June 2024

Calvale to Calliope River Transmission Line Reinforcement Project

Acknowledgement of Country

Powerlink acknowledges the Traditional Owners and their custodianship of the lands and waters of Queensland and in particular the lands on which we operate. We pay our respect to their Ancestors, Elders and knowledge holders and recognise their deep history and ongoing connection to Country.

Executive Summary

This Draft Corridor Selection Report (Draft CSR) has been prepared by Queensland Electricity Transmission Corporation Limited, trading as Powerlink Queensland (Powerlink), to assess the suitability of existing transmission easements and identify if any new infrastructure corridors or easements are required to support the construction of a new transmission line between the Calvale and Calliope River substations in Central Queensland to reinforce the Powerlink electricity network in the Gladstone area.

Powerlink has engaged Umwelt (Australia) Pty Ltd (Umwelt) to undertake technical, spatial and mapping analysis to support the preparation of this Draft CSR.

Project background

The Queensland Government has committed to unlocking renewable investment and achieving a Renewable Energy Target (RET) of 80% by 2035. In September 2022, the Queensland Government released the Queensland Energy and Jobs Plan (QEJP), identifying our global responsibilities to reduce greenhouse gas emissions. The QEJP also outlined the need for the transmission network to evolve to meet the changing electricity system.

In preparation for transitioning the electricity network to renewable energy supply, Powerlink has identified future requirements 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 and Calliope River substations needs to be strengthened with the establishment of a new transmission line.

Approach to corridor selection

In late 2022, Powerlink commenced investigations into potential corridor options to reinforce the existing Powerlink network between the existing Calvale and Calliope River substations (the project). Through investigations, a potential corridor became clear, maximising the use of existing vacant easement widths. An opportunities and constraints assessment was undertaken to confirm that with minimal additional easement widening, a complete corridor could be achieved from the Calvale Substation to the Calliope River Substation, while minimising impact to the broader community across social, environmental and economic objectives.

This proposed corridor has been split into five sections (Sections A, B, C, D and E) for reporting purposes as detailed in **Table 1**. From Calvale, the new transmission line is intended to be co-located within vacant areas of existing Powerlink easements in Sections A, B, D, and E. There are no available vacant easements in Section C and a widening of 40 metres (m) to the existing easement is required to accommodate the proposed transmission infrastructure.

Section C is located approximately 14 kilometres (km) west of the Calliope River substation in the Gladstone Regional Council (GRC) local government area (LGA) and is approximately 16km in length.

As a key component of the Transmission Easement Engagement Process, Powerlink commenced discussions with landholders and key stakeholders on the proposed project in February 2023. This engagement included local councils, Traditional Owner groups and peak bodies, to gain better insights into important community matters and what is happening in the area. These investigations also involved a strategic desktop assessment of legislative frameworks, spatial analysis of land characteristics, environment, heritage and social constraints.

This Draft CSR comparatively assesses the suitability of existing easements and corridor options to determine the recommended corridor within which to locate the proposed 275kV double circuit transmission line.

This Draft CSR builds on the outcomes of the earlier corridor analysis, by reviewing the options based on feedback received from stakeholder and landholder engagement, physical land, environment and heritage

values, social impacts, legislative requirements, and technical input from Powerlink in relation to network stability and constructability of transmission lines.

Three objectives were used to inform the approach to corridor selection:

Social

To consider the use of land and the community livelihood within and adjacent to corridor options.

Environment

To consider a balanced approach to corridor selection with the least practicable impact on environment and heritage values.

Economic

To consider construction and operational factors such as cost at a preliminary level, given the scale of the project.

The methodology for the corridor selection was developed to incorporate:

- feedback from engagement with landholders, Traditional Owner groups, and other stakeholders
- publicly available information including spatial data relating to environment, planning and heritage constraints
- technical information provided by Powerlink relevant to the planning and delivery of transmission line infrastructure.

Corridor selection has been undertaken through identification and consideration of the opportunities and constraints of the existing vacant easements in Sections A, B, D and E and a comparative analysis on potential corridor options for Section C.

Easement Suitability Recommendation of Sections A, B, D and E

Based on the opportunities and constraints for Sections A, B, D and E, it was determined that the proposed new transmission line will be able to be delivered within the existing vacant transmission easements, subject to further detailed studies, stakeholder engagement and approvals.

Co-locating the project with existing Powerlink easements and transmission infrastructure is deemed to have less impacts compared to creating a new easement that is not co-located with existing transmission infrastructure. It has the benefits of not increasing the existing easement's footprint and also minimises the extent of vegetation clearing required, reducing further impacts to landholders farming operations and visual amenity.

Recommended Corridor for Section C

Based on desktop research and preliminary field studies of the Study Area, corridor selection criteria and feedback from early engagement with landholders and stakeholders, it was determined that co-location with the existing transmission corridor in Section C was the most appropriate option for the new transmission line. The assessment identified two corridor options:

1. Northern Corridor Option: Widening of 40m to the north of the existing easement
2. Southern Corridor Option: Widening of 40m to the south of the existing easement.

The corridor options are considered to have broadly similar social, environmental and economic impacts overall however further consideration has been made in regard to technical constructability issues.

The northern option reduces the level of interaction with transmission line crossings and complex outages on existing Powerlink transmission infrastructure. It also provides an opportunity to co-locate the proposed 275kV transmission line with a section of the existing Calliope to Bouldercombe 275kV line.

The southern option has a higher potential for network disruptions during construction and maintenance i.e. there would be temporary network outage restrictions required to construct a transmission line on the south of the existing Calliope River to Bouldercombe and Calvale to Wurdong transmission lines which could significantly impact network security and reliability for the Gladstone region.

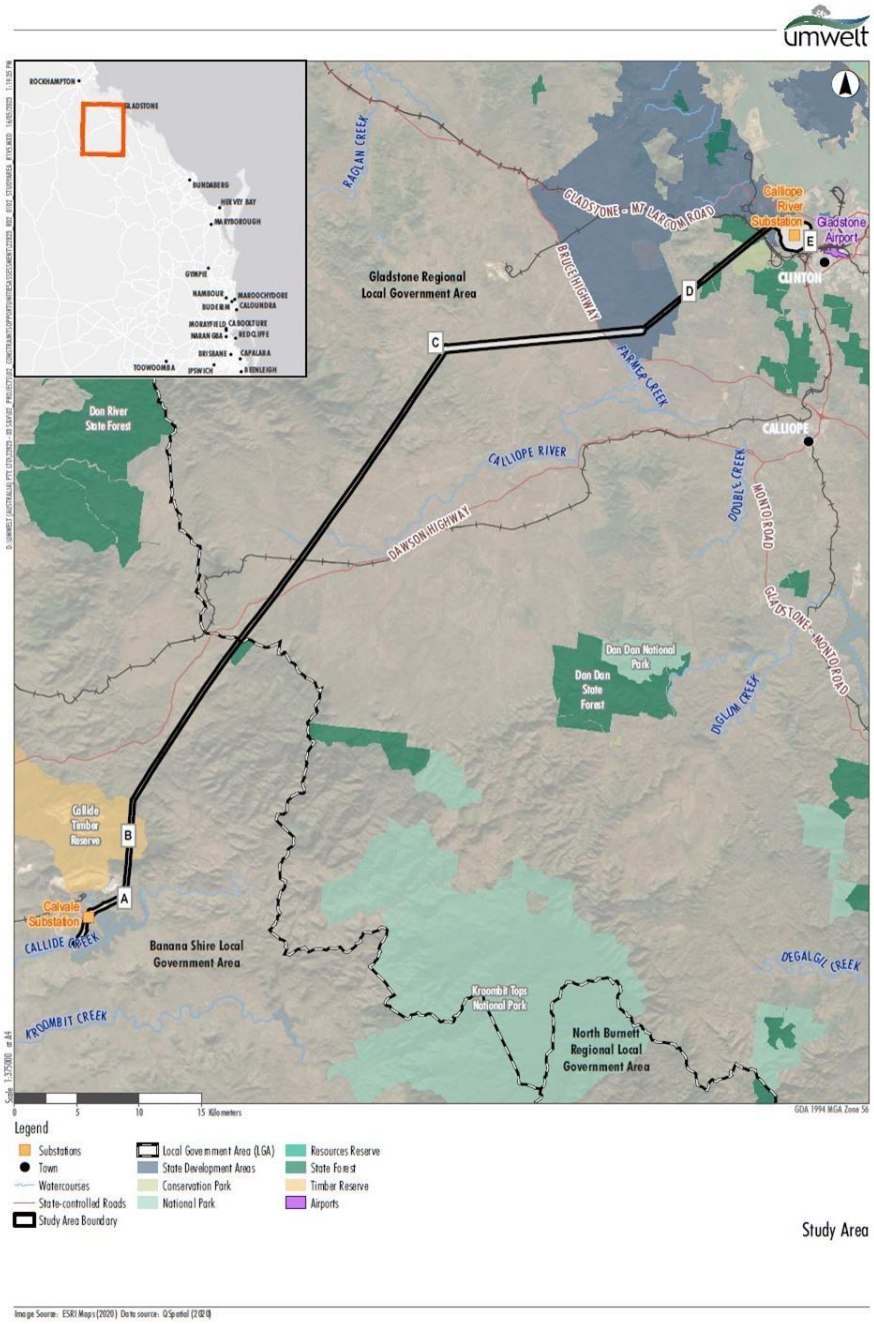
Based on the desktop assessment, preliminary stakeholder consultation and technical considerations, it has been determined the most feasible and low-impact solution is to construct a new 275kV double circuit transmission line to the north of the existing transmission infrastructure.

Table 1 Calvale to Calliope River proposed easement alignment

Section	Approximate length	Existing easement width including spare capacity	Proposed easement widening
A	3.5km	150+m	Nil
B	51.5km	110m	Nil
C	16.0km	100m	40m
D	13.5km	100m	Nil
E	2.0km	140m	Nil

Figure 1 details the Study Area for each section of the project on the following page.

Figure 1: Calvale to Calliope River Study Area showing all project sections



1.0 Introduction

1.1 Project background

The Queensland Government has committed to unlocking renewable investment and achieving a Renewable Energy Target (RET) of 80% by 2035. In preparation for transitioning the electricity network to renewable energy supply, Powerlink has identified future requirements for the Gladstone transmission network. To ensure the future security of electricity supply to the Gladstone area, the existing transmission infrastructure corridor between the Calvale and Calliope River substations is to be strengthened with the establishment of a new transmission line.

This Draft CSR has been prepared on the basis of 275 kilovolt (kV) double circuit transmission connection to our network.

The Queensland Energy and Jobs Plan (QEJP) applies a whole-of-system planning approach, setting out the pathways and targets that will facilitate a low carbon economy in the future and ensure an orderly, least-cost transformation of Queensland's power system.

Powerlink will play a critical role in supporting the energy transformation over the coming decade.

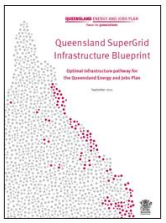
Figure 2: Queensland Energy and Jobs Plan and Blueprint

Three focus areas:

Clean Energy Economy

Empowered households and businesses

Secure jobs and communities



Queensland SuperGrid Infrastructure Blueprint outlines the infrastructure to enable the decarbonisation of the existing electricity system

Includes Renewable Energy Zones, pumped hydro energy storage and high capacity transmission

Key targets and objectives

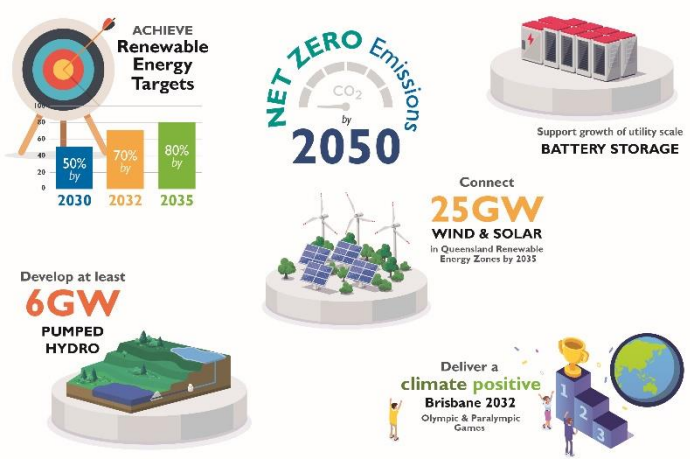
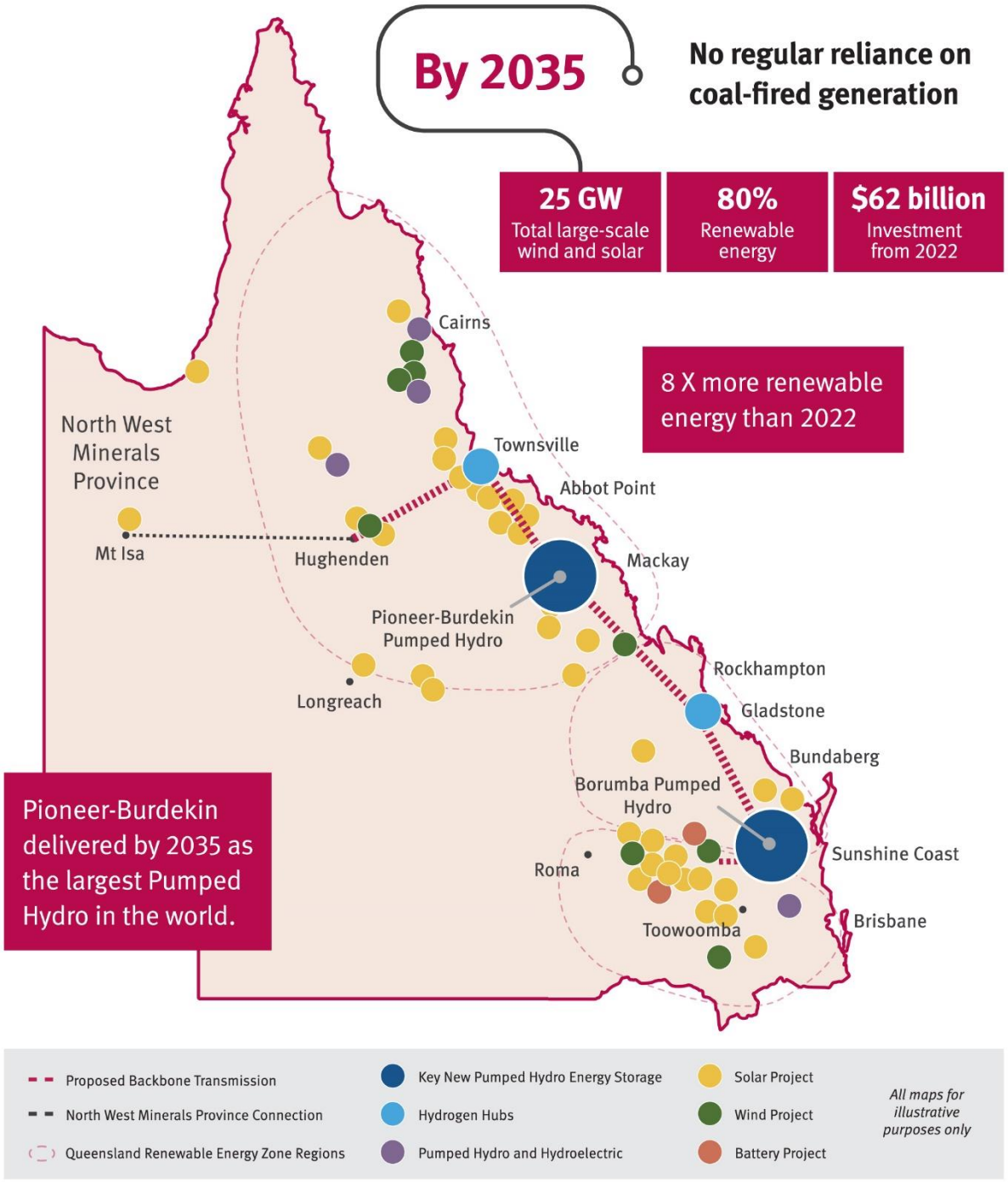


Figure 3: Queensland SuperGrid



The Queensland Government has outlined the optimal infrastructure pathway in the *Queensland SuperGrid Infrastructure Blueprint.*

Projections informed by independent modelling and internal analysis

1.2 Purpose of this report

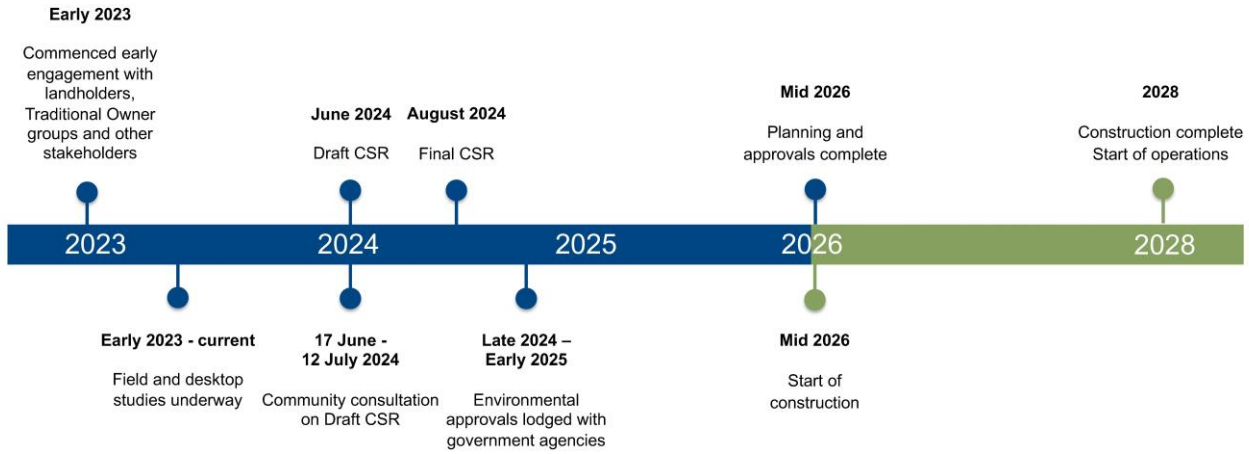
Powerlink has prepared this Draft CSR, following initial desktop assessment and technical analysis to recommend a transmission corridor from the Calvale Substation to the Calliope River Substation. It includes an opportunities and constraints assessment of the existing transmission infrastructure corridor whilst identifying a recommended corridor for any new easements.

The purpose of this report is to outline the process and analysis to:

- determine the corridor selection approach
- identify the social, environmental and economic considerations within the Study Area
- assess corridor options for Section C within 1km either side of the existing easement boundary (north and south) to accommodate a new double-circuit 275kV transmission line
- assess the suitability of the existing vacant easements in Sections A, B, D and E to accommodate a new double-circuit 275kV transmission line
- identify and consider opportunities and constraints for co-location with existing transmission infrastructure for all sections.

A final corridor will be published in the Final CSR in August 2024. Subsequent phases of the project will include further engagement, detailed environmental and social impact assessment including targeted investigations, impact assessments and the development of planning, design and construction considerations. **Figure 4** provides the timeframes for project engagement.

Figure 4: Project engagement timeline



1.3 Approach

The methodology for the corridor selection was developed to incorporate direct feedback from landholders and other stakeholders, publicly available spatial data and information relevant to the planning and delivery of the transmission line. It has been undertaken to select a recommended corridor for the project.

Three objectives were used to inform the approach to corridor selection and refinement:

Social
To consider the use of land and the community livelihood within and adjacent to corridor options.

Environment
To consider a balanced approach to corridor selection with the least practicable impact on environment and heritage values.

Economic
To consider construction and operational factors such as cost at a preliminary level, given the scale of the project.

The corridor selection approach seeks to balance the impacts of the recommended corridor across the three objectives identified, ultimately resulting in a recommended corridor with least overall impact across social, environment and economic objectives.

The assessment approach is outlined below.

Objectives

Corridor selection approach

Phase 1

- Set objectives to inform the corridor selection and refinement process
- Consideration of current and broader transmission network needs of the area
- Consideration of all stakeholder input and feedback to define criteria and measures
- Identify existing infrastructure and spare easement width.

Phase 2

- Assessment and analysis of each option considering the key criteria, measures and likely impacts
- Refinement process applies the corridor selection objectives to constraints and opportunities
- Seeks to balance the impacts across the options to get the lowest overall impact
- Identify corridor options and recommendation of the corridor to take forward for further investigation and community engagement.

2.0 Transmission Line Construction Overview

This project will predominantly use existing easements with spare capacity to host further infrastructure which provides the opportunity to minimise the need for additional land, and limits encroachment and disruption from further development. Some impacts from transmission infrastructure can be consolidated and offset when co-located with existing transmission lines.

Easements provide legal access over land to construct, operate and maintain energy infrastructure and to regulate certain activities on the easement area, allowing Powerlink to provide a safe and secure power supply. Landholders continue to own and be responsible for the land on which the easement is located, including land management and other general land maintenance activities. In some instances, rules around activities that can and cannot be undertaken on our easements are outlined in the registered easement terms and conditions on property titles, along with the rights of both the landholder and Powerlink. In addition to registered conditions, there are also other rules based on:

- safety for the public, our employees and contractors
- the risk of damage to property
- the safe operation of the overhead transmission line, underground cable or other assets
- access to the line or associated infrastructure for any future works, including maintenance, upgrading or renewal activities.

We are committed to working closely with directly affected landholders to understand how they use and manage their property so we can suitably locate transmission towers within the easement and provide sufficient tower height to avoid or minimise impacts on farming or other property operations.

Due to the design and operating requirements of high voltage electricity transmission infrastructure, easements require clearing of vegetation to safely construct and maintain towers and lines. Where possible, Powerlink does not clear the entire easement but rather minimises vegetation clearing for the safe and reliable operation of transmission line. When designing the transmission line, mitigation measures such as selective tower placement and spanning to decrease the amount of required vegetation clearing will be used, particularly in sensitive environments.

Tower pads will be approximately 40m x 40m and spans between towers will be around 450m. Tower heights will be dependent on terrain, topography and land use within the final easement alignment, with shorter towers likely on higher ground and taller towers within lower points of the corridor. It is likely the new 275kV towers will be around 64m in height.

Generally, the steps involved in building a transmission line include:

- preparing the site
- installing the foundations
- assembling the transmission towers and equipment
- stringing the transmission line
- testing and commissioning
- reinstating the site.

More detail on each step is outlined in the next section.

2.1 Preparing the site

Following comprehensive field visits for geotechnical sampling, identification and protection of sensitive areas and marking out a clearing footprint, the exact position of each transmission tower is marked on-ground. Vegetation clearing is then undertaken to make way for tower pads, lay-down areas and access tracks. Clearing is required to ensure the line can operate safely and reliably. Various clearing methods may be used based on existing land use, environmental considerations, maintenance requirements and landholder preferences. To minimise vegetation clearing, existing access tracks are used wherever possible. We will continue to use access tracks beyond construction activities to facilitate safe and streamlined access to towers during operation and maintenance.

2.2 Installing the foundations

Based on findings from geotechnical investigations completed prior to construction, the construction crew commences work to install suitable foundations at each tower site. A large boring machine is generally used to excavate foundations which can be around 8m to 12m deep. Steel is inserted to reinforce foundations and tower leg stubs are held in place, while concrete is poured into the excavation. Final steelwork is then completed, with the foundation column finishing slightly above ground level.

2.3 Assembling the structures and equipment

Fabricated and galvanised steel components for lattice towers are sorted and bundled ahead of being delivered to tower sites. Usually this delivery takes place with a semi-trailer, with tower assembly work completed adjacent to a tower's final location. Specialist crews methodically piece together the towers, with smaller assembled sections lifted with a crane and bolted into place until the tower is fully erected.

2.4 Stringing the transmission line

Machinery such as helicopters, semi-trailers, cranes and light 4WD vehicles are on-site to string the transmission line. Normally, stringing takes place in 5km to 10km sections at a time. Prior to stringing, large drums of conductor (transmission line wires) are delivered to locations along the line route. A draw wire is run between the assembled towers and used to pull the conductor along a section of line. Helicopters may be used to pull the draw wire. The conductor is fed through the line section and tensioned from the ground using winches. Equipment is then repositioned to the next stringing section to repeat the process until the conductor is strung across all towers.

2.5 Testing and commissioning

After a new transmission line is assembled, strung and ready to be energised, a series of thorough inspections and commissioning tests are carried out. This ensures the line is ready to be put into service safely and reliably as it enters the operation and maintenance phase of the project lifecycle.

2.6 Reinstating the site

Powerlink will engage with landholders to determine site and property specific rehabilitation works following completion of construction activities. Depending on the type and level of on-ground works completed, crews reinstate the tower site area and surrounding environment to ensure appropriate rehabilitation occurs. This helps to stabilise soil and encourage vegetation re-establishment to occur, preventing erosion. This stage also includes reinstating farm infrastructure that may have been impacted during construction works, and remediating paddocks and other grazing areas to enable recommencement of farming activities. Installation of identification signs on towers and anti-climb barriers are installed for safety purposes. Access tracks are finalised to allow ongoing access for future maintenance as required.

Powerlink continues to engage with landholders once a transmission line enters the operation and maintenance phase to undertake a range of activities periodically as required, including:

- routine inspections on easements and infrastructure
- vegetation management to maintain safety clearances
- minor works for infrastructure, replacement of parts and emergency repair of damage
- access track management
- installing or replacing tower signage
- installing or replacing anti-climbing barriers on towers.

3.0 Study Area

3.1 Study Area overview

The Study Area (as at March 2023) begins at the Calvale Substation site, and extends to the destination point of the new transmission line at the Calliope River Substation site, and includes a surrounding area of 100m either side of the existing easement/infrastructure boundaries – with the exception of Section C which was extended to 1km either side of the existing easement boundaries. The Calliope River Substation also includes a 500m buffer to allow for investigations for expanding 132kV and 275kV yards for future connections.

A Study Area of 1km either side of the existing transmission infrastructure for Section C was decided to allow for co-location of infrastructure, as well as the option for a separate new corridor, between Sections B and D of the project.

The Study Area has a geographical area large enough to understand constraints and opportunities between the existing substation locations. The south-western extent of the Study Area is located approximately 13km north-east of Biloela and the north-eastern extent of the Study Area is located approximately 6km west of Gladstone. The Study Area is located within the Banana Shire Council and Gladstone Regional Council local government areas (LGAs).

Early engagement with landholders and Traditional Owner groups commenced in early 2023 with phone calls and letters to these stakeholders in the Study Area. Face-to-face meetings were also undertaken from this time and engagement is ongoing.

Key matters raised by landholders included:

- construction impacts to farming operations including biosecurity and loss of productivity
- proximity to homes
- visual impact
- loss of property value.

Powerlink will work with each directly affected landholder to site transmission towers, as best as possible, in locations which minimise impacts including farming options. Towers will be positioned, where possible, close to other existing infrastructure to minimise visual and property use impacts.

Co-location advantages include streamlining and limiting the impacts to one area, and where possible using existing access tracks and points for maintenance.

The Study Area is shown in **Figure 1** of this document. More detailed diagrams of the Study Area are shown in **Appendix A**.

3.2 Social factors

3.2.1 Land tenure

Land tenure across the Study Area includes freehold, State Forest, reserve, National Park, lands lease, Profit À Prendre and industrial estates. Land parcels vary in size, from 1.3 hectares (ha) to 2,900ha within rural areas, and up to 9,630ha for land associated with Callide Timber Reserve.

Land tenure in each section of the Study Area is detailed in the below table and shown in **Appendix B**.

Table 2: Land tenure in each section of the Study Area

Section	Land Tenure
A	Freehold Lands lease Reserve (Lake Callide Park, intersecting Section A to the south-east)
B	Freehold Reserve (Callide Timber Reserve, intersecting Section B to the south) Lands lease State forest (Calliope State Forest, intersecting Section B in the centre)
C	Freehold Small areas of Lands lease
D	Freehold Lands lease Conservation Park (Calliope Conservation Park, intersecting Section D to the north) State Forest (Mount Stowe State Forest, intersecting Section D to the north)
E	Freehold Lands lease.

The Study Area is almost entirely encumbered by electricity easements, which predominantly relate to existing transmission infrastructure operated by Powerlink including the Calvale Substation site, Calvale to Tarong transmission line, Calvale to Stanwell transmission line, Gladstone to Larcom Creek transmission line, Calvale to Larcom Creek transmission line and Calliope River Substation. Other easements are present within the Study Area relate to transport and pipeline infrastructure.

3.2.2 Land use

The Study Area is situated across two LGAs. The eastern portion of the Study Area falls within the Gladstone Regional Council LGA (being Sections C, D and E, and the eastern portion of Section B). The western portion of the Study Area falls within the Banana Shire Council LGA (being Section A and the western portion of Section B).

The Study Area is mostly zoned as ‘Rural’ under the Gladstone Regional Council Planning Scheme 2017 (Gladstone Planning Scheme) and the Banana Shire Planning Scheme 2021 (Banana Planning Scheme). The land use intent for ‘Rural’ is similar under each planning scheme, recognising a range of rural land uses, including agriculture, and the need to protect the rural character/amenity of the region.

The Study Area is located entirely within the regional planning boundaries of the Central Queensland Regional Plan 2013 (CQRP).

Sections D and E are located within the Gladstone State Development Area (SDA) in precincts for port related industry, environmental management and high impact industry. Section B and C also intersects the Callide Infrastructure Corridor SDA.

Table 3: Land use in each section of the Study Area

Section	Land use
A	Land uses include grazing, intensive uses (recreation and culture), conservation and natural environments and reservoir/dam. Calvale Substation and associated transmission infrastructure.
B	Land uses include grazing, production forestry, plantation forestry and other minimal use (conservation). One existing Powerlink 275kV transmission line.
C	Section C comprises land used for grazing, native vegetation, with small areas of transport and communication. Two existing 275kV Powerlink transmission lines.
D	Land uses include grazing, production native forests, intensive uses, rural residential lifestyle blocks and other minimal use (conservation). One existing Powerlink 275kV transmission line.
E	Land uses include conservation and natural environments, mining, other minimal use (conservation) and tidal areas. Calliope River Substation and associated transmission infrastructure.

3.2.3 Transport

Transport infrastructure in each section of the Study Area is detailed the following table and displayed in **Appendix B**.

Table 4: Transport infrastructure

Section	State-controlled road	Local road	Railway line
A	Biloela-Callide Road (intersects)	Pelican Point Road Coal Road Ian McAuley Way Cocups Road	Not applicable
B	Dawson Highway (intersects)	Coal Road Blacks Road Thompsons Road Fig Tree Road	Moura System (intersects)
C	Bruce Highway (intersects)	Back Road Kaluda Road Mount Alma Road	Not applicable
D	Not applicable	Calliope River Road Boyles Road Malahoff Road Mt Miller Road Reid Road	North Coast Line (intersects)
E	Not applicable	Esplanade	Not applicable

Stock routes are also present throughout the Study Area, in Sections A and B. These stock routes are identified as minor and unused.

The Mt Alma Route Surveillance Radar (RSR) is located 11km west of the Study Area. The Gladstone Regional Council Planning Scheme includes mapping of aviation constraints and an overlay code for airport environs. Similar mapping is not available in the Banana Shire Council Planning Scheme, however a number of local aircraft facilities are present within the Banana Shire LGA.

The relevant constraints for each section relating to the operation of airport environs under the relevant planning scheme are described in the table below.

Table 5: Aviation related constraints with the Study Area

Section	LGA	Aviation related constraints
A	Banana Shire Council	Thangool-Biloela Aerodrome is located 14.5km south-west of Calvale Substation Local aircraft facility: Biloela Sports Ground 12km south-west of Section A.
B	Banana Shire Council and Gladstone Regional Council	Building Restricted Area: Aviation Facilities: Mt Alma Route Surveillance Radar (RSR) Local aircraft facility: landing ground 10km west of Section B.
C	Gladstone Regional Council	Obstacle Limitation Surface contours Outer Horizontal Surface Building Restricted Area: Approach and Departure limitation surface
D	Gladstone Regional Council	Obstacle Limitation Surface contours Outer Horizontal Surface Building Restricted Area: Approach and Departure limitation surface Airport buffers: 8km and 13km.
E	Gladstone Regional Council	Obstacle Limitation Surface contours Inner Horizontal Surface Building Restricted Area: Approach and Departure limitation surfaces Building Restricted Area: Aviation Facilities: zone A/B Airport Buffers: 3km, 8km and 13km.

A development must not cause a permanent or temporary physical or transient obstruction within the airport's operational airspace or impact on the safe operation of aviation operations, including the functioning of communication, navigation or surveillance facilities including radars.

3.2.4 Residential housing

Residences are widely dispersed surrounding the Study Area, most of which are in sparsely settled. One residence is located within the Section C Study Area.

Siting of new transmission infrastructure will seek to avoid residences and populated areas to minimise adverse impacts to the community and landholders, including minimising impact on visual amenity where possible.

3.2.5 Heritage

The *Aboriginal Cultural Heritage Act 2003* is administered by the Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts (DTATSIPCA). There are two Aboriginal cultural heritage parties identified within the Study Area, including the Gaangalu Nation People (GNP) and the Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People (BGGGTBP).

The cultural heritage features in each section of the Study Area are shown in **Appendix B**.

The *Queensland Heritage Act 1992* is administered by the Department of Environment, Science and Innovation and administers the Queensland Heritage Register. No Queensland or local historic heritage places are mapped within the Study Area. The presence of cultural heritage values will need to be investigated in future studies. Additionally, Section E is partly located within the World Heritage List/National Heritage List Great Barrier Reef, which extends seaward to the low water mark.

A number of approved Cultural Heritage Management Plans are also located throughout the Study Area.

3.2.6 Native Title

Native Title determination areas (native title exists in the whole determination area – (QCD2017/010) are present in part of Section B and Sections C, D and E.

The Project area is partly overlapped by the Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People native title determination (QUD6026/2001

3.2.7 Resource interests

Several resource interests exist throughout the Study Area, including permits for exploration, information, infrastructure, and production purposes. Resource interests in each section of the Study Area are detailed in the following table.

Table 6: Resource Interests within the Study Area

Section	Permit / Entity
A	Exploration Permit Coal (EPC) 1807 / Batchfire Callide Pty Ltd Exploration Permit Coal (EPC) 188 / Batchfire Callide Pty Ltd Mineral Development Licence (MDL) 3032 / Batchfire Callide Pty Ltd
B	Mineral Development Licence (MDL) 3032 / Batchfire Callide Pty Ltd Exploration Permit Coal (EPC) 188 / Batchfire Callide Pty Ltd Exploration Permit Mineral (EPM) 19506 / Signature Gold Pty Ltd Exploration Permit Mineral (EPM) 18350 / Signature Gold Pty Ltd Exploration Permit Mineral (EPM) 27492 / Rio Tinto Exploration Pty Limited Exploration Permit Mineral (EPM) 18504 / Canterbury Exploration Pty Limited Exploration Permit Mineral (EPM) 28042 / Ronsard Resources Pty Ltd Petroleum Pipeline Licence (PPL) 154 / APA WGP Pty Ltd Petroleum Pipeline Licence (PPL) 30 / Jemena Queensland Gas Pipeline Pty Ltd Petroleum Pipeline Licence (PPL) 166 / Santos Limited Petroleum Pipeline Licence (PPL) 163 / Australia Pacific LNG Gladstone Pipeline Pty Limited Mining Lease (ML) 6993 / Batchfire Callide Pty Ltd

C	Exploration Permit Mineral (EPM) 28042 / Ronsard Resources Pty Ltd Petroleum Pipeline Licence (PPL) 154 / APA WGP Pty Ltd Petroleum Pipeline Licence (PPL) 166 / Santos Limited Petroleum Pipeline Licence (PPL) 163 / Australia Pacific LNG Gladstone Pipeline Pty Limited Petroleum Pipeline Licence (PPL) 30 / Jemena Gas Pipelines Holdings Pty Ltd
D	Exploration Permit Geothermal (EPG) 2028 / Within Energy Pty Ltd
E	Nil

3.3 Environmental factors

3.3.1 Flora

The Study Area comprises of heavily vegetated areas (to the west and east) and cleared areas, as a result of the existing transmission network and agricultural land uses in the region. Notwithstanding this, a number of regional ecosystems (REs) are mapped as occurring in the Study Area, including some analogous with threatened ecological communities (TECs) listed as matters of national environmental significance (MNES), under the Commonwealth (Cth) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Protected Matters Search Tool (PMST, dated November 2022) identifies 21 threatened flora species and 11 TECs that have the potential to occur within the Study Area and 10km buffer.

Areas of mapped REs containing remnant vegetation are scattered throughout the Study Area, including 'endangered' and 'of concern' biodiversity status. Remnant vegetation is found mainly in association with protected areas and watercourses in the Study Area.

Table 7: Mapped REs within the Study Area

RE	Common name	Vegetation Management Act class	Biodiversity status	Likelihood within Study Area
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Sparse
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	Of concern	Of concern	Sparse
11.3.6	*Eucalyptus melanophloia* woodland on alluvial plains	Least concern	Of concern	Sparse
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	Sparse
11.3.26	*Eucalyptus moluccana* or *E. microcarpa* woodland to open forest on margins of alluvial plains	Least concern	No concern at present	Sparse

RE	Common name	Vegetation Management Act class	Biodiversity status	Likelihood within Study Area
11.3.29	*Eucalyptus crebra*, *E. exserta*, *Melaleuca* spp. woodland on alluvial plains	Least concern	No concern at present	Sparse
11.8.3	Semi-evergreen vine thicket on Cainozoic igneous rocks	Of concern	Of concern	Dense
11.8.4	*Eucalyptus melanophloia* woodland to open woodland on Cainozoic igneous rocks	Least concern	No concern at present	Very Sparse
11.10.4	*Eucalyptus decorticans*, *Lysicarpus angustifolius* +/- *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp. woodland on coarse-grained sedimentary rocks	Least concern	No concern at present	Sparse
11.10.8	Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks	Of concern	Of concern	Dense
11.10.13	*Eucalyptus* spp. and/or *Corymbia* spp. open forest on scarps and sandstone tablelands	Least concern	No concern at present	Mid-dense
11.11.3	*Corymbia citriodora*, *Eucalyptus crebra*, *E. acmenoides* open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	Least concern	No concern at present	Mid-dense
11.11.4	*Eucalyptus crebra* woodland on old sedimentary rocks with varying degrees of metamorphism and folding	Least concern	No concern at present	Sparse
11.11.10	*Eucalyptus melanophloia* woodland on deformed and metamorphosed sediments and interbedded volcanics	Of concern	Of concern	Sparse
11.11.15	*Eucalyptus crebra* woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Least concern	No concern at present	Sparse

RE	Common name	Vegetation Management Act class	Biodiversity status	Likelihood within Study Area
11.11.18	Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding	Endangered	Endangered	Dense
11.12.1	*Eucalyptus crebra* woodland on igneous rocks	Least concern	No concern at present	Sparse
11.12.2	*Eucalyptus melanophloia* woodland on igneous rocks	Least concern	No concern at present	Sparse
11.12.3	*Eucalyptus crebra*, *E. tereticornis*, *Angophora leiocarpa* woodland on igneous rocks especially granite	Least concern	Of concern	Sparse
11.12.6	*Corymbia citriodora* open forest on igneous rocks (granite)	Least concern	No concern at present	Mid-dense
11.12.17	*Eucalyptus populnea* woodland on igneous rocks	Endangered	Endangered	Sparse
12.1.2	Saltpan vegetation including grassland, herbland and sedgeland on marine clay plains	Least concern	No concern at present	Grassland
12.3.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries	Least concern	No concern at present	Dense
12.3.12	*Eucalyptus latisinensis* or *E. exserta*, *Melaleuca viridiflora* var. *viridiflora* woodland on alluvial plains	Least concern	No concern at present	Sparse
12.11.6	*Corymbia citriodora* subsp. *variegata*, *Eucalyptus crebra* woodland on metamorphics +/- interbedded volcanics	Least concern	No concern at present	Sparse
12.11.17	*Eucalyptus acmenoides* or *E. portuensis* open forest on metamorphics +/- interbedded volcanics	Of concern	Of concern	Mid-dense
12.11.14	*Eucalyptus crebra*, *E. tereticornis*, *Corymbia* intermedia woodland on	Of concern	Of concern	Sparse

RE	Common name	Vegetation Management Act class	Biodiversity status	Likelihood within Study Area
	metamorphics +/- interbedded volcanics			

MNES identified as potentially present within the Study Area include nationally threatened species and TECs. REs that correspond to several TECs are mapped within the Study Area; eight REs analogous to six TECs are mapped within the Study Area. The presence of these REs across sections of the Study Area may constitute potential TEC presence.

Table 8: Threatened Ecological Communities (TECs) within the Study Area

Common name	Threatened category	Likelihood within Study Area
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Potentially present in Sections A & B
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Potentially present in Sections B, C, D & E
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Potentially present in Sections B, C, D & E
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Potentially present in all Sections
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Potentially present in Sections D & E
Lowland Rainforest of Subtropical Australia	Critically Endangered	Potentially present in Sections B, C, D & E
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Potentially present in all Sections
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Potentially present in all Sections
Subtropical and Temperate Coastal Saltmarsh	Endangered	Potentially present in Sections C, D & E
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Potentially present in Sections B, C, D & E

Common name	Threatened category	Likelihood within Study Area
Weeping Myall Woodlands	Endangered	Potentially present in all Sections

High risk areas for protected plants represent land where threatened or near threatened plants, listed as Critically Endangered, Endangered, Vulnerable or Near Threatened under the *Nature Conversation Act 1992* (NC Act) are known to occur or likely to be present. Any clearing of native vegetation within a high risk area and is 'in-the-wild' requires a flora survey to be carried out in accordance with the *Flora Survey Guidelines – Protected Plants (*Flora Survey Guidelines). Clusters of high-risk areas for protected plants are scattered throughout the Study Area, within Sections A, B and D.

Table 9: Conservation significant flora species records within the Study Area

Scientific name	Common name	Threatened category	Likelihood within Study area
Cycas megacarpa	-	Endangered	Recorded in Section B
Dansiea elliptica	-	Near threatened	Recorded in Section D
Grevillea hockingsii	-	Endangered	Recorded in Section B
Samadera bidwilii	-	Vulnerable	Recorded in Section A

Threatened flora records are associated with Callide Timber Reserve, which is located within and adjacent to Section B of the Study Area. Similarly, within Section D, nearby Mt Larcom and Targinie State Forest also host numerous threatened flora records. There are no mapped high risk areas for protected plants under the NC Act or significant flora species noted within Section C.

High risk areas for protected plants mapped within the Study Area are shown in **Appendix C**.

Additionally, the Study Area includes regional ecosystems listed as 'Of Concern' or 'Endangered', containing essential habitat, or associated with wetlands or watercourses which are matters of state environmental significance (MSES) potentially requiring offsets under the *Environmental Offsets Act 2014*.

Table 10: Mapped MSES in each section of the Study Area

MSES	Section A	Section B	Section C	Section D	Section E
Protected areas – estates	-	-	-	Present	-
Protected areas – nature refuges	-	-	-	-	-
Protected areas – special wildlife reserves	-	-	-	-	-
State marine parks – highly protected zones	-	-	-	-	-
Fish habitat areas (A and B areas)	-	-	-	-	-
Strategic environmental areas	-	-	-	-	-
High ecological significance wetlands	-	-	-	-	-
High ecological value wetlands	-	-	-	-	-
High ecological value waterways	-	-	-	-	-
Threatened (endangered/vulnerable) wildlife	Present	Present	Present	Present	Present
Special least concern animals	Present	Present	-	Present	Present
Koala habitat – core	-	-	-	-	-
Koala habitat – locally refined	-	-	-	-	-
Sea turtle nesting areas	-	-	-	-	-
Regulated vegetation – E/OC in Category B	Present	Present	Present	Present	Present
Regulated vegetation – E/OC in Category C	Present	Present	Present	Present	Present
Regulated vegetation – E/OC in Category R	Present	Present	Present	Present	Present
Regulated vegetation – essential habitat	Present	Present	Present	Present	Present
Regulated vegetation – intersect watercourse	Present	Present	Present	Present	Present
Regulated vegetation – within 100 m wetland	Present	-	-	-	-
Legally secured offset areas – offset register	-	-	-	-	-
Legally secured offset areas – PMAV	-	-	-	-	-

The Study Area is mapped as containing bushfire prone areas, under the State Planning Policy Interactive Mapping System.

3.3.2 Fauna

The PMST report identified 53 threatened fauna species and 37 migratory species that have the potential to occur within the Study Area. The confirmation of presence of threatened and migratory species in the Study Area will require ecological field surveys to be undertaken in future investigations.

EPBC Act listed threatened fauna within the Study Area are detailed in the table below.

Table 11: EPBC Act listed threatened fauna within the Study Area

Scientific name	Common name	Threatened category	Likelihood
Birds			
Geophaps scripta scripta	Squatter Pigeon	Vulnerable	High
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Moderate
Turnix melanogaster	Black-breasted Button-quail	Vulnerable	Moderate
Rostratula australis	Australian Painted Snipe	Endangered	Moderate
Calidris canutus	Red Knot	Endangered	Moderate
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	Moderate
Calidris tenuirostris	Great Knot	Critically Endangered	Moderate
Charadrius leschenaultii	Greater Sand Plover	Vulnerable	Moderate
Limosa lapponica baueri	Nunivak Bar-tailed Godwit	Vulnerable	Moderate
Numenius madagascariensis	Eastern Curlew	Endangered	Moderate
Charadrius mongolus	Lesser Sand Plover	Endangered	Moderate
Grantiella picta	Painted Honeyeater	Vulnerable	Moderate
Marsupials			
Petauroides volans	Greater Glider (southern and central)	Endangered	High
Petaurus australis australis	Yellow-bellied Glider (southern subspecies)	Endangered	High
Phascolarctos cinereus	Koala	Endangered	High
Mammals			
Pteropus poliocephalus	Grey-Headed Flying Fox	-	High
Xeromys myoides	Watermouse	Vulnerable	High
Macroderma gigas	Ghost Bat	Endangered	Moderate

Scientific name	Common name	Threatened category	Likelihood
Reptiles			
Elseya albagula	Southern Snapping Turtle	Endangered	High
Delma torquata	Adorned Delma	Vulnerable	Moderate
Egernia rugosa	Yakka Skink	Vulnerable	Moderate
Furina dunmalli	Dunmall's Snake	Vulnerable	Moderate

Ecological field surveys are required to be undertaken in accordance with the requirements of the DCCEEW survey guidelines for nationally threatened species.

Essential Habitat is mapped where habitat of Endangered, Vulnerable or Near Threatened wildlife (protected wildlife) prescribed under the *Nature Conservation Act 1992* has been recorded or has potential to occur. Mapping is a tool used to guide field surveys to determine the presence or absence of suitable habitat and assist in protecting these areas.

Areas can be dedicated or declared a protected area under legislation. Protected areas represent those areas protected for the natural and cultural values and those areas managed for production of forest resources, including timber and quarry material.

Essential Habitat mapped within the Study Area is shown in **Appendix C**.

Waterway barrier works with potential to impede fish passages are regulated under the *Fisheries Act 1994 and the Planning Act 2016*. Waterway barrier works include construction, raising, replacement and some maintenance works on structures such as culvert crossings, bed level and low-level crossings, weirs and dams (both permanent and temporary). The Study Area is mapped as intersecting waterways for waterway barrier works. Parts of the Calliope River are declared as a fish habitat area (south of Section E). However, the proposed transmission corridor in Section C does not traverse a fish habitat area.

3.3.3 Protected areas

Protected areas identified within the Study Area include:

- Callide Timber Reserve and Calliope Range State Forest in Section B
- Mount Stowe State Forest and Calliope Conservation Park in Section D

Protected areas mapped within the Study Area are shown in **Appendix C**.

3.4 Economic Factors

3.4.1 Topography

The topography of the Study Area varies from floodplains and tidal areas to mountainous ranges. Elevation ranges as per the following table.

Table 12: Topography in each section of the Study Area

Section	Topography
A	215m to 320m Australian height datum (AHD) with key topographic features including Lake Callide.
B	65m to 565m AHD with key topographic features including Callide Timber Reserve, Calliope Range State Forest and Calliope River.
C	25m to 115m AHD being relatively flat to undulating overall.
D	15m to 200m AHD with key topographic features including Mount Stowe State Forest and Calliope Conservation Park.
E	2m to 30m AHD with key topographic features including Calliope River and the inlet to Gladstone Harbour.

Topography is an important consideration when assessing the constructability of transmission lines and associated infrastructure. Steep slopes should be avoided where possible, as this limits vehicle access and increases the extent of earthworks at each structure site.

3.4.2 Geology and soils

Geological units mapped in each section of the Study Area are detailed in **Error! Reference source not found.**the following table.

Table 13: Topography in each section of the Study Area

Geological unit	Dominant rock type	Locality
Lochenbar Formation	Mixed volcanic and sedimentary rocks	Section A
Man-Made Deposits	Man-made deposits (tailings, landfill, mine dumps etc)	Section A
Youlambie Conglomerate	Arenite-rudite	Section A and B
Rv-YARROL/SCAG	Mixed sedimentary rocks and felsites	Section B
Callide Coal Measures	Sedimentary rock	Section B
Precipice Sandstone	Arenite	Section B
Tb-QLD	Basalt	Section B
Three Moon Conglomerate	Mixed volcanic and sedimentary rocks	Section B
Rocky Point Granodiorite	Granitoid	Section B

Geological unit	Dominant rock type	Locality
Wyalla Granite	Granitoid	Section B
Qa-QLD	Alluvium	Section B, C, D and E
Mount Alma Formation	Arenite-mudrock	Section B, C and D
Erebus Beds	Sedimentary rock	Section C
Rockhampton Group	Sedimentary rock	Section D
Doonside Formation	Arenite-mudrock	Section D
Qr\s-QLD	Colluvium	Section E
Qhe/m-YARROL/SCAG	Miscellaneous unconsolidated sediments	Section E

Soils mapped within the Study Area are described by the Australian Soil Resource Information System (ASRIS). Dominant soil types mapped in each section of the Study Area are detailed in the table below.

Table 14: Topography in each section of the Study Area

Soil type	Description	Locality
Vertosols	Vertosols are the most common soil in Queensland. This soil type includes brown, grey or black soils which crack open when dry. Vertosols have very high-soil fertility and large water-holding capacity.	Section A and Section B
Chromosols	Chromosols may be located both on flat alluvial areas and on sloping land. These soils have texture contrast profiles with a clear boundary between the surface loamy soil and the clay subsoil.	Section A, B, C, D and E
Rudosols	Rudosols generally have a low fertility and low water-holding capacity. This soil type is poorly developed but widespread and can be shallow and stony.	Section B
Kandosols	Kandosols are red, yellow and grey massive earths. They generally have a sandy to loamy-surface soil, grading to porous sandy-clay subsoils with low fertility and poor water-holding capacity. A wide range of crops can be grown on these soils where rainfall is higher or where irrigation is available.	Section B and Section D
Kurosols	Kurosols are texture contrast soils with a clear boundary between the sandy to foamy surface soil and the clay subsoil. The pH in the surface can range from neutral to strongly acid while the subsoil is strongly acid (pH < 5.5).	Section B
Dermosols	These clay-to-clay loam soils generally have a dark to brownish black surface over brown to grey-brown subsoils. Textures are generally clay-to-clay loam throughout with moderate to well-structured surface and subsoils.	Section B, C and D

Soil type	Description	Locality
	Dermosols are widespread on mid to upper slope positions of low undulating hills of tertiary basalt, tertiary intrusions and tertiary sediments. This soil type is also located on alluvial flats.	
Hydrosols	Hydrosols are saturated with water for long periods of time which are typically a grey (or greenish-grey) colour. This soil type is mainly found near coastal areas.	Section D and E
Sodosols	Sodosols are texture-contrast soils with impermeable subsoils due to the concentration of sodium. This soil type generally has a low-nutrient status and are very vulnerable to erosion and dryland salinity when vegetation is removed.	Section E
Tenosols	Tenosols generally have a low fertility and low water-holding capacity. This soil type is poorly developed but widespread and can be shallow and stony.	Section E

Vertosol and sodosol soils are considered to be more susceptible to erosion due to the dispersive nature of these soils. Rocky soils are associated with the steeper mountain terrain areas.

Acid sulfate soils (ASS) are commonly found in low-lying coastal areas where the natural ground level is less than 5m AHD. There is a low to very low probability of encountering ASS within most of the Study Area, as the general topography of the area is around 100m to 600m AHD. Section E is located within a low-lying area and ASS are a high probability of occurrence according to the ASRIS and Gladstone Regional Planning Scheme mapping.

3.4.3 Hydrology

The Study Area falls within the Fitzroy and Calliope drainage basins. Major watercourses under the *Water Act 2000* mapped within the Study Area include:

- Callide Creek (intersects Section A)
- Calliope River (intersects Section B and Section E)
- Farmer Creek (intersects Section C).

A series of unmapped watercourses under the *Water Act 2000* are also located throughout the Study Area. Larcom Creek is not mapped under the *Water Act 2000* however, it is a minor watercourse present throughout the centre of Section C. Drainage features under the *Water Act 2000* are mapped within Sections D and E. Waterway crossings could involve specific design requirements to address potential flooding and erosion risks or to mitigate damage to riparian vegetation. They may require installation of additional or taller tower structures, leading to increased construction costs.

The new transmission line will span across Callide Creek in Section A and Calliope River in Sections B and E. Where waterways cannot be avoided, the new transmission line should traverse areas of the floodplain which would result in the least possible impact depending on span distance, access requirements, vegetation clearing, and water flow rates.

The new transmission line is not otherwise expected to impact upon hydrology or water quality of existing watercourses, as the infrastructure can be designed to span over constraints without the need to clear or disturb beds or banks. During the detailed design phase of works, the new transmission line should be sited through careful consideration of topography. This can be done by locating the towers on high points to maximise span distances and elevate the lines over streamside vegetation, therefore minimising any necessary clearing of riparian vegetation.

Sections B, C, D and E are mapped within the Queensland Floodplain Assessment Overlay as containing flood prone areas. Refer to **Appendix D**.

3.4.4 Contaminated land

Contaminated land searches were not undertaken as part of this assessment. However, the land uses that generally registered on the environmental management and contaminated land database include railways, landfill sites, service stations, mine processing and waste areas, and manufacturing activities.

3.4.5 Unexploded ordnance

Department of Defence unexploded ordnance mapping has identified no lands subject to potential unexploded ordnance within the Study Area. 572 Round Mountain (UXO Category: Other) is located 20km south of Section B. Despite the area being proclaimed for Defence use from March 1961 until January 1962, no records of actual use have been found.

3.5 Study Area engagement

3.5.1 Approach

Powerlink is proposing to co-locate the new transmission line with existing transmission infrastructure and to predominantly use existing vacant easements, therefore engagement on the project to date has been targeted toward directly impacted and adjacent landholders, Traditional Owner groups and stakeholder groups.

Through engagement undertaken from early 2023, the focus has been on introducing the project and seeking feedback. This was to provide important foundational information from those potentially most impacted by the decision to co-locate the planned new transmission line and allow the progression of studies to help determine if investigating corridor locations elsewhere was necessary.

Wider community feedback will be sought on release of the findings of the Draft CSR for the project.

3.5.2 Activities

Initial contact was made with the above stakeholder groups in early 2023, via briefings, letters and emails. The project need and features were explained, and early feedback was sought.

Engagement with landholders commenced in early 2023, with ongoing discussions to help inform planning and investigations for the project.

Powerlink continues to work with Traditional Owner groups to understand and obtain feedback on cultural values and constraints associated with the project.

In June 2023, Powerlink staff attended the Mt Larcom Show and hosted an information stall where details about the planned project were made available.

A project update was issued to directly impacted and adjacent landholders in July 2023, and project information was also made available on Powerlink's website.

Specific messaging was given to landholders in Section C on the need to acquire a further easement either north or south of the existing transmission line for the project. Other landholders in Sections A, B, D and E were engaged to assist with investigations to determine if the existing vacant easements were wide enough for the new transmission line to be co-located.

Discussions have been held on a range of matters including providing project updates, responding to queries, arranging Project Participation Access Allowances (PPAA) and facilitating property access for environmental and cultural heritage surveys, and site inspections.

3.5.3 Issues raised through engagement

Through this engagement, feedback has been grouped to identify the key areas of concern and interest as follows:

Biosecurity

- Weed management and prevention i.e. Giant Rats Tail Grass (GRT), African Love Grass and Parthenium
- Biosecurity protocols and compliance.

Property Impacts

- Current compensation methodology and considerations (feedback suggests previous methods were insufficient)
- Eligibility criteria for compensation
- Construction impacts of the new infrastructure within existing easements
- Off easement access considerations.

Access protocols and budgets

- Access standards and requirements
- Maintenance responsibilities, schedules funding (gates and or fences) and frequency
- Correction of any damages caused during access of a property.

Lifestyle impacts

- Visual amenity impacts, property specific and broader i.e. local area
- Proximity of dwellings and visual screening.

Regional development

- Likelihood of future transmission development in their region including substations.

All feedback received through engagement activities to date has been used to inform this report and will also be considered across various design, environmental and construction elements of the project going forward.

Powerlink acknowledges the time and effort given to contribute to this process and continues to value ongoing input and feedback.

3.5.4 Communication materials

To support this phase of engagement, the following communication tools and methods were used:

- Dedicated project webpage
- Project phone number and email address where people could provide feedback
- Dedicated Landholder Relations team member available via mobile phone to answer any questions, and to receive and discuss feedback
- Letters, emails and briefings
- Project updates, including locality maps.

4.0 Corridor Selection Process

4.1 Methodology

Planning and legislative frameworks, spatial analysis, and community and stakeholder feedback are factored into this process. Further considerations to identify the least impactful location of the proposed new transmission line included:

- Queensland and Local Heritage registered sites
- Sites on the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register
- protected plant survey trigger areas
- wetlands, General Ecological Significance/High Ecological Significance
- airports, heliports and landing strips
- mining leases
- number of crossings (transmission lines)
- flood hazard areas
- state-controlled roads and railways.

The methodology used to select a corridor is:

1. Define a Study Area and build a project-specific geographical information system (GIS) database which includes data that is publicly available and supplied by Powerlink.
2. Identify the constraints and opportunities within the Study Area through a desktop review (using the GIS database, topographic maps, satellite imagery, local government planning schemes, government mapping, database searches and Powerlink operational matters) overlaying the project objectives to identify further constraints and opportunities.
3. Evaluate the suitability of existing easements for Section A, B, D and E to accommodate an additional 275kV transmission line.
4. Identify and assess corridor options for Section C (within 1km) either side of the existing easement centreline to accommodate the new transmission line and recommend a corridor.

4.2 Objectives

The objective of this corridor selection process is to identify a corridor that maximises the use of spare existing easements, reducing further impact to the area through co-location (when compared to a greenfield corridor), yet balancing the project objectives, network considerations and stakeholder feedback.

Three project objectives were used to inform the approach to corridor selection and refinement:

Social
To consider the use of land and the community livelihood within and adjacent to corridor options.

Environment
To consider a balanced approach to corridor selection with the least practicable impact on environment and heritage values.

Economic
To consider construction and operational factors such as cost at a preliminary level, given the scale of the project.

5.0 Easement Suitability Assessment (Sections A, B, D & E)

5.1 Opportunities and constraints

Social, environmental and economic factors were taken into account in the easement suitability assessment. Based on the desktop analysis of the Study Area, and feedback from early consultation on the Study Area, the following constraints and opportunities were considered:

- Powerlink's existing transmission infrastructure
- The location of residential houses, farming infrastructure and associated structures
- Steep topography
- Presence of remnant vegetation, TECs, protected areas and State Forests
- Agricultural land scattered throughout the Study Area and areas mapped as strategic cropping land
- The existing road network, particularly Biloela-Callide Road, Bruce Highway and Dawson Highway
- Size and location of property boundaries
- The type of soils
- Siting considerations.

5.2 Objectives

The proposed transmission corridor should minimise impacts on social, environment and economic factors, and be best suited to the conditions of the physical environment, while avoiding unreasonable and indirect routes, excessive costs and non-standard design requirements to the maximum extent possible.

To achieve this, the objectives of the easement suitability assessment are identified as follows:

- Allow sufficient space to accommodate the new transmission line (i.e. 40m from an existing transmission line)
- Limit the number of land parcels affected by the proposed infrastructure
- Minimise impact to residential houses by maintaining a buffer where feasible
- Align with property boundaries where feasible
- Minimise impact to agricultural land and position the transmission structures and wires so as to cause minimal interference to farming operations
- Utilise existing road network for access where feasible
- Cross major roads at perpendicular angles
- Minimise impact on sensitive ecological areas (remnant vegetation, TECs, protected areas and state forests) and Indigenous and European cultural and heritage sites/areas
- Minimise interaction with difficult topographical conditions
- Minimise the number of watercourse and floodplain crossings and intersect at perpendicular angles where feasible
- Minimise the corridor length and the number of major bends required
- Minimise areas of dispersive soils and acid sulfate soils that may pose constructability risks.

5.3 Easement suitability assessment

As the proposed transmission corridor follows the existing easements within Sections A, B, D and E, it introduces few new constraints.

The assessment of corridor options for the new transmission line in Section C is provided in a following section of this report.

A detailed analysis of the suitability analysis for Sections A, B, D and E is included in Appendix E.

5.4 Assessment summary

A summary of the key considerations for the proposed transmission corridor which follows the existing easements within Sections A, B, D and E are detailed in the following table.

Table 15: Key Considerations

Key Considerations	Section			
	A	B	D	E
Land parcels impacted (no.)	11	38	17	3
Houses in proximity	0	0	4	0
Category B remnant vegetation (ha)	0	6.5	17.3	1.6
Category C remnant vegetation (ha)	3.2	8.4	3.4	0
Category R remnant vegetation (ha)	0.4	31.1	4.5	0.7
High risk trigger area protected plants (ha)	7.4	55.6	9.4	0
Cultural heritage sites intersected (no.)	0	21	0	0
Essential habitat (ha)	11.3	26.5	25.4	3.3
MSES wildlife habitat (Endangered or Vulnerable)	7.3	29.8	22.3	3.6
MSES wildlife habitat (Special Least Concern (SLC))	0	5.1	10.9	1.9
Existing easement width (m)	150+	110	100	140
Strategic cropping area intersected (ha)	0	5.6	0	0
Local road crossings (no.)	3	15	15	1
State-controlled road crossings (no.)	1	1	0	0
Waterway crossings (SO>1) (no.)	2	72	23	1
Queensland floodplain assessment overlay (ha)	0	8	1.6	14.2
Access tracks (no.)	12	57	16	5

5.5 Key findings

The outcomes of the corridor assessment against the criteria listed in Table 15 in Section 5.4 of this report, are as follows:

The proposed transmission corridor uses existing easements in Sections A, B, D and E, which minimises potential land use impacts and avoids impacting additional landholders to those who are already co-existing with an existing transmission line.
The existing alignment crosses infrastructure and values that will be potentially affected by an additional transmission line:

- Infrastructure corridors including road, rail and pipelines
- Waterways
- Agricultural land.

The potential use of taller transmission towers compared to existing towers will increase the scale of visual impacts across all sections, though it is beneficial to co-locate with existing towers.

The identified constraints do not preclude the construction of the additional transmission line in the existing easements, subject to further field studies and approvals.

Opportunities associated with co-locating the project with existing Powerlink easements and transmission infrastructure, compared to creating new easements and transmission infrastructure elsewhere that are not co-located include:

- Location of transmission infrastructure close to other existing infrastructure minimises visual and property use impacts
- Reduced extent of potential clearing required due to utilisation of existing access tracks and cleared portions of existing easements
- No new properties affected due to new transmission infrastructure and access tracks being located within existing host-landholder properties
- Decreased host-landholder uncertainty with respect to the location of the transmission infrastructure.

Easement requirements will be addressed in consultation with landholders and other stakeholders as part of determining a final alignment in a later project phase.

5.6 Easement suitability recommendation of Sections A, B, D and E

Based on the opportunities and constraints for Sections A, B, D and E, it was determined that the proposed new transmission line will be able to be delivered within the existing vacant transmission easements, subject to further detailed studies, stakeholder engagement and approvals.

Co-locating the project with existing Powerlink easements and transmission infrastructure is deemed less impactful compared to creating a new easement and transmission infrastructure that is not co-located. It has the benefits of not increasing the existing area of the easement footprint and also minimises the extent of vegetation clearing required and reduces further impacts to landholders' farming operations and visual amenity.

6.0 Corridor Options Assessment (Section C)

6.1 Opportunities and constraints

Social, environmental and economic constraints were taken into account in the easement suitability assessment. Based on the desktop analysis of the Study Area, the following key constraints and opportunities were considered:

- Powerlink's existing transmission infrastructure
- The location of residential houses, farming infrastructure and other structures
- Watercourses and floodplains, in particular Farmer Creek and Larcom Creek
- Presence of remnant vegetation and TECs
- The existing road network, particularly the Bruce Highway
- Size and location of property boundaries
- The type of soils, particularly dispersive soils around the watercourses
- Siting considerations.

6.2 Objectives

The proposed transmission corridor should minimise impacts and be best suited to the conditions of the physical environment, while avoiding unreasonable and indirect routes, excessive costs and non-standard design requirements to the maximum extent possible.

To achieve this, the objectives of the easement suitability assessment are identified as follows:

- Allow sufficient space to accommodate the new transmission line (i.e. 40m from an existing transmission line)
- Minimise social impact due to network disruptions and/or outages during construction of the new transmission line
- Limit the number of land titles affected by the proposed infrastructure
- Minimise impact to residential houses by maintaining a buffer where feasible
- Align with property boundaries where feasible
- Minimise impact to agricultural land and position the transmission structures and wires so as to cause minimal interference to farming operations
- Utilise existing road network for access where feasible
- Cross major roads at perpendicular angles
- Minimise impact on sensitive ecological areas (remnant vegetation, TECs, protected areas and State Forests) and Indigenous and European cultural and heritage sites/areas
- Minimise interaction with difficult topographical conditions
- Minimise the number of watercourse and floodplain crossings and intersect at perpendicular angles where feasible
- Minimise the corridor length and the number of major bends required
- Minimise areas of dispersive soils and acid sulfate soils that may pose constructability risks.

6.3 Assessment

Based on the desktop research and field studies of the Study Area, corridor selection criteria and feedback from early engagement with landholders and other stakeholders, it was determined that co-location with the existing transmission corridor in Section C was the most appropriate option for the new transmission line. The assessment identified two corridor options being:

- Northern Corridor Option: Widening of 40m to the north of the existing easement.
- Southern Corridor Option: Widening of 40m to the south of the existing easement.

As the proposed corridor options are co-located with the existing easement in Section C, it is considered to introduce few additional constraints.

6.3.1 Section C: Northern Corridor Option Assessment

Table 16: Northern Corridor Option Assessment

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor would utilise land predominantly identified as Freehold and a small area of Lands Lease.
Land use	The proposed transmission corridor will impact a total of 14 land parcels. No new landholders will be impacted. Multiple land parcels are owned by single operating entities and therefore the number of landholders or operating entities affected by the new transmission line would be less than the total number of parcels traversed. The proposed transmission corridor is located entirely within land used for grazing. Given the proposed transmission corridor is intended to be co-located with the existing easement, the impact to existing land uses will be minimised and not undermine the existing grazing activities. A portion of the proposed transmission corridor is located within the Callide Infrastructure Corridor and Gladstone State Development Area.
Resource interests	The proposed transmission corridor intersects EPM 28042, EPM 2028, PPL 154, PPL 166, PPL 163 and PPL 30.
Transport and traffic	The proposed transmission corridor intersects the Bruce Highway, Kaluda Road and Mount Alma Road. Due to co-location with the existing transmission infrastructure, existing road crossings and access tracks are proposed to be utilised, leading to potential savings in construction cost and reduced land use impacts.
Existing residential housing	The closest dwelling is located approximately 400m from the proposed corridor option.
Heritage	The proposed transmission corridor may traverse areas where cultural heritage values are known to occur. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are mapped that impact the proposed transmission corridor.
Visual amenity	The proposed transmission corridor will be visible to traffic for a short amount of time where it crosses public roads. The proposed transmission corridor is located

Constraint	Assessment
	in relatively remote rural areas and can avoid residential properties by at least 350m. Visual impacts of the new transmission line would be greatest in the flat landscapes around Larcom Creek. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised to the extent of height differences of the towers.
Environmental	
Flora	Remnant vegetation (identified as no concern at present and Of Concern biodiversity status) is mapped in clusters surrounding Kaluda Road, Larcom Creek and Mt Alma Road. The proposed transmission corridor intersects mapped essential habitat. Given the proposed transmission corridor is intended to be co-located with the existing easement, the impact to vegetation may include some additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for the new transmission line to span over vegetation where it occurs in small clusters along the alignment.
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both least concern and threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will need to be investigated in future ecological investigations.
Protected areas	The existing easement does not intersect any protected areas.
Economic	
Topography	The existing easement ranges in elevation from 23m to 115m AHD, with key topographic features including Larcom Creek.
Geology and soils	The existing easement is subject to dermosol and chromosol soil types, which are considered more susceptible to erosion due to their dispersive nature. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the new transmission line, as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The main waterway crossings include Larcom Creek. The proposed transmission corridor also crosses drainage features and unmapped water features under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways; however, most are subject to floodplains. Therefore, waterway crossings may require a tailored design response to ensure minimal damage to riparian vegetation and mitigate risks of erosion to transmission towers.

6.3.2 Section C: Southern Corridor Option Assessment

Table 17: Southern Corridor Option Assessment

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor is intended to utilise land predominantly identified as Freehold and a small area of Lands Lease.
Land use	The proposed transmission corridor will impact a total of 13 land parcels. Multiple land parcels are likely owned by single operating entities and therefore the number of landholders or operating entities affected by the new transmission line would be less than the total number of parcels traversed. The proposed transmission corridor is located entirely within land used for grazing. Given the proposed transmission corridor is intended to be co-located with the existing easement, the impact to existing land uses will be an edge effect only. A portion of the proposed transmission corridor is located within the Callide Infrastructure Corridor and Gladstone State Development Area.
Resource interest	The proposed transmission corridor intersects EPM 28042, EPM 2028, PPL 154, PPL 166, PPL 163 and PPL 30.
Transport and traffic	The proposed transmission corridor intersects the Bruce Highway, Kaluda Road and Mount Alma Road. Due to co-location with the existing transmission infrastructure, existing road crossings are proposed to be utilised and there is also potential to utilise existing access tracks, leading to reduced land use impacts.
Housing	There are no dwellings in proximity to the proposed transmission corridor.
Cultural heritage	The proposed transmission corridor may traverse areas where cultural heritage values are known to occur. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are mapped that impact the proposed transmission corridor.
Visual amenity	The proposed transmission corridor will be visible to traffic for a short amount of time where it crosses public roads. The proposed transmission corridor is located in relatively remote rural areas and can avoid most residential properties. Visual impacts of the new transmission line would be greatest in the flat landscapes around Larcom Creek. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised to the extent of height differences of the towers.
Environmental	
Flora	Remnant vegetation (identified as no concern at present and of concern biodiversity status) is mapped in clusters surrounding Kaluda Road, Larcom Creek and Mt Alma Road. The proposed transmission corridor intersects mapped essential habitat. Given the proposed transmission corridor is intended to be co-located with the existing easement, the impact to vegetation may be some additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for

Constraint	Assessment
	the new transmission line to span over vegetation where it occurs in small clusters along the alignment.
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both Least Concern and Threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will need to be investigated in future ecological investigations.
Protected areas	The existing easement does not intersect any protected areas.
Economic	
Topography	The existing easement ranges in elevation from 23m to 115m AHD, with key topographic features including Larcom Creek.
Geology and soils	The existing easement is subject to dermosol and chromosol soil types, which are considered more susceptible to erosion due to their dispersive nature. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the new transmission line, as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The main waterway crossing includes Larcom Creek. The proposed transmission corridor also crosses drainage features and unmapped water features under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways, however most are subject to floodplains. Therefore, waterway crossings may require a tailored design response to ensure minimal damage to riparian vegetation and mitigate risks of erosion to transmission towers.

6.3.2 Section C: Corridor Option Assessment Summary

The key considerations of the proposed corridors in Section C are detailed in the following table.

Table 18: Corridor Options: key considerations

Key Considerations	Section C	
	North Option	South Option
Land parcels impacted (no.)	14	13
Category B remnant vegetation (ha)	0.7	0.9
Category C remnant vegetation (ha)	1.7	0.7
Category R remnant vegetation (ha)	2.3	3.7
High risk trigger area protected plants (ha)	0	0
Essential habitat (ha)	2	1.1
MSES wildlife habitat (Endangered or Vulnerable)	2	1.2
MSES wildlife habitat (SLC)	0	0
Houses within proximity	1	0
Easement width (m)	100 existing + 40 new	100 existing + 40 new
Strategic cropping area intersected (ha)	0	0
Local road crossings (no.)	5	5
State-controlled road crossings (no.)	1	0
Waterway crossings (SO>1) (no.)	29	28
Queensland floodplain assessment overlay (ha)	27.9	28.9
Access tracks (no.)	8	19

6.4 Additional considerations

6.4.1 Early consultation

Early engagement with landholders commenced in February 2023 with phone calls and letters to landholders within in the Study Area. Face-to-face meetings were also undertaken from this time and engagement is ongoing.

Key matters raised by landholders included:

- construction impacts to farming operations including biosecurity and loss of productivity
- proximity to residences
- visual impact
- loss of property value.

Feedback from the Study Area engagement process provided valuable information for the assessment of options to widen the existing easement for the proposed transmission line. The majority of landholders were supportive of Powerlink's proposal to co-locate the proposed 275kV transmission line with existing transmission corridors, however some issues pertaining to impacts to farm infrastructure were raised in relation to the north option. Consideration to any impact on farm infrastructure will be made in Powerlink's assessment of a recommended corridor.

6.4.2 Technical considerations

Technical analysis has been undertaken to understand interactions of the Project with existing transmission network.

The analysis has identified that cross-overs of existing Calliope River to Bouldercombe and Calvale to Wurdong transmission lines are greater under the southern option and therefore may require additional network outages and could also lead to reduced network resilience.

Temporary network outages required to safely facilitate construction activities would be less impactful under the northern option.

6.5 Options comparison

The outcomes of the corridor options assessment against the criteria listed in Section 6.3 of this report are:

- As the proposed corridor options follow the existing easement for almost its length, it minimises potential land use impacts and avoids impacting additional landholders to those who are already co-existing with the transmission line. The existing alignment crosses infrastructure and values that will be potentially affected by the new transmission line:
    - Infrastructure corridor, road.
    - Waterways
    - Agricultural land.
- The key differences between the two options are not significant:
    - Houses within proximity: the northern option has one residence within proximity.
    - No new landholders impacted.
    - Vegetation affected: both options affect protected vegetation and it varies across classes and types.
- Both options require the widening of the existing easement.

- Visual impacts from the new infrastructure will occur for both options due to the increased height of the towers.
- Preliminary stakeholder consultation indicated alignment with the proposal to co-locate the proposed new transmission line with the existing transmission infrastructure.
- The northern option has less constructability issues.
- Temporary network outages required to safely facilitate construction activities would be significantly less impactful under the northern option.

6.6 Section C Recommended Corridor

The corridor options are considered to have broadly similar social, environmental and economic impacts overall however further consideration has been made in regard to technical constructability and electricity network issues.

The northern option reduces the level of interaction with transmission line crossings and complex outages on existing Powerlink transmission infrastructure. It also provides an opportunity to co-locate the proposed 275kV transmission line with a section of the existing Calliope to Bouldercombe 275kV line.

The southern option has a higher potential for network disruptions during construction and maintenance i.e. there would be network outage restrictions required to construct a transmission line on the south of the existing Calliope River to Bouldercombe and Calvale to Wurdong transmission lines which could impact network security and reliability for the Gladstone region.

Based on the desktop assessment, preliminary stakeholder consultation and technical considerations, it has been determined the most feasible and low-impact solution is to construct a new 275kV double circuit transmission line to the north of the existing transmission infrastructure.

6.7 Recommended Corridor engagement

On release of the Draft CSR, Powerlink will continue to engage with existing stakeholder groups, and also introduce the project to the wider community via:

- Hosting community information drop-in sessions in Biloela, Mt Larcom and Gladstone
- Advertising the above sessions in local newspapers and via social media
- Distributing a project newsletter which will include a project update and details of the community information drop-in sessions.

All feedback received will be considered, summarised and reported as part of the Ministerial Infrastructure Designation (MID) process.

The community feedback will be themed to help capture the spatial data layers used to support the assessment of criteria against the social, environment and economic objectives.

7.0 Legislative and Approval Requirements

There are a number of potential legislative and approval requirements in order to progress the project. Some of the Local, State and Federal Government approval frameworks are discussed in this section.

7.1 Potential environmental approvals

The recommended corridor requires further investigation from an environmental perspective. At this scale, the potential for approvals for a transmission line through this corridor can only be provided at a preliminary level. A full list of legislative considerations and other obligations is provided within Appendix F. Potential approvals are identified below and are subject to further corridor refinement, actual infrastructure disturbance locations and further ecological and cultural heritage investigations:

- Ministerial Infrastructure Designation under the *Planning Act 2016 (Qld)*
- *Environment Protection and Biodiversity Conservation Act (EPBC) 1999 (Cth)* referral and potential approval for significant impact on Matters of National Environmental Significance
- Clearing permit under the *Nature Conservation Act 1992 (Qld)*
- Species Management Program (SMP) under the *Nature Conservation (Animals) Regulation 2020 (Qld)* for the tampering of active breeding places where impact cannot be avoided (Low Risk SMP required for impact to Least Concern species / High Risk SMP is required for impact to Colonial Breeders, Near Threatened, Vulnerable, Endangered and Critically Endangered species)
- Soil disposal permit under the *Environmental Protection Act 1994 (EP Act) (Qld)* to remove contaminated soil for treatment and / or disposal
- Riverine protection permit where the Riverine protection permit exemption requirements under the *Water Act 2000 (Qld)* cannot be met.

Offsets are likely to be applicable to some of the approvals above. To determine the likely offset liabilities under the EPBC Act (Cth) and *Environmental Offsets Act 2014 (Qld)*, field surveys and the following assessments are recommended:

- A significant impact assessment using the EPBC Act Significant Residual Impact Guidelines Policy Statement 1.1
- A significant residual impact assessment under the Queensland Environmental Offsets Policy Significant Residual Impact Guideline: Nature Conservation Act 1992, and Environmental Protection Act 1994.

Prior to the future construction of the project, further assessment of the project's potential legislative obligations should be undertaken once the corridor is further refined and additional desktop and field investigations have been undertaken. Additionally, where approvals are required, potential offsets will also need to be considered.

For further detail on legislation potentially applicable to the corridor, refer to **Appendix F**.

8.0 Conclusion and Future Studies

8.1 Easement suitability recommendation of Sections A, B, D and E

Based on the opportunities and constraints for Sections A, B, D and E, it was determined that the proposed new transmission line is able to be delivered within the existing vacant transmission easements, subject to further detailed studies, stakeholder engagement and approvals.

Co-locating the project with existing Powerlink easements and transmission infrastructure is deemed less impactful compared to creating a new easement and transmission infrastructure that is not co-located. It has the benefits of minimising the extent of vegetation clearing required, and further impacts to landholders' farming operations and visual amenity.

8.1.2 Recommended Corridor: Section C

While both corridor options are considered to have broadly similar social, environmental and economic impacts, additional consideration of technical constructability and network operational matters is also required.

The northern option reduces the level of interaction required for crossing existing transmission infrastructure and minimises the risk of complex outages on Powerlink's transmission network.

The southern option has a higher potential for network disruptions during construction and maintenance i.e. there would be network outage restrictions required to construct and maintain a transmission line on the south of the existing Calliope River to Boulder combe and Calvale to Wurdong transmission lines, which could impact network security and reliability for the Gladstone region.

Based on the desktop assessment, stakeholder engagement and technical considerations, it has been determined that the northern option is the recommended corridor with the least overall impact.

8.2 Future studies

It was determined that the recommended corridor, being the northern option, should be taken forward for further planning and consultation for the project.

Further desktop and field studies are required to finalise corridor selection in line with the project objectives. These investigations will build understanding of the project constraints, opportunities and required approvals for the recommended corridor. As the recommended corridor is further refined, the project will continue to seek to avoid and/or minimise impacts to landholders and community areas as well as environment, cultural values, agriculture and cropping land values through siting and design.

8.2.1 Social

- Review of consultation feedback: Further engagement with stakeholders, particularly affected landholders and Traditional Owner groups, on the recommended corridor to understand use of land, and potential impacts to properties.
- Visual amenity assessment: Further assessment of the recommended corridor in relation to visual amenity and screening opportunities

8.2.2 Environment, heritage and planning

- Ecology: Based on the values present in the recommended corridor, there is potential for the corridor to contain areas of habitat for threatened flora and fauna species, and or threatened ecological communities. Further assessment will be undertaken to determine the potential impact to habitat for threatened flora and fauna species. Assessment should comprise a detailed desktop assessment and targeted field surveys.
- Heritage studies: Further investigations are required to identify any potential risk to Aboriginal and Non-Aboriginal heritage values.

8.2.3 Biosecurity matters

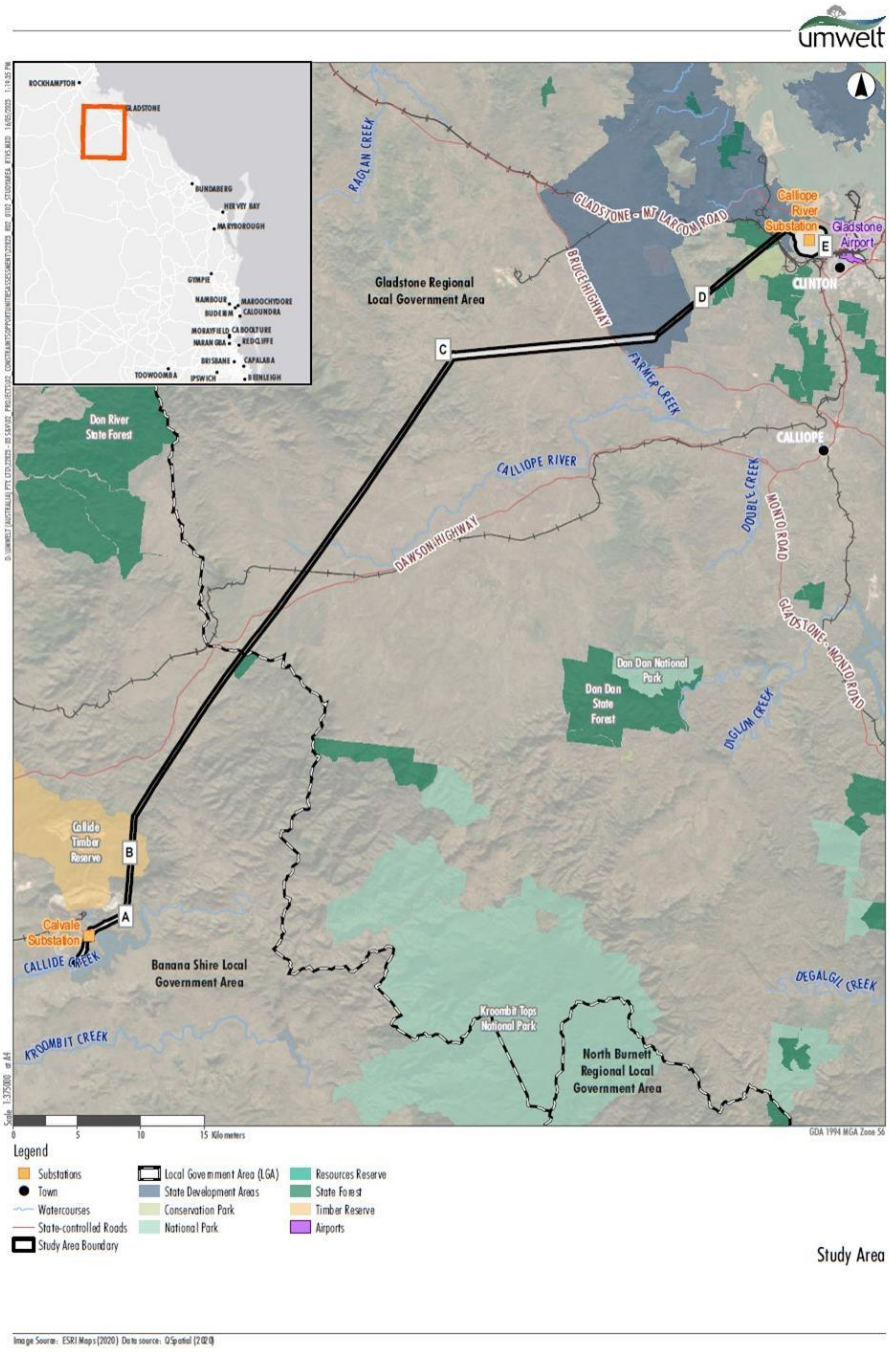
- No information is available via a desktop assessment on weed distribution and the prevalence of invasive species, in order to assess the existing integrity of flora species within the recommended corridor, further investigation into the potential biosecurity risks is recommended during ecology desktop and field investigations.

8.2.4 Economic

- Land, geology, ground conditions and soils: Based on desktop assessments, further geotechnical investigations are required to identify problematic soils and geology such as hard rock, which can pose constructability difficulties, or substantially increase project costs. Field investigations including sampling and analysis are recommended and can be combined with geotechnical investigations where appropriate.
- Flood potential: Further investigation into the potential for flooding within the corridor will be required to understand the risk to the project both during construction and operation. Waterway crossings may require a tailored design response to ensure minimal damage to vegetation and mitigate risks of damage to tower structures.
- Crossings and bends: Further investigation to confirm the minimum number of interfaces for the corridor with other infrastructure such as roads, rail, pipelines and other identified values is required to understand where these asset types are located and options for the final alignment. The number of potential bends and associated impacts to the project can be assessed and further refined during the next phase.

Appendix A

Figure 1: Calvale to Calliope River Study Area showing all project sections



Appendix B

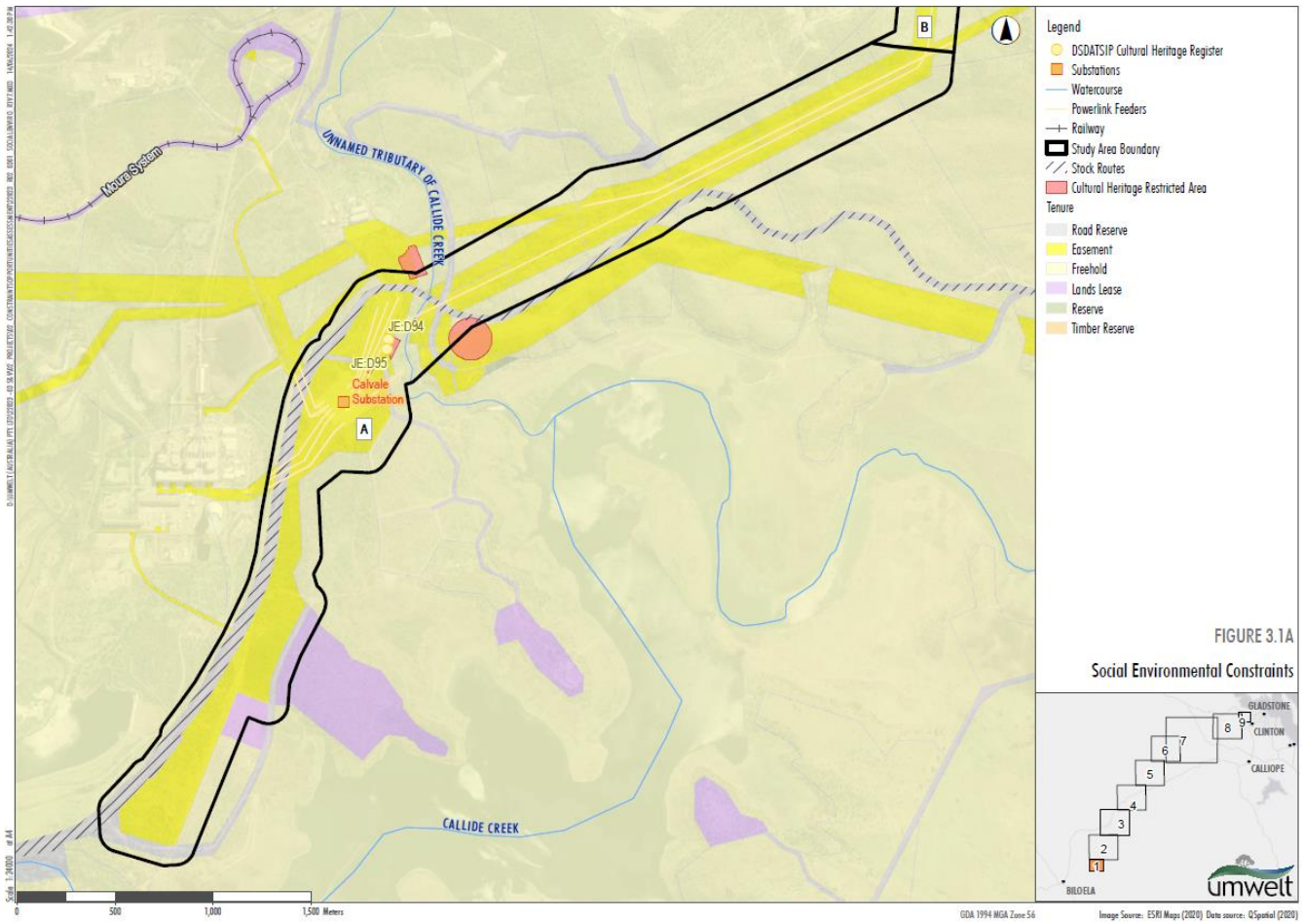


FIGURE 3.1A

Social Environmental Constraints

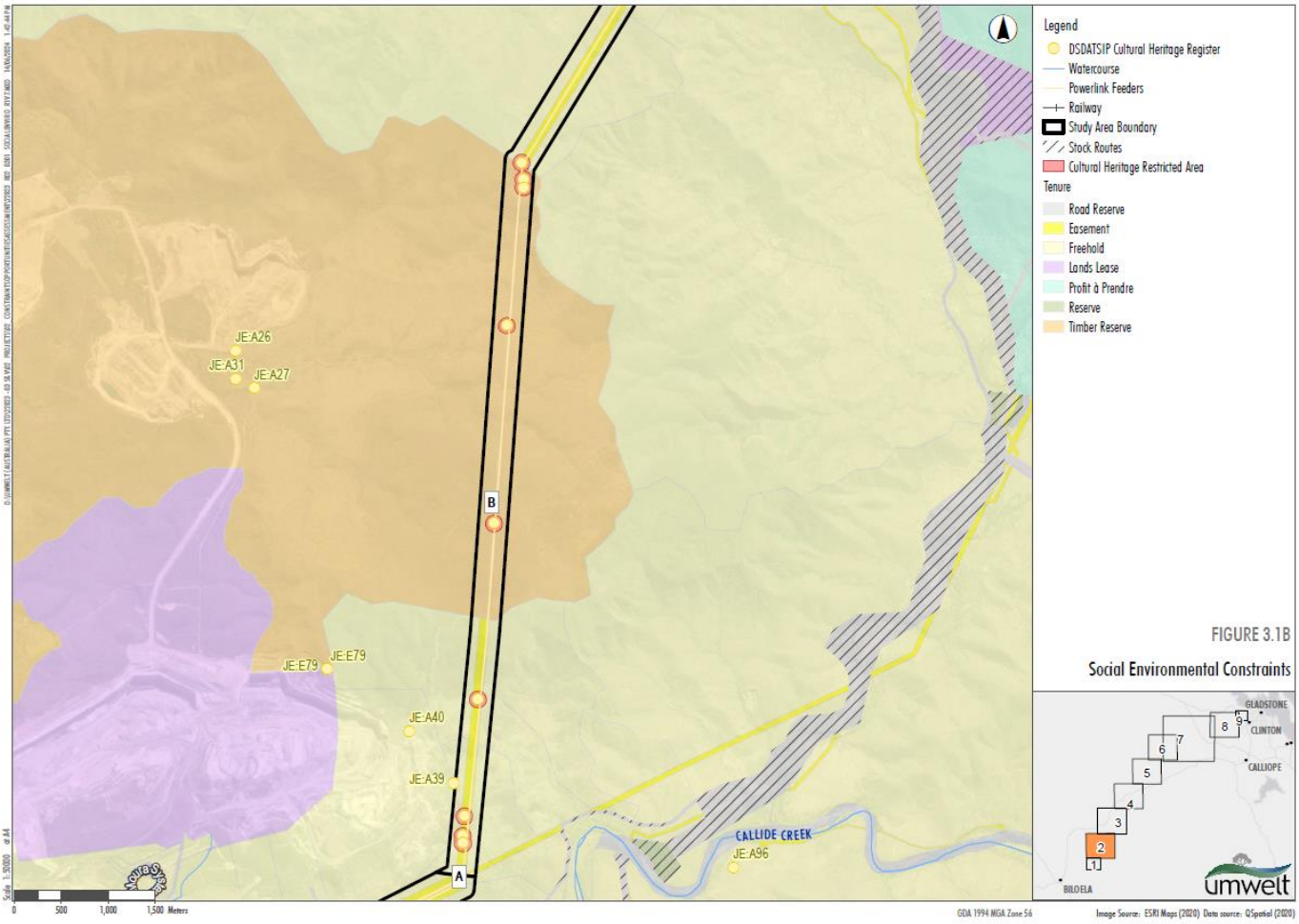
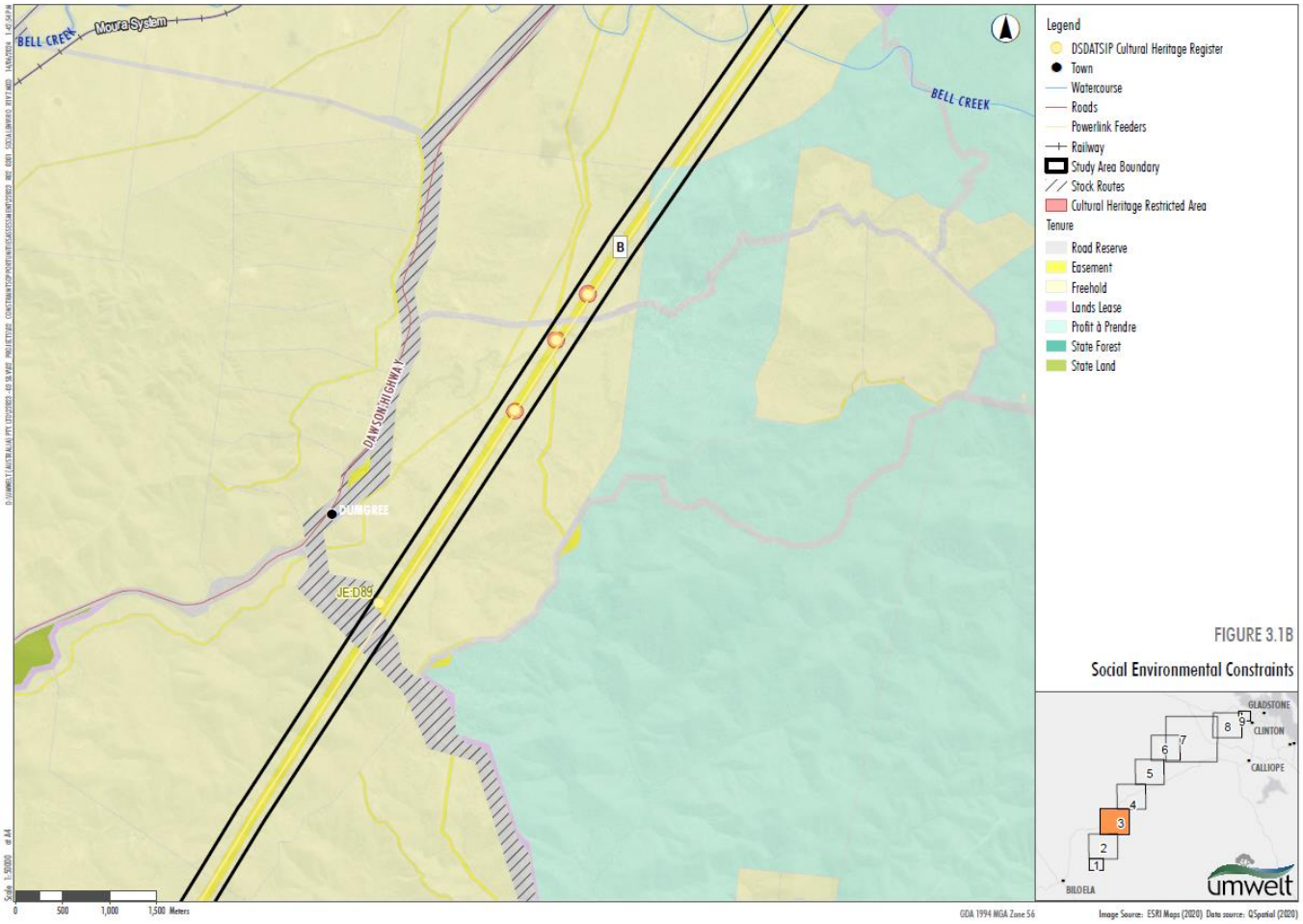
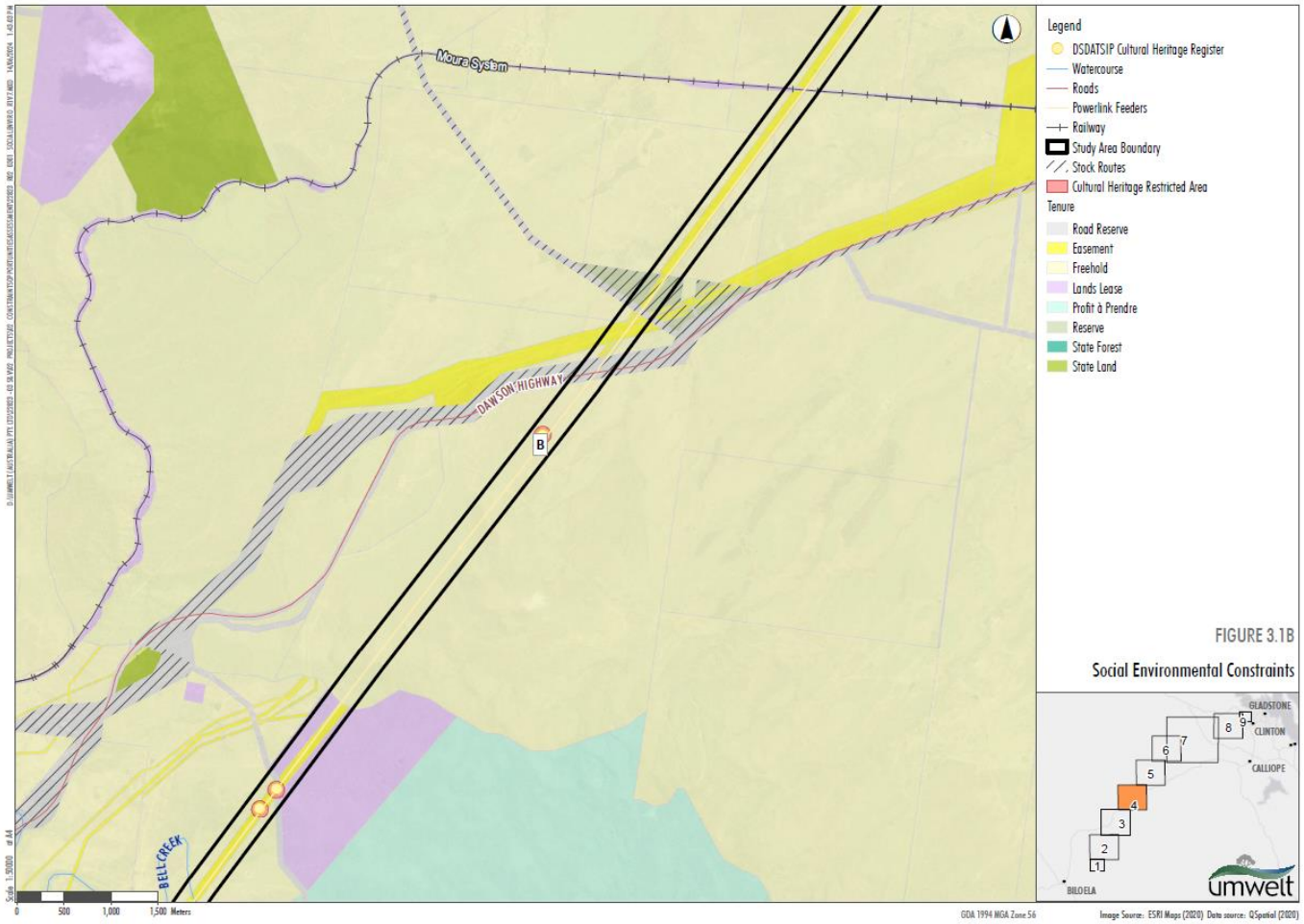


FIGURE 3.1B

Social Environmental Constraints


BELL CREEK
Moura System
BELL CREEK
B
DAWSON HIGHWAY
DUARGREE
JE:D89
Legend
DSDATSIP Cultural Heritage Register
Town
Watercourse
Roads
Powerlink Feeders
Railway
Study Area Boundary
Stock Routes
Cultural Heritage Restricted Area
Tenure
Road Reserve
Easement
Freehold
Lands Lease
Profit à Prendre
State Forest
State Land
FIGURE 3.1B
Social Environmental Constraints
GLADSTONE
CLINTON
CALLIOPE
BILOELA
1
2
3
4
5
6
7
8
9
umwelt
0
500
1,000
1,500 Meters
GDA 1994 MGA Zone 56
Image Source:: ESRI Maps (2020) Data source:: QSpatial (2020)


Moura System
DAWSON HIGHWAY
BELL CREEK
B
Legend
DSDATSIP Cultural Heritage Register
Watercourse
Roads
Powerlink Feeders
Railway
Study Area Boundary
Stock Routes
Cultural Heritage Restricted Area
Tenure
Road Reserve
Easement
Freehold
Lands Lease
Profit à Prendre
Reserve
State Forest
State Land
FIGURE 3.1B
Social Environmental Constraints
GLADSTONE
CLINTON
CALLIOPE
BILOELA
1
2
3
4
5
6
7
8
9
umwelt
0
500
1,000
1,500 Meters
GDA 1994 MGA Zone 56
Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

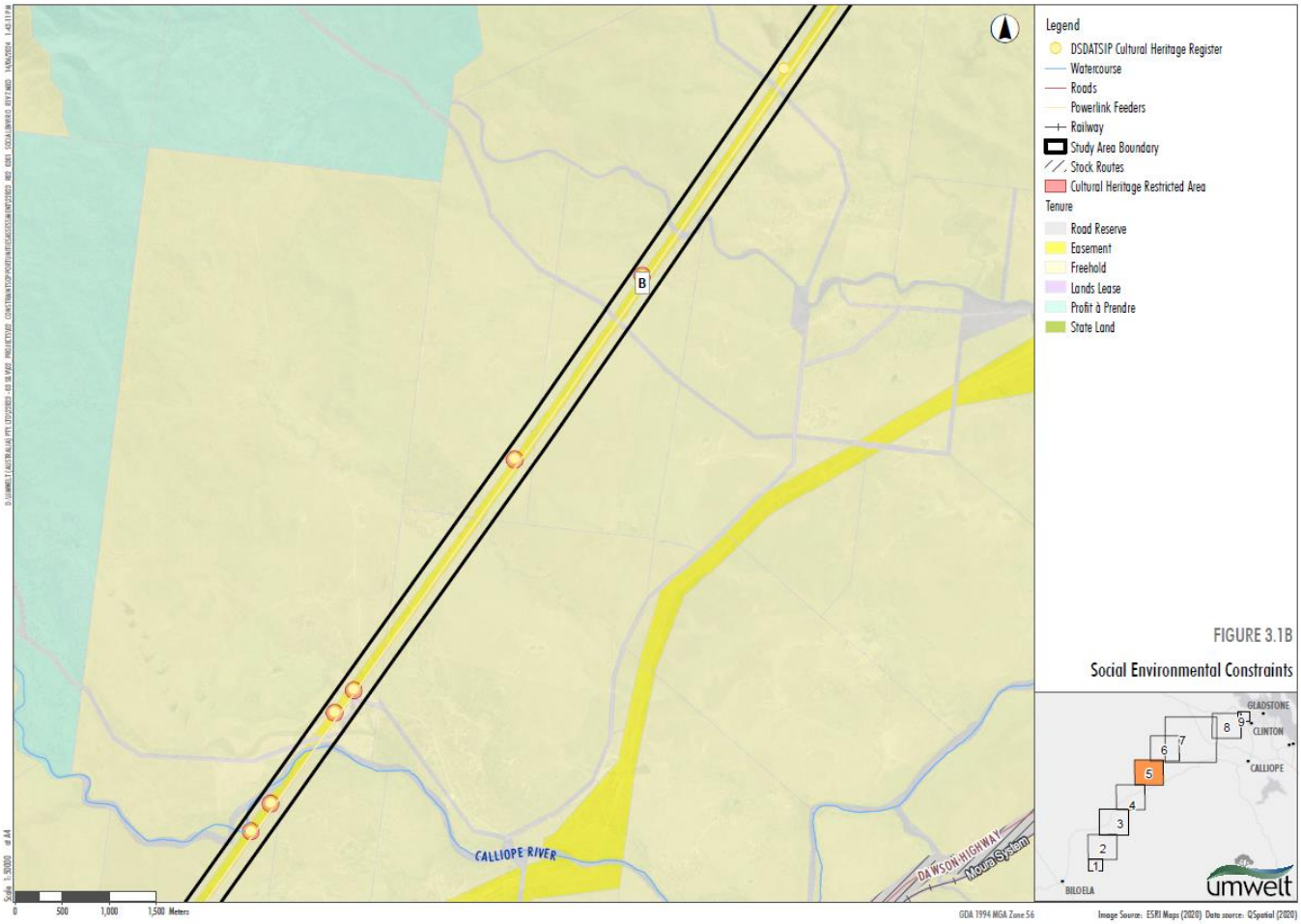


FIGURE 3.1B

Social Environmental Constraints

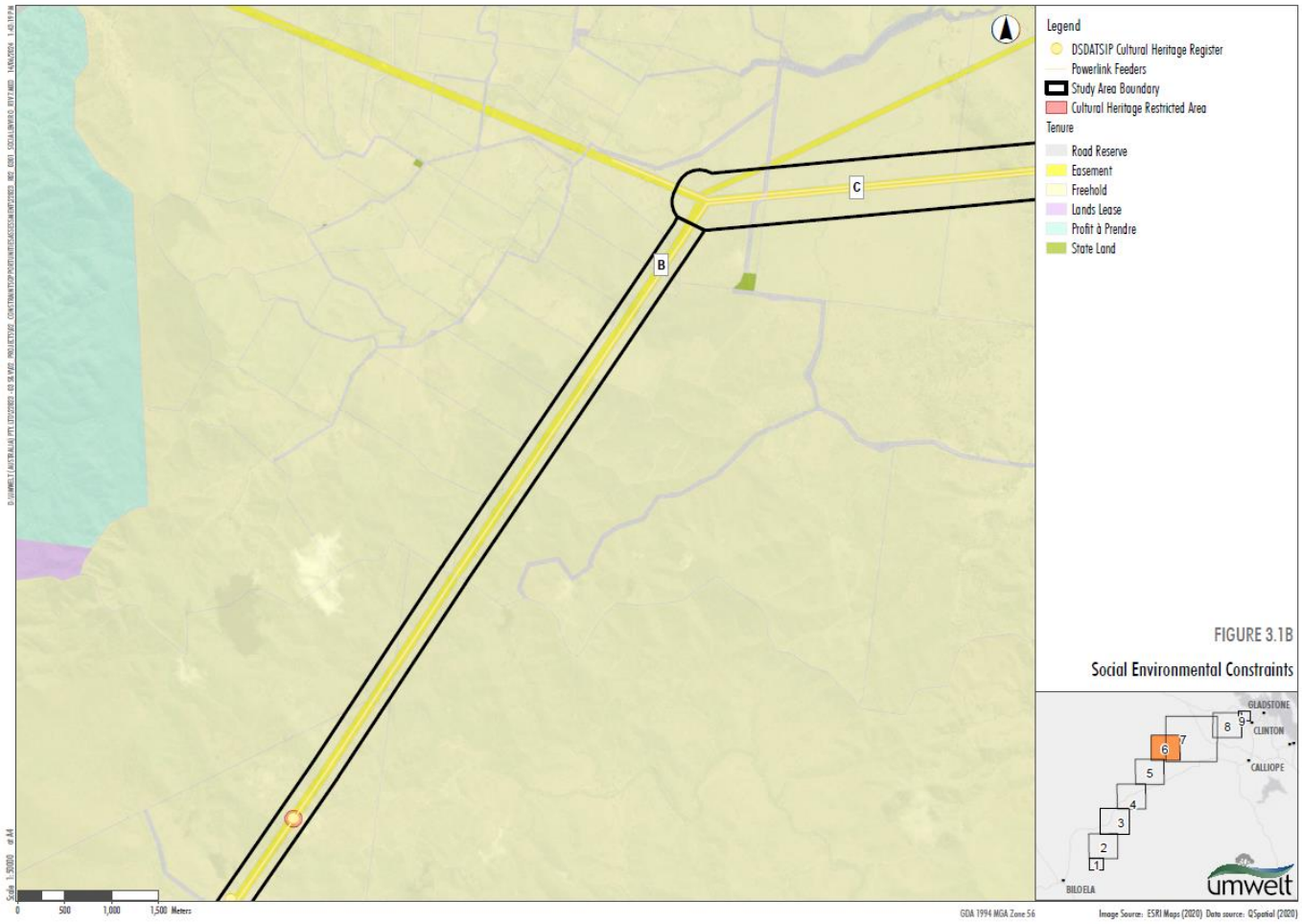
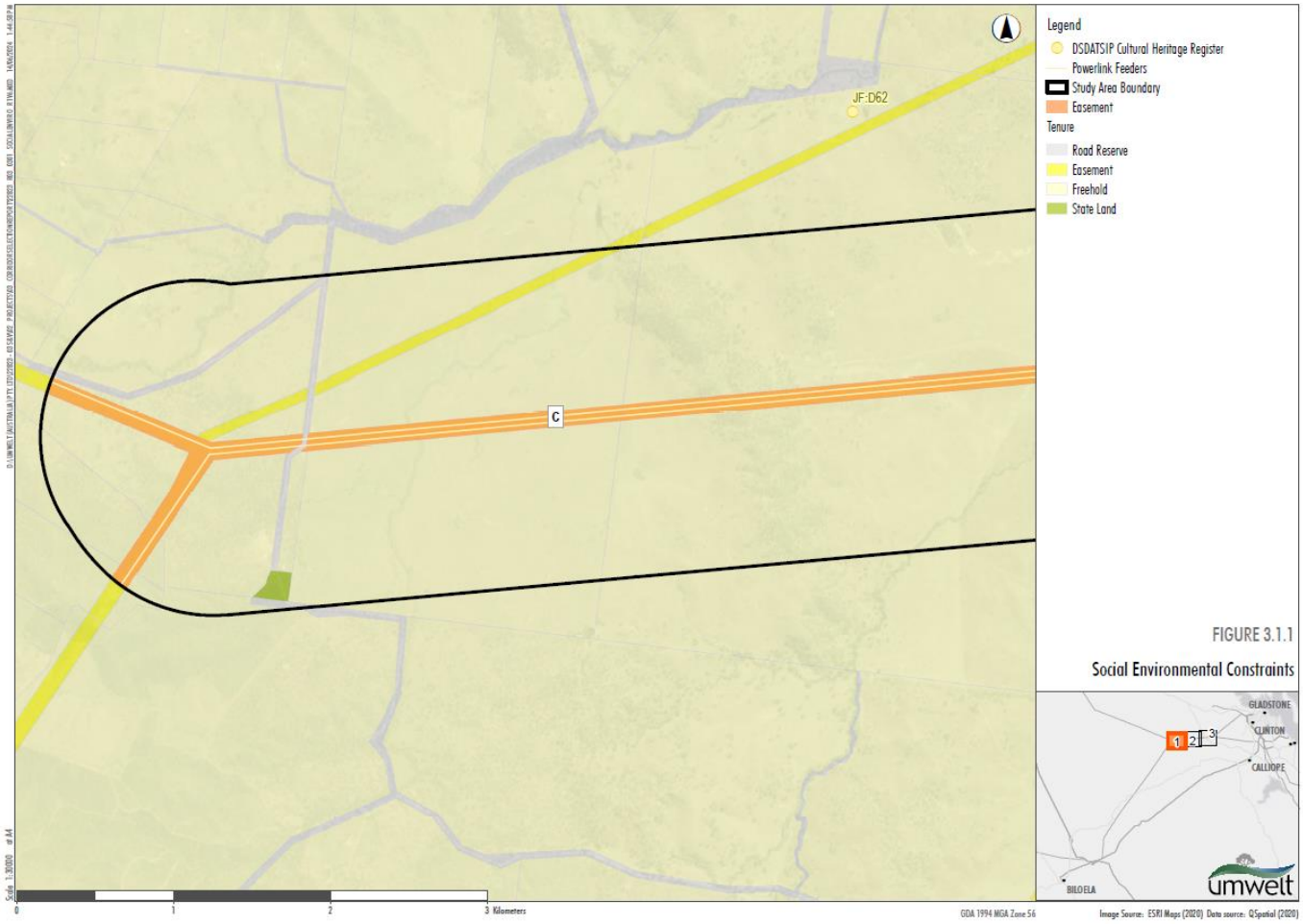


FIGURE 3.1B

Social Environmental Constraints


Legend
DSDATSIP Cultural Heritage Register
Powerlink Feeders
Study Area Boundary
Easement
Tenure
Road Reserve
Easement
Freehold
State Land
JF:D62
C
FIGURE 3.1.1
Social Environmental Constraints
GLADSTONE
CLINTON
CALLIOPE
BILOELA
1
2
3
umwelt
0
1
2
3 Kilometers
GDA 1994 MGA Zone 56
Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

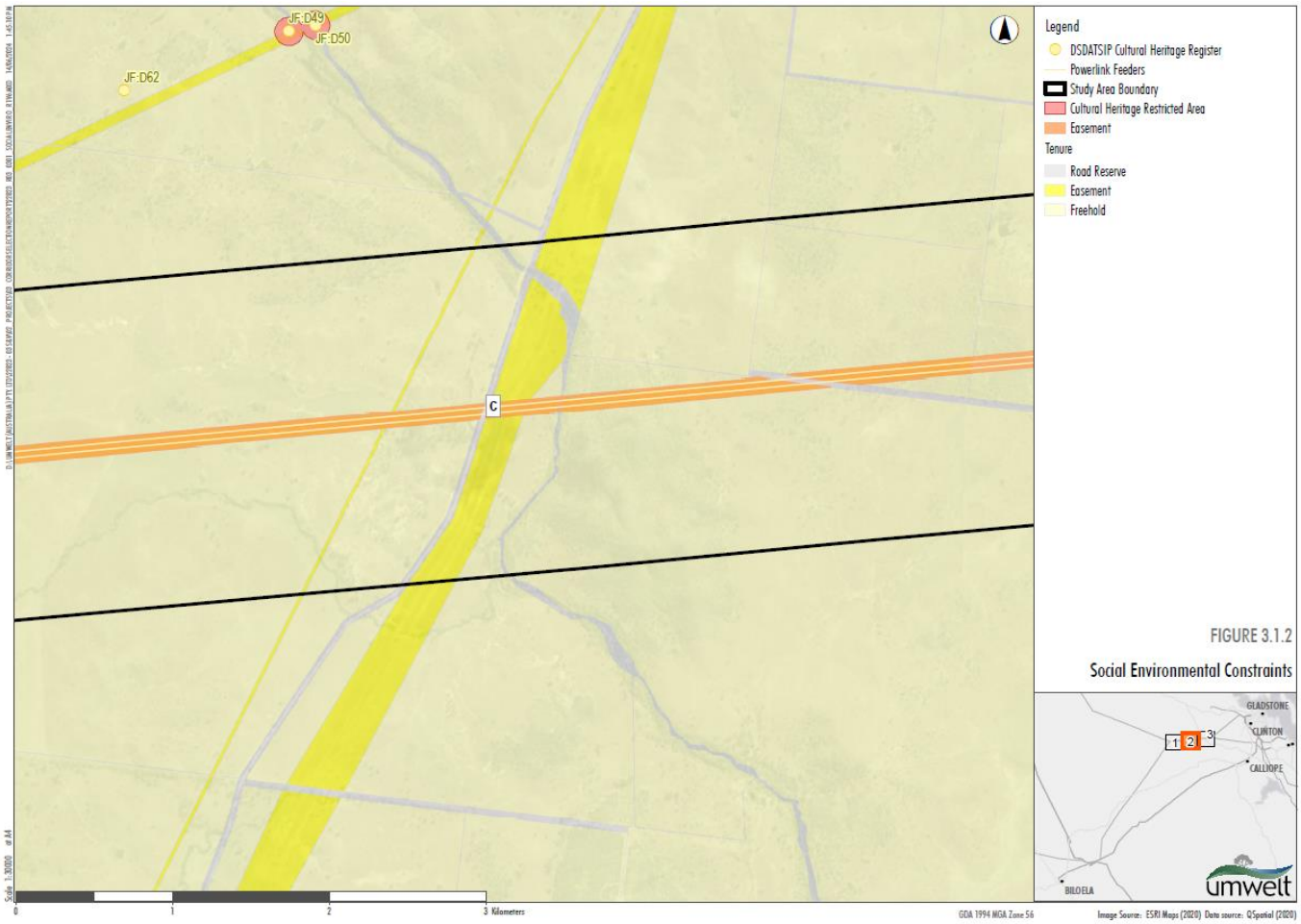


FIGURE 3.1.2

Social Environmental Constraints

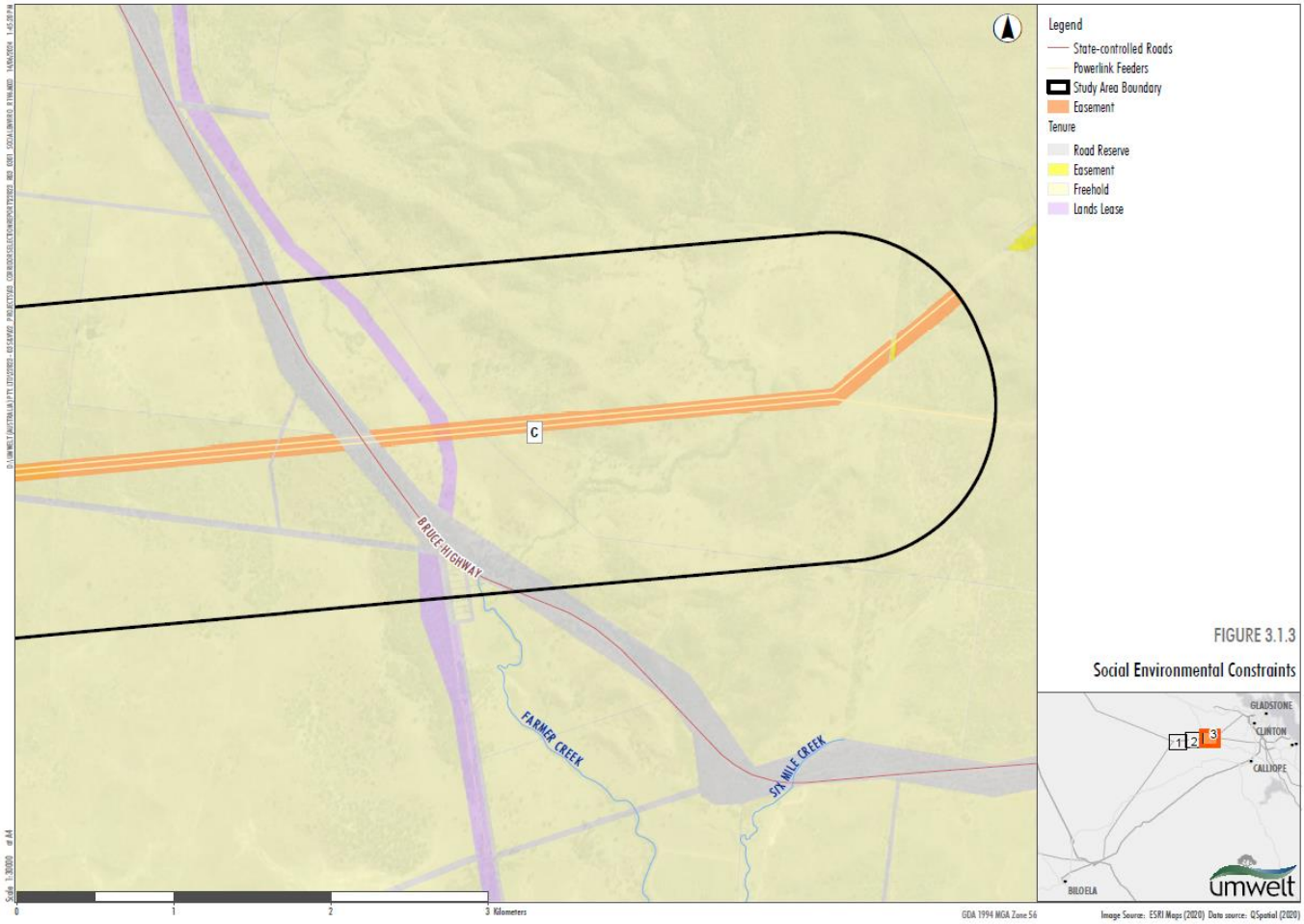


FIGURE 3.1.3

Social Environmental Constraints

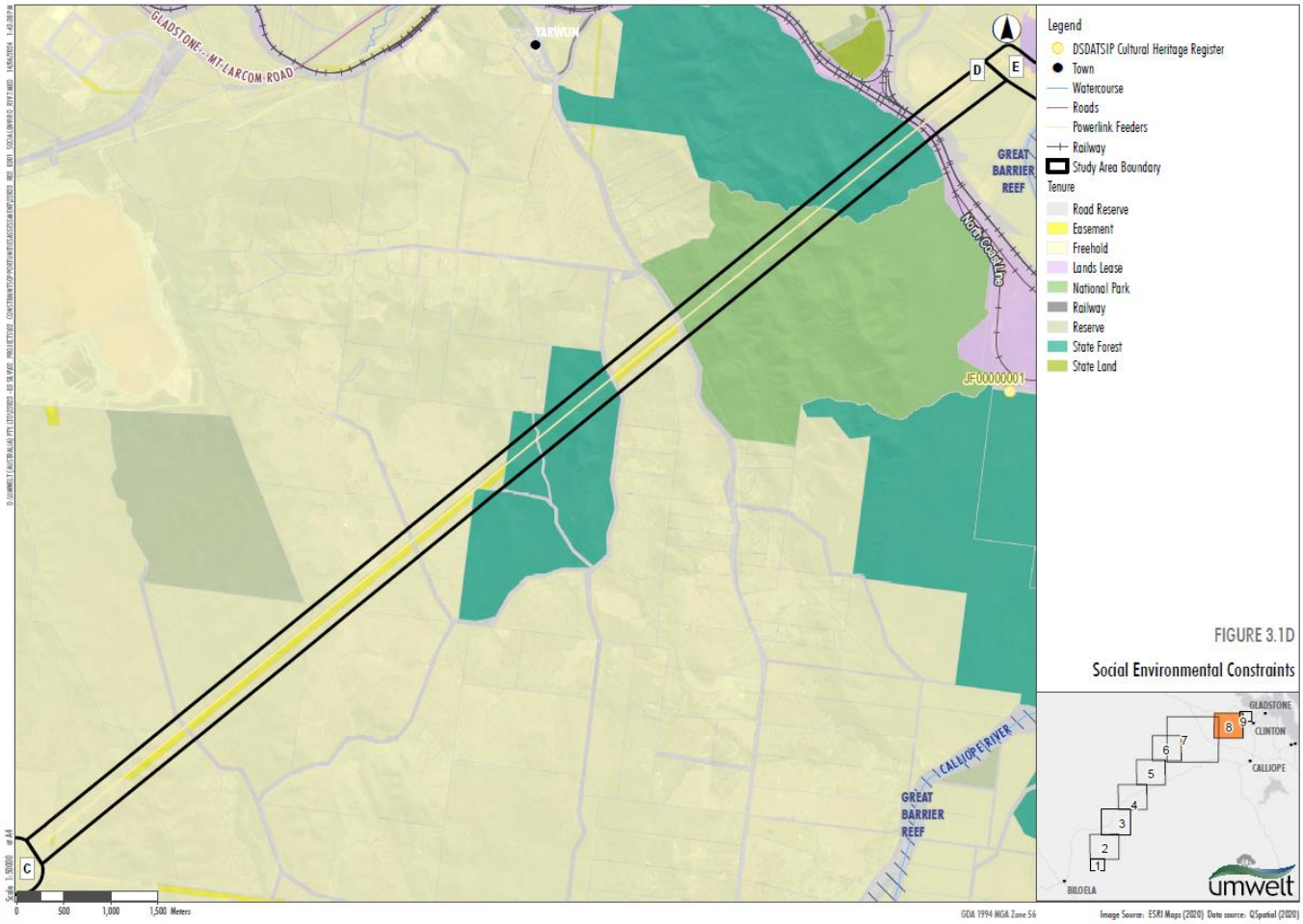


FIGURE 3.1D

Social Environmental Constraints

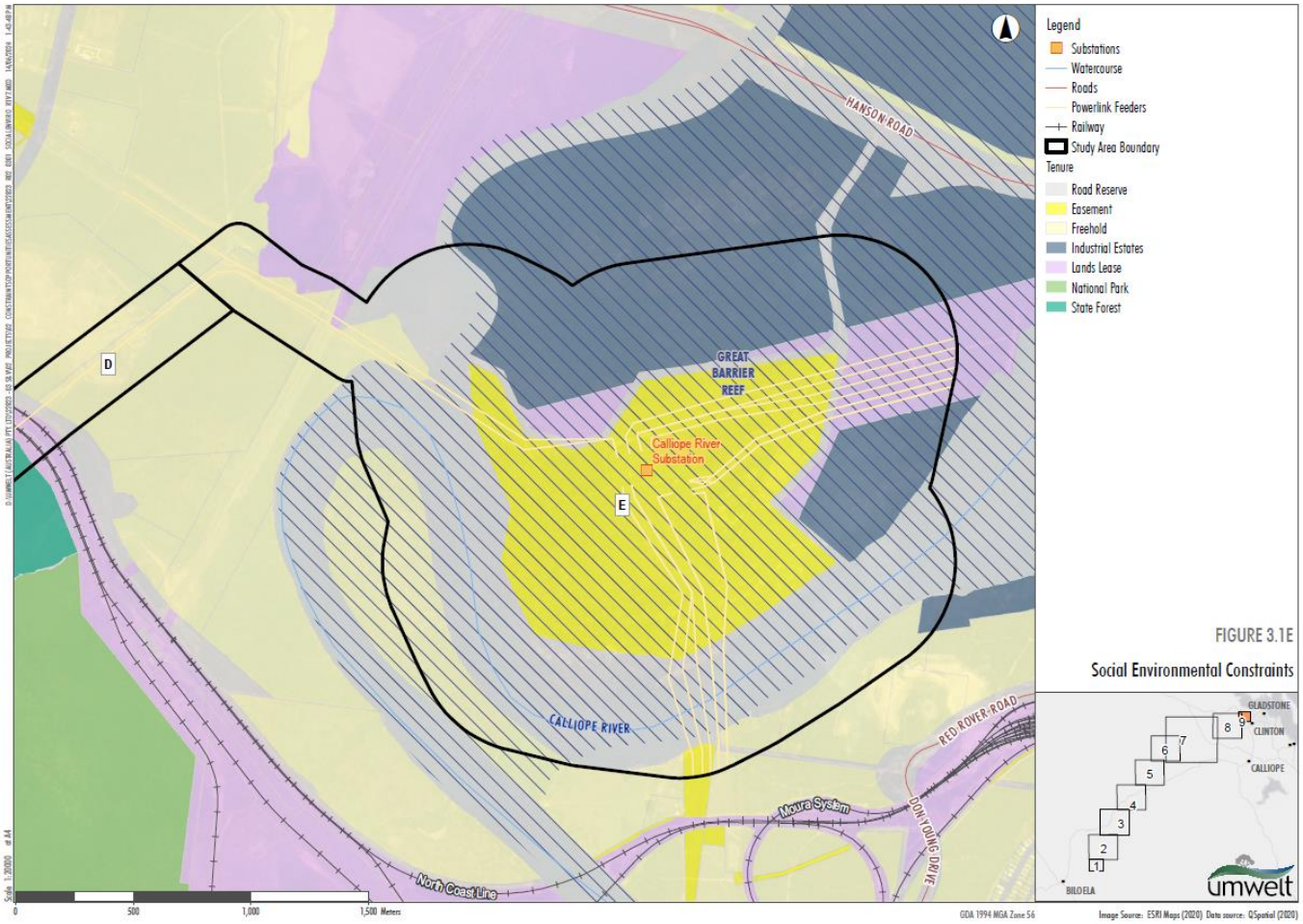
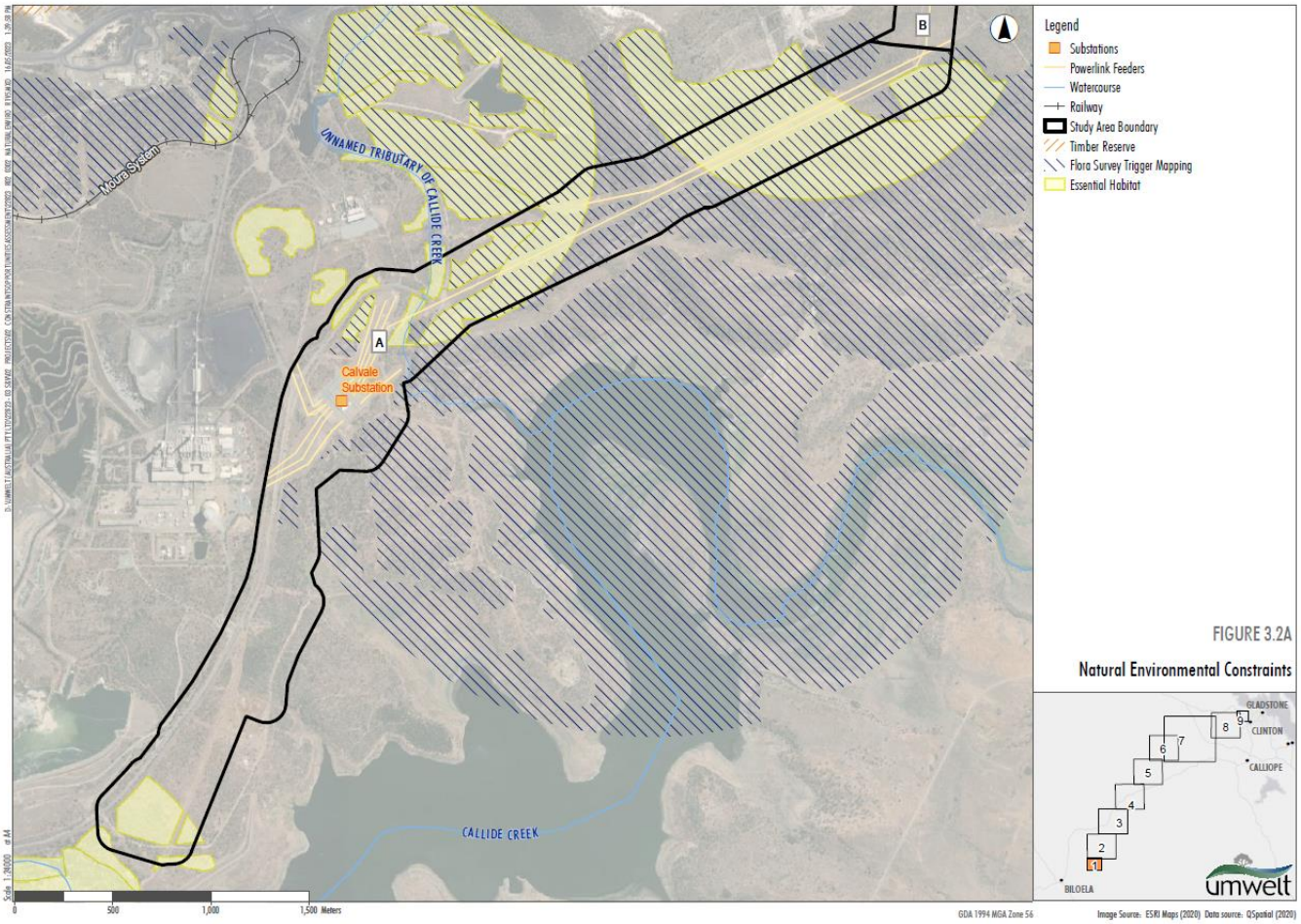


FIGURE 3.1E

Social Environmental Constraints

Appendix C


B
A
Calvale Substation
UNNAMED TRIBUTARY OF CALLIDE CREEK
Mount Scaen
CALLIDE CREEK
Legend
Substations
Powerlink Feeders
Watercourse
Railway
Study Area Boundary
Timber Reserve
Flora Survey Trigger Mapping
Essential Habitat
FIGURE 3.2A
Natural Environmental Constraints
GLADSTONE
CLINTON
CALLIOPE
BILOELA
1
2
3
4
5
6
7
8
9
umwelt
0
500
1,000
1,500 Meters
GDA 1994 MGA Zone 56
Image Source: ESRI Maps (2020) Data source: QSpatial (2020)

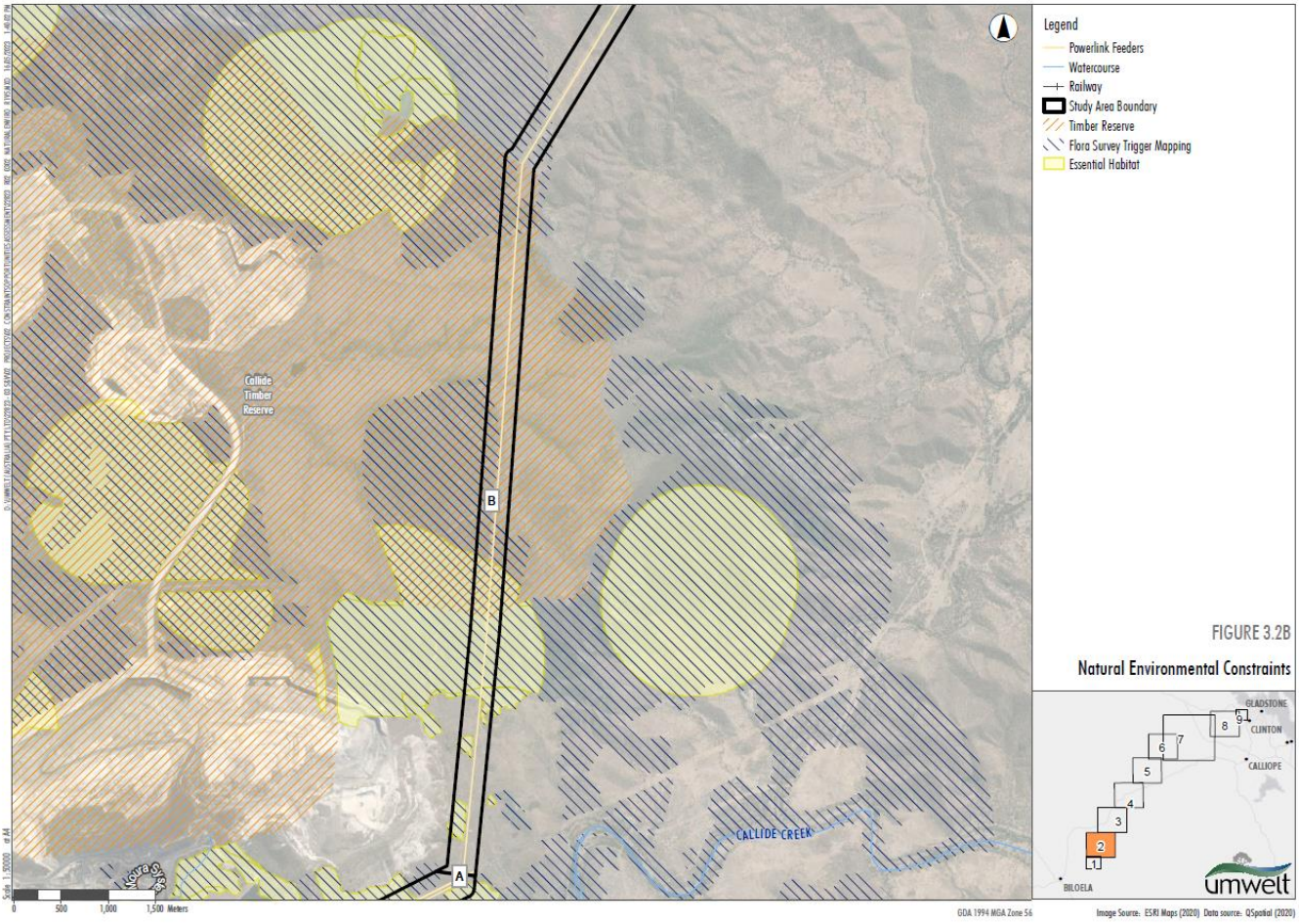


FIGURE 3.2B

Natural Environmental Constraints

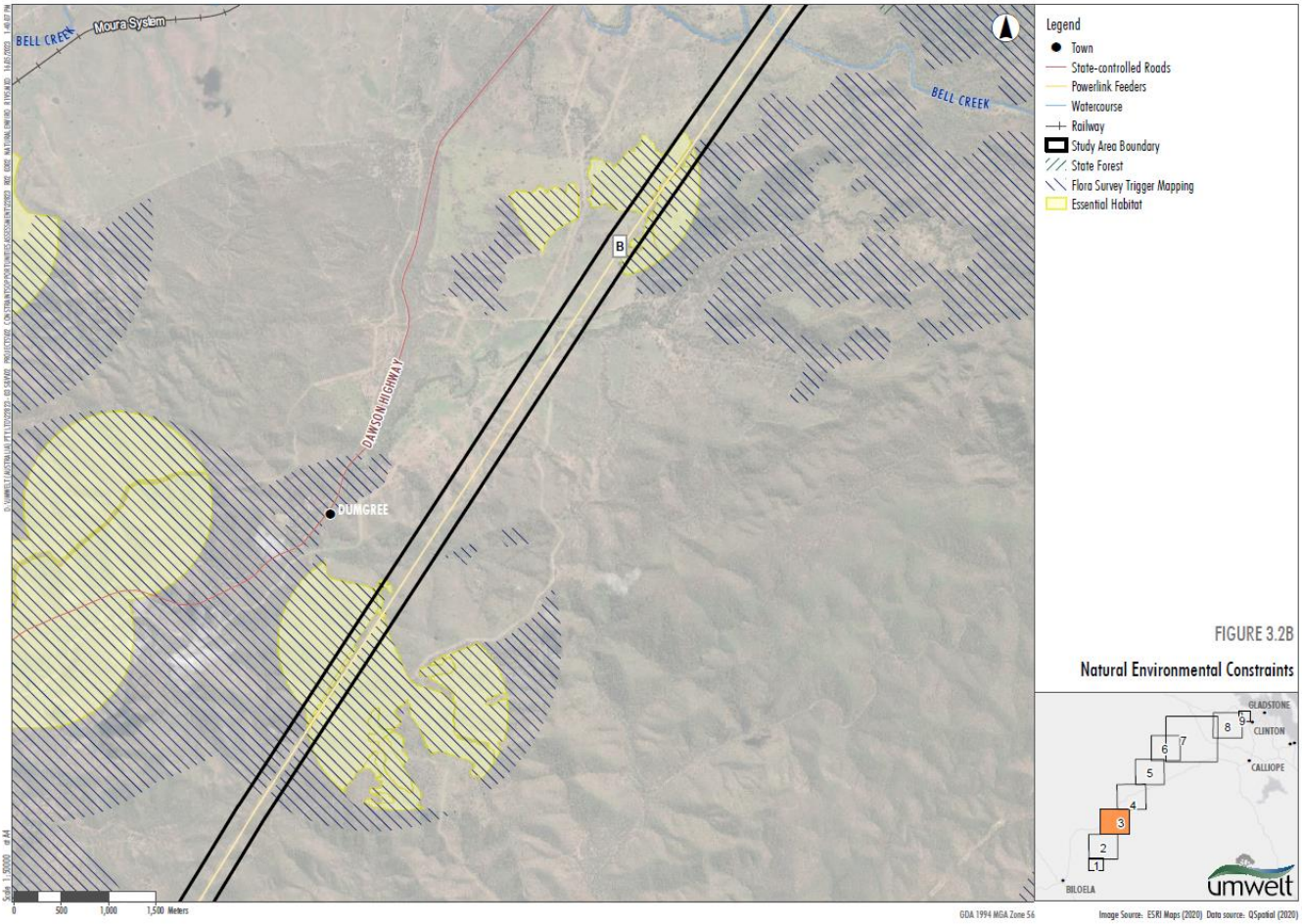


FIGURE 3.2B

Natural Environmental Constraints

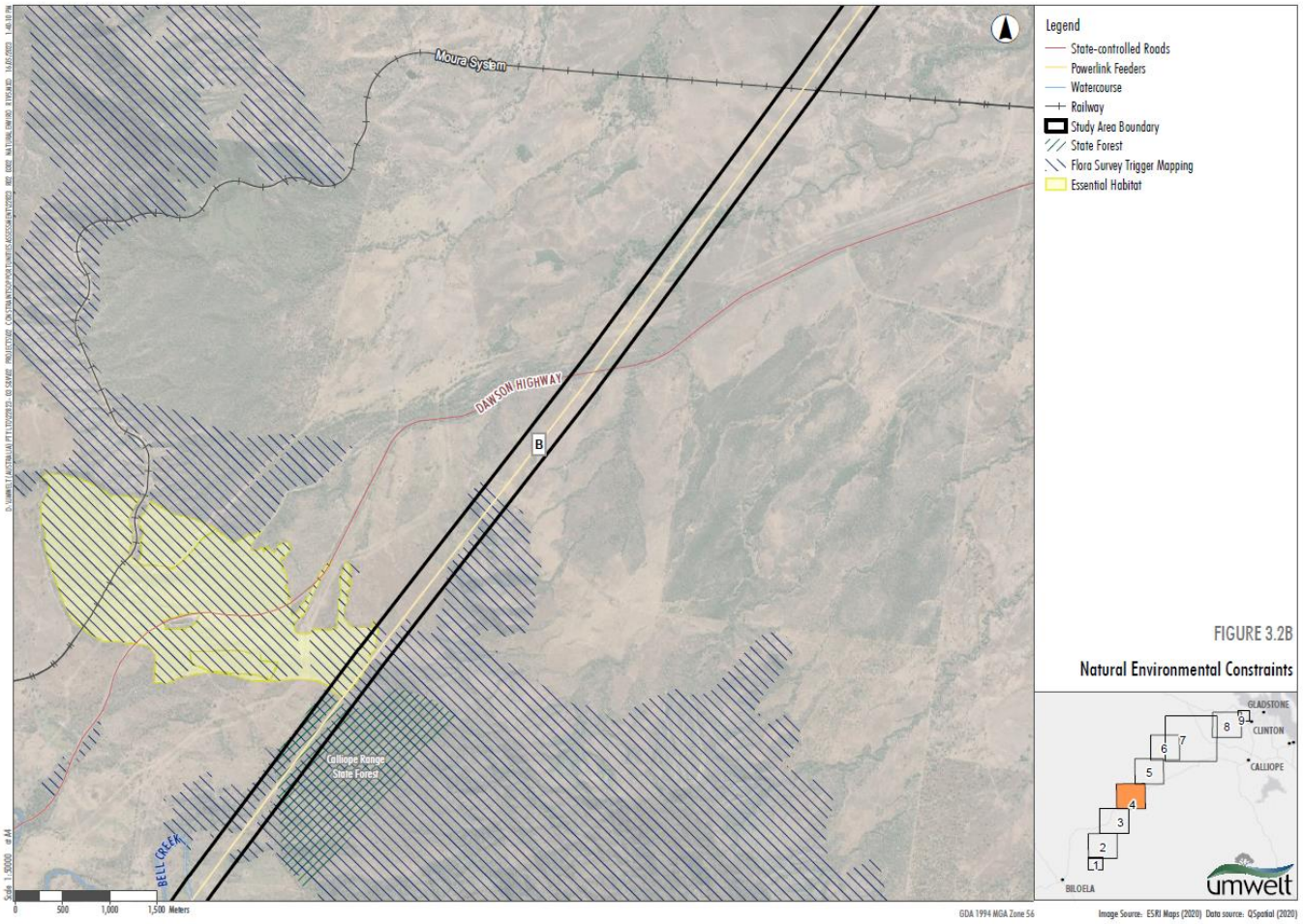


FIGURE 3.2B

Natural Environmental Constraints

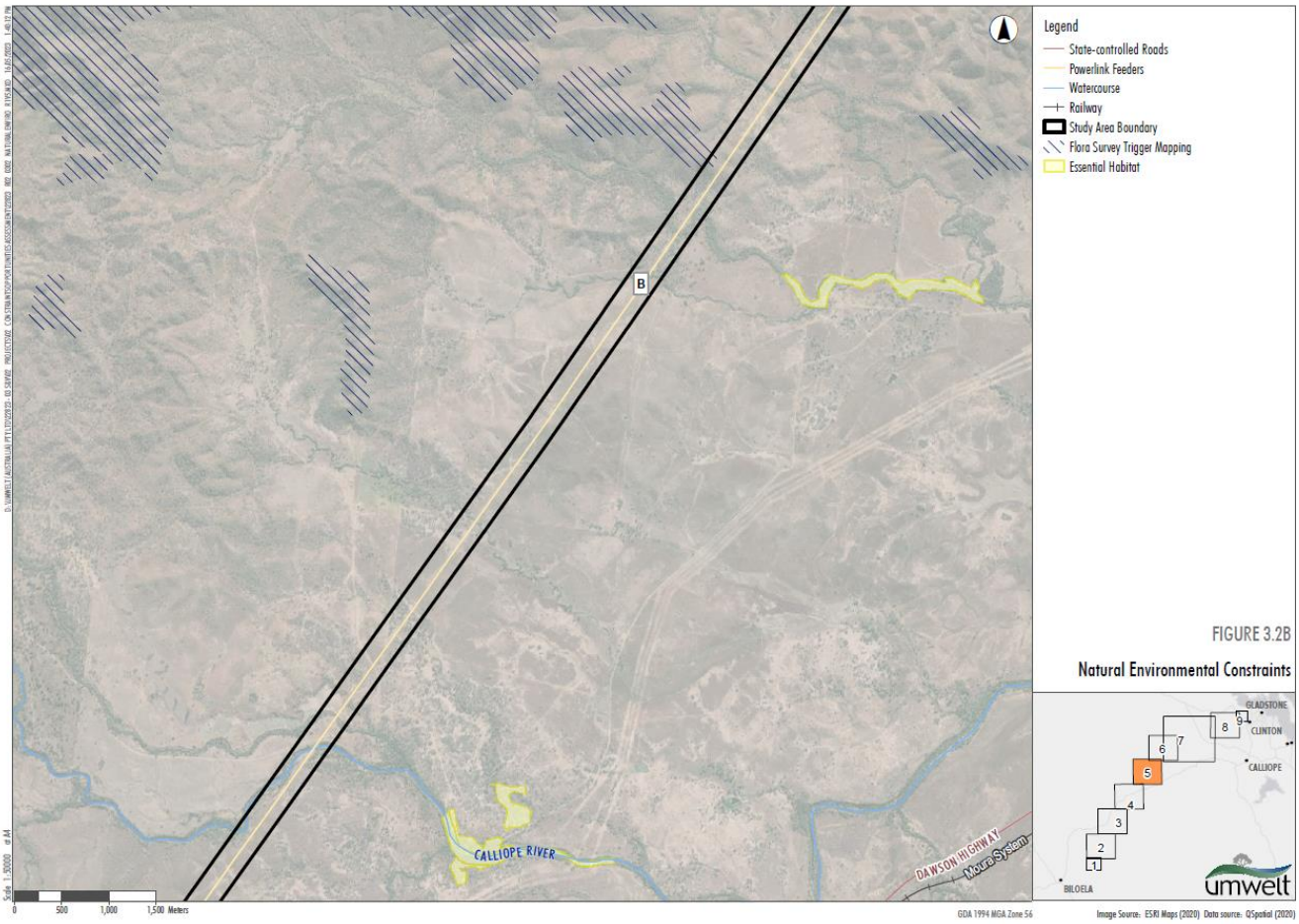


FIGURE 3.2B

Natural Environmental Constraints

FIGURE 3.2B

Natural Environmental Constraints

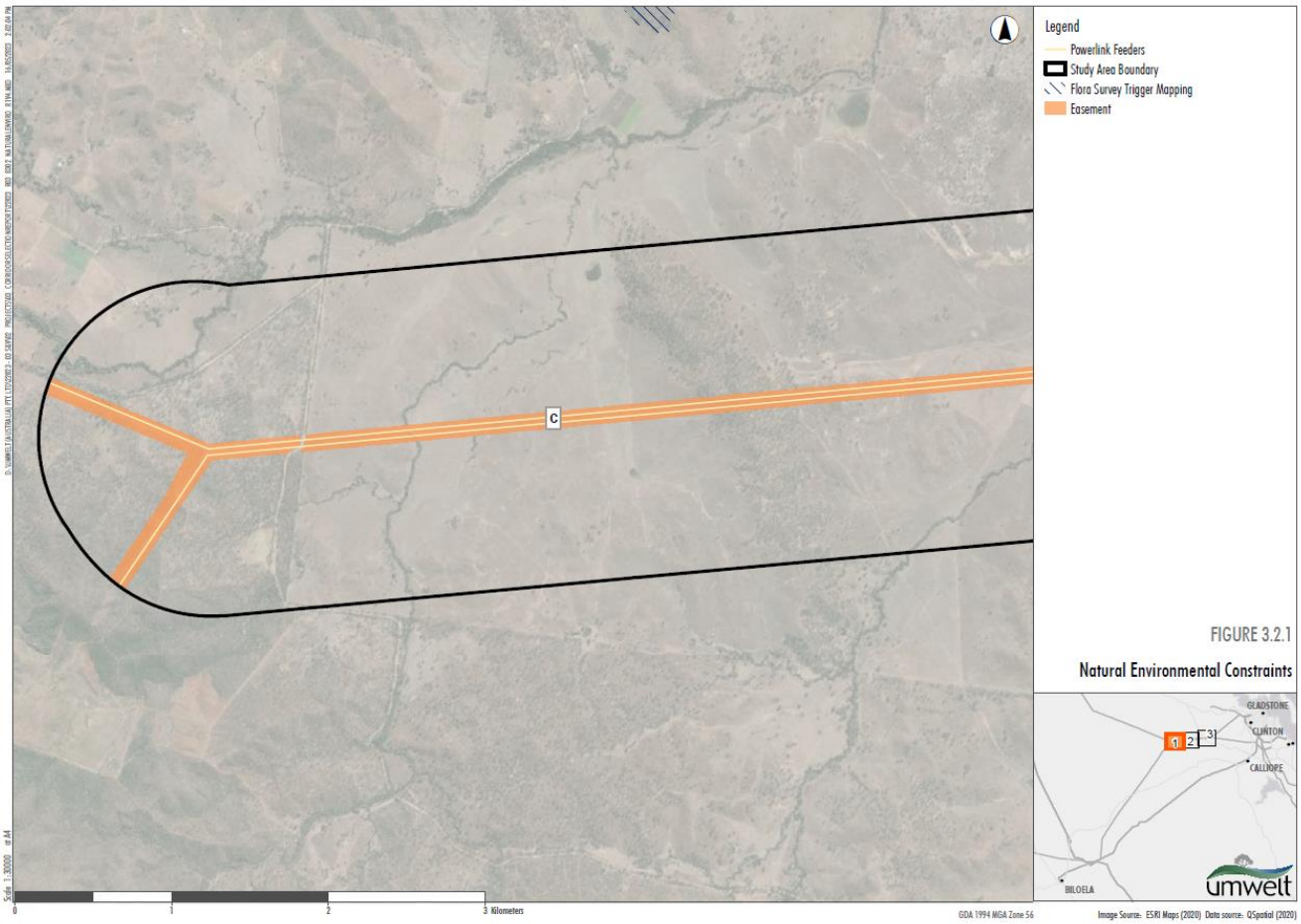


FIGURE 3.2.1

Natural Environmental Constraints

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

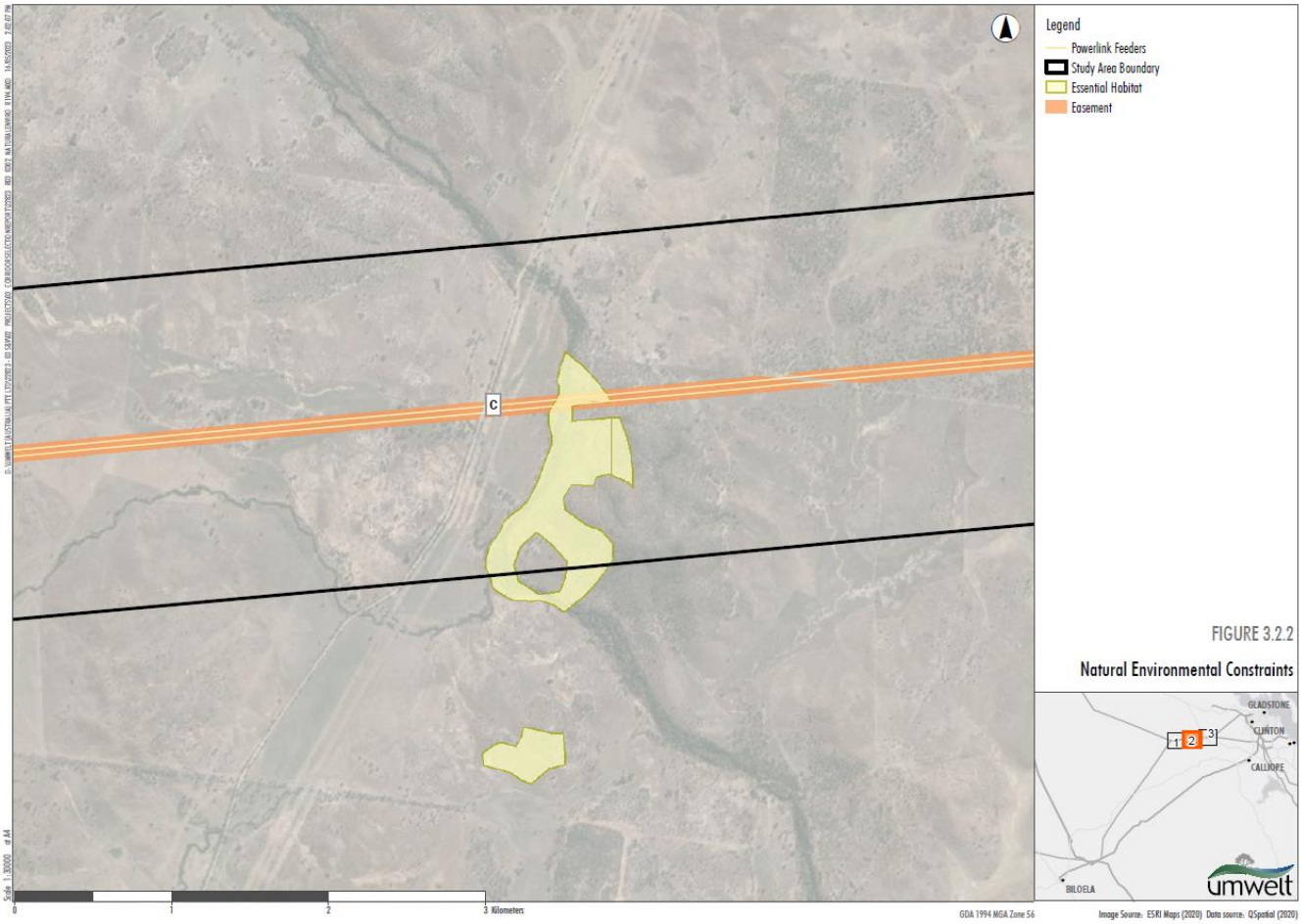


FIGURE 3.2.2

Natural Environmental Constraints

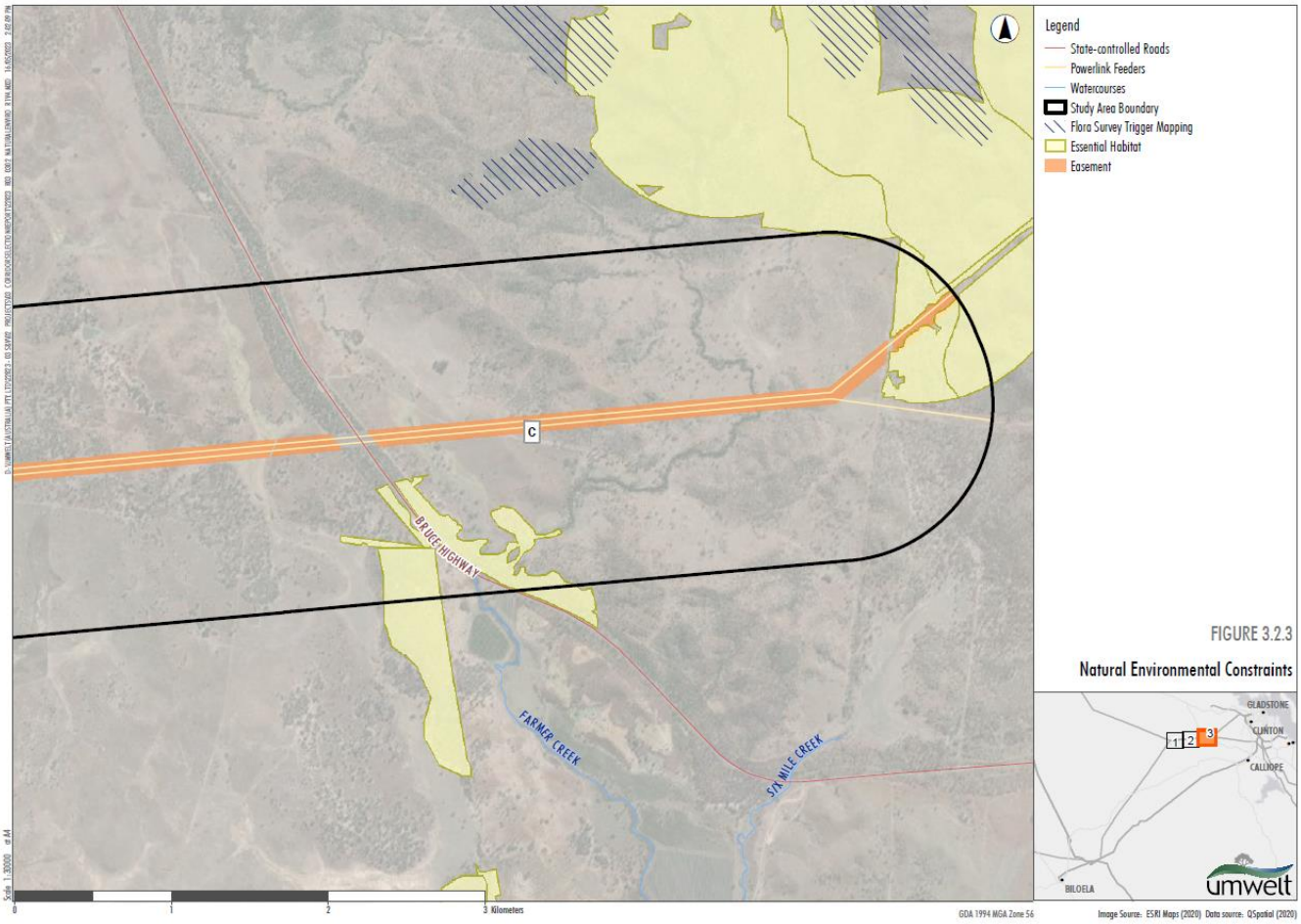


FIGURE 3.2.3

Natural Environmental Constraints

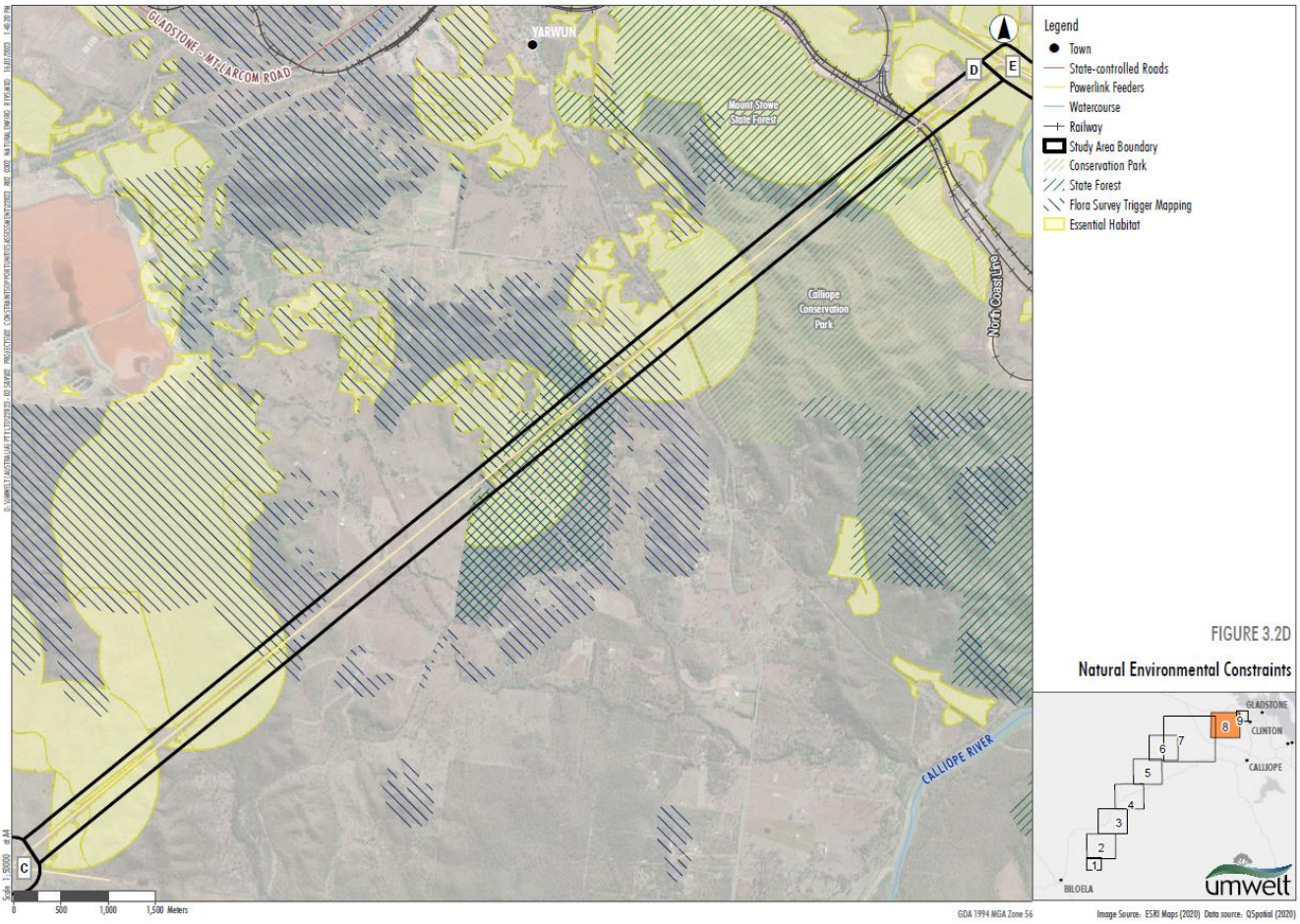


FIGURE 3.2D

Natural Environmental Constraints

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

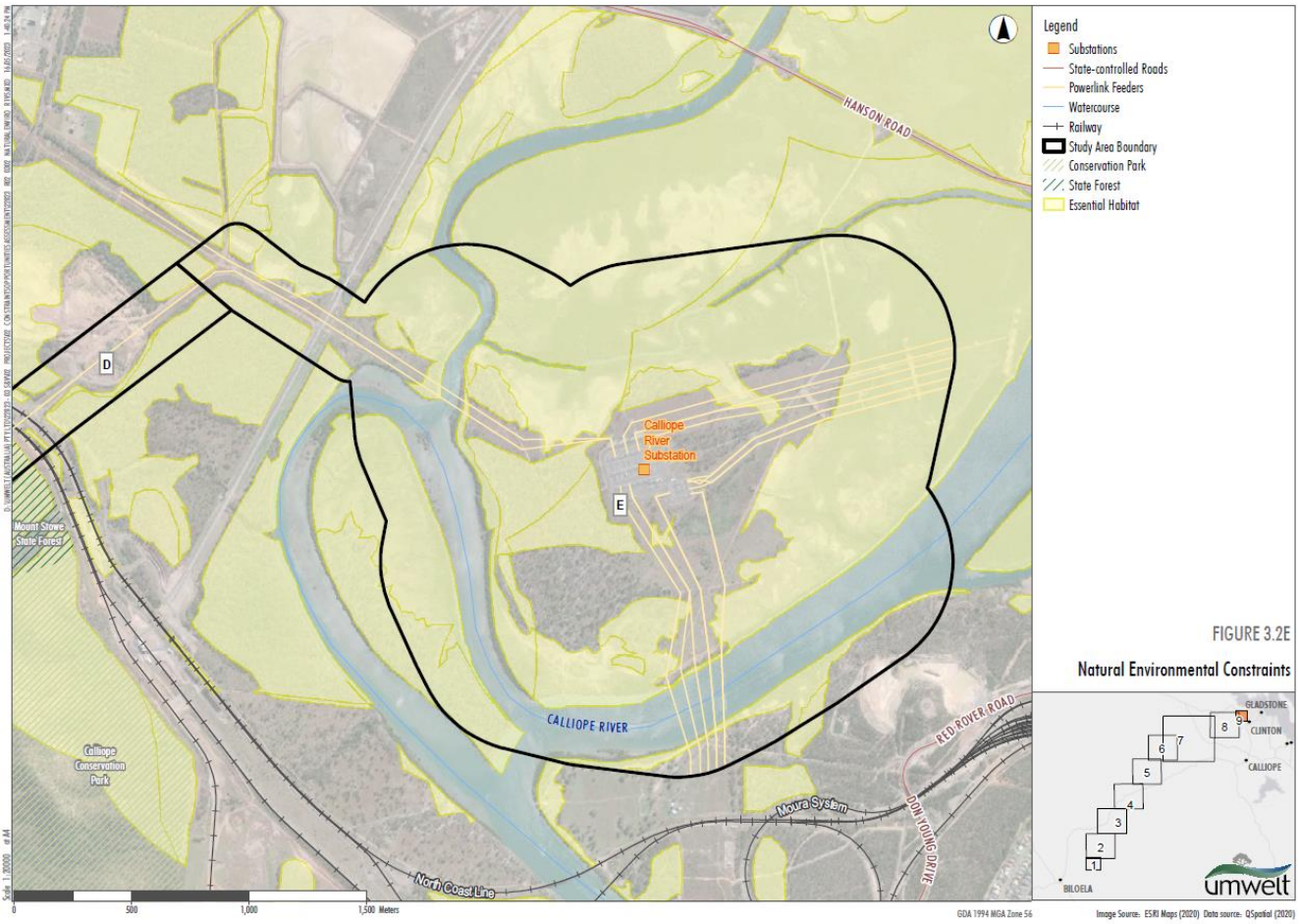


FIGURE 3.2E

Natural Environmental Constraints

Appendix D

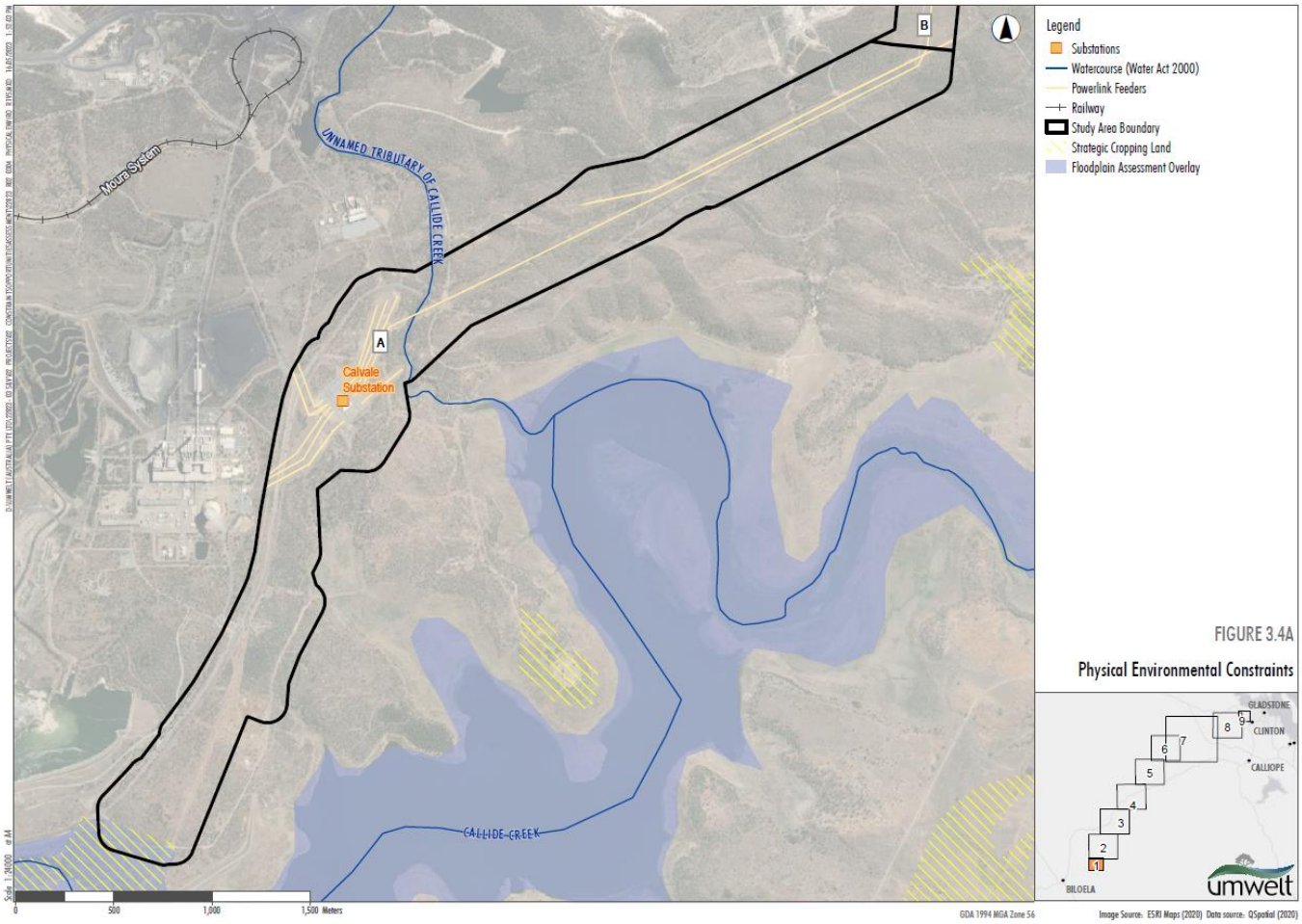


FIGURE 3.4A

Physical Environmental Constraints

FIGURE 3.4B

Physical Environmental Constraints

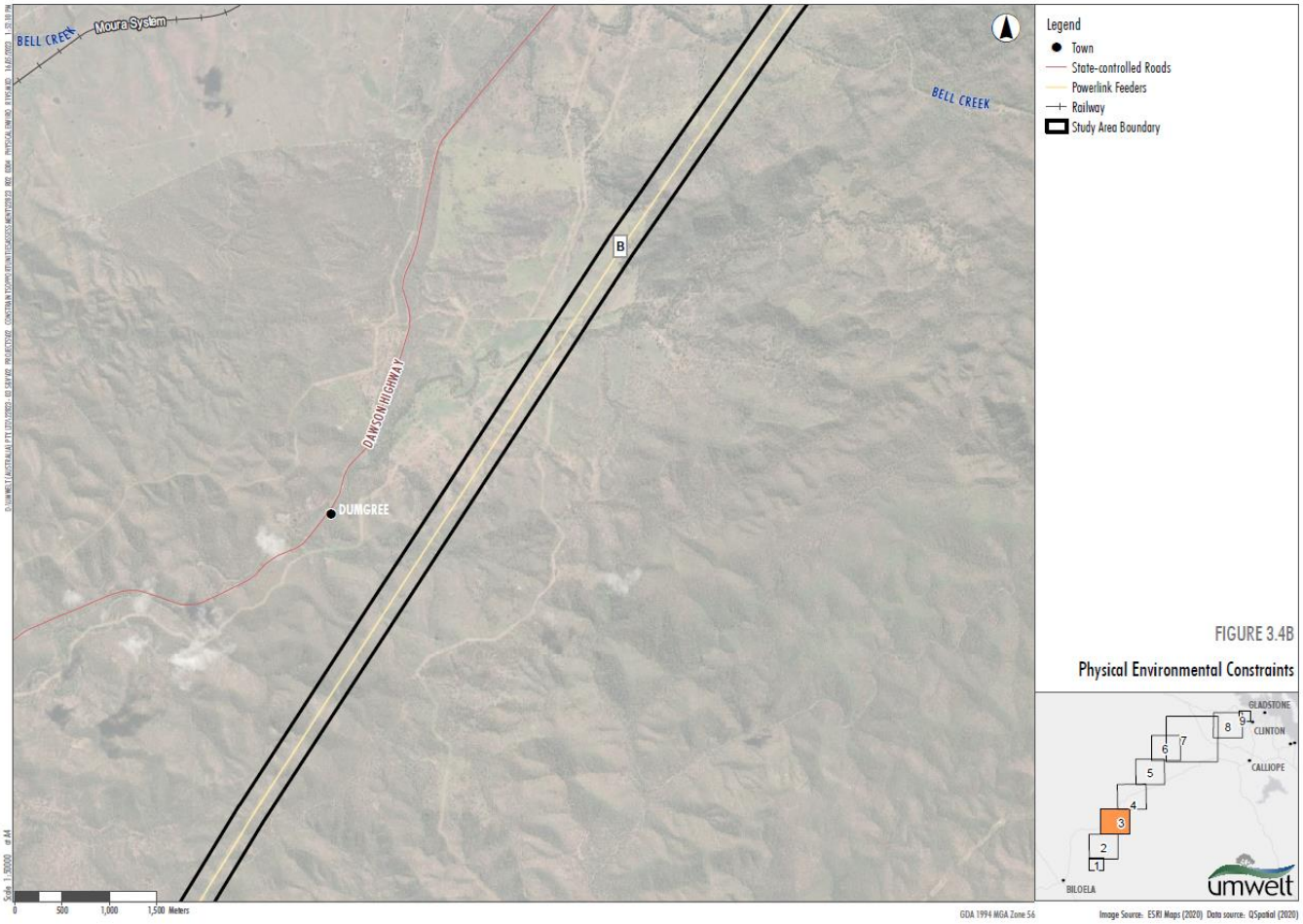


FIGURE 3.4B

Physical Environmental Constraints

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

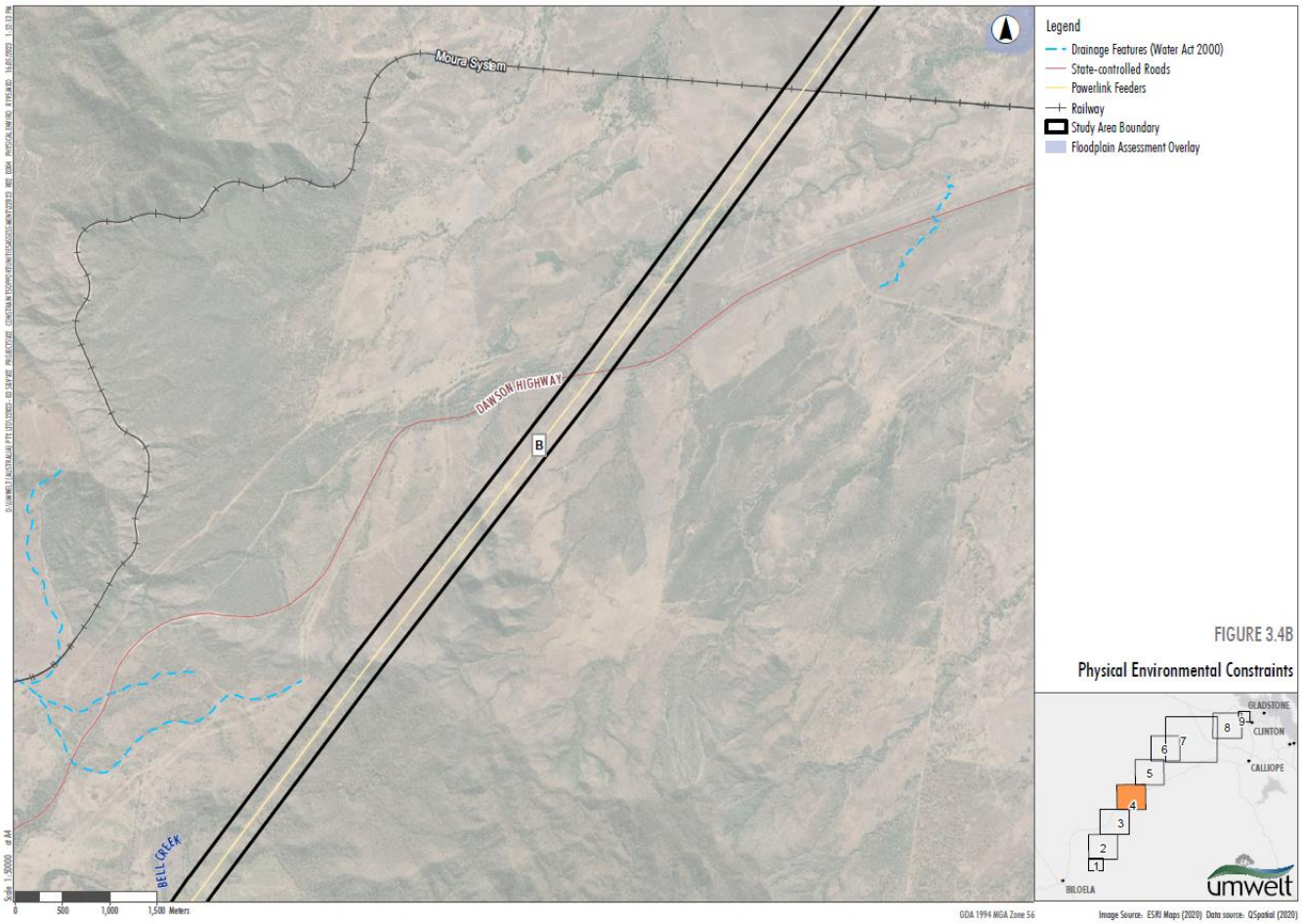


FIGURE 3.4B

Physical Environmental Constraints

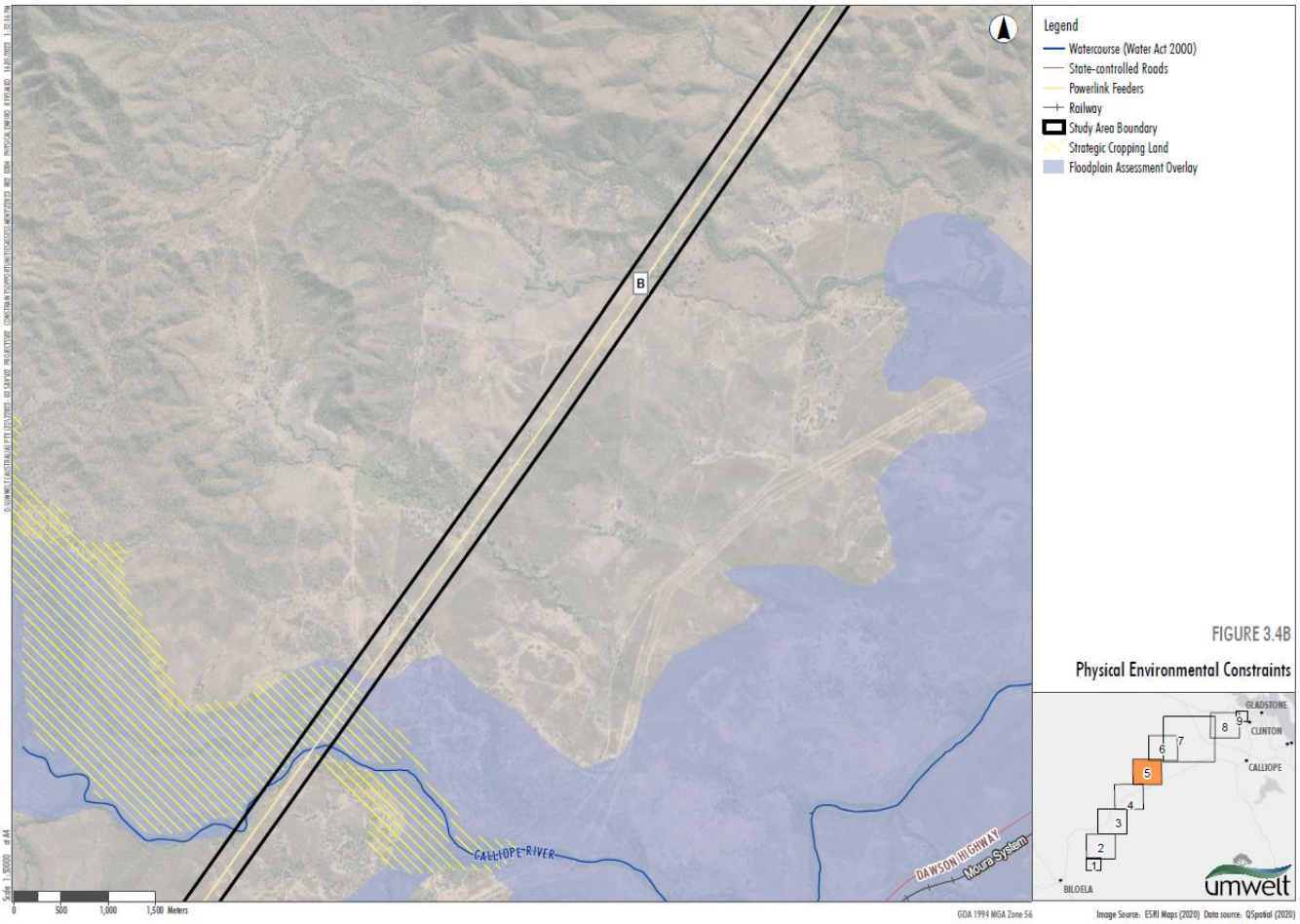


FIGURE 3.4B

Physical Environmental Constraints

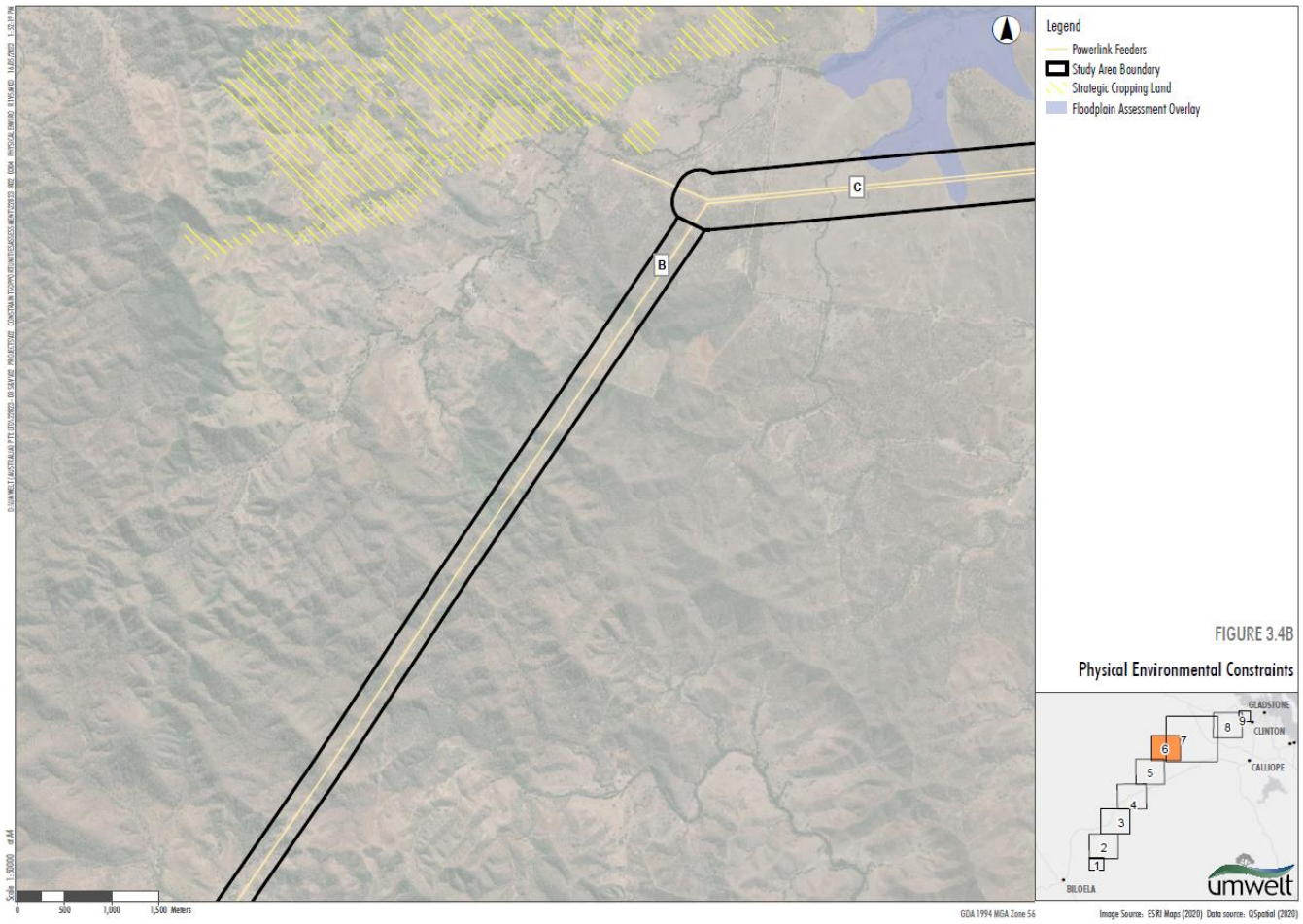


FIGURE 3.4B

Physical Environmental Constraints

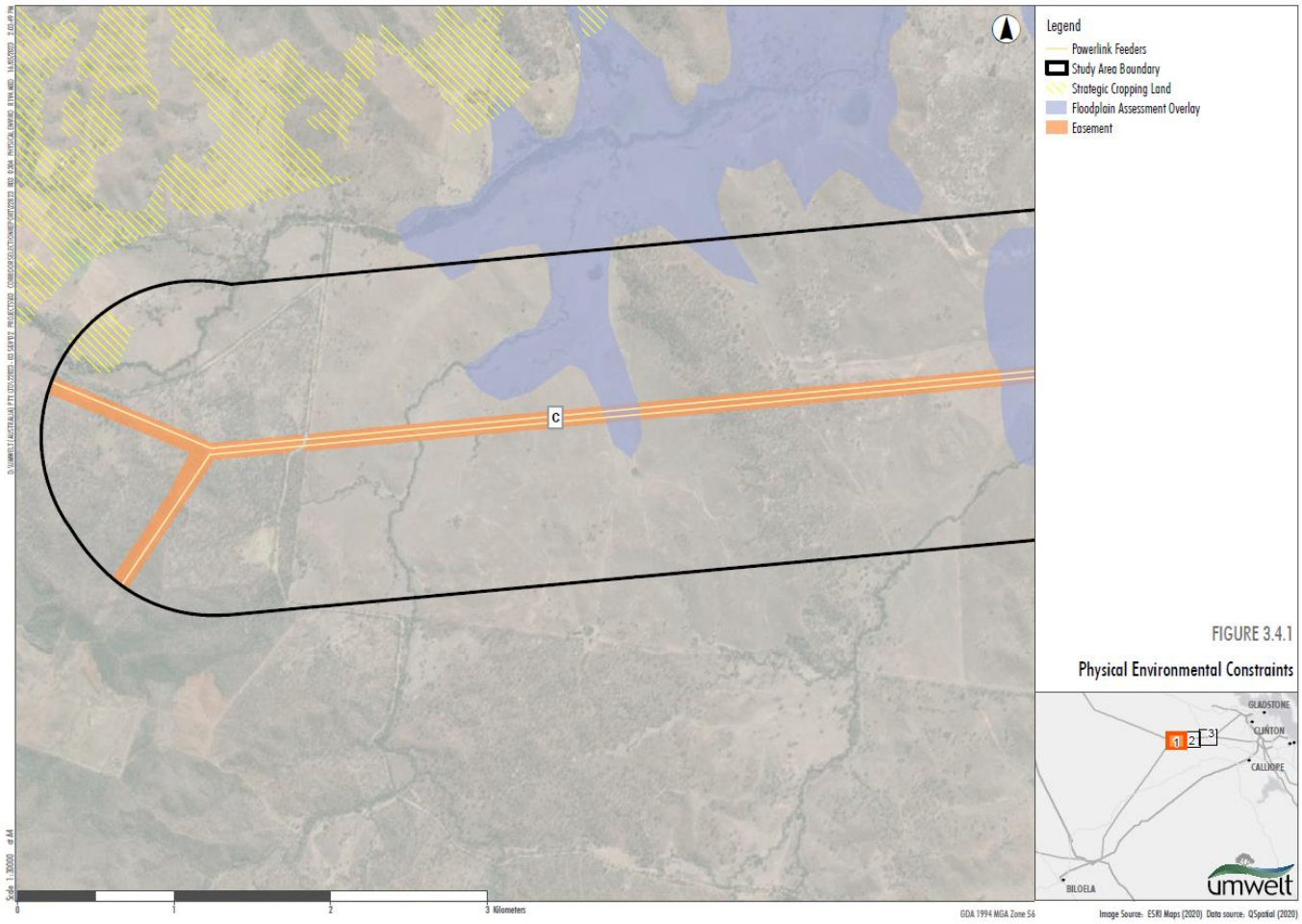


FIGURE 3.4.1

Physical Environmental Constraints

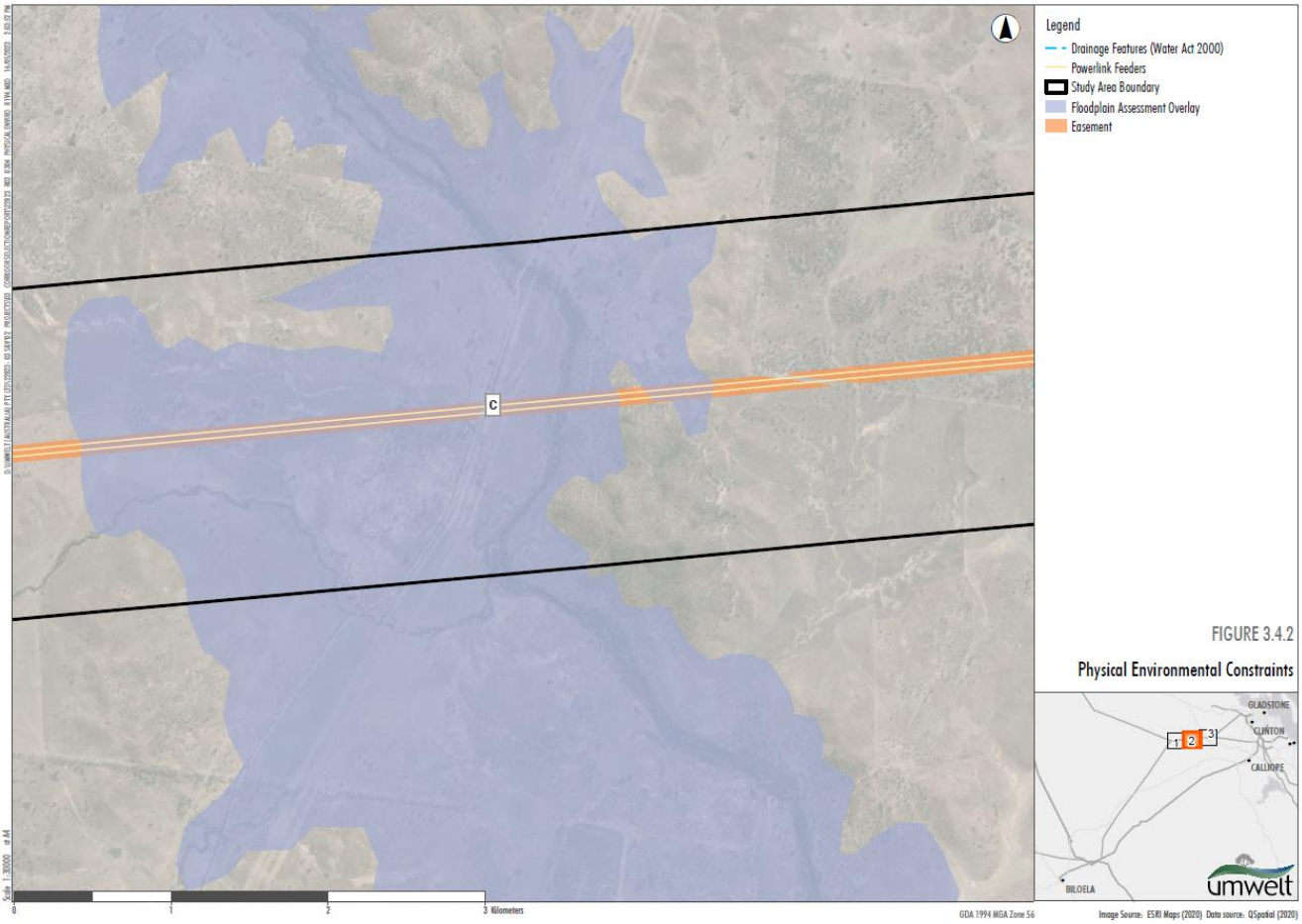


FIGURE 3.4.2

Physical Environmental Constraints

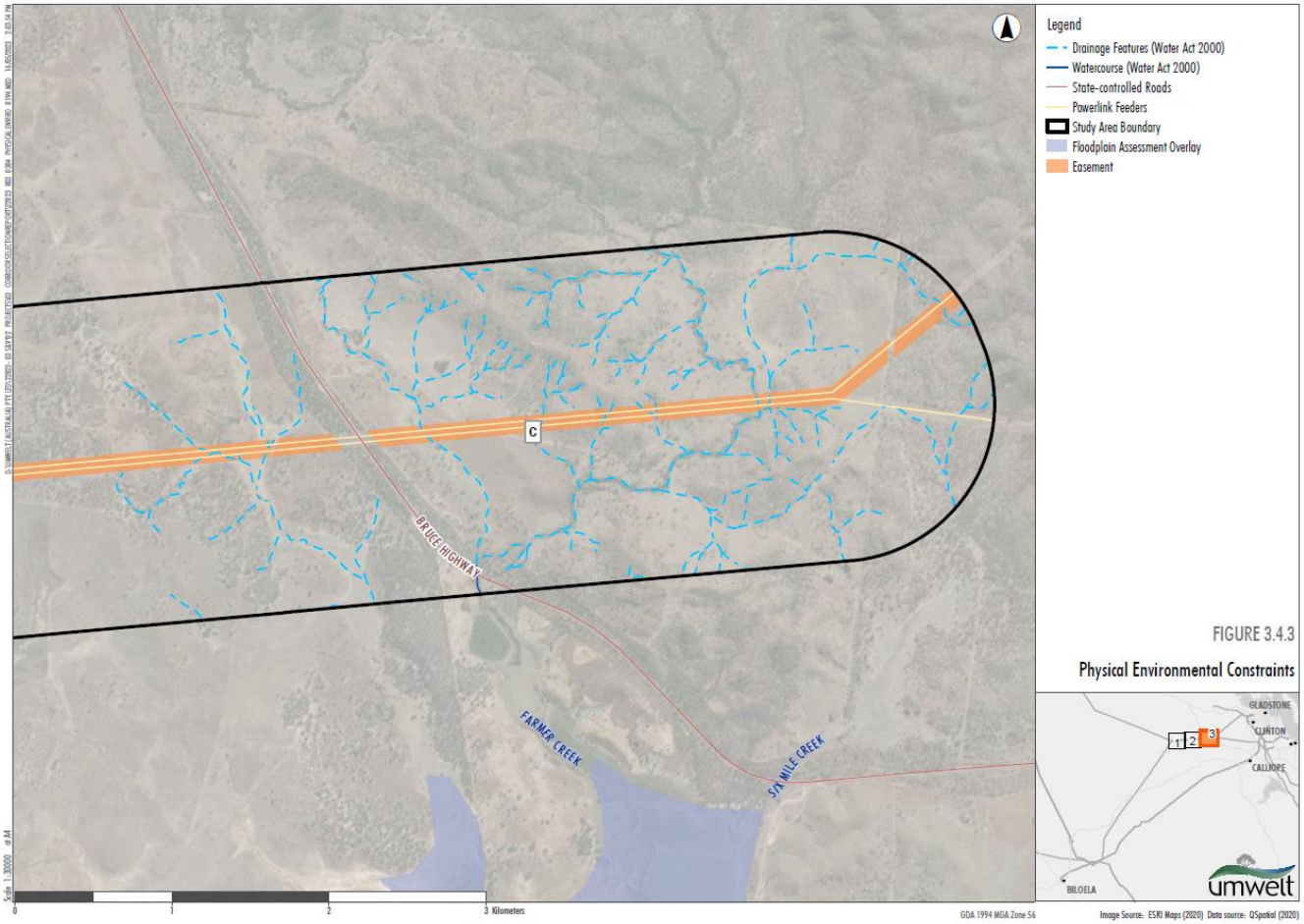


FIGURE 3.4.3

Physical Environmental Constraints

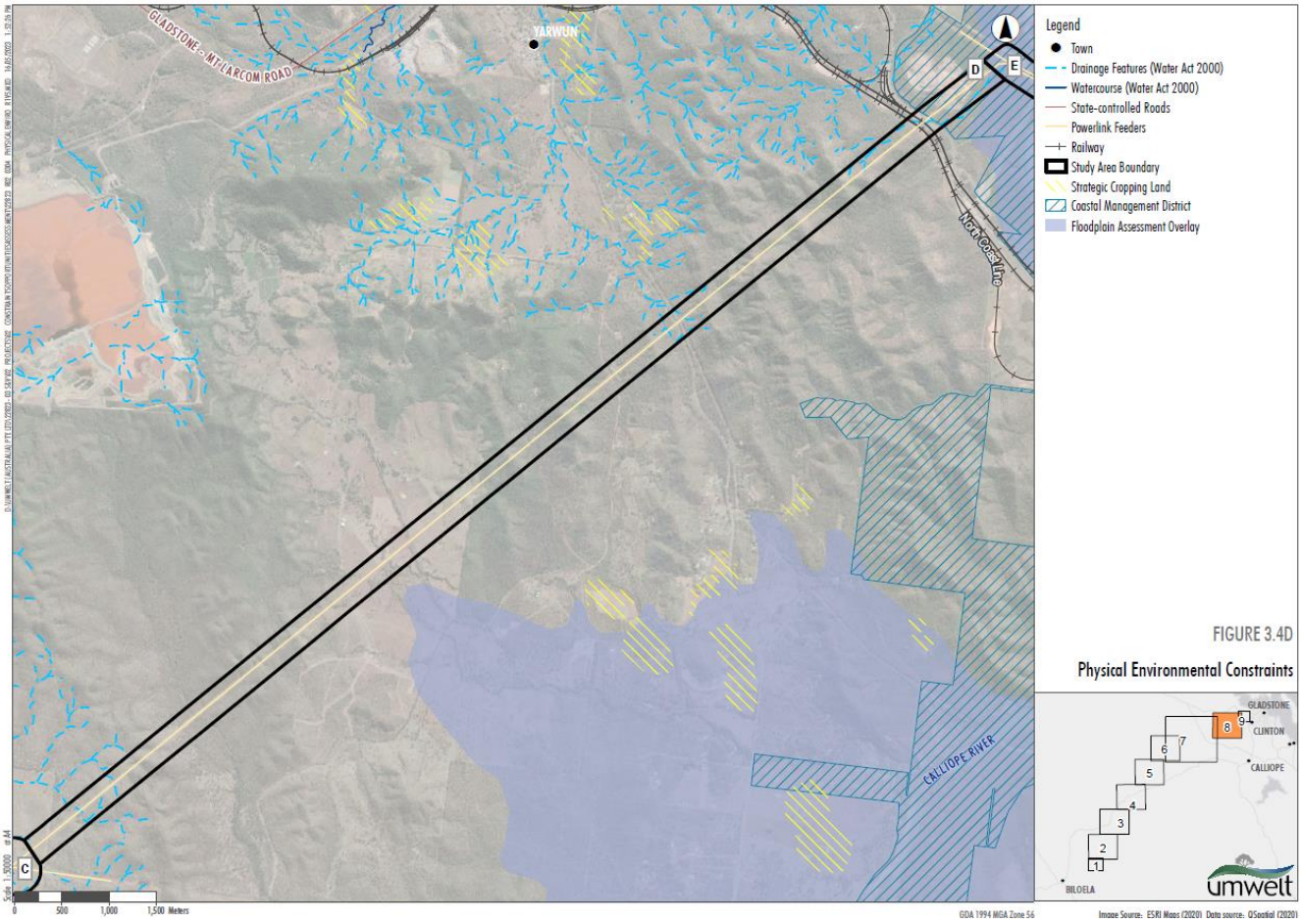


FIGURE 3.4D

Physical Environmental Constraints

Appendix E

Suitability of Section A

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor intends to utilise the existing easement for Powerlink's Calvale Substation site and associated transmission infrastructure. There is a small area, where the proposed transmission corridor intersects the easement for Coal Road. In addition, multiple land parcels are likely owned by single operating entities and therefore the number of landholders or operating entities affected by the new transmission line would be less than the total number of parcels traversed.
Land use	The proposed transmission corridor is mostly located within land use for conservation and natural environments. Small areas of strategic cropping land are also mapped to the south of Section A. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to existing land uses and strategic cropping land will be an edge effect only where the existing easement is modified.
Resource interests	The proposed transmission corridor intersects EPC 1807, MDL 3032 and Nominated Area – Coal.
Transport and traffic	The proposed transmission corridor intersects the Biloela-Callide Road (State-controlled), Cocups Road, Coal Road, Ian McAuley Way and Pelican Point Road. Due to co-location with the existing transmission infrastructure, existing road crossings are proposed to be utilised. There is also potential to utilise existing access tracks, though some may need upgrading. Stock routes are also present in the existing easement, however these are identified as minor and unused.
Existing residential housing	Houses in proximity to Section A are mainly located near Lake Callide. The closest dwellings are located within 600m of the proposed transmission corridor. In addition, the new transmission line would be co-located and would see negligible change in social impacts associated with proximity to housing.
Heritage	The proposed transmission corridor may traverse areas where cultural heritage values are known to occur, particularly around the land surrounding Callide Creek and Coal Road. Cultural heritage values may also be associated with Lake Callide. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are mapped that impact the proposed transmission corridor.
Visual amenity	The proposed transmission corridor will be temporarily visible to traffic where it crosses public roads. The proposed transmission corridor is located in relatively remote rural areas and avoids most residential properties. Visual impacts of the new transmission line would be greatest in the flat landscapes around Lake Callide. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised despite the additional tower height.
Environment	

Constraint	Assessment
Flora	Remnant vegetation (identified as no concern at present biodiversity status) is mapped in clusters surrounding the Coal Road. The proposed transmission corridor intersects mapped essential habitat and high-risk areas for protected plants. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to vegetation may be some additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for the new transmission line to span over vegetation where it occurs in small clusters along the alignment.
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both Least Concern and Threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will be investigated through ecological surveys.
Protected areas	The existing easement does not intersect any protected areas.
Economic	
Topography	The existing easement ranges in elevation from 213m AHD to 317m AHD, with key topographic features including Lake Callide.
Geology and soils	The existing easement is subject to vertosol and chromosol soil types, which are considered more susceptible to erosion due to their dispersive nature. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the new transmission line, as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The main waterway crossings include Callide Creek. The proposed transmission corridor also crosses several other unmapped water features under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways. Access roads which cross the waterways may require upgrades.

Suitability of Section B

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor intends to utilise the existing easement for Powerlink's transmission infrastructure.
Land use	The proposed transmission corridor is mostly located within land use for grazing native vegetation, with areas of conservation of natural environments, production forestry and plantation forestry. Small areas of strategic cropping land are mapped at the centre of Section B. The corridor also traverses the Callide Infrastructure Corridor State Development Area. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to existing land uses and strategic cropping land will be an edge effect only where the existing easement is modified.
Resource interest	The proposed transmission corridor intersects a number of resource interests, including PPL 154, PPL 166 and PPL 163.
Utilities	The proposed transmission corridor follows the existing easement for Powerlink's transmission infrastructure. Minimal impacts to utilities are anticipated, as the new transmission line is proposed to be co-located with existing structures (i.e. towers). Pipeline infrastructure is located within the proposed transmission corridor.
Transport and traffic	The proposed transmission corridor intersects the Dawson Highway (State-controlled), Coal Road, Blacks Road, Thompsons Road and Fig Tree Road. The Moura System Railway also traverses Section B. Due to co-location with the existing transmission infrastructure, existing road crossings are proposed to be utilised. There is also potential to utilise existing access tracks. Stock rocks are also present in the existing easement, however these are identified as minor and unused.
Existing residential housing	Houses in proximity to Section B are mainly located near Dawson Highway. The closest dwellings are located within 650m of the proposed transmission corridor. In addition, the new transmission line would be co-located and would minimise change in social impacts associated with proximity to housing, with only a low to moderate increase in scale and intensity of development from the taller transmission line.
Heritage	The proposed transmission corridor may traverse areas where cultural heritage values are known to occur, particularly around the land surrounding Blacks Road. Cultural heritage values may also be associated with Calliope River. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are identified that impact the proposed transmission corridor.

Constraint	Assessment
Visual amenity	The proposed transmission corridor will be temporarily visible to traffic for a short amount of time where it crosses public roads. The corridor is located in relatively remote rural areas and can avoid most residential properties. Visual impacts of transmission infrastructure would be greatest in the flat landscapes around Dawson Highway. Section B is also subject to the proposed Callide Infrastructure Corridor. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised.
Environmental	
Flora	Remnant vegetation (identified as No Concern at present and Of Concern biodiversity status) is mapped in large clusters surrounding the southern portion of the corridor. The proposed transmission corridor intersects mapped essential habitat and high-risk areas for protected plants. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to vegetation may consist of additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for the new transmission line to span over vegetation where it occurs in small clusters along the alignment.
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both Least Concern and Threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will be investigated through ecological surveys.
Protected areas	The existing easement contains two protected areas, including Callide Timber Reserve and Calliope Range State Forest.
Economic	
Topography	The existing easement ranges in elevation from 63m AHD to 565m AHD, with key topographic features including Callide Timber Reserve, Calliope Range State Forest and Calliope River.
Geology and soils	The existing easement is subject to a range of soil types including vertosols, chromosols, rudosols, kandosols, kurosols and dermosols. Vertosols are considered more susceptible to erosion due to their dispersive nature. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the transmission line infrastructure as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The main waterway crossings include Calliope River. The proposed transmission corridor also crosses several other unmapped water features under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways. Existing access tracks across waterways may require upgrades.

Suitability of Section D

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor intends to utilise the existing easement for Powerlink's transmission infrastructure.
Land use	The proposed transmission corridor is mostly located within land use for grazing, with areas of production native forests, conservation and natural environments and transport/communication. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to existing land uses and strategic cropping land will be an edge effect within the existing easement. The proposed transmission corridor is located within the Callide Infrastructure Corridor State Development Area.
Resource interest	The proposed transmission corridor does not intersect resource interests.
Transport and traffic	The proposed transmission corridor intersects the Calliope River Road, Boyles Road, Malahoff Road, Mt Miller Road and Reid Road. Due to co-location with the existing transmission infrastructure, existing road crossings are proposed to be utilised. There is also potential to utilise existing access tracks. Gladstone Airport is located 6km south-east of the corridor.
Existing residential housing	Houses in proximity to Section D are mainly located near Mount Stow State Forest and Calliope Conservation Park. The closest dwellings are located within 250m of the proposed transmission corridor. The new transmission line would be collocated with the existing infrastructure.
Cultural heritage	Cultural heritage values may be associated with Calliope Conservation Park. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the proposed transmission corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are mapped that impact the proposed transmission corridor.
Visual amenity	The proposed transmission corridor will be temporarily visible to traffic for a short amount of time where it crosses public roads. The corridor is located in relatively remote rural areas. Visual impacts of transmission infrastructure would be greatest in the flat landscapes around Calliope River Road. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised.
Environmental	
Flora	Remnant vegetation (identified as No Concern at present, Of Concern and Endangered biodiversity status) is mapped in large clusters throughout the entire corridor. The proposed transmission corridor intersects mapped essential habitat and high-risk areas for protected plants. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to vegetation may consist of additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for the new transmission line to span over vegetation where it occurs in small clusters along the alignment.

Constraint	Assessment
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both Least Concern and Threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will be investigated through ecological surveys.
Protected areas	The existing easement contains two protected areas, including Mount Stowe State Forest and Calliope Conservation Park.
Economic	
Topography	The existing easement ranges in elevation from 16m AHD to 200m AHD, with key topographic features including Mount Stowe State Forest and Calliope Conservation Park.
Geology and soils	The existing easement is subject to a range of soil types including chromosols, kandosols, dermosols and hydrosols. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the transmission line infrastructure as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The proposed transmission corridor does not cross any major watercourses, although it does cross several drainage features and unmapped watercourses under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways. Existing access tracks across waterways may require upgrades.

Suitability of Section E

Constraint	Assessment
Social	
Tenure	The proposed transmission corridor intends to utilise the existing easement for Powerlink's Calliope River Substation site and associated transmission infrastructure.
Land use	The proposed transmission corridor is mostly located within land use for conservation and natural environments. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to existing land uses and strategic cropping land will be an edge effect only mostly within the existing easement. The proposed transmission corridor is identified as a Priority Living Area and also located within the Gladstone State Development Area.
Resource interest	The proposed transmission corridor does not intersect resource interests.
Transport and traffic	The proposed transmission corridor intersects the Esplanade. Due to co-location with the existing transmission infrastructure, existing road crossings are proposed to be utilised. Stock routes are also present in the existing easement, however these are identified as minor and unused. Gladstone Airport is located 1km south-east of the corridor. The Calliope River Substation site and surrounding area falls within mapping associated with the matter of State interest for Strategic Airports and Aviation Facilities. Under the Gladstone Regional Planning Scheme, Section E is also located within the Obstacle Limitation Surface on the Airport Environs Overlay Map. Accordingly, development must not cause a permanent or temporary physical or transient obstruction to the safe movement of aircraft within the airport's operational airspace. Minimal impacts to the airport's operational airspace are anticipated, as the new transmission line is proposed to be co-located with existing structures (i.e. towers).
Existing residential housing	Despite being located in a Priority Living Area, there are no houses in proximity to the proposed transmission corridor. The closest dwellings are located across Calliope River and 1.5km south within the residential area of Clinton. The new transmission line would be co-located and would minimise change in social impacts associated with proximity to housing, with only a low to moderate increase in scale and intensity of development from the taller voltage line.
Cultural heritage	Cultural heritage values may be associated with Calliope River. The presence of unknown cultural heritage places and artefacts will need to be investigated in future studies. If cultural heritage sites are identified within the proposed transmission corridor, they will need to be managed through discussions and, if necessary, agreements with the relevant Aboriginal parties. No European sites are mapped that impact the proposed transmission corridor. All of Section E is mapped under the National Heritage List – Great Barrier Reef World Heritage Area. While Section E is located within the World Heritage List/National Heritage List Great Barrier Reef, the landward extent includes Calliope River Island and up to the low water mark of the mainland.
Visual amenity	The proposed transmission corridor will be temporarily visible to traffic for a short amount of time where it crosses public roads. The corridor is located in relatively remote natural area. Visual impacts of transmission infrastructure would be greatest in the flat landscapes around Calliope River. Due to co-location with the existing transmission infrastructure, the additional visual amenity impacts are minimised.

Constraint	Assessment
Environmental	
Flora	Remnant vegetation (identified as endangered and no concern at present biodiversity status) is mapped in clusters surrounding Calliope River Substation. The proposed transmission corridor intersects mapped essential habitat. Given the proposed transmission corridor is intended to utilise the existing easement, the impact to vegetation may be some additional clearing in a few places, with edge effect impacts remaining largely unchanged. To minimise the environmental impact, there may be opportunity for the new transmission line to span over vegetation where it occurs in small clusters along the alignment.
Fauna	There are a number of threatened wildlife observation records relating to MNES and MSES identified within the proposed transmission corridor. Both Least Concern and Threatened fauna species could be potentially impacted through the loss of habitat resulting from vegetation clearing needed for the transmission line structures and access tracks. Given that fauna species are mobile and move throughout their habitat, the potential extent of impact to fauna species cannot be accurately determined by desktop searches alone. Presence of protected fauna species within clearing sites will be investigated through ecological surveys.
Protected areas	The existing easement does not intersect any protected areas.
Economic	
Topography	The existing easement ranges in elevation from 2m to 30m AHD, with key topographic features including Calliope River and the inlet to Gladstone Harbour.
Geology and soils	The existing easement is subject to hydrosol, sodosol and tenosol soil types, which are considered more susceptible to erosion due to their dispersive nature. Section E is located within a low-lying area and acid sulfate soils are a high probability of occurrence. Although transmission towers can be constructed on any ground, geology and soil conditions can lead to constructability issues due to erosion, dispersion and acidity which may affect the structural integrity of the new transmission line, as well as rocky underlying soils and geological units which may cause constructability complexities. The ground conditions will need to be studied in future geotechnical investigations to establish the appropriate design strategies.
Hydrology	The main waterway crossings include Calliope River. The proposed transmission corridor also crosses several drainage features and unmapped water features under the *Water Act 2000*. The new transmission line may be sited to span across the width of these waterways; however, most are subject to floodplains. Therefore, waterway crossings may require a tailored design response to ensure minimal damage to riparian vegetation and mitigate risks of erosion to transmission towers.

Appendix F

Summary of legislative considerations

Legislation	Summary
Commonwealth Legislation	
Environment Protection and Biodiversity Conservation Act 1999	The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the centrepiece of Commonwealth environmental laws. Broadly, it protects and regulates impacts on the following Matters of National Environmental Significance (MNES): • The world heritage values of a declared world heritage property • The national heritage values of a declared national heritage place • The ecological character of a declared Ramsar wetland (wetlands of international importance) • Listed threatened species and ecological communities • Listed migratory species • Nuclear actions (including uranium mining) • Commonwealth marine areas • The Great Barrier Reef Marine Park • A water resource, in relation to coal seam gas development and large coal mining development. Actions that have, will have, or are likely to have a significant impact on MNES and actions by the Commonwealth, or involving Commonwealth land are called controlled actions and require approval under the EPBC Act. The process of assessing and approving a controlled action under the EPBC Act potentially involves three stages, including referral, assessment and approval. At the first stage a person refers a proposed action for determination of whether it is a controlled action. If the proposed action is determined to involve a controlled action it is then assessed in accordance with the EPBC Act before the Minister (or delegate of the Minister) determines whether it can proceed and any conditions that should apply.
Native Title Act 1993	The *Native Title Act 1993 (*NT Act) establishes a national framework for the protection and recognition of Native Title, including by conferring on Indigenous people who hold (or claim to hold) Native Title rights and interests in respect of any land or waters, the right to be consulted with and in some cases to participate in decisions about activities proposed to be undertaken. Whilst Native Title has been extinguished (refused recognition) over freehold land, Native Title interests and rights may still exist over a number of tenures including reserves, State Forest and National Parks, land that is or has been subject to lease, waters that are not privately owned, as well as unallocated state land. The NT Act prescribes the statutory process to allow

	parties to reach agreement about the use of land or waters where Native Title may continue to exist and for state governments and territories to grant interests over that land to both Native Title claimants and non-Native Title parties.
State legislation	
Aboriginal Cultural Heritage Act 2003	The purpose of the *Aboriginal Cultural Heritage Act 2003* (ACH Act) is to provide effective recognition, protection and conservation of Aboriginal and Torres Strait Islander cultural heritage. The ACH Act protects all indigenous cultural heritage in Queensland, whether or not it has been recorded in a database. The ACH Act requires anyone who carries out a land use activity to exercise a duty of care to take all reasonable and practical measures to avoid harming Aboriginal and Torres Strait Islander cultural heritage. Failure to comply with the duty of care is an offence, including unlawfully harming, excavating, relocating, taking away and possessing indigenous cultural heritage.
Biosecurity Act 2014	The *Biosecurity Act 2014* (Biosecurity Act) provides a biosecurity system framework which aims to minimise biosecurity risk and facilitate responses to biosecurity impacts, to ensure the safety and quality of agricultural inputs and to align the state's management of biosecurity risk and other requirements for plant and animal responses to biosecurity risk with federal and international obligations. The Act also aims to manage emerging endemic and exotic pests and diseases as well as the transfer of diseases between humans and animals and contaminants in carriers. Under the Act, a general biosecurity obligation is placed on all persons to undertake all reasonable and practicable measures to prevent or minimise biosecurity risk. Additionally, the movement of biosecurity matter must comply with movement restrictions associated with each relevant biosecurity zone, and biosecurity instrument permits are required for the movement of biosecurity matter which cannot comply with movement restrictions.
Environmental Offsets Act 2014	The purpose of the Environmental Offsets Act 2014 (EO Act) is to counterbalance the significant residual impacts of particular activities on prescribed environmental matters through the use of environmental offsets. Prescribed environmental matters are described under the EO Act as a: • Matter of National Environmental Significance (MNES) • Matter of State Environmental Significance (MSES) • Matter of Local Environmental Significance (MLES). An environmental offset may be required as a condition of development approval, where following consideration of avoidance and mitigation measures, a prescribed activity is likely to result in a significant residual impact on a prescribed environmental matter. Once the administering authority has decided that a prescribed activity is required to provide an offset, the environmental offset is required to be delivered in accordance with the EO Act, the *Environmental Offsets Regulation 2014* (EO Regulation) and the Queensland Environmental Offsets Policy. The desktop assessment has identified that MNES and MSES are potentially

	present within the Study Area, however this will need to be confirmed during future phases of the project through field surveys. To avoid duplication between jurisdictions, state and local governments can only impose an offset condition in relation to a prescribed activity if the same, or substantially the same impact, or substantially the same matter has not been subject to assessment under the EPBC Act. It is important to note that advice from Queensland Treasury is that the EO Act does not apply to the designation of premises for development of infrastructure, however the designation decision can still apply compensatory measures/requirements akin to an offset.
Electricity Act 1994	The *Electricity Act 1994* (Electricity Act) sets out the requirements that all electricity industry participants are required to promote a safe, efficient and reliable supply and use of electricity. The Act also requires that the supply of electricity is undertaken in an environmentally sound manner. Under Section 31(b) of the Electricity Act, a transmission entity is required to properly consider the environmental effects of its activities under the transmission authority. Powerlink will be required to implement project specific Environmental Management Plans (EMPs) to comply with requirements of the Electricity Act. The EMPs will be implemented through the construction, operation and maintenance stages of the project.
Electrical Safety Act 2002	The *Electrical Safety Act 2002* (Electrical Safety Act) seeks to prevent through regulation, the death, injury and destruction that can be caused by electricity. Accordingly, the purpose of the Electrical Safety Act is to establish a legislative framework for: • preventing persons from being killed or injured by electricity • preventing property from being destroyed or damaged by electricity.
Environmental Protection Act 1994	The purpose of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The EP Act regulates activities that will or may have the potential to cause environmental harm and prescribes several mechanisms to ensure that objectives are met. The two primary environmental duties that apply to everyone in Queensland are: • general environmental duty – a person must not carry out any activity that causes, or is likely to cause environmental harm, unless all reasonable and practicable measures to prevent or minimise the harm have been taken. Environmental harm is defined in Section 14 of the EP Act as any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value and includes environmental nuisance • duty to notify of environmental harm – a person must inform the administering authority and landowner or occupier when an incident has occurred that may have caused or threatens serious or material environmental harm that is not authorised. The EP Act also provides the power to administering authorities to order the actions to be taken to improve environmental performance, conduct audits and environmental evaluations

	of activities, approve environmental management programs and impose penalties or prosecute persons for non- compliance with the requirements of the EP Act. The EP Act is supported by the following subordinate legislation: • *Environmental Protection Regulation 2019 (EP Regulation)* • *Environmental Protection (Air) Policy 2019 (EPP (Air))* • *Environmental Protection (Noise) Policy 2019 (EPP (Noise))* • *Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water and Wetland Biodiversity)).* The EP Act also describes Environmentally Relevant Activities (ERAs) for which an Environmental Authority (EA) is required. Some significant construction activities can trigger the requirement for an ERA.
Fisheries Act 1994	The *Fisheries Act 1994* (Fisheries Act) provides for the use, conservation and enhancement of fisheries resources and fish habitats in Queensland. The Department of Agriculture and Fisheries (DAF) is responsible for development assessment under the Fisheries Act in combination with the Planning Act, along with the conservation and management of fish habitats in Queensland. A development under the Fisheries Act can be either an accepted development or assessable development for, relevantly, works involving the construction or raising of waterway barrier works. An accepted development must comply with all the requirements within the relevant accepted development requirements. If the development does not comply, it is assessable development, and a development application must be lodged. The Study Area contains waterways for waterway barrier works. If proposed works by Powerlink traverse mapped waterways, this may require waterway barrier works and therefore trigger a requirement to obtain a development permit for operational works, that is constructing or raising waterway barrier works, unless the works are designed to comply with accepted development requirements under the Fisheries Act.
Forestry Act 1959	The *Forestry Act 1959* (Forestry Act) provides for forest reservations, the management, silvicultural treatment and protection of State Forests, and the sale and disposal of forest products and quarry material, the property of the Crown on State Forests, timber reserves and on other lands; and for other purposes. The Forestry Act is administered primarily by the DAF. State Forests are managed by the Department of Environment and Science (DES) and Queensland Parks and Wildlife Service (QPWS). Areas of State Forest may require revocation to facilitate the provision of infrastructure. This process is regulated under the *Forestry Act 1959* and where the future intent of the revoked area is for a particular purpose other than a tourist purpose or use as a public road, a regulation to revoke all or part of an area may only be made where the Legislative Assembly has passed a resolution requesting the Governor in Council to make the revocation. An application to revoke an area of State Forest should only be undertaken as a last resort where no alternative options are available. Revocation of state land will only be considered

	when it can be demonstrated that it is in the interests of the specific tenure or where there is a net forest production benefit outcome to the QPWS managed area as an outcome. Purposes relevant to the project which may be considered by the State for revocation include: • where there is a mutual benefit to the state and applicant • to enable essential public infrastructure works to be undertaken to support delivery of a specific government commitment.
Nature Conservation Act 1992	The purpose of the *Nature Conservation Act 1992* (NC Act) is the conservation of nature while allowing for the involvement of landholders and Indigenous people in the management of protected areas in which they have an interest under Aboriginal tradition or Island custom. A framework is created under the NC Act for the dedication, declaration and management of protected areas, protection of wildlife and its habitat. The clearing regulatory requirements and the list of critically endangered, endangered, vulnerable or near threatened plants are contained in the *Nature Conservation (Plants) Regulation 2020*. The Study Area potentially contains protected plants and protected areas, however this will require confirmation during further ecological surveys during the next phase of the project. The clearing of native flora species and native fauna habitat protected under the NC Act. It is recommended that detailed ecological field surveys are undertaken to confirm the requirements of the NC Act, which may include protected plants permits.
Planning Act 2016	The *Planning Act 2016* (Planning Act) establishes a framework and overarching policy for land use planning and development assessment in Queensland. The purpose of the Planning Act is to provide an efficient, effective, transparent, integrated, coordinated and accountable system of land use planning and development assessment to facilitate the achievement of ecological sustainability. The Planning Act and *Planning Regulation 2017* (Planning Regulation) describes the type of development, the level of assessment required for particular development, responsible entity for assessing development, assessment benchmarks, as well as the process for making, assessing and deciding development applications. The Planning Act and Planning Regulation also prescribe the assessment and approval process for the designation of premises for development of infrastructure (an 'infrastructure designation') prescribed within the Planning Regulation. Infrastructure Designation is a Ministerial approval pathway, which is commonly used to facilitate electricity distribution and transmission infrastructure. Where an Infrastructure Designation is obtained, assessable development in relation to the infrastructure is deemed accepted development under the Planning Act, excluding building works under the *Building Act 1975.* This means that when an infrastructure designation is in effect, the development does not require any further development approvals for development normally assessable under the Planning Act, apart from building works. In practice, an infrastructure designation assessment will address the applicable State interests and constraints ordinarily made assessable under the Planning Act (i.e., vegetation clearing, waterway barrier works, etc).

Queensland Heritage Act 1992	The objective of the *Queensland Heritage Act 1992* is to provide for the conservation of Queensland's cultural heritage for the benefit of the community and future generations. The *Queensland Heritage Act 1992* is administered by DES and the Queensland Heritage Council to identify and protect places that have special heritage values to the community and future generations. The *Queensland Heritage Act 1992* conserves and protects Queensland Heritage Places by: • establishing heritage registers • regulating development that may impact on registered places • establishing a process for reporting discoveries of objects that may be of cultural heritage significance. Section 89 of the *Queensland Heritage Act 1992* requires a person to notify DES of an archaeological artefact that is an important source of information about an aspect of Queensland history.
State Planning Policy	The State Planning Policy (SPP) identifies matters of State interest requiring protection and enhancement. The SPP is at the top of the planning hierarchy in Queensland and is the overarching policy for all other regional and local planning instruments. The SPP States that the SPP applies to the extent relevant, when designating premises for infrastructure under the Planning Act and development applications.
Stock Route Management Act 2002	The *Stock Route Management Act 2002* (Stock Route Management Act) provides a framework for management of Queensland's stock routes. Local government authorities are responsible for the day-to-day administration and management of stock routes. The Queensland Stock Route Network Management Strategy has been prepared under the Stock Route Management Act. The strategy is a tool to link legislative principles with decision making, to ensure a consistent approach.
Transport Infrastructure Act 1994	The overall objective of the *Transport Infrastructure Act 1994* (Transport Infrastructure Act) is to provide a regime that allows for and encourages effective integrated planning and efficient management of a system of transport infrastructure. The Act is administered by the Department of Transport and Main Roads (DTMR). Under section 50 of the Act, the ancillary works and encroachments within State-controlled roads can only be undertaken with the written permission of DTMR. Under section 33 of the Transport Infrastructure Act, written approval is required from the DTMR to carry out road works on a State-controlled Road (SCR) or interfere with a SCR or its operation. This may include where road works to a Council Road interferes with a SCR or its operations. Under section 62 of the Transport Infrastructure Act, written approval is required from DTMR to locate a permitted access on a SCR. A decision of access approval may include conditions or restrictions on the location or use of the permitted road access, type or number of vehicles to use the permitted road access location.

	Under the *Transport Infrastructure (Rail) Regulation 2006* permission from the railway manager (Queensland Rail) is required to take over dimensional road loads across Queensland Rail infrastructure (e.g. rail level crossings and rail bridges).
Vegetation Management Act 1999	The *Vegetation Management Act 1999* (VM Act) regulates and manages the process and impacts of native vegetation clearing. The objectives of the VM Act include conservation of remnant regional ecosystems, prevention of the loss of biodiversity, maintenance of ecological processes, and conservation of vegetation in areas of high nature conservation value or lands vulnerable to land degradation. The Study Area contains areas of regulated vegetation under the VM Act, classified as Category A (declared), Category B (remnant), Category C (high value regrowth) and Category R (watercourse regrowth). Areas of Category X (non-remnant) vegetation also exist throughout the study area. The regional ecosystems (REs) present across the Study Area include Endangered, Of Concern and Least Concern vegetation communities. Clearing of any relevant remnant or regulated regrowth vegetation constitutes operational work under schedule 10 of the *Planning Regulation 2017*, which will require development approval unless a vegetation clearing code or exemption applies. Under Section 22A of the VM Act, an application for operational work, including applications where Department of Resources (DoR) is a concurrence agency, cannot be accepted as properly made unless the Chief Executive is satisfied that the development is for a relevant purpose. Exemptions exist for electricity infrastructure where associated with an infrastructure designation. Any infrastructure designation or development application will need to demonstrate that Powerlink has sought to reduce the impacts of vegetation clearing through the hierarchy of avoid, minimise and mitigate. Where a significant residual impact remains, an offset, or compensatory measures may be required.

Water Act 2000	*The Water Act 2000* (Water Act) provides a framework to deliver sustainable water planning, allocation, management and supply processes to provide for the improved security of water resources in Queensland. The Water Act is supported by the *Water Regulation 2016* and various water resource plans for the defined geographic regions. The Water Act provides a framework for relevant:
	
	• The sustainable management of Queensland's water resources and quarry material by establishing a system for the:
	  ○ Planning, allocation and use of water
	  ○ Allocation of quarry material and riverine protection
	• The sustainable and secure supply and demand management for the south-east Queensland region and other designated regions.
	
	Under the Water Act, water licences or permits are required to take water and to interfere with the flow of water on, under or adjoining land, including interfering with water in aquifers (if determined necessary).

Matters of State Environmental Significance	Matters of State Environmental Significance (MSES) are a component of the biodiversity state interest that is defined under the SPP and Environmental Offsets Regulation 2014. MSES includes certain environmental values that are protected under Queensland legislation. MSES are defined as:
	• Protected areas (including all classes of protected areas except coordinated conservation areas) under the *Nature Conservation Act 1992*
	• Marine parks and land within a 'marine National Park', 'Conservation Park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004*
	• Areas within declared fish habitat areas that are management A areas or management B areas under the *Fisheries Regulation 2008*
	• Threatened wildlife under the Nature Conservation Act 1992 and special Least Concern animals under the *Nature Conservation (Wildlife) Regulation 2006*
	• Regulated vegetation under the *Vegetation Management Act 1999* that is:
	  ○ Category B areas on the regulated vegetation management map, that are 'Endangered' or 'Of Concern' regional ecosystems
	  ○ Category C areas on the regulated vegetation management map that are 'Endangered' or 'Of Concern' regional ecosystems
	  ○ Category R areas on the regulated vegetation management map
	• Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map
	• Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map
	• Strategic Environmental Areas under the *Regional Planning Interests Act 2014*
	• Wetlands in a wetland protection area of wetlands of high ecological significance shown on the map of Queensland Wetland Environmental Values under the *Environment Protection Regulation 2019*
	• Wetlands and watercourses in high ecological value waters defined in the *Environmental Protection (Water) Policy 2009*, schedule 2
	• Legally secured offset areas.

Regional Plans	• The Study Area is subject to the Central Queensland Regional Plan 2013.

Central Queensland Regional Plan 2013	Central Queensland Regional Plan 2013 is a state planning instrument providing a framework to manage growth, change, land use and development in Central Queensland. The purpose of the plan is to identify the state's interests in land use planning for the region. Specifically, the plan identifies: • regional outcomes for the region • regional policies for achieving the regional outcomes • the state's intent for the future spatial structure of the region, including Priority Agricultural Areas (PAA), Priority Living Areas (PLA) and priority outcomes for infrastructure. The plan's regional policies address the emerging regional issues of land use competition between the agricultural and resources sectors, and the need to protect areas required for the growth of towns. The plan also discusses other state interests relevant to land use planning in the region, including housing and liveable communities, economic growth, environment and heritage, and hazards and safety The new transmission line would be consistent with the aim of the CQRP to promote renewable energy generation, in order to provide reliable energy which supports growth in an economically and ecologically sustainable manner. The CQRP states that development in regional landscapes needs to be responsibly planned to complement, protect, and enhance landscape values, including areas of significant biodiversity value, rural production, scenic amenity, and landscape heritage. The corridor assessment process has aimed to minimise impacts upon land uses by investigating opportunities for collocation with existing infrastructure.
State Government Supported Infrastructure Koala Conservation Policy July 2017 (SGSIKCP)	This policy (SGSIKCP) is to ensure that state activities not regulated through planning schemes or in accordance with the koala assessment benchmarks in Schedule 11 of the *Planning Regulation 2017 meet* the same requirements as the *Planning Regulation 2017*, to ensure equitable treatment of state and non-State infrastructure projects. The corridor is not located within the area covered by the SGSIKCP.
Local planning schemes	The Study Area is mostly zoned as 'Rural' under the Gladstone Regional Council Planning Scheme 2017 (Gladstone Planning Scheme) and the Banana Shire Planning Scheme 2021 (Banana Planning Scheme). The land use intent for 'Rural' is similar under each planning scheme, recognising a range of land uses, including agriculture, and the need to protect the rural character/amenity of the region. Parts of Section A are within the Community Facilities Zone under the Banana Planning Scheme and parts of Section D and E are identified within the Special Purpose Zone, Environmental Management Zone, Conservation Zone and Open Space Zone under the Gladstone Planning Scheme. The granting of an Infrastructure Designation means the construction, operation and maintenance of a transmission line will be accepted development under the Planning Act 2016 and will not require an approval under the relevant planning schemes. Nonetheless, regard must still be given to the requirements of the planning schemes relating to the land subject to

	the designation. Through a preliminary assessment of the planning schemes, the new transmission corridor would generally be consistent with the intended outcomes sought by the planning scheme.
Local Laws	The *Local Government Act 2020* (Local Government Act) allows for councils to create laws for matters that the Council has function or power under the Local Government Act to undertake and to regulate specific matters within their LGA. While the Planning Scheme is exempt where an Infrastructure Designation has been enacted, local laws imposed by each local government authority will still apply and may trigger approvals for certain activities.

Appendix G

Acronyms in Draft CSR

ASRIS	**Australian Soil Resource Information System**
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
BGGGTBP	Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People
CQRP	Central Queensland Regional Plan 2013
Cth	Commonwealth
CSR	Corridor Selection Report
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DTATSIPCA	Department of Treaty, Aboriginal And Torres Strait Islander Partnerships, Communities and the Arts
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EP Act	Environmental Protection Act 1994
EPC	Exploration Permit Coal
EPG	Exploration Permit Geothermal
EPM	Exploration Permit Mineral
GNP	Gaangalu Nation People
GRT	Giant Rats Tail Grass
GIS	Geographical Information System
GRC	Gladstone Regional Council
ha	Hectares

km	Kilometre
kV	Kilovolt
LGA	Local Government Area
MSES	Matters of State Environmental Significance
MNES	Matters of National Environmental Significance
m	Metre
MID	Ministerial Infrastructure Designation
MDL	Mineral Development Licence
ML	Mining Lease
PPAA	Project Participation Access Allowances
PPL	Petroleum Pipeline Licence
PMST	Protected Matters Search Tool
QEJP	Queensland Energy And Jobs Plan
REs	Regional Ecosystems
RET	Renewable Energy Target
RSR	Route Surveillance Radar
SLC	Special Least Concern
SDA	State Development Area
TECs	Threatened Ecological Communities
UXO	Unexploded Ordnance

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