AUGUST 2024

CopperString 2032 – Burdekin River to Reid River Section

Recommended Corridor and Substation Site Selection Report

Table of Contents

Executive Summary

This Recommended Corridor and Substation Site Selection Report (RCSSSR) has been prepared by Queensland Electricity Transmission Corporation Limited, trading as Powerlink Queensland (Powerlink), for the proposed Burdekin River to Reid River section of the CopperString 2032 project (the project).

Project background

Powerlink owns, operates, and maintains Queensland's high voltage electricity transmission network which extends 1,700 kilometres (km) from Cairns to the New South Wales border, comprising 15,345 circuit kilometres of transmission lines and 147 substations.

In March 2023, Powerlink took ownership of the CopperString 2032 project. The project will initially involve building 840 kilometres of new electricity transmission line from just south of Townsville in the Burdekin region to Mount Isa and connect Queensland's North West Minerals Province to the National Electricity Market for the first time in Australia's history.

Powerlink recently completed a review of the section of the project between the Burdekin River east to the proposed Mulgrave substation site. This review identified significant constructability, access and operational issues for the proposed transmission line corridor and substation site due to very steep terrain and the requirement to construct significant access tracks and waterway crossings through areas that experience flooding and inundation.

Given these factors, Powerlink will no longer proceed with the transmission line corridor and substation site in the previously specified location and will instead investigate an alternative transmission line corridor and substation site for CopperString 2032 that allows for better constructability and access. The new area identified for investigation, known as the Study Area, is located north east from the Burdekin River to Reid River and is approximately 60km long and 8km to 15km wide.

Approach to transmission line corridor and substation site selection

Powerlink has completed an assessment of the broad Study Area to identify potential transmission line corridors (generally 2km wide) and substation sites (generally 1.1km x 1km subject to final design).

Three objectives were identified to inform the selection of the corridor and substation site:

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.

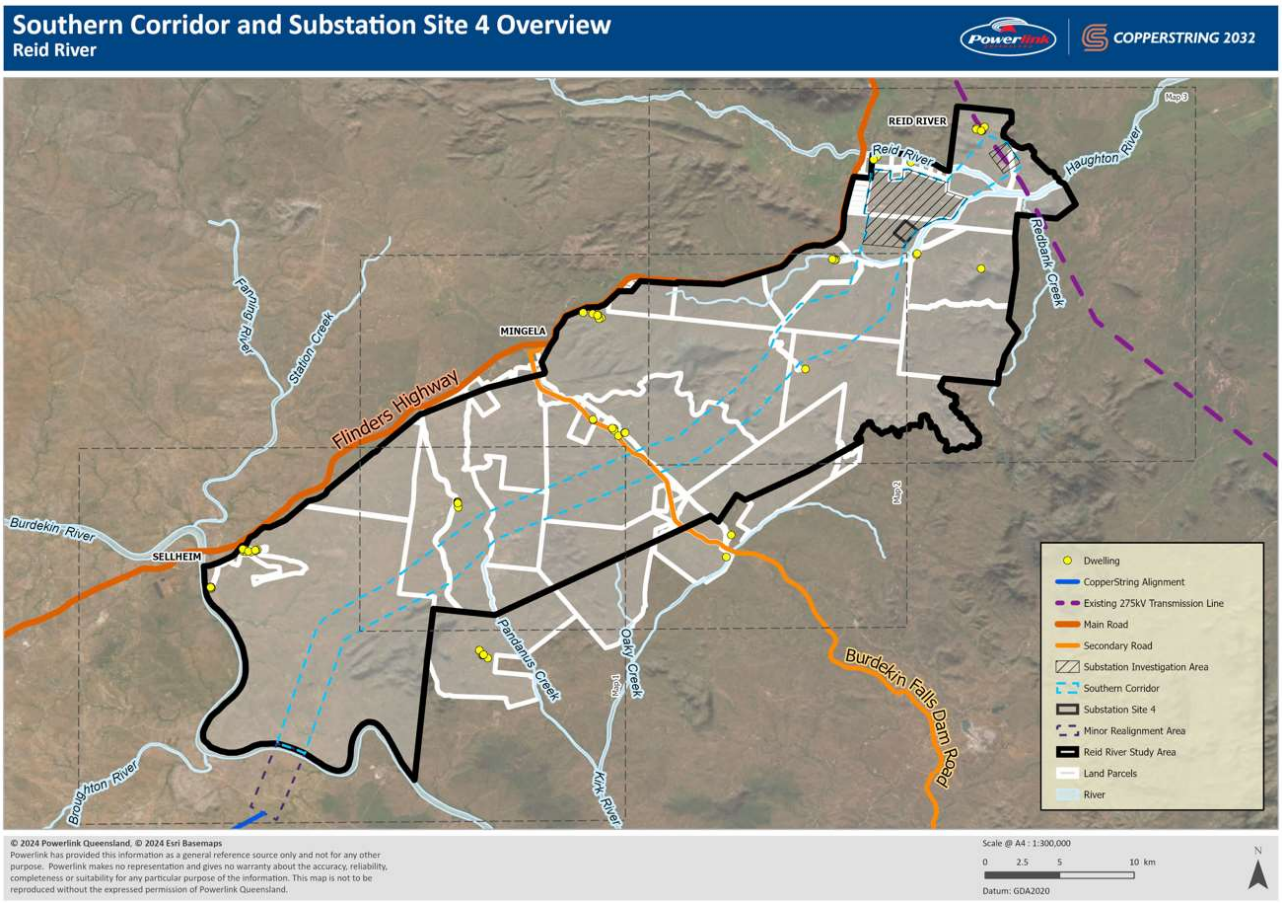
The methodology for the selection process included utilising publicly available information, as well as technical and spatial data, to identify constraints and opportunities from a social, environment and economic perspective. From this, two (2) potential transmission line corridors and four (4) potential substation sites were identified and comparatively assessed to determine a recommended transmission corridor and substation site that, on balance, has the least overall impact.

Recommended transmission line corridor

The Southern Corridor has been selected as the recommended transmission line corridor with the least overall impact across social, environment and economic objectives when compared to the Northern Corridor option. This generally 2km wide corridor has the following attributes –

- lower impact on essential habitat and minimal trigger areas for protected plants, while containing slightly more remnant vegetation with impacts that can be mitigated through strategic placement of the proposed line
- whilst containing slightly more Agricultural Land Class B, impacts on the additional area can be mitigated / avoided through strategic placement of the proposed line
- impacts less transport infrastructure and notably is further from the Macrossan Airfield
- contains no dwellings thereby enabling good physical separation to the proposed line, which is common across both corridors assessed
- lower costs and less complex construction measures due to a shorter length and less potential bend points (changes of direction).

Figure 1: Recommended corridor – Southern Corridor

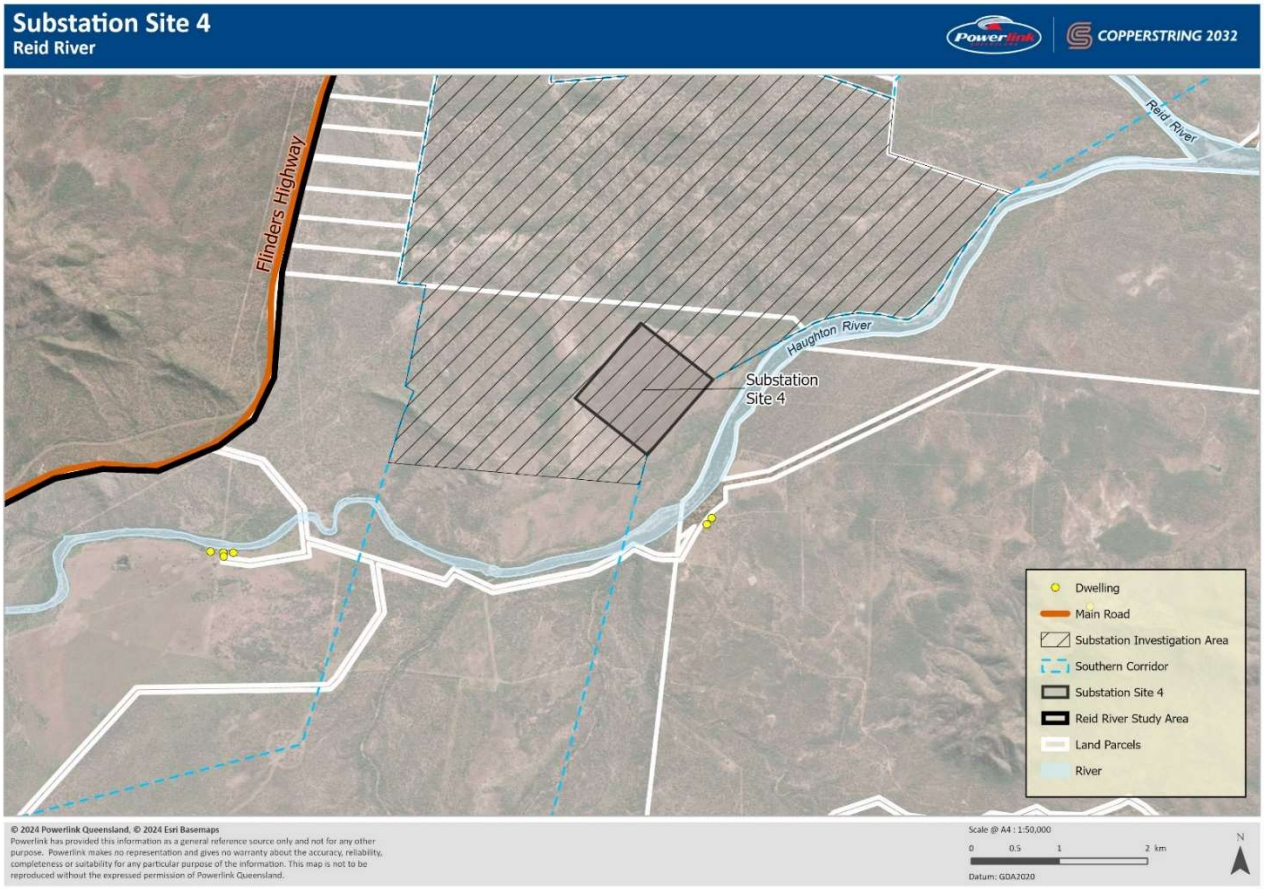


Recommended substation site

Substation Site 4 has been identified as the recommended substation site with the least overall impact across social, environment and economic objectives when compared to the three other options considered. This substation site has the following attributes –

- land has been extensively cleared and is generally flat with a slight slope down to the north. All other sites contain areas of remnant vegetation
- good transmission line entry and exit opportunities
- site is closest to the Flinders Highway providing good access and requiring least access road upgrade
- closest dwelling is well removed from the site, being approximately 1.0 km from the site boundary with vegetation providing visual screening opportunities
- site is not affected by Q200 flood level.

Figure 2: Recommended substation site – Site 4



Stakeholder engagement

Landholders, traditional owners, community members and other stakeholders are invited to review and comment on the recommendations in this report. Feedback is essential to ensure Powerlink has fully considered all matters of importance related to the proposed location of the electricity transmission infrastructure.

Powerlink will review all feedback and submissions on the RCSSSR and offer meetings with submitters to better understand and assess matters raised. A Final Corridor and Substation Site Selection Report (FCSSSR) will be released later in 2024 which will outline the submissions received to the RCSSSR and how those submissions have been considered. The FCSSSR will also include a final decision on the corridor for the proposed transmission line and location for the proposed substation.

Powerlink will then work with directly affected landholders, traditional owners and other stakeholders and undertake a range of environmental, heritage and constructability studies to determine a proposed easement alignment for the transmission line within the final corridor and if necessary, make micro siting adjustments to the proposed final location for the substation site.

1 Introduction

1.1 Project background

Powerlink Queensland (Powerlink) is the leading Australian provider of high-voltage electricity transmission network services, providing electricity to more than five million Queenslanders, and 253,000 businesses. The network extends 1,700 kilometres from Cairns to the New South Wales border, comprising 15,345 circuit kilometres of transmission line and 147 substations.

CopperString 2032, led by Powerlink, initially involves building 840 kilometres (km) of new electricity transmission line from just south of Townsville in the Burdekin region to Mount Isa that will connect Queensland's North West Minerals Province to the National Electricity Market for the first time in Australia's history. Approximately 200km of additional transmission line will be required to connect new renewable generators to CopperString 2032.

The overall expanded project has a budget of $5 billion and includes:

- 500 kilovolt (kV) transmission line from just south of Townsville to Hughenden
- 330kV transmission line from Hughenden to Cloncurry
- 220kV transmission line from Cloncurry to Mount Isa
- up to six new substation sites
- workforce accommodation and facilities in strategic locations along the corridor.

The project has broken ground in July 2024, with preliminary works commencing on the construction of the workforce accommodation and facilities in Hughenden.

Powerlink recently completed a review of the 500kV section of the project between the Burdekin River east to the proposed Mulgrave substation site. This review identified significant constructability, access and operational issues for the proposed transmission line corridor and substation site due to very steep terrain and the requirement to construct significant access tracks and waterway crossings through areas that experience flooding and inundation.

Given these factors, Powerlink will no longer proceed with the transmission line corridor and substation site in the previously specified location and will instead investigate an alternative transmission line corridor and substation site for CopperString 2032 that allows for better constructability and access. The new area identified for investigation, known as the Study Area, is located north east from the Burdekin River to Reid River and is approximately 60km long and 8km to 15km wide.

1.2 Purpose of this report

Powerlink has prepared this Recommended Corridor and Substation Site Selection Report (RCSSSR) to recommend a transmission line corridor and substation site for the Burdekin River to Reid River section of CopperString 2032. Powerlink has engaged Umwelt to provide technical, spatial and mapping analysis to support preparation of this report.

The purpose of this RCSSSR is to document the assessment outcomes as described below:

- development of objectives, criteria and measures to identify and select a recommended transmission line corridor and substation site option within the Study Area that has the least overall impact from a social, environmental and economic perspective
- selection of the recommended transmission line corridor (generally 2km wide) and substation site (generally 1.1km x 1km subject to final design)
- review and evaluation of the planning and legislative framework applicable to the recommended corridor and substation site.

1.3 Approach

Powerlink has completed an assessment of the broad Study Area to identify potential transmission line corridors and substation sites.

Three objectives were identified to inform the selection of the corridor and substation site:

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 selection process included utilising publicly available information, as well as technical and spatial data, to identify constraints and opportunities from a social, environment and economic perspective. From this, two (2) potential transmission line corridors and four (4) potential substation sites were identified and comparatively assessed to determine a recommended transmission line corridor and substation site that, on balance, has the least overall impact.

1.4 Stakeholder engagement

In early July 2024, Powerlink contacted landholders, traditional owners and other key stakeholders in the Study Area to introduce the project. As part of this notification process, Powerlink advised its intention to release this Recommended Corridor and Substation Site Selection Report (RCSSSR) for public review and comment.

Input from landholders, traditional owners, the wider community and other stakeholders about this project is vital and will guide our decision-making and planning. A full copy of this RCSSSR has been made available on the project website at www.powerlink.com.au/projects/copperstring-2032.

Feedback has been invited through a number of channels, including in person meetings, phone, email and via an interactive online map (https://bit.ly/ReidRiverAlignment) made available on the project website, along with a fact sheet and Frequently Asked Questions (FAQ) document. Community drop-in sessions in key locations will be held during the public consultation period, which is expected to continue until October 2024.

Details for these sessions will be promoted on the project website, social media, via email and in local newspaper advertising.

Powerlink will review all feedback and submissions received about the RCSSSR and offer meetings with submitters to better understand and assess matters raised. It will publicly release a Final Corridor and Substation Site Selection Report (FCSSSR) later in 2024 that will outline the submissions received to the RCSSSR and how those submissions have been considered. It will also include a final decision on the corridor for the proposed transmission line and location for the proposed substation.

Powerlink will then work with directly affected landholders, Traditional Owner groups and other stakeholders and undertake a range of environmental, heritage and constructability studies to determine a proposed easement alignment for the transmission line within the final corridor, and if necessary, make micro siting adjustments to the proposed final location of the substation site by mid-2025.

Development approval and land acquisition processes for the proposed transmission line and substation are planned to commence around mid-2025 with construction currently proposed to commence in Q3 2026.

No final decision on the location of the proposed transmission line and substation will be made until engagement has been undertaken and all required approvals have been achieved.

The indicative development activities and timeframes for the project are shown below –

Table 1: Development Activities and Timeframes

Activity	Estimated Timeframe
Recommended Corridor and Substation Site Selection Report (this report) publicly released for feedback	August 2024
Final Corridor and Substation Site Selection Report Released	Late 2024
Stakeholder Engagement and Technical Studies to determine easement alignment for the proposed transmission line and if necessary, micro adjustments to the final location for the proposed substation	From late 2024
Commonwealth Environmental Approval Referral	Late 2024 / Early 2025
Development Approval (Ministerial Infrastructure Designation) submitted to Queensland Government with opportunity for submissions	Mid 2025
Construction commences	Q3 2026

2 Transmission Line and Substation Construction Overview

The section of CopperString 2032 between the Burdekin River and Reid River will comprise –

- a 500kV transmission line, approximately 54km long, between the Burdekin River and a proposed substation at Reid River
- Two short sections of adjacent 275kV transmission lines, approximately 8km long, east from the substation at Reid River connecting to Powerlink's existing transmission network on the Strathmore to Ross 275kV line
- a 500/275kV substation at Reid River.

2.1 Transmission line

The final alignment for the proposed transmission line will be located within an easement generally 120m wide. 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 (including a temporary work area) will be approximately 60m x 60m and spans between towers will be around 500 - 650m. Tower heights will be dependent on terrain, topography and land use of the final alignment with shorter towers likely on higher ground and taller towers within low points of the corridor. It is likely 500kV towers will be around 60-85m 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 below.

2.2 Preparing the site

Following comprehensive field visits to undertake detailed investigations (eg – geotechnical, soil, vegetation etc), 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.

2.3 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 up to 21m 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.

2.4 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.

2.5 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.

2.6 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.

2.7 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.

2.8 Substation

The role of a substation is to monitor and control the flow, stability, quality and voltage of electricity within the transmission network. Equipment within substations is used to transform the voltage of electricity, protect the network, measure the flow of electricity, and switch electricity between the different transmission lines on the grid. A substation is not a power station and therefore it does not generate electricity. Substations may vary in size as a result of the voltage of transmission lines, as well as the number of different transmission lines that it needs to support.

For this project, the proposed 500/275kV substation will require a large area of land around 1.1km x 1km in size (subject to final design). The substation will be located on land acquired by Powerlink. A representative photo is shown below –

3 Study Area

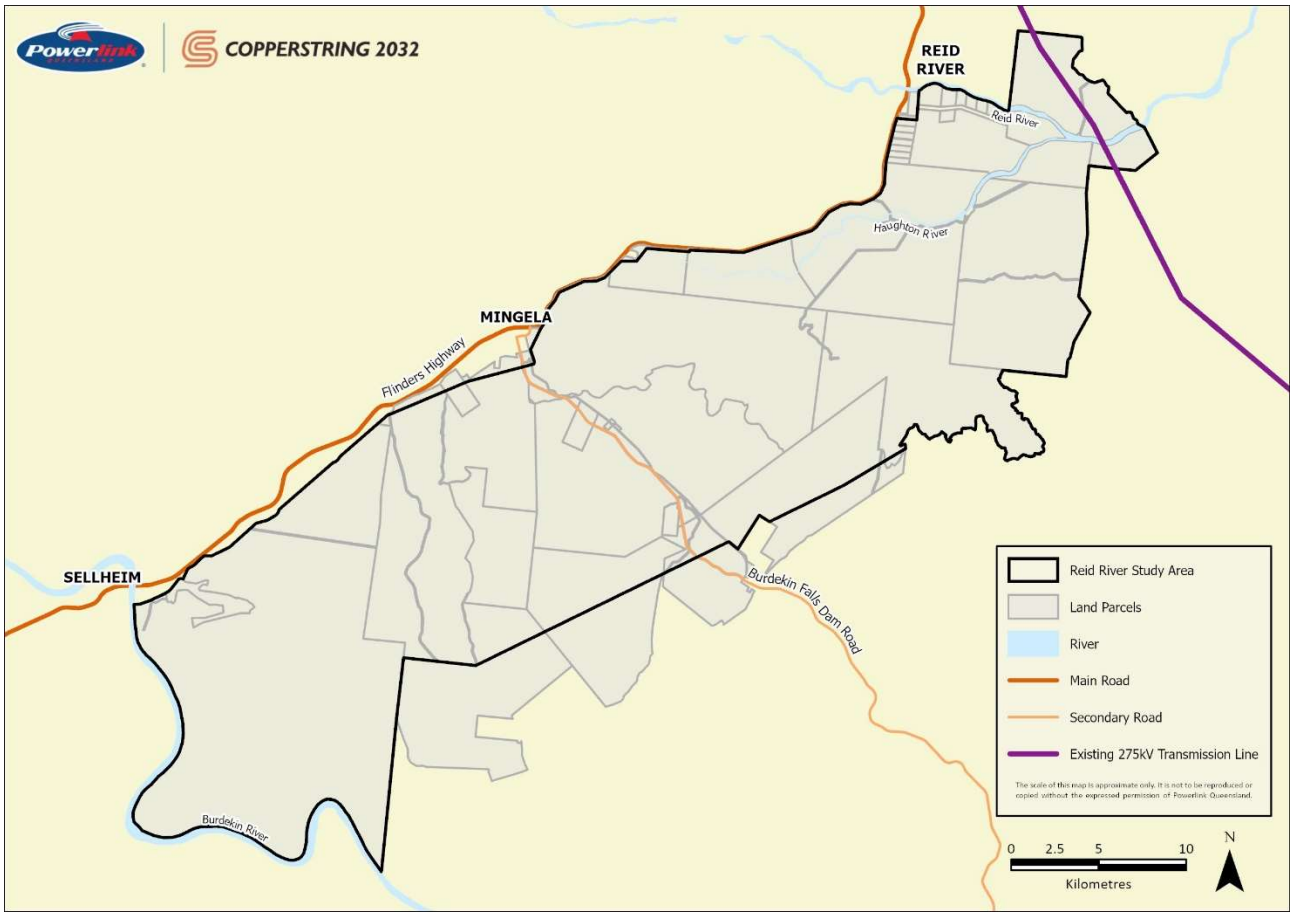
3.1 Overview

The Study Area is based on a broad area to the north of the previously specified Burdekin River to Mulgrave transmission line corridor.

The northern boundary of the area generally abuts the Flinders Highway, the western boundary abuts the Burdekin River and the eastern boundary abuts Powerlink's existing Strathmore to Ross 275kV line. The area is approximately 60km long, 8km to 15km wide and comprises around 83,900 hectares of land as shown in Figure 3 below.

The Study Area is located approximately 52km south of Townsville and is predominately within the Charters Towers Regional Council (CTRC) Local Government Area (LGA). Some portions at the eastern end extend slightly into the Townsville City Council (TCC) LGA and Burdekin Shire Council (BSC) LGA.

Figure 3: Study Area



Key characteristics of the Study Area include:

3.1.1 Land tenure

Land tenure in the Study Area is predominately leasehold with portions of freehold, reserve land, easements, road reserves and unallocated State land. Freehold land is generally located in the eastern (Reid River) portion of the Study Area. Land parcels vary in size from 1 ha to 18,400 ha.

The main reserves and easements within the Study Area include:

- Strathmore to Ross 275kV transmission line
- Burdekin Falls Dam Road

3.1.2 Land use

The majority of the Study Area within the CTRC LGA is zoned as Rural, with a small portion zoned as Special Purpose under the planning scheme. The two small portions in the north-east of the Study Area within the TCC and BSC LGAs are zoned as Rural.

Rural land use within the Study Area generally consists of grazing with scattered other uses (for example rural lifestyle, defence training area, cattle feedlot). The intent of the Rural zoning is to preserve land for agricultural purposes and protect the rural character and amenity of the region. It also recognises the need to provide opportunities for compatible non-rural uses and for areas to be managed for their contribution to the economy, landscape character and ecological values.

The Study Area is located within the North Queensland Regional Plan (March 2020). Key mapped regional interests within the Study Area include:

- 'Regional biodiversity corridor' located in the north east and centre of the Study Area.
- 'Regional biodiversity value' located in the south west and north east of the Study Area.

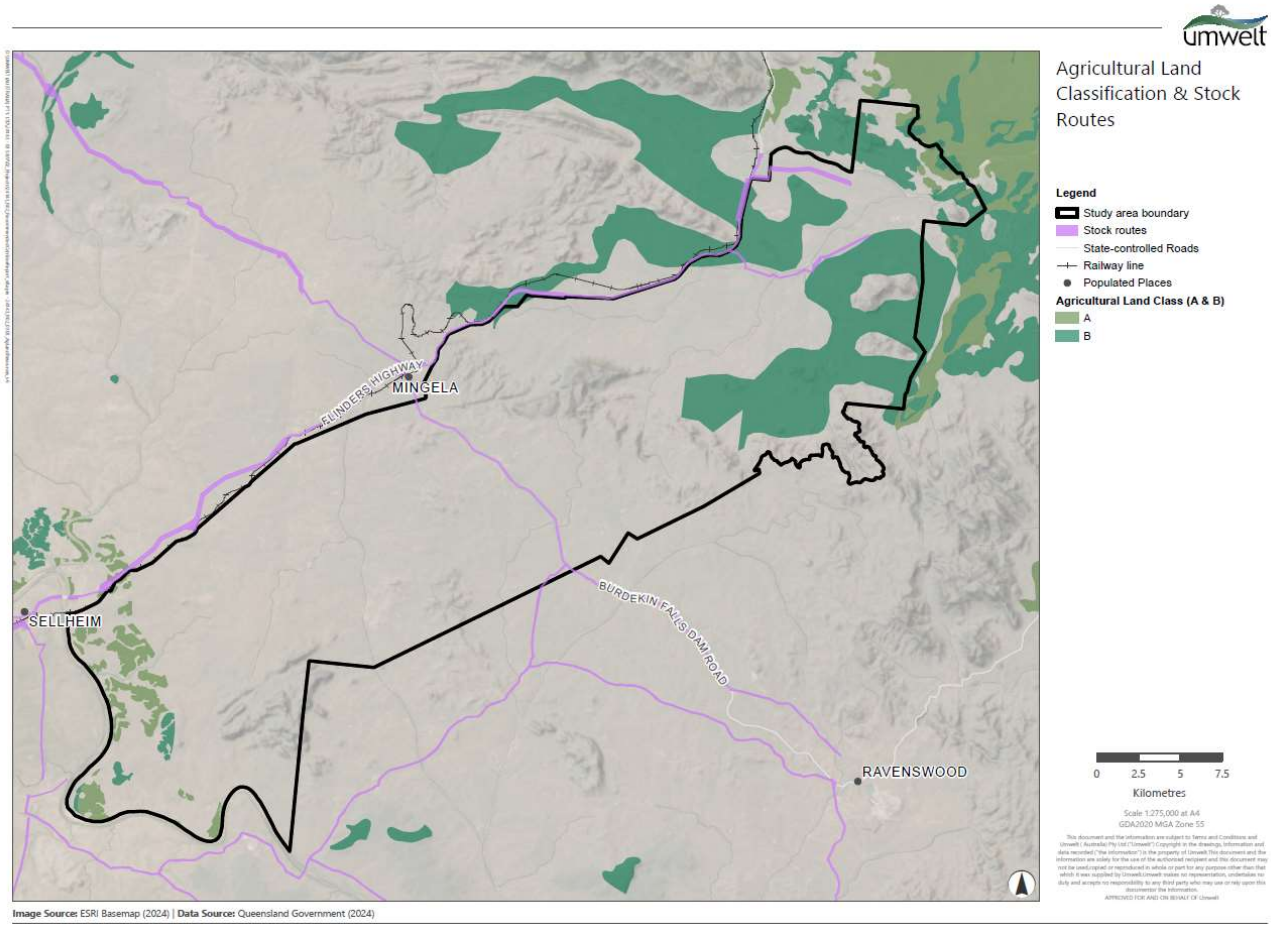
The Queensland Government maps agricultural land classes across Queensland to assist with identification of important agricultural areas in the State. Agricultural land class types include:

- Class A: Crop land that is suitable for a wide range of current and potential cops with nil to moderate limitations to production.
- Class B: Limited crop land that is suitable for a narrow range of current and potential crops due to severe limitations but is highly suitable for pastures. May be suitable for cropping with engineering or agronomic improvements.
- Class C: Pastureland that is suitable only for improved or native pastures due to limitations with preclude continuous cultivation for crop production.
- Class D: Non-agricultural land and land not suitable for agricultural uses due to extreme limitations (i.e. undisturbed land with significant conservation values, steep slopes, shallow soils, poor drainage, or is an urbanised area).

The land classes inform strategic policy, planning and investment decisions, including providing protection of locally important agricultural areas and investment in infrastructure which supports agriculture. The Queensland Government State Planning Policy (Agriculture State Interest) protects Agricultural Land Classification Class A and B.

Land within the Study Area is mostly unconstrained by Agricultural Land Classification mapping. Small areas of Class A land are mapped at the western and eastern end of the area and larger areas of Class B land are found at the eastern end. This is shown in Figure 4 below.

Figure 4: Agricultural Land Classification and Stock Routes



3.1.3 Resource interests

There are several exploration permits throughout the Study Area. These permits do not affect land use rights and are not a constraint to development of the proposed transmission line and substation.

3.1.4 Utilities

Powerlink's existing electricity transmission network is located within the eastern boundary of the Study Area and comprises the Strathmore to Ross 275kV transmission line. Various Ergon Energy sub-transmission and distribution lines are located within the Study Area to connect individual homes, Mingela township and in the south-western corner of the Study Area.

3.1.5 Transport and traffic

One State controlled road passes through the Study Area:

- Burdekin Falls Dam Road runs generally south to north in the middle of the Study Area.

One State controlled road forms the northern boundary of the Study Area:

- Flinders Highway.

A number of local roads are located within the Study Area and service individual properties.

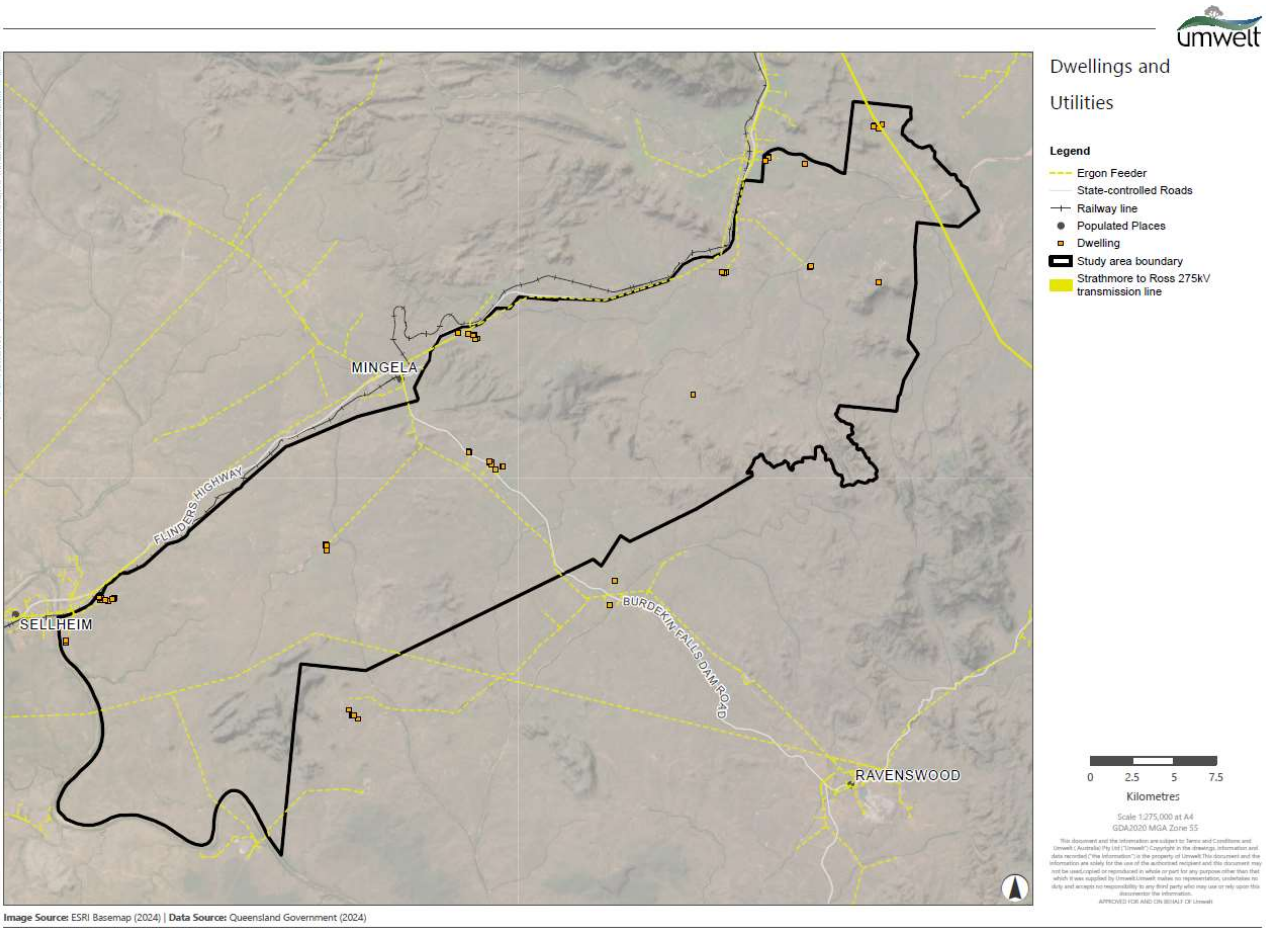
The Mount Isa Line railway borders the northern boundary of the Study Area.

Several stock routes are located within the centre and northern portion of the Study Area.

3.1.6 Dwellings

The dwellings within the Study Area are widely dispersed and associated with rural uses (mainly grazing). Many of the dwellings are located towards the northern boundary of the Study Area along the Flinders Highway as well as along Burdekin Falls Dam Road. This is shown in Figure 5 below.

Figure 5: Dwellings and Utilities



3.1.7 Cultural heritage

A search of the Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts (DTATSIPCA) cultural heritage database identified the Birriah People and Bindal People #2 as the Aboriginal parties for the Study Area. The database contains several registered Aboriginal cultural heritage sites within the Study Area. Powerlink is engaging with these parties about the project and further investigations will be undertaken to ensure sites and values are protected.

The *Queensland Heritage Act 1992* (Queensland Heritage Act) is administered by the Department of Environment, Science and Innovation (DESI) which is responsible for the Queensland Heritage Register. No Queensland heritage places are located within the Study Area. However, the following Queensland heritage places are mapped in proximity of the Study Area:

- Pandanus Creek Battery – reference: 601848
- Burdekin River Rail bridge (former) – reference: 600442.

No local heritage places are located within the Study Area.

No World Heritage Properties or National Heritage Places are located within the Study Area.

The Commonwealth Heritage List administered by the Department of Climate Change, Energy, the Environment and Water and in consultation with the Australian Heritage Council, has identified the following Commonwealth Heritage Places within the Study Area:

- Macrossan Stores Depot Group – reference 105330 is in the south west of the Study Area adjoining the Flinders Highway.

3.1.8 Native title

The Study Area is located within an existing native title area of the Birriah People (QCD2016/001) and claim area of the Bindal People #2 (QC2016/005). Engagement with the native title parties on the impact of the transmission line and substation on native title rights and interests will be addressed in accordance with the *Native Title Act 1993*.

An Indigenous Land Use Agreement (QI2014/090) intersects the majority of the Study Area. The Indigenous Land Use Agreement is between the Birriah People and Local Governments (BSC, CTRC, Isaac Regional Council, Mackay Regional Council, Whitsunday Regional Council).

3.1.9 Topography

Elevation within the Study Area ranges from 50m to 630m Australian Height Datum (AHD). Elevation is approximately 220m AHD in the south west, increases to approximately 300m AHD in the centre of the Study Area, before gradually reducing to 70m AHD at the connection to the Strathmore to Ross transmission line. Key topographic features including Mount Bluff, Tuckers Range, Burdekin River, Pandanus Creek, Haughton River and Reid River.

Some mountainous and hilly areas exist in the western, central north and eastern end of the Study Area and can be avoided by the project.

3.1.10 Vegetation and flora

The Study Area is largely vegetated with some cleared areas. Several regional ecosystems (REs) are mapped as occurring within the area and include REs listed as 'least concern' and 'of concern' under the *Vegetation Management Act 1999*, containing essential habitat or associated with watercourses which are listed as Matters of State Environmental Significance (MSES) under the Queensland *Environmental Offsets Act 2014*.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool identified seven (7) threatened plant species and no threatened ecological communities that have the potential to occur within the Study Area. These protected matters are Matters of National Environmental Significance (MNES). The presence of MNES and MSES will be confirmed in upcoming field studies.

Threatened Flora Species and Protected Plants

The centre and small portions to the east of the Study Area are mapped as containing high-risk trigger areas for protected plants under the *Nature Conservation Act 1992* (NC Act).

Records of conservation significant flora species mapped within the Study Area are detailed in Table 2 below.

Table 2: Conservation Significant Flora Species Records

Scientific Name	Common Name	NC Act Listing	EPBC Act Listing
Bulbophyllum globuliforme	Miniature Moss-orchid, Hoop Pine Orchid	Near Threatened	Vulnerable
Dichanthium setosum	Bluegrass	-	Vulnerable
Eucalyptus raveretiana	Black Ironbox	-	Vulnerable
Leichhardtia brevifolia	-	Vulnerable	Vulnerable
Omphalea celata	-	Vulnerable	Vulnerable
Phlegmariurus tetrastichoides	Square Tassel Fern	Vulnerable	Vulnerable
Tephrosia leveillei	-		Vulnerable

Regulated Vegetation and Regional Ecosystems

Regulated vegetation is managed under the *Vegetation Management Act 1999* and includes five types of vegetation:

- Category A: Compliance areas, environmental offset areas and declared areas;
- Category B: Remnant vegetation that is:
    - An 'endangered' regional ecosystem;
    - An 'of concern' regional ecosystem;
    - A 'least concern' regional ecosystem.

- Category C: high-value regrowth vegetation areas that is:
    - On freehold land, indigenous land or land subject to a lease under the *Land Use 1994*; or
    - In an area that has not been cleared for at least 15 years, if the area is:
        - An 'endangered' regional ecosystem;
        - An 'of concern' regional ecosystem;
        - A 'least concern' regional ecosystem.
- Category R: Areas within 50m of a watercourse or drainage feature in all Great Barrier Reef Catchments; and
- Category X: An area that has been cleared of vegetation and does not correspond with Categories A, B, C or R.

Descriptions of mapped REs within the Study Area are summarised in Table 3 below and shown on the map in Figure 6.

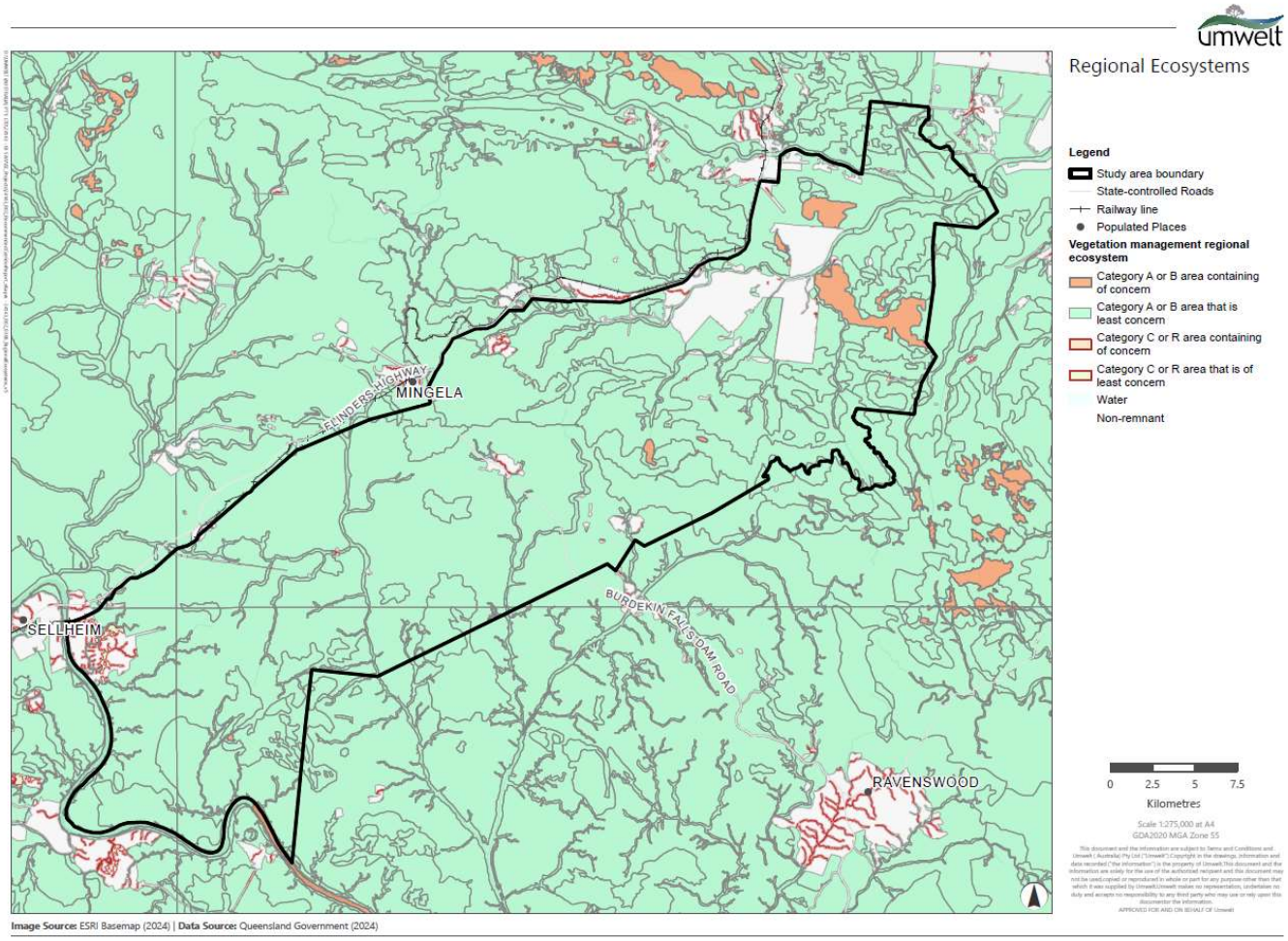
Table 3: Description of Mapped REs (Version 13) within the Study Area

RE	Short Description	VM Act	Biodiversity Status	Structure Category
9.3.1	*Eucalyptus camaldulensis and/or E. tereticornis +/- Melaleuca spp. +/- Casuarina cunninghamiana* fringing woodland on channels and levees	Least concern	Of concern	Woodland
9.3.3	*Corymbia spp. and Eucalyptus spp*. dominated mixed woodland on alluvial flats, levees and plains	Least concern	Of concern	Woodland
9.3.4	Permanent or seasonal wetlands frequently fringed by narrow bands of trees and shrubs *including Eucalyptus spp. On alluvial plains*	Of concern	Of concern	Sedgeland
9.3.6	*Eucalyptus platyphylla +/- Eucalyptus spp. +/- Corymbia spp*. woodland on alluvial plains	Least concern	No concern at present	Woodland
9.3.12	River beds and associated waterholes on major rivers and channels	Least concern	Of concern	Bare
9.5.3	*Eucalyptus crebra or E. drepanophylla and Corymbia clarksoniana* woodland on sand plains	Least concern	No concern at present	Woodland

9.11.1	*Eucalyptus melanophloia* low woodland on skeletal soils on metamorphics hills	Least concern	No concern at present	Low Woodland
9.11.2	*Eucalyptus crebra (or several other ironbark species) +/- Corymbia spp.* woodland on shallow texture contrast soils on low metamorphic hills and lowlands	Least concern	No concern at present	Woodland
9.12.1	*Eucalyptus crebra and/or E. xanthoclada and/or E. drepanophylla* low open woodland on igneous rocks	Least concern	No concern at present	Woodland
9.12.4	*Eucalyptus shirleyi and/or E. melanophloia and/or Corymbia peltata and/or Callitris intratropica* low open woodland on igneous rocks	Least concern	No concern at present	Low Open Woodland
9.12.8	Semi-evergreen vine thicket on rocky outcrops and shallow soils of igneous rocks	Least concern	No concern at present	Low Closed Forest
9.12.22	*Eucalyptus drepanophylla, Corymbia clarksoniana or C. intermedia and C. dallachiana woodland on steep rugged igneous ranges*	Least concern	No concern at present	Woodland
9.12.32	*Eucalyptus persistens* woodland on rhyolites and granites	Least concern	No concern at present	Open Woodland
9.12.34	*Semi-evergreen vine thicket with Araucaria cunninghamii on steep hills on igneous rocks*	Of concern	Of concern	Low Closed Forest
11.3.10	*Eucalyptus brownii* woodland on alluvial plains	Least concern	No concern at present	Woodland
11.3.12	*Melaleuca viridiflora, M. argentea +/- M. dealbata* woodland on alluvial plains	Least concern	No concern at present	Woodland
11.3.25	*Eucalyptus tereticornis or E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	Woodland
11.3.30	*Eucalyptus crebra, Corymbia dallachiana* woodland on alluvial plains	Least concern	No concern at present	Woodland
11.3.35	*Eucalyptus platyphylla, Corymbia clarksoniana* woodland on alluvial plains	Least concern	No concern at present	Woodland

11.11.5	*Microphyll vine forest +/- Araucaria cunninghamii* on old sedimentary rocks with varying degrees of metamorphism and folding	Least concern	No concern at present	Closed Forest
11.11.15	*Eucalyptus crebra* woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Least concern	No concern at present	Woodland
11.12.4	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	Least concern	No concern at present	Closed Forest
11.12.8	*Eucalyptus shirleyi* low woodland on igneous rocks	Of concern	Of concern	Woodland
11.12.9	*Eucalyptus platyphylla* woodland on igneous rocks	Least concern	No concern at present	Closed Forest
11.12.13	*Eucalyptus crebra, Corymbia spp., E. acmenoides* woodland on igneous rocks. Coastal hills	Least concern	No concern at present	Woodland

Figure 6: Regional Ecosystem Map



Threatened Ecological Communities

The EPBC Act PMST report identified no Threatened Ecological Communities listed as 'endangered' as being potentially present in the Study Area.

Invasive Flora

Weed and pest information will be sourced in future field investigations.

3.1.11 Fauna

Threatened Fauna Species

The EPBC Act PMST report identified 26 threatened fauna species and 18 migratory species that have the potential to occur within the Study Area. The presence of threatened and migratory species will be confirmed in upcoming field surveys. The threatened fauna that has the potential to occur within the Study Area is summarised in Table 4 below.

Table 4: Threatened fauna listed as potentially occurring the Study Area

Scientific Name	Common Name	NC Act Listing	EPBC Act Listing
Calidris acuminata	Sharp-tailed Sandpiper	Special least concern	Vulnerable
Calidris ferruginea	Curlew Sandpiper	Critically endangered	Critically Endangered
Charadrius leschenaultii	*Greater Sand Plover*	*Vulnerable*	*Vulnerable*
Erythrotriorchis radiatus	Red Goshawk	Endangered	Endangered
Falco hypoleucos	*Grey Falcon*	*Vulnerable*	*Vulnerable*
Gallinago hardwickii	Latham's Snipe	Special least concern	Vulnerable
Geophaps scripta scripta	*Squatter Pigeon*	*Vulnerable*	*Vulnerable*
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Vulnerable
Neochmia ruficauda ruficauda	Star Finch	Endangered	Endangered
Numenius madagascariensis	Eastern Curlew	Endangered	Critically Endangered
Poephila cincta cincta	Southern Black-throated Finch	Endangered	Endangered
Rostratula australis	Australian Painted Snipe	Endangered	Endangered
Tringa nebularia	Common Greenshank	Special least concern	Endangered
Tyto novaehollandiae kimberli	Masked Owl	Vulnerable	Vulnerable
Dasyurus hallucatus	Northern Quoll	Least concern	Endangered
Hipposideros semoni	Semon's Leaf-nosed Bat	Endangered	Vulnerable
Macroderma gigas	Ghost Bat	Endangered	Vulnerable
Petauroides minor	Greater Glider (northern)	Vulnerable	Vulnerable
Petauroides volans	Greater Glider (southern and central)	Endangered	Endangered
Petrogale sharmani	Sharman's Rock Wallaby	Vulnerable	Vulnerable
Phascolarctos cinereus	Koala	Endangered	Endangered
Rhinolophus robertsi	Large-eared Horseshoe Bat	Endangered	Vulnerable
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat	Endangered	Vulnerable

Denisonia maculata	Ornamental Snake	Vulnerable	Vulnerable
Egernia rugosa	Yakka Skink	Vulnerable	Vulnerable
Lerista vittata	Mount Cooper Striped Skink	Endangered	Vulnerable

Essential Habitat

Essential habitat, as defined under the *Vegetation Management Act 1999,* comprises areas in which a species that is listed as 'endangered', 'vulnerable' or 'near threatened' under the NC Act is known to occur. Mapped areas of essential habitat exist mostly to the north of Mount Bluff and a small patch in the north-east of the Study Area. These areas contain squatter pigeon (southern subspecies), Koala, black-throated finch (whiterumped subspecies), Macropteranthes leiocaulis, and Graptophyllum excelsum. The RE contained within these areas include RE 9.12.22, RE 11.3.10, RE 11.3.12, RE 11.3.25, RE 11.3.30, RE 11.3.35, RE 11.11.15, and RE 11.11.5. Areas mapped as essential habitat should be avoided as far as practical to do so.

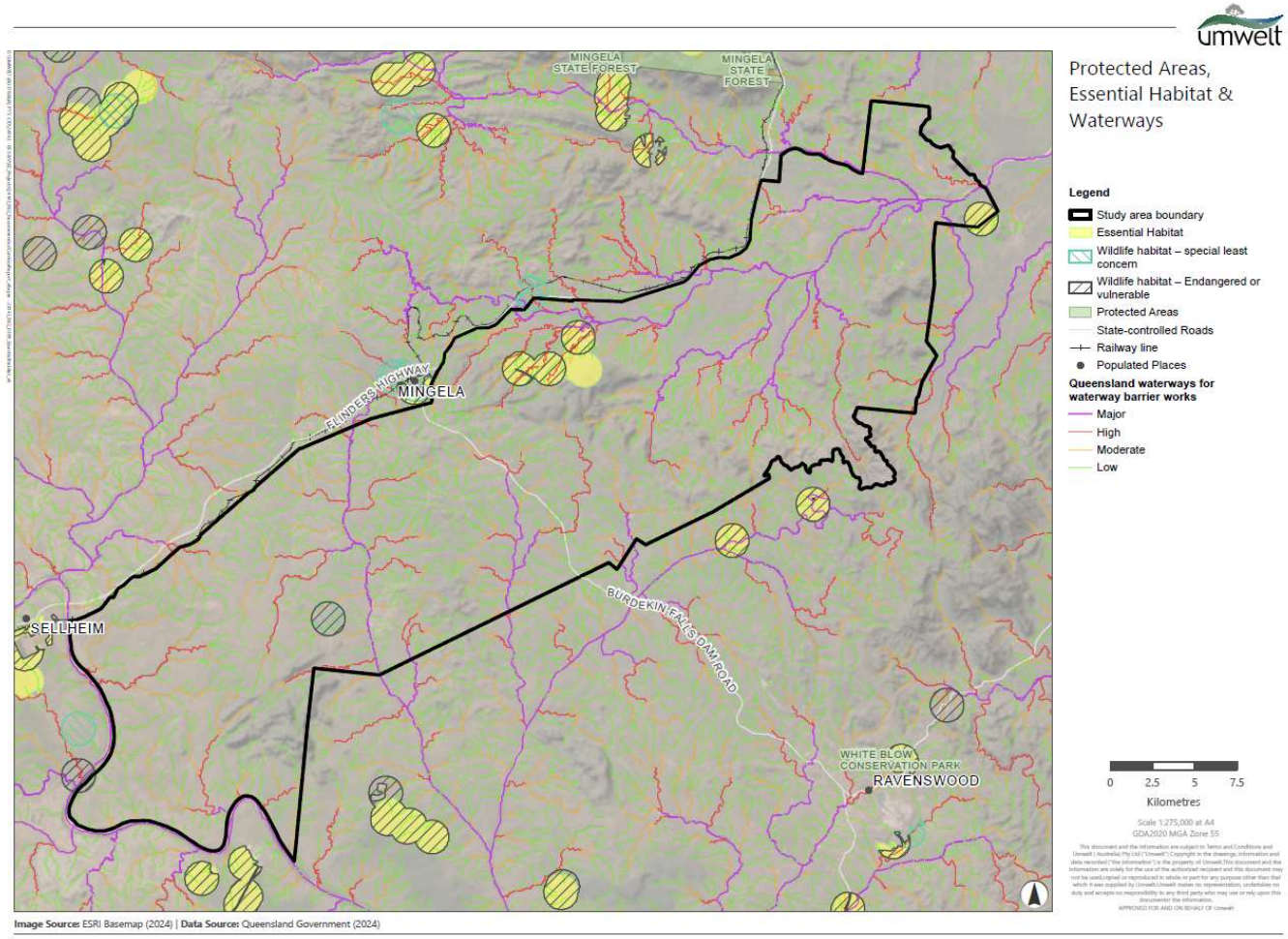
Fish Passage

Waterways for waterway barrier works under the *Fisheries Act 1994* are mapped throughout most of the Study Area. These are identified as green (low impact) waterways, orange (moderate impact) waterways, red (high impact) waterways, and purple (major impact) waterways. There are no fish habitat areas within the Study Area. Figure 7 shows the location of essential habitat and waterways.

Protected Areas

The Study Area does not intersect any protected areas under Commonwealth or State legislation. There are no National Parks, Conservation Parks or State Forests within the Study Area.

Figure 7: Protected Areas, Essential Habitat and Waterways



3.1.12 Unexploded ordnance

The Department of Defence unexploded ordnance (UXO) mapping has identified the following lands subject to potential unexploded ordnance within the Study Area:

- Macrossan Camp (UXO Category: Defence Controlled Area).
- 452 Broughton (UXO Category: Other). The site is listed as 'training area'.
- 531 Macrossan (UXO Category: slight potential). The site is listed as 'Grenades, Mortar and Artillery'.
- 707 Heathfield West / Birthday Hill Substantial 1 (UXO Category: Substantial Potential). The site is listed as 'Heavily used Range. Mustard gas fired by the Australian Field Experimental Station.
- 708 Heathfield West / Birthday Hill Substantial 2 (UXO Category: Substantial Potential). The site is listed as 'Heavily used Range. Mustard gas fired by the Australian Field Experimental Station.
- 504 Heathfield West / Birthday Hills (UXO Category: Slight Potential). The site is listed as 'Heavily used Range. Mustard gas fired by the Australian Field Experimental Station.
- 507 Haughton Valley (UXO Category: Slight Potential). The site is listed as 'Actual Area Unconfirmed
- 571 Reid River 2 (UXO Category: Other). The site listed as 'WWII Airfield'.

4 Transmission Line Corridor Options

4.1 Objectives and Siting Considerations

The transmission line corridor options assessment within the Study Area is guided by three broad objectives:

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.

Each of these objectives is informed by a range of siting considerations –

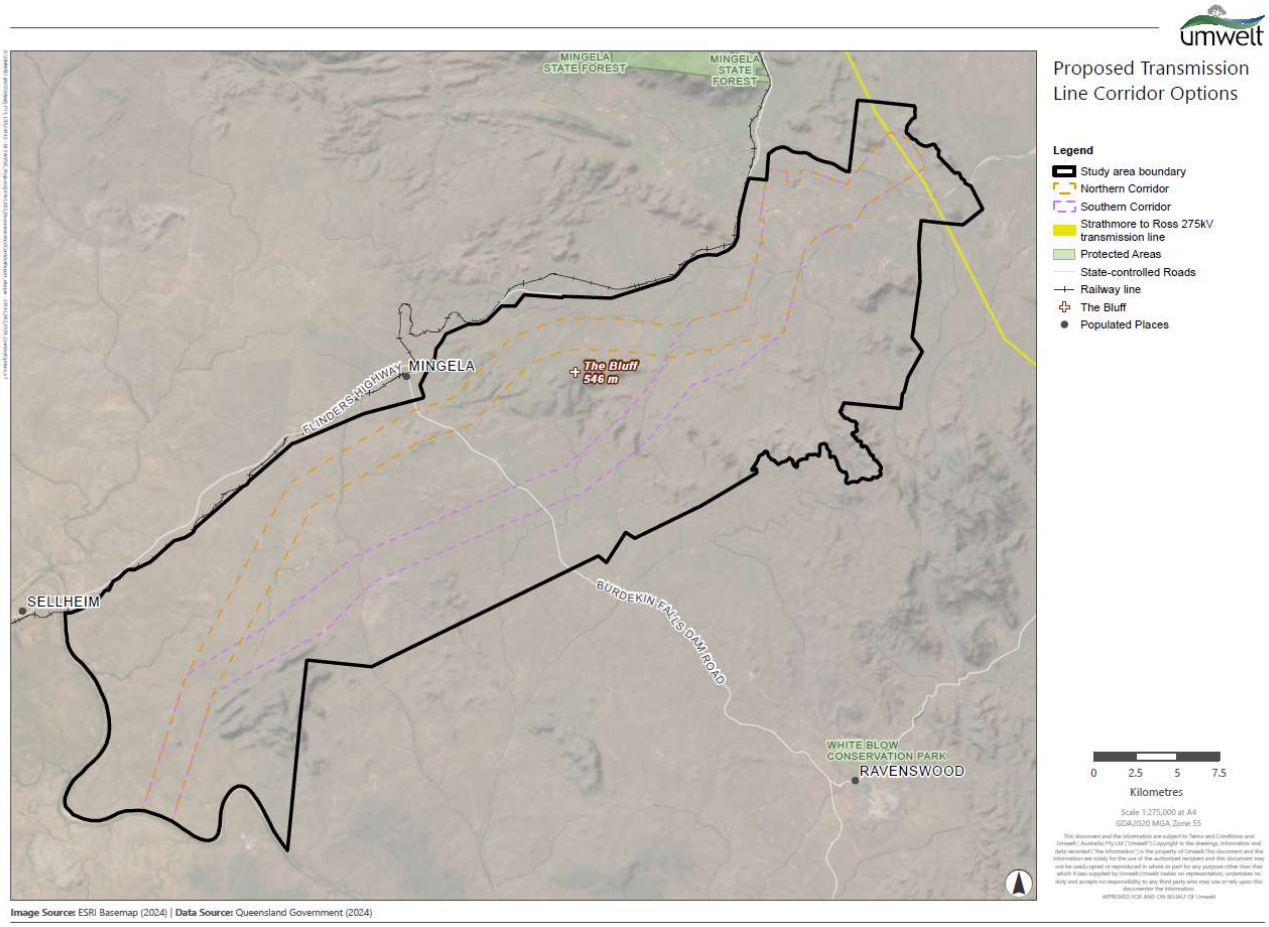
Table 5: Transmission Corridor Siting Considerations

Category	Consideration
Social factors	• Intensive land uses such as cultivation, good quality agricultural land, residential and rural residential areas. • Mining and gas production tenements and infrastructure (mining and petroleum leases, mineral development license areas, petroleum facilities, pipelines). • Separation from dwellings and other places of assembly. • Interactions with other physical infrastructure such as roads, rail, wind turbines, dams and other transmission lines. • Proximity to property boundaries. • Locations of visual amenity, viewpoints and lookouts. • Places of Aboriginal and Non-Aboriginal cultural significance. • Number of land parcels affected.
Environmental and Physical factors	• Vegetation. • Habitat for threatened flora and fauna. • Protected areas and areas of high environmental value. • Steep topography – limits vehicle access and increases the amount of earthworks benching at each structure site. • Geological features – rock, acid sulphate soils, erosive soils. • Number of watercourse crossings and flood risk. • Unexploded ordinance. • Population centres including towns and villages.
Economic factors	• Length of transmission corridor. • Number of bend points.

	• Requirement for very tall structures. • Foundations affected by rock. • Crossing of other power lines that require outages for construction and/or maintenance.

These siting considerations were applied to the Study Area to identify potential transmission line corridors for comparative analysis. Two corridors were identified - the Northern Corridor and Southern Corridor – and are shown on the map below.

Figure 8: Transmission Line Corridor Options



The corridors contain common sections at the western and eastern ends. At the western end, the common corridor commences at the Burdekin River before turning north and moving around the western side of Tuckers Range. The corridors then diverge with the Northern Corridor moving north-east towards Pandanus Creek and the Flinders Highway while the Southern Corridor moves in a more easterly direction around the northern side of Tuckers Range. At the eastern end, both corridors converge near Four Mile Creek around 3-4 km south of where it joins the Haughton River. From this point, the common corridor moves north and north-east to join the substation investigation area and connect with Powerlink's existing Strathmore-Ross 275kV transmission network which supplies Townsville.

4.2 Transmission Line Corridor Assessment

The transmission line corridor options have been assessed using quantitative and qualitative analysis and ranked against the assessment criteria in Table 6 below. Using this approach, the benefits and disadvantages of the corridor options against each criterion were considered and from this a recommended corridor has been identified.

Criteria not considered to be relevant to the purpose of this study have been excluded from the comparative assessment. This occurred in cases where:

- There was little or no variation in the criterion across the Study Area; or
- Relative scarcity of high quality and detailed information available to inform differentiation between the merits of the different options without undertaking significant additional studies.

Where it was determined that criteria were relevant (either due to relevance to the Study Area or variation between the proposed transmission corridor options), performance indicators were identified.

Table 6: Transmission Line Corridor Assessment Criteria

Assessment Criteria	Relevance	Performance Indicator
Social		
Tenure	• Both transmission line corridors traverse tenure and zoning suitable for a transmission line. • Tenure and zoning is not a differentiating factor in this transmission line corridor selection.	N/A
Land Use and Land Parcels	• Both transmission line corridors contain areas of agricultural land use (grazing). • Both transmission line corridors are mapped outside of Strategic Cropping Land (SCL). • Agricultural Land Class A and B provides a measure of the type and value of agricultural production. • Number of land parcels differs within each corridor. • Transmission line corridor with least impact to Agricultural Land Class A and B is recommended. • Transmission line corridor with the lowest number of land parcels is recommended.	Area of transmission line corridor intersecting Agricultural Land Class A and B. Number of land parcels within corridor.
Heritage	• No mapped or listed National, State, local heritage and/or registered Aboriginal cultural heritage sites are located within the transmission line corridors.	N/A

	• Field assessments will be undertaken to confirm the presence of heritage values occurring. • Based on this initial information, heritage is not a differentiating factor in this transmission line corridor selection.	
Dwellings	• No dwellings are located within the transmission line corridors. • Impact to dwellings and other sensitive receptors is not a differentiating factor in this transmission line corridor selection.	N/A.
Resource Interests	• Several mineral exploration permits are present across the transmission line corridors, however, these permits do not affect land use rights. • Resource interests are not a differentiating factor in this transmission line corridor selection.	N/A
Transport and Infrastructure	• Transmission line corridors intersect with existing infrastructure easements, roads and Powerlink transmission infrastructure. • Potential impacts occur at the intersection of the proposed transmission line and other infrastructure. • Transmission line corridor option with the least impact to transport and other infrastructure is recommended.	Transmission line corridors intersecting existing infrastructure.
Environment and Physical		
Vegetation and Threatened Flora and Fauna	• Transmission line corridors comprise areas mapped as containing protected vegetation and mapped RE's. • Transmission line corridor option with the least potential impact to flora and fauna is recommended.	Area of remnant vegetation (including mapped RE) within the corridor. Corridor with the least impact to fauna habitat.
Topography	• Transmission line corridors traverse generally similar terrain with the exception of concentrated areas of slope and rough topography. • Transmission line corridor option with less steep terrain is recommended.	Steepest slope of transmission line corridor.
Geology and Soils	• Transmission line corridors traverse similar geology and soil conditions.	N/A

	• Soil and Geology is not a differentiating factor in this transmission line corridor selection.	
Hydrology	• Various ephemeral watercourses/waterways and flood plains intersect the transmission line corridors. • Due to the nature of the infrastructure, flood protection can be achieved through design and flooding is not typically a concern for its operation. • Hydrology is not a differentiating factor in this transmission line corridor selection.	N/A
Unexploded Ordnance	• UXO may occur within the transmission line corridor options due to historical use by the Australian Defence Force especially towards the middle and eastern end of the Study Area. • The lack of reliable baseline data restricts the potential to differentiate between transmission corridors without ground truthing. • Higher risk areas are known and any UXO finds will be managed in accordance with Powerlink procedures. • UXO is not a differentiating factor in this transmission line corridor selection.	N/A
Economic		
Constructability and Cost Factors	• Cost of construction. • Transmission corridor requiring the least complex construction measures (i.e. shortest alignment) is recommended.	Length of transmission line corridor. Estimated number of bendpoints.

Each differentiating performance indicator is comparatively assessed below.

4.2.1 Land use and land parcels

The potential impact of transmission lines on Strategic Cropping Land and Agricultural Land Classes A and B is often a key issue raised by landholders, especially for areas of cultivation. Agricultural land classes are defined under the State Planning Policy and provide for the protection of agriculture and agricultural development opportunities.

The number of land parcels within each transmission line corridor is an indication of the intensity of development.

Table 7 shows the percentage area of each transmission line corridor which overlays Agricultural Land Classes A and B together with a count of land parcels within each corridor.

Table 7: Corridor intersection Agricultural Land Classes and Land Parcels

Constraint	Northern Corridor	Southern Corridor
Agricultural Land Class A (% of total corridor area)	0.28% (39ha)	0.28% (39ha)
Agricultural Land Class B (% of total corridor area)	13.17% (1,862.31ha)	13.42% (1,965.58ha)
Number of land parcels within each corridor (excludes common corridor land parcels at the western and eastern ends)	9	7

Agricultural Land Classification mapping shows both corridors traverse predominantly unclassified land with small areas of Agricultural Land Class A and B generally within the areas common to both options. The Southern Corridor contains a very slightly higher amount of Class B land and impacts on this additional area can be minimised / avoided through careful alignment selection and tower placement.

The Southern Corridor contains a lower number of land parcels than the Northern Corridor.

On this basis, the Southern Corridor is recommended.

4.2.2 Transport and infrastructure

The number of transport and other infrastructure crossings for each transmission line corridor option is summarised in Table 8 below. Crossings typically increase design and construction complexity and cost due to the special construction techniques and sometimes increased conductor heights required.

Table 8: Corridor intersection with transport and other infrastructure

Constraint	Northern Corridor	Southern Corridor
Intersecting with State controlled roads	1	1
Intersecting with Local Roads	6	5
Intersecting with Railway (operating)	0	0
Intersecting with electricity lines	4	4
Near to Airstrips	3.9km from end of Macrossan runway (following same bearing)	10km from end of Macrossan runway (following same bearing)

Both proposed transmission corridor options intersect Burdekin Falls Dam Road. There is very limited differentiation between interactions with roads, railways and electricity lines, however, the Southern Corridor would result in one less crossing of local roads.

Macrossan Airfield, an RSU (Repair and Salvage Unit) base during WWII now used as an RAAF stores depot, is located approximately 3.9km west of the Northern Corridor. Powerlink understands the airfield is still used for flights by the Australian Defence Force and a transmission line within this corridor crossing the approach / take off path may present a potential hazard for aircraft.

While both transmission line corridors have similar impacts to transport and other infrastructure, the Southern Corridor is the recommended option based on the reduced crossing of local roads and further distance from the Macrossan Airfield.

4.2.3 Vegetation and threatened flora and fauna

A review of the proposed transmission line corridor options against vegetation mapping and records of threatened flora and fauna was undertaken to identify the potential impacts as summarised below.

The PMST report identified no TECs listed under the EPBC Act as known, likely to, or may occur within the Study Area.

Remnant vegetation dominates both transmission line corridor options with scattered areas of non-remnant and small areas of regrowth. Vegetation within the northern corridor is mapped as containing essential habitat near Mount Bluff and both transmission line corridors are mapped as containing high-risk areas for protected plants.

The area of mapped remnant vegetation and wildlife habitat has been expressed as a percentage of the total area of each transmission line corridor option and is shown in Table 9 below. The table shows that areas of remnant vegetation within each transmission line corridor are very similar. The presence of high-risk areas for protected plants being present across both transmission line corridors will not be a differentiating factor, however the presence of essential habitat and wildlife habitat will be considered.

Table 9: Corridor intersection with vegetation and essential habitat

Constraint	Northern Corridor	Southern Corridor
Vegetation		
Category A Remnant Vegetation	0% (0ha)	0% (0ha)
Category B Remnant Vegetation	89.33% (12,631.15ha)	89.53% (13,107.58ha)
Category C Remnant Vegetation	0.03% (3.55ha)	0.01% (1.33ha)
Category R Remnant Vegetation	0.08% (10.63ha)	0.08% (11.07ha)
Essential habitat	5.12% (724.23ha)	0% (0ha)
High risk area for protected plants	3.39% (479.09ha)	0.32% (46.36ha)

Wildlife habitat		
Endangered or Vulnerable	4.95% (700.7ha)	2.14% (313.3ha)
Special least concern	0% (0ha)	2.14% (313.3ha)

For this performance indicator, despite containing very slightly more remnant vegetation, the Southern Corridor is the recommended option on the basis it best avoids areas potentially containing essential habitat and only contains a small extent of protected plants polygon mapping and wildlife habitat.

4.2.4 Topography

A review of the proposed transmission line corridor options against topography mapping was undertaken to identify potential constraints. Key topographic features include Mount Bluff, Tuckers Range, Pandanus Creek, Burdekin River, Haughton River and Reid River. The corridors intentionally avoid steep and mountainous terrain and this is reflected in Table 10 below.

Table 10:Transmission line corridor topography

Constraint	Northern Corridor	Southern Corridor
Slope above 30 degrees	0.007% (1.04 ha)	0.03% (4.59 ha)

Both transmission line corridors are equally recommended given the very small areas of steep land (both less than 1% of each corridor area) with slope above 30 degrees.

4.2.5 Cost and constructability

The cost to construct and maintain a transmission line is generally proportional to the length of the route and number of direction changes (bend points).

Table 11 Transmission line capital cost

Constraint	Northern Corridor	Southern Corridor
Transmission Line Corridor Distance	66.20km	63.10km
Number of potential bend points based on a nominal alignment (excludes common corridor bend points at the western and eastern ends)	7	5

The Southern Corridor has a shorter length and lower number of potential bend points compared to the Northern Corridor. A detailed cost estimate for the transmission line will be prepared following development of the alignment. For this performance indicator, the Southern Corridor is the recommended option.

4.3 Assessment Summary

The key constraints across the two transmission line corridor options are predominantly associated with land use, transport and infrastructure, protected flora and fauna, and cost. The comparative assessment of each corridor option is shown in Table 12 below. Based on their impact, each option has been ranked 1 or 2, with 1 being the least impact and 2 being the highest impact.

Table 12 Key Constraints – Transmission Line Corridor Option Comparison

Key Constraint	Northern Corridor		Southern Corridor	
	Impact	Rank	Impact	Rank
Land Use				
Agricultural land impacts (ha) – Class A	0.28% (39ha)	1	0.28% (39ha)	1
Agricultural land impacts (ha) – Class B	13.17% (1,862.31ha)	1	13.42% (1,965.58ha)	1
Number of Land Parcels within the corridor (excludes common corridor land parcels at the western and eastern ends)	9	2	7	1
Transport and Infrastructure				
Intersecting with State controlled roads	1	1	1	1
Intersecting with Local Roads	6	2	5	1
Intersecting with Railway	0	1	0	1
Intersecting with Transmission line	4	1	4	1
Nearby Airstrips	1 (3.9km from end of runway)	2	0 (10km from end of runway)	1
Protected Flora and Fauna				
Category A Remnant Vegetation (ha)	0% (0ha)	1	0% (0ha)	1
Category B Remnant Vegetation (ha)	89.33% (12,631.15ha)	1	89.53% (13,107.58ha)	2
Category C Remnant Vegetation (ha)	0.03% (3.55ha)	2	0.01% (1.33ha)	1
Category R Remnant Vegetation (ha)	0.08% (10.63ha)	1	0.08% (11.07ha)	1
Essential Habitat (ha)	5.12% (724.23ha)	2	0% (0.0ha)	1
High Risk Trigger Area for Protected Plants (ha)	3.39% (479.09ha)	2	0.32% (46.54ha)	1
Wildlife habitat – Endangered or Vulnerable	4.95% (700.7ha)	2	2.14% (313.3ha)	1
Wildlife habitat – Special least concern	0% (0ha)	1	2.14% (313.3ha)	2
Topography				
Slope above 30 degrees (ha)	0.007% (1.04ha)	1	0.03% (4.59ha)	1

Costs and Constructability				
Transmission Line Corridor Distance (km)	66.20km	2	63.10km	1
Estimated number of potential bend points based on the corridor centreline (excludes common corridor bend points at the western and eastern ends)	7	2	5	1
Total Score	28		21	
Total Rank	2		1	

Note: Displayed percentages are based on the transmission corridor area.

Based on a desktop assessment of the transmission line corridor options, the Southern Corridor has been identified as the recommended corridor for the proposed transmission line. A detailed map of this corridor is provided in Appendix A.

While impacting slightly more remnant vegetation than the Northern Corridor, the Southern Corridor has less impacts on essential habitat and minimal trigger areas for protected plants. The small additional area of Agricultural Land Class B within the Southern Corridor can be avoided / mitigated through strategic placement of infrastructure. The Southern Corridor contains a lower number of land parcels, impacts less roads and notably is further from Macrossan Airfield. It is considered to have lower costs and less complex construction measures due to a shorter length and less potential bend points.

Maps relevant to the transmission line corridor selection are shown in Figures 9 to 14 below.

Figure 9 – Northern Corridor – Key Constraints – Dwellings, Waterways and Heritage Sites

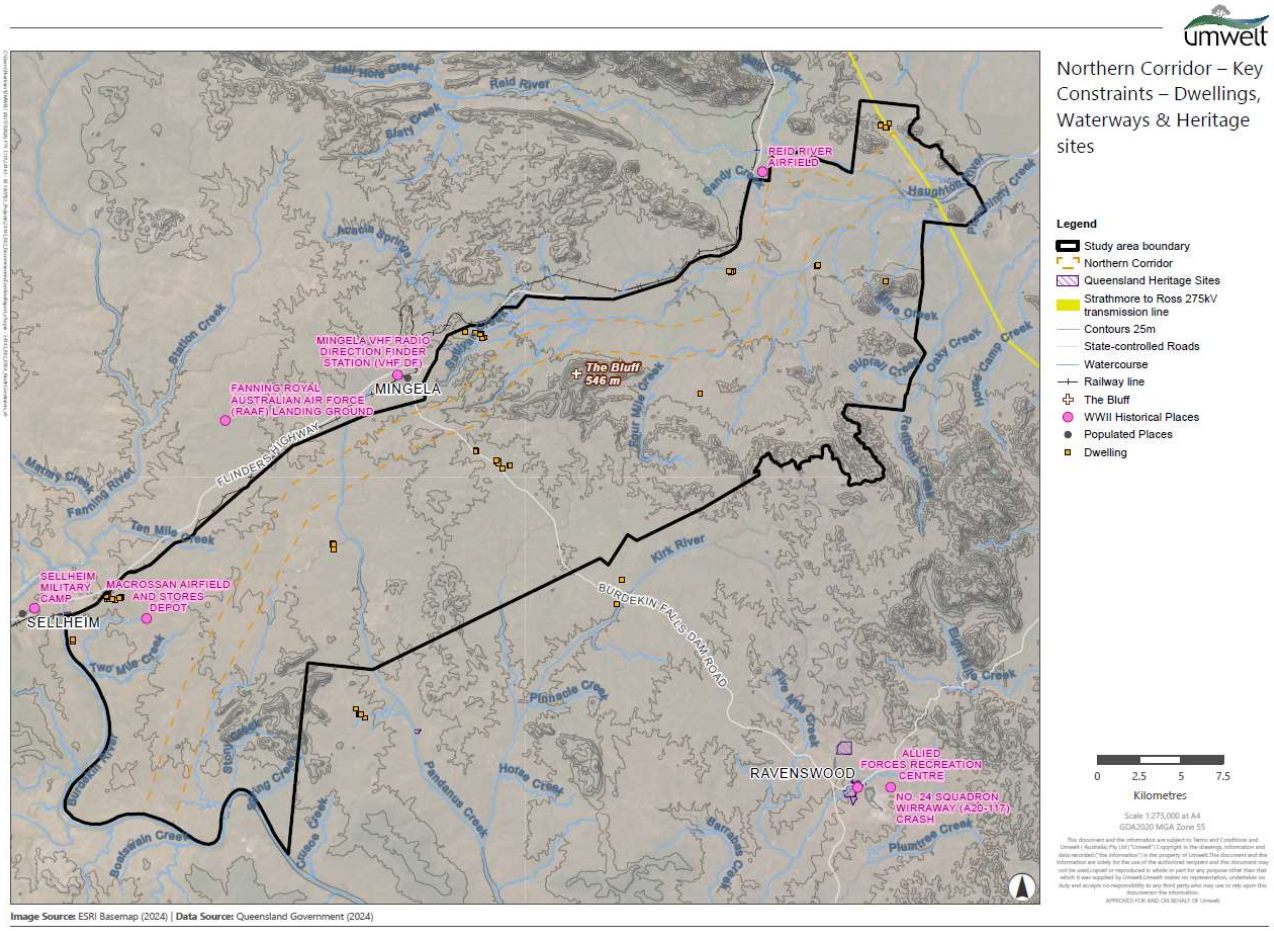


Figure 10 – Northern Corridor – Key Constraints – Protected Flora and Fauna

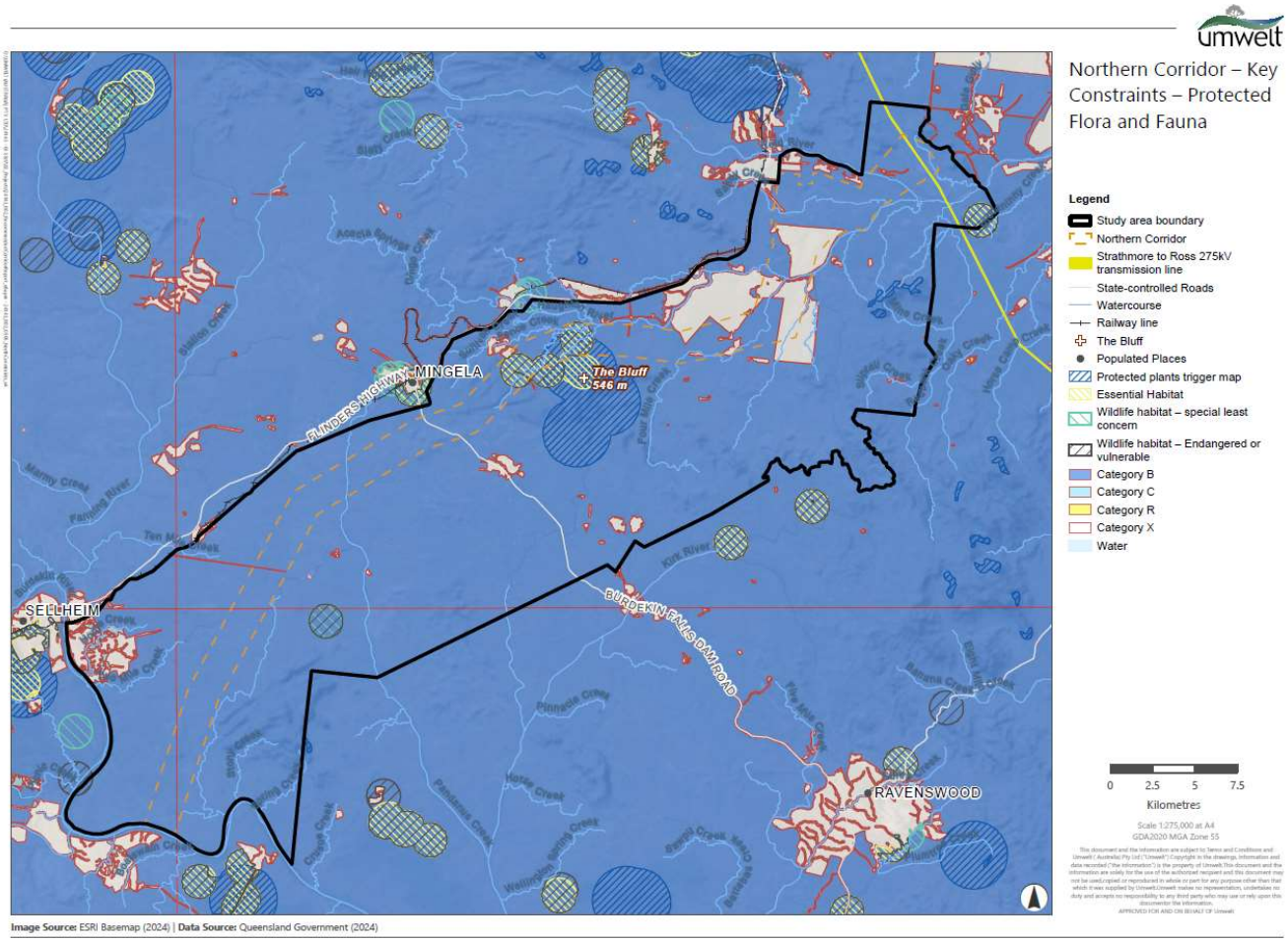


Figure 11 – Northern Corridor – Key Constraints – Agricultural Land

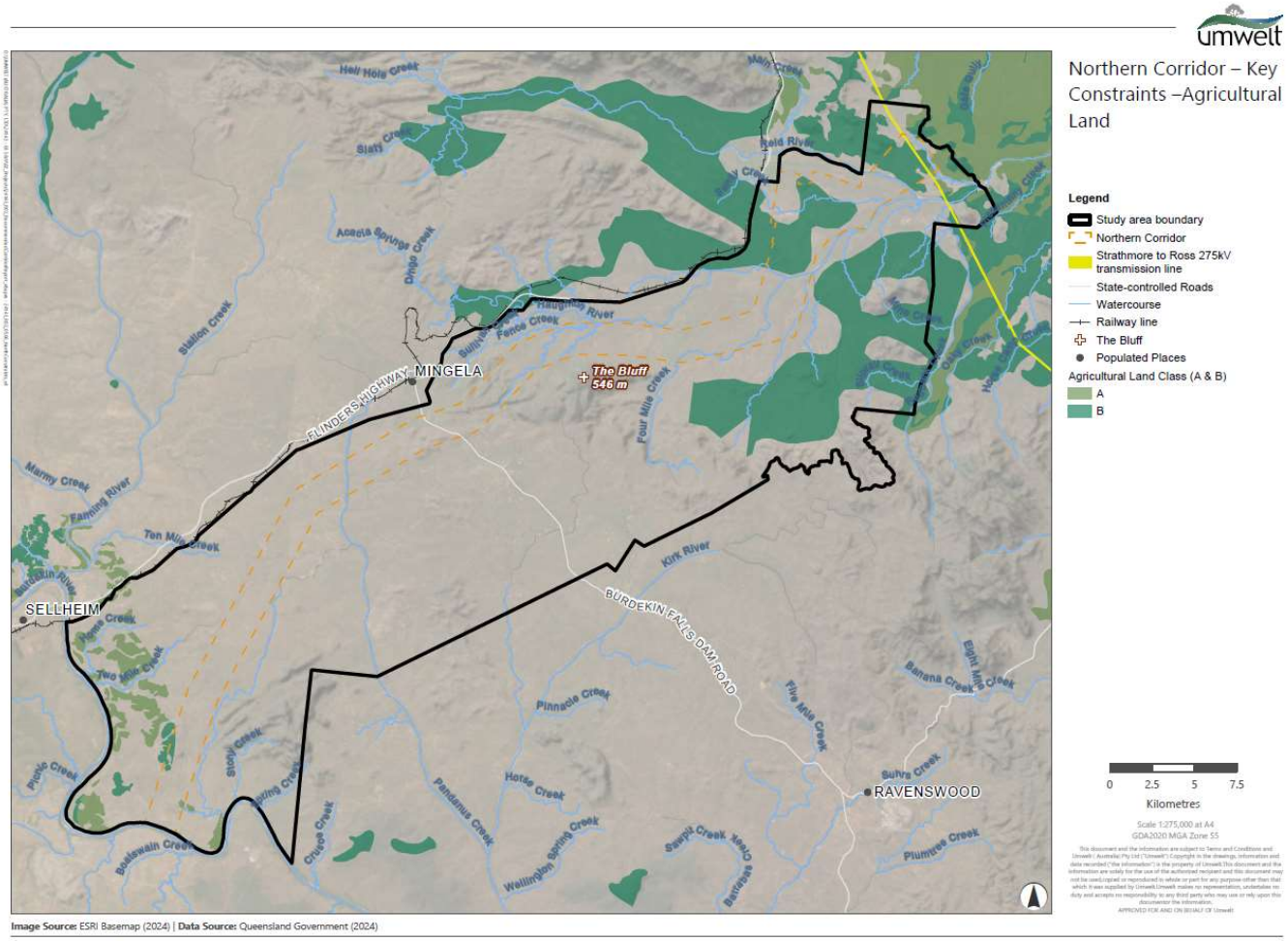


Image Source: ESRI Basemap (2024) | **Data Source:** Queensland Government (2024)

Figure 12 – Southern Corridor - Key Constraints – Dwellings, Waterways and Heritage Sites

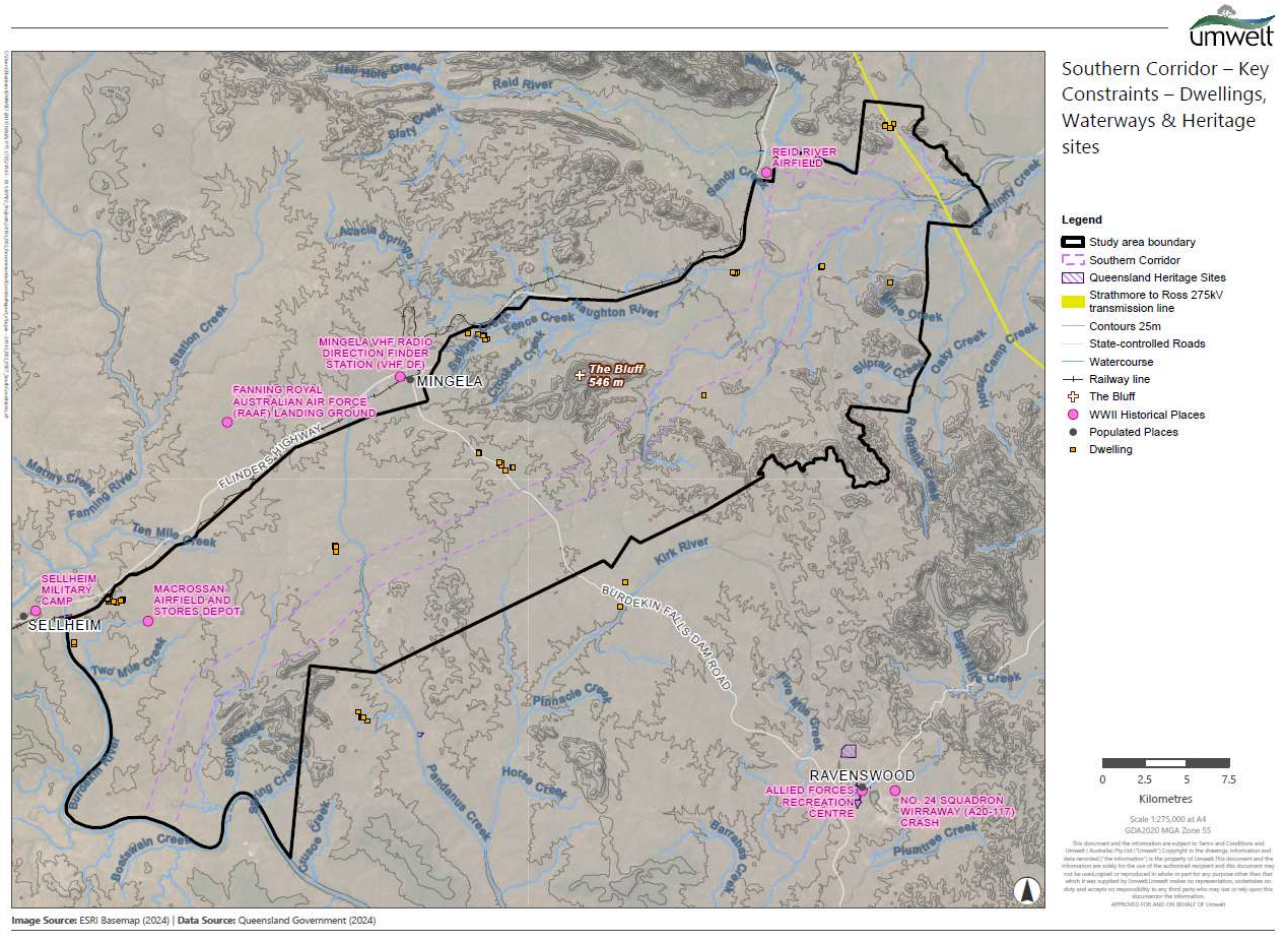


Image Source: ESRI Basemap (2024) | Data Source: Queensland Government (2024)

Figure 13 – Southern Corridor - Key Constraints – Ecological

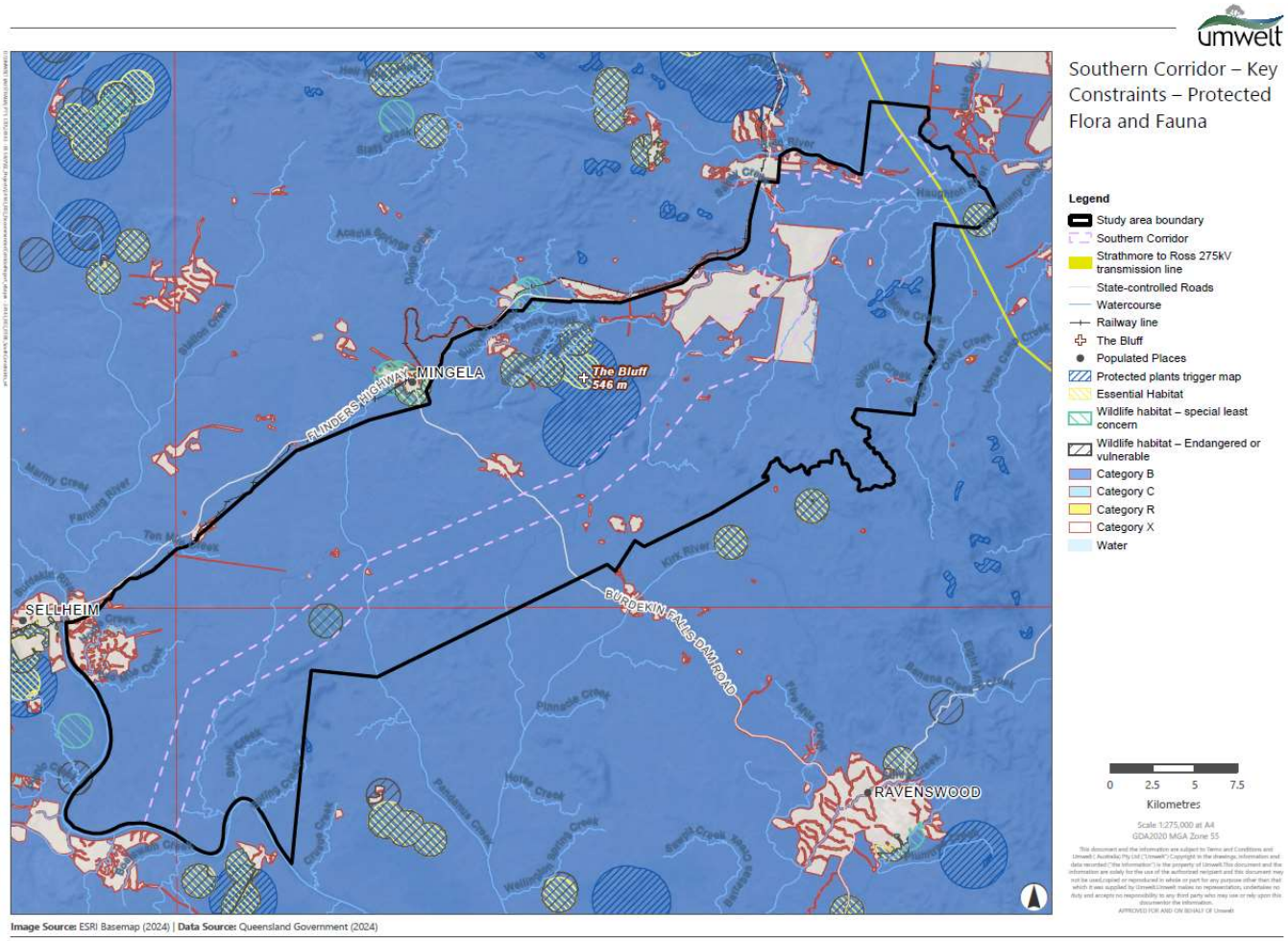
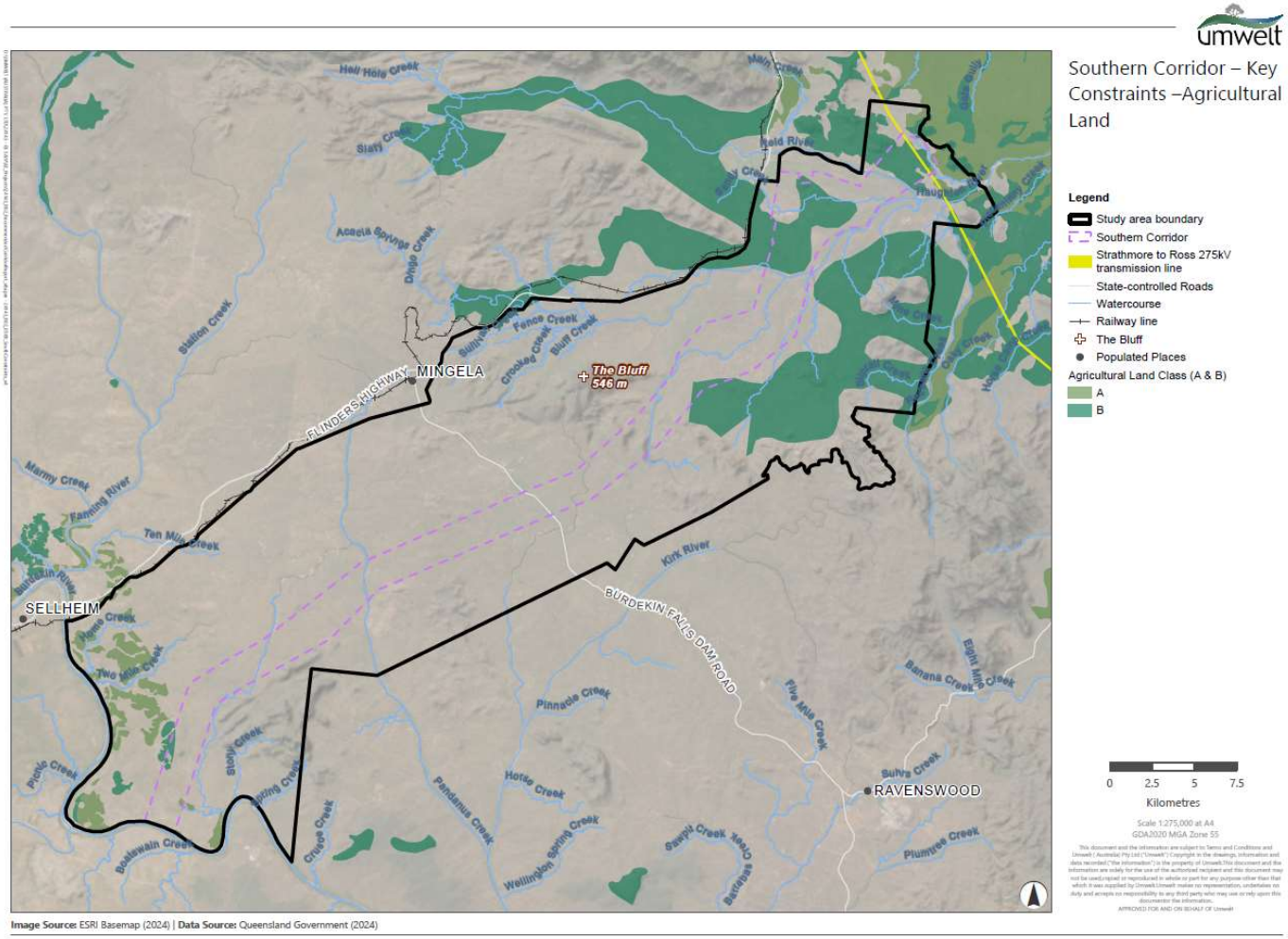


Figure 14 – Southern Corridor - Key Constraints – Agricultural Land



5 Substation Site Options

5.1 Objectives and Siting Considerations

The substation site options assessment within the Study Area is guided by three broad objectives:

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.

Each of these objectives is informed by a range of siting considerations –

Table 13: Substation Siting Considerations

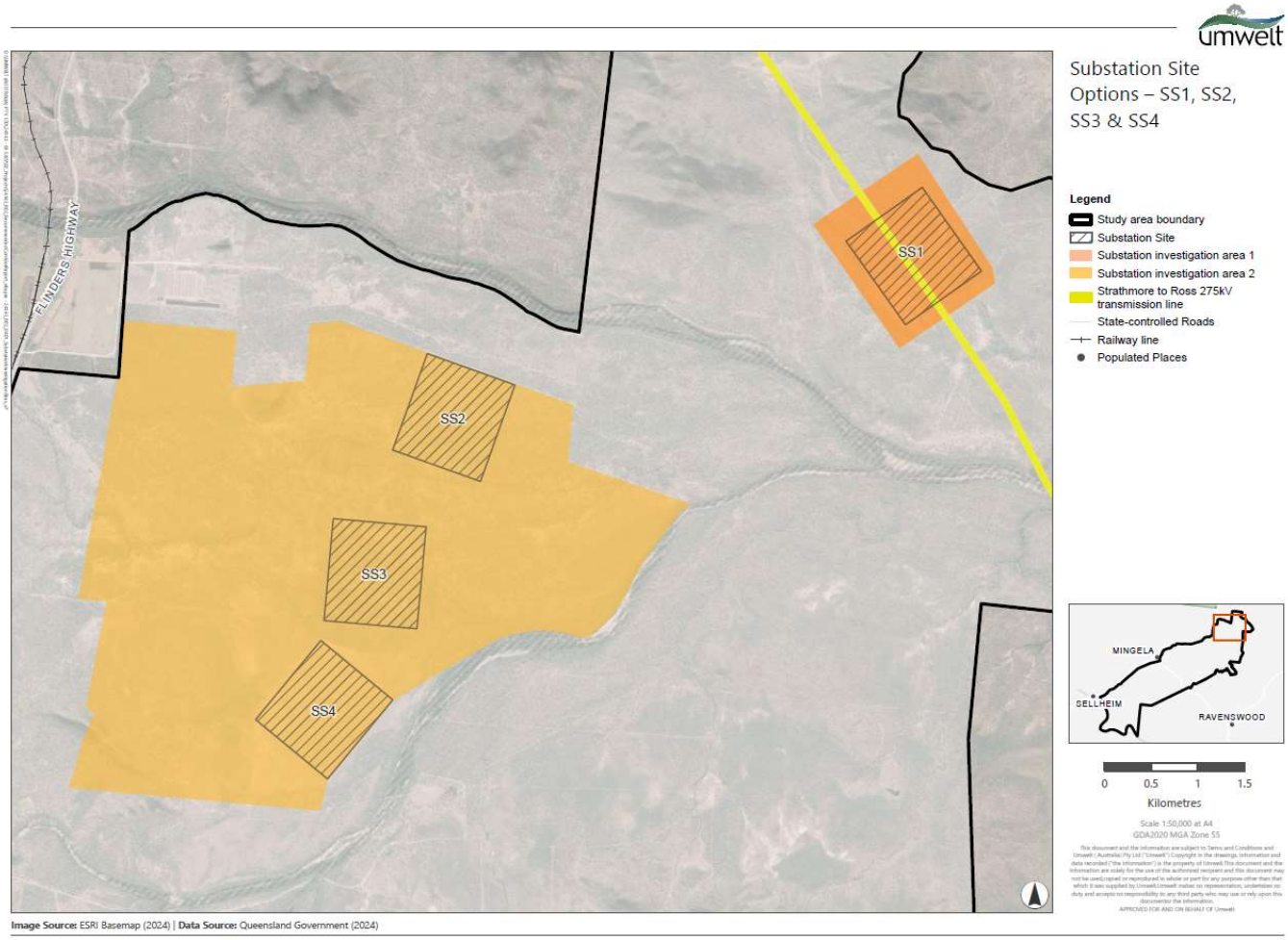
Category	Considerations
Social factors	• Intensive land uses such as cultivation, good quality agricultural land, residential and rural residential areas. • Mining and gas production tenements and infrastructure (mining and petroleum leases, mineral development license areas, petroleum facilities, pipelines). • Separation from dwellings and places of assembly. • Interactions with other physical infrastructure such as roads, rail, wind turbines, dams and transmission lines. • Proximity to property boundaries. • Locations of visual amenity, viewpoints and lookouts. • Places of Aboriginal and Historical cultural significance.
Environmental and Physical factors	• Vegetation. • Habitat for threatened flora and fauna. • Protected areas and areas of high environmental value. • Proximity to existing network. • Vehicle access. • Line entry and exits. • Steep or uneven topography. • Geological features – rock, acid sulfate soils, erosive soils. • Watercourse and flood risk (Q200). • Drainage. • Fire risk.

	• Contaminated land. • Unexploded ordnance. • Population centres including towns and villages.
Economic factors	• Foundations affected by rock. • Land cost.

These siting considerations were applied to the Substation Investigation Areas at the eastern end of the Study Area to identify potential substation site options near Reid River. Four options were identified and are shown below:

- Substation Site 1 (SS1) located within Lot 11 EP1679
- Substation Site 2 (SS2) located within Lot 16 RP837573
- Substation Site 3 (SS3) located within Lot 16 RP837573
- Substation Site 4 (SS4) located within Lot 23 SP300375.

Figure 15: Substation Site Options



The substation site options are all located just north or south of Reid River near Powerlink's existing Strathmore-Ross 275kV transmission line. General views of each substation site option are provided below.

Figure 16: Substation Site Option 1 looking west with Strathmore-Ross transmission line in the foreground

Figure 17: Substation Site Option 2 looking from the north west

Figure 18: Substation Site Option 3 looking from the north west

Figure 19: Substation Site Option 4 looking from the north

5.2 Substation Site Assessment

The substation site options have been assessed using quantitative and qualitative analysis applying the assessment criteria in Table 14 below. Using this approach, the benefits and disadvantages of the substation site options against each criterion were considered and from this a recommended substation site has been identified.

Criteria not considered to be relevant to the purpose of this study have been excluded from the comparative assessment. This occurred in cases where:

- There was little or no variation in the criterion across the Substation Investigation Areas; or
- Relative scarcity of high quality and detailed information available to inform differentiation between the merits of the different options without undertaking significant additional studies.

Where it was determined that criteria were relevant (either due to relevance to the Substation Investigation Areas or variation between the proposed substation site options), performance indicators were identified.

Table 14: Substation Site Options Assessment Criteria

Assessment Criteria	Relevance	Performance Indicator
Social Environment		
Tenure	• All substation site options traverse either freehold or leasehold tenure. • Affected tenure allows for development of a substation and has no fatal constraints. • Tenure is not a differentiating factor in this substation site selection.	N/A
Land Use	• The substation site options contain areas of agricultural land use (grazing). • All substation site options are mapped outside of Strategic Cropping Land (SCL). • Agricultural Land Class A and B provides a measure of the type and value of agricultural production. • Substation site option with least impact to Agricultural Land Class A and B is recommended.	Area of substation site option intersecting Agricultural Land Class A and B.
Heritage	• No mapped or listed State, local heritage and/or registered Aboriginal cultural heritage sites are located within the potential substation site options.	N/A

	• Ground truthing will be undertaken to confirm the presence of heritage values. • Based on this initial information, heritage is not a differentiating factor in this substation site selection.	
Dwellings	• No dwellings are located within 1km of the substation site options. • Impact to dwellings is not a differentiating factor in this substation site selection.	N/A
Resource Interests	• One mineral exploration permit is present across two substation site options, however, these permits do not affect land use rights. • Resource interests are not a differentiating factor in this substation site selection.	N/A
Transport and Infrastructure	• Substation site options intersecting with existing infrastructure easements, roads and Powerlink transmission infrastructure. • Accessibility to the substation sites from existing road network, particularly Flinders Highway. • Road building or upgrade requirements. • Substation site with least interaction with existing infrastructure, closest to the existing high speed road network and requiring the least road upgrades is recommended.	Substation sites intersecting existing infrastructure. Proximity to road network. Upgrade requirements to establish access.
Natural Environment		
Vegetation and Threatened Flora and Fauna	• Substation sites comprise areas of mapped RE's. • Substation site with the least potential impact to flora and fauna is recommended.	Area of remnant vegetation to be potentially cleared (including mapped RE).
Physical Environment		
Topography (access)	• All substation sites are accessible. They are generally flat with one site (Site 3) located on top of a hill. This feature is addressed in the Constructability and Cost Factors section below. • Topography (access) is not a differentiating factor in this substation site selection.	N/A
Geology and Soils	• Substation sites traverse similar geology and soil conditions.	N/A

	• Soil and geology are not a differentiating factor in this substation site selection.	
Hydrology	• Various ephemeral watercourses/waterways and floodplains intersect the substation site options. • Potential impacts to surface waters occur at the intersection of the development and these watercourses/waterways and floodplains. • Substation site option with least potential impact on waterways and from flood waters is recommended.	Impacts on waterways. Q200 flood immunity assessment.
Contaminated Land	• Searches of the Environmental Management Register and Contaminated Land Register have been undertaken for the land parcels affected by each potential substation site option. • The land parcels are not on the registers. • Based on this initial information, contaminated land is not a differentiating factor in this substation site selection.	N/A
Unexploded Ordnance	• All substation site options are located within UXO Category: Other, associated with a World War II airfield at Reid River. • Defence records confirm the area was used for military training but do not confirm the site was used for live firing. UXO or explosive ordnance fragments / components have not been recovered from the site. • Any UXO finds will be managed in accordance with Powerlink procedures. • UXO is not a differentiating factor in this substation site selection.	N/A
Constructability and Cost Factors		
Constructability and Cost Factors	• Cost of construction and the practicality of access to the substation sites vary across options. • Substation site requiring the least complex construction measures (i.e. efficient access, low likelihood of rock, good transmission line entry/ exits and best flood immunity) is recommended.	Foundations (rock) New roads and upgrades to existing roads Transmission line entry and exit Flood immunity (Q200)

Each differentiating performance indicator is comparatively assessed below.

5.2.1 Land use

The potential impact of a substation on Strategic Cropping Land (SCL) and Agricultural Land Classes A and B is often a key issue raised by landholders, especially for cultivation areas. Agricultural land classes are defined under the State Planning Policy and provide for the protection of agriculture and agricultural development opportunities. The percentage area of each substation site option which overlays Agricultural Land Classes A and B is shown in Table 15 below.

Table 15:Substation Sites intersection with Agricultural Land Classes

Constraint (% of total substation site area)	SS1	SS2	SS3	SS4
Agricultural Land Class A	3% (3.3ha)	0% (0ha)	0% (0ha)	0% (0ha)
Agricultural Land Class B	83% (90.7ha)	0% (0ha)	99% (109.3ha)	22% (24.5ha)

Agricultural Land Classification mapping shows all substation site options avoid areas of Agricultural Land Class A with the exception of SS1 with very minor impacts (i.e. 3%). SS2 avoids areas of Agricultural Land Class B, whereas SS4 impacts slightly (22%) and SS1 and SS3 significantly impact the overlay (83% and 99%).

For this criteria, SS2 is the recommended option on the basis it does not intersect any Agricultural Land Class A & B mapping.

5.2.2 Transport and infrastructure

The distance of each substation site option to the nearest highway and amount of road improvements required are shown in Table 16 below.

Table 16: Substation sites intersection with transport infrastructure

Constraint	SS1	SS2	SS3	SS4
Proximity to Flinders Highway	19.8km	4.4km	3.7km	3.2km
Road improvement required for heavy equipment	16.4km	0km	0km	0km
Road to be newly constructed	3.4km	4.4km	3.7km	3.2km

Access to SS1 from the bitumened Flinders Highway is approximately 19.8km comprising 16.4km on local gravel roads and 3.4km to be newly constructed. Access to all other substation site options will require new road construction.

For this criteria, SS4 is the recommended option on the basis it has the shortest distance and therefore travel time to the Flinders Highway and requires the smallest upgrades to gain access to the highway.

5.2.3 Vegetation and threatened flora and fauna

The EPBC Act PMST report identified no Threatened Ecological Communities listed under the EPBC Act as known, likely to, or may occur within the substation site options. There are no essential habitat or high-risk areas for protected plants mapped across any site options.

Remnant vegetation is the only differentiating ecological factor, based on desktop assessment. These areas have been expressed as a percentage of the total area for each substation site option as represented below**.**

Table 17:Substation site options intersecting with vegetation

Constraint (% of total substation site area)	SS1	SS2	SS3	SS4
Vegetation				
Category A	0% (0ha)	0% (0ha)	0% (0ha)	0% (0ha)
Category B	100% (110ha)	100% (110ha)	100% (110ha)	0% (0ha)
Category C	0% (0ha)	0% (0ha)	0% (0ha)	0% (0ha)
Category R	0% (0ha)	0% (0ha)	0% (0ha)	0% (0ha)
Category X	0% (0ha)	0% (0ha)	0% (0ha)	100% (110ha)
Essential habitat	0% (0ha)	0% (0ha)	0% (0ha)	0% (0ha)
High Risk Area for Protected Plants	0% (0ha)	0% (0ha)	0% (0ha)	0% (0ha)

SS1, SS2 and SS3 are all mapped 100% within Category B vegetation, whereas SS4 is mapped 100% within Category X exempt vegetation.

Aerial imagery shows SS4 is almost fully cleared of vegetation, SS1 is partially cleared of vegetation due to the existing Strathmore-Ross 275kV transmission line and grazing land use, and SS2 and SS3 are fully covered by remnant vegetation.

For this criteria, SS4 is the recommended option on the basis it has low environmental values (almost fully cleared of vegetation).

5.2.4 Hydrology

For each substation site option, the number of watercourses and percentage of area affected by the Queensland floodplain assessment overlay and Q200 flood study is summarised below.

Table 18: Substation sites intersection with watercourse and flood overlay

Constraint (% of total substation site area)	SS1	SS2	SS3	SS4
Number of waterways intersected	2 (orange)	1 (green)	3 (green)	2 (green)
Queensland floodplain assessment overlay	15.1% (16.6ha)	100% (110ha)	6.4% (7.1ha)	100% (110ha)
% of site affected by Q200 flood level	3%	2%	0%	0%

Generally, all waterways are on the edges of the substation sites and don't greatly impact the use of the sites. Field investigations will be required to confirm the level of impact and requirement for any waterway barrier works.

The Queensland floodplain assessment overlay represents an estimate of areas potentially at threat of inundation by flooding and recommends further assessment is undertaken. The overlay mapping shows SS2 and SS4 to be fully at threat of flooding whereas SS1 (15.1%) and SS3 (6.4%) are lower risk. Further assessment has been completed via a Q200 flood study. SS3 and SS4 are above this flood level, while SS1 and SS2 are only slightly affected.

For this criteria, SS4 is the recommended option on the basis it is unaffected by the Q200 flood level and affects the least number of mapped watercourses.

5.2.5 Cost and constructability

Substation construction and ongoing maintenance costs are key considerations for site selection.

As a basis for this comparative assessment, access road length, topography requiring significant earthworks, likelihood of hitting rock, transmission line entry and exit limitations and flood immunity are taken as a proxy of capital cost as shown below.

Table 19: Substation site option construction cost

Constraint	SS1	SS2	SS3	SS4
Length of access track requiring upgrade or new build	19.8km	4.4km	3.7km	3.2km
Topography	Rises to the north around 7-10m	Flat with slight rise to the north	15-20m hill in middle of site requiring extensive earthworks	Generally flat to slight slope down to north
Foundations – likelihood of hitting rock	Unlikely	Unlikely	Located on top of 15-20m high hill making rock likely	Unlikely

Transmission line entry and exit	Requires existing line to be diverted to build the substation	Adequate	Potential clearance issues for landing spans entering substation due to hilltop location	Adequate
Potential site works required for Q200 flood immunity	Minor due to watercourses	Minor due to watercourses	No	No

Overall, SS4 has the most favourable construction cost factors having the shortest access track length, suitable topography, good entry and exit for transmission lines and Q200 flood immunity.

For this criteria, SS4 is the recommended option.

5.3 Assessment Summary

The comparative assessment of each substation site option is shown in Table 20 below. Based on their impact, each option has been ranked 1 to 4, with 1 being the least impact and 4 being the highest impact.

Table 20 Key Constraints – Substation Site Options

Key Constraint	SS1		SS2		SS3		SS4	
	Impact	Ranking	Impact	Ranking	Impact	Ranking	Impact	Ranking
Land Use								
Agricultural Land Class A	3% (3.3ha)	2	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
Agricultural Land Class B	83% (90.7ha)	3	0% (0ha)	1	99% (109.3ha)	4	22% (24.5ha)	2
Transport and Infrastructure								
Proximity to Highway	19.8km	4	4.4km	3	3.7km	2	3.2km	1
Road improvement required for heavy equipment	16.4km	2	0km	1	0km	1	0km	1
Road improvement required to be newly constructed	3.4km	3	4.4km	4	3.7km	2	3.2km	1
Protected Flora and Fauna								
Category A Remnant Vegetation	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
Category B Remnant Vegetation	100% (110ha)	2	100% (110ha)	2	100% (110ha)	2	0% (0ha)	1
Category C Remnant Vegetation	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
Category R Remnant Vegetation	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
Category X Remnant Vegetation	0% (0ha)	2	0% (0ha)	2	0% (0ha)	2	100% (110ha)	1
Essential Habitat	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
High Risk Trigger Area for Protected Plants	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1	0% (0ha)	1
Hydrology								
Number of waterways intersected	2 (orange)	4	1 (green)	1	3 (green)	3	2 (green)	2
Queensland floodplain assessment overlay	15.1% (16.6ha)	2	100% (110ha)	3	6.4% (7.1ha)	1	100% (110ha)	3
% of site affected by Q200 flood level	3%	3	2%	2	0%	1	0%	1

Cost and Constructability								
Length of access track requiring upgrade or new build	19.8km	4	4.4km	3	3.7km	2	3.2km	1
Topography	Rises to the north around 7-10m	2	Flat with slight rise to the north	1	15-20m hill in middle of site requiring extensive earthworks	3	Generally flat to slight slope down to north	1
Foundations – likelihood of hitting rock	Unlikely	1	Unlikely	1	Located on top of 15-20m high hill making rock likely	2	Unlikely	1
Transmission line entry and exit	Requires existing line to be diverted to build the substation	3	Adequate	1	Potential clearance issues for landing spans entering substation due to hilltop location	2	Adequate	1
Site works required for Q200 flood immunity	Minor due to watercourses	2	Minor due to watercourses	2	No	1	No	1
TOTAL SCORE	44		33		34		24	
TOTAL RANK	4		2		3		1	

Note: Displayed percentages are based on the substation site area.

Based on the desktop assessment of the potential substation site options, SS4 has been identified as the recommended substation site. A detailed map of this substation site option is provided in Appendix A.

SS4 is almost fully cleared of vegetation (i.e. vegetation being Category X classification), is generally flat with a slight slope down to the north, has good transmission line entry and exit opportunities and is above the Q200 flood level. The site is closest to the Flinders Highway. The nearest dwelling is well removed from the site, being approximately 1.0km away from the site boundary and with vegetation providing screening opportunities.

This assessment has been undertaken at desktop level only. The findings with be verified through landholder engagement and technical field studies.

Maps relevant to the substation site selection are shown in Figures 20 to 22 below.

Figure 20: Substation Site Options – Key Constraints – Dwellings and Waterways

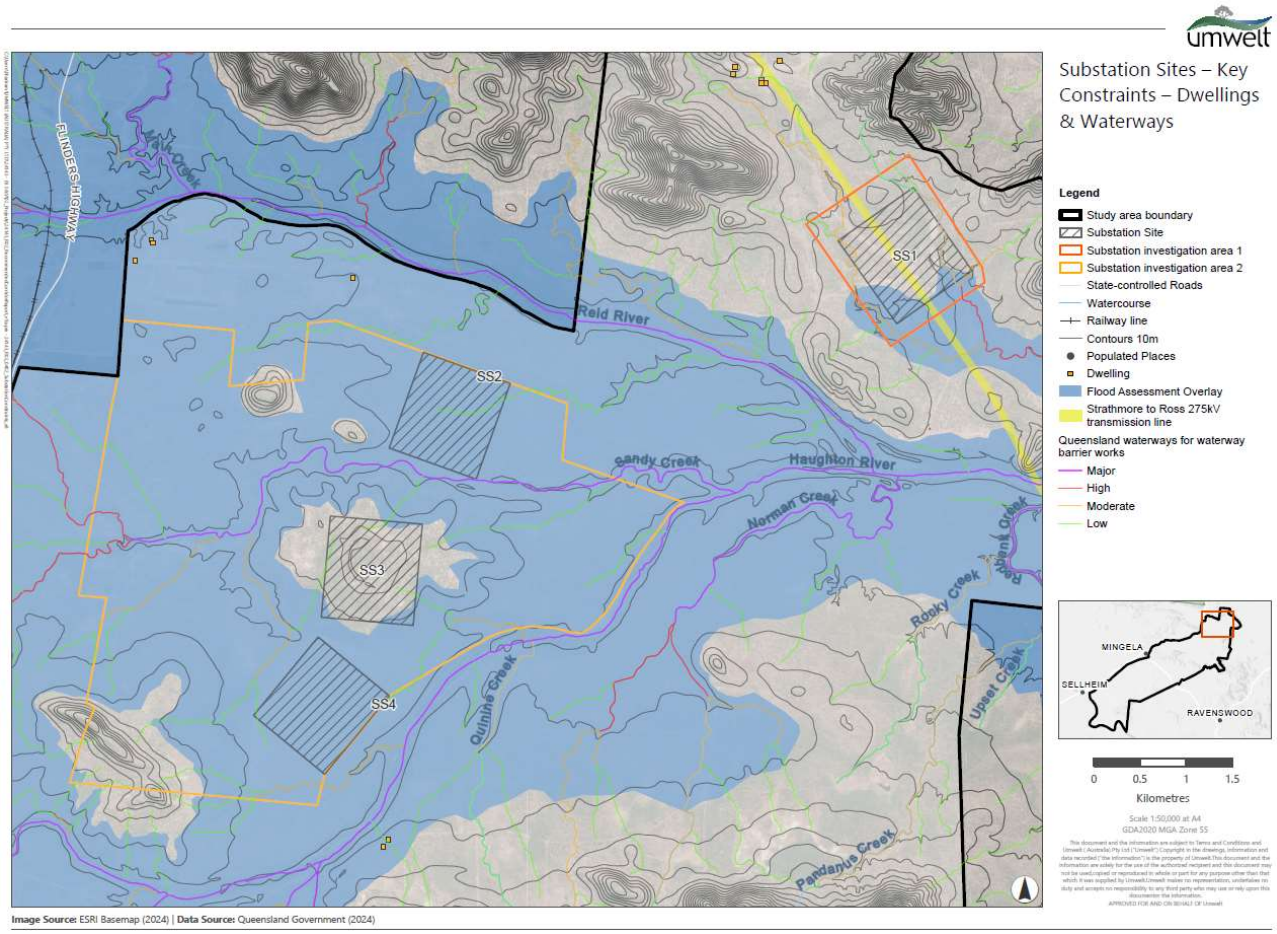


Figure 21: Substation Site Options – Key Constraints – Vegetation

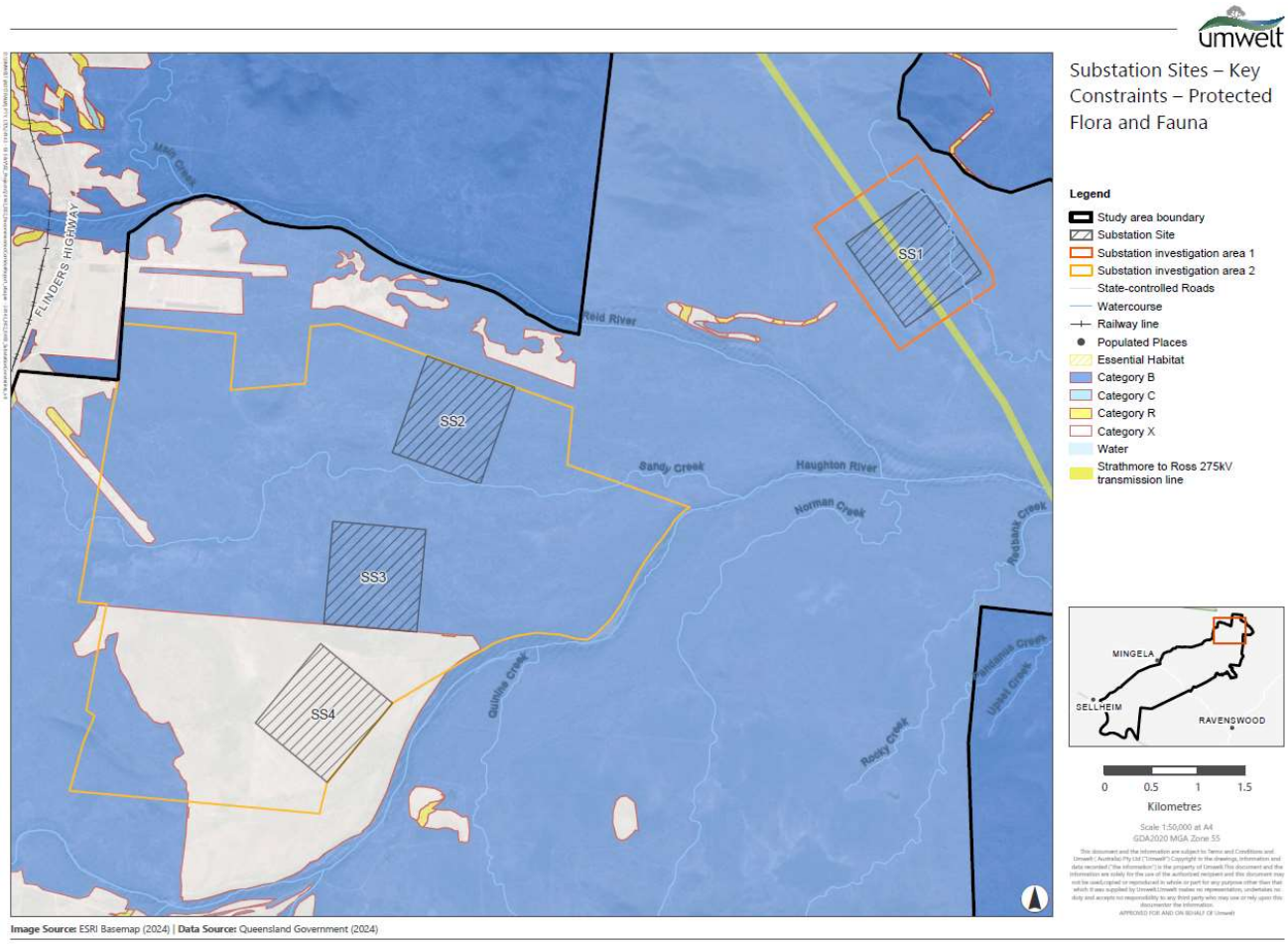


Figure 22: Substation Site Options – Key Constraints – Agricultural Land

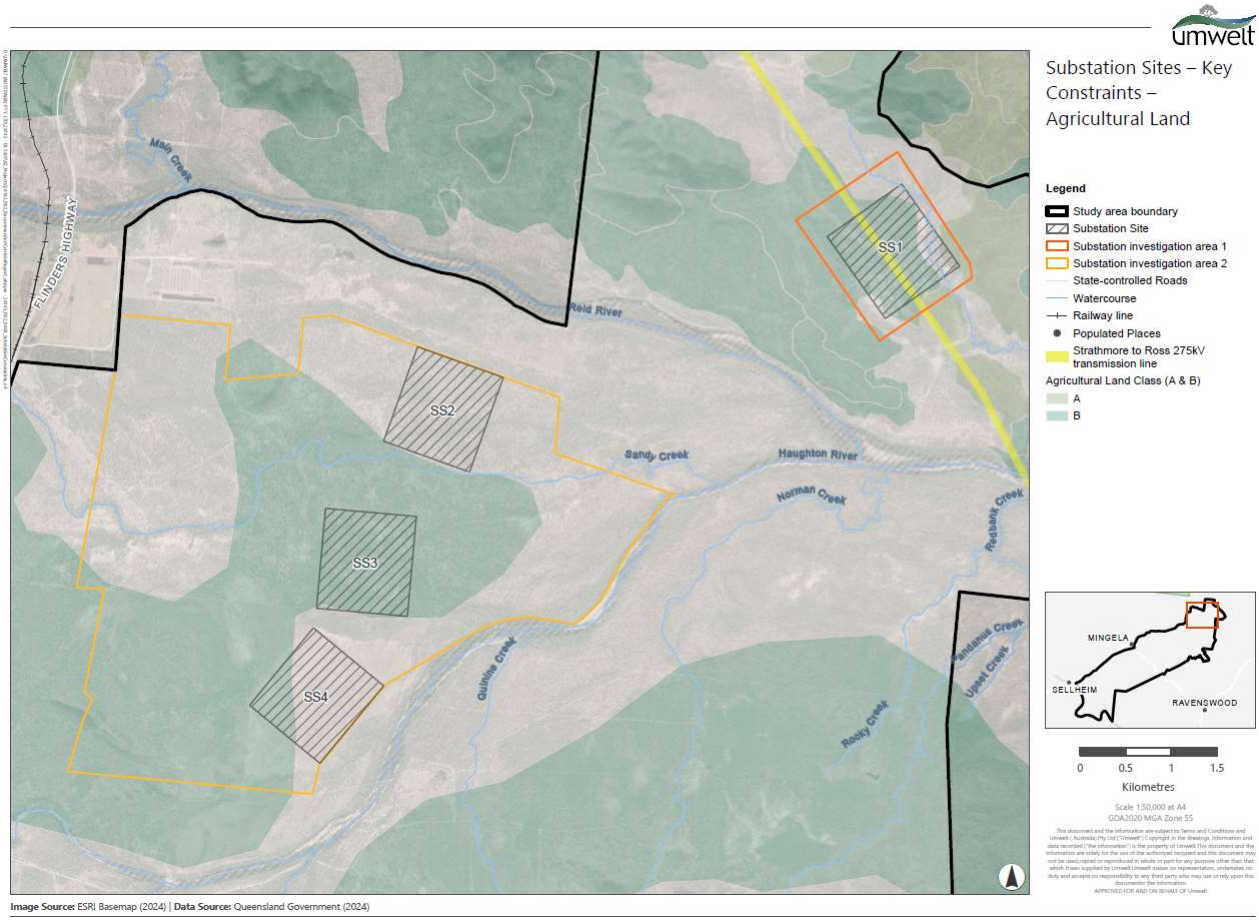


Image Source: ESRI Basemap (2024) | **Data Source:** Queensland Government (2024)

6 Legislative and Approval Requirements

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

6.1 Potential approvals

The recommended corridor and substation site has been determined at desktop level and requires field assessment to confirm social, environmental, heritage and constructability factors. Potential approvals are identified below and are subject to easement alignment and substation determination, actual infrastructure disturbance locations and further ecological and cultural heritage investigations. A full list of legislative considerations and other obligations is provided in Appendix B:

- Primary approvals:
    - Ministerial Infrastructure Designation under the *Planning Act 2016 (Qld)*
    - Referral as a proposed action under the EPBC Act and potential approval for significant impacts on Matters of National Environmental Significance
- Secondary approvals:
    - 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 (EP Act) (Qld)* to remove contaminated soil for treatment and / or disposal
    - Environmental Authority for Environmentally Relevant Activities, under the EP Act
    - Water Licence for taking or interfering with surface water or groundwater
    - 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 compensate for significant residual impacts to matters of state and national environmental significance. To determine the likely offset liabilities, 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.

For further detail on legislation potentially applicable to the recommended corridor and substation site, refer to Appendix B.

7 Conclusion and Future Studies

The Southern Corridor has been selected as the recommended transmission line corridor with the least overall impact across social, environment and economic objectives when compared to the Northern Corridor option. This corridor has the following attributes –

- lower impact on essential habitat and minimal trigger areas for protected plants, while containing slightly more remnant vegetation with impacts that can be mitigated through strategic placement of the proposed line
- whilst containing slightly more Agricultural Land Class B, impacts on the additional area can be mitigated / avoided through strategic placement of the proposed line
- impacts less transport infrastructure and notably is further from the Macrossan Airfield
- contains no dwellings thereby enabling good physical separation to the proposed line, which is common across both corridors assessed
- lower costs and less complex construction measures due to a shorter length and less potential bend points (changes of direction).

Substation Site 4 has been identified as the recommended substation site with the least overall impact across social, environment and economic objectives when compared to the three other options considered. This substation site has the following attributes –

- land has been extensively cleared and is generally flat with a slight slope down to the north. All other sites contain large areas of remnant vegetation.
- good transmission line entry and exit opportunities.
- site is closest to the Flinders Highway providing good access and requiring least access road upgrade.
- closest dwelling is well removed, being approximately 1.0 km from the site boundary with vegetation providing visual screening opportunities.
- the site is not affected by the Q200 flood level.

7.1 Upcoming engagement and future studies

Landholders, Traditional Owner groups, community members and other stakeholders are invited to review and comment on the recommendations in this report. Feedback is essential to ensure Powerlink has fully considered all matters of importance related to the proposed location of the electricity transmission infrastructure.

Powerlink will review all feedback and submissions about the RCSSSR and offer meetings with submitters to better understand and assess matters raised. It will publicly release a Final Corridor and Substation Site Selection Report (FCSSSR) later in 2024 which will outline the submissions received to the RCSSSR and how those submissions have been considered. It will also share a final decision on the corridor for the proposed transmission line and location for the proposed substation.

Powerlink will then work with directly affected landholders, Traditional Owner Groups and other stakeholders and undertake a range of environmental, heritage and constructability studies to determine a proposed easement alignment for the transmission line within the final corridor and if necessary, make micro siting adjustments to the proposed final location of the substation site by mid-2025.

The above engagement and investigations will build our understanding of the project constraints, opportunities and required approvals for the proposed electricity transmission infrastructure. As the location of the transmission line easement alignment and if necessary, the substation site is refined, the project will continue to seek to avoid and/or minimise impacts to landholders and community areas as well as social, environment and cultural values through siting and design. Future studies will include -

Social

- Engaging with stakeholders, particularly affected landholders and Traditional Owner groups, to better understand land use, proximity to homes and potential impacts to properties. This information will inform the identification of the proposed transmission line easement alignment within the final corridor and if necessary, micro siting adjustments to the proposed final location for the substation.

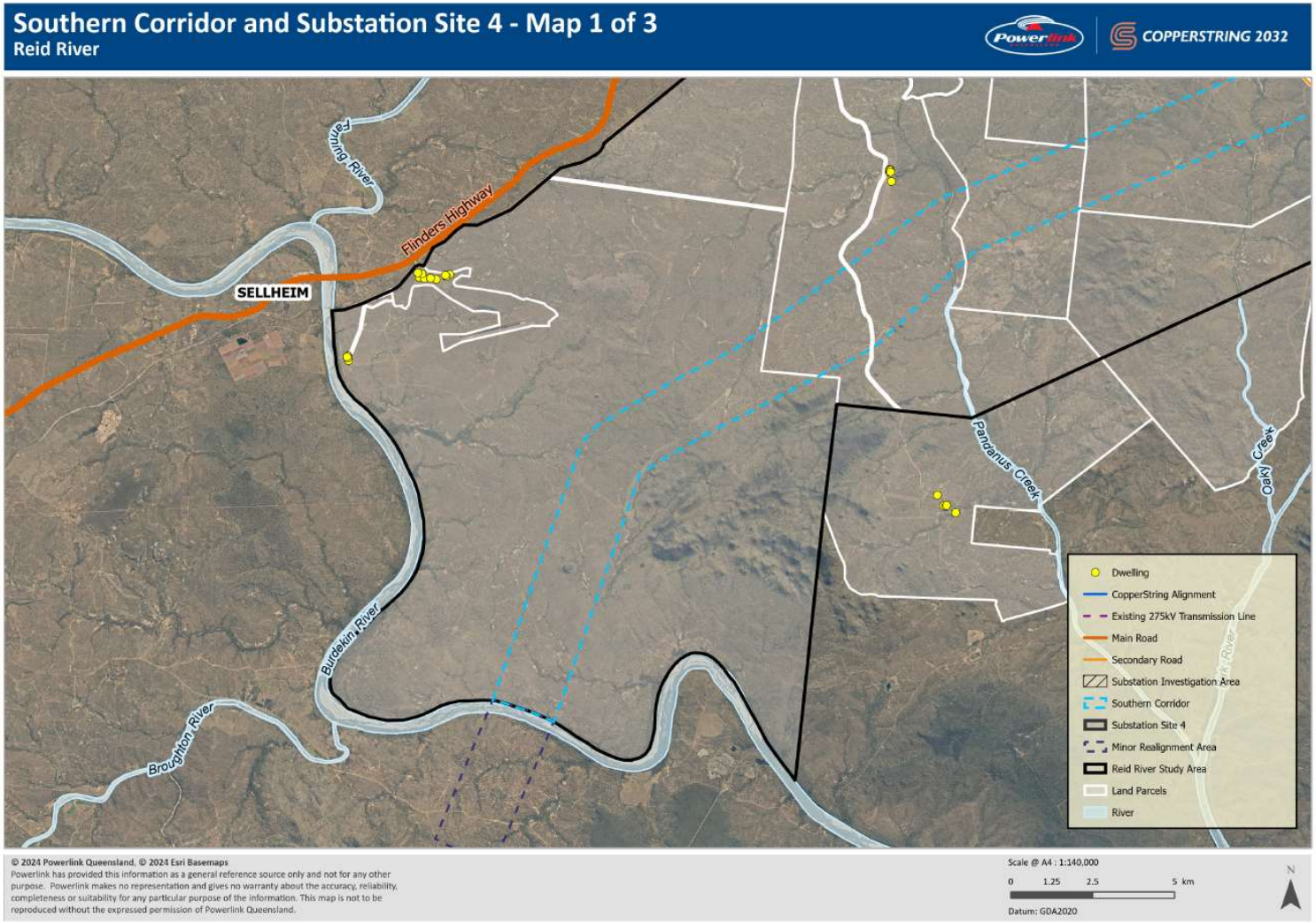
Environment, heritage and planning

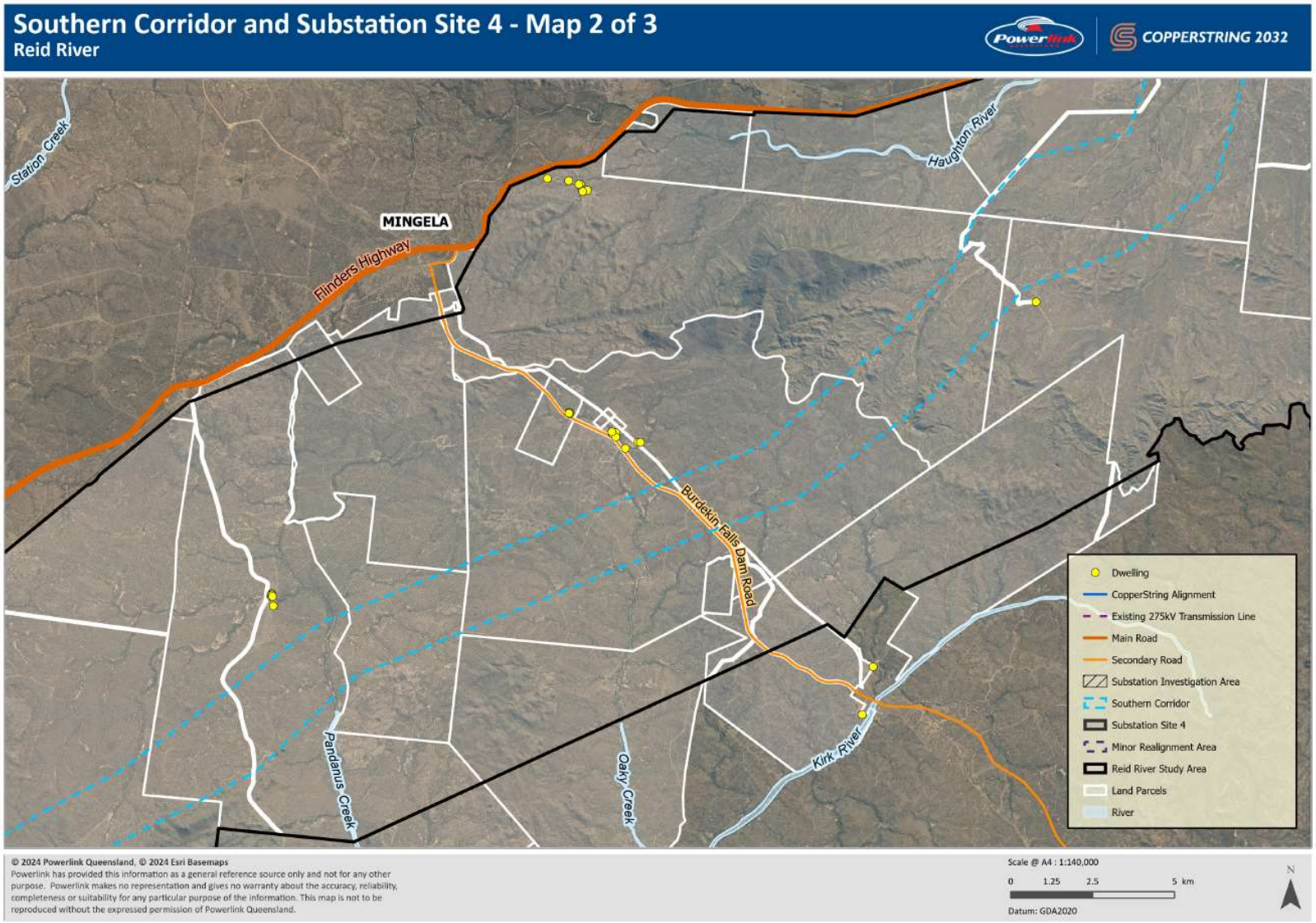
- Ecology – undertake targeted field surveys to confirm environmental values which may be affected by the proposed transmission line easement alignment within the final corridor and proposed final location for the substation. Identify and adopt mitigation measures to reasonably minimise these impacts.
- Biosecurity matters – through ongoing engagement with landholders and field studies, biosecurity risks will be identified and inform Powerlink's biosecurity management plan.
- Unexploded ordnance (UXO) - if a future final transmission line easement alignment and final substation site intrudes into a UXO area, specialist advice and the preparation of a detailed UXO Risk Assessment may be required. Additionally, a UXO Management Plan may need to be prepared to manage risk, including the possibility of encountering munitions.
- Heritage studies - further investigations are required to identify any potential risk to Aboriginal and Non-Aboriginal heritage values.

Economic

- Ground conditions - geotechnical investigations to identify problematic soils and geology such as hard rock, which can pose constructability difficulties, or substantially increase project costs due to specialist design required and/or additional construction materials and foundations.
- Flood potential - further investigation into the potential for flooding associated with the transmission line easement alignment 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 refine during the next phase.

8 Appendix A Recommended Southern Corridor and Substation Site 4 Detailed Map




Southern Corridor and Substation Site 4 - Map 2 of 3
Reid River
COPPERSTRING 2032
Station Creek
MINGELA
Flinders Highway
Haughton River
Burdekin Falls Dam Road
Pandanus Creek
Oaky Creek
Kirk River
Dwelling
CopperString Alignment
Existing 275kV Transmission Line
Main Road
Secondary Road
Substation Investigation Area
Southern Corridor
Substation Site 4
Minor Realignment Area
Reid River Study Area
Land Parcels
River
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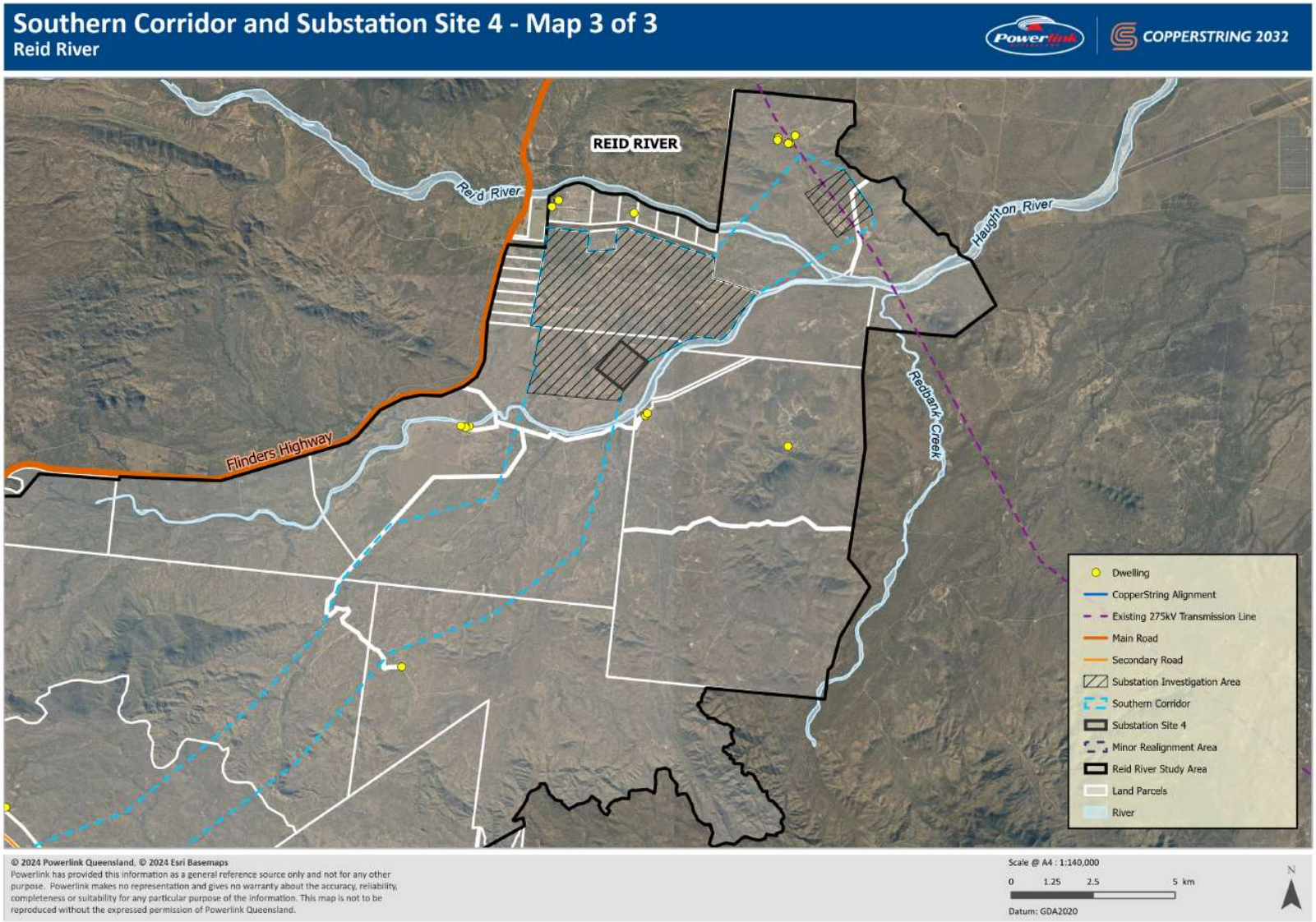
Scale @ A4 : 1:140,000
0 1.25 2.5 5 km
Datum: GDA2020
N


Southern Corridor and Substation Site 4 - Map 3 of 3
Reid River
COPPERSTRING 2032
REID RIVER
Reid River
Haughton River
Redbank Creek
Flinders Highway
Dwelling
CopperString Alignment
Existing 275kV Transmission Line
Main Road
Secondary Road
Substation Investigation Area
Southern Corridor
Substation Site 4
Minor Realignment Area
Reid River Study Area
Land Parcels
River
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Scale @ A4 : 1:140,000
0 1.25 2.5 5 km
Datum: GDA2020
N

9 Appendix B Summary of legislative considerations

A summary of legislation potentially applicable to the project is provided below in Table 21 based on the recommended transmission line corridor and recommended substation site. However, further design and detailed investigations and assessment will be required to confirm the appropriate approval pathway for the project.

Table 21 Summary of legislation

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 may contain 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.
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 clearing of native flora species and native fauna habitat is 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. 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 North Queensland Regional Plan.
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.

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