VALERIA
PROJECT

GLENCORE

Valeria Project – Initial Advice Statement

Document Number:	VAL-GCAA-05-AAM-REP-0001
Status:	Final
Version:	Rev 3
Effective:	30/04/20
Review:	Lindsay Ford, Project Manager
Owner:	Bronwen Morrison, Approvals Manager

Table of Contents

1 Executive Summary

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

Valeria Coal Holdings Pty Limited is the proponent (the Proponent) for the Project and a subsidiary of Glencore Coal Pty Ltd (Glencore). Glencore is a subsidiary of the global commodity trading and mining company, Glencore Public Limited Company. The Proponent recognises that due to the magnitude and complexity of the Project an Environmental Impact Statement (EIS) will be required. The Proponent has commenced environmental assessments to collect the requisite data needed to inform an EIS.

The Project is a greenfield open cut thermal and metallurgical coal mine located approximately 27 km north-west of Emerald within Central Highlands Local Government Area of the Bowen Basin, an existing coal production area. The Project comprises three Mine Lease Application (MLA) areas and an infrastructure corridor(s) for which an additional Mining Lease (ML) may be sought.

The Project area (excluding the required infrastructure corridor(s) spans approximately 28,267 ha with an approximate disturbance area estimated at 10,000 ha. The final Project footprint is still being defined and will be the subject of relevant studies conducted for the EIS.

The Project would involve the development of an open cut coal mine that could produce up to 20 million tonnes per annum (Mtpa) Run of Mine (ROM) coal for approximately 35 years. The Project will require one or more infrastructure corridors for coal rail transport, electricity, water, communications and roads. Once the preferred rail infrastructure corridor is selected, assessment will begin identifying the potential origin and connection points required to connect services to the Project area, with co-location of infrastructure along one alignment the preferred approach, where possible. However, being a greenfield site, the ability to co-locate infrastructure will depend on location of surrounding services and requirements for upgrade, all of which will be assessed in the EIS.

The impact assessment will be undertaken in accordance with the Project Terms of Reference (ToR), which is expected to focus on key issues such as protected areas, water, ecology and social considerations. The assessment approach will be consistent with that undertaken for all Glencore's greenfield coal projects and brownfield coal mine extensions, in both Qld and NSW, demonstrating Glencore's commitment to rigorous scientific baseline information collection and impact assessment. The Proponent will ensure that baseline environmental values in the Project area are well defined and impact assessment is robust, in meeting the requirements of the ToR, and in identifying suitable mitigation and management measures for any residual impacts within the proposed disturbance area. It is expected that construction of mining infrastructure will be staged over two years and will require a construction workforce of up to 1,400 people. An operational workforce of up to 950 fulltime equivalent personnel is expected to be required, however workforce needs are still being investigated.

The coal industry is a large contributor to the Queensland (Qld) economy and development of new coal resources will assist in meeting export and local demand for high quality coals. The Project site contains large quantities of high-quality coal resource and is surrounded by nearby townships which would provide human and material resources to support the Project. The Project is of strategic significance to the locality, region and State as it stands to provide direct and indirect employment and business opportunities inclusive of Indigenous involvement and expansion of the Proponent's investment in the region. The State is a significant benefactor from coal mining royalties, and under a 'do nothing scenario' (i.e. if the Project were not developed), the economic value that the coal would provide to the State and to the Commonwealth would not be realised.

Development of the Project will be managed within Glencore's stated commitment to cap global coal consolidated production at about 150 Mtpa. The Project will result in significant direct and indirect social and economic benefits including:

- Ongoing trade and employment opportunities;
- Indigenous participation, employment and business opportunities;
- Support for local businesses (including mining and construction businesses);
- Local investment and revenue for local businesses; and
- Government revenue through taxes and royalties.

These would occur as a result of employment and business generation from local to regional goods and services procurement, leading to maintained or increased business turnover and household income. Due to this, the Project has the potential to create significant community and social benefits, in addition to enhanced employment and economic outcomes in the nearby towns.

The capital cost investment of the Project (to commencement of operations) is estimated to be in the order of $1 billion to $1.5 billion. Glencore has a proven history of developing similar scale projects both in New South Wales (NSW) and Qld and has the financial capacity to fund the development of the Project.

The social impact assessment (SIA) being undertaken for the EIS will detail workforce accommodation opportunities for all phases of the Project, including local workforce sourcing, local accommodation and relocation strategies.

This IAS describes the existing environment and outlines potential Project impacts on and surrounding the greater Project area. Environmental assessments are required to understand the baseline environmental values in the Project area (which includes reserve land such as local government roads and State Forest) and the Project's potential impact on the values identified within those areas.

The IAS also outlines the likely approvals required for the Project, a cost and benefit summary and community and stakeholder engagement strategy.

The Proponent considers that the Project meets the requirements for declaration as a Coordinated Project under the SDPWO Act requiring an EIS.

2 Introduction

This Initial Advice Statement (IAS) for the Valeria Project (the Project) is prepared in accordance with Part 4, Subdivision 2, section 27AB of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Valeria Coal Holdings Pty Limited is the proponent (the Proponent) for the Project. The Proponent is a subsidiary of Glencore Coal Pty Ltd (Glencore), and Glencore is a subsidiary of the global commodity trading and mining company, Glencore Public Limited Company (Glencore PLC).

The Project is located approximately 27 kilometres (km) north-west of Emerald, 8 km south-west of Capella and 270 km west of Rockhampton within the Central Highlands Local Government Area (LGA) of the Bowen Basin in Central Queensland (refer Figure 1). The Project spans three Mining Lease Application (MLA) areas; 700044, 700045 and 700055 (refer Figure 2) and includes a future rail infrastructure corridor, and potentially other corridors that will link to existing water supply, electricity and communications assets.

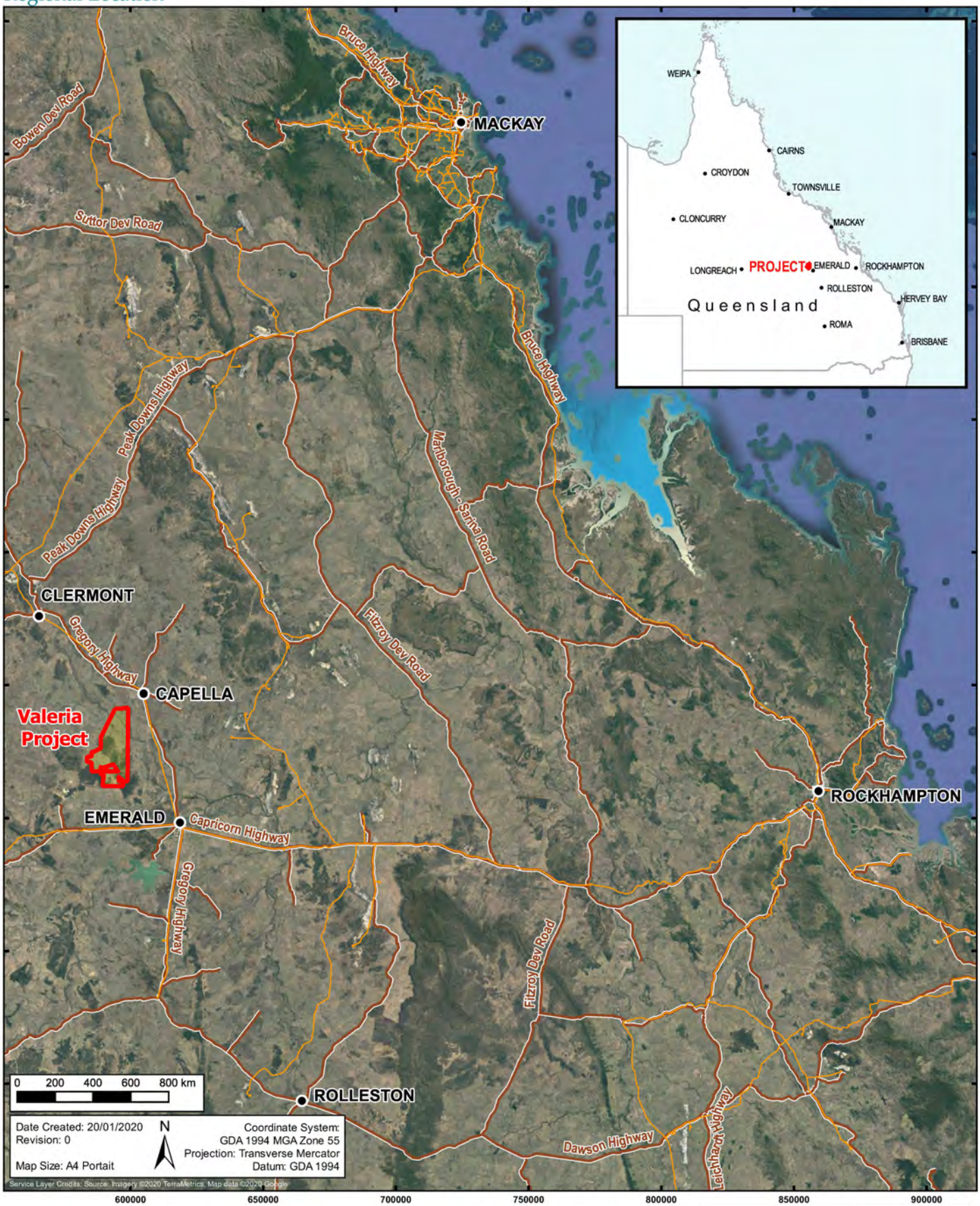
The Project would involve the development of an open cut coal mine that could produce up to 20 million tonnes per annum (Mtpa) Run of Mine (ROM) metallurgical and thermal coal for approximately 35 years. A number of State and Commonwealth statutory approvals will be required to support the Project.

Due to its significant economic and social implications and infrastructure, environmental and tenure complexities, and for reasons outlined in more detail throughout this document, the Proponent considers the Project meets the criteria for a Coordinated Project declaration, requiring an Environmental Impact Statement (EIS).

Figure 1

Regional Location

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 1 Regional Location.qgs

Valeria Project

State Controlled Roads

Rail

DISCLAIMER

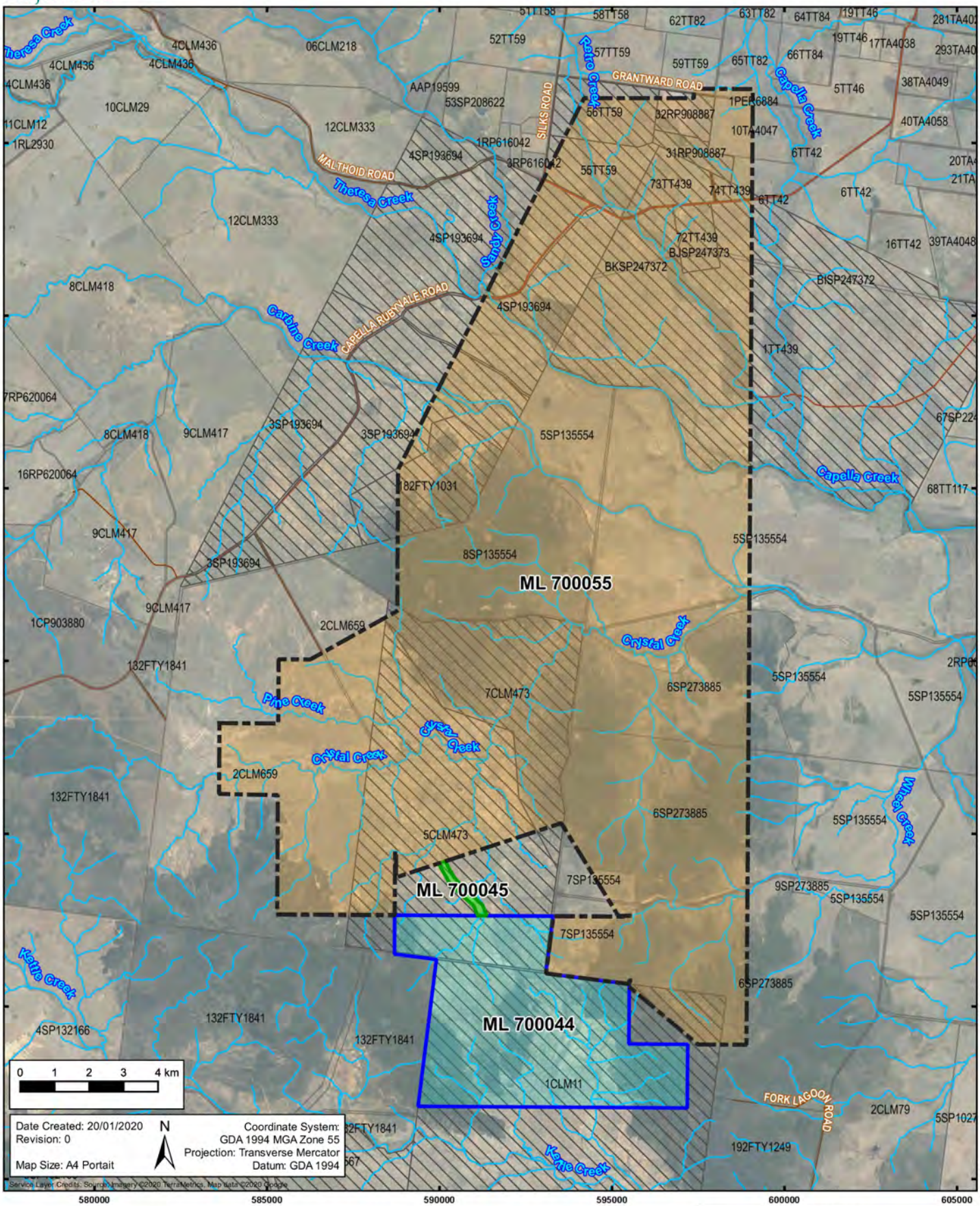
Subject To Survey

Glencore makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

Figure 2

Project Area

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 2 Project Area.qgs

Legend

- Cadastre (DCDB)
- Glencore-owned land
- Roads
- Watercourses

Valeria Project MLs

- ML 700044
- ML 700045
- ML 700055

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

2.1 Background

The coal resource in the Project area suits large scale open cut mining activities. The resource comprises high quality metallurgical and thermal coal located in proximity to existing transport corridors and within an existing coal production region.

Valeria Coal Holdings Pty Limited is a wholly owned subsidiary of Glencore. Glencore employed 9,915 people (employees and contractors) in the coal industry in Queensland (Qld) and New South Wales (NSW) in 2019. Glencore's total spend in 2019 in the Central Highlands LGA was more than $198 million (on salaries, goods and services, operational expenditure, capital expenditure, council rates and community investment). The vast majority of procurement expenditure was with local suppliers and contractors.

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

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

The Proponent has committed capital funding to the Project's development and is progressing investigations in support of its future assessment and approval. A number of baseline environmental assessments have commenced across the Project area and its surrounds, with mine planning and engineering and infrastructure design studies also in progress. Assessments required for the Project will be determined through development of the Terms of Reference (ToR) and will likely include:

- Groundwater;
- Surface Water;
- Air quality;
- Noise and Vibration;
- Terrestrial Ecology;
- Aquatic Ecology including Groundwater Dependant Ecosystems (GDEs) such as stygofauna;
- Soils and Land Use;
- Waste and Geochemistry; and
- Cultural Heritage.

In addition, an SIA and Social Impact Management Plan (SIMP) as well as a Progressive Rehabilitation and Closure Plan (PRCP) will be developed for the EIS.

2.1.1 Approvals

In 2019, three MLAs were lodged with the Department of Natural Resources Mines and Energy (DNRME) for the Project area, excluding the area required for an infrastructure corridor(s). These MLAs comprise 700044, 700045 and 700055 (refer Figure 2).

Two associated Environmental Authority (EA) applications were submitted to the Department of Environment and Science (DES), one for MLA 700055 (previously referred to as the Valeria Project) and one for MLAs 700044 and 700045 (previously referred to as the Valeria South Project). DES subsequently issued two notices that assessment through an EIS process was required to be undertaken for those projects.

Further mine planning work then determined that the Proponent would advance only one project through the EIS process, namely a combined Valeria and Valeria South Project, known as the Valeria Project. The Project comprises all three MLAs and an infrastructure corridor(s) and is the subject of

this IAS. At a future date during the approvals process, the Proponent intends to replace the two EA applications with one EA, to allow the Project to be approved and managed as a single integrated operation.

Project information such as proposed life of mine and annual ROM coal tonnage has been updated since combining the two projects into the one Valeria Project. The information presented in this IAS describes the Project as it is currently understood, for assessment via the EIS process under the SDPWO Act.

The main approvals required for the Project area are discussed further in Section 9 and include those under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for impacts on Matters of National Environmental Significance (MNES), the *Environmental Protection Act 1994* (EP Act), the *Mineral Resources Act 1989* (MR Act), the *Water Act 2000* (Water Act), and under the *Forestry Act 1959* (Forestry Act) (for impacts on State Forest).

2.2 Purpose and Scope of IAS

This IAS has been prepared in line with the *Application Requirements for a 'Coordinated Project' Declaration* (Department of State Development (DSD), 2015) 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.

3 The Proponent

The Proponent of the Project is Valeria Coal Holdings Pty Limited, a wholly owned subsidiary of Glencore. The Proponent owns 100 percent of Valeria South Pty Ltd, the underlying tenure holder and applicant for MLA 700044 and MLA 700045 and associated EA application. The Proponent is also one of four joint venture (JV) entities that are the applicants for MLA 700055 and the associated EA application (refer Table 1). As the proponent of the EIS, Valeria Coal Holdings Pty Limited is authorised to act as manager for J-Power Australia Pty Ltd, Leichhardt Coal Pty Limited and J.C.D. Australia Pty Ltd and as agent for Valeria South Pty Ltd.

Table 1 Applicants for Mining Tenures

Applicant Company Name	Mining Lease Application Number	ACN	Registered Address
Valeria South Pty Ltd (wholly owned by Valeria Coal Holdings Pty Limited)	MLA 700044 and MLA 700045	632279193	Level 44, 1 Macquarie Place, Sydney, NSW 2000
Valeria Coal Holdings Pty Limited (the Proponent)	MLA 700055	625049701	Level 44, 1 Macquarie Place, Sydney, NSW 2000
J-Power Australia Pty Ltd	MLA 700055	002307682	Suite 1 Level 4, 110 Walker Street, North Sydney, NSW 2060
Leichhardt Coal Pty Limited	MLA 700055	083181597	Level 44, 1 Macquarie Place, Sydney, NSW 2000
J.C.D. Australia Pty Ltd	MLA 700055	002017209	Level 8, 141 Queen Street, Brisbane, QLD 400

Glencore is Australia's largest coal producer with production of more than 100 million tonnes of saleable thermal and metallurgical coal in 2018[1]. Glencore operates 15 open cut and underground coal mines across Qld and NSW. Within the Qld coal sector, Glencore currently employs approximately 4,300 people. In 2018, Glencore managed the production of more than 44 million tonnes of saleable metallurgical and thermal coal across the Bowen Basin.

Glencore, as owner of the Proponent, has previously undertaken numerous studies and associated environmental impact assessments to obtain regulatory approvals for existing coal operations as well as new projects. Glencore's Qld coal operations include:

- Collinsville Open Cut;
- Newlands Open Coal;
- Hail Creek Open Cut;
- Clermont Open Cut;
- Oaky Creek Coal Underground; and
- Rolleston Open Cut.

Glencore has completed three coal mining EIS's in Queensland since 2009, comprising:

- Wandoan Coal Project 2009 - 2010;
- Newlands Coal Expansion Project 2011 – 2013; and
- Rolleston Coal Expansion Project 2009 – 2015.

[1]Glencore collates economic impact data on an annual basis, with results made available on the second quarter of the following year.

Glencore has demonstrated the financial capacity and experience to deliver high quality and comprehensive EIS's, and implementation of the commitments and conditions arising from those assessments. Furthermore, the Project's State and Commonwealth environmental approvals application material, including the EIS, will be prepared and delivered by a capable and dedicated Project team, with extensive prior experience in coal mining approvals in Qld.

4 Nature of the Proposal

4.1 Scope of Project

The Project is an open cut metallurgical and thermal coal mine proposed over MLAs 700044, 700045 and 700055. In addition to these MLA areas, infrastructure required to support the Project (e.g. communications, electricity, water, coal rail transportation and roads) will require one or more infrastructure corridors. An additional ML may be sought for the rail infrastructure corridor. The extent of the Project area, excluding the infrastructure corridor(s), is approximately 28,267 ha of which approximately 10,000 ha is estimated to be disturbed (refer Figure 3).

The Project is proposed to be a conventional truck and shovel operation, involving the removal of overburden in addition to coal and parting in up to eight pits. Coal will be separated from waste material at the Coal Handling and Preparation Plant (CHPP). Tailings and rejects will be disposed of in a Tailings Storage Facility (TSF) with options for in-pit co-disposal being investigated. Waste rock dumps will be located out-of-pit, however as mining progresses waste rock will be backfilled into pit voids. Figure 3 presents the preliminary Project layout with the final Project footprint still being refined for assessment in the EIS.

Investigations and mine planning currently being undertaken will inform pit extent and design to confirm if any pits will result in a residual void and to ensure no residual voids without a post-mine landuse are located within floodplains. The EIS and related studies to be undertaken (including the development of the PRCP) will confirm the rehabilitation designs, methods and targeted post-mining land uses for all areas, including any potential residual voids.

Within the Project area, the following key infrastructure is required:

- Open cut pits supporting production of up to 20 Mtpa ROM;
- ROM pad, hopper and stockpile;
- CHPP and Mine Infrastructure Area (MIA);
- TSF;
- Out-of-pit and in-pit waste rock dumps;
- Water supply dams;
- Mine water management dams and storage facilities;
- Load out facility and product stockpile;
- Rail loop and load out point;
- Internal haul roads linking the active mine, MIA and load out facility;
- Office buildings and amenities;
- Sewage treatment plant (STP);
- Electricity transmission line;
- Water supply pipeline; and
- Site access roads.

Project water supply options are being investigated and could include a combination of:

- Processing water re-use and recycling;
- Open cut dewatering;
- Flood harvesting;
- Groundwater;
- Wastewater treatment;
- Incidental rainfall and runoff collection; and
- Pipeline connecting to existing water networks in the area.

The preliminary Project layout will likely require internal haul road crossings of a number of watercourses and drainage lines, including:

- Retro Creek;
- Theresa Creek;
- Carbine Creek; and
- Crystal Creek.

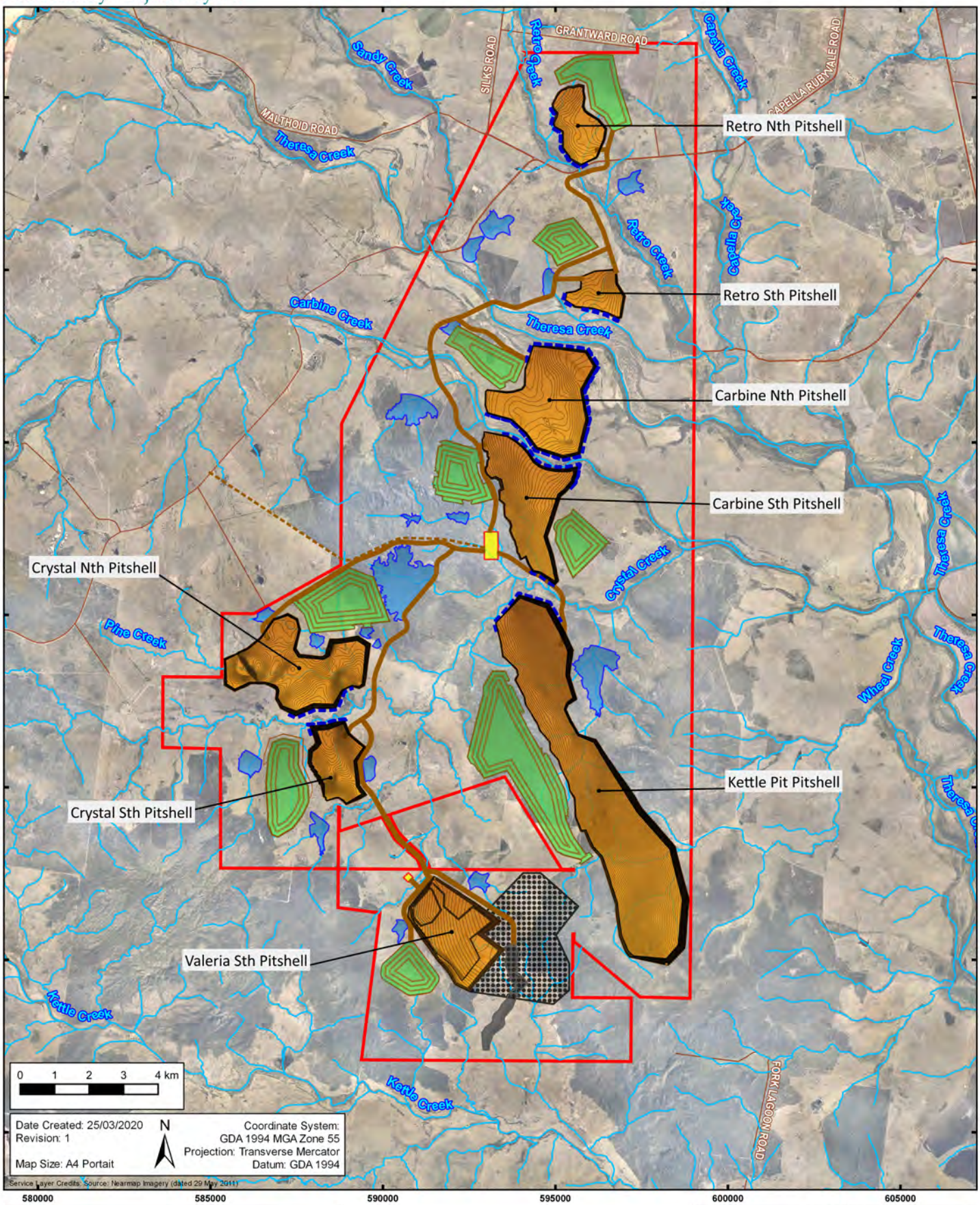
The final number and location of watercourses that will be crossed will be determined as part of detailed mine planning and subject to studies conducted as part of the EIS.

A construction workforce of up to 1,400 people is expected to be required for the Project, peaking approximately in year 2 (with year 1 being the commencement of construction). It is estimated that an operational workforce of up to 950 fulltime equivalents (FTEs) will be required. The operational workforce demand may vary during different stages of the Project's life. This estimate is based on comparison to similar operations, however exact workforce requirements for the Project are still being determined.

Figure 3

Preliminary Project Layout

GLENCORE



Project Area
Haul Road
Access Road
Levee
Watercourses
MIA
Pitshell
Dam
Dump
Quarry
Future Exploration

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

4.2 Mine Planning and EIS Assessment

As described above, the preliminary Project layout is presented in Figure 3. This preliminary layout presents indicative locations of key Project infrastructure, as understood at the date of lodgement of the IAS, and prior to completion of infrastructure design, mine planning and impact assessment. During the approvals process, the Project description and layout will be refined and documented in the EIS, to be submitted for approval under the SDPWO Act.

The infrastructure design and mine planning process for the Project is progressing toward developing a project description and layout for assessment in the EIS. This process involves positioning the various mining and transport-related infrastructure, including the MIA, CHPP, ROM stockpiles, internal haul roads, water storage dams, out of pit dumps, the TSF and rail loop/load out areas, within the constraints of the MLAs.

As part of this process, constraints analysis is on-going and balances a number of environmental, social and cultural heritage considerations, along with coal resource, mining efficiency and economic considerations. All relevant technical information collected will be incorporated into this process as it becomes available from environmental field investigations, carried out by technical specialists during the EIS process.

Key environmental, cultural heritage and social considerations in the Project infrastructure and mine design and planning process include, but are not limited to:

- Protected areas such as Nature Refuges, and reserve land including State Forests, local government roads, and other areas of significance;
- Watercourse characteristics, flood extents and groundwater information;
- Terrestrial and aquatic ecology;
- Known Indigenous cultural heritage, as well as information provided by the Western Kangoulu Traditional Owners on areas that may contain significant heritage;
- Regional interest areas and other planning restrictions;
- Private landholdings, locations of sensitive receptors and locations of Restricted land;
- Land tenure, resource tenements and existing infrastructure that occurs in the Project area;
- Topography; and
- Geology, as regards the location and extent of the coal resource.

As environmental values are defined through extensive baseline investigations undertaken across the Project area, the technical and scientific data is incorporated and assessed in the EIS as early as possible, to inform infrastructure and mine planning decision making.

The final Project description and layout to be assessed in the EIS will reflect infrastructure siting that maximises mining efficiency, whilst seeking to minimise potential impacts including on protected areas, land, ecology, water, air quality and acoustic environmental values, including identified values within reserve areas such as any State Forest areas proposed to be included within the Project's disturbance footprint.

The impact assessment will be undertaken in accordance with the Project ToR, which is expected to focus on key issues such as protected and reserve areas, water, ecology and social considerations.

The approach described above has been adopted for all Glencore's greenfield coal projects and brownfield coal mine extensions, both in Qld and NSW, demonstrating Glencore's commitment to rigorous scientific baseline data collection and impact assessment. The Proponent will ensure that baseline environmental values in the Project area are well defined and impact assessment is robust, in meeting the requirements of the ToR and in identifying suitable mitigation and management measures for any residual impacts within the proposed disturbance area.

4.3 Land Use

Land uses in the Project area (excluding the infrastructure corridor(s)) as identified by State-mapping comprise:

- Production native forests comprising Crystal Creek State Forest and part of Llandillo State Forest;
- Grazing native vegetation, with a significant portion of the Project area historically cleared for this purpose; and
- Mapped strategic Cropping Land (SCL), including an area of approximately 1,110 ha predominantly in the northern part of the Project area.

There are no mapped stock routes located within the Project area.

4.3.1 Nearby Mines

The Project is located within the Bowen Basin, in Central Queensland, where resource activities have been undertaken extensively in the region over the past several decades. Open cut coal mining is a key land use in the region and a number of operational mines occur in the general vicinity of the Project, including Ensham, Clermont and Rolleston mines. The closest Glencore managed mines are Oaky Creek, Clermont and Rolleston. Kestrel and Minerva Mines, both underground operations, are also located within the Central Highlands area.

4.3.2 Land Ownership

Approximately one third of the properties within the Project area (excluding the potential infrastructure corridor(s)) are owned in JV partnership by the Proponent. Privately-owned Pine Creek and Caroa properties occupy the majority of the remaining Project area, with other privately held properties overlaying the edges of the MLAs (refer Section 5.2).

The Western Kangoulu People are the registered Native Title Claimants (QC2013/002) of the land that comprises the Project area. Further detail on Native Title as it relates to the Project is provided in Section 6.5.1.

4.4 Project Need, Justification and Alternatives Considered

In its World Energy Outlook 2019, the International Energy Agency (IEA) modelled a number of demand scenarios (including current, sustainable development and stated policies) for coal demand up to year 2040. The IEA reports coal demand rising since 2017 and forecasts demand to remain strong under the current and stated policies until at least 2040. According to the IEA, demand for thermal coal is being led by developing countries in southeast Asia as well as significant growth in India and China. This is further supported by large investments in new coal-fired power generation in these countries.

Australia is the second largest exporter of coal globally (Reserve Bank of Australia (RBA) 2019), with capacity to meet the import needs of China, India, Korea and Japan as well as southeast Asian countries. Coal is likely to remain the most affordable form of energy production fuel in many industrialised and developing countries over the coming decades (World Coal Association (WCA), 2020). The coal industry is a large contributor to the Queensland economy and development of new coal resources will assist in meeting export and local demand for high quality coals.

Other opportunities inclusive of expansion opportunities at existing operations have been investigated by Glencore. Whilst expansions of existing assets may be also be suitable for future development, Glencore has assessed the Valeria Project as being an important component of its future production profile pending completion of environmental and technical studies. The Project area contains large quantities of high quality coal resource and is surrounded by nearby townships which would provide human and material resources to support the Project.

This Project has the potential to create significant community and social benefits, in addition to enhanced employment and economic outcomes in the nearby towns through:

- Employment opportunities for a local and regional-based workforce;
- Training opportunities in the local community;
- Revenue for local business through the purchase of goods and services, potentially increasing demand of goods and services leading to indirect increase in employment;
- Increased business activity within the region; and
- Voluntary community investment to support not-for profit groups located nearby to operations.

The Proponent is currently developing its preferred mine plan, production and workforce profiles as well as infrastructure design in consideration of environmental and planning constraints, logistics, community and stakeholder inputs, marketing, commercial and financial matters.

The Project is of strategic significance to the locality, region and State as it stands to provide direct and indirect employment and business opportunities inclusive of Indigenous involvement and expansion of the Proponent's investment in the region. The Project also will derive important export income for the national economy, a key driver for economic development.

The State is a significant benefactor from coal mining royalties, and under a 'do nothing scenario' (i.e. if the Project were not developed) the economic value that the coal would provide to the State and to the Commonwealth would not be realised.

4.5 Components, Developments, Activities and Infrastructure that Constitute the Project to be Declared Coordinated

The Project components for the Coordinated Project declaration include a greenfield open cut mine and associated infrastructure corridor(s) for coal rail transport and potentially electricity, water, communications and roads. Accordingly, a coordinated process for the statutory approvals pathway would provide continuity in terms of the assessment approach and ultimately, conditioning required in approving the Project.

Other key activities associated with development of the Project include:

- Blasting and drilling of overburden and waste rock;
- Excavation of on-site rock material to produce gravel and construction fill materials for use in construction of mine related and transport infrastructure;
- Placement of waste rock including overburden and interburden in out-of-pit waste rock emplacements and within open cut voids;
- Staged construction of production ROM pits, associated infrastructure, stockpiles and rehabilitation;
- Installation of a potential water supply pipeline, linked to an existing system;
- Progressive and ongoing development of water storage and sediment dams, pipelines, pumps and other water related management equipment, structures and levees;
- Mechanical dewatering and co-disposal of coal rejects on-site and within open-cut voids and/or in TSF areas;

- Installation of an electricity transmission line linked to the existing power network;
- Operation and construction of a MIA inclusive of offices, workshops and CHPP for ROM coal processing;
- Operation and construction of supporting infrastructure including haul roads, electricity supply, consumable storage areas, ROM pads, light vehicle roads and access tracks;
- Construction of a new rail loop and load out facility inclusive of coal stockpile areas;
- Infrastructure corridor(s) to support rail, road, water, communications or power connections to existing networks;
- On-site landfill (general waste); and
- Other associated infrastructure, plant and activities required to support construction, operation, decommissioning and rehabilitation of the Project.

These aspects will be examined in more detail in the EIS.

4.6 External Infrastructure Requirements

4.6.1 Infrastructure Corridor

The Project will require a rail infrastructure corridor and potential corridor for electricity, water, communications and site access road. These infrastructure corridors would be external to the Project, but necessary to support the mining operation. At this stage of Project development, the locations, lengths and points of origin and connections for infrastructure are not known.

The route for the rail infrastructure corridor is under evaluation with options extending to the east, north and south to connect with existing railway networks. Where practicable, linear infrastructure will be co-located and will depend on the location of infrastructure within the Project area, origin and connection points, existing land-use and planning constraints, economic considerations and environmental, cultural heritage and social impacts.

Social, economic and environmental considerations are all being considered to identify an optimised route for the rail infrastructure corridor. These include:

- Environmental, social and cultural heritage constraints;
- Proximity to key site infrastructure;
- Potential for use of land held by the Proponent;
- Length of route and extent of greenfield component;
- Tenure and underlying tenement constraints; and
- Access to port and associated port allocations.

Once the preferred rail infrastructure corridor is selected, assessment will identify the potential origin and connections points required to connect services to the Project area, with co-location of infrastructure along one alignment the preferred approach, where possible. However, being a greenfield site, the ability to co-locate infrastructure will depend on location of surrounding services and requirements for upgrade, all of which will be assessed in the EIS.

The design lifespan of ancillary infrastructure will be commensurate to the lifespan of the Project. At the end of the Project, third party beneficiary users of ancillary infrastructure will be identified and arrangements put in place for ongoing use.

4.6.2 Road Transport

Vehicle access to the site for employees, contractors and deliveries will adjoin pre-existing roads near the Project site. Access options to the site are being assessed and will require use of local and State-controlled road assets to travel to the site access turn off. The alignment of the rail infrastructure corridor will influence the location of the primary site access road and is currently

under assessment. Although Fourteen Thousand Access Road was designated as the access to the site (as required for the submission of the MLAs), alternative options to the east and south are also under consideration and identified alternatives will be assessed as part of the EIS.

During site access road construction, access to the Project area will likely be via Fourteen Thousand Access Road, a local road which connects with Capella Rubyvale Road and the Gregory Highway (state controlled). There will be no coal haulage on public roads for the Project, however haulage of ROM and potentially product coal will be required on internal roads between pits, the CHPP and the rail load out facility.

The Gregory Highway is used as a trucking route for industry within the region and is mainly classed as a Type 2 Road (Type 2 road trains and lower) between Capella and Emerald. Approximately 5 km north of Emerald the classification of the Gregory Highway changes from a Type 2 to a Type 1 Road (Type 1 road trains and lower). The Gregory Highway also provides access from the Emerald airport into the township of Emerald.

Capella Rubyvale Road is a local government-controlled road that is classed as a B25 Route allowing access for 25 m B-double trucks and lower. The road is the main access route between the Capella and the Gemfields and provides an alternative route between the Gregory Highway and the Capricorn Highway.

As detailed further in Section 4.6.7, the Project workforce may require temporary and permanent accommodation from available options within Tieri, Capella, Emerald and possibly the Gemfields. Transport between these townships and the Project will be utilising the local and State controlled road network mentioned above. The final access routes for construction and operations of the Project will be developed in consultation with Local Council, Department of Transport and Main Roads (DTMR) and other relevant stakeholders and assessed in the EIS.

4.6.3 Port

The preferred route for the rail transport of coal from the Project is being assessed and includes consideration of potential port options. Options being considered include Abbot Point Coal Terminal (APCT), Dalrymple Bay Coal Terminal (DBCT), RG Tanna Coal Terminal (RGTCT) and Wiggins Island Coal Export Terminal (WICET) (refer Figure 4). These ports have existing capacity as follows:

- APCT – located in Bowen with a nameplate capacity of 50 Mtpa;
- DBCT - exports thermal and metallurgical coal from Central Queensland's Bowen Basin mines. The terminal currently has a nameplate capacity of 85 Mtpa and operates 24 hours per day. DBCT has expansions plans to maximise nameplate capacity to meet foreseeable demand through incremental increases from current capacity of 85 Mtpa to 136 Mtpa.
- RGTCT – located in Gladstone with a nameplate capacity of 60 Mtpa; and
- WICET – located in Gladstone with a nameplate capacity of 27 Mtpa. The terminal can be expanded to accommodate a total of approximately 120 Mtpa of long-term export capacity from the existing site if fully developed.

The assessment of port options will also consider current port allocations held by other Glencore operations that are ramping down and/or where additional capacity may be available. Investigations undertaken to date have indicated that port allocation will not be a constraint to the development of the Project. Ongoing engagement with port authorities will be undertaken, with the preferred option to be described in the EIS.

Figure 4

Pit to Port

GLENCORE

©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 4 Pit to Port.qgs

- Valeria Project
- State Controlled Roads
- Existing Rail
- Pit to Port Rail Options
- Coal Terminals

4.6.4 Water Supply

The take of surface water in the Project area is regulated by the *Water Plan (Fitzroy Basin) 2011* and the *Fitzroy Basin Resource Operations Plan 2014*. The water plan provides the management framework for surface water resources in the Fitzroy Basin and the resource operations plan specifies the day-to-day rules and management arrangements for water users and infrastructure operators.

The Project area is not located within a declared Water Management Area (un-supplemented water), however, the Project area drains to the Theresa Retreat Water Management Area. The Project area is not located within a Water Supply Scheme (supplemented water), however, the Project area drains to the Nogoa Mackenzie Water Supply Scheme. Theresa Creek drains to 'Zone: Mackenzie L' of the Nogoa Mackenzie Water Supply Scheme.

Non-potable production water will be needed for use in Project facilities including the CHPP, workshops, STP, wash down bays and for ancillary activities such as dust suppression. Production water would potentially be sourced from a combination of pit-water, secure third-party raw water supply sources, water harvesting, surface water catchment dams and groundwater sources. Surface run-off from disturbed and undisturbed areas would be captured in sediment dams and reused. Potable water will likely be supplied to site by truck initially and eventually via pipeline from existing third-party supply sources.

The water requirement for the Project is still to be determined and once assessed will be included in the EIS. The potential volumes and availability of water from various sources will be determined during the Water Supply study, to be undertaken for the EIS. The Water Supply study will consider requirements of the water plan and requires a detailed mine plan to understand the likely water deficit and surplus generated across the Project area (e.g. from pit dewatering etc.).

This information will be used to determine the volumes needed to be sourced externally. Discussions will be had with third parties including Sunwater and other Glencore operations in the region as to the ability to supply all or part of the volumes required. Licensing and other requirements to secure allocations will be identified and discussed in the EIS.

4.6.5 Electricity Supply

The Project will require a permanent electricity supply during operations. Power supply to the Project would initially consist of diesel-powered generators for construction processes which would eventually be replaced by a 66/132 kilovolt (kV) powerline. The location, origin and connection points for a powerline to the Project area are yet to be determined and will depend on:

- The electricity requirements of the Project during all phases of development;
- Final proposed location of infrastructure on site (e.g. CHPP, rail loop etc); and
- The capacity of nearby service infrastructure and need for upgrade.

Diesel-fired power generation could continue to be used for temporary or mobile structures throughout the Project life.

4.6.6 Sewage Treatment

The Project will require a STP with appropriate capacity to service the anticipated workforce. It is proposed that effluent will be treated before being irrigated to land. Sewage residue would be removed from the STP by a licensed contractor and would be disposed of at an appropriately authorised facility.

4.6.7 Workforce Accommodation

As undertaken for existing Glencore operations in the region, the construction and operational workforce for the Project would be sourced and housed locally wherever possible. The assessment of workforce accommodation solutions will consider an analysis of the existing labour force in neighbouring communities and accommodation availability.

The 2016 Census indicates that there were 1,138 unoccupied private dwellings in the surrounding towns of Emerald and Capella that could offer long-term accommodation (ABS, 2016). Hotels, motels, motor inns and apartments that offer short-term accommodation are also available in these towns, indicating that there is potential to accommodate a proportion of the required workforce. At this early stage of Project development, the potential need for on-site accommodation during construction or operational phases is still being determined.

The SIA being developed for the EIS will detail workforce accommodation opportunities for all phases of the Project, including local workforce sourcing, local accommodation and relocation strategies, sustainable use of local accommodation options, and seek to minimise the extent of fly-in/fly-out (FIFO) arrangements in accordance with the *Strong and Sustainable Resource Communities Act 2017* (SSRC Act). At this early stage of Project development, percentages of FIFO workforce have not yet been determined.

4.6.8 Fuel Supply

There will be on-site diesel fuel storage within the Project area for machinery and equipment fleet. Fuel will be delivered by truck or rail by appropriately licenced contractors.

4.6.9 Telecommunications

The construction of a mobile radio tower and/or booster system may be required if there is insufficient local reception available at the Project area. Data transfer will rely on the installation of optic fibre to the site. This connection will be used to run fleet management, maintenance, and plant control systems. Digital radio communication will be required for communication between heavy vehicles and light vehicles within the Project area.

4.7 Timeframes for the Project

Should the Project be approved by State and Commonwealth regulators, construction of mine infrastructure is scheduled to commence in 2024, with production proposed to commence in approximately 2026. Operational activities will be carried out over a 35-year period. The estimated timeframes for the Project are presented in .

Table 2.

Table 2 Estimated Project Timeframes

Approximate Timeframe (pending approvals)	Project Phase
2020	Technical assessments and mine planning
2021	EIS Submission
2021-2023	Infrastructure Approvals
2024	Construction commences
2026	Production commences

4.8 Construction and Operational Processes

Construction and operation of the Project will involve the following:

- Site preparation activities such as vegetation and topsoil removal, earthworks and topsoil stockpiling;
- Civil works for construction of access roads and building of plant and structures. Due to the long term-nature of the Project, all infrastructure and buildings would be designed and constructed to a standard appropriate for the Project life;
- Construction and opening up of pits, using scrappers, excavators, dozers, haul trucks and graders;
- Operational processes would include the use of shovel and truck methods for the removal of overburden, interburden and waste rock as well as for the extraction of ROM coal; and
- Development of open cut mine pits would be staged with progressive rehabilitation and back-filling where practicable. The sequence of proposed mining is still to be determined.

Further detail will be provided in the EIS.

4.9 Workforce Requirements during Construction and Operation

It is expected that construction of Project infrastructure will be staged, extending over two years and will require a construction workforce of up to 1,400 people. An operational workforce of up to 950 FTE personnel is expected to be required, however workforce needs are still being investigated.

4.10 Economic Indicators

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.

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. 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 mining industry include automotive and business services, computer and electronic, construction, industrial services such as conveyor belts, pumping contractors, and structural and mining engineering services.

Glencore has a strong history of delivering positive economic outcomes to the regions associated with its assets. In 2018[2] as it relates to coal mining, Glencore contributed approximately $1 billion in wages and salaries and approximately $5.6 billion spend on goods and services. In addition, approximately $576 million capital and sustaining investment was spent in its operations.

Over the last 10 years, Glencore has voluntarily invested over $80 million in partnerships across NSW and Qld, supporting community groups, organisations and events. In 2019, Glencore invested over $6.5 million with 30 community projects and partnerships in NSW and Qld, over and above regulatory requirements.

In 2018, within the Central Highlands LGA, Glencore's total expenditure was more than $170 million (on salaries, operational expenditure, capital expenditure, council rates and community investment). A majority of procurement expenditure was with local suppliers and contractors.

[2]Glencore collates economic impact data on an annual basis, with results made available on the second quarter of the following year.

4.11 Financing Requirements and Implications

The capital cost investment for development of the Project (to commencement of operations) is estimated to be in the order of $1 billion to $1.5 billion. Glencore has a proven history of developing similar scale projects both in NSW and Qld and has the financial capacity to fund the development of the Project.

4.12 Planning Instruments and Government Policies

4.12.1 Local Government Planning Scheme

The Project area lies within the Central Highlands Regional Council LGA. The *Central Highlands Regional Council Planning Scheme 2016* (the Planning Scheme) may apply to off-ML components of the Project. Whilst no planning approvals will be required for works within the MLA areas, some structures may undergo self-assessment to comply with relevant building codes. Planning approval may be required for the infrastructure corridor(s) and applicable LGAs.

4.12.2 Regional Plans and Policies

The *Central Queensland Regional Plan 2013* informs the Planning Scheme and identifies coal production as a significant employer and prominent industry in the region. The *Central Queensland Regional Plan 2013* also establishes an overall direction and vision in line with *The Queensland Plan* and its 30-year vision for the state. Other State and regional plans, policies and strategies relevant to the Project include:

- *Queensland Environmental Offsets Policy*;
- *State Planning Policy*;
- *Environmental Protection (Air) Policy 2019*;
- *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*;
- *Environmental Protection (Noise) Policy 2019*; and
- *Queensland Waste Avoidance and Resource Productivity Strategy 2014 – 2024*.

4.12.3 Commonwealth Policies and Guidelines

The relevant Commonwealth policies and guidelines for the Project include:

- EPBC Act *Environmental Offsets Policy 2012*; and
- *Information guidelines for proponents preparing coal seam gas and large coal mining development proposals* (Commonwealth of Australia, 2018).

5 Location of Key Project Elements

5.1 Location

5.1.1 Regional Context

The Project area is a greenfield site located in the Bowen Basin, within the Central Highlands LGA. It is located approximately 27 km north-west of Emerald and on the western side of the Gregory Highway and Emerald / Clermont railway line (refer Figure 1). The closest city is Rockhampton which is located approximately 270 km east of the Project.

Operating mines within the vicinity of the Project (measured from tenement boundary to tenement boundary), include:

- Clermont Coal Mine – approximately 52 km north-west;
- Kestrel Coal Mine – approximately 34 km east;
- Oaky Creek Coal Mine – approximately 52 km north-east;
- Ensham Coal Mine – approximately 52 km south-east;
- Minerva Coal Mine – approximately 59 km south; and
- Gregory Coal Mine – 35 km east.

The Taroborah Coal Project located approximately 10 km south is an advanced export coal project with current EIS approval. However, to date no ML has been applied for over the Taroborah Project.

The Project area is located within the Brigalow Belt bioregion and Isaac–Comet Downs, Basalt Downs subregion in the Fitzroy catchment area.

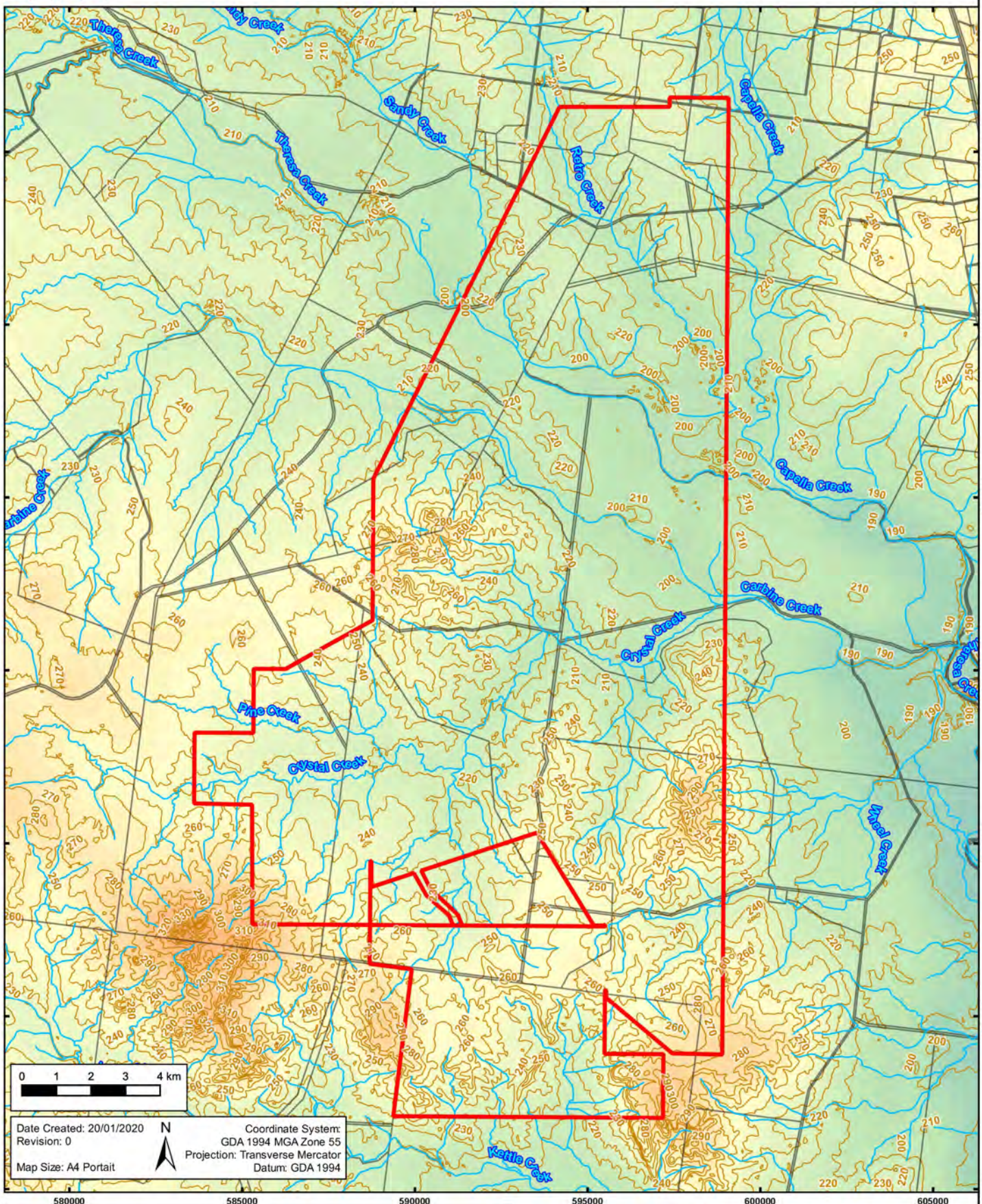
5.1.2 Local Context

The Project is located approximately 8 km south-west of Capella. Capella Rubyvale Road runs parallel to the north-western portion of the site and extends through the northern section of MLA 700055 from west to east. The south-eastern corner of the Project site (MLA 700044) is located approximately 27 km north-west of Emerald.

The general topography of the Project area comprises of gently undulating landscapes ranging from 240 to 300 m Australian Height Datum (AHD). Some steeper areas of up to 270 m AHD occur along the Project area's western boundary in association with Llandillo State Forest, in addition to some vegetated ridgelines up to 280 m AHD near to the Project's south-eastern boundary (refer Figure 5).

Figure 5
Topography

GLENCORE



Date Created: 20/01/2020
Revision: 0
Map Size: A4 Portait

Coordinate System:
GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

Project Area
Cadastre (DCDB)
Elevation Contours (10m interval)
Watercourses

Elevation (mAHD)
150
200
250
300
350

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

5.2 Landholdings and Resource Tenure

5.2.1 Landholdings

Figure 6 presents the lot and plans (cadastre) within the Project area (excluding the infrastructure corridor(s)). There are various freehold, leasehold and State landholdings within, and in the vicinity of, the Project area as detailed in Table 3. Table 3 is based on desktop research and data will be confirmed during the EIS.

Table 3 Landholdings Associated with the Project

MLA	Lot / Plan	Property Tenure
MLA 700055	Lot 1 on CLM11	Freehold
	Lot 1 on TT439	Freehold
	Lot 1 on PER6884	Lands Lease
	Lot 10 on TA4047	Freehold
	Lot 15 on CLM475	Lands Lease
	Lot 180 on FTY951	State Forest (Crystal Creek)
	Lot 182 on FTY1031	State Forest (Llandillo)
	Lot 2 on CLM659	Freehold
	Lot 3 on SP193694	Freehold
	Lot 31 on RP908887	Freehold
	Lot 32 on RP908887	Freehold
	Lot 4 on SP193694	Freehold
	Lot 5 on CLM473	Freehold
	Lot 5 on SP135554	Freehold
	Lot 65 on TT82	Freehold
	Lot 59 TT59	Freehold
	Lot 74 on TT439	Freehold
	Lot 8 on SP135554	Freehold
	Lot 6 on TT42	Lands Lease
	Lot 7 on CLM473	Lands Lease
	Lot 7 on SP135554	Freehold
	Lot 72 on TT439	Freehold
	Lot 73 on TT439	Freehold
	Lot 55 on TT59	Freehold
	Lot 56 on TT59	Freehold
	Lot 6 on SP273885	Freehold
MLA 700045	Lot 5 on CLM473	Freehold
MLA 700044	Lot 1 on CLM11	Freehold
	Lot 5 on CLM473	Freehold
	Lot 6 on SP273885	Freehold

The majority of properties and associated homesteads within the three MLAs are owned by the Proponent and its JV partners and are currently tenanted, primarily for cattle grazing. The closest privately owned homestead outside the Project MLA boundaries is located 0.18 km to the north of

MLA 700055. Table 4 identifies only those lot on plans that contain the homestead associated with each property. The information in Table 4 is based on desktop research only and will be verified as part of the EIS.

Table 4 Homestead locations relative to Project MLAs

MLA	Lot / Plan	Property Tenure	Homestead Location
700055	Lot 1 on TT439	Freehold	The homestead is located approximately 4.1 km east of the MLA boundary.
	Lot 2 on CLM659	Freehold	The homestead is located approximately 1.2 km west of the MLA boundary.
	Lot 6 on RP616042	Freehold	The homestead is located approximately 1 km north west of the MLA boundary.
	Lot 9 on CLM417	Freehold	The homestead is located approximately 4 km west of the MLA boundary.
	Lot 4 on SP193694	Freehold	The homestead is located within the MLA.
	Lot 5 on CLM473	Freehold	The homestead is located within the MLA.
	Lot 5 on SP135554	Freehold	The two homesteads on this property, located approximately 3.8 km and 5.2 km west from the MLA boundary.
	Lot 65 on TT82	Freehold	The homestead is located approximately 0.18 km north of the MLA boundary.
	Lot 5 on TT46	Freehold	The homestead is located approximately 4.1 km north east of the MLA boundary.
	Lot 59 on TT59	Freehold	The homestead is located approximately 0.19 km north of the MLA boundary.
	Lot 6 on TT42	Lands Lease	The homestead is located approximately 3.2 km north east of the MLA boundary.
	Lot 56 on TT59	Freehold	The homestead is located approximately 0.23 km north of the MLA boundary.
	Lot 55 on TT59	Freehold	The homestead is located within the MLA.
	Lot 58 on TT58	Freehold	The homestead is located approximately 3.2 km north of the MLA boundary.
	Lot 40 on TA4058	Freehold	The homestead is located approximately 4.4 km east of the MLA boundary.
700044	Lot 1 on CLM11	Freehold	The two homesteads of this property are located approximately 1.6 km south of the MLA boundary.
	Lot 5 on CLM517	Freehold	The homestead of this property is located approximately 4.8 km south of MLA boundary.

5.2.2 Resource Tenure

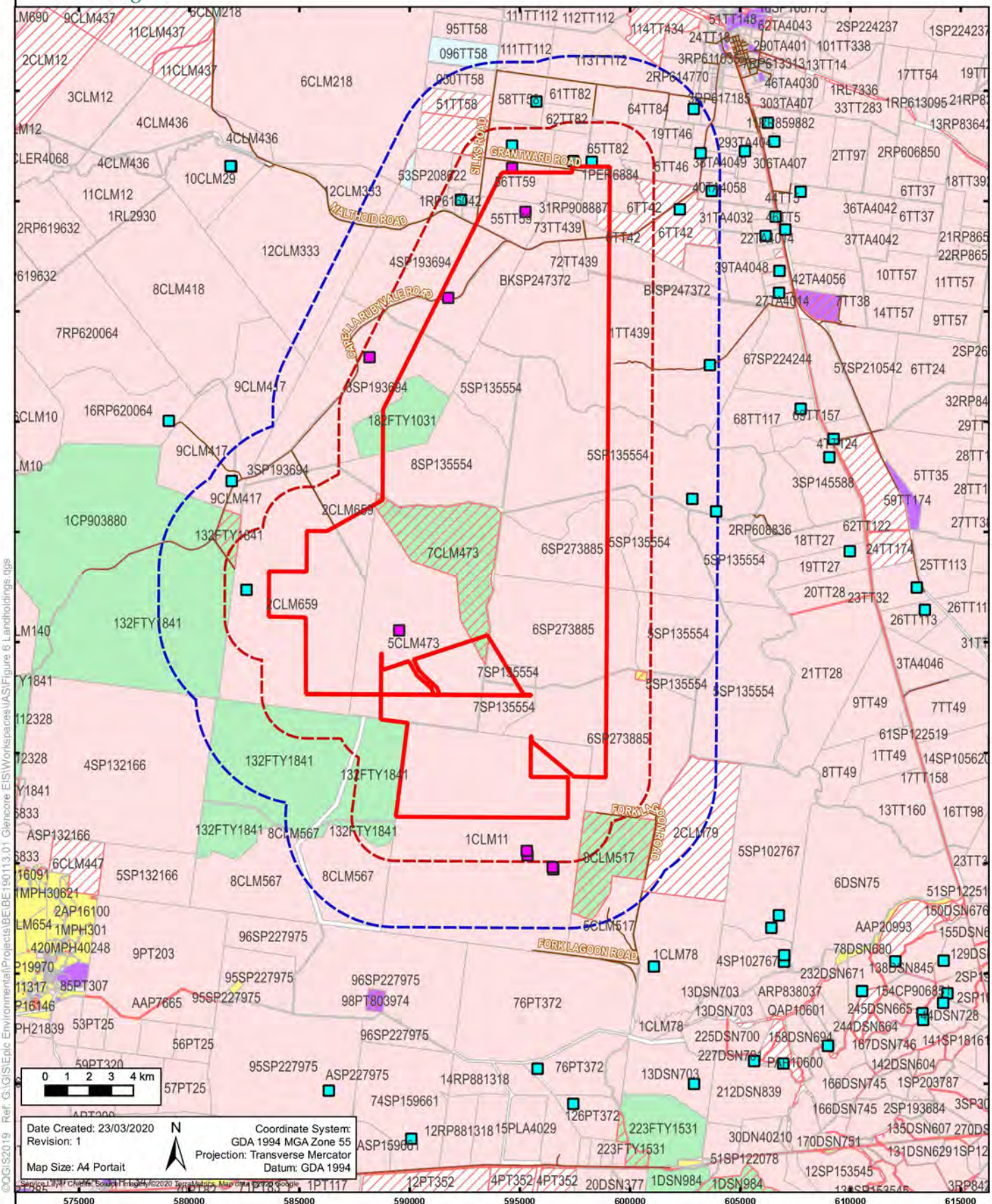
The Project area comprises MLAs 700044, 700045 and 700055 that extend over Mineral Development Licence (MDL) 219, Exploration Permit Coal (EPC) 25396 and EPC 864. The MLAs do not overlap any petroleum tenure.

All resource tenures are shown in Figure 7.

Figure 6

Landholdings

GLENCORE



Project Area
Cadastre (DCDB)
2km Buffer of Project Area
5km Buffer of Project Area
Sensitive Receptors - Glencore Owned
Sensitive Receptors - Private
Roads

Land Tenure (DCDB)

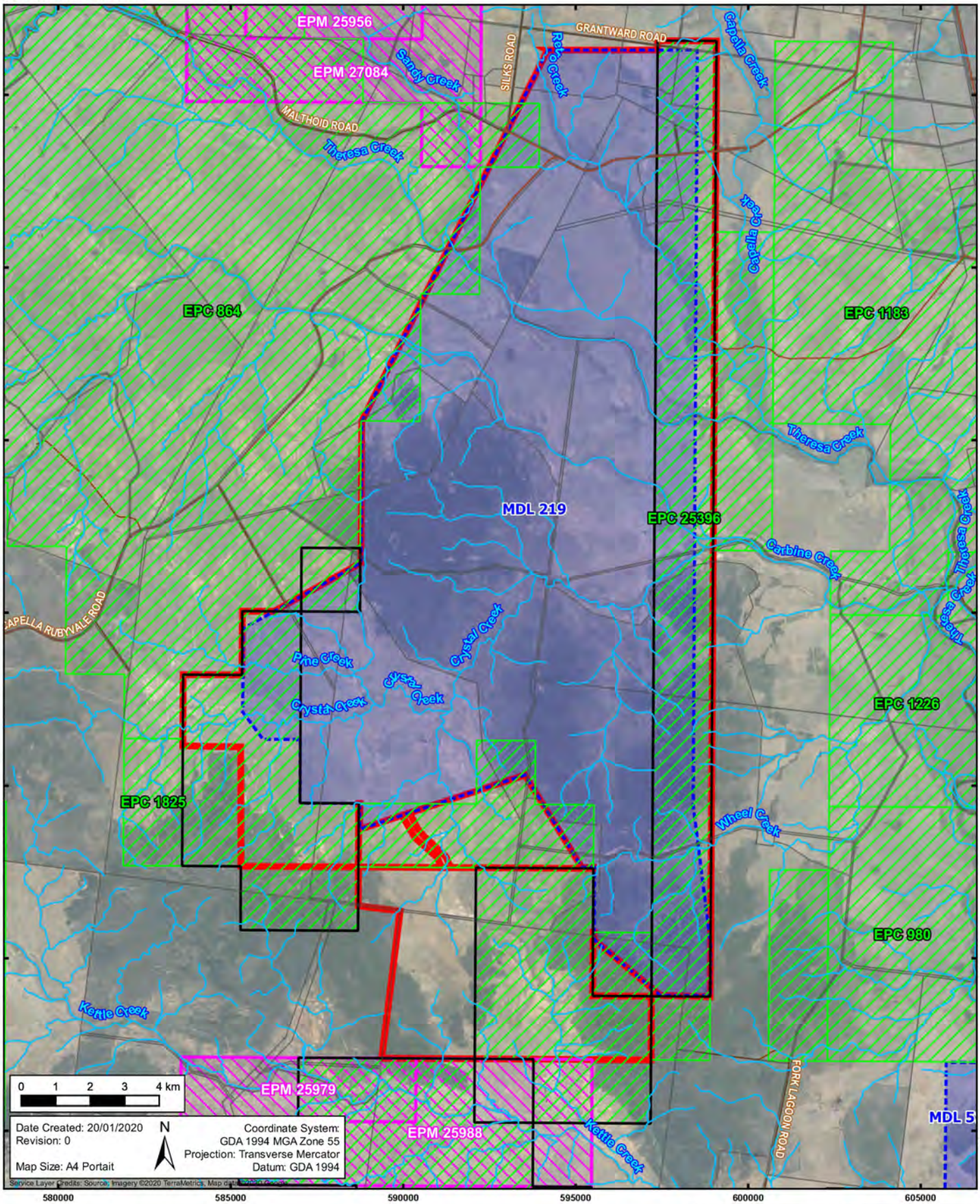
Freehold
Lands Lease
State Land
State Forest

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

Figure 7

Resource Tenure

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 7 Resource Tenure.qgs

- Project Area
- Cadastre (DCDB)
- Exploration Permits for Coal
- EPC25396
- Exploration Permits for Mineral
- Mineral Development Licence
- Roads
- Watercourses

6 Description of Existing Environment

6.1 Natural Environment

6.1.1 Land

6.1.1.1 Geology

The Project is located within the northern portion of the Denison Trough at the southern extent of the Bowen Basin. Surface geology in the region is dominated by numerous anticlines and synclines with north to north-west trending fold axes. Subsurface geology is categorised as the Bowen Basin synclinorium of Central East Queensland.

Coal resources within the Project area are contained within seams of Early to Middle Permian age. The dominant regional solid geologies mapped over the Project area are Aldebaran Sandstone and Reids Dome Beds with some small areas of surface basalt (refer Figure 8).

6.1.1.2 Soils

The Project area comprises the following six mapped land systems within the Nogoa – Belyando Area:

- Humboldt (Hu);
- Alpha (Al);
- Kinsale (K);
- Monteagle (Mo);
- Durrandella (Du); and
- Blackwater (Bl).

There are five soil units mapped within the Project area (refer Figure 9). The soil units vary across the site with Kandosols mapped in the northern extent, with Sodosols and Rudosols dominant through the central and southern portion of the Project area.

6.1.1.3 Acid Sulphate Soils

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

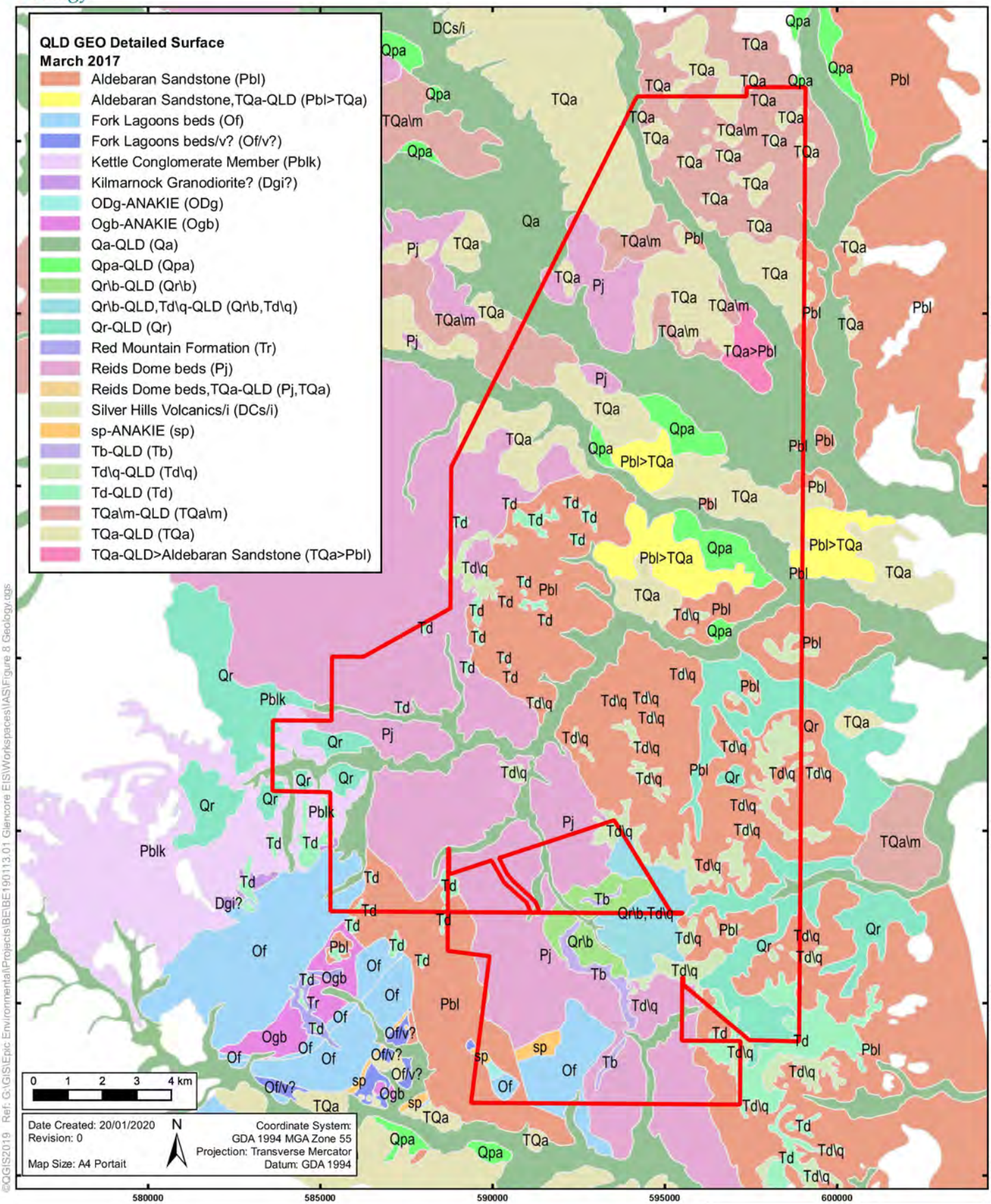
6.1.1.4 Contaminated Land and Environmental Management Registers

No properties within the Project area are listed on the Qld Government Environmental Management Register or the Contaminated Land Register.

Figure 8

Geology

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\AS\Figure 8 Geology.qgs

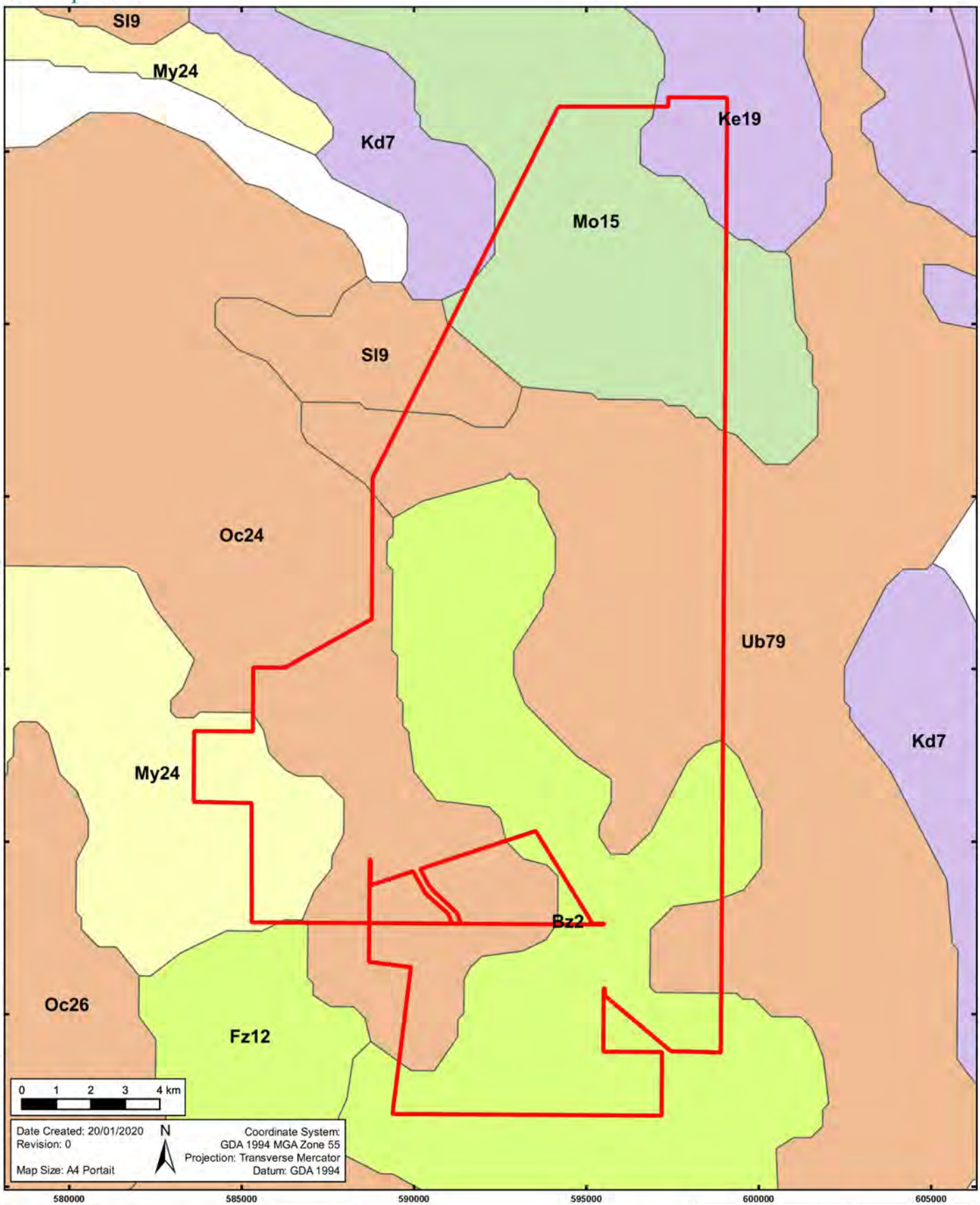
Project Area

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

Figure 9

Soil Map Units

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\ASI\Figure 9 Soil Map Units.qgs

Project Area

Australian Soil Classification Unit

- Dermosol (Mo15)
- Kandosol (MY24)
- Rudosol (Bz2, Fz12)
- Sodosol (Oc24, Oc26, Sl10, Sl9 and Ub79)
- Vertosol (Ke19, CC23, Kd7 and Kb10)

6.1.1.5 Agricultural Land

The majority of the Project area has been historically cleared for pastoral activities, with large areas used for cattle grazing. There are small patches of remnant and regrowth vegetation scattered across the Project area, with several areas of remnant vegetation located within the central aspects and associated with Crystal Creek and Llandillo State Forests.

The agricultural features of the Project area are summarised as follows:

- Entirely located within the Western Cropping Zone – Central Highlands Isaac subzone;
- No mapped Priority Agricultural Areas;
- There is an area of approximately 1,110 ha of State-mapped SCL located in the northern part of the Project area (excluding the infrastructure corridor(s)) (refer Figure 10). The area of SCL has been identified using desktop assessment only at this stage of the Project. The final Project footprint and infrastructure corridor(s) are yet to be determined, therefore the area of likely impact is currently unknown. Soil surveys will be completed as part of the EIS to verify the existence of SCL and potential area of impact. Unless exempt, potential impacts to field verified SCL will require approval under the *Regional Planning Interest Act 2014*;
- A small area of broadacre cropping land is mapped in the northern extent; and
- No mapped stock routes occur in the Project area.

6.1.1.6 Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) is State-mapped as Queensland Agricultural Land Classes A and B. A small portion of Class A1 occurs in the northern and central extent of MLA 700055 (i.e. land suitable for broadacre and horticulture crops). Some Class B (limited cropping land) is also located on land within the central portion of MLA 700055, all of MLA 700045 and a small portion of MLA 700044 (refer Figure 10). The remaining area, which is the majority of the Project area, is comprised of Class C – Pasture Land.

6.1.1.7 Mines within Project Vicinity

As described in Section 5.1.1, there are a number of currently operating and proposed mines within the general vicinity of the Project (refer Figure 11).

6.1.1.8 Conservation Areas

Two State Forests (Crystal Creek and Llandillo) designated as production native forests, occur within the Project area (refer Figure 12). Kettle State Forest is located to the west of MLA 700055 and abuts the western boundary of MLA 700044. Burn State Forest is located to the south-east of MLA 700044 (refer Figure 12 and Section 6.5).

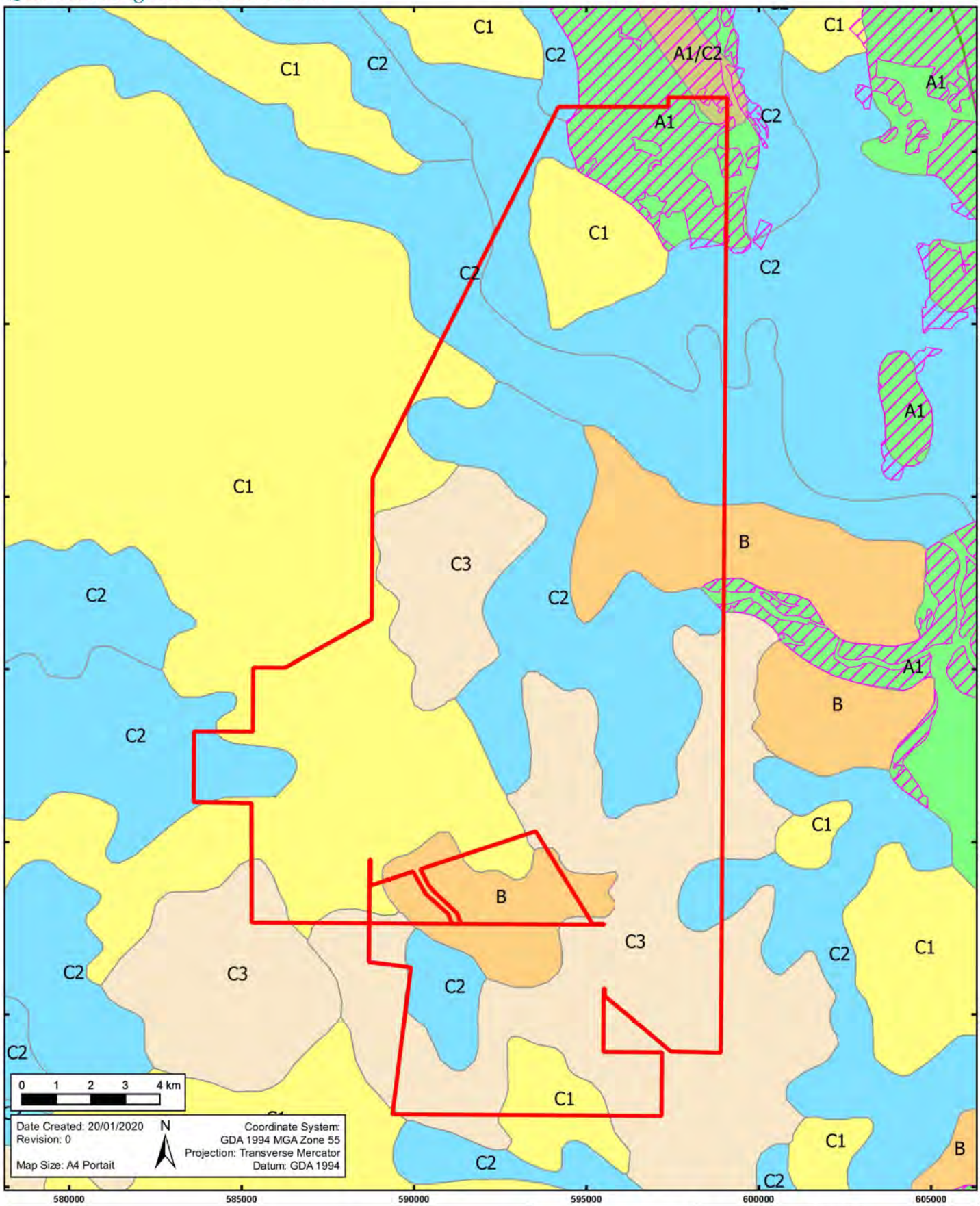
The EIS Project layout and preferred infrastructure corridor alignment(s) are yet to be finalised and will be informed by the environmental values of the State Forests and designation under Qld legislation. Consultation with relevant regulatory and advisory agencies including Queensland Parks and Wildlife Service is yet to be undertaken regarding potential impacts on State Forests. Consultation will be undertaken in accordance the ToR and the results of the technical assessments and proposed mitigation strategies addressed in the EIS.

A nature refuge protected area known as Caroa Paddock Island Nature Refuge, is located approximately 5 km to the east of the Project area along Theresa Creek (refer Figure 12). There are no World Heritage areas or RAMSAR listed wetlands within the Project area or nearby surrounds.

Figure 10

Queensland Agricultual Land Class

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 10 QLD Agricultural Land Class.qgis

Project Area

Strategic Cropping Land Trigger Map

QLD Agricultural Land Class

- A1
- A1/C2
- B
- C1
- C2
- C2/A1
- C3

DISCLAIMER

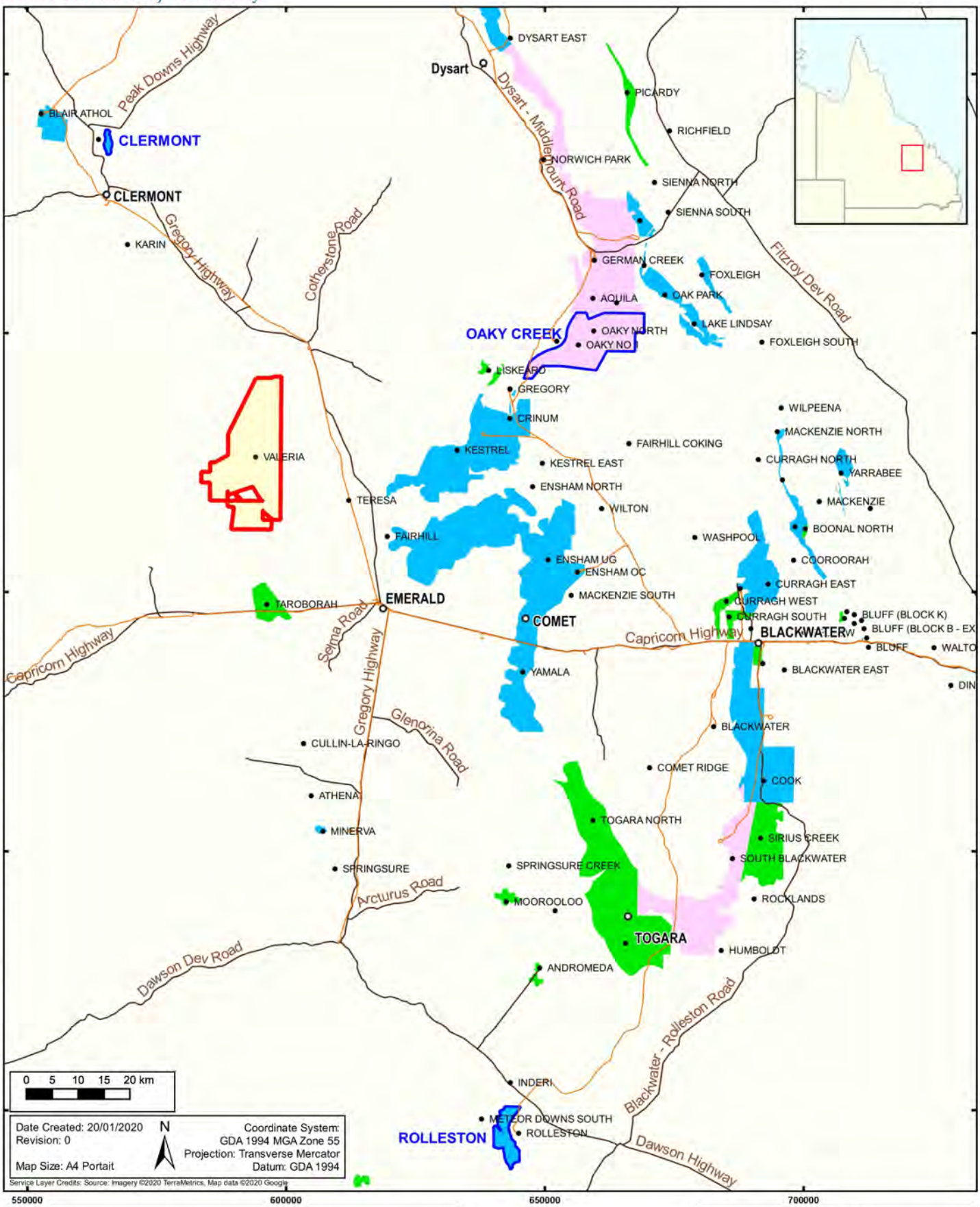
Subject To Survey

Glencore makes every effort to ensure the quality of the information available on this map. Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

Figure 11

Mines within Project Vicinity

GLENCORE



Project Area
Glencore Assets

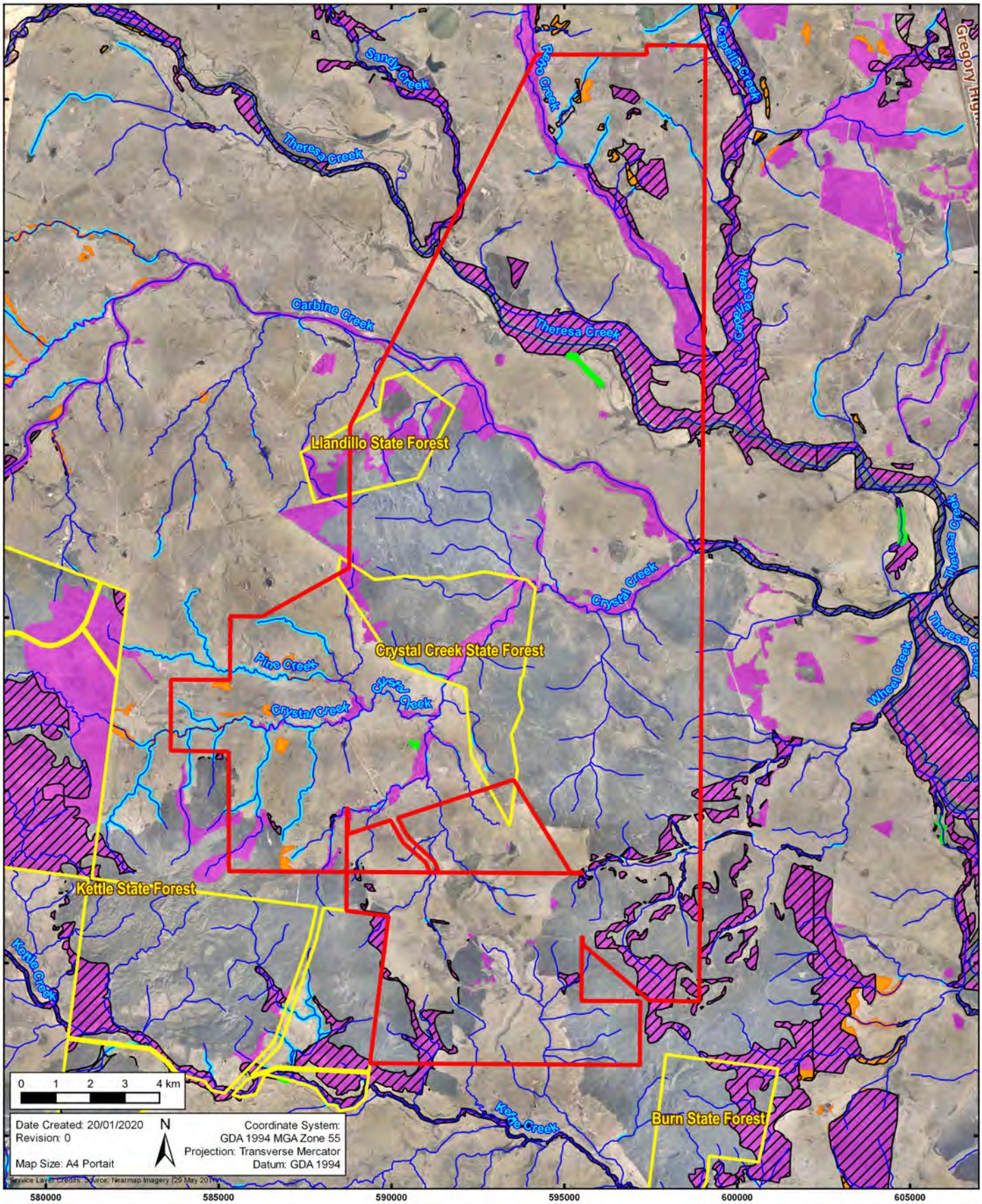
Coal Resource Areas
Operating Mine
Mineral Occurrence
Care and Maintenance

Coal Resource Sites
State Controlled Roads
Rail Network

Figure 12

Conservation Areas

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\ASI\Figure 12 Conservation Areas.qgs

Project Area
State Forests

Matters of State Environmental Significance (MSES)

Regulated Vegetation (100m from wetland)
Regulated Vegetation (Category B Endangered or Of Concern)
Regulated Vegetation (Category C Endangered or Of Concern)
Regulated Vegetation (Category R GBR Riverine)
Regulated Vegetation (Essential Habitat)
Regulated Vegetation (Intersecting a Watercourse)

6.1.2 Surface Water

6.1.2.1 Watercourses

The Project area is located within the Nogoa River sub-catchment, in the northern extent of the Fitzroy River Catchment (Queensland Government (QG), 2019a). A number of watercourses flow across or adjacent to the Project area including the following (refer Figure 13):

- Retro Creek (stream order 3), a tributary of Theresa Creek, flows south-east across the northern extent of the Project area;
- Capella Creek (stream order 5), flows from Capella to the north of the Project area, south along the eastern boundary of the Project area, to the confluence with Theresa Creek;
- Sandy Creek (stream order 6), flows north to south to the confluence with Theresa Creek;
- Theresa Creek (stream order 7), flows in a south-easterly direction across the Project area to its confluence with the Nogoa River;
- Carbine Creek (stream order 4), flows south-east across the central portion of the Project area to its confluence with Theresa Creek;
- Kettle Creek (stream order 4), flows west to east, south of the Project area;
- Crystal Creek (stream order 4), flows west to east across the Project area, to its confluence with Carbine Creek on the eastern boundary;
- Pine Creek (stream order 2), flows west to east over the Project area, where it meets Crystal Creek; and
- Wheel Creek (stream order 3), flows west to east from the south-eastern corner of the Project area.

The preliminary Project layout presented in Figure 3 shows Pine Creek traversing the Crystal North pit and the headwaters of Wheel Creek extending through the Kettle Pit. This is discussed further in Section 7.1.2.1.

All watercourses within the Project area are ephemeral, flowing only following local or in-catchment rainfall. Theresa Creek has a stream flow gauge installed, indicating a highest average monthly flow in February and equating to approximately 33,470 megalitres. August is historically the driest month (Department of Natural Resources, Mines and Energy (DNRME), 2019).

6.1.2.2 Water Users

Information on surface water entitlements on issue for the Fitzroy Basin has been obtained from the Queensland Government Water Entitlement Viewer, with a summary of entitlements by zone for the Theresa Retreat Water Management Area, Nogoa Mackenzie Water Management Area and Nogoa Mackenzie Water Supply Scheme provided in Table 5.

Table 5 Surface Water Entitlements for Nogoa Mackenzie Water Supply Scheme, Nogoa Mackenzie Water Management Area and Theresa Retreat Water Management Area

System Type	Management Group	Management Subgroup	Nominal Volume (Ml)	Number
Supplemented	Nogoa Mackenzie Water Supply Scheme	Zone Mackenzie B	1,270	4
		Zone Mackenzie C	1,764	4
		Zone Mackenzie D	2,330	5
		Zone Mackenzie E	852	2
		Zone Mackenzie F	638	2
		Zone Mackenzie G	16,518	26

System Type	Management Group	Management Subgroup	Nominal Volume (Ml)	Number
		Zone Mackenzie H	1,418	6
		Zone Mackenzie I	14,871	18
		Zone Mackenzie J	1,100	1
		Zone Mackenzie K	11,480	13
		Zone Mackenzie L	26,503	22
		Zone Mackenzie M	30,575	102
		Zone Mackenzie N	123,668	463
		Subtotal	***232,987***	***668***
Un-supplemented	Nogoa Mackenzie Water Management Area	Zone Mackenzie A	633	2
		Zone Mackenzie B	939	4
		Zone Mackenzie C	7,301	8
		Zone Mackenzie D	9,162	8
		Zone Mackenzie E	923	3
		Zone Mackenzie F	438	2
		Zone Mackenzie G	838	3
		Zone Mackenzie H	1,712	3
		Zone Mackenzie I	8,353	15
		Zone Mackenzie J	2,634	3
		Zone Mackenzie K	7,023	8
		Zone Mackenzie L	6,399	12
		Zone Mackenzie M	455	31
		Zone Mackenzie N	241	12
		Subtotal	***47,051***	***114***
	Theresa Retreat Water Management Area	Zone Retreat A	5,998	7
		Zone Theresa A	840	3
		Zone Theresa B	2,247	1
		Subtotal	***9,085***	***11***

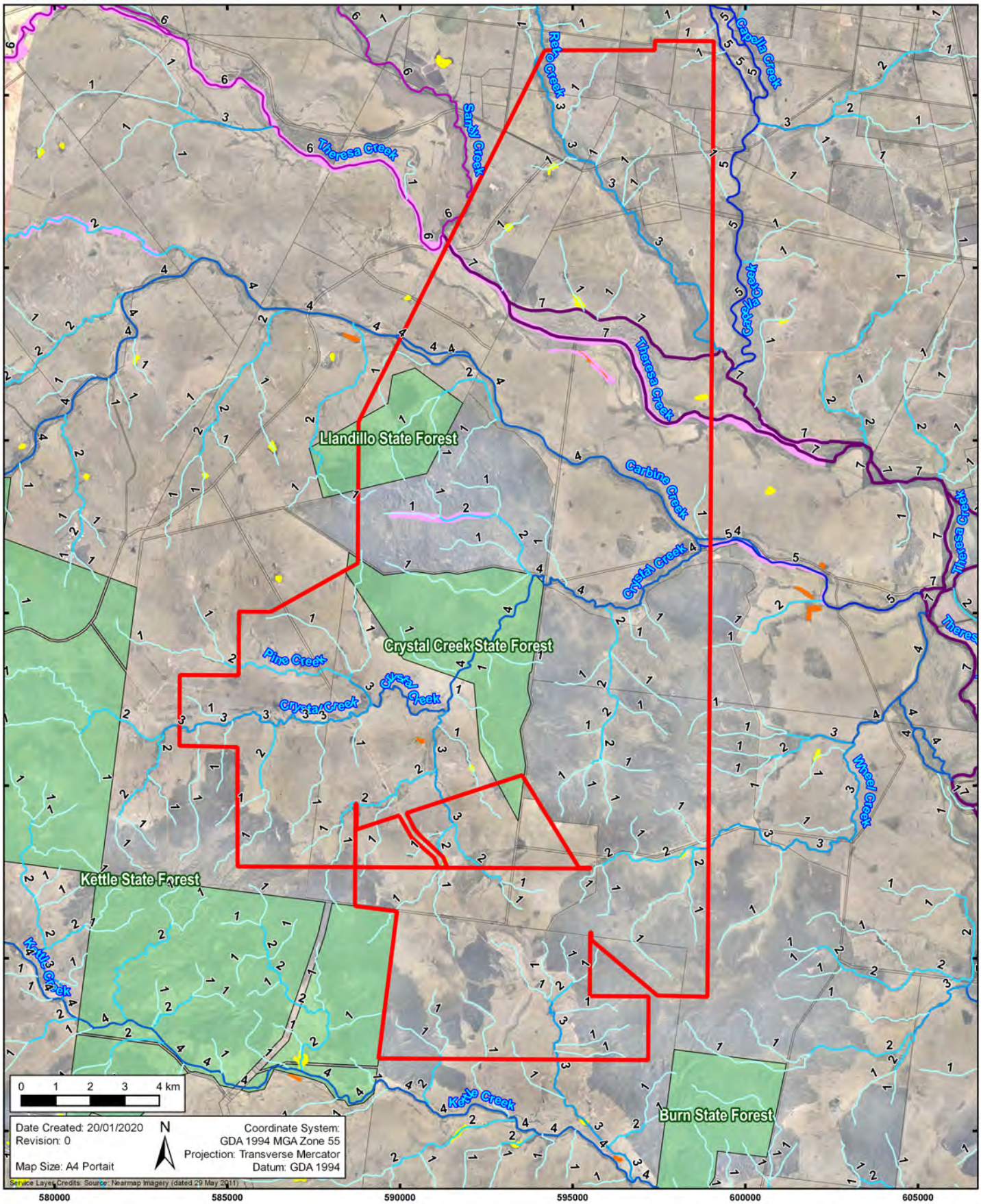
Source: Queensland Government water entitlement viewer (retrieved: January 2020)

In the catchments upstream from the Project area, there are 13 licences on Sandy Creek, Retro Creek, Theresa Creek and Capella Creek for town water supply, impound water, irrigation, stock, agriculture and water harvesting. Immediately downstream of the Project area there are eight licences on Theresa Creek, just before the confluence with the Nogoa River, for the impounding of water, water harvesting and for irrigation. The Surface Water assessment for the EIS will provide more information on surface water users upstream and downstream of the Project area and well as potential impacts that the Project may have on these users.

Figure 13

Watercourses and Wetlands

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 13 Watercourses and Wetlands.qgs

Project Area
Cadastre (DCDB)
State Forests

Wetlands Regional Ecosystems

Lacustrine system
Palustrine system
Reverine system

Ordered Drainage QLD
Stream Order (Strahler Method)

1
2
3
4
5
6
7

6.1.2.3 Wetlands

There are a number of State-mapped wetlands across the Project area, in particular along Theresa Creek and south of Llandillo State Forest (refer Figure 13). There are no State-mapped wetland areas of high ecological significance or representing Wetland Protection Areas identified as occurring within the Project area or immediate surrounds. One nationally important wetland under the Directory of Important Wetlands in Australia is Fairbairn Dam, located approximately 29 km south of the Project area.

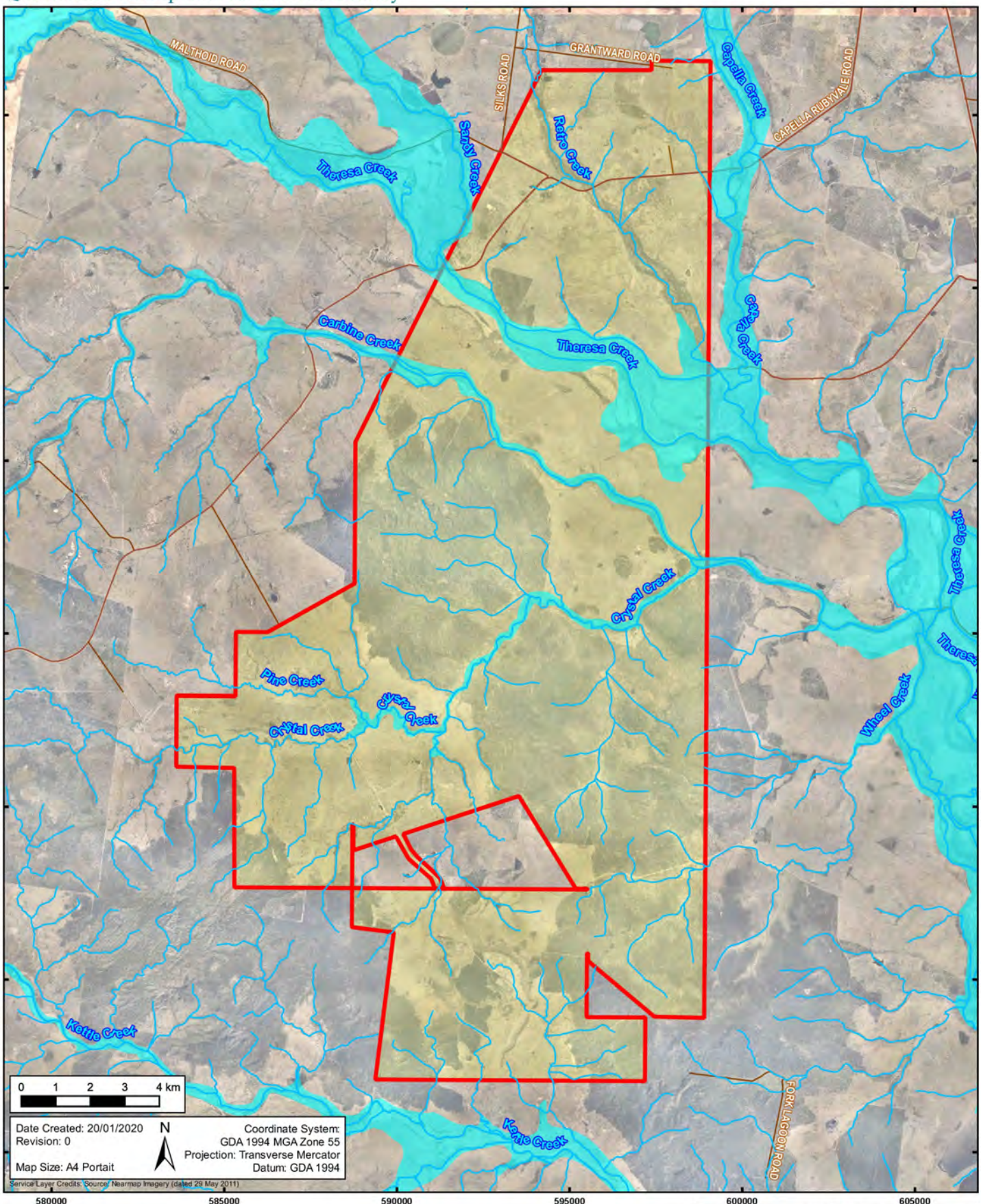
6.1.2.4 Flooding

Several floods have been recorded in the greater Project region as far back as 1950. However, there is no publicly available information on the inundation extent of the Project area during these events. State floodplain assessment overlay mapping was reviewed for the Project area and surrounds to determine potential flood hazard areas (refer Figure 14). Theresa Creek, Carbine Creek and Crystal Creek all show some potential for flooding impacts during significant rainfall events. Baseline and predictive flood modelling of levels, depths and velocities across the Project area will be undertaken to inform mine planning and infrastructure siting. This information will be presented in the EIS.

Figure 14

Queensland Floodplain Assessment Overlay

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 14 Queensland Floodplain Assessment Overlay.qgs

- Project Area
- QLD Floodplain Assessment Overlay
- Roads
- Watercourses

6.1.3 Groundwater

The Project area is located within the Lower Nogoa Groundwaters zone within the Fitzroy Basin as defined in the *Environmental Protection Policy (Water and Wetland Biodiversity) 2019*. This zone is considered an alluvial sequence with low to moderate levels of salinity and balanced bicarbonate and chloride cations. There are no springs mapped as occurring within or adjacent the Project area.

The Qld Government's registered groundwater bore database was accessed to identify bores within or adjacent to the Project area (refer Figure 15). All are classified as sub-artesian bores and are mainly concentrated within close proximity to watercourses. A census of the bores was undertaken in 2013 and showed the bores are predominantly located within the alluvium of Theresa, Carbine and Kettle Creeks and used for stock watering (4T, 2018).

6.1.3.1 Groundwater Dependent Ecosystems

State-mapping of GDEs show a number of terrestrial GDEs occurring within and adjacent the Project area. These are primarily associated with areas of remnant vegetation and watercourses/drainage lines (refer Figure 16). No subterranean GDEs are State-mapped as occurring in the Project area. Some small surface expression GDEs are thought to be present and their full extent will be assessed as part of the EIS. The assessment of GDEs will be undertaken in accordance with the *Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development's (IESC) Information Guidelines – Assessing groundwater-dependent ecosystems* (IESC, 2019).

6.1.3.2 Stygofauna

Queensland has approximately 24 known families of stygofauna (Glanville et al. 2016). These are found predominantly in aquifers with large (more than 1 millimetre) pore spaces in karstic, alluvial, fractured rock aquifers and occasionally in coal seam aquifers (Hose et al. 2015). A stygofauna assessment will be undertaken for the Project EIS.

6.1.4 Ecology

Ecological surveys were undertaken in 2012 within the Project area with no recordings of flora species listed as threatened under the *Nature Conservation Act 1992* (NC Act) (EcoSM, 2012). Field surveys are being undertaken for the EIS to confirm the presence or absence of NC Act and Commonwealth EPBC Act listed flora species within the Project area. The ecological surveys will be consistent with the Queensland Terrestrial Vertebrate Fauna Survey Guidelines and species-specific survey guidelines available on the Department of Agriculture, Water and Environment (DAWE) Species Profile and Threats database or DES website.

The Project area contains a number of biodiversity corridors mapped in the State Biodiversity Planning Assessments to be of regional and/or State significance. These corridors are predominantly associated with Carbine, Theresa, Kettle, Retro and Crystal Creeks.

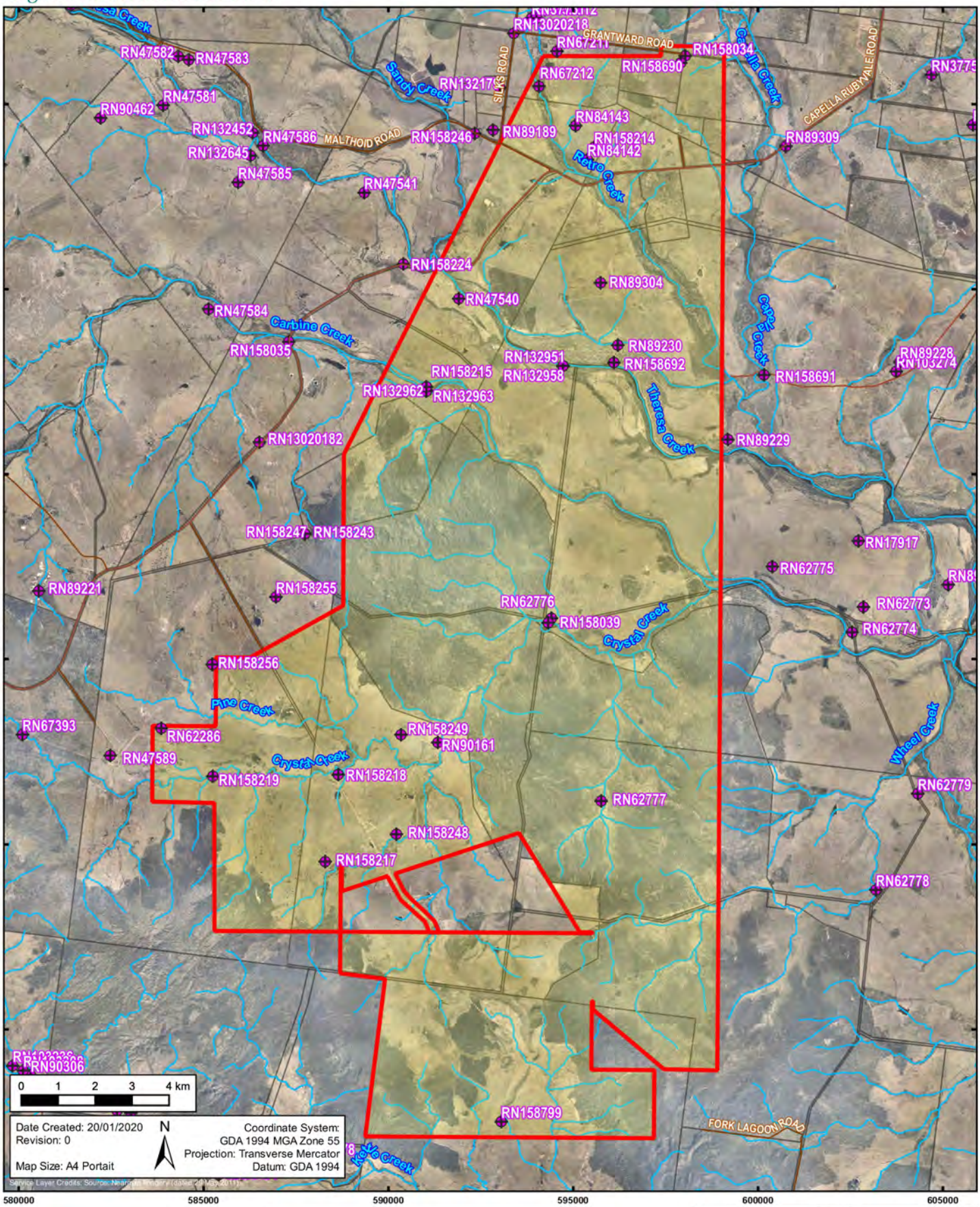
Other mapped regional and State biodiversity and conversation values that are not based on watercourses, follow vegetation tracts associated with Kettle, Crystal Creek, Llandillo and Burn State Forests. Crystal Creek and Llandillo State Forests occur within the Project area.

State-mapped Environmentally Sensitive Areas (ESAs) within the Project area include Llandillo and Crystal Creek State Forests and small sparsely scattered areas of Category B Endangered Regional Ecosystems as shown on Figure 17. Ecological surveys will assess the environmental values of the State Forests, biodiversity corridors and other ESA areas identified as occurring in the Project area.

Figure 15

Registered Groundwater Bores

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 15 Registered Groundwater Bores.qgs

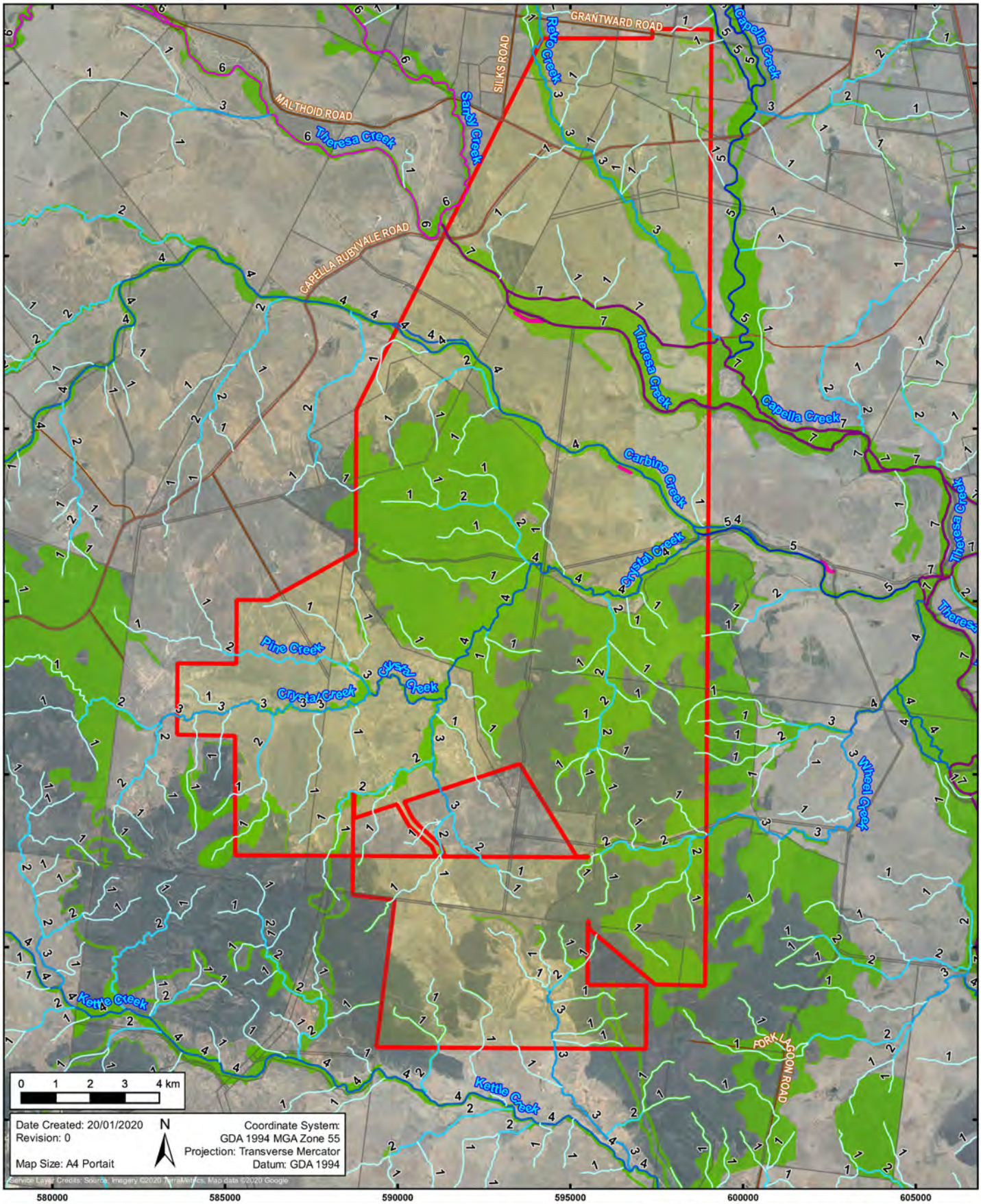
- Project Area
- Cadastre (DCDB)
- Registered Groundwater Bores
- Roads
- Watercourses

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

Figure 16

Groundwater Dependent Ecosystems

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 16 Groundwater Dependent Ecosystems.qgs

Project Area
Cadastre (DCDB)
Roads

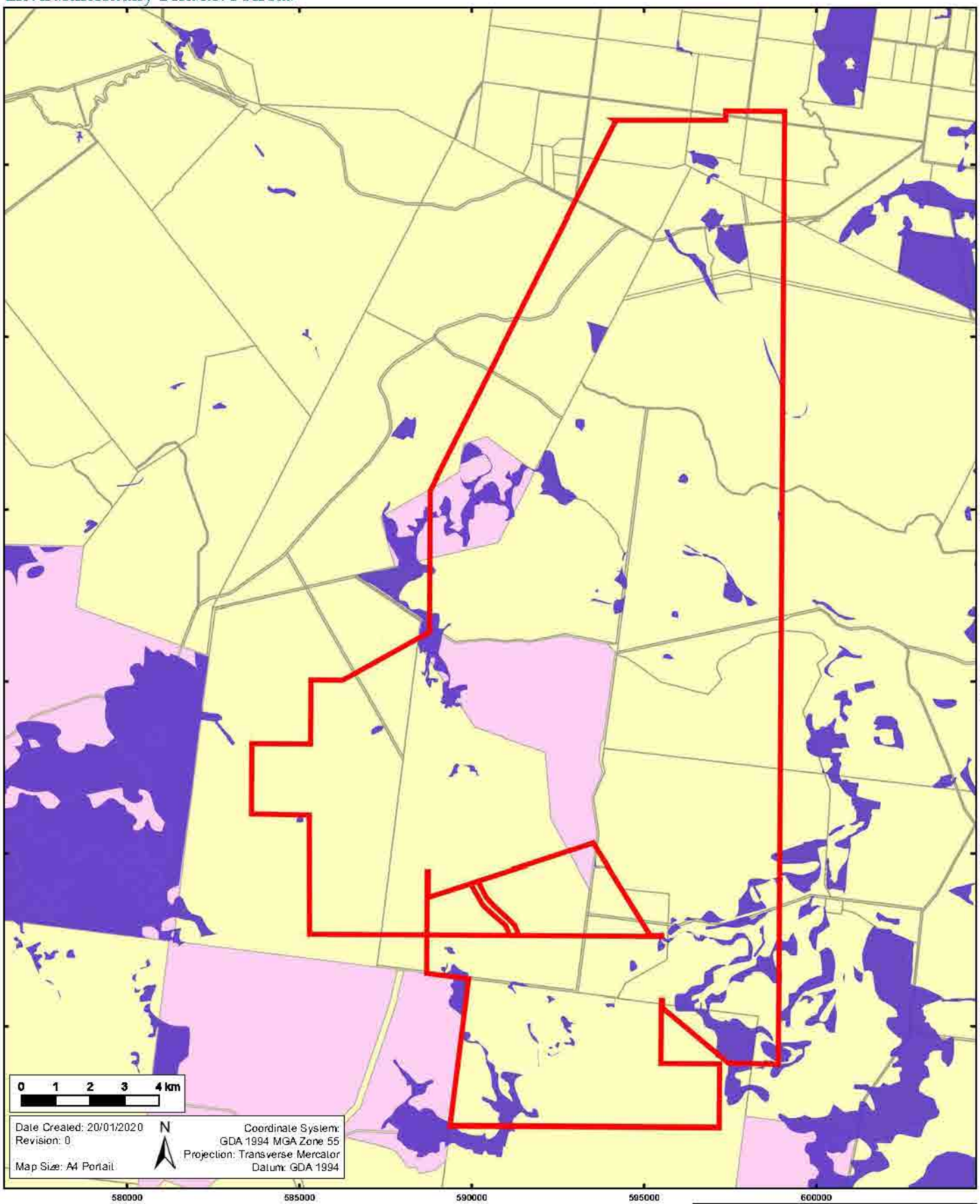
Groundwater Dependent Ecosystems (v05.0.1)
Terrestrial GDE
Surface Expression GDE

Ordered Drainage QLD
Stream Order (Strahler Method)
1
2
3
4
5
6
7

Figure 17

Environmentally Sensitive Areas

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\AS\Figure 17 Environmentally Sensitive Areas.qgs

Project Area

Cadastre (DCDB)

Environmentally Sensitive Areas

Category B
Endangered Regional Ecosystems (Biodiversity Status)

Category C
State Forest

Others
Queensland

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

6.1.4.1 Threatened Ecological Communities

A desktop search using the EPBC Act Protected Matters Search Tool (PMST) (June 2019, Appendix A.1) was undertaken for the Project area and its surrounds. The following four Threatened Ecological Communities (TECs) are known or have the potential to occur in the Project area and surrounds:

- Brigalow (*Acacia harpophylla* dominant and codominant) – listed as Endangered;
- Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin – listed as Endangered;
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions – listed as Endangered; and
- Weeping Myall Woodlands – listed as Endangered.

6.1.4.2 Regional Ecosystems

Regional Ecosystems (REs) mapped as occurring within the Project area are shown on Figure 18. The Project is located wholly within the Brigalow Belt bioregion (11). Based on the 2012 ecology survey effort undertaken within the Project area, a total of 19 REs were identified (refer Table 6). Additional field surveys will be undertaken for the EIS to confirm ecological values within the Project area.

Within the Project area (excluding the infrastructure corridor(s)), 44 percent (approximately 12,355 ha) is State-mapped as remnant vegetation and 56 percent (approximately 15,912 ha) is State-mapped as non-remnant vegetation.

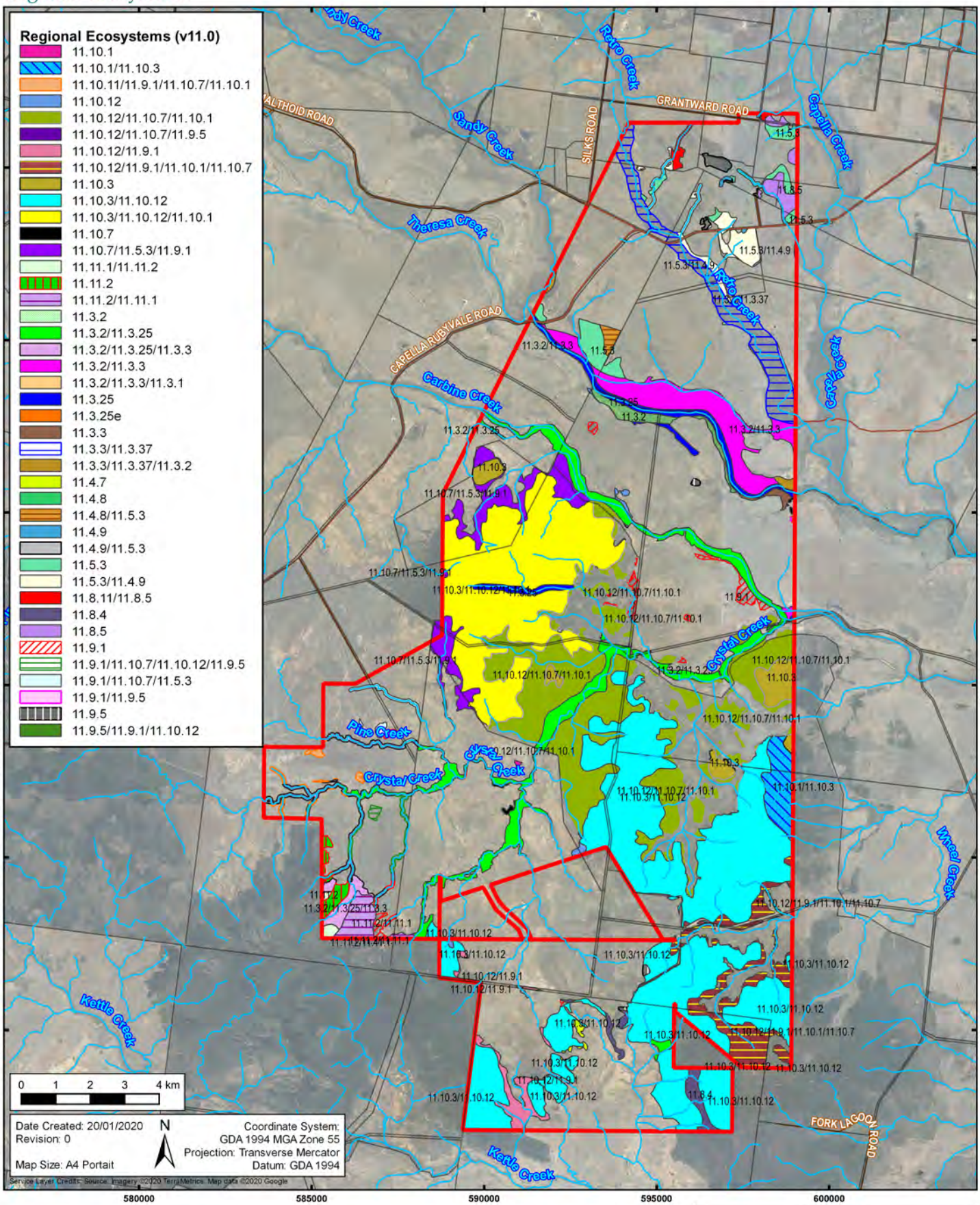
Table 6 Field Verified Regional Ecosystems (EcoSM, 2012)

RE	Short Description	VM Act Status	Biodiversity Status
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	Endangered
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	Of concern	Of concern
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	Of concern	Of concern
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern
11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	Endangered	Endangered
11.5.3	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present
11.7.2	*Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Least concern	No concern at present
11.8.1	*Eucalyptus laevopinea* tall open forest on Cainozoic igneous rocks. Elevated plateaus	Least concern	No concern at present
11.8.4	*Eucalyptus melanophloia* open woodland on Cainozoic igneous rocks.	Least concern	No concern at present
11.8.5	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Least concern	No concern at present
11.8.11	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Of concern	Of concern

RE	Short Description	VM Act Status	Biodiversity Status
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks	Endangered	Endangered
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered
11.10.1	*Corymbia citriodora* woodland on coarse-grained sedimentary rocks	Least concern	No concern at present
11.10.3	*Acacia catenulata* or *A. shirleyi* open forest on coarse-grained sedimentary rocks, crests and scarps	Least concern	No concern at present
11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	Least concern	No concern at present
11.10.12	*Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	Least concern	No concern at present
11.10.13b	*Corymbia leichhardtii* woodland.	Least concern	No concern at present

Figure 18

Regional Ecosystems



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 18 Regional Ecosystems.qgs

Project Area
Cadastre (DCDB)
Roads
Watercourses

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

6.1.4.3 Regulated Vegetation

Regulated vegetation has been identified across the Project area and comprises (refer Figure 19):

- Category B – Remnant vegetation;
- Category C – High value regrowth vegetation;
- Category R – Reef regrowth watercourse vegetation; and
- Category X – Non-remnant vegetation.

It should be noted the majority of the MLAs are dominated by Category X and Category B regulated vegetation.

6.1.4.4 Significant Flora Species

The database searches identified 10 conservation significant species under either the EPBC Act and/or NC Act relevant to the Project area and surrounds (refer Table 7). There are no high-risk areas identified by protected plants flora survey trigger mapping.

Table 7 Conservation Significant Flora Species Likely or Known to Occur in Project Area

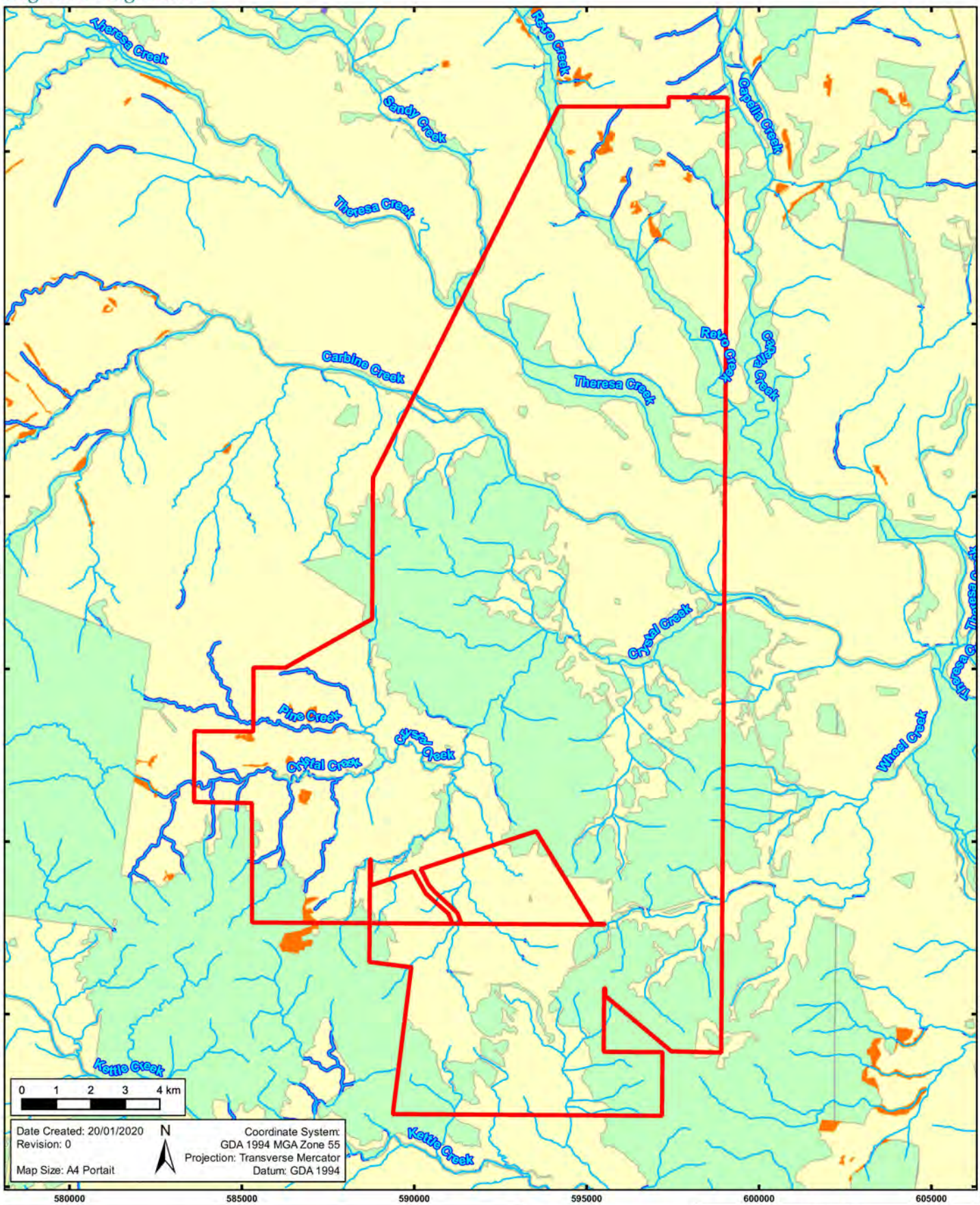
Species	Status		Source[5]
	EPBC Act[3,4]	NC Act[3,4]	
Aristida annua	V	V	PMR
Cadellia pentastylis	V	V	PMR
Dichanthium queenslandicum	E	V	PMR, WO
Dichanthium setosum	E	V	PMR
Marsdenia brevifolia	V	V	PMR
Bertya opponens	V	SLC	WO
Trioncinia retroflexa	-	E	WO
Cyperus clarus	-	V	WO
Solanum elachophyllum	-	E	WO
Solanum orgadophilum	-	E	WO

Note:
1. The species included in this table are taken from a search in a generated polygon that encompassed MLA 700055, MLA 700044 & MLA 700045 and surrounds of the *Atlas of Living Australia* (ALA, 2019). Search by coordinates with a 40 km buffer were executed for the Wildlife Online Search (QG, 2019b) and the EPBC Act Protected Matters Report.
2. Conservation Significant species are those listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act, Endangered, Vulnerable or Near Threatened under the NC Act and/or Migratory under the EPBC Act.
3. EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth), NC Act = *Nature Conservation Act 1992* (Queensland).
4. CE = Critically Endangered, E = Endangered, LC = Least Concern (Common), M = Migratory, NT = Near Threatened, SLC = Special Least Concern, V = Vulnerable.
5. WO = Wildlife Online, ALA = Atlas of Living Australia, PMR = EPBC Act Protected Matters Report.

Figure 19

Regulated Vegetation

GLENCORE



Project Area

Watercourses

Regulated Vegetation Management Map (v3.02)

- Category B
- Category C
- Category R
- Category X

DISCLAIMER
Subject To Survey
Glencore makes every effort to ensure the quality of the information available on this map.
Before relying on the information on this map, users should carefully evaluate its accuracy, currency, completeness and relevance for their purposes, and should obtain any appropriate professional advice relevant to their particular circumstances. Glencore cannot guarantee and assumes no responsibility for the accuracy, currency or completeness of the information and by using this map you accept that Glencore has no liability for any loss or damage in any form whatsoever caused directly or indirectly from the use of this map.

6.1.4.5 Introduced Flora Species

A desktop search using the EPBC Act PMST identified the following plants classified as Weeds of National Significance that are likely or known to occur in the Project area:

- Prickly Acacia *Acacia nilotica* subsp. *indica*;
- Rubber Vine *Cryptostegia grandiflora*;
- Cotton-leaved Physic-Nut *Jatropha gossypifolia*;
- Lantana *camara*;
- Prickly Pear *Opuntia* spp.;
- Parkinsonia *Parkinsonia aculeata*;
- Athel Pine *Tamarix aphylla*;
- Olive *Hymenachne amplexicaulis*;
- African Boxthorn *Lycium ferocissimum*; and
- Parthenium Weed *Parthenium hysterophorus*.

6.1.4.6 Significant Fauna Species

The database searches identified fauna species listed as Critically Endangered, Endangered, Vulnerable, Near Threatened, Migratory and/or Special Least Concern under the EBPC Act and/or NC Act relevant to the Project area or surrounds, as provided in Table 8 (refer Appendix A.1 and Appendix A.2).

Table 8 Conservation Significant Flora Species Likely to Occur in Project Area

Species	Status		Source[5]
	EPBC Act[3,4]	NC Act[3,4]	
Threatened fauna species			
Northern Quoll *Dasyurus hallucatus*	E	LC	PMR
Koala *Phascolarctos cinereus*	V	V	PMR, WO
Greater Glider *Petauroides volans*	V	V	PMR, WO
Grey-headed Flying-fox *Pteropus poliocephalus*	V	LC	PMR
Corben's Long-eared Bat *Nyctophilus corbeni*	V	V	PMR
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	PMR
Squatter Pigeon (southern) *Geophaps scripta*	V	V	PMR, WO
Red-tailed Tropicbird *Phaethon rubricauda*	-	V	WO
Australian Painted Snipe *Rostratula australis*	E	V	PMR, WO
Curlew Sandpiper *Calidris ferruginea*	CE, M	E	PMR, WO
Red Goshawk *Erythrotriorchis radiatus*	V	E	PMR, WO
Painted Honeyeater *Grantiella picta*	V	V	PMR
Star Finch *Neochmia ruficauda*	E	E	PMR
Southern Black-throated Finch *Poephila cincta*	E	E	PMR
Southern Snapping Turtle *Elseya albagula*	CE	E	PMR, WO
Fitzroy River Turtle *Rheodytes leukops*	V	V	PMR, WO
Adorned Delma *Delma torquata*	V	V	PMR
Yakka Skink *Egernia rugosa*	V	V	PMR, WO
Allan's Lerista *Lerista allanae*	E	E	PMR, WO
Ornamental Snake *Denisonia maculata*	V	V	PMR, WO
Dunmall's Snake *Furina dunmalli*	V	V	PMR
Silver Perch *Bidyanus bidyanus*	CE	LC	WO

Species	Status		Source[5]
	EPBC Act[3,4]	NC Act[3,4]	
Murray Cod *Maccullochella peelii*	V	LC	PMR
Short-beaked Echidna *Tachyglossus aculeatus*	-	SLC	WO
Migratory fauna species			
Fork-tailed Swift *Apus pacificus*	M	SLC	PMR, WO
Oriental Cuckoo *Cuculus optatus*	M	SLC	PMR
Caspian Tern *Hydroprogne caspia*	M	SLC	WO
Glossy Ibis *Plegadis falcinellus*	M	SLC	WO
Sharp-tailed Sandpiper *Calidris acuminata*	M	SLC	PMR, WO
Pectoral Sandpiper *Calidris melanotos*	M	SLC	PMR
Latham's Snipe *Gallinago hardwickii*	M	SLC	PMR
Common Sandpiper *Actitis hypoleucos*	M	SLC	PMR
Marsh Sandpiper *Tringa stagnatilis*	M	SLC	WO
White-winged Black Tern *Chlidonias leucopterus*	M	SLC	WO
(Eastern) Osprey *Pandion haliaetus* (*cristatus*)	M	SLC	PMR, WO
Rufous Fantail *Rhipidura rufifrons*	M	SLC	PMR
Black-faced Monarch *Monarcha melanopsis*	M	SLC	PMR
Satin Flycatcher *Myiagra cyanoleuca*	M	SLC	WO, PMR
Barn Swallow *Hirundo rustica*	M	SLC	WO
Yellow Wagtail *Motacilla flava*	M	SLC	PMR
Red-necked Stint *Calidris ruficollis*	M	SLC	WO

Note:
1. The species included in this table are taken from a search in a generated polygon that encompassed MLA 700055, MLA 700044 & MLA 700045 and surrounds of the Atlas of Living Australia (ALA, 2019). Search by coordinates with a 40 km buffer were executed for the Wildlife Online Search (QG, 2019b) and the EPBC Act Protected Matters Report.
2. Conservation Significant species are those listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act, Endangered, Vulnerable or Near Threatened under the NC Act and/or Migratory under the EPBC Act.
3. EPBC Act = Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth), NC Act = Nature Conservation Act 1992 (Queensland).
4. CE = Critically Endangered, E = Endangered, LC = Least Concern (Common), M = Migratory, NT = Near Threatened, SLC = Special Least Concern, V = Vulnerable.
5. WO = Wildlife Online, ALA = Atlas of Living Australia, PMR = EPBC Act Protected Matters Report.

During the 2012 ecological surveys, the vegetation communities within the Project area were found to support a diversity of habitat features including (EcoSM, 2012):

- A variety of tree, shrub and groundcover species that provide a range of forage and roosting resources;
- Hollow bearing trees that provide denning resources;
- Emergent trees on the crest of rises and low hills that provide opportunity for nesting resources (e.g. raptors);
- Rocky outcrops with overhangs, nooks and cracks;
- Deep leaf litter layer; and
- Fallen timber and coarse woody debris.

Habitats within the Project area were found to have the potential to support threatened fauna populations. A number of threatened fauna species of conservation significance were recorded during the 2012 ecological surveys. Additional detailed fauna surveys will be undertaken for the EIS to confirm the presence/absence of fauna and/or suitable habitat in the Project area.

6.1.4.7 Introduced Fauna Species

Invasive fauna likely to occur in the Project area include (former Department of Environment and Energy (DEE), 2019a):

- House Sparrow *Passer domesticus*;
- Mallard *Anas platyrhynchos*;
- Spotted Turtle-dove *Streptopelia chinensis*;
- Rock Pigeon *Columba livia*;
- Common Starling *Sturnis vulgaris*;
- Domestic Cattle *Bos taurus*;
- Cane Toad *Rhinella marina*;
- Domestic Dog *Canis lupus familiaris*;
- Cat *Felis catus*;
- Brown Hare *Lepus capensis*;
- House Mouse *Mus musculus*;
- Rabbit *Oryctolagus cuniculus*;
- Black Rat *Rattus rattus*;
- Pig *Sus scrofa*;
- Red Fox *Vulpes vulpes*; and
- Asian House Gecko *Hemidactylus frenatus*.

6.1.4.8 Aquatic Ecology

There are no State-mapped declared fish habitat areas or high ecological significance wetlands within the Project area.

Aquatic ecological surveys were undertaken at 24 sites within and adjacent to the Project area in December 2011 and March 2012 by frc environmental (frc). A summary of these survey findings is provided in Table 9. There were no threatened aquatic plants, macroinvertebrates or fish, listed under the NC Act, identified within the Project area during previous aquatic ecology surveys. These results will be verified through aquatic ecology field surveys for the Project EIS.

Table 9 Species identified during Aquatic Ecology Survey

Type	Common Name	Scientific Name
Plant	Lesser joyweed	*Alternanthera denticulata*
Plant	Giant sedge	*Cyperus exaltatus*
Plant	Awnless barnyard grass	*Echinochloa colona*
Plant	Inland tussock rush	*Juncus aridicola*
Plant	Umbrella cane grass	*Leptochloa digitata*
Plant	Water primrose	*Ludwigia peploides* subsp. *montevidensis*
Plant	Water snowflake	*Nymphoides indica*
Plant	Swamp lily	*Ottelia ovalifolia*
Plant	Attenuated smartweed	*Persicaria attenuata*
Plant	Slender knotweed	*Persicaria decipiens*
Plant	Princes feathers	*Persicaria orientalis*
Plant	-	*Blyxa aubertii*
Plant	Dirty dora	*Cyperus difformis*
Plant	-	*Cyperus trinervis*
Plant	False daisy	*Eclipta prostrata*

Type	Common Name	Scientific Name
Plant	Willow primrose	*Ludwigia octovalvis*
Plant	Red milfoil	*Myriophyllum verrucosum*
Plant	Spiny mud grass	*Pseudoraphis spinescens*
Macroinvertebrate	Freshwater shrimp	-
Macroinvertebrate	Freshwater prawn	-
Macroinvertebrate	Orange-fingered yabby	-
Macroinvertebrate	Redclaw yabby	-
Macroinvertebrate	Freshwater crab	-
Fish	Agassiz's glassfish	*Ambassis agassizii*
Fish	Goldfish	*Carassius auratus*
Fish	Fly-specked hardhead	*Craterocephalus stercusmuscarum*
Fish	Spangled perch	*Leiopotherapon unicolor*
Fish	Carp gudgeon	*Hypseleotris* spp.
Fish	Eastern rainbowfish	*Melanotaenia splendida*
Fish	Purple spotted gudgeon	*Mogurnda adspersa*
Fish	Bony bream	*Nematalosa erebi*
Fish	Hyrtl's tandan	*Neosilurus hyrtlii*
Fish	Sleepy cod	*Oxyeleotris lineolatus*
Fish	Eel-tailed catfish	*Tandanus tandanus*

Source: frc (2012).

6.1.5 Air Quality and Acoustic Environment

The closest government air quality monitoring station is located approximately 90 km east of the Project area in Blackwater and is operated by the DES. Current air quality within and surrounding the Project area is considered to be consistent with other rural settings. Existing impacts to air quality include dust emissions from natural origins and stock and farm vehicle movements, cropping activities, controlled burns and bushfires.

Ambient dust levels are expected to be influenced as a result of the Project and these are likely to be elevated during times of drought and heavy winds. Wind direction tends predominantly from north-east to south-east sectors with low to moderate windspeeds.

Ambient noise levels within the Project area are expected to be typical of a rural location, with the prominent noise sources likely to be from existing agricultural activities and insects. Noise levels along the local road network are expected to be consistent with that for rural roads.

Typical of a rural area, the night time background and ambient noise levels are expected to be lower than those experienced during the day. Noise levels during summer are expected to be higher than in winter as a result of prevalence of insect (e.g. cicada) noise during warmer months (DES, 2013) and the reduced distance that sound travels due to lower ambient air temperatures in cooler months.

6.2 Social and Economic Environment

6.2.1 Central Highlands Region

The Central Highlands Region residential population is approximately 28,645 people (Central Highlands Regional Council (CHRC), 2018). The Region encompasses an area of approximately 60,000 km^2 comprising 13 communities, including: Arcadia Valley, Bauhinia, Blackwater, Bluff, Capella, Comet, Dingo, Duaringa, Emerald, Rolleston, Sapphire Gemfields, Springsure and Tieri. The Region is rich in minerals and agriculture. A significant portion of Australia's largest coal basin (the Bowen Basin), lies within the Central Highlands (CHRC, 2019).

Based on the 2016 Census, approximately 53 percent of the Central Highlands Region population are male and approximately 47 percent are female (Australian Bureau of Statistics (ABS, 2016)). Aboriginal and/or Torres Strait Islander people made up 4.3 percent of the population (ABS, 2016).

Coal mining makes up 22 percent of industry employment in the Region (Australian Bureau of Statistics (ABS), 2016). Other major industries contributing to local employment include Beef Cattle Farming (Specialised) (7.3 percent), Primary Education (3.6 percent), Supermarket and Grocery Stores (2.4 percent) and Accommodation (2.3 percent) (ABS, 2016).

During the 2016 Census, 14,239 people reported being in the labour force. Of these approximately 65 percent were employed full time, approximately 24 percent part-time and 5.4 percent were unemployed (ABS, 2016).

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. The potential beneficial 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 mining industry include automotive and business services, computer and electronic, construction, industrial services such as conveyor belts, pumping contractors, and structural and mining engineering services.

6.2.1.1 Emerald

According to the 2016 Census, Emerald has a total population of 14,356 people, with 3.5 percent identifying as Aboriginal and/or Torres Strait Islander.

Emerald township provides a number of facilities and services to the town's population, including hospital, medical clinic, dental surgery, airport and accommodation. There are also several educational facilities in Emerald, including State and private primary and secondary schools, childcare and university campus. The town also provides recreational facilities such as, an Olympic-sized swimming pool, library, football club, sporting fields, botanical garden, racecourse and golf course.

The unemployment rate in Emerald in 2016 was 5.5 percent (413 people) (ABS, 2016). Coal mining was the primary source of employment (17.1 percent), followed by Primary Education (3.7 percent), Supermarket and Grocery Stores (3.4 percent) and Secondary Education (2.4 percent) (ABS, 2016).

6.2.1.2 Capella

Capella is located approximately 54 km north of Emerald and it hosts a population of 1,010 people. Five percent of Capella's population identifies as Aboriginal and/or Torres Strait Islander.

The township hosts a range of recreational, educational and social services, such as schools, health clinic, a library, swimming pool, sporting fields, golf course and showgrounds.

In 2016, 6.1 percent (30 people out of 304) of the active workforce was unemployed (ABS, 2016). Coal mining was the primary source of employment (19.2 percent), followed by Primary Education (5.3 percent), Beef Cattle Farming (5.3 percent) and Secondary Education (5.1 percent) (ABS, 2016).

6.2.2 Accommodation and Housing

It is anticipated that the Project will require temporary and permanent accommodation for its workforce. There are several temporary and permanent accommodation options available within Tieri, Capella, the Gemfields and Emerald such as hotels, motels and short/long term apartment and house rentals. Emerald also hosts a mine accommodation village (Discovery Parks Group, 2019). Workforce accommodation options are currently being investigated.

Currently, the median rent in Emerald is $255 per week (Realestate, 2020). Mortgage repayment rates in 2016 equated to $2,000 per month (ABS, 2016). Rent and mortgage payments represented less than 30 percent of household income for about 93.6 percent of households in Emerald, in 2016.

At this early stage of Project development, it is still to be determined whether on-site accommodation will be required during construction and/or operations phases. The SIA being developed for the EIS will detail preferred workforce accommodation opportunities for all phases of the Project, including local sourcing and relocation strategies for the workforce, sustainable use of local accommodation options and a strategy to reduce the need for FIFO arrangements.

The Project will comply with the SSRC Act regarding restrictions on use of a FIFO workforce. At this early stage of Project development, percentages of FIFO workforce are not yet known.

6.2.3 Cultural Heritage

6.2.3.1 Indigenous Cultural Heritage

A search of the Queensland Cultural Heritage Database and Register found no listed Aboriginal or Torres Strait Islander Cultural Heritage sites, Cultural Heritage Management Plans (CHMPs), Designated Landscape Areas or Registered Cultural Heritage Study Areas registered over the Project area (DATSIP, 2019).

A number of cultural heritage surveys undertaken both for the previous holder of the underlying mining tenements and Glencore, have identified Indigenous Cultural Heritage as occurring in the Project area. A CHMP over the Project area has been developed by the Proponent in consultation with the Western Kangoulu People, the registered Native Title claimants. The Valeria CHMP has been registered with the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP).

6.2.3.2 Non-Indigenous Cultural Heritage

There are no mapped non-Indigenous cultural heritage sites within the Project area, based on searches of the Queensland Heritage Register (QG, 2016). The closest registered heritage places to the Project include: Emerald Railway Station Complex in Emerald; the Tomahawk Creek Huts in Rubyvale; the Clermont Cemetery; and the Stone Farm Building in Clermont (QG, 2016).

Australia's National Heritage List, which identifies nationally significant natural, historic and Indigenous places also has no sites identified within the Project area or its surrounds (DEE, 2019b).

6.3 Built Environment

The majority of existing health, education and accommodation infrastructure within the vicinity of the Project area are located in Emerald, with some services located in Capella.

6.4 Traffic and Transport

6.4.1 Road Transport

The main State-controlled roads within the vicinity of the Project area include (refer Figure 1):

- Gregory Highway, running in a north/south direction approximately 8.5 km east of the Project area; and
- Capricorn Highway, running in an east/west direction approximately 16 km south of the Project area.

Local roads include the Capella Rubyvale Road, Malthoid Road and Grantward Road, which intersect the Project area in the northern portion of MLA 700055. A number of private unsealed roads and tracks are also located within the Project area (refer Figure 2).

Access options to the site are being assessed and will require use of local and State-controlled road assets to travel to the site access turn off. The alignment of the rail infrastructure corridor will influence the location of the primary site access road and is currently under assessment. As noted in Section 4.6.2 Fourteen Thousand Access Road has been nominated as the main access to the site (as required for the submission of the MLAs), alternative options to the east and south are also under consideration and will be discussed in the EIS.

There will be no coal haulage on public roads for the Project, however haulage of ROM and potentially product coal will be required on internal roads between pits, the CHPP and the rail load out facility. This will be discussed in the EIS.

6.4.2 Rail Transport

The principal rail transport corridor in the vicinity of the Project area is the Central Western Railway. The main line of the Central Western Railway extends from Rockhampton to Winton via Emerald and is located approximately 16 km south of the Project area (refer Figure 1). There is also a branch that runs approximately 10 km east of the Project area from Emerald to Blair Athol (i.e. north of Clermont) via Capella. The entire Central Western Railway system is a narrow gauge non-electrified rail line.

6.5 Land Use

The Project area includes freehold, State Forest and lands lease tenure (refer Figure 20). The predominant land use across the region, including the Project area, is State-mapped as grazing native vegetation. Specific land uses identified within the Project area (excluding the infrastructure corridor(s)) include:

- Cattle grazing;
- Organic cattle grazing;
- Mapped remnant vegetation; and
- Productive native forests, including for grazing, timber forestry and apiary activities.

Crystal Creek and Llandillo State Forests located within the Project area are designated as forest management units (MUID) under the *Forestry (State Forests) Regulation 1987.* The MUID denotes that the State owns the forest products on the land under the Forestry Act and has a commercial interest in managing the forest products through the Department of Agriculture and Fisheries (DAF). References for the MUID designation are as follows:

- Llandillo State Forest (SF 182 on plan 1031) MUID: C.AREM022; and
- Crystal Creek State Forest (SF 180 on plan FTY951) MUID: C.AREM023.

Adjacent land uses include cattle grazing and livestock activities to the north and south, and cropping land to the east and southeast of the Project area. Kettle State Forest is located directly west/south-west of the Project area with Burn State Forest located to the south-east.

Regional land uses comprise irrigated and non-irrigated cropping, grazing, quarrying, coal exploration and production, fossicking, forestry and residential, including the townships of Emerald, Capella and the Gemfields (Anakie, Rubyvale, and Sapphire) (CHRC, 2013; QG, 2019a).

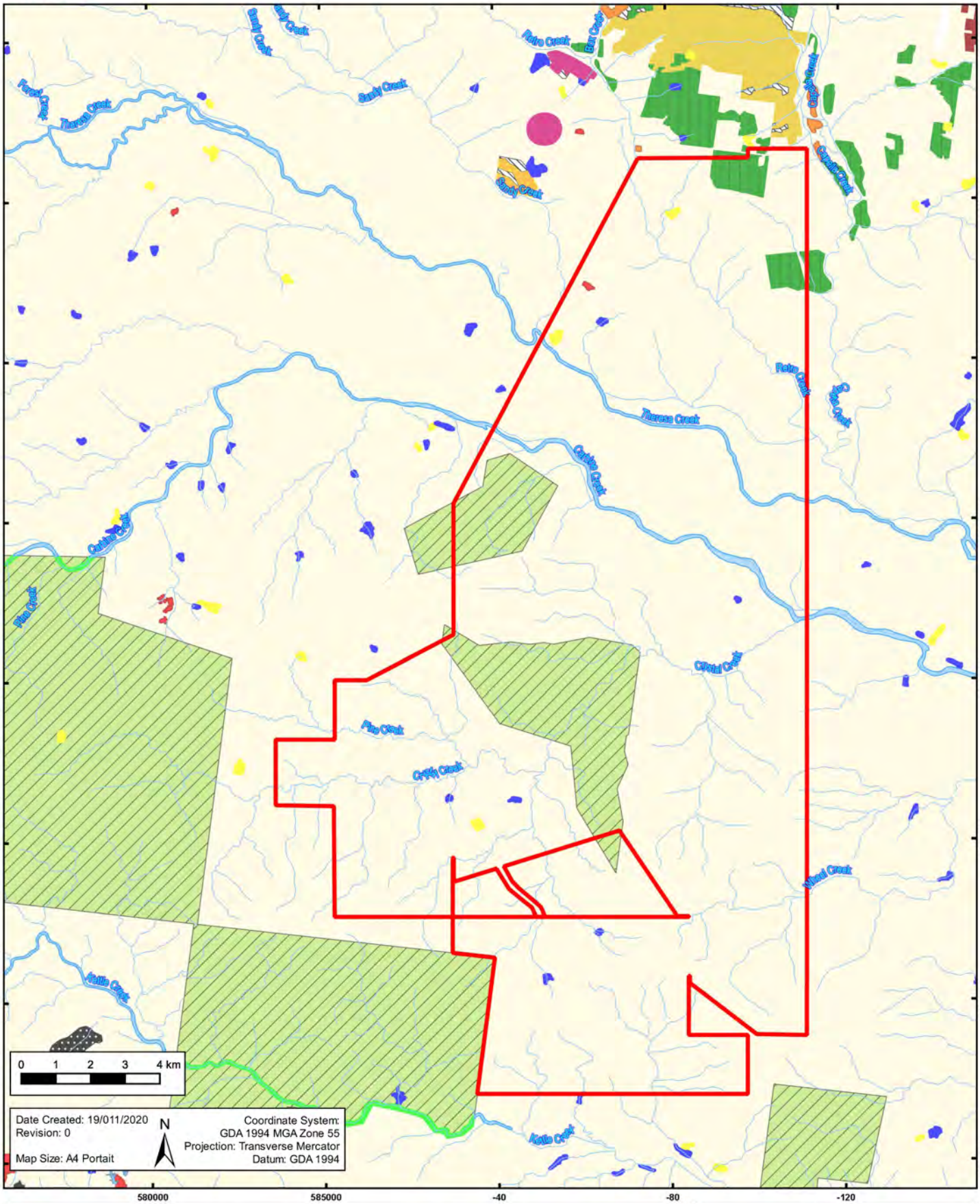
6.5.1 Native Title

The Native Title Claimants of the Project area are the Western Kangoulu People, who hold a Native Title claim (QC2013/002) over an area of approximately 16,130 km^2 (Section 6.2.3). There are locations identified within the Project area where Native Title has not been extinguished. As such, a Native Title Agreement under provisions of the *Native Title Act 1993* (Commonwealth) will be required to be developed and implemented (Figure 21).

Figure 20

Land Use

GLENCORE



Date Created: 19/011/2020
Revision: 0
Map Size: A4 Portait

Coordinate System:
GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\AS\Figure 20 Land Use.qgs

Project Area
2km Buffer of Project Area
5km Buffer of Project Area
Watercourses

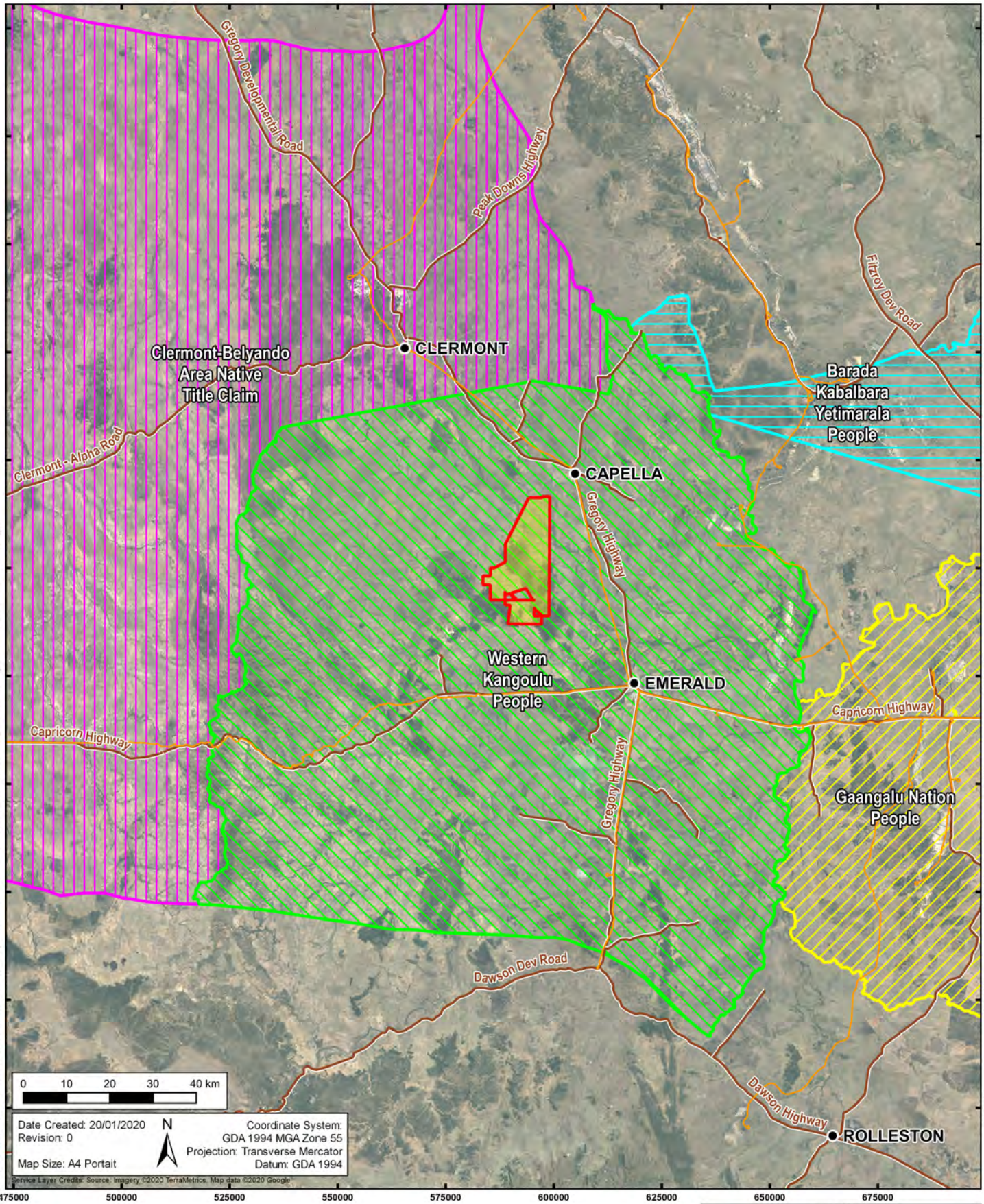
Sensitive Receptors
Glencore Owned
Private

QLD Landuse Mapping (June 2019)
Cereals
Cropping
Farm buildings/infrastructure
Grazing native vegetation
Irrigated cotton
Irrigated cropping
Marsh/wetland
Marsh/wetland - production
Other minimal use
Production native forests
Quarries
Woody fodder plants
Water storage intensive use/farm dams

Figure 21

Native Title Claims

GLENCORE



©QGIS2019 Ref: G:\GIS\Epic Environmental\Projects\BE\BE190113.01 Glencore EIS\Workspaces\IAS\Figure 21 Native Title Claims.qgs

Project Area
State Controlled Roads
Rail

Register of Native Title Claims

- Western Kangoulu People
- Barada Kabalbara Yetimarala People
- Clermont-Belyando Area Native Title Claim
- Gaangalu Nation People

7 Potential Project Impacts

Potential impacts that could occur if unmanaged or unmitigated during the construction, operation and decommissioning phases of the Project, are outlined below.

7.1 Natural Environment

7.1.1 Land

The Project will impact on land resources and land use capacity. This includes impacts such as alteration of landforms through the potential formation of residual voids and waste rock emplacements, and changes to the agricultural capacity of the land. Therefore, it is likely that some permanent changes in the remaining landform will occur.

During operations, existing agricultural land uses within the Project footprint will be directly impacted as the Project progresses over time. The mine plan will be staged to allow agricultural activities to continue as long as possible in portions of the Project area not required for operations. Once operational activities have ceased in parts of the Project area, land will be progressively rehabilitated and where possible, made available to the landholders for agricultural purposes.

If unmanaged or unmitigated, Project activities could cause contamination, compaction, degradation and erosion of soils. Baseline soil surveys will 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. Validation sampling will be undertaken for the State-mapped SCL in the northern section of the Project area and if not exempt, potential impacts may require a Regional Interest Development Approval under provisions of the *Regional Planning Interests Act 2014* (RPI Act).

A geochemical assessment will also be undertaken for the EIS to identify the characteristics of waste rock material and suitable management measures to be implemented over the Project life, including requirements for rehabilitation activities. Investigations and modelling currently being undertaken will inform pit extent and design to confirm if any pits will result in a residual void and to ensure no residual voids without a post-mine landuse are located within floodplains.

At this stage of Project development, the degree of any direct and indirect impacts that may be experienced by landholders within and surrounding the Project area including infrastructure corridor(s) is unknown and will be assessed in the EIS.

7.1.1.1 Rehabilitation

Potential temporary and permanent changes to landforms and uses resulting from Project activities will be minimised where practicable through progressive rehabilitation. Rehabilitation outcomes will be in line with pre-determined final land use objectives and developed in consultation with relevant stakeholders. The PRCP will be developed in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act) and the *Guideline–Progressive rehabilitation and closure plans* (2019) (the PRCP Guideline).

The PRCP will detail how and where Project activities will be carried out on land in a way that maximises the progressive rehabilitation of the land to a stable condition. Rehabilitation objectives for the Project post-mine landuses are that:

- The land is safe;
- The land is structurally stable;
- No environmental harm is being caused by anything in or on the land; and

- The land can sustain a post-mine land use.

The PRCP will comprise two sections, a rehabilitation planning section and a schedule (the PRCP Schedule) that includes milestones and completion dates for achieving progressive rehabilitation of the mine site.

In accordance with the PRCP Guideline all disturbed areas within the mining tenure will be progressively rehabilitated to a post-mining landuse (PMLU). The PMLU will reflect the pre-mining landuse and will likely comprise a combination of cattle grazing and native vegetation. As part of PRCP development, land uses will be nominated in consultation with relevant stakeholders.

Investigations and mine planning currently being undertaken will inform likely open cut pit extent and design, to determine whether any pits will likely result in a residual void and to ensure no residual voids without a use are located within floodplains. The current intent of the Proponent is to avoid non-use management areas (NUMAs) across the mining tenements. Information in the PRCP will be used to calculate the estimated rehabilitation costs (ERC) in accordance with the *Mineral and Energy Resources (Financial Provisioning) Act 2018*.

7.1.2 Water

Surface water and groundwater resources will be managed with regard to potential impacts associated with Project activities. Surface water and groundwater baseline and impact assessments will be undertaken for the EIS.

7.1.2.1 Surface Water

Project activities have potential to cause the following impacts to surface waters within and surrounding the Project area:

- Watercourse diversion design or construction that results in changes to existing flow conditions. A diversion of Pine Creek may be required to allow construction of Crystal North Pit (refer Figure 3). The need for this will depend on further definition of the potential coal resource and mine planning currently being undertaken, and to date no design work has progressed on this. Any watercourse diversion will be subject to regulatory agency consultation and addressed in the EIS;
- Diversion of overland flow that causes hydrological changes within the catchment. Diversion of overland flow at the headwater of Wheel Creek may be required around the proposed Kettle out of pit dump (refer Figure 3). As with the potential Pine Creek diversion, the need for overland flow diversion will depend on further definition of the potential coal resource and mine planning currently being undertaken;
- Uncontrolled releases of mine water offsite (e.g. after flood events);
- Controlled releases of mine water which do not meet the site-specific EA conditions;
- Impacts to bank stability at linear infrastructure crossings;
- Changes in surface water quality through seepage from out-of-pit dumps, TSF, water storage facilities or the on-site landfill;
- Over allocation of surface water for use in the Project's construction and operational activities; and
- Reduction in watercourse base flow as a result of surface water inflow into pits.

The Queensland Floodplain Assessment Overlay dataset presented on Figure 14 indicates that Theresa, Carbine and Crystal Creeks have the potential to flood within the Project area. Baseline and predictive flood modelling will be undertaken for the EIS and will be used to inform mine planning and infrastructure placement, particularly as regards the Carbine North and South pits and associated infrastructure. As part of the Surface Water assessment, flood modelling will be used to identify areas where landforms and or levees will seek to minimise the potential for flooding of pits and infrastructure.

7.1.2.2 Groundwater

Groundwater may be used as a supplementary water supply for the Project. Extraction of groundwater for Project use may result in drawdown on aquifers and any interconnected systems. Drawdown may also result from the construction of pits, where groundwater may preferentially flow to and require pumping out for mining activities to proceed. However, there are no planned releases from the Project to groundwater systems.

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

- Decline in groundwater levels and/or pressure at private water bores, reducing water availability;
- Reduction in groundwater head potentially causing impacts to GDEs;
- Reduction of baseflow to watercourses, potentially resulting in impacts to GDEs and reduced surface water availability to potential users downstream;
- Contamination of shallow groundwater systems due to the improper storage and handling of fuels and chemicals;
- Changes in groundwater quality through seepage from out-of-pit dumps, TSF, water storage facilities or the on-site landfill (general waste); and
- Changes to levels and/or quality of shallow groundwater systems from over-irrigating of treated effluent and over-use of water for dust suppression and construction activities.

An assessment of groundwater will be undertaken for the EIS.

7.1.2.3 Stygofauna

An assessment of stygofauna will be undertaken for the Project and included in the EIS. This will include a groundwater monitoring bore pilot program to identify the following characteristics and whether stygofauna are found within the Project area:

- Groundwater quality characteristics;
- Groundwater flow within and into the aquifer;
- Aquifer type;
- Depth to groundwater bores; and
- Food supply.

7.1.3 Flora and Fauna

Project activities have potential to cause the following impacts to flora and fauna within and surrounding the Project area:

- Clearing for on-site infrastructure resulting in vegetation and habitat loss, fragmentation and loss of general ecological significant wetlands;
- Clearing for on-site infrastructure resulting in loss of terrestrial and surface expression GDEs;
- Unplanned and mine water releases of sediment and contaminants to waterways resulting in a decline in aquatic ecology and aquatic habitat values;
- Mine water releases to watercourses resulting in a reduction of aquatic ecology values;
- Unplanned releases of contaminants to soil, resulting in degradation of surrounding vegetation and habitat;
- Excessive dust generation and deposition resulting in degradation of habitat and reduced vegetation growth; and
- Introduction and/or spread of weed and feral animal species resulting in degradation of habitat, increased competition and decline in local native populations.

Wet and dry season terrestrial and aquatic ecological surveys will be undertaken to better understand the local and regional baseline ecology and potential Project impacts.

7.2 Amenity

7.2.1 Noise and Vibration

The major sources of potential noise and vibration impacts from the Project will arise initially from construction activities such as earthmoving and the use of mobile equipment. Operational activities giving rise to noise and vibration impacts would include blasting, mining fleet, conveyors, crushing, load out processes, trains and road transport movements. The majority of vibration impacts would be due to blasting and blast overpressure occurrences. It is expected that operational noise will be generated 24 hours per day for 363 days per year.

A detailed noise and vibration assessment will be undertaken for the EIS. Noise levels at sensitive receptors will likely vary due to the distance from the point emission source, meteorological conditions, topography of intervening landforms and the type of noise source.

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.

7.2.1.1 Sensitive Receptors

The majority of properties and associated homesteads within the three MLAs are owned by the Proponent and its JV partners and are currently tenanted, primary for cattle grazing. The closest privately owned homestead outside the MLA boundaries is located 0.18 km to the north of MLA 700055. Sensitive receptor distances from the MLA boundary is discussed in Section 5.2.1 and shown on Figure 6. The potential for these sensitive receptors to experience noise and vibration impacts during the various phases of the Project will be assessed in the EIS.

7.2.2 Air Quality and Greenhouse Gas

7.2.2.1 Air Quality

Air quality is managed in accordance with the EP Act, *Environmental Protection Regulation 2019* (EP Regulation) and the *Environmental Protection Policy (Air) 2019*. Open cut mining activities have the 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 (PM_{10}) and particulate matter with an equivalent diameter of 2.5 micrometres or less ($PM_{2.5}$). The fine particles are usually generated through combustion processes, whilst the coarse particles originate from physical agitation of matter.

Project activities have potential to cause impacts to air quality from the following:

- Exhaust fumes from the generator(s), machinery and equipment operating on site;
- Exhaust fumes and dust generated by vehicles, machinery and equipment moving within the Project area and to and from site;
- Dust from the process of open cut mining (extraction, processing and transportation);
- Dust associated with transporting coal to port; and

- Spontaneous combustion caused by the oxidation of coal and related carbonaceous materials and resultant self-heating. When the generated heat is trapped in spoil or loose coal, the temperatures can rise until it ignites or spontaneously combusts.

Sensitive receptor locations and distances from the Project boundary are discussed in Section 5.2.1 and shown on Figure 6. The potential for these sensitive receptors to experience air quality impacts during the various phases of the Project will be assessed in the EIS.

7.2.2.2 Greenhouse Gas Emissions

Open cut mining activities result in direct emissions of greenhouse gas (GHG) through combustion of diesel fuels in the mining plant and equipment and fugitive coal seam gas emissions from open cut pits. Glencore recognises climate change science as set out by the United Nations Intergovernmental Panel on Climate Change (IPCC), and in 2017 announced its first target of reducing its GHG emissions intensity by 5% to 2020, compared to a 2016 baseline. Glencore is on track to meet this target and also reports annually on the progress in meeting its climate change objectives as well as reporting on its emissions. A GHG assessment will be undertaken for the EIS.

7.2.3 Visual Aesthetics

The most visually sensitive areas in the vicinity of the Project area are nearby privately owned local residences and local neighbouring roads. The location of sensitive receptors (i.e. homesteads) within and surrounding the Project have been identified in Figure 6 and discussed in Section 5.2.1. The potential view and associated impact of the Project at these locations will depend upon the final Project layout, intervening topography and vegetation.

Project activities and components that may result in potential impacts upon the visual amenity of the landscape include:

- Vegetation clearing;
- Open cut pit excavations;
- Topographical changes;
- Infrastructure corridor or potentially multiple corridors;
- Lighting associated with mine operations;
- Out-of-pit placement of waste rock and overburden; and
- Elevated mine infrastructure including levees.

Views of Project activities as well as the existing view shed from sensitive receptors, public roads and highways in the vicinity of the Project area will be considered during the visual amenity assessment for the EIS.

7.3 Social Environment

A SIA will be prepared for the EIS and will assess potential benefits and impacts the Project may have on a local, regional, State and National scale. Direct engagement with Project stakeholders will be undertaken to assess the potential impacts from the Project on existing local social values. The 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:

- Community and stakeholder engagement;
- Workforce management;
- Housing and accommodation;
- Local business and industry procurement; and

- Health and community well-being.

Consultation will be conducted with identified affected and interested stakeholders (e.g. direct and adjoining landholders, Government representatives, business operators, special interest groups, Indigenous groups and local community).

7.3.1 Potential Social Benefits

Potential benefits from the Project include:

- Employment opportunities for a local and regional-based workforce;
- Provision of training opportunities for the local community;
- Revenue for local businesses due to purchase of goods and services by workers living in the vicinity of the Project. There is also a potential for increase in demand of these goods and services leading to an indirect increase in employment within businesses;
- Revenue through taxes and royalties, enabling State and Commonwealth Government spending; and
- Enhanced business activity within the Central Highlands Region.

7.3.2 Potential Adverse Social Impacts

Potential adverse impacts from the Project may include:

- Impacts to local property values, housing accommodation and affordability;
- Change to demand on existing health, emergency, childcare and education services;
- Changes to social cohesion in surrounding townships;
- Changes in land use of the Project area;
- Population decline upon decommissioning of the Project; and
- Amenity impacts (including air quality, noise and vibration and visual amenity).

7.4 Economic Effects

Glencore invests in the communities where it operates, by way of:

- Employment and procurement;
- Consent and statutory condition payments such as those that may be associated with the Native Title agreement; and
- Voluntary community investment to support not-for-profit groups proximal to operations.

Each year, Glencore invests approximately $4 million into community initiatives across its operational areas. Opportunities for such investment are realised through extensive stakeholder engagement, in addition to publicly available grants of funding available to community organisations.

7.4.1 Potential Economic Benefits

The Project will likely result in direct and indirect economic benefits including:

- Maintenance of economic growth;
- Employment opportunities;
- Indigenous participation, employment and business opportunities;
- Support for local businesses (i.e. mining and construction businesses) and local investment; and
- Government revenue.

Benefits will be generated as a result of continued employment and business opportunity from local to regional goods and services procurement, leading to maintained or increased business turnover and household income. An economic assessment will be undertaken as part of the EIS to determine the potential impact the Project may have on local businesses, wages, labour demand and the price of goods and services.

7.4.2 Potential Adverse Economic Impacts

The Project may also result in potential adverse economic impacts such as:

- Staged disturbance to agricultural production within the Project area;
- Impacts on business activity in the region through competition for resources; and
- Potential impacts on availability and affordability of housing, resulting from an increased temporary and permanent population in the region.

The potential impacts to agricultural land within the MLA's will be staged over the life of the mine. Pits will be opened in a sequential manner meaning that all pits will not all be open and operational at the same time. The sequential nature of the operation will seek to minimise the extent of disturbance at any one time and allow progressive rehabilitation to be achieved throughout the mine life.

7.5 Built Environment

7.5.1 Transport

Increased traffic generation has potential to cause delays at new and existing intersections, as well as along major roads that may be used by the Project construction and operational workforce to travel to the site access road.

Depending on the location of the site access road, the Project has the potential to result in:

- Traffic accidents and incidents;
- Increased incidence of spills or discharges due to the transportation of hazardous or dangerous goods to the Project area;
- Delays at interface point pathways with other private and public transport;
- Damage to property and road infrastructure due to use by vehicles; and
- Surface wear along the haulage route due to the increase of vehicles causing deterioration of the surface of the pavement.

Potential traffic impacts to the safety, efficiency or road infrastructure as a result of the Project would be assessed in consultation with relevant transport authorities. A Traffic Impact Assessment (TIA) will be carried out in accordance with the DTMR *Guide to Traffic Impact Assessment*. Further, an investigation into potential impacts to local roads will be undertaken.

Coal product from the Project will likely be transported from site by rail, although road haulage along a private haul road to a train load out area is also being considered. The final preferred coal rail infrastructure corridor and site access road will be developed during options analysis and in consideration of social, cultural, environmental, engineering and logistics criteria. A transport assessment will be undertaken for the EIS.

7.6 Matters of National Environmental Significance

A desktop search using the EPBC Act PMST revealed the following MNES potentially relevant to the Project:

- Four TECs;
- Twenty-six Listed threatened species;
- Twelve Listed migratory species; and
- One Nationally important wetland – Fairbairn Dam, located approximately 29 km south of Project area.

A referral will be submitted to DAWE for a decision as to whether the Project constitutes a controlled action under the EPBC Act. An EIS under the SDPWO Act is an accredited process for assessment of a controlled action for the purposes of the EPBC Act. An assessment of the significance of residual impacts to MNES will be undertaken as part of the ecology and water studies.

8 Environmental Management and Mitigation Measures

8.1 Natural Environment

Mitigating the potential impacts from the Project on environmental values requires a range of management and mitigation measures to be adopted, such as the following:

General:

- Compliance with the Project's EA (issued under the EP Act).
- Progressive rehabilitation of disturbed areas in order to achieve stable, non-polluting landforms that are able to support post-mining land uses (grazing and native ecosystems) where achievable.

Land:

- Development of clean-water/dirty water bunding to manage overland flows entering the catchment of the disturbance area.
- To ensure appropriate rehabilitation outcomes, the implementation of suitable topsoil management practices, such as procedures around the stripping, stockpiling, cover crop sowing and timely placement of topsoil for use for use in rehabilitation.
- Progressive rehabilitation and staged disturbance planning.
- Co-location of linear infrastructure where practicable.

Water Management:

- Preparation of water management plans and monitoring programs as required.
- Licensed extraction of water resources in accordance with the Water Act and mitigation as required

Flora and Fauna:

- Procedures for vegetation clearing and surface disturbance (e.g. need for pre-clearance surveys, fauna spotter catchers and salvaging of habitat features for use in rehabilitation).
- Assessment of biodiversity impacts, and if required acquit them in accordance with the Queensland Environmental Offsets Policy and the Commonwealth EPBC Act Environmental Offsets Policy.

Air and Noise:

- Dust suppression measures, such as watering of haul roads and stockpiles.
- Blast management measures comply with the applicable criteria.

Following environmental assessment of the Project, additional, site specific environmental management and mitigation measures will be developed and refined following consultation with the relevant stakeholders. Further details will be provided in the EIS.

8.2 Built Environment

Any new roads or upgrades of existing roads will be developed in consultation with the appropriate regulatory authorities. Rail infrastructure will be developed in consultation with relevant stakeholders. Following final route selection and design of access roads, the Project will implement any required transport management measures. For rail, management measures associated with the

transport of product coal will be developed in consultation with relevant stakeholders as part of the EIS.

8.3 Indigenous Cultural Heritage Management

The *Aboriginal Cultural Heritage Act 2003* (ACH Act) provides recognition, protection and conservation of Indigenous cultural heritage. The 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.

The Proponent has developed a CHMP with the Western Kangoulu People, addressing the requirements of the ACH Act. The CHMP has been registered with DATSIP. Further, the Proponent will engage with the Western Kangoulu People in the cultural heritage survey across the Project area to better understand the occurrence of any artefacts and sites of cultural significance and its management.

8.4 Non-Indigenous Cultural Heritage Management

If non-Indigenous heritage places, landscape and values are identified during the EIS assessment, appropriate management and mitigation measures will be implemented.

8.5 Greenhouse Gas Management

An assessment of potential GHG emissions associated with the Project will be undertaken for the EIS. This will 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 where practicable the double handling of materials.

The Proponent will monitor and manage the Project GHG emissions through participation in 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.

8.6 Waste Management

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

- General waste including decomposable and compostable putrescible wastes;
- General waste that is not compostable but may be recyclable;
- Recyclable waste that can be reconditioned, reprocesses and/or reused; and
- Regulated waste.

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. Any hazardous waste would be removed from the site by a licenced contractor and disposed of or recycled at appropriate off-site facilities.

An on-site landfill is proposed to be constructed as part of the Project for the disposal of general waste. The location and design of the landfill as well as indicative waste volumes would be confirmed through the mine planning process and presented in the EIS.

8.7 Hazard, Risk, Health and Safety

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

8.8 Environmental Management

Glencore's Environmental Management System (EMS) will guide the implementation of environmental management measures and commitments for the Project. Environmental management plans will be prepared and implemented prior to commencement of each phase of the Project, as required by relevant approval conditions. Ongoing monitoring will detect changes in performance indicators detailed in the plans, to determine if outcomes are being achieved, and to inform adaptive management.

9 Approvals Required for Project

Table 10 provides a summary of the approvals likely to be required for the Project.

Table 10 Likely Project Approvals

Legislation	Approval	Trigger	Reference to Project	Administering Authority	Within Scope of EIS[1]
Commonwealth Approvals					
Environment Protection and Biodiversity Conservation Act 1999	EPBC Referral and approvals process	A Project that will have or is likely to have a significant impact on a MNES. Where the Minister makes a decision that the Project is a Controlled Action and is subject to assessment and approval under the EPBC Act. Under the bilateral agreement between the State and the Commonwealth, assessment can be via an accredited process	Entire Project Relevant for the EIS	Department of Agriculture, Water and Environment	Yes
Native Title Act 1993	Native Title Agreement	A Project that has areas subject to Native Title.	Entire Project	National Native Title Tribunal	No
State Approvals					
State Development and Public Works Organisation Act 1971	IAS, Coordinated Project and EIS Prescribed Project, if suitable	Where the Proponent is seeking a Coordinated Project determination and seeking the Coordinator-General to facilitate the planning and delivery of the infrastructure. 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	Office of Coordinator General, Department of State Development, Manufacturing, Infrastructure and Planning	Yes
Strong and Sustainable Resource Communities Act 2017	Social Impact Assessment	SIA is mandatory for EISs for large resource projects.	Entire Project	Office of Coordinator General, Department of State Development, Manufacturing,	Yes

Legislation	Approval	Trigger	Reference to Project	Administering Authority	Within Scope of EIS[1]
				Infrastructure and Planning	
Aboriginal Cultural Heritage Act 2003	Cultural Heritage Management Plan	Where an EIS is required, a CHMP must be in place and approved under Division 2 of Part 7 of the ACH Act as a pre-requisite to the grant of any lease, licence, permit, approval or other authority required under any Act for the Project.	Entire Project	Department of Aboriginal and Torres Strait Islander Partnerships	No
Environmental Protection Act 1994	Environmental Authority	The Project is required to have an EA to conduct all Environmentally Relevant Activities onsite (i.e. a resource activity) as per the *Environmental Protection Regulation 2019*.	The Project is required to obtain ERAs for mining coal and other activities relevant to construction and operation.	Department of Environment and Science	Yes
		The Project is required to have a PRCP.	The Project must have a PRCP to ensure appropriate and timely rehabilitation methods are implemented.	Department of Environment and Science	Yes
Mineral Resources Act 1989	Mining Lease	The Project is required to have a mining lease in order to operate large scale mining and all associated activities.	MLAs 700044, 700045 and 700055 have been lodged.	Department of Natural Resources, Mines and Energy	No. MLAs have been submitted separately.
Water Act 2000	Riverine Protection Permit	Placing fill or excavation in a mapped watercourse.	Local watercourses	Department of Natural Resources, Mines and Energy	Yes
Planning Act 2016	Development Application for	Any off-lease works associated with the infrastructure corridor(s).	Off-lease infrastructure.	State Assessment Referral Agency	No

Legislation	Approval	Trigger	Reference to Project	Administering Authority	Within Scope of EIS[1]
	Reconfiguration of a Lot, Material Change of Use and/or Operational Work	Will trigger referral to DTMR.			
Regional Planning Interests Act 2014	Regional Interests Development Approval	Where resource or regulated activities impact on an area of regional interest.	Areas of SCL	Department of Infrastructure, Local Government and Planning	Yes
Planning Act 2016 *Water Act 2000*	Operational work for taking or interfering with water in a water course	Taking or Interfering with a watercourse.	Off-lease infrastructure	Department of Natural Resources, Mines and Energy	Yes
Planning Act 2016 *Fisheries Act 1994*	Operational work that is constructing or raising waterway barrier works	Project potentially impacting fish passage within a mapped waterway.	Local watercourses	Department of State Development, Manufacturing, Infrastructure and Planning Department of Agriculture and Fisheries	Yes
Water Act 2000	Water licence to take unallocated water	Water licence to take unallocated water from other region(s) in basin.	Entire Project	Department of Natural Resources, Mines and Energy	Yes

Legislation	Approval	Trigger	Reference to Project	Administering Authority	Within Scope of EIS[1]
Nature Conservation Act 1992	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
	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
	Species Management Plan	If interfering with protected native fauna habitat and breeding places.	Entire Project	Department of Environment and Science	Yes
Vegetation Management Act 1999	Operational work to clear native vegetation	Where the works require the clearing of regulated vegetation.	Off-lease infrastructure	Department of Natural Resources, Mines and Energy	Yes
Forestry Act 1959	Development approval	Where works require the clearing of vegetation in a State Forest.	Areas of State Forests	Department of Agriculture and Fisheries, Queensland Parks and Wildlife Service	Yes
	Compensation for impact to State Forest				No
Environmental Offsets Act 2014	Offset Strategy	If there is a significant residual impact on a prescribed environmental matter.	Entire Project	Department of Environment and Science	Yes

Legislation	Approval	Trigger	Reference to Project	Administering Authority	Within Scope of EIS[1]
Transport Infrastructure Act 1994	Dependent upon Project specifics	Carry out road access works within a State-controlled road.	Entire Project	Department of Transport and Main Roads	Yes
	Rail feasibility investigator authority	To authorise entering land to investigate feasibility of a rail corridor (applied for under s110 of the Act).	Entire Project	Department of Transport and Main Roads	Yes
Local Approvals					
Central Highlands Regional Council Planning Scheme 2016	Development Application Approval	Where the external Project components are likely to be code assessable against the Operational Works Code in the Planning Scheme/s.	Off-lease infrastructure	Central Highlands Regional Council	No
Other Local Government Area Planning Schemes (for the Infrastructure Corridor(s))				Other Local Government Areas (as applicable)	No

Note:
[1] Please note that if 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.

10 Costs and Benefits Summary

With continuing demand for high quality thermal and metallurgical coal, development of the Project will provide ongoing employment opportunities, as well as long-term social and economic benefits to Central Queensland local and regional communities. The Proponent will primarily seek to employ a local and regional based workforce, and the establishment and creation of the Project will in turn maintain or stimulate the local, regional and State economies over the next 30-plus years. The Project has potential to maintain or result in direct and indirect employment opportunities in a range of sectors in the region.

An Economic Impact Assessment will 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 Projects 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 will be identified and compared to the '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) will be considered as part of the CBA.

10.1 Local, State and National Economies

The Project will maintain and generate opportunities for short and long-term employment during construction, operations, 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.

Local, State and National-level economic impacts from the Project including indicators such as gross regional product, gross state product, direct and indirect economic growth and employment indicators will be examined in the EIS.

10.2 Natural and Social Environments

The potential impacts to social and natural environments from the Project will be analysed and described in the CBA assessment, for which information will be provided in the EIS.

11 Community and Stakeholder Engagement

11.1 Background

The Proponent is committed to building and maintaining constructive dialogue and long-standing relationships with Project stakeholders. In 2017, Glencore introduced a Community Leadership Programme to build and enhance the social performance capabilities of the company's operational teams. The purpose of the programme is to guide employees on how to work with communities and meet global standards.

Human rights and community form part of Glencore's four pillared sustainability strategy, and encompass three key elements:

- Ensuring that all stakeholders have access to remedy, and respect for human rights;
- Strategic and proactive community and stakeholder engagement that furthers the interest of their assets and host communities; and
- A multi-dimensional approach to managing and understanding socioeconomic contributions to deliver shared value whilst managing their impact upon society.

Glencore's community engagement teams build networks of contacts within local communities and decision-making authorities. Through consultation activities, Glencore representatives are able to gain an understanding of existing social values and to share information about potential impacts, key risks and control measures.

Community and stakeholder engagement is a key element of the assessment process for large coal mine developments in Queensland under the SSRC Act. The community and stakeholder consultation process is designed to enable opportunities for ongoing community and stakeholder feedback during the preparation of the SIA and EIS. The aim is to ensure transparent and inclusive community and stakeholder engagement that informs the SIA process, and the ongoing management and monitoring of potential social impacts during the Project's lifetime.

All Glencore-owned and operated sites have stakeholder engagement plans for their surrounding communities. Generally, these plans provide for engagement with elected and administrative government officials, not-for-profit groups, communities, education institutions, Traditional Owner groups, landholders in vicinity to the operations and other relevant community bodies. Glencore consults with these stakeholders through community consultative committees and also utilises these as a means of engaging the broader community.

11.2 Stakeholder Engagement Objectives

The key stakeholder engagement objectives for the Project are to:

- Identify affected and interested stakeholders;
- Initiate contact and engage with the local community to understand existing social values;
- Build and maintain meaningful relationships with stakeholders to understand their expectations and aspirations;
- Engage openly, transparently and inclusively with all stakeholders, listening to and working with anyone impacted by the Project;
- Provide timely and accurate information to stakeholders about the Project to help them understand the Proponent's approach (i.e. timing of Project phases); and
- Actively seek feedback and input from stakeholders to address or mitigate issues raised during consultation.

11.3 Engagement Principles

The aim of the Proponent's community engagement process is to:

- Promote and support sustainable socio-economic development and growth in the local community through employment of a local workforce and local business incentives;
- Create value for the local community and region beyond direct economic impacts (i.e. supporting programmes for community development, enterprise, health, education and the environment); and
- Instil trust in the local community through open and transparent communication and responsible environmental stewardship.

11.4 Stakeholder Engagement Strategy

The Proponent will develop a Stakeholder Engagement Strategy and Plan (SEP) as part of the Project's SIA to ensure that all stakeholders are kept informed and up to date with the Project. The SEP will provide a framework to undertake the community and stakeholder engagement program to discuss impacts, seek feedback and inform the public of potential social impacts. The outcomes of community engagement will be used to develop appropriate mitigation measures and management plans as part of the SIA process.

12 References

4T 2018, Valeria Tenure – Climate, Surface Water, Groundwater Report. Prepared for Glencore Coal Assets Australia. 26 November 2018

ABS 2016, *Central Highlands (R),* Australian Bureau of Statistics, viewed 16 September 2019, Available at: https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA32270.

ALA 2019, *Atlas of Living Australia*, https://www.ala.org.au/, viewed 17 September 2019.

CHRC 2013, *Central Queensland Regional Plan 2013*. Central Highlands Regional Council, viewed 10 September 2019, https://dilgpprd.blob.core.windows.net/general/central-queensland-regional-plan.pdf.

CHRC 2018, *Central Highlands Population – Age*, Central Highlands Regional Council, viewed 16 September 2019, https://www.communityprofile.com.au/centralhighlands/population/age#!bar-chart;i=0.

CHRC 2019, *Economy Profile - Summary*, Central Highlands Regional Council, viewed 20 September 2019, https://www.economyprofile.com.au/centralhighlands?utm_source=CHDC%20website&utm_medium=website&utm_term=&utm_content=&utm_campaign=REMPLAN&utm_source=CHDC%20website&utm_medium=website&utm_term=&utm_content=&utm_campaign=REMPLAN

Commonwealth of Australia 2018, *Information guidelines for proponents preparing coal seam gas and large coal mining development proposals.*

DATSIP 2019, Tenement Search, Department of Aboriginal and Torres Strait Islander Partnerships, 17 September 2019 16:47.

DEE 2019a, *Protected Matters Search Tool*, Department of the Environment and Energy, viewed 17 September 2019, http://www.environment.gov.au/webgis-framework/apps/pmst/pmst-coordinate.jsf.

DEE 2019b, *Australia's National Heritage List*, Department of the Environment and Energy, viewed 19 September 2019, https://www.environment.gov.au/heritage/places/national-heritage-list.

DES 2013, *Noise Measurement Manual.* EM1107 V 4.

DNRME 2019, *FloodCheck Queensland*. [online] Floodcheck.information.qld.gov.au. Available at: https://floodcheck.information.qld.gov.au/ [Accessed 19 Sep. 2019].

Discovery Parks Group 2019, *Emerald, Central Highlands, Qld*, viewed 20 September 2019, https://www.discoveryparks.com.au/workforce-parks/queensland/central-highlands-emerald/accommodation.

DSD 2015, *Application requirements for a 'coordinated project' declaration,* viewed 16 September 2019, https://www.statedevelopment.qld.gov.au/resources/guideline/cg/application-requirements-for-coordinated-project-declaration.pdf.

EcoSM 2012, Valeria Project Vegetation Mapping. Prepared for Rio Tinto Coal Australia. 12 June 2012

frc environmental 2012, Valeria Project Aquatic Ecology Baseline Surveys. Prepared for Resource Strategies on behalf of Rio Tinto Coal Australia. June 2012.

Glanville K, Schulz C, Tomlinson M and Butler D 2016, Biodiversity and biogeography of groundwater invertebrates in Queensland, Australia, *Subterranean Biology,* 17, pp 55-76.

Hose GC, Sreekanth J, Barron O and Pollino C 2015, *Stygofauna in Australian Groundwater Systems: Extent of knowledge,* CSIRO, Australia.

IEA 2019, *World Energy Outlook 2018*, OECD/IEA, Paris.

IESC 2019, *Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development – Assessing groundwater-dependent ecosystems*, Commonwealth of Australia.

RBA 2019, *The Changing Global Market for Australian Coal*, viewed 27 January 2019, https://www.rba.gov.au/publications/bulletin/2019/sep/pdf/the-changing-global-market-for-australian-coal.pdf.

QG 2016, Queensland Heritage Register search, viewed 1 November, 2019, https://environment.ehp.qld.gov.au/heritage-register/map/.

QG 2019a, *Queensland Globe*, Queensland Government, viewed 16 September 2019, https://qldglobe.information.qld.gov.au/.

QG 2019b, Wildlife Online database, Queensland Government, Brisbane, viewed 18 November 2019, https://environment.ehp.qld.gov.au/report-request/species-list/.

WCA 2020, *Coal market and pricing,* World Coal Association, viewed 10 January 2020, https://www.worldcoal.org/coal/coal-market-pricing.

13 Glossary, Acronyms and Abbreviations

Acronym	Term
ABS	Australian Bureau of Statistics
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHD	Australian Height Datum
APCT	Abbot Point Coal Terminal
CBA	Cost-Benefit Analysis
CHMP	Cultural Heritage Management Plan
CHPP	Coal Handling and Preparation Plant
CHRC	Central Highlands Regional Council
DAF	Department of Agriculture and Fisheries
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
DAWE	Commonwealth Department of Agriculture Water and Environment
DBCT	Dalrymple Bay Coal Terminal
DEE	Former Commonwealth Department of Environment and Energy
DES	Department of Environment and Science
DNRME	Department of Natural Resources, Mines and Energy
DTMR	Department of Transport and Main Roads
EA	Environmental Authority
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP Act	*Environmental Protection Act 1994*
EP Regulation	*Environmental Protection Regulation 2019*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPC	Exploration Permit for Coal
ESA	Environmentally Sensitive Area
FTE	Full Time Equivalent
GDE	Groundwater Dependent Ecosystem

Acronym	Term
GHG	Greenhouse Gas
GQAL	Good Quality Agricultural Land
IAS	Initial Advice Statement
IEA	International Energy Agency
IPCC	International Panel on Climate Change
JV	Joint Venture
LGA	Local Government Area
MDL	Mineral Development Licence
MIA	Mine Infrastructure Area
ML	Mining Lease
MLA	Mining Lease Application
MNES	Matters of National Environmental Significance
MR Act	*Mineral Resources Act 1989*
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992*
NSW	New South Wales
NGERS	National Greenhouse and Energy Reporting Scheme
PMR	EPBC Act Protected Matters Report
PMST	Protected Matters Search Tool
PRCP	Progressive Rehabilitation and Closure Plan
Proponent	Valeria Coal Holdings Pty Limited
QLD	Queensland
RE	Regional Ecosystem
RGTCT	RG Tanna Coal Terminal
ROM	Run of Mine
RPI Act	*Regional Planning Interests Act 2014*
SCL	Strategic Cropping Land
SDPWO Act	*State Development and Public Works Organisation Act 1971*

Acronym	Term
SEP	Stakeholder Engagement Strategy and Plan
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SSRC Act	*Strong and Sustainable Resource Communities Act 2017*
STP	Sewage Treatment Plant
TEC	Threatened Ecological Communities
TIA	Traffic Impact Assessment
ToR	Terms of Reference
TSF	Tailings Storage Facility
WICET	Wiggins Island Coal Export Terminal
WO	Wildlife Online

A.1 EPBC Act PMST Report

Australian Government
Department of the Environment and Energy

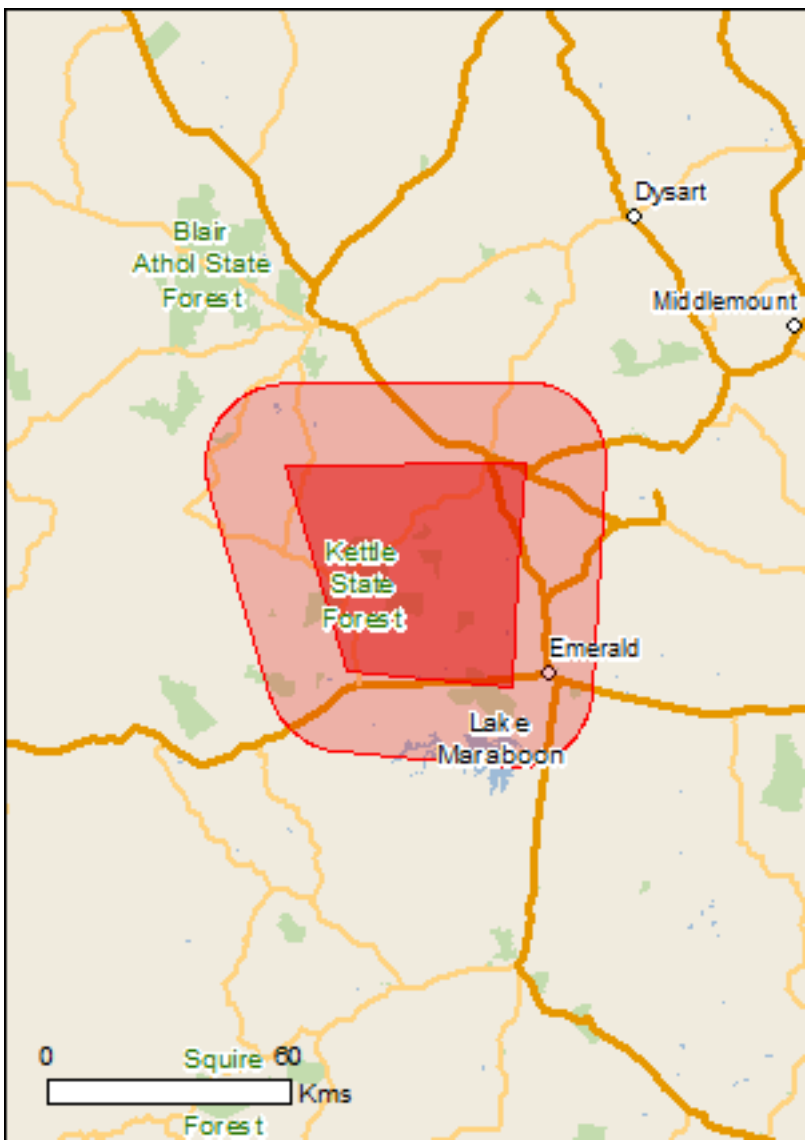
EPBC Act Protected Matters Report

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.

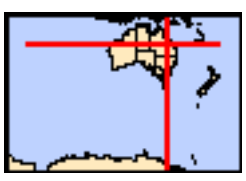
Report created: 04/06/19 14:52:36



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 20.0Km



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:	4
Listed Threatened Species:	26
Listed Migratory Species:	12

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:	18
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:	4
Regional Forest Agreements:	None
Invasive Species:	27
Nationally Important Wetlands:	1
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
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	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 likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
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 known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Aristida annua		
[17906]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis		
Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat known to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Marsdenia brevifolia		
[64585]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata		
Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area
Elseya albagula		
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	Species or species habitat known to occur within area
Rheodytes leukops		
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat known to 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
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to 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 likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to 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
Pandion haliaetus Osprey [952]		Species or species habitat known to 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

Name	Threatened	Type of Presence
		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 likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to 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 known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Belmah	QLD
Caroa Island Paddock	QLD
Mount Leura	QLD
Rifle Range	QLD

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		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
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
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		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
Lepus capensis Brown Hare [127]		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
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur

Name	Status	Type of Presence
		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 within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may 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
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		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
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		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
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
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Fairbairn Dam	QLD

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

-23.097 147.573,-23.518 147.708,-23.55 148.072,-23.093 148.102,-23.097 147.573

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-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
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-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.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

A.2 State Desktop Searches

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
epc: 25396

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

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

Disclaimer

Table of Contents

Summary Information

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

Table 1: Area of interest details: epc: 25396

Size (ha)	19,814.4
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy

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

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.3
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	436.71	2.2
Of concern	918.21	4.63
No concern at present	4,991.91	25.19

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

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	9.08	0.05
State	6,413.23	32.37
Regional	682.77	3.45
Local or Other Values	296.1	1.49

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	2
Number of Lacustrine wetlands	8
Total number of non-riverine wetlands	10

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

Table 6: Named waterways intersecting the AOI

Name	Permanency
CARBINE CREEK	Non-perennial
CRYSTAL CREEK	Non-perennial
KETTLE CREEK	Non-perennial
RETREAT CREEK	Non-perennial
RETRO CREEK	Non-perennial
THERESA CREEK	Non-perennial
WHEEL CREEK	Non-perennial

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

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

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

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	1,464.71	7.39
Medium	18,349.69	92.61
Low	0.0	0.0
Very Low	0.0	0.0

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

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	9.79	0.05
Low	0.0	0.0
Very Low	18.98	0.1

Biodiversity Planning Assessments

Introduction

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

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

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

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

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

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

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

http://qspatial.information.qld.gov.au/geoportal/

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

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	9.08	0.05
State	6,413.23	32.37
Regional	682.77	3.45
Local or Other Values	296.1	1.49

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

Diagnostic Criteria

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

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

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

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

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

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

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

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

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

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Refer to diagnostic data for additional information & Nat. Threatened Ecol. Community (B1)	1.86	0.01
State	Remnant contains at least 1 Endangered or 2 Vulnerable or Near Threatened species (A)	2.03	0.01
State	Remnant contains at least 1 Endangered or 2 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	7.05	0.04
State	Remnant contains at least 1 Endangered RE (B1) & Nat. Threatened Ecol. Community (B1)	1,084.88	5.48
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	517.34	2.61
State	Remnant contains at least one Of Concern RE (B1) & Nat. Threatened Ecol. Community (B1)	570.27	2.88
State	Remnant contains at least one Of Concern RE (B1) & Remnant contains an RE that is one of the largest of its type in the bioregion (D1)	26.24	0.13
State	remnant is part of a Tract that is one of the largest in the bioregion (C) & remnant has Ecosystem diversity in the top quartile (F) & Nat. Threatened Ecol. Community (B1)	33.72	0.17
Regional	Remnant contains at least 1 RE with 10-30 percent extent remaining in the subregion (B2) & Remnant is part of a Tract that is one of the largest in the bioregion (C)	149.18	0.75
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	524.73	2.65
Regional	Remnant contains at least one Of Concern RE (B1)	37.19	0.19
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant contains an RE that is one of the largest of its type in the subregion (D2)	2,689.28	13.57
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant has Ecosystem diversity in the top quartile (F)	39.63	0.2
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant has high connectivity or buffers an endangered RE or Significant Wetland (G)	594.32	3.0
Local or Other Values	Refer to diagnostic data for additional information	1,100.65	5.55

Assessment of diagnostic criteria with respect to the AOI

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

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

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	9.08		2,087.67	10.5	1,470.93	7.4	3,810.72	19.2
B1: Ecosystem Value (Bioregion)	2,215.16	11.2	63.43	0.3	4,464.57	22.5		

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
B2: Ecosystem Value (Subregion)	1,080.19	5.5	1,090.17	5.5	4,572.80	23.1		
C: Tract Size	5,444.46	27.5	544.51	2.7			754.19	3.8
D1: Relative RE Size (Bioregion)	26.24	0.1	875.86	4.4	1,175.94	5.9	4,665.12	23.5
D2: Relative RE Size (Subregion)	3,585.20	18.1	413.33	2.1	783.82	4.0	1,960.81	9.9
F: Ecosystem Diversity	1,900.90	9.6	4,240.36	21.4	491.82	2.5	110.08	0.6
G: Context and Connection	3,861.39	19.5	1,391.04	7.0	1,459.22	7.4	31.51	0.2

Other Essential Criteria

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

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

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	2,930.76	14.79
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	2,852.75	14.4
State	Remnant forms part of a bioregional corridor (J)	77.49	0.39
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	468.9	2.37
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	261.91	1.32
Local	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	12.39	0.06

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

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

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

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

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

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

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa					299.59	1.5		
Ia: Centres of Endemism	2.54							
Ib: Wildlife Refugia	3,554.98	17.9	2,959.39	14.9	12.39	0.1		
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations			2.54					
Ig: Variation in Species Composition	2.54							
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site	25.39	0.1						

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
Ik: Climate Refugia								

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

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

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

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

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

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

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

- Terrestrial

  • Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);

  • Follow major watershed/catchment and/or coastal boundaries;

  • Incorporate major altitudinal/geological/climatic gradients;

  • Include and maximise connectivity between large tracts/patches of remnant vegetation;

  • Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

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

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

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

Biodiversity Significance	Area (Ha)	% of AOI
State	2,909.78	14.69
Regional	282.37	1.43
Local	0.0	0.0

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

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

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

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

Special Area Decisions

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

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

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_fl_03	Remnant vegetation on serpentinite	State	Ia (endemic richness): VH; If (relictual taxa): H; Ig (ecosystem variation): VH
brbn_l_17a	None	None	None
brbn_l_18a	None	None	None
brbn_l_18b	None	None	None
brbn_l_75	Gilgai Remnants	State	Ib (refugia): VH; Ij (aggregation site):VH
brbn_l_83	Core areas	State	Ib (refugia): VH
brbn_l_87	Relictual subregions (less than 30% remnant vegetation) - largest remaining examples of each regional ecosystem in a subregion	State	Ib (refugia): VH
brbn_l_89	Relictual subregions (less than 30% remnant vegetation) - remnant vegetation	Regional	Ib (refugia): VH
brbn_l_92	Regionally significant natural palustrine & lacustrine wetlands	Regional	Ib (refugia): H
brbn_l_93	Locally significant natural palustrine & lacustrine wetlands	Local	Ib (refugia): M

Expert panel decision descriptions:

brbn_fl_03

Remnant vegetation communities situated on serpentinite geology often exhibit distinct ecosystem variation in terms of floristics and vegetation structure in comparison to similar communities situated on other geology types. These communities tend to contain a number of narrow range endemics many of which are also classified as threatened (Bursaria reevesii, Capparis thozetiana and Cycas ophiolitica). Some species are only found on this geology in QLD, including Macrozamia serpentina, Olearia macdonnellensis, Neoroepera buxifolia and Euphorbia ophiolitica.

brbn_l_17a

None

brbn_l_18a

None

brbn_l_18b

None

brbn_l_75

The gilgai wetland systems in the Brigalow Belt tend to be dominated by acacia and casuarina (mostly brigalow Acacia harpophylla and belah Casuarina cristata). Melaleuca, Corymbia and Eucalyptus species are also common along with Astrebla or Dichanthium spp. grassland. Gilgai systems are widespread and some are in good condition while others are largely cleared. The range of threatened wildlife present may use inundated gilgai as a water source at some stage of their life or are closely associated with the cracking clay soil habitat and wetlands.

Gilgai reptiles include the death adder Acanthophis antarcticus, De Vis' banded snake Denisonia devisi and ornamental snake D. maculata. Amphibians that use gilgai include salmon striped frog Limnodynastes salmini, scarlet-sided pobblebonk L. terraereginae and striped burrowing frog Cyclorana alboguttata. Other fauna which may use gilgai habitat at various times include bridled nailtail wallaby Onychogalea fraenata, black-striped wallaby Macropus dorsalis and the glossy black cockatoo Calyptorhynchus lathami.

(Source: WetlandInfo https://wetlandinfo.des.qld.gov.au/wetlands/).

Refer to brbs_l_49 for the southern BRB implementation of this decision.

brbn_l_83

Tracts are defined as patches of continuous remnant vegetation. The size of any tract is a major indicator of ecological significance and is strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts. These areas can be considered core nodes/refugia in which a large proportion of the bioregions biodiversity is represented.

A modified tract size analysis (Criterion C) (EHP 2014) was used to identify and delineate discrete tracts of remnant vegetation at a bioregion scale. For the purpose of the assessment, a core area was identified as a relatively contiguous area of remnant vegetation (disregarding small perforations, or linear breaks) and which was generally greater than 5km in width (based upon the minimum width of the terrestrial corridor network). Tracts of greater than 10,000ha were included.

Refer to brbs_l_16 for the southern BRB implementation of this decision.

brbn_l_87

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include the Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

The largest remaining examples of each regional ecosystem in a subregion represent important refuges from clearing in these fragmented landscapes.

Refer to brbs_l_08 for the southern BRB implementation of this decision.

brbn_l_89

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

The following subregions have less than 30% remnant vegetation in the southern Brigalow Belt: Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include; Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

Remnant vegetation provides a refuge from clearing in fragmented subregions and should be retained to maintain biodiversity.

Refer to brbs_l_15 for the southern BRB implementation of this decision.

brbn_l_92

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, the panel agreed that all such natural wetland complexes with a combined area of greater than or equal to 5ha in size should be classed as being of at least regional significance.

Refer to brbs_l_47 for the southern BRB implementation of this decision.

brbn_l_93

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, and regionally significant wetlands under the decision brbn_l_92, the panel agreed that all remaining relatively natural wetland complexes of less than 5ha in size be classed as being of at least local significance.

Refer to brbn_l_48 for the southern BRB implementation of this decision.

Aquatic Conservation Assessments

Introduction

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

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

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

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

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

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

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

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

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

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

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

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

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

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

flora species the traits included:

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

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

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

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

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

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

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

Riverine Wetlands

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

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

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

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	1,464.71	7.39
Medium	18,349.69	92.61
Low	0.0	0.0
Very Low	0.0	0.0

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

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

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic			1,464.71	7.4	1,554.92	7.8	16,794.76	84.8
2. Naturalness catchment	3,337.70	16.8	16,476.69	83.2				
3. Diversity and richness	7,648.39	38.6	5,835.91	29.5	6,330.09	31.9		
4. Threatened species and ecosystems			19,814.39	100.0				
5. Priority species and ecosystems	7,648.39	38.6	2,419.49	12.2				
6. Special features								
7. Connectivity			8,305.92	41.9	522.38	2.6	10,986.09	55.4
8. Representative-ness								

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

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

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

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

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

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

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	9.79	0.05
Low	0.0	0.0
Very Low	18.98	0.1

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

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

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic			3.39		20.87	0.1	4.5	
2. Naturalness catchment			20.87	0.1	7.89			
3. Diversity and richness	7.89				1.9		18.97	0.1
4. Threatened species and ecosystems	5.56		4.23					
5. Priority species and ecosystems	7.89		1.06					
6. Special features								
7. Connectivity								
8. Representative-ness					4.23			

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

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

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

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Threatened and Priority Species

Introduction

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

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

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

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

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

Threatened Species

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

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

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

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Denisonia maculata	ornamental snake	V	V	Medium			FA
Petauroides volans	greater glider	V	V	Low			FA
Rostratula australis	Australian painted snipe	V	E	Medium		Y	FA

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

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

***Y - wetland indicator species*.

BPA Priority Species

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

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

Species	Common name	Back on Track rank	Identified flora/fauna
Acacia melvillei	None	Low	FL
Chthonicola sagittata	Speckled Warbler	Low	FA
Eucalyptus tenuipes	narrow-leaved white mahogany	None	FL

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

ACA Priority Species

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

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

(no results)

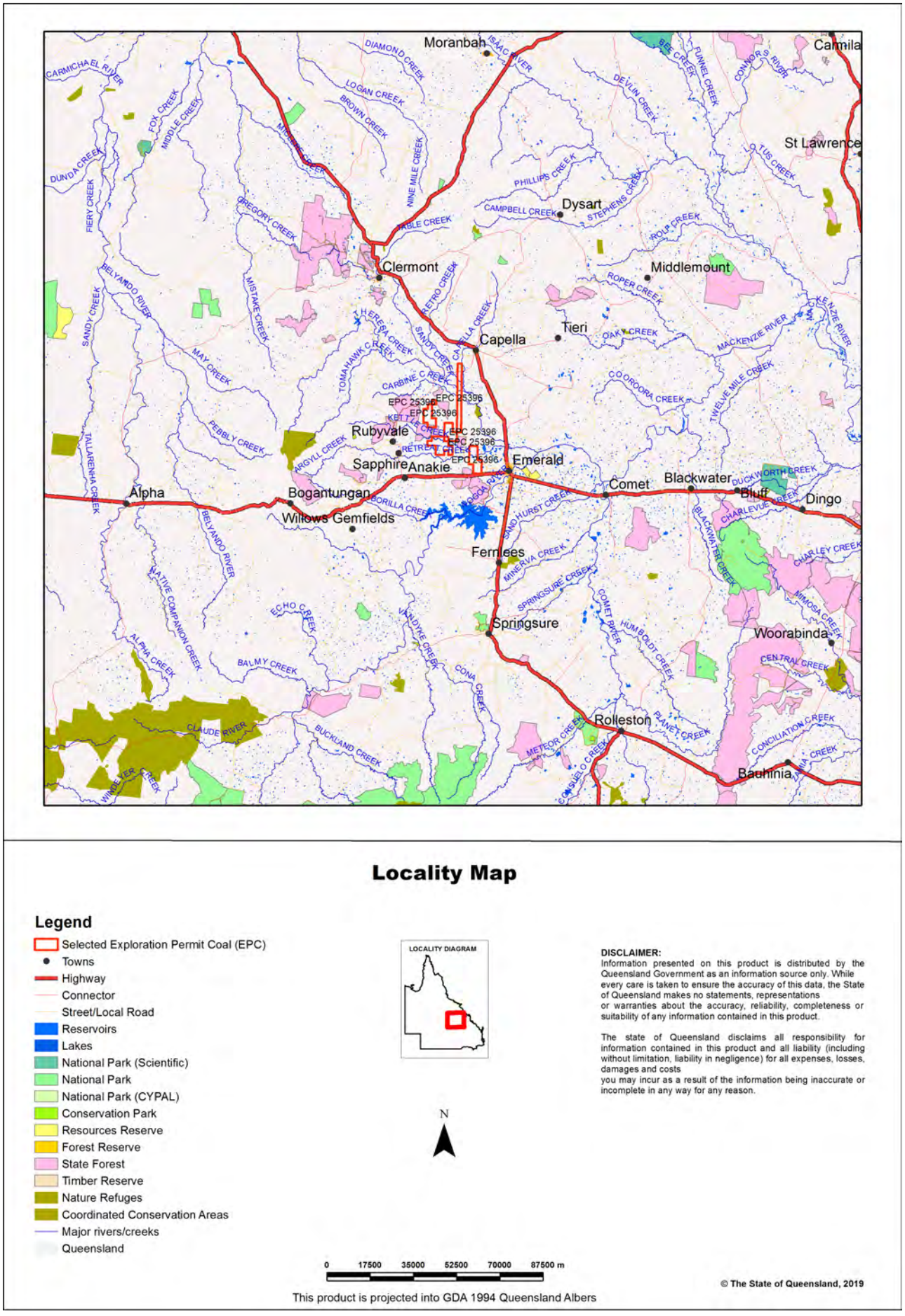
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

(no results)

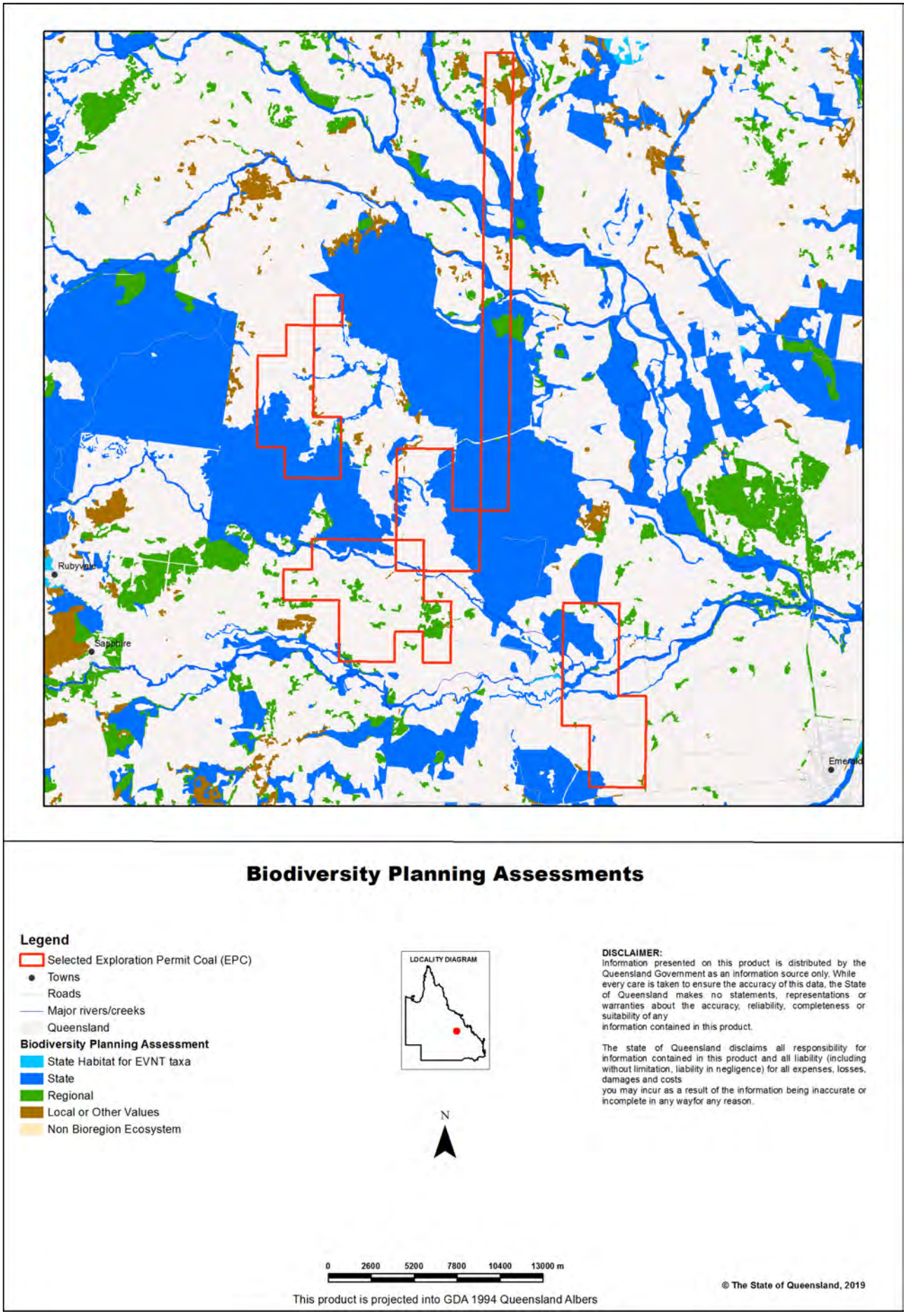
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details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

Maps

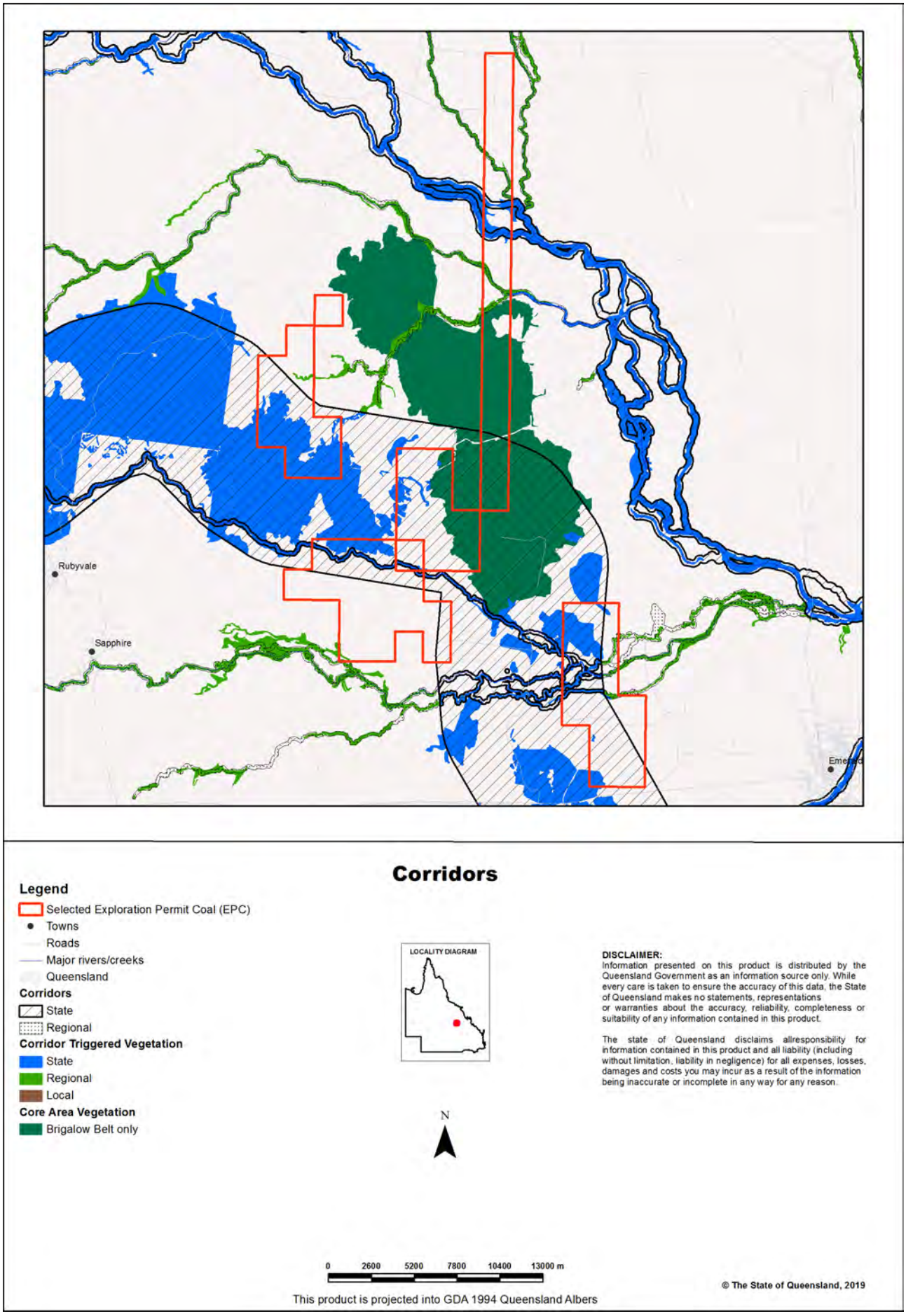
Map 1 - Locality Map



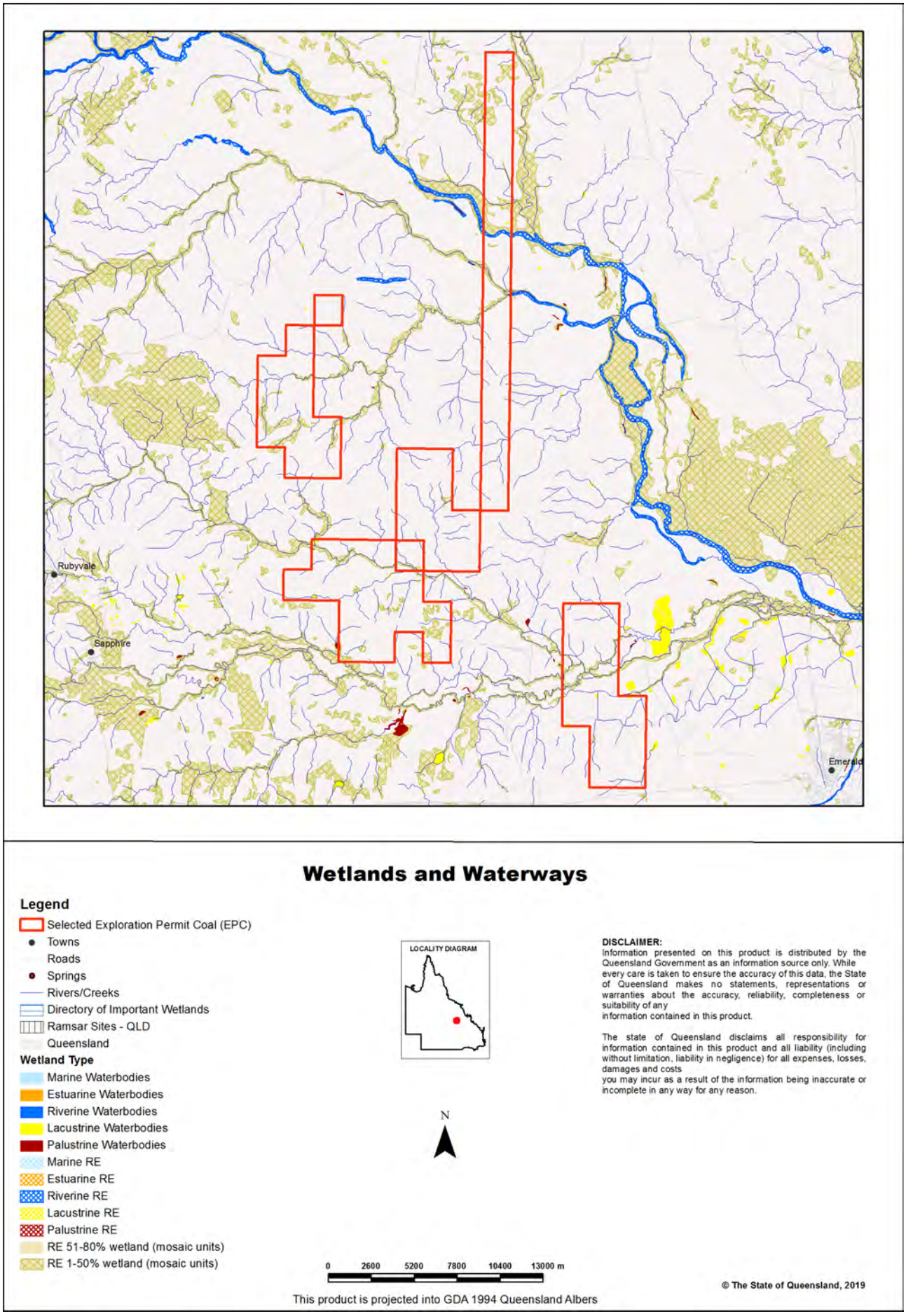
Map 2 - Biodiversity Planning Assessment (BPA)



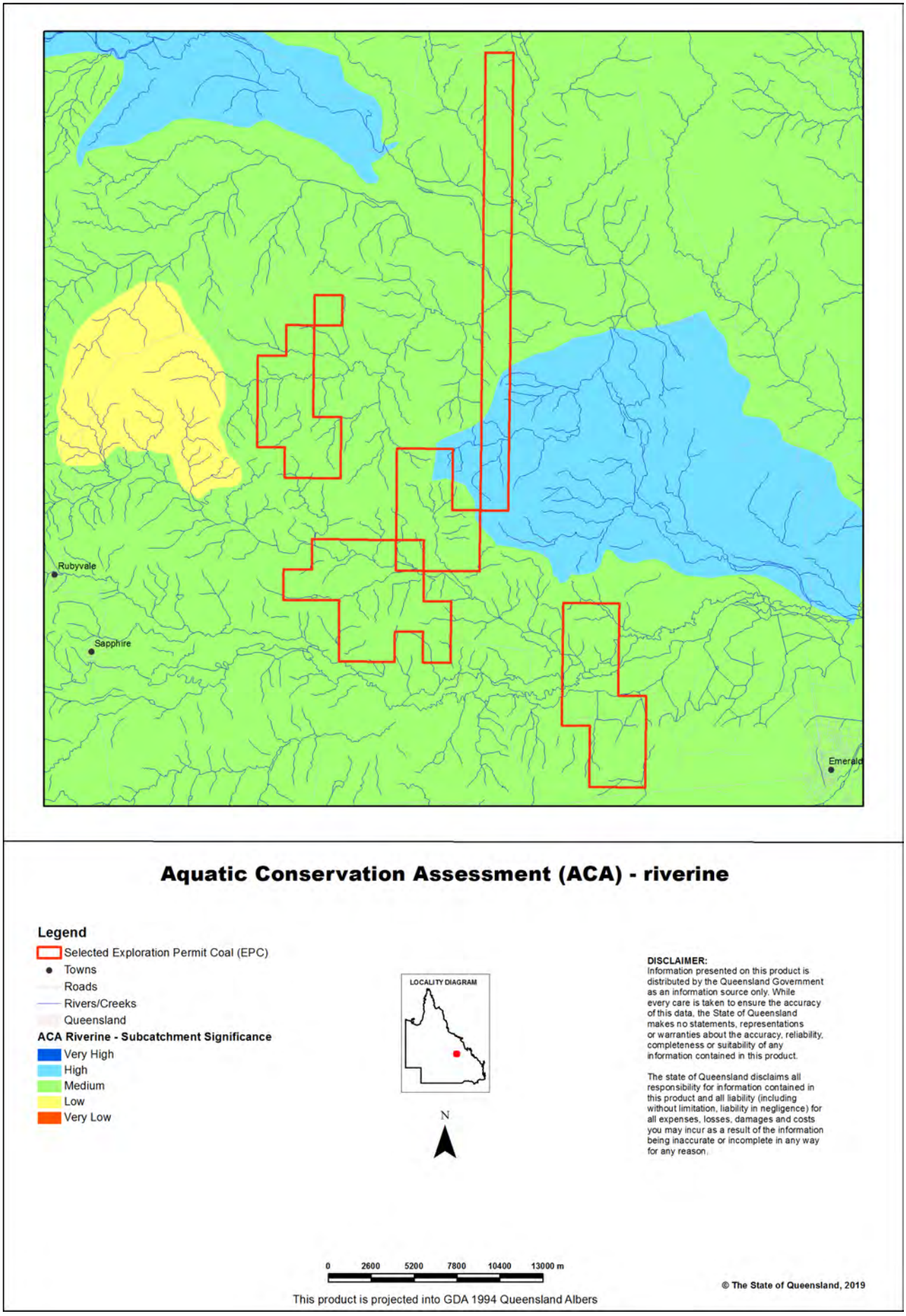
Map 3 - Corridors



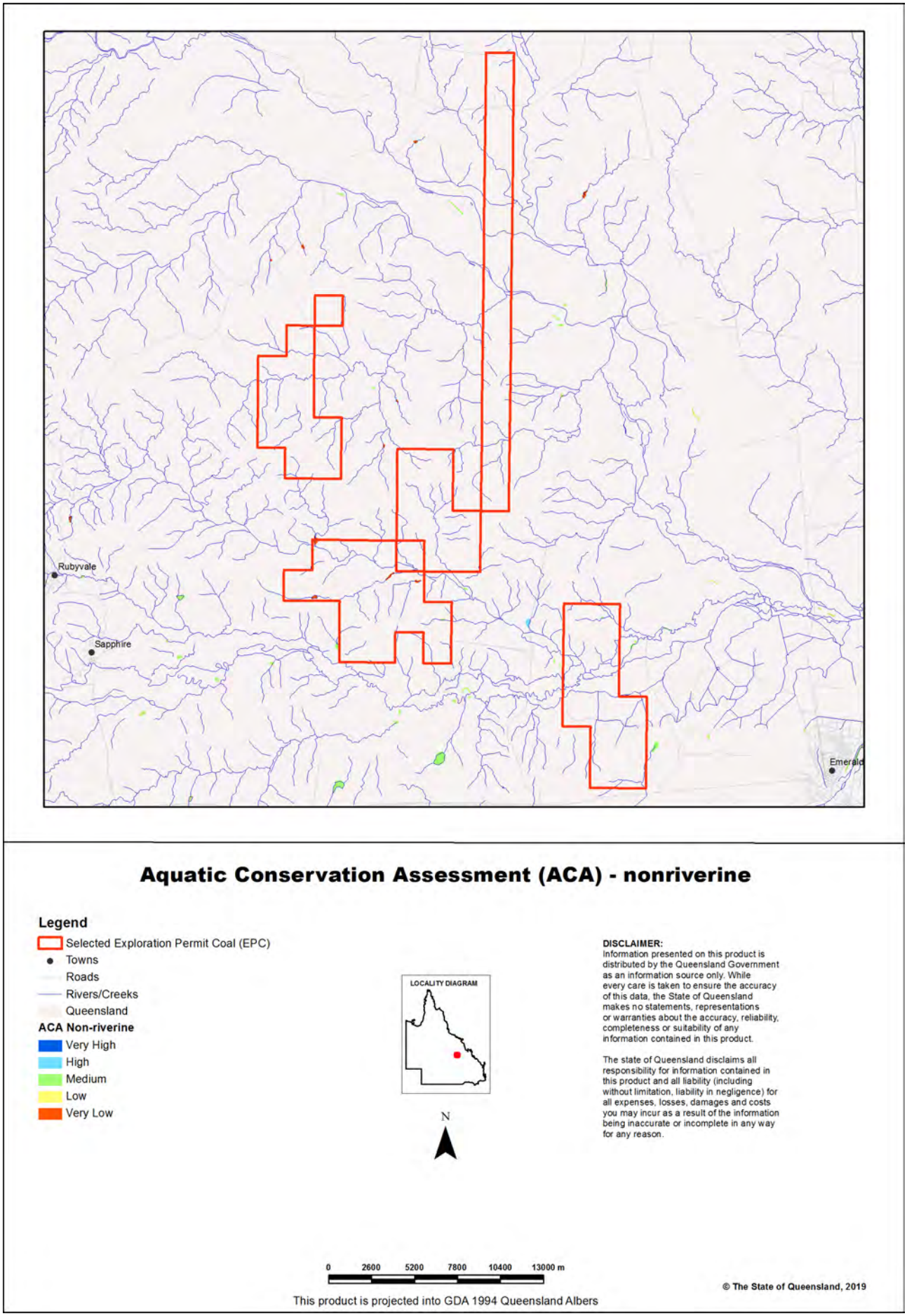
Map 4 - Wetlands and waterways



Map 5 - Aquatic Conservation Assessment (ACA) - riverine



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



References

Clayton, P.D., Fielder, D.F., Howell, S. and Hill, C.J. (2006) *Aquatic biodiversity assessment and mapping method (AquaBAMM): a conservation values assessment tool for wetlands with trial application in the Burnett River catchment.* Published by the Environmental Protection Agency, Brisbane. ISBN 1-90928-07-3. Available at

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

Environmental Protection Agency (2002) *Biodiversity Assessment and Mapping Methodology. Version 2.1, July 2002.* (Environmental Protection Agency, Brisbane).

Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series* , Paper No. 4, Biodiversity Unit, Environment Australia.

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

Appendices

Appendix 1 - Source Data

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

***These datasets are available at:**

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

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement

Queensland Government

Department of Environment and Science

Environmental Reports

Biodiversity and Conservation Values

Biodiversity Planning Assessments and Aquatic Conservation Assessments

For the selected area of interest
mdl: 219

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

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

Disclaimer

Table of Contents

Summary Information

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

Table 1: Area of interest details: mdl: 219

Size (ha)	21,703.49
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy

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

Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.3
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	403.97	1.86
Of concern	1,786.31	8.23
No concern at present	7,660.24	35.29

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

Table 4: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	10,596.96	48.83
Regional	567.55	2.62
Local or Other Values	581.38	2.68

Table 5: Non-riverine wetlands intersecting the AOI

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	2
Number of Lacustrine wetlands	3
Total number of non-riverine wetlands	5

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

Table 6: Named waterways intersecting the AOI

Name	Permanency
CARBINE CREEK	Non-perennial
CRYSTAL CREEK	Non-perennial
RETRO CREEK	Non-perennial
SANDY CREEK	Non-perennial
THERESA CREEK	Non-perennial
WHEEL CREEK	Non-perennial

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

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

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

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	1,684.00	7.76
Medium	20,019.54	92.24
Low	0.0	0.0
Very Low	0.0	0.0

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

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	9.43	0.04
Low	0.0	0.0
Very Low	4.14	0.02

Biodiversity Planning Assessments

Introduction

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

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

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

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

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

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

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

http://qspatial.information.qld.gov.au/geoportal/

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

Table 9: Summary table, biodiversity significance

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	0.0	0.0
State	10,596.96	48.83
Regional	567.55	2.62
Local or Other Values	581.38	2.68

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

Diagnostic Criteria

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

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

Criteria A. Habitat for EVNT taxa: Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

Environment Protection and Biodiversity Conservation Act 1999. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

Criteria B. Ecosystem value: Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

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

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

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

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

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

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

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Refer to diagnostic data for additional information & Nat. Threatened Ecol. Community (B1)	1.86	0.01
State	Remnant contains at least 1 Endangered RE (B1) & Nat. Threatened Ecol. Community (B1)	877.64	4.04
State	Remnant contains at least 1 Vulnerable or Near Threatened species (A) & Nat. Threatened Ecol. Community (B1)	702.6	3.24
State	Remnant contains at least one Of Concern RE (B1) & Nat. Threatened Ecol. Community (B1)	1,186.27	5.47
State	Remnant contains at least one Of Concern RE (B1) & Remnant contains an RE that is one of the largest of its type in the bioregion (D1)	159.0	0.73
State	remnant is part of a Tract that is one of the largest in the bioregion (C) & remnant has Ecosystem diversity in the top quartile (F) & Nat. Threatened Ecol. Community (B1)	388.82	1.79
Regional	Remnant contains at least 1 RE with 10-30 percent extent remaining in the subregion (B2) & Remnant is part of a Tract that is one of the largest in the bioregion (C)	110.29	0.51
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	217.39	1.0
Regional	Remnant contains at least one Of Concern RE (B1)	70.55	0.33
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant contains an RE that is one of the largest of its type in the subregion (D2)	4,230.65	19.49
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant has Ecosystem diversity in the top quartile (F)	1,013.54	4.67
Regional	Remnant is part of a Tract that is one of the largest in the bioregion (C) & Remnant has high connectivity or buffers an endangered RE or Significant Wetland (G)	2,047.28	9.43
Local or Other Values	Refer to diagnostic data for additional information	735.86	3.39

Assessment of diagnostic criteria with respect to the AOI

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

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

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa			1,819.64	8.4	2,476.11	11.4	7,445.95	34.3
B1: Ecosystem Value (Bioregion)	3,157.14	14.5	229.54	1.1	7,624.53	35.1		
B2: Ecosystem Value (Subregion)	844.09	3.9	2,068.37	9.5	8,098.75	37.3		
C: Tract Size	10,575.69	48.7					435.52	2.0

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
D1: Relative RE Size (Bioregion)	158.99	0.7	2,444.61	11.3	578.8	2.7	7,828.81	36.1
D2: Relative RE Size (Subregion)	4,991.65	23.0	4,415.55	20.3	478.14	2.2	1,125.87	5.2
F: Ecosystem Diversity	4,823.26	22.2	5,985.29	27.6	7.37		195.29	0.9
G: Context and Connection	8,098.89	37.3	772.78	3.6	2,036.54	9.4	103.0	0.5

Other Essential Criteria

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

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

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	7,992.63	36.83
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	778.83	3.59
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	1,176.86	5.42
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	984.82	4.54
Local	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	4.14	0.02

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

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

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

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al*. 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.

- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).
- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- Ii - areas with a high density of hollow-bearing trees that provide habitat for animals.
- Ij - breeding or roosting sites used by a significant number of individuals.
- Ik - climate change refuge.

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

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

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa					59.97	0.3		
Ia: Centres of Endemism								
Ib: Wildlife Refugia	8,151.61	37.6	2,781.49	12.8	4.14			
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

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

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

riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.*

The functions of these corridors are:

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

  • Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;

  • Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;

  • Maintaining large scale seasonal/migratory species processes and movement of fauna;

  • Maximising connectivity between large tracts/patches of remnant vegetation;

  • Identifying key areas for rehabilitation and offsets; and

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

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

- Terrestrial

  • Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);

  • Follow major watershed/catchment and/or coastal boundaries;

  • Incorporate major altitudinal/geological/climatic gradients;

  • Include and maximise connectivity between large tracts/patches of remnant vegetation;

  • Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

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

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

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

Biodiversity Significance	Area (Ha)	% of AOI
State	778.83	3.59
Regional	984.82	4.54
Local	0.0	0.0

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

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

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

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

Special Area Decisions

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

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

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_l_17a	None	None	None
brbn_l_18a	None	None	None
brbn_l_18b	None	None	None
brbn_l_83	Core areas	State	Ib (refugia): VH
brbn_l_87	Relictual subregions (less than 30% remnant vegetation) - largest remaining examples of each regional ecosystem in a subregion	State	Ib (refugia): VH
brbn_l_89	Relictual subregions (less than 30% remnant vegetation) - remnant vegetation	Regional	Ib (refugia): VH
brbn_l_92	Regionally significant natural palustrine & lacustrine wetlands	Regional	Ib (refugia): H
brbn_l_93	Locally significant natural palustrine & lacustrine wetlands	Local	Ib (refugia): M

Expert panel decision descriptions:

brbn_l_17a

None

brbn_l_18a

None

brbn_l_18b

None

brbn_l_83

Tracts are defined as patches of continuous remnant vegetation. The size of any tract is a major indicator of ecological significance and is strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts. These areas can be considered core nodes/refugia in which a large proportion of the bioregions biodiversity is represented.

A modified tract size analysis (Criterion C) (EHP 2014) was used to identify and delineate discrete tracts of remnant vegetation at a bioregion scale. For the purpose of the assessment, a core area was identified as a relatively contiguous area of remnant vegetation (disregarding small perforations, or linear breaks) and which was generally greater than 5km in width (based upon the minimum width of the terrestrial corridor network). Tracts of greater than 10,000ha were included.

Refer to brbs_l_16 for the southern BRB implementation of this decision.

brbn_l_87

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include the Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

The largest remaining examples of each regional ecosystem in a subregion represent important refuges from clearing in these fragmented landscapes.

Refer to brbs_l_08 for the southern BRB implementation of this decision.

brbn_l_89

A summary of research on landscape thresholds for remnant vegetation is provided by James Saunders (2001). The evidence suggests that once remnant vegetation falls below 30%, there are significant declines in biodiversity.

The following subregions have less than 30% remnant vegetation in the southern Brigalow Belt: Relictual subregions (less than 30% remnant vegetation remaining) for the Brigalow Belt include; Upper Belyando Flood out (11.8), Isaac - Comet Downs (11.11), Callide Creek Downs (11.19), Dawson River Downs (11.21), Taroom Downs (11.25), Dulacca Downs (11.28), Weribone High (11.29), Tara Downs (11.30), Eastern Darling Downs (11.31), Moonie R. - Commoron Creek Floodout (11.33), Moonie - Barwon Interfluve (11.34), Warrambool - Moonie (11.35), Macintyre - Weir Fan (11.36), Narrandool (11.38).

Remnant vegetation provides a refuge from clearing in fragmented subregions and should be retained to maintain biodiversity.

Refer to brbs_l_15 for the southern BRB implementation of this decision.

brbn_l_92

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, the panel agreed that all such natural wetland complexes with a combined area of greater than or equal to 5ha in size should be classed as being of at least regional significance.

Refer to brbs_l_47 for the southern BRB implementation of this decision.

brbn_l_93

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, and regionally significant wetlands under the decision brbn_l_92, the panel agreed that all remaining relatively natural wetland complexes of less than 5ha in size be classed as being of at least local significance.

Refer to brbn_l_48 for the southern BRB implementation of this decision.

Aquatic Conservation Assessments

Introduction

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

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

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

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

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

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

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

http://qspatial.information.qld.gov.au/geoportal/

Explanation of Criteria

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

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

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

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

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

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

flora species the traits included:

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

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

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

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

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

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

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

Riverine Wetlands

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

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

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

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	1,684.00	7.76
Medium	20,019.54	92.24
Low	0.0	0.0
Very Low	0.0	0.0

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

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

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic			1,684.00	7.8	4,113.16	19.0	15,906.37	73.3
2. Naturalness catchment	8,342.01	38.4	13,361.52	61.6				
3. Diversity and richness	41.5	0.2	10,740.98	49.5	10,921.05	50.3		
4. Threatened species and ecosystems			21,703.53	100.0				
5. Priority species and ecosystems	41.5	0.2	2,306.01	10.6				
6. Special features								
7. Connectivity	259.71	1.2	10,782.01	49.7	2,321.26	10.7	8,340.55	38.4
8. Representative-ness								

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

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

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

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Non-riverine Wetlands

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

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

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	0.0	0.0
High	0.0	0.0
Medium	9.43	0.04
Low	0.0	0.0
Very Low	4.14	0.02

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

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

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	7.12				6.45			
2. Naturalness catchment			13.57	0.1				
3. Diversity and richness			8.37		3.81			
4. Threatened species and ecosystems	1.06		8.37					
5. Priority species and ecosystems			1.06					
6. Special features								
7. Connectivity								
8. Representative-ness					8.37			

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

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

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

4 is the highest rating/value

Expert panel decision descriptions:

(No Records)

Threatened and Priority Species

Introduction

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

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

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

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

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

Threatened Species

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

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

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

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
Rostratula australis	Australian painted snipe	V	E	Medium		Y	FA

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

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

***Y - wetland indicator species*.

BPA Priority Species

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

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

Species	Common name	Back on Track rank	Identified flora/fauna
Eucalyptus tenuipes	narrow-leaved white mahogany	None	FL
Scortum hillii	Leathery Grunter	Low	FA

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

ACA Priority Species

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

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

Species	Common name	Back on Track rank	Identified flora/fauna
Scortum hillii	Leathery Grunter	L	FA

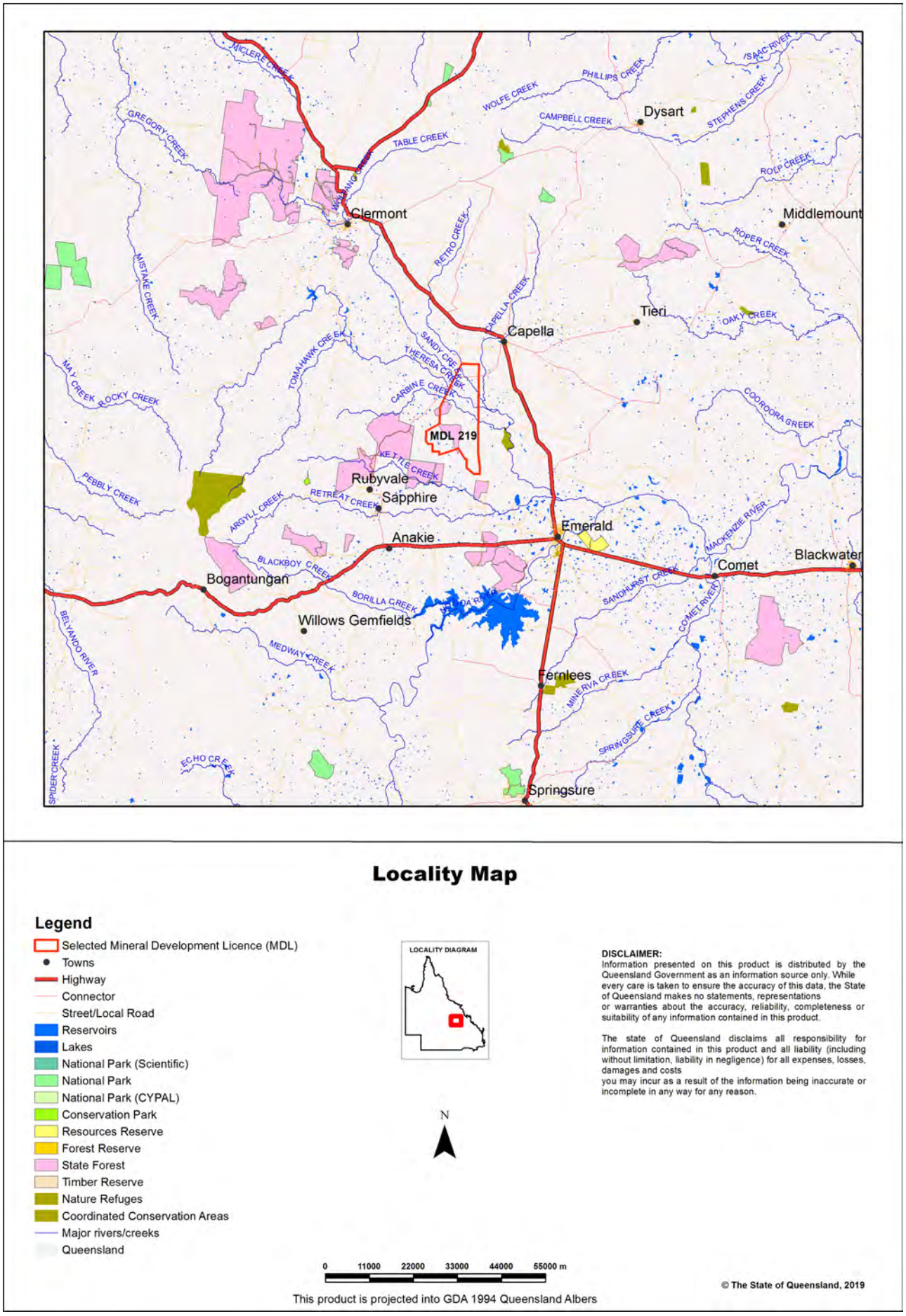
Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine

Species	Common name	Back on Track rank	Identified flora/fauna
Scortum hillii	Leathery Grunter	L	FA

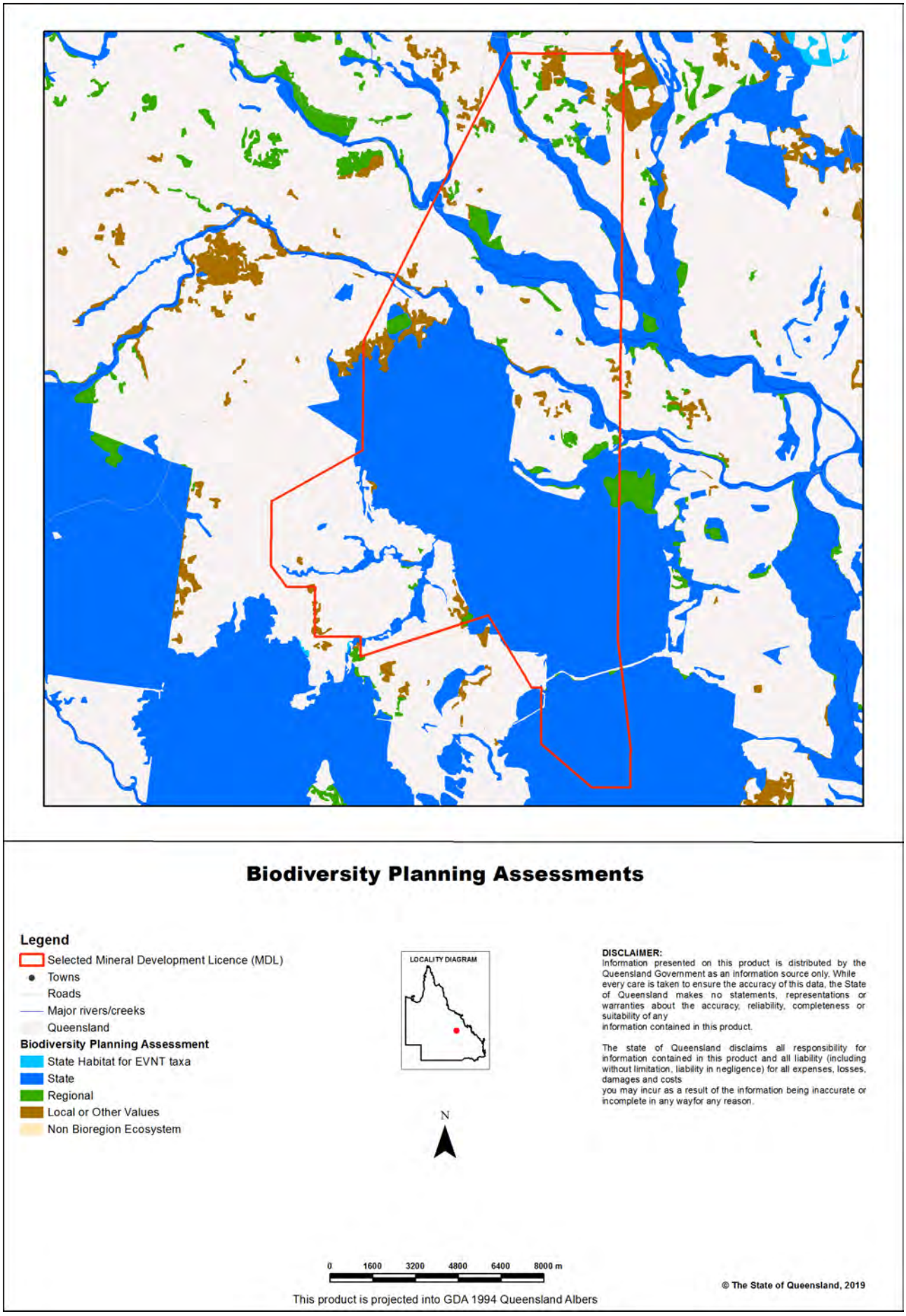
NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details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

Maps

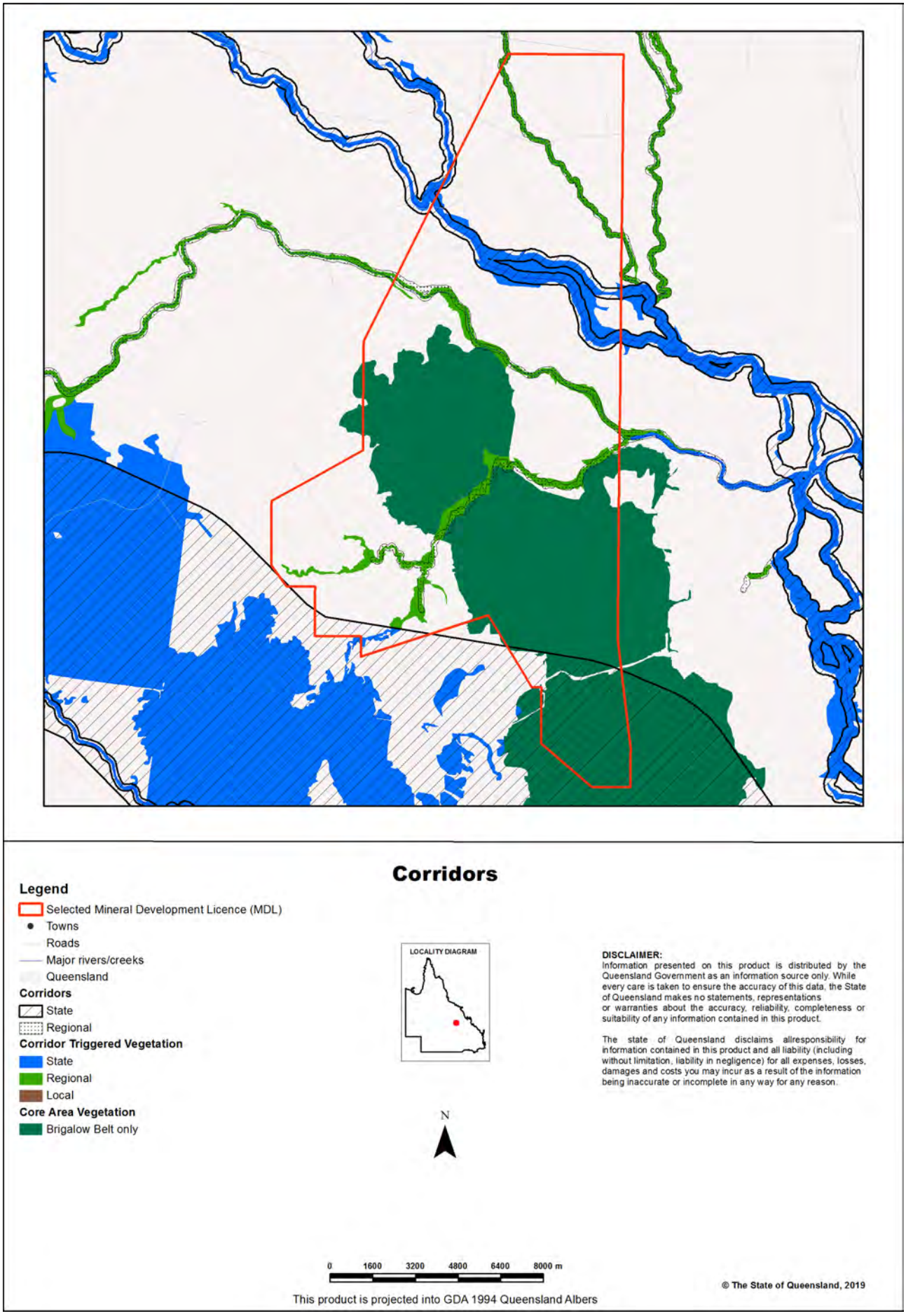
Map 1 - Locality Map



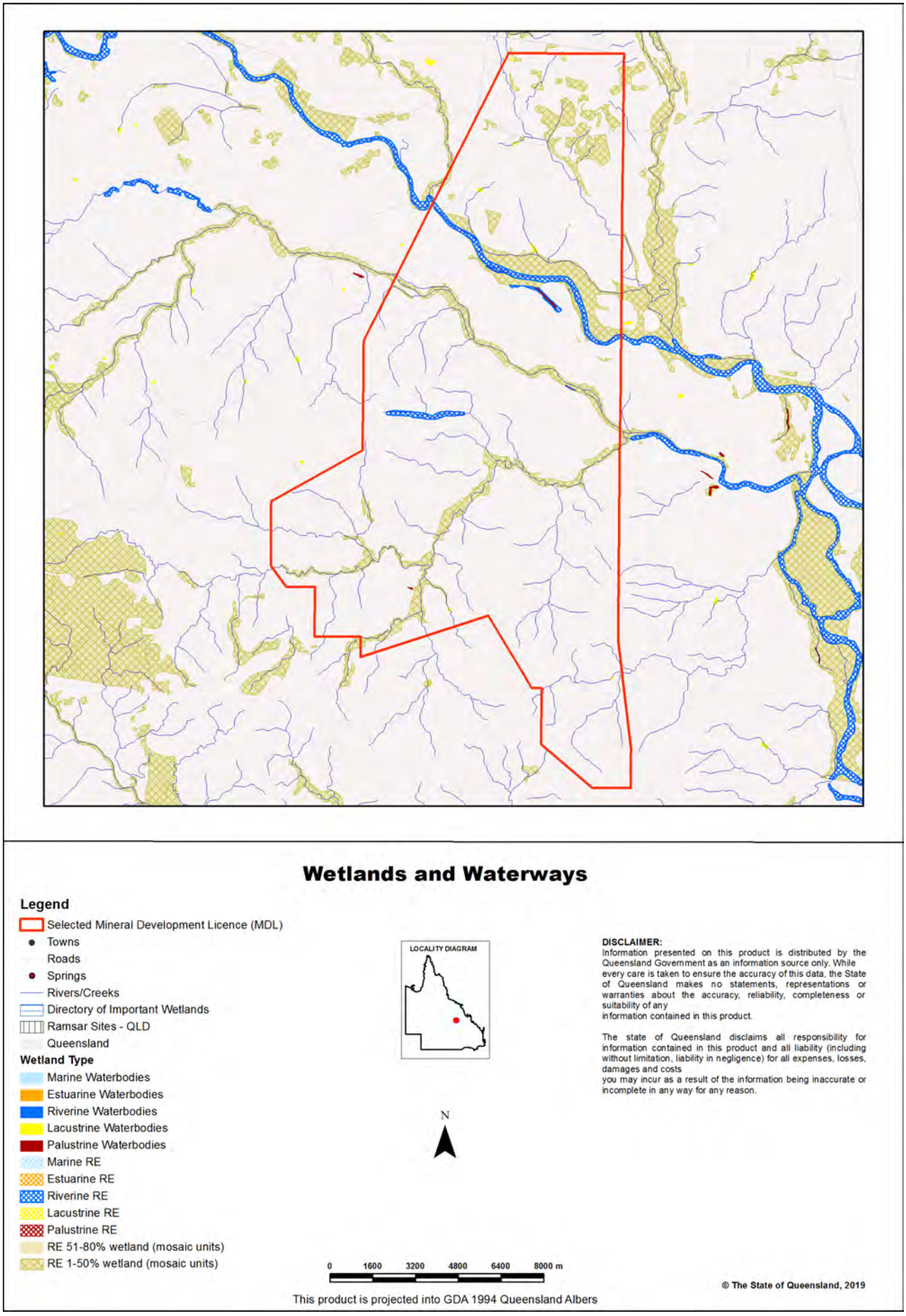
Map 2 - Biodiversity Planning Assessment (BPA)



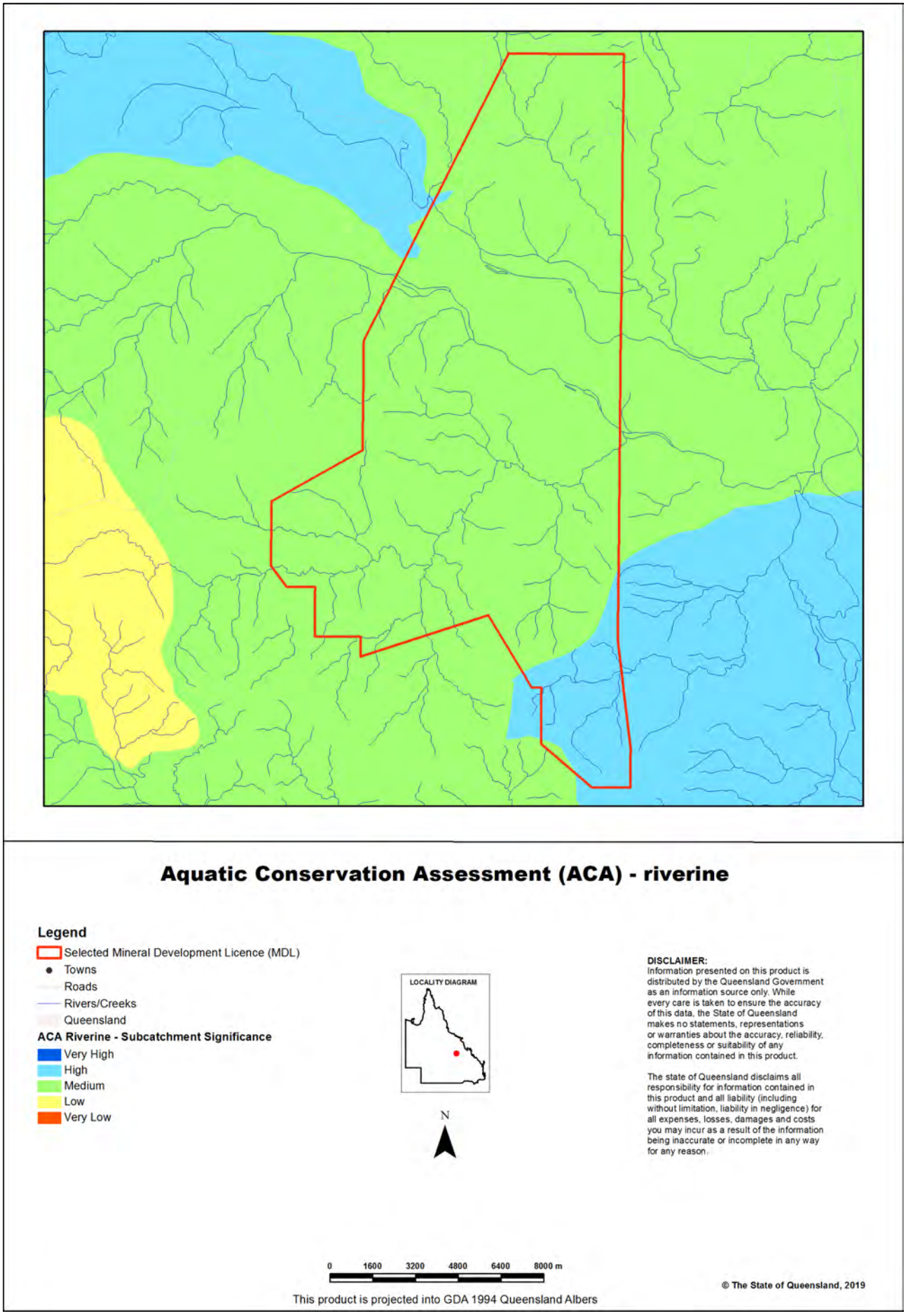
Map 3 - Corridors



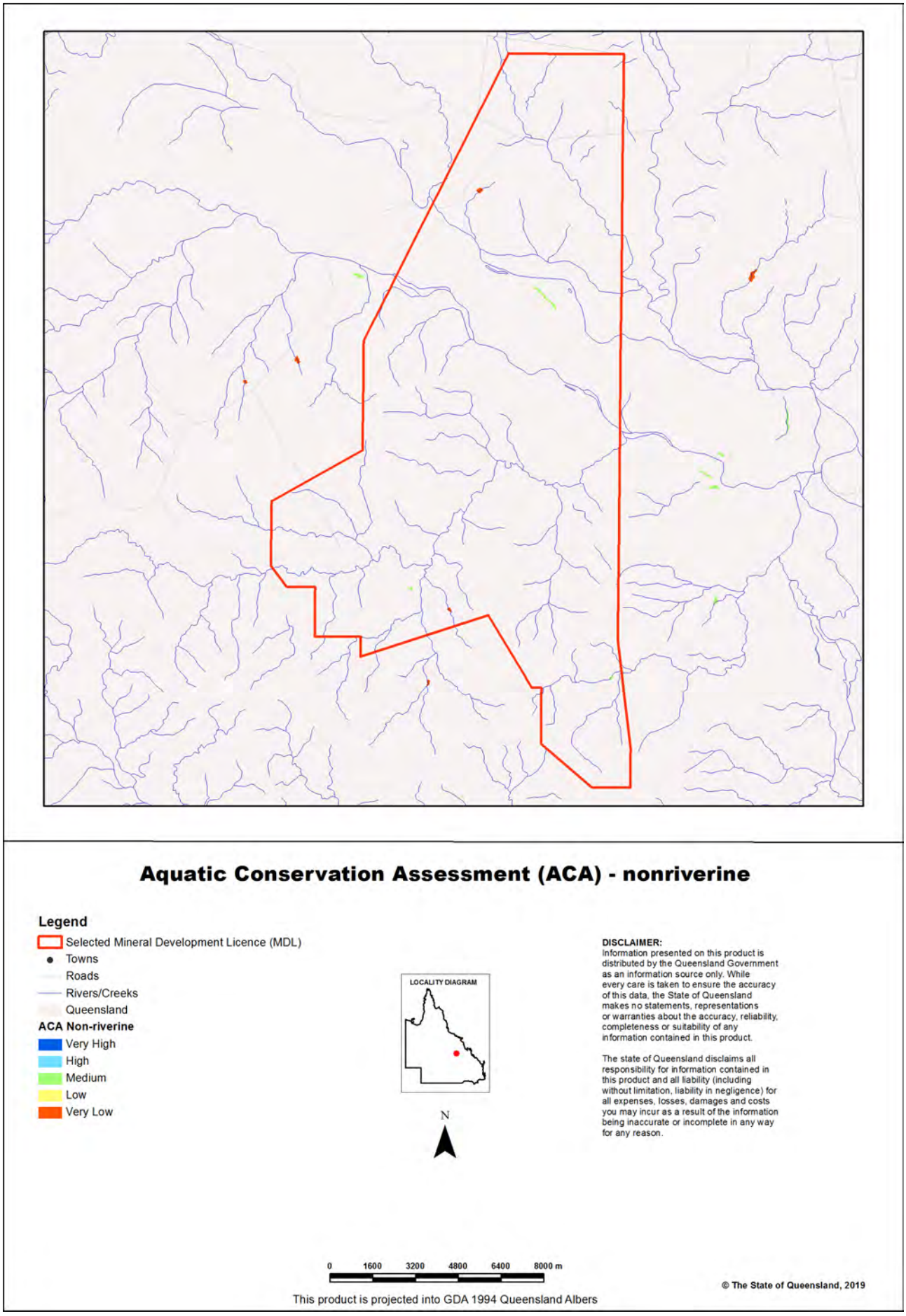
Map 4 - Wetlands and waterways



Map 5 - Aquatic Conservation Assessment (ACA) - riverine



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



References

Clayton, P.D., Fielder, D.F., Howell, S. and Hill, C.J. (2006) *Aquatic biodiversity assessment and mapping method (AquaBAMM): a conservation values assessment tool for wetlands with trial application in the Burnett River catchment.* Published by the Environmental Protection Agency, Brisbane. ISBN 1-90928-07-3. Available at

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

Environmental Protection Agency (2002) *Biodiversity Assessment and Mapping Methodology. Version 2.1, July 2002.* (Environmental Protection Agency, Brisbane).

Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series* , Paper No. 4, Biodiversity Unit, Environment Australia.

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

Appendices

Appendix 1 - Source Data

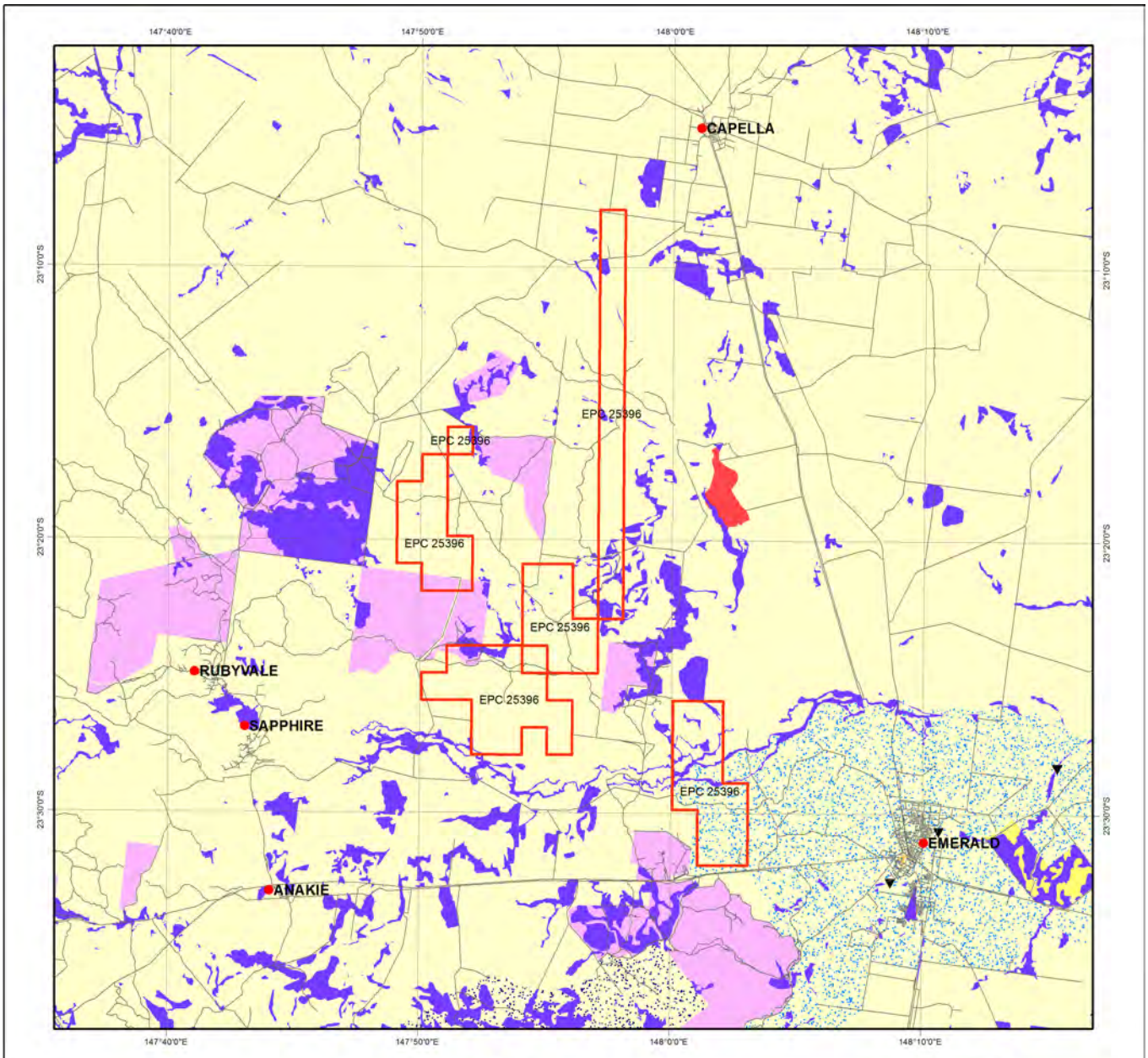
Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA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

***These datasets are available at:**

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

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- *Environment Protection and Biodiversity Conservation Act 1999*
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Exploration Permit Coal (EPC)

CATEGORY A

- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B

- World Heritage Areas
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Fish Habitat Areas
- Koala Plan
- Coordinated Conservation Areas
- Endangered Regional Ecosystems (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

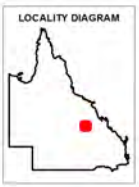
CATEGORY C

- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- Declared Catchment Areas
- Declared Irrigation Areas
- Drainage Areas
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS

- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM



N

0 3,750 7,500 11,250 15,000 18,750 m

This product is projected into GDA 1994 MGA Zone 55

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, The State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or ncomplete in any way for any reason.

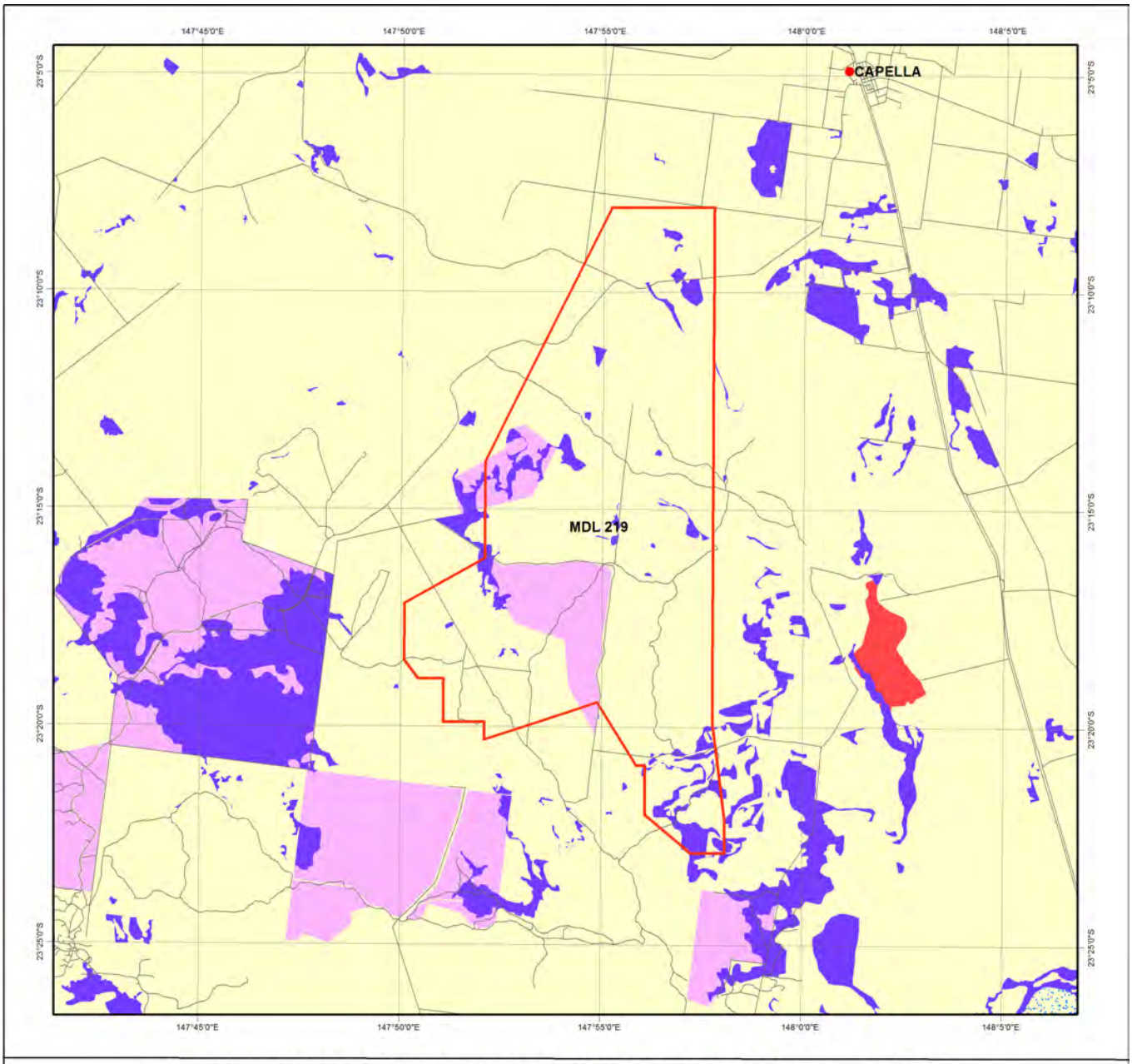
External contributors (non-government parties) of the data for this product are: Great Barrier Reef Marine Park Authority

Regional ecosystem mapping (remnant biodiversity status) may incorporate amendments, resulting from property level assessments, to the release version of the mapping available on QSpatial.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/ layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mineral Development Licence (MDL)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- World Heritage Areas
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Fish Habitat Areas
- Koala Plan
- Coordinated Conservation Areas
- Endangered Regional Ecosystems (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- Declared Catchment Areas
- Declared Irrigation Areas
- Drainage Areas
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM

N

0 2,300 4,600 6,900 9,200 11,500 m

This product is projected into GDA 1994 MGA Zone 55

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, The State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or ncomplete in any way for any reason.

External contributors (non-government parties) of the data for this product are: Great Barrier Reef Marine Park Authority

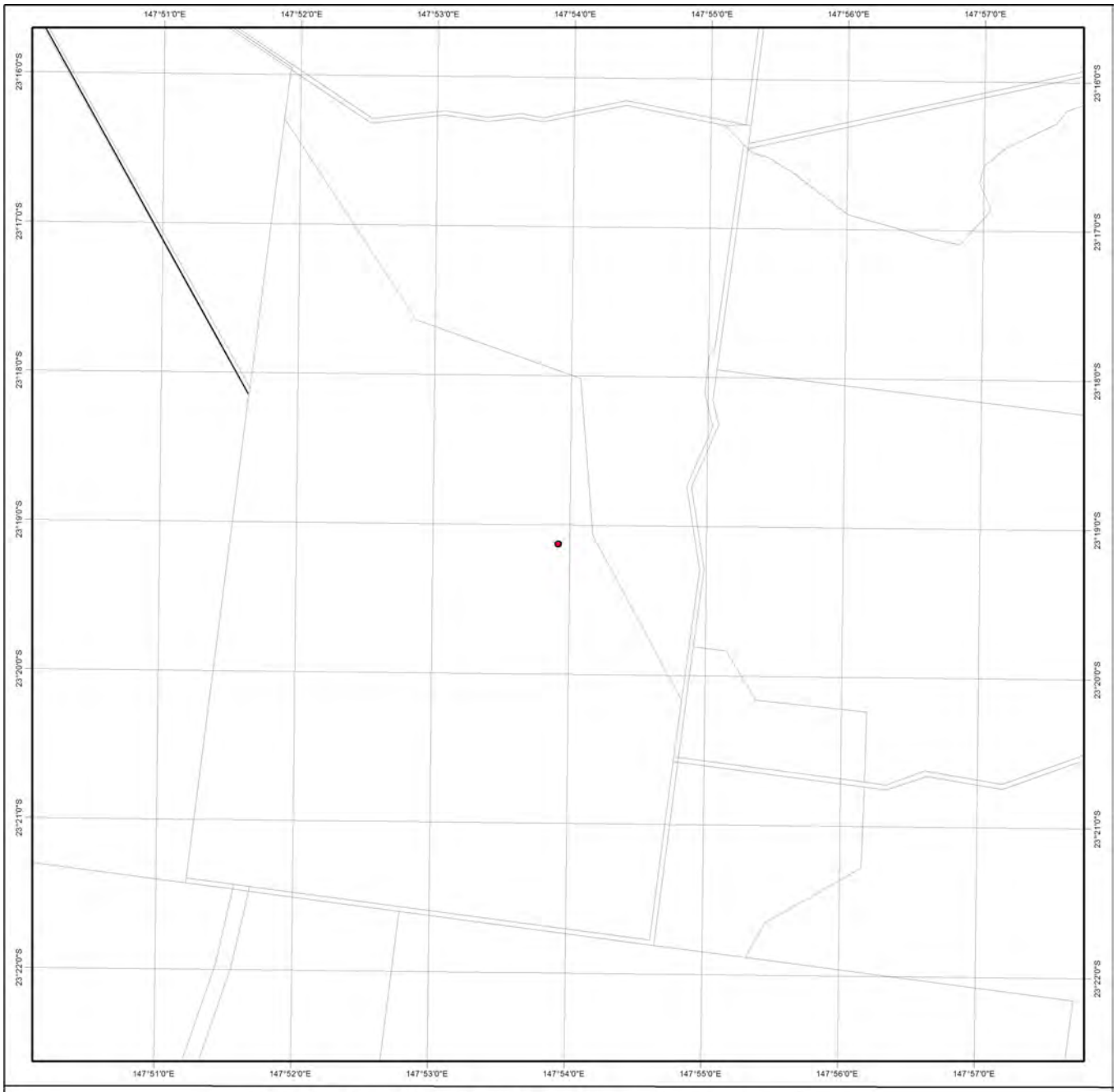
Regional ecosystem mapping (remnant biodiversity status) may incorporate amendments, resulting from property level assessments, to the release version of the mapping available on QSpatial.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/ layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.

19/08/2019 15:28:16
Longitude: 147.8986 Latitude: -23.3188



Protected Plants Flora Survey Trigger Map

Legend

- Coordinates
- High risk area
- Cadastral line
  Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets

N

0 480 960 1,440 1,920 2,400 m

This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see section 89 of the Act.

Please see the Department of Environment and Science webpage on the clearing of protected plants for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
epc: 25396

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

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

Disclaimer

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

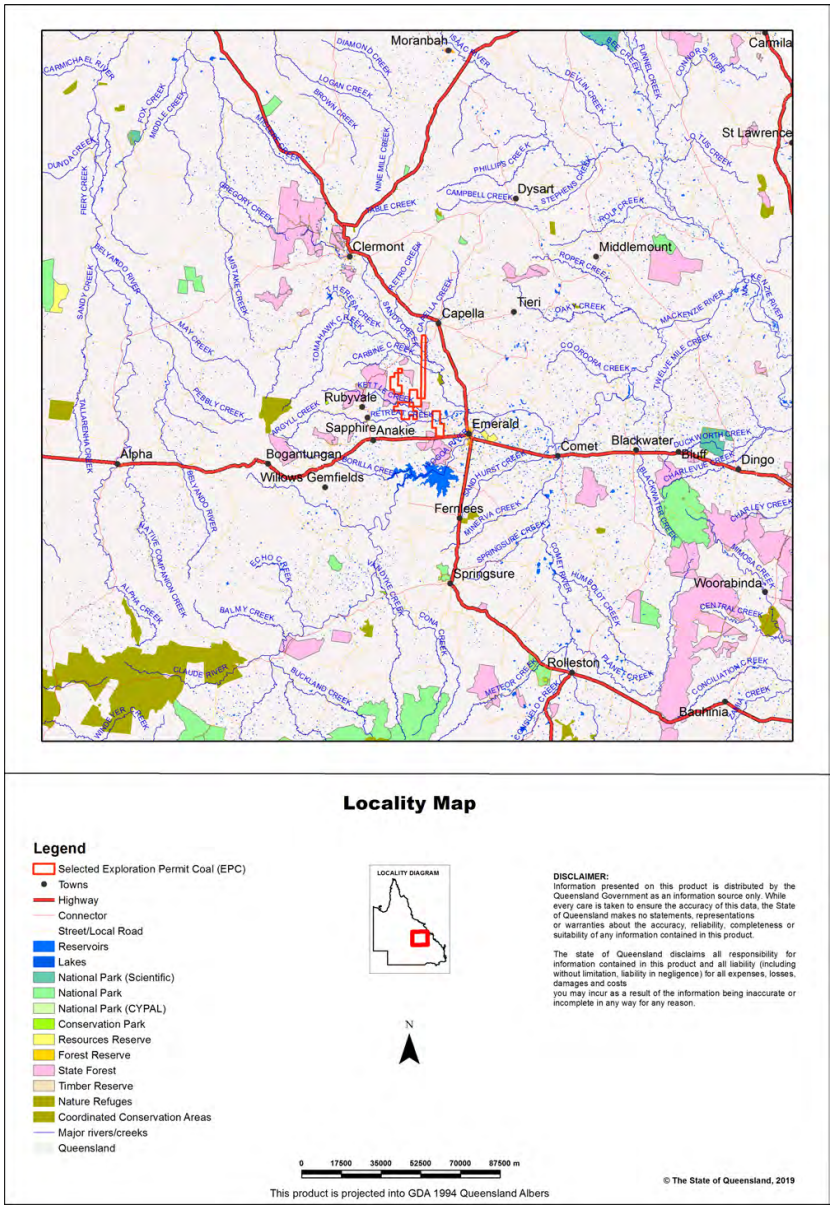
Table of Contents

Assessment Area Details

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

Table 1: Summary table, details for AOI epc: 25396

Size (ha)	19,814.4
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy



Matters of State Environmental Significance (MSES)

MSES Categories

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

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

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Referable Wetlands under the Environmental Protection Regulation 2008;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

MSES Values Present

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

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7 Threatened species and Iconic species	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	1903.61 ha	9.6%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	75.65 ha	0.4%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	227.21 ha	1.1%
8d Regulated Vegetation - Essential habitat	1274.18 ha	6.4%
8e Regulated Vegetation - intersecting a watercourse **	179.7 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	10.04 ha	0.1%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

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

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

6a. High Ecological Value (HEV) waters - wetlands

(no results)

6b. High Ecological Value (HEV) waters - waterways

(no results)

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

MSES - Species

7. Threatened wildlife and special least concern animal

(no results)

Threatened and special least concern species records

(no results)

Note: The Threatened and Special Least Concern Animal (7) layer originates from the previous MSES version (4.1, dated at 2014). The layer does not represent all currently listed species and is subject to review.

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

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

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

Refer to **Map 3 - MSES - Species** for an overview of the relevant MSES.

MSES - Regulated Vegetation

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

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.5.3/11.4.9	E-subdom	rem_end
11.3.2/11.3.3	O-dom	rem_oc
11.3.3	O-dom	rem_oc
11.10.12/11.10.7/11.9.5	E-subdom	rem_end
11.9.1	E-dom	rem_end
11.9.1/11.9.5	E-dom	rem_end
11.3.2	O-dom	rem_oc
11.10.12/11.9.1/11.10.1/11.10.7	E-subdom	rem_end
11.9.5	E-dom	rem_end
11.4.7	E-dom	rem_end
11.10.12/11.9.1	E-subdom	rem_end
11.3.2/11.3.25	O-dom	rem_oc
11.10.7/11.5.3/11.9.1	E-subdom	rem_end
11.3.2/11.3.25/11.3.3	O-dom	rem_oc
11.4.8	E-dom	rem_end
11.3.3/11.3.37/11.3.2	O-dom	rem_oc
11.3.3/11.3.37	O-dom	rem_oc
11.4.9	E-dom	rem_end
11.8.11/11.8.5	O-dom	rem_oc
11.8.11	O-dom	rem_oc
11.3.1/11.3.3/11.3.37/11.3.2	E-dom	rem_end
11.10.1/11.10.12/11.9.1/11.10.7	E-subdom	rem_end
11.3.25/11.3.2/11.3.3	O-subdom	rem_oc
11.3.2/11.3.25/11.3.3/11.3.1	E-subdom	rem_end
11.3.2/11.3.3/11.3.1/11.3.25	E-subdom	rem_end
11.4.8/11.4.9/11.5.3	E-dom	rem_end
11.3.1/11.3.37/11.3.3/11.3.2	E-dom	rem_end

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.1/11.3.37	E-dom	rem_end
11.4.2	O-dom	rem_oc
11.3.1	E-dom	rem_end

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

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.4.9/11.5.3	E-dom	hvr_end
11.5.3/11.4.9	E-subdom	hvr_end
11.9.1	E-dom	hvr_end
11.9.1/11.10.7/11.10.12/11.9.5	E-dom	hvr_end
11.3.2/11.3.25/11.3.3	O-dom	hvr_oc
11.10.11/11.9.1/11.10.7/11.10.1	E-subdom	hvr_end
11.9.1/11.10.7/11.5.3	E-dom	hvr_end
11.3.1/11.3.3/11.3.37/11.3.2	E-dom	hvr_end
11.3.1	E-dom	hvr_end
11.10.12/11.9.1/11.10.1/11.10.7	E-subdom	hvr_end

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

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

Regulated vegetation map category	Map number	RVM rule
R	8451	4
R	8551	4
R	8550	4

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Regulated vegetation map category	Map number	RVM rule
B	8451	2

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

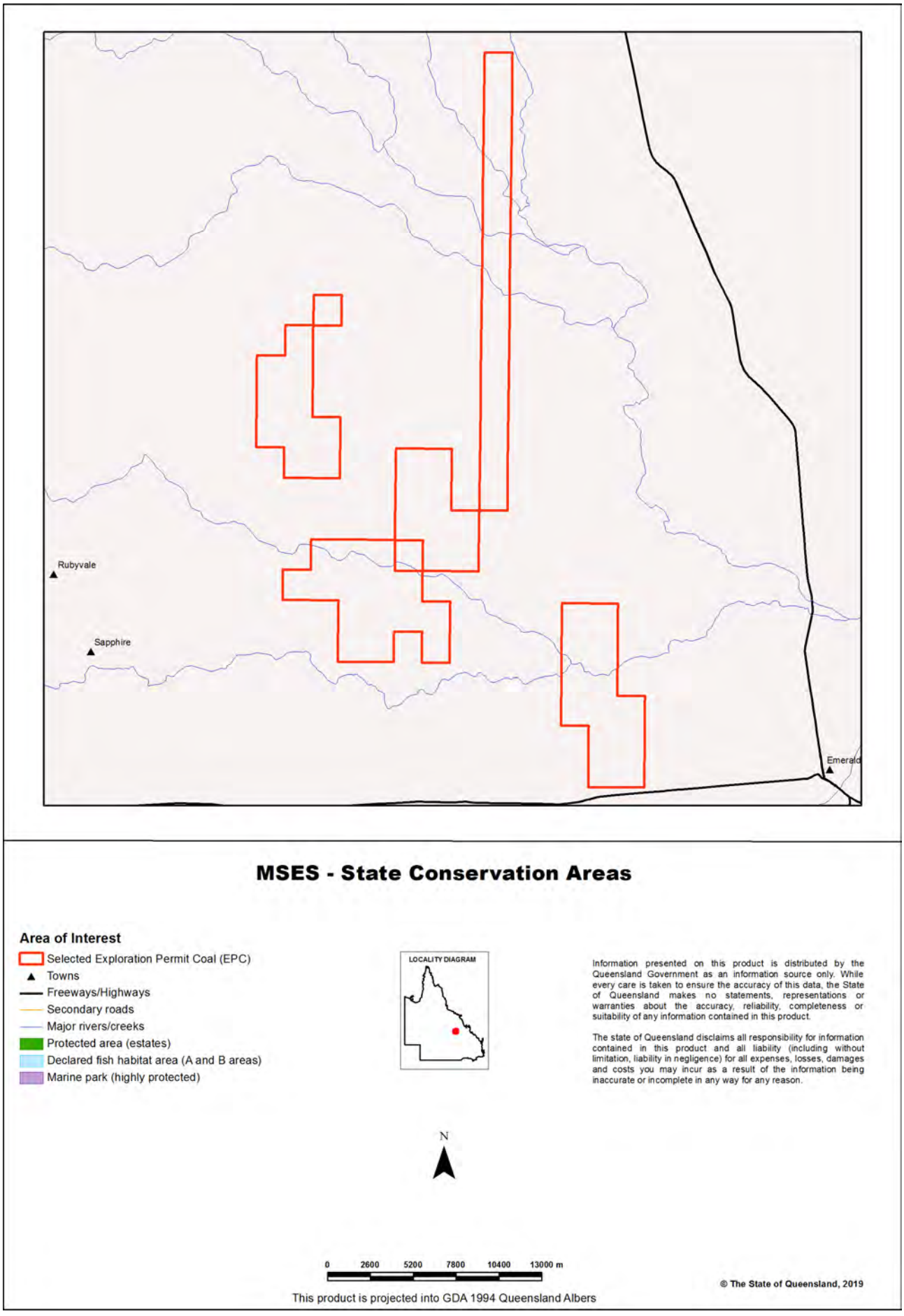
(no results)

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

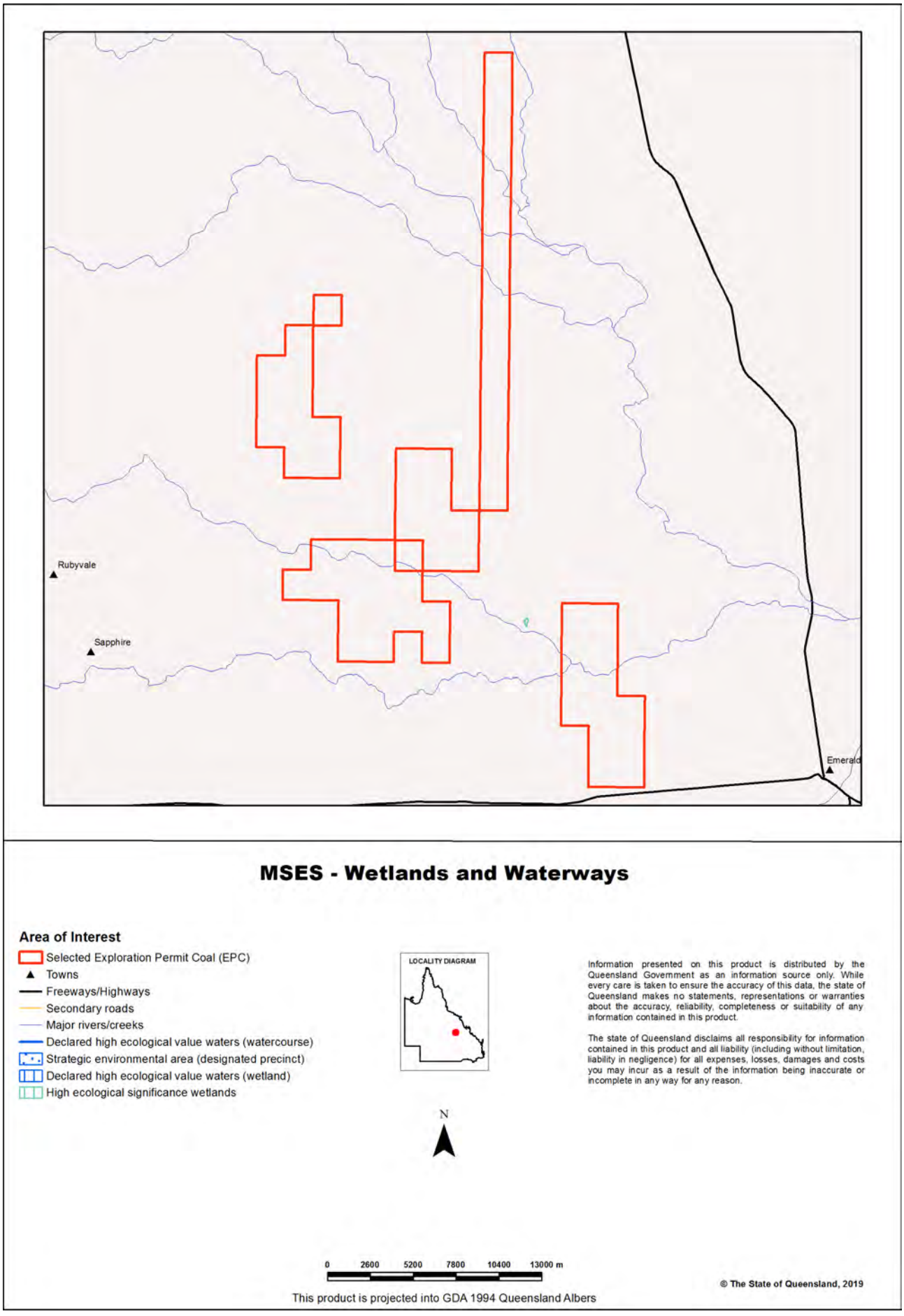
(no results)

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

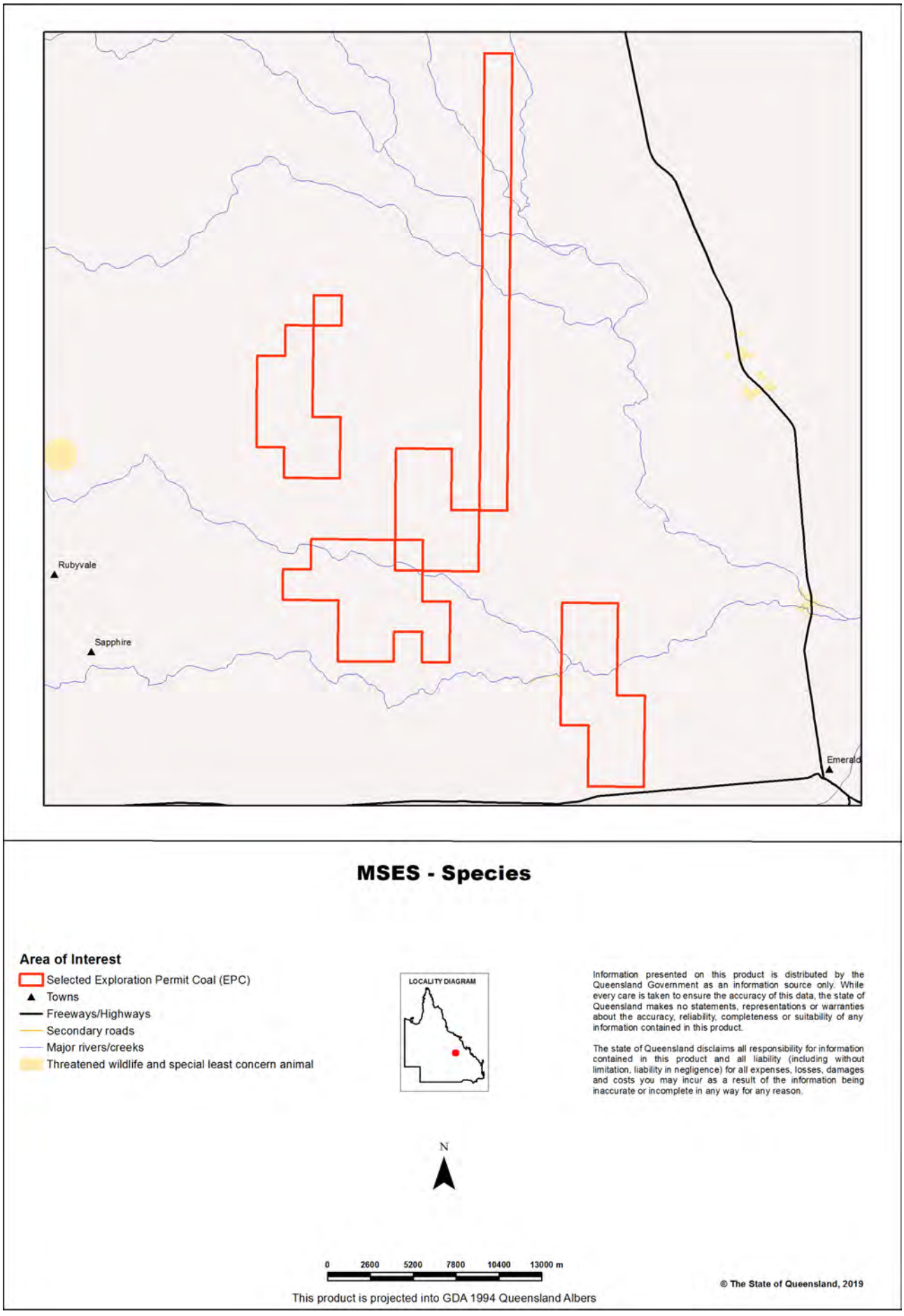
Map 1 - MSES - State Conservation Areas



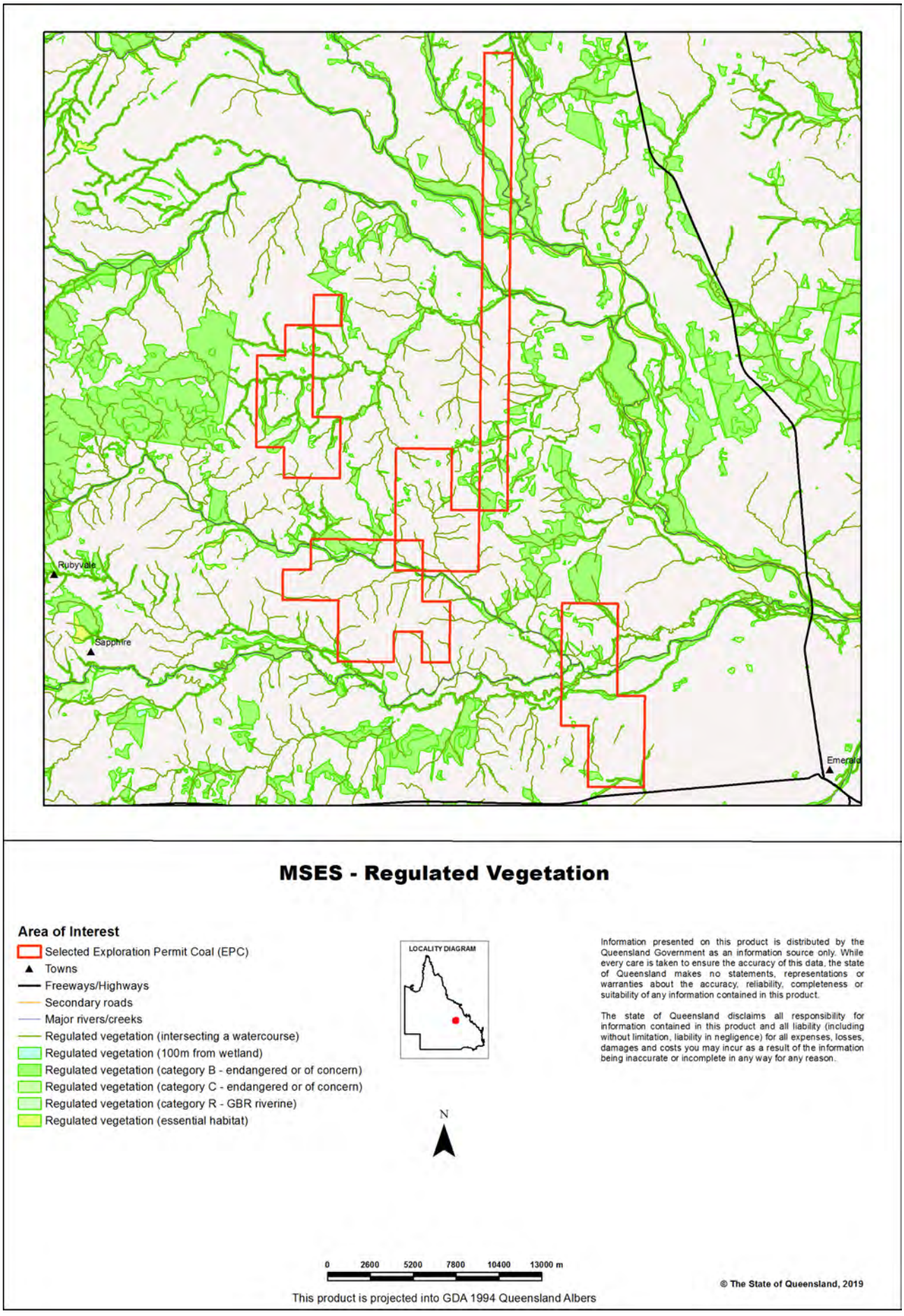
Map 2 - MSES - Wetlands and Waterways



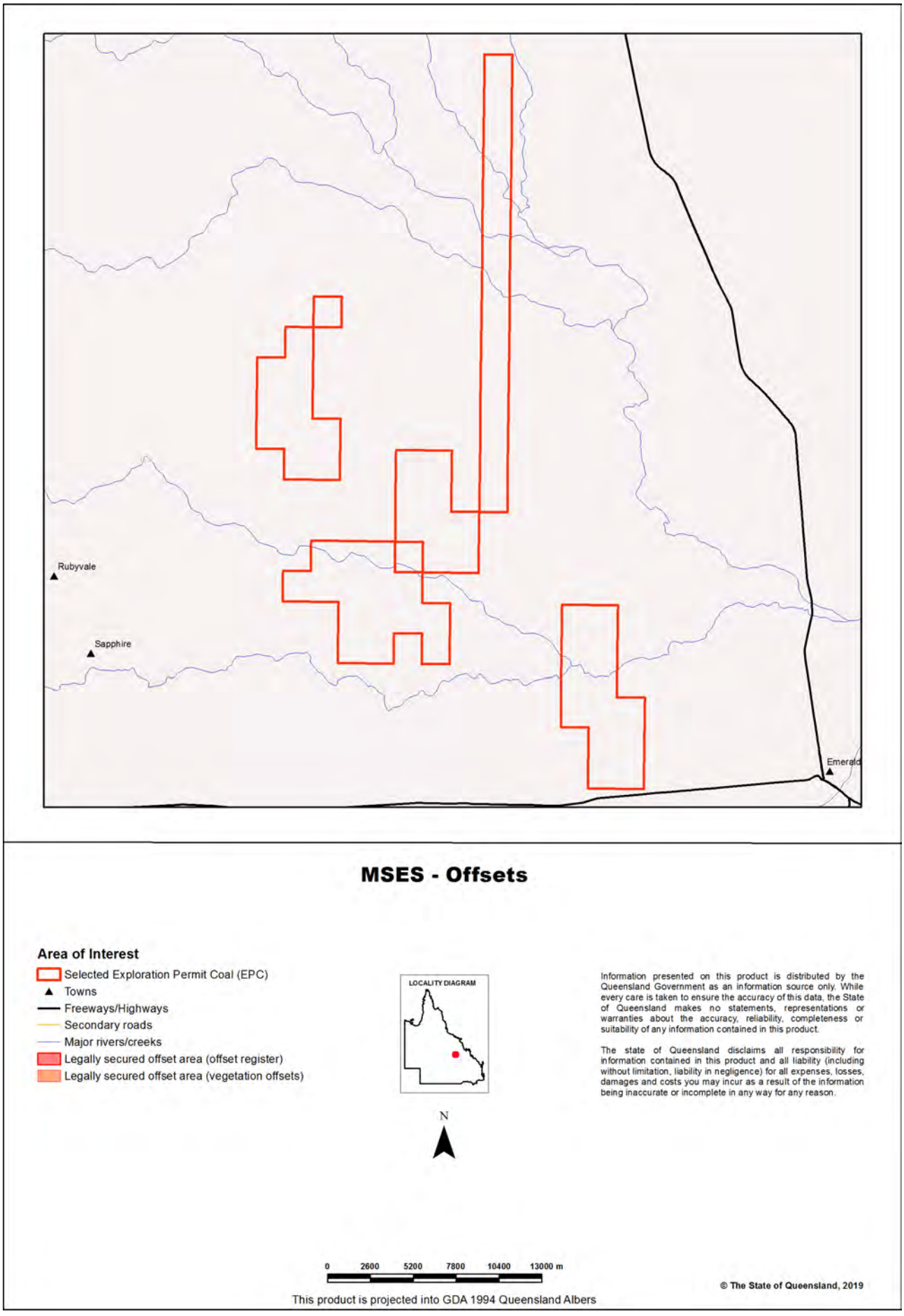
Map 3 - MSES - Species



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

MSES layers	**current QSpatial data (http://qspatial.ingormation.qld.gov.au)**
Protected Areas-Estates and Nature Refuges	- Protected areas of Queensland - Nature Refuges - Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Referable Wetland - wetland layers: - Wetland management area wetlands - Wetland protection area wetlands
wetlands in HEV waters	HEV waters: - EPP Water (multiple locations) intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 4, 2015) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000) - latest version 1.4
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various)
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map - latest version 8.0
VMA Essential Habitat	Vegetation management - essential habitat map - latest version 4.41
VMA Wetlands	Vegetation management wetlands map - latest version 2.41
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map - latest version 1.41

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- *Environmental Protection Act 1994*
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- *Vegetation Management Act 1999*

Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
mdl: 219

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

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

Disclaimer

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

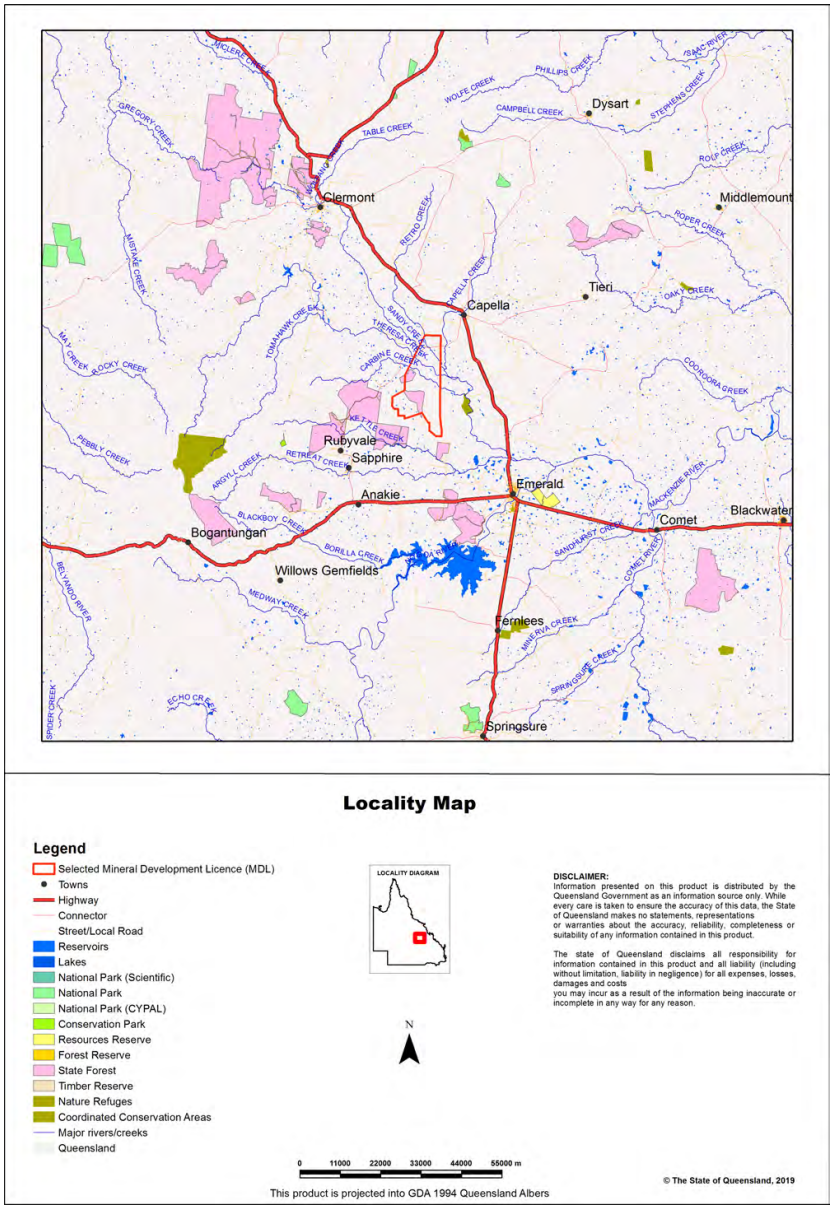
Table of Contents

Assessment Area Details

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

Table 1: Summary table, details for AOI mdl: 219

Size (ha)	21,703.49
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy



Matters of State Environmental Significance (MSES)

MSES Categories

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

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

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Referable Wetlands under the Environmental Protection Regulation 2008;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

MSES Values Present

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

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7 Threatened species and Iconic species	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	2723.81 ha	12.6%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	84.26 ha	0.4%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	153.0 ha	0.7%
8d Regulated Vegetation - Essential habitat	1352.19 ha	6.2%
8e Regulated Vegetation - intersecting a watercourse **	184.4 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	24.38 ha	0.1%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

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

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

6a. High Ecological Value (HEV) waters - wetlands

(no results)

6b. High Ecological Value (HEV) waters - waterways

(no results)

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

MSES - Species

7. Threatened wildlife and special least concern animal

(no results)

Threatened and special least concern species records

(no results)

Note: The Threatened and Special Least Concern Animal (7) layer originates from the previous MSES version (4.1, dated at 2014). The layer does not represent all currently listed species and is subject to review.

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

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

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

Refer to **Map 3 - MSES - Species** for an overview of the relevant MSES.

MSES - Regulated Vegetation

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

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.3/11.3.37/11.3.2	O-dom	rem_oc
11.5.3/11.4.9	E-subdom	rem_end
11.3.2/11.3.3	O-dom	rem_oc
11.3.3	O-dom	rem_oc
11.3.2	O-dom	rem_oc
11.9.1/11.9.5	E-dom	rem_end
11.9.5	E-dom	rem_end
11.9.1	E-dom	rem_end
11.3.2/11.3.25/11.3.3	O-dom	rem_oc
11.10.12/11.9.1/11.10.1/11.10.7	E-subdom	rem_end
11.9.5/11.9.1/11.10.12	E-dom	rem_end
11.3.2/11.3.25	O-dom	rem_oc
11.10.7/11.5.3/11.9.1	E-subdom	rem_end
11.3.3/11.3.37	O-dom	rem_oc
11.4.9	E-dom	rem_end
11.8.11/11.8.5	O-dom	rem_oc
11.4.9/11.5.3	E-dom	rem_end
11.4.8/11.5.3	E-dom	rem_end

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

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.4.9/11.5.3	E-dom	hvr_end
11.5.3/11.4.9	E-subdom	hvr_end
11.8.11/11.8.5	O-dom	hvr_oc
11.9.1/11.10.7/11.10.12/11.9.5	E-dom	hvr_end
11.3.2/11.3.25/11.3.3	O-dom	hvr_oc

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.10.11/11.9.1/11.10.7/11.10.1	E-subdom	hvr_end
11.9.1/11.10.7/11.5.3	E-dom	hvr_end

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

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

Regulated vegetation map category	Map number	RVM rule
R	8451	4

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Regulated vegetation map category	Map number	RVM rule
B	8451	2

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

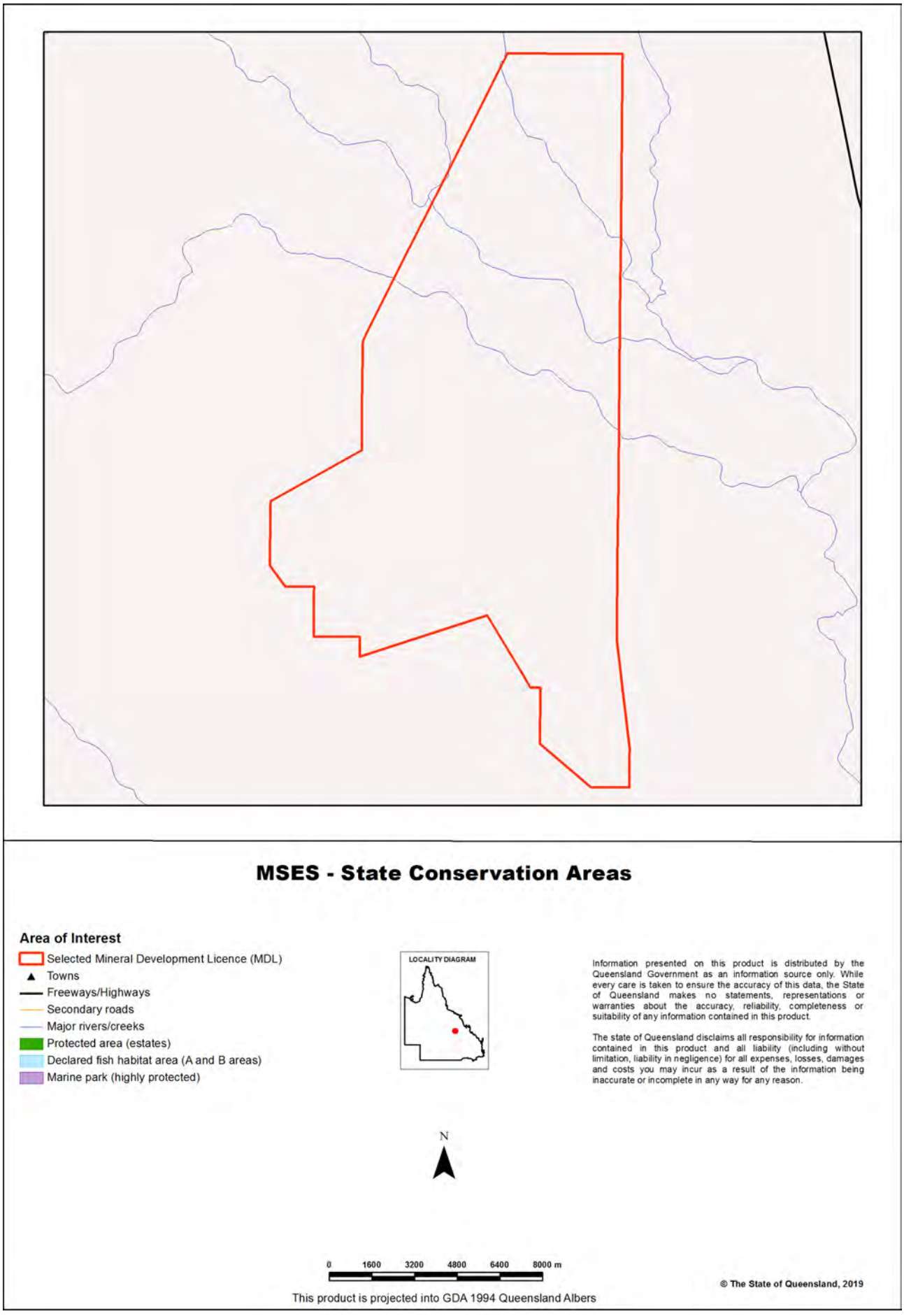
(no results)

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

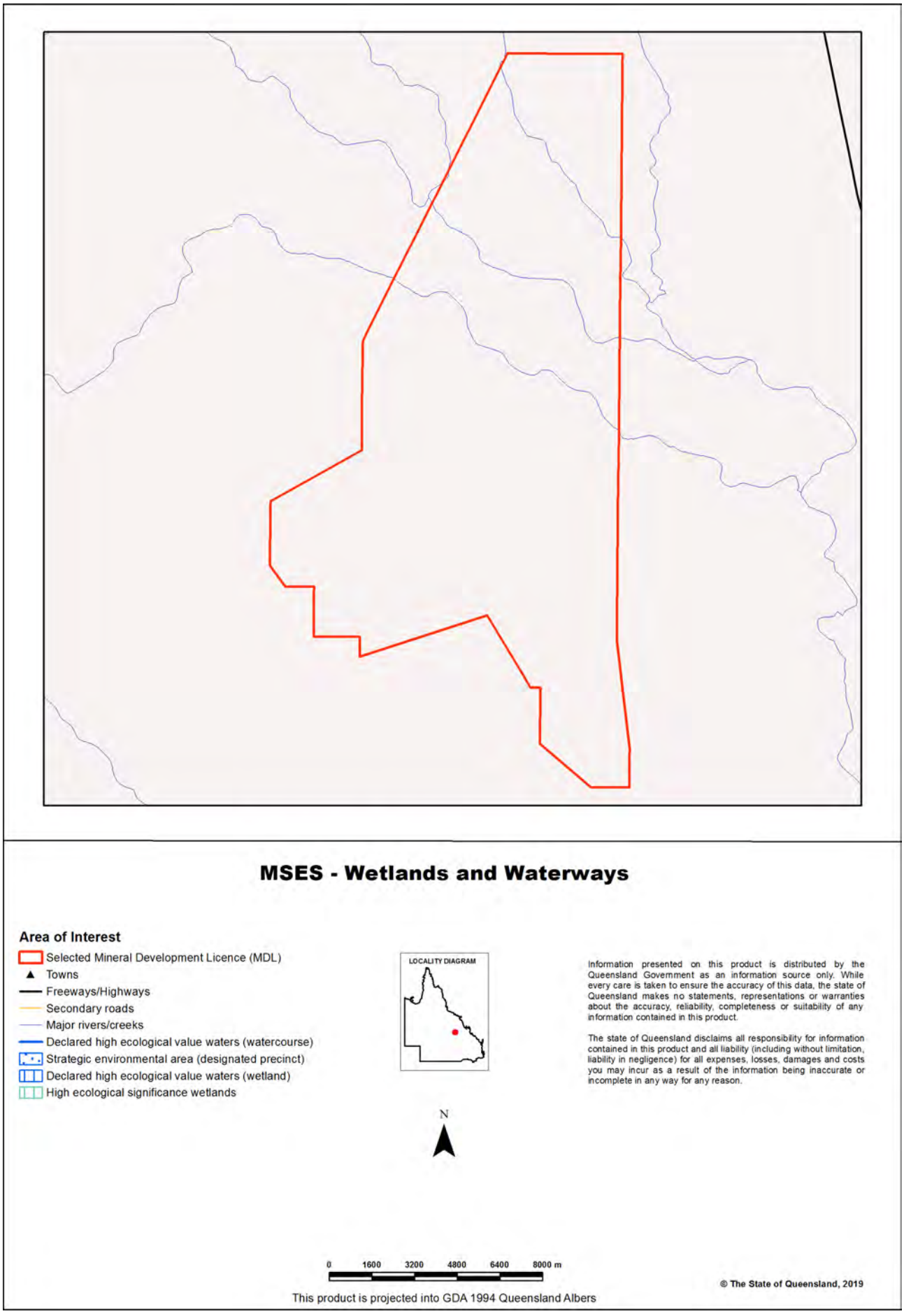
(no results)

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

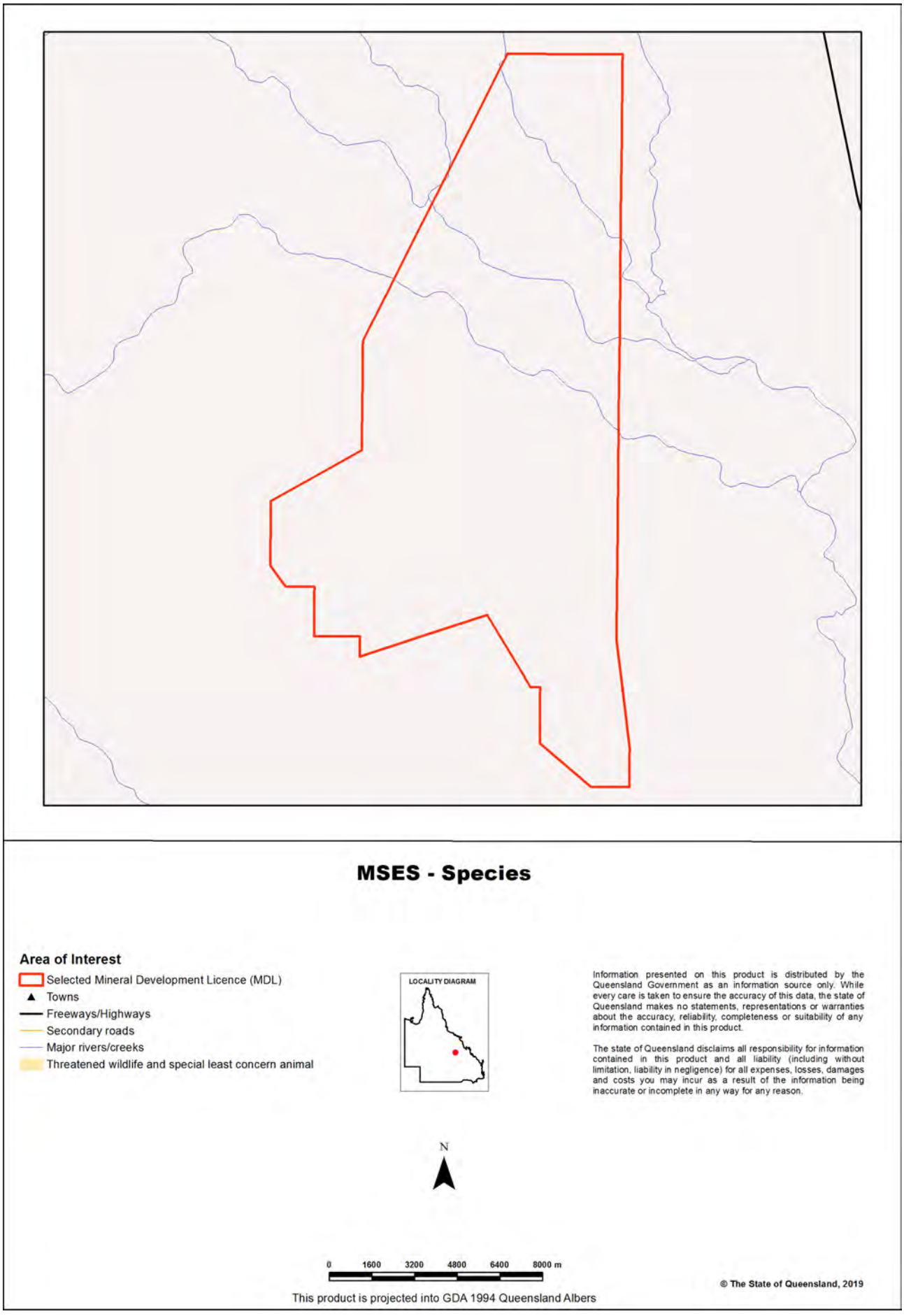
Map 1 - MSES - State Conservation Areas



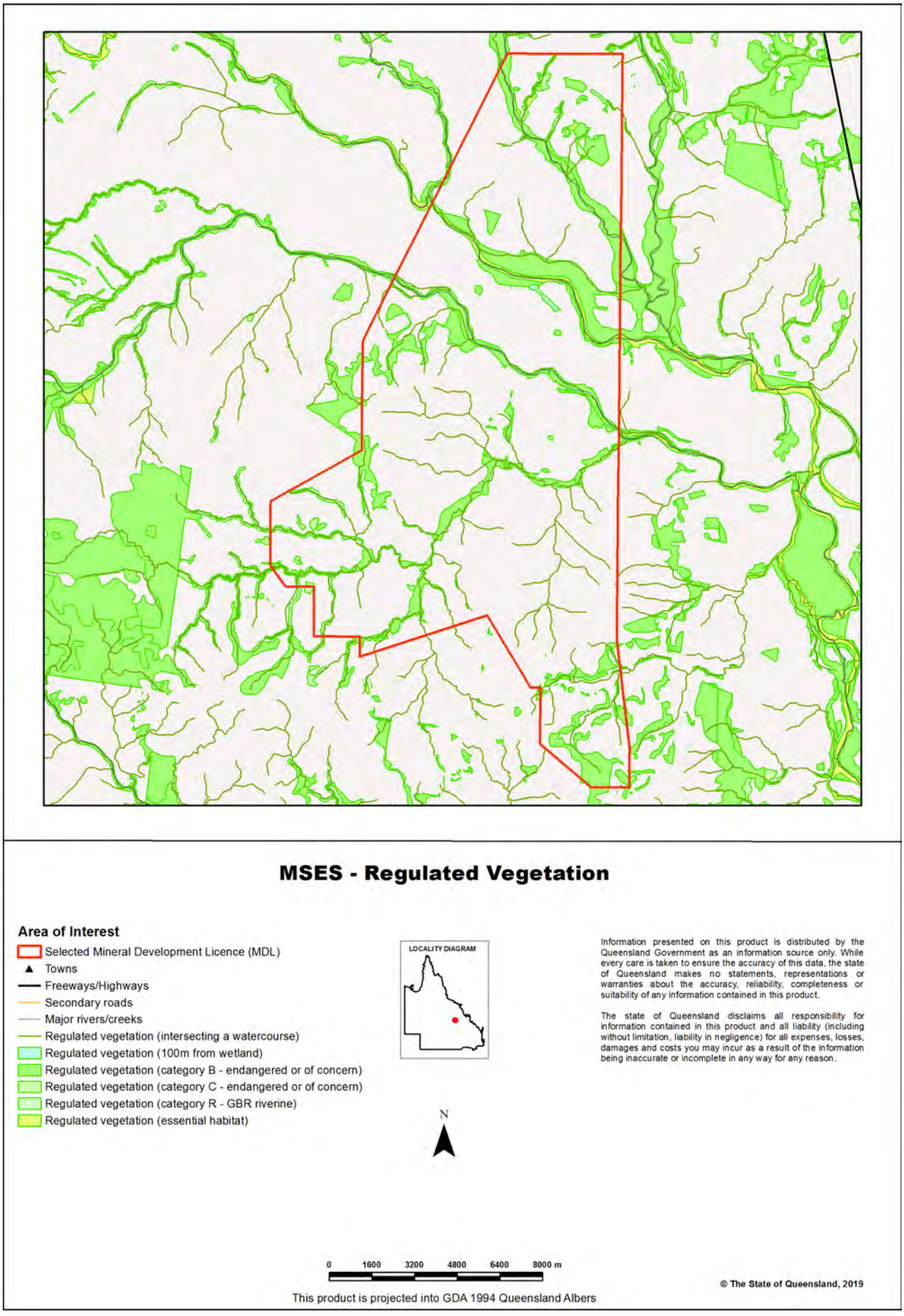
Map 2 - MSES - Wetlands and Waterways



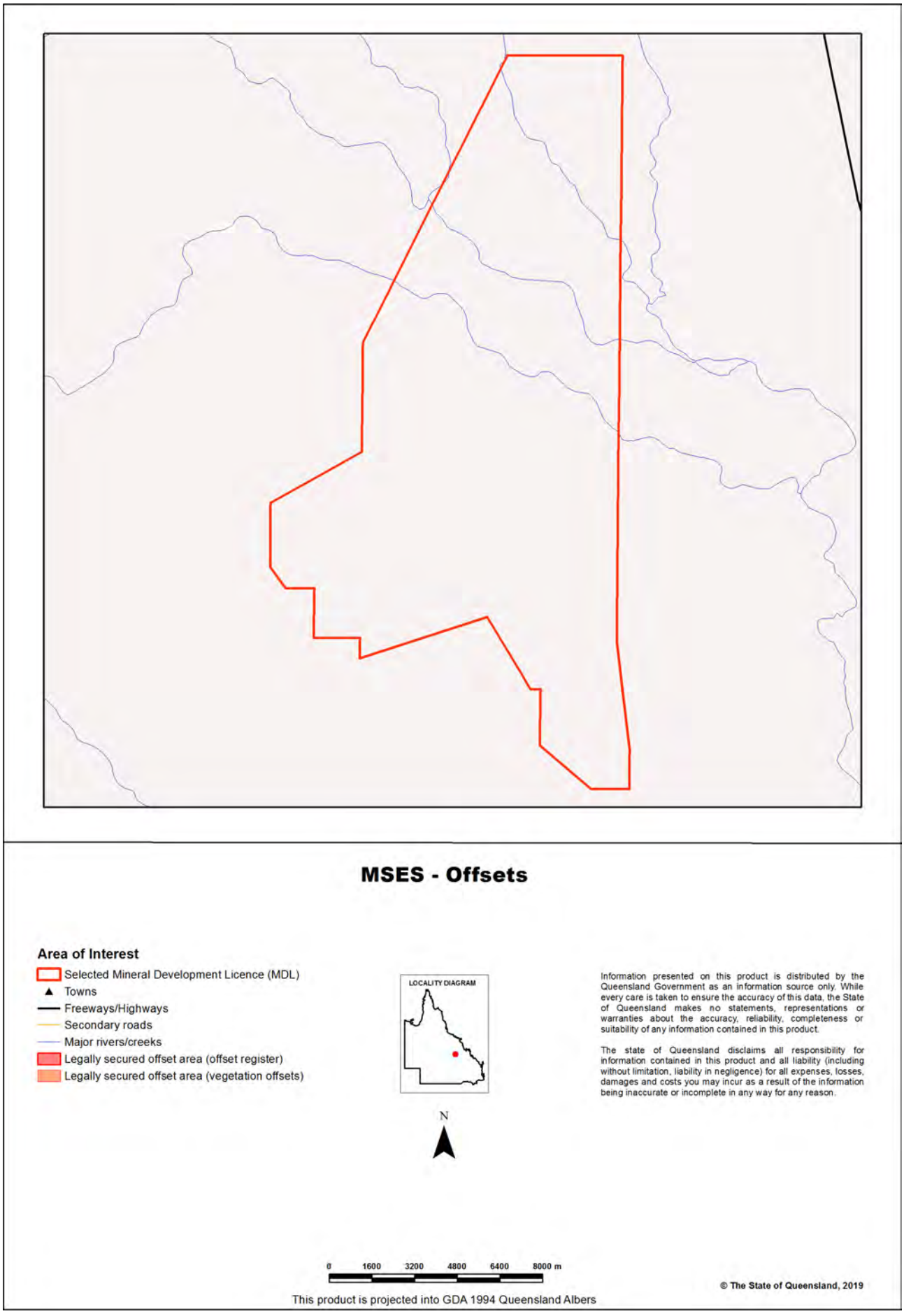
Map 3 - MSES - Species



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

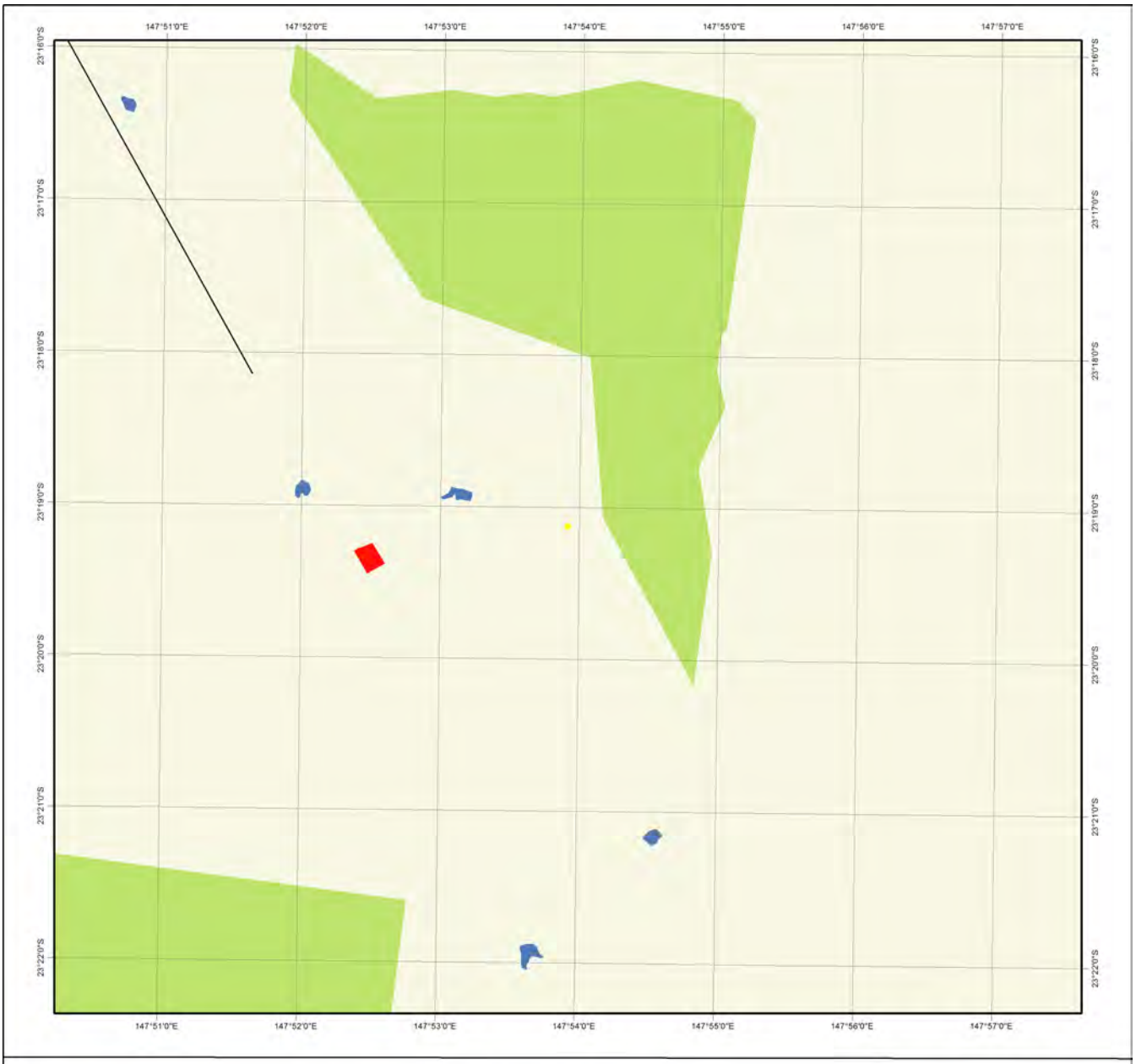
Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying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

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

MSES layers	**current QSpatial data (http://qspatial.ingormation.qld.gov.au)**
Protected Areas-Estates and Nature Refuges	- Protected areas of Queensland - Nature Refuges - Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Referable Wetland - wetland layers: - Wetland management area wetlands - Wetland protection area wetlands
wetlands in HEV waters	HEV waters: - EPP Water (multiple locations) intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 4, 2015) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000) - latest version 1.4
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various)
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map - latest version 8.0
VMA Essential Habitat	Vegetation management - essential habitat map - latest version 4.41
VMA Wetlands	Vegetation management wetlands map - latest version 2.41
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map - latest version 1.41

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- *Environmental Protection Act 1994*
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- *Vegetation Management Act 1999*



Land Use

Queensland Land Use Mapping Program

Legend

ALUM v8 Secondary level

- Coordinates
- Grazing native vegetation
- Production native forests
- Residential and farm infrastructure
- Reservoir/dam
- Freeways / motorways; Highways
- Secondary roads; Streets

LOCALITY DIAGRAM

N

0 680 1360 2040 2720 3400 m

This product is projected into GDA 1994 Queensland Albers

The land use dataset is a product of the Queensland Land use Mapping Program (QLUMP), at a nominal scale of 1:50,000. The layer is a polygon dataset with each feature having attributes describing land use . It presents the most current land use information available in Queensland.

Land use is classified according to the Australian Land Use and Management Classification (ALUMC) Version 8, October 2016. Primary and secondary levels relate to land use (i.e. the principal use of the land in terms of the objectives of the land manager), the tertiary level further discriminate land use, eg. commodity/intensity. Where required and possible, attribution is performed to tertiary level. QLUMP maps the land use classes of sugar and cotton consistently to tertiary level. The minimum attribution level for land use mapping in Queensland is secondary land use, as presented in this map.

Refer to the contact position for additional information regarding source data. Further information relating to land use mapping can be found at http://www.qld.gov.au/environment/land/vegetation/mapping/qlump/ and http://www.agriculture.gov.au/abares/aclump/land-use/

While every care is taken to ensure the accuracy of this information, the Department of Environment and Science makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the information being inaccurate or incomplete in any way and for any reason.

Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
epc: 25396

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

Important Note to User

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

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources, Mines and Energy website

https://www.dnrme.qld.gov.au/

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

Disclaimer

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

Table of Contents

Summary Information

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

Table 1: Area of interest details: epc: 25396

Size (ha)	19,814.4
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	436.71	2.2
Of concern	918.21	4.63
No concern at present	4,991.91	25.19
Total remnant vegetation	6,346.83	32.03

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

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2017) provides further details on regional ecosystem concepts and terminology.

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

https://www.dnrme.qld.gov.au/

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

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

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

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

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

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

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

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

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

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

2. Remnant Regional Ecosystems

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

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

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.10.1	Corymbia citriodora woodland on coarse-grained sedimentary rocks	No concern at present	207.43	1.05
11.10.12	Eucalyptus populnea woodland on medium to coarse-grained sedimentary rocks	No concern at present	772.28	3.9
11.10.3	Acacia catenulata or A. shirleyi open forest on coarse-grained sedimentary rocks. Crests and scarps	No concern at present	2,268.80	11.45
11.10.7	Eucalyptus crebra woodland on coarse-grained sedimentary rocks	No concern at present	140.52	0.71
11.11.1	Eucalyptus crebra +/- Acacia rhodoxylon woodland on old sedimentary rocks with varying degrees of metamorphism and folding	No concern at present	310.48	1.57
11.11.2	Acacia shirleyi or A. catenulata low open forest on old sedimentary rocks with varying degrees of metamorphism and folding	No concern at present	720.16	3.63
11.3.1	Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains	Endangered	130.85	0.66
11.3.2	Eucalyptus populnea woodland on alluvial plains	Of concern	417.94	2.11
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	186.46	0.94
11.3.25e	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	26.24	0.13
11.3.3	Eucalyptus coolabah woodland on alluvial plains	Of concern	227.95	1.15
11.3.37	Eucalyptus coolabah fringing woodland on alluvial plains	No concern at present	170.76	0.86
11.4.2	Eucalyptus spp. and/or Corymbia spp. grassy or shrubby woodland on Cainozoic clay plains	Of concern	37.19	0.19
11.4.7	Eucalyptus populnea with Acacia harpophylla and/or Casuarina cristata open forest to woodland on Cainozoic clay plains	Endangered	14.95	0.08
11.4.8	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Endangered	3.0	0.02
11.4.9	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Endangered	8.1	0.04

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.5.3	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	No concern at present	141.98	0.72
11.8.11	Dichanthium sericeum grassland on Cainozoic igneous rocks	Of concern	22.44	0.11
11.8.4	Eucalyptus melanophloia open woodland on Cainozoic igneous rocks.	No concern at present	169.0	0.85
11.8.5	Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	No concern at present	90.5	0.46
11.9.1	Acacia harpophylla-Eucalyptus cambageana woodland to open forest on fine-grained sedimentary rocks	Endangered	271.85	1.37
11.9.5	Acacia harpophylla and/or Casuarina cristata open forest on fine-grained sedimentary rocks	Endangered	7.95	0.04
non-rem	None	None	13,467.58	67.97

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

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

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

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.10.1	Pre-clearing 1007000 ha; Remnant 2017 874000 ha	10a	None	High
11.10.12	Pre-clearing 99000 ha; Remnant 2017 46000 ha	17a	None	Low
11.10.3	Pre-clearing 378000 ha; Remnant 2017 331000 ha	24a	None	Medium
11.10.7	Pre-clearing 395000 ha; Remnant 2017 288000 ha	12a	None	Low
11.11.1	Pre-clearing 243000 ha; Remnant 2017 160000 ha	13c	None	Medium
11.11.2	Pre-clearing 90000 ha; Remnant 2017 75000 ha	24a	None	Low
11.3.1	Pre-clearing 781000 ha; Remnant 2017 78000 ha	25a	None	Low
11.3.2	Pre-clearing 1926000 ha; Remnant 2017 506000 ha	17a	Contains palustrine wetland (e.g. in swales).	Low
11.3.25	Pre-clearing 795000 ha; Remnant 2017 512000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.25e	Pre-clearing 795000 ha; Remnant 2017 512000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.3	Pre-clearing 930000 ha; Remnant 2017 272000 ha	16c	Floodplain (other than floodplain wetlands).	Low

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.3.37	Pre-clearing 52000 ha; Remnant 2017 30000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.4.2	Pre-clearing 196000 ha; Remnant 2017 34000 ha	17a	None	Low
11.4.7	Pre-clearing 209000 ha; Remnant 2017 19000 ha	25a	None	Low
11.4.8	Pre-clearing 724000 ha; Remnant 2017 67000 ha	25a	Contains palustrine wetland (e.g. in swales).	Low
11.4.9	Pre-clearing 999000 ha; Remnant 2017 90000 ha	25a	Contains palustrine wetland (e.g. in swales).	Low
11.5.3	Pre-clearing 981000 ha; Remnant 2017 372000 ha	17a	None	Low
11.8.11	Pre-clearing 606000 ha; Remnant 2017 173000 ha	30b	None	Low
11.8.4	Pre-clearing 217000 ha; Remnant 2017 151000 ha	11a	None	High
11.8.5	Pre-clearing 631000 ha; Remnant 2017 347000 ha	11a	None	Low
11.9.1	Pre-clearing 565000 ha; Remnant 2017 54000 ha	25a	None	Low
11.9.5	Pre-clearing 2272000 ha; Remnant 2017 163000 ha	25a	None	Low
non-rem	None	None	None	None

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

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

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

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

Regional Ecosystem	Special Values
11.10.1	Potential habitat for NCA listed species: Acacia argentina, Acacia calantha, Acacia handonis, Acacia islana, Acacia pedleyi, Acacia sp. (Ruined Castle Creek P.I.Forster+ PIF17848), Apatophyllum teretifolium, Calytrix islensis, Capparis humistrata, Cerbera
11.10.12	None
11.10.3	Habitat for threatened flora species including Acacia deuteroneura, A. wardellii and Bertya calycina.
11.10.7	Potential habitat for NCA listed species: Acacia islana, Acacia sp. (Ruined Castle Creek P.I.Forster+ PIF17848), Eucalyptus tereticornis subsp. rotunda, Sannantha brachypoda
11.11.1	Potential habitat for NCA listed species: Corymbia clandestina, Cycas ophiolitica
11.11.2	Potential habitat for NCA listed species: Cerbera dumicola
11.3.1	Habitat for threatened fauna species including painted honeyeater, Grantiella picta particularly in subregion 35 (Oliver et al. 2003).
11.3.2	Habitat for threatened flora species Homopholis belsonii.

Regional Ecosystem	Special Values
11.3.25	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species.
11.3.25e	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species.
11.3.3	Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002). 11.3.3c: Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002).
11.3.37	None
11.4.2	Potential habitat for NCA listed species: Solanum adenophorum
11.4.7	Potential habitat for NCA listed species: Rutidosis lanata, Solanum stenopterum
11.4.8	Larger gilgai may provide ephemeral wetland habitat.
11.4.9	Potential habitat for NCA listed species: Cadellia pentastylis, Solanum adenophorum, Solanum dissectum, Solanum elachophyllum, Solanum johnsonianum, Xerothamnella herbacea
11.5.3	Potential habitat for NCA listed species: Sannantha brachypoda
11.8.11	Habitat for threatened plant species including Trioncinia retroflexa and Dichanthium queenslandicum. T. retroflexa is currently known from three small populations.
11.8.4	Potential habitat for NCA listed species: Acacia arbiana, Acacia islana, Bertya pedicellata, Grevillea hockingsii, Haloragis exalata subsp. velutina, Marsdenia brevifolia, Sannantha brachypoda
11.8.5	In southern part of bioregion, habitat for a number of threatened plant species including Picris evae and Thesium australe and near threatened species Digitaria porrecta and Discaria pubescens.
11.9.1	Potential habitat for NCA listed species: Solanum adenophorum, Solanum dissectum, Solanum elachophyllum, Solanum johnsonianum, Xerothamnella herbacea
11.9.5	Habitat for threatened fauna species including Jalmenus eubulus, pale imperial hairstreak butterfly (Eastwood et al. 2008)
non-rem	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

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

A comprehensive description of BVGs is available at:

https://publications.qld.gov.au/dataset/redd/resource/

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

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

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	13,467.58	67.97
10a	Dry woodlands to open woodlands dominated by Corymbia citriodora (spotted gum). (land zones 10, 7, 12, 11,[8]) (BRB, NET, [DEU])	207.43	1.05
11a	Moist to dry open forests to woodlands dominated by Eucalyptus orgadophila (mountain coolibah). Some areas dominated by E. tereticornis (blue gum), E. melliodora (yellow box), E. albens (white box), E. crebra (narrow-leaved red ironbark) or E. melanophloia (silver-leaved ironbark). (land zones 8, 11, 4, [3]) (BRB, SEQ, EIU)	259.5	1.31
12a	Dry woodlands to open woodlands dominated by ironbarks such as Eucalyptus decorticans (gum-topped ironbark), E. fibrosa subsp. nubila (blue-leaved ironbark), or E. crebra (narrow-leaved red ironbark) and/or bloodwoods such as Corymbia trachyphloia (yellow bloodwood), C. leichhardtii (rustyjacket), C. watsoniana (Watson's yellow bloodwood), C. lamprophylla, C. peltata (yellowjacket). Occasionally E. thozetiana (mountain yapunyah), E. cloeziana (Gympie messmate) or E. mediocris are dominant. Mostly on sub-coastal/inland hills with shallow soils. (land zones 10, 7, 9) (BRB, DEU, SEQ, GUP)	140.52	0.71
13c	Woodlands of Eucalyptus crebra (sens. lat.) (narrow-leaved red ironbark), E. drepanophylla (grey ironbark), E. fibrosa (dusky-leaved ironbark), E. shirleyi (shirley's silver-leaved ironbark) on granitic and metamorphic ranges (land zones 12, 11, 9, [5]) (BRB, EIU, SEQ, NET, CQC)	310.48	1.57
16a	Open forest and woodlands dominated by Eucalyptus camaldulensis (river red gum) (or E. tereticornis (blue gum)) and/or E. coolabah (coolabah) (or E. microtheca (coolabah)) fringing drainage lines. Associated species may include Melaleuca spp., Corymbia tessellaris (carbeen), Angophora spp., Casuarina cunninghamiana (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	383.45	1.94
16c	Woodlands and open woodlands dominated by Eucalyptus coolabah (coolabah) or E. microtheca (coolabah) or E. largiflorens (black box) or E. tereticornis (blue gum) or E. chlorophylla on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	227.95	1.15
17a	Woodlands dominated by Eucalyptus populnea (poplar box) (or E. brownii (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	1,369.38	6.91
24a	Low woodlands to tall shrublands dominated by Acacia spp. on residuals. Species include A. shirleyi (lancewood), A. catenulata (bendee), A. microsperma (bowyakka), A. clivicola, A. sibirica, A. rhodoxylon (rosewood) and A. leptostachya (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	2,988.96	15.08

BVG (1 Million)	Description	Area (Ha)	% of AOI
25a	Open forests to woodlands dominated by Acacia harpophylla (brigalow) sometimes with Casuarina cristata (belah) on heavy clay soils. Includes areas co-dominated with A. cambagei (gidgee) and/or emergent eucalypts (land zones 4, 9, 3, 11, 7, 12, [5, 8]) (BRB, MUL, MGD, DEU, [SEQ])	436.71	2.2
30b	Tussock grasslands dominated by Astrebla spp. (mitchell grass) or Dichanthium spp. (bluegrass) often with Iseilema spp. on undulating downs or clay plains. (land zones 9, 3, 4, 8, [5]) (MGD, CHC, GUP, BRB, [EIU, DEU, NWH])	22.44	0.11

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

4. Technical and BioCondition Benchmark Descriptions

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

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

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

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2012 (PDF)* section 3.3.1 of:

https://publications.qld.gov.au/dataset/redd/resource/

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

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

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

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

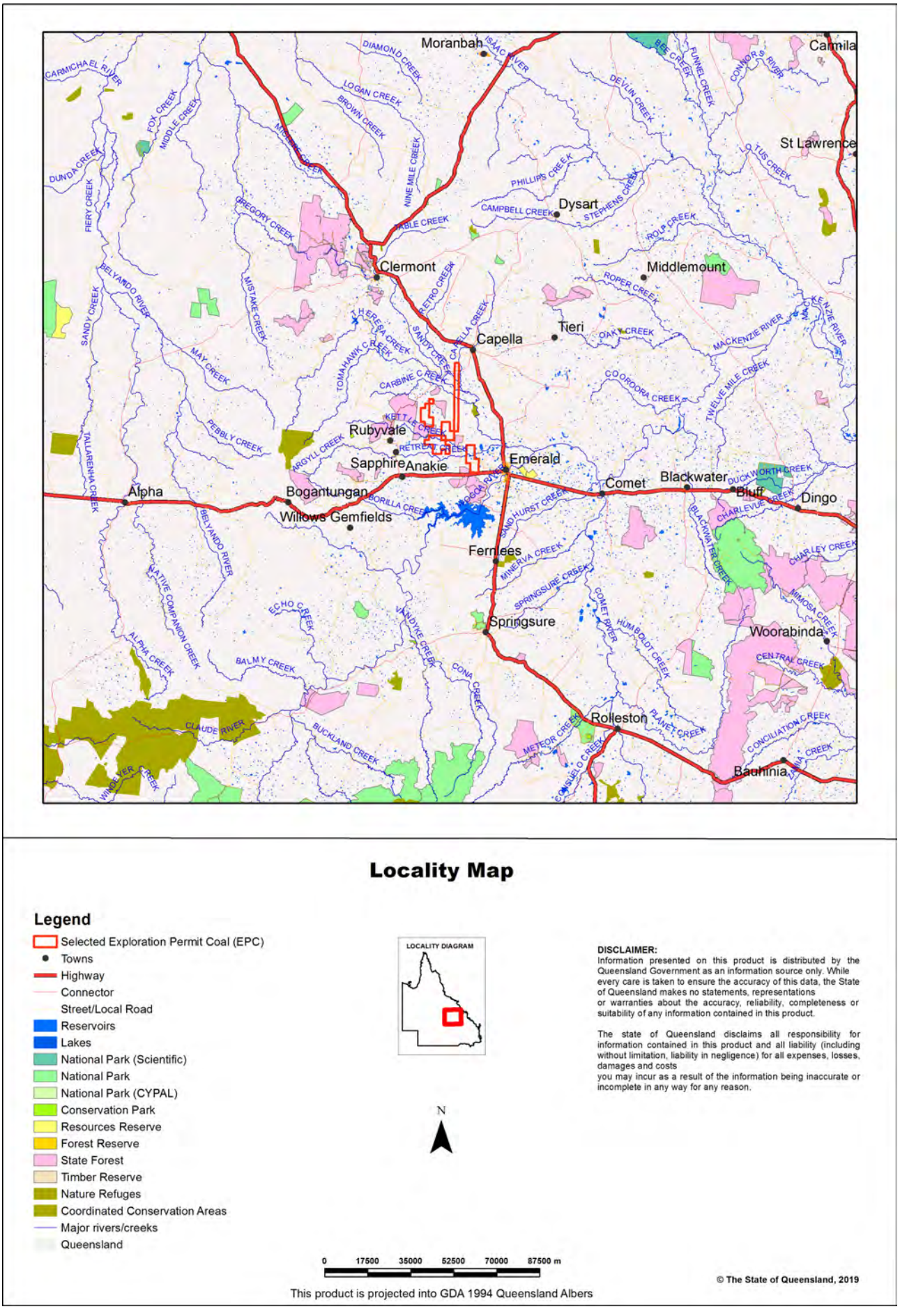
Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.10.1	Available	Not currently available
11.10.12	Available	Not currently available
11.10.3	Available	Not currently available
11.10.7	Available	Not currently available
11.11.1	Available	Not currently available
11.11.2	Available	Not currently available
11.3.1	Available	Not currently available

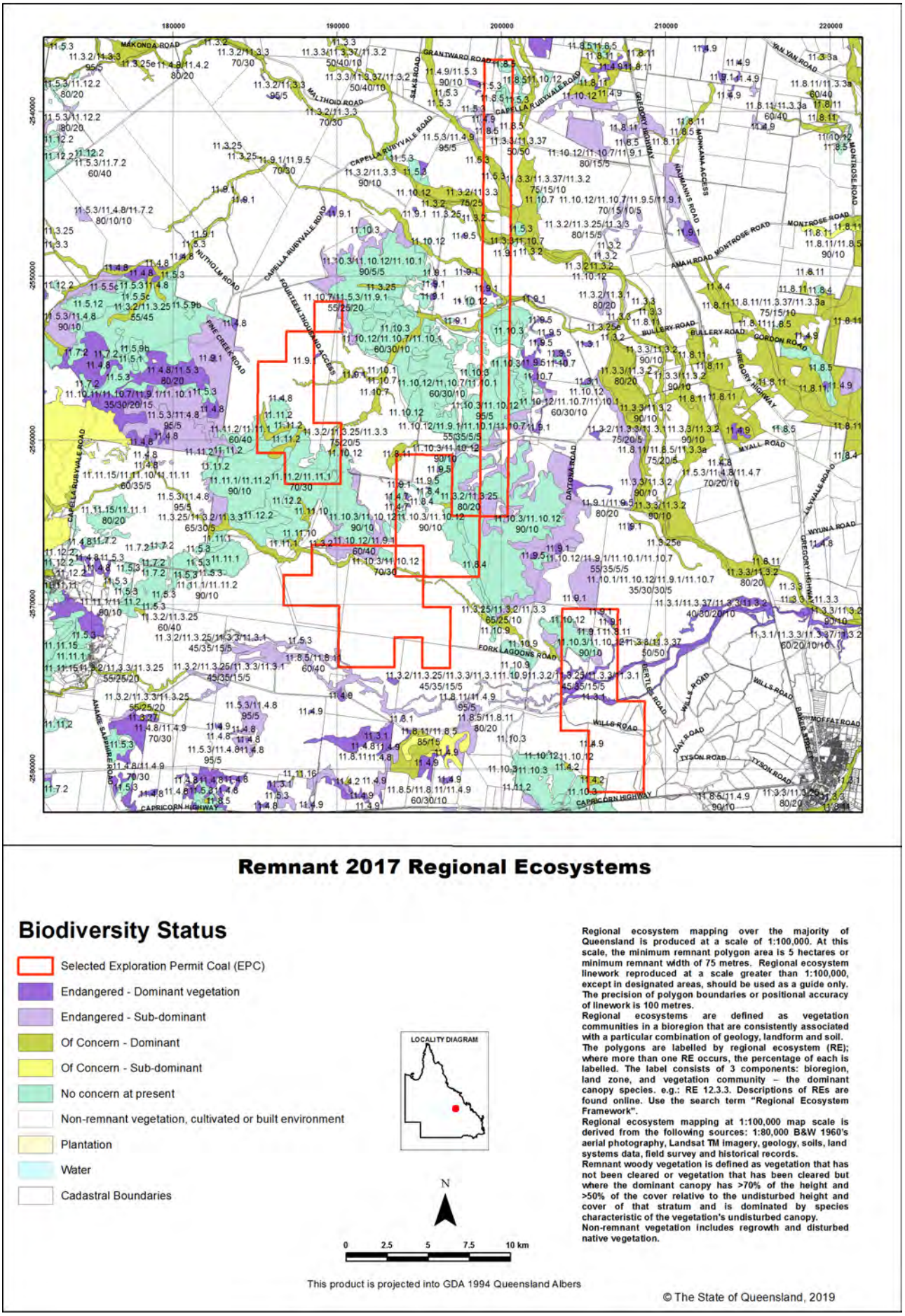
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.3.2	Available	Not currently available
11.3.25	Available	Not currently available
11.3.25e	Not currently available	Not currently available
11.3.3	Available	Not currently available
11.3.37	Available	Not currently available
11.4.2	Available	Not currently available
11.4.7	Available	Not currently available
11.4.8	Available	Not currently available
11.4.9	Available	Not currently available
11.5.3	Available	Not currently available
11.8.11	Available	Not currently available
11.8.4	Available	Not currently available
11.8.5	Available	Not currently available
11.9.1	Available	Not currently available
11.9.5	Available	Not currently available
non-rem	Not currently available	Not currently available

Maps

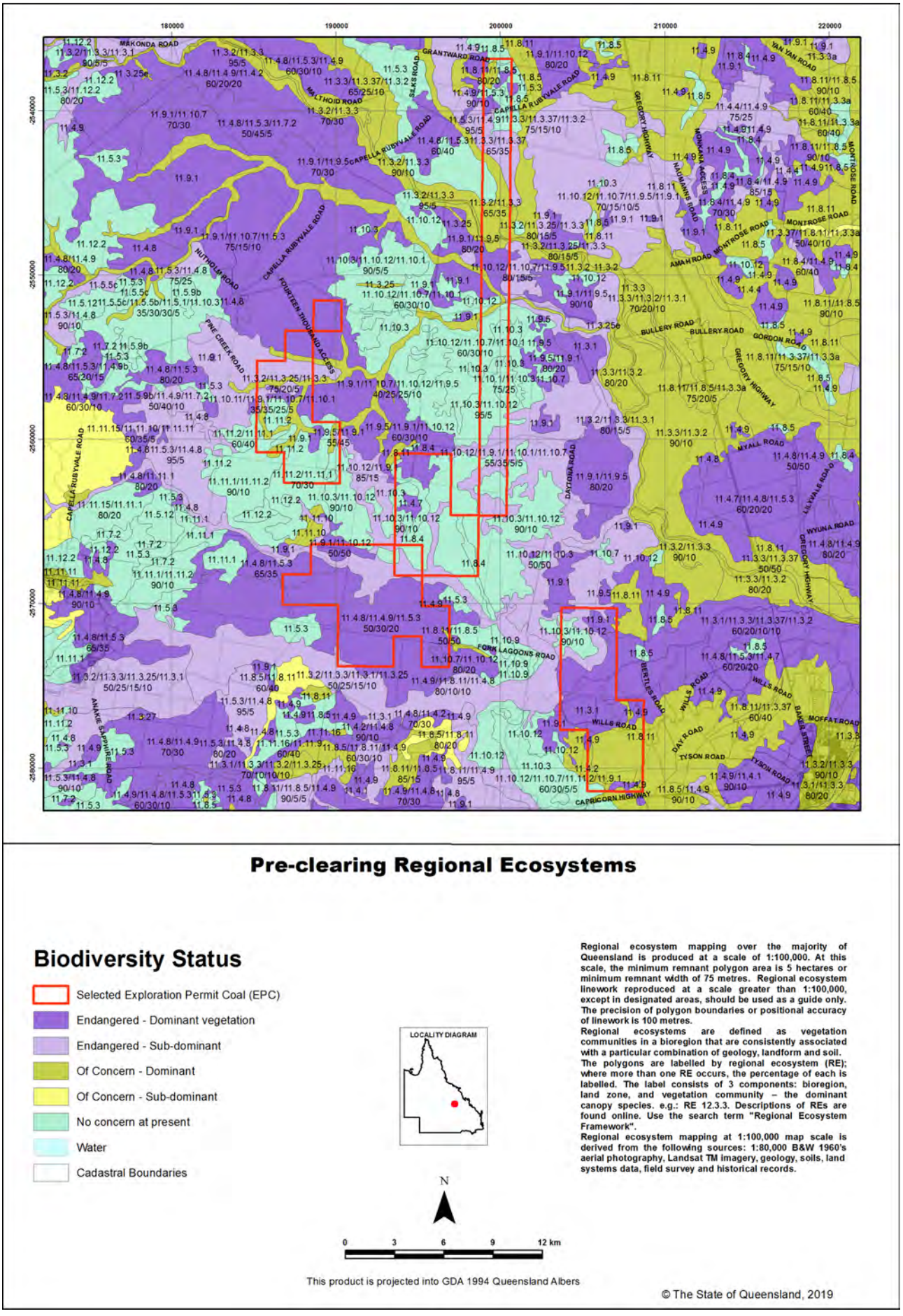
Map 1 - Location



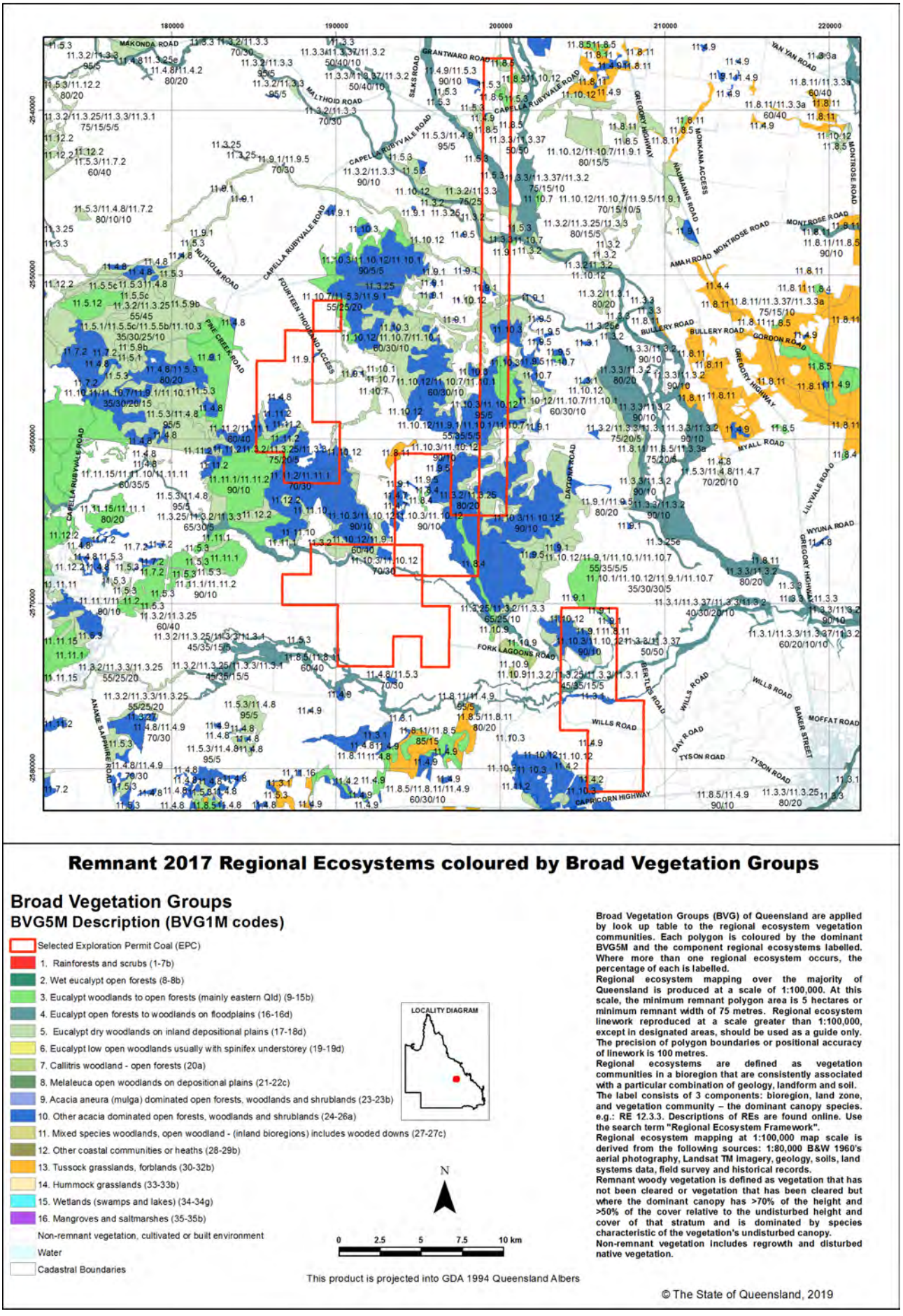
Map 2 - Remnant 2017 regional ecosystems



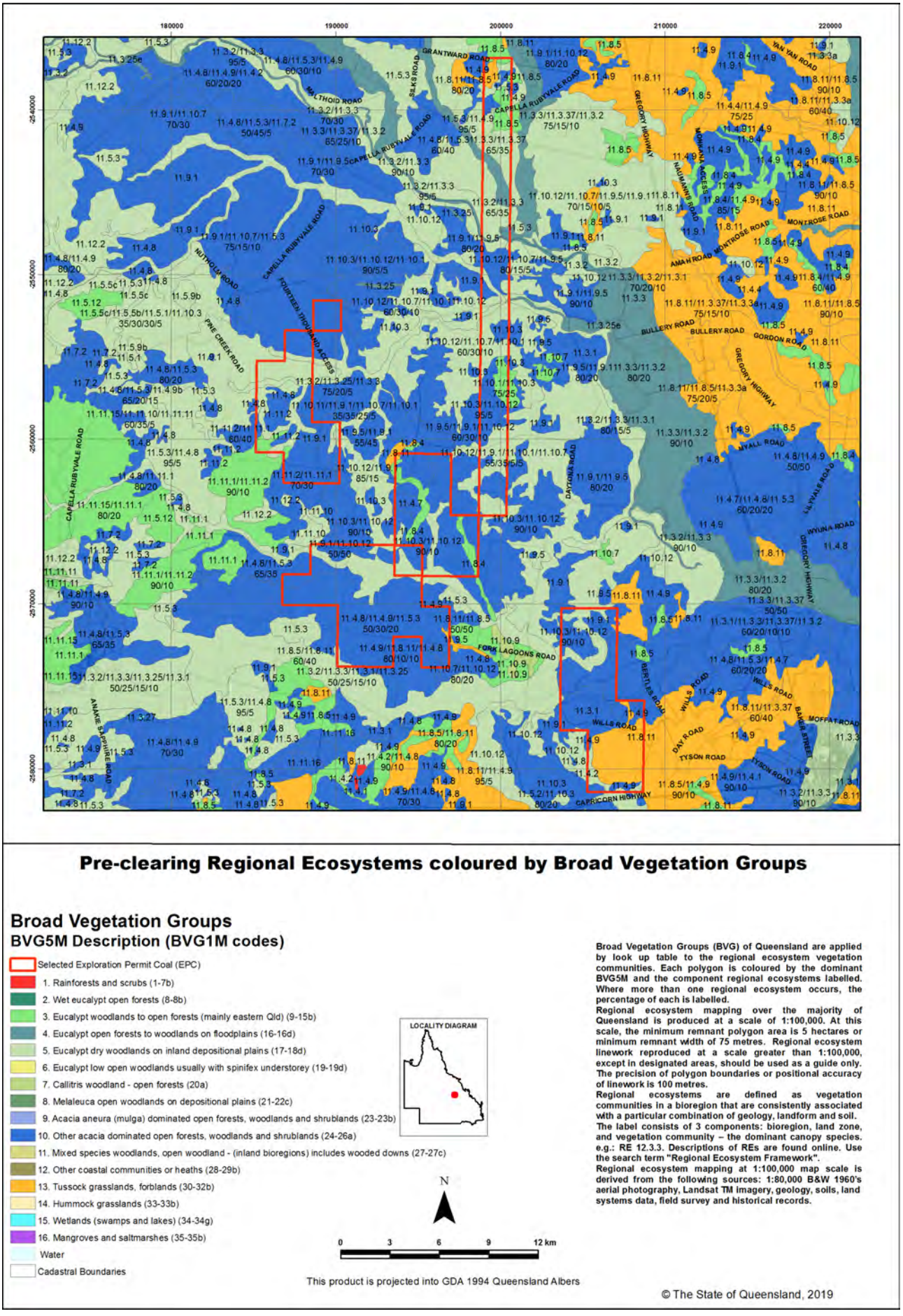
Map 3 - Pre-clearing regional ecosystems



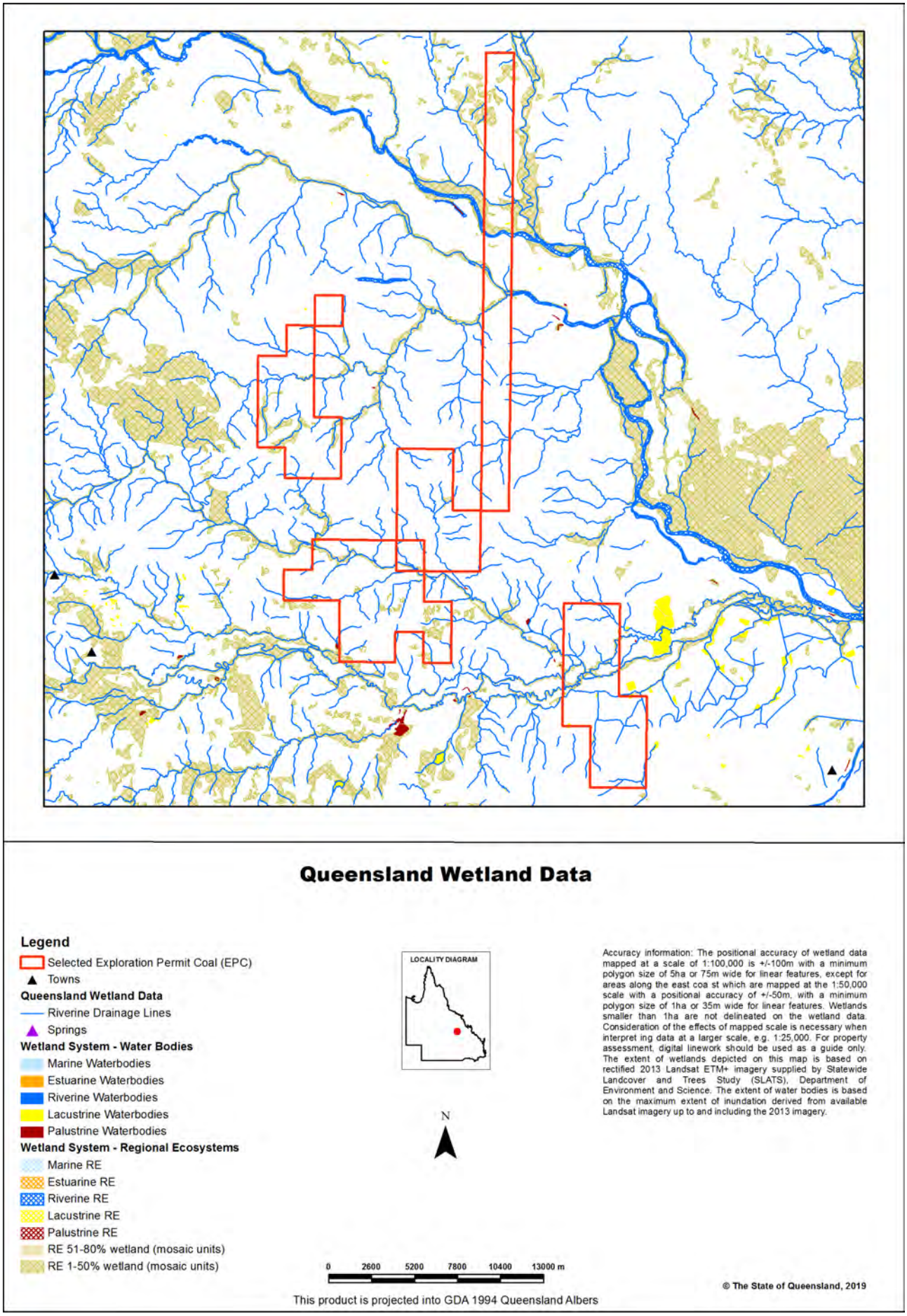
Map 4 - Remnant 2017 regional ecosystems by BVG (5M)



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



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

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

https://publications.qld.gov.au/dataset/redd/resource/

The methodology for mapping regional ecosystems can be downloaded from:

https://publications.qld.gov.au/dataset/redd/resource/

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

http://dds.information.qld.gov.au/dds/

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

http://www.dnrm.qld.gov.au/mapping-data/queensland-globe

References

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F., Ford, A.J. and Accad, A. (2017) The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 3.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

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

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2017) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 4.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

(https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4)

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

The datasets listed below are available for download from:

http://dds.information.qld.gov.au/dds/

- Biodiversity status of pre-clearing and 2017 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- *Vegetation Management Act 1999*

Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
mdl: 219

Environmental Reports - General Information

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

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

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

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

Important Note to User

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

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources, Mines and Energy website

https://www.dnrme.qld.gov.au/

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

Disclaimer

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

Table of Contents

Summary Information

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

Table 1: Area of interest details: mdl: 219

Size (ha)	21,703.49
Local Government(s)	Central Highlands Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Isaac - Comet Downs, Basalt Downs
Catchment(s)	Fitzroy

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	403.97	1.86
Of concern	1,786.31	8.23
No concern at present	7,660.24	35.29
Total remnant vegetation	9,850.51	45.39

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

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2017) provides further details on regional ecosystem concepts and terminology.

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

https://www.dnrme.qld.gov.au/

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

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

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

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

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

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

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

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

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

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

2. Remnant Regional Ecosystems

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

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

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.10.1	Corymbia citriodora woodland on coarse-grained sedimentary rocks	No concern at present	363.26	1.67
11.10.12	Eucalyptus populnea woodland on medium to coarse-grained sedimentary rocks	No concern at present	1,746.54	8.05
11.10.3	Acacia catenulata or A. shirleyi open forest on coarse-grained sedimentary rocks. Crests and scarps	No concern at present	4,096.68	18.88
11.10.7	Eucalyptus crebra woodland on coarse-grained sedimentary rocks	No concern at present	848.69	3.91
11.3.2	Eucalyptus populnea woodland on alluvial plains	Of concern	888.16	4.09
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	434.97	2.0
11.3.25e	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	158.99	0.73
11.3.3	Eucalyptus coolabah woodland on alluvial plains	Of concern	304.16	1.4
11.3.37	Eucalyptus coolabah fringing woodland on alluvial plains	No concern at present	185.24	0.85
11.4.8	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Endangered	24.84	0.11
11.4.9	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Endangered	37.49	0.17
11.5.3	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	No concern at present	393.15	1.81
11.8.11	Dichanthium sericeum grassland on Cainozoic igneous rocks	Of concern	0.02	less than 0.01
11.8.5	Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	No concern at present	26.68	0.12
11.9.1	Acacia harpophylla-Eucalyptus cambageana woodland to open forest on fine-grained sedimentary rocks	Endangered	336.33	1.55
11.9.5	Acacia harpophylla and/or Casuarina cristata open forest on fine-grained sedimentary rocks	Endangered	5.31	0.02
non-rem	None	None	11,853.02	54.61

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

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

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

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.10.1	Pre-clearing 1007000 ha; Remnant 2017 874000 ha	10a	None	High
11.10.12	Pre-clearing 99000 ha; Remnant 2017 46000 ha	17a	None	Low
11.10.3	Pre-clearing 378000 ha; Remnant 2017 331000 ha	24a	None	Medium
11.10.7	Pre-clearing 395000 ha; Remnant 2017 288000 ha	12a	None	Low
11.3.2	Pre-clearing 1926000 ha; Remnant 2017 506000 ha	17a	Contains palustrine wetland (e.g. in swales).	Low
11.3.25	Pre-clearing 795000 ha; Remnant 2017 512000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.25e	Pre-clearing 795000 ha; Remnant 2017 512000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.3	Pre-clearing 930000 ha; Remnant 2017 272000 ha	16c	Floodplain (other than floodplain wetlands).	Low
11.3.37	Pre-clearing 52000 ha; Remnant 2017 30000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.4.8	Pre-clearing 724000 ha; Remnant 2017 67000 ha	25a	Contains palustrine wetland (e.g. in swales).	Low
11.4.9	Pre-clearing 999000 ha; Remnant 2017 90000 ha	25a	Contains palustrine wetland (e.g. in swales).	Low
11.5.3	Pre-clearing 981000 ha; Remnant 2017 372000 ha	17a	None	Low
11.8.11	Pre-clearing 606000 ha; Remnant 2017 173000 ha	30b	None	Low
11.8.5	Pre-clearing 631000 ha; Remnant 2017 347000 ha	11a	None	Low
11.9.1	Pre-clearing 565000 ha; Remnant 2017 54000 ha	25a	None	Low
11.9.5	Pre-clearing 2272000 ha; Remnant 2017 163000 ha	25a	None	Low
non-rem	None	None	None	None

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

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

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

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

Regional Ecosystem	Special Values
11.10.1	Potential habitat for NCA listed species: Acacia argentina, Acacia calantha, Acacia handonis, Acacia islana, Acacia pedleyi, Acacia sp. (Ruined Castle Creek P.I.Forster+ PIF17848), Apatophyllum teretifolium, Calytrix islensis, Capparis humistrata, Cerbera
11.10.12	None
11.10.3	Habitat for threatened flora species including Acacia deuteroneura, A. wardellii and Bertya calycina.
11.10.7	Potential habitat for NCA listed species: Acacia islana, Acacia sp. (Ruined Castle Creek P.I.Forster+ PIF17848), Eucalyptus tereticornis subsp. rotunda, Sannantha brachypoda
11.3.2	Habitat for threatened flora species Homopholis belsonii.
11.3.25	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species.
11.3.25e	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species.
11.3.3	Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002). 11.3.3c: Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002).
11.3.37	None
11.4.8	Larger gilgai may provide ephemeral wetland habitat.
11.4.9	Potential habitat for NCA listed species: Cadellia pentastylis, Solanum adenophorum, Solanum dissectum, Solanum elachophyllum, Solanum johnsonianum, Xerothamnella herbacea
11.5.3	Potential habitat for NCA listed species: Sannantha brachypoda
11.8.11	Habitat for threatened plant species including Trioncinia retroflexa and Dichanthium queenslandicum. T. retroflexa is currently known from three small populations.
11.8.5	In southern part of bioregion, habitat for a number of threatened plant species including Picris evae and Thesium australe and near threatened species Digitaria porrecta and Discaria pubescens.
11.9.1	Potential habitat for NCA listed species: Solanum adenophorum, Solanum dissectum, Solanum elachophyllum, Solanum johnsonianum, Xerothamnella herbacea
11.9.5	Habitat for threatened fauna species including Jalmenus eubulus, pale imperial hairstreak butterfly (Eastwood et al. 2008)
non-rem	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the

state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at:

https://publications.qld.gov.au/dataset/redd/resource/

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

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

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	11,853.02	54.61
10a	Dry woodlands to open woodlands dominated by Corymbia citriodora (spotted gum). (land zones 10, 7, 12, 11,[8]) (BRB, NET, [DEU])	363.26	1.67
11a	Moist to dry open forests to woodlands dominated by Eucalyptus orgadophila (mountain coolibah). Some areas dominated by E. tereticornis (blue gum), E. melliodora (yellow box), E. albens (white box), E. crebra (narrow-leaved red ironbark) or E. melanophloia (silver-leaved ironbark). (land zones 8, 11, 4, [3]) (BRB, SEQ, EIU)	26.68	0.12
12a	Dry woodlands to open woodlands dominated by ironbarks such as Eucalyptus decorticans (gum-topped ironbark), E. fibrosa subsp. nubila (blue-leaved ironbark), or E. crebra (narrow-leaved red ironbark) and/or bloodwoods such as Corymbia trachyphloia (yellow bloodwood), C. leichhardtii (rustyjacket), C. watsoniana (Watson's yellow bloodwood), C. lamprophylla, C. peltata (yellowjacket). Occasionally E. thozetiana (mountain yapunyah), E. cloeziana (Gympie messmate) or E. mediocris are dominant. Mostly on sub-coastal/inland hills with shallow soils. (land zones 10, 7, 9) (BRB, DEU, SEQ, GUP)	848.69	3.91
16a	Open forest and woodlands dominated by Eucalyptus camaldulensis (river red gum) (or E. tereticornis (blue gum)) and/or E. coolabah (coolabah) (or E. microtheca (coolabah)) fringing drainage lines. Associated species may include Melaleuca spp., Corymbia tessellaris (carbeen), Angophora spp., Casuarina cunninghamiana (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	779.2	3.59
16c	Woodlands and open woodlands dominated by Eucalyptus coolabah (coolabah) or E. microtheca (coolabah) or E. largiflorens (black box) or E. tereticornis (blue gum) or E. chlorophylla on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	304.16	1.4
17a	Woodlands dominated by Eucalyptus populnea (poplar box) (or E. brownii (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	3,027.85	13.95

BVG (1 Million)	Description	Area (Ha)	% of AOI
24a	Low woodlands to tall shrublands dominated by Acacia spp. on residuals. Species include A. shirleyi (lancewood), A. catenulata (bendee), A. microsperma (bowyakka), A. clivicola, A. sibirica, A. rhodoxylon (rosewood) and A. leptostachya (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	4,096.68	18.88
25a	Open forests to woodlands dominated by Acacia harpophylla (brigalow) sometimes with Casuarina cristata (belah) on heavy clay soils. Includes areas co-dominated with A. cambagei (gidgee) and/or emergent eucalypts (land zones 4, 9, 3, 11, 7, 12, [5, 8]) (BRB, MUL, MGD, DEU, [SEQ])	403.97	1.86
30b	Tussock grasslands dominated by Astrebla spp. (mitchell grass) or Dichanthium spp. (bluegrass) often with Iseilema spp. on undulating downs or clay plains. (land zones 9, 3, 4, 8, [5]) (MGD, CHC, GUP, BRB, [EIU, DEU, NWH])	0.02	less than 0.01

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

4. Technical and BioCondition Benchmark Descriptions

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

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

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

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2012 (PDF)* section 3.3.1 of:

https://publications.qld.gov.au/dataset/redd/resource/

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

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

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

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

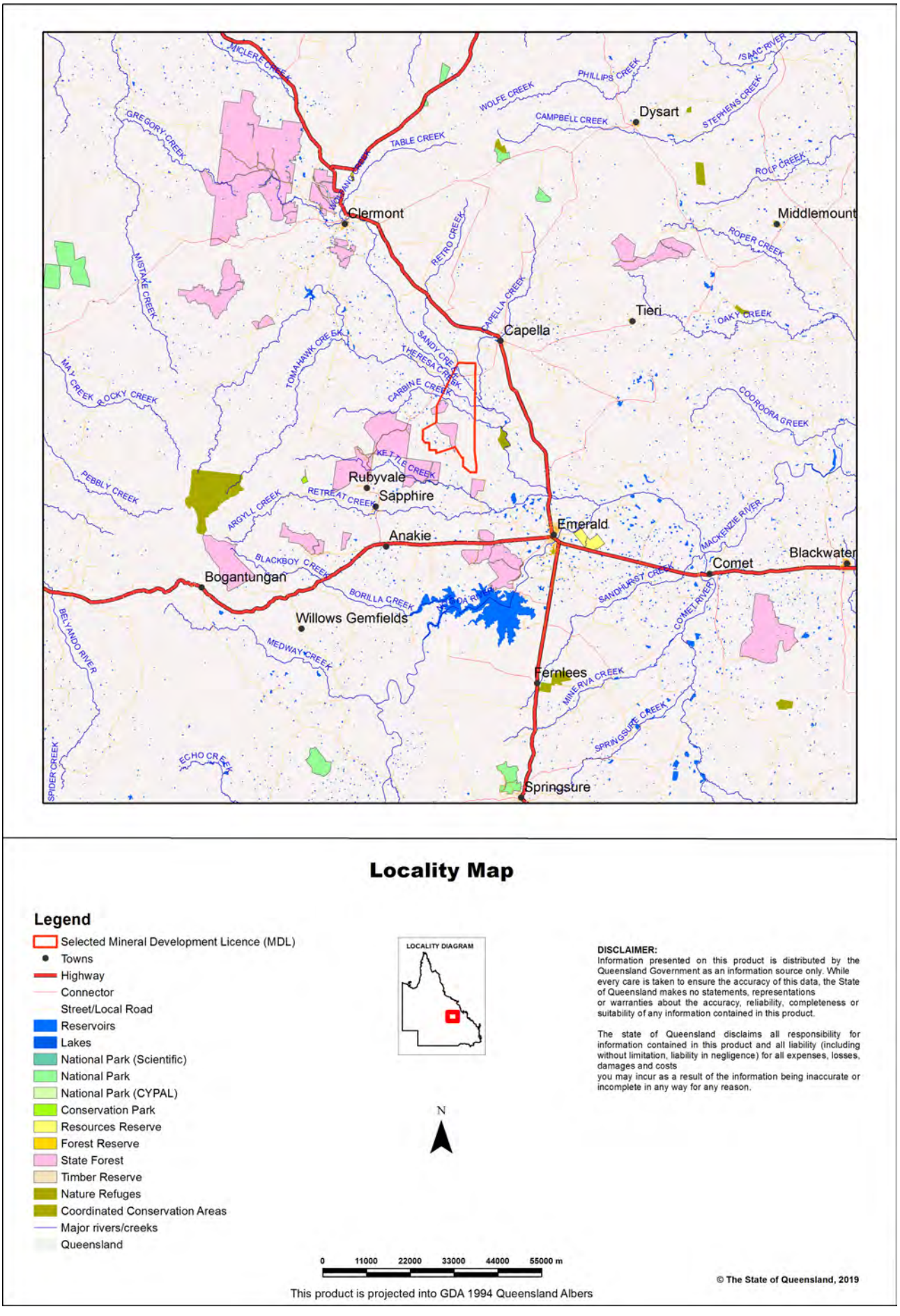
Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.10.1	Available	Not currently available
11.10.12	Available	Not currently available

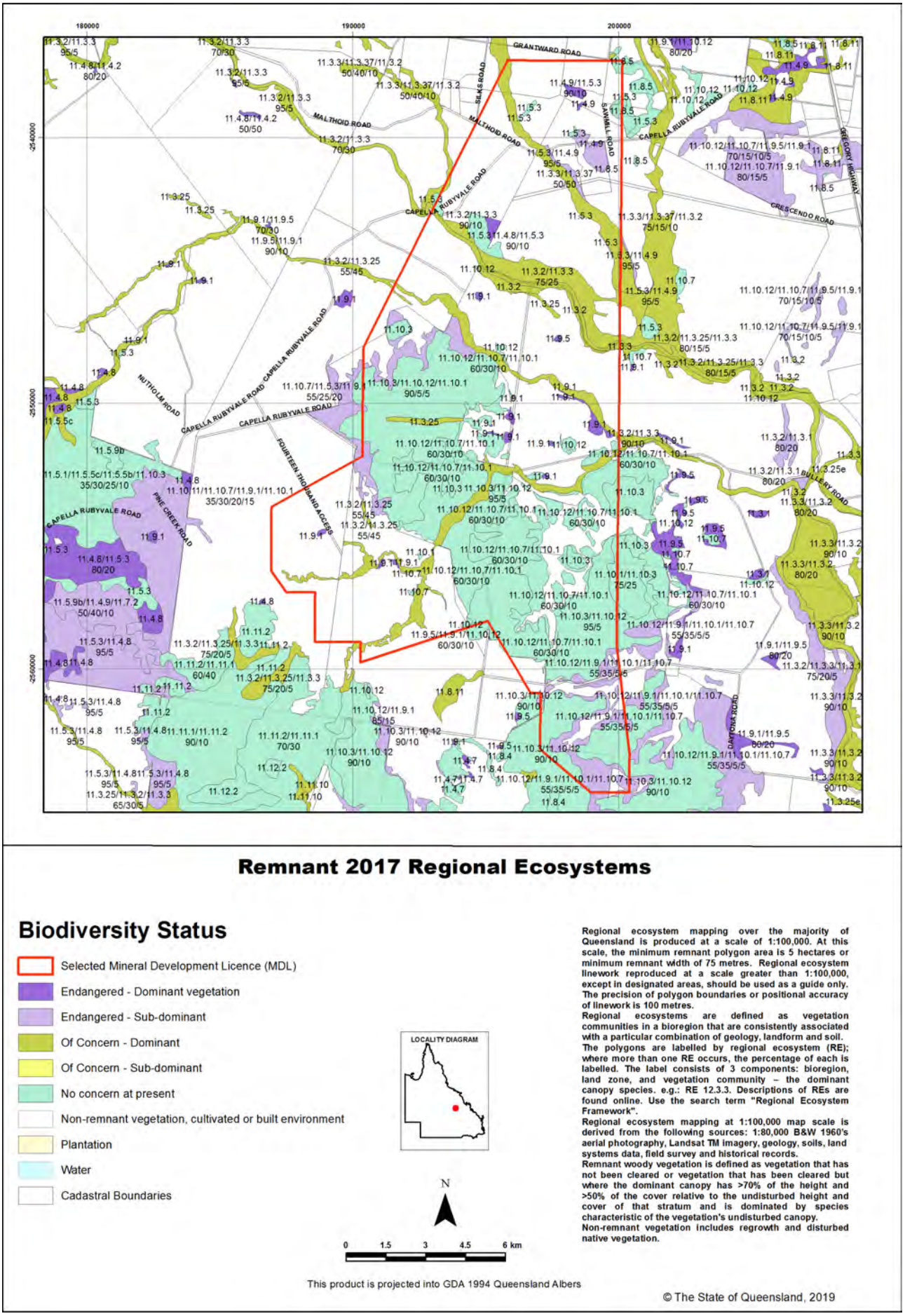
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.10.3	Available	Not currently available
11.10.7	Available	Not currently available
11.3.2	Available	Not currently available
11.3.25	Available	Not currently available
11.3.25e	Not currently available	Not currently available
11.3.3	Available	Not currently available
11.3.37	Available	Not currently available
11.4.8	Available	Not currently available
11.4.9	Available	Not currently available
11.5.3	Available	Not currently available
11.8.11	Available	Not currently available
11.8.5	Available	Not currently available
11.9.1	Available	Not currently available
11.9.5	Available	Not currently available
non-rem	Not currently available	Not currently available

Maps

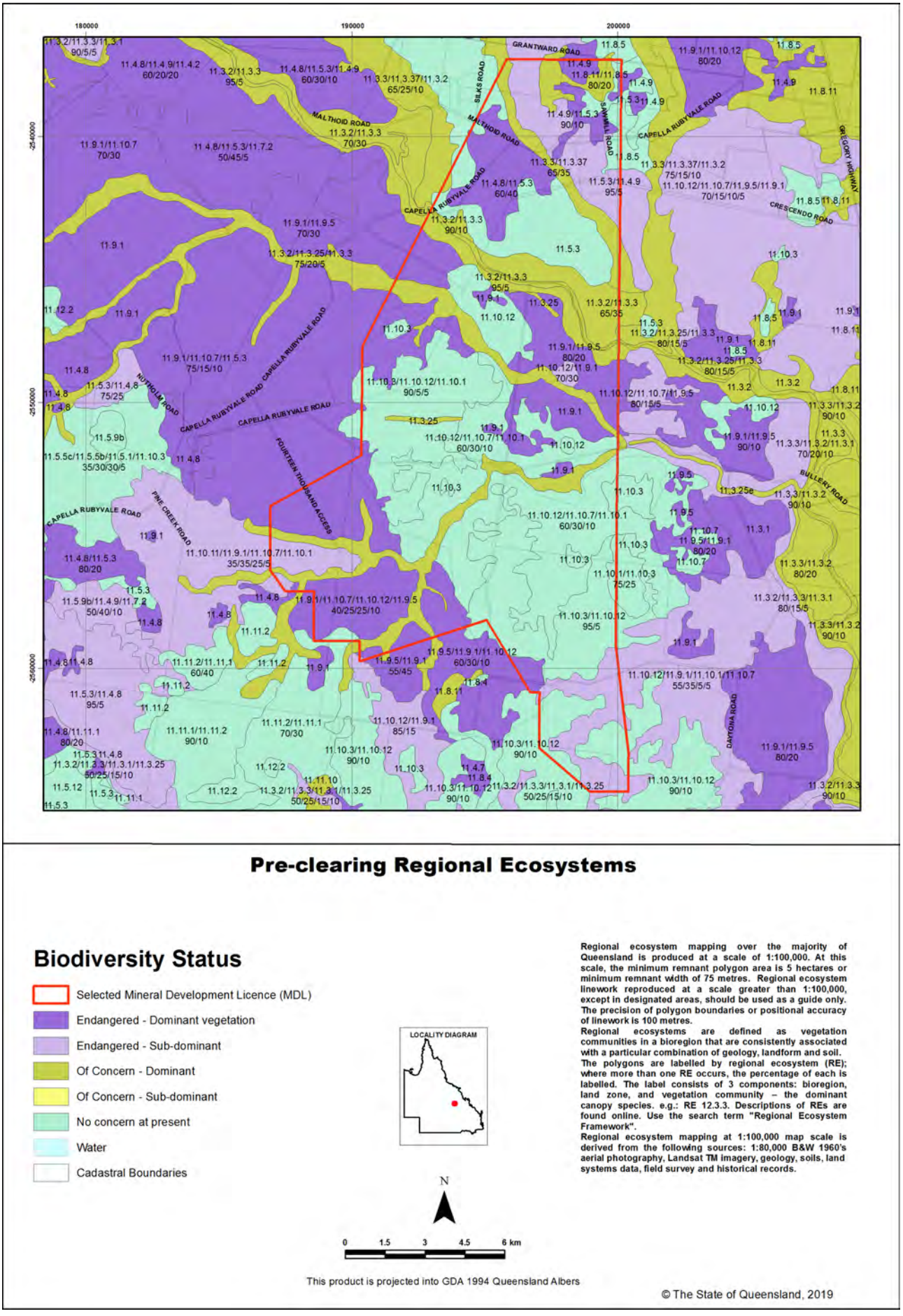
Map 1 - Location



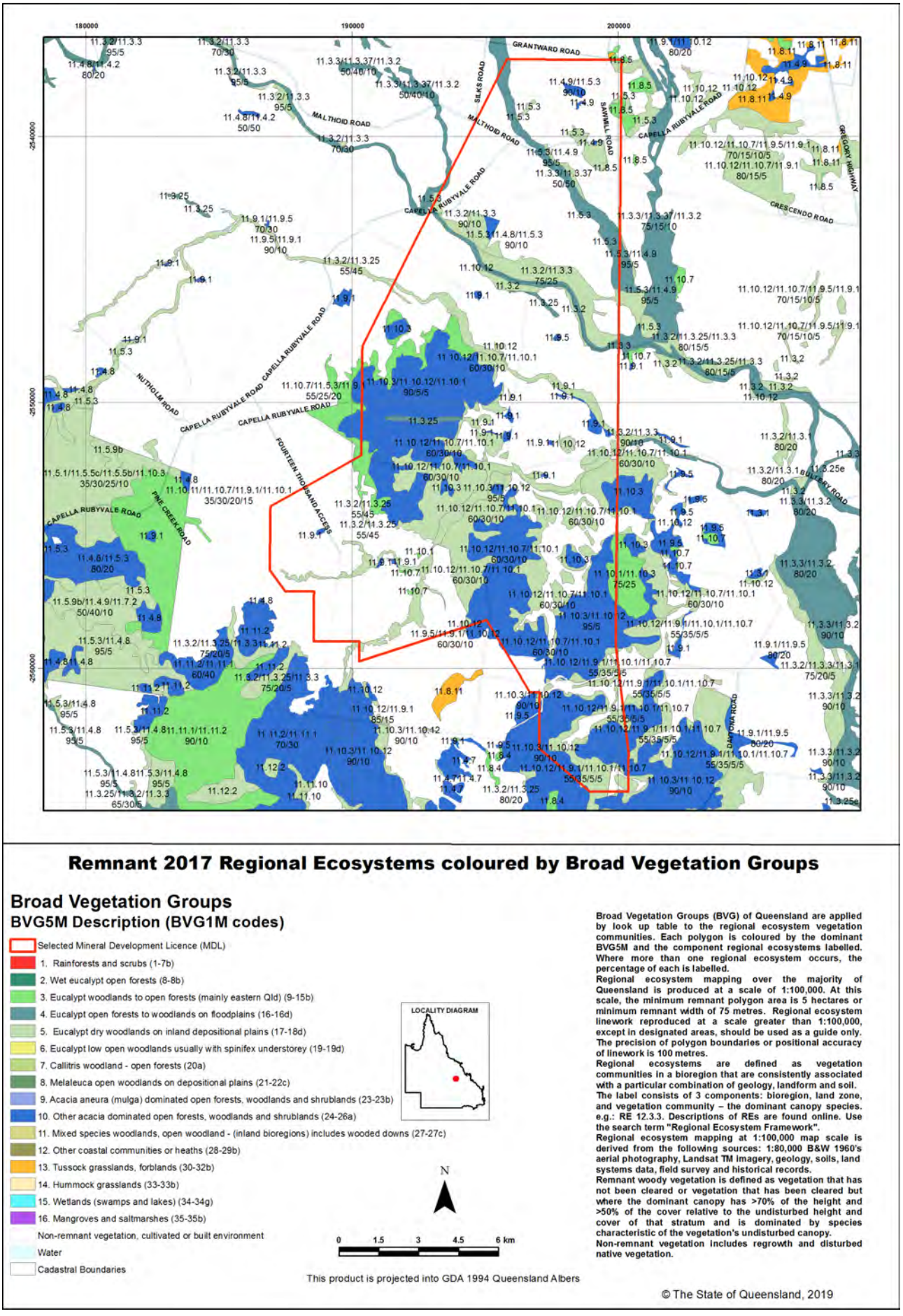
Map 2 - Remnant 2017 regional ecosystems



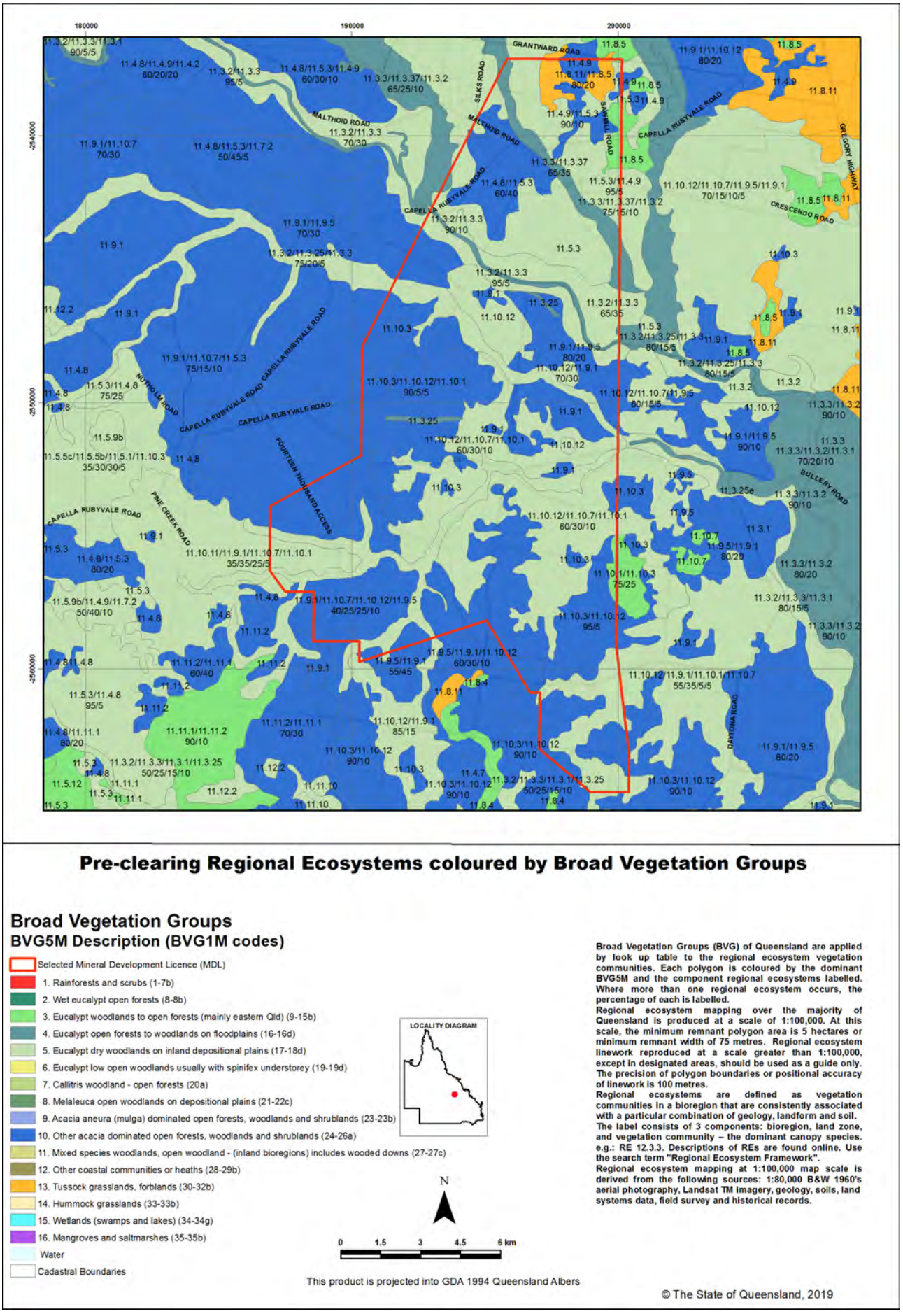
Map 3 - Pre-clearing regional ecosystems



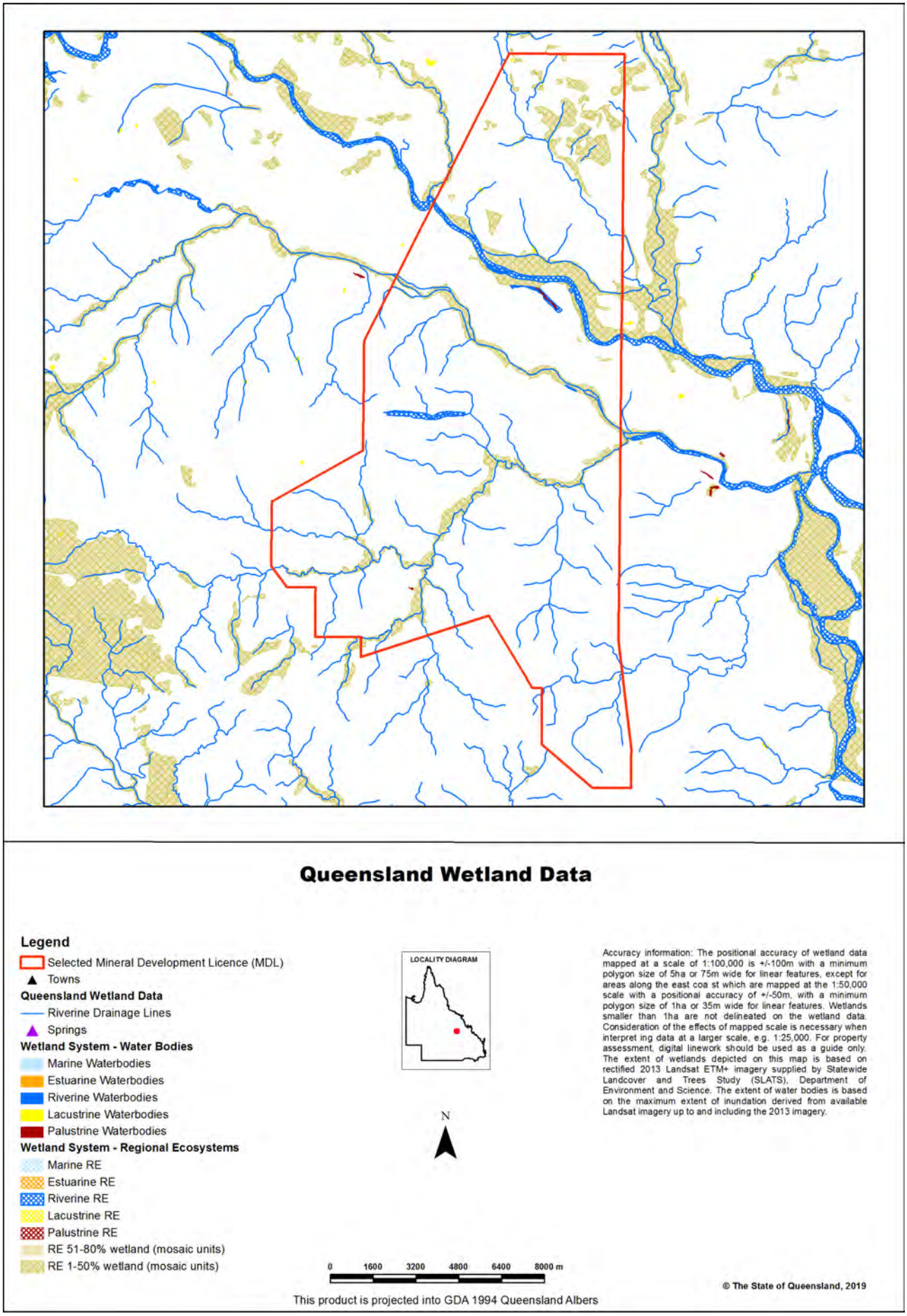
Map 4 - Remnant 2017 regional ecosystems by BVG (5M)



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



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

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

https://publications.qld.gov.au/dataset/redd/resource/

The methodology for mapping regional ecosystems can be downloaded from:

https://publications.qld.gov.au/dataset/redd/resource/

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

http://dds.information.qld.gov.au/dds/

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

http://www.dnrm.qld.gov.au/mapping-data/queensland-globe

References

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F., Ford, A.J. and Accad, A. (2017) The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 3.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

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

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2017) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 4.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

(https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4)

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

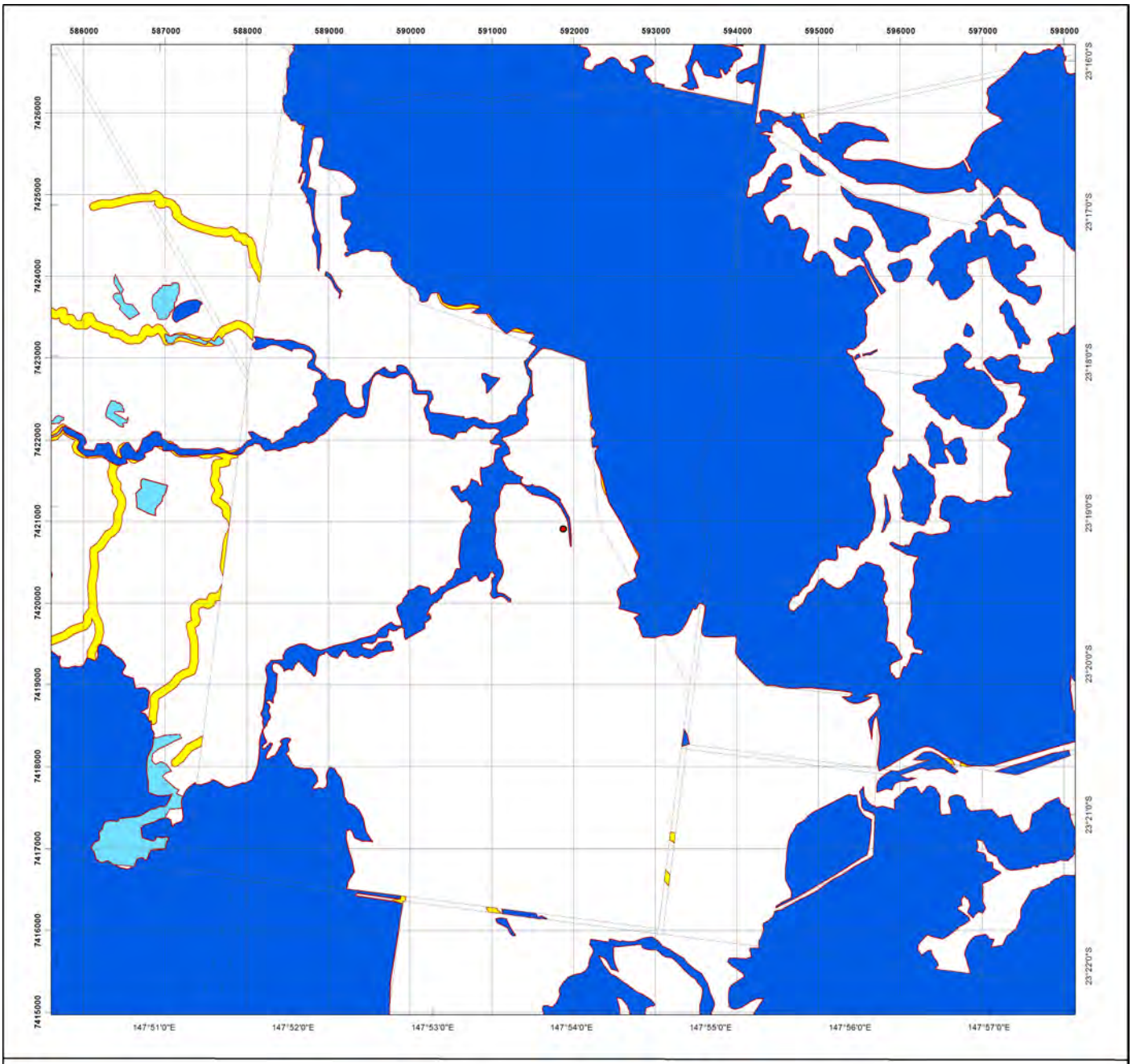
The datasets listed below are available for download from:

http://dds.information.qld.gov.au/dds/

- Biodiversity status of pre-clearing and 2017 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

Appendix 2 - Acronyms and Abbreviations

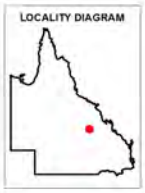
AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- *Vegetation Management Act 1999*

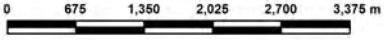


Regulated Vegetation Management Map

Legend

- Coordinates
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Area not categorised
- Cadastral line
- Property boundaries shown are provided as a locational aid only





Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

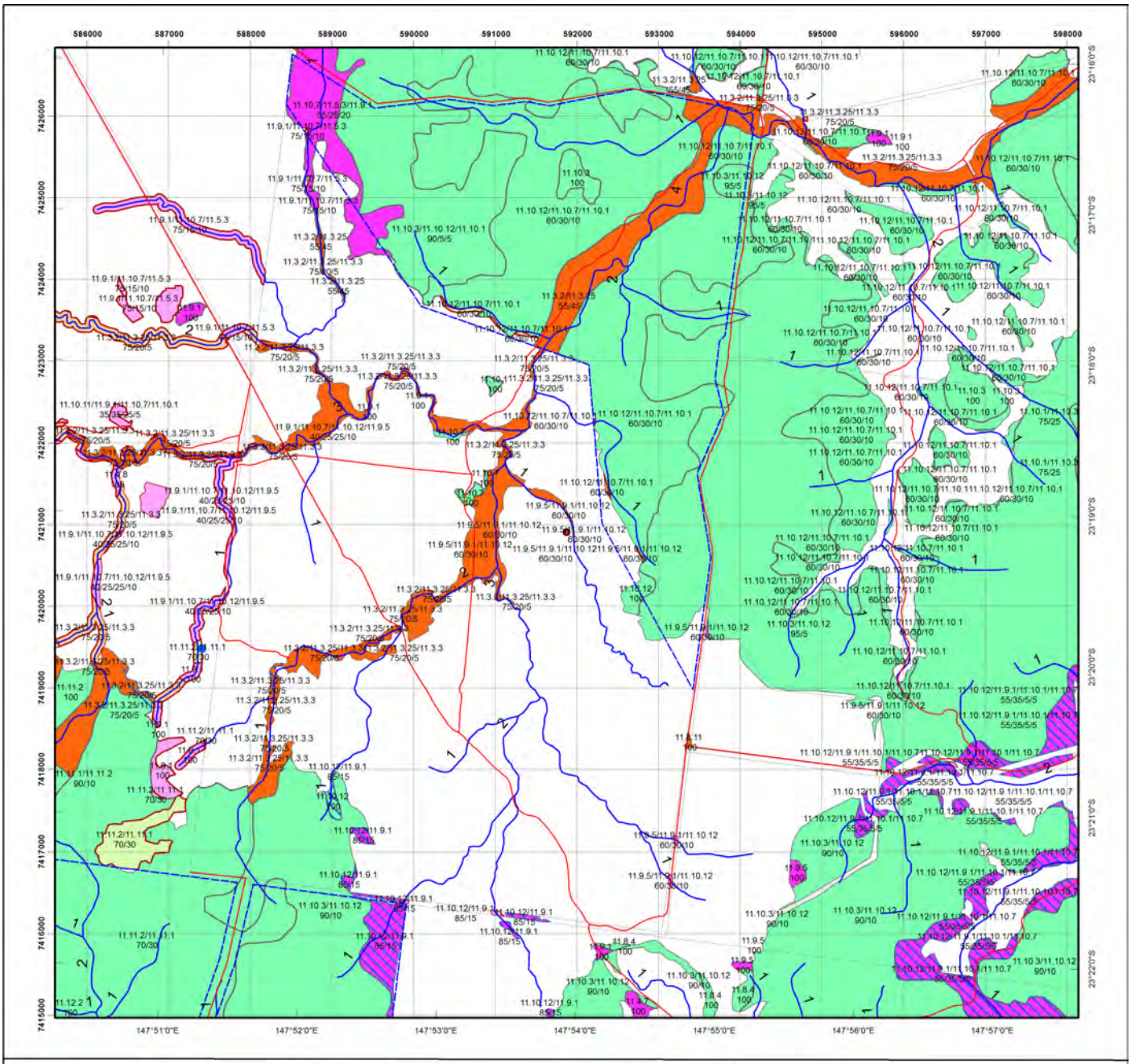
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

Queensland Government

This product is projected into:
GDA 1994 MGA Zone 55



Vegetation Management Supporting Map

Legend

- Coordinates
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
  These areas are edged in yellow and filled with the remnant RE Status
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category C area under Section 20AI
  These areas are edged in purple and filled with the remnant RE Status
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
  (Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Cadastral line
  Property boundaries shown are provided as a locational aid only

Queensland Government

LOCALITY DIAGRAM

N

0 480 960 1,440 1,920 2,400 m

This product is projected into:
GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Vegetation Management Act 1999 - Extract from the essential habitat database

Essential habitat is required for assessment under the:

- State Development Assessment Provisions - State Code 16: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the *Planning Act 2016*; and
- Accepted development vegetation clearing codes made under the *Vegetation Management Act 1999*

Essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s on the accompanying essential habitat map.

This report identifies essential habitat in Category A, B and Category C areas.

The numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

Essential habitat is compiled from a combination of species habitat models and buffered species records.

The Department of Natural Resources, Mines and Energy website (http://www.dnrme.qld.gov.au) has more information on how the layer is applied under the State Development Assessment Provisions - State Code 16: Native vegetation clearing and the *Vegetation Management Act 1999*.

Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

Essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

Protected wildlife includes endangered, vulnerable or near-threatened native wildlife prescribed under the *Nature Conservation Act 1992*.

Essential habitat in Category A and/or Category B and/or Category C

No records

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Status: All
Records: All
Date: Since 1980
Latitude: -23.294
Longitude: 147.899
Distance: 40
Email: Emma.Blacklock@ecoaus.com.au
Date submitted: Tuesday 04 Jun 2019 16:29:39
Date extracted: Tuesday 04 Jun 2019 16:30:01

The number of records retrieved = 825

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		2
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		2
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		8
animals	amphibians	Hylidae	*Cyclorana brevipes*	superb collared frog		C		1
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		4
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		1
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		15/1
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		5
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		4
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		2
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		37
animals	birds	Acanthizidae	*Acanthiza apicalis*	inland thornbill		C		8
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		15
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		24
animals	birds	Acanthizidae	*Chthonicola sagittata*	speckled warbler		C		12
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		36
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		14
animals	birds	Acanthizidae	*Gerygone fusca*	western gerygone		C		9
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		35
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		58
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		3
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		37
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		SL		2
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		4
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		1
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		12
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		5
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		85
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		8
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		11
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		6
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		1
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		30
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		6
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		4
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		10
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		44
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		99
animals	birds	Anatidae	*Aythya australis*	hardhead		C		74
animals	birds	Anatidae	*Anas rhynchotis*	Australasian shoveler		C		7
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		38
animals	birds	Anatidae	*Biziura lobata*	musk duck		C		1
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		66
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		21
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		12
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		10
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		64
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		3
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		47
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		2
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		34
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		54
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		20
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		32
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		16
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		49
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		130
animals	birds	Artamidae	*Artamus minor*	little woodswallow		C		3
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		8
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		145
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		5
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		18
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		55
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		5
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		5
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		126
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		82
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		77
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		2
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		86
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		10
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		11
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		8
animals	birds	Casuariidae	*Dromaius novaehollandiae*	emu		C		21
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		32
animals	birds	Charadriidae	*Vanellus tricolor*	banded lapwing		C		2
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		26
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		18
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		5
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		43
animals	birds	Climacteridae	*Climacteris picumnus*	brown treecreeper		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		125
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	4
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		1
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		58
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		16
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		51
animals	birds	Columbidae	*Geopelia cuneata*	diamond dove		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		19
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		83/1
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		5
animals	birds	Corvidae	*Corvus sp.*					51
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		86
animals	birds	Corvidae	*Corvus bennetti*	little crow		C		5
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		40
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		2
animals	birds	Cuculidae	*Chalcites osculans*	black-eared cuckoo		C		1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		12
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		9
animals	birds	Cuculidae	*Chalcites minutillus*	little bronze-cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		6
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		38/1
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		2
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		3
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		4
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		86
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		22
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		10
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		5
animals	birds	Eurostopodidae	*Eurostopodus argus*	spotted nightjar		C		1
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		34
animals	birds	Falconidae	*Falco subniger*	black falcon		C		15
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		7
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		79
animals	birds	Falconidae	*Falco peregrinus*	peregrine falcon		C		5
animals	birds	Gruidae	*Grus rubicunda*	brolga		C		42
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		17
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		92
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		6
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		11
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		16
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		51
animals	birds	Hirundinidae	*Hirundo rustica*	barn swallow		SL		2
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		20
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		47
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		16
animals	birds	Laridae	*Chlidonias leucopterus*	white-winged black tern		SL		1
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		23
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		28
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		5
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		97
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		60
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		38

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Megaluridae	*Megalurus timoriensis*	tawny grassbird		C		9
animals	birds	Megaluridae	*Cincloramphus mathewsi*	rufous songlark		C		2
animals	birds	Megaluridae	*Megalurus gramineus*	little grassbird		C		2
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		1
animals	birds	Meliphagidae	*Melithreptus brevirostris*	brown-headed honeyeater		C		1
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		37
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		32
animals	birds	Meliphagidae	*Acanthagenys rufogularis*	spiny-cheeked honeyeater		C		46
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		47
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		1
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		35
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		19
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		43
animals	birds	Meliphagidae	*Nesoptilotis leucotis*	white-eared honeyeater		C		1
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		C		1
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		54
animals	birds	Meliphagidae	*Gavicalis virescens*	singing honeyeater		C		45
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		120
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		95
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		5
animals	birds	Meliphagidae	*Sugomel niger*	black honeyeater		C		1
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		2/1
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		1
animals	birds	Meliphagidae	*Ptilotula plumula*	grey-fronted honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		28
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		17
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		16
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		170
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		35
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		51
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		3
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		28
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		25
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		33
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		22
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		71
animals	birds	Pardalotidae	*Pardalotus rubricatus*	red-browed pardalote		C		3
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		79
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		1
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		49
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		6
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		1
animals	birds	Petroicidae	*Melanodryas cucullata*	hooded robin		C		2
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		11
animals	birds	Phaethontidae	*Phaethon rubricauda*	red-tailed tropicbird		V		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		55
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		55
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		43
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		18
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		2
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		24
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		7
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		25
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		3
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		66
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		57
animals	birds	Psittacidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		2
animals	birds	Psittacidae	*Melopsittacus undulatus*	budgerigar		C		2
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		98
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		82
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		3
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		103
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus maculatus*	spotted bowerbird		C		57
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		32
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		50
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		52
animals	birds	Rallidae	*Tribonyx ventralis*	black-tailed native-hen		C		3
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		24
animals	birds	Recurvirostridae	*Recurvirostra novaehollandiae*	red-necked avocet		C		1
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		146
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		4
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		65
animals	birds	Scolopacidae	*Calidris ruficollis*	red-necked stint		SL		1
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		2
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		1
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		2
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		11
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		1
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		20
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		32
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		26
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		2
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		18
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		19
animals	birds	Tytonidae	*Tyto delicatula*	eastern barn owl		C		10
animals	insects	Lycaenidae	*Lampides boeticus*	long-tailed pea-blue				1
animals	insects	Lycaenidae	*Zizina otis labradus*	common grass-blue (Australian subspecies)				2
animals	insects	Nymphalidae	*Junonia villida villida*	meadow argus				3
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				2
animals	insects	Nymphalidae	*Euploea corinna*	common crow				2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Nymphalidae	*Danaus petilia*	lesser wanderer				3
animals	insects	Nymphalidae	*Hypolimnas bolina nerina*	varied eggfly				2
animals	insects	Nymphalidae	*Junonia orithya albicincta*	blue argus				1
animals	insects	Nymphalidae	*Melanitis leda bankia*	evening brown				1
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				3
animals	insects	Papilionidae	*Papilio demoleus sthenelus*	chequered swallowtail				5
animals	insects	Pieridae	*Catopsilia pyranthe crokera*	white migrant				1
animals	insects	Pieridae	*Belenois java teutonia*	caper white				5
animals	insects	Pieridae	*Elodina padusa*	narrow-winged pearl-white				1
animals	insects	Pieridae	*Eurema smilax*	small grass-yellow				3
animals	insects	Pieridae	*Eurema hecabe*	large grass-yellow				1
animals	insects	Pieridae	*Delias argenthona argenthona*	scarlet jezebel				1
animals	insects	Pieridae	*Catopsilia gorgophone gorgophone*	yellow migrant				1
animals	mammals	Dasyuridae	*Sminthopsis macroura*	stripe-faced dunnart		C		1
animals	mammals	Dasyuridae	*Planigale maculata*	common planigale		C		1
animals	mammals	Dasyuridae	*Planigale ingrami*	long-tailed planigale		C		2
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		4
animals	mammals	Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby		C		4
animals	mammals	Macropodidae	*Macropus dorsalis*	black-striped wallaby		C		2
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		3
animals	mammals	Macropodidae	*Macropus robustus*	common wallaroo		C		3
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		11
animals	mammals	Miniopteridae	*Miniopterus schreibersii oceanensis*	eastern bent-wing bat		C		2
animals	mammals	Molossidae	*Tadarida australis*	white-striped freetail bat		C		2
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		2
animals	mammals	Molossidae	*Chaerephon jobensis*	northern freetail bat		C		2
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		2
animals	mammals	Muridae	*Rattus sordidus*	canefield rat		C		6/6
animals	mammals	Muridae	*Leggadina forresti*	Forrest's mouse		C		1
animals	mammals	Muridae	*Pseudomys delicatulus*	delicate mouse		C		1
animals	mammals	Muridae	*Pseudomys desertor*	desert mouse		C		1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		3
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		6
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	6
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		2
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		2
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		2
animals	mammals	Vespertilionidae	*Scotorepens balstoni*	inland broad-nosed bat		C		1
animals	mammals	Vespertilionidae	*Chalinolobus picatus*	little pied bat		C		4
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		3
animals	mammals	Vespertilionidae	*Scotorepens greyii*	little broad-nosed bat		C		2
animals	mammals	Vespertilionidae	*Chalinolobus morio*	chocolate wattled bat		C		2
animals	mammals	Vespertilionidae	*Nyctophilus sp.*					1
animals	mammals	Vespertilionidae	*Vespadelus baverstocki*	inland forest bat		C		2
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	ray-finned fishes	Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead				5
animals	ray-finned fishes	Centropomidae	*Lates calcarifer*	barramundi				1
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				160
animals	ray-finned fishes	Eleotridae	*Hypseleotris species 1*	Midgley's carp gudgeon				1
animals	ray-finned fishes	Eleotridae	*Philypnodon grandiceps*	flathead gudgeon				4
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				8
animals	ray-finned fishes	Eleotridae	*Oxyeleotris lineolata*	sleepy cod				5
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia splendida splendida*	eastern rainbowfish				10
animals	ray-finned fishes	Osteoglossidae	*Scleropages leichardti*	southern saratoga				2
animals	ray-finned fishes	Percichthyidae	*Macquaria ambigua*	golden perch				20
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				10
animals	ray-finned fishes	Plotosidae	*Neosilurus hyrtlii*	Hyrtl's catfish				5
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				13
animals	ray-finned fishes	Terapontidae	*Scortum hillii*	leathery grunter				17
animals	ray-finned fishes	Terapontidae	*Bidyanus bidyanus*	silver perch			CE	1
animals	reptiles	Agamidae	*Diporiphora nobbi*	nobbi		C		1
animals	reptiles	Agamidae	*Tympanocryptis sp.*					21/17
animals	reptiles	Boidae	*Aspidites melanocephalus*	black-headed python		C		2
animals	reptiles	Carphodactylidae	*Nephrurus asper*	spiny knob-tailed gecko		C		1
animals	reptiles	Chelidae	*Wollumbinia latisternum*	saw-shelled turtle		C		1
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		2
animals	reptiles	Colubridae	*Boiga irregularis*	brown tree snake		C		3
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		1
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		3
animals	reptiles	Diplodactylidae	*Strophurus williamsi*	soft-spined gecko		C		3
animals	reptiles	Diplodactylidae	*Diplodactylus platyurus*	eastern fat-tailed gecko		C		1
animals	reptiles	Diplodactylidae	*Nebulifera robusta*	robust velvet gecko		C		2
animals	reptiles	Diplodactylidae	*Oedura monilis*	ocellated velvet gecko		C		1/1
animals	reptiles	Diplodactylidae	*Amalosia rhombifer*	zig-zag gecko		C		1
animals	reptiles	Elapidae	*Brachyurophis australis*	coral snake		C		1
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		3
animals	reptiles	Elapidae	*Demansia vestigiata*	lesser black whipsnake		C		1
animals	reptiles	Elapidae	*Cryptophis boschmai*	Carpentaria whip snake		C		1
animals	reptiles	Elapidae	*Suta suta*	myall snake		C		2
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		11
animals	reptiles	Gekkonidae	*Gehyra catenata*	chain-backed dtella		C		1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		3
animals	reptiles	Pygopodidae	*Pygopus lepidopodus*	common scaly-foot		C		1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		1
animals	reptiles	Pygopodidae	*Paradelma orientalis*	brigalow scaly-foot		C		1
animals	reptiles	Scincidae	*Glaphyromorphus punctulatus*	fine-spotted mulch-skink		C		2
animals	reptiles	Scincidae	*Carlia pectoralis sensu lato*			C		6
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		2
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Scincidae	*Egernia striolata*	tree skink		C		1
animals	reptiles	Scincidae	*Cryptoblepharus pannosus*	ragged snake-eyed skink		C		4/2
animals	reptiles	Scincidae	*Lerista punctatovittata*	eastern robust slider		C		1
animals	reptiles	Scincidae	*Pygmaeascincus timlowi*	dwarf litter-skink		C		4
animals	reptiles	Scincidae	*Anomalopus brevicollis*	short-necked worm-skink		C		4/1
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		4
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		2
animals	reptiles	Scincidae	*Morethia taeniopleura*	fire-tailed skink		C		1
animals	reptiles	Scincidae	*Menetia sp.*					1
animals	reptiles	Scincidae	*Carlia pectoralis*	open-litter rainbow skink		C		4
animals	reptiles	Scincidae	*Lerista fragilis*	eastern mulch slider		C		9
animals	reptiles	Scincidae	*Ctenotus ingrami*	unspotted yellow-sided ctenotus		C		1/1
animals	reptiles	Scincidae	*Lerista allanae*	Allan's lerista		E	E	3
animals	reptiles	Scincidae	*Menetia greyii*	common dwarf skink		C		8
animals	reptiles	Typhlopidae	*Anilios proximus*	proximus blind snake		C		1
animals	reptiles	Varanidae	*Varanus tristis*	black-tailed monitor		C		1
fungi	Agaricomycetes	Agaricaceae	*Chlorophyllum molybdites*	green-spored parasol		C		1/1
fungi	Agaricomycetes	Agaricaceae	*Coprinus*			C		1/1
plants	Equisetopsida	Acanthaceae	*Brunoniella australis*	blue trumpet		C		4
plants	Equisetopsida	Acanthaceae	*Pseuderanthemum variabile*	pastel flower		C		3
plants	Equisetopsida	Acanthaceae	*Rostellularia adscendens*			C		8/1
plants	Equisetopsida	Aizoaceae	*Trianthema triquetra*	red spinach		C		1
plants	Equisetopsida	Amaranthaceae	*Achyranthes aspera*			C		3
plants	Equisetopsida	Amaranthaceae	*Alternanthera*			C		1/1
plants	Equisetopsida	Amaranthaceae	*Gomphrena*			C		2
plants	Equisetopsida	Amaranthaceae	*Alternanthera nana*	hairy joyweed		C		1
plants	Equisetopsida	Amaranthaceae	*Amaranthus mitchellii*	Boggabri weed		C		2/2
plants	Equisetopsida	Amaranthaceae	*Alternanthera nodiflora*	joyweed		C		2/1
plants	Equisetopsida	Amaranthaceae	*Alternanthera denticulata*	lesser joyweed		C		2/2
plants	Equisetopsida	Amaranthaceae	*Amaranthus interruptus*			C		1/1
plants	Equisetopsida	Apiaceae	*Daucus glochidiatus*	Australian carrot		C		1/1
plants	Equisetopsida	Apiaceae	*Platysace valida*			C		1/1
plants	Equisetopsida	Apiaceae	*Centella asiatica*			C		1/1
plants	Equisetopsida	Apocynaceae	*Parsonsia lanceolata*	northern silkpod		C		2/1
plants	Equisetopsida	Apocynaceae	*Marsdenia microlepis*			C		1/1
plants	Equisetopsida	Apocynaceae	*Marsdenia australis*	doubah		C		4
plants	Equisetopsida	Apocynaceae	*Alstonia constricta*	bitterbark		C		4/2
plants	Equisetopsida	Apocynaceae	*Alyxia ruscifolia*			C		2/2
plants	Equisetopsida	Apocynaceae	*Carissa ovata*	currantbush		C		18
plants	Equisetopsida	Apocynaceae	*Marsdenia*			C		1
plants	Equisetopsida	Apocynaceae	*Marsdenia viridiflora subsp. viridiflora*			C		1/1
plants	Equisetopsida	Asteraceae	*Gnaphalium diamantinense*			C		1/1
plants	Equisetopsida	Asteraceae	*Apowollastonia spilanthoides*			C		2/1
plants	Equisetopsida	Asteraceae	*Peripleura hispidula var. setosa*			C		1/1
plants	Equisetopsida	Asteraceae	*Coronidium oxylepis subsp. lanatum*			C		1/1
plants	Equisetopsida	Asteraceae	*Acmella grandiflora var. brachyglossa*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Asteraceae	*Pterocaulon serrulatum var. serrulatum*			C		1/1
plants	Equisetopsida	Asteraceae	*Euchiton sphaericus*			C		2/2
plants	Equisetopsida	Asteraceae	*Calotis squamigera*			C		1/1
plants	Equisetopsida	Asteraceae	*Calotis lappulacea*	yellow burr daisy		C		1/1
plants	Equisetopsida	Asteraceae	*Calotis cuneifolia*	burr daisy		C		2
plants	Equisetopsida	Asteraceae	*Sigesbeckia fugax*			C		1/1
plants	Equisetopsida	Asteraceae	*Pluchea xanthina*			C		1/1
plants	Equisetopsida	Asteraceae	*Pluchea dunlopii*			C		1/1
plants	Equisetopsida	Asteraceae	*Cassinia laevis*			C		1/1
plants	Equisetopsida	Asteraceae	*Calotis cuneata*			C		1/1
plants	Equisetopsida	Asteraceae	*Brachyscome*			C		1
plants	Equisetopsida	Asteraceae	*Ozothamnus cassinioides*			C		2/2
plants	Equisetopsida	Asteraceae	*Trioncinia retroflexa*			E		1/1
plants	Equisetopsida	Asteraceae	*Senecio brigalowensis*			C		5/5
plants	Equisetopsida	Asteraceae	*Leiocarpa brevicompta*			C		1/1
plants	Equisetopsida	Asteraceae	*Cyanthillium cinereum*			C		3/1
plants	Equisetopsida	Asteraceae	*Vittadinia pustulata*			C		1/1
plants	Equisetopsida	Asteraceae	*Minuria integerrima*	smooth minuria		C		1/1
plants	Equisetopsida	Asteraceae	*Podolepis jaceoides*	showy copper-wire daisy		C		2/2
plants	Equisetopsida	Asteraceae	*Rhodanthe polyphylla*			C		1/1
plants	Equisetopsida	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		1/1
plants	Equisetopsida	Blechnaceae	*Doodia caudata*			C		1/1
plants	Equisetopsida	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		4
plants	Equisetopsida	Boraginaceae	*Heliotropium geocharis*			C		1/1
plants	Equisetopsida	Boraginaceae	*Heliotropium cunninghamii*			C		1/1
plants	Equisetopsida	Boraginaceae	*Trichodesma zeylanicum var. latisepaleum*			C		1/1
plants	Equisetopsida	Brassicaceae	*Lepidium sagittulatum*			C		1/1
plants	Equisetopsida	Brassicaceae	*Arabidella procumbens*			C		1/1
plants	Equisetopsida	Bryaceae	*Bryum lanatum*			C		1/1
plants	Equisetopsida	Byttneriaceae	*Waltheria indica*			C		1/1
plants	Equisetopsida	Byttneriaceae	*Hannafordia shanesii*			C		1/1
plants	Equisetopsida	Cactaceae	*Opuntia*			C		5
plants	Equisetopsida	Caesalpiniaceae	*Cassia brewsteri*			C		2
plants	Equisetopsida	Caesalpiniaceae	*Senna gaudichaudii*			C		1/1
plants	Equisetopsida	Caesalpiniaceae	*Senna artemisioides subsp. zygophylla*			C		1
plants	Equisetopsida	Caesalpiniaceae	*Lysiphyllum hookeri*	Queensland ebony		C		5
plants	Equisetopsida	Caesalpiniaceae	*Lysiphyllum carronii*	ebony tree		C		6
plants	Equisetopsida	Campanulaceae	*Wahlenbergia*			C		1
plants	Equisetopsida	Campanulaceae	*Lobelia concolor*			C		1
plants	Equisetopsida	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		1/1
plants	Equisetopsida	Capparaceae	*Capparis loranthifolia*			C		1
plants	Equisetopsida	Capparaceae	*Capparis lasiantha*	nipan		C		8/1
plants	Equisetopsida	Capparaceae	*Capparis arborea*	brush caper berry		C		1
plants	Equisetopsida	Capparaceae	*Capparis*			C		1
plants	Equisetopsida	Capparaceae	*Apophyllum anomalum*	broom bush		C		6
plants	Equisetopsida	Casuarinaceae	*Casuarina cunninghamiana subsp. cunninghamiana*			C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Casuarinaceae	*Casuarina cunninghamiana*			C		1
plants	Equisetopsida	Celastraceae	*Denhamia cunninghamii*			C		1
plants	Equisetopsida	Chenopodiaceae	*Atriplex*			C		3
plants	Equisetopsida	Chenopodiaceae	*Maireana*			C		4
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena*			C		1
plants	Equisetopsida	Chenopodiaceae	*Einadia nutans*			C		5
plants	Equisetopsida	Chenopodiaceae	*Atriplex muelleri*	lagoon saltbush		C		6/3
plants	Equisetopsida	Chenopodiaceae	*Salsola australis*			C		3
plants	Equisetopsida	Chenopodiaceae	*Dysphania carinata*			C		1/1
plants	Equisetopsida	Chenopodiaceae	*Enchylaena tomentosa*			C		2
plants	Equisetopsida	Chenopodiaceae	*Maireana microphylla*			C		3/1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena muricata*			C		2
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena ramulosa*			C		1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena calcarata*	red burr		C		1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena anisacanthoides*	yellow burr		C		1
plants	Equisetopsida	Chenopodiaceae	*Einadia nutans subsp. nutans*			C		1/1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena bicornis var. horrida*			C		1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena muricata var. villosa*			C		1/1
plants	Equisetopsida	Chenopodiaceae	*Sclerolaena muricata var. muricata*			C		2/2
plants	Equisetopsida	Combretaceae	*Terminalia oblongata*			C		5
plants	Equisetopsida	Combretaceae	*Terminalia oblongata subsp. oblongata*			C		8/2
plants	Equisetopsida	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		2/2
plants	Equisetopsida	Commelinaceae	*Commelina diffusa*	wandering jew		C		4
plants	Equisetopsida	Commelinaceae	*Commelina*			C		1
plants	Equisetopsida	Convolvulaceae	*Evolvulus alsinoides*			C		7
plants	Equisetopsida	Convolvulaceae	*Ipomoea racemigera*			C		1/1
plants	Equisetopsida	Convolvulaceae	*Polymeria pusilla*			C		4/4
plants	Equisetopsida	Convolvulaceae	*Ipomoea brownii*			C		1/1
plants	Equisetopsida	Convolvulaceae	*Bonamia media*			C		1
plants	Equisetopsida	Convolvulaceae	*Ipomoea lonchophylla*			C		4/4
plants	Equisetopsida	Convolvulaceae	*Polymeria longifolia*	polymeria		C		3/2
plants	Equisetopsida	Convolvulaceae	*Jacquemontia paniculata*			C		1/1
plants	Equisetopsida	Convolvulaceae	*Evolvulus alsinoides var. villosicalyx*			C		1
plants	Equisetopsida	Convolvulaceae	*Evolvulus alsinoides var. decumbens*			C		1/1
plants	Equisetopsida	Convolvulaceae	*Convolvulus graminetinus*			C		3/3
plants	Equisetopsida	Cucurbitaceae	*Cucumis melo*			C		2
plants	Equisetopsida	Cucurbitaceae	*Diplocyclos palmatus*			C		1
plants	Equisetopsida	Cucurbitaceae	*Cucumis picrocarpus*			C		1/1
plants	Equisetopsida	Cupressaceae	*Callitris*			C		1
plants	Equisetopsida	Cupressaceae	*Callitris glaucophylla*	white cypress pine		C		1
plants	Equisetopsida	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		1
plants	Equisetopsida	Cyperaceae	*Scleria mackaviensis*			C		2/2
plants	Equisetopsida	Cyperaceae	*Schoenus subaphyllus*			C		1/1
plants	Equisetopsida	Cyperaceae	*Eleocharis blakeana*			C		1
plants	Equisetopsida	Cyperaceae	*Scleria sphacelata*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus rigidellus*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Cyperaceae	*Cyperus leiocaulon*			C		1/1
plants	Equisetopsida	Cyperaceae	*Abildgaardia ovata*			C		2/1
plants	Equisetopsida	Cyperaceae	*Cyperus javanicus*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus difformis*	rice sedge		C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus concinnus*			C		2/2
plants	Equisetopsida	Cyperaceae	*Cyperus pygmaeus*	dwarf sedge		C		2/2
plants	Equisetopsida	Cyperaceae	*Cyperus gracilis*			C		11
plants	Equisetopsida	Cyperaceae	*Schoenus kennyi*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus gilesii*			C		5/5
plants	Equisetopsida	Cyperaceae	*Cyperus distans*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus fulvus*			C		3/2
plants	Equisetopsida	Cyperaceae	*Cyperus clarus*			V		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus bifax*	western nutgrass		C		1/1
plants	Equisetopsida	Cyperaceae	*Fimbristylis*			C		2
plants	Equisetopsida	Cyperaceae	*Cyperus*			C		3
plants	Equisetopsida	Cyperaceae	*Cyperus iria*			C		3/1
plants	Equisetopsida	Ebenaceae	*Diospyros humilis*	small-leaved ebony		C		1/1
plants	Equisetopsida	Ericaceae	*Melichrus*			C		1
plants	Equisetopsida	Erythroxylaceae	*Erythroxylum australe*	cocaine tree		C		8/1
plants	Equisetopsida	Euphorbiaceae	*Ricinocarpos ledifolius*	scrub wedding bush		C		1/1
plants	Equisetopsida	Euphorbiaceae	*Adriana tomentosa var. tomentosa*			C		6/6
plants	Equisetopsida	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		1
plants	Equisetopsida	Euphorbiaceae	*Euphorbia papillifolia var. papillifolia*			C		1/1
plants	Equisetopsida	Euphorbiaceae	*Euphorbia coghlanii*			C		2/2
plants	Equisetopsida	Euphorbiaceae	*Bertya opponens*			C	V	1/1
plants	Equisetopsida	Euphorbiaceae	*Euphorbia*			C		4
plants	Equisetopsida	Euphorbiaceae	*Euphorbia drummondii*			C		3
plants	Equisetopsida	Fabaceae	*Vigna*			C		1/1
plants	Equisetopsida	Fabaceae	*Crotalaria dissitiflora subsp. dissitiflora*			C		1/1
plants	Equisetopsida	Fabaceae	*Swainsona*			C		1/1
plants	Equisetopsida	Fabaceae	*Indigofera*			C		3
plants	Equisetopsida	Fabaceae	*Glycine falcata*			C		4/3
plants	Equisetopsida	Fabaceae	*Lotus australis*	Australian trefoil		C		1/1
plants	Equisetopsida	Fabaceae	*Vigna suberecta*			C		1/1
plants	Equisetopsida	Fabaceae	*Desmodium gunnii*			C		1/1
plants	Equisetopsida	Fabaceae	*Glycine tabacina*	glycine pea		C		1
plants	Equisetopsida	Fabaceae	*Hovea parvicalyx*			C		3/3
plants	Equisetopsida	Fabaceae	*Desmodium varians*	slender tick trefoil		C		1
plants	Equisetopsida	Fabaceae	*Glycine latifolia*			C		7/7
plants	Equisetopsida	Fabaceae	*Rhynchosia minima*			C		2
plants	Equisetopsida	Fabaceae	*Zornia muriculata*			C		1
plants	Equisetopsida	Fabaceae	*Glycine tomentella*	woolly glycine		C		1/1
plants	Equisetopsida	Fabaceae	*Indigofera colutea*	sticky indigo		C		1
plants	Equisetopsida	Fabaceae	*Indigofera hirsuta*	hairy indigo		C		1/1
plants	Equisetopsida	Fabaceae	*Indigofera linnaei*	Birdsville indigo		C		2
plants	Equisetopsida	Fabaceae	*Aeschynomene indica*	budda pea		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Fabaceae	*Galactia tenuiflora*			C		1
plants	Equisetopsida	Fabaceae	*Alysicarpus muelleri*			C		3/3
plants	Equisetopsida	Fabaceae	*Cullen australasicum*			C		1/1
plants	Equisetopsida	Fabaceae	*Indigofera linifolia*			C		4/2
plants	Equisetopsida	Fabaceae	*Indigofera pratensis*			C		2/2
plants	Equisetopsida	Fabaceae	*Desmodium brachypodum*	large ticktrefoil		C		1/1
plants	Equisetopsida	Fabaceae	*Desmodium campylocaulon*			C		2/2
plants	Equisetopsida	Fabaceae	*Indigofera queenslandica*			C		2/2
plants	Equisetopsida	Fabaceae	*Aphyllodium biarticulatum*			C		1
plants	Equisetopsida	Fabaceae	*Rhynchosia minima var. minima*			C		1/1
plants	Equisetopsida	Fabaceae	*Galactia tenuiflora var. lucida*			C		1/1
plants	Equisetopsida	Fabaceae	*Rhynchosia minima var. australis*			C		1/1
plants	Equisetopsida	Fabaceae	*Tephrosia filipes subsp. filipes*			C		1/1
plants	Equisetopsida	Fabaceae	*Sesbania cannabina var. cannabina*			C		3/1
plants	Equisetopsida	Fabaceae	*Zornia muelleriana subsp. muelleriana*			C		1/1
plants	Equisetopsida	Fabaceae	*Glycine*			C		1/1
plants	Equisetopsida	Goodeniaceae	*Scaevola humilis*			C		1/1
plants	Equisetopsida	Goodeniaceae	*Brunonia australis*	blue pincushion		C		1
plants	Equisetopsida	Goodeniaceae	*Goodenia sp. (Mt Castletower M.D.Crisp 2753)*			C		1/1
plants	Equisetopsida	Goodeniaceae	*Goodenia rotundifolia*			C		2
plants	Equisetopsida	Goodeniaceae	*Goodenia paniculata*			C		1/1
plants	Equisetopsida	Haloragaceae	*Haloragis stricta*			C		1/1
plants	Equisetopsida	Haloragaceae	*Haloragis aspera*	raspweed		C		1/1
plants	Equisetopsida	Haloragaceae	*Gonocarpus elatus*			C		2/2
plants	Equisetopsida	Hemerocallidaceae	*Dianella caerulea var. vannata*			C		1/1
plants	Equisetopsida	Hemerocallidaceae	*Dianella caerulea*			C		2
plants	Equisetopsida	Hydrocharitaceae	*Vallisneria nana*			C		2/2
plants	Equisetopsida	Hypoxidaceae	*Hypoxis hygrometrica var. villosisepala*			C		1/1
plants	Equisetopsida	Hypoxidaceae	*Hypoxis pratensis var. pratensis*			C		1/1
plants	Equisetopsida	Lamiaceae	*Clerodendrum floribundum*			C		1/1
plants	Equisetopsida	Lamiaceae	*Teucrium integrifolium*			C		2/2
plants	Equisetopsida	Lamiaceae	*Teucrium junceum*			C		1/1
plants	Equisetopsida	Lamiaceae	*Basilicum polystachyon*			C		4/3
plants	Equisetopsida	Laxmanniaceae	*Lomandra longifolia*			C		2
plants	Equisetopsida	Laxmanniaceae	*Lomandra hystrix*			C		3
plants	Equisetopsida	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		3
plants	Equisetopsida	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		2/2
plants	Equisetopsida	Loranthaceae	*Amyema quandang var. quandang*			C		2/1
plants	Equisetopsida	Loranthaceae	*Dendrophthoe homoplastica*			C		2/2
plants	Equisetopsida	Loranthaceae	*Dendrophthoe glabrescens*			C		1
plants	Equisetopsida	Loranthaceae	*Amyema miquelii*			C		1/1
plants	Equisetopsida	Loranthaceae	*Lysiana subfalcata*			C		1/1
plants	Equisetopsida	Lythraceae	*Lythrum paradoxum*			C		1/1
plants	Equisetopsida	Malvaceae	*Malvastrum americanum var. stellatum*			C		1/1
plants	Equisetopsida	Malvaceae	*Abutilon oxycarpum var. oxycarpum*			C		2/2
plants	Equisetopsida	Malvaceae	*Sida*			C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Malvaceae	*Abutilon*			C		1
plants	Equisetopsida	Malvaceae	*Hibiscus*			C		2/1
plants	Equisetopsida	Malvaceae	*Malvaceae*			C		1/1
plants	Equisetopsida	Malvaceae	*Malvastrum*			C		1
plants	Equisetopsida	Malvaceae	*Sida pleiantha*			C		3/3
plants	Equisetopsida	Malvaceae	*Abutilon nobile*			C		3/3
plants	Equisetopsida	Malvaceae	*Sida trichopoda*			C		1
plants	Equisetopsida	Malvaceae	*Hibiscus sturtii*			C		3
plants	Equisetopsida	Malvaceae	*Sida atherophora*			C		1/1
plants	Equisetopsida	Malvaceae	*Sida hackettiana*			C		1
plants	Equisetopsida	Malvaceae	*Abutilon oxycarpum*			C		4
plants	Equisetopsida	Malvaceae	*Gossypium australe*			C		1/1
plants	Equisetopsida	Malvaceae	*Abutilon malvifolium*	bastard marshmallow		C		1/1
plants	Equisetopsida	Malvaceae	*Gossypium sturtianum*			C		2/2
plants	Equisetopsida	Malvaceae	*Hibiscus meraukensis*	Merauke hibiscus		C		1
plants	Equisetopsida	Malvaceae	*Hibiscus verdcourtii*			C		3/3
plants	Equisetopsida	Malvaceae	*Abelmoschus ficulneus*	native rosella		C		3/3
plants	Equisetopsida	Malvaceae	*Abutilon calliphyllum*	velvet lanternflower		C		1
plants	Equisetopsida	Malvaceae	*Hibiscus krichauffianus*			C		2
plants	Equisetopsida	Malvaceae	*Abutilon oxycarpum var. incanum*			C		1/1
plants	Equisetopsida	Malvaceae	*Sida sp. (Musselbrook M.B.Thomas+ MRS437)*			C		1
plants	Equisetopsida	Marsileaceae	*Marsilea mutica*	shiny nardoo		C		1/1
plants	Equisetopsida	Marsileaceae	*Marsilea drummondii*	common nardoo		C		1
plants	Equisetopsida	Meliaceae	*Owenia acidula*	emu apple		C		1/1
plants	Equisetopsida	Meliaceae	*Turraea pubescens*	native honeysuckle		C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia melvillei*			C		3/3
plants	Equisetopsida	Mimosaceae	*Acacia harpophylla*	brigalow		C		11
plants	Equisetopsida	Mimosaceae	*Acacia holosericea*			C		2
plants	Equisetopsida	Mimosaceae	*Acacia omalophylla*			C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia stenophylla*	belalie		C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia leptostachya*	Townsville wattle		C		2/1
plants	Equisetopsida	Mimosaceae	*Acacia longispicata*			C		5/5
plants	Equisetopsida	Mimosaceae	*Acacia bancroftiorum*			C		3/2
plants	Equisetopsida	Mimosaceae	*Neptunia dimorphantha*			C		1
plants	Equisetopsida	Mimosaceae	*Archidendropsis basaltica*	red lancewood		C		3
plants	Equisetopsida	Mimosaceae	*Archidendropsis thozetiana*			C		2/2
plants	Equisetopsida	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		2/2
plants	Equisetopsida	Mimosaceae	*Acacia julifera subsp. curvinervia*			C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia*			C		4/1
plants	Equisetopsida	Mimosaceae	*Acacia excelsa*			C		2
plants	Equisetopsida	Mimosaceae	*Acacia pendula*	myall		C		2/2
plants	Equisetopsida	Mimosaceae	*Acacia oswaldii*	miljee		C		2/2
plants	Equisetopsida	Mimosaceae	*Acacia salicina*	doolan		C		6/1
plants	Equisetopsida	Mimosaceae	*Acacia shirleyi*	lancewood		C		3
plants	Equisetopsida	Mimosaceae	*Albizia lebbeck*	Indian siris		C		1/1
plants	Equisetopsida	Moraceae	*Ficus opposita*			C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Moraceae	*Ficus coronata*	creek sandpaper fig		C		2
plants	Equisetopsida	Moraceae	*Ficus rubiginosa forma rubiginosa*			C		2/2
plants	Equisetopsida	Moraceae	*Ficus virens var. virens*			C		2/2
plants	Equisetopsida	Myrtaceae	*Corymbia citriodora*	spotted gum		C		3
plants	Equisetopsida	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	Equisetopsida	Myrtaceae	*Corymbia terminalis*			C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus coolabah*	coolabah		C		5
plants	Equisetopsida	Myrtaceae	*Eucalyptus populnea*	poplar box		C		5
plants	Equisetopsida	Myrtaceae	*Eucalyptus tenuipes*	narrow-leaved white mahogany		C		2/2
plants	Equisetopsida	Myrtaceae	*Melaleuca bracteata*			C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		2
plants	Equisetopsida	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		4
plants	Equisetopsida	Myrtaceae	*Corymbia clarksoniana*			C		1
plants	Equisetopsida	Myrtaceae	*Corymbia lamprophylla*			C		1
plants	Equisetopsida	Myrtaceae	*Corymbia trachyphloia*			C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus cambageana*	Dawson gum		C		5
plants	Equisetopsida	Myrtaceae	*Eucalyptus thozetiana*			C		1
plants	Equisetopsida	Myrtaceae	*Melaleuca tamariscina*			C		1/1
plants	Equisetopsida	Myrtaceae	*Corymbia erythrophloia*	variable-barked bloodwood		C		4/1
plants	Equisetopsida	Myrtaceae	*Eucalyptus melanophloia*			C		11
plants	Equisetopsida	Myrtaceae	*Leptospermum lamellatum*			C		1/1
plants	Equisetopsida	Myrtaceae	*Melaleuca trichostachya*			C		3
plants	Equisetopsida	Myrtaceae	*Eucalyptus camaldulensis*			C		1
plants	Equisetopsida	Myrtaceae	*Corymbia citriodora subsp. citriodora*			C		1/1
plants	Equisetopsida	Myrtaceae	*Corymbia trachyphloia subsp. trachyphloia*			C		1
plants	Equisetopsida	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus exserta*	Queensland peppermint		C		1/1
plants	Equisetopsida	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		6
plants	Equisetopsida	Myrtaceae	*Asteromyrtus*			C		1
plants	Equisetopsida	Myrtaceae	*Corymbia dallachiana*			C		6/1
plants	Equisetopsida	Nyctaginaceae	*Boerhavia dominii*			C		4/2
plants	Equisetopsida	Nyctaginaceae	*Boerhavia pubescens*			C		2/2
plants	Equisetopsida	Nyctaginaceae	*Boerhavia repleta*			C		3
plants	Equisetopsida	Olacaceae	*Ximenia americana*			C		1/1
plants	Equisetopsida	Oleaceae	*Notelaea microcarpa*			C		3/3
plants	Equisetopsida	Oleaceae	*Jasminum didymum subsp. lineare*			C		1/1
plants	Equisetopsida	Oleaceae	*Jasminum simplicifolium subsp. australiense*			C		1/1
plants	Equisetopsida	Oleaceae	*Jasminum didymum*			C		2
plants	Equisetopsida	Onagraceae	*Ludwigia*			C		1/1
plants	Equisetopsida	Onagraceae	*Ludwigia peploides subsp. montevidensis*			C		1/1
plants	Equisetopsida	Orchidaceae	*Cymbidium canaliculatum*			C		2
plants	Equisetopsida	Oxalidaceae	*Oxalis*			C		1/1
plants	Equisetopsida	Pedaliaceae	*Josephinia eugeniae*	josephinia burr		C		2/2
plants	Equisetopsida	Pentapetaceae	*Melhania oblongifolia*			C		4/1
plants	Equisetopsida	Pentapetaceae	*Melhania ovata*			C		1
plants	Equisetopsida	Phrymaceae	*Mimulus gracilis*	slender monkey flower		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Phyllanthaceae	*Bridelia leichhardtii*			C		1/1
plants	Equisetopsida	Phyllanthaceae	*Phyllanthus virgatus*			C		1
plants	Equisetopsida	Phyllanthaceae	*Breynia oblongifolia*			C		1/1
plants	Equisetopsida	Phyllanthaceae	*Flueggea leucopyrus*			C		1/1
plants	Equisetopsida	Phyllanthaceae	*Notoleptopus decaisnei*			C		2/2
plants	Equisetopsida	Phyllanthaceae	*Phyllanthus maderaspatensis var. maderaspatensis*			C		4
plants	Equisetopsida	Phyllanthaceae	*Phyllanthus maderaspatensis*			C		3/3
plants	Equisetopsida	Phyllanthaceae	*Phyllanthus carpentariae*			C		1/1
plants	Equisetopsida	Phyllanthaceae	*Phyllanthus lacunarius*			C		1/1
plants	Equisetopsida	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		7/1
plants	Equisetopsida	Pittosporaceae	*Bursaria incana*			C		3/1
plants	Equisetopsida	Plantaginaceae	*Stemodia pubescens*			C		2/2
plants	Equisetopsida	Plumbaginaceae	*Plumbago zeylanica*	native plumbago		C		2
plants	Equisetopsida	Poaceae	*Ancistrachne uncinulata*	hooky grass		C		1/1
plants	Equisetopsida	Poaceae	*Dactyloctenium radulans*	button grass		C		2
plants	Equisetopsida	Poaceae	*Enneapogon purpurascens*			C		1/1
plants	Equisetopsida	Poaceae	*Eragrostis megalosperma*			C		2/2
plants	Equisetopsida	Poaceae	*Paspalidium caespitosum*	brigalow grass		C		5
plants	Equisetopsida	Poaceae	*Paspalidium constrictum*			C		2/1
plants	Equisetopsida	Poaceae	*Sporobolus actinocladus*	katoora grass		C		3/1
plants	Equisetopsida	Poaceae	*Capillipedium spicigerum*	spicytop		C		1/1
plants	Equisetopsida	Poaceae	*Enneapogon robustissimus*			C		2/2
plants	Equisetopsida	Poaceae	*Panicum buncei*			C		4/2
plants	Equisetopsida	Poaceae	*Aristida ramosa*	purple wiregrass		C		1/1
plants	Equisetopsida	Poaceae	*Eriachne obtusa*			C		1
plants	Equisetopsida	Poaceae	*Panicum effusum*			C		1
plants	Equisetopsida	Poaceae	*Setaria surgens*			C		1/1
plants	Equisetopsida	Poaceae	*Digitaria orbata*			C		2/2
plants	Equisetopsida	Poaceae	*Dinebra ligulata*			C		1/1
plants	Equisetopsida	Poaceae	*Eriochloa crebra*	spring grass		C		2/2
plants	Equisetopsida	Poaceae	*Themeda triandra*	kangaroo grass		C		4
plants	Equisetopsida	Poaceae	*Triraphis mollis*	purple plumegrass		C		1/1
plants	Equisetopsida	Poaceae	*Urochloa gilesii*			C		1
plants	Equisetopsida	Poaceae	*Urochloa reptans*			C		1/1
plants	Equisetopsida	Poaceae	*Aristida calycina*			C		3
plants	Equisetopsida	Poaceae	*Astrebla lappacea*	curly mitchell grass		C		3/3
plants	Equisetopsida	Poaceae	*Chloris pectinata*	comb chloris		C		1
plants	Equisetopsida	Poaceae	*Digitaria brownii*			C		4/4
plants	Equisetopsida	Poaceae	*Enneapogon virens*			C		2/2
plants	Equisetopsida	Poaceae	*Eriochloa procera*	slender cupgrass		C		4/2
plants	Equisetopsida	Poaceae	*Sporobolus caroli*	fairy grass		C		7
plants	Equisetopsida	Poaceae	*Thellungia advena*	coolibah grass		C		2/1
plants	Equisetopsida	Poaceae	*Aristida latifolia*	feathertop wiregrass		C		3/1
plants	Equisetopsida	Poaceae	*Aristida lazaridis*			C		3/1
plants	Equisetopsida	Poaceae	*Aristida leptopoda*	white speargrass		C		1
plants	Equisetopsida	Poaceae	*Aristida personata*			C		2/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Poaceae	*Astrebla squarrosa*	bull mitchell grass		C		1
plants	Equisetopsida	Poaceae	*Chloris ventricosa*	tall chloris		C		2
plants	Equisetopsida	Poaceae	*Chrysopogon fallax*			C		10
plants	Equisetopsida	Poaceae	*Eragrostis sororia*			C		1/1
plants	Equisetopsida	Poaceae	*Oplismenus aemulus*	creeping shade grass		C		1/1
plants	Equisetopsida	Poaceae	*Aristida gracilipes*			C		1/1
plants	Equisetopsida	Poaceae	*Cymbopogon obtectus*			C		1/1
plants	Equisetopsida	Poaceae	*Enneapogon gracilis*	slender nineawn		C		4/2
plants	Equisetopsida	Poaceae	*Enteropogon ramosus*			C		5
plants	Equisetopsida	Poaceae	*Leptochloa digitata*			C		1
plants	Equisetopsida	Poaceae	*Paspalidium gracile*	slender panic		C		2/1
plants	Equisetopsida	Poaceae	*Tragus australianus*	small burr grass		C		7
plants	Equisetopsida	Poaceae	*Bothriochloa bladhii*			C		5/1
plants	Equisetopsida	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		2
plants	Equisetopsida	Poaceae	*Dichanthium fecundum*	curly bluegrass		C		2/1
plants	Equisetopsida	Poaceae	*Dichanthium sericeum*			C		1
plants	Equisetopsida	Poaceae	*Enneapogon nigricans*	niggerheads		C		2
plants	Equisetopsida	Poaceae	*Enneapogon truncatus*			C		3/3
plants	Equisetopsida	Poaceae	*Eragrostis setifolia*			C		1
plants	Equisetopsida	Poaceae	*Eragrostis tenellula*	delicate lovegrass		C		1
plants	Equisetopsida	Poaceae	*Panicum decompositum*			C		3
plants	Equisetopsida	Poaceae	*Sporobolus elongatus*			C		2
plants	Equisetopsida	Poaceae	*Alloteropsis cimicina*			C		1/1
plants	Equisetopsida	Poaceae	*Chionachne cyathopoda*	river grass		C		2
plants	Equisetopsida	Poaceae	*Cymbopogon bombycinus*	silky oilgrass		C		4/2
plants	Equisetopsida	Poaceae	*Eragrostiella bifaria*					1
plants	Equisetopsida	Poaceae	*Eragrostis leptocarpa*	drooping lovegrass		C		1/1
plants	Equisetopsida	Poaceae	*Heteropogon contortus*	black speargrass		C		8
plants	Equisetopsida	Poaceae	*Iseilema vaginiflorum*	red flinders grass		C		1/1
plants	Equisetopsida	Poaceae	*Aristida caput-medusae*			C		1
plants	Equisetopsida	Poaceae	*Bothriochloa ewartiana*	desert bluegrass		C		5
plants	Equisetopsida	Poaceae	*Cleistochloa subjuncea*			C		1/1
plants	Equisetopsida	Poaceae	*Enneapogon lindleyanus*			C		6/3
plants	Equisetopsida	Poaceae	*Enneapogon polyphyllus*	leafy nineawn		C		2
plants	Equisetopsida	Poaceae	*Enteropogon acicularis*	curly windmill grass		C		1
plants	Equisetopsida	Poaceae	*Panicum queenslandicum*			C		1/1
plants	Equisetopsida	Poaceae	*Paspalidium globoideum*	sago grass		C		2/2
plants	Equisetopsida	Poaceae	*Paspalidium jubiflorum*	warrego grass		C		4
plants	Equisetopsida	Poaceae	*Setaria paspalidioides*			C		2/1
plants	Equisetopsida	Poaceae	*Thyridolepis xerophila*			C		6/5
plants	Equisetopsida	Poaceae	*Enteropogon paucispiceus*			C		1
plants	Equisetopsida	Poaceae	*Sporobolus australasicus*			C		1
plants	Equisetopsida	Poaceae	*Bothriochloa erianthoides*	satintop grass		C		1/1
plants	Equisetopsida	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		1/1
plants	Equisetopsida	Poaceae	*Dichanthium queenslandicum*			V	E	6/6
plants	Equisetopsida	Poaceae	*Diplachne fusca var. fusca*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Poaceae	*Eriochloa pseudoacrotricha*			C		2/1
plants	Equisetopsida	Poaceae	*Dinebra decipiens var. decipiens*			C		4
plants	Equisetopsida	Poaceae	*Panicum decompositum var. tenuius*			C		1
plants	Equisetopsida	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1
plants	Equisetopsida	Poaceae	*Bothriochloa bladhii subsp. bladhii*			C		1/1
plants	Equisetopsida	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		1/1
plants	Equisetopsida	Poaceae	*Bothriochloa decipiens var. decipiens*			C		4
plants	Equisetopsida	Poaceae	*Anthosachne kingiana subsp. multiflora*			C		1/1
plants	Equisetopsida	Poaceae	*Panicum decompositum var. decompositum*			C		2/2
plants	Equisetopsida	Poaceae	*Bothriochloa decipiens var. cloncurrensis*			C		1/1
plants	Equisetopsida	Poaceae	*Calyptochloa gracillima subsp. gracillima*			C		1/1
plants	Equisetopsida	Poaceae	*Eriachne mucronata forma (Alpha C.E.Hubbard 7882)*			C		1/1
plants	Equisetopsida	Poaceae	*Chloris*			C		1
plants	Equisetopsida	Poaceae	*Eulalia*					1
plants	Equisetopsida	Poaceae	*Panicum*			C		2
plants	Equisetopsida	Poaceae	*Aristida*			C		8
plants	Equisetopsida	Poaceae	*Cenchrus*			C		1
plants	Equisetopsida	Poaceae	*Digitaria*			C		1
plants	Equisetopsida	Poaceae	*Enneapogon*			C		3
plants	Equisetopsida	Poaceae	*Eragrostis*			C		5
plants	Equisetopsida	Poaceae	*Echinochloa*			C		1
plants	Equisetopsida	Poaceae	*Paspalidium*			C		2
plants	Equisetopsida	Poaceae	*Perotis rara*	comet grass		C		2/2
plants	Equisetopsida	Poaceae	*Eulalia aurea*	silky browntop		C		1
plants	Equisetopsida	Polygalaceae	*Polygala triflora*			C		1/1
plants	Equisetopsida	Polygonaceae	*Duma florulenta*			C		1
plants	Equisetopsida	Polygonaceae	*Persicaria attenuata*			C		2/2
plants	Equisetopsida	Polygonaceae	*Persicaria lapathifolia*	pale knotweed		C		2/2
plants	Equisetopsida	Portulacaceae	*Portulaca filifolia*			C		1
plants	Equisetopsida	Portulacaceae	*Portulaca bicolor*			C		1
plants	Equisetopsida	Potamogetonaceae	*Potamogeton crispus*	curly pondweed		C		1/1
plants	Equisetopsida	Pottiaceae	*Trichostomum brachydontium*			C		1/1
plants	Equisetopsida	Proteaceae	*Grevillea decora subsp. decora*			C		1/1
plants	Equisetopsida	Proteaceae	*Grevillea striata*	beefwood		C		1
plants	Equisetopsida	Proteaceae	*Hakea lorea*			C		1
plants	Equisetopsida	Proteaceae	*Xylomelum*			C		2
plants	Equisetopsida	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*			C		1/1
plants	Equisetopsida	Pteridaceae	*Cheilanthes sieberi*			C		3
plants	Equisetopsida	Pteridaceae	*Cheilanthes distans*	bristly cloak fern		C		1/1
plants	Equisetopsida	Pteridaceae	*Pellaea nana*			C		1/1
plants	Equisetopsida	Pteridaceae	*Adiantum hispidulum var. hypoglaucum*			C		1/1
plants	Equisetopsida	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		4
plants	Equisetopsida	Rhamnaceae	*Ventilago viminalis*	supplejack		C		6
plants	Equisetopsida	Rubiaceae	*Psydrax oleifolia*			C		2
plants	Equisetopsida	Rubiaceae	*Psydrax odorata subsp. australiana*			C		1/1
plants	Equisetopsida	Rubiaceae	*Oldenlandia coerulescens*			C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Rubiaceae	*Coelospermum reticulatum*			C		1/1
plants	Equisetopsida	Rubiaceae	*Psydrax*			C		1/1
plants	Equisetopsida	Rubiaceae	*Psydrax odorata*			C		1
plants	Equisetopsida	Rubiaceae	*Psydrax johnsonii*			C		2/2
plants	Equisetopsida	Rubiaceae	*Antirhea putaminosa*			C		1/1
plants	Equisetopsida	Rubiaceae	*Psychotria daphnoides*			C		2/2
plants	Equisetopsida	Rutaceae	*Geijera parviflora*	wilga		C		10/1
plants	Equisetopsida	Rutaceae	*Citrus glauca*			C		5/4
plants	Equisetopsida	Rutaceae	*Flindersia dissosperma*			C		3/2
plants	Equisetopsida	Rutaceae	*Geijera salicifolia*	brush wilga		C		1/1
plants	Equisetopsida	Santalaceae	*Santalum lanceolatum*			C		2/1
plants	Equisetopsida	Sapindaceae	*Dodonaea viscosa subsp. spatulata*			C		2/2
plants	Equisetopsida	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		4
plants	Equisetopsida	Sapindaceae	*Dodonaea stenophylla*			C		1/1
plants	Equisetopsida	Sapindaceae	*Alectryon oleifolius*			C		1
plants	Equisetopsida	Sapindaceae	*Atalaya hemiglauca*			C		9
plants	Equisetopsida	Sapindaceae	*Alectryon connatus*	grey birds-eye		C		2/2
plants	Equisetopsida	Sapotaceae	*Planchonella cotinifolia var. pubescens*			C		1/1
plants	Equisetopsida	Scrophulariaceae	*Eremophila longifolia*	berrigan		C		1
plants	Equisetopsida	Scrophulariaceae	*Eremophila mitchellii*			C		10
plants	Equisetopsida	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		2/2
plants	Equisetopsida	Scrophulariaceae	*Eremophila maculata*			C		2
plants	Equisetopsida	Scrophulariaceae	*Eremophila deserti*			C		3/2
plants	Equisetopsida	Solanaceae	*Solanum esuriale*	quena		C		2
plants	Equisetopsida	Solanaceae	*Solanum*			C		2
plants	Equisetopsida	Solanaceae	*Solanum elachophyllum*			E		1/1
plants	Equisetopsida	Solanaceae	*Solanum ferocissimum*			C		1/1
plants	Equisetopsida	Solanaceae	*Solanum orgadophilum*			E		2/2
plants	Equisetopsida	Sparrmanniaceae	*Grewia retusifolia*			C		3/1
plants	Equisetopsida	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		5/2
plants	Equisetopsida	Sparrmanniaceae	*Corchorus*			C		1
plants	Equisetopsida	Sparrmanniaceae	*Corchorus trilocularis*			C		3/3
plants	Equisetopsida	Sterculiaceae	*Brachychiton australis*	broad-leaved bottle tree		C		1/1
plants	Equisetopsida	Sterculiaceae	*Brachychiton acerifolius*	flame tree		C		1
plants	Equisetopsida	Thymelaeaceae	*Pimelea haematostachya*			C		1/1
plants	Equisetopsida	Ulmaceae	*Trema tomentosa*			C		1/1
plants	Equisetopsida	Urticaceae	*Dendrocnide photiniphylla*	shiny-leaved stinging tree		C		1/1
plants	Equisetopsida	Verbenaceae	*Verbena macrostachya*			C		2/2
plants	Equisetopsida	Violaceae	*Hybanthus*			C		1
plants	Equisetopsida	Violaceae	*Afrohybanthus enneaspermus*			C		1/1
plants	Equisetopsida	Violaceae	*Hybanthus monopetalus*			C		2
plants	Equisetopsida	Vitaceae	*Cissus oblonga*			C		1/1
plants	Equisetopsida	Vitaceae	*Clematicissus opaca*			C		3/1
plants	Equisetopsida	Zygophyllaceae	*Tribulus micrococcus*	yellow vine		C		3/3
plants	Equisetopsida	Zygophyllaceae	*Tribulus terrestris*	caltrop		C		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: Since 1980
Latitude: -23.3188
Longitude: 147.8986
Distance: 20
Email: lorena@ecoaus.com.au
Date submitted: Monday 19 Aug 2019 15:33:20
Date extracted: Monday 19 Aug 2019 15:40:04

The number of records retrieved = 178

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		1
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		1
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		13
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		2
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		3
animals	birds	Acanthizidae	*Acanthiza apicalis*	inland thornbill		C		2
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		2
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		2
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		3
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		3
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		2
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		2
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		1
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		1
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		1
animals	birds	Anatidae	*Aythya australis*	hardhead		C		1
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		1
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		2
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		1
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		1
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		4
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		3
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		2
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		1
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		1
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		2
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		2
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		2
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		2
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		2
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		1
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		2
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		3
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		1
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		3
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		6
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		2
animals	birds	Cuculidae	*Chalcites osculans*	black-eared cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		4
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		2
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		1
animals	birds	Gruidae	*Antigone rubicunda*	brolga		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		4
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		2
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		1
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		3
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		2
animals	birds	Megaluridae	*Megalurus timoriensis*	tawny grassbird		C		2
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		5
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		1
animals	birds	Meliphagidae	*Acanthagenys rufogularis*	spiny-cheeked honeyeater		C		3
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		4
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		3
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		1
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		4
animals	birds	Meliphagidae	*Gavicalis virescens*	singing honeyeater		C		3
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		4
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		3
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		1/1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		3
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		3
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		4
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		2
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		5
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		6
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		1
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		1
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		4
animals	birds	Psittacidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		1
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		2
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		3
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		4
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus maculatus*	spotted bowerbird		C		3
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		4
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		4
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	2
animals	reptiles	Agamidae	*Tympanocryptis sp.*					5/5
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		1
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		1
animals	reptiles	Scincidae	*Egernia striolata*	tree skink		C		1
plants	Equisetopsida	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Amaranthaceae	*Celosia elegantissima*		Y			4/4
plants	Equisetopsida	Amaranthaceae	*Amaranthus mitchellii*	Boggabri weed		C		1/1
plants	Equisetopsida	Apocynaceae	*Carissa ovata*	currantbush		C		1
plants	Equisetopsida	Asteraceae	*Pterocaulon serrulatum var. serrulatum*			C		1/1
plants	Equisetopsida	Asteraceae	*Minuria integerrima*	smooth minuria		C		1/1
plants	Equisetopsida	Asteraceae	*Pluchea xanthina*			C		1/1
plants	Equisetopsida	Asteraceae	*Rhodanthe polyphylla*			C		1/1
plants	Equisetopsida	Asteraceae	*Senecio brigalowensis*			C		1/1
plants	Equisetopsida	Asteraceae	*Gnaphalium diamantinense*			C		1/1
plants	Equisetopsida	Boraginaceae	*Heliotropium amplexicaule*	blue heliotrope	Y			1/1
plants	Equisetopsida	Boraginaceae	*Heliotropium cunninghamii*			C		1/1
plants	Equisetopsida	Brassicaceae	*Arabidella procumbens*			C		1/1
plants	Equisetopsida	Byttneriaceae	*Hannafordia shanesii*			C		1/1
plants	Equisetopsida	Caesalpiniaceae	*Cassia brewsteri*			C		1
plants	Equisetopsida	Chenopodiaceae	*Maireana*			C		1
plants	Equisetopsida	Chenopodiaceae	*Maireana microphylla*			C		1/1
plants	Equisetopsida	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		1/1
plants	Equisetopsida	Convolvulaceae	*Polymeria longifolia*	polymeria		C		1/1
plants	Equisetopsida	Convolvulaceae	*Convolvulus graminetinus*			C		1/1
plants	Equisetopsida	Cupressaceae	*Callitris glaucophylla*	white cypress pine		C		1
plants	Equisetopsida	Cyperaceae	*Schoenus subaphyllus*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus distans*			C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus pygmaeus*	dwarf sedge		C		1/1
plants	Equisetopsida	Cyperaceae	*Cyperus concinnus*			C		1/1
plants	Equisetopsida	Euphorbiaceae	*Adriana tomentosa var. tomentosa*			C		1/1
plants	Equisetopsida	Fabaceae	*Vigna*			C		1/1
plants	Equisetopsida	Fabaceae	*Hovea parvicalyx*			C		1/1
plants	Equisetopsida	Fabaceae	*Glycine latifolia*			C		2/2
plants	Equisetopsida	Fabaceae	*Alysicarpus muelleri*			C		1/1
plants	Equisetopsida	Fabaceae	*Macroptilium lathyroides*		Y			1/1
plants	Equisetopsida	Fabaceae	*Rhynchosia minima var. minima*			C		1/1
plants	Equisetopsida	Fabaceae	*Rhynchosia minima var. australis*			C		1/1
plants	Equisetopsida	Gentianaceae	*Centaurium erythraea*	common centaury	Y			1/1
plants	Equisetopsida	Haloragaceae	*Gonocarpus elatus*			C		1/1
plants	Equisetopsida	Lamiaceae	*Basilicum polystachyon*			C		1/1
plants	Equisetopsida	Malvaceae	*Abelmoschus ficulneus*	native rosella		C		1/1
plants	Equisetopsida	Malvaceae	*Hibiscus verdcourtii*			C		1/1
plants	Equisetopsida	Malvaceae	*Sida pleiantha*			C		1/1
plants	Equisetopsida	Malvaceae	*Abutilon nobile*			C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia pendula*	myall		C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia salicina*	doolan		C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia julifera subsp. curvinervia*			C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia leptostachya*	Townsville wattle		C		1/1
plants	Equisetopsida	Mimosaceae	*Acacia melvillei*			C		1/1
plants	Equisetopsida	Myrtaceae	*Eucalyptus tenuipes*	narrow-leaved white mahogany		C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	Equisetopsida	Myrtaceae	*Corymbia dallachiana*			C		1
plants	Equisetopsida	Myrtaceae	*Corymbia trachyphloia*			C		1
plants	Equisetopsida	Myrtaceae	*Melaleuca tamariscina*			C		1/1
plants	Equisetopsida	Myrtaceae	*Corymbia trachyphloia subsp. trachyphloia*			C		1
plants	Equisetopsida	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		1
plants	Equisetopsida	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus melanophloia*			C		2
plants	Equisetopsida	Myrtaceae	*Eucalyptus populnea*	poplar box		C		1
plants	Equisetopsida	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		1
plants	Equisetopsida	Pentapetaceae	*Melhania oblongifolia*			C		1/1
plants	Equisetopsida	Phrymaceae	*Mimulus gracilis*	slender monkey flower		C		1/1
plants	Equisetopsida	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		1/1
plants	Equisetopsida	Poaceae	*Dinebra panicea var. brachiata*		Y			1/1
plants	Equisetopsida	Poaceae	*Sporobolus coromandelianus*		Y			1/1
plants	Equisetopsida	Poaceae	*Bothriochloa erianthoides*	satintop grass		C		1/1
plants	Equisetopsida	Poaceae	*Enneapogon robustissimus*			C		1/1
plants	Equisetopsida	Poaceae	*Sporobolus actinocladus*	katoora grass		C		1/1
plants	Equisetopsida	Poaceae	*Moorochloa eruciformis*		Y			1/1
plants	Equisetopsida	Poaceae	*Bothriochloa ewartiana*	desert bluegrass		C		1
plants	Equisetopsida	Poaceae	*Alloteropsis cimicina*			C		1/1
plants	Equisetopsida	Poaceae	*Dichanthium fecundum*	curly bluegrass		C		1/1
plants	Equisetopsida	Poaceae	*Bothriochloa bladhii*			C		1/1
plants	Equisetopsida	Poaceae	*Tragus australianus*	small burr grass		C		1
plants	Equisetopsida	Poaceae	*Enneapogon gracilis*	slender nineawn		C		1/1
plants	Equisetopsida	Poaceae	*Chrysopogon fallax*			C		1
plants	Equisetopsida	Poaceae	*Aristida personata*			C		1/1
plants	Equisetopsida	Poaceae	*Enneapogon virens*			C		1/1
plants	Equisetopsida	Poaceae	*Triraphis mollis*	purple plumegrass		C		1/1
plants	Equisetopsida	Poaceae	*Perotis rara*	comet grass		C		1/1
plants	Equisetopsida	Poaceae	*Eragrostis*			C		1
plants	Equisetopsida	Poaceae	*Aristida*			C		1
plants	Equisetopsida	Poaceae	*Eriachne mucronata forma (Alpha C.E.Hubbard 7882)*			C		1/1
plants	Equisetopsida	Polygalaceae	*Polygala triflora*			C		1/1
plants	Equisetopsida	Proteaceae	*Grevillea decora subsp. decora*			C		1/1
plants	Equisetopsida	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1
plants	Equisetopsida	Rutaceae	*Geijera parviflora*	wilga		C		1
plants	Equisetopsida	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		1/1
plants	Equisetopsida	Scrophulariaceae	*Eremophila deserti*			C		2/1
plants	Equisetopsida	Violaceae	*Hybanthus monopetalus*			C		1
plants	Equisetopsida	Violaceae	*Afrohybanthus enneaspermus*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.