



# **Ecological Assessment Report**

Calvale to Calliope River Transmission Line Reinforcement Project

**Final**

August 2025





## Ecological Assessment Report

Calvale to Calliope River Transmission Line  
Reinforcement Project

### Final

Prepared by  
Umwelt (Australia) Pty Limited

On behalf of  
Powerlink Queensland

Project Director: Gavin Elphinstone  
Project Manager: Julius Frias  
Technical Director: David Gatfield  
Technical Manager: Jamie Ernst  
Report No.: 30283\_R13  
Date: August 2025



This report was prepared using  
Umwelt's ISO 9001 certified  
Quality Management System.

# Acknowledgement of Country

Umwelt acknowledges the Traditional Owners of Country throughout Australia and their continuing values, culture and connection to the land, waters and sky.

We pay our respects to Elders past and present.

The below image is from the artwork *Yapung Maryiyang* (Pathway Forward) by Saretta Fielding.



## Disclaimer

This document has been prepared for the sole use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Umwelt (Australia) Pty Ltd (Umwelt). No other party should rely on this document without the prior written consent of Umwelt.

Umwelt undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. Umwelt assumes no liability to a third party for any inaccuracies in or omissions to that information. Where this document indicates that information has been provided by third parties, Umwelt has made no independent verification of this information except as expressly stated.

©Umwelt (Australia) Pty Ltd

## Document Status

Rev No.	Reviewer Name	Date	Approved for Issue Name	Date
V1	Jamie Ernst	10/02/2025	Julius Frias Gavin Elphinstone	10/02/2025
V2	Amelia Mack	03/03/2025	Julius Frias Gavin Elphinstone	03/03/2025
V3	Gillian Turner	29/07/2025	Julius Frias Gavin Elphinstone	04/08/2025
V4	Jamie Ernst	03/09/2025	Elliott Fairon	03/09/2025

# Executive Summary

Powerlink Queensland (Powerlink) is proposing to reinforce the Gladstone electricity network by constructing a new transmission line along an existing transmission infrastructure corridor located between the Calvale Substation near Biloela and the Calliope River Substation near Gladstone in Central Queensland. The Calvale to Calliope River Transmission Line Reinforcement Project (the Project) comprises a new double-circuit 275 kilovolt (kV) transmission line proposed to be developed mostly within existing partially vacant easement as well as the expansion of the Calliope River substation. Umwelt has been commissioned by Powerlink to conduct an ecological assessment for the Project, including Matters of State Environmental Significance (MSES) to support a Ministerial Infrastructure Designation (MID).

Key terminology used throughout this document include:

- **Study Area:** The Study Area extends from the Calvale Substation site to the Calliope River Substation site and includes the existing powerline easement with a varying buffer for each section. The Study Area covers approximately 14,293 hectares (ha) and extends for 87 kilometres (km).
- **Disturbance Footprint:** The area required to construct and operate the Project. This includes the transmission line, grid connection of the new transmission line to the Calvale Substation, expansion of the Calliope River substation, and other ancillary infrastructure (i.e. tower pads, access tracks, laydown areas, batch plants and brake and winch sites).
- **MID Proposal Area (MPA):** represents the areas of the Project alignment that are not captured by an existing designation and are therefore the subject of the MID proposal.
- **MID Disturbance Area (MDA):** represents the disturbance footprint within the MPA.

Desktop assessments were conducted within the MDA and wider Study Area at the Project's inception and revised throughout the Project's development. To identify ecological values across the Disturbance Footprint and MDA, 12 field surveys were completed in total and occurred from 2023 to 2025.

Based on species records and habitat found during the field surveys, a detailed likelihood of occurrence assessment was conducted for all threatened species identified in the desktop assessments. Across the Study Area and Disturbance Footprint a total of 57 species listed under the Nature Conservation Act 1992 (NC Act) were considered known to occur or to have a moderate or high likelihood of occurrence, including 12 threatened flora species, 31 threatened fauna species, and 14 special least concern fauna species. Of these 57 species, four threatened flora, three threatened fauna and three special least concern species were observed (known) through field survey effort.

Despite the widespread impacts of historical clearing, thinning, and exotic weeds throughout much of the Study Area, the spatial extent of the Project covers a diverse range of habitats suitable for the aforementioned NC Act listed species. These habitats include connected areas of remnant and non-remnant vegetation, farmland, and coastal vegetation (eastern section only).



The Project alignment was strategically chosen to minimise vegetation clearing by utilising an existing easement. This approach eliminates the need for extensive lengths of new access tracks, reduces the overall environmental footprint, and allows for more precise micro-siting of transmission line towers, increasing the likelihood of avoiding MSES within the Study Area.

Powerlink also implemented the hierarchy of management principles in the planning and development phase of the Project. The Project has prioritised avoidance as part of the site selection and design and will continue to consider ecological constraints during the detailed design phase. Where avoidance is not possible, Powerlink will maximise opportunities to micro-site infrastructure and will implement mitigation and management measures across the life of the Project to reduce and manage impacts to biodiversity. Whilst the assessment of potential impacts has focused on the MDA, the avoidance and mitigation measures also encompass and incorporate the wider Project.

A Significant Residual Impact (SRI) assessment was undertaken for MSES present in the MDA utilising the *Significant Residual Impact Guideline* (Department of State Development, 2014). A total of five relevant MSES were mapped within the MDA, these being: regulated vegetation, connectivity areas, protected wildlife habitat, waterway providing fish passage and marine plants. Of the five MSES, Regulated vegetation, connectivity areas, waterways providing for fish passage and marine plants were assessed in reference to State code 11 (removal, destruction or damage of marine plants), State code 16 (native vegetation clearing) and State code 18 (constructing or raising waterway barrier works in fish habitats) of the State Development Assessment Provisions (SDAP). All other MSES were also assessed within coastal erosion prone areas of the MDA as part of State code 8 (coastal development and tidal works) of the SDAP. The findings of the assessment indicate that the Project has the potential or is likely to result in an SRI on two MSES, these being regulated vegetation and marine plants. In coastal erosion prone areas of the MDA, the SRI for protected wildlife habitat found that impacts are likely not significant. A summary of the key assessment findings for significant residual impact assessments are presented in **Table ES.1** below.

**Table ES.1 Summary of the Key Assessment Findings**

<b>MSES</b>		<b>Extent within the MDA (ha)</b>	<b>SRI Assessment Outcome</b>
<b>Relevant MSES</b>			
Regulated Vegetation	‘Endangered’ or ‘Of concern’ REs	1.1	Not Significant
	Within a defined distance of a watercourse	0.9	<b>Significant</b>
	Essential habitat	14.5 (37% reduction within the MPA)	<b>Significant</b>
Connectivity areas		-	Not significant
Protected wildlife habitat*	<i>Samadera bidwilli</i>	0.2	Not significant
	Ghost bat	0.2	Not significant
	Painted honeyeater	0.2	Not significant
	Water mouse	0.02	Not significant
	White-throated needletail	0.2	Not significant
	Threatened shorebirds	0.02	Not significant
	Short-beaked echidna	0.2	Not significant
Waterway providing for fish passage		-	Not significant
Marine plants		0.025	<b>Significant</b>

# Contents

<b>Executive Summary</b>	<b>i</b>
<b>1.0 Introduction</b>	<b>1</b>
1.1 Project Background	1
1.2 Study Area	2
1.2.1 Disturbance Footprint	7
1.3 Assessment Aims and Scope	13
<b>2.0 Project Description</b>	<b>14</b>
2.1 Construction	14
2.1.1 Materials and Resources	14
2.1.2 Transmission Line and Towers	15
2.1.3 Ancillary Infrastructure	17
2.2 Operation and Maintenance	17
2.2.1 Transmission Line Maintenance	18
2.2.2 Substation Maintenance	19
2.3 Decommissioning and Rehabilitation	19
<b>3.0 Legislative Context</b>	<b>20</b>
3.1 Nature Conservation Act 1992	20
3.2 Environmental Offsets Act 2014	20
3.3 Vegetation Management Act 1999	22
3.4 Biosecurity Act 2014	22
3.5 Planning Act 2016	22
3.6 Fisheries Act 1994	23
3.6.1 Waterway Barrier Works	23
<b>4.0 Assessment Methodology</b>	<b>24</b>
4.1 Desktop Assessment	24
4.2 Field Survey	25
4.2.1 Terrestrial Flora	26
4.2.2 Terrestrial Fauna	39
4.2.3 Survey Effort and Adequacy	51

4.2.4	Survey Limitations	62
4.3	Likelihood of Occurrence	62
4.4	Field Verified Mapping	63
4.4.1	Refined Vegetation Communities and Broad Fauna Habitats	63
4.4.2	Threatened Species Habitat Modelling	63
4.5	Significant Residual Impact Assessment	64
<b>5.0</b>	<b>Environmental Context</b>	<b>65</b>
5.1	Regional Context	65
5.1.1	Bioregion and Subregion	65
5.1.2	Climate	66
5.1.3	Landform and Geology	68
<b>6.0</b>	<b>Description of Ecological Values</b>	<b>78</b>
6.1	Vegetation Communities	78
6.1.1	Regulated Vegetation	78
6.1.2	Vegetation Management Regional Ecosystems	89
6.1.3	Ground-truthed Regional Ecosystems	92
6.2	Flora Diversity	115
6.2.1	Threatened Flora	115
6.2.2	Introduced Flora	126
6.3	Marine Plants	127
6.4	Fauna Habitat Types	131
6.4.1	<i>Corymbia citriodora</i> Open Forest to Woodlands	131
6.4.2	Eucalypt Dominated Open Forests to Woodlands on Hills and Ranges	132
6.4.3	Ironbark Woodland to Open Woodland on Hills and Ranges	133
6.4.4	Eucalypt Dominated Open Forest to Woodland Fringing Drainage Lines and Floodplains	133
6.4.5	Tidal Flats Dominated by Mangroves, Sedges and Grasses	134
6.4.6	Semi-evergreen Vine Thicket	135
6.4.7	Non-remnant Paddocks and Pasture	136
6.5	Fauna Diversity	146
6.5.1	Birds	146
6.5.2	Mammals	146
6.5.3	Reptiles and Amphibians	146



6.5.4	Threatened Fauna	147
6.5.5	Special Least Concern Fauna	149
6.5.6	Introduced Fauna	159
6.6	Essential Habitat	159
6.7	Aquatic Values	170
6.8	Biodiversity Corridors and Connectivity	180
6.9	MSES Summary	182
<b>7.0</b>	<b>Potential Project Impacts</b>	<b>186</b>
7.1	Construction	186
7.1.1	Direct Impacts	186
7.1.2	Indirect Impacts	192
7.2	Operation and Maintenance	200
7.3	Decommissioning and Rehabilitation	200
<b>8.0</b>	<b>Avoidance, Mitigation and Management</b>	<b>201</b>
8.1	Avoid	201
8.2	Minimise	202
8.3	Mitigate and Manage	203
8.3.1	General Mitigation Measures	203
8.3.2	Species Specific Mitigation Measures	209
8.4	Rehabilitate	212
8.5	Offset	212
<b>9.0</b>	<b>Significant Residual Impact Assessment</b>	<b>214</b>
<b>10.0</b>	<b>Conclusion</b>	<b>216</b>
<b>11.0</b>	<b>References</b>	<b>217</b>

## Figures

Figure 1.1	Study Area Boundaries	5
Figure 1.2	Figure Zones	6
Figure 1.3	MPA and MDA	9

Figure 1.4	Disturbance Footprint	10
Figure 4.1	Flora Survey Locations	30
Figure 4.2	Fauna Survey Locations	42
Figure 5.1	Bioregions	67
Figure 5.2	Landforms	69
Figure 6.1	Regulated Vegetation Management Map	79
Figure 6.2	Ground-truthed Regional Ecosystems	106
Figure 6.3	Threatened Flora Records	120
Figure 6.4	Marine Plants Locations	130
Figure 6.5	Fauna Habitat Types	137
Figure 6.6	Threatened and Special Least Concern Fauna Records	150
Figure 6.7	Essential Habitat	161
Figure 6.8	Wetlands and Watercourses	171
Figure 6.9	Site Connectivity	181
Figure 6.10	Coastal Erosion Prone Areas of the MDA Assessed for State Code 8 MSES	185
Figure 8.1	Unexpected Finds Protocol – Threatened Flora	211
Figure 8.2	Powerlink Draft Offsets Framework	213

## Tables

Table 1.1	Study Area Sections	2
Table 1.2	Land Use Within and Surrounding the Study Area	3
Table 1.3	Project Components	7
Table 4.1	Field Surveys Undertaken for the Project	25
Table 4.2	Fauna Field Survey Techniques and Effort	39
Table 4.3	Survey Effort and Adequacy	53
Table 4.4	Likelihood of Occurrence Definitions	63
Table 6.1	Regulated Vegetation Mapped Within the MDA	78
Table 6.2	Regional Ecosystems within the Disturbance Footprint, MPA and MDA	89
Table 6.3	Ground-truthed REs within the MDA	93
Table 6.4	Threatened Flora Likelihood of Occurrence	115
Table 6.5	Introduced Flora Recorded within the Study Area	126

Table 6.6	Coverage of Marine Plant Types in the MDA	128
Table 6.7	Marine Plants Observed Within Field Surveys of the MDA	128
Table 6.8	Fauna Habitat Types	131
Table 6.9	Threatened Fauna Likelihood of Occurrence	147
Table 6.10	Special Least Concern Fauna Likelihood of Occurrence	149
Table 6.11	Introduced Fauna Record in Study Area	159
Table 6.12	Essential Habitat Occurrence by MPA Lot and Plan	159
Table 6.13	Summary of MSES	182
Table 7.1	Potential Direct Impacts to Regulated Vegetation	186
Table 7.2	Ground-truthed REs within the MDA	187
Table 7.3	Marine Plants (ha) within the MDA	187
Table 7.4	Predicted Maximum Direct Impacts on Threatened Flora and Fauna Habitat within the MDA	188
Table 7.5	Ecological Values at Risk of Indirect Impacts	196
Table 8.1	General Mitigation Measures	205
Table 9.1	Summary of the SRI Assessments of the MDA	214

## Photos

Photo 6.1	<i>Acacia pedleyi</i> within Section B (Callide Timber Reserve)	116
Photo 6.2	<i>Cycas megacarpa</i> observed with the Calliope Range State Forest	117
Photo 6.3	<i>Grevillea hockingsii</i> observed within Callide Timber Reserve	118
Photo 6.4	<i>Samadera bidwillii</i> observed within Callide Timber Reserve	119
Photo 6.5	Low Mangroves with Saltwater Couch Typical of the Disturbance Footprint (northern side of the Calliope River)	128
Photo 6.6	<i>Corymbia citriodora</i> Open Forest to Woodlands	132
Photo 6.7	Eucalypt Dominated Open Forests to Woodlands on Hills and Ranges	132
Photo 6.8	Iron Bark Woodland to Open Woodland on Hills and Ranges	133
Photo 6.9	Eucalypt Dominated Open Forest to Woodland Alluvial Plains	134
Photo 6.10	Tidal Flats Dominated by Mangroves, Sedges and Grasses	135
Photo 6.11	Semi-evergreen Vine Thicket	135
Photo 6.12	Non-remnant Paddocks	136
Photo 6.13	Farm Dams	170

# Appendices

<b>Appendix A</b>	Desktop Search
<b>Appendix B</b>	Likelihood of Occurrence Assessment
<b>Appendix C</b>	Habitat Modelling Criteria
<b>Appendix D</b>	Flora and Fauna Species Lists
<b>Appendix E</b>	Significant Residual Impact Assessment



# 1.0 Introduction

Powerlink Queensland (Powerlink) is proposing to reinforce the Gladstone electricity network by constructing a new transmission line along an existing transmission infrastructure corridor between Calvale Substation and Calliope River Substation in Central Queensland. The Calvale to Calliope River Transmission Line Reinforcement Project (the Project) comprises a new double-circuit 275 kilovolt (kV) transmission line proposed to be developed mostly within existing vacant easement as well as the expansion of the Calliope River substation.

Umwelt has been commissioned by Powerlink to undertake an ecological assessment for the Project, including the examination of the Matters of State Environmental Significant (MSES) relevant to the proposed Ministerial Infrastructure Designation (MID). This assessment will support Powerlink's application to seek a MID from the Minister for State Development, Infrastructure, and Planning. This application has been prepared in accordance with the following:

- *Planning Act 2016* (Planning Act), Chapter 2, Part 5
- Minister's Guidelines and Rules under the *Planning Act 2016* (MGR), Version 3, Chapter 7
- Making or Amending a MID Operational Guidance.

## 1.1 Project Background

In preparation for transitioning the electricity network to renewable supply, Powerlink has identified constraints for the Gladstone transmission grid. To ensure the future security of electricity supply to the Gladstone area, the existing transmission infrastructure corridor between the Calvale Substation and Calliope River Substation is to be strengthened with the establishment of a new transmission line. The Calliope River Substation will also require expansion to accommodate this new connection, however the expansion is sited within an existing designation and is therefore not subject to this MID proposal.

The proposed transmission line is approximately 87 kilometres (km) in length and will be co-located within existing partially vacant easements for most of its route, with a widened easement to be acquired for a portion of the alignment.

The Project is the first of a collection of projects which have been identified as Priority Transmission Investments (PTI) and collectively referred to as the 'Gladstone Project'. The primary purpose of the Gladstone Project is the reinforcement of the Gladstone network to support decarbonisation in the region and provide some incremental renewable connection capacity.

## 1.2 Study Area

The Study Area consists of the existing powerline easement between the Calvale and Calliope River Substations (**Table 1.1**). The Study Area covers approximately 14,293 hectares (ha) and extends for 87 km. The Study Area extends from the Calvale Substation site to the Calliope River Substation site, as illustrated on **Figure 1.1**. For assessment purposes, the Study Area has been split into five sections as detailed in **Table 1.1**. The Study Area is 800 metres (m) on each side of the proposed transmission line in Sections A-D, 100 m around Section E, and 100 m around the footprint of an additional laydown area proposed approximately 1 km north of Section B (**Figure 1.1**).

**Table 1.1 Study Area Sections**

Section	Start of Section	End of Section	Approximate Length (km)	Existing Powerlink Infrastructure
Section A	-24.3418, 150.6270	-24.3268, 150.6560	3.5	132 kV and 275 kV lines Calvale substation
Section B	-24.3268, 150.6560	-23.9344, 150.9174	51.5	One 275 kV line
Section C	-23.9344, 150.9174	-23.9230, 151.0733	16.0	Two 275 kV lines
Section D	-23.9230, 151.0733	-23.8484, 151.1754	13.5	One 275 kV line
Section E	-23.8484, 151.1754	-23.8580, 151.1943	2.0	Two 275 kV lines Calliope River substation

The Study Area is located within two local government areas: Banana Shire and Gladstone Region (**Figure 1.1**). Given the largely narrow and linear nature of both the Study Area and Disturbance Footprint, subsequent figures have been split into nine zones so greater detail can be displayed. **Figure 1.2** provides an overview of the nine zones relevant to the Study Area which are labelled by section 'A-E'.

Topography, land use and vegetation are highly variable throughout the Study Area. The Study Area intersects several small ranges including the Callide and Calliope ranges as well as multiple rivers and creeks. Land use across the Study Area is adjacent to or includes mineral extraction, agriculture (primarily grazing) and industry. Vegetation is a mosaic of remnant and regrowth forests and woodlands interspersed by cleared grassy areas with mangroves and saltmarsh at the eastern extent of the Study Area.

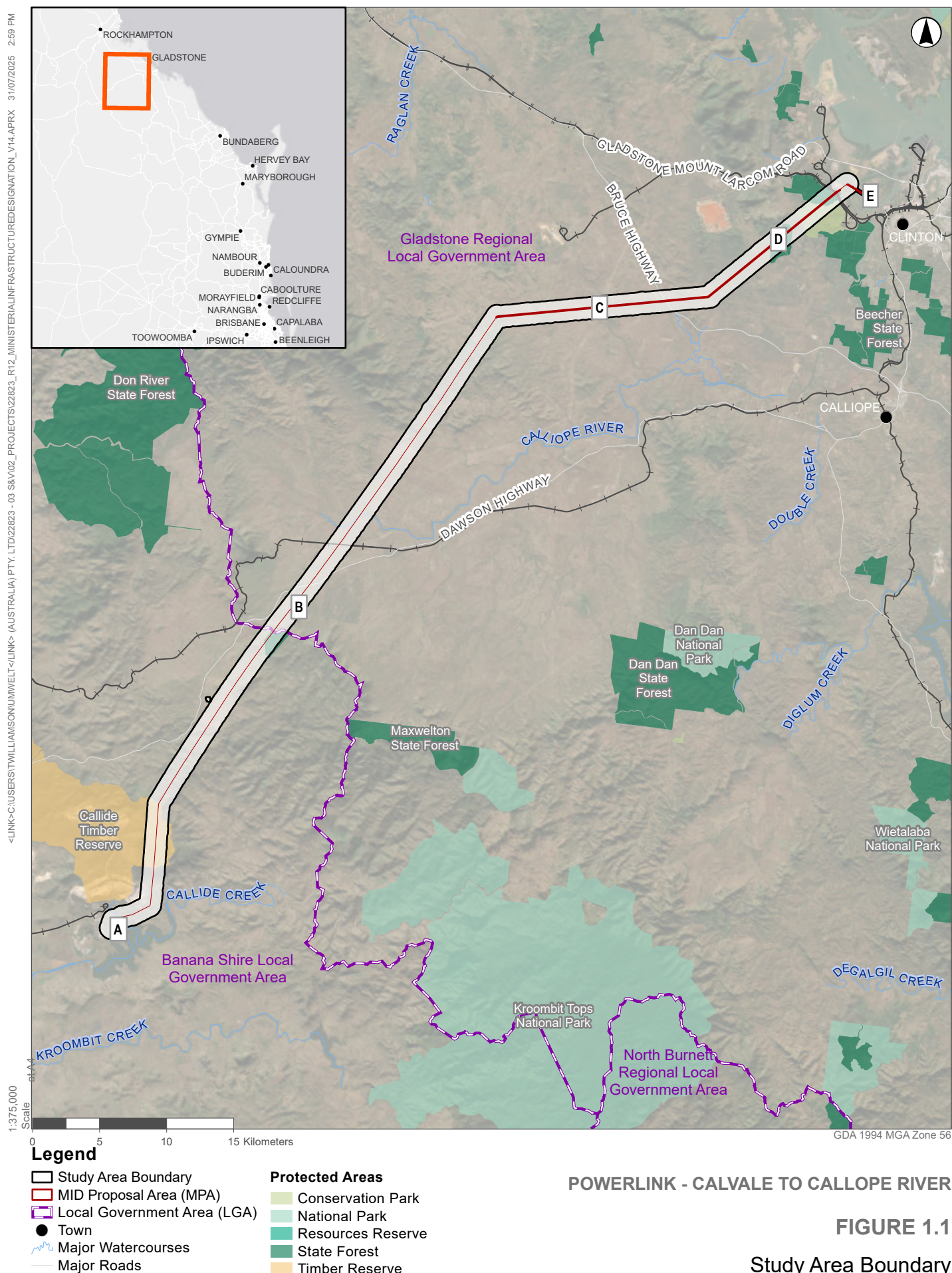
Land uses in each section of the Study Area is detailed in **Table 1.2**.

**Table 1.2 Land Use Within and Surrounding the Study Area**

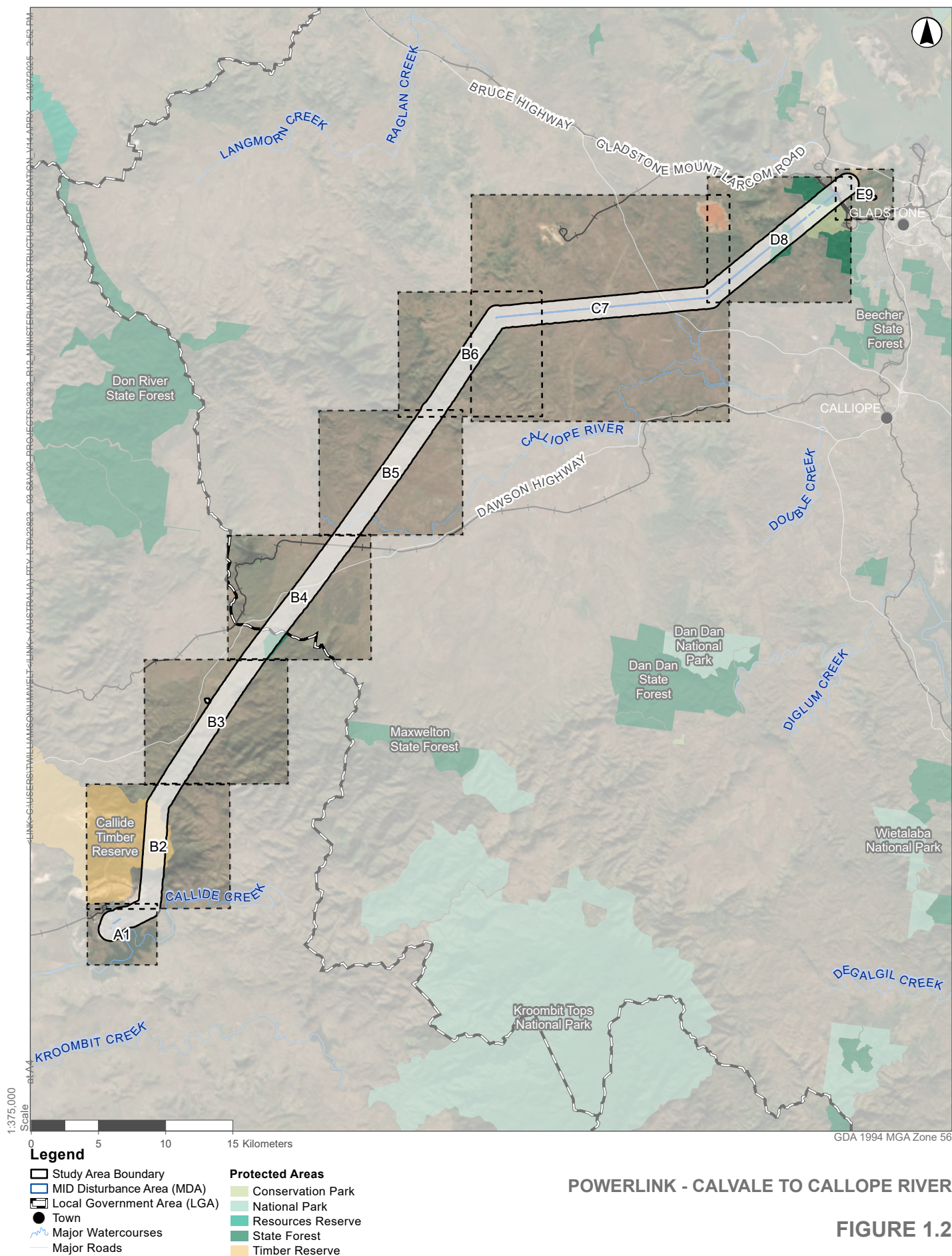
Section	Land Use
<b>Section A</b>	<p>Section A comprises land used for grazing, intensive uses (recreation and culture), conservation and natural environments and reservoir/dam.</p> <p>Section A includes the Calvale Substation and associated transmission infrastructure, located within Lot 1 CP890133. Other land uses surrounding Section A include:</p> <ul style="list-style-type: none"> <li>• Callide Mine (approximately 1 km to the north)</li> <li>• Lake Callide (located 350 m south)</li> <li>• Callide Dam (located 350 m south)</li> <li>• Callide A Power Station (located 300 m north)</li> <li>• Callide B Power Station (located 250 m west)</li> <li>• Biloela-Callide Road (located along the northern boundary of Section A).</li> </ul>
<b>Section B</b>	<p>Section B comprises land used for grazing, production forestry, plantation forestry and other minimal use (conservation). Section B includes one existing Powerlink 275 kV transmission line. Land uses surrounding Section B include:</p> <ul style="list-style-type: none"> <li>• Callide Mine (ML6993 intersects Section B)</li> <li>• Callide Timber Reserve (intersecting Section B to the south)</li> <li>• Calliope Range State Forest (intersecting Section B in the centre)</li> <li>• Pipeline infrastructure operated by APA WGP Pty Ltd, Santos Limited and Australia Pacific LNG Gladstone Pipeline Pty Limited (intersecting Section B)</li> <li>• Dawson Highway (intersecting the centre of Section B)</li> <li>• Moura System Railway (intersecting the centre of Section B).</li> </ul>
<b>Section C</b>	<p>Section C primarily comprises land used for grazing with small areas of transport and communication. Two 275 kV Powerlink transmission lines exist within the Study Area, which are not designated.</p> <p>Land uses surround Section C include:</p> <ul style="list-style-type: none"> <li>• Pipeline infrastructure operated by Jemena Gas Pipelines Holdings Pty Ltd, APA WGP Pty Ltd, Santos Limited and Australia Pacific LNG Gladstone Pipeline Pty Limited (intersecting Section C)</li> <li>• Bruce Highway (intersecting Section C).</li> </ul>
<b>Section D</b>	<p>Section D comprises land used for grazing, production native forests, intensive uses, residential and other minimal use (conservation). Section D includes one existing Powerlink 275 kV transmission line.</p> <p>Land uses surrounding Section D include:</p> <ul style="list-style-type: none"> <li>• Calliope Conservation Park (intersecting Section D to the north)</li> <li>• Mount Stowe State Forest (intersecting Section D to the north)</li> <li>• Rio Tinto Yarwun Alumina Refinery (located 3 km north)</li> <li>• North Coast Line (intersecting the north of Section D).</li> </ul>

Section	Land Use
<b>Section E</b>	<p>Section E comprises land used for conservation and natural environments, mining, other minimal use (conservation) and tidal areas. Section E includes the Calliope River Substation and associated transmission infrastructure, located within Lot 113 CTN799.</p> <p>Land uses surrounding Section E include:</p> <ul style="list-style-type: none"><li>• Gladstone Power Station (located 1 km south)</li><li>• Wiggins Island Coal Terminal (located 2.5 km north)</li><li>• Curtis Island and LNG Facility (located 8 km north).</li></ul>









## 1.2.1 Disturbance Footprint

The Project components and their clearing requirements that make up the Disturbance Footprint are outlined in **Table 1.3**. The Disturbance Footprint represents the extent of direct impacts (i.e. vegetation clearing) for all Project elements. This area represents a worst-case clearing scenario.

### 1.2.1.1 MID Proposal Area (MPA)

MID Proposal Area (MPA): totals 177.5 ha and refers to the areas of the Project alignment that are not captured by an existing designation and are therefore the subject of the MID proposal. The MPA includes a small portion of Section A and Section E and larger areas of Section C and Section D.

### 1.2.1.2 MID Disturbance Area (MDA)

MID Disturbance Area (MDA) totals 93.6 ha and represents the Disturbance Footprint within the MPA.

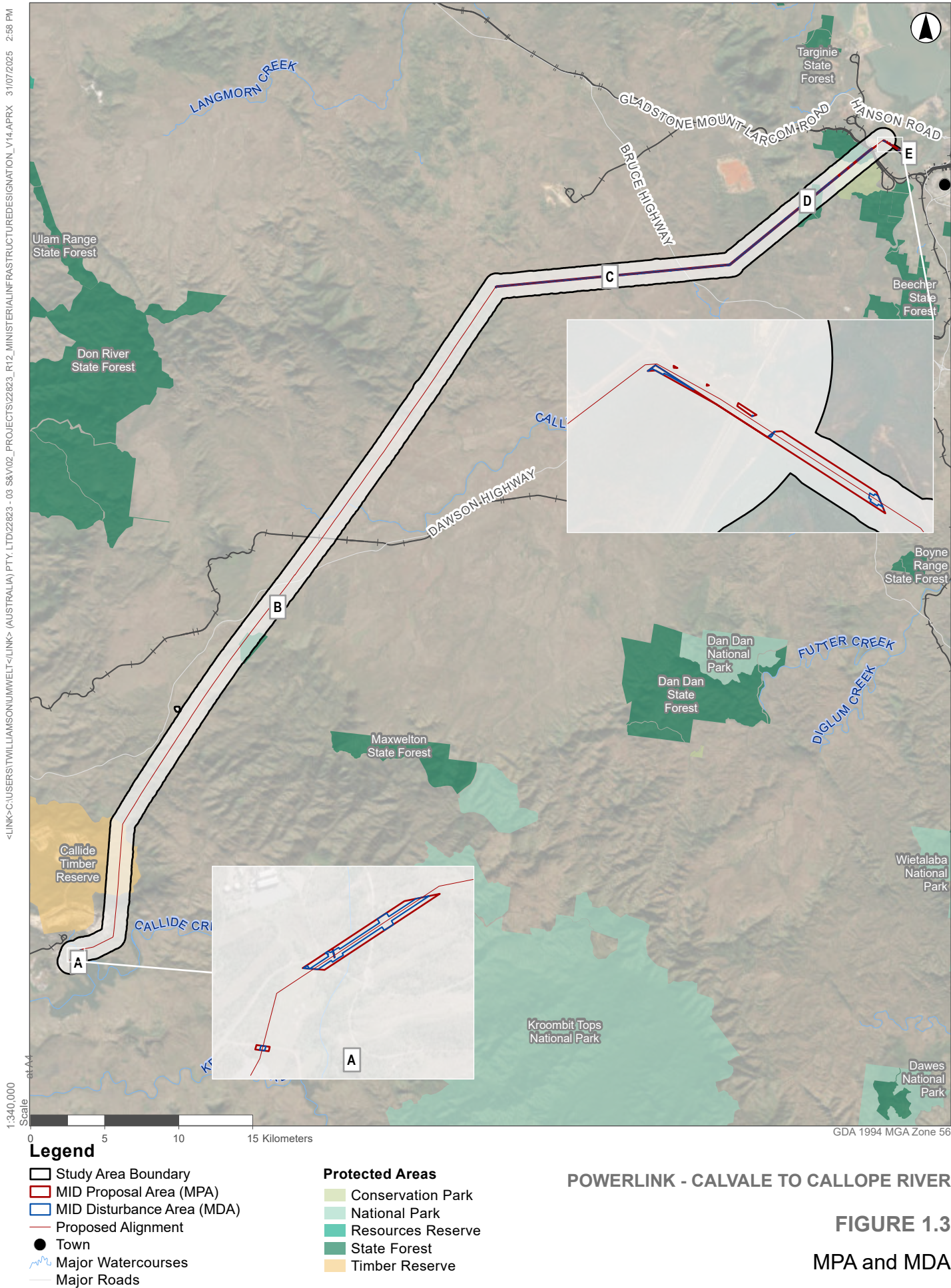
The Disturbance Footprint, MPA and MDA is displayed on **Figure 1.3** and **Figure 1.4** and are labelled by section 'A-E'.

**Table 1.3 Project Components**

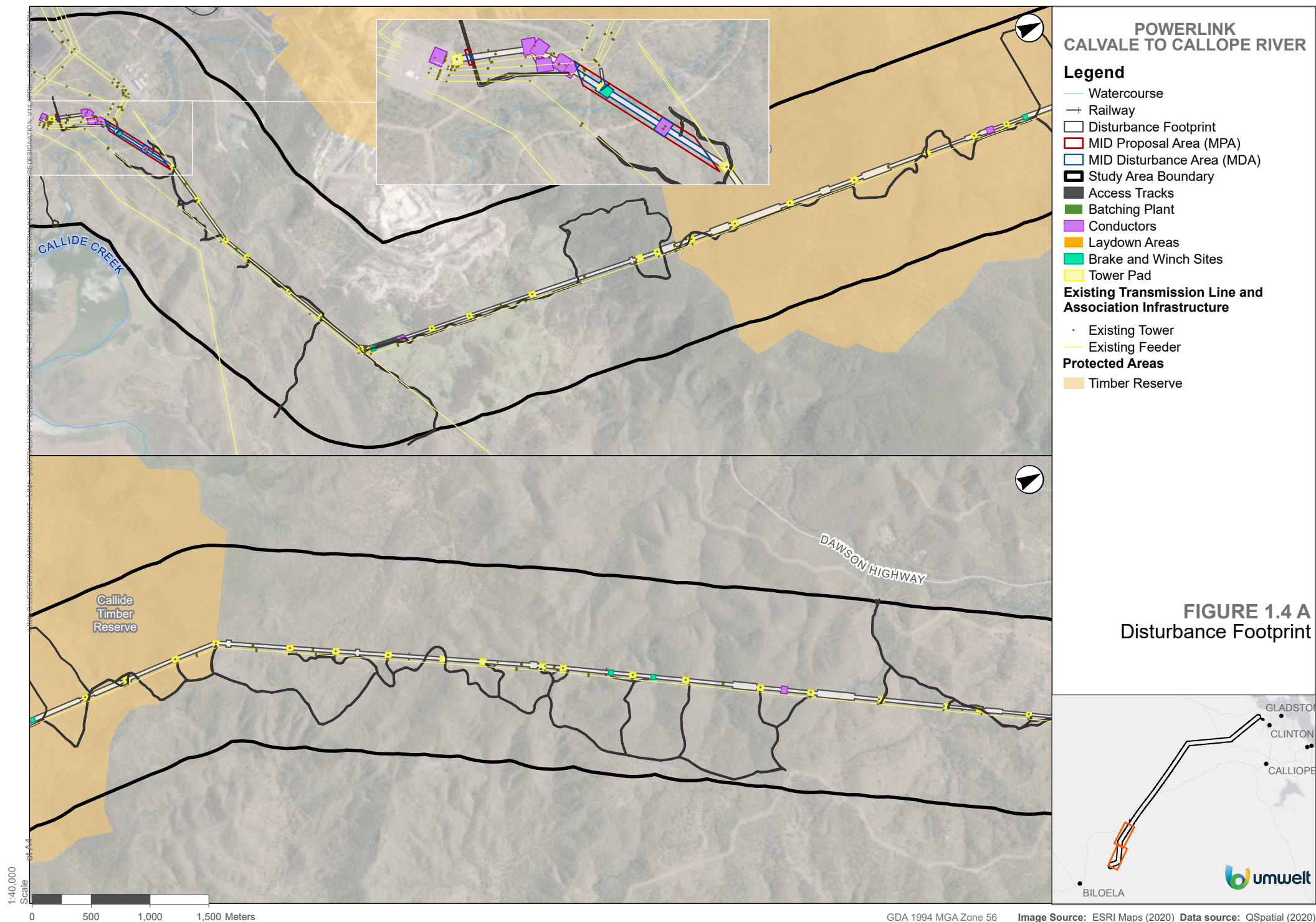
Project Component	Clearing Requirements
<b>Substation – Calvale</b>	<ul style="list-style-type: none"> <li>Grid connection of the new transmission line to the Calvale Substation.</li> </ul>
<b>Substation – Calliope River</b>	<ul style="list-style-type: none"> <li>The existing Calliope River substation comprises of a 275 kV and 132 kV switchyards. The 275 kV switchyard currently comprises of 14 diameters, and this project seeks to extend the switchyard platform to allow for ultimate expansion of up to 12 diameters, including all civil works and earth grid extensions.</li> <li>Establish 2 new diameters within the expansion footprint to connect the new 275 kV double circuit transmission line.</li> <li>Design and install busbar extension.</li> <li>Modification of secondary systems as required.</li> <li>Reconfiguration of OPGW fibre network to establish end-to-end connectivity between Calvale substation and Calliope River substation.</li> <li>The existing 132 kV switchyard comprises 12 diameters. The Project seeks to extend the platform including all civil works and earth grid extensions.</li> <li>Grid connection of the new transmission line to the Calliope River Substation.</li> </ul>
<b>Transmission Line</b>	<p>Transmission line spans are categorised into the following categories:</p> <ul style="list-style-type: none"> <li>High risk</li> <li>Low risk</li> <li>Utilise 8 m vertical and 7 m horizontal clearance of conductor.</li> </ul> <p>High risk spans:</p> <ul style="list-style-type: none"> <li>60 m wide clearing in the mid-span which can be determined from Power Line Systems – Computer Aided Design and Drafting (PLS-CADD) and violation vegetation</li> </ul>

Project Component	Clearing Requirements
	<ul style="list-style-type: none"> <li>• 30 m wide clearing in the areas between tower pad and mid-span clearing</li> <li>• Areas of no clearing (where vegetation can be spanned) – air gap between top of vegetation and bottom of conductor must be a minimum of 1.5 times the height of the vegetation (trees must be at mature height).</li> </ul> <p>Low risk spans:</p> <ul style="list-style-type: none"> <li>• 50 m wide clearing in the mid-span which can be determined from PLS-CADD and violation vegetation</li> <li>• 24 m wide clearing in the areas between tower pad and mid-span clearing</li> <li>• Areas of no clearing (where vegetation can be spanned) – air gap of 10 m between top of vegetation and bottom of conductor (trees must be at mature height).</li> </ul>
<b>Tower Pads</b>	<ul style="list-style-type: none"> <li>• High risk – 50 x 50 m</li> <li>• Low risk – 40 x 40 m</li> <li>• All towers above 50 m in height to be treated as high risk.</li> </ul>
<b>Access Tracks</b>	14 m maximum clearing width.
<b>Laydown Areas</b>	60 x 200 m.
<b>Batch Plants</b>	60 x 200 m.
<b>Conductor Brake and Winch Sites</b>	60 x 50 m.
<b>Conductor and Earth Wire (OPGW) Brake and Winch Sites</b>	40 x 40 m.

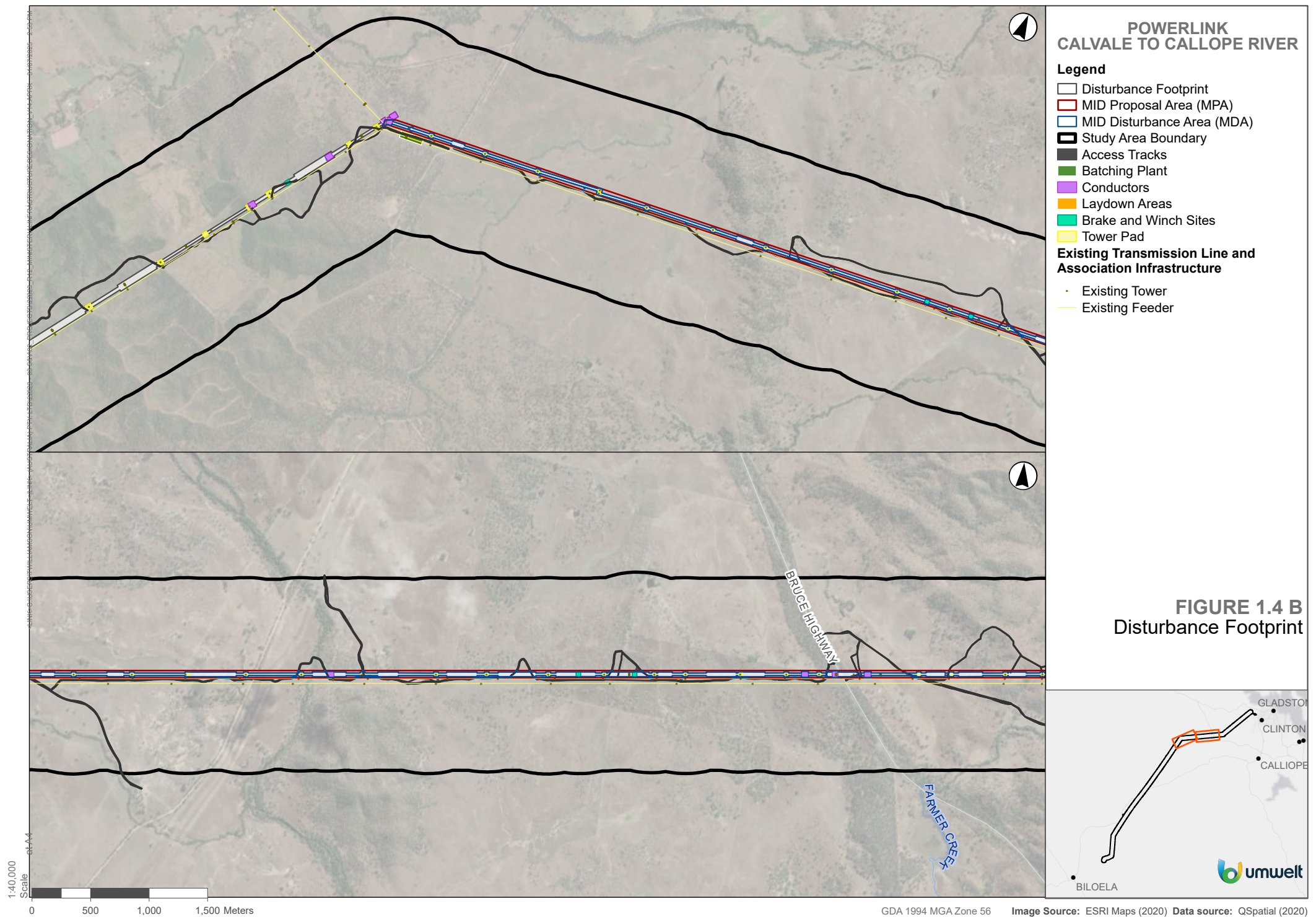




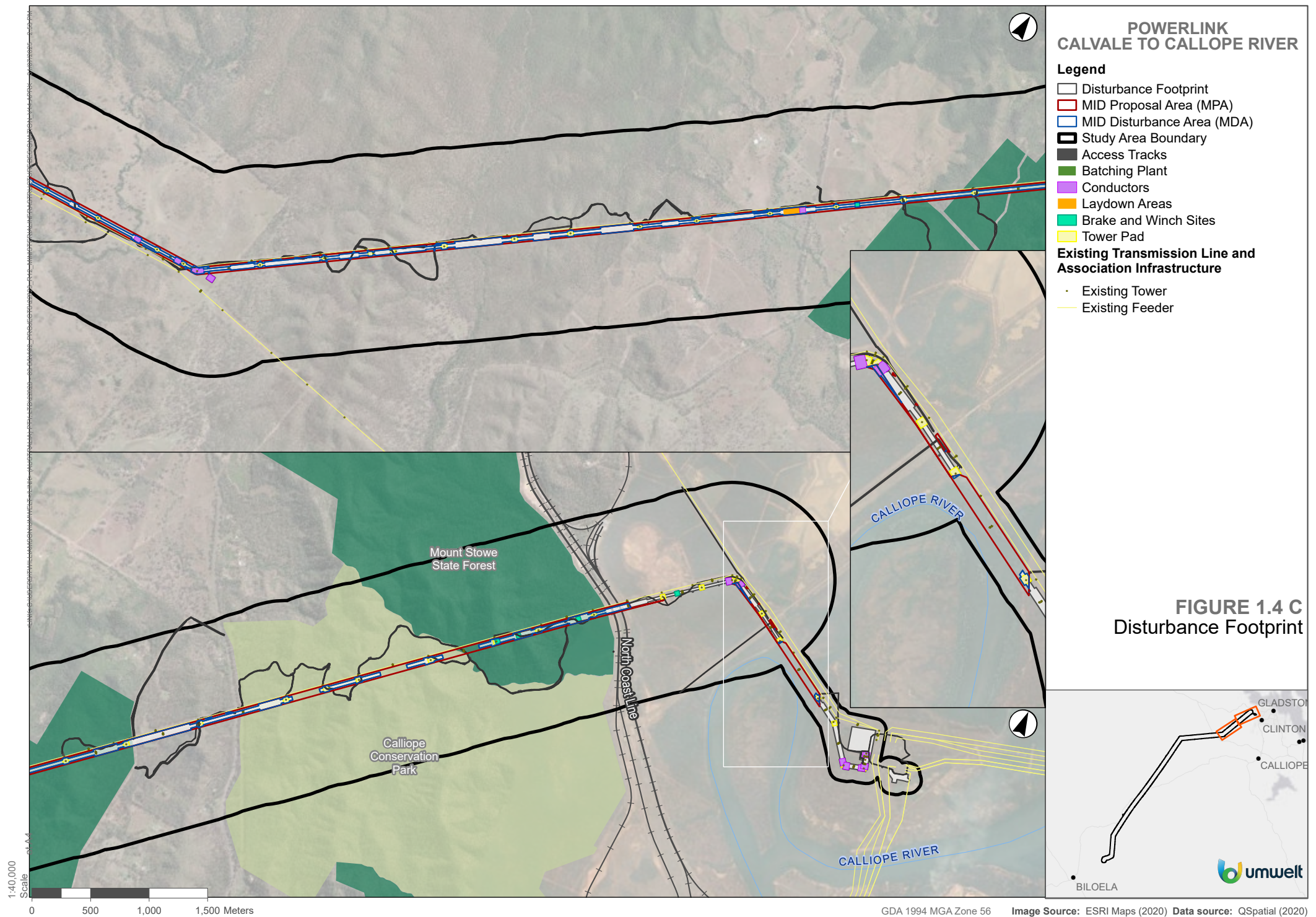












## 1.3 Assessment Aims and Scope

The aim of this report is to describe the ecological values known or likely to occur within the Study Area, MPA and MDA. Within the MDA, this report assesses the impacts of the Project on ecological values, and presents strategies to avoid, minimise or mitigate potential impacts.

To support the MID proposal for the Project, this assessment included the following tasks:

- A desktop review of available literature and previous studies in the vicinity of the Study Area and database searches for known or potentially occurring ecological values.
- Undertaking field surveys to:
  - Document presence and extent of vegetation communities, habitat types and other ecological values within the Study Area
  - Target potentially occurring flora and fauna species listed under the NC Act
  - Identify habitat for known and potentially occurring threatened flora and fauna species.
- Utilise field data, in conjunction with aerial imagery and desktop data, to determine the likely extent of vegetation communities, habitat types and associated MSES across the Study Area.
- Undertake a likelihood of occurrence assessment to confirm known or potentially present threatened flora and fauna within the Study Area.
- Complete a Significant Residual Impact (SRI) assessment for relevant MSES values in the MDA inclusive of recommended mitigation and management measures in accordance with the *Significant Residual Impact Guideline - For matters of state environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009* (Department of State Development, 2014). Relevant MSES across the MDA include regulated vegetation, connectivity, waterway for fish passage and marine plants. Within the coastal protection area of the MDA, all other MSES are assessed, specifically protected wildlife habitat.

## 2.0 Project Description

The Project includes the construction and operation of approximately 87 km of double circuit transmission line and the expansion of the Calliope River substation by 4 x 275 kV diameters and 2 x 132 kV diameters to allow for the decarbonisation of the electricity network and future growth in the Gladstone region.

A summary of the key components of the construction, operation and decommissioning and rehabilitation phases of the Project is provided in the sections below.

### 2.1 Construction

Construction is expected to commence in 2026 with anticipated completion date of December 2028. Construction is anticipated to occur Monday to Saturday between 6.30 am and 6.30 pm (subject to separate approvals from the local government). No night works are proposed during the construction phase.

#### 2.1.1 Materials and Resources

Other than the infrastructure components, key materials required for the construction of the Project include power and fuel, concrete, quarry materials and water. Further information regarding these materials is provided below:

- Water is required for dust suppression, development of access tracks and concrete batching during construction and will be sourced from local dams and existing and new bores in consultation with landholders, and only at locations where supplies are abundant. Extraction of water from local rivers and creeks will be undertaken in accordance with the requirements under the Queensland *Water Act 2000*, if required.
- Access to quarry materials during construction is required for access tracks, waterway crossings, erosion and sediment controls, foundations as well as ongoing maintenance. These materials include, but are not limited to, rock, gravel, sand and soils. Where available these materials will be source from local registered quarries.
- Several concrete batching plants are anticipated to be required for construction of the Project. Concrete suppliers located in Biloela and Gladstone will be used and to supplement this supply, concrete batching plants will be located within the Disturbance Footprint. Once the batching plants are decommissioned, the areas will be used as laydown areas during the construction phase.
  - Mobile batching plants may be used for construction areas located too far from proposed batching plants and concrete supplies. Mobile batching plants will only be used when the time to travel from batching plants to the start of curing of concrete exceeds the time limits specified by engineering standards.
- Either diesel or unleaded petrol will be required for generators, machinery and vehicles. Generators are required to power site offices and will also be required at the substation location for power generation Fuel storage and refuelling activities will occur only in a controlled and designated location.



## 2.1.2 Transmission Line and Towers

Construction of the transmission line will include the completion of the following activities:

- Site preparation, including site set out, pre-clearance surveys and vegetation clearing
- Establishment of laydowns and offices
- Installation of gates, grids, clean down bays and access tracks
- Tower site benching
- Foundation excavation and installation
- Establishment of brake and winch sites
- Structure assembly and erection using a large mobile crane
  - Assembly of prefabricated components is usually completed adjacent to the final site. A large mobile crane will be used to erect the towers in sections.
- Conductor and OPGW stringing are carried out as either conventional or aerial stringing as further described below. The determination of methodology is based on several factors such as but not limited to: structure and alignment design, terrain, environmental and cultural heritage constraints, sensitive receptors, land usage and/or landowner constraints, schedule, cost effectiveness or risk
  - Conventional stringing involves the clearing of two or more tracks directly underneath and in line with the structure crossarms. Earth moving equipment (tractor, bulldozer or similar) will then pull steel draw wire across the ground in a slack state from one structure to another down the alignment. The draw wire is then manually raised and placed into the stringing pulleys attached to the cross arms ready for running conductor
  - Aerial stringing is the method of attaching draw wire or specialised rope to either a helicopter or drone which is then flown from one structure to another lowering the draw wire or rope directly into the stringing pulleys. Aerial stringing may be carried out under tension with the assistance of a tensioner or other braking equipment (tesmec puller/tensioner) or in a slackened state where the draw wire or rope is able to be pulled at very low or no tension with the use of a heli-brake or similar and may be pulled across the ground where permitted
  - Stringing will be completed in sections of varying length of up to 10 km between termination structures, depending on constraints, terrain, and access. Specialised equipment including a powerful winch (puller), a braking device (tensioner) and pulleys (stringing sheaves) will be required.
- Site rehabilitation, including the reinstatement of pre-existing topography, topsoil, and fences where disturbed
  - Reinstatement of all disturbed areas that will not accommodate permanent infrastructure, will be undertaken progressively during construction, where practicable. The short-term goal of reinstatement is the stabilisation of soils to provide a suitable matrix for vegetation establishment to aid in preventing erosion.

Further information about the transmission line construction activities most relevant to the assessment of potential impacts on MSES including vegetation clearing, foundation installation (excavation) and watercourse crossings is provided in the following sections.

### 2.1.2.1 Vegetation Clearing

Vegetation clearing for the transmission line will be required to meet Powerlink's safety, reliability and operational requirements. Clearing for the Project will be carried out in accordance with the requirements specified in the relevant Powerlink standards and operating procedures as well as the Project Environmental Management Plan (EMP). Powerlink's Project EMP is subject to change and will be continually updated as the Project is further developed.

Clearing will most likely be completed by bulldozer, often fitted with a 'stick rake' or 'tree spear' to push over larger trees or use of a mega-mulcher. Timber of commercial value may be recovered prior to clearing. Depending on land use, landholder requirements, environmental constraints and maintenance requirements, cleared vegetation may be dealt with in the following ways:

- Chipped or mulched on site and used for easement revegetation.
- Stacked and windrowed – any stacked and windrowed vegetation must be placed in a manner which does not concentrate overland flow or create erosion.
- Stacked and burnt – any burning of cleared vegetation may only occur in accordance with a permit from the Queensland Fire Department (QFD) and so as not to create any additional hazard to the surrounding environment or transmission line.

### 2.1.2.2 Foundation Installation

Construction of tower foundations usually consists of the following steps:

- Setting out, to mark the location of the excavation
- Excavation/boring
- Leg stub/base set up
- Placement of reinforcing steel/concreting
- Concreting of excavated foundations
- Installation of earthing.

Excavation of bored foundations are performed by specialised piling equipment such as track mounted drill rigs. Although dependent upon the geology of the surrounding soil, foundations are typically excavated to approximately 4 – 12 m. Backfilling of mass concrete foundations is completed using the excavated material if suitable or imported fill. Surplus material is spread evenly about the site or removed, depending on quantity and suitability.

### 2.1.2.3 Waterway Crossings

Where the transmission line crosses watercourses, previously cleared tracks will be preferentially used to minimise new watercourse crossings. Where new crossings or improvements to existing tracks are required, the construction methodology will be dependent upon the size of the watercourse and will be in line with the Queensland *Accepted development requirements for operational work that is constructing or raising waterway barrier works* (Department of Agriculture and Fisheries, 2018) (ADR). Where a crossing cannot meet the ADR, it is considered an assessable development, and a development approval is required.

The construction of bed-level crossings typically involves the excavation of the crossing bed to an appropriate depth to provide a stable base. The excavation is then lined with a heavy-duty geo-fabric and filled with aggregate using a combination of rock sizes up to 150 mm to lock the rock into place. In some instances where it is not practical to undertake excavation works due to unfavourable soil properties, alternative solutions may be required which may include:

- Installation of bog mats
- Installation of geomaterials.

### **2.1.3 Ancillary Infrastructure**

Temporary infrastructure requirements include:

- Sites for water sourcing and extraction. Water is required for dust suppression and development of access tracks during construction and will be sourced from local dams and bores (new and existing) in consultation with landholders and will only be taken when sufficient supply exists. Extraction of water from local rivers and creeks will be undertaken in accordance with the requirements under the *Water Act 2000*.
- Brake and winch sites.
- Laydown areas.
- A mobile site office located within the cleared easement will move in association with Project progression.

Temporary ancillary infrastructure is strategically sited within the Study Area where possible. However, one laydown area is proposed to be located 1 km away from the transmission line Disturbance Footprint on a site previously used for the same purpose, on Lot 4 on RN903.

## **2.2 Operation and Maintenance**

Following the construction and commissioning of the transmission line, the amount of human activity on site will decrease substantially.

During operation, maintenance staff will carry out scheduled inspections of the line, easement and access tracks every two to four years, depending on the risk of vegetation growth. These inspections (patrols) are either by vehicle or helicopter. Maintenance staff will also carry out routine inspections of the substations and detailed maintenance of all plant and equipment at regular intervals. Additional inspections at any Project location may be required because of equipment failure, damage, modifications and upgrades.

A summary of the primary activities to be conducted as part of the operation and maintenance phase is detailed below.

## 2.2.1 Transmission Line Maintenance

### 2.2.1.1 Transmission Line and Towers

Inspection of the transmission line and towers is carried out on each scheduled line patrol, with the main aim being to record the type, density and height of vegetation regrowth. Additional matters of interest include new under-crossings (e.g. distribution powerlines) or other activity or construction within the easement, which may affect operation or maintenance of the line.

Within areas of the Disturbance Footprint identified as having a high or very high bushfire risk, all incompatible vegetation and any vegetation that can grow greater than 3.5 m in height must be removed. Within areas identified as having a low, medium or potential bushfire risk, vegetation must be maintained so it does not encroach on 6 m from the bottom of the conductor at maximum sag. The tower pads will be retained as a cleared footprint with a 10 m buffer from the tower legs for the life of the asset.

Powerlink's policy is for the landholder to be contacted prior to any vegetation control work on a property and the landholder's agreement obtained regarding the treatment method to be employed. Easement vegetation management is important to ensure the safe operation of the transmission line and will be undertaken in accordance with Powerlink's standards and procedures.

Three techniques for vegetation management are employed:

- Mechanical
- Hand clearing
- Chemical (herbicides).

The technique adopted for each area considers a number of factors such as landholder requirements, type of regrowth, terrain and the local environmental conditions. Mechanical clearing is usually by a tractor driven slasher or similar vehicle and is suitable for shrubs and smaller trees. It is limited to relatively flat and accessible terrain due to the type of vehicle used.

Hand clearing is labour intensive but allows the vegetation clearing to be quite selective and ensures that disturbance to non-target species is minimised. Hand clearing can be employed in areas where vehicle access is not available. Lopping of larger trees is also an option near urban or in visually sensitive areas.

Chemical treatment may also be used for selective treatment of incompatible vegetation while minimising ground disturbance. The method may be through stump injection, cut stump or overall spray technique and is mostly suitable for regrowth vegetation.

### 2.2.1.2 Access Tracks

Maintenance of access tracks is required to ensure that vehicle access to structure sites is available for inspections and structure maintenance. The work will aim to minimise disturbance to natural groundcover, thus reducing erosion potential and subsequent maintenance requirements.

Maintenance of access is undertaken in consultation with the appropriate authority.

## **2.2.2 Substation Maintenance**

During the routine inspections, the substation infrastructure and items of plant will be inspected for signs of unusual wear, corrosion or damage. Faults and defects will be reported to maintenance staff who will rectify any problems identified.

Substation equipment is designed with a service life in excess of 40 years with refurbishment scheduled every 15 years and is very reliable under most conditions. Apart from the detailed visual inspections that maintenance staff undertake, routine maintenance will be carried out periodically depending on the type and make of the item of plant concerned.

Vegetation regrowth control surrounding the substation and under the incoming power supply transmission lines will be undertaken to maintain electrical safety clearances between the conductors and vegetation.

## **2.3 Decommissioning and Rehabilitation**

Typically, the operational life of a transmission line and substation is 50 years.

At the transmission line end of life, it may:

- Be replaced with a transmission line designed for the revised environmental constraints and electrical system requirements at the time.
- If the line was no longer required, it would be de-energised, dismantled, removed and the easement may be surrendered to the property owner.

At the substation end of life, it is likely replacement or refurbishment work would occur to bring the equipment to the required level of performance and reliability. If the substation is considered no longer necessary, it would be removed, and remediation works undertaken.

Decommissioning management will be incorporated into an overarching Powerlink EMP which will provide detail regarding the proposed decommissioning works, environmental risks associated with decommissioning and management and mitigation measures. These management actions will utilise environmental management strategies, practices and technologies current at the time of decommissioning to comply with or exceed regulatory requirements and to appropriately manage environmental issues which may be associated with decommissioning of the substation and or transmission line.

## 3.0 Legislative Context

### 3.1 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) establishes a regulatory regime to manage flora and fauna within Queensland. Specifically, the NC Act regulates the ‘take’ (i.e. fell, remove, catch etc.) of flora and fauna and provides a permitting framework for such activities.

Under the NC Act, permits are required to:

- tamper with an animal breeding place (i.e. a bower, burrow, cave, hollow, nest etc); and
- clear protected plants.

Threatened species are listed under the NC Act in the Nature Conservation (Animals) Regulation 2020 and the Nature Conservation (Plants) Regulation 2020 in the following categories:

- Least concern/special least concern
- Near threatened
- Vulnerable
- Endangered
- Critically endangered
- Extinct in the wild/extinct.

A pre-clearing survey is required under the NC Act prior to commencing vegetation clearing to confirm the presence of active animal breeding places and tampering with an animal breeding place (i.e. during clearance works) and must be carried out in accordance with an approved Species Management Program (SMP).

### 3.2 Environmental Offsets Act 2014

The *Environmental Offsets Act 2014* (EO Act) establishes the framework for environmental offsets in Queensland. The EO Act is supported by the Environmental Offsets Regulation 2014 (EO Regulation), the Queensland Environmental Offsets Policy 2017, the Queensland Environmental Offsets Policy General Guidelines (Offsets General Guide) and the Financial Settlement Offset Calculation Methodology.

The EO Act outlines the framework for environmental offsets and how they should be provided. It supports assessment legislation by coordinating the delivery of environmental offsets across jurisdictions and placing limits on when an environmental offset condition may be imposed. It also provides for the subsequent assessment, delivery, and compliance with offset conditions once imposed.

The EO Regulation provides further detail on several elements of the EO Act, including details of the activities and environmental matters to which the EO Act applies. The Policy provides the decision-support tool to enable administering agencies to assess offsets proposals to ensure they meet the requirements of the EO Act. The EO Act, EO Regulation and Environmental Offsets Policy 2017 form Queensland's environmental offsets framework.

The environmental offset framework only applies when a prescribed activity is likely to have an SRI on a prescribed environmental matter. Prescribed environmental matters include MSES, defined in the EO Regulations as the following:

- regulated vegetation – prescribed REs that:
  - are endangered REs
  - are of concern REs
  - intersect with an area shown as a wetland on a vegetation management wetland map
  - contain an area of essential habitat on an essential habitat map for near threatened wildlife
  - are located within a defined distance of a relevant watercourse or drainage feature
  - connectivity areas.
- wetlands and watercourses that are:
  - a wetland in a wetland protection area
  - a wetland of high ecological significance shown on the map of Queensland wetlands environmental values
  - a wetland or watercourse in high ecological value waters
  - designated precinct in a strategic environmental area
  - protected wildlife habitat
  - protected areas
  - highly protected zones of State marine parks
  - fish habitat areas
  - waterway providing for fish passage
  - marine plants.

The making of a 'designation' by the Minister or local government (a designator) is not listed as a prescribed activity that is prescribed under the EO Regulation and therefore cannot be subject to an environment offset requirement under Queensland environmental offsets framework.

Where applicable, threatened species listed under both the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and NC Act will be assessed under the EPBC Act Environmental Offsets Policy, as detailed in the Calvale to Calliope River Matters of National Environmental Significance Report.

### 3.3 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) regulates the clearing of native vegetation in Queensland. Approval under the VM Act is required if remnant or certain types of regrowth vegetation is to be cleared, with applications for approval likely to be accompanied by a Property Vegetation Management Plan (PVMP).

It should be noted that a range of vegetation values provisioned under the VM Act are recognised as MSES. The presence and extent of MSES is relevant to mining activities through the application of the EP Act, NC Act and EO Act.

In relation to MSES, regulated vegetation includes the following values described under the VM Act:

- Endangered or Of Concern REs (VM Act class) that are remnant
- Essential habitat
- Regulated vegetation (remnant REs) to the extent they are located within a defined distance from the defining banks of a watercourse
- Regulated vegetation (remnant REs) that intersects with an area shown on the vegetation management wetlands map (to the extent of the intersection).

### 3.4 Biosecurity Act 2014

The *Biosecurity Act 2014* (Biosecurity Act) establishes a framework to regulate and control invasive plants and animals. Under the Biosecurity Act, landowners are responsible for taking all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is known as the general biosecurity obligation (GBO).

The Biosecurity Act categorises restricted matters (restricted plants and animals) into the following:

- Category 1: must be reported to an inspector within 24 hours (includes Red Imported Fire Ants, amongst others) (call Biosecurity Queensland on 13 25 23)
- Category 2: must be reported within 24 hours to an inspector or authorised officer (call Biosecurity Queensland on 13 25 23)
- Category 3: must not be distributed either by sale or gift, or released into the environment
- Category 4: must not be moved
- Category 5: must not be kept
- Category 6: must not be fed (animals)
- Category 7: must be euthanised (animals).

### 3.5 Planning Act 2016

The *Planning Act 2016* (the Planning Act) is Queensland's key piece of legislation pertaining to the strategic planning and development of the State. The Planning Act mandates the framework of planning instruments and process for development assessment whilst incorporating the regulatory requirements of other Queensland environmental statutory legislation, such as the VM Act.



Subordinate to the Planning Act, the Planning Regulation 2017 (Planning Regulation) details the mechanics for the operation of the Planning Act. This includes prescription of accepted, prohibited and assessable development, assessment benchmarks for assessable development and identification of the assessment manager (i.e. the chief executive or local government).

Under section 44(6)(b) of the Planning Act, development of infrastructure on premises that is subject to a MID is accepted development, subject to compliance with any requirements that are imposed in accordance with section 35(2) of the Act. This excludes building work under the *Building Act 1975*.

## **3.6 Fisheries Act 1994**

The purpose of the *Fisheries Act 1994* (Fisheries Act) is to provide management and protection of fish habitats, fish ways, aquaculture, marine plants, coral limestone and general fisheries resources. Integrated into the Planning Act, approval from the State Government may be required when assessable development works include the construction or raising waterway barrier works, fisheries development works in declared fish habitat areas or the removal, destruction or damage to marine plant(s).

### **3.6.1 Waterway Barrier Works**

Waterway barrier works include the construction of a dam, weir or other barriers across a waterway if the barrier limits fish access and movement along a waterway. This can include solid barriers, such as dams and weirs, which block a waterway to stop the flow of water and “other barriers”, such as causeways and culverts, which may physically inhibit fish movement. Proposed waterway works should be assessed against the ‘Accepted development requirements for operational work that is constructing or raising waterway barrier works’ (Department of Agriculture and Fisheries, 2018).

## 4.0 Assessment Methodology

### 4.1 Desktop Assessment

An assessment of the desktop search extent (a 10 km buffer of the Study Area) was undertaken to broadly characterise and identify the MSES that may occur within the Study Area. The desktop assessment included a review of literature, and searches of publicly available datasets and online mapping. As part of this assessment, the following information sources were reviewed at Project inception, and were revised throughout the Project's development (November 2022, May 2023, October 2024 and July 2025):

- EPBC Act Protected Matters Search Tool (PMST) for threatened flora and fauna species (Department of Climate Change, Energy, the Environment and Water, 2025a).
- Species Profile and Threats (SPRAT) database for detailed information on threatened flora and fauna species (Department of Climate Change, Energy, the Environment and Water, 2025b).
- Department of Environment, Tourism, Science and Innovation (DETSI) Wildlife Online database for species records (Department of the Environment, Tourism, Science and Innovation, 2025).
- Protected Plants Flora Survey Trigger map (Department of Environment and Science, 2025).
- Certified Biodiversity Planning Assessment (BPA) mapping for the brigalow and south east Queensland bioregions, to identify significant wildlife corridors and areas of state, regional and local biodiversity significance (Department of Environment and Science, 2020b, 2020a).
- Queensland Wetland areas mapping (Department of the Environment, Tourism, Science and Innovation, 2024).
- Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRD) online mapping layers:
  - Vegetation Management Regional Ecosystem (RE) map (Version 13) (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, 2024b)
  - Vegetation Management Watercourse and Drainage Feature map (Version 6.0) (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development, 2024)
  - Vegetation Management Supporting Map, including Essential Habitat mapping (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, 2024a)
  - Mineral resource sites – Queensland map, to identify abandoned mines (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development, 2020)
  - Detailed Surface Geology – Queensland map (Department of Resources, 2022).
- Regional Ecosystem Description Database (REDD) (Version 13) (Queensland Government, 2025).
- Atlas of Living Australia records database and spatial portal (ALA, 2025).
- Digital imagery (aerial photographs).

The results of the desktop assessment were used to inform the field survey program and are discussed throughout **Section 6.0**.

## 4.2 Field Survey

A total of 12 field surveys were completed for the Project in 2023 to 2025 (**Table 4.1**). The purpose of the field surveys varied between flora and fauna surveys as discussed in **Sections 4.2.1** and **4.2.2**.

Fauna field surveys were purposefully timed to align with the seasonal occurrence and peak activity period of threatened and migratory species potentially occurring within the Study Area and surrounds.

Weather data for the field surveys has been extracted from the nearest weather station (Gladstone Airport (039326) (Bureau of Meteorology, 2025) and is included in **Table 4.1**.

**Table 4.1 Field Surveys Undertaken for the Project**

Field Survey	Section Surveyed	Survey Dates	Survey Length (days)	Rainfall (mm)	Temperature (°C)	
					Minimum	Maximum
<b>Baseline Flora Survey and Habitat Assessment</b>	Section D	9 – 14 March 2023	6	21.23	24.0	32.2
<b>Baseline Fauna Survey</b>	Eastern Section C, D and E	25 – 30 March 2023	6	0	21.5	31.0
<b>Baseline Flora Survey and Habitat Assessment</b>	Northern Section C, D and E	30 March – 3 April 2023	5	7.16	20.4	28.7
<b>Baseline Fauna Survey</b>	Northern and Western Section C	12 – 17 April 2023	6	0	17.4	30.5
<b>Baseline Flora Survey and Habitat Assessment</b>	Southern Section B and Section A	18 – 23 April 2023	6	0	19.5	28.6
<b>Baseline Fauna Survey</b>	Southern Section B and Section A	26 April – 1 May 2023	6	0.6	17.8	27.8
<b>Baseline Flora Survey (with targeted <i>Cycas megacarpa</i>) and camera collection</b>	Section A, B, C, D and E	15 – 20 May 2023	6	2.27	13.9	24.8
<b>Targeted Quoll Survey</b>	Section A, B, C, D and E	31 July – 5 August 2024	6	0	7.6	25.1

Field Survey	Section Surveyed	Survey Dates	Survey Length (days)	Rainfall (mm)	Temperature (°C)	
					Minimum	Maximum
<b>Marine Plants Survey</b>	Section E	5 December 2024	1	1.2	24.7	30.6
<b>Weed Survey</b>	Section A, B, C, D and E	17 – 21 March 2025	5	1.4	21.7	30.8
<b>Targeted Collared Delma and Ghost Bat Survey</b>	Section A and B	28 May – 1 June 2025	5	25.6	12.4	27.7
<b>Targeted Collared Delma and Water Mouse Survey</b>	Section D and E	16 – 21 June 2025	6	1.6	9.9	28.7

## 4.2.1 Terrestrial Flora

### 4.2.1.1 Vegetation Communities

The flora and vegetation surveys were undertaken to identify and record vascular flora species as well as classify and map vegetation communities. Due to the size of the Study Area, mapping the vegetation within its entirety was not practical, therefore only the Disturbance Footprint plus a 150 m buffer was mapped.

The sampling of flora and vegetation was undertaken using the *Methodology for the Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al., 2025). Representative examples of each RE were sampled across 11 secondary sites, 56 tertiary sites and 287 quaternary sites. Incidental flora species observed during the surveys were also recorded. In addition, vegetation condition was assessed at 79 sites along the Disturbance Footprint following the methodology described within *BioCondition, A Condition Assessment Framework for Terrestrial Biodiversity in Queensland* (Eyre et al., 2015).

Quaternary assessments constitute rapid vegetation surveys which include marking the GPS location and recording the dominant species in the characteristic layers, along with structural data. Tertiary assessments include the collection of height and cover data for each strata, as well as species presence and dominance in each. Secondary level surveys involve the collection of full flora species composition and structural data within a 50 x 10 m plot. BioCondition data is collected within a nested 100 x 50 m plot and includes metrics from 13 attributes including:

- Number of large native trees
- Tree canopy height
- Recruitment of woody perennial species in the ecologically dominant layer
- Tree canopy cover
- Native tree, shrub, grass and forb richness

- Coarse woody debris
- Non-native plant cover
- Native perennial grass cover
- Organic leaf litter.

The locations of the survey sites are shown on **Figure 4.1**.

Specimens of any plant taxa that could not be identified in the field were collected, pressed and dried in accordance with the requirements of the Queensland Herbarium (Queensland Herbarium and Bean, 2016). Dried specimens were then identified through reference books and keys and through comparison with named species.

Nomenclature used in this report follows that of the Census of Queensland Flora and Fungi (Bean, 2024). Introduced species are denoted by an asterisk in the text (\*).

#### 4.2.1.2 Threatened Flora

Opportunistic searches for threatened flora species listed under the NC Act were completed throughout all field surveys in areas of suitable habitat. If threatened flora species were found during these searches, their location and spatial extent was recorded, as well as notes regarding population size and health. Photographs were also taken.

#### *Cycas megacarpa* survey

A targeted survey approach was adopted for *Cycas megacarpa* in consultation with the Queensland Herbarium. During the early field survey program, records of *C. megacarpa* within the Study Area were opportunistically identified, and then targeted assessments were conducted during the 15-20 May 2023. All surveys employed at least one of the following methods to record the presence of *C. megacarpa*:

- Individual point counts (single individuals were recorded with a GPS unit).
- Visual point counts within a 25 m radius (a centre point was marked with a GPS and all individuals within a 25 m radius from that point were recorded).

The development class for each individual was also recorded using the following classification:

- Juvenile (<50 cm)
- Sub-adult (0.5 – 1 m)
- Adult (>1 – 5 m)
- Large adult (>5 m).

#### 4.2.1.3 Marine Plants Survey

A marine plant survey was conducted on 5 December 2024 to examine the occurrences of marine plants within the MDA. This area was traversed on foot and the vegetation on northern and southern bank of the Calliope River below the highest astronomical tide (HAT) was assessed. The HAT used in the assessment was obtained from Qspatial.

At each site the following information was recorded:

- Site number
- Location
- Photographs
- Structural description of vegetation
- Marine plant types
- Height and cover values of marine plant types
- Woody debris
- Bare ground.

The location of survey sites is provided in **Figure 4.1**.

Areas below the HAT within the MDA were divided into 20 m grid sections which allowed a cover percentage to be attributed to all marine plant types within a defined section. Vegetation not included as a marine plant (weed species considered a restricted matter under the Biosecurity Act) were not included as part of percentage cover. In this instance, bare ground, wood debris or other flora species percentage cover were measured in the space the weed species occupies.

The 20 m grid sections extended above the HAT to capture data on inherent or potential marine plants. Inherent marine plants are protected regardless of their location being on or above tidal land (above HAT). Inherent marine plants are described in Table 1 of Appendix 2 of *State Development Assessment Provisions guideline State code 11: Removal, destruction or damage of marine plants* (Department of Agriculture and Fisheries, 2022). In this instance, inherent plants were not observed in the MDA above the HAT.

#### 4.2.1.4 Weed Survey

A weed survey targeting Restricted matter flora species and Weeds of National Significance (WoNS) was undertaken between 17-21 March 2025. Data was collected between existing and future infrastructure towers as well as along and adjacent to existing access tracks. Data was collected within freehold or lands lease allotments and did not include conservation parks, state forests or timber reserves

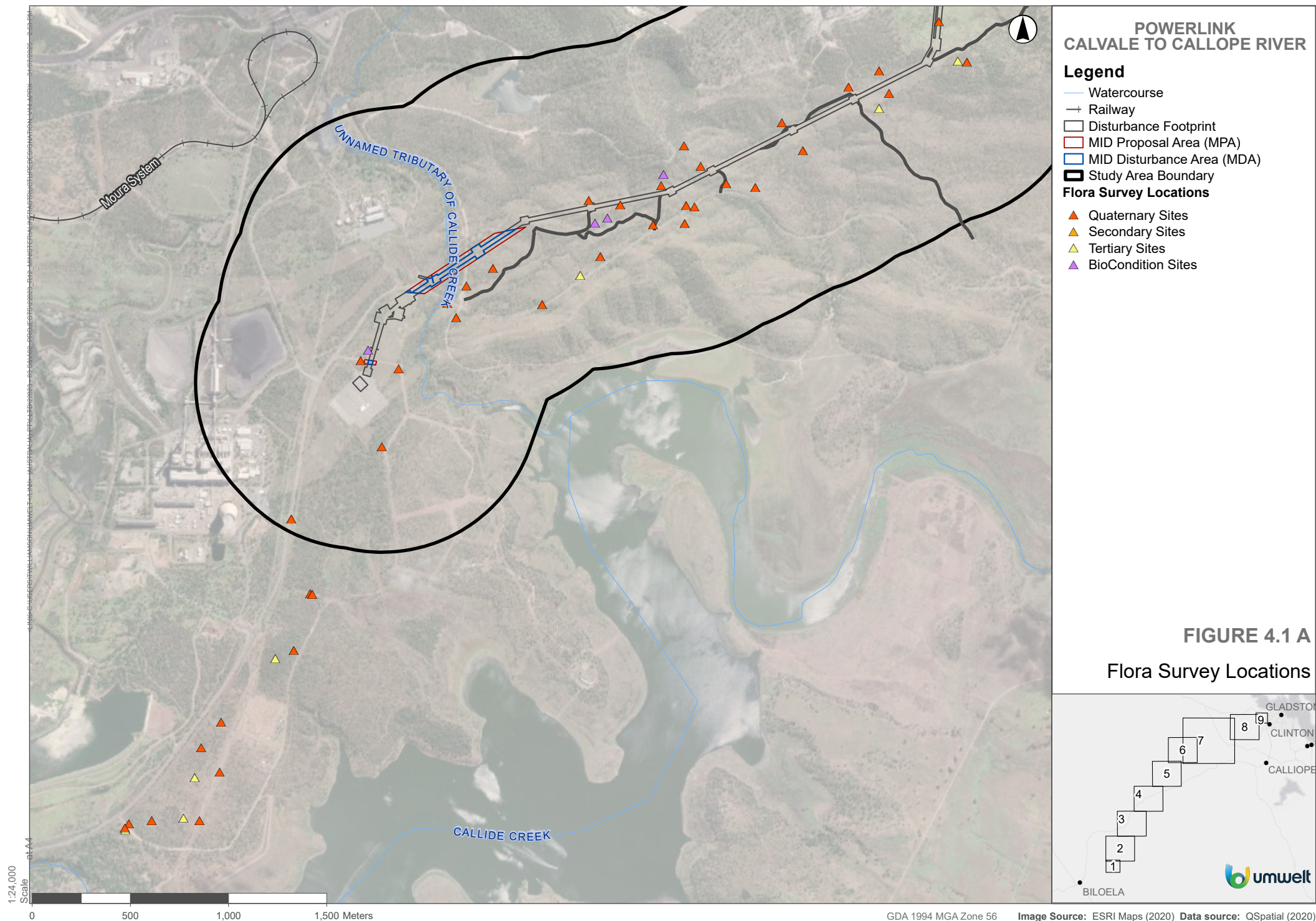
Inside the transmission line easement, survey points were established at midpoints within each span, with two points per span unless spans were under 350 m in which case only one point was used. Data collected included weed species, estimated cover (as per Powerlink guidance), and additional notes on density and maturity. Specific individual plants or patches were recorded outside designated survey points if deemed significant.

Along and adjacent to access tracks, weed species, approximate central position and patch size classification (ranging from very small to very large, based on standard methodologies) were recorded. In addition, a buffer was used to highlight the extent of a patch along the access tracks, with the location being in the centre point of a patch. Estimated cover or density for each species was documented following Powerlink provided guidelines.

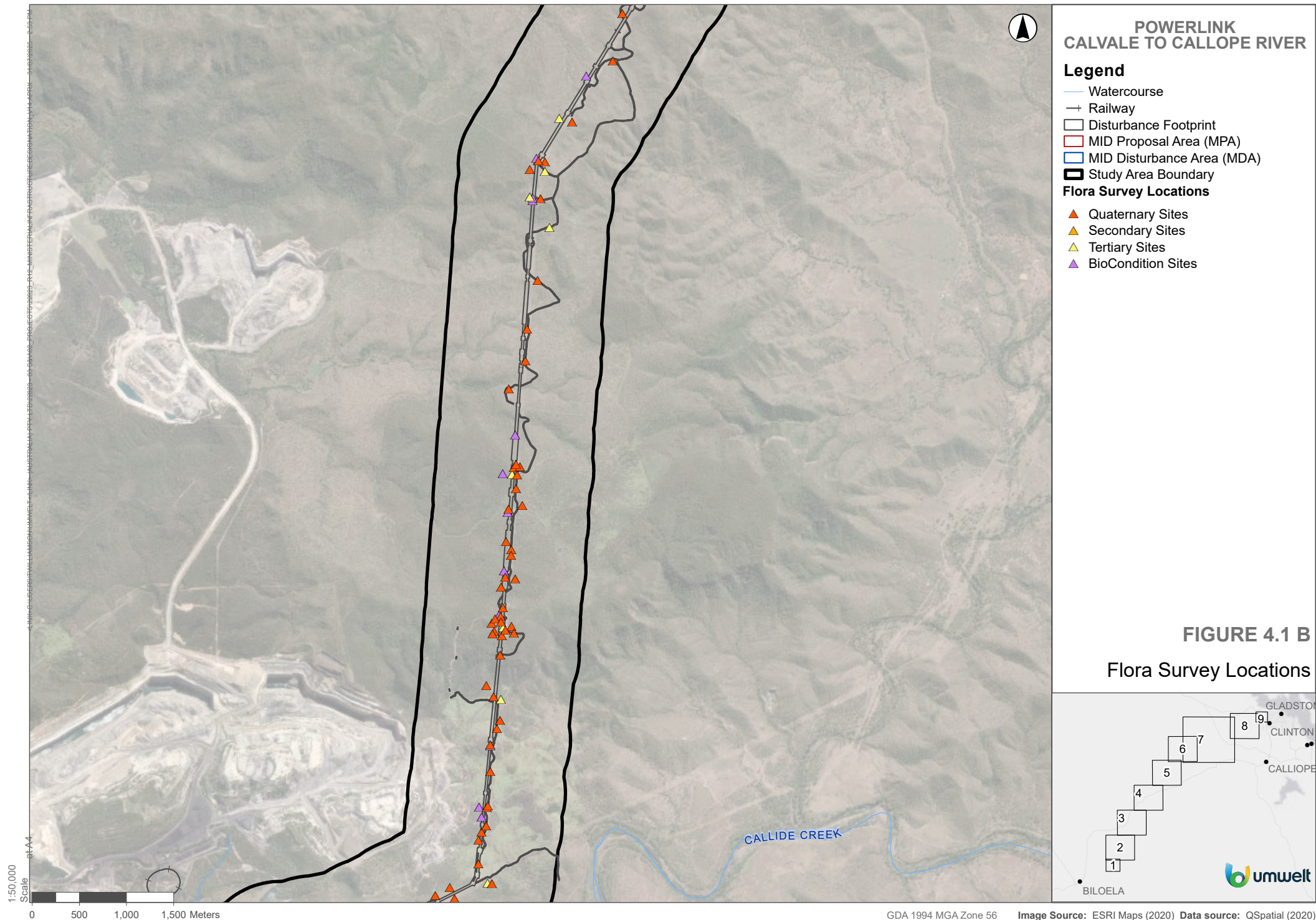
The breakdown of weed species density was as follows:

- High – >30% cover, shrubs and woody species > 6 stems/100<sup>2</sup>
- Moderate – 10-30% cover, shrubs and woody species 3-6-stems/100m<sup>2</sup>
- Sparse – <10% cover, shrubs and woody species 1-2 stems/100m<sup>2</sup>
- Individual – <1% cover, shrubs and woody species <1 stem/100m<sup>2</sup>.

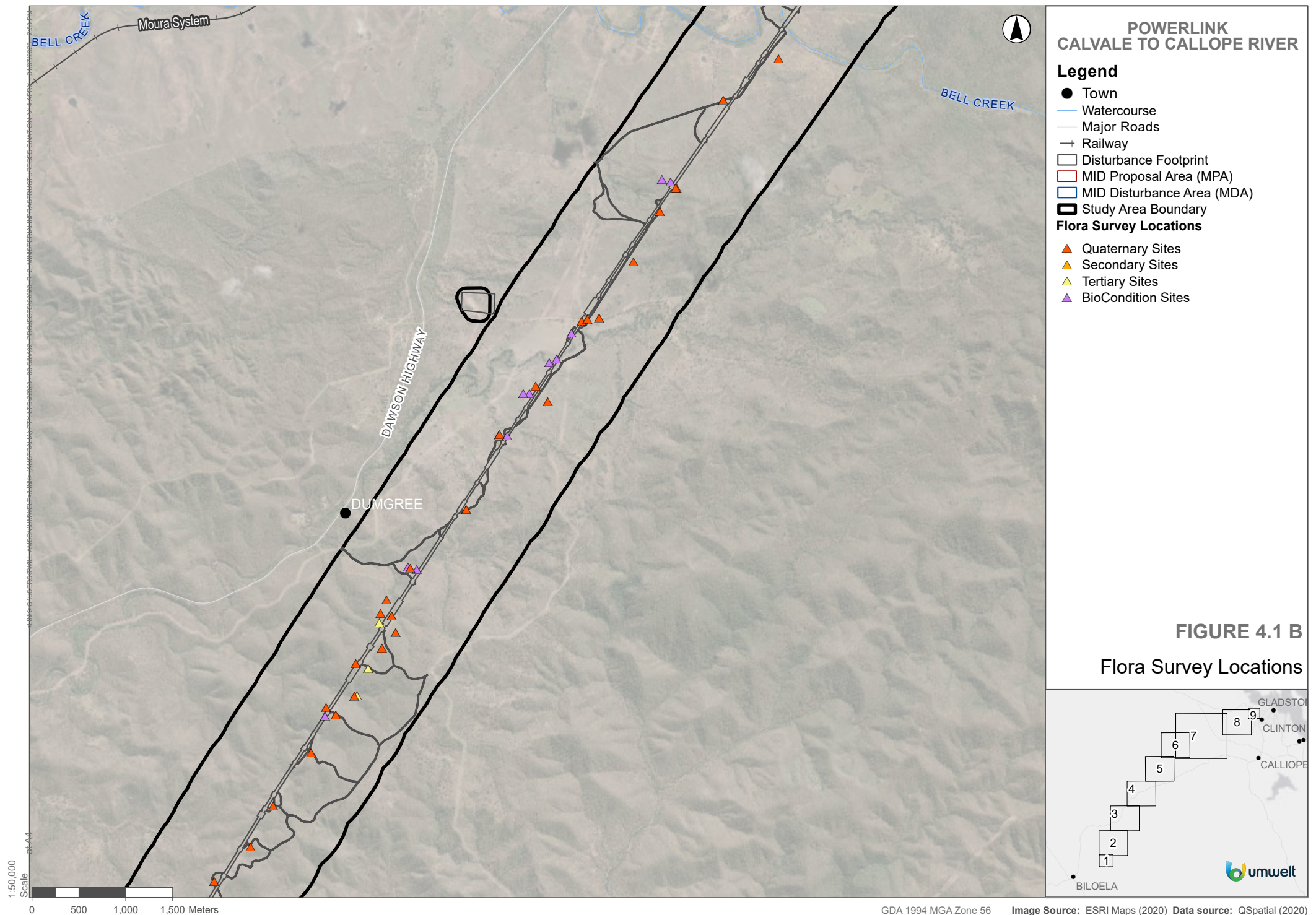




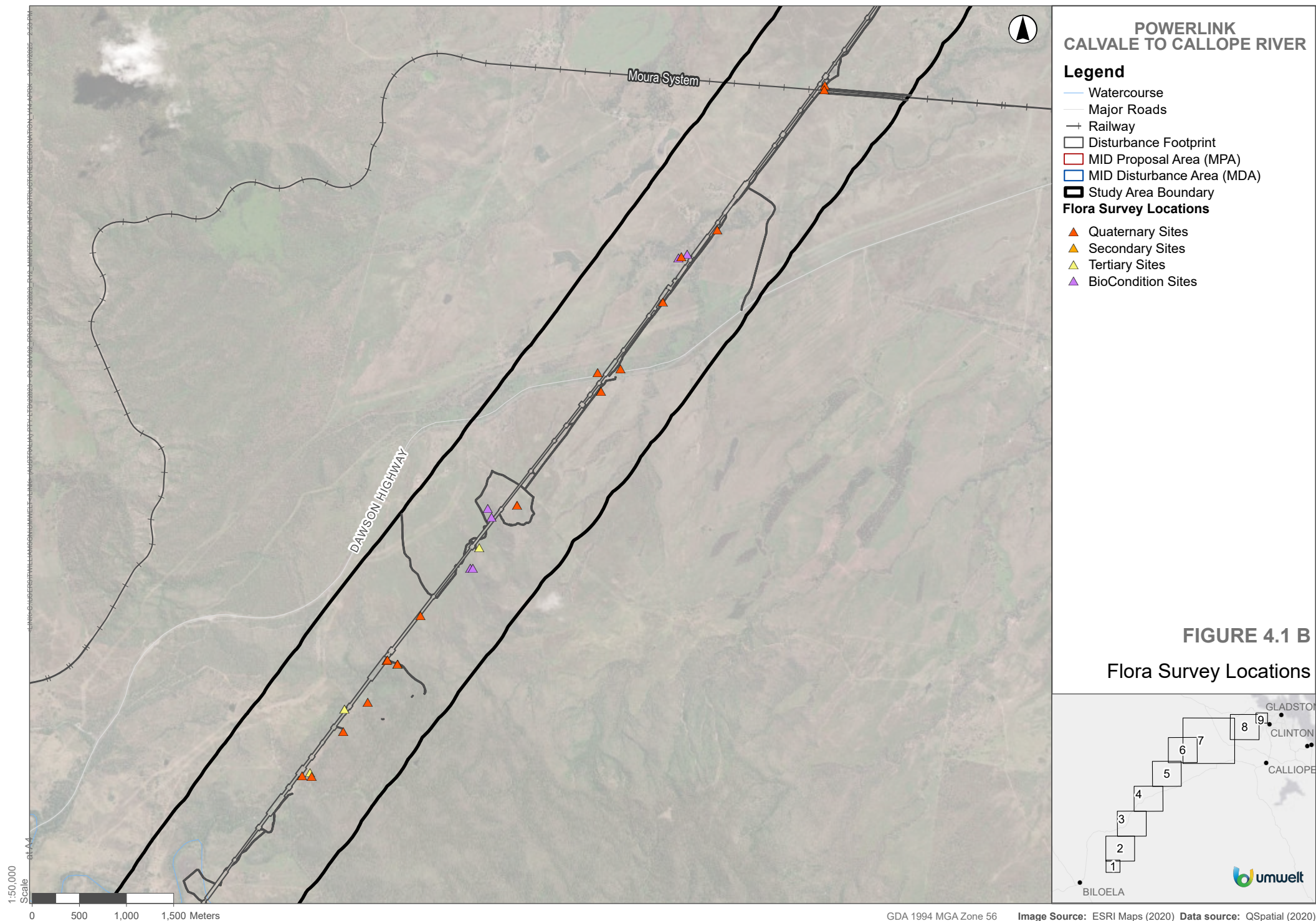




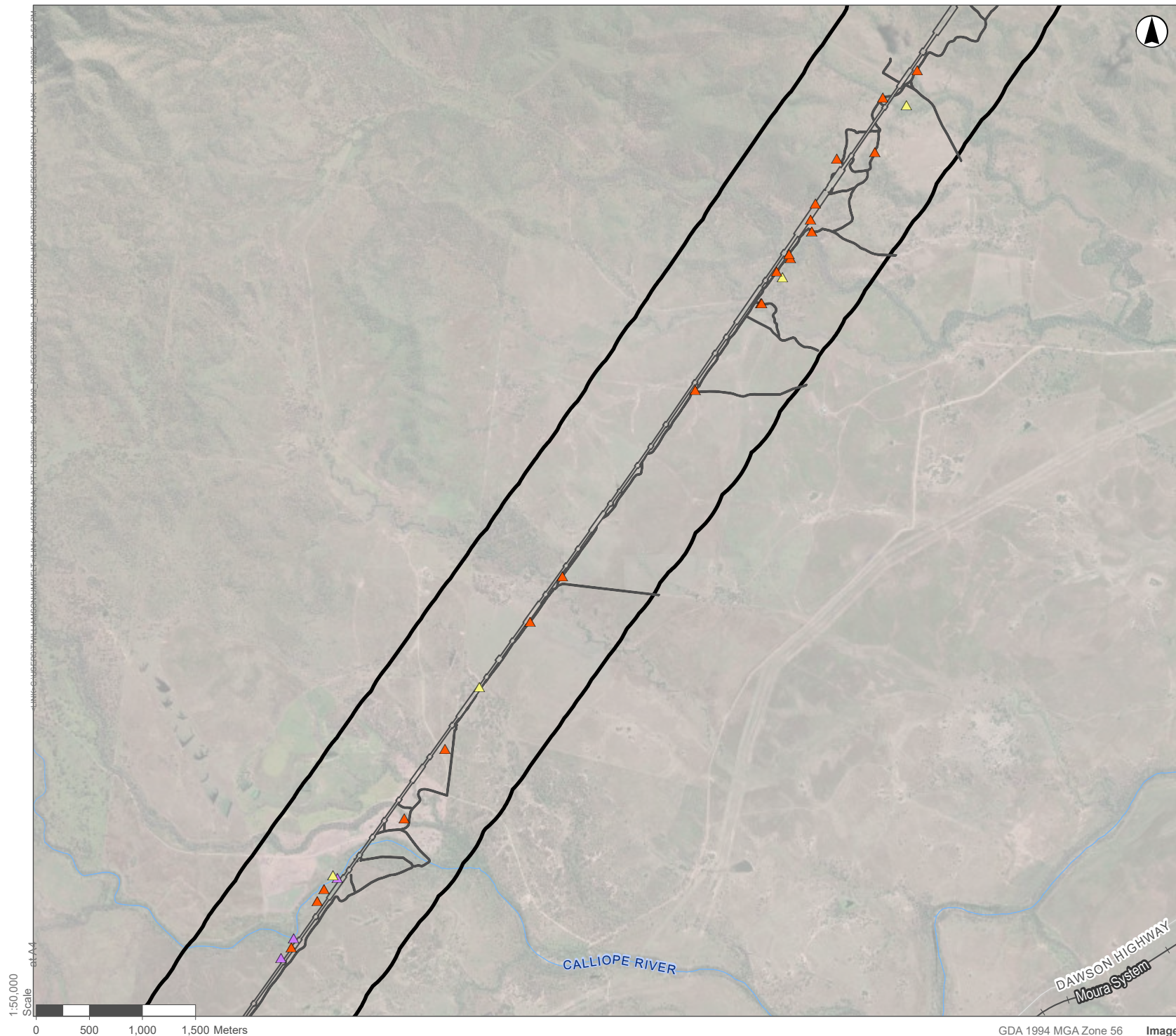












## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

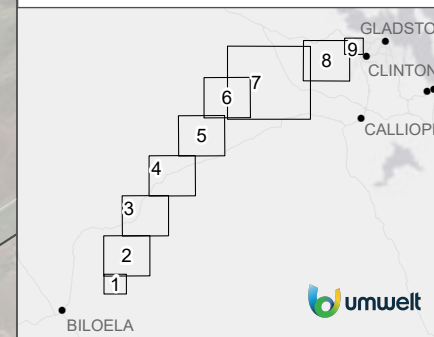
- Watercourse
- Major Roads
- Railway
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- Study Area Boundary

### Flora Survey Locations

- ▲ Quaternary Sites
- ▲ Secondary Sites
- ▲ Tertiary Sites
- ▲ BioCondition Sites

**FIGURE 4.1 B**

**Flora Survey Locations**



Scale  
1:50,000

at A4

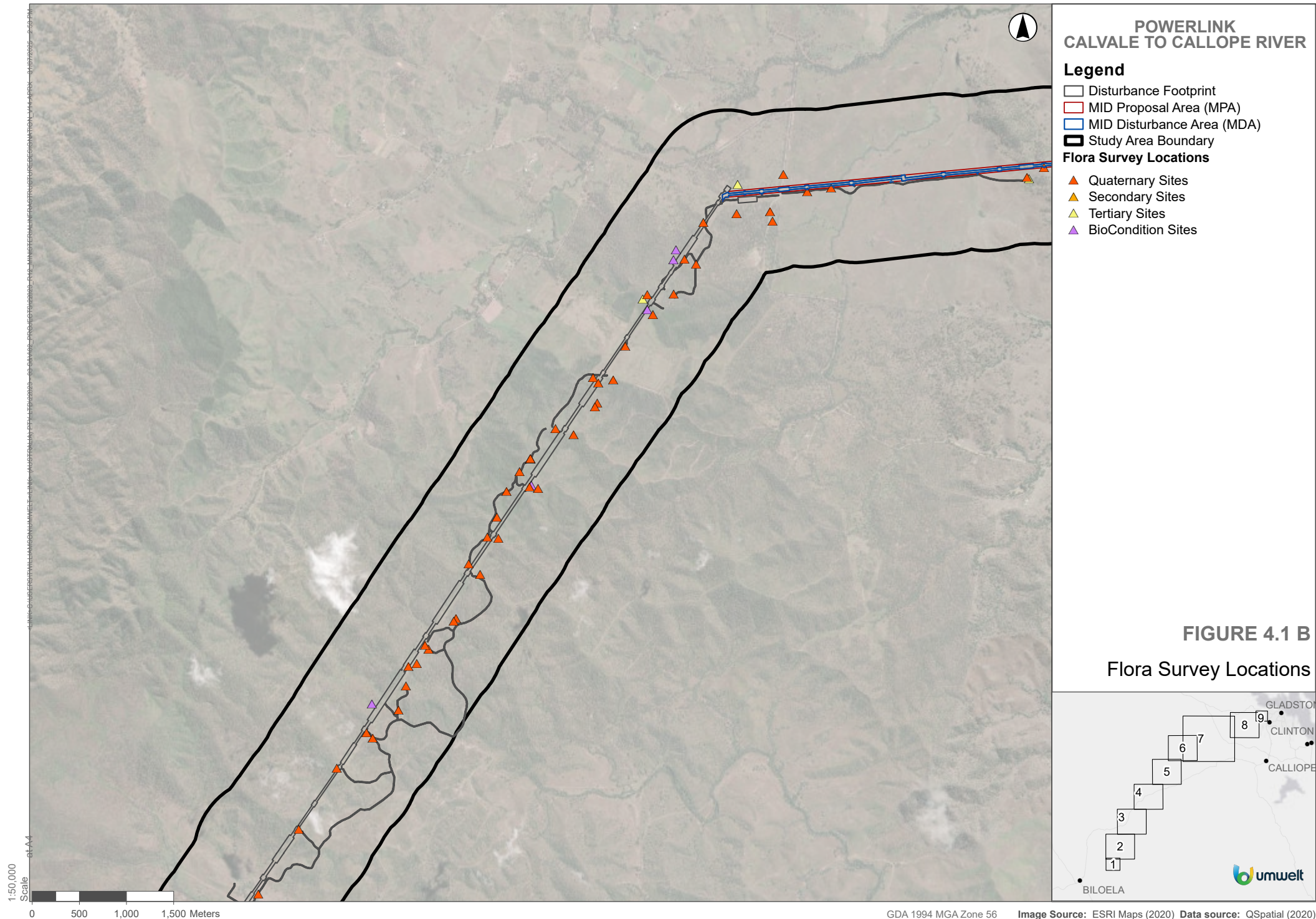
0 500 1,000 1,500 Meters

GDA 1994 MGA Zone 56

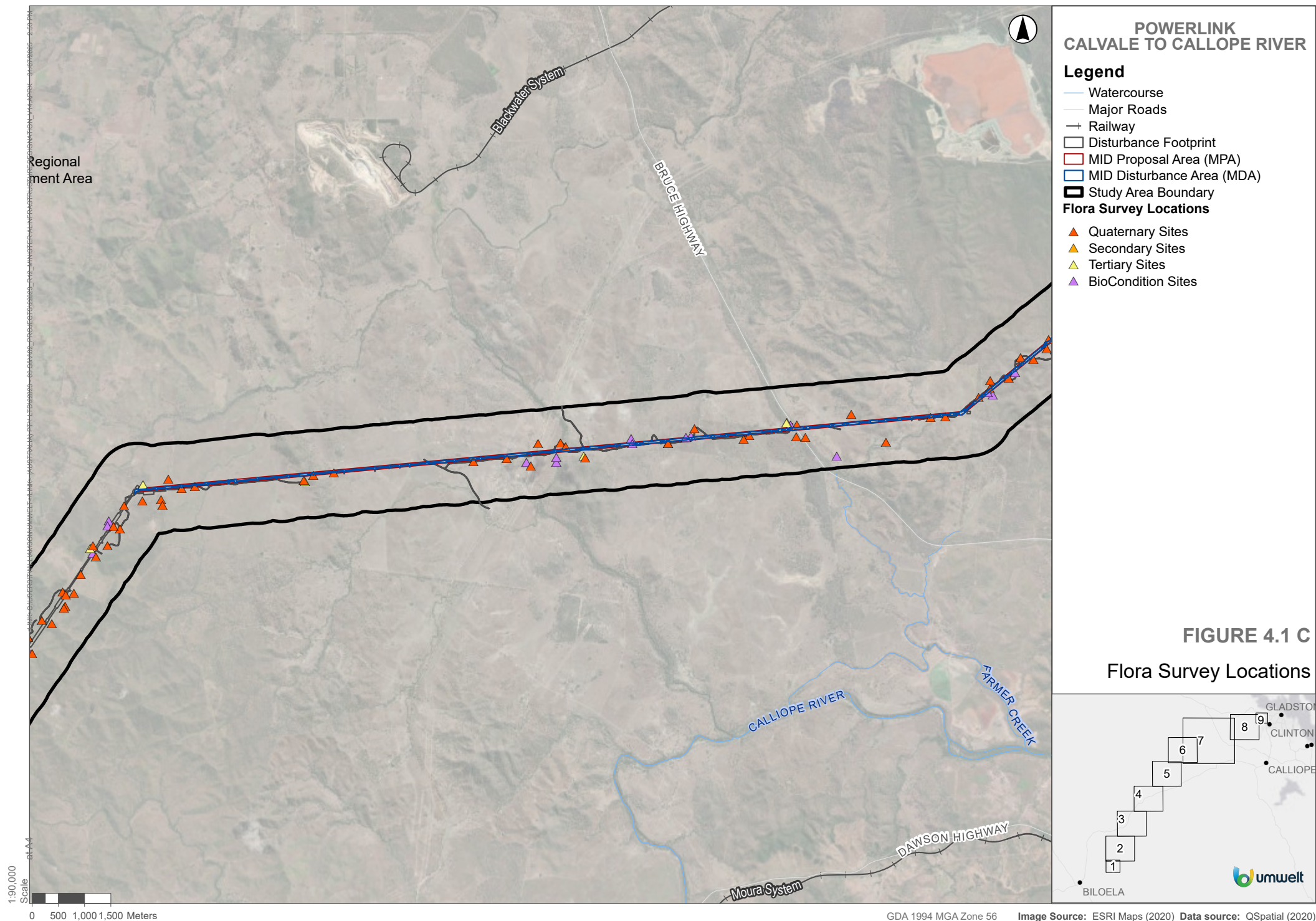
Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

**umwelt**

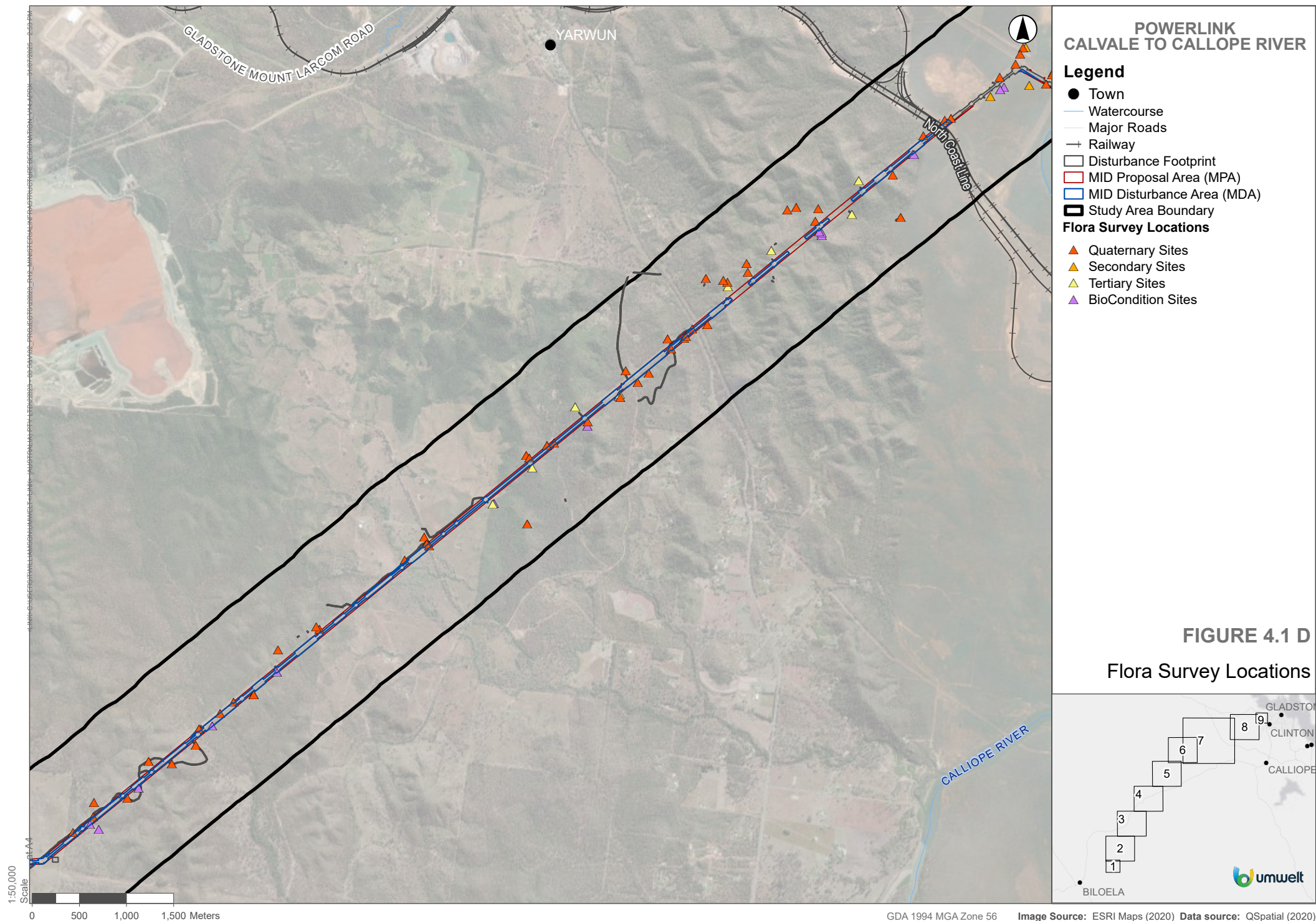




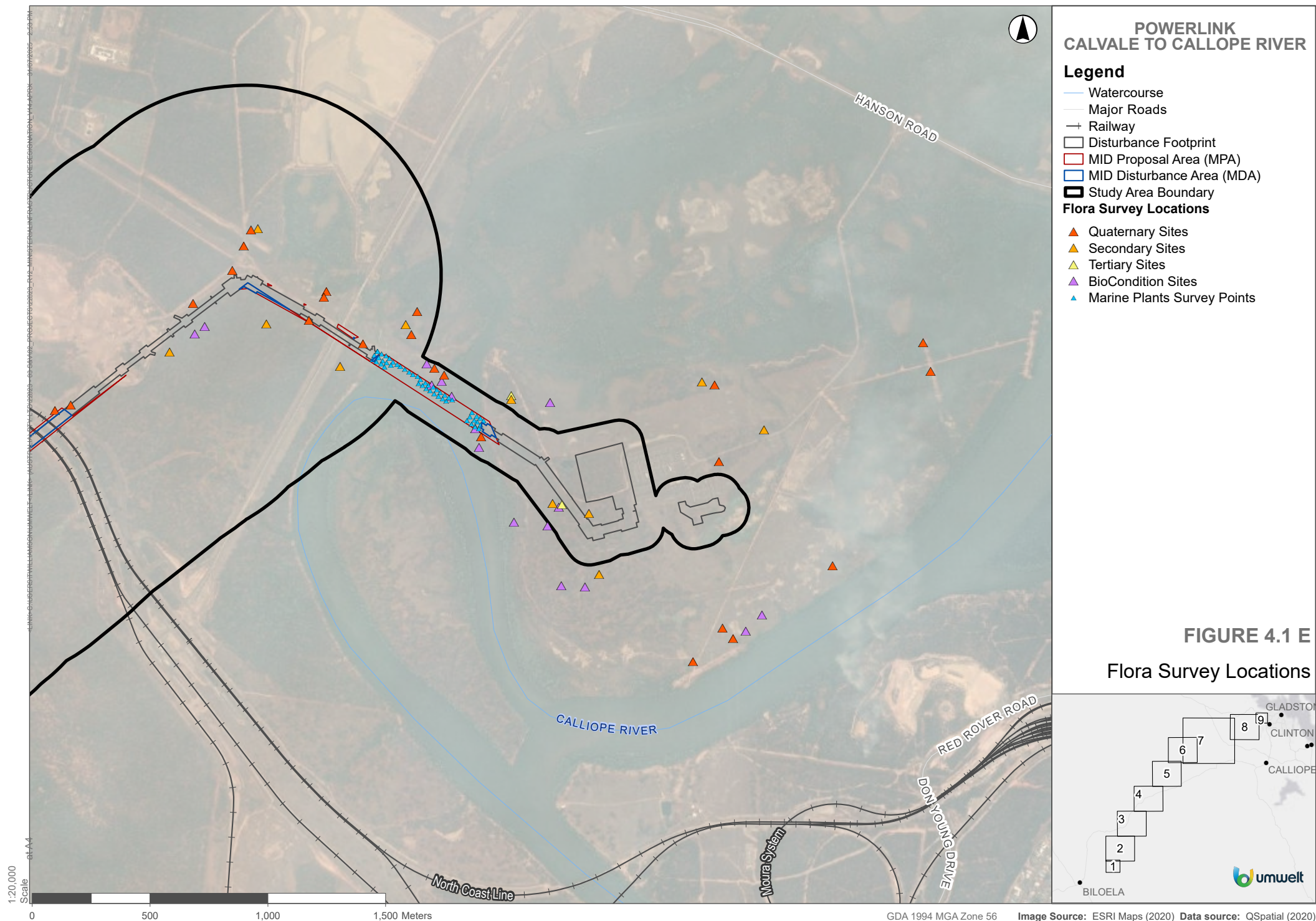












## 4.2.2 Terrestrial Fauna

The baseline sampling of terrestrial fauna species was undertaken in accordance with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Version 4.0) (Eyre *et al.*, 2022). Specific methods employed during the fauna surveys are detailed in **Table 4.2**. The fauna survey site locations are shown on **Figure 4.2**.

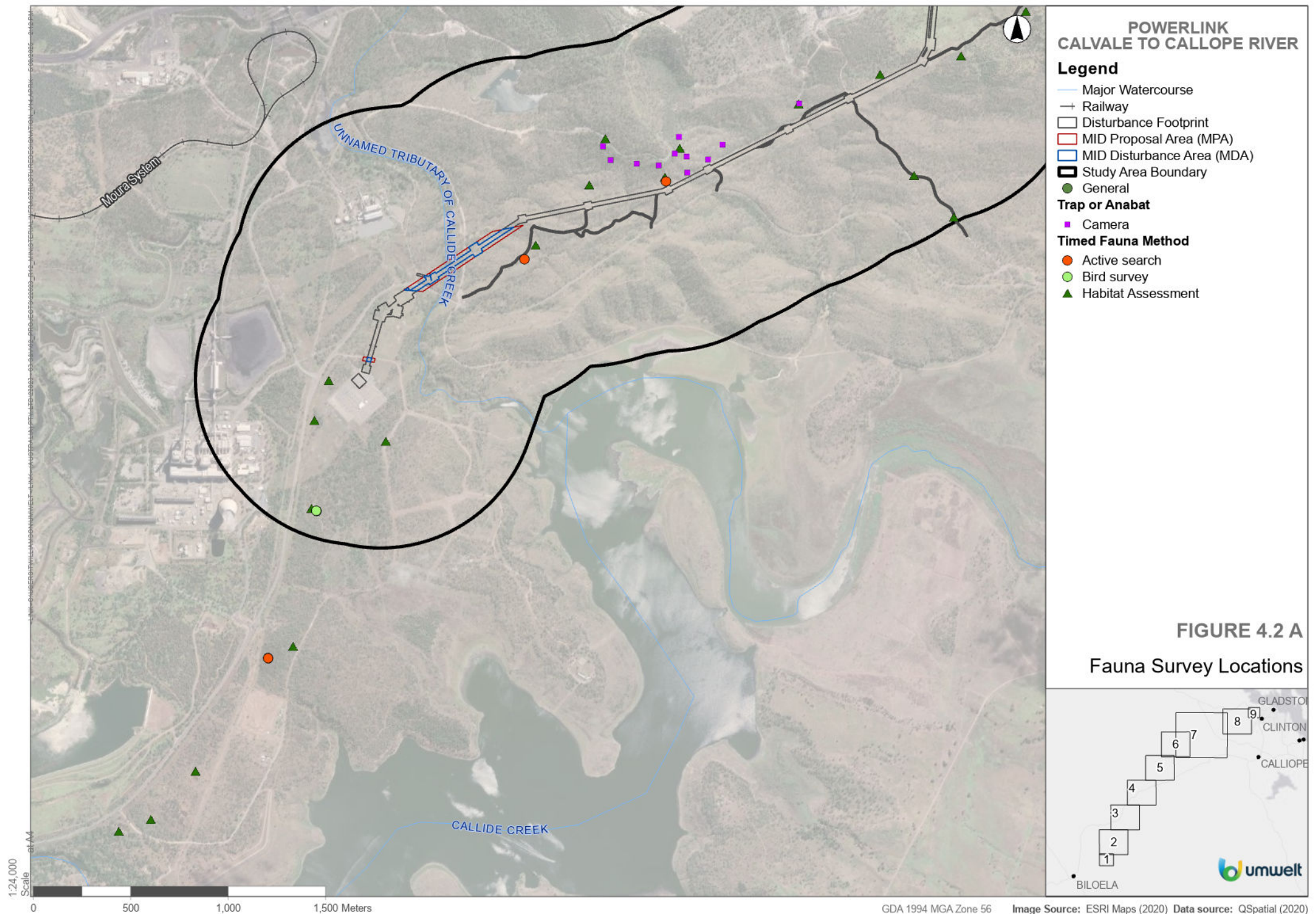
**Table 4.2 Fauna Field Survey Techniques and Effort**

Survey Technique	Description	Survey Effort
<b>Habitat assessments</b>	<p>Fauna habitat values were characterised using a comprehensive habitat assessment methodology within all accessible broad habitat types capturing variation in condition, vegetation types and disturbances. The presence and abundance of specific habitat resources was also assessed, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Koala (<i>Phascolarctos cinereus</i>) food and potential shelter trees</li> <li>• Hollow bearing trees and stags</li> <li>• Mistletoe</li> <li>• Fallen logs, woody debris and leaf litter</li> <li>• Rocky features such as surface rocks, boulders, crevices, overhangs and caves</li> <li>• Proximity to water</li> </ul> <p>Habitat assessments were used to inform habitat modelling for each of the potentially occurring or known threatened flora or fauna species.</p>	255 sites
<b>Water mouse habitat assessments</b>	<p>In water mouse (<i>Xeromys myoides</i>) habitat (Section E), targeted habitat assessments and searches were undertaken.</p> <p>Habitat assessments and searches were based on the known ecological preferences of water mouse and included:</p> <ul style="list-style-type: none"> <li>• The presence of water mouse mounds/nests</li> <li>• The defined supralittoral bank</li> <li>• Mounds with burrows</li> <li>• Burrows in the littoral zone</li> <li>• Hollow trunks</li> <li>• Tree hollows</li> <li>• Standing and fallen timber</li> <li>• Intact hydrology</li> <li>• The presence and abundance of prey</li> <li>• Channels, tracks and middens.</li> </ul>	13 sites
<b>Diurnal bird surveys</b>	<p>Roaming/meandering bird surveys using both visual and auditory identification were conducted within all habitat types. Active birding was also completed at farm dams and watercourses where accessible.</p>	27 person hours

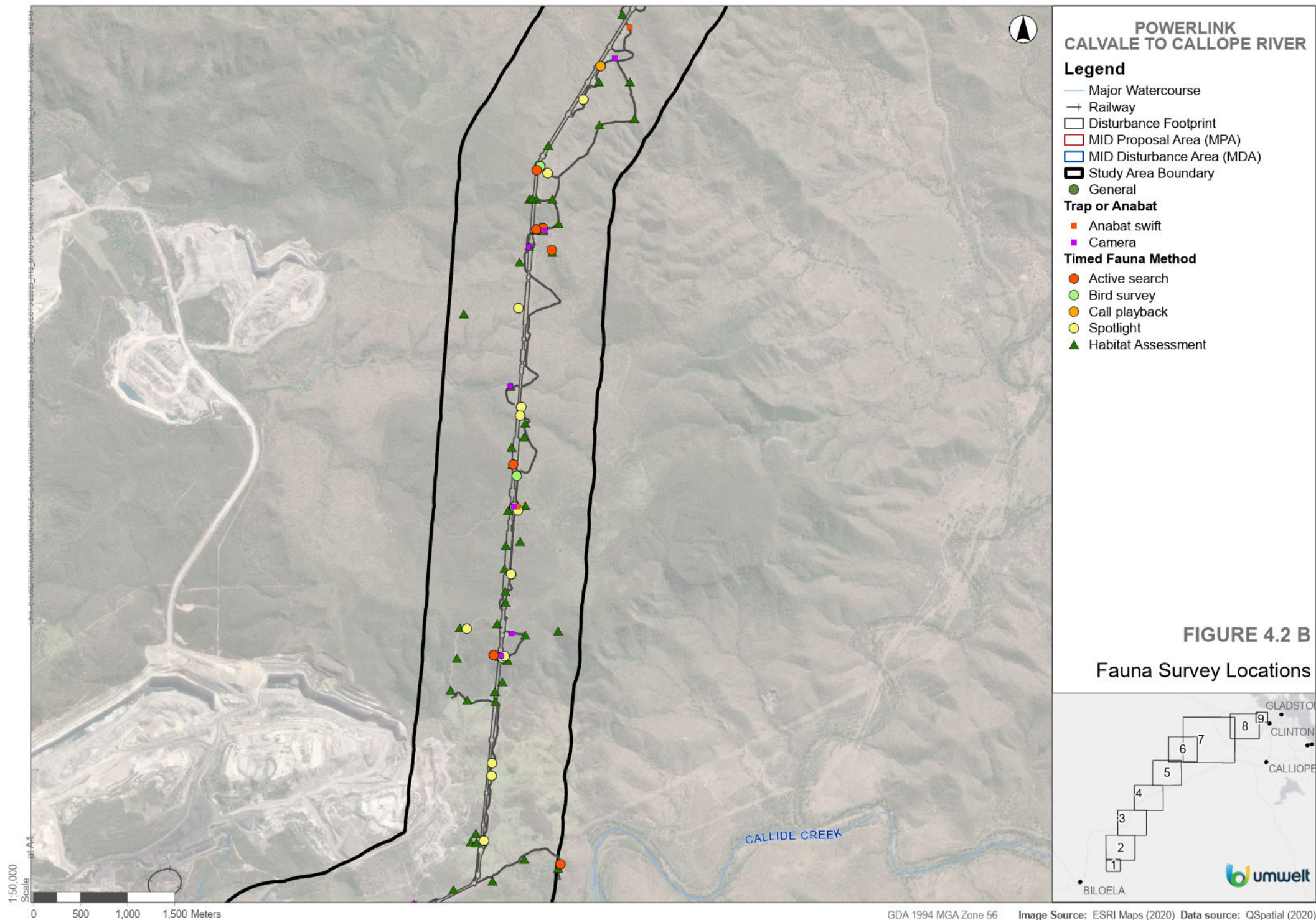
Survey Technique	Description	Survey Effort
<b>Remote camera trapping</b>	Automated camera traps were deployed in representative habitats to record visitation by nocturnal and diurnal animals. Camera traps were baited with a mixture of rolled oats, peanut butter, honey and vanilla essence, and chicken necks. Analysis of still photos captured on cameras was undertaken by qualified ecologists. Captured images of fauna were identified to species level where possible.	1,061 trap nights across Sections A-D, plus 136 trap nights in Section E
<b>Acoustic bat call detection</b>	Anabat Swift devices were deployed in representative microbat habitat including caves and rock crevices, natural flyways, and along watercourses to record the presence of microbats. Data recorded on the bat recorders were analysed by a qualified specialist, Greg Ford of Balance! Environmental. The format and content of the analysis summary reports comply with nationally accepted standards for the interpretation and reporting of Anabat data (Reardon, 2003).	147 nights
<b>Spotlighting and call playback</b>	Spotlighting was undertaken on foot targeting greater glider (southern and central) ( <i>Petauroides volans</i> ), yellow-bellied glider (south-eastern) ( <i>Petaurus australis australis</i> ) and koala habitat within eucalyptus woodland. Spotlighting was also undertaken from the passenger window of a slow-moving vehicle. Call playback surveys were also undertaken targeting koala and yellow-bellied glider within suitable habitat.	38 person hours
<b>Active searches</b>	Active diurnal searches were conducted within all habitat types to identify the presence of fauna or signs of fauna activity including scats and scratches. Searches included scanning the trees and ground, searching beneath microhabitat such as rocks, fallen timber and peeling bark, digging through leaf litter and soil at tree bases and flushing birds from areas with a dense or grassy ground cover. Grass tussocks were gently disturbed to potentially flush ground-dwelling birds such as the threatened squatter pigeon (southern) ( <i>Geophaps scripta scripta</i> ) and black-breasted button-quail ( <i>Turnix melanogaster</i> ). Disturbance to microhabitat features and reptiles was kept to a minimum. Active searches were also completed opportunistically at Habitat Assessment sites.	11 person hours (all species), plus 11 person hours dedicated to collared delma

Survey Technique	Description	Survey Effort
<b>Ghost bat roost searches</b>	<p>Potential caves were identified via desktop using aerial imagery, topography mapping and LiDAR analysis (slopes). Habitat assessments were conducted within these representative sites to determine the characteristics of the potential cave for roost suitability of the ghost bat. Searches were conducted in accordance with <i>A review of ghost bat ecology, threats and survey requirements</i> (Bat Call WA Pty Ltd, 2021) and included rating the potential cave Category 1 to 4.</p> <p>If a horizontal passage in a mine shaft ( adit) or cave was located, searches for roosting ghost bats or microbat evidence (i.e., scats) were carefully undertaken. Noting that all microbats are nocturnal, disturbance was kept to a minimum to mitigate undue stress on any bats present.</p>	18 sites
<b>Opportunistic sightings</b>	All fauna species observed incidentally throughout the field surveys were recorded.	N/A

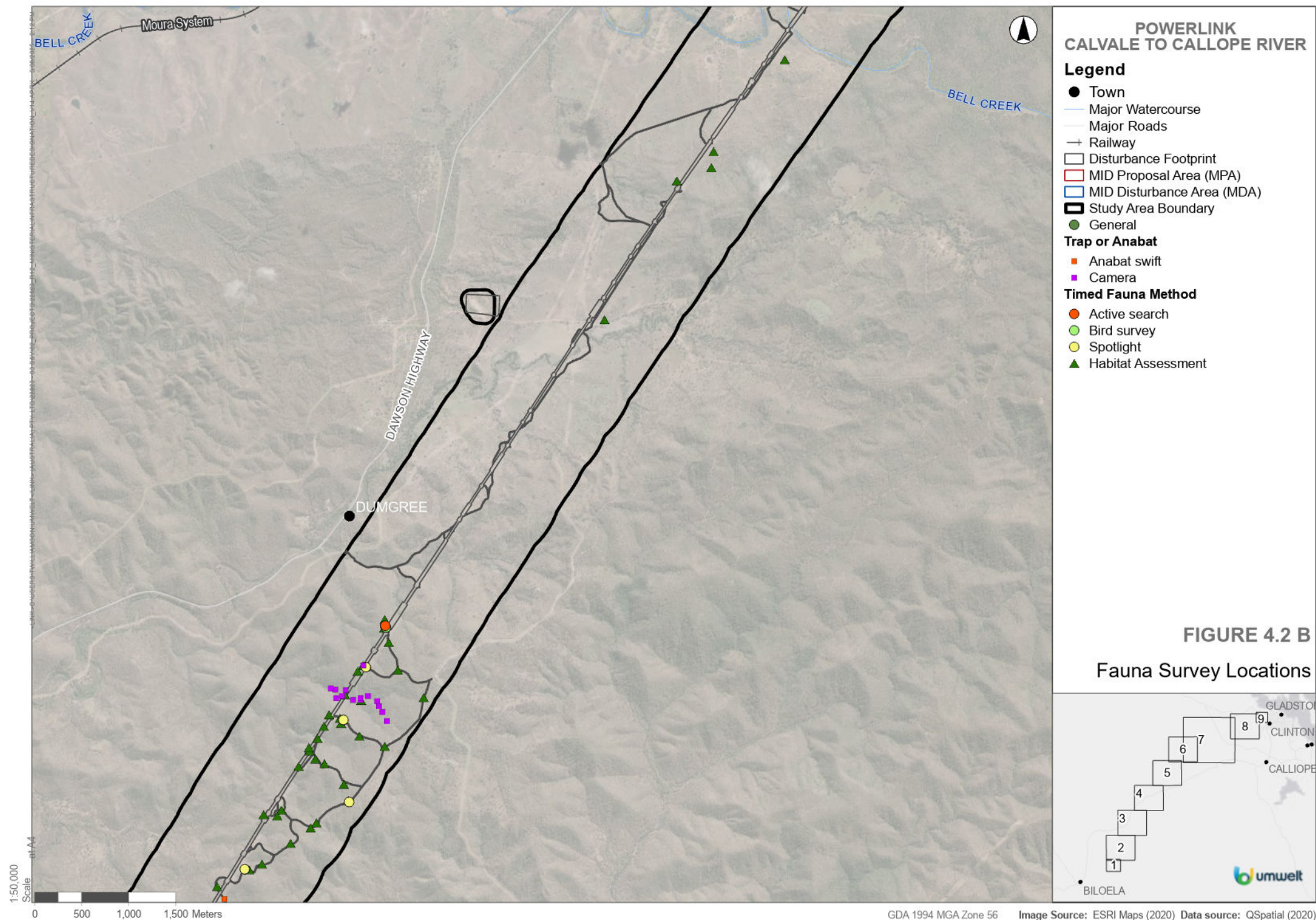




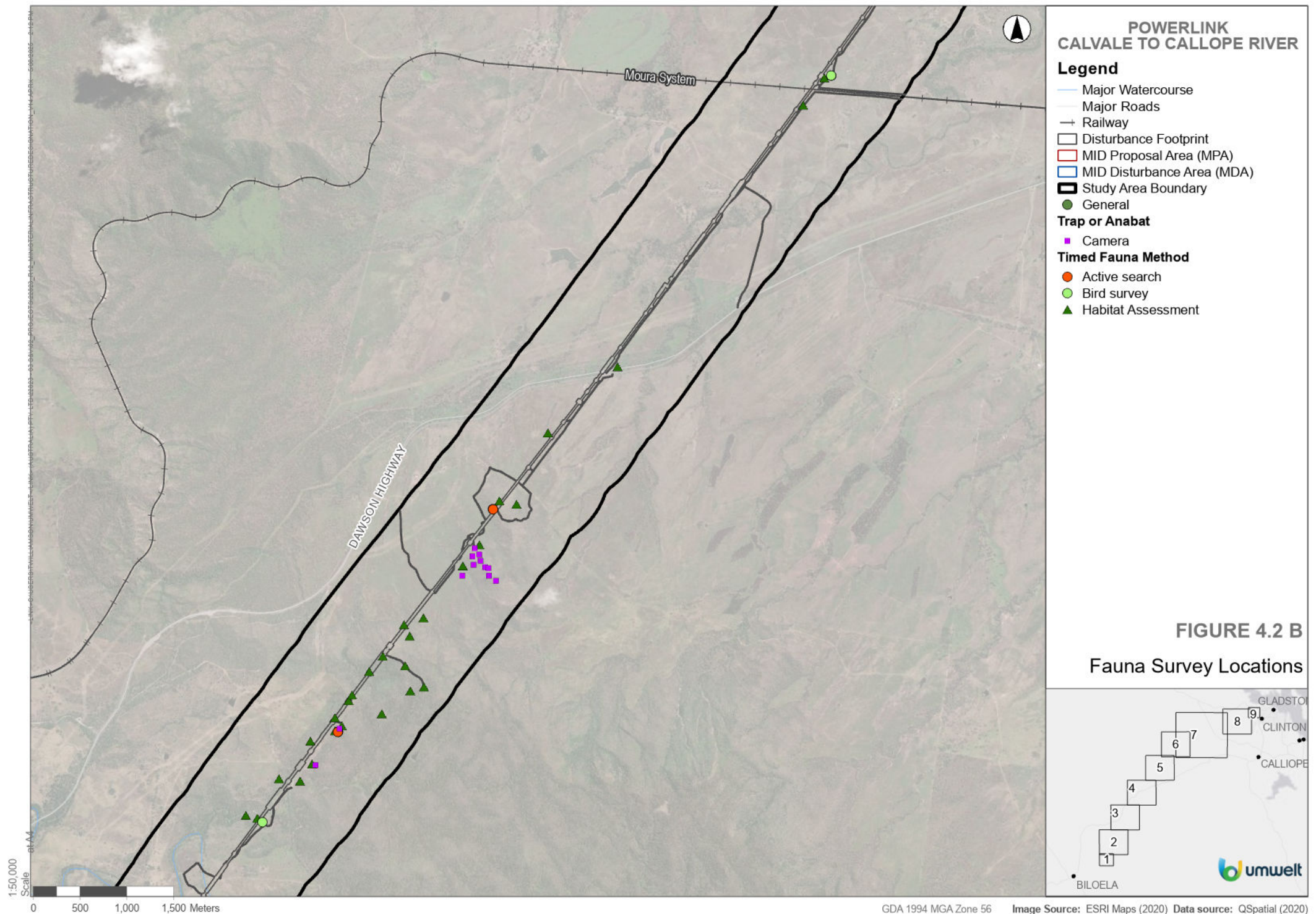




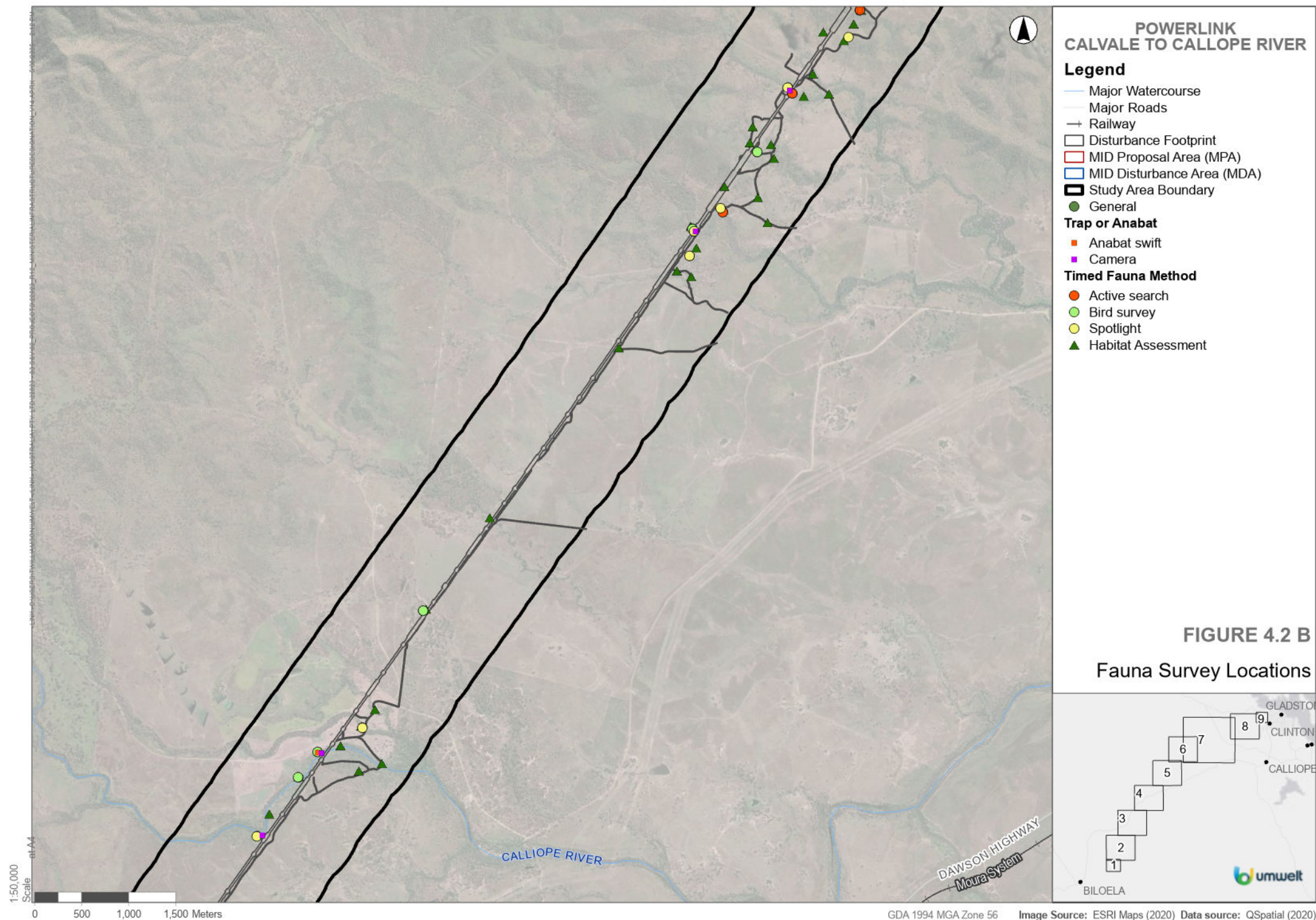




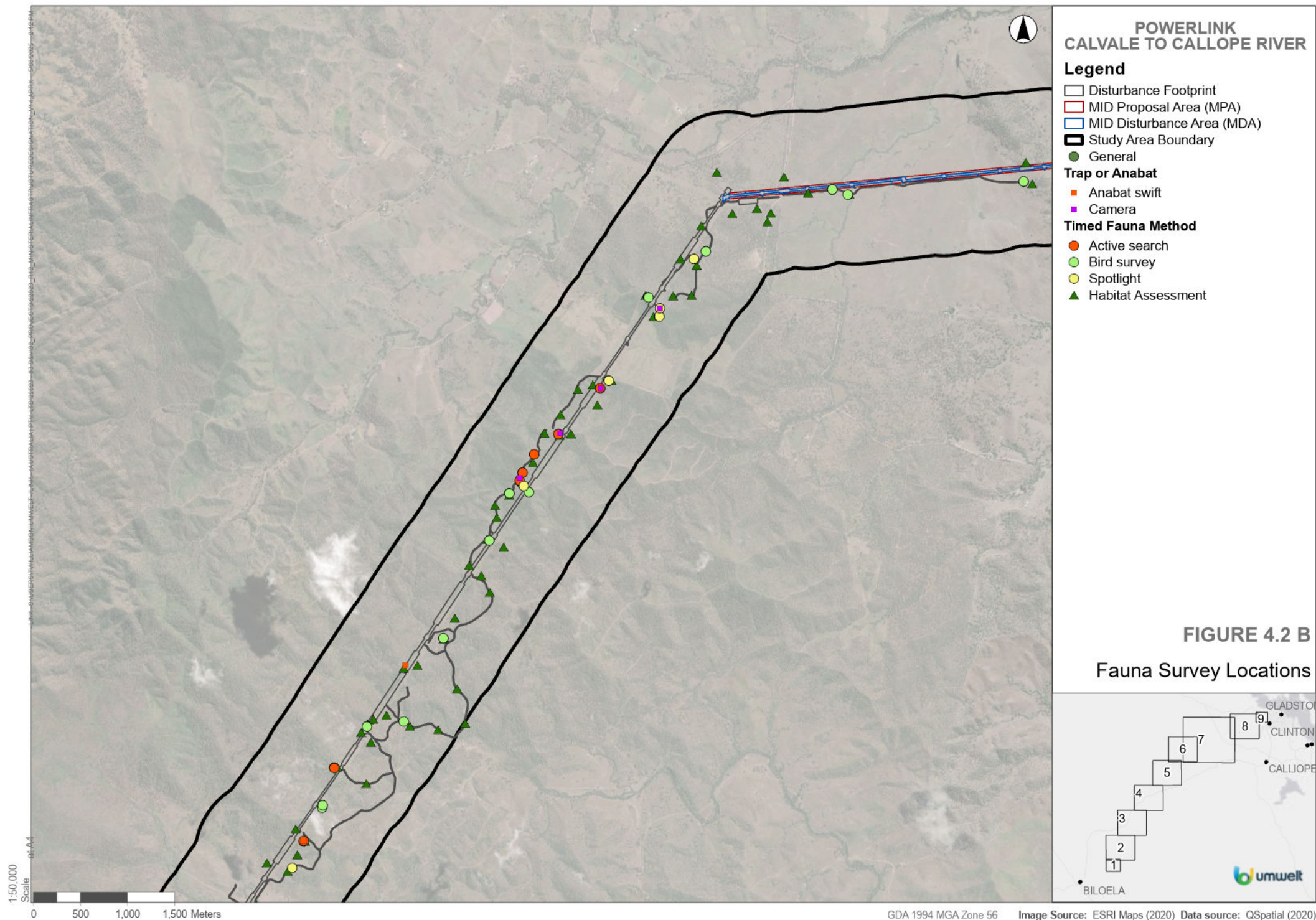




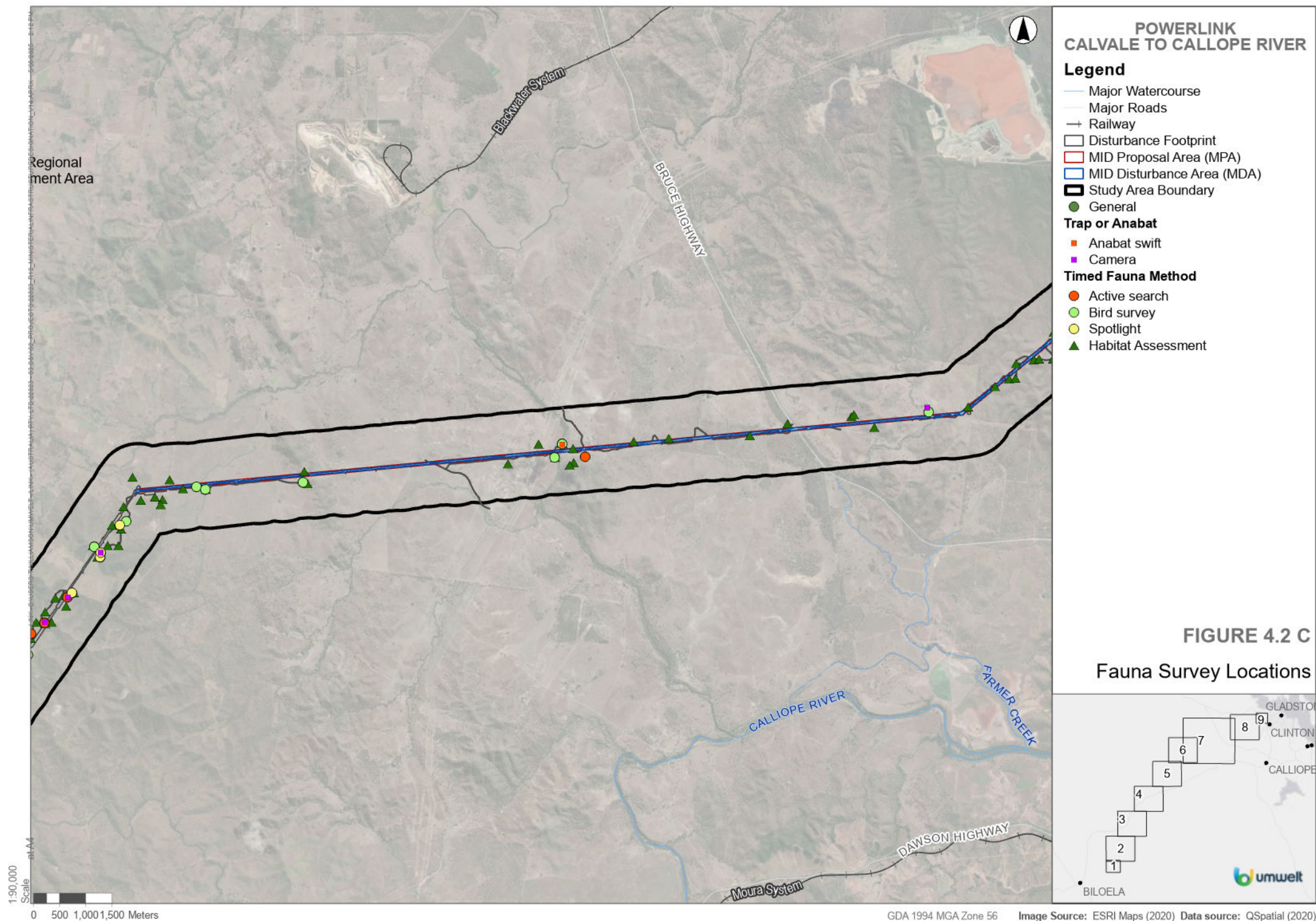




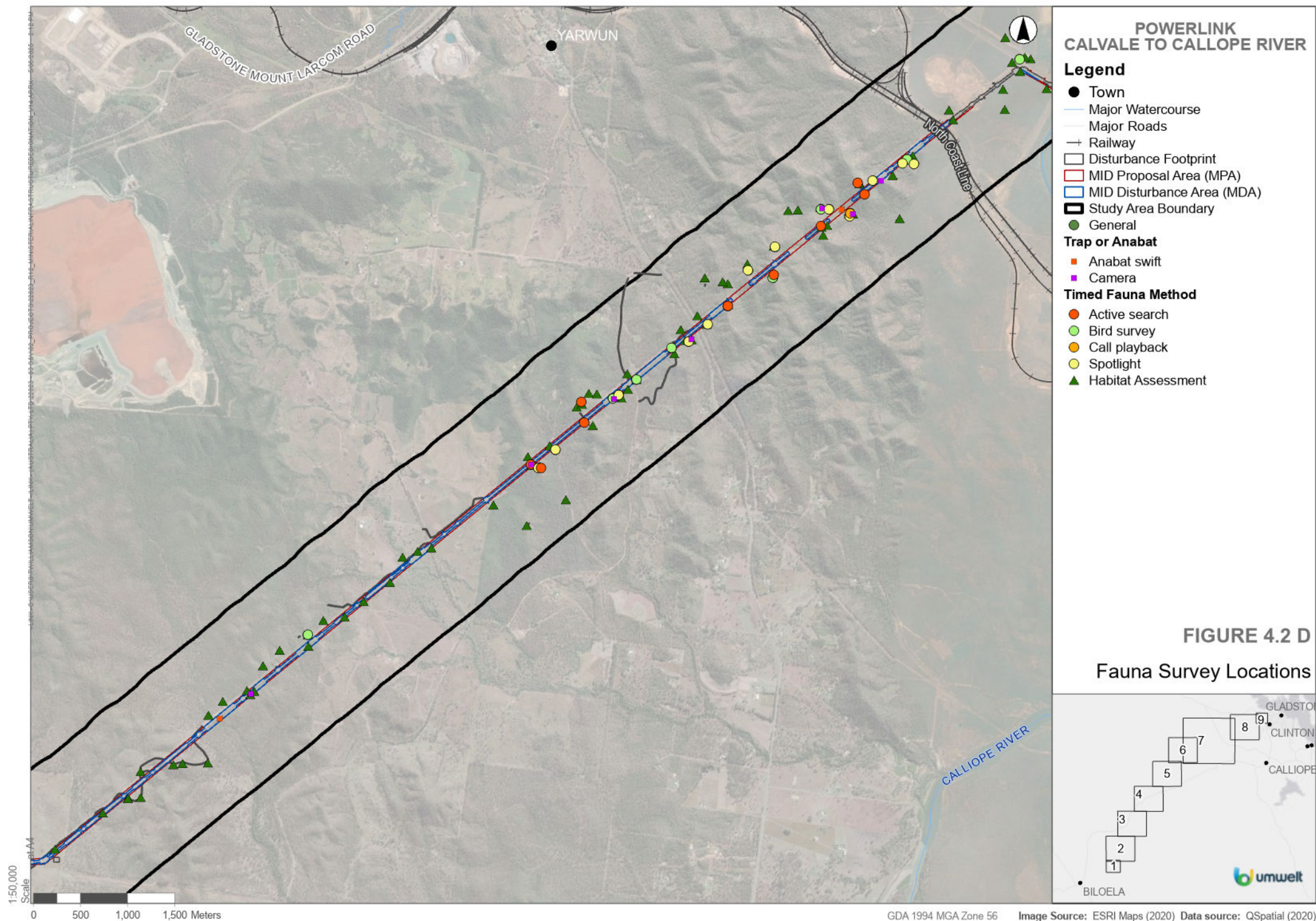




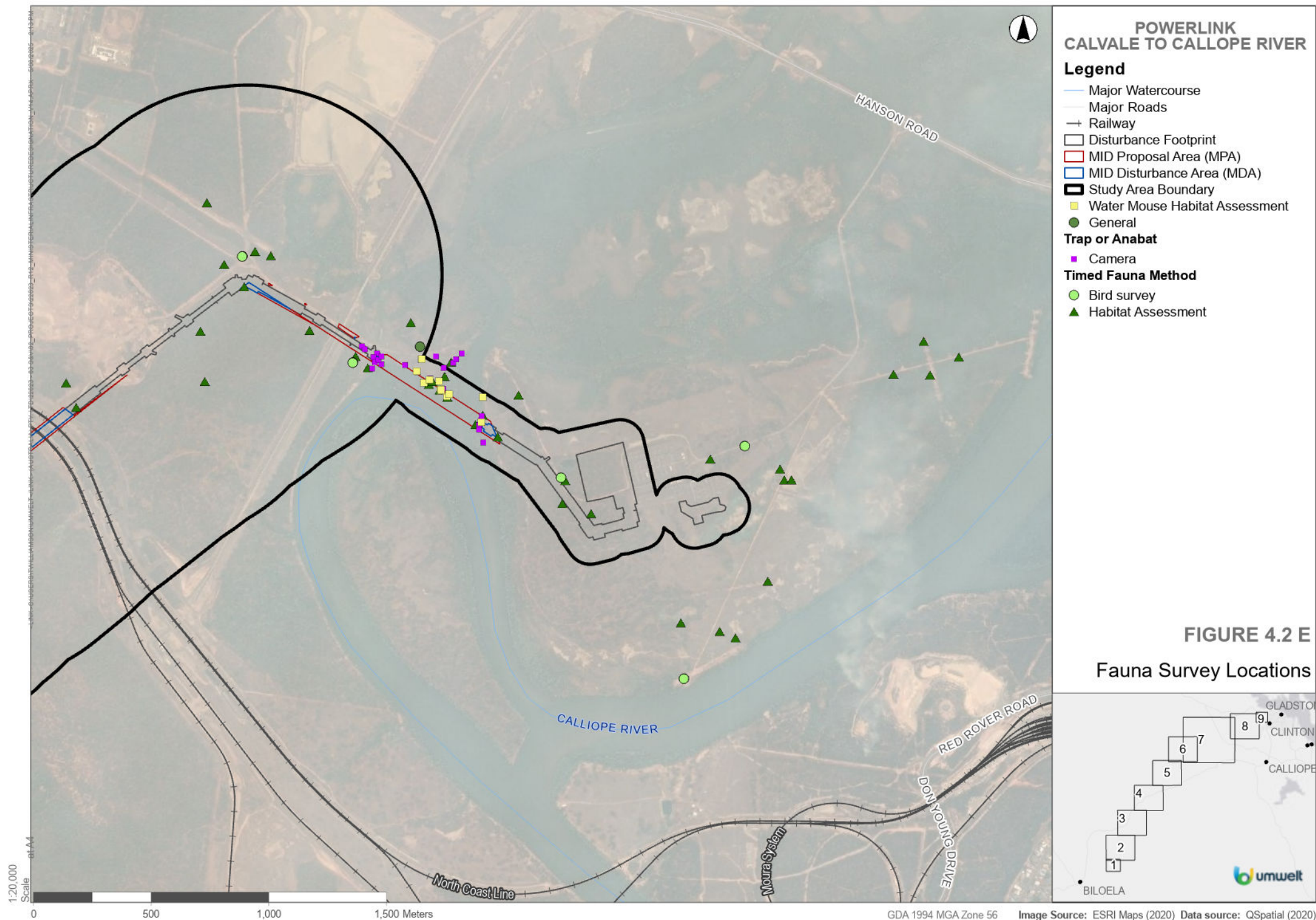












### 4.2.3 Survey Effort and Adequacy

Database searches completed as part of the initial desktop assessment identified several threatened and special least concern fauna species as potentially occurring within the Study Area. Some of these species were the subject of targeted survey effort within representative habitat types. Species not targeted during the field survey were those found to have no records in the desktop search extent, no suitable habitat within the Study Area or do not have a distribution that overlays the Study Area. Whilst these species were not specifically targeted, other survey techniques employed for the potentially occurring species are likely to have been suitable at detecting presence and suitable habitat.

Survey techniques employed to target threatened species were determined based on the DCCEEW survey guidelines for Australia's threatened fauna, referral guidelines and recently published literature where appropriate. Surveys were undertaken in accordance with the following resources:

- *Survey Guidelines for Australia's Threatened Mammals* (Department of Sustainability, Environment, Water, Population and Communities, 2011).
- *Survey Guidelines for Australia's Threatened Bats* (Department of the Environment, Water, Heritage and the Arts, 2010).
- *Survey Guidelines for Australia's Threatened Birds* (Department of Environment, Water, Heritage and the Arts, 2010).
- *Survey Guidelines for Australia's Threatened Reptiles* (Department of Sustainability, Environment, Water, 2011).
- *Draft Referral Guidelines for nationally listed Brigalow Belt reptiles* (Department of Climate Change, Energy, the Environment and Water, 2023).
- *Draft referral guideline for the 14 birds listed migratory under the EPBC Act* (Department of the Environment, 2015a).
- *Referral guideline for the vulnerable water mouse Xeromys myoides* (Department of the Environment, 2015c).
- EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Department of the Environment and Energy, 2017a).
- *A review of koala habitat assessment criteria and methods* (Youngentob, Marsh and Skewes, 2021).
- *Targeted species survey guidelines for the painted honeyeater* (Rowland, 2012).
- *Targeted species survey guidelines for the ghost bat* (Hourigan, 2011).
- *Terrestrial vertebrate fauna survey guidelines for Queensland* (Eyre et al., 2022).
- *National Recovery Plan for Black-breasted Button-quail (Turnix melanogaster)* (Department of Climate Change, Energy, the Environment and Water, 2022).

Survey techniques employed to target listed flora species reflect those endorsed by the Queensland government detailed in the *Flora Survey Guidelines – Protected Plants* (Department of Environment, Tourism, Science and Innovation, 2025) including opportunistic searches in suitable habitat.

The listed Guidelines provide a recommended standardised method of collecting ecological data, generally across smaller sized project sites (i.e. < 50 ha). They are broad guidelines and do not factor in quality of habitat and other site-specific information that may influence presence and the suitable level of survey effort that is practical to implement.

Where practical, the survey guidelines have been met as detailed in **Table 4.3**. Where survey guidelines have only partially been met due to their impracticality at this scale, effort is still considered sufficient due to the nature of the Study Area and the adoption of other techniques such as habitat assessments where presence of suitable habitat resources has been used as a surrogate for presence.



**Table 4.3 Survey Effort and Adequacy**

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
<b>Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)</b>	<i>Survey guidelines for Australia's threatened birds.</i>	<ul style="list-style-type: none"> <li>Area searches for the species in representative habitat or transect surveys. Recommended effort is 15 hours over 3 days within an area of 50 ha. Or 6 x 5-10 minute searches within an area of 1 ha. Longer surveys may be required in complex habitats.</li> <li>Flushing surveys. Recommended effort is 10 hours over 3 days within an area of 50 ha.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys.</li> <li>Walking surveys/flushing in suitable habitat.</li> <li>Tracks, watercourses and water bodies (farm dams) were targeted whilst surveying to detect the squatter pigeon (southern).</li> <li>Active searches for feathers and nests undertaken at each habitat assessment site.</li> </ul>	<p><b>Guidelines met.</b></p> <p>The recommended survey methods were employed, and there are no seasonality constraints for this species.</p> <p>The combination of diurnal bird surveys, flushing surveys and incidental records across the field program provide adequate survey effort.</p>
<b>Black-breasted button-quail (<i>Turnix melanogaster</i>)</b>	<i>Survey guidelines for Australia's threatened birds and National Recovery Plan for Black-breasted Button-quail (<i>Turnix melanogaster</i>).</i>	<ul style="list-style-type: none"> <li>Area searches for the species in representative habitat or transect surveys. Recommended effort is 15 hours over 3 days within an area of 50 ha. Or 6 x 5-10 minute searches within an area of 1 ha. Longer surveys may be required in complex habitats.</li> <li>Platelets may indicate presence of birds but are not conclusive as these are also made by other button-quail species.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys.</li> <li>Walking surveys/flushing in suitable habitat.</li> <li>Active searches for platelets and scats undertaken in suitable habitat.</li> </ul>	<p><b>Guidelines met.</b></p> <p>The recommended survey methods were employed, and there are no seasonality constraints for this species.</p> <p>The combination of diurnal bird surveys, flushing surveys and active searches across the field program provide adequate survey effort.</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
<b>Painted honeyeater (<i>Grantiella picta</i>)</b>	<i>Targeted species survey guidelines for the painted honeyeater.</i>	<ul style="list-style-type: none"> <li>In the non-breeding season, birds show up in random areas outside their core habitat (usually in association with fruiting mistletoes) either singly or in small groups. Calling is also infrequent and are more nomadic in their behaviour.</li> <li>Area searches: 4 hours over 4 days.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys. The Study Area is outside of the breeding range of the species and can be detected from March to September (i.e. outside the breeding season).</li> <li>Active searches for feathers and mistletoe undertaken at each habitat assessment site.</li> </ul>	<p><b>Guidelines met.</b></p> <p>The recommended survey methods were employed during peak activity periods to detect the species.</p> <p>The baseline surveys were undertaken when the species is potentially present within the region.</p> <p>The combination of diurnal bird surveys, mistletoe searches and incidental records across the field program provide adequate survey effort.</p>
<b>Australian painted snipe (<i>Rostratula australis</i>)</b>	<i>Survey guidelines for Australia's threatened birds.</i>	<ul style="list-style-type: none"> <li>Targeted stationary observations: 10 hours over 5 days.</li> <li>Land-based area searches or line transects: 10 hours over 3 days.</li> <li>Spotlighting: no minimum survey effort recommended.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys.</li> <li>Opportunistic surveys of wetlands.</li> <li>Incidental spotlighting at wetlands and dams.</li> </ul>	<p><b>Guidelines met.</b></p> <p>Area search effort exceeds the recommended survey effort for the species.</p> <p>Stationary observations were undertaken at areas of best habitat during the baseline surveys however this was not completed at dawn or dusk. Spotlighting at suitable wetlands was also undertaken.</p> <p>The combination of diurnal bird surveys and habitat assessments across the field program provide adequate survey effort.</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
<b>Northern quoll</b> <b>(<i>Dasyurus hallucatus</i>)</b>	<i>Survey guidelines for Australia's threatened mammals and EPBC Act referral guideline for the endangered northern quoll <i>Dasyurus hallucatus</i>.</i>	<p>Reconnaissance survey:</p> <ul style="list-style-type: none"> <li>Can be undertaken at any time of year.</li> <li>Remote camera trapping in areas of suitable habitat.</li> <li>Daytime searches for suitable habitat and latrines.</li> </ul> <p>Targeted survey:</p> <ul style="list-style-type: none"> <li>The EPBC referral guidelines note that “<i>In Qld, conformity with state survey guidelines is recommended noting that camera trapping is recommended over cage trapping</i>” (Department of the Environment, 2016).</li> <li>Camera traps should specifically target any special landscape features.</li> <li>Spotlighting: no minimum survey effort recommended.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments, which included searches for suitable denning sites.</li> <li>Deployment of 28 remote cameras during the reconnaissance survey (in March 2023), and 32 remote cameras during the targeted survey (in July 2024) in locations of identified as potential habitat. Cameras were baited using a combination of chicken coupled with a bolus of rolled oats, peanut butter, honey and vanilla essence, for a total of 1,061 camera trap nights in suitable habitat.</li> </ul>	<p><b>Guidelines met.</b></p> <p>Habitat assessments were conducted throughout the field survey program to identify potential areas of habitat critical to the survival of the species.</p> <p>Camera traps were deployed during both a reconnaissance and targeted survey. The targeted survey was conducted just prior to the breeding season in Queensland when individuals are most active.</p>
<b>Greater glider (southern and central)</b> <b>(<i>Petauroides volans</i>)</b> <b>Yellow-bellied glider (south-eastern)</b> <b>(<i>Petaurus</i>)</b>	<i>Survey guidelines for Australia's threatened mammals and the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland.</i>	<ul style="list-style-type: none"> <li>Arboreal mammal survey methods identified by DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities, 2011) include: <ul style="list-style-type: none"> <li>diurnal searches for the presence of potentially suitable habitat resources for nest or den sites as well as signs of the species' presence, such as</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments, which included searches for suitable hollows.</li> <li>38 person hours of spotlighting conducted on foot and by vehicle, within representative greater glider (southern and central) and yellow-bellied glider (south-eastern) habitat.</li> </ul>	<p><b>Guidelines met.</b></p> <p>The presence and abundance of hollow-bearing trees was assessed at each habitat assessment site. Spotlighting, which is reported to be the most effective method at detecting arboreal mammals, has also been conducted. There are no seasonality constraints for these species.</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
<b><i>australis australis</i></b>		<ul style="list-style-type: none"> <li>scratches on tree trunks and scats beneath trees</li> <li>stag watching</li> <li>spotlight surveys in suitable vegetation types</li> <li>call detection and/or call playback surveys for vocal species, in addition to playback of the calls of owl predators that are known to induce a call response</li> <li>cage trapping.</li> <li>As per Eyre et al. (2022), spotlighting transects are the most effective method.</li> <li>Where possible, survey effort should target habitat known to be suitable for listed species.</li> </ul>	<ul style="list-style-type: none"> <li>Call playback for the yellow-bellied glider (south-eastern) was conducted during surveys within areas of potential habitat. Calls were played for approximately 2 minutes at a time for 3 rounds.</li> </ul>	
<b>Koala (<i>Phascolarctos cinereus</i>)</b>	<i>A review of koala habitat assessment criteria and methods.</i>	<p>No specific methodology or effort standards are prescribed for koala surveys. However, where there is a need to critically evaluate the potential impacts of major projects, multiple techniques should be used. Repeat surveys may be necessary to take temporal variation into account.</p> <ul style="list-style-type: none"> <li>Direct observation methods include transect and point surveys, spotlighting, mark-resight or mark-recapture, thermal detection</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>38 person hours of spotlight searching on foot and by vehicle within representative koala habitat.</li> <li>Call playback of koala mating calls within suitable habitat. Calls were played for approximately 2 minutes at a time with 3 rounds.</li> </ul>	<p><b>Guidelines met.</b></p> <p>As recommended, the field program employed both direct and indirect methods.</p> <p>Spotlighting effort was undertaken in areas of representative habitat, and this included call playback.</p> <p>Habitat assessments supplemented the survey effort and overall is considered sufficient.</p>



Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
		<p>drones, radio-tracking, camera traps and detection dogs.</p> <ul style="list-style-type: none"> <li>Indirect methods include scratching's, SATs and other scat search methods, call playback, passive acoustics and landscape nutritional quality surveys.</li> <li>To optimise detection, call playback surveys should be conducted at night during the breeding season, and in the absence of strong winds or rain.</li> <li>Indirect methods are reported to be often the most effective for gathering presence/absence data due to the difficulty in observing koalas and the variable density of koalas across the landscape.</li> </ul>		
<b>Ghost bat (<i>Macroderma gigas</i>)</b>	<i>Targeted species survey guidelines for the ghost bat.</i>	<ul style="list-style-type: none"> <li>The species disperse out of maternity roosts during winter and autumn.</li> <li>Walking transects with a hand-held bat detector and spotlight: 8 detector hours over 4 nights.</li> <li>Harp traps and mist nets (optional): a minimum of 8 trap nights over 4 nights, plus 8 mist net hours over 4 nights (optional).</li> <li>Roost searches: 2 hours per survey day.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>38 person hours of spotlighting on foot and by vehicle covering a range of habitat ranges.</li> <li>18 potential roost site searches.</li> </ul>	<p><b>Guidelines partially met.</b></p> <p>Field surveys did not include the use of harp or mist nets. However, spotlighting was completed in areas of representative habitat across the Study Area.</p> <p>No known maternity roosts are located within or nearby to the Study Area. Potential roosts identified on the desktop assessment were inspected. Field surveys have been undertaken during autumn-</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
				winter (in the non-breeding season). Although not all recommended methods have been employed, habitat assessments have supplemented the survey effort and overall, it is considered sufficient.
<b>Water mouse (Xeromys myoides)</b>	<i>Referral guideline for the vulnerable water mouse Xeromys myoides.</i>	<ul style="list-style-type: none"> <li>The referral guidelines note that “proponents proposing actions in, adjacent to or nearby habitat that is already known to be critical to the survival of the water mouse should adopt less invasive surveys for the water mouse by using remote movement-activated cameras and active searching to confirm extant status”.</li> </ul>	<ul style="list-style-type: none"> <li>The Study Area occurs in an area mapped as species ‘known to occur’.</li> <li>13 species-specific habitat assessments, plus 25 general habitat assessments in suitable habitat.</li> <li>Active searches for nest mounds, tracks and middens.</li> <li>136 camera trap nights in suitable habitat.</li> </ul>	<p><b>Guidelines met.</b></p> <p>Field surveys included camera traps in representative habitat, active searches for nests and habitat assessments. Habitat assessments have supplemented the survey effort and overall, it is considered sufficient.</p>
<b>Collared delma (Delma torquata)</b>	<i>Draft referral guidelines for the nationally listed Brigalow Belt reptiles and the Survey Guidelines for Australia’s Threatened Reptiles.</i>	<ul style="list-style-type: none"> <li>Undertake diurnal active searches in appropriate habitats: <ul style="list-style-type: none"> <li>Search microhabitats, such as carefully turning woody debris and rocks and raking through leaf litter</li> <li>Survey over a maximum of 1.5 person hours per ha for habitats of average complexity</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>191 habitat assessments, noting the presence of key microhabitat features.</li> <li>22 person hours of active searches in locations of identified potential habitat.</li> <li>As pitfall trapping is considered less effective than active diurnal</li> </ul>	<p><b>Guidelines met.</b></p> <p>Surveys employed relevant methodologies (direct and indirect).</p> <p>While the surveys were not undertaken during summer, the conditions were hot and dry, with maximum temperatures greater than 25°C (refer <b>Table 4.1</b>).</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
		<ul style="list-style-type: none"> <li>Survey over a minimum of 3 days.</li> <li>Undertake pitfall trapping during late spring to summer:</li> <li>A series of pitfall trap lines comprising six 4 – 10 L buckets and funnel traps spread along a 15 m fence would be an appropriate trap design.</li> <li>As a general rule, surveys should only be undertaken from late September through to late March when weather conditions are warm, not too dry and maximum temperatures are greater than 25°C on most survey days.</li> <li>As collared delma are a diurnal species the optimal time to survey are early mornings (within 4 hours of sunrise) and late afternoons to early evenings.</li> </ul>	<p>searches in locating the species (Porter, 1998), only active search were undertaken during the survey program.</p>	<p>Although not all recommended methods have been employed (e.g. pitfall trapping), habitat assessments and active searches have supplemented the survey effort and overall, it is considered sufficient.</p>
<b>Terrestrial migratory birds</b>	<i>Draft Referral Guideline for 14 Birds Listed as Migratory Species Under the EPBC Act.</i>	<ul style="list-style-type: none"> <li>For oriental cuckoo during migration, it is recommended that surveys be undertaken over standardised timed periods. Surveys and assessments should also consider habitat (and specific locations) that is suitable and important for migration passage.</li> <li>While there are no standard survey techniques for white-throated needletail and fork-tailed swift, they</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys.</li> <li>Bird species were recorded incidentally throughout the survey program both visually and aurally.</li> </ul>	<p><b>Guidelines met.</b></p> <p>The combination of habitat assessments, diurnal bird surveys and incidental sightings provide adequate survey effort to detect migratory species.</p> <p>Surveys have been conducted when all potential species are present within Australia.</p>



Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
		<p>should be counted by an experienced person from elevated viewpoints (if present).</p> <ul style="list-style-type: none"> <li>The species occupancy within the Study Area is as follows: <ul style="list-style-type: none"> <li>Oriental cuckoo: September to May</li> <li>White-throated needletail: September to April</li> <li>Fork-tailed swift: October to April.</li> </ul> </li> </ul>		
<b>Migratory shorebirds/water birds</b>	<i>Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species.</i>	<ul style="list-style-type: none"> <li>Bird surveys in suitable habitat. Replicate surveys should be considered.</li> <li>Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e. wetland or other waterbodies and their surrounding vegetation).</li> <li>Surveys should be conducted for the between late August and April, when migratory species arrive and depart in Australia.</li> </ul>	<ul style="list-style-type: none"> <li>255 habitat assessments.</li> <li>Diurnal bird surveys undertaken throughout all field surveys.</li> <li>Opportunistic surveys of wetlands.</li> </ul>	<p><b>Guidelines met.</b></p> <p>Surveys have been undertaken during the shorebird's occupancy within Australia (3 x in March 2023, 4 x in April 2023, 2 x in May 2023 and 1 in August 2024).</p> <p>Bird surveying has been completed during all surveys. To supplement the search effort targeted habitat assessments were conducted throughout all surveys.</p>

Species	Relevant Guidelines	Recommended Methodology	Total Survey Effort Undertaken	Survey Adequacy
<b>Cycas megacarpa</b>	There are no Commonwealth-approved species-specific survey guidelines.	<ul style="list-style-type: none"> <li>There is no published methodology for surveying <i>Cycas megacarpa</i>, however, methods have been developed in consultation with the Queensland Herbarium (<b>Section 4.2.1.2</b>).</li> <li><i>Cycas megacarpa</i> is easily distinguished from other cycad species by its large glaucous seeds as well as its green leaves with moderate broad leaflets.</li> <li>Fruiting cones are produced between May and February. Seeds become ripe from March onwards and drop from the tree.</li> </ul>	<ul style="list-style-type: none"> <li>Targeted surveys were undertaken in areas of suitable habitat following methods provided in <b>Section 4.2.1.2</b>.</li> </ul>	<p><b>Guidelines met.</b></p> <p>A targeted survey approach was adopted for <i>Cycas megacarpa</i> in consultation with the Queensland Herbarium. The survey effort reflected these guidelines but was adapted to accommodate the steep terrain.</p>
<b>Threatened flora</b>	<i>Flora survey guidelines – protected plants.</i>	<ul style="list-style-type: none"> <li>Random meander technique (Cropper, 1993).</li> <li>Random meander technique (Department of Environment, Tourism, Science and Innovation, 2025).</li> </ul>	<ul style="list-style-type: none"> <li>Opportunistic surveys were undertaken in area of suitable habitat for threatened flora species.</li> </ul>	<p><b>Guidelines met.</b></p> <p>Opportunistic surveys are considered suitable.</p>

#### 4.2.4 Survey Limitations

Throughout some sections of the Study Area, terrain was rugged and sometimes inaccessible due to the steepness and the associated safety risk. Vehicle tracks were available to all existing towers but often not in between. At several locations, these areas were observed from the existing transmission towers. Where access was unavailable, State RE mapping was applied in place of ground-truthed vegetation.

Surveys have been undertaken across summer, autumn and winter. Fauna species with seasonal survey requirements in spring may not have been captured during the survey and this has been taken into consideration when determining the likelihood of occurrence (**Section 4.3**). After a review of flora species with the possibility of being present within the Study Area, all species have year-round characteristics, making these species observable across any climatic season.

Despite the identified limitations, survey effort and coverage overall are considered appropriate as representative vegetation communities and habitat types were sampled and an extensive suite of flora and fauna survey methodologies were employed. The limitations have been taken into consideration throughout this report.

##### 4.2.4.1 Specific Flora Survey Limitations

Floristic sampling and searches for threatened species were restricted in the semi-evergreen vine thicket (SEVT) communities due to the closed and complex vegetation structure, presence of thorned plants and steep terrain where this community occurs. This has been taken into consideration when determining the likelihood of occurrence (**Section 4.3**).

##### 4.2.4.2 Specific Fauna Survey Limitations

The detection of fauna activity and estimates of relative abundance and occurrence of species during field surveys can vary in response to the following:

- Recent environmental events, such as bushfire.
- Change in fauna movement and activity from seasons (i.e., spring versus summer).
- Species that have large home ranges can make detection challenging as the species may not be present in this part of their home range during the survey period.
- Certain species may be difficult to detect as they occur in low densities within the Study Area, or they are a cryptic species.

### 4.3 Likelihood of Occurrence

A likelihood of occurrence assessment was completed for threatened flora and fauna species identified in the desktop assessment. Each threatened flora and fauna species was assessed against the categories outlined in **Table 4.4**. The assessment considered known records, the mapped distribution, preferred habitat and ecological requirements of the species or community. Following the completion of the field survey program, the methodology was applied again to reassess the likelihood of occurrence outcomes in the context of the ground-truthed data.



**Table 4.4 Likelihood of Occurrence Definitions**

Category	Definition
<b>Known</b>	The species was confirmed via field surveys within the Study Area.
<b>High</b>	The species has been previously recorded within the Study Area or desktop search extent, and details on presence are reliable. The Study Area contains preferred habitat which may support a population of the species.
<b>Moderate</b>	The species is known from the broader area (desktop search extent or wider for highly mobile species) and suitable habitat occurs within the Study Area, but habitat may not support a population of the species as it lacks necessary habitat features, is disturbed or has poor connectivity.
<b>Low</b>	The species is not known from the broader area (desktop search extent) and/or the Study Area supports limited or marginal habitat. The species may disperse through the Study Area infrequently and is unlikely to depend on the habitat for their survival.
<b>Unlikely</b>	The Study Area offers limited to no potential habitat for the species, is outside its known range and/or is lacking broader habitat requirements.

## 4.4 Field Verified Mapping

### 4.4.1 Refined Vegetation Communities and Broad Fauna Habitats

Following the completion of the field survey program, a refined RE map was developed for the Disturbance Footprint (Ground-truthed Regional Ecosystem (GTRE) map). The *Vegetation Management Regional Ecosystem Map - Version 13* (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, 2024b) formed the basis of the GTRE map. Boundaries and RE assignments were revised to reflect floristic field data and patterns observed in aerial imagery. The vegetation mapping of areas that were not accessed during the field survey was refined only where values could be reasonably extrapolated. The GTRE map, in conjunction with habitat assessment data, was then used to map broad habitat types.

### 4.4.2 Threatened Species Habitat Modelling

Following the completion of the likelihood of occurrence assessment and the mapping of GTRE and habitat, mapping of habitat for the threatened flora and fauna species known or having a high or moderate likelihood of occurring within the Disturbance Footprint was undertaken.

‘Modelling criteria’ were primarily based on habitat requirements, as specified by the SPRAT database. As required, other publicly available datasets were also reviewed to inform the modelling criteria, including species recovery plans (where available), referral guidelines, approved conservation advice and listing advice, management plans and peer-reviewed journal articles. Habitat assessments, species records (public and ones captured for the Project), and GTRE mapping informed the mapping of potential habitat per species according to their modelling criteria.

Although REs form the basis of the fauna habitat types discussed in this assessment, the presence and abundance of required habitat resources as determined through field surveys was considered foremost when assessing if suitable for a particular species. The modelling criteria are detailed in **Appendix C**.

## 4.5 Significant Residual Impact Assessment

An assessment against the current *Significant Residual Impact Guideline: For Matters of State Environmental Significance* and prescribed activities under the repealed *Sustainable Planning Act 2009* (Department of State Development, 2014) has been undertaken to determine whether the Project is likely to have a SRI on MSES. The SRI assessment (regulated vegetation, connectivity, fish passage and marine plants) has been completed for State code 11 (removal, destruction or damage of marine plants), State code 16 (native vegetation clearing) and State code 18 (constructing or raising waterway barrier works in fish habitats). All other MSES were also assessed within coastal erosion prone areas of the MDA as part of State code 8 (coastal development and tidal works). Outside of the coastal erosion prone areas of the MDA, threatened species listed under both the EPBC Act and NC Act have been assessed under the EPBC Act Environmental Offsets Policy, as detailed in *Matters of National Environmental Significance Assessment Calvale to Calliope River Transmission Line Reinforcement* (Umwelt, 2024).

## 5.0 Environmental Context

### 5.1 Regional Context

#### 5.1.1 Bioregion and Subregion

The Study Area occurs within two bioregions: the Brigalow Belt (bioregion 11) and Southeast Queensland (bioregion 12). Section E and parts of Section D (east of Calliope River Road) occur within Southeast Queensland bioregion and Section A, B and C occur within the Brigalow Belt bioregion (**Figure 5.1**).

##### 5.1.1.1 Brigalow Belt

The Brigalow Belt is characterised by the tree species *Acacia harpophylla* (brigalow) which forms forests and woodlands on clay soils (Sattler and Williams, 1999). Other large areas in the bioregion are characterised by eucalypt forests and woodlands, grasslands, dry rainforests, cypress pine woodland and riparian communities.

The majority of Section A to D occurs within the Mount Morgan Ranges subregion. This subregion is formed on Palaeozoic rocks of the coastal ranges, forming rugged terrain. The dominant rock types are volcanics, with areas of igneous rocks and small areas of folded metasediments. The vegetation is dominated by *Eucalyptus crebra* (narrow-leaf ironbark) with *Corymbia erythrophloia* (red bloodwood) and *C. citriodora* (spotted gum), all of which typically occur in association with steep slopes. Woodlands of *E. melanophloia* (silver-leaved ironbark) are present on the lower slopes and *E. moluccana* (gum-topped box) forms a woodland on colluvial slopes. On alluvial soils, *E. tereticornis* (forest red gum) and *Blakella tessellaris* (Moreton Bay ash) can be found (Sattler and Williams, 1999).

Small parts of Section A extend into the Callide Creek Downs subregion.

##### 5.1.1.2 Southeast Queensland

Southeast Queensland is one of the most species rich and diverse bioregions. The region contains a range of varying habitats such as wallum heaths near the coast, rainforests on mountain slopes and valleys, eucalypt woodlands and forest and overlapping brigalow in the west beyond the great dividing range (Sattler and Williams, 1999).

The northern part of Section D and Section E is in the Burnett – Curtis Hills and Ranges subregion. The main vegetation types within this subregion include, *Eucalyptus crebra* and *Corymbia citriodora* woodlands, eucalypt mixed open forest and araucarian microphyll rainforest. The geology varies and incorporates granite ranges and hills in the east, and low rolling hills on old sedimentary rock in the west. The subregion also includes elevated sandstone and the volcanic Kroombit Tops plateau in the northwest (Sattler and Williams, 1999).



## **5.1.2 Climate**

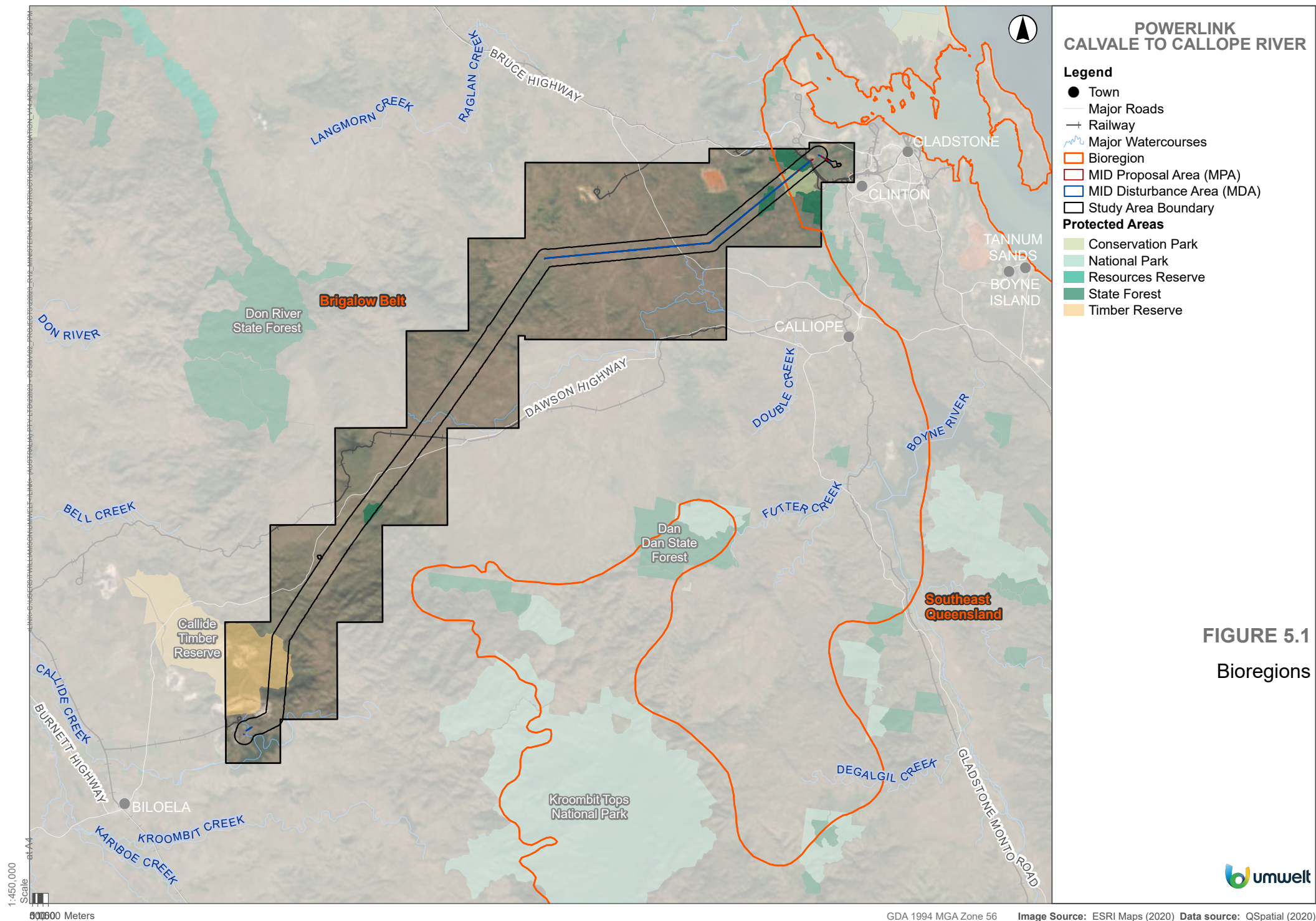
### **5.1.2.1 Brigalow Belt**

The Brigalow Belt lies in the 500 – 750 mm annual rainfall belt. From east to west total rainfall decreases and rainfall variability and drought events increase. Annual rainfall representing Section A and B, was taken from the Biloela – Valbona weather station (039290) (Bureau of Meteorology, 2024). The mean annual rainfall is 627.2 mm. Rainfall is seasonal, with the months November, December, January and February consistently recording the highest rainfall for the year. Weather data for Section A and B was obtained from Thangool Airport weather station (039089) (BOM 2023). The mean minimum temperature ranges from 16.2° Celsius (C) to 20.6°C, while mean maximum temperature ranges from 29.8°C to 37.2°C.

The annual rainfall data for Section C and D was obtained from the Hazeldean weather station (039334) (Bureau of Meteorology, 2024). The mean annual rainfall is 823.1 mm. Rainfall is seasonal, with the summer months of December, January, and February consistently recording the highest rainfall for the year. No weather stations were located within the vicinity of Section C and D.

### **5.1.2.2 Southeast Queensland**

Southeast Queensland bioregion climate is humid and subtropical. Summers are warm and wet, and winters are mild. Rainfall occurs mostly within summer and autumn months. Annual rainfall and temperature data Section D to E was obtained from the Gladstone Airport (039326) (Bureau of Meteorology, 2024). The mean annual rainfall is 866.5 mm. Rainfall is seasonal, with the months December, January, February and March consistently recording the highest rainfall for the year. The mean minimum temperature ranges from 17.2 °C to 18.9°C, while mean maximum temperature ranges from 26.4°C to 28.4°C.



### 5.1.3 Landform and Geology

The Study Area ranges in elevation from 10 m Australian Height Datum (AHD) on the lower slopes and plains to 580 m AHD on the upper slopes, ridges, and peaks. A review of DoR (Department of Resources, 2022) Detailed Surface Geology – Queensland map indicates that the Study Area mostly occurs on volcanic and metamorphic geologies (**Figure 5.2**).

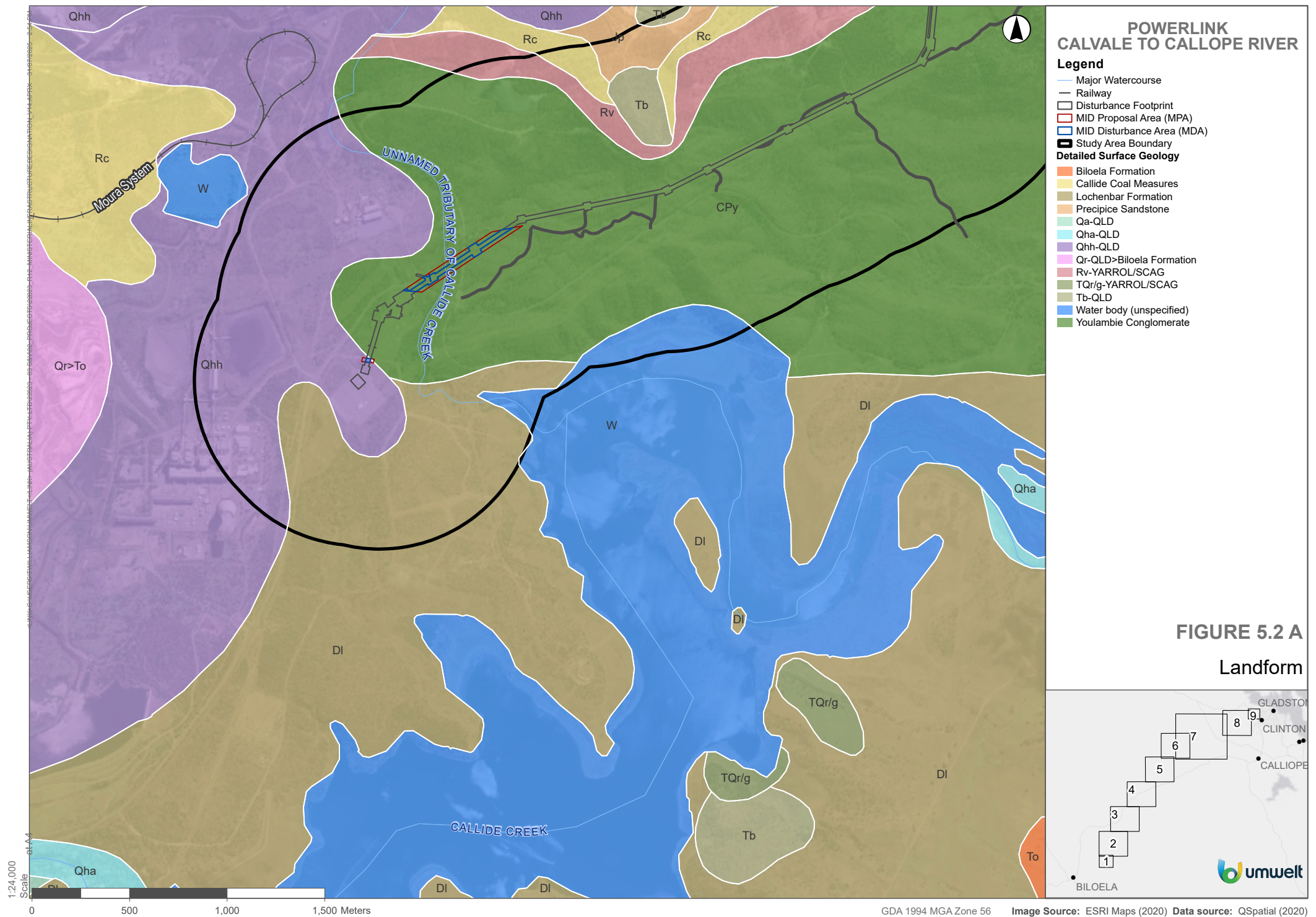
The dominant geologies and their lithographic summaries are as follows:

- Porphyritic biotite-hornblende quartz and microdiorite with abundant secondary biotite.
- Flood-plain alluvium of clay, silt, sand and gravel.
- Olivine basalt flows and some plugs and some areas of nephelinite and basanite.

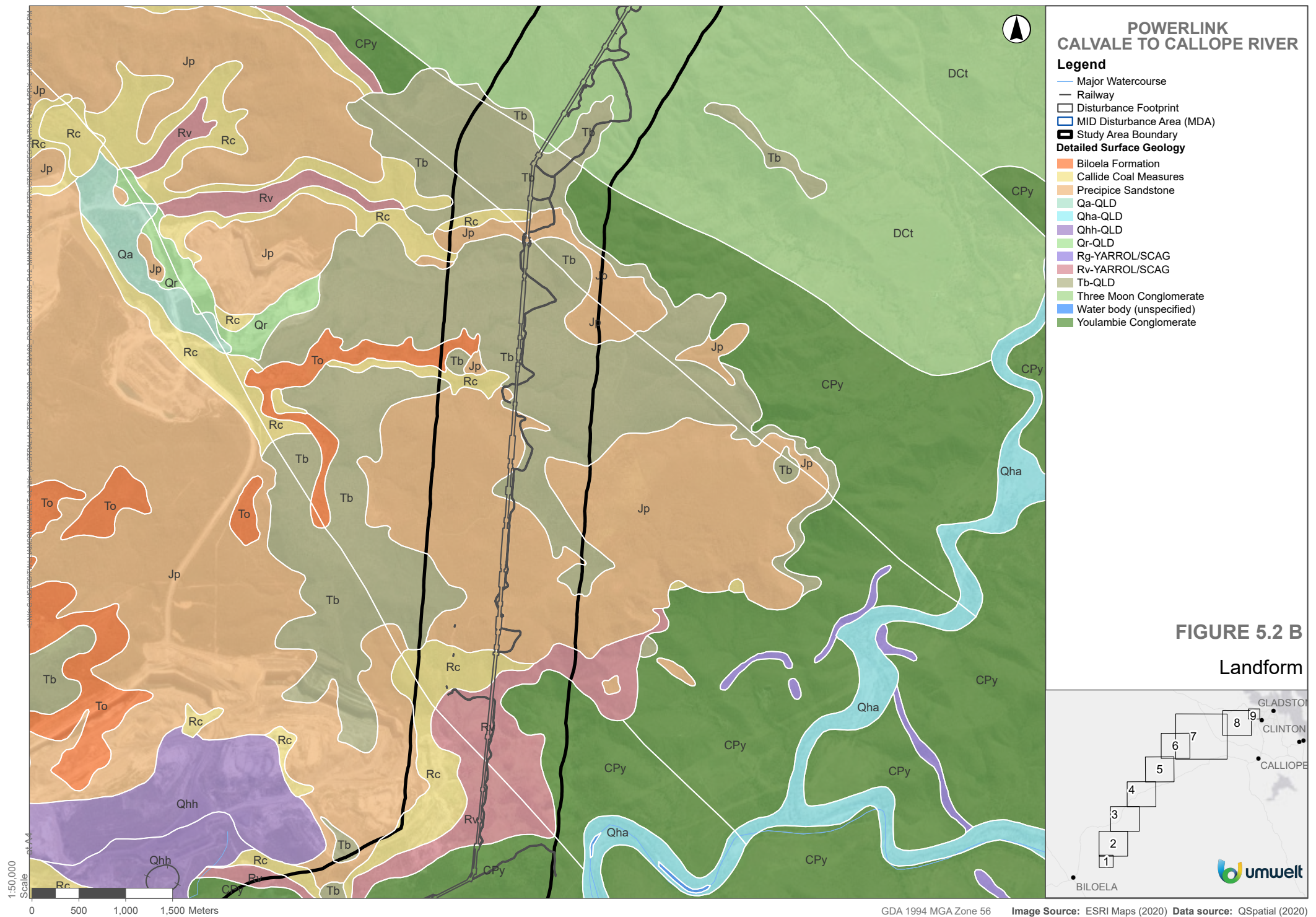
Other geologies in the Study Area include:

- Granitoids in conjunction with alluvium, felsite, and basalt.
- Estuarine channels and banks and supratidal flats and coastal grasslands of mud, sandy mud, muddy sand and minor gravel.
- Thinly interbedded fine-grained sandstone and siltstone and thick beds of conglomerate with andesitic to dacitic clasts and siltstone rip-up-clasts.
- Fine to very coarse-grained, pebbly quartzose sandstone, laminated siltstone (in upper part), carbonaceous shale and lithic sublabile sandstone.
- Coal seams and felsic tuff.

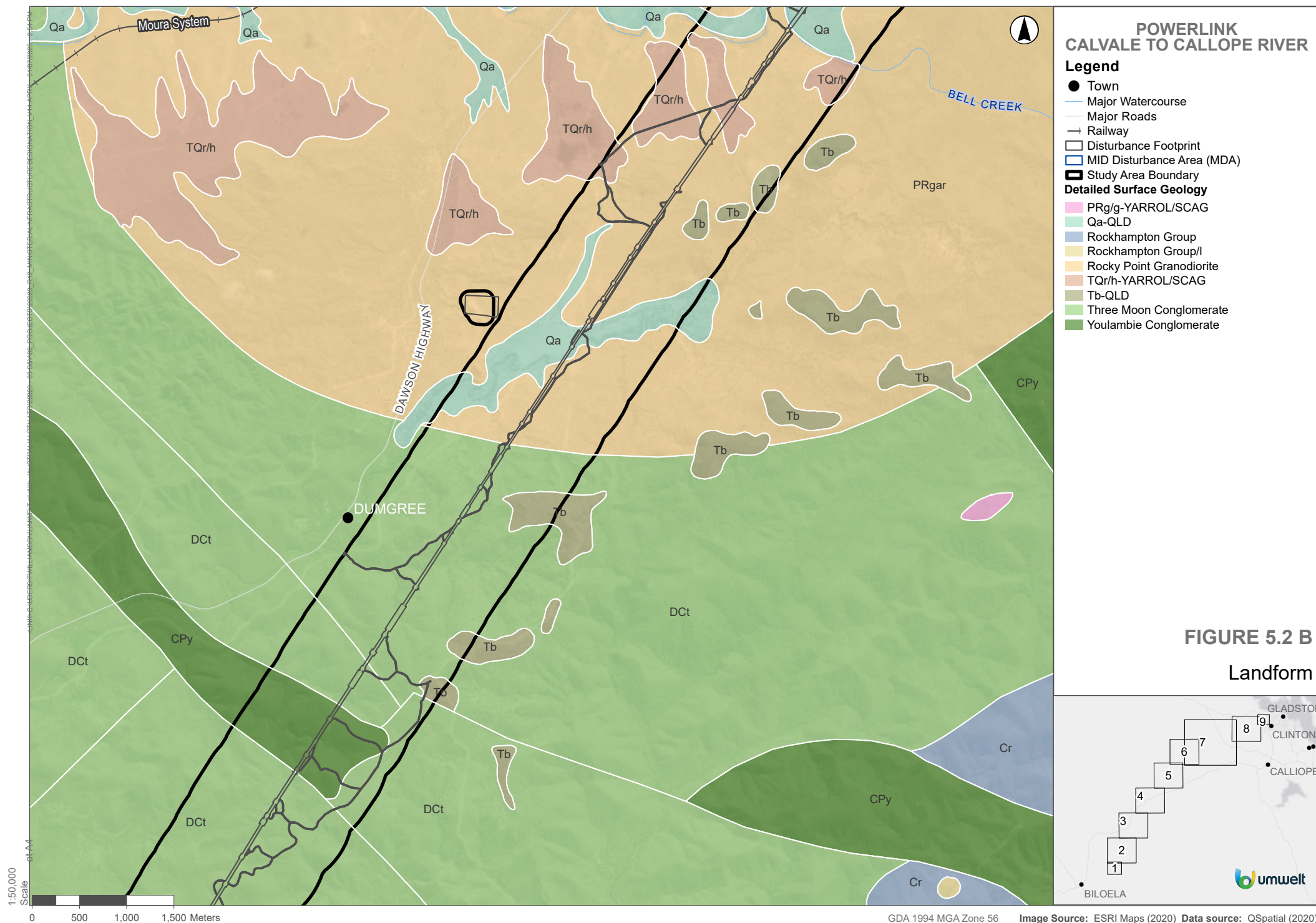




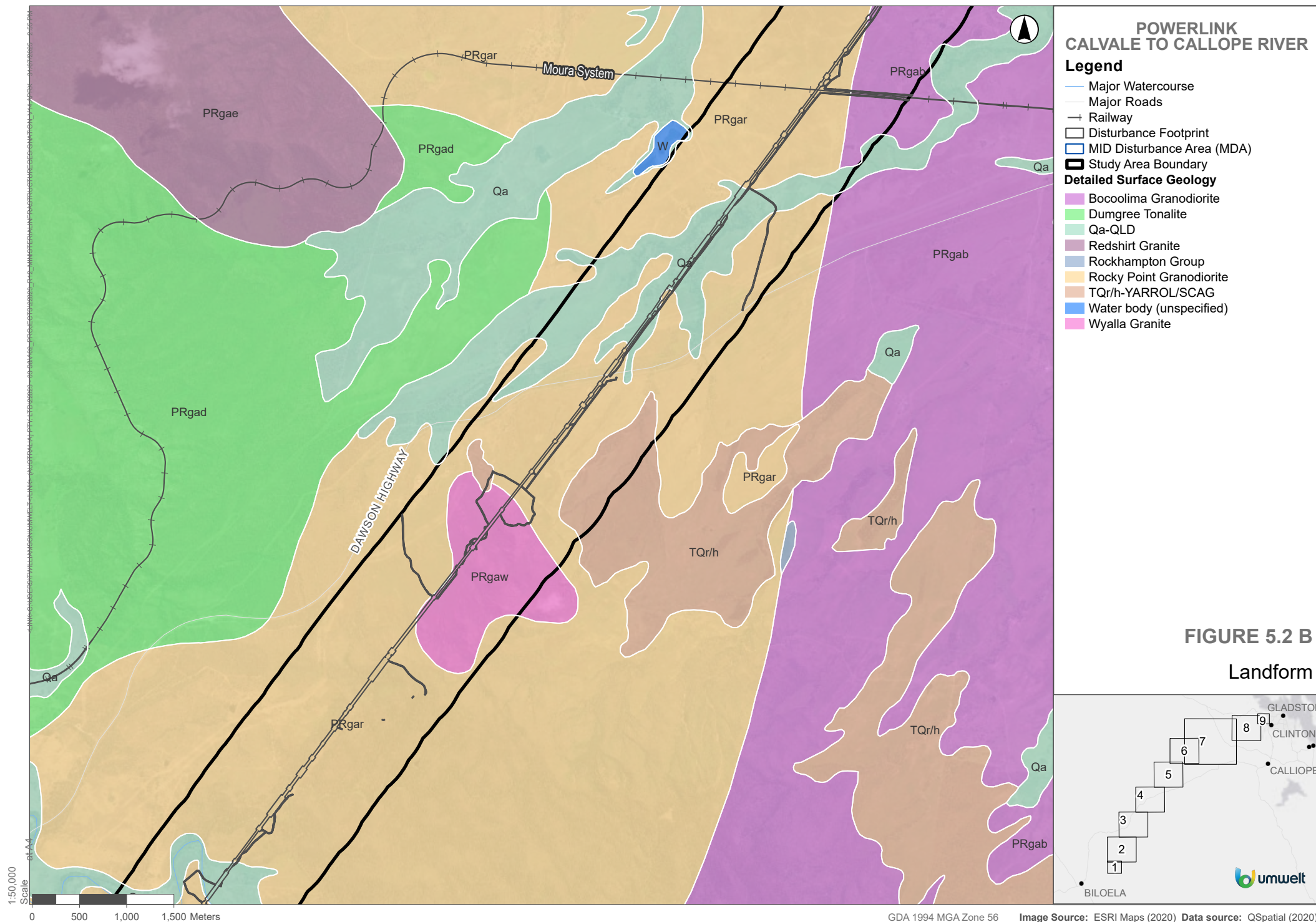




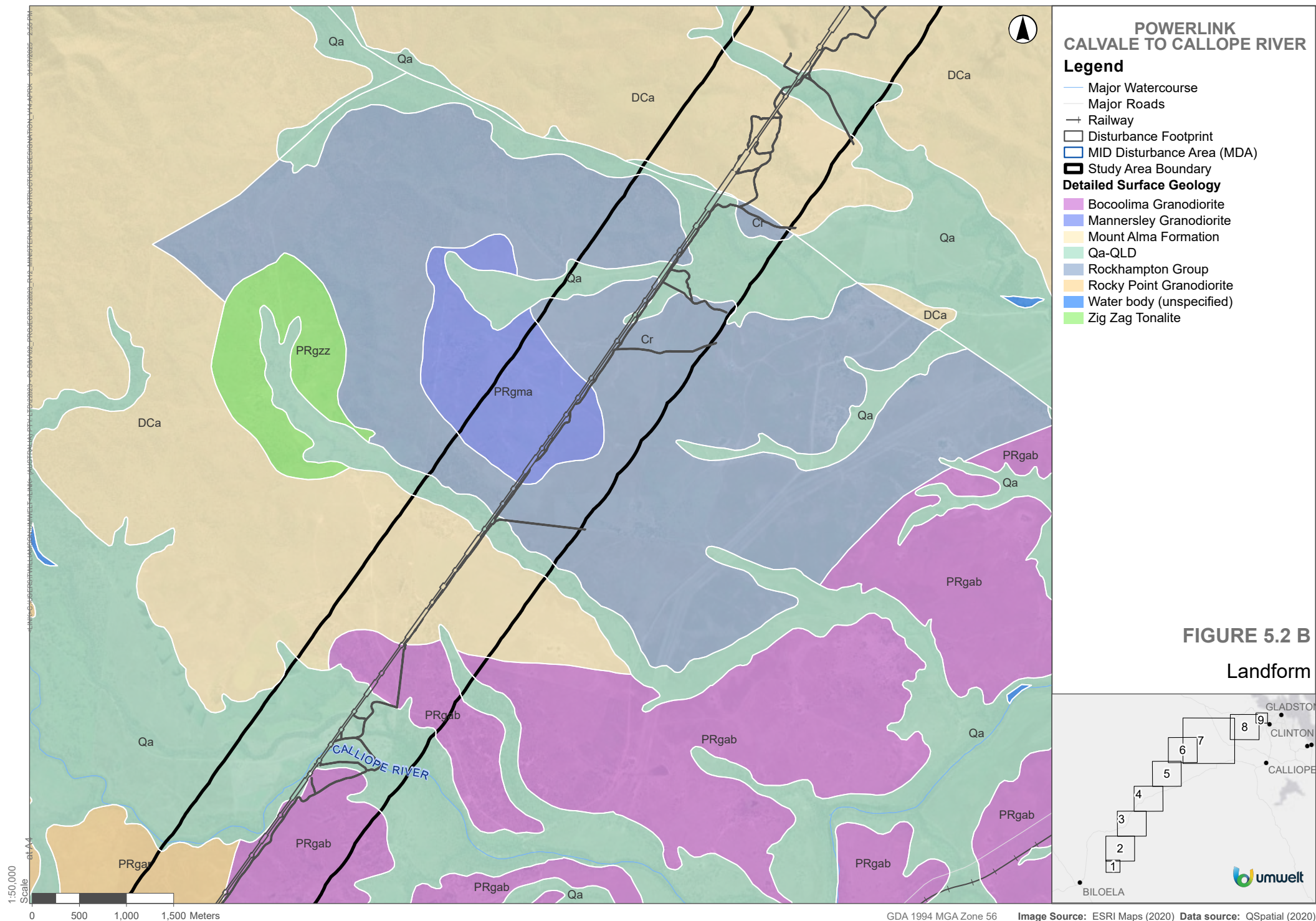








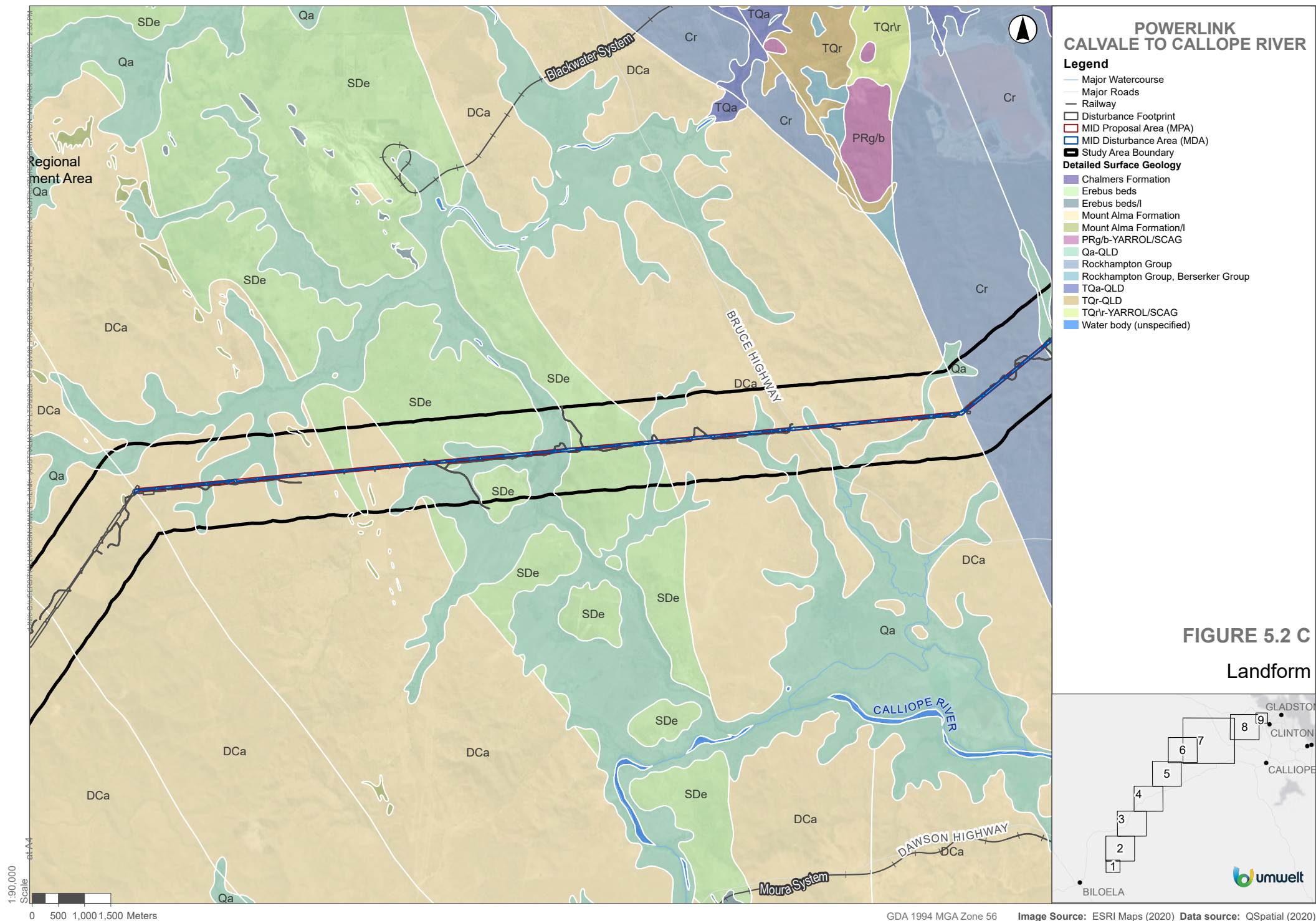




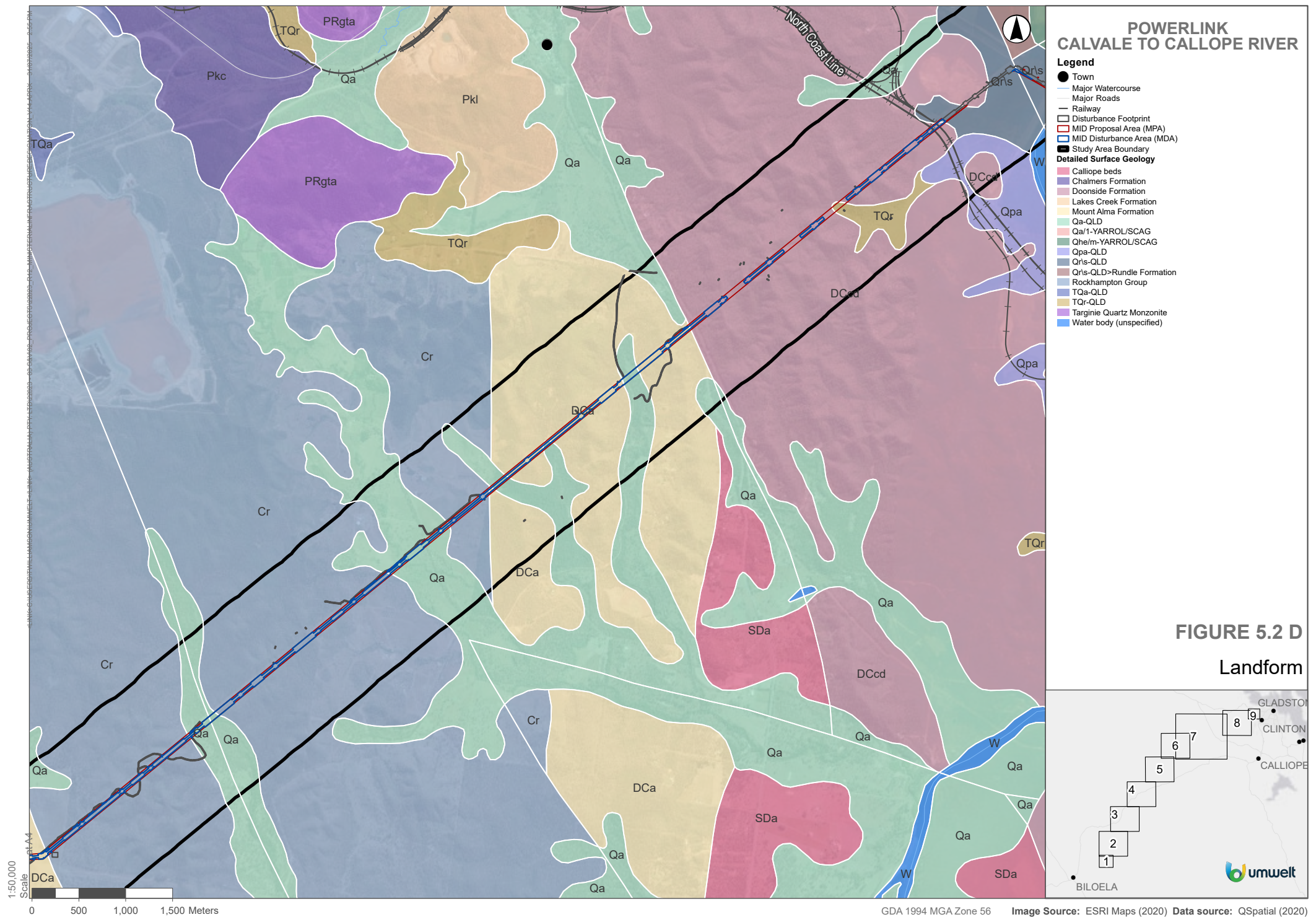




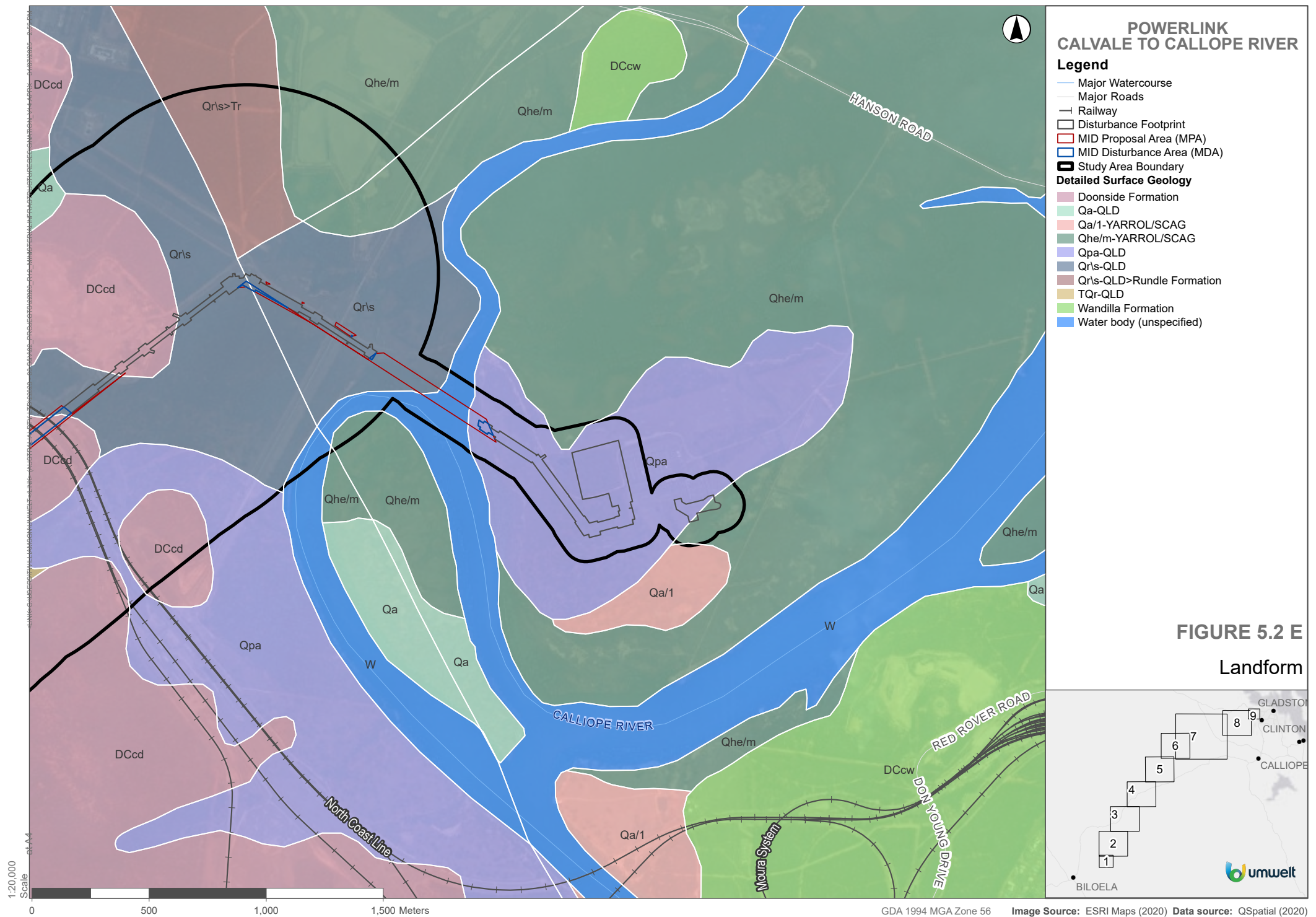














## 6.0 Description of Ecological Values

### 6.1 Vegetation Communities

#### 6.1.1 Regulated Vegetation

The Regulated Vegetation Management map (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, 2024c) identifies four vegetation management categories present within the MDA (**Figure 6.1**) and **Table 6.1**). Category B vegetation is mapped throughout most of the MDA with non-remnant (Category X) and High-value Regrowth (HVR) (Category C) areas scattered throughout. Mapped Category R vegetation occurs in association with Strahler stream order one and two watercourses and/or drainage features, and there is no mapped Category A (vegetation offsets, compliance notices) vegetation mapped within the MDA.

**Table 6.1 Regulated Vegetation Mapped Within the MDA**

Regulated Vegetation Category	Present within MDA
Category B – Remnant vegetation	✓
Category C – High-value regrowth vegetation	✓
Category R – Regrowth within 50 m of a watercourse or drainage feature in the Great Barrier Reef catchment)	✓
Category X – Exempt clearing work on Freehold, Indigenous and Leasehold land	✓

<LINK>C:\USERS\T\WILLIAMSON\UMWELT\LINK> (AUSTRALIA) PTY. LTD\22823 - 03 S&V\02\_PROJECTS\22823\_R12\_MINISTERIAL INFRASTRUCTURE\DESIGNATION\_V14.APRX 31/07/2025 2:59 PM



### Legend

- Study Area Boundary
- MID Proposal Area (MPA)
- Town
- Major Watercourses
- Major Roads
- Railway

### Agricultural Land Audit

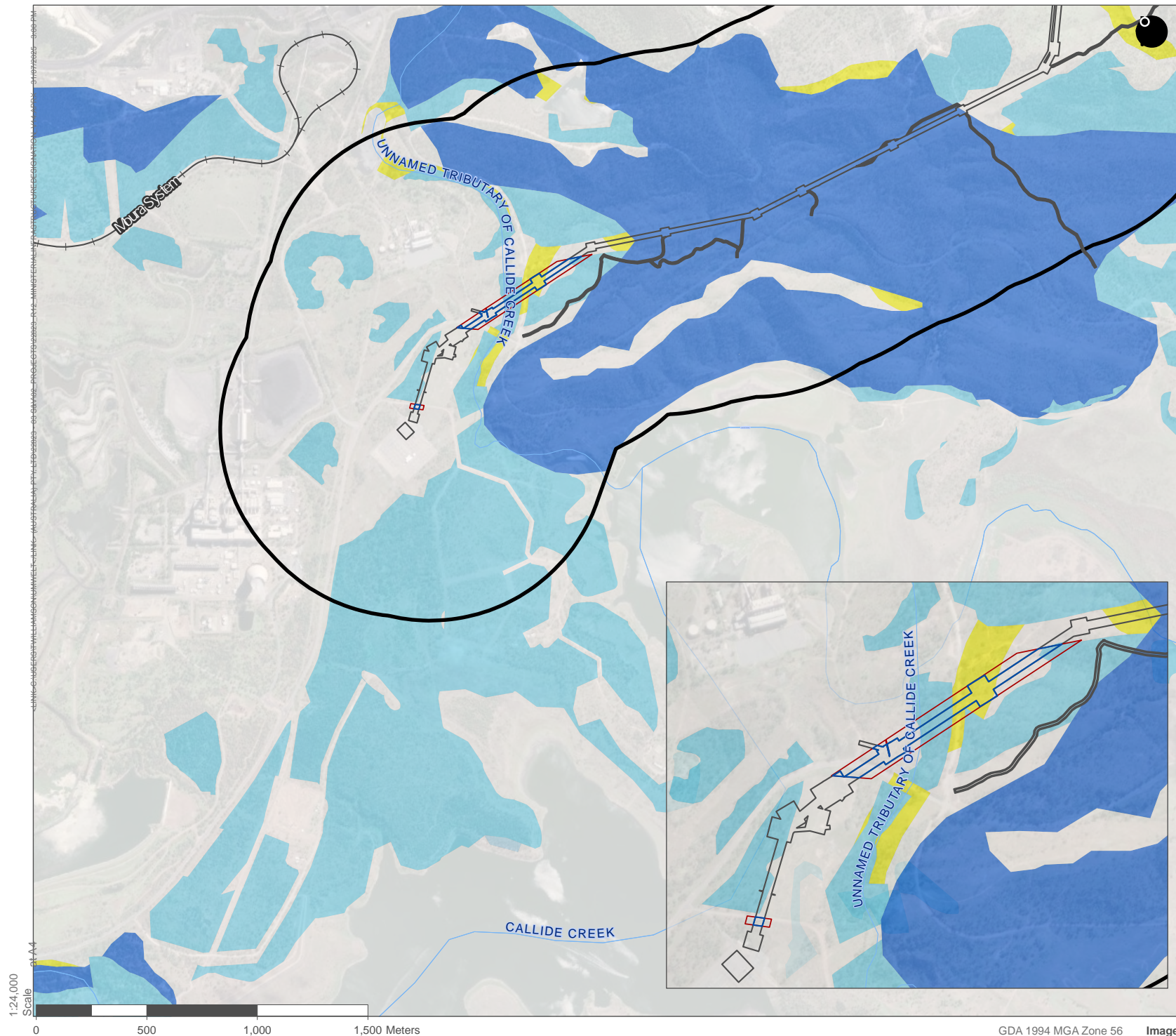
- Land Class A
- Land Class B

POWERLINK - CALVALE TO CALLOPE RIVER

FIGURE 6.1

Agricultural Land





# POWERLINK CALVALE TO CALLOPE RIVER

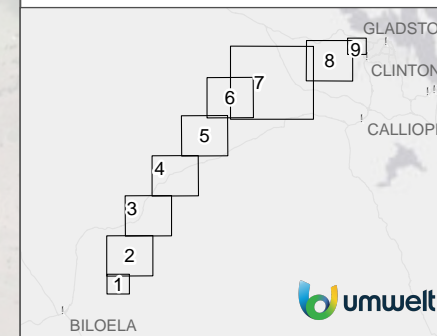
## Legend

- Major Watercourse
- Railway
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- Study Area Boundary

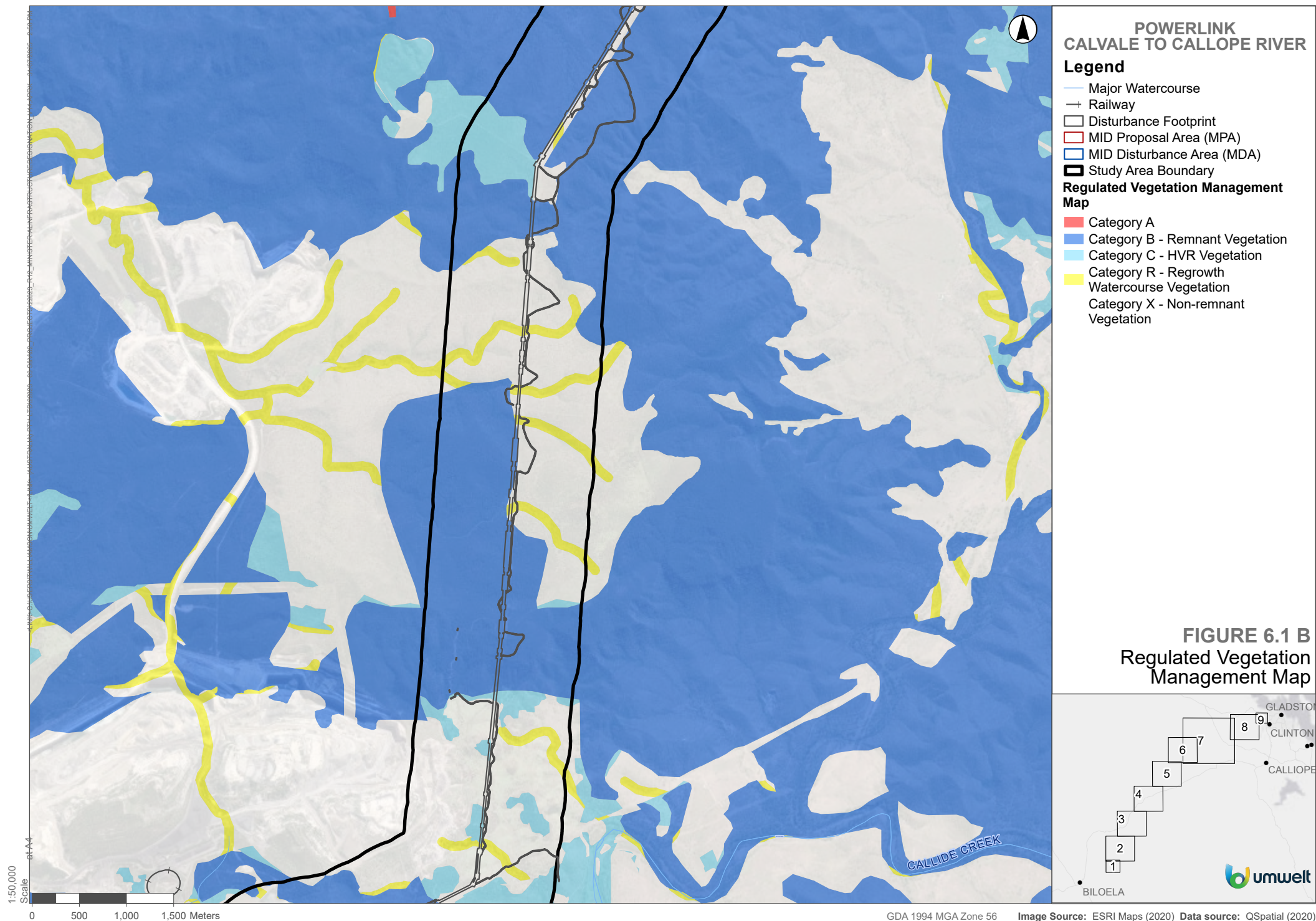
## Regulated Vegetation Management Map

- Category B - Remnant Vegetation
- Category C - HVR Vegetation
- Category R - Regrowth
- Watercourse Vegetation
- Category X - Non-remnant Vegetation
- Water

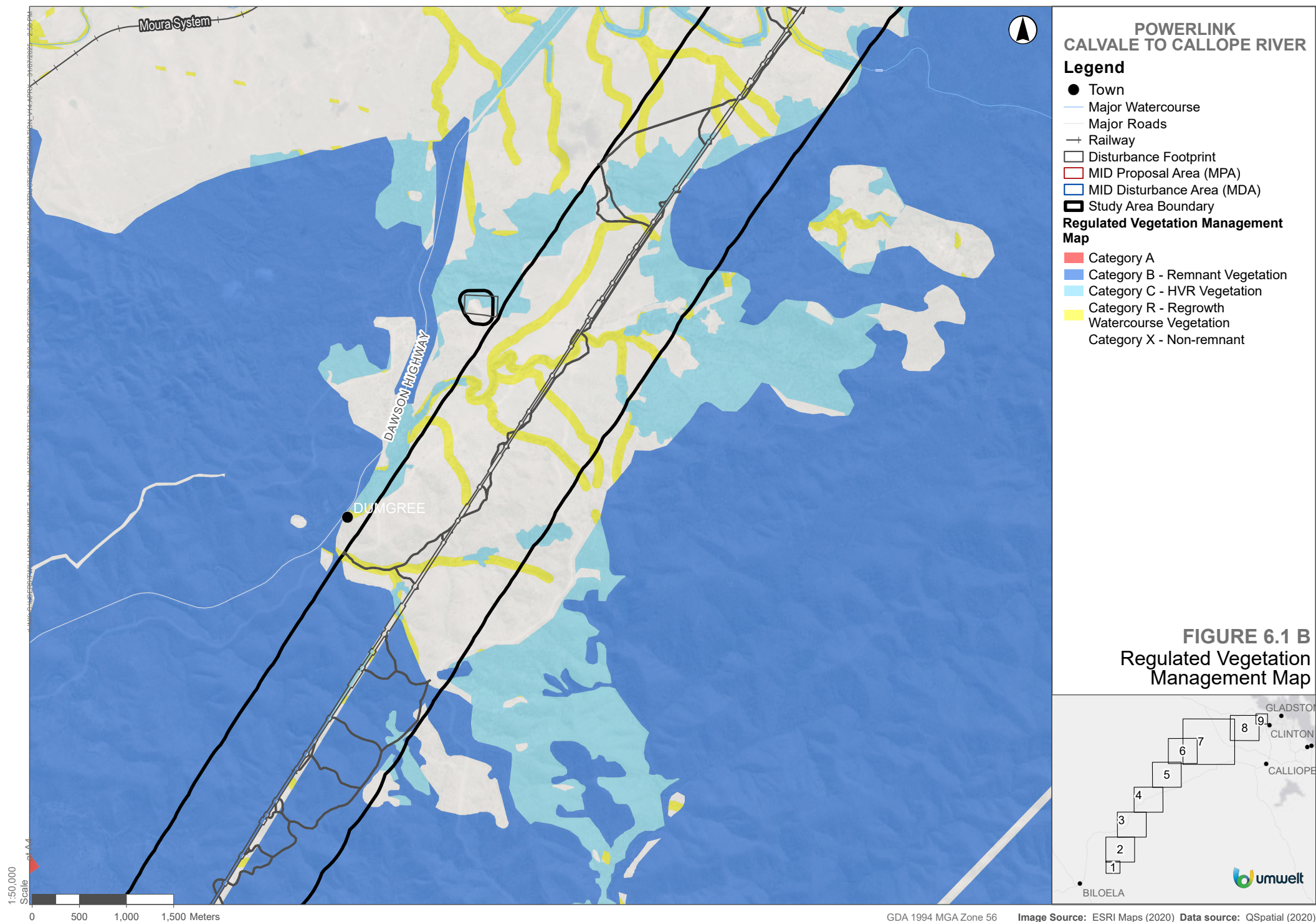
**FIGURE 6.1 A**  
Regulated Vegetation Management Map



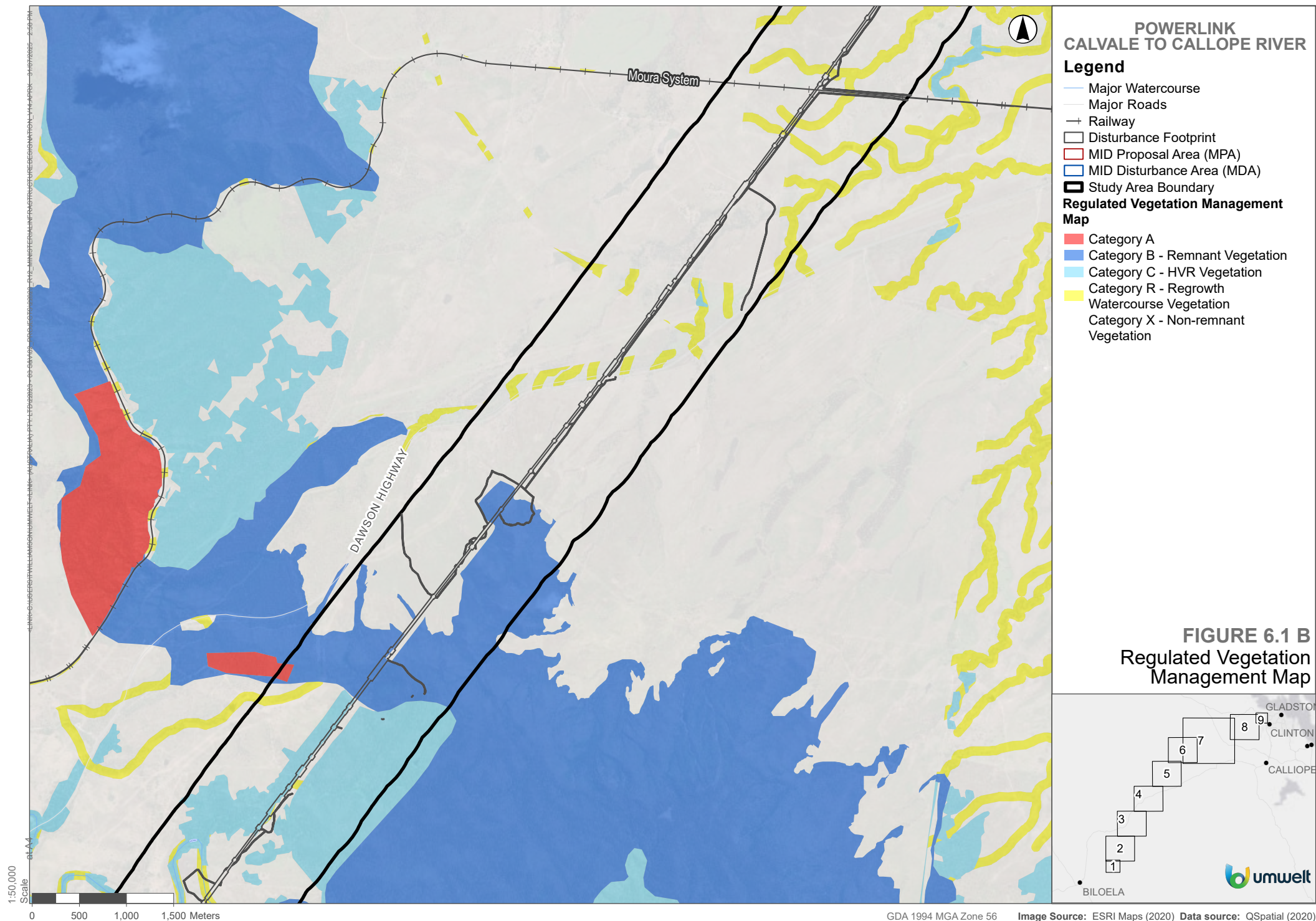




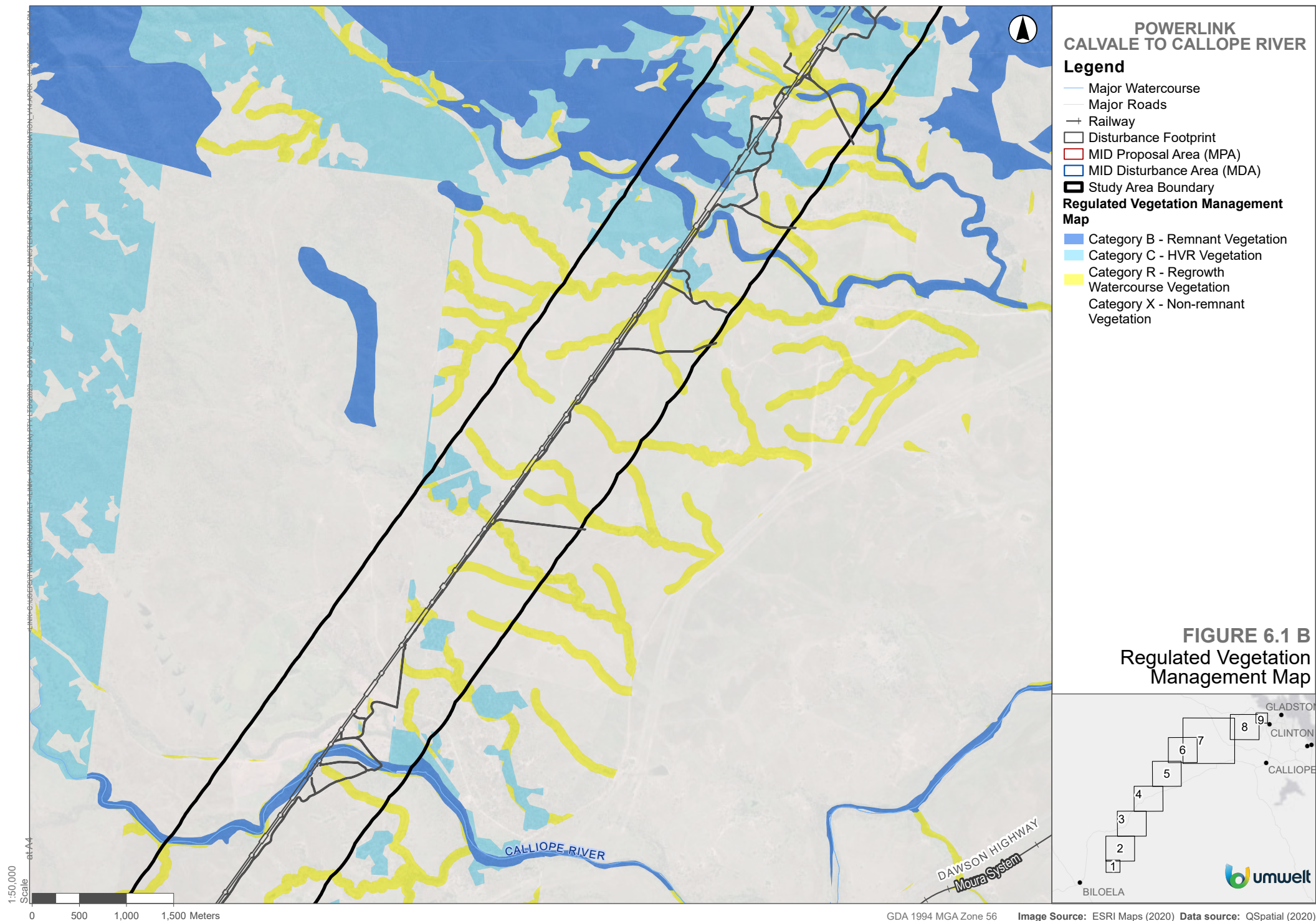




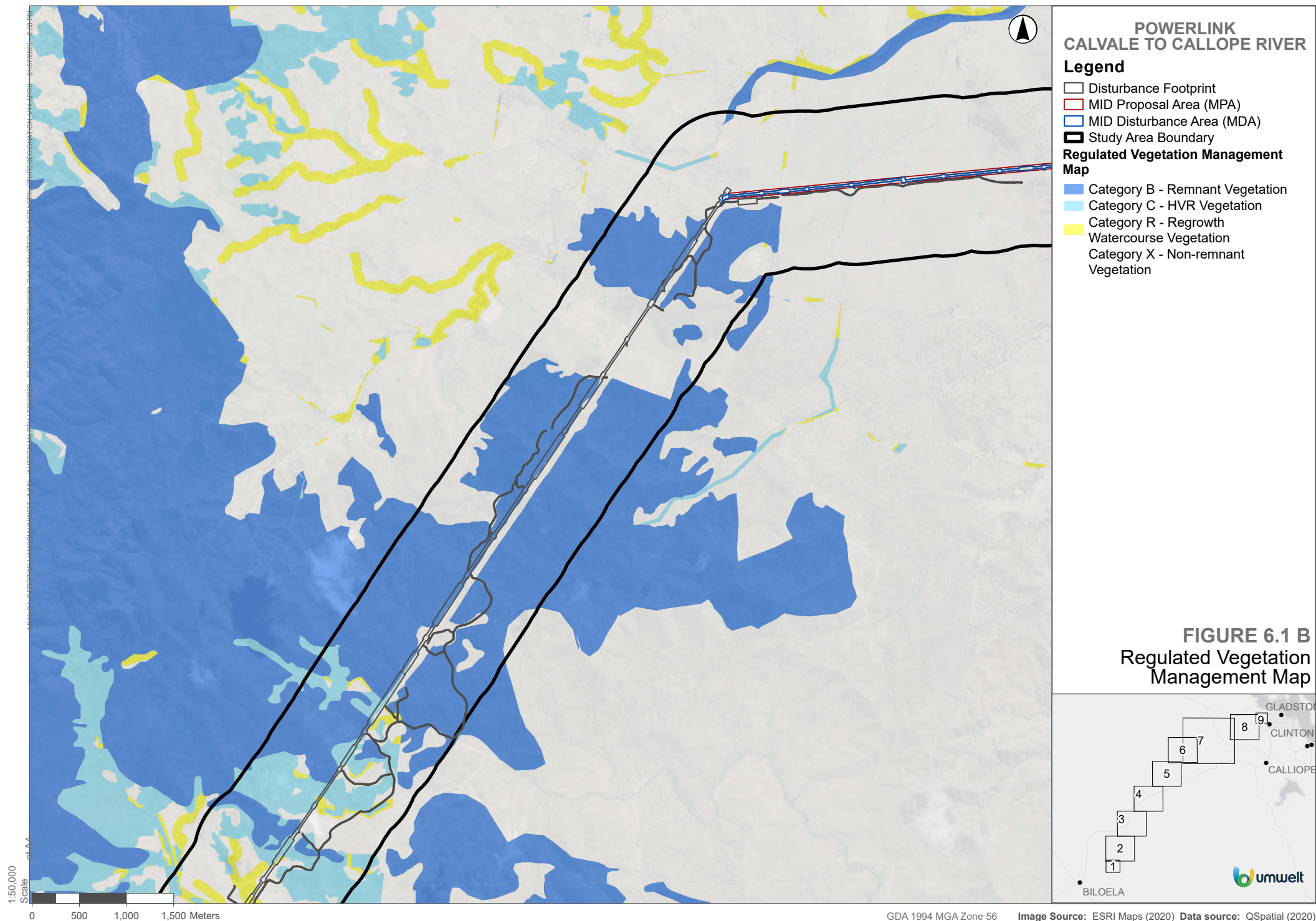




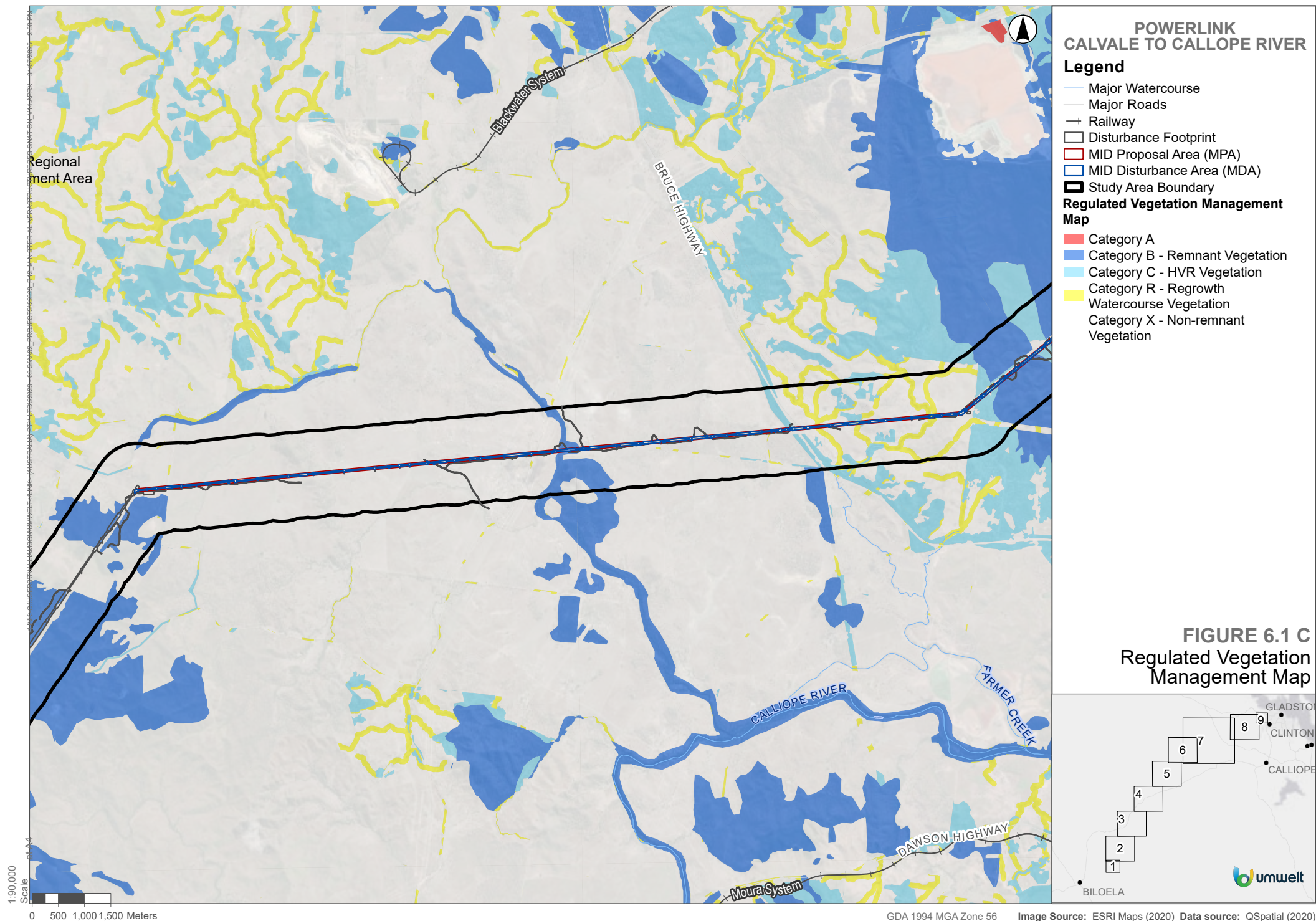




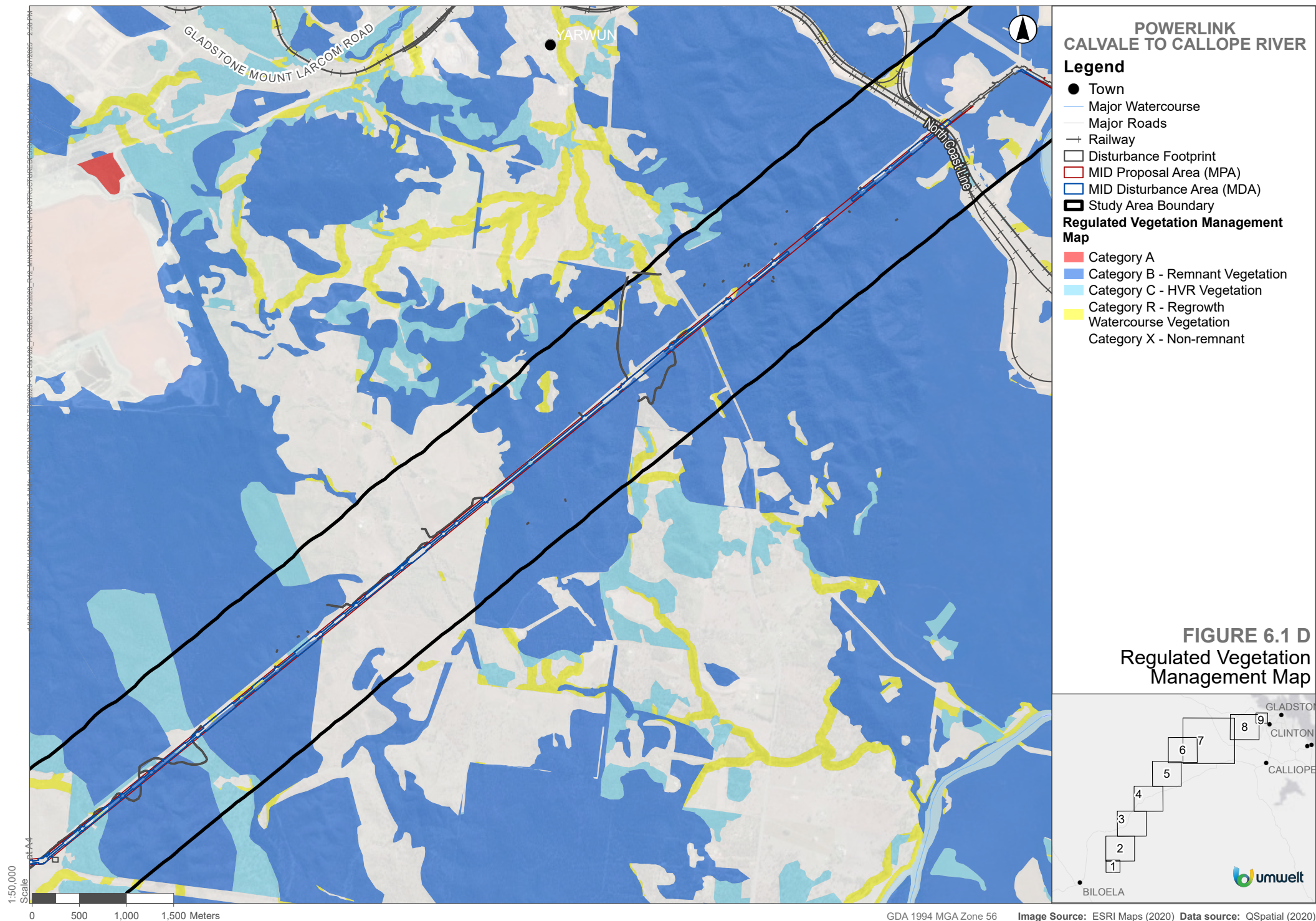




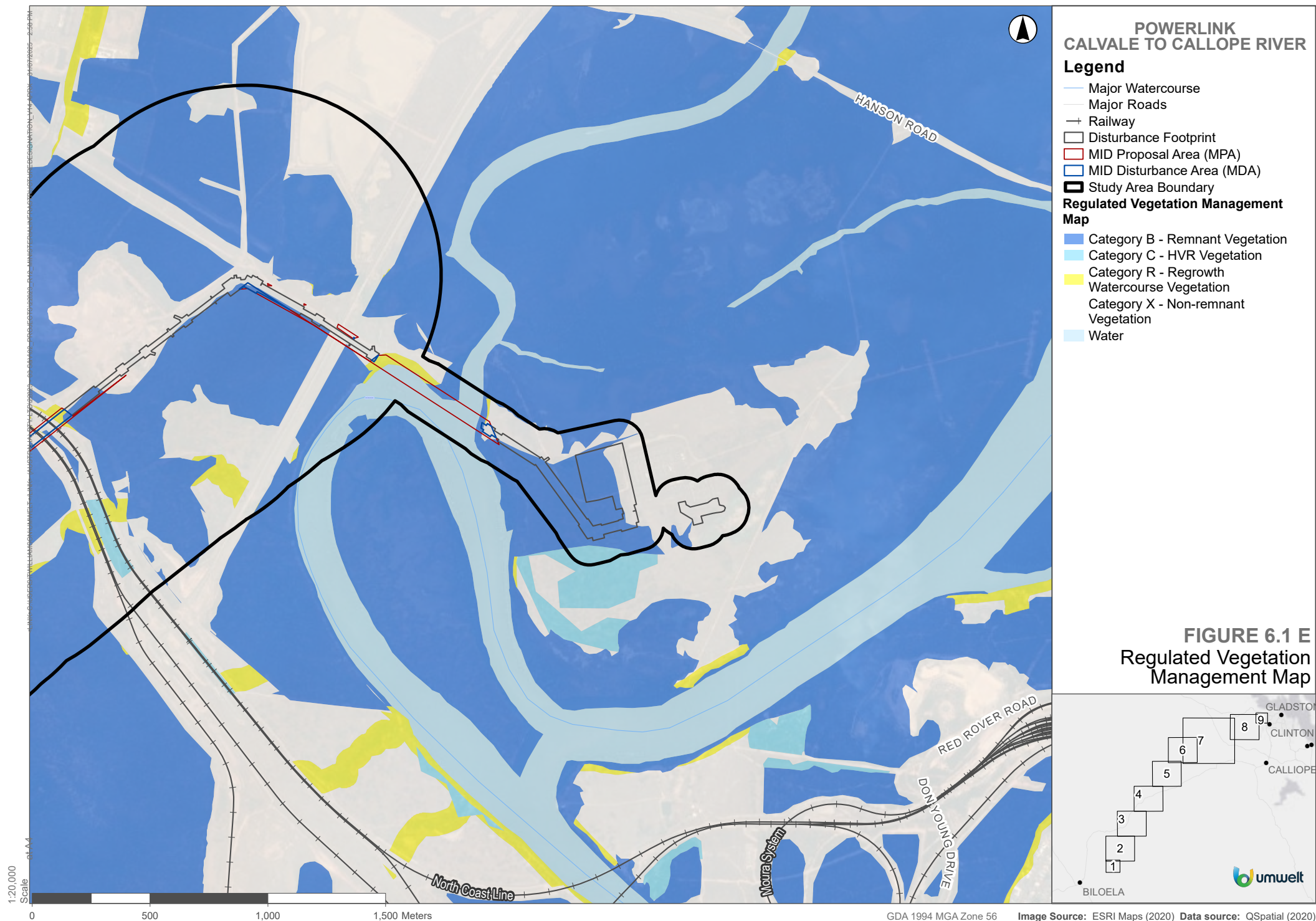












## 6.1.2 Vegetation Management Regional Ecosystems

The Vegetation Management Regional Ecosystem Map (Version 13) was reviewed as part of the desktop assessment to understand the likely presence and extent of REs across the Study Area. Within the Disturbance Footprint homogenous and heterogeneous polygons were identified, comprising 37 REs (**Table 6.2**). Of these REs, five are listed as Endangered, seven are listed as Of Concern and 25 are listed as Least Concern under the VM Act. Mapped within the MPA, 21 REs are mapped with three listed as Endangered, three listed as Of Concern and 14 listed as Least Concern. Mapped within the MDA, 20 REs are mapped with three Endangered REs, four Of Concern REs and 13 Least Concern REs.

**Table 6.2 Regional Ecosystems within the Disturbance Footprint, MPA and MDA**

RE ID	Short description	VM Act Status	Present within Disturbance Footprint	Present within the MPA	Present within MDA
11.3.2	<i>Eucalyptus populnea</i> (poplar box) woodland on alluvial plains.	Of Concern	✓	✓	✓
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> woodland on alluvial plains.	Of Concern	✓	✓	✓
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines.	Least Concern	✓	✓	✓
11.3.26	<i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> (inland grey box) woodland to open forest on margins of alluvial plains.	Least Concern	✓	✓	✓
11.3.27f	<i>Eucalyptus coolabah</i> (coolabah) and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps.	Least Concern	✓	-	-
11.3.29	<i>Eucalyptus crebra</i> , <i>E. exserta</i> (Queensland peppermint), <i>Melaleuca spp.</i> woodland on alluvial plains.	Least Concern	✓	✓	✓
11.3.6	<i>Eucalyptus melanophloia</i> woodland on alluvial plains.	Least Concern	✓	-	-
11.8.3	Semi-evergreen vine thicket on Cainozoic igneous rocks.	Of Concern	✓	-	-
11.8.4	<i>Eucalyptus melanophloia</i> open woodland on Cainozoic igneous rocks.	Least Concern	✓	-	-
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> (belah) open forest on fine-grained sedimentary rocks.	Endangered	✓	✓	✓



RE ID	Short description	VM Act Status	Present within Disturbance Footprint	Present within the MPA	Present within MDA
11.10.1	<i>Corymbia citriodora</i> woodland on coarse-grained sedimentary rocks.	Least Concern	✓	-	-
11.10.4	<i>Eucalyptus decorticans</i> , <i>Lysicarpus angustifolius</i> (budgeroo) +/- <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp. woodland on coarse-grained sedimentary rocks.	Least Concern	✓	-	-
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks.	Least concern	✓	-	-
11.10.8	Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks.	Of Concern	✓	-	-
11.10.13	<i>Eucalyptus</i> spp. and/or <i>Corymbia</i> spp. open forest on scarps and sandstone tablelands.	Least Concern	✓	-	-
11.11.3	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> , <i>E. acmenoides</i> open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges.	Least Concern	✓	✓	✓
11.11.4	<i>Eucalyptus crebra</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges.	Least Concern	✓	✓	✓
11.11.4a	<i>Eucalyptus tereticornis</i> dominated woodland.	Least Concern	✓	✓	✓
11.11.4c	<i>Eucalyptus moluccana</i> dominated woodland.	Least Concern	✓	✓	✓
11.11.5	Microphyll vine forest +/- <i>Araucaria cunninghamii</i> (hoop pine) on old sedimentary rocks with carrying degrees of metamorphism and folding.	Least Concern	✓	✓	✓
11.11.10	<i>Eucalyptus melanophloia</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	Of Concern	✓	-	-

RE ID	Short description	VM Act Status	Present within Disturbance Footprint	Present within the MPA	Present within MDA
11.11.14	<i>Acacia harpophylla</i> open forest on deformed and metamorphosed sediments and interbedded volcanics.	Endangered	✓	-	-
11.11.15	<i>Eucalyptus crebra</i> woodland on deformed and metamorphosed sediments and interbedded volcanics.	Least Concern	✓	✓	✓
11.11.18	Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding.	Endangered	✓	✓	✓
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks.	Least Concern	✓	✓	-
11.12.2	<i>Eucalyptus melanophloia</i> woodland on igneous rocks.	Least Concern	✓	-	-
11.12.3	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> , <i>Angophora leiocarpa</i> (rusty gum) woodland on igneous rocks especially granite.	Least Concern	✓	-	-
11.12.6	<i>Corymbia citriodora</i> open forest on igneous rocks (granite).	Least Concern	✓	-	-
11.12.17	<i>Eucalyptus populnea</i> woodland on igneous rocks. Colluvial lower slopes.	Endangered	✓	-	-
12.1.2	Saltpan vegetation including grassland, herbland and sedgeland on marine clay plains.	Least Concern	✓	✓	✓
12.1.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries.	Least Concern	✓	✓	✓
12.3.3	<i>Eucalyptus tereticornis</i> woodland on Quaternary alluvium.	Endangered	✓	✓	✓
12.5.1	Open forest complex with <i>Corymbia citriodora</i> subsp. <i>variegata</i> on subcoastal remnant Tertiary surfaces.	Least Concern	✓	-	-

RE ID	Short description	VM Act Status	Present within Disturbance Footprint	Present within the MPA	Present within MDA
12.11.6	<i>Corymbia citriodora</i> subsp. <i>variegata</i> , <i>Eucalyptus crebra</i> woodland on metamorphics +/- interbedded volcanics.	Least Concern	✓	✓	✓
12.11.7	<i>Eucalyptus crebra</i> woodland on metamorphics +/- interbedded volcanics.	Least Concern	✓	✓	✓
12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> , <i>Corymbia intermedia</i> (pink bloodwood) woodland on metamorphics +/- interbedded volcanics.	Of Concern	✓	✓	✓
12.11.17	<i>Eucalyptus acmenoides</i> or <i>E. portuensis</i> open forest on metamorphics +/- interbedded volcanics.	Of Concern	✓	✓	✓

### 6.1.3 Ground-truthed Regional Ecosystems

Results of the field surveys confirmed the presence of 24 REs in remnant and regrowth condition within the Disturbance Footprint. Of these RE, 13 are mapped within the MDA. One of the observed ground-truthed REs (RE 11.11.3c) was not previously identified in the State mapping as a vegetation community within the MPA. The extent, condition and a description of the ground-truthed REs is provided in **Table 6.3**, along with representative images. The mapped extent of REs within the MDA is shown in **Figure 6.2**.

Despite a wide diversity of vegetation communities, RE 11.11.15 is the dominant community across the MDA, particularly in Section D. This community is dominated by *Eucalypts crebra*, occasionally with *Corymbia erythrophloia*, on metamorphosed sediments and interbedded volcanics. Two other vegetation communities; RE 11.11.4 (*Eucalyptus crebra* woodland on old sedimentary rocks) and RE 12.11.6 (*Corymbia citriodora* subsp. *variegata*, *Eucalyptus crebra* woodland on metamorphic derived soils) are also present within the MDA in section D.

Section E is dominated by two REs and include the following:

- RE 12.1.3 comprising mangrove shrubland of *Rhizophora stylosa* (spotted mangrove) and *Cerriops australis* on estuaries.
- RE 12.3.3 composed of remnant or regrowth *Eucalyptus tereticornis* over native and exotic grasses.

Outside of the MDA, Section E also comprises large areas of cleared, non-remnant vegetation, primarily composed of exotic grasses.




**Table 6.3**      **Ground-truthed REs within the MDA**

RE ID		Vegetation Description
11.3.4		<p>This RE is described as <i>Eucalyptus tereticornis</i> and/or <i>E. spp.</i> woodland on alluvial plains.</p> <p>Within the Disturbance Footprint, remnant RE 11.3.4 was dominated by <i>Blakella tessellaris</i> across the T1, T2 and T3. <i>Casuarina cunninghamiana</i> and <i>Melaleuca quinquenervia</i> (swamp paperbark) were prevalent in the T3. The T1, T2 and T3 layer were sparse. The S1 layer was very sparse and was dominated by introduced species, specifically, <i>Lantana camara</i>* (lantana). The ground layer was dominated by <i>Hyparrhenia rufa</i>* with <i>Lantana montevidensis</i>* (creeping lantana) as a co-dominant species. Native species were sparse, including <i>Lomandra confertifolia</i>.</p> <p>Regrowth patches of RE 11.3.4 also occurred within the Disturbance Footprint. It was typically dominated by <i>B. tessellaris</i> and was a sparse canopy to approximately 15 m tall.</p>
VM Act Status	Of concern	
Extent of MDA (ha)	Remnant 0.0	Regrowth 0.4
Structure – average height (m)	Remnant T1 – 23 T2 – 15 T3 – 8 S1 – 1.5 G – 0.5	Regrowth T1 – 15






RE ID	Vegetation Description	
11.3.25	<p>This RE is described as <i>Eucalyptus tereticornis</i> and/or <i>E. camaldulensis</i> woodland fringing drainage lines.</p> <p>Within the Disturbance Footprint, remnant RE 11.3.25 occurred in association with streams and was typically dominated by <i>E. tereticornis</i>, to 29 m tall at times. Other trees that occurred occasionally in the T2 layer included <i>Blakella tessellaris</i> and <i>Casuarina cunninghamiana</i>.</p> <p>Regrowth patches of RE 11.3.25 also occurred within the Disturbance Footprint. These areas were typically dominated by <i>E. tereticornis</i>, with occasional <i>E. moluccana</i>, <i>E. crebra</i> and <i>Lophostemon suaveolens</i> (swamp box). The canopy was typically very sparse.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 0.0	Regrowth 0.4
Structure – average height (m)	Remnant T1 – 22	Regrowth T1 – 14






RE ID	Vegetation Description	
11.3.26	<p>This RE is described as <i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> woodland to open forest on margins of alluvial plains.</p> <p>Within the Disturbance Footprint, RE 11.3.26 occurred adjacent streams and drainage lines and was dominated by <i>E. moluccana</i>. Sparse <i>E. crebra</i>, <i>E. tereticornis</i> and <i>Blakella tessellaris</i> occurred throughout patches but were not dominant. The canopy varied across patches between sparse and mid-dense.</p> <p>Regrowth patches of RE 11.3.26 also occurred within the Disturbance Footprint. The dominant canopy species was <i>E. moluccana</i> and the canopy was mid-dense.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 0.6	Regrowth 0.0
Structure – average height (m)	Remnant T1 – 20	Regrowth T1 – 11
		
RE ID	Vegetation Description	



RE ID	Vegetation Description	
11.11.3	<p>This RE is a <i>Corymbia citriodora</i>, <i>Eucalyptus crebra</i>, <i>E. acmenoides</i> open forest on old sedimentary rocks with varying degrees of metamorphism and folding. It occurs on coastal ranges.</p> <p>Within the Disturbance Footprint, remnant RE 11.11.3 was dominated by <i>E. crebra</i> or <i>C. citriodora</i> and had a sparse cover. <i>C. erythrophloia</i> occurred occasionally throughout patches.</p> <p>Regrowth patches of RE 11.11.3 also occurred within the Disturbance Footprint, which typically comprised a very sparse canopy of <i>C. citriodora</i> and <i>E. crebra</i>.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 3.8	Regrowth 1.9
Structure – average height (m)	Remnant T1 – 19	Regrowth T1 – 13



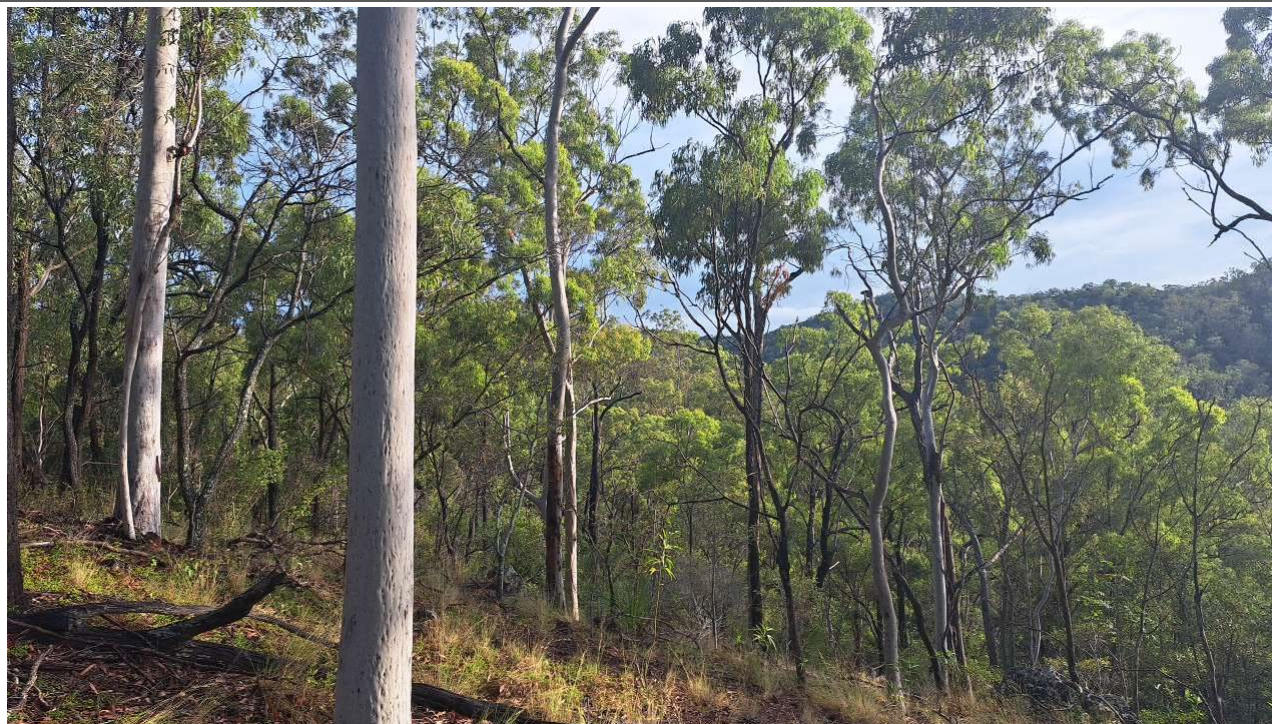


RE ID	Vegetation Description
11.11.3c	<p>This RE is described as a <i>Eucalyptus moluccana</i> woodland on lower slopes in association with <i>E. crebra</i> +/- <i>Corymbia citriodora</i> +/- <i>Eucalyptus</i> spp. Usually on lower slopes or low rises of Devonian-Carboniferous metasediments, on clay soils.</p> <p>Within the Disturbance Footprint, remnant RE 11.11.3c was dominated by <i>E. moluccana</i> and <i>C. citriodora</i>. Occasionally, <i>E. crebra</i> also occurred in the canopy.</p>
VM Act Status	Least concern
Extent of MDA (ha)	Remnant 1.2
Structure – average height (m)	Remnant T1 – 20






RE ID	Vegetation Description	
11.11.4	<p>This RE is described as a <i>Eucalypts crebra</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding.</p> <p>Within the Disturbance Footprint, RE 11.11.4 was dominated by <i>Corymbia citriodora</i> with frequent <i>E. crebra</i> and rare <i>E. tereticornis</i>. The T1 layers was dense and the T2, T3 and S1 layers were sparse. The S1 layer was very sparse. The T3 and shrub layers were dominated by <i>Acacia disparrima</i>, <i>A. leiocalyx</i> and <i>Planchonia careya</i> (cockatoo apple). The S2 layer typically comprised <i>A. fasciculifera</i> (scaly bark). The ground layer comprised <i>Lomandra longifolia</i>, <i>Flemingia parviflora</i> (flemingia), <i>Desmodium rhytidophyllum</i> and <i>Praxelis clematidea</i>*.</p> <p>Regrowth patches of RE 11.11.4 also occurred within the Disturbance Footprint, which typically comprised a sparse canopy of <i>C. citriodora</i> and <i>C. intermedia</i>. Occasional patches of low, mid-dense (2-4 m) <i>Acacia disparrima</i> regrowth were present.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 6.5	Regrowth 2.8
Structure – average height (m)	Remnant T1 – 20 T2 – 13 T3 – 5 S1 – 2 S2 – 0.8 G – 0.3	Regrowth T1 – 12






RE ID	Vegetation Description	
11.11.4c	This RE is described as a <i>Eucalyptus moluccana</i> dominated woodland, occurring on undulating rises and low hills, on moderately to strongly deformed and metamorphised sediments and interbedded volcanics and Permian sediments.	
VM Act Status	Least Concern	
Extent of MDA (ha)	Remnant	Regrowth
	1.4	0.6
Structure – average height (m)	Remnant T1 – 18	






RE ID	Vegetation Description	
11.11.15	<p>This RE is described as a <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphised sediments and interbedded volcanics.</p> <p>Within the Disturbance Footprint, remnant RE 11.11.15 was dominated by <i>E. crebra</i> across the T1, T2 and T3 layers. The T1 layer was typically sparse and the T2 and S1 layers were very sparse. The shrub layer comprised <i>Acacia decora</i> (pretty wattle) and <i>Lantana camara</i>* with occasional <i>Opuntia tomentosa</i>* (velvety tree pear). The ground layer was diverse and comprised a variety of native and introduced herbs and graminoids, including <i>Heteropogon contortus</i> (black speargrass), <i>Themeda triandra</i>, <i>Melinis repens</i>* (red natal grass), <i>Gomphocarpus physocarpus</i>* (balloon cottonbush) and <i>Pterocaulon sphacelatum</i> (applebush).</p> <p>Regrowth patches of 11.11.15 also occurred within the Disturbance Footprint, which were dominated by a sparse to very sparse canopy of <i>E. crebra</i> and <i>C. erythrophloia</i>. The T2, T3 and S1 layers were also very sparse. The ground layer comprised <i>Cymbopogon refractus</i> (barbed-wire grass), <i>Stylosanthes scabra</i>*, <i>Melinis repens</i>* and <i>Bidens pilosa</i>*.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 2.0	Regrowth 6.0
Structure – average height (m)	Remnant	Regrowth
	T1 – 14	T1 – 11
	T2 – 9	T2 – 6
	S1 – 1.5	T3 – 3
	S2 – 0.8	S1 – 1
	G – 0.3	





RE ID	Vegetation Description	
11.11.18	<p>This RE is described as semi-evergreen vine thicket. It occurs on undulating plains, rises and gentle slopes of ranges formed on moderately to strongly deformed and metamorphised sediments and inter bedded volcanics.</p> <p>Within the Disturbance Footprint, remnant RE 11.11.18 occurred as a low vine-thicket, with very sparse, emergent <i>Eucalyptus crebra</i>. The T1 and T2 were diverse, comprising <i>Terminalia porphyrocarpa</i>, <i>Secamone elliptica</i>, <i>Alectryon tomentosus</i> and <i>Alphitonia excelsa</i> (soap tree). The T1 layer was dense, the T2 layer was mid-dense and the S1 layer was sparse. The S1 and S2 layers comprised <i>Carissa lanceolata</i>, <i>Alyxia ruscifolia</i>, <i>Cassytha filiformis</i> (dodder laurel) and <i>Pittosporum spinescens</i>. The ground layer was sparse and comprised <i>Gahnia aspera</i>, <i>Ancistrachne uncinata</i> (hooky grass) and <i>Lantana montevidensis</i>*.</p> <p>Regrowth RE 11.11.18 also occurred within the Disturbance Footprint. It comprised a mid-dense canopy of <i>Alphitonia excelsa</i> and <i>Secamone elliptica</i>.</p>	
VM Act Status	Endangered	
Extent of MDA (ha)	Remnant 0.5	Regrowth 0.08
Structure – average height (m)	Remnant E – 13 T1 – 8 T2 – 4 S1 – 1.5 S2 – 0.6 G – 0.2	Regrowth T1 – 6
		



RE ID	Vegetation Description
12.1.2	<p>This RE is described as saltpan vegetation including grassland, herbland and sedgeland on marine clay plans.</p> <p>RE 12.1.2 occurred in Section E. It occurred as a samphire grassland, dominated by <i>Sporobolus virginicus</i> (sand couch), with occasional <i>Fimbristylis ferruginea</i>.</p> <p>This vegetation community has a limited occurrence within the Disturbance Footprint.</p>
VM Act Status	Least Concern
Extent of MDA (ha)	Regrowth 0.01
Structure – average height (m)	Remnant G – 0.3





RE ID	Vegetation Description	
12.1.3	<p>This RE is described as 12.1.3 as a mangrove shrubland to low closed forest on marine clay plains and estuaries.</p> <p>RE 12.1.3 occurred as a low, open woodland, typically with &gt;70% cover. A variety of mangrove species were present. <i>Avicennia marina</i>, <i>Rhizophora stylosa</i> and <i>Ceriops australis</i> were typically dominant. There were also occasional occurrences of <i>Lumnitzera racemosa</i>.</p> <p>One small patch of regrowth 12.1.3 is considered to occur within Section E but has not been accessed to ground-truth. Therefore, data is not available.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 0.0	Regrowth 0.03
Structure – average height (m)	Remnant & regrowth T1 – 5	





## RE ID Vegetation Description

### 12.3.3

This RE is described as a *Eucalyptus tereticornis* woodland on Quaternary alluvium.


Within the Disturbance Footprint, remnant areas of RE 12.3.3 was dominated by *E. tereticornis* with occasional *E. crebra*. The T1 layer was mid-dense and the T2, T3 and S1 layers were very sparse. *Melaleuca quinquenervia* occurred in the T3 and shrub layer, alongside *Acacia disparrima*. The ground layer was typically dominated by introduced species, including *Melinis repens*\*, *Megathyrsus maximus*\* and *Macroptilium atropurpureum*\* (siratro), however native species were also present, including *Capillipedium spicigerum* (spicytop) and *Breynia oblongifolia*.

The Disturbance Footprint also contained patches of regrowth RE 12.3.3. These patches were typically dominated by *E. tereticornis*, with *E. crebra* as a co-dominant canopy species. The canopy cover was sparse.

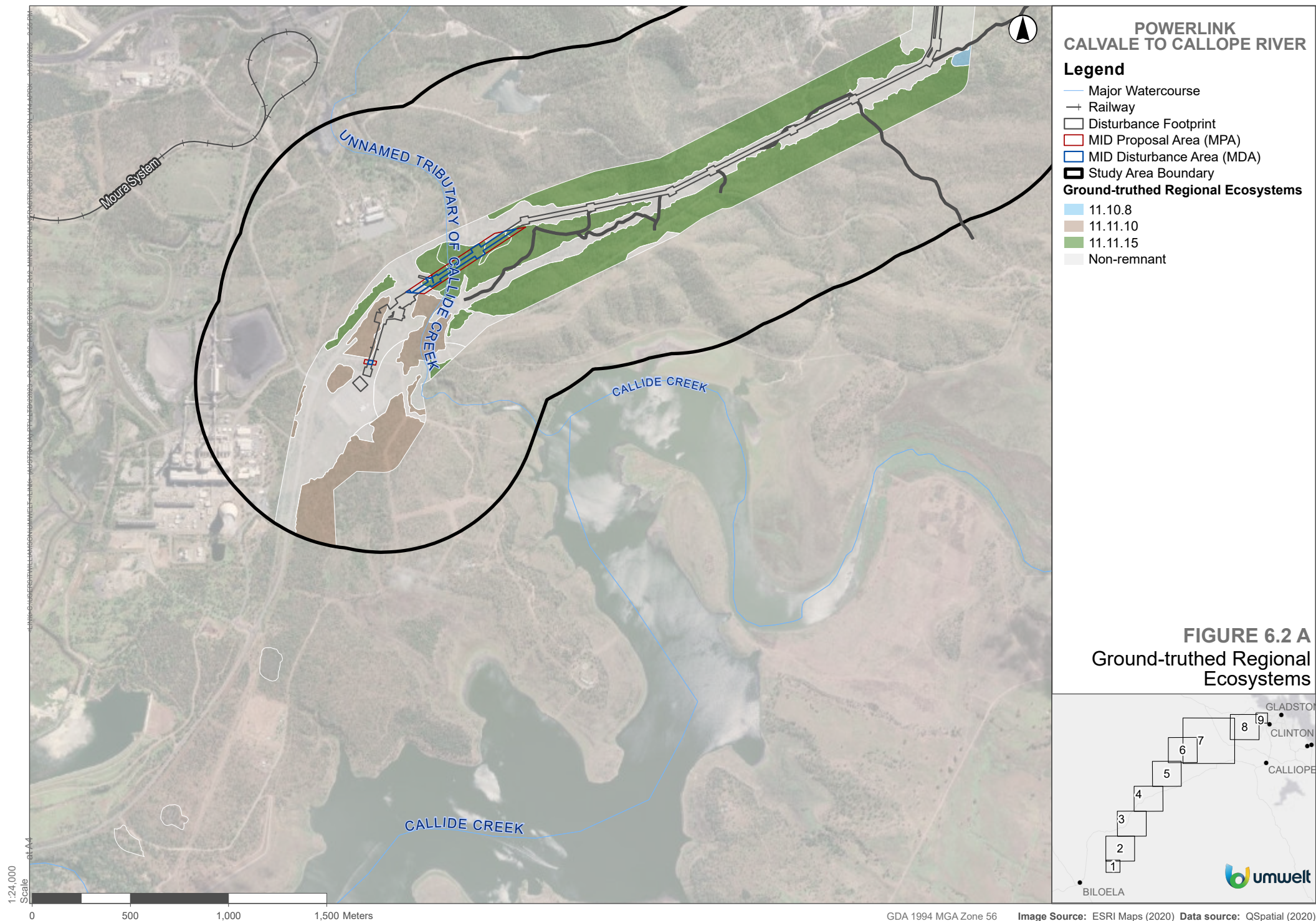
<b>VM Act Status</b>	Endangered	
<b>Extent of MDA (ha)</b>	<b>Remnant</b>	<b>Regrowth</b>
	0.4	0.0
<b>Structure – average height (m)</b>	<b>Remnant</b>	<b>Regrowth</b>
	T1 – 16	T1 – 14
	T2 – 12	
	T3 – 5	
	S1 – 1.5	
	G – 0.4	



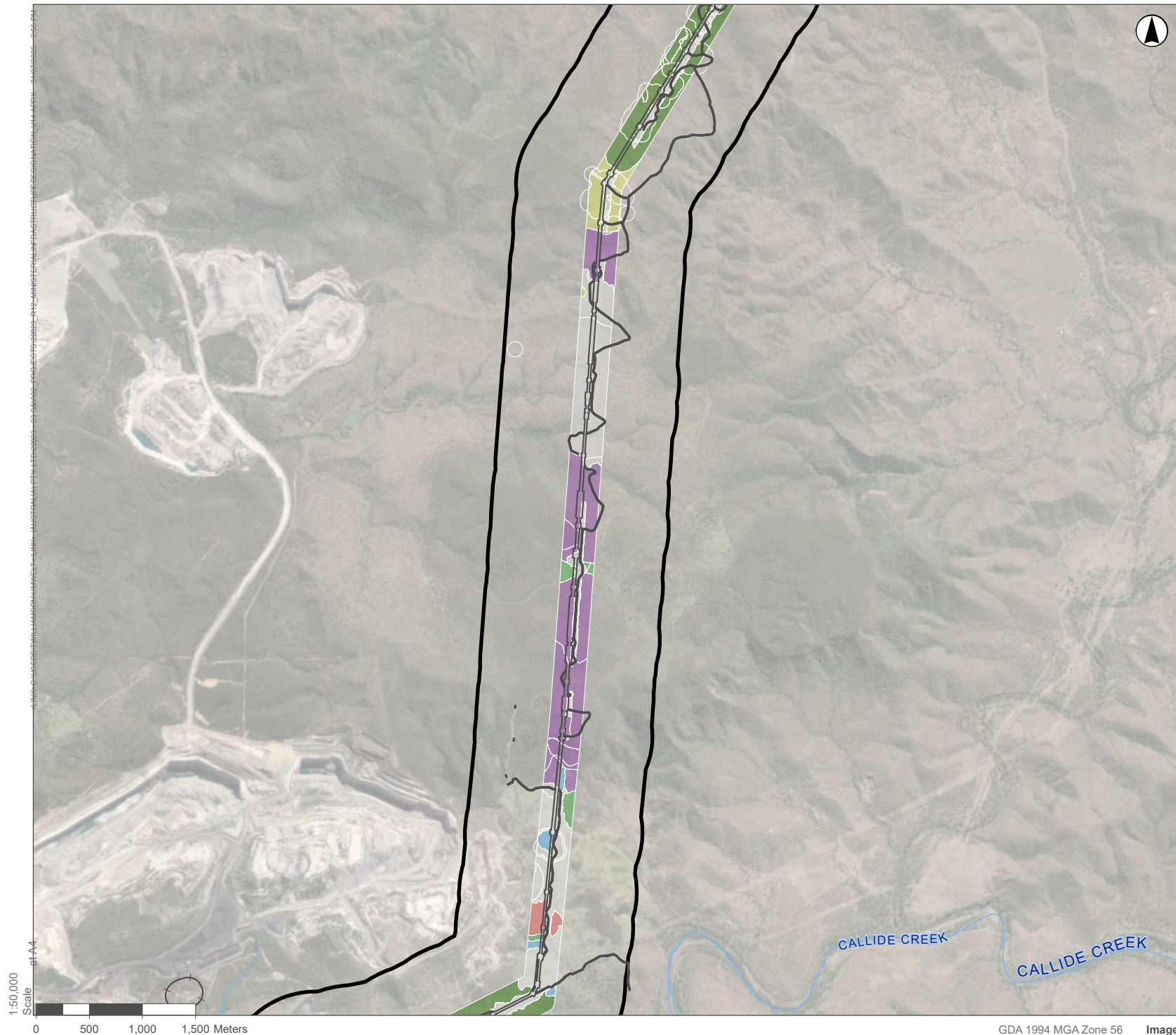


RE ID	Vegetation Description	
12.11.6	<p>This RE is described as a <i>Corymbia citriodora</i> subsp. <i>variegata</i>, <i>Eucalyptus crebra</i> woodland on metamorphics +/- interbedded volcanics.</p> <p>Within the Disturbance Footprint, RE 12.11.6 occurred in remnant patches, dominated by <i>C. citriodora</i> and <i>E. crebra</i>. Occasionally, <i>E. acmenoides</i> was present. The T1 and T2 layers were mid-dense and the T3 and S1 layers were very sparse. The shrub layers comprised <i>Jasminum simplicifolium</i>, <i>Alphitonia excelsa</i> and <i>Acacia fasciculifera</i>. The ground layer comprised native and introduced herbs and graminoids, including <i>Arundinella nepalensis</i> (reedgrass), <i>Melinis repens</i>*, <i>Passiflora suberosa</i>* (corky passion flower) and <i>Cyanthillium cinereum</i>.</p>	
VM Act Status	Least concern	
Extent of MDA (ha)	Remnant 8.5	
Structure – average height (m)	Remnant	
	T1 – 20 T2 – 11 T3 – 5 S1 – 2 S2 – 0.8 G – 0.3	









## POWERLINK CALVALE TO CALLOPE RIVER

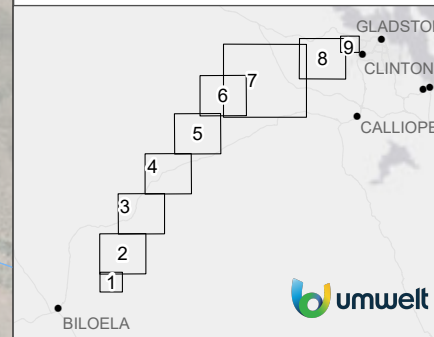
### Legend

- Major Watercourse
- Railway
- Disturbance Footprint
- ▭ Study Area Boundary

### Ground-truthed Regional Ecosystems

- 11.10.13
- 11.10.4
- 11.10.8
- 11.11.15
- 11.3.26
- 11.8.4
- Non-remnant

**FIGURE 6.2 B**  
Ground-truthed Regional  
Ecosystems



Scale  
1:50,000

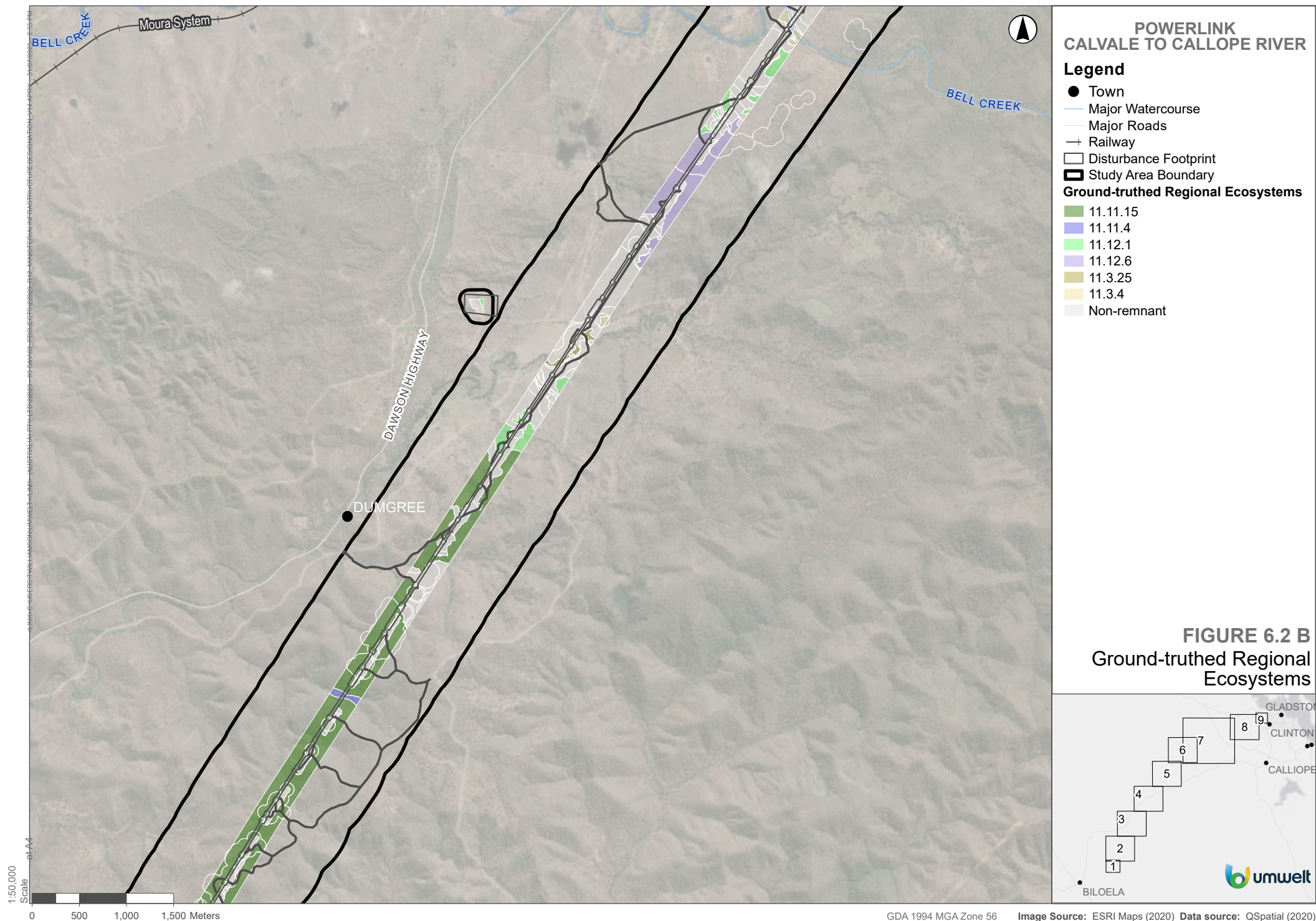
0 500 1,000 1,500 Meters

GDA 1994 MGA Zone 56

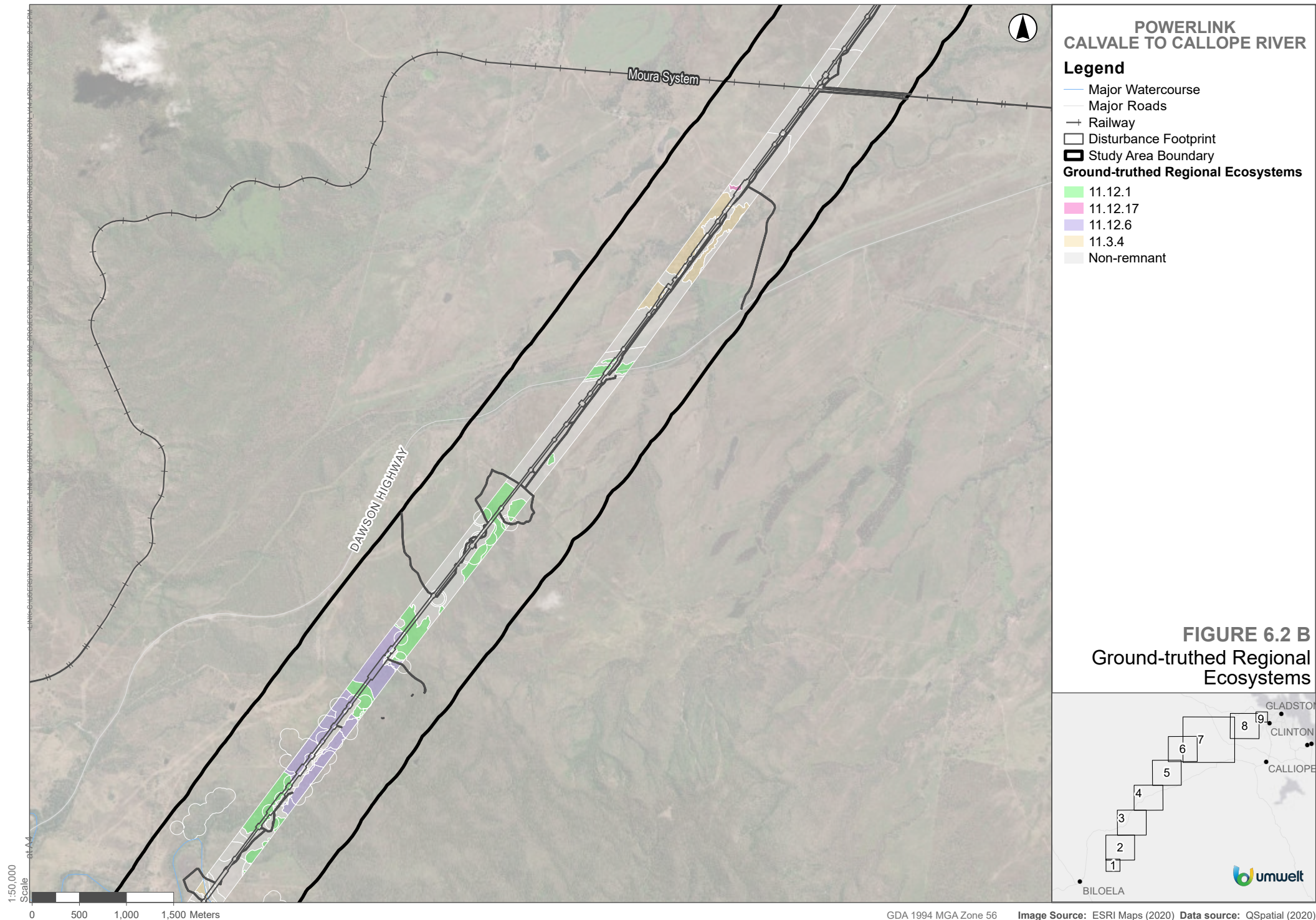
Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

umwelt

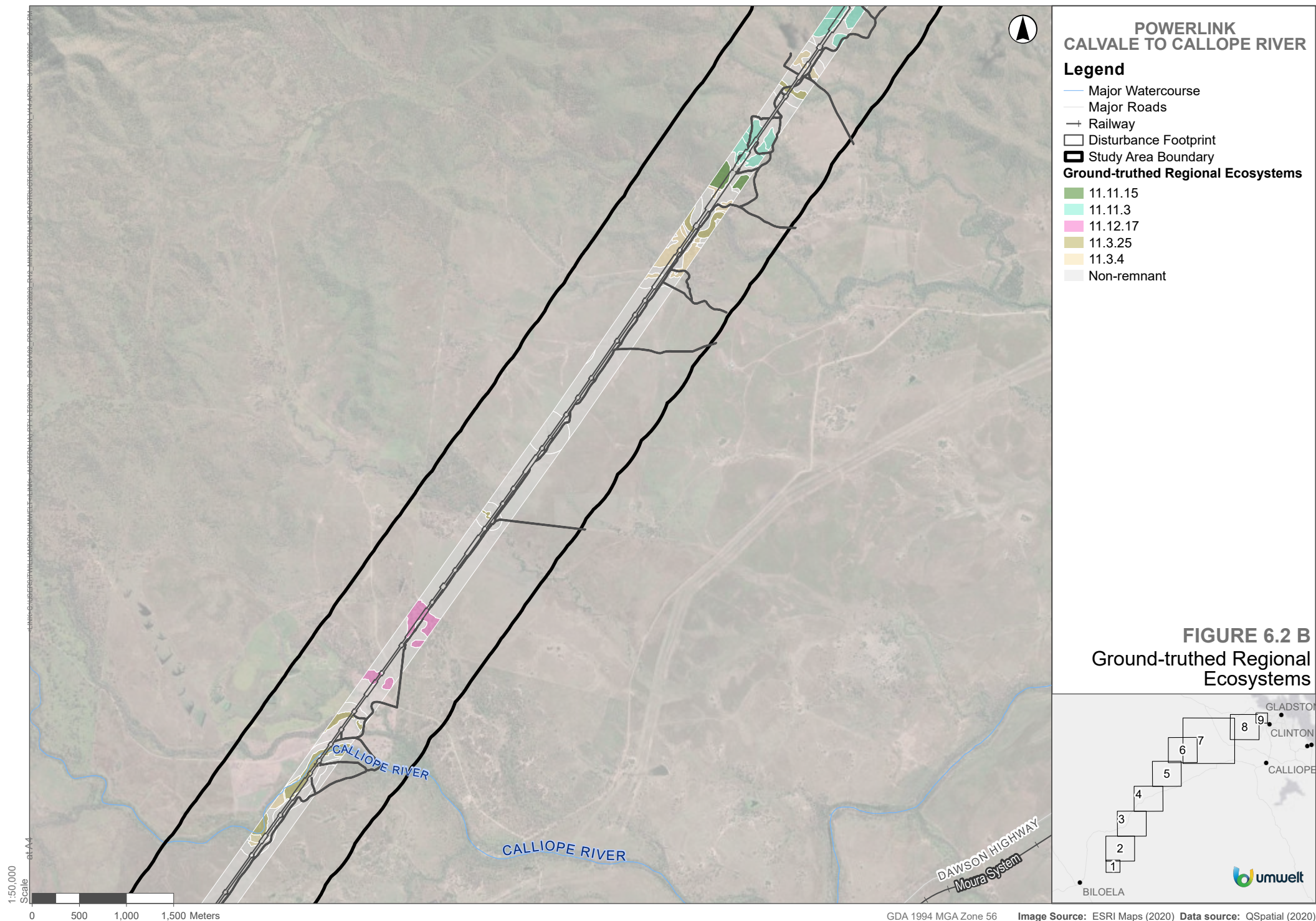




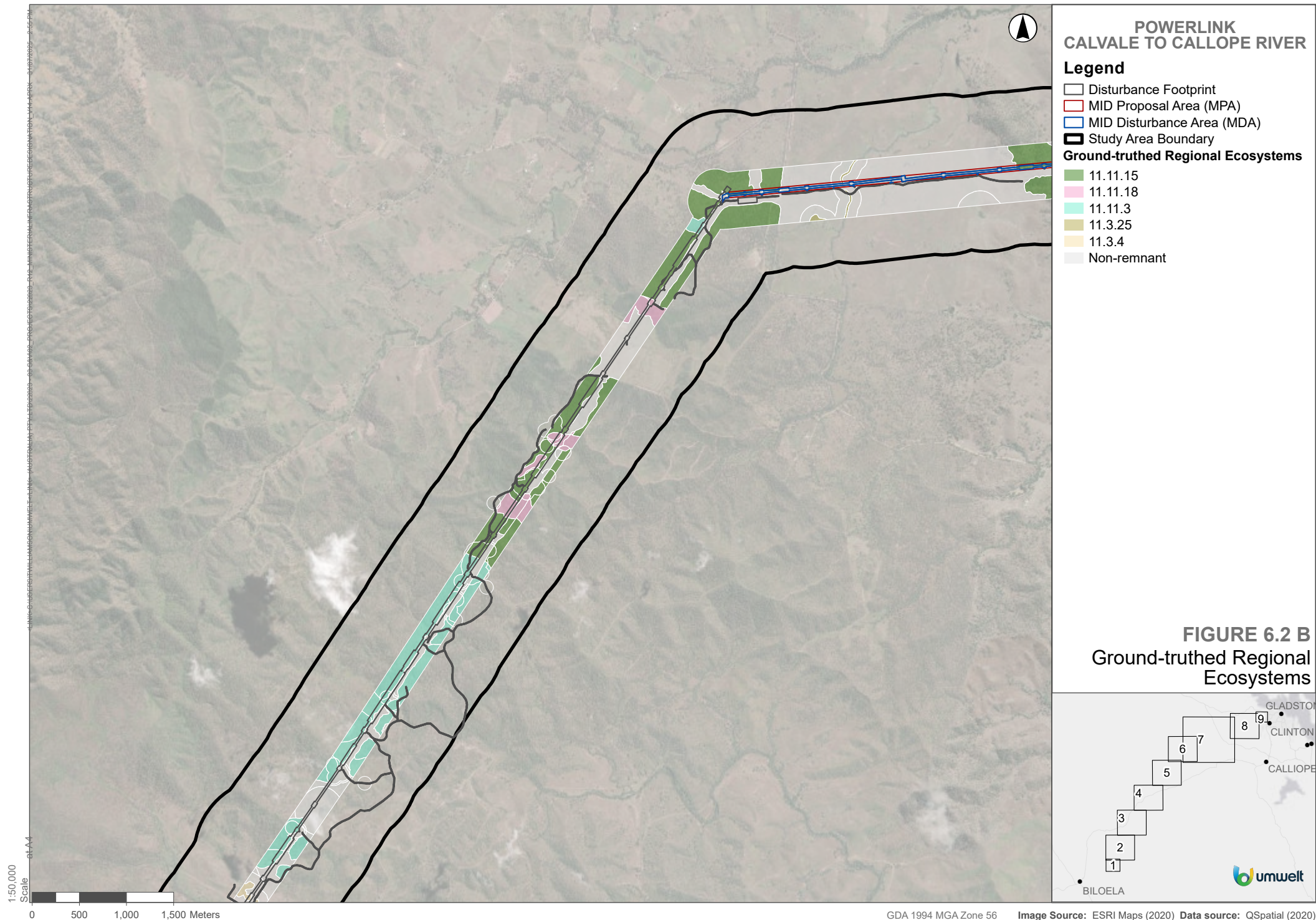




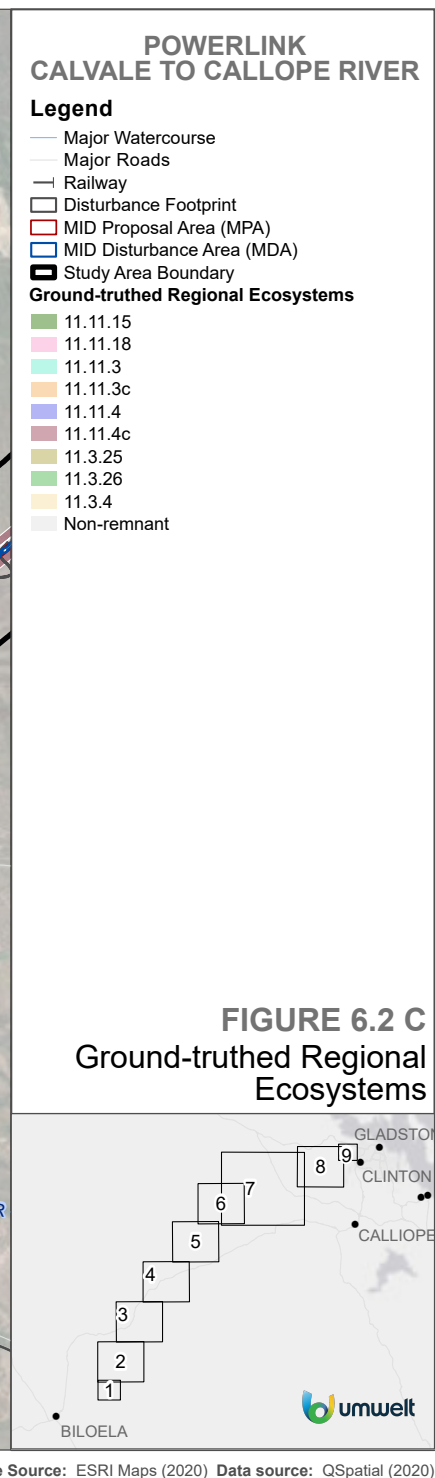
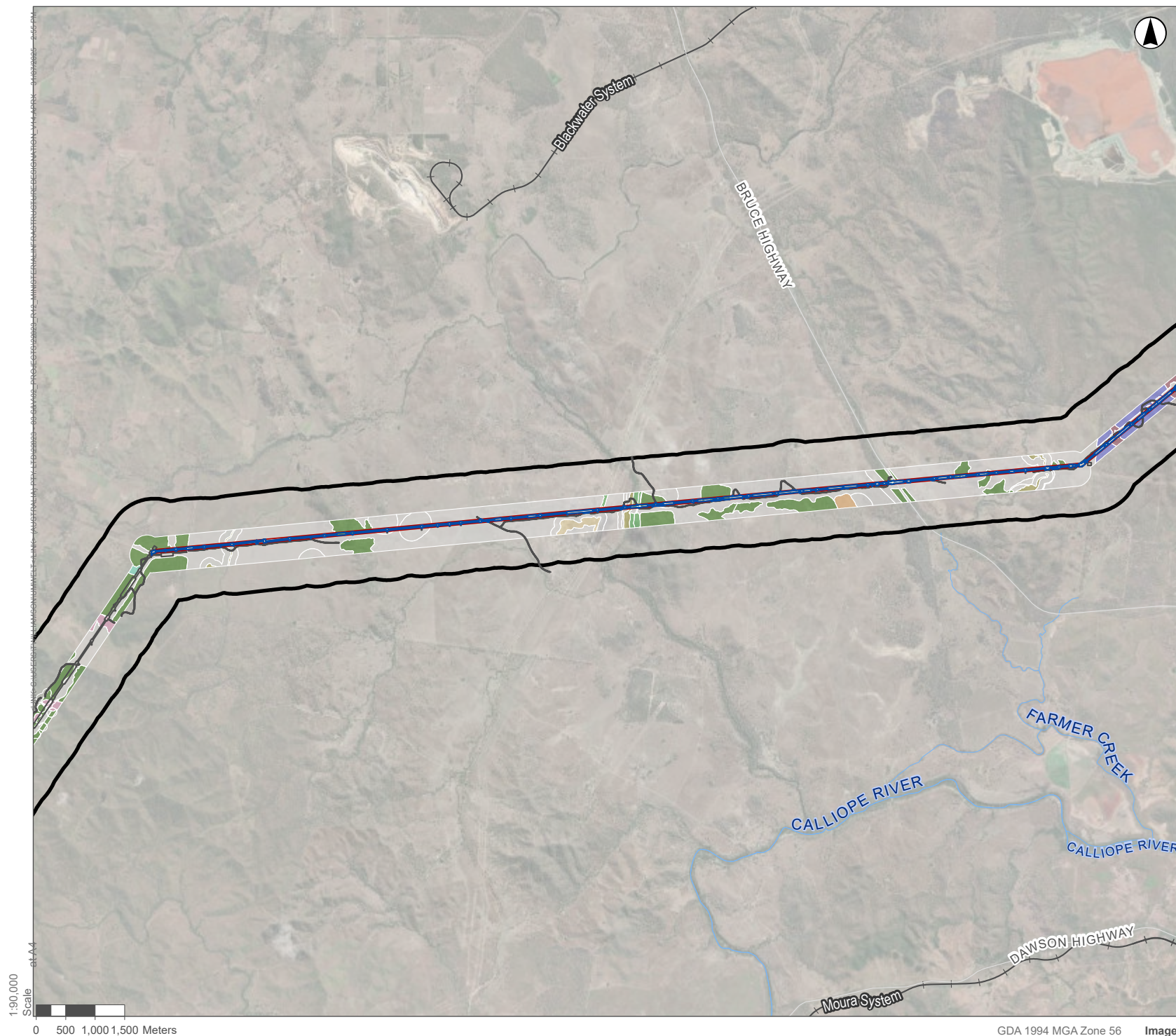




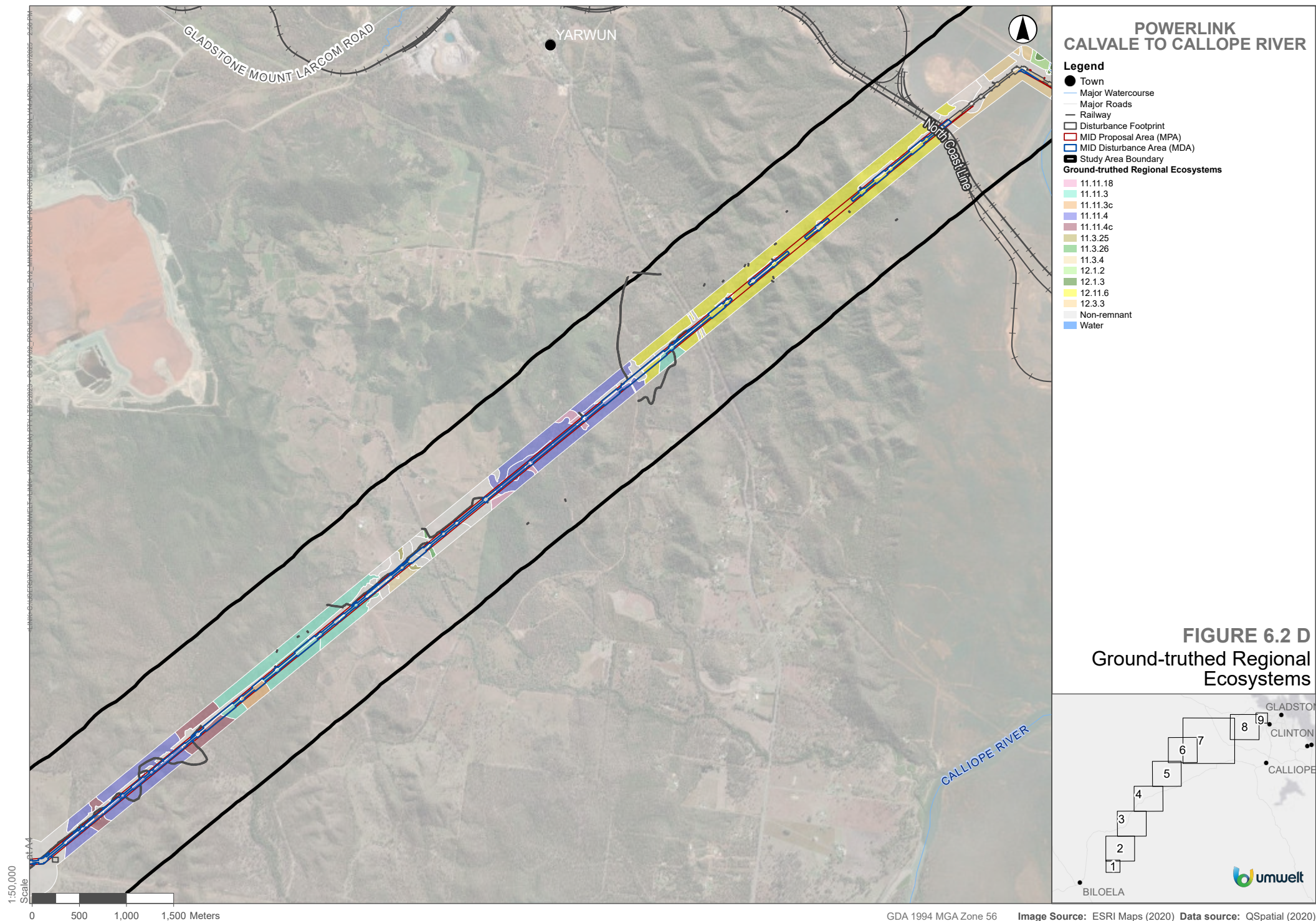














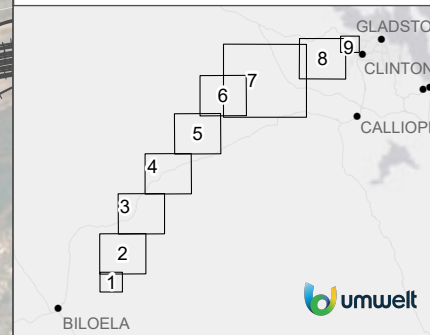


## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

- Major Watercourse
- Major Roads
- + Railway
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- ▬ Study Area Boundary
- Ground-truthed Regional Ecosystems**
  - 12.1.2
  - 12.1.3
  - 12.11.6
  - 12.3.3
  - Intertidal Zone
  - Non-remnant
  - Water

**FIGURE 6.2 E**  
Ground-truthed Regional  
Ecosystems



1:20,000  
Scale  
0 500 1,000 1,500 Meters

GDA 1994 MGA Zone 56

Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

umwelt



## 6.2 Flora Diversity

A total of 378 flora species from 74 families and 232 genera were identified within the Study Area during the field surveys. The plant families representing the most taxa were Poaceae (43 taxa), Leguminosae (40 taxa), Myrtaceae (23 taxa) and Asteraceae (17 taxa). A total of 59 introduced species were identified within the Study Area, which are discussed further in **Section 6.2.2**. A list of all flora species identified within the Study Area is provided in **Appendix D**.

### 6.2.1 Threatened Flora

The desktop assessment identified 32 species listed under the NC Act as potentially occurring within the Study Area. Of these species, four were confirmed present within the Study Area. An additional four species were considered a high likelihood of occurring and four were considered a moderate likelihood of occurring (**Table 6.4**). After extensive survey effort, no threatened flora species were observed within the MDA. The completed likelihood of occurrence for all threatened flora is provided in **Appendix B**. **Figure 6.3** displays verified Wildlife online records of moderate, high or known threatened flora species as well as field survey observations of the known species.

**Table 6.4 Threatened Flora Likelihood of Occurrence**

Scientific Name	Common Name	EPBC Act Status	NC Act Status
<b>Known to Occur</b>			
<i>Acacia pedleyi</i>	Pedley's wattle	-	Vulnerable
<i>Cycas megacarpa</i>	-	Endangered	Endangered
<i>Grevillea hockingsii</i>	-	-	Vulnerable
<i>Samadera bidwillii</i>	Quassia	Vulnerable	Vulnerable
<b>High Likelihood of Occurrence</b>			
<i>Atalaya collina</i>	Yarwun whitewood	Endangered	Endangered
<i>Dansiea elliptica</i>	-	-	Near threatened
<i>Melaleuca groveana</i>	Grove's paperbark	-	Near threatened
<i>Polianthion minutiflorum</i>	-	Vulnerable	Vulnerable
<b>Moderate Likelihood of Occurrence</b>			
<i>Cerbera dumicola</i>	-	-	Near threatened
<i>Cossinia australiana</i>	-	Endangered	Endangered
<i>Graptophyllum excelsum</i>	Scarlet fuchsia	-	Near threatened
<i>Sphaeromorphaea major</i>	Spreading nut-heads	-	Near threatened

### 6.2.1.1 *Acacia pedleyi*

*Acacia pedleyi*, listed as vulnerable under the NC Act, was recorded in several locations in within Section B, within and adjacent Callide Timber Reserve. It was not recorded within the MDA. In total, approximately 167 individuals were recorded within the Study Area. *Acacia pedleyi* was recorded within three habitat types within the Study Area:

- *Eucalyptus cloeziana*, *Corymbia citriodora* and *Eucalyptus crebra* woodland (RE 11.10.13),
- *Eucalyptus melanophloia* woodland on Cainozoic igneous rocks (RE 11.8.4), and
- Non-remnant vegetation, along disturbed tracks, including within a non-remnant drainage line.

Field-verified records of this species are illustrated on **Figure 6.3** and an individual recorded within the Callide Timber Reserve is shown in **Photo 6.1**.



**Photo 6.1** *Acacia pedleyi* within Section B (Callide Timber Reserve)

### 6.2.1.2 *Cycas megacarpa*

*Cycas megacarpa*, listed as endangered under the NC Act, was observed in several locations along Section B associated with multiple vegetation communities. It was not recorded within the MDA. From March to May 2023 field surveys for this Project included the mapping of *Cycas megacarpa* individuals within the existing easement, the Disturbance Footprint and adjacent vegetation. In total, approximately 1,462 individuals were observed during field surveys with an estimated 343 individuals occurring within the Disturbance Footprint. During field surveys, all development class categories as described in **Section 4.2.1.2** were observed and included 371 juveniles, 485 sub-adults, 598 adults and 8 large adults. Habitats within the Disturbance Footprint which were recorded to support the *Cycas megacarpa* include:



- Eucalypt dominated open forests to woodlands on hills and ranges.
- Ironbark woodland to open woodland on hills and ranges.
- *Corymbia citriodora* open forest to woodlands.
- Eucalypt dominated open forest to woodland fringing drainage lines and on floodplains.
- Semi-evergreen vine thicket and microphyll vine forest.
- Non-remnant or cleared pasture.

Observed individuals were noted from remnant vegetation, existing cleared areas as well as from underneath the existing transmission corridor. **Photo 6.2** displays a sub-adult adjacent to the existing overhead transmission corridor within the Calliope Range State Forest. Individuals of *Cycas megacarpa* are present across freehold, leasehold, road reserve, the Callide Timber Reserve and the Calliope Range State Forest.



**Photo 6.2** *Cycas megacarpa* observed with the Calliope Range State Forest

#### 6.2.1.3 *Grevillea hockingsii*

*Grevillea hockingsii*, listed as vulnerable under the NC Act, was recorded within Section B, within and adjacent the Callide Timber Reserve. It was not recorded within the MDA. *Grevillea hockingsii* were recorded sporadically in an approximately 8 ha area (specific counts were not undertaken, but the number of individuals is estimated to be greater than 200). They were recorded within *Eucalyptus cloeziana*, *Corymbia citriodora* and *Eucalyptus melanoleuca* woodland (RE 11.10.13), as well as non-remnant vegetation, underneath the existing powerline easement.

Field-verified records of this species are illustrated on **Figure 6.3** and an individual recorded within the Callide Timber Reserve is shown in **Photo 6.3**.



**Photo 6.3** *Grevillea hockingsii* observed within Callide Timber Reserve

#### **6.2.1.4** *Samadera bidwillii*

*Samadera bidwillii*, listed as vulnerable under the NC Act, was recorded within Section B, within and adjacent to the Callide Timber Reserve. It was not recorded within the MDA. *Samadera bidwillii* were recorded sporadically in two patches in an approximately 1.9 ha total area. Specific counts plus an estimate in a large patch were undertaken, with the number of stems estimated to be between 450-550 individuals. As this species is known to coppice the actual count of individuals is less due to the counts being based on stem number. They were recorded within *Eucalyptus cloeziana*, *Corymbia citriodora* and *Eucalyptus melanoleuca* woodland (RE 11.10.13), adjacent to the existing powerline easement.

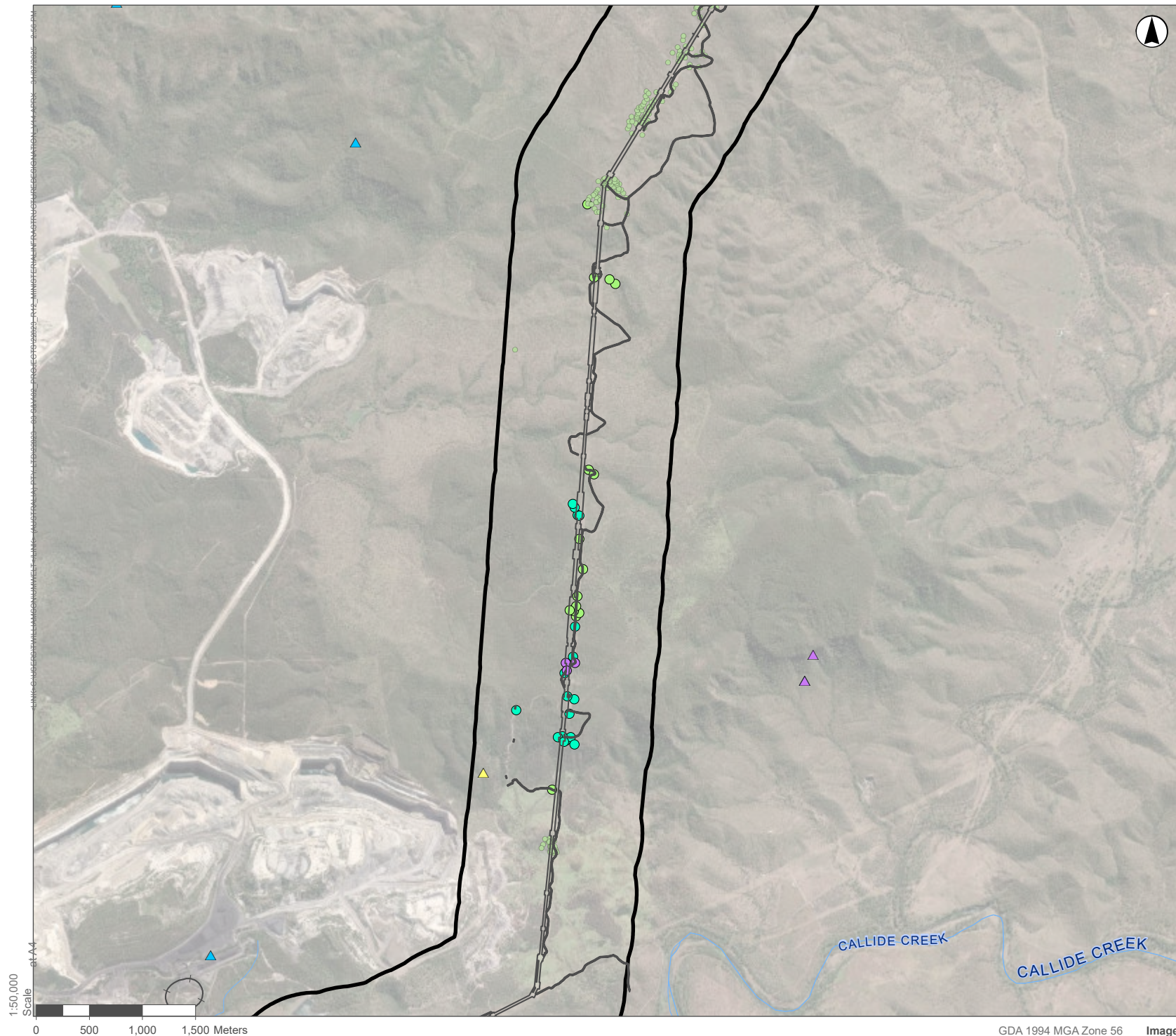
Field-verified records of this species are shown in **Figure 6.3** and an individual recorded within the Callide Timber Reserve is shown in **Photo 6.4**.





**Photo 6.4**      ***Samadera bidwillii* observed within Callide Timber Reserve**





## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

- Major Watercourse
- Railway
- Disturbance Footprint
- ▭ Study Area Boundary

### Threatened Flora Records (Wildlife Online)

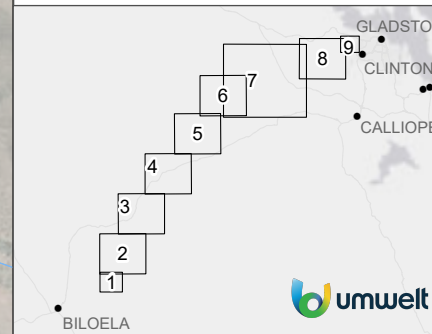
- ▲ *Cossinia australiana*
- ▲ *Polianthion minutiflorum*
- ▲ *Samadera bidwillii*

### Threatened Flora Records (Umwelt)

- *Cycas megacarpa*
- *Acacia pedleyi*
- *Grevillea hockingsii*
- *Samadera bidwillii*

**FIGURE 6.3 B**

Threatened Flora Records



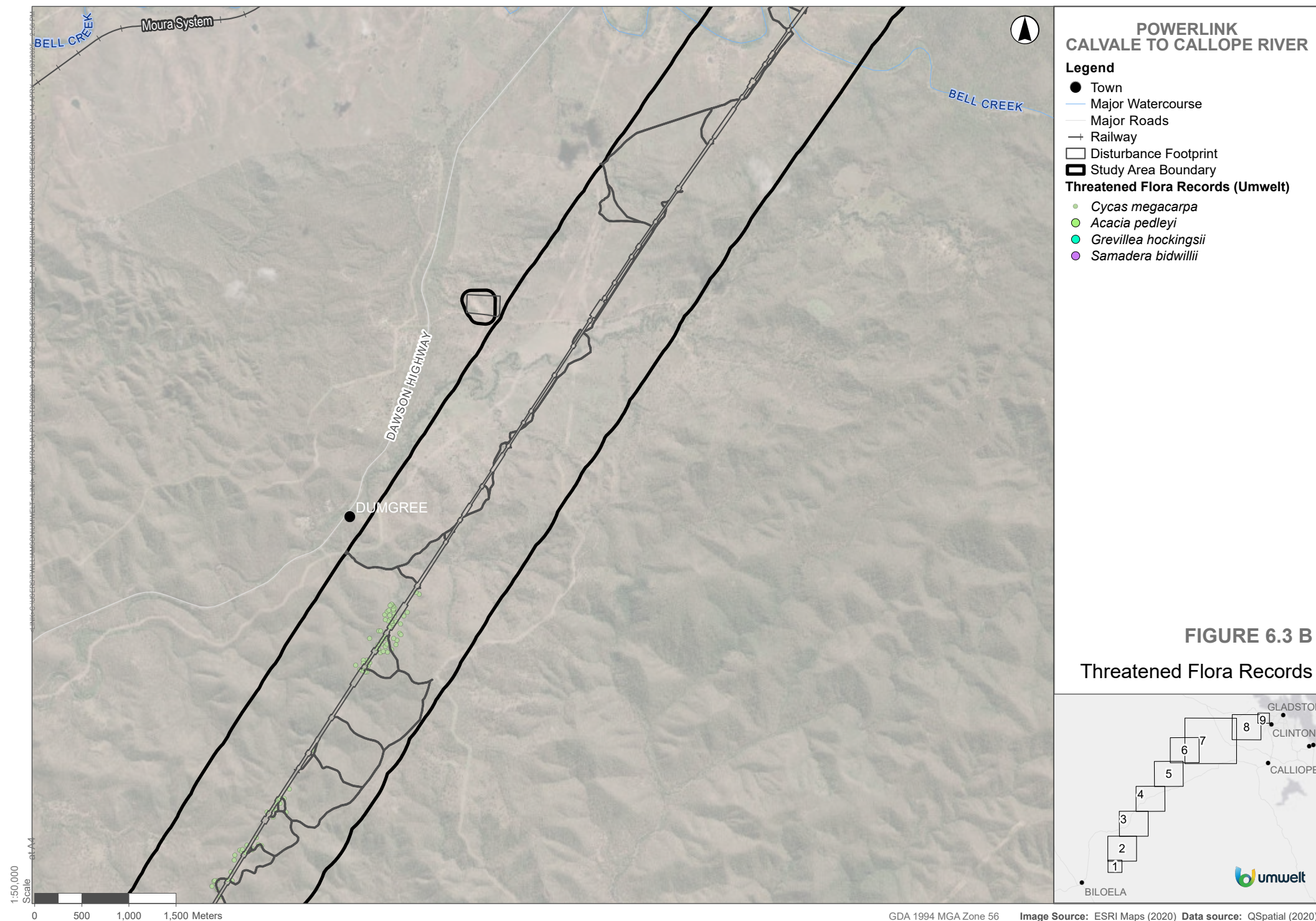
Scale  
1:50,000

0 500 1,000 1,500 Meters

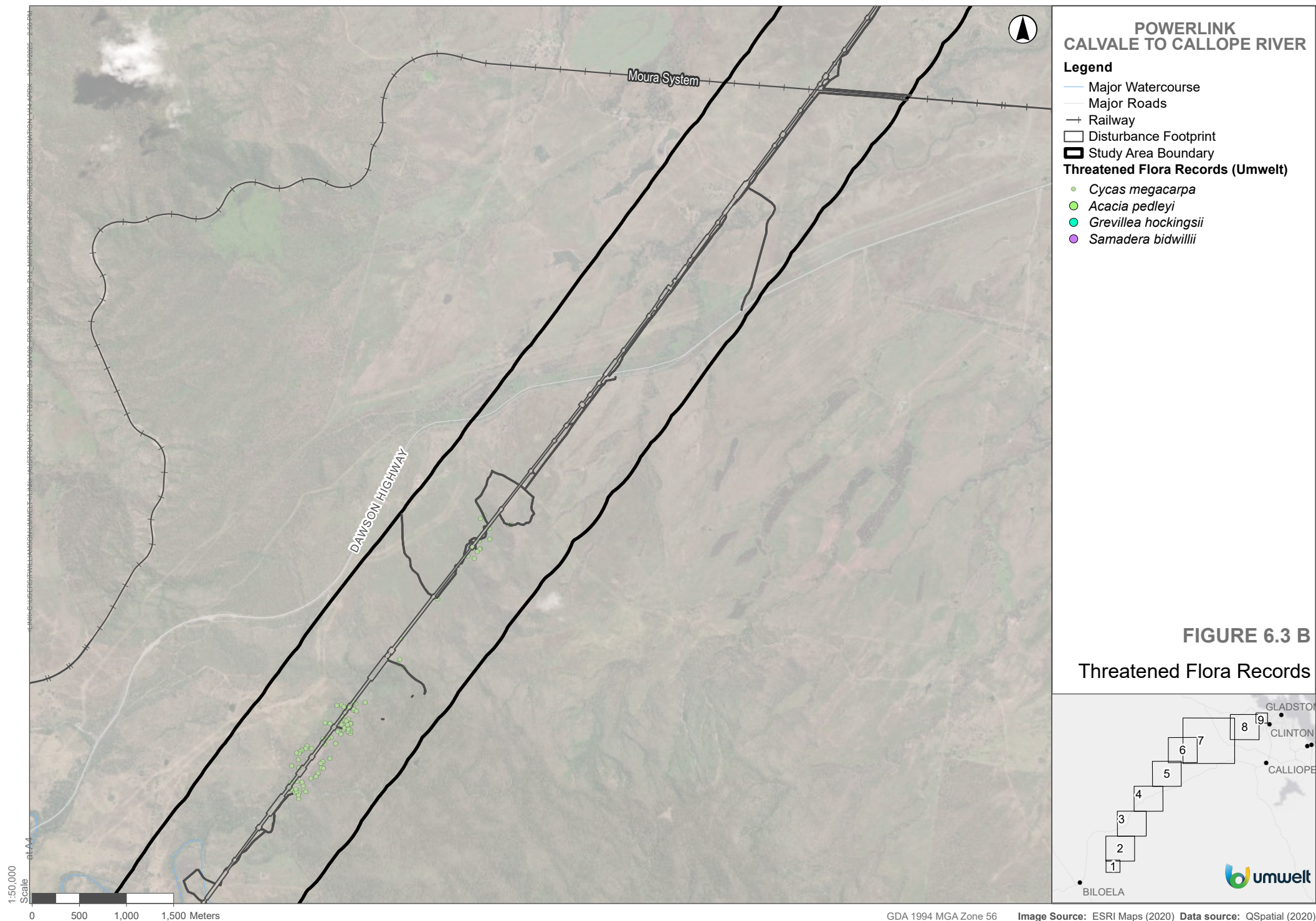
GDA 1994 MGA Zone 56

Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

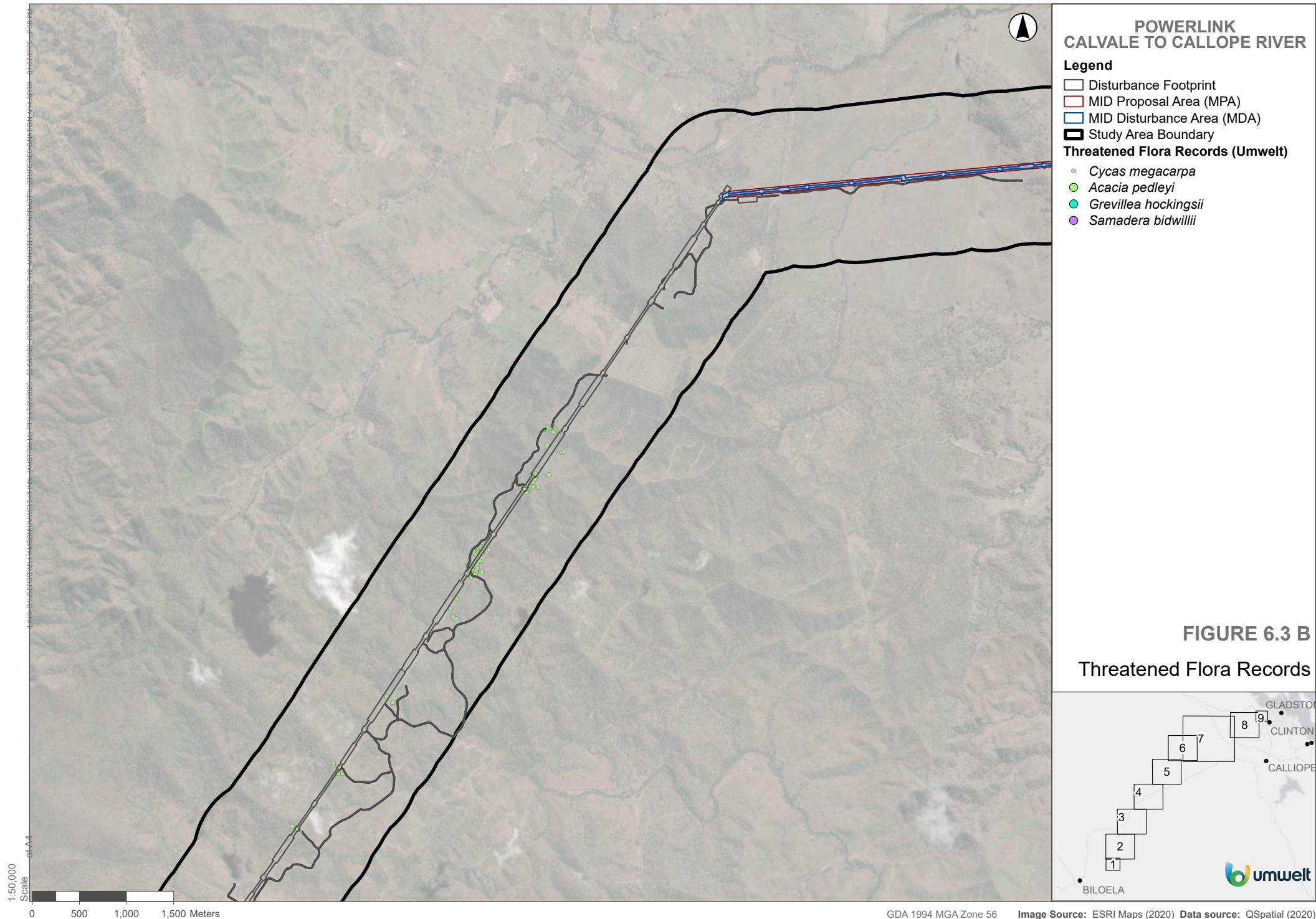








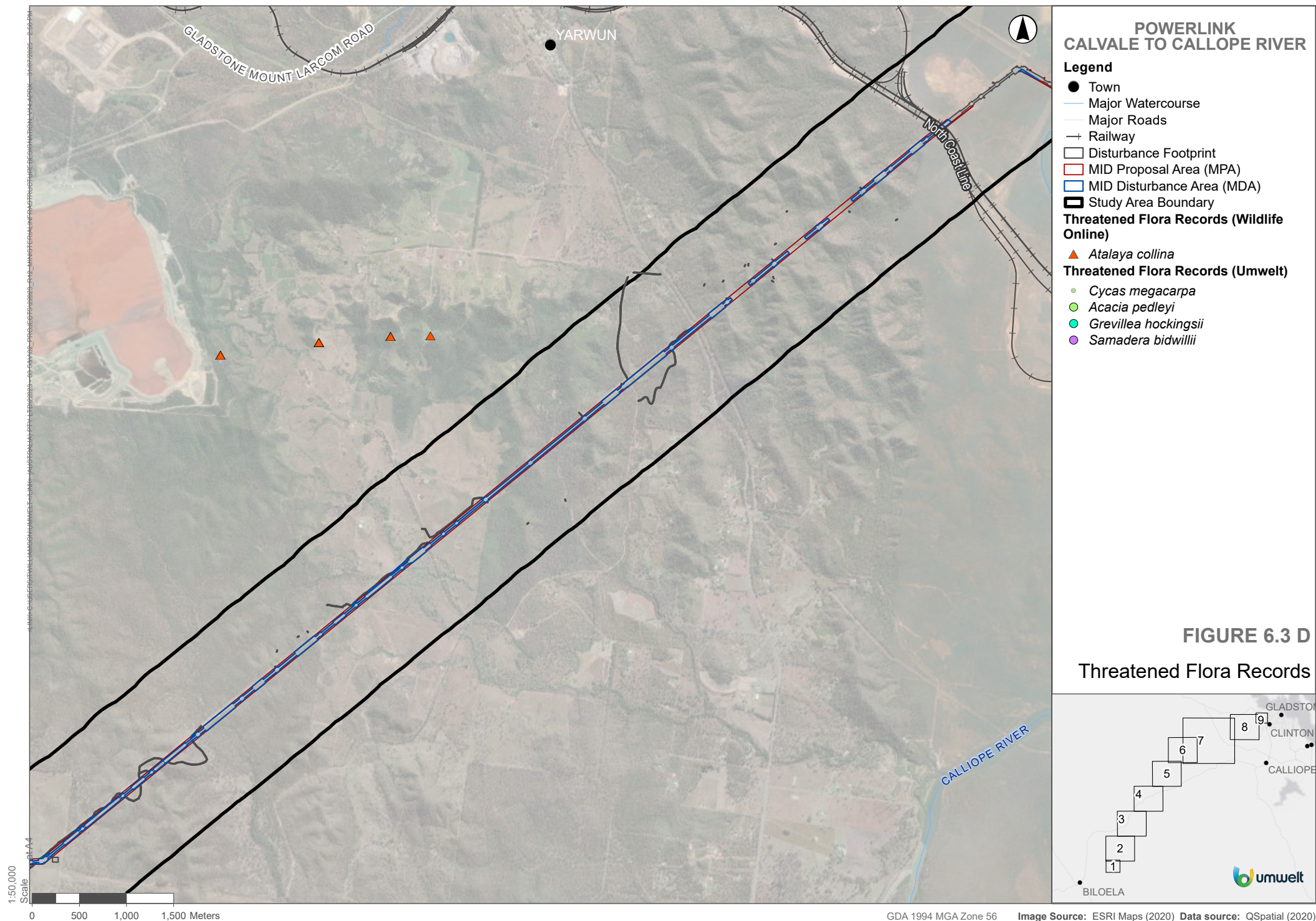












## 6.2.2 Introduced Flora

A total of 80 introduced flora were identified during the field surveys which represents 21% of the total flora recorded (**Appendix D**). Of these 80 species, 16 are listed as Prohibited or Restricted Plants under the Biosecurity Act and six species are listed as Weeds of National Significance (WoNS) (**Table 6.5**). In addition to species listed as restricted matter or WoNS, a further five species are targeted with strategic (local control) measures within the Gladstone Regional Council Biosecurity Plan 2021-25 (Gladstone Regional Council, 2020).

Weeds were prominent throughout the Study Area, often dominating the ground layer. *Cenchrus ciliaris*\* dominated non-native patches. In Sections D and E, *Hyparrhenia rufa*\* was abundant in non-native patches and throughout the understorey of remnant and regrowth vegetation. Throughout Section C, the highly noxious *Sporobolus pyramidalis*\* was scattered through paddocks and along tracks. *Lantana camara*\* and *Opuntia tomentosa*\* were common throughout most of the Study Area but typically occurred sparsely.

**Table 6.5 Introduced Flora Recorded within the Study Area**

Scientific Name	Common Name	Queensland Biosecurity Act 2014 Status	WoNS	Gladstone Council Strategic Measures
<i>Aristolochia elegans</i> *	Dutchman's pipe	Category 3 Restricted matter	-	Local control to high priority assets
<i>Baccharis halimifolia</i> *	groundsel bush	Category 3 Restricted matter	-	Containment
<i>Cryptostegia grandiflora</i> *	rubber vine	Category 3 Restricted matter	WoNS	Containment
<i>Cascabela thevetia</i> *	Yellow oleander	Restricted matter, category 3	-	Local control to high priority assets
<i>Celtis sinensis</i> *	Chinese celtis	Category 3 Restricted matter	-	Local control to high priority assets
<i>Dolichandra unguis-cati</i> *	cat's claw creeper	Category 3 Restricted matter	WoNS	Eradication
<i>Eragrostis curvula</i> *	African love grass	-	-	Local control to high priority assets
<i>Hymenachne amplexicaulis</i> *	Hymenachne	Category 3 Restricted matter	-	Local control to high priority assets
<i>Hyparrhenia rufa</i> *	thatch grass	-	-	Local control to high priority assets
<i>Lantana camara</i> *	lantana	Category 3 Restricted matter	WoNS	Local control to high priority assets
<i>Lantana montevidensis</i> *	creeping lantana	Category 3 Restricted matter	-	Local control to high priority assets
<i>Opuntia stricta</i> *	Prickly pear	Category 3 Restricted matter	WoNS	Local control to high priority assets
<i>Opuntia tomentosa</i> *	velvety tree pear	Category 3 Restricted matter	WoNS	Local control to high priority assets
<i>Parthenium hysterophorus</i> *	Parthenium	Category 3 Restricted matter	WoNS	Local control to high priority assets



Scientific Name	Common Name	Queensland Biosecurity Act 2014 Status	WoNS	Gladstone Council Strategic Measures
<i>Praxelis clematidea</i> *	praxelis	-	-	Local control to high priority assets
<i>Schinus terebinthifolius</i> *	broadleaved pepper tree	-	-	Local control to high priority assets
<i>Senna hirsuta</i> *	Woolly senna	Category 3 Restricted matter	-	Local control to high priority assets
<i>Sporobolus pyramidalis</i> *	GRT	Category 3 Restricted matter	-	Containment
<i>Stachytarpheta</i> spp.*	snake weed	-	-	Local control to high priority assets
<i>Tecoma stans</i> *		Category 3 Restricted matter	-	Containment
<i>Ziziphus mauritiana</i> *	Chinese apple	Category 3 Restricted matter	-	Eradication

## 6.3 Marine Plants

The marine plants identified within the MDA occur within the fringing vegetation adjacent to the Calliope River below the HAT (**Figure 6.4**). Mangroves fringing the Calliope River are often up to 6 m in height and the dominant mangrove species are *Avicennia marina* and *Rhizophora stylosa*. Further from the Calliope River within the Disturbance Footprint, mangrove heights decrease and are typically less than 1.5 m (**Photo 6.5**). *Sporobolus virginicus* typically dominated saltmarsh vegetation with very few bare patches of ground; however, a variety of native forbs are also present. Saltmarsh vegetation is also interspersed with native trees including *Acacia disparrima* subsp. *disparrima*, *Melaleuca quinquenervia* suggesting that vegetation has been disturbed or modified in the past, likely associated with the previous transmission line construction. Woody debris of various sizes is scattered throughout the area and often concentrated at the lowest points of the topography. Rubbish and litter are prevalent throughout the area and observations suggest that rubbish is largely deposited via tidal influence rather than direct access.



**Photo 6.5 Low Mangroves with Saltwater Couch Typical of the Disturbance Footprint (northern side of the Calliope River)**

The area of marine plants within the MDA as defined under the Fisheries Act, totals 251.86m<sup>2</sup> and marine plant types and coverage are detailed in **Table 6.6**. Excluded from the marine plant coverage within the MDA is bare ground, which totalled 2.43 m<sup>2</sup>. The definition states that both marine and terrestrial flora species are considered marine plants under the Fisheries Act if they are recorded below the HAT. These species are outlined in **Table 6.7**.

**Table 6.6 Coverage of Marine Plant Types in the MDA**

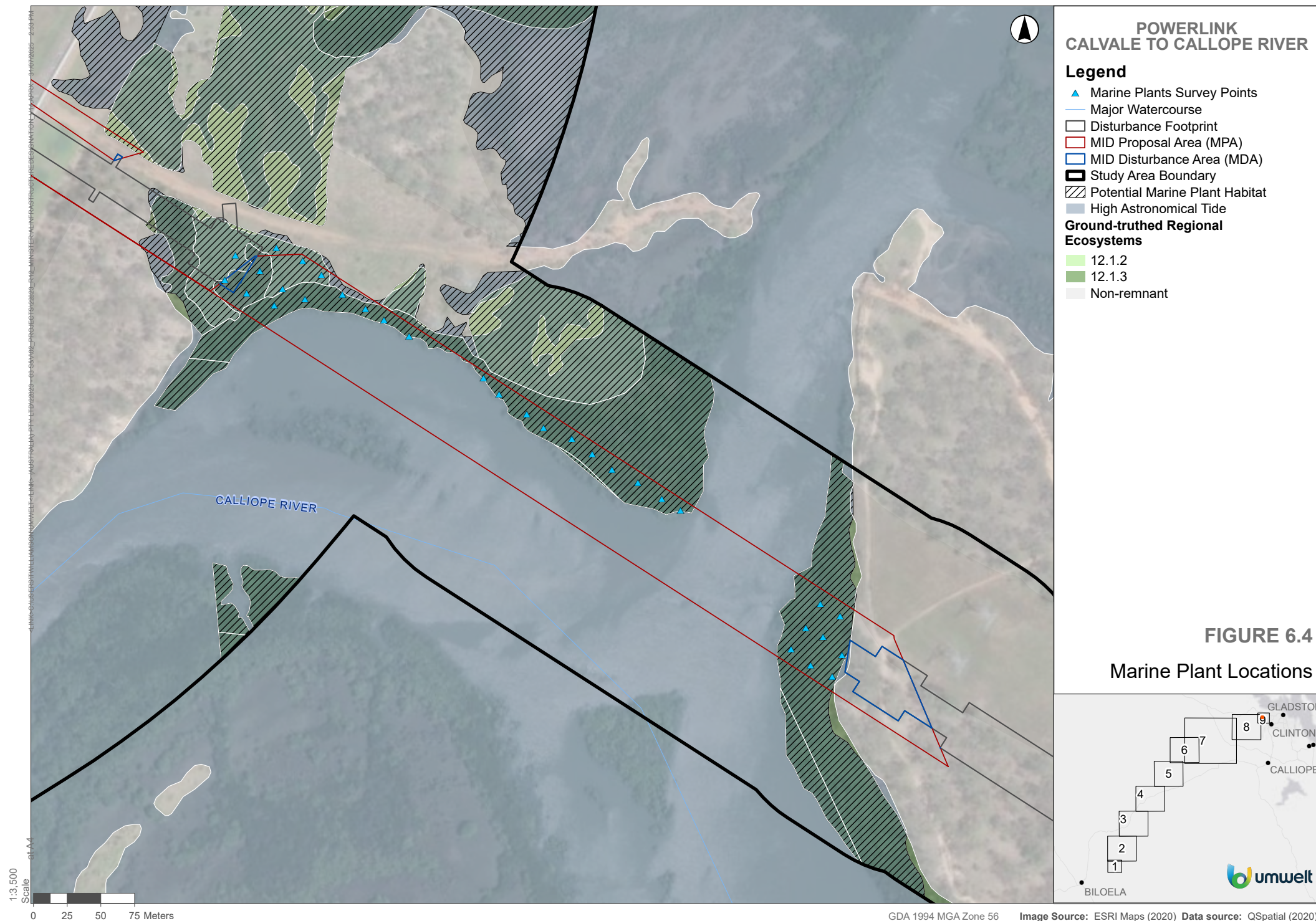
Marine Plant Types	Coverage (m <sup>2</sup> ) in MDA
Mangroves	40.49
Native grasses (commonly found in saltmarshes)	117.71
Native forbs (commonly found in saltmarshes)	0.58
Native trees (which are not mangroves)	30.61
Woody debris	27.73
Exotic grasses and forbs	34.74
<b>Total</b>	<b>251.86</b>

**Table 6.7 Marine Plants Observed Within Field Surveys of the MDA**

Scientific Name	Common Name	Marine Plant Type
<i>Acacia disparrima</i> subsp. <i>disparrima</i>	-	Native tree
<i>Aegiceras corniculatum</i>	River mangrove	Mangrove
<i>Avicennia marina</i>	-	Mangrove
<i>Carpobrotus glaucescens</i>	Pigface	Native forb
<i>Chloris gayana</i> *	Rhodes grass	Exotic grasses and forbs



Scientific Name	Common Name	Marine Plant Type
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	-	Native forb
<i>Eucalyptus tereticornis</i>	-	Native tree
<i>Excoecaria agallocha</i>	Milky mangrove	Mangrove
<i>Fimbristylis polytrichoides</i>	-	Native forb
<i>Gomphocarpus physocarpus</i> *	Balloon cottonbush	Exotic grasses and forbs
<i>Hyparrhenia rufa</i> *	-	Exotic grasses and forbs
<i>Isolepis inundata</i>	Swamp club rush	Native forb
<i>Limonium solanderi</i>	-	Native forb
<i>Macroptilium atropurpureum</i> *	Siratro	Exotic grasses and forbs
<i>Melaleuca quinquenervia</i>	Swamp paperbark	Native tree
<i>Myoporum acuminatum</i>	Coastal boobialla	Native tree
<i>Passiflora foetida</i> *	-	Exotic grasses and forbs
<i>Pterocaulon sphacelatum</i>	-	Native forb
<i>Rhizophora stylosa</i>	Spotted mangrove	Mangrove
<i>Salicornia quinqueflora</i>	-	Native forb
<i>Sesuvium portulacastrum</i>	Sea purslane	Native forb
<i>Sporobolus virginicus</i>	Sand couch	Native grass
<i>Suaeda australis</i>	-	Native forb
<i>Symphyotrichum subulatum</i> *	-	Exotic forbs and grasses
<i>Vitex trifolia</i> var. <i>trifolia</i>	-	Native tree





## 6.4 Fauna Habitat Types

A total of seven fauna habitat types have been identified within the MDA (**Table 6.8**). Fauna habitat types are depicted on **Figure 6.5**.

**Table 6.8 Fauna Habitat Types**

Fauna Habitat Type	Regional Ecosystem	Extent of Disturbance Footprint within the MDA (ha)
<i>Corymbia citriodora</i> open forest to woodlands	11.11.3 and 12.11.6	14.2
Eucalypt dominated open forests to woodlands on hills and ranges	11.11.3c and 11.11.4c	3.2
Ironbark woodland to open woodland on hills and ranges	11.11.4 and 11.11.15	17.2
Eucalypt dominated open forest to woodland fringing drainage lines and on floodplains	11.3.4, 11.3.25, 11.3.26 and 12.3.3	1.8
Tidal flats dominated by mangroves, sedges and grasses	12.1.2 and 12.1.3	0.04
Semi-evergreen vine thicket	11.11.18	0.6
Non-remnant paddocks and pasture	N/A	56.6

### 6.4.1 *Corymbia citriodora* Open Forest to Woodlands

This habitat type is scattered in large and small patches across Section D and E, analogous with REs 11.11.3 and 12.11.6. This fauna habitat type is defined by a canopy comprised of *Corymbia citriodora* as the dominant species with scattered *Eucalyptus crebra* and *Eucalyptus acmenoides* (**Photo 6.6**). Medium and small sized hollows are occasionally present in dead branches of *C. citriodora* trees and in stags. The shrub layer is sparse and consisted of *Alphitonia excelsa*, *Jasminum simplicifolium*, *Acacia disparrima* and *Macrozamia miquelii*. The ground layer is comprised of exotic grasses, weeds and areas with scattered leaf litter up to 40 mm in depth. Ground timber of less than 30 cm diameter was also scattered in areas with the occasional large, hollowed logs.

Trees with the presence of small and medium sized hollows may provide refuge for arboreal mammals, nocturnal bird species and microbats. The presence of *Corymbia* and *Eucalyptus* trees provide suitable breeding, foraging and dispersal habitat for koala and foraging for species including yellow-bellied glider, painted honeyeater (*Grantiella picta*) and satin flycatcher (*Myiagra cyanoleuca*). The presence of native and exotic grasses, leaf litter, woody debris and scattered small rocks can provide habitat opportunities for macropods, native rodents, reptiles and amphibians including whip-tailed wallaby (*Notamacropus parryi*), striped snake-eyed skink (*Cryptoblepharus virgatus*), Australian brush-turkey (*Alectura lathamii*) and brown quail (*Coturnix ypsilophora*) which were all observed utilising this habitat type.



**Photo 6.6** *Corymbia citriodora* Open Forest to Woodlands

### 6.4.2 Eucalypt Dominated Open Forests to Woodlands on Hills and Ranges

This habitat type in the MDA was recorded in three small patches along Section D, analogous with REs 11.11.3c and 11.11.4c. The canopy is dominated by *Eucalyptus populnea* with the occasional *Eucalyptus tereticornis*, *Eucalyptus crebra* and *Corymbia erythrophloia* (**Photo 6.7**). The canopy trees vary in age with some *E. tereticornis* forming the occasional small to large hollows providing suitable denning habitat for arboreal mammals, like the greater glider (southern and central) (*Petauroides volans volans*) and birds such as the sulphur-crested cockatoo (*Cacatua galerita*). The shrub layer is absent apart from scattered patches of *Lantana camara*\* which can provide connectivity and refuge for small woodland birds including willie wagtail (*Rhipidura leucophrys*) and white throated gerygone (*Gerygone olivacea*). The ground layer has limited microhabitat features and is dominated by native and exotic grasses.

The habitat type showed signs of historical clearing and is heavily impacted by cattle grazing in areas.



**Photo 6.7** Eucalypt Dominated Open Forests to Woodlands on Hills and Ranges



### 6.4.3 Ironbark Woodland to Open Woodland on Hills and Ranges

The majority of the native vegetation communities within the MDA were represented by this habitat type, which was analogous with two REs including 11.11.4 and 11.11.15. This fauna habitat type is defined by a canopy comprised of a variety of species including *Eucalyptus crebra*, *Corymbia erythrophloia*, *C. citriodora* and *E. tereticornis* (**Photo 6.8**). The shrub layer was absent except for some recruiting canopy species and *Lantana camara*\*. The ground layer was comprised of both native and exotic grasses and ground timber of various sizes. Other habitat values included occasional hollows (occasional medium and small) in mature *E. crebra* and *C. erythrophloia* trees and stags.

Native grasses, leaf litter and woody debris may provide habitat opportunities for native rodents, amphibians and reptiles. Trees with medium to small hollows may provide suitable denning habitat for small arboreal mammals, nocturnal bird species and microbat species. The presence of *Eucalyptus* species and *Corymbia* species may provide breeding, foraging and dispersal habitat for the koala. Historical clearing was evident in some locations with the presence of timber piles and grazing from livestock.



**Photo 6.8** Iron Bark Woodland to Open Woodland on Hills and Ranges

### 6.4.4 Eucalypt Dominated Open Forest to Woodland Fringing Drainage Lines and Floodplains

This habitat type is comprised of alluvial riparian forests, analogous with 11.3.4, 11.3.25, 11.3.26 and 12.3.3 generally associated with watercourses. Watercourses associated with this habitat type were commonly found to be dry, have ponding water or a slow flowing stream.

This community is defined by a canopy of *Eucalyptus tereticornis*, *Eucalyptus moluccana*, *Blakella tessellaris* and /or *Casuarina cunninghamiana* (**Photo 6.9**). Large, medium and small hollows were present in areas with large old growth trees providing refuge sites for greater gliders (southern and central) and other arboreal mammals and microbats. In addition, these larger trees provide nesting site for many hollow dependant birds, including the eastern barn owl (*Tyto javanica*) and sulphur-crested cockatoo, both of which were recorded within the Study Area. This habitat type is also suitable foraging and dispersal habitat for koalas and given the close proximity to water, koalas may utilise this habitat as refuge when water in the landscape is low during dry periods.

The shrub layer was absent except for some recruiting canopy species and *Lantana camara*\*. In some areas the ground layer was covered in dense native and exotic grass species with *Lantana camara*\* scattered throughout. Stream beds that were dry were often infested with *Megathyrus maximus*\* or lined with small rocks. These microhabitat features with the presence of water create ideal habitat for species like the squatter pigeon (southern), forest king fisher (*Todiramphus macleayii*), red-backed fairy-wren (*Malurus melanocephalus*), carpet python (*Morelia spilota*) and broad palmed rocket frog (*Litoria latopalmata*) all of which were recorded during field surveys. Although disturbance from weeds, cattle grazing and some bank erosion is present, this habitat is likely to provide corridors for fauna movement across the landscape.



**Photo 6.9 Eucalypt Dominated Open Forest to Woodland Alluvial Plains**

#### 6.4.5 Tidal Flats Dominated by Mangroves, Sedges and Grasses

This habitat type occurs on the eastern end of the Study Area around the Gladstone substation (Section E), analogous with REs 12.1.3 and 12.1.2. This fauna habitat type occurs on saltwater tidal flats and is a combination of mangrove shrubland to low closed forests and saltpan vegetation including grassland, herbland and sedges (**Photo 6.10**). The mangrove shrubland consists of *Avicennia marina*, *Rhizophora stylosa* and *Ceriops australis* and the grassland is dominated by *Sporobolus virginicus*, with occasional *Fimbristylis ferruginea*.

In areas where mangroves and saltpan vegetation were present, the banks had slight descending slopes onto intertidal muddy areas where terrestrial and aquatic fauna can forage or shelter in amongst the dense grass or mangrove roots and foliage. This fauna habitat may provide potential breeding and foraging habitat for the water mouse and migratory shorebirds including Australian painted snipe (*Rostratula australis*) and curlew sandpiper (*Calidris ferruginea*).





**Photo 6.10 Tidal Flats Dominated by Mangroves, Sedges and Grasses**

### 6.4.6 Semi-evergreen Vine Thicket

Associated with Section D, scattered patches of semi-evergreen vine thicket are present which are analogous with 11.11.18. This community is a low open forest comprised of a variety of species including *Terminalia porphyrocarpa*, *Secamone elliptica*, *Alectryon tomentosus* and *Alphitonia excelsa* with patches dominated by either *Acacia rhodoxylon* or *Acacia harpophylla*. The shrub layer in this community was typically dense and diverse across the community (**Photo 6.11**). Areas with a dense shrub layer present provide refuge and foraging opportunities for small birds such as grey-crowned babbler (*Pomatostomus temporalis*), white-throated honeyeater (*Melithreptus albogularis*), grey shrike-thrush (*Colluricincla harmonica*) and scarlet honeyeater (*Myzomela sanguinolenta*) which were recorded foraging and moving through the shrub layer. Microhabitat features such as hollows, and decorating bark were absent from this community making it unsuitable for arboreal mammals.

The ground layer was sparse and comprised *Gahnia aspera*, *Ancistrachne uncinata* and *Lantana montevidensis*\*. Within the ground-layer there are some areas with large, exposed boulders; however, it does not provide suitable denning habitat for fauna species. Fallen timber (less than 30 cm) and dense leaf litter ranging from 10 – 40 mm in depth was present in the ground layer. This microhabitat may provide shelter and dispersal opportunities for small ground-dwelling mammals and reptiles.



**Photo 6.11 Semi-evergreen Vine Thicket**

## 6.4.7 Non-remnant Paddocks and Pasture

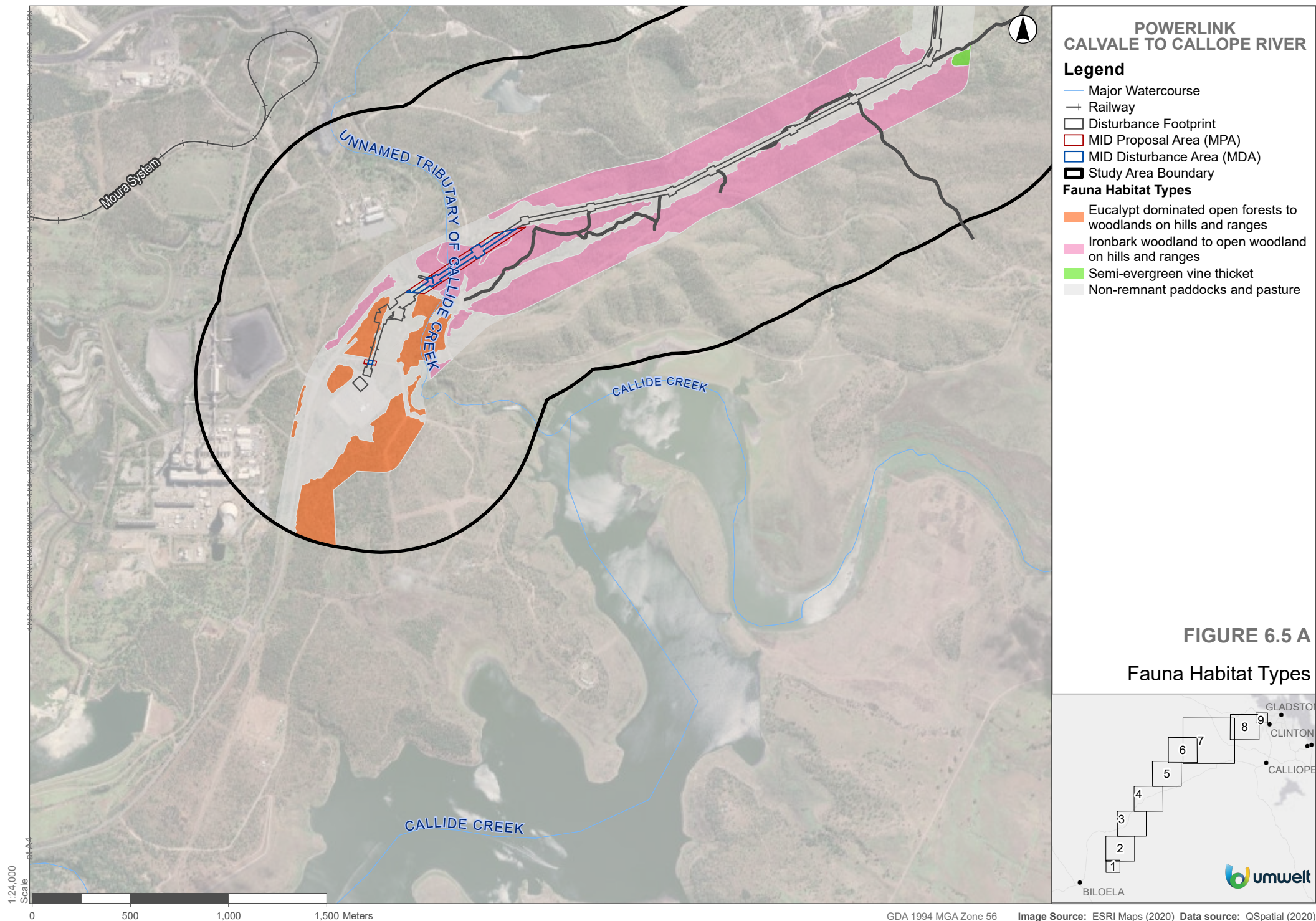
Cleared grassy paddocks resulting from historical and ongoing clearing, the existing powerline, livestock grazing practices and cropping, covered a large portion of the Study Area. Habitat values in this community were limited but included rare small stands of mature trees (often *Acacia harpophylla* or *Eucalyptus* spp.), rare scattered native or exotic shrubs and an abundance of exotic grass in the ground layer where grazing had been restricted (**Photo 6.12**). Occasional patches of native grass species are also present. Other than the dense grass cover, ground layer microhabitat features are largely absent, limited to occasional medium stones on undulating rises.

Although highly disturbed, areas containing scattered eucalypts have been considered as dispersal habitat for koala and foraging habitat for ghost bat. Raptors, granivorous birds and larger mammal species may forage in this habitat. Brown falcons (*Falco berigora*) and black-faced wood-swallows (*Artamus cinereus*) were often observed foraging above open paddocks whilst red-backed fairy-wrens were active in amongst the *Lantana camara*\*

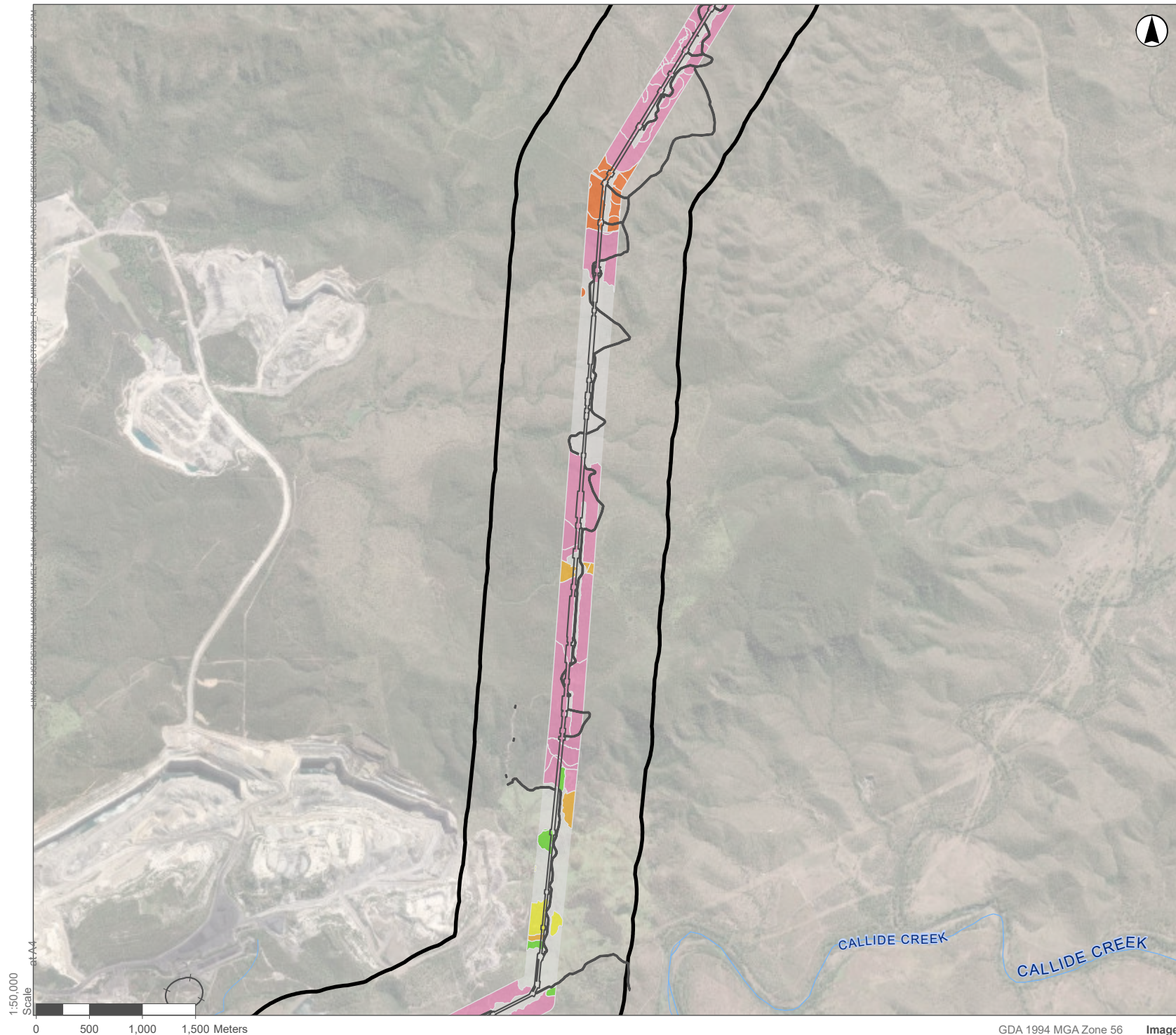


**Photo 6.12 Non-remnant Paddocks**









## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

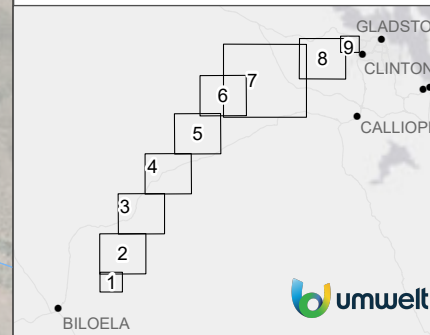
- Major Watercourse
- Railway
- Disturbance Footprint
- ▭ Study Area Boundary

### Fauna Habitat Types

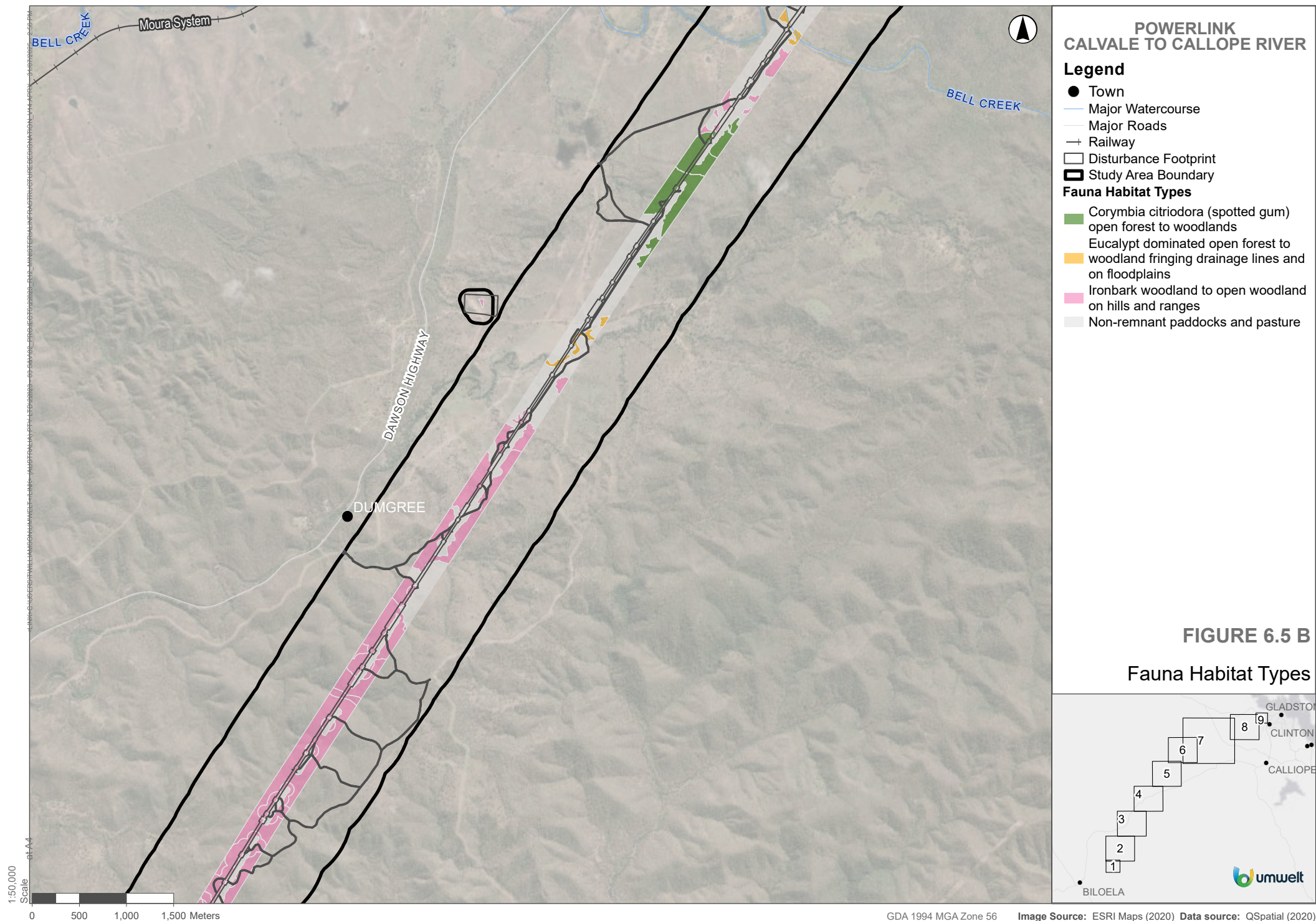
- Acacia dominated regrowth with emergent eucalyptus and corymbia
- Eucalypt dominated open forest to woodland fringing drainage lines and on floodplains
- Eucalypt dominated open forests to woodlands on hills and ranges
- Ironbark woodland to open woodland on hills and ranges
- Semi-evergreen vine thicket
- Non-remnant paddocks and pasture

**FIGURE 6.5 B**

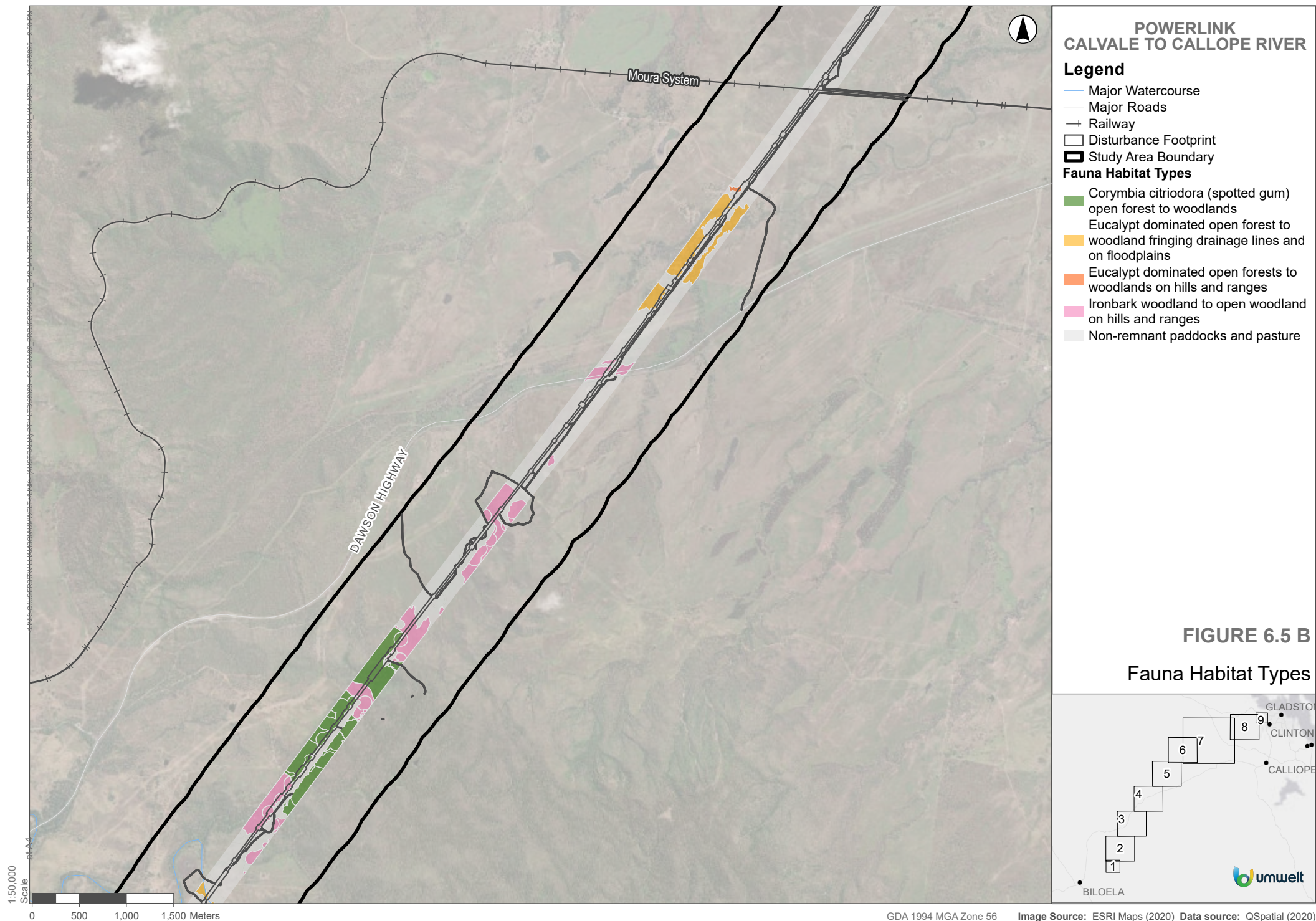
### Fauna Habitat Types



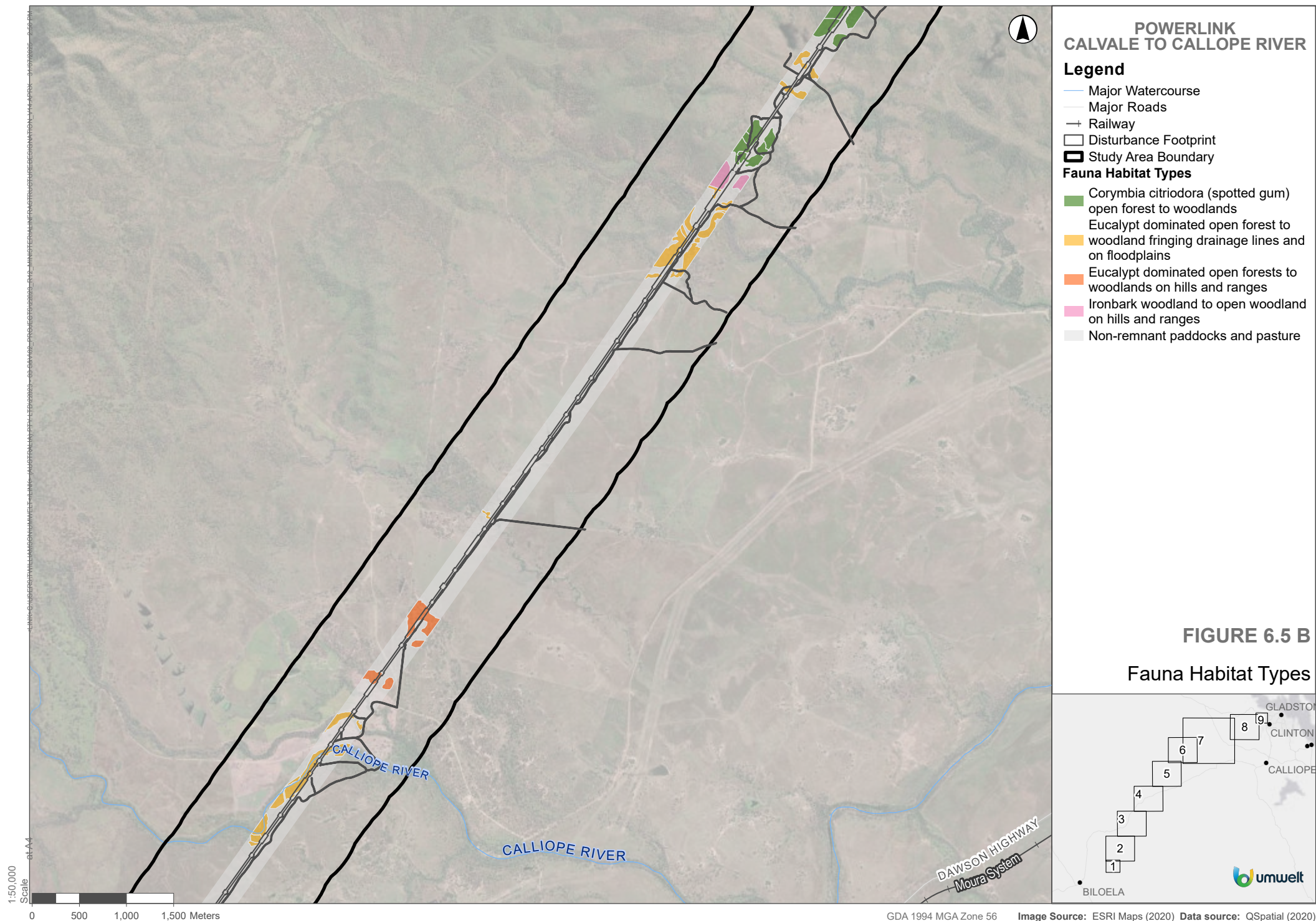




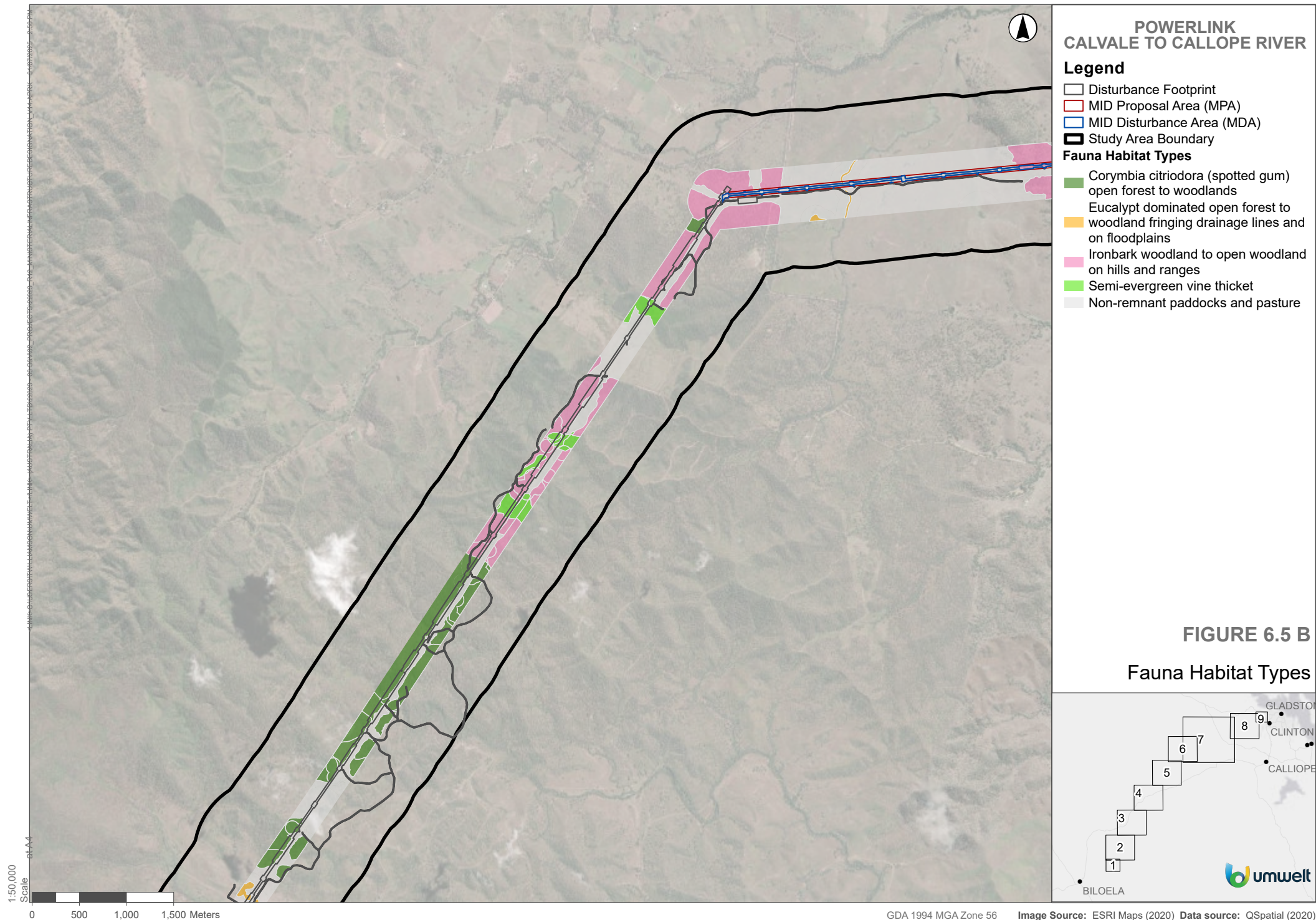




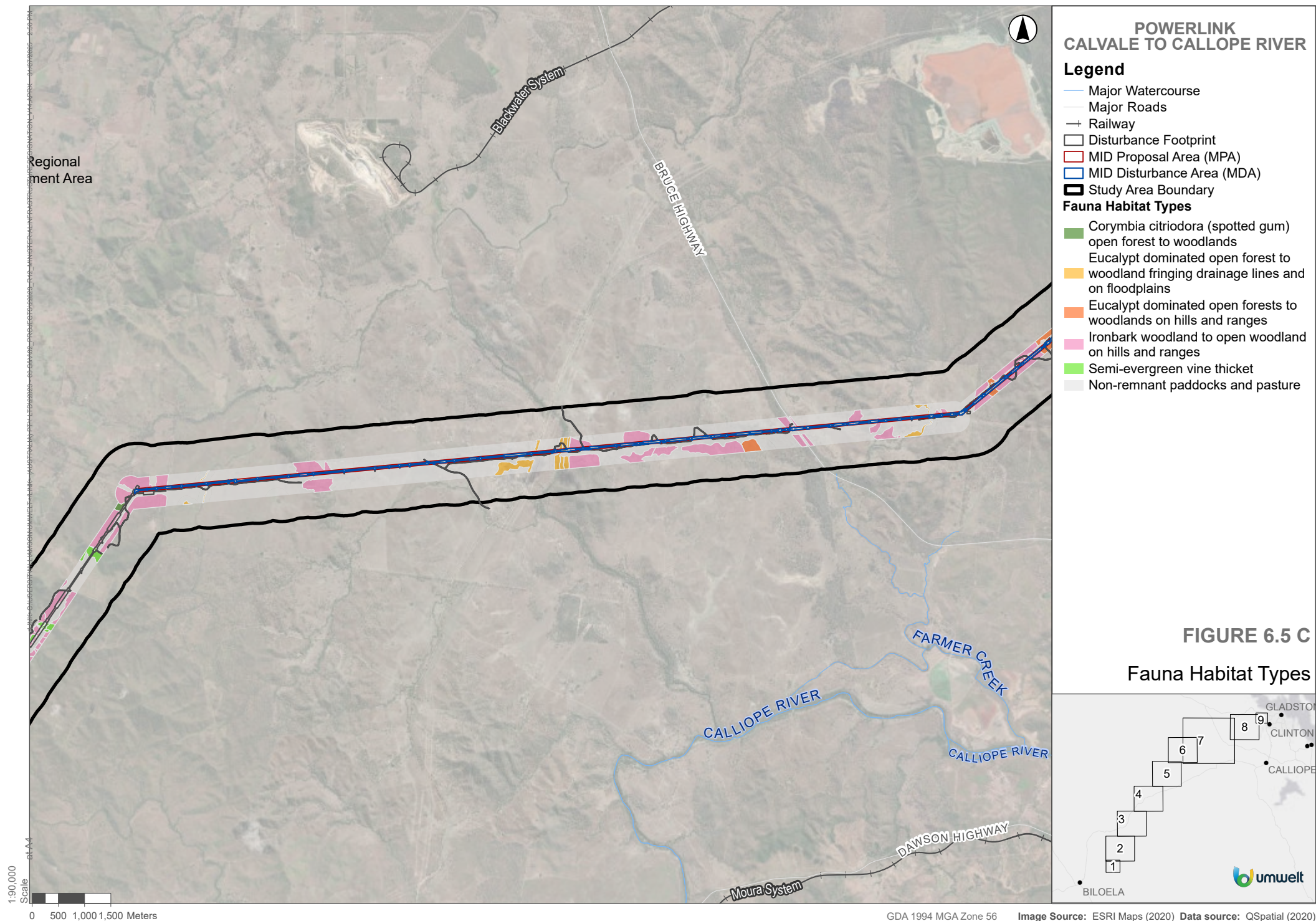




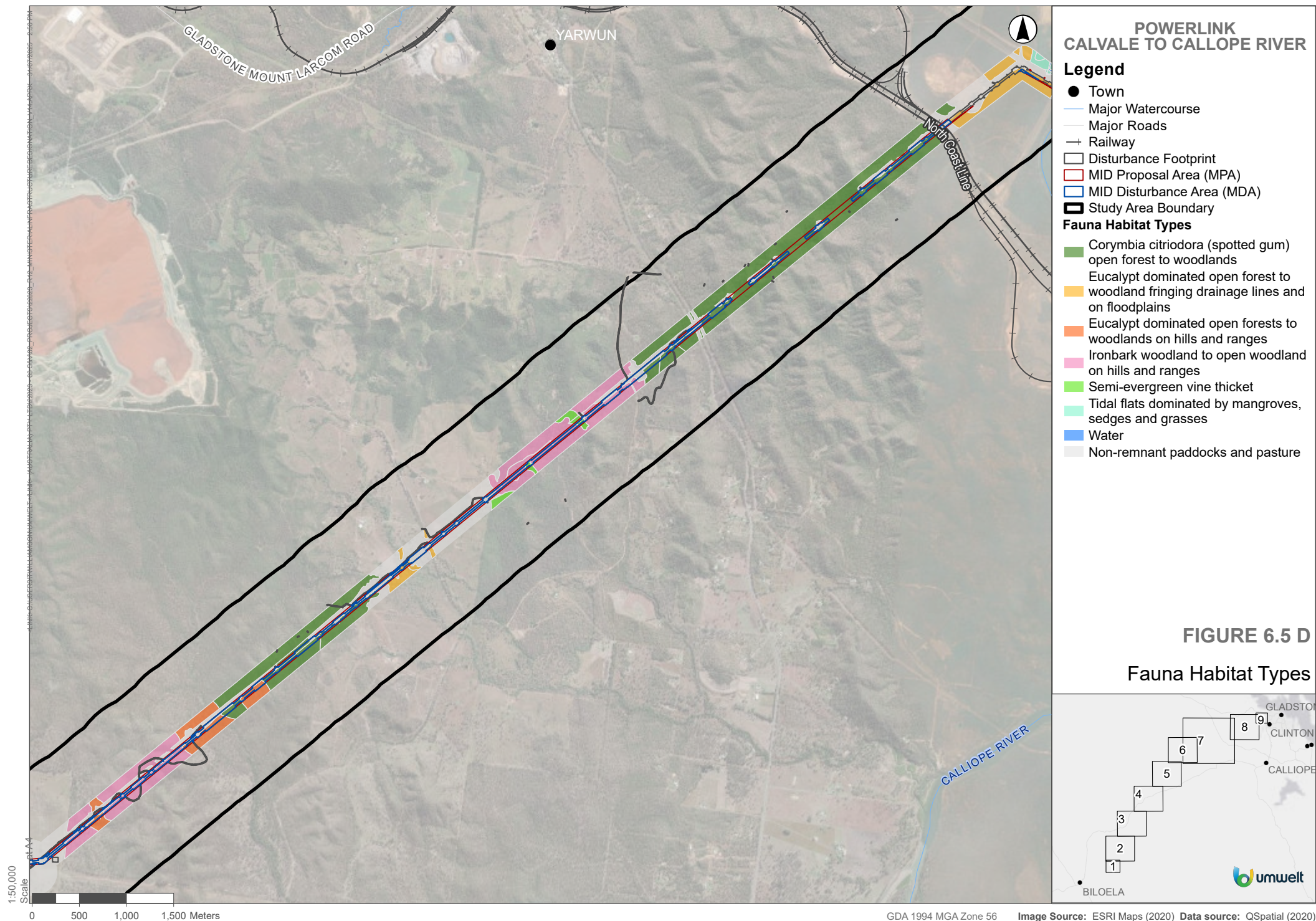
















## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

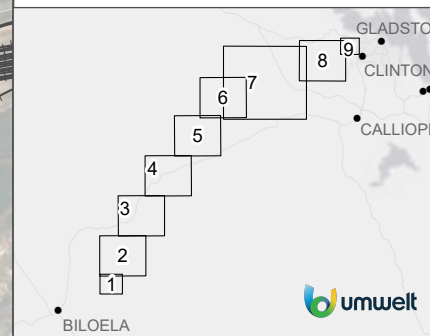
- Major Watercourse
- Major Roads
- Railway
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- Study Area Boundary

### Fauna Habitat Types

- Corymbia citriodora (spotted gum) open forest to woodlands
- Eucalypt dominated open forest to woodland fringing drainage lines and on floodplains
- Intertidal Zone
- Tidal flats dominated by mangroves, sedges and grasses
- Water
- Non-remnant paddocks and pasture

FIGURE 6.5 E

Fauna Habitat Types



1:20,000  
Scale

8144

0 500 1,000 1,500 Meters

GDA 1994 MGA Zone 56

Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

umwelt

## 6.5 Fauna Diversity

A total of 186 fauna species were recorded during the field surveys, comprising 129 birds, 44 mammals, seven reptiles and six amphibians. A total of ten introduced fauna species were recorded within the Study Area which are further discussed in **Section 6.5.5**. The full list of species recorded within the Study Area is provided in **Appendix D**.

### 6.5.1 Birds

A total of 129 birds were recorded during the field survey program. This includes a range of commonly occurring birds of the region occupying various bird groups. Bird groups and example species observed include:

- Birds of prey – brown falcon, nankeen kestrel (*Falco cenchroides*), wedge-tailed eagle (*Aquila audax*), whistling kite (*Haliastur sphenurus*), black kite (*Milvus migrans*) and brahmyn kite (*Haliastur indus*).
- Parrots – Australian king-parrot (*Alisterus scapularis*), red-winged parrot (*Aprosmictus erythropterus*), sulphur-crested cockatoo, red-tailed black cockatoo (*Calyptorhynchus banksii*), pale-headed rosella (*Platycercus adscitus*) and lorikeet species (*Trichoglossus* spp.).
- Nocturnal birds – Australian owl-nightjar (*Aegotheles cristatus*), white-throated nightjar (*Eurostopodus mystacalis*) and tawny frogmouth (*Podargus strigoides*).
- Wetland/waterbirds – Australasian grebe (*Tachybaptus novaehollandiae*), Australian wood duck (*Chenonetta jubata*), black-winged stilt (*Himantopus himantopus*), egrets (*Egretta* spp.) and herons (*Ardea* spp.).
- Woodland birds – including small woodland birds such as varied sittella (*Daphoenositta chrysoptera*), weebill and eastern yellow robin (*Eopsaltria australis*), as well as various honeyeater species and larger woodland birds including grey crowned babbler (*Pomatostomus temporalis*) and pied currawong (*Strepera graculina*).
- Two bird species recorded within the Study Area are listed under the NC Act these being the squatter pigeon (southern) and glossy black cockatoo.

### 6.5.2 Mammals

A total of 44 mammal species were recorded within the Study Area, including five macropod species, 20 bat species, three arboreal mammals, seven ground-dwelling mammals and nine feral species. One mammal species is listed under the EPBC Act: grey-headed flying-fox (*Pteropus poliocephalus*) was observed, which is not listed under the NC Act.

### 6.5.3 Reptiles and Amphibians

Five native amphibians and seven reptile species were recorded during the field surveys. These species include the green treefrog (*Litoria caerulea*), broad palmed rocketfrog (*Litoria latopalmata*), salmon striped frog (*Limnodynastes salmini*), ornate burrowing frog (*Platyplectrum ornatum*) and copper backed broodfrog (*Pseudophryne raveni*). The reptile species include striped snake-eyed skink (*Cryptoblepharus virgatus*), tommy roundhead (*Diporiphora australis*), barking gecko (*Underwoodisaurus milii*), carpet python (*Morelia spilota*) and bearded dragon (*Pogona barbata*).

A single threatened reptile was recorded during the field surveys, this being collared delma (*Delma torquata*). No threatened amphibians were recorded.



## 6.5.4 Threatened Fauna

The desktop assessment identified 64 threatened fauna species as potentially occurring within the Study Area. Of these species, three were confirmed present within the MDA: glossy black cockatoo and collared delma (Section B) and squatter pigeon (southern) in Section C and D. Additionally, five were identified as having a high likelihood of occurring and 23 with a moderate likelihood of occurring within the Study Area (Table 6.9). The completed likelihood of occurrence for all threatened fauna is provided in Appendix B.

**Table 6.9 Threatened Fauna Likelihood of Occurrence**

Scientific Name	Common Name	EPBC Act Status	NC Act Status
<b>Known</b>			
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo		Vulnerable
<i>Delma torquata</i>	Collared delma	Vulnerable	Vulnerable
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	Vulnerable	Vulnerable
<b>High</b>			
<i>Hirundapus caudacutus</i>	White-throated needletail	Vulnerable, Migratory	Vulnerable
<i>Petauroides volans</i>	Greater gilder (southern and central)	Endangered	Endangered
<i>Petaurus australis australis</i>	Yellow-bellied glider (south-eastern)	Vulnerable	Vulnerable
<i>Phascolarctos cinereus</i>	Koala	Endangered	Endangered
<i>Xeromys myoides</i>	Water mouse	Vulnerable	Vulnerable
<b>Moderate</b>			
<i>Arenaria interpres</i>	Ruddy turnstone	Vulnerable, Migratory	Vulnerable
<i>Calidris canutus</i>	Red knot	Vulnerable, Migratory	Vulnerable
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	Vulnerable, Migratory	Vulnerable
<i>Calidris ferruginea</i>	Curlew sandpiper	Critically Endangered, Migratory	Critically Endangered
<i>Calidris tenuirostris</i>	Great knot	Vulnerable, Migratory	Vulnerable
<i>Charadrius leschenaultia</i>	Greater sand plover	Vulnerable, Migratory	Vulnerable
<i>Charadrius mongolus</i>	Lesser sand plover	Endangered, Migratory	Endangered
<i>Gallinago hardwickii</i>	Latham's snipe	Vulnerable, Migratory	Vulnerable
<i>Grantiella picta</i>	Painted honeyeater	Vulnerable	Vulnerable

Scientific Name	Common Name	EPBC Act Status	NC Act Status
<i>Limosa lapponica baueri</i>	Nunivak bar-tailed godwit	Endangered, Migratory	Endangered
<i>Limosa limosa</i>	Black-tailed godwit	Endangered, Migratory	Endangered
<i>Numenius madagascariensis</i>	Eastern curlew	Critically Endangered, Migratory	Critically Endangered
<i>Pluvialis squatarola</i>	Grey plover	Vulnerable, Migratory	Vulnerable
<i>Rostratula australis</i>	Australian painted snipe	Endangered	Endangered
<i>Tringa nebularia</i>	Common greenshank	Endangered, Migratory	Endangered
<i>Turnix melanogaster</i>	Black-breasted button-quail	Vulnerable	Vulnerable
<i>Xenus cinereus</i>	Terek sandpiper	Vulnerable, Migratory	Vulnerable
<i>Macroderma gigas</i>	Ghost bat	Vulnerable	Endangered
<i>Caretta caretta</i>	Loggerhead turtle	Endangered, Migratory	Endangered
<i>Chelonia mydas</i>	Green turtle	Vulnerable, Migratory	Vulnerable
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Vulnerable, Migratory	Endangered
<i>Lepidochelys olivacea</i>	Olive ridley turtle	Endangered, Migratory	Endangered
<i>Natator depressus</i>	Flatback turtle	Vulnerable, Migratory	Vulnerable

Across the field survey program, a total of 11 squatter pigeons (southern) were recorded in the Study Area (Section C and D), on two separate occasions, both in non-remnant vegetation. The largest flock was nine individuals in May 2023, and another two individuals were recorded in March 2023 ().

A single glossy black cockatoo was observed flying down the existing powerline corridor near the Calliope River in April 2023 ().

Two collared delma's were observed along a ridge line in *Eucalyptus crebra* dominated woodland in the southern part of Section B at the end of May 2025 (**Figure 6.6**). The individual collared delma's were observed approximately 90 m apart on a gentle south facing slope which had been burnt in extensive bushfires in 2023.

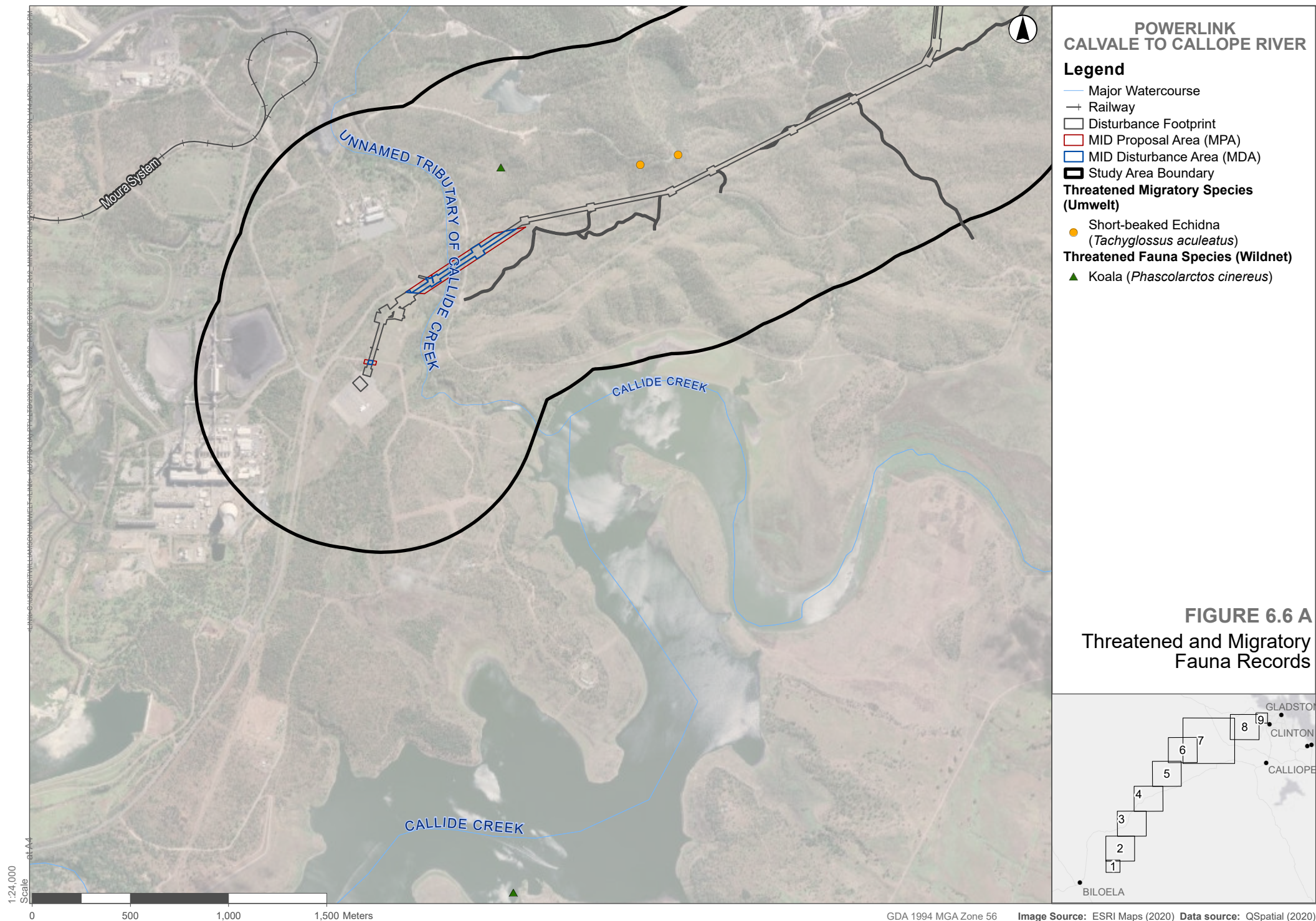


## 6.5.5 Special Least Concern Fauna

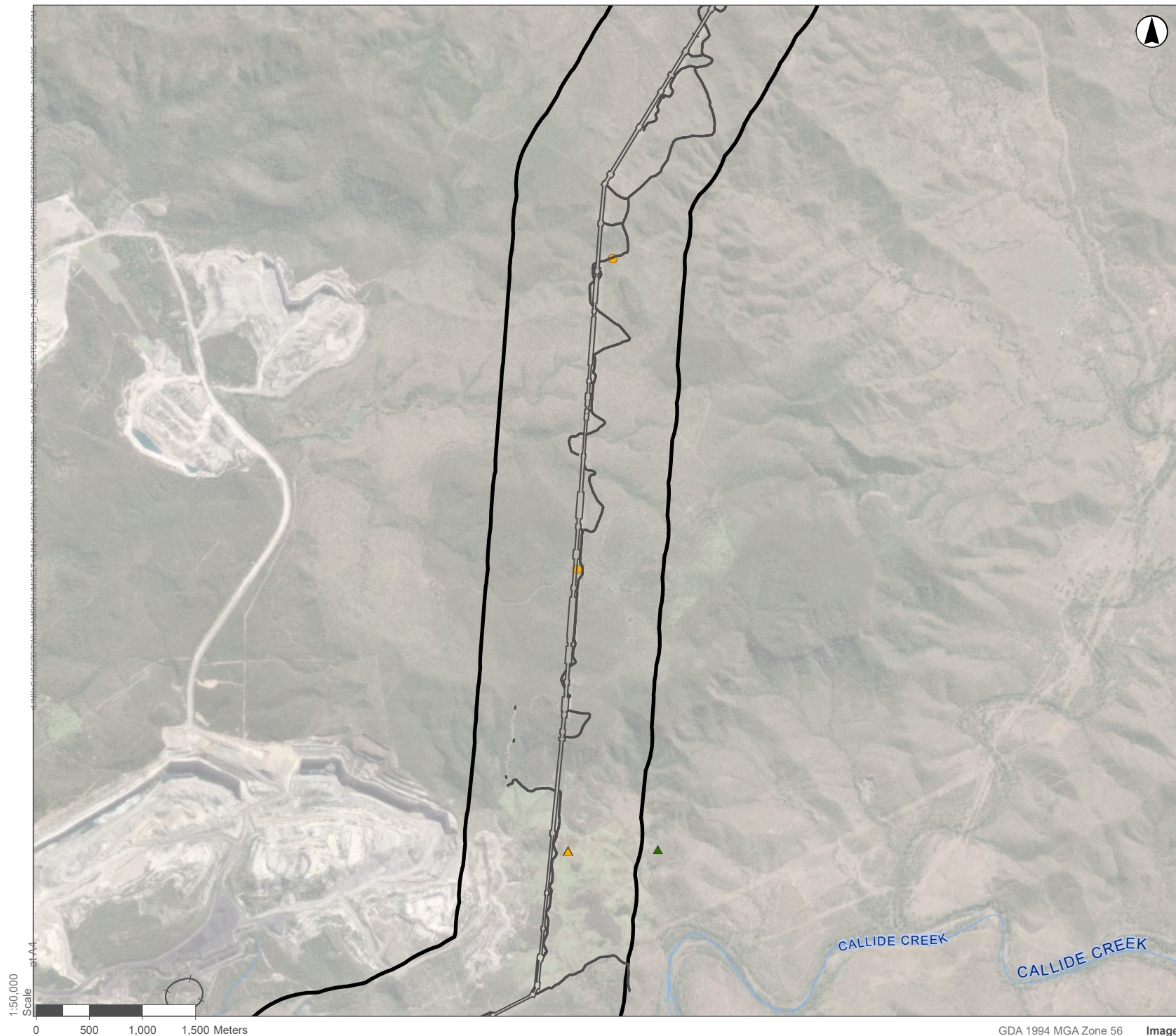
The desktop assessment identified 27 special least concern fauna species as potentially occurring within the Study Area. Of these species, three were confirmed present within the Study Area. Across the field survey program, fork-tailed swifts have been recorded overflying Section D of the MPA on three separate occasions. The largest flock was estimated at 1,000 individuals in March 2023, with 15 individuals recorded in a similar location on the same day, and a further five individuals recorded the following day at a new location (**Figure 6.6**). The short-beaked echidna was observed in several camera traps in Section A, B, C and D within the Study Area but outside of the MDA. Adjacent to the MDA in Section E, a single eastern osprey (*Pandion haliaetus*) was also recorded in March 2023 at the Calliope River substation (**Figure 6.6**). Eleven species were considered to have a moderate likelihood of occurring within the Study Area (**Table 6.10**).

**Table 6.10 Special Least Concern Fauna Likelihood of Occurrence**

Scientific Name	Common Name	EPBC Status	NC Status
<b>Known</b>			
<i>Apus pacificus</i>	Fork-tailed swift	Migratory	Special Least Concern
<i>Pandion haliaetus</i>	Eastern osprey	Migratory	Special Least Concern
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	-	Special Least Concern
<b>Moderate</b>			
<i>Actitis hypoleucos</i>	Common sandpiper	Migratory	Special Least Concern
<i>Calidris melanotos</i>	Pectoral sandpiper	Migratory	Special Least Concern
<i>Calidris ruficollis</i>	Red-necked stint	Migratory	Special Least Concern
<i>Cuculus optatus</i>	Oriental cuckoo	Migratory	Special Least Concern
<i>Limosa lapponica</i>	Bar-tailed godwit	Migratory	Special Least Concern
<i>Limicola falcinellus</i>	Broad-billed sandpiper	Migratory	Special Least Concern
<i>Numenius minutus</i>	Little curlew	Migratory	Special Least Concern
<i>Numenius phaeopus</i>	Whimbrel	Migratory	Special Least Concern
<i>Pluvialis fulva</i>	Pacific golden plover	Migratory	Special Least Concern
<i>Tringa brevipes</i>	Grey-tailed tattler	Migratory	Special Least Concern
<i>Tringa stagnatilis</i>	Marsh sandpiper	Migratory	Special Least Concern







## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

- Major Watercourse
- Railway
- Disturbance Footprint
- ▭ Study Area Boundary

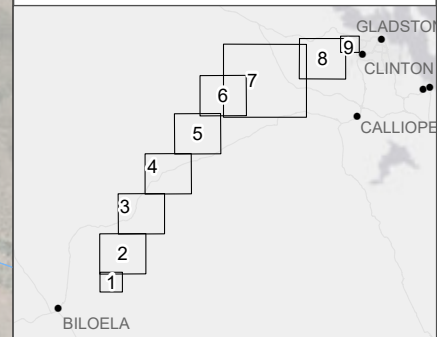
### Threatened Migratory Species (Umwelt)

- Short-beaked Echidna (*Tachyglossus aculeatus*)

### Threatened Fauna Species (Wildnet)

- ▲ Koala (*Phascolarctos cinereus*)
- ▲ Short-beaked Echidna (*Tachyglossus aculeatus*)

**FIGURE 6.6 B**  
Threatened and Migratory  
Fauna Records



Scale  
1:50,000

0 500 1,000 1,500 Meters

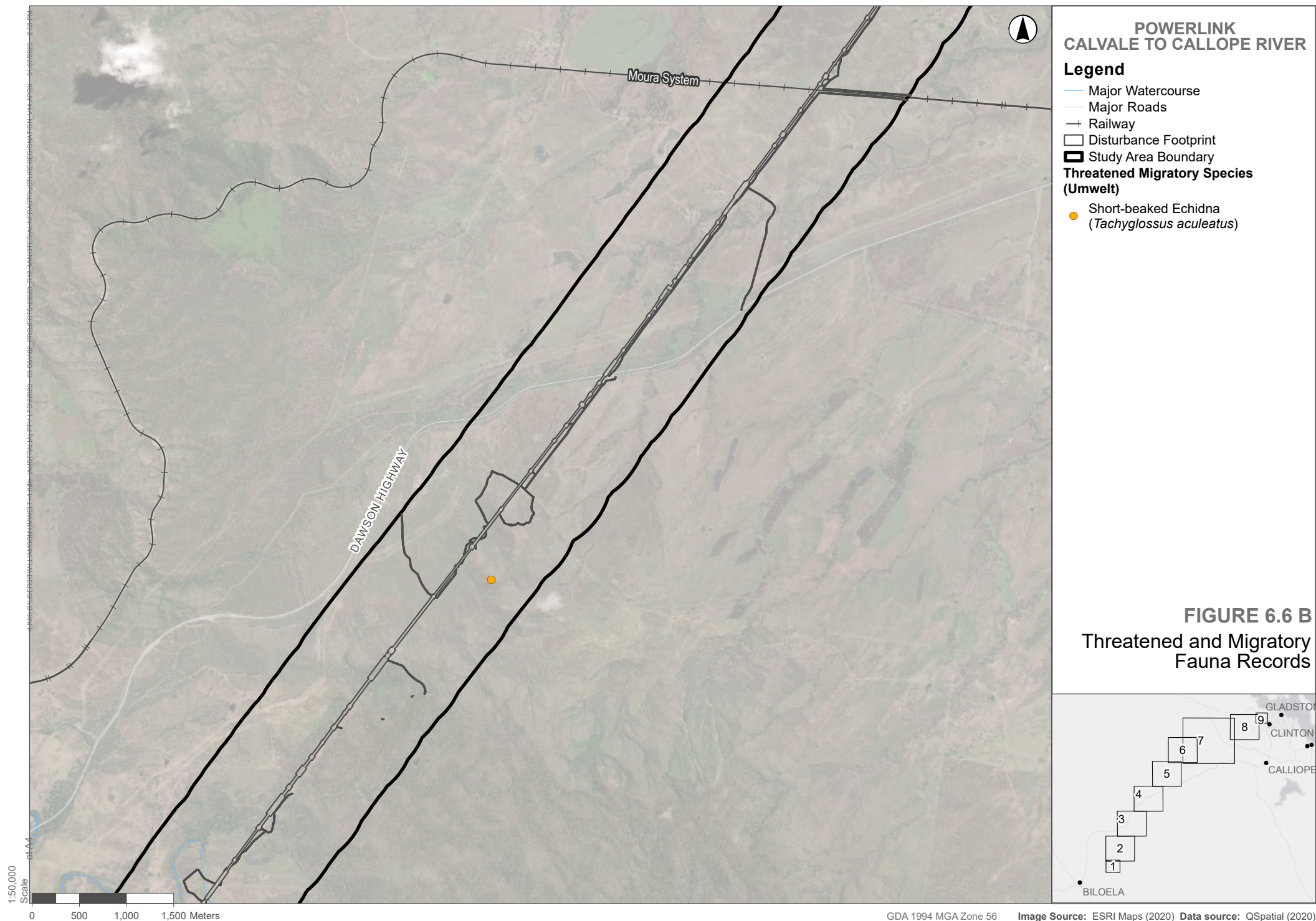
GDA 1994 MGA Zone 56

Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

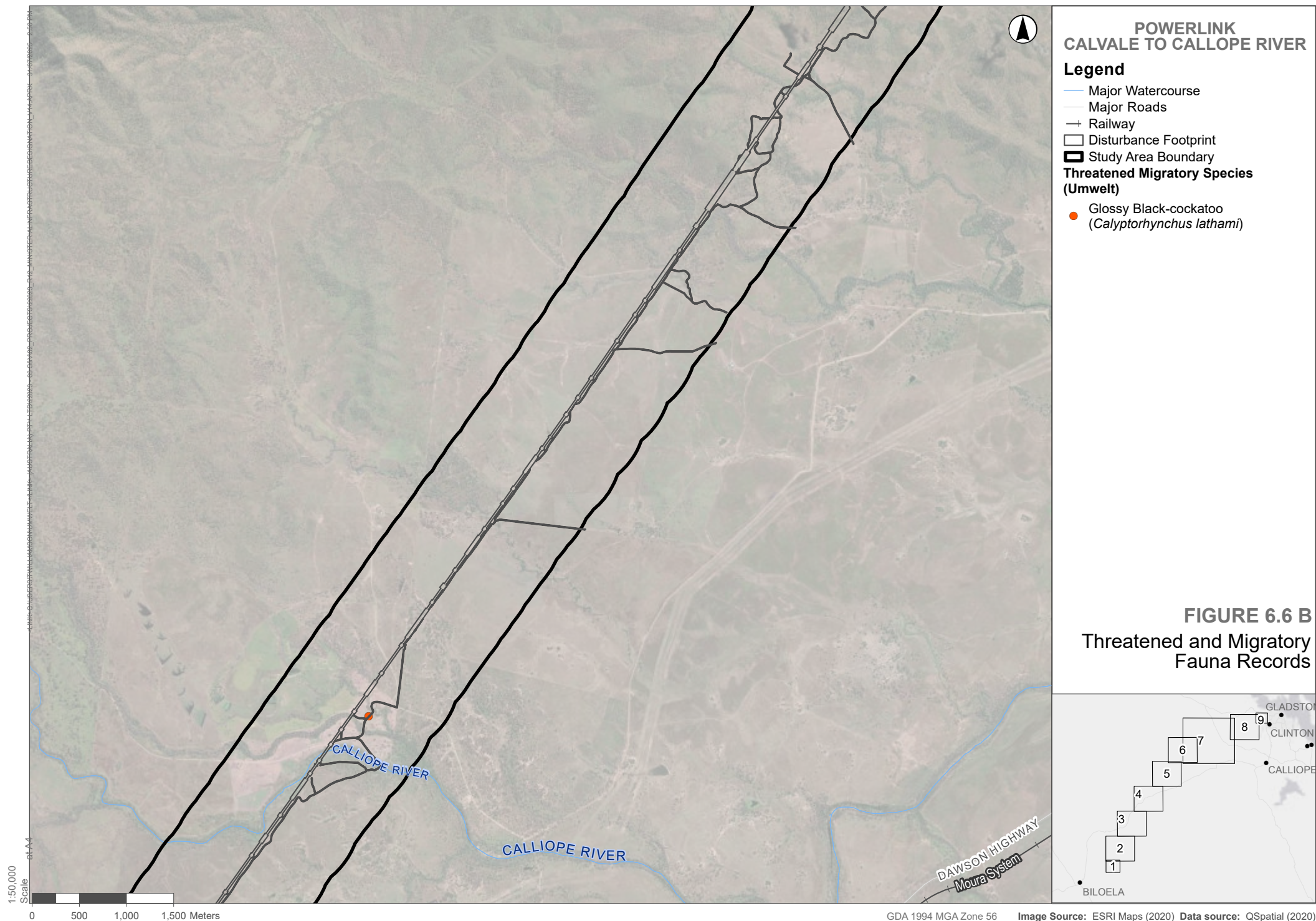




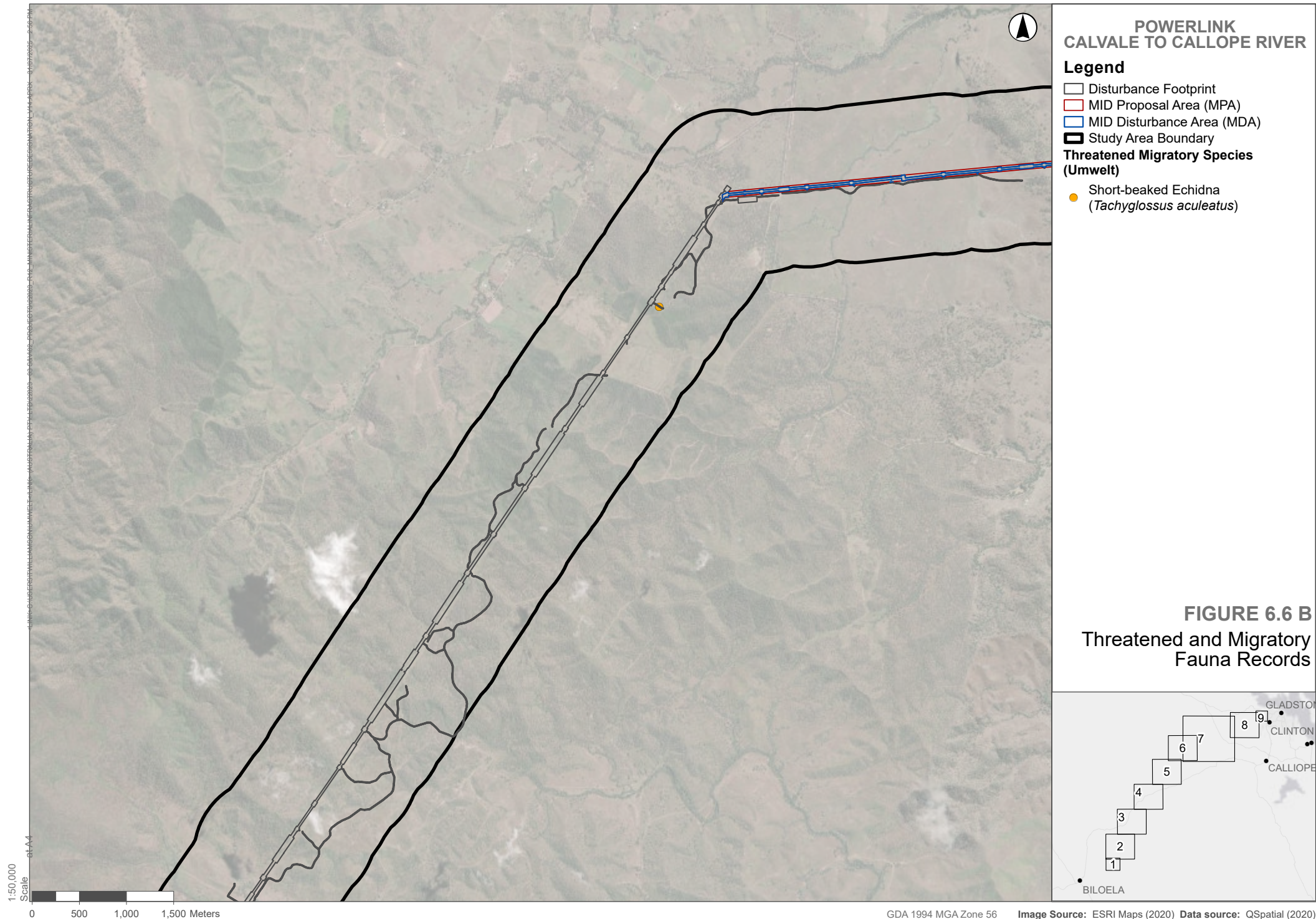




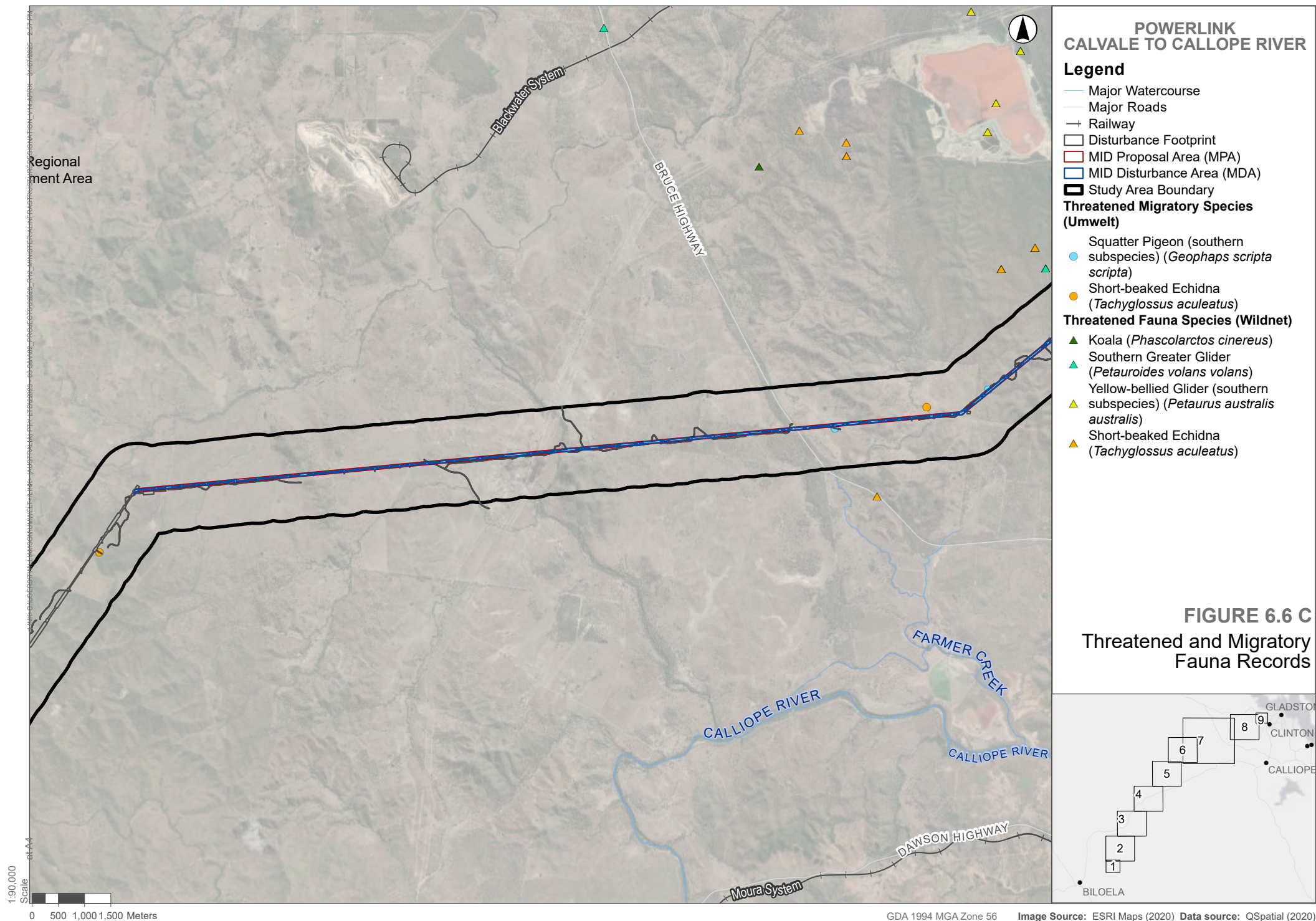




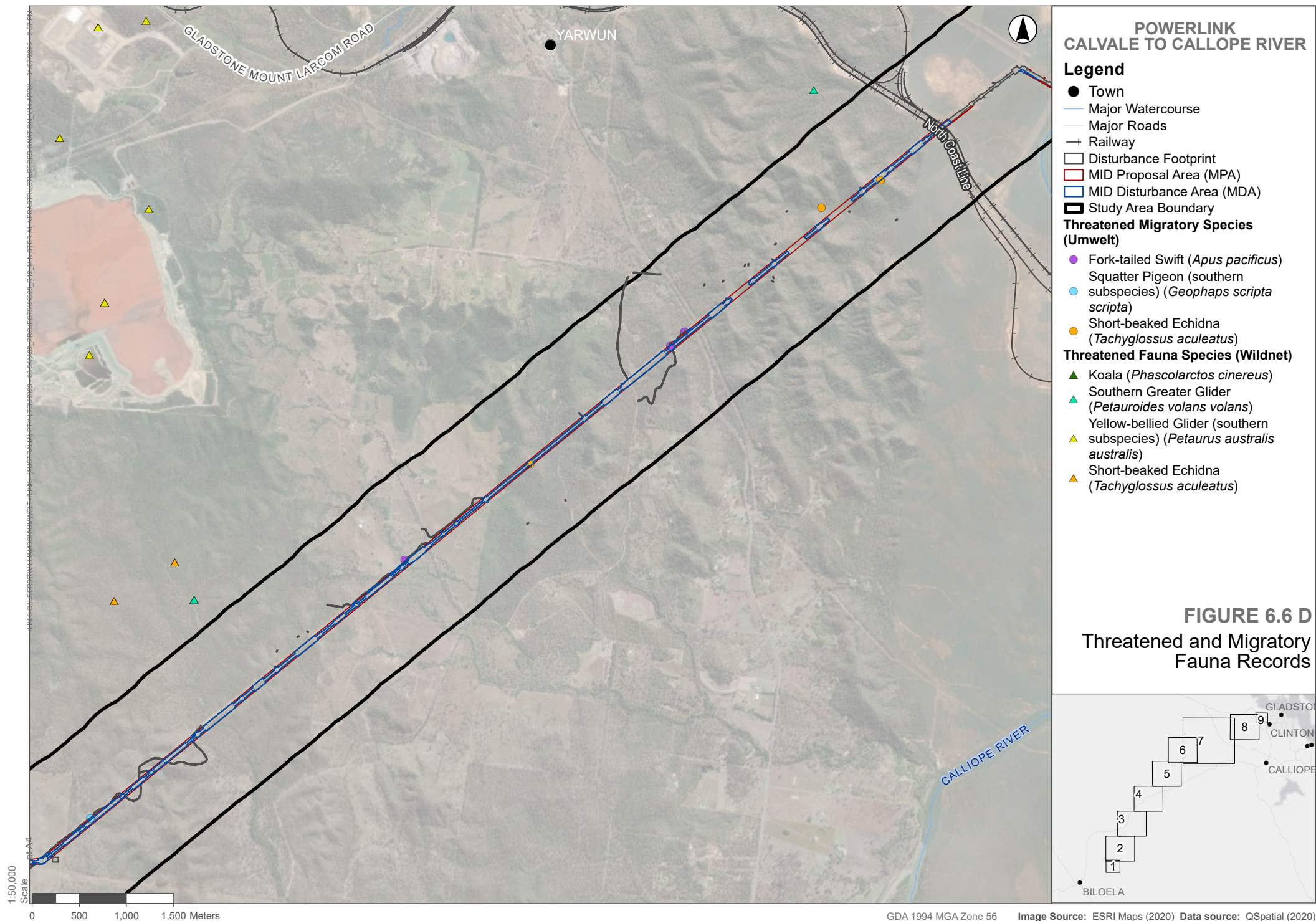
















## POWERLINK CALVALE TO CALLOPE RIVER

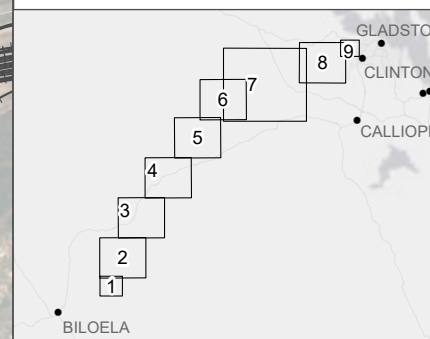
### Legend

- Major Watercourse
- Major Roads
- + Railway
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- ▭ Study Area Boundary

### Threatened Migratory Species (Umwelt)

- Eastern Osprey (*Pandion cristatus*)

**FIGURE 6.6 E**  
Threatened and Migratory  
Fauna Records





## 6.5.6 Introduced Fauna

A total of ten introduced fauna species were identified within the Study Area during the field survey program. Eight of the introduced species are listed under the Biosecurity Act. **Table 6.11** provides a breakdown of the introduced species identified within the Study Area and status under the Biosecurity Act (Department of Agriculture and Fisheries, 2016).

**Table 6.11 Introduced Fauna Record in Study Area**

Scientific Name	Common Name	Queensland Biosecurity Act 2014 status
<i>Bos taurus</i> *	Cattle	-
<i>Felis catus</i> *	Cat	Categories 3, 4, 6 restricted matter
<i>Rattus rattus</i> *	Black rat	-
<i>Sus scrofa</i> *	Pig	Categories 3, 4, 6 restricted matter
<i>Canis lupus familiaris</i> *	Dingo	Categories 3, 4, 6 restricted matter
<i>Canis familiaris</i> *	Dog	Categories 3, 4, 6 restricted matter
<i>Vulpes vulpes</i> *	Red fox	Categories 3, 4, 5, 6 restricted matter
<i>Oryctolagus cuniculus</i> *	Rabbit	Categories 3,4, 6 restricted matter
<i>Rhinella marina</i> *	Cane toad	Invasive biosecurity matter
<i>Mus musculus</i> *	House mouse	Invasive biosecurity matter

## 6.6 Essential Habitat

The essential habitat mapping shows vegetation which is known to support essential habitat values for conservation significant species, or habitat which surrounds point records of conservation significant species.

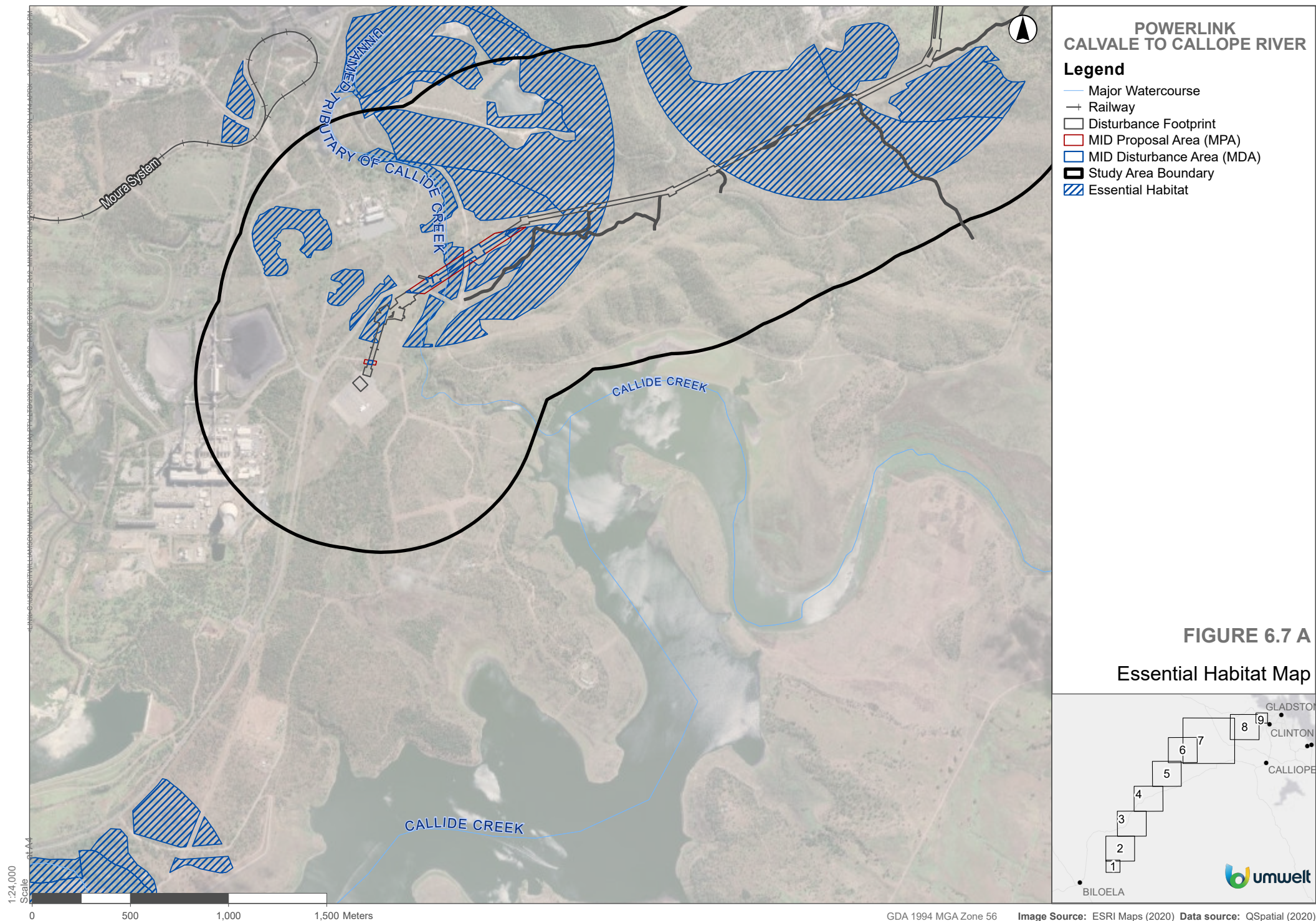
A review of the essential habitat mapping on the Vegetation Management Supporting Map (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, 2024c), was reviewed to identify areas delineated as species essential habitat (**Table 6.12**). This review determined that essential habitat is present within the MPA in multiple locations in the north in association with Calliope River and Calliope Conservation Park, and in the south, in and around Callide Timber Reserve (**Figure 6.7**). Essential habitat within the MPA is mapped for a variety of species, including but not limited to squatter pigeon (southern subspecies), lesser sand plover, central greater glider, powerful owl, koala, water mouse, and *Cossinia australiana*. A full list of species can be found in **Table 6.12**. A total of 23.0 ha of essential habitat occurs within the MPA whilst 14.5 ha is present within the MDA.

**Table 6.12 Essential Habitat Occurrence by MPA Lot and Plan**

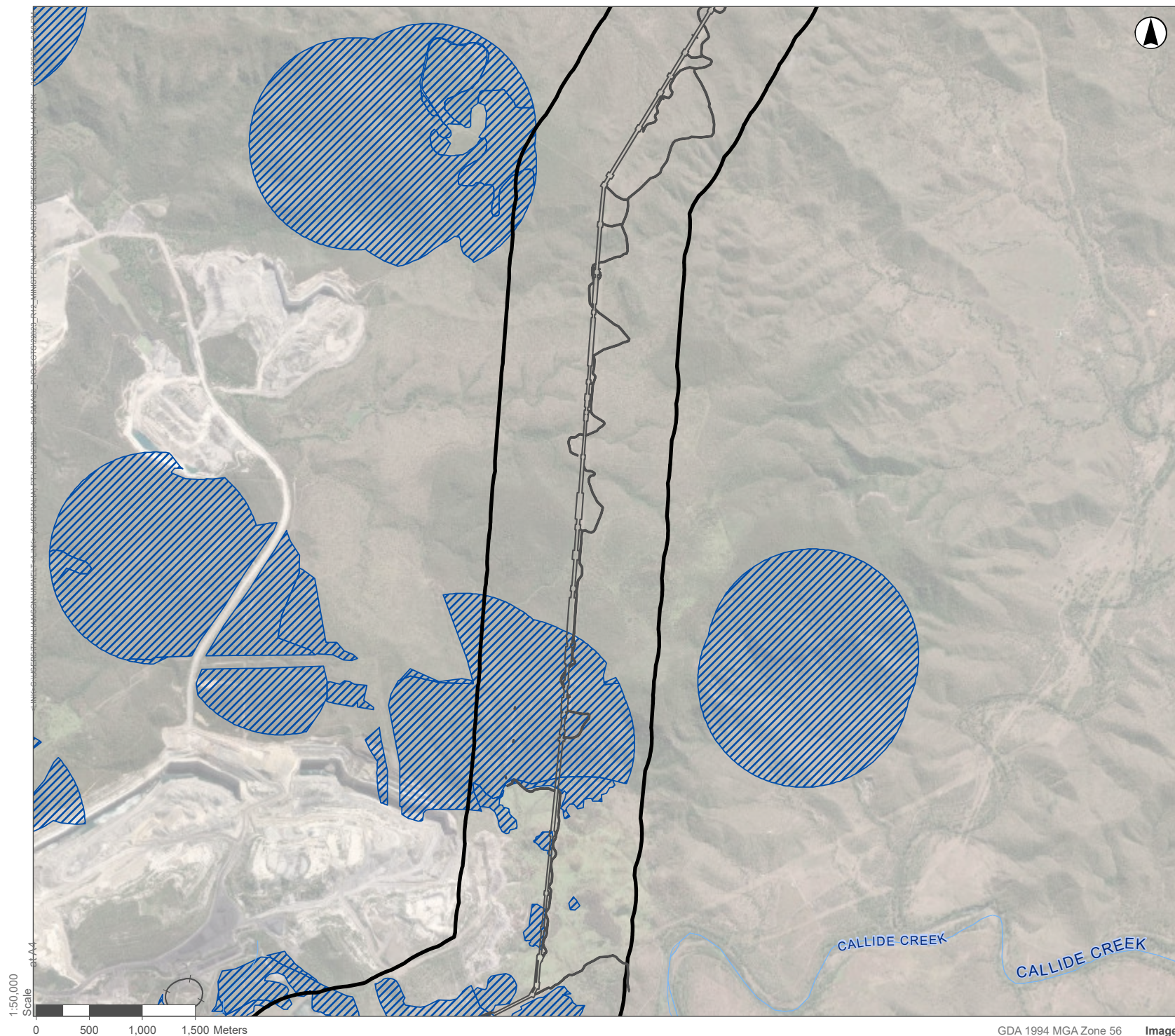
Lot and Plan	Section	Type of Essential Habitat
-23.85304, 151.18359 No lot and plan, adjacent to Calliope River substation	E	water mouse, koala, powerful owl, lesser sand plover, eastern curlew, Western Alaskan bar-tailed godwit, curlew sandpiper, lesser sand plover, central greater glider

Lot and Plan	Section	Type of Essential Habitat
-23.85415, 151.18516 No lot and plan, adjacent to Calliope River substation	E	water mouse, koala, powerful owl, lesser sand plover
113CTN799	E	water mouse, koala, powerful owl, lesser sand plover
15RP848908	A	<i>Cycas megacarpa</i>
365FTY1160	D	central greater glider, squatter pigeon (southern subspecies), koala, powerful owl, <i>Dansiea elliptica</i>
3RP606484	D	<i>Atalaya collina</i> , <i>Dansiea elliptica</i>
3RP863615	D	powerful owl, central greater glider
3SP338512	E	water mouse, koala, powerful owl, lesser sand plover, central greater glider
40CTN157	D	powerful owl
45CTN198	D	yellow-bellied glider (southern subspecies), black-breasted button-quail, powerful owl
475SP238753	C	squatter pigeon (southern subspecies)
479CL40215	C	koala, squatter pigeon (southern subspecies)
4SP103557	A	<i>Cycas megacarpa</i>
4SP200839	D	yellow-bellied glider (southern subspecies), powerful owl, squatter pigeon (southern subspecies), central greater glider
4SP218648	E	water mouse, koala, powerful owl, lesser sand plover, central greater glider
51SP239654	D	koala, powerful owl, central greater glider
541AP22498	D	koala, powerful owl, central greater glider
6SP103557	A	<i>Cycas megacarpa</i>
6SP200837	D	yellow-bellied glider (southern subspecies), black-breasted button-quail, powerful owl, central greater glider, squatter pigeon (southern subspecies)
ACTN1581	D	powerful owl
ARP611046	D	powerful owl
ARP611047	D	powerful owl
ARP612744	D	<i>Dansiea elliptica</i>
ARP612789	D	central greater glider, squatter pigeon (southern subspecies)
ARP612790	D	powerful owl, central greater glider, squatter pigeon (southern subspecies)
ARP612793	C	squatter pigeon (southern subspecies)
ASP165453	D	water mouse, koala, powerful owl, lesser sand plover, central greater glider
BRP612792	C	squatter pigeon (southern subspecies)
BRP620399	D	central greater glider, squatter pigeon (southern subspecies)
EMTCTN799	E	water mouse, koala, powerful owl, lesser sand plover
JRP615739	E	water mouse, koala, powerful owl, lesser sand plover









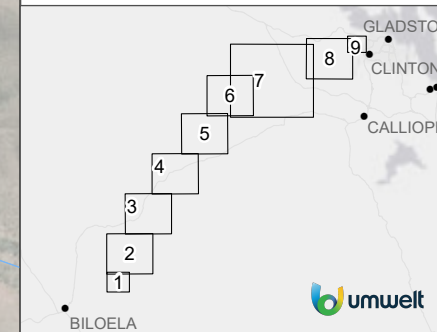
## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

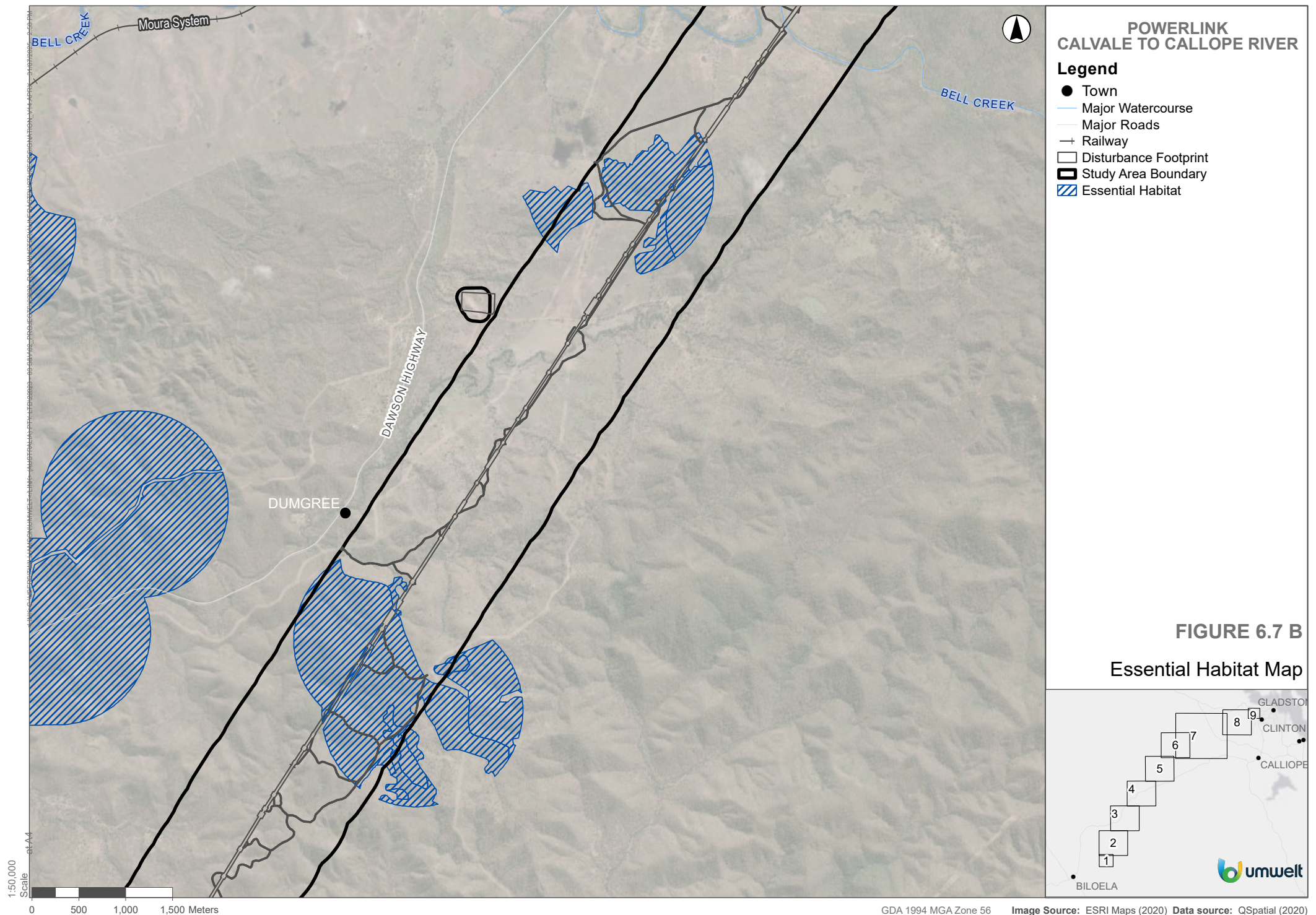
- Major Watercourse
- Railway
- Disturbance Footprint
- Study Area Boundary
- Essential Habitat

**FIGURE 6.7 B**

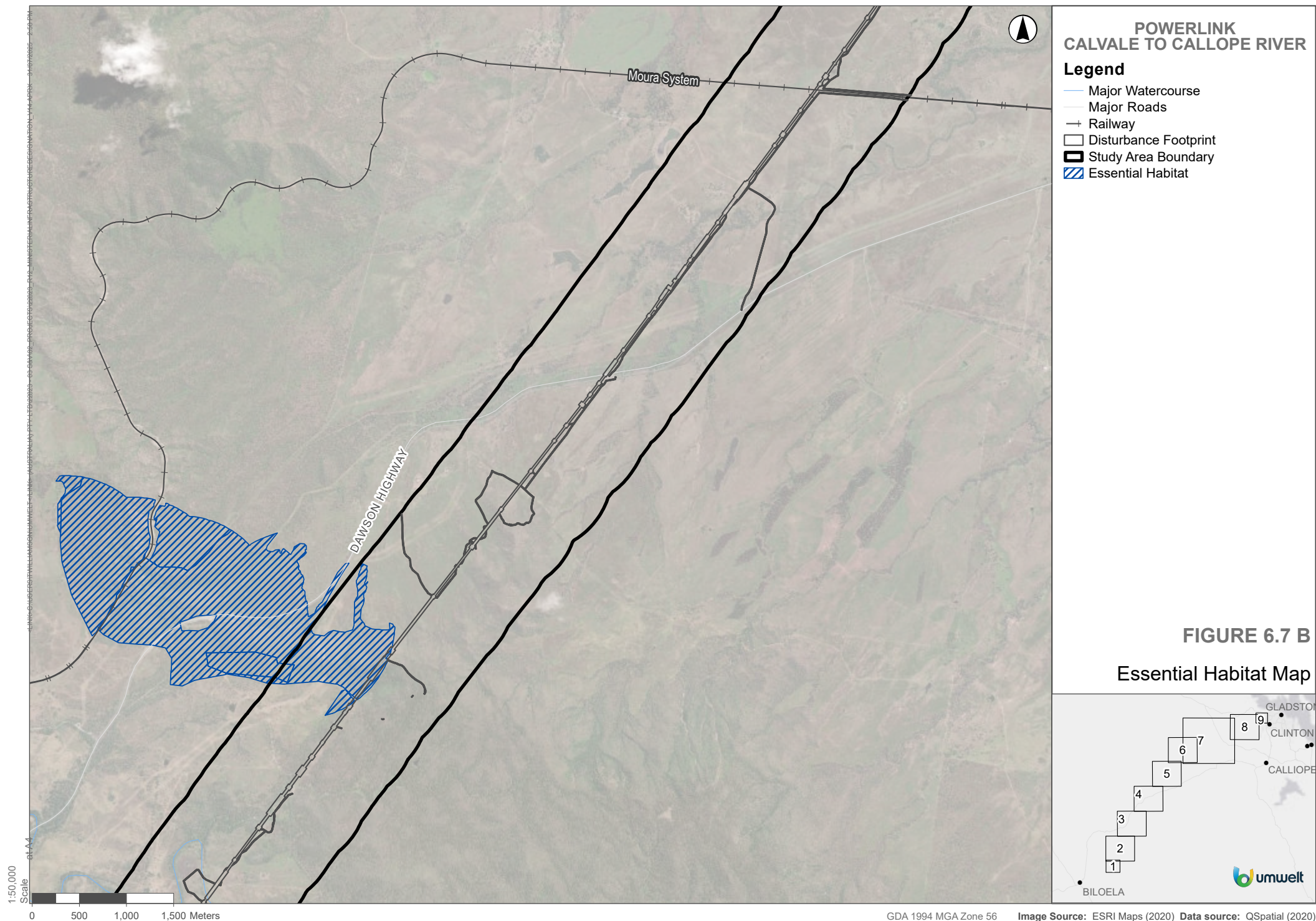
### Essential Habitat Map



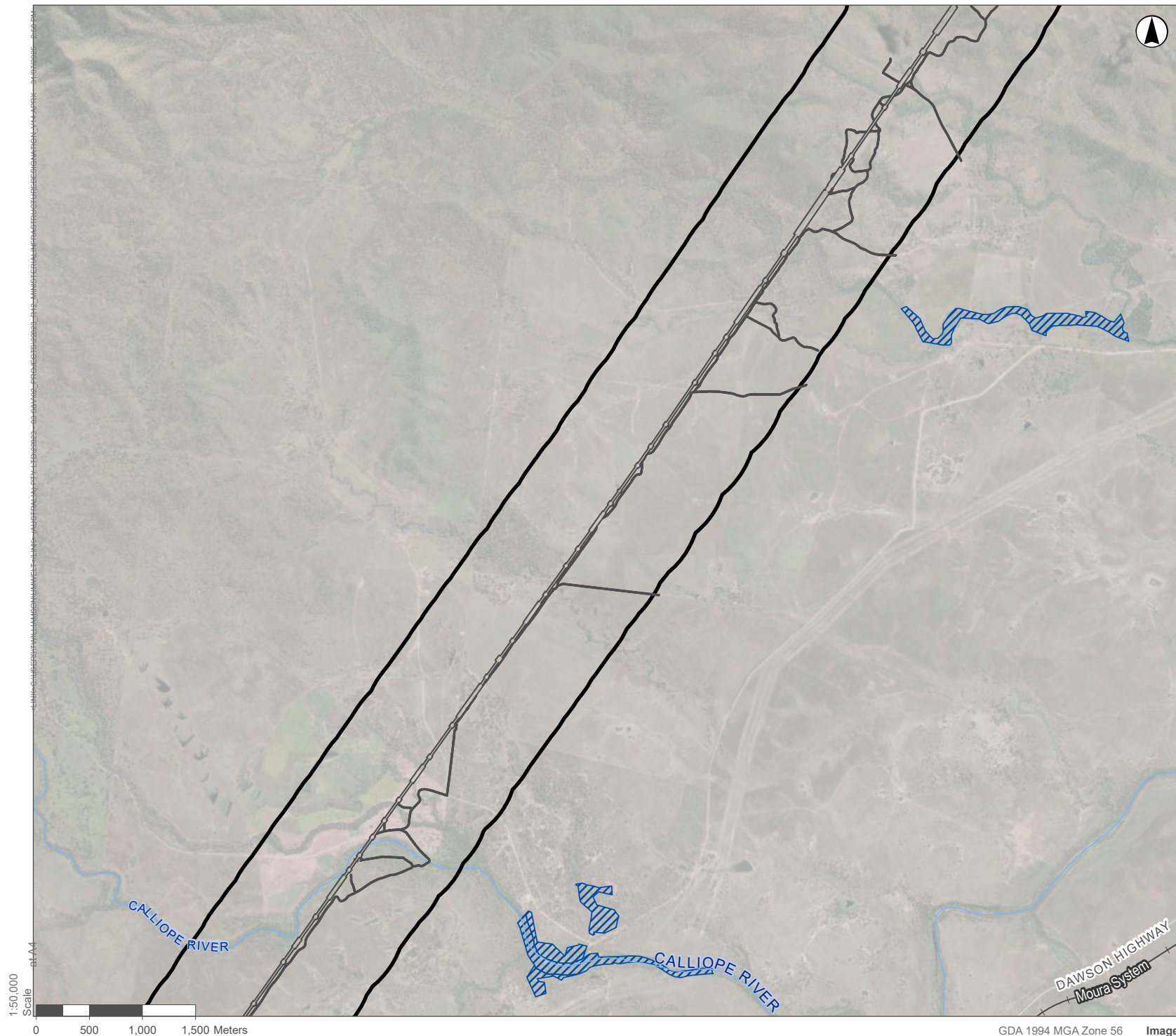












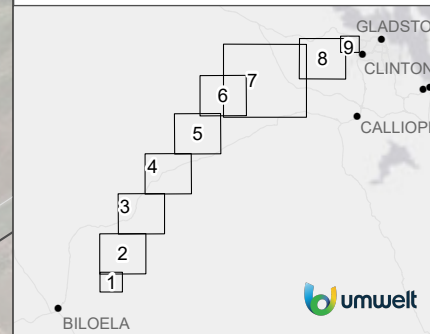
## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

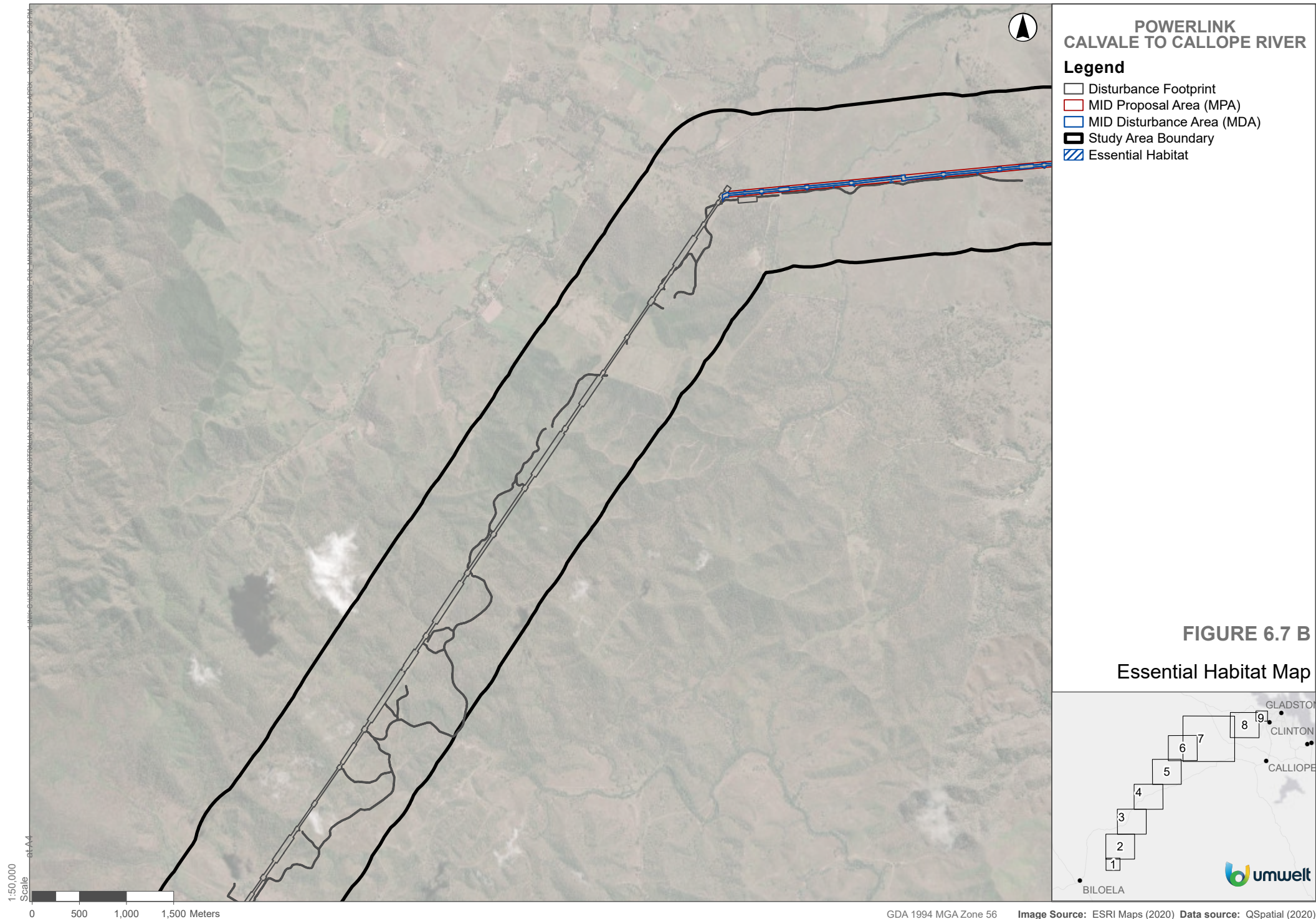
- Major Watercourse
- Major Roads
- + Railway
- Disturbance Footprint
- Study Area Boundary
- Essential Habitat

**FIGURE 6.7 B**

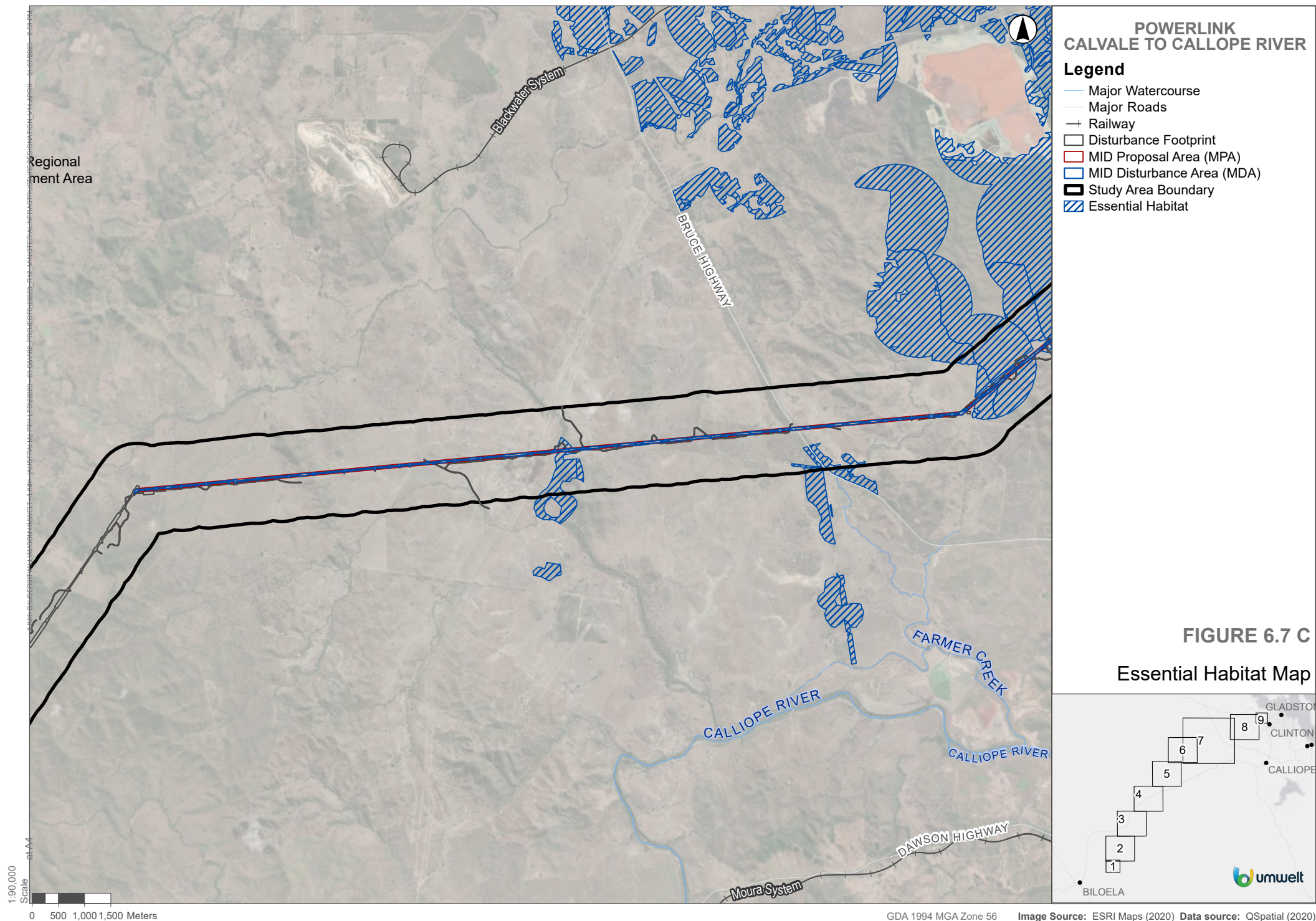
**Essential Habitat Map**



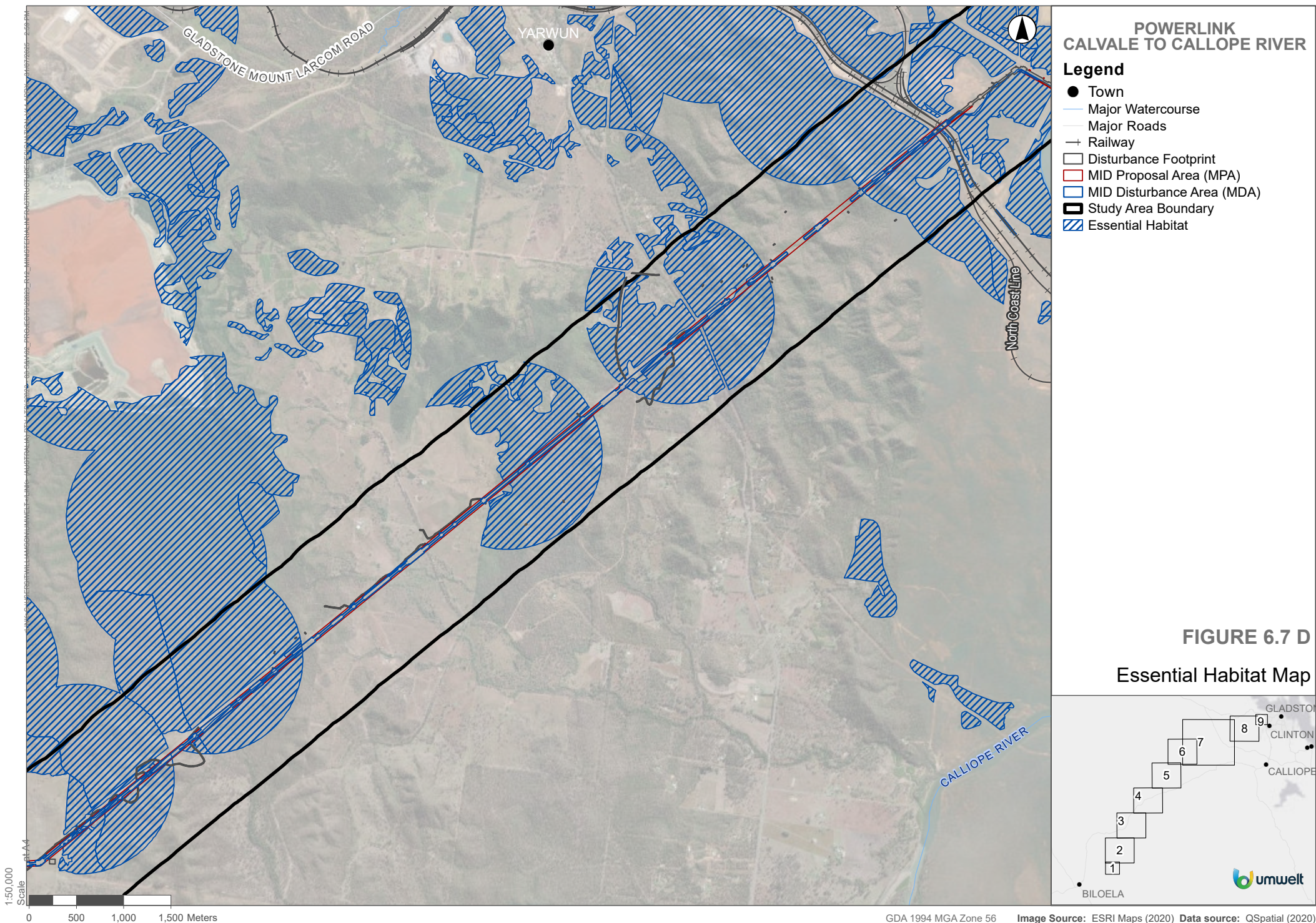




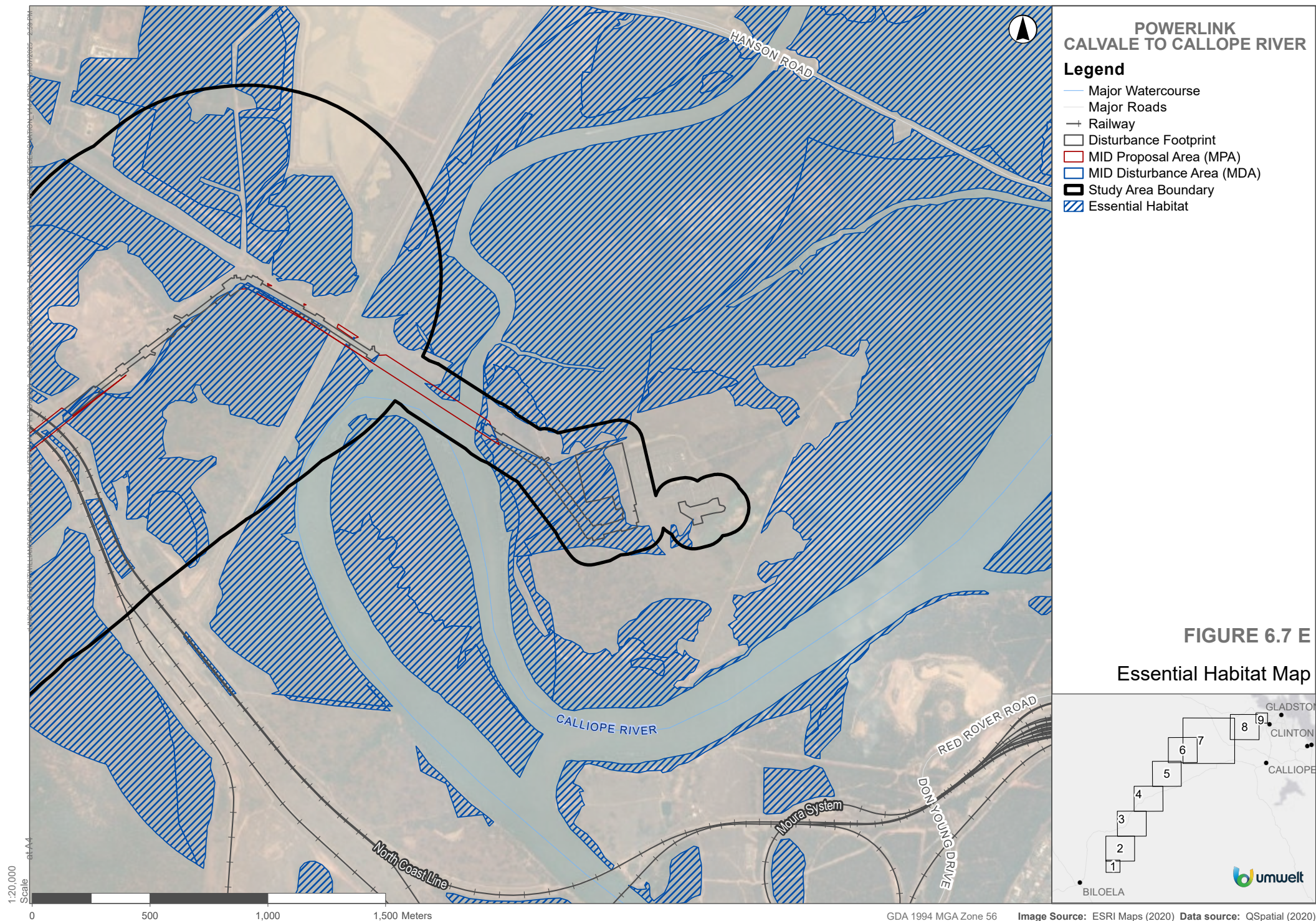














## 6.7 Aquatic Values

Queensland 1:100,000 wetland areas waterway mapping (Department of the Environment, Tourism, Science and Innovation, 2024) and Vegetation management watercourse and drainage feature map (1:100,000 and 1:250,000) (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development, 2024) depicts wetland and watercourse features throughout each section of the Study Area (**Figure 6.8**).

The largest system within the Study Area is the Calliope River, located within Section E. This is a stream order 7 watercourse that drains directly into the Pacific Ocean. The river's main tributaries include Oakey, Paddock, Double and Larcom creeks, the latter of which crosses the Disturbance Footprint and is categorised as a stream order 6 watercourse. The Calliope River crosses the Disturbance Footprint again further upstream, near Mount Alma in Section B, where it is categorised as a stream order 5. Numerous stream order 1-4 waterways intersect the Disturbance Footprint; however, these typically lack surface flow for the majority of the year.

During the field survey program, watercourses showed evidence of disturbance, often associated with cattle impacts including pugging, erosion and the presence of weeds e.g. *Lantana camara*\* and *Megathyrsus maximus*\*. During brief periods of inundation, the aquatic environments within the Study Area may support assemblages of aquatic fauna such as native fish, freshwater and saltwater crustaceans and common amphibians.

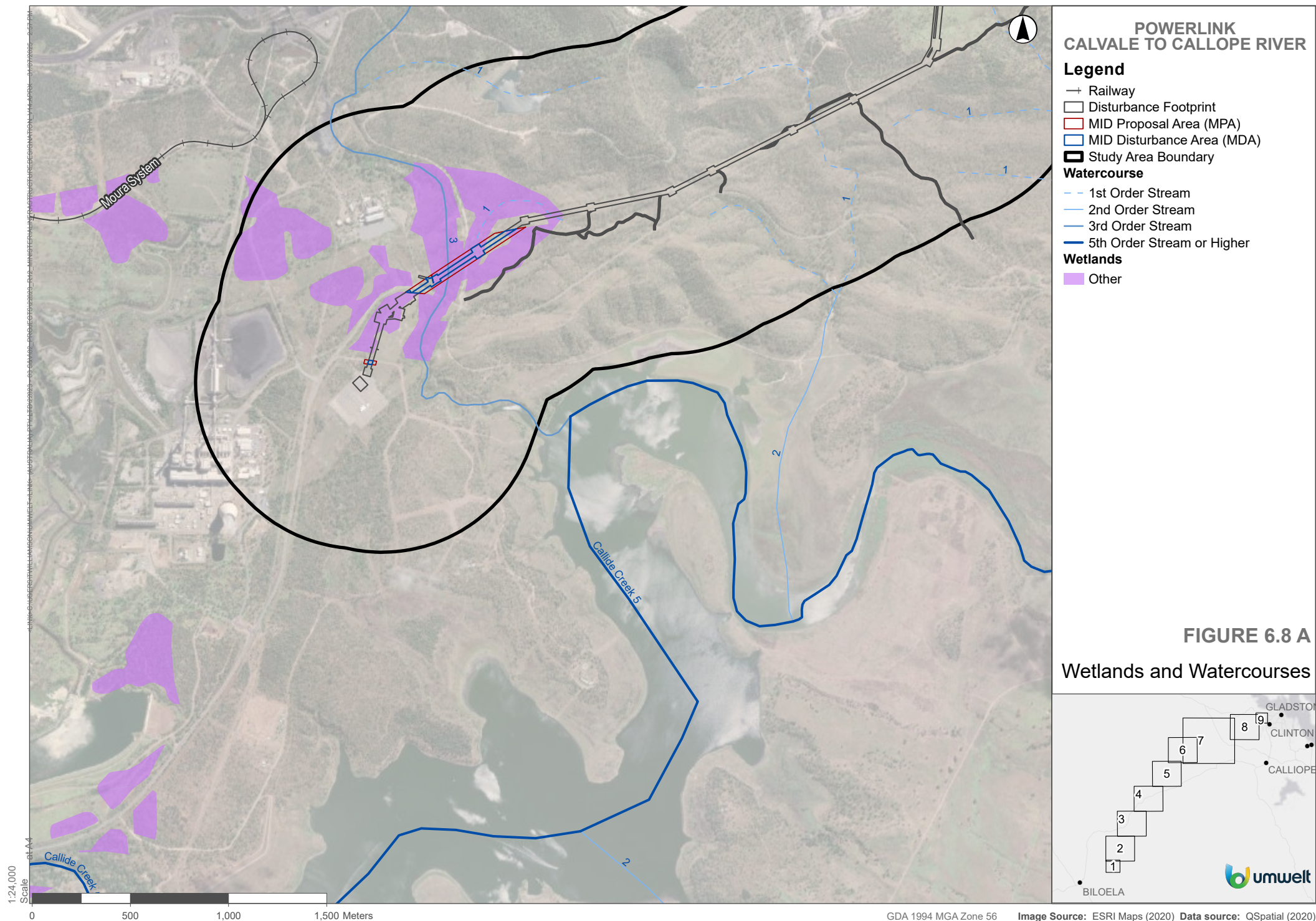
While numerous wetland areas are mapped within the Study Area, few wetlands intersect the Disturbance Footprint. At the Calliope River Substation, intertidal wetlands occur with both mangrove and saltpan vegetation.

Freshwater farm dams throughout the Study Area occur in varying sizes and contain varying levels of water. Section D of the MPA has modified water storage within the Disturbance Footprint. Most dams have muddy banks with low dense shrubs, whilst two dams have some fringing aquatic vegetation including rushes and sedges (**Photo 6.13**). Dams with fringing vegetation provide potential habitat for Australian painted snipe (*Rostratula australis*) and Latham's snipe (*Gallinago hardwickii*). All farm dams assessed during the field surveys have shallow sloping muddy banks that have been heavily impacted by cattle and pigs (*Sus scrofa*\*). Common waterbird species such as Australasian grebe, hardhead (*Aythya australis*) and Australian wood duck were recorded utilising the dams, whilst red-browed finch (*Neochmia temporalis*), brown honeyeater (*Lichmera indistincta*) and double-barred finch (*Taeniopygia bichenovii*) were recorded utilising the vegetation surrounding the dams.

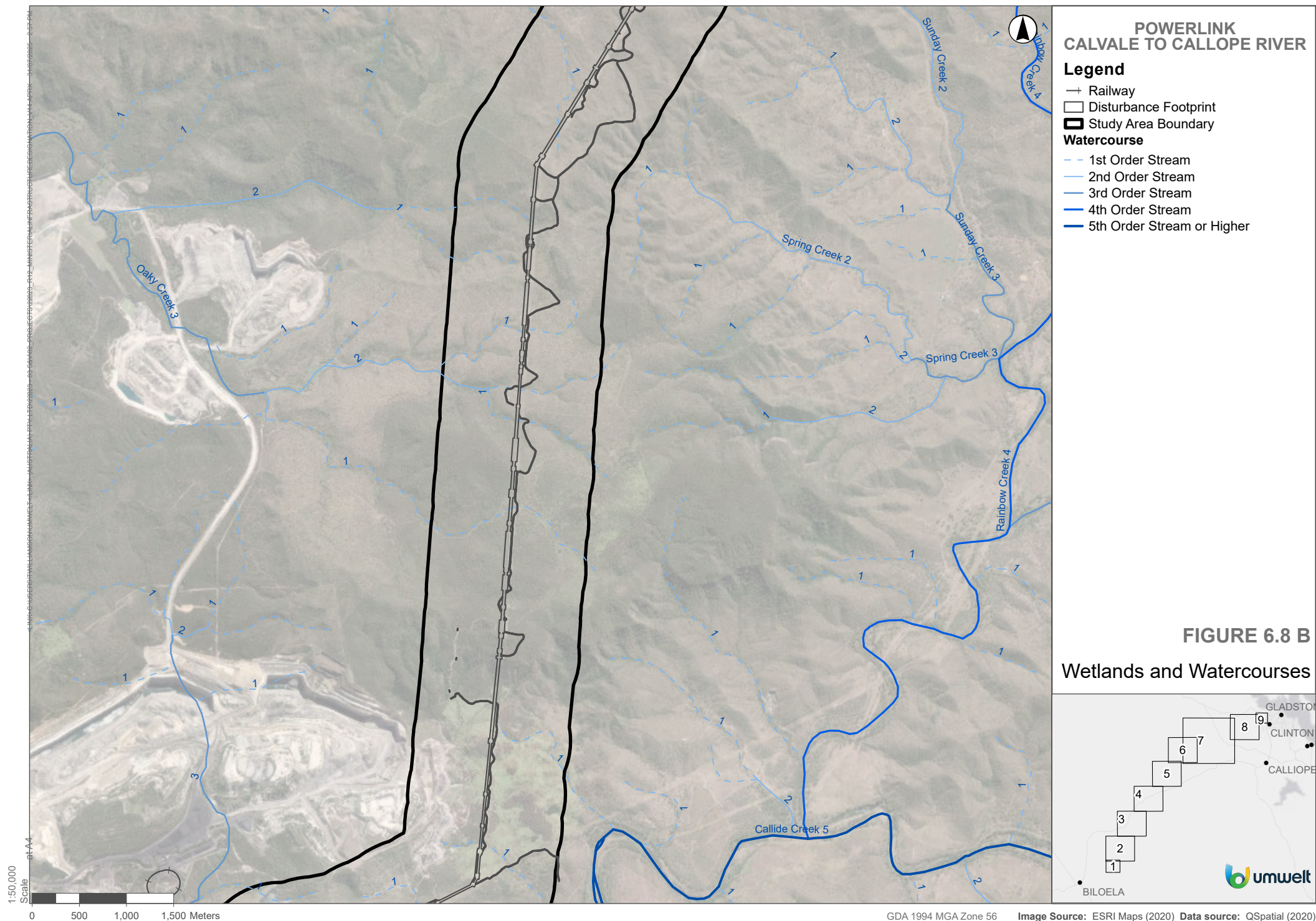


**Photo 6.13 Farm Dams**

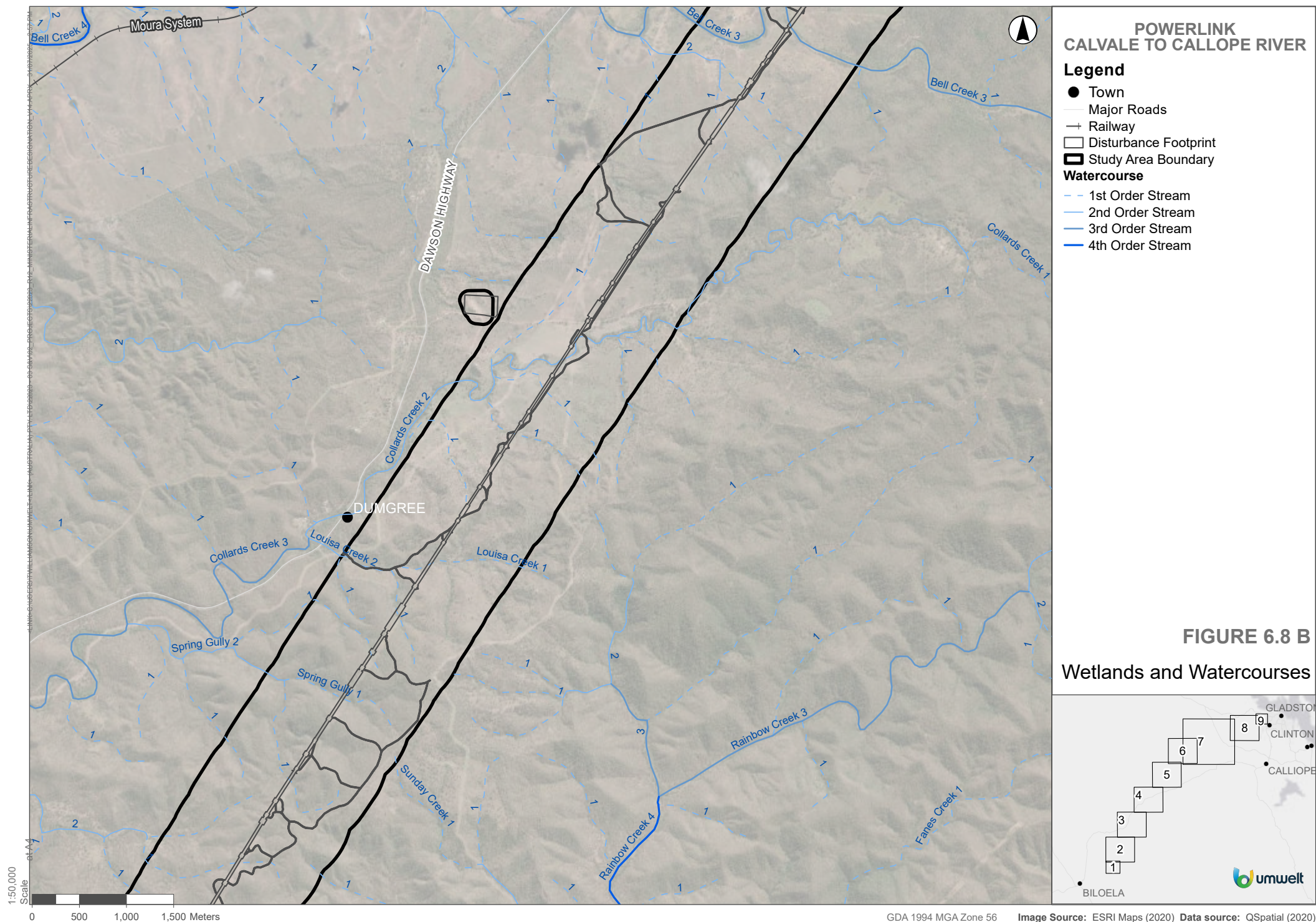




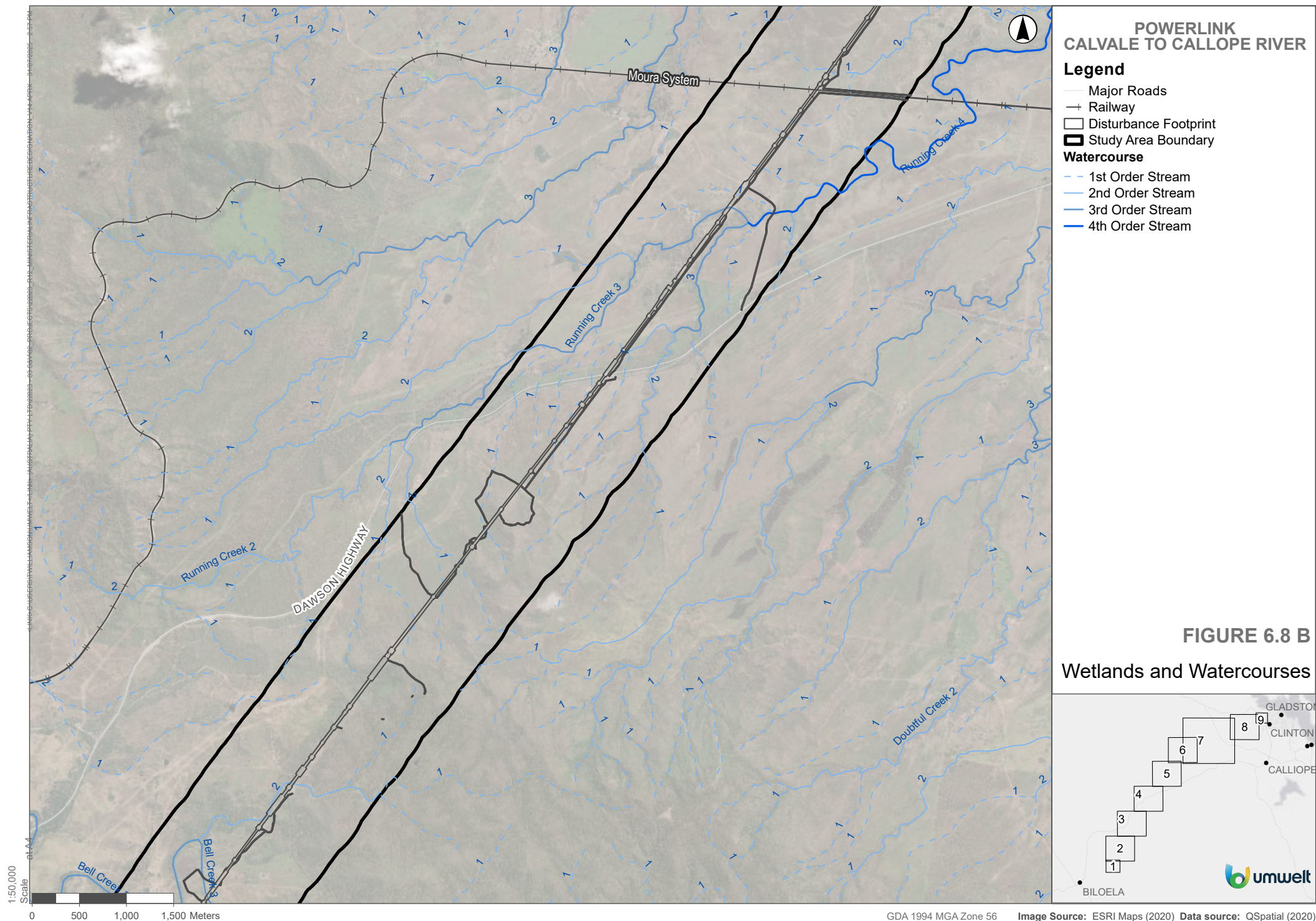




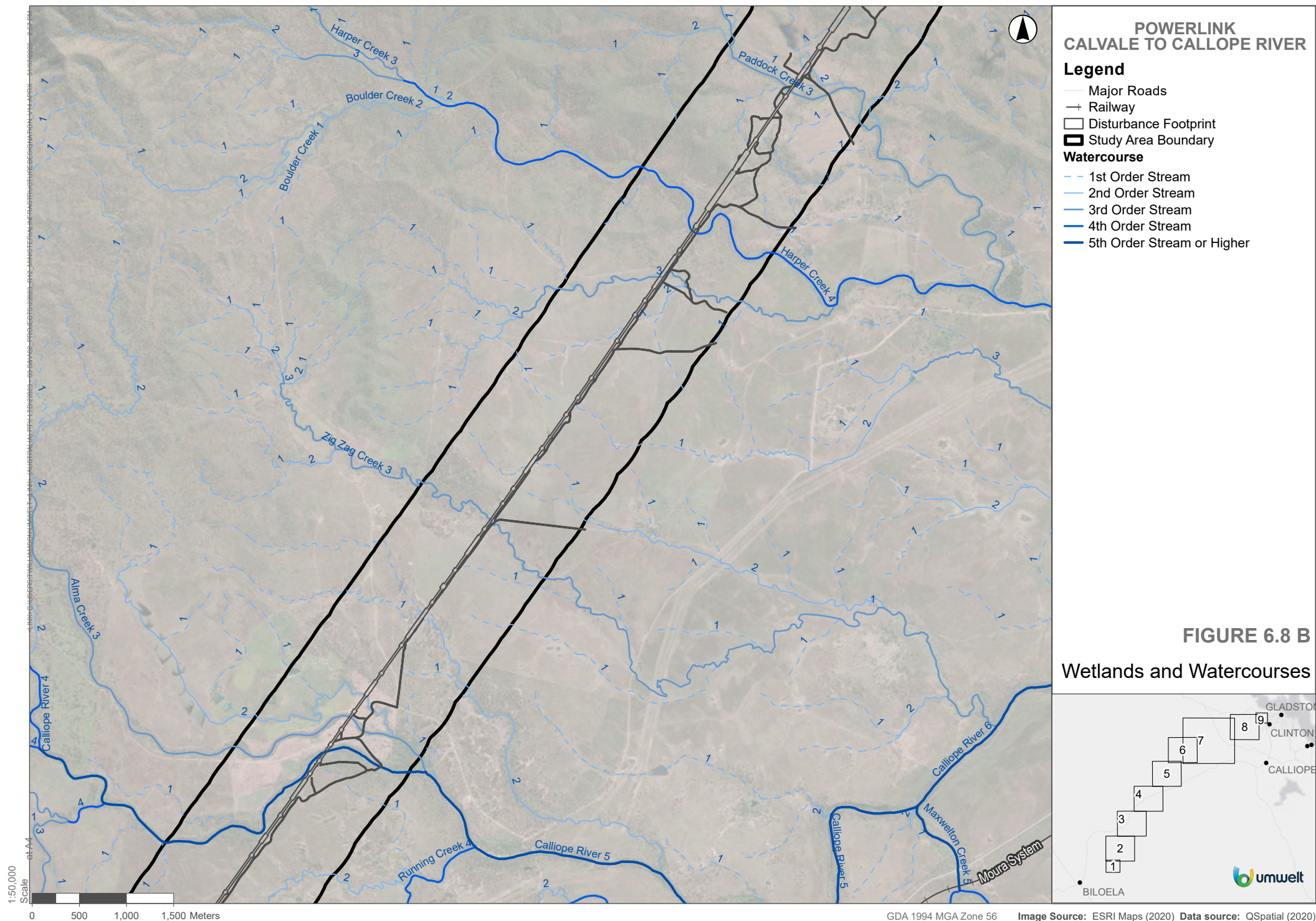




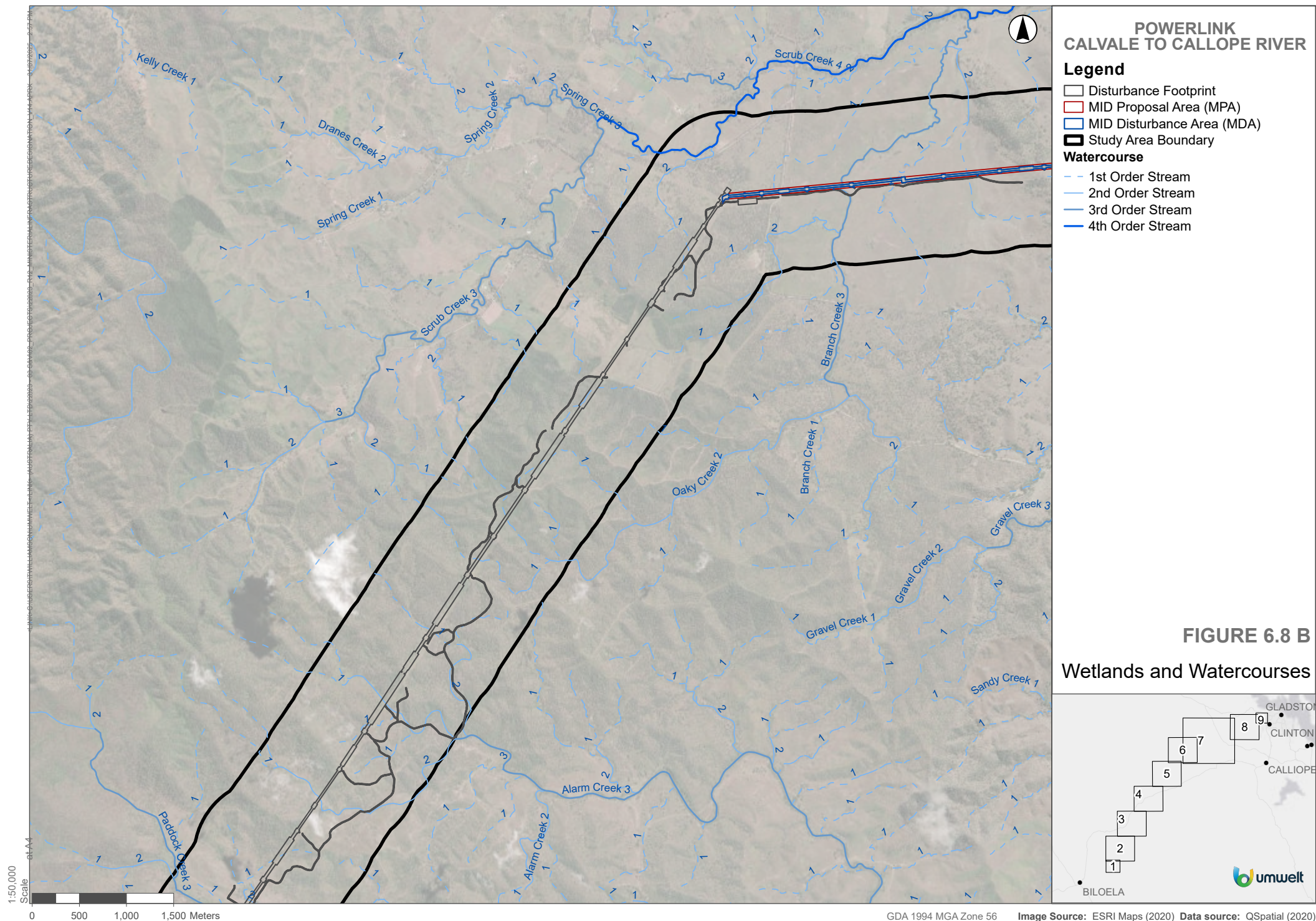




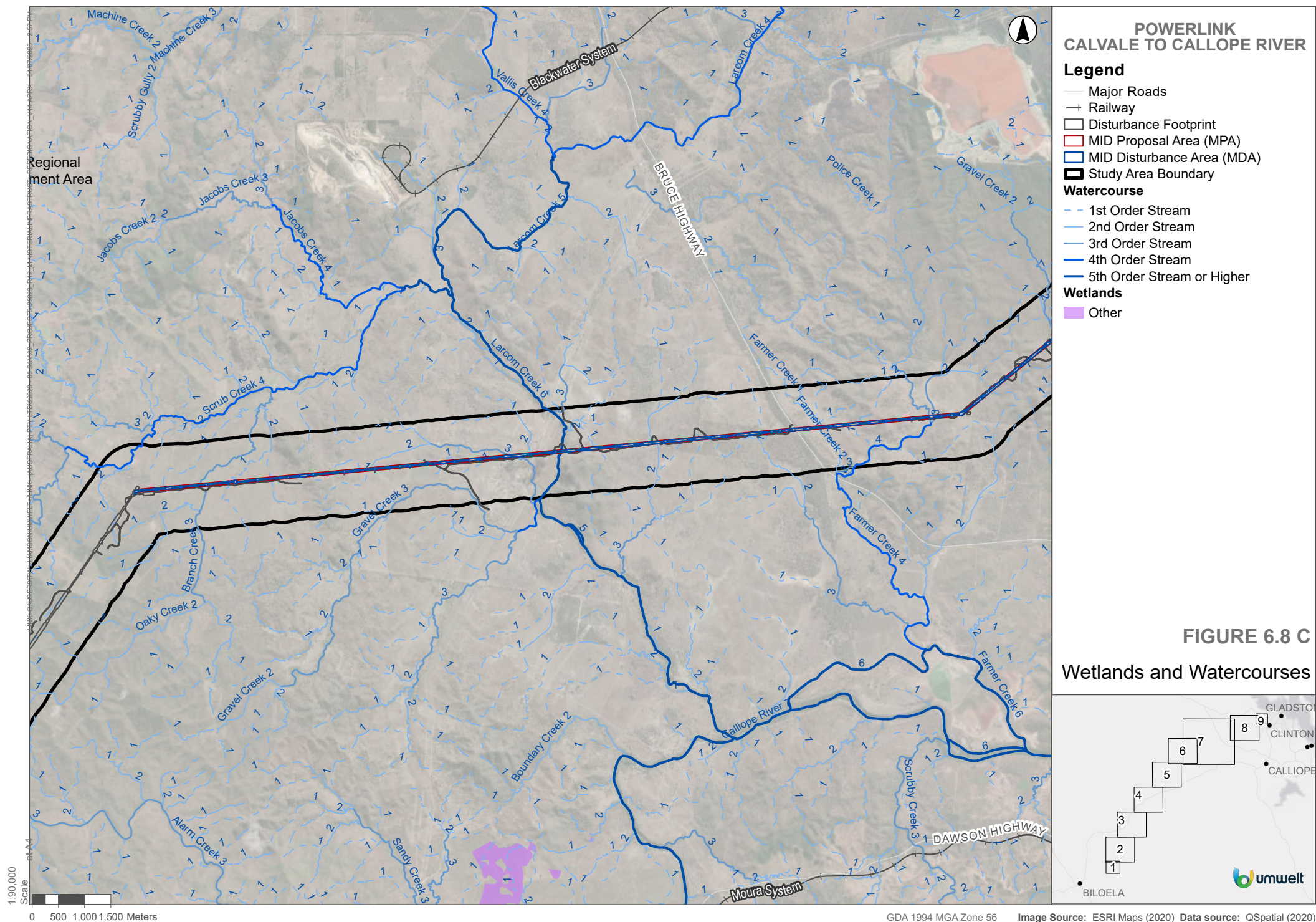




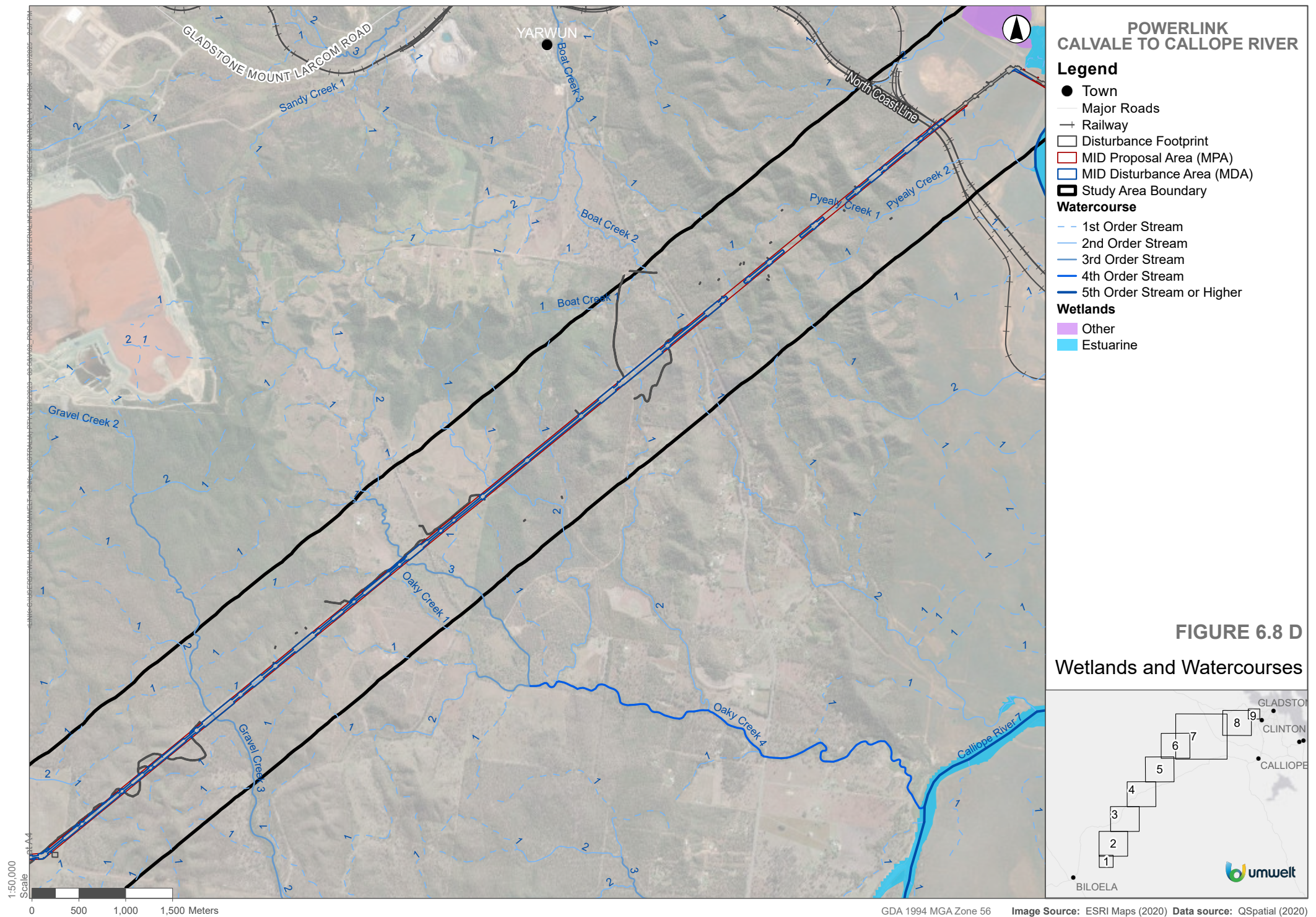




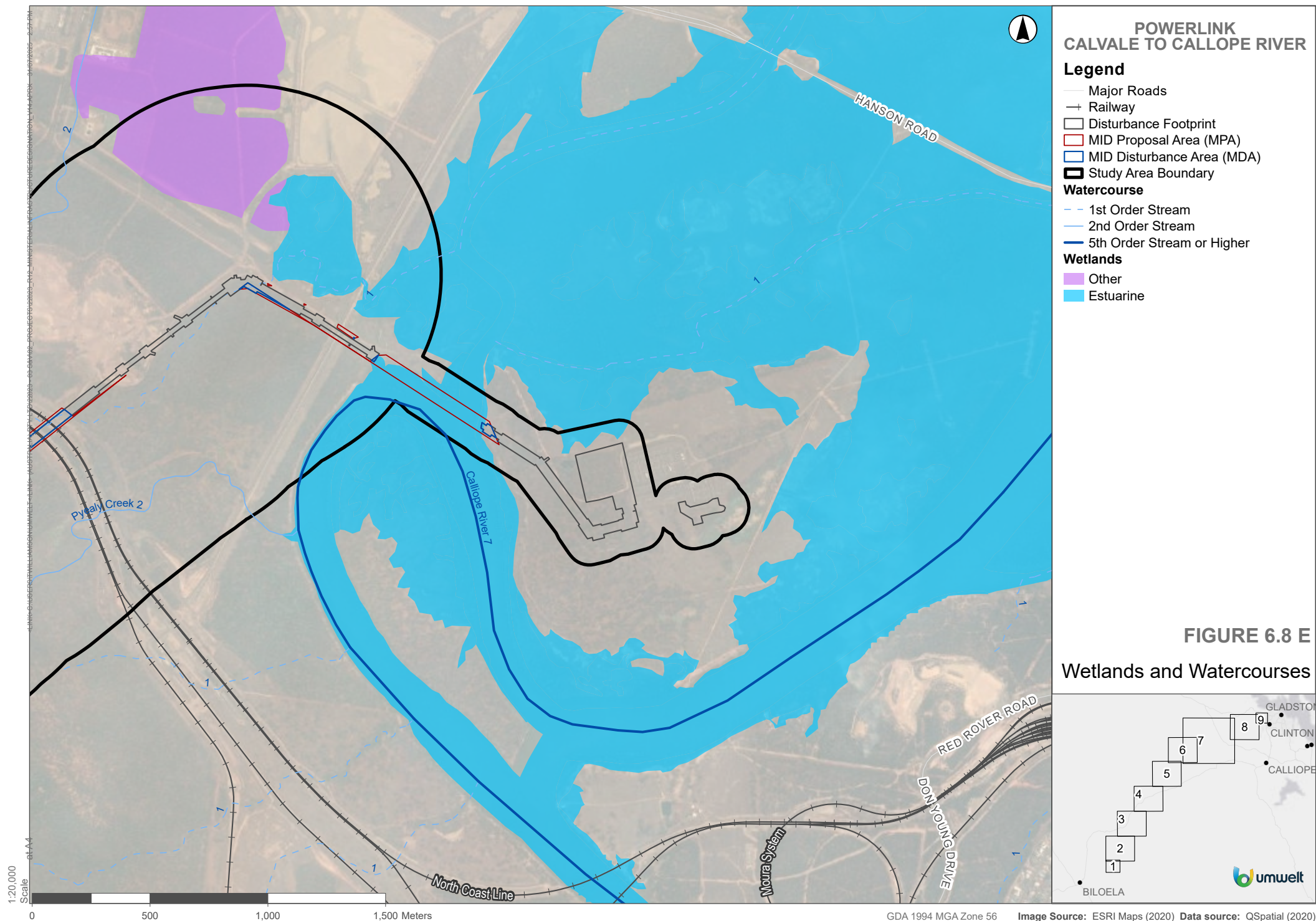












## 6.8 Biodiversity Corridors and Connectivity

Review of the Biodiversity Planning Assessment – Brigalow Belt mapping (Department of Environment and Science, 2018) indicates there are biodiversity corridors of either State or regional significance mapped within all sections of the MPA (**Figure 6.9**).

A portion of Lake Callide is situated adjacent to the MPA in Section A and is designated as a biodiversity corridor of regional significance. Lake Callide is part of Callide Creek which flows from Kroombit Tops National Park 16 km to the east.

Scrub Creek and Larcom Creek both meander through Section C and are associated with regionally significant biodiversity corridors. These creeks link outside of Section C and flow south to the Calliope River (as a State significant biodiversity corridor) approximately 5 km to the south of Section C.

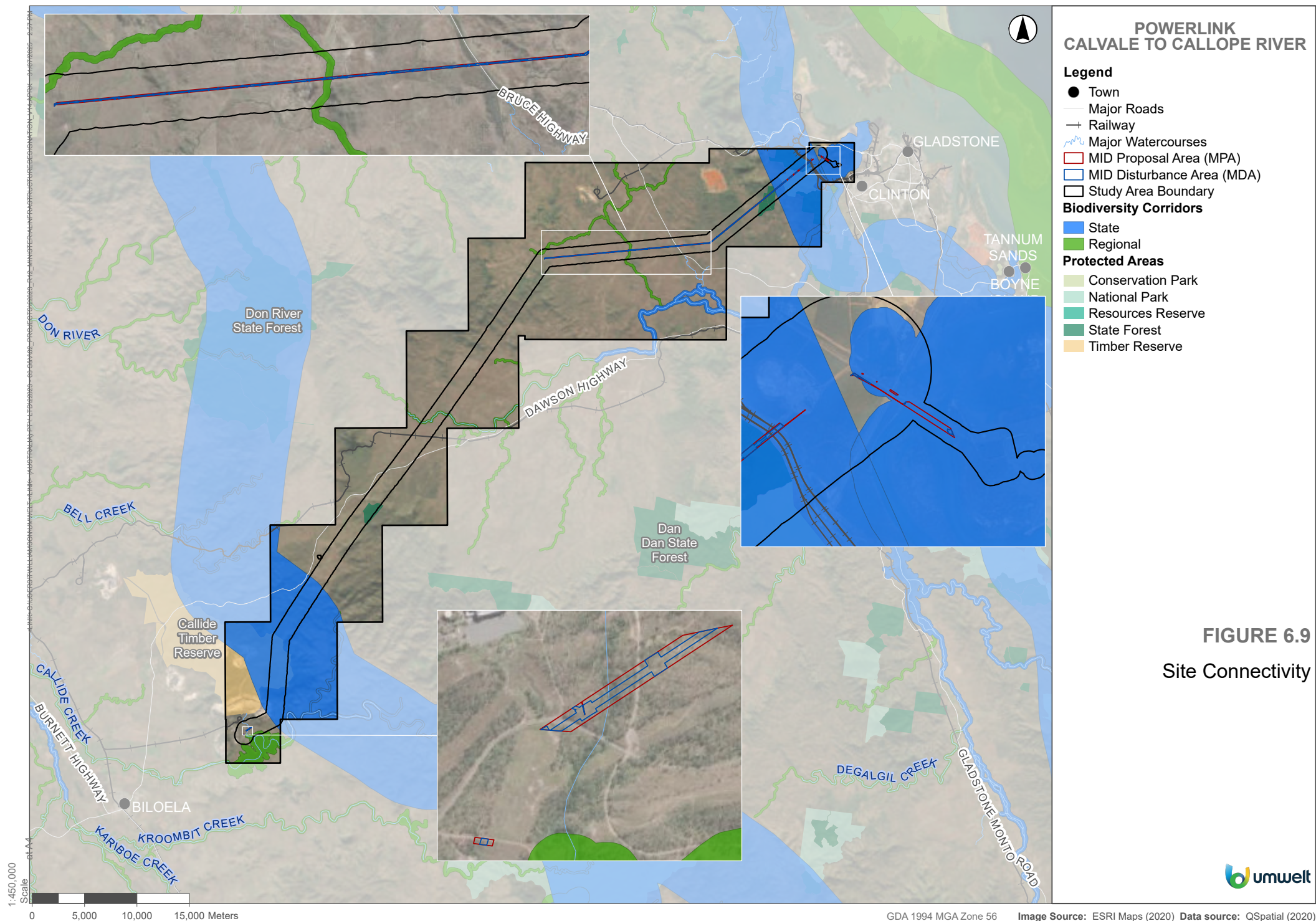
Section D is associated with a major biodiversity corridor of State significance linking numerous State forests and conservation reserves including Calliope Conservation Park, Beecher State Forest, Mount Stowe State Forest and Targinie State Forest to the north. In addition, the biodiversity corridor of State significance skirts the passage between Curtis Island and mainland Queensland.

Section E is largely contained within a biodiversity corridor of State significance associated with the mouth of the Calliope River. In addition, this State significant biodiversity corridor is linked to the major State significant biodiversity corridor in Section D.

A number of barriers to fauna movement currently exist within the Study Area. Most significant are the large areas of cleared land present within the existing transmission line easement, which disconnect and fragment habitat, inhibiting fauna movement between patches. A network of farm tracks, roads and fences also occur within the Study Area, which are likely to hinder or obstruct movement at a local scale of some fauna groups including cover dependent reptiles and small, ground-dwelling mammals. During the field survey program, some occurrences of flying-fox collisions with barbed wire fences were recorded, all of which ended with injury or death.

Despite the barriers to movement at a local scale, the Study Area is functionally connected to the nearby State forests and national parks listed above, which may provide movement opportunities for more mobile species such as birds and mammals.





## 6.9 MSES Summary

Prescribed environmental matters or MSES values are derived from Schedule 2 of the EO Regulation. The SRI assessment (regulated vegetation, connectivity, fish passage and marine plants) has been completed for State code 11 (removal, destruction or damage of marine plants), State code 16 (native vegetation clearing) and State code 18 (constructing or raising waterway barrier works in fish habitats). All other MSES were also assessed within coastal erosion prone areas of the MDA as part of State code 8 (coastal development and tidal works) (see **Figure 6.10** below). In assessing the significant residual impact associated with State code 8, erosion prone area mapping has been utilised within the MDA to define MSES boundaries for this code.

A summary of all MSES values (across all codes) is presented in **Table 6.13**. Highlighted in blue are those within the MDA which the Project may require an SRI assessment.

**Table 6.13 Summary of MSES**

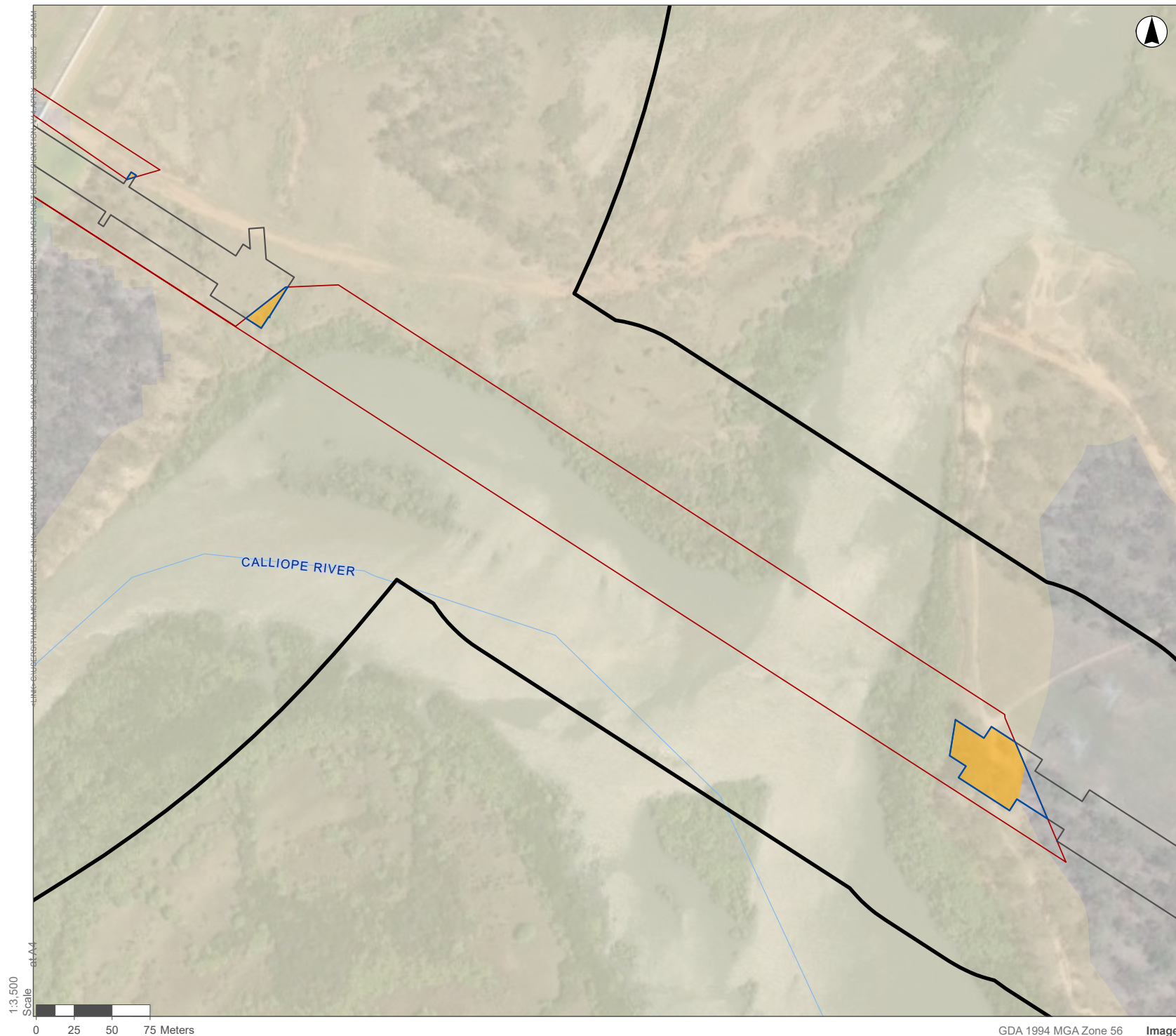
MSES	Description	Present
<b>Regulated Vegetation</b>	<p>MSES Regulated Vegetation includes prescribed regional ecosystems (Category B):</p> <ul style="list-style-type: none"> <li>• that are 'endangered' or 'of concern' REs</li> <li>• remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map</li> <li>• essential habitat as identified on the essential habitat map</li> <li>• for a prescribed activity mentioned in Schedule 1, Item 7(e), if the ecosystem is in an area of essential habitat on the essential habitat map for an animal that is near threatened wildlife or plant that is near threatened wildlife</li> <li>• To the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature. In accordance with the Queensland Environmental Offset Policy (Department of Environment and Science, 2020), distances from the defining bank of the watercourse stream order (SO): <ul style="list-style-type: none"> <li>○ Coastal bioregion (bioregion 12) <ul style="list-style-type: none"> <li>▪ 10 m for SO 1 and 2</li> <li>▪ 25 m for SO 3 and 4</li> <li>▪ 50 m for SO 5 or greater.</li> </ul> </li> <li>○ non-coastal bioregion (bioregion 11) comprises: <ul style="list-style-type: none"> <li>▪ 25 m for SO 1 and 2</li> <li>▪ 50 m for SO 3 and 4</li> <li>▪ 100 m for SO 5 or greater.</li> </ul> </li> </ul> </li> </ul>	<p><b>Yes</b></p> <p>Category B Endangered and Of concern REs are mapped within the MDA. Essential habitat is mapped within the MDA. Vegetation within a defined distance of a watercourse is mapped within the MDA.</p>
<b>Connectivity Areas (Non-urban Areas)</b>	<p>Connectivity areas are areas of mapped remnant vegetation (Category B) outside urban areas containing prescribed REs that are required for ecosystem functioning (a connectivity area).</p>	<p><b>Yes</b></p> <p>Category B regulated vegetation is mapped within the MDA.</p>



MSES	Description	Present
<b>Wetlands and Watercourses</b>	<p>An offset may be required for impacts to the following wetlands and watercourses:</p> <ul style="list-style-type: none"> <li>wetland in a wetland protection area</li> <li>wetland of high ecological significance</li> <li>wetland or watercourse in a high ecological value water.</li> </ul>	<p><b>No</b></p> <p>No wetlands or watercourses defined as a MSES occur within or adjacent to the MDA.</p>
<b>Strategic Environmental Area</b>	<p>Strategic Environmental Areas are:</p> <ul style="list-style-type: none"> <li>the Cape York Strategic Environmental Area</li> <li>the Channel Country Strategic Environmental Area</li> <li>the Frazer Island Strategic Environmental Area</li> <li>the Gulf Rivers Strategic Environmental Area</li> <li>the Hinchinbrook Island Strategic Environmental Area.</li> </ul>	<p><b>No</b></p> <p>No strategic environmental areas occur within or adjacent to the MDA.</p>
<b>Protected Wildlife Habitat</b>	<p>Protected wildlife habitat is defined as an area of habitat (e.g. foraging, roosting, nesting or breeding habitat) for an animal or plant that is listed Endangered or Vulnerable, or a Special Least Concern (non-migratory) animal under the NC Act. Offsets may be required for the following protected wildlife habitat:</p> <ul style="list-style-type: none"> <li>an area that contains plants that are 'endangered', 'vulnerable' or 'near threatened' wildlife</li> <li>a habitat for an animal that is 'endangered', 'vulnerable' or 'near threatened' wildlife or a special least concern animal (non-migratory), including areas or features used by an animal for foraging, roosting, nesting or breeding</li> <li>koala habitat that is classified as essential habitat on the essential habitat map</li> <li>an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called 'Map of Assessable Development Area Koala Habitat Values' that applies under the South East Queensland Koala Conservation State Planning Regulatory Provisions (now repealed).</li> </ul>	<p><b>Yes</b></p> <p>Protected wildlife habitat as part of State code 8 of the State development provisions is present in coastal erosion prone areas (coastal management). Species with mapped habitat in coastal erosion prone areas have been assessed through the SRI process. In addition, threatened and migratory species outside of coastal erosion prone areas have been assessed through the Commonwealth significant impact assessment (SIA) process, which is ongoing and incorporate similar measures as the SRI assessment.</p>

MSES	Description	Present
<b>Protected Areas</b>	<p>An offset may be required for impacts to the following classes of protected areas:</p> <ul style="list-style-type: none"> <li>• national parks</li> <li>• national parks (Aboriginal land)</li> <li>• national parks (Torres Strait Islander land)</li> <li>• national parks (Cape York Peninsula Aboriginal land)</li> <li>• regional parks</li> <li>• nature refuges.</li> </ul>	<p><b>No</b></p> <p>No national parks, regional parks or nature refuges occur within or adjacent to the MDA. Only the Calliope Conservation Park and Mt Stowe State Forest are associated with the MDA.</p>
<b>Fish Habitat Areas and Highly Protected Zones of State Marine Parks</b>	<p>Declared Fish Habitat Areas protect critical wetlands to ensure fisheries productivity and legal fishing access to these areas. The highly protected zones of the marine parks are defined as a prescribed environmental matter and therefore permissions for works within these zones are subject to offset considerations. These highly protected zones are:</p> <ul style="list-style-type: none"> <li>• preservation zones</li> <li>• marine national park zones</li> <li>• scientific research zones</li> <li>• buffer zones</li> <li>• conservation park zones.</li> </ul>	<p><b>No</b></p> <p>No State marine parks or fish habitat areas occur within or adjacent to the MDA.</p>
<b>Waterway Providing for Fish Passage</b>	<p>An environmental offset may be required for any part of a waterway that provides for passage of fish (other than that part of a waterway within an urban area) if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.</p>	<p><b>Yes</b></p> <p>Waterways providing for fish passage found within the MDA.</p>
<b>Marine Plants</b>	<p>Marine plants are protected under the Fisheries Act. Marine plants are part of the mosaic of fish habitats and are an integral and usually highly visible feature of the coastline.</p>	<p><b>Yes</b></p> <p>Found on the northern and southern bank of the Calliope River within the MDA.</p>
<b>Legally Secured Offset Area Under State Legislation</b>	<p>Legally secured offset areas are any areas declared as an environmental offset protection area, high nature conservation value under the VM Act or another area prescribed under a regulation.</p>	<p><b>No</b></p> <p>No legally secured offset areas are present within or adjacent to the MDA.</p>



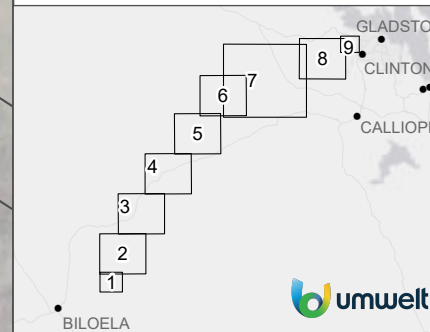


## POWERLINK CALVALE TO CALLOPE RIVER

### Legend

- Major Watercourse
- Disturbance Footprint
- MID Proposal Area (MPA)
- MID Disturbance Area (MDA)
- ▬ Study Area Boundary
- Coastal Erosion Prone Area
- Coastal Erosion Prone Area Within the MDA

**FIGURE 6.10**  
Coastal Erosion Prone  
Areas of the MDA Assessed  
for State Code 8 MSSES



## 7.0 Potential Project Impacts

Information on the potential impacts associated with the MDA are outlined in the following sections. Proposed mitigation and management measures to reduce the severity or extent of potential impacts on ecological values are outlined in **Section 8.0**.

### 7.1 Construction

The greatest risk of adverse impact on ecological values and biodiversity from the Project will occur during the construction phase. The construction activities to support the installation of transmission towers, associated lines and access tracks will involve vegetation clearing, excavation and ground reinstatement. The duration of the impact will be limited to the construction period of 2.5 years. Direct and indirect impacts potentially associated with this are described in the following sections.

#### 7.1.1 Direct Impacts

##### 7.1.1.1 Regulated Vegetation

There is the potential that clearing will be required across the entirety of the MDA. This will result in direct impacts to Category B, C, R and X vegetation as per **Table 7.1**.

**Table 7.1 Potential Direct Impacts to Regulated Vegetation**

Regulated Vegetation Categories	Extent within the MDA (ha)
Category B – Remnant vegetation	17.9
Category C – High-value regrowth vegetation	3.9
Category R – Regrowth within 50 m of a watercourse or drainage feature in the Great Barrier Reef catchment	3.6
Category X – Exempt clearing work on Freehold, Indigenous and Leasehold land	68.1

##### 7.1.1.2 Regional Ecosystems

**Table 7.2** identifies the impacted ground-truthed REs that occur in remnant and regrowth condition and presents the extent within the MDA. While the clearance of remnant vegetation is unavoidable within the MDA, there are a range of measures that will be implemented to minimise the level of impact from clearing. Vegetation clearance will be minimised within the MDA around the final infrastructure layout and will be guided by an EMP with vegetation and fauna specific measures (**Section 8.3**). For the full range of avoidance, mitigation, and management measures see **Section 8.0**.



**Table 7.2 Ground-truthed REs within the MDA**

Regional Ecosystem	Condition	Extent within the MDA (ha)
<b>VM Act Class: Endangered</b>		
11.11.18	Remnant	0.5
	Regrowth	0.1
12.3.3	Remnant	0.4
<b>VM Act Class: Of Concern</b>		
11.3.4	Regrowth	0.4
<b>VM Act Class: Least Concern</b>		
11.11.15	Remnant	2.0
	Regrowth	6.0
11.11.3	Remnant	3.8
	Regrowth	1.8
11.11.3c	Remnant	1.2
11.11.4	Remnant	6.5
	Regrowth	2.8
11.11.4c	Remnant	1.4
	Regrowth	0.6
11.3.25	Regrowth	0.4
11.3.26	Remnant	0.6
12.1.2	Regrowth	0.01
12.1.3	Remnant	0.0
	Regrowth	0.03
12.11.6	Remnant	8.5

### 7.1.1.3 Marine Plants

Marine plant extent within the MDA is 0.025 ha or 251.86 m<sup>2</sup>. **Table 7.3** identifies the impacted composition of habitat below the HAT and presents the extent within the MPA and the extent within the MDA. While the clearance of marine plants is unavoidable within the MDA, there are a range of measures that will be implemented to minimise the level of impact from clearing. Vegetation clearance will be minimised within the MDA around the final infrastructure layout and will be guided by an EMP with specific vegetation mitigation measures (**Section 8.3**). For the full range of avoidance, mitigation, and management measures see **Section 8.0**.

**Table 7.3 Marine Plants (ha) within the MDA**

Composition of Habitat Below HAT	Extent within the MDA (ha)
Marine plants	0.025
Intertidal zone	-
Water	-

#### 7.1.1.4 Threatened Flora and Fauna Habitat

Vegetation clearing is a direct impact that can result in the loss of vegetation values and habitat; with the severity of impacts more pronounced in habitats that provide values for threatened and migratory species and communities. Potential impacts resulting from clearing native vegetation can include:

- Reduced patch size of vegetation communities potentially compromising the viability of the community and associated habitat.
- Loss of habitat causing a reduction of biological diversity or loss of local populations and genotypes.
- Loss of, or disturbance to, microhabitat features such as tree hollows, leaf litter, ground timber, rocks and dense shrubs.
- Loss of floristic diversity and the food resources this provides such as foliage, flowers, nectar, fruit and seeds.
- Fragmentation of habitats resulting in reduced dispersal opportunities for fauna.
- Destruction of abiotic features necessary to support vegetation communities and habitat types.

**Table 7.4** details the maximum extent of direct impacts to habitat of threatened species as a result of vegetation clearing. Also highlighted in blue within **Table 7.4** are species which have a smaller extent of mapped habitat in coastal erosion prone areas which are further examined in detail as part of the SRI process (**Appendix E**).

Clearing will only be undertaken strictly as needed and will be minimised wherever possible and practical. It is acknowledged that where clearing and habitat loss cannot be avoided. Particularly in high constraint areas (i.e. breeding or denning habitat for NC Act listed fauna), it is likely to result in permanent impacts to threatened biodiversity values.

As construction will occur in phases, direct impacts will be limited to a relatively small area within the MDA at any one time. The staging will substantially reduce the duration of the overall permanent impact by gradually and progressively undertaking the clearing. Given this, direct impacts are considered predictable and known.

**Table 7.4 Predicted Maximum Direct Impacts on Threatened Flora and Fauna Habitat within the MDA**

Species	Likelihood of Occurrence	Habitat Utilisation	Extent within MDA (ha)
<b>Threatened Flora</b>			
<i>Acacia pedleyi</i> Pedley's wattle	Known	-	1.6
<i>Atalaya collina</i> Yarwun whitewood	High	-	0.6
<i>Cerbera dumicola</i>	Moderate	-	0.6
<i>Cossinia australiana</i>	Moderate	-	0.6
<i>Dansiea elliptica</i>	High	-	0.6
<i>Graptophyllum excelsum</i> Scarlett fuchsia	Moderate	-	0.6
<i>Samadera bidwillii</i> Quassia	Known	-	21.1



Species	Likelihood of Occurrence	Habitat Utilisation	Extent within MDA (ha)
<i>Sphaeromorphaea major</i> Spreading nut-heads	Moderate	-	0.0
<b>Threatened Fauna</b>			
Australian painted snipe <i>Rostratula australis</i>	Moderate	Seasonal breeding, foraging and dispersal	0.8
Black-breasted button-quail <i>Turnix melanogaster</i>	Moderate	Nesting and foraging	0.6
Black-tailed godwit <i>Limosa limosa</i>	Moderate	Roosting and foraging	0.02
Collared delma <i>Delma torquata</i>	Known	Breeding and foraging	0.7
Common greenshank <i>Tringa nebularia</i>	Moderate	Roosting and foraging	0.02
Curlew sandpiper <i>Calidris ferruginea</i>	Moderate	Roosting and foraging	0.02
Eastern curlew <i>Numenius madagascariensis</i>	Moderate	Roosting and foraging	0.02
Great knot <i>Calidris tenuirostris</i>	Moderate	Roosting and foraging	0.02
Greater sand plover <i>Charadrius leschenaultia</i>	Moderate	Roosting and foraging	0.02
Grey plover <i>Pluvialis squatarola</i>	Moderate	Roosting and foraging	0.02
Latham's snipe <i>Gallinago hardwickii</i>	Moderate	Roosting and foraging	0.02
Lesser sand plover <i>Charadrius mongolus</i>	Moderate	Roosting and foraging	0.02
Nunivak bar-tailed godwit <i>Limosa lapponica baueri</i>	Moderate	Roosting and foraging	0.02
Painted honeyeater <i>Grantiella picta</i>	Moderate	Foraging and dispersal	10.7
Red knot <i>Calidris canutus</i>	Moderate	Roosting and foraging	0.02
Ruddy turnstone <i>Arenaria interpres</i>	Moderate	Roosting and foraging	0.02
Sharp-tailed sandpiper <i>Calidris acuminata</i>	Moderate	Roosting and foraging	0.02
Squatter pigeon (southern) <i>Geophaps scripta scripta</i>	Known	Breeding	1.3
		Foraging	0.0
		Dispersal	91.5
Terek sandpiper	Moderate	Roosting and foraging	0.02

Species	Likelihood of Occurrence	Habitat Utilisation	Extent within MDA (ha)
<i>Xenus cinereus</i>			
White-throated needletail	High	Roosting and foraging	0.0
<i>Hirundapus caudacutus</i>		Foraging and dispersal	36.9
Ghost bat	Moderate	Seasonal foraging and dispersal	36.9
<i>Macroderma gigas</i>			
Greater gilder (southern and central)	High	Likely or current denning	23.8
<i>Petauroides volans</i>		Potential or future denning	12.0
		Foraging and dispersal	0.0
Koala	High	Breeding, foraging and dispersal	34.6
<i>Phascolarctos cinereus</i>		Climate refugia	1.6
		Dispersal only	56.6
Water mouse	High	Breeding, foraging and dispersal	0.02
<i>Xeromys myoides</i>			
Yellow-bellied glider (south-eastern)	High	Denning, foraging and dispersal	19.8
<i>Petaurus australis australis</i>			
<b>Special Least Concern Fauna Species</b>			
Bar-tailed godwit	Moderate	Roosting and foraging	0.02
<i>Limosa lapponica</i>			
Broad-billed sandpiper	Moderate	Roosting and foraging	0.02
<i>Limicola falcinellus</i>			
Common sandpiper	Moderate	Roosting and foraging	0.02
<i>Actitis hypoleucos</i>			
Eastern osprey	Known	Nesting and foraging	0.02
<i>Pandion haliaetus</i>			
Fork-tailed swift	Known	Foraging and dispersal	36.9
<i>Apus pacificus</i>			
Grey-tailed tattler	Moderate	Roosting and foraging	0.02
<i>Tringa brevipes</i>			
Little curlew	Moderate	Roosting and foraging	0.02
<i>Numenius minutus</i>			
Marsh sandpiper	Moderate	Roosting and foraging	0.02
<i>Tringa stagnatilis</i>			
Oriental cuckoo	Moderate	Roosting and foraging	36.9
<i>Cuculus optatus</i>			
Pacific golden plover	Moderate	Roosting and foraging	0.02
<i>Pluvialis fulva</i>			
Pectoral sandpiper	Moderate	Roosting and foraging	0.02



Species	Likelihood of Occurrence	Habitat Utilisation	Extent within MDA (ha)
<i>Calidris melanotos</i>			
Red-necked stint	Moderate	Roosting and foraging	0.02
<i>Calidris ruficollis</i>			
Short-beaked echidna	Known	Breeding, foraging and dispersal	102.7
Tachyglossus aculeatus			
Whimbrel	Moderate	Roosting and foraging	0.02
<i>Numenius phaeopus</i>			

As the MDA has largely been co-located adjacent to an existing transmission line and many existing access tracks are present, habitat has already been subjected to low level fragmentation. Despite this, further vegetation clearing will be required for the construction of the Project. Clearing has the potential to further dissect and disconnect vegetation communities, reducing the size of patches or potentially isolating them, which can impact on the success of seed dispersal, species recruitment and ultimately the long-term viability and persistence of a vegetation community within the landscape. Fragmentation impacts may also result in reduced fauna movement opportunities, leading to reduced species recruitment, genetic flow and ultimately affect the long-term viability and persistence of fauna populations within the landscape.

Species that are considered most susceptible to fragmentation impacts include threatened flora, greater glider (southern and central), yellow-bellied glider (south-eastern), collared delma (*Delma torquata*) and water mouse.

The maximum clearing width for the transmission line is 60 m and as such, fragmentation impacts to koala, threatened birds and bats are considered low. These species are either highly mobile, adapted to fragmented landscapes or are known to still traverse cleared or modified areas without significant risk. As detailed above, infrastructure siting has maximised the use of existing cleared areas to ensure fragmentation impacts are minimised.

#### 7.1.1.5 Fauna Mortality

Fauna mortality is another direct impact that may occur to all species including threatened and migratory fauna species during the construction phase. Fauna may be injured or killed during construction principally through:

- Strike from moving vehicles/machinery – key issue for ground dwelling species, particularly those with poor mobility.
- Entrapment in habitat during removal – key issue during tree felling for species that use tree hollows or hollow logs for roosting and denning.
- Entrapment in trenches/holes – key issue for ground dwelling species (reptiles and small mammals), particularly those that are active at night and cannot detect trenches/excavations to avoid.

Threatened fauna that are most susceptible to fauna mortality as a result of construction of the Project include koala, water mouse, squatter pigeon (southern) and threatened reptiles.

## 7.1.2 Indirect Impacts

The loss of vegetation and habitat as well as construction activities, can result in indirect or secondary impacts to the associated fauna and floristic values in the form of habitat degradation. This includes:

- Increased edge effects reducing the condition of quality of remaining vegetation communities and habitat types.
- The establishment and spread of exotic species that may displace native species, native habitat resources and alter fire regimes.
- Soil exposure resulting in an increased risk of erosion and sedimentation of water bodies, reducing water quality and degrading aquatic habitats.
- Increased risk of contamination associated with activities such as refuelling, concrete spillage or storage of chemicals.
- Changes in hydrology from installation of infrastructure creating a barrier to surface flow and increasing stormwater run-off.
- Changes to soil chemistry at the Calliope River due to importation of foreign soils, exposure of subsoils or exposure of acid sulfate soils.
- Generation of dust emissions leading to excessive deposition of dust on leaves of plants suppressing photosynthesis and growth.
- Increased noise and light levels affecting foraging and breeding behaviour for some fauna species or resulting in complete avoidance and displacement from habitats.
- Periodic burst of elevated noise levels may startle and disorientate fauna species within proximity.
- Although unlikely, increased anthropogenic activity may lead to temporary increased pest levels.

During the construction phase, some of the indirect impacts (e.g. noise, light and dust) are temporary and concentrated in specific areas before moving progressively through the Disturbance Footprint. However, other indirect impacts (e.g. edge effects, hydrology changes) are longer term disturbances.

Further information about potential indirect impacts is provided in the subsequent sections.

### 7.1.2.1 Introduction / Exacerbation of Weeds and Pest Fauna

The introduction and/or spread of weeds is a potential indirect impact that can compromise the integrity of the remaining vegetation, increase the intensity and/or frequency of fires, as well as threaten the long-term survival of threatened species. Within the Study Area, weed species are common within the cleared and regrowth vegetation communities as well as sporadically throughout remnant vegetation. The weed species that pose the largest threat to flora and vegetation values are those identified as WoNS including *Cryptostegia grandiflora*\* (rubber vine), *Dolichandra unguis-cati*\* (cat's claw creeper), *Lantana camara*\*, and *Opuntia tomentosa*\*. High-biomass grass species such as *Cenchrus ciliaris*\* and *Hyparrhenia rufa*\* can out-compete native vegetation, reduce the germination of native species, and increase fire intensity and/or frequency.

Actively removing and managing WoNS and high-biomass grass species within the MDA and wider Study Area and preventing the introduction of additional weed species may prevent indirect impacts to flora and vegetation values.



The MDA and wider Study Area was also found to support several introduced fauna species including feral cat (*Felis catus*\*), feral pig (*Sus scrofa*), feral dog (*Canis familiaris*\*), and European rabbit (*Oryctolagus cuniculus*\*). These species are likely to utilise newly disturbed areas. Their movement into higher quality habitat areas may be further facilitated and contribute toward the degradation of fauna habitat within the wider Study Area.

Given the prevalence of exotic species within the existing landscape, it is unlikely that the proposed works will result in further introductions of feral vertebrate species. However, habitat modification as a result of the Project may facilitate larger populations of certain introduced species such as the European rabbit in areas where some native species will not be able to persist. Refer to **Section 8.3** for measures to manage vertebrate pest species.

#### 7.1.2.2 Edge Effects

Ecological edges are transitional zones between adjoining habitat patches where ecological parameters can differ (Porensky and Young, 2013). Such parameters can be biological (e.g., changes in species distributions and interactions) and abiotic (e.g., changes in gradients of air and soil temperature, moisture and sunlight levels) and this may drive changes in fauna and flora communities able to persist in such environments and create population sinks (Porensky and Young, 2013; Willmer, Püttker and Prevedello, 2022).

Edges and their effects can be created through clearing of vegetation, such as new edges created by roads and transmission line corridors. The distance the effect spreads from the edge, known as edge permeability, can be highly variable and depends upon many factors such as vulnerability of the ecosystems, degree of change in land use, intensity of this use and chance events (Murcia, 1995).

The main environmental impacts of new edges which would be created by the Project are likely to include:

- The modification of microclimates where new edges are created due to a greater penetration of light and wind into the remaining vegetation. Microclimate changes should be expected in the creation of new edges as greater temperature extremes and lower air humidity are generally observed at edge communities, with this effect known to increase if vegetation is dense or cover is high.
- Changes to soil properties including greater compaction and erosion, and less organic matter.
- The introduction of weeds and pathogens through mud and dirt falling off vehicles.
- The physical disturbance of edge vegetation. Ongoing impacts on newly created edge vegetation may occur through the upkeep of access tracks (e.g., weed control, grading).
- Changes in vegetation community composition.

#### 7.1.2.3 Soil Erosion and Sedimentation

Removal of vegetation and disturbance to the soil profile through clearing and construction activities can lead to soil erosion, and result in an increased input of sediment into waterways. This can lead to siltation of watercourses and a reduction in water quality of creeks and rivers near the Study Area. Erosion can also lead to the loss of important topsoil resources, leading to the exposure of subsoil often with poor physical and chemical properties.

#### 7.1.2.4 Impacts to the Calliope River

The MPA crosses the Calliope River adjacent to the existing Calliope substation with construction activities proposed below the HAT, but not within the waterway. Potential indirect impacts to the Calliope River during construction may occur during the cut and fill works for the construction of towers. These activities may lead to increased degradation of habitat values through sedimentation and decreased soil stability. Other construction impacts to the Calliope River include:

- Erosion and sedimentation.
- Reduced water quality from point and non-point sources:
  - Large stockpiles of soil during construction may cause a direct influx of sediment in the surface water runoff from the work sites, particularly from areas of cleared vegetation
  - Increased nutrient input which may have flow on effects to vegetation and algal growth
  - Contamination of hydrocarbons and other chemicals due to spills
  - Sediment and suspended solids as a run-off from transmission tower pads and access tracks
  - Stratification of temperature, dissolved oxygen and nutrients in the water column.
- Changes to soil chemistry due to:
  - Importation of foreign soils
  - Exposure of subsoils
  - Exposure of acid sulfate soils.
- Facilitation of the establishment of terrestrial and aquatic weed species, which may further degrade habitat value in fringing vegetation.

#### 7.1.2.5 Noise, Activity and Light

During the construction phase, there will be an increase in noise and activity in and around the MDA and MPA as machinery undertakes clearing and other activities. When activity and noise is occurring in areas adjoining retained habitat, potential impacts may include:

- Reduced foraging ability by auditory predators due to increased background noise.
- Increased risk of predation by visual predators due to increased background noise.
- Increased potential for collisions with vehicles.
- Human visitation causing disturbance to foraging or breeding behaviours.

Current research indicates that there are no government policies or other widely accepted guidelines in respect to the noise levels which may be acceptable to wildlife. The levels or character of noise that may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are also not firmly established in the technical literature.

Sudden loud, impulsive or impact noises can cause birds and other fauna to become startled, which if occurring over the longer term, may affect feeding and breeding behaviour in some species. These impacts are expected to occur to the fauna using the habitats both within and immediately adjacent to the MDA and MPA.



It is expected that excavation, construction and earthmoving associated with the Project will potentially cause disturbance to all groups of fauna. In particular the water mouse and shorebirds, which have potential habitat adjacent to the existing operational Calliope River substation. This may result in the temporary avoidance of the area for the duration of these activities. However, it is important to note that the habitat for the water mouse and shorebirds is located in an already severely degraded area, with existing transmission lines, roads and the Calliope River substation. Therefore, noise, light and activity are already present.

#### **7.1.2.6 Dust Impacts**

Deposition of dust, sand and soil resulting from construction may have potential impacts on vegetation if excessive levels are sustained over extended periods. When dust settles on plant foliage it can reduce the amount of light penetration on the leaf surface, block and damage stomata, and slow rates of gas exchange and water loss (Farmer, 1993). Reduction in the ability to photosynthesize due to physical effects may result in reduced growth rates of vegetation and decreases in floral vigour and overall community health.

These impacts are dependent on the type of vegetation, type of dust (chemical properties, grain size) and total dust load setting on the vegetation.

Dust impacts on vegetation from the Project are expected to be restricted to areas directly adjacent to unsealed access tracks where soil can be disturbed through vehicle movement. As the dust will be chemically inert, any potential impacts will be physical in nature. This could include the blocking of plant stomata and reduction in light penetration to the leaf surface, potentially reducing photosynthetic capacity. A reduction in the health and vigour of vegetation directly adjacent to areas of construction could result.

#### **7.1.2.7 Ecological Values Susceptible to Indirect Impacts**

All ecological values are susceptible to these indirect impacts to some degree; however, some are known to be more susceptible than others. The susceptibility of the specific values identified within the MPA to the potential indirect impacts is outlined in **Table 7.5**.

**Table 7.5 Ecological Values at Risk of Indirect Impacts**

Indirect Impact	Relevant Ecological Value	Description	Frequency	Duration	Magnitude
<b>Weed and pest incursion</b>	Threatened flora species and marine plants	Encroachment or exacerbation of exotic weed species including but not limited to high biomass grasses could inhibit regeneration, increase fire loads and/or smother individuals within the retained areas of potential habitat.	Infrequent / periodic – fluctuate seasonally and with land management practices or breaches in general construction protocols (weed washdowns etc.).	Temporary – outbreaks addressed via general land management obligations under State laws.	Localised, but could extend to the MPA if unmanaged. Magnitude also considered low given existing condition of habitat is already impacted by weeds and pests.
	Squatter pigeon (southern)	The squatter pigeon (southern) is a predominantly ground dwelling species. The subspecies is highly susceptible to predation from exotic predators including feral cats and red foxes ( <i>Vulpes vulpes</i> ). However, as detailed previously, feral cat population levels in the Study Area are likely to already be high and the MDA has been co-located with cleared areas wherever possible, that may already provide a conduit for pest movement. With the implementation of best practice weed and pest mitigation measures, it is considered unlikely the Project will lead to a notable increase in pest populations.			
	Koala	Any potential increase in dingo or wild dog populations as a result of the Project could threaten the local koala population. However, as detailed previously, it is considered unlikely the Project will lead to a notable increase in pest populations given there is likely abundance of the existing population.			
	Collared delma	Habitat for this species is susceptible to weed incursion, which may degrade and eventually displace individuals or lead to their mortality. This species is also susceptible to increased predation from exotic predators. With the implementation of best practice weed and pest mitigation measures, it is considered unlikely the Project will lead to a notable increase in weed populations.			
	Water mouse	Weeds have the potential to degrade water mouse habitat, particularly <i>Lantana camara</i> *. They are also susceptible to			



Indirect Impact	Relevant Ecological Value	Description	Frequency	Duration	Magnitude
		predation by exotic predators such as the red fox and feral cats, while feral pigs are known to predate on water mouse and dismantle critical shelters.			
	Waterbirds/shorebirds	Quality and availability of foraging resources are directly related to condition of aquatic habitat and therefore increased weed incursion could impact on species habitat in the Study Area. These species are also high susceptible to predation due to their ground roosting habits however the Project is considered highly unlikely to lead to a notable increase in pest populations.			
<b>Elevated dust</b>	Threatened flora species and marine plants	Extended periods of dust deposition could threaten the health and viability of potentially present individuals and vegetation communities. The implementation of dust management as deemed necessary and in response to conditions will limit the chances of construction dust having an adverse impact on vegetation.	Infrequent – associated with breaches in general construction protocols. Frequency is likely to be higher within the access road corridor due to higher levels of traffic during construction.	Temporary – potential impacts rectified through active management or through natural processes such as rainfall.	Localised / low – will only affect immediate area.

Indirect Impact	Relevant Ecological Value	Description	Frequency	Duration	Magnitude
<b>Erosion, sedimentation and reduced water quality</b>	Threatened flora species and marine plants	The MDA has variable terrain and includes areas of steep hills and rises. Threatened flora and vegetation communities are known, or have the potential to occur in these areas, and will be susceptible to habitat degradation and direct impact should soils become unstable as a result of adjacent works.	Infrequent / periodic – fluctuate seasonally and with land management practices or breaches in general construction protocols.	Temporary – limited to once off incident or rectified through seasonal inundation diluting to background levels given the ephemeral nature of most waterbodies.	Localised / low – will only effect immediate area.
	Greater glider (southern and central) and yellow-bellied glider (south-eastern)	Although unlikely, erosion and alteration of riparian zones may lead to the loss of canopy vegetation. These trees may contain hollows which are necessary for the breeding of arboreal mammals. Trees may also be important for maintaining shelter and connectivity along the watercourse.			
	Water mouse	Quality and availability of foraging resources are directly related to condition of aquatic habitat and therefore any reduction in water quality could impact on species habitat in the Study Area.			
	Waterbirds/ shorebirds				
	Marine turtles				
<b>Increased noise and artificial light</b>	Nocturnal threatened species	Increased lighting within or adjacent to potential habitat within the MDA could increase the success of predation by visual predators (including exotic pests) or could alter foraging and breeding behaviours. Construction noise during the day may disturb denning or roosting individuals and negatively affect circadian rhythms. Noise and light impacts will be managed via a Project-specific Environmental Management Plan (EMP) which will minimise the overall risk of adverse impacts.	Occasional – no night work however noise and light as a result of construction works have the potential to disrupt fauna species.	Temporary – no night work, significant excavation work likely required only within a portion of the MDA and generally limited to tower locations.	Localised – restricted to confined worksite within MDA.
	Waterbirds/ shorebirds				



Indirect Impact	Relevant Ecological Value	Description	Frequency	Duration	Magnitude
<b>Altered fire regimes</b>	All values	Changes to fire frequency within the wider Study Area may result in increased predation and mortality of ground-dwelling individuals, especially those with poor or no mobility. Altered fire regimes may also impact on habitat and lead to degradation. Construction activities are unlikely to significantly alter existing grazing pressure or the implementation of land management practices currently employed by the landholder. Although the increased plant and vehicle presence will result in an increased number of potential ignition sources, employment of standard construction protocols in conjunction with an EMP with bushfire management measures will ensure the risk of bushfire is actively managed.	Infrequent – associated with breaches in general construction protocols.	Temporary – potential impacts rectified through active management or through natural processes such as rainfall.	Localised / low – will only effect immediate area.

## 7.2 Operation and Maintenance

Potential impacts on ecological values during the operation and maintenance phase of the Project are likely to be low. Activity within the MPA and MDA will be very low and limited to periodic maintenance as detailed in **Section 2.2**. Maintenance will involve vegetation clearing (predominantly ground slashing of regrowth canopy vegetation as needed) in areas that were cleared during the construction phase and along tracks. While some access tracks will remain during operations, the remaining ancillary infrastructure will no longer be required once construction has finished.

As per the construction phase, maintenance clearing will be completed in phases allowing time for fauna to disperse and temporarily avoid active areas. Traversing maintenance vehicles may inadvertently introduce weeds and potentially collide with ground dwelling species resulting in injury or mortality. These potential impacts will be mitigated through Powerlink's specific controls such as weed hygiene procedures, designated tracks and site speed limits and triggers for erosion and sediment control management.

Operation of the Project may also lead to an increased risk of fauna mortality through collision with powerlines. Mortality because of collision is a known threat to the ghost bat, however this is restricted to fences as the species generally flies at much lower heights. Collision with transmission lines is not a known risk to the greater glider (southern and central) or yellow-bellied glider (south-eastern). Nonetheless, design of the MDA has sought to maximise the use of high points in the landscape to allow large line spans and less vegetation clearing. Given the average tower height in the proposed transmission line is 54.4 m, it is considered highly unlikely that towers and connecting lines will be low enough to obstruct gliding. However, it is noted that the Project will occur adjacent to an existing powerline in some areas which may obstruct gliding when it is required over a larger distance. Retention of riparian vegetation will ensure preferential movement corridors remain in the local area.

## 7.3 Decommissioning and Rehabilitation

Similar to the operation and maintenance phase of the Project, decommissioning and rehabilitation activities are also considered to have only low and temporary impacts on ecological values. All works in this phase will be conducted in consultation with landholders. Other than for surface rehabilitation, no ground disturbance will occur as subsurface components of the Project infrastructure will likely remain in-situ.

Temporary and localised increases in noise and potentially dust may occur but will be managed using the same methods used during construction. Traversing vehicles required to complete decommissioning or rehabilitation activities may inadvertently introduce weeds and potentially collide with ground dwelling species resulting in injury or mortality.



## 8.0 Avoidance, Mitigation and Management

Powerlink has implemented the hierarchy of management principles in the planning for and development of the Project. These principles and the order in which they have been applied is as follows.

- **Avoid:** locating activities to avoid direct and indirect impacts on ecological values.
- **Minimise:** minimising direct and indirect impacts where they cannot be completely avoided.
- **Mitigate:** implementing mitigation and management measures to reduce direct, indirect and cumulative impacts.
- **Remediate and Rehabilitate:** actively remediate and rehabilitate impacted areas to promote long-term recovery.

**Sections 8.1** and **8.2** describe how impacts on ecological values have been avoided and minimised for the Project and **Section 8.3** describes the mitigation measures.

### 8.1 Avoid

The siting of permanent infrastructure components within MPA and MDA has been carefully considered in the context of environmentally sensitive areas including known threatened species habitat. The primary purpose of this assessment was to maximise opportunities to reduce the clearing of vegetation and direct impacts on MSES, threatened species and associated habitat.

The process that was undertaken includes:

- The initial line design was created which shows tower locations, tower heights, centre line and conductor location (offset 6 m either side of centreline). Software models the maximum sag of the conductor under maximum capacity on the hottest day of the year. Next, the plan and profile of this design was created. Vegetation violations were modelled, using LIDAR, identifying where trees and vegetation intercepted the clearance zones.
- From an environmental perspective, each span and tower location were considered. The presence of threatened species based on ground-truthed ecological survey data was noted, along with bushfire risk. Where threatened species or threatened species habitat were present, and there were significant vegetation violations, the towers and spans were identified for discussion at a mitigation workshop.
- A mitigation workshop was held with internal stakeholders (environment, cultural heritage, indigenous partnerships, line design layout, maintenance works control manager, landholder relations, property, line construction access specialist, construction project manager) to review the proposed alignment and tower placement. Where sensitive areas were identified, changes were made to the design and the model was re-run to determine whether the changes resulted in avoidance of impacts on relevant values (environmental, cultural, landholder constraints, design constraints). Parameters changed included increasing tower height, moving tower location, reducing span length, adding towers and changing tower type from suspension to tension tower.
- Following the workshop, the line design was revised and circulated for subsequent review by internal stakeholders.

- Vegetation violations were re-modelled to identify where vegetation violated the exclusion zones. This data was provided as a spatial output for GIS analysis.
- Each span was reviewed, recording the regional ecosystem, vegetation status (remnant, regrowth, non-remnant), bushfire hazard rating (potential impact buffer, low, medium, high, very high) from Qld Bushfire Prone Area mapping developed by CSIRO, Queensland Fire Department and PSBA. Where multiple bushfire hazard risk categories occurred within a span, the highest value was selected. This information was used to determine vegetation clearing risk. Vegetation clearing risk is generally low if the analysis identifies no bushfire risk, potential impact buffer, low or medium bushfire risk. If bushfire risk is high or very high, vegetation clearing risk is high.
- To model the Disturbance Footprint, vegetation clearing risk classification, line design and LIDAR was provided to a spatial specialist. Modelling was based on the clearing requirements identified in **Table 1.3**.
- After the tower locations were identified, the ancillary infrastructure sites were determined.
- The spatial specialist then ran a second phase of modelling, to determine if there is sufficient air gap between the bottom of the conductor and the top of the vegetation to avoid the need to clear.
- The MDA was then reviewed with the construction team to ensure constructability is achievable.
- A site visit was then undertaken to identify areas where clearing can be further reduced.

## 8.2 Minimise

The following measures will be implemented to minimise the loss of vegetation and habitats:

- Vegetation clearing will be restricted to the minimal amount necessary for the construction of the Project activities. Micro-siting of infrastructure such as tower footprints will be undertaken during the detailed design phase to further reduce impacts and to ensure areas of high ecological significance are avoided as a priority.
- Construction of the Project will occur progressively and in phases. By doing this, only a small subset of the Disturbance Footprint will be impacted at one time. Many of the indirect impacts from the construction of the Project will be localised and temporary, and all indirect impacts will be actively managed as detailed in following sections. Furthermore, clearing extents detailed in **Table 7.4** represent a maximum area. Direct impacts to threatened species and MSES will be minimised where possible including through micro-siting.
- Areas of high terrain will allow spanning of a majority of vegetated areas, particularly in habitats of low open woodlands that feature very sparse canopy trees of low height. In such areas, clearing is likely to be limited to that required for tower footprints and access tracks. These tower and access locations will be determined during the detailed design phase.
- Waterway crossings containing riparian vegetation corridors will be spanned in most instances, and particularly where values for and occurrences of listed threatened flora and fauna species have been identified by desktop mapping or surveys. Larger waterways will have higher towers and longer spans in order to avoid the bed and banks of waterways and place towers as far back from fringing vegetation. For access tracks across ephemeral waterways, existing crossings or clearings will be used. Any clearing required within a riparian corridor will be minimised with larger habitat trees retained.



- Rehabilitation of construction sites will occur progressively as the construction process advances. Disturbed areas not required for access roads and maintenance areas around structures will be restored as soon as practicable.

## 8.3 Mitigate and Manage

Mitigation and management measures developed for the Project vary in scope and include both general and species-specific measures. Further detail on these measures, which will be captured and implemented through Project management plans, is detailed in the subsequent sections and reflect project wide measures which include the MPA and MDA.

The Project will be governed by several management plans including, but not limited to:

- A comprehensive EMP, which will include actions to limit and reduce the potential impacts on ecological values and biodiversity more broadly across the life of the Project. This EMP will also encompass actions for decommissioning, vegetation and fauna, weeds and pests, bushfire management and basic controls for biosecurity
- A Biosecurity Management Plan (BioMP)
- An Erosion and Sediment Control Management Plan (ESCP)
- An Acid Sulfate Soils Management Plan
- A Water Quality Monitoring Plan.

Management plans will be prepared for the Project prior to construction and once the necessary approvals are gained. Project management plans will include performance criteria and general requirements / standard operational controls. All measures included in the Project plans will be developed to be consistent with the S.M.A.R.T principle, ensuring they are:

- Specific – prescriptive, with no uncertainty or ambiguity around their purpose or implementation.
- Measurable – the status (i.e. success or failure) and outcomes/results can be measured.
- Achievable – through the chosen method of implementation, by the responsible personnel and within the specified timeframe.
- Relevant – to the action/impact being controlled and to the protected matter.
- Time bound – Measures were given specific and achievable timeframes for implementation in relation to specific development activities or stages.

### 8.3.1 General Mitigation Measures

The mitigation and management measures for this Project have been proposed in line with Powerlink's Environmental Management Plan. An environmental annexure will be developed and issued as part of contractor engagement. The environmental annexure will detail site specific environmental management requirements relevant to the project. The contractor will then be expected to develop a Construction Environmental Management Plan (CEMP) in compliance with both the EMP and annexures.

Environmental Work Plans (EWPs) provide a geospatial representation of key terrestrial and aquatic based data sets which are of relevance to Powerlink's assets. EWPs shall be used by Powerlink staff, contractors, relevant subcontractors and relevant Maintenance Service Providers for the identification of key environmental features and/or constraints which have been highlighted to enable works to be undertaken on or in association with a Powerlink asset.

The expected impacts for the Project have been listed, and suitable mitigation measures identified in **Table 8.1.**



**Table 8.1 General Mitigation Measures**

Impact	Project Phase	Mitigation Measures
<b>Vegetation Clearance</b>	Construction	<p>Clearing of vegetation will be undertaken in accordance with Powerlink's project specific EMP, environmental annexure and relevant management plans. The following measures specific to the clearing of vegetation and habitat, including no-go zones, approved widths, methods and preparation procedures should be considered:</p> <ul style="list-style-type: none"> <li>• Clearly demarcate vegetation clearance areas to avoid over-clearing within mapped habitat.</li> <li>• Clearing methodology should be specified on the EWP. Restricted clearing areas will be identified which include areas that only hand clearing can occur.</li> <li>• Clearly demarcate no-go zones. These areas may include threatened species habitat and marine plants that is mapped within the Disturbance Footprint and removal is not required for the Project. Areas to be cleared and no go zones, including habitat areas to be retained should be identified on the EWP (ESRI software Field Maps).</li> <li>• Fauna Spotter Catchers will carry out pre-clearance surveys and be on site during all clearing activities.</li> <li>• Microhabitat features such as large fallen logs should be relocated to adjacent areas of undisturbed vegetation prior to vegetation clearing where practicable.</li> <li>• Woody debris in the Disturbance Footprint collected below the HAT is considered as marine plants and should be relocated adjacent to provide for potential fish habitat.</li> <li>• Stockpiling of felled vegetation, retention of vegetation for use in on-site rehabilitation, and specific requirements for clearing vegetation surrounding creek lines and watercourses.</li> <li>• Relevant weed, dust, erosion and sediment control.</li> <li>• Rehabilitation requirements for disturbed areas no longer required for active use or construction.</li> <li>• Site induction/education of site personnel to be familiar with the content of the plan.</li> </ul>
<b>Weed Disturbance</b>	Construction and operation	<p>Biosecurity will be managed in accordance with Powerlink's EMP, environmental annexure and the project-specific CEMP and should consider the following:</p> <ul style="list-style-type: none"> <li>• Identifying, locating, and removing/treating restricted weeds and high-biomass grasses within the Disturbance Footprint.</li> <li>• Identifying the origin of, and implementing hygiene protocols for, machinery, vehicles, equipment and construction materials to avoid weed introduction.</li> <li>• Keeping staff and contractors informed about the location of biosecurity threats.</li> <li>• Implementing management methods to control the spread of WoNS and/or weeds considered restricted matters under Queensland legislation.</li> </ul>

Impact	Project Phase	Mitigation Measures
		<ul style="list-style-type: none"> <li>• Raising weed management awareness through including weed issues, pictures, and procedures into the Project's site induction.</li> <li>• Undertaking a weed management program to identify spread and new incidents of weeds.</li> <li>• Implementing reporting requirements and performance measures.</li> </ul> <p>To ensure its suitability, Biosecurity protocols should be developed in coordination with Traditional Owners, regional conservation groups and landholders.</p>
<b>Pest Fauna</b>	Construction and operation	<p>Pest fauna will be managed in accordance with Powerlink's EMP, environmental annexure and the project-specific CEMP and should consider the following:</p> <ul style="list-style-type: none"> <li>• Implement a species-specific control program for pest fauna in consultation with landowner(s). This is only to be implemented if incidence of any feral species has increased during construction or operation as reasonably attributable to the Project.</li> <li>• Avoid inclusion of any water retaining voids or pits in the design where these are not otherwise required for the control of stormwater run-off erosion and sediment control measures or dams required to supply water for construction activities. Where pits and voids are required, include appropriate cover to prevent extended water retention and subsequent breeding opportunities for cane toads.</li> <li>• For pits and voids where long-term presence of retained water is reasonably anticipated and covering is not practicable, fencing to exclude access by cane toads will be incorporated in the design. Sediment fencing, free standing or attached to the base of other fencing material has proven to be effective.</li> <li>• Wash down and laydown areas will be designed to include cane toad traps where exclusion from areas of potential water retention is not practicable and where cane toad activity is locally detected.</li> <li>• No alteration, or refuse left exposed, which will specifically assist breeding opportunities for cane toad, red fox, feral cat, dog, house mouse or black rat on site.</li> <li>• To reduce the presence of pest fauna on site, all food scraps must be placed into designated waste bins, and their lids securely closed.</li> <li>• Train workforce in the identification of pest fauna species present in the area.</li> </ul>
<b>Erosion and Sediment</b>	Construction	<ul style="list-style-type: none"> <li>• A project – specific erosion and sediment control plan will be developed and implemented in accordance with Powerlink's EMP by the construction contractor. It is suggested the plan be developed by a Certified Professional in Erosion and Sediment Control (CPESC) or a Registered Soil Practitioner – Erosion and Sediment Control (RSP-ESC). The plan should follow the IECA Best Practice Erosion and Sediment Control Guidelines 2008 and be developed to minimise habitat degradation in areas adjacent to construction. This may include the establishment of temporary</li> </ul>



Impact	Project Phase	Mitigation Measures
		erosion and sediment control until construction is complete, or exposed areas have been rehabilitated to prevent the sedimentation of waterways within the Study Area.
<b>Water Quality</b>	Construction	<ul style="list-style-type: none"> <li>• Appropriate spill prevention and response plans will be developed to cover Project activities and the types and quantities of fuel, oil and chemicals held.</li> <li>• Temporary site offices, stockpiling/laydown areas, plant and equipment storage areas will be located away from waterbodies and will be sited within already cleared or disturbed areas.</li> <li>• A Water Quality Monitoring Program will be implemented at the Calliope River, to compare pre- and post-construction water quality and determine extent of Project related impacts.</li> </ul>
<b>Acid Sulphate Soils</b>	Construction	<ul style="list-style-type: none"> <li>• A Powerlink developed Project-specific Acid Sulfate Soils Management Plan (ASSMP) will be prepared and implemented in accordance with Queensland Acid Sulphate Soil Technical Manual Soil Management Guidelines v5.1.</li> </ul>
<b>Fauna Mortality/ Disturbance</b>	Construction and operation	<p>To mitigate fauna mortality/disturbance, works will be carried out in accordance with Powerlink's EMP, environmental annexure and the project-specific CEMP and should consider the following:</p> <ul style="list-style-type: none"> <li>• Pre-clearance searches of habitat will be undertaken prior to clearing by a qualified fauna spotter, with habitat features/trees clearly identified and searched for fauna. The EMP outlines measures, including the presence of qualified fauna spotters, to protect and recover fauna encountered during vegetation clearing.</li> <li>• Habitat trees within the clearing footprint that can be safely retained will be marked with flagging tape and avoided.</li> <li>• A qualified fauna spotter will be present at all times during clearing and where possible will inspect habitat features (including but not limited to, hollow-bearing trees and stags, caves and rocky boulder piles) for MSES prior to felling, using work platforms, inspection cameras, or other methods deemed safe and suitable. Spotters will also be present during earthworks where exposed trenches and holes will be left for periods greater than 24 hours.</li> <li>• Hollow bearing trees will be 'slow felled' to minimise the chances of injury or death and will be inspected by a qualified fauna spotter to confirm no injured wildlife are present.</li> <li>• Fauna welfare procedures will be considered throughout the Project including operational and compliance reporting procedures for injured and/or dead wildlife.</li> <li>• Outline measures to replace/relocate habitat and resources that will be unavoidably lost. This will include rehabilitation procedures for the decommissioning of infrastructure if those areas are not otherwise useful to the ongoing land use.</li> <li>• Training/information requirements for all personnel working on the Project, including but not limited to inductions, daily toolbox talks and/or site walk overs which discuss the management measures or risks at particular locations.</li> </ul>

Impact	Project Phase	Mitigation Measures
		<ul style="list-style-type: none"> <li>• Active animal breeding places will only be tampered with following the development and approval of an appropriate Species Management Program (low and/or high-risk) as per the Nature Conservation (Animals) Regulation 2020.</li> <li>• Outside of public areas, vehicle movement within the Study Area will be via approved access tracks only with speed limits imposed (40 km/hr on private property). The requirement to enter and traverse the Study Area will be minimised and limited to those required for essential Project activities. Changes to speed limits and access will be promptly communicated to all site personnel via email notifications, toolbox talks and notices in common areas.</li> <li>• On the advice of a suitably qualified ecologist, signage which includes information such as wildlife presence will be installed on private roads and tracks to mitigate potential collisions.</li> </ul>
<b>Other Indirect Impacts</b>	Construction and operation	<ul style="list-style-type: none"> <li>• Dust suppression measures will be implemented as required i.e. on high wind days (winds above 20 km/hr) during dry periods.</li> <li>• No night works will occur for the construction of the Project.</li> <li>• Where approved, Powerlink or the construction contractor may extract water from select farm dams for construction purposes. Water will only be taken where available supplies provide continuity of habitat function and quality.</li> <li>• Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards.</li> <li>• The threat of wildfire caused by Powerlink activities will be minimised through maintenance of firebreaks around ignition sources as appropriate.</li> </ul>



### 8.3.2 Species Specific Mitigation Measures

As well as the mitigation measures listed in **Section 8.3.1**, the following Project specific measures to known or potentially occurring threatened or migratory species should be included:

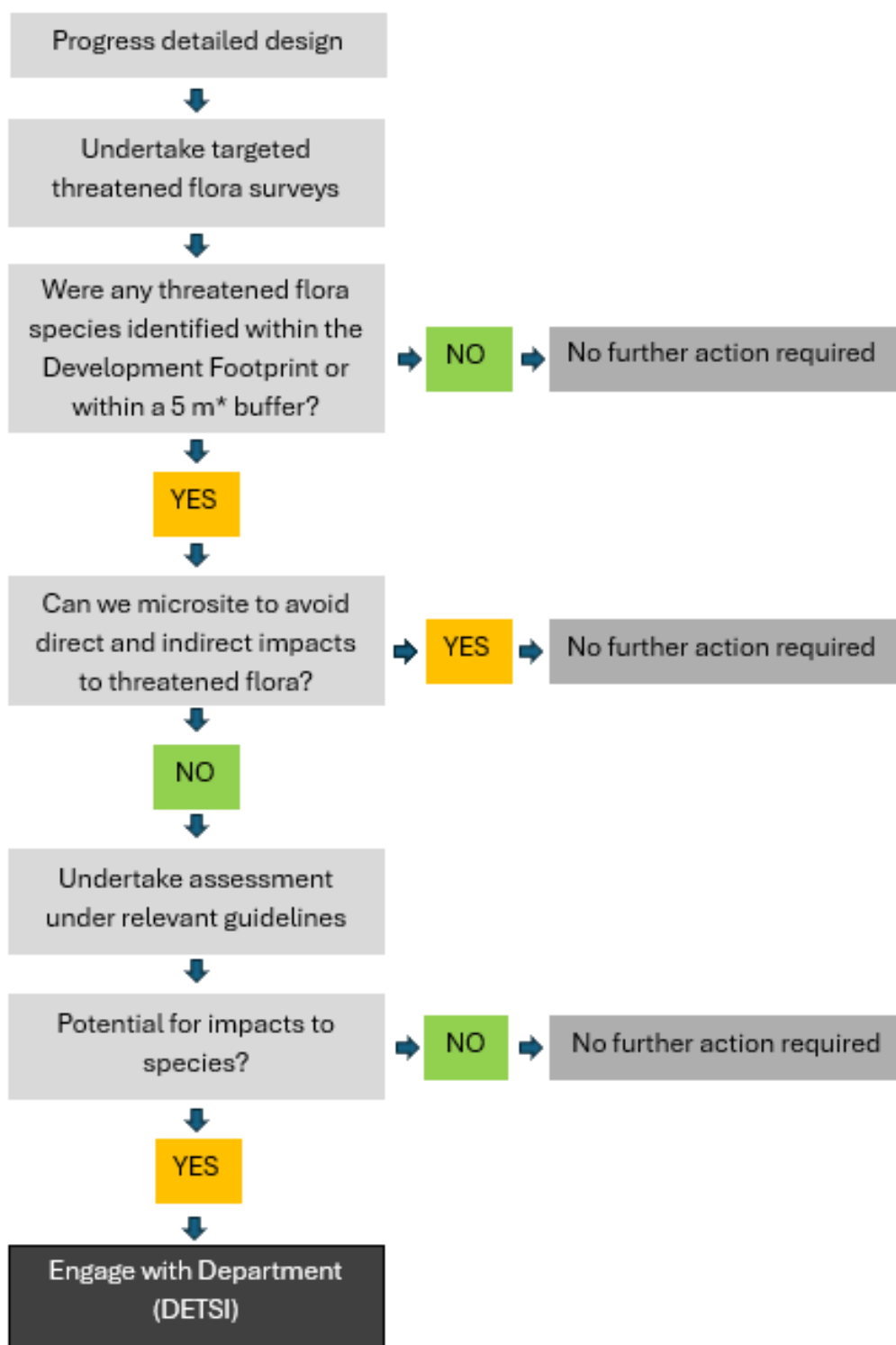
- The Disturbance Footprint plus a 5 m buffer (to account for GPS inaccuracies) will be surveyed by suitably qualified persons to identify potential threatened flora species, and will record the location, extent, and numbers present. Individuals adjacent to the Disturbance Footprint to be retained will be demarcated to ensure their presence is known and avoided during construction.
- Where they cannot be retained, hollow-bearing trees and stags will be soft felled to minimise the chances of injury or death and inspected by a fauna spotter-catcher to identify any potentially denning greater glider (southern and central) or yellow-bellied glider individuals.
- In areas of mapped squatter pigeon (southern), Australian painted snipe, black-breasted button-quail and shorebird species habitat planned for clearing, spotter-catchers will complete flushing surveys to encourage the dispersal of any individuals present out of the clearing path.
- Where potential habitat may be suitable for squatter pigeon (southern), short-beaked echidna and black-breasted button-quail breeding or nesting, nest/burrow and egg searches will also be conducted.
- If the spotter-catcher determines a nest/burrow to be active, it will be managed in accordance with an approved Species Management Program issued under the Queensland Government.
- In areas of mapped collared delma habitat planned for clearing, spotter-catchers will search for individuals and potential nests/burrows belonging to the species. A species-specific management plan will be developed to outline the relocation protocol of the species out of the Disturbance Footprint.
- In the event a koala is detected during clearing works, the clearance of vegetation should be halted until the individual leaves the location on its own accord.
- Water extraction will be conducted at an alternative location within the Study Area should any migratory wetland birds be identified utilising the habitat.
- Water extraction activities will be strictly controlled and monitored in liaison with the landholder to ensure no waterbodies are reduced to unusually low levels. Per waterbody, a single access point will be utilised for water extraction to minimise areas of disturbance and allow potentially occurring individuals to avoid the same area during construction. Existing access points to dams will be used preferentially over the creation of new ones.
- Appropriate sediment and erosion control measures will be implemented to avoid potential contamination of surface water or adjacent habitats and increases in areas of pooling water, which may create breeding habitat for cane toads.
- The presence of exposed trenches or excavations which may entrap dispersing, ground-dwelling NC Act-listed species such as the koala and short-beaked echidna should be minimised as much as practical. Where open trenches or excavations will occur for prolonged periods, trench ladders, ramps, sticks, ropes and the use of moist hessian sacks at regular intervals (or similar) will be utilised to help trapped fauna escape and/or survive until removed by a fauna spotter-catcher.
- Where pits, voids or trenches are required, include appropriate cover to prevent extended water retention in these spaces and/or subsequent breeding opportunities for cane toads.
- No off-track driving within the mangrove or saltmarsh habitat will be permitted.

- The presence of threatened plants within the Disturbance Footprint requires specific measures to reduce impacts to each known species. This will include a species-specific management plan (SMP) to reduce the potential impacts within the Study Area, by outlining mitigation and management measures to be implemented throughout the duration of the Project. In addition, for relevant species, a translocation plan will be completed dependent on the final design and impacts to individuals.

#### **8.3.2.1 Unexpected Finds Protocol – Threatened Flora**

Despite the significant survey effort to date, Powerlink recognises that there is potential for a previously unidentified threatened plant individual or population to be observed during future surveys for the Project (targeted surveys of any new areas established during detailed design; pre-clearance surveys). In this circumstance, the unexpected finds protocol for threatened flora would be initiated (**Figure 8.1**). This protocol involves determining if the individual or population would be directly impacted by the Project and if so, engagement with DETSI initiated to determine the next steps. It is anticipated that these surveys would be conducted with sufficient time to execute the protocol while still maintaining the Project schedule.





\* A minimum 5 m buffer will be applied; however, the actual buffer will be species -specific, dependent on the relevant conservation advice.

**Figure 8.1 Unexpected Finds Protocol – Threatened Flora**

## 8.4 Rehabilitate

Nominated areas of temporary construction activities where not required for operations will be subject to rehabilitation efforts including:

- Laydown areas (including former areas used as batching plants)
- Brake and winch sites outside the operational footprint.

Rehabilitation will include the planting of species known to the region, consistent with the characteristics of surrounding retained vegetation. Rehabilitation will also involve continuous monitoring and management, including erosion prevention, management of weed species and protection and enhancement of impacted water sources to achieve a condition of the historic vegetation at the rehabilitation site.

## 8.5 Offset

Under the Queensland's environmental offsets framework, an environmental offset can be imposed by an administering agency as a condition of an authority if the activity has been identified as a 'prescribed activity'.

Section 9 of the EO Act defines a 'prescribed activity' as:

- the subject of an authority under another Act; and
- for which an offset condition may be imposed under the other Act on the authority; and
- that is prescribed under the regulation.

Schedule 1 of the EO Regulation identifies the prescribed activities that are prescribed under the regulation for the purposes of Section 9 (c) of the EO Act.

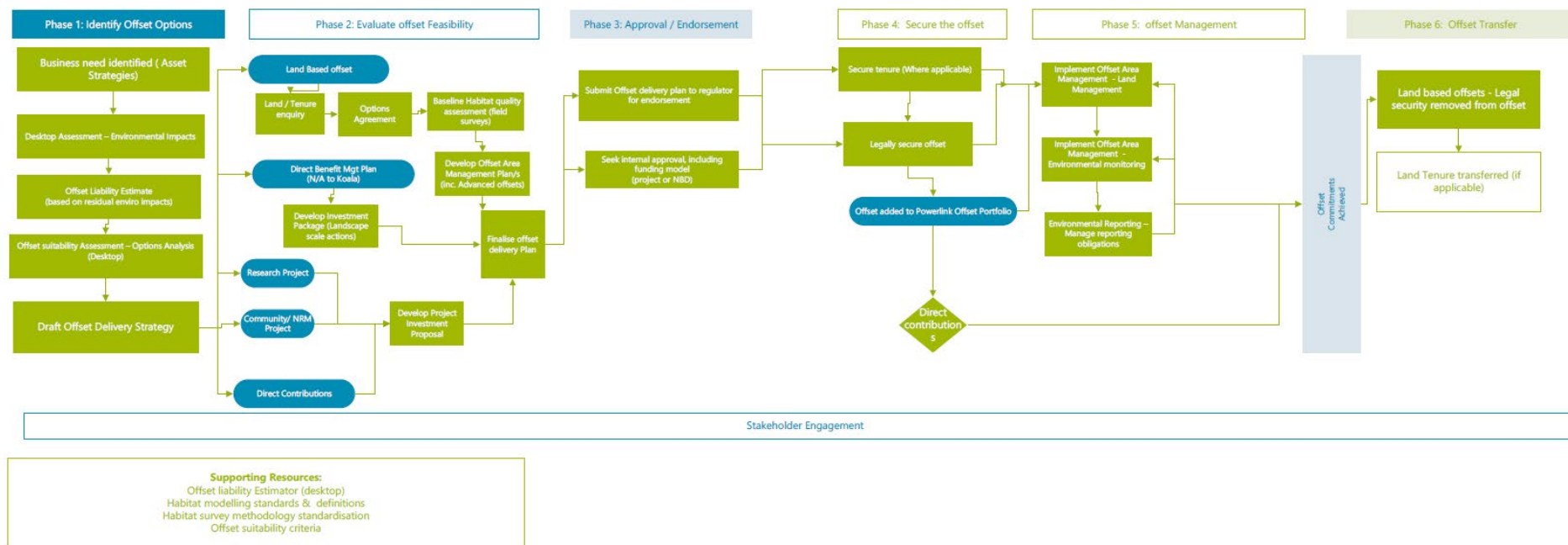
Notwithstanding, the Project may be subject to environment offsets under other approval mechanisms under the EPBC Act and the NC Act.

To satisfy the offset requirements under the EPBC Act and the NC Act, Powerlink is in the process of refining and finalising its Draft Offsets Framework for the Project and the other stages of the Gladstone Project. The Draft Offsets Framework currently comprises of six phases:

- Phase 1: Identify Offset Options
- Phase 2: Evaluate Offset Feasibility
- Phase 3: Approval / Endorsement
- Phase 4: Secure the Offset
- Phase 5: Offset Management
- Phase 6: Offset Transfer.

A flowchart further detailing the Draft Offsets Framework is shown as **Figure 8.2**. Powerlink is currently in Phase 1 of this process where offsets liability for threatened species and ecological communities have been identified, and an assessment of offset land suitability is progressing. It is important to note that the Draft Offsets Framework is subject to change and further refinement.





**Figure 8.2 Powerlink Draft Offsets Framework**

## 9.0 Significant Residual Impact Assessment

The MPA totals 177.5 ha, whilst the MDA totals 93.6 ha. For the purpose of the impact assessments, complete clearing of the MDA been assumed. However, this total impact may be reduced during detailed design and during construction, as vegetation adjacent to the transmission line may remain in place if it does not violate the exclusion zones.

As described in **Section 6.9**, five MSES are mapped within the MPA. These being:

- Regulated Vegetation
  - Category B REs listed as endangered or of concern under the VM Act
  - Essential habitat
  - Vegetation within a defined distance of a watercourse.
- Connectivity areas
- Protected wildlife habitat (assessed within the coastal erosion zone of the MDA)
- Waterway providing for fish passage
- Marine plants.

Regulated vegetation, connectivity areas, waterways providing for fish passage and marine plants were mapped in reference to Module 5 and Module 8 of the of the *Significant Residual Impact Guideline* (Department of State Development, 2014). Whilst all other MSES were mapped within coastal erosion prone areas of the MDA as part of Module 10 of the *Significant Residual Impact Guideline* (Department of State Development, 2014).

An assessment of these MSES against the SRI guidelines is located in **Appendix E** with a summary of results shown in **Table 9.1**.

**Table 9.1 Summary of the SRI Assessments of the MDA**

MSES		Extent within the MDA (ha)	SRI Assessment Outcome
<b>Regulated Vegetation</b>	Category B REs listed as endangered or of concern	1.1	Not Significant
	Vegetation within a defined distance of a watercourse	0.9	<b>Significant</b>
	Essential habitat	14.5	<b>Significant</b>
<b>Connectivity Areas</b>		-	Not Significant
<b>Protected Wildlife Habitat</b>	<i>Samadera bidwillii</i>	0.2	Not Significant
	Ghost bat	0.2	Not Significant
	Painted honeyeater	0.2	Not Significant
	Water mouse	0.02	Not Significant
	White-throated needletail	0.2	Not Significant



MSES	Extent within the MDA (ha)	SRI Assessment Outcome
Threatened shorebirds	0.02	Not Significant
Short-beaked echidna	0.2	Not Significant
<b>Waterway Providing for Fish Passage</b>	-	Not Significant
<b>Marine Plants</b>	0.025	<b>Significant</b>

## 10.0 Conclusion

This ecological assessment was developed to support the MID process of the Project. Using a combination of desktop information, field-validated data and extrapolated field survey results, the potential presence and extent of ecological values within the MPA was determined.

A total of 56 threatened flora and fauna species were considered known to occur, or to have a moderate or high likelihood of occurring within the Study Area. This includes 12 threatened flora species, 30 threatened fauna species and 14 special least concern fauna species.

Potential impacts on known and potentially occurring threatened flora and fauna resulting from the Project were determined (**Section 7.0**). Numerous sources of both direct and indirect impacts were identified, with the greatest risk to ecological values occurring during the construction phase due to vegetation clearing and associated habitat loss. Other potential impacts include exacerbation of biosecurity risks and disturbance from indirect impacts such as noise, weed dispersal, light and dust.

The Project has employed avoidance controls as part of the site selection and design of the Disturbance Footprint and will continue to consider ecological constraints during the detailed design phase. Where avoidance is not possible, the Project will maximise opportunities to micro-site infrastructure and mitigate or manage potential impacts during all phases. This will be done through the implementation of numerous management plans including an CEMP.

Five relevant MSES were mapped within the MDA: regulated vegetation, connectivity areas, protected wildlife habitat, waterway providing fish passage and marine plants. Regulated vegetation, connectivity areas, waterways providing for fish passage and marine plants were mapped in reference to Module 5 and Module 8 of the *Significant Residual Impact Guideline* (Department of State Development, 2014). Whilst all other MSES were mapped within coastal erosion prone areas of the MDA as part of Module 10 of the *Significant Residual Impact Guideline* (Department of State Development, 2014).

With consideration of Project avoidance, minimisation and mitigation measures, SRI assessments were undertaken in accordance with the *Significant Residual Impact Guideline* (Department of State Development, 2014). The findings of the assessment indicate that the Project has the potential or is likely to result in an SRI on two MSES, these being regulated vegetation and marine plants. In coastal erosion prone areas of the MDA, the SRI for protected wildlife habitat found that impacts are likely to be not significant. To mitigate impacts on these species and communities, **Section 8.0** details avoidance, mitigation and management measures for the Project.



# 11.0 References

- 3D Environmental (2012) *Appendix 11 - Terrestrial Ecology Supplementary EIS Study Arrow LNG Plant*. Prepared for Arrow Energy.
- ALA (2025) *ALA, Atlas of Living Australia*. Available at: <http://www.ala.org.au/about-the-atlas/> (Accessed: 5 January 2024).
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R., Poulter, R. (2003) *The New Atlas of Australian Birds, Birds Australia*. Melbourne, Victoria.
- Bat Call WA Pty Ltd (2021) *A review of ghost bat ecology, threats and survey requirements*. report prepared for the Department of Agriculture, Water and Environment, Canberra.
- Bean, A.R. (2024) *In Queensland Herbarium 2025. Census of the Queensland Flora and Fungi 2024*. Queensland Government: Queensland Department of Environment, Science and Innovation.
- Blakers, M. Davies, S. J. J. F., Reilly, P.N. (1984) *The Atlas of Australian Birds*. Melbourne, Victoria.
- Boehm, E.F. (1939) 'The Fork-tailed Swift (*Micropus pacificus*, Latham 1801): with special reference to its occurrence in South Australia', *South Australian Ornithologist*, (15), pp. 54–58.
- Bravery, J.A. (1971) 'Sight record of Uniform Swiftlet at Atherton, Qld', *Emu*, (71), p. 182.
- Bureau of Meteorology (2024) *Bureau of Meteorology, Climate Statistics for Australian Locations*. Available at: <http://www.bom.gov.au/climate/averages/tabhttp://www.bom.gov.au/climate/data/les/>.
- Bureau of Meteorology (2025) *Climate Data Online*. Available at: <http://www.bom.gov.au/climate/data/>.
- Burnham, M. (2000) *New locality records for Xeromys myoides false water-rat within the Great Sandy and Wide-Bay-Burnett management areas: results from surveys conducted February to April 1999 and March to May 2000*. Maroochydore: Queensland Parks.
- Cameron, A.C. (1968) 'Feeding habits of the Spine-tailed Swift', *Emu*, (68), pp. 217–219.
- Cameron, R., Hinchey, M. (1981) 'An apparently immature White-throated Needletail in Australia', *Australian Bird Watcher*, (9), p. 68.
- Campbell, A.G. (1930) 'Notes on swifts', *Emu*, (29), p. 308.
- Corben, C., Roberts, G., Smyth, A. (1982) 'Roosting of a White-throated Needletail', *Sunbird*, (12), pp. 47–48.
- Cropper, S. (1993) *Management of Endangered Plants*. Melbourne: CSIRO Publications.
- Day, N. (1983) 'Tree perching and presumed roosting of White-throated Needletails *Hirundapus caudacutus*', *Australian Bird Watcher*, (15), pp. 43–44.
- Department of Agriculture and Fisheries (2016) *Biosecurity Act 2014*.

Department of Agriculture and Fisheries (2018) 'Accepted development requirements for operation work that is constructing or raising waterway barrier works'.

Department of Agriculture and Fisheries (2022) 'State Development Assessment Provisions guideline State code 11: Removal, destruction or damage of marine plants'. Fisheries Queensland, Department of Agriculture and Fisheries.

Department of Agriculture Water and the Environment (2020) *Species Profile and Threats Database*. Canberra.

Department of Agriculture, Water and the Environment (2021a) *Conservation Advice for Xeromys myoides (Water Mouse)*. Canberra.

Department of Agriculture, Water and the Environment (2021b) *National Recovery Plan for the Painted Honeyeater (Grantiella picta)*.

Department of Climate Change, Energy, the Environment and Water (2022) 'National Recovery Plan for Black-breasted Button-quail (*Turnix melanogaster*)'. Commonwealth of Australia.

Department of Climate Change, Energy, the Environment and Water (2023) *Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles*. Canberra. Available at: <https://www.dcceew.gov.au/sites/default/files/documents/draft-referral-guidelines-nationally-listed-brigalow-belt-reptiles.pdf>.

Department of Climate Change, Energy, the Environment and Water (2025a) *Protected Matters Search Tool*. Available at: <http://www.environment.gov.au/epbc/protected-matters-search-tool>.

Department of Climate Change, Energy, the Environment and Water (2025b) *Species Profile and Threats Database*. Available at: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.

Department of Environment and Science (2020a) *Biodiversity Planning Assessment for the Brigalow Belt Bioregion*. Brisbane: Department of Environment and Science.

Department of Environment and Science (2020b) *Biodiversity Planning Assessment for the South East Queensland Bioregion*.

Department of Environment and Science (2025) *Species Profile Search*. Available at: <https://apps.des.qld.gov.au/species-search/>.

Department of Environment, Science and Innovation (2023) *Operational policy - When a protected plant in Queensland is considered to be 'in the wild'*. Queensland Government.

Department of Environment, Tourism, Science and Innovation (2025) *Flora Survey Guidelines - Protected Plants Nature Conservation Act 1992*. V2.03. Department of Environment, Tourism, Science and Innovation, pp. 1–11.

Department of Environment, Water, Heritage and the Arts (2010) *Survey guidelines for Australia's threatened birds: guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, ACT: Department of the Environment, Water, Heritage and the Arts, p. 278.

Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (2024a) *Vegetation management essential habitat map no attribute - version 12.08*. Available at:



<http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Vegetation%20management%20essential%20habitat%20map%20no%20attribute%20-%20version%2011.06%22>.

Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (2024b) 'Vegetation management regional ecosystem map - Version 13'. Available at: <http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Vegetation%20management%20regional%20ecosystem%20map%20-%20version%2012.02%20-%20By%20Area%20Of%20Interest%22>.

Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (2024c) 'Vegetation management regulated vegetation management map - version 7.08'.

Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (2024) *Vegetation management watercourse and drainage feature map (1:100000 and 1:250000) - Queensland except South East Queensland Version 7.00*. Department of Resources. Available at: [http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Vegetation%20management%20watercourse%20and%20drainage%20feature%20map%20\(1:100000%20and%201:250000\)%20-%20Queensland%20except%20South%20East%20Queensland%20Version%207.00%22](http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22Vegetation%20management%20watercourse%20and%20drainage%20feature%20map%20(1:100000%20and%201:250000)%20-%20Queensland%20except%20South%20East%20Queensland%20Version%207.00%22).

Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development, D. of R. (2020) 'Mineral resource sites - Queensland'. Department of Resources.

Department of Resources (2022) 'Detailed surface geology - Queensland'. State of Queensland. Available at:

<https://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={9BA2F66C-1933-4439-B9C9-E631911ADD7E}>.

Department of State Development, I. and P. (2014) *Significant Residual Impact Guideline - For matters of state environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009*. Brisbane.

Department of State Development, Infrastructure and Planning (2024) 'Development Assessment Mapping System'. Available at: <https://sppims-dams.dsdlgp.qld.gov.au/dams/?tab=layers&accordions=SARA+DA+MAPPING>.

Department of Sustainability, Environment, Water, P. and C. (2011) *Survey guidelines for Australia's threatened reptiles: guidelines for detecting reptiles listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, ACT: Australian Government. Available at: [www.ag.gov.au/ccca](http://www.ag.gov.au/ccca).

Department of Sustainability, Environment, Water, Population and Communities (2011) *Survey guidelines for Australia's threatened mammals: guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, ACT: Australian Government.

Department of the Environment (2015a) *Referral guideline for 14 birds listed as migratory species under the EPBC Act*. Commonwealth of Australia. Available at: <https://www.dcceew.gov.au/sites/default/files/documents/migratory-birds-draft-referral-guideline.pdf>.

Department of the Environment (2015b) *Referral guideline for 14 birds listed as migratory species under the EPBC Act*. Commonwealth of Australia, Canberra.

Department of the Environment (2015c) *Referral guideline for the vulnerable water mouse Xeromys myoides*. Commonwealth of Australia.

Department of the Environment (2015d) *Wildlife Conservation Plan for Migratory Shorebirds*. Commonwealth of Australia.

Department of the Environment (2016) *EPBC Act Referral Guidelines for the Endangered Northern Quoll Dasyurus hallucatus*. Australian Government.

Department of the Environment and Energy (2017a) *EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*. Commonwealth of Australia.

Department of the Environment and Energy (2017b) *EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*. Commonwealth of Australia.

Department of the Environment, Tourism, Science and Innovation (2023) *Flora Survey Trigger Map for Clearing Protected Plants in Queensland - Version 10.0*.

Department of the Environment, Tourism, Science and Innovation (2024) *Map of Queensland wetland environmental values*. Available at:  
<http://qldspatial.information.qld.gov.au/catalogue/custom/search.page?q=%22metadata%20title%22>  
 2.

Department of the Environment Water Heritage and the Arts (2008) *Approved Conservation Advice for Quassia bidwillii (Quassia)*. Canberra.

Department of the Environment, Water, Heritage and the Arts, H. and the A. (2010) *Survey guidelines for Australia's threatened bats: guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, ACT: Australian Government. Available at: [www.ag.gov.au/cca](http://www.ag.gov.au/cca).

Draffan, R. D. W., Garnett, S. T., Malone, G.J. (1983) 'Birds of the Torres Strait: an annotated list and biogeographic analysis', *Emu*, (83), pp. 207–234.

Eyre, T.J. et al. (2015) *BioCondition: A condition assessment framework for terrestrial biodiversity in Queensland - biocondition-assessment-manual. Version 2.2*. Brisbane: Department of Environment and Resource Management, p. 85.

Eyre, T.J. et al. (2018) *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland version 3*. Brisbane: Department of Environment and Science, Queensland Government.

Eyre, T.J. et al. (2022) *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland version 4. Version 4.0*. Department of Environment and Science. Available at:  
[https://www.qld.gov.au/\\_\\_data/assets/pdf\\_file/0022/68224/fauna-survey-guidelines.pdf](https://www.qld.gov.au/__data/assets/pdf_file/0022/68224/fauna-survey-guidelines.pdf).

Farmer, A.M. (1993) 'The effects of dust on vegetation - a review', *Environmental Pollution*, 79, pp. 63–75.

Garnett, S., Szabo, J. and Dutson, G. (2011) *The Action Plan for Australian Birds 2010*. CSIRO Publications.



Gladstone Regional Council (2020) 'Biosecurity Plan 2021-25 for invasive plants and animals'.

Higgins, P.J. (1999) *Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird*. Melbourne, Victoria: Oxford University Press.

Hourigan, C. (2011) *Ghost bat, Macroderma gigas. Targeted species survey guidelines*. Brisbane: Queensland Herbarium.

Hull, C.L. et al. (2013) 'Avian collisions at two wind farms in Tasmania, Australia: taxonomic and ecological characteristics of colliders versus non-colliders', *New Zealand Journal of Zoology*, 40(1), pp. 47–62. Available at: <https://doi.org/10.1080/03014223.2012.757243>.

Learmonth, N.F. (1950) 'Observations on swifts near Portland, Vic., during summer, 1949-1950', *Emu*, (50), pp. 56–58.

Learmonth, N.F. (1951) 'More observations on swifts', *Emu*, (51), pp. 151–152.

Legge, R.W. (1927) 'Birds of Sandy Cape, Tasmania', *Emu*, (27), pp. 19–23.

Loyn, R.H. (1985) 'Bird populations in successional forests of Mountain Ash, Eucalyptus regnans, in central Victoria', *Emu*, (85), pp. 213–230.

Madden, J.L. (1982) 'Avian predation of the Woodwasp, *Sirex noctilio* F., and its parasitoid complex in Tasmania', *Australian Wildlife Research*, (9), pp. 135–144.

McDonald, N.H.E. (1938) 'Notes on swifts', *Emu*, (38), p. 339.

McMicking, F. V. (1925) 'Spine-tailed Swifts (*Hirundapus caudacutus*) feeding on grasshoppers', *Emu*, (25), p. 41.

Mitchell, A., Peter, J. McCarthy, G. (1996) 'Birds of the Ironbark Basin', *Geelong Bird Report*, (1995), pp. 29–40.

Murcia, C. (1995) 'Edge effects in fragmented forests: implications for conservation', *Trends in Ecology & Evolution*, 10(2), pp. 58–62. Available at: [https://doi.org/10.1016/S0169-5347\(00\)88977-6](https://doi.org/10.1016/S0169-5347(00)88977-6).

Neldner, V.J. et al. (2025) *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0*. The State of Queensland (Department of Environment, Science and Innovation).

Partnership for the East Asian-Australasian Flyway (2008) *East Asian-Australasian Flyway Site Network: October 2008*.

Porensky, L.M. and Young, T.P. (2013) 'Edge-Effect Interactions in Fragmented and Patchy Landscapes', *Conservation Biology*, 27(3), pp. 509–519. Available at: <https://doi.org/10.1111/cobi.12042>.

Porter, R. (1998) 'A preliminary field investigation of the collared delma *Delma torquata* (Reptilia: Pygopodidae).', *Queensland: Lone Pine Koala Sanctuary*. [Preprint].

Queensland Government (2025) *Regional Ecosystem Descriptions, Regional Ecosystems*. Available at: <https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions>.

- Queensland Herbarium and Bean, T. (2016) *Collecting and Preserving plants specimens, a manual, Second Edition*. Department of Science, Information Technology and Innovation, Brisbane.
- Quested, T. (1982) 'Spine-tailed Swift landing in tree', *Australian Birds*, (16), p. 64.
- Reardon, T. (2003) *Standards in bat detector based surveys*, *Australasian Bat Society Newsletter* 20.
- Rose, A.B. (1997) 'Notes on the diet of swifts, kingfishers and allies in eastern New South Wales', *Australian Bird Watcher*, (17), pp. 203–210.
- Rowland, J. (2012) *Painted honeyeater, Grantiella picta. Targeted species survey guidelines*. Brisbane: Department of Environment and Science.
- Sattler, P. and Williams, R. (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*. Edited by R. Sattler, P., Williams. Brisbane: Environmental Protection Agency, Queensland Government.
- Slater, K.R. (1964) 'Spine-tailed Swift in central Australia', *Emu*, (64), p. 72.
- Stokes, T. (1983) 'Bird casualties in 1975-76 at the Booby Island Lightstation, Torres Strait', *Sunbird*, (13), pp. 53–58.
- Tarburton., M. (2015) 'Swifts over the Hunter Region', *The Whistler*, 9, pp. 23–27.
- Tarburton, M.K. (1993a) 'Radiotracking a White-throated Needletail to roost', *Emu*, 93, pp. 121–124.
- Tarburton, M.K. (1993b) 'Radiotracking a White-throated Needletail to roost', *Emu*, 93, pp. 121–124.
- Tarburton, M.K. (2014) 'Status of the White-throated Needletail *Hirundapus caudacutus* in Australia: Evidence for a marked decline', *Australia Field Ornithology*, (31), pp. 122–140.
- Templeton, M.T. (1991) 'Birds of scientific area S.A.16, Marbletop, Nanango, Queensland', *Sunbird*, (21), pp. 19–25.
- Threatened Species Scientific Committee (2015) *Conservation Advice, Grantiella picta, Painted Honeyeater*. Canberra: Department of the Environment.
- Umwelt (2024) 'MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE ASSESSMENT - Calvale to Calliope River Transmission Line Reinforcement Project'. Produced by Umwelt Australia Pty Ltd for Powerlink Queensland.
- Watson, I.M. (1955) 'Some Species Seen at the Laverton Saltworks, Victoria, 1950-1953, with Notes on Seasonal Changes', *Emu*, (55), pp. 224–248.
- Wheeler, J. (1965) 'A boy's care of an injured bird', *Australian Bird Watcher*, (2), pp. 152–153.
- Wheeler, W.R. (1959) 'Notes on Swifts, 1958-59', *Bird Observer*, (334), pp. 2–5.
- Wildlife Unlimited (2020) *Gladstone Ports Corporation Report for Migratory Shorebird Monitoring - Port Curtis and the Curtis Coast Annual Report – 2019*. Report produced for the Ecosystem Research and Monitoring Program Advisory Panel as part of Gladstone Ports Corporation's Ecosystem Research and Monitoring Program.

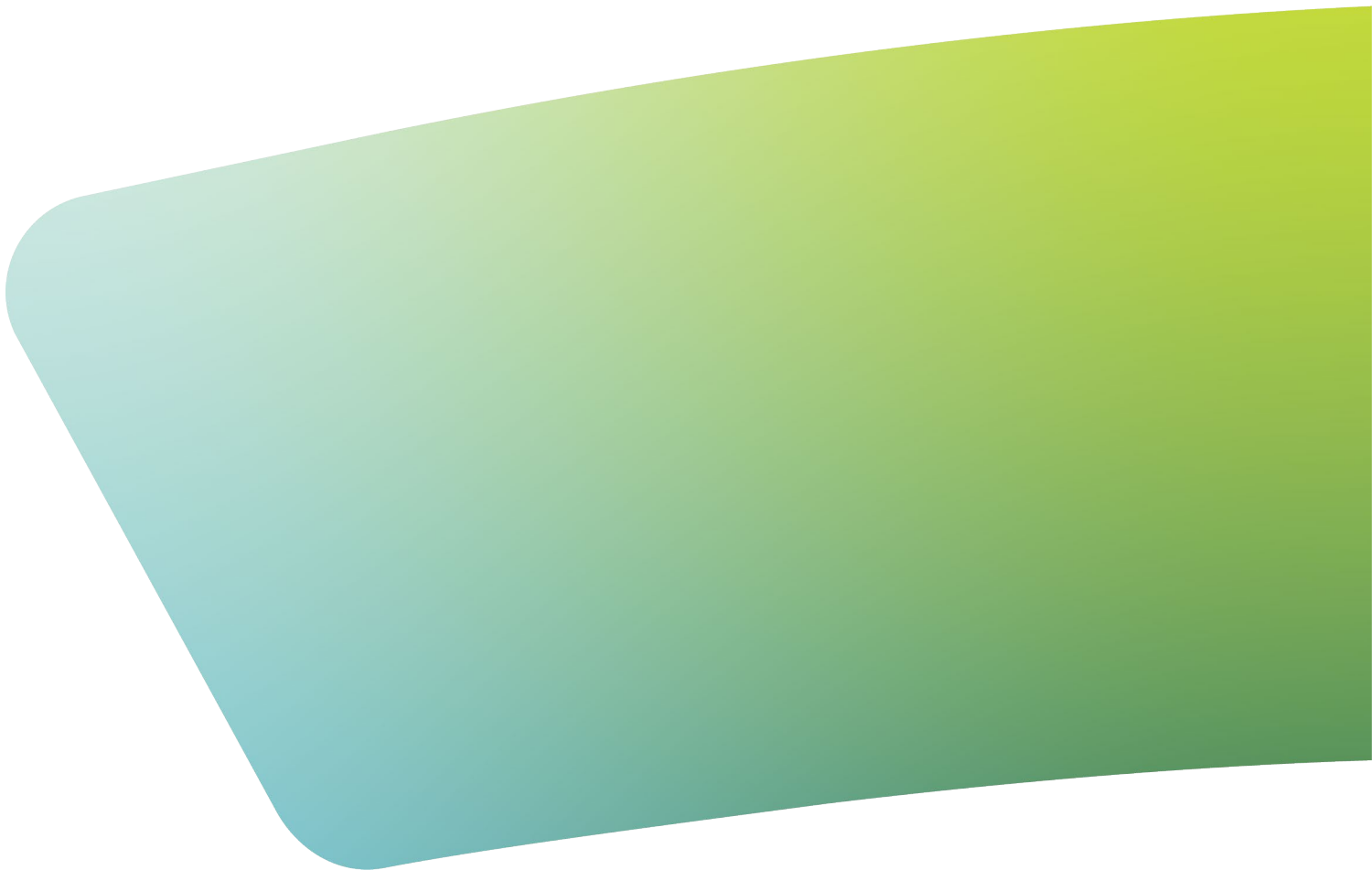


Willmer, J.N.G., Püttker, T. and Prevedello, J.A. (2022) 'Global impacts of edge effects on species richness', *Biological Conservation*, 272, p. 109654. Available at: <https://doi.org/10.1016/j.biocon.2022.109654>.

Youngentob, K., Marsh, K. and Skewes, J. (2021) *A review of koala habitat assessment criteria and methods*. Department of Agriculture, Water and the Environment.

Appendix A

# Desktop Search







Australian Government

Department of Climate Change, Energy,  
the Environment and Water

# 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. Please see the caveat for interpretation of information provided here.

Report created: 22-Jul-2025

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

# Summary

## Matters of National Environment 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](#).

<a href="#">World Heritage Properties:</a>	1
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Importance (Ramsar)</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	5
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	11
<a href="#">Listed Threatened Species:</a>	91
<a href="#">Listed Migratory Species:</a>	66

## 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 <https://www.dcceew.gov.au/parks-heritage/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.

<a href="#">Commonwealth Lands:</a>	2
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	110
<a href="#">Whales and Other Cetaceans:</a>	13
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	1

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	12
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	3
<a href="#">EPBC Act Referrals:</a>	87
<a href="#">Key Ecological Features (Marine):</a>	None
<a href="#">Biologically Important Areas:</a>	8
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None



# Details

## Matters of National Environmental Significance

World Heritage Properties			[ Resource Information ]
Name	State	Legal Status	Buffer Status
<a href="#">Great Barrier Reef</a>	QLD	Declared property	In feature area

National Heritage Places			[ Resource Information ]
Name	State	Legal Status	Buffer Status
Natural			
<a href="#">Great Barrier Reef</a>	QLD	Listed place	In feature area

Great Barrier Reef Marine Park			[ Resource Information ]
Zone Type	Zone ID	IUCN	Buffer Status
Conservation Park	CP-23-4109	IV	In buffer area only
General Use	GU-21-6016	VI	In buffer area only
Habitat Protection	HP-23-5367	VI	In buffer area only
Habitat Protection	HP-23-5369	VI	In buffer area only
Marine National Park	MNP-23-1167	II	In buffer area only

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.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Brigalow (Acacia harpophylla dominant and co-dominant)</a>	Endangered	Community known to occur within area	In buffer area only
<a href="#">Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland</a>	Endangered	Community may occur within area	In feature area
<a href="#">Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions</a>	Endangered	Community may occur within area	In feature area
<a href="#">Littoral Rainforest and Coastal Vine Thickets of Eastern Australia</a>	Critically Endangered	Community likely to occur within area	In buffer area only

Community Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Lowland Rainforest of Subtropical Australia</a>	Critically Endangered	Community likely to occur within area	In feature area
<a href="#">Poplar Box Grassy Woodland on Alluvial Plains</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Subtropical and Temperate Coastal Saltmarsh</a>	Vulnerable	Community likely to occur within area	In feature area
<a href="#">Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions</a>	Endangered	Community likely to occur within area	In feature area
<a href="#">Weeping Myall Woodlands</a>	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[ [Resource Information](#) ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.  
 Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Cyclopsitta diophthalma coxeni</a> Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Epthianura crocea macgregori</a> Capricorn Yellow Chat, Yellow Chat (Dawson) [67090]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Erythroriorchis radiatus</a> Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Fregetta grallaria grallaria</a> White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Geophaps scripta scripta</a> Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Grantiella picta</a> Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Limosa lapponica baueri</a> Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]	Endangered	Roosting known to occur within area	In buffer area only
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Neochmia ruficauda ruficauda</a> Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Phoebetria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Pluvialis squatarola</a> Grey Plover [865]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Poephila cincta cincta</a> Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Pterodroma neglecta neglecta</a> Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Stagonopleura guttata</a> Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Sternula albifrons</a> Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Turnix melanogaster</a> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only
FROG			
<a href="#">Taudactylus pleione</a> Kroombit Tinker Frog, Pleione's Torrent Frog [1889]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Dasyurus maculatus maculatus (SE mainland population)</a> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Hipposideros semoni</a> Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Orcaella heinsohni</a> Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Petauroides volans</a> Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Petaurus australis australis</a> Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Potorous tridactylus tridactylus</a> Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
<a href="#">Sousa sahalensis</a> Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Atalaya collina</a> Yarwun Whitewood [55417]	Endangered	Species or species habitat known to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Bertya opposens</a> [13792]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Bosistoa transversa</a> Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Bulbophyllum globuliforme</a> Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Cadellia pentastylis</a> Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Cossinia australiana</a> Cossinia [3066]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Cupaniopsis shirleyana</a> Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Cycas megacarpa</a> [55794]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Cycas ophiolitica</a> [55797]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Dichanthium queenslandicum</a> King Blue-grass [5481]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Eucalyptus raveretiana</a> Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Fontainea venosa</a> [24040]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Leichhardtia brevifolia listed as Marsdenia brevifolia</a> [91893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Leuzea australis listed as Rhaponticum australe</a> Austral Cornflower, Native Thistle [9363]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Macadamia integrifolia</a> Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Parsonsia larcomensis</a> Mt Larcom Silk Pod [64587]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Polianthion minutiflorum</a> [82772]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Samadera bidwillii</a> Quassia [29708]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Solanum dissectum</a> [75720]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Solanum johnsonianum</a> [84820]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Sophora fraseri</a> [8836]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Xerothamnella herbacea</a> [4146]	Endangered	Species or species habitat likely to occur within area	In buffer area only

REPTILE



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Delma torquata</a> Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Denisonia maculata</a> Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Elseya albagula</a> Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Furina dunmalli</a> Dunmall's Snake [59254]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Hemiaspis damelii</a> Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Rheodytes leukops</a> Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Endangered	Species or species habitat may occur within area	In feature area
SHARK			
<a href="#">Carcharias taurus (east coast population)</a> Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Sphyrna lewini</a> Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species	[ <a href="#">Resource Information</a> ]		
Scientific Name	Threatened Category	Presence Text	Buffer Status
null			
<a href="#">Balaenoptera omurai</a> Omura's Whale [87136]		Species or species habitat likely to occur within area	In buffer area only

Migratory Marine Birds			
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat known to occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
<a href="#">Ardenna carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Phaethon rubricauda</a> Red-tailed Tropicbird [994]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Phoebetria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Sternula albifrons</a> Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Marine Species			
<a href="#">Anoxypristis cuspidata</a> Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
<a href="#">Carcharias taurus</a> Grey Nurse Shark [64469]		Foraging, feeding or related behaviour may occur within area	In buffer area only
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Mobula alfredi as Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat likely to occur within area	In feature area
<a href="#">Mobula birostris as Manta birostris</a> Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Orcaella heinsohni</a> Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Sousa sahalensis as Sousa chinensis</a> Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
Migratory Terrestrial Species			
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Wetlands Species			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area	In buffer area only
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area	In buffer area only
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area	In buffer area only
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area	In buffer area only
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Roosting known to occur within area	In buffer area only
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Roosting known to occur within area	In buffer area only
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area	In feature area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]	Critically Endangered	Roosting likely to occur within area	In buffer area only
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area	In buffer area only
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area	In buffer area only
<a href="#">Tringa brevipes</a> Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area	In buffer area only
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In buffer area only
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area	In buffer area only

## Other Matters Protected by the EPBC Act

Commonwealth Lands

[ [Resource Information](#) ]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - BILOELA TRAINING DEPOT [30240]	QLD	In buffer area only
Defence - GLADSTONE ARES DEPOT [31002]	QLD	In buffer area only

Listed Marine Species

[ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat known to occur within area	In feature area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Ardenna carneipes as Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]	Vulnerable	Roosting known to occur within area	In buffer area only
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Roosting known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Chalcites osculans as Chrysococcyx osculans</a> Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In buffer area only
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In feature area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In buffer area only
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In buffer area only
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
<a href="#">Himantopus himantopus</a> Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]	Endangered	Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In buffer area only
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area	In buffer area only
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Phaethon rubricauda</a> Red-tailed Tropicbird [994]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]		Species or species habitat may occur within area	In buffer area only
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area	In buffer area only
<a href="#">Pluvialis squatarola</a> Grey Plover [865]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Pterodroma cervicalis</a> White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
<a href="#">Recurvirostra novaehollandiae</a> Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Rostratula australis as Rostratula benghalensis (sensu lato)</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Sternula albifrons as Sterna albifrons</a> Little Tern [82849]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<a href="#">Symposiachrus trivirgatus as Monarcha trivirgatus</a> Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Tringa brevipes as Heteroscelus brevipes</a> Grey-tailed Tattler [851]		Roosting known to occur within area	In buffer area only
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In buffer area only
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]	Vulnerable	Roosting known to occur within area overfly marine area	In buffer area only
Fish			
<a href="#">Acentronura tentaculata</a> Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
<a href="#">Campichthys tryoni</a> Tryon's Pipefish [66193]		Species or species habitat may occur within area	In feature area
<a href="#">Choeroichthys brachysoma</a> Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Corythoichthys amplexus</a> Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys flavofasciatus</a> Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys haematopterus</a> Reef-top Pipefish [66201]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys intestinalis</a> Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys ocellatus</a> Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys paxtoni</a> Paxton's Pipefish [66204]		Species or species habitat may occur within area	In feature area
<a href="#">Corythoichthys schultzi</a> Schultz's Pipefish [66205]		Species or species habitat may occur within area	In feature area
<a href="#">Doryrhamphus excisus</a> Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area	In feature area
<a href="#">Festucalex cinctus</a> Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus dunckeri</a> Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus nitidus</a> Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus spirostris</a> Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys cyanospilos</a> Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys heptagonus</a> Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus bargibanti</a> Pygmy Seahorse [66721]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus zebra</a> Zebra Seahorse [66241]		Species or species habitat may occur within area	In feature area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Micrognathus andersonii</a> Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area	In feature area
<a href="#">Micrognathus brevirostris</a> thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area	In feature area
<a href="#">Nannocampus pictus</a> Painted Pipefish, Reef Pipefish [66263]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
<a href="#">Solenostomus paradoxus</a> Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
Mammal			
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat known to occur within area	In buffer area only
Reptile			
<a href="#">Aipysurus duboisii</a> Dubois' Sea Snake, Dubois' Seasnake, Reef Shallows Sea Snake [1116]		Species or species habitat may occur within area	In buffer area only
<a href="#">Aipysurus laevis</a> Olive Sea Snake, Olive-brown Sea Snake [1120]		Species or species habitat may occur within area	In buffer area only



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Aipysurus mosaicus as Aipysurus eydouxii</a> Mosaic Sea Snake [87261]		Species or species habitat may occur within area	In buffer area only
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Emydocephalus annulatus</a> Eastern Turtle-headed Sea Snake [1125]		Species or species habitat may occur within area	In buffer area only
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Hydrophis elegans</a> Elegant Sea Snake, Bar-bellied Sea Snake [1104]		Species or species habitat may occur within area	In buffer area only
<a href="#">Hydrophis hardwickii as Lapemis hardwickii</a> Spine-bellied Sea Snake [93516]		Species or species habitat may occur within area	In buffer area only
<a href="#">Hydrophis kingii as Disteira kingii</a> Spectacled Sea Snake [93511]		Species or species habitat may occur within area	In buffer area only
<a href="#">Hydrophis major as Disteira major</a> Olive-headed Sea Snake [93512]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Hydrophis peronii</a> as <a href="#">Acalyptophis peronii</a> Horned Sea Snake [93509]		Species or species habitat may occur within area	In buffer area only
<a href="#">Hydrophis platura</a> as <a href="#">Pelamis platurus</a> Yellow-bellied Sea Snake [93746]		Species or species habitat may occur within area	In buffer area only
<a href="#">Hydrophis stokesii</a> as <a href="#">Astrotia stokesii</a> Stokes' Sea Snake [93510]		Species or species habitat may occur within area	In buffer area only
<a href="#">Laticauda colubrina</a> Yellow-lipped Sea Krait [1092]		Species or species habitat may occur within area	In buffer area only
<a href="#">Laticauda laticaudata</a> a sea krait [1093]		Species or species habitat may occur within area	In buffer area only
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area

Whales and Other Cetaceans [ Resource Information ]			
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Balaenoptera omurai</a> Omura's Whale [87136]		Species or species habitat likely to occur within area	In buffer area only



Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
<a href="#">Orcaella heinsohni</a> Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
<a href="#">Sousa sahalensis</a> Australian Humpback Dolphin [87942]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Habitat Critical to the Survival of Marine Turtles			[ Resource Information ]
Scientific Name	Behaviour	Presence	Buffer Status
All year (Jun - Aug)			
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Nesting	Known to occur	In buffer area only

Extra Information

State and Territory Reserves			[ Resource Information ]
Protected Area Name	Reserve Type	State	Buffer Status
Boyne Island	Conservation Park	QLD	In buffer area only
Calliope	Conservation Park	QLD	In feature area
Curtis Island	Nature Refuge	QLD	In buffer area only
Curtis Island	National Park	QLD	In buffer area only
Curtis Island	Conservation Park	QLD	In buffer area only
D?-ral-l? (Calliope River)	Fish Habitat Area (B)	QLD	In buffer area only
Garden Island	Conservation Park	QLD	In buffer area only
Great Barrier Reef Coast	Marine Park	QLD	In buffer area only
Kroombit Tops	National Park	QLD	In buffer area only
Mount Murchison	Nature Refuge	QLD	In buffer area only
Mount Scoria	Conservation Park	QLD	In buffer area only
Southend	Conservation Park	QLD	In buffer area only

Nationally Important Wetlands		[ Resource Information ]
Wetland Name	State	Buffer Status
<a href="#">Great Barrier Reef Marine Park</a>	QLD	In buffer area only
<a href="#">Port Curtis</a>	QLD	In feature area
<a href="#">The Narrows</a>	QLD	In buffer area only

EPBC Act Referrals			[ Resource Information ]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<a href="#">Aldoga Solar Farm Project</a>	2020/8773		Post-Approval	In buffer area only
<a href="#">Big G Pumped Hydropower Energy Storage</a>	2024/10056		Referral Decision	In feature area
<a href="#">Boundary Hill South Lease Extension</a>	2012/6324		Post-Approval	In buffer area only
<a href="#">Callide Solar Power Station Project</a>	2024/09863		Completed	In buffer area only



Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<a href="#">Callide Wind Farm</a>	2021/9057		Post-Approval	In buffer area only
<a href="#">Calvale to Calliope River Transmission Line Reinforcement Project</a>	2024/10044		Assessment	In feature area
<a href="#">CQ-H2 Hydrogen Production Facility (HPF) Project</a>	2024/09902		Assessment	In buffer area only
<a href="#">CQ-H2 Hydrogen Transport Facility (HTF) Project</a>	2024/09901		Assessment	In buffer area only
<a href="#">CQ-H2 Surplus Industrial Water Pipeline (SIWP) Project</a>	2024/09935		Assessment	In feature area
<a href="#">Forest Springs - Commercial and residential development</a>	2021/9135		Post-Approval	In buffer area only
<a href="#">Gladstone - Fitzroy Pipeline</a>	2007/3501		Post-Approval	In feature area
<a href="#">Hughes Road Battery Energy Storage System</a>	2024/09892		Assessment	In buffer area only
<a href="#">Powerlink Gladstone to Larcom Creek 275kV Transmission Line</a>	2003/1229		Completed	In feature area
<a href="#">Raglan Battery Energy Storage System</a>	2025/10108		Completed	In buffer area only
<a href="#">Renewable Diesel and Sustainable Aviation Fuel Project</a>	2022/09369		Completed	In buffer area only
<a href="#">Specimen Hill Wind Farm</a>	2020/8864		Post-Approval	In feature area
<a href="#">Upper Calliope Solar Farm</a>	2023/09752		Assessment	In feature area
Controlled action				
<a href="#">Aldoga Aluminium Smelter Gladstone</a>	2001/160	Controlled Action	Post-Approval	In buffer area only
<a href="#">Aluminium Smelter Expansion.</a>	2001/477	Controlled Action	Post-Approval	In buffer area only
<a href="#">Arrow Bowen Pipeline (CSG), QLD</a>	2012/6459	Controlled Action	Post-Approval	In buffer area only
<a href="#">Blackwater to Gladstone Gas Pipeline Project</a>	2011/6034	Controlled Action	Completed	In buffer area only
<a href="#">Bridge Construction Connecting Mainland &amp; Curtis Island</a>	2008/4400	Controlled Action	Completed	In buffer area only
<a href="#">Clinton Vessel Interaction Project - Clinton Widening, Qld</a>	2017/7976	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
<a href="#">Coal Mining Lease 6993 (The Bluff)</a>	2002/569	Controlled Action	Post-Approval	In feature area
<a href="#">Construct and operate 447km high pressure gas transmission pipeline</a>	2009/4976	Controlled Action	Post-Approval	In feature area
<a href="#">Construction of a Chlor-Alkali/Ethylene Di-Chlorid</a>	2003/922	Controlled Action	Completed	In buffer area only
<a href="#">Construction of a Chlor-Alkali-Ethylene Di-Chloride (CA/EDC) Plant at the Gladst</a>	2002/764	Controlled Action	Completed	In feature area
<a href="#">Construction of a high pressure buried gas pipeline, Kogan to Gladstone, QLD</a>	2009/5029	Controlled Action	Post-Approval	In feature area
<a href="#">Construction of Bridge and Road to Access Proposed Natural Gas Liquefaction Park</a>	2008/4060	Controlled Action	Completed	In buffer area only
<a href="#">Development, Construction and Decommissioning of LNG Plant and Onshore Faciliti</a>	2008/4402	Controlled Action	Post-Approval	In buffer area only
<a href="#">Development of a Natural Gas Liquefaction Park</a>	2008/4057	Controlled Action	Post-Approval	In buffer area only
<a href="#">Development of marine facilities to service natural gas liquefaction park</a>	2008/4058	Controlled Action	Post-Approval	In buffer area only
<a href="#">Development of the Yarwun Coal Terminal</a>	2012/6348	Controlled Action	Completed	In buffer area only
<a href="#">Gas Pipeline with Alternative Pipeleine to Supply Natural Gas Liquefaction Park</a>	2008/4096	Controlled Action	Post-Approval	In feature area
<a href="#">Gladstone New Fuels Development Project - stage 2A</a>	2014/7241	Controlled Action	Completed	In buffer area only
<a href="#">H2-Hub??? Gladstone - Export-class Green Hydrogen and Ammonia Complex</a>	2021/9049	Controlled Action	Referral Decision	In feature area
<a href="#">HPAL Nickel Plant</a>	2005/2376	Controlled Action	Post-Approval	In feature area
<a href="#">install &amp; operate gas pipeline</a>	2005/2059	Controlled Action	Post-Approval	In feature area
<a href="#">LNG Plant and Ancillary onshore and marine facilities</a>	2009/4977	Controlled Action	Post-Approval	In buffer area only
<a href="#">Lot 7 Borrow Pits, Aldoga Road, Gladstone, Qld</a>	2018/8381	Controlled Action	Post-Approval	In buffer area only



Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
<a href="#">Nickel and cobalt laterite mine, High-pressure acid leach plant, slurry pipeline</a>	2005/2257	Controlled Action	Completed	In feature area
<a href="#">Port of Gladstone Gatcombe &amp; Golding Cutting Channel Duplication Project</a>	2012/6558	Controlled Action	Post-Approval	In buffer area only
<a href="#">Port of Gladstone Western Basin Strategic Dredging and Disposal Project</a>	2009/4904	Controlled Action	Post-Approval	In buffer area only
<a href="#">Queensland Curtis LNG Project - Curtis Island Road</a>	2008/4404	Controlled Action	Completed	In buffer area only
<a href="#">Queensland Curtis LNG Project - LNG Marine Facilities</a>	2008/4401	Controlled Action	Post-Approval	In feature area
<a href="#">Queensland Curtis LNG Project - Mainland Road and Bridge Approach</a>	2008/4403	Controlled Action	Completed	In buffer area only
<a href="#">Queensland Curtis LNG Project - Pipeline Network</a>	2008/4399	Controlled Action	Post-Approval	In feature area
<a href="#">Queensland Curtis LNG Project - Swing Basin and Channel Dredging</a>	2008/4406	Controlled Action	Completed	In buffer area only
<a href="#">Shipping Activities Associated with the QLD Curtis LNG Project</a>	2008/4405	Controlled Action	Post-Approval	In buffer area only
<a href="#">Stage 1 and 2 borrow pits, stockpiles, haul roads and Stage 3 red mud dam, Aldoga, Qld</a>	2017/8107	Controlled Action	Completed	In buffer area only
<a href="#">Talisman Saber 2005 Military Exercise</a>	2004/1819	Controlled Action	Post-Approval	In buffer area only
<a href="#">The Arrow Gas Transmission Pipeline, Gladstone to Curtis Island</a>	2009/5008	Controlled Action	Post-Approval	In buffer area only
<a href="#">The Arrow LNG Facility, Curtis Island, Gladstone</a>	2009/5007	Controlled Action	Post-Approval	In buffer area only
<a href="#">Turtle Street Beach Resort, Curtis Island, Qld</a>	2015/7585	Controlled Action	Post-Approval	In buffer area only
<a href="#">Wiggins Island Coal Terminal</a>	2005/2374	Controlled Action	Post-Approval	In feature area
<a href="#">ZeroGen Integrated Gasification Combined Cycle Power Plant and CO2 Capture, Transport and Storage</a>	2009/5195	Controlled Action	Completed	In feature area
Not controlled action				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
<a href="#">Aldoga Livestock Handling Facility</a>	2017/7905	Not Controlled Action	Completed	In buffer area only
<a href="#">Aldoga Power Station</a>	2012/6265	Not Controlled Action	Completed	In buffer area only
<a href="#">Aldoga Solar Farm, Aldoga, QLD</a>	2018/8251	Not Controlled Action	Completed	In buffer area only
<a href="#">Boundary Hill Mine Extension</a>	2007/3434	Not Controlled Action	Completed	In buffer area only
<a href="#">Calcining Plant</a>	2001/193	Not Controlled Action	Completed	In buffer area only
<a href="#">Cement Australia East End Mine Extension, Mt Larcom, QLD</a>	2015/7595	Not Controlled Action	Completed	In buffer area only
<a href="#">Construction of a portable water pipeline and a sewer pressure main</a>	2010/5646	Not Controlled Action	Completed	In buffer area only
<a href="#">Construction of Calliope River 275kV and 132kV Bulk Supply Substation</a>	2009/5229	Not Controlled Action	Completed	In feature area
<a href="#">Expansion and dredging at existing RG Tanna Coal Terminal</a>	2004/1619	Not Controlled Action	Completed	In buffer area only
<a href="#">Expansion of Red Mud storage facility</a>	2006/2928	Not Controlled Action	Completed	In buffer area only
<a href="#">Expansion of the Trap Gully Open Cut Mining Area, Callide Mine</a>	2006/2965	Not Controlled Action	Completed	In buffer area only
<a href="#">Extension of R G Tanna Coal Wharf</a>	2000/54	Not Controlled Action	Completed	In buffer area only
<a href="#">Fisherman's Landing Port Facility</a>	2000/124	Not Controlled Action	Completed	In buffer area only
<a href="#">Fishermans Landing site conversion for Lime Kiln</a>	2002/740	Not Controlled Action	Completed	In buffer area only
<a href="#">Gladstone Energy and Ammonia Project, Qld</a>	2018/8305	Not Controlled Action	Completed	In buffer area only
<a href="#">Gladstone State Development Area, Ammonia Production Facility</a>	2006/2855	Not Controlled Action	Completed	In buffer area only
<a href="#">Gladstone Steel Making Facility</a>	2009/4786	Not Controlled Action	Completed	In buffer area only
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area



Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
<a href="#">Liquefied Natural Gas Export Terminal</a>	2008/3954	Not Controlled Action	Completed	In buffer area only
<a href="#">Moura Link - Aldoga Rail Project</a>	2007/3773	Not Controlled Action	Completed	In feature area
<a href="#">Project Sun Liquefied Natural Gas Plant and Pipeline</a>	2008/3994	Not Controlled Action	Completed	In buffer area only
<a href="#">Proposed clay borrow pit and associated haul roads and stockpiles, Gladstone, Qld</a>	2017/7858	Not Controlled Action	Completed	In buffer area only
<a href="#">Rail deviation including construction of 2 new rail lines</a>	2009/4884	Not Controlled Action	Completed	In buffer area only
<a href="#">Replacement of Existing Processing Plant with a smaller Technology Demonstration Plant</a>	2009/5064	Not Controlled Action	Completed	In buffer area only
<a href="#">RG Tanna Coal Terminal Expansion</a>	2004/1906	Not Controlled Action	Completed	In buffer area only
<a href="#">Riverstone Rise residential, commercial &amp; industrial development, Benaraby, Qld</a>	2013/6857	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
<a href="#">Calliope Range Deviation - single carriageway, dual lane road along 4.7km of Dawson Highway</a>	2009/4702	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
<a href="#">Curtis Island Water &amp; Sewerage Facilities Project Seismic Survey</a>	2010/5735	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
<a href="#">Gas Transmission Pipeline to supply Natural Gas Liquefaction Park</a>	2008/4061	Referral Decision	Completed	In feature area
<a href="#">Glen Eden residential estate development, Glen Eden, Qld</a>	2013/6925	Referral Decision	Completed	In buffer area only
<a href="#">Port of Gladstone Western Basin Strategic Dredging and Disposal Project</a>	2009/4826	Referral Decision	Completed	In buffer area only
Biologically Important Areas			[ <a href="#">Resource Information</a> ]	
Scientific Name		Behaviour	Presence	Buffer Status
Dolphins				

Scientific Name	Behaviour	Presence	Buffer Status
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]	Breeding	Known to occur	In buffer area only
<a href="#">Tursiops aduncus</a> Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In buffer area only
Seabirds			
<a href="#">Anous minutus</a> Black Noddy [824]	Foraging	Likely to occur	In buffer area only
<a href="#">Ardenna pacifica</a> Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In buffer area only
<a href="#">Sterna sumatrana</a> Black-naped Tern [800]	Breeding	Known to occur	In buffer area only
<a href="#">Sula sula</a> Red-footed Booby [1023]	Foraging	Likely to occur	In buffer area only
Sharks			
<a href="#">Carcharias taurus</a> Grey Nurse Shark [64469]	Foraging	Known to occur	In buffer area only
Whales			
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Breeding and calving	Known to occur	In buffer area only

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

## 3 DATA SOURCES

### Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions when time permits.

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.



# 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.

[© Commonwealth of Australia](#)

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

Canberra ACT 2601 Australia

+61 2 6274 1111

## Appendix B

# Likelihood of Occurrence Assessment



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
<b>Flora</b>					
Pedley's wattle	<i>Acacia pedleyi</i>	-	V	This species is found open forest and woodlands associated with variety of landforms including alluvial flats, hill slopes and tops of ridges. <i>Acacia pedleyi</i> is present as an understorey species in <i>Corymbia</i> or eucalypt open forest or woodland. This species is largely restricted to the Port Curtis District in Queensland, specifically the Callide and Calliope Ranges.	<b>Known</b> This species was recorded adjacent to the existing powerline easement. The majority of ALA records are in the northern section of the Callide Timber Reserve. This species occurs in a variety of habitats, but vegetation along the proposed alignment contains large areas which appear to be modified reducing the likelihood of this species presence.
Hairy joint grass	<i>Arthraxon hispidus</i>	V	V	The species is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. It has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, on sandy alluvium in creek beds in open forests, and with bog mosses in mound springs.	<b>Low</b> Suitable habitat is present within the Study Area, including woodlands near creeks, creek banks and shaded gullies. However, this species has not been recorded within the desktop search extent.
Yarwun whitewood	<i>Atalaya collina</i>	E	E	<i>Atalaya collina</i> (Yarwun whitewood) occurs in semi-evergreen vine thicket or dry rainforest. Surface soils are moderately drained, brownish-black clay loams overlying clay subsoils. Both known populations occur in partially cleared highly disturbed areas.	<b>High</b> Records for this species occur within 1.5 km of the Study Area west of Mount Stowe State Forest. Vegetation containing the species records are connected with similar vegetation within the Study Area.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Hoop pine orchid	<i>Bulbophyllum globuliforme</i>	V	NT	The species is host-specific, only growing on the hoop pine, where it colonises the upper branches of mature trees. The hoop pine occurs in upland (usually 100 – 900 m above sea level) subtropical rainforest communities.	<b>Low</b> <i>Araucaria cunninghamii</i> is species is the host plant for <i>B. globuliforme</i> . Vegetation with <i>Araucaria cunninghamii</i> present was not observed.
Ooline	<i>Cadellia pentastylis</i>	V	V	This species occurs in a range of vegetation types including semi-evergreen vine thicket, <i>Acacia harpophylla</i> and <i>Casuarina cristata</i> , <i>Eucalyptus populnea</i> and <i>Acacia catenulata</i> (bendee) communities. <i>Cadellia pentastylis</i> (ooline) often occurs on the edges of sandstone and basalt escarpments, 200 – 500 m above sea level (ASL). In most areas of its range, <i>Cadellia pentastylis</i> grows on the moderately fertile soils preferred for agriculture and pasture development.	<b>Unlikely</b> This species has not been recorded within the wider region. Further, suitable habitat for this species is limited within the Study Area and suitable patches are often isolated.
-	<i>Cerbera dumicola</i>	-	NT	<i>Cerbera dumicola</i> occurs in a range of habitat types such as: sandstone hills in open <i>Eucalyptus umbra</i> subsp. <i>carnea</i> , on plateaus, in woodlands of <i>Acacia shirleyi</i> with <i>Corymbia dolichocarpa</i> , acidic soils in mine rehabilitation areas, on sandy/clay soil with a woodland of <i>Acacia catenulata</i> and <i>Acacia shirleyi</i> and with <i>Eucalyptus thozetiana</i> on a slope, semi-deciduous notophyll-microphyll vine forest of <i>Brachychiton australis</i> , <i>Gyrocarpus americanus</i> , <i>Flindersia australis</i>	<b>Moderate</b> Isolated patches of suitable habitat, with most species associations absent.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				(crow's ash), <i>Pleiogynium timorense</i> (Burdekin plum), <i>Drypetes deplanchei</i> (grey boxwood) and <i>Sterculia quadrifida</i> (peanut tree) on rhyolite hillslopes, semi-evergreen vine thicket with <i>Corymbia citriodora</i> and <i>C. aureola</i> emergents, woodland of <i>A. rhodoxylon</i> on brown, sandy loam and in <i>Blakella tessellaris</i> - <i>Acacia aneura</i> open woodland.	
-	<i>Cossinia australiana</i>	E	E	<i>Cossinia australiana</i> is noted from ecotones at dry rainforest edges, primarily araucarian microphyll vine forest and relict semi-evergreen vine thicket; however, may occur within closed forests as individuals. This species is noted to grow on a variety of soil types within an altitudinal range from 20 to 520 m. <i>Cossinia australiana</i> has a 300 km distribution from Rockhampton to Kingaroy, within southern and central Queensland.	<b>Moderate</b> This species has been recorded northeast of the Callide Mine; however, the majority of occurrences have been recorded in the northern section of the Callide Timber Reserve. This species occurs in vine forest/thicket vegetation which small and scattered are present within the Study Area; however, isolated by larger areas of eucalypt woodlands.
Wedge-leaf tuckeroo	<i>Cupaniopsis shirleyana</i>	V	V	The species occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m ASL. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. It is predominately found on dark brown sandy loams and sandy clay loams (pH 5 – 7.5) and rocky scree slopes.	<b>Low</b> Two isolated records from 1995 to the north of the Study Area, with the majority of records to the south near Turkey Beach and Agnes Waters. Suitable vine forest/thicket vegetation largely isolated, scattered and separated by eucalypt dominated woodlands.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
-	<i>Cycas megacarpa</i>	E	E	The species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory. This species is found in habitat dominated by <i>Eucalyptus crebra</i> and <i>Corymbia citriodora</i> as well as <i>C. erythrophloia</i> , <i>E. melanophloia</i> and <i>Lophostemon confertus</i> (brush box). There are also reports that it can be found in or on the edge of rainforest habitat.	<b>Known</b> Observed within the corridor during field surveys.
Marlborough blue	<i>Cycas ophiolitica</i>	E	E	The species occurs on hills and slopes in sparse, grassy open forest at altitude ranges from 80 – 400 m ASL. It is frequently found on shallow, stony, infertile soils developed on sandstone and serpentinite, and is often associated with species such as <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> , <i>C. xanthope</i> (Glen Eddes bloodwood) and <i>Eucalyptus fibrosa</i> . Climate in the habitat of the species is tropical with hot, humid summers and mild, dry winters.	<b>Low</b> Although some suitable habitat may exist within the Study Area; the Study Area does not occur within this species known distribution which terminates approximately 30 km south of Rockhampton.
-	<i>Dansiea elliptica</i>	-	NT	This species is found in lowland dry rainforest and vine thicket (notophyll vine forest and semi evergreen vine thicket) on soils derived from sandstone or volcanics. This species is restricted to Queensland being found in two disjunct locations, with five localities in central Queensland.	<b>High</b> Records for this species occur adjacent to the Study Area as well as within 3 km of the proposed alignment west of Mount Stowe State Forest. Vegetation suitable for this species is present within the Study

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					Area, being semi-evergreen vine thicket.
King blue-grass	<i>Dichanthium queenslandicum</i>	E	V	This species occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses ( <i>Dichanthium spp.</i> and <i>Bothriochloa spp.</i> ) but also with other grasses restricted to this soil type. <i>Dichanthium queenslandicum</i> (king blue-grass) occurs from near Dalby north to about 90 km north of Hughenden and west as far as Clermont. The main concentration of populations in central Queensland in the Emerald region.	<b>Unlikely</b> This species does not occur within the Project region. Further, suitable habitat for this species is limited within the Study Area.
Bluegrass	<i>Dichanthium setosum</i>	V	V	This species occurs on heavy basaltic soils and red-brown loams. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	<b>Unlikely</b> This species does not occur within the Project region. Further, suitable habitat for this species is limited within the Study Area.
-	<i>Eucalyptus decolor</i>	-	NT	This species grows in open forest or tall open woodland atop steep slopes, crests and ridges or on shallow soils derived from granite or sandstone. It is often associated with <i>Corymbia citriodora</i> , <i>C. trachyphloia</i> subsp. <i>trachyphloia</i> , <i>Eucalyptus major</i> (mountain grey	<b>Unlikely</b> Likely error in positioning of point. Further detail states individual found in Baddow Island CP (in Maryborough) at the summit of Arthu's Seat (or Arthur's seat) which is located near

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				gum), <i>Eucalyptus moluccana</i> , <i>Eucalyptus acmenoides</i> , <i>Eucalyptus montivaga</i> , <i>Eucalyptus exserta</i> , <i>Allocasuarina littoralis</i> , <i>Lophostemon confertus</i> , <i>Leptospermum neglectum</i> , <i>Pomaderris argyrophylla</i> , <i>Arundinella nepalensis</i> and <i>Eremochloa bimaclate</i> (poverty grass).	Miriam Vale. Spatial inaccuracies suggest this species occurs outside of the Survey Extent and consequently, is unlikely to be present.
Queensland fontainea	<i>Fontainea venosa</i>	V	V	This species is found in notophyll vine forest and vine thicket with a mean annual rainfall of 1000 – 1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks. The distribution of <i>Fontainea venosa</i> (Queensland fontainea) ranges from south-west of Beenleigh near Brisbane, along the Koolkooroon Creek in the Boyne Valley, and near Littlemore, in Queensland.	<b>Low</b> Suitable habitat for this species to occur is scattered along small areas of the proposed corridor; however, this species does not occur within the wider region.
Scarlet fuchsia	<i>Graptophyllum excelsum</i>	-	NT	This species is found in semi-evergreen vine thicket; however, in north Queensland this species has also been found in grassy woodlands. Species distribution occurs in coastal regions from Chillagoe in the north to central and southern Queensland.	<b>Moderate</b> A single observation from 1997 has been recorded south of the proposed corridor. Suitable habitat for this species is scattered along small areas of the proposed corridor; however, this vegetation is often isolated by larger tracts of eucalypt woodland / forest.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
-	<i>Grevillea hockingsii</i>	-	V	This species is commonly found on slopes in hilly sandstone country on a variety of soil types, primarily sandy soils, and occasionally stony or gravelly. <i>Grevillea hockingsii</i> has been observed growing in woodland or open forest communities associated with a variety of eucalypt species including ironbark, spotted gum and stringybark species. This species is present only in Queensland from three disjunct areas: west of Monto, east of Biloela, and near Mt Morgan.	<b>Known</b> Observed in Section B of alignment. Previous reports along or adjacent to the proposed corridor have noted occurrences of this species. Suitable vegetation is present within the Study Area.
Grease nut	<i>Hernandia bivalvis</i>	-	NT	This species mainly grows in rainforest on rock pavements and outcrops with shallow soils with records indicating occurrences from either vine thicket or microphyll vine forest. <i>Hernandia bivalvis</i> occurs up to 620 m ASL. This species is restricted to the central coastal and southeast Queensland. It is known from Dryander Creek (near Proserpine) south to Mt Tamborine (northeast of Beaudesert).	<b>Low</b> Suitable habitat may be present within the Study Area. However, the nearest record is more than 10 km outside of Section D of the Study Area and the individual record has a spatial uncertainty of 20 km.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Shrubby bush pear	<i>Leichhardtia brevifolia</i>	V	V	<p>This species has been recorded from a variety of vegetation communities including eucalypt dominated woodland with grassy understorey, eucalypt woodlands on serpentine rock outcrops or on black crumbly soils derived from serpentine, Eucalypt woodlands on granite soils or in Eucalypt dominated open forest on dark massive acid agglomerate soils.</p> <p><i>Leichhardtia brevifolia</i> (shrubby bush pear) is endemic to Queensland and has an apparent disjunct distribution in northern and central Queensland with records near Townsville, Springsure and north of Rockhampton.</p>	<p><b>Low</b></p> <p>Suitable habitat for this species in the form of Eucalypt woodland is present within the Study Area. However, there are no known nearby (within 50 km) recorded occurrences of this species.</p>
Austral cornflower	<i>Leuzea australis</i>	V	V	<p><i>Leuzea australis</i> (austral cornflower) is currently confined to Queensland. The current distribution extends from Allora (north of Warwick) to Callide (north-west of Biloela). This species usually grows on heavy black or red-brown clay, or clay loams derived from basalt. Populations are often confined to roadsides and cultivation headlands. This species is often found in woodland and grassland and in association with <i>Eucalyptus crebra</i>, <i>E. orgadophila</i> (mountain coolibah), <i>E. populnea</i>, <i>E. tereticornis</i>, and <i>E. melanophloia</i>.</p>	<p><b>Low</b></p> <p>Eucalypt woodlands dominated by <i>Eucalyptus crebra</i> or <i>E. melanophloia</i> are present within the Study Area; however, there are very limited occurrences of heavy basalt derived clays. Records are only present from the western end of the proposed transmission line, with nearest recent record 35 km south of Section A in 2017. Records closer to Biloela are dated from 1966 and 1947.</p>

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Macadamia nut	<i>Macadamia integrifolia</i>	V	V	<i>Macadamia integrifolia</i> (macadamia nut) grows in remnant rainforest, preferring partially open areas such as rainforest edges on a diversity of landforms including hill crests, hill slopes, scree slopes and foot slopes, gullies, benches and terrace plains. This species occurs within an altitudinal range from 5 – 340 m growing high nutrient alluvial and volcanic soils which are well drained, slightly acidic and varying in texture from clayey-sand through various loams to silty-clay. This species is known from Mt Bauple, north of Gympie, to Currumbin Valley in the Gold Coast hinterland.	<b>Low</b> The nearest recorded occurrence for this species is from Bell Creek Conservation Park (30 km north-west of Biloela) in 1994. Suitable habitat for this species is limited within the Study Area.
-	<i>Macropteranthes leiocaulis</i>	-	NT	This species occurs in dry rainforest and vine thicket communities.	<b>Low</b> The nearest records occur within 8 km of the study site in Gladstone. However, suitable semi-evergreen vine thicket patches are limited and isolated by larger areas of eucalypt woodlands.
Grove's paperbark	<i>Melaleuca groveana</i>	-	NT	<i>Melaleuca groveana</i> (Grove's paperbark) grows on exposed rocky ridges, high mountain slopes and the summits of mountains, at altitudes between 340 – 600 m ASL. It generally occurs in heaths and eucalypt woodlands and forests with heath understoreys. It is also found in tall open forest with a grassy understorey and in microphyll vine forests. It has been recorded	<b>High</b> This species has been recorded within 2.5 km of Section B of the Study Area. Suitable habitat is present within the Study Area reflecting the nearby record of this species.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				growing on red sandy loams, brown loams, skeletal rocky soils and sandy soils over sandstone rock. This species has a fragmented distribution from Port Stephens, New South Wales to the Blackdown Tableland in central Queensland.	
Mt Larcom silkpod	<i>Parsonsia larcomensis</i>	V	V	This species occurs in open heathland and shrubland at or near the summits of mountain peaks in shallow, loamy soils on cliffs or among outcrops of acid volcanic rocks and serpentinites. Records indicate this species occurs in an altitudinal range from 350 to 750 m elevation. <i>Parsonsia larcomensis</i> (Mt Larcom silkpod) is restricted to central eastern Queensland, where it is confined to the Rockhampton – Mount Perry area.	<b>Low</b> This species has been recorded approximately 5 – 10 km north of Section D of the Study Area. However, suitable heathland or shrubland habitat is not present within the Study Area.
-	<i>Pimelea fugiens</i>		CR	<i>Pimelea fugiens</i> is only known from two sites near Biloela. It is known from dry gullies dominated by <i>Melaleuca bracteata</i> .	<b>Low</b> This species is known from only two locations, the closest is approx. 17 km from the study site. There is extremely limited suitable habitat within the study site.
-	<i>Polianthion minutiflorum</i>	V	V	This species frequently occurs in forest and woodland on sandstone slopes and gullies with skeletal soil. Occasionally noted on deeper sands adjacent to deeply weathered laterite. <i>Polianthion minutiflorum</i> is often found within acacia woodland or eucalypt	<b>High</b> This species has been recorded approximately 1 km north of the Study Area in similar vegetation to that which occurs within the Study Area.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				woodland. This species has been recorded west of Mackay, south to Kingaroy.	
Narrow-leaved malletwood	<i>Rhodamnia angustifolia</i>	-	CR	The species grows in microphyll vine forest with a diversity of other vine forest species dominating the canopy. This species occurs within an altitudinal range between 200 to 560 m on reddish or brown loam substrates derived from mudstones of Muncon volcanics. Occurs at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba National Park (previously State Forest 583), 45 km south of Gladstone.	<b>Low</b> Vine forest vegetation is present within the Study Area. However, the nearest recorded occurrence of this species to the Study Area, is 5 km south at the Toondoon Botanic Gardens, Gladstone. The record suggests this specimen is cultivated from material found at Wietaloba National Park approximately 40 km south of Section C of the Study Area.
Quassia	<i>Samadera bidwillii</i>	V	V	This species is found in a variety of vegetation types; but frequently occurs in lowland rainforest often with <i>Araucaria cunninghamii</i> or on rainforest margins. Other forest types include open forest and woodland and is commonly recorded in areas adjacent to both temporary and permanent watercourses up to 510 m altitude. The Distribution of this species encompasses an area beginning east of Mackay, south to Bauple and west to Biloela.	<b>Known</b> This species was recorded within Section B, within and adjacent to the Callide Timber Reserve. It was not recorded within the MDA. <i>Samadera bidwillii</i> were recorded sporadically in two patches in an approximately 1.9 ha total area. Specific counts plus an estimate in a large patch were undertaken, with the number of stems estimated to be between 450-550 individuals. As this species is known

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					to coppice the actual count of individuals is less due to the counts being based on stem number. They were recorded within <i>Eucalyptus cloeziana</i> , <i>Corymbia citriodora</i> and <i>Eucalyptus melanoleuca</i> woodland (RE 11.10.13), adjacent to the existing powerline easement.
-	<i>Solanum dissectum</i>	E	E	<i>Solanum dissectum</i> occurs in open forest and woodland of <i>Acacia harpophylla</i> or <i>Eucalyptus thozetiana</i> on solodic clay soils. <i>Solanum dissectum</i> has a restricted distribution in central Queensland. It has mainly been found in the area bounded by Banana, Dululu, Moura and Thangool but has also been recorded 40 km south of Blackwater.	<b>Low</b> Recorded occurrences of this species from 1966 are located within 15 – 20 km of Section A. Small patches of Brigalow vegetation are mapped within Section A, however, given the long time period between recorded occurrences, the likely presence of this species within the Study Area is low.
-	<i>Solanum johnsonianum</i>	E	E	This species occurs within communities dominated or co-dominated by <i>Acacia harpophylla</i> , on heavy cracking soils. Other associated species include <i>Eucalyptus thozetiana</i> with understorey of <i>Geijera parviflora</i> . <i>Solanum johnsonianum</i> is endemic to central Queensland within a distribution over a distance of approximately 100 km, extending from north-west of Theodore to north of Jambin.	<b>Low</b> The nearest recorded occurrences of this species from 1959 is located approximately 20 km west of Section A. Small patches of Brigalow vegetation are mapped within Section A, however, given the long time period between recorded occurrences, the likely presence of



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					this species within the Study Area is low.
Spreading nut-heads	<i>Sphaeromorphaea major</i>	-	NT	This species is associated marine couch grasslands on coastal alluvial flats and swamps and inhabits area where soil is intermittently or permanently damp or wet, but does not persist where there is standing water. A review of recorded occurrences suggests this species is localised within the Gladstone – Rockhampton coastal area; however, several records are noted from the Lake Gahilee area north of Barcaldine.	<b>Moderate</b> Recorded occurrences of this species occur approximately 10 – 15 km north and east of Section E of the Study Area. Suitable habitat in the form of marine grass habitat may occur within the Study Area.
Mt Larcom stink bush	<i>Zieria actites</i>	-	CE	<i>Zieria actites</i> (Mt Larcom stink bush) is endemic to central Queensland and is found only at Mt Larcom. The species grows in open woodland/shrubland in crevices and clefts on exposed outcrops and cliff lines on quartz alunite at an approximate altitude of 630 m.	<b>Low</b> Isolated shallow clifftop or outcrop vegetation present within the Study Area. However, this species has only been recorded approximately 5–10km north of Section D of the Study Area at Mt Larcom. Detailed examination of all ALA records describes this species as occurring at the top of Mt Larcom

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					highlighting spatial uncertainty in records away from Mt Larcom.
<b>Birds</b>					
Ruddy turnstone	<i>Arenaria interpres</i>	V, M	V	This species strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed. May also occur in a variety of coastal environments including rock platforms and shelves, shingle or gravel beaches, sand, coral or shell beaches, this species has occasionally been sighted in estuaries, harbours, bays, and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats.	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area. Historical records occur around Gladstone along the coast with the most recent record from 2020 located 5 km east of Section E.
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	V, M	V	This species occurs on muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans, and	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area where sedges, grass and saltpans occur. Recent records in Gladstone occur from 2021.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				hypersaline salt lakes inland. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores and swamps and creeks lined with mangroves.	
Red knot	<i>Calidris canutus</i>	V, M	V	In Australasia the species mainly inhabit intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. This species usually forage in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2019 located 5 km east of Section E.
Curlew sandpiper	<i>Calidris ferruginea</i>	CE, M	CR	The species mainly occurs on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded less often inland, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand, occurring in both fresh and brackish waters.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2019 located 5 km east of Section E.
Great knot	<i>Calidris tenuirostris</i>	V, M	V	This species prefers sheltered coastal habitats with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries, and lagoons. Typically, the species roosts in large	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				groups in open areas, often at the water's edge or in shallow water close to feeding grounds.	Gladstone along the coast with two records recorded in 2019, with the closest record 2 km east of Section E.
Glossy black cockatoo	<i>Calyptorhynchus lathamii</i>		V	Glossy black cockatoos inhabit open forests and woodlands, including coastal woodlands, dry eucalypt forests, and open inland woodlands in eastern Australia. This species prefers areas with their primary food source, she-oak ( <i>Casuarina</i> and <i>Allocasuarina</i> species) are found. The birds require large, hollow-bearing eucalyptus trees for nesting and depend on extensive, intact stands of she-oaks for feeding.	<b>Known</b> This species was observed flying down the existing powerline corridor in the vicinity of the upper reaches of the Calliope River (Section B).
Greater sand plover	<i>Charadrius leschenaultii</i>	V, M	V	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks. They seldom occur at shallow freshwater wetlands.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2019 located 5 km east of Section E.
Lesser sand plover	<i>Charadrius mongolus</i>	E, M	E	This species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries. It sometimes occurs in short saltmarsh or among mangroves. This species breeds outside of Australia.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					most recent record from 2019 located 5 km east of Section E.
Coxen's fig parrot	<i>Cyclopsitta diophthalma coxeni</i>	CE	CR	Recorded from the Maryborough – Gympie district in Queensland to the Macleay River on the NSW mid north coast. Occurs in a range of habitats including lowland sub-tropical rainforest and dry rainforest, woodland, scrub, cleared land, urban and agricultural areas, from sea level to 900 m ASL. Microhabitat consists of areas where fig trees predominate.	<b>Unlikely</b> The species has not been recorded from the search extent with the most recent record (from 1970) located 85 km to the south in Bulburin National Park. The presence of woodlands and urban and agricultural area within the Study Area may provide potentially habitat for the species.
Yellow chat (Dawson)	<i>Epthianura crocea macgregori</i>	CE	E	This species inhabits marine plain wetlands that are subject to extensive seasonal inundation and varying degrees of both fresh and saltwater (tidal) influence. Often associated with shallow drainage channels and depressions with saltwater couch, dense beds of rush or sedge, patches of Samphire, and areas of bare or sparsely vegetated mud and/or shallow water.	<b>Low</b> This species has very localised occurrences near Raglan, 45 km to the north of the Study Area. Suitable habitat may occur in Section E of the Study Area within the intertidal areas.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Red goshawk	<i>Erythroriorchis radiatus</i>	E	E	The species occurs in coastal and sub-coastal tall open forests and woodlands, preferring areas with a mosaic of vegetation types, permanent water, and abundant small birds. Associated with gorge and escarpment country in partially cleared country in eastern Queensland. In eastern Australia, populations seem to move from inland nest sites to coastal plains in winter, thus occupying home ranges of 50 – 220 km <sup>2</sup> .	<b>Low</b> Suitable habitat for this species may occur within the Study Area. Recorded occurrences are scattered with multiple occurrences in Kroombit Tops National Park in 1993/94 (25 km SE of Section B) and one record southeast of Gladstone on Boyne Island in 2016 (10 km SE of Section E).
Grey falcon	<i>Falco hypoleucos</i>	V	V	The species frequents timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland.	<b>Low</b> The Study Area contains some suitable habitat including <i>Acacia</i> shrubs along tree-lines watercourses, however, is very limited due to disturbances from agricultural practices. The species has not been recorded within the Study Area with historical records occurring 73 km west. The Study Area does not occur in an arid or semi-arid zone.
Latham's snipe	<i>Gallinago hardwickii</i>	V, M	V	In Australia, the species occurs in permanent and ephemeral wetlands up to 2000 m ASL. They usually inhabit open, freshwater wetlands with low, dense vegetation such as swamps, flooded grasslands or heathlands, around bogs and other water bodies.	<b>Moderate</b> Suitable habitat may occur within several sections of the Study Area where permanent and ephemeral wetland occur. Recent from 2016



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					approximately 7 km north of Section C.
Squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	V	V	The species occurs in open, dry woodland with a grassy understorey in proximity to permanent water. Prefers areas of sandy soil with sparser cover of low grasses; and less common on heavier soils with dense grass cover.	<b>Known</b> The Study Area contains woodlands dominated by <i>Eucalyptus</i> and <i>Acacia</i> species of remnant and regrowth or partly modified vegetation with permanent water sources present. The species was recorded on three occasions in Sections C and D.
Painted honeyeater	<i>Grantiella picta</i>	V	V	Mostly occurs in woodland habitats which have an abundance of mistletoes. These woodlands are usually dominated by <i>Acacia</i> spp. (e.g., <i>A. harpophylla</i> , <i>A. pendula</i> (myall), and <i>A. aneura</i> , <i>Casuarina cristata</i> and <i>Allocasuarina luehmannii</i> . Also found in <i>Callitris glaucophylla</i> (white cypress pine) woodlands in the eastern part of their range, if mistletoes are abundant.	<b>Moderate</b> The Study Area contains some <i>Acacia</i> and <i>Casuarina</i> woodlands with the presence of mistletoe species. The species has not been recorded within the Study Area; the closest record is 11 km away in Biloela recorded in 2017.
White-throated needletail	<i>Hirundapus caudacutus</i>	V, M	V	The species is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though it roosts in tree hollows and the foliage canopy. It forages for insects aerially, flying anywhere between “cloud level” and “ground level”,	<b>High</b> Records occur within 10 km of the Study Area and suitable foraging habitat exists within the airspace above the Study Area.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				often forming mixed feeding flocks with other species. The species roosts in tall trees at night, mainly in forests.	
Asian dowitcher	<i>Limnodromus semipalmatus</i>	V, M	V	The Asian dowitcher ( <i>Limnodromus semipalmatus</i> ) is known to visit to Australia, and occurs in sheltered coastal environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats.	<b>Low</b> Suitable habitat may occur within Section E of the Study Area. However, only a single nearby record occurs (Boyne Island) with a spatial uncertainty of 54 km.
Nunivak bar-tailed godwit	<i>Limosa lapponica baueri</i>	E, M	E	The species occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. The species roosts on sandy beaches, sandbars, spits and in near-coastal saltmarsh. This species breeds outside of Australia.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2016.
Black-tailed godwit	<i>Limosa limosa</i>	E, M	E	In Australia, this species has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. It is also found in shallow and sparsely vegetated, near-coastal,	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2014.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains.	
Southern giant-petrel	<i>Macronectes giganteus</i>	E, M	E	A marine seabird ranging widely in the Southern Ocean and many breed on offshore Australian and Antarctic islands. Their diets usually consist of fish and cephalopods.	<b>Unlikely</b> The species has not been recorded from the search extent and nearby records are either spatially inaccurate or predate 1980. The Study Area is unlikely to provide suitable habitat for the species.
Star finch (eastern)	<i>Neochmia ruficauda ruficauda</i>	E	E	The species inhabits tall grass and reed beds associated with swamps and watercourses. It may also be found in grassy woodlands, open forests and mangroves.	<b>Unlikely</b> Suitable habitat may occur at various points along the Study Area; however, there are no nearby records, and a lack of recent occurrences supports that this species is likely extinct from this part of its range.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Eastern curlew	<i>Numenius madagascariensis</i>	CE, M	CR	The species occurs in sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). The species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. They are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. They are also found in coastal saltworks and sewage farms.	<b>Moderate</b> Suitable foraging and roosting habitat may occur in Section E with the presence of intertidal mudflats. Historical records occur around Gladstone along the coast with the most recent record from 2019 located 2 km east of Section E.
Grey plover	<i>Pluvialis squatarola</i>	V, M	V	In nonbreeding grounds in Australia, grey plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayment's, estuaries and lagoons with mudflats and sandflats. They may also occur around terrestrial wetlands.	<b>Moderate</b> Suitable habitat may occur within Section E on mudflats of the Study Area. Recent records occur in Gladstone from 2019.
Southern black-throated finch	<i>Poephila cincta cincta</i>	E	E	The species inhabits grassy, open woodlands and forests, typically dominated by <i>Eucalyptus</i> spp. (including <i>E. crebra</i> , <i>E. camaldulensis</i> and <i>E. melanophloia</i> , <i>Corymbia</i> spp. and <i>Melaleuca</i> spp. and occasionally in tussock grasslands or other habitats often along or near watercourses, or in the vicinity of water.	<b>Low</b> Suitable habitat is likely present along portions of the Study Area where <i>Eucalyptus</i> woodlands are present. However, recent records are not present in the wider Study Area. A record of vouchered eggs was recorded 11 km south of Gladstone in dated 1898. Historical species and

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					vouchered egg records are located west of Rockhampton.
Australian painted snipe	<i>Rostratula australis</i>	E	E	The species occurs in shallow freshwater wetlands or saltmarshes, including inundated grasslands, dams and bore drains, generally with good cover of grasses or low scrub.	<b>Moderate</b> Suitable foraging and roosting habitat occur in the Study Area with the presence of wetlands and intertidal grasslands. Further habitat is present in dams that present suitable fringing vegetation. The most recent record from 2011 is located 8 km east of Section E.
Diamond firetail	<i>Stagonopleura guttata</i>	V	V	Habitat includes <i>Eucalyptus</i> , <i>Acacia</i> or <i>Casuarina</i> woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. Includes areas of relatively low tree density, few large logs and little litter cover but high grass cover.	<b>Low</b> Suitable habitat is present within the Study Area associated with the extent of lightly timbered eucalypt woodland throughout. However, while their range once extended to north Queensland inland from Cardwell, they now occur only in the very south of the state (from Roma south). A historical, undated record occurs 25

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					km south of the intersection between Sections B and C.
Campbell albatross	<i>Thalassarche impavida</i>	V, M	SLC	A marine seabird ranging widely in the Southern Ocean and many breed on offshore Australian and Antarctic islands. Their diets usually consist of fish and cephalopods.	<b>Unlikely</b> Suitable habitat is absent in the Study Area. Nearby records absent from the wider search area. The closest recorded record is located off the coast of NSW.
Common greenshank	<i>Tringa nebularia</i>	E, M	E	This species does not breed in Australia but is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves, or seagrass. The species may use both permanent and ephemeral terrestrial wetlands.	<b>Moderate</b> Suitable habitat may occur within Section E on mudflats, mangroves or grasslands within the Study Area. Recent records occur in Gladstone from 2019.
Black-breasted button-quail	<i>Turnix melanogaster</i>	V	V	The species is restricted to rainforests and forests, mostly in areas with 770 – 1,200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest and Araucarian notophyll vine forest. They may also be found	<b>Moderate</b> Suitable breeding and foraging habitat likely present along sections of the Study Area within semi-ever green vine thicket where suitable leaf litter was present.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				in low, dense acacia thickets and, in littoral areas, in vegetation behind sand dunes.	One undated record occurs south of the Study Area at the Kroombit Tops National Park, and records from 1997 and 1999 occur approximately 10 km north of Section D. Boyne Island also has scattered records ranging from 2007 – 2017.
Terek sandpiper	<i>Xenus cinereus</i>	V, M	V	This species has a primarily coastal distribution, with occasional records inland. Mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayment's, harbours, or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire forbland.	<b>Moderate</b> Suitable habitat may occur within Section E on tidal mudflats and mangroves within the Study Area. Recent records occur in Gladstone from 2020.
<b>Amphibians</b>					
Kroombit tinker frog	<i>Taudactylus pleione</i>	CE	CR	The Kroombit tinker frog ( <i>Taudactylus pleione</i> ) has an extremely restricted distribution. The species is only known from nine small unconnected patches of notophyll rainforest between 400 m and 800 m above sea level in Kroombit Tops National Park.	<b>Low</b> Notophyll rainforest is not found within the Study Area, and this species is only known from Kroombit Tops National Park, located 25 km south-east of the Study Area.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
<b>Fish</b>					
Grey nurse shark (east coast population)	<i>Carcharias taurus</i>	CE	E	<p>The grey nurse shark (east coast population) (<i>Carcharias taurus</i>) has been regularly reported from southern Queensland and around south-east Australia, although the species is uncommon in Victorian, South Australian and Tasmanian waters.</p> <p>Grey nurse sharks are found primarily in warm temperate (from subtropical to cool temperate) inshore waters around rocky reefs and islands, in or near deep sandy-bottomed gutters or rocky caves, and occasionally in the surf zone and shallow bays. They have been recorded at varying depths down to 230 m on the continental shelf, but are most commonly found between 15 – 40 m.</p>	<p><b>Unlikely</b></p> <p>No records occur in the surrounding area. This species is unlikely to venture into the Calliope River.</p>
Scalloped hammerhead	<i>Sphyrna lewini</i>	CD	E	<p>Scalloped hammerheads (<i>Sphyrna lewini</i>) are mobile animals that range widely over shallow coastal shelf waters, but rarely venture into or across deep ocean waters. Scalloped hammerhead pups are born in shallow intertidal habitats and they remain in shallow inshore habitats for the first few years of their lives.</p>	<p><b>Unlikely</b></p> <p>Suitable habitat absent. Records associated with the offshore islands to the east of the Study Area.</p>

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
<b>Mammals</b>					
Large-eared pied bat	<i>Chalinolobus dwyeri</i>	E	E	Sandstone cliffs and fertile woodland valley habitat within close proximity of each other is habitat of importance to the species. Rainforest and moist eucalypt forest habitats on other geological substrates (rhyolite, trachyte and basalt) at high elevation are of similar importance.	<b>Low</b> Small areas of sandstone derived landform are present in the western portion of the Study Area. However, there are no nearby records for this species in the wider area surrounding the Study Area. The closest historical records for this species are located 130 km north within the Shoalwater Bay Training Area.
Spotted-tailed quoll (southern subspecies)	<i>Dasyurus maculatus maculatus</i>	E	E	The spot-tailed quoll inhabits a range of different vegetation communities, including temperate and subtropical rainforests, wet sclerophyll forest, lowland forests, open and closed eucalypt woodlands, inland riparian and <i>Eucalyptus camaldulensis</i> forests and coastal heathlands. It is reported that they prefer mature wet forest that has den sites and is relatively undisturbed from thinning.	<b>Low</b> Suitable refuge habitat may occur scattered across the Study Area within open eucalypt woodlands, however limited denning habitat. A single historical record from 1935 exists 10 km south of Section B of the Study Area. The Study Area is just north of the species mapped distribution, which stops at Tablelands.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Semon's leaf-nose bat	<i>Hipposideros semoni</i>	V	E	The known broad-scale distribution for this species includes coastal Queensland from Cape York to just south of Cooktown. There is an outlier population at Kroombit Tops, near Gladstone. This species utilises a variety of features as roost sites including caves, buildings, tree hollows and road culverts. Preferring rainforest, this species generally forages in undergrowth within one to two meters from the ground.	<b>Low</b> Limited suitable roosting habitat may occur across the Study Area where tree hollows and suitable vegetation is present. The only nearby records of this species are from Kroombit Tops National Park (approximately 25 km south-east of the Study Area) from 1994. All other records of the species are north of Townsville.
Ghost bat	<i>Macroderma gigas</i>	V	E	The species occurs throughout a wide range of habitats from rainforest, monsoon and vine scrub to open woodlands in arid areas. These habitats are used for foraging, while roost habitat is more specific. Favoured roosting sites of the species are undisturbed caves or mineshafts which have several openings.	<b>Moderate</b> A known maternity roost occurs at the Mount Etna Caves, which is located approximately 100 km north of the Study Area. Suitable seasonal foraging and dispersal habitat may occur within remnant and regrowth vegetation woodlands within the Study Area. A historical record from 1985 is located 14 km north of Section D.  Four vertical mine shaft openings occur to the north of Section E areas (<10 km). These mine shafts do not constitute as mine adits (i.e. horizontal shafts) and are unlikely to provide roosting habitat for this species.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Corben's long-eared bat	<i>Nyctophilus corbeni</i>	V	V	A range of inland dry forest habitats including <i>Eucalyptus camaldulensis</i> , mallee, <i>Acacia harpophylla</i> and other arid and semi-arid habitats; more common in box, ironbark and cypress pine forests on sandy soils in southern Qld. Most abundant in vegetation with a distinct canopy and a dense, cluttered shrub layer, and in large, continuous remnants; sensitive to habitat fragmentation. Roosts solitarily in tree hollows, crevices, and under loose bark (particularly on dead <i>Allocasuarina luehmannii</i> or <i>Casuarina cristata</i> trees. Rare or uncommon over most of its range.	<b>Low</b> Limited suitable roosting and foraging habitat may be present where a densely vegetated understorey is present with the presence of <i>Casuarina cristata</i> within the Study Area. There are no records of this species within the Study Area. Historical records occur within the Expedition Stare Forest, Expedition National Park and Barakula State Forest.
Greater glider (southern and central)	<i>Petauroides volans sensu lato</i>	E	E	The species is largely restricted to eucalypt forests and woodlands; it is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows.	<b>High</b> Suitable breeding, foraging and dispersal habitat is present within the Study Area where <i>Corymbia citriodora</i> and eucalypt woodlands occur. Sections of this vegetation is also linked to nearby recorded occurrences of this species in Section B, Section D and Section E. Historical records occur in Mount Stowe State Forest (1997), records from 2015 occurred in the Callide Timber Reserve with the most recent records from 2020 recorded in the north of

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
					Kroombit Tops National Park 18 km south of the Study Area.
Yellow-bellied glider (south-eastern)	<i>Petaurus australis australis</i>	V	V	The species occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests. Abundance is highly dependent on habitat suitability, which is in turn determined by forest age and floristics. The subspecies shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter.	<b>High</b> Suitable breeding, foraging and dispersal habitat is present within the Study Area where <i>Corymbia citriodora</i> and eucalypt woodlands occur. Sections of this vegetation is also linked to nearby recorded occurrences of this species in Section B and Section D of the Study Area. Historical record from 1997 occurs within 1 km of the Study Area.
Koala	<i>Phascolarctos cinereus</i>	E	E	The species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypt species. The species is limited by habitat (restricted to below 800 m ASL), temperature and, at the western and northern ends of the range, leaf moisture.	<b>High</b> Suitable breeding and foraging habitat present in eucalypt woodlands within climate refugia habitat present within vegetation fringing watercourse. This vegetation is also linked to nearby recorded occurrences of this species in Section A and Section D. Historical record from 1997 occurs within 1 km of the Study Area. A more recent record from 2016 was recorded 5 km from Section D.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Short-beaked echidna	<i>Tachyglossus aculeatus</i>	-	SLC	The short-beaked echidna is found throughout Australia, including Tasmania. The short-beaked echidna lives in forests and woodlands, heath, grasslands and arid environments. This species can live anywhere with a good supply of food and regularly feast on ants and termites.	<b>Known</b> Observed during field surveys and numerous records within the wider Study Area.
Water mouse	<i>Xeromys myoides</i>	V	V	The species habitat includes mangrove communities and adjacent sedgeland, grasslands and freshwater wetlands. A supralittoral bank where present maybe be utilised by the water mouse for nesting. The water mouse may nest or forage in the following Queensland REs considered essential habitat for this species: 8.1.1, 11.1.1, 11.1.2, 11.1.4, 12.1.1, 12.1.2, 12.1.3, 12.2.5, 12.2.7, 12.2.11, 12.2.12 and 12.2.14.	<b>High</b> Suitable habitat is present for this species within the mangroves, sedges and grasses within intertidal areas in Section E. The species was recorded on the Study Area boundary of Section E in 2011 and 2 km from the Study Area at the mouth of the Calliope River.
<b>Reptiles</b>					
Collared delma	<i>Delma torquata</i>	V	V	The species inhabits eucalypt-dominated woodlands and open-forests in Qld Regional Ecosystem Land Zones 3 (alluvium), 9 (undulating country on fine-grained sedimentary rocks) and 10 (sandstone ranges).	<b>Known</b> Observed in <i>Eucalyptus crebra</i> (narrow-leaved ironbark) dominated woodland on metamorphic derived soils in Section B. Suitable habitat for this species also noted in other areas of Section A and B.
Ornamental snake	<i>Denisonia maculata</i>	V	V	Lower-lying subtropical areas with deep-cracking clay soils and adjacent slightly	<b>Low</b>

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				elevated ground of clayey and sandy loams, is the preferred habitat for this species. The species is also found in vegetation of woodland and shrub land, including some <i>Acacia harpophylla</i> , and also riverside woodland and open forest, particularly on natural levees.	Limited cracking clay soils exists within the Study Area. Two patches of <i>Acacia harpophylla</i> are present within western portion of the Study Area, however, gilgai is absent. Historical records are located in Biloela and west to Moura.
Yakka skink	<i>Egernia rugosa</i>	V	V	The species occurs in a variety of drier forests and woodlands, usually on well-drained, gritty soils, including <i>Eucalyptus populnea</i> on alluvial soils, <i>Callitris glaucophylla</i> on sands, <i>Allocasuarina luehmannii</i> , <i>Acacia harpophylla</i> , <i>A. catenulata</i> and <i>A. aneura</i> . The species inhabits burrows, abandoned rabbit warrens, and hollow logs or in deep rock crevices.	<b>Low</b> Suitable drier forests and woodlands present across the sections of the Study Area. However, all records within 100 km of the Study Area (in all directions) are dated from the 1950's to 1970's. the closest record within the last 30 years is from 288 km south-east of the Study Area, south of Injune, dated from 2006.
Southern snapping turtle	<i>Elseya albagula</i>	CE	CE	The southern snapping turtle is only found in the Burnett, Fitzroy, Raglan and Mary River drainages of south-east Qld. It prefers permanent flowing water habitats where there are suitable shelters and refuges.	<b>Low</b> Suitable habitat (streams with suitable structure and bed characteristics) is absent within the Study Area. Previous records linked with the Lake Callide area in 1998.
Dunmall's snake	<i>Furina dunmalli</i>	V	V	The species is found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by <i>Acacia harpophylla</i> , <i>Acacia spp.</i> , <i>Callitris spp.</i> or <i>Allocasuarina luehmannii</i> ; and	<b>Low</b> The preferred habitat for this species (black alluvial cracking clay and clay loams dominated by <i>Acacia</i> ) is not

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> and/or <i>E. melanophloia</i> , <i>Callitris glaucophylla</i> and/or <i>Allocasuarina luehmannii</i> open forest and woodland associations on sandstone derived soils.	recorded in the Study Area. Only one small patch of <i>Acacia harpophylla</i> regrowth occurs and is not suitable for the species due to the size and the lack of microhabitat. A 1986 record occurs at Gladstone City, and a 1994 record occurs at Boyne Island.
Grey snake	<i>Hemiaspis damelii</i>	E	E	Grey snake habitat is <i>Acacia harpophylla</i> and <i>Casuarina cristata</i> woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks.	<b>Low</b> Minimal cracking clay soils. Only one small, isolated patch of brigalow regrowth is present within the western portion of the Study Area. No gilgai occurs. Nearest recorded occurrence (undated) of this species is at Bajool approximately 50 km north of the Study Area.
Fitzroy River turtle	<i>Rheodytes leukops</i>	E	E	Occurs in flowing rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. It is a benthic feeder whose diet consists of insects, macro-invertebrates, crustaceans, algae, gastropods, worms, freshwater sponges and aquatic plants. Preferred areas have high water clarity and are often associated with <i>Vallisneria</i> sp. beds. Common riparian vegetation includes <i>Eucalyptus tereticornis</i> , <i>Casuarina cunninghamiana</i> , <i>Melaleuca viminalis</i> and <i>Melaleuca linariifolia</i> (snow-in summer).	<b>Low</b> Suitable habitat may occur along the sections of the Study Area. However, the nearest recorded occurrence from 2009 of this species is 75 km to the west near Moura.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
<b>Marine Turtles</b>					
Loggerhead turtle	<i>Caretta caretta</i>	E, M	E	<p>In Australia this species relies on open sandy beaches with little to no light pollution as nesting habitat. Hatchlings are pelagic for approximately the first 15 years of life where they feed within the first five metres of the water column.</p> <p>Following early life stages individuals will begin recruiting to inshore or neritic tidal and sub-tidal feeding grounds. They occupy areas with both soft and hard substrate including rocky and coral reefs, muddy bays, sand flats, estuaries and sea grass meadows.</p>	<p><b>Moderate</b></p> <p>Suitable foraging habitat may occur within Section E. A historical record from 1989 occurs approximately 2 km from the Study Area and are associated with the Calliope River. A more recent record from 2021 occurs south of the coastline at Tannum Sands Beach.</p>
Green turtle	<i>Chelonia mydas</i>	V, M	V	<p>Green turtles are pelagic for the first five to ten years of life and are associated with floating rafts of <i>Sargassum</i> which are carried by currents.</p> <p>Once individuals reach between 30 to 40 cm in carapace length, they begin to utilise foraging habitat associated with shallow benthic areas such as tropical tidal and sub-tidal coral and rocky reefs and in-shore seagrass meadows. Adults utilise shallow coastal habitats feeding on seagrass, algal mats and mangroves.</p>	<p><b>Moderate</b></p> <p>Suitable foraging habitat may occur within Section E. Numerous records occur within 6 km of the Study Area from Calliope River and Gladstone Harbor with one record from 2016 occurring 450 m from the Study Area.</p>
Leatherback turtle	<i>Dermochelys coriacea</i>	E, M	E	<p>Leatherback turtles in Australia are most commonly associated with central eastern Australian coastal waters occupying tropical</p>	<p><b>Low</b></p> <p>The Study Area is not likely to provide suitable foraging resources or nesting</p>

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				and temperate waters where they forage on jelly fish and other soft bodies invertebrates. Nesting largely occurs internationally with individuals migrating to Indonesia, Papua New Guinea and the Solomon Islands. However, nesting events have occurred at Wreck Rock and Rules Beach between December and January. Sandy beaches are the preferred nesting habitat for this species.	habitat for this species. The nearest records are associated with Heron Island and Seventeen Seventy which are approximately 85 km from Section E.
Hawksbill turtle	<i>Eretmochelys imbricata</i>	V, M	E	Hawksbill turtles are pelagic for the first five to ten years of life and are associated with floating rafts of <i>Sargassum</i> which are carried by currents. Once individuals reach between 30 to 40 cm in carapace length, they begin to utilise sponge and algae foraging resources associated with shallow benthic areas such as tropical tidal and sub-tidal coral and rocky reefs and in-shore seagrass meadows. Although less common, this species is known to occasionally forage on coastal seagrass.	<b>Moderate</b> Section E may provide foraging resources this species. However, suitable nesting habitat is absent. The nearest records are generally old and associated with the outer edges of nearshore islands off Gladstone 15 – 20 km from the Study Area.
Olive Ridley turtle	<i>Lepidochelys olivacea</i>	E, M	E	Females of this species lay their eggs on sandy beaches in Australia undertaking solitary or low-density nesting. Hatchlings disperse to open oceans once they hatch, the duration of this pelagic phase is unknown for the species. Small juveniles and adults are associated with coastal zones along northeastern Australia.	<b>Moderate</b> Section E may provide foraging resources this species. However, suitable nesting habitat is absent. The nearest records are generally old and associated with the outer edges of

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				Foraging habitat ranges from a few metres to 100 m in depth. A substantial part of the juvenile and adult population forage over shallow benthic habitats feeding on gastropods and bivalve molluscs.	nearshore islands off Gladstone 15 – 20 km from the Study Area.
Flatback turtle	<i>Natator depressus</i>	V, M	V	Post hatchling and juveniles of this species do not have the wide-ranging pelagic dispersal phase associated with their early years like other species of marine turtles. Peak, Wild Duck and Curtis Islands are all considered primary nesting sites for this species. Adults of this species inhabit soft bottom habitat over the continental shelf with an indicated preference for turbid, shallow inshore waters north of latitude 25°S.	<b>Moderate</b> Section E may provide foraging resources this species. However, suitable nesting habitat is absent. The nearest records including recent occur from within 18 km of Section E of the Study Area.
<b>Special Least Concern Marine Birds</b>					
Common noddy	<i>Anous stolidus</i>	M	SLC	The common noddy occurs mainly in ocean off the Queensland coast. During the breeding season, they usually occur on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand.	<b>Unlikely</b> Pelagic species. Most records of this species south of Gladstone or offshore.
Fork-tailed swift	<i>Apus pacificus</i>	M	SLC	The species is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher.	<b>Known</b> Records scattered within the vicinity of the Study Area. Suitable foraging habitat exists within the airspace above the Study Area.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Flesh-footed shearwater	<i>Ardenna carneipes</i>	M	SLC	This species is classified as an aerial pelagic marine seabird, spending most of the time in flight over inshore, offshore and in pelagic waters ranging widely in the Southern Ocean. These species are known to frequent small islands off the southern coasts of Australian and Antarctic islands for breeding purposes.	<b>Unlikely</b> Pelagic species. No nearby records. Two records (2017 and 2023) occur 130 km offshore from Gladstone.
Lesser frigatebird	<i>Fregata ariel</i>	M	SLC	It is common in tropical and subtropical seas, breeding on remote islands, including Christmas Island in the Indian Ocean in recent years. It is almost exclusively a sea bird spending many months out at sea seeking refuge on remote islands and coming to nest between May and December in trees on Christmas Island.	<b>Unlikely</b> Pelagic species. Most records of this species south of Gladstone or offshore. One historical record from 2009 occurs off Barney Point at Gladstone.
Great frigatebird	<i>Fregata minor</i>	M	SLC	This species has a wide distribution throughout the world's tropical seas. Hawaii is the northernmost extent of their range in the Pacific Ocean, in the Central and South Pacific, colonies are found on most islands' groups from Wake Island to the Galapagos to New Caledonia with a few pairs nesting on Australian possessions in the Coral Sea. Colonies are also found on numerous Indian Ocean islands including Aldabra, Christmas Island, the Maldives and Mauritius.	<b>Unlikely</b> Pelagic species. Most records of this species south of Gladstone or 63 km offshore.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
White-tailed tropicbird	<i>Phaethon lepturus</i>	M	SLC	This species occupies marine habitats in tropical waters with sea-surface temperatures of more than 22°C. The tropicbird breeds on islands and atolls, where it nests in a variety of habitats including on bare sandy ground, in closed-canopy rainforest, on rocky cliffs and in quarries. The species feeds over warm waters of low salinity close to Christmas Island. In Australian waters they are more pelagic.	<b>Unlikely</b> Pelagic species. No nearby records. Closest record is from 2002 and is 85 km offshore.
Little tern	<i>Sternula albifrons</i>	M	SLC	This species inhabits sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours, and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. They appear to be less often on offshore continental islands or coral cays off Queensland.	<b>Low</b> This species typically inhabits coastal environments with sand-spits and beaches. Neither are present within the Study Area. Recent mainland records in Gladstone from 2017.
Short-tailed shearwater	<i>Ardenna tenuirostris</i>	M	SLC	This species is classified as an aerial pelagic marine seabird, spending most of the time in flight over inshore, offshore and in pelagic waters ranging widely in the Southern Ocean. Nests and breeds in colonies on headlands and sea stacks, particularly in southern Australia.	<b>Unlikely</b> Pelagic species. Most records of this species south of Gladstone or offshore. Most recent record from 2020 is located 85 km offshore from Gladstone.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Brown booby	<i>Sula leucogaster</i>	M	SLC	This species uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land.	<b>Low</b> Pelagic species. Recent mainland records in Gladstone from 2019.
Crested tern	<i>Thalasseus bergii</i>	M	SLC	This species is classified as an aerial pelagic marine seabird, spending most of the time in flight over inshore, offshore and in pelagic waters ranging widely in the Central / Southern Pacific and Indian Oceans. Nests and breeds on offshore islands, low-lying coral reefs, sandy or rocky coastal islets, coastal spits, and lagoon mudflats.	<b>Low</b> Primarily an offshore species. Recent mainland records occur in Gladstone from 2019.
<b>Special Least Concern Terrestrial Birds</b>					
Oriental cuckoo	<i>Cuculus optatus</i>	M	SLC	The species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and often along edges of forests, or ecotones between forest types.	<b>Moderate</b> Suitable habitat may occur within several sections of the Study Area within open <i>Eucalyptus</i> woodlands. Recent record in Gladstone from 2019.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Yellow wagtail	<i>Motacilla flava</i>	M	SLC	Habitat requirements for the species are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves.	<b>Low</b> Marginal habitat may occur within several sections of the Study Area. A migratory vagrant with a recent record from south of Section E of the Study Area at Boyne Island in 2016, however, prior to this record there are no nearby records on mainland Australia since 1905.
<b>Special Least Concern Wetlands Birds</b>					
Common sandpiper	<i>Actitis hypoleucos</i>	M	SLC	The species utilises a wide range of coastal wetlands and some inland wetlands with varying levels of salinity, mostly around muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, as well as on banks further upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. It is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area on muddy margins and banks. Recent mainland records in Gladstone from 2020.
Pectoral sandpiper	<i>Calidris melanotos</i>	M	SLC	The species prefers shallow fresh to saline wetlands. It is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area on muddy margins and banks. However, only a

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
				grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	single nearby record occurs with a spatial uncertainty of 54 km and is undated.
Red-necked stint	<i>Calidris ruficollis</i>	M	SLC	This species has been recorded in all coastal regions and found inland in all states when conditions are suitable. They are mostly found in coastal areas, including in sheltered inlets, bays, lagoons, and estuaries with intertidal mudflats, often near spits, islets, and banks and, sometimes, on protected sandy or coralline shores. Occasionally recorded in other wetland areas where suitable.	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area where intertidal flats occur. Recent mainland records in Gladstone from 2019.
Swinhoe's snipe	<i>Gallinago megala</i>	M	SLC	During the non-breeding season Swinhoe's snipe ( <i>Gallinago megala</i> ) occurs at the edges of wetlands, such as wet paddy fields, swamps, and freshwater streams. Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams, and sewage ponds.	<b>Low</b> Suitable habitat may occur within several sections of the Study Area. However, nearby records are absent from the wider desktop extent.
Pin-tailed snipe	<i>Gallinago stenura</i>	M	SLC	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. A non-breeding species in Australia.	<b>Low</b> Suitable habitat may occur within several sections of the Study Area. However, nearby records are absent from the wider desktop extent.

Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Broad-billed sandpiper	<i>Limicola falcinellus</i>	M	SLC	The Broad-billed Sandpiper occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, and in areas with large soft intertidal mudflats. Foraging occurs on exposed flats of soft mud or wet sand at edges of coastal and near-coastal wetlands.	<b>Moderate</b> Suitable habitat may occur within Section E on intertidal mudflats of the Study Area. Mainland records in Gladstone from 1999.
Bar-tailed godwit	<i>Limosa lapponica</i>	M	SLC	This species is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	<b>Moderate</b> Suitable habitat may occur within Section E on mudflats of the Study Area. Recent mainland records in Gladstone from 2019.
Little curlew	<i>Numenius minutus</i>	M	SLC	The species is recorded in Australia between September and April and there are few winter records. Most often found feeding in short, dry grassland and sedgeland, including dry floodplains and black soil plains, which have scattered, shallow freshwater pools or areas seasonally inundated.	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area. Recorded in Gladstone within 1 km of the Study Area in 1989.
Whimbrel	<i>Numenius phaeopus</i>	M	SLC	The whimbrel is a regular migrant to Australia and New Zealand, with a primarily coastal distribution. Found often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries, and river deltas, often those with mangroves, but also open, unvegetated mudflats.	<b>Moderate</b> Suitable habitat may occur within Section E of the Study Area within mangroves and intertidal mudflats. Recent mainland records in Gladstone from 2019.



Common Name	Scientific Name	EPBC Act Status^	NC Act Status^	Habitat	Likelihood of Occurrence
Eastern osprey	<i>Pandion haliaetus</i>	M	SLC	Favoured habitats are coastal areas, especially the mouths of large rivers, lagoons and lakes but also along the larger coastal rivers such as the Clarence where nesting occurs upriver of Grafton, New South Wales.	<b>Known</b> Suitable habitat may occur within Section E of the Study Area. The species was recorded in Section E nesting on the powerline towers.
Pacific golden plover	<i>Pluvialis fulva</i>	M	SLC	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats, and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> spp., or beds of seagrass).	<b>Moderate</b> Suitable habitat may occur within Section E within mudflats and mangroves of the Study Area. Recent mainland records in Gladstone from 2019.
Grey-tailed tattler	<i>Tringa brevipes</i>	M	SLC	This species is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral, or stony reefs as well as platforms and islets that are exposed at low tide.	<b>Moderate</b> Suitable habitat may occur within Section E on intertidal mudflats within the Study Area. Recent mainland records in Gladstone from 2019.
Marsh sandpiper	<i>Tringa stagnatilis</i>	M	SLC	The marsh sandpiper ( <i>Tringa stagnatilis</i> ) is found on coastal and inland wetlands throughout Australia. It lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats.	<b>Moderate</b> Suitable habitat may occur within Section E on intertidal mudflats of the Study Area. Recent mainland records in Gladstone from 2021.

## Appendix C

# Habitat Modelling Criteria



Habitat modelling criteria has been developed for threatened and special least concern species which are known to occur or have a high or moderate likelihood of occurring within the Study Area. This criterion is largely based on REs or mapped fauna habitat types presented in this report, however, also considers the presence and abundance of habitat features as determined through field surveys.

**Appendix Table C.1 MSES Habitat Modelling Criteria and Justification**

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
<b>Threatened Flora</b>					
<i>Atalaya collina</i>  Yarwun whitewood	Potential habitat	<i>Atalaya collina</i> occurs in semi-evergreen vine thicket or dry rainforest. Surface soils are moderately drained, brownish-black clay loams overlying clay subsoils. Both known populations occur in partially cleared highly disturbed areas.	RE 11.11.18. In Section D and E only.	Remnant and regrowth	Sections A – C are outside the species distribution; given only two populations are known.
<i>Cossinia australiana</i>	Potential habitat	Habitat noted from ecotones at dry rainforest edges, primarily Araucarian microphyll vine forest and relict semi-evergreen vine thicket; however, may occur within closed forests as individuals. This species is noted to grow on a variety of soil types within an altitudinal range from 20 to 520 m.	Vine thicket communities i.e. RE 11.10.8 and 11.11.18 between 20 and 520 m ASL.	Remnant and regrowth	Vine thicket communities in remnant and regrowth condition. Regrowth communities included due to the occurrence with ecotones. No Araucarian vine forest communities recorded in Study Area. Only include areas at elevations between 20 and 550 m ASL.
<i>Cerbera dumicola</i>	Potential habitat	This species occurs in a range of habitat types such as: Sandstone hills in open <i>Eucalyptus umbra subsp. carnea</i> on plateaus, in woodlands of <i>Acacia shirleyi</i> with <i>Corymbia dolichocarpa</i> . Acidic soils in mine	REs 11.10.4, 11.10.8 and 11.11.18.	Remnant and regrowth	REs 11.10.8 and 11.11.18 are SEVT communities which is known habitat for the species. RE 11.10.4 contains associated species ( <i>Acacia shirleyi</i> ).



MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
		rehabilitation areas. On sandy/clay soil with a woodland.			
<i>Cycas megacarpa</i>	Known habitat - confirmed	The species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory. This species is found in habitat dominated by <i>Eucalyptus crebra</i> and <i>Corymbia citriodora</i> as well as <i>C. erythrophloia</i> , <i>E. melanophloia</i> and <i>Lophostemon confertus</i> . There are also reports that it can be found in or on the edge of rainforest habitat.	An 80 m buffer on confirmed <i>Cycas megacarpa</i> records, to reflect the latest population research which indicates most individuals disperse within 80 m of mature female plants (Etherington et al. 2018; James 2016 PhD thesis).	Remnant, regrowth and non-remnant	Mapping has not been limited to certain REs noting the species was also recorded within non-remnant vegetation within the Study Area.
	Known habitat - suspected		REs 11.10.13, 11.10.8, 11.11.15, 11.11.18, 11.11.3, 11.11.4, 11.12.1, 11.12.6, 11.3.4, 11.8.4.	Remnant, regrowth and non-remnant	Reasonable extrapolation of known habitat mapping. Suspected habitat includes vegetation communities that <i>Cycas megacarpa</i> can occur in, including remnant and regrowth vegetation communities and select non-remnant areas.  In areas where surveys were not undertaken due to site access issues, REs where the species had been recorded, as well as those identified as habitat by the Queensland Herbarium, were considered suspected habitat.

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
<i>Dansiea elliptica</i>	Potential habitat	This species occurs in lowland dry rainforest and vine thicket (notophyll vine forest and semi evergreen vine thicket) on soils derived from sandstone or volcanics. This species is restricted to Queensland being found in two disjunct locations, with five localities in central Queensland.	RE 11.10.8 and 11.11.18.	Remnant and regrowth	Remnant and regrowth condition semi-evergreen vine thicket communities.
<i>Graptophyllum excelsum</i> Scarlett fuchsia	Potential habitat	This species occurs in semi-evergreen vine thickets. It has also been recorded in grassy woodland in association with <i>Eucalyptus cullenii</i> and <i>Corymbia erythrophloia</i> . Other associated species include <i>Macropteranthes</i> sp., <i>Gyrocarpus americanus</i> , <i>Lysiphyllum hookeri</i> , <i>Acacia fasciculifera</i> , <i>Brachychiton australis</i> , <i>Polyscias elegans</i> , <i>Archidendropsis thozetiana</i> , <i>Gossia bidwillii</i> , <i>Alstonia constricta</i> , <i>Alyxia ruscifolia</i> and <i>Alchornea ilicifolia</i> .	RE 11.10.8 and 11.11.18.	Remnant and regrowth	Semi-evergreen vine thicket communities.
<i>Grevillea hockingsii</i>	Potential habitat	This species is commonly found on slopes in hilly sandstone country on a variety of soil types, primarily sandy soils, and occasionally stony or gravelly. <i>Grevillea hockingsii</i> has been observed growing in woodland or open forest communities associated with a variety of eucalypt species	RE 11.8.4 and 11.10.13.	Remnant and regrowth	A review of other nearby species records in comparison with mapped vegetation communities shows this species associated with these RE. No other suitable REs within Study Area due to land zone or dominance of eucalypts.

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
		including ironbark, spotted gum and stringybark species.			
<i>Melaleuca groveana</i> Grove's paperbark	Potential habitat	Melaleuca groveana grows on exposed rocky ridges, high mountain slopes and the summits of mountains, at altitudes between 340 – 600 m above sea level. It generally occurs in heaths and eucalypt woodlands and forests with heath understoreys. It is also found in tall open forest with a grassy understorey and in microphyll vine forests. It has been recorded growing on red sandy loams, brown loams, skeletal rocky soils and sandy soils over sandstone rock.	RE 11.10.13 between 340 and 600 m ASL.	Remnant and regrowth	A review of other nearby species records in comparison with mapped vegetation communities shows this species associated with this RE. Consequently, the only suitable habitat present within the study site due to suitable canopy and land zone.
<i>Polianthion minutiflorum</i>	Potential habitat	This species frequently occurs in forest and woodland on sandstone slopes and gullies with sandy skeletal soil. Occasionally noted on deeper sands adjacent to deeply weathered laterite. <i>Polianthion minutiflorum</i> is often found within acacia woodland or eucalypt woodland.	RE 11.10.13.	Remnant and regrowth	A review of other nearby species records in comparison with mapped vegetation communities shows this species associated with this sandy soils and eucalypt canopy. Consequently, the only suitable habitat present within the Study Area due to suitable canopy and land zone reflects the described mapping rule.



MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
<i>Samadera bidwillii</i>	Potential habitat	This species is found in a variety of vegetation types; but frequently occurs in lowland rainforest often with <i>Araucaria cunninghamii</i> or on rainforest margins. Other forest types include open forest and woodland and is commonly recorded in areas adjacent to both temporary and permanent watercourses up to 510 m ASL.	RE 11.8.4, 11.10.13, 11.10.8, 11.11.10, 11.11.15, 11.11.3/c, 11.11.4/c, 11.11.18, 11.12.1, 11.12.6, 11.3.25 11.3.26, 11.3.4, 12.11.16, 12.11.6 and 12.3.3 below 510 m ASL.	Remnant and regrowth	All remnant and regrowth areas of eucalypt woodland and forests and semi-evergreen vine thicket below 510 m ASL. Geographically widespread species being recorded at both ends of the Study Area.
<b>Threatened and Migratory Fauna</b>					
<i>Geophaps scripta scripta</i>	Breeding	Any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i> , <i>Corymbia</i> , <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils with patchy perennial tussock grasses or a mix of perennial tussock grasses and low shrubs and forbs (including but not limited to areas mapped as Queensland land zones 3, 5 or 7).	All REs that occurs on land zone 3 within 1 km of a suitable waterbody with gently sloping banks.	Remnant and regrowth.	No REs on land zones 5 or 7 occur in the Study Area.  Suitable water sources include farm dams, lacustrine wetlands and watercourses with a stream order of 3 or higher.
Squatter pigeon (southern)	Foraging		All REs that occurs on land zone 3 within 3 km of a suitable waterbody with gently sloping banks.		
	Dispersal		All REs not mapped as breeding or foraging (excluding 11.11.18, 11.10.8, 12.1.2 and 12.1.3), including non-remnant vegetation.		

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
					Marine areas (saltwater), intertidal zones and REs 12.1.2 and 12.1.3 have not been included in the mapped dispersal habitat.
<i>Grantiella picta</i>  Painted honeyeater	Breeding	Habitat includes woodland ecosystems, as well as riparian woodlands and <i>Acacia</i> scrubs. The species relies heavily on <i>Amyema quandang</i> and <i>Amyema cambagei</i> for breeding and foraging.	-	-	No breeding habitat has been mapped for this species as the Study Area is outside of the species' breeding range. The breeding distribution of this species is almost exclusively along the western slopes of the Great Diving Range from southern Queensland, New South Wales and Victoria.
	Foraging and dispersal	Many birds move after breeding to semi-arid regions such as north-eastern South Australia, central and western Qld, and central Northern Territory.	Connected eucalypt, <i>Acacia</i> and <i>Casuarina</i> forest and woodlands where suitable mistletoe resources present (REs 11.3.25, 11.11.3, 11.11.4, 11.12.6, 12.3.3).	Remnant.	Suitable habitat connected to contiguous forest with mistletoe resources present. Highly fragmented and regrowth vegetation excluded.
<i>Hirundapus caudacutus</i>  White-throated needletail	Roosting and foraging	Areas containing tall and/or hollow bearing trees at high elevations including the top of ridges, peaks and mountains.	Remnant woodland and forest occurring within areas above 400 m AHD.	Remnant.	This species is a non-breeding migrant to Australia.
	Foraging and dispersal	A range of habitats, although more often over wooded areas, where it is almost exclusively aerial.	All remaining vegetation communities in remnant or regrowth condition.	Remnant and regrowth.	

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
<i>Turnix melanogaster</i>  Black-breasted button-quail	Nesting and foraging	Rainforest and dry forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest, with deep leaf litter in the ground layer. Habitat types include <i>Acacia harpophylla</i> woodland/open forest and semi-evergreen vine thicket.	Semi-evergreen vine thicket (RE 11.10.8 and 11.11.18).	Remnant and regrowth.	Results of the field survey found these habitats contained leaf litter, but it generally comprised a thin layer (1-2 cm).  Other <i>Acacia</i> habitat (RE 11.10.4) was found in sparse regrowth condition only and do not contain the microhabitat features required by the species.
<i>Rostratula australis</i> Australian painted snipe	Seasonal breeding, foraging and dispersal	Habitat includes the fringe of a wide variety of permanent and/or temporary shallow, brackish and freshwater wetlands. Suitable wetlands usually support a mosaic of low, patchy vegetation, as well as lignum and cane grass. This species can also use modified habitats, such as low-lying woodlands converted to grazing pasture, sewage farms, dams, bores and irrigation schemes. Nesting occurs within a scrape on the ground amongst reeds and tussocks which is lined with twigs, leaves and stalks of grass.	All freshwater waterbodies and dams.	-	Freshwater waterbodies and dams includes all areas mapped as lacustrine or palustrine wetlands on Queensland globe. Presence of 'low patchy vegetation' is confirmed via field survey. The species is not known to utilise intertidal areas and as such the tidal flats including RE 12.1.2 and 12.1.3, intertidal wetlands and the Calliope River are excluded.
Threatened and migratory shorebirds and waterbirds	Roosting and foraging	Intertidal mudflats or sandflats exposed at low tide and with soft substrate provide foraging habitat. At high tide lakes, sewage ponds and	All freshwater waterbodies and dams. Intertidal areas, near-coastal wetlands and	-	Freshwater waterbodies and dams includes all areas mapped as lacustrine or palustrine wetlands on Queensland globe.



MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
		flood waters provide suitable foraging habitat.	dams, tidal flats dominated by mangroves, sedges and grasses. Adjacent to and including REs 12.1.2 and 12.1.3.		Also includes areas mapped as intertidal wetlands on Queensland globe. These species are non-breeding in Australia.
<i>Apus pacificus</i>  Fork-tailed swift	Foraging and dispersal	Exclusively aerial, occupying the airspace above a range of habitat types, although mostly over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. Sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines and non-remnant vegetation communities. Roosting probably occurs aerially.	All habitat types.	Remnant, regrowth and non-remnant.	All remnant and non-remnant vegetation communities included. Suitable habitat is present in all sections of the Study Area. This species is a non-breeding migrant to Australia.
<i>Cuculus optatus</i>  Oriental cuckoo	Foraging and dispersal	Monsoonal rainforest, vine thickets, wet sclerophyll forest or open <i>Casuarina</i> , <i>Acacia</i> or <i>Eucalyptus</i> woodlands. Frequently at edges or ecotones between habitat types.	All habitat types in remnant condition except 12.1.2 and 12.1.3.	Remnant and regrowth.	All vegetation communities are likely to be suitable for foraging and dispersal during this species' winter migration. This species is a non-breeding migrant to Australia.
<i>Macroderma gigas</i>	Roosting	Caves, rock crevices, rock outcrops and disused mine adits/shafts. Preference for those deep enough to maintain a relatively stable	-	-	No suitable roosting habitat occurs within the Study Area.

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
Ghost bat		temperature and high relative humidity.			
	Seasonal foraging and dispersal	Foraging has mostly been recorded over cleared agricultural land and along the edges of a few small remnant thickets of <i>Eucalyptus/Corymbia</i> woodlands on alluvial plains, rather than vine thickets surrounding their cave roost. Sites along an ephemeral watercourse are often used.	All vegetation communities including non-remnant vegetation.	Remnant, regrowth and non-remnant	-
<i>Petauroides volans</i>  Greater glider (southern and central)	Likely or current denning	Eucalypt forests and woodlands in Qld REs considered habitat or potential habitat as per the <i>Species Specific Guidance – Greater Glider habitats in Qld</i> containing trees with a DBH greater than 30 cm (used as a proxy for hollow-bearing trees).	REs 11.10.4, 11.11.15, 11.11.3, 11.11.3c, 11.11.4, 11.11.4c, 11.12.1, 11.12.3, 11.12.6, 11.10.13, 11.3.26, 11.3.4, 11.3.25, 12.11.6, 12.3.3 and 12.11.16.	Remnant.	Suitable communities in remnant condition only were found during the field survey program to consistently support large trees.  Patches found to contain trees <30 cm DBH were excluded from the mapping. Little DBH data is known from the Disturbance Footprint, therefore all patches where the DBH of trees was unknown were conservatively included.
	Potential or future denning	Eucalypt forest and woodlands in Qld REs considered habitat or potential habitat as per the <i>Species Specific Guidance – Greater Glider habitats in Qld</i> containing appropriate tree species with a DBH less than 30 cm.	REs 11.10.4, 11.11.15, 11.11.3, 11.11.3c, 11.11.4, 11.11.4c, 11.12.1, 11.12.3, 11.12.6, 11.10.13, 11.3.26, 11.3.4, 11.3.25,	Regrowth.	All suitable regrowth vegetation communities.

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
			12.11.6, 12.3.3 and 12.11.16.		
	Foraging and dispersal	Eucalypt forest and woodland where known important tree species for foraging are dominant/co-dominant AND in Qld REs considered habitat or potential habitat as per the <i>Species Specific Guidance - Greater Glider habitats in Qld</i> AND where the trees present do not have a DBH greater than 30 cm.	-	-	Excludes those areas that are isolated (>100 m from current or future denning). No habitat mapping occurs within this category. Any suitable habitat has already been captured in the potential or future denning habitat.
<i>Petaurus australis australis</i>  Yellow-bellied glider (south-eastern)	Denning, foraging and dispersal	Floristically diverse, mature eucalypt woodlands and forests dominated by smooth-barks or half-barks, comprising intact and connected patches that contain live and large hollow-bearing trees.	REs 11.10.13, 11.11.10, 11.11.15, 11.11.3, 11.11.4, 11.12.1, 11.12.17, 11.12.3, 11.12.6, 11.3.25, 11.3.4, 11.8.4, 12.11.14, 12.11.17, 12.11.6, 12.11.7 and 12.3.3.	Remnant.	Includes all areas of suitable vegetation communities where patches are considered viable for the sub-species' (i.e. 50 ha or greater), noting their large home ranges, territorial nature and inability to persist in narrow linear fragments. Patches that extend beyond the Study Area bounds were also considered.
<i>Phascolarctos cinereus</i>  Koala	Breeding, foraging and dispersal	Any forest or woodland containing species that are koala food trees (trees of the genus <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Angophora</i> ).	All REs excluding those on land zone 3, and REs 11.11.18, 11.10.8, 12.1.2 and 12.1.3.	Remnant and regrowth.	Patches included are considered viable (i.e. 0.5 ha or greater or extend beyond the Study Area bounds).
	Climate refugia	Forests or woodlands on drainage lines or riparian zones that are resilient to drying conditions, likely to provide a cooler refuge during periods	All REs on land zone 3.		

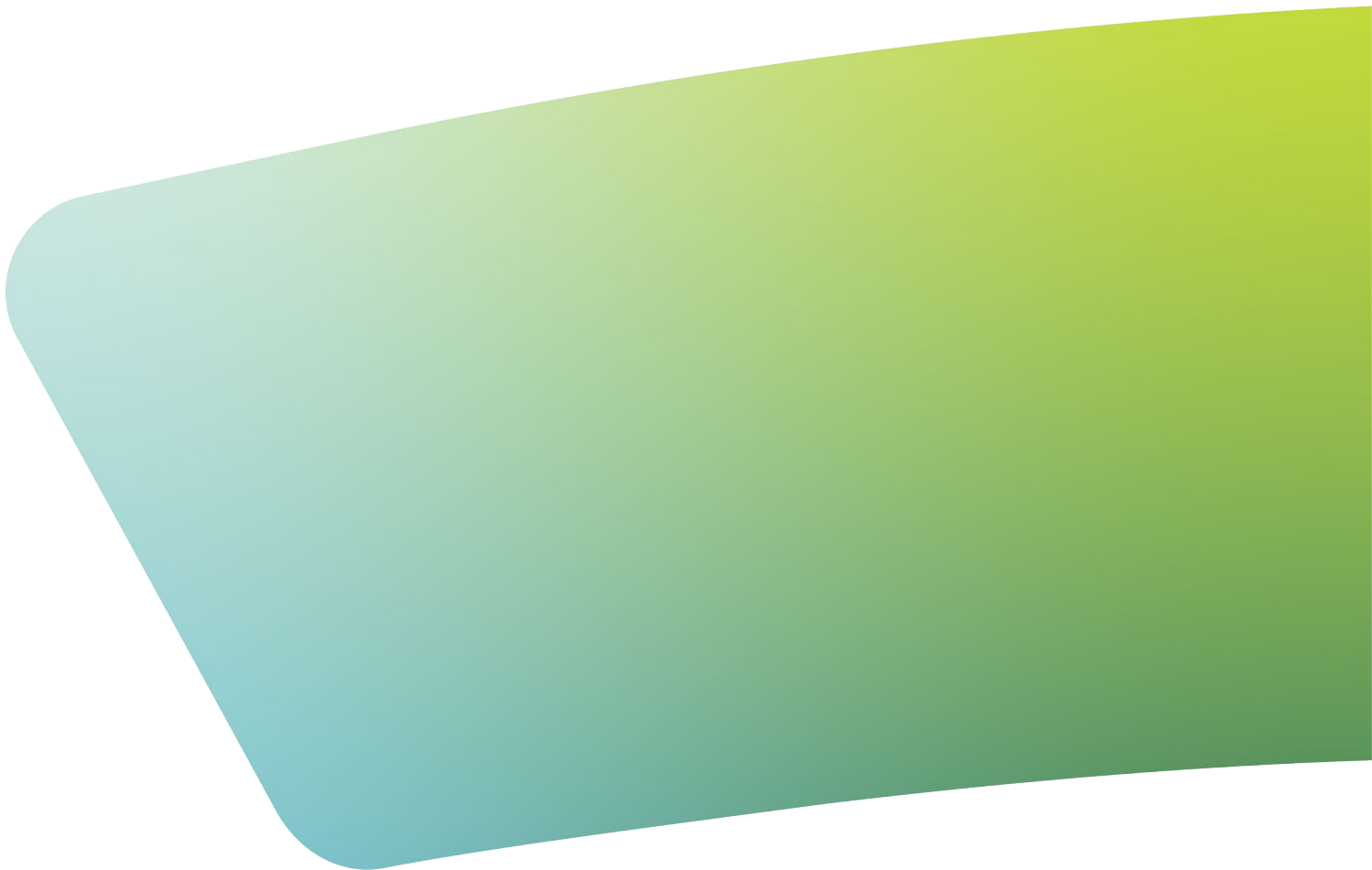


MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
		of bushfire and heatwaves, including but not limited to regional ecosystems on land zone 3.			
	Dispersal only	Shrublands or grasslands with emergent koala food trees, shelter or paddock trees.	-	Non-remnant.	Areas of cleared pasture with scattered regrowth eucalypts were present within the Study Area. Trees generally had DBHs ranging from 10 – 20 cm and were in average health given their isolated nature in the landscape. Noting the highly cleared nature of the Study Area, it is considered possible that these areas may provide key dispersal opportunities for the species, facilitating movement to and from areas of breeding, foraging and dispersal habitat and climate refugia habitat.
<i>Tachyglossus aculeatus</i> Short-beaked echidna	Breeding, foraging and dispersal	The short-beaked echidna is found throughout Australia, including Tasmania. The short-beaked echidna lives in forests and woodlands, heath, grasslands and arid environments. This species can live anywhere with a good supply of food, and regularly feast on ants and termites.	All RE except mangroves, water and intertidal zones. Includes non-remnant.	Remnant, regrowth and non-remnant.	Due to the generalist habitat requirements for the short-beaked echidna, the Study Area provides suitable habitat for breeding, foraging and dispersal.

MSES	Habitat Utilisation Type	Habitat Definition	Vegetation Communities and/or REs	Vegetation Condition	GIS Approach and Explanatory Notes
<i>Xeromys myoides</i> Water mouse	Breeding, foraging and dispersal	All mangrove communities, intertidal communities, and coastal freshwater wetlands with intact hydrology. May include a defined supralittoral bank to support nest construction.	Intertidal areas or tidal flats dominated by mangroves, sedges and grasses. Adjacent to and including RE 12.1.2 and 12.1.3.	Remnant and regrowth.	Any mangrove or saltmarsh dominated vegetation and intertidal area is considered suitable habitat for various life stages for this species.
<i>Delma torquata</i> Collared delma	Breeding and foraging	Open eucalypt forest to woodland with exposed rocky areas. Must be associated with suitable microhabitat (rocks, logs, coarse woody debris and leaf litter) where ground cover is predominantly native grasses. Habitat includes open-forests, woodlands and adjacent exposed rocky areas in QLD RE Land Zones 3, 9 and 10.	REs associated with land zones 3 and 10 associated with suitable micro-habitat features and native ground cover species.	Remnant.	No land zone 9 communities present within the Study Area. Only viable patches have been included (i.e. 0.5 ha or greater or extend beyond Study Area bounds).
Marine turtles	Nesting	All species of marine turtles' nest on sandy beaches.	-	-	No sandy beaches or nesting habitat is found within the Study Area.
	Foraging	While all species have different diets and foraging habits, foraging occurs within both inshore and offshore waters.	Calliope River.	-	-

## Appendix D

# Flora and Fauna Species Lists





Appendix Table D.1 Flora Species List

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Abutilon oxycarpum</i>	-	-	C	-
<i>Acacia concurrens</i>	-	-	C	-
<i>Acacia crassa</i>	-	-	C	-
<i>Acacia crassa subsp. longicoma</i>	-	-	C	-
<i>Acacia decora</i>	Pretty wattle	-	C	-
<i>Acacia disparrima</i>	-	-	C	-
<i>Acacia excelsa</i>	-	-	C	-
<i>Acacia falcata</i>	Sickle wattle	-	C	-
<i>Acacia falciformis</i>	Broad-leaved hickory	-	C	-
<i>Acacia fasciculifera</i>	Scaly bark	-	C	-
<i>Acacia harpophylla</i>	Brigalow	-	C	-
<i>Acacia implexa</i>	Lightwood	-	C	-
<i>Acacia leiocalyx</i>	-	-	C	-
<i>Acacia leptocarpa</i>	North coast wattle	-	C	-
<i>Acacia leptostachya</i>	Townsville wattle	-	C	-
<i>Acacia maidenii</i>	Maiden's wattle	-	C	-
<i>Acacia neriifolia</i>	Pechey wattle	-	C	-
<i>Acacia pedleyi</i>	-	-	V	-
<i>Acacia rhodoxylon</i>	Ringy rosewood	-	C	-
<i>Acacia salicina</i>	Doolan	-	C	-
<i>Acacia shirleyi</i>	Lancewood	-	C	-
<i>Acacia sparsiflora</i>	-	-	C	-
<i>Acalypha eremorum</i>	Soft acalypha	-	C	-
<i>Achyranthes aspera</i>	-	-	C	-
<i>Adiantum capillus-veneris</i>	-	-	SL	-
<i>Adiantum hispidulum</i>	-	-	SL	-
<i>Aegiceras corniculatum</i>	River mangrove	-	C	-
<i>Ageratum houstonianum*</i>	Blue billygoat weed	-	-	-
<i>Ajuga australis</i>	Australian bugle	-	C	-
<i>Alchornea ilicifolia</i>	Native holly	-	C	-
<i>Alectryon connatus</i>	Grey birds-eye	-	C	-
<i>Alectryon diversifolius</i>	Scrub boonaree	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Alectryon oleifolius</i>	-	-	C	-
<i>Alectryon tomentosus</i>	-	-	C	-
<i>Alloteropsis semialata</i>	Cockatoo grass	-	C	-
<i>Alphitonia excelsa</i>	Soap tree	-	C	-
<i>Alstonia constricta</i>	Bitterbark	-	C	-
<i>Alternanthera denticulata</i>	Lesser joyweed	-	C	-
<i>Alternanthera nana</i>	Hairy joyweed	-	C	-
<i>Alternanthera nodiflora</i>	Joyweed	-	C	-
<i>Alyxia ruscifolia</i>	-	-	C	-
<i>Amyema cambagei</i>	-	-	C	-
<i>Ancistrachne uncinulata</i>	Hooky grass	-	C	-
<i>Angophora leiocarpa</i>	Rusty gum	-	C	-
<i>Apowollastonia spilantheidoides</i>	-	-	C	-
<i>Heliodendron basalticum</i>	-	-	C	-
<i>Aristida calycina</i>	-	-	C	-
<i>Aristida holathera</i>	-	-	C	-
<i>Aristida latifolia</i>	Feathertop wiregrass	-	C	-
<i>Aristolochia elegans</i> *	Dutchman's pipe	-	-	Yes
<i>Arundinella nepalensis</i>	Reedgrass	-	C	-
<i>Asclepias curassavica</i> *	Red-head cottonbush	-	-	-
<i>Atalaya hemiglauca</i>	-	-	C	-
<i>Atalaya salicifolia</i>	-	-	C	-
<i>Avicennia marina</i>	-	-	C	-
<i>Baccharis halimifolia</i> *	Groundsel bush	-	-	Yes
<i>Bidens pilosa</i> *	-	-	-	-
<i>Blakella leichhardtii</i>	Rustyjacket	-	C	-
<i>Blakella tessellaris</i>	Moreton Bay ash	-	C	-
<i>Boerhavia dominii</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Boronia rosmarinifolia</i>	Forest boronia	-	C	-
<i>Bothriochloa bladhii</i>	-	-	C	-
<i>Bothriochloa decipiens</i>	-	-	C	-
<i>Bothriochloa pertusa*</i>	-	-	-	-
<i>Brachychiton australis</i>	Broad-leaved bottle tree	-	SL	-
<i>Brachychiton discolor</i>	-	-	SL	-
<i>Brachychiton populneus</i>	-	-	C	-
<i>Brachychiton rupestris</i>	-	-	SL	-
<i>Breynia oblongifolia</i>	-	-	C	-
<i>Bridelia leichhardtii</i>	-	-	C	-
<i>Brunonia australis</i>	Blue pincushion	-	SL	-
<i>Brunoniella australis</i>	Blue trumpet	-	C	-
<i>Bryophyllum delagoense*</i>	-	-	-	Yes
<i>Bursaria spinosa</i>	-	-	-	-
<i>Calypocarpus vialis*</i>	Creeping cinderella weed	-	-	-
<i>Capillipedium spicigerum</i>	Spicytop	-	C	-
<i>Capparis canescens</i>	-	-	C	-
<i>Capparis lasiantha</i>	Nipan	-	C	-
<i>Carissa lanceolata</i>	-	-	C	-
<i>Carissa ovata</i>	Currantbush	-	C	-
<i>Cascabela thevetia*</i>	Yellow oleander	-	-	Yes
<i>Cassia brewsteri</i>	-	-	C	-
<i>Cassinia laevis</i>	-	-	C	-
<i>Cassinia quinquefaria</i>	-	-	C	-
<i>Cassytha filiformis</i>	Dodder laurel	-	C	-
<i>Cassytha pubescens</i>	Downy devil's twine	-	C	-
<i>Casuarina cristata</i>	Belah	-	C	-
<i>Casuarina cunninghamiana</i>	-	-	C	-



Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Cayratia acris</i>	Hairy grape	-	C	-
<i>Cenchrus ciliaris</i> *	-	-	-	-
<i>Celtis sinensis</i> *	Chinese celtis	-	-	Yes
<i>Centella asiatica</i>	-	-	C	-
<i>Ceriops australis</i>	-	-	C	-
<i>Chamaecrista rotundifolia</i> *	-	-	-	-
<i>Cheilanthes sieberi</i>	-	-	C	-
<i>Chloris gayana</i> *	Rhodes grass	-	-	-
<i>Chrysocephalum apiculatum</i>	Yellow buttons	-	C	-
<i>Chrysopogon fallax</i>	-	-	C	-
<i>Cirsium vulgare</i> *	Spear thistle	-	-	-
<i>Cissus oblonga</i>	-	-	C	-
<i>Clematicissus opaca</i>	-	-	C	-
<i>Clerodendrum floribundum</i>	-	-	C	-
<i>Clerodendrum inerme</i>	Coastal lolly bush	-	C	-
<i>Coelospermum reticulatum</i>	-	-	C	-
<i>Commelina lanceolata</i>	-	-	C	-
<i>Corymbia citriodora</i>	Spotted gum	-	C	-
<i>Corymbia clarksoniana</i>	-	-	C	-
<i>Corymbia erythrophloia</i>	Variable-barked bloodwood	-	C	-
<i>Corymbia intermedia</i>	Pink bloodwood	-	C	-
<i>Corymbia trachyphloia</i>	-	-	C	-
<i>Crotalaria brevis</i>	-	-	C	-
<i>Crotalaria calycina</i>	-	-	C	-
<i>Crotalaria eremaea</i>	-	-	C	-
<i>Crotalaria goreensis</i> *	Gambia pea	-	-	-
<i>Crotalaria lanceolata</i> *	-	-	-	-
<i>Crotalaria montana</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Cryptocarya triplinervis</i>	-	-	C	-
<i>Cryptostegia grandiflora</i> *	Rubber vine	-	-	Yes
<i>Cupaniopsis anacardioides</i>	Tuckeroo	-	C	-
<i>Cyanthillium cinereum</i>	-	-	C	-
<i>Cycas megacarpa</i>	-	E	E	-
<i>Cyclophyllum coprosmoides</i>	-	-	C	-
<i>Cymbidium canaliculatum</i>	-	-	SL	-
<i>Cymbopogon bombycinus</i>	Silky oilgrass	-	C	-
<i>Cymbopogon refractus</i>	Barbed-wire grass	-	C	-
<i>Cynodon dactylon</i> *	-	-	-	-
<i>Cyperus bifax</i>	Western nutgrass	-	C	-
<i>Cyperus cyperoides</i>	-	-	C	-
<i>Cyperus difformis</i>	Rice sedge	-	C	-
<i>Cyperus gracilis</i>	-	-	C	-
<i>Cyperus iria</i>	-	-	C	-
<i>Denhamia cunninghamii</i>	-	-	C	-
<i>Denhamia disperma</i>	-	-	C	-
<i>Denhamia oleaster</i>	-	-	C	-
<i>Denhamia pittosporoides</i> subsp. <i>pittosporoides</i>	-	-	C	-
<i>Desmodium gangeticum</i>	-	-	C	-
<i>Desmodium intortum</i> *	-	-	-	-
<i>Desmodium rhytidophyllum</i>	-	-	C	-
<i>Dianella brevipedunculata</i>	-	-	C	-
<i>Dianella caerulea</i>	-	-	C	-
<i>Dianella longifolia</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Dianella rara</i>	-	-	C	-
<i>Dianella revoluta</i>	-	-	C	-
<i>Dichanthium sericeum</i>	-	-	C	-
<i>Digitaria divaricatissima</i>	Spreading umbrella grass	-	C	-
<i>Digitaria parviflora</i>	-	-	C	-
<i>Diospyros australis</i>	Black plum	-	C	-
<i>Diospyros geminata</i>	Scaly ebony	-	C	-
<i>Diospyros humilis</i>	Small-leaved ebony	-	C	-
<i>Dodonaea stenophylla</i>	-	-	C	-
<i>Dodonaea triangularis</i>	-	-	C	-
<i>Dodonaea triquetra</i>	Large-leaved hop bush	-	C	-
<i>Dodonaea viscosa</i>	-	-	C	-
<i>Dolichandra unguis-cati*</i>	Cat's claw creeper	-	-	Yes
<i>Drypetes deplanchei</i>	Grey boxwood	-	C	-
<i>Eclipta prostrata*</i>	White eclipta	-	-	-
<i>Ehretia membranifolia</i>	Weeping koda	-	C	-
<i>Einadia hastata</i>	-	-	C	-
<i>Einadia nutans</i>	-	-	C	-
<i>Elaeocarpus obovatus</i>	Blueberry ash	-	C	-
<i>Elaeodendron australe</i>	-	-	C	-
<i>Elaeodendron australe</i> var. <i>integrifolium</i>	-	-	C	-
<i>Elaeodendron melanocarpum</i>	-	-	C	-
<i>Elattostachys xylocarpa</i>	White tamarind	-	C	-
<i>Emilia sonchifolia*</i>	-	-	-	-
<i>Enchylaena tomentosa</i>	-	-	C	-



Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	-	-	C	-
<i>Enneapogon lindleyanus</i>	-	-	C	-
<i>Enteropogon acicularis</i>	Curly windmill grass	-	C	-
<i>Entolasia stricta</i>	Wiry panic	-	C	-
<i>Eragrostis brownii</i>	Brown's lovegrass	-	C	-
<i>Eragrostis curvula</i> *	-	-	-	-
<i>Eragrostis sororia</i>	-	-	C	-
<i>Eremophila debilis</i>	Winter apple	-	C	-
<i>Eremophila mitchellii</i>	-	-	C	-
<i>Erigeron bonariensis</i> *	-	-	-	-
<i>Erythrina vespertilio</i>	-	-	C	-
<i>Erythroxylum australe</i>	Cocaine tree	-	C	-
<i>Erythroxylum</i> sp.	-	-	C	-
<i>Eucalyptus acmenoides</i>	-	-	C	-
<i>Eucalyptus cloeziana</i>	Gympie messmate	-	C	-
<i>Eucalyptus crebra</i>	Narrow-leaved red ironbark	-	C	-
<i>Eucalyptus decorticans</i>	-	-	C	-
<i>Eucalyptus exserta</i>	Queensland peppermint	-	C	-
<i>Eucalyptus melanoleuca</i>	Nanango ironbark	-	C	-
<i>Eucalyptus melanophloia</i>	-	-	C	-
<i>Eucalyptus moluccana</i>	Gum-topped box	-	C	-
<i>Eucalyptus populnea</i>	Poplar box	-	C	-
<i>Eucalyptus tereticornis</i>	-	-	C	-
<i>Euphorbia cyathophora</i> *	Dwarf poinsettia	-	-	-
<i>Euroschinus falcatus</i>	-	-	C	-
<i>Eustrephus latifolius</i>	Wombat berry	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Evolvulus alsinoides</i>	-	-	C	-
<i>Excoecaria agallocha</i>	Milky mangrove	-	C	-
<i>Exocarpos cupressiformis</i>	Native cherry	-	C	-
<i>Exocarpos latifolius</i>	-	-	C	-
<i>Ficus coronata</i>	Creek sandpaper fig	-	C	-
<i>Ficus opposita</i>	-	-	C	-
<i>Ficus racemosa</i>	-	-	C	-
<i>Ficus racemosa</i> var. <i>racemosa</i>	-	-	C	-
<i>Ficus rubiginosa</i>	Port Jackson fig	-	C	-
<i>Ficus rubiginosa</i> forma <i>glabrescens</i>	-	-	C	-
<i>Fimbristylis dichotoma</i>	Common fringe-rush	-	C	-
<i>Fimbristylis ferruginea</i>	-	-	C	-
<i>Fimbristylis polytrichoides</i>	-	-	C	-
<i>Flemingia parviflora</i>	Flemingia	-	C	-
<i>Flindersia collina</i>	Broad-leaved leopard tree	-	C	-
<i>Gahnia aspera</i>	-	-	C	-
<i>Galactia tenuiflora</i>	-	-	C	-
<i>Geijera parviflora</i>	Wilga	-	C	-
<i>Geijera salicifolia</i>	Brush wilga	-	C	-
<i>Glandularia aristigera</i> *	-	-	-	-
<i>Glossocardia bidens</i>	Native cobbler's pegs	-	C	-
<i>Glycine clandestina</i>	-	-	C	-
<i>Glycine tabacina</i>	Glycine pea	-	C	-
<i>Glycine tomentella</i>	Woolly glycine	-	C	-
<i>Gomphocarpus fruticosus</i> *	Narrow-leaved cotton bush	-	-	-
<i>Gomphocarpus physocarpus</i> *	Balloon cottonbush	-	-	-
<i>Gomphrena celosioides</i> *	Gomphrena weed	-	-	-
<i>Goodenia rotundifolia</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Gossia bidwillii</i>	-	-	C	-
<i>Grewia latifolia</i>	Dysentery plant	-	C	-
<i>Hardenbergia violacea</i>	-	-	C	-
<i>Heliotropium amplexicaule</i> *	Blue heliotrope	-	-	-
<i>Heteropogon contortus</i>	Black speargrass	-	C	-
<i>Heteropogon triticeus</i>	Giant speargrass	-	C	-
<i>Hibiscus divaricatus</i>	-	-	C	-
<i>Hibiscus heterophyllus</i>	-	-	C	-
<i>Hymenachne amplexicaulis</i> *	Hymenachne	-	-	Yes
<i>Hyparrhenia rufa</i> *	-	-	-	-
<i>Hypochaeris radicata</i> *	Catsear	-	-	-
<i>Imperata cylindrica</i>	Blady grass	-	C	-
<i>Indigofera hirsuta</i>	Hairy indigo	-	C	-
<i>Indigofera linifolia</i>	-	-	C	-
<i>Indigofera linnaei</i>	Birdsville indigo	-	C	-
<i>Ipomoea plebeia</i>	Bellvine	-	C	-
<i>Isolepis cernua</i>	Nodding club rush	-	C	-
<i>Isolepis inundata</i>	Swamp club rush	-	C	-
<i>Jacksonia scoparia</i>	-	-	C	-
<i>Jagera pseudorhus</i>	-	-	C	-
<i>Jasminum didymum</i>	-	-	C	-
<i>Jasminum simplicifolium</i>	-	-	C	-
<i>Juncus continuus</i>	-	-	C	-
<i>Juncus usitatus</i>	-	-	C	-
<i>Lantana camara</i> *	Lantana	-	-	Yes
<i>Lantana montevidensis</i> *	Creeping lantana	-	-	Yes
<i>Leichhardtia viridiflora</i>	-	-	C	-
<i>Leucaena leucocephala</i> *	-	-	-	-



Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Leucas lavandulifolia</i> *	-	-	-	-
<i>Limonium solanderi</i>	-	-	C	-
<i>Lomandra confertifolia</i>	-	-	C	-
<i>Lomandra filiformis</i>	-	-	C	-
<i>Lomandra hystrix</i>	-	-	C	-
<i>Lomandra longifolia</i>	-	-	C	-
<i>Lomandra multiflora</i>	-	-	C	-
<i>Lophostemon confertus</i>	Brush box	-	C	-
<i>Lophostemon suaveolens</i>	Swamp box	-	C	-
<i>Lumnitzera racemosa</i>	-	-	C	-
<i>Macroptilium atropurpureum</i> *	Siratro	-	-	-
<i>Macroptilium lathyroides</i> *	-	-	-	-
<i>Macrozamia miquelii</i>	-	-	SL	-
<i>Mallotus philippensis</i>	Red kamala	-	C	-
<i>Malvastrum americanum</i> *	-	-	-	-
<i>Mangifera indica</i> *	Mango	-	-	-
<i>Megathyrsus maximus</i> *	-	-	-	-
<i>Melaleuca bracteata</i>	-	-	C	-
<i>Melaleuca dealbata</i>	Swamp tea-tree	-	C	-
<i>Melaleuca fluviatilis</i>	-	-	C	-
<i>Melaleuca linariifolia</i>	Snow-in summer	-	C	-
<i>Melaleuca nervosa</i>	-	-	C	-
<i>Melaleuca quinquenervia</i>	Swamp paperbark	-	C	-
<i>Melaleuca viminalis</i>	-	-	C	-
<i>Melia azedarach</i>	White cedar	-	C	-
<i>Melinis minutiflora</i> *	Molasses grass	-	-	-
<i>Melinis repens</i> *	Red natal grass	-	-	-
<i>Myoporum acuminatum</i>	Coastal boobialla	-	C	-
<i>Myrsine variabilis</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Neptunia gracilis</i>	-	-	C	-
<i>Notelaea microcarpa</i>	-	-	C	-
<i>Oplismenus aemulus</i>	Creeping shade grass	-	C	-
<i>Opuntia stricta</i> *	-	-	-	Yes
<i>Opuntia tomentosa</i> *	Velvety tree pear	-	-	Yes
<i>Ottochloa gracillima</i>	Pademelon grass	-	C	-
<i>Oxalis perennans</i>	-	-	C	-
<i>Panicum effusum</i>	-	-	C	-
<i>Parsonsia lanceolata</i>	Northern silkpod	-	C	-
<i>Parthenium hysterophorus</i> *	Parthenium weed	-	-	Yes
<i>Paspalum conjugatum</i> *	Sourgrass	-	-	-
<i>Passiflora foetida</i> *	-	-	-	-
<i>Passiflora suberosa</i> *	Corky passion flower	-	-	-
<i>Petalostigma pubescens</i>	Quinine tree	-	C	-
<i>Phyllanthus simplex</i>	-	-	C	-
<i>Phyllanthus virgatus</i>	-	-	C	-
<i>Physalis peruviana</i> *	-	-	-	-
<i>Pigea stellarioides</i>	-	-	C	-
<i>Pittosporum spinescens</i>	-	-	C	-
<i>Planchonia careya</i>	Cockatoo apple	-	C	-
<i>Pleiogynium timorense</i>	Burdekin plum	-	C	-
<i>Pleogyne australis</i>	Wiry grape	-	C	-
<i>Portulaca oleracea</i> *	Pigweed	-	-	-
<i>Praxelis clematidea</i> *	-	-	-	-
<i>Psydrax johnsonii</i>	-	-	C	-
<i>Psydrax latifolia</i>	-	-	C	-
<i>Psydrax odorata</i>	-	-	C	-
<i>Psydrax odorata forma buxifolia</i>	-	-	C	-
<i>Psydrax odorata subsp. australiana</i>	-	-	C	-
<i>Psydrax oleifolia</i>	-	-	C	-
<i>Pterocaulon redolens</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Pterocaulon sphacelatum</i>	Applebush	-	C	-
<i>Rhizophora stylosa</i>	Spotted mangrove	-	C	-
<i>Rhynchosia minima</i>	-	-	C	-
<i>Richardia brasiliensis</i> *	White eye	-	-	-
<i>Rivina humilis</i> *	-	-	-	-
<i>Rostellularia adscendens</i>	-	-	C	-
<i>Ruellia simplex</i> *	-	-	-	-
<i>Salicornia quinqueflora</i> subsp. <i>quinqueflora</i>	-	-	C	-
<i>Salsola australis</i>	-	-	C	-
<i>Santalum lanceolatum</i>	-	-	SL	-
<i>Samadera bidwillii</i>	Quassia	V	V	
<i>Schinus terebinthifolius</i> *	-	-	-	Yes
<i>Scleria mackaviensis</i>	-	-	C	-
<i>Secamone elliptica</i>	-	-	C	-
<i>Senna hursta</i> *	Woolly senna	-	-	Yes
<i>Senna pendula</i> *	-	-	-	-
<i>Sesbania cannabina</i>	-	-	C	-
<i>Sesuvium portulacastrum</i>	Sea purslane	-	C	-
<i>Sida acuta</i> *	Spinyhead sida	-	-	-
<i>Sida cordifolia</i> *	-	-	-	-
<i>Sida hackettiana</i>	-	-	C	-
<i>Sida rhombifolia</i> *	-	-	-	-
<i>Sigesbeckia orientalis</i>	Indian weed	-	C	-
<i>Siphonodon australis</i>	Ivorywood	-	C	-
<i>Smilax australis</i>	Barbed-wire vine	-	C	-
<i>Solanum ellipticum</i>	Potato bush	-	C	-
<i>Solanum nemophilum</i>	-	-	C	-
<i>Solanum nigrum</i> *	-	-	-	-



Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Solanum seaforthianum</i> *	Brazilian nightshade	-	-	-
<i>Solanum torvum</i> *	Devil's fig	-	-	-
<i>Sonchus oleraceus</i> *	Common sowthistle	-	-	-
<i>Sorghum halepense</i> *	Johnson grass	-	-	-
<i>Sporobolus actinocladius</i>	Katoora grass	-	C	-
<i>Sporobolus caroli</i>	Fairy grass	-	C	-
<i>Sporobolus creber</i>	-	-	C	-
<i>Sporobolus pyramidalis</i> *	-	-	-	Yes
<i>Sporobolus virginicus</i>	Sand couch	-	C	-
<i>Stachytarpheta australis</i> *	-	-	-	-
<i>Stachytarpheta jamaicensis</i> *	Jamaica snakeweed	-	-	-
<i>Stylosanthes hamata</i> *	-	-	-	-
<i>Stylosanthes scabra</i> *	-	-	-	-
<i>Suaeda australis</i>	-	-	C	-
<i>Symphyotrichum subulatum</i> *	-	-	-	-
<i>Tecoma stans</i> *	Yellow bells	-	-	Yes
<i>Tecticornia indica</i>	-	-	C	-
<i>Terminalia porphyrocarpa</i>	-	-	C	-
<i>Themeda avenacea</i>	-	-	C	-
<i>Themeda triandra</i>	Kangaroo grass	-	C	-
<i>Tragus australianus</i>	Small burr grass	-	C	-
<i>Trema tomentosa</i>	-	-	C	-
<i>Trichodesma zeylanicum</i>	-	-	C	-
<i>Tridax procumbens</i> *	Tridax daisy	-	-	-
<i>Trophis scandens</i>	-	-	C	-
<i>Turraea pubescens</i>	Native honeysuckle	-	C	-
<i>Typha orientalis</i>	Broad-leaved cumbungi	-	C	-
<i>Urena lobata</i> *	Urena weed	-	-	-
<i>Urochloa foliosa</i>	-	-	C	-

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Invasive or Restricted
<i>Urochloa mosambicensis</i> *	Sabi grass	-	-	-
<i>Vachellia bidwillii</i>	-	-	C	-
<i>Ventilago viminalis</i>	Supplejack	-	C	-
<i>Verbena bonariensis</i> *	Purpletop	-	-	-
<i>Vigna lanceolata</i>	-	-	C	-
<i>Vitex trifolia</i> var. <i>trifolia</i>	-	-	C	-
<i>Vittadinia cuneata</i>	-	-	C	-
<i>Wahlenbergia gracilis</i>	Sprawling bluebell	-	SL	-
<i>Xanthium occidentale</i> *	-	-	-	-
<i>Xanthorrhoea johnsonii</i>	-	-	SL	-
<i>Xerochrysum bracteatum</i>	Golden everlasting daisy	-	C	-
<i>Ziziphus mauritiana</i> *	Chine apple	-	-	Yes
<i>Zornia muriculata</i>	-	-	C	-

\*Denotes exotic species

**Appendix Table D.2 Fauna Species List**

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
<b>Amphibian</b>	Salmon striped frog	<i>Limnodynastes salmini</i>	-	Least Concern
<b>Amphibian</b>	Common green treefrog	<i>Litoria caerulea</i>	-	Least Concern
<b>Amphibian</b>	Broad palmed rocketfrog	<i>Litoria latopalmata</i>	-	Least Concern
<b>Amphibian</b>	Ornate burrowing frog	<i>Platyplectrum ornatum</i>	-	Least Concern
<b>Amphibian</b>	Copper backed broodfrog	<i>Pseudophryne raveni</i>	-	Least Concern
<b>Amphibian</b>	Cane toad	<i>Rhinella marina</i>	-	Introduced
<b>Bird</b>	Brown thornbill	<i>Acanthiza pusilla</i>	-	Least Concern
<b>Bird</b>	Brown goshawk	<i>Accipiter fasciatus</i>	-	Least Concern
<b>Bird</b>	Australian owlet-nightjar	<i>Aegotheles cristatus</i>	-	Least Concern
<b>Bird</b>	Australian brush-turkey	<i>Alectura lathamii</i>	-	Least Concern
<b>Bird</b>	Australian king-parrot	<i>Alisterus scapularis</i>	-	Least Concern

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Bird	Chestnut teal	<i>Anas castanea</i>	-	Least Concern
Bird	Grey teal	<i>Anas gracilis</i>	-	Least Concern
Bird	Pacific black duck	<i>Anas superciliosa</i>	-	Least Concern
Bird	Australasian darter	<i>Anhinga novaehollandiae</i>	-	Least Concern
Bird	Magpie goose	<i>Anseranas semipalmata</i>	-	Least Concern
Bird	Australasian pipit	<i>Anthus novaeseelandiae</i>	-	Least Concern
Bird	Brolga	<i>Antigone rubicunda</i>	-	Least Concern
Bird	Red-winged parrot	<i>Aprosmictus erythropterus</i>	-	Least Concern
Bird	Fork-tailed swift	<i>Apus pacificus</i>	Migratory	Special Least Concern
Bird	Wedge-tailed eagle	<i>Aquila audax</i>	-	Least Concern
Bird	Intermediate egret	<i>Ardea intermedia</i>	-	Least Concern
Bird	White-necked heron	<i>Ardea pacifica</i>	-	Least Concern
Bird	Black-faced woodswallow	<i>Artamus cinereus</i>	-	Least Concern
Bird	White-breasted woodswallow	<i>Artamus leucorhynchus</i>	-	Least Concern
Bird	White-browed woodswallow	<i>Artamus superciliosus</i>	-	Least Concern
Bird	Pacific baza	<i>Aviceda subcristata</i>	-	Least Concern
Bird	Hardhead	<i>Aythya australis</i>	-	Least Concern
Bird	Sulphur-crested cockatoo	<i>Cacatua galerita</i>	-	Least Concern
Bird	Fan-tailed cuckoo	<i>Cacomantis flabelliformis</i>	-	Least Concern
Bird	Red-tailed black-cockatoo	<i>Calyptorhynchus banksii</i>	-	Least Concern
Bird	Glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	-	Vulnerable
Bird	Pheasant coucal	<i>Centropus phasianinus</i>	-	Least Concern
Bird	Azure kingfisher	<i>Ceyx azureus</i>	-	Least Concern
Bird	Horsfield's bronze-cuckoo	<i>Chalcites basalus</i>	-	Least Concern
Bird	Australian wood duck	<i>Chenonetta jubata</i>	-	Least Concern
Bird	Tawny grassbird	<i>Cincloramphus timoriensis</i>	-	Least Concern



Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Bird	Golden-headed cisticola	<i>Cisticola exilis</i>	-	Least Concern
Bird	Grey shrike-thrush	<i>Colluricincla harmonica</i>	-	Least Concern
Bird	Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>	-	Least Concern
Bird	White-bellied cuckoo-shrike	<i>Coracina papuensis</i>	-	Least Concern
Bird	White-winged chough	<i>Corcorax melanorhamphos</i>	-	Least Concern
Bird	White-throated treecreeper	<i>Cormobates leucophaea</i>	-	Least Concern
Bird	Australian raven	<i>Corvus coronoides</i>	-	Least Concern
Bird	Torresian crow	<i>Corvus orru</i>	-	Least Concern
Bird	Pied butcherbird	<i>Cracticus nigrogularis</i>	-	Least Concern
Bird	Grey butcherbird	<i>Cracticus torquatus</i>	-	Least Concern
Bird	Blue-winged kookaburra	<i>Dacelo leachii</i>	-	Least Concern
Bird	Laughing kookaburra	<i>Dacelo novaeguineae</i>	-	Least Concern
Bird	Varied sittella	<i>Daphoenositta chrysoptera</i>	-	Least Concern
Bird	Mistletoebird	<i>Dicaeum hirundinaceum</i>	-	Least Concern
Bird	Spangled drongo	<i>Dicrurus bracteatus</i>	-	Least Concern
Bird	Emu	<i>Dromaius novaehollandiae</i>	-	Least Concern
Bird	Common cicadabird	<i>Edolisoma tenuirostre</i>	-	Least Concern
Bird	White-faced heron	<i>Egretta novaehollandiae</i>	-	Least Concern
Bird	Black-fronted dotterel	<i>Elseyornis melanops</i>	-	Least Concern
Bird	Blue-faced honeyeater	<i>Entomyzon cyanotis</i>	-	Least Concern
Bird	Galah	<i>Eolophus roseicapilla</i>	-	Least Concern
Bird	Eastern yellow robin	<i>Eopsaltria australis</i>	-	Least Concern
Bird	White-throated nightjar	<i>Eurostopodus mystacalis</i>	-	Least Concern

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Bird	Dollarbird	<i>Eurystomus orientalis</i>	-	Least Concern
Bird	Brown falcon	<i>Falco berigora</i>	-	Least Concern
Bird	Nankeen kestrel	<i>Falco cenchroides</i>	-	Least Concern
Bird	Mangrove honeyeater	<i>Gavicalis fasciogularis</i>	-	Least Concern
Bird	Singing honeyeater	<i>Gavicalis virescens</i>	-	Least Concern
Bird	Bar-shouldered dove	<i>Geopelia humeralis</i>	-	Least Concern
Bird	Peaceful dove	<i>Geopelia placida</i>	-	Least Concern
Bird	Squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	Vulnerable	Vulnerable
Bird	White-throated gerygone	<i>Gerygone olivacea</i>	-	Least Concern
Bird	Magpie-lark	<i>Grallina cyanoleuca</i>	-	Least Concern
Bird	Australian magpie	<i>Gymnorhina tibicen</i>	-	Least Concern
Bird	White-bellied sea-eagle	<i>Haliaeetus leucogaster</i>	-	Least Concern
Bird	Brahminy kite	<i>Haliastur indus</i>	-	Least Concern
Bird	Whistling kite	<i>Haliastur sphenurus</i>	-	Least Concern
Bird	Black-winged stilt	<i>Himantopus himantopus</i>	-	Least Concern
Bird	Varied triller	<i>Lalage leucomela</i>	-	Least Concern
Bird	Brown honeyeater	<i>Lichmera indistincta</i>	-	Least Concern
Bird	Chestnut-breasted mannikin	<i>Lonchura castaneothorax</i>	-	Least Concern
Bird	Topknot pigeon	<i>Lopholaimus antarcticus</i>	-	Least Concern
Bird	Red-backed fairy-wren	<i>Malurus melanocephalus</i>	-	Least Concern
Bird	Noisy miner	<i>Manorina melanocephala</i>	-	Least Concern
Bird	Lewin's honeyeater	<i>Meliphaga lewinii</i>	-	Least Concern
Bird	White-throated honeyeater	<i>Melithreptus albogularis</i>	-	Least Concern
Bird	Rainbow bee-eater	<i>Merops ornatus</i>	-	Least Concern
Bird	Little pied cormorant	<i>Microcarbo melanoleucos</i>	-	Least Concern

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Bird	Black kite	<i>Milvus migrans</i>	-	Least Concern
Bird	Horsfield's bushlark	<i>Mirafrja javanica</i>	-	Least Concern
Bird	Satin flycatcher	<i>Myiagra cyanoleuca</i>	-	Special Least Concern
Bird	Restless flycatcher	<i>Myiagra inquieta</i>	-	Least Concern
Bird	Leaden flycatcher	<i>Myiagra rubecula</i>	-	Least Concern
Bird	Scarlet honeyeater	<i>Myzomela sanguinolenta</i>	-	Least Concern
Bird	Plum-headed finch	<i>Neochmia modesta</i>	-	Least Concern
Bird	Red-browed finch	<i>Neochmia temporalis</i>	-	Least Concern
Bird	White-eared honeyeater	<i>Nesoptilotis leucotis</i>	-	Least Concern
Bird	Southern boobook	<i>Ninox boobook</i>	-	Least Concern
Bird	Crested pigeon	<i>Ocyphaps lophotes</i>	-	Least Concern
Bird	Blue-billed duck	<i>Oxyura australis</i>	-	Least Concern
Bird	Golden whistler	<i>Pachycephala pectoralis</i>	-	Least Concern
Bird	Rufous whistler	<i>Pachycephala rufiventris</i>	-	Least Concern
Bird	Eastern osprey	<i>Pandion cristatus</i>	Migratory	Special Least Concern
Bird	Spotted pardalote	<i>Pardalotus punctatus</i>	-	Least Concern
Bird	Striated pardalote	<i>Pardalotus striatus</i>	-	Least Concern
Bird	Fairy martin	<i>Petrochelidon ariel</i>	-	Least Concern
Bird	Tree martin	<i>Petrochelidon nigricans</i>	-	Least Concern
Bird	Pied cormorant	<i>Phalacrocorax varius</i>	-	Least Concern
Bird	Little friarbird	<i>Philemon citreogularis</i>	-	Least Concern
Bird	Noisy friarbird	<i>Philemon corniculatus</i>	-	Least Concern
Bird	Pale-headed rosella	<i>Platycercus adscitus</i>	-	Least Concern
Bird	Striped honeyeater	<i>Plectorhyncha lanceolata</i>	-	Least Concern
Bird	Tawny frogmouth	<i>Podargus strigoides</i>	-	Least Concern
Bird	Grey-crowned babbler	<i>Pomatostomus temporalis</i>	-	Least Concern



Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Bird	Purple swamphen	<i>Porphyrio melanotus</i>	-	Least Concern
Bird	Wompoo fruit-dove	<i>Ptilinopus magnificus</i>	-	Least Concern
Bird	Radjah shelduck	<i>Radjah radjah</i>	-	Least Concern
Bird	Grey fantail	<i>Rhipidura albiscapa</i>	-	Least Concern
Bird	Willie wagtail	<i>Rhipidura leucophrys</i>	-	Least Concern
Bird	Channel-billed cuckoo	<i>Scythrops novaehollandiae</i>	-	Least Concern
Bird	White-browed scrubwren	<i>Sericornis frontalis</i>	-	Least Concern
Bird	Weebill	<i>Smicrornis brevirostris</i>	-	Least Concern
Bird	Australasian figbird	<i>Sphecotheres vieilloti</i>	-	Least Concern
Bird	Pied currawong	<i>Strepera graculina</i>	-	Least Concern
Bird	Apostlebird	<i>Struthidea cinerea</i>	-	Least Concern
Bird	Brown quail	<i>Synoicus ypsilophorus</i>	-	Least Concern
Bird	Australasian grebe	<i>Tachybaptus novaehollandiae</i>	-	Least Concern
Bird	Double-barred finch	<i>Taeniopygia bichenovii</i>	-	Least Concern
Bird	Australian white ibis	<i>Threskiornis molucca</i>	-	Least Concern
Bird	Forest kingfisher	<i>Todiramphus macleayii</i>	-	Least Concern
Bird	Sacred kingfisher	<i>Todiramphus sanctus</i>	-	Least Concern
Bird	Scaly-breasted lorikeet	<i>Trichoglossus chlorolepidotus</i>	-	Least Concern
Bird	Rainbow lorikeet	<i>Trichoglossus moluccanus</i>	-	Least Concern
Bird	Red-backed button-quail	<i>Turnix maculosus</i>	-	Least Concern
Bird	Painted button-quail	<i>Turnix varius</i>	-	Least Concern
Bird	Eastern barn owl	<i>Tyto javanica</i>	-	Least Concern
Bird	Masked lapwing	<i>Vanellus miles</i>	-	Least Concern
Bird	Silvereye	<i>Zosterops lateralis</i>	-	Least Concern
Mammal	Rufous bettong	<i>Aepyprymnus rufescens</i>	-	Least Concern

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Mammal	White-striped free-tailed bat	<i>Austronomus australis</i>	-	Least Concern
Mammal	Cow	<i>Bos taurus</i>	-	Introduced
Mammal	Dog	<i>Canis familiaris</i>	-	Introduced
Mammal	Dingo	<i>Canis lupus dingo</i>	-	Introduced
Mammal	Greater northern free-tailed bat	<i>Chaerephon jobensis</i>	-	Least Concern
Mammal	Gould's wattled bat	<i>Chalinolobus gouldii</i>	-	Least Concern
Mammal	Chocolate wattled bat	<i>Chalinolobus morio</i>	-	Least Concern
Mammal	Hoary wattled bat	<i>Chalinolobus nigrogriseus</i>	-	Least Concern
Mammal	Little pied bat	<i>Chalinolobus picatus</i>	-	Least Concern
Mammal	Cat	<i>Felis catus</i>	-	Introduced
Mammal	Water rat	<i>Hydromys chrysogaster</i>	-	Least Concern
Mammal	Northern brown bandicoot	<i>Isodon macrourus</i>	-	Least Concern
Mammal	Black-striped wallaby	<i>Macropus dorsalis</i>	-	Least Concern
Mammal	Eastern grey kangaroo	<i>Macropus giganteus</i>	-	Least Concern
Mammal	Little bent-winged bat	<i>Miniopterus australis</i>	-	Least Concern
Mammal	Large bent-winged bat	<i>Miniopterus orianae oceanensis</i>	-	Least Concern
Mammal	House mouse	<i>Mus musculus</i>	-	Introduced
Mammal	Whip-tailed wallaby	<i>Notamacropus parryi</i>	-	Least Concern
Mammal	Long-eared bat	<i>Nyctophilus sp.</i>	-	Least Concern
Mammal	Rabbit	<i>Oryctolagus cuniculus</i>	-	Introduced
Mammal	Northern free-tailed bat	<i>Ozimops lumsdenae</i>	-	Least Concern
Mammal	Ride's free-tailed bat	<i>Ozimops ridei</i>	-	Least Concern
Mammal	Long-nosed bandicoot	<i>Perameles nasuta</i>	-	Least Concern
Mammal	Sugar glider	<i>Petaurus breviceps</i>	-	Least Concern
Mammal	Squirrel glider	<i>Petaurus norfolcensis</i>	-	Least Concern

Class	Common Name	Scientific Name	EPBC Act Status	NC Act Status
Mammal	Herbert's rock-wallaby	<i>Petrogale herberti</i>	-	Least Concern
Mammal	Black flying-fox	<i>Pteropus alecto</i>	-	Least Concern
Mammal	Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Least Concern
Mammal	Bush rat	<i>Rattus fuscipes</i>	-	Least Concern
Mammal	Black rat	<i>Rattus rattus</i>	-	Introduced
Mammal	Eastern horseshoe bat	<i>Rhinolophus megaphyllus</i>	-	Least Concern
Mammal	Yellow-bellied sheath-tailed bat	<i>Saccolaimus flaviventris</i>	-	Least Concern
Mammal	Greater broad-nosed bat	<i>Scoteanax rueppellii</i>	-	Least Concern
Mammal	Inland broad-nosed bat	<i>Scotorepens balstoni</i>	-	Least Concern
Mammal	Little broad-nosed bat	<i>Scotorepens greyii</i>	-	Least Concern
Mammal	Northern broad-nosed bat	<i>Scotorepens sanborni</i>	-	Least Concern
Mammal	Common dunnart	<i>Sminthopsis murina</i>	-	Least Concern
Mammal	Pig	<i>Sus scrofa</i>	-	Introduced
Mammal	Short-beaked echidna	<i>Tachyglossus aculeatus</i>	-	Special Least Concern
Mammal	Troughton's sheath-tailed bat	<i>Taphozous troughtoni</i>	-	Least Concern
Mammal	Brush-tailed possum	<i>Trichosurus vulpecula</i>	-	Least Concern
Mammal	Red fox	<i>Vulpes vulpes</i>	-	Introduced
Mammal	Swamp wallaby	<i>Wallabia bicolor</i>	-	Least Concern
Reptile	Striped snake-eyed skink	<i>Cryptoblepharus virgatus</i>	-	Least Concern
Reptile	Collared delma	<i>Delma torquata</i>	Vulnerable	Vulnerable
Reptile	Tommy roundhead	<i>Diporiphora australis</i>	-	Least Concern
Reptile	Bynoe's gecko	<i>Heteronotia binoei</i>	-	Least Concern
Reptile	Carpet python	<i>Morelia spilota</i>	-	Least Concern
Reptile	Bearded dragon	<i>Pogona barbata</i>	-	Least Concern
Reptile	Barking gecko	<i>Underwoodisaurus milii</i>	-	Least Concern



Appendix E

# **Significant Residual Impact Assessment**

# 1.0 Significant Residual Impact Assessment

## 1.1 Regulated Vegetation

Regulated vegetation excludes regrowth vegetation and has been defined as Category B areas on the regulated vegetation map that are:

- ‘Endangered’ or ‘Of Concern’ regional ecosystems (REs); or
- remnant vegetation within the defined distance of a watercourse identified on the vegetation management watercourses map; or
- remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map; or
- essential habitat as identified on the essential habitat map.

Within the MPA, remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map is absent. An examination of the other regulated criteria are detailed in the sections below based on the *Significant Residual Impact Guideline - For matters of State environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009* (Department of State Development, 2014).

### 1.1.1 Endangered or Of Concern Regional Ecosystem

Small patches of ‘Endangered’ and ‘Of Concern’ REs occur throughout the MPA. These REs occur as part of heterogeneous polygons and impacts have been calculated based on the percentages provided in the Vegetation Management Ecosystems mapping.

A SRI assessment has been completed for Endangered or Of Concern REs against Section 3.1 of the Significant Residual Impact Guideline (Department of State Development, 2014) (**Table 1.1**). The outcome of this SRI assessment is that the Project is unlikely to result in a SRI to Endangered or Of Concern REs.

**Table 1.1 SRI Assessment for Endangered or Of Concern REs within the MDA**

Impact Criteria	Assessment
<b>An action is LIKELY to have a SRI on Endangered or Of Concern REs if the action will result in:</b>	
Clearing of more than 5 ha of ‘endangered’ or ‘of concern’ RE vegetation;	<b>No.</b> A total of 1.1 ha of Endangered and Of Concern RE will be cleared within the MDA for the Project.

Impact Criteria	Assessment
Clearing that results in an overall area (not confined to property boundaries) of 'endangered' or 'of concern' RE vegetation of less than 5 ha; OR	<b>No.</b> Within the MDA, seven 'endangered' or 'of concern' RE vegetation polygons are mapped. Two polygons are currently smaller than 5 ha (one is 0.6 ha and one is 1.4 ha). After assessing each polygon that are currently greater than 5 ha, it was found that no polygon / vegetation community patches will be reduced to below 5 ha.
Clearing that results in the physical separation of 'endangered' and 'of concern' RE communities within and on adjoining sites.	<b>No.</b> The proposed clearing of vegetation is adjacent to existing clearing and therefore the Project is not creating additional separation of 'endangered' and 'of concern' RE communities. In addition, where the existing transmission line spans over vegetation, it is anticipated that the Project will follow a similar construction process, thereby eliminating physical separation at those locations.

### 1.1.2 Defined Distance of a Watercourse

Strahler stream orders 1 – 9 intersect the MPA and MDA.

A SRI assessment has been completed for remnant vegetation within a defined distance to a watercourse against Section 3.1 of the Significant Residual Impact Guideline (Department of State Development, 2014) (**Table 1.2**). The outcome of this SRI assessment is that the Project may result in a SRI to regulated vegetation within a defined distance to a watercourse.

**Table 1.2 SRI for Regulated Vegetation within a Define Distance to a Watercourse**

Impact Criteria	Assessment
<b>An action is LIKELY to have a SRI on regulated vegetation within a defined distance to a watercourse if the action will result in:</b>	
Permanent removal of vegetation within a defined distance of a stream order 2 or higher, where no rehabilitation is proposed;	<b>Yes.</b> Within the MDA, a total of 0.9 ha of vegetation (excluding non-remnant vegetation) is proposed to be permanently removed within a defined distance of a stream order 2 or higher, where no rehabilitation is proposed.
Building of an online detention basin greater than 1 ha in size or other similar works that result in the clearing of vegetation which fragments up and downstream remnant areas on any stream order; OR	<b>No.</b> An online detention basin is not proposed for this Project.
Permanent clearing of 0.5 ha of an endangered or of concern RE, within a defined distance of a watercourse.	<b>No.</b> A total of 0.4 ha of Endangered and Of Concern RE within a defined distance of a watercourse if proposed to be permanently removed within the MDA.



### 1.1.3 Essential Habitat

Essential habitat is mapped as being present within the MPA in multiple locations in the east of the Study Area in association with the Calliope River and Calliope Conservation Park (Section D & E), and in the south, in and around Callide Timber Reserve (adjacent to Section A). In addition, essential habitat is also associated with Larcom Creek (stream order 6) where it crosses Section C.

A SRI is likely to occur on essential habitat if the action will result in clearing of essential habitat exceeding the thresholds specified in Table 1, SDAP Module 8 (see **Table 1.3**) and resulting in a greater than 10% permanent reduction in the extent of essential habitat mapped on site.

In examining impacts to regulated vegetation, assessments are based upon thresholds to vegetation structure which are displayed in **Table 1.3**.

**Table 1.3 Impact Thresholds per RE Structure**

RE structure category <sup>1</sup>	Impact area threshold (width in metres) (Linear infrastructure clearing)	Impact area threshold (ha) (non-linear infrastructure)
Dense and mid-dense	>10	0.5
Sparse to very sparse	>20	2
Grassland	>25	5

<sup>1</sup>Refer to the structure category within the REDD

Displayed in **Table 1.4** are the REs, structural categories and clearing widths enabling the identification of threshold exceedance for essential habitat which would result from the construction of the Project. As identified in **Table 1.4**, clearing associated with more than half of the mapped RE polygons exceed maximum clearing width thresholds. Of the 20 RE combinations listed only 7 are below the clearing thresholds.

**Table 1.4 Clearing Widths of Essential Habitat**

Mapped homogenous and heterogenous RE polygon combinations	Structure Category <sup>1</sup>	Maximum clearing width threshold (m)	Maximum clearing width of MDA (m) within MPA	Impact threshold exceeded?
11.3.4/11.3.25	Sparse	20	40	Yes
11.3.26/11.11.15	Sparse	20	9	No
11.3.26/11.3.4/11.11.18	Dense	10	34	Yes
11.3.29	Sparse	20	9	No
11.3.29/12.3.3	Sparse	20	24	Yes
11.9.5/11.3.2	Mid-dense	10	17	Yes
11.11.3/11.11.15/11.3.26	Mid-dense	10	34	Yes
11.11.3/11.11.15/11.3.26/11.11.18	Dense	10	30	Yes
11.11.4/11.11.18	Dense	10	30	Yes

Mapped homogenous and heterogenous RE polygon combinations	Structure Category <sup>1</sup>	Maximum clearing width threshold (m)	Maximum clearing width of MDA (m) within MPA	Impact threshold exceeded?
11.11.4/11.11.4c/11.11.15/11.11.5	Dense	10	19	Yes
11.11.15	Sparse	20	50	Yes
11.11.15/11.11.3	Mid-dense	10	47	Yes
11.11.15/11.3.4	Sparse	20	3	No
11.11.18/11.11.15	Dense	10	1	No
12.1.3	Dense	10	22	Yes
12.3.3	Sparse	20	5	No
12.11.6	Sparse	20	45	Yes
12.11.6/12.11.14	Sparse	20	31	Yes
12.11.7	Sparse	20	16	No
12.11.17/12.11.6/11.11.4a	Mid-dense	10	27	No

<sup>1</sup> Within heterogeneous polygons, the densest structure category of mapped REs is chosen to represent this attribute

A total of 23.0 ha of essential habitat occurs within the MPA whilst 14.5 ha is present within the MDA. This represents a 37% reduction in essential habitat within the MPA due to clearing for the Project.

As a result of exceeding maximum clearing widths and an overall reduction in essential habitat >10%, the action is likely to result in a SRI.

## 1.2 Connectivity Areas

Ecological connectivity is critical for the connection between ecosystems and habitat to allow fauna to cross landscapes in search of shelter, food, and breeding. Connectivity areas are areas of remnant vegetation outside of urban areas that are required for ecosystem functioning, including facilitating fauna movement.

In deciding if a SRI is likely to occur on a connectivity area, DETSI has developed a Landscape Fragmentation and Connectivity (LFC) tool. The LFC tool can be used to support decisions by identifying and quantifying any significant impact on connectivity for an individual impact area. The measure of impact significance is based on how the prescribed activity will change the size and configuration of remnant vegetation areas and the level of fragmentation that will result at the local scale (5 km radius) given regard to the regional scale (20 km radius).

The LFC tool determined that Project related impacts within the MPA on connectivity areas are **not significant** (see **Table 1.5**).

**Table 1.5 LFC Tool Results for Connectivity**

Impact Criteria	Assessment
Significance test one	Area of core at the local scale (pre impact): 9,431.12 Area of core at the local scale (post impact): 9,390.56 Percent change of core at the local scale (post impact): 0.43 percent
Significance test two	The number of core remnant areas occurring on the site: 6 The number of core remnant areas remaining on the site post impact: 6 (Only core polygons greater than or equal to 1 hectare are included)
Result	Analysis has determined any impact on connectivity areas is NOT significant (A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is False)

## 1.3 Protected Wildlife Habitat

Protected wildlife habitat has been assessed for species which have been mapped associated with coastal protection areas as displayed in the Development Assessment Mapping System (DAMS) (Department of State Development, Infrastructure and Planning, 2024). In this instance, species habitat within the MDA associated with coastal erosion prone mapping have been included in an assessment for SRI to protected wildlife habitat.

### 1.3.1 *Samadera bidwillii*

#### 1.3.1.1 Description and Status

*Samadera bidwillii* (Quassia) is listed as Vulnerable under the NC Act.

*Samadera bidwillii* is a small shrub or tree that grows to about 6 m in height (Department of Environment and Science, 2022c). The petioles are 3 to 7 mm long. Its leaves are narrowly elliptic or narrowly ovate, the apex is obtuse, the base cuneate (wedge shaped), to attenuate, 4.5 to 18.5 cm long by 1 to 3.5 cm wide, they are glabrous (hairless) or sub glabrous, the lateral venation is parallel and prominent beneath when dry. The flowers occur in axillary clusters of one to four, and each flower has eight to ten stamens, the filaments are pubescent on the outer surface, the sepals are 0.75 to 1 mm long and the petals about 2.5 mm long. The fruits are compressed, ovoid or ellipsoid, about 1 cm long and are 1-seeded (Ross, 1984).

#### 1.3.1.2 Distribution and Habitat Requirements

*Samadera bidwillii* is endemic to Queensland and is currently known to occur in several localities between Scawfell Island near Mackay and Goomboorian, north of Gympie (Department of the Environment Water Heritage and the Arts, 2008). The nearest known records fall within the Study Area near Lake Callide and east of the Callide mine. Other records for the species are located 20 km north, near Mt Morgan, and within the northwestern portion of the Callide Timber Reserve, east of Biloela.



*Samadera bidwillii* commonly occurs in lowland rainforest or at rainforest margins, but it can also be found in other forest types, such as open eucalypt forest and woodland. It is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude (Department of the Environment Water Heritage and the Arts, 2008). The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils (Department of the Environment Water Heritage and the Arts, 2008). Commonly associated tree species for *Samadera bidwillii* include *Corymbia citriodora*, *Eucalyptus propinqua*, *E. acmenoides*, *E. tereticornis*, *C. intermedia*, *E. siderophloia*, *E. moluccana*, *E. cloeziana* and *E. fibrosa* (Department of the Environment Water Heritage and the Arts, 2008).

### 1.3.1.3 Threats

Potential threats to the species include:

- Inappropriate fire regimes.
- Exotic shrubs and grasses (e.g. *Lantana camara*\*, *Megathyrsus maximus*\* and *Chloris gayana*\*).

### 1.3.1.4 Occurrence and Potential Habitat

*Samadera bidwillii* was recorded within Section B of the Study Area and Disturbance Footprint during the field survey program associated with vegetation reflective of RE 11.10.13 (*Corymbia citriodora*, *Eucalyptus cloeziana* and *Eucalyptus melanolueca* woodland). In addition, the Study Area contains a variety of vegetation types suitable for the species, including remnant and regrowth areas of eucalypt woodlands and forests, as well as SEVT communities below 510 m ASL. Within the Study Area, the following remnant and regrowth RE are considered potential habitat: REs 11.8.3, 11.8.4, 11.10.8, 11.11.10, 11.11.15, 11.11.3c, 11.11.4c, 11.11.18, 11.12.1, 11.12.6, 11.3.1, 11.3.25, 11.3.26, 11.3.4, 12.11.16, 12.11.6, 12.3.3. Within the MDA, potential habitat for the species is RE 12.3.3.

Other recent records for this species are noted in the northwestern portion of Callide Timber Reserve, approximately 6.6 km west of the Study Area and records to the east of the Callide Timber Reserve, approximately 1.4 km east of the Study Area. Records are absent from the eastern portion of the MDA near Gladstone. The extent of *Samadera bidwillii* habitat within the MDA is provided in **Table 1.6**.

**Table 1.6 Habitat Extent for *Samadera bidwillii***

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Potential habitat	0.2
<b>Total</b>	<b>0.2</b>

### 1.3.1.5 Potential Project Impacts and Key Mitigation Measures

Potential impacts on this species as a result of the Project include habitat loss, fragmentation and degradation, edge effects, soil erosion, dust generation, introduction and exacerbation of introduced flora species and increased intensity and frequency of fires. Vegetation clearing required for the construction of the Project will result in direct impacts to 0.2 ha of mapped potential habitat within the MDA.

In addition to the general mitigation and management measures outlined in **Section 8.3.1**, the following species-specific mitigation measures will be implemented:

- Where clearing is proposed in areas of mapped habitat, pre-clearance surveys will include searches for *Samadera bidwillii*. If any individuals or populations are located during the targeted surveys, a detailed account of their occurrence will be recorded including number of individuals, GPS location and extent. The plants or population area, including a minimum 20 m buffer, will be demarcated, with the aim of avoidance via micro-siting. The pre-clearance survey unexpected finds protocol (see **Section 8.3.2.1** in the body of this report) will then be followed to ensure any potential impacts on the species are avoided or managed appropriately.
- This species is a protected plant under the State NC Act. The Nature Conservation (Plants) Regulation 2020 outlines the regulatory requirements for managing potential impacts on a protected plant. Should the Project's clearing impact area (footprint inclusive of a 100 m buffer) contain high risk trigger area mapping or protected plant individuals, a protected plants permit will be required to be obtained prior to the commencement of construction. The permit application will need to be supported by a protected plants assessment and survey in accordance with the guidelines, and if necessary, an impact management plan will be developed and implemented.

### 1.3.1.6 Significant Residual Impact Assessment for *Samadera bidwillii*

The significant impact assessment for the species is presented in **Table 1.7**. In summary, the assessment found that the Project is unlikely to result in a significant residual impact on *Samadera bidwillii*.

**Table 1.7 Significant Residual Impact Assessment: Vulnerable *Samadera bidwillii***

Impact Criteria	Significant Residual Impact Assessment
<b>An action is UNLIKELY to have an SRI on a plant that is 'endangered' or 'vulnerable' wildlife if the action will result in:</b>	
Clearing of plants that are threatened wildlife and not located within a natural setting (i.e. does not meet the definition of 'in the wild' under the <i>Nature Conservation Act 1992</i> ) where the proposal includes translocation.	<p><b>Not Significant.</b></p> <p>No individuals/populations have been recorded within the MDA; however, individuals were observed in the wider Study Area associated with Section B. Habitat mapped for this species is confined to suitable remnant and regrowth vegetation. If this species was present within the MDA, and it meets the definition of 'in the wild' as per the Operational Policy -when a protected plant in Queensland is taken to be 'in the wild' (Department of Environment, Science and Innovation, 2023), a <i>Samadera bidwillii</i> SMP will be developed and implemented in consultation with DETSI. Management actions may include seed collection, propagation and reestablishment measures at selected suitable sites.</p>

Impact Criteria	Significant Residual Impact Assessment
Clearing of up to 10% of the total number of plants that are threatened wildlife occurring on a site where the proposal results in 90% of all plants that are threatened wildlife being retained and protected as a reserve or similar.	<p><b>Not Significant.</b></p> <p>Based on the current Project design, 0.2 ha of habitat within coastal erosion prone areas of the MDA will be directly impacted. Pre-clearance surveys will be conducted to guide design changes aimed at avoiding or minimising impacts. After the detailed design phase, impacts are expected to be further reduced through micro-siting of infrastructure. Given the small area of proposed habitat clearance, and the preference to avoid impacts through micro siting, it is unlikely that the Project will results in the clearing of more than 10% of a population. Additional mitigation and management procedures will be implemented to prevent indirect impacts on populations near the MDA.</p>
Clearing of regenerating plants that are threatened wildlife which have previously been cleared within the last 5 years and that are historically maintained through slashing or grazing	<p><b>Not Significant.</b></p> <p>It is unlikely that individuals of this species would be regenerating plants that have been previously cleared within the last five years and maintained through slashing or grazing, given that agriculture is a key threat to the species. Whilst this species may have generalist habitat requirements, slashing or grazing would not maintain suitable conditions for its survival, and it is unlikely that regenerating plants of this species would persist in areas where these practices are ongoing. Therefore, further clearing of regenerating plants under these conditions is unlikely.</p>
The proposed relocation of an area of plants that are threatened wildlife less than 1000 m <sup>2</sup> not occurring in a relatively natural ecological situation (e.g. bushland), to a permanent retention area via an approved management plan	<p><b>Not Significant.</b></p> <p>Based on the current Project design, direct impacts via vegetation clearing of 0.2 ha of habitat is identified within coastal erosion prone areas of the MDA. This species has been detected within Section B of the Study Area, however, no individuals have been observed within the MDA. and if observed within the MDA, a SMP will be developed in consultation with DETSI and may include protocols for seed collection, propagation or re-establishment at selected suitable sites.</p>

### 1.3.2 Ghost Bat (*Macroderma gigas*)

#### 1.3.2.1 Status

The ghost bat is listed Endangered under the NC Act.

#### 1.3.2.2 Distribution and Habitat Requirements

The ghost bat is endemic to northern Australia. It has a disjunct distribution, comprising isolated populations extant in the semi-desert Pilbara region of Western Australia, the mesic Kimberley and Top End of the Northern Territory, north-western Queensland south of the Gulf of Carpentaria, Cape York peninsular, wet and dry tropics and the central Queensland coastal and hinterland regions. As per SPRAT, within Queensland their estimated range extends from Cape York to the Queensland – New South Wales border. The Gladstone region falls within the species ‘likely’ distribution, with known breeding sites occurring at Mount Etna and the surrounding area. The Study Area is situated approximately 100 km south of Mount Etna.



The species occupies a wide range of habitats from rainforest, monsoon and vine scrub to open woodlands in arid areas. Recent studies have also indicated the use of cleared agricultural land (Bat Call WA Pty Ltd, 2021). These habitats are used for foraging, while roost habitat is more specific. Ghost bats move between a number of roosts seasonally or as dictated by weather conditions and/or foraging opportunities, as such they require a range of roost sites (Van Dyck and Strahan, 2008). Roost sites can include caves, rock crevices and disused mine adits. Based on recently published species-specific guidance on the species, roost habitat can be categorised based on utilisation (maternity/diurnal roost or nocturnal roost) and occupancy rates (permanent, regular, occasional or opportunistic) (Bat Call WA Pty Ltd, 2021). Diurnal roost sites are generally deep natural caves or disused mines with a relatively stable temperature of 23° – 28°C and a moderate to high relative humidity of 50 – 100 percent. Most breeding sites appear to require multiple entranced or chambered caves. In contrast, shallow caves, shelters and deep overhangs are likely to be used opportunistically by transient individuals as nocturnal roosts (Bat Call WA Pty Ltd, 2021).

The nightly foraging range is 10 to 15 km (Bat Call WA Pty Ltd, 2021). In the cooler months (non-breeding season) individuals may disperse up to 150 km from their permanent roost locations in small groups or pairs (Hoyle, Pople and Toop, 2001).

#### **1.3.2.3 Threats**

The key threat to the ghost bat is habitat loss and degradation due to mining activities. The species' slow reproductive rate, and the lack of suitable habitat which restricts its movement, renders it vulnerable to threats and localised extinctions. Known threats to the ghost bat include:

- Habitat loss (destruction of, or disturbance to, roost sites and nearby areas) due to mining.
- Disturbance of (human visitation at) breeding sites.
- Loss and modification to foraging habitat.
- Collision with fences, especially those with barbed wire.
- Contamination by mining residue at roost sites.
- Disease.
- Poisoning by cane toads.
- Competition for prey with foxes and feral cats.

As per Bat Call WA (2021), other indirect sources potentially causing impacts to colonies include:

- Sound, vibration, airborne dust and pollutants (NOx).
- Increased light.
- Changed fire regimes.

#### **1.3.2.4 Occurrence and Potential Habitat**

The ghost bat was not confirmed during the field survey program. It is considered to have a moderate likelihood of occurring within the Study Area, based on the presence of potential habitat. A historical record from 1985 is located 14 km north of Section D.

No potential roost sites including caves, rock overhangs or crevices were recorded during the field survey program. Four vertical mine shaft openings occur to the north of Section E areas (<10 km).

These mine shafts do not constitute as mine adits (i.e. horizontal shafts) and are unlikely to provide roosting habitat for this species. Based on this finding, roosting habitat is considered absent within the MDA and the wider Study Area.

Due to the absence of potential roost sites within the MDA and the wider Study Area and the known nightly foraging distance of up to 15 km, no foraging habitat during the breeding season is considered present. While a known maternity roost occurs at Mount Etna, this site occurs a significant distance north (>100 km) and is not within the species foraging range. As the species disperses up to 150 km during the non-breeding season, potential habitat within the MDA is restricted to seasonal foraging and dispersal habitat only.

The nearby state forests such as the Mount Stowe State Forest, are all expected to provide large areas of suitable habitat for the species and are functionally connected to the MDA. While barriers to movement exist in the form of the existing transmission line, roads and fences, the dispersal of the ghost bat between these areas is likely to be high.

The extent of ghost bat within the MDA is provided in **Table 1.8**.

**Table 1.8 Habitat Extent for Ghost Bat**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Seasonal foraging and dispersal	0.2
<b>Total</b>	<b>0.2</b>

### 1.3.2.5 Potential Project Impacts and Key Mitigation Measures

Under the worst-case scenario, a maximum of 0.2 ha of seasonal foraging and dispersal habitat will be cleared for construction of the Project within the MDA coastal erosion prone extent. However, as described above, the species is dependent on the presence of suitable roosts. Potential habitat within the MDA is unlikely to be regularly inhabited, instead utilised only by rare individuals only while dispersing during the non-breeding season. This loss of habitat is likely to be inconsequential to the species' success within Queensland.

Potential indirect impacts on ghost bat as a result of the Project include:

- Alterations to fire regimes and potential for increased accidental bushfire that may result from construction and/or operation.
- Noise, activity and vibration generated during construction and operation interrupting foraging dispersal behaviours.

To minimise impacts to this species, the general mitigation measures listed in **Section 8.3.1** will be followed.

### 1.3.2.6 Significant Residual Impact Assessment for Ghost bat

The significant impact assessment for the species is presented in **Table 1.9** below. This assessment considers the latest species information including that presented in the Bat Call WA Pty Ltd (2022) report: *A review of ghost bat ecology, threats and survey requirements*. In summary, the assessment found that the Project is unlikely to result in a significant residual impact on the ghost bat.

**Table 1.9 Significant Residual Impact Assessment – Endangered Ghost Bat**

Impact Criteria	Significant Residual Impact Assessment
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of local population	<p><b>Unlikely.</b></p> <p>The ghost bat is considered to have a moderate likelihood of occurrence within the MDA and wider Study Area as it is located &gt;100 km from the Mt Etna Caves and no records occur nearby. Populations are reported to be highly structured, being genetically distinct at both regional and local scales. Highly genetically divergent populations are known from Mount Etna, Cape Hillsborough and Camooweal in Queensland. Given the Study Area’s significant distance from Mount Etna (&gt;100 km) and the lack of other known roost locations in the region, it is likely that only transient individuals dispersing to areas of higher quality habitat during the non-breeding season may utilise the MDA and wider Study Area.</p> <p>Under worst-case scenario, a maximum of 0.2 ha seasonal foraging and dispersal habitat in coastal erosion prone areas of the MDA will be cleared for construction of the Project. Potential habitat within the Study Area occurs extensively but is unlikely to be inhabited permanently or support a population due to the lack of diurnal and nocturnal roosting opportunities. Relative to the area of habitat that will be lost, large areas will remain. Foraging and dispersal habitat requirements are broad and as such it is likely suitable habitat also occurs extensively in the wider area. Based on this, the loss of seasonal foraging and dispersal habitat as a result of the Project is expected to have a negligible effect on the species.</p>
Reduce the extent of occurrence of the species	<p><b>Unlikely.</b></p> <p>The ghost bat has a large but discontinuous distribution across northern Australia; however it’s area of occupancy is less than 10 km<sup>2</sup> and reducing. This estimate may also overstate the true area given the low resolution in the mapping methodology used (2 km x 2 km grid) by the Commonwealth.</p> <p>Ghost bats are continuing to decline at the Mount Etna Caves National Park (Bat Call WA, 2022), which is located in the Rockhampton region. However, the MDA and wider Study Area occurs &gt;100 km south of the Mt Etna Caves. As described above, the MDA is unlikely to support a local population and is unlikely to in the future due to the lack of roosting opportunities. Noting the typical nightly foraging range of 10 – 15 km, individuals occupying the Mt Etna Caves are unlikely to primarily utilise the MDA and wider Study Area.</p> <p>Although a maximum of 0.2 ha of seasonal foraging and dispersal habitat in coastal erosion prone areas of the MDA may be cleared for construction of the Project, large areas of potential habitat will remain which should be of sufficient size to support any individuals that may occur temporally. Project works are therefore unlikely to reduce the extent of occurrence of this species.</p>



Impact Criteria	Significant Residual Impact Assessment
Fragment an existing population	<p><b>Unlikely.</b></p> <p>The ghost bat is highly mobile, and recent studies have confirmed their use of cleared agricultural land while foraging. Direct impacts to seasonal foraging and dispersal habitat will not result in habitat fragmentation in the context of the species, given its high dispersal capacity. Further, the Project is linear in nature and no barriers to movement will be created.</p> <p>No new fencing is required for the Project that may increase mortality. Collisions with electricity transmission lines are not documented and information regarding their known flight patterns does not suggest the species is overly susceptible.</p> <p>Based on the above, the Project is unlikely to fragment an existing population.</p>
Result in genetically distinct populations forming as a result of habitat isolation	<p><b>Unlikely.</b></p> <p>The ghost bat is a highly mobile species which may utilise the MDA and wider Study Area for foraging and dispersal. As described above, the MDA is unlikely to support a permanent local population and is unlikely to in the future due to the lack of roosting opportunities.</p> <p>Project activities will be collocated with existing disturbance. Project infrastructure will not create a barrier to movement between retained habitat patches. These retained habitat patches are likely to continue to support the foraging and dispersal requirements for the small number of individuals which may be present at any one time.</p> <p>Given the ability for this species to readily disperse across the landscape and an absence of suitable roosting opportunities to establish a new, maternity population, vegetation clearance associated with the Project is unlikely to result in genetically distinct populations forming.</p>
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	<p><b>Unlikely.</b></p> <p>The ghost bat may be impacted by invasive species, including poisoning by cane toads and competition for prey with foxes and feral cats. Invasive species including feral cats and cane toads were recorded throughout the field survey program. Historical clearing has occurred in discrete locations across the MDA and wider Study Area, and it is considered likely that these areas already act as conduits for pest movement in the landscape.</p> <p>As pests are already established and likely to be common, the Project is unlikely to further exacerbate population levels. Nonetheless, pest measures including monitoring will be implemented via the Project management plans. To ensure breeding opportunities for the cane toad are limited, where pits, voids or trenches are required they will be appropriately covered to prevent extended water retention in these spaces.</p> <p>Based on this, it is unlikely the Project will result in invasive species that are harmful to the ghost bat becoming established.</p>

Impact Criteria	Significant Residual Impact Assessment
Introduce disease that may cause the population to decline	<p><b>Unlikely.</b></p> <p>There are no known diseases affecting the species. The Project will employ best practice biosecurity protocols during construction and operation; therefore, introduction of a disease that may cause the species to decline is unlikely.</p>
Interfere with the recovery of the species	<p><b>Unlikely.</b></p> <p>The need for a recovery plan has been identified, but one has not yet been developed. The species' commonwealth Conservation Advice identifies primary conservation and management actions. The two primary conservation actions are:</p> <ul style="list-style-type: none"> <li>• protect roost sites from mining, human disturbance and collapse, and</li> <li>• replace the top strands of barbed wire in fences near roost sites with single-strand wire.</li> </ul> <p>Management actions are grouped into six key themes including active mitigation of threats, captive breeding, quarantining isolated populations, translocation, community engagement and reduce disturbance of roost sites. Specific actions relevant to the theme of 'active mitigation of threats' all relate to the protection of roost sites and significant colonies.</p> <p>The Project is unlikely to hinder the success of the conservation actions, given no potential roost sites occur in the MDA. Although clearing will occur in seasonal foraging and dispersal habitat, this habitat is unsuitable for breeding due to the lack of potential roosts. Furthermore, the Project will not exacerbate any known threats to the species including pest populations. Potential indirect impacts on the species as a result of the Project will be actively managed via Project management plans. Given the above, the Project is unlikely to interfere substantially with the recovery of the species.</p>
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	<p><b>Unlikely.</b></p> <p>There is no evidence to suggest that the MDA or wider Study Area comprises an ecologically significant location of the species. Foraging and dispersal habitat within the MDA is only marginally suitable and is already fragmented. Clearing for construction of the Project will not significantly disrupt or fragment an existing population. The movements of dispersing individuals required to maintain breeding potential should not be impacted as construction will occur in stages and additional barriers to movement are not proposed.</p> <p>Given the distance of the Study Area from the closest known maternity roost (over 100 km from Mt Etna), the absence of potential roosting sites within the MDA and wider Study Area and with the implementation of mitigation measures, the Project is unlikely to disrupt the breeding cycle of a local population or cause disruption to ecologically significant locations.</p>

### 1.3.3 Painted Honeyeater (*Grantiella picta*)

#### 1.3.3.1 Status

The painted honeyeater is listed as Vulnerable under the NC Act.

#### 1.3.3.2 Distribution and Habitat Requirements

This species is highly nomadic, sparsely and widely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations and almost all records of breeding come from south of 26°S, on inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland (Threatened Species Scientific Committee, 2015). Many birds move after breeding to semi-arid regions such as north-eastern South Australia, central and western Queensland, and central Northern Territory.

The painted honeyeater occurs in dry forests and woodlands, where its primary food is mistletoes in the genus *Amyema*, though it will also take some nectar and insects. Invertebrates are of particular importance as a dietary item provided to nestlings and are also used by adults in the breeding season. The species is also known to occur in riparian woodland communities dominated by species such as *Eucalyptus camaldulensis*, *Casuarina* sp., *Callitris* sp., and in *Acacia* dominated woodlands, paperbarks, and trees on farmland and in gardens. The species demonstrates preference for wider patches of remnant woodland and areas with higher numbers of older trees as mistletoes are largely restricted to these trees.

The species does exhibit distinct movement patterns which are influenced by the fruiting of mistletoe which also coincides with its breeding season. Breeding occurs in October to March. Two mistletoe species in particular are heavily relied on in particular during breeding: grey mistletoe (*Amyema quandang*) and needle-leaf mistletoe (*A. cambagei*). The painted honeyeater shows preference for wider patches of woodland habitat, however it is known to breed in narrow roadside strips of vegetation provided that ample mistletoe is available (Threatened Species Scientific Committee, 2015).

#### 1.3.3.3 Threats

The primary identified threat to this species is habitat loss. Both breeding and non-breeding habitat has been subject to extensive clearing in the past or degraded to the point where they no longer provide suitable habitat. Regrowth woodland, which contains similar or higher densities of mistletoe than remnant woodland, is viewed as having little conservation value and is also being cleared at an unsustainable rate.

Other identified threats include:

- Habitat degradation by grazing livestock, native macropods and rabbits leading to a collapse in mistletoe resources.
- Deliberate destruction of mistletoe by landholders and in production forests.
- Competition with the native noisy miner (*Manorina melanoccephala*).
- Predation by invasive species such as the black rat.
- Collision with road vehicles.



- Nest predation by over-abundant native birds including currawongs, butcherbirds, crows and ravens.

#### 1.3.3.4 Occurrence and Potential Habitat

The painted honeyeater was not confirmed during the field survey program. It is considered to have a moderate likelihood of occurring within the MDA and wider Study Area, based on the presence of potential habitat. The closest record is in Biloela recorded in 2017.

Potential habitat within the Study Area comprises regrowth and remnant eucalypt, *Acacia* and *Casuarina* forest and woodlands where suitable mistletoe resources are present (REs 11.3.25, 11.11.3, 11.11.4, 11.12.6 and 12.3.3). Within the MDA, suitable habitat is associated with RE 12.3.3. The nearby Mount Stowe State Forest, is expected to provide large areas of suitable habitat for the species and is functionally connected to the MDA. While barriers to movement exist in the form of the existing transmission lines, roads and fences, the dispersal of the painted honeyeater between these areas is likely to be high.

Habitat is considered suitable for foraging and dispersal only. No breeding habitat has been mapped for this species as the MDA and wider Study Area is outside of the species' breeding range. The breeding distribution of this species is almost exclusively along the western slopes of the Great Dividing Range from southern Queensland (Roma), New South Wales and Victoria.

The extent of painted honeyeater within the MDA is provided in **Table 1.10**.

**Table 1.10 Habitat Extent for Painted Honeyeater**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Foraging and dispersal	0.2
<b>Total</b>	<b>0.2</b>

#### 1.3.3.5 Potential Project Impacts and Key Mitigation Measures

Under the worst-case scenario, a total of 0.2 ha of potential foraging and dispersal habitat will be cleared within the MDA for construction of the Project.

Potential indirect impacts of the Project on the painted honeyeater includes:

- Increased competition with other species, particularly the noisy miner (*Manorina melanocephala*), and/or nest predation by other species, such as pied and grey butcherbirds (*Cracticus nigrogularis* and *C. torquatus*), that become displaced by clearing.
- Introduction or proliferation of pest and weed species resulting in degradation of habitat.
- Dust generated during pre-construction activities disturbing behaviours or health/palatability of foraging resources.

To minimise impacts to this species, the general mitigation measures listed in **Section 8.3.1** will be followed.

### 1.3.3.6 Significant Residual Impact Assessment for Painted Honeyeater

The significant impact assessment for the species is presented in **Table 1.11** below. In summary, the assessment found that the Project is unlikely to result in a significant residual impact on the painted honeyeater.

**Table 1.11 Significant Residual Impact Assessment – Vulnerable Painted Honeyeater**

Evaluation Criteria	Response
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of local population	<p><b>Unlikely.</b></p> <p>The painted honeyeater has not been recorded within the MDA or wider Study Area despite significant field survey effort. It is conservatively considered a potential occurrence within the Study Area due to the presence of potential habitat and ALA records within the wider region. During the winter, the painted honeyeater is more likely to be found in the north of its distribution, which may explain the scattered records around the MDA and wider Study Area. The habitat within the MDA and wider Study Area is generally marginal in quality and likely to only be utilised opportunistically when resource availability in the region is low. Since this species typically breeds south of Roma in Queensland, no breeding habitat has been mapped within the Study Area.</p> <p>Direct impacts to potential habitat in coastal erosion prone areas of the MDA are limited to clearing of 0.2 ha of foraging and dispersal habitat. This loss of habitat is considered unlikely to significantly reduce the species’ ability to persist in the local area given habitat within the adjacent state forests is likely to be preferred. Final clearing areas are expected to be lower as clearing will only be completed as strictly necessary and will be minimised as part of construction. Some vegetation adjacent to the transmission line may remain in place if it does not violate the exclusion zones.</p> <p>Implementation of the Project’s EMP will assist to minimise potential indirect impacts of the Project, such as habitat degradation from increased dust, edge effects, weeds and temporary altered hydrology. Therefore, a long-term decrease in the size of a local population of this species is unlikely to occur.</p>
Reduce the extent of occurrence of the species	<p><b>Unlikely.</b></p> <p>The painted honeyeater is a nomadic species found at low densities across its range (Threatened Species Scientific Committee, 2015). The extent of occurrence is estimated to be 2 800 000 km<sup>2</sup> and the area of occupancy for the species is estimated to be 1,000 km<sup>2</sup> (Garnett, Szabo and Dutson, 2011). Habitat mapping within coastal erosion prone areas of the MDA has identified a total of 0.2 ha of potential foraging and dispersal habitat to be directly impacted via vegetation clearing. This species is highly nomadic and the landscape in which the wider Study Area occurs is already highly disturbed and many patches of habitat are highly fragmented due to the existing transmission line.</p>

Evaluation Criteria	Response
	<p>Given the extent of habitat in the region and the relatively small amount of habitat being impacted within the MDA, it is considered unlikely the Project will reduce the extent of occurrence of this species.</p>
<p>Fragment an existing population</p>	<p><b>Unlikely.</b></p> <p>The painted honeyeater is a highly mobile species which undergoes large seasonal movements. Potential habitat within the MDA is highly fragmented as a result of historical clearing and the existing transmission line. Given the ability for this species to readily disperse across the landscape, vegetation clearance associated with the Project is unlikely to present barriers to this species local movement, to the extent that it fragments any population of this species within the MDA.</p>
<p>Result in genetically distinct populations forming as a result of habitat isolation</p>	<p><b>Unlikely.</b></p> <p>The painted honeyeater is a highly mobile species which undergoes large seasonal movements across landscapes and is considered to be a single, interbreeding population (Department of Agriculture, Water and the Environment, 2021b). Project activities will be collocated with existing disturbance. Project infrastructure will not create a barrier to movement between retained habitat patches. These retained habitat patches are likely to continue to support the foraging requirements for the small number of individuals which may be present at any one time. Given the ability for this species to readily disperse across the landscape, vegetation clearance associated with the Project is unlikely to present barriers to this species local movement, thus creating habitat isolation and resulting in genetically distinct populations forming.</p>
<p>Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat</p>	<p><b>Unlikely.</b></p> <p>Predation by black rat is considered to be a threat to the species (Threatened Species Scientific Committee, 2015). This species was observed during the field surveys, and numbers are expected to fluctuate according to seasonal conditions. Rats may pose a threat to the species during plague periods. The Project will employ best practice control methods for weeds and pests and is unlikely to introduce or exacerbate weeds or pests beyond existing levels.</p>
<p>Introduce disease that may cause the population to decline</p>	<p><b>Unlikely.</b></p> <p>Disease has not been identified as a threat to the species. The Project will follow best practice construction and operational methods; therefore, introduction of a disease is unlikely.</p>
<p>Interfere with the recovery of the species</p>	<p><b>Unlikely.</b></p> <p>A <i>National Recovery Plan for the Painted Honeyeater</i> was published in 2021. Six main strategies are detailed:</p> <ul style="list-style-type: none"> <li>• Protect, manage and restore painted honeyeater breeding and foraging habitats at the local, regional and landscape scales.</li> <li>• Monitor, reduce and manage threats and sources of mortality.</li> <li>• Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions.</li> </ul>



Evaluation Criteria	Response
	<ul style="list-style-type: none"> <li>• Improve understanding of habitat use at a landscape scale in order to better target protection and restoration measures.</li> <li>• Engage local communities and stakeholders in painted honeyeater conservation.</li> <li>• Coordinate, review and report on recovery progress.</li> </ul> <p>The foraging and dispersal habitat within the MDA is considered to have negligible impacts on the species in the long-term or on a population scale. Since the MDA in coastal erosion prone areas lacks the large tracks of vegetation preferred by this species, the painted honeyeater is likely to be an infrequent visitor to the MDA, potentially only present during the winter when individuals move towards the north of their range. The Project will not result in disruptions to breeding cycles and existing threats to the species are unlikely to be increased. As such, the Project is considered unlikely to interfere substantially with the recovery of the species.</p>
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	<p>The Project will maximise the use of historically cleared areas including non-remnant vegetation and disturbed areas. As a result, direct impacts to suitable habitat within the MDA totals 0.2 ha. The Study Area is north of the known breeding distribution of the species which is on the inland slopes of the Great Dividing Range, south of Roma. Breeding habitat has not been mapped within the MDA and wider Study Area. Therefore, the Project will not result in disruptions to breeding cycles or any ecologically significant locations.</p>

### 1.3.4 Water mouse (*Xeromys myoides*)

#### 1.3.4.1 Status

The water mouse is listed as Vulnerable under the NC Act.

#### 1.3.4.2 Distribution and Habitat Requirements

The water mouse occurs across an extensive although almost linear range in coastal and near-coastal Queensland and the Northern Territory. However, the regions in which it occurs are widely separated.

In south-east Queensland, the water mouse is distributed from the Gold Coast and Moreton Bay area to the Great Sandy Strait and as far inland to the Beerwah State Forest. In central eastern Queensland, the water mouse is known to occur from Agnes Water to Mackay, and Cannonvale. More recently, it has been recorded around Gladstone Harbour and on Curtis Island. The discovery of the species along the Jack Barnes Bicentennial Boardwalk, adjacent to Cairns Airport in 2017, represents the sole record of the water mouse from north Queensland, extending its known range in the State northwards by approximately 600 km.

The habitat of the water mouse is aquatic environments, including coastal saltmarsh, samphire shrublands, saline reed-beds and saline grasslands, mangroves, and coastal freshwater wetlands, and wet heathlands as demonstrated through occupancy by the species continuously, periodically or occasionally in the past or present.

The attributes of water mouse habitat providing for the species for various life cycle stages i.e breeding, nest construction, foraging, refuge and dispersal include but are not limited to:

- Intact hydrology.
- Prey resources (crustaceans, polyclad worms, pulmonated snails and bivalves).
- A defined supralittoral bank (enabling construction of nest burrows above the high tide level); and
- Structures (tidal pools, channels, crab holes, pneumatophores, crevices in bark and around roots, hollows in standing and fallen timber/mangroves, suspended drifts of twigs and leaves and driftwood).

Water mice are nocturnal foragers and will search for prey between low and high tides along exposed tidal flats and around the water's edge (Department of Agriculture, Water and the Environment, 2021a). Foraging behaviour can be identified through leftover meal remains, otherwise known as middens. Prey remains can be located at the base of or on the external structure of nests and at feeding stations used by the species within the intertidal zone.

The water mouse makes unique and varied mud-based nests for refuge and breeding. These nests are permanent and important features, contributing to the stability of water mouse populations (Department of Agriculture, Water and the Environment, 2021a). Nest construction is a nocturnal activity and is time-consuming, requiring constant maintenance due to imposing factors such as tidal influence and seasonal storm events.

#### 1.3.4.3 Threats

The primary threat to the water mouse is the loss, degradation, and fragmentation of freshwater and intertidal wetland communities utilised by the species. Drivers of this primary threat vary across the species range. In Queensland, changes in hydrology and expression of acid sulphate soils are causing loss, fragmentation and degradation of habitat.

The water mouse is also seriously threatened by feral predators, particularly in Queensland, where the red fox (*Vulpes vulpes*) poses a severe threat to the species. In both Queensland and the Northern Territory, the water mouse may be at risk of predation by domestic and feral cats, though this has not been quantified.

#### 1.3.4.4 Occurrence and Potential Habitat

This species has been confirmed on Curtis Island and at Gladstone Harbour and is therefore considered a high likelihood of occurrence within the MDA. The water mouse may nest or forage in the following Queensland REs: 8.1.1, 11.1.1, 11.1.2, 11.1.4, 12.1.1, 12.1.2, 12.1.3, 12.2.5, 12.2.7, 12.2.11, 12.2.12 and 12.2.14 (Department of Agriculture Water and the Environment, 2020). RE 12.1.2 and 12.1.3 are mapped within and immediately adjacent to the MDA. This habitat consists of the mangrove shrublands and the adjacent saltpan vegetation including grassland, herbland and sedges.

Historically, water mouse trapping in Gladstone has resulted in very low capture rates. For example, trapping over a seven-month period in water mouse habitat near Gladstone only resulted in two individuals being caught after thousands of trap nights (3D Environmental, 2012). These rates indicate that trapping is not the most efficient method for determining the presence of the species, and active searching is considered to be a more reliable method to determine presence of water mouse. Therefore, focus was placed on this method.

A combination of active searching and habitat assessments, combined with the precautionary approach when assessing the likelihood of the species presence, provides a comprehensive assessment of the likely distribution of the water mouse in relation to the MDA and wider Study Area.

Habitat assessments and nest searches have occurred in the mapped habitat with the aim of determining extant status of the species. Field surveys in this habitat found considerable mounding over the entire mapped area. Mud mounding crabs can create similar mud shelters to the water mouse, but they lack entrance holes and mud-formed tracks or runways (Burnham, 2000). Many of the mounds observed in the MDA and wider Study Area do exhibit external burrows. However, no other signs of water mouse were recorded, including mud-formed trackways or runways, midden or crab remains that are typically seen scattered at or near the burrow entrances, or scats or footprints. Using the precautionary principle, due to the low detectability of the species, a population of water mouse in the wider Study Area has been presumed.

The extent of water mouse habitat within the MDA is provided in **Table 1.12** below.

**Table 1.12 Habitat Extent for Water Mouse**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Breeding, foraging and dispersal	0.02
<b>Total</b>	<b>0.02</b>

#### 1.3.4.5 Potential Project Impacts and Key Mitigation Measures

Under the worst-case scenario, a total of 0.02 ha of potential breeding, foraging and dispersal habitat will be cleared within the MDA for construction of the Project. The proposed tower locations on either side of the Calliope River are located adjacent to the mapped habitat in Eucalypt woodland (southern side) and within suitable habitat as saltmarsh and young mangroves (northern side). The saltmarsh and mangrove vegetation may have been previously cleared, lacks large woody structure and generally contains younger mangrove saplings. A defined supra littoral bank is missing from this area, as are structures like crevices in bark, and larger pieces of driftwood.

Potential indirect impacts on the water mouse as a result of the Project include those listed below.

- Mortality or injury from vehicle collisions.
- Introduction or proliferation of pest and weed species resulting in degradation of habitat.
- Soil exposure resulting in an increased risk of erosion and sedimentation of water bodies, reducing water quality and degrading aquatic habitats.
- Increased risk of contamination associated with activities such as refuelling or storage of chemicals.
- Temporary changes in hydrology from installation of infrastructure creating a barrier to surface flow and increasing stormwater run-off.
- Periodic burst of elevated noise levels may startle and disorientate individuals within proximity.
- Increased pest levels, notably those which may prey upon this species.



In addition to the general mitigation and management measures outlined in **Section 8.3.1**, the following species-specific mitigation measures will be implemented:

- Appropriate sediment and erosion control measures will be implemented to avoid potential contamination of surface water or adjacent habitats.
- Appropriate spill prevention and response plans will be developed to cover Project activities, and the types and quantities of fuel, oil and chemicals held.
- Temporary site offices, stockpiling/laydown areas, plant and equipment storage areas will be located away from waterbodies and will be sited within already cleared or disturbed areas.
- A Water Quality Monitoring Program will be implemented at the Calliope River, to compare pre and post construction water quality and determine extent of Project related impacts.
- Acid sulfate soils will be managed in accordance with Powerlink's Acid Sulfate Soils Management Plan.
- Powerlink has committed to no night works during the construction phase.
- No off-track driving within the mangrove or saltmarsh habitat will be permitted.

In addition, the Commonwealth Referral Guidelines for this species suggests the risk of having a significant impact on the species is considered low if the mitigation standards outlined below are properly implemented (Department of the Environment, 2015c):

- Buffers of natural vegetation of at least 50 m from habitat critical to the survival of the water mouse are implemented (design and construction).
- Protection of this habitat should ensure the mangrove and sedge/saltmarsh zones are preserved and protected by the abutting zone of vegetation or the defined supralittoral bank is protected (design and construction).
- Existing hydrology (including any appropriate flood regime, as well as water flow and quality) is maintained (design and construction).
- Foxes, cats and pigs are controlled and managed (construction and operation).
- Supralittoral and intertidal habitat corridors are retained and connectivity exists between an array of habitat types (design and construction).
- Any freshwater run-off is captured to avoid degradation to habitat critical to the survival of the water mouse, including on prey abundance due to changes in salinity (construction).
- The spread and invasion of noxious weeds is controlled and managed (construction).
- Nearby or adjacent construction management practices includes plant and personnel wash down, quarantine, material treatment and material import limits (construction).
- Fencing and signage is implemented to avoid degradation of habitat critical to the survival of the water mouse, i.e. through cattle grazing or vehicle access (construction).

#### 1.3.4.6 Significant Residual Impact Assessment for Water Mouse

The significant impact assessment for the species is presented in **Table 1.13** below. The assessment found that the Project is unlikely to result in a significant impact on the water mouse.

**Table 1.13 Significant Residual Impact Assessment – Vulnerable Water Mouse**

Evaluation Criteria	Response
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of local population	<p><b>Unlikely.</b></p> <p>A single transmission tower footprint falls within mapped habitat for water mouse which may involve the modification or removal of 0.02 ha of saltmarsh or mangroves within the MDA. This loss of habitat is considered unlikely to significantly reduce the species’ ability to persist in the local area given habitat within the adjacent areas and offshore island is likely to be preferred as it is less disturbed. In addition, habitat assessments and active searches nest mounds failed to find evidence of current occupation for this species.</p> <p>The species may also be subjected to indirect impacts from the Project including the proliferation of weed and pest populations which may degrade habitat and increase predation risks. In addition, clearing for the Project within nearby habitats may alter the hydrology of the Calliope River or expose the habitat to acid sulfate soils, chemicals or run-off. Indirect impacts to the species will be managed via the implementation of Project management plans including a site-specific EMP which will govern the construction and operational conditions in which wildlife will be managed within the Study Area. Other management plans that will be implemented for the Project include a Water Quality Monitoring Plan and Acid Sulfate Soils Management Plan. These plans will also include biosecurity management measures to minimise the risk of invasive species impacting on threatened wildlife. As the species is ground-dwelling, there is a risk of mortality during construction as a result of vehicle/plant strike. To manage this risk, speed limits will be strictly enforced. No off-track driving within the mangrove or saltmarsh habitat will be permitted.</p> <p>Implementation of the Project’s EMP will assist to minimise potential direct and indirect impacts of the Project, such as habitat degradation, weeds and temporary altered hydrology. Consequentially, the Project is unlikely to lead to a long-term decrease in the size of a local population of this species.</p>
Reduce the extent of occurrence of the species	<p>In Queensland, the population of the water mouse is estimated to be between 1001 and 10 000 individuals, occupying an area of approximately 101 to 1000 km<sup>2</sup>.</p> <p>Very limited (0.02 ha) direct impacts to mapped water mouse breeding, foraging and dispersal habitat is anticipated from vegetation clearing for construction of the Project. This habitat is analogous with small patches of mangroves and saltmarsh habitat that extends around the Calliope River. During design iterations, this habitat was avoided to the greatest extent possible, to minimise the impact to threatened species. Indirect</p>

Evaluation Criteria	Response
	<p>impacts are unlikely to materially affect mapped habitat for the species nor are they expected to cause the species to leave areas mapped as suitable habitat. Nevertheless, a range of mitigation measures including the implementation of Project environmental management plans are proposed to mitigate these potential impacts.</p> <p>Given that 0.02 ha of clearing of mapped habitat is proposed, the Project is unlikely to reduce the extent of occurrence of this species.</p>
Fragment an existing population	<p><b>Unlikely.</b></p> <p>There is currently no recorded information about the capacity for the water mouse to disperse, or about coastal barriers to water mouse population connectivity. The water mouse can travel over 600 m per night between shelter and feeding grounds, 1 km in a few hours, and 2.9 km overnight when foraging. Only small amounts of migration are required to maintain the genetic resilience of water mouse populations across its distribution. This suggests that irregular dispersal events across large distances of seemingly inhospitable terrain may be sufficient to ensure connectivity.</p> <p>The Project will not include fences or other above-ground infrastructure that may limit the species dispersal ability. Therefore, the Project is unlikely to fragment an existing population.</p>
Result in genetically distinct populations forming as a result of habitat isolation	<p><b>Unlikely.</b></p> <p>Habitat mapped within the MDA and wider Study Area has been identified as being suitable for breeding given the vegetative structure provided. Direct vegetation removal of up to 0.02 ha of potential habitat within the coastal erosion prone areas within the MDA is proposed, however, suitable habitat is unlikely to be isolated from existing habitat due to the linear nature of the Project and the presence of current transmission line infrastructure.</p> <p>Indirect impacts such as increased dust exposure, degradation from weeds, water quality changes and increased risk of bushfire may alter the species utilisation of this habitat. Indirect impacts to the Project will be managed in accordance with Project management plans including an EMP. Given these impacts will be managed appropriately and direct impacts will not result in habitat isolation, the Project is unlikely to result in genetically distinct populations forming as a result of habitat isolation.</p>
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	<p><b>Unlikely.</b></p> <p>Weeds have the potential to degrade water mouse habitat, particularly lantana. The species is also susceptible to predation by exotic predators such as the European red fox and feral cats, while feral pigs are known to predate on water mouse and dismantle critical shelters. Both species was recorded within the wider Study Area during the field surveys, and it is considered unlikely that clearing required for construction of the Project will significantly exacerbate the movement of exotic predators. The Project will employ best practice control methods for weeds and pests and is unlikely to introduce or exacerbate weeds or pests beyond existing levels.</p>



Evaluation Criteria	Response
Introduce disease that may cause the population to decline	<p><b>Unlikely.</b></p> <p>Disease has not been identified as a threat to the species. Nevertheless, the Project will follow appropriate biosecurity protocols; therefore, introduction of a disease is unlikely.</p>
Interfere with the recovery of the species	<p><b>Unlikely.</b></p> <p>The National Recovery Plan sites key actions required for the recovery of the water mouse as:</p> <ul style="list-style-type: none"> <li>• Confirming and documenting the current distribution of the species.</li> <li>• Mapping known populations and their habitat.</li> <li>• Assessing the impact of known threatening processes.</li> <li>• Developing and implementing a threat management plan to rehabilitate habitat at priority sites.</li> <li>• Engaging the community in efforts to protect existing populations by establishing voluntary agreements with relevant landowners and managers.</li> <li>• Coordinating the recovery process.</li> </ul> <p>A single transmission tower footprint falls within mapped habitat for water mouse which may involve the modification or removal of 0.02 ha of saltmarsh or mangroves within the MDA. Based on the implementation of Project management plans, direct and indirect impacts to the species are likely to be negligible. The Project is unlikely to interfere with any of the abovementioned recovery objectives and is therefore unlikely to interfere substantially with the recovery of the species.</p>
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	<p><b>Unlikely.</b></p> <p>The Project will maximise the use of historically cleared areas including non-remnant vegetation and disturbed areas, and Project infrastructure will be collocated the existing transmission line further limiting fragmentation and isolation of suitable habitat. As a result, direct impacts to suitable habitat within the MDA totals 0.02 ha. The movements of dispersing individuals of this species required to maintain breeding potential should not be impacted as construction will occur in stages and barriers to movement during construction are not anticipated. Surveys will be conducted by a suitably qualified person prior to construction commencing to identify any nests in the MDA Active animal breeding places will only be tampered with under an approved High-risk Species Management Program issued under the Queensland Government (DESI). Given the absence of known nests/burrows within the MDA and wider Study Area and with the implementation of mitigation measures, the Project is unlikely to disrupt the breeding cycle of a population or cause disruption to ecologically significant locations.</p>

### 1.3.5 White-throated Needletail (*Hirundapus caudacutus*)

#### 1.3.5.1 Status

The white-throated needletail is listed Vulnerable under the NC Act.

#### 1.3.5.2 Distribution and Habitat Requirements

The white-throated needletail is a large species of swift which is a non-breeding migrant to Australia typically arriving in September and departing in April (Draffan, R. D. W., Garnett, S. T., Malone, 1983). They most commonly migrate to Australia via the Torres Strait and disperse in a southerly direction along the eastern and western sides of the Great Divide in Queensland and New South Wales. By November the species reaches the southern extent of its range in Australia dispersing throughout parts of Victoria, south-eastern South Australia and Tasmania (Higgins, 1999). In the Northern Territory and Western Australia, they occur as vagrants. Estimates place the white-throated needletail's range in Australia at 126,200 km<sup>2</sup>. (Blakers, M. Davies, S. J. J. F., Reilly, 1984; Higgins, 1999; Barrett, G., Silcocks, A., Barry, S., Cunningham, R., Poulter, 2003).

White-throated needletails are an almost exclusively aerial, large-bodied swift that are insectivorous feeding on a variety of insect prey items during their migration in Australia across a range of habitat types and landscapes. Whilst in Australia the species is gregarious observed flying in flocks of hundreds and even thousands of birds. They are occasionally observed individually or in smaller groups and can sometimes be found in mixed flocks with other insectivorous aerial species such as fork-tailed swift (*Apus pacificus*) and fairy martins (*Hirundo ariel*) (McMicking, 1925; Learmonth, 1950, 1951; Wheeler, 1959).

They are regularly recorded above wooded areas including open forest and rainforest, though may also fly below the canopy between trees or in clearings. When flying above farmland, they are more often recorded above partly cleared pasture, plantations, or remnant vegetation at the edge of paddocks. According to the *Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015b) trees with dense canopy foliage and tree hollows are considered to provide roosting habitat for white-throated needletail (Corben, C., Roberts, G., Smyth, 1982; Quested, 1982; Day, 1983; Tarburton, 1993a; Tarburton., 2015), although the degree to which the species roosts in trees is potentially over-emphasised (Higgins, 1999). A radiotracking study on white-throated needletails was able to track an individual to a roosting site in open sclerophyll forest. Although the study was unable to detect the exact roosting tree the dominant tree species included *Eucalyptus crebra*, *Eucalyptus muelleriana*, *Eucalyptus gummifera* and *Lophostemon confertus*. It is thought the species will return to roost sites over consecutive nights (Tarburton, 1993a). Home ranges and territories are not maintained while the birds are in Australia.

During non-breeding migrations to Australia the white-throated needletail feeds on a variety of insects including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (Cameron, 1968; Madden, 1982; Tarburton, 1993a; Rose, 1997). The species feeds up to the height of clouds over a variety of foraging habitats including heavily treed forests. Open foraging habitats include farmland, heathland or mudflats (McDonald, 1938; Learmonth, 1951; Templeton, 1991; Tarburton, 1993b), although the species has been observed feeding at lower altitudes closer to the ground as low as 15 cm at a coastal saltworks (Watson, 1955). They occasionally forage above recently disturbed habitats, such as recently burned or cleared forest, or above paddocks being ploughed or cut (Bravery, 1971; Blakers, M. Davies, S. J. J. F., Reilly, 1984). The species is also known

to hunt in updraught locations like ridges, cliffs, or sand dunes (Legge, 1927; Loyn, 1985; Mitchell, A., Peter, J. McCarthy, 1996). Low pressure systems both lift food sources and provide assistance with flight and needletails often forage at the edge of these systems (Boehm, 1939).

### 1.3.5.3 Threats

Within Australia threats to white-throated needletails include wind turbine collision (Hull *et al.*, 2013), overhead wires (Campbell, 1930; Wheeler, 1965; Cameron, R., Hinchey, 1981), windows (Slater, 1964), and lighthouses (Draffan, R. D. W., Garnett, S. T., Malone, 1983; Stokes, 1983). Further research is required to determine the extent of the impact at the population level for this species.

It is possible that the species may decline as a result of pesticide use either through a reduction of prey abundance or secondary poisoning through the accumulation of sublethal doses in prey species (Tarburton, 2014). The decrease of roosting locations in Australia may potentially be a factor in the species' decline. It's possible that the decline in invertebrate prey was also a result of the loss of woodland and forest ecosystems (Tarburton, 2014).

### 1.3.5.4 Occurrence and Potential Habitat

Records throughout a migration event generally begin during spring when the species arrives in Australia and ends in autumn when the species is leaving Australia. The white-throated needletail was not confirmed during the field survey program, despite field surveys occurring when the species is present within Australia, including 3 x in March 2023 and 4 x in April 2023. It is considered to have a high likelihood of occurring within the MDA and wider Study Area, based on the presence of potential habitat and the presence of nearby records. Database records indicate the species is regularly recorded in the region surrounding Gladstone with the closest record occurring within 10 km of the MDA dated from 2021.

Across the wider Study Area potential habitat for white-throated needletail consists of roosting, foraging and dispersal habitat. However, within the MDA only foraging and dispersal habitat is mapped. White-throated needletail roosting habitat is limited to remnant vegetation with mature stands of trees confined to ridgelines throughout the Study Area. This combination of topography and vegetation is absent from the MDA associated with coastal erosion prone areas surrounding the Calliope River. Due to the species broad habitat requirements and aerial nature, all remaining areas of regrowth and remnant vegetation are considered potential foraging and dispersal habitat. Given the species is a non-breeding migrant to Australia, no breeding habitat exists and will not be considered further.

The extent of water mouse habitat within the MDA is provided in **Table 1.14** below.

**Table 1.14 Habitat Extent for White-throated Needletail**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Foraging and dispersal	0.2
<b>Total</b>	<b>0.2</b>



### 1.3.5.5 Potential Project Impacts and Key Mitigation Measures

Under the worst-case scenario, a total of 0.2 ha of foraging and dispersal habitat within the MDA will be cleared for construction of the Project. Noting that the species is almost exclusively aerial, occurring above a range of habitat types and extensive habitat of similar value will remain, this loss of habitat is likely to represent only a very minor impact to the species.

Potential indirect impacts on white-throated needletail habitat (fly-over foraging habitat) as a result of the Project include:

- Habitat fragmentation and edge effects
- Weeds and pests.

To minimise impacts to this species, the general mitigation measures listed in **Section 8.3.1** will be followed.

### 1.3.5.6 Significant Residual Impact Assessment for White-throated Needletail

The significant impact assessment is presented in **Table 1.15** below. The assessment found that the Project is unlikely to result in a significant impact on the white-throated needletail.

**Table 1.15 Significant Residual Impact Assessment – Vulnerable White-throated Needletail**

Evaluation Criteria	Response
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of local population	<p><b>Unlikely.</b></p> <p>The white-throated needletail is not known to the MDA or wider Study Area. It is a non-breeding migrant to eastern Australia where it occurs as transient populations, often influenced by prevailing weather conditions. The species generally arrives in Australia during spring and migrates along both sides of the Great Diving Range in Queensland and NSW to the southern parts of their range. The journey is reversed as the species leaves Australia in autumn. While migrating, it is likely the species will inhabit the airspace above all remnant and regrowth habitat types within the Study Area.</p> <p>Under worst-case scenario, up to 0.2 ha of foraging and dispersal habitat in coastal erosion prone areas of the MDA will be directly impacted via vegetation clearing for construction of the Project. Relative to the area that will be cleared, large areas of suitable habitat will remain. Given the species aerial nature and broad requirements for foraging, it is unlikely this loss of habitat will result in a material change to the species’ utilisation of the area.</p> <p>Implementation of the Project’s EMP will assist to minimise potential indirect impacts of the Project, such as habitat degradation from increased dust, edge effects and weeds. Further, any population utilising the Study Area is not considered an important population. Therefore, a long-term decrease in the size of a local population of this species is unlikely to occur.</p>

Evaluation Criteria	Response
Reduce the extent of occurrence of the species	<p><b>Unlikely.</b></p> <p>While in Australia the species has a large distribution that extends across eastern Australia. As per the species' Commonwealth Conservation Advice, the estimated area of occupancy within Australia is &gt;18,000 km<sup>2</sup> however this may be overstated given the mapping methodology used by the Commonwealth (2 km x 2 km grid). Although the Project will result in a maximum loss of up to 0.2 ha of foraging and dispersal habitat in coastal erosion prone areas of the MDA, habitat is likely to only be utilised temporarily while on migration. The quantum of habitat that will remain is likely to be sufficient to support the ecological requirements of any expected population. Furthermore, areas of suitable habitat are likely to occur extensively within the wider region. Given the aerial nature and high mobility of the species, as well as the broad habitat requirements and habitat availability in the broader region, the Project is unlikely to reduce the extent of occurrence of this species.</p>
Fragment an existing population	<p><b>Unlikely.</b></p> <p>As a migratory species, a distinct local population of white-throated needletail is unlikely to utilise the MDA or wider Study Area. The species is highly mobile, flying for thousands of kilometres during migration. It is known to occur within fragmented landscapes as well as over a range of habitat types. The Project has been strategically sited to maximise the use of cleared areas, minimising additional habitat fragmentation including within foraging and dispersal habitat. Given the aerial nature of the species, vegetation clearance associated with the Project is unlikely to reduce the mobility of the species and will not result in the fragmentation of a population. As such, it is unlikely the Project will fragment an existing population into two or more populations.</p>
Result in genetically distinct populations forming as a result of habitat isolation	<p><b>Unlikely.</b></p> <p>As described above, this species is almost entirely aerial, highly mobile and uses a variety of habitat types covering a vast extent of the MDA, Study Area and the local region. The Project will not be a barrier to movement nor is it likely to deter individuals from the area once constructed. The quantum of habitat that will remain is likely to be sufficient to support the ecological requirements of any expected population. Furthermore, areas of suitable habitat are likely to occur extensively within the wider region. As such, vegetation clearance associated with the Project is unlikely to result in genetically distinct populations forming as a result of habitat isolation.</p>
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	<p><b>Unlikely.</b></p> <p>Invasive species are not known to be a threat to the white-throated needletail. Nonetheless, the Project will employ best practice control methods for weeds and pests and is unlikely to introduce or exacerbate weeds or pests beyond existing levels.</p>

Evaluation Criteria	Response
Introduce disease that may cause the population to decline	<p><b>Unlikely.</b></p> <p>There are no known diseases affecting the species. The Project will employ best practice biosecurity protocols during construction and operation; therefore, introduction of a disease that may cause the species to decline is unlikely.</p>
Interfere with the recovery of the species	<p><b>Unlikely.</b></p> <p>There is currently no evidence to suggest that the species relies on the habitat of the MDA or wider Study Area while in Australia or on migration. No roosting locations were identified during the field survey program within the MDA or wider Study Area. Additionally, no roosting habitat has been mapped within the MDA within the coastal prone areas due to the low elevation. Following construction of the Project, large and extensive areas of foraging and dispersal habitat will remain which are of sufficient scale to support any individuals that may occur.</p> <p>Given the above, it is unlikely that Project will interfere with recovery of the species.</p>
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	<p><b>Unlikely.</b></p> <p>The species is a non-breeding migrant to Australia. As the species forages predominantly on insects, foraging resources are widely available and are not a limitation to building sufficient energy reserves required for their return migration to breeding grounds. The species has very broad habitat requirements and is almost exclusively aerial. Based on the nature of the habitat supported by the MDA and wider Study Area, it is considered highly unlikely habitat is relied upon by the species or would constitute an ecologically significant location. Construction of the Project is therefore unlikely to disrupt the species' foraging behaviour or limit foraging opportunities, noting the areas of already cleared vegetation (and, as such, clearing works are unlikely to substantially affect the availability of insect prey above the Disturbance Footprint). Given the limited extent to which the Project is likely to disrupt potential habitat for the species, and the availability of similarly suitable habitat within the broader landscape, any resulting impact of the white-throated needletail is likely to be negligible. As such, the Project is considered unlikely to cause disruption to ecologically significant locations for the white-throated needletail.</p>

## 1.3.6 Threatened Shorebirds

### 1.3.6.1 Status

The following shorebird species are listed as Vulnerable under the NC Act:

- Ruddy turnstone (*Arenaria interpres*)
- Red knot (*Calidris canutus*)
- Sharp-tailed sandpiper (*Calidris acuminata*)



- Great knot (*Calidris tenuirostris*)
- Greater sand plover (*Charadrius leschenaultia*)
- Latham's snipe (*Gallinago hardwickii*)
- Grey plover (*Pluvialis squatarola*)
- Terek sandpiper (*Xenus cinereus*).

The following species are listed as Endangered or Critically Endangered under the NC Act:

- Curlew sandpiper (*Calidris ferruginea*)
- Lesser sand plover (*Charadrius mongolus*)
- Nunivak bar-tailed godwit (*Limosa lapponica baueri*)
- Black-tailed godwit (*Limosa limosa*)
- Eastern curlew (*Numenius madagascariensis*)
- Common greenshank (*Tringa nebularia*).

#### 1.3.6.2 Distribution and Habitat Requirements

Shorebirds undergo amongst the most spectacular feats of migration seen in the animal kingdom, with some species travelling in excess of 20,000 km a year during a life span that may exceed 20 years. Migration enables them to breed in highly productive wetlands at high (Arctic) latitudes of the northern hemisphere during the brief northern summer and then disperse widely to the south (including to Australia) for the rest of the year. Migratory shorebird species are mostly present in Australia from as early as August to as late as April/May each year (excluding the double-banded plover, which is generally present from March to September) (Department of the Environment and Energy, 2017b).

Migratory shorebird species use a variety of different wetland habitats for foraging, typically in or near water, wading up to a depth of around 15 cm for long-legged species. Shorebirds occur in marine habitats including ocean beaches, rocky coastlines and intertidal mudflats. They also occur in coastal wetland habitats and river estuaries, including saltmarsh and mangroves, and in freshwater wetland habitats such as marshes, the margins of lagoons and along creeks (Department of the Environment, 2015d).

#### 1.3.6.3 Threats

Residential, agricultural and natural resource development across Australia can be a significant threat to migratory shorebirds, primarily from the loss and degradation of foraging and roosting habitat and through interference during important lifecycle stages of migratory shorebirds (Department of the Environment and Energy, 2017b).

Shorebirds are susceptible to disturbance during daytime roosting and foraging periods. As an example, disturbance of shorebirds in Australia is known to result from aircraft over-flights, industrial operations and construction, artificial lighting, and recreational activities such as fishing, off-road driving on beaches, unleashed dogs and jet-skiing. Human presence has a negative effect on bird abundance at foraging and roosting sites (Department of the Environment, 2015d).

#### 1.3.6.4 Occurrence and Potential Habitat

While no field surveys have occurred within the Study Area during summer (December to February), all surveys have been undertaken during the shorebird's occupancy within Australia (3 x in March 2023, 4 x in April 2023, 2 x in May 2023 and 1 in August 2024). No threatened shorebird species have been recorded within or adjacent to the Study Area during the surveys.

Suitable foraging habitat for shorebird species includes the intertidal mudflats and associated mangroves within Section E, as well as the freshwater wetlands and larger creeks throughout the remainder of the MDA and wider Study Area. Suitable habitat within the MDA is limited, however connectivity to similar estuarine habitat is maintained both upstream and downstream along the Calliope River. The freshwater wetlands throughout the MDA and wider Study Area are largely disconnected to surrounding vegetation, and contain steep modified banks, weeds, extensive cattle pugging at the water's edge and little to no aquatic or canopy vegetation. It is unlikely that the shorebird species will depend on the habitat within the MDA, due to the small patch size and the existing human disturbances such as clearing for the existing transmission line, the presence of feral predators, litter, and noise and activity from the existing roads and substations.

The above listed shorebird species do not breed in Australia, and they are typically found in large numbers along the coastline in what is known as 'important sites'. No known important sites for any listed shorebird species occur within or adjacent to the MDA or wider Study Area. A detailed shorebird surveys undertaken by Wildlife Unlimited throughout the summer of 2019 included multiple surveys at the mouth of the Calliope River, immediately adjacent to the Study Area. While low numbers of shorebird species were recorded at the sites adjacent to the Study Area, the surveys found no important shorebird roosts or sites of national significance along the Calliope River or at the mouth of the Calliope River (Wildlife Unlimited, 2020). All publicly available records of shorebirds in the MDA and wider Study Area (eBird and ALA) are of single individuals only. It is therefore considered that the habitat within the MDA or wider Study Area does not reflect important habitat as it does not support an ecologically significant proportion of the population and is therefore not considered to be critical to the survival of any shorebird species.

The extent of modelled habitat within the Disturbance Footprint is provided in **Table 1.16**.

**Table 1.16 Habitat Extent for Threatened Shorebirds**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Roosting and foraging	0.02
<b>Total</b>	<b>0.02</b>

#### 1.3.6.5 Potential Project Impacts and Key Mitigation Measures

Potential impacts of the Project on shorebird species include habitat loss, and disturbance to foraging behaviours due to increased noise and activity during construction, and degradation of habitat in and adjacent to the MDA and wider Study Area.

Potential indirect impacts on threatened shorebird species as a result of the Project include:

- Soil exposure resulting in an increased risk of erosion and sedimentation of water bodies, reducing water quality and degrading aquatic habitats.

- Increased risk of contamination associated with activities such as refuelling or storage of chemicals.
- Temporary changes in hydrology from installation of infrastructure creating a barrier to surface flow and increasing stormwater run-off.
- Removal of water from existing constructed wetlands and farm dams leading to changes in hydrology / habitat extent and water quality. Increased activity at these locations resulting in avoidance and potentially altered foraging and roosting behaviour.
- Periodic burst of elevated noise levels may startle and disorientate individuals within proximity.
- Increased pest levels, notably those which may prey upon this species.

In addition to the general mitigation and management measures outlined in **Section 8.3.1**, the following species-specific mitigation measures will be implemented:

- In areas of mapped shorebird species habitat planned for clearing, spotter-catchers will complete flushing surveys to encourage the dispersal of any individuals present out of the clearing path.
- Water extraction will be conducted at an alternative location within the Study Area should any migratory wetland birds be identified utilising the habitat.
- Water extraction activities will be strictly controlled and monitored in liaison with the landholder to ensure no waterbodies are completely drained.
- For each waterbody, a single access point will be utilised for water extraction to minimise areas of disturbance and allow potentially occurring individuals to avoid the same area during construction.
- Appropriate sediment and erosion control measures will be implemented to avoid potential contamination of surface water or adjacent habitats.
- Appropriate spill prevention and response plans will be developed to cover Project activities, and the types and quantities of fuel, oil and chemicals held.
- Temporary site offices, stockpiling/laydown areas, plant and equipment storage areas will be located away from waterbodies and will be sited within already cleared or disturbed areas.
- A Water Quality Monitoring Program will be implemented at the Calliope River, to compare pre and post construction water quality and determine extent of Project related impacts.
- Acid sulfate soils will be managed in accordance with Powerlink's Acid Sulfate Soils Management Plan.
- Powerlink has committed to no night works during the construction phase.
- No off-track driving within the mangrove or saltmarsh habitat will be permitted.

#### 1.3.6.6 Significant Residual Impact Assessment for Threatened Shorebirds

Given the large number of shorebird species to be assessed, one assessment was undertaken for all species due to their similar habitat requirements and the limited impacts expected as a result of the Project.

The significant impact assessment is presented in **Table 1.17** below and the assessment found that the Project is unlikely to result in a significant impact on any threatened shorebird species.



**Table 1.17 Significant Residual Impact Assessment – Threatened Shorebird Species**

Evaluation Criteria	Response
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of local population	<p><b>Unlikely.</b></p> <p>Direct impacts to potential habitat are limited to clearing of 0.02 ha of roosting and foraging habitat within coastal erosion prone areas of the MDA. This loss of habitat is considered unlikely to significantly reduce the species’ ability to persist in the local area given habitat within the adjacent areas and offshore island is likely to be preferred as it is less disturbed. While suitable foraging habitat is found within and immediately adjacent, the site is not known to support significant numbers of any shorebird species and therefore they are expected to occur as infrequent individuals only.</p> <p>Implementation of the Project’s EMP will assist to minimise potential indirect impacts of the Project, such as habitat degradation, weeds and temporary altered hydrology. The Project is therefore unlikely to lead to a long-term decrease in the size of a local population.</p>
Reduce the extent of occurrence of the species	<p><b>Unlikely.</b></p> <p>All shorebird species are migratory that occur in coastal areas (and sometimes inland areas) throughout Australia. A total of 0.02 ha of direct habitat clearing will occur as a result of the Project. Therefore, the Project is unlikely to reduce the extent of occurrence of the species.</p>
Fragment an existing population	<p><b>Unlikely.</b></p> <p>All shorebird species are highly mobile species which undergoes large seasonal movements. Potential habitat within the MDA and wider Study Area is highly fragmented as a result of historical clearing and the existing transmission line and substation. It is considered marginal in quality due to the existing disturbances and human activity. Given the ability for these species to readily disperse across the landscape, vegetation clearance associated with the Project is unlikely to present barriers to local movement, to the extent that it fragments any population within the MDA and wider Study Area.</p>
Result in genetically distinct populations forming as a result of habitat isolation	<p><b>Unlikely.</b></p> <p>The Project will not be a barrier to movement nor is it likely to deter individuals from the area once constructed. The quantum of habitat that will remain is likely to be sufficient to support the ecological requirements of any expected population of any threatened migratory bird species. Furthermore, areas of suitable habitat are likely to occur extensively within the wider region. As such, vegetation clearance associated with the Project is unlikely to result in genetically distinct populations forming as a result of habitat isolation.</p>

Evaluation Criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	<p><b>Unlikely.</b></p> <p>Invasion of intertidal mudflats by weeds such as cord grass (<i>Spartina</i> species) and predation have been identified as threats to these species (Department of the Environment and Energy, 2017a). Historical clearing has occurred in discrete locations across the MDA and wider Study Area primarily for cattle grazing purposes, and ongoing maintenance currently occurs within the existing transmission line. It is considered likely that these areas already act as conduits for pest movement in the landscape. The Project will employ best practice control methods for weeds and pests including monitoring and adaptive management. Based on this, it is unlikely the Project will result in invasive species that are harmful to shorebird species becoming established.</p>
Introduce disease that may cause the population to decline	<p><b>Unlikely.</b></p> <p>There are no known diseases affecting shorebird species. The Project will employ best practice biosecurity protocols during construction and operation; therefore, introduction of a disease that may cause a shorebird species to decline is unlikely.</p>
Interfere with the recovery of the species	<p><b>Unlikely.</b></p> <p>There are currently no recovery plans for any threatened shorebird species. However the <i>Wildlife Conservation Plan for Migratory Shorebirds</i> (Department of the Environment, 2015d) outlines national activities to support the Flyway shorebird conservation initiatives and provides a strategic framework to ensure these activities and future research and management actions are integrated and remain focused on the long-term survival of migratory shorebird populations and their habitats.</p> <p>Additionally, the East Asian-Australasian Flyway Site Network, which is part of the broader Flyway Partnership, promotes the identification and protection of key sites for migratory shorebirds. Australia has 17 sites in the network (Partnership for the East Asian-Australasian Flyway, 2008). The Queensland sites include:</p> <ul style="list-style-type: none"> <li>• Moreton Bay, Queensland</li> <li>• Bowling Green Bay, Queensland</li> <li>• Shoalwater Bay, Queensland</li> <li>• Great Sandy Strait, Queensland</li> <li>• Currawinya National Park, Queensland.</li> </ul> <p>None of these sites are located within or adjacent to the Study Area. Therefore, the Project is unlikely to interfere with the recovery of any shorebird species.</p>
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	<p><b>Unlikely.</b></p> <p>The Project will maximise the use of historically cleared areas including non-remnant vegetation and disturbed areas. As a result, direct impacts to suitable habitat within coastal erosion prone areas of the MDA totals 0.02 ha. The listed threatened migratory shorebirds are non-breeding in Australia and as such, there will be no disruption to the breeding cycle.</p>

Evaluation Criteria	Response
	Given the limited extent to which the Project is likely to disrupt potential roosting and foraging habitat for the species, and the availability of similarly suitable habitat within the broader landscape, any resulting impact to threatened migratory shorebirds is likely to be negligible. Indirect impacts such as noise and lighting, and weeds and pests will be managed via Project management plans. As such, the Project is considered unlikely to cause disruption to ecologically significant locations to threatened migratory shorebirds.

### 1.3.7 Short-beaked Echidna (*Tachyglossus aculeatus*)

#### 1.3.7.1 Status

The short-beaked echidna is listed Special Least Concern (non-migratory) under the NC Act.

#### 1.3.7.2 Distribution and Habitat Requirements

The short-beaked echidna is found in almost all terrestrial habitats in Australia. This species lives alone, and, apart from the burrow created for rearing young, have no fixed shelter or nest site. This species does not have a home territory, but range over a wide area. This species can live anywhere with a good supply of food, and regularly forages on ants and termites, and are most common in forested areas with abundant, termite-filled, fallen logs. It shelters in fallen logs, rock crevices, dense leaf litter and abandoned burrows and relies on a substrate of leaf litter and coarse woody debris for foraging.

#### 1.3.7.3 Threats

The main threats to echidnas are feral dogs and foxes. They are also vulnerable to habitat loss from land clearing and development. The echidna is also a frequent casualty on roads.

#### 1.3.7.4 Occurrence and Potential Habitat

This species was recorded within the Study Area on three occasions during ecological field surveys. All observations are outside the MDA associated with Section A and B of the Study Area. All remnant, regrowth and non-remnant vegetation within the Study Area is considered potential habitat for this species. The species was recorded in ironbark (*Eucalyptus crebra*) dominated woodland on steep grassy slopes. The extent of short-beaked echidna habitat within the MDA is provided in **Table 1.18** below.

**Table 1.18 Habitat extent – Short-beaked Echidna**

Habitat Utilisation	Extent in MDA associated with coastal erosion prone areas (ha)
Breeding, foraging and dispersal	0.2
<b>Total</b>	<b>0.2</b>



### 1.3.7.5 Potential Project Impacts and Key Mitigation Measures

Under the worst-case scenario, a total of 0.2 ha of foraging and dispersal habitat within the MDA will be cleared for construction of the Project. Potential indirect impacts on the short-beaked echidna as a result of the Project include:

- Degradation of habitat through the loss of microhabitat features including fallen timber.
- Increased predation by exotic fauna species.
- Noise and light disturbance.
- Injuries or death from vehicle strikes.

To minimise impacts to this species, the general mitigation measures listed in **Section 8.3.1** will be followed.

### 1.3.7.6 Significant Residual Impact Assessment for Short-beaked Echidna

The significant impact assessment is presented in **Table 1.19** below. The assessment found that the Project is unlikely to result in a significant impact on the white-throated needletail.

**Table 1.19 Significant Residual Impact Assessment – Special List Concern Short-beaked Echidna**

Evaluation Criteria	Response
<b>An action is UNLIKELY to have an SRI on a plant that is ‘endangered’ or ‘vulnerable’ wildlife if the action will result in:</b>	
Lead to a long-term decrease in the size of a local population	<p><b>Unlikely.</b></p> <p>The short-beaked echidna was recorded on three occasions within the wider Study Area during ecological field surveys. This species is a habitat generalist, found in suitable habitat across Australia and recorded regularly within the Surat Basin. Due to the broad habitat requirements of the species, suitable habitat totalling 0.2 ha is mapped across the MDA in coastal erosion prone areas, in vegetation associated with remnant, regrowth and non-remnant areas. Whilst the species is most commonly found in forested areas, short-beaked echidnas are known to persist in disturbed landscapes subjected to clearing and fragmentation. Whilst the Project is likely to result in the clearing of suitable habitat for the species, the Project is considered unlikely to lead to the long-term decrease in the size of a local population, given:</p> <ul style="list-style-type: none"> <li>• The presence and extent of similarly suitable habitat adjacent to and contiguous with the MDA.</li> <li>• Potential utilisation of cleared/disturbed areas for foraging following construction of the Project and during the operation phase (including ants and termites likely to recolonise disturbed areas following construction).</li> <li>• As species is ground-dwelling there is a risk of mortality during construction as a result of vehicle strike. To manage this risk, speed limits will be strictly enforced.</li> <li>• No permanent barriers to movement will result from the Project. Construction works associated with the Project will continue to</li> </ul>

Evaluation Criteria	Response
	<p>facilitate movement and connectivity for any individuals in the surrounding landscape.</p> <ul style="list-style-type: none"> <li>Where trenching is required, these areas will be monitored by a spotter catcher to ensure no echidna individuals are entrapped.</li> <li>Preclearance surveys will be undertaken in areas of habitat to be cleared. Although clearing will also impact microhabitat, larger items which are likely to provide the greatest shelter such as fallen timber will be relocated to adjacent areas of suitable habitat, if safe and practical.</li> </ul>
Reduce the extent of occurrence of the species	<p><b>Unlikely.</b></p> <p>The species is known to occur across all of mainland Australia. The short-beaked echidna was recorded on three occasions within the wider Study Area during ecological field surveys. Due to the broad habitat requirements of the species, there are large areas of potential habitat for the species in the MDA, Study Area and the region. The nature of the Project infrastructure (above ground linear infrastructure) and the ability for the species to disperse between habitat patches means the Project is unlikely to reduce the species' extent of occurrence.</p>
Fragment an existing population	<p><b>Unlikely.</b></p> <p>As fences will be not used to surround Project infrastructure, it is considered unlikely the Project will result in any significant permanent barriers to movement. Given the species ability to disperse readily through modified environments including developed and cleared areas, the potential habitat loss associated with the Project is unlikely to hinder movement of individuals of an existing population to the extent where it would become fragmented.</p>
Reduce gene flow among populations	<p><b>Unlikely.</b></p> <p>Given the ability for the species to disperse between vegetated patches, the potential habitat loss associated with the Project is unlikely to increase habitat fragmentation which leads to a disjunction in distribution and movement between local populations of the species. Furthermore, no permanent barriers to movement will result from the Project. As such, the Project is considered unlikely to result in a reduced gene flow among populations.</p>
Disrupt ecologically significant locations (breeding, feeding or nesting sites)	<p><b>Unlikely.</b></p> <p>The species is a wide-ranging, nomadic species that is known to occur over a wide range of habitats, within intact and modified/fragmented landscapes. The species does not require specialised habitat but is dependent on the presence of ants and termites for food. The MDA and wider Study Area does contain suitable foraging habitat for the short-beaked echidna (i.e. scattered ant and termite nests) and the species was recorded within Section A and B of the Study Area during ecological field surveys. However, there is no evidence to suggest that the MDA or wider Study Area comprises an ecologically significant location of the species. As the species has very broad habitat requirements, the loss of habitat as a result of the Project will not significantly reduce habitat opportunities in the local area or impede movement. It is considered doubtful that the</p>

Evaluation Criteria	Response
	<p>habitat to be impacted is important for the species, considering the context in which criteria for assessing an SRI are being applied given:</p> <ul style="list-style-type: none"> <li>• The extent and availability of similarly suitable habitat for short-beaked echidna (including ants and termite nests) within the wider surrounding landscape.</li> <li>• The implementation of mitigation and management measures, including the presence of a fauna-spotter catcher who will conduct preclearance surveys and will be present during vegetation clearing, and the relocation of shelter habitat. Larger items which are likely to provide the greatest shelter such as fallen timber will be relocated to adjacent areas of suitable habitat, if safe and practical.</li> <li>• No permanent barriers to movement will result from the Project. Construction works associated with the Project will continue to facilitate movement and connectivity for any individuals in the surrounding landscape. Furthermore, the species will continue to utilise cleared areas during the operation phase (including ants and termites likely to recolonise disturbed areas following construction).</li> <li>• In the unlikely event that an active short-beaked echidna nursery burrow is located during construction, this will be managed under an approved High-risk Species Management Program issued under the Queensland Government (DESI).</li> </ul> <p>The Project is therefore considered unlikely to disrupt ecologically significant locations to the short-beaked echidna.</p>

## 1.4 Waterways Providing for Fish Passage

An environmental offset may be required for any part of a waterway that provides for passage of fish (other than that part of a waterway within an urban area) if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.

Barriers to fish passage can restrict and/or isolate fish communities, preventing access to, and benefits of fish habitats otherwise available to them. Poorly designed structures can injure or kill fish moving over or around them, or fish may become stranded and subjected to inappropriate water quality, lack of food, increased predation, crowding or other conditions that impact on their health, wellbeing and productivity.

The MPA contains several minor and major watercourse features recognised under the VM Act, with stream orders ranging from one to seven. The Calliope River is the highest order watercourse (stream order 7) within the MPA; however, only traverses a small section at the eastern end of the alignment near Gladstone. The Calliope River also crosses the proposed alignment within Section B; however, this is outside of the MPA. The only other larger watercourses within the MPA are Larcom Creek (stream order 6), Branch and Gravel Creeks (stream order 3). Many watercourses run in a north-south direction and due to the largely east-west linear shape of the MPA, this means only small discrete sections of a watercourse are intersected.



Under the Fisheries Act, any operational works within a mapped waterway for waterway barrier works may require assessment under the Planning Act if the proposed development temporarily or permanently restricts fish access and movement along the waterway. Where required, any proposed waterway barrier works as part of the Project will be designed in accordance with the *Accepted development requirements (ADR) for operations works that is constructing or raising waterway barrier works* (Department of Agriculture and Fisheries, 2018). Consequently, an SRI assessment is not required.

Where waterway barrier works do not comply with the ADR a development permit for operational work that is waterway barrier works will be obtained as part of a separate development application. SRIs will be assessed as part of the separate development application, where required.

## 1.5 Marine Plants

Marine plants are part of the mosaic of fish habitats and are an integral and usually highly visible feature of the coastline. Queensland has a very high diversity of marine plant species, including mangroves, seagrass, salt couch, algae, samphire (succulent) vegetation and adjacent plants. Effective management and protection of all marine plants and adjacent coastal areas is important in ensuring sustainable fish habitats and fisheries production.

A marine plant under the Fisheries Act, is defined as:

- a plant (a tidal plant) that usually grows on, or adjacent to, tidal land, whether it is living or dead, standing or fallen;
- material of a tidal plant, or other plant material on tidal land;
- a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

This definition excludes prohibited matter or restricted matter under the Biosecurity Act 2014.

Tidal land, as defined in the Schedule Dictionary of the Fisheries Act includes ‘reefs, shoals and other land permanently or periodically submerged by waters subject to tidal influence.’ For the purpose of this assessment the QSpatial HAT has been utilised to define the area of tidal influence.

Following the definitions outlined above, 251.86 m<sup>2</sup> of marine plants are found within the Disturbance Footprint associated with the MPA.

A SRI assessment has been completed for marine plants against Section 3.9 of the Significant Residual Impact Guideline (Department of State Development, 2014) (**Table 1.20**). The outcome of this SRI assessment is that the Project is likely to result in a SRI to marine plants.

**Table 1.20 SRI Assessment for Marine Plants**

Impact Criteria	Assessment
<b>An action is <b>LIKELY</b> to have a SRI on marine plants if the action will result in:</b>	
More than 50 m <sup>2</sup> of marine plants above tidal limits will be permanently removed as a result of the project; AND	<b>Yes.</b> Approximately 251.86 m <sup>2</sup> of marine plants as defined under the Fisheries Act will be impacted by the Project in the MDA. Therefore, the action is likely to have a SRI on the marine plants within the MDA.

Impact Criteria	Assessment
Onsite rehabilitation or restoration will not result in an equal or larger area of marine plants, providing equal or better fisheries values, within 5 years of clearing.	<p><b>Yes.</b></p> <p>Transmission towers adjacent to the proposed MDA have been infilled and raised to be above the tidal range in the Calliope River. It is anticipated that this process will occur in the MDA for new transmission towers associated with the Project. Similarly, raised access tracks for ongoing maintenance of new transmission towers for the Project will be required. Infill is unlikely to be compatible with saltmarsh or mangrove species which prefer layers of shallow or deep muddy or sandy substrates to grow and persist. Therefore, after the completion of the Project and any rehabilitation or restoration of temporary work areas has been established, it is unlikely that restoration works will result in equal or larger areas of marine plants, even after 5 years.</p>



**P** 1300 793 267    **E** [info@umwelt.com.au](mailto:info@umwelt.com.au)    **W** [umwelt.com.au](http://umwelt.com.au)  
NSW | ACT | WA | QLD | VIC | SA    **ABN** 18 059 519 041