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RPI Development Application Supporting Information

LYND RESOURCES PTY LTD

ORURO

May 2018

LYN001

Document Control Sheet

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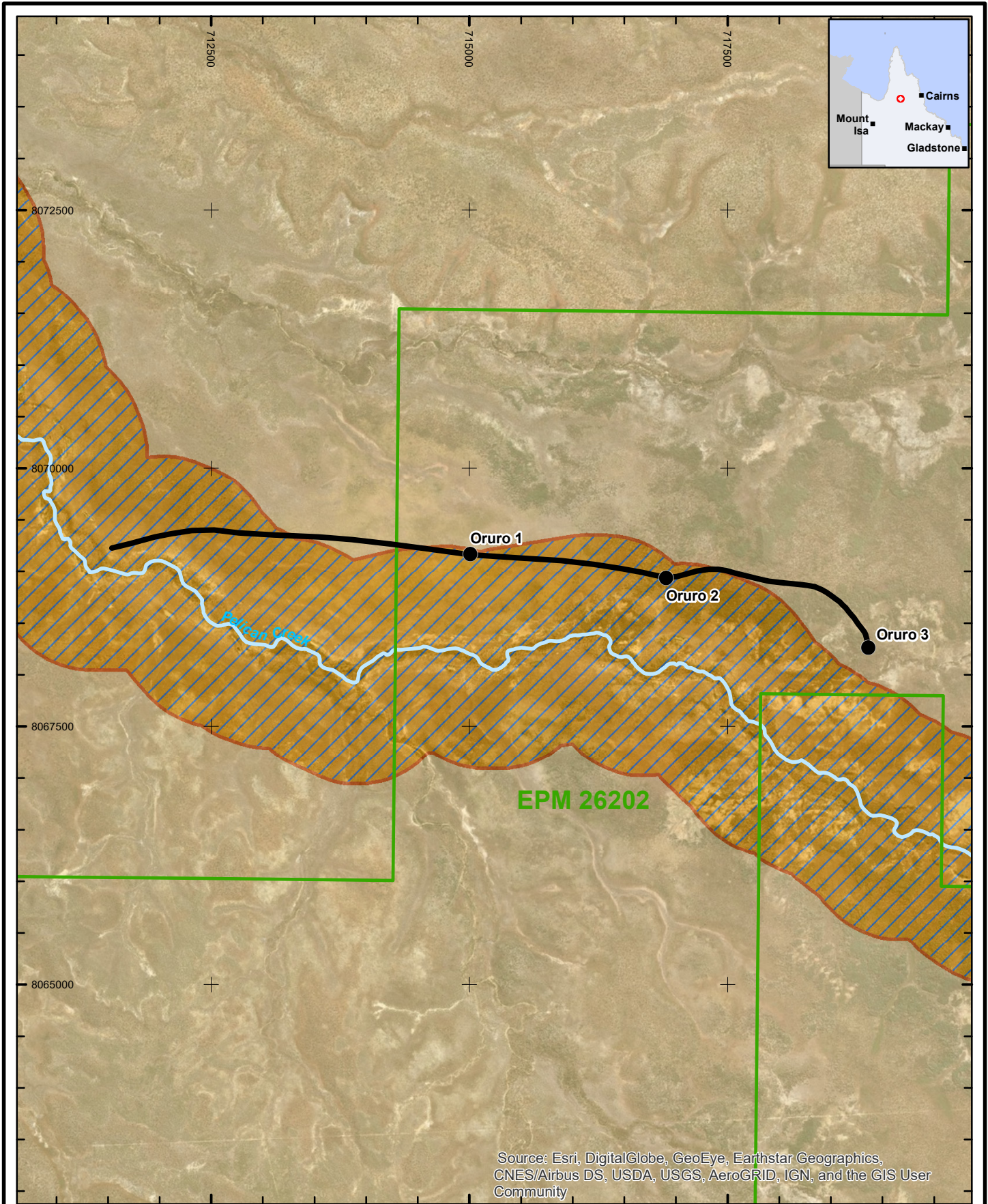
1. Introduction

Lynd Resources Pty Ltd (Lynd Resources) proposes to undertake exploration drilling for minerals on EPM 26202 as part of the Oruro Project located approximately 100km north-northwest of Georgetown in North Queensland. The Oruro Project makes up part of the overall Lynd Resources' North Queensland exploration project.

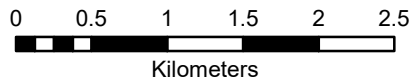
The Oruro exploration project is situated within the Gulf Rivers Strategic Environmental Area (SEA) (**Figure 1**) and therefore Lynd Resources requires approval under s28 of the *Regional Planning Interests Act 2014* (RPI Act). Lynd Resources holds an existing Environmental Authority (EA) (EPSX03893416) and is therefore an eligible person under s28 of the RPI Act.

Pursuant to s34(2) of the RPI Act and s13 of *Regional Planning Interests Regulation 2014* (RPI Regulation), the assessment application is not notifiable as the proposed exploration activities will be carried out in a SEA and not a priority living area. However, in accordance with s34(4) of the RPI Act, the assessment application can become notifiable if the chief executive provides Lynd Resources with a notice requiring the application to be notifiable

Pursuant to s12(2) of the RPI Regulation, the assessing agencies for a SEA are the Department of Environment and Science (DES) and the Department of Natural Resources, Mines and Energy (DNRME). The function of DES is to assess the expected impact of the activity on the ecological integrity of the environmental attributes for the area that relate to riparian processes, wildlife corridors or water quality. While the function of DNRME is to assess the expected impact of the activity on the hydrodynamics of, and interactions with, the environmental attributes for the area that relate to hydrologic or geomorphic processes or beneficial flooding. This report will discuss the environment attributes and expected impacts of this proposed exploration project on the environmental attributes.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



LYND RESOURCES PTY LTD
EPM 26202



	Location of Proposed Exploration Activities within the Gulf Rivers SEA	EPM Boundary Major Watercourse Proposed Drill Pad (30m x 20m) Proposed Track (3m width)	Areas of Regional Interest Strategic Environmental Area Strategic Environmental Area - Designated Precinct	
	Figure 1 Sheet No. ADMG_ARD_LYN001_MAP_0052_A	Drawn By: Chris Schlebusch Requested by: Richard Smith Date: 30/04/2018	Data sources: Qld Department of Natural Resources and Mines, National Native Title Tribunal Geoscience Australia, Esri	

1.1 The Applicant and Project Overview

Lynd Resources (ACN 610 450 498) is a wholly owned subsidiary of North Queensland Resources Pty Ltd (NQR) (ACN 610 450 185), which also has two other subsidiaries Gamboola Resources Pty Ltd and Yappar Resources Pty Ltd. In 2016/17, NQR acquired 100% of the mineral rights to a large tenement package in North Queensland.

In February 2018, NQR entered into a Strategic Alliance Agreement (SAA) with diversified global miner South32 to appraise a number of these exploration opportunities with significant potential across an area of 200km by 500km in North Queensland. The area comprises 27 tenements (granted and under application), with 22 wholly-owned by NQR and five subject to farm-in with third parties.

NQR has defined at least 50 exploration targets across an area it has identified as prospective for Tier 1 mineral deposits. The prospective area is concealed under 20 to 200 metres of cover and historically has had minimal exploration.

1.2 Property and Tenure Details

A summary of the property and tenure details situated within EPM 26202 are shown in **Table 1**.

Table 1 Property and Tenure details within EPM 26202

Category	Property
Lot/Plan	Lot 171 on E1835473
Property Name	Abingdon Downs Station
Tenure	Lands Lease
Landholder	Keough Cattle Co. Pty Ltd

EPM 26202 is situated wholly within Lot 171 on E1835473 and all disturbance caused by the exploration activities will occur within this lot.

EPM 26202 was granted to Lynd Resources on 11 November 2016 for a period of 2 years, to expire 16 November 2018. Lynd Resources will apply to DRNME to renew the tenement for an extended period in due course.

EPM 26202 was granted over an area of 37 sub-blocks (approximately 9,990ha based upon a sub-block size of 270ha). Standard EA EPSX03893416 was granted as a part of the approval for EPM 26202, requiring Lynd Resources to comply with the terms and conditions of the “*Eligibility criteria and standard conditions for exploration and mineral development projects – ESR/2016/1985*”, as produced by DES.

2. Proposed Activities

Lynd Resources propose to undertake the following resources activities under EPM 26202, which will fall within Lot 171 on EI835473 and the Gulf Rivers SEA:

1. Construction of access tracks;
2. Establishment of one initial drill pad with a potential of up to three drill pads;
3. Establishment of a temporary fuel storage and laydown area;
4. Establishment of a temporary mobile campsite for the drill and geological crews.

There will be a maximum of three drillholes over the Oruro project with one initial target location. Oruro 1 will be the sole target site within the area and if results permit up to two more may be conducted at sites Oruro 2 and Oruro 3.

A summary of the proposed activities, their locations and expected disturbance levels are summarised in **Table 2**. Definitions of each activity are described in **Table 4**, in addition, schematics of the proposed drill pad, temporary mobile campsite and temporary fuel storage and laydown area are illustrated in **Figure 2**, **Figure 3** and **Figure 4**.

Table 2 Summary of proposed activities and their estimated disturbance

Activity	Number	Location	Total disturbance (ha)
Access tracks	As required	Lot 171 on EI835473	Initial: 1.04ha Maximum: 2.29ha (3m wide tracks)
Drill pads	1 initial; maximum 3	All pads located on Lot 171 on EI835473: Oruro 1: -17.453240°, 143.024520°* Oruro 2: -17.455130°, 143.042390° Oruro 3: -17.461020°, 143.060910°	Initial: 0.06ha Maximum: 0.18ha (3 x (20m x 30m))
Temporary Fuel and Laydown Storage Area	1	Lot 171 on EI835473	0.04ha (20m x 20m)
Temporary Mobile Campsite	1	Lot 171 on EI835473	0.04ha (20m x 20m)
INITIAL TOTAL DISTURBANCE FOR 1 TARGET SITES:			1.18ha
MAXIMUM DISTURBANCE TOTAL:			2.55ha

*Indicates initial target sites

All proposed disturbance will occur within Lot 171 on EI835473, however there will be 0.83ha of disturbance off EPM 26202 for an access track to the EPM.

Table 3 Definitions of resource activities

Resource Activity	Definition
Access tracks	A cleared track approximately 3m wide to facilitate vehicular access of drilling equipment and personnel.
Drill pads	As shown in Error! Reference source not found. , the drill pad is a 20m x 30m (0.06ha) area used to provide a stable platform for the mud rotary and diamond tail drilling procedure.
Fuel and laydown storage area	As shown in Figure 3 , the fuel and laydown storage area is a 20m x 20m (0.04ha) area to temporarily store drilling equipment and reservoirs of fuel required for drilling and transport.
Mobile campsite	As shown in Figure 4 , the mobile campsite is a 20m x 20m (0.04ha) area for a temporary mobile campsite for drilling and geological crews.

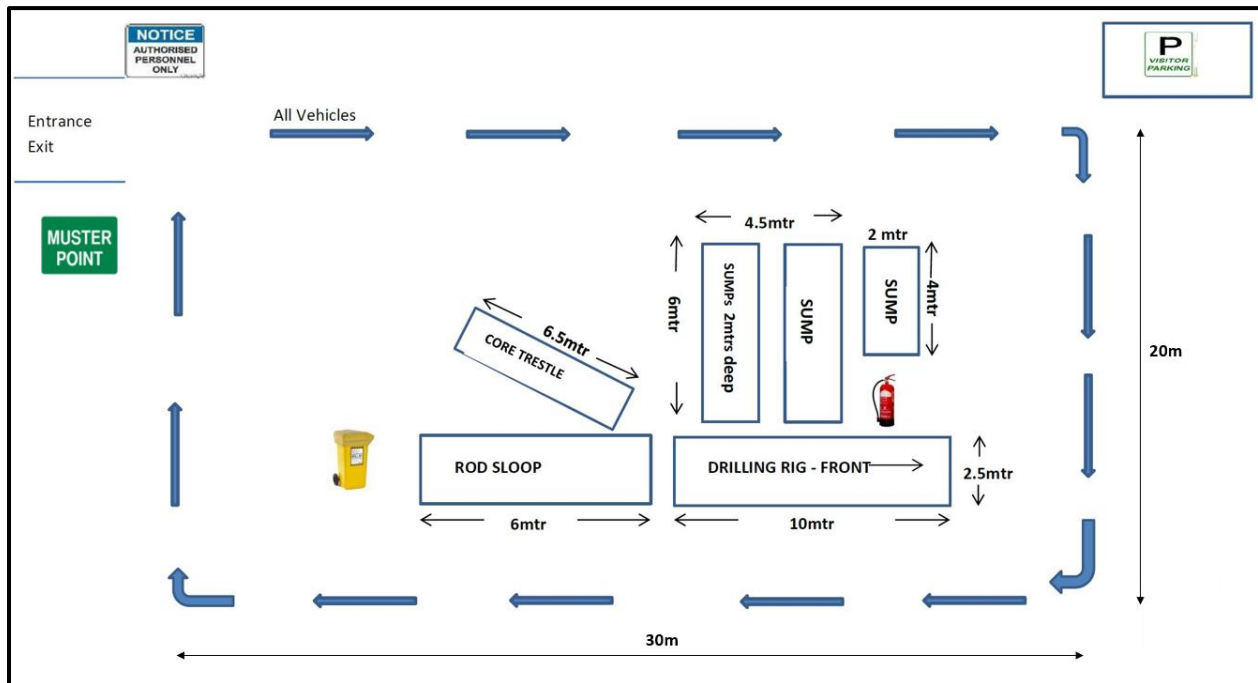


Figure 2 Schematic of the proposed drill pad

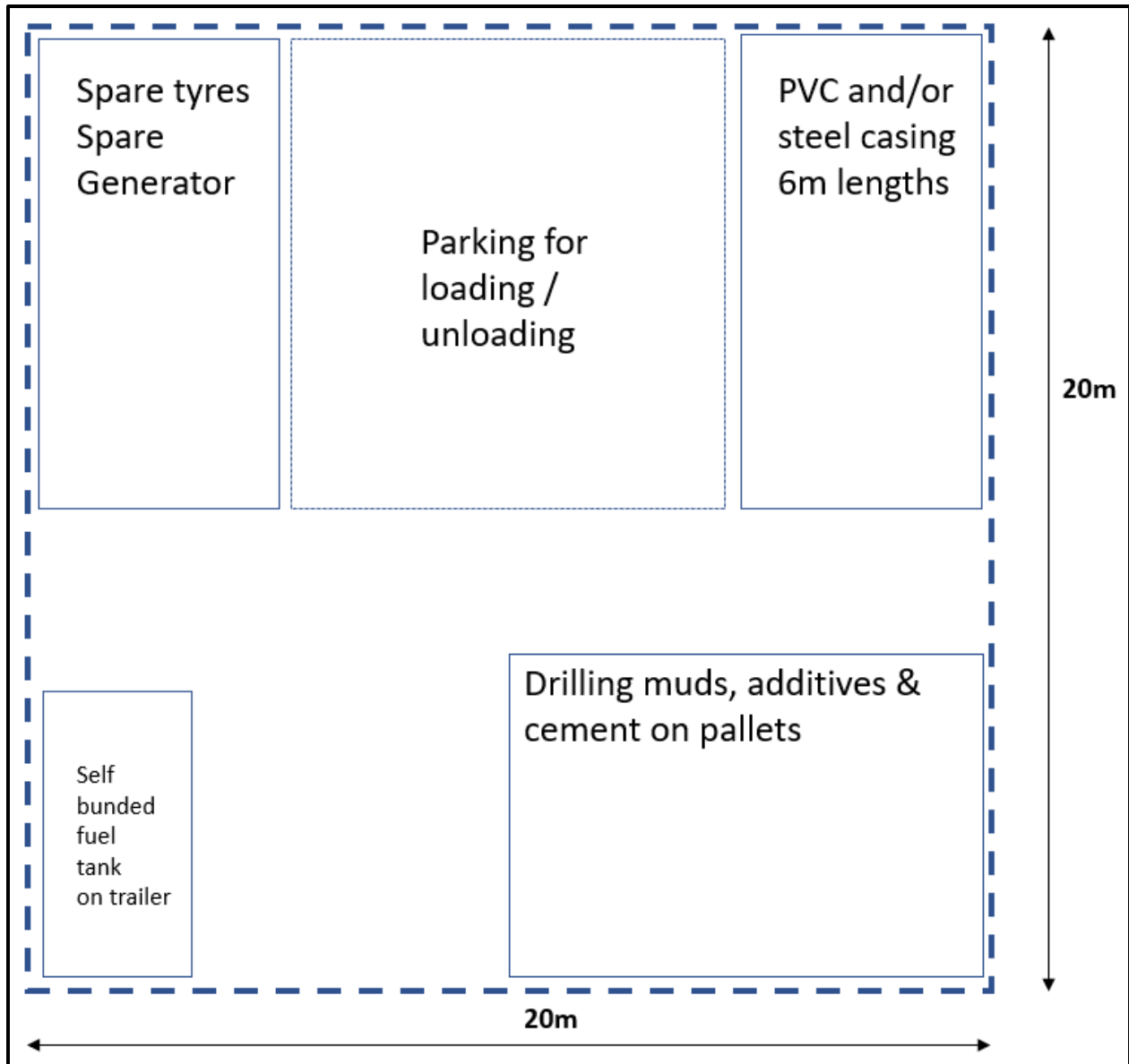


Figure 3 Schematic of the fuel and laydown storage area

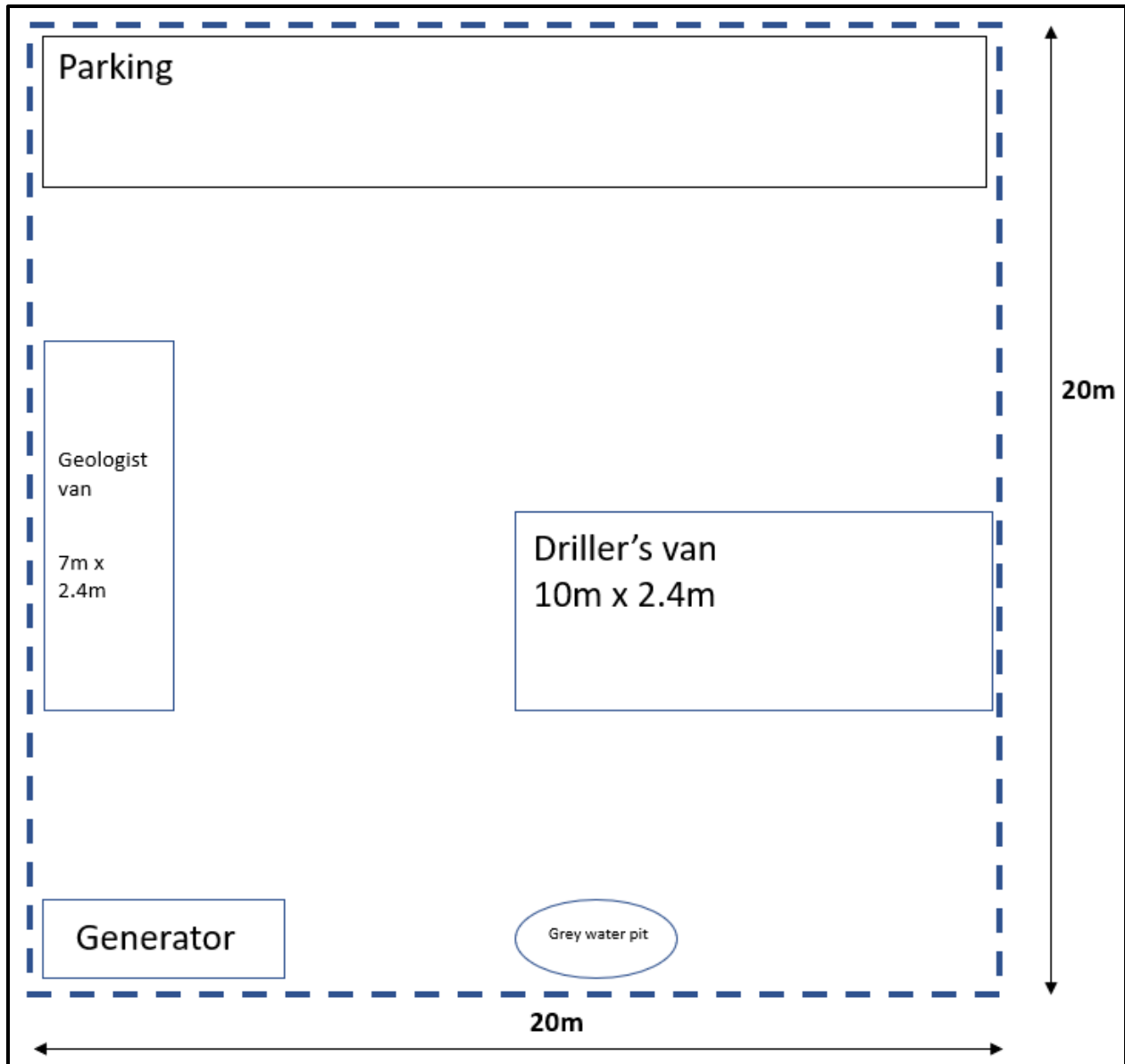


Figure 4 Schematic of the mobile campsite

2.1 Drilling Program

Exploration drilling undertaken during the Oruro project will use a combined mud rotary and diamond tail drill method conducted by a qualified and experienced contractor. All drillholes are designed to target the Palaeozoic basement rocks beneath sedimentary rocks of the Karumba and Carpentaria Basins. Drilling at the proposed sites aim to test magnetic anomalies interpreted to be igneous and associated rocks similar to those that host the Cerro Rico de Potosi silver-tin deposit in Bolivia and possibly analogous to the Red Dome copper-gold deposit and Mt Leyshon/Mt Wright gold deposit.

The diamond core drilling will be either (NQ) 45.1mm or (HQ) 61.1mm in diameter and have a target of 150m. The target depths and diamond tails for the initial drillhole is below in **Table 4**. Actual hole depths may exceed predicted depths. The on-duty geologist will inform if the target has been reached.

Table 4 Details on drilling at the initial drillhole

Site	Estimated Target Depth	Estimated Diamond Tail
Oruro 1	150m	25m

Some drillholes may intersect an artesian aquifer and as a result will be pre-collared by installation and pressure cementing casing of adequate strength, to sufficient depth, to enable well control procedures to be undertaken in the event of a blow-out. Conductor casing (either steel or UPVC) of the top part of the hole (~30-40m) and into approximately 20m of stable formation is anticipated, with casing set according to the Minimum Construction Requirements for Water Bores in Australia. UPVC or steel surface casing of the portion of the pre-collar to just below the aquifer will depend on local conditions. The use of steel casing during drilling with retrieval after hole completion being preferred.

The Gilbert River Formation is expected to be over-pressured in some areas. Due to this, drilling will proceed with caution with materials and equipment on-hand to cope with water pressures of around 480kpa or 70 PSI. Materials of the Carpentaria Basin are subject to collapse due to the presence of running sands, swelling clays and free-flowing sub-artesian and artesian aquifers.

Drillholes will be completely grouted following the completion of drilling to prevent groundwater leakage between aquifers and the surface according to the Minimum Construction Requirements for Water Bores in Australia.

Clearing and minor earthworks may be required to prepare drill pads in at the proposed sites. The drill pad will contain the drill rig and associated vehicles in addition to the drill sumps to hold drilling waters.

Drill pads have been selected on both geological and environmental grounds. Lynd Resources has, where necessary, after determining the location of the geological anomaly also considered the corresponding environmental attribute(s) for that area. Geological anomalies are typically large enough that drill hole locations can be moved, without losing confidence in the quality of the drilling results. The exact locations may be modified slightly should an on-site review by the botanist-ecologist prior to disturbance determine that the initial site is unacceptable.

Clearing is likely to be undertaken with the following equipment:

- Grader/bulldozer;
- wheeled loader / backhoe.

The vegetation clearing will use the “blade up” method where possible, so that vegetation is cleared while minimising disturbance to roots and topsoil. The preparation of the drill sites may involve topsoil disturbance (to create a safe, level site) and in this case, cleared vegetation will be stockpiled separately from topsoil. The excavation of drill sumps is likely to use a wheeled loader/backhoe but may also involve a tracked bulldozer. Excavated subsoil soils will be stockpiled separately from topsoil.

Drilling equipment is likely to include the following equipment;

- drill rig (3 or 4 axle body truck);
- support truck (3 or 4 axle body truck);
- water truck (3 or 4 axle body truck);
- light vehicles (4WD ute);
- mobile campsite;
- caravan.

Site rehabilitation will be undertaken in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)*. This includes, but not limited to:

- Condition B26: The holder of the environmental authority must backfill all excavations, drill holes or sampling sites as soon as practical following the completion of exploration activities.
- Condition B27: Condition B26 does not apply to any excavations, drill holes or sampling sites that are to remain after the completion of exploration activities, by agreement with the land owner.
- Condition B28: The holder of the environmental authority must rehabilitate areas disturbed by mining activities to a stable landform similar to that of surrounding undisturbed areas.
- Condition B29: The holder of the environmental authority must spread seeds or plant species that will promote vegetation of a similar species and density of cover to that of the surrounding undisturbed areas or vegetation that is appropriate for providing erosion control and stabilisation of the disturbed areas.

In regard to Condition B27, if the landowner requests that the drill hole be kept as a water bore, the appropriate approvals will be applied for in order to retain the drill hole as a water bore for the landholder.

2.2 Access Tracks

An access track will be required to allow access for all drilling equipment and personnel to the initial proposed drilling site. The proposed access track will begin off the nearest practical existing access track to minimise the level of overall disturbance and disturbance to environmental attributes. The width of the proposed access tracks will be kept to a maximum of 3m wide to provide enough room for vehicular access.

Tracks will be constructed by driving the grader (or bulldozer) along the route, with the blade up where possible, to minimise disturbance to topsoil.

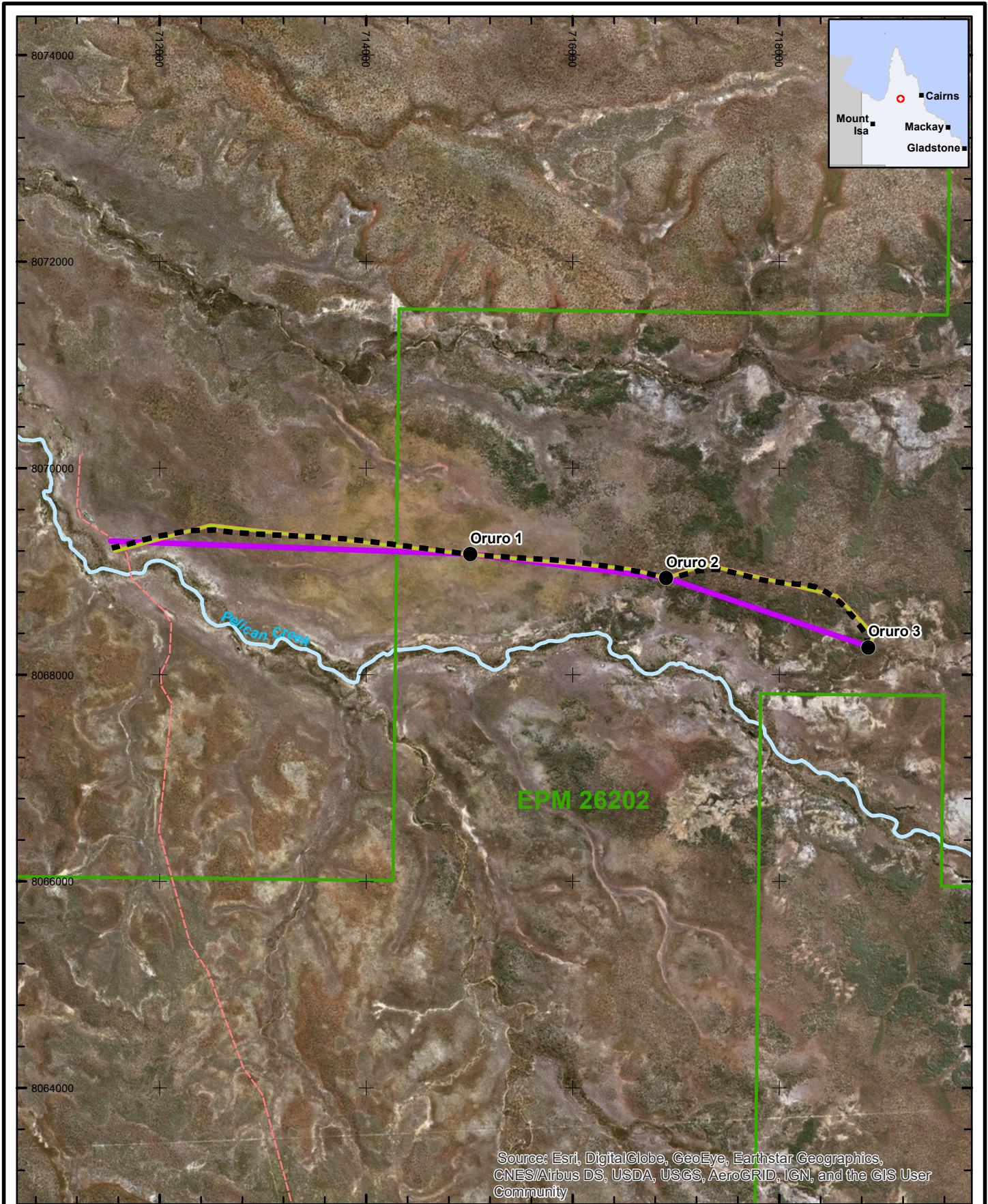
Access tracks have been planned on desktop and continually refined to minimise the amount of environmental harm or disturbance caused. **Figure 5** illustrates all proposed track alternatives that have been considered appropriate for access to the Oruro drill sites and the refinement of these tracks.

The initial (purple) route selection was originally selected as it provided the most direct access from the pre-existing track to each of the drill sites. The first route refinement (pink), second route refinement and the final (black) proposed access track route, all of which are quite similar, will avoid more dense vegetation resulting in less environmental disturbance in comparison to the initial proposed route. The

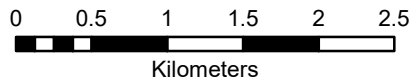
access route has been relocated to, as far as practical, to avoid steep inclines even though there is very little topography in this area.

The final alignment may be modified further during marking out or pre-clearing should the botanist-ecologist (who will be on-site during this time) determine that areas (once ground-truthed) require additional management.

All access tracks used for exploration purposes will be rehabilitated as soon as practical following the completion of drilling or geological interest in the area in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)*.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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EPM 26202



	Refinement of the Oruro access tracks	EPM Boundary Major Watercourse Existing Property Track Proposed Drill Pad (30m x 20m)	Initial Route Selection 1st Route Refinement 2nd Route Refinement Access Final Draft
	Figure 5 Sheet No. ADMG_ARD_LYN001_MAP_0049_A	Drawn By: Chris Schlebusch Requested by: Richard Smith Date: 30/04/2018	Data sources: Qld Department of Natural Resources and Mines, National Native Title Tribunal Geoscience Australia, Esri

2.3 Campsites and Laydown Area

Campsites will be temporary and involve a mobile campsite and/or caravan (kitchen and shower facilities), but otherwise employees will swag out at the campsite.

The laydown area will consist of an existing cleared area, where possible, for temporary storage of consumables for drilling.

2.4 Water Supply

Water will be obtained by agreement with local landholders from water storages on the site. Water will be trucked to either the drill site or camp site, as required.

2.5 Timing

Exploration activities will occur in the dry season with activities concluding by mid-November to avoid conditions of high precipitation in the region. At this stage, it is considered likely that site works will begin in September/October 2018. This allows time for on-the-ground ecological and cultural heritage assessment to be completed to ensure the most appropriate final locations are described. Following assessment of this application, Lynd Resources will immediately seek access to the site to commence the exploration programme. The rehabilitation of all disturbance will commence as soon as practical after the conclusion of drilling if the area is of no longer of geological interest and the access track is not needed by the landholder.

3. Gulf Rivers Environmental Attributes

The relevant environmental attributes for the Gulf Rivers SEA are described in section 9 of the RPI Regulation and are reproduced below.

- a) The natural hydrologic processes of the area characterised by –
 - i. Natural, unrestricted flows in and along watercourses and estuaries; and
 - ii. Overflow from watercourses onto the flood plains of the area, or the other way; and
 - iii. Natural flow paths of water across flood plains connecting waterholes, lakes and wetlands in the area; and
 - iv. Natural flow in and from groundwater and springs;
- b) The natural geomorphic processes of the area characterised by-
 - i. Natural erosion; and
 - ii. The transport and deposit of sediment by water throughout the catchments and along the watercourse systems and estuaries;
- c) The functioning riparian processes of the area characterised by native riparian vegetation associated with watercourses, estuaries, lakes and floodplains and wetlands;
- d) The functioning wildlife corridors of the area characterised by-
 - i. Natural habitat in the watercourse systems; and
 - ii. Permanent waterholes and springs;
- e) The natural water quality in the watercourse channels and aquifers and on flood plains in the area characterised by physical, chemical and biological attributes that support and maintain natural aquatic and terrestrial ecosystems.

Sub-sections 3.1 to 3.8 detail the existing environment, with potential impacts and mitigation strategies detailed in Section 4 of this Report.

3.1 Riparian Process

The beginning of the access track will start within 200m of Water Act defined Pelican Creek in dominant 'of concern' RE containing REs 2.3.26a/2.3.41/2.3.29a/2.3.55b and will involve very minor clearing within this mixed RE. These REs are associated with riverine wetlands, palustrine wetlands and floodplains. The majority of disturbance will occur in 'no concern' REs and include no disturbance to regulated vegetation as part of the Oruro exploration activities (**Figure 6**). There are no known estuaries, lakes or wetlands that will be encountered as a result of the drill pads or access tracks.

A RE environmental report was conducted for each of the drill sites which details the amount and types of RE within 2km of the drill hole. **Table 5** provides a summary of search results received. A MSES environmental report was also conducted for each of the drill sites which details the amount and types of MSES within 2km of the drill hole. **Table 6** provides a summary of search results received.

Both an Environmentally Sensitive Area map and a protected plants flora survey trigger map were also obtained for each drill site. No endangered regional ecosystems or protected plants were noted on these searches.

Copies of all searches mentioned above are attached at **Appendix 1**.

Table 5 Summary of the drill site area by RE biodiversity status

Drill Site	Biodiversity Status	Area (ha)	% of AOI
Oruro 1	Endangered	0.0	0.0
	Of concern	72.83	5.8
	No concern at present	1,183.72	94.2
	Total remnant vegetation	1,256.55	100.0
Oruro 2	Endangered	0.0	0.0
	Of concern	57.61	4.58
	No concern at present	1,198.94	95.42
	Total remnant vegetation	1,256.55	100.0
Oruro 3	Endangered	0.0	0.0
	Of concern	50.62	4.03
	No concern at present	1,205.93	95.97
	Total remnant vegetation	1,256.55	100.0

AOI: Area of Interest – A 2km buffer around the drill hole

Bold indicates target drill site

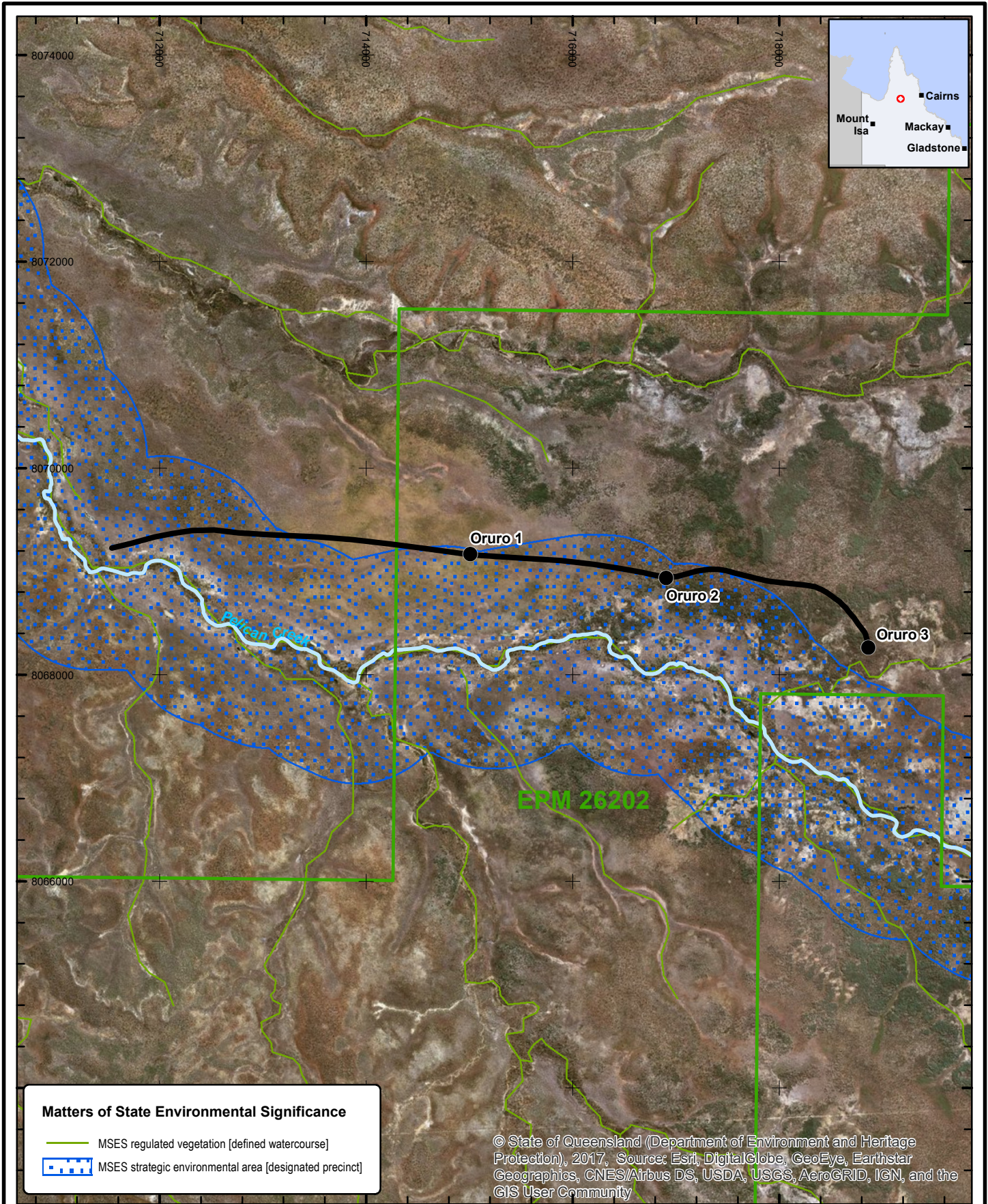
Table 6 Summary of the area/disturbance of MSES by drill site

Drill Site	MSES	Area (ha)/ Distance (km)	% of AOI
Oruro 1	4 Strategic Environmental Areas (SEA), designated precinct	668.91ha	53.2%
	8e Regulated Vegetation – intersecting a watercourse	9.3km	Not applicable
Oruro 2	4 Strategic Environmental Areas (SEA), designated precinct	640.89ha	51%
	8e Regulated Vegetation – intersecting a watercourse	6.3km	Not applicable
Oruro 3	4 Strategic Environmental Areas (SEA), designated precinct	548.6ha	43.7%
	8e Regulated Vegetation – intersecting a watercourse	9.1km	Not applicable

AOI: Area of Interest – A 2km buffer around the drill hole

Bold indicates target drill site

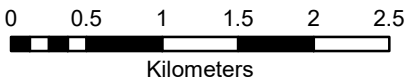
A summary of all REs which will be disturbed through access tracks and/or drill pads are described in **Table 7** with ‘of concern’ REs illustrated in **Figure 7**.



Matters of State Environmental Significance

- MSES regulated vegetation [defined watercourse]
- MSES strategic environmental area [designated precinct]

© State of Queensland (Department of Environment and Heritage Protection), 2017. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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EPM 26202



	Exploration Activities Matters of State Environmental Significance (MSES)	<ul style="list-style-type: none"> EPM Boundary — Major Watercourse Proposed Drill Pad (30m x 20m) Proposed Track (3m width)
	<p>Drawn By: Chris Schlebusch</p> <p>Requested by: Richard Smith</p> <p>Date: 30/04/2018</p>	
<p>Figure 6</p> <p>Sheet No.</p> <p>ADMG_ARD_LYN001_MAP_0051_A</p>		<p>Data sources: Qld Department of Natural Resources and Mines, National Native Title Tribunal Geoscience Australia, Esri</p>

Table 7 Summary of Regional Ecosystems disturbed by exploration activities

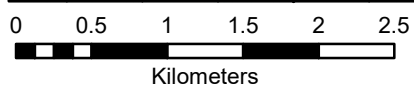
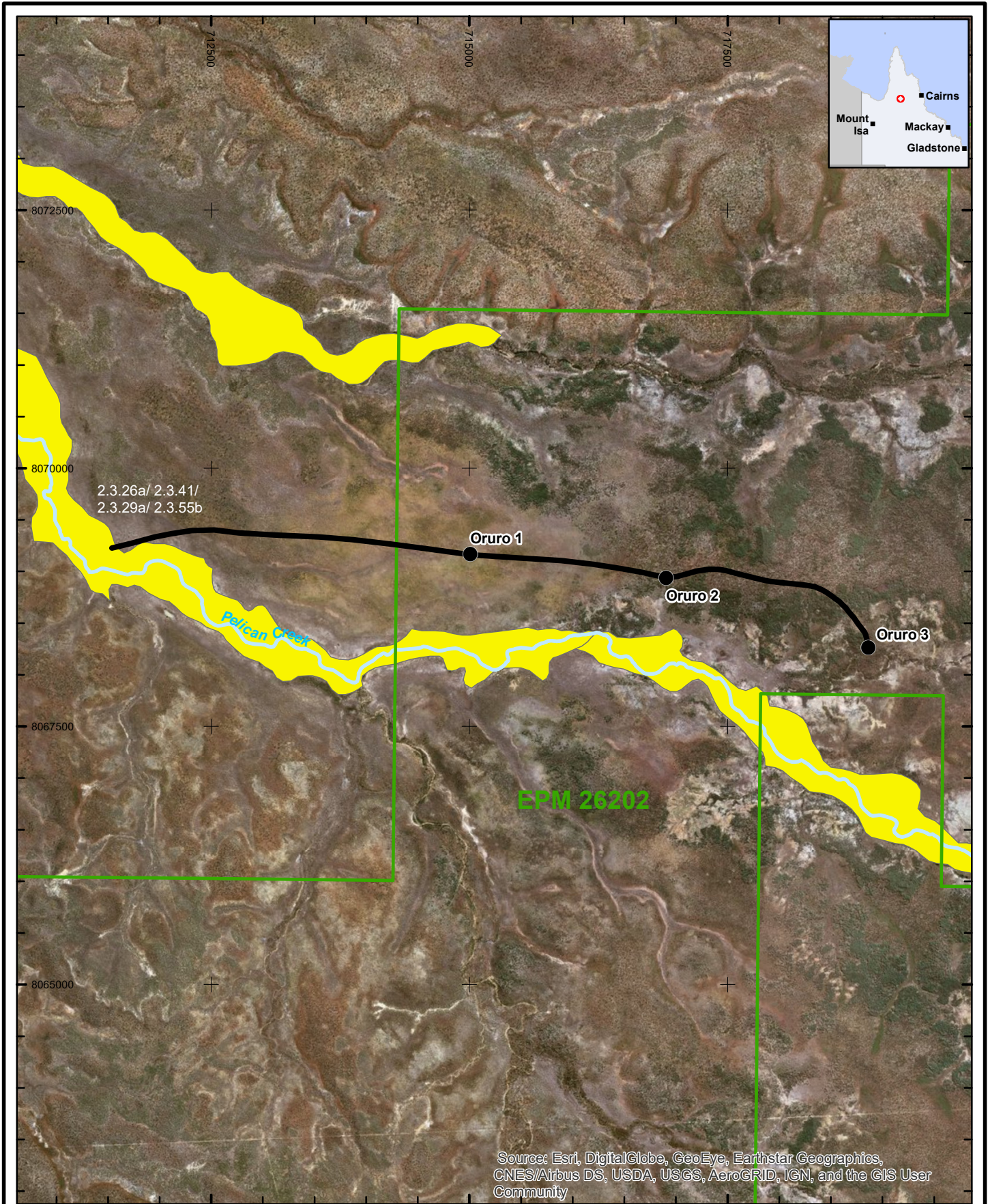
RE	Summary Description	Biodiversity Status	Vegetation Management Act Class	Structure Category
2.3.26a	<i>Eucalyptus camaldulensis</i> woodland to low woodland, commonly with <i>Melaleuca spp.</i> Occasional canopy species include <i>Lophostemon grandiflorus</i> , <i>Grevillea pteridifolia</i> , <i>Corymbia polycarpa</i> and <i>Erythrophleum chlorostachys</i> . A sparse shrub layer may occur, including <i>Acacia spp.</i> , and <i>Asteromyrtus symphyocarpa</i> . The ground layer is sparse, commonly tussock grasses. Occurs on fringes and in channels of minor watercourses in the north-east of the bioregion. Coarse sands. Riverine wetland or fringing riverine wetland. (BVG1M: 16a). Special values: Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species.	Of concern	Least concern	Mid-dense
2.3.29a	<i>Melaleuca viridiflora</i> low woodland to low open woodland, occasionally with <i>M. citrolens</i> , <i>M. stenostachya</i> . <i>M. acacioides</i> , <i>Grevillea striata</i> and <i>Terminalia spp.</i> may occur in the canopy. Emergent <i>Corymbia polycarpa</i> , <i>Eucalyptus chlorophylla</i> , <i>E. microtheca</i> and <i>C. clarksoniana</i> may occur. A shrub layer commonly occurs, including <i>Melaleuca spp.</i> , <i>Petalostigma spp.</i> and <i>Carissa lanceolata</i> . The ground layer is tussock grasses, commonly <i>Eriachne spp.</i> Occurs on active Quaternary alluvial plains and drainage depressions in the north-east of the bioregion. Silty clay and texture contrast soils. Floodplain (other than floodplain wetlands). (BVG1M: 21a). Special values: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>)	No concern at present	Least concern	Sparse
2.3.29c	<i>Melaleuca viridiflora</i> low open woodland to woodland, occasionally with <i>M. citrolens</i> and <i>M. stenostachya</i> . Emergent <i>Corymbia polycarpa</i> , <i>Eucalyptus chlorophylla</i> and <i>C. dallachiana</i> may occur. A shrub layer commonly occurs, including <i>Melaleuca viridiflora</i> and <i>Petalostigma banksii</i> . The ground layer is tussock grasses, including <i>Eriachne spp.</i> , <i>Schizachyrium fragile</i> and <i>Aristida spp.</i> Occurs on old alluvial plains (recent Pleistocene surface) in the north-east of the bioregion. Grey-brown sandy loam and sandy clay loam soils. Floodplain (other than floodplain wetlands). (BVG1M: 21a). Special values: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>)	No concern at present	Least concern	Sparse
2.3.41	<i>Aristida dominii</i> , <i>Eriachne spp.</i> and <i>Chloris lobata</i> annual tussock grassland, commonly with <i>Eragrostis basedowii</i> , <i>Iseilema sp.</i> , <i>Themeda arguens</i> and <i>Brachyachne convergens</i> (short grass grassland). Emergent <i>Corymbia confertiflora</i> , <i>Lysiphyllum</i>	Of concern	Least concern	Grassland

	<i>cunninghamii</i> and <i>Eucalyptus chlorophylla</i> commonly occur. Occurs on active Quaternary alluvial plains, commonly associated with major watercourses. Silty loam soils. (BVG1M: 31a). Special values: None			
2.3.55b	Seasonal swamps (wooded). <i>Melaleuca viridiflora</i> and/or <i>M. clarksonii</i> low open woodland to low open forest. The ground layer is a combination of tussock grasses, sedges and forbs, including <i>Pseudoraphis spinescens</i> , <i>Nymphoides indica</i> and <i>Eleocharis spp.</i> Includes small unwooded areas and open water. Occurs in closed depressions on Quaternary deposits in the Mitchell-Gilbert Fans subregion. Silty and sandy clay soils. Palustrine wetland (e.g. vegetated swamp). (BVG1M: 34c). Special values: Seasonal wetland. Important feeding and moulting sites for water birds.	No concern at present	Least concern	Sparse
2.5.5a	<i>Eucalyptus tetradonta</i> and/or <i>Corymbia polycarpa</i> woodland to open woodland. <i>Erythrophleum chlorostachys</i> and <i>C. curtipes</i> may occur in the canopy. A lower tree or shrub layer commonly occurs, including <i>Melaleuca spp.</i> and <i>Petalostigma spp.</i> The ground layer is tussock grasses, including <i>Aristida spp.</i> , <i>Schizachyrium fragile</i> and <i>Thaumastochloa spp.</i> Occurs on sandy rises and abandoned levees on broad, Tertiary sand sheets. Pale brown sands. (BVG1M: 14a). Special values: None	No concern at present	Least concern	Very sparse
2.5.14c	<i>Melaleuca viridiflora</i> low open woodland to low woodland, commonly with <i>M. citrolens</i> and <i>Asteromyrtus symphyocarpa</i> . Emergent <i>Corymbia polycarpa</i> and <i>Cochlospermum gregorii</i> may occur. A shrub layer commonly occurs, including <i>Petalostigma banksii</i> , <i>Acacia spp.</i> and <i>Gardenia vilhelmii</i> . The ground layer is tussock grasses, including <i>Schizachyrium fragile</i> , <i>Thaumastochloa spp.</i> and <i>Aristida spp.</i> Occurs on level to gently undulating Tertiary sand sheets in the north-east of the bioregion. Yellow to brown sandy loams and texture contrast soils. (BVG1M: 21a). Special values: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>)	No concern at present	Least concern	Sparse
2.5.17a*	<i>Melaleuca stenostachya</i> and/or <i>M. citrolens</i> low woodland to woodland, occasionally with <i>Eucalyptus microneura</i> , <i>E. provecta</i> , <i>Acacia leptostachya</i> and <i>Terminalia platyptera</i> . A shrub layer of <i>Petalostigma banksii</i> may occur. The ground layer is variable, commonly tussock grasses. Occurs on undulating outwash deposits and erosional Tertiary sand sheets in the north of the bioregion. Brown sandy and texture contrast soils. (BVG1M: 21b). Special values: None	No concern at present	Least concern	Sparse
2.5.19a*	<i>Eucalyptus tetradonta</i> and <i>Erythrophleum chlorostachys</i> woodland commonly with <i>Eucalyptus chartaboma</i> . Occasional canopy species include <i>Corymbia pocillum</i> and <i>C. polycarpa</i> . A lower tree or shrub layer commonly occurs, including canopy species,	No concern at present	Least concern	Sparse

	<i>Grevillea spp.</i> and <i>Petalostigma spp.</i> The ground layer is tussock grasses, including <i>Schizachyrium fragile</i> , <i>Heteropogon spp.</i> and <i>Aristida spp.</i> Occurs on undulating sand sheets on Mesozoic sandstone plateaus. Red to brown sands and sandy loams. (BVG1M: 14a). Special values: None			
2.5.19b*	<i>Eucalyptus chartaboma</i> and/or <i>Corymbia pocillum</i> woodland to open forest, occasionally with <i>Eucalyptus tetradonta</i> and <i>Erythrophleum chlorostachys</i> . A lower tree or shrub layer may occur, including canopy species, <i>Petalostigma spp.</i> and <i>Acacia spp.</i> The ground layer is tussock grasses, including, <i>Schizachyrium fragile</i> and <i>Aristida spp.</i> Occurs on sand sheets on Mesozoic sandstone plateaus. Red to brown sands and sandy loams. (BVG1M: 14a). Special values: None	No concern at present	Least concern	Sparse
2.7.1x3a*	<i>Melaleuca citrolens</i> low open woodland. A sparse shrub layer may occur, including <i>Petalostigma pubescens</i> , <i>Carissa lanceolata</i> , <i>Acacia meiosperma</i> and <i>Calytrix leptophylla</i> . The ground layer is commonly bare rock with sparse grasses, including <i>Aristida spp.</i> , <i>Schizachyrium fragile</i> and <i>Eriachne spp.</i> Occurs on breakaways and outcrops of exposed ferricrete on erosional surfaces in Tertiary sand sheets. (BVG1M: 21b). Special values: Supports plants with restricted geographic ranges.	No concern at present	Least concern	Mid-dense
2.7.1x6*	<i>Triodia spp.</i> hummock grassland, commonly with emergent <i>Eucalyptus melanophloia</i> , <i>Melaleuca citrolens</i> , <i>Corymbia pocillum</i> , <i>M. stenostachya</i> and <i>Acacia meiosperma</i> . Small areas of <i>Eucalyptus melanophloia</i> and/or <i>Melaleuca citrolens</i> low open woodland with <i>Triodia spp.</i> understorey occasionally occur. Occurs on crests and slopes of lateritised, Tertiary sandstone hills. (BVG1M: 33b). Special values: Supports plants with restricted geographic ranges.	No concern at present	Least concern	Mid-dense
2.7.2x5*	<i>Acacia shirleyi</i> and/or <i>Melaleuca foliolosa</i> woodland. <i>Corymbia pocillum</i> , <i>C. setosa</i> , <i>M. citrolens</i> , <i>C. polycarpa</i> , <i>M. viridiflora</i> and <i>Corymbia grandifolia</i> subsp. <i>grandifolia</i> may occur in the canopy or as lower trees. A shrub layer may occur, including <i>Petalostigma banksii</i> , <i>Gardenia vilhelmii</i> and <i>Bossiaea armitii</i> . The ground layer is tussock grasses, including <i>Schizachyrium fragile</i> , <i>Thaumastochloa sp.</i> and <i>Eriachne spp.</i> Occurs on exposures of ferricrete in erosional, Tertiary sand sheets. Shallow to skeletal sandy soils over ferricrete. (BVG1M: 24a). Special values: Supports plant species with restricted geographic ranges.	No concern at present	Least concern	Sparse
2.10.5a*	<i>Acacia shirleyi</i> low woodland to open forest, commonly with <i>Corymbia serendipita</i> , <i>C. pocillum</i> and <i>Eucalyptus chartaboma</i> . <i>C. gilbertensis</i> , <i>Callitris intratropica</i> , <i>E. similis</i> and <i>E. tetradonta</i> occasionally occur in the canopy. A shrub layer commonly occurs, including <i>Acacia shirleyi</i> , <i>Gardenia spp.</i> and <i>Grevillea decora</i> . The ground layer is	No concern at present	Least concern	Sparse

	tussock grasses, including <i>Schizachyrium sp.</i> and <i>Cleistochloa subjuncea</i> . Occurs on Mesozoic sandstone plateaus, scarps and steps. (BVG1M: 24a). Special values: Supports plant species with restricted geographic ranges.			
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*RE not encountered as part of the initial target drillhole exploration.



LYND RESOURCES PTY LTD
EPM 26202



	Exploration Activities Of Concern Regional Ecosystems (Biodiversity Status v10.1) Drawn By: Chris Schlebusch Requested by: Richard Smith Date: 30/04/2018	[Green Box] EPM Boundary [Blue Line] Major Watercourse [Black Circle] Proposed Drill Pad (30m x 20m) [Black Line] Proposed Track (3m width)	[Yellow Box] Of Concern - Dominant
	Figure 7 Sheet No. ADMG_ARD_LYN001_MAP_0050_A	Data sources: Qld Department of Natural Resources and Mines, National Native Title Tribunal Geoscience Australia, Esri	

3.2 Wildlife Corridors

Vegetation communities along watercourses and drainage features not only function as habitat for particular fauna but also as a movement corridor. According to the Vegetation Management Watercourse and Drainage Feature Mapping for the area, the proposed tracks will not intersect any corridors of regulated vegetation. The disturbance at the start of the project access track to Oruro 1 will involve very minor clearing of a ‘of concern’ riparian vegetation community corridor associated with Pelican Creek.

There are no known Groundwater Dependent Ecosystems (GDE) mapped nearby to the proposed disturbance areas.

3.3 Water Quality

The exploration activities will occur in the upper catchment of the Staaten River sub-basin. The location of the proposed exploration is very remote with little to no data on the water quality of watercourses within the upper catchment of the Staaten Basin. Drainage from the Oruro sites will flow into Pelican Creek before it converges with the Red River which then diverges into back into Pelican Creek and Wyaaba Creek. The watercourses then converge again into the Wyaaba Creek before flowing into the Staaten River which ultimately flows into the Gulf of Carpentaria. There are no open or closed DNRME gauging stations downstream of the Oruro sites. There is currently only one open DNRME gauging station within the Staaten Basin. While this gauging station will not display the exact characteristics of the exploration sites, the Staaten River at Dorunda gauging station will provide some insight to the characteristics of the catchment.

Water quality characteristics and flow conditions can be observed in **Table 8** and **Table 9**. Water flow in the catchment is seasonal, exhibiting large flows throughout the wet season from December to April before flows decrease dramatically over the dry season.

Table 8 Water Quality Characteristics at Site 918003A Staaten River at Dorunda (Queensland Government, 2018)

Parameter	Count	Mean	Median
EC @ 25°C (µS/cm)	22	52.19	48
pH	22	6.98	6.92
Turbidity (NTU)	22	7.19	6.5
Total Nitrogen (mg/L)	19	0.42	0.38
Total Phosphorous (mg/L)	19	0.07	0.04

Table 9 Water Flow Volume (ML) at Site 918003A Staaten River at Dorunda (Queensland Government, 2018)

Month	Daily				Monthly
	Max	Min	Mean	Median	Mean
January	92107	0	11720	862	358168
February	98090	0	23382	9331	635999
March	98712	11	19667	7733	609675
April	93797	0	3682	583	108850
May	30996	0	508	55	15441
June	2917	0	74	2	2176
July	407	0	10	0	318
August	31	0	1	0	16
September	1	0	0	0	0
October	508	0	1	0	31
November	3162	0	20	0	589
December	72052	0	1313	0	39923
All months	98712	0	4717	0	141722

In terms of groundwater, the Oruro project is situated on the Great Artesian Basin in the Gulf Gilbert River Aquifer area. There are no known artesian springs located near the Oruro sites. The nearest registered groundwater bore within the catchment is bore RN14732 located approximately 23km from Oruro 1, the most recent water quality analysis conducted at this location was on 29 October 1968.

3.4 Hydrological Processes

The nearest Water Act defined watercourse (Pelican Creek) is approximately 200m west of the beginning of the access track and is situated approximately 800m south of Oruro 2, the closest drillhole. There will be eighteen non-perennial lakes situated within 2km of the access track or drill pads, with the closest located approximately 350m from the beginning of the access track. These non-perennial lakes appear to be associated with Pelican Creek as they are all located within 350m of Pelican Creek. There will not be any dams, waterholes or springs located near the proposed exploration activities.

3.5 Geomorphic Processes

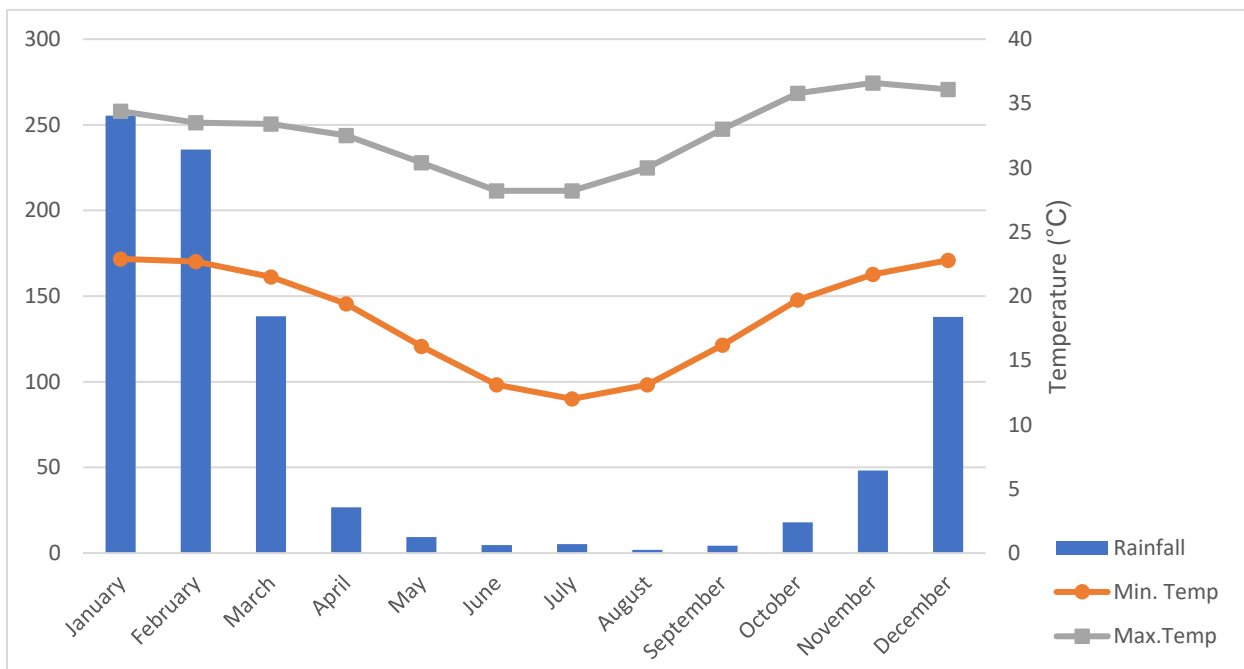
Drillholes will encounter sedimentary rocks of the Karumba and Carpentaria Basins before bottoming in Palaeozoic rocks, possibly volcanic or intrusive rocks. Several aquifers occur in the Karumba and Carpentaria Basin stratigraphy likely to be encountered, including weakly to moderately producing aquifers of the Gilbert River Formation, which is a sub-artesian to artesian aquifer.

3.6 Beneficial Flooding

The proposed areas of disturbance are not situated in the mapped rapid hazard assessment for floodplain areas which are potentially at threat of inundation.

3.7 Climate

The region is characterised by having a distinct wet and dry season, the mean annual rainfall for the region is 882.9mm with 87% of the annual rainfall falling between December and March. Daily minimum temperatures range from 12°C in winter to 22.9°C in summer and maximum temperatures range from 28.2°C in winter to 36.1°C in summer (**Figure 8**).



Rainfall data taken from Abingdon Downs Station weather station located approximately 23km from the Oruro sites using monthly rainfall data beginning in 1945. The temperature data is taken from the Georgetown Post Office weather station located approximately 107km from the Oruro Sites. Monthly data used for mean maximum temperature is from 1909 to present while the mean minimum temperature is from 1894 to present.

Figure 8 Monthly mean rainfall, minimum and maximum temperatures for the region (BOM, 2018)

3.8 Land Use

The land use of the surrounding area is classified as grazing native vegetation with the land use on Lot 171 on E1835473 being a cattle station owned by Keough Cattle Co. Pty Ltd.

4. Potential Impacts on Environmental Attributes

To address Section 9 of the RPI Regulation (as shown in Section 3 of this Report), sub-sections 4.1 to 4.5 below detail the required outcomes in relation to:

- Riparian process;
- Wildlife corridors;
- Water quality;
- Hydrologic processes and beneficial flooding; and
- Geomorphic processes.

The botanist-ecologist will prepare a summary report tabulating information about all regulated waterways and other MSESs encountered during track and pad layout. The report will include a description and specific details of the MSES, a description of alternative routes/locations (where there are any), a brief discussion of matters considered in determining the most appropriate route/location, and an outline of residual environmental impacts (if any). The report will be accompanied by spatially referenced photographs and maps as relevant, and be available prior to site disturbance.

4.1 Riparian Process

The proposed exploration activities may have a slight impact on riparian vegetation as the beginning of the access track begins in a mixed polygon of dominant 'of concern' RE 2.3.26a/2.3.41/2.3.29a/2.3.55b. These REs are associated with riverine wetlands, palustrine wetlands and floodplains. Review of satellite imagery would suggest the disturbance would involve RE 2.3.41 composing of *Aristida dominii*, *Eriachne spp.* and *Chloris lobata* annual tussock grassland. The disturbance would be <0.03ha of this grassland and clearing is likely to not be required at all. The proposed exploration activities will not result in any disturbance to regulated vegetation.

A protected plant trigger search indicated there are no protected plants in or near the proposed disturbance area. Notwithstanding, the wetland REs (i.e. REs 2.3.26a and 2.3.55b) may be habitat for *Eriocaulon carsonii* which is listed as endangered within Queensland and Nationally. In the initial drill program there will only be approximately 50m of crossing within these REs. The REs on Landzones 5, 7 and 10 may be habitat for *Macropteranthes montana*, an *Environmental Protection and Conservation Biology (EPBC) Act 1999* protected matters search indicates the plant is likely to occur within 1km of all drill sites. The protected matters search also indicated that *Cajanus mareebensis* may occur within 1km of each of the drill sites, however, there are no REs appropriate for *Cajanus mareebensis* in the proposed disturbance area. Both *Eriocaulon carsonii* and *Macropteranthes montana* will be surveyed for during track layout and if appropriate habitat is encountered for *Cajanus mareebensis* the plant will also be surveyed for. A qualified botanist-ecologist will be on-site pre-clearance to ensure that these species are avoided.

Desktop and preliminary investigations have considered riparian ecosystems and therefore, there is no current intention to have further setback areas for this particular project. The proposed activities will not cause widespread or irreversible impacts to the riparian processes in the region, as:

- exploration activities will be small-scale, of a temporary nature and conducted during the dry season;
- widespread areas of riparian vegetation will not be cleared;
- disturbance rehabilitation will occur immediately after works have been completed; and
- all activities and disturbance rehabilitation will be in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)*.

4.2 Wildlife Corridors

The proposed routes for the access tracks will minimise isolation, fragmentation and edge effects as access tracks will only be 3m wide. Wildlife corridors in the exploration area will largely involve the vegetation community associated with Pelican Creek in addition to RE 2.10.5a occurring on a small scarp being crossed between Oruro 2 and Oruro 3. The fauna in the region using the corridors of particular vegetation communities should not be impacted through the temporary disturbance of the 3m wide access track.

The clearing of vegetation will minimise the clearing of mature native trees and all disturbance will be rehabilitated as soon as practical following the conclusion of geological interest in the region. The exploration activities will not compromise the preservation of wildlife corridor function of the riparian vegetation as the connection between native terrestrial vegetation along and across any watercourse systems will maintain sufficient migration, shelter and habitat and will not impede passage for aquatic/marine fauna along watercourses.

Much of the proposed Oruro exploration activities occur within a designated precinct corridor. During the access track refinement process it was proposed to possibly move as much of the access track outside much of this designated precinct, in particular the access track between Oruro 1 and Oruro 2. However, moving the access between these two drill holes would firstly, increase the total amount of disturbance and secondly, disturb denser vegetation. Therefore, the decision was made to keep the access track more direct and inside the designated precinct than moving the track outside the designated precinct where greater environmental disturbance would occur.

As described in **Table 7**, REs 2.3.29a, 2.3.29c and 2.5.14c may provide habitat for the Golden-Shouldered Parrot (*Psephotus chrysopterygius*) which is listed as endangered in Queensland (*Nature Conservation Act 1992*) and Nationally (EPBC Act). The Golden-Shouldered Parrot nests in termite mounds, and as such termite mounds will be surveyed for and avoided during exploration activities within this RE.

There are no permanent waterholes and springs nearby that will be impacted as a result of the exploration activities.

4.3 Water Quality

The proposed exploration activities will occur in the dry season with minimal if any precipitation falling resulting in reduced watercourse flows in the region. As illustrated in **Figure 8**, the mean average rainfall during proposed exploration activities occurring within September and October is 4.3mm and 18mm respectively. During exploration activities, the physical, chemical and biological water quality immediately downstream of the activities will remain consistent with water quality immediately upstream of the activity. Therefore, there will be negligible impacts on the physical, chemical and biological attributes that support and maintain natural aquatic and terrestrial ecosystems in the area.

In regard to drilling, each drill hole is expected to be completed in 2 to 5 days. The drilling and casing methodology will be undertaken in a manner to case off any aquifers encountered in the overburden. There may be some additives added to the water recirculated in the drill hole to improve drilling conditions, including materials such as bentonite clay. The drill fluid is recirculated within the casing (once placed) in the upper part of the drill hole, and therefore there will be little, if any exchange with the near surface aquifers. Deeper in the hole, pore pressure in the basement rock are such that drilling fluids will not migrate out of the drill hole. Therefore, there should be no impact on groundwater quality from the drilling.

Upon completion of drilling, the drill hole will be backfilled to surface with grout (cement) so as to fully seal the drill hole. This will ensure that any aquifers encountered are fully sealed and there can be no connection between aquifers, nor surface seepage. Therefore, there should be no impact on aquifer pressure from the drilling. Suitably qualified and experienced drillers (for artesian conditions) will supervise the drilling.

All drill sites and associated sumps will be rehabilitated in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)*. Due to the high evaporation rates in the region, drill water remaining in the sumps will likely evaporate within two to three weeks. Temporary fencing of the sumps will occur to prevent cattle or wildlife access. Once dry, rehabilitation of the site will occur with the bentonite clay material remaining at the bottom of the sumps to be covered with the stockpiled subsoil and topsoil. Timing of all activities will aid in minimising surface water impacts.

4.4 Hydrologic processes and beneficial flooding

The proposed access tracks will be constructed and used in the dry season and will have minimal influence on the gradient of the land to ensure the overflow or flow of surface water in or out of a watercourse will not be inhibited. As detailed in **Table 9**, mean monthly water flow at the DNRME water monitoring site 918003A Staaten River at Dorunda during the planned period of exploration in September and October is 0ML and 31ML respectively. This site is located within a higher order stream and significantly downstream of proposed activities. Therefore, it would be considered that watercourse flows will be minimal if at all throughout the exploration area during the time of exploration activities. Crossings of minor drainage features should not impact any waterflow. The exploration activities will not alter the natural patterns

and levels of runoff, stream flow and connectivity with other elements of the river and flood plain system to the extent of causing significant adverse outcomes.

Exploration activities are proposed to occur in the dry season (April to October), specifically in September and October when monthly rainfall is 4.3mm and 18mm respectively. However, although not proposed, activities may extend into mid-November where an average rainfall of 48.2mm (median of 34.2mm) is expected occur during the month. In the region, the month of November has also experienced minimal rainfall, especially throughout the first half of the month. In the last five years, there has been an average of 8.48mm of rainfall in the first twenty days of November. During November 2017, there was 1mm of rainfall up until the 20th day of the month and during November 2016 there was only 10mm of rainfall in the entire month (BOM, 2018). If activities do extend into mid-November it is unlikely that there will be sufficient rainfall in the region to increase the exploration activities disturbance on environmental attributes.

The proposed activities will not be situated near any major watercourses or floodplains that have the potential of being inundated. In addition, the proposed activities will not compromise beneficial flooding where the activity will alter natural flow paths and the natural extent of flooding across the floodplain.

4.5 Geomorphic processes

The proposed exploration activities will not have widespread or irreversible impact on the natural erosion and transport and deposit of sediment by water throughout the catchment. As activities will occur in the dry season when negligible precipitation is expected, and water flow is heavily reduced, the transport and deposit of sediment by water throughout the catchment will be minimal reducing the possibility of any widespread or irreversible impacts. The exploration activities will not compromise the preservation of the natural erosion, transport and deposition of sediments by water throughout the catchment. Whereby, activities will not alter the delivery of sediment to the river system from adjacent lands and the erosion of the bed, banks and floodplains to the extent of causing significant adverse outcomes.

Erosion and sediment control may be required for both the access tracks, drill pads and other disturbance areas. Measures will be undertaken in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)* and in line with the guiding principles contained within the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control (BPESC) manual.

For the access tracks, drill pads and other disturbance areas, it will be the intention to:

- Select appropriate areas (for example: avoiding areas of environmental significance, retention of mature or habitat trees, minimise vegetation clearing, retain rootstock where practicable);
- Ensure the effect of exploration activities are minimised on surrounding vegetation or watercourses.

To meet these key principles, following appropriate site selection, mitigation measures such as the following will be implemented as necessary:

- Minimise all vegetation clearing;
- Store topsoil and subsoil for use in rehabilitation;
- Ensure all fuel is appropriately banded;
- Store all exploration materials (drilling muds etc) on pallets;
- Construct all drill pads on flat surfaces;
- Stabilise access tracks wherever necessary and, if necessary, employ geotextile;
- Repair any damage caused by traffic as soon as practicable;
- Limit traffic along the access tracks;
- Direct all drilling muds to appropriately-sized sumps;
- Conduct regular inspections for fuel discharge, and sedimentation and erosion, as a result of exploration activities; and
- Commence rehabilitation as soon as practicable after final use.

5. Regional Planning Interests Regulation 2014 Assessment Criteria

Schedule 2, Part 5 of the RPI Regulation provide criteria for the assessment or decision of the RPI application. The required outcome and prescribed solutions are detailed below in **Table 10**. This table provides a summary of the details described in this report against the assessment criteria.

Table 10 Criteria for assessment or decision in a SEA

Schedule 2 Part 5 of the RPI Regulation	Response
Required Outcome	Response
(14) The activity will not result in a widespread or irreversible impact on an environmental attribute of a strategic environmental area.	The proposed activities will not result in widespread or irreversible damage to the environmental attributes listed in s9 of the RPI Regulation for the Gulf Rivers SEA as described in Sections 4.1-4.5 of this report (and summarised in the response components of this table, below).
Prescribed Solution	Response
(15)(1) The application demonstrates either – (a) the activity will not, and is not likely to, have a direct or indirect impact on an environmental attribute of the strategic environmental area; or	<i>Note: this application addresses the requirement of section 15(1)(b)</i>
(b) all of the following – (i) if the activity is being carried out in a designated precinct in the strategic environmental area – the activity is not an unacceptable use for the precinct;	The will be activity that occurs within a designated precinct. However, the proposed activities do not include any of the unacceptable uses listed in Schedule 2 Part 5 s15(2).
(ii) the construction and operation footprint of the activity on the environmental attribute is minimised to the greatest extent possible;	<ul style="list-style-type: none"> • Desktop investigations have been conducted to refine the access tracks to the drill sites in order to minimise the operational footprint on environmental attributes. Figure 5 details the various access track options reviewed. Environmental attribute impacts (such as vegetation removal and crossing of minor drainage features) were considered before a final route selection was decided upon (the route as seen in Figure 1, Figure 6 and Figure 7). • Searches of Queensland (MSES, RE, ESA, Vegetation Management Watercourse and Drainage Features and Protected Plants Flora Survey Trigger) and Commonwealth (EPBC Act) databases have been undertaken. • A desktop assessment by a qualified ecologist has occurred and recommended changes to site access and drill hole locations have been implemented.

	<ul style="list-style-type: none"> • Site access construction will be limited to a 3m wide track. • Drill pads are limited to 20m x 30m, with temporary fuel storage and laydown areas and mobile campsite areas limited to 20m x 20m. • During on-site access road construction and drill pad location, all mature trees and areas of ecological significance will be avoided. A botanist-ecologist will be present during marking out to determine the most appropriate and environmentally sensitive route to take across or around MSES waterways. The botanist-ecologist will prepare a summary report tabulating information about all regulated waterways and other MSESs encountered during track and pad layout. The report will include a description and specific details of the MSES, a description of alternative routes/locations (where there are any), a brief discussion of matters considered in determining the most appropriate route/location, and an outline of residual environmental impacts (if any). The report will be accompanied by spatially referenced photographs and maps as relevant, and be available prior to site disturbance.
<p>(iii) the activity does not compromise the preservation of the environmental attribute within the strategic environmental area;</p>	<ul style="list-style-type: none"> • Desktop investigations have been conducted to refine the access tracks to the drill sites in order to minimise the operational footprint on environmental attributes. • The exploration activities will have minimal impacts on the natural hydrologic processes of the area with waterflows related to watercourses, floodplains and groundwater will be minimal due to activities being conducted in the dry season when precipitation and waterflow is very low. • The activities will have minimal impacts on geomorphic processes of the area through limited impact to the natural erosion of the region, in addition to the movement of sediment by water throughout the catchment as waterflow will be minimal in the dry season. • A desktop assessment by a qualified botanist-ecologist has occurred and recommended changes to site access and drill hole locations have been implemented. Based upon this

	<p>desktop assessment, it is considered that only minor disturbance to the wildlife corridors in the area will occur. Due to the small-scale and temporary nature of the exploration works, it is unlikely to create widespread or irreversible impact to the functioning of the wildlife corridors.</p> <ul style="list-style-type: none"> • Although minor disturbance to the riparian area will occur, due to the small-scale and temporary nature of the exploration works and the fact that works will be conducted only during the dry season, it is considered unlikely that there will be widespread or irreversible impact to the functioning riparian processes. Mitigation measures will be employed as required. • An ecological field assessment will be undertaken, and access track and drill site locations will be amended if required, as part of the impact minimisation process. • Water quality in the region that supports and maintains natural aquatic and terrestrial ecosystems will not be impacted as no major watercourses will be disturbed. With only minor drainage features being crossed with no flow likely to be present at this proposed time of year. • All drill site and associated sumps will be rehabilitated in accordance with the <i>Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)</i>. Due to the high evaporation rates in the region, drill water remaining in the sumps will likely evaporate within two to three weeks. Temporary fencing of the sumps will occur to prevent cattle or wildlife access. Once dry, rehabilitation of the site will occur with the bentonite clay material remaining at the bottom of the sumps to be covered with the stockpiled subsoil and topsoil. Timing of all activities will aid in minimising surface water impacts.
<p>(iv) if the activity is to be carried out in a strategic environmental area identified in a regional plan – the activity will contribute to the regional outcomes, and be consistent with the regional policies, stated in the regional plan.</p>	<p>The Far North Queensland Regional Plan 2009-2031 does not identify the Gulf River SEA.</p>

6. Conclusion

Lynd Resources intends to conduct a small-scale exploration drilling programme within its granted EPM 26202. As part of this programme, one initial drill pad will be constructed. Should results from this drilling prove encouraging, a further three drill pads will be installed. To access these sites, a 3m wide access track will be constructed.

Disturbance areas are detailed in **Table 2** of this Report and are summarised below:

- Drill pads - initially 0.06ha (1 x 20m x 30m) up to a maximum of three drill pads (a further 0.12ha);
- Access track – initially 1.04ha (to access the first drill pad), with an additional 1.25ha of disturbance for the final two drill pads should they be required;
- Temporary fuel storage and laydown area – 0.04ha (20m x 20m);
- Temporary mobile campsite - 0.04ha (20m x 20m).

Therefore, the initial total disturbance for the one target site is 1.18ha, with a maximum disturbance total of 2.55ha. The vast majority of this is created by the access track to the drill sites which has been minimised to a 3m wide corridor to limit broader disturbance. The largest area of disturbance in any one location is 0.06ha (20m x 30m), which is the size of the drill pad.

In line with Section 15 (1)(b) of the RPI Regulation, it is not considered that the proposed activities will cause widespread or irreversible impacts to the SEA in the region, as:

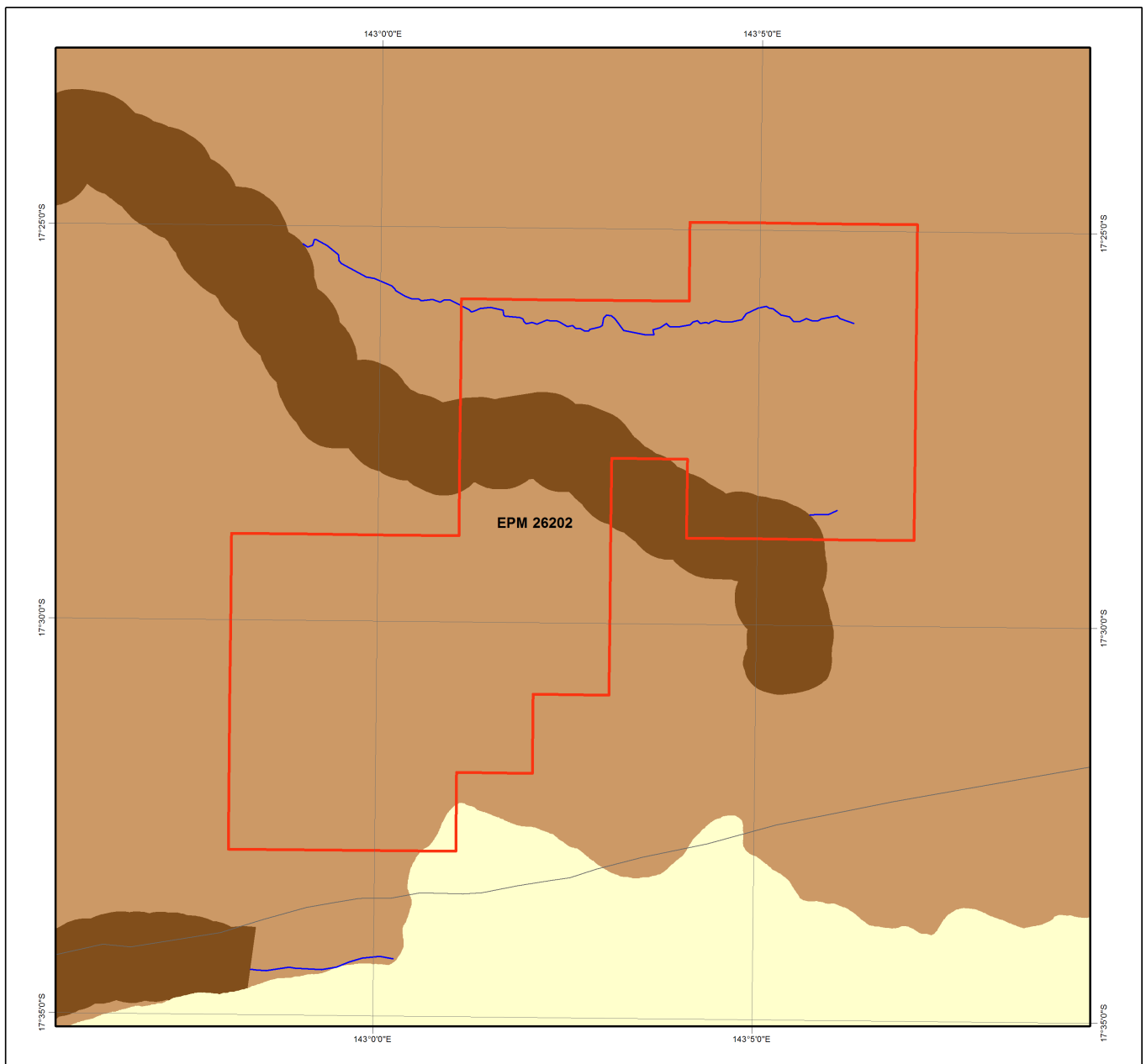
- The activity will be carried out in a designated precinct, but none of the activities are considered an unacceptable use, as listed in Schedule 2 Part 5 s15(2) of the RPI Regulation;
 - exploration activities will be small-scale, of a temporary nature and conducted during the dry season;
 - drilling at each site is expected to be completed within two to five days;
 - searches of appropriate State and Commonwealth databases have been undertaken and desktop assessment by a qualified botanist-ecologist has been included in the final selection of drill sites and preferred access routes;
 - the botanist-ecologist will be on-site during site marking to ensure that areas of ecological significance are avoided or impact to them is minimised;
 - widespread areas of riparian vegetation will not be cleared;
 - disturbance rehabilitation will occur as soon as possible after works have been completed; and
 - all activities and disturbance rehabilitation will be in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects – Version 2 (2016)*.
-

7. References

- Bureau of Meteorology (BOM) 2018, Monthly rainfall Abingdon Downs Station, accessed 20 March 2018, <http://www.bom.gov.au/jsp/ncc/cdio/wData/wdata?p_nccObsCode=139&p_display_type=dataFile&p_stn_num=030000>.
- BOM 2018, Monthly mean maximum temperature Georgetown Post Office, accessed 20 March 2018, <http://www.bom.gov.au/jsp/ncc/cdio/wData/wdata?p_nccObsCode=36&p_display_type=dataFile&p_stn_num=030018>.
- BOM 2018, Monthly mean minimum temperature Georgetown Post Office, accessed 20 March 2018, <http://www.bom.gov.au/jsp/ncc/cdio/wData/wdata?p_nccObsCode=38&p_display_type=dataFile&p_stn_num=030018>.
- Queensland Government 2018, 918003A Staaten River at Dorunda, accessed 20 March 2018, <<https://water-monitoring.information.qld.gov.au/>>.
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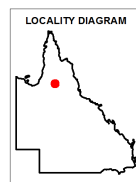
RPI DEVELOPMENT APPLICATION SUPPORTING INFORMATION
LYND RESOURCES PTY LTD

Appendix 1: Environmental Reports



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- | | |
|---|---|
| Selected Exploration Permit Mineral (EPM) | CATEGORY C |
| CATEGORY A | Nature Refuges |
| National Parks | Resources Reserve |
| Conservation Parks | State Forests |
| Forest Reserves | Timber Reserves |
| Wet Tropics World Heritage Area | Declared Catchment Areas |
| Great Barrier Reef Marine Park Area | Declared Irrigation Areas |
| Marine Parks other than General Use Zones | Drainage Areas |
| CATEGORY B | River Improvement Areas |
| World Heritage Areas | Stanbroke DLA |
| Queensland Heritage Register Places | Coastal Management District |
| Ramsar Sites | Dams and Weirs |
| Cultural Heritage Registered Areas and DLA's other than Stanbroke | OTHERS |
| Special Forestry Areas | Towns |
| Fish Habitat Areas | Roads |
| Koala Plan | Repealed Wild River Nominated Waterways |
| Coordinated Conservation Areas | Repealed Wild River Preservation Areas |
| Endangered Regional Ecosystems (Biodiversity Status) | Repealed Wild River High Preservation Areas |
| Marine Parks other than General Use Zones | Mahogany Glider Habitat |
| Marine Plants | Directory of Important Wetlands |
| | Queensland |



This product is projected into GDA 1994 MGA Zone 54

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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.

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ORURO 1 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.02452 Latitude: -17.45324 with 2 kilometre radius

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

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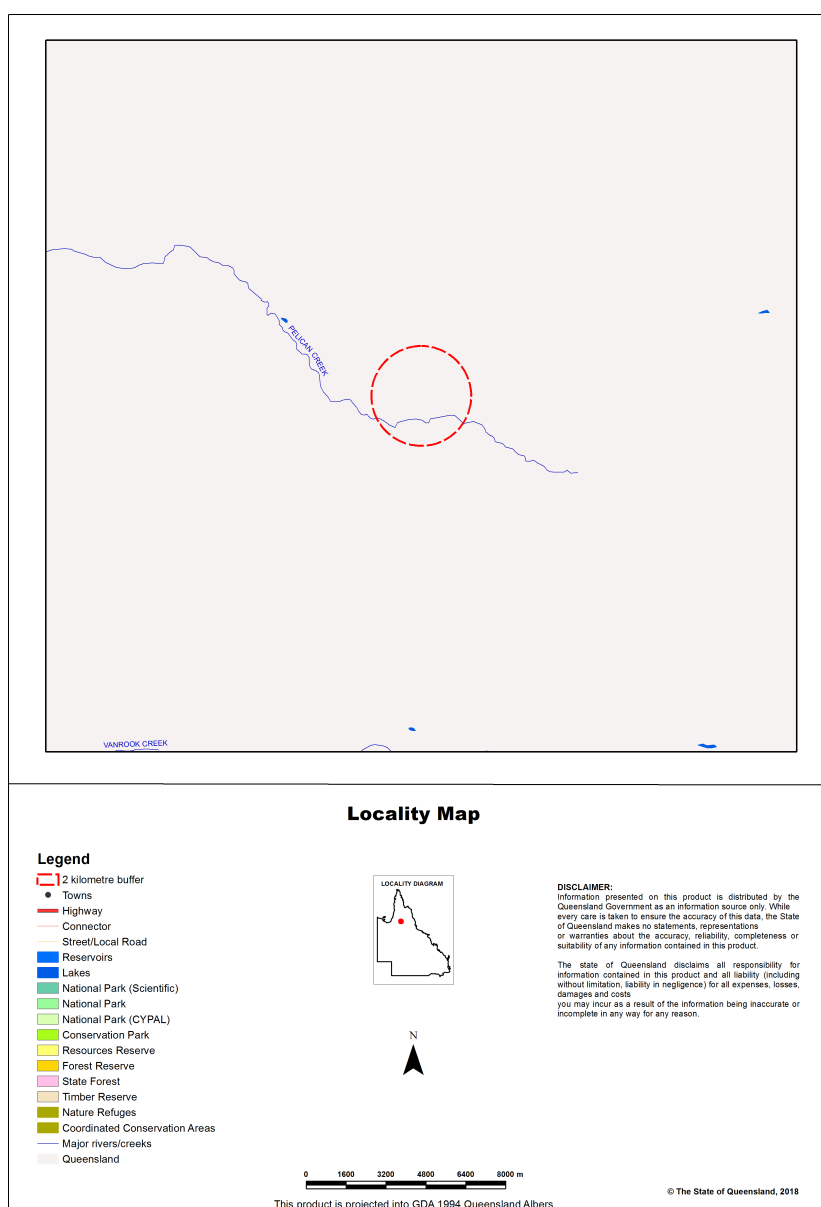
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Assessment Area Details

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 Longitude: 143.02452 Latitude: -17.45324 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten



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)	668.91 ha	53.2%
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)	0.0 ha	0.0 %
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	0.0 ha	0.0 %
8e Regulated Vegetation - intersecting a watercourse **	9.3 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
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)

Regional planning interest type	Region	Status
Strategic Environmental Area - Designated Precinct	Gulf Rivers	Current - June 2014

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)

Not applicable

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

Not applicable

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)

Not applicable

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Not applicable

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

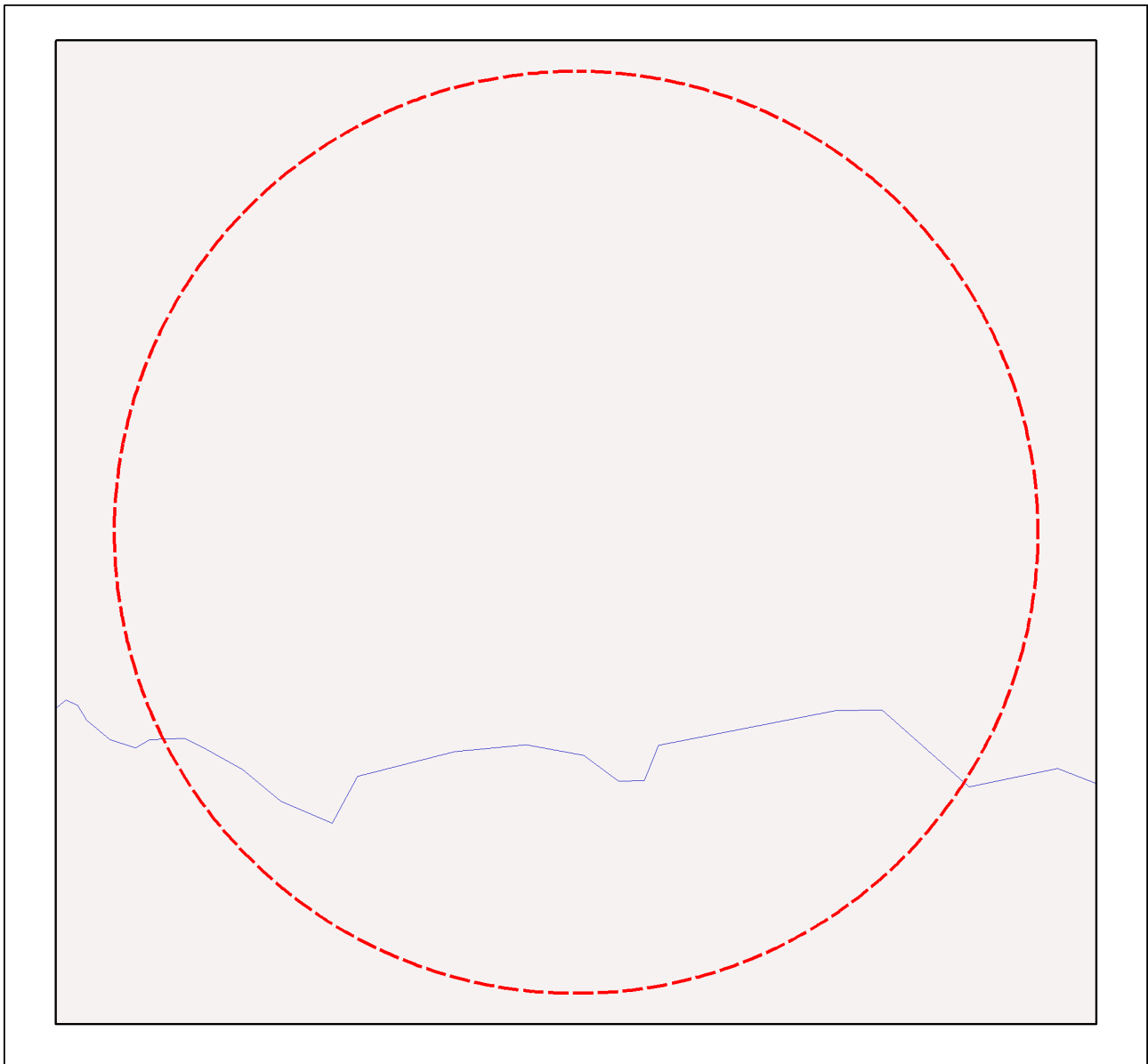
(no results)

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

(no results)









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

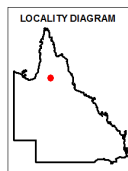
Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Protected area (estates)
-  Declared fish habitat area (A and B areas)
-  Marine park (highly protected)



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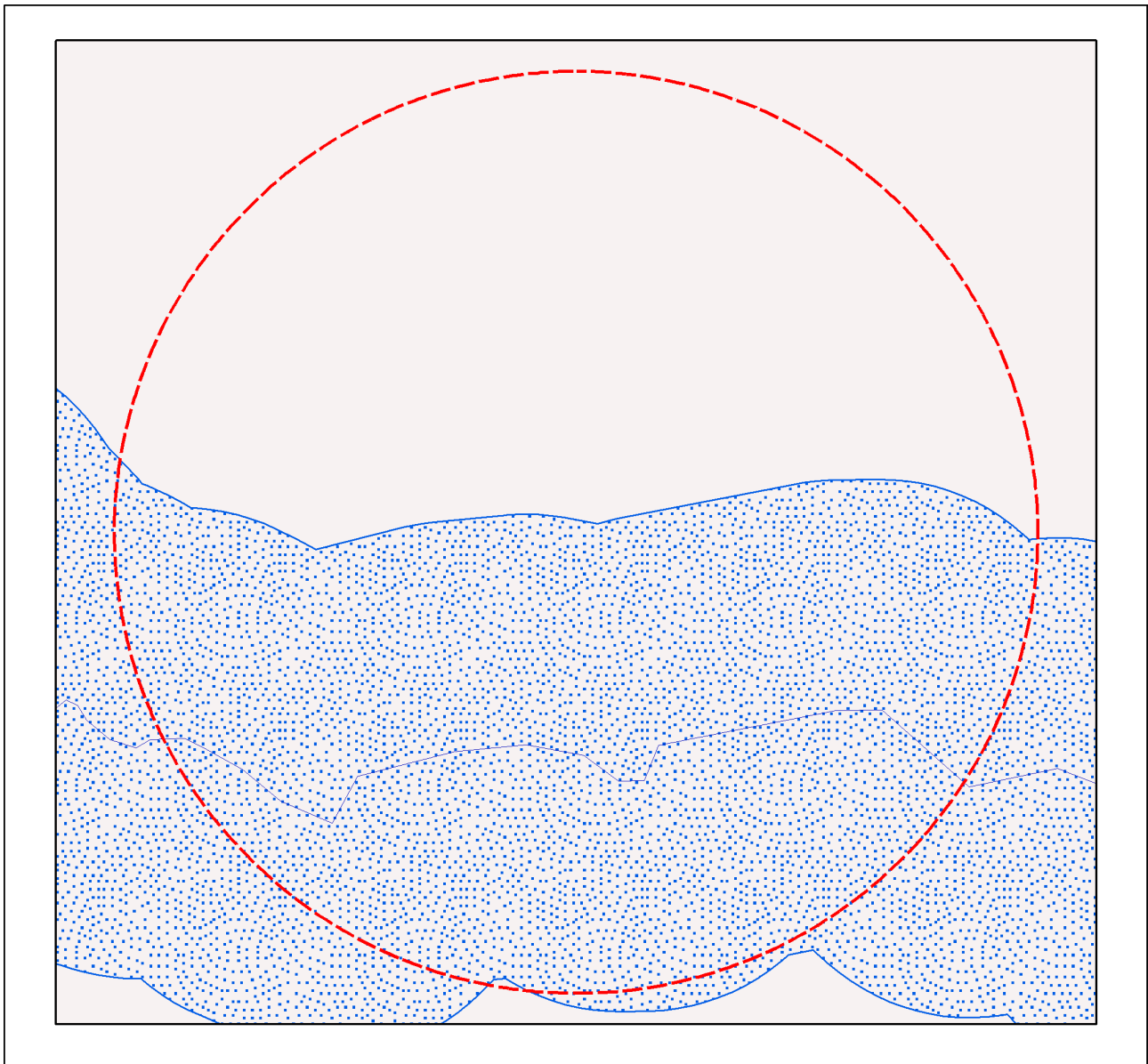
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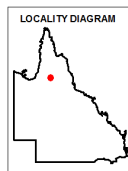
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Declared high ecological value waters (watercourse)
-  Strategic environmental area (designated precinct)
-  Declared high ecological value waters (wetland)
-  High ecological significance wetlands



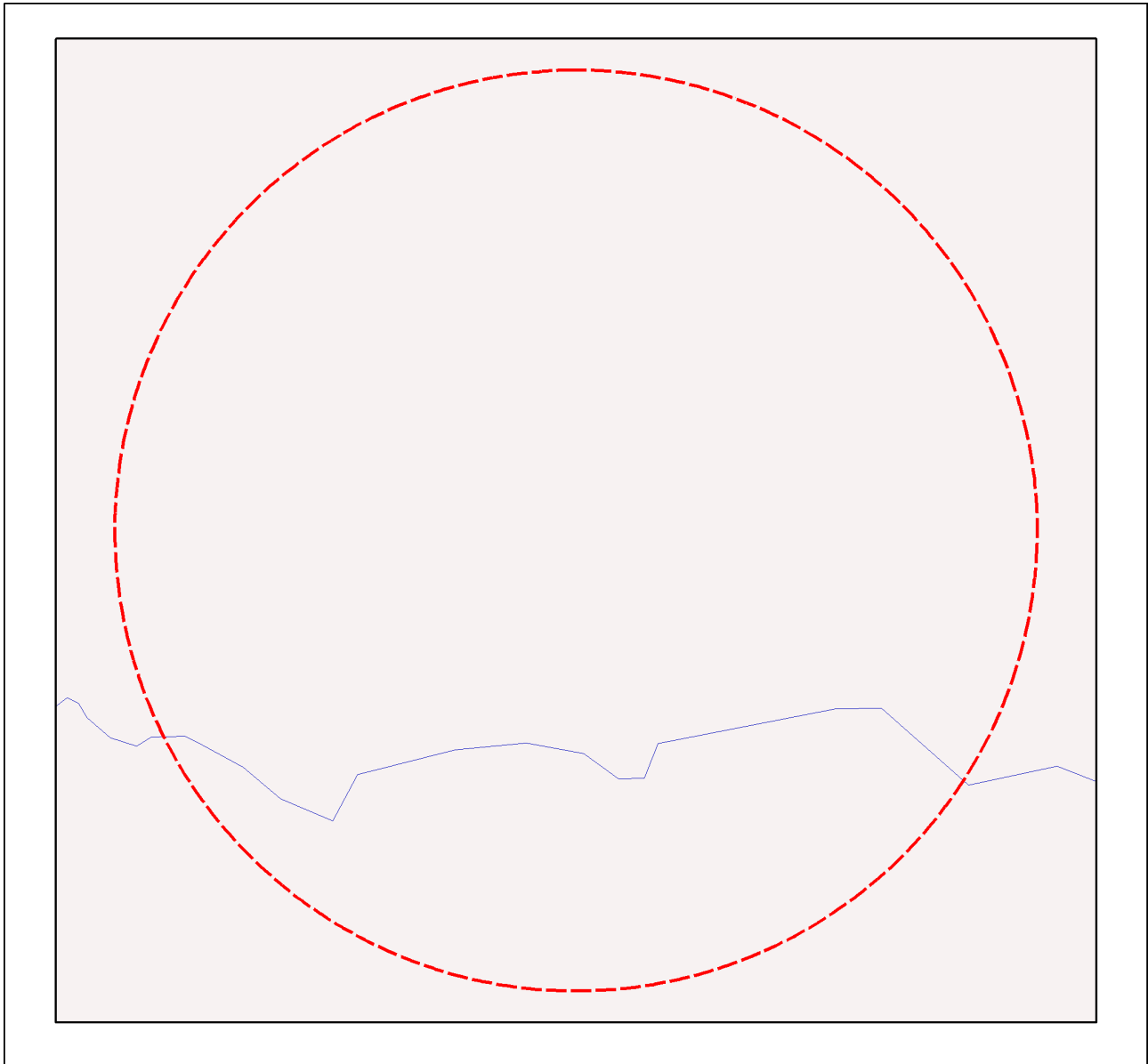
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



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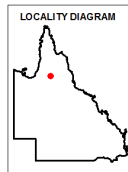
Map 3 - MSES - Species



MSES - Species

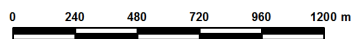
Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Threatened wildlife and special least concern animal



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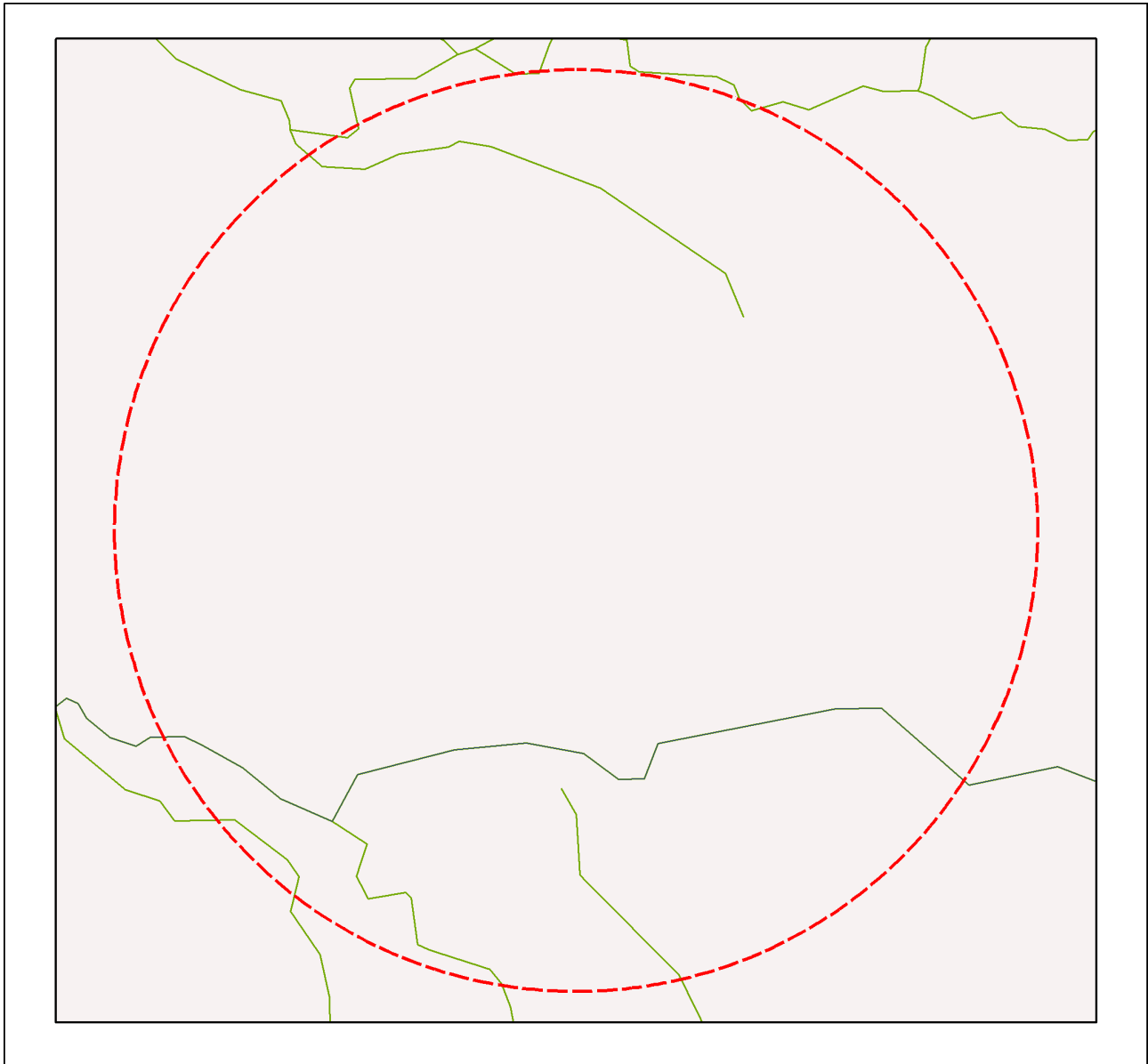
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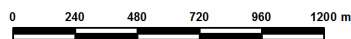
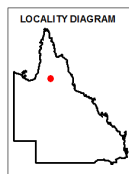
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

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



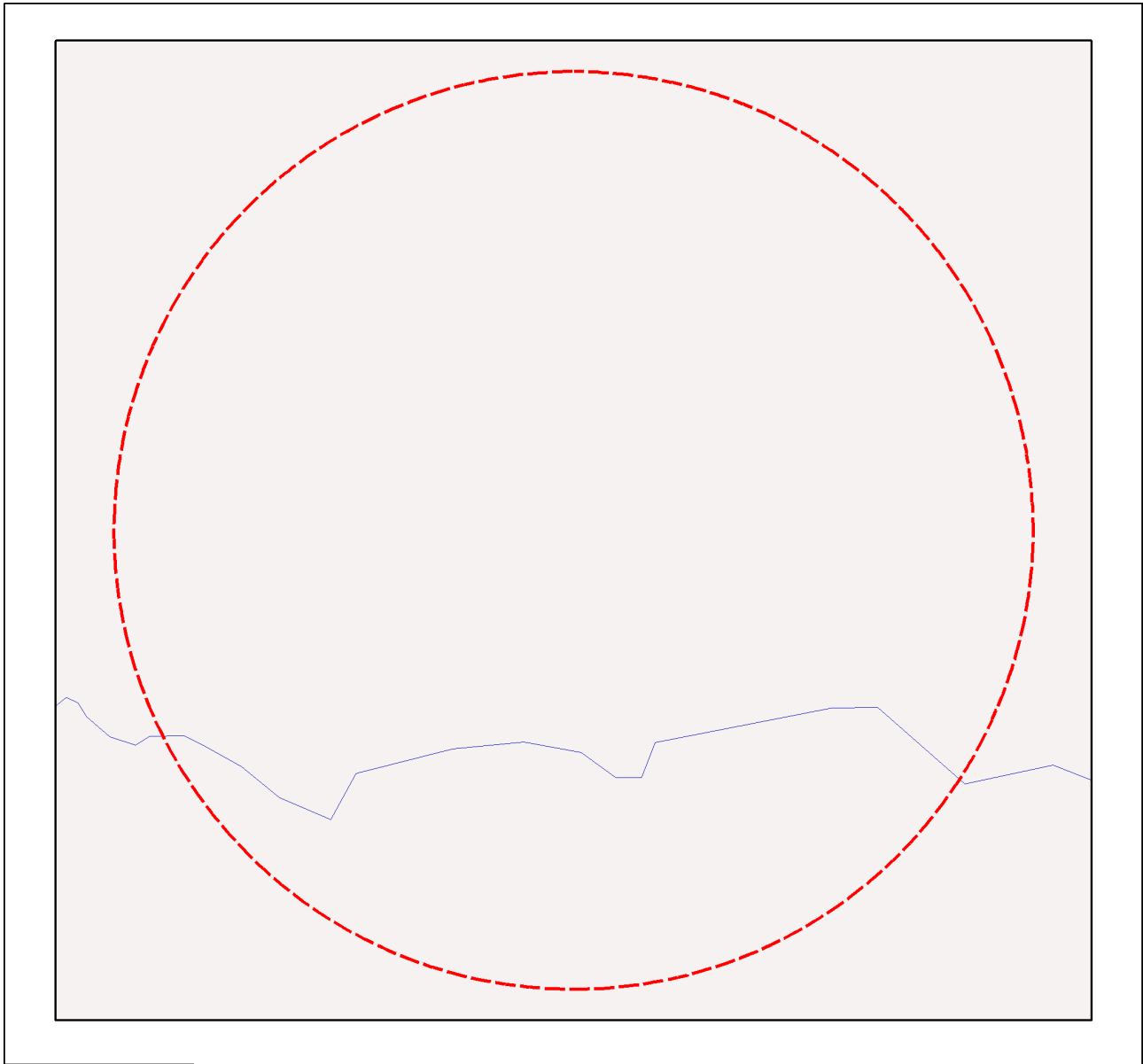
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



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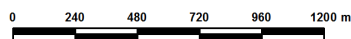
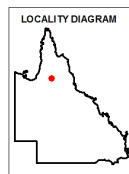
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Legally secured offset area (offset register)
-  Legally secured offset area (vegetation offsets)



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Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). 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.information.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	- <i>Environmental Protection Act 1994</i>
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	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>



Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Longitude: 143.02452 Latitude: -17.45324 with 2 kilometre radius

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.



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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: Longitude: 143.02452 Latitude: -17.45324 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	72.83	5.8
No concern at present	1,183.72	94.2
Total remnant vegetation	1,256.55	100.0

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
2.10.5a	Acacia shirleyi woodland and Triodia pungens hummock grassland on scarps and stony ledges	No concern at present	14.07	1.12
2.3.26a	Eucalyptus camaldulensis +/- Melaleuca spp. woodland fringing sandy, seasonal channels	Of concern	54.46	4.33
2.3.29a	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	102.93	8.19
2.3.29c	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	339.16	26.99
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	184.48	14.68
2.3.41	Aristida dominii, Eriachne spp., Chloris lobata +/- Eragrostis basedowii, Iseilema sp. tussock grassland on active Quaternary alluvial plains of major watercourses	Of concern	18.37	1.46
2.3.54	Corymbia polycarpa +/- Melaleuca viridiflora open woodland fringing minor watercourses on Tertiary sand sheets in the north-east	No concern at present	12.5	1.0
2.3.55b	Seasonal swamps (wooded). Melaleuca viridiflora and/or M. clarksonii low woodland in closed depressions on Tertiary to Quaternary deposits in the north	No concern at present	30.59	2.43
2.5.14c	Melaleuca spp. low woodland on plains on earths and podsolics (south)	No concern at present	175.96	14.0
2.5.17a	Melaleuca citrolens and/or M. stenostachya low open woodland on Tertiary outwash deposits and sand sheets in the east	No concern at present	55.86	4.45
2.5.19a	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	19.74	1.57
2.5.19b	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	15.79	1.26

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
2.5.26	Eucalyptus melanophloia, Acacia julifera subsp. gilbertensis, Corymbia setosa and Melaleuca spp. in mixed low woodlands on Tertiary sand sheets	No concern at present	53.34	4.25
2.5.5a	Eucalyptus tetrodonta and Corymbia polycarpa open woodland on pale earths and sands on plains	No concern at present	34.39	2.74
2.7.1x2a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	11.09	0.88
2.7.1x3a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	27.44	2.18
2.7.1x4	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	7.77	0.62
2.7.1x6	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	10.12	0.81
2.7.2x5	Acacia shirleyi, Eucalyptus shirleyi, Corymbia setosa subsp. pedicellaris or Melaleuca acacioides woodland on low scarps on skeletal soils	No concern at present	88.49	7.04

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
2.10.5a	Pre-clearing 373000 ha; Remnant 2015 373000 ha	24a	None	High
2.3.26a	Pre-clearing 254000 ha; Remnant 2015 252000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
2.3.29a	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.29c	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.41	Pre-clearing 86000 ha; Remnant 2015 84000 ha	31a	Floodplain (other than floodplain wetlands).	Low
2.3.54	Pre-clearing 97000 ha; Remnant 2015 97000 ha	16b	Riverine wetland or fringing riverine wetland.	High
2.3.55b	Pre-clearing 65000 ha; Remnant 2015 65000 ha	34c	Palustrine wetland (e.g. vegetated swamp).	High
2.5.14c	Pre-clearing 1351000 ha; Remnant 2015 1348000 ha	21a	None	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.19a	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium
2.5.19b	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.5.5a	Pre-clearing 336000 ha; Remnant 2015 334000 ha	14a	None	Medium
2.7.1x2a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	24a	None	Low
2.7.1x3a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x4	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x6	Pre-clearing 307000 ha; Remnant 2015 307000 ha	33b	None	Low
2.7.2x5	Pre-clearing 305000 ha; Remnant 2015 304000 ha	24a	None	Medium

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
2.10.5a	Supports plant species with restricted geographic ranges.
2.3.26a	Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26a: Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26b: Provincial refuge for flora and fauna. 2.3.26d: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26e: Provincial refuge for flora and fauna. 2.3.26f: Provincial refuge for flora and fauna. 2.3.26x1a: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1b: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1c: Provincial refuge for flora and fauna. 2.3.26x1d: Provincial refuge for flora and fauna. 2.3.26x2: Supports plant growth well into the dry season. Provincial refuge for flora and fauna.
2.3.29a	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.29c	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.36a	None

Regional Ecosystem	Special Values
2.3.41	None
2.3.54	None
2.3.55b	Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55a: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55b: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55c: Seasonal wetland. Important feeding and moulting sites for water birds.
2.5.14c	Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.5.17a	None
2.5.19a	None
2.5.19b	None
2.5.26	None
2.5.5a	None
2.7.1x2a	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x3a	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x4	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x6	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.

Regional Ecosystem	Special Values
2.7.2x5	Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2b: Supports plant species with restricted geographic ranges. 2.7.2x2c: Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2f: Supports plant species with restricted geographic ranges. 2.7.2x4: Supports plant species with restricted geographic ranges. 2.7.2x6: Supports locally uncommon plant species in the bioregion, including <i>Eucalyptus</i> persists. 2.7.2x9: Supports plant species with restricted geographic ranges.

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
14a	Woodlands and tall woodlands dominated by <i>Eucalyptus tetradonta</i> (Darwin stringybark) (or <i>E. megasepala</i>), with <i>Corymbia nesophila</i> (Melville Island bloodwood). Occasionally <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), on deeply weathered plateaus and remnants. (Primarily land zone 5, 7, 9). (CYP, GUP)	69.93	5.57
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	54.46	4.33
16b	Woodlands dominated by <i>Eucalyptus leptophleba</i> (Molloy red box), with <i>Corymbia tessellaris</i> (carbeen) or <i>C. clarksoniana</i> (grey bloodwood) or <i>C. dallachiana</i> . On sandy levees. (land zones 3, 5) (GUP, EIU, CYP)	12.5	1.0
17b	Woodlands to open woodlands dominated by <i>Eucalyptus melanophloia</i> (silver-leaved ironbark) (or <i>E. shirleyi</i> (shirley's silver-leaved ironbark)) on sand plains and footslopes of hills and ranges. (land zones 5, 12, 3, 11, 9, 7) (BRB, DEU, EIU, SEQ, NET, GUP, NWH)	53.34	4.25
21a	Low woodlands and low open woodlands dominated by <i>Melaleuca viridiflora</i> (coarse-leaved paperbark) on depositional plains. (land zones 3, 5, 11, [10]) (GUP, CYP, BRB, CQC, EIU, WET, SEQ)	802.52	63.87

BVG (1 Million)	Description	Area (Ha)	% of AOI
21b	Low open woodlands and tall shrublands of <i>Melaleuca citrolens</i> or <i>M. stenostachya</i> or other <i>Melaleuca</i> spp. (land zones 5, 3, 7, 10, 11, 12) (GUP, CYP, EIU, DEU, BRB, [SEQ])	91.07	7.25
24a	Low woodlands to tall shrublands dominated by <i>Acacia</i> spp. on residuals. Species include <i>A. shirleyi</i> (lancewood), <i>A. catenulata</i> (bendee), <i>A. microperma</i> (bowyakka), <i>A. clivicola</i> , <i>A. sibirica</i> , <i>A. rhodoxylon</i> (rosewood) and <i>A. leptostachya</i> (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	113.65	9.04
31a	Open forblands to open tussock grasslands which may be composed of <i>Atriplex</i> spp. (saltbush), <i>Sclerolaena</i> spp. (burr), <i>Asteraceae</i> spp. and/or short grasses on alluvial plains. (land zone 3) (CHC, MGD, MUL, GUP, [BRB, DEU])	18.37	1.46
33b	Hummock grasslands dominated by <i>Triodia pungens</i> or <i>T. longiceps</i> (giant grey spinifex) or <i>T. mitchellii</i> (buck spinifex) sandplains. (land zones 6, 7, 5, [3, 9]) (MUL, MGD, GUP, DEU, [BRB])	10.12	0.81
34c	Palustrine wetlands. Freshwater swamps on coastal floodplains dominated by sedges and grasses such as <i>Oryza</i> spp., <i>Eleocharis</i> spp. (spikerush) or <i>Baloskion</i> spp. (cord rush) / <i>Leptocarpus tenax</i> / <i>Gahnia sieberiana</i> (sword grass) / <i>Lepironia</i> spp. (land zones 3, 2, [1]) (CYP, GUP, BRB, SEQ, WET, [CQC])	30.59	2.43

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/>

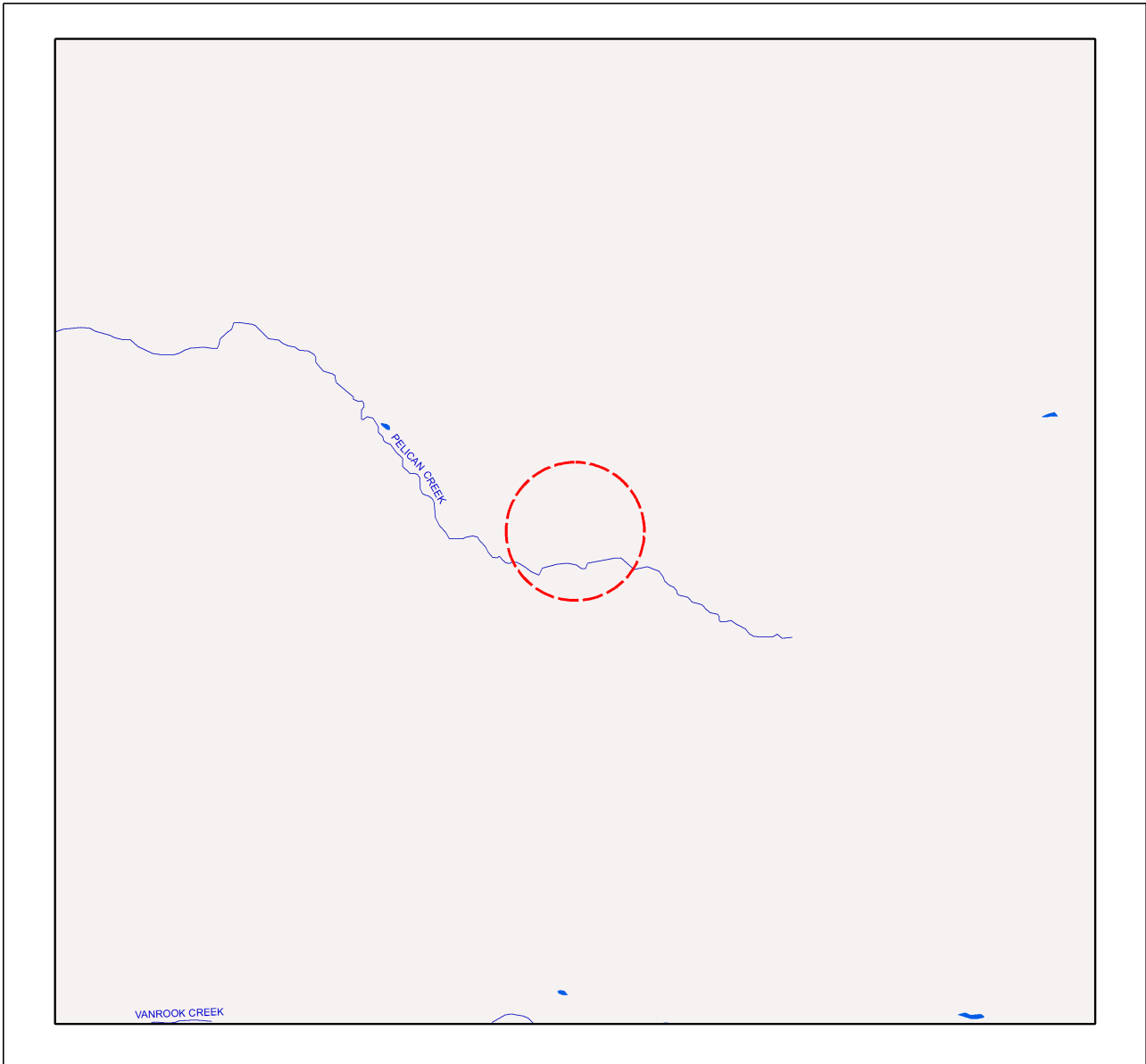
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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
2.10.5a	Not currently available	Not currently available
2.3.26a	Not currently available	Not currently available
2.3.29a	Not currently available	Not currently available
2.3.29c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.3.41	Not currently available	Not currently available
2.3.54	Not currently available	Not currently available
2.3.55b	Not currently available	Not currently available
2.5.14c	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.19a	Not currently available	Not currently available
2.5.19b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.5.5a	Not currently available	Not currently available
2.7.1x2a	Not currently available	Not currently available
2.7.1x3a	Not currently available	Not currently available
2.7.1x4	Not currently available	Not currently available
2.7.1x6	Not currently available	Not currently available
2.7.2x5	Not currently available	Not currently available

Maps

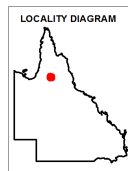
Map 1 - Location



Locality Map

Legend

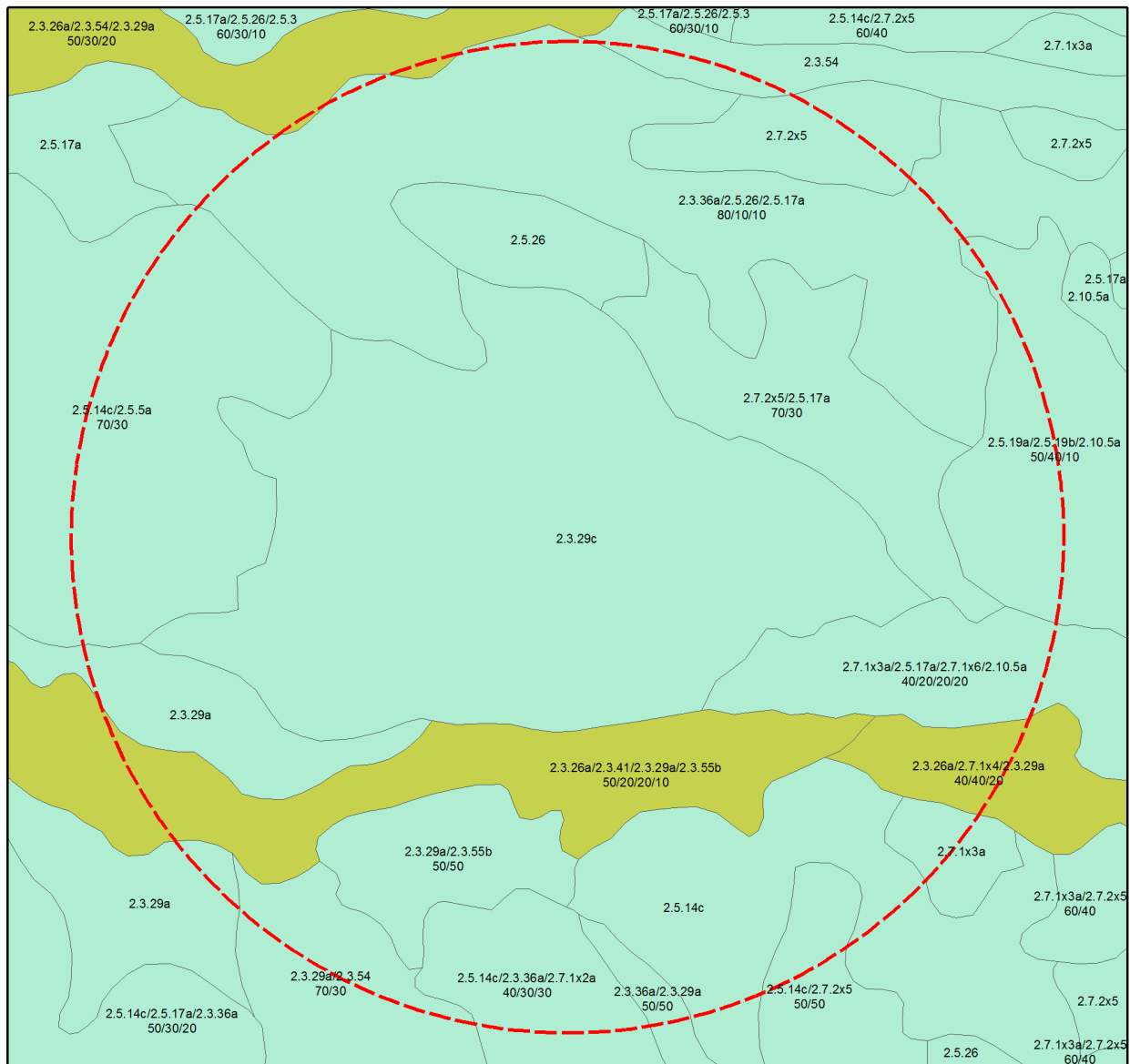
-  2 kilometre buffer
-  Towns
-  Highway
-  Connector
-  Street/Local Road
-  Reservoirs
-  Lakes
-  National Park (Scientific)
-  National Park
-  National Park (CYPAL)
-  Conservation Park
-  Resources Reserve
-  Forest Reserve
-  State Forest
-  Timber Reserve
-  Nature Refuges
-  Coordinated Conservation Areas
-  Major rivers/creeks
-  Queensland



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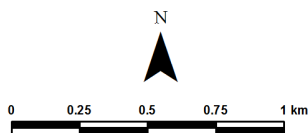
Map 2 - Remnant 2015 regional ecosystems



Remnant 2015 Regional Ecosystems

Biodiversity Status

- 2 kilometre buffer
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries



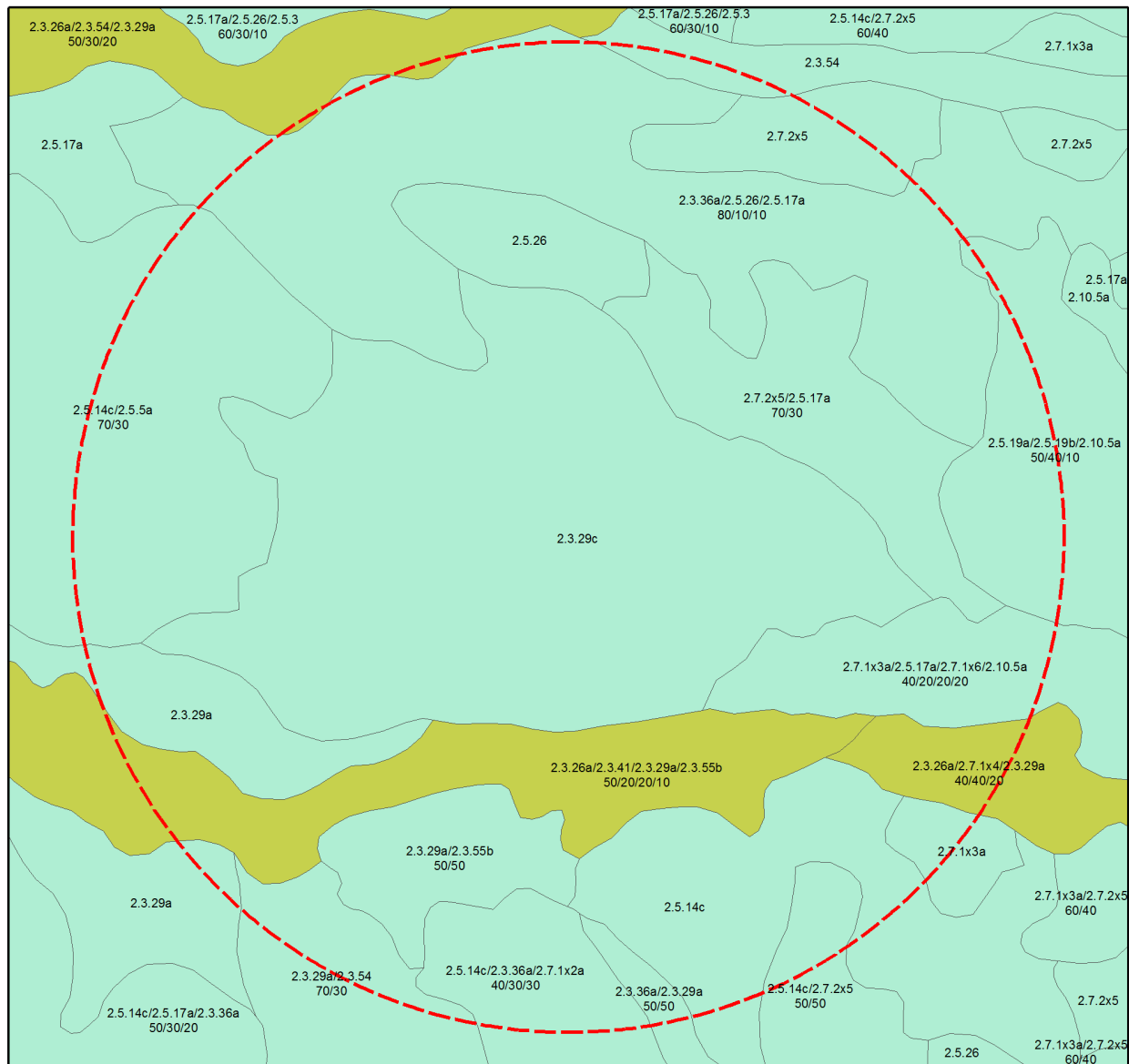
This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records. Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.

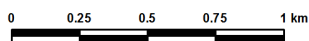
Map 3 - Pre-clearing regional ecosystems



Pre-clearing Regional Ecosystems

Biodiversity Status

- 2 kilometre buffer
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

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Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

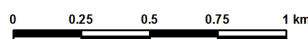
Map 4 - Remnant 2015 regional ecosystems by BVG (5M)



Remnant 2015 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

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Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

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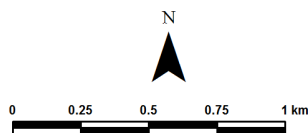
Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Pre-clearing Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
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- 16. Mangroves and saltmarshes (35-35b)
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

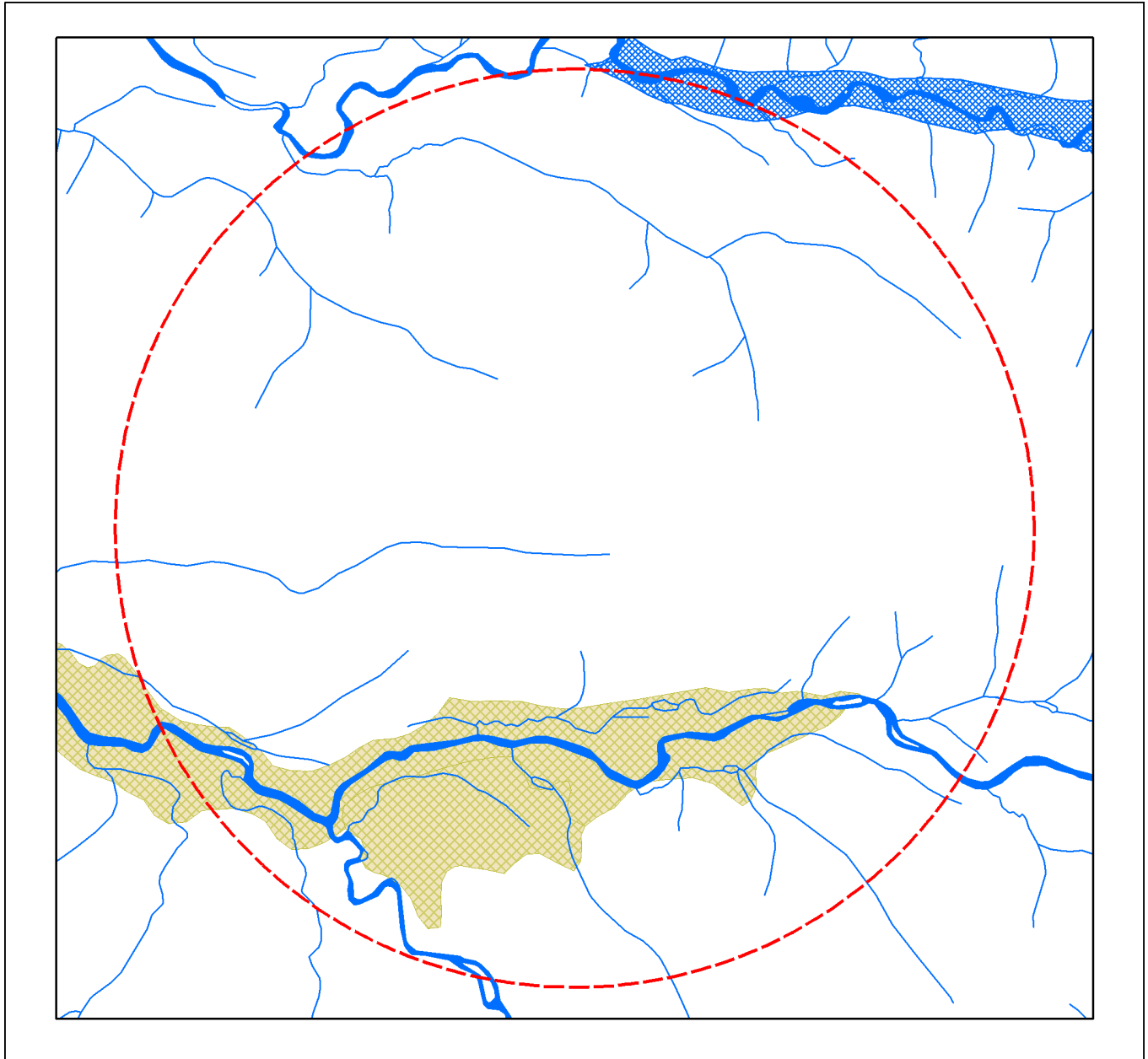
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.

The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Map 6 - Wetlands and waterways



Queensland Wetland Data

Legend

- 2 kilometre buffer
- Towns

Queensland Wetland Data

- Riverine Drainage Lines
- Springs

Wetland System - Water Bodies

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies

Wetland System - Regional Ecosystems

- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)



Accuracy information: The positional accuracy of wetland data mapped at a scale of 1:100,000 is +/-100m with a minimum polygon size of 5ha or 75m wide for linear features, except for areas along the east coast which are mapped at the 1:50,000 scale with a positional accuracy of +/-50m, with a minimum polygon size of 1ha or 35m wide for linear features. Wetlands smaller than 1ha are not delineated on the wetland data. Consideration of the effects of mapped scale is necessary when interpreting data at a larger scale, e.g. 1:25,000. For property assessment, digital linework should be used as a guide only. The extent of wetlands depicted on this map is based on rectified 2013 Landsat ETM+ imagery supplied by Statewide Landcover and Trees Study (SLATS), Department of Environment and Science. The extent of water bodies is based on the maximum extent of inundation derived from available Landsat imagery up to and including the 2013 imagery.

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This product is projected into GDA 1994 Queensland Albers

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

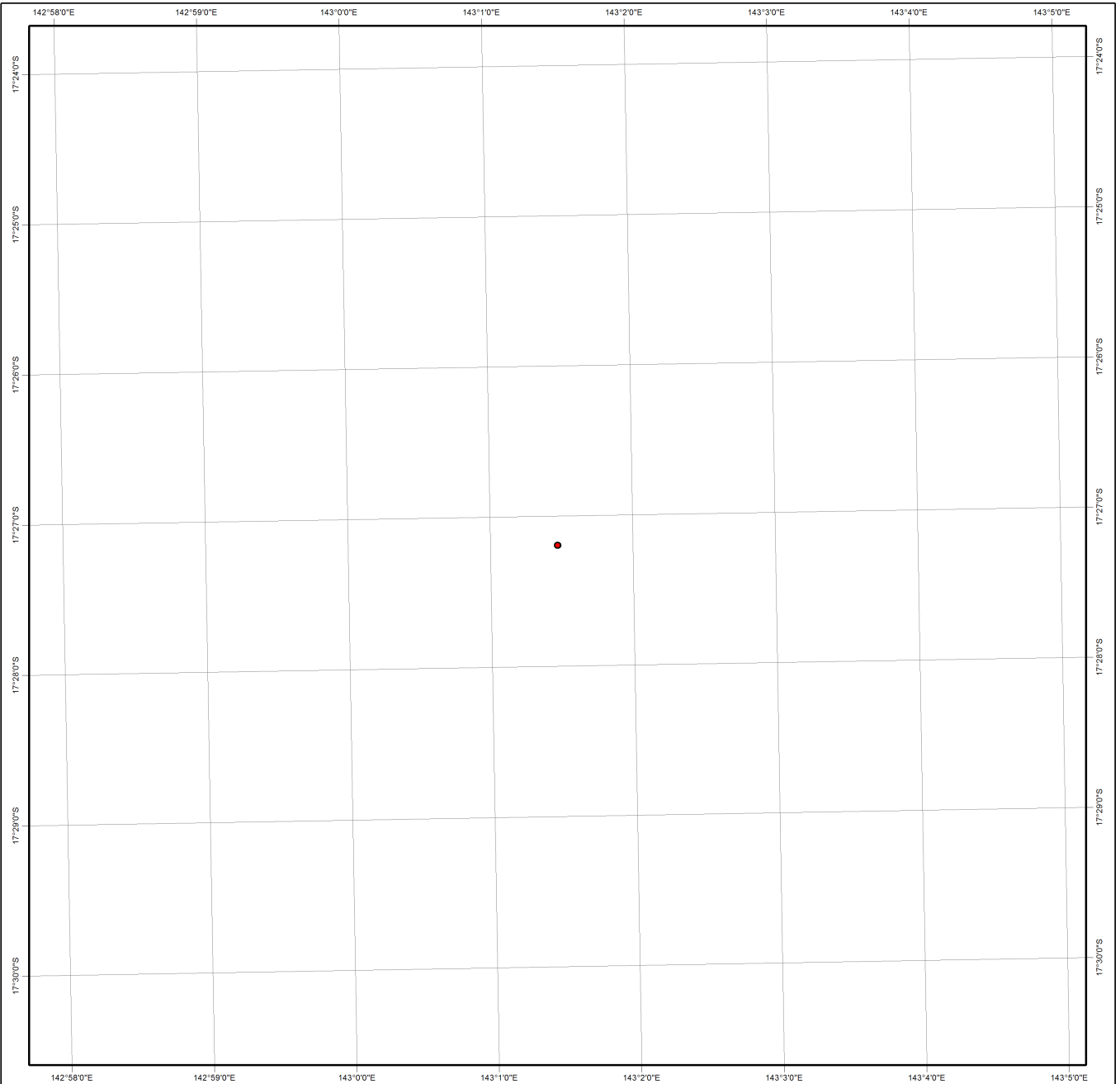
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 2015 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

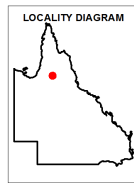
AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



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



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:
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ORURO 2 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

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

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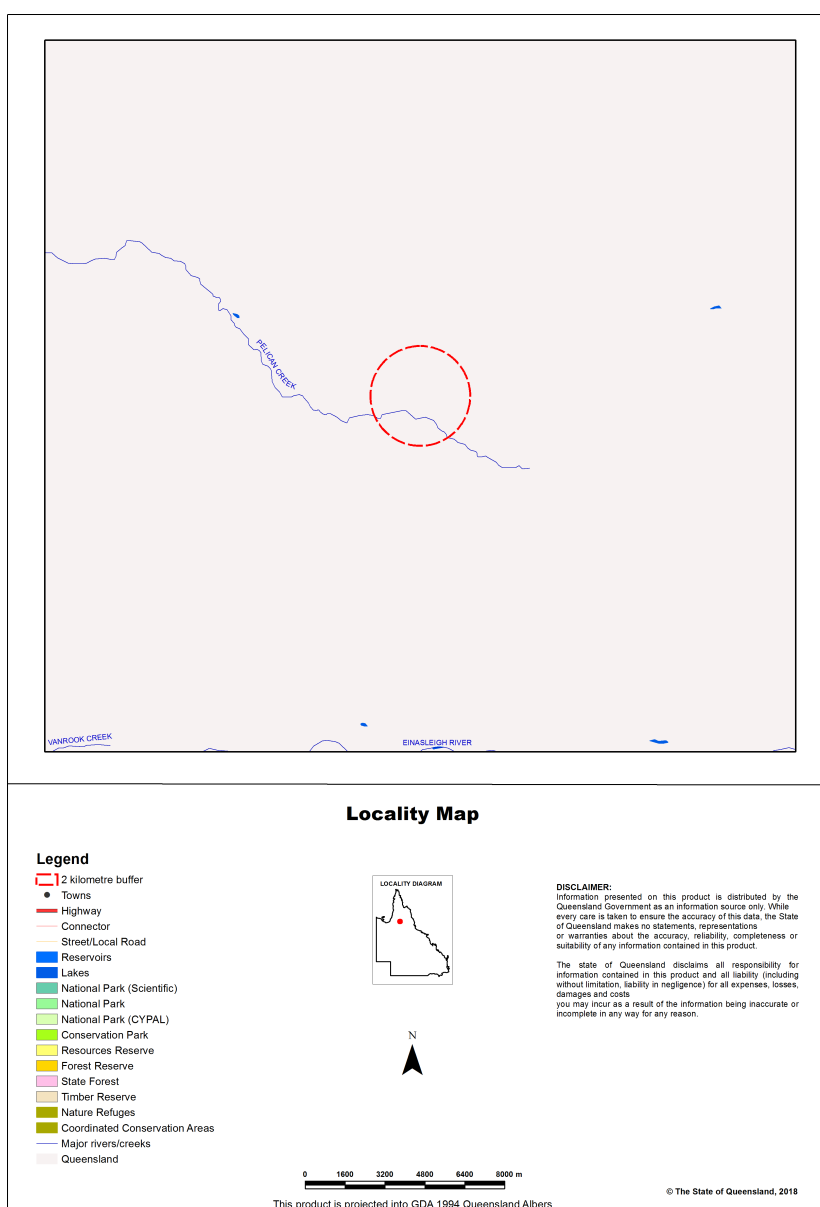
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Assessment Area Details

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 Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten



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)	640.89 ha	51.0%
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)	0.0 ha	0.0 %
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	0.0 ha	0.0 %
8e Regulated Vegetation - intersecting a watercourse **	6.3 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
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)

Regional planning interest type	Region	Status
Strategic Environmental Area - Designated Precinct	Gulf Rivers	Current - June 2014

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)

Not applicable

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

Not applicable

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)

Not applicable

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Not applicable

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

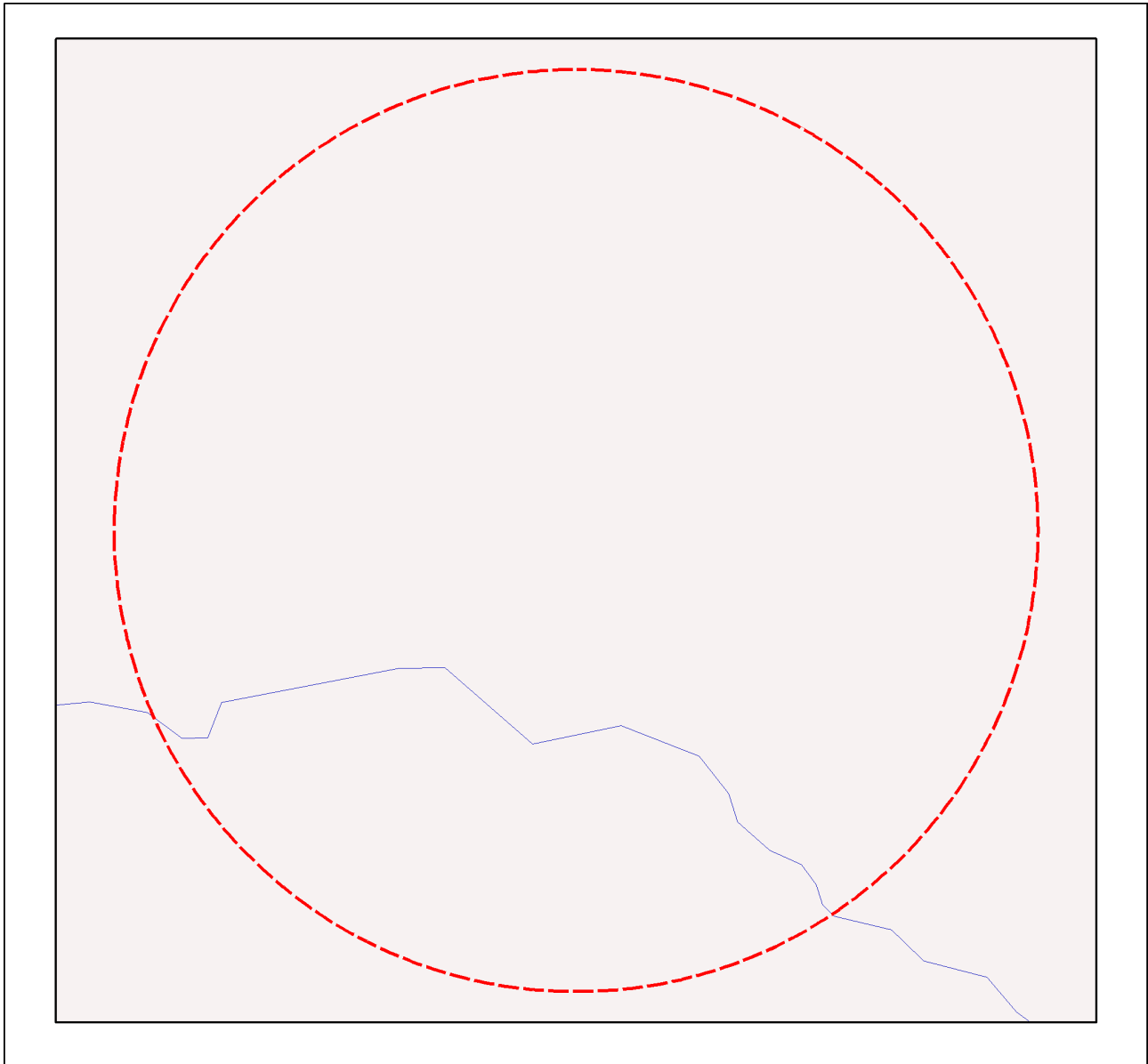
(no results)

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

(no results)









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

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

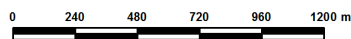
Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Protected area (estates)
-  Declared fish habitat area (A and B areas)
-  Marine park (highly protected)



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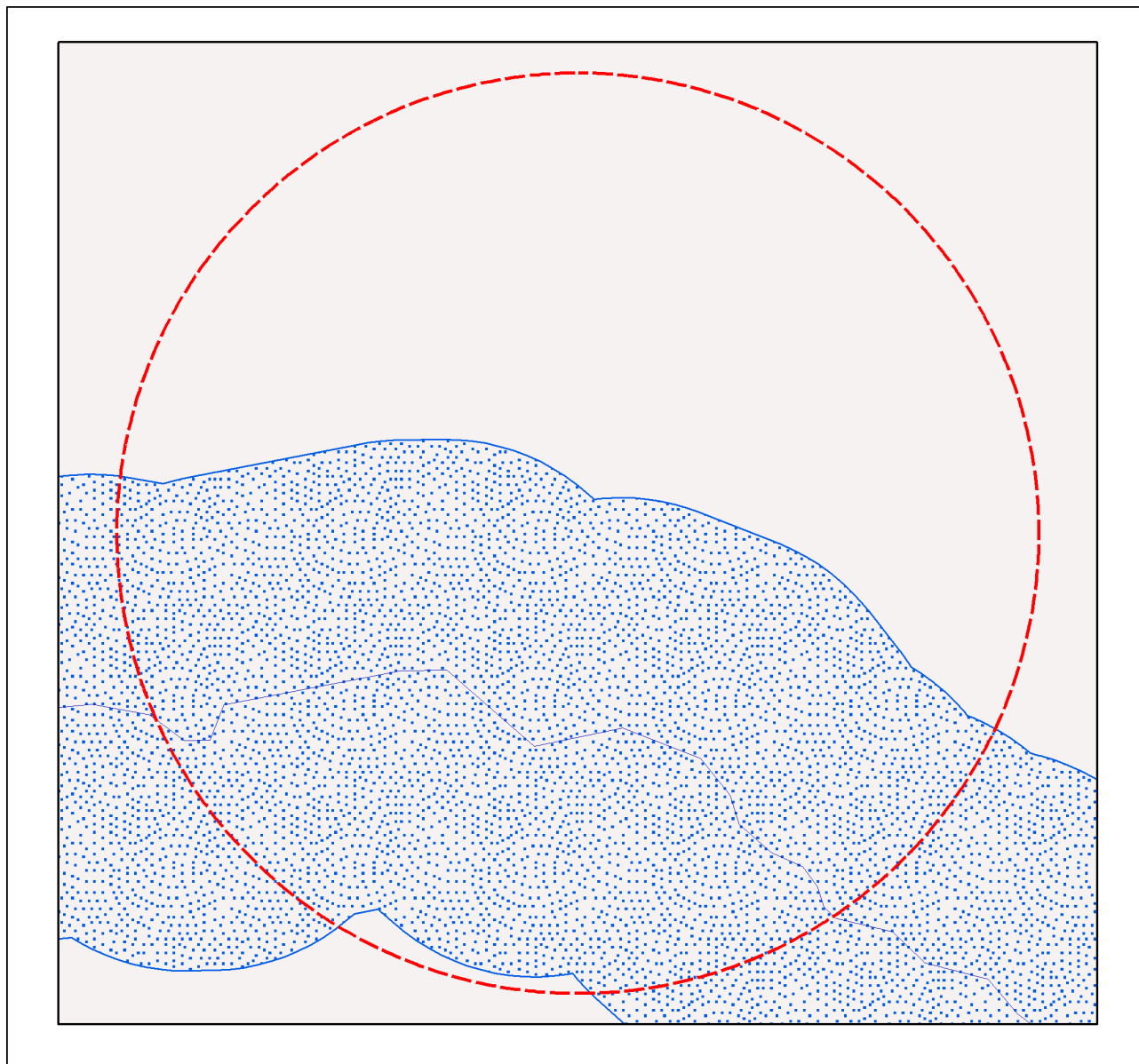
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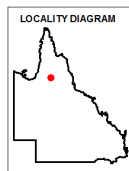
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Declared high ecological value waters (watercourse)
-  Strategic environmental area (designated precinct)
-  Declared high ecological value waters (wetland)
-  High ecological significance wetlands



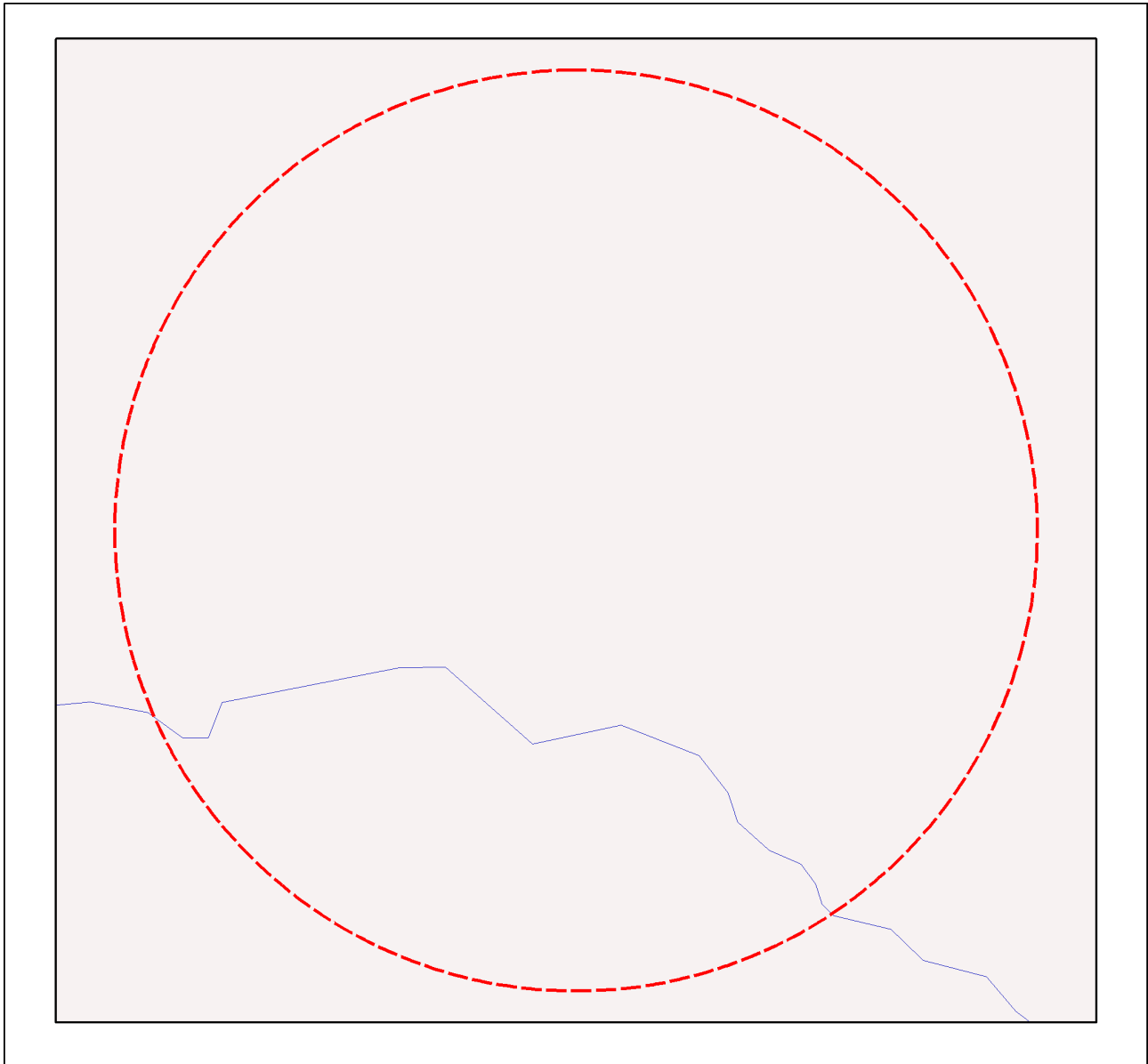
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



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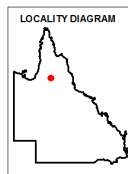
Map 3 - MSES - Species



MSES - Species

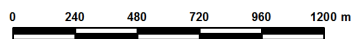
Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Threatened wildlife and special least concern animal



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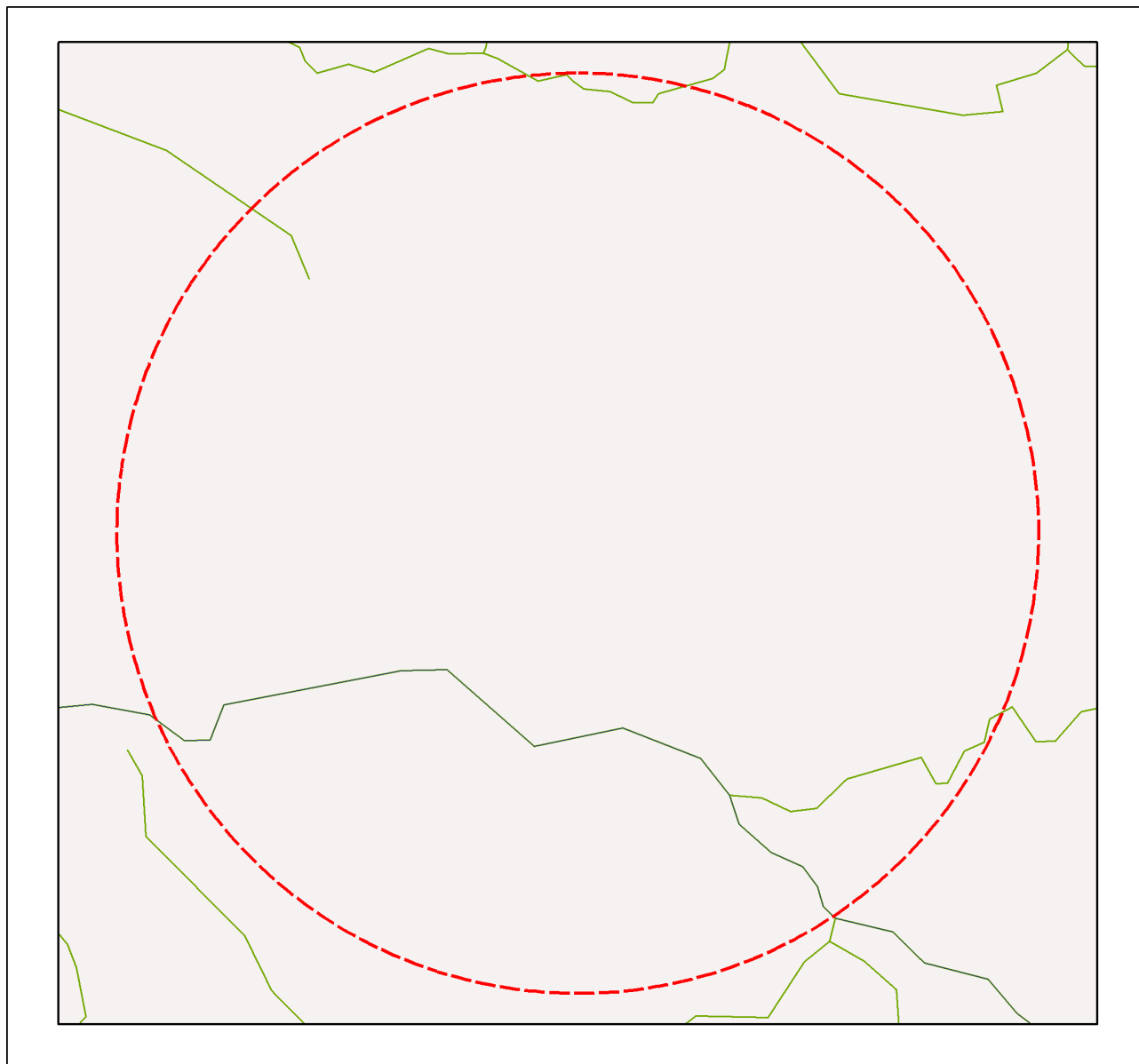
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






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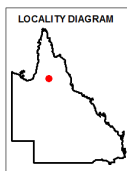
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

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



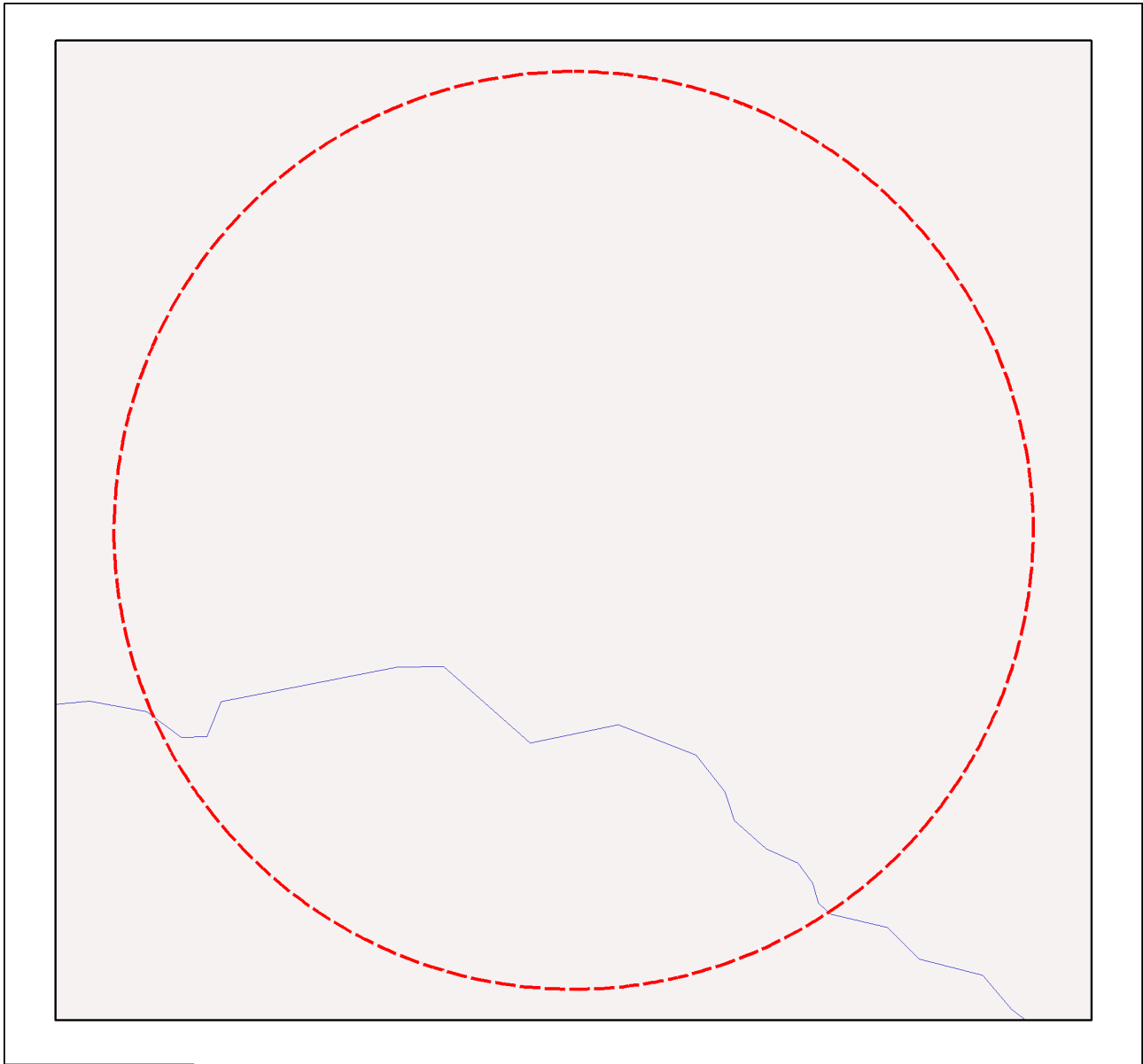
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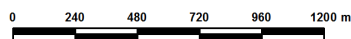
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Legally secured offset area (offset register)
-  Legally secured offset area (vegetation offsets)



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Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). 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.information.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	- <i>Environmental Protection Act 1994</i>
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	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>



Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

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.



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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: Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	57.61	4.58
No concern at present	1,198.94	95.42
Total remnant vegetation	1,256.55	100.0

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
2.10.5a	Acacia shirleyi woodland and Triodia pungens hummock grassland on scarps and stony ledges	No concern at present	123.03	9.79
2.3.26a	Eucalyptus camaldulensis +/- Melaleuca spp. woodland fringing sandy, seasonal channels	Of concern	50.07	3.98
2.3.29a	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	23.15	1.84
2.3.29c	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	139.64	11.11
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	91.1	7.25
2.3.41	Aristida dominii, Eriachne spp., Chloris lobata +/- Eragrostis basedowii, Iseilema sp. tussock grassland on active Quaternary alluvial plains of major watercourses	Of concern	7.54	0.6
2.3.54	Corymbia polycarpa +/- Melaleuca viridiflora open woodland fringing minor watercourses on Tertiary sand sheets in the north-east	No concern at present	8.72	0.69
2.3.55b	Seasonal swamps (wooded). Melaleuca viridiflora and/or M. clarksonii low woodland in closed depressions on Tertiary to Quaternary deposits in the north	No concern at present	3.77	0.3
2.5.14c	Melaleuca spp. low woodland on plains on earths and podsolics (south)	No concern at present	117.65	9.36
2.5.17a	Melaleuca citrolens and/or M. stenostachya low open woodland on Tertiary outwash deposits and sand sheets in the east	No concern at present	112.46	8.95
2.5.19a	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	132.26	10.53
2.5.19b	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	105.8	8.42

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
2.5.26	Eucalyptus melanophloia, Acacia julifera subsp. gilbertensis, Corymbia setosa and Melaleuca spp. in mixed low woodlands on Tertiary sand sheets	No concern at present	16.5	1.31
2.7.1x3a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	127.45	10.14
2.7.1x4	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	31.2	2.48
2.7.1x6	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	35.66	2.84
2.7.2x5	Acacia shirleyi, Eucalyptus shirleyi, Corymbia setosa subsp. pedicellaris or Melaleuca acacioides woodland on low scarps on skeletal soils	No concern at present	130.54	10.39

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
2.10.5a	Pre-clearing 373000 ha; Remnant 2015 373000 ha	24a	None	High
2.3.26a	Pre-clearing 254000 ha; Remnant 2015 252000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
2.3.29a	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.29c	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.41	Pre-clearing 86000 ha; Remnant 2015 84000 ha	31a	Floodplain (other than floodplain wetlands).	Low
2.3.54	Pre-clearing 97000 ha; Remnant 2015 97000 ha	16b	Riverine wetland or fringing riverine wetland.	High
2.3.55b	Pre-clearing 65000 ha; Remnant 2015 65000 ha	34c	Palustrine wetland (e.g. vegetated swamp).	High
2.5.14c	Pre-clearing 1351000 ha; Remnant 2015 1348000 ha	21a	None	Medium
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.19a	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
2.5.19b	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.7.1x3a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x4	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x6	Pre-clearing 307000 ha; Remnant 2015 307000 ha	33b	None	Low
2.7.2x5	Pre-clearing 305000 ha; Remnant 2015 304000 ha	24a	None	Medium

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
2.10.5a	Supports plant species with restricted geographic ranges.
2.3.26a	Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26a: Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26b: Provincial refuge for flora and fauna. 2.3.26d: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26e: Provincial refuge for flora and fauna. 2.3.26f: Provincial refuge for flora and fauna. 2.3.26x1a: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1b: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1c: Provincial refuge for flora and fauna. 2.3.26x1d: Provincial refuge for flora and fauna. 2.3.26x2: Supports plant growth well into the dry season. Provincial refuge for flora and fauna.
2.3.29a	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.29c	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.36a	None
2.3.41	None
2.3.54	None
2.3.55b	Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55a: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55b: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55c: Seasonal wetland. Important feeding and moulting sites for water birds.
2.5.14c	Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).

Regional Ecosystem	Special Values
2.5.17a	None
2.5.19a	None
2.5.19b	None
2.5.26	None
2.7.1x3a	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x4	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x6	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.2x5	Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2b: Supports plant species with restricted geographic ranges. 2.7.2x2c: Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2f: Supports plant species with restricted geographic ranges. 2.7.2x4: Supports plant species with restricted geographic ranges. 2.7.2x6: Supports locally uncommon plant species in the bioregion, including <i>Eucalyptus persistens</i> . 2.7.2x9: Supports plant species with restricted geographic ranges.

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
14a	Woodlands and tall woodlands dominated by <i>Eucalyptus tetradonta</i> (Darwin stringybark) (or <i>E. megasepala</i>), with <i>Corymbia nesophila</i> (Melville Island bloodwood). Occasionally <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), on deeply weathered plateaus and remnants. (Primarily land zone 5, 7, 9). (CYP, GUP)	238.06	18.95
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	50.07	3.98
16b	Woodlands dominated by <i>Eucalyptus leptophleba</i> (Molloy red box), with <i>Corymbia tessellaris</i> (carbeen) or <i>C. clarksoniana</i> (grey bloodwood) or <i>C. dallachiana</i> . On sandy levees. (land zones 3, 5) (GUP, EIU, CYP)	8.72	0.69
17b	Woodlands to open woodlands dominated by <i>Eucalyptus melanophloia</i> (silver-leaved ironbark) (or <i>E. shirleyi</i> (shirley's silver-leaved ironbark)) on sand plains and footslopes of hills and ranges. (land zones 5, 12, 3, 11, 9, 7) (BRB, DEU, EIU, SEQ, NET, GUP, NWH)	16.5	1.31
21a	Low woodlands and low open woodlands dominated by <i>Melaleuca viridiflora</i> (coarse-leaved paperbark) on depositional plains. (land zones 3, 5, 11, [10]) (GUP, CYP, BRB, CQC, EIU, WET, SEQ)	371.53	29.57
21b	Low open woodlands and tall shrublands of <i>Melaleuca citrolens</i> or <i>M. stenostachya</i> or other <i>Melaleuca</i> spp. (land zones 5, 3, 7, 10, 11, 12) (GUP, CYP, EIU, DEU, BRB, [SEQ])	271.12	21.58
24a	Low woodlands to tall shrublands dominated by <i>Acacia</i> spp. on residuals. Species include <i>A. shirleyi</i> (lancewood), <i>A. catenulata</i> (bendee), <i>A. microsperma</i> (bowyakka), <i>A. clivicola</i> , <i>A. sibirica</i> , <i>A. rhodoxylon</i> (rosewood) and <i>A. leptostachya</i> (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	253.57	20.18
31a	Open forblands to open tussock grasslands which may be composed of <i>Atriplex</i> spp. (saltbush), <i>Sclerolaena</i> spp. (burr), <i>Asteraceae</i> spp. and/or short grasses on alluvial plains. (land zone 3) (CHC, MGD, MUL, GUP, [BRB, DEU])	7.54	0.6
33b	Hummock grasslands dominated by <i>Triodia pungens</i> or <i>T. longiceps</i> (giant grey spinifex) or <i>T. mitchellii</i> (buck spinifex) sandplains. (land zones 6, 7, 5, [3, 9]) (MUL, MGD, GUP, DEU, [BRB])	35.66	2.84
34c	Palustrine wetlands. Freshwater swamps on coastal floodplains dominated by sedges and grasses such as <i>Oryza</i> spp., <i>Eleocharis</i> spp. (spikerush) or <i>Baloskion</i> spp. (cord rush) / <i>Leptocarpus tenax</i> / <i>Gahnia sieberiana</i> (sword grass) / <i>Lepironia</i> spp. (land zones 3, 2, [1]) (CYP, GUP, BRB, SEQ, WET, [CQC])	3.77	0.3

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/>

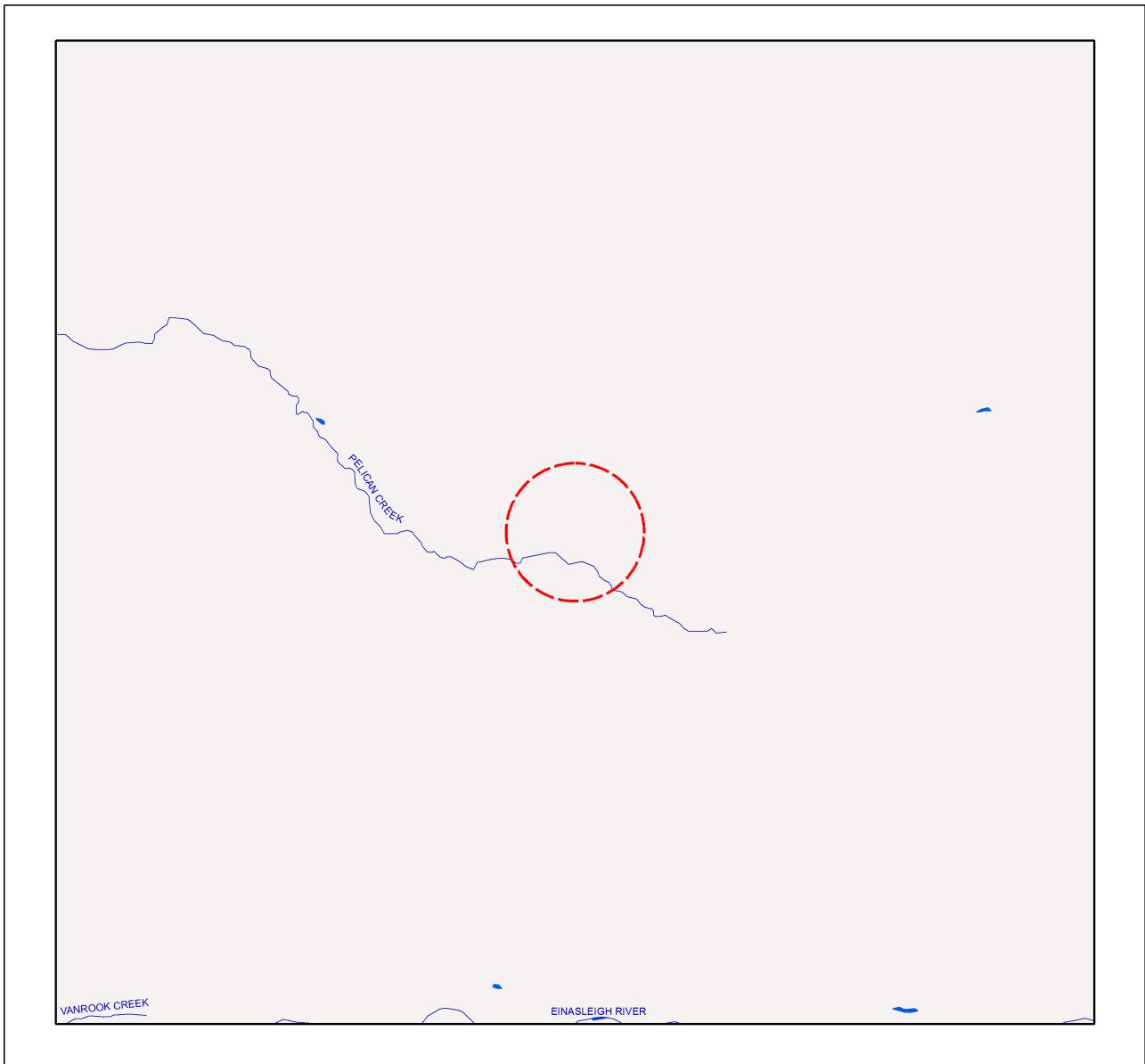
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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
2.10.5a	Not currently available	Not currently available
2.3.26a	Not currently available	Not currently available
2.3.29a	Not currently available	Not currently available
2.3.29c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.3.41	Not currently available	Not currently available
2.3.54	Not currently available	Not currently available
2.3.55b	Not currently available	Not currently available
2.5.14c	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.19a	Not currently available	Not currently available
2.5.19b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.7.1x3a	Not currently available	Not currently available
2.7.1x4	Not currently available	Not currently available
2.7.1x6	Not currently available	Not currently available
2.7.2x5	Not currently available	Not currently available

Maps

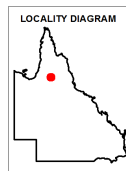
Map 1 - Location



Locality Map

Legend

- 2 kilometre buffer
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland



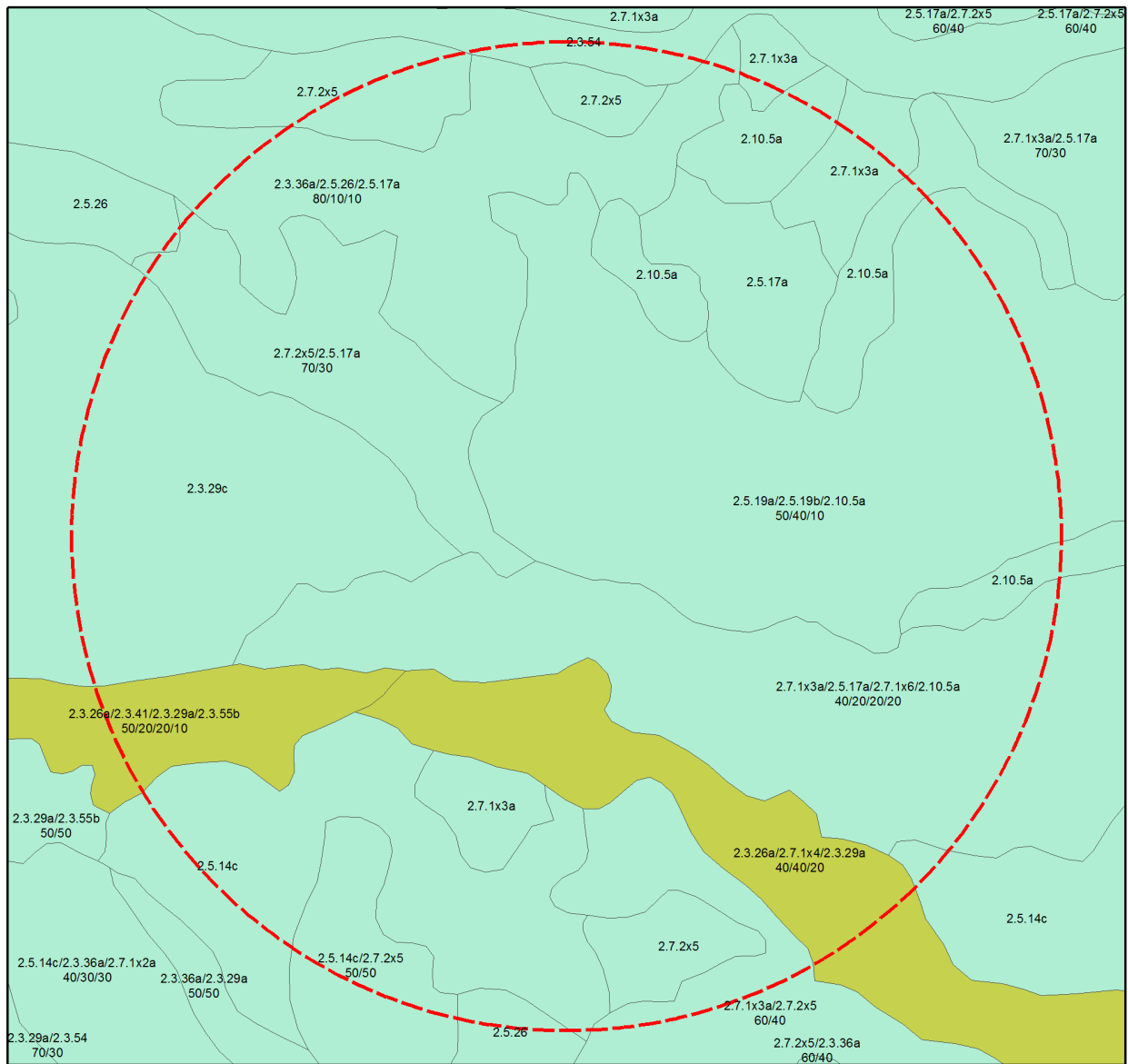
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


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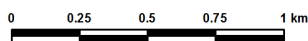
Map 3 - Pre-clearing regional ecosystems



Pre-clearing Regional Ecosystems

Biodiversity Status

-  2 kilometre buffer
-  Endangered - Dominant vegetation
-  Endangered - Sub-dominant
-  Of Concern - Dominant
-  Of Concern - Sub-dominant
-  No concern at present
-  Water
-  Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

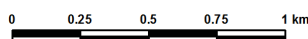
Map 4 - Remnant 2015 regional ecosystems by BVG (5M)



Remnant 2015 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The label consists of 3 components: bioregion, land zone, and vegetation community - the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.

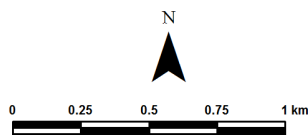
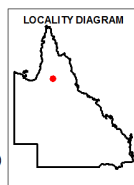
Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Pre-clearing Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
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- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

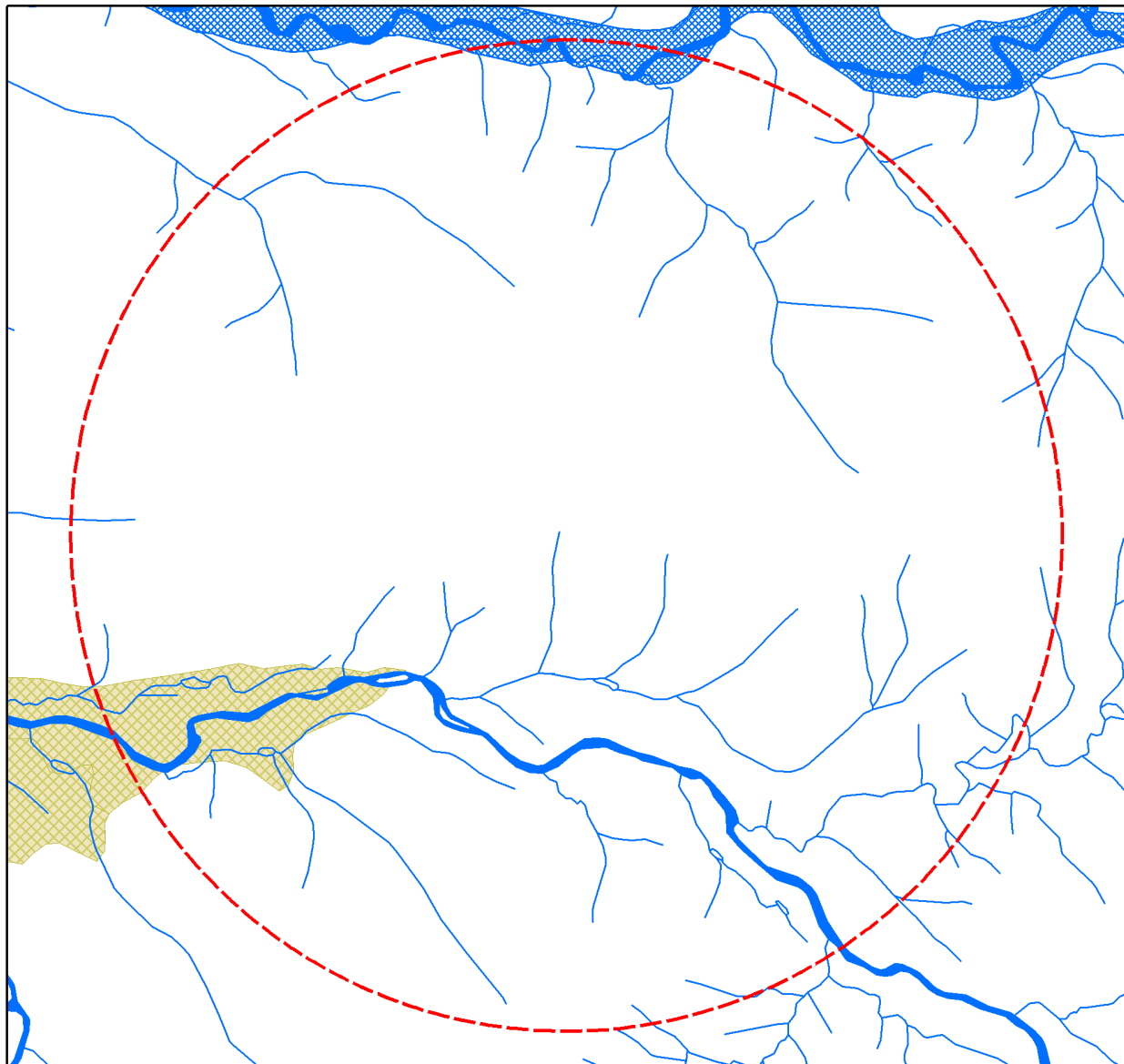
Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Map 6 - Wetlands and waterways



Queensland Wetland Data

Legend

- 2 kilometre buffer
- Towns

Queensland Wetland Data

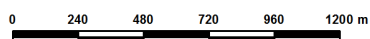
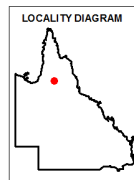
- Riverine Drainage Lines
- Springs

Wetland System - Water Bodies

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies

Wetland System - Regional Ecosystems

- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)



Accuracy information: The positional accuracy of wetland data mapped at a scale of 1:100,000 is +/-100m with a minimum polygon size of 5ha or 75m wide for linear features, except for areas along the east coast which are mapped at the 1:50,000 scale with a positional accuracy of +/-50m, with a minimum polygon size of 1ha or 35m wide for linear features. Wetlands smaller than 1ha are not delineated on the wetland data. Consideration of the effects of mapped scale is necessary when interpreting data at a larger scale, e.g. 1:25,000. For property assessment, digital linework should be used as a guide only. The extent of wetlands depicted on this map is based on rectified 2013 Landsat ETM+ imagery supplied by Statewide Landcover and Trees Study (SLATS), Department of Environment and Science. The extent of water bodies is based on the maximum extent of inundation derived from available Landsat imagery up to and including the 2013 imagery.

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

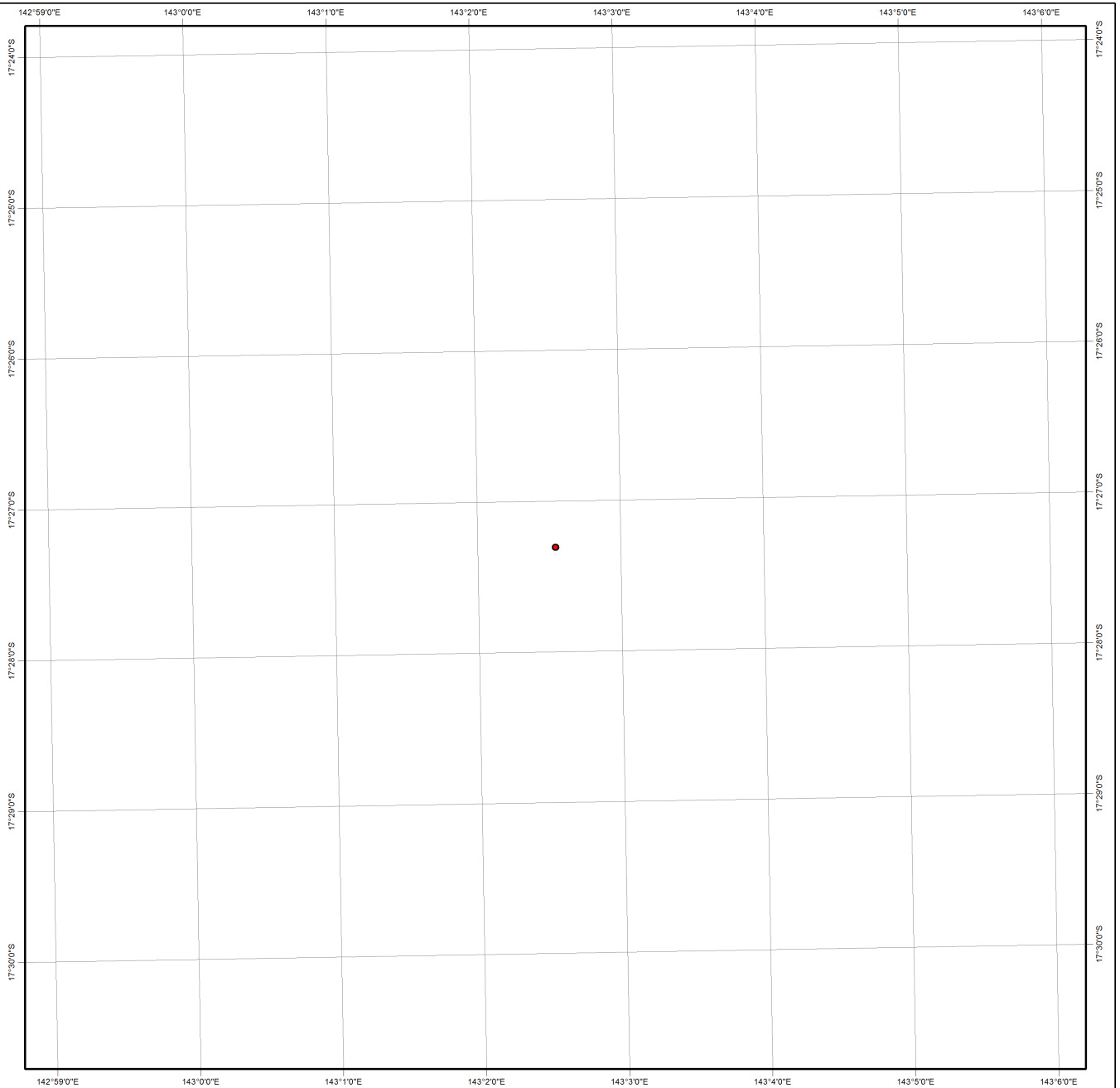
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 2015 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	- <i>Vegetation Management Act 1999</i>



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



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.

ORURO 3 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.06091 Latitude: -17.46102 with 2 kilometre radius

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

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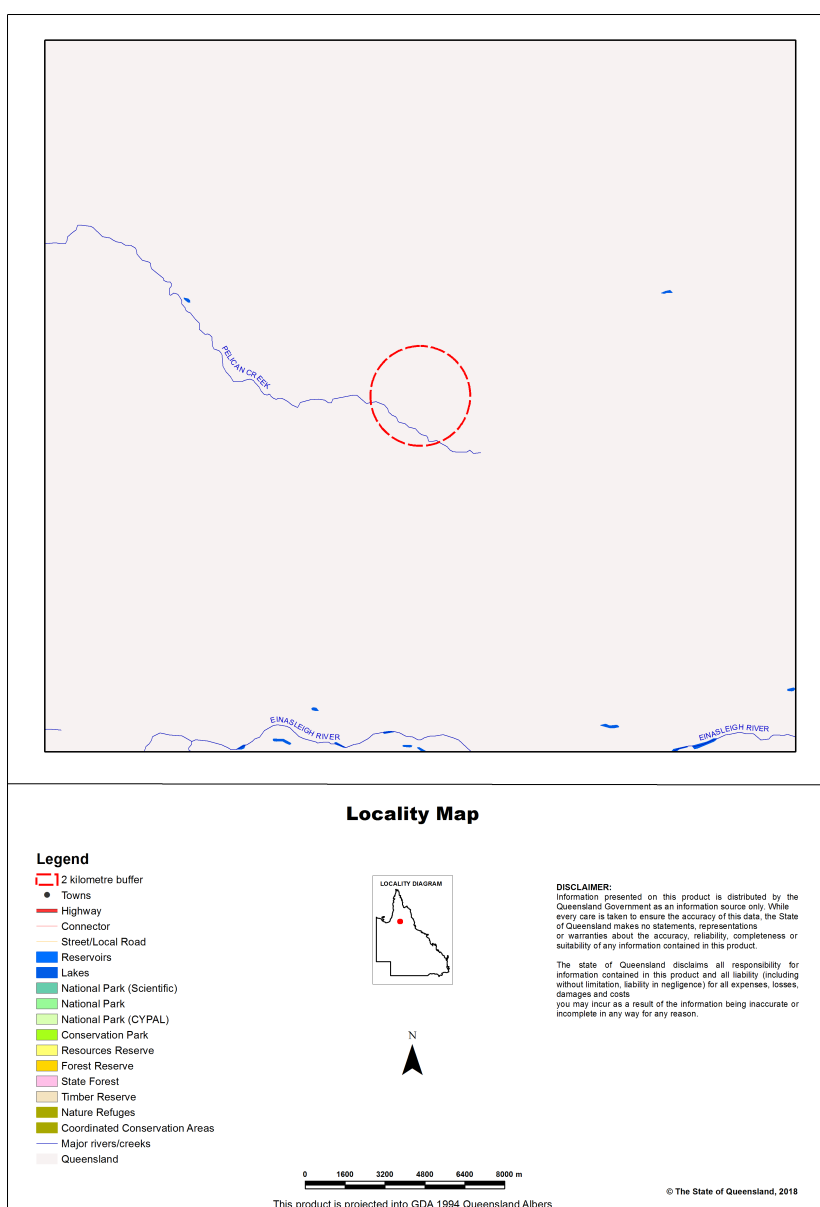
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Assessment Area Details

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 Longitude: 143.06091 Latitude: -17.46102 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten



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)	548.6 ha	43.7%
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)	0.0 ha	0.0 %
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	0.0 ha	0.0 %
8e Regulated Vegetation - intersecting a watercourse **	9.1 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
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)

Regional planning interest type	Region	Status
Strategic Environmental Area - Designated Precinct	Gulf Rivers	Current - June 2014

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)

Not applicable

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

Not applicable

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)

Not applicable

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

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

Not applicable

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

MSES - Offsets

9a. Legally secured offset areas - offset register areas

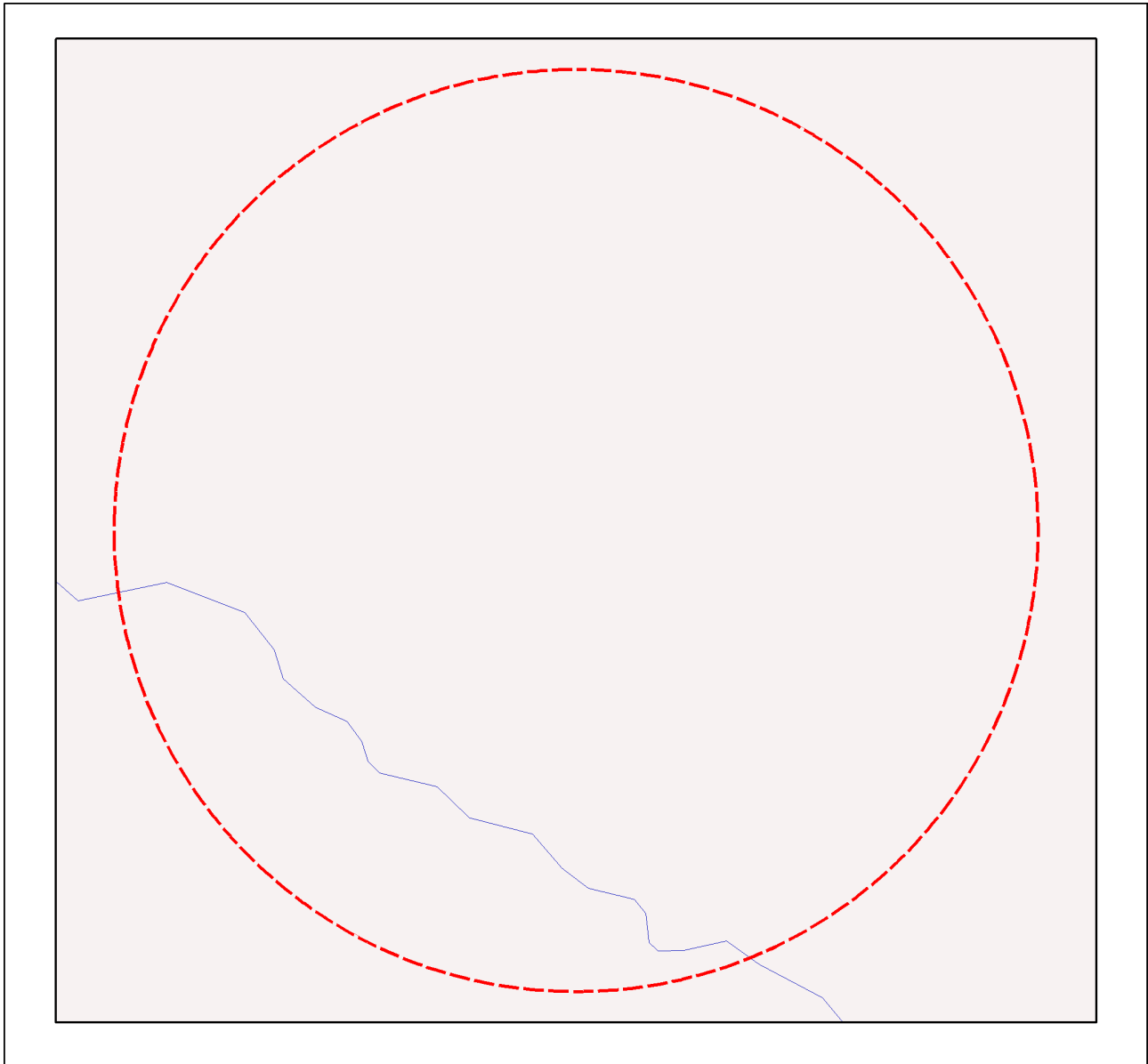
(no results)

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

(no results)









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

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

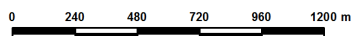
Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Protected area (estates)
-  Declared fish habitat area (A and B areas)
-  Marine park (highly protected)



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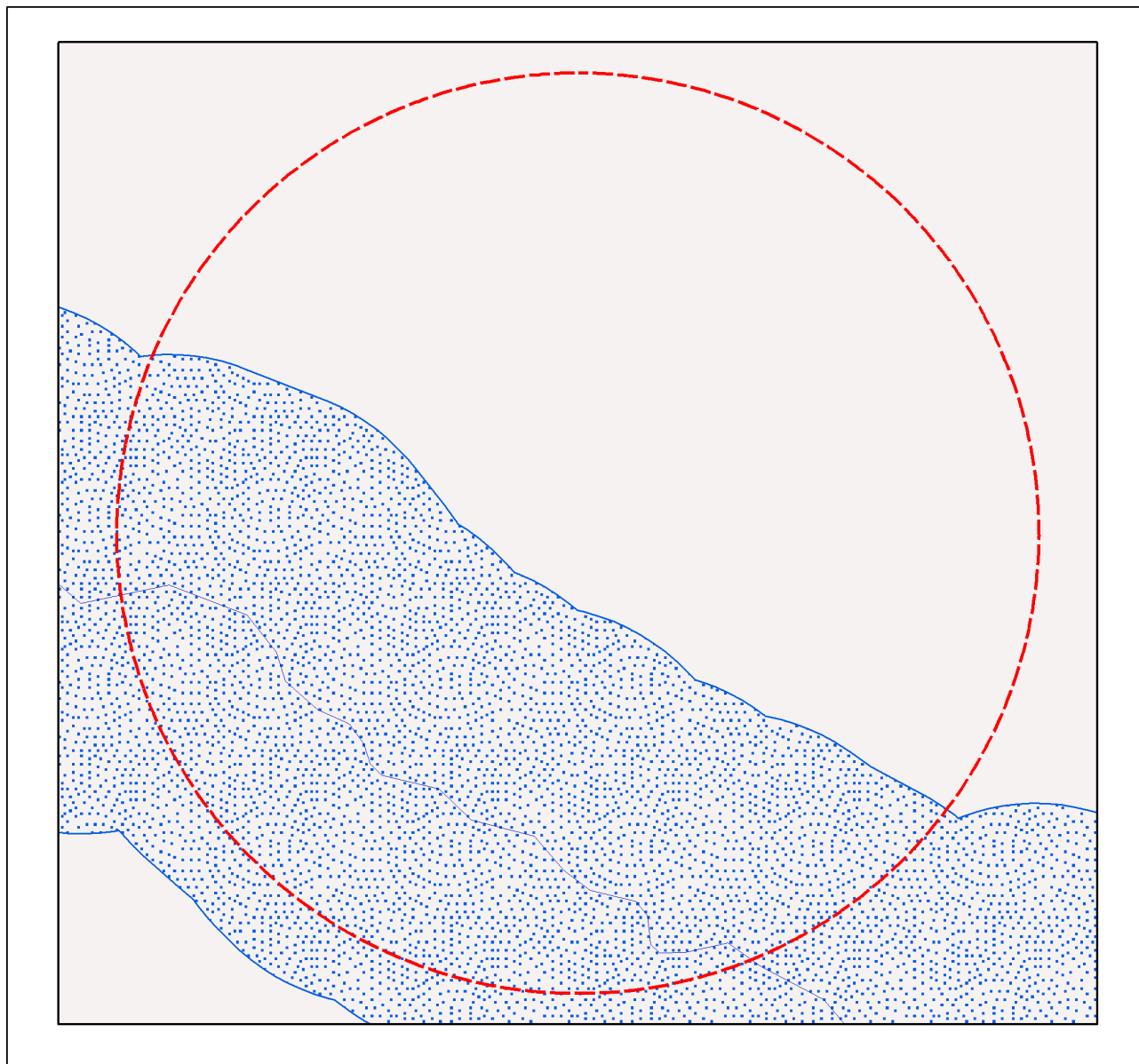
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





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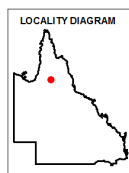
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Declared high ecological value waters (watercourse)
-  Strategic environmental area (designated precinct)
-  Declared high ecological value waters (wetland)
-  High ecological significance wetlands



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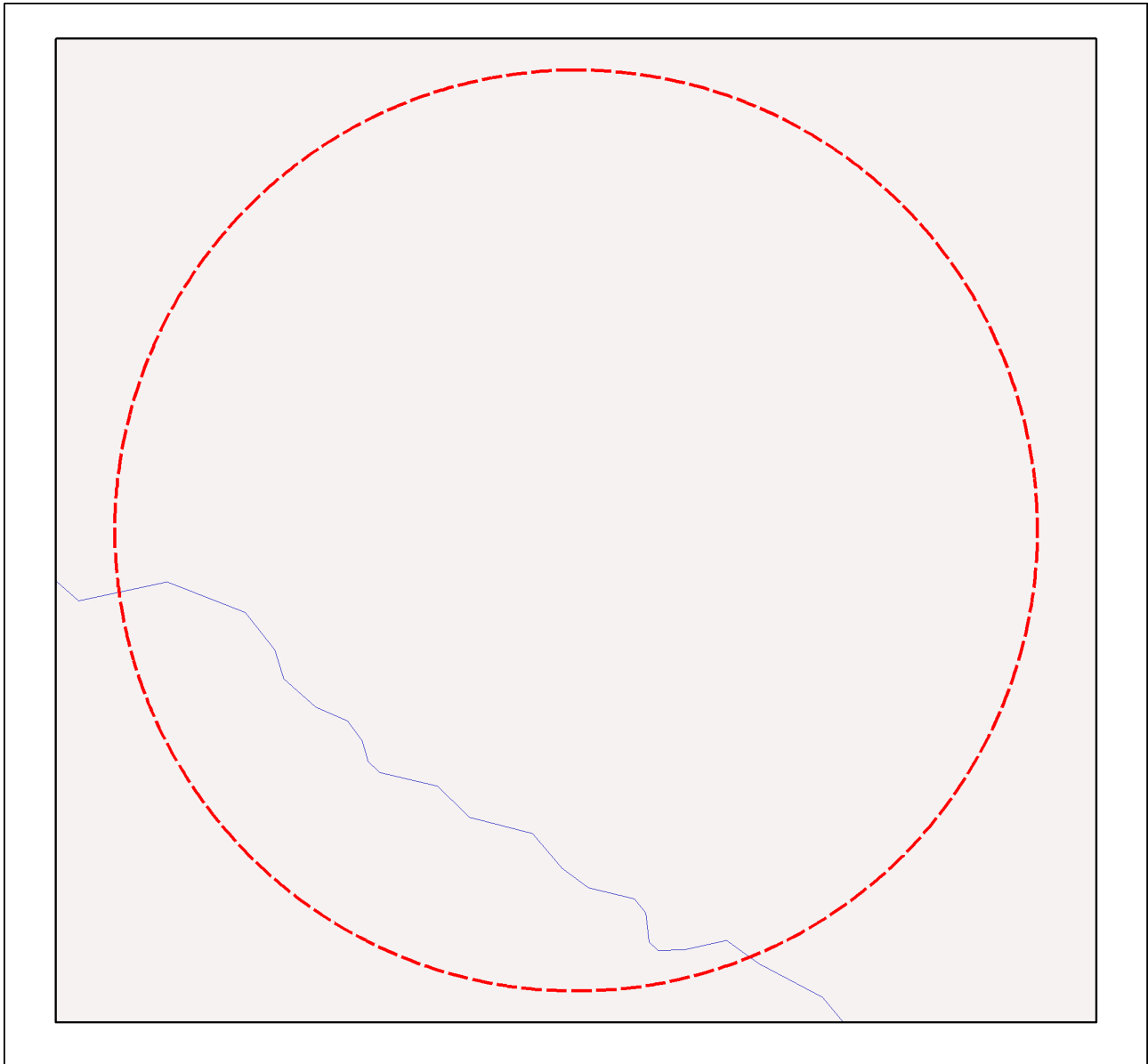
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
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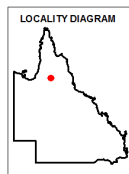
Map 3 - MSES - Species



MSES - Species

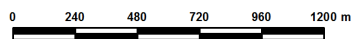
Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Threatened wildlife and special least concern animal



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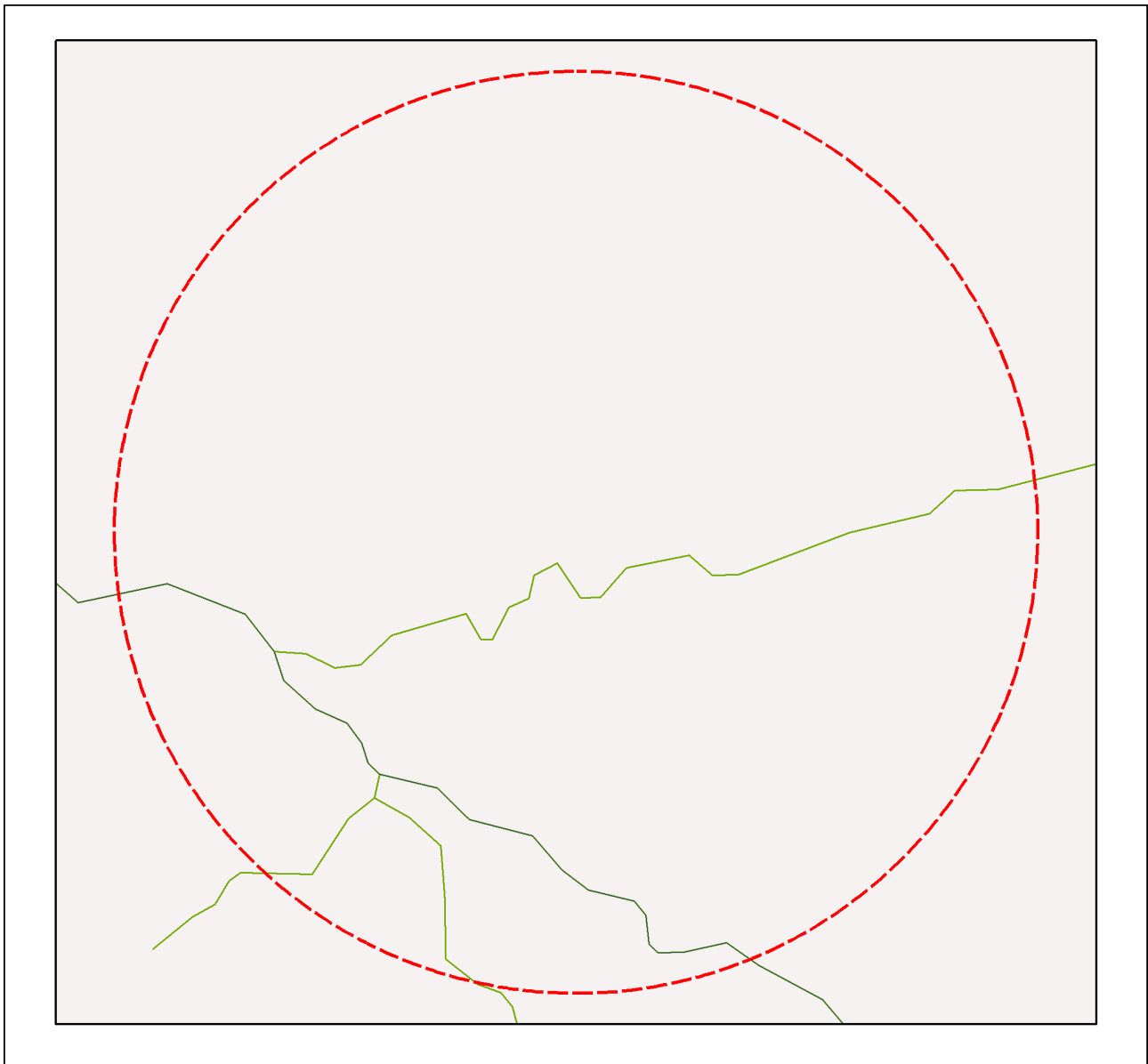
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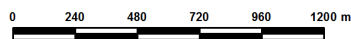
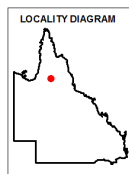
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

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



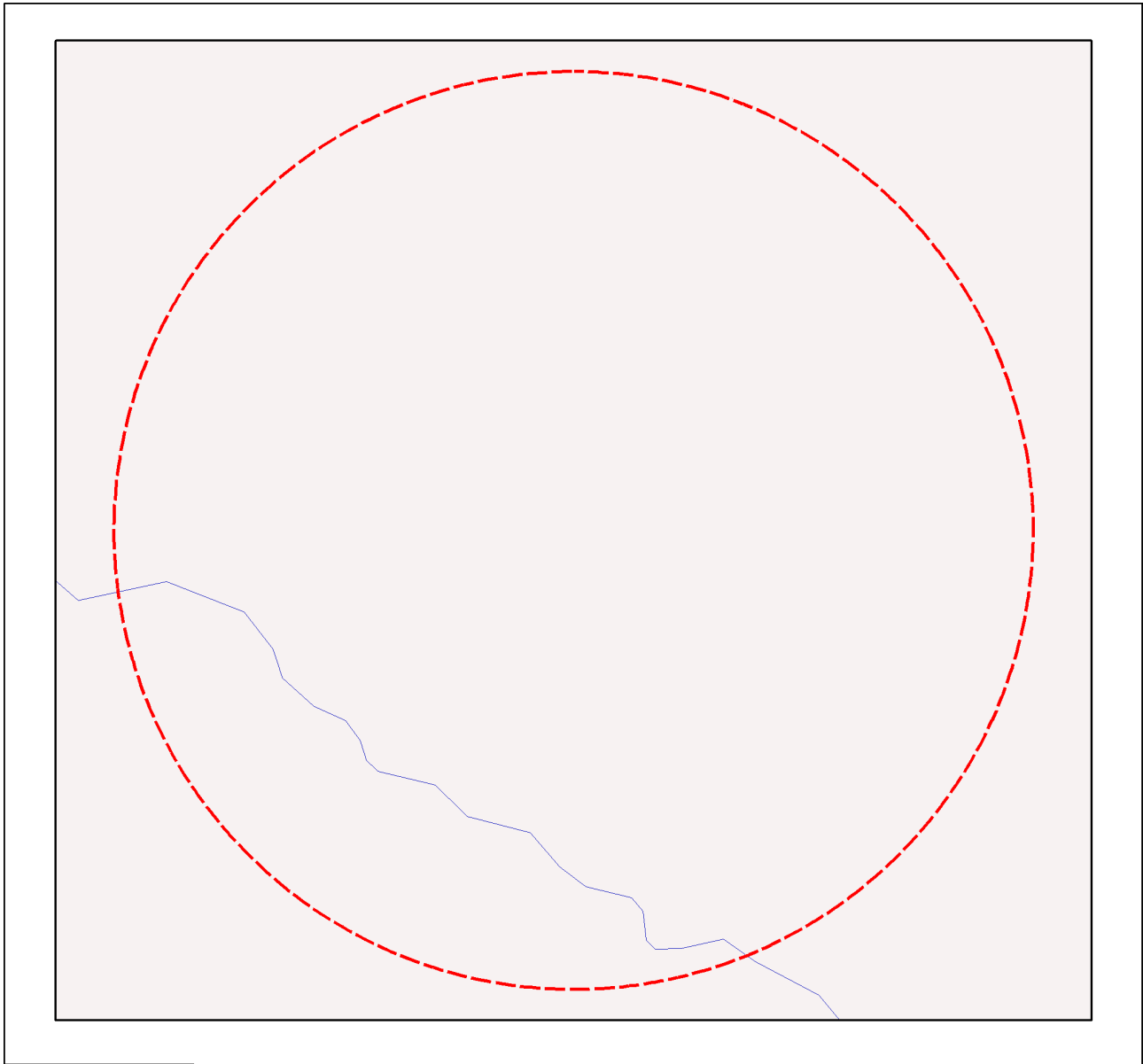
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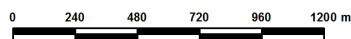
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

-  2 kilometre buffer
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Legally secured offset area (offset register)
-  Legally secured offset area (vegetation offsets)



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This product is projected into GDA 1994 Queensland Albers

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.information.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	- <i>Environmental Protection Act 1994</i>
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	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>



Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

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.

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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.



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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: Longitude: 143.04239 Latitude: -17.45513 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau, Mitchell - Gilbert Fans
Catchment(s)	Staaten

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

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

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	57.61	4.58
No concern at present	1,198.94	95.42
Total remnant vegetation	1,256.55	100.0

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
2.10.5a	Acacia shirleyi woodland and Triodia pungens hummock grassland on scarps and stony ledges	No concern at present	123.03	9.79
2.3.26a	Eucalyptus camaldulensis +/- Melaleuca spp. woodland fringing sandy, seasonal channels	Of concern	50.07	3.98
2.3.29a	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	23.15	1.84
2.3.29c	Melaleuca viridiflora +/- M. citrolens, M. stenostachya low woodland in depressions and broad valleys on solodised soils in the east	No concern at present	139.64	11.11
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	91.1	7.25
2.3.41	Aristida dominii, Eriachne spp., Chloris lobata +/- Eragrostis basedowii, Iseilema sp. tussock grassland on active Quaternary alluvial plains of major watercourses	Of concern	7.54	0.6
2.3.54	Corymbia polycarpa +/- Melaleuca viridiflora open woodland fringing minor watercourses on Tertiary sand sheets in the north-east	No concern at present	8.72	0.69
2.3.55b	Seasonal swamps (wooded). Melaleuca viridiflora and/or M. clarksonii low woodland in closed depressions on Tertiary to Quaternary deposits in the north	No concern at present	3.77	0.3
2.5.14c	Melaleuca spp. low woodland on plains on earths and podsolics (south)	No concern at present	117.65	9.36
2.5.17a	Melaleuca citrolens and/or M. stenostachya low open woodland on Tertiary outwash deposits and sand sheets in the east	No concern at present	112.46	8.95
2.5.19a	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	132.26	10.53
2.5.19b	Eucalyptus tetradonta, E. chartaboma, Erythrophleum chlorostachys, Corymbia pocillum in mixed woodlands on sand sheets on Mesozoic sandstone plateaus	No concern at present	105.8	8.42

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
2.5.26	Eucalyptus melanophloia, Acacia julifera subsp. gilbertensis, Corymbia setosa and Melaleuca spp. in mixed low woodlands on Tertiary sand sheets	No concern at present	16.5	1.31
2.7.1x3a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	127.45	10.14
2.7.1x4	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	31.2	2.48
2.7.1x6	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	35.66	2.84
2.7.2x5	Acacia shirleyi, Eucalyptus shirleyi, Corymbia setosa subsp. pedicellaris or Melaleuca acacioides woodland on low scarps on skeletal soils	No concern at present	130.54	10.39

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
2.10.5a	Pre-clearing 373000 ha; Remnant 2015 373000 ha	24a	None	High
2.3.26a	Pre-clearing 254000 ha; Remnant 2015 252000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
2.3.29a	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.29c	Pre-clearing 1127000 ha; Remnant 2015 1122000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.3.41	Pre-clearing 86000 ha; Remnant 2015 84000 ha	31a	Floodplain (other than floodplain wetlands).	Low
2.3.54	Pre-clearing 97000 ha; Remnant 2015 97000 ha	16b	Riverine wetland or fringing riverine wetland.	High
2.3.55b	Pre-clearing 65000 ha; Remnant 2015 65000 ha	34c	Palustrine wetland (e.g. vegetated swamp).	High
2.5.14c	Pre-clearing 1351000 ha; Remnant 2015 1348000 ha	21a	None	Medium
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.19a	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
2.5.19b	Pre-clearing 145000 ha; Remnant 2015 144000 ha	14a	None	Medium
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.7.1x3a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x4	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low
2.7.1x6	Pre-clearing 307000 ha; Remnant 2015 307000 ha	33b	None	Low
2.7.2x5	Pre-clearing 305000 ha; Remnant 2015 304000 ha	24a	None	Medium

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
2.10.5a	Supports plant species with restricted geographic ranges.
2.3.26a	Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26a: Significant provincial refuges for fauna. Includes areas of permanent water with high habitat values for aquatic and other species. 2.3.26b: Provincial refuge for flora and fauna. 2.3.26d: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26e: Provincial refuge for flora and fauna. 2.3.26f: Provincial refuge for flora and fauna. 2.3.26x1a: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1b: Significant provincial refuges for fauna. Includes permanent, spring-fed water with high habitat values for aquatic and other species. 2.3.26x1c: Provincial refuge for flora and fauna. 2.3.26x1d: Provincial refuge for flora and fauna. 2.3.26x2: Supports plant growth well into the dry season. Provincial refuge for flora and fauna.
2.3.29a	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.29c	Provides wetland habitat for a flora and fauna. 2.3.29a: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>). 2.3.29b: Provides wetland habitat for a flora and fauna. 2.3.29c: Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).
2.3.36a	None
2.3.41	None
2.3.54	None
2.3.55b	Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55a: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55b: Seasonal wetland. Important feeding and moulting sites for water birds. 2.3.55c: Seasonal wetland. Important feeding and moulting sites for water birds.
2.5.14c	Potential habitat for the golden-shouldered parrot (<i>Psephotus chrysopterygius</i>).

Regional Ecosystem	Special Values
2.5.17a	None
2.5.19a	None
2.5.19b	None
2.5.26	None
2.7.1x3a	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x4	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.1x6	Supports plant species with restricted geographic ranges in the bioregion, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x2b: Supports plant species with restricted geographic ranges. 2.7.1x2c: Supports plant species with restricted geographic ranges. 2.7.1x3a: Supports plant species with restricted geographic ranges. 2.7.1x4: Supports plant species with restricted geographic ranges, including the threatened species <i>Macropteranthes montana</i> (V). 2.7.1x5: Supports plant species with restricted geographic ranges, including <i>Macropteranthes montana</i> (V). 2.7.1x6: Supports plant species with restricted geographic ranges. 2.7.1x7: Supports plant species with restricted geographic ranges.
2.7.2x5	Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2b: Supports plant species with restricted geographic ranges. 2.7.2x2c: Supports plant species with restricted geographic ranges. Occurs at the southern range extent of <i>Eucalyptus megasepala</i> . 2.7.2x2f: Supports plant species with restricted geographic ranges. 2.7.2x4: Supports plant species with restricted geographic ranges. 2.7.2x6: Supports locally uncommon plant species in the bioregion, including <i>Eucalyptus persistens</i> . 2.7.2x9: Supports plant species with restricted geographic ranges.

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
14a	Woodlands and tall woodlands dominated by <i>Eucalyptus tetradonta</i> (Darwin stringybark) (or <i>E. megasepala</i>), with <i>Corymbia nesophila</i> (Melville Island bloodwood). Occasionally <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), on deeply weathered plateaus and remnants. (Primarily land zone 5, 7, 9). (CYP, GUP)	238.06	18.95
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	50.07	3.98
16b	Woodlands dominated by <i>Eucalyptus leptophleba</i> (Molloy red box), with <i>Corymbia tessellaris</i> (carbeen) or <i>C. clarksoniana</i> (grey bloodwood) or <i>C. dallachiana</i> . On sandy levees. (land zones 3, 5) (GUP, EIU, CYP)	8.72	0.69
17b	Woodlands to open woodlands dominated by <i>Eucalyptus melanophloia</i> (silver-leaved ironbark) (or <i>E. shirleyi</i> (shirley's silver-leaved ironbark)) on sand plains and footslopes of hills and ranges. (land zones 5, 12, 3, 11, 9, 7) (BRB, DEU, EIU, SEQ, NET, GUP, NWH)	16.5	1.31
21a	Low woodlands and low open woodlands dominated by <i>Melaleuca viridiflora</i> (coarse-leaved paperbark) on depositional plains. (land zones 3, 5, 11, [10]) (GUP, CYP, BRB, CQC, EIU, WET, SEQ)	371.53	29.57
21b	Low open woodlands and tall shrublands of <i>Melaleuca citrolens</i> or <i>M. stenostachya</i> or other <i>Melaleuca</i> spp. (land zones 5, 3, 7, 10, 11, 12) (GUP, CYP, EIU, DEU, BRB, [SEQ])	271.12	21.58
24a	Low woodlands to tall shrublands dominated by <i>Acacia</i> spp. on residuals. Species include <i>A. shirleyi</i> (lancewood), <i>A. catenulata</i> (bendee), <i>A. microsperma</i> (bowyakka), <i>A. clivicola</i> , <i>A. sibirica</i> , <i>A. rhodoxylon</i> (rosewood) and <i>A. leptostachya</i> (Townsville wattle). (land zones 7, 10, 5, 12, 11, [9, 3]) (MUL, CHC, BRB, GUP, EIU, MGD, DEU, NWH, [CYP])	253.57	20.18
31a	Open forblands to open tussock grasslands which may be composed of <i>Atriplex</i> spp. (saltbush), <i>Sclerolaena</i> spp. (burr), <i>Asteraceae</i> spp. and/or short grasses on alluvial plains. (land zone 3) (CHC, MGD, MUL, GUP, [BRB, DEU])	7.54	0.6
33b	Hummock grasslands dominated by <i>Triodia pungens</i> or <i>T. longiceps</i> (giant grey spinifex) or <i>T. mitchellii</i> (buck spinifex) sandplains. (land zones 6, 7, 5, [3, 9]) (MUL, MGD, GUP, DEU, [BRB])	35.66	2.84
34c	Palustrine wetlands. Freshwater swamps on coastal floodplains dominated by sedges and grasses such as <i>Oryza</i> spp., <i>Eleocharis</i> spp. (spikerush) or <i>Baloskion</i> spp. (cord rush) / <i>Leptocarpus tenax</i> / <i>Gahnia sieberiana</i> (sword grass) / <i>Lepironia</i> spp. (land zones 3, 2, [1]) (CYP, GUP, BRB, SEQ, WET, [CQC])	3.77	0.3

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/>

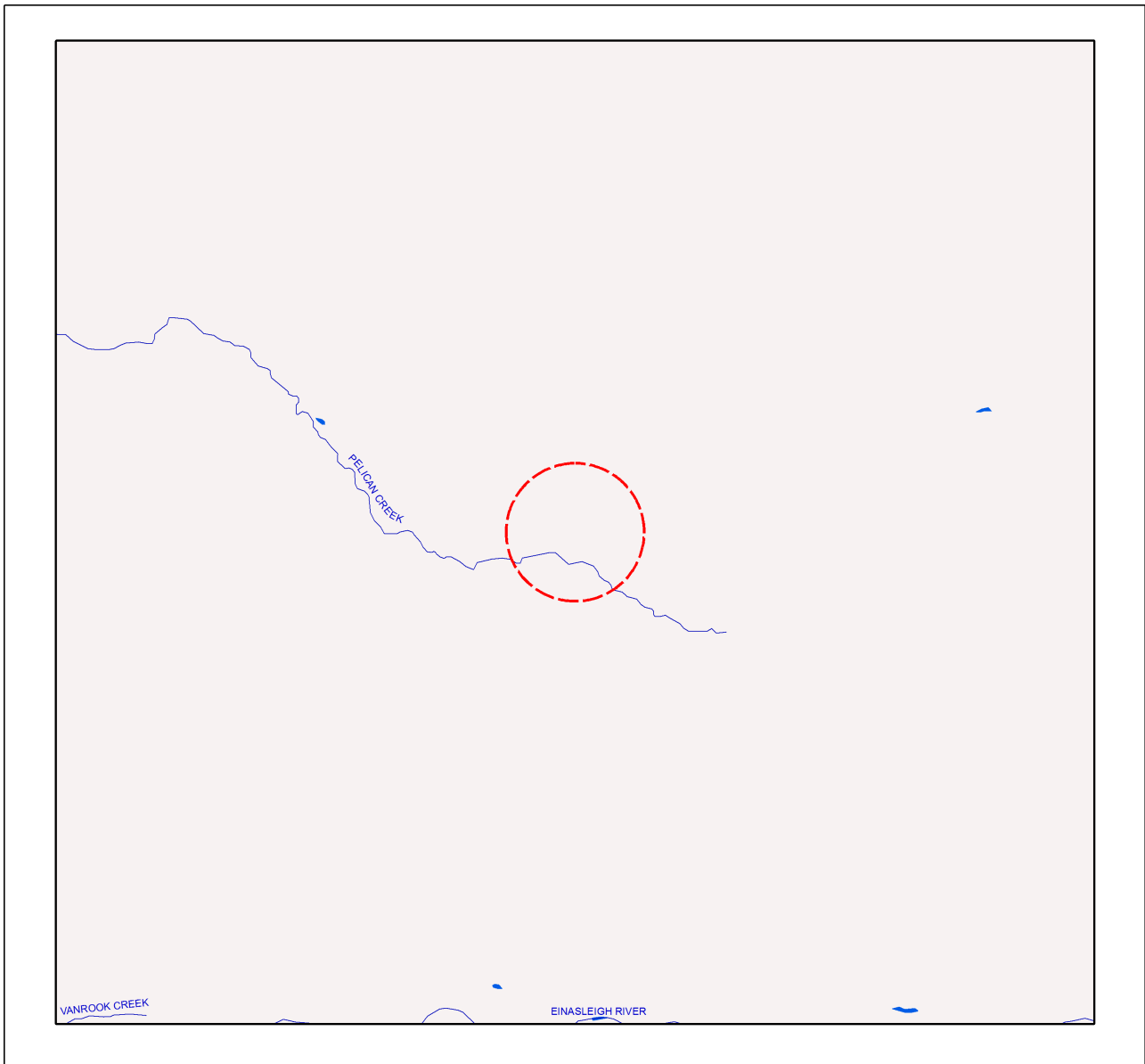
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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
2.10.5a	Not currently available	Not currently available
2.3.26a	Not currently available	Not currently available
2.3.29a	Not currently available	Not currently available
2.3.29c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.3.41	Not currently available	Not currently available
2.3.54	Not currently available	Not currently available
2.3.55b	Not currently available	Not currently available
2.5.14c	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.19a	Not currently available	Not currently available
2.5.19b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.7.1x3a	Not currently available	Not currently available
2.7.1x4	Not currently available	Not currently available
2.7.1x6	Not currently available	Not currently available
2.7.2x5	Not currently available	Not currently available

Maps

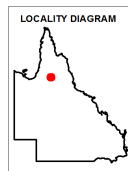
Map 1 - Location



Locality Map

Legend

- 2 kilometre buffer
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland



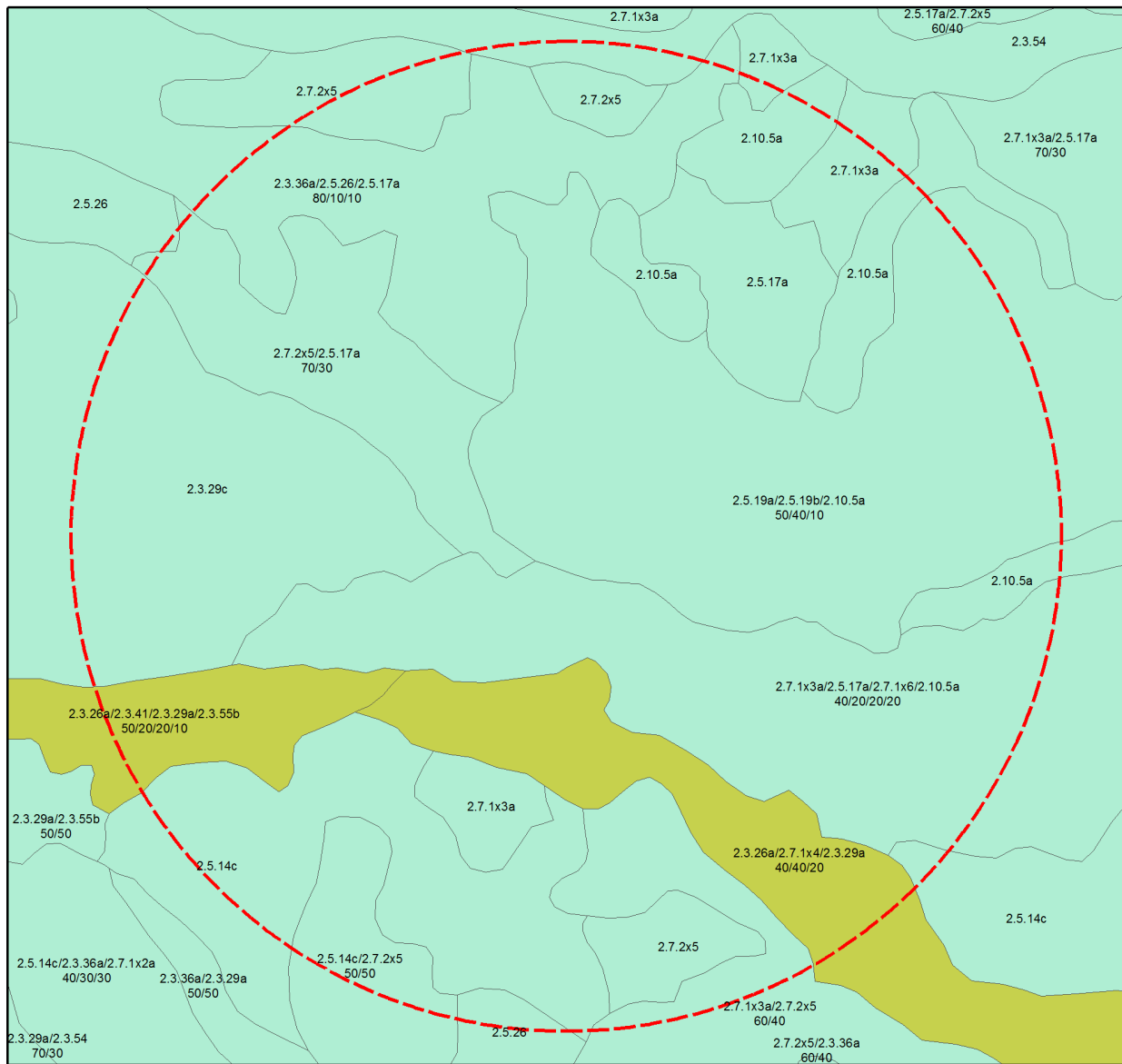
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




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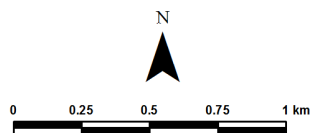
Map 2 - Remnant 2015 regional ecosystems



Remnant 2015 Regional Ecosystems

Biodiversity Status

-  2 kilometre buffer
-  Endangered - Dominant vegetation
-  Endangered - Sub-dominant
-  Of Concern - Dominant
-  Of Concern - Sub-dominant
-  No concern at present
-  Non-remnant vegetation, cultivated or built environment
-  Plantation
-  Water
-  Cadastral Boundaries



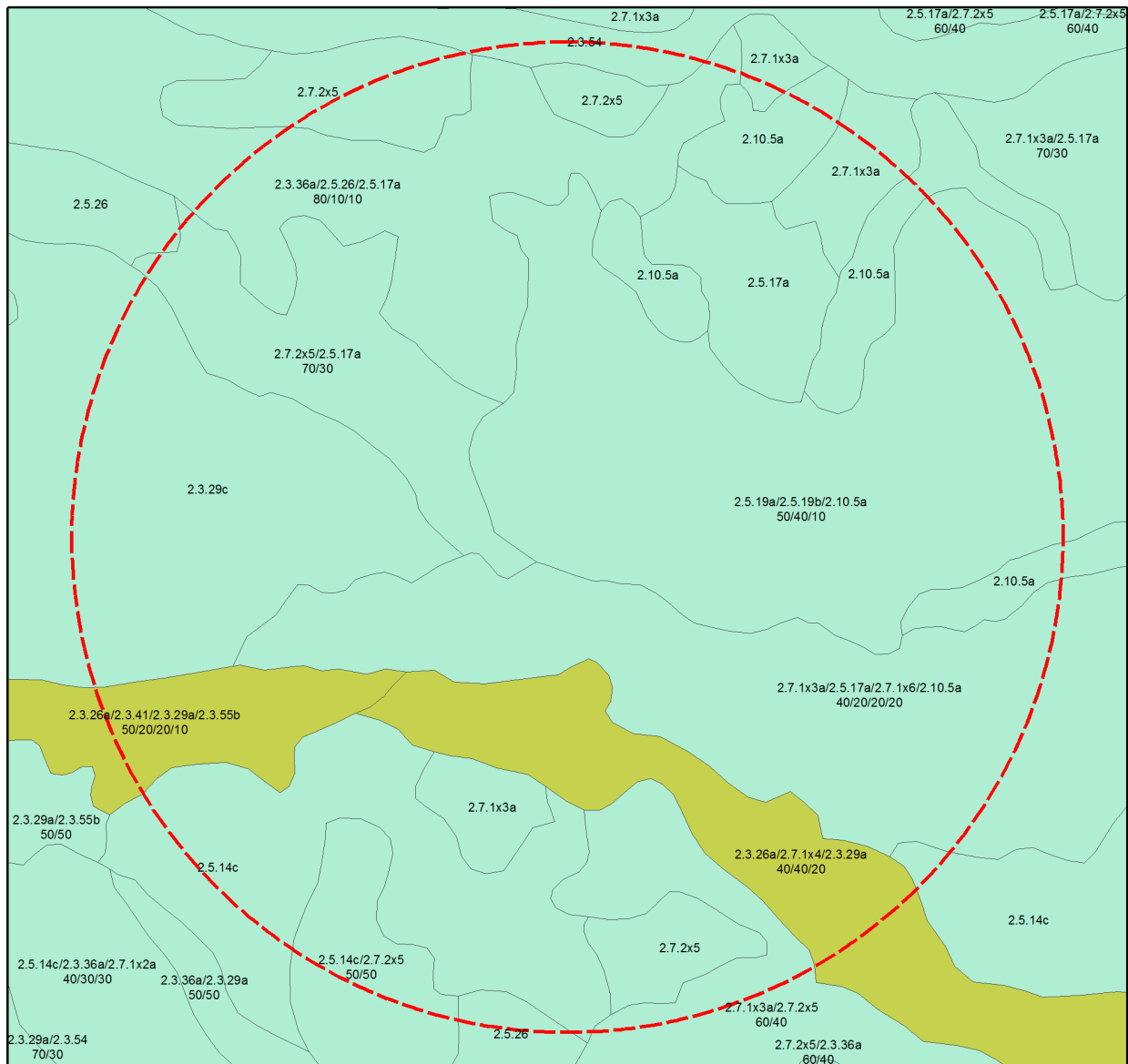
This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".









Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records. Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.

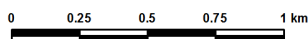
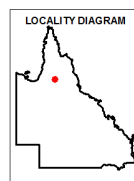
Map 3 - Pre-clearing regional ecosystems



Pre-clearing Regional Ecosystems

Biodiversity Status

-  2 kilometre buffer
-  Endangered - Dominant vegetation
-  Endangered - Sub-dominant
-  Of Concern - Dominant
-  Of Concern - Sub-dominant
-  No concern at present
-  Water
-  Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

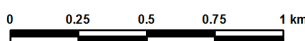
Map 4 - Remnant 2015 regional ecosystems by BVG (5M)



Remnant 2015 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The label consists of 3 components: bioregion, land zone, and vegetation community - the dominant canopy species, e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy. Non-remnant vegetation includes regrowth and disturbed native vegetation.

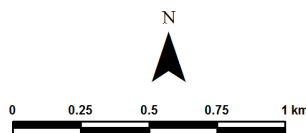
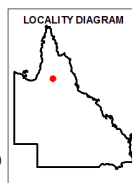
Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Pre-clearing Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups BVG5M Description (BVG1M codes)

- 2 kilometre buffer
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
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- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Water
- Cadastral Boundaries



This product is projected into GDA 1994 Queensland Albers

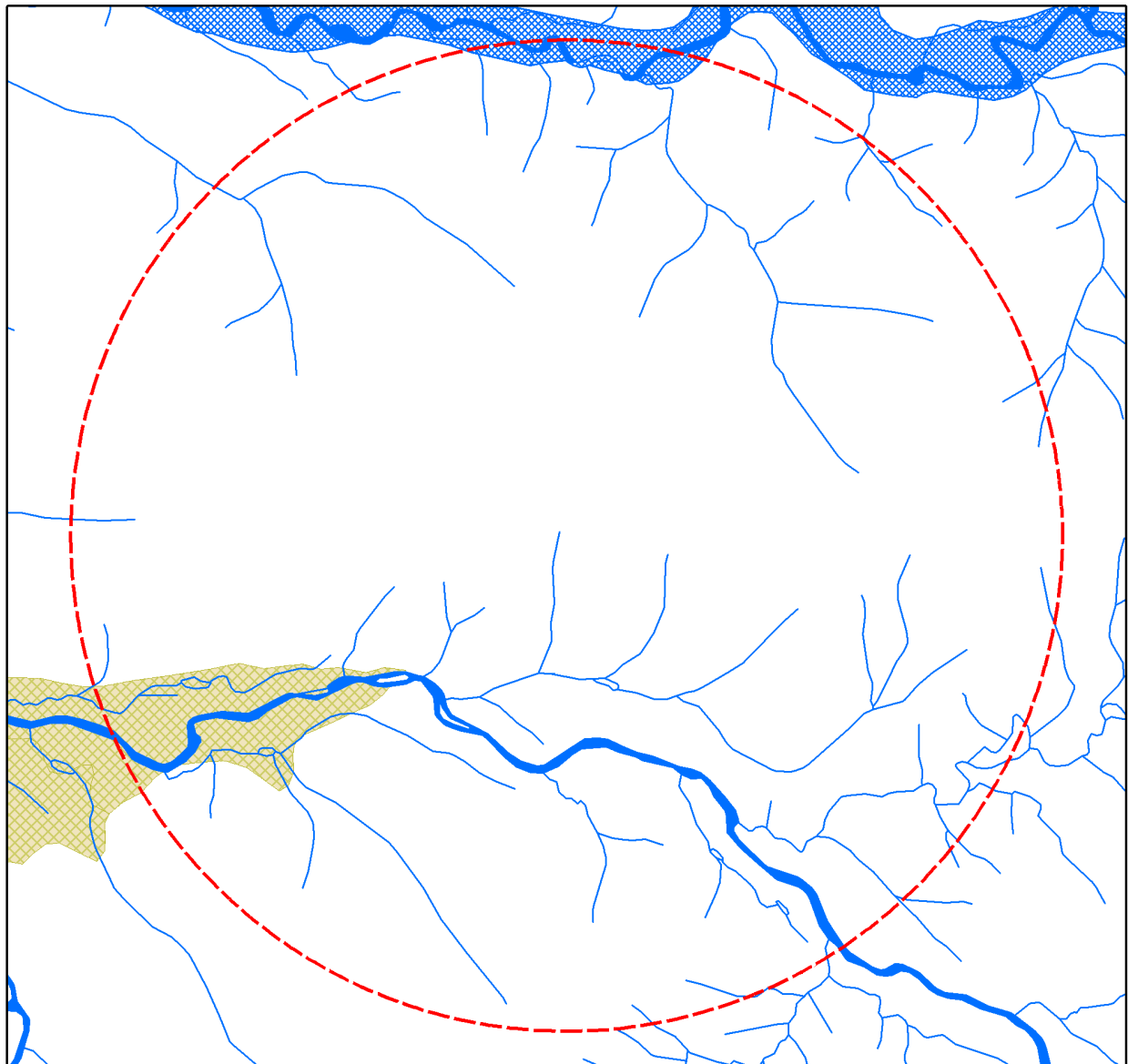
Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem line work reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of line work is 100 metres.

Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Map 6 - Wetlands and waterways



Queensland Wetland Data

Legend

- 2 kilometre buffer
- Towns

Queensland Wetland Data

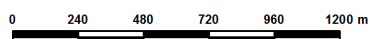
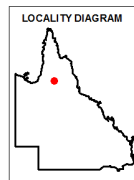
- Riverine Drainage Lines
- Springs

Wetland System - Water Bodies

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies

Wetland System - Regional Ecosystems

- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)



Accuracy information: The positional accuracy of wetland data mapped at a scale of 1:100,000 is +/-100m with a minimum polygon size of 5ha or 75m wide for linear features, except for areas along the east coast which are mapped at the 1:50,000 scale with a positional accuracy of +/-50m, with a minimum polygon size of 1ha or 35m wide for linear features. Wetlands smaller than 1ha are not delineated on the wetland data. Consideration of the effects of mapped scale is necessary when interpreting data at a larger scale, e.g. 1:25,000. For property assessment, digital linework should be used as a guide only. The extent of wetlands depicted on this map is based on rectified 2013 Landsat ETM+ imagery supplied by Statewide Landcover and Trees Study (SLATS), Department of Environment and Science. The extent of water bodies is based on the maximum extent of inundation derived from available Landsat imagery up to and including the 2013 imagery.

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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

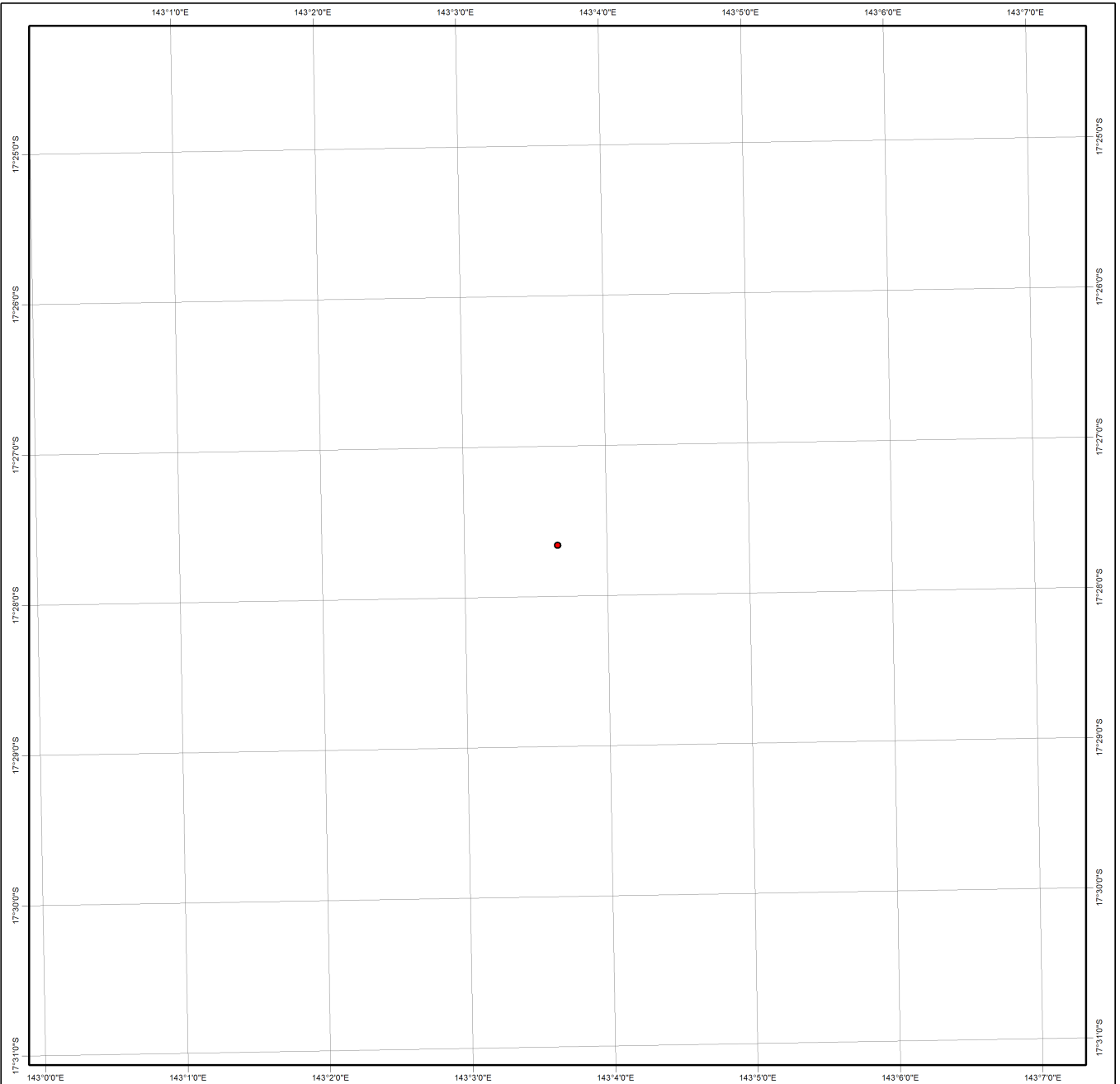
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 2015 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	- <i>Vegetation Management Act 1999</i>



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



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:
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