure, Local Government and Planning	Yes
<i>Planning Act 2016</i> <i>Water Act 2000</i>	Operational work for taking or interfering with water in a watercourse	Taking or Interfering with a watercourse.	Drainage Channels and embankments	Department of State Development, Infrastructure, Local Government and Planning and multiple referral agencies.	Yes
<i>Planning Act 2016</i> <i>Fisheries Act 1994</i>	Operational work that is constructing or raising waterway barrier works	Project potentially impacting fish passage within a mapped waterway. Waterway barrier approvals associated with waterway crossing/s outside of the indicative MLA area.	Local watercourses	Department of Regional Development, Manufacturing and Water	Yes
<i>Water Act 2000</i>	Water licence to take unallocated water	Water licence to take unallocated water. Coordinated Project status allows for direct negotiation of water from the strategic reserve.	Entire Project	Department of Regional Development, Manufacturing and Water	Yes
<i>Nature Conservation Act 1992</i>	Permit for the movement of protected animals	If protected species are identified during the environmental assessment or pre-clearing survey.	Entire Project	Department of Environment and Science	Yes
<i>Nature Conservation Act 1992</i>	Protected plant clearing permit – or Exempt clearing notification	If protected plants are found in areas to be cleared or if no protected plants found in areas to be cleared.	Entire Project	Department of Environment and Science	Yes
<i>Nature Conservation Act 1992</i>	Species Management Program	If tampering with protected native fauna habitat and animal breeding places.	Entire Project	Department of Environment and Science	Yes
<i>Vegetation Management Act 1999</i>	Operational work to clear native vegetation	Where off-lease works require the clearing of regulated vegetation.	As needed	Department of Resources	Yes
<i>Environmental Offsets Act 2014</i>	Offset Strategy	If there is a significant residual impact on a prescribed environmental matter of State significance.	Entire Project	Department of Environment and Science	Yes
<i>Aboriginal Cultural Heritage Act 2003</i>	Cultural Heritage Management Plan	To demonstrate Cultural Heritage Duty of Care.	Entire Project	Department of Aboriginal and Torres Strait Islander Partnerships	No

Legislation	Approval	Trigger	Relevance to Project	Administering Authority	Within Scope of EIS ¹
<i>Transport Infrastructure Act 1994</i>	Dependent upon Project specifics	Carry out road access works within a State-controlled road.	Entire Project	Department of Transport and Main Roads	Yes
<i>Work Health and Safety Act 2011</i> <i>Work Health and Safety Regulation 2011</i>	Major Hazard Facility Licence	If required, need a licence for operating a Major Hazard Facility where threshold quantities of fuels / chemicals listed in schedule 15 of the <i>Work Health and Safety Regulation 2011</i> are stored, handled or processed.	As needed	Workplace Health and Safety Queensland	No
<i>Environmental Protection Act 1994</i>	Environmental Authority (EA) Progressive Rehabilitation and Closure Plan (PRC Plan)	A granted EA for the Project would allow the mining of vanadium under schedule 2A (ERA 19, mining metal ore) of the <i>Environmental Protection Regulation 2008</i> (EP Regulation). The EA would cover the relevant prescribed Environmentally Relevant Activities (ERAs) listed under schedule 2 of the EP Regulation. All mines with a site specific EA must prepare a PRC Plan. A PRC Plan allows the EA holder to plan for how and where activities will be carried out on the land in a way that maximises the progressive rehabilitation of the land to a stable condition.	Entire Project	Department of Environment and Science	Yes
<i>Mineral Resources Act 1989</i>	Granting of Mining Lease/s	Securing of resource tenure in the form of Mining Lease/s (ML) after OCG releases report on EIS and after EA issued.	Entire Project	Department of Resources	No
Local Approvals					
<i>Planning Act 2016</i> <i>Richmond Shire Planning Scheme 2020</i>	Development Application Approval/s	Where the Project is likely to be code assessable against the Operational Works Code in the Planning Scheme.	Entire Project	Richmond Shire Council	No

¹If declared a coordinated project requiring an EIS under Part 4 of the SDPWO Act, the Coordinator-General may apply conditions to the entire Project under a consolidated approvals approach.

5 LOCATION OF KEY PROJECT ELEMENTS

5.1 LOCATION

5.1.1 Regional Context

The Project tenure is a greenfield site located within both Mitchell Grass Downs and Gulf Plains bioregions in the NWMP, Queensland. The NWMP covers an area of approximately 40,127 km² and comprises the following regional towns:

- Richmond;
- Hughenden;
- Maxwellton; and
- Julia Creek.

Richmond has a population of 648 (ABS 2016) and functions as a rural base with several large cattle stations. The principal commercial land uses in the shire and region are beef cattle production and mining operations that underpin the region's status as a world class mineral province.

The region is characterised by low-lying tropical savanna braided with river systems. The area is further characterised by gently undulating, rolling downs and plains which form the basis of a pastoral landscape intercepted by predominantly minor watercourses and bounded by several creeks, including the Saxby River, Julia Creek and Flinders River.

5.1.2 Local Context

The Project (measured from the indicative MLA area access point / entrance) is located 45 km northwest of Richmond and 30 km north-northeast of Maxwellton.

6 ENVIRONMENTAL CONSIDERATIONS

6.1 LAND USE AND BUILT ENVIRONMENT

6.1.1 Description of Existing Environment

Topography across the Project tenure ranges from approximately 100 to 200 m Australian Height Datum (GDA94) from west to east, consistent with broader topographical trends in the area (refer **Figure 3**) and is intercepted by a network of gazetted local road parcels (unnamed and unformed) however it is understood the indicative MLA area will not overlap these areas.

Predominant land use for most of the region (including the Project tenure) is mapped as grazing on native vegetation with small areas of irrigated cropping, a reservoir / dam and some residential use all within Richmond.

The Project tenure comprises Freehold, Lands Lease, Reserve and Stock Route (Unallocated State Land) tenures. Adjoining tenure is made up of predominantly Freehold, Lands Lease and Reserve tenures detailed in **Table 7** and shown on **Figure 4**. This information is based on desktop research only, it is noted that all data would be confirmed during the EIS.

There are no other current resource tenures that overlay the Project tenure.

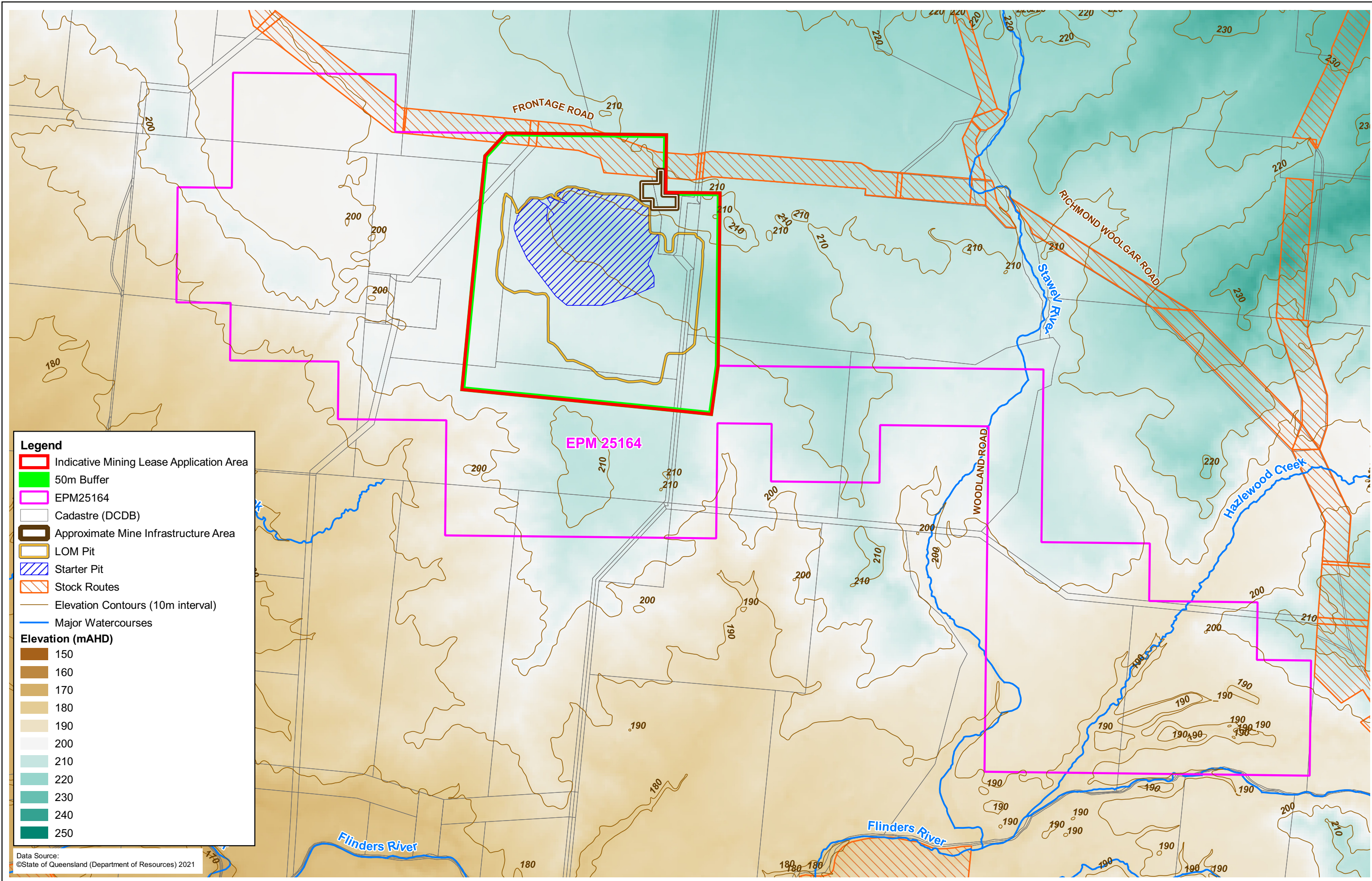
Table 7: Landholdings Associated with the Project

EPM	Lot / Plan	Tenure	Coverage Type
25164	Lot A on AP5737*	Lands Lease	Strata ²
	Lot 2 on SP200736	Lands Lease	Base ¹
	Lot 2 on SP200736	Lands Lease	Strata
	Lot 1 on B157104	Freehold	Base
	Lot 25 on B157119*	Freehold	Base
	Lot 24 on B157118	Freehold	Base
	Lot 4 on B157112	Freehold	Base
	Lot 30 on B157120*	Freehold	Base
	Lot 27 on B157119*	Freehold	Base
	Lot 26 on B157119*	Freehold	Base
	Lot 1 on YP5	Freehold	Base
	Lot 33 on B157119*	Reserve	Base
	Lot 34 on B157119	Lands Lease	Base
	Lot 34 on B157119	Lands Lease	Strata
	Lot 23 on B157118	Freehold	Base
	Lot 7 on SP317969*	Freehold	Base
	Lot 10 on B157107	Freehold	Base
	Lot 12 on SP317969	Freehold	Base
	Lot 6 on YP28	Freehold	Base
	Lot 5 on YP28*	Freehold	Base
	Lot 4 on YP5	Freehold	Base
	Lot 13 on YP5	Freehold	Base
	Lot 8 on B157107	Freehold	Base

¹ Base parcel makes up the entire coverage of the State and are contiguous with surrounding base parcels.

² Strata parcel are generally secondary lease over the base parcel.

*Comprise indicative MLA area



6.1.1.1 Geology

The Project is located within the Northern Eromanga Basin with the main lithological unit the Allaru Formation (Allaru Mudstone), the Toolebuc Formation and some thin undifferentiated Quaternary deposits. The Allaru Formation is part of the Rolling Downs Group and has a thickness of approximately 700 m. Lithology consists primarily of mudstone, grey to brown lithic and feldspathic siltstone grading to very fine calcareous sandstone.

The calcareous siltstone is well sorted and rich in calcite cement. It is also abundant in lithics, comprising predominately andesite and plagioclase. Cone in cone limestone along the bedding planes of some siltstones and coquinas is common. There are thin bands of shelly marine fossils as the depositional environment was marine, with the presence of wave ripple marks suggesting it must have been quite shallow.

The Toolebuc Formation is of Albian Age (120 Ma) of the Early Cretaceous Period. It is part of the Rolling Downs Group and conformally underlies the Allaru Formation and overlies the Wallumbilla Formation. It is composed of interbedded concretionary white, cream, pale pink, finely crystalline oolitic limestones that are mainly a fabrication of large-massive concretions. It also consists of platy fine crystalline limestone with common fossils and bands of coquinite, interbedded with calcareous shale. The Toolebuc Formation is abundant in marine fossils, including microfossils and vertebrate and invertebrate macrofossils.

6.1.1.2 Soils

There are eight soil units within the Project tenure, mapped as AC20, CC66, CC70, MM31, MM33, MM44, Mu14 and Si16 under the Atlas of Australian Soils. These are described further in **Table 8**. It is noted that all on-site soils will be ground-truthed and confirmed during site specific soil surveys as part of the EIS.

Table 8: Soil Types

Soil Type	Description
AC20	Gently undulating plains: dominant soils are deep yellow earthy sands with similar sands. Commonly occurring are deep sandy yellow earths and red earths. Some grey earths occur in lower sites. Deep grey-brown cracking clays, uniform clays and loamy duplex soils and occur in broad depressions.
CC66	Alluvial plains associated with major streams: dominant soils are deep grey-brown cracking clays with lesser brown clays. Small levees adjacent to some stream channels have other uniform-textured soils. Also associated are small areas of loamy duplex soils, which are often scalded. On levees of some major streams and channels are deep loamy red earths, with some carbonate nodules throughout the profile, and small areas of loamy red duplex soils.
CC70	Gently undulating plains: chief soils are deep grey-brown or brown cracking clays and, varying locally in dominance. Adjacent to smaller stream channels and on levees are loamy red earths or brown earths. Small low rises occur through-out the unit with quartz-gravel-strewn loamy duplex soils, and or earths.
MM31	Gently undulating to undulating lands with calcareous rock outcrop common on higher slopes and ridge crests: dominant soils are the deep brown and grey-brown cracking clays of unit MM5. Associated on higher slopes and ridge crests, particularly adjacent to rock outcrop, are a range of shallow loams and shallow clays. On some slopes there are small areas of calcareous earths.
MM33	Level alluvial plains with many braided distributary channels: dominant soils are deep brown cracking clays, with other deep cracking clays closely, and in some areas locally dominant. Deep uniform clays with a scalded and crusted surface are also widespread. Small areas of moderately deep cracking clays and of unit MM5 occur on isolated low rises between stream channels

Soil Type	Description
<i>MM44</i>	Gently undulating plains with many low ridges with limestone outcrop: dominant soils are shallow to moderately deep red or red-brown clays, with lesser deep red clays. Associated soils are brown and grey-brown clays and of unit MM5. A range of shallow uniform calcareous clays and loams occur on the areas of limestone outcrop.
<i>Mu14</i>	Alluvial plains with old flood channels and small terraces: dominant soils are fine sandy red earths. On levees close to the stream channels are deep earthy fine sands.
<i>Si16</i>	Gently undulating plains: dominant are deep loamy duplex soils. Included in the unit are areas of deep grey-brown and brown cracking clays and deep sands.

6.1.1.3 Acid Sulphate Soils

Acid sulphate soils are not expected to occur in the Project tenure due to the topography (i.e. not below 5 m AHD), geomorphic and soil characteristics, and lack of proximity to the coastline.

6.1.1.4 Contaminated Land and Environmental Management Registers

Searches were run for the two Lots that would be overlain by the indicative MLA area, Lot 33 on B157119 and Lot 26 on B157119. Lot 33 comprises Lilyvale Homestead and Lot 26 comprises the area of the ore reserve. Neither lot is listed on the Environmental Management Register (EMR) nor the Contaminated Land Register (CLR).

6.1.1.5 Agricultural Land Class

The agricultural land classes for the Project tenure have been provided in **Table 9** and **Figure 5**.

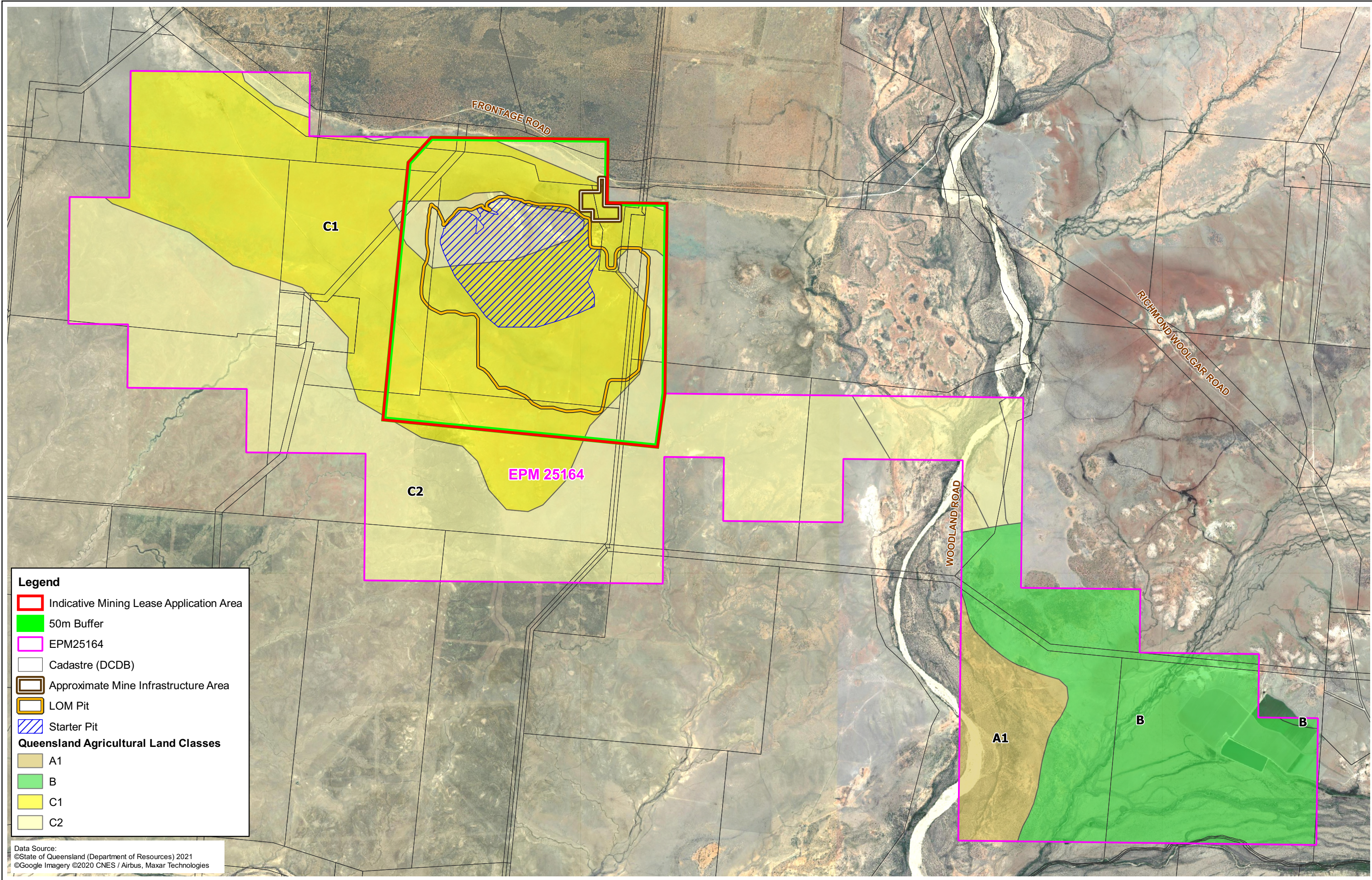
Table 9: Queensland Agricultural Land Classes (the Project tenure)

EPM	Agricultural Land Class	Description	Area (ha)
25164	A1	Land suitable for a wide range of broadacre crops.	1,381
	B	Land not suitable for a wide range of crops but is suitable for a narrow range of crops or crops with specialised requirements.	5,338
	C1	Land is the higher fertility grazing land typically used for beef cattle fattening and includes the brigalow and gidgee lands that are not suitable for cropping.	9,623
	C2	Land is more typically suited to sheep and cattle breeding.	11,526

It is noted that within the indicative MLA area, only classes C1 and C2 are present. There is an area of irrigated cropping land located at the Project tenure's far eastern aspect and a current cattle feedlot.

6.1.1.6 Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) is mapped by the State as Queensland Agricultural Land Classes – A and B. GQAL is present within the Project tenure in the areas of A1 and B, located on the eastern end of the Project tenure (which are outside the indicative MLA area). The remaining area, which is the majority of the Project tenure is comprised of Class C – Pasture Land, refer **Figure 5**.



6.1.1.7 Stock Routes

There is one Minor and Unused, Open stock route (010RICH) which traverses the northern border of the EPM, refer **Figure 4**.

6.1.1.8 Visual Amenity

Surrounding views are of the existing environment which comprises mostly degraded, cattle grazing country, Frontage Road and Lilyvale homestead. From Frontage Road, the indicative MLA area is viewed as flat and mainly treeless plains subject to cattle grazing.

6.1.1.9 Built Environment

The town of Richmond is located southeast of the Project tenure and the town of Maxwellton to the south. The nearest built infrastructure is the Mount Isa Rail Line and the State Controlled Road – Flinders Highway, located directly south of the tenure. Local roads, both sealed and unsealed surround the Project tenure and would require more intensive study to understand their connections and usage.

Generally, there is not a large amount of built infrastructure proximate to the Project tenure that would be impacted by the Project. As the approvals process progresses, all affected, adjoining, and interested landowners would be notified and invited to comment on the Project and voice any concerns they may have.

6.1.2 Potential Impacts to Existing Land Use and Built Environment

At this stage of the Project, detailed direct and indirect impacts that may be experienced by landholders within and surrounding the Project area are largely unknown and would be assessed as part of the EIS. A summary of key potential impacts during construction, commissioning, operation, closure, decommissioning and final rehabilitation have been included where applicable.

During construction and operation, the Project has potential to impact on land resources and land use capacity in the area. This includes impacts such as changes to the agricultural capacity of the land and to existing landforms.

Existing land uses within the proposed mining footprint would be directly impacted. Once operational activities have ceased in parts of the indicative MLA area, land would be progressively rehabilitated and made stable, safe, and non-polluting.

Project activities have potential to lead to degradation and erosion of soils. Baseline soil surveys would be undertaken for the EIS to determine the physical and chemical characteristics of soils on site, and to inform mitigation and management measures to be implemented throughout the construction, operation, and rehabilitation phases. A geochemical assessment would also be undertaken for the EIS to identify the

characteristics of waste materials and suitable management measures to be implemented, including requirements for rehabilitation activities.

To evaluate the existing landscape character and its visual amenity, the nearest key visual receptor point to the indicative MLA area (e.g. public viewing area) has been identified as Frontage Highway. It is anticipated that vehicles travelling along this road (and other minor public roads) may have a direct line of sight to the indicative MLA area from different directions. It is noted that the general area where the Project is located is relatively flat and currently used for cattle grazing on unimproved pastures.

Whilst this preliminary desktop assessment has identified that passers-by would be able to see various aspects of the Project from Frontage Road, until Project design details are available (e.g. locations and heights of infrastructure) a formal visual amenity assessment cannot be completed. Once these details are available, more in-depth visual amenity studies could be completed, including the development of view sheds, showing what the Project would look like at various stages of development.

Based on a thorough assessment, visual mitigation measures could then be implemented (e.g. vegetation, fencing and/or screening etc.). While the Project involves activities that would result in a change to the visual aspect of the area, the Project is located in a very remote area of northwest Queensland and is approximately 45 km from the nearest township. Therefore, impacts to visual amenity of the area are not expected to be significant.

An in-depth visual impact assessment would be undertaken for the Project as part of the EIS.

6.1.2.1 Planning Scheme and Regional Plan Designation

Richmond Shire Planning Scheme

The Project tenure lies wholly within the Richmond Shire LGA and is zoned as rural. The *Richmond Shire Planning Scheme 2020* (the Planning Scheme) currently applies to off-lease components of the Project as identified in **Section 3.2**. Whilst no planning approvals would be required for works within the Project area once a ML is in place, some structures may undergo self-assessment to comply with relevant building codes.

Queensland Plan

The Queensland Plan, a 30-year vision, represents the views of Queenslanders. The Plan seeks to ensure that in 30 years' time Queensland will be home to vibrant and prosperous communities. The Plan identifies nine foundation areas which create the framework, namely; education, community, regions, economy, health and wellbeing, environment, people, infrastructure and governance.

The 2014 *ResourcesQ 30-year Vision and Action Plan* delivers the objectives of the Queensland Plan as they pertain to the resources sector. By 2044, Queensland seeks to be recognised as a preferred resource destination, with an enviable investment track record and competitive operating environment.

The Project aligns with both the Queensland Plan and the *ResourcesQ 30-year Vision and Action Plan* as the Project would positively contribute to the region, produce significant economic outcomes and also support the renewable energy sector.

North West Regional Plan 2010

The *North West Regional Plan 2010-2031* (regional plan) is a statutory instrument released by the Minister for Infrastructure and Planning. The regional plan provides the broad framework for addressing priority issues in the North West region until 2031 to ensure that planning decisions do not compromise longer-term planning needs. The regional plan applies to Richmond Shire, Flinders Shire, McKinlay Shire, Cloncurry Shire and Mount Isa City.

The Project falls within the catchment of the regional plan. It is noted that most of Queensland's base metal production is from the NWMP and growth in mining for base metals in the north west has the potential to produce state-wide social and economic benefits.

Strategic Blueprint for Queensland's North West Minerals Province

The NWMP is centred around Mount Isa and Cloncurry and spans 10 LGAs, including Richmond, where the Project is located. The NWMP has contributed to significant economic benefits to Queensland for several decades. In November 2015, the Queensland Government supported the launch of the NWMP Taskforce to discuss issues, opportunities and scope the way forward for the region's future. The Strategic Blueprint for Queensland's NWMP presents actions to secure the long-term future of the region and its communities in anticipation to create a stronger and more diversified economy, leveraging existing economic and community strengths. This includes funding under three strategic priorities including:

- facilitating continued resources sector development;
- diversifying the regional economy and creating employment opportunities; and
- working with businesses and the community to deliver integrated and appropriate services.

The Project would provide significant economic benefits to the region, support diversification of the regional economy, and help achieve the goals of the Strategic Blueprint for Queensland's NWMP.

6.1.3 Management and Mitigation Measures

Proposed management and mitigation measures for the Project in relation to land use and built environment will be detailed as part of ongoing investigations undertaken during the EIS. Preliminary measures however could include ongoing soil / geochemical surveying, visual amenity screening / fencing,

rehabilitation landform modelling, and ongoing consultation with landholders and the community in general to ensure open and transparent communication during all stages of the Project.

6.2 TERRESTRIAL AND AQUATIC ECOLOGY

6.2.1 Existing Environment

Baseline post-wet season and spring terrestrial ecology surveys have been undertaken for the Project within a Study area which was approximately based on the indicative MLA area. In accordance with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2018) surveys in the Mitchell Grass Downs should be carried out in autumn (late February to May) and spring (September to early November).

A flora survey was conducted over a four day period from 7 to 10 April 2021. A late wet season fauna survey including trapping and observation of terrestrial vertebrate fauna was conducted over a five day period from 20 to 24 March 2021. A dry season (spring) survey for both flora and fauna was carried out from 3 to 7 September 2021.

6.2.1.1 Flora

Field-verified Regional Ecosystems

Eight Regional Ecosystems (REs) were verified within the Study area during the flora surveys. The extent of the flora survey effort and the assessed vegetation communities as they occur throughout the Study area is shown in **Figure 6** and **Table 10**.

Table 10: Verified RE Areas Calculated within Study area

Regional Ecosystem ¹	Description ¹	VM Act ² status	EP Act Biodiversity Status ²	Area (ha)
2.3.3	<i>Astrebla squarrosa</i> and/or <i>A. elymoides</i> and/or <i>Iseilema</i> spp. tussock grassland to closed tussock grassland. Occasional species include <i>Astrebla lappacea</i> , <i>Dichanthium</i> spp. and <i>Eulalia aurea</i> . Emergent <i>Eucalyptus microtheca</i> , <i>Atalaya hemiglauca</i> , <i>Excoecaria parvifolia</i> and <i>Acacia cambagei</i> may occur. Occurs on active quaternary alluvial plains; calcareous clays, some gilgai.	LC	NC	849.87
2.4.2a	<i>Astrebla</i> spp. and <i>Iseilema</i> spp. tussock grassland to closed tussock grassland, occasionally with <i>Aristida latifolia</i> , <i>Sarga</i> spp. and <i>Dichanthium</i> spp. Emergent <i>Atalaya hemiglauca</i> may occur. Occurs on broad, tertiary clay plains. Brown cracking clay soils.	LC	NC	4,373.38
2.4.5	Mixed low open woodland with combinations of the species <i>Atalaya hemiglauca</i> , <i>Grevillea striata</i> , <i>Acacia victoriae</i> and <i>Vachellia sutherlandii</i> . <i>Acacia cambagei</i> and <i>Ventilago viminalis</i> may also occur in the canopy. The ground layer is tussock grasses, including <i>Dichanthium</i> spp., <i>Astrebla</i> spp., <i>Aristida latifolia</i> , <i>Panicum decompositum</i> , <i>Chrysopogon fallax</i> , <i>Eulalia aurea</i> , <i>Iseilema</i> sp. Occurs on Tertiary clay plains. Grey to brown cracking clay soils.	LC	OC	62.18

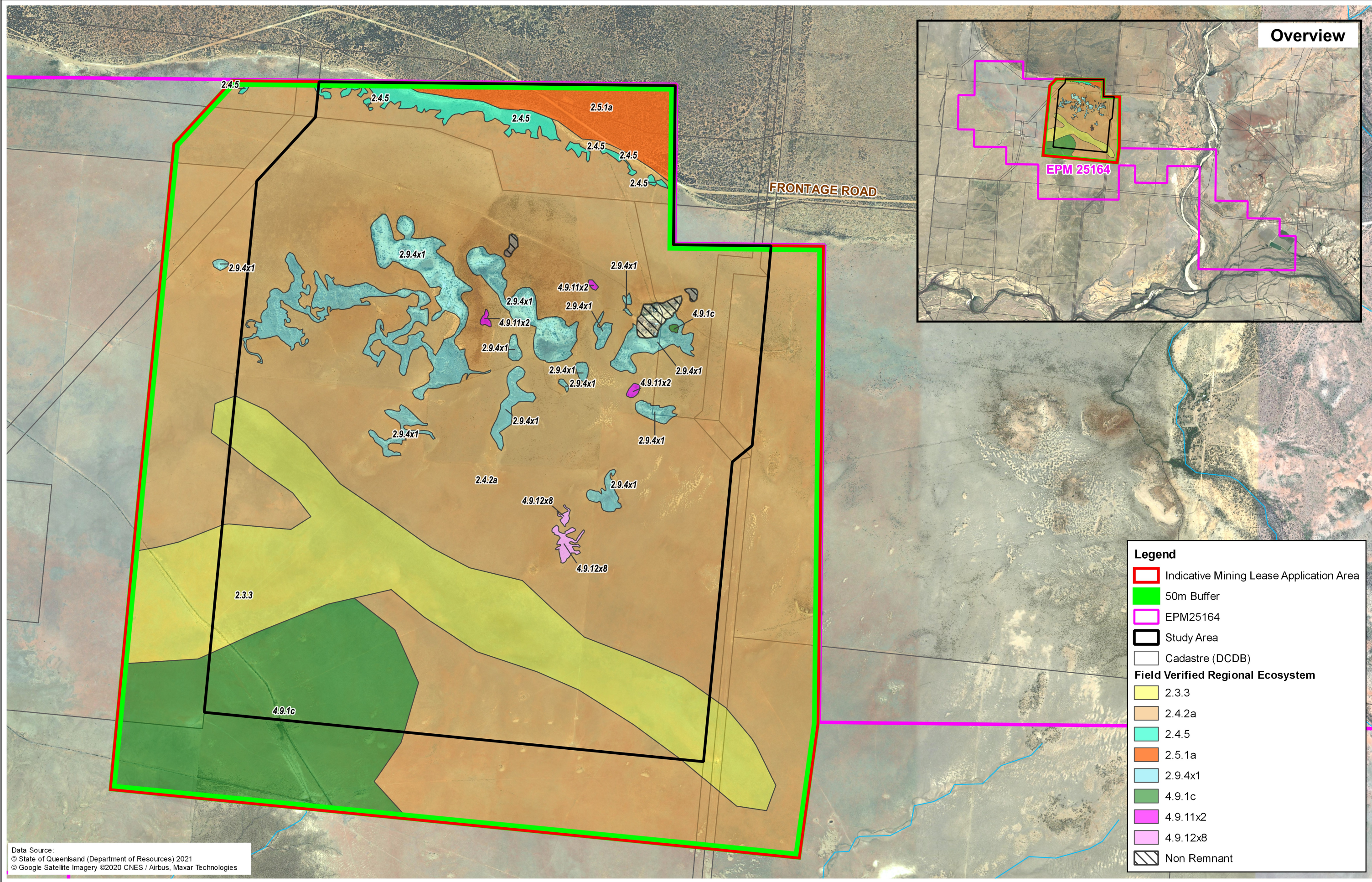
Regional Ecosystem ¹	Description ¹	VM Act ² status	EP Act Biodiversity Status ²	Area (ha)
2.5.1a	Mixed woodland, including combinations of the species <i>Lysiphyllum cunninghamii</i> , <i>Atalaya hemiglaucula</i> , <i>Eucalyptus microneural</i> , <i>Grevillea striata</i> , <i>Acacia</i> spp. and <i>Archidendropsis basaltica</i> . Occasional canopy species include <i>Terminalia</i> spp., <i>Erythrophleum chlorostachys</i> and <i>Melaleuca</i> spp. A variable shrub layer, including <i>Acacia</i> spp., <i>Eremophila mitchellii</i> and <i>Carissa lanceolata</i> , may occur. The ground layer is tussock grasses, including <i>Aristida</i> spp., <i>Enneapogon</i> spp. and <i>Eriachne</i> spp. Occurs on gently undulating Tertiary sand plains. Light-textured brown sandy soils and red and yellow earths.	LC	NC	143.46
2.9.4x1	Mixed low woodland, including a combination of the species <i>Lysiphyllum cunninghamii</i> , <i>Ventilago viminalis</i> , <i>Atalaya hemiglaucula</i> , <i>Corymbia terminalis</i> , <i>Owenia acidula</i> , <i>Denhamia oleaster</i> and <i>Acacia cambagei</i> . A sparse shrub layer may occur, including canopy species <i>Carissa lanceolata</i> and <i>Santalum lanceolatum</i> . The ground layer is tussock grasses. Includes small areas of <i>Enneapogon polyphyllus</i> tussock grassland on exposed mudstone rocks. Occurs on plains and low rises of cretaceous mudstone and limestone (toolebuc formation). Brown cracking clay soils with patches of exposed rock.	LC	OC	290.9
4.9.11x2	<i>Acacia tephрина</i> and/or <i>Acacia cambagei</i> low open woodland to woodland, occasionally with <i>Atalaya hemiglaucula</i> . The ground layer is tussock grasses, predominantly <i>Astrelba</i> spp. Occurs on undulating plains derived from cretaceous mudstones. Cracking clay soils.	LC	NC	4.0
4.9.12x8	Mixed low open woodland, including combinations of the species <i>Atalaya hemiglaucula</i> , <i>Ventilago viminalis</i> , <i>Corymbia terminalis</i> and <i>Denhamia oleaster</i> . A sparse shrub layer may occur. The ground layer is tussock grasses, including <i>Aristida</i> spp., <i>Enneapogon</i> spp. and <i>Astrelba lappacea</i> . Occurs on rises of exposed Cretaceous mudstone (Toolebuc Formation) with rocks to the surface.	LC	NC	8.19
4.9.1c	<i>Astrelba</i> spp., <i>Iseilema</i> spp. tussock grassland, commonly with <i>Panicum decompositum</i> , <i>Dichanthium</i> spp., <i>Eulalia aurea</i> , <i>Chrysopogon fallax</i> and <i>Sarga plumosum</i> . Emergent <i>Atalaya hemiglaucula</i> commonly occur. Occurs on level to gently undulating downs derived from cretaceous mudstones (predominantly allaru mudstone) in the north of the bioregion.	LC	NC	650.75
Non-remnant	-	-	-	18.18
Total (ha):				6,400.89

Note:

1. Taken from REDD – Regional Ecosystem Description Database (V12.0) (Queensland Herbarium 2021).
2. LC = Least Concern, NC = No Concern, OC = Of Concern, E = Endangered.

Flora Species Diversity

A total of 91 plant species was identified during the flora surveys. Of these, 16 were introduced species, three of which are scheduled as both Weeds of National Significance (WoNS) and Restricted Class 3 Invasive Plants under the *Biosecurity Act 2014*. No flora species listed as critically endangered, endangered, vulnerable, near threatened (CEEVNT) and/or Special Least Concern under the EPBC Act and/or NC Act was identified in the Study area. No species considered significant at the bioregional level (DERM 2009a; DEHP 2015b) was recorded.



Regulated Vegetation

The Study area is largely mapped as comprising Category B (remnant vegetation listed as least concern under the *Vegetation Management Act 1999* (VM Act)) on the Regulated vegetation management map (DoR 2021). Category B vegetation on the site comprises seven REs. The extent of mapped REs across the study area and survey effort are shown in **Figure 6**.

A small area of Category X vegetation (non-remnant vegetation and exempt from clearing works permit) is mapped in the north of the Study area.

Significant Flora Species

A desktop assessment was undertaken to identify species and ecological communities of conservation significance that could potentially occur within the Study area. Desktop analysis of remnant vegetation within the Project area showed a modified landscape with large areas converted to agricultural purposes (predominately grazing) with small areas of remnant vegetation remaining

Mitchell Grass Downs are dominated by Mitchell Grass (*Astrebla* spp.) tussock grasslands on rolling plains (downs). Soils are predominantly deep, heavy clays. The plains are interspersed with drainage lines, supporting open grasslands, herblands or eucalypt woodlands and isolated remnant plateaus.

The Gulf Plains are characterised by extensive alluvial plains and coastal areas. The tropical savanna vegetation comprises mainly eucalypt and tea-tree open woodlands.

For the purposes of the IAS, flora of conservation significance were considered to include:

- species listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act; and
- species listed as Endangered, Vulnerable or Near Threatened under the NC Act.

The WildNet search identified one species of plant listed as Vulnerable under the EPBC Act and/or NC Act. This species was also predicted to occur by the PMR. The species and its likelihood of occurrence is provided in **Table 11**.

Table 11: Likelihood of Occurrence of Conservation Significant Plant Species for the Project

Species	Status		Likelihood of Occurrence
	NC Act	EPBC Act	
Pink Gidgee (<i>Acacia crombiei</i>)	V	V	Unlikely. There is a Queensland Herbarium (2000) record approximately 20 km south-east of the Study area (DES 2021). There are several other Queensland Herbarium records within 85 km of the Study area: ▪ 1990 record >58 km north-east ▪ 1963 record north-east approximately 60 km north-east in Ronald Plains, Olga Downs ▪ 2010 record from Amaroo Station, >75 km, near Alexander Creek just north of Grampian Hills ▪ 1991 record >60 km east

Species	Status		Likelihood of Occurrence
	NC Act	EPBC Act	
			1974 record >80 km east-south-east The Study area lies outside the DAWE (2021) mapped distribution of the species.

Threatened Ecological Communities

A desktop search using the EPBC Act PMST (February 2021, **Appendix A**) was undertaken for the Project tenure and its surrounds. The following Threatened Ecological Community (TEC) was identified as having the potential to occur in the Project tenure and surrounds:

- the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin (endangered).

Field survey found no evidence of a spring ecosystem TEC (community of native species dependent on natural discharge of groundwater from the Great Artesian Basin) within or near the Study area.

Introduced Flora Species

Three WoNS were identified across the Study area, namely Prickly Acacia (*Vachellia nilotica*), Parkinsonia (*Parkinsonia aculeata*) and Athel Pine (*Tamarix aphylla*). These plants are also listed as 'Category 3 Restricted Invasive Plants' under the *Biosecurity Act 2014*.

Prickly Acacia is possibly the most serious weed species within the Project tenure. Prickly Acacia creates a woody overstorey stratum and substantially alters tussock grasslands by binding the soil and excluding some native plant species. It flourishes along watercourses and can out-compete native plants for water. Once established along watercourses and waterbodies such as dams, Prickly Acacia spreads into adjacent grasslands. Cattle preferentially graze the high protein seed pods, which can remain viable after passing through the digestive tract. Cattle spread the seeds as they move from infestations. Julia Creek Dunnart is known to be threatened by invasion of woody weeds, especially Prickly Acacia.

Environmentally Sensitive Areas

There are no environmentally sensitive areas (as listed under the EP Act) mapped within or adjacent to the Study area.

6.2.1.2 Fauna

The post-wet season survey recorded a total of 61 species while 78 species were recorded during the Spring survey (92 species in total). There was a noted increase in bird and mammal activity (largely associated with the woodland areas) between the two surveys. The fauna assemblage comprised one amphibian, 11 reptile, 66 bird and 14 mammal species. One conservation significant fauna species was identified in the wider area during the spring survey: Short-beaked Echidna (*Tachyglossus aculeatus*) (Special Least Concern under the NC Act). Two species considered of priority at the bioregional level were recorded, one at the State level and one at the Regional level. Four introduced species were recorded.

Assessment of habitat values for fauna (focused on Julia Creek Dunnart) was undertaken at various points across the entire Study area. Julia Creek Dunnart shelters during the day in soil cracks and vegetation (DERM 2009c). Prickly Acacia is a known threat to the species as it reduces ground cover species and inhibits the ability for soil cracks to form where it occurs (DERM 2009c). Soil cracking was often not evident throughout much of the Study area (likely a result of soil trampling caused by long-term cattle grazing activity). Prickly Acacia has been subject to management controls over much of the Study area and was generally relatively sparse throughout, excepting the Near Ridge paddock which remains subject to moderate to heavy infestation. Prickly Acacia was also common along two bore drain channels in the north and south of the Study area.

Conservation Significant Fauna Species

Of the 13 threatened fauna species identified in the desktop review, no species are considered as known or likely to occur and two species are considered as potentially occurring. A further two species listed as Migratory under the EPBC Act may also potentially occur based on the habitat values present within the Study area (refer **Table 12**).

Table 12: Conservation Significant Fauna Species Likelihood of Occurrence

Species	Status ¹		Source ²	Likelihood of Occurrence Assessment
	NC Act Status	EPBC Act Status		
Threatened species				
Grey Falcon (<i>Falco hypoleucos</i>)	V	V	PMR, WO, ALA	Potential. There are two records within 50 km of the Study area. Grey Falcon may occur in the area but any such occurrence is likely to be brief and may be of dispersing young birds. No suitable breeding habitat for the species present within the Study area.
Julia Creek Dunnart (<i>Sminthopsis douglasi</i>)	E	V	PMR, WO, ALA	Potential. There are six records located within 50 km of the Study area. At the time of the March 2021 survey habitat values across the site were generally poor for the species likely because of a lack of recent substantial rainfall in the Study area and grazing impacts (lack of grassy ground cover and soil trampling). Nevertheless, the species has potential to occur.
Migratory Species				
Fork-tailed Swift (<i>Apus pacificus</i>)	SL	M	PMR	Potential. There is one record from WildNet (undated) approximately 40 km south-east of the Study area and

Species	Status ¹		Source ²	Likelihood of Occurrence Assessment
	NC Act Status	EPBC Act Status		
				another record from eBird Australia (2000), approximately 32 km south-west of the Study area (ALA 2021). In Australia, Fork-tailed Swift is almost exclusively an aerial species, probably even sleeping on the wing, though individuals are occasionally recorded roosting in trees (DAWE 2021). The species has potential to occur over almost any habitat within its range.
Oriental Pratincole (<i>Glareola maldivarum</i>)	SL	M	PMR	Potential. There is a historical record from 1900 at Wyangarie Station, Richmond approximately 17 km south of the Study area (DES 2021). There are several other historical records greater than 100 km from the Study area (DES 2021). Oriental Pratincole occurs in open country, often near water. It is usually found on plains, floodplains or grassland with little vegetation. It also uses agricultural land, airfields and mudflats and occurs around the margins of wetlands, including artificial waterbodies (DAWE 2021).

1. Status abbreviations: CE= Critically Endangered, E= Endangered, V=Vulnerable, M= Migratory, SL = Special Least Concern

2. Source: PMR = Protected Matters Report, WO = Wildlife Online Extract, ALA = Atlas of Living Australia

It is noted there are no WildNet records of Koalas within a 50 km radius of the indicative MLA area. The closest record is approximately 167 km east of the proposed disturbance area in Porcupine Gorge. Koala is a well-known species which inhabits forests and woodlands usually dominated by *Eucalyptus* species on which it feeds. It also consumes foliage of other Myrtaceous genera including *Corymbia*, *Angophora* and *Lophostemon* species. Koala habitat can be broadly defined as any environment containing Koala food tree species or shelter trees.

In Queensland, the Koala's distribution extends across several bioregions in the east, encompassing a great diversity of habitats with the greatest concentrations recorded in the south-east. The proposed disturbance area is located well outside the accepted range of the species.

Introduced Fauna Species

Four species of feral animal were recorded during the field survey (refer **Table 13**). Three of these species are listed under Schedule 2 of the *Biosecurity Act 2014* as a 'Restricted Matter'. European Rabbit (*Oryctolagus cuniculus*) was recorded on three occasions in the north-central paddock in association with RE 2.9.4x1. Pest mapping indicates the Study area is on the western edge of the species distribution. Chital (*Axis axis*) is an introduced deer species and was recorded on a single occasion on a remote camera located near the property dwelling. This species does not appear to be previously identified as occurring in the Richmond area based on species database records or from 2018 pest distribution mapping (DAF 2019).

Table 13: Pest Species Identified During Field Survey

Species Name	Biosecurity Act Categories	Density	Distribution
Cat (<i>Felis catus</i>)	3, 4, 6	Common	Widespread
Cane Toad (<i>Rhinella marina</i>)	-	Common	Widespread
Chital (<i>Axis axis</i>)	3,4,6	Unknown	Scattered areas in Queensland

Species Name	Biosecurity Act Categories	Density	Distribution
European Rabbit (<i>Oryctolagus cuniculus</i>)	3,4,5,6	Sparse	Widespread in southern Australia

6.2.1.3 Matters of National Environmental Significance

A desktop search using the EPBC Act PMST on 16 February 2021 with a 50 km buffer surrounding coordinates -20.50593, 142.83523 (**Appendix A**) identified the following MNES potentially relevant to the Project:

- listed threatened species and communities comprising the following:
 - one TEC;
 - fourteen listed threatened species including eight birds, four mammals, one reptile and one plant species; and
- ten bird species listed as Migratory.

6.2.1.4 Matters of State Environmental Significance

Matters of state environmental significance (MSES) are defined under the State Planning Policy (SPP) and the Queensland *Environmental Offsets Regulation 2020*. The DES Environmental Report for MSES indicates there are no MSES mapped within the Study area. The nearest MSES to the site is associated with regulated vegetation (on defined watercourses) within 2.5 km of the south-western and southern boundary of the Study area and regulated vegetation (100 m from a wetland), approximately 4 km west of the Study area.

6.2.1.5 MNES and MSES Applicability

The only MNES or MSES applicable to the Study area is potential habitat for fauna species listed under the NC Act and/or EPBC Act. Four species listed as Endangered or Vulnerable are considered as potentially occurring. Three of these species, Grey Falcon, Fork-tailed Swift and Oriental Pratincole are expected to use the Project only very sporadically, if at all, based on known distribution, habitat use and the nature and condition of habitats onsite. Any possible impacts to these three species would be negligible at worst and they are not discussed further. Although there is no evidence of Julia Creek Dunnart in the Study area, there is suitable habitat, albeit degraded, and there are two records of the species approximately 20 km south of the Project. Also, unlike the three highly mobile bird species, should Julia Creek Dunnart be present it is likely to be resident.

An assessment of the Project and its potential to cause significant residual impacts to Julia Creek Dunnart has been carried out using the criteria described in the MNES Guidelines. Under the nine-part test it is considered the Project is unlikely to cause a significant residual impact on Julia Creek Dunnart, however this will be assessed further as part of the EIS.

6.2.1.6 Matters of Local Environmental Significance

Examination of Environmental Overlay mapping within the *Richmond Shire Planning Scheme 2020* identified no areas mapped as having high environmental values, agricultural land, or as a waterbody or waterway.

6.2.1.7 Aquatic Ecology

There are no declared fish habitat areas or high ecological significance wetlands mapped within the Project tenure. Desktop searches using the EPBC Act PMST, Biodiversity and Conservation Values and MSES were undertaken for the Project tenure and its surrounds in order to determine species likely to occur (refer **Appendix A**). These searches revealed no species that are Aquatic Conservation Assessment, NC Act or EPBC listed.

WetlandInfo lists ray-finned fishes likely to occur within Richmond Shire LGA and therefore within the Project tenure (DES 2013), refer **Table 14**.

Table 14: Native Ray-finned Fishes of Richmond Shire LGA

Family	Species	Common name	Endemicity
Ambassidae	<i>Parambassis gulliveri</i>	giant glassfish	QAI
Ariidae	<i>Neoarius berneyi</i>	highfin catfish	QAI
Centropomidae	<i>Lates calcarifer</i>	barramundi	QAI
Clupeidae	<i>Nematalosa erebi</i>	bony bream	QA
Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod	QA
	<i>Oxyeleotris selheimi</i>	blackbanded gudgeon	QAI
Gobiidae	<i>Glossogobius aureus</i>	golden flathead goby	QAI
Melanotaeniidae	<i>Melanotaenia splendida inornata</i>	checkered rainbowfish	QA
Plotosidae	<i>Neosilurus hyrtlui</i>	Hyrtl's catfish	QA
Terapontidae	<i>Amniataba percoides</i>	barred grunter	QA
	<i>Hephaestus fuliginosus</i>	sooty grunter	QA
	<i>Leiopotherapon unicolor</i>	spangled perch	QA
	<i>Pingalla gilberti</i>	Gilbert's grunter	Q
	<i>Scortum ogilbyi</i>	Gulf grunter	QA
Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish	QAI

Q: Queensland endemic - naturally occurs in Queensland

QA: Intranational - naturally occurs in Queensland and interstate

QAI: Not endemic to Australia - naturally occurs in Queensland, interstate and overseas

6.2.2 Potential Impacts to Ecology

The Project has potential to cause the following impacts to the ecological environment within and surrounding the Project tenure:

- introduction and/or spread of weed and feral animal species resulting in degradation of habitat and increased competition;
- clearing for Project infrastructure resulting in vegetation / habitat loss and potential cumulative impacts;
- impacts with regards to habitat fragmentation are considered low given the nature of the habitat within the Study area and surrounding landscape (both dominated by grasslands);

- direct mortality or injury to fauna as a result of vegetation clearing (if mitigation measures not implemented);
- loss of potential habitat (254.75 ha of poor habitat and 299.44 ha of moderate habitat value, e.g. a total of 554.19 ha) for Julia Creek Dunnart during initial survey works in Study area;
- altered fire regimes and impacts to fauna (considered low risk);
- unplanned releases of contaminants to soil, resulting in degradation of surrounding vegetation and habitat; and
- excessive dust generation and deposition resulting in degradation of habitat and reduced vegetation growth.

6.2.3 Management and Mitigation Measures

Proposed management and mitigation measures for the Project include (but are not limited to):

- procedures for vegetation clearing and surface disturbance (e.g. pre-clearance surveys, fauna spotter catchers and salvaging of habitat features for use in rehabilitation).
- site induction program to include environmental obligations and compliance requirements;
- ongoing rehabilitation throughout the life of mine, to reduce environmental impacts;
- dust should be suppressed using water trucks / wetting to keep dust related impacts to a minimum;
- reduced fire regimes will require onsite staff to be vigilant of the potential for fire. Fire awareness training can be included in site induction process;
- wastes should be disposed of appropriately and collected by a licensed waste contractor and taken to a licensed waste facility. Waste tracking certificates should be kept and maintained;
- vehicle wash downs for all new vehicles entering the site to ensure seeds are not spread onto Project area; and
- areas subject to progressive rehabilitation will be regularly inspected for weed presence, including Prickly Acacia. Management controls will be developed and implemented where necessary.

6.3 WATER

6.3.1 Existing Environment

The Project is located within the Flinders River catchment and water management area and falls under the *Water Resources (Gulf) Plan 2007* (the Gulf Water Plan). Allocation volumes and rules for dealing with allocations for this specific catchment are defined in the amended Gulf Resource Operations Plan (ROP) which was released in August 2015.

6.3.1.1 Watercourses

Defined watercourses intersecting the Project tenure are summarised in **Table 15**.

Table 15: Watercourses Intersecting the Project Tenure (EPM)

Name	Permanency
Flagstone Creek	Non-perennial
Flinders River	Non-perennial
Hazlewood Creek	Non-perennial
Rathole Creek	Non-perennial
Stawell (Cambridge Creek) River	Non-perennial

Flagstone Creek is located in the south-western aspect of the western side of the Project tenure and Rathole Creek is also on the western side of the Project tenure. Hazlewood Creek traverses the far eastern side of the Project tenure which is bordered to the south by the Flinders River. A number of smaller, low order tributaries surrounding the Project tenure include Eurumpy Creek, O'Connell Creek, Middle Creek, Bullock Creek and Eight Mile Creek.

It is noted that no watercourses are mapped within the indicative MLA area.

6.3.1.2 Water Availability

A Water Supply Options Investigation (OD Hydrology 2021) has been undertaken for the Project which identified multiple options that have potential to meet water supply requirements of the mine. The investigation assessed each option against a set of criteria relating to their suitability and feasibility for the Project and recommended preferred options for further development. The two preferred options, based on the outcome of the investigation, were groundwater extraction and surface water harvesting. These two options will now be carried through as the preferred options for further development in the next phase of mine feasibility assessment.

6.3.1.3 Water Allocation

There are currently a number of proponents with an interest in accessing unallocated water in the General and Strategic Reserves with known demand for water across the Flinders River Catchment exceeding the available reserves. There is 139,650 ML of unallocated water in the General Reserve which may be made available for any purpose. Further, there is 17,850 ML of unallocated water in the Strategic Reserve which may be made available for a coordinated project or a project of regional significance, though it is noted that projects declared as a coordinated project are not guaranteed access to water under the Strategic Reserve.

6.3.1.4 Fisheries Waterways

There are two purple (major waterways providing for fish passage) waterways mapped centrally and within the east of the Project tenure. A number of green (low impact) waterways also intercept the perimeter of the Project tenure (refer **Figure 7**).

It is noted however that none of these waterways intercept the indicative MLA area.

6.3.1.5 Wetlands

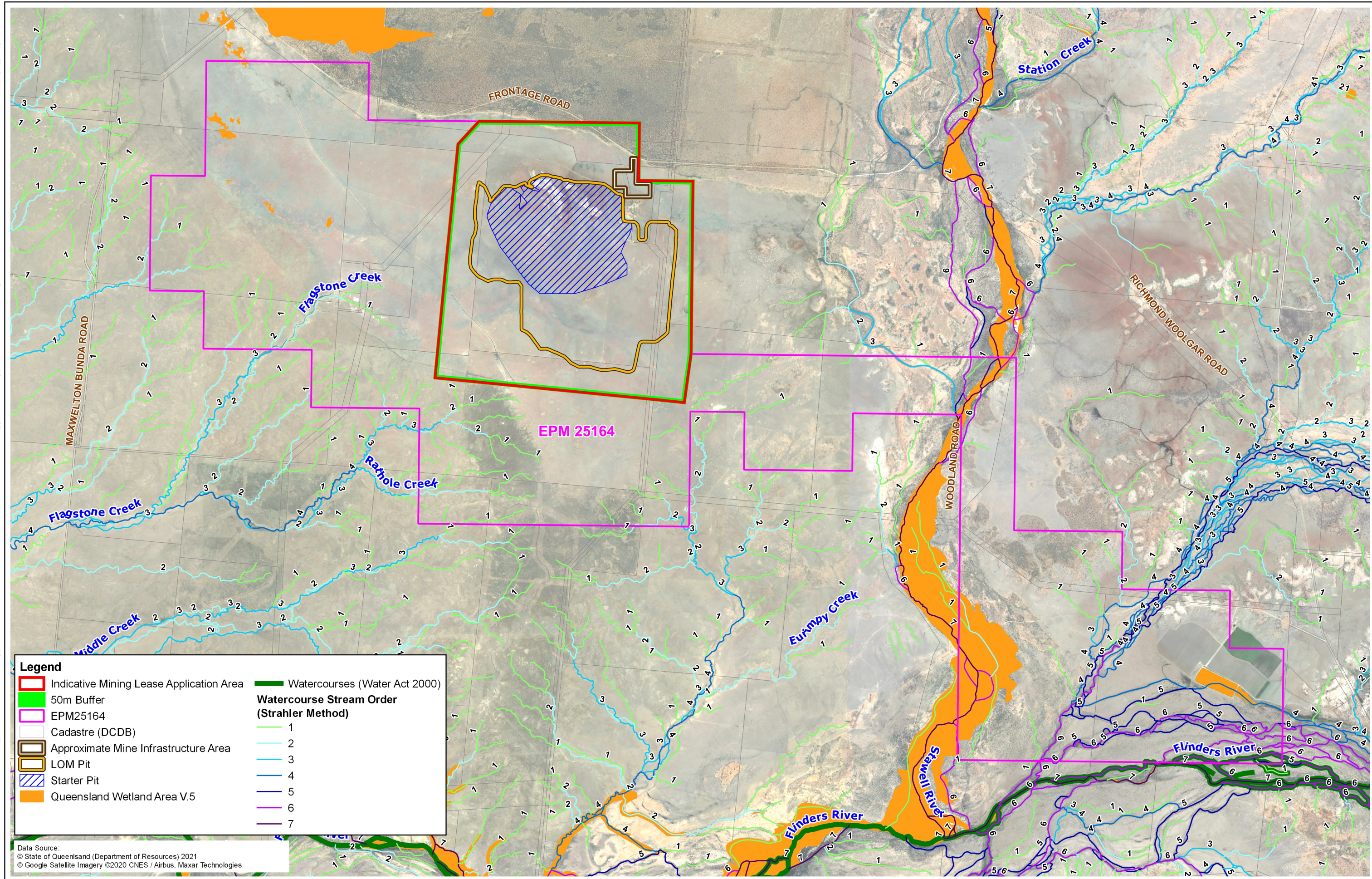
There are a number of mapped wetlands across the Project tenure mainly associated with the Stawell River, Flinders River and Hazlewood Creek, refer **Figure 7**. There is one artificial / highly modified lacustrine wetland mapped on the most south-eastern corner of the Project tenure, and several mapped palustrine wetlands scattered on the western side of the Project tenure. It is noted however that there are no mapped wetlands within the indicative MLA area which is the area of interest.

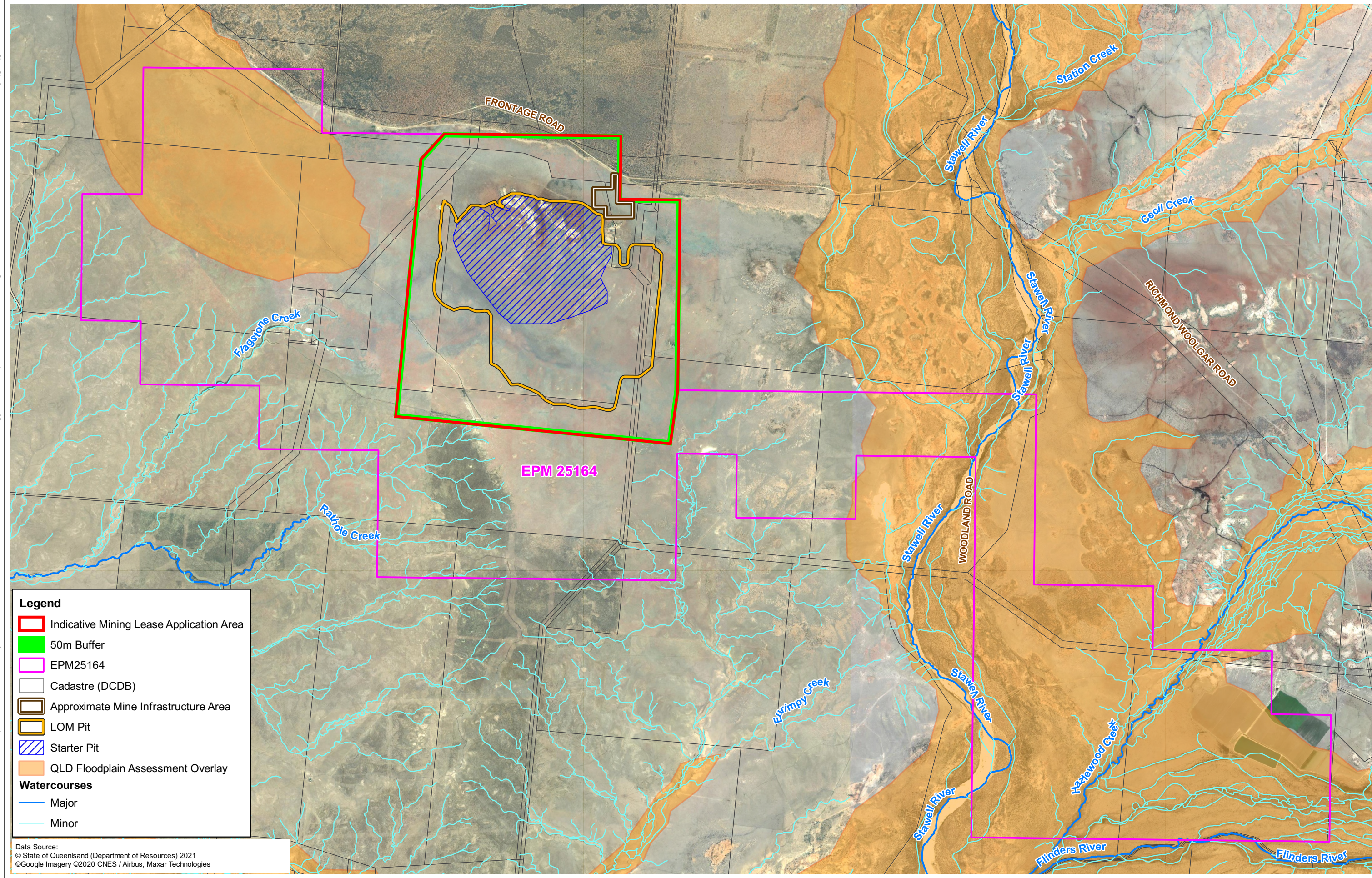
There are no mapped wetland areas of high ecological significance or representing Wetland Protection Areas identified as occurring within the Project tenure or immediate surrounds.

6.3.1.6 Flooding

Queensland Flood Plain Assessment Overlay mapping (**Figure 8**) indicates an estimate of areas at threat of inundation by flooding. This data considers historical flood records, contours, soil and vegetation mapping and satellite imagery. The far eastern and western aspects of the Project tenure fall within potential flood hazard areas. Namely, Stawell River, Hazlewood Creek and Flinders River within the Project tenure have the potential to flood. However, no mapped watercourses or waterways intercept the indicative MLA area and there is no floodplain assessment overlay over the indicative MLA area.

Detailed baseline and predictive flood modelling of levels, depths and velocities across the Project tenure will be undertaken to inform future mine planning and infrastructure siting. Potential mitigation for areas at threat of inundation by flooding will be identified following field studies and technical assessments undertaken in more detail as required as part of the EIS process.





6.3.1.7 Groundwater

The Project is located within the area of the *Water Plan GABORA (Great Artesian Basin and Other Regional Aquifers) 2017*. The Project is located within Eromanga Precipice, Hutton and Springbok Walloon zones and within the following groundwater units and sub-areas:

- Betts Creek Beds;
- Winton Mackunda;
- Rolling Downs;
- Hutton;
- Springbok Walloon;
- Precipice;
- Hooray; and
- Clematis.

Queensland Government's registered groundwater database was used to identify any bores within and adjacent to the Project tenure. All registered Groundwater Bores within the broader Project tenure are shown and have been labelled in **Figure 9**. With progression of the Project, further investigations into potential impacts to groundwater and bores would be undertaken in order to determine which of these are currently in use. Standing water level from bore report for registered bore (RN184201) within the indicative MLA area is at 20.43 m depth.

6.3.1.8 Groundwater Dependent Ecosystems

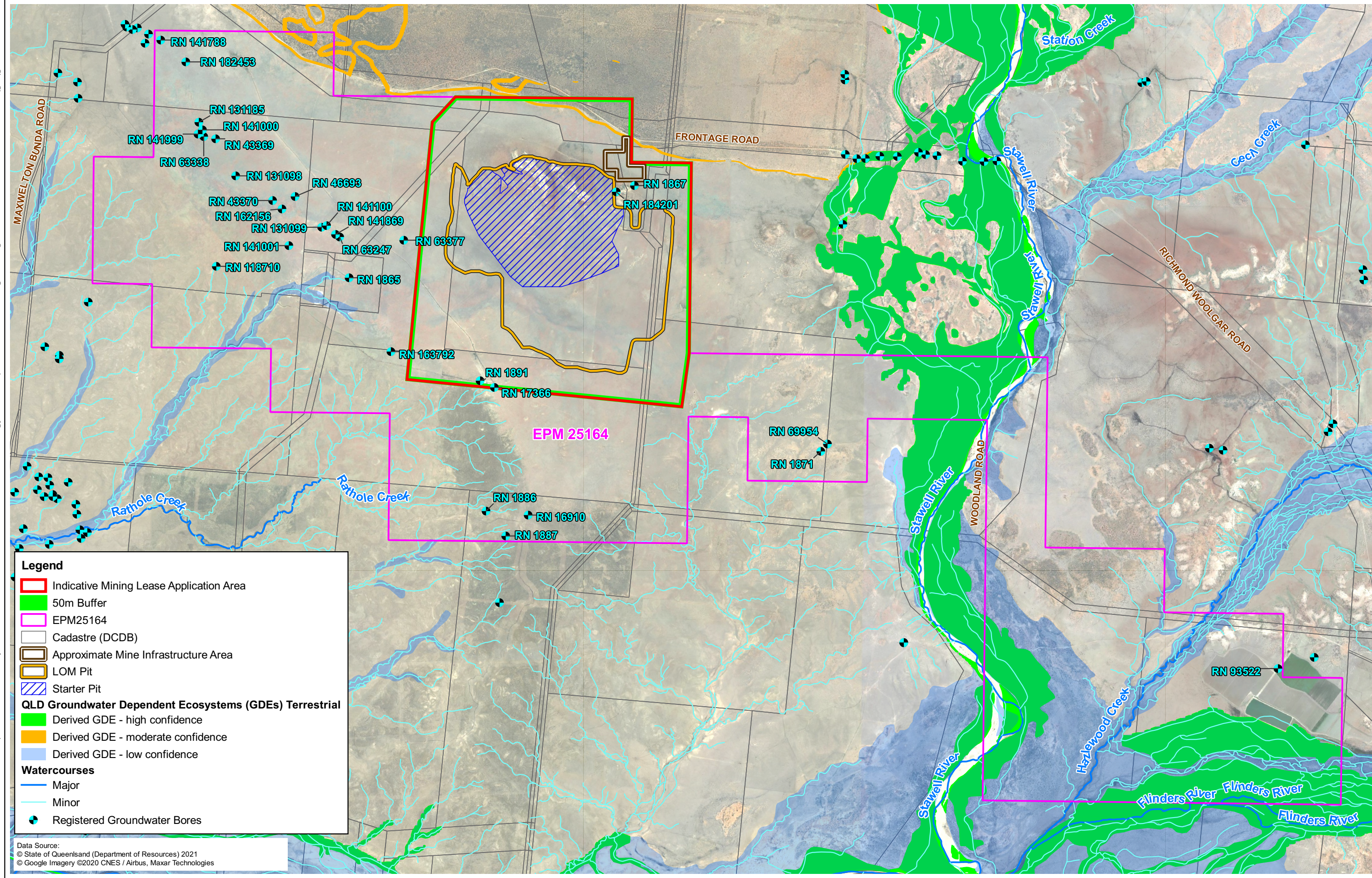
Groundwater Dependent Ecosystems (GDEs) as mapped by the State show a number of terrestrial GDEs occurring within the wider Project tenure. These are primarily associated with areas of remnant vegetation and watercourses / drainage lines (refer **Figure 9**). No subterranean GDEs are mapped as occurring in the Project tenure.

There are no active, inactive or GDE springs mapped within the indicative MLA area. Some small surface expression GDEs are thought to be present and their full extent would be assessed as part of the surface, groundwater and ecological assessments undertaken as part of the EIS.

6.3.1.9 Stygofauna

Stygofauna are found predominantly in aquifers with large (more than 1 millimetre) pore spaces in karstic, alluvial and fractured rock aquifers (Hose et al. 2015). Queensland comprises approximately 24 known families of stygofauna (Glanville et al. 2016). A stygofauna investigation would be undertaken for the EIS as part of the groundwater and aquatic ecology scope of works.

File Path: G:\GIS\Epic Environmental\Projects\BE2020\BE200088.01 Richmond Vanadium Technology EIS\Workspaces\IAS\IAS Rev 1\Figure 9 Registered Groundwater Bores and GDEs.qgs.qgz



0 1 2 3 4 5 km

Scale: 1:100,000@ A3
Datum: GDA2020 Projection: MGA54



**Richmond Vanadium Technology
Initial Advice Statement (IAS)**

Figure 9
Registered Groundwater Bores and GDEs

6.3.2 Potential Impacts to Water

6.3.2.1 Surface Water

Project activities have potential to cause the following impacts to surface water within and surrounding the Project tenure:

- uncontrolled releases of mine water offsite (e.g. after flood events);
- cumulative impacts / potential competition for surface water resources in the region;
- controlled releases of mine processing water; and
- changes in surface water quality through seepage from the tailings dam or water storage facilities.

The Queensland Floodplain Assessment Overlay dataset presented in **Figure 8** indicates that Stawell River, Hazlewood Creek and Flinders River have the potential to flood within the Project tenure. Due to the location of Lilyvale pit, and the topography of the indicative MLA area, it is not expected that floodwaters would impact on the Project area (within the indicative MLA area). However, this would be assessed in more detail as part of the EIS.

6.3.2.2 Groundwater

Project activities have potential to cause the following impacts to groundwater, groundwater users and potential GDEs within and around the Project tenure:

- reduction of baseflow to watercourses, potentially resulting in impacts to GDEs and reduced surface water availability to potential users downstream;
- if groundwater is used as a water supply source there could be increased competition and potentially cumulative effects on groundwater drawdown;
- contamination of shallow groundwater systems due to the improper storage and handling of fuels and chemicals;
- changes in groundwater quality through seepage from the tailings dam or water storage facilities; and
- changes to levels and/or quality of shallow groundwater systems from overuse of water.

A detailed assessment of groundwater will be undertaken as part of the EIS process. The assessment will be inclusive of cumulative impacts on other groundwater users.

6.3.3 Management and Mitigation Measures

The following management and mitigation measures will reduce potential impacts on surface water flows and quality:

- the Project will be designed and constructed to provide a stable landform compatible with the local hydrological regime;

- implementation of a “clean water – dirty water” system to divert clean run-off around disturbed areas and direct run-off from disturbed areas to retention dams;
- beneficial uses will be sought for surplus water if it is available and where practicable; and
- discharges of any surplus water will be managed to minimise impacts to the surrounding environment.

Water at the processing plant will be recycled as follows:

- process water from the plant dewatering, wet screening, thickening and filtering areas will be recycled to the process water pond. The process plant will recycle up to 90 percent of the raw water feed from the plant;
 - a return water decant system from the wet tailing dam will recycle as much water from the tailings as possible to the process water pond;
 - water will be drawn from the raw water pond for dust suppression throughout the mining and process area of the facility; and
 - in pit water management will be required for excavation of the mine pit. Dewatering during major rain events could potentially be stored to supply water for the Project.
- licensed extraction of water resources in accordance with the *Water Act 2000* and mitigation as required;
 - preparation of water management plans and monitoring programs as required.

The following management and mitigation measures will reduce potential impacts on groundwater:

- appropriate storage of chemicals and hydrocarbons will be required as part of operations. Dedicated fuel / lubrication storage facilities will be located within the MIA and constructed in line with the containment and spill response requirements of *Australian Standard 1940 – The Storage and Handling of Flammable and Combustible Liquids (2017)*;
- installation of monitoring bores in the vicinity of processing, waste and fuel storage facilities;
- ongoing geochemical and physical sampling and analysis program will be carried out by the Proponent to further define and characterise reject materials as mining progresses; and
- installation of monitoring bores around the perimeter of the pit/s to monitor potential drawdown associated with mining (if below the water table) and leaching of potential contaminants from backfill material.

6.4 AIR, NOISE AND VIBRATION

6.4.1 Existing Environment

6.4.1.1 Air

Aside from potential localised and seasonal vegetation burning, or dust raised as a result of cattle grazing, the Project tenure is largely unaffected from processes affecting air quality. A baseline air quality assessment has however not yet been completed. This assessment will be undertaken as part of the EIS process.

6.4.1.2 Noise and Vibration

The Project is located in a rural area and is currently subject to very little anthropogenic noise and vibration aside from occasional exploration drilling activities and noises associated with vehicle and mustering activities.

6.4.1.3 Sensitive Receptors

The only nearby sensitive receptor identified by a preliminary desktop search is Lilyvale Station, which is located within the indicative MLA area. Lilyvale Station is currently used for cattle grazing and includes a homestead.

6.4.2 Potential Impacts to Air, Noise and Vibration

6.4.2.1 Air Quality

Air quality is managed in accordance with the EP Act, the *Environmental Protection Regulation 2019* (EP Reg) and the *Environmental Protection Policy (Air) 2019*. Open-cut mining activities have potential to generate particulate matter including dust and other smaller particulate emissions such as airborne matter with an equivalent diameter of 10 micrometres, or less (PM₁₀) and particulate matter with an equivalent diameter of 2.5 micrometres or less (PM_{2.5}).

Any future impacts to air quality at the Project would likely arise from wind-blown dust, grazing and associated activities, vehicles on unsealed roads and/or small aircraft. A detailed assessment of potential impacts that the Project may have on air quality would need to be undertaken as part of the EIS, including further approvals processes when more detailed designs are available. An on-site dust monitoring station would also be installed during the EIS process to accurately record baseline air quality conditions.

Potential impacts to air quality from mining activities include:

- dust generation from:
 - land disturbance during construction activities;
 - excavation activities to develop pits etc;
 - processes associated with open-cut mining (extraction, processing and/or transportation);

- product handling; and
- transportation on unsealed roads / tracks.
- odour generation from:
 - equipment operating on site; and
 - exhaust fumes from generators, machinery.

The only nearby sensitive receptor identified by a preliminary desktop search is Lilyvale Station, located within the indicative MLA area.

An assessment of the potential impacts on air quality (dust) would be undertaken for the Project EIS with consideration to the DES *Guideline Application Requirements for Activities with Impacts to Air (2017)*.

6.4.2.2 Greenhouse Gas Emissions

Mining activities have potential to result in emissions of greenhouse gas (GHG) through combustion of diesel fuels in mining plant and equipment, mining activities, electricity consumption and transportation. A GHG assessment would be undertaken for the Project as part of the EIS with consideration to the DES *Guideline Application Requirements for Activities with Impacts to Air (2017)*.

The Proponent recognises climate change science as set out by the United Nations Intergovernmental Panel on Climate Change (IPCC) plan to meet the required emissions targets as required by the Commonwealth Government's National Greenhouse and Energy Reporting Scheme (NGERS). Under this reporting system, all relevant sources of GHG emissions and energy consumption must be measured and reported annually. The Proponent will also report on the progress in meeting its future climate change objectives in addition to reporting emissions.

6.4.2.3 Noise and Vibration

Key potential noise and vibration impacts that could arise from the Project include:

- construction activities such as earthmoving and the use of mobile earthmoving equipment to build infrastructure associated with the Project;
- operational activities including operation of the mine, load-out processes, and road transport movements; and
- vibration impacts as a result of heavy vehicle movements.

The *Environmental Protection Policy (Noise) 2019* details Acoustic Quality Objectives for sensitive receptors and aims to ensure that the qualities of the acoustic environment are conducive to human health and wellbeing for sleep, study or learning, recreation, relaxation, conversation and to protecting the general amenity of the community.

Noise sensitive receptors in the vicinity of the Project would be identified as part of the EIS. A preliminary desktop search has identified one sensitive receptor located approximately 5 km to the south of the Project. Noise levels at sensitive receptors would vary due to the distance from the point emission source, meteorological conditions, topography of intervening landforms and the type of noise source. The existing noise environment is anticipated to be very quiet, as expected in a rural area. Existing background noises likely include natural noises such as wind and grass and occasional vehicles passing by. A detailed baseline noise and vibration assessment will however be undertaken as part of the EIS process.

6.4.3 Management and Mitigation Measures

A summary of management and mitigation measures will include (but not limited to):

- dust suppression measures, such as watering of haul roads and stockpiles;
- chemical surface suppressant e.g. salt, lignosulphonate or polymer to major haul road surfaces;
- use of large haul trucks to reduce number of trips;
- limiting vehicle speeds;
- minimising drop heights; and
- use of filters and scrubbers where appropriate within processing plant.

Following environmental assessment of the Project, additional site specific environmental management and mitigation measures would be developed and refined following consultation with the relevant stakeholders, guidelines and policies such as:

- *Environmental Protection (Air) Policy 2019*; and
- *Environmental Protection (Noise) Policy 2019*.

6.4.3.1 Greenhouse Gas Management Plan

An assessment of potential GHG emissions associated with the Project would be undertaken for the EIS. This would include developing measures to manage GHG emissions as a result of the Project and may include strategies such as monitoring the fuel efficiency of equipment and minimising double handling of materials.

The Proponent would monitor and manage the Project GHG emissions through participation in the Australian Government's National Greenhouse and Energy Reporting Scheme. Under this reporting system, all relevant sources of GHG emissions and energy consumption must be measured and reported annually.

6.5 TRAFFIC AND TRANSPORT

6.5.1 Existing Environment

6.5.1.1 Road Network

Access to the indicative MLA area is provided by Flinders Highway (a State controlled road) which runs in an east-west direction approximately 33 km south of the indicative MLA area access point off Frontage Road.

There are several local roads within the vicinity of the Project which provide access to the site, including:

- Frontage Road (to the north);
- Richmond Woolgar Road (to the east); and
- Maxwellton-Bunda Road (to the west).

There is also a number of private unsealed roads and tracks located within the Project tenure. Refer **Figure 10** for existing transport network.

6.5.1.2 Rail Network

The Queensland Rail (QR) operated Mount Isa Line runs in an east / west direction parallel to the Flinders Highway, approximately 33 km south of the indicative MLA area access point.

6.5.1.3 Port Facilities

The Port of Townsville Port Authority (Port) operates the harbour, ship berthing operations and some non-commodity freight. The Port is not directly involved in the bulk material handling of mineral commodities or concentrates.

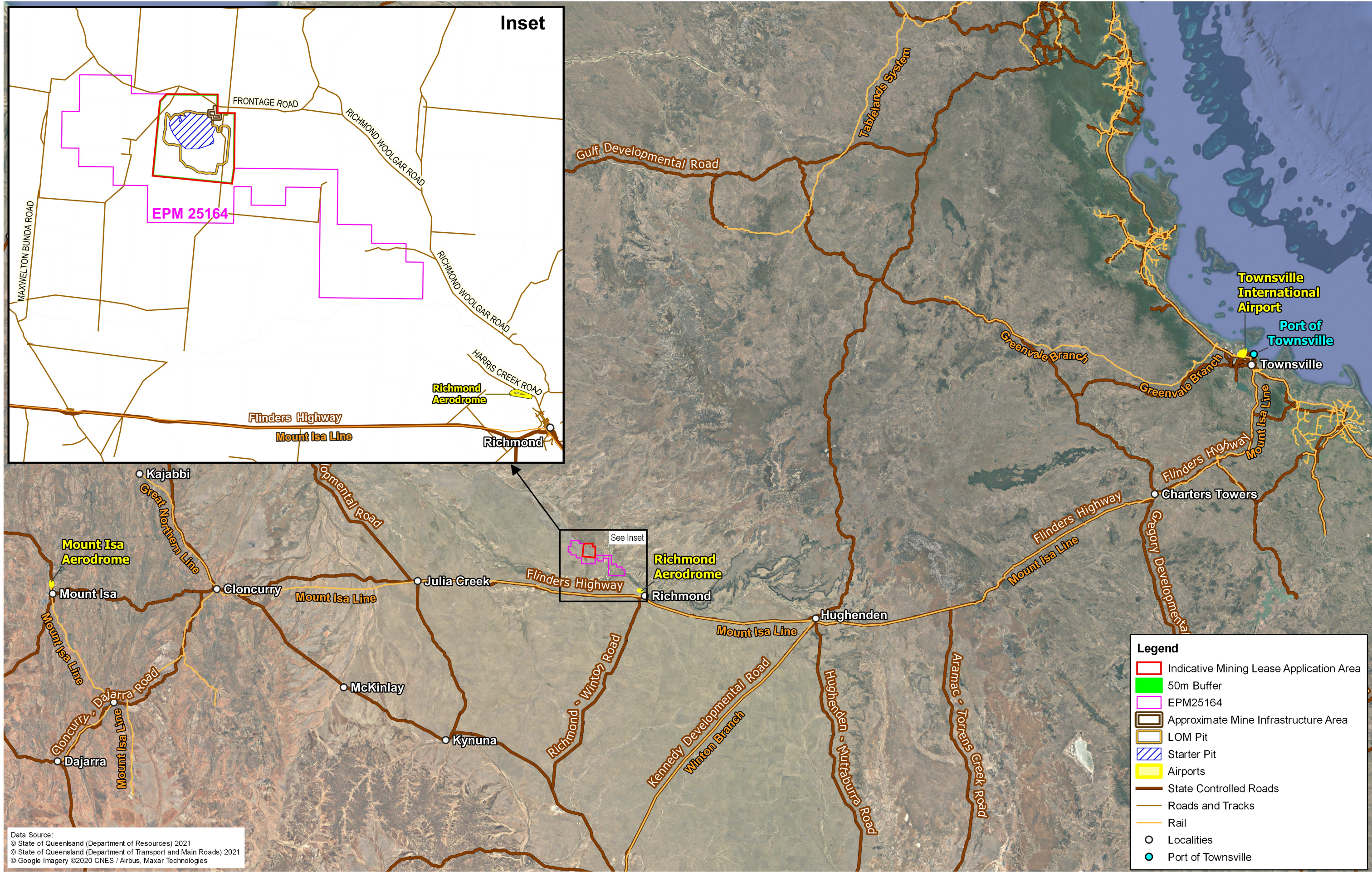
Private operators at the Port include South 32 for mineral concentrate and Glencore for container and bulk hopper and conveyor loading, both of which are closed to external parties. Other docking companies at the Port include Queensland Sugar Limited for containers, Northern Stevedoring Services for rotainers and Townsville Logistics.

6.5.1.4 Air Services

It is anticipated that Richmond Airport may be able to accommodate any necessary air travel or flying in of equipment. Other airports such as Mount Isa Airport may be able to handle larger volumes to support Richmond Airport as needed.

File Path: G:\GIS\Epic Environmental\Projects\BE2020\BE200088.01 Richmond Vanadium Technology EIS\Workspaces\IAS\IAS Rev 1\Figure 10 Existing Transport Network.qgs

©OGIS 2019



6.5.2 Potential Impacts to Traffic and Transport

6.5.2.1 Existing Transport Networks and Infrastructure

Impacts to Frontage Road and Flinders Highway as a result of the Project are possible due to increases in road and rail traffic. If disruptions are anticipated during construction and/or operation of the Project, it is important that the necessary bodies are actively involved in these discussions, e.g. Department of Transport and Main Roads (DTMR), QR, Richmond Airport and the Port of Townsville. Approvals may also need to be sought with these authorities depending on proposed movement activities.

The proposed indicative MLA area access point will require the use of Frontage Road and it is noted that some sections of the road intersect with the northern corners of the indicative MLA area. It is understood the ML configuration will exclude the road areas and that at this stage, no permanent road closures are required.

6.5.2.2 Traffic

It is expected that construction would use the existing road and rail networks in the area. As such, the Project has potential to impact on traffic generation, roadway capacity, safety, and condition. The potential impacts of the Project would be assessed in accordance with the DTMR (2017) *Guidelines: Guide to Traffic Impact Assessment*. A logistics study is currently being undertaken and more details would be provided in the EIS. Impacts may include:

- traffic delays at intersections, along major roads and rail used by the Project's activities;
- increased traffic accidents and incidents; and
- road surface damage or deterioration.

Traffic generation associated with the Project also has potential to impact terrestrial flora and fauna in the following ways:

- mortality resulting from vehicle collision;
- dust generation, which has the potential to smother roadside plants thereby affecting vegetation condition and reducing available habitat and food resources; and
- noise disturbance which can disrupt fauna behaviour.

6.5.2.3 Port Facilities

Currently, the Port of Townsville is the Project's primary option for import and export of products, with other alternatives being investigated. As it is understood there is limited availability of berths at the port, ongoing discussions with relevant stakeholders are underway to determine if there is capacity for the Project.

6.5.2.4 Airports

It is acknowledged that the proposed Project has the potential to impact scheduling and capacity of local flights and may affect availability of flights to local residents. Further studies will be undertaken as part of the EIS to assess impacts.

6.5.3 Management and Mitigation Measures

A summary of the proposed management and mitigation measures to ensure the ongoing performance and safety of the local and state-controlled road networks is detailed below:

- new roads or upgrades to existing roads would be developed in consultation with the appropriate regulatory authorities;
- following final route selection and design of access roads, the Project would implement any required transport management measures in consultation with relevant stakeholders such as the DTMR for State-controlled roads and Richmond Shire Council for local roads;
- for potential rail use, management measures associated with the transport of product would be developed in consultation with relevant stakeholders as part of the EIS. Consultation would also occur with Townsville Port Authority regarding access and use of existing Port facilities; and
- for air transport, consultation would be conducted with Richmond Shire Council regarding the capacity of Richmond Airport for air travel and transportation of equipment.

Negative impacts upon existing structures would need to be minimised and any new works need to be compatible with existing infrastructure. If disruptions are anticipated during construction and/or operation of the Project, it is important that the necessary bodies are actively involved in these discussions, e.g. Department of Transport and Main Roads (DTMR), QR, Richmond Airport and the Port of Townsville. Approvals may also need to be sought with these authorities depending on proposed movement activities.

6.6 SOCIAL AND ECONOMIC

6.6.1 Existing Environment

Richmond is located approximately 45 km to the southeast of the Project tenure. The Richmond area, originally known as Richmond Run, was explored and settled for pastoral use. Presently, the Richmond economy is dominated by the pastoral industry and has been capitalising on its position on the inland tourist route, notably as a location on the dinosaur trail, a marine fossil museum created in homage to the discovery of the *Kronosaurus queenslandicus* in the Richmond area.

Richmond covers an area of approximately 26,580 km². Richmond is a rural activity centre which provides essential functions at a district to sub-regional scale. The Project tenure is located between the towns of Richmond and Julia Creek; the Project tenure falls exclusively within the Richmond Shire LGA. Richmond has a population of 648 (ABS 2016) and is serviced by a hospital, school (from Prep to Year 10), swimming facilities, racecourse, caravan park and tourist information centre.

The local population is relatively small, and the area has historically had to import workers from larger regional centres such as Mount Isa and Townsville. The Project's location between Richmond and Julia Creek means it is nestled in the heart of a regional agricultural and mining dominated area.

6.6.1.1 Key Stakeholders

Key stakeholders relevant to the Project include:

- direct landholders;
- adjoining landholders;
- Federal, State and local government including representatives and agencies;
- indigenous groups;
- business operators and representatives;
- special interest groups; and
- local community.

6.6.1.2 Community Profile

The workforce in Richmond is currently comprised of Managers (21.4 percent), Labourers (20.2 percent), as well as Machinery Operators and Drivers, Technicians and Trades Workers, Clerical and Administrative Workers, Professionals, Community and Personal Service Workers and Sales Workers.

All data in this section has been sourced from the Australian Bureau of Statistics (ABS) 2016 Census data. More than 80 percent of Richmond's population are Australian born to Australian parents, with smaller percentages originating from New Zealand, England, Fiji, Papua New Guinea and Scotland. Current data reports full-time employment at 69.6 percent in the region, while 21.7 percent were employed on a part-time basis, 3.1 percent of people are unemployed. The median weekly personal income is \$668.

6.6.1.3 Community Services and Facilities

An overview of current services and facilities has been provided in **Table 16**.

Table 16: Richmond Community Services and Facilities

Community Services and Facilities	Summary
Richmond Health Service	The Richmond Health Service provides: ▪ inpatient, outpatient and emergency care services plus a (24-hours a day, seven days a week) hospital-based ambulance service; ▪ visiting services available to the Richmond community include, dental, women's health, allied health and mental health; ▪ Telehealth services via video conference, for linking patients with specialist services, reducing the need for patient travel; and ▪ school-based health support and child health services.
Emergency Services and Recovery Services	The following emergency services and community recovery services are provided to Richmond:

Community Services and Facilities	Summary
	▪ Queensland Police Service; ▪ Queensland Fire and Emergency Services; ▪ Rural Fire Brigade; ▪ State Emergency Service; ▪ Queensland Rural and Industry Development Authority; ▪ Department of Agriculture and Fisheries; ▪ AgForce; ▪ QHealth; ▪ BlazeAid; and ▪ Rural Financial Counselling Service.
Educational Facilities	Richmond State School, situated on the Flinders highway is a co-educational facility for students in Prep to Year 10. It caters for approximately 80 students from Richmond.
Recreational Facilities	The following recreation facilities are available to Richmond: ▪ Charlie Wehlow Oval; ▪ tennis courts; ▪ swimming pool; ▪ Lake Fred Tritton; ▪ skate Park; ▪ Jack Browns Lions Park; and ▪ Bobby Murray Memorial Park.

6.6.1.4 Community and Stakeholder Consultation

The Proponent has been undertaking exploration activities in the Project area since 2013, and during this time have engaged with key stakeholders including the owner and manager of Lilyvale Station, Richmond Shire Council, McKinlay Shire Council, and local community members.

To support the environmental approvals process, a draft CSES has been developed, consistent with the requirements of the *Strong and Sustainable Resource Communities Act 2017* (SSRC Act), and the *Social Impact Assessment Guidelines* published by the DSDMIP.

The engagement strategy was implemented prior to this IAS and will continue through the release of the draft ToR, EIS technical studies, the SIA and through the release of the EIS for public comment. To-date, the following consultation activities have been undertaken:

- town hall meeting in Richmond (2019);
- ongoing meetings with State and Federal government representatives;
- distribution of introductory letters and Q&A sheets for local landowners;
- attendance at Richmond Field Day (2019);
- sponsorship of community events, e.g. Richmond races; and
- follow up community meetings which were planned however due to COVID-19 travel restrictions had to be post-poned. Contact has been maintained with the local community via Richmond Shire Council through email and telephone.

Largely neutral comments regarding the Project have been received from adjoining landholders, and the community generally supports the development of the Project and the future opportunities it is likely to bring to the region. Emphasis was placed on a largely local workforce and this has been carried forward into options studies.

Richmond Shire Council is also supportive of the Project and have significant interest in the development of additional local infrastructure. Local businesses operating around the Project area are supportive of the Project and the economic benefits it would bring to the region in terms of creating new opportunities for existing businesses and increase economic stability. The retention of youth that would otherwise move on to opportunities in more populated areas is also a priority within the region.

Community and stakeholder engagement objectives for the Project are to:

- ensure disadvantaged and hard to reach stakeholders and groups are identified and included in community engagement activities;
- identify opportunities to work together with stakeholders to develop strategies that maximise Project benefits and minimise adverse impacts;
- raise stakeholder awareness of the Project, and its potential impacts and timelines;
- initiate engagement as early as possible in the EIS process to ensure stakeholders have sufficient time to consider the Project's potential impacts and provide input into mitigation strategies; and
- understand and address stakeholder concerns, issues and interests.

A range of engagement and communications tools would be utilised throughout the environmental approvals process, including but not limited to:

- Project newsletters and factsheets;
- Project email and 1800 community information line;
- regular updates to the Proponent's website;
- face-to-face meetings;
- Council briefings;
- Government briefings;
- community roadshows and public information sessions;
- business briefings; and
- media releases.

6.6.1.5 Accommodation and Housing

Richmond has a number of accommodation options including hotels, motels and a caravan park as well as supermarkets and cafes. There is no public transport within the town, though it is connected by REX air service to Mount Isa, Cloncurry and Townsville; a bus service and twice weekly rail service. Private vehicles are the primary form of transport.

There are 330 dwellings in Richmond, with 254 of these (77 percent) being occupied, and 76 (23 percent) being unoccupied private dwellings. The majority of these (90.9 percent) are separate houses, whilst the remainder are either semi-detached, rows or terrace houses, townhouses, flats, apartments, or other dwelling types.

6.6.1.6 Economic Environment

It is noted that the economic catchment is still recovering from the previous mining industry downturn with higher unemployment levels than the State average.

6.6.2 Potential Project Impacts

Potential beneficial social and economic impacts include:

- enhanced business activity within the region through creating and maintaining ongoing trade opportunities;
- revenue through taxes and royalties, enabling Government spending;
- employment and training opportunities throughout construction and operation;
- revenue for local / regional businesses;
- ongoing indirect and direct outputs, household incomes, direct employment and business turnover;
- improved population stability and economic well-being in the region;
- directly generating significant output through the construction and operation phases; and
- indirectly generate output through increased demand for goods and services required to support the Project as well as household consumption effects as a direct result of additional salaries paid;

Potential negative social and economic impacts include:

- additional pressures on existing health, emergency and educational services from non-local workers relocating with their families;
- potential competition for labour within the region;
- changes in land use;
- impacts to community cohesion;
- amenity impacts (including air quality, noise and vibration and visual amenity) though given the moderate distance from any major population centre impacts are anticipated to be either negligible or low; and
- potential adverse economic impacts including impacts on business activity in the region through competition for resources.

Based on the current social environment, a new project would help to raise employment rates within the Richmond Shire LGA and inject capital into the area.

6.6.3 Management and Mitigation Measures

6.6.3.1 Social Impact Assessment

As part of the EIS process, a Social Impact Assessment (SIA) will be prepared in accordance with the Coordinator-General's *Social Impact Assessment Guideline (March 2018)* to address legislative requirements of the SSRC Act, including the following key matters:

- local business and industry procurement;
- health and community well-being;
- community and stakeholder engagement;
- workforce management; and
- housing and accommodation.

As detailed in the Queensland Government's *Social Impact Assessment Guidelines*, the SIMP would include detail on the proposed management measures, timeframes for implementation, roles, responsibilities, stakeholders, and potential partnerships. Furthermore, the SIMP would include mechanisms to enable monitoring and review to ensure the mitigation and management measures remain effective and appropriate over time.

The SIA would be supported by the CSES, which is currently in draft. The CSES provides a framework for community and stakeholder engagement to discuss potential project impacts and opportunities, seek feedback and identify opportunities for partnerships.

6.6.3.2 Economic Analysis

It is understood that a detailed economic analysis and SIA would need to be undertaken as the Project progresses. This would include a summary of the existing economic environment, economic baseline assessment, potential beneficial and adverse impacts, and proposed mitigation measures to minimise adverse and enhance beneficial economic impacts to the local area and broader region. This assessment could be provided in the form of an Economic Impact Assessment for the Project's EIS.

6.6.3.3 Community Stakeholder and Engagement Strategy

To support the environmental approvals process, a draft CSES has been developed, consistent with the requirements of the SSRC Act, and the *Social Impact Assessment Guidelines* published by the DSDMIP.

The engagement strategy has been implemented prior to this IAS and would continue, through the release of the draft ToR, EIS technical studies, in particular the SIA and through the release of the EIS for public comment.

6.6.3.4 Social Impact Management Plan

Outcomes of community and stakeholder engagement and the SIA would be used to develop appropriate mitigation and management measures through a Social Impact Management Plan (SIMP). The SIMP would document the mitigation and management strategies recommended in the SIA and would provide a practical basis for implementation through a series of action plans relating to community and stakeholder engagement, workforce management and facilitating local and regional employment opportunities, housing and accommodation, community health and wellbeing and local business and industry procurement.

6.7 CULTURAL HERITAGE

6.7.1 Existing Environment

Cultural heritage across the Project tenure has been assessed as either Indigenous or Non-Indigenous.

6.7.1.1 Indigenous Cultural Heritage

Cultural heritage tenement searches using the Queensland Government Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Aboriginal and Torres Strait Islander Cultural Heritage Database Search Request Form indicate no artefacts on the Project tenure or within a 1 km buffer of the tenure.

The cultural heritage party for the Project tenure is Wanamara People Core Country Claim.

6.7.1.2 Native Title

A search of the National Native Title Tribunal (NNTT) register has not identified any areas of Native Title within the Project tenure.

6.7.1.3 Non-Indigenous Cultural Heritage

Based on searches using the Queensland Government's QGlobe tool, there are no non-Indigenous cultural heritage areas or artefacts recorded within the Project tenure.

6.7.2 Potential Project Impacts

Items of unrecorded cultural heritage may occur within or near the Project tenure and without appropriate site management initiatives, may be threatened by construction impacts.

6.7.3 Management and Mitigation Measures

The undertaking of cultural heritage assessments in regard to Indigenous cultural heritage and the implementation of site protection or remediation measures will be specified in the approved CHMP as appropriate for the site.

6.7.3.1 Indigenous Cultural Heritage Management Plan

The ACH Act provides recognition, protection, and conservation of Indigenous cultural heritage. The ACH Act mandates that a CHMP or Native Title Agreement is required to be developed in accordance with Part 7 of the ACH Act when an EIS is required.

Consultation would commence during the next development phase of the Project with the aim to develop an Indigenous engagement strategy, targeting Indigenous businesses and training facilities which work to up-skill individuals throughout the region.

6.7.3.2 Non-Indigenous Cultural Heritage Management

There are no non-Indigenous heritage places, landscape or values identified via database register searches, however if they are suspected or identified during the EIS assessment, appropriate management and mitigation measures would be implemented. The conduct of cultural heritage assessments and the implementation of site protection or remediation measures will be specified in the Environmental Management Plan for non-Indigenous cultural heritage.

6.8 HAZARD AND RISK AND HEALTH AND SAFETY

6.8.1 Existing Environment

Existing risks and hazards to the Project include flooding, bushfires and drought.

6.8.2 Potential Project Impacts

The probability of accidents associated with the development and implementation of the Project would be as low as reasonably practicable, given that the design, operating and control measures adopted by the Proponent would focus on their prevention.

Similarly, natural events of sufficient magnitude (e.g. flooding during the wet season) that could cause significant damage and pose serious safety risks, likely have a low probability of occurring during operation of the Project, noting that operations will be limited to the indicative MLA area where there are no nearby additional water sources (i.e. watercourses).

Impacts from bushfire are unlikely as fire is generally only possible in Mitchell grass grasslands after an adequate wet season which promotes sufficient vegetative growth. When burnt with adequate soil moisture, Mitchell grass responds well to fire and is known to seed profusely after recovering from a burn. Despite this, the area is rarely widely burnt due to the high fodder value of Mitchell grass species.

Some impacts due to drought are possible as this may impact the availability of water to the Project. Flooding is possible, however unlikely, based on the location of the indicative MLA area away from any watercourses.

6.8.3 Management and Mitigation Measures

A Project risk assessment would be undertaken in accordance with Australian Standard / New Zealand Standard International Standards Organisation (ISO) 31000:2009 Risk Management – Risk Assessment Techniques. Hazards and risks would be identified and managed to reduce any risk of potential harm to people and the environment, including cultural heritage. The results of this assessment would be included in the Project EIS.

6.8.3.1 Waste Management

The management of non-mineral waste would be governed by the EP Act, the EP Regulation, the *Waste Reduction and Recycling Act 2011* (Queensland), *Waste Reduction and Recycling Regulation 2011* and *Queensland Waste Avoidance and Resource Productivity Strategy 2014 – 2024*. Likely waste streams generated by the Project would comprise the following:

- regulated waste;
- recyclable waste that can be reconditioned, reprocessed and/or reused;
- general waste including decomposable and compostable putrescible wastes; and
- general waste that is not compostable but may be recyclable.

Any hazardous waste would be removed from the site by a licenced contractor and disposed of or recycled at appropriate off-site facilities. The most to least preferred waste management options under the *Waste Reduction and Recycling Act 2011* are as follows; ‘avoid, reduce, reuse, recycle, recover, treat and dispose.’ This hierarchy would be used to manage waste for the Project.

6.8.3.2 Environmental Management

An Environmental Management System (EMS) would be developed by the Proponent to guide the implementation of environmental management measures and commitments for the Project. Environmental Management Plans (EMPs) would be prepared, as required, and implemented prior to commencement of the Project. EMPs would be in accordance with relevant approval conditions. Ongoing monitoring would also be used to detect changes in performance indicators detailed in the EMPs and to proactively inform adaptive management.

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8 GLOSSARY, ACRONYMS AND ABBREVIATIONS

Acronym	Term
ABS	Australian Bureau of Statistics
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i>
AHD	Australian Height Datum
CBA	Cost-Benefit Analysis
CHMP	Cultural Heritage Management Plan
CLR	Contaminated Land Register
CSES	Community and Stakeholder Engagement Strategy
DAF	Department of Agriculture and Fisheries
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning
DTMR	Department of Transport and Main Roads
EA	Environmental Authority
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Register
EMS	Environmental Management System
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>
FTE	Full Time Equivalent
GABORA	Great Artesian Basin and other Regional Aquifers
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse Gas
GL	Gigalitre
GQAL	Good Quality Agricultural Land
Ha	Hectare
IAS	Initial Advice Statement
ISO	International Standards Organisation
JORC	Joint Ore Reserves Committee
Km	Kilometres
Km ²	Square kilometre
Kt	Kilotonne
LGA	Local Government Area
LOM	Life of Mine
M	Metre
MIA	Mine Infrastructure Area
ML	Mining Lease
MNES	Matters of National Environmental Significance
MR Act	<i>Mineral Resources Act 1989</i>
Mtpa	Million tonnes per annum
MW	Megawatt
NWMP	North West Minerals Province
NC Act	<i>Nature Conservation Act 1992</i>
NGERS	National Greenhouse and Energy Reporting Scheme
PFS	Pre-Feasibility Study
PMR	Protected Matters Report
PMST	Protected Matters Search Tool
PRC Plan	Progressive Rehabilitation and Closure Plan

Acronym	Term
Proponent	Richmond Vanadium Technology Pty Ltd
QG	Queensland Government
RE	Regional Ecosystem
RoM	Run of Mine
RPI Act	<i>Regional Planning Interests Act 2014</i>
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i>
SIA	Social Impact Assessment
SSRC Act	<i>Strong and Sustainable Resource Communities Act 2017</i>
TEC	Threatened Ecological Communities
ToR	Terms of Reference
WO	Wildlife Online
WoNs	Weeds of National Significance

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APPENDIX A – EPBC PROTECTED MATTERS REPORT



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/02/21 15:48:46

[Summary](#)

[Details](#)

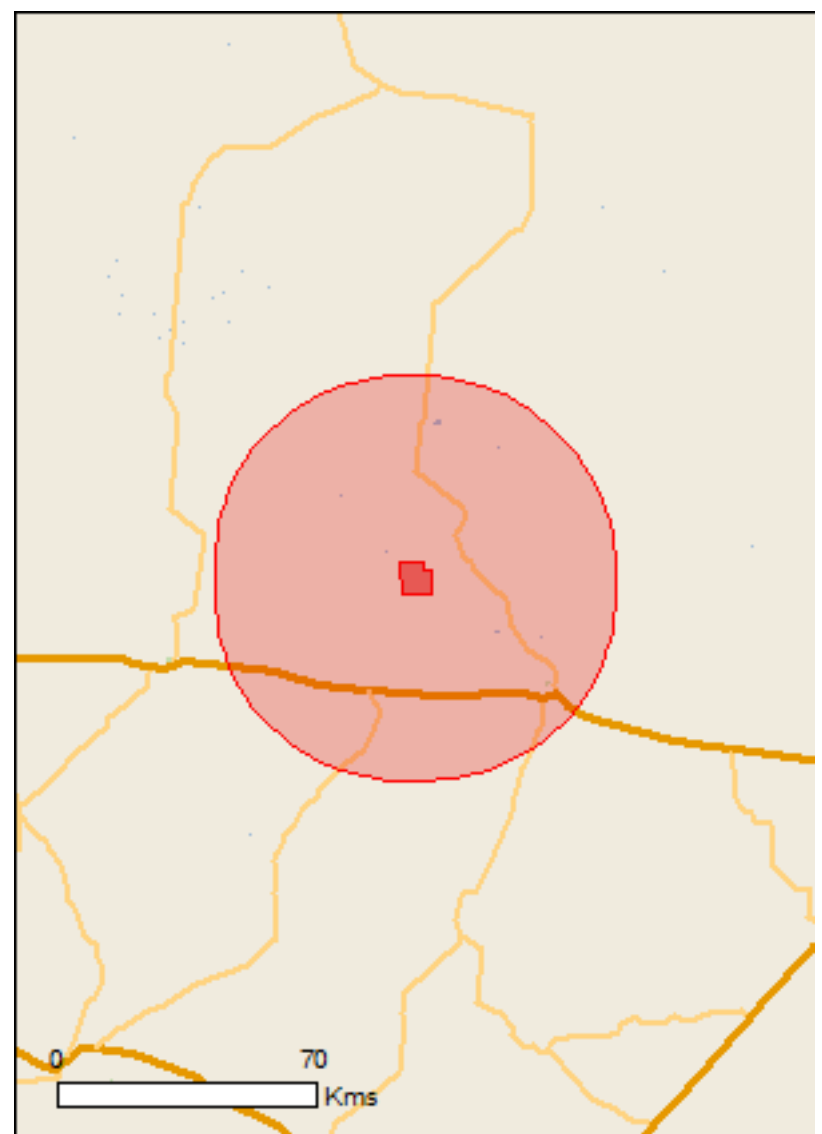
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

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Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	14
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin	Endangered	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
Mammals		
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Sminthopsis douglasi		
Julia Creek Dunnart [305]	Vulnerable	Species or species habitat known to occur within area

Plants		
Acacia crombiei		
Pink Gidgee [10927]	Vulnerable	Species or species habitat likely to occur within area

Reptiles		
Acanthophis hawkei		
Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species

[[Resource Information](#)]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area

Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area

Extra Information

Invasive Species

[[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

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- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
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- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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- Naturally Occurring Radiological Material assessment and management;
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- Site suitability assessments;
- Environmental offset assessments and development of management strategies;
- Waste auditing and management;
- Landfill design and management;
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