

PEMBROKE

Olive Downs Coking Coal Project
Draft Environmental Impact Statement

Appendix A
Terrestrial Flora
Assessment



Olive Downs Coking Coal Project – Terrestrial Flora Assessment

August 2018

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August 2018

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Olive Downs Coking Coal Project – Terrestrial Flora Assessment

20 August 2018

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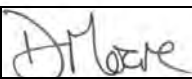


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EXECUTIVE SUMMARY

DPM Envirosciences Pty Ltd was engaged by Pembroke Olive Downs Pty Ltd to undertake terrestrial flora surveys and to prepare an impact assessment for the proposed Olive Downs Project (herein referred as the Project). The Project is a proposed coal mine and associated infrastructure within the Bowen Basin, located approximately 40 kilometres (km) south-east of Moranbah, Queensland (Qld).

In a regional context, the Project is located within the Brigalow Belt North Bioregion. The Project spans across two sub-regions, with the northern extent (including the electricity transmission line [ETL] corridor, rail loop and spur and water pipeline) falling within the Northern Bowen Basin subregion and the mine site falling within the Isaac – Comet Downs subregion.

In a local context, the Project area is located within the Bowen Basin mining area where, in parallel with agricultural activities, open cut (and underground) coal mining is a key land use. As a result, the majority of the Study area comprises agricultural grasslands with tracts of remnant vegetation.

The scope of this assessment was to verify Regional Ecosystem (RE) mapping for the Project area; identify any conservation significant species under the Qld *Nature Conservation Act 1992* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; identify and describe any Matters of State and National Environmental Significance; and identify proposed avoidance and mitigation measures to protect the natural values, including consideration of biodiversity offset requirements.

The findings discussed in this report are based on a desktop assessment of readily available information on the vegetation characteristics in a study area covering the Project (i.e. the Study area), supplemented by flora surveys in spring (November 2016, September and November 2017) and follow-up surveys in autumn (March and May-June 2017).

The flora surveys were undertaken in accordance with the Queensland Herbarium vegetation survey methods. Survey techniques included a combination of tertiary and quaternary surveys, identification of threatened ecological communities, targeted searches for conservation significant species and random meanders.

A total of 21 individual native REs were ground-truthed within the Study area. These REs fall within six broad vegetation groups, including:

- eucalypt dry woodlands on inland depositional plains (BVG5M:5);
- eucalypt open forests to woodlands on floodplains (BVG5M:4);
- eucalypt woodlands to open forests (BVG5M:3);
- other acacia dominated open forests, woodlands and shrublands (BVG5M:10);
- wetlands (swamps and lakes) (BVG5M:15); and
- other coastal communities or heaths (BVG5M:12).

Of the 21 REs identified within the Study area, four have a conservation status of 'Endangered' (RE 11.3.1, RE 11.4.8, RE 11.4.9 and RE 11.5.17) and five have a conservation status of 'Of Concern' (RE 11.3.2, RE 11.3.3, RE 11.3.3c, RE 11.3.4 and RE 11.5.18) under the *Vegetation Management Act, 1999* (VM Act).

Matters of National Environmental Significance (MNES) recorded within the Study area were limited to one threatened ecological community listed under the EPBC Act, namely, the Brigalow (*Acacia harpophylla* Dominant and Co-dominant) Threatened Ecological Community (Brigalow TEC). The Brigalow TEC in the Study area is represented by one patch of RE 11.3.1, one patch of RE 11.4.8 and two patches of RE 11.4.9 (both within the Mine Site and Access Road [EPBC 2017/7867] footprint). The two patches of Brigalow TEC are small (7 and 6 ha), degraded by edge effects and weeds and are highly fragmented.

Matters of State Environmental Significance (MSES) relevant to this assessment identified within the Project area include the following Regulated Vegetation:

- 'Endangered' REs – RE 11.3.1, RE 11.4.8, RE 11.4.9 and RE 11.5.17;
- 'Of Concern' REs – RE 11.3.2, RE 11.3.3, RE 11.3.3c, RE 11.3.4 and RE 11.5.18;
- REs that intersect a wetland on the vegetation management wetlands map; and
- REs within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map.

Two sub-populations of *Bertya pedicellata*, listed as 'Near Threatened' under the VM Act, were recorded in the north-west section of the ETL corridor. No other conservation significant flora species listed under the NC Act or EPBC Act have been recorded in the Study area, despite targeted surveys.

The Project would require the clearance of various patches of woodland / forest (totalling approximately 5,661.5 ha) occurring in four stages over the 79 years of construction and operation. All of the native vegetation communities / REs to be cleared occur more extensively in the surrounding landscapes and subregions. The native vegetation types that would be cleared by the Project include:

- approximately 4,805 ha of eucalypt dry woodlands on inland depositional plains;
- approximately 88.5 ha of eucalypt open forests to woodlands on floodplains;
- approximately 570 ha of eucalypt woodlands to open forests;
- approximately 78 ha of acacia dominated open forests, woodlands and shrublands; and
- approximately 120 ha of wetlands (swamps and lakes).

Indirect impacts that have been considered in this assessment include potential impacts associated with weeds, edge effects, hydrological changes, impacts to groundwater dependant ecosystems, bushfire and potential cumulative impacts. It is concluded that the Project is unlikely to have a significant impact on terrestrial flora as a result of these potential indirect impacts.

To mitigate unavoidable adverse impacts on terrestrial flora associated with the Project, Pembroke has committed to a number of mitigation and management measures, including:

- vegetation clearance procedures that specify when and how vegetation would be cleared with the view of minimising impacts on terrestrial flora;
- specific measures to manage conservation significant flora (including avoidance of the *Bertya pedicellata* located along the ETL corridor and application for a Protected Plant Clearing Permit if required);
- progressive establishment of woodland / forest cover on the post-mine landforms;
- measures to prevent, monitor and control weeds;
- measures to manage bushfire risk; and
- various measures to manage other environmental factors (e.g. dust suppression, erosion and sediment control, water management).

To address the residual significant adverse impacts (on MSES and MNES), an offset strategy has been developed by Pembroke in accordance with relevant State and Commonwealth offset requirements.

Pembroke proposes a staged environmental offset in consideration of the staged land clearing described above. The offset for each stage of clearance would be provided before clearing the relevant stage. The result of implementing the offset strategy would be an increase in the area of land being conserved and managed for conservation in the medium to long term.

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Acronyms

Acronym	Description
BoT	Back on Track
BVG	Broad Vegetation Group
CE	Critically Endangered (threatened flora species status)
CHPP	Coal Handling Processing Plant
DERM	The former Queensland Department of Environment and Resource Management
DEHP	Queensland Department of Environment and Heritage Protection
DES	Queensland Department of Environment and Science
DNRM	The Queensland Department of Natural Resources and Mines
DotE	The former Commonwealth Department of the Environment
DSEWPC	The former Australian Government Department of Sustainability, Environment, Water, Population and Communities
DSITI	The former Queensland Department of Science, Information Technology and Innovation
DSITIA	The former Queensland Department of Science, Information Technology, Innovation and the Arts
DSDIP	The former Queensland Department of State Development, Infrastructure and Planning
E	Endangered (threatened flora species status)
EA	Environmental Authority
EH	Essential Habitat
EIS	Environmental Impact Statement
EO Act	Queensland <i>Environmental Offsets Act 2014</i>
EO Regulation	Queensland Environmental Offsets Regulation 2014
EP Act	Queensland <i>Environmental Protection Act 1994</i>
EP Regulation	Queensland Environmental Protection Regulation 2008
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERE	Endangered Regional Ecosystem
ESA	Environmentally Sensitive Area
ESD	Ecologically Sustainable Development
ETL	Electricity Transmission Line
EVNT	Endangered, Vulnerable or Near Threatened (threatened flora species)
HES	High Ecological Significance
HRA	High Risk Area
LC	Least Concern species listed under the NC Act
LGA	Local Government Area
MLA	Mining Lease Area
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	Queensland <i>Nature Conservation Act 1992</i>
NC Regulation	Nature Conservation (Wildlife) Regulation 2006
NRM	Natural Resource Management
NT	Near Threatened (flora species status)
RE	Regional Ecosystem
ROM	Run-of-Mine

Acronym	Description
SEVT	Semi-evergreen Vine Thicket
SLC	Special Least Concern
SPP	State Planning Policy
TEC	Threatened Ecological Community
V	Vulnerable (threatened flora species status)
VM Act	Queensland <i>Vegetation Management Act 1999</i>
WONS	Weeds of National Significance
WPA	Wetland Protection Area

Definitions

Term	Description
Project site	This area is defined by the area of impact of the mine site, mine infrastructure, access road, water pipeline, electricity transmission line and rail spur. It is a total area of 16,300 ha that is contained within the large Study area. It reflects the area of disturbance for the Project.
Study area	This area encompasses the area of land that was investigated for the ecological assessments. It includes the entire MLA, eastern dump, mine infrastructure areas and supporting infrastructure corridors. It is a larger area than the Project site as it incorporates buffer zones. It is 26,957 ha.

1 INTRODUCTION

Pembroke Olive Downs Pty Ltd (Pembroke) proposes to develop the Olive Downs Project (the Project), a metallurgical coal mine and associated infrastructure within the Bowen Basin, located approximately 40 kilometres south-east of Moranbah, Queensland (Figure 1). The Project provides an opportunity to develop an open cut metallurgical coal resource within the Bowen Basin mining precinct that can deliver up to 20 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal.

The Project comprises the Olive Downs South and Willunga mining domains and associated linear infrastructure corridors, including a rail spur connecting to the Norwich Park Branch Railway, a water pipeline connecting to the Eungella pipeline network, an electricity transmission line (ETL) and access roads (Figure 2). The coal resource would be mined by conventional open cut mining methods, with product coal to be transported by rail to the Dalrymple Bay Coal Terminal. Up to 20 Mtpa of ROM coal would be extracted over the anticipated Project operational life of approximately 79 years.

1.1 Purpose

The Coordinator-General has declared the Olive Downs Project to be a ‘coordinated project for which an EIS is required’ under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This declaration initiates the statutory environmental impact assessment procedure of Part 4 of the Act, which requires a proponent to prepare an EIS for the project. Further, several referrals have been made under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) regarding the four different components of the Project. The Commonwealth Minister for the Environment and Energy (DEE) has determined the following controlling provisions apply for each proposed action under the EPBC Act:

1. Olive Downs Project Mine Site and Access Road (EPBC 2017/7867)
 - a) listed threatened species and communities (sections 18 and 18A);
 - b) listed migratory species (sections 20 and 20A); and
 - c) a water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).
2. Olive Downs Project Water Pipeline (EPBC 2017/7868)
 - i. listed threatened species and communities (sections 18 and 18A).
3. Olive Downs Project Electricity Transmission Line (EPBC 2017/7869)
 - i. listed threatened species and communities (sections 18 and 18A).
4. Olive Downs Project Rail Spur (EPBC 2017/7870)
 - i. listed threatened species and communities (sections 18 and 18A).

The EIS process has been accredited under the Bilateral Agreement for the assessment of the Project under the EPBC Act, hence the EIS must state the controlling provisions for the Project and describe the particular aspects of the environment that led to the controlled action decision.

In December 2017, Pembroke lodged an application to vary the Action to incorporate the latest Project layout designs for the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867) and the Olive Downs Project Water Pipeline (EPBC 2017/7868). These variations were accepted by the DEE on 17 April 2018.

The purpose of the Terrestrial Flora Assessment is to describe the floristic values of the Project area as relevant to current Commonwealth and State legislation, assess the impacts of the proposed actions on these values and present strategies to avoid, minimise or mitigate impacts to floristic values and any offset requirements. This document is a supporting document to the EIS.

1.2 Scope of work

The scope of work for this terrestrial flora assessment includes the following tasks:

- conduct a desktop review of available literature and previous studies in the vicinity of the Study area, and conduct database searches for conservation significant flora species;
- undertake flora surveys throughout the Study area using appropriate methodology to:
 - target potentially occurring conservation significant flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and / or Queensland *Nature Conservation Act 1992* (NC Act);
 - target potentially occurring Threatened Ecological Communities (TECs) listed under the EPBC Act;
 - ground truth Regional Ecosystem (RE) mapping;
 - identify the presence of Weeds of National Significance and restricted matter species listed under the Queensland *Biosecurity Act 2014*;
 - identify groundwater-dependent ecosystems (terrestrial); and
- prepare a terrestrial flora assessment report that identifies the methods and results of the desktop and field studies, assesses the potential impacts of the Project, and present mitigation measures and any offset requirements.

1.3 Terms of Reference

Sections of the Terms of Reference (ToR) (June 2017) addressed by this report and the accompanying Terrestrial Fauna Assessment and Aquatic Ecology Assessment (DPM Envirosciences 2018a and 2018b) are shown in Table 1. In addressing these specific ToR guidance was also taken from Sections 11.3 – 11.15 and 11.30 – 11.34, where within the original scope of works.

Table 1 Location of information addressing ToR within the ecological reports

Terms of Reference	Section in this report
<i>Matters of National Environmental Significance – listed threatened species and communities</i>	
11.16 For each proposed action the EIS must:	Sections 4.5.4, 5.1.3 and 5.5 (Table 7)
(a) describe the relevant listed threatened species and ecological communities (TEC) (including EPBC Act listing status, distribution, life history and habitat);	Appendix G

Terms of Reference	Section in this report
(b) provide details of the scope, methodology, timing and effort of surveys for each proposed action (including areas outside of each proposed action area which may be impacted by each proposed action); and include details of: (i) the application of best practice survey guidelines (ii) how studies or surveys are consistent with (or a justification for divergence from) published Australian Government guidelines and policy statements;	Section 4.5
(c) describe and assess the impacts to listed threatened species and ecological communities identified below and any others that are found to be or may potentially be present in areas that may be impacted by each proposed action in accordance with the Matters of National Environmental Significance, Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999;	Sections 6.1.2, 6.2 and 6.10 Appendix G
(d) identify which aspect of each proposed action is of relevance to each listed threatened species or ecological community or if the threat of impact relates to consequential actions; and	Section 6.10 Appendix G
(e) where relevant, have regard to any approved conservation advice.	Appendix G
11.17 Where relevant, the EIS must demonstrate that each proposed action will not be inconsistent with:	
(a) Australia's obligations under: (i) the Biodiversity Convention; (ii) the Convention on Conservation of Nature in the South Pacific (Apia Convention); (iii) the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and	Fauna are addressed in the Terrestrial Fauna Assessment and / or Aquatic Ecology Assessment (DPM Envirosciences 2018a and 2018b)
(b) a recovery plan or threat abatement plan.	Appendix G
11.18 The EIS must address impacts on the following listed threatened species for each proposed action:	
Fauna (a) Red Goshawk (<i>Erythrorhynchus radiatus</i>) – vulnerable; (b) Australian Painted Snipe (<i>Rostratula australis</i>) – endangered; (c) Curlew Sandpiper (<i>Calidris ferruginea</i>) – critically endangered; (d) Squatter Pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable; (e) Painted Honeyeater (<i>Grantiella picta</i>) – vulnerable; (f) Star Finch (eastern) (<i>Neochmia ruficauda ruficauda</i>) – endangered;	Fauna are addressed in the Terrestrial Fauna Assessment and / or Aquatic Ecology Assessment (DPM Envirosciences 2018a and 2018b)

Terms of Reference	Section in this report
(g) Black-throated Finch (southern) (<i>Poephila cincta cincta</i>) – endangered; (h) Northern Quoll (<i>Dasyurus hallucatus</i>) – endangered; (i) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)) – vulnerable; (j) Greater Glider (<i>Petauroides volans</i>) – vulnerable; (k) Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) – vulnerable; (l) Ghost Bat (<i>Macroderma gigas</i>) – vulnerable; (m) Corben's Long-eared Bat (<i>Nyctophilus corbeni</i>) – vulnerable; (n) Southern Snapping Turtle (<i>Elseya albagula</i>) – critically endangered; (o) Fitzroy River Turtle (<i>Rheodytes leukops</i>) – vulnerable; (p) Yakka Skink (<i>Egernia rugosa</i>) – vulnerable; (q) Allan's Lerista (<i>Lerista allanae</i>) – endangered; (r) Ornamental Snake (<i>Denisonia maculata</i>) – vulnerable; (s) Dunmall's Snake (<i>Furina dunmalli</i>) – vulnerable;	
Flora (t) <i>Cycas ophiolitica</i> – endangered; (u) King Blue-grass (<i>Dichanthium queenslandicum</i>) – endangered; (v) Bluegrass (<i>Dichanthium setosum</i>) – vulnerable; (w) Black Ironbox (<i>Eucalyptus raveretiana</i>) – vulnerable; and (x) <i>Quassia</i> (<i>Samadera bidwillii</i>) – vulnerable.	Sections 4.5.1 (Table 3), 5.5 (Table 7) and 6.2. Appendix G
11.19 The EIS must address impacts on the following listed threatened ecological communities for each proposed action: (a) Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) – endangered; (b) Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin – endangered; and (c) Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions – endangered.	Sections 4.5.4, 5.1.3, 6.1.2, 6.10 Appendix G
11.20 For the proposed mine site and access road (EPBC 2017/7867) the EIS must: (a) describe the listed migratory species identified below (including distribution, life history and habitat); (b) provide details of the scope, methodology, timing and effort of surveys for the proposed action (including areas outside of the proposed action area which may be impacted	Fauna are addressed in the Terrestrial Fauna Assessment (DPM Envirosciences 2018a)

Terms of Reference	Section in this report
by the proposed action); and include details of: (i) the application of best practice survey guidelines; (ii) how studies or surveys are consistent with (or a justification for divergence from) published Australian Government guidelines and policy statements; (c) describe and assess the impacts to the listed migratory species identified below and any others that are found to be or may potentially be present in areas that may be impacted by the proposed action in accordance with the Matters of National Environmental Significance, Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999; and (d) identify which aspect of the proposed action is of relevance to each species or if the threat of impact relates to consequential actions. 11.21 Where relevant, demonstrate that the proposed action will not be inconsistent with: (a) Australia's obligations under: (i) the Bonn Convention; (ii) CAMBA; (iii) JAMBA; and (iv) an international agreement approved under subsection 209(4) of the EPBC Act.	Fauna are addressed in the Terrestrial Fauna Assessment (DPM Envirosiences 2018a)
11.22 The EIS must address impacts on the following migratory species: (a) Glossy Ibis (<i>Plegadis falcinellus</i>); (b) Caspian Tern (<i>Hydroprogne caspia</i>); (c) Fork-tailed Swift (<i>Apus pacificus</i>); (d) Oriental Cuckoo (<i>Cuculus optatus</i>); (e) White-throated Needletail (<i>Hirundapus caudacutus</i>); (f) Black-faced Monarch (<i>Monarcha melanopsis</i>); (g) Yellow Wagtail (<i>Motacilla flava</i>); (h) Satin Flycatcher (<i>Myiagra cyanoleuca</i>); (i) Curlew Sandpiper (<i>Calidris ferruginea</i>); (j) Latham's Snipe (<i>Gallinago hardwickii</i>); (k) Osprey (<i>Pandion haliaetus</i>); and (l) Common Greenshank (<i>Tringa nebularia</i>).	
Offsets 11.27 The EIS must describe the residual impacts of each proposed action for each relevant matter protected by the EPBC Act, after all proposed avoidance and mitigation measures are taken into account.	Sections 6.10 and 8

Terms of Reference	Section in this report
11.28 The EIS must identify whether the residual impacts are significant with reference to the Matters of National Environmental Significance, Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999.	Sections 6.10 and 8 Appendix G
11.29 If those residual impacts are significant the EIS must propose offsets for relevant matters protected by the EPBC Act consistent with the Environment Protection and Biodiversity Conservation Act 1999, Environmental Offsets Policy.	Section 8
Information requirements—flora and fauna 11.46 Describe the likely impacts on the biodiversity and natural environmental values of affected areas arising from the construction, operation and eventual decommissioning of the project (where known) in accordance with EHP's EIS information guidelines relevant to terrestrial and aquatic ecology.	Section 6
11.47 Take into account any proposed avoidance and/or mitigation measures. The assessment should include, but not be limited to, the following key elements:	Section 7.1 and 7.2
(a) matters of state environmental significance and national environmental significance	Sections 5.7, 5.8, 6.10 and 6.11
(b) terrestrial and aquatic ecosystems (including groundwater-dependent ecosystems) and their interaction	Section 5.2, 6.1 and 6.6 Fauna are addressed in the Terrestrial Fauna Assessment and / or Aquatic Ecology Assessment (DPM Envirosciences 2018a and 2018b)
(c) biological diversity including listed flora and fauna species and regional ecosystems	Section 5
(d) the existing integrity of ecological processes, including habitats of threatened, near-threatened or special least-concern species	Sections 5.1, 5.5, 5.7 and 5.8
(e) the integrity of landscapes and places, including wilderness and similar natural places	Section 5.3
(f) actions of the project that require an authority under the Nature Conservation Act 1992, and/or would be assessable development for the purposes of the Vegetation Management Act 1999 (VMA) and the Fisheries Act 1994	Section 7.2 (Table 13)
(g) impacts on native fauna due to wastes at the site, particularly those related to any form of toxicants in supernatant water of any tailings storage facility.	Fauna are addressed in the Terrestrial Fauna Assessment and / or Aquatic Ecology Assessment (DPM Envirosciences 2018a and 2018b)

Terms of Reference	Section in this report
<i>11.48 Propose practical measures for protecting or enhancing natural values, and assess how the nominated quantitative indicators and standards may be achieved for nature conservation management. In particular, address measures to protect or preserve any threatened or near-threatened species.</i>	Sections 7.1, 7.2 (Table 13)
<i>11.49 Assess the need for buffer zones and the retention, rehabilitation or planting of movement corridors, and propose measures that would avoid the need for waterway barriers, or propose measures to mitigate the impacts of their construction and operation.</i>	Section 7.1
<i>11.50 The measures proposed for the progressive rehabilitation of disturbed areas should include rehabilitation success criteria in relation to natural values that would be used to measure progress and adjust practices if necessary to ensure success over time.</i>	The Project rehabilitation strategy is detailed within Section 4 of the main text of the EIS.
<i>11.51 Describe how the achievement of the rehabilitation objectives would be monitored and audited, and how corrective actions would be managed.</i>	
<i>11.52 Proposals for the rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows, watering points and ground litter.</i>	
Offsets	Section 8
<i>11.53 The EIS should identify whether the project will result in a significant residual impact on matters of State environmental significance (MSES) with reference to the Queensland Environmental Offsets Policy, Significant Residual Impact Guideline 2014.</i>	
<i>11.54 For staged offsets, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the significant residual impact test.</i>	Section 8 (Table 14)
<i>11.55 The proposed offsets should be in line with the requirements set out in the Queensland Environmental Offsets Policy (Version 1.2) 2016.</i>	Section 8

2 PROJECT DESCRIPTION

The main activities associated with the development of the Project would include:

- up to 20 Mtpa of ROM coal production for an operational mine life of approximately 66 years (commencing approximately in 2020 or upon grant of all required approvals), including mining operations using conventional mining equipment (e.g. excavators, dozers, front end loaders and trucks) and strip mining, associated with:
 - development of the Olive Downs South domain open cut pits and out-of-pit waste rock emplacements within Mining Lease Application (MLA) 1, MLA 2 (within Mineral Development Licenses [MDL] 3012 and MDL 3013), Specific Purpose Mining Lease Application (SPMLA) 1 and SPMLA 2; and
 - development of the Willunga domain open cut pits and out-of-pit waste rock emplacements within MLA 3 (within MDL 3014).
- exploration activities;
- progressive development of soil stockpiles, laydown areas and borrow areas (e.g. for road base and ballast material);
- use of local quarries to source road base and ballast material (e.g. in the case where material is unavailable from sources within MLA 1, MLA 2 and MLA 3);
- drilling and blasting of competent waste rock material;
- progressive placement of waste rock in emplacements adjacent to and nearby the open pit extents;
- progressive backfilling of the mine voids with waste rock behind the advancing open cut mining operations;
- construction of an access road from Annandale Road to the Olive Downs South domain infrastructure area including a crossing of the Isaac River, and a second access road from the Fitzroy Developmental Road to the Willunga infrastructure facilities;
- progressive development of new haul roads and internal roads, including an Isaac River road crossing to provide access between the Olive Downs South and Willunga domains;
- installation and operation of on-site ROM coal handling and crushing facilities at the Willunga domain;
- transfer of crushed ROM coal from the Willunga domain to the CHPP at the Olive Downs South domain, via either haul road or conveyor with an Isaac River crossing;
- storage and disposal of CHPP rejects (coarse and fine rejects) during the initial years (until in-pit containment facilities become available) in initial rejects storage facilities including tailings cells;
- disposal of CHPP rejects (coarse and fine rejects) on-site within appropriate in-pit containment facilities, including mine voids behind the advancing open cut mining operations, and where circumstances allow, disposal in other out-of-pit containment facilities;
- progressive development of sediment dams and water storage dams (including the North Eastern Water Dam, North Western Water Dam, Central Water Dam, mine affected water dams, raw water dams, etc.) and installation of pumps, pipelines and other water management equipment and structures (including up-catchment diversions and levees);
- wastewater and sewage treatment by package sewage treatment plants;
- advance dewatering of Olive Downs South and Willunga domain open cut pits and construction and use of a groundwater supply borefield subject to the prevalence of suitable hydrogeological conditions;

- installation of a raw water supply pipeline from the existing Eungella pipeline network;
- discharge of excess water off-site in accordance with relevant principles and conditions of the Model Water Conditions for Coal Mines in the Fitzroy Basin (Department of Environment and Heritage Protection [DEHP] 2013);
- electricity supply from the existing regional power network, via construction of a 66 kilovolt (kV) ETL and switching / substation;
- construction of a new rail loop and rail spur from the Norwich Park Branch Railway, and rail-loadout facility including product coal stockpiles at the Olive Downs South domain for rail transport of coking and PCI coal products and by-products (i.e. thermal coal) for the export market via the DBCT (subject to availability of rail and port allocation); and
- other associated minor infrastructure, plant, equipment and activities.

The general arrangement of the mine site and the assessment areas are shown in Figure 2 and Figure 3 respectively.

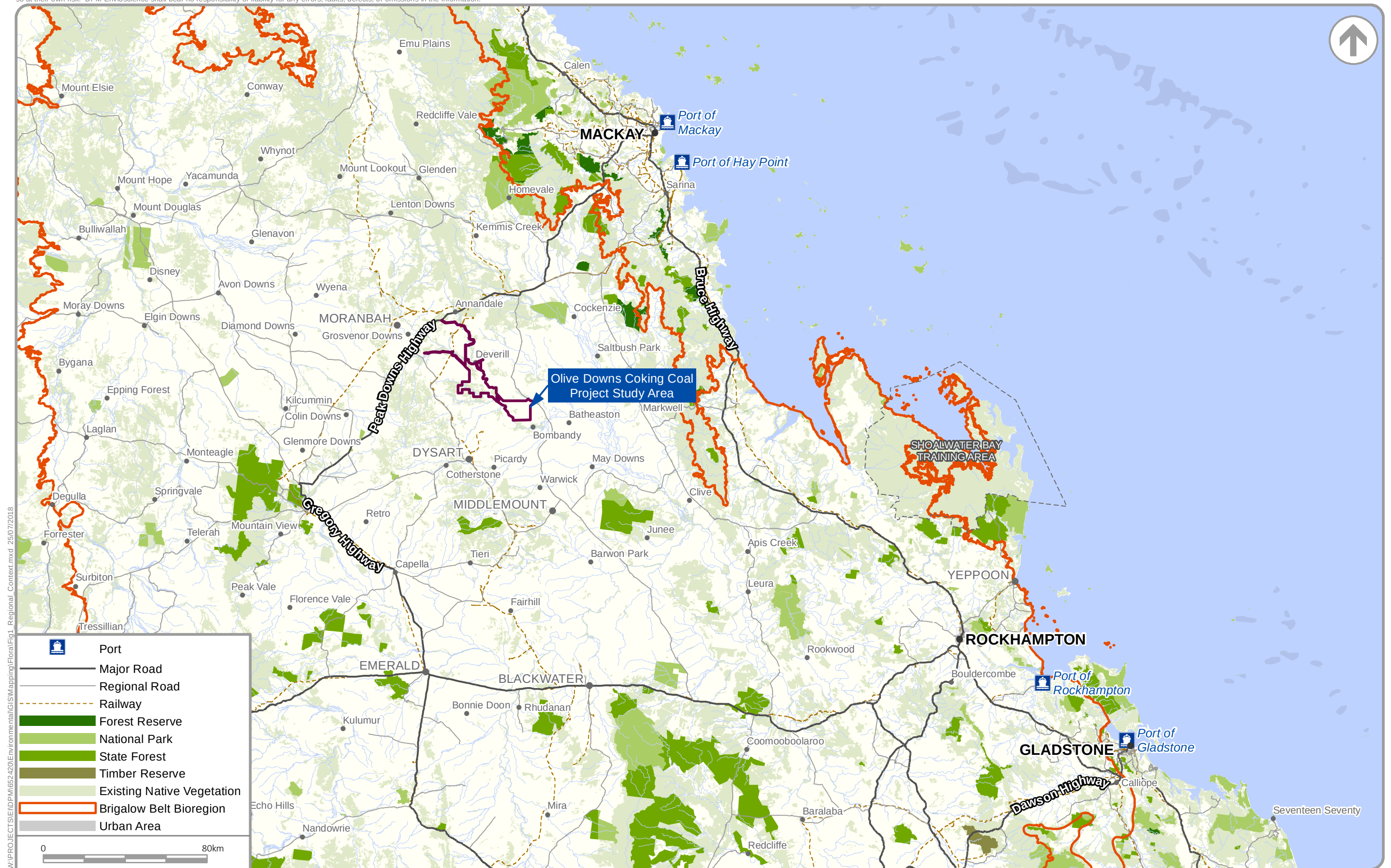
2.1 Study area

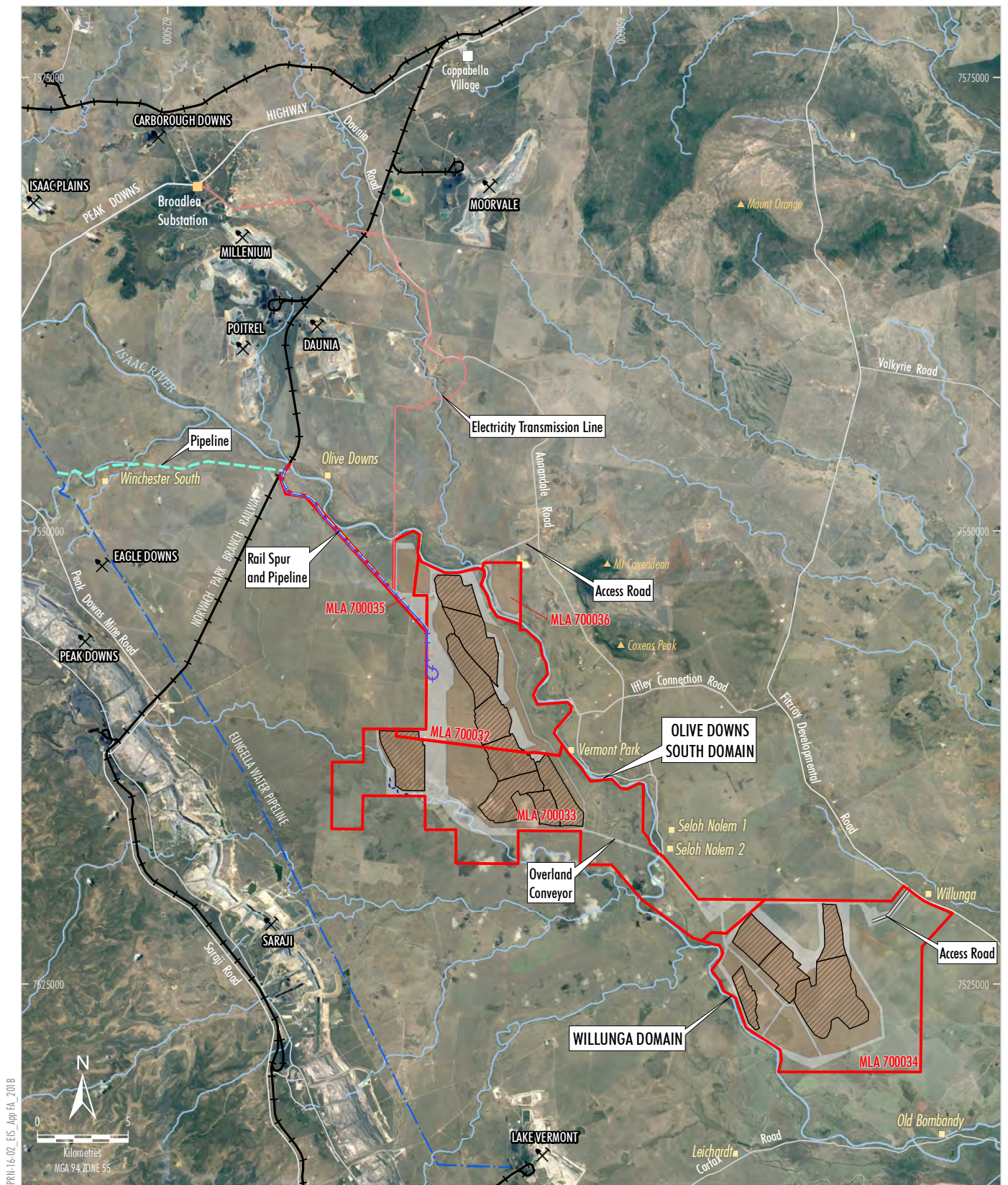
The Study area covers all components of the proposed Project, including (Figure 4):

- Olive Downs Project Mine Site and Access Road (EPBC 2017/7867);
- Olive Downs Project Water Pipeline (EPBC 2017/7868);
- Olive Downs Project Electricity Transmission Line (EPBC 2017/7869); and
- Olive Downs Project Rail Spur (EPBC 2017/7870).

The overall Study area for the Project covers approximately 27,000 ha of land including the full extent of the Project MDLs, MLAs and SPMLAs. The Study area extends between 75 and 175 m either side of the proposed infrastructure corridors.

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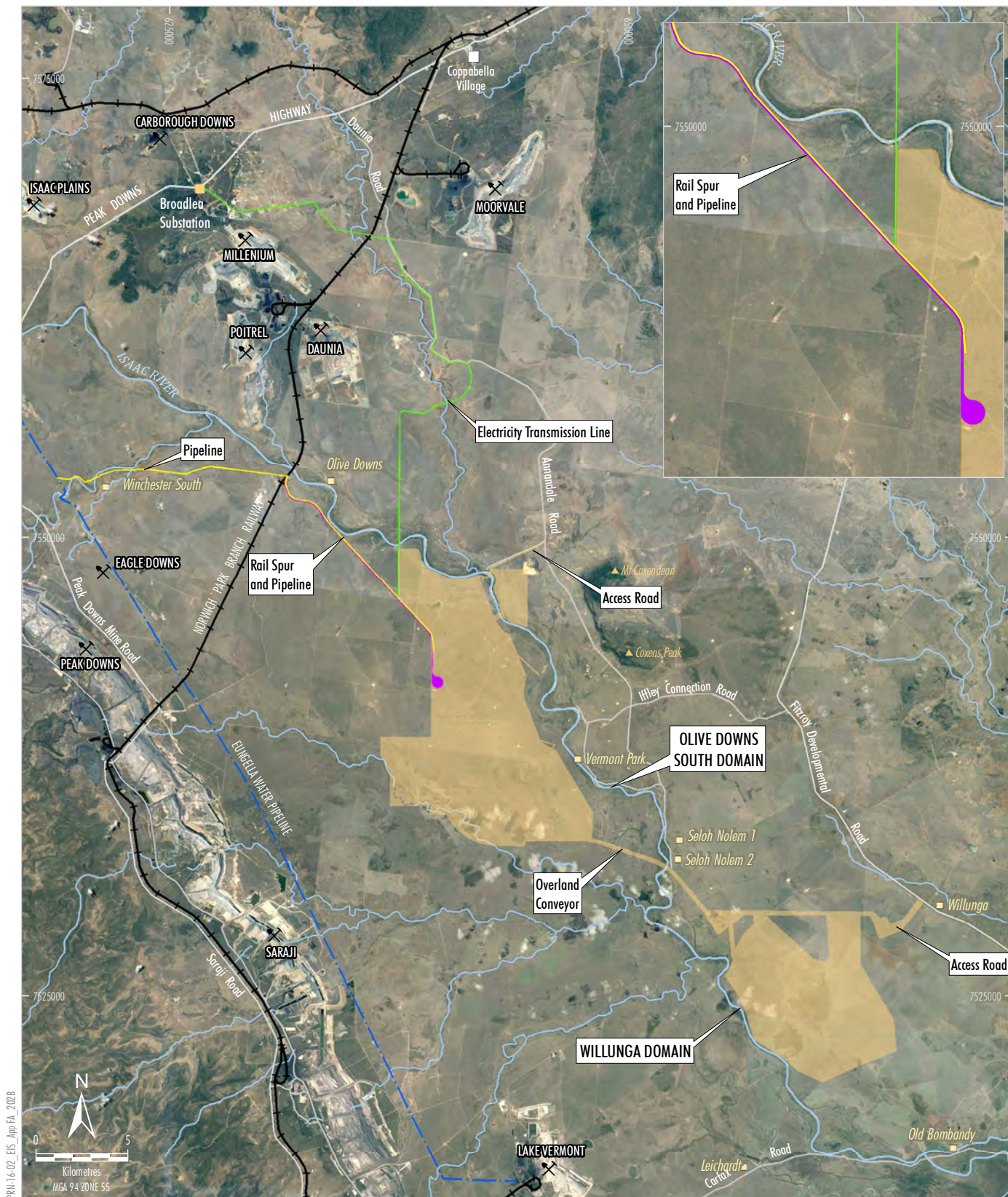


Source: Geoscience Australia - Topographical Data 250K (2006)
 Department of Natural Resources and Mines (2016)
 Orthophotography: Google Image (2016)



OLIVE DOWNS COKING COAL PROJECT
Project General Arrangement

Figure 2



PRH-16-02_EIS_Apr FA_2028

LEGEND

- Approved/Operating Coal Mine
- Eungella Pipeline Network
- Railway
- Dwelling
- Proposed Creek Diversion
- Olive Downs Project Mine Site and Access Road (EPBC 2017/7867)
- Olive Downs Project Water Pipeline (EPBC 2017/7868)
- Olive Downs Project Rail Spur (EPBC 2017/7870)
- Olive Downs Project Electricity Transmission Line (EPBC 2017/7869)

Source: Pembroke (2018); Department of Natural Resources and Mines (2018); Orthophotography; Google Image (2016)



OLIVE DOWNS COKING COAL PROJECT
EPBC Act Assessment Areas

Figure 3



3 EXISTING ENVIRONMENT

3.1 Regional setting

The Study area is located centrally within the Isaac Regional Council Local Government Area (Isaac LGA). It is approximately 30 km south-east of Moranbah and within the Brigalow Belt Bioregion. The Project spans across two biodiversity sub-regions, with the northern extents (including the ETL, rail spur and water pipeline) falling within the Northern Bowen Basin subregion and the mine site in the Isaac – Comet Downs subregion. The context of the Study area on a regional scale is shown in Figure 1.

3.2 Climate

The climate of the Study area is sub-tropical with October through to February typically the warmer months, with mean maximum daily temperatures around mid-30°C (**Figure 5**). The mean maximum daily temperature at the Moranbah monitoring station was 33.8 degrees Celsius (°C), recorded during the summer season. The mean minimum daily temperature at the monitoring station is 9.9°C, recorded during winter.

The annual average rainfall is 614 millimetres (mm), with the wettest period occurring during the warmer months from December to February when, on average, 50% of the annual rainfall occurs (Figure 6).

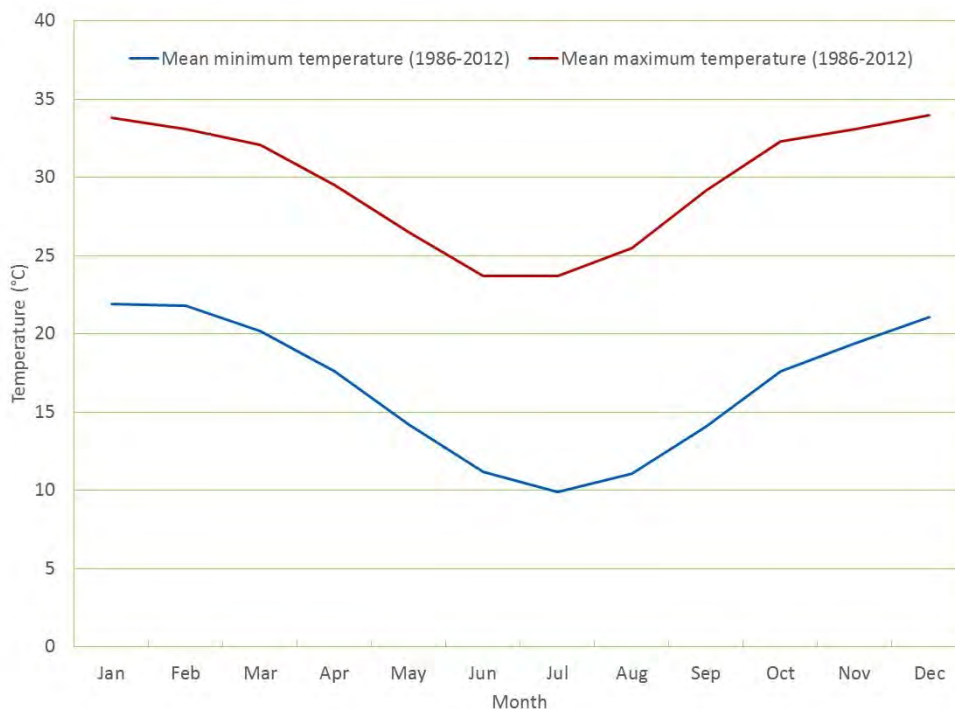


Figure 5 Temperature statistics for Moranbah Water Treatment Plant (BoM station 034038) (BOM 2018)

The annual average rainfall is 614 millimetres (mm), with the wettest period occurring during the warmer months from December to February when, on average, 50% of the annual rainfall occurs (Figure 6).



Figure 6 Rainfall statistics for Moranbah Water Treatment Plant (BoM station 034038)

On the north-eastern boundary of the Study area, the Deverill rainfall and stream gauging station 130410A (DNRM 2017a) has measured similar patterns in rainfall. That is: November through to March are typically wetter months of the year (Figure 7), with rainfall across the Study area expected to be greatest in mid-summer, and lowest in mid-winter, as inferred from 21 years of data. More recent data (July 2016 to November 2017) has indicated higher than average rainfall, particularly over winter and spring 2016, and significant falls associated with Cyclone Debbie in March 2017 (DNRM 2017a).

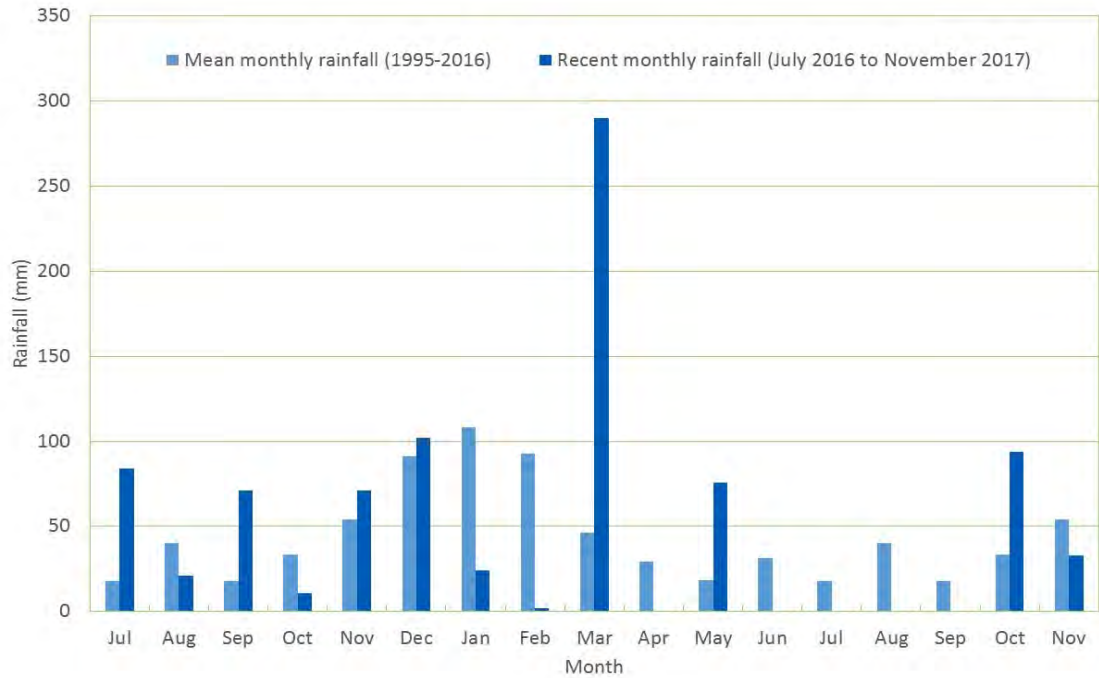


Figure 7 Historical and recent rainfall at Deverill (DNR station 130410A)

3.3 Topography

The surrounding land is gently undulating to flat and low-lying (i.e. 200 m AHD or less). The overall elevation of the Project area ranges from 150 m AHD in the low-lying south-east of the Willunga domain to 200 m AHD in the higher areas to the west and north-west of the Project area. Immediately adjacent to the east of the Study area is a small isolated hill known as Mt Coxendean (470m AHD), Coxen's Peak (415 m AHD) and Iffley Mount (310 m).

3.4 Hydrology

The Study area is located within the headwaters of the Isaac River catchment of the greater Fitzroy Basin (Hatch 2018). The Isaac River is the main watercourse which bisects the Study area and flows in a north-west to south-east direction, passing the township of Moranbah. The existing Isaac Plains, Millennium, Poitrel and Daunia mines are immediately upstream of the Study area. The Isaac River flows to the north-east of the Olive Downs South domain and then further downstream to the south of the Willunga domain before continuing in a south-easterly direction.

The Connors River flows into the Isaac River approximately 85 km downstream of the Study area (Hatch 2018), with the Isaac River finally converging with the Mackenzie River a further approximate 50 km downstream (Figure 1). Ultimately, the Mackenzie River joins the Fitzroy River, which flows initially north and then east towards the east coast of Queensland and discharges into the Coral Sea southeast of Rockhampton near Port Alma (Hatch 2018).

At a regional scale, the greater Isaac-Connors sub-catchment area (at the confluence with the Mackenzie River) is approximately 22,364 square kilometres (km²) of the total Fitzroy River catchment of 142,665 km², or if represented as a percentage, it accounts for 15% of the overall Fitzroy River catchment area (Hatch 2018).

DNR has confirmed (via a letter dated 5 February 2018) that the only tributaries of the Isaac River in the vicinity of the Study area which have been determined to meet the definition of a 'watercourse' under the *Water Act 2000* comprise (from upstream to downstream) (Figure 2):

- North Creek;
- Ripstone Creek;
- Boomerang Creek (including One Mile Creek); and
- Phillips Creek.

3.5 Land Zones and soils

The following land zones occur in the Study area:

- Land Zone 3 – Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes. Excludes colluvial deposits such as talus slopes and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols; also with Dermosols, Kurosols, Chromosols, Kandosols, Tenosols, Rudosols and Hydrosols; and Organosols in high rainfall areas.
- Land Zone 4 – Tertiary-early Quaternary clay deposits, usually forming level to gently undulating plains not related to recent Quaternary alluvial systems. Excludes clay plains formed in-situ on bedrock. Mainly Vertosols with gilgai microrelief, but includes thin sandy or loamy surfaced Sodosols and Chromosols with the same paleo-clay subsoil deposits.
- Land Zone 5 – Tertiary-early Quaternary extensive, uniform near level or gently undulating plains with sandy or loamy soils. Includes dissected remnants of these surfaces. Also includes plains with sandy or loamy soils of uncertain origin, and plateau remnants with moderate to deep soils usually overlying duricrust. Excludes recent Quaternary alluvial systems (Land Zone 3), exposed duricrust (Land Zone 7), and soils derived from underlying bedrock (Land Zones 8 to 12). Soils are usually Tenosols and Kandosols, also minor deep sandy surfaced Sodosols and Chromosols. There may be a duricrust at depth.
- Land Zone 9 (present in areas with higher relief) – Fine grained sedimentary rocks, generally with little or no deformation and usually forming undulating landscapes. Siltstones, mudstones, shales, calcareous sediments, and labile sandstones are typical rock types, although minor interbedded volcanics may occur. Includes a diverse range of fine textured soils of moderate to high fertility, predominantly Vertosols, Sodosols, and Chromosols.

3.6 Land use

The Study area is located within the Bowen Basin where open cut coal mining is a key land use, and a number of existing and approved coal mines, including Moorvale, Daunia, Poitrel, Millennium, Eagle Downs, Peak Downs, Saraji, Lake Vermont surround the Study area. Coal and petroleum (e.g. coal seam gas) mining exploration activities have been conducted within the Study area and surrounds for decades, and continues.

Land within the Study area is used predominately for cattle grazing, with small areas showing some evidence of opportunistic cropping. The land has been largely cleared through past agricultural practices; however some tracts of remnant vegetation exist, particularly along the riparian corridor of the Isaac River.

The properties associated with the Study area are owned by Pembroke (i.e. Iffley and Deverill), other mining companies (i.e. Wynette) and private landholders (i.e. Vermont Park, Willunga, Seloh Nolem, Old Bombandy and Winchester South). Surrounding land to the west of the Study area is owned predominantly by other mining companies. The Study area is overlapping with existing petroleum tenements in the region, including for the approved Bowen Gas Project.

4 METHODS

4.1 Taxonomic nomenclature

Scientific names of flora used in this report follow the Australian Plant Census (Council of Heads of Australasian Herbaria 2017).

4.2 Determination of significance level

The significance of TECs is described as per their listing in the EPBC Act as Critically Endangered (CE), Endangered (E) or Vulnerable (V). REs are classified according to their Biodiversity Status as Endangered (E); Of Concern (OC); or No Concern at Present (NC), except in the application of the *Environmental Offsets Act 2014* that requires reference to status under the *Vegetation Management Act 1999*.

EVNT flora species are defined as those taxa listed in the EPBC Act or NC Act as Critically Endangered (CE), Endangered (E), Vulnerable (V) or Near Threatened (NT). Priority species are those listed as such in the Fitzroy NRM Region Back on Track Actions for Biodiversity (DERM 2010). All other native flora species are designated as being Special Least Concern (SLC) or Least Concern (LC) under the NC Act.

4.3 EVNT species likelihood of occurrence

EVNT species identified from the desktop assessment (and subsequent field surveys) were assigned a likelihood of occurrence based on the criteria identified in Table 2. Targeted searches were undertaken in the field for species identified as either being likely to occur, or having potential to occur within the Study area, based on the desktop sources. The methodology was applied again after surveys to determine the likelihood of occurrence once site-based information became available.

Table 2 Criteria adopted for the likelihood of Endangered, Vulnerable or Near Threatened species identified from the desktop searches occurring within the Study area

Likelihood of occurrence	Criteria
Unlikely	- species or species habitat may occur, is likely to occur or is known to occur from the broader search area (based on database searches); but - preferred habitat has not been identified within the Study area; and - there are no confirmed species records within 10 km of the Study area. - preferred habitat occurs within the Study area, but there are no confirmed species records within 50 km of the Study area.
Potential	- species or species habitat may occur, is likely to occur or is known to occur from the broader search area (based on database searches); and - preferred habitat occurs within the Study area; and - there are no confirmed species records within 10 km of the Study area; however, there are confirmed species records within 50 km of the Study area; OR - species indicated as likely during desktop assessment, but field surveys revealed no evidence of occurrence in the Study area.
Likely	- preferred habitat occurs within the Study area; and - confirmed species records within 10 km of the Study area; however

Likelihood of occurrence	Criteria
Known	- species not yet confirmed as occurring within the Study area. - confirmed species records within the Study area (generally as a result of subsequent field survey).

4.4 Desktop assessment

Desktop searches were undertaken in September 2016, May 2017 and December 2017 (to cater for any new listings and the inclusion of the infrastructure corridors in the Study area) and included a review of the following:

- DEE EPBC Act Protected Matters Search Tool, to identify MNES relevant to flora within a search area extending at least 10 km from the Study area (DEE 2018b).
- The Queensland Department of Environment and Science (DES) Wildlife Online search results for EVNT and SLC species records within a search area extending at least 50 km from the Study area (DES 2018a).
- Queensland Herbarium records search for EVNT and SLC species records within the Australian Virtual Herbarium (AVH 2018).
- Department of Environment and Heritage Protection (DEHP) mapping of Matters of State Environmental Significance Version 4.1 (DEHP 2014a), to identify known MSES relevant to flora within the Study area.
- Remnant RE mapping (Version 10.0) for the Study area to identify vegetation communities that are likely to occur (DSITI 2017a).
- Regulated Vegetation Management mapping (version 4.34) (which forms part of the MSES mapping) to identify areas of assessable and non-assessable vegetation (DNRM 2017b).
- NC Act Protected Plants Flora Survey Trigger Map spatial (Version 6.13) to identify any HRAs where EVNT flora are present or are likely to be present (DES 2018b).
- Biodiversity Planning Assessment mapping (including mapped ecological corridors) for Brigalow Belt (DEHP 2008).
- The Fitzroy Natural Resource Management Region Back on Track Actions for Biodiversity (DERM 2010).
- Previous studies from Red Hill Mine (approximately 50 km north-west) (URS 2013), Lake Vermont (12 km east) (AARC 2016a and 2016b), Eagle Downs Mine (approximately 15 km east) and Saraji Mine (approximately 6 km east) (SKM 2011a and 2011b).

4.5 Field survey

The field surveys were undertaken in accordance with the following relevant survey guidelines:

- Queensland *Flora Survey Guidelines – Protected Plants* (DEHP 2016); and
- Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al. 2017).

4.5.1 Survey timing

A spring flora survey was conducted from 22-30 November 2016 within the MLA and again from 26-30 September and 14-20 November 2017 within the infrastructure corridors. A follow-up autumn flora survey was conducted from 7-9 March 2017 and from 30 May to 10 June 2017.

Seasonal surveys were undertaken to maximise detection of EVNT flora species that may occur in the Study area, based on the desktop assessment. Survey timing was appropriate for detection of the species being targeted. The rationale for survey timing was to conduct surveys at a time when the majority of targeted species would have reproductive material (to aid in identification), as summarised in Table 3. This is considered more important for the less conspicuous species such as *Aristida annua*, and less important for more obvious species such as black ironbox (*Eucalyptus raveretiana*).

Table 3 Endangered, Vulnerable or Near Threatened flora species considered likely or with potential to occur in the Study area, and the optimal time of year to survey

Scientific name	Common name	Status		Seasonality
		EPBC Act ¹	NC Act ²	
<i>Acacia spania</i>	-		NT	Considered unlikely in Study area due to habitat requirements (Table 7).
<i>Acacia storyi</i>	Story's wattle	-	NT	Flowering specimens have been collected in April to September and maturing pods in August to December (Queensland Herbarium 2011, cited in DES 2018c).
<i>Aristida annua</i>	-	V	V	Flowers and fruits in March, and May-June (Simon 2005; and Queensland Herbarium 2012, cited in DES 2018d).
<i>Bertya pedicellata</i>	-		NT	Flowers have been recorded from March to November, fruits from August to November (Halford and Henderson 2002; Queensland Herbarium 2012, cited in DES 2018e).
<i>Capparis humistrata</i>	-		E	Flowers have been recorded for March, May and December, and fruits have been recorded in November and December (Hewson and George 1982; Queensland Herbarium 2008, cited in DES 2018f).
<i>Cerbera dumicola</i>	-		NT	Flowering has been recorded in October (Queensland Herbarium 2011 cited in DES 2018g).
<i>Cycas ophiolitica</i>	Marlborough blue	E	E	Considered unlikely in Study area due to habitat requirements (Table 7).
<i>Dichanthium queenslandicum</i>	King blue-grass	E	V	Flowers have been recorded throughout the year, particularly from March (Queensland

Scientific name	Common name	Status		Seasonality
		EPBC Act ¹	NC Act ²	
				Herbarium 2012, cited in DES 2018h).
<i>Dichanthium setosum</i>	Bluegrass	V		A warm season perennial, the species commences growing in spring, flowers in summers and becomes dormant in late autumn (DEE 2018a).
<i>Digitaria porrecta</i>	Finger panic		NT	Seeds from March to April (DES 2018i), when it is presumably detectable.
<i>Eucalyptus raveretiana</i>	Black ironbox	V	LC	Has been recorded in flower from December to March (Halford 1997, cited in DES 2018j). Identifiable from leaves and fallen fruit, so survey timing not critical.
<i>Macropteranthes leiocaulis</i>	-		NT	Recorded flowering from December to January, and fruiting from January to February (DES 2018k; Calvert, Lokkers and Cumming 2005). Identifiable from bark and leaves, so survey timing not critical.
<i>Samadera bidwillii</i>	Quassia	V	V	Considered unlikely in Study area due to habitat requirements (Table 7).
<i>Solanum adenophorum</i>	-		E	Flowers late spring to autumn (National Herbarium of NSW 2016; and DES 2018l).
<i>Solanum elachophyllum</i>	-		E	Flowers have been recorded in February, March, July and September, and fruits in March-May, July and September-October (Bean 2004; and Queensland Herbarium 2012, cited in DES 2018m).

Notes:

¹ Conservation status under the EPBC Act. E = Endangered, V = Vulnerable.

² Conservation status under the NC Act. E = Endangered, V = Vulnerable, NT = Near Threatened, LC = Least Concern.

Rainfall data has been derived from DNRM rainfall and stream gauging station 130410A on the Isaac River at Deverill (BoM 2018). In the lead-up to the Spring flora survey of the MLA 22-30 November 2016, above average and unseasonal falls of rain were received in July and September, with below average rainfall in August and October 2016 (Figure 7). Above average rainfall was then recorded in November 2016. Although somewhat variable, climatic conditions in

the lead-up to the spring flora survey in late November 2016 were suitable for surveying a diversity of flora species.

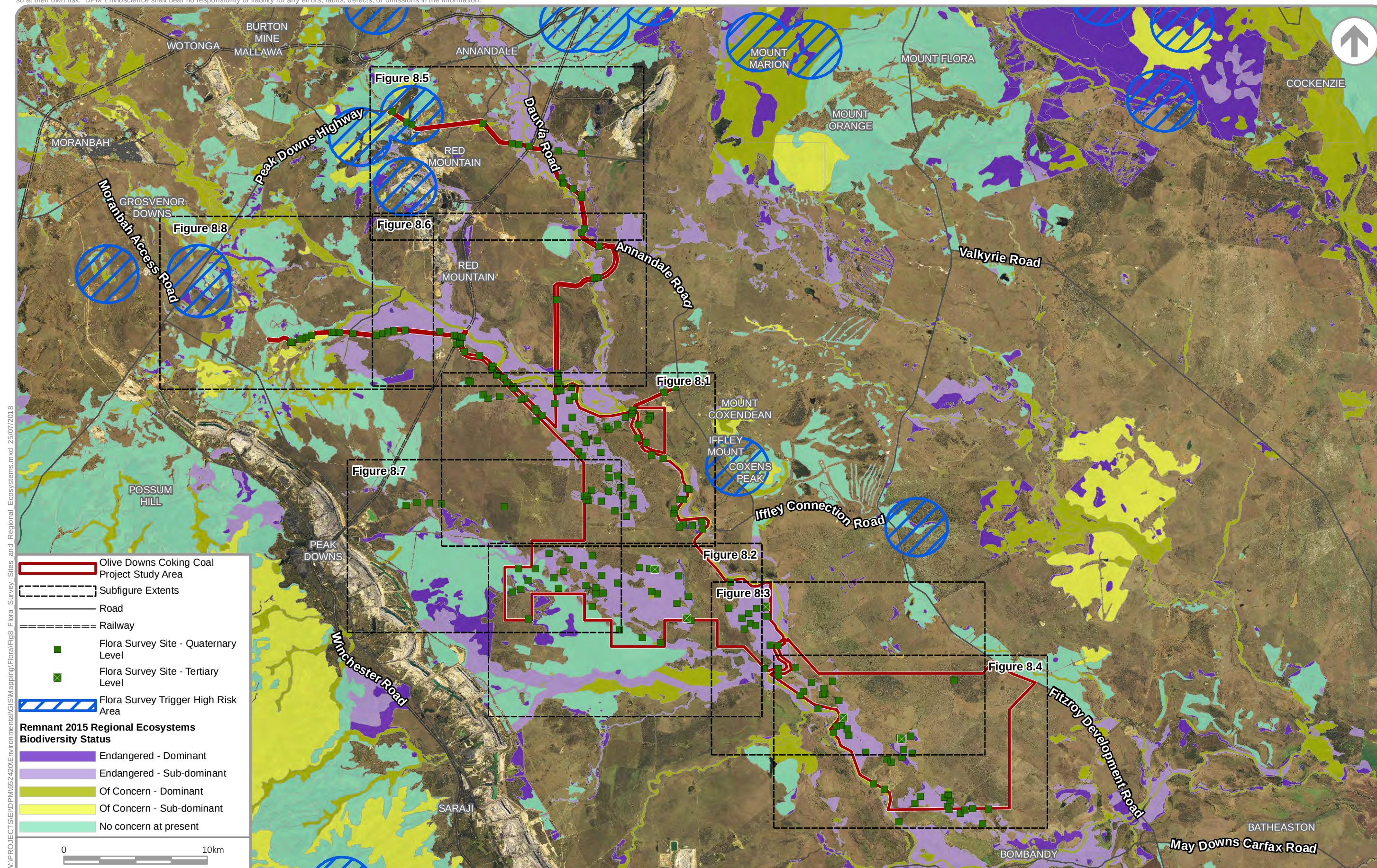
Conditions at the time of the autumn 2017 surveys of the MLA and infrastructure corridors were highly variable. No rain was recorded during the autumn survey of the MLA from 7-9 March 2017, and below average rainfall was recorded in the two months preceding the survey (Figure 7). Similarly, no rainfall was recorded during the autumn survey of the infrastructure corridors from 30 May to 10 June 2017; however, surface water was prevalent across the Study area as a result of substantial rainfall and runoff associated with Cyclone Debbie in late March 2017. The Isaac River was in flow at the time of the March 2017 survey, although had reduced to scattered deep pools connected by shallow, trickling runs. Wetlands and numerous gilgais across the Study area remained full of water.

Conditions at the time of the spring 2017 surveys of the infrastructure corridors were variable. No rain was recorded during the surveys in 26-30 September 2017, and ground conditions were particularly dry as a result of below average rainfall over the preceding four months. Survey conditions had markedly improved for the surveys undertaken from 14-20 November 2017, with above average rainfall in October, and follow-up rainfall in early November.

Given the wide range in seasonality of the field surveys, it can be determined that there were no limitations to the surveys based on climatic variables.

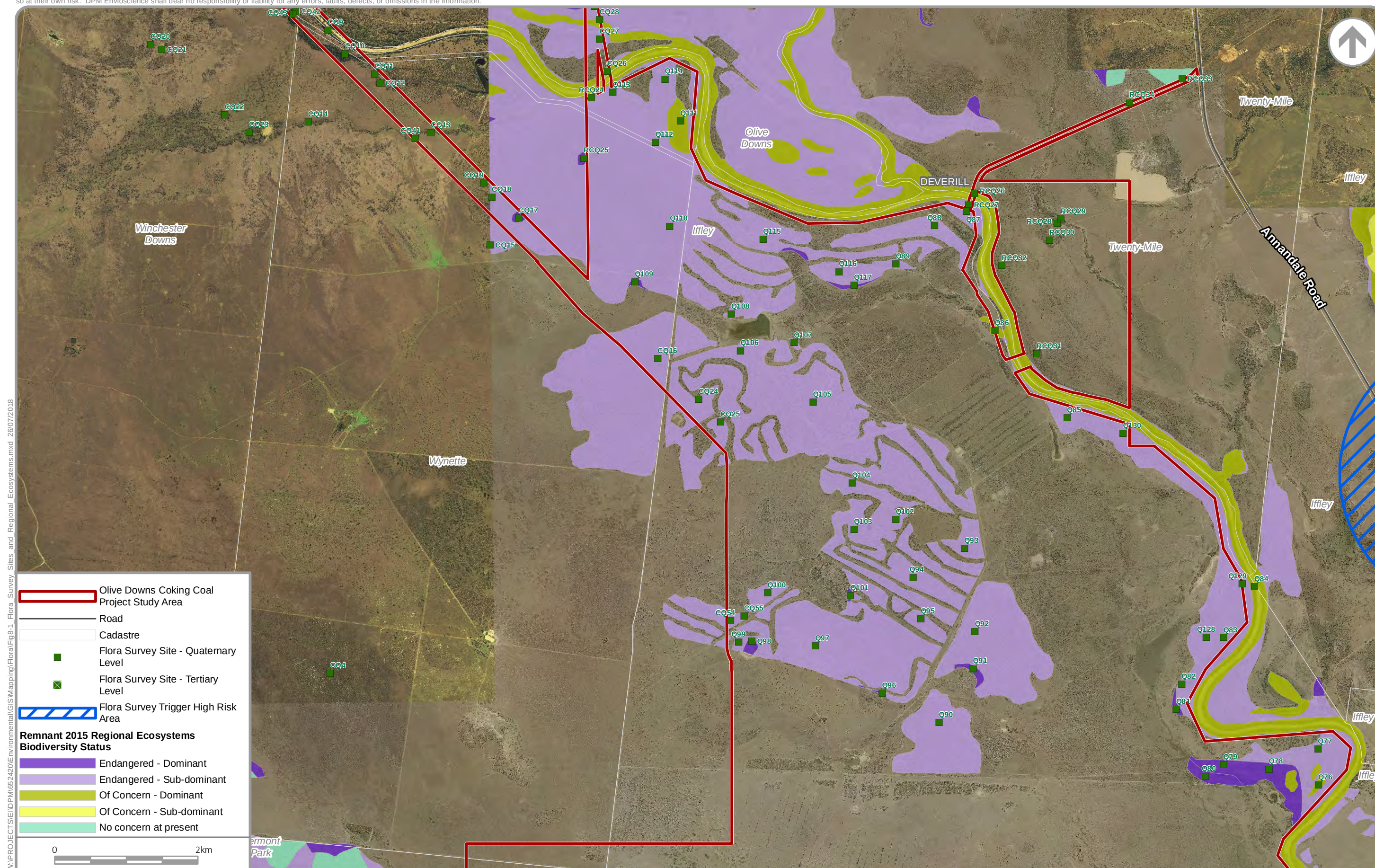
4.5.2 Survey locations

Aerial imagery and RE mapping (Version 10.0, DSITI 2017a) were used to identify 227 suitable sites for the assessment of vegetation communities. Site selection aimed to capture numerous representations of each mapped RE within the Study area, as well as adequate spatial separation of sites. The location of some survey sites was refined in the field to capture the most representative datasets. Four Tertiary level and 117 Quaternary level flora survey sites were assessed within the proposed MLA over the spring survey period 22-30 November 2016. In addition, another Tertiary level site and ten Quaternary level flora survey sites were assessed in the autumn survey period 7-9 March 2017. Another 40 Quaternary level flora survey sites were assessed along the proposed infrastructure corridors over the autumn survey period 30 May to 10 June 2017. During spring 2017 (26-30 September and 14-20 November 2017) another three Quaternary level flora survey sites were assessed in the MLA and 52 within the infrastructure corridors. Searches for EVNT flora species were undertaken in potential habitat at each of these sites, as well as whilst moving between sites either on foot or by all-terrain vehicle. The survey effort is depicted in Figure 8, and is further detailed in Sections 4.5.3 and 4.5.5.



FLORA SURVEY SITES AND STATE-MAPPED REGIONAL ECOSYSTEMS

Olive Downs Coking Coal Project – Terrestrial Flora Assessment



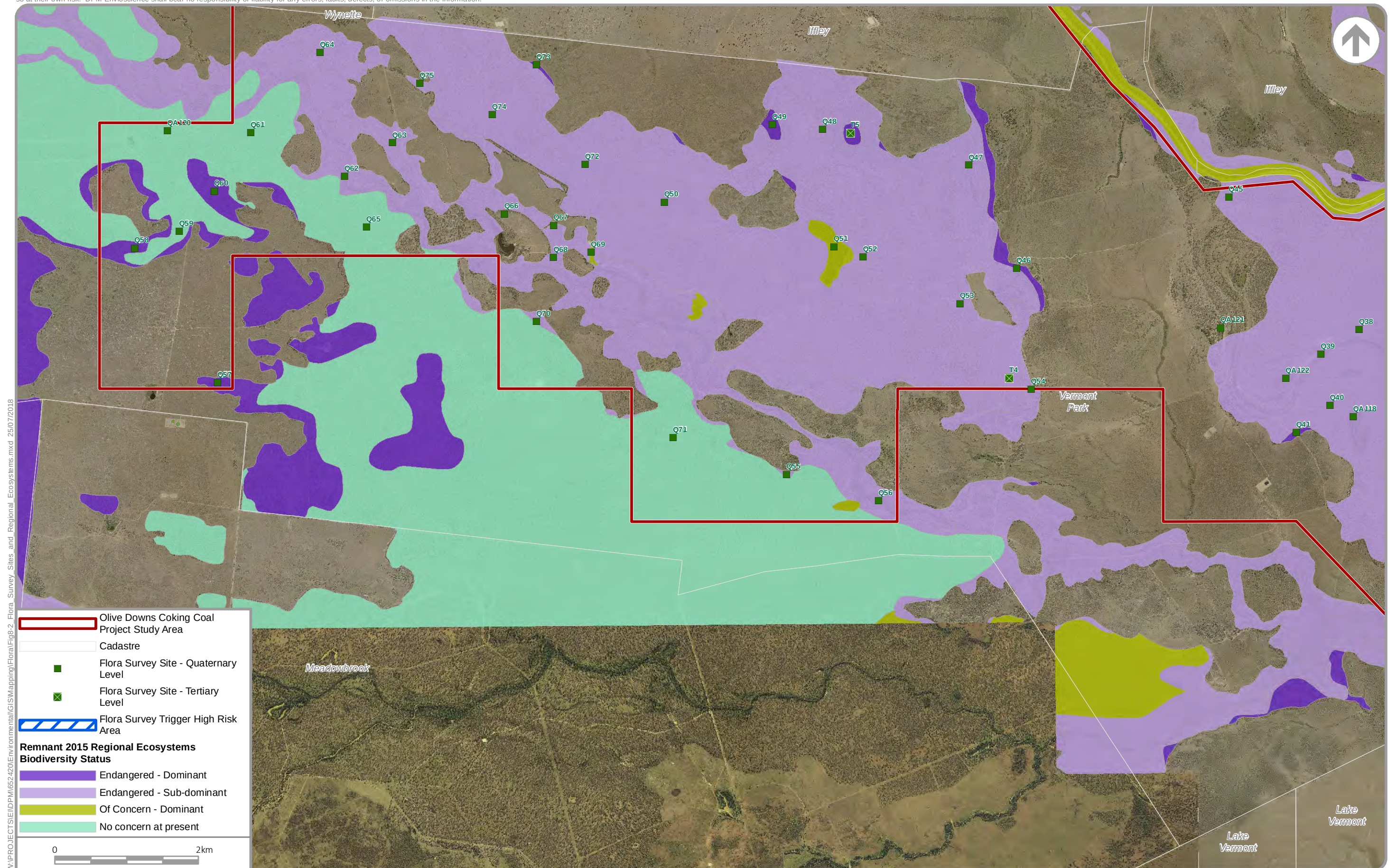
FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 1

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.1

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Aerial Imagery: Pembroke MDL - flown August 2017
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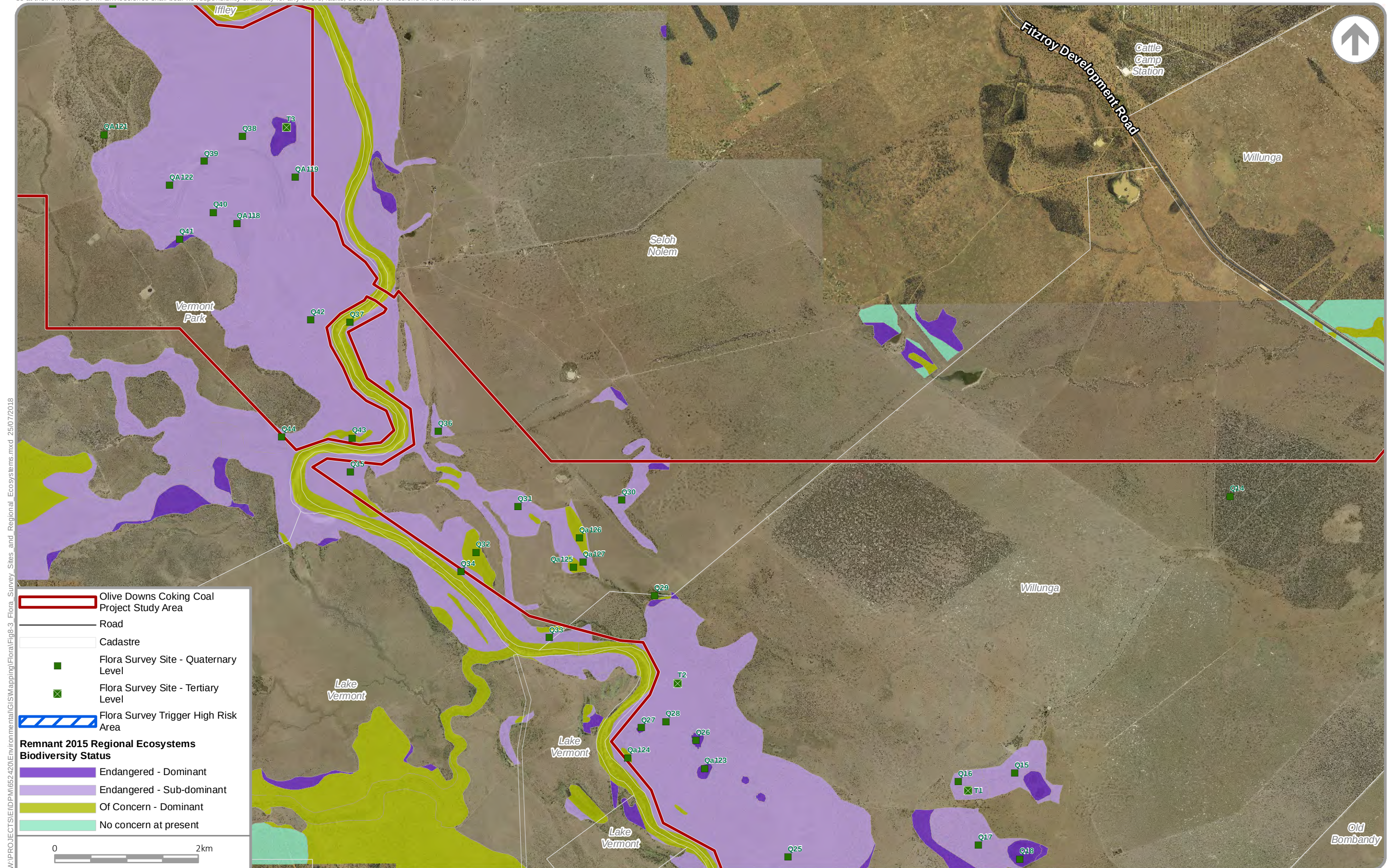
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FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 2

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

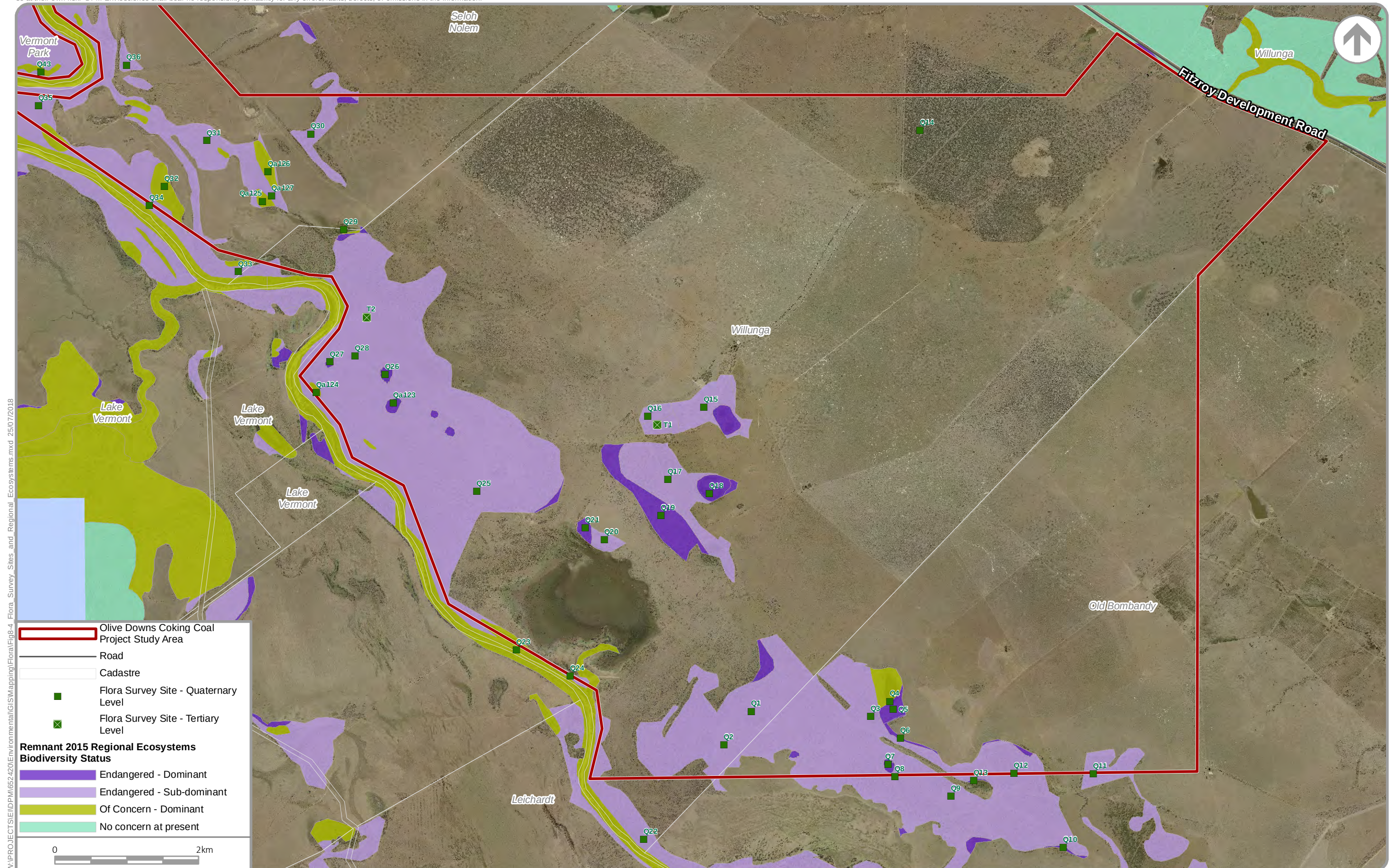
FIGURE 8.2



FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 3

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.3



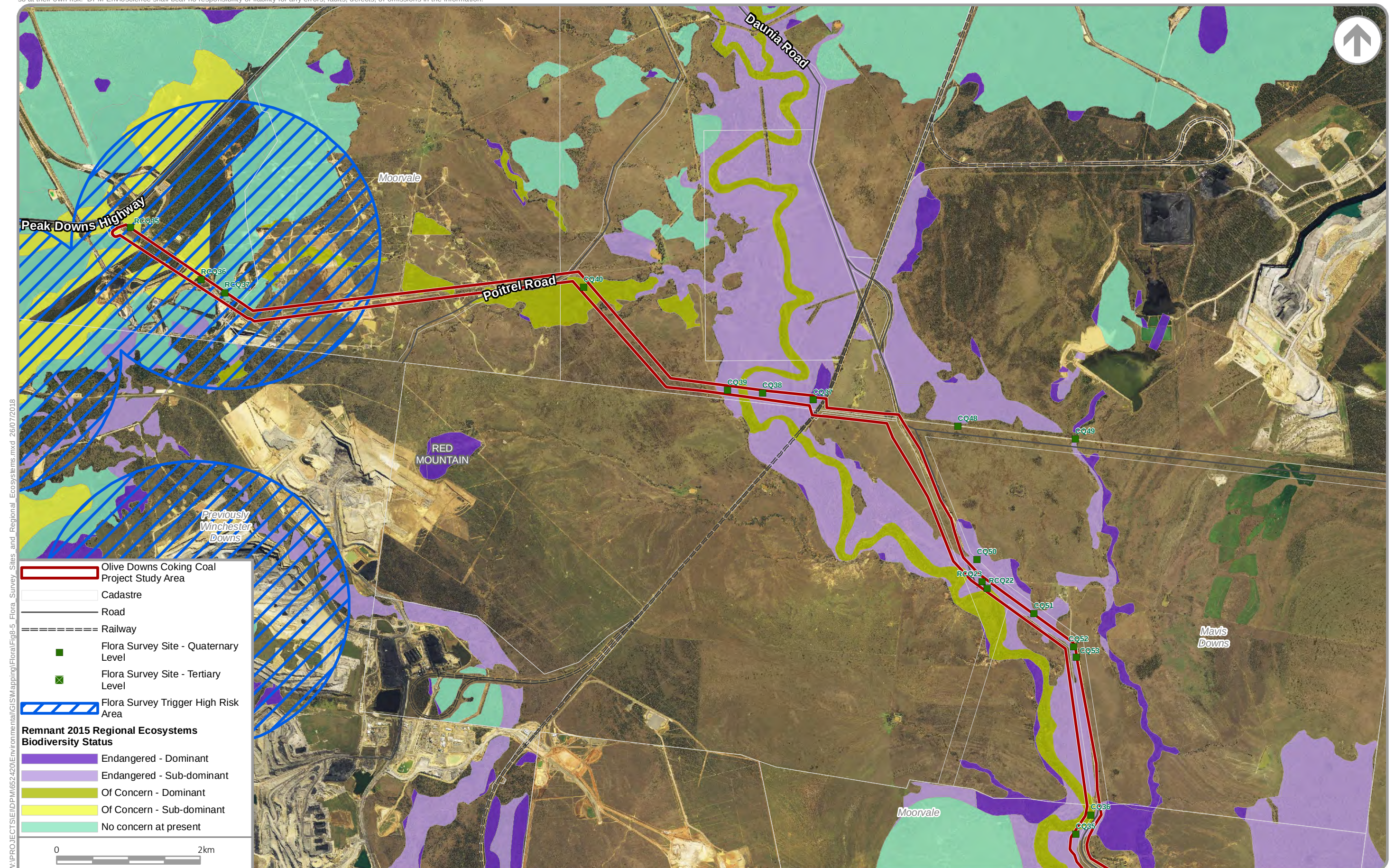
FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 4

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.4

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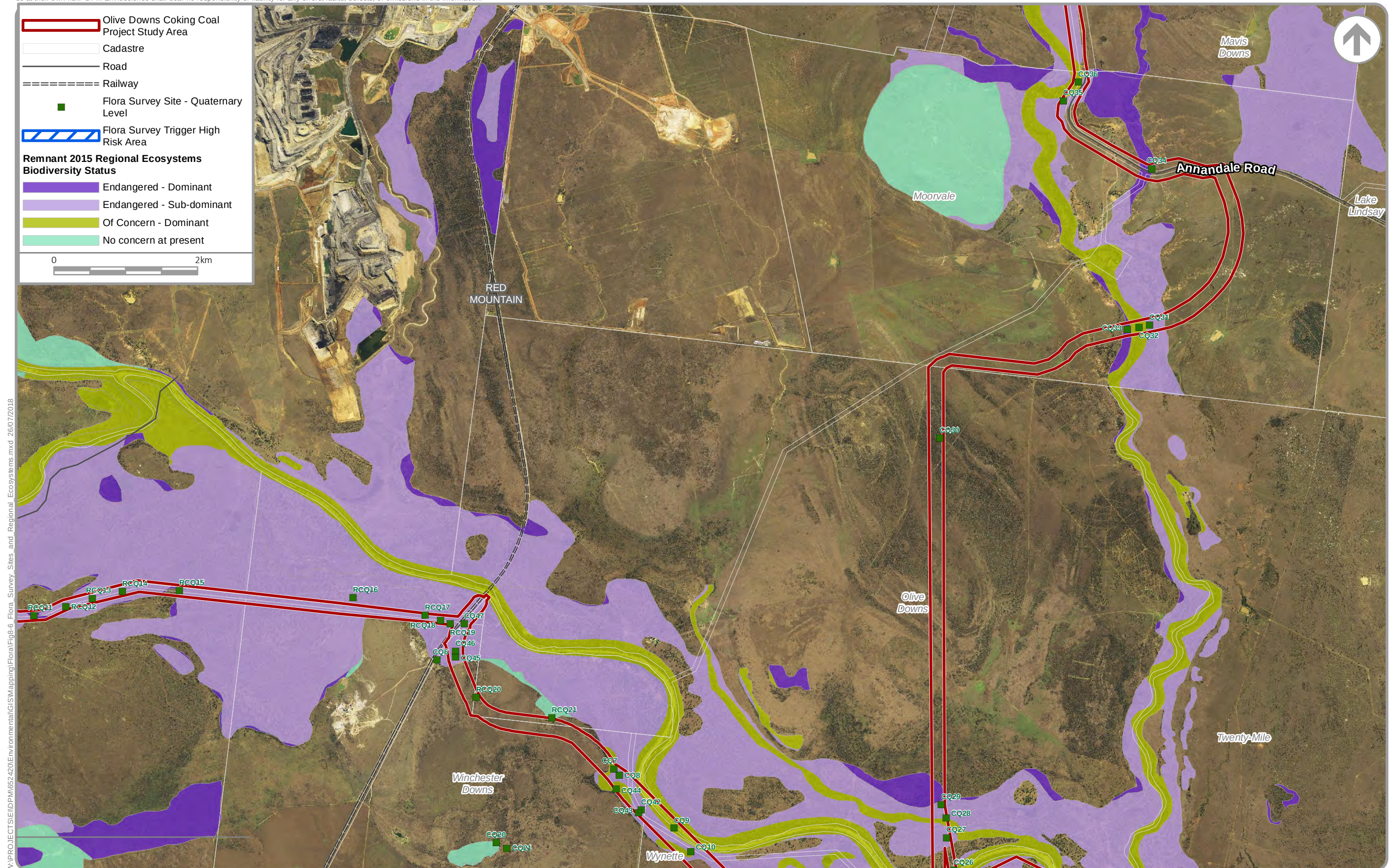
FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 5

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.5

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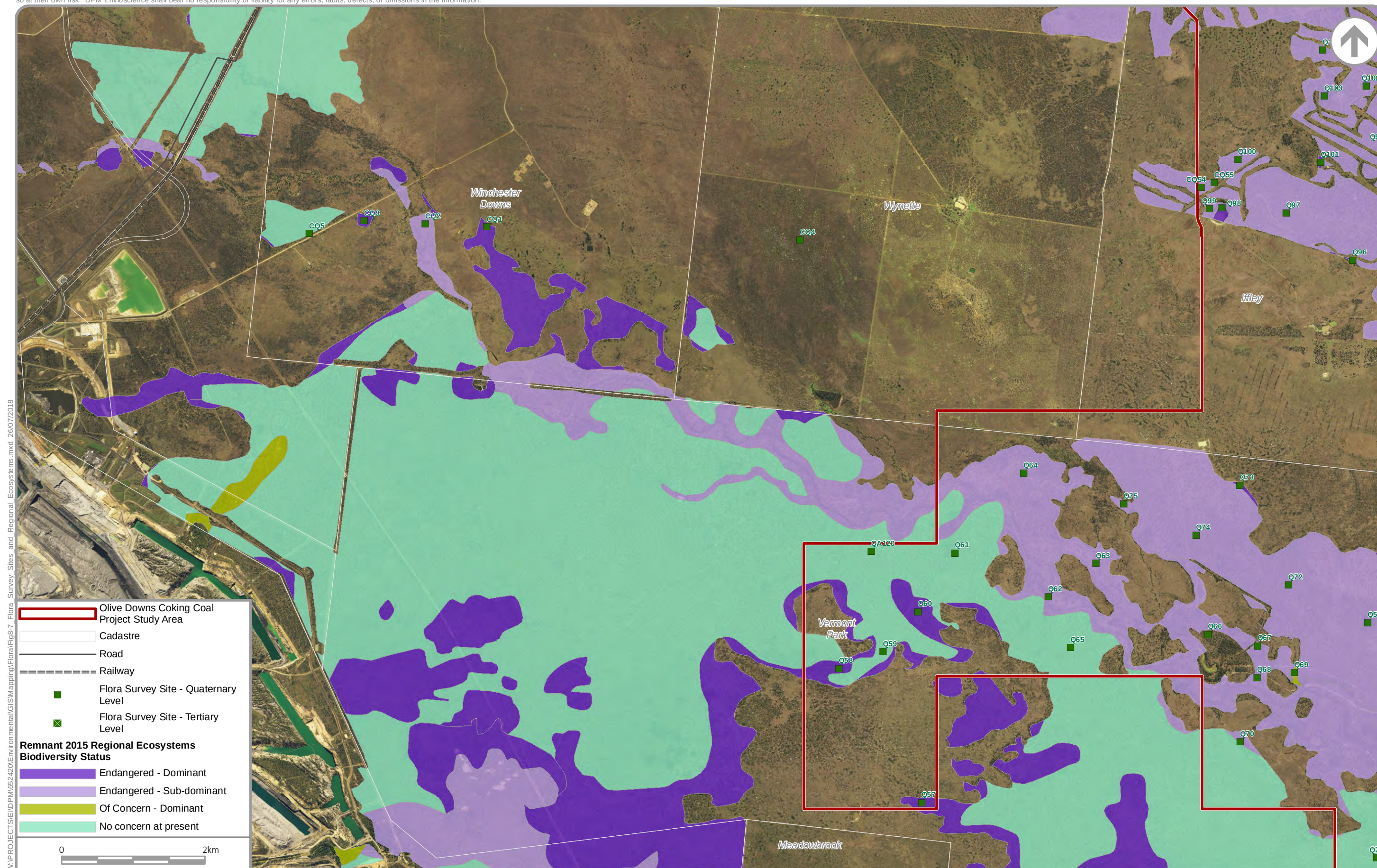
FLORA SURVEY SITES AND STATE -MAPPED REGIONAL ECOSYSTEMS – MAP 6

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.6

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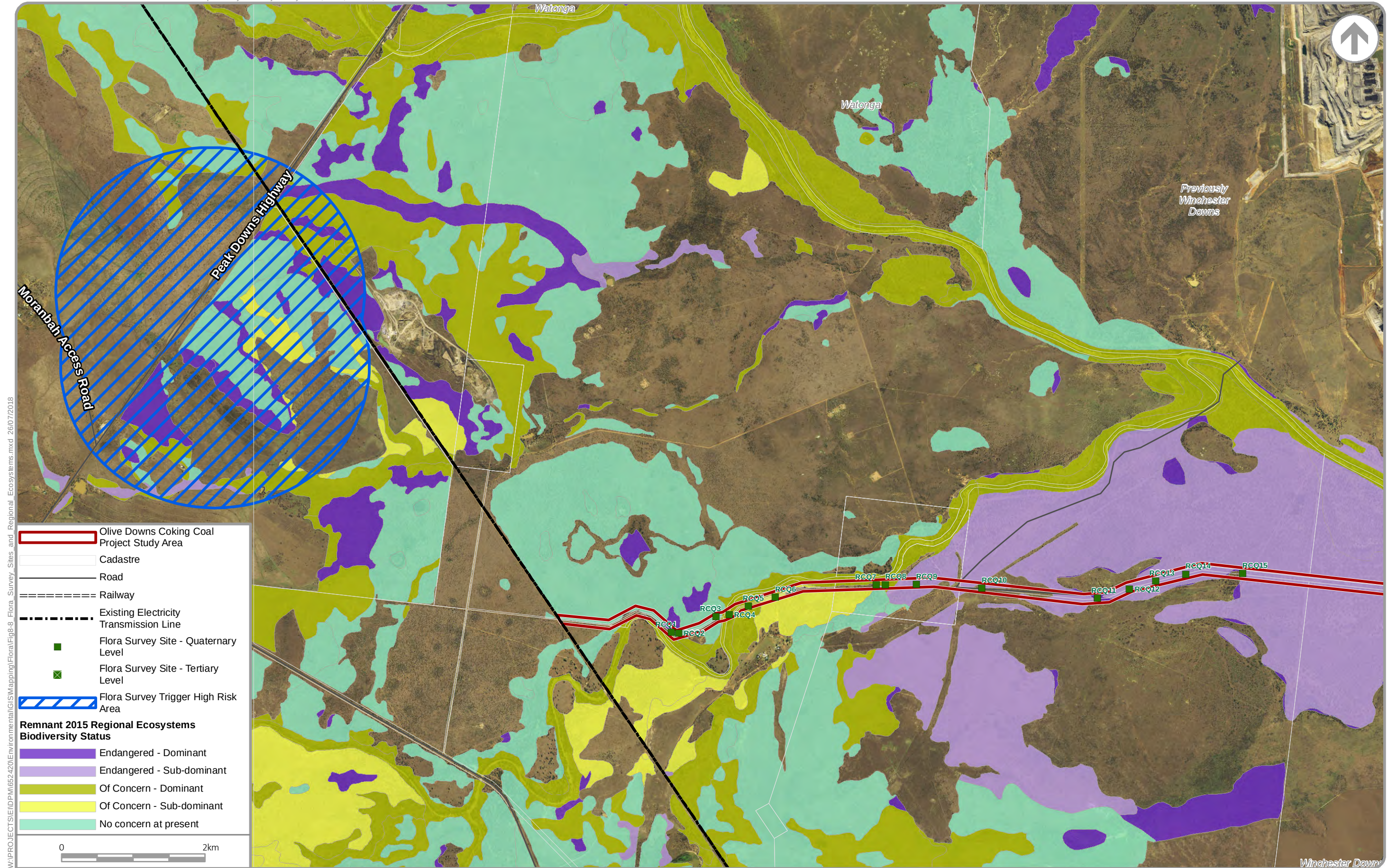
Aerial Imagery: Pembroke MDL - flown August 2017
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FLORA SURVEY SITES AND STATE-MAPPED REGIONAL ECOSYSTEMS – MAP 7

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.7



FLORA SURVEY SITES AND STATE-MAPPED REGIONAL ECOSYSTEMS – MAP 7

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 8.8

4.5.3 Vegetation sampling and mapping

Vegetation communities were assessed at a total of 227 sites, comprising five Tertiary level sites and 222 Quaternary level sites. This included 121 sites that were assessed during the first spring survey undertaken from 22-30 November 2017, comprising four Tertiary level sites and 117 Quaternary level sites. In the second round of spring surveys (26-30 September and 14-20 November) another 55 Quaternary level sites were assessed. In addition, another Tertiary level site and 10 Quaternary level flora survey sites were assessed in the autumn survey period 7-9 March 2017. Autumn surveys (30 May to 10 June 2017), representing seasonal surveys for the mine area and baseline for infrastructure corridors, added another 40 Quaternary sites. Survey site locations are identified in Figure 8. The assessments were undertaken in accordance with the Queensland Herbarium vegetation survey methods described in Neldner et al. (2017). Survey sites were undertaken within representative communities and as vegetation community types transitioned to aid vegetation mapping and interpretation.

Tertiary assessments were undertaken to record the more detailed floristic and structural information at a site and included:

- confirmation of the RE;
- structural characteristics of the vegetation (based on life forms, strata, height and cover);
- relative abundance of each species (dominant, abundant, frequent, occasional or rare)
- groundcover characteristics;
- vegetation condition (integrity as either pristine, excellent, very good, good, average, degraded or completely degraded);
- presence and abundance of WoNS and Restricted weeds;
- presence and population characteristics of EVNT flora;
- landscape characteristics;
- regolith characteristics, including erosion; and
- wetland characteristics (if present).

Quaternary level flora assessments were undertaken to confirm the identity of REs and assist in field-verifying the RE mapping boundaries. The following information was recorded at these sites:

- the dominant and characteristic canopy, midstorey and understorey species (relative abundance measured as dominant, abundant, frequent, occasional or rare);
- field-verified RE;
- vegetation condition (integrity as either pristine, excellent, very good, good, average, degraded or completely degraded);
- presence and population characteristics of EVNT flora;
- presence and abundance of WoNS and Restricted weeds; and
- other notes of relevance, such as community characteristics (size of community), site features (gullies) or evidence of disturbance.

RE boundaries were assessed using the State RE mapping (Version 10.0, DSITI 2017a), aerial imagery taken of the site in August 2017, the latest available aerial imagery for the Bowen Basin (DNRME 2012) and field assessment results. Vegetation boundaries were mapped at an approximate 1:10,000 scale where possible.

4.5.4 Threatened Ecological Communities mapping

The desktop review identified four TECs with potential to occur in the Study area. Where the field surveys identified vegetation communities containing constituent species of a TEC, the condition

thresholds described in the Commonwealth listing advice were referenced to determine whether the community meets the TEC status. The condition thresholds of relevant TECs are summarised as follows:

Brigalow (*Acacia harpophylla*) dominant and co-dominant – Endangered TEC (EPBC Act)

A patch must include each of the following key diagnostic characteristics to be considered the Brigalow TEC (DotE 2013a):

1. The presence of *Acacia harpophylla* as one of the most abundant tree species in the patch. *A. harpophylla* is either dominant in the tree layer, or co-dominant with other species (notably *Casuarina cristata*, other species of *Acacia*, or species of *Eucalyptus*).
2. In Queensland, the patch is in one of the following bioregions (including outliers) and it meets the description of one of 16 REs determined at the time of the national listing of the Brigalow TEC. The 12 Res relevant to the Study area, as described by the Queensland Herbarium (2016), comprise:
 - Brigalow Belt Bioregion REs:
 - 11.3.1 – *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains;
 - 11.4.3 – *Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains;
 - 11.4.7 – *Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on Cainozoic clay plains;
 - 11.4.8 – *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains;
 - 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains;
 - 11.4.10 – *Eucalyptus populnea* or *E. woollsiana*, *Acacia harpophylla*, *Casuarina cristata* open forest to woodland on margins of Cainozoic clay plains;
 - 11.5.16 – *Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains and remnant surfaces;
 - 11.9.1 – *Acacia harpophylla*-*Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks;
 - 11.9.5 – *Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks;
 - 11.9.6 – *Acacia melvillei* +/- *A. harpophylla* open forest on fine-grained sedimentary rocks;
 - 11.11.14 – *Acacia harpophylla* open forest on deformed and metamorphosed sediments and interbedded volcanics;
 - 11.12.21 – *Acacia harpophylla* open forest on igneous rocks. Colluvial lower slopes;

In addition, a patch must meet the following condition thresholds to be considered the Brigalow TEC:

3. The patch is 0.5 ha or more in size; and
4. Exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m), that is representative of the patch.

The Brigalow TEC also includes some vegetation considered to be ‘non-remnant’ within state classifications (e.g. regrowth vegetation not included in Qld RE mapping), in particularly brigalow regrowth more than 15 years old. However, areas of regrowth vegetation are not considered part of the EPBC Act listed Brigalow TEC if they are of poor quality (e.g. more than 50% perennial weeds) (DotE 2013a).

Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin – Endangered TEC (EPBC Act)

Within the specified Brigalow Belt subregions (including the Brigalow Belt North Isaac – Comet Downs subregion [BNN11] in which the Study area is located), the Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin TEC includes the following seven Queensland REs (TSSC 2009a):

- RE 11.3.21 – *Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains. Cracking clay soils;
- RE 11.4.4 – *Dichanthium* spp., *Astrebla* spp. grassland on Cainozoic clay plains;
- RE 11.4.11 – *Dichanthium sericeum* and *Astrebla* spp. grassland with patchy *Acacia harpophylla* or *Eucalyptus coolabah* on Cainozoic clay plains;
- RE 11.8.11 – *Dichanthium sericeum* grassland on Cainozoic igneous rocks;
- RE 11.9.3 – *Dichanthium* spp., *Astrebla* spp. grassland on fine-grained sedimentary rocks;
- RE 11.9.12 – *Dichanthium sericeum* grassland with clumps of *Acacia harpophylla* on fine-grained sedimentary rocks; and
- RE 11.11.17 – *Dichanthium sericeum* grassland on old sedimentary rocks with varying degrees of metamorphism and folding.

This TEC is characterised by (TSSC 2009a):

- tree canopy absent or sparse (less than 10% projective foliage cover) – if it can be demonstrated, beyond reasonable doubt, that the grassland was derived from cleared woodland then it is not part of the TEC; and
- the ground layer is typically dominated by perennial native grasses and contains at least three of the indicator native species listed below:
 - feather-top wiregrass (*Aristida latifolia*);
 - white speargrass (*Aristida leptopoda*);
 - hoop Mitchell grass (*Astrebla elymoides*);
 - curly Mitchell grass (*Astrebla lappacea*);
 - bull Mitchell grass (*Astrebla squarrosa*);
 - satin-top grass (*Bothriochloa erianthoides*);
 - King blue-grass (*Dichanthium queenslandicum*);
 - Queensland bluegrass (*Dichanthium sericeum*);
 - cup grass (*Eriochloa crebra*);
 - native millet (*Panicum decompositum*);
 - yabila grass (*Panicum queenslandicum*);
 - shot grass (*Paspalidium globoideum*); and
 - coolibah grass (*Thellungia advena*).

The condition thresholds for this TEC are identified in Table 4.

Table 4 Condition thresholds for the Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin Threatened Ecological Community (based on TSSC 2009a)

Attribute	TEC Condition	
	Best quality	Good quality
Patch size	≥ 1ha	≥ 5ha
Grasses	≥ 4 native perennial grass species from the list of perennial native grass indicator species	≥ 3 native perennial grass species from the list of perennial native grass indicator species
Tussock cover	≥ 200 native grass tussocks	≥ 200 native grass tussocks
Woody shrub cover	Total projected canopy cover of shrubs is < 30%	Total projected canopy cover of shrubs < 50%
Introduced species	Perennial non-woody introduced species are < 5% of the total projected perennial foliage cover.	Perennial non-woody introduced species are < 30% of the total projected perennial foliage cover.

¹The shrub layer is typically absent. However, where shrubs are present, they are defined as woody plants, more than 0.5 m tall that occupy the mid vegetation layer. The upper, or tree canopy layer, also is typically absent but may comprise scattered trees to less than 10% projective crown cover.

Sampling should be based upon a quadrat size of 0.1ha (e.g. 50 m x 20 m) selected in an area with the most apparent native perennial grass species. Unless exceptional circumstances apply, to maximise the assessment of condition, sites must be assessed during a good season, two months after cessation of disturbance (fire / grazing / mowing / slashing) and within two months of effective rain.

Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT) – Endangered TEC (EPBC Act)

This TEC includes the following 10 REs within the Brigalow Belt Bioregion (TSSC 2001):

- RE 11.2.3 – Microphyll vine forest ("beach scrub") on sandy beach ridges and dune swales;
- RE 11.3.11 – Semi-evergreen vine thicket on alluvial plains;
- RE 11.4.1 – Semi-evergreen vine thicket +/- *Casuarina cristata* on Cainozoic clay plains;
- RE 11.5.15 – Semi-evergreen vine thicket on Cainozoic sand plains and / or remnant surfaces;
- RE 11.8.3 – Semi-evergreen vine thicket on Cainozoic igneous rocks;
- RE 11.8.6 – *Macropteranthes leichhardtii* thicket on Cainozoic igneous rocks;
- RE 11.8.13 – Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks;
- RE 11.9.4 – Semi-evergreen vine thicket or *Acacia harpophylla* with a semi-evergreen vine thicket understorey on fine-grained sedimentary rocks;
- RE 11.9.8 – *Macropteranthes leichhardtii* thicket on Cainozoic fine-grained sedimentary rocks; and
- RE 11.11.18 – Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding.

This TEC may also correspond with other REs, particularly new or varied REs since the national listing occurred, including areas identified in Queensland such as RE 11.7.1x1 (this was described in 2002 after the national listing and relates closely to RE 11.5.15).

To be determined a TEC, a patch needs to conform to the Queensland Herbarium's definition of remnant vegetation 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' (Neldner *et al.* 2017). No determination has been made on minimum patch size.

Weeping Myall Woodlands – Endangered TEC (EPBC Act)

This TEC is restricted to small patches of weeping myall (*Acacia pendula*) that occur within two REs in Queensland (DEWHA 2009a):

- 11.3.2 *Eucalyptus populnea* woodland on alluvial plains; and
- 11.3.28 *Eucalyptus coolabah* +/- *Casuarina cristata* open woodland on alluvial plains.

A patch must fit the following criteria in order to comprise this TEC (DEHWA 2009):

- the tree canopy is dominated (at least 50% of trees present) by living, dead or defoliated weeping myall (*Acacia pendula*) trees; and
- the overstorey must have at least 5% tree canopy cover or at least 25 dead or defoliated mature weeping myall trees / ha; and
- the area is at least 0.5 ha in size; and
- the patch has either:
 - more than two layers of regeneration of weeping myall present; or
 - the tallest layer of living, dead or defoliated weeping myall trees is at least 4 m tall and of the vegetative cover present, 50% is comprised of native species.

4.5.5 Targeted flora searches

Preliminary desktop searches were undertaken to establish a list of EVNT flora species listed under the NC Act and / or EPBC Act that are likely or potentially located within the Study area. These species formed the target flora species and are listed in Table 3. Target flora species were surveyed for as a component of field verifying REs, which was undertaken over 31 ten-hour days (310 hours) in four different seasonal sampling events. Flora species were recorded for each assessment site, as well as whilst traversing the Study area. In addition, EVNT flora species were targeted in areas of potential habitat identified from the desktop assessment (one day in conjunction with RE field verification). In the instance that an EVNT flora species is located, the survey methodology for protected plant species (i.e. EVNT population survey or EVNT plot survey) was applied to map the extent and numbers involved (Flora Survey Guidelines – Protected Plants [DEHP 2016]). Where suspected EVNT species could not be identified in the field, samples were collected, pressed and then delivered to the Queensland Herbarium for identification.

There is a small section of the ETL within a mapped 'High Risk' area at the far northern extent, where the ETL would connect to an existing sub-station (Figure 8.5). These areas relate to records of *Bertya pedicellata* (which was included in the targeted surveys). Access in this area was granted for the spring 2017 surveys. During these surveys access was limited to the Study area encompassing the proposed ETL corridor and time was restricted to only four hours on site. As a result a complete species list was not recorded in these areas. Instead the length of the ETL corridor was traversed from the sub-station in the north-west to the point where the proposed ETL changes direction (-21.0091°; 148.2462°) and any observed EVNT flora were recorded and vouchered for confirmation by the Queensland Herbarium. Quaternary level flora assessments were also undertaken in those vegetation communities supporting EVNT flora.

5 FLORA CHARACTERISTICS OF THE STUDY AREA

5.1 Vegetation communities

5.1.1 General description

Large parts of the Study area have been subjected to both historic and recent clearing for agricultural grazing (Figure 8). The most degraded REs are those belonging to the clay soil brigalow communities, with very few remnant areas remaining. The remnant patches that remain are generally small (less than 10ha in area), with the majority suffering from edge effects from adjoining clearings that have been 'improved' with buffel grass (*Cenchrus ciliaris*) pasture. Edge effects include damage from fires, infestation with buffel grass and other weeds and pressure from grazing stock. This includes evidence of cattle camping within these small pockets of generally denser tree canopies.

The majority of extant vegetation is eucalypt woodland on alluvium adjacent to the Isaac River and eucalypt woodlands on Cainozoic sand plains. The Broad Vegetation Groups (BVG 1:5 million) mapped as present in the Study area (in order of dominance) are:

- BVG 5 – Eucalypt dry woodlands on inland depositional plains;
- BVG 3 – Eucalypt woodlands to open forests (mainly eastern Qld);
- BVG 15 – Wetlands;
- BVG 10 – Acacia dominated open forests, woodlands and shrublands;
- BVG 4 – Eucalypt open forests to woodlands on floodplains;
- BVG 12 – Other coastal communities or heaths; and
- BVG 13 – Tussock grasslands, forblands.

In general, the woodlands are in good condition. However, pasture modification (predominantly the use of buffel grass) has in some areas almost entirely replaced native groundcover species.

There are a number of wetland communities in the Study area that have developed on Tertiary alluvium and older Cainozoic plains. The alluvial wetlands are commonly old oxbows that formed as part of the Isaac River's movement. These fill during flood events and many contain seasonal water. Most appear to be impacted by grazing stock which use the systems for water and camps. The Cainozoic formation wetlands are mostly situated within the alluvium, but have been formed by flood scouring through the alluvium into harder substrates of the older formations. These systems appear to fill during floods but retain water for relatively short periods.

5.1.2 Regional Ecosystems

Existing RE mapping (Version 10.0, DSITI 2017a) suggests that approximately 9,069 ha of the Study area is remnant (regulated) vegetation. The DSITI (2017a) RE mapping is shown in Figure 8 and has been mapped using Biodiversity Status, relevant under the EP Act. Field-verified RE mapping undertaken by DPM Envirosciences following the November 2017 fieldwork demonstrates that approximately 9,121 ha of the Study area is remnant vegetation (Table 5). This includes various minor realignments of mapped remnant vegetation, as well as inclusion of a larger patch of previously unmapped remnant vegetation on Wynette (Figure 9). A large component of the differences in mapping is due to the ability of the field surveys to separate mixed vegetation polygons into separate units. Within the Study area the water pipeline and rail corridor are co-located for a distance of 12 km from the MLA boundary to the existing Norwich Park Branch rail. In order to provide an accurate description of the Study area (without duplication), all field-

verified RE within this corridor has been included within the Rail Spur (EPBC 2017/7870) calculations in Table 5. This is also the case with some parts of the rail spur, ETL and water pipeline that are co-located within the MLA, which have been included within the Mine Site and Access Road (EPBC 2017/7867).

Table 5 Field-verified Regional Ecosystems of the Study area

Regional Ecosystem	VM Act status	Biodiversity status	Description	Area (ha)
Mine Site and Access Road (EPBC 2017/7867)				
11.3.1	E	E	Brigalow (<i>Acacia harpophylla</i>) and / or belah (<i>Casuarina cristata</i>) open forest on alluvial plains.	109.1
11.3.2	OC	OC	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains.	2,143.7
11.3.25	LC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) or river red gum (<i>E. camaldulensis</i>) woodland fringing drainage lines.	130.9
11.3.27b	LC	OC	Lacustrine wetland, with fringing woodland, commonly river red gum (<i>Eucalyptus camaldulensis</i>) or coolabah (<i>E. coolabah</i>).	45.6
11.3.27c	LC	OC	Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species.	14.3
11.3.27f	LC	OC	Palustrine wetland, coolabah (<i>Eucalyptus coolabah</i>) and / or Queensland blue gum (<i>E. tereticornis</i>) open woodland to woodland fringing swamps.	131.7
11.3.27i	LC	OC	Palustrine wetland (e.g. vegetated swamp). River red gum (<i>Eucalyptus camaldulensis</i>) or Queensland blue gum (<i>E. tereticornis</i>) woodland to open woodland with sedgeland ground layer.	31.8
11.3.3	OC	OC	Coolabah (<i>Eucalyptus coolabah</i>) woodland on alluvial plains.	31.4
11.3.4	OC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) and / or <i>Eucalyptus</i> spp. woodland on alluvial plains.	34.3
11.3.7	LC	OC	<i>Corymbia</i> spp. woodland on alluvial plains.	1019.5
11.4.8	E	E	Dawson gum (<i>Eucalyptus cambageana</i>) woodland to open forest with brigalow (<i>Acacia harpophylla</i>) or blackwood (<i>A. argyrodendron</i>) on Cainozoic clay plains.	15.8
11.4.9	E	E	Brigalow (<i>Acacia harpophylla</i>) shrubby woodland with yellowwood (<i>Terminalia oblongata</i>) on Cainozoic clay plains.	91.3
11.5.3	LC	NCP	Poplar box (<i>Eucalyptus populnea</i>) +/- silver-leaved ironbark (<i>E. melanophloia</i>) +/- Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) woodland on Cainozoic sand plains and / or remnant surfaces.	3905.8

Regional Ecosystem	VM Act status	Biodiversity status	Description	Area (ha)
11.5.8c	LC	NCP	Poplar gum (<i>Eucalyptus platyphylla</i>) woodland on white-yellow weathered sands, with grassy ground layer.	47.7
11.5.9	LC	NCP	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces.	946.9
11.5.17	E	E	Palustrine swamp with fringing Queensland blue gum (<i>Eucalyptus tereticornis</i>) woodland in depressions on Cainozoic sand plains and remnant surfaces.	70.4
SUB-TOTAL				8770.2
Water Pipeline (EPBC 2017/7868)				
11.3.1	E	E	Brigalow (<i>Acacia harpophylla</i>) and / or belah (<i>Casuarina cristata</i>) open forest on alluvial plains.	0.8
11.3.2	OC	OC	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains.	14.0
11.3.25	LC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) or river red gum (<i>E. camaldulensis</i>) woodland fringing drainage lines.	13.4
11.3.27f	LC	OC	Palustrine wetland, coolabah (<i>Eucalyptus coolabah</i>) and / or Queensland blue gum (<i>E. tereticornis</i>) open woodland to woodland fringing swamps.	Included in Rail Spur (EPBC 2017/7870)
11.3.4	OC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) and / or <i>Eucalyptus</i> spp. woodland on alluvial plains.	2.6
11.4.8	E	E	Dawson gum (<i>Eucalyptus cambageana</i>) woodland to open forest with brigalow (<i>Acacia harpophylla</i>) or blackwood (<i>A. argyrodendron</i>) on Cainozoic clay plains.	0.7
11.4.9	E	E	Brigalow (<i>Acacia harpophylla</i>) shrubby woodland with yellowwood (<i>Terminalia oblongata</i>) on Cainozoic clay plains.	5.5
11.5.3	LC	NCP	Poplar box (<i>Eucalyptus populnea</i>) +/- silver-leaved ironbark (<i>E. melanophloia</i>) +/- Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) woodland on Cainozoic sand plains and / or remnant surfaces.	88.0
11.5.9	LC	NCP	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces.	Included in Mine Site and Access Road (EPBC 2017/7867)
SUB-TOTAL				125.0

Regional Ecosystem	VM Act status	Biodiversity status	Description	Area (ha)
Electricity Transmission Line (EPBC 2017/7869)				
11.3.1	E	E	Brigalow (<i>Acacia harpophylla</i>) and / or belah (<i>Casuarina cristata</i>) open forest on alluvial plains.	5.4
11.3.2	OC	OC	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains.	66.3
11.3.25	LC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) or river red gum (<i>E. camaldulensis</i>) woodland fringing drainage lines.	17.2
11.3.7	LC	OC	<i>Corymbia</i> spp. woodland on alluvial plains.	6.9
11.4.8	E	E	Dawson gum (<i>Eucalyptus cambageana</i>) woodland to open forest with brigalow (<i>Acacia harpophylla</i>) or blackwood (<i>A. argyrodendron</i>) on Cainozoic clay plains.	5.5
11.4.9	E	E	Brigalow (<i>Acacia harpophylla</i>) shrubby woodland with yellowwood (<i>Terminalia oblongata</i>) on Cainozoic clay plains.	0.5
11.5.3	LC	NCP	Poplar box (<i>Eucalyptus populnea</i>) +/- silver-leaved ironbark (<i>E. melanophloia</i>) +/- Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) woodland on Cainozoic sand plains and / or remnant surfaces.	12.0
11.5.9	LC	NCP	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces.	Included in Mine Site and Access Road (EPBC 2017/7867)
11.5.9b	LC	NCP	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>), narrow-leaved white mahogany (<i>E. tenuipes</i>), budgeroo (<i>Lysicarpus angustifolius</i>) +/- <i>Corymbia</i> spp. woodland.	2.6
11.5.18	OC	OC	<i>Micromyrtus capricornia</i> shrubland on Cainozoic sand plains and/or remnant surfaces	0.3
11.7.2	LC	NCP	Monospecific stands of <i>Acacia</i> spp. forest / woodland on Cainozoic lateritic duricrusts.	2.0
SUB-TOTAL				118.7
Rail Spur (EPBC 2017/7870)				
11.3.1	E	E	Brigalow (<i>Acacia harpophylla</i>) and / or belah (<i>Casuarina cristata</i>) open forest on alluvial plains.	4.7
11.3.2	OC	OC	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains.	35.1
11.3.25	LC	OC	Queensland blue gum (<i>Eucalyptus tereticornis</i>) or river red gum (<i>E.</i>	13.9

Regional Ecosystem	VM Act status	Biodiversity status	Description	Area (ha)
			<i>camaldulensis</i>) woodland fringing drainage lines.	
11.3.27f	LC	OC	Palustrine wetland, coolabah (<i>Eucalyptus coolabah</i>) and / or Queensland blue gum (<i>E. tereticornis</i>) open woodland to woodland fringing swamps.	11.7
11.4.8	E	E	Dawson gum (<i>Eucalyptus cambageana</i>) woodland to open forest with brigalow (<i>Acacia harpophylla</i>) or blackwood (<i>A. argyrodendron</i>) on Cainozoic clay plains.	3.2
11.4.9	E	E	Brigalow (<i>Acacia harpophylla</i>) shrubby woodland with yellowwood (<i>Terminalia oblongata</i>) on Cainozoic clay plains.	0.1
11.5.3	LC	NCP	Poplar box (<i>Eucalyptus populnea</i>) +/- silver-leaved ironbark (<i>E. melanophloia</i>) +/- Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) woodland on Cainozoic sand plains and / or remnant surfaces.	35.8
11.5.9	LC	NCP	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces.	Included in Mine Site and Access Road (EPBC 2017/7867)
11.5.17	E	E	Palustrine swamp with fringing Queensland blue gum (<i>Eucalyptus tereticornis</i>) woodland in depressions on Cainozoic sand plains and remnant surfaces.	2.9
11.9.2	LC	NCP	Silver-leaf ironbark (<i>Eucalyptus melanophloia</i>) +/- coolabah (<i>E. orgadophila</i>) woodland on fine-grained sedimentary rocks	0.1
SUB-TOTAL				107.4
TOTAL				9,121.3

Notes:

E = Endangered; OC = Of Concern; NCP = No Concern at Present; LC = Least Concern.

The remnant vegetation of the Study area (based on the field-verified RE mapping) includes the following six Broad Vegetation Groups (BVGs 1:5 million), represented by 21 REs:

- eucalypt dry woodlands on inland depositional plains (BVG5M:5);
- eucalypt open forests to woodlands on floodplains (BVG5M:4);
- eucalypt woodlands to open forests (BVG5M:3);
- other acacia dominated open forests, woodlands and shrublands (BVG5M:10);
- wetlands (swamps and lakes) (BVG5M:15); and
- other coastal communities or heaths (BVG5M:12).

Eucalypt dry woodlands on inland depositional plains

The most prevalent BVG of the Study area comprises eucalypt dry woodlands on inland depositional plains (BVG5M:5), which includes the following REs:

- 11.3.2 – Poplar box (*Eucalyptus populnea*) woodland to open woodland on alluvial plains (Plate 1);
- 11.5.3 – Poplar box (*E. populnea*) +/- silver-leaved ironbark (*E. melanophloia*) +/- Clarkson's bloodwood (*C. clarksoniana*) woodland on Cainozoic sand plains and / or remnant surfaces;
- 11.5.8c – Poplar gum (*E. platyphylla*) woodland on white-yellow weathered sands, with grassy ground layer;
- 11.5.9 – Narrow-leaved ironbark (*E. crebra*) and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces;
- 11.5.9b – Narrow-leaved ironbark (*E. crebra*), narrow-leaved white mahogany (*E. tenuipes*), budgeroo (*Lysicarpus angustifolius*) +/- *Corymbia* spp. woodland; and
- 11.9.2 – Silver-leaved ironbark (*Eucalyptus melanophloia*) and / or Coolibah (*E. orgadophila*) grassy woodland to open woodland. Occurs on rises on undulating plains with cracking clay or texture contrast soils.



Plate 1 Poplar box (*Eucalyptus populnea*) woodland on alluvial plains on Iffley, November 2016

Eucalypt open forests to woodlands on floodplains

Eucalypt open forests to woodland on floodplains (BVG5M:4) form the riparian corridor of the Isaac River and parts of Ripstone Creek (Figure 9-1 – 9-4), and comprise the following REs within the Study area:

- 11.3.3 – Coolabah (*E. coolabah*) open woodland to woodland on alluvial plains;
- 11.3.3c – Coolabah (*E. coolabah*) woodland to open woodland (to scattered trees) with a sedge or grass understorey in back swamps and old channels;
- 11.3.4 – Queensland blue gum (*E. tereticornis*) and / or *Eucalyptus* spp. woodland to open forest on alluvial plains; and
- 11.3.25 – Queensland blue gum (*E. tereticornis*) and / or river red gum (*E. camaldulensis*) open forest to woodland fringing drainage lines (Plate 2). This RE is also a riverine wetland mapped on the Vegetation Management Wetlands Map v2.48 (DSITI 2017b).



Plate 2 Queensland blue gum (*Eucalyptus tereticornis*) open forest fringing the Isaac River on Iffley, November 2016

Eucalypt woodlands to open forests

The eucalypt woodlands to open forests BVG (BVG5M:3) is represented by RE 11.3.7 – Bloodwood (*Corymbia* spp.) tall woodland to open woodland on alluvial plains (Plate 3) (Figure 9-1 – 9-4).



Plate 3 Bloodwood (*Corymbia* spp.) tall woodland to open woodland on alluvial plains on Iffley, November 2016

Other acacia dominated open forests, woodlands and shrublands

Much of the acacia dominated open forests, woodlands and shrublands (BVG5M:10) of the Study area have been cleared to make way for agricultural grasslands. REs constituting this BVG within the Study area include:

- 11.3.1 – Brigalow (*Acacia harpophylla*) and / or belah (*Casuarina cristata*) open forest on alluvial plains;
- 11.4.8 – Dawson gum (*Eucalyptus cambageana*) woodland to open forest with brigalow or blackwood (*Acacia argyrodendron*) on Cainozoic clay plains;
- 11.4.9 – Brigalow (*A. harpophylla*) shrubby woodland to open forest with yellowwood (*Terminalia oblongata*) on Cainozoic clay plains (Plate 4); and
- 11.7.2 – Monospecific stands of *Acacia* spp. forest / woodland on Cainozoic lateritic duricrusts. Lancewood (*A. shirleyi*) and / or bendee (*A. catenulata*) usually predominate the woodland to low woodland to low open forest tree canopy (7-12 m high).



Plate 4 Brigalow (*Acacia harpophylla*) open forest on Vermont Park, November 2016

Wetlands (swamps and lakes)

The wetlands of the Study area (BVG5M:15) include the following REs:

- 11.3.27b – Lacustrine wetland;
- 11.3.27c – Mixed grassland or sedgeland with areas of open water;
- 11.3.27f – Coolibah (*E. coolibah*) and / or Queensland blue gum (*E. tereticornis*) open woodland to woodland fringing swamps;
- 11.3.27i – River red gum (*E. camaldulensis*) or Queensland blue gum (*E. tereticornis*) woodland to open woodland with sedgeland ground layer; and
- 11.5.17 – Queensland blue gum (*E. tereticornis*) woodland in depression on Cainozoic sand plains and remnant surfaces (Plate 5).

These REs are all 'regulated vegetation that coincides with the Vegetation Management Wetlands Map v2.48 (DSITI 2017c)'.



Plate 5 Palustrine wetland (vegetated swamp) on Willunga, November 2016

Other coastal communities or heaths

The heaths of the Study area (BVG5M:12) is located only in one small section of the ETL (Figure 9-5) and comprises the following RE:

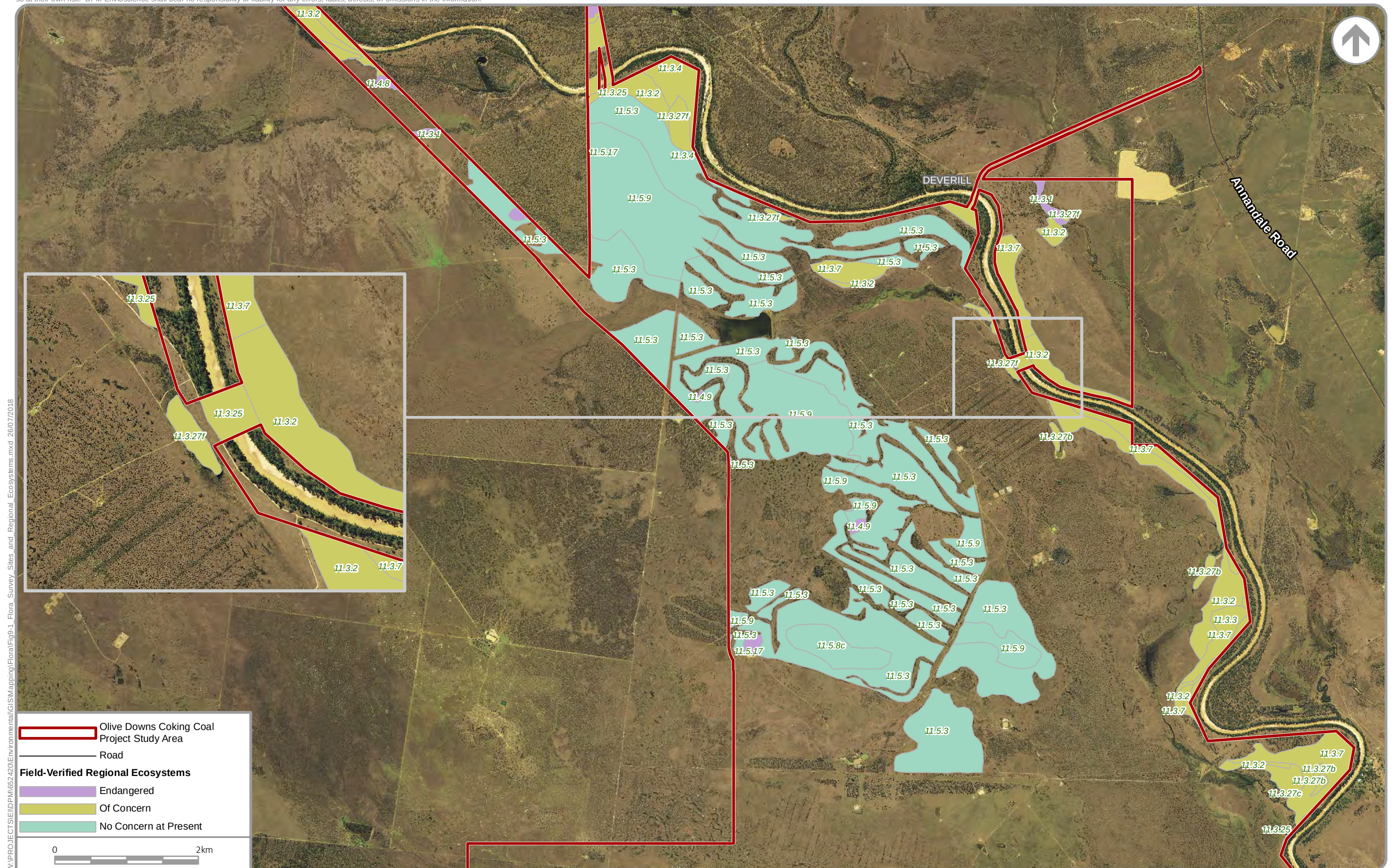
- 11.5.18 – *Micromyrtus capricornia* shrubland +/- emergent tree/open woodland layer dominated by species such as *Eucalyptus exserta*, *E. melanophloia*, *E. crebra*, *Corymbia trachyphloia*, *C. clarksoniana* or *Melaleuca nervosa*. Distinguished by prominent understorey of *Micromyrtus capricornia* to 1-2 m.



Plate 6 RE 11.5.18 on the Electricity Transmission Line corridor, November 2017

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FIELD-VERIFIED REGIONAL ECOSYSTEMS – MAP 1

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

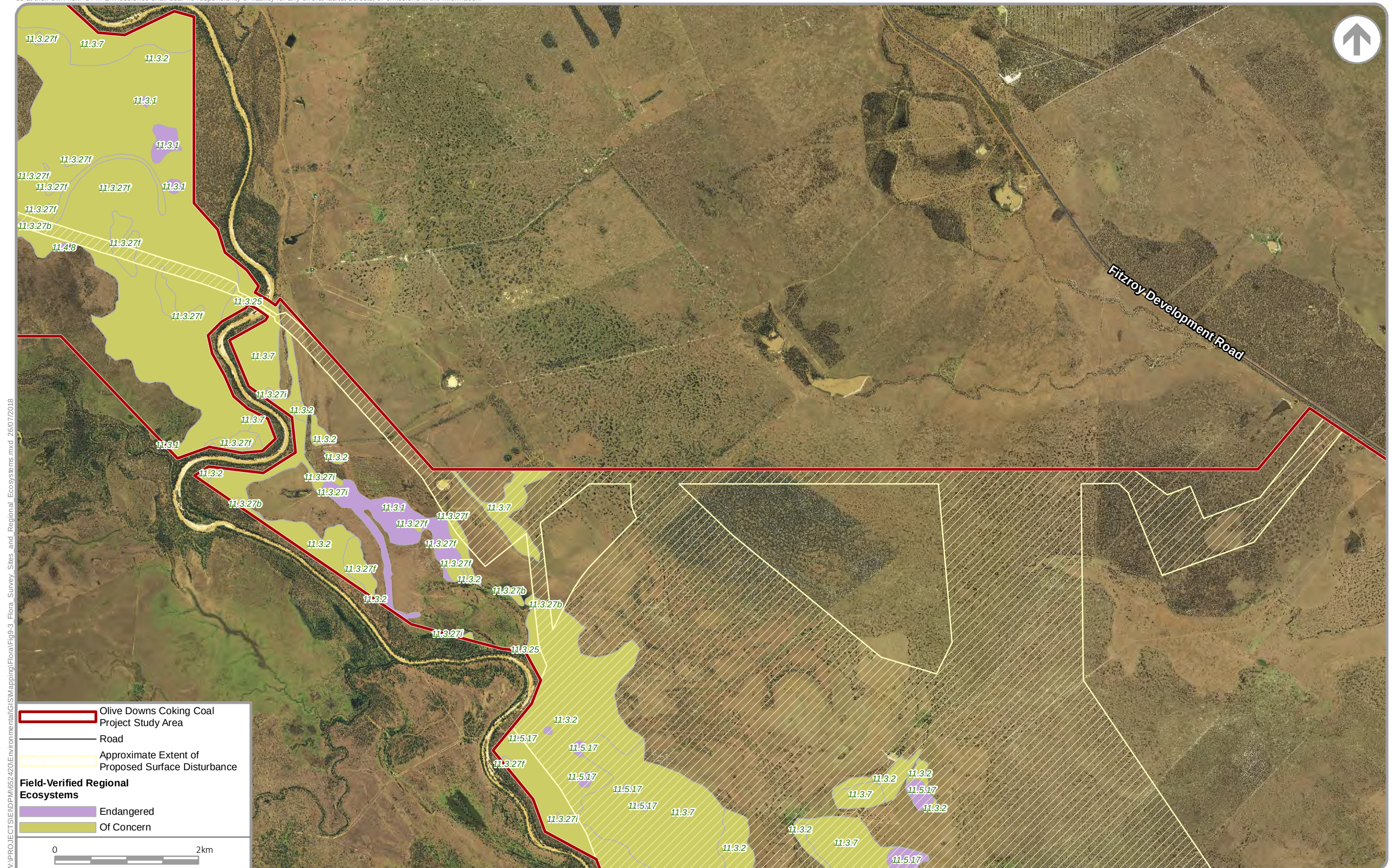
FIGURE 9.1

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Aerial Imagery: Pembroke MDL - flown August 2017
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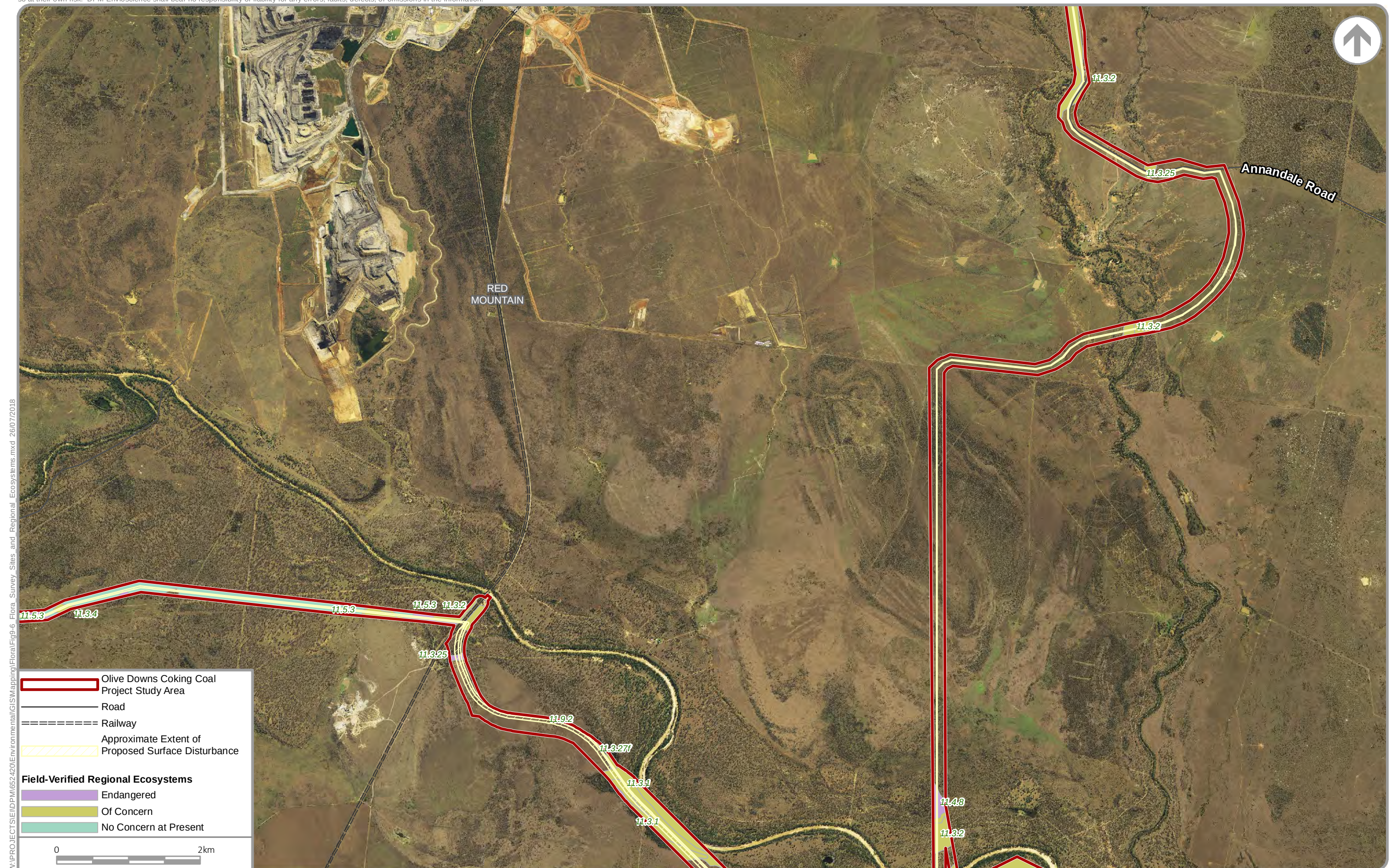
FIELD-VERIFIED REGIONAL ECOSYSTEMS – MAP 5

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 9.5

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FIELD-VERIFIED REGIONAL ECOSYSTEMS – MAP 6

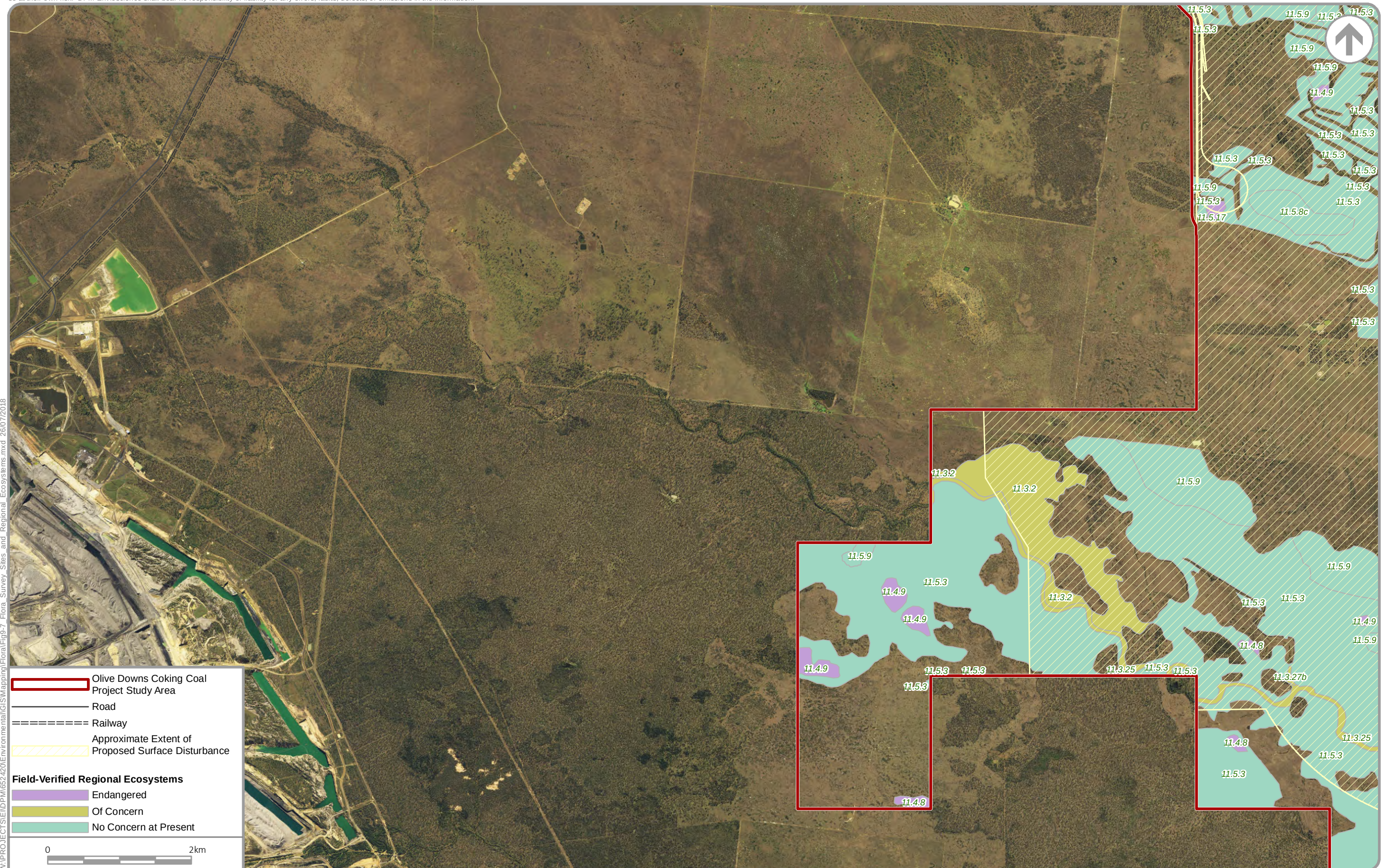
Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 9.6

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W:\PROJECTS\ENV\DP\652420\Environmental\GIS\Mapping\Flora\Fig9-7 Flora Survey Sites and Regional Ecosystems.mxd 26/07/2018





FIELD-VERIFIED REGIONAL ECOSYSTEMS – MAP 8

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 9.8

5.1.3 Threatened Ecological Communities

The desktop assessment identified the potential occurrence of four TECs within the Study area. Each are listed as Endangered under the EPBC Act. These communities are identified in Table 6. One of these communities, the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (Brigalow TEC), was identified within the Study area. Brigalow TEC within the Study area comprises only those patches of vegetation that meet the condition thresholds identified in Section 4.5.4. The location of Brigalow TEC within the Study area is identified in Figure 10 – 10-1.

Sixteen potential TEC vegetation patches were assessed for floristic values as part of the field surveys in November 2016. This included one Tertiary flora survey site in RE 11.3.1 (Appendix C), three Quaternary flora survey sites in RE11.3.1, six in RE11.4.8 and six in RE11.4.9 (Appendix D). Most patches failed to meet the Brigalow TEC condition thresholds (Section 4.5.4), owing primarily to groundcover being dominated by exotic species including buffel grass (*Cenchrus ciliaris*). Four patches were confirmed as being the Brigalow TEC (Appendix D). This includes a 7 ha patch on which flora survey site Q49 was positioned, a 4ha patch on which flora survey site Q70 was positioned, a 6 ha patch on which flora survey site T5 was positioned and a 1 ha patch along the rail spur corridor.

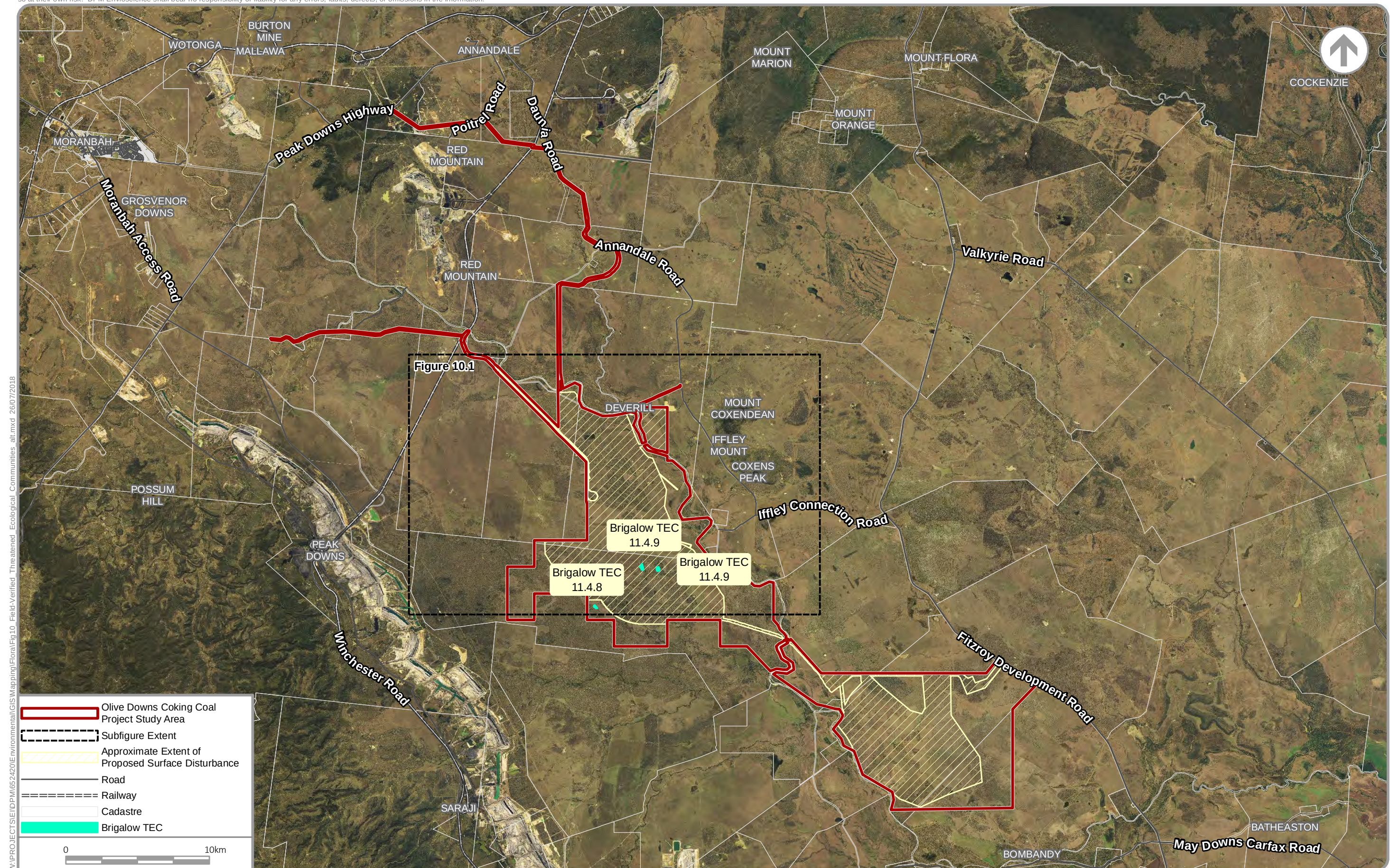
Patches of regrowth vegetation within the Study area were also assessed to determine whether they meet the criteria to be mapped as Brigalow TEC (DotE, 2013a). No patches of regrowth vegetation were determined to meet these criteria as the trees were too small to have been more than 15 years old and the understory vegetation was dominated by weeds (i.e. buffel grass).

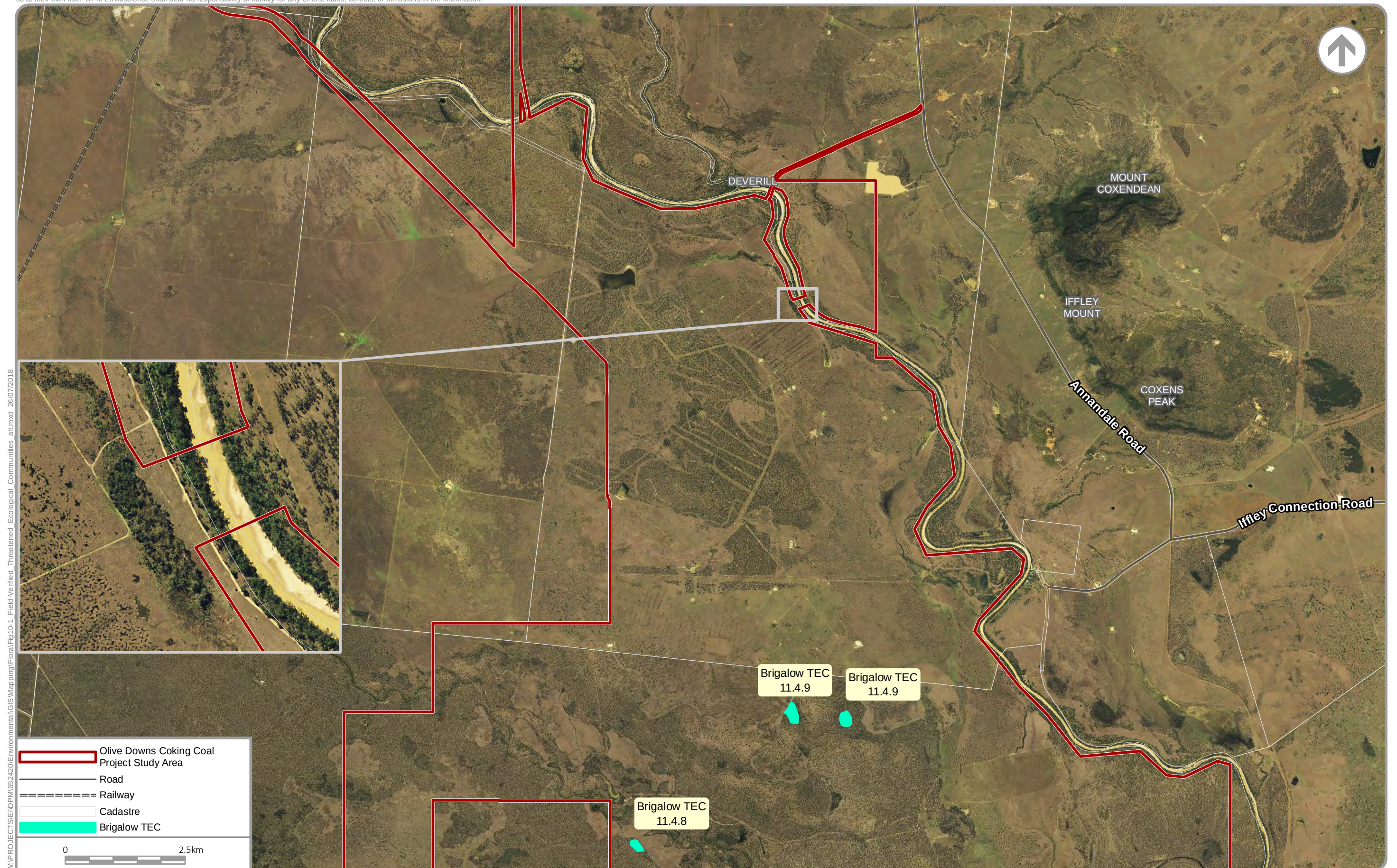
Table 6 Threatened Ecological Communities identified as potentially occurring within the Study area

Threatened Ecological Community	Status (EPBC Act)	Field survey findings
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	E	Three small patches of Brigalow TEC were recorded for the Study area within the MLA (Figure 11), aligning with REs 11.4.8, 11.4.9 and 11.3.1 and comprising approximately 19.0 ha.
Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin	E	This community was not observed within the Study area.
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	E	This community was not observed within the Study area.
Weeping Myall Woodlands	E	This community was not observed within the Study area.

Notes:

E = Endangered.





W:\PROJECTS\IDPM\652420\Environmental\GIS Mapping\Flora\Fig 10-1 Field-Verified Threatened Ecological Communities.alt.mxd 26/07/2018

5.1.4 Other vegetation

There is 17,836 ha of land in the Study area that is not associated with any regulated vegetation. This area has been classified in this report as ‘agricultural grasslands dominated by buffel grass (*Cenchrus ciliaris*)’ and is the area not mapped as remnant vegetation or wetlands in Figure 9. Much of this area contains sparse Brigalow (*Acacia harpophylla*) regrowth (which does not meet the criteria to be mapped as Brigalow TEC as outlined in Section 5.1.3), buffel grass and gilgai.

Gilgai are repeated mounds and depressions formed on shrink-swell and cracking clay soils (or Vertosols) and where water can accumulate seasonally in the depressions to form temporary wetlands. This landform is common in the Brigalow Belt, but has been largely cleared for grazing.

5.2 Groundwater dependant ecosystems

Groundwater-Dependent Ecosystems (or GDEs) are ecosystems that rely upon groundwater for their continued existence. GDEs may be 100% dependent on groundwater, such as aquifer GDEs, or may access groundwater intermittently to supplement their water requirements, such as riparian tree species in arid and semi-arid areas (IESC 2018). Desktop mapping of potential GDEs throughout Queensland (DSITI 2017 and BoM 2017) indicates terrestrial and aquatic ecosystems with possible high, moderate and low potential for groundwater interaction to occur within the Project locality. The desktop GDE mapping (DSITI 2017 and BoM 2017) indicates (Figure 28 in DPM Envirosciences 2018b):

- Terrestrial riparian vegetation associated with the Isaac River, North Creek, Cherwell Creek and Ripstone Creek is mapped as having a high potential to be dependent on subsurface expression of groundwater.
- Aquatic habitat within the Isaac River, North Creek, Cherwell Creek and smaller associated tributaries are mapped as having a high potential to be dependent on the surface expression of groundwater.
- Terrestrial vegetation and aquatic habitat associated with a number of palustrine wetlands surrounding the Olive Downs South and Willunga domains is mapped as having a moderate potential to be associated with the surface expression of groundwater.
- Of the remaining terrestrial vegetation within the Project locality, the majority is shown as having a low to moderate potential to be dependent on subsurface groundwater, with vegetation near creeks / drainage lines mapped as having moderate potential.

The accuracy of the desktop GDE mapping (DSITI 2017 and BoM 2018) of the Project locality has been reviewed by HydroSimulations (2018) and DPM Envirosciences, with the following conclusions made based on site observations:

- The terrestrial riparian vegetation associated with the Isaac River, North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek have a high potential to be dependent on subsurface groundwater. This is because the vegetation (RE 11.3.25) is dominated by forest red gum (*Eucalyptus tereticornis*) and river oak (*Casuarina cunninghamiana*), both species have been shown to access groundwater in other locations (IESC 2018) and the groundwater table in this area is likely to be located at a depth which could be accessed by these species. HydroSimulations (2018) has indicated that the alluvium appears to be saturated at a depth of approximately 10 mbgl adjacent / underlying the Isaac River and lower reaches of the creeks at the confluence with the Isaac River (HydroSimulations 2018).
- Aquatic habitats within the Isaac River, North Creek, Cherwell Creek and smaller associated tributaries also have a high potential to intermittently use the surface expression of groundwater during occasional periods of baseflow from the adjacent /

underlying alluvium after prolonged rainfall events or following flood events (HydroSimulations 2018). Under these conditions, recharged alluvium may drain to the watercourses as the hydraulic gradient reverses, the result of which may sustain stream-flow for short periods (in the order of days to possibly weeks in the lower reaches) depending on the sequence of rainfall events (HydroSimulations 2018).

- Terrestrial and aquatic habitat associated with the palustrine wetlands surrounding the Olive Downs South and Willunga domains are unlikely to be dependent on groundwater given that groundwater levels in these areas have been identified as being in excess of 10 mbgl (HydroSimulations 2018). Localised perched water tables are evident where waterbodies, such as these palustrine wetlands, continue to hold water throughout the dry period, occurring where clay layers slow the percolation of surface water (HydroSimulations 2018). It is likely that these wetlands rely on the slow percolation of surface water after rainfall events rather than direct access to the groundwater system.
- The remaining vegetation communities within the Project locality are dominated by Poplar box (*Eucalyptus populnea*; a key constituent of RE 11.5.3 and RE 11.3.2), poplar gum (*Eucalyptus platyphylla*; a common constituent of RE 11.5.17) and Clarkson's bloodwood (*Corymbia clarksoniana*; a key constituent of RE 11.3.7). While poplar gum and Clarkson's bloodwood have been shown to access groundwater to a depth reaching 10 mbgl (IESC 2018), the maximum rooting depths for poplar box are unknown (Kath et al. 2014). Despite this, it is expected that rooting depths for poplar box would be similar to other eucalypts and corymbias occurring in the vicinity (i.e. up to a maximum of 10 m). Given that HydroSimulations has determined groundwater levels within the Olive Downs South and Willunga domains to range from 10 to 17 mbgl, the vegetation communities beyond the riparian corridors of the Isaac River, North Creek and Cherwell Creek have a low likelihood of being dependent on the presence of groundwater.

In summary, the terrestrial riparian vegetation (RE 11.3.25) and aquatic habitats associated with the Isaac River are likely to be GDEs. The terrestrial riparian vegetation (RE 11.3.25) associated with North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek may also be a GDE.

5.3 Protected areas

Protected areas of Queensland represent those areas protected for the conservation of natural and cultural values and those areas managed for production of land for public enjoyment, water sheds and productive resources, iconic geological and landscape values, and land of significance to traditional owners. No protected areas occur within the Study area. The nearest protected area is the Dipperu National Park (Scientific), located approximately 36 km north-east of the Study area.

5.4 Flora species

Least Concern species

A total of 335 Least Concern flora species have been recorded from the MLA and infrastructure corridors as a result of the spring 2016 and autumn 2017 surveys. These species are identified in Appendix E.

Special Least Concern species

Special Least Concern (SLC) species are defined in schedule 3A of the *Nature Conservation (Wildlife Management) Regulation 2006*. SLC flora are afforded some protection to manage their harvest and commercial trade. There were ten SLC flora species recorded from the Study area during the field surveys, namely the:

- broad-leaved bottle tree (*Brachychiton australis*);
- mulga fern (*Cheilanthes sieberi*);
- darling lily (*Crinum flaccidum*);
- black orchid (*Cymbidium canaliculatum*);
- wavy marshwort (*Nymphoides crenata*);
- Swamp lily (*Otella ovalifolia*);
- sandalwood (*Santalum lanceolatum*);
- *Stylidium eriorhizum*;
- Australian bluebell (*Wahlenbergia gracilis*); and
- *Wahlenbergia queenslandica*.

Some of these species are widespread across the Study area and in the greater region, particularly mulga fern and Australian bluebell. The SLC status is not a reflection of rarity, but rather the commercial value of these species in the nursery trade or agriculturally.

Priority species

The Fitzroy NRM Region BoT Actions for Biodiversity (DERM 2010) recognises 36 flora species that are considered to be of Critical or High priority for conservation by the Fitzroy Basin Association. None of these species were recorded from the Study area during surveys.

5.5 Threatened flora

Searches of the EPBC Act Protected Matters database (DEE 2018b) and Queensland Wildlife Online database (DES 2018a) identified the potential occurrence of 19 EVNT flora species within a search area extending 10 km and 50 km (respectively) from the Study area boundaries (Table 7). Of these, three were considered 'likely' to occur within the Study area based on the likely occurrence of their potential habitat within the Study area, as well as previous species records from within 10 km of the Study area (Table 7). These are:

- *Bertya pedicellata* – Near Threatened (NC Act);
- bluegrass (*Dichanthium setosum*) – Vulnerable (EPBC Act); and
- *Solanum elaeagnifolium* – Endangered (NC Act).

A further eight EVNT flora species were identified as having 'potential' to occur within the Study area based on the likely occurrence of their potential habitat within the Study area, lack of previous species records from within 10 km of the Study area, but previous species records from within 50 km of the Study area (Table 7). These are:

- *Aristida annua* – Vulnerable (EPBC Act and NC Act);
- *Capparis humistrata* – Endangered (NC Act);
- native frangipani (*Cerbera dumicola*) – Near Threatened (NC Act);
- King blue-grass (*Dichanthium queenslandicum*) – Endangered (EPBC Act); Vulnerable (NC Act);
- finger panic (*Digitaria pruriens*) – Near Threatened (NC Act);

- black ironbox (*Eucalyptus raveretiana*) – Vulnerable (EPBC Act);
- southern bonewood (*Macropteranthes leiocaulis*) – Near Threatened (NC Act); and
- *Solanum adenophorum* – Endangered (NC Act).

These eleven species were targeted during flora surveys in November 2016 and May 2017. One EVNT flora species was detected during the spring 2017 surveys, namely *Bertya pedicellata*. Two sub-populations of *Bertya pedicellata* were recorded in the north-west section of the ETL corridor between the electricity sub-station and the point where the ETL changes direction (Figure 11). All specimens detected within the ETL corridor were recorded. The western-most sub-population is germinating as regrowth from the soil seed bank in a spoil pile within an area mapped as 'non-remnant'. There were 59 individuals recorded in this population. The eastern-most population is associated with remnant RE 11.7.2 'Acacia dominated open forest, woodlands and shrublands'. It is a larger population (149 individuals detected within the ETL) and continues into the surrounding remnant vegetation to the north of the ETL alignment (as indicated by the specimens outside the ETL).

Table 7 Endangered, Vulnerable or Near Threatened flora species, or their habitat, identified from the Search area (within at least 50 km of the Study area)

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Acacia arbiana</i>			NT	Confined to the summits of Ropers and Scott's Peak and perhaps other peaks of the Peak Range, east of Clermont. Recorded from trachyte outcrops in heath-like vegetation (World Wide Wattle 2017)	Unlikely. Potential habitat unlikely to occur within the Study area.	Unlikely. Not detected during field surveys.		✓	
<i>Acacia spania</i>			NT	Rocky sandstone ridges and hills in sandy to loamy soils in eucalypt or acacia dominated woodland. Also in vine thickets along scarp edges (DES 2018n).	Unlikely. This species has been recorded to the east of the Project area (Figure 11). Potential habitat unlikely to occur within the Study area.	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Acacia storyi</i>	Story's wattle		NT	The species grows on sandstone plateaux, on sandy and shallow skeletal soils over sandstone. Vegetation includes open forests or tall open forest. Associated species include <i>Eucalyptus tereticornis</i> and <i>Aristida</i> spp.; <i>E. hendersonii</i> , <i>E. cloeziana</i> , <i>E. melanoleuca</i> and <i>E. propinqua</i> (DES 2018c).	Unlikely. The appropriate geological formation is not present within the Study area.	Unlikely. Not detected during field surveys.	✓		
<i>Aristida annua</i>		V	V	Black earth, basalt and sandy, red loamy soils. It occurs in eucalypt woodland with <i>Eucalyptus orgadophila</i> . It also occurs in disturbed sites such as roadsides with pasture grass (DES 2018d, DEE 2018a).	Potential. The Study area contains potential habitat for this species; however, there are no records from within 10 km of the Study area. Records do occur within 50 km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.	✓	✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Bertya pedicellata</i>			NT	Rocky hillsides in eucalypt forest or woodland, acacia woodland or shrubland, and open heathland or vine thicket communities. Soils are recorded mostly as skeletal to shallow sandy, sandy clay or clay loams overlaying rhyolite, trachyte or sandstone substrates. Associated species include <i>Corymbia trachyphloia</i> , <i>Dodonaea filifolia</i> , <i>Acacia catenulata</i> , <i>A. curvinervia</i> , <i>A. shirleyi</i> , <i>A. rhodoxylon</i> , <i>A. sparsiflora</i> , <i>E. crebra</i> , <i>A. harpophylla</i> and <i>E. decorticans</i> (Queensland Herbarium 2012 cited in DES 2018e).	Likely. The species habitat is known to occur in the broader search area and there are records within 10 km of the Study area.	Known. Associated with 'high risk' flora survey trigger area in the northern extent of the ETL. Two populations located in the proposed ETL corridor (Figure 11).		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Capparis humistrata</i>			E	Eucalypt woodland with a shrubby understorey, on stony hard ridges and serpentine soil; also on the margins of brigalow forest on sandy soil (Hewson 1982; and Guymer 2009 cited in DES 2018f).	Potential. The Study area contains potential habitat for this species however there are no records from within 10 km of the Study area. Records do occur within 50km of the Study area (DES 2018a, AVH 2018).	Unlikely. Not detected during field surveys.		✓	
<i>Cerbera dumicola</i>	native frangipani		NT	A range of habitats in central and southern Queensland. Associated vegetation includes: sandstone hills with open <i>E. umbra subsp. carnea</i> ; on plateaus, in woodland of <i>Acacia shirleyi</i> with <i>Corymbia dolichocarpa</i> ; acidic soils in mine rehabilitation area; woodland of <i>A. catenulate</i> and <i>A. shirleyi</i> with <i>E. thozetiana</i> on a slope of	Potential. Potential habitat may occur within the Study area. No records from within 10 km of the Study area, although confirmed records within 50 km of the Study area (DES 2018a, AVH 2018). This species was also recorded in the Red Hill MLA, 50 km north of the Study area (URS 2013).	Unlikely. Not detected during field surveys.		✓	✓

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
				sand / clay soil; semi-deciduous notophyll-microphyll vine forest on rhyolite hillslopes; open-woodland of <i>E. melanophloia</i> with occasional <i>Acacia shirleyi</i> , <i>E. populnea</i> and <i>E. brownii</i> ; semi-evergreen vine thicket; woodland of <i>A. rhodoxylon</i> on brown, sandy loam; and in <i>Corymbia tessellaris</i> - <i>Acacia aneura</i> open woodland (DES 2018g).					
<i>Cycas ophiolitica</i>	Marlborough blue	E	E	Grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80–400 m above sea level. Although this species reaches its best development on red clay soils near Marlborough, it is	Unlikely. The species or species habitat is likely to occur in the broader search area (DEE 2018b), however, Potential habitat is unlikely in the Study area and there are no confirmed records within 50 km.	Unlikely. Not detected during field surveys.	✓		

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
				more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite, and is associated with species such as <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> , <i>C. xanthope</i> and <i>Eucalyptus fibrosa</i> . <i>Cycas ophiolitica</i> has also been found on mudstone in association with <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> and <i>Eucalyptus crebra</i> , and on alluvial loams with <i>Corymbia intermedia</i> , <i>Eucalyptus drepanophylla</i> and <i>E. tereticornis</i> (DES 2018o, DEE 2018a).					

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Dichanthium queenslandicum</i>	King blue-grass	E	V	Black cracking clay in tussock grasslands mainly in association with other species of blue grasses (<i>Dichanthium</i> spp. and <i>Bothriochloa</i> spp.), but also with other grasses restricted to this soil type (Fletcher 2001, Simon 1982 cited in DEE 2018a). <i>D. queenslandicum</i> is mostly confined to natural grassland on the heavy black clay soils (basalt downs, basalt cracking clay, and open downs) on undulating plains (DES 2018h).	Potential. The Study area contains potential habitat for this species. Records do occur within 10 km of the Study area (Figure 11) (DES 2018a, AVH 2018).	Unlikely. Not detected during field surveys.	✓	✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Dichanthium setosum</i>	Bluegrass	V		Recorded from the Leichardt, Morton, North Kennedy and Port Curtis regions (Henderson 1997). Occurs in the Mistake Range, in Main Range National Park and possibly in Glen Rock Regional Park. Associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil (Ayers et al. 1996; DEC 2005a cited in DEE 2018a) and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture (DEE 2018a).	Likely. Species or species habitat likely to occur within broad search area (DEE 2018a). Potential habitat likely to occur within the Study area. Records from previous studies at Red Hill Mine (50 km north) and Saraji (6 km east) of the Study area (URS 2013; SKM 2011a).	Unlikely. Not detected during field surveys.	✓		✓

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Digitaria porrecta</i>	Finger panic		NT	Occurs in tussock grassland or open woodland of poplar box or Queensland blue gum, invariably on heavy, cracking clays, sometimes of alluvial origin. The climate is subtropical and seasonal, often with extended periods of drought (Queensland Herbarium 2012 cited in DES 2018i).	Potential. Potential habitat likely to occur within the Study area. No records from within 10 km of the Study area, although confirmed records within 50 km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	
<i>Eucalyptus raveretiana</i>	Black ironbox	V		Along watercourses and occasionally on river flats. It occurs in open forest or woodland communities, preferring sites with moderately fertile soil and adequate sub-soil moisture. The alluvial soils in which it grows are sands, loams, light clays or cracking clays (Halford 1997 cited in DES 2018j).	Potential. Potential habitat occurs within the Study area. No records from within 10 km of the Study area, although confirmed records within 50 km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Kelita unicella</i>		-	E	Known only from the vicinity of the Newlands Coal Mine, growing on the slopes of Tertiary plateau appearing to prefer south-facing slopes in <i>Acacia shirleyi</i> woodland with 'scrub' understorey on pink, gravelly loam (DES 2018p).	Unlikely. Potential habitat unlikely to occur within the Study area. Confirmed records within 50 km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	
<i>Macropteranthes leiocaulis</i>	Southern bonewood		NT	In vine thickets and dry rainforest; north from the Binjour Plateau (NW of Gayndah), Qld, to Mingela (SW of Townsville), North Queensland (Hardin <i>et al.</i> 2014 cited in DES 2018k).	Unlikely. Confirmed records within 50 km of the Study area, but not within 10 km (DES 2018a). Species or species habitat does not occur in the Study area.	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Omphalea celata</i>		V	V	Known from three sites in central east Queensland. Locations include Hazlewood Gorge, near Eungella; Gloucester Island, near Bowen; and Cooper Creek in the Homevale Station area, north-west of Nebo. Grows in fragmented semi-evergreen vine thicket and Araucarian microphyll vine forest (TSSC 2008).	Unlikely. Potential habitat unlikely to occur within the Study area. Confirmed records within 50km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Samadera bidwillii</i>	Quassia	V	V	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils (DEE 2018a).	Unlikely. The species or species habitat is likely to occur in the broader search area (DEE 2018b), however, Potential habitat is unlikely in the Study area and there are no confirmed records within 50 km (DEE 2018b).	Unlikely. Not detected during field surveys.	✓		
<i>Solanum adenophorum</i>			E	<i>S. adenophorum</i> occurs mostly in brigalow woodland and on very gently inclined slopes. It also occurs in gidgee (<i>Acacia cambagei</i>) scrub on deep cracking clay soils (Bean 2004 cited in DES 2018I).	Potential. Potential habitat occurs within the Study area. No records from within 10 km of the Study area, although confirmed records within 50 km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Solanum elaeagnifolium</i>			E	<i>S. elaeagnifolium</i> grows on fertile cracking-clay soils in open forest of <i>Eucalyptus thozetiana</i> , <i>Acacia harpophylla</i> , with understorey of <i>Geijera parviflora</i> , <i>Casuarina cristata</i> , <i>Macropteranthes leichhardtii</i> , <i>E. cambageana</i> , or woodland of <i>E. crebra</i> and <i>E. tenuipes</i> (Bean 2004; Queensland Herbarium 2012 cited in DES 2018m).	Likely. Potential habitat occurs within the Study area. Confirmed records within 10 km of the Study area (DES 2018a; AVH 2018).	Unlikely. Not detected during field surveys.		✓	

Scientific name	Common name	Status		Preferred habitat	Likelihood of occurrence within Study area based on desktop	Likelihood of occurrence within Study area post field survey	Source		
		EPBC Act ¹	NC Act ²				DEE 2018b	DES 2018a	Previous studies
<i>Trioncinia patens</i>			E	Known only from three locations all on the toe-slopes of peaks in and near the Peak Range National Park between Clermont and Dysart. Occurs in Eucalypt woodland on basalt-derived dark-grey to red-brown clays or clay-loams, often some surface gravel (Holland and Butler 2007).	Unlikely. Potential habitat unlikely to occur within the Study area. Confirmed records within 50km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	
<i>Triconinia retroflexa</i>			E	Found near Clermont and Springsure in central Queensland and occurs in grasslands on basalt downs and also on dark brown or black cracking clay soils (DES 2018q).	Unlikely. Potential habitat unlikely to occur within the Study area. Confirmed records within 50km of the Study area (DES 2018a).	Unlikely. Not detected during field surveys.		✓	

Notes:

1. EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; 2. NC Act = Queensland *Nature Conservation Act 1992*.



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5.6 Introduced flora

A total of 73 introduced plant species were recorded from the Study area. This comprised 42 introduced plant species recorded during the spring 2016 surveys, a further 23 during the autumn 2017 surveys, and another eight during the spring 2017 surveys (Appendix F). Eleven of these are category 3 restricted matter species listed under the Queensland *Biosecurity Act 2014*, including ten that are also listed WoNS (Table 8). Category 3 restricted matter weed species must not be distributed; meaning that they must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised under a regulation or under a permit. However, unlike category 1 and 2 prohibited matter species, there is no requirement to notify Biosecurity Queensland of their occurrence.

Table 8 Restricted pest plants and Weeds of National Significance recorded from the Study area

Scientific name	Common name	Qld Bio Act *	National status^	Identified in search area	Identified in Study area
<i>Cryptostegia grandiflora</i>	Rubbervine	3	WONS	✓	✓
<i>Harrisia martini</i>	Harrisia cactus	3		✓	✓
<i>Jatropha gossypifolia</i>	Bellyache bush	3	WONS	✓	✓
<i>Lantana camara</i>	Lantana	3	WONS	✓	✓
<i>Lantana montevidensis</i>	Creeping lantana	3	WONS	✓	✓
<i>Opuntia stricta</i>	Common pest pear	3	WONS	✓	✓
<i>Opuntia tomentosa</i>	Velvety tree pear	3	WONS	✓	✓
<i>Parkinsonia aculeata</i>	Parkinsonia	3	WONS	✓	✓
<i>Parthenium hysterophorus</i>	Parthenium	3	WONS	✓	✓
<i>Senecio madagascariensis</i>	Fireweed	3	WONS	✓	✓
<i>Vachellia nilotica</i> subsp. <i>indica</i>	Prickly acacia	3	WONS	✓	✓

Notes:

* Restricted species under the *Queensland Biosecurity Act 2014* (Qld Bio Act);

^ Species listed as Weed of National Significance (DEE 2018c).

5.7 Matters of National Environmental Significance

Threatened Ecological Communities

The desktop assessment identified the potential occurrence of four TECs listed under the EPBC Act. One of these communities, the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (Brigalow TEC), was identified within the Study area. Brigalow TEC within the Study area comprises only those patches of vegetation that meet the condition thresholds identified in Section 4.5.4. The location of Brigalow TEC within the Study area is identified in Figure 10. The TEC's in the Study area are discussed in detail in Section 5.1.3.

Threatened species

Despite targeted surveys no flora species listed under the EPBC Act were recorded in the Study area.

5.8 Matters of State Environmental Significance

The environmental offsets framework in Queensland includes the *Environmental Offsets Act 2014* (EO Act), the *Environmental Offsets Regulation 2014* (EO Regulation) and the Queensland *Environmental Offsets Policy* (EO Policy). MSES are defined in the EO Regulation and are a component of the biodiversity state interest identified in the Queensland State Planning Policy (DILGP 2017).

No flora species listed as Endangered or Vulnerable under the NC Act were recorded from the Study area during the field surveys by DPM Envirosciences.

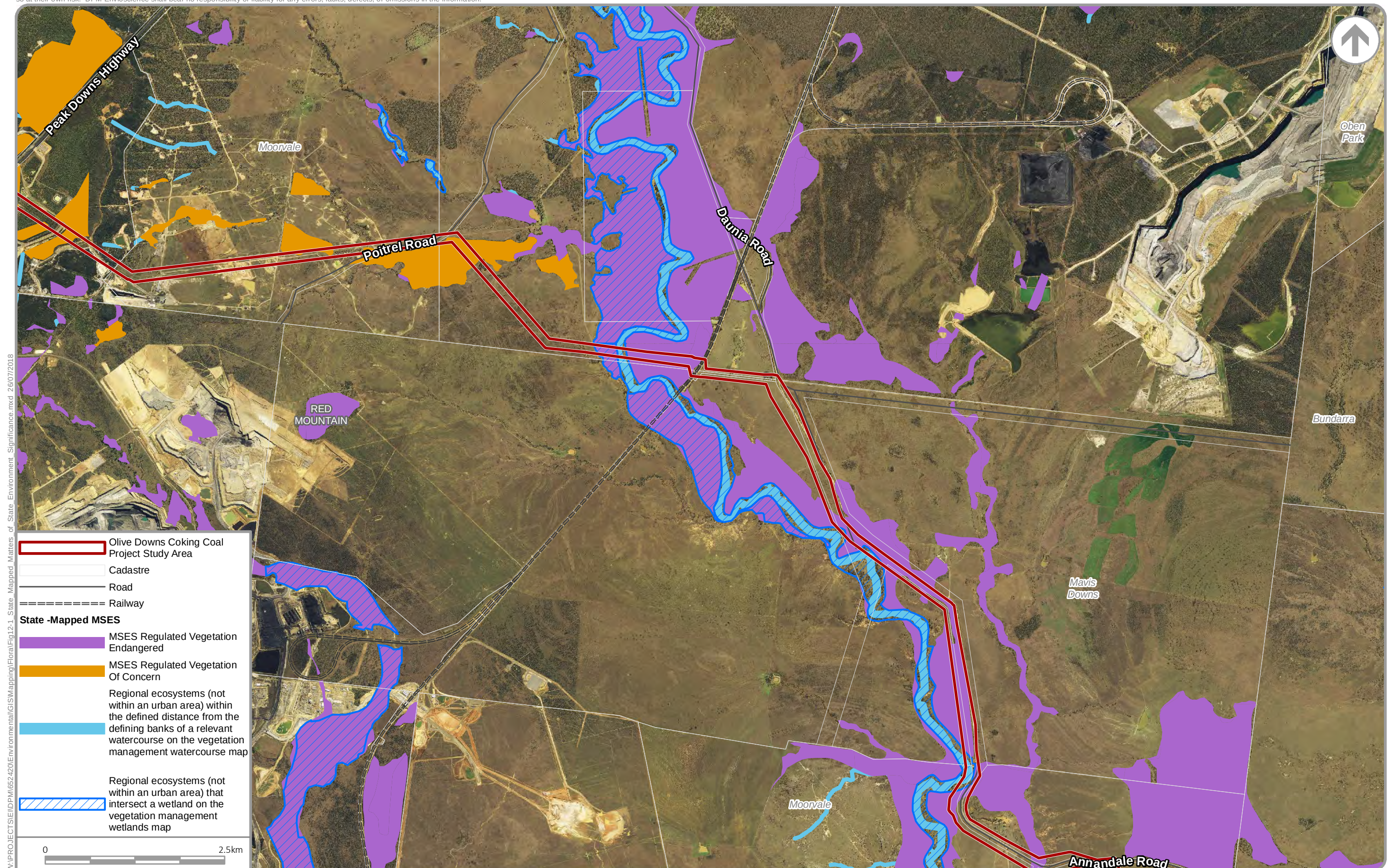
A summary of the MSES (relevant to terrestrial flora) that were recorded in the Study area during the field surveys are listed in Table 9 and shown on Figure 13.

Table 9 MSES located in the Study area

Prescribed Environmental Matter	Present in the Study area	Detail
Regulated vegetation	Yes	A number of matters of state environmental significance were identified during the surveys as occurring within the Study area (DEHP 2014a) (Figure 12). These include: ▪ Endangered RE (RE 11.3.1, RE 11.4.8, RE 11.4.9 and RE 11.5.17) ; ▪ Of Concern RE (RE 11.3.2, RE 11.3.3 and RE 11.3.4) ; ▪ RE that intersects with an area shown as a wetland on the vegetation management wetlands map (RE RE 11.3.27); and ▪ RE located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature.
Connectivity areas	Yes	Refer to DPM Envirosciences (2018a)
Wetlands and watercourses	Yes	Refer to DPM Envirosciences (2018b)
Protected Wildlife Habitat	Yes – Fauna	Refer to DPM Envirosciences (2018a)
Koala Habitat in South-East Queensland	No	The Study area is not located in South-east Queensland
Protected Areas	No	The Study area does not contain protected areas.
Fish Habitat Areas and Highly Protected Zones of State Marine Parks	No	The Study area is not located in a State Marine Park.
Waterway providing for fish passage	Yes	Refer to DPM Envirosciences (2018b).
Marine Plants	No	The Study area is not located in a marine environment.
Secured Offset Area	No	The Study area does not contain legally secured offset areas.

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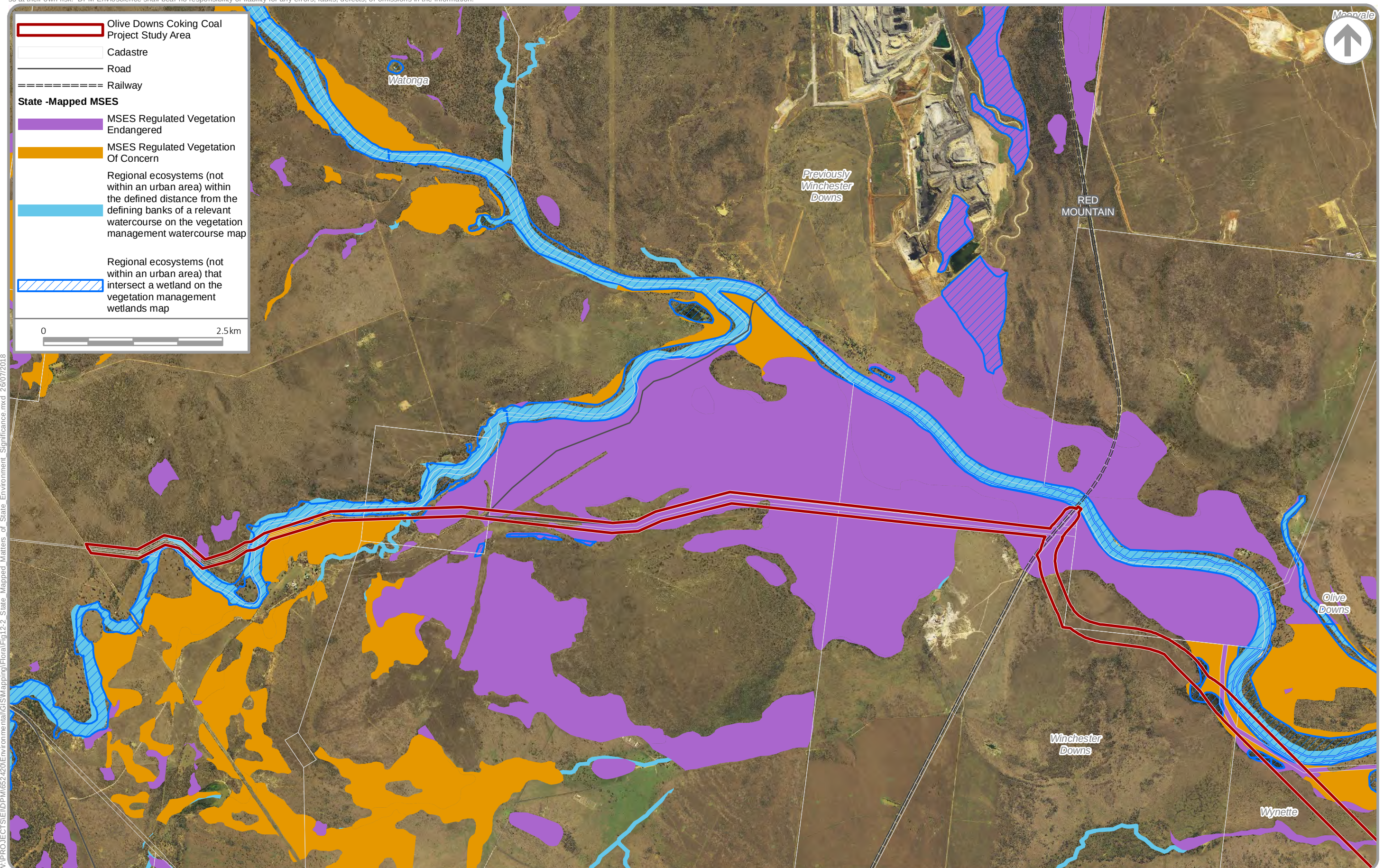




STATE-MAPPED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 1

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

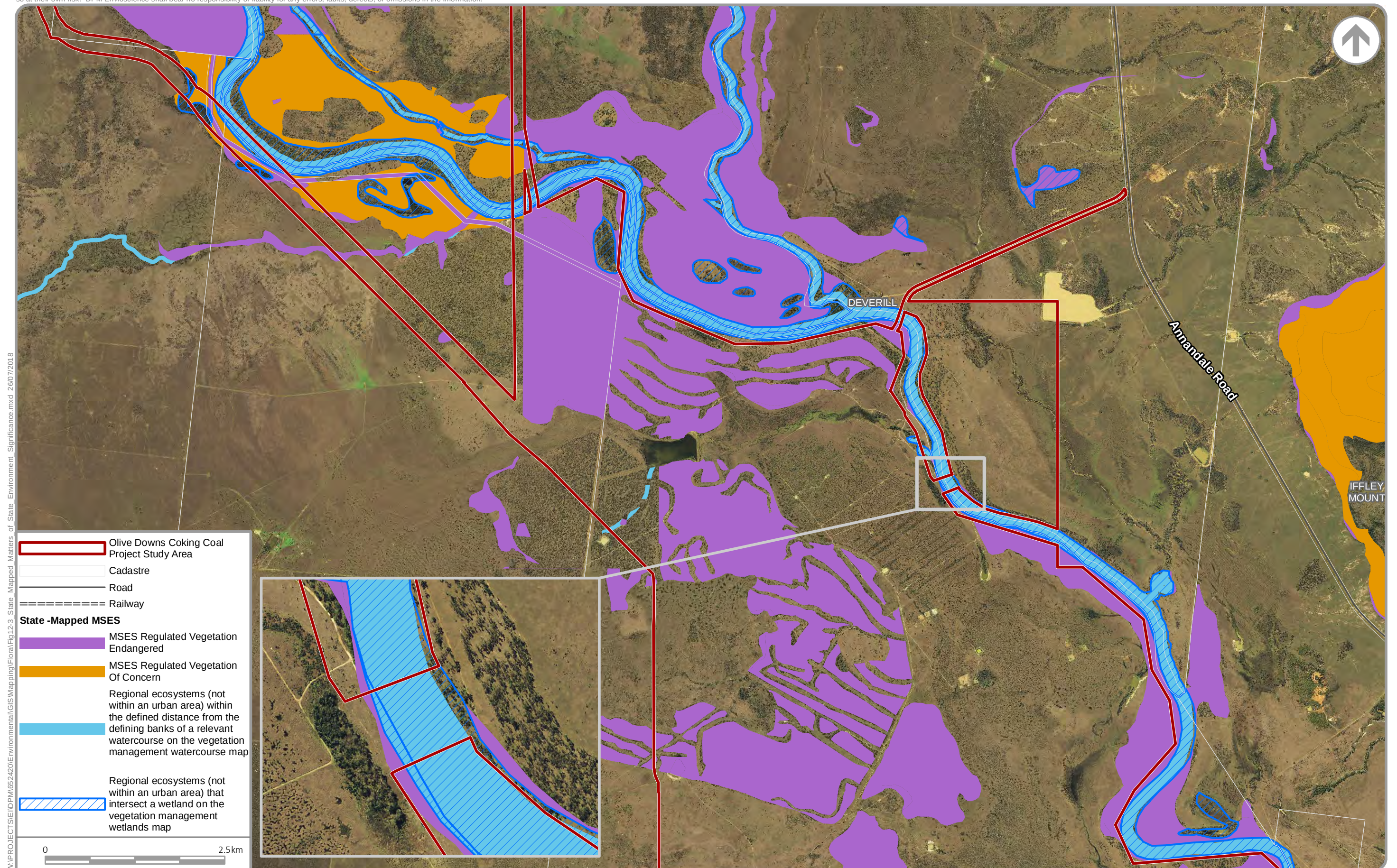
FIGURE 12



STATE-MAPPED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 2

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 12



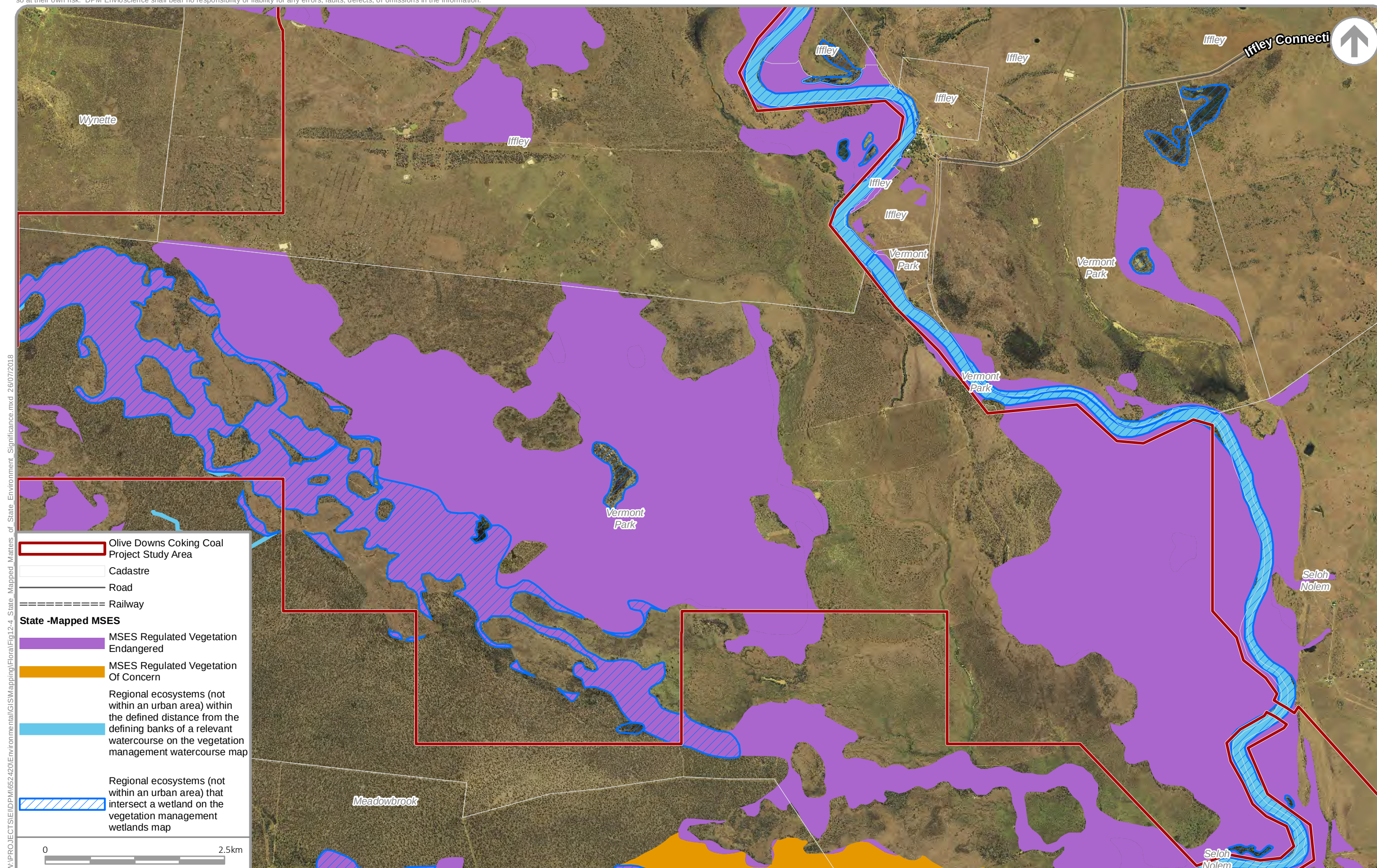
STATE-MAPPED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 3

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 12

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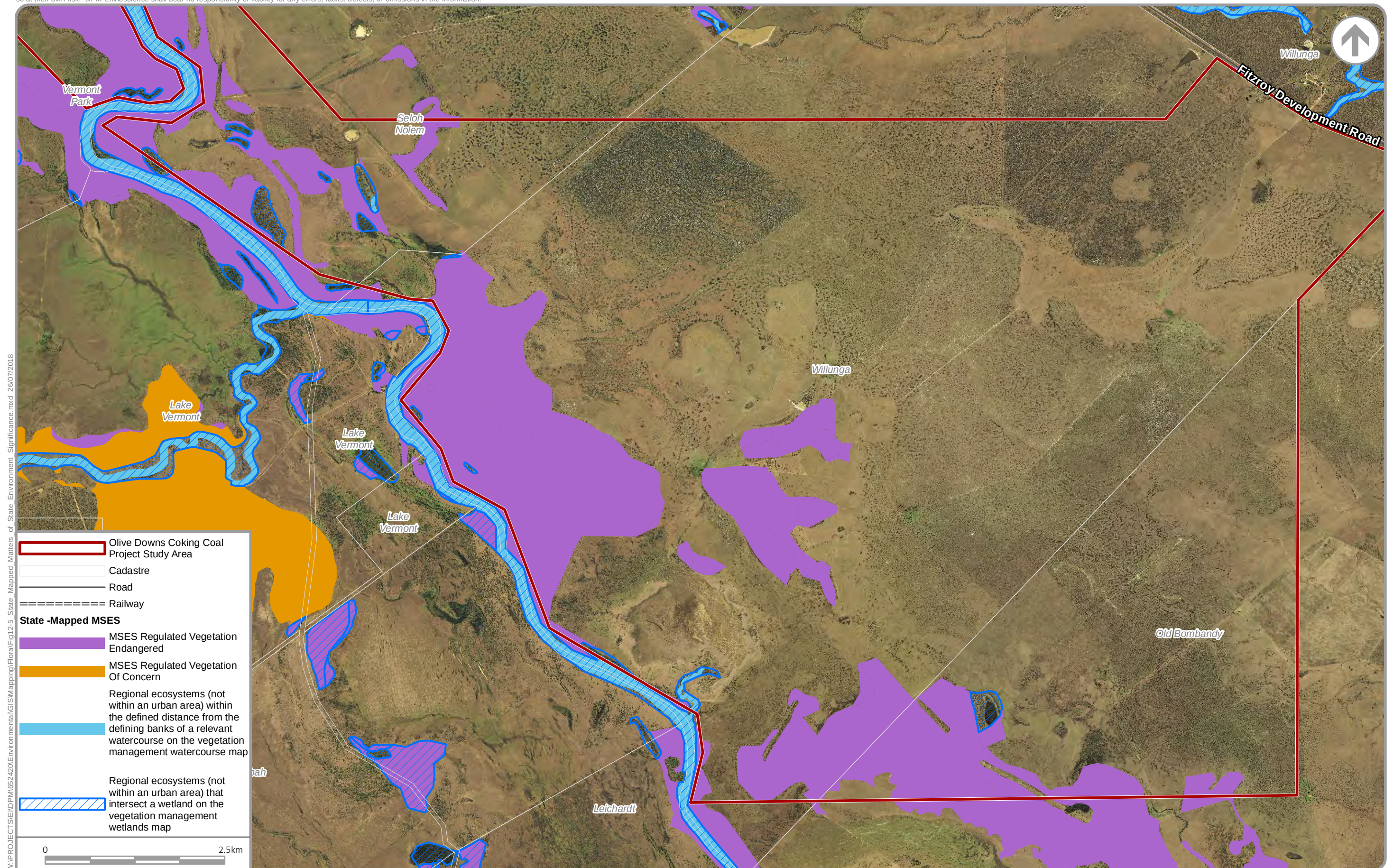
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STATE-MAPPED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 4

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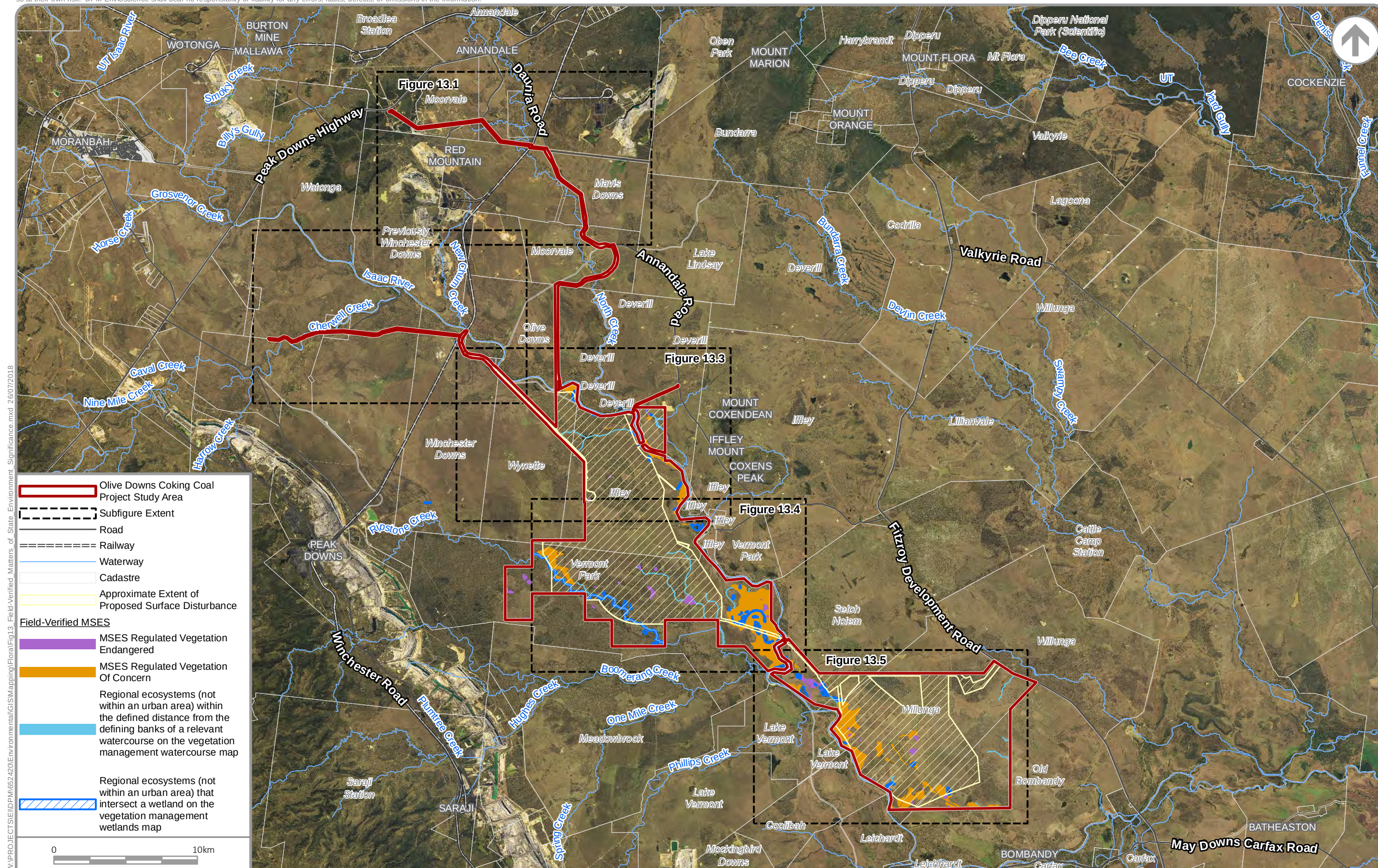
FIGURE 12



STATE-MAPPED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 5

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 12



FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE MAP

Olive Downs Coking Coal Project Study Area



FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 1

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 13.1

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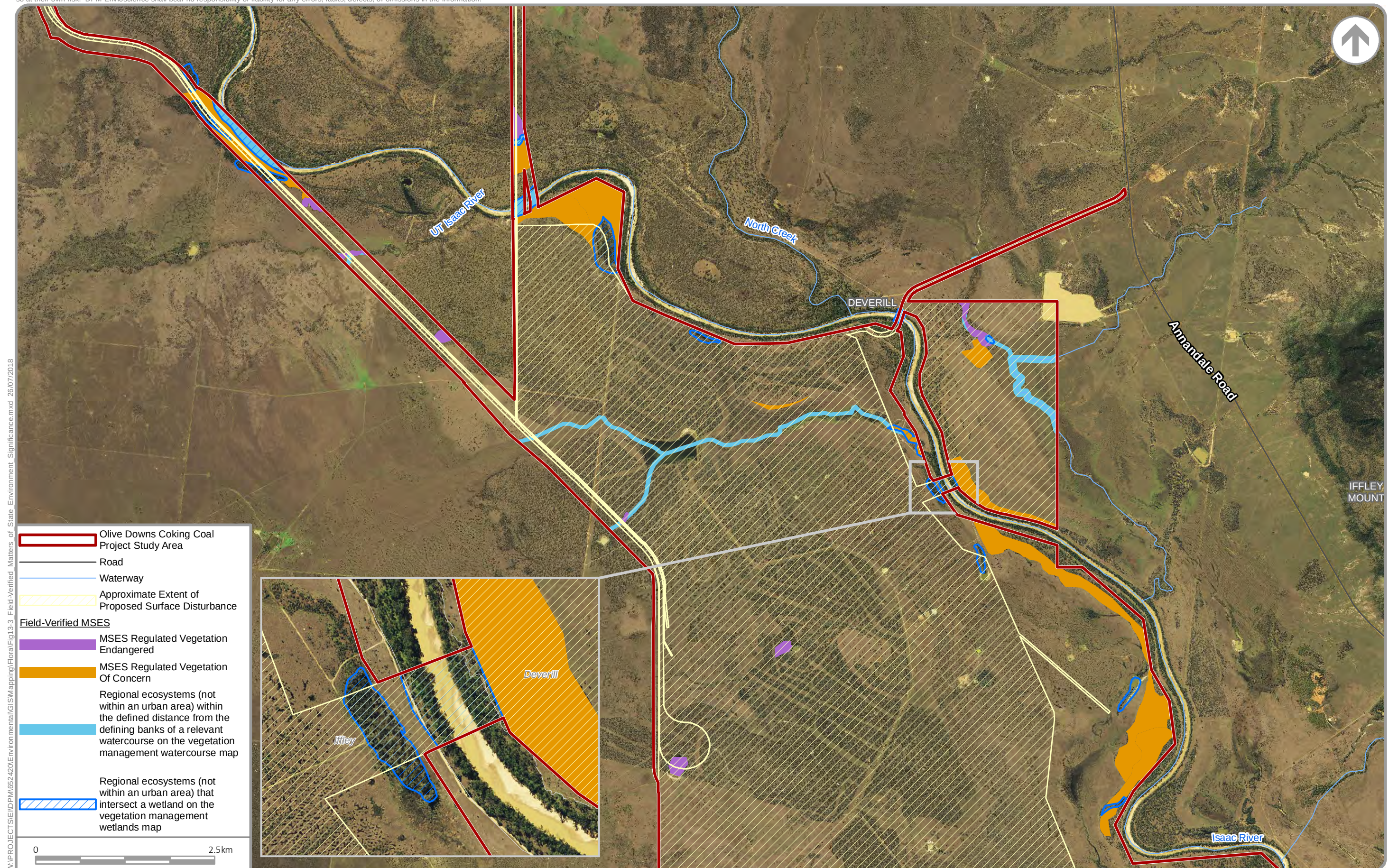


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FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 2

Olive Downs Coking Coal Project Study Area

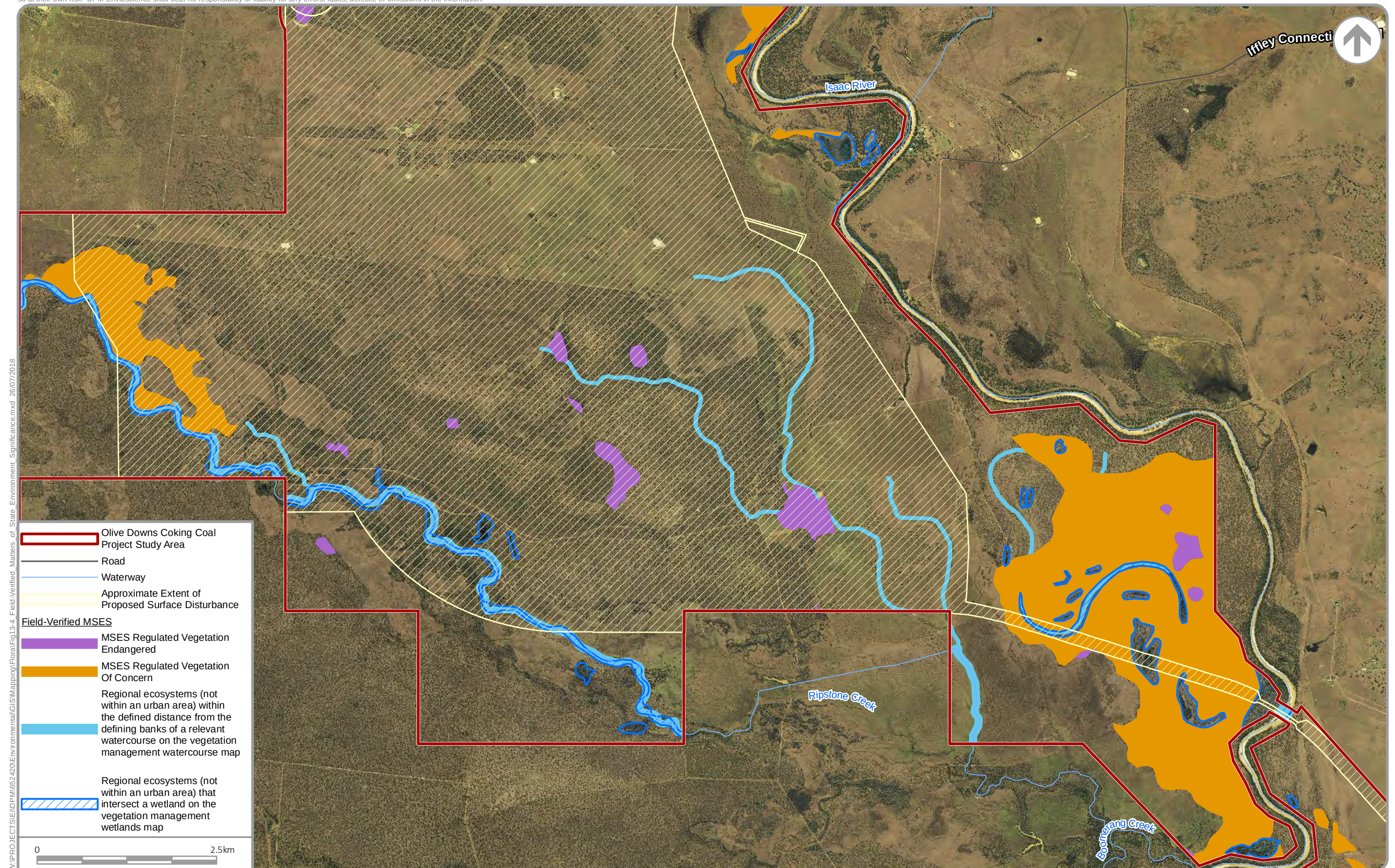
FIGURE 13.2



FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 3

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 13.3



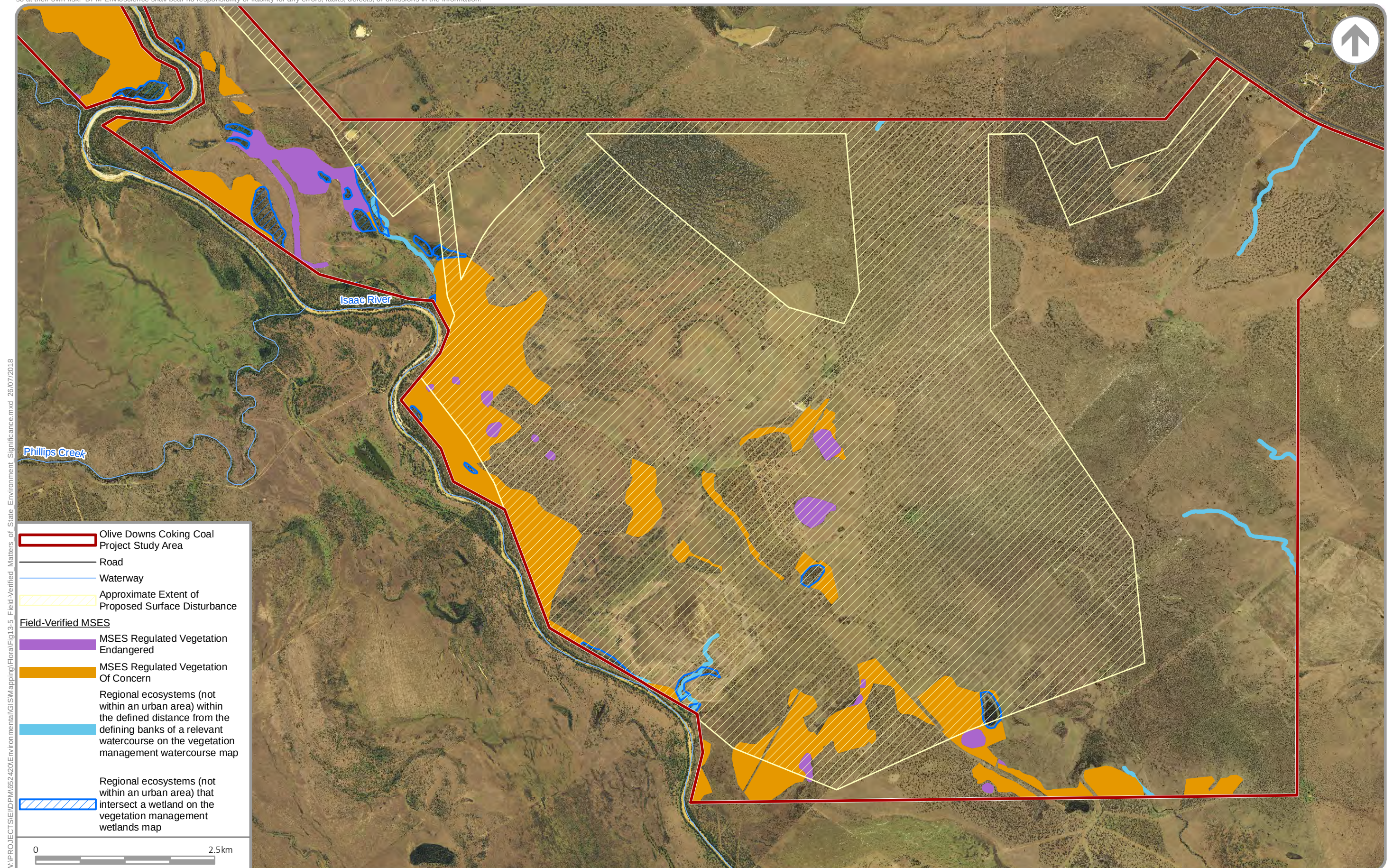
FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 4

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 13.4

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FIELD-VERIFIED MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE - MAP 5

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 13.5

5.10 Environmentally Sensitive Areas

The ESA mapping tool (DNRM 2017b) does not identify any Category A or C ESAs within the Study area; however, it shows patches of Category B ESA scattered throughout the Study area.

Ground-truthing of the REs within the Study area confirmed the presence of Category B ESAs, comprising REs with an Endangered biodiversity status (Figure 14), namely:

- 11.3.1 – Brigalow (*Acacia harpophylla*) and / or belah (*Casuarina cristata*) open forest on alluvial plains;
- 11.4.8 – Dawson gum (*Eucalyptus cambageana*) woodland to open forest with brigalow or blackwood (*Acacia argyrodendron*) on Cainozoic clay plains; and
- 11.5.17 – Palustrine swamp with fringing Queensland blue gum (*Eucalyptus tereticornis*) woodland in depressions on Cainozoic sand plains and remnant surfaces.



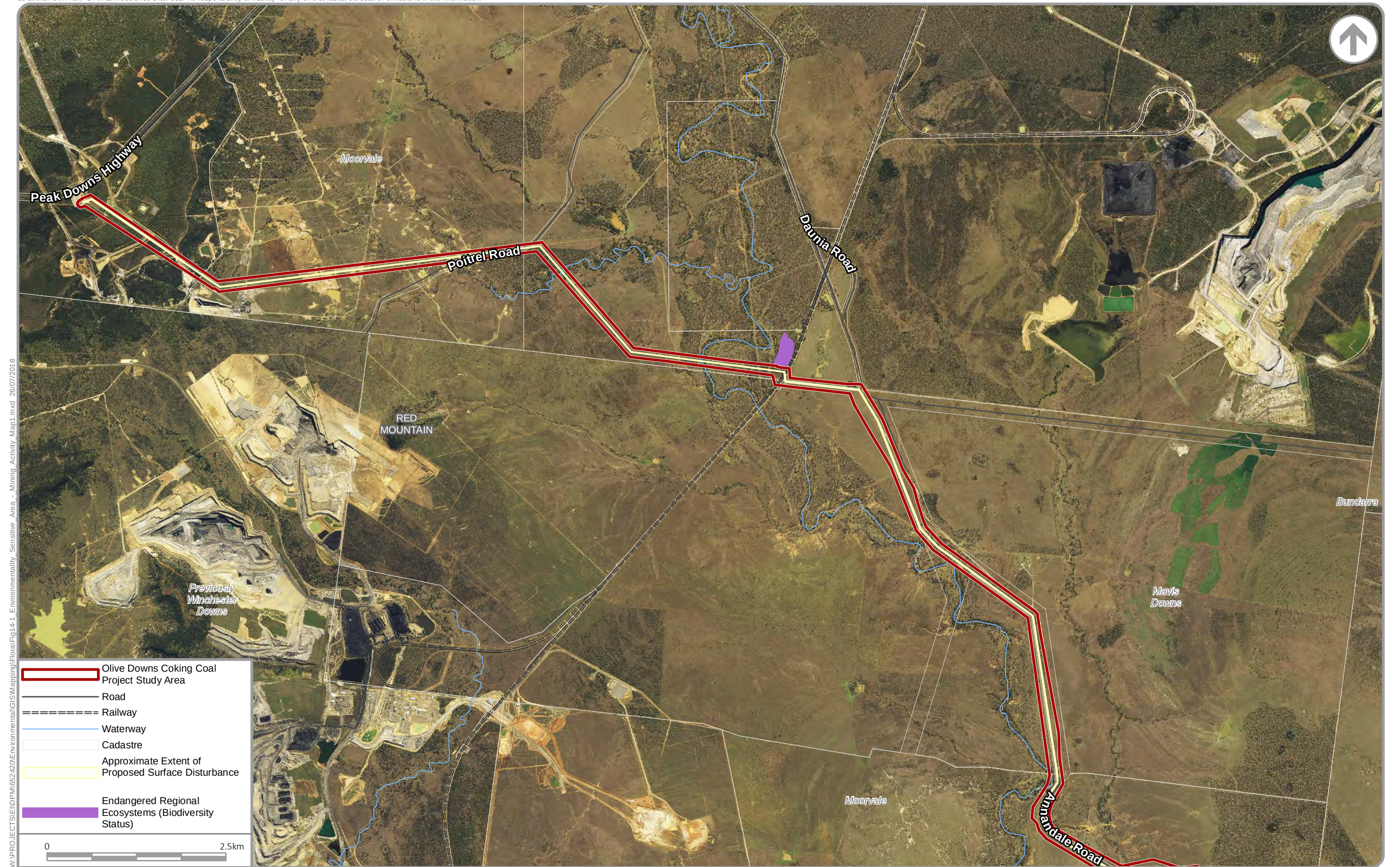
ENVIRONMENTALLY SENSITIVE AREAS – MINING ACTIVITIES

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 14

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ENVIRONMENTALLY SENSITIVE AREAS – MINING ACTIVITIES – Map 1

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 14

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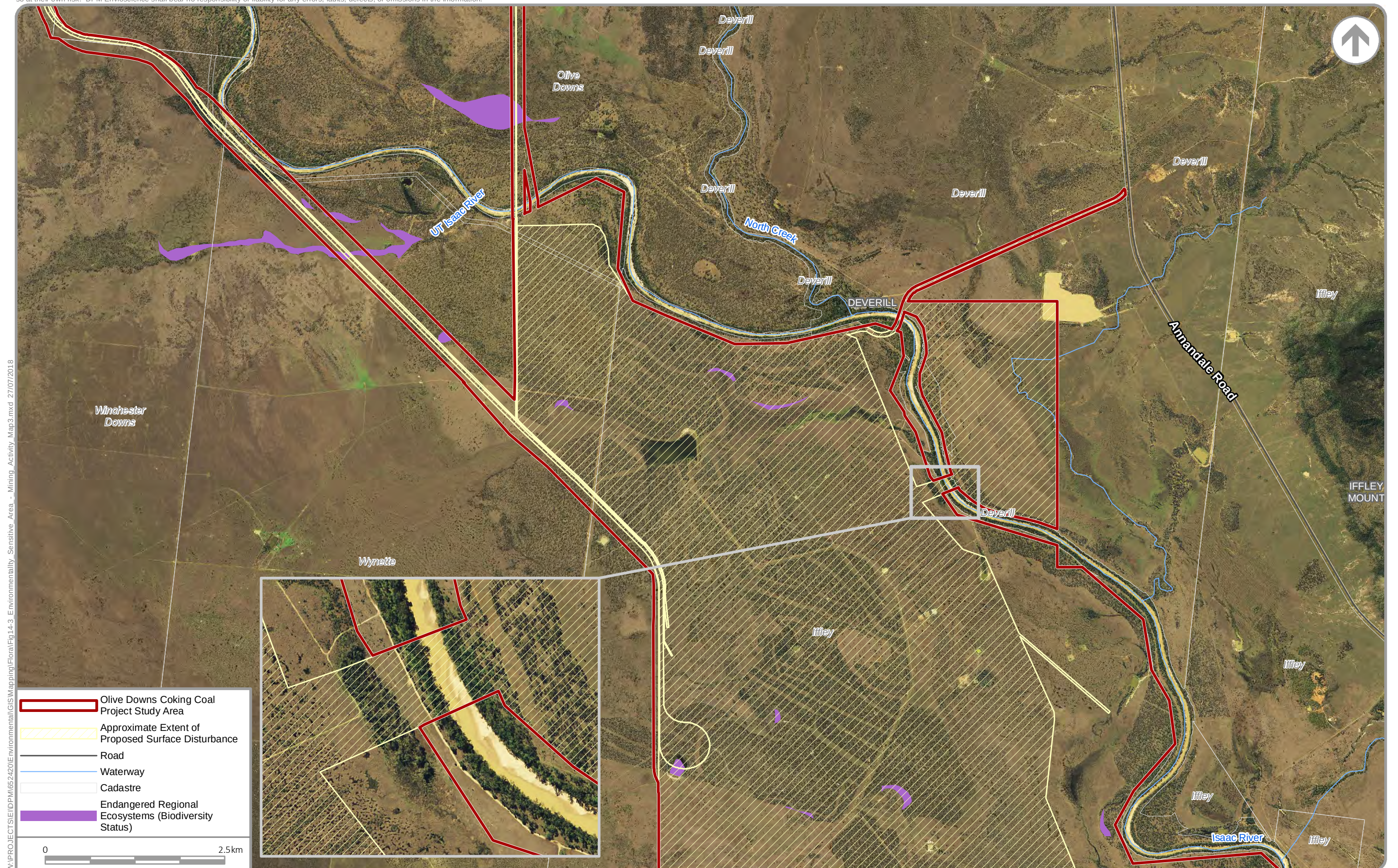
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W:\PROJECTS\I\DP\652420\Environmental\GIS\Mapping\Flora\Fig14-2 Environmentally Sensitive Area - Mining Activity Map2.mxd 26/07/2018

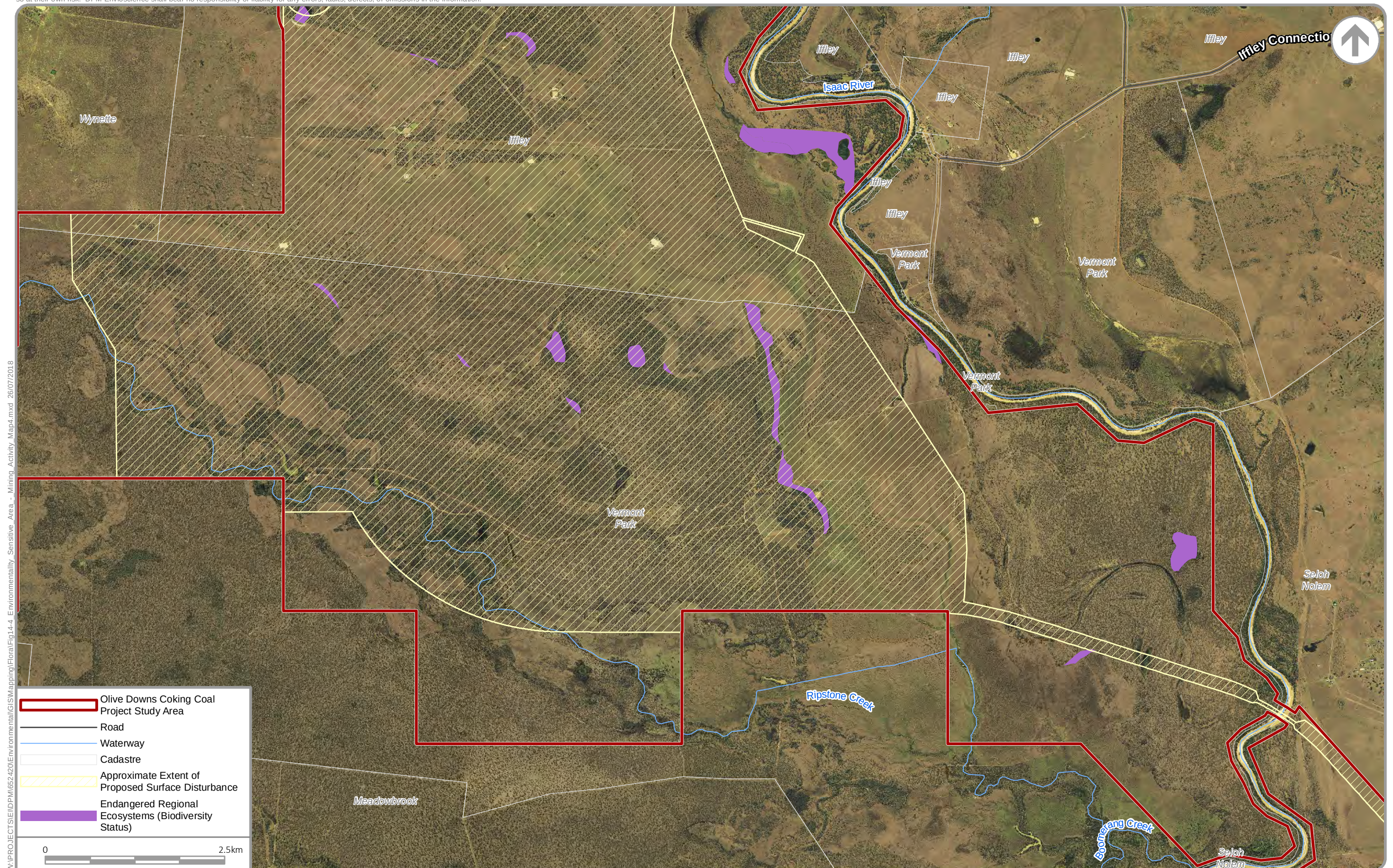
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W:\PROJECTS\IDPM\652420\Environmental\GIS\Mapping\Flora\Fig14-4 Environmentally Sensitive Area - Mining Activity Map4.mxd 26/07/2018



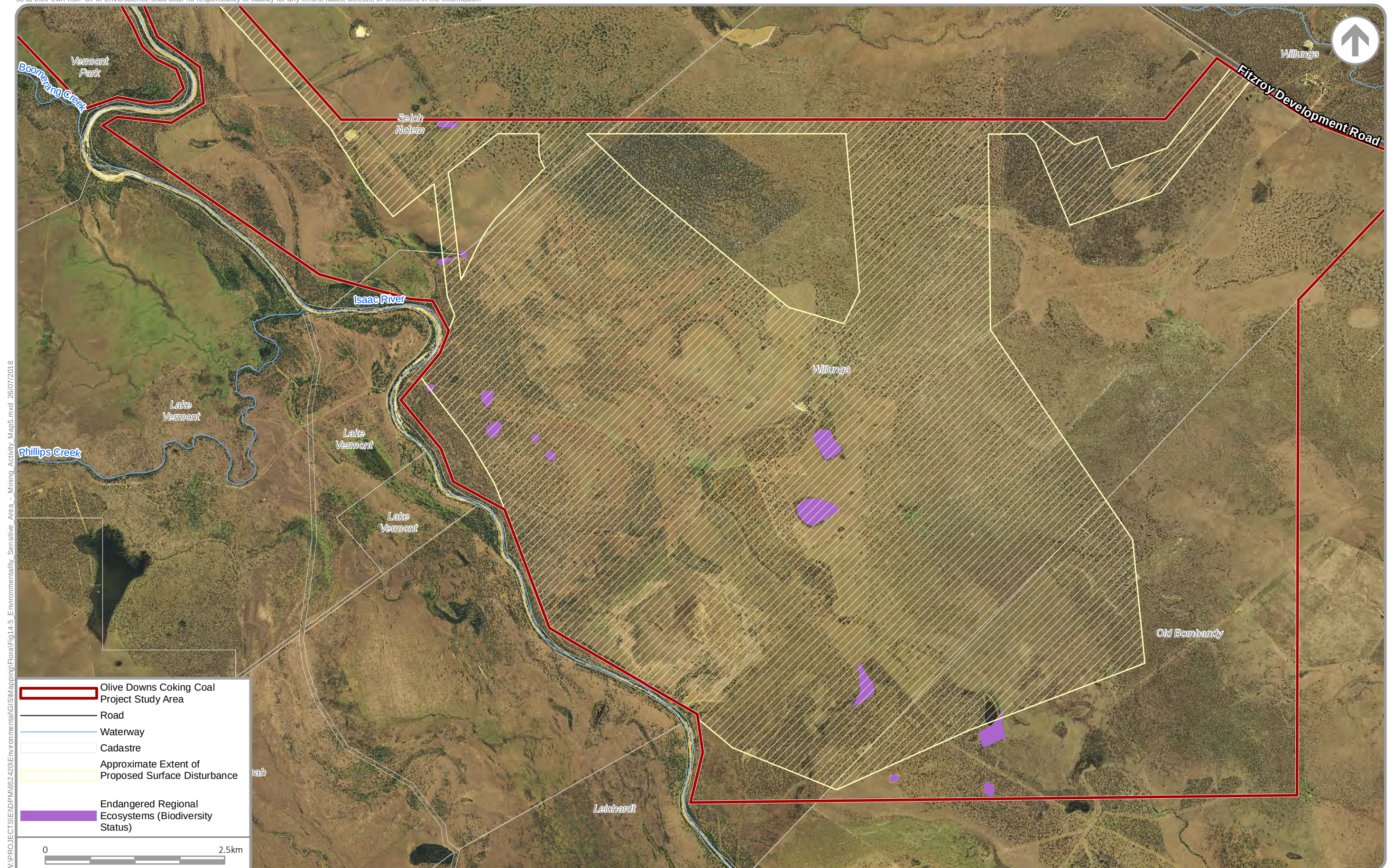
ENVIRONMENTALLY SENSITIVE AREAS – MINING ACTIVITIES – Map 4

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 14

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W:\PROJECTS\ENDP\652420\Environmental\GIS\Mapping\Flora\Fig14-5 Environmentally Sensitive Area - Mining Activity Map5.mxd 26/07/2018

5.12 Biodiversity Planning Assessment

Biodiversity Planning Assessments (BPAs) have been produced by the Queensland Government to identify the terrestrial ecological values in a region, or bioregion, according to their conservation significance (DEHP 2014b). The BPA mapping for the Brigalow Belt identifies areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes (DEHP 2014b).

The BPA mapping for the Brigalow Belt identifies areas of State, Regional and Local biodiversity significance within the Study area (Figure 15). Areas of both State and Regional biodiversity significance align with the State RE mapping for the Study area. Areas of State biodiversity significance include the Isaac River corridor as well as mapped REs predominantly on Vermont Park. Areas of Regional biodiversity significance include remnant vegetation on Lake Vermont, Iffley, Seloh Nolem, Willunga and Old Bombandy. Areas of Local biodiversity significance within the Study area comprise wetlands of General Ecological Significance that appear in the State Referable Wetlands mapping (refer to the aquatic ecology assessment – DPM Envirosciences 2018b), but that are not considered to be of High Ecological Significance, nor are they of sufficient extent to appear in the State RE mapping.

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BIODIVERSITY PLANNING ASSESSMENT MAP

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 15

6 POTENTIAL IMPACTS

6.1 Vegetation clearance

6.1.1 General description

The overall approximate extent of surface disturbance (clearance) associated with the Project is referred to as the Project area. The Project area is approximately 16,300 ha, comprising a disturbance footprint of approximately 16,100 ha for the Mine Site and Access Road, approximately 56 ha for the Water Pipeline, approximately 40.5 ha for the Project ETL, approximately 103 ha for the Rail Spur and Loop.

Of this, about 5,661.5 ha is remnant vegetation (Table 10), while approximately 65% (approximately 10,628 ha) of the Project area comprises non-remnant modified grassland and regrowth.

The BVG most affected by the Project would be BVG 5 – Eucalypt dry woodlands on inland depositional plains (4,805 ha). The approximate areas of impact for the four components of the Project are:

- Mine site and access roads – 5,573 ha remnant vegetation;
- Water pipeline (20 m corridor) – 30.5 ha remnant vegetation;
- ETL (10 m corridor) – 14.0 ha remnant vegetation; and
- Rail spur (45 m corridor) – 44.0 ha remnant vegetation.

In summary, the clearing of REs (based on ground-truthed mapping) is estimated to be as follows:

- Endangered RE – 139.5 ha;
- Of Concern RE – 865.5 ha; and
- Least Concern RE – 4,656.5 ha.

All the native vegetation communities / REs to be cleared occur more widely in the surrounding landscape and subregion (after Accad et al. 2017). The RE that would be subject to the largest area of clearing is RE 11.5.3 (approximately 2,963 ha). This represents approximately 1.97% of the mapped extent of this RE available in the biodiversity subregions in which the Project area is situated (Northern Bowen Basin and Isaac-Comet Downs) (Queensland Herbarium 2016), and is a reflection of the wide distribution of RE 11.5.3.

The RE with the highest proportion impacted by the Project compared to the extent within the bioregion is Endangered RE 11.5.17 (*Eucalyptus tereticornis* woodland in depressions), which would suffer a 54.6% loss, being a significant loss of an already limited wetland ecosystem. A breakdown of the amount of each RE required to be cleared for the Project is presented in Table 11.

Staged Clearance

Land clearing is proposed to occur in the following four stages:

- Stage 1 – 2019-2024;
- Stage 2 – 2025-2030;
- Stage 3 – 2031-2050; and
- Stage 4 – 2051- end of mine.

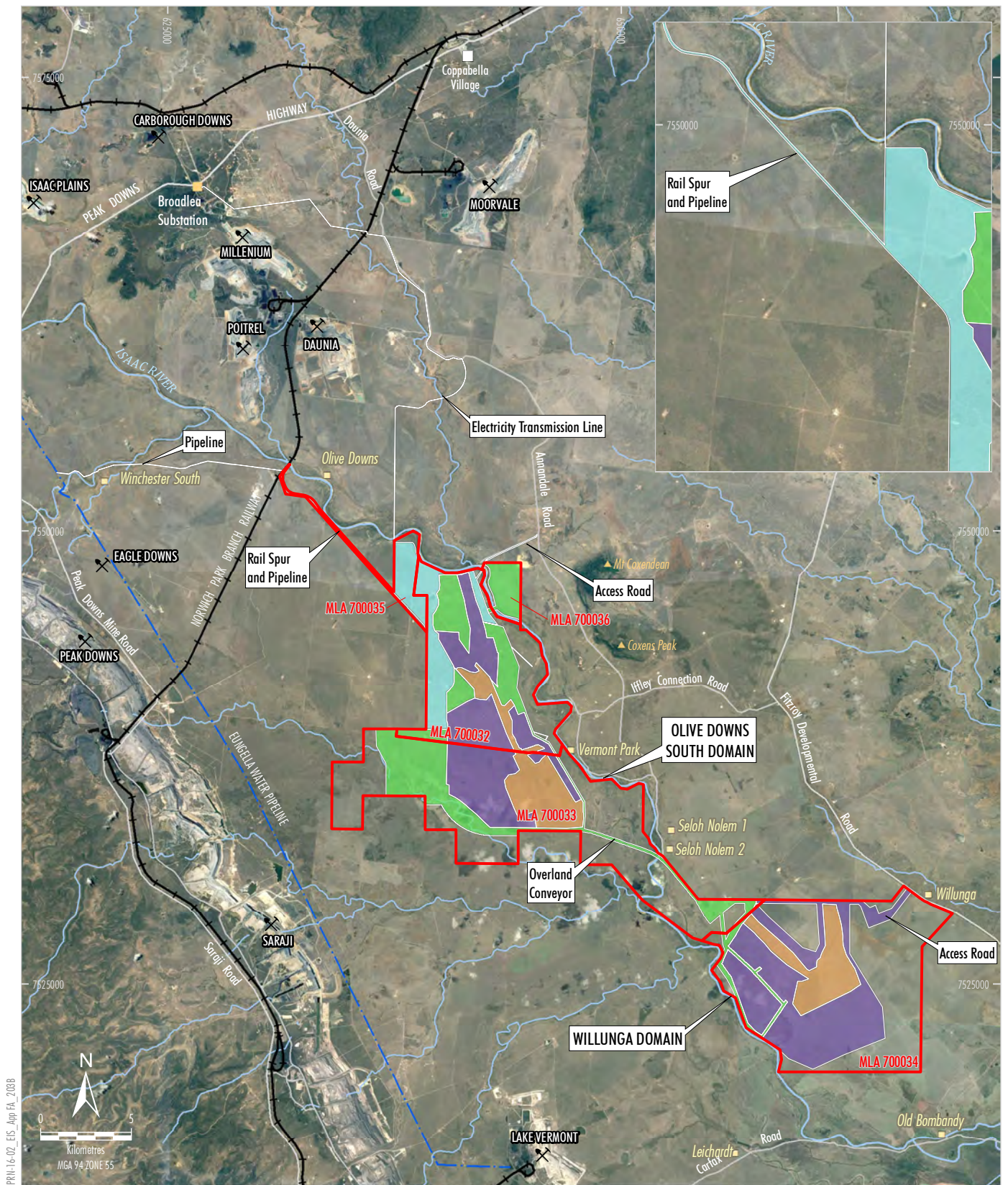
Stage 1 of the Project would include the following works (Figure 16):

- construction of each of the infrastructure corridors:
 - rail corridor;
 - ETL;
 - water pipeline;
 - Olive Downs South access road;
- construction of the mine infrastructure area (including offices, workshops, CHPP, ROM pad, ILF cells);
- development of the north-western waste emplacement;
- construction of temporary flood levees located within the Stage 1 boundary; and
- commencement of open cut mining in Pit 1.

The subsequent stages include:

- Stage 2 – all works proposed during the Willunga domain construction period.
- Stage 3 – all works proposed up until year 2050.
- Stage 4 – all works required until completion of the Project.

Table 10 provides a breakdown of the vegetation that would be cleared within Stage 1 and the subsequent stages. Pembroke proposes a staged environmental offset in consideration of the staged land clearing as described in Section 8.



PRM-16-02_EIS_Apr FA_2018

- | LEGEND | |
|---|-----------------------------------|
| | Mining Lease Application Boundary |
| | Approved/Operating Coal Mine |
| | Dwelling |
| | Eungella Pipeline Network |
| | Railway |
| | Indicative Mine Stage 1 |
| | Indicative Mine Stage 2 |
| | Indicative Mine Stage 3 |
| | Indicative Mine Stage 4 |

Source: Pembroke (2018); Department of Natural Resources and Mines (2018); Orthophotography; Google Image (2016)



OLIVE DOWNS COKING COAL PROJECT
Indicative Mine Stages
for Biodiversity Offset

Figure 16

Table 10 Impact of Project on Regional Ecosystems

Regional Ecosystem	VM Act status	Biodiversity status	Stage 1 impact (ha)	Stage 2 impact (ha)	Stage 3 impact (ha)	Stage 4 impact (ha)	Total Impact area (ha)
Approximate Extent of Proposed Surface Disturbance – Mine Site and Access Road (EPBC 2017/7867)							
11.3.1	E	E	-	6.5	5.5	-	12.0
11.3.2	OC	OC	5.5	401.5	416.0	20.5	843.5
11.3.25	LC	OC	1.0	74.0	5.5	-	80.5
11.3.27b	LC	OC	-	9.5	-	-	9.5
11.3.27f	LC	OC	12.0	11.5	5.5	-	29.0
11.3.27i	LC	OC	-	2.0	13.5	-	15.5
11.3.3	OC	OC	0.5	-	4.5	-	5.0
11.3.4	OC	OC	0.5	-	-	-	0.5
11.3.7	LC	OC	2.5	103.5	391.5	72.0	569.5
11.4.8	E	E	-	3.5	-	-	3.5
11.4.9	E	E	1.0	-	21.5	35.0	57.5
11.5.3	LC	NCP	442.0	921.0	1040.0	507.0	2,910
11.5.8c	LC	NCP	34.0	14.0	-	-	48.0
11.5.9	LC	NCP	243.0	221.0	353.0	113.0	930.0
11.5.17	E	E	2.0	1.0	31.0	25.0	59.0
Sub-totals			744	1769.0	2287.5	772.5	5573
Approximate Extent of Proposed Surface Disturbance – Water Pipeline (EPBC 2017/7868)							
11.3.1	E	E	0.5	0	0	0	0.5
11.3.2	OC	OC	6.0	0	0	0	6.0
11.3.25	LC	OC	1.5	0	0	0	1.5
11.3.27f	LC	OC	1.0	0	0	0	1.0
11.3.4	OC	OC	0.5	0	0	0	0.5
11.4.8	E	E	0.5	0	0	0	0.5
11.4.9	E	E	1.0	0	0	0	1.0
11.5.3	LC	NCP	19.0	0	0	0	19.0
11.5.9	LC	NCP	0.5	0	0	0	0.5
Sub-totals			30.5	0	0	0	30.5

Regional Ecosystem	VM Act status	Biodiversity status	Stage 1 impact (ha)	Stage 2 impact (ha)	Stage 3 impact (ha)	Stage 4 impact (ha)	Total Impact area (ha)
Approximate Extent of Proposed Surface Disturbance – Electricity Transmission Line (EPBC 2017/7869)							
11.3.1	E	E	0.5	0	0	0	0.5
11.3.2	OC	OC	5.0	0	0	0	5.0
11.3.25	LC	OC	0.5	0	0	0	0.5
11.3.7	LC	OC	0.5	0	0	0	0.5
11.4.8	E	E	0.5	0	0	0	0.5
11.4.9	E	E	0.5	0	0	0	0.5
11.5.3	LC	NCP	3.5	0	0	0	3.5
11.5.9	LC	NCP	2.0	0	0	0	2.0
11.5.9b	LC	NCP	0.5	0	0	0	0.5
11.7.2	LC	NCP	0.5	0	0	0	0.5
Sub-totals			14.0	0	0	0	14.0
Approximate Extent of Proposed Surface Disturbance – Rail Spur (EPBC 2017/7870)							
11.3.1	E	E	1.0	0	0	0	1.0
11.3.2	OC	OC	5.0	0	0	0	5.0
11.3.27f	LC	OC	3.0	0	0	0	3.0
11.5.3	LC	NCP	30.5	0	0	0	30.5
11.5.9	LC	NCP	1.5	0	0	0	1.5
11.5.17	E	E	3.0	0	0	0	3.0
Sub-totals			44.0	0	0	0	44.0
TOTALS			832.5	1769.0	2287.5	772.5	5661.5

Table 11 Summary statistics for impact of Project on Regulated Vegetation

Regional Ecosystem	Stage 1 impact (ha)	Stage 2 impact (ha)	Stage 3 impact (ha)	Stage 4 impact (ha)	Total impact area (ha)	Total impact as % of RE in biodiversity sub-region ¹
Endangered	10.5	11.0	58.0	60.0	139.5	
11.3.1	2.0	6.5	5.5	-	14.0	0.05
11.4.8	1.0	3.5	-	-	4.5	0.02
11.4.9	2.5	-	21.5	35.0	59.0	0.2
11.5.17	5.0	1.0	31.0	25.0	62.0	54.6
Least Concern	799.0	1,356.5	1,809.0	692.0	4656.5	
11.3.25	3.0	74.0	5.5	-	82.5	0.11
11.3.27, including:	16.0	23.0	19.0	-	58.0	7.35
▪ 11.3.27b	-	9.5	-	-	9.5	
▪ 11.3.27f	16.0	11.5	5.5	-	33.0	
▪ 11.3.27i	-	2	13.5	-	15.5	
11.3.7	3.0	103.5	391.5	72	570.0	6.74
11.5.3	495	921.0	1,040.0	507.0	2963.0	1.95
11.5.8c	34.0	14.0	-	-	48.0	3.83
11.5.9, including:	247.5	221.0	353.0	113.0	934.5	0.88
▪ 11.5.9b	0.5	-	-	-	0.5	
11.7.2	0.5	-	-	-	0.5	0.005
Of Concern	23.0	401.5	420.5	20.5	865.5	
11.3.2	21.5	401.5	416.0	20.5	859.5	1.24
11.3.3	0.5	-	4.5	-	5.0	0.014
11.3.4	1.0	-	-	-	1.0	0.03
TOTALS	832.5	1,769	2,287.5	772.5	5,661.5	0.43

Note:

1. The Project is located across two biodiversity sub-regions (Northern Bowen Basin and Isaac-Comet Downs). The statistics presented are based on the sum of remaining RE's in both sub-regions (REDD v10 2016).

6.1.2 Threatened Ecological Communities

A total of 13 ha of Brigalow TEC listed under the EPBC Act would be removed by the Project. This is further discussed in Section 6.10.1.

6.2 Conservation significant flora

One Near Threatened flora species, *Bertya pedicellata*, was recorded within and adjacent to the north west section of the ETL (Section 5.5). Mitigation measures to reduce the potential impacts to this species are detailed in Section 7.2 and focus on avoiding removal of the species through design. As a Near Threatened species under the NC Act, a significant impact assessment or an offset is not required. No other threatened flora species under the NC Act and / or EPBC Act were recorded.

6.3 Exotic flora and restricted plants

The current assessment has recorded the presence of a variety of exotic flora, including the following Category 3 Restricted Matter species listed under the Queensland *Biosecurity Act, 2014*:

- rubbervine (*Cryptostegia grandiflora*);
- Harrisia cactus (*Harrisia martini*);
- bellyache bush (*Jatropha gossypifolia*)
- lantana (*Lantana camara*);
- creeping lantana (*Lantana montevidensis*);
- common pest pear (*Opuntia stricta*);
- velvety tree pear (*Opuntia tomentosa*);
- parkinsonia (*Parkinsonia aculeata*);
- parthenium (*Parthenium hysterophorus*);
- fireweed (*Senecio madagascariensis*); and
- prickly acacia (*Vachellia nilotica* subsp. *indica*).

With the exception of harrisia cactus, each of these introduced species is also listed as a weed of national significance (WoNS).

Exotic flora species are concentrated in areas suffering some form of disturbance, mostly clearing for cattle grazing. Weeds threaten populations of native flora and fauna by competing with native flora and eventually changing the habitat, which is no longer suitable for the majority of native species. The EPBC Act lists weed invasion as a 'key threatening process' to biodiversity due to the impact on wildlife and the landscape (TSSC 2009b).

The spread of weed species is facilitated by disturbance. During construction there would be the potential for disturbing weeds in the Project area resulting in the movement of weeds within and outside of the Project area. This could increase the level of infestation in the Project locality and potentially facilitate the spread of weeds to the other adjacent areas. Weed seed can be transported in the mud on machinery or in the machinery itself.

There is a low likelihood of weeds spreading into adjoining native woodland/forest vegetation as a result of the Project because the control of declared weeds would be implemented for the Project area. Further, construction areas and the post-mine landforms would be progressively rehabilitated with native vegetation (limiting opportunities for weeds to grow).

6.4 Edge effects

Edge effects occur when previously intact remnant vegetation is cleared in part, leaving a new boundary of vegetation that becomes exposed to some form of disturbance. Edge effects can include: the establishment of weeds, immigration of pest fauna species, colonisation of aggressive native species (especially birds), exclusion of more sensitive native species, greater light intensity, wind penetration, lower humidity and greater fire susceptibility. The impact of increasing edge effects on flora and fauna relate primarily to a decrease in the effective area of habitat and an increase in competition for resources with aggressive pest or edge species. Depending on the disturbance and the shape of the remaining remnant patch, the processes associated with edge effects may extend well into a habitat area resulting in the eventual displacement of more sensitive native flora and fauna (which are generally restricted to habitat interiors). Smaller habitat patches are often dominated by common or generalist species that are more adaptable to their environment.

In this instance, the majority of the Project locality is already impacted by edge effects because there is an existing rural activity that has resulted in clearing of native vegetation. There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to areas of intact native vegetation. These areas include:

- the southern boundary of the Olive Downs South MLA close to Vermont Park where there are large areas of eucalypt woodland (predominantly RE11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and / or remnant surfaces).
- the north-western boundary of the Olive Downs South MLA, including the rail corridor where there is currently a large area of eucalypt woodland (predominantly RE 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and / or remnant surfaces).

In the above listed areas, the Project would result in the clearing of large tracts of woodland and create a new edge on areas of woodland remaining. Given the existing vegetation in the Project area and adjacent land is currently fragmented from pastoral areas, roads and easements; any edge effects are likely to have already manifested. Further, given the open nature of the adjacent woodland habitats, no alterations to microclimate or species assemblage are likely to occur as a result of the Project.

6.5 Hydrological changes

6.5.1 Surface water quality

The surface water assessment (supported by site water balance modelling) by Hatch (2018) concludes that:

- No uncontrolled spills of mine-affected water from the worked water dams are predicted under normal operating conditions.
- Some overflow of water from sediment dams (designed in accordance with the Best Practice Erosion and Sediment Control guideline [International Erosion Control

Association Australasia 2008]) may occur during wet periods; however, it is unlikely that this would have a measurable impact on receiving water quality.

- There is a predicted negligible impact on the downstream water quality through releases from the Project.

Based on the implementation of management strategies (e.g. erosion and sediment controls and land contamination controls), the risks of elevated dissolved solids and other contaminants impacting downstream waters is considered to be low (Hatch 2018).

Based on the analysis undertaken by Hatch (2018), no measurable impacts on surface water quality are likely to occur from changes in surface water. If no measurable impacts on surface water quality are likely to occur, no adverse impacts are likely to occur on surrounding habitats.

Further to this, elevated landforms (i.e. waste rock emplacements) would be progressively rehabilitated (e.g. by establishment of a protective vegetation cover [i.e. cover crop], construction of graded banks, rock-lined waterways, and / or diversion banks) which would minimise potential for sediment transport downstream of the Project.

Surface runoff from the waste rock emplacements would be directed to dedicated sediment dams.

Sediment dams would be retained until the revegetated surface of the waste rock emplacements are stable and runoff water quality reflects runoff water quality from similar un-mined areas, at which time these controls would be removed and the areas would be free-draining.

Given the above, the final landform is unlikely to lead to an increase in sediment transport downstream of the Project that would result in adverse impacts on terrestrial flora.

6.5.2 Surface water quantity

During active mining operations, the mine water management system would capture runoff from areas that would have previously flowed to the receiving waters. The maximum mine affected catchment areas represent (Hatch 2018):

- approximately 13% of the Ripstone Creek catchment to its confluence with the Isaac River; and
- less than 1% of the Isaac River at a location downstream of the Project.

The changed topography as a result of the Project final landform would have the following impacts on catchment areas (Hatch 2018):

- The catchment draining to Ripstone Creek would reduce by around 19 km² (compared to pre-mining conditions), a decrease of less than 7%.
- The catchment draining to the Isaac River would reduce by around 49 km² (compared to pre-mining conditions), a decrease of less than 1%.

Based on the analysis undertaken by Hatch (2018) no measurable impacts on surface water quantity are likely to occur regardless of changes in captured catchment areas. If no measurable impacts on surface water quantity are likely to occur, no adverse impacts are likely to occur on surrounding habitats.

6.6 Groundwater dependant ecosystems

6.6.1 Terrestrial riparian vegetation

As described in Section 5.2, the terrestrial riparian vegetation (11.3.25) associated with the Isaac River is likely to be a GDE. In addition, the terrestrial riparian vegetation along the downstream reaches of Ripstone Creek may also be a GDE.

Groundwater drawdown predictions have been produced by HydroSimulations (2018), indicating that drawdown in the alluvium is only predicted to reach / extend past the Isaac River in an approximately 4 km stretch of the Isaac River at the very northern extent of the Project area and an approximately 2.5 km stretch of the Isaac River adjacent to the Willunga Domain. The drawdown in these areas is not expected to exceed 2 m, while the potential drawdown at the downstream reaches of Ripstone Creek may reach up to 5 m (HydroSimulations 2018).

Although the potential drawdown of approximately 2 to 5 m is predicted to occur in areas where vegetation may be dependent on subsurface expression of groundwater, it is unlikely that this potential impact would result in a significant impact to terrestrial riparian vegetation surrounding the Project. This is due to the fact that the vegetation in these locations is subject to continuous (natural) wetting and drying cycles which in turn results in continual fluctuations in the groundwater levels in these locations. The Project would not result in a drawdown in the alluvial aquifers that would dewater the aquifer to the extent that it would not recover following rainfall (HydroSimulations 2018).

As described in Section 5.2, the terrestrial riparian vegetation associated with North Creek and Cherwell Creek may also be a GDE. The terrestrial riparian vegetation and aquatic habitats along North Creek and Cherwell Creek are located outside the area of potential drawdown associated with the Project (HydroSimulations 2018). As such, these features are unlikely to be impacted by the Project.

6.6.2 Aquatic habitats

As described in Section 5.2, the aquatic habitat associated with the Isaac River, North Creek, Cherwell Creek and downstream reaches of Ripstone Creek may be a GDE at times for a short period after rainfall events. However, the waterways are ephemeral and the aquatic species that occur within these habitats are prone to wetting and drying cycles.

The Project is unlikely to result in any noticeable changes to baseflow contributions to North Creek or Cherwell Creek given the distance of these waterways from the proposed mining area (HydroSimulations 2018).

HydroSimulations (2018) predicts that the Project would result in a potential 0.5% reduction in flow within the Isaac River during mining operations. It should be noted that this potential reduction is applying to the entire reach of the Isaac River adjacent to the Project area. Given the ephemeral nature of the Isaac River and the small contribution of baseflow, which only occurs after periods of prolonged rainfall, this predicted reduction in baseflow is expected to only have a minimal impact on the presence of aquatic habitat within the Isaac River and associated tributaries. The aquatic species that inhabit these waterways have adapted to wetting and drying cycles and are expected to persist in the environment despite the potential reduction in baseflow.

HydroSimulations (2018) also considered potential baseflow impacts to Ripstone Creek and concluded that there would be no discernible change in baseflow.

Groundwater Quality

Waste Rock Emplacement Areas

As the mine progresses, waste rock material will be placed within out-of-pit and in-pit waste rock emplacement areas. Waste rock emplacement areas may produce seepage as a result of rainfall inundation. The waste rock material exhibits similar to improved water quality compared to water within regolith material (HydroSimulations 2018). However, the waste rock material generally exhibits poorer water quality compared to the alluvium (HydroSimulations 2018).

Seepage from in-pit emplacements is not expected to migrate to the surrounding alluvium, as the groundwater level that would ultimately equilibrate within the waste rock would be below the base of the alluvium (HydroSimulations 2018). Given this, the Project is not expected to have a significant impact on groundwater quality that would lead to any adverse impact on potential GDEs.

Final Voids

Water within final voids would evaporate from the lake surface and draw in groundwater from the surrounding geological units. Evaporation from the lake surface would concentrate salts in the lake slowly over time (HydroSimulations 2018). This gradually increasing salinity is not expected to pose a risk to the surrounding groundwater regime as the final voids are predicted to remain permanent sinks (HydroSimulations 2018). Given the final voids would be sinks, the final voids are not expected to result in any adverse groundwater quality related impacts on GDEs.

6.7 Dust

Excessive dust deposition on foliage can reduce photosynthetic processes, respiration, transpiration and subsequent growth rate of the plant (Thompson, Mueller, Flückiger and Rutter 1984). There are some studies that suggest that dust deposition on foliage may allow the penetration of phytotoxic gaseous pollutants, subsequently affecting the health of the plants (Farmer 1993).

Potential dust impacts on vegetation are concentrated near dust sources (e.g. haul roads and areas with active mine landforms). Early in the mine life, much of the surrounding vegetation is within areas proposed to be cleared in later stages of the mine.

The landscape surrounding the Project is already heavily cleared. Dust from the Project is unlikely to significantly degrade surrounding native vegetation given vegetation in the locality is already subjected to dust from exposed soils which have not led to any observed impacts on vegetation. It is also likely that seasonal rainfall in the locality would help wash dust from the vegetation and/or encourage new growth.

Measures to reduce dust are detailed in the Air Quality and Greenhouse Gas Assessment prepared by Katestone (2018).

6.8 Bushfire

A fire starting in the Project area may be caused by sparks originating from machinery, or an accident (such as a collision), scheduled burns getting out of control, hot works, spontaneous combustion of coal or from operators and personnel dropping matches or cigarette butts in the Project area, which may then cause fires that expand into the surrounding area. The Project is not likely to increase the potential for bushfires to occur within the surrounding landscape given the mitigation and management measures which would be implemented for the Project (Section 7). Bushfire management would include clearing restrictions, controlled grazing,

restricted vehicle movements, fire breaks, the use of diesel vehicles, prohibition of smoking in fire prone areas and rapid response to any outbreak of fire.

6.9 Cumulative impacts

The Isaac Region is founded on mining, grain production and beef grazing, and the land use in the Project area and surrounds is reflective of this. The Project area is made up of some patches of remnant vegetation and grazing land, utilised for cattle grazing. It is immediately south of the approved (yet not constructed) Olive Downs North Mine and within 6 km of an existing mine to the east (Peak Downs and Saraji Mine). There are many more mines within a 30 km radius of the site to the north and west, including Moorvale, Daunia, Poitrel, Millennium, Eagle Downs and Lake Vermont. There are 25 operating coal mines in the region.

The clearing for the Project would remove a further 5,656 ha of remnant vegetation, representing approximately 0.42% of the remaining remnant vegetation in the Northern Bowen Basin and Isaac-Comet Downs biodiversity sub-regions (Queensland Herbarium 2016).

The result of implementing the Project offset strategy would be an increase in the area of land being conserved and managed for conservation in the medium to long term. The proposed offset area would provide a beneficial conservation outcome for regulated vegetation as demonstrated by preliminary surveys and its continued regeneration will help offset biodiversity losses from the Project. In addition, the progressive rehabilitation of mining areas over the life of the Project would provide habitat in the medium to long term.

6.10 Impacts on Matters of National Environmental Significance

In accordance with the Matters of National Environmental Significance, Significant Impact Guidelines 1.1, *Environment Protection and Biodiversity Conservation Act 1999* (DotE 2013b), a Significant Impact Assessment has been completed for each MNES known or likely to be located in the Project area. The Significant Impact Assessment indicated that there are no flora species listed under the EPBC Act at risk of a significant impact (Section 5.5 and Appendix G). The clearance of the Brigalow TEC would be compensated for by the implementation of an offset strategy (Section 8).

6.10.1 Mine site and access road action area (EPBC 2017/7867)

A total of approximately 13 ha of Brigalow TEC would be cleared for the proposed mine site and access road (Figure 10).

A significant impact analysis is presented in Appendix G. This analysis has found that although some clearing of Brigalow TEC (13 ha) would occur as a result of the Project, the areas to be cleared are small fragmented patches that appear to be typical of the local area, the total impact represents approximately 0.002% of the existing extent of Brigalow TEC (TSSC 2001), and is not recognised as critical habitat (DotE 2013a). The impact from the Project is unlikely to be significant to this community.

No known occurrences of any flora species listed under the EPBC Act would be removed for the proposed mine site and access road.

6.10.2 Water pipeline action area (EPBC 2017/7868)

No TECs or known occurrences of flora species listed under the EPBC Act would be removed by the proposed water pipeline. Consequently, it is unlikely that the Water Pipeline would have a significant impact on any threatened flora or TEC.

6.10.3 Electricity transmission line action area (EPBC 2017/7869)

No TECs or known occurrences of flora species listed under the EPBC Act would be removed for the proposed ETL. Consequently, it is unlikely that the ETL would have a significant impact on any threatened flora or TEC.

6.10.4 Rail spur action area (EPBC 2017/7870)

No TECs or known occurrences of flora species listed under the EPBC Act would be removed for the proposed rail spur. Consequently, it is unlikely that the Rail Spur would have a significant impact on any threatened flora or TEC.

6.11 Impacts on Matters of State Environmental Significance

Regulated Vegetation that would be impacted by the Project includes:

- Endangered REs;
- Of Concern REs;
- RE associated with a wetland; and
- RE associated with a watercourse.

The significant residual impact test for impacts to REs defines a significant impact for linear infrastructure as follows (DEHP 2014c):

- greater than 25 m wide in a grassland (structural category) RE; or
- greater than 20 m wide in a sparse (structural category) RE; or
- greater than 10 m wide in a dense to mid-dense (structural category) RE.

With reference to the Project area, there are three linear infrastructure elements:

- Electricity Transmission Line (ETL) – 10m wide;
- Water pipeline – 20m wide; and
- Rail spur – 45m wide.

By definition, the ETL could not have a significant impact on RE's because the disturbance width is not greater than 10 m wide. Within the water pipeline and rail spur corridors all impacted REs are classified as sparse to mid-dense (Queensland Herbarium 2016). All clearing within the rail spur would exceed the threshold for a significant impact due to the clearing width (45 m). Only mid-dense REs within the water pipeline corridor would be subject to a significant impact, as the clearing width is not greater than 20 m. This has been taken into consideration in the calculations provided as Table 12.

Similarly, the significant residual impact test for impacts to REs defines a significant impact for non-linear infrastructure as follows (DEHP 2014c):

- area greater than 5 ha where in a grassland (structural category) RE; or
- area greater than 2 ha where in a sparse (structural category) RE; or
- area greater than 0.5 ha where in a dense to mid-dense (structural category) RE.

For some sparse REs that are poorly represented (i.e. less than 2 ha) in Stage 1, the significant impact test has indicated no significant impact – particularly for RE 11.3.4. This has been taken into consideration in the calculations provided as Table 12.

There were no Endangered or Vulnerable flora species listed under the NC Act detected in the Project area and no Essential Habitat has been mapped. The impacts to MSES in Stage 1 and the overall Project are summarised in Table 12.

Table 12 Summary of Impacts to Matters of State Environmental Significance

Matters of State Environmental Significance			Stage 1 Impact (ha)	Significant residual impact for Stage 1 (ha)	Stage 2 Impact (ha)	Stage 3 Impact (ha)	Stage 4 Impact (ha)
Regulated Vegetation	'Endangered' or 'of concern' regional ecosystems*	RE11.3.1	2.0	1.5	6.5	5.5	0
		RE11.3.2	21.5	11.0	401.5	416.0	20.5
		RE11.3.3	0.5	0	0	4.5	0
		RE11.3.4	1.0	0	0	0	0
		RE11.4.8	1.0	0.5	3.5	0	0
		RE11.4.9	2.5	2.0	0	21.5~	35.0
		RE11.5.17	5.0	5.0	1.0	31.0	25.0
	Regional ecosystems within mapped vegetation management wetlands*		7.8	6.8	23.0	19.0	0
	Regional ecosystems within the defined distance of a vegetation management watercourse*		6.2	4.7	94.5	13.0	12.5
Connectivity Areas			Refer to DPM Envirosciences (2018a)				
Wetlands and Watercourses			Refer to DPM Envirosciences (2018b)				
Designated Precinct in a Strategic Environmental Area			N/A				
Protected Wildlife Habitat*	Ornamental Snake^		Refer to DPM Envirosciences (2018a)				
	Common Death Adder						
	Australian Painted Snipe^						
	Red Goshawk						
	Squatter Pigeon^						
	Koala^						
	Greater Glider^						
Protected Areas			N/A				
Highly Protected Zones of State Marine Parks			N/A				
Fish Habitat Areas			N/A				
Waterways Providing for Fish Passage			Refer to DPM Envirosciences (2018b)				
Marine Plants			N/A				
Legally Secured Offset Areas			N/A				

* The REs are mutually exclusive.

^ These species are also listed under the EPBC Act.

~ Excludes 13 ha of RE 11.4.9 which represents Brigalow Woodland TEC.

6.12 Impacts on Environmentally Sensitive Areas

As detailed in Section 5.10, Category B ESAs recorded within the Project area include REs with an Endangered biodiversity status (Figure 14), namely:

- 11.3.1 – Brigalow (*Acacia harpophylla*) and / or belah (*Casuarina cristata*) open forest on alluvial plains;
- 11.4.8 – Dawson gum (*Eucalyptus cambageana*) woodland to open forest with brigalow or blackwood (*Acacia argyrodendron*) on Cainozoic clay plains;
- 11.4.9 – Brigalow (*Acacia harpophylla*) shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains; and
- 11.5.17 – Palustrine swamp with fringing Queensland blue gum (*Eucalyptus tereticornis*) woodland in depressions on Cainozoic sand plains and remnant surfaces.

A total of 139.1 ha of Category B ESA would be cleared by the Project.

7 MITIGATION MEASURES

Consistent with DES' management hierarchy, the mitigation strategy for the Project has focused on a hierarchy of:

1. avoidance;
2. minimisation;
3. mitigation; then
4. offset residual impacts.

The avoidance or minimisation of adverse impacts is most relevant to the design phase of the Project, where information collected through desktop analysis and field surveys can be incorporated into the planning and preliminary engineering work (Section 7.1). Mitigation of impacts (including the implementation of monitoring and management plans) is most relevant to the construction and operational phases of the Project. Table 10 provides a summary of the mitigation strategies for the Project, with a brief description of potential impacts and measures that can be implemented at each stage in the life of the Project.

Residual impacts, after the implementation of the mitigation strategy, may be required to be offset in accordance with Commonwealth and State legislation. Offset requirements for the Project are discussed in Section 8.

7.1 Measures to avoid and minimise impacts

The following measures would be implemented to avoid and / or minimise impacts on terrestrial flora (Figure 2):

- Mine – The location of the mine and pits are informed by geological surveys and largely determined by the location of the natural resource, as a result the location of mine impacts are relatively inflexible. Where possible, riparian vegetation along the Isaac River has been avoided in the mine design and a minimum buffer of 200 m between the mine pits and Isaac River (defined bank) has been implemented.
- Overland conveyor – to reduce impacts that would normally be associated with a haul road crossing the Isaac River, an overland conveyor spanning approximately 14 km would be used to link the Willunga Domain to the CHPP within the Olive Downs South Domain. The conveyor would run North-west from the Willunga Domain and cross the Isaac River approximately 4.5 km from its origin point. The conveyor would be restricted to a construction corridor of 180 m however this would be reduced when crossing the Isaac River; where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to reduce impact on the riparian habitat.
- Access road – the proposed 3.5 km access road would be co-located with existing public and private roads as far as possible to reduce impacts to native vegetation. The access road would make use of an existing private dirt road for a distance of 2.3 km before deviating to cross over the Isaac River and into an area ground-truthed as being RE 11.3.25 of Least Concern. The location of the Isaac River crossing was selected due to the constructability of a low impact crossing at this point. The access road would be restricted to 40 m at the crossing point to reduce the impact on the riparian habitat.
- Haul road crossing – The haul road crossing would provide access to the waste emplacement at Deverill from the Olive Downs South Domain. The crossing would be located approximately 2 km south-south east of the access road where it crosses the Isaac River entering an area ground-truthed as being RE 11.3.25 of Least Concern. The haul road would be restricted to a construction corridor of 60 m.

- Water pipeline – the proposed water pipeline would connect to the existing Eungella Pipeline west of the Project. The water pipeline would be approximately 23 km long and has been co-located with the rail corridor as far as possible (for a distance of 15 km from the mine site to the existing Norwich Park Branch to reduce native vegetation clearance. All patches of TEC have been avoided and impacts to Endangered and Of Concern REs minimised by minimising the corridor for the water pipeline to 20 m.
- ETL – the proposed ETL utilises an existing easement between the sub-station on Peak Downs Highway and the rail (Norwich Park Branch), then follows Daunia Road and Annandale Road before heading south for 13 km across predominately cleared land to the MLA. The ETL would be restricted to a construction corridor of 10 m.
- Rail spur – options for the location of the rail spur were limited due to the need to connect to the Norwich Park Branch Railway and to avoid existing mining lease areas (and associated mining pits) to the south. The final location would maintain a buffer of approximately 85 m to the bank of the Isaac River at its closest point (affecting 1.5 km of the rail alignment). It has avoided all areas of TEC and most Endangered RE (with the exception of waterway crossings).

7.2 Impact mitigation

Mitigation measures proposed to be implemented for the Project are detailed in Table 13.

Table 13 Mitigation measures

Potential impact	Mitigation measures
1. Vegetation clearing	- Demarcate exclusion zones prior to clearing to protect areas of vegetation to be retained. - Clearing of native vegetation would be undertaken progressively over the life of the mine and only in areas required for mining activities within the following year. This would have the effect of minimising the area of exposed land. - Vegetation clearing / excavation to be subject to internal permitting system. - Salvage felled vegetation for millable timber, as appropriate. - Collection of native seed from the Project area for use in rehabilitation program. - Implement the Vegetation Clearance Procedure (Section 7.3). - Implement Rehabilitation Plan (Section 7.3).
2. Reduction of threatened flora populations	The Near Threatened (NC Act) <i>Bertya pedicellata</i> was identified during ecological surveys of the ETL corridor. The following measures will be adopted: - the placement of poles and towers to avoid the <i>B. pedicellata</i> populations, where possible; and - the placement of a maintenance track to avoid the <i>B. pedicellata</i> specimens, where possible. - Demarcate exclusion zones prior to clearing to protect areas of vegetation to be retained. - A Protected Plant Clearing Permit would be required if impacts to this species are required as part of the ETL construction. If required (to be determined following detailed design of the ETL), Energy Queensland would apply for this permit.
3. Weed management and edge effects	- Clearing of vegetation to be restricted to the minimum required to enable the safe construction, operation and maintenance of the Project, including infrastructure corridors. - Conduct rehabilitation activities for disused areas of the Project, as soon as possible. - Identification of weed infestations. - Prioritisation of treatment of weed infestations or weed species and ongoing treatment regimes (as necessary). - Strategies for preventing weed spread i.e. machinery wash-down, boot scrubbing facilities, disposal of weed material. - Implement the Weed and Pest Management Plan (Section 7.3).
4. Hydrological change (including Groundwater Dependent Ecosystems)	Implement water management strategy (refer to Surface Water Assessment, Hatch 2018).
5. Dust deposition (including coal dust)	- Limit vehicle speeds on unsealed haul roads to reduce dust generation. - Conduct rehabilitation activities for disused areas of the Project, as soon as possible. - Implement air quality management strategy (refer to Katestone 2018)
6. Increased occurrence of wildfire	- Provide appropriate buffer distances between the MLA and surrounding bushland and manage vegetation within the buffer areas to maintain safe fuel loads. - Any chemicals used in the Project area would be handled and disposed of in accordance with the relevant Safety Data Sheet. - Access tracks would be able to be used for fire-fighting and other emergency purposes by Queensland Fire and Rescue Service. - Implement an Emergency Response Procedure prepared in consultation with emergency services.

7.3 Management and monitoring plans

The following management plans have been recommended for the ongoing management of terrestrial flora:

1. Vegetation Clearance Procedure, including:
 - demarcate exclusion zones to protect areas of vegetation to be retained prior to clearing;
 - vegetation clearing / excavation to only be authorised in accordance with clearing / disturbance permitting system to ensure that the Environmental Advisor has reviewed all proposed clearing / excavation activities throughout operation of the mine;
 - salvage of felled vegetation for millable timber, as appropriate; and
 - collection of native seed from Project area prior to clearing for use in rehabilitation program;
2. Weed and Pest Management Plan, to be prepared in consultation with relevant agencies and be compatible with state and local plans. Requirements to be addressed include, but not limited to:
 - identification of weed infestations;
 - strategies for preventing weed spread (i.e. machinery wash-down, boot scrubbing facilities, appropriate disposal of weed material);
 - prioritisation of treatment of weed infestations or weed species and ongoing treatment regimes (as necessary);
 - recommended weed removal strategies (including those appropriate for aquatic habitats); and
 - weed monitoring protocols and follow-up weed control methods and protocols.
3. Rehabilitation and Mine Closure Plan, which must comply with the requirements of the conditions of approval. It would contain:
 - identification of desired post-mining land use;
 - protocol for progressive rehabilitation and staging of rehabilitation or natural regeneration and site preparation;
 - rehabilitation criteria to assess the effectiveness of the rehabilitation work;
 - recommended native species to be used during rehabilitation activities; and
 - measures to monitor the success of the rehabilitation strategies.

8 OFFSETS

8.1 Biodiversity offset requirements

The Final ToR for the Project states the following in relation to environmental offsets:

11.27 The EIS must describe the residual impacts of each proposed action for each relevant matter protected by the EPBC Act, after all proposed avoidance and mitigation measures are taken into account.

11.28 The EIS must identify whether the residual impacts are significant with reference to the Matters of National Environmental Significance, Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999.

11.29 If those residual impacts are significant the EIS must propose offsets for relevant matters protected by the EPBC Act consistent with the Environment Protection and Biodiversity Conservation Act 1999, Environmental Offsets Policy.

11.53 The EIS should identify whether the project will result in a significant residual impact on matters of State environmental significance (MSES) with reference to the Queensland Environmental Offsets Policy, Significant Residual Impact Guideline 2014.

11.54 For staged offsets, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the significant residual impact test.

11.55 The proposed offsets should be in line with the requirements set out in the Queensland Environmental Offsets Policy (Version 1.2) 2016.

It should be noted that, despite the requirements of the ToR, the *Queensland Environmental Offsets Policy (Version 1.2) 2016* has been replaced by the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The EO Act and EPBC Act and the following related policies are relevant to the environmental offset proposal for the Project:

- Queensland Environmental Offsets Policy (Version 1.6) (DEHP 2018); and
- EPBC Act Environmental Offsets Policy (DSEWPC 2012) (and supporting EPBC Act Offsets Assessment Guide).

As described in the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018), section 15 of the EO Act removes the ability for the State government to impose an offset condition in relation to a prescribed activity if a Commonwealth decision has already been made in relation to the same or substantially the same activity, matter and area of impact.

Given all components of the Project have been determined to be controlled actions under the EPBC Act, an offset will be provided for significant residual impacts on MNES. This negates the need for the State government to impose an offset condition on MSES (i.e. RE 11.4.9 where it represents Brigalow Woodland TEC).

8.2 Significant residual impacts on State and National matters

Land clearing is proposed to occur in multiple stages. Stage 1 would include the following works:

- construction of each of the infrastructure corridors:
 - rail corridor;
 - ETL;

- water pipeline;
- Olive Downs South access road;
- construction of the mine infrastructure area (including offices, workshops, CHPP, ROM pad, ILF cells);
- development of the north-western waste emplacement;
- construction of temporary flood levees located within the Stage 1 boundary; and
- commencement of open cut mining in Pit 1.

The Stage 1 disturbance boundary is shown on Figure 16. The Stage 1 disturbance boundary includes the full extent of the following Actions:

- Olive Downs Project Water Pipeline (EPBC 2017/7868);
- Olive Downs Project Electricity Transmission Line (EPBC 2017/7869); and
- Olive Downs Project Rail Spur (EPBC 2017/7870).

The Stage 1 disturbance boundary would facilitate approximately the first five years of mining of the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867).

Table 14 quantifies the significant residual impacts on MSES and MNES for each stage of clearance. The Offset Strategy proposed to compensate for these significant residual impacts is described below.

Table 14 Summary of matters relevant to the offset package

Matter	Stage 1 Impact (ha)	Stage 2 Impact (ha)	Stage 3 Impact (ha)	Stage 4 Impact (ha)
Matters of National Environmental Significance				
Brigalow Woodland TEC	0	0	13.0	0
Australian Painted Snipe	Refer to DPM Envirosciences (2018a)			
Squatter Pigeon				
Greater Glider				
Koala				
Ornamental Snake				
Matters of State Environmental Significance				
Regulated Vegetation				
Endangered RE				
RE 11.3.1	1.5	6.5	5.5	0
RE 11.4.8	0.5	3.5	0	0
RE 11.4.9	2	0	21.5*	35.0
RE 11.5.17	5	1.0	31.0	25.0
Of Concern RE				
RE 11.3.2	11	401.5	416.0	20.5
RE 11.3.3	0	0	4.5	0
Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map – (RE 11.3.27)	6.8	23.0	19.0	0
Regional ecosystems (not within an urban area) within the defined distance from the defining	4.7	94.5	13.0	12.5

Matter	Stage 1 Impact (ha)	Stage 2 Impact (ha)	Stage 3 Impact (ha)	Stage 4 Impact (ha)
banks of a relevant watercourse on the vegetation management watercourse map				
Connectivity Areas				
All areas of RE not already offset	Refer to DPM Envirosciences (2018a)			
Protected Wildlife Habitat				
Habitat for an Animal that is Vulnerable Wildlife	Refer to DPM Envirosciences (2018a)			
Australian Painted Snipe ¹				
Squatter Pigeon ¹				
Greater Glider ¹				
Koala ¹				
Ornamental Snake ¹				
Wetlands and Watercourses				
A wetland of High Ecological Significance	Refer to DPM Envirosciences (2018b)			
Waterways providing for fish passage	Refer to DPM Envirosciences (2018b)			

¹ These species are also listed under the EPBC Act and will be offset under the federal policy

* Excludes 13 ha of RE 11.4.9 which represents Brigalow Woodland TEC.

8.3 Biodiversity offset strategy

Pembroke propose to offset the significant residual impacts on Matters of National Environmental Significance in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPC 2012) and offset the significant residual impacts on Matters of State Environmental Significance in accordance with the *Queensland Environmental Offsets Policy* (Version 1.6) (DES 2018).

Pembroke propose a staged environmental offset in consideration of the staged land clearing described above. The offset for each stage of clearance would be provided before clearing the relevant stage.

A land-based proponent-driven offset is proposed to address the relevant impacts from Stage 1. Section 1.4 provides a description of the Stage 1 Offset Area and a description of how it offsets impacts on regulated vegetation under the *Vegetation Management Act 1999*. The Terrestrial Fauna Assessment (DPM Envirosciences 2018a) and Aquatic Ecology Assessment (DPM Envirosciences 2018b) describe how the Stage 1 Offset Area would offset impacts on Matters of National Environmental Significance and other Matters of State Environmental Significance.

The Stage 1 Offset Area would compensate for the impacts associated with each of the following Actions in full:

- Olive Downs Project Water Pipeline (EPBC 2017/7868);
- Olive Downs Project Electricity Transmission Line (EPBC 2017/7869); and
- Olive Downs Project Rail Spur (EPBC 2017/7870).

In addition, the Stage 1 Offset Area would compensate for the impacts associated with approximately the first five years of mining of the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867).

For subsequent stages (Stages 2 to 4), the offset would be provided before the commencement of each stage. It is likely that the residual significant adverse impacts can be offset given the following:

- The native vegetation communities / Regional Ecosystems to be cleared during the life of the Project (including those listed as 'Endangered' and 'Of Concern') all occur extensively in the surrounding landscape and subregions.
- The surrounding landscape contains large areas of non-remnant vegetation (required to offset the significant residual impact on 'Connectivity').

8.4 Offset for Stage 1

8.4.1 General description for the Stage 1 Offset Area

A land-based offset area is proposed for Stage 1. The Stage 1 Offset Area is comprised of three distinct areas (A, B and C) located approximately 35 km south-east of Moranbah (Figure 17). The proposed offset areas occur within the Isaac-Comet Downs subregion of the North Brigalow Belt Bioregion, within the Fitzroy catchment and is on the eastern side of the Isaac River, adjacent to the Project area.

The closest National Park reserve is the Dipperu National Park located approximately 15 km east of the Stage 1 Offset Area (Figure 17).

The Stage 1 Offset Area covers an overall area of approximately 6,065 ha. There is a combined total of approximately 1,950 ha of remnant vegetation within the Stage 1 Offset Area, which greatly exceeds and is more than 2.5 times the area of remnant vegetation proposed to be cleared as part of Stage 1 (approximately 832.5 ha [Table 10]).

Within the overall boundaries of the Stage 1 Offset Area, there is approximately 1,200 ha which is not required to be included in an offset area for Stage 1 and may be used to offset impacts from subsequent stages. These areas are mapped on Figure 17 as 'Areas Retained for Future Offset'. These areas would be secured along with the Stage 1 Offset Area.

Pembroke owns the land on which the Stage 1 Offset Area is proposed and there are no other relevant parties with registered interests under the Qld *Land Act 1994* or the Qld *Land Title Act 1994* (Table 15).

Table 15 Relevant offset area details

Reference	Landholder Details
Registered Owner on Title	Pembroke Olive Downs Pty Ltd
Real Property Descriptions	Twenty Mile – Lot 5, SP 113322 Deverill – Lot 18, SP 113322

8.4.2 Ecological surveys

Flora and fauna surveys were undertaken by DPM Envirosciences (2018c) in accordance with contemporary Qld and Commonwealth survey guidelines to assess the suitability of the Stage 1 Offset Area (Appendix H). The field surveys were undertaken in March to May 2018.

The flora surveys were undertaken in accordance with the Qld Herbarium vegetation survey methods described in Neldner *et al.* (2017). Survey techniques included quaternary surveys, identification of threatened ecological communities, targeted searches for conservation significant species and random meanders (DPM Envirosciences 2018c).

Where the field surveys identified vegetation communities containing constituent species of a TEC, the condition thresholds described in the Commonwealth listing advice were referenced to determine whether the community met the TEC status.

8.4.3 Presence of relevant matters

Overview

The majority of extant vegetation is eucalypt woodland on alluvium adjacent to the Isaac River and eucalypt woodlands on Cainozoic sand plains. The BVGs within the Stage 1 Offset Area (in order of dominance) are:

- BVG 5 – Eucalypt dry woodlands on inland depositional plains;
- BVG 10 – Acacia dominated open forests, woodlands and shrublands;
- BVG 4 – Eucalypt open forests to woodlands on floodplains;
- BVG 15 – Wetlands; and
- BVG 3 – Eucalypt woodlands to open forests.

Each of the above BVGs are described in detail in Appendix H.

REs that are relevant to the offset strategy that were recorded within the Stage 1 Offset Area include RE 11.3.1, RE 11.4.8, RE 11.4.9, RE 11.5.17 and RE 11.3.2. Further to this, REs that intersect wetlands and watercourses were also recorded. These are described further below.

RE 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains

RE 11.3.1 within the Stage 1 Offset Area comprises a total of approximately 30 ha (Figure 17) and the area impacted by Stage 1 is 1.5 ha (Table 14). This constitutes an offset ratio of 1:20, therefore exceeding the requirements of the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The average terrestrial habitat quality of these areas has been assessed as a 6.



Plate 7 RE 11.3.1 within the Stage 1 Offset Area

RE 11.4.8 Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains

RE 11.4.8 within the Stage 1 Offset Area comprises a total of approximately 74 ha (Figure 17) and the impacted area is 0.5 ha (Table 14). This constitutes an offset ratio of 1:147, therefore exceeding the requirements of the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The average terrestrial habitat quality of these areas has been assessed as a 6.



Plate 8 RE 11.4.8 within the Stage 1 Offset Area

RE 11.4.9 Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains

RE 11.4.9 within the Stage 1 Offset Area comprises a total of approximately 153.8 ha (Figure 17) and the impacted area is 2 ha (Table 14). This constitutes an offset ratio of 1:77, therefore exceeding the requirements of the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The average terrestrial habitat quality of these areas has been assessed as a 6.



Plate 9 RE 11.4.9 within the Stage 1 Offset Area

RE 11.5.17 *Eucalyptus tereticornis* woodland in depressions on Cainozoic sand plains and remnant surfaces

RE 11.5.17 within the Stage 1 Offset Area comprises a total of approximately 64 ha (Figure 17) and the impacted area is 5 ha (Table 14). This constitutes an offset ratio of 1:12; however, the excess of these areas will contribute towards offsets for other wetland REs, achieving an offset ratio of 1:4 for RE 11.5.17 and therefore complying with the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The average terrestrial habitat quality of these areas has been assessed as a 6.



Plate 10 RE 11.5.17 within the Stage 1 Offset Area

RE 11.3.2 *Eucalyptus populnea* woodland on alluvial plains

RE 11.3.2 within the Stage 1 Offset Area comprises a total of approximately 501 ha (Figure 17) and the impacted area is 11 ha (Table 14). This constitutes an offset ratio of 1:45, and thereby exceeding the requirements of the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The excess areas will contribute towards offsets for MNES threatened fauna species habitat (DPM Envirosciences 2018a). The average terrestrial habitat quality of these areas has been assessed as a 7.



Plate 11 RE 11.3.2 within the Stage 1 Offset Area

Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map – (RE 11.3.27)

To offset the clearance of 6.8 ha of vegetation intersecting a wetland (RE 11.3.27) (Table 14), the Stage 1 Offset Area contains 23.4 ha of RE 11.3.27 and 4 ha of RE 11.5.17. The combined areas constitute an offset ratio of 1:4, therefore complying with the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018). The average terrestrial habitat quality of these areas has been assessed as a 7.



Plate 12 RE 11.3.27 within the Stage 1 Offset Area

Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map

Several watercourses have been mapped traversing the Stage 1 Offset Area, including Devlin Creek and Bundarra Creek (Figure 17). The REs that are associated with the defined buffers of these watercourses are numerous and comprise a total of 348.5 ha and the impacted area is 6.3 ha. The REs that are associated with the watercourses in the impact area include RE 11.3.1 (0.5 ha), RE 11.4.8 (0.2 ha), RE 11.4.9 (0.9 ha), RE 11.3.25 (1.7 ha) and RE 11.5.3 (3 ha).

The potential impacts to RE 11.3.1, RE 11.4.8 and RE 11.4.9 (including the areas associated with a watercourse) have been offset as described above. A separate offset for the impacts to RE 11.3.25 and RE 11.5.3 (i.e. 4.7 ha) is provided for within the Stage 1 Offset Area, therefore complying with the *Queensland Environmental Offsets Policy (Version 1.6)* (DES 2018).



Plate 13 Waterways within the Stage 1 Offset Area (Devlin Creek)

8.4.4 Management measures

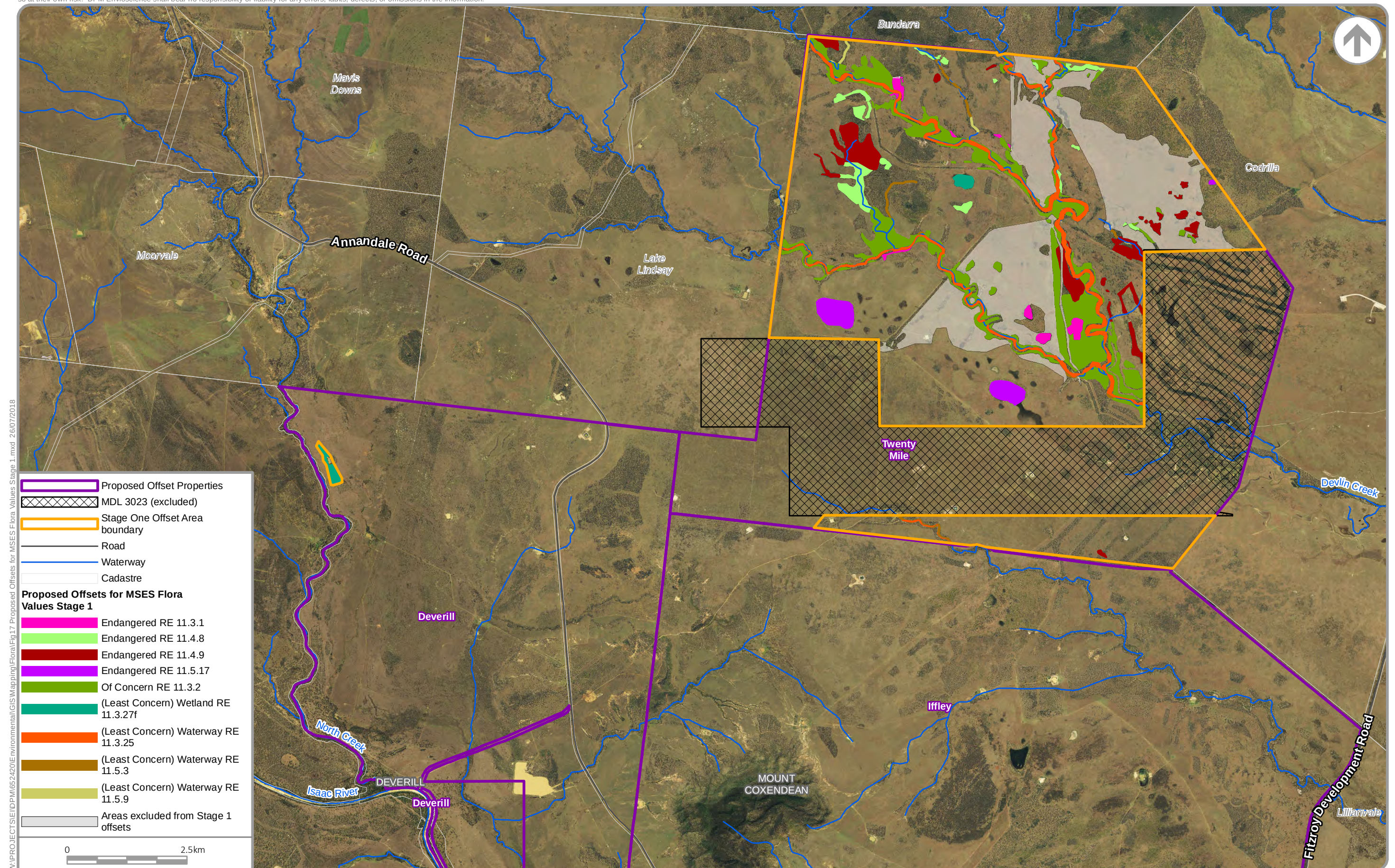
Proposed management actions within the Stage 1 Offset Area include:

- feral animal control to reduce habitat degradation (particularly by feral pigs);
- reducing weed cover (reducing indirect threats that affect habitat quality);
- implementation of controlled livestock grazing regimes to encourage natural regeneration of foraging trees and prevent further degradation of habitat;
- supplementary seeding with native grass species; and
- fuel management to avoid high intensity bushfires.

All management actions are additional to existing obligations for managing the land. An Offset Management Plan would provide further detail on the management of the offset area.

8.4.5 Long-term conservation

Given the offset area would be developed to compensate for impacts to MNES and MSES, Pembroke would seek to secure the offset area as a Nature Refuge, as requested by DNRME and DES during consultation regarding the Project.



PROPOSED OFFSETS FOR MSES FLORA VALUES STAGE ONE

Olive Downs Coking Coal Project – Terrestrial Flora Assessment

FIGURE 17

9 CONCLUSION

The scope of this assessment was to verify RE mapping for the Project area; identify any conservation significant species under the Qld *Nature Conservation Act 1992* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; identify and describe any Matters of State and National Environmental Significance; and to identify proposed avoidance and mitigation measures to protect the natural values, including consideration of biodiversity offset requirements.

Terrestrial flora surveys were undertaken in accordance with the Queensland Herbarium vegetation survey methods described in Neldner et al. (2017). Survey techniques included a combination of tertiary and quaternary surveys, identification of TECs, targeted searches for conservation significant species and random meanders.

A total of 21 individual native REs were ground-truthed within the Study area. Of these 21 REs, four have a conservation status of 'Endangered' (RE 11.3.1, RE 11.4.8, RE 11.4.9 and RE 11.5.17) and five have a conservation status of 'Of Concern' (RE 11.3.2, RE 11.3.3, RE 11.3.3c, RE 11.3.4 and RE 11.5.18) under the Qld *Vegetation Management Act 1999*.

MNES recorded within the Study area was limited to one TEC listed under the EPBC Act, namely, the Brigalow TEC. The Brigalow TEC in the Study area is represented by one patch of RE 11.3.1, one patch of RE 11.4.8 and two patches of RE 11.4.9 (both within the Mine Site and Access Road [EPBC 2017/7867] footprint). The two patches of Brigalow TEC are small (7 and 6 ha), degraded by edge effects and weeds and are highly fragmented.

MSES relevant to this assessment identified within the Project area include the following Regulated Vegetation:

- 'Endangered' REs – RE 11.3.1, RE 11.4.8, RE 11.4.9 and RE 11.5.17;
- 'Of Concern' REs – RE 11.3.2, RE 11.3.3 RE 11.3.3c, RE 11.3.4 and RE 11.5.18;
- REs that intersect a wetland on the vegetation management wetlands map; and
- REs within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map.

The Project would require the clearance of various patches of woodland / forest (totalling approximately 5,661.5 ha) occurring in four stages over the 79 years of construction and operation. All of the native vegetation communities / REs to be cleared occur more extensively in the surrounding landscapes and subregions.

To mitigate unavoidable adverse impacts on terrestrial flora associated with the Project, Pembroke has committed to a number of mitigation and management measures, including:

- vegetation clearance procedures that specify when and how vegetation would be cleared with the view of minimising impacts on terrestrial flora;
- specific measures to manage conservation significant flora (including avoidance of the *Bertya pedicellata* located along the ETL corridor and application for a Protected Plant Clearing Permit if required);
- progressive establishment of woodland / forest cover on the post-mine landforms;
- measures to prevent, monitor and control weeds;
- measures to manage bushfire risk; and
- various measures to manage other environmental factors (e.g. dust suppression, erosion and sediment control, water management).

To address the residual significant adverse impacts (on MSES and MNES), an offset strategy has been developed by Pembroke in accordance with relevant State and Commonwealth offset requirements. Pembroke proposes a staged environmental offset in consideration of the staged land clearing described above. The offset for each stage of clearance would be provided before clearing the relevant stage. The result of implementing the offset strategy would be an increase in the area of land being conserved and managed for conservation in the medium to long term.

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Appendix A: Assessment team Curricula Vitae

Bruce McLennan

Professional summary

Bruce is an experienced ecologist with over 10 years working on a range of projects in Queensland and Northern NSW. The last six years have been focussed on professional support to the major gasfields projects in a number of capacities with a skills focus around the botanical sciences. Bruce has significant experience undertaking pre-clearance vegetation surveys and mapping regional ecosystems. Having worked as a Vegetation Planning Officer with Greening Australia for a number of years, Bruce has a wide knowledge of vegetation management and rehabilitation techniques at a property scale. In addition, Bruce has particular experience in environmental offsets. Bruce was an integral member of the offsets team at Amec Foster Wheeler, playing a key role in landholder engagement, ground-truthing offset sites including BioCondition assessments and preparing offset management plans and costings.

Education

Bachelor of Business, Rural Management, University of Queensland, Gatton, Queensland, Australia, 1982
Master of Sustainability Science, University of Southern Queensland, Toowoomba, Queensland, Australia, 2009

Relevant training and endorsements

Vegetation Structure Training – Queensland Herbarium
Regional Ecosystem Training – O2 Ecology
BioCondition Assessment Training – Queensland Herbarium
Grass Identification training – Greening Australia
Native seed collection training – Florabank
Working With Wildlife – Catch and relocate venomous snakes for regional areas
RTD2313A Clean machinery of plant, animal and soil material
RTD2312A Inspect machinery for plant, animal and soil material
DSEWPaC approved suitable ecologist for APLNG terrestrial ecology surveys
DSEWPaC approved suitable ecologist for QCLNG terrestrial ecology surveys
Mining Supervisor (S123) training – OHSA
Senior First Aid and CPR
MC Class Drivers Licence
Operate and Maintain 4WD RIIVEH305E
Construction blue card
Fauna handling training – Geckoes Wildlife
Approved NSW BioBanking, BioCertification & Framework for Biodiversity Assessment Assessor (December 2015)
(Assessor number: 189)
Member of EIANZ
Basic level competency with Arc Map and MapInfo
Competent in field data collection with Trimble, Leica and Garmin GPS products.

Employment history

2016 to Present | Arcadian Ecology | Senior Ecologist
2013 to 2016 | Amec Foster Wheeler | Senior Environmental Scientist (Unidel was purchased by AMEC in mid 2013)
2010 to 2013 | Unidel | Senior Environmental Scientist
2010 | Unidel | Land Access Consultant
2009 to 2010 | Greening Australia Queensland | Bunya Biolink Implementation Manager
2008 to 2009 | Greening Australia Queensland | Regional Supervisor Vegetation and Business (West Region)
2007 to 2008 | Greening Australia Queensland | Vegetation Planning Officer (West Region)
2003 to 2007 | Toowoomba Landscape Supplies | Customer relations, estimates and quotes, manufacturing
2002 to 2003 | Westbank Feedlot | Yardman
2001 to 2002 | Queensland Department of Primary Industries | Landholder Liaison and Group Coordinator
2000 to 2001 | Conservation Farmers Inc | Field Services Officer
1985 to 2001 | Broad-acre farming enterprise, Wallumbilla, Queensland | Owner/Manager

Representative and recent projects

North Maclean EPBC Offsets

28 South Environmental, Queensland, Australia, 2016

Bruce has provided technical input to offset requirements for a development proposal at North Maclean. Bruce has located a number of potential offset sites for the federally listed Koala, Swift parrot and Grey-headed flying fox within the Wivenhoe Valley area and has initiated contact with a number of landholders with potential offset sites. Project ongoing.

Australia Pacific LNG Project – Wybara and Moorabinda Weeds Surveys

Australia Pacific LNG, Queensland, Australia, 2016

Bruce assisted in the collection of weeds and waterway crossing data across Phase 2 gasfields works on Wybara property and Exploration and Assessments early works on Moorabinda near Origin Energy's Spring Gully and Eurombah Creek gas projects.

Australia Pacific LNG Project – Orana North Soils and Weeds Surveys

Australia Pacific LNG, Queensland, Australia, 2016

Bruce assisted in collecting soil data and samples across the APLNG construction footprint on Origin Energy's Orana well development area south of Miles and Chinchilla. This data is used to inform the soil amelioration report as well as the site sediment and erosion control management plan. The collection of data on weed species listed under national and state legislation is used to inform pre-construction control teams and contribute to reporting conditions.

Central Highlands Regional Council – Water Pipeline Survey and TEC Evaluations

28 South Environmental, Queensland, Australia, 2016

Bruce provided technical advice and field survey expertise on flora species and vegetation communities along a 22km water pipeline route from Emerald to a proposed development site. Bruce also provided advice and field survey sufficient to allow the delineation of threatened ecological community (Brigalow EPBC listing) units within a broader polygon of mapped endangered vegetation under the Qld Vegetation Management Act.

Australia Pacific LNG Project – Talinga Soils Survey

Australia Pacific LNG, Queensland, Australia, 2016

Bruce assisted in collecting soil data and samples across the APLNG construction footprint on Origin Energy's Talinga well development area south of Miles. This data is used to inform the soil amelioration report as well as the site sediment and erosion control management plan.

Eugene Street – Vegetation Assessment

28 South Environmental, Queensland, Australia, 2016

Bruce conducted an assessment of vegetation extent and quality on a planned private development site at Bellbird Park, in the Ipswich City Council area in south east Queensland. Key considerations were the accuracy of regulated vegetation mapping, the presence of MNES and/or EVNT species, habitat quality and any other conservation values on the site. The client was provided with a vegetation report and plant species list for the area.

Keperra Quarry – Vegetation Assessment

28 South Environmental, Queensland, Australia, 2016

Bruce conducted a vegetation assessment on Keperra Quarry in Brisbane for a private developer. An assessment of the extent and health of mapped regulated vegetation, assessment of weed infestations and a species list were provided to the client.

Central Highlands Regional Council – Regional Ecosystem Map Change

28 South Environmental, Queensland, Australia, 2016

Bruce provided technical advice on threatened ecological communities and field surveyed across three properties to define vegetation mapping units at a property scale. Bruce prepared sufficient site assessment documents using the Queensland Herbarium's Map Modification Kit to allow the remapping of vegetation on the properties.

Australia Pacific LNG Project – Orana South Soils Survey

Australia Pacific LNG, Queensland, Australia, 2016

Bruce assisted in collecting soil data and samples across the APLNG construction footprint on Origin Energy's Orana well development area south of Chinchilla. This data is used to inform the soil amelioration report as well as the site sediment and erosion control management plan.

Bowen Gas Pipeline and Bowen Gas Project – Environmental Offsets

Arrow Energy Pty Ltd, 2015

Bruce was part of the Amec Foster Wheeler team which developed the offset strategy for the Bowen Gas Project in Central Queensland. Bruce's contribution included assessment of MNES impacts and input into the Offsets Strategy report. Subsequent to this Bruce was involved in the assessment of suitable properties within the vicinity of the project that would allow the offsetting of Brigalow, SEVT and Natural Grasslands Threatened Ecological Communities as well as a number of identified MNES and MSES which included threatened flora and fauna, wetlands, regional ecosystems and riparian vegetation. Bruce made initial contact with potential landholders and arranged field visits on properties from Nebo west to Gemfields and south to Rolleston. Bruce conducted field visits where landholders were introduced to the offset concept and preliminary property assessments were made where vegetation allowed suitable offset opportunity. Subsequent to field visits Bruce shortlisted suitable properties and developed high level costings and high level vegetation management plans for each offset property and contributed to a final report for the client.

Central Queensland Offset Monitoring

Greening Australia Queensland, Brisbane, 2015

Bruce provided photo monitoring and condition reporting for offset sites on five properties at Nebo, Mt Coolon, Hibernia and Dingo in Central Queensland. Bruce also provided advice to the offset manager on grazing, weeds and general site condition.

Australia Pacific LNG Project – Wybara Weeds Survey

Australia Pacific LNG, Queensland, Australia, 2015

Bruce conducted a survey for weeds listed under the Queensland Land Protection Act 2002 and Weeds of National Significance across infrastructure footprints on Wybara in the Spring Gully area. Data was collected on Trimble GPS units to provide accurate quantification of weed infestation across the property.

Australia Pacific LNG Project – Wybara Soils Survey

Australia Pacific LNG, Queensland, Australia, 2015

Bruce assisted in collecting soil data and samples across the APLNG construction footprint on Wybara. This data is used to inform the soil amelioration report as well as the site sediment and erosion control management plan.

Mount Isa Mines – Biodiversity Study (Wet Season)

Glencore - Mount Isa Mines, Queensland Australia 2015

Bruce led the flora team survey effort in which 40 BioCondition sites, within the Mount Isa Mines ML8058, were surveyed for species composition, canopy covers and heights, weediness and general site condition to provide baseline and comparative data for ongoing monitoring of biodiversity within the lease.

Walton Coal Project – Environmental Offsets Advice

Aquila Resources, Queensland, Australia, 2015

Bruce contributed to the high level environmental offsets advice for the Walton development near Dingo and was responsible for assessing likely offset requirements, locating suitable rural properties for offset locations and providing a high level costing.

Wiggins Island Balloon Loop Offsets,

Aurizon, Queensland, Australia, 2012-2015

Bruce has played a significant role in delivery of vegetation offset requirements for the Wiggins Island Balloon Loop development near Gladstone. Bruce has assisted in the identification of suitable offset sites to meet the project's requirements through a combination of desktop analysis and ground-truthing. Bruce was responsible for engaging with landholders and assessing the suitability of potential offset sites in the field. Bruce completed vegetation surveys to confirm regional ecosystems, completed BioCondition assessments and identified key management requirements and overall offset suitability. Bruce completed the first monitoring assessment of the site on behalf of Greening Australia in July 2015 and provided sufficient reporting to satisfy client and regulatory requirements.

Wiggins Island Coal Export Terminal (WICET) environmental offsets monitoring,

Greening Australia Queensland, Queensland, Australia 2013-2015

Bruce has led the monitoring program for the WICET offset which involves the annual recording of data from a number of sites at the offset location near Bororen south of Gladstone. Disciplines involved include BioCondition assessments, photo monitoring and a range of landholder liaison issues including fire and firebreak management, weed control measures, fencing and repair, grazing management, feral animal control and erosion control. Bruce has also completed final reporting for the client and regulator.

Ergon Energy environmental offsets monitoring,

Greening Australia Queensland, Queensland, Australia 2013-2015

Bruce has led the monitoring program for the Ergon offset which has involved the annual recording of data from a number of sites at the offset location near Bororen south of Gladstone. Disciplines involved include BioCondition assessments, photo monitoring and a range of landholder liaison issues including fire and firebreak management, weed control measures, fencing and repair, grazing management, feral animal control and erosion control. Bruce has provided information sufficient to allow the client to prepare the required reporting for the regulator.

Gladstone Area Water Board (GAWB) environmental offsets monitoring,

Greening Australia Queensland, Queensland, Australia 2015

Bruce has led the GAWB monitoring program which has involved the annual recording of data from two separate offset areas near Bororen south of Gladstone. Disciplines involved include BioCondition assessments, photo monitoring and a range of landholder liaison issues including fire and firebreak management, weed control measures, fencing and repair, grazing management, feral animal control and erosion control. Bruce has provided information sufficient to allow the client to prepare the required reporting for the regulator.

Australia Pacific LNG Project – Gasfields Pre-Clearance Ecological Surveys

Australia Pacific LNG, Queensland, Australia, 2011-2015

Bruce has filled a team lead and mentoring role in the pre-clearance ecological surveys for gas fields infrastructure in the Injune, Miles, Condamine and Chinchilla area involving ground truthing of regional ecosystems, identifying and recording MNES constraints such as TECs, flora and fauna species, potential habitat sites, weed species distribution and abundance, assessment of referable wetlands and ordered streams, general site data including current land use and disturbances. He has also contributed to and reviewed final reporting.

Mount Isa Mines – Biodiversity Study (Dry Season)

Glencore - Mount Isa Mines, Queensland Australia 2014

Bruce led the flora team survey effort in which 40 BioCondition sites, within the Mount Isa Mines ML8058, were surveyed for species composition, canopy covers and heights, weediness and general site condition to provide baseline data for ongoing monitoring of biodiversity within the lease.

Southern Georgina Basin Exploration Program - Preclearance Surveys for Exploration Wells and Access

Central Petroleum, Queensland, Australia, 2014

Bruce completed ecology surveys for a number of proposed well sites in the Simpson Desert west of Bedourie and Boulia including access track environmental clearances. Involved in the surveys was the ground truthing of regional ecosystems, habitat assessment, survey for MNES and MSES, wetland and ordered stream impacts, record flora and fauna species.

Surat Gas Project – EPBC Act Offsets Plan

Arrow Energy Pty Ltd, 2014

Bruce provided high level costing advice and contributed to the offset strategy for the Surat Gas development in southern Queensland. Bruce helped identify a number of suitable offset properties via GIS desktopping and developed costing models for Brigalow, Natural Grasslands and Semi Evergreen Thicket Threatened Ecological Communities as well as a number of EPBC listed fauna species.

Mt Margaret Mine – Purple-Necked Rock Wallaby offset

Xstrata Copper, Queensland, Australia 2013

Bruce provided field advice on regional ecosystems and habitat suitability for Purple Necked Rock Wallabies on an Xstrata owned property to the north of Mount Isa. The survey involved the location and spatial identification of areas of suitable habitat as well as the survey of detailed baseline BioCondition transects. Bruce provided technical input into the final offset size and location.

Rolleston Coal Mine Expansion Offsets

Glencore/Xstrata Coal, Rolleston, Queensland, Australia, 2013

Bruce's role in delivery of offsets for this project entailed surveying proposed offset sites in proximity to Rolleston including assessing the presence and condition of offset values such as the natural grassland threatened ecological community, brigalow threatened ecological community and semi-evergreen vine thicket threatened ecological community. Bruce also prepared three offset management plans to identify the required management actions and associated timeframes, monitoring requirements, identification of key risks and how they would be mitigated. Bruce also liaised with on-ground contractors and Xstrata Coal to prepare costings for the implementation of the management plans including on-going monitoring and reporting.

Australia Pacific LNG Project – Analogue Site Vegetation Surveys

Australia Pacific LNG, Queensland, Australia, 2012-2013

Bruce led the field survey of 150 analogue vegetation sites for benchmarking APLNG project impacts for assessing rehabilitation effort. The sites were surveyed in accordance with the Queensland Herbarium Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Sites were selected from an area bounded by Millmerran, Injune, Dululu and Gladstone. Bruce's role included:

- Identifying best on offer analogue sites using desktop information and GIS for the required regional ecosystems
- Arranging land access including contacting landholders and gaining their agreement for entry
- Field trip preparation including safety assessments and documentation, setting up GPS and field sheets etc.
- Completing community assessments in the field
- Writing up results of the BioCondition assessments.

Queensland Curtis LNG – Pre-clearance Surveys

Queensland Gas Company, Queensland, Australia, 2010-2012

Bruce has conducted ecological surveys which have included export pipelines, well locations and other supporting infrastructure. Surveys included identification and mapping locations of Threatened Ecological Communities (TEC); Ecologically Sensitive Areas; Endangered, Vulnerable and Near Threatened flora species and likely habitat; MNES, Essential Habitat features for flora and fauna; field verification of High Value Regrowth for TECs, waterways and wetlands; flora and fauna pests; wildlife corridors and regional ecosystems. Bruce has provided all reporting of surveyed areas.

Wiggins Island Balloon Loop Preclearance Survey

Aurizon, Queensland, Australia, 2012

Bruce conducted a field survey to allow the widening of parts of the existing rail corridor which involved regional ecosystem ground truthing and identification of impacts to habitat and EVNT flora species. Bruce provided input to reporting.

Australia Pacific LNG Project – Detailed Environmental Infield Surveys (DEIS)

Australia Pacific LNG, Queensland, Australia, 2011-2012

Bruce was a team leader on the DEIS for the Condabri Lateral, Wandoan to Gladstone Mainline, Woleebee Lateral, Western Pipeline and Spring Gully to Fairview Pipeline involving regional ecosystem identification and recording of structural characteristics, identification of MNES constraints, identification and quantification of EVNT plant species, identification of habitat features, identification of wetland and watercourse constraints, identification of weed issues, detailed species lists, and a number of other features such as disturbance, erosion, current land use etc. from Condamine to The Narrows north of Gladstone and from Wandoan west to Reedy Creek (Yuleba) and north to Santos' Fairview gasfields.

Australia Pacific LNG Project – Environmental Offsets (APLNG Project)

Australia Pacific LNG, Queensland, Australia, 2011-2012

Bruce was involved in the field assessments of potential offset sites suitable to allow offsetting of the vegetation and habitat impacts of the APLNG project in two phases over 2011 and 2012. The areas covered were from Hannaford in the south to Monto in the north and Durong in the east to Injune in the west. The assessments involved landholder discussions and field verification of regrowth values followed by preparation of detailed site reports, costing of the offsets and recommendations to the client.

Australia Pacific LNG Project – Route Alignment Walks (RAW) Survey

Australia Pacific LNG, Queensland, Australia, 2011

Bruce provided in field environmental advice on critical constraints to construction during the RAW survey in the planning stages of the Condabri Lateral and Wandoan to Gladstone Mainlines in the area stretching from Miles to east of Biloela. In this rapid assessment process critical tasks involved the identification of MNES such as endangered vegetation communities, identification of EVNT plant species and identification of habitat likely to contain EVNT fauna species.

Australia Pacific LNG Project – Environmental Offsets (Origin owned properties)

Australia Pacific LNG, Queensland, Australia, 2011

Bruce conducted rapid field assessments of the offset potential of Origin owned properties in the Chinchilla, Miles, Yuleba and Injune districts involving regional ecosystem identification of regrowth vegetation, calculation of useable areas and preparation of property reports to the client.

Australia Pacific LNG Project – Environmental Offsets (Spring Gully BioCondition Survey)

Australia Pacific LNG, Queensland, Australia, 2011

Bruce led the team which completed BioCondition surveys of the Origin owned "Scott's Creek" property in the Injune district involving the recording of 21 regrowth vegetation sites in Brigalow and SEVT regrowth and 6 reference sites on surrounding properties.

Origin Energy – Spring Gully Biodiversity Offset Potentials Survey

Origin Energy, Queensland, Australia, 2009

Bruce was part of a Greening Australia team which conducted surveys of Brigalow and SEVT regrowth on the Origin owned Spring Gully and Scott's Creek properties in the Injune district. Assessments involved regional ecosystem identification, measurement of structural characteristics and preparation of a report and recommendations on perceived offset potential in the lead up to the release of the Qld Biodiversity Offset Policy.

GAQ Rural – Vegetation Management Consultancy

Greening Australia Queensland, Queensland, Australia, 2007-2009

Bruce provided and oversaw a range of land management projects aimed at helping landholders comply with the Queensland Vegetation Management Act 1999 and VMOLA 2004 while at the same time enabling them to run their rural businesses in line with best management practices. Bruce was involved in a number of initiatives from preparing and presenting workshops on the VMA, providing PMAV (Property Map of Assessable Vegetation) services to landholders, completing map change applications on behalf of landholders, delineation of regional ecosystems and management advice to landholders.

Bunya Biolink – Cooyar Creek Riparian Zone Rehabilitation

Caring For Our Country, Commonwealth of Australia, 2008-2009

Bruce project managed the on-ground component of this Greening Australia project in the headwaters of the Brisbane River catchment. Key tasks involved initial community engagement with ongoing update meetings, full financial planning and disbursement of commonwealth funding, oversight of work program, organisation of project inputs, and input into reporting and financial reconciliation. A significant portion of the project involved the on-ground management of a weed control program and subsequent rehabilitation effort which involved replanting with locally provenanced canopy species.



Melody Stoneham Principal Consultant

Qualifications

Bachelor of Science (Australian Environmental Studies) major in Ecology and Environmental Planning - Griffith University (1999)

BSc (First Class Honours) Terrestrial Ecology, Griffith University (2001).

Affiliations

Member of Ecological Society of Australia

Certified Environmental Practitioner (CEnvP)

Special skills

Australian Flora Families

Grass Identification (QUT)

Venomous Snake Relocation

Advanced 4WD

Senior First Aid

Certified Open Water Diver 2009

Published and Technical Papers

Stoneham, MB (2001) *The influence of stream-dwelling predators on the distribution and density of Mixophyes tadpoles in South-east Queensland*. Honours Thesis. Griffith University.

Hero J-M, M Stoneham (2005) *Bufo marinus*. Pp 417 – 422. In MJ Lanoo (Ed) *Amphibian Declines: The Conservation Status of United States Species*. University of California Press.

Career History

Melody Stoneham has over 15 years experience as an environmental professional within local government and private industry. Melody has participated in the management and delivery of environmental education programs, State of Environment reporting, local law review and community consultation within a local government context.

As an environmental consultant, Melody has worked in Queensland, New South Wales and Victoria with both government and private clients. Her project experience includes: linear infrastructure (particularly road and rail), natural resources (mining & CSG), residential development, master planning, ecotourism facilities, coastal development, establishment of conservation areas and rehabilitation programs, management of wetlands within the context of water sensitive urban design (WSUD), water infrastructure and desalination facilities. Melody is practiced in the assessment and management of terrestrial and aquatic ecosystems.

Melody's background in environmental science and ecology allow her to integrate elements of ecological sustainability into all assessment and consultation projects.

Areas of expertise:

- Environmental Impact Assessment
- Environmental Planning & Management
- Environmental Design & Compliance
- Flora Assessment & Management
- Fauna Assessment & Management
- Environmental Offsets (vegetation & biodiversity)
- Bushfire Hazard Assessment & Management
- Environmental legislation

Project Experience

Environmental Impact Assessment, Environmental Management & Permitting

Melody has regularly worked as part of a multidisciplinary team in the various stages of many projects. She has project managed and participated in studies on vegetation, terrestrial fauna, aquatic fauna and water. Melody's ecological background enables her to contribute to the project design through recommendations for minimising environmental damage and she has been involved in the production and delivery of several Environmental Impact Assessments (EIA's), Environmental Management Plans (EMPs) and Environmental Design Reports (EDRs) for large projects. Melody frequently has an advisory role focussed on compliance of the design with current environmental legislation.

Transport

- Lockyer Valley road repairs – Lockyer Valley – Lockyer Valley Regional Council – threatened flora surveys in accordance with NC Act guideline and pre-construction activities.
- Behm Creek bridge replacement – Jacobs Well – Department of Transport & Main Roads (DTMR) – ecological component of EAR.
- Goat Track flood reparation – Mt Nebo – Moreton Bay Regional Council – completion of targeted survey and management plan for threatened Lowland Rainforest and Queensland Nut.
- Tilley Road Extension – Wynnum - Brisbane City Council – fauna component of ecological assessment.
- Central Queensland Integrated Rail Project (CQIRP) – Central Queensland - QR National – lead for terrestrial ecology and matters of national environmental significance (MNES) component of EIS.
- Dohles Rocks Road overpass – Moreton Bay Region - Department of Transport & Main Roads (DTMR) - Environmental Approvals Report (EAR).
- Transport Network Reconstruction Program (TNRP) – Qld –DTMR – development of environmental filtration system for assessment and permitting. Conducting ecological assessments.
- Pacific Highway Upgrade – Glenugie - NSW – Roads and Traffic Authority (RTA) – Construction Environmental Management Plan.
- Aldoga – Moura Rail Link Corridor (significant project) – QR National – clearing permit.
- Bruce Highway Realignment - Traveston Crossing, Qld – DTMR – clearing permit.

- Moreton Bay Rail Link (Petrie to Kippa-Ring passenger rail) - DTMR – Initial Assessment Report (IAR), Final Assessment Report (FAR) and referral under the federal *Environment Protection and Biodiversity Conservation Act 1999*.
- Olsen Avenue upgrade – Gold Coast, Qld - DTMR – compliance with clearing permits.
- Landsborough to Nambour rail corridor (significant project) - Sunshine Coast, Qld – DTMR – ecology lead for EIS
- Caloundra to Maroochydore rail corridor (CAMCOS) - Sunshine Coast, Qld – DTMR – ecology lead for EIS

Mining, Oil & Gas

- Broughton mine project – U & D Mining ecology lead for EIS
- Hail Creek mine expansion project – Rio Tinto – technical review of aquatic ecology report for EIS
- Meteor Downs South mine project – U & D Mining – BioCondition assessments and offsets strategy under EPBC Act.
- Meteor Downs South mine project –U & D Mining - targeted threatened grass survey for EIS supplement.
- New Acland Mine expansion – New Hope – flora assessments (including BioCondition) for EIS and offsets. Targeted fauna surveys for threatened species.
- Dawson Mine expansion – Anglo American – fauna assessments for EIS
- Arrow Surat Pipeline & Arrow Bowen Pipeline, Arrow Energy – vegetation assessments, weed management plans, offset management plans and species management plans.
- Arrow Bowen Pipeline (ABP) - Bowen Basin - Arrow Energy- flora assessments for contribution to an EIS
- Arrow Surat Pipeline (ASP) – Surat Basin – Arrow Energy – flora and fauna assessments for contribution to an EIS
- Secondment to Arrow Energy – Brisbane – Arrow Energy – development of systems for flora and fauna assessment of proposed infrastructure sites in compliance with EA and undertaking flora and fauna assessments
- Rolleston Coal Mine, Rolleston Coal Joint Venture – fauna and matters of national environmental significance (MNES) chapter of EIS
- Chinchilla and Miles gas fields, Origin Energy – ecological assessment and reporting.

- Hail Creek Mine, Rio Tinto – bio-condition and rehabilitation monitoring and reporting.

Power & Energy

- Bannockburn high pressure gas main repair and realignment, Albert River – APA Group – prescribed tidal works permit
- Tully 275/132kV site expansion project – Jarra Creek Road, Tully – Powerlink – lead ecologist and field ecologist for EIS
- Acacia Ridge substation – Leoroyd Road, Acacia Ridge – Powerlink - vegetation assessment and clearing permits
- River Heat-rejection System - 111 Eagle Street, Brisbane - Urbis Pty Ltd – assessment of impacts of heat dispersion into the Brisbane River

Water

- Mer Island sewerage upgrade - Department of Aboriginal and Torres Strait Islander Partnerships - threatened flora survey in accordance with NC Act guideline
- Bellbird Park pump station upgrade - Queensland Urban Utilities (QUU) – threatened flora survey in accordance with NC Act guideline
- Pimpama River Active Floodgate Management Study – Gold Coast City Council – investigations of potential impacts on terrestrial fauna
- SEQ Desalination Siting – Queensland Water Commission (QWC) – options analysis for proposed SEQ desalination plant
- Lockyer Valley Purified Recycled Water (PRW) Study – SEQ Water Grid – impact assessment on effect of re-watering aquatic ecosystems
- Gladstone – Fitzroy Pipeline – Gladstone Area Water Board (GAWB) – impact assessment

Industrial Development

- Komatsu Industrial Facility – Wacol – Pradella Constructions – Vegetation Management Strategy
- Ebenezer Industrial Estate – Ipswich – Diverse Property Solutions – Vegetation Management Plan and permitting

Department of Defence (Australia)

- RAAF Base Amberley – Department of Defence - Koala Assessment and Management Plan

Department of Housing (Queensland)

- Basil Stafford Centre extension and access – Wacol – Department of Housing and Public Works – Koala Assessment and Management Plan

Residential Development

- Miles Platting Road – Rochedale – Urbis –

Ecological Assessment Report

- Multi-unit Dwellings – Capalaba – ACH Architects – Koala Management Plan
- Bellvista II - Caloundra, Qld – Stockland - Ecological Assessment & EPBC referral
- Burbank Hindu Temple – Hindu Mandir Association – Vegetation Management Plan and clearing permits
- Rural residential development – Dayboro – THG Resource Strategists – vegetation assessment and bushfire management planning
- Mossman Gorge Visitor Transit Centre - Indigenous Land Corporation (ILC) - EPBC referral and state permitting
- Caloundra Downs Masterplanned Community - Caloundra, Qld - Stockland - EPBC referral

Airports and aeronautical infrastructure

- New Parallel Runway - Brisbane Airport, Qld – Brisbane Airport Corporation – audit of offsets for Lewin's Rail.
- Navigational tower for Rockhampton airport – Princhester, Qld – Indra Australia – flora surveys for threatened species and vegetation mapping.
- Runway extension and airport expansion – Coolangatta, Qld & NSW – Gold Coast Airport - flora and fauna assessment for EIS.
- Sand Dredging for Aeronautical Purposes – Brisbane Airport - Brisbane Airport Corporation (BAC) - Environmental Assessment Report (EAR).

Conservation Management Planning

Melody has provided technical input and undertaken the role of project manager for a variety of projects for conservation initiatives. These conservation initiatives have included: establishment of conservation areas, rehabilitation programs, eco-sensitive tourist facilities, environmental offsets and economic evaluation of ecosystem services to secure funding for land management. In undertaking these projects, Melody has undertaken field investigations to identify core ecological values and past / present threats. It is then possible to suggest mitigation and management in the form of land-use planning, environmental design, construction and operational activities.

Relevant conservation management planning experience includes:

- Anglicare retirement facility – Taigum, Qld, Cusp Landscaping – rehabilitation plan for an environmental protection zone
- Caloundra Downs - Caloundra, Qld, Stockland – development of a Conservation Strategy

- Richlands – Brisbane City Council - Wetland Rehabilitation Plan 2007 – 2010
Arup - Senior Ecologist
- Funding submission for Parks Victoria - Western Victoria – Parks Victoria - economic evaluation of on-ground management and conservation benefits provided by Parks Victoria using environmental economics methodology. 2004 – 2007
PLACE Design Group - Environmental Planner
- Skywalk – Mt Tamborine – vegetation assessment, permitting and Vegetation Management Plan. 2001 – 2003
Logan City Council - Environment Management Officer
- Offset Assessment – Ecofund - South-east Queensland – assessment of proposed offsets

Conferences

Fire & Biodiversity Consortium – Bushfire Planning

Mitigation Mythbusters (EIANZ)

The new Queensland State Planning Policy (EIANZ)

Federal Listing of Koala (Enviro)

BioCondition Assessment (EIANZ)

Regulated Regrowth (QELA)

Achieving Biodiversity Outcomes (EIANZ)

Koala State Planning Policy (SPP 2/10) & State Planning Regulatory Provisions (UDIA)

Ecology of Urban Lakes (Healthy Waterways)

Training

Australian Flora Families (LAMR Pty Ltd)

Grass Identification (QUT)

Venomous Snake Relocation Course (ERD)

BioCondition Assessment Training (Qld Herbarium)

Regional Ecosystem Training (Qld Herbarium)

Introduction to Water Sensitive Urban Design (Healthy Waterways)

Concept Design of Water Sensitive Urban Developments (Healthy Waterways)

Senior First Aid & CPR (St John's Ambulance)

4WD Training

GIQ Coal Surface Induction (Standard 11)

General Safety Induction (Construction) - Blue Card

Professional History

2012 – present

Gaia Environmental Consulting -Director / Principal

2010 – 2012

AECOM- Senior Environmental Scientist

David Moore

Principal Environmental Scientist

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Satellite: 0414 918 605
E: dmoore@dpm-enviro.com.au
12 Lauren Drive, Buderim QLD 4556
PO Box 1298, Mooloolaba QLD 4557

Overview

David is an environmental scientist with over 15 years of experience in ecology, environmental impact assessment and management. He combines scientific knowledge with industry experience to devise practical impact mitigation and management measures to facilitate sustainable development. David has developed skills across a broad range of environmental sciences including aquatic and terrestrial ecology, soil and water management. He has applied these skills across many sectors including water, transport, agriculture, waste, Defence, coal seam gas, mining, power generation and transmission.

David maintains relevant construction, petroleum and mining industry inductions, and has gained substantial experience in the environmental aspects of a broad range of projects. This includes site secondment in the roles of Senior Environmental Advisor and Environment Superintendent for BMA Coal, as well as Environmental Advisor and Ecologist roles for Origin Energy.

In addition to his work history, David holds a Bachelor of Applied Science in Ecology and Environmental Science (with majors in Water Science and Vegetation & Wildlife Ecology). He is an Accredited Ecologist for the Australian River Assessment System (AusRivAS), a Senior Operator in electrofishing practice, a Certified Environmental Practitioner, and a 'suitably qualified ecologist' as recognised by the Commonwealth Department of the Environment.

Competencies

- Strong personal commitment to safety & the environment
- Extensive project management experience
- Practical and analytical problem solving abilities
- Effective leadership, communication & interpersonal skills



Qualifications

Bachelor of Applied Science
(Ecology & Environmental Science),
University of Canberra, 2002

Certified Environmental Practitioner,
Environment Institute of Australia
and New Zealand, since 2009

Australian River Assessment
System (AusRivAS) Accreditation,
University of Canberra, 2004

Senior Operator in Electrofishing
Practice, Aquateco Consulting, 2008

UAV Controller and Operator, Civil
Aviation Safety Authority, 2015

Areas of expertise

Environmental impact assessment

Ecology

Water quality

Permits and Approvals

QUEENSLAND:

Scientific User Registration 521

Animal Ethics Committee Approval
CA 2017/03/1043

Scientific Purposes Permit
WISP14748714

General Fisheries Permit 192554

Rehabilitation Permit WA0002595
(Spotter Catcher)

NEW SOUTH WALES:

Animal Care Ethics Committee
Animal Research Authority

NPWS Scientific Licence SL101497

DPI Fisheries Scientific Collection
Permit P14/0041-1.2

Insurances

Professional Indemnity \$5M

Public Liability \$20M

Aviation (UAV) operations \$10M

Workplace Personal Injury
Insurance

Employment History

- July 2014 – Present Principal Environmental Scientist / Director
DPM Envirosciences Pty Ltd
Buderim, Queensland
www.dpm-enviro.com.au
- Oct 2012 – July 2014 Principal Ecologist / Team Leader
Ecosure Pty Ltd
Maroochydore, Queensland
www.ecosure.com.au
- Mar 2012 – Oct 2012 Principal Ecologist
Unidel / AMEC Environment & Infrastructure Pty Ltd
Brisbane, Queensland
www.amec.com
- Mar 2007 – Mar 2012 Senior Environmental Scientist
HLA Envirosciences / ENSR / AECOM Australia Pty Ltd
Brisbane, Queensland
www.aecom.com
- Mar 2003 – Mar 2007 Environmental Scientist
Geolyse Pty Ltd
Orange, New South Wales
www.geolyse.com

Volunteer Experience

- 2012 – Present 1300 ANIMAL wildlife rescuer
RSPCA Queensland
- 2011 – 2012 Wildlife Hospital Volunteer
Australia Zoo Wildlife Hospital
- 2003 – 2007 Firefighter (Deputy Captain and Crew Leader)
NSW Rural Fire Service

Licences and Permits

- Driver's Licence (Car, Medium Rigid Truck, Marine, Motorcycle, Recreational Pilot)
- ASIC Airside Security Clearance, Civil Aviation Safety Authority
- UAV Controller and Operator Certificates, Civil Aviation Safety Authority
- Weapons Licence (Category A and B), Queensland
- Chainsaw Licence – Tree Feller, NSW Rural Fire Service
- Senior Operator Electrofishing, Aquateco Consulting
- Scientific Purposes Permits (NSW / QLD) – Terrestrial & Aquatic Ecological Surveys
- General Fisheries Permits (NSW / QLD) – Aquatic Ecological Surveys
- Rehabilitation Permit (QLD) – Fauna Spotter Catcher and Relocation

Training

- NSW Biodiversity Offsets Scheme Accredited Assessors Course (2018)
- Generic Induction (Refresher) Queensland – Coal Surface (2018)
- (Gas) Industry Safety Induction (2018)
- Apply First Aid (2017) and CPR (2017)
- Mining Supervisor training S1, S2 and S3 (2016)
- Fluvial geomorphology and River Styles, Water Technology (2016)
- Sediment and Erosion Control Training: Preparing and Reviewing Sediment and Erosion Control Plans (2014)
- General Induction for Construction (2003)
- Contaminated Machinery Washdown Certification (2013)
- PMASUP236B Operate Vehicles in the Field (2012)
- BMA Defensive Driving, SOPs and Light Vehicle Authorization (2010)
- Drive 4WD Vehicles in Operational Conditions, NSW Rural Fire Service (2006)
- 4WD Recovery – Advanced Techniques, Australian 4WD Driver Training (2009)
- Wildlife Rescue, RSPCA (2012)
- Venomous Snake Relocation, Educational Reptile Displays (2009)
- Wildlife Carer Education – Advanced Bat Handling and Care, BCRQ / RSPCA (2013)
- Wildlife Carer Education – Fractures Management, Dr Howard Ralph (2014)
- Bushfire Fighter (2003), Advanced Firefighter (2005) & Crew Leader – Wildfire (2007), NSW Rural Fire Service
- Developing Future Leaders Program, Australasian Fire Authorities Council (2004)
- Origin Inductions: Module 0&1 HSE Leadership – Upstream and DA Induction (2012), ISSOW Permit System (2014)
- Santos Inductions: Land Access (2013), Eastern Queensland (2013) and Induction Level 1 (2013)
- Arrow Energy CSG Induction (2013)
- Queensland Regional Ecosystem and Vegetation Structure Training (2009), Queensland Herbarium
- Best Practice in Project Management (2009), Chifley Business School
- Bird and Wildlife Hazard Management (2012), Avisure

Referees

Andrew Brownlow, Director and Environment Manager – Geolyse Pty Ltd
(my former manager whilst at Geolyse from 2003 to 2007, now a client)
Phone: 02 6393 5000. Email: abrownlow@geolyse.com

Melody Stoneham, Principal Ecologist – Gaia Environmental Consulting
(my former colleague whilst at AECOM, now an alliance partner)
Phone: 0401 615 454. Email: melody@gaiaenviro.com.au

Key project experience

Date	Project	Client	Project Position	Role
Terrestrial Ecology				
2018	Terrestrial flora and fauna assessments, Central QLD	Resource Strategies	Principal Ecologist	Desktop assessments, flora surveys, field verification of Regional Ecosystems and Threatened Ecological Communities, fauna habitat assessment, comprehensive fauna survey (trapping), targeted fauna survey, preparation of baseline flora and fauna assessment reports, preparation of a baseline offset investigation report and Offset Strategy for the Olive Downs Project in the Bowen Basin.
2017	Contamination investigation, Army Aviation Centre, Oakey, QLD	AECOM	Principal Ecologist	Contribution to ecological and human health risk assessments. Heath assessment of vegetation communities, bird surveys, fauna habitat assessment, mammal dissections, and provision of a technical report.
2016	Former Petrie Cartonboard Mill – Ecological surveys and management plans, South East QLD	Peter J Ramsay & Associates / Orora	Ecologist	Field data collection of Restricted weeds; ground-truthing vegetation communities; mapping weed distributions and abundance across the 218 ha property; preparation of vegetation, weed, pest animal and fauna management plans for remediation of the site.
2016	Origin Energy gas field development – Weed surveys, Spring Gully, QLD	Amec Foster Wheeler	Ecologist	Field data collection of Declared weeds across areas to be constructed for gas wells, access tracks and flow lines, to quantify the extent and biomass of Declared weeds requiring removal prior to construction.
2016	Ecological investigations at RAAF Base Williamtown, NSW	AECOM	Ecologist	Fieldwork, fauna habitat assessment and provision of a technical report to inform the fauna usage of waterways and adjoining habitats of the study area.
2016	Origin Energy gas field development – Weed surveys, Wandoan, QLD	Amec Foster Wheeler	Ecologist	Field data collection of Declared weeds across areas to be constructed for gas wells, access tracks and flow lines, to quantify the extent and biomass of Declared weeds requiring removal prior to construction.
2015	Proposed expansion of the Daroobalgie Landfill – Ecological Constraints Assessment, Central West NSW	Forbes Shire Council	Ecologist	Fieldwork (floristic surveys, vegetation mapping, fauna habitat assessment, fauna surveys), ecological constraints assessment and provision of a technical report to inform a potential property acquisition.
2015	Proposed Orange to Carcoar potable water pipeline – Flora, fauna and aquatic ecology assessments, Central West NSW	Geolyse	Ecologist	Fieldwork (floristic surveys, vegetation mapping, fauna habitat assessment, fauna surveys, aquatic habitat assessment), impact assessment and provision of a technical report to inform the Review of Environmental Factors.
2015	Mineral Hill Mine – Ecological Impact Assessments for Exploration Drilling, Condobolin, NSW	KBL Mining	Ecologist	Ecological impact assessment of proposed surface disturbance in relation to vegetation, flora and fauna species. Completion of Assessments of Significance (7-part tests) for six threatened fauna species. Provision of advice in relation to impact mitigation.
2015	Mineral Hill Mine – Surface preparations for the new Pearse Pit and Pearse Waste Rock Emplacement, Condobolin, NSW	KBL Mining	Ecologist and vegetation clearing crew supervisor	Development of a vegetation clearing procedure, demarcation of vegetation clearance and retention areas, fauna pre-clearance surveys/checks, direction of clearing operations with bulldozer and excavator, fauna spotter catcher activities.

Date	Project	Client	Project Position	Role
2015	Arrow Bowen Pipeline – Terrestrial fauna surveys, QLD	Ecosure	Ecologist	Assistance with detailed (trapping) post-wet season fauna surveys and habitat assessments over a two-week period.
2012	Australia Pacific LNG Western High Pressure Gas Network – Terrestrial Fauna Survey, South QLD	Australia Pacific LNG	Field Team Leader and Terrestrial Ecologist	Habitat assessment and fauna survey using Anabat, harp traps, pit-fall traps, ground Elliot traps, baited camera traps, active reptile searches, spotlighting, morning and evening bird surveys.
2011	Arrow Bowen Pipeline – Flora Survey, Central QLD	Arrow Energy	Senior Environmental Scientist	Flora ecologist ground-truthing Regional Ecosystems, undertaking targeted flora searches and weed inventories for the EIS.
2010	Arrow Surat Pipeline Header – Flora Survey, South QLD	Arrow Energy	Field Ecologist	Ground-truthing of Regional Ecosystems, targeted flora searches and weed inventories.
2008	Origin Energy Darling Downs Power Station Site – Threatened Species Translocation and Monitoring: <i>Philotheca sporadica</i>	Origin Energy	Project Manager and Senior Environmental Scientist	Management of Commonwealth and State approvals, on-ground translocation works and monitoring the translocation success of the Vulnerable Kogan waxflower (<i>P. sporadica</i>) using a combination of techniques (direct relocation, relocation via an intermediate site, propagation via cuttings and direct strike, propagation via cuttings and tissue culture); twice monthly monitoring and reporting for 18 months; final data analysis and reporting.
Surface Water and Aquatic Ecology				
2018	Aquatic ecology impact assessment, Olive Downs Project, Central QLD	Resource Strategies	Principal Aquatic Ecologist	Desktop assessment, field investigations and preparation of an aquatic ecology assessment to inform an EIS for the proposed Olive Downs Project in the Bowen Basin. Subsequent preparation of an Offset Strategy involving wetlands of High Ecological Significance (HES wetlands).
2018	Stream health monitoring, Macquarie River and Summer Hill Creek, NSW	Geolyse / Orange City Council	Principal Aquatic Ecologist	Stream health monitoring in accordance with NSW AusRivAS protocols, using macroinvertebrates as bio-indicators of stream health, to satisfy regulatory requirements and project commitments associated with Orange City Council's water supply augmentation.
2018	Receiving Environment Monitoring Program, Lady Annie Mine, Mt Isa, QLD	EMM Consulting / CST Minerals	Principal Aquatic Ecologist	Implementation of the 2018 Receiving Environment Monitoring Program, including water and sediment sampling, macroinvertebrate sampling, aquatic habitat assessment and reporting, associated with an acid leaching copper extraction facility.
2018	Baseline aquatic habitat assessments, Rolleston, QLD	Golder	Principal Aquatic Ecologist	Desktop and field investigations to inform a subsequent impact assessment for a coal seam gas project.
2018	Contamination investigation, RAAF Base Richmond, NSW	AECOM / Defence	Principal Aquatic Ecologist	Contribution to the ecological and human health risk assessment of PFAS. Sampling freshwater invertebrates and freshwater fish, sample processing, stream health assessment following NSW AusRivAS protocols, in-situ water quality measurement, habitat assessment and reporting on behalf of AECOM.

Date	Project	Client	Project Position	Role
2017	Contamination investigation, RAAF Base Williamtown, Newcastle, NSW	AECOM / Defence	Principal Aquatic Ecologist	Contribution to the ecological and human health risk assessment of PFAS. Sampling surface water, sediment, marine invertebrates, marine fish, freshwater invertebrates and freshwater fish, sample processing, stream health assessment following NSW AusRivAS protocols, in-situ water quality measurement, habitat assessment, and reporting on behalf of AECOM.
2017	Contamination investigation, Army Aviation Centre, Oakey, QLD	AECOM / Defence	Principal Aquatic Ecologist	Contribution to the ecological and human health risk assessment of PFAS. Sampling freshwater fish and aquatic macroinvertebrates, stream health assessment following Queensland AusRivAS protocols, targeted fish sampling using backpack and boat-based electrofishing techniques, sample processing, in-situ water quality measurement, habitat assessment, and reporting on behalf of AECOM.
2017	Environmental flow riffle monitoring, Summer Hill Creek, Orange, NSW	Geolyse / Orange City Council	Principal Environmental Scientist and UAV Operator	Riffle habitat mapping of high and low flow environmental releases using a Remotely Piloted Aircraft, data analysis using Pix4D Mapper Pro and ArcGIS to efficiently ground-truth the HEC-RAS model and demonstrate that low flow environmental releases are maintaining sufficient riffle habitat to maintain licence conditions in Summer Hill Creek downstream of Orange's main water supply dam.
2016	Fish survey, Evans Head Memorial Aerodrome, NSW	Mitch Hanlon Consulting	Principal Aquatic Ecologist	Backpack electrofishing to characterise the fish community of waterways within an area proposed for development of the Evans Head Air Park.
2016	Water quality monitoring, Pumicestone Creek, Caloundra, QLD	Rob Carr Engineering	Project manager	Water quality monitoring upstream and downstream of works on a tidal reach of Pumicestone Creek, to assess the impacts of pipeline placement works using a coffer dam and flume pipe.
2016	Aquatic ecology impact assessment, Cameby, QLD	Resource Strategies	Principal Aquatic Ecologist	Field investigations and preparation of an aquatic ecology impact assessment for the proposed modification and continuation of operations at the Cameby Downs (Coal) Mine. Also preparation of a Receiving Environment Monitoring Program (REMP) Design Document.
2016	Assessment of waterway barrier to fish passage, confidential end-client, QLD	AECOM	Principal Aquatic Ecologist	Site visit, assessment of stream geomorphology, fish survey and provision of advice relating to fish passage.
2016	Brisbane City Council Telegraph Road Upgrade, QLD	AECOM	Principal Aquatic Ecologist	Aquatic ecological assessment, including sampling of macroinvertebrates, fish, macrophytes and targeted frog surveys to inform practical impact mitigation measures for stream diversions and realignments.
2016	Contamination investigation, Army Aviation Centre, Oakey, QLD	AECOM	Principal Aquatic Ecologist	Targeted fish sampling using boat-based electrofishing techniques, sample processing, water quality assessment, habitat assessment, and processing of other biota samples on behalf of AECOM.

Date	Project	Client	Project Position	Role
2015	Origin Energy gas field development – Aquatic Ecological Assessments, QLD	Amec Foster Wheeler	Principal Aquatic Ecologist	Field investigations, impact assessment and reporting of aquatic ecological values in various development areas of the Surat Basin in the vicinity of Miles, Spring Gully and Wandoan. The field surveys and resulting report assessed aquatic macroinvertebrate community compositions; fish and turtle species compositions, age structures and general health; aquatic flora species composition; physical habitat assessment; and a description of likely impacts of an unplanned CSG water spill on identified aquatic ecological values.
2015	Cowra Heavy Vehicle Bypass – Aquatic and Terrestrial Ecology Impact Assessment, NSW	Geolyse	Principal Ecologist	Field investigations and preparation of an aquatic and terrestrial ecology impact assessment for the proposed bypass road and bridge crossing of the Lachlan River.
2014-2015	Arrow Bowen Pipeline (ABP) – Aquatic Values Surveys, QLD	Ecosure	Principal Aquatic Ecologist	Led aquatic ecological surveys of watercourses of stream order 3 and above intersected by the proposal ABP alignment. The surveys were undertaken over two weeks in the 'early wet' season, then repeated in the 'late wet' season, to inform an Aquatic Values Survey Report and an Aquatic Values Management Plan for the project. Field surveys focused on aquatic habitat assessment, macroinvertebrate sampling, fish and turtle sampling.
2015	Rio Tinto Coal Australia Hail Creek Transition Project – Aquatic Ecology Impact Assessment, QLD	Resource Strategies	Principal Aquatic Ecologist	Prepared an aquatic ecology impact assessment to form part of a broader Environmental Assessment Report for the Project.
2014	Queensland Energy Resources Aquatic Ecology and Stygofauna Baseline Assessments, Gladstone QLD	Resource Strategies	Project Manager and Principal Aquatic Ecologist	Project management, fieldwork and reporting for an aquatic ecological assessment and stygofauna sampling within and surrounding the proposed development site.
2012-2014	Arrow Surat Pipeline (ASP) – Aquatic Values Surveys and Management Plans, QLD	Arrow Energy	Principal Aquatic Ecologist	Project management, fieldwork and reporting associated with aquatic ecological surveys of watercourses (of stream order 3 and above) intersected by the proposal ASP alignment. The surveys were undertaken in the AusRivAS 'early wet' and 'late wet' sampling seasons. An Aquatic Values Survey Report and an Aquatic Values Management Plan were prepared based on the desktop and field findings. Some minor realignments were proposed to avoid areas of high aquatic ecological value. These were discussed with the client while the team was still on site. Field surveys focused on aquatic habitat assessment, aquatic plants, macroinvertebrate sampling, fish sampling, turtle sampling, and habitat assessment for platypus and turtle breeding places.
2013-2014	Defence South Queensland Water Quality Monitoring Program, South East QLD	Spotless	Project Manager and Principal Aquatic Ecologist	Project management, fieldwork and reporting. Undertake seasonal water and sediment quality sampling within the Evans Head Air Weapons Range, interpretation of results and reporting.
2013-2014	Paragon Coal T9 West Project – Baseline Aquatic Ecological Assessment, South East QLD	Resource Strategies	Project Manager and Principal Aquatic Ecologist	Project management, fieldwork and reporting, including scoping, baseline assessment and reporting on aquatic values within the T9 West project area, Tiaro.

Date	Project	Client	Project Position	Role
2013	Aquatic Ecological Investigation following sediment release event, South QLD	(Confidential client)	Principal Aquatic Ecologist	Project management, fieldwork and reporting. Legally privileged investigation and assessment of ecological impacts following sedimentation of a high value watercourse.
2013	Watercourse pre-clearance inspections, South and Central QLD	Saipem	Principal Aquatic Ecologist	Project management, fieldwork and reporting. Pre-construction site inspections by an aquatic ecologist at 14 watercourse crossings.
2012-2013	Byerwen Coal Mine Aquatic Ecological Impact Assessment, Central QLD	QCoal	Principal Aquatic Ecologist	Technical lead, fieldwork and reporting. Baseline survey and impact assessment of waterways and wetlands within the proposed Byerwen Coal Mine project area.
2012-2013	Australia Pacific Liquefied Natural Gas Western High Pressure Gas Network (WHPGN) – Aquatic Values Survey and Management Plan, South QLD	Australia Pacific LNG	Principal Aquatic Ecologist	Technical lead, fieldwork and reporting associated with aquatic ecological surveys at 64 waterway crossings intersected by the proposed WHPGN. Field surveys were undertaken to inform the Preparation of an Aquatic Values Survey Report and an Aquatic Values Management Plan, as part of the broader Environmental Management Plan for the project. Field surveys focussed on aquatic habitat assessment, aquatic plants, macroinvertebrate sampling, fish sampling, turtle survey, and habitat assessment for platypus and turtle breeding places.
2012	SunCoast 132kV Power Project – Platypus Management Plan, South East QLD	ENERGEX	Principal Ecologist	Development of management measures to negate impacts of pole placement on platypus.
2012	Hutton Creek targeted aquatic fauna survey and management plan, South QLD	Saipem	Project Manager and Principal Aquatic Ecologist	Project management, fieldwork and reporting for targeted platypus and turtle survey on Hutton Creek and preparation of a management plan prior to construction of the GLNG Gas Transmission Pipeline.
2012	Water quality monitoring on the Nerang River, South East QLD	Gold Coast Barges	Project Manager and Principal Aquatic Ecologist	Project manager, report structure and technical review. Development and implementation of baseline sampling and a weekly water quality monitoring program for the duration of an erosion mitigation project on the Nerang River.
2012	Roma to Brisbane Pipeline duplication – Aquatic Values Survey and Management Plan, South East QLD	APA Group	Principal Aquatic Ecologist	Technical lead, fieldwork and reporting. Habitat assessment and aquatic flora surveys for the proposed duplication of the Roma Brisbane Pipeline.
2011-2012	Proposed Monto Coal Mine – Aquatic Ecology Impact Assessment, Central QLD	Macarthur Coal	Senior Environmental Scientist	Technical lead and fieldwork. Baseline survey and impact assessment of waterways and wetlands of the Mining Lease Area encompassing the proposed Monto Coal Mine.
2011	Ecological characterisation of the Cobourg Peninsula Ramsar Wetlands, NT	Department of the Environment	Senior Environmental Scientist	Marine field team lead, including assessment of fish and macroinvertebrate community composition of representative marine and estuarine wetlands of the Cobourg Peninsula Ramsar Wetlands.
2011	Aquatic Ecology Impact Assessment for Proposed Gas Fields, NSW	Eastern Star Gas	Senior Environmental Scientist	Technical lead, fieldwork and reporting. Aquatic ecological assessment for proposed gas fields and surface water discharges as part of the project EIS for gas field development in the Pilliga Nature Reserve, NSW.

Date	Project	Client	Project Position	Role
2011	Contaminant bioaccumulation assessment of intertidal wetlands bordering the Brisbane Airport.	Airservices Australia	Technical lead, including fieldwork and reporting.	Development and implementation of a contaminant bioaccumulation experiment (with reference sites and controls) using oysters. Sampling and assessment of macroinvertebrates and fish tissue and organs.
2009, 2011	BMA Norwich Park Mine - Sediment and Biological Monitoring Program, Central QLD	BMA Coal	Project Manager and Senior Environmental Scientist	Development and implementation of a biological monitoring program. Habitat assessment and collection of macroinvertebrates, data analysis and reporting.
2010-2011	Proposed Foxleigh Plains Mine – Aquatic Ecology Impact Assessment, Central QLD	Anglo Coal	Project Manager and Senior Environmental Scientist	Technical lead, fieldwork and reporting. Baseline surveys and impact assessment of waterways transecting the proposed expansion area.
2010-2011	BMA Norwich Park Mine – Secondment, Central QLD	BMA Coal	Project Manager and Seconded	Senior Environmental Advisor and Acting Environment Superintendent.
2010	Effluent discharge investigation at RAAF Base Amberley, South East QLD	Spotless	Senior Environmental Scientist	Technical lead, fieldwork and reporting. Sediment, surface water and macroinvertebrate sampling, data analysis and reporting to assess the level of impact of treated effluent discharge upon receiving waters.
2008-2010	Defence South Queensland Water Quality Monitoring Program, South East QLD	Spotless	Senior Environmental Scientist	Technical lead, fieldwork and reporting. Twice-yearly macroinvertebrate sampling, analysis and reporting for Amberley RAAF Base and Canungra Field Training Area.
2009	Lihir Gold Mine, PNG – Aquatic and Terrestrial Ecology Impact Assessment	Lihir Gold	Senior Environmental Scientist	Field team lead and reporting. Ecological surveys for a proposed dam on the Hurtol River to supply water to the mine processing plant.
2009	Greenbank Training Area Aquatic Ecological Impact Assessment, South East QLD	Defence	Senior Environmental Scientist	Technical lead, fieldwork and reporting. Desktop, field surveys and impact assessment to characterise aquatic ecological values of waterways draining areas of proposed training infrastructure development at the GBTA.
Site Secondment Roles				
2014-2015	Origin Energy gas field development – Surat Basin, QLD	Amec Foster Wheeler	Environment Advisor	Ensure consistency of on-ground works with work packages issued by Origin Energy, present environment considerations daily at toolbox talks, pre-clearance surveys and checks, weed identification and management, monitoring and refinement of sediment and erosion controls.
2014-2015	Origin Energy Gas Field Development, QLD	Amec Foster Wheeler	Fauna Spotter Catcher	Pre-clearance stage fauna and breeding place relocation; clearing stage fauna salvage, relocation, first aid and euthanasia; monitoring of open excavations; water quality measurement, volume calculations and provision of advice on pit water management.
2010-2011	BMA Norwich Park Mine – Secondment, Central QLD	BMA Coal	Senior Environment Advisor Acting Environment Superintendent	Delegate tasks to team members; monitor surface water, groundwater, air quality and rehabilitation success; manage the mine water balance; monitor the quality and quantity of discharges and receiving waters; investigate and complete planning and approvals for pipeline watercourse crossings and new haul road.

Appendix B: Database search results



EPBC Act Protected Matters Report

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

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

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

Report created: 29/07/18 12:24:47

[Summary](#)

[Details](#)

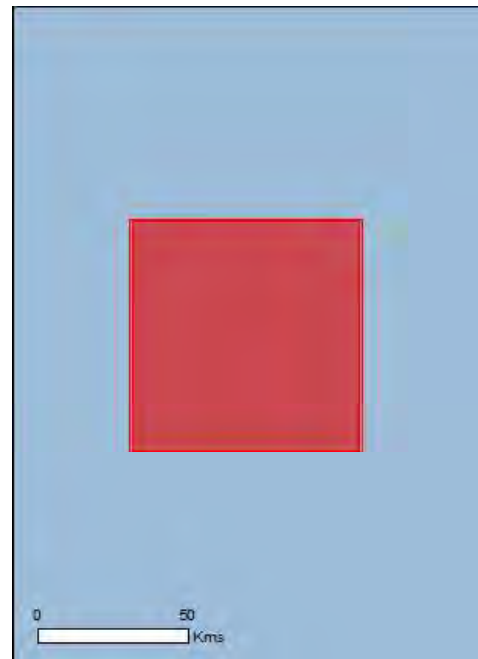
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	27
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	23
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[[Resource Information](#)]

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

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species

[[Resource Information](#)]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrorichis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Mammals		
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Aristida annua		
[17906]	Vulnerable	Species or species habitat likely to occur within area
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus raveretiana		
Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula		
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	Species or species habitat likely to occur within area
Rheodytes leukops		
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy	Vulnerable	Species or species

Name	Status	Type of Presence
Turtle, White-eyed River Diver [1761]		habitat likely to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
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Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species habitat likely to occur within area

Migratory Terrestrial Species

[Cuculus optatus](#)

Oriental Cuckoo, Horsfield's Cuckoo [86651]

Species or species habitat may occur within area

[Monarcha melanopsis](#)

Black-faced Monarch [609]

Species or species habitat known to occur within area

[Motacilla flava](#)

Yellow Wagtail [644]

Species or species habitat may occur within area

[Myiagra cyanoleuca](#)

Satin Flycatcher [612]

Species or species habitat likely to occur within area

[Rhipidura rufifrons](#)

Rufous Fantail [592]

Species or species habitat may occur within area

Migratory Wetlands Species

[Actitis hypoleucos](#)

Common Sandpiper [59309]

Species or species habitat may occur within area

[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]

Species or species habitat known to occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat may occur within area

[Calidris melanotos](#)

Pectoral Sandpiper [858]

Species or species habitat may occur within area

[Gallinago hardwickii](#)

Latham's Snipe, Japanese Snipe [863]

Species or species habitat may occur within area

[Numenius madagascariensis](#)

Eastern Curlew, Far Eastern Curlew [847]

Critically Endangered

Species or species habitat may occur within area

[Pandion haliaetus](#)

Osprey [952]

Species or species habitat likely to occur within area

[Tringa nebularia](#)

Common Greenshank, Greenshank [832]

Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Dipperu	QLD

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large- leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-21.8887 148.0555,-21.8887 148.7304,-22.5177 148.7304,-22.5177 148.0555,-21.8887 148.0555

Acknowledgements

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

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

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

Please feel free to provide feedback via the [Contact Us](#) page.



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: Native
Status: Rare and threatened species
Records: All
Date: All
Latitude: 21.8887 to 22.5177
Longitude: 148.0555 to 148.7304
Email: dmoore@dpm-enviro.com.au
Date submitted: Sunday 29 Jul 2018 12:26:04
Date extracted: Sunday 29 Jul 2018 12:30:02

The number of records retrieved = 15

Disclaimer

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami erebus</i>	glossy black-cockatoo (northern)		V		6
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	9
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	10
animals	mammals	Pseudocheiridae	<i>Petauroides volans</i>	greater glider		V	V	5
animals	mammals	Pseudocheiridae	<i>Petauroides volans minor</i>	northern greater glider		V	V	2
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	20
animals	reptiles	Elapidae	<i>Acanthophis antarcticus</i>	common death adder		V		1
plants	higher dicots	Capparaceae	<i>Capparis humistrata</i>			E		1/1
plants	higher dicots	Combretaceae	<i>Macropteranthus leiocaulis</i>			NT		4/4
plants	higher dicots	Euphorbiaceae	<i>Bertya pedicellata</i>			NT		9/9
plants	higher dicots	Mimosaceae	<i>Acacia spania</i>			NT		1/1
plants	lower dicots	Apocynaceae	<i>Cerbera dumicola</i>			NT		1/1
plants	lower dicots	Solanaceae	<i>Solanum elachophyllum</i>			E		1/1
plants	lower dicots	Solanaceae	<i>Solanum adenophorum</i>			E		1/1
plants	monocots	Poaceae	<i>Dichanthium queenslandicum</i>			V	E	1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: Native
Status: Rare and threatened species
Records: All
Date: All
Latitude: 21.7 to 22.7
Longitude: 147.9000 to 148.9000
Email: dmoore@dpm-enviro.com.au
Date submitted: Sunday 29 Jul 2018 12:31:13
Date extracted: Sunday 29 Jul 2018 12:40:02

The number of records retrieved = 23

Disclaimer

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk		E	V	1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami erebus</i>	glossy black-cockatoo (northern)		V		6
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	32
animals	birds	Phaethontidae	<i>Phaethon rubricauda</i>	red-tailed tropicbird		V		1
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	49
animals	mammals	Pseudocheiridae	<i>Petauroides volans minor</i>	northern greater glider		V	V	19
animals	mammals	Pseudocheiridae	<i>Petauroides volans</i>	greater glider		V	V	6
animals	mammals	Vombatidae	<i>Lasiorhinus krefftii</i>	northern hairy-nosed wombat		E	CE	1
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	40
animals	reptiles	Elapidae	<i>Acanthophis antarcticus</i>	common death adder		V		1
animals	reptiles	Scincidae	<i>Lerista allanae</i>	Allan's lerista		E	E	1/1
plants	higher dicots	Amaranthaceae	<i>Kelita uncinella</i>			E		1/1
plants	higher dicots	Capparaceae	<i>Capparis humistrata</i>			E		1/1
plants	higher dicots	Combretaceae	<i>Macropteranthes leiocaulis</i>			NT		4/4
plants	higher dicots	Euphorbiaceae	<i>Bertya pedicellata</i>			NT		14/14
plants	higher dicots	Mimosaceae	<i>Acacia spania</i>			NT		1/1
plants	higher dicots	Mimosaceae	<i>Acacia arbiana</i>			NT		3/3
plants	lower dicots	Apocynaceae	<i>Cerbera dumicola</i>			NT		5/5
plants	lower dicots	Solanaceae	<i>Solanum elachophyllum</i>			E		1/1
plants	lower dicots	Solanaceae	<i>Solanum adenophorum</i>			E		3/3
plants	monocots	Poaceae	<i>Dichanthium queenslandicum</i>			V	E	7/7
plants	monocots	Poaceae	<i>Digitaria porrecta</i>			NT		1/1
plants	monocots	Poaceae	<i>Aristida annua</i>			V	V	1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

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

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

Appendix C: Tertiary flora site assessments

Tertiary Assessment Sheet

Recorder Name: Bruce McLennan					
Site: T1	RE: 11.3.7	Bioregion: BBN	Property: Willunga		
Date: 23/11/16	Photos N: ☒	S: ☒	E: ☒	W: ☒	Ground: ☒
Landscape Photo(s): Start point ☒			Spot Photo(s):		
Transect co-ordinates 0m (start of transect) Datum: GDA94 22°22'24.552"E 148°32'59.159"S 50m (centre point) Datum: GDA94 22°22'23.15"E 148°33'00.002"S					
General Description: Corymbia woodland on alluvial sand deposits					
Pastoral district: Leichhardt			IBRA subregion: BBN11 Isaac-Comet Downs		
Map sheet name/number:			Map scale:		

Geology/Soils

Map Unit:	Bombandy 8653 / Tu Early tertiary	
Geology type:	Mudstone, sandstone, conglomerate, siltstone, oil shale, lignite, basalt	
Soil description:	Red sandy loam	
Situation: B	Landform pattern: ALP	Erosional pattern: GP
Landform element: PLA	Slope type: VG	Slope angle: 1
Slope aspect: S	Altitude: 160m	

100m x 50m area (0.5 ha)

Proportion of dominant canopy or EDL species with evidence of recruitment: 100	
Eucalypt large tree DBH – 55cm <i>(from benchmark document)</i> Number of large Eucalypt trees: 0 Number of large Eucalypt trees with >10cm hollow:	Non-Eucalypt Large tree DBH – 30cm <i>(from benchmark document)</i> Number of large non-eucalypt trees: 0 Number of large non-eucalypt trees with >10cm hollow:
Total large trees: 0	Total large trees with hollows:
Tree canopy (EDL) height: 18m Tree <u>S</u>ub-canopy and/or <u>E</u>mergent height (where relevant): <u>S</u>: 13m	
Total Tree species richness: Eucalyptus clarksoniana, Corymbia tessellaris, Corymbia dallachyana, Cassia brewsteri, Acacia species, Notelaea microcarpa	
6	

50m x 10m area: *List species*

Shrub species richness: <i>Carissa ovata</i> , <i>Grewia latifolia</i> , <i>Capparis mitchellii</i> , <i>Capparis lasiantha</i> , <i>Petalostigma pubescens</i> , <i>Ehretia membranifolia</i> , <i>Alectryon connatus</i> , <i>Diospyros humilis</i> , <i>Acacia excelsa</i> 9
Grass species richness: <i>Aristida calycina</i> , <i>Bothriochloa ewartiana</i> , <i>Chrysopogon fallax</i> , <i>Digitaria</i> sp., <i>Heteropogon contortus</i> , <i>Eriachne</i> sp., <i>Bothriochloa bladhii</i> 7
Forbs and other species richness: <i>Indigofera linifolia</i> , <i>Evolvulus alsinoides</i> , <i>Spermacoce multicaulis</i> , <i>Indigofera linnaei</i> , <i>Hybanthus enneaspermus</i> , <i>Boerhavia</i> sp., <i>Glycine clandestina</i> , <i>Glycine tomentella</i> , <i>Parsonsia</i> sp., 9
Weed species and cover as % of area: 60% <i>Cenchrus ciliaris</i> , <i>Stylosanthes scabra</i> , <i>Sida cordifolia</i> , <i>Portulaca pilosa</i> , <i>Melinis repens</i> , <i>Harrisia martinii</i> , <i>Malvastrum americanum</i>

Site Disturbance

Logging: Old	Ringbarking:
Grazing: Moderate to heavy	Clearing:
Animal diggings:	Roadworks:
Salinity:	Fire: old fire scars – none recent
Weeds: High exotic groundcover	Erosion:
Other:	Non-remnant:

50 x 20 m area: Coarse woody debris (CWD; >10 cm, >0.5 m, measured to the CWD plot boundary):

CWD length	19.5m	CWD/ha	195m
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Five 1 x 1 m plots

Ground Cover	1	2	3	4	5	Mean
Native perennial (decreaser) grass cover*	5	10	35	25	20	19
Native other grass cover (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (< 1m height)		15				3
Non-native grass	35	10	5		20	14
Non-native forbs and shrubs						
Litter *	8	5	10	60	15	19.6
Rock						
Bare ground	52	60	50	15	45	44.4
Cryptogams (ie mosses, lichen, liverworts)						
Total	=100%	=100%	=100%	=100%	=100%	100

Notes: (dead trees etc.)

Young community with occasional dead tree

Evidence of old logging

Old fire scars

This site is consistent with or exceeds benchmarks for this community, except for canopy cover (which is approximately 60% of the benchmark), weed cover and large tree count. This site has no large trees highlighting relative young age of the patch.

Shrub canopy cover: (*denote as native or exotic)

	Shrub <i>Woody plant multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2 m</i>	Canopy Measurements	Distance (m)
1	<i>Alectryon diversifolius</i>	20.0-20.3	0.3
2	<i>Carissa ovata / Diospyros humilis</i>	72.0-82.4	10.4
3	<i>C. ovata</i>	94.7-97.6	2.9
4	<i>A. diversifolius</i>	98.5-100	1.5
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
			Total native: 15.1
			Total exotic: 0

Shrub Canopy 15.1%

Benchmark shrub canopy 2%



Start point facing NE



50m facing north



50m facing south



50m facing east



50m facing west



Quad – 30m



Quad 40m



Quad 50m



Quad 70m

Tertiary Assessment Sheet

Recorder Name: Bruce McLennan					
Site: T2	RE: 11.3.2	Bioregion: BBN	Property: Willunga		
Date: 24/11/16	Photos N: ☒	S: ☒	E: ☒	W: ☒	Ground: ☒
Landscape Photo(s): Start point ☒			Spot Photo(s):		
Transect co-ordinates 0m (start of transect) Datum: GDA94 22°21'35.377"E 148°30'47.197"S 50m (centre point) Datum: GDA94 22°21'34.943"E 148°30'48.865"S					
General Description: Poplar box woodland on alluvial plain					
Pastoral district: Leichhardt			IBRA subregion: BBN11 Isaac-Comet Downs		
Map sheet name/number:			Map scale:		

Geology/Soils

Map Unit:	Bombandy 8653 / Tu Early tertiary	
Geology type:	Mudstone, sandstone, conglomerate, siltstone, oil shale, lignite, basalt Dauringa formation	
Soil description:	Red sandy loam	
Situation: B	Landform pattern: ALP	Erosional pattern: GP
Landform element: PLA	Slope type: VG	Slope angle: 1
Slope aspect: W	Altitude: 165m	

50m x 10m area (0.05 ha)

Proportion of dominant canopy or EDL species with evidence of recruitment: 100	
Eucalypt large tree DBH – 40cm <i>(from benchmark document)</i> Number of large Eucalypt trees: 0 Number of large Eucalypt trees with >10cm hollow:	Non-Eucalypt Large tree DBH – NA <i>(from benchmark document)</i> Number of large non-eucalypt trees: Number of large non-eucalypt trees with >10cm hollow:
Total large trees: 0	Total large trees with hollows:
Tree canopy (EDL) height: 16m Tree <u>S</u>ub-canopy and/or <u>E</u>mergent height (where relevant): <u>S</u>: 8m	
Total Tree species richness: Eucalyptus populnea, Eucalyptus fibrosa, Corymbia clarksoniana, Acacia salicina 4	

50m x 10m area: *List species*

Shrub species richness: <i>Carissa ovata</i> , <i>Grewia latifolia</i> , <i>Capparis arborea</i> , <i>Petalostigma pubescens</i> , <i>Alphitonia excelsa</i> , <i>Atalaya hemiglaucula</i> , <i>Archidendropsis basaltica</i> , <i>Denhamia oleaster</i> , <i>Erythroxylum australe</i>	9
Grass species richness: <i>Heteropogon contortus</i> , <i>Alloteropsis semialata</i>	2
Forbs and other species richness: <i>Evolvulus alsinoides</i> , <i>Spermacoce multicaulis</i> , <i>Rostellularia adscendens</i> , <i>Sida</i> sp x 2., <i>Rhynchosia minima</i> , <i>Phyllanthus virgata</i> , <i>Hybanthus enneaspermus</i> , <i>Glycine clandestina</i> ,	9
Weed species and cover as % of area: 50% <i>Cenchrus ciliaris</i> , <i>Stylosanthes scabra</i> , <i>Melinis repens</i> , <i>Lantana camara</i> , <i>Urochloa mosambicensis</i>	

Site Disturbance

Logging: Old	Ringbarking:
Grazing: Moderate to heavy	Clearing:
Animal diggings:	Roadworks:
Salinity:	Fire: old fire scars – >10 years
Weeds: High exotic groundcover	Erosion: Surface erosion – hard pan
Other:	Non-remnant:

50 x 20 m area: Coarse woody debris (CWD; >10 cm, >0.5 m, measured to the CWD plot boundary):

CWD length	0m	CWD/ha	0m
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Five 1 x 1 m plots

Ground Cover	1	2	3	4	5	Mean
Native perennial (decreaser) grass cover*	15			10		5
Native other grass cover (if relevant)						
Native forbs and other species (non-grass)			5			1
Native shrubs (< 1m height)						
Non-native grass	5	45	55	5	60	34
Non-native forbs and shrubs			5	2	20	5.4
Litter *	60	30	28	35	25	35.6
Rock						
Bare ground	20	20	10	30	15	19
Cryptograms (ie mosses, lichen, liverworts)						
Total	=100%	=100%	=100%	=100%	=100%	100

Notes: (dead trees etc.)

Scattered stags (dead, hollow bearing standing trees)

Senescing old box trees with large hollows (occasional)

Young community

This site is consistent with most benchmarks for this community, except for weed cover, native grass species and cover, woody debris and large tree count.

Lack of any woody debris within the transect and a relatively young woodland community would indicate a possible history of fire or of high floods moving debris away.

High level of weed cover is consistent across the area, with most remnant vegetation infested with buffel grass, the dominant ground cover.

Low native grass species count and cover is closely related to the dominance of buffel grass.

Shrub canopy cover: (*denote as native or exotic)

	Shrub <i>Woody plant multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2 m</i>	Canopy Measurements	Distance (m)
1	<i>Acacia salicina</i>	15.2-15.8	0.6
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
			Total native: 0.6
			Total exotic: 0

Shrub Canopy 1.2%

Benchmark shrub canopy 2%



Start point facing NE



50m facing north



50m facing south



50m facing east



50m facing west



Quad - 0m



Quad 10m



Quad 20m



Quad 30m



Quad 40m

Tertiary Assessment Sheet

Recorder Name: Bruce McLennan					
Site: T3	RE: 11.3.1	Bioregion: BBN	Property: Vermont Park		
Date: 25/11/16	Photos N: ☒	S: ☒	E: ☒	W: ☒	Ground: ☒
Landscape Photo(s): Start point ☒			Spot Photo(s):		
Transect co-ordinates 0m (start of transect) Datum: GDA94 22°17'22.143"E 148°27'52.15"S 50m (centre point) Datum: GDA94 22°17'23.672"E 148°27'52.18"S					
General Description: Brigalow woodland on gilgai clay plain					
Pastoral district: Leichhardt			IBRA subregion: BBN11 Isaac-Comet Downs		
Map sheet name/number:			Map scale:		

Geology/Soils

Map Unit:	Grosvenor Downs 8553 / Qa Qld Quaternary	
Geology type:	Clay, silt, sand, gravel; floodplain alluvium	
Soil description:	Brown alluvial clay	
Situation: B	Landform pattern: ALP	Erosional pattern: LP
Landform element: PLA	Slope type: LE	Slope angle: <1%
Slope aspect: SE	Altitude: 165m	

50m x 10m area (0.05 ha)

Proportion of dominant canopy or EDL species with evidence of recruitment: 100	
Eucalypt large tree DBH – NA <i>(from benchmark document)</i> Number of large Eucalypt trees: Number of large Eucalypt trees with >10cm hollow:	Non-Eucalypt Large tree DBH – 28cm <i>(from benchmark document)</i> Number of large non-eucalypt trees: 0 Number of large non-eucalypt trees with >10cm hollow:
Total large trees:	Total large trees with hollows: 0
Tree canopy (EDL) height: 13m Tree <u>S</u> ub-canopy and/or <u>E</u> mergent height (where relevant): <u>S</u> :	
Total Tree species richness: Acacia harpophylla, Terminalia oblongata, Eucalyptus coolabah, Casuarina cristata	
4	

50m x 10m area: *List species*

Shrub species richness: <i>Carissa ovata</i> , <i>Ehretia membranifolia</i> , <i>Terminalia oblongata</i> , <i>Sarcostemma viminale</i> subsp. <i>brunonianum</i>	4
Grass species richness: <i>Walwhalleya subxerophila</i> , <i>Paspalidium caespitosum</i> , <i>Eriochloa pseudoacrotricha</i>	3
Forbs and other species richness: <i>Marsilea</i> sp., <i>Basilicum polystachion</i> , <i>Fimbristylis bisumbellata</i> , <i>Sida</i> sp., <i>Commelina</i> sp., <i>Alternanthera nana</i> , <i>Parsonsia</i> sp., <i>Cyperus fulvus</i>	8
Weed species and cover as % of area: 15% <i>Cenchrus ciliaris</i> , <i>Cyperus rotundus</i> , <i>Harrisia martinii</i> , <i>Opuntia tomentosa</i> , <i>Parthenium hysterophorus</i>	

Site Disturbance

Logging:	Ringbarking:
Grazing: Moderate with pugging	Clearing:
Animal diggings:	Roadworks:
Salinity:	Fire:
Weeds: High exotic groundcover	Erosion:
Other:	Non-remnant:

50 x 20 m area: Coarse woody debris (CWD; >10 cm, >0.5 m, measured to the CWD plot boundary):

<u>CWD length</u>	79.7m	<u>CWD/ha</u>	797m
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Five 1 x 1 m plots

Ground Cover	1	2	3	4	5	Mean
Native perennial (decreaser) grass cover*						
Native other grass cover (if relevant)						
Native forbs and other species (non-grass)	15	10	30	20	10	17
Native shrubs (< 1m height)	10					2
Non-native grass	20					4
Non-native forbs and shrubs						
Litter*	50	45	15	35	75	44
Rock						
Bare ground	5	45	55	45	15	33
Cryptograms (ie mosses, lichen, liverworts)						
Total	=100%	=100%	=100%	=100%	=100%	100

Notes: (dead trees etc.)

Appears to be a young community with no mature trees but likely to be a low woodland variation on this regional ecosystem which occurs in some situations. Some large very mature Eucalyptus coolabah scattered throughout the patch.

This site is consistent with most benchmarks for this community, except for weed cover, native grass cover, woody debris and large tree count.

Woody debris is less than 50% of the benchmark, but is likely directly related to the low woodland structure.

Low native grass species cover is closely related to the dominance of buffel grass.

Buffel grass cover is variable but estimated at greater than 50% of the ground cover species. Cover will vary with season as buffel is not a significant weed in the melon hole hollows but dense on the tops. Melon hole aquatic species will dominate through wet seasons.

Shrub canopy cover: (*denote as native or exotic)

	Shrub <i>Woody plant multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2 m</i>	Canopy Measurements	Distance (m)
1	<i>Terminalia oblongata</i>	23.8-24.8	1
2	<i>Carissa ovata</i>	34.8-36.6	1.8
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
			Total native: 2.8
			Total exotic: 0

Shrub Canopy 5.6%

Benchmark shrub canopy 8%



Start point facing NE



50m facing north



50m facing south



50m facing east



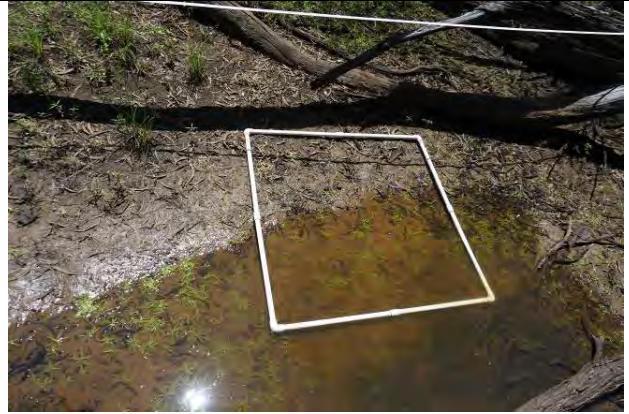
50m facing west



Quad – 0m



Quad 10m



Quad 20m



Quad 30m



Quad 40m

Tertiary Assessment Sheet

Recorder Name: Bruce McLennan					
Site: T4	RE: 11.5.3	Bioregion: BBN	Property: Vermont Park		
Date: 26/11/16	Photos N: ✓	S: ✓	E: ✓	W: ✓	Ground: ✓
Landscape Photo(s): Start point ✓			Spot Photo(s):		
Transect co-ordinates 0m (start of transect) Datum: GDA94 22°17'51.068"E 148°24'55.313"S 50m (centre point) Datum: GDA94 22°17'49.756"E 148°24'54.355"S					
General Description: Poplar box woodland on sand plain					
Pastoral district: Leichhardt			IBRA subregion: BBN11 Isaac-Comet Downs		
Map sheet name/number:			Map scale:		

Geology/Soils

Map Unit:	Grosvenor Downs 8553 / TQa-ANAKIE	
Geology type:	Locally mottled, poorly consolidated sand, silt, clay, minor gravel; high-level alluvial deposits, generally dissected, and related to present stream valleys	
Soil description:	Sandy duplex clay	
Situation: A	Landform pattern: PLA	Erosional pattern: GP
Landform element: PLA	Slope type: VG	Slope angle: 1%
Slope aspect: NNE	Altitude: 170m	

50m x 10m area (0.05 ha)

Proportion of dominant canopy or EDL species with evidence of recruitment: 100	
Eucalypt large tree DBH – 44 cm (from benchmark document)	Non-Eucalypt Large tree DBH – 34cm (from benchmark document)
Number of large Eucalypt trees: 6/0.5ha	Number of large non-eucalypt trees: 0
Number of large Eucalypt trees with >10cm hollow:	Number of large non-eucalypt trees with >10cm hollow:
Total large trees: 12/ha	Total large trees with hollows: 6
Tree canopy (EDL) height: 16m Tree <u>S</u> ub-canopy and/or <u>E</u> mergent height (where relevant): <u>S</u> : 11m	
Total Tree species richness: Eucalyptus populnea, Cassia brewsteri, Ventilago viminalis, Geijera parviflora	
4	

50m x 10m area: *List species*

Shrub species richness: <i>Carissa ovata</i> , <i>Owenia acidula</i> , <i>Psydrax oleifolius</i> , <i>Acacia excelsa</i> , <i>Grewia latifolia</i> , <i>Ventilago viminalis</i> , <i>Eremophila mitchellii</i>	7
Grass species richness: <i>Themeda triandra</i> , <i>Paspalidium caespitosum</i> , <i>Chrysopogon fallax</i> , <i>Aristida</i> sp., <i>Eragrostis</i> sp., <i>Aristida calycina</i> , Unidentified	7
Forbs and other species richness: <i>Phyllanthus virgatus</i> , <i>Sida</i> sp., <i>Enchylaena tomentosa</i> , <i>Cyperus gracilis</i> , <i>Glycine</i> sp., <i>Dianella</i> sp., Unidentified, <i>Lomandra filiformis</i> , <i>Boerhavia</i> sp., <i>Alternanthera nana</i> , <i>Melhanian oblongifolia</i>	11
Weed species and cover as % of area: 50% <i>Cenchrus ciliaris</i> , <i>Stylosanthes scabra</i> , <i>Stylosanthes hamata</i>	

Site Disturbance

Logging:	Ringbarking:
Grazing: Moderate	Clearing:
Animal diggings:	Roadworks:
Salinity:	Fire:
Weeds: High exotic groundcover	Erosion: Low
Other:	Non-remnant:

50 x 20 m area: Coarse woody debris (CWD; >10 cm, >0.5 m, measured to the CWD plot boundary):

CWD length	16.2m	CWD/ha	32.4m
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Five 1 x 1 m plots

Ground Cover	1	2	3	4	5	Mean
Native perennial (decreaser) grass cover*		10				2
Native other grass cover (if relevant)						
Native forbs and other species (non-grass)						
Native shrubs (< 1m height)						
Non-native grass	40	20	20	15	30	25
Non-native forbs and shrubs						
Litter*	35	40	65	45	45	46
Rock						
Bare ground	25	30	15	40	25	27
Cryptogams (ie mosses, lichen, liverworts)						
Total	=100%	=100%	=100%	=100%	=100%	100

Notes: (dead trees etc.)

Mature community, large trees with hollows, with a very high level of buffel grass as the dominant ground cover. This site is consistent with most benchmarks for this community, except for weed cover, native grass cover and woody debris count.

Woody debris is just over 10% of the benchmark.

Low native grass species cover is closely related to the dominance of buffel grass.

Shrub canopy cover: (*denote as native or exotic)

	Shrub <i>Woody plant multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2 m</i>	Canopy Measurements	Distance (m)
1	<i>Carissa ovata</i>	21.7-24.1	2.4
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
			Total native: 2.4
			Total exotic: 0

Shrub Canopy 4.8%

Benchmark shrub canopy 3%



Start point facing NE



50m facing north



50m facing south



50m facing east



50m facing west



Quad – 0m



Quad 10m



Quad 20m



Quad 30m



Quad 40m

Tertiary Assessment Sheet

Recorder Name: Bruce McLennan					
Site: T5	RE: 11.4.9	Bioregion: BBN	Property: Vermont Park		
Date: 07/03/17	Photos N: ✓	S: ✓	E: ✓	W: ✓	Ground: ✓
Landscape Photo(s): Start point ✓			Spot Photo(s):		
Transect co-ordinates 0m (start of transect) Datum: GDA94 22°15'59.918"E 148°23'41.519"S 50m (centre point) Datum: GDA94 22°15'59.028"E 148°23'42.968"S					
General Description: Brigalow woodland on gilgai clay plain					
Pastoral district: Leichhardt			IBRA subregion: BBN11 Isaac-Comet Downs		
Map sheet name/number:			Map scale:		

Geology/Soils

Map Unit:	Grosvenor Downs 8553 / TQa	
Geology type:	Locally mottled, poorly consolidated sand, silt, clay, minor gravel; high-level alluvial deposits, generally dissected, and related to present stream valleys	
Soil description:	Grey light clay	
Situation: U	Landform pattern: PLA	Erosional pattern: GP
Landform element: PLA	Slope type: VG	Slope angle: <1
Slope aspect:	Altitude: 180m	

100m x 50m area (0.5 ha)

Proportion of dominant canopy or EDL species with evidence of recruitment: 100	
Eucalypt large tree DBH – NA <i>(from benchmark document)</i>	Non-Eucalypt Large tree DBH – 28cm <i>(from benchmark document)</i>
Number of large Eucalypt trees: 0	Number of large non-eucalypt trees: 10
Number of large Eucalypt trees with >10cm hollow:	Number of large non-eucalypt trees with >10cm hollow:
Total large trees: 10 (20/ha)	Total large trees with hollows:
Tree canopy (EDL) height: 12m Tree <u>S</u> ub-canopy and/or <u>E</u> mergent height (where relevant): <u>S</u> : 6m	
Total Tree species richness: Acacia harpophylla, Atalaya hemiglauca, Lysiphyllum carronii, Terminalia oblongata, Eremophila mitchellii 5	

50m x 10m area: *List species*

Shrub species richness: <i>Pittosporum spinescens</i> , <i>Carissa ovata</i> , <i>Capparis lasiantha</i> , <i>Geijera parviflora</i> , <i>Mariana microphylla</i> , <i>Ehretia membranifolia</i> , <i>Alectryon oleifolius</i> , <i>Apophyllum anomalum</i> 8
Grass species richness: <i>Sporobolus</i> sp., <i>Sporobolus caroli</i> , <i>Walwhalleya subxerophila</i> , <i>Paspalidium caespitosum</i> , 4
Forbs and other species richness: <i>Clematicissus opaca</i> , <i>Pseuderanthemum variabile</i> , <i>Balsamicum polystachion</i> , <i>Rostellularia adscendens</i> , <i>Melhania oblongifolia</i> , <i>Brunoniella australis</i> , <i>Parsonsia</i> sp., <i>Evolvulus alsinoides</i> , <i>Alternanthera denticulata</i> , <i>Nyssanthus diffusa</i> , <i>Tribulus terrestris</i> , Unident, 12
Weed species and cover as % of area: 45% <i>Cenchrus ciliaris</i> , <i>Parthenium hysterophorus</i> , <i>Stylosanthes scabra</i> , <i>Echinochloa colona</i> , <i>Sida spinosa</i>

Site Disturbance

Logging: Nil	Ringbarking:
Grazing: Moderate	Clearing:
Animal diggings:	Roadworks:
Salinity:	Fire: old fire scars – none recent
Weeds: moderate exotic groundcover	Erosion:
Other:	Non-remnant:

50 x 20 m area: Coarse woody debris (CWD; >10 cm, >0.5 m, measured to the CWD plot boundary):

CWD length	68m	CWD/ha	680m
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Five 1 x 1 m plots

Ground Cover	1	2	3	4	5	Mean
Native perennial (decreaser) grass cover*	10		10	15	10	9
Native other grass cover (if relevant)						
Native forbs and other species (non-grass)				10	5	3
Native shrubs (< 1m height)	5					1
Non-native grass		30	10			8
Non-native forbs and shrubs		5	15			4
Litter *	25	15	45	40	85	42
Rock						
Bare ground	60	50	20	35		33
Cryptogams (ie mosses, lichen, liverworts)						
Total	=100%	=100%	=100%	=100%	=100%	100

Notes: (dead trees etc.)

This community is similar to other remnant melon hole brigalow in the area which generally consists of small diameter brigalow with a slightly lower canopy than might be expected elsewhere, possibly indicative of soil constraints.

This site is consistent with most benchmarks for this community, except for large tree count which is about half the benchmark. Native grass cover is lower than the benchmark but this is due to seasonal conditions, grazing impacts and exotic grass infestation. Under optimal conditions, it is expected native grass cover would be closer to benchmark.

There is a high percentage of dead standing trees within the patch which indicates likely soil constraints (possibly higher deep profile drainage than in comparable clay plain communities further away from the Isaac River alluvium) and in keeping with the generally young nature of the community.

Exotic species ground cover is high at around 45%. This patch is close to being ineligible for TEC inclusion due to high weed cover.

[illegible]

Shrub canopy cover: (*denote as native or exotic)

	Shrub <i>Woody plant multi-stemmed from the base (or within 200mm from ground level) or if single stemmed, less than 2 m</i>	Canopy Measurements	Distance (m)
1	<i>Acacia harpophylla</i>	51.7-50.9	0.8
2	<i>Carissa ovata</i>	16.5-15.1	1.4
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
			Total native: 2.2
			Total exotic: 0

Shrub Canopy 2.2%

Benchmark shrub canopy 5%



Start point facing NE



50m facing north



50m facing south



50m facing east



50m facing west



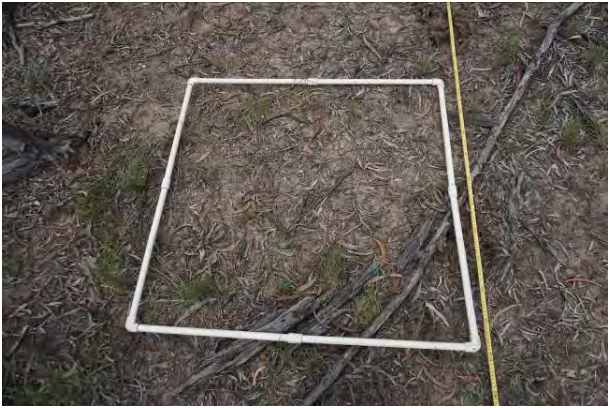
Quad – 25m



Quad35m



Quad 45m



Quad 55m



Quad 65m

Appendix D: Quaternary flora site assessments

Survey Code

Q1 (Flora)

Location

Willunga

Date

22/11/2016

Latitude

-22.40904

Longitude

148.56177

Slope:

1°

Aspect:

NW


General Site Description
Landform

Deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy clay loam

Height of ecologically dominant stratum

Median height 19 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.3.2 – Poplar box (*Eucalyptus populnea*) woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy woodland dominated by poplar box (*E. populnea*) with a low tree layer of quinine tree (*Petalostigma pubescens*), whitewood (*Atalaya hemiglauca*) and bean tree (*Cassia brewsteri*). Groundcover dominated by buffel grass (*Cenchrus ciliaris*). Black spear grass (*Heteropogon contortus*) and wiregrasses (*Aristida* spp.) make up balance of grasses with scattered herbage such as *Sida* sp., matt rush (*Lomandra longifolia*) and exotic shrubby stylo (*Stylosanthes scabra*).

General Site Observations

Trees form ecologically dominant stratum; young community with few old trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; mostly exotic groundcover with scattered native grasses and herbs; moderate recruitment; erosion absent; no dieback detected; fire scars absent.

Health

Good.

Survey Code

Q2 (Flora)

Location

Willunga

Date

22/11/2016

Latitude

-22.41321

Longitude

148.55833

Slope:

<1°

Aspect:

NW


General Site Description
Landform

Deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Orange-brown light sandy clay loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

15%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy open woodland co-dominated by Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*), with associated Dallachy's gum (*C. dallachyana*) and poplar gum (*Eucalyptus platyphylla*). There is a sparse low tree layer of red ash (*Alphitonia excelsa*) and bean tree (*Cassia brewsteri*). Groundcover dominated by buffel grass (*Cenchrus ciliaris*). Black spear grass (*Heteropogon contortus*) and kangaroo grass (*Themeda triandra*) make up balance of grasses with scattered herbage such as *Sida atherophora*, shrub sida (*Sida rohlenae*) and yellow rattlepod (*Crotalaria mitchellii*).

General Site Observations

Trees form ecologically dominant stratum; patchy young recovering community with few old trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; mostly exotic groundcover with scattered native grasses and herbs; good recruitment; erosion absent; old dieback evident; fire scars absent.

Health

Average.

Survey Code

Q3 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.40966

Longitude

148.57673

Slope:

0°

Aspect:

N/A


General Site Description
Landform

Closed depression – swamp

Lithology

Cainozoic sands

Soil

Sandy clay

Height of ecologically dominant stratum

Median height 25 m

Crown cover

5%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.5.17 – Palustrine swamp with fringing forest red gum (*Eucalyptus tereticornis*) woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)

Biodiversity Status

Endangered

Dominant vegetation observed

 Fringing woodland of forest red gum (*E. tereticornis*) and river red gum (*E. camaldulensis*), with open sedgeland dominated by native grasses, *Eleocharis* sp., and exotic *Heliotropium indicum*.

General Site Observations

Trees form ecologically dominant stratum with some mature trees; dense young regrowth above the high-water level; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; old and recent dieback evident; fire scars absent.

Health

Average.

Survey Code

Q4 (Flora)

Location

 Old
 Bombandy

Date

22/11/2016

Latitude

-22.40776

Longitude

148.57911

Slope:

0°

Aspect:

N/A


General Site Description
Landform

Closed depression – old floodplain

Lithology

Alluvial sands and clays

Soils

Light clay

Height of ecologically dominant stratum

Median height 20 m

Crown cover

20%

Mapped RE

11.3.27

Observed RE

 11.3.27i – Palustrine wetland (e.g. vegetated swamp). River red gum (*Eucalyptus camaldulensis*) or forest red gum (*E. tereticornis*) woodland to open woodland with sedgeland ground layer. (BVG 34d).

Biodiversity Status

Of Concern

Dominant vegetation observed

 Woodland of forest red gum (*E. tereticornis*) and river red gum (*E. camaldulensis*), with open sedgeland dominated by native grasses, Milfoil (*Myriophyllum simulans*), *Eleocharis* sp., *Heliotropium ovalifolium* and exotic *Heliotropium indicum*.

General Site Observations

Trees form ecologically dominant stratum with some mature trees; young regrowth fringe above the high-water level; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; grazing stock impacts with pugging of clay soils; old and recent dieback evident; fire scars absent.

Health

Average.

Survey Code

Q5 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.40876

Longitude

148.57949

Slope:

1°

Aspect:

N


General Site Description
Landform

Alluvial plain

Lithology

Alluvial sands and clays

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 16 m

Crown cover

20%

Mapped RE

11.4.9

Observed RE

 11.3.2 – Poplar box (*Eucalyptus populnea*) woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland of poplar box (*E. populnea*) and low tree layer of white bauhinia (*Lysiphyllum hookeri*). There is a mid-dense shrub layer of cocaine tree (*Erythroxylum australe*), stiff denhamia (*Denhamia oleaster*), large-fruited orange thorn (*Pittosporum spinescens*) and small-leaved Queensland ebony (*Diospyros humilis*). The ground layer is dominated almost exclusively by exotic buffel grass (*Cenchrus ciliaris*).

General Site Observations

Trees form ecologically dominant stratum with few old mature trees; moderate regeneration; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; light to moderate grazing stock impacts; no dieback evident; fire scars absent.

Health

Good.

Survey Code

Q6 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41239

Longitude

148.58042

Slope:

1°

Aspect:

NE


General Site Description
Landform

Plain

Lithology

Cainozoic clays

Soil

Light clay

Height of ecologically dominant stratum

Median height 19 m

Crown cover

20%

Mapped RE

11.4.9 / 11.4.8 (90 / 10)

Observed RE

 11.4.8 – Dawson gum (*Eucalyptus cambageana*) woodland to open forest with Brigalow (*Acacia harpophylla*) or blackwood (*A. argyrodendron*) on Cainozoic clay plains. (BVG 25a)

Biodiversity Status

Endangered

Dominant vegetation observed

 Woodland of Dawson gum (*E. cambageana*) and poplar box (*E. populnea*). There is a dense shrub layer of scrub boonaree (*Alectryon diversifolius*), stiff denhamia (*Denhamia oleaster*), acalypha (*Acalypha eremorum*), wilga (*Geijera parviflora*), scrub wilga (*Geijera salicifolia*) and poison peach (*Ehretia membranifolia*). The ground layer is dominated by the exotic buffel grass (*Cenchrus ciliaris*).

General Site Observations

This patch is a thin fringe of clay plain (ecotonal) that was not cleared when the original clearing to the north occurred. It was likely uncleared due to the absence of Brigalow in this patch. Trees form ecologically dominant stratum; moderate regeneration; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; light to moderate grazing stock impacts; no dieback evident; fire scars absent.

TEC status

 This vegetation does not meet TEC threshold criteria due to the sparsity of Brigalow (*Acacia harpophylla*) in the patch and the dominance of ground cover vegetation by the exotic buffel grass (*Cenchrus ciliaris*).

Health

Good.

Survey Code

Q7 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41566

Longitude

148.57885

Slope:

0°

Aspect:

NA


General Site Description
Landform

Shallow closed depression

Lithology

Cainozoic sands

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 20 m

Crown cover

10%

Mapped RE

11.5.17

Observed RE

 11.5.17 – Palustrine swamp with fringing forest red gum (*Eucalyptus tereticornis*) woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b).

Biodiversity Status

Endangered

Dominant vegetation observed

 Sparse woodland of forest red gum (*E. tereticornis*), carbeen (*Corymbia tessellaris*), poplar gum (*E. platyphylla*) and poplar box (*E. populnea*), with grass and forb ground layer. The ground layer is dominated by hairy carpet weed (*Glinus lotoides*) and exotic Indian heliotrope (*Heliotropium indicum*).

General Site Observations

Trees form ecologically dominant stratum; few old mature trees; good regeneration cohort about 5 years old on high water line; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; moderate grazing stock impacts; no dieback evident; fire scars absent.

Health

Good.

Survey Code

Q8 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41722

Longitude

148.57976

Slope:

<1°

Aspect:

SW


General Site Description
Landform

Deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 21 m

Crown cover

15%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy woodland co-dominated by Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*). There is a sparse low tree layer of soap tree (*Alphitonia excelsa*), quinine tree (*Petalostigma pubescens*) and bean tree (*Cassia brewsteri*). Groundcover dominated by buffel grass (*Cenchrus ciliaris*). Red natal grass (*Melinis repens*) makes up balance of grasses with scattered herbage such as yellow rattlepod (*Crotalaria mitchellii*), hairy glycine (*Glycine tomentella*) and shrubby stylo (*Stylosanthes scabra*).

General Site Observations

Trees form ecologically dominant stratum; good mix of older trees with hollows and regeneration across a range of maturities; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; mostly exotic groundcover; erosion absent; old dieback evident; fire scars absent.

Health

Good.

Survey Code

Q9 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41966

Longitude

148.58677

Slope:

1°

Aspect:

N


General Site Description
Landform

Deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 20 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy woodland co-dominated by Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*), with poplar box (*Eucalyptus populnea*) and poplar gum (*E. platyphylla*) associated. Clarkson's bloodwood and carbeen form a second stratum at 11 m, while a sparse third low tree stratum is made up of bean tree (*Cassia brewsteri*) and quinine tree (*Petalostigma pubescens*). There is a sparse shrub layer of bean tree and cocaine tree (*Erythroxylum australe*). Groundcover dominated by buffel grass (*Cenchrus ciliaris*). Black speargrass (*Heteropogon contortus*) and wiregrass (*Aristida* sp.) make up balance of grasses.

General Site Observations

Trees form ecologically dominant stratum; a range of canopy maturities but mostly younger trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; mostly exotic groundcover; erosion absent; no dieback; fire scars absent.

Health

Good.

Survey Code

Q10 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.42604

Longitude

148.60083

Slope:

1°

Aspect:

S


General Site Description

Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 15 m
Crown cover	20%
Mapped RE	11.3.1
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Grassy woodland co-dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and carbeen (<i>C. tessellaris</i>) with poplar box (<i>Eucalyptus populnea</i>) associated. Clarkson's bloodwood, dead finish (<i>Archidendropsis basaltica</i>) and bean tree (<i>Cassia brewsteri</i>) form a second stratum at 7 m. There is a sparse and patchy shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and stiff denhamia (<i>Denhamia oleaster</i>). Groundcover dominated by buffel grass (<i>Cenchrus ciliaris</i>). Wiregrass (<i>Aristida</i> sp.), shrubby stylo (<i>Stylosanthes scabra</i>), yellow rattlepod (<i>Crotalaria mitchellii</i>), flannel weed (<i>Sida cordifolia</i>) and <i>Glycine</i> sp. make up balance of groundcover species.
General Site Observations	Trees form ecologically dominant stratum; healthy canopy, but mostly younger trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; mostly exotic groundcover; erosion absent; no dieback; fire scars absent. Site RE mapped by the State as 11.3.1, but likely to be a scale of mapping error with overlaps from pre-clear mapping not plotted correctly.
Health	Good.

Survey Code

Q11 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41688

Longitude

148.60456

Slope:

1°

Aspect:

S


General Site Description
Landform

Deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy clay loam

Height of ecologically dominant stratum

Median height 18 m

Crown cover

30%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)

Observed RE

 11.3.2 – Poplar box (*Eucalyptus populnea*) woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy woodland dominated by poplar box (*E. populnea*). Associated canopy species included carbeen (*Corymbia tessellaris*), Clarkson's bloodwood (*C. clarksoniana*), narrow-leaved ironbark (*Eucalyptus crebra*) and bull oak (*Allocasuarina luehmannii*). Carbeen, narrow-leaved ironbark, quinine tree (*Petalostigma pubescens*), soap tree (*Alphitonia excelsa*) and bootlace oak (*Hakea lorea*) form a second stratum at 8 m. There is a mid-dense shrub layer of currant bush (*Carissa ovata*), scrub boonaree (*Alectryon diversifolius*), stiff denhamia (*Denhamia oleaster*), cocaine tree (*Erythroxylum australe*), bean tree (*Cassia brewsteri*), dysentery plant (*Grewia latifolia*) and *Kennedia procurrens*. Groundcover is dominated by buffel grass (*Cenchrus ciliaris*).

General Site Observations

Trees form ecologically dominant stratum; healthy canopy with mostly younger trees; connected through large isolated vegetation unit (over 5 km long) with tenuous connection through to Isaac River corridor; totally exotic groundcover; erosion absent; no dieback; fire scars absent. Invasive restricted pest *Harrisia cactus* (*Harrisia martinii*) present.

Health

Good.

Survey Code

Q12 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.41678

Longitude

148.59465

Slope:

1-2°

Aspect:

W


General Site Description

Landform	Gently undulating plain; deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Brown clay loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Grassy woodland dominated by poplar box (<i>Eucalyptus populnea</i>). Second stratum at 9 m comprised of poplar box, Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and bean tree (<i>Cassia brewsteri</i>). Scattered shrub layer of cocaine tree (<i>Erythroxylum australe</i>), bean tree and small-leaved ebony (<i>Diospyros humilis</i>). Groundcover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional black spear grass (<i>Heteropogon contortus</i>), wire grasses (<i>Aristida spp.</i>) and curly windmill grass (<i>Enteropogon acicularis</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy canopy with mostly younger trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; predominantly exotic groundcover; erosion absent; no dieback; fire scars absent.
Health	Good.

Survey Code

Q13 (Flora)

Location

Old Bombandy

Date

22/11/2016

Latitude

-22.4176877

Longitude

148.5896194

Slope:

0°

Aspect:

NA


General Site Description
Landform

Level plain; closed depression – old floodplain

Lithology

Cainozoic sands

Soil

Clay

Height of ecologically dominant stratum

Median height 17 m

Crown cover

20%

Mapped RE

11.5.17

Observed RE

 11.5.17 – Palustrine swamp with fringing *Eucalyptus tereticornis* woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)

Biodiversity Status

Endangered

Dominant vegetation observed

 Scattered woodland dominated by forest red gum (*Eucalyptus tereticornis*) and abundant carbeen (*Corymbia tessellaris*), with frequent poplar gum (*E. platyphylla*) and occasional poplar box (*E. populnea*). Ground layer comprises an open sedgeland dominated by *Eleocharis* sp., and sneezeweed (*Centipeda minima*).

General Site Observations

Trees form ecologically dominant stratum with mostly young trees; connected through large isolated vegetation unit (over 5km long) with tenuous connection through to Isaac River corridor; erosion absent; no dieback evident; fire scars absent; the community is significantly larger than the sliver of 11.5.17 indicated by the state RE mapping and extends across non-remnant mapped area; low level of recruitment evident and area likely to suffer stocking impacts; close to stock handling facility.

Health

Good.

Survey Code

Q14 (Flora)

Location

Willunga

Date

22/11/2016

Latitude

-22.33622

Longitude

148.58287

Slope:

0°

Aspect:

NA


General Site Description

Landform	Level plain with gilgai formation
Lithology	Fine sediments (Sandstone)
Soil	Grey light to medium clay
Height of ecologically dominant stratum	Median height 4 m
Crown cover	60%
Mapped RE	Non-remnant (HVR 11.4.9)
Observed RE	Non-remnant
Biodiversity Status	
Dominant vegetation observed	Regrowth of Brigalow (<i>Acacia harpophylla</i>) to 6 m tall. Buffel grass (<i>Cenchrus ciliaris</i>) dominates groundcover. High value regrowth assessed for condition thresholds for TEC status. Invasive restricted pest plant harrisia cactus (<i>Harrisia martinii</i>) present.
General Site Observations	Shrubs form ecologically dominant stratum; regrowth community estimated 15 years since last cleared; part of large patch of regrowth of similar age, isolated from other vegetation by clearing; exotic groundcover; deep gilgai clay soils, erosion absent.
TEC status	High value regrowth assessed for condition thresholds for TEC status. Fails to meet 70% of height of original canopy for this community. Fails to meet minimum 50% native species in ground stratum. Fails to meet species diversity required for this RE.
Health	Good.

Survey Code

Q15 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.37093

Longitude

148.55581

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain; deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Red-brown sandy loam

Height of ecologically dominant stratum

Median height 17 m

Crown cover

25%

Mapped RE

11.4.4 / 11.4.9 (90 / 10)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with frequent Clarkson's bloodwood (*Corymbia clarksoniana*). Second stratum at 9m of poplar box, white bauhinia (*Lysiphyllum hookeri*), sally wattle (*Acacia salicina*), ironwood (*Acacia excelsa*) and whitewood (*Atalaya hemiglauca*). Tall shrub layer of bean tree (*Cassia brewsteri*), poison peach (*Ehretia membranifolia*), stiff denhamia (*Denhamia oleaster*), native olive (*Notelaea microcarpa*), dead finish (*Archidendropsis basaltica*), and yellowberry bush (*Denhamia cunninghamii*). Low shrub layer of currant bush (*Carissa ovata*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with occasional wire grass (*Aristida calycina*), shrubby stylo (*Stylosanthes scabra*), *Sida* sp. and *Spermacoce multicaulis*.

General Site Observations

Trees form ecologically dominant stratum; healthy community with mostly young trees; vegetation unit approximately 1.4 km long, isolated by clearing; mostly exotic groundcover with scattered native grasses and herbs; moderate recruitment; erosion absent; old dieback detected; fire scars absent.

Health

Good.

Survey Code

Q16 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.37204

Longitude

148.54876

Slope:

1-2°

Aspect:

N


General Site Description
Landform

Gently undulating plain; deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Red-brown sandy loam

Height of ecologically dominant stratum

Median height 17 m

Crown cover

15%

Mapped RE

11.4.2 / 11.4.8 (70 / 30)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy open woodland co-dominated by poplar box (*Eucalyptus populnea*) and Clarkson's bloodwood (*Corymbia clarksoniana*). Second stratum at 8m of Clarkson's bloodwood and poplar box. Tall scattered shrub layer of poison peach (*Ehretia membranifolia*), stiff denhamia (*Denhamia oleaster*), tea tree (*Melaleuca viridiflora*), ironwood (*Acacia excelsa*), quinine tree (*Petalostigma pubescens*), and whitewood (*Atalaya hemiglauca*). Low shrub layer of currant bush (*Carissa ovata*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with associated wiregrass (*Aristida calycina*), shrubby stylo (*Stylosanthes scabra*) and flannel weed (*Sida cordifolia*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of ages; vegetation unit approximately 1.4 km long isolated by clearing; mostly exotic groundcover with scattered native grasses and exotic herbs; moderate recruitment; erosion absent; no dieback detected; fire scars absent; ecotone between 11.3.2 and 11.3.7 to the south, shows greater affinity to RE 11.3.2.

Health

Good.

Survey Code

Q17 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.37996

Longitude

148.55129

Slope:

<1°

Aspect:

General Site Description

Landform	Level plain; deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Red-brown sandy loam
Height of ecologically dominant stratum	Median height 20 m
Crown cover	15%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Grassy open woodland co-dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), carbeen (<i>C. tessellaris</i>) and poplar box (<i>Eucalyptus populnea</i>). Very sparse second stratum at 10m of Clarkson's bloodwood, soap tree (<i>Alphitonia excelsa</i>) and ironwood (<i>Acacia salicina</i>). Very sparse shrub layer of Clarkson's bloodwood, stiff denhamia (<i>Denhamia oleaster</i>) and bootlace oak (<i>Hakea lorea</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant shrubby stylo (<i>Stylosanthes scabra</i>) and frequent black spear grass (<i>Heteropogon contortus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of ages; vegetation unit approximately 2.4 km long isolated by clearing; mostly exotic groundcover with scattered native grasses and exotic herbs; moderate recruitment; erosion absent; no dieback detected; fire scars absent.
Health	Good.

Survey Code

Q18 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.38176

Longitude

148.55646

Slope:

0°

Aspect:

NA


General Site Description

Landform	Level plain; closed depression
Lithology	Cainozoic sands
Soil	Brown sandy clay with ironstone nodules and conglomerate masses
Height of ecologically dominant stratum	Median height 18 m
Crown cover	25%
Mapped RE	11.5.17
Observed RE	11.5.17 – Palustrine swamp with fringing <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Forest red gum (<i>Eucalyptus tereticornis</i>) woodland with sedge groundcover. Very sparse second stratum at 10m of forest red gum. Shrub layer absent. Ground layer dominated by <i>Cyperus trinervis</i> , with abundant awnless barnyard grass (<i>Echinochloa colona</i>) and sneezeweed (<i>Centipeda minima</i>) and occasional cup grass (<i>Eriochloa crebra</i>), purple lovegrass (<i>Eragrostis lacunaria</i>), <i>Dinebra ligulata</i> and <i>Panicum larcomianum</i> . Occasional parthenium (<i>Parthenium hysterophorus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit approximately 2.4 km long, isolated by clearing; sandy clay soils; erosion absent; some dieback evident; fire scars absent.
Health	Good.

Survey Code

Q19 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.38447

Longitude

148.55042

Slope:

1°

Aspect:

SW


General Site Description

Landform	Gently undulating plain; deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Red sandy loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	15%
Mapped RE	11.4.9 / 11.4.8 (70 / 30)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open woodland dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), with frequent carbeen (<i>Corymbia tessellaris</i>). Sparse second stratum at 7m of Clarkson's bloodwood, carbeen and sally wattle (<i>Acacia salicina</i>). Very sparse tall shrub layer of bean tree (<i>Cassia brewsteri</i>), stiff denhamia (<i>Denhamia oleaster</i>), soap tree (<i>Alphitonia excelsa</i>), sally wattle and small-leaved ebony (<i>Diospyros humilis</i>). Very sparse low shrub layer of currant bush (<i>Carissa ovata</i>). Ground layer is dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent shrub sida (<i>Sida rohlenae</i>) and shrubby stylo (<i>Stylosanthes scabra</i>) and occasional wiregrass (<i>Aristida calycina</i>) and black speargrass (<i>Heteropogon contortus</i>).
General Site Observations	Trees form ecologically dominant stratum; young community with moderate regeneration; vegetation unit approximately 2.4 km long, isolated by clearing; erosion absent; some dieback evident; fire scars absent; woody habitat on ground.
Health	Good.

Survey Code

Q20 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.38752

Longitude

148.54337

Slope:

1°

Aspect:

S


General Site Description

Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Red-brown sandy loam
Height of ecologically dominant stratum	Median height 20 m
Crown cover	35%
Mapped RE	11.4.2 / 11.4.8 (90 / 10)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by carbeen (<i>Corymbia tessellaris</i>), with frequent poplar box (<i>Eucalyptus populnea</i>), poplar gum (<i>E. platyphylla</i>), and occasional sally wattle (<i>Acacia salicina</i>). Sparse second stratum at 9m of carbeen, soap tree (<i>Alphitonia excelsa</i>) and quinine tree (<i>Petalostigma pubescens</i>). Mid-dense shrub layer of bean tree (<i>Cassia brewsteri</i>), stiff Denhamia (<i>Denhamia oleaster</i>), soap tree, sally wattle, cocaine tree (<i>Erythroxylum australe</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant wiregrass (<i>Aristida calycina</i>) and occasional black speargrass (<i>Heteropogon contortus</i>), shrub sida (<i>Sida rohlenae</i>) and umbrella grass (<i>Digitaria divaricatissima</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with moderate regeneration; vegetation unit approximately 0.7 km long, isolated by clearing; ground layer dominated by exotic grass; sandy loam soils; erosion absent; some dieback evident; fire scars absent; ecotone between REs 11.3.2 and 11.3.7.
Health	Good.

Survey Code

Q21 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.38600

Longitude

148.54095

Slope:

1°

Aspect:

SW


General Site Description

Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Orange-brown sandy clay loam
Height of ecologically dominant stratum	Median height 19 m
Crown cover	25%
Mapped RE	11.4.9 / 11.4.8 (70 / 30)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with frequent Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and sally wattle (<i>Acacia salicina</i>), and occasional Dallachy's gum (<i>Corymbia dallachiana</i>). Sparse second stratum at 8m of poplar box, bean tree (<i>Cassia brewsteri</i>), soap tree (<i>Alphitonia excelsa</i>) and quinine tree (<i>Petalostigma pubescens</i>). Mid-dense shrub layer of dysentery plant (<i>Grewia latifolia</i>), scrub boonaree (<i>Alectryon diversifolius</i>), sally wattle, whitewood (<i>Atalaya hemiglauca</i>), poison peach (<i>Ehretia membranifolia</i>), cocaine tree (<i>Erythroxylum australe</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent wiregrasses (<i>Aristida calycina</i> and <i>A. jerichoensis</i>) and <i>Sida</i> spp.
General Site Observations	Trees form ecologically dominant stratum; healthy young community with moderate regeneration; vegetation unit approximately 0.7 km long, isolated by clearing; ground layer dominated by exotic grass; erosion absent; some dieback evident; fire scars absent; ecotone between REs 11.3.2 and 11.3.7.
Health	Good.

Survey Code

Q22 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.42510

Longitude

148.54825

Slope:

<1°

Aspect:

E


General Site Description

Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Brown sand
Height of ecologically dominant stratum	Median height 20 m
Crown cover	40%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with frequent carbeen (<i>Corymbia tessellaris</i>), and occasional silver-leaved ironbark (<i>E. melanophloia</i>) and coolabah (<i>E. coolabah</i>). Second stratum at 10m of poplar box and sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer of scrub boonaree (<i>Alectryon diversifolius</i>), bean tree (<i>Cassia brewsteri</i>), poison peach (<i>Ehretia membranifolia</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent green panic (<i>Megathyrsus maxima</i>) and occasional wiregrass (<i>Aristida calycina</i>), spiked matt rush (<i>Lomandra longifolia</i>), black spear grass (<i>Heteropogon contortus</i>), parthenium (<i>Parthenium hysterophorus</i>) and malvastrum (<i>Malvastrum americanum</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with moderate regeneration; vegetation unit part of the vegetated but narrow Isaac River riparian corridor; ground layer dominated by exotic grass; erosion absent; some dieback evident; fire scars absent.
Health	Good.

Survey Code

Q23 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.40132

Longitude

148.53235

Slope:

<1°

Aspect:

SE


General Site Description

Landform	River bank
Lithology	Alluvial sands (origin undetermined)
Soil	Brown sand
Height of ecologically dominant stratum	Median height 22 m
Crown cover	65%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open forest dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent weeping tea-tree (<i>Melaleuca fluviatilis</i>), occasional river she-oak (<i>Casuarina cunninghamiana</i>) and coolabah (<i>Eucalyptus coolabah</i>). Second stratum at 12m of poplar box (<i>Eucalyptus populnea</i>), sally wattle (<i>Acacia salicina</i>), rough-barked apple (<i>Angophora floribunda</i>), flax leafed paperbark (<i>Melaleuca linariifolia</i>), black tea tree (<i>Melaleuca bracteata</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), stiff-leaved denhamia (<i>Denhamia oleaster</i>), bitter bark (<i>Alstonia constricta</i>) and sally wattle. Ground layer co-dominated by buffel grass (<i>Cenchrus ciliaris</i>) and green panic (<i>Megathyrsus maxima</i>), with occasional vernonia (<i>Cyanthillium cinereum</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community which has been drastically narrowed by clearing; moderate regeneration; vegetation unit part of the vegetated, but narrow, Isaac River riparian corridor; ground layer dominated by exotic grass; erosion absent; fire scars absent.
Health	Good.

Survey Code

Q24 (Flora)

Location

Willunga

Date

23/11/2016

Latitude

-22.40456

Longitude

148.53908

Slope:

<1°

Aspect:

General Site Description

Landform	Level plain; palustrine wetland
Lithology	Alluvial sediments and clays (origin undetermined)
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 18 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (75 / 20 / 5)
Observed RE	11.3.3c – Palustrine wetland (e.g. vegetated swamp). <i>Eucalyptus coolabah</i> woodland to open woodland (to scattered trees) with a sedge or grass understorey in back swamps and old channels. (BVG 16c)
Biodiversity Status	Of Concern
Dominant vegetation observed	Coolabah (<i>Eucalyptus coolabah</i>) woodland, with a second sparser stratum at 9 m of Coolabah. Very sparse shrub layer of lignum (<i>Duma florulenta</i>), sally wattle (<i>Acacia salicina</i>) and bean tree (<i>Cassia brewsteri</i>). Ground layer dominated by spike rush (<i>Eleocharis plana</i>), nardoo (<i>Marsilea drummondii</i>) and parthenium (<i>Parthenium hysterophorus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy ephemeral wetland community with moderate regeneration; vegetation unit part of the vegetated but narrow Isaac River riparian corridor; clay soils; erosion absent; fire scars absent.
Health	Good.

Survey Code

Q25 (Flora)

Location

Willunga

Date

24/11/2016

Latitude

-22.38145

Longitude

148.52737

Slope:

1-2°

Aspect:

S


General Site Description

Landform	Gently undulating plain; deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Brown sandy loam
Height of ecologically dominant stratum	Median height 13 m
Crown cover	15%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), with frequent carbeen (<i>C. tessellaris</i>) and Dallachy's gum (<i>C. dallachyana</i>), and occasional poplar box (<i>E. populnea</i>). Sparse shrub layer of Clarkson's bloodwood, carbeen and Dallachy's gum. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) with scattered forbs and grasses, including <i>Sida rohlenae</i> , wiregrass (<i>Aristida calycina</i>), red Natal grass (<i>Melinis repens</i>), sticky indigo (<i>Indigofera colutea</i>), ryncho (<i>Rhynchosia minima</i>), four-leaved cassia (<i>Chamaecrista absus</i>) and trefoil rattlepod (<i>Crotalaria medicaginea</i>).
General Site Observations	Trees form ecologically dominant stratum; sparse community with moderate regeneration; vegetation unit is intact remnant approximately 4.5 km long by 1.6 km wide and linked to the Isaac River corridor; ground layer dominated by exotic grass; sandy loam soils; erosion absent; minimal dieback evident with old logs on ground and evidence of old logging; fire scars absent; moderate grazing impacts.
Health	Good.

Survey Code

Q26 (Flora)

Location

Willunga

Date

24/11/2016

Latitude

-22.36682

Longitude

148.51587

Slope:

0°

Aspect:

General Site Description

Landform	Level plain; closed depression
Lithology	Cainozoic sands
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	20% within the vegetated fringe – centre of wetland bare of woody vegetation
Mapped RE	11.5.17
Observed RE	11.5.17 – Palustrine swamp with fringing <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Fringing woodland of forest red gum (<i>Eucalyptus tereticornis</i>), carbeen (<i>Corymbia tessellaris</i>) and poplar box (<i>E. populnea</i>). Sparse 2m shrub layer of forest red gum above the high-water mark. Ground cover in the wetland dominated by giant sedge (<i>Cyperus exaltatus</i>), Indian heliotrope (<i>Heliotropium indicum</i>), grey-leaved heliotrope (<i>Heliotropium ovalifolium</i>), small knotweed (<i>Polygonum plebeium</i>) and sneezeweed (<i>Centipeda minima</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is intact remnant approximately 4.5 km long by 1.6 km wide and linked to the Isaac River corridor; ground layer dominated by native aquatic species; erosion absent; minimal dieback; fire scars absent; moderate grazing impacts.
Health	Good.

Survey Code

Q27 (Flora)

Location

Willunga

Date

24/11/2016

Latitude

-22.36525

Longitude

148.50899

Slope:

0°

Aspect:

General Site Description

Landform	Level plain; closed depression / swamp
Lithology	Cainozoic sands
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 17 m
Crown cover	25% within the vegetated fringe – centre of wetland bare of woody vegetation
Mapped RE	11.5.17
Observed RE	11.5.17 – Palustrine swamp with fringing <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Fringing woodland dominated by coolabah (<i>Eucalyptus coolabah</i>), with abundant poplar box (<i>Eucalyptus populnea</i>) and occasional forest red gum (<i>Eucalyptus tereticornis</i>). Very sparse 10m second stratum of scattered sapling coolabah. Ground layer in the wetland is dominated by giant sedge (<i>Cyperus exaltatus</i>), para grass (<i>Brachiaria mutica</i>), white eclipta (<i>Eclipta prostrata</i>), willow primrose (<i>Ludwigia octovalvis</i>) and sneezeweed (<i>Centipeda minima</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is intact remnant approximately 4.5 km long by 1.6 km wide and linked to the Isaac River corridor; ground layer a mix of native and exotic species; erosion absent; minimal dieback; fire scars absent; moderate grazing impacts.
Health	Good.

Survey Code

Q28 (Flora)

Location

Willunga

Date

24/11/2016

Latitude

-22.36448

Longitude

148.51211

Slope:

1°

Aspect:

S


General Site Description

Landform	Gently undulating plain, with gilgai formation
Lithology	Cainozoic clays
Soil	Brown light to medium cracking clay
Height of ecologically dominant stratum	Median height 10 m
Crown cover	60%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)
Observed RE	11.3.1 – <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Low open forest dominated by brigalow (<i>Acacia harpophylla</i>), with frequent yellowwood (<i>Terminalia oblongata</i>), emu apple (<i>Owenia acidula</i>), false sandalwood (<i>Eremophila mitchellii</i>) and red bauhina (<i>Lysiphyllum carronii</i>). Tall shrub layer of scrub boonaree (<i>Alectryon diversifolius</i>), scrub wilga (<i>Geijera salicifolia</i>), peach bush (<i>Ehretia saligna</i>), currant bush (<i>Carissa ovata</i>), false sandalwood and wilga (<i>Geijera parviflora</i>). Ground cover restricted to high points on the gilgais and is dominated by buffel grass (<i>Cenchrus ciliaris</i>), with sparse areas of brigalow grass (<i>Paspalidium caespitosum</i>) and canegrass (<i>Walwhallea subxerophila</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is an intact remnant approximately 4.5 km long by 1.6 km wide and linked to the Isaac River corridor; ground layer dominated by exotic species; erosion absent; minimal dieback; fire scars absent; moderate grazing impacts.
TEC status	This vegetation will not meet TEC threshold criteria due to the dominance of ground cover vegetation by the exotic buffel species (<i>Cenchrus ciliaris</i>).
Health	Good.

Survey Code

Q29 (Flora)

Location

 Willunga and
 Seloh Nolem

Date

24/11/2016

Latitude

-22.34866

Longitude

148.51068

Slope:

0°

Aspect:

General Site Description

Landform	Palustrine wetland on level plain
Lithology	Sandstone / mudstone
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 18 m
Crown cover	30%
Mapped RE	11.3.27b and Non-remnant
Observed RE	11.3.27b – Lacustrine / palustrine wetland with fringing woodland. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Wetland with fringing woodland dominated by coolabah (<i>Eucalyptus coolabah</i>) and forest red gum (<i>E. tereticornis</i>), with occasional belah (<i>Casuarina cristata</i>). Second stratum at 8 m of belah, forest red gum and yellowwood (<i>Terminalia oblongata</i>). Ground cover dominated by common couch (<i>Cynodon dactylon</i>), with giant sedge (<i>Cyperus exaltatus</i>), Indian heliotrope (<i>Heliotropium indicum</i>) and <i>Juncus</i> sp.
General Site Observations	Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is an intact remnant approximately 4.5 km long by 1.6 km wide and linked to the Isaac River corridor; ground layer restricted to drying fringes of the wetland; erosion absent; minimal dieback; fire scars absent; moderate grazing impacts.
Health	Good.

Survey Code

Q30 (Flora)

Location

Seloh Nolem

Date

24/11/2016

Latitude

-22.33668

Longitude

148.50658

Slope:

1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain; deposited low rises – old floodplain

Lithology

Alluvial sands and clays

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 16 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by Clarkson's bloodwood (*Corymbia clarksoniana*), with abundant poplar box (*Eucalyptus populnea*) and frequent carbeen (*Corymbia tessellaris*). Second stratum at 7m of prickly pine (*Bursaria incana*), stiff-leaved denhamia (*Denhamia oleaster*), carbeen, Clarkson's bloodwood, bean tree (*Cassia brewsteri*) and scrub boonaree (*Alectryon diversifolius*). Shrub layer of brush hovea (*Hovea longipes*), peach (*Ehretia saligna*), cassinia (*Elaeodendron australe*), small-leaved ebony (*Diospyros humilis*), cocaine tree (*Erythroxylum australe*), large-fruited orange thorn (*Pittosporum spinescens*) and currant bush (*Carissa ovata*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*).

General Site Observations

Trees form ecologically dominant stratum; open community with moderate regeneration; vegetation unit is an isolated linear remnant approximately 2 km long by 0.25 km wide, surrounded by clearing; ground layer dominated by exotic grass; erosion absent; minimal dieback evident; fire scars absent; moderate grazing impacts.

Health

Good.

Survey Code

Q31 (Flora)

Location

Seloh Nolem

Date

24/11/2016

Latitude

-22.33750

Longitude

148.49354

Slope:

1°

Aspect:

SE


General Site Description

Landform	Level plain
Lithology	Cainozoic clays
Soil	Brown cracking clays
Height of EDL	Median height 8 m
Crown cover	20%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)
Observed RE	11.3.1 – <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open low woodland of yellowwood (<i>Terminalia oblongata</i>), brigalow (<i>Acacia harpophylla</i>), red bauhinia (<i>Lysiphyllum carronii</i>), and white bauhinia (<i>Lysiphyllum hookeri</i>). Denser shrub layer of brigalow, scrub boonaree (<i>Alectryon diversifolius</i>), warrior bush (<i>Apophyllum anomalum</i>), yellowwood, native lime (<i>Citrus glauca</i>), red bauhinia, whitewood (<i>Atalaya hemiglauc</i>), water bush (<i>Myoporum acuminatum</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with scattered herbs such as red pigweed (<i>Portulaca oleracea</i>), soda bush (<i>Atriplex muelleri</i>), brigalow burr (<i>Sclerolaena tetracuspis</i>), soft rolypoly (<i>Salsola australis</i>) and <i>Maireana microphylla</i> .
General Site Observations	Trees form ecologically dominant stratum; highly disturbed community with poor regeneration, likely fire damaged when surrounding clearing was burned; vegetation unit is an isolated linear remnant approximately 3 km long with tenuous connection to Isaac River riparian corridor in the north; very similar cover to mapped non-remnant country to north east; ground layer dominated by exotic grass; clay gilgai soils; erosion absent.
TEC status	This vegetation will not meet TEC threshold criteria due to the dominance of ground cover vegetation by the exotic buffel species (<i>Cenchrus ciliaris</i>) and inconsistencies with the structure of a remnant community.
Health	Poor.

Survey Code

Q32 (Flora)

Location

Seloh Nolem

Date

24/11/2016

Latitude

-22.34325

Longitude

148.48826

Slope:

<1°

Aspect:

S


General Site Description

Landform	Level plain; alluvial plain
Lithology	Alluvium – clays and sands
Soil	Brown cracking clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	35%
Mapped RE	11.3.27b
Observed RE	11.3.27f – Palustrine wetland, <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of coolabah (<i>Eucalyptus coolabah</i>). Very sparse second stratum at 9 m of coolabah and sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer of coolabah and sally wattle seedlings. Ground layer is <i>Cyperus</i> sp., <i>Eleocharis</i> sp., cane grass (<i>Walwhalleya subxerophila</i>), native grasses, lesser joyweed (<i>Alternanthera denticulata</i>) and parthenium (<i>Parthenium hysterophorus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy wetland community with good regeneration; vegetation unit is part of the Isaac River riparian corridor where the vegetated corridor is approximately 1km wide at this point; clay soils; erosion absent, no dieback.
Health	Good.

Survey Code

Q33 (Flora)

Location

Seloh Nolem

Date

24/11/2016

Latitude

-22.35394

Longitude

148.49749

Slope:

<1°

Aspect:

General Site Description

Landform	Level plain; stream channel
Lithology	Alluvium – clays and sands
Soil	Alluvial sands over clay substrate
Height of ecologically dominant stratum	Median height 20 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)
Observed RE	11.3.3 – <i>Eucalyptus coolabah</i> woodland on alluvial plains. (BVG 16c)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Coolabah (<i>Eucalyptus coolabah</i>), with occasional carbeen (<i>Corymbia tessellaris</i>). Slightly denser canopy second stratum at 10 m of white bauhinia (<i>Lysiphyllum hookeri</i>), bean tree (<i>Cassia brewsteri</i>), sandpaper fig (<i>Ficus opposita</i>), coolabah and sally wattle (<i>Acacia salicina</i>). Mid-density shrub layer of poison peach (<i>Ehretia membranifolia</i>), scrub boonaree (<i>Alectryon diversifolius</i>), bitterbark (<i>Alstonia constricta</i>), coolabah and sally wattle. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional parthenium (<i>Parthenium hysterophorus</i>), <i>Paspalidium sp.</i> and Queensland blue grass (<i>Dichanthium sericeum</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with moderate regeneration; vegetation unit is part of the Isaac River riparian corridor where the vegetated corridor is approximately 1km wide at this point; clay soils; erosion absent; no dieback.
Health	Good

Survey Code

Q34 (Flora)

Location

Seloh Nolem

Date

24/11/2016

Latitude

-22.34563

Longitude

148.48637

Slope:

<1°

Aspect:

NE


General Site Description
Landform

Level plain; alluvial plain

Lithology

Alluvial sands and clays

Soil

Brown sandy clay loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Poplar box (*Eucalyptus populnea*) woodland, with occasional coolabah (*Eucalyptus coolabah*) and Clarkson's bloodwood (*Corymbia clarksoniana*). Very sparse second stratum at 8 m of sally wattle (*Acacia salicina*). Sparse shrub layer of currant bush (*Carissa ovata*), bean tree (*Cassia brewsteri*), sally wattle, poplar box, and supplejack (*Ventilago viminalis*). Ground layer dominated by buffel grass, with occasional natives, including black spear grass (*Heteropogon contortus*), wiregrass (*Aristida calycina*), curly windmill grass (*Enteropogon acicularis*) and Darling lily (*Crinum flaccidum*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is part of the Isaac River riparian corridor where the vegetated corridor is approximately 1km wide at this point; erosion absent; no dieback noted.

Health

Good.

Survey Code

Q35 (Flora)

Location

Seloh Nolem

Date

25/11/2016

Latitude

-22.33314

Longitude

148.47250

Slope:

<1°

Aspect:

S


General Site Description
Landform

Level plain; alluvial plain

Lithology

Alluvial sands and clays

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

35%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by carbeen (*Corymbia tessellaris*), with abundant Clarkson's bloodwood (*C. clarksoniana*) and poplar box (*E. populnea*), and occasional Dallachy's gum (*Corymbia dallachiana*), forest red gum (*Eucalyptus tereticornis*), sally wattle (*Acacia salicina*) and poplar box (*Eucalyptus populnea*). Sub-canopy at 8 m of poplar box, carbeen, bean tree (*Cassia brewsteri*), soap tree (*Alphitonia excelsa*) and sally wattle. Sparse shrub layer of lantana (*Lantana camara*), sandpaper fig (*Ficus opposita*), poplar box and bean tree. Ground layer is dominated by buffel grass, with frequent black spear grass (*Heteropogon contortus*), wiregrass (*Aristida jerichoensis*), shrubby stylo (*Stylosanthes scabra*) and red Natal grass (*Melinis repens*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with good regeneration; vegetation unit is part of the Isaac River riparian corridor; this site is located at the southern end of a large block of remnant vegetation approximately 6.5 km long by up to 4.5 km wide; erosion absent; no dieback noted.

Health

Good.

Survey Code

Q36 (Flora)

Location

Seloh Nolem

Date

25/11/2016

Latitude

-22.32805

Longitude

148.48349

Slope:

<1°

Aspect:

SSW


General Site Description

Landform	Level plain; alluvial plain
Lithology	Alluvial sands and clays
Soil	Orange-brown loamy clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 / 11.3.1b (65 / 20 / 10 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of poplar box (<i>Eucalyptus populnea</i>), with a sub-canopy at 6 m of poplar box, sally wattle (<i>Acacia salicina</i>), emu apple (<i>Owenia acidula</i>), white bauhinia (<i>Lysiphyllum hookeri</i>) and whitewood (<i>Atalaya hemiglauca</i>). Well-developed shrub layer of poplar box, white bauhinia, wilga (<i>Geijera parviflora</i>), cocaine tree (<i>Erythroxylum australe</i>), currant bush (<i>Carissa ovata</i>), supplejack (<i>Ventilago viminalis</i>) and sally wattle. The ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional black spear grass (<i>Heteropogon contortus</i>), wire grass (<i>Aristida</i> sp.) and <i>Sida</i> spp.
General Site Observations	Trees form ecologically dominant stratum; patchy community, but with good regeneration; this a small patch of vegetation that has been isolated by clearing; tunnel erosion evident with sinkhole action; some dieback noted.
Health	Average.

Survey Code

Q37 (Flora)

Location

Seloh Nolem

Date

25/11/2016

Latitude

-22.31433

Longitude

148.47243

Slope:

10-15°

Aspect:

SW


General Site Description

Landform	River bank
Lithology	Alluvial sands, clays and gravels
Soil	Yellow-brown sand
Height of ecologically dominant stratum	Median height 17 m
Crown cover	45%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland to open forest dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent river she-oak (<i>Casuarina cunninghamiana</i>), and occasional carbeen (<i>Corymbia tessellaris</i>) and coolabah (<i>E. coolabah</i>). Sparse second stratum at 8 m of river she-oak and forest red gum. Sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>) and lantana (<i>Lantana camara</i>) on the upper bank and snow-in-summer (<i>Melaleuca linariifolia</i>) on the lower bank. Ground layer dominated by green panic (<i>Megathyrsus maxima</i>), with frequent common couch (<i>Cynodon dactylon</i>), Queensland blue grass (<i>Dichanthium sericeum</i>) and Para grass (<i>Brachiaria mutica</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community within a large remnant patch; good recruitment; clearing for fence lines and tracks on the river bank to north east of this point appears to be destabilising the river bank and the bank is being eaten away by flood events faster than normal erosive meander; no dieback noted.
Health	Good

Survey Code

Q38 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.29103

Longitude

148.45897

Slope:

<1°

Aspect:

S


General Site Description
Landform

Level plain

Lithology

Alluvial sands, clays and gravels

Soil

Brown loamy clay

Height of ecologically dominant stratum

Median height 16 m

Crown cover

35%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Poplar box (*Eucalyptus populnea*) woodland, with a sparse second stratum at 6 m of whitewood (*Atalaya hemiglauc*), false sandalwood (*Eremophila mitchellii*), bean tree (*Cassia brewsteri*), emu apple (*Owenia acidula*) and poplar box. Very sparse shrub layer of whitewood, nelia (*Acacia oswaldii*), yellowberry bush (*Denhamia cunninghamii*), supplejack (*Ventilago viminalis*), sally wattle (*Acacia salicina*) currant bush (*Carissa ovata*) and nipan (*Capparis lasiantha*). Ground layer dominated by wiregrass (*Aristida* sp.) and kangaroo grass (*Themeda triandra*) and black spear grass (*Heteropogon contortus*), with occasional bearded watergrass (*Bulbostylis barbata*) and buffel grass (*Cenchrus ciliaris*).

General Site Observations

Trees form ecologically dominant stratum; healthy community within a large remnant patch; good recruitment; no dieback noted; native ground cover species are dominant; no erosion noted; no weediness noted.

Health

Very good.

Survey Code

Q39 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.29414

Longitude

148.45418

Slope:

<1°

Aspect:

NE


General Site Description

Landform	Paleochannel on level plain
Lithology	Alluvial sands, clays and gravels
Soil	Brown sandy alluvial clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	40%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)
Observed RE	11.3.27b – Lacustrine wetland, with fringing woodland, commonly <i>Eucalyptus camaldulensis</i> or <i>E. coolabah</i> . (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by coolabah (<i>Eucalyptus coolabah</i>), with occasional carbeen (<i>Corymbia tessellaris</i>). Very sparse shrub layer of bean tree (<i>Cassia brewsteri</i>). The ground layer is almost bare, with scattered black spear grass (<i>Heteropogon contortus</i>), buffel grass (<i>Cenchrus ciliaris</i>) and forbs.
General Site Observations	Trees form ecologically dominant stratum; healthy community within a large remnant patch; good recruitment; no dieback noted; no erosion noted, no weediness noted; grazing livestock impacts evident with pugging and general grazing pressure.
Health	Good.

Survey Code

Q40 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.30054

Longitude

148.45531

Slope:

<1°

Aspect:

General Site Description
Landform

Level plain

Lithology

Alluvial sands, clays and gravels

Soil

Brown loamy clay

Height of ecologically dominant stratum

Median height 14 m

Crown cover

20%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by Poplar box (*Eucalyptus populnea*), with boonaree (*Alectryon oleifolius*). Sparse sub-canopy of poplar box, sally wattle (*Acacia salicina*) and emu apple (*Owenia acidula*). Very sparse shrub layer of bean tree (*Cassia brewsteri*), whitewood (*Atalaya hemiglauca*), currant bush (*Carissa ovata*) and native lime (*Citrus glauca*). Ground layer is approximately 50% buffel grass (*Cenchrus ciliaris*) and 50% native grasses, including kangaroo grass (*Themeda triandra*), black spear grass (*Heteropogon contortus*) and wiregrass (*Aristida jerichoensis*).

General Site Observations

Trees form ecologically dominant stratum; healthy community within a large remnant patch; good recruitment; no dieback noted; range of canopy maturities with some larger hollows in old trees; no erosion noted; no fire scars.

Health

Good.

Survey Code

Q41 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.30393

Longitude

148.45110

Slope:

<1°

Aspect:

E


General Site Description
Landform

Level plain

Lithology

Cainozoic clay

Soil

Brown sandy light clay

Height of ecologically dominant stratum

Median height 12 m

Crown cover

40%

Mapped RE

11.4.9

Observed RE

 11.4.8 – *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains. (BVG 25a)

Biodiversity Status

Endangered

Dominant vegetation observed

Woodland co-dominated by brigalow (*Acacia harpophylla*) and Dawson gum (*Eucalyptus cambageana*), with a sparse sub-canopy (6m) of brigalow, scrub leopard ash (*Flindersia dissosperma*) and red bauhinia (*Lysiphyllum carronii*). Mid-dense shrub layer of currant bush (*Carissa ovata*), red bauhinia, wilga (*Geijera parviflora*) and whitewood (*Atalaya hemiglauca*). Ground layer dominated by wiregrass (*Aristida jerichoensis*), with abundant buffel grass (*Cenchrus ciliaris*) and frequent brigalow grass (*Paspalidium caespitosum*).

General Site Observations

Trees form ecologically dominant stratum; thin sliver of brigalow community that was not cleared when the original clearing to the south occurred; no dieback noted; no erosion noted; no fire scars.

TEC status

This patch is too small to be considered a TEC.

Health

Good.

Survey Code

Q42 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.31403

Longitude

148.46753

Slope:

<1°

Aspect:

ESE


General Site Description

Landform	Level plain
Lithology	Alluvial sands, clays and gravels
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Poplar box (<i>Eucalyptus populnea</i>) woodland, with a sparse sub-canopy (7m) of poplar box and bean tree (<i>Cassia brewsteri</i>). Sparse shrub layer containing dead finish (<i>Archidendropsis basaltica</i>), lantana (<i>Lantana camara</i>), supplejack (<i>Ventilago viminalis</i>), sally wattle (<i>Acacia salicina</i>), nelia (<i>Acacia oswaldii</i>), wild orange (<i>Capparis umbonata</i>), myrtle wood (<i>Psydrax oleifolius</i>) and shiny-leaved canthium (<i>Psydrax odorata</i>). Ground layer dominated by wiregrasses (<i>Aristida spp.</i>) and curly windmill grass (<i>Enteropogon ramosus</i>), with abundant Buffel grass (<i>Cenchrus ciliaris</i>), frequent kangaroo grass (<i>Themeda triandra</i>) and forest blue grass (<i>Bothriochloa sp.</i>).
General Site Observations	Trees form ecologically dominant stratum; a good mix of canopy maturities; good recruitment; no dieback noted; no erosion noted; no fire scars; good habitat timber on the ground; part of a significant remnant block adjacent to the Isaac River 7km long by up to 4km wide.
Health	Very good.

Survey Code

Q43 (Flora)

Location

 Vermont Park
 (Lot 9 CNS98)

Date

25/11/2016

Latitude

-22.32888

Longitude

148.47273

Slope:

<1°

Aspect:

General Site Description
Landform

Palustrine wetland; level plain

Lithology

Alluvial sands, clays and gravels

Soil

Brown sandy light clay

Height of ecologically dominant stratum

Median height 20 m

Crown cover

35% within the vegetated fringe

Mapped RE

11.3.27b

Observed RE

 11.3.27f – Palustrine wetland (e.g. vegetated swamp). *Eucalyptus coolabah* and / or *E. tereticornis* open woodland to woodland fringing swamps. (BVG 34d)

Biodiversity Status

Of Concern

Dominant vegetation observed

 Woodland dominated by forest red gum (*Eucalyptus tereticornis*) and coolabah (*Eucalyptus coolabah*), with occasional carbeen (*Corymbia tessellaris*). Similar density sub-canopy at 11m of young forest red gum, coolabah and carbeen, with a scattering of mature swamp mahogany (*Lophostemon suaveolens*). No shrub layer. Ground layer includes a mix of native grasses, small knotweed (*Polygonum plebeium*), indian heliotrope (*Heliotropium indicum*), *Heliotropium ovalifolium* and *Verbena* sp.

General Site Observations

Trees form ecologically dominant stratum; a healthy wetland community within a large remnant with intact linkages to larger remnants to the west; good recruitment; no dieback noted; no erosion noted; no fire scars; part of a remnant block adjacent to the Isaac River 7km long by up to 4km wide.

Health

Very good.

Survey Code

Q44 (Flora)

Location

Vermont Park

Date

25/11/2016

Latitude

-22.32872

Longitude

148.46386

Slope:

<1°

Aspect:

General Site Description

Landform	Level plain
Lithology	Cainozoic clays
Soil	Brown light to medium clay
Height of ecologically dominant stratum	Median height 12 m
Crown cover	60%
Mapped RE	11.3.3 / 11.3.2 / 11.3.1 / 11.3.2b (40 / 30 / 25 / 5)
Observed RE	11.3.1 – <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest dominated by brigalow (<i>Acacia harpophylla</i>), with abundant coolabah (<i>Eucalyptus coolabah</i>). Sub-canopy at 7m of white bauhinia (<i>Lysiphyllum hookeri</i>) and yellowwood (<i>Terminalia oblongata</i>). Sparse shrub layer of scrub boonaree (<i>Alectryon diversifolius</i>), poison peach (<i>Ehretia membranifolia</i>), and shiny-leaved canthium (<i>Psydrax odorata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Trees form ecologically dominant stratum; a healthy but relatively small patch of brigalow that missed being cleared; good recruitment; no dieback noted; no erosion noted; no fire scars; highly infested with exotic grass and suffering edge effects from adjacent clearing.
TEC status	This patch does not meet TEC listing criteria thresholds due to >50% exotic groundcover.
Health	Good.

Survey Code

Q45 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.27440

Longitude

148.44267

Slope:

1°

Aspect:

ESE


General Site Description
Landform

Level plain

Lithology

Alluvial sands, clays and gravels

Soil

Brown sandy clay loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

12%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Open woodland dominated by Clarkson's bloodwood (*Corymbia clarksoniana*) and Dallachy's gum (*C. dallachyana*), with abundant narrow-leaved iron-bark (*Eucalyptus crebra*) and occasional carbeen (*C. tessellaris*). Very sparse sub-canopy of carbeen, Clarkson's bloodwood and Bean tree (*Cassia brewsteri*). Very sparse shrub layer of bean tree, currant bush (*Carissa ovata*), dysentery plant *Grewia latifolia*) and lantana (*Lantana camara*). Ground layer includes a mix of wiregrass (*Aristida jerichoensis*), buffel grass (*Cenchrus ciliaris*), kangaroo grass (*Themeda triandra*) and black spear grass (*Heteropogon contortus*).

General Site Observations

Trees form ecologically dominant stratum; healthy recovering community; good recruitment; old dead trees noted with large hollows; no erosion noted; old fire scars.

Health

Good.

Survey Code

Q46 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.28331

Longitude

148.41602

Slope:

1°

Aspect:

N


General Site Description

Landform	Depression within gently undulating plain
Lithology	Cainozoic clays
Soil	Brown light to medium clay
Height of ecologically dominant stratum	Median height 11 m
Crown cover	65%
Mapped RE	11.4.9
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest dominated by brigalow (<i>Acacia harpophylla</i>), with abundant yellowwood (<i>Terminalia oblongata</i>) and occasional coolabah (<i>Eucalyptus coolabah</i>). Very sparse sub-canopy of sandalwood (<i>Santalum lanceolatum</i>), bean tree (<i>Cassia brewsteri</i>), white bauhinia (<i>Lysiphyllum hookeri</i>) and yellowwood. Shrub layer of cocaine tree (<i>Erythroxylum australe</i>), poison peach (<i>Ehretia membranifolia</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent green panic (<i>Megathyrsus maxima</i>), brigalow grass (<i>Paspalidium caespitosum</i>), <i>Cyperus</i> sp. and smart weed (<i>Persicaria attenuata</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy, mostly young community; good recruitment; no dieback noted; no significant erosion noted; old fire scars. Wetland areas along gully part of dam impoundment.
TEC status	This patch will not meet TEC threshold criteria due to greater than 50% exotic species cover in the ground layer.
Health	Good.

Survey Code

Q47 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.27040

Longitude

148.41005

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy clay loam

Height of ecologically dominant stratum

Median height 16 m

Crown cover

30%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with a sub-canopy of quinine tree (*Petalostigma pubescens*), emu apple (*Owenia acidula*), bean tree (*Cassia brewsteri*) and white bauhinia (*Lysiphyllum hookeri*). Shrub layer of currant bush (*Carissa ovata*), wombat berry (*Eustrephus latifolius*), cocaine tree (*Erythroxylum australe*), cassine (*Elaeodendron australe*), quinine tree, poison peach (*Ehretia membranifolia*), yellowberry bush (*Denhamia cunninghamii*) and bitterbark (*Alstonia constricta*). Ground layer includes a mix of wiregrass (*Aristida* sp.), buffel grass (*Cenchrus ciliaris*), kangaroo grass (*Themeda triandra*), shrubby stylo (*Stylosanthes scabra*), hooky grass (*Ancistrachne uncinulata*) and black spear grass (*Heteropogon contortus*).

General Site Observations

Trees form ecologically dominant stratum; healthy community showing shrubbiness consistent with ecotone between REs 11.5.3 and 11.4.9; good recruitment; older trees noted with medium hollows; no erosion noted; no fire scars.

Health

Good.

Survey Code

Q48 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.26591

Longitude

148.39170

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Orange-brown loamy sand

Height of ecologically dominant stratum

Median height 17 m

Crown cover

20%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by Clarkson's bloodwood (*Corymbia clarksoniana*), with occasional carbeen (*C. tessellaris*). Sparse sub-canopy of Clarkson's bloodwood, prickly pine (*Bursaria incana*), soap tree (*Alphitonia excelsa*) and quinine tree (*Petalostigma pubescens*). Very sparse shrub layer, including currant bush (*Carissa ovata*) and velvety tree pear (*Opuntia tomentosa*). Ground layer dominated by native species, including wiregrass (*Aristida* sp.), kangaroo grass (*Themeda triandra*) and black spear grass (*Heteropogon contortus*).

General Site Observations

Trees form ecologically dominant stratum; healthy but naturally sparse community; evidence of old logging; natural dieback evident; good recruitment; no erosion noted; no fire scars: deeply weathered sand capping (possibly ancient alluvium) over Cainozoic sand plains.

Health

Good.

Survey Code

Q49 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.26532

Longitude

148.38541

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain, with light gilgai formation

Lithology

Cainozoic clays

Soil

Brown light clay

Height of ecologically dominant stratum

Median height 11 m

Crown cover

50%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains. (BVG 25a)

Biodiversity Status

Endangered

Dominant vegetation observed

Woodland dominated by brigalow (*Acacia harpophylla*) with frequent yellowwood (*Terminalia oblongata*) and occasional poplar box (*Eucalyptus populnea*). Sparse sub-canopy of yellowwood, brigalow, scrub leopard ash (*Flindersia dissosperma*), false sandalwood (*Eremophila mitchellii*) and whitewood (*Atalaya hemiglauca*). Sparse shrub layer of currant bush (*Carissa ovata*), yellowwood and scrub leopard ash seedlings. Ground layer includes a mix of buffel grass (*Cenchrus ciliaris*), brigalow grass (*Paspalidium caespitosum*), comet grass (*Perotis rara*) and forest blue grass (*Bothriochloa bladhii*).

General Site Observations

Trees form ecologically dominant stratum; healthy small patch of brigalow community surrounded by poplar box community; naturally low brigalow canopy with low disturbance; good recruitment; no erosion noted; no fire scars.

TEC status

Confirmed: Meets minimum criteria for a TEC: exotic cover <50%, exceeds the 50 / 70 rule for this community, species and structure consistent with RE 11.4.9.

Health

Good.

Survey Code

Q50 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.27507

Longitude

148.37189

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain, with light gilgai formation

Lithology

Cainozoic clays

Soil

Brown light clay

Height of ecologically dominant stratum

Median height 14 m

Crown cover

45%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains. (BVG 25a)

Biodiversity Status

Endangered

Dominant vegetation observed

Woodland dominated by brigalow (*Acacia harpophylla*), with frequent yellowwood (*Terminalia oblongata*). Mid-dense shrub layer of currant bush (*Carissa ovata*), yellowwood, wilga (*Geijera parviflora*) and whitewood (*Atalaya hemiglauca*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with brigalow grass (*Paspalidium caespitosum*) and curly windmill grass (*Enteropogon acicularis*) more prevalent in barer areas.

General Site Observations

Trees form ecologically dominant stratum; healthy small patch of brigalow community surrounded by poplar box (*Eucalyptus populnea*) community; some internal disturbance with patchy colonisation by buffel grass; moderate recruitment; no erosion noted; no fire scars.

TEC status

This patch will not meet minimum threshold criteria for referral as a TEC due to exotic ground cover in excess of 50%.

Health

Good.

Survey Code

Q51 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.28063

Longitude

148.39313

Slope:

<1°

Aspect:

S


General Site Description

Landform	Palustrine wetland / swamp
Lithology	Cainozoic sands, clays and gravels and alluvium
Soil	Pale brown sandy clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	35%
Mapped RE	11.3.27b
Observed RE	11.5.17 – Palustrine swamp with fringing forest red gum (<i>Eucalyptus tereticornis</i>) woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by poplar gum (<i>Eucalyptus platyphylla</i>), with occasional forest red gum (<i>E. camaldulensis</i>) and carbeen (<i>Corymbia tessellaris</i>). A sub-canopy is not evident, nor is a shrub layer. Ground cover is <i>Cyperus</i> sp., couch grass (<i>Cynodon dactylon</i>) and <i>Eleocharis</i> sp.
General Site Observations	Trees form ecologically dominant stratum; healthy wetland community; medium to high stock impacts with pugging and grazing; close to water point; no dieback evident; recruitment is poor and seedling regeneration possibly suffering from grazing pressures; no erosion noted; no fire scars; ironstone nodules throughout wetlands with some areas of conglomerate formations.
Health	Good.

Survey Code

Q52 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.28190

Longitude

148.39678

Slope:

<1°

Aspect:

S


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Red-brown sandy loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	20%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.9 – <i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), Dallachy's gum (<i>C. dallachyana</i>) and carbeen (<i>C. tessellaris</i>), with a sparse sub-canopy of Clarkson's bloodwood, prickly pine (<i>Bursaria incana</i>) and Dallachy's gum. Sparse shrub layer of cocaine tree (<i>Erythroxylum australe</i>), quinine tree (<i>Petalostigma pubescens</i>), currant bush (<i>Carissa ovata</i>) and dysentery plant (<i>Grewia latifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant wiregrasses (<i>Aristida calycina</i> and <i>Aristida</i> sp.) and frequent black spear grass (<i>Heteropogon contortus</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), yellow rattlepod (<i>Crotalaria mitchellii</i>), malvastrum (<i>Malvastrum americanum</i>) and <i>Sida</i> sp.
General Site Observations	Trees form ecologically dominant stratum; healthy but naturally sparse community; natural dieback evident; moderate recruitment; no erosion noted; no fire scars; deeply weathered sand capping (possibly ancient alluvium) over Cainozoic sand plains.
Health	Good.

Survey Code

Q53 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.28781

Longitude

148.40895

Slope:

1-2°

Aspect:

E


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Orange-brown sandy topped clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	25%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Poplar box (<i>Eucalyptus populnea</i>) woodland, with occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and Poplar gum (<i>E. platyphylla</i>). Sparse sub-canopy of bean tree (<i>Cassia brewsteri</i>), dead finish (<i>Archidendropsis basaltica</i>) and poplar box. Sparse shrub layer of dead finish, cocaine tree (<i>Erythroxylum australe</i>) and yellowberry bush (<i>Denhamia cunninghamii</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant <i>Aristida</i> spp. and frequent shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy woodland with older trees containing small hollows; no dieback; good recruitment; gully erosion noted on edge of plain with exposed ironstone nodulation at depth; no fire scars.
Health	Average to Good.

Survey Code

Q54 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.29851

Longitude

148.41786

Slope:

1°

Aspect:

NE


General Site Description

Landform	Gently undulating plain, with slight gilgai
Lithology	Cainozoic clays
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 10 m
Crown cover	25%
Mapped RE	11.3.3 / 11.3.2 / 11.3.1 / 11.3.2b (40 / 30 / 25 / 5)
Observed RE	11.4.8 – <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by brigalow (<i>Acacia harpophylla</i>), with occasional Dawson gum (<i>Eucalyptus cambageana</i>) and Yellowwood (<i>Terminalia oblongata</i>). Sparse emergent of large Dawson gums to 17 m. Low shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and cocaine tree (<i>Erythroxylum australe</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent brigalow grass (<i>Paspalidium caespitosum</i>), curly windmill grass (<i>Enteropogon ramosa</i>), <i>Panicum larcomianum</i> and <i>Cyperus</i> sp.
General Site Observations	Trees form ecologically dominant stratum; untidy sliver of woodland on the edge of cleared brigalow country; some large Dawson gum with moderate hollows; no dieback; good recruitment; gully erosion noted from minor watercourse; edge of 11.5.3 community with some ecotonal aspects; no fire scars.
TEC status	This patch is not likely to meet minimum threshold criteria for Brigalow TEC due to ground cover being more than 50% exotic species.
Health	Average.

Survey Code

Q55 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.30921

Longitude

148.38719

Slope:

1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy light clay

Height of ecologically dominant stratum

Median height 16 m

Crown cover

20%

Mapped RE

11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland of poplar box (*Eucalyptus populnea*), with a sparse sub-canopy of poplar box, scrub leopard ash (*Flindersia dissosperma*), bean tree (*Cassia brewsteri*) and sally wattle (*Acacia salicina*). Mid-dense shrub layer of currant bush (*Carissa ovata*), scrub leopard ash, gumbi gumbi (*Pittosporum angustifolium*), beefwood (*Grevillea striata*) and emu apple (*Owenia acidula*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with frequent kangaroo grass (*Themeda triandra*), forest blue grass (*Bothriochloa bladhii*), shrubby stylo (*Stylosanthes scabra*), *Aristida* sp. and red Natal grass (*Melinis repens*).

General Site Observations

Trees form ecologically dominant stratum; healthy woodland with older trees containing with small hollows; natural dieback observed; moderate recruitment; no erosion noted; no fire scars; small patch.

Health

Good.

Survey Code

Q56 (Flora)

Location

Vermont Park

Date

26/11/2016

Latitude

-22.31249

Longitude

148.39874

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Alluvial sediments
Soil	Sandy alluvium
Height of ecologically dominant stratum	Median height 17 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent weeping tea-tree (<i>Melaleuca fluviatilis</i>). Mid-dense sub-canopy of forest red gum, sally wattle (<i>Acacia salicina</i>), white bauhinia (<i>Lysiphyllum hookeri</i>), bean tree (<i>Cassia brewsteri</i>) and belmont siris (<i>Albizia canescens</i>). Sparse shrub layer of poison peach (<i>Ehretia membranifolia</i>), coffee bush (<i>Breynia oblongifolia</i>), wombat berry (<i>Eustrephus latifolius</i>), small-leaved ebony (<i>Diospyros humilis</i>), sandpaper fig (<i>Ficus opposita</i>), cocaine tree (<i>Erythroxylum australe</i>) and bean tree. Ground layer dominated by exotics buffel grass (<i>Cenchrus ciliaris</i>) and green panic (<i>Megathyrsus maxima</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy riparian woodland with mature trees containing large hollows; old logging observed; good recruitment; no erosion noted; no fire scars.
Health	Good.

Survey Code

Q57 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.29768

Longitude

148.31588

Slope:

1°

Aspect:

General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic clays
Soil	Yellow-brown sandy-topped clay
Height of EDL	Median height 17 m
Crown cover	10%
Mapped RE	11.4.9 / 11.4.8 / 11.5.3 (35 / 35 / 30)
Observed RE	11.4.8 - <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open woodland of Dawson gum (<i>Eucalyptus cambageana</i>), with a sub-canopy of Dawson gum, brigalow (<i>Acacia harpophylla</i>) and scrub leopard ash (<i>Flindersia dissosperma</i>) to 9m tall. Mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), scrub leopard ash, wild orange (<i>Capparis canescens</i>), yellowwood (<i>Terminalia oblongata</i>), native lime (<i>Citrus glauca</i>), <i>Maireana microphylla</i> , false sandalwood (<i>Eremophila mitchellii</i>), poison peach (<i>Ehretia membranifolia</i>), boonaree (<i>Alectryon oleifolius</i>) and ruby saltbush (<i>Enchylaena tomentosa</i>). Ground layer dominated by Buffel grass (<i>Cenchrus ciliaris</i>), with abundant wiregrasses (<i>Aristida calycina</i> and <i>A. sp</i>) and kangaroo grass (<i>Themeda triandra</i>).
General Site Observations	Trees form ecologically dominant stratum; narrow tongue of woodland surrounded by cleared brigalow country; apparent damaged community which may have suffered burning when surrounding country originally cleared; moderate recruitment; no erosion noted; no fire scars.
TEC status	This patch is not considered likely to meet minimum threshold criteria for Brigalow TEC due the very low Brigalow component of the patch.
Health	Average.

Survey Code

Q58 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.28084

Longitude

148.30548

Slope:

1-2°

Aspect:

NE


General Site Description

Landform	Gently undulating plain, with large gilgai formation
Lithology	Cainozoic clays
Soil	Brown cracking clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	10%
Mapped RE	11.4.9 / 11.4.8 / 11.5.3 (35 / 35 / 30)
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open woodland of brigalow (<i>Acacia harpophylla</i>) and red bauhinia (<i>Lysiphyllum carronii</i>) with a slightly denser sub-canopy of brigalow and yellowwood (<i>Terminalia oblongata</i>) to 7m height. Mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), yellowwood, brigalow, large-fruited orange thorn (<i>Pittosporum spinescens</i>), dwarf lantern flower (<i>Abutilon fraseri</i>) and Dawson gum (<i>Eucalyptus cambageana</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent parthenium (<i>Parthenium hysterophorus</i>), cane grass (<i>Walwhalleya subxerophila</i>) and brigalow grass (<i>Paspalidium caespitosum</i>).
General Site Observations	Trees form ecologically dominant stratum; highly disturbed patch which may have suffered burning when surrounding country was cleared; moderate recruitment; no erosion noted; fire scars and charcoal noted.
TEC status	This patch is not considered likely to meet minimum threshold criteria for Brigalow TEC due to poor structure and >50% exotic groundcover species.
Health	Poor patch, although existing vegetation healthy.

Survey Code

Q59 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27870

Longitude

148.31106

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 14 m

Crown cover

15%

Mapped RE

11.5.3

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland of poplar box (*Eucalyptus populnea*), with a very sparse sub-canopy of poplar box, supplejack (*Ventilago viminalis*) and bootlace oak (*Hakea lorea*). Sparse shrub layer of currant bush (*Carissa ovata*), beefwood (*Grevillea striata*), sally wattle (*Acacia salicina*), bitterbark (*Alstonia constricta*), supplejack, bean tree (*Cassia brewsteri*) and cocaine tree (*Erythroxylum australe*). Ground layer is dominated by buffel grass (*Cenchrus ciliaris*), with abundant wiregrass (*Aristida calycina*), and frequent kangaroo grass (*Themeda triandra*) and black spear grass (*Heteropogon contortus*).

General Site Observations

Trees form ecologically dominant stratum; disturbed woodland that has suffered a destructive fire event, probably from initial clearing of adjacent country; moderate recruitment; no erosion noted; fire scars evident; contiguous with large remnant to east and west, exposed to clearing to the south.

Health

Poor to Average.

Survey Code

Q60 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27367

Longitude

148.31543

Slope:

1°

Aspect:

NE


General Site Description
Landform

Gently undulating plain with large gilgai formations

Lithology

Cainozoic clays

Soil

Cracking clays

Height of ecologically dominant stratum

Median height 11 m

Crown cover

20%

Mapped RE

11.4.9 / 11.4.8 / 11.5.3 (35 / 35 / 30)

Observed RE

 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains. (BVG 25a)

Biodiversity Status

Endangered

Dominant vegetation observed

Open woodland of brigalow (*Acacia harpophylla*) and red bauhinia (*Lysiphyllum carronii*), with a very sparse sub-canopy of brigalow and yellowwood (*Terminalia oblongata*) to 6m height. Sparse shrub layer of currant bush (*Carissa ovata*), brigalow and false sandalwood (*Eremophila mitchellii*). Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with frequent brigalow grass (*Paspalidium caespitosum*) and windmill grass (*Eragrostis sp.*).

General Site Observations

Trees form ecologically dominant stratum; highly mobile gilgai formation with many leaning brigalow trees, likely contributing to high level of timber on ground as well as relatively low canopy with no large trees; good recruitment; no erosion noted; no fire scars.

TEC status

This patch is not considered likely to meet minimum threshold criteria for Brigalow TEC due to >50% exotic groundcover species.

Health

Good.

Survey Code

Q61 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.26632

Longitude

148.32005

Slope:

1°

Aspect:

SW


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 14 m

Crown cover

25%

Mapped RE

11.5.3

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with occasional Clarkson's bloodwood (*Corymbia clarksoniana*) and supplejack (*Ventilago viminalis*). Very sparse sub-canopy of poplar box, supplejack, Dallachy's gum (*C. dallachyana*), bean tree (*Cassia brewsteri*) and sally wattle (*Acacia salicina*). Sparse shrub layer of yellowberry bush (*Denhamia cunninghamii*), dysentery plant (*Grewia retusifolia*), water bush (*Myoporum acuminatum*), sally wattle and bean tree. Ground layer is dominated by buffel grass (*Cenchrus ciliaris*), with abundant kangaroo grass (*Themeda triandra*), wiregrasses (*Aristida* sp. and *Aristida calycina*) and umbrella cane grass (*Leptochloa digitata*).

General Site Observations

Trees form ecologically dominant stratum; healthy woodland in a possible discharge area or swampy ground; good recruitment; no erosion noted; no fire scars; some mature trees with hollows; part of a large remnant to east 14km by 7km; moderate grazing impacts.

Health

Good.

Survey Code

Q62 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27178

Longitude

148.33179

Slope:

1-2°

Aspect:

S


General Site Description

Landform	Stream bed
Lithology	Alluvial sands, clays and gravels
Soil	Yellow-brown sand
Height of ecologically dominant stratum	Median height 18 m
Crown cover	55%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open forest dominated by forest red gum (<i>Eucalyptus tereticornis</i>), river red gum (<i>E. camaldulensis</i>), weeping tea-tree (<i>Melaleuca fluviatilis</i>) and river she-oak (<i>Casuarina cunninghamiana</i>). Sparse sub-canopy of forest red gum, river she-oak and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of sally wattle (<i>Acacia salicina</i>), river she-oak, white bauhinia and Category 3 restricted plant Rubber vine (<i>Cryptostegia grandiflora</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) on the banks, with frequent spike rush (<i>Lomandra longifolia</i>) and <i>Cyperus</i> sp.
General Site Observations	Trees form ecologically dominant stratum; healthy narrow riparian community; good recruitment; noted clay outwash from upstream brigalow patch; no fire scars; large mature trees with hollows; part of a large remnant to east 14km by 7km; moderate grazing impacts.
Health	Very good.

Survey Code

Q63 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.26759

Longitude

148.33779

Slope:

1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown loamy sand

Height of ecologically dominant stratum

Median height 16 m

Crown cover

20%

Mapped RE

11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Poplar box (*Eucalyptus populnea*) woodland, with a very sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*) and white bauhinia (*Lysiphyllum hookeri*). Sparse shrub layer of currant bush (*Carissa ovata*), wombat berry (*Eustrephus latifolius*) and bean tree. Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with associated black spear grass (*Heteropogon contortus*), wiregrass (*Aristida sp.*) and yellow rattlepod (*Crotalaria mitchellii*).

General Site Observations

Trees form ecologically dominant stratum; moderately healthy woodland with apparent grazing impacts; minimal recruitment; no erosion noted; no fire scars; mature trees with hollows; part of a large remnant 14km by 7km, but patchily cleared in this area.

Health

Average.

Survey Code

Q64 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.25625

Longitude

148.32867

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown loamy sand
Height of ecologically dominant stratum	Median height 18 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional brigalow (<i>Acacia harpophylla</i>), Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), carbeen (<i>C. tessellaris</i>), silver-leaved ironbark (<i>E. melanophloia</i>) and crows ash (<i>Flindersia australis</i>). Very sparse sub-canopy of poplar box, false sandalwood (<i>Eremophila mitchellii</i>), scrub leopard ash (<i>Flindersia dissosperma</i>) and bean tree (<i>Cassia brewsteri</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), nipan (<i>Capparis lasiantha</i>), dead finish (<i>Archidendropsis basaltica</i>), sally wattle (<i>Acacia salicina</i>), yellowberry bush (<i>Denhamia cunninghamii</i>), wombat berry (<i>Eustrephus latifolius</i>) and crows ash. Ground cover comprises a mix of kangaroo grass (<i>Themeda triandra</i>), buffel grass (<i>Cenchrus ciliaris</i>), wiregrass (<i>Aristida calycina</i>), curly windmill grass (<i>Enteropogon ramosa</i>), yellow rattlepod (<i>Crotalaria mitchellii</i>) and black spear grass (<i>Heteropogon contortus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy woodland with variable soils and some brigalow elements; good recruitment; no erosion noted; no fire scars; numerous mature trees with hollows; part of a large remnant 14km by 7km, but patchily cleared in this area.
Health	Good.

Survey Code

Q65 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27819

Longitude

148.33455

Slope:

1°

Aspect:

SW


General Site Description

Landform	Level plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	25%
Mapped RE	11.5.3
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with a very sparse sub-canopy of poplar box, supplejack (<i>Ventilago viminalis</i>), bean tree (<i>Cassia brewsteri</i>) and native pomegranate (<i>Capparis arborea</i>). Very sparse shrub layer of yellow berry bush (<i>Denhamia cunninghamii</i>), beefwood (<i>Grevillea striata</i>), bean tree and dead finish (<i>Archidendropsis basaltica</i>). Ground layer co-dominated by buffel grass (<i>Cenchrus ciliaris</i>), wiregrass (<i>Aristida calycina</i>) and black spear grass (<i>Heteropogon contortus</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy woodland with a range of maturities; moderate recruitment; no erosion noted; no fire scars; part of large remnant patch; velvety tree pear (<i>Opuntia tomentosa</i>) noted.
Health	Very good.

Survey Code

Q66 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27653

Longitude

148.35184

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Level plain

Lithology

Alluvial sands, clays and gravels

Soil

Sand

Height of ecologically dominant stratum

NA

Crown cover

0%

Mapped RE

11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)

Observed RE

Non-remnant

Biodiversity Status

NA

Dominant vegetation observed

 Agricultural grassland dominated by buffel grass (*Cenchrus ciliaris*).

General Site Observations

This paddock has been cleared and seeded to improved pasture. Burned windrows evident throughout the paddock. Most recent imagery (2011) shows remnant vegetation.

Health

Poor.

Survey Code

Q67 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27795

Longitude

148.35803

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic clays
Soil	Brown light clay
Height of EDL	Median height 16 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.4.8 – <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by Dawson gum (<i>Eucalyptus cambageana</i>) and belah (<i>Casuarina cristata</i>), with a sparse sub-canopy of brigalow (<i>Acacia harpophylla</i>), white bauhinia (<i>Lysiphyllum hookeri</i>), false sandalwood (<i>Eremophila mitchellii</i>), emu apple (<i>Owenia acidula</i>) and scrub leopard ash (<i>Flindersia dissosperma</i>) to 10m height. Mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), scrub leopard ash, false sandalwood, poison peach (<i>Ehretia membranifolia</i>), wilga (<i>Geijera parviflora</i>), cocaine tree (<i>Erythroxylum australe</i>), whitewood (<i>Atalaya hemiglauca</i>), warrior bush (<i>Apophyllum anomalum</i>) and small-leaved ebony (<i>Diospyros humilis</i>). Ground layer includes a mix of brigalow grass (<i>Paspalidium caespitosum</i>), black spear grass (<i>Heteropogon contortus</i>), harrisia cactus (<i>Harrisia martinii</i>) and buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy but small strip of woodland surrounded by cleared brigalow country; intergrades with RE 11.3.2 in places; good recruitment; no erosion noted; no fire scars.
TEC status	This patch is unlikely to meet minimum threshold criteria for Brigalow TEC due to the low Brigalow component of the patch. Exotic ground cover is variable, but buffel grass dominates the more open areas. Patch is small.
Health	Good.

Survey Code

Q68 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.28196

Longitude

148.35798

Slope:

1°

Aspect:

SW


General Site Description
Landform

Plain

Lithology

Cainozoic sands, clays and gravels

Soil

Weathered sands

Height of ecologically dominant stratum

Median height 14 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

 Woodland of poplar box (*Eucalyptus populnea*), brigalow (*Acacia harpophylla*) and boonaree (*Alectryon oleifolius*), with a very sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*), ironwood (*Acacia excelsa*) and white bauhinia (*Lysiphyllum hookeri*). Very sparse shrub layer of bean tree, currant bush (*Carissa ovata*) and wilga (*Geijera parviflora*). Ground cover is buffel grass (*Cenchrus ciliaris*), wiregrass (*Aristida sp.*) and curly windmill grass (*Enteropogon ramosus*).

General Site Observations

Trees form ecologically dominant stratum; healthy woodland with mostly young regrowth; good recruitment; no erosion noted; no fire scars; patchy clearing surrounds this patch; Landzone 5 based on exposed ironstone nodules; intermixes with small patch of brigalow to the south east.

Health

Good.

Survey Code

Q69 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.28131

Longitude

148.36267

Slope:

1°

Aspect:

S


General Site Description

Landform	Palustrine wetland
Lithology	Alluvial sands, clays and gravels
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 17 m
Crown cover	30%
Mapped RE	11.3.27b
Observed RE	11.3.27b - Lacustrine / palustrine wetland, often with fringing woodland, commonly <i>Eucalyptus camaldulensis</i> or <i>E. coolabah</i> . (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Fringing woodland dominated by river red gum (<i>Eucalyptus camaldulensis</i>), with frequent forest red gum (<i>E. tereticornis</i>), carbeen (<i>Corymbia tessellaris</i>) and poplar gum (<i>E. platyphylla</i>). Very sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>) and brigalow (<i>Acacia harpophylla</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>). Ground layer includes a range of wetland species including giant sedge (<i>Cyperus exaltatus</i>), common rush (<i>Juncus usitatus</i>), Indian heliotrope (<i>Heliotropium indicum</i>), Noogoora burr (<i>Xanthium orientalis</i>), damascisa (<i>Glinus lotoides</i>), sneezeweed (<i>Centipeda minima</i>), smart weed (<i>Persicaria attenuata</i>), awnless barnyard grass (<i>Echinochloa colona</i>), white eclipta (<i>Eclipta prostrata</i>), water primrose (<i>Ludwigia peploides</i>) and couch grass (<i>Cynodon dactylon</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland fringe with some older trees; good recruitment; no erosion noted; no fire scars; impoundment, banked to the south with excavations at both ends.
Health	Average.

Survey Code

Q70 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.29000

Longitude

148.35586

Slope:

1-2°

Aspect:

NE


General Site Description

Landform	Gently undulating plain, with gilgai
Lithology	Cainozoic clays
Soil	Light to medium clay
Height of EDL	Median height 16 m
Crown cover	45%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.4.8 – <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by brigalow (<i>Acacia harpophylla</i>), with abundant Dawson gum (<i>Eucalyptus cambageana</i>) and occasional poplar box (<i>E. populnea</i>). Very sparse sub-canopy of brigalow, white bauhinia (<i>Lysiphyllum hookeri</i>) and emu apple (<i>Owenia acidula</i>). Sparse shrub layer of currant bush (<i>Carissa ovata</i>), wilga (<i>Geijera parviflora</i>), cocaine tree (<i>Erythroxylum australe</i>), wild orange (<i>Capparis mitchellii</i>), nipan (<i>Capparis lasiantha</i>), <i>Maireana microphylla</i> and brigalow. Ground layer includes brigalow grass (<i>Paspalidium caespitosum</i>), curly windmill grass (<i>Enteropogon acicularis</i>), hooky grass (<i>Ancistrachne uncinulata</i>), wiregrass (<i>Aristida sp.</i>) and buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy patch adjacent to cleared Brigalow country; good recruitment; no erosion noted; no fire scars.
TEC status	Confirmed: This patch is likely to meet minimum threshold criteria for Brigalow TEC due to low exotic weed cover combined with good structure and composition.
Health	Good

Survey Code

Q71 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.30458

Longitude

148.37300

Slope:

2°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Yellow-brown sandy clay

Height of ecologically dominant stratum

Median height 15 m

Crown cover

25%

Mapped RE

11.5.3

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with frequent Clarkson's bloodwood (*Corymbia clarksoniana*), poplar gum (*E. platyphylla*) and Bull oak (*Allocasuarina luehmannii*). Very sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*) and poplar gum. Very sparse shrub layer of bean tree, quinine tree (*Petalostigma pubescens*), myrtle wood (*Psydrax oleifolius*), supplejack (*Ventilago viminalis*) and currant bush (*Carissa ovata*). Ground layer dominated by wiregrass (*Aristida* sp.), *Sida* sp. and shrubby stylo (*Stylosanthes scabra*).

General Site Observations

Trees form ecologically dominant stratum; good recruitment; no erosion noted; no fire scars; slightly scalded look about this site.

Health

Good.

Survey Code

Q72 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.27029

Longitude

148.36193

Slope:

1°

Aspect:

SW


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy clay, with ironstone nodules

Height of ecologically dominant stratum

Median height 16 m

Crown cover

25%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with occasional broad-leaved ironbark (*E. fibrosa*). Very sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*) and supplejack (*Ventilago viminalis*). Very sparse shrub layer of bean tree, currant bush (*Carissa ovata*), dead finish (*Archidendropsis basaltica*), cocaine tree (*Erythroxylum australe*), whitewood (*Atalaya hemiglauc*), yellowberry bush (*Denhamia cunninghamii*) and poison peach (*Ehretia membranifolia*). Ground layer dominated by wiregrass (*Aristida calycina*), with abundant cover is curly windmill grass (*Enteropogon acicularis*), black spear grass (*Heteropogon contortus*), buffel grass (*Cenchrus ciliaris*) and nine-awn grass (*Enneapogon robustissimus*).

General Site Observations

Trees form ecologically dominant stratum; good recruitment; minor surface erosion noted on what appears to be an old track; healthy vegetation with older trees with good hollows; no dieback noted; no fire scars.

Health

Good.

Survey Code

Q73 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.25782

Longitude

148.35582

Slope:

1°

Aspect:

S


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy light clay

Height of ecologically dominant stratum

Median height 17 m

Crown cover

15%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland dominated by narrow-leaved ironbark (*Eucalyptus crebra*), with abundant Clarkson's bloodwood (*Corymbia clarksoniana*), carbeen (*C. tessellaris*) and Dallachy's gum (*C. dallachyana*). Very sparse sub-canopy of poplar box (*Eucalyptus populnea*), scrub leopard ash (*Flindersia dissosperma*) and Clarkson's bloodwood. Sparse shrub layer of currant bush (*Carissa ovata*), cocaine tree (*Erythroxylum australe*), quinine tree (*Petalostigma pubescens*), *Corymbia* sp. and scrub leopard ash. Ground layer dominated by buffel grass (*Cenchrus ciliaris*), with abundant black spear grass (*Heteropogon contortus*) and wiregrass (*Aristida* sp.).

General Site Observations

Trees form ecologically dominant stratum; moderate recruitment; healthy and naturally sparse vegetation with some older trees; no dieback noted; no fire scars; ecotonal and on the edge of cleared brigalow (*Acacia harpophylla*) country to the north east.

Health

Good.

Survey Code

Q74 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.26406

Longitude

148.35032

Slope:

1-2°

Aspect:

E


General Site Description

Landform	Plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	30%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of Poplar box (<i>Eucalyptus populnea</i>) and broad-leaved ironbark (<i>Eucalyptus fibrosa</i>), with a very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>) and scrub leopard ash (<i>Flindersia dissosperma</i>). Very sparse shrub layer of bean tree, currant bush (<i>Carissa ovata</i>), ironwood (<i>Acacia excelsa</i>), quinine tree (<i>Petalostigma pubescens</i>), false sandalwood (<i>Eremophila mitchellii</i>) and myrtle wood (<i>Psydrax oleifolius</i>). Ground layer dominated by curly windmill grass (<i>Enteropogon acicularis</i>), black spear grass (<i>Heteropogon contortus</i>), buffel grass (<i>Cenchrus ciliaris</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and wiregrass (<i>Aristida sp.</i>).
General Site Observations	Trees form ecologically dominant stratum; good recruitment; no erosion; healthy vegetation; older trees with good hollows, no dieback noted, no fire scars.
Health	Good.

Survey Code

Q75 (Flora)

Location

Vermont Park

Date

27/11/2016

Latitude

-22.26016

Longitude

148.34124

Slope:

1°

Aspect:

SE


General Site Description

Landform	Plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	20%
Mapped RE	11.3.2 / 11.3.25 / 11.3.1 (80 / 15 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>) with occasional carbeen (<i>Corymbia tessellaris</i>). Very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>) and sally wattle (<i>Acacia salicina</i>). Sparse shrub layer of bean tree, currant bush (<i>Carissa ovata</i>), sally wattle, yellowwood (<i>Terminalia oblongata</i>) and cocaine tree (<i>Erythroxylum australe</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent black spear grass (<i>Heteropogon contortus</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and wiregrass (<i>Aristida</i> sp.).
General Site Observations	Trees form ecologically dominant stratum; good recruitment; no erosion; healthy vegetation with mostly young trees, no dieback noted, no fire scars.
Health	Good.

Survey Code

Q76 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.24110

Longitude

148.42486

Slope:

1°

Aspect:

S


General Site Description
Landform

Level plain; palustrine wetland

Lithology

Alluvial sands, clays and gravels

Soil

Brown light clay

Height of ecologically dominant stratum

Median height 18 m

Crown cover

40% in fringing vegetation; bare within wetland itself

Mapped RE

11.3.27b

Observed RE

 11.3.27b – Palustrine or lacustrine wetland, often with fringing woodland, commonly *Eucalyptus camaldulensis* or *E. coolabah*. (BVG 34d)

Biodiversity Status

Of Concern

Dominant vegetation observed

Fringing woodland dominated by forest red gum (*Eucalyptus tereticornis*), with occasional sally wattle (*Acacia salicina*). Sparse sub-canopy of forest red gum and sally wattle. Very sparse shrub layer of bean tree (*Cassia brewsteri*) and parkinsonia (*Parkinsonia aculeata*). Ground layer includes a range of wetland species including giant sedge (*Cyperus exaltatus*), common rush (*Juncus usitatus*), Indian heliotrope (*Heliotropium indicum*), awnless barnyard grass (*Echinochloa colona*), spike rush (*Eleocharis plana*), shiny nardoo (*Marsilea mutica*), parthenium (*Parthenium hysterophorus*), and umbrella cane grass (*Leptochloa digitata*).

General Site Observations

Trees form ecologically dominant stratum; wetland fringe with mostly young regrowth trees; good recruitment; no erosion noted; no fire scars; parthenium and parkinsonia noted at this site, both are Restricted Category 3 species under the *Qld Biosecurity Act 2014* and Weeds of National Significance. Note: this community is palustrine in nature.

Health

Average.

Survey Code

Q77 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.23659

Longitude

148.42475

Slope:

<1°

Aspect:

S


General Site Description
Landform

Level plain; deposited low rises – old floodplain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 14 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy open woodland dominated by sally wattle (*Acacia salicina*), with frequent Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*), and occasional Dallachy's gum (*C. dallachyana*), silver-leaved ironbark (*Eucalyptus melanophloia*). Very sparse sub-canopy of Clarkson's bloodwood, carbeen and sally wattle. Very sparse shrub layer consisting of bean tree (*Cassia brewsteri*). Groundcover is dominated by buffel grass (*Cenchrus ciliaris*), with occasional green panic (*Megathyrsus maxima*) and sabi grass (*Urochloa mosambicensis*).

General Site Observations

Trees form ecologically dominant stratum; regrowth community with no old trees; connected through the narrow Isaac River corridor; exotic groundcover with few native grasses and herbs; good recruitment; erosion absent; old dieback evident; fire scars absent; the dominant canopy of sally wattle – a pioneer species – suggests that this area was likely completely cleared at some point.

Health

Average.

Survey Code

Q78 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.23910

Longitude

148.41858

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Level plain; swamp
Lithology	Alluvial sands, clays and gravels
Soil	Light clay
Height of ecologically dominant stratum	Median height 0.3m
Crown cover	5-10% in fringing vegetation
Mapped RE	11.4.8
Observed RE	11.3.27c – Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Very sparse fringing woodland of sally wattle (<i>Acacia salicina</i>) and occasional Dallachy's gum (<i>Corymbia dallachyana</i>). Mid-dense shrub layer of Parkinsonia (<i>Parkinsonia aculeata</i>) in parts. Ground layer dominated by spike rush (<i>Eleocharis plana</i>) with abundant umbrella cane grass (<i>Leptochloa digitata</i>) and frequent parthenium (<i>Parthenium hysterophorus</i>).
General Site Observations	The ground layer forms the ecologically dominant stratum; most likely a vegetated swamp, which has been cleared; no erosion noted; no fire scars; parthenium and parkinsonia noted at this site, both are Restricted Category 3 species under the Qld <i>Biosecurity Act 2014</i> and WONS.
Health	Poor – degraded

Survey Code

Q79 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.23852

Longitude

148.41289

Slope:

1°

Aspect:

S


General Site Description
Landform

Plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 14 m

Crown cover

25%

Mapped RE

11.4.8

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with frequent Dawson gum (*Eucalyptus cambageana*) and occasional brigalow (*Acacia harpophylla*). Very sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*) and whitewood (*Atalaya hemiglauca*). Very sparse shrub layer of scrub boonaree (*Alectryon diversifolius*), red bauhinia (*Lysiphyllum carronii*) and yellowwood (*Terminalia oblongata*). Ground cover dominated by sabi grass (*Urochloa mosambicensis*).

General Site Observations

Trees form ecologically dominant stratum; regrowth vegetation that would meet the 50 / 70 rule for this community; good recruitment; no erosion noted; no fire scars; isolated patch; thin strip of highly disturbed 11.4.8 to the south of this point.

Health

Poor.

Survey Code

Q80 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.23998

Longitude

148.41062

Slope:

0°

Aspect:

N/A


General Site Description
Landform Level plain, with gilgai

Lithology Cainozoic clays

Soil Medium clay

Height of ecologically dominant stratum Median height of regrowth 11 m
Median height of ground cover 1 m

Crown cover <5%

Mapped RE 11.4.8

Observed RE Non-remnant

Biodiversity Status
Dominant vegetation observed Scattered regrowth brigalow (*Acacia harpophylla*) and yellowwood (*Terminalia oblongata*). Sparse shrub layer of parkinsonia (*Parkinsonia aculeata*), brigalow and lignum (*Duma florulenta*). Ground layer dominated by umbrella cane grass (*Leptochloa digitata*).

General Site Observations Groundcover forms ecologically dominant stratum; regrowth vegetation with poor recovery; some gully erosion noted north of site; likely RE11.4.9 before clearing; historical image sequence before 2004 would required to confirm.

Health Poor.

Survey Code

Q81 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.23153

Longitude

148.40696

Slope:

1°

Aspect:

SE


General Site Description

Landform	Plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 14 m
Crown cover	25%
Mapped RE	11.4.8
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Poplar box (<i>Eucalyptus populnea</i>) woodland, with a very sparse sub-canopy of poplar box and sally wattle (<i>Acacia salicina</i>). Sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), carbeen (<i>Corymbia tessellaris</i>), sally wattle and supplejack (<i>Ventilago viminalis</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent curly windmill grass (<i>Enteropogon ramosus</i>) and occasional sabi grass (<i>Urochloa mosambicensis</i>), red Natal grass (<i>Melinis repens</i>) and umbrella canegrass (<i>Leptochloa digitata</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy vegetation with a range of maturities; good recruitment; no erosion noted; no fire scars; Part of the Isaac River corridor, which is approximately 1km wide at this point; moderate to heavy grazing impacts; very dry.
Health	Good.

Survey Code

Q82 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.22842

Longitude

148.40763

Slope:

1°

Aspect:

S


General Site Description

Landform	Gently undulating plain; oxbow wetland
Lithology	Alluvial sands, clays and gravels
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	40% in fringing vegetation; mostly bare within palustrine wetland itself
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.27f – Palustrine wetland (e.g. vegetated swamp). <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Fringing woodland dominated by coolabah (<i>Eucalyptus coolabah</i>), with occasional forest red gum (<i>E. tereticornis</i>) and carbeen (<i>Corymbia tessellaris</i>). Sub-canopy and shrub layer generally absent. Ground layer dominated by spike rush (<i>Eleocharis plana</i>), with occasional parthenium (<i>Parthenium hysterophorus</i>) and umbrella cane grass (<i>Leptochloa digitata</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland fringe consists of mostly mature trees; low recruitment; no erosion noted; no fire scars; old river channel or flood out channel running roughly north to south; <i>Parthenium</i> and <i>Parkinsonia</i> noted at this site.
Health	Good.

Survey Code

Q83 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.22254

Longitude

148.41288

Slope:

<1°

Aspect:

S


General Site Description
Landform

Deposited low rises – old floodplain; level plain

Lithology

Alluvial sands (origin undetermined)

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 18 m

Crown cover

25%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)

Observed RE

 11.3.3 – *Eucalyptus coolabah* woodland on alluvial plains. (BVG 16c)

Biodiversity Status

Of Concern

Dominant vegetation observed

Grassy woodland dominated by coolabah (*Eucalyptus coolabah*), with frequent Dallachy's gum (*Corymbia dallachyana*) and carbeen (*Corymbia tessellaris*), occasional Clarkson's bloodwood (*Corymbia clarksoniana*) and sally wattle (*Acacia salicina*). Sparse sub-canopy of sally wattle, emu apple (*Owenia acidula*), white bauhinia (*Lysiphyllum hookeri*), scrub boonaree (*Alectryon oleifolius*), yellowberry bush (*Denhamia cunninghamii*) and bean tree (*Cassia brewsteri*). Sparse shrub layer of dead finish (*Archidendropsis basaltica*), poison peach (*Ehretia membranifolia*), scrub boonaree and bean tree. Groundcover is dominated by buffel grass (*Cenchrus ciliaris*).

General Site Observations

Trees form ecologically dominant stratum; mature community with older trees; connected to the Isaac River corridor, 900 metres wide at this point; exotic groundcover with few native grasses and herbs; moderate recruitment; erosion absent; fire scars absent; heavy grazing evident.

Health

Average to Good.

Survey Code

Q84 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.21612

Longitude

148.41676

Slope:

1°

Aspect:

S


General Site Description

Landform	River bank
Lithology	Alluvial sediments
Soil	Sand
Height of ecologically dominant stratum	Median height 17 m
Crown cover	45%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with occasional narrow-leaved ironbark (<i>E. crebra</i>), Clarkson's bloodwood (<i>C. clarksoniana</i>), carbeen (<i>Corymbia tessellaris</i>) and sally wattle (<i>Acacia salicina</i>). Sparse sub-canopy of forest red gum, sally wattle and carbeen. Sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), white bauhinia (<i>Lysiphyllum hookeri</i>) and lantana (<i>Lantana camara</i>). Ground cover dominated by exotics – buffel grass (<i>Cenchrus ciliaris</i>) and green panic (<i>Megathyrsus maxima</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy riparian woodland with mature trees and large hollows; good recruitment; no erosion noted; no fire scars; narrow riparian corridor; high fire fuel loading within the fenced river, primarily exotic grasses.
Health	Good.

Survey Code

Q85 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.19487

Longitude

148.39323

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Level plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 1 m
Crown cover	25%
Mapped RE	11.4.8
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>) with occasional Dallachy's gum (<i>Corymbia dallachyana</i>). Very sparse sub-canopy of poplar box, Boonaree (<i>Alectryon oleifolius</i>), soap tree (<i>Alphitonia excelsa</i>), ironwood (<i>Acacia excelsa</i>), Dallachy's gum and white bauhinia (<i>Lysiphyllum hookeri</i>). Mid-dense shrub layer of bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), white bauhinia, cocaine tree (<i>Erythroxylum australe</i>), ironwood, wilga (<i>Geijera parviflora</i>), lantana (<i>Lantana camara</i>), dysentery plant (<i>Grewia retusifolia</i>), Ellangowan poison bush (<i>Eremophila deserti</i>), wild orange (<i>Capparis canescens</i>) and dead finish (<i>Archidendropsis basaltica</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant windmill grass (<i>Enteropogon</i> sp.) and frequent kangaroo grass (<i>Themeda triandra</i>), wiregrasses (<i>Aristida calycina</i> and <i>A. sp.</i>), watergrass (<i>Bulbostylis barbata</i>), velvet hibiscus (<i>Melhania oblongifolia</i>) and jasmine (<i>Jasminum didymum</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy vegetation with a range of maturities; good recruitment; no erosion noted; no fire scars; Part of the Isaac River corridor which is approximately 600m wide at this point; moderate to heavy grazing impacts; very dry.
Health	Good.

Survey Code

Q86 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.18399

Longitude

148.38416

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Stream bank

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 18 m

Crown cover

20%

Mapped RE

11.3.25

Observed RE

 11.3.3 – *Eucalyptus coolabah* woodland on alluvial plains. (BVG 16c)

Biodiversity Status

Of Concern

Dominant vegetation observed

Open woodland dominated by coolabah (*Eucalyptus coolabah*), with frequent carbeen (*Corymbia tessellaris*) and occasional forest red gum (*Eucalyptus teretecronis*). Very sparse sub-canopy of white bauhinia (*Lysiphyllum hookeri*), river she oak (*Casuarina cunninghamiana*), black tea tree (*Melaleuca bracteata*) and bean tree (*Cassia brewsteri*). Very sparse shrub layer of lantana (*Lantana camara*), scrub boonaree (*Alectryon diversifolius*), poison peach (*Ehretia membranifolia*), sandpaper fig (*Ficus opposita*), forest red gum, castor oil weed (*Ricinus communis*) and river she oak. Groundcover dominated by green panic (*Megathyrsus maxima*) with frequent Mexican poppy (*Argemone ochroleuca*).

General Site Observations

Trees form ecologically dominant stratum; disturbed vegetation with a poor structure; moderate recruitment; gully erosion noted; no fire scars; Part of the Isaac River corridor and junction of a minor gully; moderate to heavy grazing impacts; very dry; many dead canopy trees, possibly old ring barking.

Health

Average.

Survey Code

Q87 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.16893

Longitude

148.38058

Slope:

1°

Aspect:

SW


General Site Description
Landform

Deposited low rises – old floodplain; gently undulating plain

Lithology

Alluvial sands (origin undetermined)

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

25%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by Clarkson's bloodwood (*Corymbia clarksoniana*) and Dallachy's gum (*C. dallachyana*), with frequent narrow-leaved ironbark (*Eucalyptus crebra*) and occasional carbeen (*C. tessellaris*). Sparse sub-canopy of Clarkson's bloodwood, Dallachy's gum, carbeen, narrow-leaved ironbark and sally wattle (*Acacia salicina*). Mid-dense shrub layer of lantana (*Lantana camara*), bean tree (*Cassia brewsteri*) and sally wattle. Groundcover dominated by buffel grass (*Cenchrus ciliaris*), with frequent kangaroo grass (*Themeda triandra*) and occasional black spear grass (*Heteropogon contortus*), sabi grass (*Urochloa mosambicensis*) and green panic (*Megathyrsus maxima*).

General Site Observations

Trees form ecologically dominant stratum; mature community, but mostly younger trees; connected to the Isaac River corridor, 450 m wide at this point; exotic groundcover with limited native grasses and herbs; moderate recruitment; erosion absent; fire scars absent; high fire fuel load; infested with lantana.

Health

Average

Survey Code

Q88 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.17071

Longitude

148.37659

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Level plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown light clay

Height of ecologically dominant stratum

Median height 14 m

Crown cover

30%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*) with occasional Dallachy's gum (*Corymbia dallachyana*). Sparse sub-canopy of poplar box, ironwood (*Acacia excelsa*), sally wattle (*Acacia salicina*), supplejack (*Ventilago viminalis*), Dallachy's gum and boonaree (*Alectryon oleifolius*). Very sparse shrub layer of bean tree (*Cassia brewsteri*), wilga (*Geijera parviflora*), supplejack, lantana (*Lantana camara*), scrub boonaree (*Alectryon diversifolius*) and scrub wilga (*Geijera salicifolia*). Ground cover co-dominated by buffel grass (*Cenchrus ciliaris*) and wiregrass (*Aristida* sp.), with abundant cotton panic (*Digitaria brownii*), frequent kangaroo grass (*Themeda triandra*) and native daisy (*Vittadinia sulcata*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities, including old dead trees; good recruitment; no erosion noted; no fire scars; reasonable connectivity despite vegetation having been cleared in strips in this area; moderate to heavy grazing pressure.

Health

Good

Survey Code

Q89 (Flora)

Location

Iffley

Date

28/11/2016

Latitude

-22.17556

Longitude

148.37174

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Level plain; depression

Lithology

Cainozoic sands, clays and gravels

Soil

Light clay

Height of ecologically dominant stratum

Median height 16 m

Crown cover

30%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

 Woodland dominated by poplar box (*Eucalyptus populnea*) with occasional Dallachy's gum (*Corymbia dallachyana*). Very sparse sub-canopy of poplar box and whitewood (*Atalaya hemiglauc*). Very sparse shrub layer of bean tree (*Cassia brewsteri*), sally wattle (*Acacia salicina*), Dallachy's gum and whitewood. Ground cover dominated by forest blue grass (*Bothriochloa bladhii*), with occasional *Cyperus* sp., kangaroo grass (*Themeda triandra*) and dysentery plant (*Grewia retusifolia*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities, including old trees with large hollows; good recruitment; no erosion noted; no fire scars; low point with swampy characteristics; very low exotic groundcover likely due to ephemeral wetland.

Health

Very good.

Survey Code

Q90 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.23319

Longitude

148.37714

Slope:

1°

Aspect:

S


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy clay loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

25%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*), with rare occurrence of poplar box hybrid. Very sparse sub-canopy of poplar box, boonaree (*Alectryon oleifolius*), emu apple (*Owenia acidula*) and bean tree (*Cassia brewsteri*). Very sparse shrub layer of yellowberry bush (*Denhamia cunninghamii*), water bush (*Myoporum acuminatum*), currant bush (*Carissa ovata*), bean tree, nipan (*Capparis lasiantha*) and quinine tree (*Petalostigma pubescens*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with abundant wiregrasses (*Aristida calycina* and *Aristida jerichoensis*), frequent black spear grass (*Heteropogon contortus*) and kangaroo grass (*Themeda triandra*), and occasional velvet hibiscus (*Melhania oblongifolia*) and red Natal grass (*Melinis repens*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch size approx. 1km x 1km, isolated by clearing.

Health

Good.

Survey Code

Q91 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22645

Longitude

148.38144

Slope:

1°

Aspect:

SW


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Brown sandy clay loam

Height of ecologically dominant stratum

Median height 16 m

Crown cover

25%

Mapped RE

11.4.9

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland of Poplar box (*Eucalyptus populnea*) and beefwood (*Grevillea striata*), with a very sparse sub-canopy of poplar box, ironwood (*Acacia excelsa*) and beefwood. Very sparse shrub layer of currant bush (*Carissa ovata*), bean tree (*Cassia brewsteri*), quinine tree (*Petalostigma pubescens*), dead finish (*Archidendropsis basaltica*), soap tree (*Alphitonia excelsa*), cocaine tree (*Erythroxylum australe*), beefwood, ironwood and supplejack (*Ventilago viminalis*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with abundant wiregrasses (*Aristida calycina* and *Aristida* sp.) and frequent forest blue grass (*Bothriochloa bladhii*), kangaroo grass (*Themeda triandra*), shrubby stylo (*Stylosanthes scabra*) and dysentery plant (*Grewia retusifolia*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch size approx. 1km x 1km isolated by clearing; moderate to heavy grazing pressure; very dry.

Health

Good

Survey Code

Q92 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22180

Longitude

148.38164

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Loamy sand
Height of ecologically dominant stratum	Median height 16 m
Crown cover	20%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.9 – <i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 18b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by Clarkson's bloodwood (<i>C. clarksoniana</i>), with abundant carbeen (<i>Corymbia tessellaris</i>) and occasional poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of carbeen, Clarkson's bloodwood, quinine tree (<i>Petalostigma pubescens</i>), soap tree (<i>Alphitonia excelsa</i>) and bean tree (<i>Cassia brewsteri</i>). Very sparse shrub layer of poplar box and cocaine tree (<i>Erythroxylum australe</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with black spear grass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida calycina</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), red Natal grass (<i>Melinis repens</i>), dysentery plant (<i>Grewia retusifolia</i>) and Caribbean stylo (<i>Stylosanthes hamata</i>).
General Site Observations	Trees form ecologically dominant stratum; naturally open, healthy community with a range of maturities including older trees; good recruitment; no erosion noted; no fire scars; patch size approx. 1km x 1km isolated by clearing; moderate to heavy grazing pressure; very dry; natural dieback noted with standing dead timber; deep sands.
Health	Good

Survey Code

Q93 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.21133

Longitude

148.38036

Slope:

1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Red brown sand

Height of ecologically dominant stratum

Median height 15 m

Crown cover

10%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland of carbeen (*Corymbia tessellaris*), Clarkson's bloodwood (*C. clarksoniana*) and Dallachy's gum (*C. dallachyana*), with a sparse sub-canopy of Clarkson's bloodwood, quinine tree (*Petalostigma pubescens*), soap tree (*Alphitonia excelsa*), bootlace oak (*Hakea lorea*), yellowberry bush (*Denhamia cunninghamii*), sally wattle (*Acacia salicina*), white bauhinia (*Lysiphyllum hookeri*) and prickly pine (*Bursaria incana*). Very sparse shrub layer of quinine tree, white bauhinia, lolly bush (*Clerodendrum floribundum*), bootlace oak and cocaine tree (*Erythroxylum australe*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with frequent wiregrass (*Aristida calycina*) and occasional black spear grass (*Heteropogon contortus*), velvet hibiscus (*Melhania oblongifolia*), kangaroo grass (*Themeda triandra*), bottle tree caustic (*Euphorbia tannensis*) and grey rattlepod (*Crotalaria dissitiflora*).

General Site Observations

Trees form ecologically dominant stratum; extremely sparse community with many dead standing trees; moderate recruitment; no erosion noted; no fire scars; patch size small with strip clearing fragmenting the area; moderate grazing pressure; very dry; deep weathered sands; over 50% canopy dieback.

Health

Average

Survey Code

Q94 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.21499

Longitude

148.37391

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy light clay
Height of EDL	Median height 15 m
Crown cover	25%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Poplar box (<i>Eucalyptus populnea</i>) woodland. Sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>), white bauhinia (<i>Lysiphyllum hookeri</i>), quinine tree (<i>Petalostigma pubescens</i>), ironwood (<i>Acacia excelsa</i>), poison peach (<i>Ehretia membranifolia</i>), clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and bootlace oak (<i>Hakea lorea</i>). Sparse shrub layer of currant bush (<i>Carissa ovata</i>), quinine tree, dead finish (<i>Archidendropsis basaltica</i>), emu apple (<i>Owenia acidula</i>), scrub wilga (<i>Geijera salicifolia</i>), wombat berry (<i>Eustrephus latifolius</i>) and supplejack (<i>Ventilago viminalis</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant black spear grass (<i>Heteropogon contortus</i>) and wiregrass (<i>Aristida calycina</i>), frequent shrubby stylo (<i>Stylosanthes scabra</i>) and Forest blue grass (<i>Bothriochloa bladhii</i>), and occasional velvet hibiscus (<i>Melhania oblongifolia</i>), red Natal grass (<i>Melinis repens</i>), dysentery plant (<i>Grewia retusifolia</i>), spike rush (<i>Lomandra longifolia</i>) and flax lily (<i>Dianella sp.</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch linear in an area fragmented by strip clearing; moderate to heavy grazing pressure; very dry.
Health	Good.

Survey Code

Q95 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22019

Longitude

148.37488

Slope:

1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Pale brown sandy light clay

Height of ecologically dominant stratum

Median height 16 m

Crown cover

30%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by poplar box (*Eucalyptus populnea*) with occasional Clarkson's bloodwood (*Corymbia clarksoniana*). Sparse sub-canopy of poplar box, bean tree (*Cassia brewsteri*), ironwood (*Acacia excelsa*), Clarkson's bloodwood, dead finish (*Archidendropsis basaltica*) and emu apple (*Owenia acidula*). Very sparse shrub layer of quinine tree (*Petalostigma pubescens*), supplejack (*Ventilago viminalis*), yellowberry bush (*Denhamia cunninghamii*), wild orange (*Capparis mitchellii*), native pomegranate (*Capparis arborea*), and poplar box. Ground cover dominated by buffel grass (*Cenchrus ciliaris*) with abundant black spear grass (*Heteropogon contortus*), wiregrasses (*Aristida calycina* and *A. sp.*), shrubby stylo (*Stylosanthes scabra*) and kangaroo grass (*Themeda triandra*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities, including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch linear in an area fragmented by strip clearing; moderate to heavy grazing pressure; very dry.

Health

Good

Survey Code

Q96 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22954

Longitude

148.37000

Slope:

1°

Aspect:

SW


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy light clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	25%
Mapped RE	11.4.9
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by poplar box (<i>E. populnea</i>), with occasional Clarkson's bloodwood (<i>C. clarksoniana</i>); very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>), Clarkson's bloodwood and Sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), quinine tree (<i>Petalostigma pubescens</i>), sally wattle, poplar box, water bush (<i>Myoporum acuminatum</i>), myrtle wood (<i>Psychrax oleifolius</i>) and soap tree (<i>Alphitonia excelsa</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with silky oilgrass (<i>Cymbopogon bombycinus</i>), dysentery plant (<i>Grewia retusifolia</i>), <i>Sida</i> sp., black spear grass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida calycina</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and kangaroo grass (<i>Themeda triandra</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities, including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch linear in an area fragmented by strip clearing; moderate to heavy grazing pressure; very dry; mistletoe (<i>Dendrophthoe homoplantica</i>) observed on one poplar box tree.
Health	Good.

Survey Code

Q97 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22357

Longitude

148.36161

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Pale yellow-brown sand

Height of ecologically dominant stratum

Median height 9 m

Crown cover

30%

Mapped RE

11.4.9

Observed RE

 11.5.8c – *Eucalyptus platyphylla* woodland on white-yellow weathered sands, with grassy ground layer. (BVG 18a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Low woodland of poplar gum (*E. platyphylla*), beefwood (*Grevillea striata*) and bean tree (*Cassia brewsteri*), with no discernible sub-canopy. Very sparse shrub layer of water bush (*Myoporum acuminatum*), silver oak (*Grevillea parallela*), beefwood, bean tree, dead finish (*Archidendropsis basaltica*) and yellowberry bush (*Denhamia cunninghamii*). Ground cover is dominated by kangaroo grass (*Themeda triandra*), with abundant wiregrass (*Aristida calycina*), frequent black spear grass (*Heteropogon contortus*) and shrubby stylo (*Stylosanthes scabra*), and occasional dysentery plant (*Grewia retusifolia*), buffel grass (*Cenchrus ciliaris*), flax lily (*Dianella sp.*), red Natal grass (*Melinis repens*) and golden beard grass (*Chrysopogon fallax*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities including dead trees with hollows; good recruitment; no erosion noted; no fire scars; patch 2km x 1km; moderate grazing pressure; very dry; multiple mistletoe (*Amyema miquelii*) observed on most poplar gum trees; high habitat quality for woodland birds.

Health

Good.

Survey Code

Q98 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22298

Longitude

148.35360

Slope:

<1°

Aspect:

SW


General Site Description

Landform	Level plain; swamp / closed depression
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy clay
Height of ecologically dominant stratum	Median height 15 m (fringing woodland)
Crown cover	25% within the fringing woodland
Mapped RE	11.5.17
Observed RE	11.5.17 – <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Swamp with a fringing woodland of poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of poplar box. No shrub layer. Wetland ground cover is aquatic species dominated by couch grass (<i>Cynodon dactylon</i>), with giant sedge (<i>Cyperus exaltatus</i>), willow primrose (<i>Ludwigia octovalvis</i>) and spike rush (<i>Eleocharis plana</i>).
General Site Observations	Trees form ecologically dominant stratum; dead trees with hollows in wetland; good recruitment in fringe; no erosion noted; impoundment and excavation for stock water, rise in water level likely contributing to tree die back in centre of wetland; high grazing pressure.
Health	Good.

Survey Code

Q99 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.22308

Longitude

148.35198

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	25%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of Poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>), dead finish (<i>Archidendropsis basaltica</i>), whitewood (<i>Atalaya hemiglauc</i>) and Dallachy's gum (<i>C. dallachyana</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), quinine tree (<i>Petalostigma pubescens</i>), sally wattle (<i>Acacia salicina</i>), poplar box, lantana (<i>Lantana camara</i>), water bush (<i>Myoporum acuminatum</i>), myrtle wood (<i>Psydrax oleifolius</i>) and soap tree (<i>Alphitonia excelsa</i>). Ground cover is dominated by buffel grass (<i>Cenchrus ciliaris</i>), with purpletop Chloris (<i>Chloris inflata</i>), dysentery plant (<i>Grewia retusifolia</i>), sabi grass (<i>Urochloa mosambicensis</i>) and wiregrass (<i>Aristida sp.</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities including old trees with hollows; good recruitment; no erosion noted; no fire scars; patch 2km x 1km in an area fragmented by strip clearing; moderate to heavy grazing pressure; very dry.
Health	Good.

Survey Code

Q100 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.21690

Longitude

148.35558

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy light clay
Height of EDL	Median height 16 m
Crown cover	35%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>), ironwood (<i>Acacia excelsa</i>), supplejack (<i>Ventilago viminalis</i>) and emu apple (<i>Owenia acidula</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), bean tree, dead finish (<i>Archidendropsis basaltica</i>), emu apple, water bush (<i>Myoporum acuminatum</i>), native pomegranate (<i>Capparis arborea</i>) and false sandalwood (<i>Eremophila mitchellii</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with wiregrass (<i>Aristida</i> sp.), kangaroo grass (<i>Themeda triandra</i>), curly windmill grass (<i>Enteropogon ramosus</i>), pink tongues (<i>Rostellularia adscendens</i>), velvety tree pear (<i>Opuntia tomentosa</i>), forest blue grass (<i>Bothriochloa bladhii</i>), pastel flower (<i>Pseuderanthemum variable</i>), shrubby stylo (<i>Stylosanthes scabra</i>), <i>Paspalidium</i> sp. and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities including old trees with hollows; good recruitment; no erosion noted; no fire scars; small patch in an area fragmented by strip clearing; moderate to heavy grazing pressure; very dry.
Health	Good.

Survey Code

Q101 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.21726

Longitude

148.36601

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy clay
Height of ecologically dominant stratum	Median height 13 m
Crown cover	10%
Mapped RE	11.4.9
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Open woodland of poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of poplar box, ironwood (<i>Acacia excelsa</i>), whitewood (<i>Atalaya hemiglauca</i>) and beefwood (<i>Grevillea striata</i>). Mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), bean tree (<i>Cassia brewsteri</i>), dead finish (<i>Archidendropsis basaltica</i>), emu apple (<i>Owenia acidula</i>), scrub boonaree (<i>Alectryon diversifolius</i>), wilga (<i>Geijera parviflora</i>), shiny-leaved canthium (<i>Psydrax odorata</i>), beefwood, whitewood and native lime (<i>Citrus glauca</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional wiregrass (<i>Aristida</i> sp.), red Natal grass (<i>Melinis repens</i>) and hooky grass (<i>Ancistrachne uncinulata</i>).
General Site Observations	Trees form ecologically dominant stratum; scrappy ecotonal community of mostly young box trees; moderate recruitment; no erosion noted; no fire scars; small patch in an area fragmented by strip clearing; brigalow clearing close by, suggesting mapping error originally labelled this patch 11.4.9 instead of 11.5.3; exposed edge with edge effects.
Health	Poor.

Survey Code

Q102 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.20766

Longitude

148.37169

Slope:

1-2°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Pale red-brown sand

Height of ecologically dominant stratum

Median height 16 m

Crown cover

25%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland dominated by narrow-leaved ironbark (*E. crebra*), with abundant Clarkson's bloodwood (*Corymbia clarksoniana*), occasional poplar box (*E. populnea*), and a sub-canopy of Clarkson's bloodwood, narrow-leaved ironbark and silver oak (*Grevillea parallela*). Sparse shrub layer of quinine tree (*Petalostigma pubescens*), white bauhinia (*Lysiphyllum hookeri*), lolly bush (*Clerodendrum floribundum*), bean tree (*Cassia brewsteri*), jasmine (*Jasminum didymum*) and cocaine tree (*Erythroxylum australe*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with black spear grass (*Heteropogon contortus*), wiregrass (*Aristida* sp.), velvet hibiscus (*Melhania oblongifolia*), red Natal grass (*Melinis repens*) kangaroo grass (*Themeda triandra*), shrubby stylo (*Stylosanthes scabra*) and dysentery plant (*Grewia retusifolia*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with scattered dead standing trees; good recruitment; no erosion noted; no fire scars; patch size 1km x 1km but with strip clearing fragmenting the area; moderate grazing pressure; very dry; deeply weathered sands.

Health

Good.

Survey Code

Q103 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.20893

Longitude

148.36644

Slope:

1°

Aspect:

E


General Site Description

Landform	Gently undulating plain, with gilgais
Lithology	Cainozoic clays
Soil	Brown light clay
Height of ecologically dominant stratum	Median height 7 m
Crown cover	35%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Low woodland of brigalow (<i>A. harpophylla</i>), yellow-wood (<i>T. oblongata</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Sparse shrub layer of currant bush (<i>Carissa ovata</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with canegrass (<i>Walwhalleya subxerophila</i>), brigalow grass (<i>Paspalidium caespitosum</i>), fairy grass (<i>Sporobolus caroli</i>), awnless barnyard grass (<i>Echinochloa colona</i>), <i>Cyperus</i> sp., willow primrose (<i>Ludwigia octovalvis</i>), musk basil (<i>Basilicum polystachyon</i>), lesser joyweed (<i>Alternanthera denticulata</i>), ruby saltbush (<i>Enchylaena tomentella</i>) and nardoo (<i>Marsilea</i> sp.).
General Site Observations	Trees form ecologically dominant stratum; disturbed community with strip clearing at intervals running SW to NE through the woodland; good recruitment; no erosion noted; no fire scars; patch size 1km x 1km but with strip clearing fragmenting the area; high grazing pressure close to water point; melon holes with standing water.
TEC status	This patch is unlikely to meet minimum threshold of less than 50% exotic species in the ground layer with buffel grass (<i>C. ciliaris</i>) a dominant species.
Health	Average.

Survey Code

Q104 (Flora)

Location

Iffley

Date

29/11/2016

Latitude

-22.20312

Longitude

148.36622

Slope:

1-2°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Red sand

Height of ecologically dominant stratum

Median height 17 m

Crown cover

25%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland of Narrow-leaved ironbark (*E. crebra*), Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*), with a very sparse sub-canopy of Dallachy's gum (*C. dallachyana*), narrow-leaved ironbark, quinine tree (*Petalostigma pubescens*), yellow berry bush (*Denhamia cunninghamii*), and bean tree (*Cassia brewsteri*). No shrub layer. Ground cover dominated by wiregrass (*Aristida calycina*), with abundant black spear grass (*Heteropogon contortus*) and occasional buffel grass (*Cenchrus ciliaris*), velvet hibiscus (*Melhania oblongifolia*), red Natal grass (*Melinis repens*), shrubby stylo (*Stylosanthes scabra*) and spike rush (*Lomandra longifolia*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with scattered dead standing trees; good recruitment; no erosion noted; no fire scars; patch linear with strip clearing fragmenting the area; moderate grazing pressure; very dry; deeply weathered sands.

Health

Good.

Survey Code

Q105 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.19293

Longitude

148.36133

Slope:

1°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Red sand

Height of ecologically dominant stratum

Median height 15 m

Crown cover

15%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Woodland of narrow-leaved ironbark (*E. crebra*), Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*Corymbia tessellaris*), with a very sparse sub-canopy of Clarkson's bloodwood. Very sparse shrub layer of bean tree (*Cassia brewsteri*) and quinine tree (*Petalostigma pubescens*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with black spear grass (*Heteropogon contortus*), wiregrass (*Aristida calycina*), velvet hibiscus (*Melhania oblongifolia*), golden beard grass (*Chrysopogon fallax*), curly windmill grass (*Enteropogon ramosus*), yellow rattlegod (*Crotalaria mitchellii*) and birdsville indigo (*Indigofera linnaei*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with scattered dead standing trees; moderate recruitment; no erosion noted; no fire scars; patch approx. 1.3km x 1.5 km; moderate grazing pressure; very dry; deeply weathered sands.

Health

Good.

Survey Code

Q106 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.18649

Longitude

148.35221

Slope:

1°

Aspect:

N


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	40%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of poplar box (<i>E. populnea</i>) with a very sparse sub-canopy of poplar box, bean tree (<i>Cassia brewsteri</i>) and quinine tree (<i>Petalostigma pubescens</i>). Very sparse shrub layer of bean tree, dead finish (<i>Archidendropsis basaltica</i>), nipan (<i>Capparis lasiantha</i>), poplar box and sally wattle (<i>Acacia salicina</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with wiregrasses (<i>Aristida spp.</i>), kangaroo grass (<i>Themeda triandra</i>), pink tongues (<i>Rostellularia adscendens</i>), black spear grass (<i>Heteropogon contortus</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), creeping phyllanthus (<i>Phyllanthus virgatus</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and red Natal grass (<i>Melinis repens</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities but few old trees; good recruitment; no erosion noted; no fire scars; small patch in an area fragmented by strip clearing and tracks; moderate to heavy grazing pressure close to water; very dry.
Health	Good.

Survey Code

Q107 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.18547

Longitude

148.35894

Slope:

<1°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 8 m

Crown cover

15%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland of poplar box (*E. populnea*) and beefwood (*Grevillea striata*) with a very sparse sub-canopy of bean tree (*Cassia brewsteri*), ironwood (*Acacia excelsa*), emu apple (*Owenia acidula*) and sally wattle (*Acacia salicina*). Sparse shrub layer containing nipan (*Capparis lasiantha*), bean tree, currant bush (*Carissa ovata*), native lime (*Citrus glauca*), dead finish (*Archidendropsis basaltica*), emu apple (*Owenia acidula*), cocaine tree (*Erythroxylum australe*), wombat berry (*Eustrephus latifolius*), poison peach (*Ehretia membranifolia*), scrub boonaree (*Alectryon diversifolius*), *Psydrax* sp., lantana (*Lantana camara*), native pomegranate (*Capparis arborea*) and snakevine (*Tinospora smilacina*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with abundant wiregrass (*Aristida calycina*), sabi grass (*Urochloa mosambicensis*) and shrubby stylo (*Stylosanthes scabra*).

General Site Observation

Trees form ecologically dominant stratum; disturbed community with a range of maturities including dead hollow trees; moderate recruitment; no erosion noted; no fire scars; cleared to east, west and north; remnant connection to south even though RE mapping indicates otherwise; moderate to heavy grazing pressure; close to water; very dry.

Health

Average

Survey Code

Q108 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.18185

Longitude

148.35101

Slope:

1°

Aspect:

S


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	20%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of bean tree (<i>Cassia brewsteri</i>), ironwood (<i>Acacia excelsa</i>), sally wattle (<i>A. salicina</i>), silver oak (<i>Grevillea parallela</i>), poplar box, whitewood (<i>Atalaya hemiglauc</i>) and scrub boonaree (<i>Alectryon diversifolius</i>). Sparse shrub layer containing nipan (<i>Capparis lasiantha</i>), currant bush (<i>Carissa ovata</i>), native lime (<i>Citrus glauca</i>), dead finish (<i>Archidendropsis basaltica</i>), scrub boonaree (<i>Alectryon diversifolius</i>), wild orange (<i>Capparis umbonata</i>), quinine tree (<i>Petalostigma pubescens</i>), whitewood (<i>Atalaya hemiglauc</i>), water bush (<i>Myoporum acuminatum</i>), sally wattle and velvety tree pear (<i>Opuntia tomentosa</i>). Ground dominated by buffel grass (<i>Cenchrus ciliaris</i>) with abundant wiregrass (<i>Aristida sp.</i>), dysentery plant (<i>Grewia retusifolia</i>), red Natal grass (<i>Melinis repens</i>) and black spear grass (<i>Heteropogon contortus</i>).
General Site Observation	Trees form ecologically dominant stratum; healthy community with a range of maturities; moderate recruitment; no erosion noted; no fire scars; part of relatively large block of intact remnant (over 4km long) although parts strip cleared; moderate to heavy grazing pressure close to water; very dry.
Health	Good.

Survey Code

Q109 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.17782

Longitude

148.33894

Slope:

1°

Aspect:

N


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic clays

Soil

Light clay with gilgai

Height of ecologically dominant stratum

NA

Crown cover

unmeasured

Mapped RE

11.4.9

Observed RE

Non-remnant

Biodiversity Status
Dominant vegetation observed

 Cleared land with scattered Brigalow (*Acacia harpophylla*) suckers to 3 m height.

General Site Observations

 All Brigalow has been cleared in this area; buffel grass (*Cenchrus ciliaris*) is the dominant ground cover species.

Health

Survey Code

Q110 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.17081

Longitude

148.34330

Slope:

1°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Red sand

Height of ecologically dominant stratum

Median height 17 m

Crown cover

20%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Open woodland of poplar gum (*Eucalyptus platyphylla*), Clarkson's bloodwood (*Corymbia clarksoniana*) and carbeen (*C. tessellaris*), with a sparse sub-canopy of carbeen, Clarkson's bloodwood and quinine tree (*Petalostigma pubescens*). Very sparse shrub layer of quinine tree, *Corymbia* sp. and prickly pine (*Bursaria incana*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with black spear grass (*Heteropogon contortus*), wiregrass (*Aristida calycina*), velvet hibiscus (*Melhanis oblongifolia*), yellow rattlepod (*Crotalaria mitchellii*), kangaroo grass (*Themeda triandra*), red Natal grass (*Melinis repens*), *Glycine* sp., dysentery plant (*Grewia retusifolia*), shrubby stylo (*Stylosanthes scabra*) and bottle tree caustic (*Euphorbia tannensis*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with good recruitment; no erosion noted; no fire scars; patch approx. 3 km x 2 km; low grazing pressure; dry; deeply weathered sands.

Health

Good.

Survey Code

Q111 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.15759

Longitude

148.34466

Slope:

<1°

Aspect:

S


General Site Description

Landform	Gently undulating plain; floodchannel
Lithology	Alluvial sands, clays and gravels
Soil	Red sand
Height of ecologically dominant stratum	Median height 25 m
Crown cover	60%
Mapped RE	11.3.27b
Observed RE	11.3.27f – Palustrine wetland (e.g. vegetated swamp). <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open forest of forest red gum (<i>Eucalyptus tereticornis</i>) with a very sparse sub-canopy of carbeen (<i>Corymbia tessellaris</i>) and forest red gum. Sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>), mimosa (<i>Vachellia farnesiana</i>), lantana (<i>Lantana camara</i>), stinking passionfruit (<i>Passiflora foetida</i>), dysentery plant (<i>Grewia latifolius</i>), sandpaper fig (<i>Ficus opposita</i>), bushweed (<i>Flueggea leucopyrus</i>), forest red gum saplings, sally wattle (<i>Acacia salicina</i>), soap tree (<i>Alphitonia excelsa</i>) and snow-in summer (<i>Melaleuca linariifolia</i>). Ground cover is unident. native grasses x2, forest bluegrass (<i>Bothriochloa bladhii</i>), Queensland bluegrass (<i>Dichanthium sericeum</i>), umbrella canegrass (<i>Leptochloa digitata</i>), giant sedge (<i>Cyperus exaltatus</i>), phasey bean (<i>Macroptilium lathyroides</i>), white eclipta (<i>Eclipta prostrata</i>), <i>Cyperus</i> sp., couch grass (<i>Cynodon dactylon</i>), caustic spurge (<i>Euphorbia drummondii</i>), musk basil (<i>Basilicum polystachyon</i>), paspalum (<i>Paspalum dilatatum</i>) and blackberry nightshade (<i>Solanum nigrum</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with good recruitment; no erosion noted; no fire scars; good linkage to Isaac River corridor through forest red gum forest; low grazing pressure; koala presence noted.
Health	Very good.

Survey Code

Q112 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.16026

Longitude

148.34151

Slope:

1°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic sands, clays and gravels

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 15 m

Crown cover

15%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces. (BVG 17a)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

 Open woodland of poplar box (*E. populnea*) with a very sparse sub-canopy of bean tree (*Cassia brewsteri*) and poplar box. Very sparse shrub layer of lantana (*Lantana camara*) and bean tree. Ground cover dominated by buffel grass (*Cenchrus ciliaris*), with wiregrass (*Aristida sp.*), dysentery plant (*Grewia retusifolia*), red Natal grass (*Melinis repens*), black spear grass (*Heteropogon contortus*), curly windmill grass (*Enteropogon ramosus*), oat grass (*Themeda avenacea*) and shrubby stylo (*Stylosanthes scabra*).

General Site Observations

Trees form ecologically dominant stratum; healthy community with a range of maturities; good recruitment; no erosion noted; no fire scars; part of relatively large block of intact remnant (over 4km long), although parts strip cleared; low grazing pressure; very dry with moderate to high fire fuel load.

Health

Good.

Survey Code

Q113 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.15400

Longitude

148.33613

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Brown sandy loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	20%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of poplar box (<i>E. populnea</i>), Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), carbeen (<i>C. tessellaris</i>) and sally wattle (<i>Acacia salicina</i>), with a very sparse sub-canopy of poplar box, Clarkson's bloodwood and sally wattle. Very sparse shrub layer of sally wattle, Lantana (<i>Lantana camara</i>), bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), dead finish (<i>Archidendropsis basaltica</i>) and poplar box. Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with wiregrass (<i>Aristida sp.</i>), red Natal grass (<i>Melinis repens</i>), black spear grass (<i>Heteropogon contortus</i>) and yellow rattlepod (<i>Crotalaria mitchellii</i>).
General Site Observations	Trees form ecologically dominant stratum; patchy community with good recruitment; no erosion noted; no fire scars; part of relatively large block of intact remnant along Isaac River and to the SW; low grazing pressure; very dry with moderate to high fire fuel load.
Health	Average.

Survey Code

Q114 (Flora)

Location

Lake Vermont

Date

30/11/2016

Latitude

-22.15230

Longitude

148.34270

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Gently undulating plain

Lithology

Cainozoic alluvial

Soil

Brown sandy loam

Height of ecologically dominant stratum

Median height 22 m

Crown cover

30%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)

Observed RE

 11.3.4 – *Eucalyptus tereticornis* and / or *Eucalyptus* spp. woodland on alluvial plains. (BVG 16c)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland of forest red gum (*E. tereticornis*), river red gum (*E. camaldulensis*), Clarkson's bloodwood (*Corymbia clarksoniana*), carbeen (*C. tessellaris*) and sally wattle (*Acacia salicina*), with a very sparse sub-canopy of younger forest red gum, carbeen, Clarkson's bloodwood and sally wattle. Mid-dense shrub layer dominated by lantana (*Lantana camara*). Other shrub species include bean tree (*Cassia brewsteri*) and sally wattle regrowth and forest red gum regrowth. Ground cover is dominated by buffel grass (*Cenchrus ciliaris*), with black spear grass (*Heteropogon contortus*) and dysentery plant (*Grewia retusifolia*).

General Site Observations

Trees form ecologically dominant stratum; weedy community with old trees with hollows; good recruitment; no erosion noted; no fire scars; part of relatively large block of intact remnant along Isaac River and to the SW; low grazing pressure; very dry with moderate to high fire fuel load; old logging area.

Health

Average

Survey Code

Q115 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.17248

Longitude

148.35506

Slope:

1°

Aspect:

SE


General Site Description

Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	15%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Open woodland of Poplar box (<i>E. populnea</i>) with a very sparse sub-canopy of emu apple (<i>Owenia acidula</i>), whitewood (<i>Atalaya hemiglauc</i>), Clarkson's bloodwood (<i>C. clarksoniana</i>), ironwood (<i>Acacia excelsa</i>), Dallachy's gum (<i>C. dallachyana</i>) and poplar box. Sparse shrub layer of lantana (<i>Lantana camara</i>), bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), nipan (<i>Capparis lasiantha</i>), harrisia cactus (<i>Harrisia martinii</i>), poison peach (<i>Ehretia membranifolia</i>), yellow berry bush (<i>Denhamia cunninghamii</i>), dead finish (<i>Archidendropsis basaltica</i>), emu apple and poplar box. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), wiregrass (<i>Aristida calycina</i>), red Natal grass (<i>Melinis repens</i>), velvet hibiscus (<i>Melhanian oblongifolia</i>) and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form ecologically dominant stratum; healthy community with a range of maturities; good recruitment; no erosion noted; no fire scars; connected to relatively large block of intact remnant (over 4km long to west), although parts strip cleared; moderate grazing pressure; very dry.
Health	Good.

Survey Code

Q116 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.17652

Longitude

148.36459

Slope:

<1°

Aspect:

E


General Site Description
Landform

Gently undulating plain

Lithology

Alluvial sands and clays

Soil

Brown loamy sand

Height of ecologically dominant stratum

Median height 17 m

Crown cover

15%

Mapped RE

11.5.3 / 11.4.9 (95 / 5)

Observed RE

 11.3.7 – *Corymbia* spp. woodland on alluvial plains. (BVG 9e)

Biodiversity Status

Of Concern

Dominant vegetation observed

Open woodland of carbeen (*Corymbia tessellaris*) and Clarkson's bloodwood (*C. clarksoniana*) with a very sparse sub-canopy of Clarkson's bloodwood, carbeen and quinine tree (*Petalostigma pubescens*). Very sparse shrub layer of currant bush (*Carissa ovata*). Ground cover dominated by buffel grass (*Cenchrus ciliaris*) with yellow rattlepod (*Crotalaria mitchellii*) and spike rush (*Lomandra longifolia*).

General Site Observations

Trees form ecologically dominant stratum; sparse but healthy community with a range of maturities; moderate recruitment; large number of standing hollow dead trees; no erosion noted; no fire scars; isolated patch some 1.3km x.3km; moderate grazing pressure.

Health

Average.

Survey Code

Q117 (Flora)

Location

Iffley

Date

30/11/2016

Latitude

-22.17826

Longitude

148.36646

Slope:

<1°

Aspect:

S


General Site Description
Landform

Gently undulating plain

Lithology

Alluvial sands and clays

Soil

Brown loamy sand

Height of ecologically dominant stratum

Median height 16 m

Crown cover

10%

Mapped RE

11.4.9

Observed RE

 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Open woodland of poplar box (*E. populnea*) and Clarkson's bloodwood (*Corymbia clarksoniana*) with a very sparse sub-canopy of bean tree (*Cassia brewsteri*) and white bauhinia (*Lysiphyllum hookeri*). Very sparse shrub layer of poplar box, lolly bush (*Clerodendrum floribundum*) and sally wattle (*Acacia salicina*). Ground cover is dominated by buffel grass (*Cenchrus ciliaris*) with yellow rattlepod (*Crotalaria mitchellii*), shrubby stylo (*Stylosanthes scabra*) and red Natal grass (*Melinis repens*).

General Site Observations

Trees form ecologically dominant stratum; sparse sliver on edge of 11.3.7 community against cleared country to south; poor recruitment; large number of standing hollow dead trees; no erosion noted; no fire scars; isolated patch some 1.3km x.3km; moderate grazing pressure.

Health

Average.

Survey Code

Q118 (Flora)

Location

Vermont Park

Date

07/03/2017

Latitude

-22.301968

Longitude

148.458276

Slope:

1°

Aspect:

S


General Site Description
Landform

Old channels – floodplain

Lithology

Fine sediments

Soil

Clay loam to light clay

Height of ecologically dominant stratum

Median height 14 m

Crown cover

35%

Mapped RE

11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)

Observed RE

11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)

Biodiversity Status

Of Concern

Dominant vegetation observed

Sedge swamp dominated by Coolabah (*Eucalyptus coolabah*) with a low tree layer of Coolabah. There is a very sparse shrub layer of Coolabah and Sally wattle (*Acacia salicina*) saplings. Groundcover dominated by wetland species, Tall flatsedge (*Cyperus exaltatus*), *Eleocharis* sp., Musk basil (*Balsamicum polystachion*), *Juncus* sp., White Eclipta (*Eclipta prostrata*), *Heliotropium ovata* and Canegrass (*Leptochloa digitata*). Other species present include weeds Parthenium, Stinking passionfruit (*Passiflora foetida*) and Indian heliotrope (*Heliotropium indicum*),

General Site Observations

Trees form ecologically dominant stratum; mature community with many old trees; connected through large riparian vegetation unit (over 5km long) through the Isaac River corridor; mostly native groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.

Health

Very dry and heavily grazed - Good.

Survey Code

Q119 (Flora)

Location

Vermont Park

Date

07/03/2017

Latitude

-22.296115

Longitude

148.465601

Slope:

<1°

Aspect:

S


General Site Description

Landform	Floodplain
Lithology	Fine sediments
Soil	Light to medium clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	55%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (65 / 30 / 5)
Observed RE	11.3.1 – Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland to open forest dominated by Brigalow (<i>Acacia harpophylla</i>) with occasional Coolabah (<i>Eucalyptus coolabah</i>). There is a very sparse low tree layer of Brigalow and Yellowwood (<i>Terminalia oblongata</i>). There is a very sparse shrub layer of Poison peach (<i>Ehretia membranifolia</i>), Small leaved ebony (<i>Diospyros humilis</i>), Scrub wilga (<i>Geijera salicifolia</i>), Wilga (<i>Geijera parviflora</i>) and Yellowwood with the occasional <i>Lantana camara</i> . Groundcover is dominated by Buffel grass (<i>Cenchrus ciliaris</i>) with Brigalow cane grass (<i>Walwhalleya subxerophila</i>) common in the wetter hollows of gilgais.
General Site Observations	Trees form ecologically dominant stratum; mature community with mature trees; connected through large riparian vegetation unit (over 5km long) through the Isaac River corridor; mostly exotic groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.
TEC Assessment	Not a TEC due to greater than 50% exotic species cover in the ground stratum.
Health	Very dry with moderate grazing - Good.

Survey Code

Q120 (Flora)

Location

Vermont Park

Date

08/03/2017

Latitude

-22.266083

Longitude

148.309555

Slope:

1°

Aspect:

SE


General Site Description
Landform

Rises - sandplain

Lithology

Fine sediments

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

30%

Mapped RE

11.5.3

Observed RE

11.5.9 – Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces (BVG 18b)

Biodiversity Status

No Concern at Present

Dominant vegetation observed

Mixed woodland of Narrow leaved ironbark (*Eucalyptus crebra*) and Clarkson's bloodwood (*Corymbia clarksoniana*), with occasional Poplar box (*Eucalyptus populnea*). There is a sparse low tree layer of Narrow leaved ironbark, Clarkson's bloodwood and Bean tree (*Cassia brewsteri*). There is a very sparse shrub layer of Bean tree, Currant bush (*Carissa ovata*), Dysentery bushes (*Grewia latifolia* and *G. retusifolia*) and Cocaine (*Erythroxylum australe*). Groundcover is a mix of Buffel grass (*Cenchrus ciliaris*), *Aristida* sp., Forest bluegrass (*Bothriochloa bladhii*) and Black spear grass (*Heteropogon contortus*).

General Site Observations

Trees form ecologically dominant stratum; regrowing community with mostly young trees; Timber harvesting of ironbark ongoing; connected through large intact vegetation units to west and south east; mostly native groundcover with buffel; good recruitment; erosion absent; no dieback detected; fire scars absent.

Health

Dry with moderate grazing – Average/Good.

Survey Code

Q121 (Flora)

Location

Vermont Park

Date

08/03/2017

Latitude

-22.266083

Longitude

148.441616

Slope:

1°

Aspect:

S


General Site Description

Landform	Old channels – floodplain
Lithology	Fine sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 15 m
Crown cover	50%
Mapped RE	Non-remnant
Observed RE	11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of Coolabah (<i>Eucalyptus coolabah</i>) and Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), with a sparse sub-canopy of Coolabah, and occasional Carbeen (<i>Corymbia tessellaris</i>), Boonaree (<i>Alectryon oleifolius</i>), Wilga (<i>Geijera parviflora</i>) and Red bauhinia (<i>Lysiphyllum carronii</i>). There is a very sparse shrub layer of Lime bush (<i>Citrus glauca</i>) and Currant bush (<i>Carissa ovata</i>). Groundcover is very short couch grass (<i>Cynodon dactylon</i>), sedges and Cane grass (<i>Leptochloa digitata</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland community with mostly mature trees; connected through remnant wetland strips and regrowth vegetation; mostly native groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.
Health	Dry with heavy grazing – Good.

Survey Code

Q122 (Flora)

Location

Vermont Park

Date

08/03/2017

Latitude

-22.2971339

Longitude

148.449813

Slope:

<1°

Aspect:

NE


General Site Description
Landform

Old channels – floodplain

Lithology

Fine sediments

Soil

Sandy light clay

Height of ecologically dominant stratum

Median height 17 m

Crown cover

35%

Mapped RE

11.3.2/11.3.7/11.3.1 (65/30/5)

Observed RE

11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by Coolabah (*Eucalyptus coolabah*) with associated Queensland blue gum (*Eucalyptus tereticornis*), Carbeen (*Corymbia tessellaris*) and Clarkson's bloodwood (*Corymbia clarksoniana*) with a very sparse sub-canopy of young Coolabah and Queensland blue gum. There is a very sparse shrub layer of Coolabah, Sally wattle (*Acacia salicina*), Bean tree (*Cassia brewsteri*) and Currant bush (*Carissa ovata*). Groundcover is Tall flat sedge (*Cyperus exaltatus*), *Juncus* sp., *Eleocharis* sp. and Forest blue grass (*Bothriochloa bladhii*).

General Site Observations

Trees form ecologically dominant stratum; wetland community with mostly mature trees; connected through a large block of remnant vegetation; mostly native groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.

Health

Dry with moderate grazing – Good.

Survey Code

Q123 (Flora)

Location

Willunga

Date

09/03/2017

Latitude

-22.370356

Longitude

148.516932

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Old channels – floodplain
Lithology	Fine sediments
Soil	Clay loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	10%
Mapped RE	11.5.17
Observed RE	11.5.17 – <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Very Sparse Woodland dominated by Queensland blue gum (<i>Eucalyptus tereticornis</i>) with associated Poplar gum (<i>Eucalyptus platyphylla</i>), with a very sparse sub-canopy of young Queensland blue gum. There is a very sparse shrub layer of Queensland blue gum mainly about the high-water mark. Groundcover is very dry consisting of <i>Cyperus sp.</i> , <i>Juncus sp.</i> , and <i>Eleocharis sp.</i>
General Site Observations	Trees form ecologically dominant stratum; wetland community with mostly mature trees; connected through a large block of remnant vegetation; mostly native groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.
Health	Dry with moderate grazing – Good.

Survey Code

Q124 (Flora)

Location

Willunga

Date

09/03/2017

Latitude

-22.3690467

Longitude

148.507273

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Old channels – floodplain
Lithology	Fine sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 17 m
Crown cover	35%
Mapped RE	11.3.27b
Observed RE	11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Coolabah (<i>Eucalyptus coolabah</i>) with associated Queensland blue gum (<i>Eucalyptus tereticornis</i>), Carbeen (<i>Corymbia tessellaris</i>) and Sally wattle (<i>Acacia salicina</i>) with a very sparse sub-canopy of young Coolabah, Sally wattle, Bean tree (<i>Cassia brewsteri</i>) and Queensland blue gum. There is a very sparse shrub layer of Queensland blue gum saplings. Groundcover is Musk basil (<i>Basilicum polystachion</i>), <i>Cyperus</i> sp., Shot grass (<i>Paspalidium globoideum</i>) and Grey leaved heliotrope (<i>Heliotropium ovatum</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland community with mostly mature trees; connected through a large block of remnant vegetation; mostly native groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.
Health	Dry with moderate grazing – Good.

Survey Code

Q125 (Flora)

Location

Seloh Nolem

Date

09/03/2017

Latitude

-22.345138

Longitude

148.5005109

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Old channels – floodplain
Lithology	Fine sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	15%
Mapped RE	11.3.27b
Observed RE	11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Coolabah (<i>Eucalyptus coolabah</i>) with no obvious sub canopy or shrub layer. Groundcover is <i>Eleocharis spp.</i> , Melon hole canegrass (<i>Walwhalleya subxerophila</i>), <i>Panicum sp.</i> , and Musk basil (<i>Basilicum polystachion</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland community with all mature trees; isolated patch with minimal connectivity; mostly native groundcover; no recruitment noted; erosion absent; no dieback detected; fire scars absent.
Health	Dry with low level grazing – Good.

Survey Code

Q126 (Flora)

Location

Seloh Nolem

Date

09/03/2017

Latitude

-22.341406

Longitude

148.5012077

Slope:

<1°

Aspect:

SE


General Site Description

Landform	Old channels – floodplain
Lithology	Fine sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	15%
Mapped RE	11.3.27b
Observed RE	11.3.27f – Eucalyptus coolabah and/or E. tereticornis open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Coolabah (<i>Eucalyptus coolabah</i>) with associated Queensland blue gum (<i>Eucalyptus tereticornis</i>), no obvious sub canopy or shrub layer. Groundcover is <i>Eleocharis</i> spp., Tall flat sedge (<i>Cyperus exaltatus</i>), Canegrass (<i>Leptochloa digitata</i>), Sesbania (<i>Sesbania cannabina</i>), Musk basil (<i>Basilicum polystachion</i>), Couch grass (<i>Cynodon dactylon</i>) and Hairy carpet weed (<i>Glinus lotoides</i>).
General Site Observations	Trees form ecologically dominant stratum; wetland community with a fringe of mature trees and large area of treeless swamp; isolated patch with minimal connectivity; mostly native groundcover; no recruitment noted; erosion absent; no dieback detected; fire scars absent.
Health	Dry with low level grazing – Good.

Survey Code

Q127 (Flora)

Location

Seloh Nolem

Date

09/03/2017

Latitude

-22.3444227

Longitude

148.5016715

Slope:

<1°

Aspect:

SE


General Site Description
Landform

Alluvial deposits – floodplain

Lithology

Fine and coarse sediments

Soil

Sandy loam

Height of ecologically dominant stratum

Median height 15 m

Crown cover

45%

Mapped RE

11.3.2/11.3.7/11.3.1/11.3.1b (65/20/10/5)

Observed RE

11.3.2 – Eucalyptus populnea woodland on alluvial plains. (BVG 17a)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by Poplar box (*Eucalyptus populnea*) with associated Coolabah (*Eucalyptus coolabah*) and Sally wattle (*Acacia salicina*) with a very sparse sub canopy of Polar box and Sally wattle. There is a mid-dense shrub layer of Bean tree (*Cassia brewsteri*), Dysentery bush (*Grewia latifolia*), Currant bush (*Carissa ovata*), Poison peach (*Ehretia membranifolia*), Small leafed ebony (*Diospyros humilis*), Wombat berry (*Eustrephus latifolius*), Whitewood (*Atalaya hemiglauca*), Scrub boonaree (*Alectryon diversifolius*) and Supplejack (*Ventilago viminalis*). Groundcover is Buffel grass (*Cenchrus ciliaris*) Kangaroo grass (*Themeda triandra*), Tall sida (*Sida rohlenae*) and Shrubby stylo (*Stylosanthes scabra*)

General Site Observations

Trees form ecologically dominant stratum; linear community on a sand bar between two coolabah wetlands; isolated patch with minimal connectivity; mostly exotic groundcover; good recruitment; erosion absent; no dieback detected; fire scars absent.

Health

Low level grazing – Good.

Survey Code Q128 (Flora)	
Location Iffley	
Date 28/09/2017	
Latitude -22.22252	
Longitude 148.41071	
Slope: 1°	
Aspect: SE	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 16 m
Crown cover	45%
Formation	
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland of poplar box (<i>Eucalyptus populnea</i>), with a very sparse sub-canopy of poplar box. Very sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), sally wattle (<i>Acacia salicina</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and whitewood (<i>Atalaya hemiglauca</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent sabi grass (<i>Urochloa mosambicensis</i>), parthenium (<i>Parthenium hysterophorus</i>), wire grass (<i>Aristida</i> sp.), velvet hibiscus (<i>Melhania oblongifolia</i>) and <i>Dianella nervosa</i> .
General Site Observations	Trees form ecologically dominant stratum; healthy vegetation with a range of maturities; good recruitment; no erosion noted; no fire scars detected; part of the Isaac River corridor which is approximately 1 km wide at this point; moderate grazing impacts; very dry.
Health	Good.

Survey Code Q129 (Flora)	
Location Iffley	
Date 28/09/2017	
Latitude -22.21575	
Longitude 148.41524	
Slope: <1°	
Aspect: S	
General Site Description	
Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 19 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Grassy woodland with sparse canopy dominated by Dallachy's gum (<i>Corymbia dallachiana</i>) and narrow-leaved ironbark (<i>Eucalyptus crebra</i>), with frequent Clarkson's bloodwood (<i>C. clarksoniana</i>) and carbeen (<i>C. tessellaris</i>), and occasional poplar box (<i>E. populnea</i>). Very sparse sub-canopy of poplar box, narrow-leaved ironbark, sally wattle (<i>Acacia salicina</i>) and bean tree (<i>Cassia brewsteri</i>). Sparse shrub layer, including dead finish (<i>Archidendropsis basaltica</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and bean tree. Groundcover is a mix of native and exotic species, including buffel grass (<i>Cenchrus ciliaris</i>), kangaroo grass (<i>Themeda triandra</i>), wiregrass (<i>Aristida jerichoensis</i>), parthenium (<i>Parthenium hysterophorus</i>), green panic (<i>Megathyrsus maximus</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; mature community with older trees; connected to the Isaac River corridor; moderate recruitment; erosion not detected; fire scars not detected; moderate grazing evident.
Health	Good.

Survey Code Q130 (Flora)	
Location Iffley	
Date 28/09/2017	
Latitude -22.19688	
Longitude 148.40029	
Slope: <1°	
Aspect: S	
General Site Description	
Landform	Deposited low rises – old floodplain
Lithology	Alluvial sands
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 19 m
Crown cover	45%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Grassy woodland dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), with occasional forest red gum (<i>Eucalyptus tereticornis</i>), carbeen (<i>Corymbia tessellaris</i>), Dallachy's gum (<i>C. dallachiana</i>), narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and poplar box (<i>E. populnea</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>) and Clarkson's bloodwood. Sparse shrub layer of lantana (<i>Lantana camara</i>), bean tree (<i>Cassia brewsteri</i>), flannel weed (<i>Sida subspicata</i>), dysentery plant (<i>Grewia latifolia</i>) and juvenile Clarkson's bloodwood. Groundcover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent wiregrass (<i>Aristida</i> sp.), parthenium (<i>Parthenium hysterophorus</i>), sabi grass (<i>Urochloa mosambicensis</i>) and curly windmill grass (<i>Enteropogon ramosus</i>).
General Site Observations	Trees form the ecologically dominant stratum; mature community with older trees; connected to the Isaac River corridor; good recruitment; no erosion detected; no fire scars detected; light cattle grazing.
Health	Good.

Survey Code	CQ1 (Flora)
Location	Winchester Downs
Date	30/05/2017
Latitude	-22.22539
Longitude	148.26130
Slope:	1°
Aspect:	S
Infrastructure:	Water pipeline



General Site Description	
Landform	Gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	NA
Crown cover	0%
Mapped RE	11.4.9
Observed RE	Non-remnant (cleared)
Biodiversity Status	-
Dominant vegetation observed	Buffel grass dominated pasture with scattered shrub layer consistent with either RE 11.4.8 or 11.4.9. Canopy trees (most likely <i>Eucalyptus cambageana</i>) are dead and likely had been treated with a chemical such as Graslan™. Due to the condition of dead trees it is considered this clearing happened at least a decade ago or earlier.
General Site Observations	Vegetation within the mapped polygon is inconsistent with remnant classification.
Health	Poor.

Survey Code	CQ2 (Flora)
Location	Winchester Downs
Date	30/05/2017
Latitude	-22.22493
Longitude	148.25355
Slope:	1°
Aspect:	SE
Infrastructure:	Water pipeline



General Site Description	
Landform	Gently undulating plain
Lithology	Alluvial sediments
Soil	Loamy sand
Height of ecologically dominant stratum	15 m
Crown cover	5%
Mapped RE	11.3.2 / 11.3.1 / 11.3.25 (80 / 10 / 10)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open woodland. Very sparse canopy of poplar box (<i>Eucalyptus populnea</i>) with a very sparse sub-canopy of poplar box saplings. Very sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), poplar box, sally wattle (<i>Acacia salicina</i>), bean tree (<i>Cassia brewsteri</i>) and ironwood (<i>A. excelsa</i>). Buffel grass dominates the ground layer with associated black speargrass (<i>Heteropogon contortus</i>), red Natal grass (<i>Melinis repens</i>), velvet hibiscus (<i>Melhanian oblongifolia</i>) and golden beard grass (<i>Chrysopogon fallax</i>).
General Site Observations	The patch appears to have been chemically treated, evidenced by dead and unhealthy canopy trees. This patch is part of riparian vegetation along a minor watercourse which provides moderate connectivity in an otherwise highly cleared landscape.
Health	Poor.

Survey Code

CQ3 (Flora)

Location

 Winchester
Downs

Date

30/05/2017

Latitude

-22.22459

Longitude

148.24590

Slope:

<1°

Aspect:

E

Infrastructure:

Water pipeline


General Site Description

Landform	Plain
Lithology	Fine sediments (Cainozoic era mudstone and siltstone)
Soil	Light clay
Height of ecologically dominant stratum	16 m,
Crown cover	25%
Mapped RE	11.4.9 / 11.4.8 / 11.5.3 (40 / 40 / 20)
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 17a)
Biodiversity Status	Endangered
Dominant vegetation observed	Sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>) and associated poplar box (<i>E. populnea</i>), with a very sparse sub-canopy of Dawson gum, poplar box and scrub leopardwood (<i>Flindersia dissosperma</i>). Sparse to mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), poison peach (<i>Ehretia membranifolia</i>), bean tree (<i>Cassia brewsteri</i>), shiny-leaved canthium (<i>Psydrax odorata</i> subsp. <i>buxifolia</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and small-leaved ebony (<i>Diospyros humilis</i>). Ground layer is a mix of buffel grass (<i>Cenchrus ciliaris</i>), green panic (<i>Megathyrsus maximus</i>), hairy panic (<i>Panicum effusum</i>), <i>Aristida</i> sp., fairy grass (<i>Sporobolus caroli</i>), forest bluegrass (<i>Bothriochloa decipiens</i>), shot grass (<i>Paspalidium distans</i>) and golden beard grass (<i>Chrysopogon fallax</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community, but suffering edge effects due to small patch size; isolated within the landscape; mostly non-native groundcover; moderate recruitment; erosion absent; no dieback detected; fire scars absent.
TEC status	<u>Not</u> a TEC due to the absence of <i>Acacia harpophylla</i> in the canopy.
Health	Average.

Survey Code	CQ4 (Flora)
Location	Wynnette
Date	31/05/2017
Latitude	-22.22702
Longitude	148.30059
Slope:	<1°
Aspect:	S
Infrastructure:	Water pipeline



General Site Description	
Landform	Level plain
Lithology	Fine sediments (Cainozoic era mudstone and siltstone)
Soil	Light-medium clay; cracking soils with gilgai relief.
Height of ecologically dominant stratum	1.5 m
Crown cover	35%
Mapped RE	Non-remnant
Observed RE	Non-remnant
Biodiversity Status	NA
Dominant vegetation observed	Shrubland dominated by brigalow (<i>Acacia harpophylla</i>) regrowth. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Regrowth brigalow, estimated age 5-10 years, with improved pasture. Mid-sized gilgai relief with ephemeral aquatic values present at the time of survey.
Health	Poor (recovering from clearing).

Survey Code CQ5 (Flora)	
Location Winchester Downs	
Date 31/05/2017	
Latitude -22.22619	
Longitude 148.23903	
Slope: <1°	
Aspect: N	
Infrastructure: Water pipeline	
General Site Description	
Landform	Plain
Lithology	Fine sandstone sediments
Soil	Clay loam
Height of ecologically dominant stratum	14 m
Crown cover	40%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with frequent narrow-leaved ironbark (<i>E. crebra</i>), occasional sally wattle (<i>Acacia salicina</i>), Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and Dallachy's gum (<i>C. dallachiana</i>). Sparse shrub layer of currant bush (<i>Carissa ovata</i>), poison peach (<i>Ehretia membranifolia</i>), bean tree (<i>Cassia brewsteri</i>), scrub boonaree (<i>Alectryon diversifolius</i>), beefwood (<i>Grevillea striata</i>), red bauhinia (<i>Lysiphyllum carronii</i>), lolly bush (<i>Clerodendron floribunda</i>), dysentery plant (<i>Grewia retusifolia</i>), nipan (<i>Capparis lasiantha</i>), water bush (<i>Myoporum acuminatum</i>), jasmine (<i>Jasminum didymum</i>) and coffee bush (<i>Breynia oblongifolia</i>). Ground layer is a mix of <i>Aristida</i> sp., golden beard grass (<i>Chrysopogon fallax</i>), kangaroo grass (<i>Themeda triandra</i>), brown silky top (<i>Eulalia aurea</i>), potato bush (<i>Solanum ellipticum</i>), <i>Phyllanthus virgata</i> , orange spade flower (<i>Hybanthus enneaspermus</i>), Sturt's hibiscus (<i>Hibiscus sturtii</i>) and rhynco (<i>Rhynchosia minima</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community, but mostly younger trees; areas within the larger mapped polygon are dominated by <i>E. crebra</i> , patch isolated within the landscape approx. 1 km x 0.4 km; mostly native groundcover; moderate recruitment; erosion absent; no dieback detected; fire scars absent.
Health	Good.

Survey Code CQ6 (Flora)	
Location Winchester Downs	
Date 1/06/2017	
Latitude -22.12503	
Longitude 148.27063	
Slope: °	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Drainage line transecting level plain
Lithology	Fine sandstone sediments
Soil	Clay
Height of ecologically dominant stratum	20 m
Crown cover	40%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of forest red gum (<i>Eucalyptus tereticornis</i>) and coolabah (<i>E. coolabah</i>), with a very sparse sub-canopy of Sally wattle (<i>Acacia salicina</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of Sally wattle. Ground layer dominated by exotic species, consisting primarily of Indian couch (<i>Bothriochloa pertusa</i>), green panic (<i>Megathyrsus maximus</i>) and paddy's lucerne (<i>Sida rhombifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with some hollows; a narrow riparian strip approx. 50 metres wide but on the edge of a significant area of intact remnant vegetation which includes the Isaac River corridor; moderate recruitment; normal watercourse erosion, siltation in places; no dieback detected; fire scars absent.
Health	Average.

Survey Code

CQ7 (Flora)

Location

 Winchester
Downs

Date

1/06/2017

Latitude

-22.13870

Longitude

148.29280

Slope:

1°

Aspect:

S

Infrastructure:

Rail corridor


General Site Description
Landform

Palustrine wetland on level plain

Lithology

Alluvial sediments

Soil

Light clay

Height of ecologically dominant stratum

15 m

Crown cover

30%

Mapped RE

11.3.2 / 11.3.7 (80 / 20)

Observed RE

 11.3.27f *Eucalyptus coolabah* and / or *E. tereticornis* open woodland to woodland fringing swamps. (BVG 34d)

Biodiversity Status

Of Concern

Dominant vegetation observed

Woodland dominated by forest blue gum (*Eucalyptus tereticornis*), with abundant coolabah (*E. coolabah*). No distinguishable sub-canopy. Very sparse shrub layer of sally wattle (*Acacia salicina*). Ephemeral native wetland species dominate the ground layer with Spike rush (*Eleocharis philippinensis*) the dominant species. Southern cut grass (*Leersia hexandra*) is common in patches while willow primrose (*Ludwigia octovalvis*), giant flat sedge (*Cyperus exaltatus*), white eclipta (*Eclipta prostrata*) and hairy nardoo (*Marsilea drummondii*) are scattered throughout.

General Site Observations

Trees form the ecologically dominant stratum; a mature community with some hollows; part of a significant area of intact remnant vegetation which includes the Isaac River corridor; low to moderate recruitment; low erosion; no dieback detected; fire scars absent.

Health

Good.

Survey Code CQ8 (Flora)	
Location Winchester Downs	
Date 1/06/2017	
Latitude -22.13952	
Longitude 148.29348	
Slope: <1°	
Aspect: SW	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Alluvial sandstone sediments
Soil	Loam
Height of ecologically dominant stratum	17 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 (80 / 20)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with frequent Dallachy's gum (<i>Corymbia dallachyana</i>). Very sparse sub canopy of poplar box and sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), dysentery bushes (<i>Grewia retusifolia</i> and <i>G. latifolius</i>), sandpaper fig (<i>Ficus opposita</i>), whitewood (<i>Atalaya hemiglauca</i>) and wombat berry (<i>Eustrephus latifolius</i>). Ground layer is a mix of buffel grass (<i>Cenchrus ciliaris</i>), black speargrass (<i>Heteropogon contortus</i>), kangaroo grass (<i>Themeda triandra</i>), brown silky top (<i>Eulalia aurea</i>), hairy panic (<i>Panicum effusum</i>), curly windmill grass (<i>Enteropogon acicularis</i>) and hairy panic (<i>Digitaria brownii</i>).
General Site Observations	Trees form ecologically dominant stratum; a mature community but mostly younger trees with few hollows; part of a significant area of intact remnant vegetation which includes the Isaac River corridor; good recruitment; low erosion; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ9 (Flora)
Location	Wynette
Date	1/06/2017
Latitude	-22.14615
Longitude	148.30033
Slope:	<1°
Aspect:	S
Infrastructure:	Rail corridor



General Site Description	
Landform	River bank
Lithology	Alluvial sandstone sediments
Soil	Sand
Height of ecologically dominant stratum	22 m
Crown cover	45%
Mapped RE	11.3.25
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent river she oak (<i>Casuarina cunninghamiana</i>), occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and carbeen (<i>C. tessellaris</i>). Very sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>) and sally wattle (<i>Acacia salicina</i>). Sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), sandpaper fig (<i>Ficus opposita</i>), lantana (<i>Lantana camara</i>) and flax-leaved paperbark (<i>Melaleuca linariifolia</i>). Ground layer dominated by introduced green panic (<i>Megathyrsus maximus</i>) and butterfly pea (<i>Clitoria ternatea</i>), with occasional kangaroo grass (<i>Themeda triandra</i>).
General Site Observations	Trees form ecologically dominant stratum; an immature community with mostly younger trees with occasional hollows in older trees; part of a significant area of intact remnant vegetation which includes the Isaac River corridor; moderate recruitment, likely to be affected by dense exotic groundcover; moderate erosion and slumping in parts from recent flooding; no dieback detected; fire scars absent.
Health	Average.

Survey Code CQ10 (Flora)	
Location Wynette	
Date 1/06/2017	
Latitude -22.14910	
Longitude 148.30247	
Slope: <1°	
Aspect: ESE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Closed depression on level plain
Lithology	Alluvial sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.3.27b
Observed RE	11.3.27f <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with a sparse canopy dominated by coolabah (<i>Eucalyptus coolabah</i>), with frequent forest red gum (<i>E. tereticornis</i>). Very sparse sub-canopy of coolabah and sally wattle (<i>Acacia salicina</i>). Shrub layer absent. Ground layer is composed of native wetland species including southern cut grass (<i>Leersia hexandra</i>), spiny mudgrass (<i>Pseudoraphis spinescens</i>), brown beetle grass (<i>Diplachne fusca</i>), spike rushes (<i>Eleocharis philippinensis</i> and <i>E. plana</i>) and dwarf cassia (<i>Chamaecrista mimosoides</i>).
General Site Observations	Trees form the ecologically dominant stratum; ephemeral wetland currently full after recent rainfall and runoff events; part of a significant area of intact remnant vegetation which includes the Isaac River corridor; moderate recruitment; no erosion; no dieback detected; fire scars absent.
Health	Good.

Survey Code

CQ11 (Flora)

Location

Wynette

Date

1/06/2017

Latitude

-22.15170

Longitude

148.30618

Slope:

1°

Aspect:

SE

Infrastructure:

Rail corridor


General Site Description
Landform

Gently undulating plain

Lithology

Fine sediments

Soil

Light clay

Height of ecologically dominant stratum

NA

Crown cover

0%

Mapped RE

11.3.2 / 11.3.7 (80 / 20)

Observed RE

Non-remnant (cleared)

Biodiversity Status

NA

Dominant vegetation observed

Buffel grass dominated pasture with adjacent vegetation consistent with RE 11.4.8. It is considered likely this clearing happened at least a decade ago as area has been blade ploughed.

General Site Observations

Some vegetation within the mapped polygon is inconsistent with remnant classification.

Health

Poor.

Survey Code CQ12 (Flora)	
Location Wynette	
Date 1/06/2017	
Latitude -22.15286	
Longitude 148.30689	
Slope: <1°	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	14 m
Crown cover	15%
Mapped RE	11.4.9
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Sparse woodland dominated by Dawson gum (<i>Eucalyptus cambageana</i>), with a sparse sub-canopy of Brigalow (<i>Acacia harpophylla</i>), scrub leopardwood (<i>Flindersia dissosperma</i>) and ironwood (<i>Acacia excelsa</i>). Very sparse shrub layer containing currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>), dysentery plant (<i>Grewia retusifolia</i>), whitewood (<i>Atalaya hemiglauc</i>), shiny-leaved canthium (<i>Psydrax buxifolia</i>), red bauhinia (<i>Lysiphyllum carronii</i>), poison peach (<i>Ehretia membranifolia</i>) and scrub leopardwood. Ground layer dominated by a mix of curly windmill grass (<i>Enteropogon acicularis</i>), wiregrass (<i>Aristida sp.</i>) and buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Trees form the ecologically dominant stratum; a sparse community that has suffered some disturbance, possibly fire; part of a significant area of intact remnant vegetation which includes the Isaac River corridor; moderate recruitment; no erosion; no dieback detected; fire scars absent.
TEC status	<u>Not</u> a TEC due to <i>Acacia harpophylla</i> not being co-dominant in the canopy or sub-canopy.
Health	Average.

Survey Code	CQ13 (Flora)
Location	Wynette
Date	1/06/2017
Latitude	-22.15908
Longitude	148.31327
Slope:	<1°
Aspect:	E
Infrastructure:	Rail corridor



General Site Description	
Landform	Drainage feature on level plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	13 m
Crown cover	20%
Mapped RE	11.4.9
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with a sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>) and sparse sub-canopy of Brigalow (<i>Acacia harpophylla</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Very sparse shrub layer including yellowwood (<i>Terminalia oblongata</i>), red bauhinia, wilga (<i>Geijera parviflora</i>) and brigalow. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>). Other exotic species include harrisia cactus (<i>Harrisia martinii</i>), parthenium (<i>Parthenium hysterophorus</i>) and sabi grass (<i>Urochloa mosambicensis</i>). Native grasses represented in low numbers by forest bluegrass (<i>Bothriochloa bladhii</i>) and Queensland bluegrass (<i>Dichanthium sericeum</i>).
General Site Observations	Trees form the ecologically dominant stratum; a narrow and sparse community that has suffered edge effect disturbance from fire; tenuous linkage to the Isaac River corridor; moderate recruitment; significant erosion in adjacent cleared paddocks; siltation; dieback detected; fire scarring present.
TEC status	<u>Not</u> a TEC due to poor structure and infestation of exotic species in the ground layer. The brigalow component of this community may also be considered to not meet co-dominant status.
Health	Poor to average

Survey Code
CQ14 (Flora)

Location
Wynette

Date
2/06/2017

Latitude
-22.15769

Longitude
148.29784

Slope:
1°

Aspect:
E

Infrastructure:
Rail corridor



General Site Description	
Landform	Level plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	13 m
Crown cover	20%
Mapped RE	11.3.1
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>) and very sparse sub-canopy of brigalow (<i>Acacia harpophylla</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Very sparse shrub layer containing yellowwood (<i>Terminalia oblongata</i>), red bauhinia, brigalow, sandalwood (<i>Santalum lanceolatum</i>), scrub boonaree (<i>Alectryon diversifolius</i>), brigalow senna (<i>Senna coronilloides</i>) and poison peach (<i>Ehretia membranifolia</i>). Ground layer dominated by canegrass (<i>Leptochloa digitata</i>) in drainage line and by buffel grass (<i>Cenchrus ciliaris</i>) on plain, with frequent musk basil (<i>Basilicum polystachion</i>), parthenium (<i>Parthenium hysterophorus</i>), forest bluegrass (<i>Bothriochloa bladhii</i>) and Queensland bluegrass (<i>Dichanthium sericeum</i>).
General Site Observations	Trees form the ecologically dominant stratum; a sparse community that has possibly suffered edge effect disturbance from fire; tenuous linkage to the Isaac River corridor; moderate recruitment; no erosion; dieback detected; fire scarring low; broad drainage area.
TEC status	<u>Not</u> a TEC due to brigalow component of this community not meeting co-dominant status.
Health	Poor to average.

Survey Code CQ15 (Flora)	
Location Wynette	
Date 2/06/2017	
Latitude -22.17320	
Longitude 148.32074	
Slope: 1°	
Aspect: NNW	
Infrastructure: Rail corridor	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sandstone sediments
Soil	Loam
Height of ecologically dominant stratum	13 m
Crown cover	10%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Open woodland with a very sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box and white bauhinia (<i>Lysiphyllum hookeri</i>). Sparse shrub layer containing scrub boonaree (<i>Alectryon diversifolius</i>), small-leaved ebony (<i>Diospyros humilis</i>) and poison peach (<i>Ehretia membranifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>).
General Site Observations	Trees form the ecologically dominant stratum; a sparse community that has suffered edge effect disturbance from fire; part of a large block of contiguous vegetation (4.5km x 2.5km), connecting with the Isaac River corridor; moderate recruitment; no erosion; no dieback detected; fire scarring present.
Health	Poor.

Survey Code	CQ16 (Flora)
Location	Wynette
Date	2/06/2017
Latitude	-22.18744
Longitude	148.34176
Slope:	<1°
Aspect:	NW
Infrastructure:	Rail corridor



General Site Description	
Landform	Level plain
Lithology	Fine sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	35%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>). Sparse sub-canopy of ironwood (<i>Acacia excelsa</i>), bootlace oak (<i>Hakea lorea</i>) and bean tree (<i>Cassia brewsteri</i>). Sparse shrub layer of quinine tree (<i>Petalostigma pubescens</i>), yellowberry bush (<i>Denhamia cunninghamii</i>), scrub wilga (<i>Geijera salicifolia</i>), vine tree (<i>Ventilago viminalis</i>), ironwood, dead finish (<i>Archidendropsis basaltica</i>) and poison peach (<i>Ehretia membranifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional golden beard grass (<i>Chrysopogon fallax</i>), black spear grass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida</i> sp.), wiry nineawn (<i>Enneapogon lindleyanus</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), bottletree caustic (<i>Euphorbia tannensis</i>) and shotgrass (<i>Paspalidium distans</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy community with a range of maturities; part of a large block of contiguous vegetation (4.5km x 2.5km) including the Isaac River corridor; good recruitment; no erosion; no dieback detected; no fire scarring.
Health	Average.

Survey Code CQ17 (Flora)	
Location Wynette	
Date 2/06/2017	
Latitude -22.16978	
Longitude 148.32429	
Slope: 0°	
Aspect: -	
Infrastructure: Rail corridor	
General Site Description	
Landform	Closed depression on level plain
Lithology	Weathered sediments
Soil	Clay loam with weathered ironstone nodules
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.5.17
Observed RE	11.5.17 <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy comprised of forest red gum (<i>Eucalyptus tereticornis</i>). No discernible sub-canopy. Very sparse shrub layer of young forest red gum. Ground layer inundated at the time of survey and consisted of <i>Juncus</i> sp., willow primrose (<i>Ludwigia octovalvis</i>), white eclipta (<i>Eclipta prostrata</i>) and clustered lovegrass (<i>Eragrostis elongata</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy community on what appears to be a short-term ephemeral wetland; part of a large block of contiguous vegetation (4.5km x 2.5km) adjoining the Isaac River corridor; good recruitment; no erosion; numerous dead trees; no fire scarring.
Health	Good.

Survey Code CQ18 (Flora)	
Location Wynette	
Date 2/06/2017	
Latitude -22.16728	
Longitude 148.32146	
Slope: <1°	
Aspect: S	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sandstone sediments
Soil	Loam
Height of ESD	18 m
Crown cover	30%
Mapped RE	11.5.15
Observed RE	11.5.15 Semi-evergreen vine thicket on Cainozoic sand plains and / or remnant surfaces. (BVG 7a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with a sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>) with occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), Dallachy gum (<i>C. dallachiana</i>) and poplar box hybrid. Very sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>), crows ash (<i>Flindersia australis</i>) and shiny-leaved canthium (<i>Psydrax odorata</i> subsp. <i>buxifolia</i>). Mid-dense shrub layer of purple pea bush (<i>Hovea longipes</i>), scrub wilga (<i>Geijera salicifolia</i>), acalypha (<i>Acalypha eremorum</i>), wilga (<i>Geijera parviflora</i>), cocaine tree (<i>Erythroxylum australe</i>), shiny-leaved canthium, quinine tree (<i>Petalostigma pubescens</i>) and dysentery plant (<i>Grewia latifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant Wiregrass (<i>Aristida</i> sp.) and occasional golden beard grass (<i>Chrysopogon fallax</i>), red natal grass (<i>Melinis repens</i>), black spear grass (<i>Heteropogon contortus</i>), wiry nineawn (<i>Enneapogon lindleyanus</i>), velvet hibiscus (<i>Melhania oblongifolia</i>) and kangaroo grass (<i>Themeda triandra</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mixed community comprising a canopy of 11.5.3 species with sub-canopy and shrub layer consistent with SEVT 11.5.15 community; part of a large block of contiguous vegetation (4.5km x 2.5km) adjoining the Isaac River corridor; good recruitment; no erosion; no dieback detected; no fire scarring.
Health	Good.

Survey Code
CQ19 (Flora)

Location
Wynette

Date
2/06/2017

Latitude
-22.16570

Longitude
148.31992

Slope:
1°

Aspect:
W

Infrastructure:
Rail corridor



General Site Description	
Landform	Gently undulating plain
Lithology	Fine sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	35%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by narrow-leaved ironbark (<i>Eucalyptus crebra</i>), with frequent poplar box (<i>E. populnea</i>), <i>E. populnea</i> x <i>E. crebra</i> hybrid and Dallachy's gum (<i>Corymbia dallachiana</i>). Very sparse sub-canopy of narrow-leaved ironbark, Dallachy's gum and emu apple (<i>Owenia acidula</i>). Very sparse shrub layer of narrow-leaved ironbark, bean tree (<i>Cassia brewsteri</i>) and quinine tree (<i>Petalostigma pubescens</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent golden beard grass (<i>Chrysopogon fallax</i>), red Natal grass (<i>Melinis repens</i>), black spear grass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida</i> sp.), velvet hibiscus (<i>Melhania oblongifolia</i>), <i>Digitaria</i> sp., shrubby stylo (<i>Stylosanthes scabra</i>) and shrub sida (<i>Sida rohlenae</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mostly young community with the occasional hollow-bearing older tree; ironbark dominates the canopy in this component of the 11.5.3 polygon. Part of a large block of contiguous vegetation (4.5km x 2.5km) adjoining the Isaac River corridor; good recruitment; no erosion; no dieback detected; no fire scarring.
Health	Good.

Survey Code
CQ20 (Flora)

Location
Winchester
Downs

Date
3/06/2017

Latitude
-22.14796

Longitude
148.27804

Slope:
1°

Aspect:
W

Infrastructure:
Rail corridor



General Site Description

Landform	Gently undulating plain
Lithology	Fine sediments
Soil	Light clay (cracking)
Height of ecologically dominant stratum	13 m
Crown cover	25%
Mapped RE	11.9.3 / 11.9.2 (50 / 50)
Observed RE	11.9.5 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy of brigalow (<i>Acacia harpophylla</i>) and mountain coolabah (<i>Eucalyptus orgadophila</i>). Very sparse sub-canopy of brigalow, whitewood (<i>Atalaya hemiglauca</i>), white bauhinia (<i>Lysiphyllum hookeri</i>) and yellowwood (<i>Terminalia oblongata</i>). Sparse shrub layer containing yellowwood, brigalow, currant bush (<i>Carissa ovata</i>), white bauhinia and vine tree (<i>Ventilago viminalis</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional parthenium (<i>Parthenium hysterophorus</i>) and forest bluegrass (<i>Bothriochloa bladhii</i>).
General Site Observations	Trees form the ecologically dominant stratum; a disturbed community that has possibly suffered edge effect disturbance from fire; isolated patch in the landscape; moderate recruitment; no erosion; dieback common; large amount of coarse woody debris; fire scarring not obvious, 11.9.5 community extends to the SW within the mapped 11.9.3 / 11.9.2 polygon.
TEC status	<u>Not</u> a TEC due to poor structure and dominance of exotic species in the ground layer. Structurally this community does not reach a mid-dense canopy (i.e. crown cover of 50-80%).
Health	Poor.

Survey Code CQ21 (Flora)	
Location Winchester Downs	
Date 3/06/2017	
Latitude -22.14861	
Longitude 148.27941	
Slope: <1°	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sediments
Soil	Light clay (reddish)
Height of ecologically dominant stratum	14 m
Crown cover	10%
Mapped RE	Non-remnant
Observed RE	11.9.2 <i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland on fine-grained sedimentary rocks. (BVG 17b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with very sparse canopy of mountain coolabah (<i>Eucalyptus orgadophila</i>), with no discernible sub-canopy. Very sparse shrub layer containing currant bush (<i>Carissa ovata</i>), red bauhinia (<i>Lysiphyllum carronii</i>), vine tree (<i>Ventilago viminalis</i>), boonaree (<i>Alectryon oleifolius</i>), scrub boonaree (<i>A. diversifolius</i>), bean tree (<i>Cassia brewsteri</i>), whitewood (<i>Atalaya hemiglauca</i>) and limebush (<i>Citrus glauca</i>). Ground layer dominated by forest bluegrass (<i>Bothriochloa bladhii</i>), with abundant buffel grass (<i>Cenchrus ciliaris</i>) and kangaroo grass (<i>Themeda triandra</i>), frequent black spear grass (<i>Heteropogon contortus</i>) and occasional parthenium (<i>Parthenium hysterophorus</i>) and wiregrass (<i>Aristida</i> sp.).
General Site Observations	Trees form the ecologically dominant stratum; a naturally sparse community that has possibly been overlooked during mapping due to its open grassland nature; low recruitment; no erosion; some dieback; fire scarring not obvious; aerial imagery indicates no historical clearing.
Health	Good.

Survey Code CQ22 (Flora)	
Location Winchester Downs	
Date 3/06/2017	
Latitude -22.15685	
Longitude 148.28737	
Slope: 1°	
Aspect: SE	
Infrastructure : Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sediments
Soil	Light clay (cracking)
Height of ecologically dominant stratum	13 m
Crown cover	30%
Mapped RE	11.9.3 / 11.9.2 (50 / 50)
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>), with a very sparse to sparse sub-canopy of red bauhinia (<i>Lysiphyllum carronii</i>), yellowwood (<i>Terminalia oblongata</i>) and brigalow (<i>Acacia harpophylla</i>). Sparse shrub layer containing yellowwood, brigalow, emu apple (<i>Owenia acidula</i>), brigalow senna (<i>Senna coronilloides</i>), red bauhinia, scrub boonaree (<i>Alectryon diversifolius</i>), wild orange (<i>Capparis mitchellii</i>), currant bush (<i>Carissa ovata</i>), and fuchsia bush (<i>Eremophila maculata</i>). Ground layer is a mix of Queensland bluegrass (<i>Dichanthium sericeum</i>), Mitchell grass (<i>Astrebla lappacea</i>), slender rat's tail grass (<i>Sporobolus creber</i>), windmill grass (<i>Enteropogon acicularis</i>), shot grass (<i>Paspalidium distans</i>), <i>Sida</i> sp., <i>Malvastrum</i> sp., <i>Aristida</i> sp., and forest bluegrass (<i>Bothriochloa bladhii</i>).
General Site Observations	Trees form the ecologically dominant stratum; a disturbed and patchy community that has likely suffered edge effects, including disturbance from fire; isolated patch with tenuous linkage to the east along a minor watercourse; moderate recruitment; no erosion; dieback detected; fire scarring not obvious.
TEC status	<u>Not</u> a TEC due to brigalow not being co-dominant in the canopy or sub-canopy.
Health	Average.

Survey Code
CQ23 (Flora)

Location
Winchester
Downs

Date
3/06/2017

Latitude
-22.15899

Longitude
148.29041

Slope:
1°

Aspect:
E

Infrastructure:
Rail corridor



General Site Description

Landform	Drainage depression on gently undulating plain
Lithology	Fine sediments
Soil	Light clay (cracking)
Height of ecologically dominant stratum	12 m
Crown cover	30%
Mapped RE	11.4.9
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with frequent Dawson gum (<i>Eucalyptus cambageana</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Very sparse sub-canopy of brigalow, red bauhinia and false sandalwood (<i>Eremophila mitchellii</i>). Sparse shrub layer containing yellowwood (<i>Terminalia oblongata</i>), brigalow, white bauhinia (<i>Lysiphyllum hookeri</i>), scrub boonaree (<i>Alectryon diversifolius</i>), limebush (<i>Citrus glauca</i>) and poison peach (<i>Ehretia membranifolia</i>). Ground layer contains buffel grass (<i>Cenchrus ciliaris</i>), fairy grass (<i>Sporobolus caroli</i>), parthenium (<i>Parthenium hysterophorus</i>), cumbungi (<i>Typha sp.</i>), <i>Juncus sp.</i> , forest blue grass (<i>Bothriochloa bladhii</i>), canegrass (<i>Leptochloa digitata</i>), <i>Cyperus isabellinus</i> , trim flat sedge (<i>Cyperus concinnus</i>), nardoo (<i>Marsilea drummondii</i>) and musk basil (<i>Basilicum polystachion</i>).
General Site Observations	Trees form the ecologically dominant stratum; high level disturbance from grazing cattle; tenuous linkage to the east along a minor watercourse; moderate recruitment; low erosion; within a watercourse and tail end of impoundment; large component of patch is semi-permanent water; fire scarring not obvious.
TEC status	<u>Confirmed</u> a TEC. Sufficient canopy cover and height to be considered remnant, with mostly native species ground cover.
Health	Average to good.

Survey Code CQ24 (Flora)	
Location Iffley	
Date 4/06/2017	
Latitude -22.19259	
Longitude 148.34695	
Slope: 1°	
Aspect: NE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sandstone sediments
Soil	Light clay to sandy loams
Height of ecologically dominant stratum	15 m
Crown cover	40%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.4.9 <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional poplar box (<i>Eucalyptus populnea</i>). Sparse to very sparse sub-canopy of sandalwood (<i>Santalum lanceolatum</i>), white bauhinia (<i>Lysiphyllum hookeri</i>), brigalow and emu apple (<i>Owenia acidula</i>). Very sparse shrub layer containing shiny-leaved canthium (<i>Psydrax odorata</i> subsp. <i>buxifolia</i>), sandalwood, currant bush (<i>Carissa ovata</i>), poison peach (<i>Ehretia membranifolia</i>), water vine (<i>Clematicissus opaca</i>) and northern silk pod (<i>Parsonsia lanceolata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) and green panic (<i>Megathyrsus maximus</i>), with occasional sabi grass (<i>Urochloa mosambicensis</i>) and native grasses windmill grass (<i>Enteropogon acicularis</i>), fairy grass (<i>Sporobolus caroli</i>), wiregrass (<i>Aristida calycina</i>), shot grass (<i>Paspalidium distans</i>), brigalow grass (<i>P. caespitosum</i>) and <i>P. rarum</i> .
General Site Observations	Trees form the ecologically dominant stratum; part of a significant block of intact remnant vegetation with reduced connectivity due to strip clearing; good recruitment; low erosion; within a minor drainage depression downstream of a stock watering dam; soil change boundary with only a small patch on land zone 4; fire scarring not obvious.
TEC status	<u>Not</u> a TEC. Relatively small patch size combined with ground cover dominated by exotic species.
Health	Good.

Survey Code CQ25 (Flora)	
Location Iffley	
Date 4/06/2017	
Latitude -22.19544	
Longitude 148.34967	
Slope: 1°	
Aspect: NW	
Infrastructure: Rail corridor	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>E. populnea</i>), with occasional narrow-leaved ironbark (<i>Eucalyptus crebra</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>), ironwood (<i>A. excelsa</i>), poplar box, vine tree (<i>Ventilago viminalis</i>), bean tree (<i>Cassia brewsteri</i>) and emu apple (<i>Owenia acidula</i>). Sparse to very sparse shrub layer of currant bush (<i>Carissa ovata</i>), sally wattle, poplar box and quinine tree (<i>Petalostigma pubescens</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) and wiregrasses (<i>Aristida calycina</i> and <i>A. jericoensis</i>), with frequent golden beard grass (<i>Chrysopogon fallax</i>), wiry nineawn (<i>Enneapogon lindleyanus</i>), shotgrass (<i>Paspalidium distans</i>), kangaroo grass (<i>Themeda triandra</i>), curly windmill grass (<i>Enteropogon acicularis</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and shrub sida (<i>Sida rohlenae</i>).
General Site Observations	Trees form the ecologically dominant stratum; mature community with the occasional hollow-bearing older tree; part of a large irregularly shaped block of contiguous vegetation (6km x 4km) with moderate fragmentation from clearing corridors throughout; good recruitment; no erosion; no dieback detected; no fire scarring; changes to RE 11.5.9 about 100m south of this point.
Health	Good.

Survey Code
CQ26 (Flora)
Location
Olive Downs
Date
8/06/2017
Latitude
-22.15137
Longitude
148.33544
Slope:
<1°
Aspect:
E
Infrastructure:
ETL and access



General Site Description	
Landform	River bank on level plain
Lithology	Alluvium; sandstone sediments
Soil	Sand
Height of ecologically dominant stratum	23 m
Crown cover	45%
Mapped RE	11.3.25
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland to open forest with sparse to mid-dense canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with occasional carbeen (<i>Corymbia tessellaris</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>), forest red gum and bean tree (<i>Cassia brewsteri</i>). Mid-dense shrub layer dominated by lantana (<i>Lantana camara</i>), with occasional bean tree (<i>Cassia brewsteri</i>), sandpaper fig (<i>Ficus opposita</i>), sally wattle and birdflower (<i>Crotalaria laburnifolia</i> subsp. <i>laburnifolia</i>). Ground layer dominated by introduced green panic (<i>Megathyrsus maximus</i>) and buffel grass (<i>Cenchrus ciliaris</i>), with occasional natives including forest blue grass (<i>Bothriochloa bladhii</i>) and pitted blue grass (<i>B. decipiens</i>).
General Site Observations	Trees form the ecologically dominant stratum; an immature community with mostly younger trees, with occasional hollows in older trees; part of a significant area of intact remnant vegetation along the Isaac River corridor; moderate recruitment likely to be affected by dense exotic groundcover; moderate erosion and slumping in parts from recent flooding; no dieback detected; fire scars absent.
Health	Average.

Survey Code	CQ27 (Flora)
Location	Olive Downs
Date	8/06/2017
Latitude	-22.14731
Longitude	148.33450
Slope:	1°
Aspect:	NE
Infrastructure:	ETL and access



General Site Description	
Landform	Gently undulating plain
Lithology	Sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional Dallachy's gum (<i>Corymbia dallachiana</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>) and poplar box. Very sparse shrub layer containing lantana (<i>Lantana camara</i>), whitewood (<i>Atalaya hemiglauca</i>), sally wattle and bean tree (<i>Cassia brewsteri</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional sabi grass (<i>Urochloa mosambicensis</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and golden beard grass (<i>Chrysopogon fallax</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy community with mostly younger trees with occasional older trees; part of a significant area of intact remnant vegetation along the Isaac River corridor; good recruitment; erosion NE of this site with some subsoil exposure; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ28 (Flora)
Location	Olive Downs
Date	8/06/2017
Latitude	-22.14460
Longitude	148.33392
Slope:	<1°
Aspect:	SW
Infrastructure:	ETL and access



General Site Description	
Landform	Drainage line on level plain
Lithology	Alluvial and Quaternary deposits; sandstone sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	23 m
Crown cover	45%
Mapped RE	11.4.8
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines BVG 16a
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by coolabah (<i>Eucalyptus coolabah</i>), with occasional brigalow (<i>Acacia harpophylla</i>), poplar box (<i>Eucalyptus populnea</i>) and narrow-leaved ironbark (<i>E. crebra</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>), coolabah, Dallachy's gum (<i>Corymbia dallachiana</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of sally wattle and mimosa (<i>Vachellia farnesiana</i>). Ground layer dominated by introduced green panic (<i>Megathyrsus maximus</i>) and Indian couch (<i>Bothriochloa pertusa</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mixed community with influence from land zone 4 clays along the northern extent; part of a significant area of intact remnant vegetation along the Isaac River corridor; good recruitment and good health; low erosion but some gullyng in banks from cattle pads; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ29 (Flora)
Location	Olive Downs
Date	8/06/2017
Latitude	-22.14321
Longitude	148.33383
Slope:	1°
Aspect:	SW
Infrastructure:	ETL and access



General Site Description	
Landform	Gently undulating plain
Lithology	Quaternary deposits; sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	15 m
Crown cover	20%
Mapped RE	Non-remnant
Observed RE	11.4.8 <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with very sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>). Very sparse sub-canopy of Dawson gum, brigalow (<i>Acacia harpophylla</i>) and ironwood (<i>Acacia excelsa</i>). Sparse shrub layer of scrub boonaree (<i>Alectryon diversifolius</i>), yellowwood (<i>Terminalia oblongata</i>), warrior bush (<i>Apophyllum anomalum</i>), currant bush (<i>Carissa ovata</i>), narrow-leaved bumbil (<i>Capparis loranthifolia</i>), limebush (<i>Citrus glauca</i>), whitewood (<i>Atalaya hemiglauca</i>) and poison peach (<i>Ehretia membranifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent Indian couch (<i>Bothriochloa pertusa</i>) and occasional fairy grass (<i>Sporobolus caroli</i>), Queensland blue grass (<i>Dichanthium sericeum</i>) and cup grass (<i>Eriochloa pseudoacrotricha</i>).
General Site Observations	Trees form the ecologically dominant stratum; likely fire damaged; part of a significant area of intact remnant vegetation along the Isaac River corridor; recruitment is low; scattered rill erosion; no dieback detected; fire scars absent.
TEC status	Not a TEC. Brigalow is not co-dominant and exotic species greater than 50% of the ground layer.
Health	Poor.

Survey Code CQ30 (Flora)	
Location Olive Downs	
Date 8/06/2017	
Latitude -22.09724	
Longitude 148.33364	
Slope: 1°	
Aspect: SE	
Infrastructure: ETL and access	
General Site Description	
Landform	Plain
Lithology	Quaternary deposits; sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	1.5 m
Crown cover	20%
Mapped RE	Non-remnant
Observed RE	Non-remnant
Biodiversity Status	-
Dominant vegetation observed	Shrubland with sparse canopy of brigalow (<i>Acacia harpophylla</i>), with frequent yellowwood (<i>Terminalia oblongata</i>) and occasional scrub boonaree (<i>Alectryon diversifolius</i>) and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent cup grass (<i>Eriochloa crebra</i>), <i>Cyperus</i> sp., musk basil (<i>Basilicum polystachion</i>), dirty dora (<i>Cyperus difformis</i>), canegrass (<i>Leptochloa digitata</i>), parthenium (<i>Parthenium hysterophorus</i>), common rush (<i>Juncus usitatus</i>), white Eclipta (<i>Eclipta prostrata</i>) and dwarf lantern flower (<i>Abutilon fraseri</i>).
General Site Observations	Brigalow regrowth; estimated 3-5 years since last treated; gilgai, varying from small to medium water holes; wet at time of survey with ephemeral wetland species estimated at 15-25% of ground cover depending on density of gilgai; good habitat for reptiles and amphibians, with waterbirds on larger gilgai.
Health	Degraded.

Survey Code	CQ31 (Flora)
Location	Moorvale
Date	9/06/2017
Latitude	-22.08308
Longitude	148.35991
Slope:	1°
Aspect:	SW
Infrastructure:	ETL and access



General Site Description	
Landform	Gently undulating plain
Lithology	Sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	40%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box, sally wattle (<i>Acacia salicina</i>) and carbeen (<i>Corymbia tessellaris</i>). Sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), dead finish (<i>Archidendropsis basaltica</i>), poplar box, boonaree (<i>Alectryon oleifolius</i>) and scrub boonaree (<i>A. diversifolius</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant sabi grass (<i>Urochloa mosambicensis</i>), frequent shrub sida (<i>Sida rhombifolia</i>) and wiregrasses (<i>Aristida calycina</i> and <i>Aristida</i> sp.), and occasional golden beard grass (<i>Chrysopogon fallax</i>), hooky grass (<i>Ancistrachne uncinulata</i>), burr daisy (<i>Calotis cuneifolia</i>), cockatoo grass (<i>Alloteropsis semialata</i>), pitted blue grass (<i>Bothriochloa decipiens</i>) and tropical speedwell (<i>Evolvulus alsinoides</i>).
General Site Observations	Trees form the ecologically dominant stratum; mostly young community with scattered older trees; part of a riparian corridor approx. 0.5km wide with linkage to the Isaac River; recruitment is good; scattered rill erosion; stags present; fire scars absent.
Health	Good.

Survey Code

CQ32 (Flora)

Location

Moorvale

Date

9/06/2017

Latitude

-22.08335

Longitude

148.35862

Slope:

1°

Aspect:

S

Infrastructure:

ETL and access


General Site Description

Landform	Bank of watercourse transecting gently undulating plain
Lithology	Alluvial deposits; sandstone sediments
Soil	Sands
Height of ecologically dominant stratum	22 m
Crown cover	40%
Mapped RE	11.3.25
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with abundant river she-oak (<i>Casuarina cunninghamiana</i>), frequent carbeen (<i>Corymbia tessellaris</i>), and occasional Clarkson's bloodwood (<i>C. clarksoniana</i>). Very sparse sub-canopy of forest red gum, carbeen and ironwood (<i>Acacia excelsa</i>). Very sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>), lantana (<i>Lantana camara</i>), sandpaper fig (<i>Ficus opposita</i>) and bean tree (<i>Cassia brewsteri</i>). Ground layer dominated by Green panic (<i>Megathyrsus maximus</i>), with frequent long-leaved matrush (<i>Lomandra longifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with a range of canopy maturities; part of a riparian corridor approx. 0.5km wide with linkage to the Isaac River; good recruitment and good health; low erosion, but a mobile creek on alluvial sands with evidence of regular movement; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ33 (Flora)
Location	Moorvale
Date	9/06/2017
Latitude	-22.08366
Longitude	148.35711
Slope:	1°
Aspect:	S
Infrastructure:	ETL and access



General Site Description	
Landform	Gently undulating plain
Lithology	Sandstone sediments - alluvium
Soil	Sandy loam
Height of ecologically dominant stratum	14 m
Crown cover	20%
Mapped RE	11.9.5 / 11.9.1 / 11.9.2 (60 / 30 / 10)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with very sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box and carbeen (<i>Corymbia tessellaris</i>). Very sparse shrub layer of bean tree (<i>Cassia brewsteri</i>), sally wattle (<i>Acacia salicina</i>), boonaree (<i>Alectryon oleifolius</i>), white bauhinia (<i>Lysiphyllum hookeri</i>), and ironwood (<i>Acacia excelsa</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant wiregrass (<i>Aristida calycina</i>) and frequent golden beard grass (<i>Chrysopogon fallax</i>), pineapple daisy (<i>Pterocaulon redolens</i>), shrubby stylo (<i>Stylosanthes scabra</i>), <i>Waltheria indica</i> and flannel weed (<i>Sida cordifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; sparse community with numerous dead trees, possibly old treated country; part of a riparian corridor approx. 0.5km wide with linkage to the Isaac River; recruitment is poor; low erosion; large stags present; fire scars absent.
Health	Average.

Survey Code	CQ34 (Flora)
Location	Moorvale
Date	9/06/2017
Latitude	-22.06348
Longitude	148.36022
Slope:	1°
Aspect:	SW
Infrastructure:	ETL and access



General Site Description	
Landform	Bank of watercourse transecting gently undulating plain
Lithology	Alluvial and Quaternary deposits; sandstone sediments
Soil	Sands and light clays
Height of ecologically dominant stratum	17 m
Crown cover	30%
Mapped RE	11.4.9 / 11.5.3 (80 / 20)
Observed RE	11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with occasional carbeen (<i>Corymbia tessellaris</i>) and brigalow (<i>Acacia harpophylla</i>). Very sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>), yellowwood (<i>Terminalia oblongata</i>) and brigalow. Sparse to very sparse shrub layer of yellowwood, cassinia (<i>Elaeodendron australe</i>), cocaine tree (<i>Erythroxylum australe</i>), scrub boonaree (<i>Alectryon diversifolius</i>), narrow-leaved bumbil (<i>Capparis loranthifolia</i>), wild orange (<i>Capparis mitchellii</i>), currant bush (<i>Carissa ovata</i>) and whitewood (<i>Atalaya hemiglauc</i>). Ground layer dominated by Indian couch (<i>Bothriochloa pertusa</i>) and green panic (<i>Megathyrsus maximus</i>).
General Site Observations	Trees form the ecologically dominant stratum; a complex community with clay soil elements (land zone 4) as the southern boundary of riparian movement; a range of canopy tree maturities with good hollows; part of a riparian corridor approx. 150 m wide with linkage to the Isaac River; moderate recruitment and good health; active tunnel erosion in highly dispersible subsoils to west of creek line; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ35 (Flora)
Location	Moorvale
Date	9/06/2017
Latitude	-22.05499
Longitude	148.34910
Slope:	<1°
Aspect:	NW
Infrastructure:	ETL and access



General Site Description	
Landform	Level plain
Lithology	Sandstone sediments - alluvium
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	20%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with very sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box and vine tree (<i>Ventilago viminalis</i>). Very sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>), currant bush (<i>Carissa ovata</i>), false sandalwood (<i>Eremophila mitchellii</i>), nipan (<i>Capparis lasiantha</i>) and scrub boonaree (<i>Alectryon diversifolius</i>). Ground layer dominated by Buffel grass (<i>Cenchrus ciliaris</i>), Indian couch (<i>Bothriochloa pertusa</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; sparse community with old fire damage; part of a riparian corridor approx. 0.5 km wide with linkage to the Isaac River and a local block of remnant vegetation 2.5 km x 2.5 km; poor recruitment; eroding edges of the plain in this locality; small to medium stags present; fire scars evident.
Health	Poor.

Survey Code	CQ36 (Flora)
Location	Moorvale
Date	9/06/2017
Latitude	-22.05260
Longitude	148.35101
Slope:	1°
Aspect:	SW
Infrastructure:	ETL and access
General Site Description	
Landform	Bank of watercourse transecting gently undulating plain
Lithology	Alluvial deposits; sandstone sediments
Soil	Sand
Height of ecologically dominant stratum	23 m
Crown cover	30%
Mapped RE	11.3.25
Observed RE	11.3.25 Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines BVG 16a
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with abundant river she-oak (<i>Casuarina cunninghamiana</i>), occasional carbeen (<i>Corymbia tessellaris</i>) and poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of white bauhinia, bean tree (<i>Cassia brewsteri</i>), lantana (<i>Lantana camara</i>) and sandpaper fig (<i>Ficus opposita</i>). Ground layer dominated by green panic (<i>Megathyrsus maximus</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with a range of canopy tree maturities, with good hollows; part of a riparian corridor approx. 0.5 km wide, with linkage to the Isaac River and a local block of remnant vegetation 2.5 km x 2.5 km; moderate recruitment and good health; semi-permanent waterbody with downstream sandstone bar; upstream barrier comprising granite boulder crossing with small flume pipes, being the road crossing to Daunia granite quarry; lantana prominent within the shrub layer; no dieback detected; fire scars absent.
Health	Good.



Survey Code CQ37 (Flora)	
Location Moorvale	
Date 10/06/2017	
Latitude -22.00054	
Longitude 148.31614	
Slope: 1°	
Aspect: W	
Infrastructure: ETL	
General Site Description	
Landform	Plain
Lithology	Cainozoic; sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	20 m
Crown cover	15%
Mapped RE	11.3.2 / 11.3.1 (95/5)
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with very sparse canopy of Dawson gum (<i>Eucalyptus cambageana</i>) and sparse sub-canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional yellowwood (<i>Terminalia oblongata</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>), nipan (<i>Capparis lasiantha</i>), vine tree (<i>Ventilago viminalis</i>) and yellowwood. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent Wiregrass (<i>Aristida jerichoensis</i>), and occasional sabi grass (<i>Urochloa mosambicensis</i>), hooky grass (<i>Ancistrachne uncinulata</i>), windmill grass (<i>Enteropogon acicularis</i>), spiked sida (<i>Sida hackettiana</i>), brigalow grass (<i>Paspalidium caespitosum</i>), flannel weed (<i>Abutilon oxycarpum</i>), fairy grass (<i>Sporobolus caroli</i>) and <i>Maireana microphylla</i> .
General Site Observations	Trees form the ecologically dominant stratum; a patchy community with grassy open areas; part of a riparian corridor approx. 1.5 km wide with linkage to the Isaac River; moderate recruitment and good health; no dieback detected; fire scars absent.
TEC status	<u>Not</u> a TEC. Poor structure in parts; high levels of exotic species in groundcover.
Health	Good.

Survey Code	CQ38 (Flora)
Location	Moorvale
Date	10/06/2017
Latitude	-21.99964
Longitude	148.30980
Slope:	<1°
Aspect:	W
Infrastructure:	ETL



General Site Description	
Landform	Level plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	20 m
Crown cover	15%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.7 <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with a sparse canopy dominated by carbeen (<i>Corymbia tessellaris</i>) and Clarkson's bloodwood (<i>C. clarksoniana</i>), with abundant narrow-leaved ironbark (<i>Eucalyptus crebra</i>). Very sparse sub-canopy of carbeen, narrow-leaved ironbark and Clarkson's bloodwood. Very sparse shrub layer of carbeen and narrow-leaved ironbark. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional wiregrass (<i>Aristida calycina</i>), curly windmill grass (<i>Enteropogon ramosus</i>), Paddy's Lucerne (<i>Sida rhombifolia</i>), yellow buttons (<i>Chrysocephalum apiculatum</i>), golden beard grass (<i>Chrysopogon fallax</i>) and yellow rattlepod (<i>Crotalaria mitchellii</i>).
General Site Observations	Trees form the ecologically dominant stratum; a young community with some mature larger trees; part of a riparian corridor approx. 1.5 km wide, with linkage to the Isaac River; good recruitment; no dieback detected; fire scars absent.
Health	Good.

Survey Code	CQ39 (Flora)
Location	Moorvale
Date	10/06/2017
Latitude	-21.99931
Longitude	148.30542
Slope:	<1°
Aspect:	S
Infrastructure:	ETL



General Site Description	
Landform	Level plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.1 / 11.3.25 (90 / 5 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box, ironwood (<i>Acacia excelsa</i>) and bean tree (<i>Cassia brewsteri</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and bean tree. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional black spear grass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida</i> sp.), shrub sida (<i>Sida rohlenae</i>) and dysentery plant (<i>Grewia retusifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with numerous mature larger trees; part of a riparian corridor approx. 1.5km wide with linkage to the Isaac River; good recruitment; no dieback detected; fire scars absent.
Health	Good.

Survey Code CQ40 (Flora)	
Location Moorvale	
Date 10/06/2017	
Latitude -21.98639	
Longitude 148.28738	
Slope: 2°	
Aspect: SE	
Infrastructure: ETL	
General Site Description	
Landform	Gently undulating plain
Lithology	Sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	45%
Mapped RE	11.4.2
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse to mid-dense canopy of poplar box (<i>Eucalyptus populnea</i>), with a very sparse sub-canopy of poplar box, ironwood (<i>Acacia excelsa</i>), bean tree (<i>Cassia brewsteri</i>), scrub leopardwood (<i>Flindersia dissosperma</i>) and false sandalwood (<i>Eremophila mitchellii</i>). Very sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), vine tree (<i>Ventilago viminalis</i>), bean tree and currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant Paddy's lucerne (<i>Sida rhombifolia</i>), frequent curly windmill grass (<i>Enteropogon ramosus</i>), and occasional cockatoo grass (<i>Alloteropsis semialata</i>), shrubby stylo (<i>Stylosanthes scabra</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), <i>Waltheria indica</i> , conetop nineawn (<i>Enneapogon lindleyanus</i>), golden beard grass (<i>Chrysopogon fallax</i>), chaff weed (<i>Achyranthes aspera</i>) and hairy panic (<i>Panicum effusum</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with scattered larger, mature trees; a disconnected patch 0.6 km wide with narrow linkage to riparian corridor to the east; good recruitment; no dieback detected; fire scars absent.
Health	Good.

Survey Code CQ41 (Flora)	
Location Wynette	
Date 26/09/2017	
Latitude -22.15987	
Longitude 148.31131	
Slope: 1-2°	
Aspect: E	
Infrastructure: Rail spur / WP	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	13 m
Crown cover	25%
Mapped RE	11.4.9
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest with a sparse canopy of Brigalow (<i>Acacia harpophylla</i>), coolabah (<i>Eucalyptus coolabah</i>), yellowwood (<i>Terminalia oblongata</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Very sparse shrub layer containing yellowwood, scrub boonaree (<i>Alectryon diversifolius</i>), wilga (<i>Geijera parviflora</i>) and sandalwood (<i>Santalum lanceolatum</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent canegrass (<i>Leptochloa digitata</i>) and curly windmill grass (<i>Enteropogon acicularis</i>).
General Site Observations	Trees form the ecologically dominant stratum; sparse community that has suffered edge effect disturbance from fire and exotic species incursion; tenuous linkage to the Isaac River corridor; moderate recruitment; some gully and bank erosion; fire scarring low.
TEC status	Not a TEC due to high exotic plant cover in the ground stratum.
Health	Average.

Survey Code Q42 (Flora)	
Location Winchester Downs	
Date 26/09/2017	
Latitude -22.14381	
Longitude 148.29625	
Slope: <1°	
Aspect: S	
Infrastructure Rail spur / WP	
General Site Description	
Landform	Level plain
Lithology	Alluvium – clays and sands
Soil	Light clays
Height of ecologically dominant stratum	Median height 21 m
Crown cover	40%
Formation	
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.27f - Palustrine wetland, <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by coolabah (<i>Eucalyptus coolabah</i>), with frequent forest red gum (<i>E. tereticornis</i>), carbeen (<i>Corymbia tessellaris</i>) and Dallachy's gum (<i>C. dallachiana</i>). Very sparse sub-canopy at 12 m, reflective of the canopy species. Sparse shrub layer of bean tree (<i>Cassia brewsteri</i>) and sally wattle (<i>Acacia salicina</i>), with occasional lantana (<i>Lantana camara</i>). Ground layer dominated by forest bluegrass (<i>Bothriochloa bladhii</i>), common rush (<i>Juncus usitatus</i>), clustered lovegrass (<i>Eragrostis elongata</i>) and white eclipta (<i>Eclipta prostrata</i>).
General Site Observations	Flood channel that periodically floods; trees form the ecologically dominant stratum; healthy wetland community with good recruitment; vegetation unit is part of the Isaac River riparian corridor, where the vegetated corridor is approximately 2 km wide at this point; no erosion detected; some old dieback evident.
Health	Good.

Survey Code CQ43 (Flora)	
Location Winchester Downs	
Date 26/09/2017	
Latitude -22.14418	
Longitude 148.29590	
Slope: <1°	
Aspect: S	
Infrastructure: Rail corridor / WP	
General Site Description	
Landform	Level plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional carbeen (<i>Corymbia tessellaris</i>), Dallachy's gum (<i>C. dallachiana</i>) and Clarkson's bloodwood (<i>C. clarksoniana</i>). Sparse sub-canopy of sally wattle (<i>Acacia salicina</i>), boonaree (<i>Alectryon oleifolius</i>), Dallachy's gum and bean tree (<i>Cassia brewsteri</i>). Very sparse shrub layer of dysentery bush (<i>Grewia retusifolia</i>), lantana (<i>Lantana camara</i>) and bean tree. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent black speargrass (<i>Heteropogon contortus</i>), wiregrass (<i>Aristida sp.</i>), Paddy's Lucerne (<i>Sida rhombifolia</i>), barbed wire grass (<i>Cymbopogon refractus</i>) and forest blue grass (<i>Bothriochloa bladhii</i>).
General Site Observations	Trees form the ecologically dominant stratum; part of the Isaac River riparian corridor approx. 2 km wide; good recruitment; no dieback detected; no fire scars evident.
Health	Good.

Survey Code CQ44 (Flora)	
Location Winchester Downs	
Date 26/09/2017	
Latitude -22.14123	
Longitude 148.29309	
Slope: <1°	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sediments
Soil	Light clay; alluvium
Height of ecologically dominant stratum	11 m
Crown cover	45%
Mapped RE	11.3.27b
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest dominated by sparse canopy of brigalow (<i>Acacia harpophylla</i>) with occasional coolabah (<i>Eucalyptus coolabah</i>). Very sparse sub-canopy of brigalow. Shrub layer non-existent. Ground layer contains mostly aquatic species, dominated by brown beetle grass (<i>Diplachne fusca</i> var. <i>fusca</i>), with occasional rigid panic (<i>Walwhalleya proluta</i>), musk basil (<i>Basilicum polystachion</i>), spike rushes (<i>Eleocharis plana</i> and <i>Eleocharis</i> sp.) and wavy marshwort (<i>Nymphoides crenata</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy community that is periodically inundated, being located on the edge of a palustrine wetland; part of the Isaac River corridor approx. 2km wide at this point; moderate recruitment; low exotic species.
TEC status	This is a TEC. Meets minimum thresholds for patch size and species composition.
Health	Good.

Survey Code CQ45 (Flora)	
Location Winchester Downs	
Date 26/09/2017	
Latitude -22.12471	
Longitude 148.27298	
Slope: 1-2°	
Aspect: E	
Infrastructure: Rail corridor	
General Site Description	
Landform	Drainage line transecting gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	14 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest with a sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional coolabah (<i>Eucalyptus coolabah</i>), yellowwood (<i>Terminalia oblongata</i>) and Dallachy's gum (<i>Corymbia dallachiana</i>). Very sparse sub-canopy of yellowwood and red bauhinia (<i>Lysiphyllum carronii</i>). Sparse shrub layer of red bauhinia and bean tree (<i>Cassia brewsteri</i>). Ground layer contains dominated by green panic (<i>Megathyrsus maximus</i>), with frequent parthenium (<i>Parthenium hysterophorus</i>), sabi grass (<i>Urochloa mosambicensis</i>), Noogoora burr (<i>Xanthium occidentale</i>) and curly bluegrass (<i>Dichanthium fecundum</i>).
General Site Observations	Trees form the ecologically dominant stratum; a patchy linear community which is suffering from edge effects; part of the Isaac River corridor over 2 km wide at this point; moderate recruitment; high abundance of exotic species, likely ecotone with elements of 11.3.1 and 11.3.7.
TEC status	Not a TEC. Exceeds the threshold for exotic plant cover.
Health	Average.

Survey Code	CQ46 (Flora)	
Location	Winchester Downs	
Date	26/09/2017	
Latitude	-22.12398	
Longitude	148.27299	
Slope:	1-2°	
Aspect:	SE	
Infrastructure:	Rail corridor	
General Site Description		
Landform	Gently undulating plain	
Lithology	Fine sediments	
Soil	Light clay	
Height of ecologically dominant stratum	0 m	
Crown cover	0%	
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)	
Observed RE	Recently cleared	
Biodiversity Status	-	
Dominant vegetation observed	Cleared recently, with brigalow (<i>Acacia harpophylla</i>), yellowwood (<i>Terminalia oblongata</i>) and red bauhinia (<i>Lysiphyllum carronii</i>) small trees (suckers) evident in the debris.	
General Site Observations	Likely regrowth of previous clearing that has been re-treated.	
Health	Degraded.	

Survey Code CQ47 (Flora)	
Location Winchester Downs	
Date 26/09/2017	
Latitude -22.12054	
Longitude 148.27409	
Slope: <1°	
Aspect: S	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	19 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional sally wattle (<i>Acacia salicina</i>) and ironwood (<i>A. excelsa</i>). Very sparse sub-canopy of sally wattle, poplar box and ironwood. Very sparse shrub layer of sally wattle, poplar box, bean tree (<i>Cassia brewsteri</i>) and lolly bush (<i>Clerodendrum</i> sp.). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional red Natal grass (<i>Melinis repens</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and velvety tree pear (<i>Opuntia tomentosa</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy mature community; part of the Isaac River riparian corridor approx. 2 km wide; good recruitment; no dieback detected; no fire scars detected; high exotic ground cover.
Health	Good.

Survey Code CQ48 (Flora)	
Location Moorvale Mine Rd	
Date 27/09/2017	
Latitude -22.00384	
Longitude 148.33431	
Slope: 1-2°	
Aspect: S	
Infrastructure: Access road option	
General Site Description	
Landform	Gently undulating plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Sparse sub-canopy of poplar box, vine tree (<i>Ventilago viminalis</i>), bean tree (<i>Cassia brewsteri</i>) and belah (<i>Casuarina cristata</i>). Very sparse shrub layer of sally wattle (<i>Acacia salicina</i>), ironwood (<i>A. excelsa</i>), false sandalwood (<i>Eremophila mitchellii</i>), nipan (<i>Capparis lasiantha</i>) and lime bush (<i>Citrus glauca</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy mature community; small patch approx. 1.3 km x 0.5 km in a fragmented area; moderate recruitment; no dieback detected; no fire scars detected, mostly native grasses.
Health	Good.

Survey Code CQ49 (Flora)	
Location Moorvale Mine Rd	
Date 27/09/2017	
Latitude -22.00567	
Longitude 148.34911	
Slope: 1-2°	
Aspect: S	
Infrastructure: Access road option	
General Site Description	
Landform	Drainage depression on gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	11 m
Crown cover	15%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest with very sparse canopy of poplar box (<i>Eucalyptus populnea</i>), brigalow (<i>Acacia harpophylla</i>), Dallachy's gum (<i>Corymbia dallachiana</i>), carbeen (<i>C. tessellaris</i>) and yellowwood (<i>Terminalia oblongata</i>). Sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>) and native olive (<i>Notelaea microcarpa</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), brigalow, mimosa (<i>Vachellia farnesiana</i>) and acalypha (<i>Acalypha eremorum</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; a patchy linear community which is suffering from edge effects; the vegetation present is likely to be ecotonal and containing elements of 11.3.1 and 11.3.2; moderate recruitment; high abundance of exotic species.
TEC status	Not a TEC, as it exceeds the threshold for exotic plant cover.
Health	Average.

Survey Code CQ50 (Flora)	
Location Daunia Road	
Date 27/09/2017	
Latitude -22.02058	
Longitude 148.33667	
Slope: 1-2°	
Aspect: SE	
Infrastructure: Access road option	
General Site Description	
Landform	Gently undulating plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box and bean tree (<i>Cassia brewsteri</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>) and bean tree. Ground layer species include wiregrass (<i>Aristida calycina</i>), Paddy's lucerne (<i>Sida rhombifolia</i>), <i>Enneapogon</i> sp., black speargrass (<i>Heteropogon contortus</i>), buffel grass (<i>Cenchrus ciliaris</i>) and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy community of mostly mid age trees; narrow linear patch which links to the riparian corridor but is fragmented by roads and other farming, moderate recruitment; no dieback detected; no fire scars detected; groundcover mostly native grasses.
Health	Good.

Survey Code CQ51 (Flora)	
Location Daunia Road	
Date 27/09/2017	
Latitude -22.02732	
Longitude 148.34369	
Slope: 1-2°	
Aspect: SW	
Infrastructure: Access road option	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	11 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional Dawson gum (<i>Eucalyptus cambageana</i>) and yellowwood (<i>Terminalia oblongata</i>). Very sparse sub-canopy of brigalow, yellowwood, sandalwood (<i>Santalum lanceolatum</i>) and false sandalwood (<i>Eremophila mitchellii</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), brigalow, warrior bush (<i>Apophyllum anomalum</i>) and desert jasmine (<i>Jasminum didymum</i> subsp. <i>lineare</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; a patchy linear community which is suffering from edge effects; the vegetation is only a small patch of 11.3.1 sandwiched between 11.3.2 and confined to a minor watercourse; low / moderate recruitment; high abundance of exotic species.
TEC status	Not a TEC – Exceeds the threshold for exotic plant cover.
Health	Average.

Survey Code CQ52 (Flora)	
Location Daunia Road	
Date 27/09/2017	
Latitude -22.03149	
Longitude 148.34897	
Slope: 1-2°	
Aspect: SW	
Infrastructure: Access road option	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sediments
Soil	Light clay
Height of ecologically dominant stratum	12 m
Crown cover	20%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.1 <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open forest with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional poplar box (<i>Eucalyptus populnea</i>). Sparse sub-canopy of white bauhinia (<i>Lysiphyllum hookeri</i>), false sandalwood (<i>Eremophila mitchellii</i>) and narrow-leaf bumbil (<i>Capparis loranthifolia</i>). Sparse shrub layer of currant bush (<i>Carissa ovata</i>), wombat berry (<i>Eustrephus latifolius</i>), whitewood (<i>Atalaya hemiglauc</i>), white bauhinia, bean tree (<i>Cassia brewsteri</i>) and shiny-leaved canthium (<i>Psydrax odorata</i> subsp. <i>buxifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent hooky grass (<i>Ancistrachne uncinulata</i>), wiregrass (<i>Aristida</i> sp.), windmill grasses (<i>Enteropogon acicularis</i> and <i>E. ramosus</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; a patchy linear community which is suffering from edge effects; the vegetation is only a small patch of 11.3.1 sandwiched in between 11.3.2 and confined to roadside vegetation; poor recruitment; moderate to high exotic species.
TEC status	Not a TEC – Patch size small and exceeds the threshold for exotic plant cover.
Health	Average.

Survey Code CQ53 (Flora)	
Location Daunia Road	
Date 27/09/2017	
Latitude -22.03274	
Longitude 148.34926	
Slope: 1-2°	
Aspect: S	
Infrastructure: Access road option	
General Site Description	
Landform	Gently undulating plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	13 m
Crown cover	35%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer including cocaine tree (<i>Erythroxylum australe</i>), bean tree (<i>Cassia brewsteri</i>), currant bush (<i>Carissa ovata</i>), dead finish (<i>Archidendropsis basaltica</i>) and wilga (<i>Geijera parviflora</i>). Ground layer dominated by wiregrass (<i>Aristida calycina</i>), with frequent Paddy's lucerne (<i>Sida rhombifolia</i>), buffel grass (<i>Cenchrus ciliaris</i>), windmill grass (<i>Enteropogon ramosus</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy community at this point, though progressively deteriorates to the south; narrow linear patch which links to the riparian corridor but has been damaged by fire, moderate recruitment; fire scars evident on dead trees.
Health	Good.

Survey Code CQ54 (Flora)	
Location Iffley	
Date 28/09/2017	
Latitude -22.22033	
Longitude 148.35092	
Slope: 1°	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Old weathered coarse sediments
Soil	Sand
Height of ecologically dominant stratum	14 m
Crown cover	40%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.5.9 <i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by narrow-leaved ironbark (<i>Eucalyptus crebra</i>), with occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and poplar box (<i>Eucalyptus populnea</i>). Sparse sub-canopy of prickly pine (<i>Bursaria incana</i>), red ash (<i>Alphitonia excelsa</i>) and quinine tree (<i>Petalostigma pubescens</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), bean tree (<i>Cassia brewsteri</i>) and lolly bush (<i>Clerodendrum</i> sp.). Ground layer includes wiregrass (<i>Aristida calycina</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), forest bluegrass (<i>Bothriochloa bladhii</i>), black speargrass (<i>Heteropogon contortus</i>) and golden beard grass (<i>Chrysopogon fallax</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch but the area has been fragmented by strip clearing; good recruitment; no fire scars evident; some natural dieback; native grasses.
Health	Good.

Survey Code CQ55 (Flora)	
Location Iffley	
Date 28/09/2017	
Latitude -22.21985	
Longitude 148.35257	
Slope: 1°	
Aspect: SE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	16 m
Crown cover	35%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional narrow-leaved ironbark (<i>Eucalyptus crebra</i>). Very sparse sub-canopy of poplar box, red ash (<i>Alphitonia excelsa</i>), quinine tree (<i>Petalostigma pubescens</i>), vine tree (<i>Ventilago viminalis</i>), bean tree (<i>Cassia brewsteri</i>), silver oak (<i>Grevillea parallela</i>) and emu apple (<i>Owenia acidula</i>). Sparse shrub layer of bean tree, dead finish (<i>Archidendropsis basaltica</i>), native pomegranate (<i>Capparis arborea</i>), water bush (<i>Myoporum acuminatum</i>), boonaree (<i>Alectryon oleifolius</i>), scrub boonaree (<i>A. diversifolius</i>) and lolly bush (<i>Clerodendrum</i> sp.). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional wiregrass (<i>Aristida calycina</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), black speargrass (<i>Heteropogon contortus</i>), barbed wire grass (<i>Cymbopogon refractus</i>) and red Natal grass (<i>Melinis repens</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch but the area has been fragmented by strip clearing; good recruitment; no fire scars evident; mostly exotic grasses.
Health	Good.

Survey Code RCQ1 (Flora)	
Location Winchester Downs	
Date 14/11/2017	
Latitude -22.12372	
Longitude 148.16667	
Slope: 1°	
Aspect: SE	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	18 m
Crown cover	35%
Mapped RE	11.4.8
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional carbeen (<i>Corymbia tessellaris</i>). Very sparse sub-canopy of poplar box and sally wattle (<i>Acacia salicina</i>). Sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), currant bush (<i>Carissa ovata</i>), broad-leaved wilga (<i>Geijera salicifolia</i>), cocaine tree (<i>Erythroxylum australe</i>), sally wattle and northern silk pod (<i>Parsonsia lanceolata</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional velvet hibiscus (<i>Melhania oblongifolia</i>), climbing saltbush (<i>Einadia nutans</i>), flaxleaf fleabane (<i>Conyza bonariensis</i>), parthenium (<i>Parthenium hysterophorus</i>), golden beard grass (<i>Chrysopogon fallax</i>), blue spade flower (<i>Hybanthus enneaspermus</i>), bluebells (<i>Wahlenbergia</i> sp.), <i>Spermacoce brachystema</i> , <i>Cyperus</i> sp., shrub sida (<i>Sida rohlenae</i>) and Paddy's Lucerne (<i>Sida rhombifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch, despite the area having been fragmented by clearing; good recruitment; no fire scars evident; mostly exotic grasses.
Health	Good.

Survey Code RCQ2 (Flora)	
Location Winchester Downs	
Date 14/11/2017	
Latitude -22.12387	
Longitude 148.16759	
Slope: 1°	
Aspect: S	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	18 m
Crown cover	30%
Mapped RE	11.5.3
Observed RE	11.5.3 <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional carbeen (<i>Corymbia tessellaris</i>) and forest red gum (<i>Eucalyptus tereticornis</i>). Very sparse sub-canopy of poplar box, carbeen, forest red gum and sally wattle (<i>Acacia salicina</i>). Sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), wilga (<i>Geijera parviflora</i>), bean tree (<i>Cassia brewsteri</i>) and sally wattle. Ground cover dominated by Buffel grass (<i>Cenchrus ciliaris</i>), with occasional flaxleaf fleabane (<i>Conyza bonariensis</i>), blue spade flower (<i>Hybanthus enneaspermus</i>), <i>Cyperus conicus</i> , Paddy's lucerne (<i>Sida rhombifolia</i>), green panic (<i>Megathyrsus maximus</i>), flannel weed (<i>Sida cordifolia</i>), sleepy morning (<i>Waltheria indica</i>), black speargrass (<i>Heteropogon contortus</i>), coat buttons (<i>Tridax procumbens</i>), rattlepod (<i>Crotalaria mitchellii</i>) and milk thistle (<i>Sonchus oleraceus</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch, but adjacent to a clearing; good recruitment; no fire scars evident; mostly exotic grasses, shallow drainage linking to nearby Cherwell Creek.
Health	Good.

Survey Code	
RCQ3 (Flora)	
Location	
Winchester Downs	
Date	
14/11/2017	
Latitude	
-22.12178	
Longitude	
148.17227	
Slope:	
1-2°	
Aspect:	
SE	
Infrastructure:	
Water pipeline	
General Site Description	
Landform	Gently undulating plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	-
Crown cover	0%
Mapped RE	11.5.3
Observed RE	Non-remnant
Biodiversity Status	-
Dominant vegetation observed	No canopy or sub-canopy present. Sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), currant bush (<i>Carissa ovata</i>), stiff denhamia (<i>Denhamia oleaster</i>), whitewood (<i>Atalaya hemiglauc</i>), boonaree (<i>Alectryon oleifolius</i>) and desert jasmine (<i>Jasminum didymum</i> subsp. <i>lineare</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional red Natal grass (<i>Melinis repens</i>), sabi grass (<i>Urochloa mosambicensis</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), yellow burr daisy (<i>Calotis lappulacea</i>), kangaroo grass (<i>Themeda triandra</i>), curly bluegrass (<i>Dichanthium fecundum</i>), rough fuzzweed (<i>Vittadinia pustula</i>), hairy panic (<i>Panicum effusum</i>) and rhynco (<i>Rhynchosia minima</i>).
General Site Observations	Trees have all been killed; no obvious fire scars evident; mostly exotic grasses.
Health	Poor.

Survey Code RCQ4 (Flora)	
Location Winchester Downs	
Date 14/11/2017	
Latitude -22.12157	
Longitude 148.173926	
Slope: <1°	
Aspect: NNE	
Infrastructure: Water pipeline	
General Site Description	
Landform	Watercourse; creek
Lithology	Alluvial sediments
Soil	Sand
Height of ecologically dominant stratum	21 m
Crown cover	40%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Riparian woodland with sparse canopy of forest red gum (<i>Eucalyptus tereticornis</i>), river she-oak (<i>Casuarina cunninghamiana</i>), river tea tree (<i>Melaleuca fluviatilis</i>), carbeen (<i>Corymbia tessellaris</i>) and Dallachy's gum (<i>Corymbia dallachiana</i>). Very sparse sub-canopy of river she-oak, black tea tree (<i>Melaleuca bracteata</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Sparse shrub layer of sandpaper fig (<i>Ficus opposita</i>), black tea tree and white bauhinia. Ground layer dominated by exotic species and consists of green panic (<i>Megathyrsus maximus</i>), Paddy's lucerne (<i>Sida rhombifolia</i>), buffel grass (<i>Cenchrus ciliaris</i>), flannel weed (<i>Sida cordifolia</i>), cobbler's pegs (<i>Bidens pilosa</i>), parthenium (<i>Parthenium hysterophorus</i>), flaxleaf fleabane (<i>Conyza bonariensis</i>), tropical girdlepod (<i>Mitracarpus hirtus</i>) and grey crown-beard (<i>Verbesina encelioides</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with some hollows; the narrow riparian strip is within a larger mapped area of remnant vegetation, but significant historical disturbance has occurred and parts adjacent would be considered non-remnant; moderate recruitment; normal watercourse erosion, no dieback detected; fire scars not detected.
Health	Good.

Survey Code RCQ5 (Flora)	
Location Winchester Downs	
Date 14/11/2017	
Latitude -22.12046	
Longitude 148.17633	
Slope: <1°	
Aspect: S	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Alluvium; sandstone sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	5%
Mapped RE	11.3.4 / 11.3.7 (50 / 50)
Observed RE	Non-remnant
Biodiversity Status	-
Dominant vegetation observed	Primarily cleared, with a very sparse canopy of carbeen (<i>Corymbia tessellaris</i>), Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and poplar box (<i>Eucalyptus populnea</i>). No sub-canopy or shrub layer. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant bluebells (<i>Wahlenbergia</i> sp.) and frequent yellow rattlepod (<i>Crotalaria mitchellii</i>), woolly glycine (<i>Glycine tomentosa</i>) and purple burr daisy (<i>Calotis cuneifolia</i>).
General Site Observations	This area has been largely cleared with extremely sparse canopy retained or regrown; roughly only 20% of the benchmark canopy cover for this community; poor recruitment; old pushed tree trunks on the ground; high exotic ground cover.
Health	Poor.

Survey Code RCQ6 (Flora)	
Location Winchester Downs	
Date 14/11/2017	
Latitude -22.11933	
Longitude 148.17969	
Slope: <1°	
Aspect:	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Alluvium
Soil	Loam
Height of ecologically dominant stratum	17 m
Crown cover	20%
Mapped RE	11.5.3 / 11.3.2 (60 / 40)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional carbeen (<i>Corymbia tessellaris</i>). Very sparse sub canopy of poplar box and sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer of poplar box, sally wattle and red bauhinia (<i>Lysiphyllum carronii</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent Paddy's lucerne (<i>Sida rhombifolia</i>) and occasional velvet hibiscus (<i>Melhania oblongifolia</i>), sleepy morning (<i>Waltheria indica</i>), blue burr daisy (<i>Calotis cuneifolia</i>) and tropical sensitive pea (<i>Chamaecrista absus</i>).
General Site Observations	Trees form the ecologically dominant stratum; mostly younger trees with few hollows; part of a relatively narrow vegetated corridor following Cherwell Creek of which parts have been cleared but not reflected in the vegetation mapping; moderate level of historical disturbance; close to Winchester Downs homestead; moderate recruitment; low erosion; no dieback detected; no fire scars detected.
Health	Average.

Survey Code	RCQ7 (Flora)
Location	Winchester Downs
Date	14/11/2017
Latitude	-22.117811
Longitude	148.192413
Slope:	1-2°
Aspect:	S
Infrastructure:	Water pipeline
General Site Description	
Landform	Gently undulating plain
Lithology	Cainozoic sediments
Soil	Sandy loam
Height of ecologically dominant stratum	15 m
Crown cover	30%
Mapped RE	11.5.3 / 11.3.2 (60 / 40)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with frequent carbeen (<i>Corymbia tessellaris</i>), and occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and sally wattle (<i>Acacia salicina</i>). Very sparse sub-canopy of false sandalwood (<i>Eremophila mitchellii</i>), wilga (<i>Geijera parviflora</i>) and whitewood (<i>Atalaya hemiglauca</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), cocaine tree (<i>Erythroxylum australe</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent rattlepod (<i>Crotalaria medicaginea</i>), shrub sida (<i>Sida rohlenae</i>), spermacoce (<i>Spermacoce brachystema</i>) and lilac tasselflower (<i>Emilia sonchifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch and part of linear intact vegetation corridor of Cherwell Creek; good recruitment; mostly exotic grasses; very narrow tip of a larger geological component running to the south west; Deep gully erosion (natural process) to the south of this point.
Health	Good.



Survey Code	RCQ8 (Flora)
Location	Winchester Downs
Date	14/11/2017
Latitude	-22.11776
Longitude	148.19356
Slope:	1°
Aspect:	W
Infrastructure:	Water pipeline
General Site Description	
Landform	Flood out closed depression
Lithology	Alluvial sediments
Soil	Sand
Height of ecologically dominant stratum	21 m
Crown cover	30%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Riparian woodland with sparse canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with occasional carbeen (<i>Corymbia tessellaris</i>) and poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of sally wattle (<i>Acacia salicina</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Very sparse shrub layer of sally wattle, white bauhinia and bean tree (<i>Cassia brewsteri</i>). Ground layer contains Juncus (<i>Juncus usitatus</i>), Indian couch (<i>Bothriochloa pertusa</i>), Paddy's lucerne (<i>Sida rhombifolia</i>), western nut grass (<i>Cyperus bifax</i>), Noogoora burr (<i>Xanthium occidentale</i>), silky browntop (<i>Eulalia aurea</i>) and musk basil (<i>Basilicum polystachyon</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with some hollows, but mostly young trees; part of a flood out closed depression that likely fills when Cherwell Creek floods; dieback observed; moderate recruitment; no fire scars detected.
Health	Good.



Survey Code RCQ9 (Flora)	
Location Winchester Downs	
Date 15/11/2017	
Latitude -22.11775	
Longitude 148.19742	
Slope: 1°	
Aspect: NW	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy loam
Height of ecologically dominant stratum	17 m
Crown cover	35%
Mapped RE	11.5.3 / 11.4.9
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of poplar box, white bauhinia (<i>Lysiphyllum hookeri</i>), sally wattle (<i>Acacia salicina</i>) and native peach (<i>Ehretia membranifolia</i>). Very sparse shrub layer of sally wattle, native peach, cocaine tree (<i>Erythroxylum australe</i>) and dead finish (<i>Archidendropsis basaltica</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>) with frequent rattlepod (<i>Crotalaria medicaginea</i>) and shrub sida (<i>Sida rohlenae</i>) and occasional spermacoce (<i>Spermacoce brachystema</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), snail flower (<i>Galactia tenuiflora</i>), purple wiregrass (<i>Aristida ramosa</i>), shrubby stylo (<i>Stylosanthes scabra</i>) and rough fuzzweed (<i>Vittadinia pustula</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy patch and part of linear intact vegetation corridor adjacent to Cherwell Creek, that runs through to the Isaac River; moderate recruitment; mostly exotic grasses; no dieback detected; no fire scars detected.
Health	Good.

Survey Code RCQ10 (Flora)	
Location Winchester Downs	
Date 15/11/2017	
Latitude -22.11822	
Longitude 148.20564	
Slope: 1°	
Aspect: NW	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy loam
Height of ecologically dominant stratum	16 m
Crown cover	20%
Mapped RE	11.5.3 / 11.4.9
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>), carbeen (<i>Corymbia tessellaris</i>) and Clarkson's bloodwood (<i>Corymbia clarksoniana</i>). Very sparse sub-canopy of poplar box. Sparse shrub layer of currant bush (<i>Carissa ovata</i>), sally wattle (<i>Acacia salicina</i>) and dead finish (<i>Archidendropsis basaltica</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent shrub sida (<i>Sida rohlenae</i>) and parthenium (<i>Parthenium hysterophorus</i>) and occasional <i>Glycine</i> sp., bluebell (<i>Wahlenbergia gracilis</i>), austral bugle (<i>Ajuga australis</i>), woolly glycine (<i>Glycine tomentella</i>), vernonia (<i>Cyanthillium cinereum</i>), harrisia cactus (<i>Harrisia martinii</i>) and pineapple daisy (<i>Pterocaulon redolens</i>).
General Site Observations	Trees form the ecologically dominant stratum; small patch surrounded by clearing; moderate recruitment; mostly exotic grasses, significant dieback evidenced by more dead trunks than live trunks; no fire scars observed, but it's possible these trees might have been killed by fires from adjacent clearing; if there had been evidence of chemical treatment, this patch would have been mapped as non-remnant.
Health	Poor.

Survey Code	RCQ11 (Flora)
Location	Winchester Downs
Date	16/11/2017
Latitude	-22.11950
Longitude	148.22017
Slope:	<1°
Aspect:	E
Infrastructure:	Water pipeline
General Site Description	
Landform	Level plain
Lithology	Fine sandstone sediments
Soil	Light clay with moderate gilgai
Height of ecologically dominant stratum	14 m
Crown cover	35%
Mapped RE	11.4.9
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>) and belah (<i>Casuarina cristata</i>), with occasional yellowwood (<i>Terminalia oblongata</i>) and poplar box (<i>E. populnea</i>). Sparse to very sparse sub-canopy of brigalow, red bauhinia (<i>Lysiphyllum carronii</i>) and belah. Sparse shrub layer containing currant bush (<i>Carissa ovata</i>), poison peach (<i>Ehretia membranifolia</i>) and red bauhinia. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent Paddy's lucerne (<i>Sida rhombifolia</i>), sabi grass (<i>Urochloa mosambicensis</i>), shrub sida (<i>Sida rohlenae</i>), harrisia (<i>Harrisia martinii</i>) and parthenium (<i>Parthenium hysterophorus</i>).
General Site Observations	Trees form the ecologically dominant stratum; a very narrow strip of remnant vegetation which was not cleared with adjacent brigalow; low recruitment; fire scarring not obvious.
TEC status	Not a TEC – Relatively small patch size combined with ground cover dominated by exotic species.
Health	Poor.



Survey Code RCQ12 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.11839	
Longitude 148.22416	
Slope: <1°	
Aspect: E	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Alluvial sands
Soil	Sandy loam
Height of ecologically dominant stratum	20 m
Crown cover	40%
Mapped RE	11.5.3 / 11.4.9 (90 / 10)
Observed RE	11.3.4 – <i>Eucalyptus tereticornis</i> and / or <i>Eucalyptus</i> spp. woodland on alluvial plains. (BVG 16c)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with abundant carbeen (<i>Corymbia tessellaris</i>) and occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of carbeen and sally wattle (<i>Acacia salicina</i>). Very sparse shrub layer containing currant bush (<i>Carissa ovata</i>), carbeen, sally wattle and scrub boonaree (<i>Alectryon diversifolius</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant Paddy's lucerne (<i>Sida rhombifolia</i>) and parthenium (<i>Parthenium hysterophorus</i>) and occasional shrub sida (<i>Sida rohlenae</i>), austral bugle (<i>Ajuga australis</i>), rattlepod (<i>Crotalaria mitchellii</i>), black speargrass (<i>Heteropogon contortus</i>), vernonia (<i>Cyanthillium cinereum</i>), snail flower (<i>Galactia tenuiflorum</i>) and white eyes (<i>Richardia brasiliensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; a low point in the plain combined with deposited sands to form a relatively small patch of this community; good recruitment; fire scarring not obvious; little erosion.
Health	Good.

Survey Code RCQ13 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.117321	
Longitude 148.227484	
Slope: <1°	
Aspect: E	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	18 m
Crown cover	35%
Mapped RE	11.5.3 / 11.4.9 (90 / 10)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with very sparse canopy of poplar box (<i>Eucalyptus populnea</i>) and boonaree (<i>Alectryon oleifolius</i>), with no discernible sub-canopy. Sparse to mid-dense shrub layer of dead finish (<i>Archidendropsis basaltica</i>), currant bush (<i>Carissa ovata</i>), beefwood (<i>Grevillea striata</i>), bean tree (<i>Cassia brewsteri</i>) and scrub boonaree (<i>Alectryon diversifolius</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional blue burr daisy (<i>Calotis cuneifolia</i>), Paddy's lucerne (<i>Sida rhombifolia</i>), golden beard grass (<i>Chrysopogon fallax</i>), chaff weed (<i>Achyranthes aspera</i>), devil's apple (<i>Eremophila debilis</i>) and pineapple daisy (<i>Pterocaulon redolens</i>).
General Site Observations	Trees form the ecologically dominant stratum; extreme dieback, possibly associated with fire in neighbouring cleared brigalow country moving into the retained remnant; no fire scars evident; mostly exotic grasses.
Health	Poor.

Survey Code RCQ14 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.11646	
Longitude 148.23124	
Slope: <1°	
Aspect: SE	
Infrastructure: Water pipe	
General Site Description	
Landform	Level plain
Lithology	Fine sediments (Cainozoic era mudstone and siltstone)
Soil	Light clay with gilgai formation
Height of ecologically dominant stratum	15 m
Crown cover	15%
Mapped RE	11.5.3 / 11.4.9 (90 / 10)
Observed RE	11.4.8 – <i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains. (BVG 17a)
Biodiversity Status	Endangered
Dominant vegetation observed	Open woodland to woodland with very sparse canopy dominated by Dawson gum (<i>Eucalyptus cambageana</i>) and brigalow (<i>Acacia harpophylla</i>). Sparse sub-canopy of brigalow, red bauhinia (<i>Lysiphyllum carronii</i>) and yellowwood (<i>Terminalia oblongata</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and warrior bush (<i>Apophyllum anomalum</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional harrisia (<i>Harrisia martinii</i>), parthenium (<i>Parthenium hysterophorus</i>), brown beetle grass (<i>Diplachne fusca</i> var. <i>fusca</i>), musk basil (<i>Basilicum polystachion</i>), hooky grass (<i>Ancistrachne uncinulata</i>) and flannel weed (<i>Abutilon oxycarpum</i>).
General Site Observations	Trees form the ecologically dominant stratum; a small but mature pocket of this community bounded to the north by sparse remnant 11.5.3 and cleared country to the south; mostly exotic groundcover; moderate recruitment; no erosion detected; dieback detected with low to nil canopy cover across melon holes; no fire scars detected.
TEC status	Not a TEC – Groundcover dominated by exotic buffel grass, plus unlikely to meet minimum patch size for the Brigalow TEC.
Health	Good.

Survey Code RCQ15 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.11635	
Longitude 148.23838	
Slope: <1°	
Aspect: SW	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	16 m
Crown cover	30%
Mapped RE	11.4.9
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional brigalow (<i>Acacia harpophylla</i>) (on western edge). Very sparse sub-canopy of ironwood (<i>Acacia excelsa</i>), poplar box, red bauhinia (<i>Lysiphyllum carronii</i>) and emu apple (<i>Owenia acidula</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), cocaine tree (<i>Erythroxylum australe</i>), red bauhinia (<i>Lysiphyllum carronii</i>), bean tree (<i>Cassia brewsteri</i>), sweet canthium (<i>Psydrax oleifolius</i>) and dysentery plant (<i>Grewia latifolia</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional velvet hibiscus (<i>Melhania oblongifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; there is a very thin sliver of what would be 11.4.9 consisting of a single canopy width of brigalow and belah (<i>Casuarina cristata</i>) on the western edge (abutting the non-remnant vegetation) that is too narrow for mapping and should be removed from the mapping; no fire scars evident; mostly exotic grasses.
Health	Good.

Survey Code RCQ16 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.11724	
Longitude 148.26012	
Slope: <1°	
Aspect: S	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	17 m
Crown cover	30%
Mapped RE	11.5.3 / 11.4.9 (90 / 10)
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional carbeen (<i>Corymbia tessellaris</i>) and Clarkson's bloodwood (<i>Corymbia clarksoniana</i>). Very sparse sub-canopy of red bauhinia (<i>Lysiphyllum carronii</i>), sally wattle (<i>Acacia salicina</i>) and poplar box. Very sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), bean tree (<i>Cassia brewsteri</i>), sally wattle and quinine tree (<i>Petalostigma pubescens</i>). Ground cover dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional <i>Oxalis</i> sp., chaff flower (<i>Achyranthes aspera</i>) and shrub sida (<i>Sida rohlenae</i>).
General Site Observations	Trees form the ecologically dominant stratum; this community is part of a larger remnant adjacent to the Isaac River and is approximately 3 km wide and over 10 km long; recruitment good, young trees with occasional older hollow trees; no fire scars evident; mostly exotic grasses.
Health	Good.

Survey Code RCQ17 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.11946	
Longitude 148.26915	
Slope: 1-2°	
Aspect: S	
Infrastructure: Water pipeline	
General Site Description	
Landform	Gently undulating plain
Lithology	Fine sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	12 m
Crown cover	25%
Mapped RE	11.5.3 / 11.4.9 (90 / 10)
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>), with occasional red bauhinia (<i>Lysiphyllum carronii</i>) and poplar box (<i>Eucalyptus populnea</i>). Very sparse sub-canopy of brigalow and red bauhinia. Mid-dense shrub layer containing currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>), northern silk pod (<i>Parsonsia lanceolata</i>), scrub leopardwood (<i>Flindersia dissosperma</i>), red bauhinia, yellowwood (<i>Terminalia oblongata</i>), warrior bush (<i>Apophyllum anomalum</i>), whitewood (<i>Atalaya hemiglauc</i>), nipan (<i>Capparis lasiantha</i>) and harrisia (<i>Harrisia martinii</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional soft roly-poly (<i>Salsola australis</i>), green panic (<i>Megathyrsus maximus</i>), chaff flower (<i>Achyranthes aspera</i>) and brigalow grass (<i>Paspalidium caespitosum</i>).
General Site Observations	Trees form the ecologically dominant stratum; small patch of brigalow dominated vegetation linked to another patch of brigalow (11.3.1) to the east; moderate recruitment; fire scarring not obvious; high level of exotic ground cover; subjected to light stock grazing; part of a larger remnant adjacent to the Isaac River.
TEC status	Not a TEC – Groundcover dominated by exotic species.
Health	Good.

Survey Code RCQ18 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.12010	
Longitude 148.27108	
Slope: <1°	
Aspect: NE	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Alluvial sediments
Soil	Loam
Height of ecologically dominant stratum	17 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy of poplar box (<i>Eucalyptus populnea</i>). Sparse sub-canopy of red bauhinia (<i>Lysiphyllum carronii</i>), white bauhinia (<i>L. hookeri</i>) and ironwood (<i>Acacia excelsa</i>). Sparse shrub layer of poplar box, red bauhinia and bean tree (<i>Cassia brewsteri</i>). Ground layer contains wiregrass (<i>Aristida calycina</i>), buffel grass (<i>Cenchrus ciliaris</i>), purple wiregrass (<i>Aristida ramosa</i>) and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form the ecologically dominant stratum; a good spread of ages in the upper canopy; part of a significant block of remnant vegetation through to the Isaac River, but bisected by the Peak Downs rail spur; good recruitment; little erosion; no dieback detected; no fire scars evident.
Health	Good.

Survey Code RCQ19 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.12054	
Longitude 148.27232	
Slope: 1°	
Aspect: N	
Infrastructure: Water pipeline	
General Site Description	
Landform	Level plain
Lithology	Cainozoic clays
Soil	Light to medium clay
Height of ecologically dominant stratum	Median height 21 m
Crown cover	25%
Mapped RE	11.3.2 / 11.3.7 / 11.3.1 (70 / 25 / 5)
Observed RE	11.3.1 – <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland of Dawson gum (<i>Eucalyptus cambageana</i>) with a sparse sub-canopy of brigalow (<i>Acacia harpophylla</i>), boonaree (<i>Alectryon oleifolius</i>) and yellowwood (<i>Terminalia oblongata</i>). Mid-dense shrub layer of currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>), cocaine tree (<i>Erythroxylum australe</i>), water vine (<i>Clematicissus opaca</i>), yellowwood, poison peach (<i>Ehretia membranifolia</i>), boonaree, warrior bush (<i>Apophyllum anomalum</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent hooky grass (<i>Ancistrachne uncinulata</i>), purple wiregrass (<i>Aristida ramosus</i>), barbed wire grass (<i>Cymbopogon refractus</i>), shot grass (<i>Paspalidium distans</i>) and sabi grass (<i>Urochloa mosambicensis</i>).
General Site Observations	Trees form the ecologically dominant stratum; healthy community with moderate regeneration; vegetation unit is part of an intact remnant linked to the Isaac River corridor but bisected by the Peak Downs spur line; patch is suffering weedy edge effects adjacent to the rail corridor; ground layer dominated by exotic species; clay soils; no erosion detected; minimal dieback; no fire scars detected; light grazing impacts.
TEC status	This vegetation will not meet TEC threshold criteria due to the dominance of groundcover vegetation by the exotic buffel grass (<i>Cenchrus ciliaris</i>).
Health	Good.

Survey Code RCQ20 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.12975	
Longitude 148.27557	
Slope: 1°	
Aspect: N	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Cainozoic clays
Soil	Light to medium clay with shallow gilgai
Height of ecologically dominant stratum	Median height 13 m
Crown cover	15%
Mapped RE	11.9.3 / 11.9.2
Observed RE	Non-remnant (regrowth of RE 11.4.9)
Biodiversity Status	-
Dominant vegetation observed	Open woodland of brigalow (<i>Acacia harpophylla</i>) and poplar box (<i>Eucalyptus populnea</i>). Sparse sub-canopy of brigalow, scrub leopard ash (<i>Flindersia dissosperma</i>), yellowwood (<i>Terminalia oblongata</i>), narrow-leaved bumbil (<i>Capparis loranthifolia</i>) and red bauhinia (<i>Lysiphyllum carronii</i>). Sparse shrub layer of limebush (<i>Citrus glauca</i>), currant bush (<i>Carissa ovata</i>), scrub boonaree (<i>Alectryon diversifolius</i>), cocaine tree (<i>Erythroxylum australe</i>), narrow-leaved bumbil, whitewood (<i>Atalaya hemiglauca</i>), poison peach (<i>Ehretia membranifolia</i>), harrisia (<i>Harrisia martinii</i>) and brigalow. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional sabi grass (<i>Urochloa mosambicensis</i>), wiregrass (<i>Aristida calycina</i>), northern silk pod (<i>Parsonsia lanceolata</i>), maireana (<i>Maireana microphylla</i>), hooky grass (<i>Ancistrachne uncinulata</i>) and slender grape (<i>Clematicissus opaca</i>).
General Site Observations	Trees form the ecologically dominant stratum; a partly cleared community (possibly from clearing fires) with moderate regeneration; within a cleared paddock but with slightly higher canopy cover than surrounding regrowth vegetation; ground layer dominated by exotic species; clay soils; erosion absent; dieback evidenced by dead standing trees (possibly from original clearing); fire scars not detected; moderate grazing impacts.
TEC status	Not a TEC – Groundcover dominated by exotic species, plus does not meet minimum canopy cover for RE 11.4.9.
Health	Good.

Survey Code RCQ21 (Flora)	
Location Winchester Downs	
Date 16/11/2017	
Latitude -22.13228	
Longitude 148.28504	
Slope: 1°	
Aspect: NE	
Infrastructure: Rail corridor	
General Site Description	
Landform	Level plain
Lithology	Fine sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	Median height 22 m
Crown cover	30%
Mapped RE	11.9.3 / 11.9.2 (50 / 50)
Observed RE	11.9.2 – <i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland on fine-grained sedimentary rocks. (BVG 17b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of mountain coolabah (<i>Eucalyptus orgadophila</i>) and Dawson gum (<i>E. cambageana</i>). Very sparse sub-canopy of brigalow (<i>Acacia harpophylla</i>) and sally wattle (<i>A. salicina</i>). Sparse shrub layer of dead finish (<i>Archidendropsis basaltica</i>), currant bush (<i>Carissa ovata</i>), boonaree (<i>Alectryon oleifolius</i>), bean tree (<i>Cassia brewsteri</i>), stiff canthium (<i>Psydrax odorata forma buxifolia</i>), sally wattle, poison peach (<i>Ehretia membranifolia</i>), false sandalwood (<i>Eremophila mitchellii</i>), mountain coolabah and nipan (<i>Capparis lasiantha</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional spiked malvastrum (<i>Malvastrum americanum</i>), pineapple daisy (<i>Pterocaulon redolens</i>), chaff flower (<i>Achyranthes aspera</i>), velvet hibiscus (<i>Melhania oblongifolia</i>), <i>Einadia nutans</i> and Paddy's lucerne (<i>Sida rhombifolia</i>).
General Site Observations	Trees form the ecologically dominant stratum; possibly ecotonal with elements of RE 11.4.8 evident; cleared to the south with possible edge effects or clearing fire impacts; ground layer dominated by exotic species; light clay soils; no erosion detected; dieback evidenced by dead standing trees (possibly from original clearing); no fire scars detected; moderate grazing impacts.
Health	Average.

Survey Code RCQ22 (Flora)	
Location Daunia Rd	
Date 17/11/2017	
Latitude -22.02417	
Longitude 148.33796	
Slope: 2-5°	
Aspect: S	
Infrastructure: Access road	
General Site Description	
Landform	Undulating plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	15 m
Crown cover	20%
Mapped RE	11.3.25
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional brigalow (<i>Acacia harpophylla</i>). Sparse sub-canopy of red bauhinia (<i>Lysiphyllum carronii</i>), white bauhinia (<i>L. hookeri</i>), boonaree (<i>Alectryon oleifolius</i>), sally wattle (<i>Acacia salicina</i>) and poplar box. Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), cocaine tree (<i>Erythroxylum australe</i>), bean tree (<i>Cassia brewsteri</i>), scrub boonaree (<i>Alectryon diversifolius</i>) and red bauhinia. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with abundant <i>Vittadinia dissecta</i> var. <i>dissecta</i> , frequent parthenium (<i>Parthenium hysterophorus</i>), and occasional red Natal grass (<i>Melinis repens</i>) and woolly glycine (<i>Glycine tomentella</i>).
General Site Observations	Trees form the ecologically dominant stratum; this site sits on an exposed and eroding edge of older sediments with active alluvium to the south associated with a watercourse and alluvia to the north and east, likely associated with flood flows; heavy grazing impacts contributing to erosive forces; active erosion areas with deeper gullying in parts; mostly exotic grasses; significant dieback.
Health	Average.

Survey Code RCQ23 (Flora)	
Location Daunia Rd	
Date 17/11/2017	
Latitude -22.023383	
Longitude 148.337375	
Slope: 1-3°	
Aspect: S	
Infrastructure: Access road	
General Site Description	
Landform	Undulating plain
Lithology	Fine sandstone sediments
Soil	Light clay
Height of ecologically dominant stratum	11 m
Crown cover	40%
Mapped RE	11.3.2 / 11.3.1 (95 / 5)
Observed RE	11.4.9 – <i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland with sparse canopy dominated by brigalow (<i>Acacia harpophylla</i>) and Yellowwood (<i>Terminalia oblongata</i>). Very sparse sub-canopy of brigalow, red bauhinia (<i>Lysiphyllum hookeri</i>) and boonaree (<i>Alectryon oleifolius</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent chaff flower (<i>Achyranthes aspera</i>).
General Site Observations	Trees form the ecologically dominant stratum; very small patch of brigalow dominated vegetation linked to another patch of brigalow (11.4.9) to the east on the same landform; low recruitment; fire scarring not obvious, high level of exotic ground cover; high level stock impacts; part of an intact riparian corridor approximately 750 m wide at this point.
TEC status	Not a TEC – Ground cover dominated by exotic species, plus patch size < 0.5ha.
Health	Good.

Survey Code RCQ24 (Flora)	
Location Iffley	
Date 17/11/2017	
Latitude -22.15464	
Longitude 148.33347	
Slope: 1°	
Aspect: N	
Infrastructure: ETL and access	
General Site Description	
Landform	Level plain
Lithology	Alluvial sediments
Soil	Loam
Height of ecologically dominant stratum	15 m
Crown cover	30%
Mapped RE	11.3.2 / 11.3.7 (80 / 20)
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Poplar box (<i>Eucalyptus populnea</i>) woodland. Very sparse sub-canopy of red bauhinia (<i>Lysiphyllum carronii</i>), sally wattle (<i>Acacia salicina</i>), bean tree (<i>Cassia brewsteri</i>) and nipan (<i>Capparis lasiantha</i>). Very sparse shrub layer of lantana (<i>Lantana camara</i>), poison peach (<i>Ehretia membranifolia</i>), nipan, boonaree (<i>Alectryon oleifolius</i>) and sally wattle. Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent black spear grass (<i>Heteropogon contortus</i>) and wiregrass (<i>Aristida</i> sp.), and occasional red Natal grass (<i>Melinis repens</i>), blue tongues (<i>Rostellularia adscendens</i>), <i>Glycine</i> sp. and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form the ecologically dominant stratum; a thin strip of vegetation in the RE mapping with no discernible difference to the adjacent 11.5.3 community although close enough to the Isaac River to be considered part of the alluvium; part of a significant block of remnant vegetation (2.5 km x 3 km) with good connection through the Isaac River corridor; moderate recruitment; low erosion; no dieback detected; no fire scars detected.
Health	Good.

Survey Code RCQ25 (Flora)	
Location Iffley	
Date 17/11/2017	
Latitude -22.16224	
Longitude 148.33246	
Slope: 0°	
Aspect: NA	
Infrastructure: Powerline	
General Site Description	
Landform	Shallow closed depression on level plain
Lithology	Cainozoic sands
Soil	Sandy light clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	20%
Mapped RE	11.5.17
Observed RE	11.5.17 – Palustrine swamp with fringing <i>Eucalyptus tereticornis</i> woodland in depressions on Cainozoic sand plains and remnant surfaces. (BVG 34b)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent poplar gum (<i>E. platyphylla</i>). Very sparse sub-canopy of poplar gum and forest red gum, mostly as fringing vegetation to the wetland. Very sparse shrub layer of seedling poplar gum and lantana (<i>Lantana camara</i>). Ground layer dominated by <i>Cyperus victoriensis</i> and brown beetle grass (<i>Diplachne fusca</i> var. <i>fusca</i>), with frequent hairy joyweed (<i>Alternanthera nana</i>), sneezeweed (<i>Centipeda minima</i>), white eclipta (<i>Eclipta prostrata</i>) and slender knotweed (<i>Persicaria decipiens</i>).
General Site Observations	Trees form ecologically dominant stratum; good regeneration cohort about 5 years old, on high water line; connected through large vegetation unit (over 3 km long) with connection through to Isaac River corridor; light clay soils; erosion absent; moderate grazing stock impacts; exotic shrub weeds; no dieback evident; no fire scars evident.
Health	Good.

Survey Code RCQ26 (Flora)	
Location Deverill	
Date 18/11/2017	
Latitude -22.16665	
Longitude 148.38162	
Slope: <1°	
Aspect: SE	
Infrastructure: Waste dump	
General Site Description	
Landform	Watercourse / river on level plain
Lithology	Alluvial sediments
Soil	Sand
Height of ecologically dominant stratum	22 m
Crown cover	60%
Mapped RE	11.3.25
Observed RE	11.3.25 – <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines. (BVG 16a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Open forest with a mid-dense canopy dominated by forest red gum (<i>Eucalyptus tereticornis</i>), with frequent river she-oak (<i>Casuarina cunninghamiana</i>) and carbeen (<i>Corymbia tessellaris</i>). Very sparse sub-canopy of river she-oak, snow in summer (<i>Melaleuca linariifolia</i>) and white bauhinia (<i>Lysiphyllum hookeri</i>). Sparse shrub layer of sandpaper fig (<i>Ficus opposita</i>), wombat berry (<i>Eustrephus latifolia</i>), white bauhinia, poison peach (<i>Ehretia membranifolia</i>) and lantana (<i>Lantana camara</i>). Ground layer dominated by green panic (<i>Megathyrsus maximus</i>).
General Site Observations	Trees form the ecologically dominant stratum; a mature community with some hollows, but mostly young trees; part of the Isaac River corridor, but high level of historical disturbance at this point and downstream, with riparian vegetation narrowed by clearing to little further than the high bank; moderate recruitment; normal watercourse erosion; no dieback detected; no fire scars detected.
Health	Good.

Survey Code RCQ27 (Flora)	
Location Deverill	
Date 18/11/2017	
Latitude -22.16809	
Longitude 148.38084	
Slope: 1°	
Aspect: SE	
Infrastructure: Waste dump	
General Site Description	
Landform	Deposited low rises; old floodplain
Lithology	Alluvial sands (origin undetermined)
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 20 m
Crown cover	25%
Mapped RE	11.5.3 / 11.4.9 (95 / 5)
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland with sparse canopy dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>) and carbeen (<i>C. tessellaris</i>), with frequent Dallachy's gum (<i>C. dallachiana</i>) and narrow-leaved ironbark (<i>Eucalyptus crebra</i>). Sparse sub-canopy of carbeen, sally wattle (<i>Acacia salicina</i>), narrow-leaved ironbark and Clarkson's bloodwood. Mid-dense shrub layer comprised mostly of lantana (<i>Lantana camara</i>). Ground layer is a mix of buffel grass (<i>Cenchrus ciliaris</i>), barbed wire grass (<i>Cymbopogon refractus</i>), kangaroo grass (<i>Themeda triandra</i>), black speargrass (<i>Heteropogon contortus</i>), rough fuzzweed (<i>Vittadinia pustula</i>), pineapple daisy (<i>Pterocaulon redolens</i>) and red Natal grass (<i>Melinis repens</i>).
General Site Observations	Trees form ecologically dominant stratum; some older trees, but mostly young 'regrowth' with a cohort of carbeen within more open patches, suggesting this area may have been burned at some time and is regenerating; part of the Isaac River corridor; high level of historical disturbance at this point and downstream, where riparian vegetation is narrowed by clearing to the high bank; no erosion detected; no fire scars detected.
Health	Good.

Survey Code RCQ28 (Flora)	
Location Deverill	
Date 18/11/2017	
Latitude -22.17044	
Longitude 148.39201	
Slope: <1°	
Aspect: NE	
Infrastructure: Eastern waste dump	
General Site Description	
Landform	Level plain
Lithology	Cainozoic clays
Soil	Light to medium clay
Height of ecologically dominant stratum	Median height 14 m
Crown cover	40%
Mapped RE	Non-remnant
Observed RE	11.3.1 – <i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains. (BVG 25a)
Biodiversity Status	Endangered
Dominant vegetation observed	Woodland dominated by brigalow (<i>Acacia harpophylla</i>) and coolabah (<i>Eucalyptus coolabah</i>), with occasional poplar box (<i>E. populnea</i>). Sparse sub-canopy of brigalow, white bauhinia (<i>Lysiphyllum hookeri</i>), boonaree (<i>Alectryon oleifolius</i>) and poplar box, with occasional quinine tree (<i>Petalostigma pubescens</i>). Very sparse shrub layer of white bauhinia, desert jasmine (<i>Jasminum didymum</i> subsp. <i>lineare</i>), currant bush (<i>Carissa ovata</i>), boonaree, brigalow, whitewood (<i>Atalaya hemiglauc</i>), wilga (<i>Geijera parviflora</i>), emu apple (<i>Owenia acidula</i>) and harrisia (<i>Harrisia martinii</i>). Buffel grass (<i>Cenchrus ciliaris</i>) dominates the ground layer.
General Site Observations	Trees form the ecologically dominant stratum; a small but healthy patch with moderate recruitment; part of a small unmapped remnant isolated from the Isaac River corridor by clearing; ground layer dominated by exotic species; no erosion detected; minimal dieback; no fire scars detected; moderate grazing impacts.
TEC status	Not a TEC – Groundcover dominated by exotic buffel grass (<i>Cenchrus ciliaris</i>).
Health	Good.

Survey Code RCQ29 (Flora)	
Location Deverill	
Date 18/11/2017	
Latitude -22.16993	
Longitude 148.39247	
Slope: 1°	
Aspect: SE	
Infrastructure: Eastern waste dump	
General Site Description	
Landform	Closed depression on level plain
Lithology	Alluvial clays
Soil	Light clay
Height of ecologically dominant stratum	Median height 17 m
Crown cover	45%
Mapped RE	Non-remnant
Observed RE	11.3.27f – <i>Eucalyptus coolabah</i> and / or <i>E. tereticornis</i> open woodland to woodland fringing swamps. (BVG 34d)
Biodiversity Status	Of Concern
Dominant vegetation observed	Fringing coolabah (<i>Eucalyptus coolabah</i>) woodland. Very sparse sub-canopy of brigalow (<i>Acacia harpophylla</i>) and coolabah. Very sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>). Native wetland species dominate the ground layer and include tall flatsedge (<i>Cyperus exaltatus</i>), hairy carpet weed (<i>Glinus lotoides</i>), musk basil (<i>Basilicum polystachion</i>) and umbrella canegrass (<i>Leptochloa digitata</i>).
General Site Observations	Fringing trees form the ecologically dominant stratum; a healthy wetland with moderate recruitment; contains old mature trees with hollows; part of a small unmapped remnant isolated from the Isaac River corridor by clearing; ground layer dominated by native species; no erosion, dieback or fire scars detected; moderate grazing impacts.
Health	Good.

Survey Code	RCQ30 (Flora)
Location	Deverill
Date	18/11/2017
Latitude	-22.17262
Longitude	148.39100
Slope:	1°
Aspect:	SE
Infrastructure:	Eastern waste dump
General Site Description	
Landform	Level plain
Lithology	Alluvial sediments
Soil	Loam
Height of ecologically dominant stratum	13 m
Crown cover	35%
Mapped RE	Non-remnant
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional Dallachy's gum (<i>Corymbia dallachiana</i>). Very sparse sub-canopy of poplar box, sally wattle (<i>Acacia salicina</i>) and boonaree (<i>Alectryon oleifolius</i>). Sparse shrub layer of white bauhinia (<i>Lysiphyllum hookeri</i>), sally wattle, bean tree (<i>Cassia brewsteri</i>) and flannel weed (<i>Sida cordifolia</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional green panic (<i>Megathyrsus maximus</i>), curly windmill grass (<i>Enteropogon ramosus</i>), red Natal grass (<i>Melinis repens</i>) and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy community with good regeneration; contains old mature trees with hollows; part of a small unmapped remnant isolated from the Isaac River corridor by clearing; ground layer dominated by exotic species; no erosion, dieback or fire scars detected; moderate grazing impacts.
Health	Good.



Survey Code RCQ31 (Flora)	
Location Deverill	
Date 18/11/2017	
Latitude -22.18689	
Longitude 148.38944	
Slope: <1°	
Aspect: S	
Infrastructure: Eastern waste dump	
General Site Description	
Landform	Level plain
Lithology	Alluvial sediments
Soil	Loam
Height of ecologically dominant stratum	18 m
Crown cover	35%
Mapped RE	Non-remnant
Observed RE	11.3.2 – <i>Eucalyptus populnea</i> woodland on alluvial plains. (BVG 17a)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), ironwood (<i>Acacia excelsa</i>) and sally wattle (<i>A. salicina</i>). Very sparse sub-canopy of poplar box and Dallachy's gum (<i>C. dallachiana</i>). Very sparse shrub layer of dysentery plant (<i>Grewia retusifolia</i>), sally wattle, bean tree (<i>Cassia brewsteri</i>) and lantana (<i>Lantana camara</i>). Ground layer dominated by Buffel grass (<i>Cenchrus ciliaris</i>), with abundant kangaroo grass (<i>Themeda triandra</i>) and occasional wiregrasses (<i>Aristida calycina</i> and <i>A. jerichoensis</i>), red Natal grass (<i>Melinis repens</i>), curly windmill grass (<i>Enteropogon ramosus</i>), Devil's apple (<i>Eremophila debilis</i>) and kangaroo grass (<i>Themeda triandra</i>).
General Site Observations	Trees form the ecologically dominant stratum; a healthy remnant community with good regeneration; contains older mature trees with hollows; part of an unmapped linear remnant adjacent to the Isaac River corridor; ground layer dominated by exotic species; no erosion, dieback or fire scars detected; moderate grazing impacts.
Health	Good.

Survey Code RCQ32 (Flora)	
Location Deverill	
Date 19/11/2017	
Latitude -22.17577	
Longitude 148.38503	
Slope: <1°	
Aspect: S	
Infrastructure: Eastern waste dump	
General Site Description	
Landform	Level plain; deposited low rises; old floodplain
Lithology	Alluvial sands
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 18 m
Crown cover	20%
Mapped RE	Non-remnant
Observed RE	11.3.7 – <i>Corymbia</i> spp. woodland on alluvial plains. (BVG 9e)
Biodiversity Status	Of Concern
Dominant vegetation observed	Woodland dominated by Clarkson's bloodwood (<i>Corymbia clarksoniana</i>), with frequent Dallachy's gum (<i>C. dallachiana</i>), carbeen (<i>C. tessellaris</i>) and narrow-leaved ironbark (<i>Eucalyptus crebra</i>). Very sparse sub-canopy of carbeen, sally wattle (<i>Acacia salicina</i>), Dallachy's gum and Clarkson's bloodwood. Very sparse shrub layer composed of sally wattle, Dallachy's gum, Clarkson's bloodwood and lantana (<i>Lantana camara</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with occasional red Natal grass (<i>Melinis repens</i>), vernonia (<i>Cyanthillium cinereum</i>), wandering jew (<i>Commelina diffusa</i>), snail flower (<i>Galactia tenuiflora</i>), lilac tassel-flower (<i>Emilia sonchifolia</i>), purple spade flower (<i>Hybanthus enneaspermus</i>) and austral bugle (<i>Ajuga australis</i>).
General Site Observations	Trees form the ecologically dominant stratum; naturally sparse community with some older trees with hollows; a good range of regenerating canopy species; part of an unmapped linear remnant adjacent to the Isaac River corridor; no erosion or fire detected.
Health	Good.

Survey Code RCQ33 (Flora)	
Location Deverill	
Date 19/11/2017	
Latitude -22.15224	
Longitude 148.40768	
Slope: 1-2°	
Aspect: SSW	
Infrastructure: Waste dump	
General Site Description	
Landform	Gently undulating plain
Lithology	Cainozoic sands, clays and gravels
Soil	Sandy loam
Height of ecologically dominant stratum	Median height 16 m
Crown cover	15%
Mapped RE	11.5.9b
Observed RE	11.5.9 – <i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 18b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Open woodland of narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and Clarkson's bloodwood (<i>Corymbia clarksoniana</i>). Very sparse sub-canopy of red ash (<i>Alphitonia excelsa</i>), <i>Acacia faucium</i> , tea tree (<i>Melaleuca viridiflora</i>), quinine tree (<i>Petalostigma pubescens</i>) and Clarkson's bloodwood. Very sparse shrub layer of red ash, lantana (<i>Lantana camara</i>), tea tree, Clarkson's bloodwood and sweet canthium (<i>Psydrax oleifolius</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent shrubby stylo (<i>Stylosanthes scabra</i>) and flannel weed (<i>Sida cordifolia</i>), and occasional golden beard grass (<i>Chrysopogon fallax</i>), red Natal grass (<i>Melinis repens</i>) and northern silk pod (<i>Parsonsia lanceolata</i>).
General Site Observations	Trees form the ecologically dominant stratum; sparse community which may have been partly cleared by fire; good recruitment; significant dieback of immature canopy species noted, possibly related to dry seasons; no fire scars noted; light grazing pressure.
Health	Average.

Survey Code RCQ34 (Flora)	
Location Deverill	
Date 19/11/2017	
Latitude -22.15531	
Longitude 148.40104	
Slope: 2°	
Aspect: SW	
Infrastructure: Eastern waste dump	
General Site Description	
Landform	Gently undulating plain
Lithology	Cainozoic sediments
Soil	Sandy light clay
Height of ecologically dominant stratum	14 m
Crown cover	40%
Mapped RE	Non-remnant
Observed RE	11.5.3 – <i>Eucalyptus populnea</i> +/- <i>E. melanophloia</i> +/- <i>Corymbia clarksoniana</i> woodland on Cainozoic sand plains and / or remnant surfaces. (BVG 17a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland with sparse canopy dominated by poplar box (<i>Eucalyptus populnea</i>), with occasional narrow-leaved ironbark (<i>E. crebra</i>). Very sparse sub-canopy of poplar box, sally wattle (<i>Acacia salicina</i>), red ash (<i>Alphitonia excelsa</i>) and ironwood (<i>Acacia excelsa</i>). Very sparse shrub layer of currant bush (<i>Carissa ovata</i>), cocaine tree (<i>Erythroxylum australe</i>), bean tree (<i>Cassia brewsteri</i>), boonaree (<i>Alectryon oleifolius</i>), poplar box, narrow-leaved ironbark, northern silk pod (<i>Parsonsia lanceolata</i>), harrisia (<i>Harrisia martinii</i>), sally wattle, red bauhinia (<i>Lysiphyllum carronii</i>) and sandalwood (<i>Santalum lanceolatum</i>). Ground layer dominated by buffel grass (<i>Cenchrus ciliaris</i>), with frequent red Natal grass (<i>Melinis repens</i>), purple wiregrass (<i>Aristida ramosa</i>), curly windmill grass (<i>Enteropogon ramosus</i>), flannel weed (<i>Abutilon oxycarpum</i>) and shrubby stylo (<i>Stylosanthes scabra</i>).
General Site Observations	Trees form the ecologically dominant stratum; patch is mapped non-remnant in error due to sparse canopy cover to the east associated with RE 11.5.9; cleared country to the west; moderate stock impacts; erosion areas with gullyng in parts mostly associated with old roads or stock movement; mostly exotic grasses; some dieback in otherwise healthy canopy.
Health	Good.

Survey Code RCQ35 (Flora)	
Location Carborough Downs	
Date 20/11/2017	
Latitude -21.97890	
Longitude 148.23054	
Slope: 1°	
Aspect: SW	
Infrastructure: ETL and access	
General Site Description	
Landform	Level plain
Lithology	Weathered sands and gravels
Soil	Red loam
Height of ecologically dominant stratum	Median height 11 m
Crown cover	25%
Mapped RE	11.5.9b / 11.5.18 (50 / 50)
Observed RE	11.5.9b – <i>Eucalyptus crebra</i> , <i>E. tenuipes</i> , <i>Lysicarpus angustifolius</i> +/- <i>Corymbia</i> spp. woodland. (BVG1M: 18b)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Woodland of narrow-leaved ironbark (<i>Eucalyptus crebra</i>) and Clarkson's bloodwood (<i>Corymbia clarksoniana</i>). Mid-dense sub-canopy of red ash (<i>Alphitonia excelsa</i>), <i>Acacia faucium</i> , black wattle (<i>A. leiocalyx</i>), quinine tree (<i>Petalostigma pubescens</i>), Clarkson's bloodwood and wild pear (<i>Persoonia falcata</i>). Very sparse shrub layer of quinine tree. Ground layer sparsely covered by golden beard grass (<i>Chrysopogon fallax</i>), black speargrass (<i>Heteropogon contortus</i>) and red Natal grass (<i>Melinis repens</i>).
General Site Observations	Trees form the ecologically dominant stratum; young community which may have been cleared by fire and is in the process of regrowing, with some trees have coppiced, indicating regrowth from rootstock; good recruitment; shrubby sub-canopy dominated by <i>Acacias</i> ; no fire scars noted; no grazing pressure.
Health	Good.

Survey Code	RCQ36 (Flora)
Location	Carborough Downs
Date	20/11/2017
Latitude	-21.98543
Longitude	148.23941
Slope:	1°
Aspect:	SE
Infrastructure:	Powerline
General Site Description	
Landform	Level plain
Lithology	Lateritic sands and gravels – sandstone rocks
Soil	Pale skeletal loam
Height of ecologically dominant stratum	Median height 7 m
Crown cover	60%
Mapped RE	Non-remnant
Observed RE	Non-remnant
Biodiversity Status	-
Dominant vegetation observed	Open scrub of red lancewood (<i>Acacia shirleyi</i>), currawong (<i>A. sparsiflora</i>) and red ash (<i>Alphitonia excelsa</i>). Very sparse shrub layer of red lancewood, red ash and <i>Bertya pedicellata</i> . Ground layer sparsely covered, dominated by red Natal grass (<i>Melinis repens</i>).
General Site Observations	Trees form the ecologically dominant stratum; this is a regrowth community which appears to have been mechanically cleared and is in the process of regrowing; good recruitment; <i>Bertya pedicellata</i> (listed as Near Threatened under the Qld NC Act) is growing on sandstone spoil that has been dumped in this locality; no fire scars noted; no grazing pressure.
Health	Average.



Survey Code RCQ37 (Flora)	
Location Carborough Downs	
Date 20/11/2017	
Latitude -21.98707	
Longitude 148.24238	
Slope: 25°	
Aspect: SE	
Infrastructure: ETL and access	
General Site Description	
Landform	Escarpment
Lithology	Lateritic loams and sandstone rocks
Soil	Pale skeletal loam
Height of ecologically dominant stratum	Median height 11 m
Crown cover	70%
Mapped RE	11.7.2
Observed RE	11.7.2 – <i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone. (BVG1M: 24a)
Biodiversity Status	No Concern at Present
Dominant vegetation observed	Open forest of red lancewood (<i>Acacia shirleyi</i>), with a sparse shrub layer of red lancewood, cocaine tree (<i>Erythroxylum australe</i>) and <i>Bertya pedicellata</i> . Sparse ground layer dominated by <i>Cleistochloa subjuncea</i> .
General Site Observations	Trees form the ecologically dominant stratum; mature community in good condition; good recruitment; no fire scars noted; no grazing pressure.
Health	Good.

Appendix E: Least Concern flora species recorded from the Study area

Least Concern flora species recorded from the Study area

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Abutilon fraseri</i> subsp. <i>fraseri</i>	Malvaceae	Dwarf lantern flower		✓	✓	✓	✓
<i>Abutilon oxycarpum</i> var. <i>incanum</i>	Malvaceae	Flannel weed		✓	✓	✓	✓
<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>	Malvaceae	Flannel weed				✓	
<i>Acacia excelsa</i>	Mimosaceae	Ironwood		✓	✓	✓	✓
<i>Acacia faucium</i>	Mimosaceae			✓			✓
<i>Acacia harpophylla</i>	Mimosaceae	Brigalow	Key species in Brigalow TEC, host to a range of <i>Jalmenus</i> spp. including <i>Jalmenus ebulus</i> (Brigalow blue) listed as Vulnerable under the Qld NC Act.	✓	✓	✓	✓
<i>Acacia macradenia</i>	Mimosaceae	Zig zag wattle				✓	
<i>Acacia oswaldii</i>	Mimosaceae	Nelia	Host to twin spotted lineblue butterfly	✓	✓	✓	✓
<i>Acacia rhodoxylon</i>	Mimosaceae	Rosewood			✓		
<i>Acacia salicina</i>	Mimosaceae	Sally wattle	Common in most communities but widespread riparian species - Host to twin spotted lineblue and wattle blue butterflies	✓	✓	✓	✓
<i>Acacia shirleyi</i>	Mimosaceae	Red lancewood			✓		
<i>Acacia sparsiflora</i>	Mimosaceae	Currawang			✓		
<i>Acalypha eremorum</i>	Euphorbiaceae	Soft acalypha	Vine thicket species	✓			✓
<i>Achyranthes aspera</i>	Amaranthaceae			✓	✓	✓	✓
<i>Aeschynomene indica</i>	Fabaceae	Budda pea	Host for the Common Grass Yellow	✓			✓
<i>Ajuga australis</i>	Lamiaceae	Austral trumpet		✓	✓		✓
<i>Albizia canescens</i>	Mimosaceae		Host to tailed emperor butterfly	✓			
<i>Alectryon connatus</i>	Sapindaceae	Grey birds eye	Vine thicket species, edible fruit and seeds, host plant for Macqueen's Imperial blue	✓			
<i>Alectryon diversifolius</i>	Sapindaceae	Scrub boonaree	Vine thicket and Brigalow species, edible fruit and seeds, host plant for at least 6 butterfly species	✓	✓	✓	✓
<i>Alectryon oleifolius</i>	Sapindaceae	Boonaree		✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Allocasuarina luehmannii</i>	Casuarinaceae	Bull oak	Seeds eaten by Glossy black cockatoo	✓			✓
<i>Allotroopsis semialata</i>	Poaceae	Cockatoo grass		✓	✓	✓	✓
<i>Alphitonia excelsa</i>	Rhamnaceae	Red ash	Host plant for indigo flash, large green-banded blue, copper jewel and fiery jewel butterflies	✓	✓	✓	✓
<i>Alstonia constricta</i>	Apocynaceae	Bitterbark		✓	✓	✓	✓
<i>Alternanthera denticulata</i> var. <i>denticulata</i>	Amaranthaceae	Lesser joyweed	Host to the common eggfly	✓	✓	✓	✓
<i>Alternanthera denticulata</i> var. <i>micrantha</i>	Amaranthaceae	Lesser joyweed		✓	✓	✓	✓
<i>Alternanthera nana</i>	Amaranthaceae	Hairy joyweed		✓	✓		✓
<i>Alternanthera nodiflora</i> var. <i>nodiflora</i>	Amaranthaceae	Common joyweed		✓	✓	✓	✓
<i>Alternanthera</i> sp.	Amaranthaceae			✓			
<i>Ammannia multiflora</i>	Lythraceae	Jerry jerry		✓	✓	✓	✓
<i>Amyema miquelii</i>	Loranthaceae		Edible fruits and host for at least 16 butterfly species	✓			✓
<i>Ancistrachne uncinulata</i>	Poaceae	Hooky grass		✓	✓		✓
<i>Angophora floribunda</i>	Myrtaceae	Rough barked apple	Host for copper jewel butterfly, Nectary	✓	✓		✓
<i>Apophyllum anomalum</i>	Capparaceae	Warrior bush	Common in Brigalow communities, host for Caper white and Pearl white butterflies	✓	✓	✓	✓
<i>Apowollastonia spilanthisoides</i>	Asteraceae	Native wedelia		✓	✓		✓
<i>Archidendropsis basaltica</i>	Mimosaceae	Dead finish		✓	✓	✓	✓
<i>Aristida benthamii</i>	Poaceae			✓	✓	✓	✓
<i>Aristida calycina</i>	Poaceae	Dark wire grass	Widespread in most eucalypt communities	✓	✓	✓	✓
<i>Aristida holathera</i>	Poaceae	Erect kerosene grass		✓	✓	✓	✓
<i>Aristida ingrata</i>	Poaceae	Unpleasant wiregrass		✓	✓	✓	✓
<i>Aristida jerichoensis</i>	Poaceae	Jericho wire grass	Widespread in drier areas	✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Aristida latifolia</i>	Poaceae	Feathertop wiregrass		✓	✓	✓	✓
<i>Aristida leptopoda</i>	Poaceae	White speargrass		✓	✓		✓
<i>Aristida personata</i>	Poaceae	Purple speargrass		✓	✓	✓	✓
<i>Astrebla lappacea</i>	Poaceae	Curly Mitchell grass			✓	✓	✓
<i>Atalaya hemiglauca</i>	Sapindaceae	Whitewood	Host to the Wattle blue and Saltbush Blue	✓	✓	✓	✓
<i>Atriplex muelleri</i>	Chenopodiaceae	Soda bush		✓			
<i>Basilicum polystachion</i>	Lamiaceae	Musk basil		✓	✓	✓	✓
<i>Bothriochloa erianthoides</i>	Poaceae	Satintop grass					✓
<i>Bothriochloa ewartiana</i>	Poaceae	Desert Mitchell grass		✓	✓	✓	✓
<i>Bothriochloa bladhii</i>	Poaceae	Forest bluegrass	Widespread	✓	✓	✓	✓
<i>Bothriochloa decipiens</i>	Poaceae	Pitted bluegrass		✓	✓	✓	✓
<i>Brachyachne convergens</i>	Poaceae	Annual couch		✓	✓	✓	✓
<i>Brachychiton australis</i>	Sterculiaceae	Broad leafed bottle tree				✓	
<i>Breynia oblongifolia</i>	Phyllanthaceae	Coffee bush	Host to common grass yellow butterfly	✓	✓	✓	✓
<i>Brunoniella australis</i>	Acanthaceae	Blue trumpet		✓			
<i>Bulbostylis barbata</i>	Cyperaceae	Bearded watergrass		✓			
<i>Bursaria incana</i>	Pittosporaceae	Prickly pine	Host to dull copper butterfly	✓	✓	✓	✓
<i>Calotis cuneata</i>	Asteraceae	Burr daisy		✓	✓	✓	✓
<i>Calotis cuneifolia</i>	Asteraceae	Blue Burr daisy		✓	✓		
<i>Canavalia papuana</i>	Fabaceae	Wild jack bean		✓			
<i>Capillipedium spicigerum</i>	Poaceae	Scented top		✓			✓
<i>Capparis arborea</i>	Capparaceae	Native pomegranate	Edible fruit, host for caper white, chalky white, southern pearl white, and Australian gull butterflies	✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Capparis canescens</i>	Capparaceae	Wild orange	Edible fruits, host for caper white, chalk white, southern pearl white, Australian gull, narrow winged pearl white and yellow albatross butterflies	✓			
<i>Capparis lasiantha</i>	Capparaceae	Nipan	Edible fruits, host for Caper white and narrow winged pearl white butterflies	✓	✓	✓	✓
<i>Capparis loranthifolia</i>	Capparaceae	Narrow leafed bumbil	Edible fruits	✓	✓	✓	✓
<i>Capparis mitchellii</i>	Capparaceae	Wild orange	Edible fruits, host for caper white and narrow winged pearl white butterflies	✓	✓	✓	✓
<i>Capparis umbonata</i>	Capparaceae	Wild orange	Edible fruits, Host for Caper white butterflies	✓			✓
<i>Carissa ovata</i>	Apocynaceae	Currant bush	Edible fruits and host for common crow butterfly	✓	✓	✓	✓
<i>Cassia brewsteri</i>	Caesalpiniaceae	Bean tree or Leichhardt bean	Widespread low tree, host for common migrant, lemon migrant, tailed emperor and common pencilled blue butterflies	✓	✓	✓	✓
<i>Casuarina cristata</i>	Casuarinaceae	Belah	Component of Brigalow communities	✓	✓		✓
<i>Casuarina cunninghamiana</i>	Casuarinaceae	River she oak		✓	✓	✓	✓
<i>Centipeda minima</i>	Asteraceae	Snuffweed		✓			
<i>Chamaecrista absus</i>	Caesalpiniaceae	Tropical sensitive pea		✓	✓		✓
<i>Chamaecrista mimosoides</i>	Caesalpiniaceae	Dwarf cassia		✓			✓
<i>Chamaecrista nomame</i>	Caesalpiniaceae	Five leaf Cassia	Host for the No Brand Grass Yellow	✓	✓	✓	✓
<i>Cheilanthes sieberi</i>	Adiantaceae	Brigalow fern		✓	✓	✓	✓
<i>Chloris divaricata</i> var. <i>divaricata</i>	Poaceae	Slender chloris		✓	✓		✓
<i>Chrysocephalum apiculatum</i>	Asteraceae	Yellow buttons		✓	✓		✓
<i>Chrysopogon fallax</i>	Poaceae	Golden beard grass	Host for the Pale-orange Darter	✓	✓	✓	✓
<i>Citrus glauca</i>	Rutaceae	Native lime	Brigalow community species, edible fruits and host to the dingy swallowtail butterfly	✓	✓	✓	✓
<i>Cleistochloa subjuncea</i>	Poaceae				✓		
<i>Clematicissus opaca</i>	Vitaceae	Slender grape	Edible fruit, edible tuber	✓	✓	✓	✓
<i>Clerodendrum floribundum</i>	Lamiaceae	Lolly bush	Host for fiery jewel and common tit butterflies	✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Clerodendrum tomentosum</i>	Lamiaceae	Lolly bush		✓			✓
<i>Commelina diffusa</i>	Commelinaceae	Wandering jew		✓	✓	✓	✓
<i>Convolvulus erubescens</i>	Convolvulaceae	Australian bindweed		✓	✓	✓	✓
<i>Convolvulus graminetinus</i>	Convolvulaceae			✓	✓	✓	✓
<i>Corchorus trilocularis</i>	Sparrmanniaceae	Native jute					✓
<i>Corymbia clarksoniana</i>	Myrtaceae	Clarkson's bloodwood	The most common Corymbia in the study area, Nectary	✓	✓	✓	✓
<i>Corymbia dallachyana</i>	Myrtaceae	Dallachy's gum		✓	✓	✓	✓
<i>Corymbia tessellaris</i>	Myrtaceae	Carbeen	Host to dark oakblue butterfly, Nectary	✓	✓	✓	✓
<i>Crinum flaccidum</i>	Amaryllidaceae	Murray lily		✓	✓	✓	✓
<i>Crotalaria dissitiflora</i>	Fabaceae	Grey rattlepod		✓			
<i>Crotalaria medicaginea</i>	Fabaceae			✓			
<i>Crotalaria mitchellii</i>	Fabaceae	Yellow rattlepod	Host for Long tailed pea blue butterfly	✓	✓	✓	✓
<i>Croton phebaloides</i>	Euphorbiaceae	Narrow-leafed croton		✓			
<i>Cucumis melo</i>	Cucurbitaceae					✓	✓
<i>Cullen tenax</i>	Fabaceae	Emu foot	Host for Chequered Swallowtail and Common Grass Blue	✓		✓	✓
<i>Cyanthillium cinereum</i>	Asteraceae	Vernonia		✓	✓	✓	✓
<i>Cymbidium canaliculatum</i>	Orchidaceae	Black orchid		✓	✓	✓	✓
<i>Cymbopogon bombycinus</i>	Poaceae	Silky oil grass		✓			
<i>Cymbopogon oblectus</i>	Poaceae	Silky heads		✓		✓	
<i>Cymbopogon refractus</i>	Poaceae	Barbed wire grass	Host for the No-brand Grass Dart	✓	✓	✓	✓
<i>Cynodon dactylon</i>	Poaceae	Couch grass	Host to the Mottled Grass Skipper, White Banded Grass Dart, Walker's Grass Dart, Common Ringlet and Common Brown	✓	✓	✓	✓
<i>Cyperus bifax</i>	Cyperaceae	Western nut grass		✓	✓	✓	✓
<i>Cyperus isabellinus</i>	Cyperaceae				✓		✓
<i>Cyperus concinnus</i>	Cyperaceae			✓	✓		✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Cyperus conicus</i>	Cyperaceae				✓	✓	
<i>Cyperus difformis</i>	Cyperaceae	Dirty dora		✓	✓	✓	✓
<i>Cyperus exaltatus</i>	Cyperaceae	Giant sedge		✓	✓	✓	✓
<i>Cyperus gracilis</i>	Cyperaceae			✓	✓	✓	✓
<i>Cyperus trinervis</i>	Cyperaceae			✓			
<i>Dactyloctenium radulans</i>	Poaceae	Button grass		✓	✓		
<i>Damasonium minus</i>	Alismataceae	Star fruit		✓	✓	✓	✓
<i>Dendrophthoe homoplatica</i>	Loranthaceae	Mistletoe	Edible fruits and host for Diggle's jewel butterfly	✓			
<i>Denhamia cunninghamii</i>	Celastraceae	Orange berry bush		✓	✓	✓	✓
<i>Denhamia disperma</i>	Celastraceae	Orangebark		✓			
<i>Denhamia oleaster</i>	Celastraceae	Stiff Denhamia		✓	✓	✓	✓
<i>Desmodium brachypodum</i>	Fabaceae	Large tick trefoil		✓			
<i>Dianella nervosa</i>	Hemerocallidaceae			✓	✓	✓	✓
<i>Dichanthium fecundum</i>	Poaceae	Curly bluegrass		✓	✓		✓
<i>Dichanthium sericeum</i>	Poaceae	Queensland bluegrass	Host to the Dingy Bushbrown	✓	✓	✓	✓
<i>Digitaria ammophila</i>	Poaceae	Silky umbrella grass					✓
<i>Digitaria bicornis</i>	Poaceae						✓
<i>Digitaria brownii</i>	Poaceae	Cotton panic		✓	✓	✓	✓
<i>Digitaria ciliaris</i>	Poaceae	Southern crabgrass					✓
<i>Digitaria divaricatissima</i>	Poaceae	Umbrella grass		✓			✓
<i>Digitaria orbata</i>	Poaceae				✓		
<i>Dinebra decipiens</i> var. <i>decipiens</i>	Poaceae			✓		✓	✓
<i>Dinebra ligulata</i>	Poaceae			✓	✓	✓	✓
<i>Dioscorea transversa</i>	Dioscoreaceae	Yam	Edible tuber	✓			

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Diospyros humilis</i>	Ebenaceae	Small leafed ebony	Edible fruits	✓	✓	✓	✓
<i>Diplachne fusca var. fusca</i>	Poaceae	Brown beetle grass		✓	✓	✓	✓
<i>Dipteracanthus australasicus</i>	Acanthaceae			✓		✓	
<i>Dodonaea stenophylla</i>	Sapindaceae					✓	
<i>Duma florulenta</i>	Polygonaceae	Lignum		✓	✓	✓	✓
<i>Eclipta prostrata</i>	Asteraceae	White Eclipta		✓	✓	✓	✓
<i>Ehretia membranifolia</i>	Boraginaceae	Poison peach		✓	✓	✓	✓
<i>Ehretia saligna</i>	Boraginaceae			✓			
<i>Einadia nutans</i>	Chenopodiaceae			✓	✓	✓	✓
<i>Elaeodendron australe</i>	Celastraceae	Cassine		✓	✓		
<i>Eleocharis philippinensis</i>	Cyperaceae			✓			✓
<i>Eleocharis plana</i>	Cyperaceae			✓			
<i>Elytrophorus spicatus</i>	Poaceae	Spikegrass				✓	
<i>Enchylaena tomentosa</i>	Chenopodiaceae	Ruby salt bush		✓	✓	✓	✓
<i>Enneapogon lindleyanus</i>	Poaceae	Conetop nineawn		✓	✓	✓	✓
<i>Enneapogon polyphyllus</i>	Poaceae	Leafy nineawn		✓			
<i>Enneapogon robustissimus</i>	Poaceae	Nineawn grass		✓		✓	✓
<i>Enteropogon acicularis</i>	Poaceae	Curly windmill grass	Host to the Inland Sand Skipper	✓	✓	✓	✓
<i>Enteropogon ramosus</i>	Poaceae	Curly twirly windmill grass		✓	✓		✓
<i>Eragrostis elongata</i>	Poaceae	Clustered lovegrass		✓	✓	✓	✓
<i>Eragrostis lacunaria</i>	Poaceae	Purple lovegrass		✓			
<i>Eragrostis microcarpa</i>	Poaceae				✓		

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Eragrostis parviflora</i>	Poaceae	Weeping lovegrass		✓	✓	✓	✓
<i>Eragrostis sororia</i>	Poaceae	Forest lovegrass		✓	✓	✓	✓
<i>Eragrostis spartinoides</i>	Poaceae						✓
<i>Eragrostis tenellula</i>	Poaceae	Delicate lovegrass				✓	
<i>Eremophila debilis</i>	Scrophulariaceae	Devil's apple	Edible fruit	✓	✓	✓	✓
<i>Eremophila deserti</i>	Scrophulariaceae	Ellangowan poison bush	Host for common rayed blue butterfly	✓	✓	✓	✓
<i>Eremophila maculata</i> subsp. <i>maculata</i>	Scrophulariaceae	Emu bush		✓			✓
<i>Eremophila mitchellii</i>	Scrophulariaceae	False sandalwood		✓	✓	✓	✓
<i>Eriachne mucronata</i>	Poaceae	Wanderrie grass		✓	✓		
<i>Eriochloa crebra</i>	Poaceae	Cup grass		✓	✓	✓	✓
<i>Eriochloa procera</i>	Poaceae	Slender cup grass		✓	✓	✓	✓
<i>Eriochloa pseudoacrotricha</i>	Poaceae				✓	✓	✓
<i>Erythroxylum australe</i>	Erythroxylaceae	Cocaine	Widespread shrub	✓	✓	✓	✓
<i>Eucalyptus camaldulensis</i>	Myrtaceae	River red gum	Nectary	✓	✓		
<i>Eucalyptus cambageana</i>	Myrtaceae	Dawson gum	Component of Brigalow TEC and Endangered RE 11.4.8	✓	✓	✓	✓
<i>Eucalyptus coolabah</i>	Myrtaceae	Coolabah	Riparian tree species	✓	✓	✓	✓
<i>Eucalyptus crebra</i>	Myrtaceae	Narrow leafed ironbark	Nectary	✓	✓	✓	✓
<i>Eucalyptus crebra</i> x. <i>E. populnea</i>	Myrtaceae			✓			✓
<i>Eucalyptus exserta</i>	Myrtaceae	Queensland peppermint			✓		
<i>Eucalyptus fibrosa</i>	Myrtaceae	Broad leafed ironbark	Nectary	✓			
<i>Eucalyptus melanophloia</i>	Myrtaceae	Silver leafed ironbark	Host for Daemel's imperial blue butterfly	✓			✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Eucalyptus orgadophila</i>	Myrtaceae	Mountain coolabah					✓
<i>Eucalyptus platyphylla</i>	Myrtaceae	Poplar gum		✓	✓		✓
<i>Eucalyptus populnea</i>	Myrtaceae	Poplar box	Key component of REs 11.3.2 ad 11.5.3	✓	✓	✓	✓
<i>Eucalyptus tereticornis</i>	Myrtaceae	Queensland blue gum	Nectary	✓	✓	✓	✓
<i>Eulalia aurea</i>	Poaceae	Silky browntop	Host to the Large Yellow Grass Dart	✓	✓	✓	✓
<i>Euphorbia drummondii</i>	Euphorbiaceae	Caustic weed		✓			
<i>Euphorbia tannensis subsp. eremophila</i>	Euphorbiaceae	Bottle tree caustic		✓	✓	✓	✓
<i>Eustrephus latifolius</i>	Laxmanniaceae	Wombat berry	Edible roots, fruit suitable for birds	✓	✓	✓	✓
<i>Evolvulus alsinoides var. decumbens</i>	Convolvulaceae	Tropical speedwell	Host for meadow argus butterfly	✓	✓	✓	✓
<i>Exocarpos latifolius</i>	Santalaceae	Cherry ballart	Edible fruits – Host for the Common Red-eye and Fiery Jewel butterflies.	✓			✓
<i>Ficus opposita</i>	Moraceae	Sandpaper fig	Edible fruits – Host for the Common Moonbeam and Common Crow butterflies	✓	✓	✓	✓
<i>Fimbristylis bisumbellata</i>	Cyperaceae			✓	✓	✓	✓
<i>Fimbristylis dichotoma</i>	Cyperaceae	Common fringe-rush		✓	✓	✓	✓
<i>Flindersia australis</i>	Rutaceae	Crows ash	Host to the orchard butterfly	✓			✓
<i>Flindersia dissosperma</i>	Rutaceae	Scrub leopard ash		✓	✓	✓	✓
<i>Flueggea leucopyrus</i>	Phyllanthaceae	Bushweed		✓			
<i>Galactia tenuiflora</i>	Fabaceae	Snail flower				✓	
<i>Geijera parviflora</i>	Rutaceae	Wilga	Host to the orchard butterfly, dingy swallowtail and tailed citrus swallowtail butterflies	✓	✓	✓	✓
<i>Geijera salicifolia</i>	Rutaceae	Scrub wilga	Host to the orchard butterfly, Macleay's swallowtail, blue triangle and Ulysses butterflies	✓	✓	✓	✓
<i>Glinus lotoides</i>	Molluginaceae	Hairy carpet weed	Host to spotted grass blue butterfly	✓			
<i>Glinus oppositifolius</i>	Molluginaceae		Host to spotted grass blue butterfly	✓			

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Glycine tabacina</i>	Fabaceae	Glycine pea	Host to the Scalloped Grass Yellow	✓	✓	✓	✓
<i>Glycine tomentella</i>	Fabaceae	Woolly glycine	Host to the Common Grass Blue	✓	✓	✓	✓
<i>Gossypium australe</i>	Malvaceae	Rose cotton bush				✓	
<i>Grevillea parallela</i>	Proteaceae	Silver oak		✓			✓
<i>Grevillea striata</i>	Proteaceae	Beefwood		✓	✓	✓	✓
<i>Grewia latifolia</i>	Malvaceae	Dysentery bush	Edible fruit	✓	✓	✓	✓
<i>Grewia retusifolia</i>	Malvaceae	Dysentery bush	Edible fruit	✓	✓	✓	✓
<i>Hakea lorea</i>	Proteaceae	Bootlace oak		✓	✓	✓	✓
<i>Heliotropium ovalifolium</i>	Boraginaceae	Grey leaved heliotrope		✓	✓		✓
<i>Heteropogon contortus</i>	Poaceae	Black speargrass		✓	✓	✓	✓
<i>Heteropogon triticeus</i>	Poaceae	Giant speargrass		✓			
<i>Hibiscus meraukensis</i>	Malvaceae				✓		
<i>Hibiscus sturtii</i> subsp. <i>sturtii</i>	Malvaceae	Sturt's hibiscus		✓		✓	
<i>Hovea longipes</i>	Fabaceae	Purple pea bush		✓			✓
<i>Hybanthus enneaspermus</i>	Violaceae	Purple spade flower	Host to the glasswing butterfly	✓	✓	✓	✓
<i>Indigofera australis</i>	Fabaceae	Australian indigo			✓		
<i>Indigofera colutea</i>	Fabaceae	Sticky indigo	Host to the Grass Jewel	✓	✓		
<i>Indigofera linifolia</i>	Fabaceae			✓	✓	✓	✓
<i>Indigofera linnaei</i>	Fabaceae	Birdsville indigo		✓	✓	✓	✓
<i>Ipomoea plebeia</i>	Convolvulaceae	Bell vine		✓			✓
<i>Ipomoea polymorpha</i>	Convolvulaceae	Morning glory		✓			
<i>Iseilema vaginiflorum</i>	Poaceae	Red flinders grass		✓		✓	
<i>Jacquemontii paniculata</i> var. <i>paniculata</i>	Convolvulaceae					✓	✓
<i>Jasminum didymum</i> subsp. <i>lineare</i>	Oleaceae	Jasmine	Edible fruit	✓	✓	✓	✓
<i>Jasminum simplicifolium</i>	Oleaceae	Stiff jasmine				✓	

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Juncus usitatus</i>	Juncaceae	Common rush		✓	✓	✓	✓
<i>Kennedia procurrens</i>	Fabaceae			✓			
<i>Leptochloa digitata</i>	Poaceae	Umbrella canegrass		✓	✓	✓	✓
<i>Leersia hexandra</i>	Poaceae	Southern cut grass	Host to the Orange Grass Dart, Swamp Darter, Hyaline Swift, Grey Swift and Evening Brown				✓
<i>Lobelia concolor</i>	Campanulaceae	Poison pratia		✓	✓	✓	✓
<i>Lomandra filiformis</i>	Laxmanniaceae	Wattle matt rush		✓		✓	✓
<i>Lomandra longifolia</i>	Laxmanniaceae	Long leafed matt rush	Orange ochre, Small Orange Ochre,	✓	✓	✓	✓
<i>Lophostemon suaveolens</i>	Myrtaceae	Swamp mahogany	Host to the Rare Red-eye, Fiery Jewel, Miskin's Jewel and Narcissus Jewel	✓			
<i>Ludwigia octovalvis</i>	Onagraceae	Willow primrose		✓	✓	✓	✓
<i>Ludwigia peploides subsp. montevidensis</i>	Onagraceae			✓	✓	✓	✓
<i>Lysiphyllum carronii</i>	Caesalpiniaceae	Red bauhinia		✓	✓	✓	✓
<i>Lysiphyllum hookeri</i>	Caesalpiniaceae	White bauhinia		✓	✓	✓	✓
<i>Maireana microphylla</i>	Chenopodiaceae			✓	✓	✓	✓
<i>Marsdenia viridiflora</i>	Apocynaceae		Host to the Common Crow	✓	✓	✓	✓
<i>Marsilea drummondii</i>	Marsileaceae	Common nardoo	Aquatic fern, edible sporing body	✓	✓	✓	✓
<i>Marsilea exarata</i>	Marsileaceae	Sway back Nardoo			✓		
<i>Marsilea mutica</i>	Marsileaceae	Shiny nardoo	Edible fruits	✓			
<i>Melaleuca bracteata</i>	Myrtaceae	Black tea tree	Nectary	✓			✓
<i>Melaleuca fluviatilis</i>	Myrtaceae	River tea tree	Nectary	✓			
<i>Melaleuca linariifolia</i>	Myrtaceae	Snow in summer	Nectary	✓			✓
<i>Melaleuca viridiflora</i>	Myrtaceae	Tea tree	Nectary	✓			
<i>Melhanian oblongifolia</i>	Pentapetaceae	Velvet hibiscus		✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Microlaena stipoides</i>	Poaceae	Meadow rice grass	Host to the Wedge Grass Skipper, Two-spotted Grass Skipper, Lilac Grass Skipper, White-banded Grass Dart, White-margined Grass Dart, Ringed Xenica, Silver Xenica, Common Brown and Spotted Brown.	✓			✓
<i>Micromyrtus capricornia</i>	Myrtaceae				✓		
<i>Minuria integerrima</i>	Asteraceae	Smooth minuria		✓		✓	
<i>Monochoria cyanea</i>	Pontederiaceae	Native water hyacinth			✓	✓	✓
<i>Murdannia graminea</i>	Commelinaceae	Slug lily					✓
<i>Myoporum acuminatum</i>	Scrophulariaceae	Water bush	Edible fruit	✓	✓	✓	✓
<i>Myriophyllum simulans</i>	Haloragaceae	Milfoil		✓			✓
<i>Neptunia gracilis</i>	Mimosaceae	Sensitive plant	Host for the Small Grass Yellow	✓			✓
<i>Notelaea microcarpa</i>	Oleaceae	Native olive	Edible fruit	✓			
<i>Nymphoides crenata</i>	Menyanthaceae	Wavy marshwort					✓
<i>Nyssanthus diffusa</i>	Amaranthaceae	Barbed wire weed		✓	✓	✓	✓
<i>Nyssanthus erecta</i>	Amaranthaceae			✓	✓	✓	✓
<i>Ocimum tenuiflorum</i>	Lamiaceae	Holy basil			✓		✓
<i>Ophiuros exaltatus</i>	Poaceae	Canegrass					✓
<i>Ottelia ovalifolia</i>	Hydrocharitaceae	Swamp lily		✓	✓	✓	
<i>Owenia acidula</i>	Meliaceae	Emu apple	Edible fruit	✓	✓	✓	✓
<i>Oxalis radicata</i>	Oxalidaceae			✓	✓	✓	✓
<i>Panicum decompositum</i>	Poaceae	Native millet		✓			✓
<i>Panicum effusum</i>	Poaceae	Hairy panic		✓	✓	✓	✓
<i>Panicum larcomianum</i>	Poaceae			✓			
<i>Panicum queenslandicum</i> var. <i>acuminatum</i>	Poaceae	Yabilla grass		✓			✓
<i>Parsonsia eucalyptophylla</i>	Apocynaceae	Gargaloo	Nectary, host plant for common crow butterfly	✓			
<i>Parsonsia lanceolata</i>	Apocynaceae	Northern silkpod		✓	✓	✓	✓
<i>Paspalidium caespitosum</i>	Poaceae	Brigalow grass		✓	✓	✓	✓

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Paspalidium constrictum</i>	Poaceae	Knottybutt grass		✓	✓	✓	✓
<i>Paspalidium globoideum</i>	Poaceae	Shot grass		✓	✓	✓	✓
<i>Peripleura hispidula</i> var. <i>setosa</i>	Asteraceae				✓		
<i>Perotis rara</i>	Poaceae	Comet grass		✓	✓		
<i>Persicaria decipiens</i>	Polygonaceae	Slender knotweed		✓	✓		
<i>Persicaria attenuata</i>	Polygonaceae	Prince's plume		✓	✓	✓	✓
<i>Persoonia falcata</i>	Proteaceae	Wild pear			✓		
<i>Petalostigma pubescens</i>	Picrodendraceae	quinine	Edible fruits and host to the copper jewel butterfly	✓	✓	✓	✓
<i>Phyllanthus virgatus</i>	Phyllanthaceae			✓	✓	✓	✓
<i>Pimelea haematostachya</i>	Thymelaeaceae						✓
<i>Pittosporum angustifolium</i>	Pittosporaceae	Gumbi gumbi		✓	✓	✓	✓
<i>Pittosporum spinescens</i>	Pittosporaceae	Large fruited orange thorn	Edible fruits, host to dull copper butterfly	✓	✓	✓	✓
<i>Plumbago zeylanica</i>	Plumbaginaceae	Native plumbago	Host to the Zebra Blue butterfly				✓
<i>Polygala linariifolia</i>	Polygalaceae	Native milkwort		✓		✓	
<i>Polygonum plebeium</i>	Polygonaceae	Small knotweed		✓		✓	
<i>Portulaca oleracea</i>	Portulacaceae	Red pigweed		✓	✓	✓	✓
<i>Potamogeton octandrus</i>	Potamogetonaceae	Pondweed		✓		✓	✓
<i>Pseuderanthemum variabile</i>	Acanthaceae	Pastel flower	Host to the Leafwing, Blue Egg-fly, Common Egg-fly, Danaid Egg-fly and Blue Argus	✓	✓	✓	✓
<i>Psydrax odorata</i> forma <i>buxifolia</i>	Rubiaceae			✓	✓	✓	✓
<i>Psydrax odorata</i> subsp. <i>australiensis</i>	Rubiaceae				✓		
<i>Psydrax oleifolia</i>	Rubiaceae	Myrtle wood	Nectary	✓	✓	✓	✓
<i>Pterocaulon redolens</i>	Asteraceae	Pineapple daisy		✓	✓	✓	✓
<i>Pterocaulon serrulatum</i> var <i>serrulatum</i>	Asteraceae	Rag weed		✓	✓	✓	✓
<i>Pterocaulon sphacelatum</i>	Asteraceae	Fruit salad plant		✓	✓		

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Rhynchosia minima</i>	Fabaceae			✓	✓	✓	✓
<i>Rostellularia adscendens</i>	Acanthaceae		Host to the Blue Argus	✓	✓	✓	✓
<i>Salsola australis</i>	Chenopodiaceae	Soft roly poly		✓	✓	✓	✓
<i>Salvia plebeia</i>	Lamiaceae	Common sage					✓
<i>Santalum lanceolatum</i>	Santalaceae	Sandalwood	Edible fruit and host to the wood white and northern jezebel butterflies	✓	✓	✓	✓
<i>Sarcostemma viminalis</i> subsp. <i>brunonianum</i>	Apocynaceae	Caustic vine		✓			✓
<i>Schenkia australis</i>	Gentianaceae			✓			
<i>Scleria mackaviensis</i>	Cyperaceae			✓		✓	
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Chenopodiaceae	Grey roly poly		✓			
<i>Sclerolaena tetracuspis</i>	Chenopodiaceae	Brigalow burr		✓	✓	✓	✓
<i>Secamone elliptica</i>	Apocynaceae	Corky milk vine	Host to the Common Crow and Blue Tiger				✓
<i>Senecio brigalowensis</i>	Asteraceae	Fireweed					✓
<i>Senna coronilloides</i>	Caesalpiniaceae	Brigalow senna	Host for the Lemon Migrant, Common Grass Yellow and Small Grass Yellow				✓
<i>Senna sophora</i> var. (40Mile Scrub J.R.Clarkson+ 6908)	Caesalpiniaceae			✓			
<i>Sesbania cannabina</i>	Fabaceae	Sesbania	Host to the Common Grass Yellow, Wattle Blue, Long-tailed Pea Blue and Spotted Pea Blue	✓	✓	✓	✓
<i>Sida atherophora</i>	Malvaceae			✓	✓	✓	✓
<i>Sida corrugata</i>	Malvaceae			✓	✓	✓	✓
<i>Sida hackettiana</i>	Malvaceae			✓	✓	✓	✓
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	Malvaceae	Shrub sida		✓	✓	✓	✓
<i>Sida trichopoda</i>	Malvaceae			✓	✓	✓	✓
<i>Sida subspicata</i>	Malvaceae	Flannel weed		✓	✓	✓	✓
<i>Solanum ellipticum</i>	Solanaceae	Potato bush		✓	✓	✓	✓
<i>Solanum parvifolium</i> subsp. <i>parvifolium</i>	Solanaceae			✓			

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Sorghum nitidum forma aristatum</i>	Poaceae			✓			
<i>Spermacoce brachystema</i>	Rubiaceae			✓	✓		
<i>Sphaeromorphaea australis</i>	Asteraceae	Nutheads	Host to the Meadow Argus	✓			
<i>Sporobolus actinocladus</i>	Poaceae	Katoora grass					✓
<i>Sporobolus australasicus</i>	Poaceae	Windgrass		✓			
<i>Sporobolus caroli</i>	Poaceae	Fairy grass		✓	✓	✓	✓
<i>Sporobolus disjunctus</i>	Poaceae			✓			
<i>Sporobolus elongatus</i>	Poaceae	Slender rats tail		✓		✓	
<i>Sporobolus scabridus</i>	Poaceae			✓	✓	✓	✓
<i>Stemodia glabella</i>	Plantaginaceae						✓
<i>Stylidium eriorhizum</i>	Stylidiaceae			✓			
<i>Terminalia oblongata</i>	Combretaceae	Yellow wood	Component of northern Brigalow communities, host for brown awl butterfly	✓	✓	✓	✓
<i>Themeda avenacea</i>	Poaceae	Oat grass		✓	✓	✓	✓
<i>Themeda triandra</i>	Poaceae	Kangaroo grass	Host to the Spotted Grass Skipper, White-margined Grass Dart, Evening Brown, Dingy Bushbrown, Cedar Bushbrown, Orange Bushbrown, Orange Ringlet, Dingy Ringlet, Dingy Ring, Ringed Xenica, Klug's Xenica, Common Brown and Shouldered Brown.	✓	✓	✓	✓
<i>Tinospora smilacina</i>	Menispermaceae	Snake vine		✓			
<i>Trianthema triquetra</i>	Aizoaceae	Red spinach				✓	✓
<i>Trichodesma zeylanicum</i>	Boraginaceae	Camel bush		✓			✓
<i>Tricoryne elatior</i>	Johnsoniaceae	Yellow autumn lily		✓		✓	
<i>Triraphis mollis</i>	Poaceae	Purple plumegrass					✓
<i>Ventilago viminalis</i>	Rhamnaceae	Supplejack		✓	✓	✓	✓
<i>Verbena gaudichaudii</i>	Verbenaceae	Native verbena		✓			
<i>Vittadinia dissecta var. dissecta</i>	Asteraceae				✓		✓
<i>Vittadinia pustulata</i>	Asteraceae	Rough fuzzweed			✓		✓
<i>Vittadinia sulcata</i>	Asteraceae	Native daisy		✓	✓		

Scientific name	Family	Common name	Comments	Mine and Access	ETL	Water pipe	Rail
<i>Wahlenbergia gracilis</i>	Campanulaceae	Sprawling bluebell		✓	✓	✓	✓
<i>Wahlenbergia queenslandica</i>	Campanulaceae	Northern bluebell				✓	
<i>Waltheria indica</i>	Byttneriaceae	Sleepy morning		✓	✓	✓	✓
<i>Walwhalleya proluta</i>	Poaceae	Rigid panic					✓
<i>Walwhalleya subxerophila</i>	Poaceae	Melon hole canegrass		✓	✓	✓	✓
<i>Wikstroemia indica</i>	Thymelaeaceae	Tie bush				✓	
<i>Zornia muelleriana</i>	Fabaceae					✓	

Appendix F: Introduced plants recorded from the Study area

Pest plant species recorded from the Study area

Scientific name	Common name	Qld Bio Act *	National status^	Identified in search area	Identified on Mine/ Access	Identified on Water Pipeline	Identified on Rail Corridors	Identified on ETL	Identified on Waste Dump
<i>Acanthospermum hispidum</i>	Star burr			✓	✓		✓	✓	
<i>Alternanthera pungens</i>	Khaki weed				✓				
<i>Argemone ochroleuca</i>	Mexican poppy				✓	✓	✓	✓	✓
<i>Bidens pilosa</i>	Cobblers pegs			✓	✓		✓	✓	✓
<i>Bothriochloa pertusa</i>	Indian couch			✓	✓	✓	✓	✓	✓
<i>Brachiaria mutica</i>	Para grass				✓				
<i>Calyptocarpus vialis</i>	Creeping Cinderella weed							✓	
<i>Cascabela thevetia</i>	Captain Cook bush			✓	✓		✓	✓	
<i>Cenchrus ciliaris</i>	Buffel grass			✓	✓	✓	✓	✓	✓
<i>Chenopodium album</i>	Fat hen				✓	✓			
<i>Chloris gayana</i>	Rhodes grass				✓			✓	
<i>Chloris inflata</i>	Purple top chloris			✓	✓	✓	✓	✓	
<i>Chloris virgata</i>	Feathertop Rhodes grass			✓	✓			✓	
<i>Clitoria ternatea</i>	Butterfly pea				✓		✓	✓	✓
<i>Crotalaria laburnifolia</i> <i>subsp. laburnifolia</i>	Birdflower							✓	✓
<i>Cryptostegia grandiflora</i>	Rubbervine	3	WONS	✓	✓				
<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian gherkin			✓	✓	✓	✓		
<i>Cynodon dactylon</i>	Couch grass			✓	✓	✓	✓	✓	
<i>Dichanthium annulatum</i>	Bluestem				✓				
<i>Echinochloa colona</i>	Awnless barnyard grass			✓	✓	✓	✓	✓	
<i>Emilia sonchifolia</i>	Lilac tasselflower			✓	✓		✓	✓	✓
<i>Erigeron bonariensis</i>	Flax leafed fleabane				✓			✓	✓
<i>Gamochaeta pensylvanica</i>	Pennsylvania cudweed				✓				

Scientific name	Common name	Qld Bio Act *	National status^	Identified in search area	Identified on Mine/ Access	Identified on Water Pipeline	Identified on Rail Corridors	Identified on ETL	Identified on Waste Dump
<i>Gomphocarpus physocarpus</i>	Balloon cottonbush				✓	✓	✓	✓	
<i>Gomphrena celosioides</i>	Gomphrena weed			✓	✓	✓	✓	✓	✓
<i>Harrisia martinii</i>	Harrisia	3		✓	✓	✓	✓	✓	✓
<i>Heliotropium indicum</i>	Indian heliotrope			✓	✓		✓	✓	✓
<i>Hyparrhenia rufa subsp. rufa</i>	Thatchgrass			✓				✓	
<i>Jatropha gossypifolia</i>	Bellyache bush	3	WONS	✓					✓
<i>Lactuca serriola</i>	Prickly lettuce						✓		
<i>Lantana camara</i>	Lantana	3	WONS	✓	✓	✓	✓	✓	✓
<i>Lantana montevidensis</i>	Creeping lantana	3	WONS	✓				✓	
<i>Leucas lavandulifolia</i>				✓	✓		✓	✓	
<i>Macroptilium lathyroides</i>	Phasey bean				✓		✓	✓	
<i>Malvastrum americanum var. americanum</i>	Malvastrum			✓	✓	✓	✓	✓	✓
<i>Mecardonia procumbens</i>				✓				✓	
<i>Megathyrsus maxima</i>	Green panic			✓	✓	✓	✓	✓	✓
<i>Melinis repens</i>	Red natal grass			✓	✓	✓	✓	✓	✓
<i>Melochia pyramidata</i>	Pyramidflower			✓	✓				
<i>Opuntia stricta</i>	Prickly pest pear	3	WONS	✓	✓	✓	✓	✓	✓
<i>Opuntia tomentosa</i>	Velvety tree pear	3	WONS	✓	✓	✓	✓	✓	✓
<i>Panicum coloratum var. makarikariense</i>	Bambatsi panic				✓				
<i>Parkinsonia aculeata</i>	Parkinsonia	3	WONS	✓	✓				
<i>Parthenium hysterophorus</i>	Parthenium	3	WONS	✓	✓	✓	✓	✓	✓
<i>Paspalum dilatatum</i>	Paspalum				✓				
<i>Passiflora foetida</i>	Stinking passionfruit			✓	✓		✓	✓	
<i>Portulaca oleracea</i>	Red pigweed			✓	✓	✓	✓	✓	✓

Scientific name	Common name	Qld Bio Act *	National status^	Identified in search area	Identified on Mine/ Access	Identified on Water Pipeline	Identified on Rail Corridors	Identified on ETL	Identified on Waste Dump
<i>Portulaca pilosa</i>	Hairy pigweed			✓	✓	✓	✓	✓	
<i>Richardia brasiliensis</i>	White eyes			✓	✓	✓	✓		✓
<i>Ricinus communis</i>	Castor oil bush			✓	✓		✓	✓	✓
<i>Salvia reflexa</i>	Mint bush			✓	✓				
<i>Scoparia dulcis</i>				✓	✓	✓	✓	✓	✓
<i>Senecio madagascariensis</i>	Fireweed	3	WONS	✓					
<i>Senna occidentalis</i>	Coffee senna			✓	✓		✓	✓	
<i>Sida cordifolia</i>	Flannel bush			✓	✓	✓	✓	✓	✓
<i>Sida rhombifolia</i>	Paddy's lucerne			✓	✓	✓	✓	✓	✓
<i>Sida spinosa</i>	Spiny sida			✓	✓				
<i>Solanum nigrum</i>	Blackberry nightshade				✓	✓	✓	✓	
<i>Solanum torvum</i>	Devil's fig			✓	✓				
<i>Sonchus oleraceus</i>	Milk thistle			✓	✓	✓	✓	✓	✓
<i>Stachytarpheta cayennensis</i>	Dark blue snakeweed								✓
<i>Stylosanthes hamata</i>	Caribbean stylo			✓	✓			✓	
<i>Stylosanthes scabra</i>	Shrubby stylo			✓	✓	✓	✓	✓	✓
<i>Symphyotrichum subulatum</i>	Wild aster				✓				
<i>Trianthema portulacastrum</i>	Black pig weed			✓	✓				✓
<i>Urena lobata</i>	Caesarweed				✓		✓	✓	
<i>Urochloa mosambicensis</i>	Sabi grass			✓	✓	✓	✓	✓	✓
<i>Vachellia farnesiana</i>	Mimosa			✓	✓	✓	✓	✓	✓
<i>Vachellia nilotica subsp. indica</i>	Prickly acacia	3	WONS	✓					
<i>Verbena bonariensis</i>	Purpletop				✓		✓	✓	
<i>Verbena halei</i>	Slender verbain				✓				
<i>Verbesina encelioides</i>	Grey crownbeard			✓	✓		✓	✓	✓

Scientific name	Common name	Qld Bio Act *	National status^	Identified in search area	Identified on Mine/ Access	Identified on Water Pipeline	Identified on Rail Corridors	Identified on ETL	Identified on Waste Dump
<i>Xanthium orientalis</i>	Noogoora burr			✓	✓	✓	✓	✓	✓

Notes:

* Restricted species under the *Queensland Biosecurity Act 2014* (Qld Bio Act);

^ Species listed as Weed of National Significance

Appendix G: Significance tests (EPBC Act)

Significant Impact Analysis for Threatened Ecological Communities and Threatened Flora Species

In accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DotE 2013a), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. A significant impact is considered to be 'likely' if there is a real or not remote chance or possibility that it could happen (DotE 2013a). If there is scientific uncertainty about the potential impacts and they may be serious or irreversible, the precautionary principle is applicable. Actions leading to 'likely significant impacts' must be referred to the Commonwealth Government under EPBC Act and residual significant impacts (after mitigation has been applied) are subject to provision of offsets under the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (DSEWPC 2012).

To determine 'significance' of residual impacts the guideline contains significance criteria as follows:

Significance Criteria Endangered TECs (Table G1)

1. reduce the extent of an ecological community;
2. fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or rail;
3. adversely affect habitat critical to the survival of an ecological community (e.g. for the long-term maintenance of the community or habitat listed in a recovery plan);
4. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
5. cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
6. cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - i. assisting invasive species, that are harmful to the listed ecological community, to become established;
 - ii. causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; and / or
7. interfere with the recovery of an ecological community.

Significance Criteria for Vulnerable Threatened Species (Table G2)

1. lead to a long-term decrease in the size of an important population of a species;
2. reduce the area of occupancy of an important population;
3. fragment an existing important population into two or more populations;
4. adversely affect habitat critical to the survival of a species (e.g. for activities such as foraging, breeding, roosting, or dispersal or habitat listed in a recovery plan);
5. disrupt the breeding cycle of an important population;

6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
8. introduce disease that may cause the species to decline; and / or
9. interfere substantially with the recovery of the species.

Significance Criteria for Endangered Threatened Species (Table G2)

As above, except that any population is considered important.

Notes:

An 'important population' is a population that is necessary for a species' long term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and / or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

Significant Impact Assessments completed for the Project

The ToR for the Project indicated that consideration of the following MNES (relating to TEC) must be included in the EIS documentation:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) – Endangered TEC;
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin – Endangered TEC; and
- Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions – Endangered TEC.

Only one TEC was located within the Project area and would be impacted by the mine site and access road (EPBC 2017/7867). This Significant Impact Assessment has been completed in Table G1. No further assessments are necessary for other TEC or within other parts of the Project.

For threatened flora species, the ToR require this assessment address impacts on the following listed threatened species:

- *Cycas ophiolitica* – Endangered;
- King Blue-grass (*Dichanthium queenslandicum*) – Endangered;
- Bluegrass (*Dichanthium setosum*) – Vulnerable;
- Black Ironbox (*Eucalyptus raveretiana*) – Vulnerable; and

- Quassia (*Samadera bidwillii*) – Vulnerable.

Detailed desktop and field-based investigations (Section 5.4) indicate that some of these species are unlikely to occur in the Project area (i.e. *Cycas ophiolitica* and Quassia) due to the species distribution and habitat requirements.

The desktop investigations led to a list of four EPBC Act listed flora species considered to have potential or to be likely to occur in the Project area:

- *Aristida annua* – Vulnerable;
- King Blue-grass (*Dichanthium queenslandicum*) – Endangered;
- Bluegrass (*Dichanthium setosum*) – Vulnerable; and
- Black Ironbox (*Eucalyptus raveretiana*) – Vulnerable.

These flora species have been the subject of Significant Impact Assessment (Table G2). Despite targeted searches for these species, no EPBC Act listed threatened flora species were identified within the Project area. The impact of each of four separate Action areas associated with the Project has been considered within the Significant Impact Assessments. It is noted that potential habitat for the above listed species only occurs within the Mine Site and Access Road (EPBC 2017/7867) and Electricity Transmission Line (ETL) (EPBC 2017/7869) components.

Table G1: Threatened Ecological Communities Significant Impact Assessment for Brigalow TEC impacted within the mine site (EPBC 2017/7867)

Significance Criteria	Brigalow (Endangered)
1	There are two patches of Brigalow TEC totalling approximately 13 ha (represented by RE11.4.9) that would be removed by the Mine Site and Access Road (EPBC 2017/7867) however these patches are already degraded by edge effects and are highly fragmented. In addition, the TSSC (2001) reports that approximately 804,264 hectares (661,314 ha in Queensland and 142,950 ha in New South Wales) remains. The impact area represents 0.002% of the existing extent of Brigalow TEC. Further to this there are two small patches of Brigalow TEC located within the Project locality that would not be cleared by the Project (Figure 11 of the main report). No areas of Brigalow TEC were identified within the following components of the Project: ▪ Water Pipeline (EPBC 2017/7868); ▪ Electricity Transmission Line (EPBC 2017/7869); or ▪ Rail Spur (EPBC 2017/7870).
2	The Brigalow TEC community in the Mine Site and Access Road (EPBC 2017/7867) area are already very fragmented, represented by a few small patches in an otherwise disturbed/agricultural landscape. Although the Mine Site and Access Road (EPBC 2017/7867) would clear approximately 13 ha of Brigalow TEC, no patches would be fragmented further as a result of the Project.
3	There is currently no habitat for the Brigalow TEC listed on the Register for Critical Habitat (DEE 2017), however DoE (2013b) identifies that all patches of Brigalow TEC that meet key diagnostic characteristics and condition thresholds for the ecological community are critical to its survival. The two patches of Brigalow TEC that have been mapped within the Mine Site and Access Road (EPBC 2017/7867) area are 7 ha and 6 ha; and meet the condition thresholds for a TEC, although the level of existing fragmentation of the patches of Brigalow TEC within the Project area is high.
4	The areas of Brigalow TEC within the Mine Site and Access Road (EPBC 2017/7867) area would be removed by the Project, however the Project would be managed so as not to modify environmental factors necessary for the survival of Brigalow TEC surrounding the Project. The small patch of Brigalow that have been mapped to the south-west of the Mine Site and Access Road (EPBC 2017/7867) is located more than 1 km from the disturbance boundary and it is unlikely that any potential indirect impacts would modify environmental factors necessary for the survival of the Brigalow TEC. The second small patch that would be retained has been avoided by the Rail Spur (EPBC 2017/7870) and it is unlikely that any potential indirect impacts would modify environmental factors necessary for the survival of the Brigalow TEC.
5	As sated above, the areas of Brigalow TEC within the Mine Site and Access Road (EPBC 2017/7867) area would be removed by the Project, however the Project would be managed so as not to modify environmental factors necessary for the survival of Brigalow TEC

Significance Criteria	Brigalow (Endangered)
	surrounding the Project. The small patch of Brigalow that have been mapped to the south-west of the Mine Site and Access Road (EPBC 2017/7867) is located more than 1 km from the disturbance boundary and it is unlikely that any potential indirect impacts would result in a substantial change in the species composition of the Brigalow TEC. The second small patch that would be retained has been avoided by the Rail Spur (EPBC 2017/7870) and it is unlikely that any potential indirect impacts would result in a substantial change in the species composition of the Brigalow TEC.
6	The Brigalow TEC in the Mine Site and Access Road (EPBC 2017/7867) area would be cleared by the Project. After clearing, burning and weed invasion are considered the most significant threats to areas of Brigalow TEC in Queensland (Butler 2007a). The Mine Site and Access Road (EPBC 2017/7867) is unlikely to significantly increase the level of threat from weeds already experienced given, a Weed and Pest Management Plan would be prepared for the Project. Similarly the threat of fire would be managed through a Emergency Response Procedure proposed to be implemented for the Project.
7	Land clearance is a recognised threat to Brigalow TEC. The Mine Site and Access Road (EPBC 2017/7867) would require clearance of two patches of Brigalow TEC with a combined area of approximately 13 ha (Figure 11). The patches of Brigalow TEC are already small, degraded by edge effects and highly fragmented.
Summary	Two small patches of Brigalow TEC (13 ha) would be cleared as a result of the Mine Site and Access Road (EPBC 2017/7867), however these patches are small (7 ha and 6 ha), already degraded by edge effects and highly fragmented. The total impact represents 0.002% of the existing extent of Brigalow TEC (TSSC 2001). No areas of Brigalow TEC were identified within the following components of the Project: ▪ Water Pipeline (EPBC 2017/7868); ▪ Electricity Transmission Line (EPBC 2017/7869); or ▪ Rail Spur (EPBC 2017/7870). Two small patches of Brigalow TEC would be avoided by the Project (Figure 11) and it is unlikely that any potential indirect impacts would result in significant impacts to these patches of Brigalow TEC. Given this, and the mitigation measures proposed to be implemented for the Project (Table 13), it is unlikely that a significant impact to the Brigalow TEC would result from the following Actions: ▪ Mine Site and Access Road (EPBC 2017/7867); ▪ Water Pipeline (EPBC 2017/7868); ▪ Electricity Transmission Line (EPBC 2017/7869); or ▪ Rail Spur (EPBC 2017/7870).

Table G2: Significant Impact Assessment for EPBC Act listed flora species possible or likely within the Study area

Topic	Criteria	<i>Aristida annua</i>	King blue-grass (<i>Dichanthium queenslandicum</i>)	Bluegrass (<i>Dichanthium setosum</i>)	Black ironbox (<i>Eucalyptus raveretiana</i>)
Legal status	NC Act	Vulnerable	Vulnerable		-
	EPBC Act	Vulnerable	Endangered	Vulnerable	Vulnerable
Life History and Occurrence	Distribution	<i>Aristida annua</i> is endemic to central Queensland. It has been collected at six locations, from west of Dysart south to almost Rolleston (AVH 2018).	King blue-grass has been collected from north of Hughenden to Dalby (AVH 2018). The greatest densities of known populations are on black clay soils around Emerald.	<i>Dichanthium setosum</i> has a wide distribution, being collected from near Palmer River north-west of Cairns through central Queensland into northern New South Wales (DEE 2018a).	The species has a wide distribution in coastal and sub-coastal areas of Queensland, from south of Townsville to Nebo, around Rockhampton and areas 100 km west of the city. It has been recorded from about 23 sites throughout its range, in two main areas: Nebo to Ayr and Aps Creek to Rockhampton (DEE 2018a).
	General habitat requirements	<i>Aristida annua</i> has been collected on basalt and red sandy soil ridges and hills, in <i>Eucalyptus orgadophila</i> woodland (RE 11.8.5) and Blue grass grasslands on basalt (RE 11.8.11). It has been collected in disturbed roadsides and of the six collection sites; four are in non-remnant roadsides or	King blue-grass grows in remnant and non-remnant derived grasslands on alluvium, cracking clays, and basalt. 70% of the entire 67 collections of this species stored in Australian Herbaria (AVH 2018) overlay areas mapped by the Queensland Herbarium as non-remnant. Where King blue-grass has	This blue grass has been collected near the Study area from Saraji Mine 6km to the east (Figure 11). It also grows in cracking clay soil (AVH 2018), particularly in association with Natural Grasslands TEC.	Black Ironbox usually grows along watercourses, and sometimes on river flats or open woodland. Soil varies from sand through to heavy clay. Altitudinal range is 0–300 m and the climate of the area is sub-tropical with an annual rainfall of 650–1100 m. The species is said to be highly salt tolerant.

Topic	Criteria	<i>Aristida annua</i>	King blue-grass (<i>Dichanthium queenslandicum</i>)	Bluegrass (<i>Dichanthium setosum</i>)	Black ironbox (<i>Eucalyptus raveretiana</i>)
		paddocks (some sites have possibly been cleared prior to the time of collection and others possibly after collection). It is also associated with the distribution of Natural Grasslands TEC (DEE 2018a).	been collected within remnant ecosystems, 80% have been with RE 11.8.11: <i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks; and RE 11.8.5: <i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks. King blue-grass has also been collected within RE 11.3.3: <i>Eucalyptus coolabah</i> woodland on alluvial plains (DEE 2018a).		
	Life history	As an annual grass, <i>A. annua</i> would regenerate from disturbance from seedlings rather than vegetative coppice growth. However, the exact triggers and abundance of seed germination is not known (DEE 2018a).	King blue-grass flowers mainly in the wet season (Sharp and Simon 2001). This perennial grass is a palatable stock grazing species and can decline with heavy grazing pressure (Fensham 1998). It has been found that king blue grass significantly increased in density after experimental burning and also after mowing treatments, regardless of the season of treatment (Fensham 1998).	<i>Dichanthium setosum</i> is a perennial grass. It is likely to be capable of vegetative coppice growth after minor disturbance. The timing and abundance of seed germination is not known (DEE 2018a).	Black Ironbox matures at five years, flowers are borne from December–March and fruits may be found from March–September. The fruits mature in late summer and the seeds are expelled within a few weeks. Insects are presumed the primary pollinator and the species is not capable of vegetative reproduction, although it resprouts after fire. The seed germinates after fire (DES 2018).

Topic	Criteria	<i>Aristida annua</i>	<i>King blue-grass (Dichanthium queenslandicum)</i>	<i>Bluegrass (Dichanthium setosum)</i>	<i>Black ironbox (Eucalyptus raveretiana)</i>
	Occurrence within the Project site	This species was not recorded during the field surveys. Sub-standard potential habitat occurs on the Study area in Eucalypt woodland to open forest (BVG5M:3). The potential habitat is impacted by the four components of the Project as follows: ▪ Mine site and access road (EPBC 2017/7867) – potential habitat is present however the species was not recorded during any of the targeted survey work. ▪ Water pipeline (EPBC2017/7868) – no potential habitat impacted. ▪ ETL (EPBC 2017/7869) – potential habitat is present however the species was not recorded during any of the targeted	This species was not recorded during the field surveys. There is no Natural grassland TEC on the Study area, but there are areas of RE11.3.3 (31.4 ha) and other areas of sub-standard potential habitat represented by Eucalypt woodland on alluvial plains (BVG5M:3).	This species was not recorded during the field surveys. Sub-standard potential habitat occurs on the Study area in Eucalypt woodland to open forest (BVG5M:3). The potential habitat is impacted by the four components of the Project as follows: ▪ Mine site and access road (EPBC 2017/7867) – potential habitat is present however the species was not recorded during any of the targeted survey work. ▪ Water pipeline (EPBC2017/7868) – no potential habitat impacted. ▪ ETL (EPBC 2017/7869) – potential habitat is present however the species was not recorded during any of the targeted	Thorough searches along the Isaac River did not locate the species.

Topic	Criteria	<i>Aristida annua</i>	<i>King blue-grass (Dichanthium queenslandicum)</i>	<i>Bluegrass (Dichanthium setosum)</i>	<i>Black ironbox (Eucalyptus raveretiana)</i>
		survey work. Rail spur (EPBC2017/7870) – no potential habitat impacted.		survey work. Rail spur (EPBC2017/7870) – no potential habitat impacted.	
	Generally Recognised threats to the species	The species' grassland habitat has been heavily fragmented by clearing for agriculture therefore replacing native grasses within exotic pasture species (Fensham 1999). Remaining habitat is threatened by degradation by exotic pasture grasses (Fensham 1999).	The species' grassland habitat has been heavily fragmented by clearing for agriculture and replacing native grasses within exotic pasture species (Fensham 1999). Remaining habitat is threatened by degradation by exotic pasture grasses, invasive weeds, inappropriate grazing regimes and clearing of plants and surrounding habitat during construction and on-going management activities and roadside management (Butler 2007b).	Major threats to this blue grass are direct clearing and soil disturbance of plants and associated habitat and weed invasion of grasslands, especially of exotic pasture species such as buffel grass (<i>Cenchrus ciliaris</i>) (Fensham 1999). Clearing of plants and surrounding habitat, during construction and on-going management activities and roadside management is also a considerable threat (DEWHA 2008a).	In the past timber harvesting was a threat. Major threats to the species are rubber vine and exotic grasses, which smother the trees and seedlings and create hot fires detrimental to germination. Black Ironbox has in the past been affected by habitat loss or degradation from water resource developments, e.g. diversions associated with mines and decreased environmental flows (DEWHA 2008c).
	Recovery Actions	There is no recovery plan for the species, however, there is a Draft Recovery Plan for Natural Grassland of the Queensland Central Highlands and northern	There is no recovery plan for the species, however, regional / local priority actions defined by DSWEPC (2013) in the conservation advice for the	There is no recovery plan for the species, however, regional / local priority actions defined by DEWHA (2008a) in the conservation advice for the species	There is no recovery plan for the species, however, there is a draft species management plan (DEWHA 2008c), which indicates the control of rubber vine and

Topic	Criteria	<i>Aristida annua</i>	<i>King blue-grass (Dichanthium queenslandicum)</i>	<i>Bluegrass (Dichanthium setosum)</i>	<i>Black ironbox (Eucalyptus raveretiana)</i>
		Fitzroy Basin (DEWHA 2008b) ecological community of which this species may be a part. Key recovery actions for the grassland are: - Monitor known occurrences to identify threats. - Identify areas of high conservation priority. - Minimise loss, disturbance through development. - Weed management, particularly Parthenium, Parkinsonia, Prickly Acacia and buffel grass. - Pest management. Particularly house mouse. - Incentives for stock management on private property.	species include: - Monitor known occurrences to identify threats. - Identify areas of high conservation priority. - Minimise loss, disturbance through development. - Manage known, potential or emerging threats, including mining practices. - Weed management, particularly Parthenium, Parkinsonia. - Incentives for stock management on private property. - Raise awareness.	include: - Monitor known occurrences to identify threats. - Identify areas of high conservation priority. - Minimise loss, disturbance through development. - Weed management, particularly Coolatai, African Lovegrass and Lippia. - Incentives for stock management on private property. - Develop and implement a suitable fire management strategy. - Undertake seed collection and storage for potential establishment of additional populations.	creation of 30m buffers around populations is appropriate management. Regional / local priority actions defined by DEWHA (2008c) in the conservation advice for the species include: - Monitor known populations to identify threats. - Identify populations of high conservation priority. - Minimise loss, disturbance through development. - Weed management, particularly rubber vine and exotic grasses. - Develop and implement a suitable fire management strategy. - Raise awareness in the community. - Undertake seed collection and storage for potential establishment of additional populations.

Topic	Criteria	<i>Aristida annua</i>	<i>King blue-grass (Dichanthium queenslandicum)</i>	<i>Bluegrass (Dichanthium setosum)</i>	<i>Black ironbox (Eucalyptus raveretiana)</i>
	Project specific impacts	No specimens were located within the Study area, therefore there are no direct impacts. The available habitat represents sub-standard potential habitat for the species. Approximately 569.5 ha would be cleared as follows: ▪ Mine site and access road (EPBC 2017/7867) – 569 ha ▪ ETL (EPBC 2017/7869) – 0.5 ha	No specimens were located within the Study area, therefore there are no direct impacts. The available habitat RE 11.3.3 would be impacted by the Project resulting in clearing of 5.0 ha of potential habitat.	No specimens were located within the Study area, therefore there are no direct impacts. The available habitat represents sub-standard potential habitat for the species. Approximately 569.5 ha would be cleared as follows: ▪ Mine site and access road (EPBC 2017/7867) – 569 ha ▪ ETL (EPBC 2017/7869) – 0.5 ha	No specimens were located within the Study area, therefore there are no direct impacts. Potential habitat on the banks of the Isaac River would remain in its current state.
Significant Impact Assessment (from EPBC Act Policy Statement 1.1 (DoE 2013)).		A species specific recovery plan has not been developed. The draft recovery plan for natural grasslands of central Queensland does not refer to any important populations (Butler 2007).	A species specific recovery plan has not been developed. However, as an endangered species all populations are considered important (in accordance with the 'Significant Impact Guidelines' v 1.1 (DotE 2013a)). There are currently 23 populations known in Queensland and the area of occupancy is 245km². The	A species specific recovery plan has not been developed. The draft recovery plan for natural grasslands of central Queensland does not refer to any important populations (Butler 2007b).	The species is not known to occur on site and was not recorded during recent field surveys. There is no important population on the site.

Topic	Criteria	<i>Aristida annua</i>	King blue-grass (<i>Dichanthium queenslandicum</i>)	Bluegrass (<i>Dichanthium setosum</i>)	Black ironbox (<i>Eucalyptus raveretiana</i>)
			species is indicated as being more common in lightly grazed areas in the Central Highlands. No important populations are affected by the Project.		
	Will the action lead to a long-term decrease in the size of an important population of a species?	<i>Aristida annua</i> is not currently known to occur on site, and therefore it is unlikely that a long-term decrease in an important population will result from this action.	The species is not currently known to occur on site, and therefore it is unlikely that a long-term decrease in an important population will result from this action.	The species is not currently known to occur on site, and therefore it is unlikely that a long-term decrease in an important population would result from this action.	The species is not currently known to occur on site, and therefore it is unlikely that a long-term decrease in an important population would result from this action.
	Will the action reduce the area of occupancy of an important population of a species?	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would reduce the area of occupancy of this species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would reduce the area of occupancy of this species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would reduce the area of occupancy of this species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would reduce the area of occupancy of this species.
	Will the action fragment an existing important population into two or more populations?	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would fragment an existing important population into two or more populations.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would fragment an existing important population into two or more populations.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would fragment an existing important population into two or more populations.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would fragment an existing important population into two or more populations.

Topic	Criteria	<i>Aristida annua</i>	<i>King blue-grass (Dichanthium queenslandicum)</i>	<i>Bluegrass (Dichanthium setosum)</i>	<i>Black ironbox (Eucalyptus raveretiana)</i>
	Will the action adversely affect habitat critical to the survival of a species?	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would adversely affect habitat critical to the survival of a species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would adversely affect habitat critical to the survival of a species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would adversely affect habitat critical to the survival of a species.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would adversely affect habitat critical to the survival of a species.
	Will the action disrupt the breeding cycle of an important population?	This is an annual grass that is reliant on germination for persistence. However, as it is not known to occur on site, the action is unlikely to affect the breeding of an important population.	As it is not known to occur on site, the action is unlikely to affect the breeding of an important population.	As it is not known to occur on site, the action is unlikely to affect the breeding of an important population.	As it is not known to occur on site, the action is unlikely to affect the breeding of an important population.
	Will the action modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Given this species has not been recorded during the targeted surveys it is unlikely that the Project would modify, destroy or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
	Will the action result in establishment	The species was not recorded in the Study area and the potential habitat	The Project may result in increased weed invasion in surrounding areas of	The Project may result in increased weed invasion in surrounding areas of	The Project may result in increased weed invasion in surrounding areas of

Topic	Criteria	<i>Aristida annua</i>	King blue-grass (<i>Dichanthium queenslandicum</i>)	Bluegrass (<i>Dichanthium setosum</i>)	Black ironbox (<i>Eucalyptus raveretiana</i>)
	of harmful invasive species in the species' habitat?	occurring is of a sub-standard quality. The Project may result in increased weed invasion in surrounding areas of potential habitat. However, washdown procedures would be implemented to dramatically reduce the risk of weeds being introduced. Given this, it is unlikely that the Project would result in establishment of harmful invasive species in the species' habitat	potential habitat. However, weed management measures to be implemented for the Project would be implemented to dramatically reduce the risk of weeds being introduced. Given this, it is unlikely that the Project would result in establishment of harmful invasive species in the species' habitat	potential habitat. However, weed management measures to be implemented for the Project would be implemented to dramatically reduce the risk of weeds being introduced. Given this, it is unlikely that the Project would result in establishment of harmful invasive species in the species' habitat	potential habitat. However, weed management measures to be implemented for the Project would be implemented to dramatically reduce the risk of weeds being introduced. Given this, it is unlikely that the Project would result in establishment of harmful invasive species in the species' habitat
	Will the action result in the introduction of disease(s) that may cause the species to decline?	The species was not recorded in the Study area and the potential habitat occurring is of a sub-standard quality. It is unlikely that the Project would result in the introduction of disease(s) that may cause the species to decline given the wash-down procedures that would be implemented for the Project	It is unlikely that the Project would result in the introduction of disease(s) that may cause the species to decline given the wash-down procedures that would be implemented for the Project	The species was not recorded in the Study area and the potential habitat occurring is of a sub-standard quality. It is unlikely that the Project would result in the introduction of disease(s) that may cause the species to decline given the wash-down procedures that would be implemented for the Project	It is unlikely that the Project would result in the introduction of disease(s) that may cause the species to decline given the wash-down procedures that would be implemented for the Project

Topic	Criteria	<i>Aristida annua</i>	King blue-grass (<i>Dichanthium queenslandicum</i>)	Bluegrass (<i>Dichanthium setosum</i>)	Black ironbox (<i>Eucalyptus raveretiana</i>)
	Will the action interfere substantially with the recovery of the species?	Unlikely. No current recovery programs are known to be implemented for <i>A. annua</i> near the site.	Unlikely. No current recovery programs are known to be implemented for <i>D. queenslandicum</i> near the site.	Unlikely. No current recovery programs are being implemented for <i>Dichanthium setosum</i> near the site.	Unlikely. No current recovery programs are known to be implemented for black ironbox near the site.
	Conclusion	<i>Aristida annua</i> is an annual grass known from near Rolleston to Dysart, in central Queensland. Despite surveys, no populations of <i>A. annua</i> have been found on site. Although some potential habitat for this species will be impacted by the mine site (569 ha) and ETL (0.5 ha), it is considered unlikely that the Project would result in a significant impact to <i>A. annua</i>.	King blue-grass is a perennial grass known from north of Hughenden to Dalby. Although some potential habitat for this species will be impacted by the mine site (569 ha) and ETL (0.5 ha), it is considered unlikely that the Project would result in a significant impact to <i>D. queenslandicum</i>.	<i>Dichanthium setosum</i> is a perennial grass known from north Queensland to northern New South Wales. Although some potential habitat for this species will be impacted by the mine site (569 ha) and ETL (0.5 ha), it is considered unlikely that the Project would result in a significant impact to <i>D. setosum</i>.	Black ironbox usually grows along watercourses in coastal and sub-coastal areas of Queensland, from south of Townsville to Nebo, around Rockhampton and areas 100 km west. Despite surveys, no populations of black ironbox have been found on site. Although some potential habitat for this species has been identified on the Isaac River within the mine site and ETL, it is considered that there is a low risk of a significant impact to black ironbox.

Appendix G References

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Appendix H: Baseline Offset Survey Investigation Report