

RPI Development Application Supporting Information

LYND RESOURCES PTY LTD

HUANCHACA

May 2018

LYN001

Document Control Sheet

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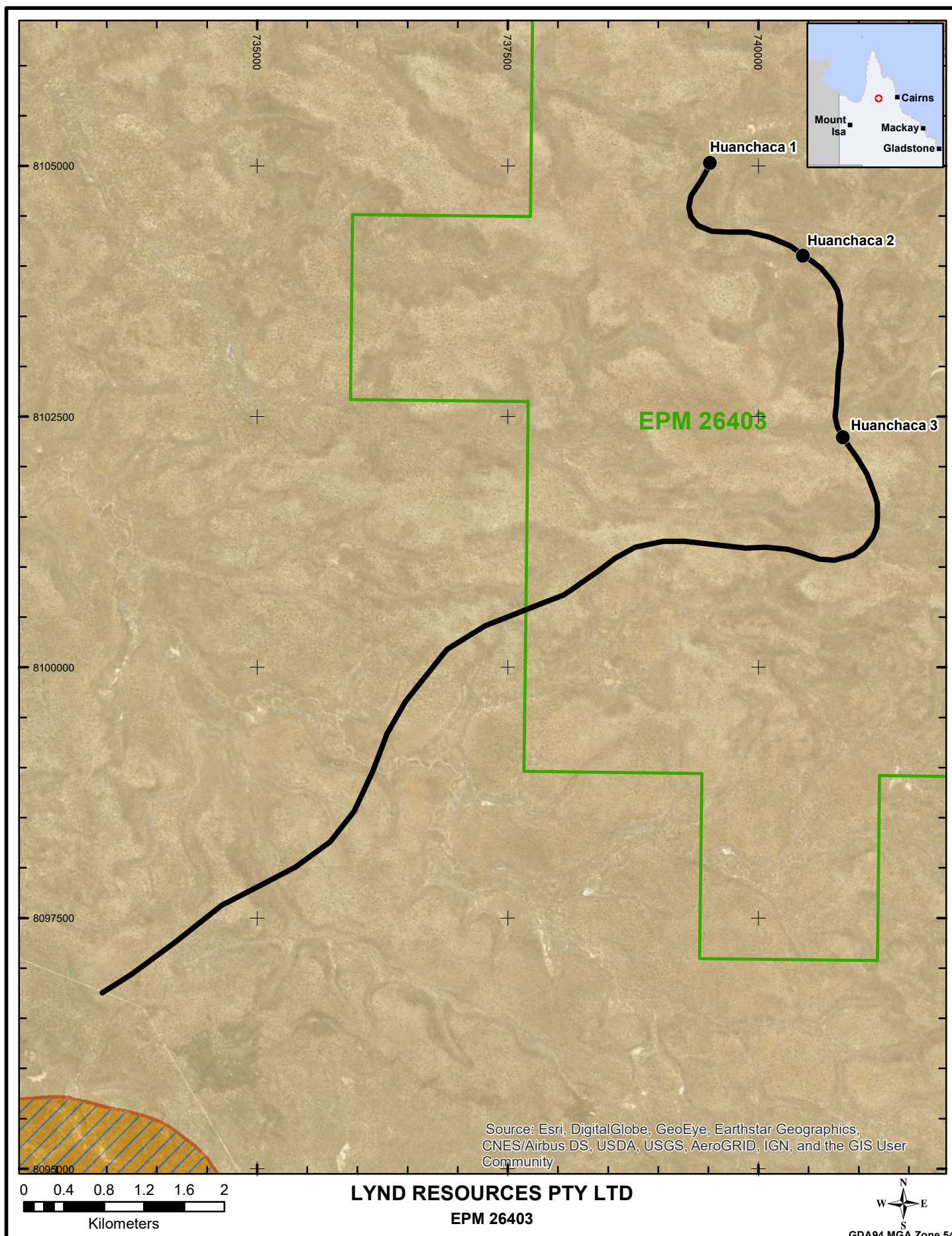
1. Introduction

Lynd Resources Pty Ltd (Lynd Resources) proposes to undertake exploration drilling for minerals on EPM 26403 as part of the Huanchaca Project located approximately 134km west of Chillagoe in North Queensland. The Huanchaca Project makes up part of the overall Lynd Resources' North Queensland exploration project.

The Huanchaca 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) (BRMN0006) 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.



	Location of Proposed Exploration Activities within Gulf Rivers SEA	<div> <div> EPM Boundary</div> <div> Proposed Drill Pad (30m x 20m)</div> <div> Proposed Track (3m width)</div> </div>	Areas of Regional Interest <div> <div> Strategic Environmental Area</div> <div> Strategic Environmental Area - Designated Precinct</div> </div>
Figure 1 Sheet No. ADMG_ARD_LYN001_MAP_0056_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 26403 are shown in **Table 1**.

Table 1 Property and Tenure details within EPM 26403

Category	Property 1	Property 2
Lot/Plan	Lot 4 on SE1	Lot 5309 on PH1681
Property Name	Strathmore Station	Torwood Station
Tenure	Lands Lease	Lands Lease
Landholder	Scott Alexander Harris	Carolyn Joyce Curley

The majority of EPM 26403 is situated within Lot 4 on SE1 and all disturbance caused by the exploration activities will only take place within this lot. There will be approximately 1.77ha of disturbance off EPM 26403 for access track to the EPM; this will occur within Lot 4 on SE1.

EPM 26403 was granted to Lynd Resources on 04 May 2017 for a period of 2 years, to expire 03 May 2019. Lynd Resources will apply to DNRME to renew the tenement for an extended period in due course.

EPM 26403 was granted over an area of 19 sub-blocks (approximately 5,130ha based upon a sub-block size of 270ha). Standard EA BRMN0006 was granted as a part of the approval for EPM 26403, 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 resource activities under EPM 26403, which will fall within Lot 4 on SE1 and the Gulf Rivers SEA:

1. Construction of access tracks;
2. Establishment of two initial drill pads 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 Huanchaca project with two initial target locations. Huanchaca 2 and Huanchaca 3 will be the two target sites within the area, and if results permit, one more may be conducted at site Huanchaca 1.

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 3**, 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 4 on SE1	Initial: 3.80ha Maximum: 4.34ha (3m wide tracks)
Drill pads	2 initial; maximum 3	All pads located on Lot 4 on SE1: Huanchaca 1: -17.126820°, 143.251230° Huanchaca 2: -17.135050°, 143.260060°* Huanchaca 3: -17.151410°, 143.263990°*	Initial: 0.12ha Maximum: 0.18ha (3 x (20m x 30m))
Temporary Fuel and Laydown Storage Area	1	Lot 4 on SE1	0.04ha (20m x 20m)
Temporary Mobile campsite	1	Lot 4 on SE1	0.04ha (20m x 20m)
INITIAL TOTAL DISTURBANCE FOR 2 TARGET SITES:			4.00ha
MAXIMUM DISTURBANCE TOTAL:			4.60ha

*Indicates initial target sites

All proposed disturbance will occur within Lot 4 on SE1, however there will be 1.77ha of disturbance off EPM for access track to EPM 26403.

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 Figure 2 , 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.

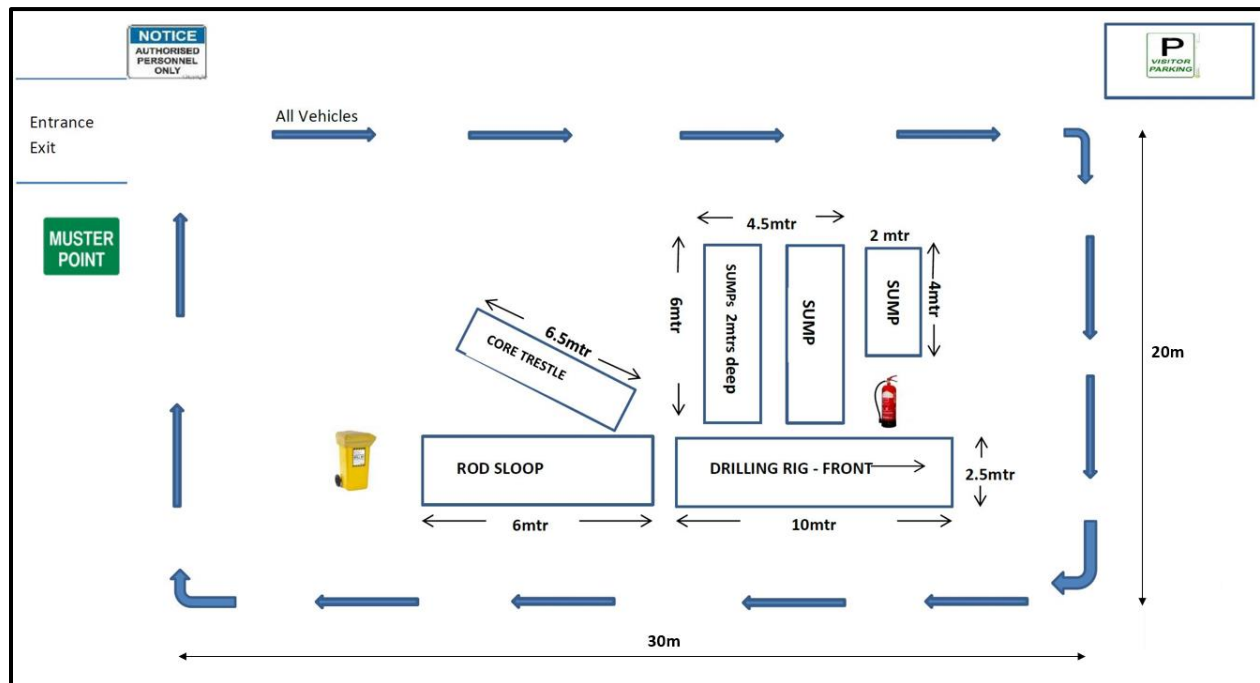


Figure 2 Schematic of the proposed drill pad

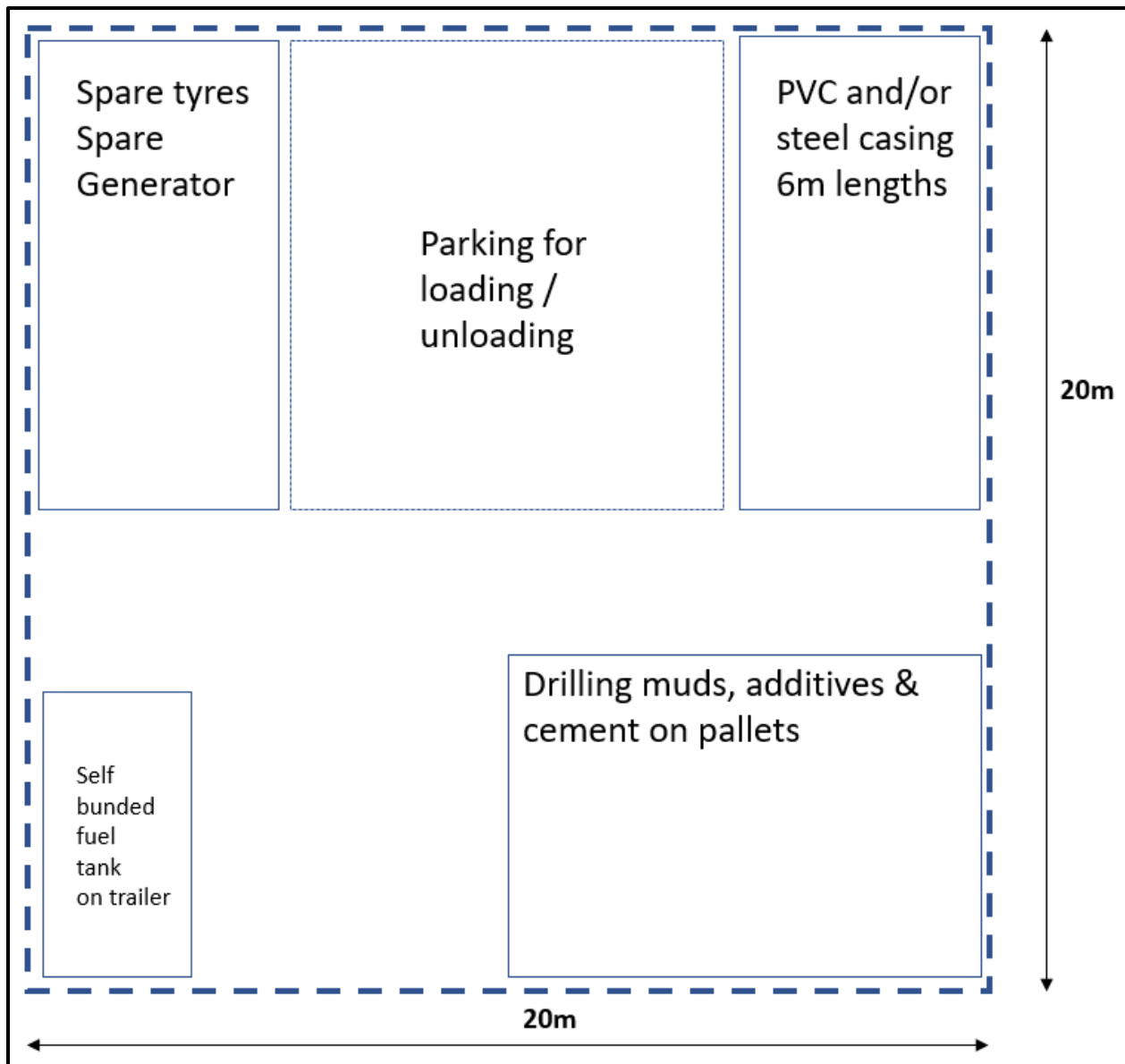


Figure 3 Schematic of the fuel and laydown storage area

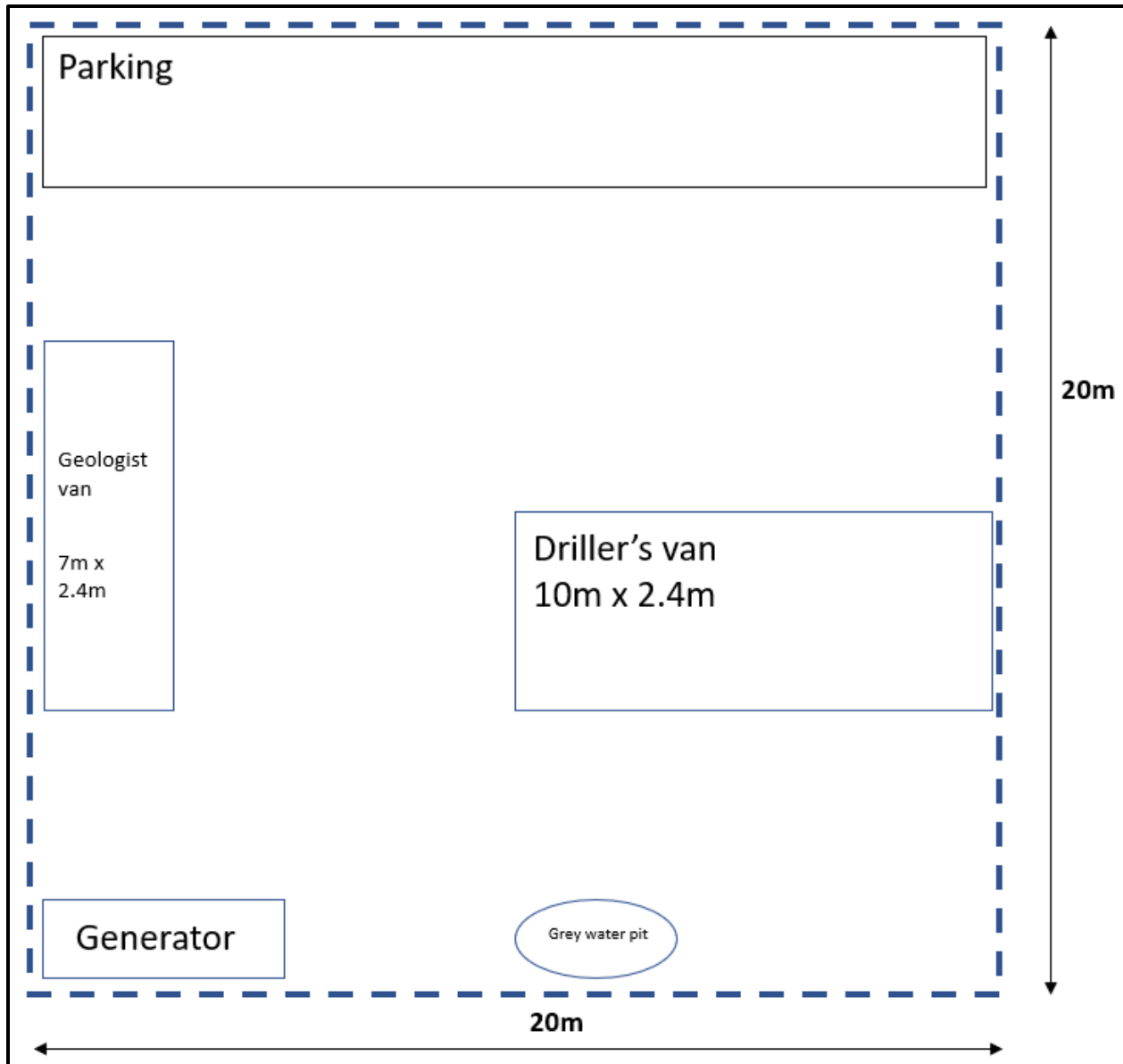


Figure 4 Schematic of the mobile campsite

2.1 Drilling Program

Exploration drilling undertaken during the Huanchaca 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 target depths to 200m. The target depths and diamond tails for the two initial drillholes are 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 two initial drillholes

Site	Estimated Target Depth	Estimated Diamond Tail
Huanchaca 2	200m	25m
Huanchaca 3	200m	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 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 drillhole be kept as a water bore, the appropriate approvals will be applied for in order to retain the drillhole 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 each of the two initial proposed drilling sites. 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 Huanchaca drill sites and the refinement of these tracks.

The first three route selections (purple, pink and green on **Figure 5**), all of which are quite similar, were selected as they were initially seen to create the least environmental disturbance, in particular to sub-dominant 'of concern' RE.

The second route refinement involved approximately 1,146m² of disturbance to the sub-dominant 'of concern' RE mixed polygon comprising of 40% 'of concern' REs (20% of RE 2.3.24c and 20% of RE 2.3.26a).

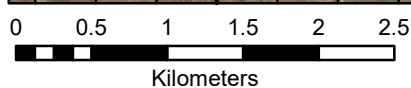
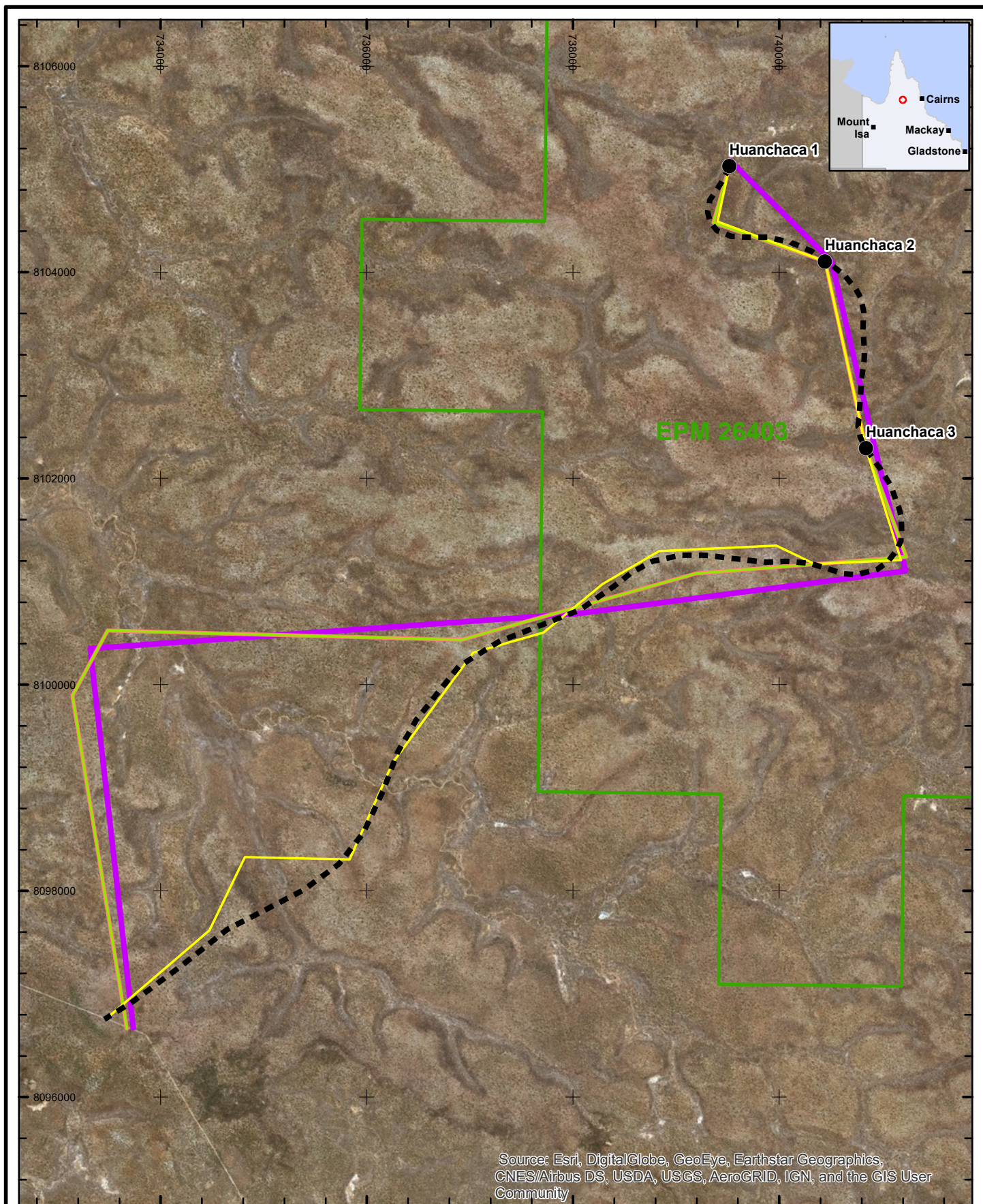
The final proposed route involves two crossings of sub-dominant 'of concern' RE mixed polygon, the southern crossing involves approximately 1008m² of disturbance to mixed RE polygon containing only 20% of 'of concern' RE 2.3.24c, with northern crossing involving approximately 399m² disturbance to mixed RE polygon containing 40% 'of concern' REs (20% of RE 2.3.24c and 20% of RE 2.3.26a).

The final proposed access track route is approximately 1.98km shorter in total length compared to the second route refinement, which equates to almost 0.6ha of reduced environmental disturbance. In addition, the drainage line crossings are likely to involve less disturbance to the bed and banks of the creek lines.

The final access route has also been relocated to, as far as practical, to avoid steep gradients, crossing incised drainage lines, and crossing permanent, wide, complex or braided watercourses and drainage lines.

This 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)*.



LYND RESOURCES PTY LTD
EPM 26403



**Refinement of the
 Huanchaca
 track access**

- EPM Boundary
- Proposed Drill Pad (30m x 20m)

- Initial Route Selection
- 1st Route Refinement
- 2nd Route Refinement
- 3rd Route Refinement
- Access Final Draft

Figure 5
 Sheet No.

ADMG_ARD_LYN001_MAP_0053_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 find 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 proposed access tracks to each of the three drill pads will involve the crossings of three corridors of regulated vegetation (intersecting a watercourse), however these are only associated with minor drainage features and do not include any major watercourse crossings (**Figure 6**). The Huanchaca 3 drillhole is located within 185m of regulated vegetation (intersecting a watercourse) and if results permit and drilling is required at Huanchaca 1, this drillhole is proposed to be situated within 40m of regulated vegetation (intersecting a watercourse). As detailed in Sections 2.1 and 2.2 of this Report, Lynd Resources has endeavoured to avoid areas of regulated vegetation and limit creek crossings during the desktop assessment process. This has meant:

- Reviewing drill pad locations to ensure that, wherever practicable, holes are drilled outside of areas that may have the potential to be wetlands or watercourses or are mapped as areas of “Of concern” vegetation.

- Refining proposed access tracks to avoid creek crossings or areas of significant vegetation. Where this has not been possible, Lynd Resources has sought to mitigate any impact by crossing lower order streams, choosing vegetation corridors that are less likely to contain “of concern” vegetation, minimising the width of the access track and committing to comply with recognised soil and erosion control standards. Section 4.5 contains more detail on this latter initiative.

The access track to Huanchaca 3 will involve crossing sub-dominant ‘of concern’ riparian communities of REs 2.3.24c and 2.3.26a. RE 2.3.24c is associated with a floodplain ecosystem while 2.3.26a is associated with a riverine wetland ecosystem. RE 2.5.6a will experience the greatest disturbance as a result of the exploration activities followed by RE 2.5.9. There are no known estuaries, lakes or wetlands that will be encountered as a result of the drills 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
Huanchaca 1	Endangered	0.0	0.0
	Of concern	10.09	0.8
	No concern at present	1,246.46	99.2
	Total remnant vegetation	1,256.55	100.0
Huanchaca 2	Endangered	0.0	0.0
	Of concern	7.95	0.63
	No concern at present	1,248.61	99.37
	Total remnant vegetation	1,256.55	100.0
Huanchaca 3	Endangered	0.0	0.0
	Of concern	3.33	0.27
	No concern at present	1,253.22	99.74
	Total remnant vegetation	1,256.55	100.0

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

Bold indicates target drill site

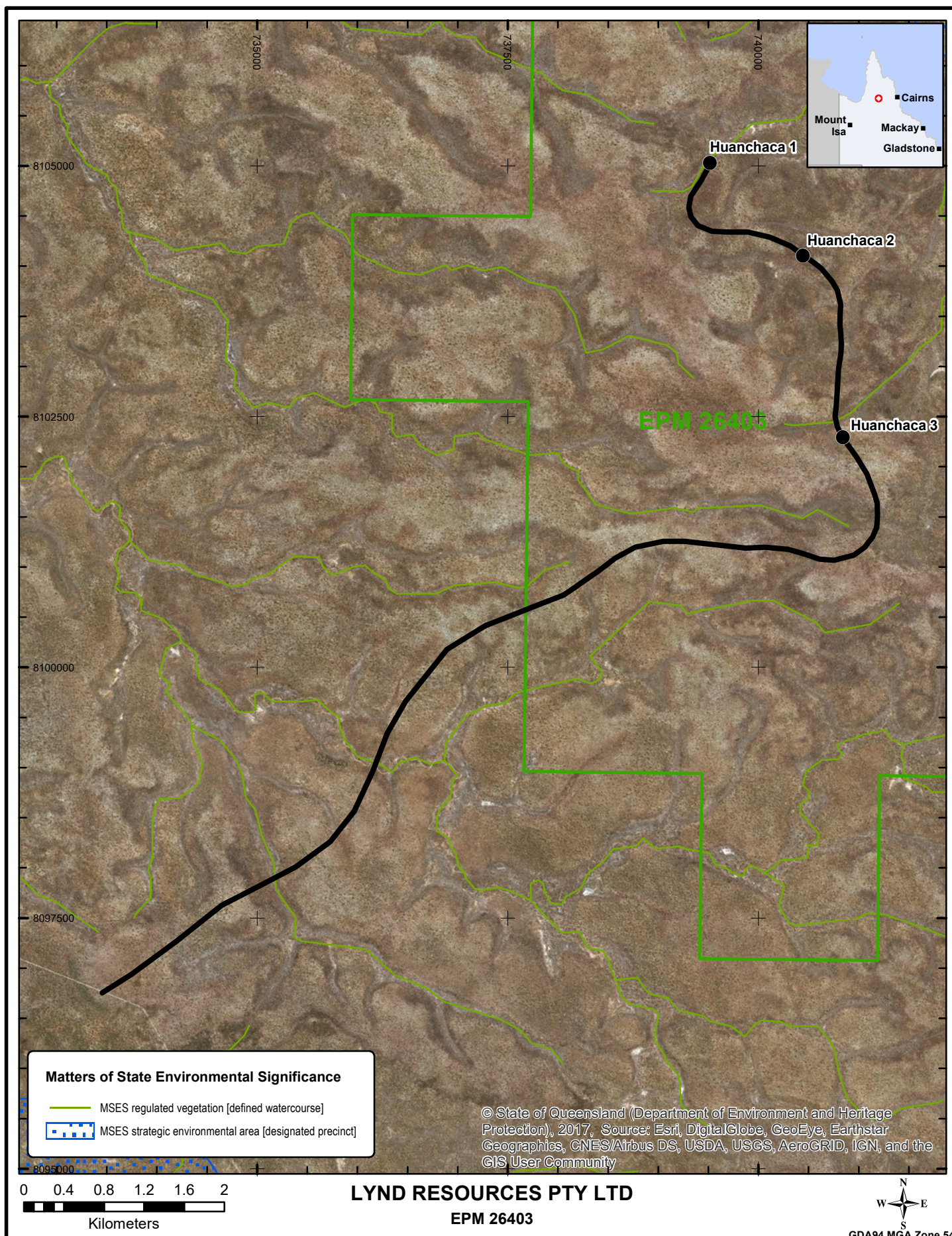
Table 6 Summary of the area/distance of MSES by drill site

Drill Site	MSES	Area (ha)/ Distance (km)	% of AOI
Huanchaca 1	8e Regulated Vegetation intersecting a watercourse –	7.5km	Not applicable
Huanchaca 2	8e Regulated Vegetation intersecting a watercourse –	8.7km	Not applicable
Huanchaca 3	8e Regulated Vegetation intersecting a watercourse –	8.7km	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**.



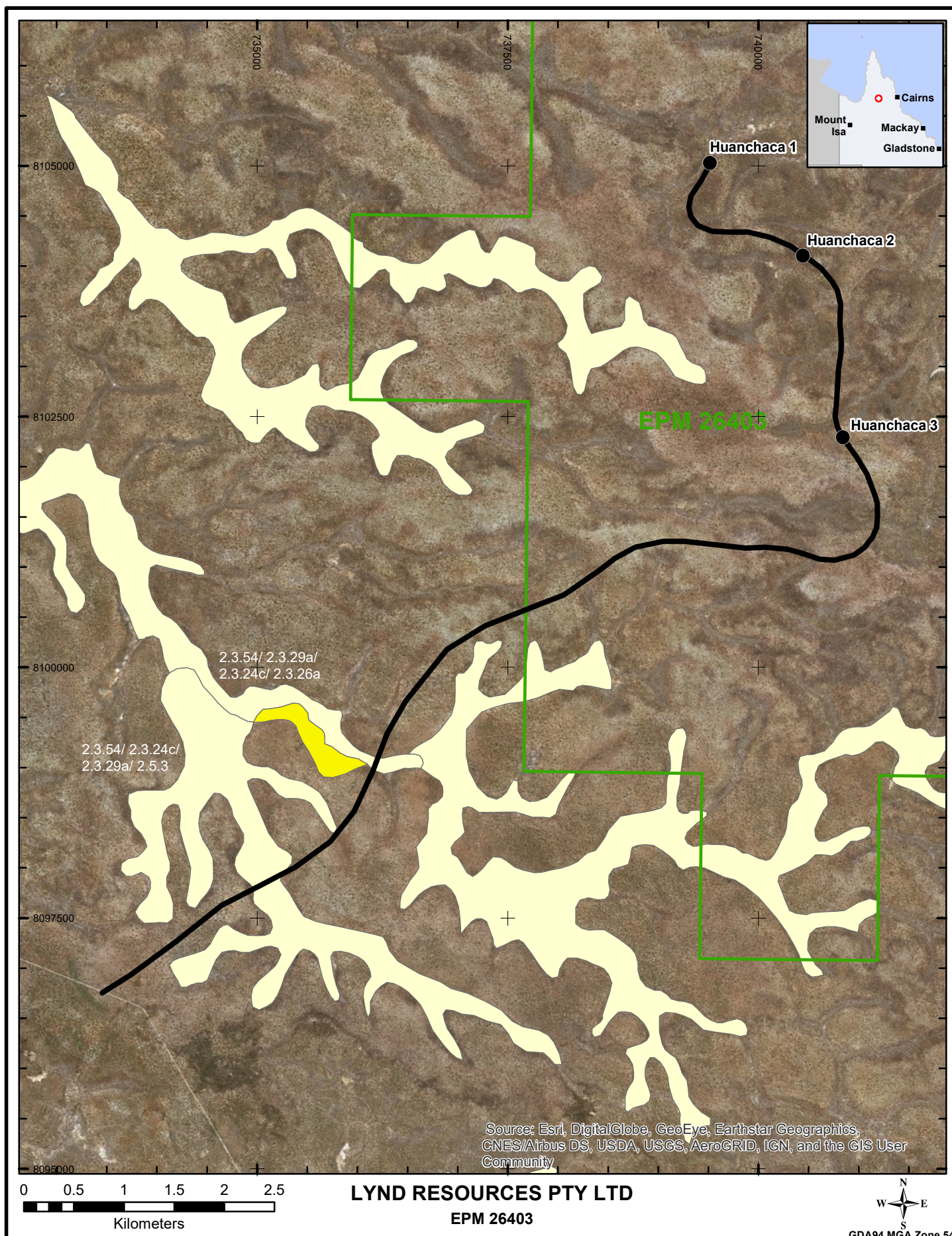
	Exploration Activities Matters of State Environmental Significance (MSES)	<ul style="list-style-type: none"> EPM Boundary Proposed Drill Pad (30m x 20m) Proposed Track (3m width)
Figure 6 Sheet No. ADMG_ARD_LYN001_MAP_0055_A	Drawn By: Chris Schlebusch Requested by: Richard Smith Date: 30/04/2018	Data sources: Qld Department of Natural Resources and Mines, National Native Title Tribunal Geoscience Australia, Esri


Table 7 Summary of Regional Ecosystems disturbed by exploration activities

RE	Summary Description	Biodiversity Status	Vegetation Management Act Class	Structure Category
2.3.24c	Mixed woodland to open forest, with combinations of the species <i>Celtis paniculata</i> , <i>Terminalia platyphylla</i> , <i>Eucalyptus camaldulensis</i> , <i>Thryptomene oligandra</i> , <i>Canarium australianum</i> , <i>Parinari nonda</i> and <i>Acacia spp.</i> A variable shrub layer commonly occurs, including <i>Margaritaria dubium-traceyi</i> , <i>Antidesma parvifolium</i> and <i>Syzygium eucalyptoides</i> . The ground layer is sparse tussock grasses. Occurs on elevated, stabilised terraces in channels of larger watercourses in the north of the bioregion. Pale brown sands. Floodplain (other than floodplain wetlands). (BVG1M: 16a). Special values: Supports locally uncommon plant species.	Of concern (sub-dominant)	Least concern	Sparse
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 (sub-dominant)	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
2.3.36a	<i>Melaleuca viridiflora</i> and/or <i>M. citrolens</i> low woodland to low open woodland, occasionally with <i>Asteromyrtus symphyocarpa</i> , <i>M. acacioides</i> and <i>Acacia torulosa</i> .	No concern at present	Least concern	Sparse

	<i>Emergent Corymbia polycarpa</i> , <i>C. clarksoniana</i> , <i>C. dallachiana</i> and <i>Livistona muelleri</i> may occur. A sparse shrub layer may occur, including <i>Melaleuca spp.</i> and <i>Petalostigma banksii</i> . The ground layer is tussock grasses and sedges, including <i>Eriachne spp.</i> , <i>Aristida spp.</i> , <i>Schizachyrium spp.</i> and <i>Fimbristylis spp.</i> Occurs in drainage depressions in undulating Tertiary sand sheets in the north-east of the bioregion. Texture contrast soils. A narrow band of tussock grassland in the centre of depressions may occur. Floodplain (other than floodplain wetlands). (BVG1M: 21a). Special values: None			
2.3.54	<i>Corymbia polycarpa</i> open woodland to woodland. A lower tree layer commonly occurs, including <i>Melaleuca viridiflora</i> , <i>Grevillea spp.</i> , <i>Erythrophleum chlorostachys</i> and <i>Pandanus sp.</i> A sparse shrub layer may occur. The ground layer is tussock grasses, including <i>Schizachyrium spp.</i> , <i>Thaumatococcus spp.</i> and <i>Pseudopogonatherum contortum</i> . Occurs in depressions and on fringes of minor watercourses in broad, Tertiary sand sheets in the north-east of the bioregion. (BVG1M: 16b). Special values: None	No concern at present	Least concern	Sparse
2.5.3	Evergreen mixed scrub that includes a combination of <i>Eucalyptus spp.</i> and/or <i>Corymbia spp.</i> , <i>Melaleuca spp.</i> , <i>Acacia spp.</i> , <i>Alphitonia excelsa</i> , <i>Banksia spp.</i> , <i>Cochlospermum gillivraei</i> , <i>Erythroxylum ellipticum</i> , <i>Excoecaria spp.</i> , <i>Gardenia spp.</i> , <i>Coelospermum spp.</i> , <i>Grevillea spp.</i> , <i>Hakea spp.</i> , <i>Pandanus spp.</i> , <i>Sersalisia sericea</i> , <i>Persoonia falcata</i> , <i>Petalostigma pubescens</i> and <i>Thryptomene oligandra</i> . Occurs on gently undulating plains on Quaternary and Tertiary terrestrial deposits; deep sands, yellow earths and texture contrast soils, some clays. (BVG1M: 14b). Special values: Provincial refuge for some flora and fauna species. Potential habitat for <i>Psephotus chrysapterygus</i> (golden-shouldered parrot).	No concern at present	Least concern	Mid-dense
2.5.5b	Mixed woodland, including combinations of the species <i>Eucalyptus tetradonta</i> , <i>Corymbia polycarpa</i> , <i>Erythrophleum chlorostachys</i> , <i>Eucalyptus leptophleba</i> and <i>C. confertiflora</i> . <i>C. pocillum</i> may occur in the canopy. A sparse shrub layer may occur, including canopy species, <i>Planchonia careya</i> and <i>Grevillea glauca</i> . The ground layer is tussock grasses, including <i>Heteropogon contortus</i> , <i>Pseudopogonatherum contortum</i> and <i>Aristida spp.</i> Occurs on residuals of Tertiary sand sheets, commonly within re-worked surfaces. Brown sands and loams. (BVG1M: 14a). Special values: None	No concern at present	Least concern	Very sparse
2.5.6a	Mixed woodland, including combinations of the species <i>Eucalyptus tetradonta</i> , <i>Corymbia pocillum</i> , <i>Erythrophleum chlorostachys</i> , <i>C. polycarpa</i> and <i>C. setosa</i> .	No concern at present	Least concern	Sparse

	<i>Eucalyptus chartaboma</i> and <i>C. dallachiana</i> may occur in the canopy. A variable shrub commonly occurs, including canopy species, <i>Melaleuca spp.</i> , <i>Grevillea spp.</i> and <i>Petalostigma spp.</i> The ground layer is tussock grasses, including <i>Aristida spp.</i> , <i>Heteropogon spp.</i> , <i>Schizachyrium fragile</i> and <i>Sarga plumosum</i> . Occurs on undulating Tertiary sand sheets. Red and yellow sands or earths. (BVG1M: 14b). Special values: Occurs at the highest altitudes in the bioregion (up to 1000+m)			
2.5.9	<i>Eucalyptus microneura</i> woodland with a grassy understorey of <i>Aristida spp.</i> Sparse lower tree storey. Occurs on plains and plateaus on earths, podzolics and skeletal soils. (BVG1M: 18d). Special values: None	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
2.5.18b	<i>Corymbia setosa</i> open woodland to woodland, commonly with <i>C. polycarpa</i> , <i>Erythrophleum chlorostachys</i> and <i>C. pocillum</i> . Occasional canopy species include <i>Melaleuca nervosa</i> and <i>Eucalyptus tetradonta</i> . A lower tree or shrub layer may occur, including <i>Grevillea glauca</i> , <i>Petalostigma pubescens</i> , <i>Asteromyrtus symphyocarpa</i> and <i>Alphitonia pomaderroides</i> . The ground layer is tussock grasses, including <i>Schizachyrium fragile</i> , <i>Aristida spp.</i> and <i>Chrysopogon fallax</i> . Occurs on undulating, dissected, Tertiary sand sheets in the north of the bioregion. Brown sandy loam soils. (BVG1M: 18a). Special values: None	No concern at present	Least concern	Very sparse
2.5.26	Mixed low woodland to woodland, including combinations of the species <i>Eucalyptus melanophloia</i> , <i>Acacia julifera subsp. gilbertensis</i> , <i>Corymbia setosa</i> , <i>Melaleuca spp.</i> , <i>E. microneura</i> and <i>Erythrophleum chlorostachys</i> . A variable shrub layer commonly occurs, including canopy species, <i>Acacia spp.</i> and <i>Petalostigma banksii</i> . The ground layer is tussock grasses, including <i>Thaumatococcus spp.</i> , <i>Schizachyrium fragile</i> and <i>Chrysopogon sp.</i> Occurs on undulating, erosional, Tertiary sand sheets. Yellow to brown sands and loams. (BVG1M: 17b). Special values: None	No concern at present	Least concern	Sparse



	Exploration Activities Of Concern Regional Ecosystems (Biodiversity Status v10.1)	<div> <div></div> EPM Boundary <div></div> Proposed Drill Pad (30m x 20m) <div></div> Proposed Track (3m width) </div>	<div> <div></div> Of Concern - Dominant <div></div> Of Concern - Sub-dominant </div>
Figure 7 Sheet No. ADMG_ARD_LYN001_MAP_0054_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

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 intersect three regulated vegetation (intersecting a watercourse) corridors which may be used as habitat and movement corridors for fauna. In addition, there will be two relatively small crossings of sub-dominant 'of concern' vegetation corridors involving two 'of concern' REs.

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 Huanchaca sites will flow into the Staaten River which flows into the Gulf of Carpentaria. There is currently only one open DNRME gauging station within the Staaten Basin and occurs downstream of the Huanchaca sites. While this gauging station will not display the exact characteristics of the exploration sites due to being located significantly downstream, 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 Huanchaca project is situated on the Great Artesian Basin in the Gulf Gilbert River Aquifer area. There are no known artesian springs located near the Huanchaca sites. The nearest registered groundwater bore within the catchment is bore RN157934 located approximately 54.5km from Huanchaca 3, however no groundwater quality data has been collected at this bore.

3.4 Hydrological Processes

The nearest Water Act defined watercourse (Staaten River) is approximately 3.4km northeast of the Huanchaca 2 drill site. There are no known dams, lakes, waterholes or springs located within 2km of any proposed drill pad or access track.

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 and are likely to be encountered, including weakly to moderately producing aquifers of the Gilbert River Formation, which is a sub-artesian to artesian aquifer.

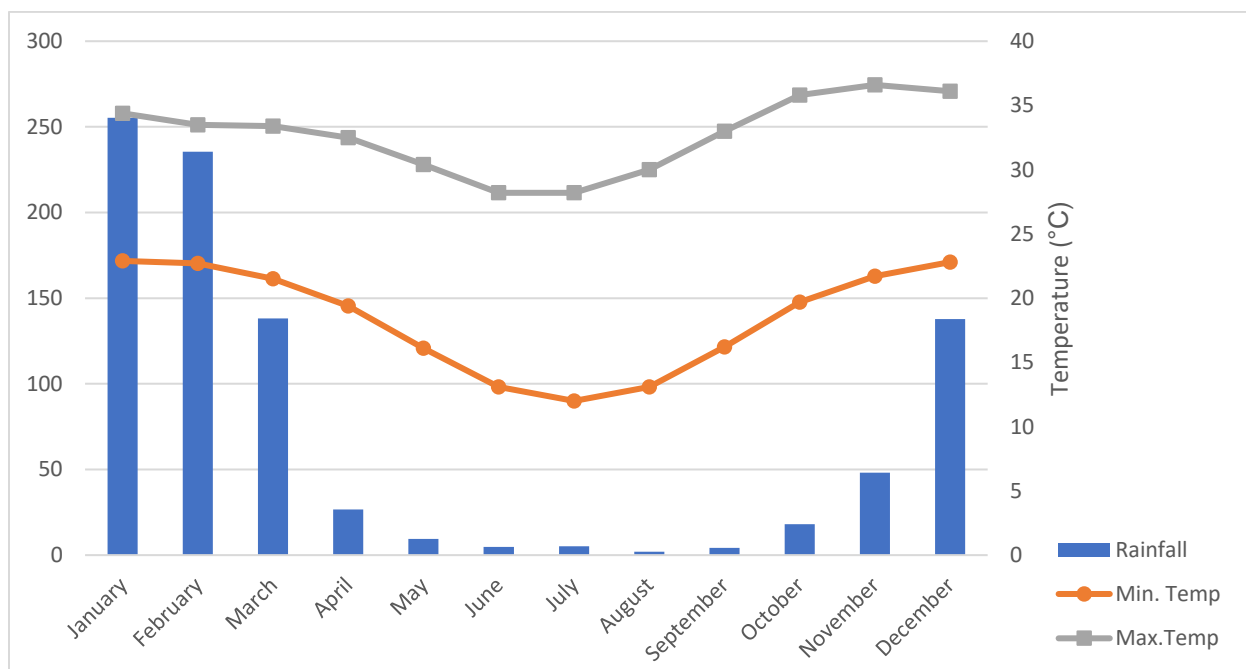
A bore report from bore RN157934 drilled on 14 July 2015 appeared to have struck a sub-artesian aquifer 24m below the surface with a yield of 5.5L/s.

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 52km from the Huanchaca sites using monthly rainfall data beginning in 1945. The temperature data is taken from the Georgetown Post Office weather station located approximately 131km from the Huanchaca 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 4 on SE1 being a cattle station owned by Scott Alexander Harris.

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 MSEs 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 will impact on riparian vegetation as there are three crossings of regulated vegetation (intersecting a watercourse) associated with minor drainage features. Part of the route assessment process was to refine the site access to cross these drainage features at as low a stream order as practical. In addition, as discussed in Section 2.2 of this report, the access track route has been designed to minimise the amount of disturbance to the 'of concern' REs in the area relating to floodplain RE 2.3.24c and riverine wetland RE 2.3.26a. The area of land disturbance caused to these areas of regulated vegetation and 'of concern' REs are considered to be minor, as only 3m wide tracks will be created which will not cause widespread, irreversible damage to the riparian processes.

A protected plant trigger search indicated there are no protected plant in or near the proposed disturbance area. Notwithstanding, the wetland REs (i.e. RE 2.3.26a) 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 130m of crossing within this RE where RE 2.3.26a comprises of approximately 20% of the mixed RE polygon. The REs on Landzone 5 may be habitat for vulnerable *Macropteranthes montana* while in addition, RE 2.5.3 may be habitat for vulnerable *Vappodes phaleanopsis*. *Eriocaulon carsonii*, *Macropteranthes montana* and *Vappodes phaleanopsis* will be surveyed for during track layout. 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 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 and largely constructed within the RE 2.5.6a. Wildlife corridors in the exploration area will largely involve three crossings of regulated vegetation (intersecting a watercourse) associated with minor drainage features. The access track was refined to cross drainage lines at a higher stream order than the original proposed track, and consequently where the drainage line is less incised. The disturbance to these corridors will only involve 3m wide sections of track and is not considered that widespread or irreversible disturbance of these corridors.

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.

As described in **Table 7**, REs 2.3.29a and 2.5.3 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 site 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 watercourse crossings, it will be the intention to:

- Select appropriate crossing areas (for example: lower order streams, areas with less significant vegetation or with less vegetation requiring clearing and streams with sand/gravel/rocky streambeds;
- Minimise any significant bank damage during the construction of any required access ramps;
- Minimise the risk of sediment-laden runoff from the access ramps being allowed to discharge directly into the watercourse without passing through an appropriate sediment trap or vegetative filter; and
- Minimise harm (including sediment accumulation) to the streambed.

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

- Minimise all vegetation clearing;
- Construct the crossing perpendicular to the channel;
- Install overland flow diversions to prevent run-off from the access road entering the watercourse directly;

- Stabilise access ramps and, if necessary, employ geotextile;
- Stabilise the streambed with a geogrid;
- Conduct regular inspections for erosion or channel scour; and
- Commence rehabilitation as soon as practicable after final use.

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 proposed activities will not be carried out in a designated precinct and also 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 Triggers) and Commonwealth (EPBC Act) databases have been undertaken. A desktop assessment by a qualified botanist-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.
(iii) the activity does not compromise the preservation of the environmental attribute within the strategic environmental area;	<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.
(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.	The Far North Queensland Regional Plan 2009-2031 does not identify the Gulf River SEA.

6. Conclusion

Lynd Resources intends to conduct a small-scale exploration drilling programme within its granted EPM 26403. As part of this programme, an initial two drill pads will be constructed. Should results from this drilling prove encouraging, a further drill pad 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 0.12ha (2 x 20m x 30m) up to a maximum of three drill pads (a further 0.06ha)
- Access track – initially 3.8ha (to access the first two drill pads), with an additional 0.54ha of disturbance for the final drill pad should it 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 three target sites is 4ha, with a maximum disturbance total of 4.6ha. 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 is not being carried out in a designated precinct and is not considered an unacceptable use;
 - 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>.

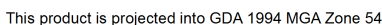
Queensland Government 2018, 918003A Staaten River at Dorunda, accessed 20 March 2018,

<<https://water-monitoring.information.qld.gov.au/>>.

RPI DEVELOPMENT APPLICATION SUPPORTING INFORMATION

LYND RESOURCES PTY LTD

Appendix 1: Environmental Reports



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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HUANCHACA 1 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.25123 Latitude: -17.12682 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

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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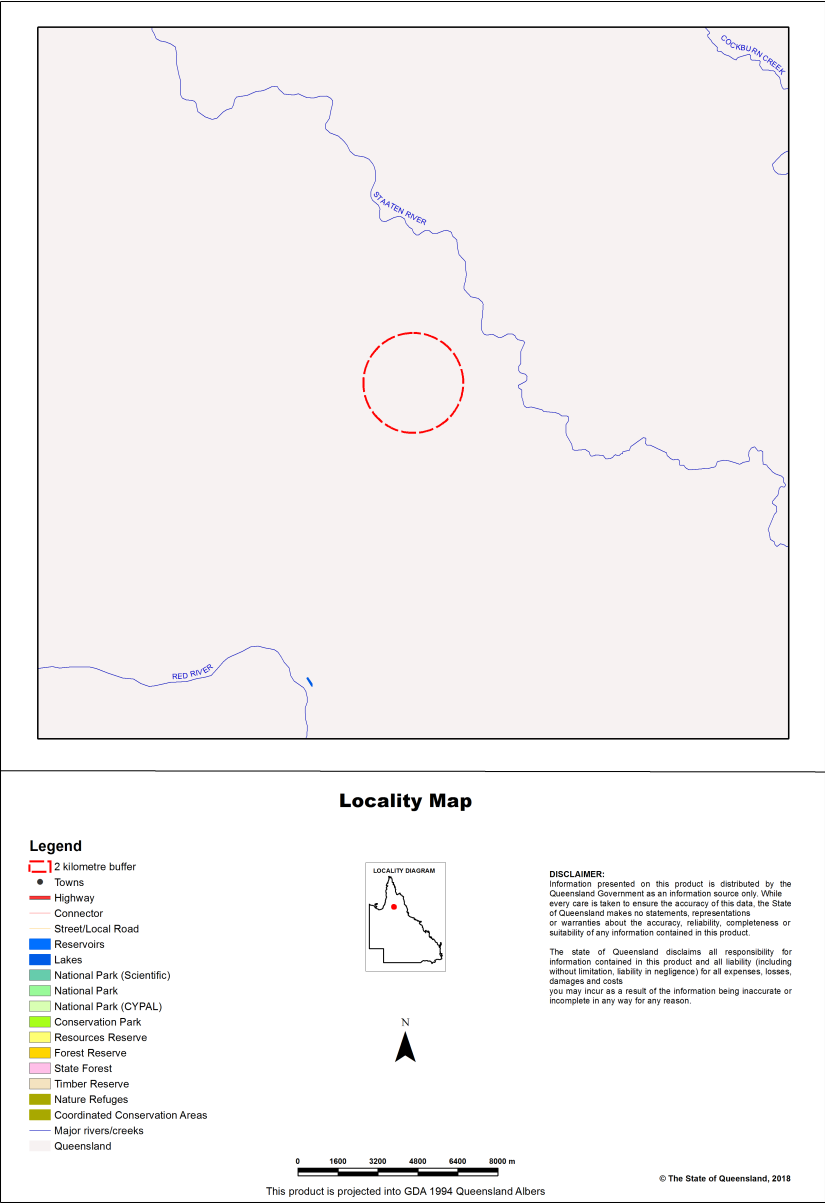
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Assessment Area Details

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: 143.25123 Latitude: -17.12682 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau
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)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7 Threatened species and Iconic species	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	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 **	7.5 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)

(no results)

5. High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

6a. High Ecological Value (HEV) waters - wetlands

(no results)

6b. High Ecological Value (HEV) waters - waterways

(no results)

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

MSES - Species

7. Threatened wildlife and special least concern animal

(no results)

Threatened and special least concern species records

(no results)

Note: The Threatened and Special Least Concern Animal (7) layer originates from the previous MSES version (4.1, dated at 2014). The layer does not represent all currently listed species and is subject to review.

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

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

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

Refer to **Map 3 - MSES - Species** for an overview of the relevant MSES.

MSES - Regulated Vegetation

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

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

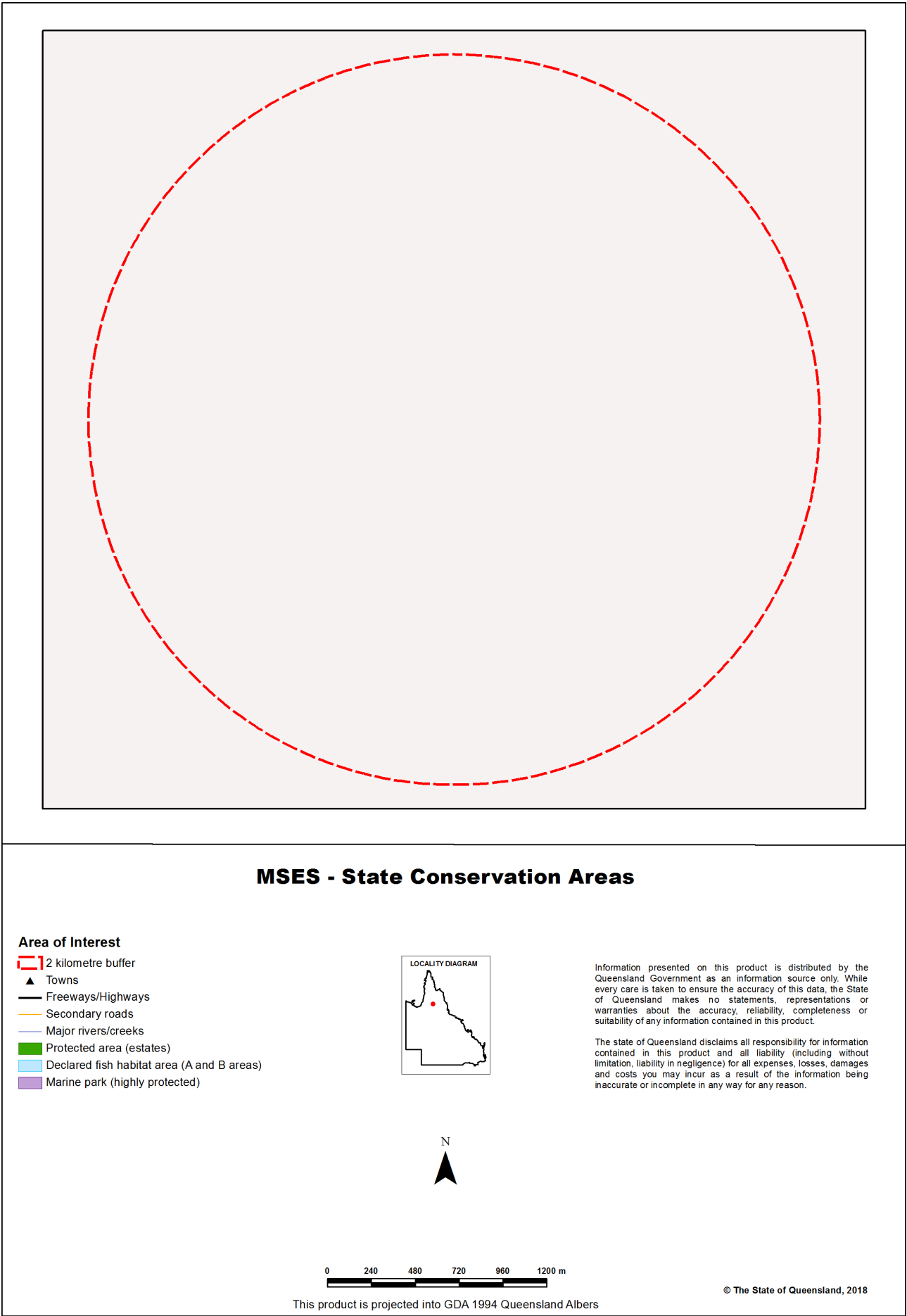
(no results)

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

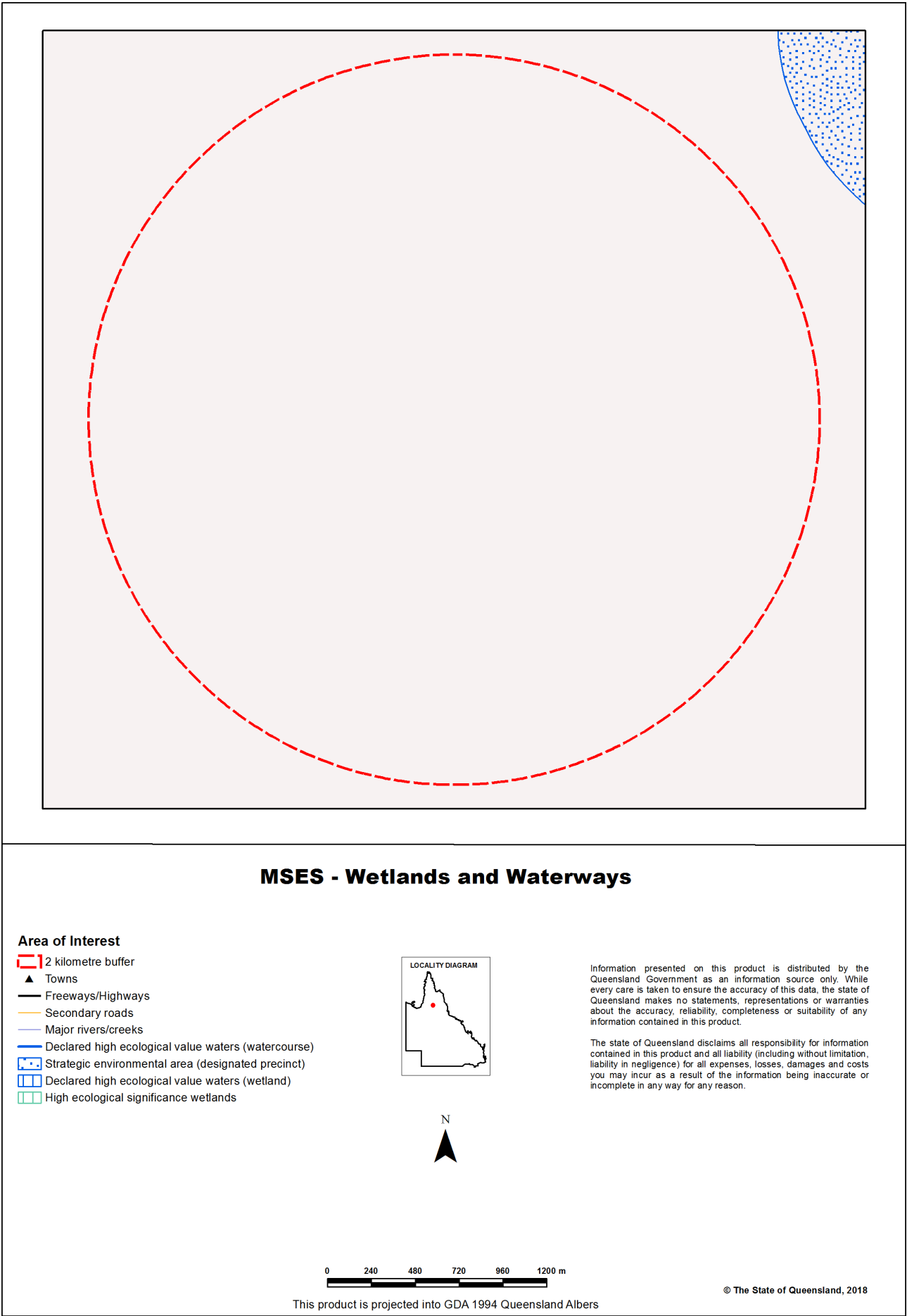
(no results)

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

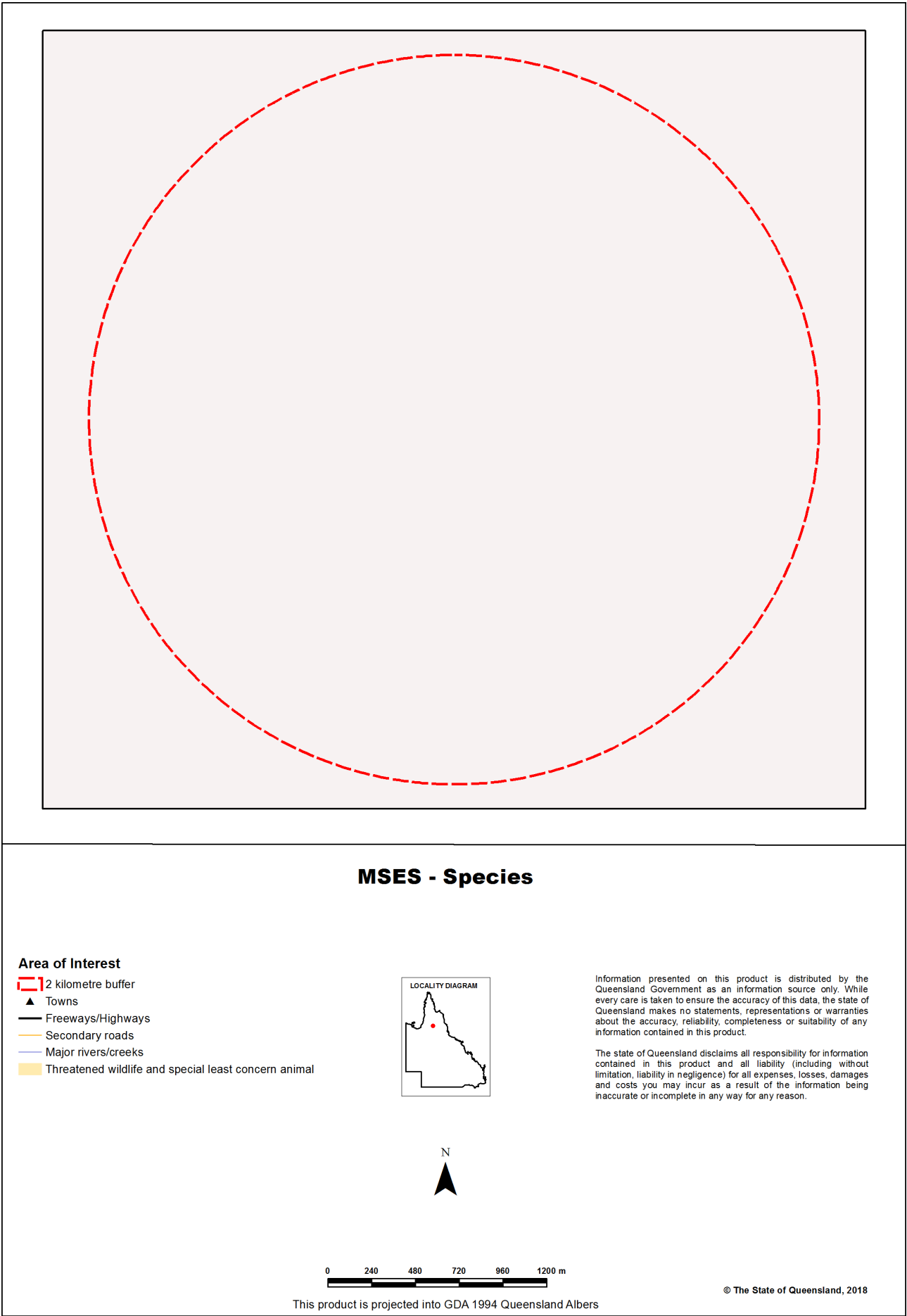
Map 1 - MSES - State Conservation Areas



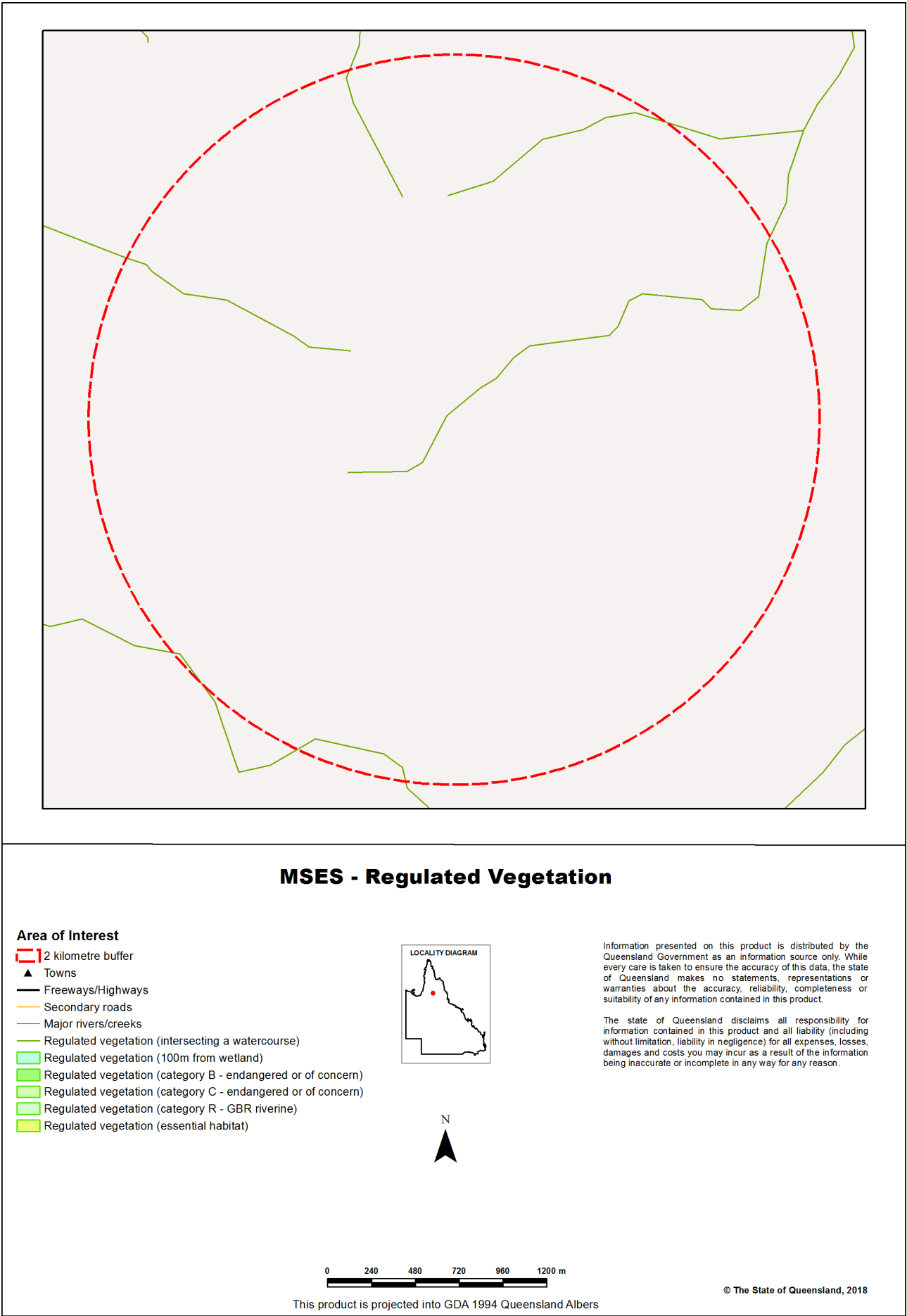
Map 2 - MSES - Wetlands and Waterways



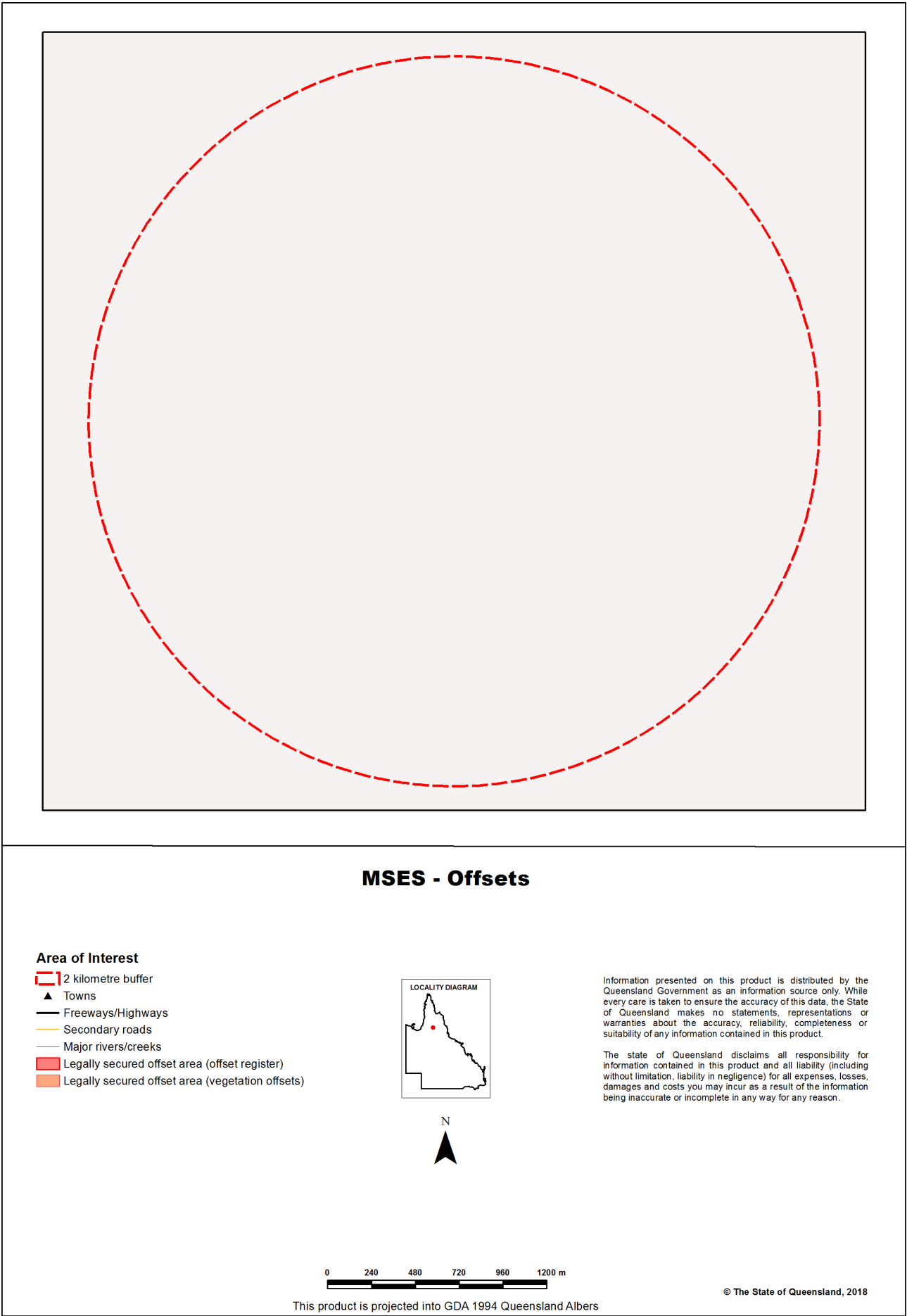
Map 3 - MSES - Species



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

MSES layers	current QSpatial data (http://qspatial.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: 143.25123 Latitude: -17.12682 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

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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: 143.25123 Latitude: -17.12682 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Mareeba Shire
Bioregion(s)	Gulf Plains
Subregion(s)	Holroyd Plain - Red Plateau
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	10.09	0.8
No concern at present	1,246.46	99.2
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
2.3.10e	Eucalyptus chlorophylla +/- Melaleuca spp., Eucalyptus microtheca and Corymbia polycarpa low open woodland on Quaternary alluvial deposits	No concern at present	16.82	1.34
2.3.24c	Melaleuca spp. woodland-open forest on sands in channels and on levees	Of concern	10.09	0.8
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	80.93	6.44
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	25.87	2.06
2.5.18b	Corymbia setosa +/- C. polycarpa, Erythrophleum chlorostachys, C. pocillum low open woodland on Tertiary sand sheets	No concern at present	39.2	3.12
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	294.61	23.45
2.5.3	Evergreen scrub on plains on mainly deep sandy soils	No concern at present	65.18	5.19
2.5.6a	Eucalyptus tetrodonta and Corymbia spp. woodland to open forest on plains on red and yellow earths	No concern at present	460.85	36.68
2.5.9	Eucalyptus microneura woodland on plains and plateaus on earths, podsolics and skeletal soils	No concern at present	208.55	16.6
2.7.1x3a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	54.46	4.33

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
2.3.10e	Pre-clearing 541000 ha; Remnant 2015 536000 ha	16c	Frequently inundated areas (not wetlands or floodplains).	Medium
2.3.24c	Pre-clearing 124000 ha; Remnant 2015 123000 ha	16a	Floodplain (other than floodplain wetlands).	Low
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.18b	Pre-clearing 277000 ha; Remnant 2015 277000 ha	18a	None	Low
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.5.3	Pre-clearing 55000 ha; Remnant 2015 55000 ha	14b	Frequently inundated areas (not wetlands or floodplains).	High
2.5.6a	Pre-clearing 598000 ha; Remnant 2015 597000 ha	14b	None	High
2.5.9	Pre-clearing 331000 ha; Remnant 2015 329000 ha	18d	None	Low
2.7.1x3a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low

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
2.3.10e	Includes seasonal wetlands significant as feeding sites for water birds.
2.3.24c	Provincial refuge for some fauna and flora. <i>Pristis pristis</i> (freshwater sawfish) habitat. 2.3.24a: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24b: Supports locally uncommon plant species. Provincial refuge for flora and fauna. 2.3.24c: Supports locally uncommon plant species. 2.3.24x12: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24x3: Supports locally uncommon plant species. The only mappable occurrence of <i>Syzygium forte</i> subsp. <i>potamophilum</i> in the bioregion.
2.3.36a	None
2.5.17a	None
2.5.18b	None
2.5.26	None
2.5.3	Provincial refuge for some flora and fauna species. Potential habitat for <i>Psephotus chrysapterygus</i> (golden-shouldered parrot) 2.5.3x1: Supports locally uncommon plant species.
2.5.6a	Occurs at the highest altitudes in the bioregion (up to 1000+m).
2.5.9	None

Regional Ecosystem	Special Values
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.

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
14b	Woodlands dominated by <i>Eucalyptus tetrodonta</i> (Darwin stringybark) (or <i>E. megasepala</i> (Melville Island bloodwood)) or <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), with <i>Corymbia clarksoniana</i> (grey bloodwood) on erosional surfaces, residual sands and occasionally alluvial plains. (land zones 5, 3, 7, 10, 2) (CYP, GUP, EIU, NWH, [DEU])	526.03	41.86
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)	10.09	0.8
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	16.82	1.34
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)	294.61	23.45

BVG (1 Million)	Description	Area (Ha)	% of AOI
18a	Dry woodlands to open woodlands, dominated by bloodwoods (<i>Corymbia dallachiana</i> , <i>C. terminalis</i> (long-fruited bloodwood), <i>C. plena</i> , or <i>C. leichhardtii</i> (rusty-jacket)) or ironbarks (<i>Eucalyptus quadricostata</i> (Pentland ironbark), <i>E. crebra</i> (narrow-leaved red ironbark) or <i>E. exilipes</i> (fine-leaved ironbark)), often with <i>E. acmenoides</i> (narrow-leaved white stringybark), <i>Angophora leiocarpa</i> (rusty gum) and <i>Callitris glaucophylla</i> (white cypress pine) in the Brigalow Belt, on sandy plateaus and plains. (land zones 5, 3, 7) (GUP, DEU, BRB)	39.2	3.12
18d	Woodlands to low open woodlands dominated by <i>Eucalyptus microneura</i> (Gilbert River box) sometimes with <i>Corymbia</i> spp. (land zones 5, 10, 3, 12) (GUP, EIU)	208.55	16.6
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)	80.93	6.44
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])	80.32	6.39

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/>

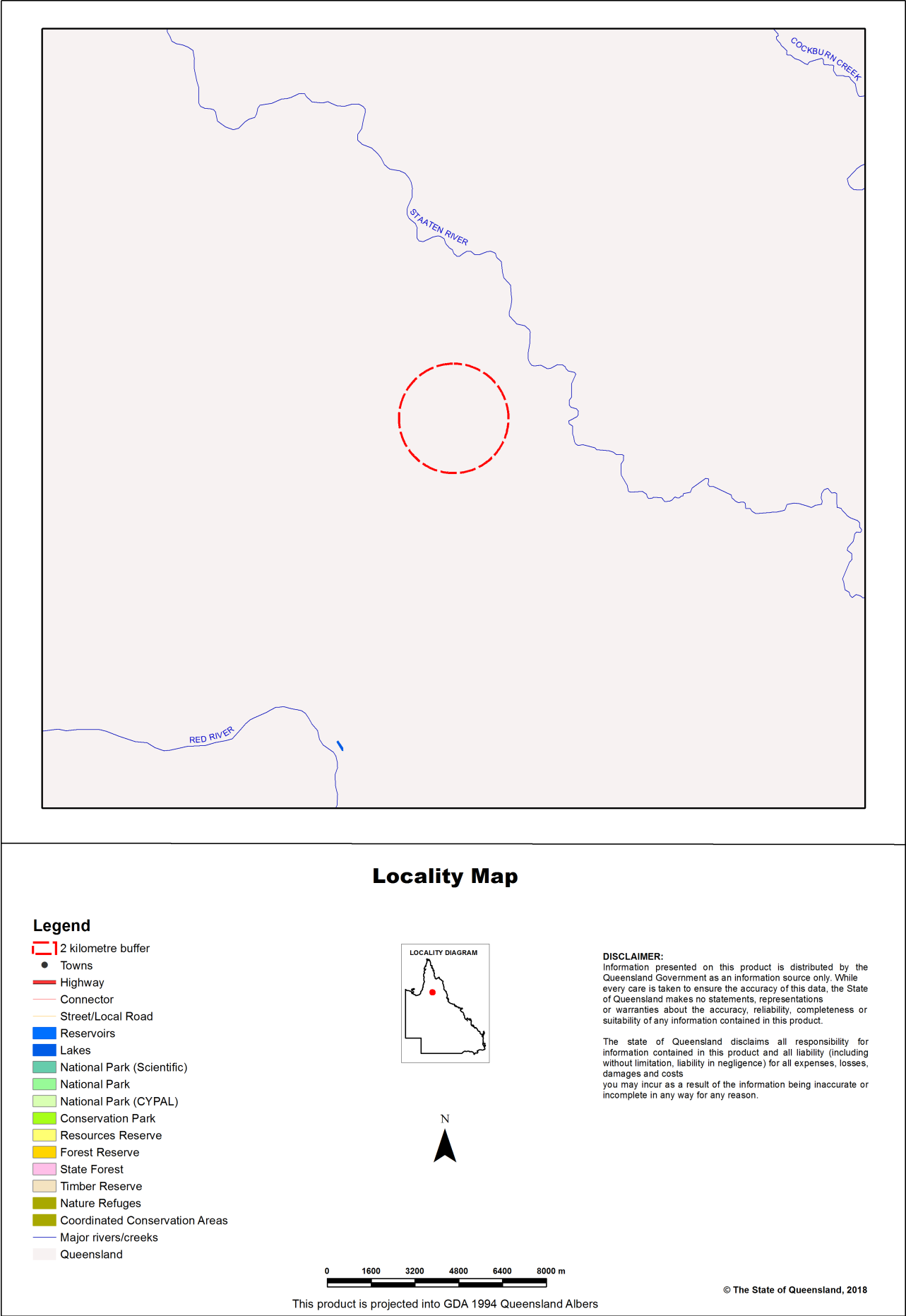
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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

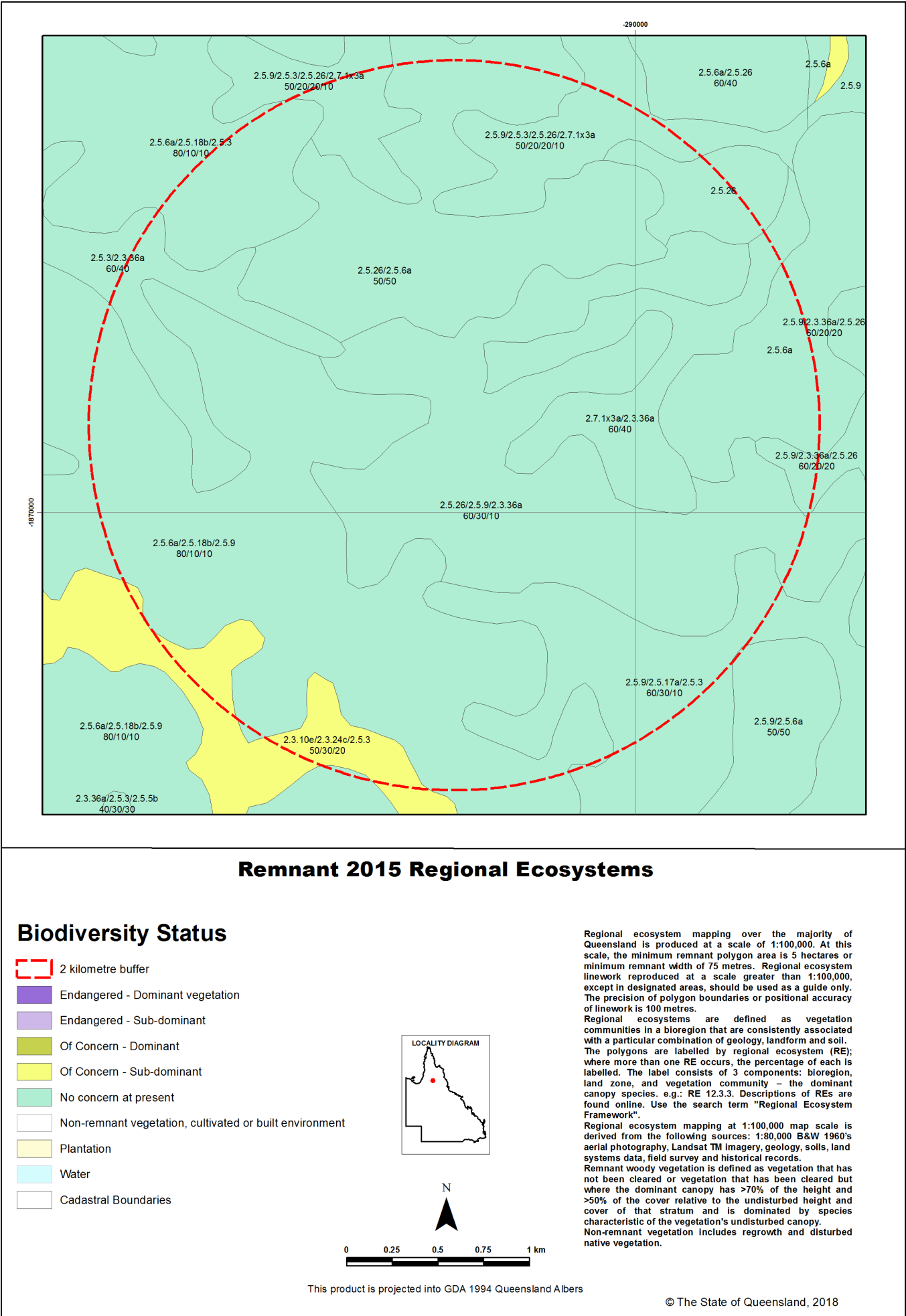
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
2.3.10e	Not currently available	Not currently available
2.3.24c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.18b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.5.3	Not currently available	Not currently available
2.5.6a	Not currently available	Not currently available
2.5.9	Not currently available	Not currently available
2.7.1x3a	Not currently available	Not currently available

Maps

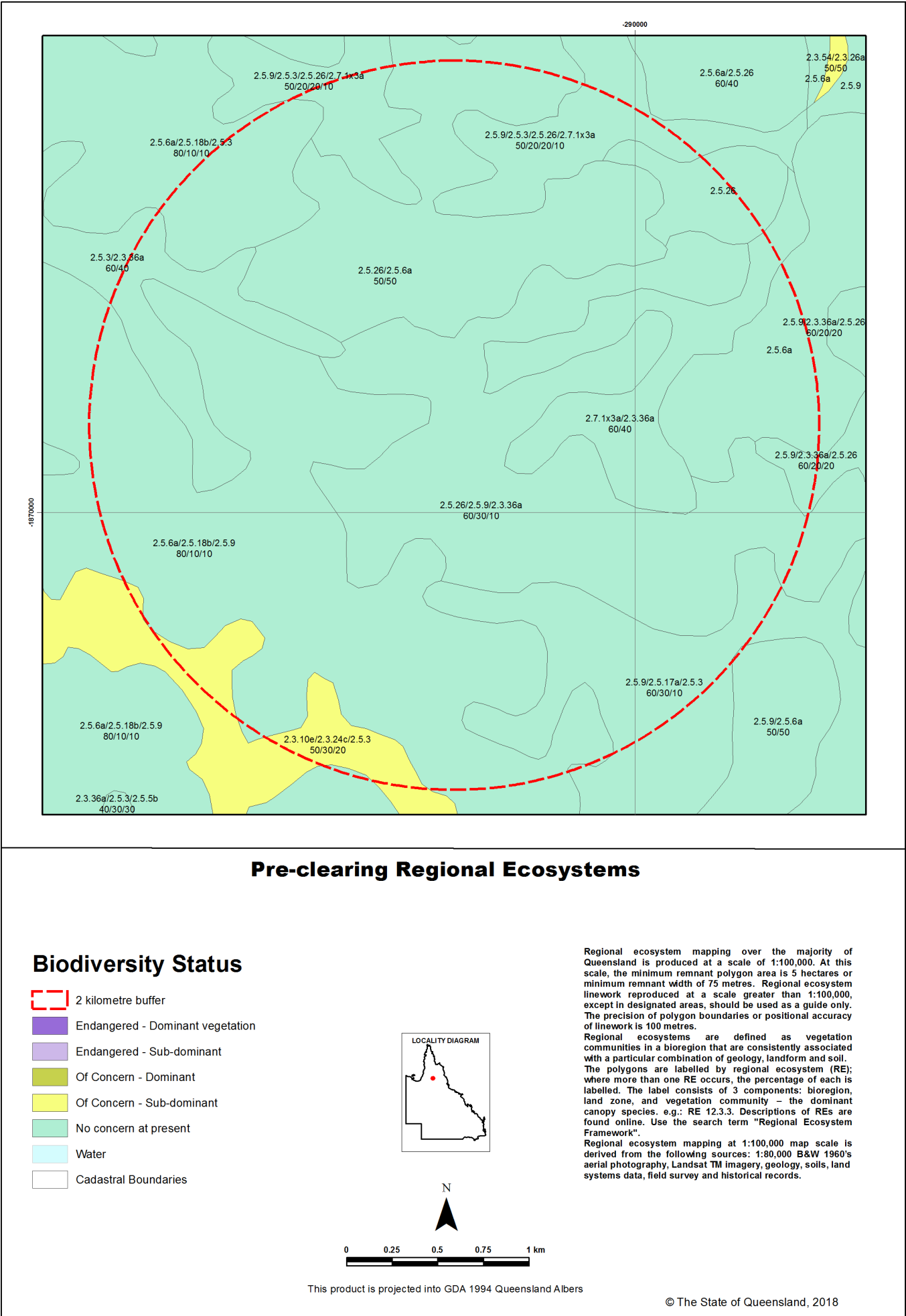
Map 1 - Location



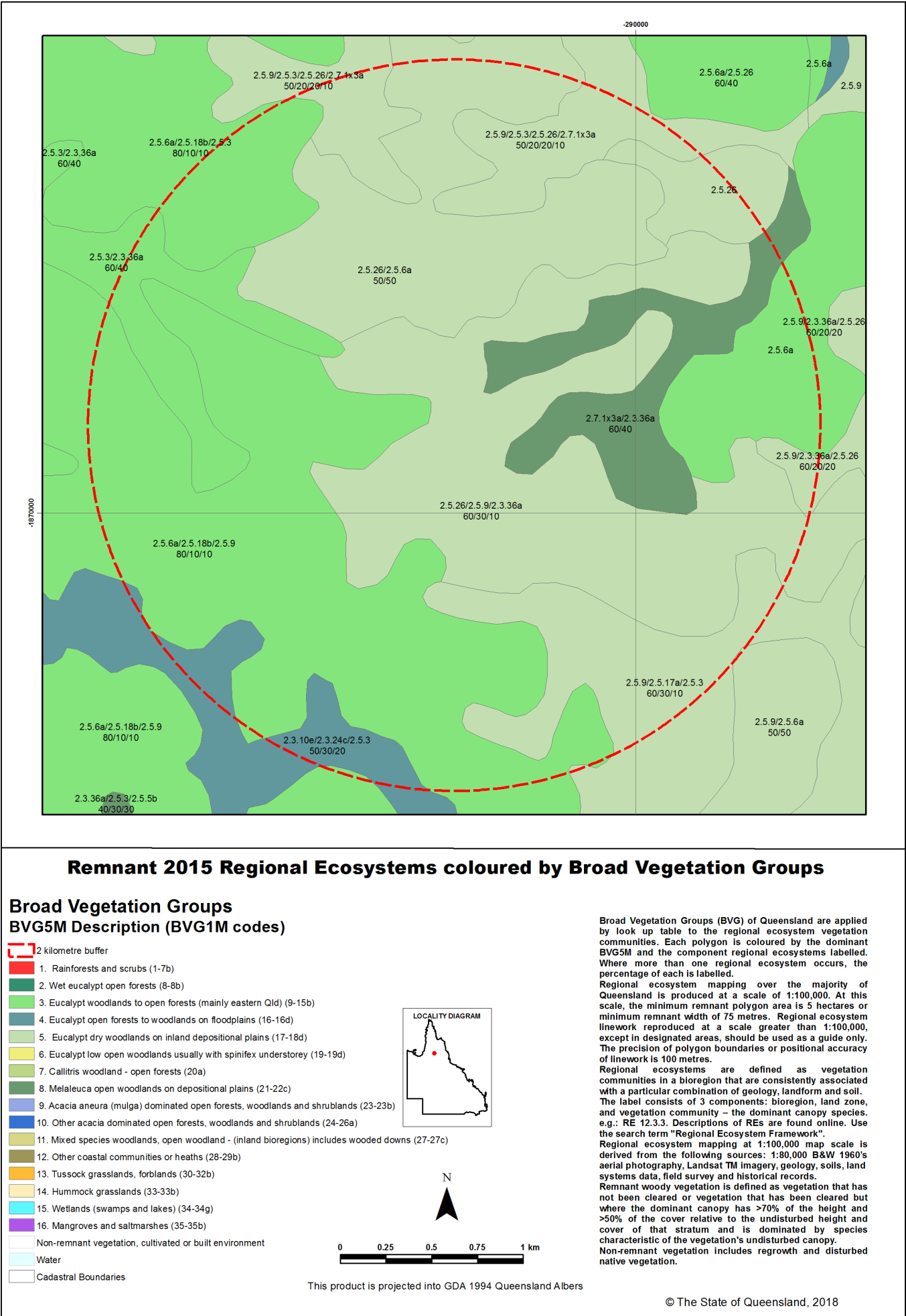
Map 2 - Remnant 2015 regional ecosystems



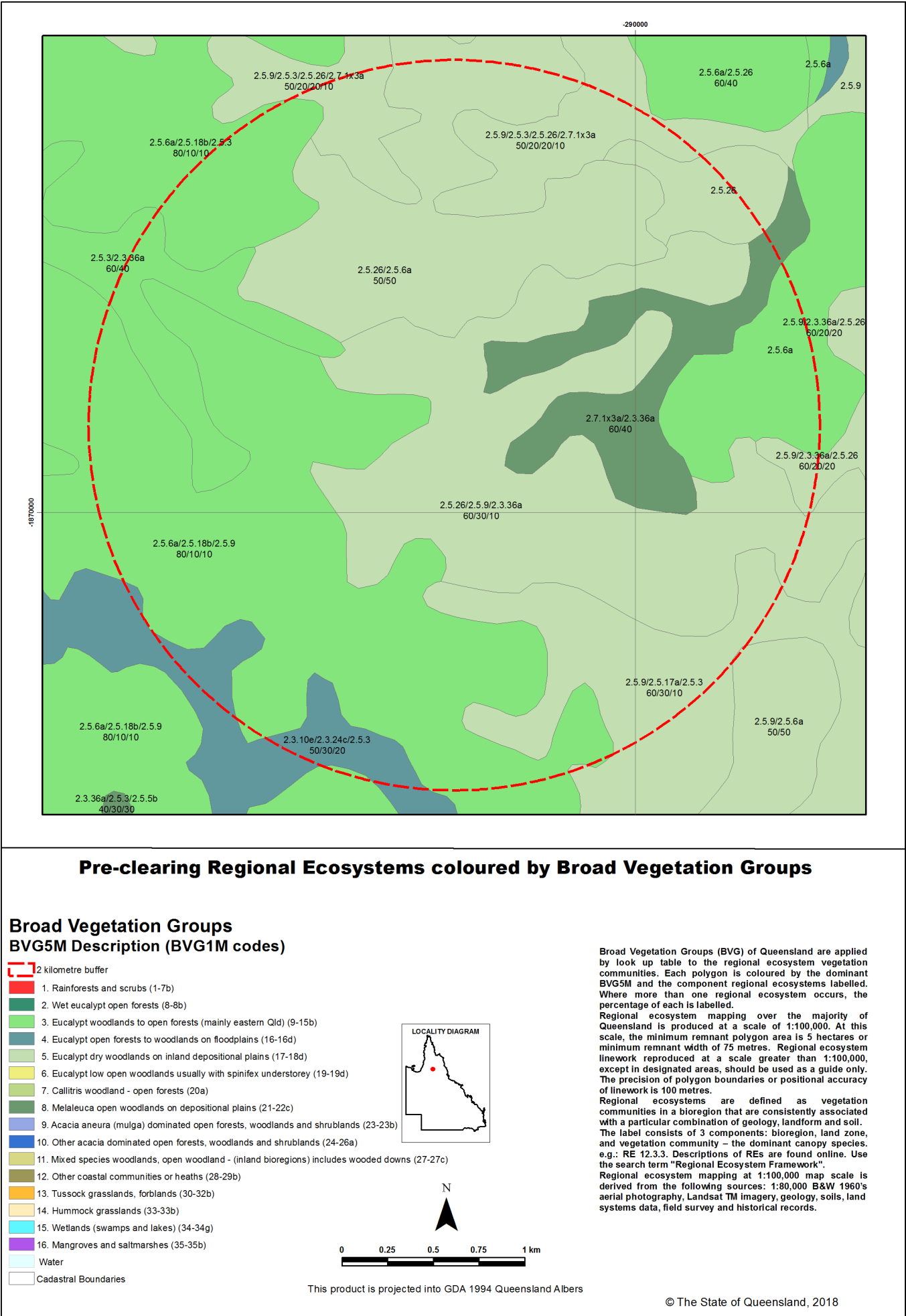
Map 3 - Pre-clearing regional ecosystems



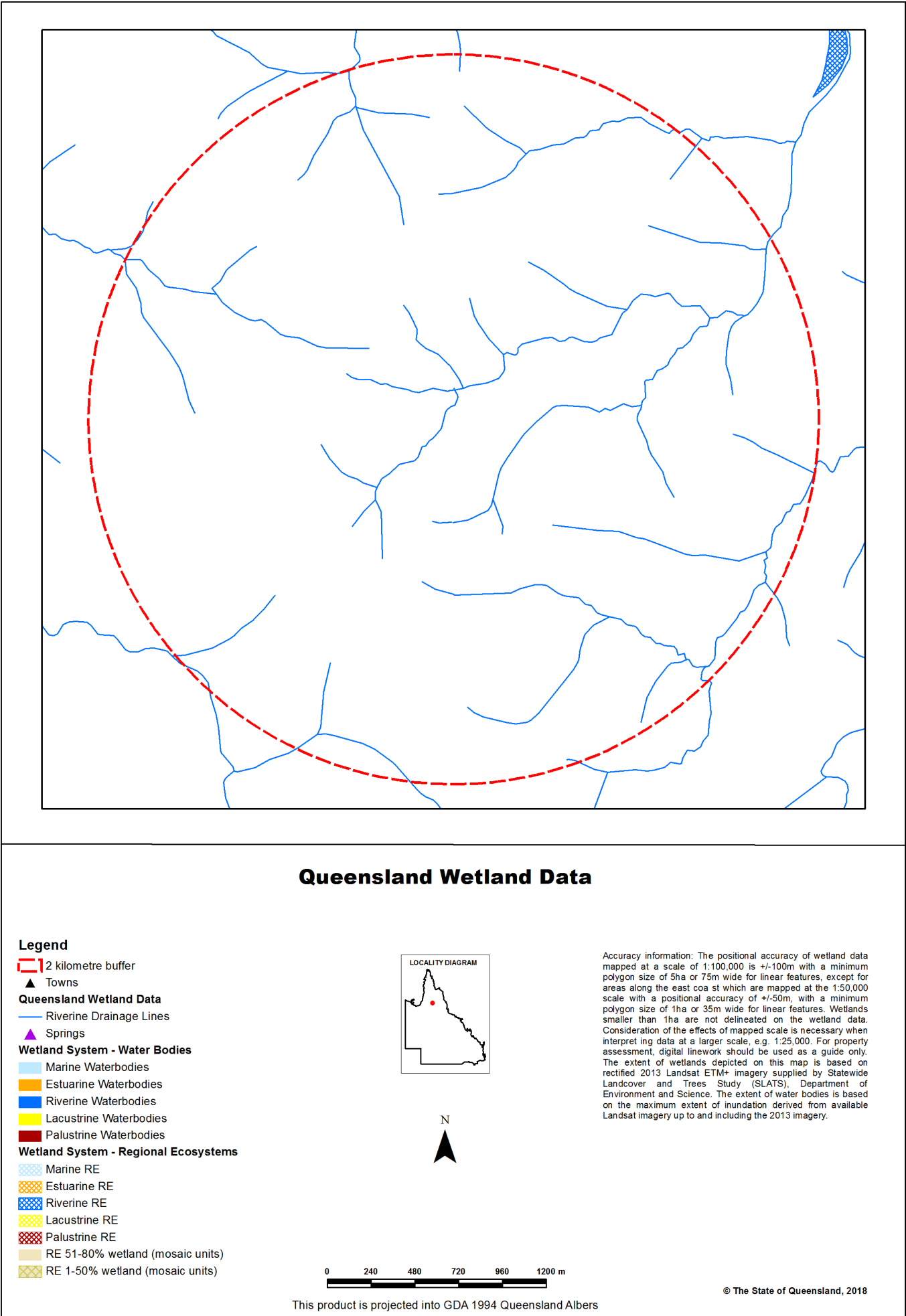
Map 4 - Remnant 2015 regional ecosystems by BVG (5M)



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



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

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

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

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

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

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

References

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F., Ford, A.J. and Accad, A. (2017) The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 3.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

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

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2017) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 4.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

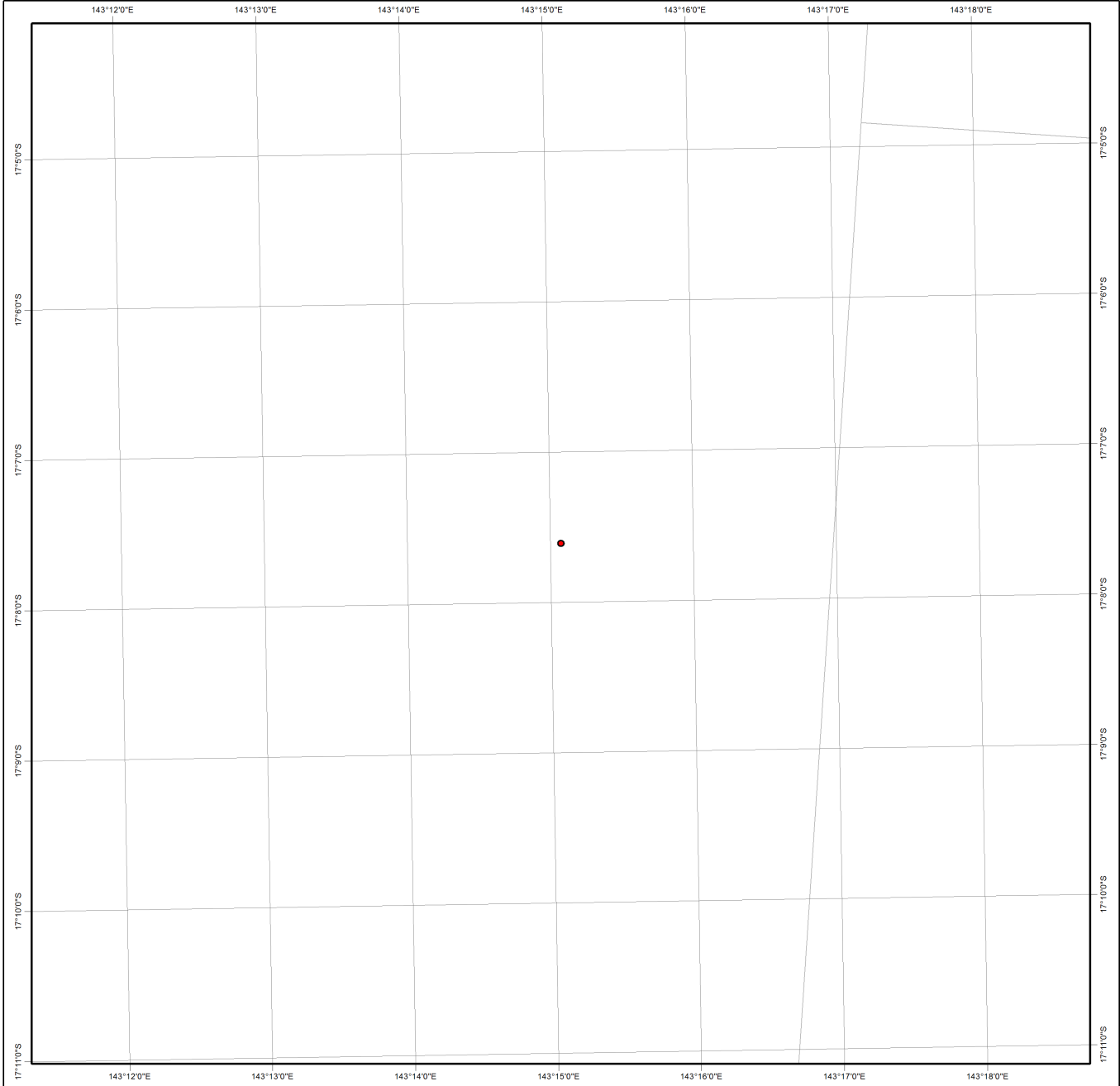
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 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

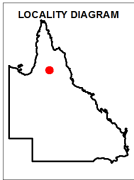
AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



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.

HUANCHACA 2 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.26006 Latitude: -17.13505 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

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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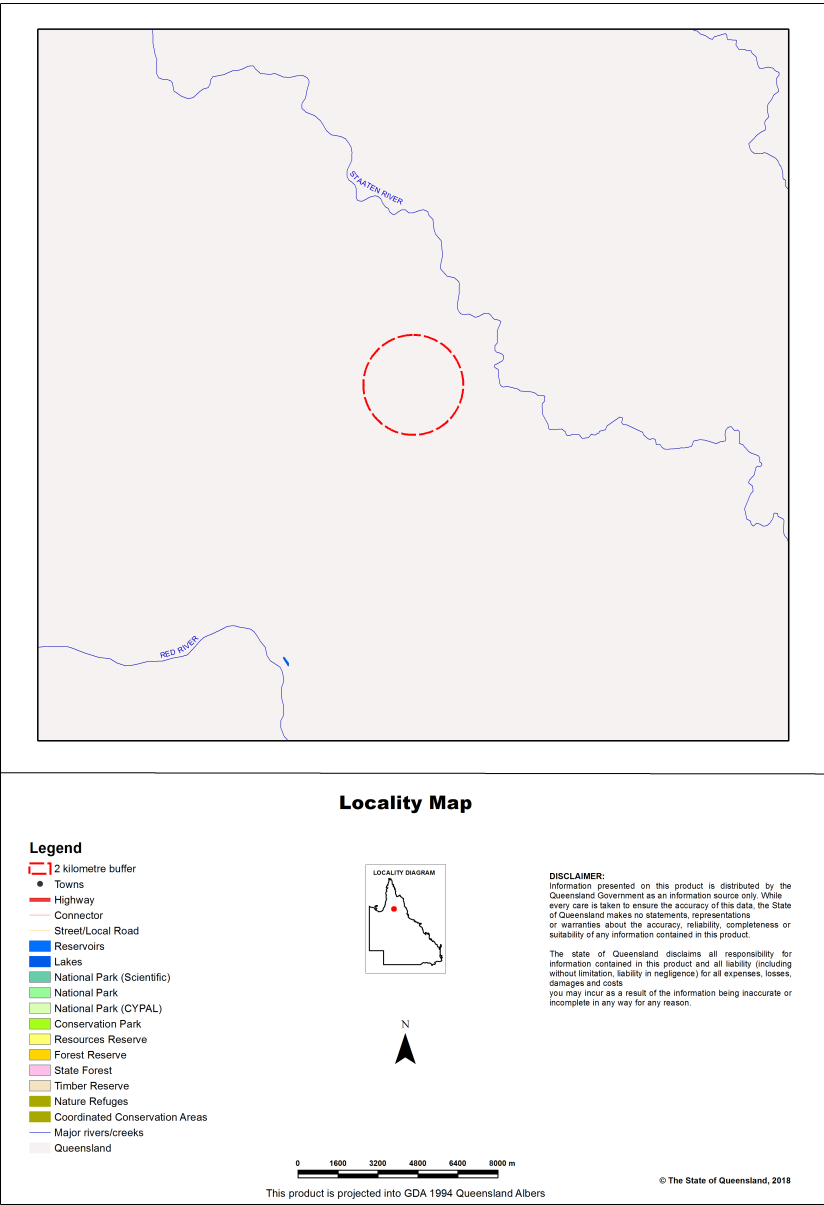
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Assessment Area Details

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: 143.26006 Latitude: -17.13505 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)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7 Threatened species and Iconic species	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	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 **	8.7 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)

(no results)

5. High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

6a. High Ecological Value (HEV) waters - wetlands

(no results)

6b. High Ecological Value (HEV) waters - waterways

(no results)

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

MSES - Species

7. Threatened wildlife and special least concern animal

(no results)

Threatened and special least concern species records

(no results)

Note: The Threatened and Special Least Concern Animal (7) layer originates from the previous MSES version (4.1, dated at 2014). The layer does not represent all currently listed species and is subject to review.

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

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

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

Refer to **Map 3 - MSES - Species** for an overview of the relevant MSES.

MSES - Regulated Vegetation

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

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

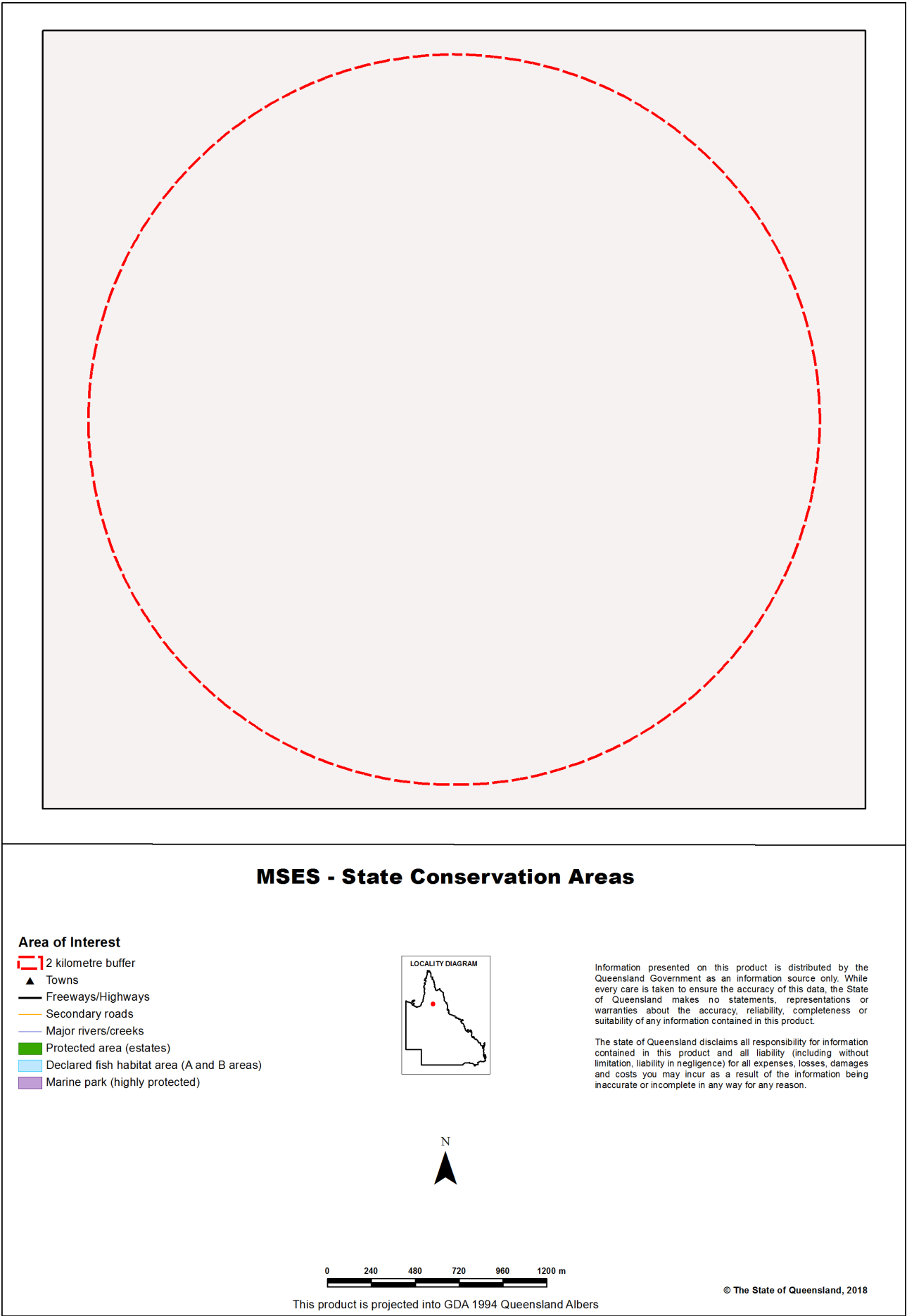
(no results)

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

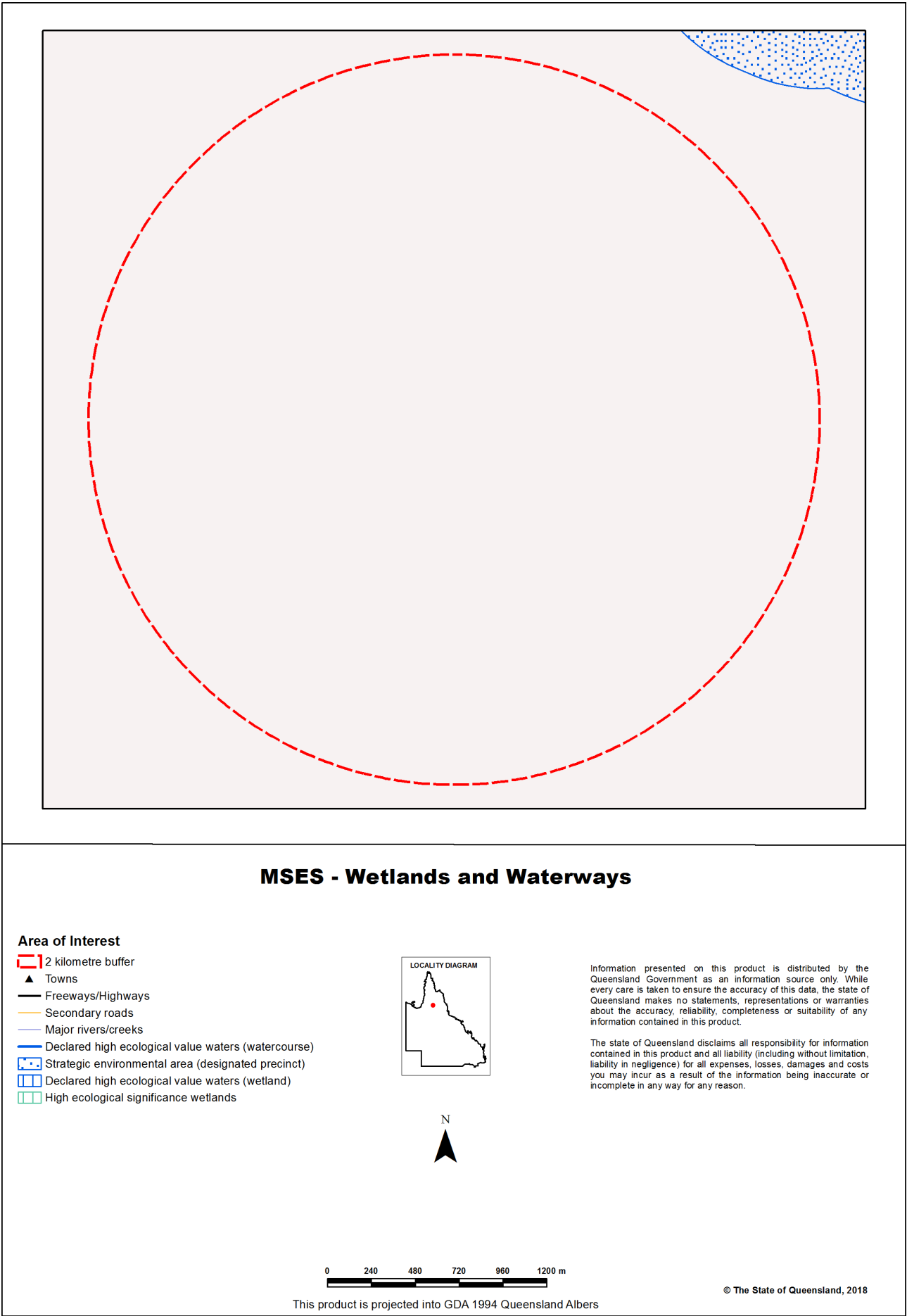
(no results)

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

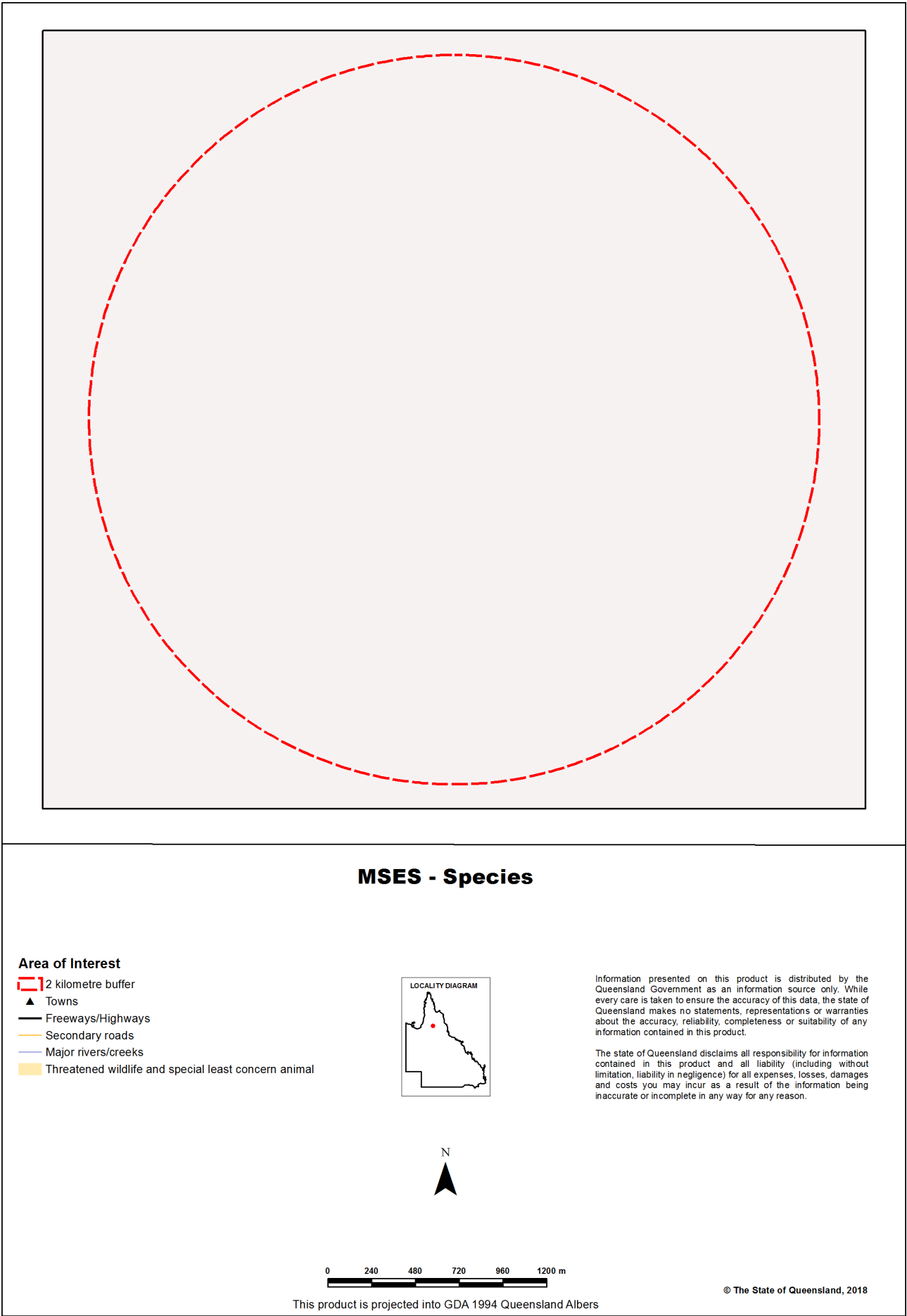
Map 1 - MSES - State Conservation Areas



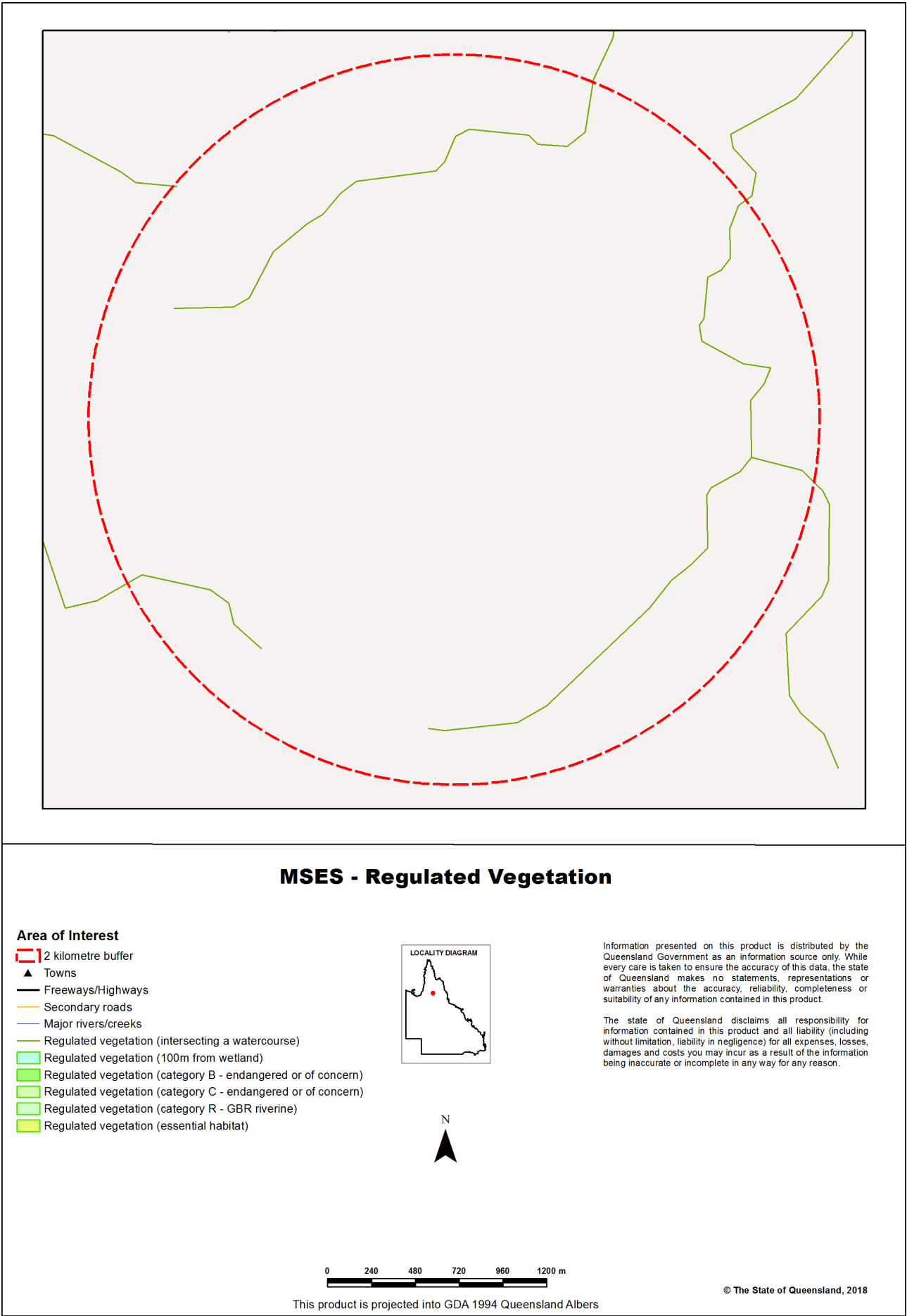
Map 2 - MSES - Wetlands and Waterways



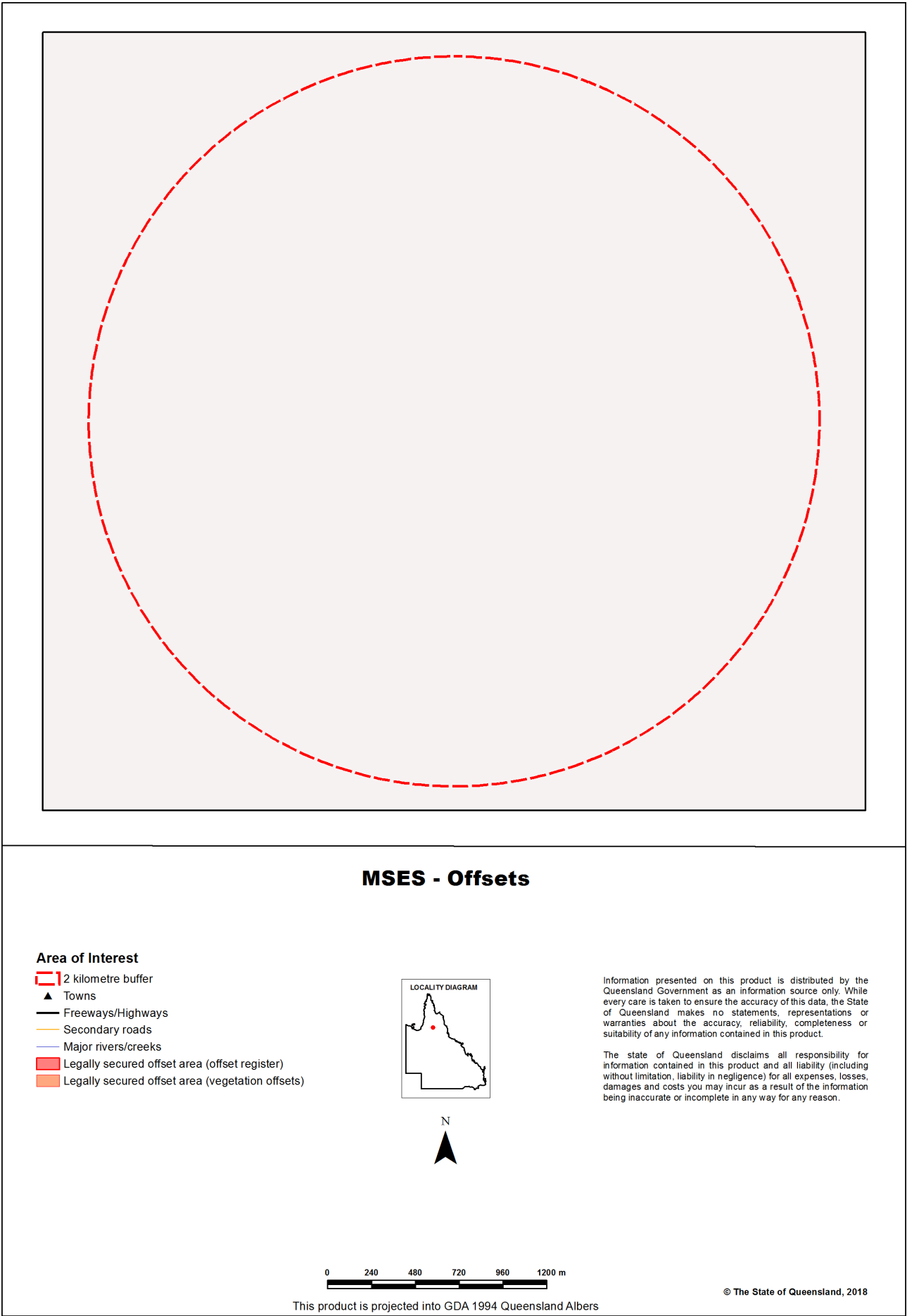
Map 3 - MSES - Species



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

MSES layers	current QSpatial data (http://qspatial.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: 143.26006 Latitude: -17.13505 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: 143.26006 Latitude: -17.13505 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	7.95	0.63
No concern at present	1,248.61	99.37
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
2.3.10e	Eucalyptus chlorophylla +/- Melaleuca spp., Eucalyptus microtheca and Corymbia polycarpa low open woodland on Quaternary alluvial deposits	No concern at present	13.25	1.05
2.3.24c	Melaleuca spp. woodland-open forest on sands in channels and on levees	Of concern	7.95	0.63
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	78.95	6.28
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	70.05	5.57
2.5.18b	Corymbia setosa +/- C. polycarpa, Erythrophleum chlorostachys, C. pocillum low open woodland on Tertiary sand sheets	No concern at present	31.09	2.47
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	264.47	21.05
2.5.3	Evergreen scrub on plains on mainly deep sandy soils	No concern at present	28.65	2.28
2.5.6a	Eucalyptus tetrodonta and Corymbia spp. woodland to open forest on plains on red and yellow earths	No concern at present	371.19	29.54
2.5.9	Eucalyptus microneura woodland on plains and plateaus on earths, podsolics and skeletal soils	No concern at present	344.15	27.39
2.7.1x3a	Acacia shirleyi low open forest or Melaleuca tamariscina shrubland on laterised mudstones on skeletal soils	No concern at present	46.8	3.72

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
2.3.10e	Pre-clearing 541000 ha; Remnant 2015 536000 ha	16c	Frequently inundated areas (not wetlands or floodplains).	Medium
2.3.24c	Pre-clearing 124000 ha; Remnant 2015 123000 ha	16a	Floodplain (other than floodplain wetlands).	Low
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.18b	Pre-clearing 277000 ha; Remnant 2015 277000 ha	18a	None	Low
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.5.3	Pre-clearing 55000 ha; Remnant 2015 55000 ha	14b	Frequently inundated areas (not wetlands or floodplains).	High
2.5.6a	Pre-clearing 598000 ha; Remnant 2015 597000 ha	14b	None	High
2.5.9	Pre-clearing 331000 ha; Remnant 2015 329000 ha	18d	None	Low
2.7.1x3a	Pre-clearing 307000 ha; Remnant 2015 307000 ha	21b	None	Low

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
2.3.10e	Includes seasonal wetlands significant as feeding sites for water birds.
2.3.24c	Provincial refuge for some fauna and flora. <i>Pristis pristis</i> (freshwater sawfish) habitat. 2.3.24a: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24b: Supports locally uncommon plant species. Provincial refuge for flora and fauna. 2.3.24c: Supports locally uncommon plant species. 2.3.24x12: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24x3: Supports locally uncommon plant species. The only mappable occurrence of <i>Syzygium forte</i> subsp. <i>potamophilum</i> in the bioregion.
2.3.36a	None
2.5.17a	None
2.5.18b	None
2.5.26	None
2.5.3	Provincial refuge for some flora and fauna species. Potential habitat for <i>Psephotus chrysapterygus</i> (golden-shouldered parrot) 2.5.3x1: Supports locally uncommon plant species.
2.5.6a	Occurs at the highest altitudes in the bioregion (up to 1000+m).
2.5.9	None

Regional Ecosystem	Special Values
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.

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
14b	Woodlands dominated by <i>Eucalyptus tetrodonta</i> (Darwin stringybark) (or <i>E. megasepala</i> (Melville Island bloodwood)) or <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), with <i>Corymbia clarksoniana</i> (grey bloodwood) on erosional surfaces, residual sands and occasionally alluvial plains. (land zones 5, 3, 7, 10, 2) (CYP, GUP, EIU, NWH, [DEU])	399.84	31.82
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)	7.95	0.63
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	13.25	1.05
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)	264.47	21.05

BVG (1 Million)	Description	Area (Ha)	% of AOI
18a	Dry woodlands to open woodlands, dominated by bloodwoods (<i>Corymbia dallachiana</i> , <i>C. terminalis</i> (long-fruited bloodwood), <i>C. plena</i> , or <i>C. leichhardtii</i> (rustyjack)) or ironbarks (<i>Eucalyptus quadricostata</i> (Pentland ironbark), <i>E. crebra</i> (narrow-leaved red ironbark) or <i>E. exilipes</i> (fine-leaved ironbark)), often with <i>E. acmenoides</i> (narrow-leaved white stringybark), <i>Angophora leiocarpa</i> (rusty gum) and <i>Callitris glaucophylla</i> (white cypress pine) in the Brigalow Belt, on sandy plateaus and plains. (land zones 5, 3, 7) (GUP, DEU, BRB)	31.09	2.47
18d	Woodlands to low open woodlands dominated by <i>Eucalyptus microneura</i> (Gilbert River box) sometimes with <i>Corymbia</i> spp. (land zones 5, 10, 3, 12) (GUP, EIU)	344.15	27.39
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)	78.95	6.28
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])	116.86	9.3

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/>

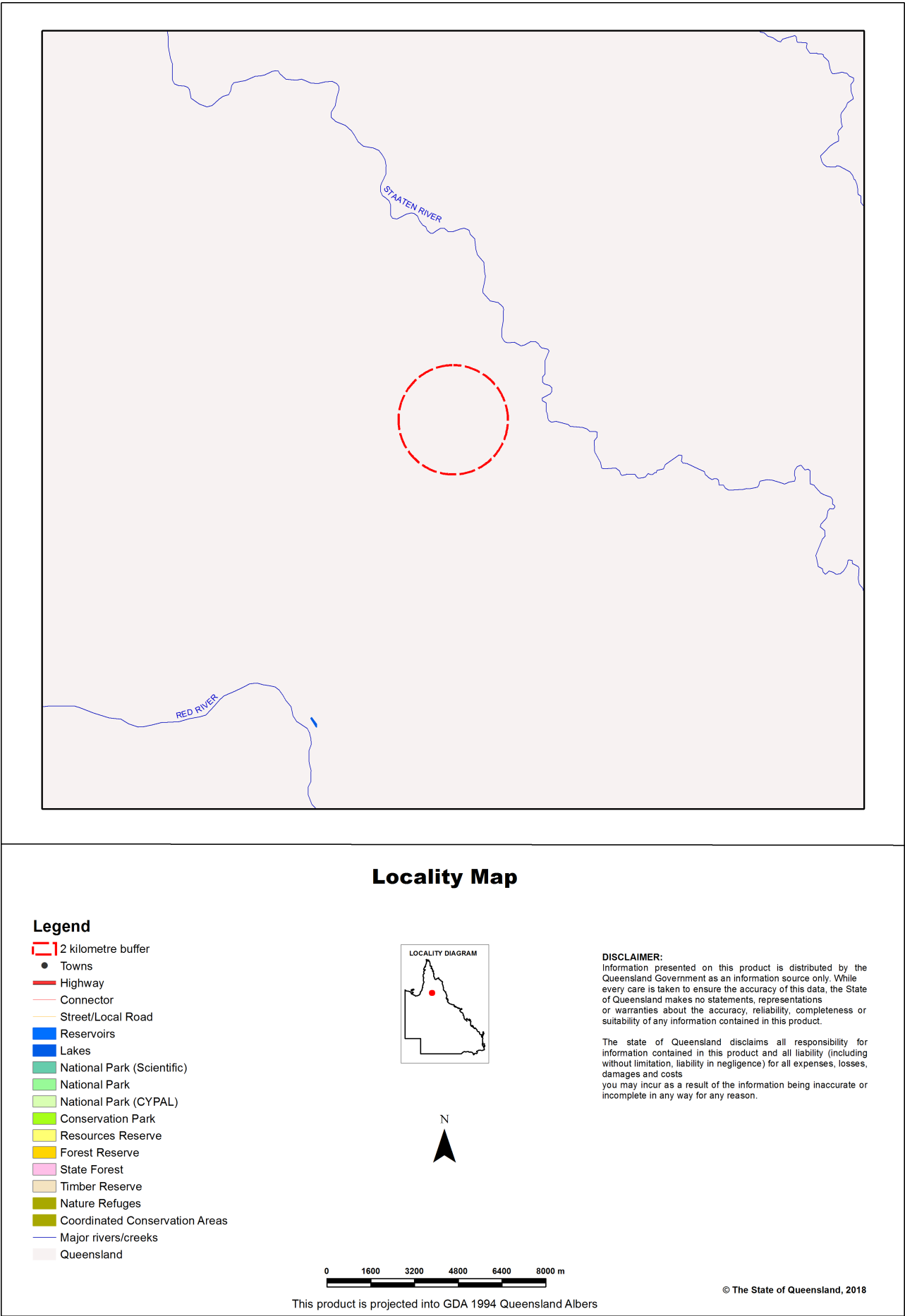
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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

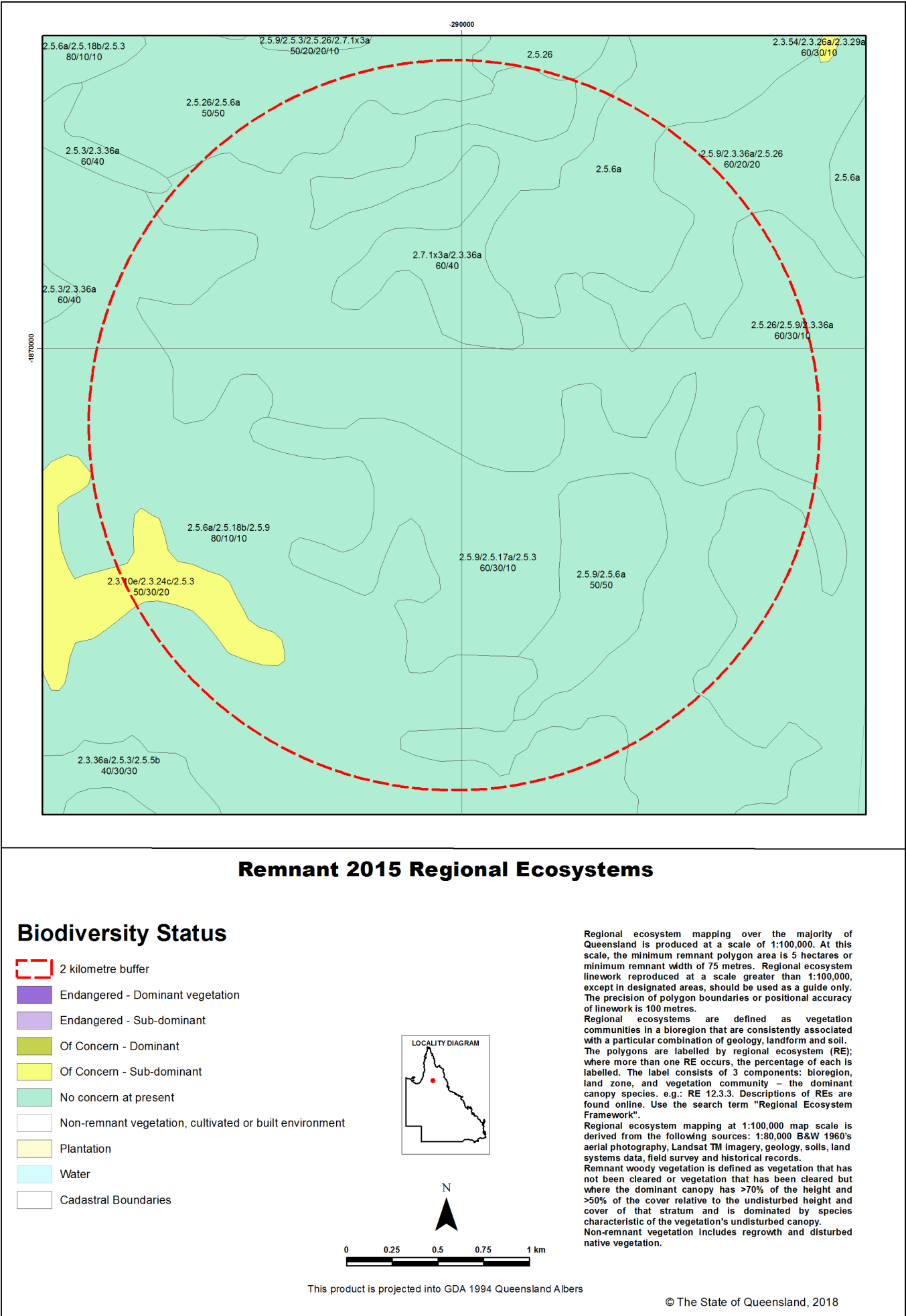
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
2.3.10e	Not currently available	Not currently available
2.3.24c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.18b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.5.3	Not currently available	Not currently available
2.5.6a	Not currently available	Not currently available
2.5.9	Not currently available	Not currently available
2.7.1x3a	Not currently available	Not currently available

Maps

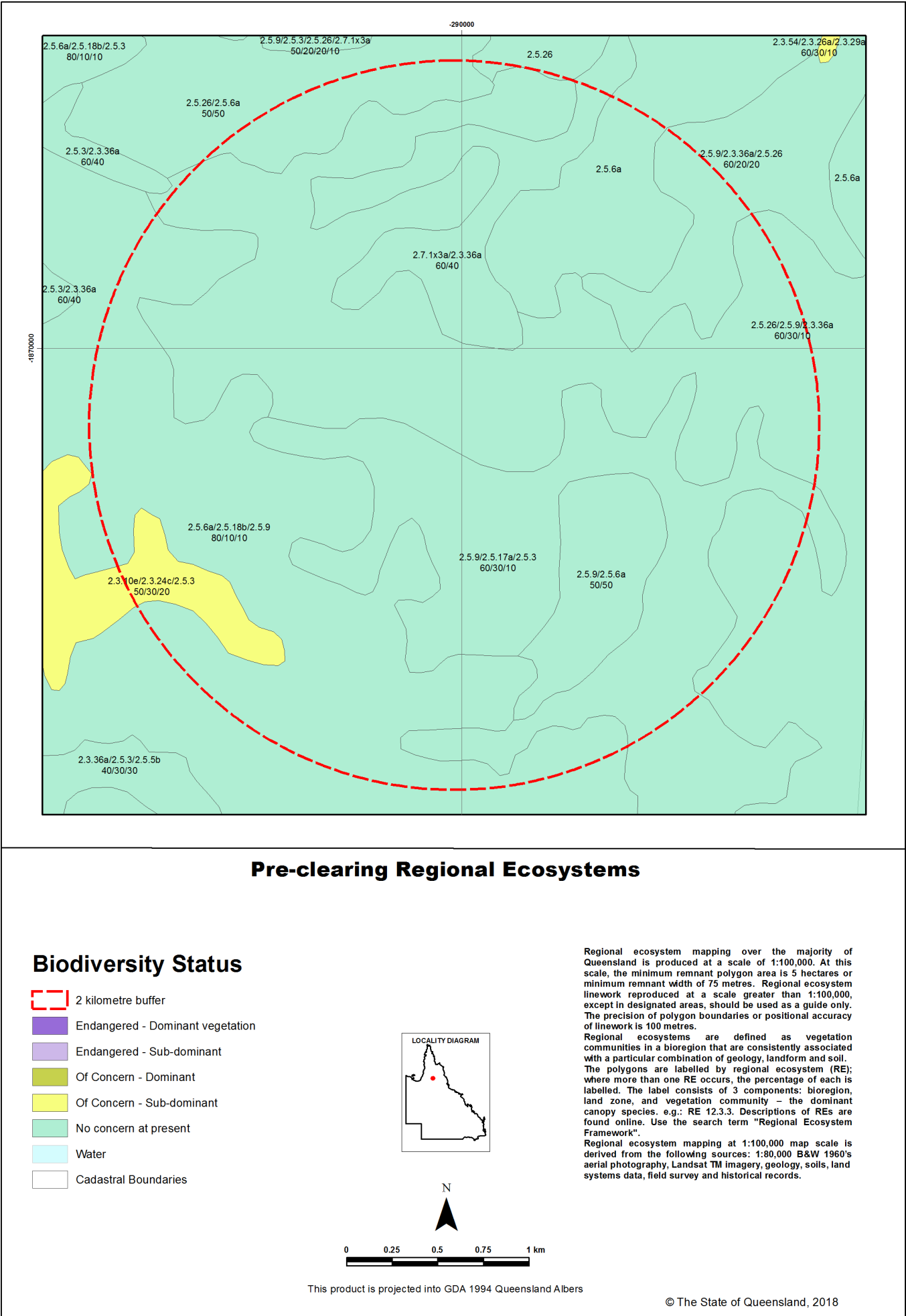
Map 1 - Location



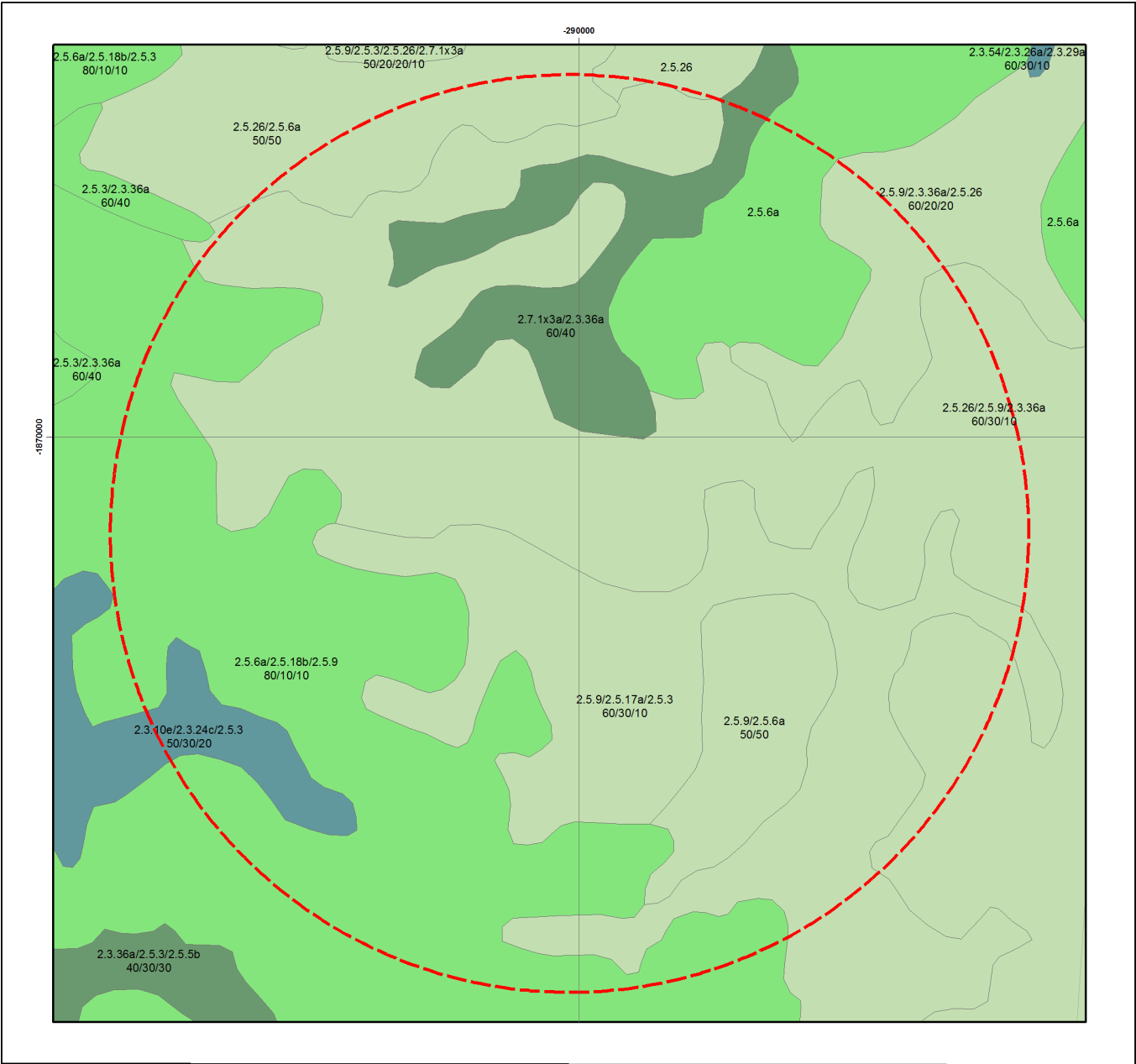
Map 2 - Remnant 2015 regional ecosystems



Map 3 - Pre-clearing regional ecosystems



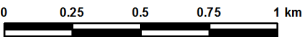
Map 4 - Remnant 2015 regional ecosystems by BVG (5M)



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.

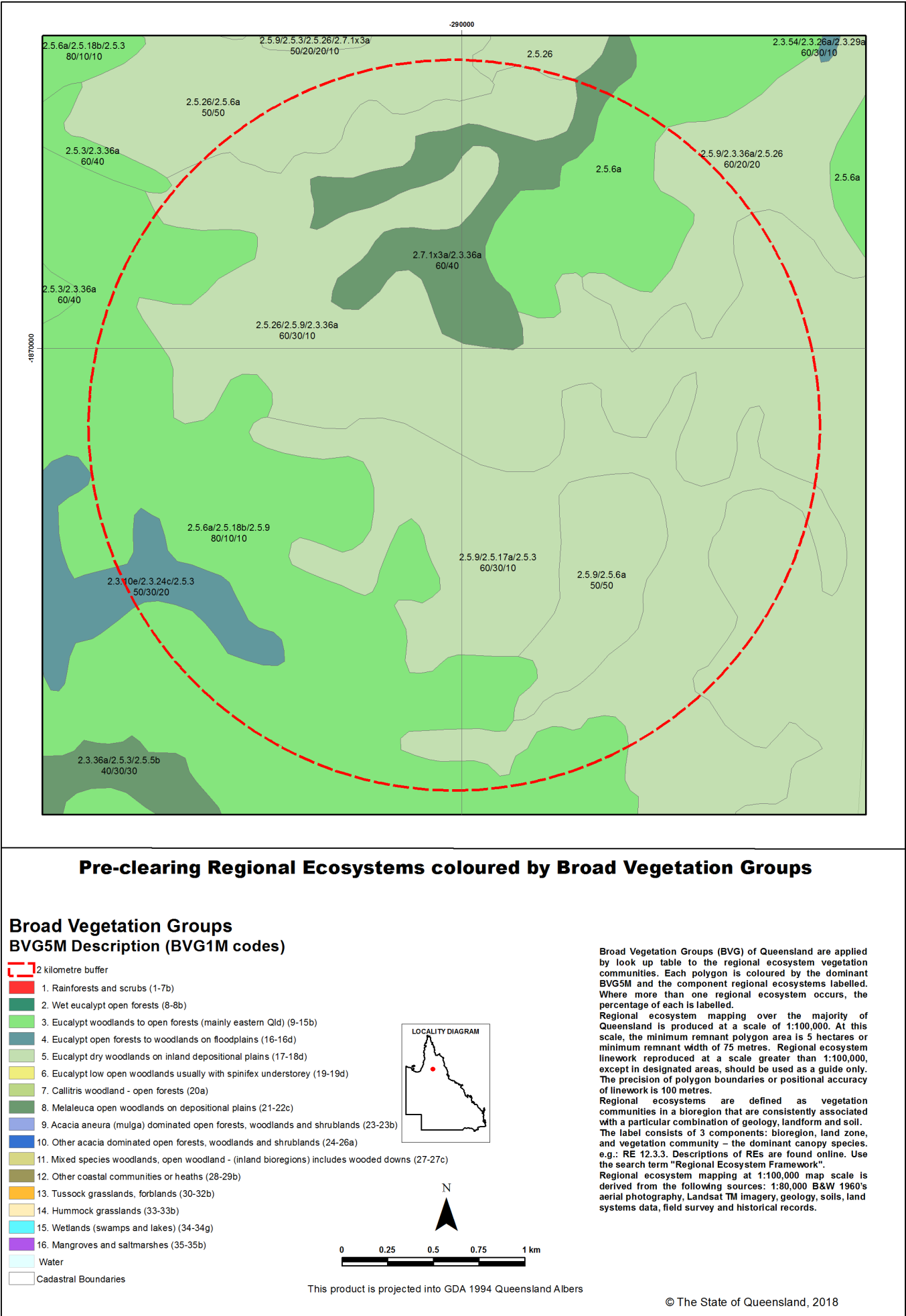
Regional ecosystem mapping of the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should 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".

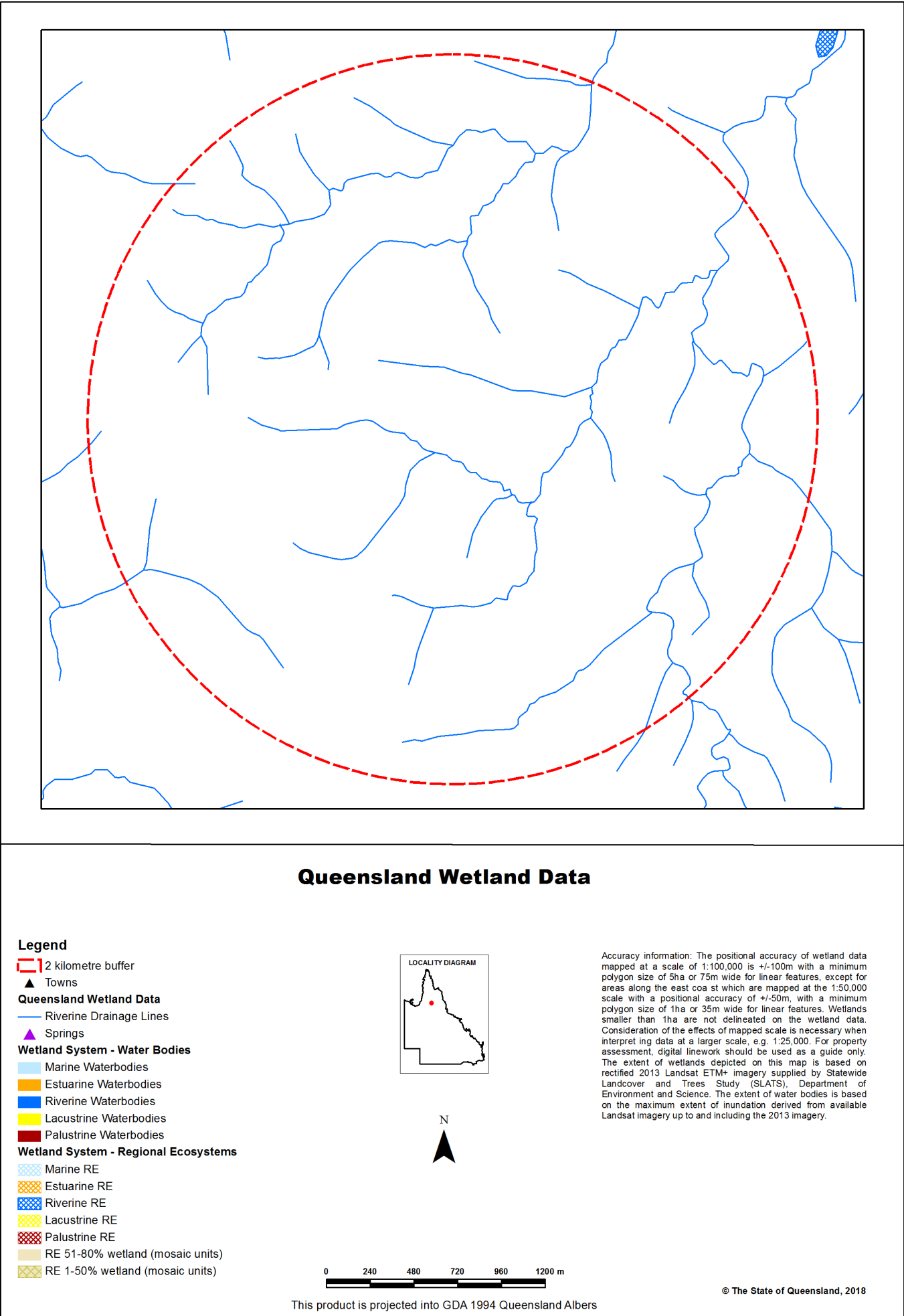
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

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)



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

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

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

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

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

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

References

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F., Ford, A.J. and Accad, A. (2017) The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 3.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

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

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2017) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 4.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

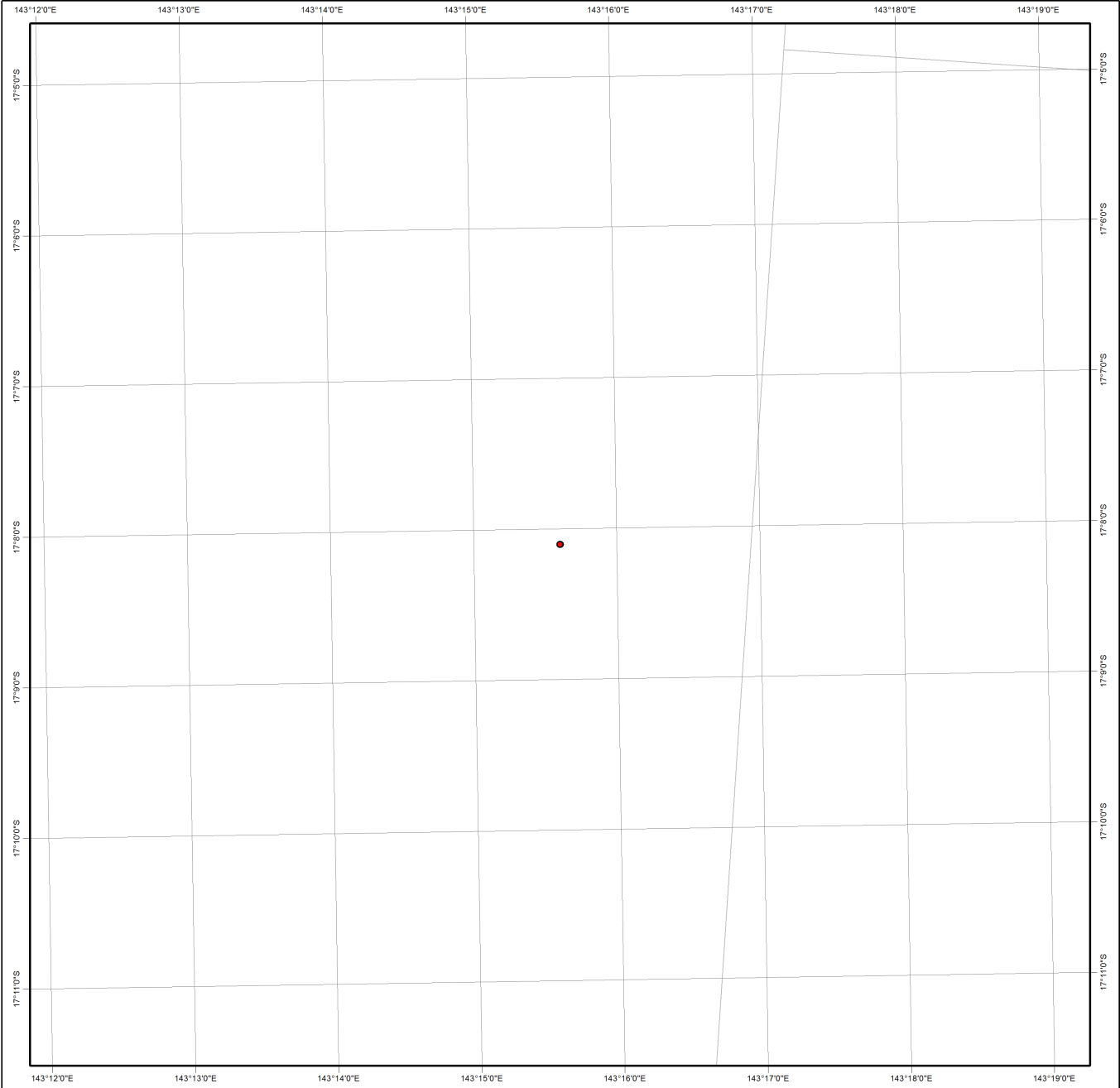
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 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

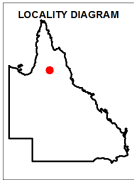
AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



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.

HUANCHACA 3 ENVIRONMENTAL REPORTS



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 143.26399 Latitude: -17.15141 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

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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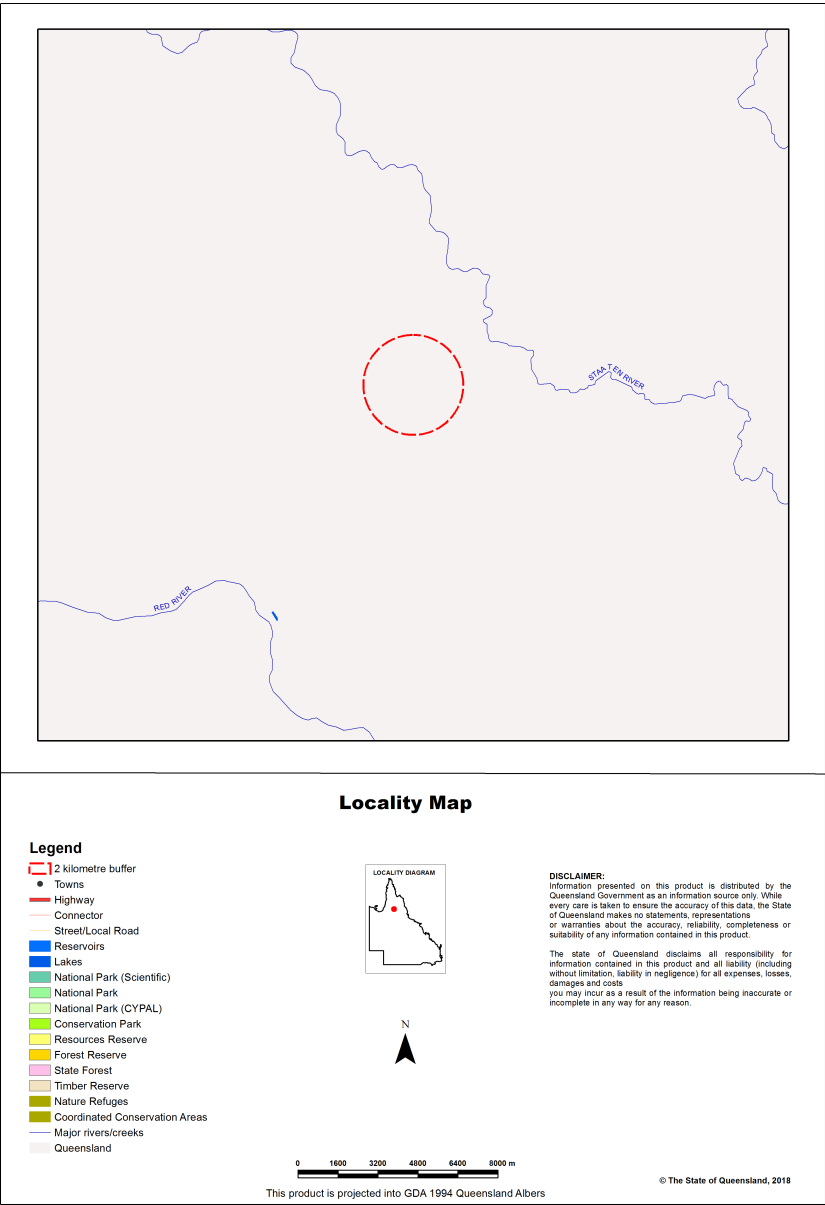
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Assessment Area Details

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: 143.26399 Latitude: -17.15141 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)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7 Threatened species and Iconic species	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	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 **	8.7 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)

(no results)

5. High Ecological Significance wetlands on the Map of Referable Wetlands

(no results)

6a. High Ecological Value (HEV) waters - wetlands

(no results)

6b. High Ecological Value (HEV) waters - waterways

(no results)

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

MSES - Species

7. Threatened wildlife and special least concern animal

(no results)

Threatened and special least concern species records

(no results)

Note: The Threatened and Special Least Concern Animal (7) layer originates from the previous MSES version (4.1, dated at 2014). The layer does not represent all currently listed species and is subject to review.

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

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

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

Refer to **Map 3 - MSES - Species** for an overview of the relevant MSES.

MSES - Regulated Vegetation

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

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

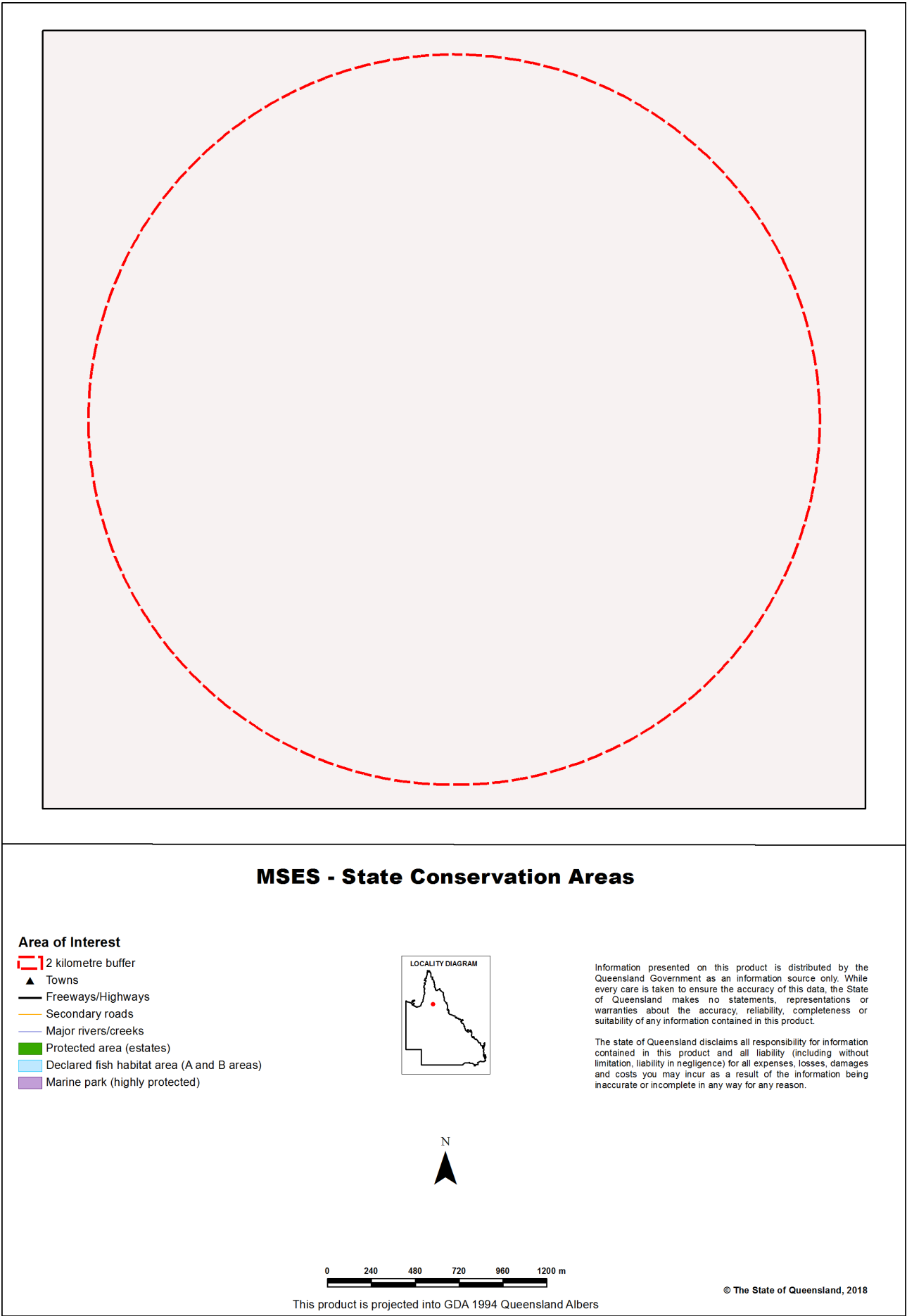
(no results)

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

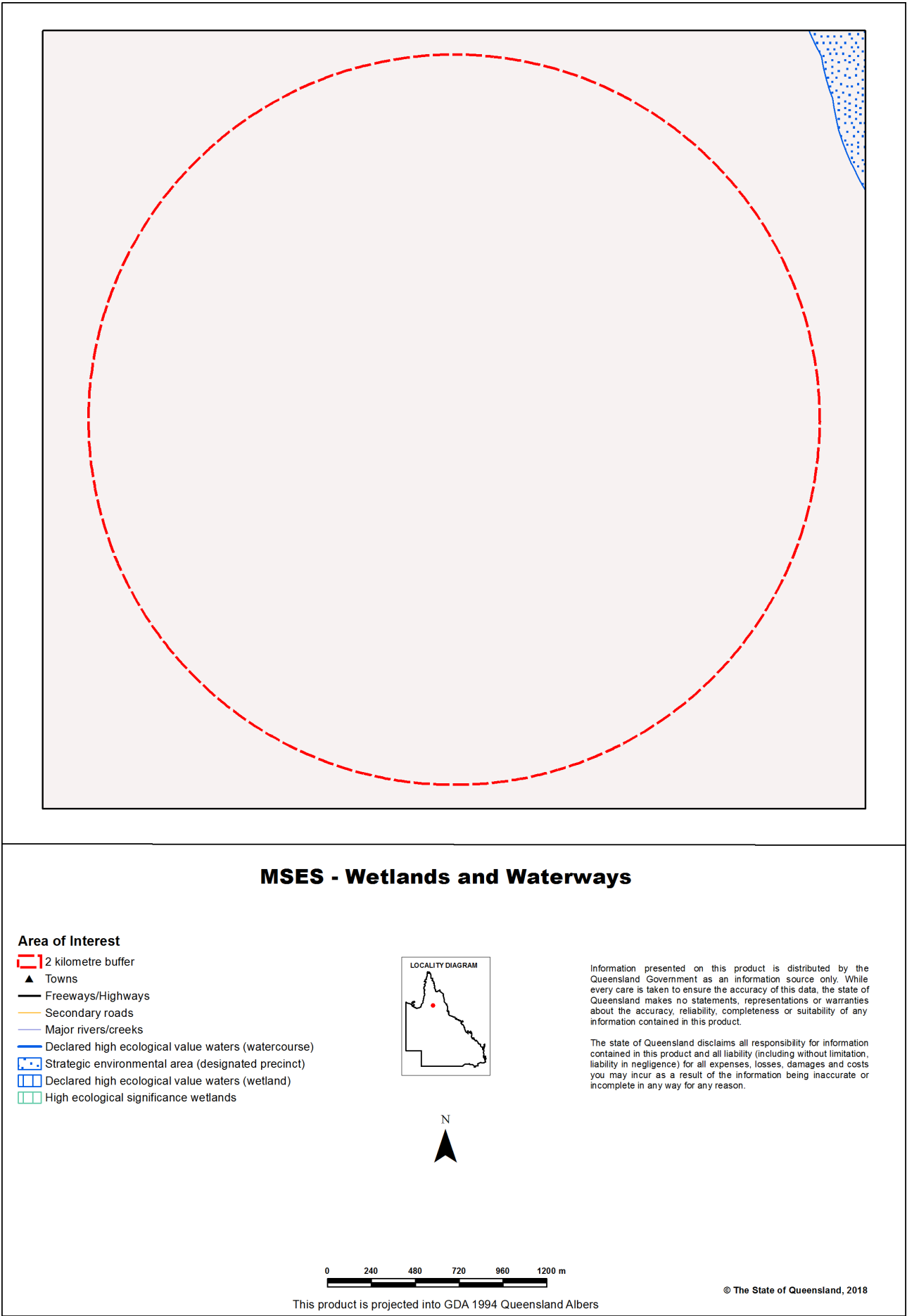
(no results)

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

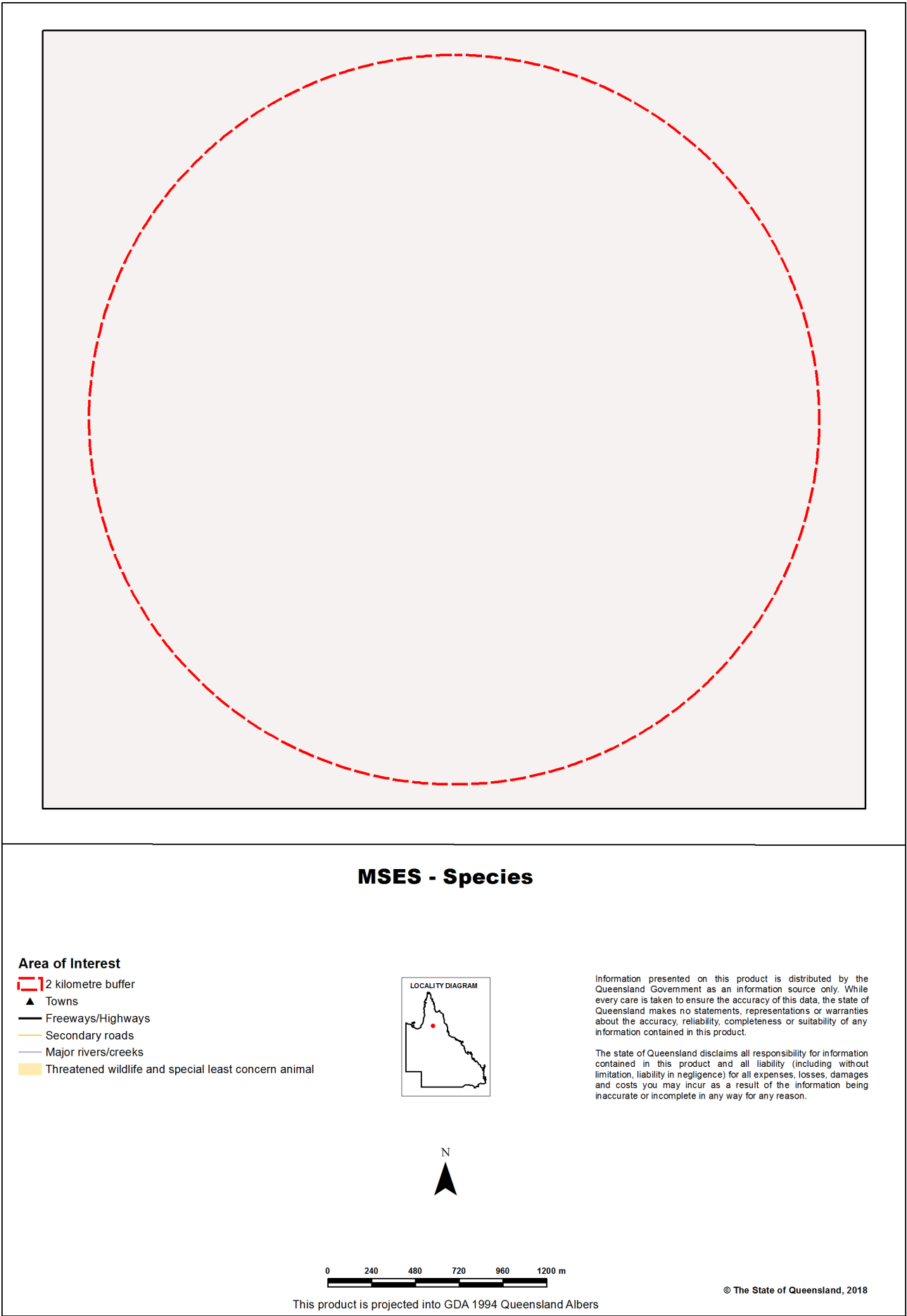
Map 1 - MSES - State Conservation Areas



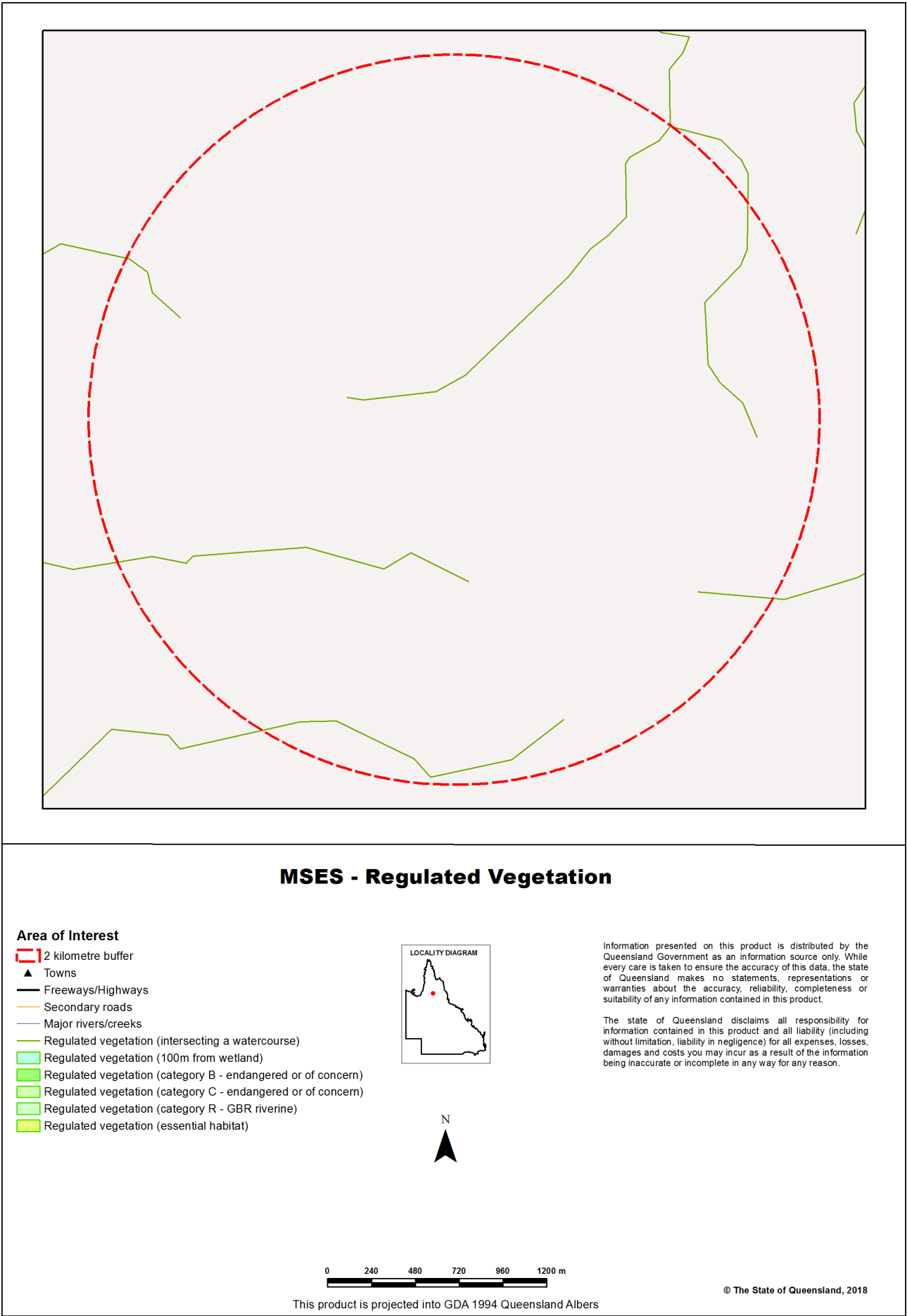
Map 2 - MSES - Wetlands and Waterways



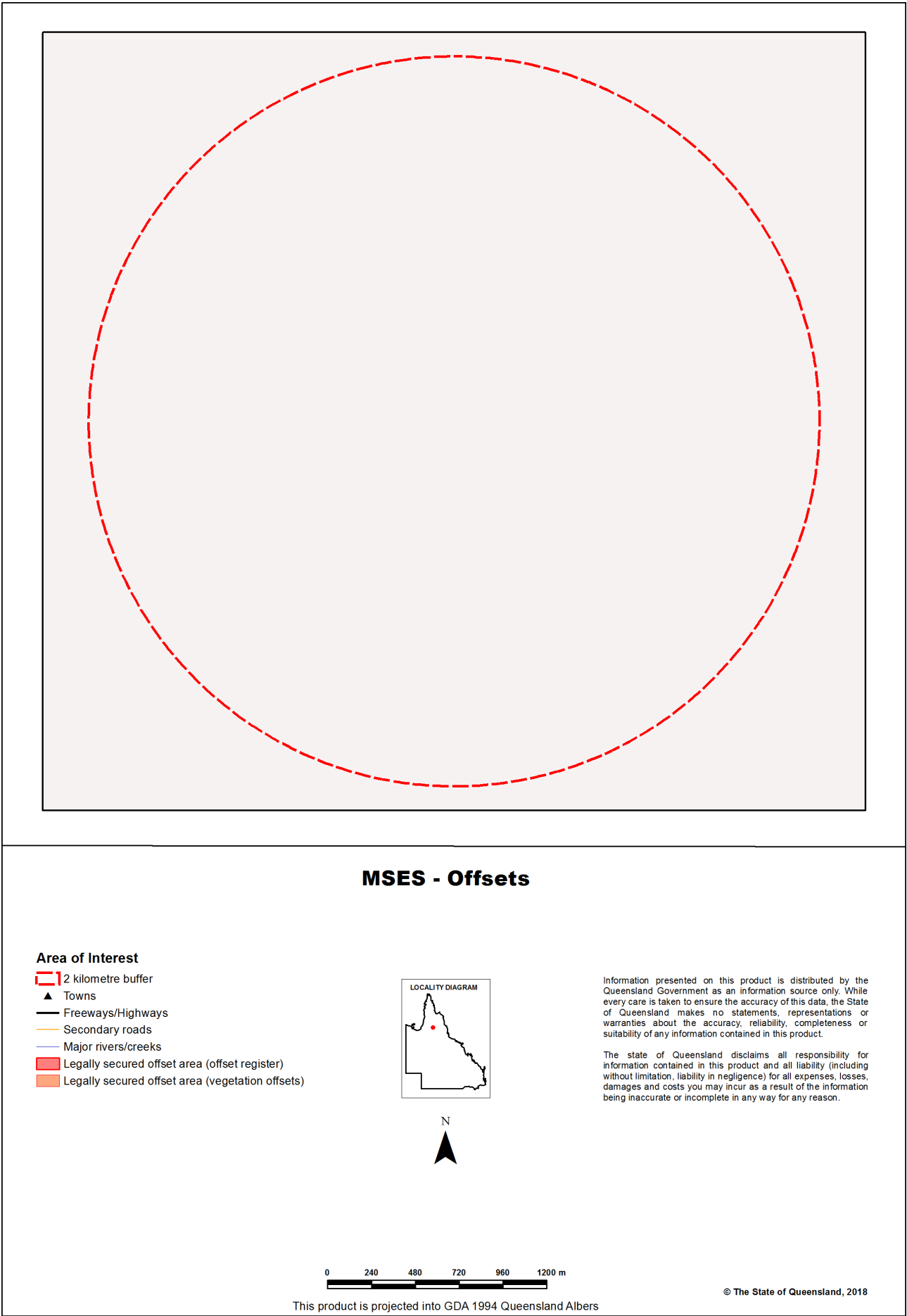
Map 3 - MSES - Species



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

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

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

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

Appendix 2 - Source Data

The datasets listed below are available on request from:

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

- Matters of State environmental significance

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

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

MSES layers	current QSpatial data (http://qspatial.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: 143.26399 Latitude: -17.15141 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: 143.26399 Latitude: -17.15141 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	3.33	0.27
No concern at present	1,253.22	99.74
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
2.3.10e	Eucalyptus chlorophylla +/- Melaleuca spp., Eucalyptus microtheca and Corymbia polycarpa low open woodland on Quaternary alluvial deposits	No concern at present	5.56	0.44
2.3.24c	Melaleuca spp. woodland-open forest on sands in channels and on levees	Of concern	3.33	0.27
2.3.36a	Melaleuca spp. low woodland in bottoms of shallow valleys, on solodised soils	No concern at present	79.59	6.33
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	97.93	7.79
2.5.18b	Corymbia setosa +/- C. polycarpa, Erythrophleum chlorostachys, C. pocillum low open woodland on Tertiary sand sheets	No concern at present	32.72	2.6
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	142.51	11.34
2.5.3	Evergreen scrub on plains on mainly deep sandy soils	No concern at present	83.85	6.67
2.5.5b	Eucalyptus tetrodonta and Corymbia polycarpa open woodland on pale earths and sands on plains	No concern at present	20.58	1.64
2.5.6a	Eucalyptus tetrodonta and Corymbia spp. woodland to open forest on plains on red and yellow earths	No concern at present	412.52	32.83
2.5.9	Eucalyptus microneura woodland on plains and plateaus on earths, podsolics and skeletal soils	No concern at present	377.96	30.08

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
2.3.10e	Pre-clearing 541000 ha; Remnant 2015 536000 ha	16c	Frequently inundated areas (not wetlands or floodplains).	Medium
2.3.24c	Pre-clearing 124000 ha; Remnant 2015 123000 ha	16a	Floodplain (other than floodplain wetlands).	Low
2.3.36a	Pre-clearing 68000 ha; Remnant 2015 68000 ha	21a	Floodplain (other than floodplain wetlands).	High
2.5.17a	Pre-clearing 446000 ha; Remnant 2015 444000 ha	21b	None	Low
2.5.18b	Pre-clearing 277000 ha; Remnant 2015 277000 ha	18a	None	Low
2.5.26	Pre-clearing 81000 ha; Remnant 2015 81000 ha	17b	None	Low
2.5.3	Pre-clearing 55000 ha; Remnant 2015 55000 ha	14b	Frequently inundated areas (not wetlands or floodplains).	High
2.5.5b	Pre-clearing 336000 ha; Remnant 2015 334000 ha	14a	None	Medium
2.5.6a	Pre-clearing 598000 ha; Remnant 2015 597000 ha	14b	None	High
2.5.9	Pre-clearing 331000 ha; Remnant 2015 329000 ha	18d	None	Low

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
2.3.10e	Includes seasonal wetlands significant as feeding sites for water birds.
2.3.24c	Provincial refuge for some fauna and flora. <i>Pristis pristis</i> (freshwater sawfish) habitat. 2.3.24a: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24b: Supports locally uncommon plant species. Provincial refuge for flora and fauna. 2.3.24c: Supports locally uncommon plant species. 2.3.24x12: Important sites for feeding and movement of birds, fish and reptiles. 2.3.24x3: Supports locally uncommon plant species. The only mappable occurrence of <i>Syzygium forte</i> subsp. <i>potamophilum</i> in the bioregion.
2.3.36a	None
2.5.17a	None
2.5.18b	None
2.5.26	None
2.5.3	Provincial refuge for some flora and fauna species. Potential habitat for <i>Psephotus chrysopterygius</i> (golden-shouldered parrot) 2.5.3x1: Supports locally uncommon plant species.
2.5.5b	None
2.5.6a	Occurs at the highest altitudes in the bioregion (up to 1000+m).

Regional Ecosystem	Special Values
2.5.9	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

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

A comprehensive description of BVGs is available at:

<https://publications.qld.gov.au/dataset/redd/resource/>

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

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

BVG (1 Million)	Description	Area (Ha)	% of AOI
14a	Woodlands and tall woodlands dominated by <i>Eucalyptus tetrodonta</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)	20.58	1.64
14b	Woodlands dominated by <i>Eucalyptus tetrodonta</i> (Darwin stringybark) (or <i>E. megasepala</i> (Melville Island bloodwood)) or <i>E. chartaboma</i> (or <i>E. miniata</i> (Darwin woollybutt)), with <i>Corymbia clarksoniana</i> (grey bloodwood) on erosional surfaces, residual sands and occasionally alluvial plains. (land zones 5, 3, 7, 10, 2) (CYP, GUP, EIU, NWH, [DEU])	496.36	39.5
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)	3.33	0.27
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	5.56	0.44
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)	142.51	11.34

BVG (1 Million)	Description	Area (Ha)	% of AOI
18a	Dry woodlands to open woodlands, dominated by bloodwoods (<i>Corymbia dallachiana</i> , <i>C. terminalis</i> (long-fruited bloodwood), <i>C. plena</i> , or <i>C. leichhardtii</i> (rusty-jacket)) or ironbarks (<i>Eucalyptus quadricostata</i> (Pentland ironbark), <i>E. crebra</i> (narrow-leaved red ironbark) or <i>E. exilipes</i> (fine-leaved ironbark)), often with <i>E. acmenoides</i> (narrow-leaved white stringybark), <i>Angophora leiocarpa</i> (rusty gum) and <i>Callitris glaucophylla</i> (white cypress pine) in the Brigalow Belt, on sandy plateaus and plains. (land zones 5, 3, 7) (GUP, DEU, BRB)	32.72	2.6
18d	Woodlands to low open woodlands dominated by <i>Eucalyptus microneura</i> (Gilbert River box) sometimes with <i>Corymbia</i> spp. (land zones 5, 10, 3, 12) (GUP, EIU)	377.96	30.08
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)	79.59	6.33
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])	97.93	7.79

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/>

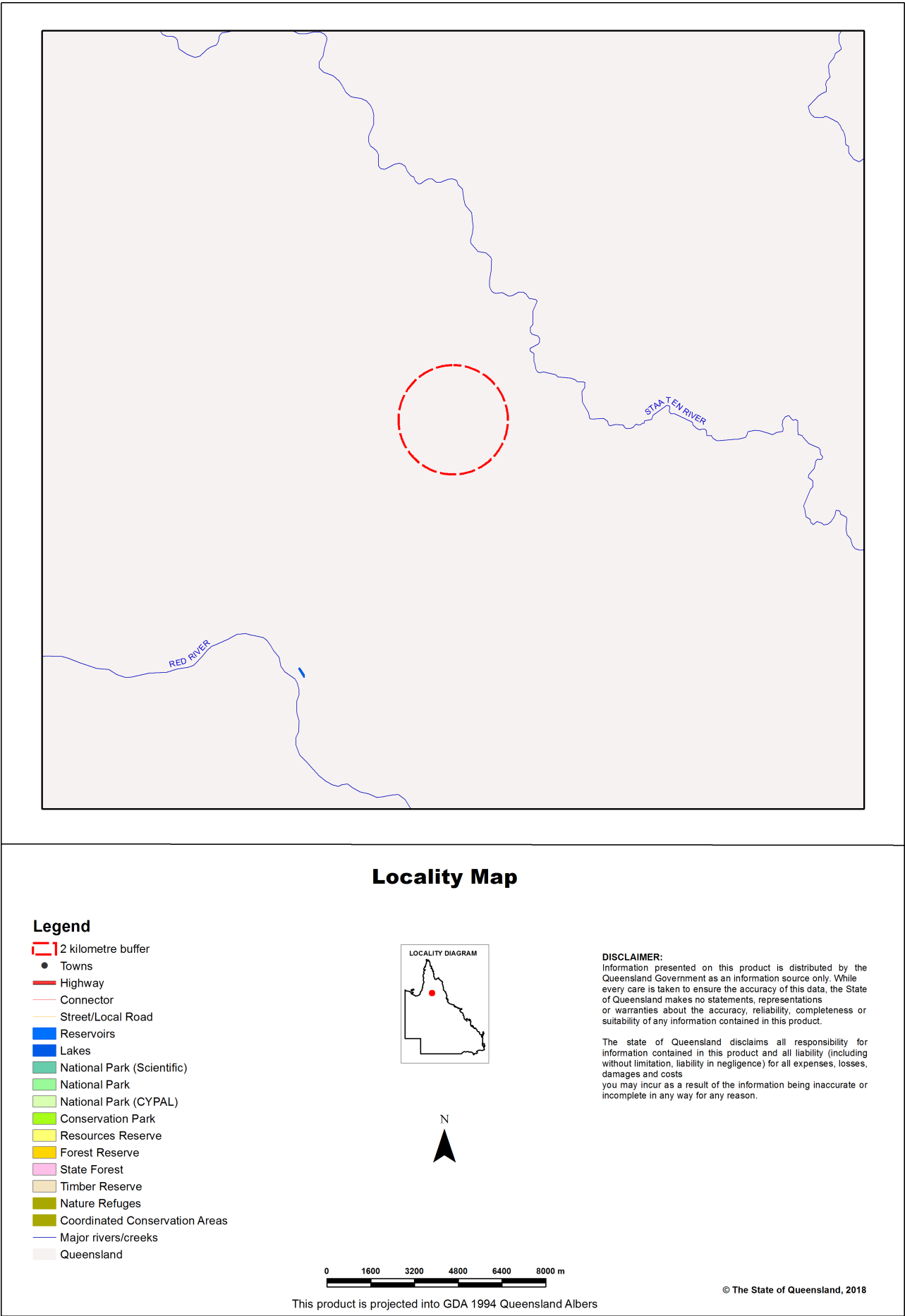
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance 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

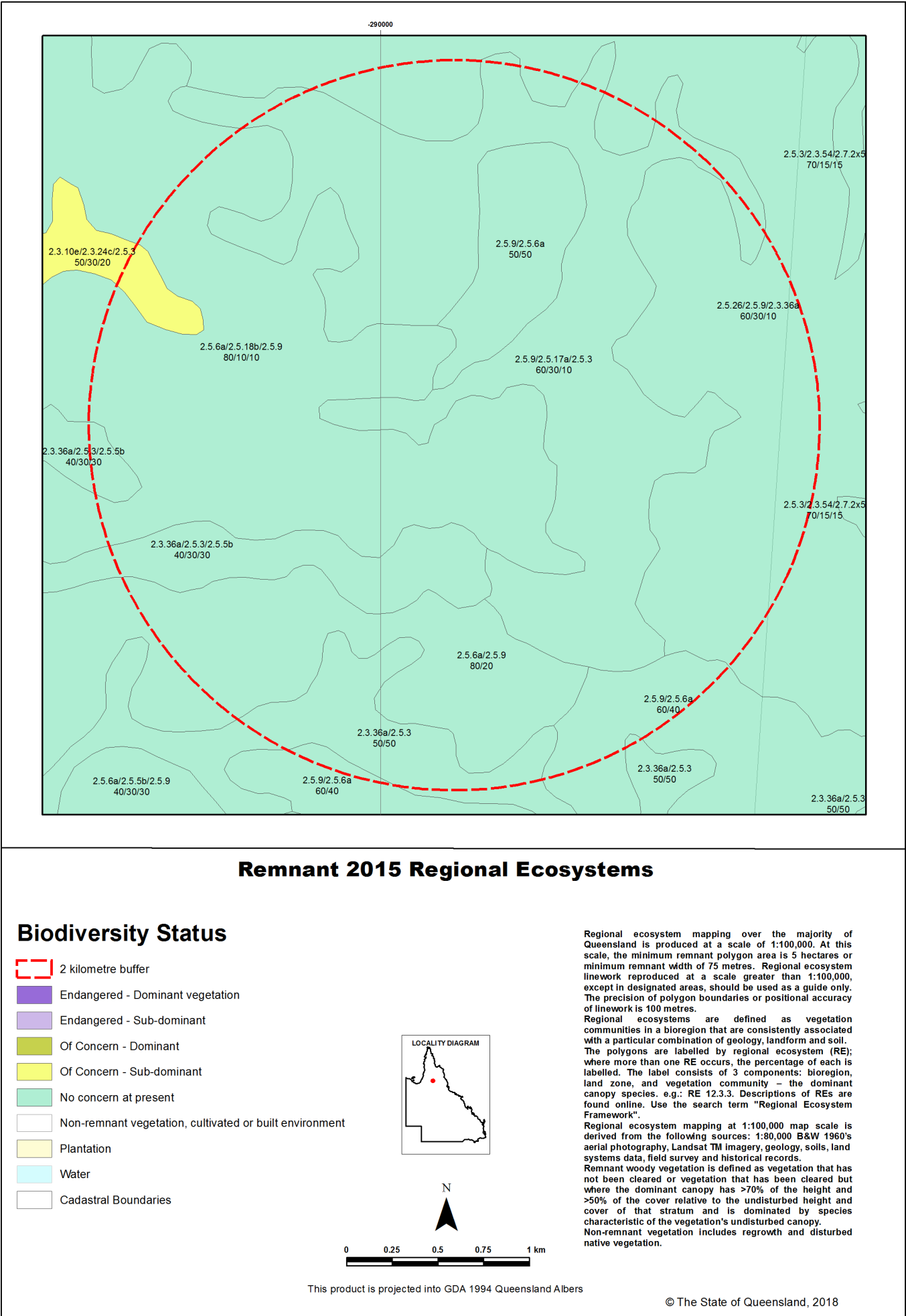
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
2.3.10e	Not currently available	Not currently available
2.3.24c	Not currently available	Not currently available
2.3.36a	Not currently available	Not currently available
2.5.17a	Not currently available	Not currently available
2.5.18b	Not currently available	Not currently available
2.5.26	Not currently available	Not currently available
2.5.3	Not currently available	Not currently available
2.5.5b	Not currently available	Not currently available
2.5.6a	Not currently available	Not currently available
2.5.9	Not currently available	Not currently available

Maps

Map 1 - Location



Map 2 - Remnant 2015 regional ecosystems



-290000

2.5.3/2.3.54/2.7.2x5
70/15/15

2.3.10e/2.3.24c/2.5.3
50/30/20

2.5.9/2.5.6a
50/50

2.5.26/2.5.9/2.3.36a
60/30/10

2.5.6a/2.5.18b/2.5.9
80/10/10

2.5.9/2.5.17a/2.5.3
60/30/10

2.3.36a/2.5.3/2.5.5b
40/30/30

2.5.3/2.3.54/2.7.2x5
70/15/15

2.3.36a/2.5.3/2.5.5b
40/30/30

2.5.6a/2.5.9
80/20

2.5.9/2.5.6a
60/40

2.3.36a/2.5.3
50/50

2.5.6a/2.5.5b/2.5.9
40/30/30

2.5.9/2.5.6a
60/40

2.3.36a/2.5.3
50/50

2.3.36a/2.5.3
50/50

2.3.36a/2.5.3
50/50

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

LOCALITY DIAGRAM

N

0 0.25 0.5 0.75 1 km

This product is projected into GDA 1994 Queensland Albers

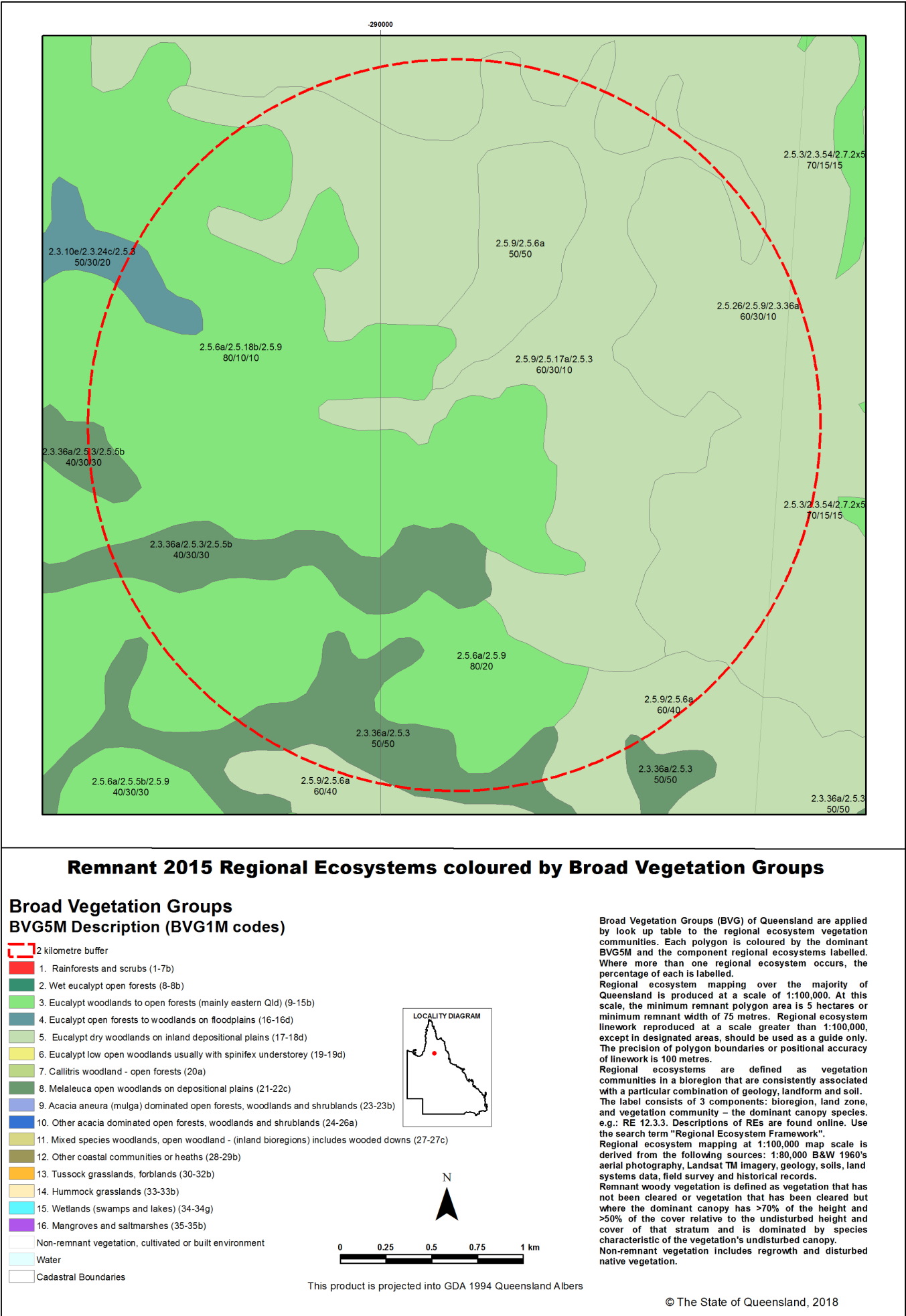
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should 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 12.3.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".

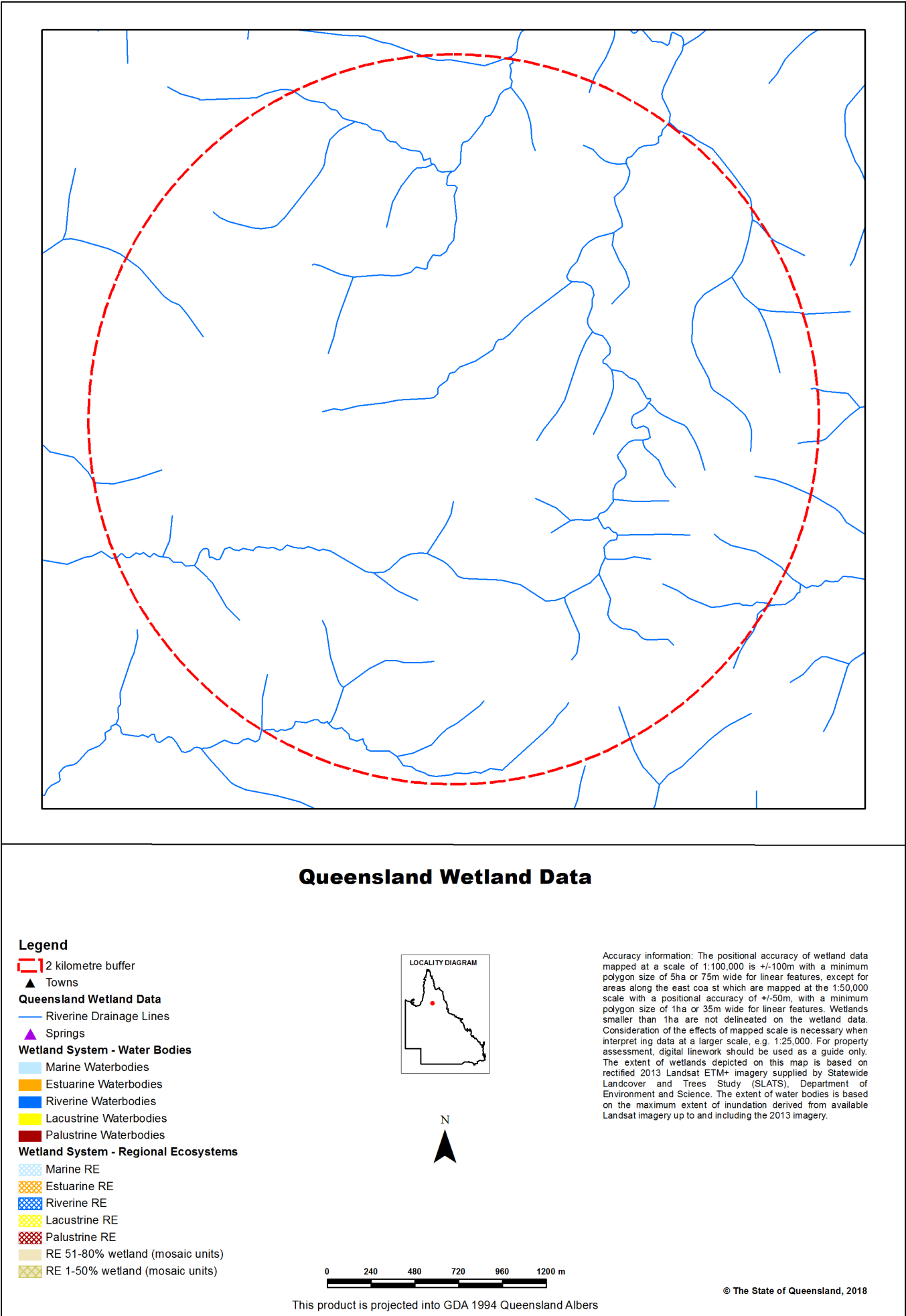
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

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



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

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

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

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

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

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

Benchmarks can be obtained from:

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

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

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

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

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

References

Neldner, V.J., Niehus R.E., Wilson, B.A. McDonald, W.J.F., Ford, A.J. and Accad, A. (2017) The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 3.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

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

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W. (2017) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 4.0. Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

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

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

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

- Regional Ecosystem Description Database

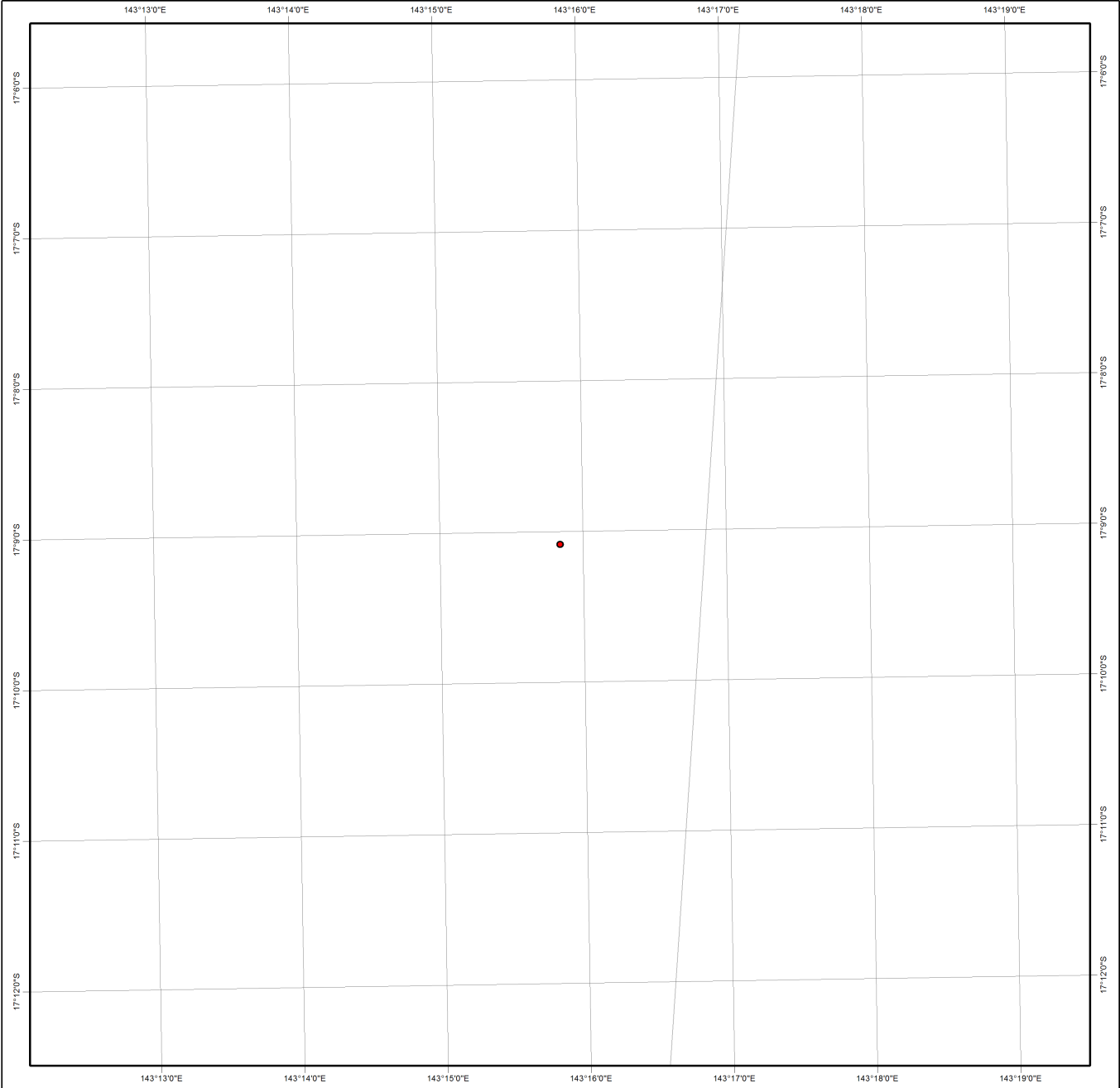
The datasets listed below are available for download from:

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

- Biodiversity status of pre-clearing and 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

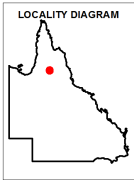
AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>



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.