Transgrid

People. Power. Possibilities.

Amendment Report

EnergyConnect (NSW – Eastern Section)

May 2022

Contents

Abbreviations ..... **v**

Glossary ..... **vi**

Executive summary ..... **i**

EnergyConnect i
Planning approvals process i
Purpose of this Amendment Report ii
Consultation on the refined proposal iv
Conclusions and next steps v
Conclusion v
Next steps v

1. Introduction **1**

1.1. Background 1
1.2. Key features of the proposal (as publicly exhibited) 1
1.2.1. Timing and commencement of operation 5
1.3. Exhibition of the EIS 5
1.4. The refined proposal 5
1.5. Purpose and structure of this report 6

2. Strategic context **7**

2.1. Strategic context for the refined proposal 7
2.2. Key benefits of the refined proposal 7

3. Description of the amendments **9**

3.1. Overview of the proposed refinements 9
3.2. Local alignment refinements 11
3.2.1. Lake Cullivel alignment 11
3.2.2. Lockhart alignment 13
3.2.3. Buronga substation access 15
3.2.4. Avoidance of Telstra infrastructure – Benanee 17
3.2.5. Yanco Creek alignment 19
3.2.6. Disused Narrandera Tocumwal Railway section 21
3.2.7. Urana alignment – west of Federation Way 21
3.2.8. Urana alignment – west of Boree Creek Road 23
3.2.9. Minor Lockhart alignment shift 23

Contents (continued)

3.3. Other proposal refinements 25
3.3.1. Optical repeater site alignment – Booroorban 25
3.3.2. Additional tower – Colombo Creek 25
3.3.3. General longitudinal shifting of tower locations 28
3.4. Proposal construction 28
3.4.1. Construction compound and accommodation camp sites 28
3.4.2. Water supply points 30
3.4.3. Construction impact area refinements 34
3.5. Consideration of additional information and clarifications 35
3.5.1. Cumulative impact update 35
3.5.2. New mineral exploration licence 35
3.5.3. Construction haulage routes 36
3.5.4. Operational noise impacts 38
3.5.5. Morundah Road clarification 39

4. Statutory context 40
4.1. NSW assessment and approval process 40
4.1.1. Commonwealth assessment and approval process 40

5. Engagement 42
5.1. Consultation following public exhibition of the EIS 42
5.2. Consultation during development of the refined proposal 42
5.2.1. Community consultation 42
5.2.2. Directly impacted land holders and residents 43
5.2.3. Public authorities 43
5.2.4. Aboriginal stakeholders 44
5.2.5. Water suppliers 45
5.3. Ongoing consultation 45

6. Assessment of additional impacts 47
6.1. Assessment approach 47
6.2. Biodiversity 49
6.3. Aboriginal heritage 54
6.4. Visual and landscape character 57
6.5. Hydrology and flooding 58
6.6. Noise and vibration 59
6.7. Water supply points 59

Contents (continued)

7. Evaluation of merits and conclusion 60

7.1. Evaluation of the merits of the refined proposal 60

7.2. Concluding statement 61

7.3. Next steps 62

8. References 63

Appendix A Updated proposal description (operation) A-1

Appendix B Updated proposal description (construction) B-1

Appendix C Revised mitigation measures C-1

Tables

Table 3-1 Additional indicative water supply points 30

Table 3-2 Clarifications to the construction haulage road classifications 36

Table 3-3 Significance of audible noise impact per NPfI 39

Table 6-1 Summary of environmental aspect considered to be potentially changed in its impact by the refined proposal (compared to the EIS) 48

Table 6-2 Summary of change in potential biodiversity impacts associated with the refined proposal 49

Table 6-3 Summary of change in potential Aboriginal impacts associated with the refined proposal 54

Table 6-4 Summary of change in potential landscape character and visual impacts associated with the refined proposal 57

Table 6-5 Summary of change in potential hydrology and flooding impacts associated with the refined proposal 58

Table 6-6 Summary of change in potential noise and vibration impacts associated with the refined proposal 59

Figures

Figure 1-1 Proposal overview – EnergyConnect (NSW – Eastern section) 3

Figure 1-2 Proposal alignment and existing transmission lines arrangements – EnergyConnect (NSW – Eastern section) 4

Figure 3-1 Overview of the proposed design refinements 10

Figure 3-2 Figure showing the refined alignment to the south of Lake Cullivel 12

Figure 3-3 Figure showing the refined alignment to the south of Lockhart 14

Figure 3-4 Figure showing refined alignment from the Buronga substation expansion and upgrade site 16

Figure 3-5 Figure showing refined alignment to avoid an existing Telstra infrastructure site 18

Figure 3-6 Figure showing the refined alignment within the vicinity of Yanco Creek 20

Figure 3-7 Figure showing proposed revised alignment at Federation Way 22

Figure 3-8 Figure showing proposed revised alignment at Boree Creek Road 24

Figure 3-9 Figure showing comparison of the alignment for optical repeater site overhead electrical infrastructure 26

Figure 3-10 Figure showing location of additional tower east of Colombo Creek within identified PAD area 27

Figure 3-11 Figure showing the revised site arrangement for the construction compound and accommodation camp at the Cobb Highway 29

Figure 3-12 Additional indicative water supply points 32

Figure 3-13 Figure showing additional mining exploration licence application area 35

Figure 4-1 Planning approvals process 41

Abbreviations

Proposal term/acronym	Definition
AEMO	Australian Energy Market Operator
APZ	asset protection zone
Airspace Regulations	Airports (Protection of Airspace) Regulations 1996
BDAR	Biodiversity Development Assessment Report
CSSI	Critical State significant infrastructure
DAWE	Australian Department of Agriculture, Water and the Environment
DPE	Department of Planning and Environment
DPE – BCD	NSW Department of Planning and Environment – Biodiversity Conservation Division
EIS	environmental impact statement
EP&A Regulation	NSW Environmental Planning and Assessment Regulation 2021
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
HV	high voltage
ICNIRP	International Commission on Non-Ionizing Radiation Protection
LGA	local government area
NEM	National Electricity Market
NSW	New South Wales
PADs	potential archaeological deposits
PCT	plant community type
Planning Systems SEPP	NSW State Environmental Planning Policy (Planning Systems) 2021
RAPs	Registered Aboriginal Parties
SA	South Australia

Glossary

Proposal term	Definition
brake/winch sites	A brake and winch site is a temporarily cleared area where plant and equipment is located for the purposes of spooling and winching a conductor into place on erected transmission line towers along a transmission line easement. Dependent upon the angle of line deviation, the location of the brake and winch site at that angle may or may not be within the nominated transmission line easement. The brake and winch site is only required for the construction phase of the proposal. It does not need to be maintained for ongoing operation and/or maintenance of the transmission line.
construction impact area	Refers to the area that would be directly impacted by construction of the proposal comprising the following: • construction of all proposal infrastructure elements (including the proposed transmission line alignment, transmission line easement, substation site works (at both the proposed Dinawan 330kV and upgraded and expanded Wagga Wagga substations), optical repeater infrastructure, and other ancillary works) • locations for construction elements such as construction compounds and accommodation camps, access tracks (excluding public roads proposed to be used for access routes), site access points, water supply points, laydown and staging areas, concrete batching plants, brake/winch sites and site offices. The area is identified based on realistic project component locations and areas however it is indicative at this stage. The area would be confirmed during finalisation of the design and construction methodology and would be developed as part of the consideration of avoidance and impact minimisation. This area includes the operational impact area (including areas required for maintenance) (refer definition below). For heritage and biodiversity assessments, the construction impact has been divided into four subset disturbance areas. These subsets relate to the identified level of disturbance in each area to reflect construction and operational requirements – specifically: • Disturbance area A, in which ground disturbance would be required • Disturbance area A (centreline) in which ground disturbance would be required • Disturbance area B, in which ground disturbance is not required except in limited circumstances • Disturbance area hazard/high risk trees, in which trees could be removed/trimmed for operational requirements if they meet the definition of hazard/high risk tree. Further detail of these areas is provided below. From time to time during construction and operation, high risk trees may be removed from within, or adjacent to, the easement but outside the disturbance area.
Dosimetric analyses	Dosimetric analyses involves the measurement, calculation and assessment of the amount and distribution of electric field absorbed by an object, usually the human body. Dosimetric analyses is used to evaluate compliance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) general public basic restrictions for electric field.

Proposal term	Definition
disturbance area A	Refers to an area at and around the transmission line towers (including associated construction work areas), areas for brake and winch sites and for new/upgraded access tracks in which vegetation would be removed during construction. The area also includes the proposed Dinawan 330kV substation site, the existing Wagga Wagga substation site and each of the main construction compounds and accommodation camps at Balranald, the Cobb Highway, Dinawan (Kidman Way), Lockhart and Wagga Wagga. It would include vegetation (including tree) removal and sub-surface impacts through construction activities such as grading, excavation, and full tree removal (i.e. root ball removal). Except in areas where only temporary disturbance is required (i.e. temporary access tracks and brake and winch sites), this area would also be subject to ongoing maintenance during operation (i.e. removal to ground level) for operational and safety requirements (including bushfire). This zone is a subset to the construction impact area (see definition above).
disturbance area A (centreline)	Refers to a centreline area between the proposed transmission line towers in which all vegetation (including trees) has been assumed to be removed during construction to ground level. In areas of known or potential heritage subsurface sensitivity (i.e. potential archaeological deposits (PADs)) sub-surface impacts in these areas would be avoided. In these areas vegetation would be cut to ground level and root balls would be retained as necessary to avoid subsurface impacts. Additionally, in areas of key Plains Wanderer primary habitat these centreline areas would not be subject to vegetation clearing. Alternative methods would be adopted in these key habitat areas for the conductor stringing activities. In circumstance where a tree is located within one of these areas that would exceed the vegetation clearing requirements then this tree(s) would be subject to removal to ground level (i.e. tree height cut back but rootball to be retained in place) using methods that minimise potential impact to key habitat and to ensure avoidance of impact to bird individuals. This would occur under supervision of an ecologist. This area would also be subject to ongoing maintenance during operation (i.e. removal to maintain vegetation clearance requirements) for operational and safety requirements (including bushfire). This zone is a subset to the construction impact area (see definition above).
disturbance area B	Refers to an area between transmission line towers in the easement in which removal of vegetation (including trees) would be undertaken where they have the potential to exceed vegetation clearance heights. This removal may result in temporary ground disturbance. Vegetation that is to be removed would have root balls removed except where practicable to retain. Vegetation clearance heights are set by Transgrid for operational and safety requirements, including bushfire risk management. This area would also be subject to ongoing maintenance during operation. This zone is a subset to the construction impact area (see definition above).

Proposal term	Definition
disturbance area – hazard/high risk trees	Refers to discrete areas alongside the proposal alignment where vegetation (trees) located outside of the easement have been assumed to potentially meet the definition of hazard/high risk trees and as a result have had an impact assumed. The impact would include partial vegetation clearing which would be restricted to the operational phase. Vegetation that is to be removed would have root balls retained and where practicable impacts will be restricted to pruning. Vegetation clearing has been identified as being limited to maintenance of hazard/high risk trees which are outside of the disturbance area B10 zone and within the adjacent 10 metre area where trees within vegetated areas exceed defined height thresholds of 30 metres for the 330kV line and 20 metres for the 500kV line. Locations identified for this disturbance area are shown in Appendix B of the Revised BDAR. This zone is a subset to the construction impact area (see definition above).
EIS alignment	The proposed alignment presented in the EIS
EnergyConnect	An electrical interconnector of around 900 kilometres between the electricity grids of South Australia and New South Wales, with an added connection to north west Victoria. In NSW, EnergyConnect comprises two sections – Western Section (which has been the subject of a separate environmental assessment and approval) and the Eastern Section (the proposal the subject of this EIS).
hazard/high risk tree	Hazard/high risk trees are defined under Transgrid procedures and include any tree or part of a tree that if it were to fall would infringe on the vegetation clearance requirements at maximum conductor sag of the transmission lines. Hazard/high risk trees will be confirmed based on the final proposal design (considering the transmission line conductor profile) and following qualified arborist assessment of the tree. All hazard/high risk trees confirmed as posing a risk to the corridor shall be removed.
operational impact area	Refers to the area that would be directly impacted by permanent components of the proposal, including all proposed infrastructure elements such as the proposed transmission line easement, transmission line and transmission line towers, any new or upgraded substation infrastructure, optical repeater sites, and permanent access tracks. Includes the disturbance area – hazard/high risk trees.
proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (referred to as Transgrid). Transgrid is the operator and manager of the main high voltage (HV) transmission network in NSW and the Australian Capital Territory (ACT), and is the Authorised Network Operator for the purpose of an electricity transmission or distribution network under the provisions of the *Electricity Network Assets (Authorised Transactions) Act 2015*.
proposal, the	The proposal is known as 'EnergyConnect (NSW – Eastern Section)' as described in Chapter 5 and Chapter 6 of the *EnergyConnect (NSW – Eastern Section) Environmental Impact Statement*.

Proposal term	Definition
proposal study area	The study area for this EIS, which comprises a generally one kilometre wide corridor (500 metres either side of the proposal alignment) between the Buronga substation and the Wagga Wagga substation as well as additional proposal components located away from the transmission line easement (with the exception of the proposed water points which has had a 200 metre diameter applied around each site). The proposal study area has been applied to identify the constraints nearby to the proposal which may or may not be indirectly impacted by the proposal. It encompasses the components including the construction impact area, the optical repeater sites (and associated connections), construction water points and other ancillary construction facilities. Note: Where required, each specialist has also considered a specific specialist study area relevant to their discipline.
refined alignment	Updated alignment as presented in this Amendment Report which takes into account refinements that have been identified along the alignment exhibited in the EIS based on ongoing land holder consultation and through changes to reduce potential environmental impacts.
transmission line easement	An area surrounding and including the transmission lines, which is a legal right of way allowing for construction of the transmission line, along with ongoing access and maintenance of the lines and will be acquired from land holders either by agreement or pursuant to compulsory acquisition process. The easement width would be 80 metres wide.

Executive summary

EnergyConnect

Transgrid (electricity transmission operator in New South Wales (NSW)) and ElectraNet (electricity transmission operator in South Australia (SA)) are seeking regulatory and environmental planning approval for the construction and operation of a new High Voltage (HV) interconnector between NSW and SA, with an added connection to north west Victoria. Collectively, the proposed interconnector is known as EnergyConnect. EnergyConnect aims to secure increased electricity transmission between SA, NSW and Victoria, while facilitating the longer-term transition of the energy sector across the National Electricity Market (NEM) to low emission energy sources.

EnergyConnect comprises of several sections that would be subject to separate environmental planning approvals under the relevant jurisdictions. It includes:

- NSW sections including:
  - Western Section – which has been subject to separate approval – which would extend from:
    - the SA/NSW border (near Chowilla in SA) to Transgrid's existing Buronga substation
    - the Buronga substation to the NSW/Victoria border at Monak (near Red Cliffs in Victoria)
  - Eastern Section – the subject of this document – which would extend from the Buronga substation to the existing Wagga Wagga 330kV substation (including the proposed Dinawan 330kV substation)
- a Victorian Section, which would extend from the NSW/Victoria border to Red Cliffs substation
- a SA Section, which would extend from Robertstown to the SA/NSW border.

Planning approvals process

The NSW Minister for Planning declared the NSW portions of EnergyConnect to be Critical State significant infrastructure (CSSI) under section 5.13 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act). An Environmental Impact Statement (EIS) was prepared to support Transgrid's application for approval of the proposal in accordance with the requirements of Division 5.2 of the EP&A Act. The EIS was placed on public exhibition by the NSW Department of Planning and Environment (DPE) for a period of 28 days, commencing 19 January 2022 and concluding on 15 February 2022.

During the public exhibition period, interested stakeholders and members of the community were able to review the EIS online or at display locations, participate in consultation and engagement activities, and make a written submission to the DPE for consideration in its assessment of the proposal.

In accordance with clause 179(2) of the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), an application may, with the approval of the Planning Secretary, be amended at any time before the application is determined. This Amendment Report outlines the proposed design and construction refinements to the proposal (the refined proposal) and assesses the associated environmental impacts.

Purpose of this Amendment Report

This Amendment Report considers the proposed design refinements which have been made following public exhibition of the EIS and includes an assessment of any different or new impacts arising out of the proposed refinements. The Amendment Report is intended to assist the community, government agencies and the approval authority to understand the implications of the changes that are currently proposed to the proposal as described in the EIS. The proposed amendments have been made in response to both issues raised in community and stakeholder submissions received during the public exhibition of the EIS, as well as changes which have been made by Transgrid as part of ongoing design refinement of the proposal. This Amendment Report should also be read in conjunction with the Submissions Report (Transgrid, 2022).

The proposed changes and their justifications are summarised in Table ES-1.

Table ES-1 Summary of proposed design refinement

	Overview of proposed design refinement
Lake Cullivel alignment	Transgrid has identified an opportunity to refine the alignment in this locality to improve environmental outcomes and to reduce visual impacts on neighbouring properties. The refined alignment would be located further south of Lake Cullivel and adjoining properties compared with the previously identified alignment in the EIS.
Lockhart alignment	Following a submission from a land holder to the south of the EIS alignment and ongoing land holder consultation, a refined alignment has been identified at Lockhart. The refined alignment would remove a right angled section of the EIS alignment at Kings Lane and would replace this with a more angled alignment.
Buronga substation access	As part of the ongoing refinement of the final layout for the Buronga substation expansion and upgrade (approved as part of EnergyConnect (NSW – Western Section)), a revised connection point for the proposal with the expanded substation has been identified.
Avoidance of Telstra infrastructure	As part of ongoing consultation with key stakeholders, a Telstra infrastructure site was identified as being impacted by the EIS alignment. To avoid this site, around seven kilometres of the alignment to the north of the Sturt Highway and east of Benanee has been slightly adjusted.
Yanco Creek alignment	Further design refinement and ongoing discussion with the impacted land holder has identified an opportunity to reduce potential impacts of the proposal on existing infrastructure within the vicinity of Yanco Creek at Bundure. The refined alignment has slightly altered the approach angle at which the transmission line would cross Yanco Creek.
Disused Narrandera Tocumwal Railway	Ongoing engagement with the adjacent land holder at the location of the proposed design refinement has resulted in a minor shift of the alignment by around five metres to the south of the EIS alignment.
Urana alignment – West of Federation Way	As a result of ongoing consultation with the Department of Planning and Environment – Biodiversity Conservation Division (DPE – BCD) as well as land holder consultation prior to and following public exhibition of the EIS, a minor refinement to the EIS alignment has been identified to the west of Federation Way at Urana where the alignment would be parallel to Coonong Road.

	Overview of proposed design refinement
Urana alignment – West of Boree Creek Road	Consultation with land holders impacted by the EIS alignment has noted land holders impacted by the EIS alignment objected to the proposal affecting a property to the north of Gums Road. To avoid impact to this property, the refined alignment would shift slightly between Barragunda Road and Boree Creek Road.
Minor Lockhart alignment shift	Since the public exhibition of the EIS, the proposed transmission line tower locations for the EIS alignment along Strongs Lane, Lockhart were identified to be in very close proximity to the road edge. The refined design would move one of the angle transmission line towers within the vicinity of Ben Hoffmanns Lane in order to improve safety and minimise the potential of a vehicle colliding with the previously located tower.
Optical repeater site – Booroorban	The EIS alignment identified the proposed overhead electrical infrastructure within an existing 'paper road' to the north of Booroorban-Tchelery Road. The proposed electrical infrastructure would now be located to the east of the identified 'paper road' corridor (directly adjacent to the EIS alignment for this infrastructure) into the adjoining private property.
Additional tower – Colombo Creek	One additional tower is required to the east of Colombo Creek within an identified area of Potential Archaeological Deposit (PAD).
General longitudinal shifts of tower locations	As a result of ongoing refinement to the design since public exhibition of the EIS, a number of the transmission line towers along the alignment have been refined. The tower locations have typically been refined to provide additional avoidance of environmental constraints (predominantly biodiversity and Aboriginal heritage) and to optimise the overall design for the proposal.
Construction compounds and accommodation camp sites	*Lockhart* – Ongoing consultation with the land holders of the two sites being considered as possible compound and accommodation sites has determined that the preferred site for the construction compound and accommodation camp site at Lockhart is the County-Boundary Road site to the north east of the Lockhart township. *Cobb Highway* – As part of the ongoing heritage survey and field investigations that were undertaken following public exhibition of the EIS, an area of PAD has been identified at the location of the previously proposed construction compound and accommodation camp site. In order to minimise potential impacts to this PAD, a revised site arrangement for the construction compound and accommodation camp has been developed.
Construction water supply	Further development of the construction methodology for the proposal, and ongoing consultation with water suppliers and land holders since public exhibition of the EIS have identified 16 additional water supply points which may be utilised during the construction of the proposal. These additional water supply points may be utilised in addition to the water supply points identified in the EIS.

The environmental impacts of the refined proposal have been assessed, including impacts to biodiversity, Aboriginal and non-Aboriginal heritage, landscape character and visual amenity, hydrology and flooding and noise and vibration.

Further consideration of the refined proposal has identified additional opportunities to reduce impacts. In particular, the proposal has been refined to:

- respond to community and agency feedback received during the public exhibition process for the EIS
- further avoid and minimise environmental impacts where possible in comparison to the EIS alignment. This has included:
  - reduced impact on biodiversity through elements such as:
    - refinement of the alignment at Lake Cullivel, Lockhart and Yanco Creek to avoid or reduce the impact on a range of biodiversity constraints
    - general refinement and ongoing micro-siting of transmission line tower locations along the length of the proposal alignment
  - reduced impact on Aboriginal heritage through ongoing test excavation and refinement of the alignment at Lake Cullivel to minimise impacts on an identified PAD
  - reduced potential for impacts on localised flooding and hydrology in the vicinity of Lake Cullivel due to the proposed realignment of this section of the proposal further to the south away from the main body of the lake.

On balance, the proposed design refinements would result in an improvement to the proposal as described in the EIS, in particular resulting in reduced impacts both to the environment as well as local land holders. The remaining impacts are generally consistent with those previously presented in the EIS. A full assessment of the proposed design refinements is presented in Chapter 6. The impacts associated with the proposed design refinements would be managed through the application of the environmental mitigation and management measures presented in Appendix C of this Amendment Report.

Consultation on the refined proposal

Key consultation activities that have been carried out regarding the development of the refined proposal include:

- *consultation with directly impacted land holders and residents* – Transgrid has continued to engage with all directly impacted land holders of the refined proposal from mid-February 2022 until April 2022. This has included both written communication / notification and face-to-face sessions with impacted land holders to discuss the relevant refinements in comparison to the impacts identified in the EIS.

- *consultation with relevant government agencies and public authorities* – ongoing briefings with the following government agencies and public authorities since exhibition of the EIS has included acknowledgement of the proposed design refinements:

  - Department of Planning and Environment – Biodiversity Conservation Division (DPE – BCD)
  - Heritage NSW
  - Relevant local councils where a proposal refinement has been made

- *consultation with Aboriginal stakeholders* – face to face briefings with Registered Aboriginal Parties (RAPs) as part of the consultation and feedback period for the *Revised Aboriginal Cultural Heritage Assessment Report* (Navin Officer, 2022) included discussion of the relevant design refinements applicable to each of the RAPs.

A full description of the consultation activities undertaken during the development of the refined proposal is provided in Chapter 5.

Conclusions and next steps

Conclusion

This Amendment Report considers and documents the proposed refinements and clarifications that have been identified in response to further design investigations, submissions received and/or outstanding issues identified in the EIS.

On balance, the proposed design refinements would result in an improvement to the environmental impacts described in the EIS, in particular resulting in reduced impacts both to the environment as well as local land holders. The remaining impacts are generally consistent with those previously presented in the EIS.

This proposal is a critical and large component of EnergyConnect, which would enhance the energy transmission link between SA, NSW and northern Victorian transmission networks. The operation of the proposal would facilitate enhanced security and reliability of the energy supply with associated social and economic benefits to consumers at the State level across NSW, SA and Victoria. Not proceeding with the proposal, including the proposed refinements as identified in this Amendment Report, would reduce the security of the electricity supply in SA and NSW, particularly as coal-fired generators commence retirement.

Next steps

It is proposed that the revised proposal, as described in this Amendment Report, be considered, along with the *EnergyConnect (NSW – Eastern Section) Submissions Report* (Transgrid, 2022) as part of the assessment by DPE. DPE will then prepare a report to the Minister for Planning who will subsequently decide whether to grant approval, or to refuse the proposal. Should the proposal be approved by the Minister, Transgrid would continue to consult with community members, government agencies and other stakeholders during the pre-construction, construction and commissioning phases.

1. Introduction

This chapter provides a background to, and description of the key features of the proposal as described in the EIS, a summary of the exhibition of the EIS and outlines the purpose and structure of this report.

1.1. Background

Transgrid (electricity transmission operator in New South Wales (NSW)) and ElectraNet (electricity transmission operator in South Australia (SA)) are seeking regulatory and environmental planning approval for the construction and operation of a new High Voltage (HV) interconnector between NSW and SA, with an added connection to north west Victoria. Collectively, the proposed interconnector is known as EnergyConnect.

EnergyConnect aims to secure increased electricity transmission between SA, NSW and Victoria, while facilitating the longer-term transition of the energy sector across the National Electricity Market (NEM) to low emission energy sources.

EnergyConnect has been identified as a priority transmission project in the *NSW Transmission Infrastructure Strategy* (NSW Department of Planning and Environment (DPE), 2018), linking the SA and NSW energy markets and would assist in transporting energy from the South-West Renewable Energy Zone to major demand centres.

EnergyConnect comprises of several sections that would be subject to separate environmental planning approvals under the relevant jurisdictions. It includes:

- NSW sections including:
  - Western Section – which has been subject to separate approval – which would extend from:
    - the SA/NSW border (near Chowilla in SA) to Transgrid's existing Buronga substation
    - the Buronga substation to the NSW/Victoria border at Monak (near Red Cliffs in Victoria)
  - Eastern Section – the subject of this document – which would extend from the Buronga substation to the existing Wagga Wagga 330kV substation (including the proposed Dinawan 330kV substation)
- a Victorian Section, which would extend from the NSW/Victoria border to Red Cliffs substation
- a SA Section, which would extend from Robertstown to the SA/NSW border.

1.2. Key features of the proposal (as publicly exhibited)

The proposal, as described in the EIS, comprised the works associated with the NSW – Eastern Section of EnergyConnect. The key components of the proposal (as outlined in the EIS) included:

- about 375 kilometres of new 330kV double circuit transmission line and associated infrastructure between the Buronga substation and the proposed Dinawan 330kV substation
- connection of the proposed transmission lines to the existing Buronga substation
- construction of a new 330kV substation around 30 kilometres south of Coleambally, referred to as the proposed Dinawan 330kV substation
- connection of the proposed transmission lines to the proposed Dinawan 330kV substation

- about 162 kilometres of new 500kV double circuit transmission line and associated infrastructure between the proposed Dinawan 330kV substation and the existing Wagga Wagga substation at Wagga Wagga, NSW
- upgrade and expansion of the Wagga Wagga substation to accommodate the new transmission line connections including the installation of new line bays, relocation and upgrade of existing bays and associated electrical and civil works (road, kerb, gutter, drainage works and earthworks)
- provision of three optical repeater structures and associated connections to existing local electrical supplies
- new/and or upgrade of access tracks as required
- ancillary works required to facilitate the construction of the proposal (e.g. laydown and staging areas, concrete batching plants, brake/winch sites, site offices and accommodation camps).

An overview of the proposal, as presented in the EIS, is provided in Figure 1-1. Further detail on the key infrastructure components of the proposal and construction activities were provided in Chapter 5 and Chapter 6 of the EIS respectively. Where aspects of the proposal infrastructure or construction method have been refined following public exhibition, these changes have been described in Chapter 3 of this Amendment Report and the revised proposal description and construction chapters included in Appendix A and Appendix B respectively.

Overall, the proposal alignment has been designed to maximise the route running parallel to existing transmission lines as far as possible in consideration of other constraints and operational requirements. The proposed alignment of the transmission line easement would be parallel to existing lines for around 407 kilometres of the full approximately 537 kilometre-long route (refer Figure 1-2).

The proposal would be located across nine local government area (LGAs) which consist of the following: Wentworth, Balranald, Murray River, Edward River, Hay, Murrumbidgee, Federation, Lockhart and Wagga Wagga LGAs.

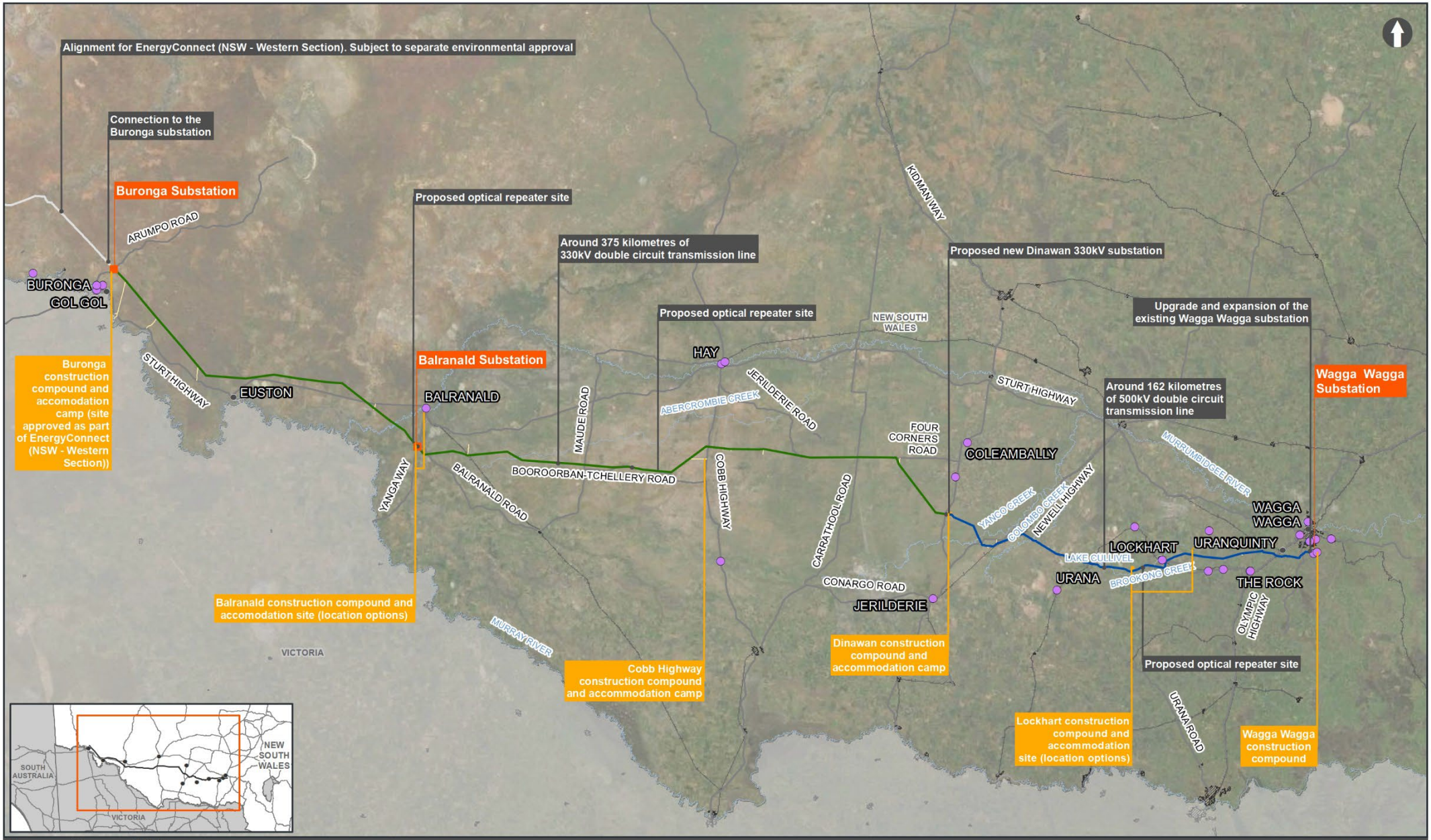

Figure 1-1

Proposal Overview - EnergyConnect (NSW - Eastern section as presented in the exhibited EIS)

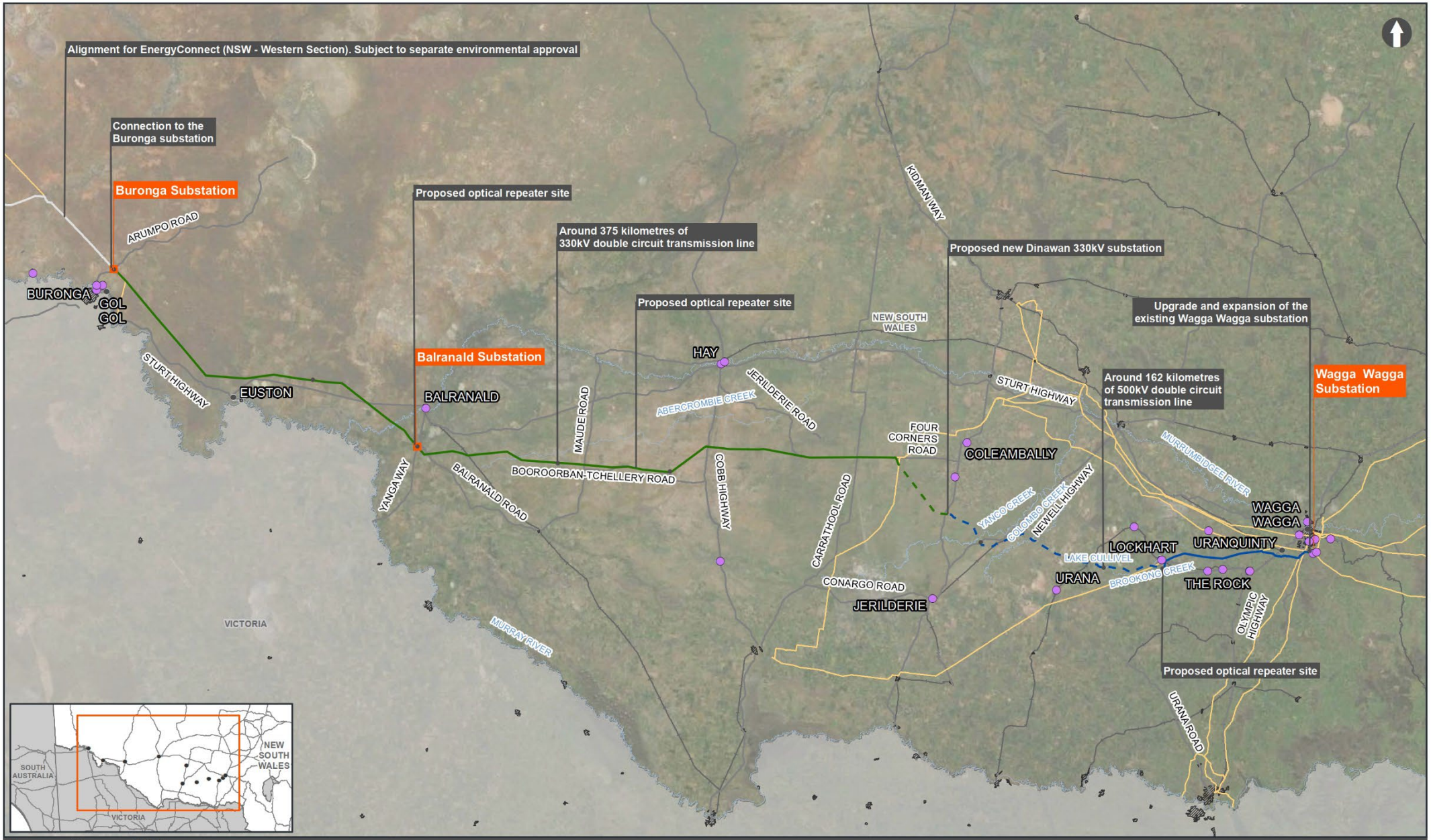

Figure 1-2

Proposal Alignment and Existing Transmission Lines Arrangements - EnergyConnect (NSW – Eastern Section) (as presented in the exhibited EIS)

- EnergyConnect (NSW - Eastern Section) 330kV transmission line (Parallel)
- EnergyConnect (NSW - Eastern Section) 500kV transmission line (Parallel)
- EnergyConnect (NSW - Eastern Section) 330kV transmission line (Greenfield)
- EnergyConnect (NSW - Eastern Section) 500kV transmission line (Greenfield)
- EnergyConnect (NSW - Western Section)
- Main Construction Compounds and Accomodation Sites
- Water Fill Point
- Existing Substation
- Built Up Areas
- Waterbody
- Existing Transmission Line

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Source: NSWSS, ESRI, Transgrid, WSP

1.2.1. Timing and commencement of operation

Construction of the proposal would commence in late-2022 (enabling works phase), subject to NSW Government and Commonwealth planning approvals. The main construction works phase for the transmission lines and substation facilities would take around 18 months. The upgraded Wagga Wagga substation and proposed Dinawan 330kV substation are expected to be operational by August 2024. Removal and re-instatement of construction compounds and associated works and remediation would extend around six months beyond the commissioning phase, with estimated completion in March 2025.

1.3. Exhibition of the EIS

An EIS was prepared to support Transgrid's application for approval of the proposal in accordance with the requirements of Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS was placed on public exhibition by the NSW DPE for a period of 28 days, commencing 19 January 2022 and concluding on 15 February 2022.

During the public exhibition period consultation activities were conducted to involve stakeholders and the broader community in exhibition activities, provide guidance on the submissions process, and encourage parties to engage with the information in the EIS and make a submission accordingly. Submissions on the EIS were made directly to DPE. Submissions were accepted by DPE via electronic submission or by post.

A separate Submissions Report (Transgrid, 2022) has also been prepared to respond to the submissions received during public exhibition of the EIS as part of this process and should be read in conjunction with this Amendment Report.

1.4. The refined proposal

A series of design refinements have been completed after the public exhibition of the EIS. In response to further community engagement, consideration of submissions, and ongoing design and construction methodology development, these refinements provide functional improvements to the design and alignment. They also confirm certain elements of the proposal that were highlighted as options or opportunities in the EIS (hereafter referred to as 'the EIS alignment').

The proposed refinements to the proposal as described in the EIS (inclusive of the proposed alignment and other refinements and clarification to the EIS proposal) are collectively referred to in this report as the 'refined proposal'. The key proposed refinements include:

- refinement to the EIS alignment at Lake Cullivel and Lockhart following engagement with neighbouring property owners at these locations. Other minor refinements to the alignment have also been made as part of ongoing consultation with agencies and land holders, and to further reduce potential environmental impacts. Cumulatively these changes are referred to in this report as 'the refined alignment'
- confirmation of the preferred construction compound and accommodation camp site at Lockhart and refinement of the preferred arrangement for the Cobb Highway construction compound and accommodation camp site due to identification of additional heritage constraints
- identification of a series of additional construction water supply points
- changes to the construction impact area following refinement of the proposed construction methodology

A detailed description of the elements of refined proposal is provided in Chapter 3. A detailed description of the refined proposal is also provided in Appendix A – Updated proposal description (operation) and Appendix B – Updated proposal description (construction).

1.5. Purpose and structure of this report

In accordance with clause 179(2), an application may, with the approval of the Planning Secretary, be amended at any time before the application is determined. This Amendment Report outlines the refined proposal and assesses the associated environmental impacts of the refinements. Where required, the Amendment Report has included additional or revised environmental management measures to manage or minimise environmental impacts.

This Amendment Report is intended to assist the community, government agencies and the approval authority to understand the implications of these changes. The Minister for Planning will subsequently decide whether to grant approval, or to refuse the proposal, under the EP&A Act. Approval from the Minister is required before Transgrid can proceed with the proposal.

Given the status of the proposal as a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the proposal would also be assessed using the bilateral assessment process by the Australian Department of Agriculture, Water and the Environment (DAWE) for the required Commonwealth approval.

This Amendment Report has been structured as follows in line with the *State significant infrastructure guidelines – Preparing an Amendment Report* (DPIE, 2021) as follows:

- *Chapter 1: Introduction* – which provides an overview of the proposal background and purpose of the report
- *Chapter 2: Strategic context* – which identifies any changes to the strategic context of the proposal arising from the proposed refinements
- *Chapter 3: Description of the amendments* – which provides detailed description of the proposed refinements to the proposal as described in the EIS
- *Chapter 4: Statutory context*: which provides an outline of any changes to the statutory requirements arising from the proposed refinements
- *Chapter 5: Engagement* – which summarises the stakeholder engagement that has been undertaken during the development of the proposed refinements
- *Chapter 6: Assessment of impacts* – which assesses the change in impacts associated with the proposed refinements
- *Chapter 7: Merits and conclusions:* which provides an evaluation of the merits and conclusions of the refined proposal
- *Chapter 8: References*
- Appendices
  - Appendix A – Updated proposal description (operation)
  - Appendix B – Updated proposal description (construction)
  - Appendix C – Updated approach to environmental management, including revised environmental mitigation measures.

2. Strategic context

The strategic context for the proposal was detailed in Chapter 2 of the EIS. Section 2.1 of the EIS outlined the challenges facing the existing energy market and the need for future power generation to both reduce emissions and encourage a shift towards renewable energy opportunities.

2.1. Strategic context for the refined proposal

Section 2.4 of the EIS outlined the strategic planning response to the identified challenges facing the existing energy market, including consideration of the proposal against both NSW and Australian Government policy contexts such as its alignment with the:

- *NSW Transmission Infrastructure Strategy* (DPE, 2018)
- *(NSW) State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
- *NSW Climate Change Policy Framework* (NSW Office of Environment and Heritage, 2016)
- Australian government's *2020 Integrated System Plan* (Australian Energy Market Operator (AEMO), 2020)
- Australian government's Climate change policy.

Overall, the *2020 Integrated System Plan* (2020 ISP) (AEMO, 2020) estimates that over 26 gigawatts of new grid-scale renewables is needed to replace the approximately 15 gigawatts, or 63 per cent, of Australia's coal-fired generation that will reach the end of its technical life and so likely retire by 2040. This will increase pressure on energy supply, particularly as energy consumption continues to increase in NSW (Transgrid, 2018). The National Energy Market needs to identify and connect to new low emission energy generation sources to continue to have enough energy to meet the future demand, while meeting Australia's carbon emissions policy commitments (ElectraNet, 2019a).

The development of EnergyConnect (including the refined proposal) would provide a key electricity distribution connection within western NSW to encourage future renewable energy providers to invest in lower emission electrical generation alternatives within this region.

Overall, the proposed refinements identified in this Amendment Report would fall within the same strategic context as was previously discussed in the EIS. The proposed refinements would also be consistent with seeking to achieve the overall benefits identified for the proposal in Section 2.6 of the EIS.

2.2. Key benefits of the refined proposal

Section 2.6 of the EIS outlined the key benefits of EnergyConnect. This included the expectation that EnergyConnect, as a whole project comprising the (approved) Western Section and the Eastern Section (subject of the current application) would:

- deliver net market benefits of approximately $900 million over 21 years (in present value terms) including wholesale market fuel cost savings in excess of $100 million per year as soon as it is energised (primarily from avoided expensive gas-fired generation in SA)
- provide diverse low-cost renewable generation sources to help service NSW demand going forward, particularly as existing coal-fired generators retire
- avoid substantial capital costs associated with enabling greater integration of renewables in the NEM
- generate sufficient benefits to recover the proposal capital costs within nine years of completion

- reduce annual residential bills and small business customer bills in SA and NSW
- deliver flow on economic benefits to the wider economy totalling over $6 billion across SA and NSW (in present value terms)
- generate around 1,500 jobs (including up to around 300 local/regional jobs) during construction
- improve the security, reliability and resilience of the power network in SA and NSW
- improve the ability of parties to obtain hedging contracts in SA and help relieve the tight liquidity in hedging markets currently.

3. Description of the amendments

This chapter describes the proposed changes associated with the refined proposal. This chapter also provides a summary of a series of minor clarifications and refinements that have been made to the proposal following public exhibition of the EIS. A consolidated revised proposal description, taking into account the proposed changes, clarifications and refinements is provided in Appendix A (operation) and Appendix B (construction).

3.1. Overview of the proposed refinements

A series of design refinements have been completed after the public exhibition of the EIS. In response to further community engagement, consideration of submissions, and ongoing design and construction methodology development, these refinements provide functional improvements to the design and alignment. They also confirm certain elements of the proposal that were highlighted as options or opportunities in the EIS.

The proposed refinements to the proposal as described in the EIS (inclusive of the proposed alignment, other refinements and clarification to the EIS proposal) are collectively referred to in this report as the 'refined proposal'. The key proposed refinements include:

- refinement to the EIS alignment at Lake Cullivel and Lockhart following engagement with neighbouring property owners at these locations. Other minor refinements to the alignment have also been made as part of ongoing consultation with land holders, and to further reduce potential environmental impacts. Cumulatively these changes are referred to in this report as 'the refined alignment' (refer to Section 3.2)
- confirmation of the preferred construction compound and accommodation camp site at Lockhart and refinement of the preferred arrangement for the Cobb Highway construction compound and accommodation camp site due to identification of additional heritage constraints (refer to Section 3.4.1)
- identification of a series of additional construction water supply points (refer to Section 3.4.2)
- changes to the construction impact area following refinement of the proposed construction methodology (refer to Section 3.4.2.2).

Figure 3-1 provides an overview of the location of each of the proposed refinements to the EIS proposal which are described in greater detail in the following sections.

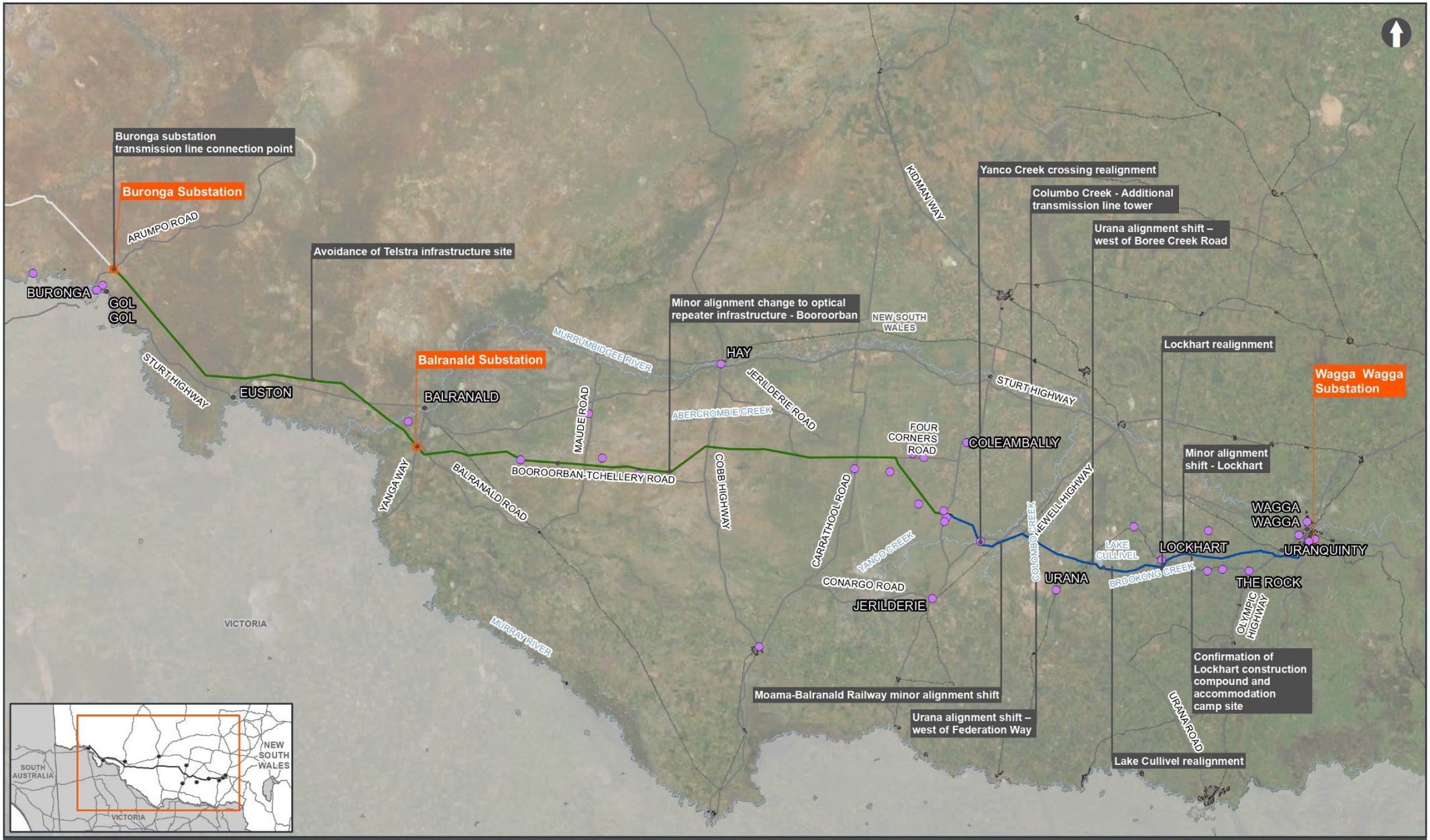

Figure 3-1

Overview of the proposed design refinements following public exhibition

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Source: NSWSS, ESRI, Transgrid, WSP

3.2. Local alignment refinements

This section provides a description of the proposed refinements to the EIS alignment. An assessment of the potential impacts associated with these refinements, and any changes to the environmental impact assessment described in the EIS, is provided in Chapter 6 of this Amendment Report.

3.2.1. Lake Cullivel alignment

3.2.1.1. EIS description of proposal

Section 5.3.1.2 of the EIS provided a general overview of the proposed alignment within the vicinity of Lake Cullivel, noting that the alignment would be located to the south of Lake Cullivel and traverse an existing property boundary. The EIS alignment identified a transmission line easement that traversed directly to the south of Lake Cullivel before continuing in a generally east-west alignment to the south of an existing property fence line between the eastern edge of Lake Cullivel and Urana-Lockhart Road. The EIS alignment consisted of around 13.4 kilometres of transmission line easement between the end of Andriskes Lane and Urana-Lockhart Road. This alignment was shown on Figure 5-2e of the EIS.

3.2.1.2. Description of refinement

As described in section 4.1.3.2 of the Submissions Report, two submissions from local land holders in the vicinity of Lake Cullivel, and one submission from a member of the public from Little Hartley in NSW, provided objection to the EIS alignment in this region due to the potential impacts on environmental elements such as existing waterways, bird populations and local groundwater dependent ecosystems.

Transgrid has identified an opportunity to refine the alignment in this locality to improve environmental outcomes and to reduce visual impacts on neighbouring properties. The refined alignment would be located further south of Lake Cullivel and adjoining properties compared with the EIS alignment. From Andriskes Lane, the refined alignment would extend further to the south than the EIS alignment before traversing in an east-west alignment towards Urana-Lockhart Road (generally parallel to the EIS alignment). The refined alignment would be around 13.5 kilometres of transmission line easement (an increased distance of around 100 metres compared to the EIS alignment). The refined alignment would require the same number of transmission line towers as the EIS alignment. At its maximum point of deviation, the refined alignment would be located around 1.1 kilometres further south than the EIS alignment.

While responding to the submissions received during public exhibition, the refined alignment would provide the following advantages:

- potentially reduced biodiversity impacts such as existing bird populations, aquatic groundwater dependent ecosystems and an existing stands of trees within the vicinity of Lake Cullivel
- movement of the proposed transmission line easement further away from potential areas of flooding around Lake Cullivel
- reduced visual impact for the neighbouring property to the north of the proposed transmission line.

Figure 3-2 shows a comparison between the EIS alignment and the refined alignment within the vicinity of Lake Cullivel.

Figure 3-2

Figure showing the refined alignment to the south of Lake Cullivel

EIS
- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal
- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

Potential Archaeological Deposit area

Sensitive Receptors
- Industry facility
- Residential dwelling

Source: NSWSS, ESRI, Transgrid, WSP

3.2.2. Lockhart alignment

3.2.2.1. EIS description of proposal

Section 5.3.1.2 of the EIS provided a general overview of the proposed alignment within the vicinity of Lockhart, noting that the options evaluation for the proposal in this area determined that the preferred alignment should be located to the south of the township. To achieve this, the EIS alignment provided for a generally east-west alignment between Urana-Lockhart Road and Kings Lane, before turning generally north-south towards the Lockhart-The Rock Road. This alignment was shown on Figure 5-2e of the EIS.

3.2.2.2. Description of refinement

As described in section 3.3.3.1 of the EIS, two options were considered for the EIS alignment within the immediate area around the township of Lockhart between Tenison Lane and Lockhart-The Rock Road. The preferred option, as presented in the EIS, identified an alignment to the south of the Lockhart township which provided a right angled alignment along Kings Lane to the west of Albury Road (refer to Figure 3-3).

Following a submission from a land holder to the south (refer to section 4.1.9.2 of the Submissions Report), and ongoing consultation with the land holder whose property the alignment would cross, a refined alignment has been identified at this location. The refined alignment would remove the right angled section of the EIS alignment at Kings Lane, and would be replaced with a more angled alignment (around 45 degrees). The refined alignment at this location would consist of around two kilometres of deviated transmission line when compared to the EIS alignment. This would result in a reduction in the length of the transmission line at this location by around 900 metres and would remove the need for up to two transmission line towers compared to the EIS alignment.

While responding to the submissions received during public exhibition, the refined alignment would also provide the following advantages when compared to the EIS alignment at this location:

- reduced visual impact for the neighbouring property to the south of the proposed transmission line
- reduced overall length of the proposed alignment and reduction in the need for (and impact of) up to two transmission line towers
- reduced impact on mature remnant trees on the property
- improved engineering outcome as it would remove the need for a 90 degree angled tower.

Figure 3-3 shows a comparison between the EIS alignment and the refined alignment to the south of the Lockhart township.

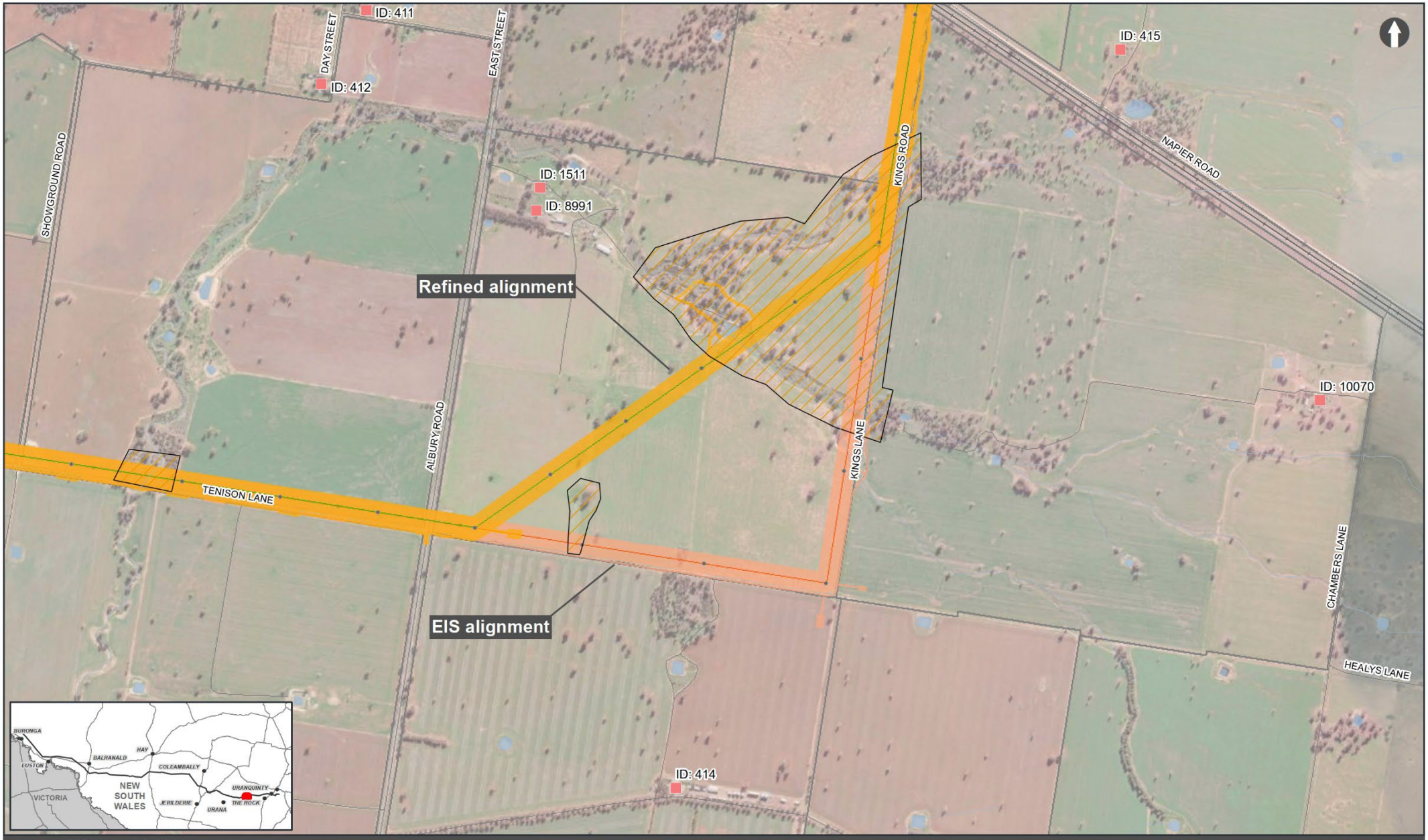

Figure 3-3

Figure showing the refined alignment to the south of Lockhart

EIS

- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal

- Refined alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

- Potential Archaeological Deposit area

Sensitive Receptors

- Residential dwelling

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Source: NSWSS, ESRI, Transgrid, WSP

3.2.3. Buronga substation access

3.2.3.1. EIS description of proposal

Section 5.3.1.1 of the EIS provided a general overview of the proposed alignment within the vicinity of the Buronga substation, noting that the EIS alignment would provide an alignment out of the Buronga substation parallel to the existing transmission line (and approved EnergyConnect (NSW – Western Section) alignment). This alignment was shown on Figure 5-2a of the EIS.

3.2.3.2. Description of refinement

As part of the ongoing refinement of the final layout for the Buronga substation expansion and upgrade (approved as part of EnergyConnect (NSW – Western Section)), a revised connection point for the proposal within the expanded substation has been identified. The EIS identified the location of the transmission line easement to be through a connection to the Buronga substation site generally on the north eastern side of the existing substation infrastructure. The refinement of the final layout of the Buronga substation expansion and upgrade as part of the EnergyConnect (NSW – Western Section) has identified the need to modify this previously identified access point for the transmission line to a location on the southern side of the existing substation infrastructure.

The new transmission line connection point would be located around 370 metres to the south west of the connection point identified for the EIS alignment. As a result of this shift, a new alignment for the transmission line would be required for around the first 300 metres of the proposal. The refined alignment would be around 680 metres in length (an increase of around 350 metres in comparison to the EIS alignment) and would require one additional transmission line tower (in comparison to the EIS alignment).

Figure 3-4 shows a comparison between the EIS alignment and the refined alignment at the access point to the Buronga substation.

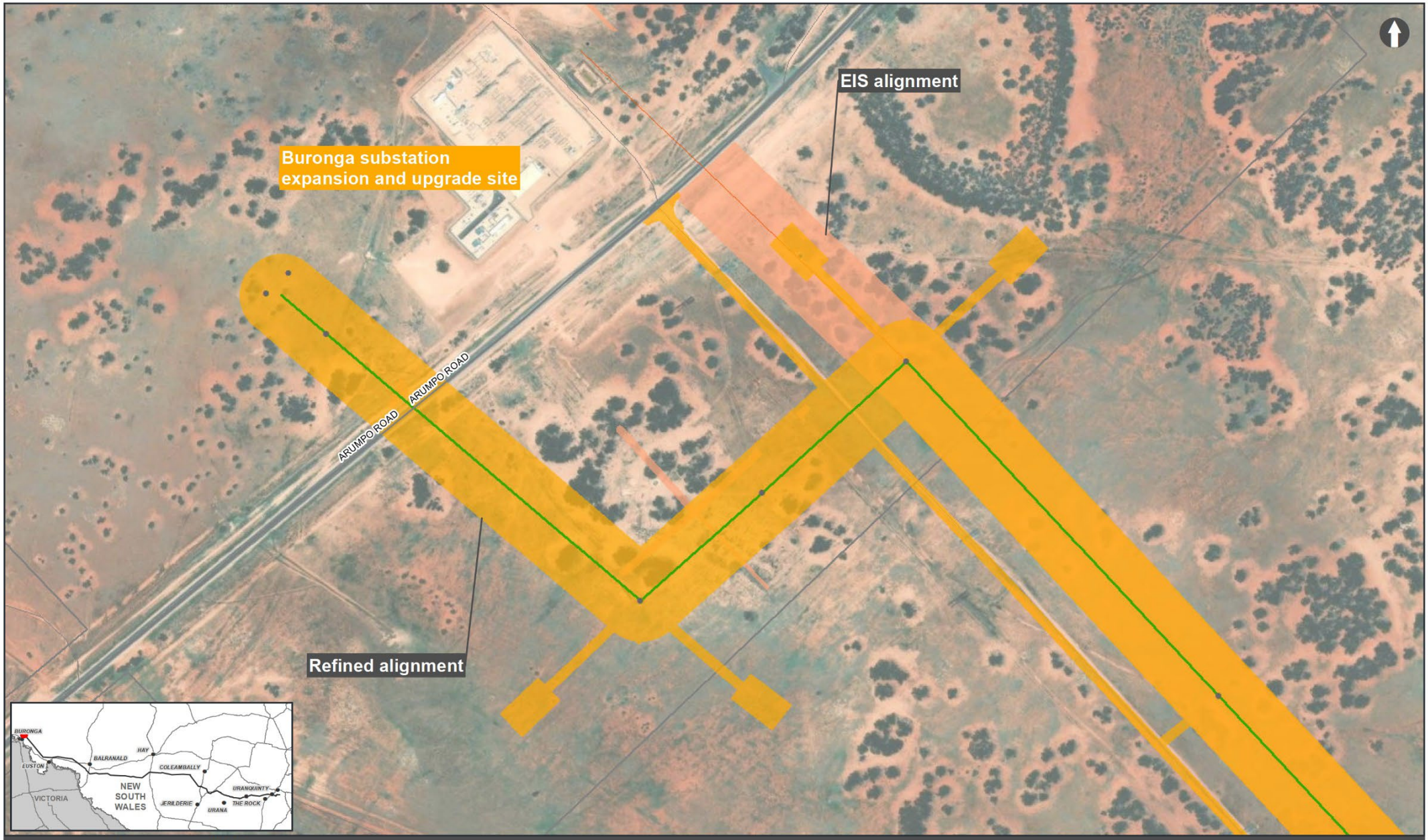

Figure 3-4

Figure showing refined alignment exiting the Buronga substation expansion and upgrade site

EIS

- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal

- Refined alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

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Source: NSWSS, ESRI, Transgrid, WSP

3.2.4. Avoidance of Telstra infrastructure – Benanee

3.2.4.1. EIS description of proposal

Section 5.3.1.1 of the EIS provided a general overview of the proposed alignment between Euston and Balranald, noting that the proposal would generally be co-located parallel to the existing 220kV transmission line in this area. This alignment was shown on Figure 5-2a and Figure 5-2b of the EIS.

3.2.4.2. Description of refinement

As identified in section 5.3.1.1, the section of the proposal between Benanee and Balranald would generally be located on the northern side of, and parallel to the existing 220kV transmission line.

As part of ongoing consultation with key stakeholders, a Telstra infrastructure site was identified as being impacted by the EIS alignment. To avoid this site, around seven kilometres of the alignment to the north of the Sturt Highway and east of Benanee has been slightly adjusted. At the greatest deviation from the EIS alignment, the refined alignment would result in a shift of the transmission line easement by around 50 metres to the north and result in the adjustment of around 15 transmission line tower footprint locations.

Figure 3-5 shows a comparison between the EIS alignment and the refined alignment at the access point to the Buronga substation.

Figure 3-5

Figure showing refined alignment to avoid an existing Telstra infrastructure site

EIS

- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal

- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

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Source: NSWSS, ESRI, Transgrid, WSP

3.2.5. Yanco Creek alignment

3.2.5.1. EIS description of proposal

Section 5.3.1.2 of the EIS provided a general overview of the proposed alignment between the proposed Dinawan 330kV substation and Lockhart which would include a section generally parallel to Thurrowa Road at Bundure where it would cross over Yanco Creek. This alignment was shown on Figure 5-2d of the EIS.

3.2.5.2. Description of refinement

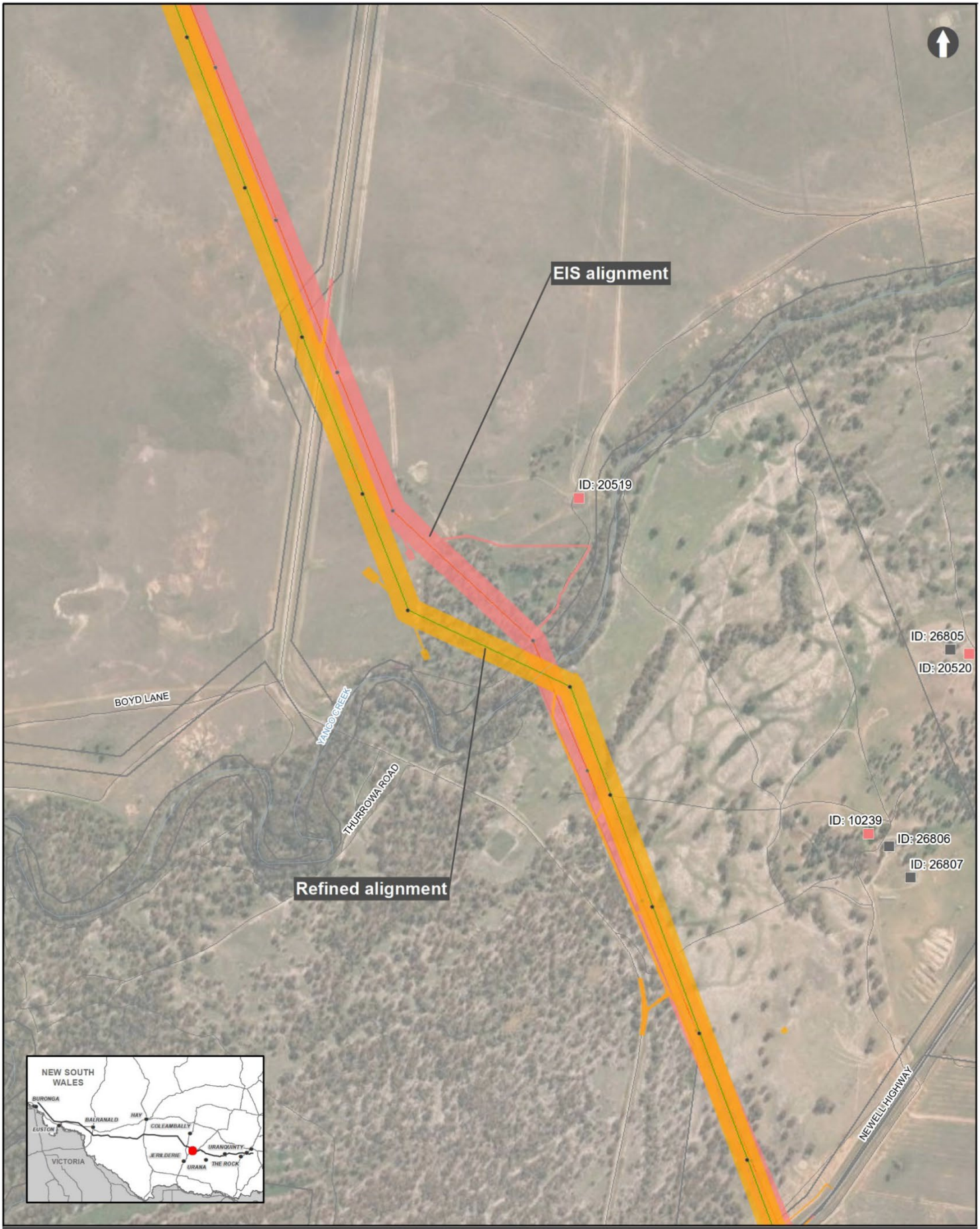
Further design refinement following public exhibition of the EIS and ongoing discussion with the impacted land holder has identified an opportunity to reduce potential impacts of the proposal on existing infrastructure within the vicinity of Yanco Creek, to the north of the Newell Highway at Bundure. To meet the request of the land holder to reduce the potential impacts of the proposal on the existing infrastructure, the refined alignment has slightly altered the approach angle at which the transmission line would cross Yanco Creek.

Deviation of the refined alignment would commence around 4.6 kilometres north of Yanco Creek and would create an alternative approach to the creek crossing point from the northern side. The approach for the refined alignment would be located up to around 190 metres to the southwest of the EIS alignment. Due to the revised approach on the northern side of Yanco Creek, the refined alignment to the south would also shift slightly (up to around 50 metres east of the EIS alignment) to accommodate the altered angle. The refined alignment would then tie back into the EIS alignment to the south of the Newell Highway. One additional transmission line tower would be required to accommodate the refined design. A number of other transmission line towers for this section of the proposal would also need to be adjusted to suit the refined alignment (both laterally and longitudinally).

While responding to the request of the land holder to change the EIS alignment, the refined alignment would also provide the following advantages:

- the refined alignment would move the transmission line further away from an area of mapped Plains-Wanderer habitat on the northern side of Yanco Creek
- the refined alignment would result in some minor reductions to the overall impact on biodiversity and the existing riparian corridor within the vicinity of the crossing point of Yanco Creek
- when compared to the EIS alignment, the refined alignment would be located within areas of more optimal geotechnical and ground conditions.

Figure 3-6 shows a comparison between the EIS alignment and the refined alignment within the vicinity of Yanco Creek.



0 0.25 0.5 KM

Figure 3-6

Figure showing the refined alignment within the vicinity of Yanco Creek

EIS
- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal
- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

Sensitive Receptors
- Industry facility
- Residential dwelling

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Source: NSWSS, ESRI, Transgrid, WSP

3.2.6. Disused Narrandera Tocumwal Railway section

A minor shift in the EIS alignment within the vicinity of the disused Narrandera Tocumwal Railway, generally between Colombo Road and Coonong Road has been identified following the public exhibition of the EIS. Since the public exhibition of the EIS, ongoing engagement with the adjacent land holder has identified an opportunity to reduce an unnecessary requirement to acquire an easement. Based on more accurate survey data of the cadastral boundaries a minor shift of the refined alignment by around five metres to the south of the EIS alignment is proposed.

The length of this minor shift of the proposal alignment would be up to around 10.3 kilometres and would affect the footprint of around 22 transmission line towers. No additional towers would be required for this refinement. The location of this proposed minor shift in the proposed alignment (up to around nine metres to the south) is indicated on Figure 3-1.

3.2.7. Urana alignment – west of Federation Way

3.2.7.1. EIS description of proposal

Section 5.3.1.2 of the EIS provided a general overview of the proposed alignment north of Urana which would include a section generally parallel to Coonong Road where it would cross over Federation Way. This alignment was shown on Figure 5-2d of the EIS.

3.2.7.2. Description of refinement

As a result of ongoing consultation with the Department of Planning and Environment – Biodiversity Conservation Division (DPE – BCD) as well as land holder consultation prior to and following public exhibition of the EIS, a minor refinement to the EIS alignment has been identified to the west of Federation Way at Urana where the alignment would be parallel to Coonong Road. The refined alignment would relocate up to around six kilometres of the EIS alignment up to around 150 metres north (at its maximum point of deviation near the crossing point of the proposal with Federation Way) of the EIS alignment.

The refined alignment would tie back into the EIS alignment around 300 metres east of Federation Way (on the northern side of West Gums Road).

The refined alignment was primarily driven by the request of the land holder to avoid the existing stand of River Red Gum trees on the eastern part of the property adjacent to Federation Way. This refinement would provide improved biodiversity outcomes.

Figure 3-7 shows a comparison between the EIS alignment and the refined alignment at Urana, west of Federation Way.

Figure 3-7

Figure showing revised alignment at Federation Way

EIS

- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal

- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

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Source: NSWSS, ESRI, Transgrid, WSP

3.2.8. Urana alignment – west of Boree Creek Road

3.2.8.1. EIS description of proposal

Section 5.3.1.2 of the EIS provided a general overview of the proposed alignment north of Urana which would include a section generally parallel to Gums Road where it would cross over Boree Creek. This alignment was shown on Figure 5-2e of the EIS.

3.2.8.2. Description of refinement

As a result of ongoing land holder consultation prior to and following public exhibition of the EIS, a minor refinement to the EIS alignment has been identified to the west of Boree Creek Road at Urana. Consultation with land holders impacted by the EIS alignment has noted objection to the proposal affecting the property to the north of Gums Road.

To avoid impacts to this property as far as practicable, the refined alignment would relocate around 3.1 kilometres of the EIS alignment between Barragunda Road and Boree Creek Road. At its maximum point of deviation – near the intersection of Barragunda Road and Gums Road – the refined alignment would be located around 240 metres south of the EIS alignment. The refined alignment would tie back into the EIS alignment around 300 metres east of Boree Creek Road. One additional transmission line tower would be required to accommodate this refinement.

Figure 3-8 shows a comparison between the EIS alignment and the refined alignment at Urana, west of Boree Creek Road.

3.2.9. Minor Lockhart alignment shift

Since the public exhibition of the EIS, the proposed transmission line tower locations for the EIS alignment along Strongs Lane, Lockhart were identified to be in very close proximity to the road edge.

The refined design would move one of the angle transmission line towers within the vicinity of Ben Hoffmanns Lane in order to improve safety and minimise the potential of a vehicle colliding with the previously located tower. This proposed refinement would result in the refined alignment:

- next to Strongs Lane shifting around 10 metres further to the south, therefore locating the towers parallel to Strongs Lane slightly further from the road edge
- to the south-west of Strongs Lane shifting slightly further from the co-located 99A easement.

The location of this proposed minor shift in the proposed alignment is indicated on Figure 3-1.

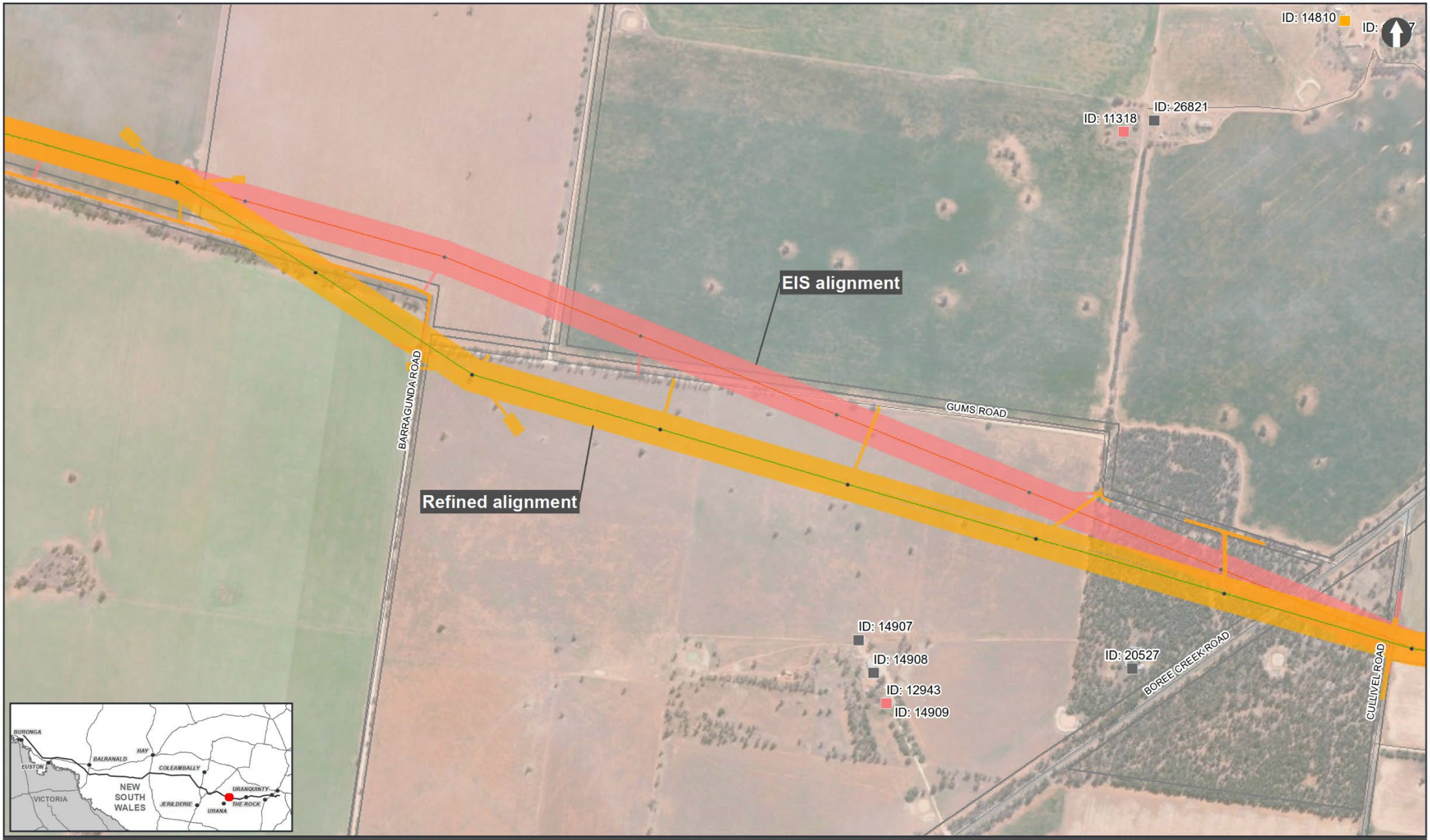

Figure 3-8

Figure showing refined alignment at Boree Creek Road

EIS
- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal
- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

Sensitive Receptors
- Community facility
- Industry facility
- Residential dwelling

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Source: NSWSS, ESRI, Transgrid, WSP

3.3. Other proposal refinements

3.3.1. Optical repeater site alignment – Booroorban

Section 5.3.6.1 of the EIS identified the need for three optical repeater sites along the length of the proposal. For the Booroorban site, this included:

- connection of a proposed communication hut to an existing Essential Energy transmission line to the north of the alignment. The connection would require:
    - around two kilometres of new overhead electrical infrastructure (overhead wires and around 10 new poles at regular spacings) within a 25-metre easement
    - installation of a new pole-mounted transformer adjacent to the communications hut for connection.

Figure 5-9 of the EIS identified an alignment for the new overhead electrical infrastructure easement connecting the communication hut and the existing Essential Energy transmission line. The EIS alignment identified the proposed overhead electrical infrastructure within an existing 'paper road' to the north of Booroorban-Tchelery Road.

It is proposed that the new overhead electrical infrastructure easement now be located to the east of the identified 'paper road' corridor (directly adjacent to the EIS alignment for this infrastructure) into the adjoining private property. This change has been made to ensure the affected land holder is able to be appropriately compensated for the new easement.

Figure 3-9 shows a comparison between the EIS alignment and the refined alignment for the optical repeater site overhead electrical infrastructure.

3.3.2. Additional tower – Colombo Creek

One additional tower has been identified as being required to the east of Colombo Creek. The additional tower is required to ensure that the conductors between the towers remain within the identified easement. The previous design which provided only two transmission line was identified as not achieving this outcome.

While consistent with other additional or refined tower locations along the alignment of the proposal, the proposed new tower to the east of Colombo Creek would be required to be located within a previously identified Potential Archaeological Deposit (PAD) at this location.

Figure 3-10 shows the location of the proposed additional transmission line tower in relation to the identified PAD site, east of Colombo Creek.

Figure 3-9

Figure showing comparison of the existing and refined alignments at Booroorban for the optical repeater site overhead electrical infrastructure

EIS

- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal

- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

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Source: NSWSS, ESRI, Transgrid, WSP

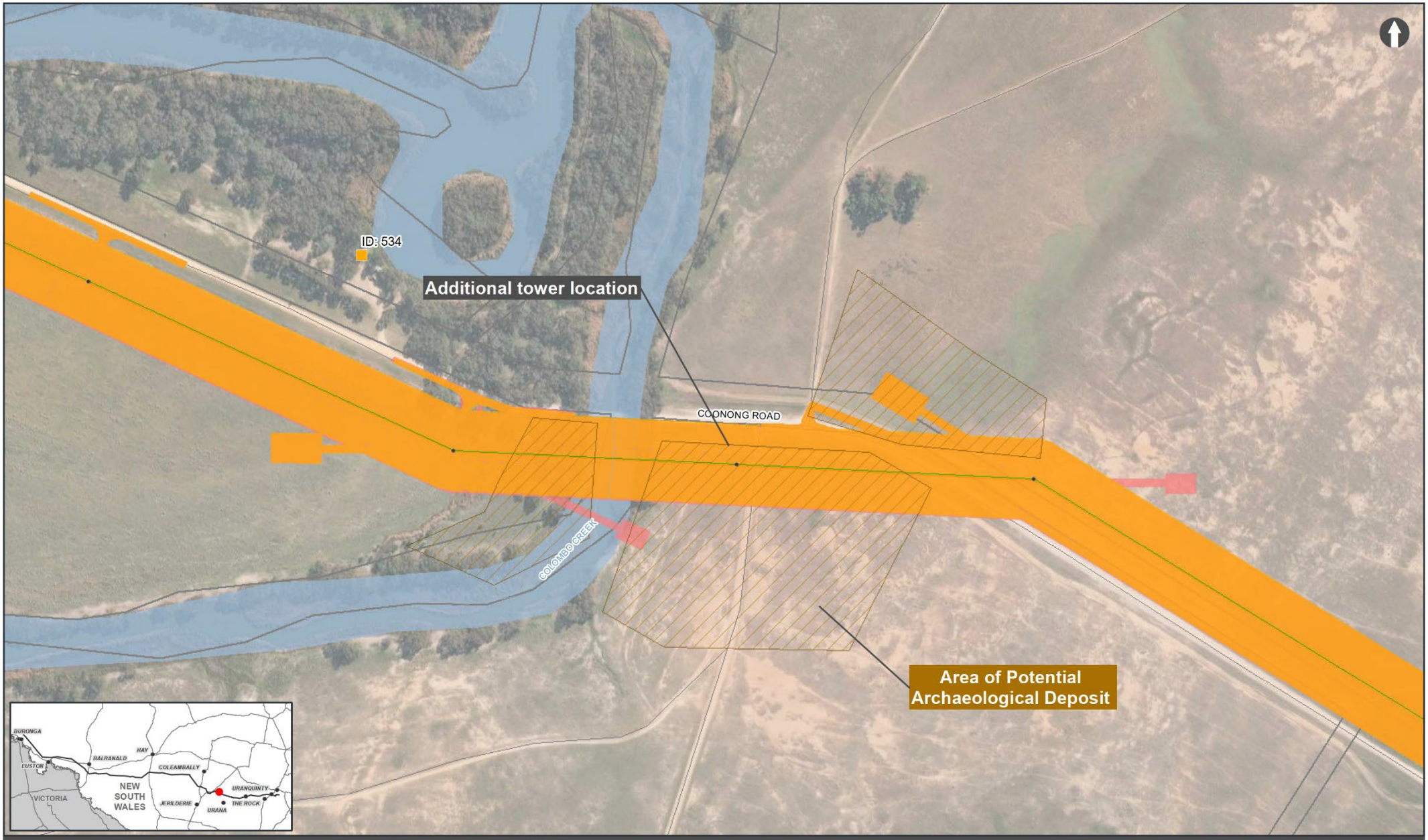

Figure 3-10

Figure showing location of additional tower east of Columbo Creek within identified PAD area

EIS
- EIS Alignment
- EIS Proposed Tower Locations
- EIS Construction Impact Area

Refined Proposal
- Refined Alignment
- Refined Proposed Transmission Line Tower Locations
- Refined Construction Impact Area

- Potential Archaeological Deposit

Sensitive Receptors
- Community facility

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Source: NSWSS, ESRI, Transgrid, WSP

3.3.3. General longitudinal shifting of tower locations

As a result of ongoing refinement to the design of the proposal since public exhibition of the EIS, and consistent with various mitigation measures presented in EIS Appendix E (Summary mitigation measures), a number of the transmission line towers along the alignment have been refined. The tower locations have been refined to provide additional avoidance of environmental constraints (predominantly biodiversity and Aboriginal heritage) and to optimise the overall design for the proposal. Predominantly these shifts in tower locations:

- have occurred longitudinally along the length of the alignment; or
- have included the movement of the material staging and construction areas from their original location to the other side of the tower base.

These refinements are all within the construction impact footprint identified within the EIS. The overall impact of the refined transmission line tower locations has been captured as part of the final revised construction impact area that is presented in Section 3.4.2.2 and in the Submissions Report Appendix D. Further refinements may also occur as part of the ongoing finalisation of the design of the proposal to further minimise potential impacts.

3.4. Proposal construction

3.4.1. Construction compound and accommodation camp sites

3.4.1.1. Lockhart

Section 6.7.1.4 of the EIS noted that at the time of writing, two construction compound and accommodation camp site options at Lockhart were being considered. These sites were identified as being to the north east (County-Boundary Road site) and west (Urana-Lockhart Road site) of the Lockhart township. The Lockhart construction compound and accommodation camp site would provide primary support for the construction of the central east and eastern sections of the proposal (generally west of Coonong Road to the Bullenbong Road, north of the township of The Rock) as well as worker accommodation.

Following public exhibition of the EIS, ongoing consultation with the land holders of the two sites has determined that the preferred site for the construction compound and accommodation camp sites at Lockhart is the County-Boundary Road site to the north east of the Lockhart township. The Urana-Lockhart Road site has therefore been removed from the scope of the proposal.

3.4.1.2. Cobb Highway

As described in section 6.7.1.2 of the EIS, the proposed Cobb Highway main construction compound and accommodation camp site would be located along the western side of the Cobb Highway around five kilometres to the south of the alignment of the proposal. As part of the ongoing heritage survey and field investigations that have been undertaken following public exhibition of the EIS, an area of PAD has been identified at the location of the previously proposed construction compound and accommodation camp site.

In order to minimise potential impacts to this PAD, a revised site arrangement for the construction compound and accommodation camp has been developed. The revised arrangement is shown in Figure 3-11.

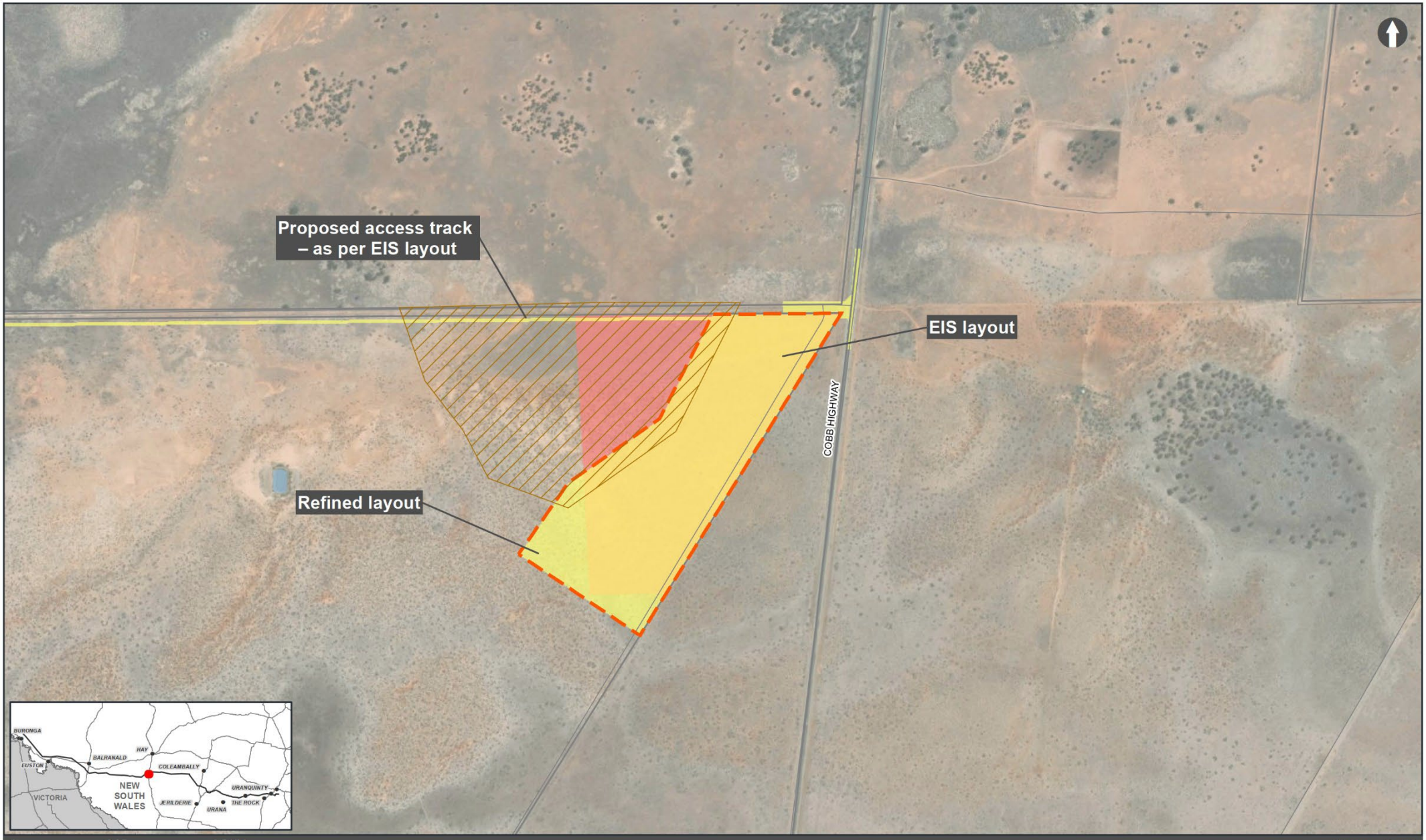

Figure 3-11

EIS constuction compound and accommodation camp site

Refined constuction compound and accommodation camp site

Revised Construction Impact Area

Potential Achaeological Deposit

Figure showing the revised site arrangement for the construction compound and accommodation camp site at Cobb Highway

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Source: NSWSS, ESRI, Transgrid, WSP

3.4.2. Water supply points

3.4.2.1. Additional water supply points

As described in Section 6.9.2 of the EIS, 26 sources of water were identified along the length of the proposal which were intended to support the construction water needs for the proposal.

Further development of the construction methodology for the proposal, and ongoing consultation with water suppliers and land holders since public exhibition of the EIS have identified 16 additional water supply points which may be utilised during the construction of the proposal. These additional water supply points may be utilised in addition to the water supply points identified in the EIS. The additional water supply points are listed in Table 3-1 and shown in Figure 3-12.

Table 3-1 Additional indicative water supply points

Location	Water supplier	Type of water supply	Typical use	Connection type	Average number of fills per day (trucks/[total movements])
Ravensworth	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	5 [10]
Moulamein Road, Moulamein	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	5 [10]
Cooinbil, Four Corners Road, Coleambally	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	3 [6]
1254 Four Corners Road Coleambally	Private	Both	Dust suppression, earthworks, washdown	Existing	5 [10]
Wonga	Private	Both	Dust suppression, earthworks, washdown	Existing	5 [10]
Lucerne at Balranald	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	5 [10]
394 Hay Road, Deniliquin	Edward River Council	Potable	Office/Welfare	Existing	5 [10]
Lockhart-Collinguille Road, Lockhart	Riverina Water	Potable	All proposed uses	New piped connection under Collinguille Road	N/A
North Bundy, Booroorban-Tchelery Road, Booroorban	Private	Non-potable	Dust suppression, earthworks, washdown	Dam	5 [10]
Cadell Road, Coleambally	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	10 [20]

Location	Water supplier	Type of water supply	Typical use	Connection type	Average number of fills per day (trucks/[total movements])
Mclennons Bore Road, Coleambally	Private	Non-potable	All proposed uses	Existing	10 [20]
Four Corners Road, Mabins Well	Private	Non-potable	All proposed uses	TBC	5 [10]
Red Swamp/ Dinawan Substation	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	15 [30]
Red Swamp/ Dinawan Substation	Private	Non-potable	Dust suppression, earthworks, washdown	Dam	10 [20]
Newell Highway, Bundure	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	10 [20]
Keri Keri Road, Kerri, Kerri	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	5 [10]

The identified sources and volumes available for supply to the proposal would be confirmed during ongoing negotiations with each water supplier. Each of the additional water supply points identified have been confirmed as being located along traffic routes that were identified and assessed previously as part of the EIS.

As with the description provided in the EIS, the additional water supply would be from existing regulated sources. Water from the additional supply points would be purchased from the existing water market within the region or from local council facilities. Access to these sources would occur through the use of existing licensed water extraction infrastructure only. No new extraction infrastructure from existing water sources is proposed as part of the additional water supply points proposed.

The proposed connections may require some works to ensure that the water fill point is suitable for the intended use. Water supply points typically require water infrastructure to be installed or modified (based on the recommendations of the water supply authority), vehicle access and vehicle turn-arounds. The vehicle access and turnarounds would either need to be installed, widened and/or maintained. This may require some clearing (as required), grading, rolling and/or compaction which would be confirmed, and the impacts of which assessed for consistency with the planning approval, as part of the refinement of the proposal design and construction methodology.

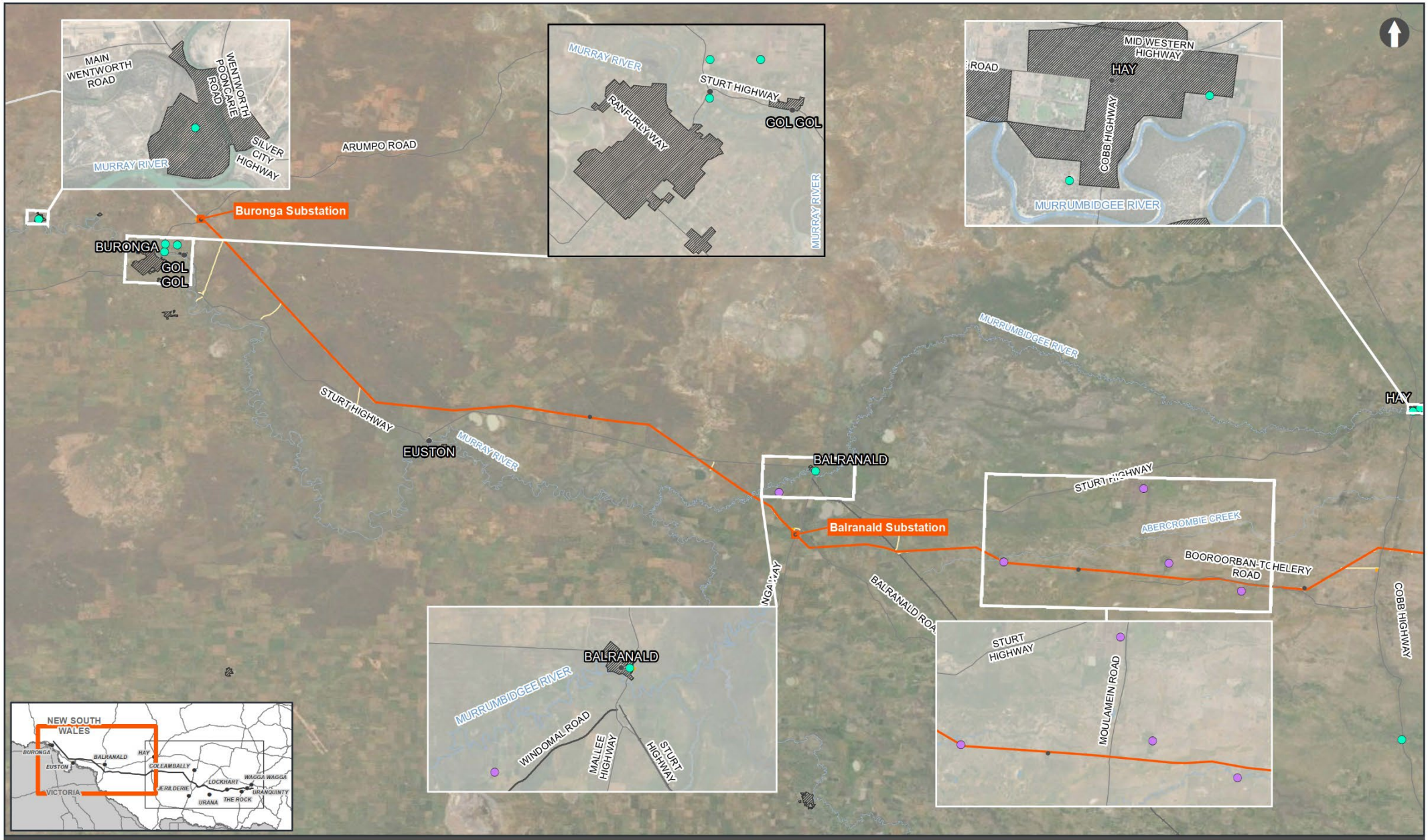

Figure 3-12a

Indicative water supply points (including additional locations)

Sheet 1 of 2

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Main Construction Compounds and Accommodation Sites
- Access Tracks
- Water supply points - EIS
- Additional water supply points
- Existing Substation
- Existing Railway
- Built Up Areas
- Waterbody

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Source: NSWSS, ESRI, Transgrid, WSP

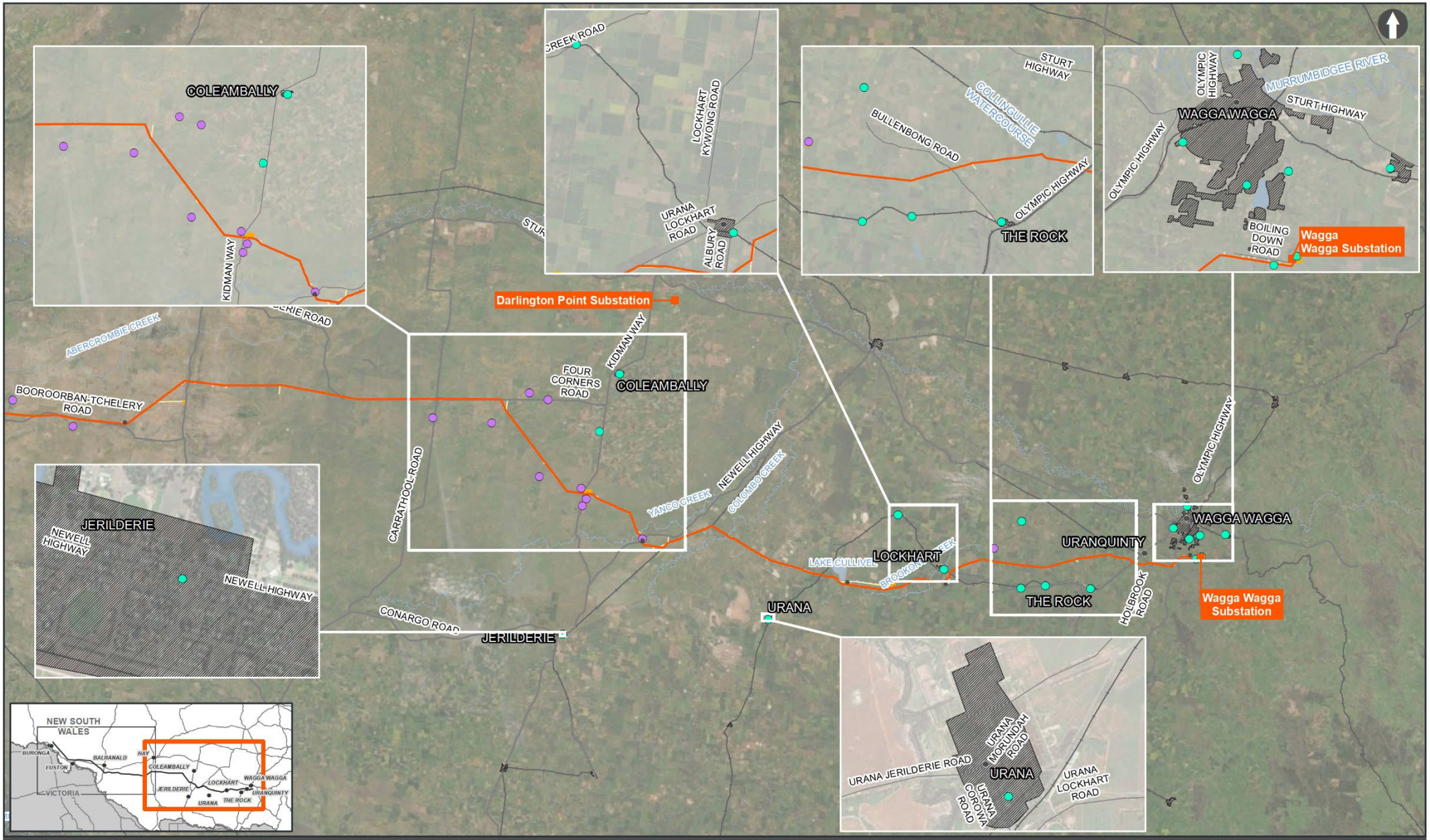

Figure 3-12b

Indicative water supply points (including additional locations)

- EnergyConnect (NSW - Eastern section)
- EnergyConnect (NSW - Western section)
- Main Construction Compounds and Accommodation Sites
- Access Tracks
- Water supply points - EIS
- Additional water supply points
- Existing Substation
- Existing Railway
- Built Up Areas
- Waterbody

Sheet 2 of 2

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Source: NSWSS, ESRI, Transgrid, WSP

3.4.2.2. Removal of proposed water supply points

Section 6.9.2 of the EIS identified a number of proposed water supply points including the following three sites within the Wagga Wagga City local government area:

- Kooringal Sewage Treatment Plant
- Narrung Sewage Treatment Works
- Gregadoo Waste Management.

Since public exhibition of the EIS, ongoing consultation with Wagga Wagga Shire Council in March 2022 has been undertaken to discuss the potential for use of wastewater from these facilities during construction of the proposal. While Wagga Wagga City Council was supportive of the reuse of water from these facilities, it advised that the existing wastewater output was not of a suitable quality to meet the EPA licence requirements for use in dust suppression activities or other construction uses in its current treatment state. To meet the required output quality, additional works would be required at each of these facilities to improve the treatment of the existing wastewater. In consideration of these requirements, Transgrid and SecureEnergy have proposed that these three water supply points would no longer by utilised as part of the overall water supply strategy for the proposal.

A consolidated list of proposed water supply points is provided in the updated proposal description (construction) chapter provided in Appendix B of this Amendment Report.

3.4.3. Construction impact area refinements

As a result of ongoing refinement to the design and construction methodology of the proposal since public exhibition of the EIS, and consistent with the mitigation measures presented in Appendix E of the EIS, the overall construction impact area has been refined. The refinements have arisen as a result of:

- refinements of the proposal alignment
- changes to the construction methodology, including confirmation of the preferred construction compound and accommodation camp site at Lockhart
- changes to avoid features of high biodiversity and heritage conservation significance
- removal or refinement of access points and access tracks, to accommodate the refined alignment
- rationalisation of proposed brake and winch sites
- changes to footprints for transmission line towers (predominantly as a result of longitudinal shifting of tower locations)
- inclusion of additional water supply points.

The overall construction impact area has been recalculated to account for refinements to the design. This revised construction impact area is captured in Appendix D, and has been utilised for the updated biodiversity and Aboriginal heritage impact assessments as part of the Submissions Report. These updated assessments are included as supplementary technical papers 1 and 2 respectively to support the Submissions Report and Amendment Report.

3.5. Consideration of additional information and clarifications

The following section includes consideration of additional information that has been made available following the public exhibition of the EIS and provides some clarifications to information presented in the EIS.

3.5.1. Cumulative impact update

Chapter 23 of the EIS considered the potential cumulative impacts of the proposal in relation to other known projects and proposals within the region. This EIS presented known, public information available at the time of the writing of the EIS. Following public exhibition of the EIS, additional information regarding the Buronga Landfill Expansion project has become available. The EIS for this project was placed on public exhibition for review and comment on 22 February 2022.

A review of the proposed impacts of the Buronga Landfill Expansion project identified that the cumulative assessment presented in section 23.2.3 of the EIS would not change as a result of the additional information made available in the EIS documentation.

3.5.2. New mineral exploration licence

Following public exhibition of the EIS, an additional Minerals Exploration Licence application was lodged for an area located along the proposal alignment generally between the Newell Highway at Bundure and Urana-Lockhart Road to the west of Lockhart (refer to the blue shaded area in Figure 3-13).

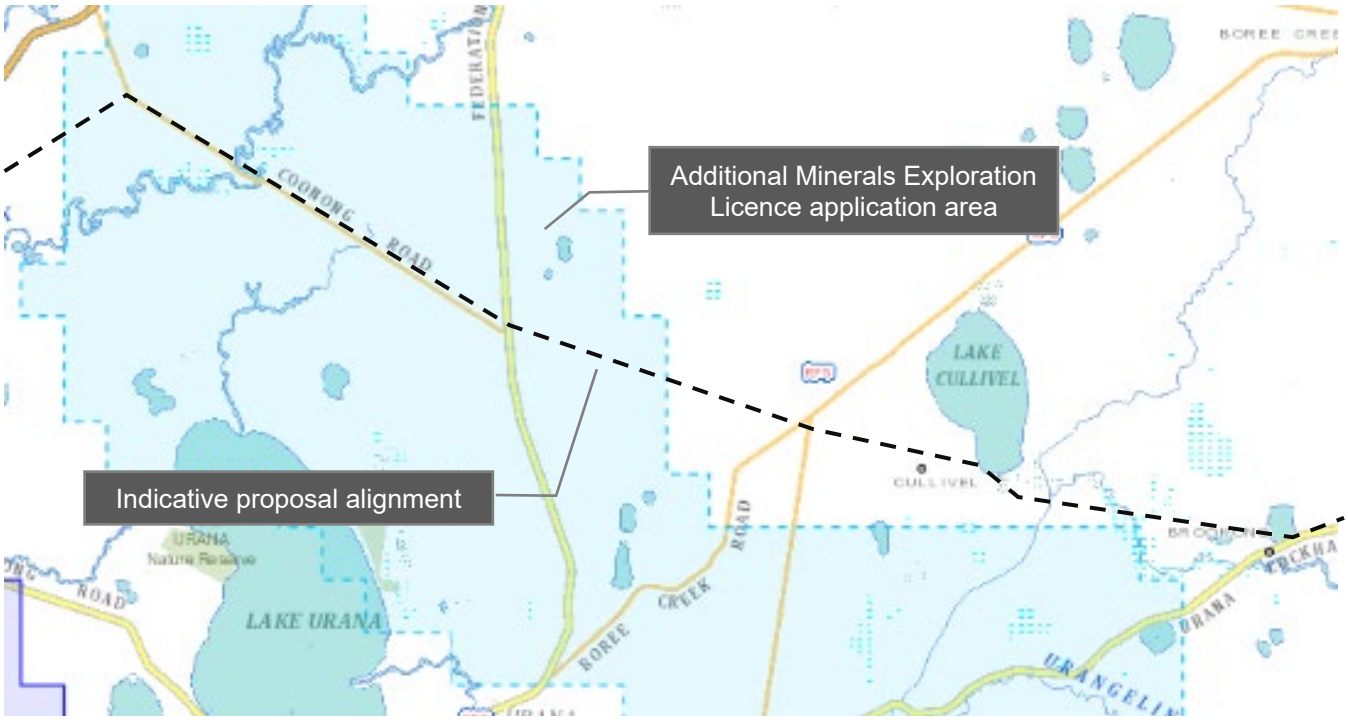

Figure 3-13 Figure showing additional mining exploration licence application area

As identified in section 12.3.1 of the EIS, the alignment of the proposal would intersect with a number of existing mining, mining lease and mining exploration areas. Transgrid is consulting with the relevant stakeholder representatives for the minerals exploration applications to advise them of any potential impacts that the proposal may have on this area. This an additional Minerals Exploration Licence application does not change the findings presented in the EIS.

3.5.3. Construction haulage routes

Section 6.11.3.1 and Figure 6-12 the EIS identified the primary, secondary and water haulage routes that would be used during construction. This information was also presented in Technical paper 11 – Traffic and transport impact assessment, including Table 5-12 of the technical paper.

Following public exhibition of the EIS, a number of discrepancies or errors were identified within the figures and/or tables that assigned roads to the primary, secondary or water haulage categories.

Table 3-2 summarises the roads that have been clarified in order to align with the haulage routes categories as described in Section 6.11.3.1 of the EIS, or to ensure consistency with the figures that depict the construction haulage network. Importantly, the volume (daily and peak) of heavy or light vehicles travelling along these roads, and the duration of use does not change as a consequence of these clarifications. Figure 6-12 of the EIS has been corrected as required to reflect these changes (refer to Appendix B). The assessment of potential construction traffic impacts would not change as a result of the correction.

In addition to the below changes, Figure 6-12 of the EIS (refer to Appendix B) has now been corrected to show the full length of Morundah Road within the Murrumbidgee local government area. This regional sealed road, alongside other connecting roads (such as Yamma Road) provides an east-west corridor between Kidman Way and the Newell Highway and road further east.

Table 3-2 Clarifications to the construction haulage road classifications

Road and classification	Description of change
Wentworth local government area	
Alcheringa Drive (local)	This road had been identified in figures as a water supply route but was not identified in Table 6-8 of the EIS. This road had been grouped with Corbett Avenue within the transport and traffic impact assessment.
Balranald local government area	
Balranald-Tooleybuc Road (state)	This road was identified in the EIS as Yanga Way. This road is also known as Balranald-Tooleybuc Road and this road name has been added for clarification.
Church Street (local)	Correction from a secondary to primary haulage road as this road serves as access to the main construction compound and accommodation camp option.
Murray River local government area	
Kerri Kerri Road (local)	Corrections made to assignment of the northern and southern section of this road in Table 5-12 of EIS Technical Paper 11 to align with Figure 6-8 of the EIS. This has not altered the category of the road.
Moulamein Road (regional)	Correction from a secondary to primary haulage road. These regional, sealed roads provide a key connection to other primary roads.
Tallow Street (regional)	

Road and classification	Description of change
Hay local government area	
West Burrabogie Road (local)	Correction from a secondary to primary haulage road as it provides access between main construction compounds as well as the transmission line.
Edward River local government area	
Booroorban-Tchelery Road (local)	Correction from a primary to secondary haulage road as it only serves to provide access to the transmission line.
Carrathool Road (local)	The classification of this road has been split at its intersection with Moonbria Road to reflect the change in category. The section to the north of Moonbria Road intersection has been changed from a primary to secondary haulage road. The residual section of the road remains a primary haulage road.
Finley Street (state)	Correction from secondary to primary haulage roads. These state and regional roads provide connections to other nominated primary haulage roads within Deniliquin.
Wanderer Street (regional)	
Murrumbidgee local government area	
Kidman Way (near Morundah Road) (state)	Correction to a primary haulage road for the full length of Kidman Way. The road had been incorrectly identified as a water or secondary haulage road.
Kidman Way (near Sturt Highway) (state)	
Conargo Road (near Sturt Highway)	Correction from a primary haulage road to a secondary haulage road. This road has been correctly depicted as a secondary road in Figure 6-12 but identified as a primary haulage road in Table 6-8.
Federation local government area	
Back Berrigan Road (regional)	Correction from primary to secondary haulage roads.
Battens Road (local)	
Berrigan Oaklands Road (local)	
Federation Way (north of Urana) (regional)	Correction from a secondary to primary haulage road. This road provides key regional north-south movements for construction vehicles.
Federation Way (south of Urana) (regional)	
Woodhouse Street (regional)	Correction from secondary to primary haulage road. This road provides a connection between William Street and Federation Way (both primary haulage roads).
Riverina Highway (north of Corowa) (State)	Correction from secondary to primary haulage roads as both roads were identified in the EIS as providing port access from the south.
Honour Ave (State)	

Road and classification	Description of change
Lockhart local government area	
Andriskes Lane (local)	Correction from water to secondary haulage road as it provides access to the transmission line.
***French Park-Bullenbung Road** (local)*	
***Hendersons Road** (local)*	
***Lockhart Boree Creek Road** (local)*	
Lockhart-Kywong Road (local)	
Dunlevys Lane (local)	Correction from a primary to secondary haulage road as it provides access to the transmission line.
***Green Street** (local)*	Correction from a water to secondary haulage road. This road within Lockhart provides a link between other secondary haulage roads and was identified as a water route in error.
Reid Street (regional)	Correction from a secondary to primary haulage road. This road provides a connection between East St/Urana-Lockhart Road (both primary haulage roads) and is the signposted detour of the town centre.
Wagga Wagga local government area	
Dunns Road (local)	Correction from secondary and/or water to primary haulage routes reflect the regional connections to the main construction compound and substation upgrade site at Wagga Wagga.
Elizabeth Avenue (local)	
Gregadoo Road (local)	
Inglewood Road (local)	
Olympic Highway (State)	
Yarragundry Street (local)	Correction from a primary to secondary haulage road.

3.5.4. Operational noise impacts

Table 6-7 of the *Noise and vibration impact assessment* (Technical assessment 10) (WSP, 2021) supporting the EIS identified the predicted noise impacts during operation that had been determined based on guidance provided in *NSW Noise Policy for Industry* (EPA, 2017).

Following field validation of the potentially impacted sensitive receivers following public exhibition of the EIS, three of the sensitive receivers identified as potentially being exposed to moderately significant noise impacts during operation have been confirmed as not being residential dwellings, but associated sheds and other structures. As such, the overall number of operationally impacted receivers due to noise impacts associated with the proposal would be reduced by three. An updated version of the Table 6-7 has been reproduced below as Table 3-3 (showing the removed sensitive receivers and revised number of receivers impacted).

Table 3-3 Significance of audible noise impact per NPfI

Significance of noise impact	Number of receivers	List of receivers (ID)
330kV (Base) Buronga substation to Dinawan substation and 500kV (Base) Dinawan substation to Wagga Wagga substation		
Negligible	6	20522, 12942, 450, 313, 500, 259
Marginal	0	
Moderate	~~6~~ 3	422, ~~208~~, ~~26750~~, 504, ~~27028~~, 202
Significant	2	385, 26749
Total	**~~14~~ 11**	
330kV (Base + 1% SVG) Buronga substation to Dinawan substation and 500kV (Base + 1% SVG) Dinawan substation to Wagga Wagga substation		
Negligible	12	20519, 461, 468, 26908, 26907, 211, 279, 313, 186, 20533, 500, 259
Marginal	0	
Moderate	~~9~~ 6	422, 20522, 12942, 450, ~~208~~, ~~26750~~, 504, ~~27028~~, 202
Significant	2	385, 26749
Total	**~~23~~ 20**	

The identified construction noise impacts for the three removed receivers would also no longer occur.

3.5.5. Morundah Road clarification

There are several sensitive receivers located along the section of Morundah Road that were not correctly identified in the EIS as being used by the proposal (refer to Section 3.5.3 for more information). The closest sensitive receiver to the corrected section road is estimated at 75 metres from the road.

As described in the EIS, construction vehicles would intermittently use this section of Morundah Road with around three vehicle movements during the peak hour (in one direction), consisting of two light vehicles and one heavy vehicle. This low volume would occur during typical and peak construction periods. Rural roads such as these typically carry up to around 20 vehicles per hour (per direction). Table 5.12 of Technical paper 11 – Traffic and transport impact assessment provides the assessment for this road and the clarification does not change the outcomes of this assessment.

Morundah Road forms part of an east-west corridor and would carry the same volume of construction traffic as the connecting roads of Yamma Road (a regional, sealed road) and McDonald Road (a local, unsealed road). The construction noise assessment is the EIS identified that construction vehicles on these roads would result in a maximum increase of 4.8 dB at the nearest receivers (resulting in a low risk of construction noise impacts). As receivers along Morundah Road are marginally further away from the road compared to those on Yamma Road and Mcdonald Road, the maximum increase at the nearest receiver would be similar. Any noise contribution would be intermittent as the road would not be used daily by construction vehicles.

With respect to air quality impacts from construction haulage, this section of road is sealed. As outlined in Section 5.3.3 of Technical paper 9 – Air quality impact assessment, sensitive receivers could be potentially impacted by dust on sealed roads during dry conditions that is generated in the wake of construction vehicles. Any such impacts would be short duration, intermittent and would occur infrequently.

4. Statutory context

This chapter provides an overview of the statutory context for the proposal and provides a summary of the statutory requirement changes that would occur as a result of the proposed design refinements.

4.1. NSW assessment and approval process

The NSW Minister for Planning declared the NSW portions of EnergyConnect to be Critical State significant infrastructure (CSSI) under section 5.13 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) and by amendment to Schedule 5, clause 15 of the NSW *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) (formerly *State Environmental Planning Policy (State and Regional Development) 2011*). As a CSSI project, the proposal requires approval from the NSW Minister for Planning under Division 5.2, Part 5 of the EP&A Act.

An EIS was prepared to support Transgrid's application for approval of the proposal in accordance with the requirements of Division 5.2 of the EP&A Act. As described in Section 1.3, the EIS was placed on public exhibition for a period of 28 days, commencing 19 January 2022 and concluding on 15 February 2022. During the exhibition period, interested stakeholders and members of the community were able to review the EIS online or at display locations, participate in consultation and engagement activities, and make a written submission to the DPE for consideration in its assessment of the proposal.

In accordance with clause 179(2) of the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), an application may, with the approval of the Planning Secretary, be amended at any time before the application is determined. This Amendment Report outlines the proposed design and construction refinements to the proposal (the refined proposal) and assesses the associated environmental impacts.

4.1.1. Commonwealth assessment and approval process

A referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was also submitted on 25 August 2020. The Australian Department of Agriculture, Water and the Environment (DAWE) determined the proposal to be a controlled action on 30 September 2020 and that it would be assessed using the bilateral assessment process. As such, the proposal also requires approval from the Australian Minister for the Environment under the EPBC Act. This Amendment Report would be provided to DAWE as part of the package of information to allow them to make their determination regarding the proposal.

An overview of both the NSW and Commonwealth planning approvals process and current status of the proposal application within this process is shown in Figure 4-1. Further detail regarding the overall legislative approval processes that apply to the proposal is provided in Appendix C of the EIS.

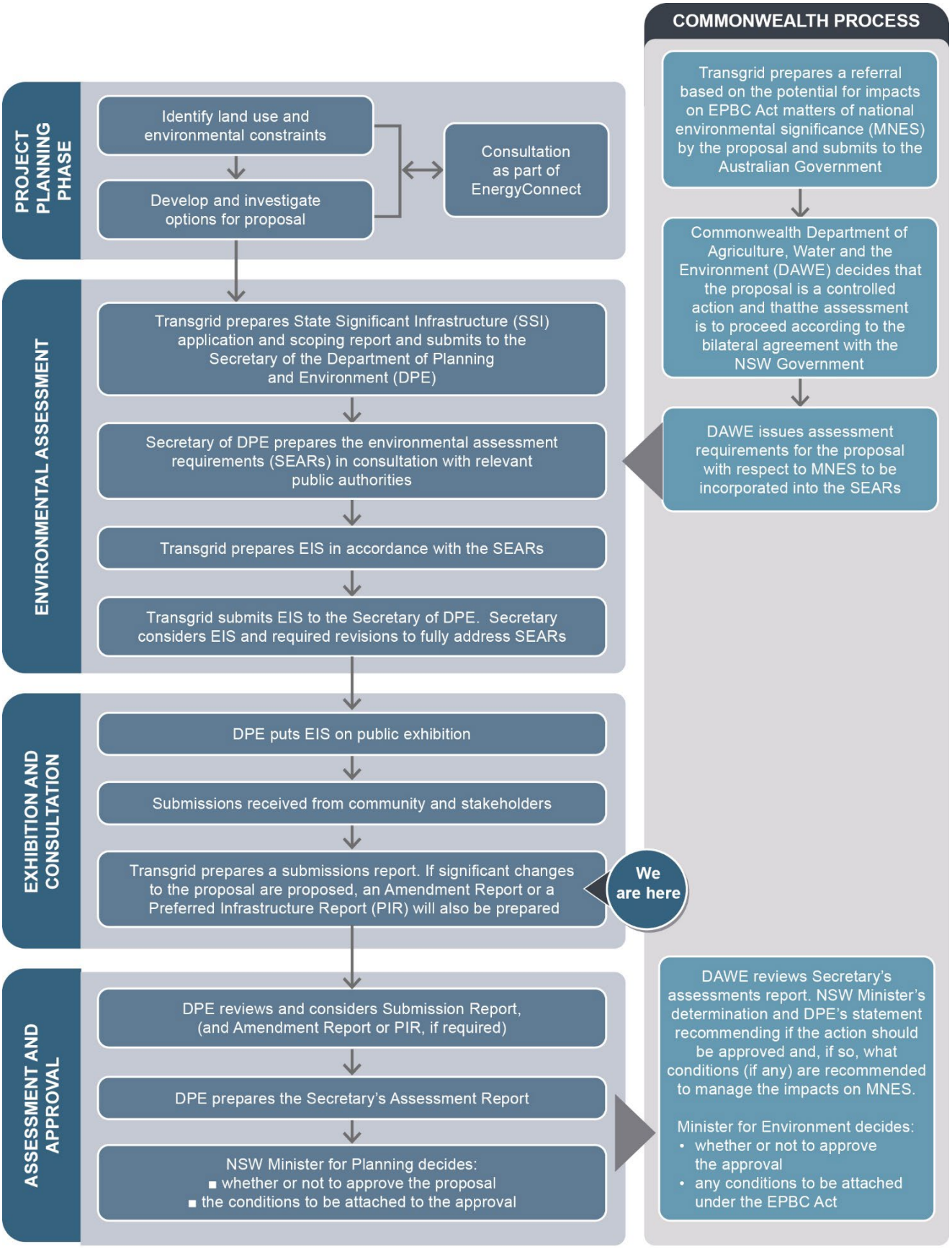

Figure 4-1 Planning approvals process

5. Engagement

This chapter describes the stakeholder engagement and other consultation activities undertaken following the public exhibition of the EIS and development of the proposal refinements.

5.1. Consultation following public exhibition of the EIS

Since the lodgement of the EIS in December 2021, the following consultation activities have been undertaken with relevant stakeholders:

- ongoing land holder consultation with a number of land holders along the proposal alignment
- consultation with local businesses such as SST Trimble regarding the ongoing investigations associated with potential GPS interference
- consultation with Government agencies and local councils to discuss issues raised in their submissions during public exhibition of the EIS. including:
  - Office of Sussan Ley – Member of Parliament for Farrer (21 March 2022)
  - Murrumbidgee Council (21 March 2022)
  - Riverina Emergency Management Committee (22 March 2022)
  - Lockhart Shire Council (22 March 2022)
  - Federation Council (22 March 2022)
- onsite visual impact assessments of around 20 properties was undertaken in the last two weeks of February 2022 where a Transgrid Community Engagement Officer was also present to speak with land holders and answer any questions about the proposal.

5.2. Consultation during development of the refined proposal

Chapter 7 of the EIS described the consultation that was carried out prior to the public exhibition of the EIS and the consultation activities that were proposed as part of the public exhibition of the EIS. Further details of community consultation during the exhibition of the EIS are described in Chapter 3 of the Submissions Report which has been prepared in parallel to this Amendment Report.

This chapter provides a summary of the consultation that has been carried out following the public exhibition of the EIS, specifically regarding the proposed design refinements described in Chapter 3 of this Amendment Report. A number of consultation and engagement activities have been carried out following the public exhibition of the EIS with a range of stakeholders including the directly impacted land holders and residents, relevant government authorities, relevant local councils, water suppliers, and Aboriginal stakeholders.

Key consultation activities that have been carried out regarding the proposed design refinements are summarised in the following sections.

5.2.1. Community consultation

Since the public exhibition of the EIS, engagement activities have been focused on direct liaison with impacted property owners (and adjacent property owners) and relevant government agencies and other relevant parties in relation to acquisition and refinements to the design of the proposal.

Section 5.3 of this Amendment Report outlines the proposed ongoing community consultation and engagement activities for the proposal (subject to project approval).

5.2.2. Directly impacted land holders and residents

Additional (or changed areas of previously identified) privately owned land would be impacted in order to accommodate the refined proposal. Transgrid has continued to engage with all directly impacted and potentially impacted land holders of the refined proposal from mid-February 2022 until April 2022. This has included both written communication/notification and face-to-face sessions with impacted land holders to discuss the relevant refinements to the proposal and the potential change in impacts or changes to any easements/acquisition of private property to accommodate the refined proposal in comparison to the impacts identified in the EIS.

From the consultation undertaken with impacted land holders, the following key responses/issues are noted:

- where a realignment of the proposal has occurred, the refined alignment section has been developed in consultation/agreement with the directly affected land holder. This has included refinements which have occurred both within a previously affected property as well as where a proposed refinement has resulted in affecting an additional land holding
- in principal agreement has been reached for a majority of the identified alignment refinements. Where agreement has not yet been confirmed, ongoing engagement is still being undertaken
- where appropriate, notification of the proposed refinement has been provided to adjoining land holders for information
- no new or additional key issues have been identified by the directly affected land holders as a result of the ongoing consultation.

5.2.3. Public authorities

5.2.3.1. NSW Department of Planning and Environment – Biodiversity Conservation Division

A number of briefings and discussions have been undertaken between the project team and Department of Planning and Environment – Biodiversity Conservation Division (DPE – BCD) following exhibition of the EIS.

Formal discussions were held with DPE – BCD on 4 April 2022 and 12 April 2022 to discuss the proposed response to the issues raised in their submission (refer to Section 4.2.3 of the Submissions Report) as well as outline the key design refinements proposed to the proposal and seek feedback on these refinements. Key items discussed as part of the meetings in relation to the proposed design refinements included:

- acknowledgement to DPE – BCD that the *Revised Biodiversity Development Assessment Report* would take into account all of the proposed design refinements that were being considered
- any changes in impacts would also be presented in the Amendment Report (refer to Section 6.2), noting that there were no real substantial increase in impacts expected as a result of the proposed refinements
- DPE – BCD identified that they would review the proposed changes in a holistic manner in combination with overall *Revised Biodiversity Development Assessment Report*.

5.2.3.2. Heritage NSW

Discussions and briefings and have been undertaken between the project team and NSW Heritage during and following exhibition of the EIS.

Formal discussion was held with Heritage NSW on 7 March 2022 to discuss the proposed response to the issues raised in their submission (refer to Section 4.2.11 of the Submissions Report), the key design refinements proposed and seek feedback on these refinements. Key issues/outcomes raised as a result of the meetings have included:

- acknowledgement to Heritage NSW that the *Revised Aboriginal Cultural Heritage Assessment Report* would take into account all of the proposed design refinements that were being considered
- any changes in impacts would also be presented in the Amendment Report (refer to Section 6.3), noting that there were no real substantial increase in impacts expected as a result of the proposed refinements, and that the proposed refinements such as at Lake Cullivel would result in reduced impacts
- Heritage NSW identified that they would review the proposed changes as part of the overall *Revised Aboriginal Cultural Heritage Assessment Report*
- discussion regarding the approach to the heritage test excavations, the proposed program of these works and the proposed inclusion of the results as part of the response to submissions phase (detailed further in section 3.3.2 of the Submissions Report and supplementary technical assessment 2).

5.2.3.3. Local councils

Given the proposed design refinements did not materially affect the issues previously raised by the local councils within which the proposed design refinements would be located, no formal consultation regarding the proposed design refinements was considered necessary.

Further discussion regarding the broader consultation activities undertaken with local councils since exhibition of the EIS is presented in section 3.1 of the Submissions Report.

5.2.4. Aboriginal stakeholders

As part of the ongoing development of the refined proposal, consultation has continued with representatives of the Aboriginal community in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2020* (Office of Environment and Heritage, 2020). As part of this process, the Registered Aboriginal Parties (RAPs) who were involved with the development of the EIS were provided the opportunity to take part in the additional cultural surveys of the locations that were surveyed as part of the post-public exhibition period and which included areas impacted by the refined proposal.

The RAPs were also provided with a draft copy of the *Revised Aboriginal Cultural Heritage Assessment Report* (Navin Officer, 2022) with an invitation to provide comment on the outcomes of the revised cultural heritage assessment and consideration of the refined proposal between 14 April 2022 and 12 May 2022. Additionally, a number of sessions (online meetings between RAPs and the project team) were held in April and May 2022 to provide a briefing on the revised report.

Overall, the additional consultation did not raise any substantial concerns from the RAP members, with a majority of the representatives that provided feedback generally supporting the recommendations/ mitigation measures proposed for the project. Some concern was however raised regarding the ongoing potential for the project to cause harm to Aboriginal Ancestral places of significance. Further detail regarding the additional consultation and feedback received from RAPs as part of the refined proposal is provided in Section 5.7 of the *Revised Aboriginal Cultural Heritage Assessment Report* (refer to supplementary technical assessment 2).

Transgrid will continue to consult with the Aboriginal community throughout the proposal, including (but not limited to) if any Aboriginal objects are unexpectedly found during construction.

5.2.5. Water suppliers

Following public exhibition of the EIS, the nominated construction contractor SecureEnergy, have continued ongoing discussions with a range of potential water suppliers to provide additional clarity in relation to access to potable and non-potable water during construction. These ongoing discussions have resulted in the identification of an additional 16 water supply points which may be utilised during the construction of the proposal (refer to Section 3.4.2 of this Amendment Report).

While Transgrid and SecureEnergy are yet to enter into formal agreement(s) with the respective water suppliers, consultation to date has identified that the necessary water volumes to provide sufficient water entitlements are likely to be available when required from the identified supply points. Transgrid and SecureEnergy are continuing to liaise with all water providers in relation to securing sufficient water entitlements and formalise agreements for water licencing and access arrangements.

5.3. Ongoing consultation

Consultation with the community and key stakeholders is ongoing, and would continue in the lead up to and during construction of the proposal (subject to approval). Ongoing consultation activities would aim to provide:

- the community and stakeholders with a high level of awareness of all processes and activities associated with construction of the proposal
- updates on the proposed timing of construction
- accurate and accessible information and a timely response to issues and concerns raised by the community
- opportunities for feedback and input.

The EnergyConnect phone number and email address will continue to be available during construction. Targeted consultation methods, such as letters, notifications, signage and face-to-face communications, will also continue to occur. The Transgrid webpage and social media platforms will also include updates on the progress of the proposal.

SecureEnergy, the nominated construction contractor, has prepared a community engagement and communication strategy. The strategy outlines the continued engagement approach with all members of the community and provides information on the proposal, upcoming impacts and answering enquiries.

The project engagement team will continue to build on the constructive relationships formed by providing:

- true and clear information
- information on how Transgrid and SecureEnergy will meet commitments made to the community
- opportunities to collaborate, work together and generate shared experiences.

The SecureEnergy Community Engagement Strategy also includes a feedback management procedure to manage communications with the community such as enquiries, complaints or disputes. Any feedback provided by the community will be managed with respect and be responded to efficiently and in a timely manner, with each stakeholder interaction being treated as an opportunity for a positive experience.

6. Assessment of additional impacts

This chapter provides a summary of the additional assessments undertaken to assess the refined proposal. These additional assessments have been carried out to identify and assess the potential construction, operational and cumulative impacts associated with the refined proposal, focusing on potential changes to the expected impacts identified in the EIS as a result of the refinements to the proposal discussed in Chapter 3 of this Amendment Report. Where required, additional or revised environmental management measures have been proposed.

6.1. Assessment approach

Part C of the EIS provided an assessment of the key environmental issues for the project as identified in the SEARs. These assessments were carried out on the proposal as described in Chapter 5 and Chapter 6 of the EIS.

The refined proposal, as described in Chapter 3 of this Amendment Report, was assessed against each of the key issues as set out in the SEARs issued for the proposal on 2 October 2020 by the Secretary of DPE. Discussions were held between the project team and DPE representatives in March 2022 to discuss the refined proposal. In response, DPE confirmed on 25 March 2022 that an Amendment Report was appropriate to address the environmental impacts associated with the refined proposal. No additional or updated SEARs were issued by DPE. This Amendment Report and its appendices have been prepared in consideration of the previous SEARs issued for the proposal. DPE also determined that the Amendment Report would not require public exhibition on the basis that Transgrid have completed targeted consultation with the relevant stakeholders on the refined proposal. The outcomes of that engagement have been documented in Chapter 5 of this Amendment Report.

A screening assessment of the potential environmental impacts of each proposed refinement was undertaken as part of the development of the revised proposal. This included consideration of environmental, social and economic issues and an assessment of the potential changes to the environmental impacts as compared to those described in the EIS. Where no material change in impact was identified, this environmental aspect was not considered further as part of the assessment of each of the proposed refinements.

Evaluation of the proposed refinements for the proposal also provided an opportunity to identify potential reductions to the environmental impacts identified in the EIS, while also providing other benefits.

A summary of the potential environmental aspects potentially affected by each of the proposed refinements is provided in Table 6-1. These aspects are those considered to have a change in impact from those described in the EIS. Improvements in environmental outcomes are marked with a tick. Where there is no changes to the impacts assessed in the EIS, these are marked with a dash. Impacts associated with other aspects would be unchanged from those assessed in the EIS and as such, have not been considered further as part of this Amendment Report.

Table 6-1 Summary of environmental aspect considered to be potentially changed in its impact by the refined proposal (compared to the EIS)

Refined proposal section	Environmental aspect													
	Biodiversity	Aboriginal heritage	Non-Aboriginal heritage	Land use and property	Landscape character and visual amenity	Social and economic	Hydrology, flooding and water quality	Air quality	Noise and Vibration	Traffic and access	Hazards and risks	Soils, contamination and groundwater	Waste management and resources	Cumulative impacts
Alignment refinements														
Lake Cullivel alignment	✓	✓	-	-	✓	-	✓	-	-	-	-	-	-	-
Lockhart alignment	✓	✓	-	-	✓	-	-	-	✓	-	-	-	-	-
Buronga substation access	✓	✓	-	-		-	-	-	-	-	-	-	-	-
Avoidance of Telstra infrastructure	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-
Yanco Creek alignment	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-
Disused Narrandera Tocumwal Railway	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Urana alignment – West of Federation Way	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-
Urana alignment – West of Boree Creek Road	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-
Minor Lockhart alignment shift	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alignment refinements														
Optical repeater site – Booroorban	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional tower – Colombo Creek	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-
General longitudinal shifts of tower locations	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alignment refinements														
Construction compounds and accommodation camp sites	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-
Construction water supply	-	-	-	-	-	-	-	-	-	-	-	-	-	-

These assessments have been supported by additional detailed investigations which have been documented as part of the following supplementary technical assessments:

- Supplementary technical assessment 1 – *Revised Biodiversity Development Assessment Report* (WSP, 2022)
- Supplementary technical assessment 2 – *Revised Aboriginal Cultural Heritage Assessment* (Navin Officer, 2022a)
- Supplementary technical assessment 3 – *Historic heritage addendum memo* (Navin Officer, 2022b)
- Supplementary technical assessment 4 – *Revised visual impact assessment addendum* (Iris, 2022)
- Supplementary technical assessment 5 – *Aviation Impact Assessment* (Aviation Projects, 2022).

These assessments have been prepared as supporting documents to the Submissions Report (Transgrid, 2022) and this Amendment Report.

6.2. Biodiversity

A revised *Biodiversity Development Assessment Report* (BDAR) (WSP, 2022) has been prepared following the public exhibition of the EIS. The Revised BDAR was prepared in order to respond to both:

- the submission from DPE – BCD (which is primarily discussed in the Submissions Report (Transgrid, 2022))
- assessment of the potential change in impacts associated with the refined proposal (including the refined construction impact area).

The biodiversity offsets calculations for the refined proposal to reflect the above has also been completed as part of the Revised BDAR.

A summary of the revised biodiversity impacts of the refined proposal compared to those presented in the EIS (where a material change to potential biodiversity impacts has been identified) is provided in Table 6-2. Further details regarding the specific changes as a result of the refined proposal are provided in the Revised BDAR provided as supplementary technical assessment 1 of the Submissions Report.
This section should be read in conjunction with Chapter 9 of the EIS and the Submissions Report.

Table 6-2 Summary of change in potential biodiversity impacts associated with the refined proposal

Refined proposal element	Description of potential change in impact
Lake Cullivel alignment	At this location, vegetation within the construction impact area for the EIS alignment was identified as being predominately exotic vegetation except for some areas of PCT 249 (River Red Gum swampy woodland wetland on cowals (lakes) and associated flood channels in central NSW) both in derived and moderate conditions. The EIS alignment was identified as impacting around 4.03 hectares of moderate condition vegetation of this type and 2.10 hectare of the derived condition vegetation. The EIS alignment was also identified as impacting a small area of PCT 75 (Yellow Box – White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina Bioregion and western NSW South Western Slopes Bioregion) both in derived and moderate conditions to the west of the Urana-Lockhart Road.

Refined proposal element	Description of potential change in impact
	As a result of the refined alignment (and associated construction features such as access tracks: • the potential impacts on PCT 249 would be greatly reduced compared to the EIS alignment. The refined alignment would only impact on around 0.05 hectares of moderate condition vegetation and no derived vegetation • impacts to PCT 75 would remain largely the same where the section of realignment reconnects into the EIS alignment near Urana-Lockhart Road • a new impact would occur to around 0.26 hectares of PCT45 – Natural Grasslands of the Murray Valley Plains in moderate to good condition (listed as Critically Endangered under the EPBC Act). This impact has been described in the Revised BDAR, attached as Supplementary technical assessment 1 • the remainder of the impacts from this section of the refined alignment would continue to be consistent with the EIS alignment, largely impacting on non-native vegetation currently used for various agricultural purposes. The refined alignment would also provide the following advantages: • movement of the proposal further to the south away from the main body of Lake Cullivel would provide a positive outcome for water bird populations by further separating the transmission line infrastructure from the lake • potential reduced impacts to aquatic groundwater dependent ecosystems and an existing stands of trees within the vicinity of Lake Cullivel. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. Overall, the refined alignment is considered to provide a beneficial outcome in comparison to the previously identified impacts to biodiversity within the vicinity of Lake Cullivel. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.
Lockhart alignment	At this location, vegetation within the construction impact area for the EIS alignment is predominantly exotic vegetation except for an area of Yellow Box - White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina Bioregion and western NSW South Western Slopes Bioregion (PCT 75) in moderate to good condition. This vegetation was identified as a substantial stand of trees where the alignment was proposed to cross an existing waterway. The refined alignment (as shown in Figure 3-3) has been refined at this location through extensive consultation with the land holder to identify an optimal alignment which would minimise potential biodiversity impacts. The refined alignment would remove the previously identified impacts to the substantial stand of trees and instead provide a crossing further to the west though a less vegetated section of land comprising Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion (PCT 80) of moderate to good condition. The EIS alignment at this location also included impacts to a substantial number of mature trees located along the edge of Kings Lane between Albury Road and Napier Road. The refined alignment however would cross through a large open area which is generally cleared of large/mature trees and which is currently utilised for cropping and other agricultural farming uses.

Refined proposal element	Description of potential change in impact
	Additionally, during construction, the refined alignment would be able to make use of an existing track without the need for additional clearing. This would represent a further benefit to potential biodiversity impacts compared to the EIS alignment which required additional clearing for this purpose. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral or improved impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. Overall, the refined alignment is considered to provide a beneficial outcome in comparison to the previously identified impacts to biodiversity. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.
Buronga substation access	At this location, vegetation within the construction impact area for the EIS alignment comprises of PCT 170 (Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid) of both derived and moderate to good vegetation conditions. The new transmission line connection point as part of the refined proposal (as shown in Figure 3-4)) would also be located on land containing PCT 170. There would be a minor increase (up to around 2.5 hectares) in the construction impact area at this location due to the proposed deviation. This would result in an overall minor increase to the potential impact on biodiversity in comparison to the EIS alignment. This increase has been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment.
Avoidance of Telstra infrastructure	At this location, vegetation within the construction impact area for the EIS alignment comprises a mix of exotic and native vegetation (PCT 23, PCT 163, PCT 170, PCT 171), with PCT 23 being associated with threatened ecological community, Acacia melvillei Shrubland in the Riverina and Murray Darling Depression Bioregion, listed as endangered under the BC Act. The realignment of seven kilometres of transmission line (as shown in Figure 3-5) would result in a slight shift of the transmission line easement by around 50 metres to the north of the EIS alignment. Due to the small shift in the alignment at this location, the change would largely impact on the same vegetation species that was identified as being impacted by the EIS alignment. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. On balance, the refined alignment would result in a neutral change to the potential impacts on biodiversity in comparison to the alignment presented in the EIS. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.

Refined proposal element	Description of potential change in impact
Yanco Creek alignment	Due to land holder access restrictions prior to exhibition of the EIS, assessment for the EIS alignment of vegetation within the construction impact area at this location relied on a desktop assessment of state vegetation mapping. The mapping available at this time identified vegetation in the vicinity of Yanco Creek to consist of: • PCT 7 – River Red Gum – Warrego Grass – herbaceous riparian tall open forest wetland mainly in the Riverina Bioregion in a moderate to good condition (predominantly the densely vegetated area to the north of Yanco Creek) • PCT 11 – River Red Gum – Lignum very tall open forest or woodland wetland on flood plains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion) in a moderate to good condition • PCT 26 – Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slop es Bioregion in both in moderate and derived conditions • PCT 44 – Forb-rich Speargrass – Windmill Grass – White Top grassland of the Riverina Bioregion • Other exotic and miscellaneous vegetation. Following public exhibition of the EIS, additional field survey has been undertaken which verified a substantial amount of the desktop mapping to the south of Yanco Creek, with the exception of PCT 44 which was field-verified to consist of additional areas of PCT 26. The slight adjustment to the approach and crossing point of the alignment at this location (as shown in Figure 3-6) would impact on the same PCTs in largely the same extents as assessed for the EIS alignment. None of the four PCTs impacted by the refined alignment have been identified as threatened ecological communities. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. On balance, the refined alignment would result in a neutral change to the potential impacts on biodiversity in comparison to the alignment presented in the EIS. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.
Urana alignment – West of Federation Way	At this location, vegetation within the construction impact area for the EIS alignment comprises native vegetation (PCT 45, PCT 46, PCT 160, PCT 44). PCT 44, 45 and 46 are associated with a threatened ecological community, Natural Grasslands of the Murray Valley Plains, listed as critically endangered under the EPBC Act. The refined alignment at this location would primarily provide a benefit when compared to the EIS alignment, by removing the potential impact of the proposal on an existing stand of River Red Gum trees (PCT 11) in this area (just to the west of Federation Way). Within the existing landscape context of this region, trees are limited. Therefore by avoiding the stand of River Red Gums at this location, the refined alignment would reduce the potential impacts of the proposal to habitat for a range of highly mobile fauna species. Additionally, some of the trees within this stand have been previously been identified as containing hollows / habitat for hollow-dependent fauna which would be retained as a result of the refined alignment.

Refined proposal element	Description of potential change in impact
	With the exception of the avoidance of the River Red Gums, the refined alignment would generally result in a comparative level of impact to the other vegetation categories (including the critically endangered listed species) when compared to the EIS alignment. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. Overall, the refined alignment would provide a generally beneficial outcome as a result of the avoidance of the existing tree stand and a neutral change to the potential impacts on biodiversity in comparison to the other vegetation species in this area. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.
Urana alignment – West of Boree Creek Road	At this location, vegetation within the construction impact area for the EIS alignment contains exotic and native vegetation (PCT80). PCT 80 is associated with threatened ecological community, Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South bioregions, listed as endangered under the BC Act. The slight adjustment of the alignment to the south of the EIS alignment would generally impact the same native vegetation categories or the threatened ecological community as previously identified as being impacted by the EIS alignment. Due to the relatively minor shift in the alignment and potential impact on comparative vegetation species, the refined alignment is also considered to have a neutral impact on threatened fauna species, or their habitat, compared to those identified for the EIS alignment. On balance, the refined alignment would result in a neutral change to the potential impacts on biodiversity in comparison to the alignment presented in the EIS. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.
Additional tower – Colombo Creek	An additional tower location in the vicinity of the Colombo Creek crossing would be within the EIS centreline (disturbance area A). As such, the clearing at this location would also need to include a small area of additional clearing to accommodate an additional transmission line tower construction area. This area has been mapped as PCT 46 – Curly Windmill Grass – speargrass – wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion (in moderate to good condition) listed as critically endangered under the EPBC Act. Whilst the additional transmission line tower would result in a small increase the amount of this vegetation type compared to what was previously identified, this has been quantified as part of the Revised BDAR and would be appropriately offset.
Optical repeater site alignment – Booroorban	Due to the relatively minor shift in the alignment of this component, the refined impact would impact on comparative vegetation species, therefore resulting in an overall neutral impact on biodiversity when compared to those identified for the EIS alignment. The revised impact has also been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.

Refined proposal element	Description of potential change in impact
Lockhart construction compound and accommodation camp (Urana-Lockhart Road option)	The potential impacts of this construction compound were previously assessed as part of the EIS. The removal of the Urana-Lockhart Road construction compound site would result in a reduction of the overall construction impact area by around 125 hectares, a majority of which was identified as cleared agricultural land. The removal of this site and the associated revised impact has been captured as part of the overall vegetation impact calculations presented in the Revised BDAR for the proposal.

6.3. Aboriginal heritage

A *Revised Aboriginal Cultural Heritage Assessment Report* (Navin Officer, 2022a) has been prepared to:

- respond to the issues raised during public exhibition of the EIS regarding Aboriginal heritage impacts including those provided by NSW Heritage
- update the assessment based on the program of test excavation undertaken
- assess the potential additional and/or changed impacts associated with the refined proposal, in comparison to those of the proposal as described in the EIS.

A summary of the revised Aboriginal heritage impacts of the refined proposal components compared to those presented in the EIS (where a material change has been identified as discussed in Section 6.1) is provided in Table 6-3. The *Revised Aboriginal Cultural Heritage Assessment Report* (Navin Officer, 2022a) is provided as supplementary technical assessment 2 of the Submissions Report, with the results of the test excavations provided in Appendix 6. This section of the Amendment Report should also be read in conjunction with Chapter 10 of the EIS and the Submissions Report.

Table 6-3 Summary of change in potential Aboriginal impacts associated with the refined proposal

Refined proposal element	Description of potential change in impact
Lake Cullivel alignment	The EIS identified that the EIS alignment to the east of Lake Cullivel would be positioned adjacent to Potential Archaeological Deposit (PAD) 34, just south of Lake Cullivel, which included an identified artefact scatter (PEC-E-63). In addition, the EIS also identified that this section of the EIS alignment would pass across a second PAD (PAD35) to the west of Urana-Lockhart Road, including three towers which were identified within PAD35. This PAD also included two artefact scatters PEC-E-64 and PEC-E-65 and an isolated find (PEC-E-66) within the area of the PAD. The EIS alignment did not directly impact on any of these items. Test excavations of PAD35 has resulted in refinements to the spatial extent of the PAD, reducing its overall extent (refer to the relevant test excavation memo in Appendix 6 of supplementary technical assessment 2). The refined alignment at Lake Cullivel (as shown in Figure 3-2) would: • move the refined alignment further away from PAD34 • reduce the potential impact of the proposal within PAD35 (as refined through recent test excavations) and would result in no towers being located within the refined PAD area. The refined alignment would also continue to avoid direct impact to the two identified artefact scatters and isolated find within PAD35. Overall, the refined alignment is considered to result in a positive outcome on Aboriginal heritage.

Refined proposal element	Description of potential change in impact
Lockhart alignment	The EIS alignment at this location was identified as having direct impacts on PAD38. Test excavations and additional field surveys of this PAD area to take into account the refined alignment have also been completed since public exhibition of the EIS. This has resulted in the PAD area being refined into a larger PAD area that also encompasses a section of the refined alignment (refer to the relevant test excavation memo in Appendix 6 of supplementary technical assessment 2). The refined alignment (as shown in Figure 3-3) would be located to the west of the EIS alignment and would resulting in a portion of a new transmission line tower and access track being located within the refined area of PAD38. Test excavations of this site indicated that a low density of Aboriginal artefacts are likely to be present across the PAD in shallow deposits. Surface artefacts were evident in eroded areas in proximity to the creek lines where visibility was good. The archaeological investigation found the tower locations were suitable for construction due to the low-density scatter across the tested area. Prior to construction it would be recommended to undertake a surface collection with artefacts catalogued and in consultation with RAPs either reburied or moved to an area that will not be impacted by the construction. Overall, the refined alignment would result in minimal change to potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS.
Buronga substation access	The EIS identified no PADs or Aboriginal heritage items in the vicinity of the Buronga substation site. The revised transmission line connection point (as shown in Figure 3-4) would also not impact any areas of PADs or Aboriginal heritage items. Overall, the refined alignment would result in no change to the potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS.
Avoidance of Telstra infrastructure	The EIS identified an isolated find (PEC-E-04) adjacent to the EIS alignment to the east of the township of Euston. The EIS identified that this site would not be directly impacted by the proposal and would be adjacent to impact areas, therefore resulting in a potential indirect impact rating. The realignment of seven kilometres of transmission line (as shown in Figure 3-5), including the section of the alignment adjacent to the isolated find PEC-E-04 would result in a slight shift of the transmission line easement by around 50 metres to the north, increasing the distance to this identified Aboriginal item. Overall, the refined alignment would result in in a positive outcome to Aboriginal heritage in comparison to the alignment presented in the EIS.
Yanco Creek alignment	The EIS did not identify a PAD or registered Aboriginal items within the vicinity of the Yanco Creek alignment. The proposal at this location (as proposed in the EIS and as refined) would not result in any change in impacts to Aboriginal heritage as described and assessed in the EIS.
Urana alignment – West of Federation Way	The EIS identified that the alignment at this location would have the potential for subsurface archaeological deposits to be impacted (within PAD29) with the identification of an earth mound (PEC-E-56), an earth mound with hearth (PEC-E-57) and an isolated find (PEC-E-58) during field surveys for the EIS. The EIS alignment passed through the PAD area, with one transmission line tower located within the PAD and PEC-E-58 located within the construction impact footprint. Since public exhibition of the EIS, test excavations of the proposed transmission line tower footprint have been undertaken to investigate this area, identifying no constraints from an Aboriginal cultural heritage perspective.

Refined proposal element	Description of potential change in impact
	Overall, the minor shift of the EIS alignment (around five metres) to the south of the EIS alignment (as shown in Figure 3-7) would result in no change to the potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS.
Urana alignment – West of Boree Creek Road	The EIS did not identify any potential archaeological deposits, artefacts or items within the vicinity of the EIS alignment in this section. The realignment would relocate the transmission line up to around 240 metres to the south of the EIS alignment (as shown in Figure 3-8). Overall, the realignment would present no change to the potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS.
Optical repeater site alignment – Booroorban	The EIS did not identify any PADs or registered Aboriginal artefacts or items within the vicinity of the optical repeater site alignment. The slight adjustment to the alignment would be located immediately adjacent to the EIS alignment (as shown in Figure 3-9). Overall, the realignment would present no change to the potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS.
Additional tower – Colombo Creek	The EIS identified that the EIS alignment would pass through a PAD (PAD32) which included an artefact scatter (PEC-E-60). The EIS alignment did not propose to include a transmission line tower within this PAD, proposing to span it with towers either side of the PAD. The refined design has identified the need for an additional transmission line tower (as shown in Figure 3-10) at this location. The additional transmission line tower would be located within the PAD, with the construction footprint of the tower being located at a point of one of the items of the previously located artefact scatter. Test excavation of this site following public exhibition of the EIS also identified a small number of artefacts and identified that there is therefore moderate potential for there to be intact archaeological deposits within the vicinity of this tower. Overall, this would result in a slightly increased potential impact on Aboriginal heritage in comparison to the alignment presented in the EIS (due to the additional ground disturbance required to accommodate the additional tower). Prior to construction it would be recommended surface collection be undertaken, with any collected artefacts catalogued, and in consultation with RAPs either reburied or moved to an area that will not be impacted by the construction.
Cobb Highway construction compound and accommodation camp	Following public exhibition of the EIS, additional investigation of the Cobb Highway construction compound and accommodation camp site was undertaken. This additional investigation identified an additional PAD area (PEC-E-PAD45) which encompassed a substantial portion of the proposed construction compound and accommodation camp arrangement. In order to minimise potential impacts on the PAD, a refined construction compound and accommodation camp site layout was developed (refer to Section 3.4.1.2). The refined layout would reduce the potential impacts of this construction facility on the identified PAD at this location. One part of the construction compound and accommodation camp would be included within the area of the PAD however this would only be the required asset protection zone (APZ) which would be required to be established on the outer edge of the PAD. Within this zone, there would be a commitment to trimming of vegetation only to maintain the required APZ and no subsurface impacts in this area. The refinement of the area for this site and the reduced impacts have been captured in the updated assessment of Aboriginal heritage (included as supplementary technical paper 2 in the Submissions Report).

6.4. Visual and landscape character

A summary of the revised landscape character and visual impacts of the refined proposal components compared to those presented in the EIS (where a material change has been identified as discussed in Section 6.1) is provided in Table 6-4.

Table 6-4 Summary of change in potential landscape character and visual impacts associated with the refined proposal

Refined proposal element	Description of potential change in impact
Lake Cullivel alignment	The refined alignment would move the transmission line easement of the proposal southwards and further away from two dwellings to the north of Lake Cullivel (dwelling receivers 378 and 26830). This would reduce visual impacts on these specific receivers, in particular the resultant impact to the landscape character and visual setting within the immediate vicinity of the lake. The refined alignment would however move closer to one residential dwelling to the south of Urana-Lockhart Road ((identified as receiver 10739). For this dwelling, the refined alignment would be located around 800 metres in the distance (at the closest transmission line tower location), compared to around 1.6 kilometres for the EIS alignment. Given the distance to the closest transmission line tower, it is considered that the refined alignment would not result in a change to the visual impact on this dwelling in comparison to the impacts identified in the EIS. Additionally, the refined alignment is not considered to change the overall landscape character impact of the proposed for the Lockhart rural valley landscape as assessed in the EIS.
Lockhart alignment	The visual impact at dwelling receiver 414 (located on the property directly to south of the refined alignment) would be reduced as a result of the refined alignment. The living areas of dwelling receiver 414 are oriented northwards and appreciates a northerly view to Galore Hill. The refined alignment would be located further north of this dwelling when compared to the EIS alignment, and as a result the visual impacts of the proposal would be reduced at this location from moderate (as assessed in the EIS) to low. The refined alignment would move the alignment around 800 metres closer to the two dwellings located immediately to the north west of the refined alignment (identified as sensitive receiver ID's 8991 and 1511 within the property the refined alignment would cross) however, these dwellings would still be located around one kilometre north of the refined alignment and would not be expected to result in a change to the impact ratings identified in the EIS at this location. Existing vegetation between the refined alignment and these receivers, would reduce the visibility of the proposal so that the visual impact would not increase notably as a result of the refined alignment. Additionally, the refined alignment is not considered to change the overall landscape character impact of the proposed for the Lockhart rural valley landscape as assessed in the EIS.

Refined proposal element	Description of potential change in impact
Boree Creek Road alignment	The revised alignment would bring the transmission line easement closer to receiver dwelling 12943 and ID 14909 (by up to around 130 metres from a previous distance of around 570 metres at its closest point to a refined distance of 440 metres), however, this dwelling is oriented to the south, and there are existing sheds and vegetation to the north and northeast of the dwelling that would screen views to the refined alignment. There would be additional tree removal along the field boundaries, but this would not alter the overall landscape impact identified in the EIS. Therefore there would be no expected change to the impact ratings identified in the EIS at this location.
Additional tower – Colombo Creek	The additional transmission line tower would potentially be visible along this section of Coonong Road from the Urana Ski Club. The additional transmission line tower would be located around 410 metres from the ski club facility however would be somewhat screened by the existing vegetation. Additionally, the primary orientation of the ski club would be towards the north (looking towards Colombo Creek). The new tower would be seen within the view of two previously proposed towers. Therefore, the additional transmission line tower may have some minor increased visual impacts to the ski club. Additionally, there would be no additional visual impact on the holiday camp receiver around 1.1 kilometres to the west as this property would not have a view to the additional tower.

6.5. Hydrology and flooding

A summary of the revised hydrology and flooding impacts of the refined proposal component(s) compared to those presented in the EIS (where a material change has been identified as discussed in Section 6.1) is provided in Table 6-5.

Table 6-5 Summary of change in potential hydrology and flooding impacts associated with the refined proposal

Refined proposal element	Description of potential change in impact
Lake Cullivel alignment	The refined alignment would move the location of the transmission line towers further south from the potential areas of identified flood extents. The refined alignment would also move south and further away from areas which have anecdotally been identified as having experienced historic flood events to the south of Lake Cullivel. During construction the overall risks and potential impacts associated with the revised alignment during construction would be consistent or improved in comparison to the impacts identified in the EIS. During operation, between six and 10 towers for the refined alignment would be located in the potentially flood-affected areas south of Lake Cullivel (which is generally consistent with the EIS alignment). Given the wide flat nature of the floodplain in the vicinity of Lake Cullivel, the impact of the towers on flood behaviour would be insignificant. There may be minor local increases in flood levels and velocities that would dissipate within 50 metres of the tower footing. This would be the same impacts as described for the EIS alignment. There is no flood sensitive development or infrastructure in close proximity to the towers at this location. Consistent with the description in the EIS, any changes in flood behaviour would be localised in the vicinity of each tower, and the design of each tower would be such that any changes would not affect their structural integrity.

6.6. Noise and vibration

A summary of the revised noise and vibration impacts of the refined proposal component(s) compared to those presented in the EIS (where a material change has been identified as discussed in Section 6.1) is provided in Table 6-6.

Table 6-6 Summary of change in potential noise and vibration impacts associated with the refined proposal

Refined proposal element	Description of potential change in impact
Lockhart alignment	The EIS and associated *Noise and Vibration Impact Assessment* (Technical paper 10) identified that a series of residential dwellings would experience noise exceedances during both the standard, out of hours (day) and out of hours (night) construction scenarios within the vicinity of the proposed alignment refinement at Lockhart. As described previously, the refined alignment would move the alignment closer to two existing residential dwellings (within the affected property) (sensitive receiver IDs 8991 and 1511). The EIS identified that both of these properties would experience various levels of exceedance for each of the standard, out of hours (day) and out of hours (night) construction scenarios. These exceedances would likely continue to occur (though potentially to a slightly higher level of exceedance) as a result of the refined alignment. It is however noted that the works in this location would be localised construction noise impacts at the receivers which are expected to be temporary with the proposed breaks between key activities allowing respite periods for the receivers. For the remaining dwellings previously identified, it is expected that the construction of the refined alignment would continue to result in some noise impacts during construction. The overall level of predicted exceedance may however be slightly lower based on the respective increase in distance to the construction impact area from each of the affected dwellings. During operation, the closest residential dwellings to the refined alignment would be located outside the transmission lines audible noise risk zone (the distance from proposed new transmission line centreline to the dwelling). Therefore, it is considered that the refined alignment would not result in any change to the operational noise and vibration impacts of the refined proposal compared to those assessed in the EIS.

6.7. Water supply points

The proposed additional water supply points would consist of connections to existing sources and would not result in any overall additional impacts, compared to the EIS.

All of the additional water supply points would be located along traffic routes previously assessed as part of the EIS. Given the number of trips proposed to be generated by the additional water supply points, there would be no changes to the traffic impacts assessed in the EIS.

7. Evaluation of merits and conclusion

7.1. Evaluation of the merits of the refined proposal

The proposal, including the proposed refinements identified in this Amendment Report, have been designed, to the greatest extent practicable, to respond to the issues raised by the community and stakeholders and to avoid and minimise potential environmental impacts. Continued development and refinement of the design and construction methodology for the proposal would aim to further avoid and minimise potential impacts on the local and regional environment, and the local community, where possible.

The environmental impacts of the refined proposal have been assessed, including impacts to biodiversity, Aboriginal and non-Aboriginal heritage, landscape character and visual amenity, land use flooding and noise and vibration.

As a result of the proposed refinements to the proposal, the refined proposal is considered to, in comparison to the EIS proposal, result in an improved overall outcome through:

- reduced impact on biodiversity through:
  - refinement of the alignment at Lake Cullivel, Lockhart and Yanco Creek to avoid or reduce the impact on a range of flora and fauna constraints
  - general refinement and ongoing micro-siting of transmission line tower locations along the length of the proposal alignment
- reduced impact on Aboriginal heritage through ongoing test excavation and refinement of the alignment at Lake Cullivel to provide an alignment that would minimise impacts on an identified PAD
- reduced potential impact on localised flooding and hydrology in the vicinity of Lake Cullivel due to the proposed realignment of this section of the proposal further to the south away from the main body of the lake.

On balance, the proposed design refinements are considered to result in an improvement to the proposal as described in the EIS, in particular resulting in reduced impacts both to the environment as well as local land holders. The remaining impacts are generally consistent with those previously presented in the EIS.

To avoid, minimise or manage the potential impacts identified as a result of the refined proposal, a suite of revised mitigation measures have been identified to guide detailed design, and to manage the construction and operational phases of the proposal (refer to Appendix C). With the implementation of the proposed revised mitigation measures, the potential environmental impacts of the refined proposal are considered to be able to be adequately managed.

7.2. Concluding statement

The proposal, which is an essential component of EnergyConnect, would build on the approved EnergyConnect (NSW – Western Section) project to further enhance and provide an energy transmission link between the SA, NSW and Victorian transmission networks. This proposal is a critical and large component of EnergyConnect, which would enhance the energy transmission link between SA and NSW transmission networks, as it would:

- provide a key electricity distribution connection option within western NSW to encourage future renewable energy providers to invest in lower emission electrical generation alternatives within this region.
- deliver positive net market benefits and support the energy market transition to a lower carbon emissions future as soon as it can be built. In particular, it would reduce the cost of providing secure and reliable electricity transmission between NSW, SA and northern Victoria in the near term
- be crucial in meeting the requirements for the connection of the identified REZs within south west and western NSW.

The proposal, inclusive of the design refinements that have been proposed as part of this Amendment Report, has been developed, to avoid and minimise impacts, and to respond to the issues raised by the community and stakeholders to the greatest extent possible. Transgrid is committed to further minimising environmental impacts of the proposal through ongoing refinement to the design and construction methodology.

To avoid, minimise and/or manage the potential impacts of the refined proposal, a series of revised mitigation measures that would be implemented during construction and operation of the proposal have been identified. This includes implementing the construction environmental management plan(s) and community and stakeholder engagement plan during main construction works which were identified as part of the exhibited EIS. With the implementation of the proposed revised mitigation measures, the potential environmental impacts of the proposal would be adequately managed. This would also ensure compliance with relevant legislation and any conditions of approval.

Overall, the operation of the proposal is expected to facilitate enhanced security and reliability of the energy supply with associated social and economic benefits to consumers at the State level across NSW, SA and Victoria.

Not proceeding with the proposal, including the proposed refinements as identified in this Amendment Report, would reduce the security of the electricity supply in SA, NSW and northern Victoria, particularly as coal-fired generators commence retirement. It would also discourage investment in renewable energy generation and storage within REZs the Murray River, Riverland and South West NSW REZs. The provision of appropriate infrastructure to these zones is required to allow the adoption of new renewable technologies in the future, which is required to support the delivery of commitments and policies at a State, Federal and international level.

7.3. Next steps

The EIS, this Amendment Report, the Submissions Report (Transgrid, 2022) and the supplementary technical assessments will be reviewed by DPE, on behalf of the Minister for Planning. Once DPE has completed their assessment, a draft assessment report will be prepared for the Secretary of DPE, which may include recommended conditions of approval. A final assessment report will then be provided to the Minister for Planning, who will determine the proposal.

A copy of this Amendment Report will be published on DPE's website following submission of the report to DPE for assessment. Following assessment, the Minister for Planning's determination will also be published on DPE's website, as well as any conditions of approval (should the proposal be approved).

Given the status of the proposal as a controlled action, the proposal would be assessed using the bilateral assessment process by DAWE for the required Commonwealth approval.

8. References

Australian Energy Market Operator, 2020. *2020 Integrated System Plan*

Department of Planning, Infrastructure and Environment, 2021. *State significant infrastructure guidelines – Preparing an Amendment Report*

DPE, 2018. *NSW Transmission Infrastructure Strategy*

Environment Protection Authority, 2017. *Noise Policy for Industry*

Infrastructure NSW, 2018. *NSW State Infrastructure Strategy 2018-2038*

Iris, 2022. *Supplementary technical assessment 4 – Revised visual impact assessment addendum*

Navin Officer, 2022a. *Supplementary technical assessment 2 – Revised Aboriginal Cultural Heritage Assessment*

Navin Officer, 2022b. *Supplementary technical assessment 3 – Historic heritage addendum memo*

NSW Office of Environment and Heritage, 2016. *NSW Climate Change Policy Framework*

Office of Environment and Heritage, 2020. *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2020*

Transgrid, 2022. *EnergyConnect (NSW – Eastern Section) Submissions Report*

WSP, 2021. *EnergyConnect (NSW – Eastern Section) Noise and vibration impact assessment*

WSP, 2022. *Supplementary technical assessment 1 – Revised Biodiversity Development Assessment Report*

Appendix A Updated proposal description (operation)

5. Proposal infrastructure and operation

This chapter provides a description of the key elements of the proposal, including the proposed transmission lines, proposed Dinawan 330kV substation and works associated with the upgrade and expansion of the Wagga Wagga substation. This chapter also outlines how the proposal would operate and be maintained. A description of how the proposal would be constructed is provided in Chapter 6 (Proposal construction).

The description of the proposal components presented in this chapter is based on the current design (including design refinements made following public exhibition of the full Environmental Impact Statement). Some elements of the final proposal infrastructure location may continue to be refined as part of the finalisation of the design. For this EIS, a proposed operational easement has been defined within which the proposal would be operated following construction.

5.1. Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements relating to description of the proposal and where these requirements are addressed in this EIS are outlined in Table 5-1.

Table 5-1 Secretary's environmental assessment requirements – Proposal infrastructure and operation

Ref.	Secretary's environmental assessment requirements	Where addressed in the EIS
General requirements	The EIS must include:	
	• a full description of the project, accompanied by suitable maps and plans, including the:	This chapter provides an operational description of the proposal, and is supported by maps and figures throughout the chapter.
	- disturbance area	The construction impact area for the proposal is described in Section 6.4. A more defined disturbance area for the biodiversity and heritage assessments is described in Section 8.1).
	- physical layout of the project over time, including sections of key components	The transmission line easement is shown in Figure 5-2a to Figure 5-2e, with typical arrangement of each transmission line tower in Figure 5-3 (330kV towers) and Figure 5-4 (500kV towers) The typical design for the proposed Dinawan 330kV substation is shown in Figure 5-5 and Figure 5-6. The typical design for the upgrade and expansion of the Wagga Wagga substation is shown in Figure 5-7.
	- key uses and activities to be carried out on site;	This chapter provides a description of the key uses and activities to be carried out, including an outline of the operational components of the proposal in Section 5.4. A description of construction activities is provided in Chapter 6 (Proposal construction).

Ref.	Secretary's environmental assessment requirements	Where addressed in the EIS
	- likely timing of the project including any stages, the key phases within each stage (site preparation, construction, commissioning, operation, decommissioning and rehabilitation) and the sequencing of these stages and phases;	Refer to Chapter 6 (Proposal construction).

5.2. Proposal overview

An overview of the key components of the proposal is provided in Table 5-2 and shown on Figure 5-1. Section 5.3 provides a greater level of detail about each of the key components of the proposal and Section 5.4 provides the operational and maintenance aspects of the proposal.

Table 5-2 Project summary table – operations

Proposal element	Summary of the proposal	Figure reference
Project location	The proposal would extend from the existing Buronga substation to the existing Wagga Wagga substation. The proposal would be located across a number of LGAs being the Wentworth, Balranald, Murray River, Edward River, Hay, Murrumbidgee, Federation, Lockhart and Wagga Wagga LGAs.	Figure 5-1
Transmission lines	The key components of the transmission line works would include: • about 375 kilometres of new 330kV double circuit transmission line and associated infrastructure between the Buronga substation and the proposed Dinawan 330kV substation • connection of the proposed transmission lines to the existing Buronga substation • connection of the proposed transmission lines to the proposed Dinawan 330kV substation • about 162 kilometres of new 500kV double circuit transmission line and associated infrastructure between the proposed Dinawan 330kV substation and the existing Wagga Wagga substation at Wagga Wagga, NSW.	Figure 5-1 to Figure 5-4 and Appendix F (of the EIS)
Substations	The key components of the substation works would include: • construction of a new 330kV substation around 30 kilometres south of Coleambally, referred to as the proposed Dinawan 330kV substation • upgrade and expansion of the Wagga Wagga substation to accommodate the new transmission line connections including the installation of new line bays, relocation and upgrade of existing bays and associated electrical and civil works (road, kerb, gutter, drainage works and earthworks).	Figure 5-5 to Figure 5-7

Proposal element	Summary of the proposal	Figure reference
Ancillary facilities	The ancillary facilities would include: • provision of three optical repeater structures and associated connections to existing local electrical supplies • new and/or upgrade of access tracks as required.	Figure 5-8 to Figure 5-9
Operational footprint	The transmission line between the Buronga substation and Wagga Wagga substation would be located within an easement up to 80 metres wide. This easement would provide a right of access to construct, maintain and operate the transmission line and other operational assets associated with the line. The total operational footprint of the project would be around ~~4,481~~ 4,490 hectares comprising: • transmission line easement: around ~~4,298~~ 4,293 hectares • permanent operational footprint of the proposed Dinawan substation site: around 184 hectares • permanent operational footprint of the proposed Wagga Wagga substation site: around 13 hectares (noting this is an existing substation with all works to be undertaken within the current substation boundary).	–
Creek crossings	The proposed transmission line would require crossing (spanning) of a series of watercourses and adjoining riparian areas including the Murrumbidgee River at Balranald; Abercrombie Creek; Yanco Creek; the Coleambally Outfall Drain, Colombo Creek; Halliday's Cut (at Lake Cullivel); Burkes Creek (The Rock) and several other smaller creek crossings.	Figure 5-1
Operational maintenance	Regular maintenance activities would be required for the transmission lines during its operation. Likely maintenance activities would include: • regular inspection and maintenance of transmission lines, towers and poles • ad hoc fault and emergency fly over(s) to assess infrastructure condition should an unplanned outage occur • vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines Maintenance at the substations would typically include ad-hoc attendance (up to three times a week) of one or two switching operators to undertake planned and unplanned switching of equipment.	Figure 5-10 and Figure 5-11
Commencement of operation	August 2024	–
Capital investment	Approximately $1.08 billion	–
Operational workforce	Around 5 workers	–

The location for the transmission line tower infrastructure would continue to be refined as part of the finalisation of the design. These elements would be located within the transmission line easement as shown in Figure 5-1.

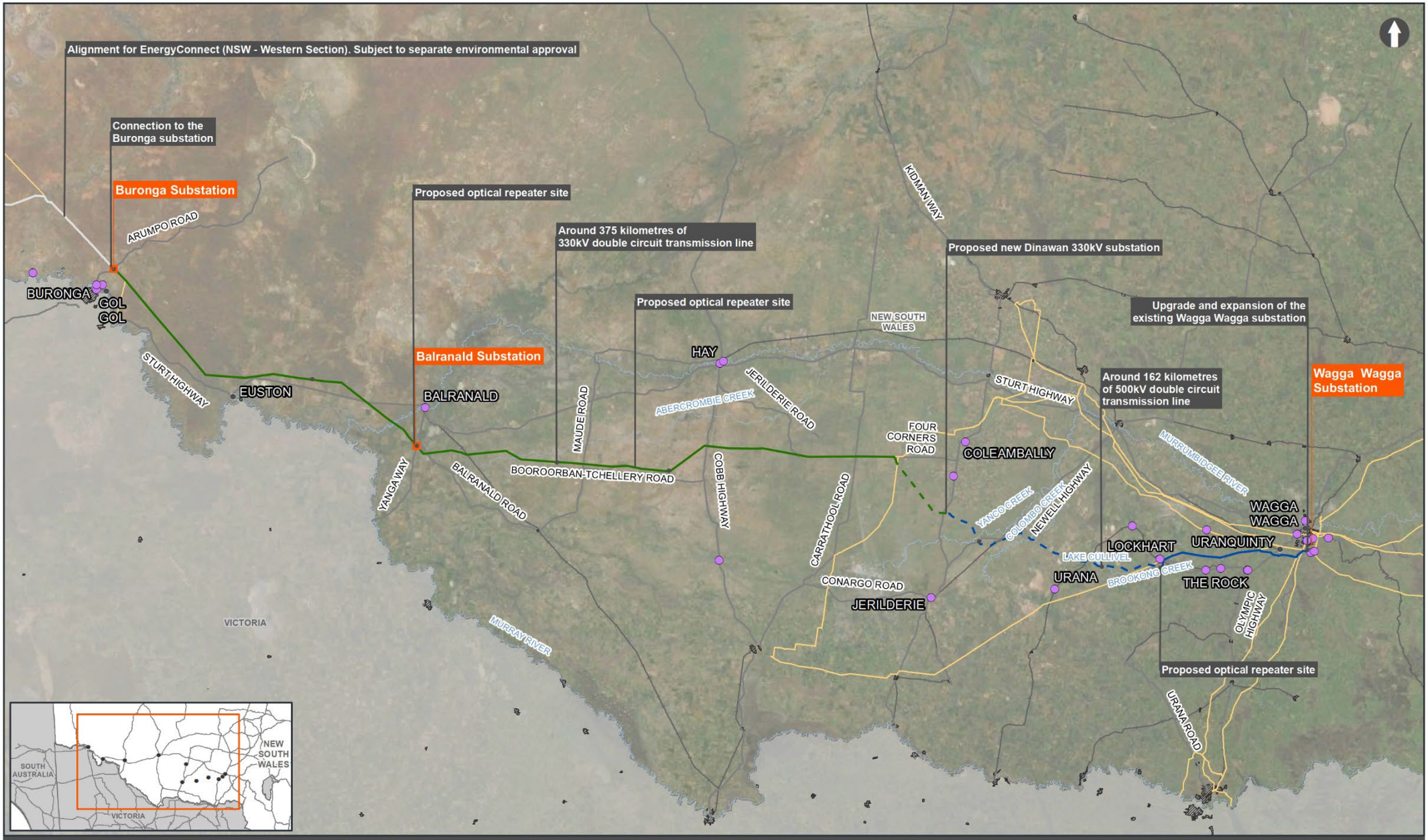

Figure 5-1

Refined Proposal Alignment and Existing Transmission Lines Arrangements - EnergyConnect (NSW - Eastern Section)

- EnergyConnect (NSW - Eastern Section) 330kV transmission line (Parallel)
- EnergyConnect (NSW - Eastern Section) 500kV transmission line (Parallel)
- EnergyConnect (NSW - Eastern Section) 330kV transmission line (Greenfield)
- EnergyConnect (NSW - Eastern Section) 500kV transmission line (Greenfield)
- EnergyConnect (NSW - Western Section)
- Main Construction Compounds and Accomodation Sites
- Water Fill Point
- Existing Substation
- Built Up Areas
- Waterbody
- Existing Transmission Line

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Source: NSWSS, ESRI, Transgrid, WSP

5.3. Components of the proposal

5.3.1. Transmission line alignment

5.3.1.1. 330kV transmission line between the Buronga substation and proposed Dinawan 330kV substation

This component of the proposal comprises of a new double circuit 330kV transmission line from the existing Buronga substation (as proposed to be upgraded by the approved EnergyConnect (NSW – Western Section) project) to a proposed new Dinawan 330kV substation located along Kidman Way, around halfway between Coleambally and Jerilderie. The nominal distance of this line would be about 375 kilometres.

From the existing 330kV Buronga substation, the transmission line would run parallel to the existing 220kV transmission line (on the northern side of existing easement) for about 55 kilometres in a generally south-east direction (the first 6.5 kilometres of which are proposed to be upgraded as part of EnergyConnect (NSW – Western Section). At this point the alignment would continue in a parallel alignment in a predominantly east-west direction for a further 66 kilometres. At this point the alignment would cross the Sturt Highway and then continue in a south-east direction parallel to the existing 220kV transmission line towards the existing Balranald substation (a distance of around 27 kilometres). It is not proposed to connect the transmission line to the existing 220kV Balranald substation.

From the 220kV Balranald substation, the transmission line would continue in a generally east-west alignment (parallel on the northern side of the existing 220kV transmission line) for around 196 kilometres to a point along Four Corners Road at Mabins Well (around 25 kilometres to the east of the road's intersection with Kidman Way). This section of the alignment would cross and/or be located parallel to a number of key north-south roadways including Yanga Way; Balranald Road; Maude Road; Booroorban-Tchelery Road; the Cobb Highway; Jerilderie Road; Carathool and Conargo Roads and Four Corners Road.

From the point along Four Corners Road, the alignment would deviate from a parallel alignment to the existing transmission line infrastructure and would continue in a generally south-east alignment for around 31 kilometres towards Kidman Way. At this point, the alignment would cross Kidman Way and connect to the proposed Dinawan 330kV substation (refer to Section 5.3.4).

5.3.1.2. 500kV transmission line between the proposed Dinawan 330kV substation and the Wagga Wagga substation

This component of the proposal comprises of a new double circuit 500kV transmission line from the proposed Dinawan 330kV substation to the existing Wagga Wagga substation. The nominal distance of this line would be about 162 kilometres.

This section of line would initially only be operated at a 330kV capacity and not the full 500kV capacity. In the future – once other network upgrades and their associated planning approvals are completed (including potentially the upgrade of the Dinawan 330kV substation to a 500kV facility) – this line would operate at its 500kV capacity. This section of line is being proposed to be built now with the physical infrastructure components required for a future 500kV operating capacity. This will allow for future proofing of this section of the network and prevent any future disruptions and impacts to landholders by removing the need for additional future construction activities (post EnergyConnect (NSW – Eastern Section)).

The impacts associated with the construction of the required infrastructure and operating parameters of the full 500kV capacity line are presented in this EIS and the associated planning approval sought for them now.

From the proposed Dinawan 330kV substation, the alignment would travel in a typically south-east direction for around 19 kilometres, generally following the alignments of Bundure Road and Thurrowa Road to a crossing point with the Newell Highway.

From this point, the alignment would have a generally east-west alignment for around 45 kilometres, generally following the alignments of a section of transmission line parallel to the existing (disused) Narrandera-Tocumwal Railway (a distance of around 10.5 kilometres); Coonong Road, West Gums Road and Gums Road to Boree Creek Road, west of Lake Cullivel.

From Boree Creek Road, the alignment would be located to the south of Lake Cullivel through to Urana-Lockhart Road. At this point, the alignment would generally follow the alignments of Urana-Lockhart Road, Tenison Lane and Kings Lane to the Lockhart–The Rock Road. This alignment would be located to the south of the township of Lockhart. The distance of this section of the transmission line would be around 36 kilometres.

The sections of transmission line between the proposed Dinawan 330kV substation and the Lockhart–The Rock Road would be located within a new transmission line easement and would not be parallel to any existing high voltage electrical infrastructure.

From the point at which the transmission line crosses the Lockhart–The Rock Road, the alignment would be located parallel to an existing 132kV transmission line for around 39 kilometres (south side of existing easement). This section of the alignment would cross a series of key roadways including: County-Boundary Road, Bullenbong Road and The Rock-Collingullie Road.

At this point, the alignment would continue parallel (south side of existing easement) to an existing 330kV transmission line for around 24 kilometres to connect with the existing Wagga Wagga substation.

An overview of the proposed transmission line is shown in Figure 5-2a to Figure 5-2e.

Figure 5-2a

Detailed proposal transmission line arrangement

Sheet 1 of 5

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Roads
- Existing Railway
- Existing Substation
- Built Up Areas
- Waterbody
- Watercourse
- Existing Transmission Line
- Dinawan 330kV Substation

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Source: NSWSS, ESRI, Transgrid, WSP

Figure 5-2b

Detailed proposal transmission line arrangement

Sheet 2 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

Figure 5-2c

Detailed proposal transmission line arrangement

Sheet 3 of 5

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Roads
- Existing Railway
- Existing Substation
- Built Up Areas
- Waterbody
- Watercourse
- Existing Transmission Line
- Dinawan 330kV Substation

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Source: NSWSS, ESRI, Transgrid, WSP

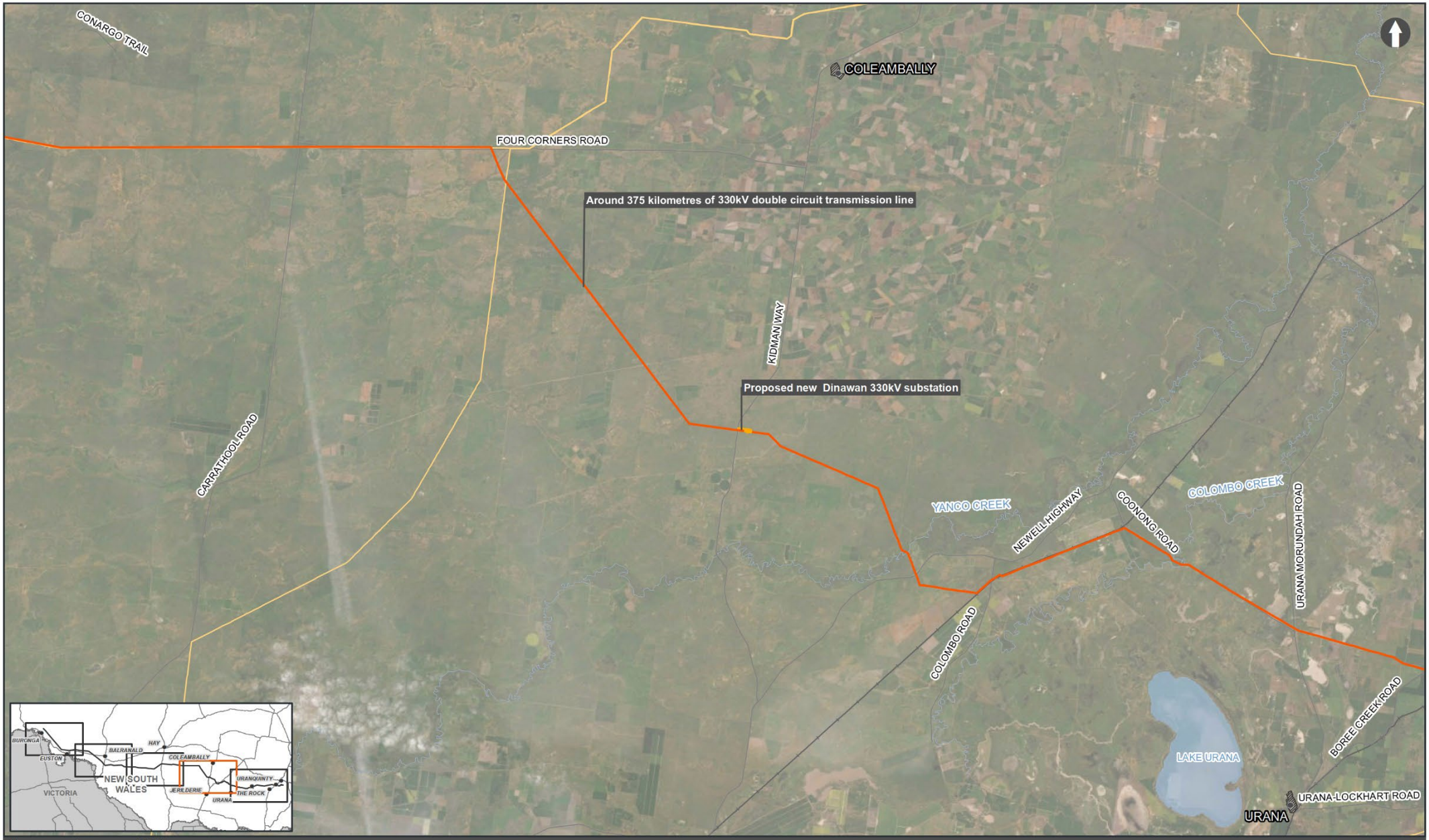

Figure 5-2d

Detailed proposal transmission line arrangement

Sheet 4 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

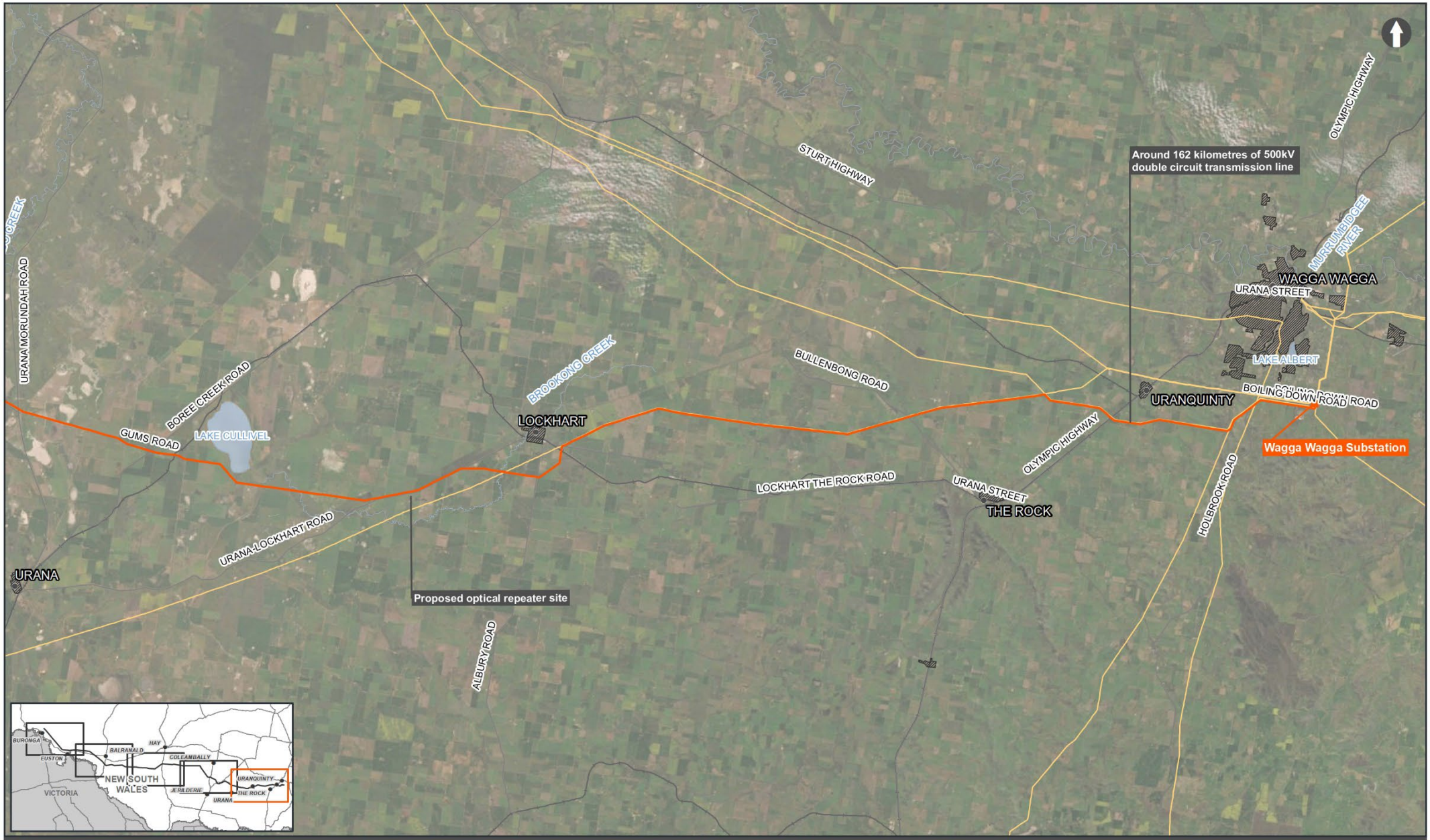

Figure 5-2e

Detailed proposal transmission line arrangement

Sheet 5 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

5.3.2. Transmission line towers

The proposed transmission line would be supported on a series of transmission line towers. The final location and specification of each tower would be dependent on a range of factors such as distance between each tower, local geotechnical conditions, local environmental constraints (for example the need to avoid specific areas of biodiversity and heritage). The type and arrangement of the towers would continue to be refined (micro-sited) as part of the finalisation of the infrastructure location with a view to further minimising environmental impacts, within the identified transmission line easement, wherever practicable.

For simplicity, all transmission line towers (guyed, suspension, strain, etc) along this corridor are referred to as transmission line towers within this EIS. A summary of the typical transmission line towers for the various anticipated voltages expected to be used for the proposal are outlined below.

5.3.2.1. 330kV transmission line towers

The 330kV transmission line towers would be typically spaced between 450 and 600 metres apart, however shorter distances may be required in limited circumstances. The number and exact type of each towers required would be confirmed as part of the finalisation of the proposed infrastructure locations.

The tower types for this section would consist of (refer to Figure 5-3):

- suspension towers for intermediate/straight sections of the transmission line, comprised of either:
  - a guyed steel tower – which consist of a thinner tower design with guy wires and ground anchors attached to provide stability. Typical height would be between around 40 and 60 metres. These tower types would have a typical permanent base footprint area of around 48 metres by 51 metres (or around 2,448 square metres) including the area to the guywire extents, noting that not all of this area would be directly impacted/require clearing. Only a radial area of around 20 metres around the guy pole and a radial area of around five metres around each guywire extent would be required to be cleared of vegetation)
  - as free-standing tower (also referred to a suspension towers) – which consist of a wider base and are self-supporting (that is, the tower does not require other supporting infrastructure such as guy wires). A typical height would be between around 40 and 60 metres. These tower types would have a typical permanent base footprint area of around 14 metres by 14 metres (or around 196 square metres). A radial area of around 20 metres from the structure would also be required for vegetation clearing.
- strain towers – which consist of a wider base and are self-supporting. This type of tower is used for the first and last tower of the transmission line, at major road or river crossings, and where there is a change in direction. This type of tower can also be used for structural reasons to break up long runs of suspension towers. Typical height would be between around 40 and 65 metres. These tower types would have a typical permanent base footprint area of between around 24 metres by 24 metres (576 square metres). A radial area of around 20 metres from the structure would also be required for vegetation clearing.

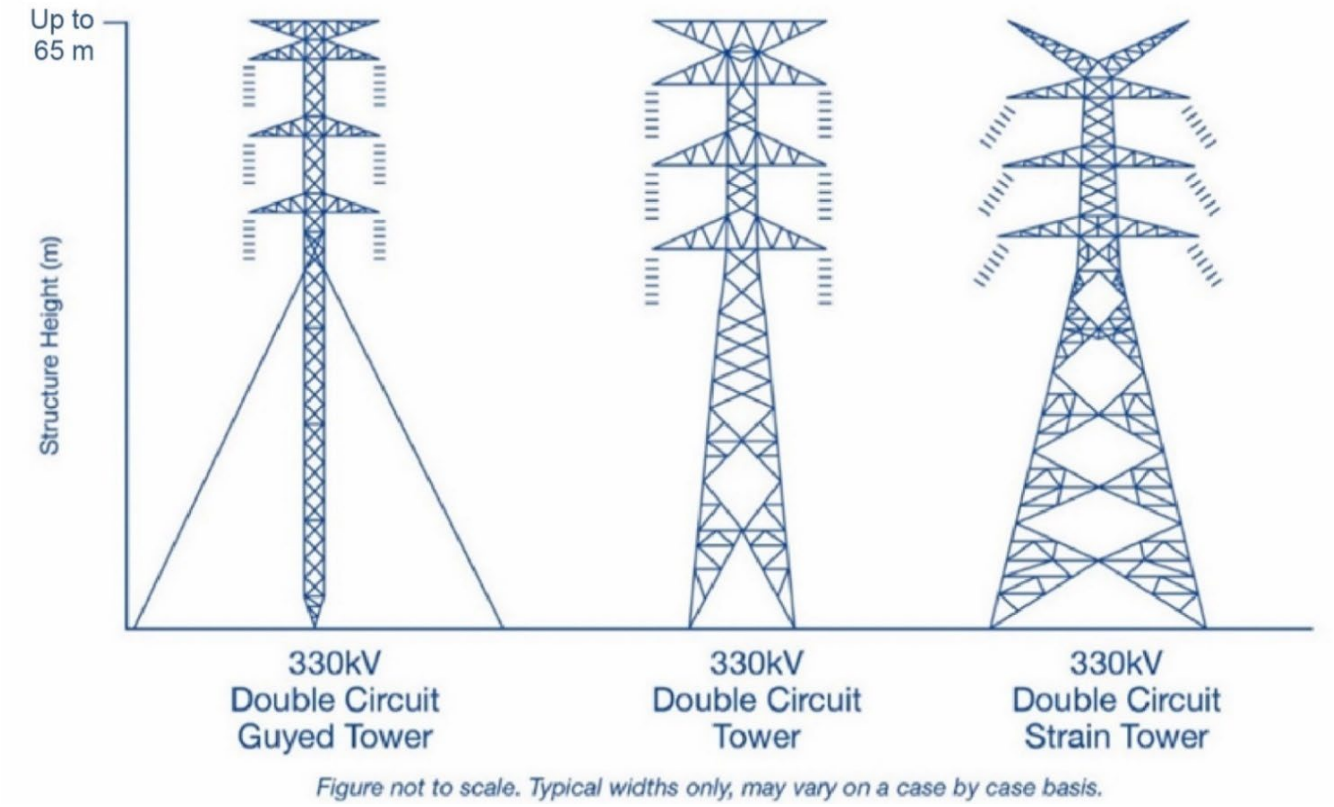


Figure 5-3 Proposed concept design for the transmission line towers on the 330kV line

The permanent disturbance footprint for each of the 330kV transmission line tower would also include a 20 metre vegetation cleared area around each tower.

5.3.2.2. 500kV transmission line tower

Similar to the 330kV line, the 500kV transmission line would be supported on a series of transmission line towers. These would be typically spaced between 450 and 600 metres apart, however shorter distances may be required in limited circumstances. The number and exact type of each towers required would be confirmed as part of the finalisation of the proposed infrastructure locations.

The tower types for this section would consist of

- suspension towers – This type of tower is used for the intermediate/straight sections of the transmission line and are self-supporting. Typical height would be between around 40 and 65 metres. These tower types would have a typical base footprint of around 22 metres by 22 metres (or around 484 square metres). A radial area of around 20 metres from the structure would also be required for vegetation clearing
- strain towers – which consist of a wider base and are self-supporting. This type of tower is used for the first and last tower of the transmission line, at major road or river crossings, and where there is a change in direction. This type of tower can also be used for structural reasons to break up long runs of suspension towers. Typical height would be between around 40 and 65 metres. These tower types would have a typical base footprint of around 26 metres by 26 metres (or 676 square metres). A radial area of around 20 metres from the structure would also be required for vegetation clearing.

Depending on local circumstances, the tower heights for both forms of towers could be up to 65 metres (refer to Figure 5-4).

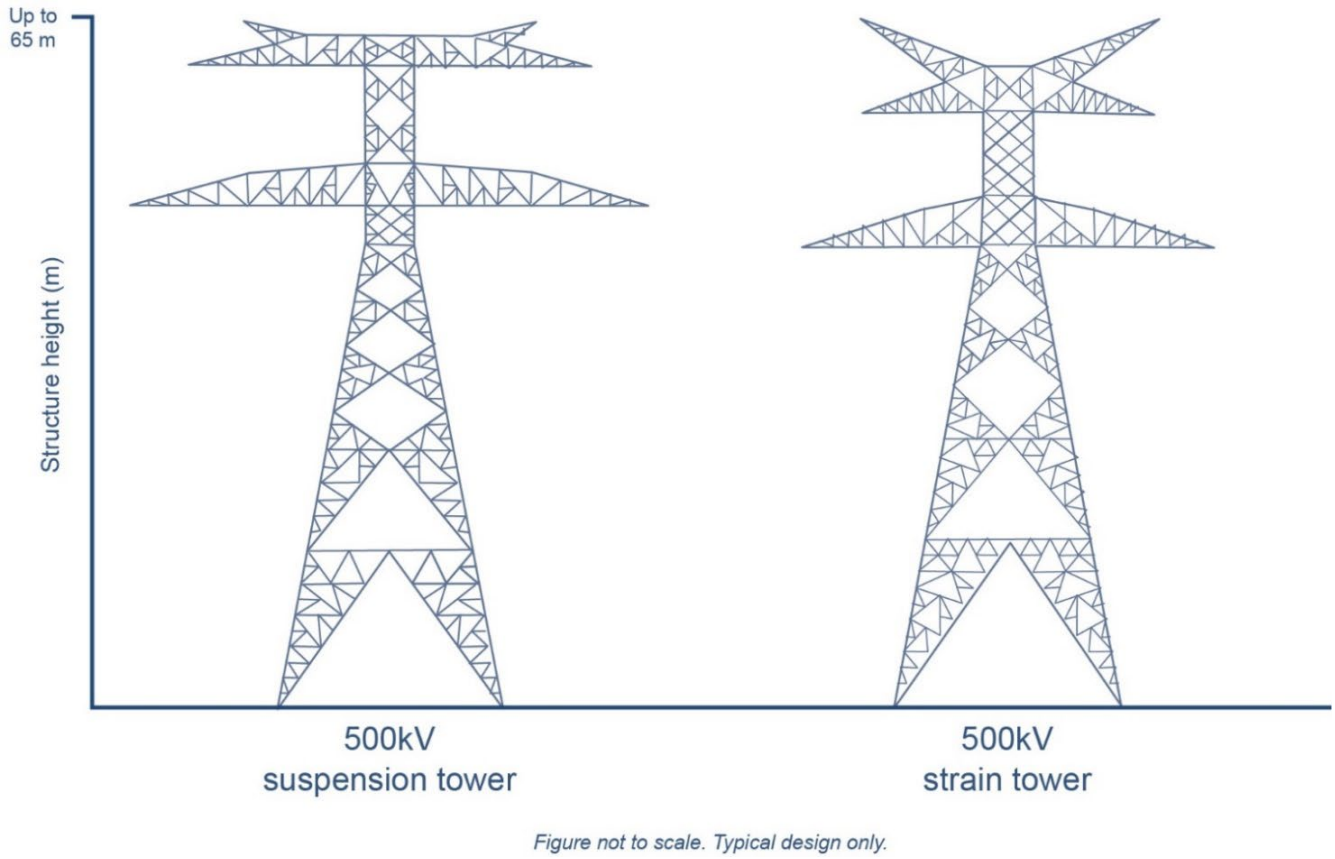


Figure 5-4 Proposed concept design for the transmission line towers on the 500kV line

The permanent disturbance footprint for each of the 500kV transmission line tower would also include a 20 metre vegetation cleared area around each tower (from the extents of the corner of the tower base).

5.3.3. Transmission line access

Land access protocols would be established with each landholder during the acquisition of property or easement interests including access requirements where necessary. Access to the proposed easement for construction and operational purposes would preferentially use existing public and private roads and tracks although some new access would be required to provide appropriate access to construction areas and some of these accesses may be retained for operational purposes in limited circumstances.

5.3.4. Proposed Dinawan 330kV substation

To provide a connection point between the existing Buronga and Wagga Wagga substation, a new 330kV substation would be constructed. The new substation, referred to as the proposed Dinawan 330kV substation, would be located along Kidman Way, around halfway between Coleambally and Jerilderie. A summary of the works associated with the proposed Dinawan 330kV substation site are described in the following sections.

While the current substation is proposed to be constructed to allow for operation at 330kV, the proposed substation site and design has been future proofed to allow for expansion of the site to accommodate additional 500kV substation infrastructure should this be required in the future. The expansion of the

proposed Dinawan 330kV substation to accommodate additional 500kV infrastructure would be subject to separate environmental approval and is not considered as part of the current proposal.

5.3.4.1. Built form and layout

The proposed Dinawan 330kV substation would be located approximately 500 to 700 metres east of Kidman Way and accessed via a newly constructed access road. The area of the proposed substation would be around 84,000 square metres (inclusive of the required buffer zone surrounding the site – refer to Figure 5-5). The final area required would be confirmed as part of the finalisation of the proposed infrastructure location.

The typical infrastructure and equipment that would be installed for the new substation would include:

- two line bays installed at the western end of the substation to provide a connection to the 330kV Buronga substation associated with two 60 mega volt ampere of reactive power (MVAr) Shunt Reactors and two line bays installed at the eastern end of the substation to provide a connection to the Wagga Wagga substation associated with two 50 MVAr Shunt Reactors
- two capacitor banks rated about 50 MVAr
- two 100 MVAr synchronous condensers (with 200 MVAr capability for 10 seconds), together with associated 330kV transformers. The transformers would also provide connection for auxiliary transformers which would provide low voltage AC for all switching station and synchronous condenser auxiliary loads
- a range of supporting 330kV electrical components including shunt reactors, overhead conductors, busbars and gantries
- 330kV circuit breaker switchgear equipment.

Other key features of the proposed substation would include:

- construction of up to three secondary system control buildings to accommodate protection for new switchgear and fixed portions of secondary system (such as fire protection, security system, air conditioning etc.) and 125 volt (V) direct current (DC) and 50V DC battery system
- control and protection systems (including relays, metering, disturbance recorder, etc.)
- 125V DC and 400V AC electrical distribution system
- lighting and lighting mast(s)
- oil containment system (including bunding and containment tank)
- communications network infrastructure including:
  - optical ground wire (OPGW) to be established within the substation
  - provision of a microwave link
  - two optical multiplexer network systems (powered by two independent battery systems).

The maximum height of the new equipment would be around 45 metres.

All key substation equipment (such as the transmission gantries, transformers, etc.) within the substation site would be fixed to either a driven steel pile or reinforced concrete footing. The transformers within the substation site would be bunded and incorporate a flame trap and drainage point in the event of an emergency. The hardstand areas of the substation site would be designed to drain to a reinforced concrete spill oil containment tank.

Figure 5-5 and Figure 5-6 show the layout of the proposed Dinawan 330kV substation, which are indicative only and would be subject to finalisation of the infrastructure design.

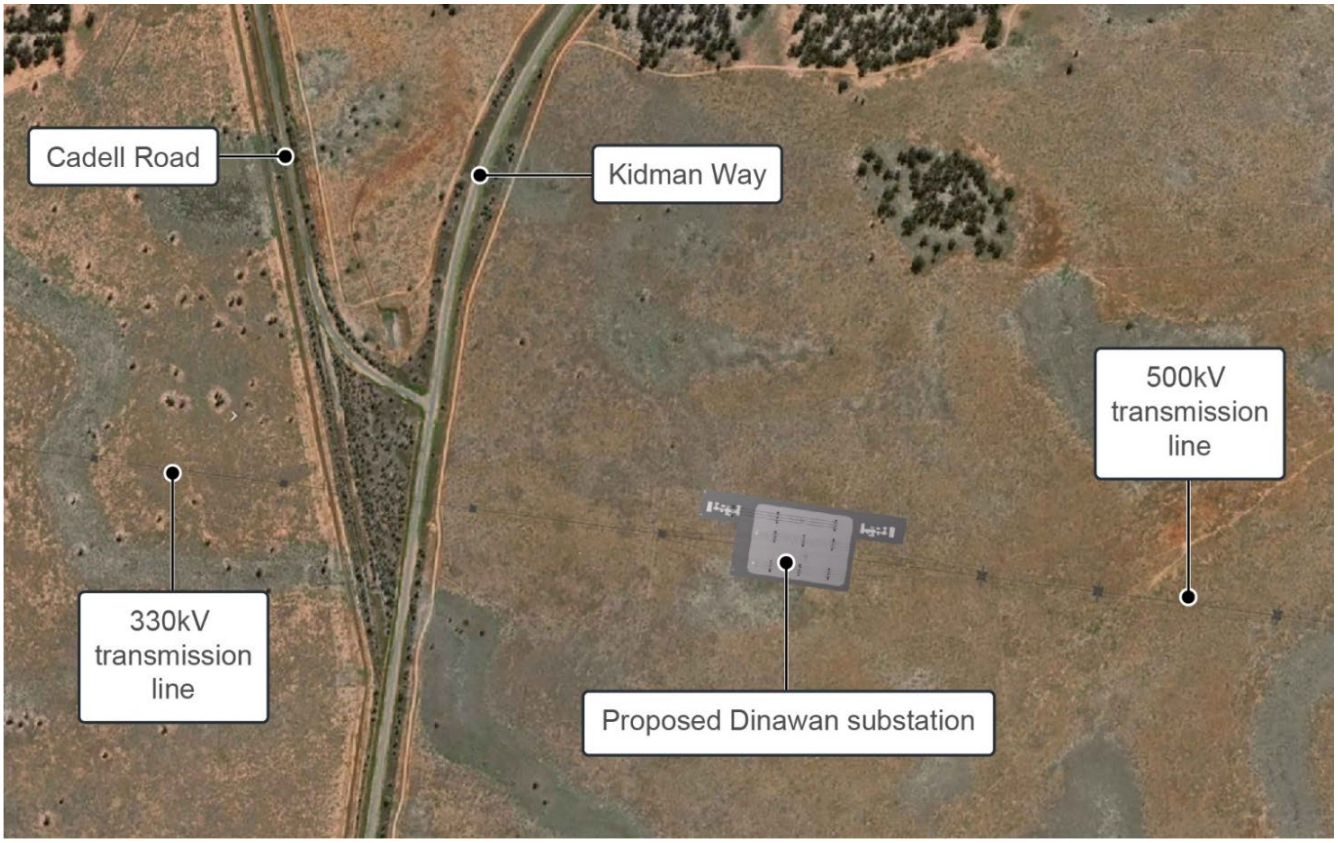


Figure 5-5 Plan of the proposed Dinawan 330kV substation layout (indicative)

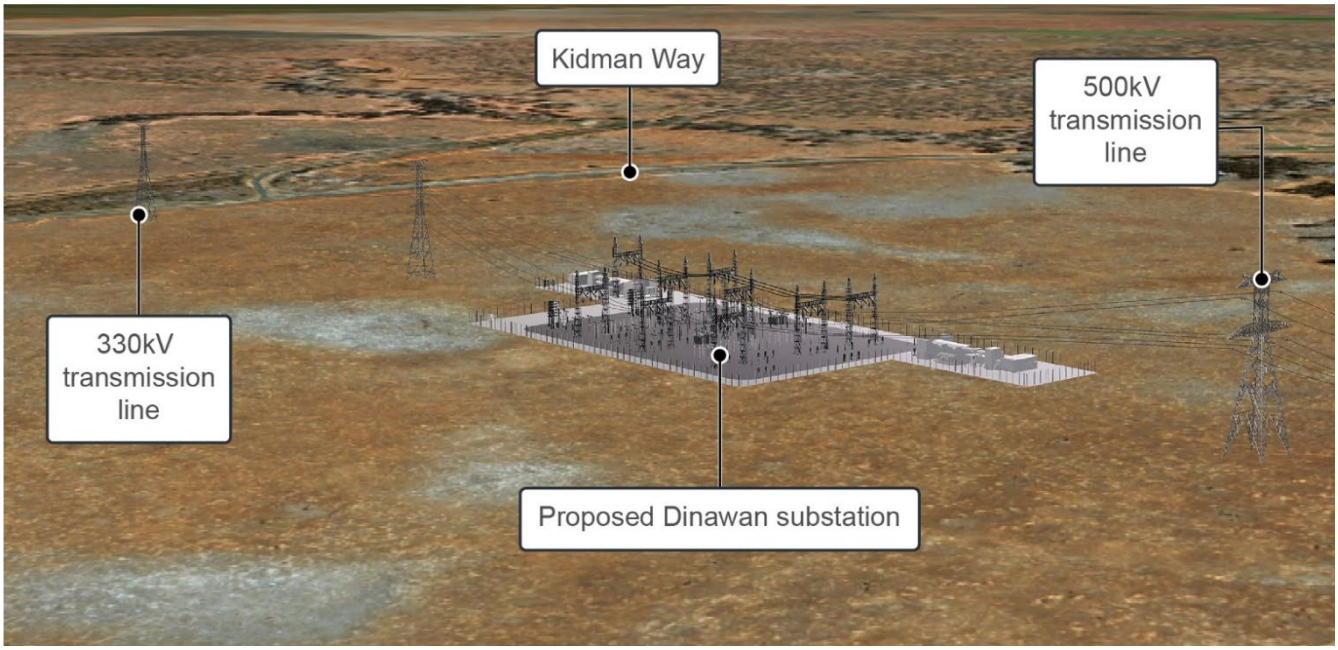


Figure 5-6 Arrangement of the proposed Dinawan 330kV substation layout (indicative)

5.3.4.2. Safety and security

Security fencing would be installed on all sides of the substation and would be compliant with current Transgrid standards for substation fencing. The security fence would be comprised of a galvanised steel (or similar) material. Two motorised sliding gates would also be installed to provide an overall opening of around seven metres at the main entrance point to the site and be operated by a security access card, with an adjacent pedestrian portal gate operated by key access (to allow emergency access).

To comply with Transgrid's safety requirements, additional security measures would be incorporated across and around the substation site. These would include:

- security cameras within the substation site
- safety and public information signage on both the substation and incoming and outgoing transmission line towers connections to ensure public safety
- an asset protection zone (APZ) – consisting of an area maintained to be cleared of all trees and vegetation which may affect the substation during a bushfire in accordance with Transgrid design and safety standards.

5.3.4.3. Lighting

Operational lighting would be required for the operation of the substation for site security and for the safety of operational personnel operating and maintaining the substation equipment. Operation of the substation lighting would be from dusk until dawn, seven days a week. The external lighting would be installed to maintain an even distribution across the site, typically located on poles around four metres in height. The substation lighting would minimise light spill to areas beyond the substation boundary including potential impacts on passing traffic along Kidman Way and local fauna.

5.3.4.4. Access and parking

A new access road around 600 metres long would be constructed from Kidman Way to the new substation as shown in Figure 5-5. The access road would allow access for employees undertaking maintenance operations and would also be suitable to allow longer vehicles as required (such as equipment replacement). The new access points would meet relevant Transport for NSW road design and council guidelines, including required sight-lines along Kidman Way.

Additional parking for around one truck and three general vehicles would be provided within the site boundary near the new control room buildings. Additional parking bays would be used by occasional maintenance and operational crew visiting the site. An unsealed, internal perimeter road would be constructed as shown in Figure 5-5.

5.3.4.5. Water supply

Water would be required for maintenance activities and the operation of the proposed Dinawan 330kV substation. This would require up to around 12,000 litres of water per year which would be sourced from the local council or water supplier and rainwater tanks at the substation.

5.3.4.6. Stormwater and drainage

An on-site stormwater drainage system to capture and discharge stormwater collected from within the expanded substation site during operation.

Runoff from outside the proposed Dinawan 330kV substation site would be intercepted and diverted around the site by new drainage infrastructure. The drains would be designed for rainfall corresponding to an annual exceedance probability (AEP) of two per cent (equivalent to around a one in 50-year probability that a given rainfall event would occur or exceed in any one year). The runoff would be diverted to natural watercourses using appropriate dispersion/dissipation structures or drainage systems.

Within the substation site, the stormwater drainage system would be designed for a rainfall corresponding to an AEP of 10 per cent per year (equivalent to around a one in 10-year probability). This system would include a series of surface drains which would interconnect with a grid of stormwater pits within the substation site.

The new substation would also be designed to have an impervious surface and an oil containment system would be installed (separate to the stormwater drainage collection system to prevent cross-contamination). The oil containment system would be designed in accordance with Transgrid's substation oil containment design procedure which defines Transgrid's approach to meeting the requirements of the *Protection of the Environment Operations Act 1997* (POEO Act).

5.3.4.7. Landscaping

Landscaping or visual screening of the substation site is not proposed.

5.3.5. Upgrade and expansion of the existing Wagga Wagga substation

To accommodate the new transmission lines, expansion and upgrade of the existing Wagga Wagga substation would be required to install new line bays, transformer bays and relocating existing bays including associated electrical and civil works. All works work associated with the upgrade and expansion of Wagga Wagga substation would occur within the existing substation site at the corner of Ashfords Road and Boiling Down Road, Gregadoo (to the south of the main town centre of Wagga Wagga).

A summary of the proposed upgrade and expansion works within the Wagga Wagga substation site are described in the following sections.

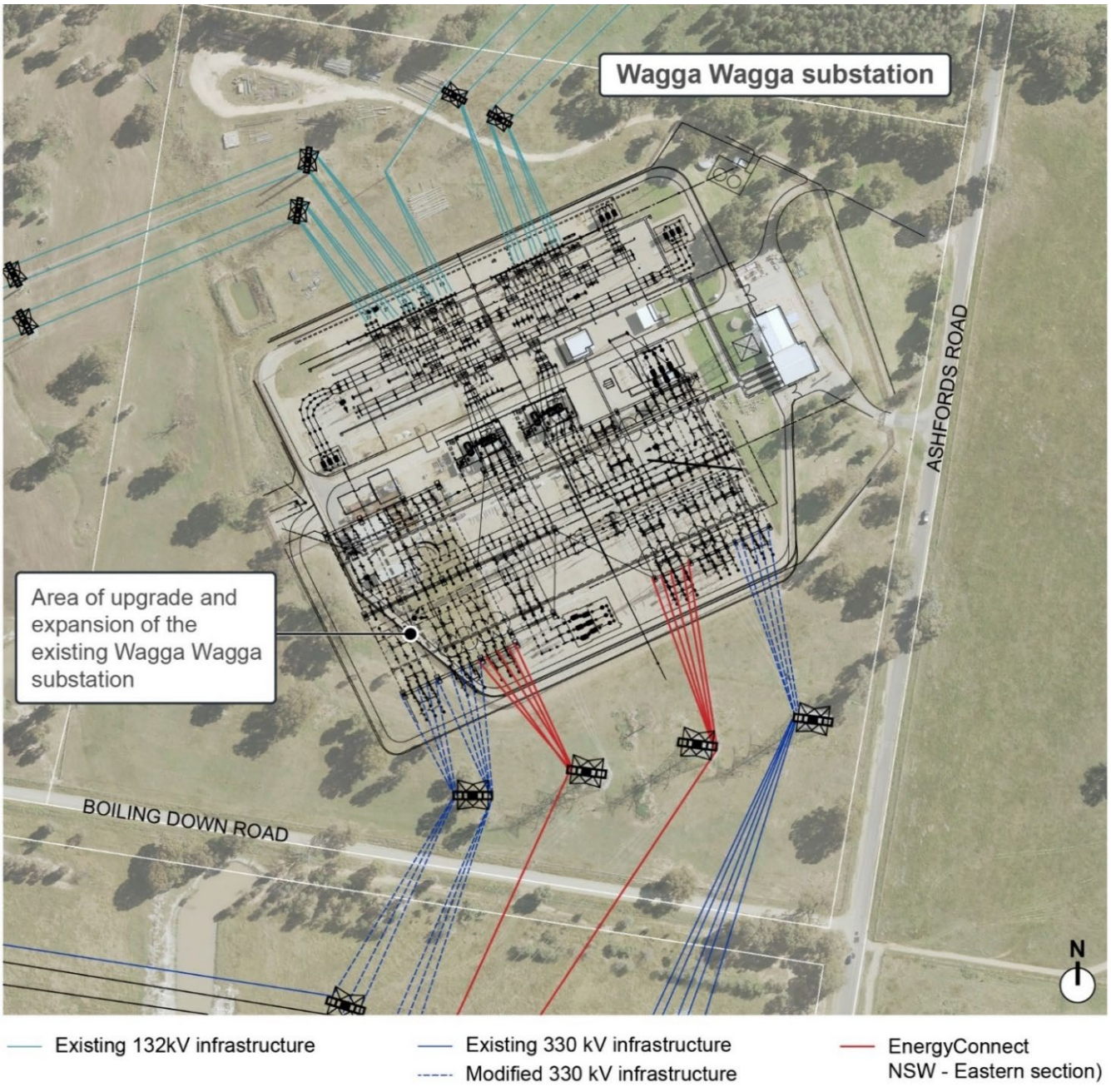
5.3.5.1. Built form and layout

The general layout and built form of the Wagga Wagga substation would not be highly altered by the proposal and expansion of the substation to the west of the existing infrastructure. The typical infrastructure and equipment that would be installed and works associated within the upgrade and expansion substation site for the Wagga Wagga substation would include:

- new bays constructed to the west of the existing infrastructure and associated civil works (new foundations and cable trench extension)
- relocation and connection of existing and proposed new circuit for incoming transmission lines including:
  - Darlington Point transmission line (existing)
  - Jindera transmission line (existing)
  - Lower Tumut transmission line (existing)
  - the proposed 330kV Dinawan transmission line (the proposal)
- relocation, modification and replacement of other existing electrical infrastructure within the Wagga Wagga substation site including existing capacitor banks and associated equipment, line disconnector/ earthing switches, surge arresters and capacitor voltage transformers
- extension of the existing switchyard and fencing within the existing substation site

- demolition of the existing transformer storage, oil storage and equipment sheds to accommodate the double circuit configuration. Works would be required to clear the concrete base, bunds and other utilities (oil and water pipes which would require relocation)
- localised earthworks and associated civil works required to accommodate the new infrastructure within the existing substation site
- potential extension or adjustment to the external catch drains diverting the external catchment (subject to finalisation of the proposal design).

Figure 5-7 shows the layout of the proposed upgrade and expansion of the Wagga Wagga substation infrastructure, which are indicative only and would be subject to finalisation of the infrastructure design.



Note: Design shown is indicative. Subject to finalisation.

Figure 5-7 Arrangement of the proposed upgrade and expansion of Wagga Wagga substation

5.3.5.2. Access and parking

No additional parking or access arrangements would be required for the operation of the additional infrastructure to be constructed within the existing Wagga Wagga substation site. However, the proposed upgrade and expansion of the Wagga Wagga substation would require adjustment/extension to the internal perimeter road to accommodate access to the additional infrastructure.

5.3.5.3. Stormwater and drainage

An on-site stormwater drainage system currently exists within the Wagga Wagga substation to capture and discharge stormwater collected from within the site. Some additional stormwater drainage would be required to be installed to extend any existing infrastructure within the vicinity of the proposed works (within the boundary of the existing substation site).

5.3.5.4. Utility relocations

Minor works to existing electrical infrastructure may be required in order to complete the proposed civil and electrical works, including relocation of some existing utilities.

The proposed upgrade and expansion of the Wagga Wagga substation to accommodate the additional transmission lines associated with the proposal would not impact on any of the other operational aspects of the substation. These aspects include existing operation and maintenance requirements, safety and security measures or parking arrangements.

5.3.6. Ancillary infrastructure

5.3.6.1. Optical repeater sites

In addition to the key transmission line and substation infrastructure, three communication repeater sites would be required at various intervals along the alignment. The repeater sites are communication huts which contain signal boosting equipment and back-up power supplies to ensure the stability of the communications system over great distances (greater than around 135 kilometres). The optical repeater sites facilitate communication of protection and control systems between substations. The communication huts would include a security fence erected around the perimeter of the structure.

The proposed communications huts would be located at the following locations:

- within the existing Balranald substation site (Balranald repeater site)
- adjacent to the proposal located along the Booroorban-Tchelery Road, west of the Cobb Highway (Booroorban repeater site)
- along Urana-Lockhart Road, to the south west of Lockhart (Brookong repeater site).

The locations of the proposed communications huts are shown on Figure 5-2b, Figure 5-2c and Figure 5-2e.

Built form and layout

The general layout and built form of each communication hut would include a small shelter around 3.2 by 4.6 metres. The hut would contain the relevant electrical and communications equipment required to operate the repeater functions.

An example of a proposed communication hut it shown in Figure 5-8.

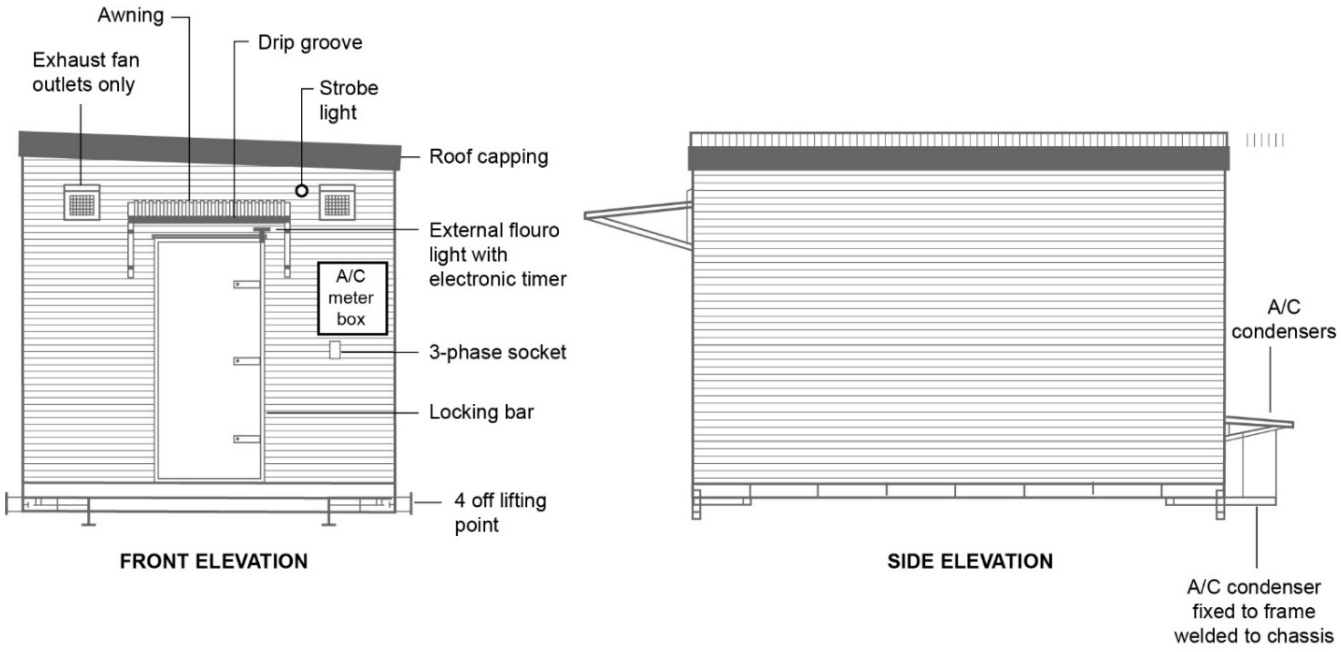


Figure 5-8 Example of a proposed optical repeater station communication hut

Electrical connections

The repeater sites would require two sources of low voltage electrical supply. One source would be via solar panels (to be mounted on the roof of each communications hut), and the other would be from a new connection to the existing the Essential Energy network. The Essential Energy network in this regional area is high voltage. As a result, either a pole-top transformer or a pad-mount transformer would be required to convert the high voltage supply to the necessary low voltage supply. For each of the proposed sites, the following is proposed:

- Balranald repeater site
  - connection of around 75 metres of underground conduit and cabling to connect the new repeater site to the proposal running parallel to the Balranald substation.
- Booroorban repeater site
  - The proposed communication hut would be connected to an existing Essential Energy transmission line to the north of the alignment. The connection would require:
    - > around two kilometres of new overhead electrical infrastructure (overhead wires and around 10 new poles at regular spacings) within a 25-metre easement.
    - > installation of a new pole-mounted transformer adjacent to the communications hut for connection
- Brookong repeater site
  - installation of a new pole-mounted transformer on a new pole close to the proposed communications hut and provision of an overhead electrical connection (around 90 metres) to the nearest Essential Energy infrastructure on the southern side of Urana-Lockhart Road.

An overview of the proposed electrical connection requirement for each communication repeater station is shown on Figure 5-9.

EnergyConnect (NSW - Eastern Section)
EnergyConnect (NSW - Western Section)
Roads
Existing Railway
Existing Substation

Construction Impact Area
Built Up Areas
Waterbody
Watercourse

Approximate Optical Repeater Sites
Approximate Optical Repeater Sites

Optical Repeater Sites Description
Proposed 2km of New Essential Energy LV

Proposed Overhead HV Cable
Proposed Underground HV Cable

Figure 5-9

Overview of the electrical connection requirements for the proposed optical repeater sites

C:\Users\AUDG504200\WSP O365\EnergyConnect - General\5_Shared\54_Production\Maps\003_PEC_East\05_SubmissionsReport\Amendment_Report\PS117658_EIS_0509_OverviewOpticalRepeater_r1v8.mxd

Source: NSWSS, ESRI, Transgrid, WSP

5.4. Operation and maintenance

The expanded substation and transmission lines would be inspected by field staff and contractors on a regular basis, with other operational activities occurring in the event of an emergency (as required).

Likely maintenance activities would include:

- regular inspection (ground and aerial) and maintenance of electrical equipment
- general building, APZ and general landscaping maintenance
- fire detection system inspection and maintenance
- fence repair
- stormwater and drainage infrastructure maintenance.

5.4.1. Transmission line maintenance

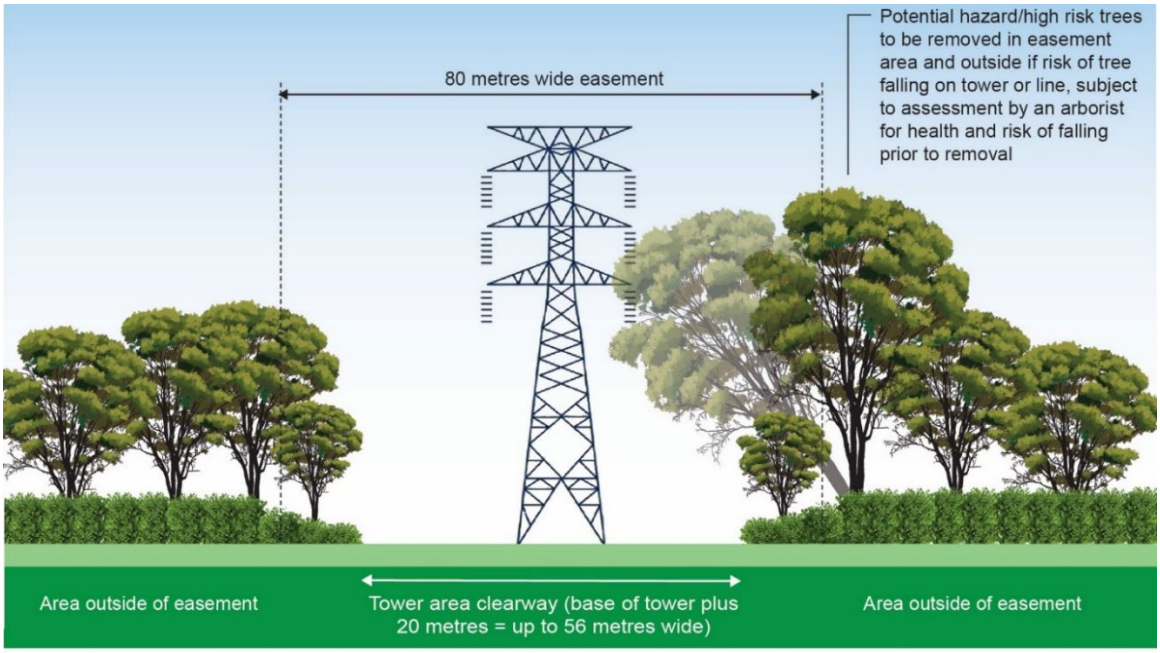
Regular maintenance activities would be required for the transmission lines during its operation. Likely maintenance activities would include:

- regular inspection and maintenance of transmission lines, towers and poles including:
    - an annual fly over as part of seasonal bushfire prevention surveys
    - routine infrastructure inspection on a six-yearly cycle for self-supporting towers and three-yearly cycle for guyed towers. This would typically involve two to three maintenance crews driving a light vehicle from public roads to the easement utilising access tracks, then along the easement inspecting each transmission line tower in turn. Towers would be inspected both from the ground and by personnel climbing the tower
    - routine/planned line maintenance using a light vehicle(s), an elevated work platform and a medium sized truck with up to around five to ten personnel to rectify any defects found from routine inspections. Generally, this would occur within the same three to six-year maintenance cycles as the routine infrastructure inspection
- ad hoc fault and emergency fly over(s) to assess infrastructure condition should an unplanned outage occur (for example through a weather event or other failure of infrastructure). This maintenance would occur as required. The amount of maintenance and/or crew required for repair of any damaged infrastructure would depend on the extent of repairs required
- vegetation removal required to maintain appropriate clearances between ground vegetation and transmission lines. Vegetation below the transmission lines would require ongoing maintenance throughout the operation to ensure electrical safety clearances and protection zones are maintained. The required clearance of vegetation within the corridor would be undertaken in accordance with Transgrid maintenance guides (refer to section below).

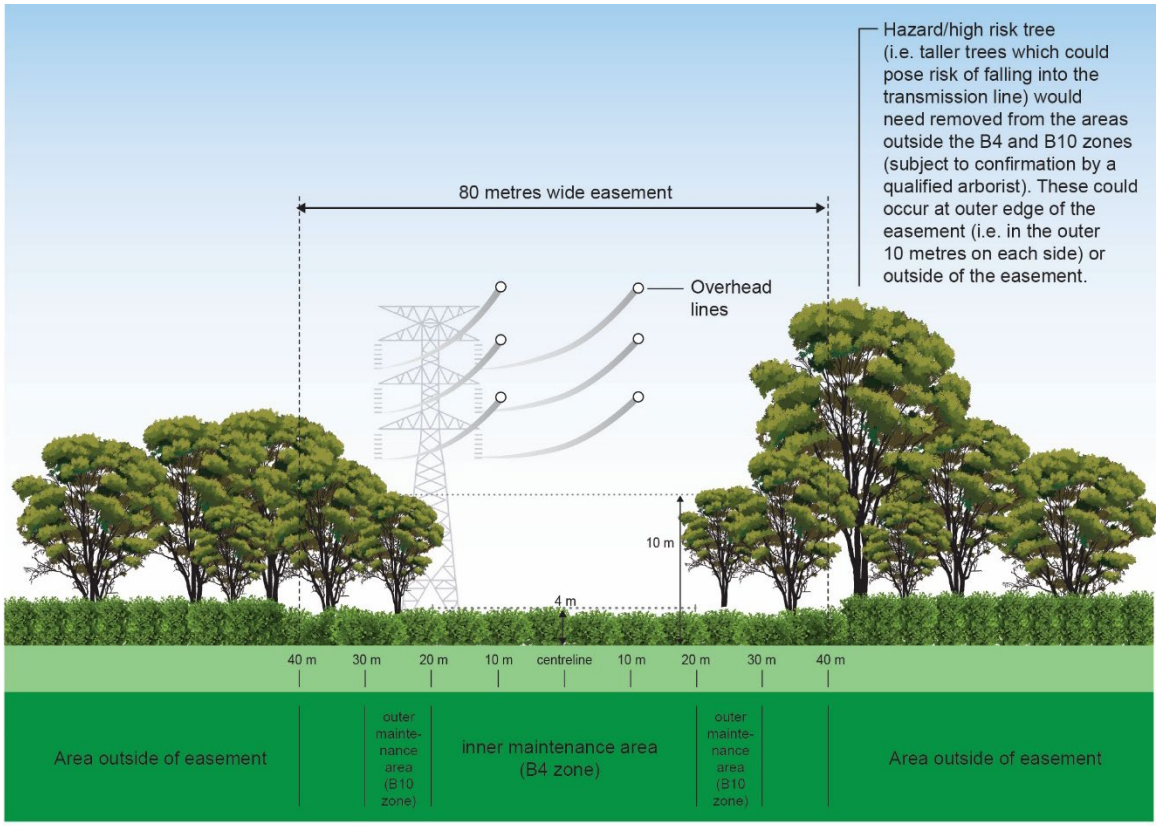
5.4.1.1. Vegetation clearance

The following approach is proposed noting that final refinement of the proposal may allow for some increase in vegetation height to occur if vegetation clearances are able to be achieved for each of the transmission line arrangements:

- For the 80 metre wide 330kV easement, vegetation clearing would generally only be required for the centre 60 metre wide section (which includes the inner and outer maintenance zones combined). To achieve this, the following clearances would be implemented (refer to Figure 5-10):
  - inner maintenance zone – vegetation with growth heights of up to four metres can be retained from the centreline out to 20 metres distance from the centreline (i.e. a 40 metre wide inner section of the easement)
  - outer maintenance zone – vegetation with growth heights of up to 10 metres would be able to be retained in the easement section which is 20 metres to 30 metres from the centreline. This is permitted as the maximum sag point height is increased at this greater distance for the centreline and therefore taller vegetation is permitted without impacting on the vegetation clearance requirements
  - vegetation clearing within the outer 10 metres of each side of the easement would not be required (with exception of hazard / high risk trees ~~– refer below~~)
  - hazard/high risk trees located along the corridor would be removed, inside and outside the easement area, where they are identified to pose a risk to the transmission line, subject to assessment by an arborist for health and risk of falling prior to removal – refer below.
- For the 80 metre wide 500kV easement, vegetation clearing would be required to some extent for the full 80 metre wide section. To achieve this, the following clearances would be implemented (refer to Figure 5-11):
  - inner maintenance zone – vegetation with growth heights of up to four metres can be retained from the centreline out to 30 metres distance from the centreline (i.e. a 60 metre wide inner section of the easement)
  - outer maintenance zone – vegetation with growth heights of up to 10 metres would be able to be retained in the easement section which is 30 metres to 40 metres from the centreline. This is permitted as the maximum sag point height is increased at this greater distance for the centreline and therefore taller vegetation is permitted without impacting on the vegetation clearance requirements
  - hazard/high risk trees located along the corridor would be removed, inside and outside the easement area, where they are identified to pose a risk to the transmission line, subject to assessment by an arborist for health and risk of falling prior to removal – refer below.



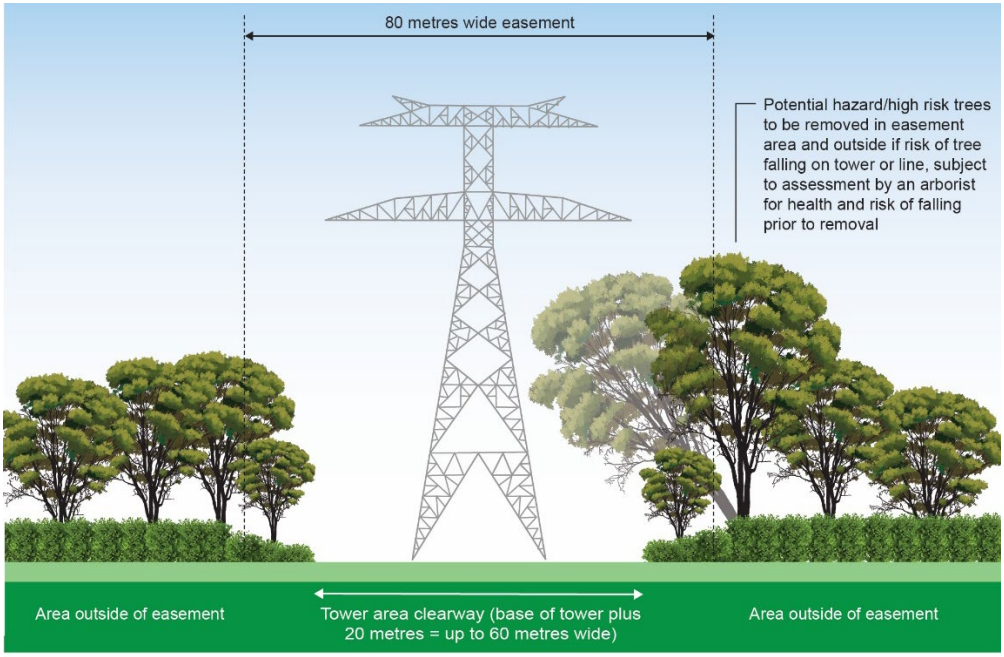
Vegetation in the easement to be maintained to achieved minimum clearance requirements.



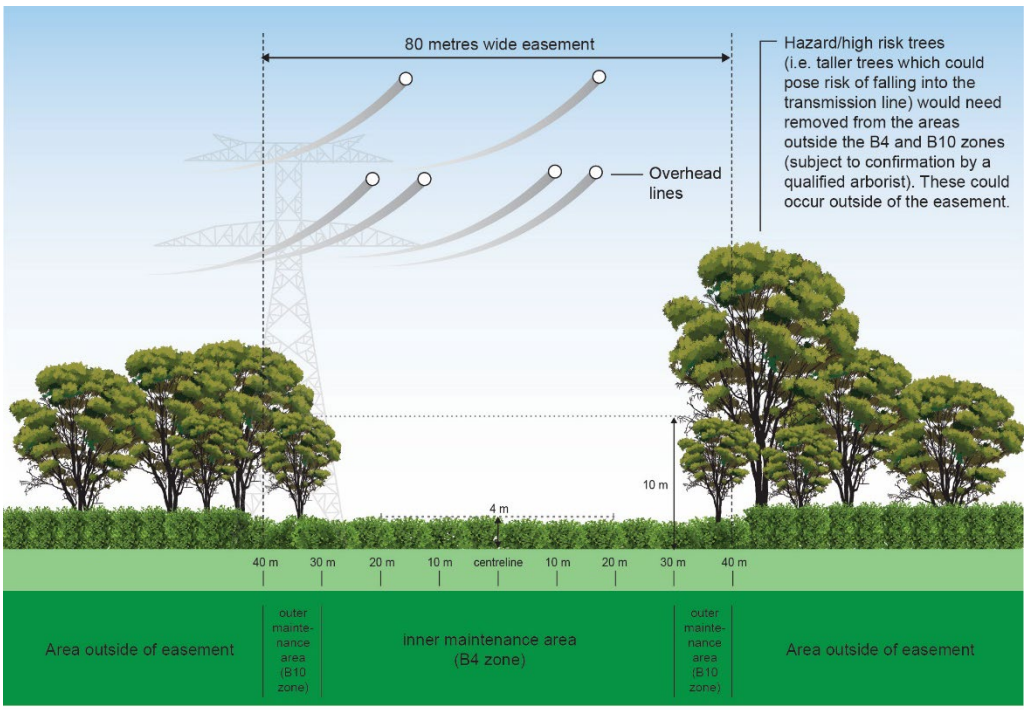
Vegetation in the centre 60 metres wide section of 80 metres wide easement to be maintained to achieved minimum clearance requirements (based on growth heights).(Assessed as up to 4 metres growth heights in inner maintenance area and up to 10 metres in outer maintenance area)

Note: Towers shown are indicative. Subject to finalisation of the proposal design.

Figure 5-10 Elevation of the indicative proposed vegetation clearing requirements within the 330kV transmission line at tower locations (top) and mid easement between towers (bottom)



Vegetation to be removed in inner 60 metres wide section. Vegetation in outer 10 metres wide section on each side of easement to be maintained to achieve minimum vegetation clearance requirements (about 10 metres growth height permitted).



Vegetation in the easement to be maintained to achieved minimum clearance requirements (based on growth heights). (Assessed as up to 4 metres growth heights in inner maintenance area and up to 10 metres in outer maintenance area)

Note: Towers shown are indicative. Subject to finalisation of the proposal design.

Figure 5-11 Elevation of the indicative proposed vegetation clearing requirements within the 500kV transmission line at tower locations (top) and mid easement between towers (bottom)

Hazard/high risk trees

Hazard/high risk trees are defined under Transgrid procedures and include any tree or part of a tree that if it were to fall would infringe on the vegetation clearance requirements at maximum conductor sag of the transmission lines. Hazard/high risk trees will be confirmed based on the final proposal design (considering the transmission line conductor profile) and following qualified arborist assessment of the tree. All hazard/high risk trees confirmed as posing a risk to the corridor shall be removed.

To enable adequate assessment of future potential impacts on hazard/high risk trees beyond the disturbance area the following parameters have been established for both the 330kV and 500kV transmission lines:

- 330kV transmission line – hazard/high risk tree height is greater than 30 metres at the outer edge of the disturbance area B10 (i.e. outside the easement) and around 39 metres at 10 metres beyond
- 500kV transmission line – hazard/high risk tree height is 20 metres at the outer edge of the disturbance area B10 (i.e. outside the easement) and 29 metres at 10 metres beyond.

Trees located outside the disturbance area that exceed or have potential to exceed these defined hazard/high risk tree parameters include trees occurring in certain taller growing PCTs as defined in section 4.3.6 of the *Revised Biodiversity Development Assessment Report*. These sections have been located along the alignment and assessed for impact of removal of hazard / high risk trees.

5.4.2. Proposed Dinawan 330kV substation operation and maintenance

The proposed Dinawan 330kV substation would not accommodate full-time staff or contractors. Maintenance at the substation site would typically include ad-hoc attendance (up to three times a week) of one or two switching operators to undertake planned and unplanned switching of equipment. It is expected that these activities would only require light vehicles and/or small to medium plant (depending on the works required). Any waste generated during operation would be minimal and disposed of on an 'as need' basis to a licensed waste facility by the attending maintenance personnel.

Additional maintenance activities at the expanded substation site would typically include:

- routine substation infrastructure inspection (such as transformers and other electrical plant and equipment) throughout the year by around two to three personnel
- routine/planned substation maintenance of equipment, property and switchyard areas on a scheduled basis. This would typically be monthly and undertaken by around three to five maintenance personnel
- ad hoc fault and emergency works for repair of any damaged infrastructure (for example through a weather event or other failure of infrastructure). This maintenance would occur as required. The amount of maintenance and/or crew required to access for repair of any damaged infrastructure would depend on the extent of repairs required.

Equipment for the substation is expected to have a service life of around 50 years. Maintenance would be regularly undertaken for the different infrastructure components and plant items such as transformers. These components would be replaced/refurbished towards the end of their serviceable life, allowing the service life of the substation to be extended.

5.4.3. Wagga Wagga substation operation and maintenance

The upgrade and expansion of the Wagga Wagga substation would not change the existing operational or maintenance requirements that currently occur for this infrastructure.

5.5. Land acquisition, easements and operational access

5.5.1. Freehold land acquisition

The land required for the proposed Dinawan 330kV substation (inclusive of APZs) has been acquired and comprise the following parcels:

- Lot 4 DP 593483
- Lot 52 DP 756396
- Lot 53 DP 756396
- Lot 54 DP 756396
- Lot 55 DP 756396.

The need for acquisition of any further land as part of the proposal would be determined during finalisation of the proposal in consultation with relevant landholders (as required).

5.5.2. Easements

Transgrid is continuing to work with relevant landholders to create the new transmission line easements. Typical easement requirements for the proposal are further discussed in the following section.

All acquisitions of privately owned land would be carried out in consultation with the landholders through the private treaty process or in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* and the supporting NSW Government Land Acquisition Reform 2016.

The acquisition of Crown Land would be undertaken in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991, Crown Lands Management Act 2016* and the *Crown Land Legislation Amendment Act 2017*.

Additionally, as the proposal would travel through two areas of land reserved under the NP&W Act being the Yanga State Conservation Area, Cullivel State Forest and the Brookong State Forest, Transgrid would also need to secure easements for these relevant sections under Section 47I of the NP&W Act.

5.5.2.1. Transmission line easement

The transmission line between the Buronga substation and Wagga Wagga substation would be located within an easement up to 80 metres wide. This easement would provide a right of access to construct, maintain and operate the transmission line and other operational assets associated with the line (such as the transmission line towers and conductors). The easement would also ensure safe electrical clearances during the operation of the lines.

The transmission line easement would also be required to accommodate other permanent infrastructure including the optical repeater station communication huts at Booroorban and Brookong (noting the Balranald site within be located within the existing Balranald substation yard). Additional minor easements would also likely be required for the associated power connection infrastructure to these communication huts where this falls outside the proposed easement for the new transmission line.

5.5.3. Operational access requirements

Access to the proposed easement for operational purposes would preferentially use existing public and private roads and tracks, although access tracks created for construction may be retained during operation of the proposal to provide safe access (refer to Section 6.6.1.2). Access easements may be required to provide Transgrid with access from the nearest public road to the easement. These access easements would be negotiated with landholders as necessary. Transgrid may install locked and signed access gates to enable access to the easement should a landholder not have a suitable existing gate nearby.

Appendix B Updated proposal description (construction)

6. Proposal construction

This chapter describes the likely key construction works for the proposal and describes the indicative construction staging, strategy and program.

The construction approach and methodology presented in this chapter has been developed with input from the nominated construction contractor (SecureEnergy) and would continue to be refined as the design and construction planning progresses. The final construction methodology and program would continue to be developed by the nominated construction contractor. This would be reviewed for consistency with the assessment contained in this EIS, including relevant mitigation measures and any future conditions of approval.

Any material changes to the construction methodology which could result in additional environmental impacts to those assessed in this EIS would be the subject of additional environmental assessment or consistency review, as relevant.

6.1. Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements relating to the description of the proposal and where these requirements are addressed in this EIS are outlined in Table 6-1.

Table 6-1 Secretary's environmental assessment requirements – Proposal construction

Ref.	Secretary's environmental assessment requirements	Where addressed in the EIS
General requirements	The EIS must include:	
	• a full description of the project, accompanied by suitable maps and plans, including the:	This chapter provides a description of the construction activities and sites associated with the proposal and is supported by figures. A description of operational component of the proposal is provided in Chapter 5 (Proposal infrastructure and operation).
	- disturbance area;	The construction impact area for the proposal is described in Section 6.4. A more defined disturbance area for the biodiversity and heritage assessments is described in Section 8.1.1).
	- physical layout of the project over time, including sections of key components;	Description of the physical layout of the proposal is provided throughout this chapter, in particular Section 6.5 to Section 6.7. Figure 6-1 and Figure 6-4 provide the location of the proposal and key supporting main construction sites and accommodation camps.
	- key uses and activities to be carried out on site;	This chapter provides a description of the key uses and activities to be carried out during construction. A description of operational activities is provided in Chapter 5 (Proposal infrastructure and operation).

Ref.	Secretary's environmental assessment requirements	Where addressed in the EIS
	- likely timing of the project including any stages, the key phases within each stage (site preparation, construction, commissioning, operation, decommissioning and rehabilitation) and the sequencing of these stages and phases.	This chapter provides the program for the proposed construction of the project and describes the proposed phases of construction (refer to Section 6.3, Section 6.5, Section 6.6 and Figure 6-2).

6.2. Construction overview

Key works for the proposal would typically include (but not be limited to):

- enabling works phase (refer to Section 6.6.1)
  - investigation works such as geotechnical, contamination, ecology and service locating
  - site establishment (including early stages of establishment and operation of some construction compound and accommodation camp components)
  - vegetation clearance
  - property adjustment
  - service connections, and utility relocation and protection
  - access tracks
  - material deliveries
- main construction phase (refer to Section 6.6.2)
  - transmission line construction
  - Dinawan 330kV substation construction
  - Wagga Wagga substation upgrade and expansion
  - optical repeater sites
  - Buronga substation connection
- commissioning and demobilisation phase (refer to Section 6.6.3)
  - commissioning
  - demobilisation.

An overview of the key construction features of proposal is provided in Table 6-2 and shown in Figure 6-1. Further details of each of the construction phases is provided in Section 6.6.

Table 6-2 Project summary table – construction

Proposal element	Summary of the proposal	Figure/table reference
Construction program	Construction of the proposal would commence in late-2022 (enabling works phase). The main construction works phase for the transmission lines and substation facilities would take around 18 months.	Figure 6-2
Construction workforce	During peak construction activities, around 500 workers.	Table 6-6

Proposal element	Summary of the proposal	Figure/table reference
Construction impact area	The construction impact area (i.e. overall site area required for the proposal) for the proposal would encompass all construction activities and components of the proposal (including the main construction compounds and accommodation camp sites and access tracks). This would comprise an approximate area of around ~~5,000~~ 4,889 hectares. Of this area, the construction footprint would comprise the following: • disturbance area A: around ~~2,066~~ 1,954 hectares • disturbance area B: around 2,935 hectares.	Figure 6-4a to Figure 6-4e and Appendix F of the EIS
Construction compound and accommodation camps	Several main construction compound and accommodation camps would be required to support the construction of the proposal including sites at: • Buronga (approved for use as part of EnergyConnect (NSW – Western Section, including ongoing use for EnergyConnect (NSW – Western Section) • Balranald (two options being considered) • Cobb Highway • Dinawan • Lockhart ~~(two options being considered)~~ • Wagga Wagga. The final location of the Balranald ~~and Lockhart~~ site~~s~~ would be selected prior to construction following ongoing landholder agreement. The construction compound and accommodation camp sites would accommodate a range of facilities including: • staging and laydown facilities • concrete batching plants (Balranald, Cobb Highway, Dinawan and Lockhart sites) • new workforce accommodation camp areas (Cobb Highway, Dinawan and Lockhart sites) • demountable offices • construction support facilities including vehicle and equipment storage, maintenance sheds, chemical/ fuel stores and potential stockpile areas.	Figure 6-4a to Figure 6-4e
Water management	Around 1.1 gigalitres of water would be required for construction, comprising: • 728 megalitres for dust suppression • 203 megalitres for earthworks compaction • 20 megalitres for concrete batching activities (potable water) • 11 megalitres for vehicle washdown facilities • 100 megalitres for camp sites (potable water). Water would be supplied for the proposal from existing regulated sources. No new extraction infrastructure from existing watercourses is proposed as part of the water supply points proposed.	Figure 6-9

Proposal element	Summary of the proposal	Figure/table reference
Construction haulage routes	Construction haulage routes have been divided into the following: • Primary haulage routes – haulage route between cities/ports and the main construction compounds • Secondary haulage routes – haulage routes between the main construction compounds and the transmission line work areas • Water haulage routes – identified routes proposed to be used by water trucks to travel between water source and the nearest primary or secondary routes.	Figure 6-12a and Figure 6-12b

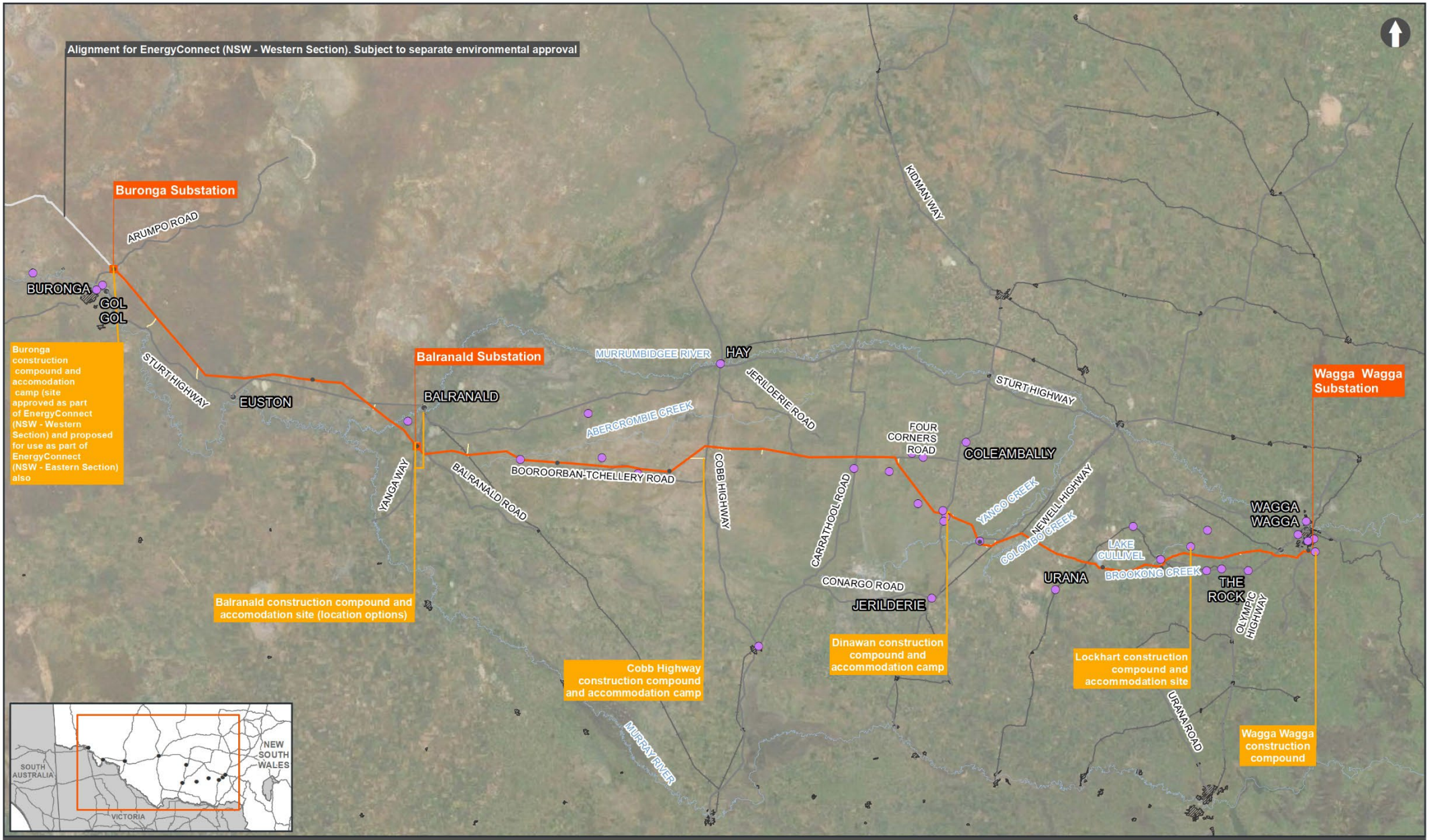


Figure 6-1

Overview of key construction features

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Main Construction Compound and Accommodation Sites
- Access Tracks
- Water Fill Point
- Existing Substation
- Existing Railway
- Built Up Areas
- Waterbody

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Source: NSWSS, ESRI, Transgrid, WSP

6.3. Indicative construction program

Construction of the proposal would commence in late-2022 (enabling works phase), subject to NSW Government and Commonwealth planning approvals. The main construction works phase for the transmission lines and substation facilities would take around 18 months. The upgraded Wagga Wagga substation and proposed Dinawan 330kV substation are expected to be operational by August 2024. Removal and re-instatement of construction compounds and associated works and rehabilitation ~~remediation~~ would extend around six months beyond the commissioning phase, with estimated completion in March 2025.

Figure 6-2 presents an indicative program for the proposal (following planning approval) for all proposed construction phases. The indicative staging strategy for construction is discussed in Section 6.5. Construction at each transmission line tower would be intermittent and construction activities would not occur for the full duration for each phase of construction as expressed in Figure 6-3.

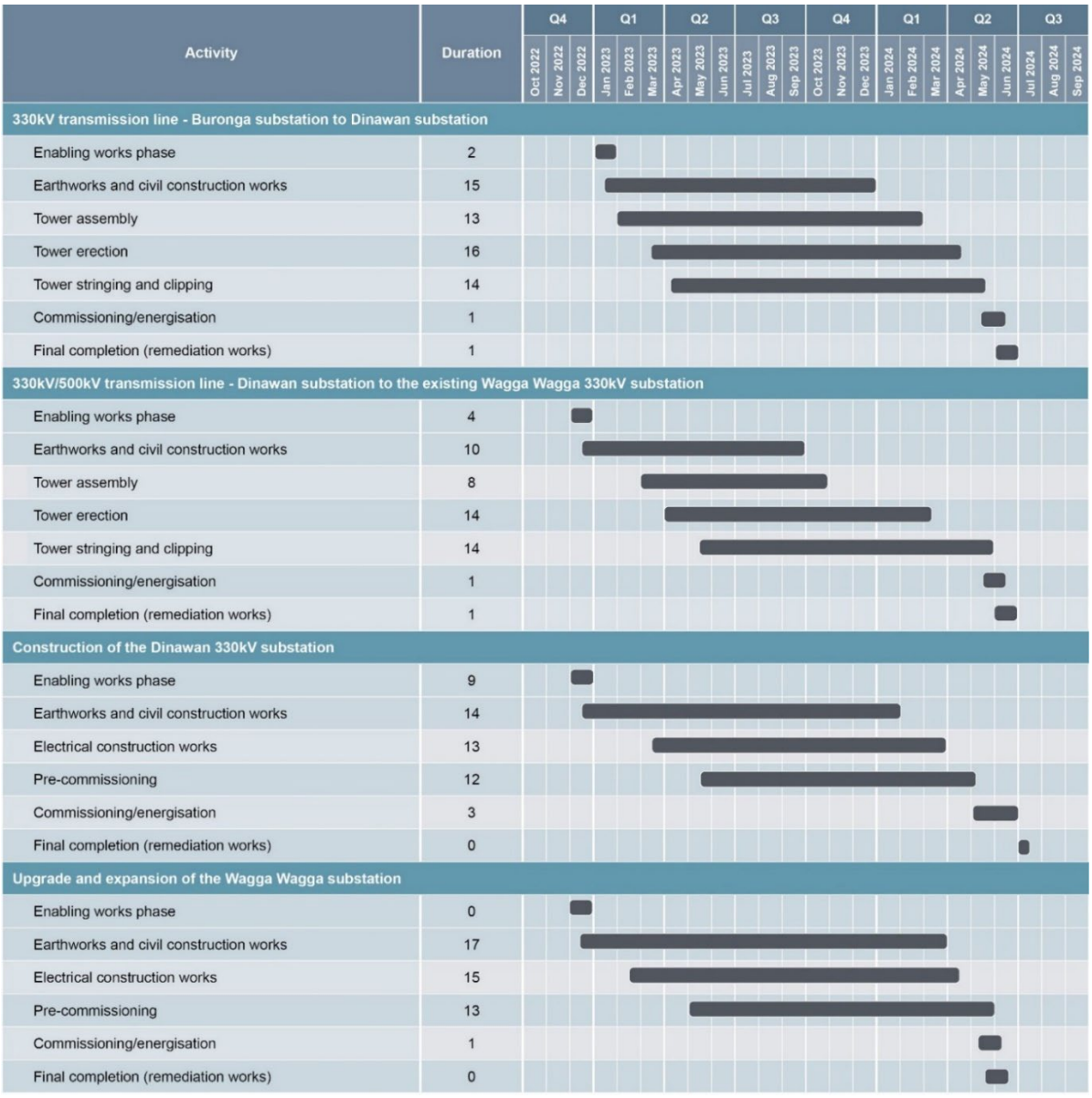

Figure 6-2 Indicative construction program

Figure 6-3 presents an indicative duration of construction activities associated with the transmission line towers. These durations could vary and breaks between activities may be shorter which may lead to longer inactive periods in subsequent stages of construction at an individual transmission line tower. Durations of any particular construction activity, and respite periods, can vary for a number of reasons including (but not limited to), multiple work fronts, resource and engineering constraints, works sequencing and location.

These activities would also have multiple work fronts, therefore (for example) foundation works or tower erection would be occurring in several locations along the easement at the same time.

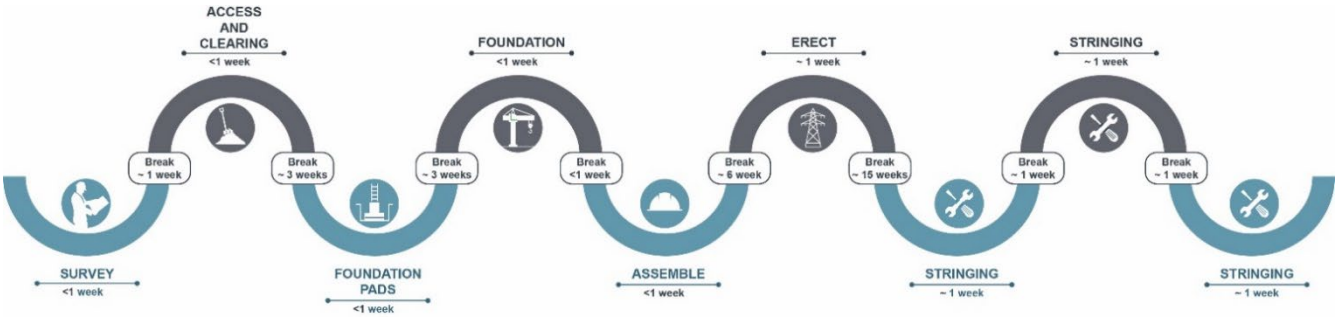

Figure 6-3 Indicative duration of construction activities at each individual transmission line tower site

6.4. Construction impact area

The construction impact area for the proposal would encompass all construction activities and components of the proposal (including access tracks). The operational footprint and associated easements for the final infrastructure would be within the construction impact area.

The construction impact area for the proposal is shown in Figure 6-4a to Figure 6-4e, and includes:

- transmission line and tower locations
- proposed Dinawan 330kV substation
- upgrade and expansion of the Wagga Wagga substation
- main construction compounds and accommodation camps along the alignment (including proposed options for site~~s~~ at Balranald ~~and Lockhart~~)
- other ancillary elements for the construction and operation of the proposal such as the optical repeater stations, construction water supply points and earthwork material site.

For the purposes of this EIS and as discussed further in Chapter 8 (Approach to impact assessment) of the EIS:

- the majority of the impact assessments have assumed potential for disturbance across the construction impact area
- for biodiversity and heritage assessments, more defined disturbance areas for the transmission line components (and ancillary construction works) have been assumed within the construction impact area to more appropriately quantify the potential impact extents (refer to Section 8.1.1).

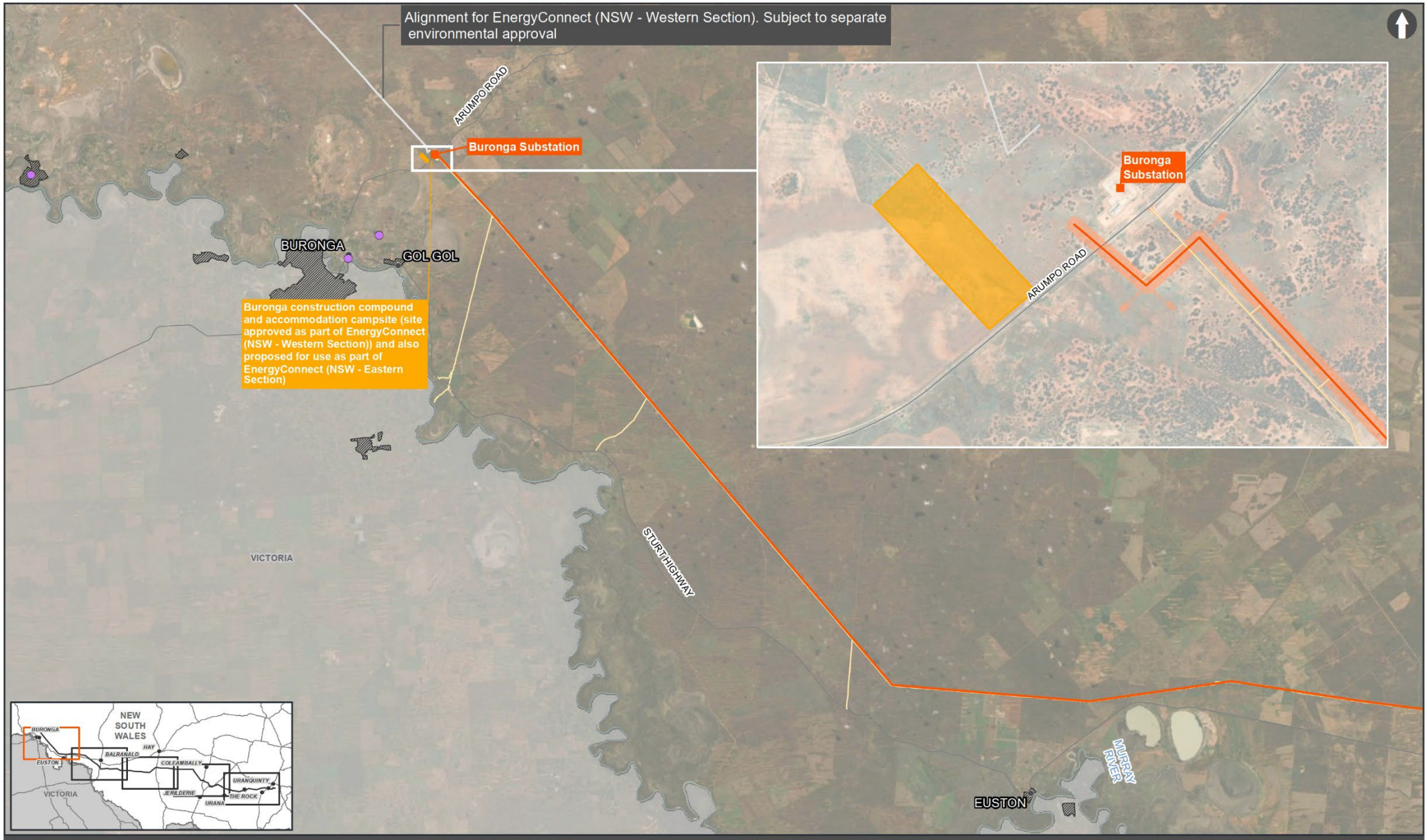

Figure 6-4a

Construction overview

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Existing Substation
- Existing Railway
- Built Up Areas

Construction Impact Area Components

- Construction Impact Area (transmission line component)
- Water Fill Point
- Access Tracks
- Main Construction Compounds and Accommodation Sites

Sheet 1 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

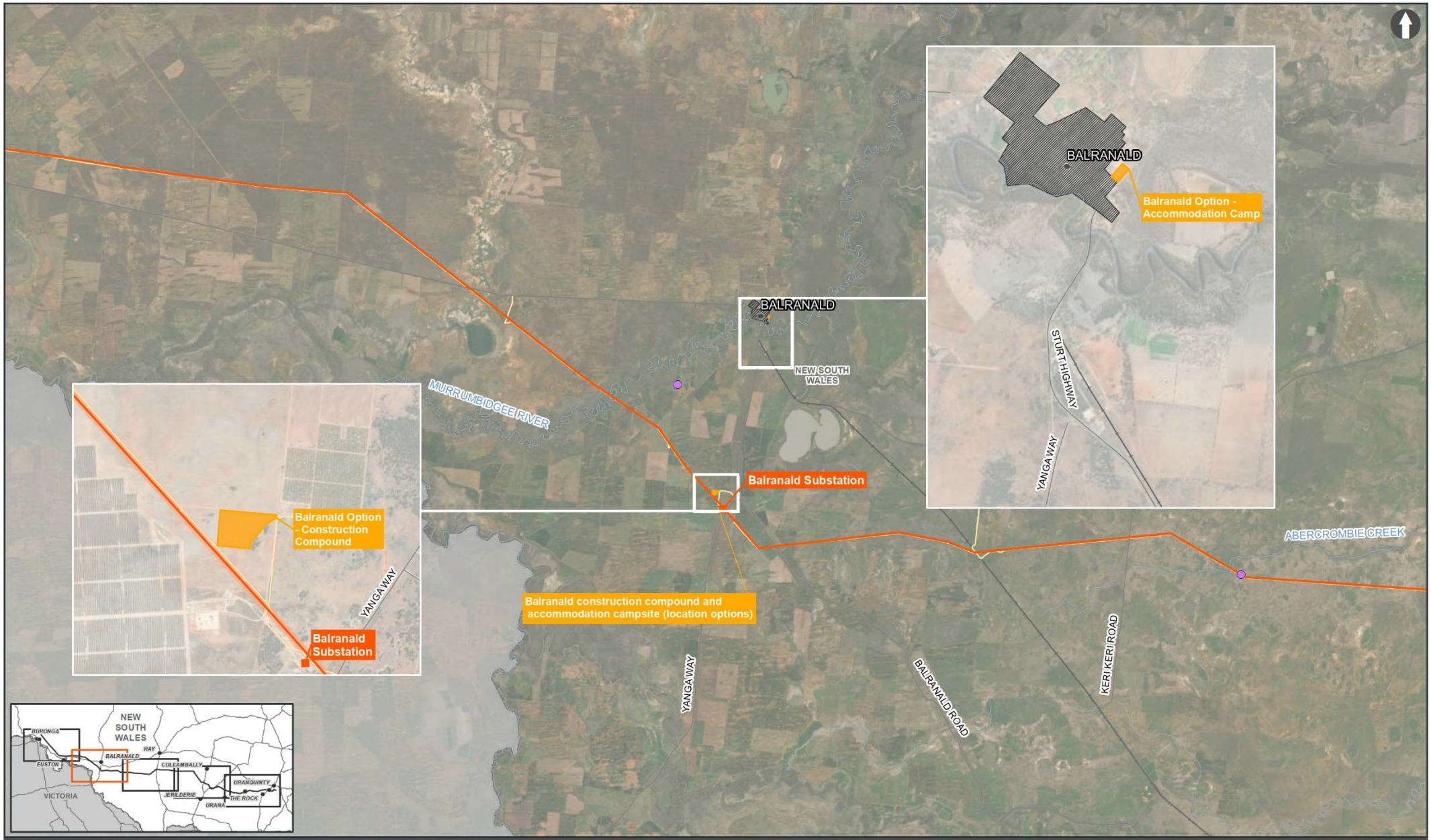

Figure 6-4 b

Construction overview

EnergyConnect (NSW - Eastern Section)
EnergyConnect (NSW - Western Section)
Existing Substation
Existing Railway
Built Up Areas

Construction Impact Area Components

Construction Impact Area (transmission line component)
Water Fill Point
Access Tracks
Main Construction Compounds and Accomodation Sites

Sheet 2 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

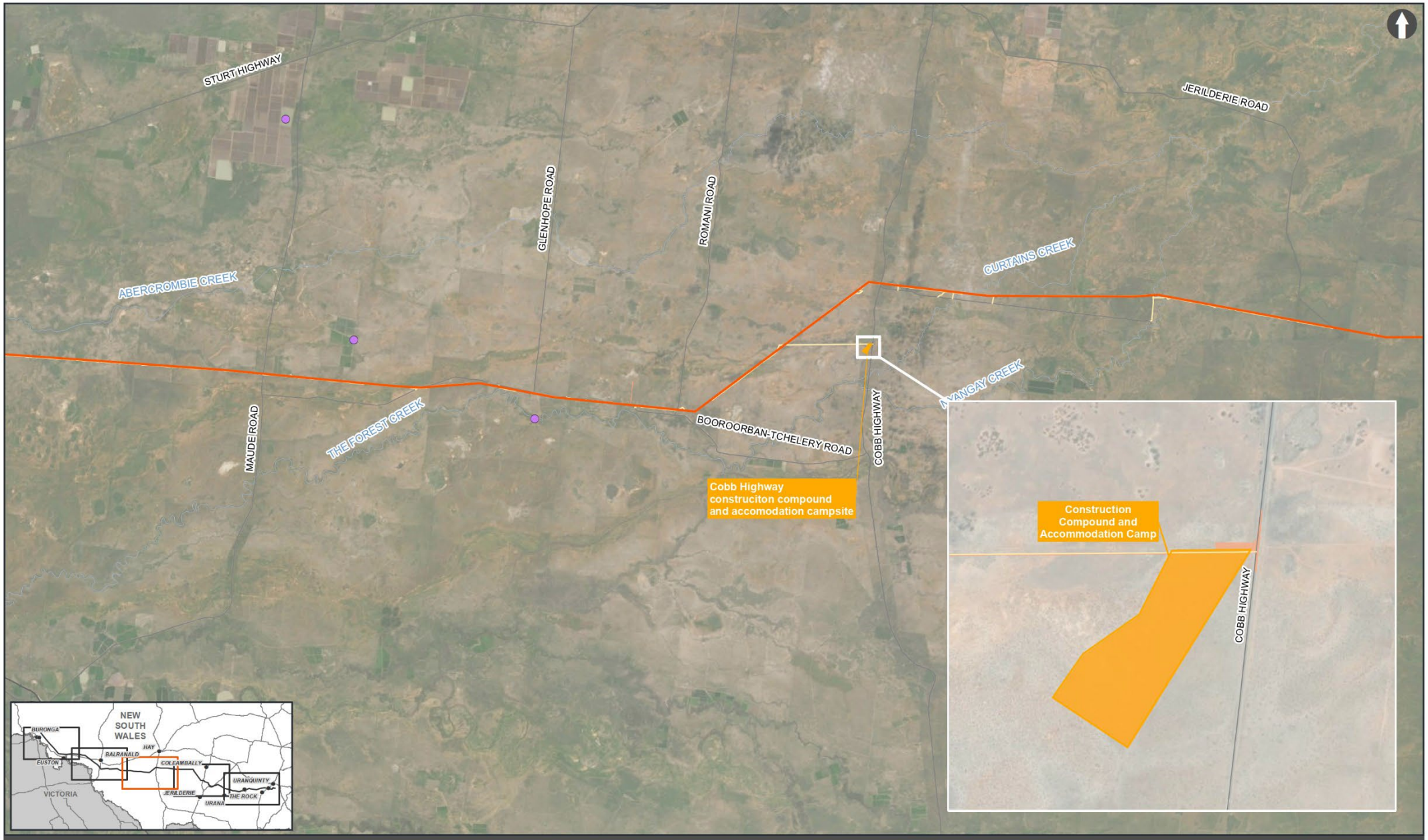

Figure 6-4c

Construction overview

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Existing Substation
- Existing Railway
- Built Up Areas

Construction Impact Area Components

- Construction Impact Area (transmission line component)
- Water Fill Point
- Access Tracks
- Main Construction Compounds and Accommodation Sites

Sheet 3 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

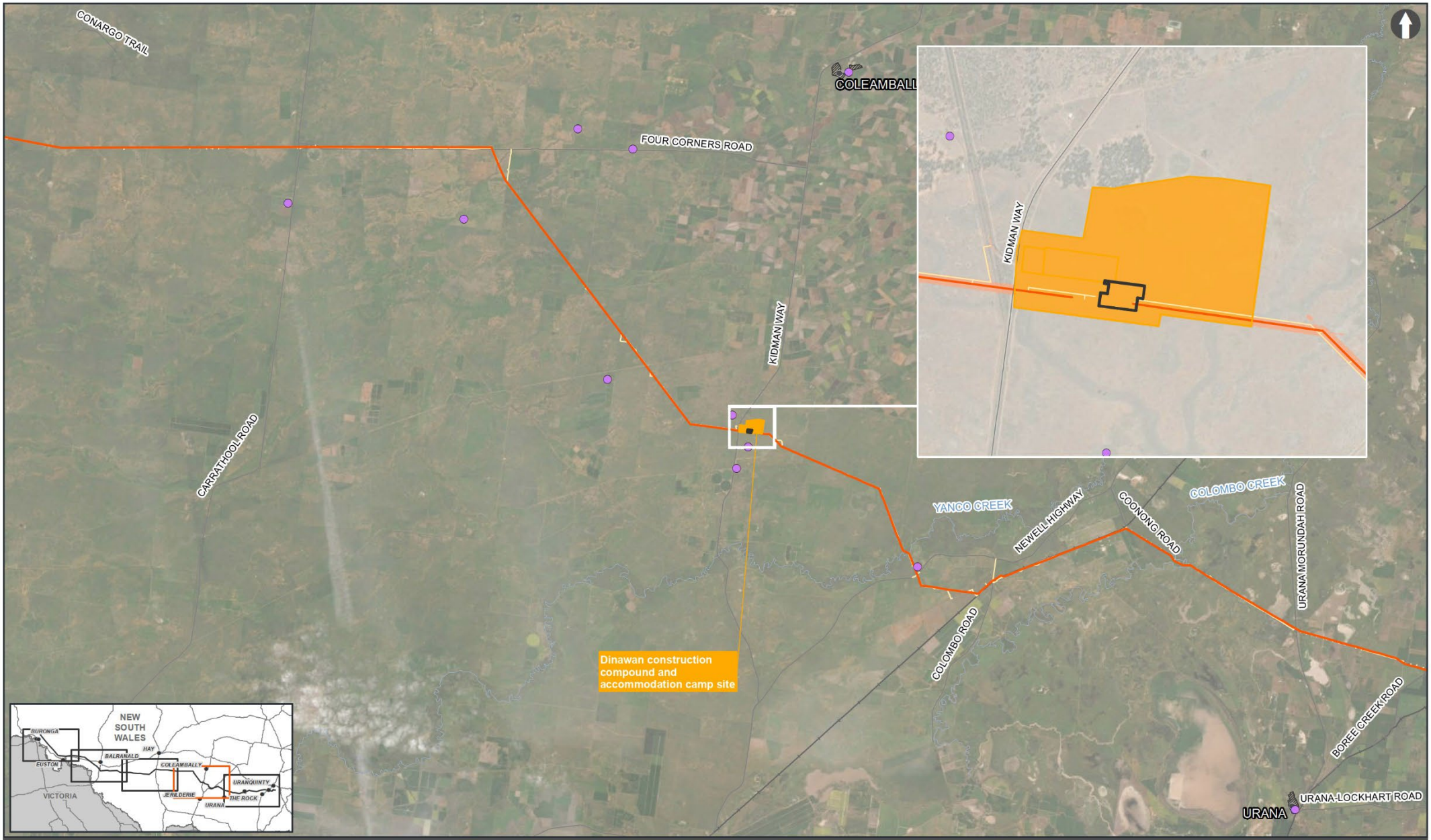

Figure 6-4d

Construction overview

EnergyConnect (NSW - Eastern Section)
Existing Substation
Existing Railway
Built Up Areas

Construction Impact Area Components
Construction Impact Area (transmission line component)
Water Fill Point
Access Tracks
Main Construction Compounds and Accommodation Sites

Dinawan Substation Layout

Sheet 4 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

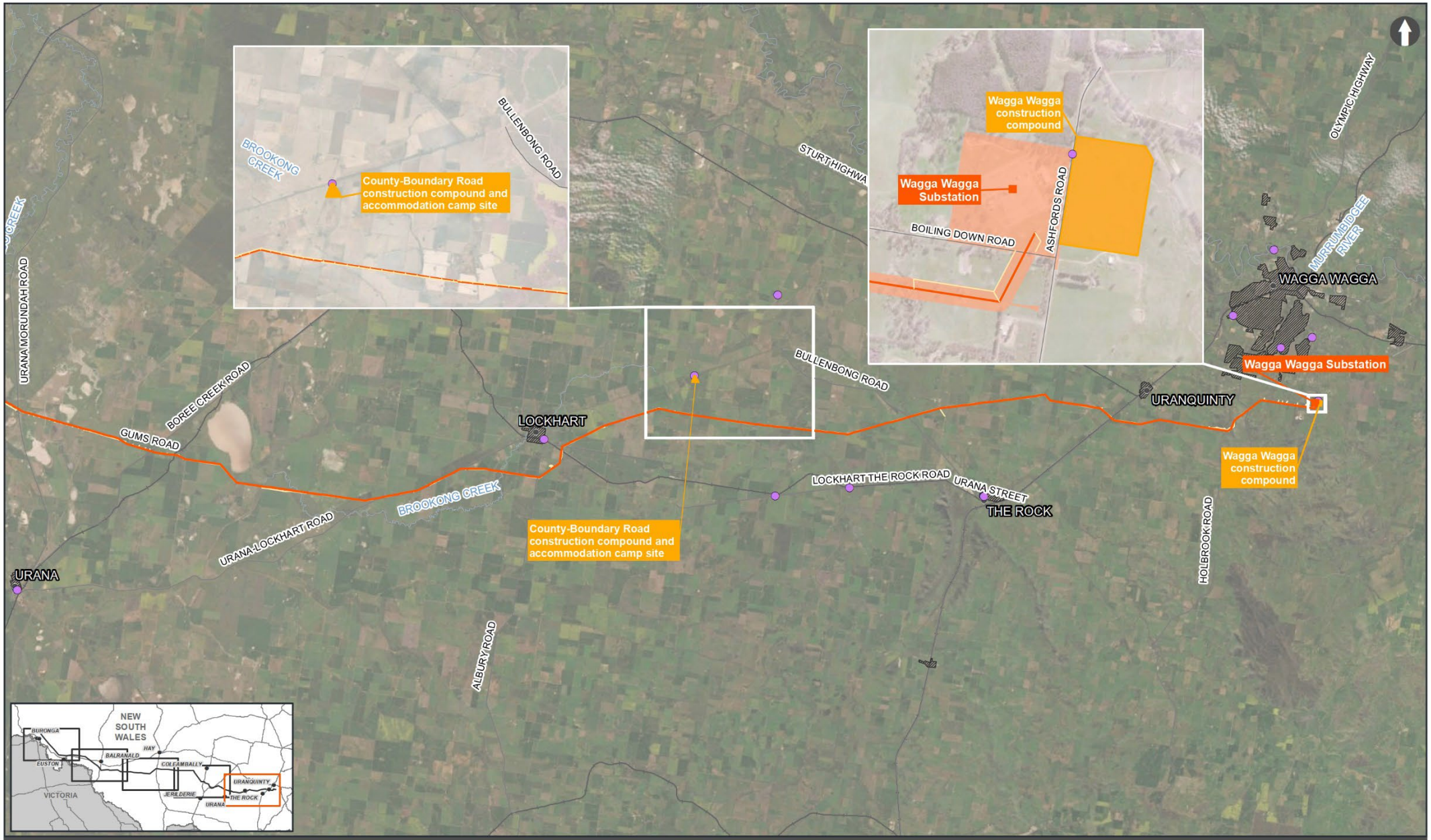

Figure 6-4e

Construction overview

EnergyConnect (NSW - Eastern Section)
Existing Substation
Existing Railway
Built Up Areas

Construction Impact Area Components

Construction Impact Area (transmission line component)
Water Fill Point
Access Tracks
Main Construction Compounds and Accommodation Sites

Sheet 5 of 5

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Source: NSWSS, ESRI, Transgrid, WSP

6.5. Construction staging and construction phases

6.5.1. Construction staging

The construction of the proposal would involve staging of various elements of the proposals' construction. Staging involves constructing only certain parts of the infrastructure or carrying works in only certain locations at a time. Staging is typically adopted to address program, resource, logistical and construction approval requirements. Where staging of the proposal is proposed, the staging arrangements would be confirmed by the construction contractor during detailed development of the construction methodology.

6.5.2. Construction phases

The delivery of the proposal is expected to occur in the following three general phases:

- enabling works (minor/low impact pre-construction activities)
- main construction
- pre-commissioning, commissioning and demobilisation.

6.5.2.1. Enabling works

Enabling works are low/minor impact pre-construction activities that would be carried out to make key construction sites (including construction compounds and substation locations) ready to facilitate the commencement of main construction activities, establish the accommodation camps, manage features or issues, and collect additional information required to finalise the design and construction methodology of the proposal.

To be considered minor/low impact, the activities typically must involve no impact to:

- features of high environmental or heritage conservation significance
- excessive amenity impacts to nearby receivers.

Enabling works would include activities such as (where they meet the above requirements):

- site establishment and operation of the main construction compound and camp sites
- site establishment and earthworks at the proposed Dinawan 330kV substation
- additional and ongoing biodiversity, heritage and geotechnical investigations.

Details of the proposed enabling work activities are provided in Section 6.6.1. Further details regarding the considerations that would be undertaken when confirming whether an activity is minor/low impact are provided in Section 23.1.2 of the EIS.

6.5.2.2. Main construction works

Where construction activities have the potential to result in environmental, heritage and amenity impacts that are not considered to be minor/low, these activities would be conducted in accordance with a construction environmental management plan (CEMP) (or similar) approved by the Secretary of the NSW Department of Planning~~, Industry~~ and Environment (~~DPIE~~ DPE). These activities are referred to as main construction works.

Main construction works for the proposal would include:

- transmission line construction (vegetation clearance, civil construction works, tower erection and assembly and conductor stringing)
- upgrades and expansion of the Wagga Wagga substation
- construction of Dinawan 330kV substation and associated works.

Details of the proposed construction activities to occur during the main construction works are provided in Section 6.6.2. Once the main construction phase commences, all remaining enabling works are typically also carried out in accordance with the approved CEMP.

6.5.2.3. Commissioning and demobilisation

Commissioning is the process by which the constructed infrastructure is energised and integrated into the existing electricity network (i.e. made operational). These activities typically occur entirely within existing project areas and involve no additional environmental or heritage impacts and minimal amenity impacts to nearby sensitive receivers.

Demobilisation is the process by which all remaining construction materials and equipment are removed from site and the project areas are rehabilitated and restored in accordance with project commitments. Depending on the detailed construction methodology and program, the general phases described above may overlap at some points throughout the overall construction program. Details of the proposed commissioning and demobilisation activities are provided in Section 6.6.3.

6.6. Construction methodology

6.6.1. Enabling works

Enabling works are activities that would be carried out before the start of substantial construction in order to make ready the key construction sites (including camps and compounds), facilitate the commencement of substantial construction, manage specific feature or issues and collect additional information required to finalise the final design and construction methodology.

Enabling works are to include:

- site establishment and operation of the main construction compounds and accommodation camp sites
- site establishment and earthworks at the proposed Dinawan 330kV substation site
- site establishment and earthworks at the Wagga Wagga substation upgrade and expansion site
- minor clearance of vegetation (excluding threatened species and ecological communities) to facilitate other enabling works, and relocation of salvaged habitat features
- biodiversity, heritage and other investigations, including test excavation, protection, salvage, environmental monitoring and recordings
- establishing connections at water supply points
- utility works, connections, adjustments, relocation and protection
- property adjustment work, including adjustments to property fencing, barricades
- installation of fencing, gates, barricades, exclusion zones and other access controls
- establishing access tracks and adjustments to local, regional and state roads
- additional geotechnical and contamination investigations

- realignment of the existing TL62 (Wagga – Jindera 330kV), TL63 (Wagga – Darlington Point 330kV) and TL51 (Wagga – Lower Tumut 330kV) transmission lines outside the Wagga Wagga substation to make way for the proposed transmission line from Dinawan
- other survey work, such as road dilapidation surveys, and surveys of the general alignment and existing utilities, installing survey controls (including installation of global positioning systems (GPS)), installing repeater stations, carrying out surveys of existing and future utilities
- installation of environmental controls, mitigation measures and monitoring equipment
- installation of temporary site sheds, amenities facilities and storage containers
- maintenance of existing buildings and structures required to facilitate the carrying out of the proposal (as required)
- removal of waste from the proposal impact area and remediation of contaminated land (if present and required)
- installation of communication towers (other than those using microwave technology).

These works are described further in the relevant sections of this chapter.

6.6.1.1. Site establishment

Site establishment is the preparation of the site for further activity, for example the construction compounds, accommodation camps or substation locations. Site establishment activities would commence as enabling works.

Site establishment activities would include:

- clearing and removal of vegetation and topsoils (excluding threatened species and ecological communities). Topsoil would be stockpiled on site
- establishing temporary advance accommodation camps to support the construction start up phase of the proposal. These camps would be required to temporarily house the construction workforce (particularly early works contractors) to carry out the establishment of the permanent camps, pre-construction works activities and early earthworks activities. These camps would be located within the same areas identified for the main construction compound and accommodation camps and would occupy a portion of the proposed camp boundary at each location and be supported by temporary infrastructure such as portable generators and water trucks for potable water
- establishing the main construction compounds, batching plants, accommodation camps and ancillary facilities, including offices, amenities, workshops, and creating internal roads
- connections of utilities (water and power) to main construction compounds and accommodation camp sites, where possible
- establishing vehicle access and egress points, including adjustment of public roads, to ensure safe vehicle movements at relevant locations
- establishing wheel washes, rumble grids and vehicle washdown facilities (for weeds etc)
- establishing hardstand areas for storage, laydown and carparking
- establishment of the earthwork material site at the proposed Dinawan 330kV substation site (refer to Section 6.9.1)
- establishing perimeter fencing, where required
- installing temporary fencing and security measures as well as any necessary environmental management measures such as erosion and sediment controls.

Further discussion on some components of site establishment are discussed below.

Vegetation clearance

Vegetation clearing carried out as enabling works to facilitate other enabling works only. Such clearing would only occur in locations that have been subject to full assessment in accordance with the Biodiversity Assessment Method (refer to Chapter 9 of the EIS and the *Revised Biodiversity Development Assessment Report* (WSP, 2022)) and would be limited to vegetation that is not a threatened species or part of a threatened ecological community (TEC).

All other vegetation clearing would be undertaken during the main construction phase in accordance with the approved CEMP and this EIS.

Property adjustments

Property adjustments that would be carried out as enabling works include installation of or alterations to gates, fences, installation of exclusion zones and other access controls. Property adjustments would occur in consultation with the affected landholder. Where the transmission line crosses or runs parallel in close proximity to a metallic fence, an earthing or isolation section would be installed in the fence to reduce the potential for induced currents due to electromagnetic effects.

Service relocations and/or protection works

Utility service connections (including power, water, gas and communications) for accommodation camps, construction compounds and other location would occur as enabling works.

The following utility relocation and protection works are proposed as part of enabling works:

- installation of a new transmission tower outside the Wagga Wagga substation to allow realignment of TL62 (Wagga 330kV – Jindera transmission line) and TL051 (Wagga 330kV – Lower Tumut transmission line) and transfer of the existing conductors
- conversion of overhead distribution powerlines up to and including 66kV to underground cables for the entire width of the transmission line easement, at locations where the existing powerlines cross the proposed transmission line easement. Alternately, hurdles may be erected to protect overhead lines that are unable to be undergrounded.

The proposal would cross an existing high-pressure gas main that runs in a generally north-south alignment to the west of the Olympic Highway. The proposal has sought to locate the towers either side of this pipeline to avoid the gas main and avoid the need for any protection works. Transgrid would continue to consult with the asset owner and enter into any agreements as required.

Other potential impacts to, or clashes with, other existing services and utilities would be confirmed prior to construction and any proposed relocation or protection works to be carried out as enabling works would be determined at the time in consultation with the relevant asset owners.

6.6.1.2. Establishment of access tracks

The establishment of access tracks would include:

- installation of access points from public roads
- installation of access tracks to accommodate safe access of construction machinery and materials to each transmission line tower site and the expanded and new substation sites.

Each of these elements are described in greater detail below.

Construction of access points

Access points are locations where access tracks and construction camp/compound access roads meet a public road. Where this occurs, works may be required to ensure safe vehicular access and egress. A series of locations have been identified along the length of the proposal which required construction of access points. These locations may require minor works such as the creation of widened lanes, widened road shoulders as well as sections which have been identified as potentially requiring either pavement alterations, minor earthworks (infill, grading and rolling etc) in adjacent unsealed surfaces, and new/or altered line marking and signage.

The type of access point and activities required would depend on sight distance, the largest design vehicle to utilise the access point, deceleration or acceleration movements, topography and existing road and track condition (dilapidation). All access points will be designed in consultation with the relevant road authority and would occur in accordance with road occupancy licence(s) as required. These features would be designed in accordance with the Austroads and other relevant guidelines. These areas have been included as part of the overall area of impact assessed for the proposal. Drainage works (for example culverts) may also be required.

Construction access tracks

Access to each tower would be required during construction, and tracks may be retained for operational purposes. Access tracks would be required to be traversable by a range of vehicles. Access tracks would fall into the following broad groups:

- un-improved access tracks
- improved access tracks
- constructed access tracks.

The proposed access tracks for the construction of the proposal are shown on Figure 6-4.

Un-improved access tracks

Un-improved access tracks would provide access to work sites by using existing roads or tracks or driving on existing soil or ground surface with minimal or no prior preparation. Existing roads, tracks and other existing disturbed areas would be used wherever possible in order avoid or minimise disturbance.

Where access is across open spaces, particularly in cultivated areas, pasture improved grazing land or native grasslands, care would be exercised to ensure that minimum damage is caused to the surface by confining movement, as far as possible, to one route.

Improved access tracks

Improved access tracks would provide access to work sites by using existing roads or tracks where some additional grading or widening of the existing track is required. This may include widening of existing narrow sections to allow for sufficient width to allow construction vehicles to pass without leaving the roadway.

Constructed access tracks

Constructed access tracks would be required in areas where there are no existing roads or tracks, or where terrain conditions prevent continuous access along the line easement between road crossings. In these situations, 'off easement' access may be required, and suitable access tracks would be constructed. Alignment selection for construction access tracks would consider existing vegetation and minimise the need for clearing as much and practicable. Any vegetation clearing required to create construction access tracks as enabling works would occur as described above.

All construction access tracks would be between four and eight metres wide, with an additional metre either side for material windrows, and would generally follow existing property owner tracks as well as the natural contour of the land as far as practicable to minimise the amount of cut and fill and soil disturbance. Access tracks would also include drainage control features such as table drains or cross banks to minimise erosion.

Where access tracks extend beyond the transmission line easement, the location of the access tracks would be agreed with the landholder and subject to separate agreements. For permanent access tracks beyond the transmission line easement, an access easement may be required and negotiated with the landholder. Where these tracks are currently known, impacts to these areas have been considered as part of this EIS.

In the case of cultivated land, it may be necessary to route access tracks along fence lines or otherwise in accordance with landholder requirements. Final track alignments would be selected and track construction would be carried out so as to cause minimum disturbance to soil and vegetation both on and adjacent to the track, including restricting the use of bulldozers where practical.

Where tracks are, or are required to be, located in areas which are not suitable for use by vehicles and plant following adverse weather conditions, the area would be temporarily by-passed (i.e. alternative access paths would be identified).

6.6.2. Main construction phase

The main construction phase would include the completion of any enabling works that were not completed prior to approval of the CEMP and any similar activities that could not be completed as enabling works. Main construction works would include:

- transmission line construction
- Dinawan 330kV substation construction
- Wagga Wagga substation upgrade and expansion
- connection to the Buronga substation.

Further details are provided in the sections below.

6.6.2.1. Transmission line construction

Main works associated with the construction of the transmission lines would include (but not be limited to):

- remaining vegetation clearing
- remaining access track installation
- earthworks and footing construction including:
  - earthworks and establishment of laydown areas and construction pads for each transmission line tower
  - construction of footings and foundation works for the new transmission line towers including with concrete or steel piles (driven and/or screw), boring and/or excavation, steel fabrication works and concrete pours
- assembly of transmission line towers
- erection of the transmission line towers
- installation of earthing conductors
- stringing of the conductors and overhead earth wires and optical ground wire
- earthing of fences and gates (as required).

Further detail of these key tasks is provided below.

Earthworks and transmission tower footing construction

Excavation works at each tower site would typically be required for the installation of foundations, levelling around the individual tower foundations, drainage and grading or preparation for construction at the tower site.

Bench sites (stepped ground excavation) may be required to provide a level platform for equipment setup, the erection of the tower and other construction activities. Benching would be constructed by use of earth moving equipment such as graders and excavators. Due to the topography of the line corridor the requirement for benching is assumed to be minimal.

Where excavation is required (excluding piling for tower foundations), excavations would typically be up to around five metres. Where groundwater is shallow, alternative construction methodologies and designs may be implemented to limit interaction with groundwater and avoid or minimise the need to dewater.

Typical transmission line tower piling depth would be up to 16 metres below ground level and would depend on ground conditions (e.g. greater piling depths would be required where soft soil types are present).

The foundation type would also vary and (subject to finalisation of the proposal infrastructure) would consist of either:

- bored pile/cast in-situ (reinforced concrete)
- driven or screw pile (concrete or steel).

If groundwater is encountered or the excavations are filled by rainwater, the excavation would be dewatered and managed as appropriate. Dewatering may also be required during the concrete pour process. Concrete would be poured wet into the pile footings with any water removed from the top of the concrete as required.

Excavated material would be stockpiled to be used for backfill around the transmission line tower foundations and embankment filling at the tower site from which it was excavated. Topsoil would be stripped and stored separately from the excavated material to assist in site restoration. Any excess excavated material would be spread evenly around the site after completion of the foundation backfilling (if suitable) or removed from the site and disposed of in accordance with the appropriate waste classification.

Blasting

Blasting may be required, depending on geotechnical conditions along the alignment of the proposal to loosen and break up existing rock to allow for creation of transmission tower pads. This would be confirmed during detailed development of the construction methodology however would be expected to be limited to small areas as required at tower locations where shallow bedrock or hard geological conditions are identified.

The controlled blasting would typically be done by drilling a line of closely spaced holes within the area required (such as a transmission tower pad). Each hole would then be loaded with a small amount of explosives and a delayed detonation of the explosive would be carried out to limit the amount of energy being released at any particular moment. The energy generated as a result of detonating the explosive would break the harder rock formation(s) into smaller pieces to allow subsequent removal. Following the controlled blasting activities, two options would be available for the removal of the rock material. These would include traditional excavation with excavation equipment or additional blasting. The technique to be used would be determined based on the success of the initial blasting activities.

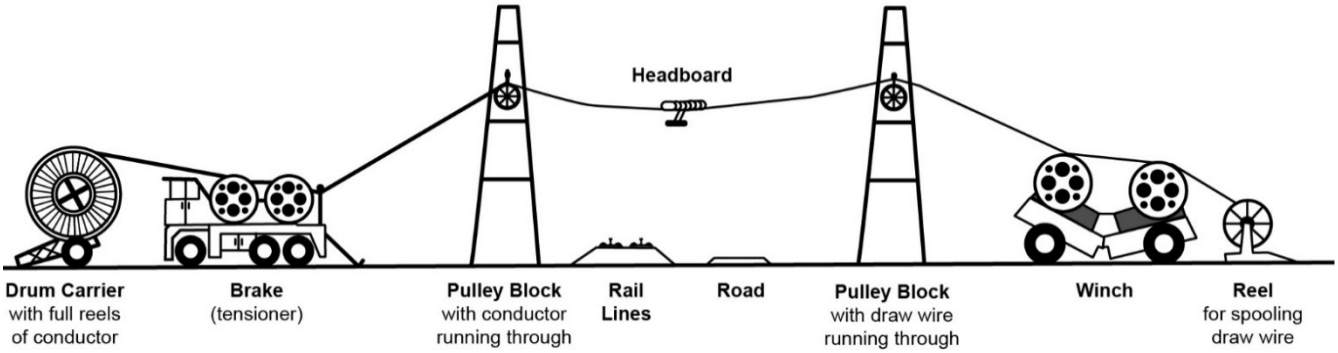
Construction of transmission line towers

Transmission line towers are typically erected by assembling in sections on the ground and hoisting or lifting successive sections into place using cranes. Alternatively, towers may be erected in place on the footings by installing individual members. These towers would include infrastructure such as step bolts, climbing attachment plates, ladders, platforms, climbing barriers, identification plates, warning plates, other fixtures and fittings for the attachment of earthwires and insulators.

Construction of each tower would require access for tower assembly and stringing works. Where a transmission tower is proposed to allow for a direction change of the transmission line, a larger area would be required (to allow for brake and winching sites). At a typical site, this would include a temporary area of up around 60 metres by 80 metres at each transmission line tower location.

Stringing of the transmission lines

Following erection and securing of the tower, the transmission line would be strung by either a ground pulled draw wire (with brake and winch sites – refer to indicative schematic shown in Figure 6-5 which shows how each component of the brake and winch site would interact) or a line stringing drone. A brake and winch site is a temporarily cleared area where plant and equipment is located for the purposes of spooling and winching a conductor into place on erected transmission line towers along a transmission line easement.



Note: Schematic illustration only. The location of brake and winch components could be up to around 10 kilometres apart (up to around 20 towers, not consecutive towers)

Figure 6-5 Diagram of how conductor stringing operations could occur over road and rail corridors

To assist with the stringing of conductors, a centreline area cleared of vegetation between towers would be required. For the 330kV line, this area would be up to 10 metres wide and for the 500kV section this would area be up to 20 metres wide. In certain highly significant areas (such as identified Plains Wanderer primary habitat – refer to Chapter 9 of the EIS), alternative construction methods that would not require vegetation clearing between towers would be adopted.

Transmission line crossing points

Spanning watercourses

The proposed transmission line would require spanning of a series of major watercourses including the Murrumbidgee River at Balranald; Abercrombie Creek; Yanco Creek; the Coleambally Outfall Drain, Colombo Creek; Halliday's Cut (at Lake Cullivel); Burkes Creek (The Rock) and several other smaller creek spans.

Generally, the design of the transmission line would include a transmission line tower on either side of each watercourse. A drone would then be used to take a lead wire over the river to allow cables to then be pulled and strung tower to tower. In some circumstances it may be impractical to use a drone, and in such cases alternative methods, such as the use of watercraft, might be required.

It is not envisaged that any access tracks or bridges would be required for these particular crossings due to the design and proposed construction method of the transmission line at these locations. There would likely be some temporary works at the transmission line tower on each side of the span to allow for the construction of the transmission line tower, however it is likely that these would be at least 50 metres from the river bank and with appropriate environmental controls (such as erosion and sediment controls).

Where alternative access routes are impractical, a number of local waterway spans and causeways would be required at other smaller waterway locations along the length of the proposal. Where required, bed-level fords (i.e. construction of a good footing where a river or stream may be spanned) or causeways may be required to be constructed to provide temporary access. Where these crossings are required, they would typically be constructed using the following typical methodology:

- removing all loose material from the watercourse at the point to be spanned, forming a depression with firm base and sides
- the depression would then be filled with graded layers of rock. The rock layers would be placed so as to produce an interlocked bed of rock, sloped and dished, to allow water to drain freely through and flow over the causeway (minimum thickness of around 450 millimetres but not higher than the bed of the watercourse).

The spanning of all watercourses would be designed and installed in accordance with relevant Department of Primary Industries (DPI) guidelines for waterway crossings including:

- *Policy and Guidelines for Fish Friendly Waterway Crossings* (DPI, 2004a)
- *Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings* (DPI, 2004b)
- *Guidelines for Controlled Activities on Waterfront Land* (DPI, 2012a)
- *Policy and Guidelines for Fish Habitat and Conservation and Management* (NSW Fisheries, 2013).

If required as part of a water crossing, culverts may also be installed in accordance with required standards (such as *Precast concrete pipes (pressure and non-pressure) – AS/NZS 4058:2007* (Standards Australia and Standards New Zealand, 2007)).

Road and rail crossings

The proposal would cross a number of major and minor road crossings between Buronga and Wagga Wagga. Key roadway crossings would include (but not be limited to):

- Arumpo Road
- Sturt Highway
- Yanga Way
- Maude Road
- Booroorban-Tchelery Road
- Cobb Highway
- Jerilderie Road
- Four Corners Road
- Kidman Way
- Newell Highway
- Urana-Morundah Road
- Boree Creek Road
- Urana-Lockhart Road
- Lockhart-The Rock Road
- Bullenbong Road
- The Rock-Collingullie Road
- Olympic Highway
- Holbrook Road.

Key railway line crossings would consist of:

- Moama Balranald Railway, around 25 kilometres southeast of Balranald (non-operational)
- Narrandera Tocumwal Railway, near intersection of Colombo Road and Crutchs Road, Bundure (non-operational)
- The Rock Oaklands Railway, around nine kilometres northeast of Urana (non-operational)
- The Rock Oakland Railway, around two kilometres southeast of Lockhart (operational)
- Main Southern Railway, around three kilometres southwest of Uranquinty (operational).

Similar to the proposed method for crossing waterways as outlined above, the design of the transmission line would include a transmission line tower on either side of each road or rail crossing. Typically a brake and winch style operation would then be used to string the transmission lines, with temporary road and/or rail stoppages as required put in place (subject to confirmation of the final construction methodology) (refer to Figure 6-5).

6.6.2.2. Dinawan 330kV substation

As described in Section 5.3.4, a new 330kV substation between Buronga and Wagga Wagga, the proposed Dinawan 330kV substation, would be constructed east of Kidman Way, around 30 kilometres to the south of Coleambally. The construction of the proposed Dinawan 330kV substation would be up to around 36 hectares in area.

The construction methodology for the proposed Dinawan 330kV substation would consist of the following key activities:

- site establishment, including vegetation removal and establishment of temporary construction site office and amenities within the proposed substation site
- earthworks to form the substation pad including placement of up to around 150,000 to 200,000 cubic metres of material to allow for the construction of the substation pad, and the temporary stockpiling of existing soil that does not meet engineering requirements for the substation pad. The earthwork material would be primarily obtained from a proposed earthwork material site to the north of the proposed Dinawan 330kV substation where possible (refer to the following section). Where materials cannot be obtained from within the earthwork material site, additional earthwork material would be imported to the site
- excavation and preparation of the site for concrete foundations
- installation of reinforced concrete and piled foundations for the electrical equipment
- excavation and installation of electrical equipment conduits, including earth grid, trenches and general site drainage works, including construction of oil containment facilities
- construction of two to three new ancillary and equipment control buildings
- erection of galvanised steel supports for electrical equipment and gantries on foundations, using cranes
- installation of high voltage electrical cables and terminations, including earthing wire
- installation of site wiring and electrical control equipment within the control buildings
- erection of the substation site boundary security fence, including site access gates
- surfacing and stabilising works for access, dust and vegetation suppression.

Site establishment and earthworks would commence as enabling works.

Dinawan earthwork material site

The construction methodology for the earthwork material site would generally consist of the following key activities:

- existing topsoil would be stripped from the earthwork material site (refer to Figure 6-8 and Section 6.9.1 for detail of the proposed location). These would be stockpiled within the construction impact area and proposed APZ
- excavation of the earthwork material sites. Following excavation, the material may be passed through a mobile screening plant (refer to section below)
- following the screening process, the refined material would be transferred to the pad site for the substation upgrade and expansion
- contouring to the site to re-establish surface flow regimes, noting the final site would consist of a depression within the existing landscape up to around two metres deep at the lowest point.

Screening plant

The main purpose of the mobile screening plant would be to reduce the size of large rocks and meet the engineering requirements for use as the substation base.

Up to around 150,000 to 200,000 cubic metres (total volume) of material may need to be screened at a rate of around 600 to 700 cubic metres per day (with the final quantity material requiring screening to be confirmed after geotechnical investigations are complete). Screening activities are proposed to be undertaken between the period of 7:00am to 7:00pm seven days per week for the duration of the earthworks at this site.

Typical screening operation would include:

- unloading the accepted material via dump trucks/scrapers to a designated area within the earthwork material sites ready for the screening process
- loading the material into a hopper that feeds the screening plant which would consist of a deck which holds a screening media, that, when vibrated, causes particle separation
- once processed, a conveyer belt would transport the material out of the plant. Material for use would be stockpiled in a designated area adjacent to the earthwork material site.

The proposed screening plant would be relatively small and typically consist of two mobile units requiring a footprint of around 40 square metres to 60 square metres each. The specifications of the plant would be confirmed prior to construction (refer to example in Figure 6-6).

The screening plant and material stockpiles would be contained within the earthworks material sites as shown in Figure 6-8. Material that is not suitable for use in the substation pad would be used during the re-instatement of the earthwork material sites.

Details of the Dinawan earthwork material site is provided in Section 6.9.1. Further discussion of the proposed earthwork and material management is discussed in Chapter 21 (Soils, contamination and groundwater) and Chapter 22 (Waste management and resource use) of the EIS.

Figure 6-6 Example of a mobile screening plant process as proposed for use within the Dinawan earthwork material site

6.6.2.3. Wagga Wagga substation upgrade and expansion

As described in Section 5.3.5 the existing Wagga Wagga substation would be upgraded and expanded to add new line entry bays, transformer bays and to other associated works. The construction methodology for the proposed expansion of the Wagga Wagga substation would consist of the following key activities:

- site establishment, including vegetation removal and establishment of temporary construction site office and amenities within the expanded substation site
- earthworks and preparation of the site for concrete foundations

- installation of reinforced concrete and piled foundations for the electrical equipment
- excavation and installation of electrical equipment conduits, including earth grid, trenches and general site drainage works
- erection of galvanised steel supports for electrical equipment and gantries on foundations, using cranes installation of electrical equipment on steel supports installation of site wiring and electrical control equipment within the control buildings
- removal of existing electrical equipment (as required based on detailed connection requirements)
- demolition of existing foundations (where required)
- erection of the expanded substation site boundary security fence, including site access gates (where required) surfacing and stabilising works for access, dust and vegetation suppression and drainage.

Site establishment and earthworks would commence as enabling works.

6.6.2.4. Optical repeater sites

As described in Section 5.3.6, three optical repeater site communication huts would need to be constructed at Balranald, Boorooban and Lockhart. The construction methodology for the proposed optical repeater sites would consist of the following key activities:

- site establishment, including any vegetation removal and establishment of temporary construction site office (if required)
- earthworks and preparation of the site for concrete foundations
- construction of a new communication hut building at each site
- provision of power connections between the transmission line and associated optical repeater site consisting of:
  - trenching for underground conduit between the Balranald optical repeater hut and transmission line
  - installation of new above ground poles between the transmission line and the respective Booroorban and Lockhart optical repeater sites
  - installation of new pole-mounted transformers
  - installation of electrical cables and terminations (either through the installed conduits or stringing of the aboveground poles)
- installation of site wiring and electrical control equipment within each building
- removal of waste and remediation of site areas.

6.6.2.5. Buronga substation

EnergyConnect (NSW – Western Section) includes new and upgraded infrastructure associated with the existing Buronga substation. Parts of those works include changes to accommodate a connection with the new infrastructure proposed as part of this proposal. Connection to new and upgraded infrastructure at the Buronga substation would occur as part of main construction for this proposal.

6.6.3. Commissioning and demobilisation phase

6.6.3.1. Pre-commissioning and commissioning

The pre-commissioning process would commence in the final phase of construction. This process would be to ensure that the proposal has been constructed in accordance with the design and statutory standards and is safe to proceed to main commissioning.

The key activities involved in the pre-commissioning process would include:

- testing and commissioning of the new substation equipment
- point to point testing of the new transmission lines and substation connections
- earthing testing
- high voltage testing
- high voltage equipment operational checks
- testing of the installed protection, metering, control, and communication systems
- testing oil containment systems at the proposed Dinawan 330kV substation
- cut over (energisation) of electricity between the existing and new transmission lines (where required, such as the section south of the Buronga substation).

Once all high voltage and low voltage testing is completed, the electrical protection systems have been set and all quality assurance documentation has been completed, main commissioning would proceed.

The key activities involved in the main commissioning process would include:

- transmission line cut in and connection to the electrical network
- protection, control, and metering checks
- high voltage equipment operation and energisation
- audible noise, thermographic imaging and electric and magnetic field (EMF) testing.

The new substation components would be commissioned and integrated with any necessary Transgrid external facilities.

6.6.3.2. Demobilisation and site rehabilitation

Site rehabilitation would be carried out progressively along sections of the transmission line and at tower installation sites as well as the substation sites. This phase would occur following the completion of construction and would involve the removal of all construction plant and equipment, and all materials not required during the operation of the proposal. This phase would include the removal and restoration of the construction compounds and camp sites (where these have been established as part of the proposal), removal of any temporary site buildings and temporary environmental controls. Rehabilitation of access roads or tracks would also be undertaken where they are not required for further construction or maintenance activities, or where a landholder has requested the access track to remain.

Within the transmission line easement, restoration works would consider and facilitate proposal commitments in relation to future vegetation maintenance and management. In other non-operational locations, site restoration would occur to make good any disturbances caused during proposal activities. Works may also be undertaken to restore the following (where impacted by the construction of the proposal):

- irrigation and water infrastructure facilities to pre-existing conditions before arrival on site
- natural drainage in areas where temporary facilities were provided
- fences, gates, etc. which may have been damaged during construction.

Installation of the permanent Transgrid property boundary fence surrounding the proposed Dinawan 330kV substation site and the expanded Wagga Wagga substation site (as required) would also likely occur during this phase.

Dinawan earthwork material site

Rehabilitation and remediation of the areas surrounding the Dinawan earthwork material site would generally include:

- removing temporary access tracks to/from the material site
- removing all hardstand material and surplus extracted material. These would be placed and spread back into the material site area
- contouring to the site to re-establish surface flow regimes, noting the final site would consist of a depression within the existing landscape up to 2.5 metres deep at the lowest point
- ensuring the material site is made stable and safe (i.e. reshaping any steep sides to the final depression form to ensure safe grades are provided.
- ripping disturbed areas to a depth of around 300 millimetres
- re-using stripped topsoil over disturbed areas
- seeding with a suitable cover crop and in accordance with any revegetation / landscaping requirements.

It is currently estimated that the final depression would be up to 2.5 metres in depth (from the existing surface level) and cover an area around 250 metres by 250 metres. Subject to final agreement with the landholder, this area would be returned to the landholder for use as a future dam. Further discussion of the proposed earthwork and material management is discussed in Chapter 16 (Flooding, hydrology and water quality).

6.7. Construction facilities

6.7.1. Main construction compound and accommodation camp sites

Several main construction compound and accommodation camps would be required to support the construction of the proposal. Lease agreements to utilise the identified properties for the main construction compound and accommodation camps would be established prior to commencement of works within these sites.

The proposal would use the Buronga construction and accommodation camp site which has been approved as part EnergyConnect (NSW – Western Section). The approved EnergyConnect (NSW – Western Section) approval identified and assessed impacts of the operation of the Buronga construction camp and compound facility for the duration of the project up to around mid-2024 with the facility potentially still being used during the decommissioning and rehabilitation phases up to this point. The scope of the EnergyConnect (NSW – Eastern Section) is expected to require the usage and operation of this facility for a similar timeframe, to around mid-2024 (August 2024). It is confirmed that the decommissioning of this facility and rehabilitation of the site would now occur post this time period and be completed by about March 2025. The decommissioning and rehabilitation of this construction compound and accommodation camp site would occur as part of the EnergyConnect (NSW – Eastern Section) approval. The concurrent use of the Buronga main construction compound and accommodation camp would not increase the type or intensity of activities within the main construction compound or increase the capacity of the accommodation camp as approved for EnergyConnect (NSW – Western Section).

The other main construction compound and accommodation camps that are proposed are summarised in Table 6-3. Construction compound and accommodation camps have been selected to be located near a sealed main road to facilitate journeys to worksites and airports and local services and amenities. The construction compound and accommodation camps would typically be located adjacent to each other with the exception of the Balranald site (see Table 6-3). For the Balranald ~~and Lockhart~~ main construction compound~~s~~ and accommodation camp site~~s~~, options for the final site have been considered as part of this EIS.

Table 6-3 Summary of proposed construction compound and accommodation camps (excluding asset protection zone requirements)

Site name	Indicative camp area (m^2)	Indicative laydown area (m^2)	Approximate number camp beds	Office size (no. of people)
Balranald (option – split arrangement)	n/a – propose to use existing accommodation opportunities	87,000	n/a	50-100
Balranald (option – combined arrangement)	36,000	87,000	n/a	50-100
Cobb Highway	36,000	87,000	250	50-100
Dinawan 330kV substation	33,000	122,000	400	50-100
Lockhart ~~(approx. for each option)~~	32,000	~~73,000~~ 87,000	250	50-100
Wagga Wagga	n/a – propose to use existing accommodation opportunities	~~115,000~~ 65,000	n/a	50-100

The main construction compound and accommodation camp sites would be established as enabling work and demobilised at the completion of the proposal. The new construction compound and accommodation camp sites would accommodate a range of facilities including:

- staging and laydown facilities
- concrete batching plants (at the Balranald, Cobb Highway, Dinawan 330kV substation and Lockhart sites construction compounds)
- new workforce accommodation camp areas proposed at the Cobb Highway, Dinawan and Lockhart sites. These locations would also include food and catering facilities, fitness and recreational facilities (such as indoor and outdoor recreational spaces, gymnasium areas) and telecommunication services for personal use. An option for an accommodation camp is also being considered at the Balranald main construction compound and would be accommodated within the existing area identified for the main construction compound
- demountable offices
- construction support facilities including vehicle and equipment storage, maintenance sheds, chemical/ fuel stores (such as petroleum, diesel, liquefied natural gas, herbicide, pesticide and mineral oils) and potential stockpile areas. Hazardous and dangerous good storage would be secured in purpose-built bunded and secure areas.

Upon completion of works, the construction compound and accommodation camp sites would be cleared of any temporary infrastructure and equipment, and rehabilitated in line with Section 6.6.3.

6.7.1.1. Balranald

Two options for the Balranald construction compound and accommodation camp are currently being considered. These options include a split arrangement and a combined arrangement for the accommodation camp. These options are described below. The final arrangement of the Balranald site would be determined following prior to commencement of construction.

Balranald – option – split arrangement

For this option, the Balranald main construction compound (laydown and compound area only) would be located within a cleared area adjacent to the proposal, around 1.1 kilometres to the north west of the existing Balranald substation (located along Yanga Way). The Balranald main construction compound would provide primary support for the construction of the western and central west sections (generally west of Maude Road) of the transmission line. An indicative location for the main construction compound is shown on Figure 6-4b.

Worker housing for the Balranald section of the proposal would be accommodated within an established accommodation camp within the town of Balranald (around 16 kilometres to the north of the proposal). The location for the proposed worker accommodation in Balranald is shown on Figure 6-4b.

A photo of an existing accommodation camp (existing Balranald camp) is also shown in Figure 6-7.

Balranald – option – combined arrangement

An option for an accommodation camp is also being considered at the Balranald main construction compound should the existing camp within the Balranald township not be available. The accommodation camp would be accommodated within the existing area identified for the Balranald construction compound (as described in the previous option above).

Figure 6-7 Example of an existing accommodation camp site (existing accommodation camp located in Balranald)

6.7.1.2. Cobb Highway

The Cobb Highway main construction compound and accommodation camp site would be located along the western side of the Cobb Highway around five kilometres to the south of the alignment of the proposal. The Cobb Highway site would provide primary support for the construction of the central section of the transmission line (generally west of Maude Road to For Corners Road) as well as worker accommodation. An indicative location for the main construction compound and accommodation camp site is shown on Figure 6-4c.

6.7.1.3. Dinawan 330kV substation

The proposed Dinawan 330kV substation construction compound and accommodation camp site would be located along the eastern side of Kidman Way adjacent to the proposed Dinawan 330kV substation site, around 30 kilometres to the south of the township of Coleambally. The Dinawan camp would provide primary support for the construction of the proposed Dinawan 330kV substation and central east section of the transmission line (generally along For Corners Road to Coonong Road between the Newell Highway and Urana-Morundah Road) as well as worker accommodation. An indicative location for the main construction compound and accommodation camp site is shown on Figure 6-4d.

6.7.1.4. Lockhart

~~Two alternatives for the Lockhart main construction compound and accommodation camp site have been identified. These sites have been identified to the north east of (County Boundary Road site) and west (Urana-Lockhart Road site) of the township of Lockhart.~~

The proposed Lockhart construction compound and accommodation camp site would be located to the north east of the township of Lockhart along County-Boundary Road. The Lockhart site would provide primary support for the construction of the central east and eastern sections of the transmission line (generally west of Coonong Road to the Bullenbong Road, north of the township of The Rock) as well as worker accommodation.

An indicative location for the main construction compound and accommodation camp site is shown on Figure 6-4e. The final location of the Lockhart site would be selected subject to ongoing landholder agreement.

6.7.1.5. Wagga Wagga

The Wagga Wagga main construction compound (laydown and compound area only) would be located within a cleared area adjacent to the existing Wagga Wagga substation (to the east of Ashfords Road). The Wagga Wagga main construction compound would provide primary support for the construction of the eastern section of the transmission line and proposed expansion and upgrade works to the Wagga Wagga substation. An indicative location for the main construction compound is shown on Figure 6-4e.

6.7.1.6. Additional worker accommodation

Worker accommodation at the eastern end of the proposal is proposed to be provided within the township of Wagga Wagga utilising local hotel, motel and rental accommodation opportunities. Local hotel, motel and rental accommodation are also proposed to supplement the accommodation camps where necessary during portions of the construction period at:

- Mildura
- Hay
- Narrandera.

6.7.2. Other ancillary facilities and the transmission line construction corridor

A number of minor staging, storage and laydown ancillary areas would be required within the construction impact area for the temporary storage of materials, plant and equipment required to construct the various elements of the proposal (in particular transmission line towers). Upon completion of works, these ancillary sites would be cleared of any temporary infrastructure and equipment, and rehabilitated in line with Section 6.6.3. These sites would be in place for shorter periods at locations suitable to support the construction works as they move along the alignment.

6.8. Plant and equipment

An indicative list of construction plant and equipment likely to be required for the key construction elements is provided below. Not all the equipment identified below would be required for all phases of construction.

- asphalt plant
- air compressor
- backhoe
- bob cat
- cable truck
- chainsaws
- cranes (ranging from 50 to 300 tonnes)/crane trucks
- compactor
- concrete agitator
- concrete pump
- crawler crane with grab attachments
- dozers (D6 to D10)
- drones
- dumper trucks
- elevated working platforms
- excavators (ranging from five to 45 tonnes)

- excavator(s) with hammer or harvester
- forklift
- franna cranes (ranging from 12 to 25 tonnes)
- flatbed Hi-Ab trucks
- generators
- geotechnical boring rigs
- graders (CAT 14M and 140M)
- haulage trucks
- lift trucks
- mulchers
- piling rig(s)
- pneumatic jackhammers
- prime mover and semi-
- telehandlers
- trailers
- rigid tippers with trailers
- rollers (ranging from 10 to 15 tonnes)
- scrapers
- semi-trailers
- stringing winches
- specialised heavy haul, lift and shift plant
- specialised plant for large specialist equipment assembly and commissioning
- stump grinder and mulcher/chipper
- tilt tray trucks
- tractor and slasher
- transport trucks
- trenchers
- watercarts.

6.9. Resources and materials

6.9.1. Excavation volumes

As described in Section 6.5, excavation works would be required within the construction impact area for activities such as transmission line construction, preparation of the Dinawan 330kV substation site to provide level surfaces, to create the required trenches for drainage, earthing, and electrical conduits and to construct access tracks.

Spoil from the excavations associated with the transmission line may be reused on site wherever possible, however in some instances spoil would be removed from site and disposed of at an appropriately licensed facility. Any such on site re-use would be within the construction impact area, and would not substantially alter landform or drainage in the vicinity of the transmission line towers. Excavation works would be carried out using earth moving equipment such as excavators, dozers, piling rigs and rock breakers.

Based on the current design of the proposal, the anticipated excavation volumes for the proposal are shown in Table 6-4.

Table 6-4 Indicative earthwork volumes

Approximate volume of material to be excavated	Approximate volume of material	Earthwork balance	Typical depth
Dinawan 330kV substation site			
Dinawan earthworks material site	Up to around 150,000 to 200,000 cubic metres of earthworks material may be sourced from the proposed Dinawan earthworks material site (refer below table for details.	–	Up to around 2.5 metres in depth for the earthworks material site.

Approximate volume of material to be excavated	Approximate volume of material	Earthwork balance	Typical depth
Excavation for new pad foundations	Around 150,000 cubic metres of material would be required for fill to create the new substation infrastructure pad (primarily sourced from the Dinawan earthworks material site).	Nil	Minimal earthwork excavation. Concrete pad to be formed on new earthwork surface.
Wagga Wagga substation upgrade and expansion site			
Excavation for new pad foundations within the expanded substation site	Around 7,500 cubic metres of cut would be required to accommodate the expanded substation area. Around 500 cubic metres of this (subject to suitability) is expected to be able to be used for fill. Around 625 cubic metres of reinforced concrete would be used to create the new substation infrastructure pad.	Excess of around 7,000 cubic metres for reuse or removal	Depth typically around 500 millimetres. Concrete pad to be formed on existing surface.
Transmission line			
Excavation for tower foundations Around 260,000 cubic metres of material to be excavated across all tower locations and access tracks	Around 225,000 cubic metres of material required for fill across all tower locations and access tracks. Reinforced concrete would be used to fill the remaining excavation areas at tower footings etc.	Around 35,000 cubic metres (excess/spoil)	8 to 26 metres.

Where required along the overall length of the proposal, imported quarry products would likely be sourced locally and be transported by road to transmission line sites. In order to reduce potential earthwork requirements, top soil would be stockpiled within the construction impact area and reused for re-establishing grasses and other vegetation in areas proposed to be rehabilitated. Where excavated spoil is determined not to be appropriate for reuse on site, it may be necessary to import additional material to site to make up any identified deficit. Where this is required, this would be sourced locally.

There would also be a requirement to maintain safe working clearances under the existing transmission lines where the proposal would be located in or adjacent to existing lines or the Wagga Wagga substation. Accordingly, excavation works would generally commence where clearances from natural ground level to the above transmission lines exceed the safe working requirements. Benching and spoil removal would progress using rock breakers, excavators and trucks. This methodology would ensure that safe clearances are maintained and excavation works can proceed without the requirement to disconnect electrical transmission along these lines during construction.

6.9.1.1. Dinawan 330kV substation earthwork

In order to reduce the potential impacts of the traffic movements to local quarry sources, a substantial portion of the required fill material may be sourced from an area adjacent to the proposed Dinawan 330kV substation site (subject to the suitability of the available fill material). Additional materials (such as gravel or other materials that would not be won from these site) would still be required to be imported to the site from external location(s).

The proposed Dinawan earthwork material site (including an area for suitable laydown of processing equipment and stockpiling) would have an area of around 20 to 25 hectares and be located on the slightly mounded area generally to the north and east of the proposed Dinawan 330kV substation site (refer to Figure 6-8).

The area shown in Figure 6-8 represents a maximum possible extent and would likely require a somewhat reduced area. The final location of the Dinawan earthwork material site would seek to avoid areas of potential environmental impacts as far as practical, while minimising impacts to the overall landform. The suitability of fill material for the raised substation pad and the final extent of the Dinawan earthwork material site would be confirmed by further geotechnical investigations during finalisation of the proposal design.

By sourcing some of the material from an area adjacent to the new substation site where a majority of the earthworks would be required to be imported to, the key benefits of the proposed Dinawan earthwork material site would include:

- reduced overall truck movements during construction that are associated with the movement of materials for the proposed Dinawan 330kV substation site
- reduced safety risk associated with trucks and driver fatigue
- reduced overall program timeframe associated with the movement of materials for the proposed Dinawan 330kV substation site
- reduced impacts on local roads and proposed haulage routes.

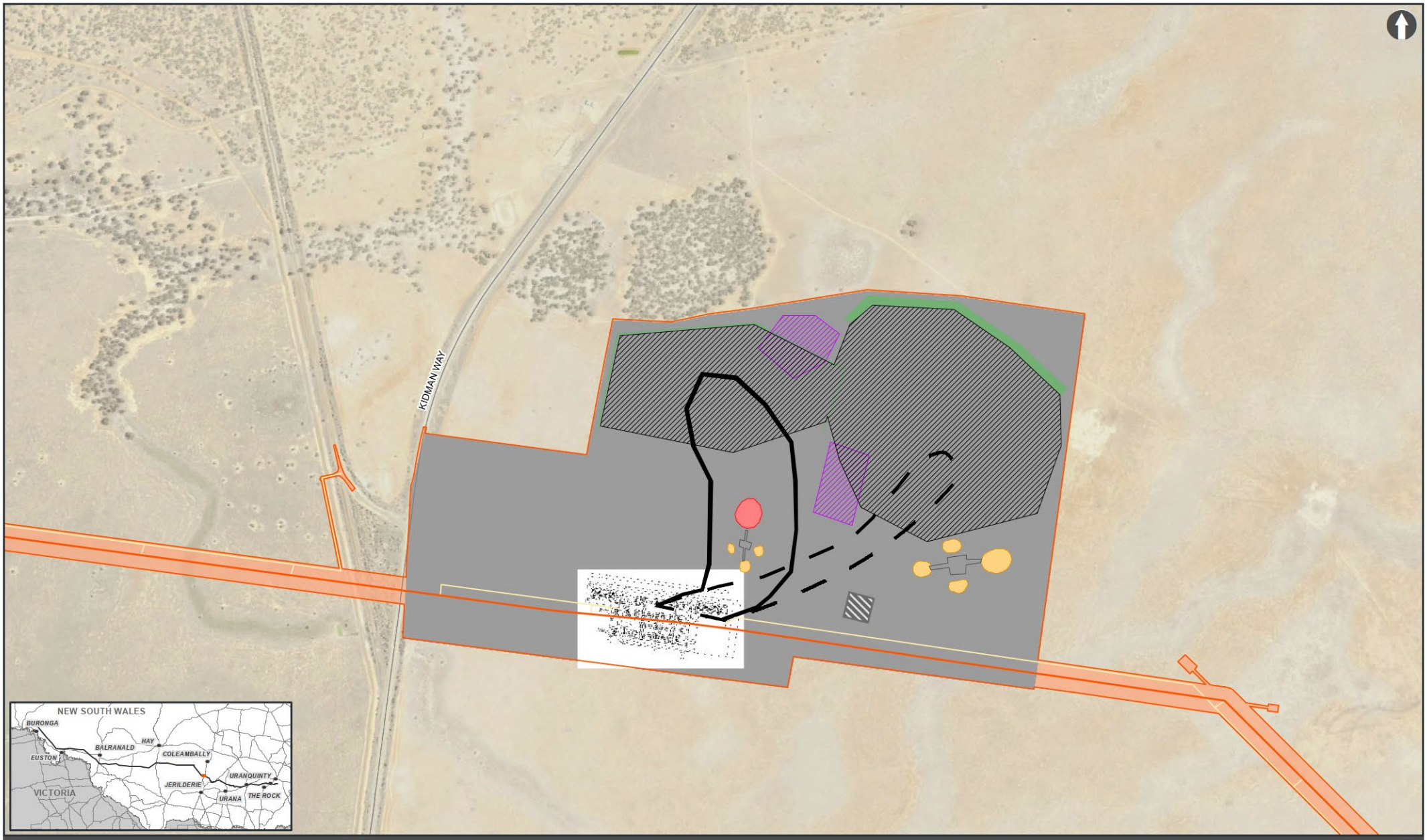


Figure 6-8

Proposed Dinawan earthwork material site

6.9.2. Water supply

Water would be required during construction for activities such as:

- dust suppression on substation construction sites and line tower construction sites, and on access tracks through the use of a water spray attached to a tanker vehicle (including the possible use of water reduction polymers)
- concrete batching activities
- wetting backfill material (if it is too dry for effective compaction)
- general worker facilities at the main construction compound and camp sites (drinking water, toilets/showers etc).

It is estimated that about 1.1 gigalitres of water would be required for construction, comprising:

- 728 megalitres for dust suppression
- 203 megalitres for earthworks compaction
- 20 megalitres for concrete batching activities (potable water)
- 11 megalitres for vehicle washdown facilities
- 100 megalitres for camp sites (potable water).

Water would be supplied for the proposal from existing regulated sources. Water would be purchased from the existing water market within the region or from local council facilities. Access to these sources would occur through the use of existing, licensed water extraction infrastructure only. No new extraction infrastructure from existing watercourses is proposed as part of the water supply points proposed.

Water storage tanks would be provided, where required, along the transmission line easement to manage demand requirements.

Transgrid has commenced discussions with a number of water suppliers within the broad region through which the proposal would be located to identify the required volume water (potable and non-potable) for the proposal from existing facilities. This has included initial consultation with local councils, Riverina Water and other water suppliers such as the Coleambally Irrigation and private water licence holders.

Based on ~~initial~~ current investigation and consultation, a total of ~~26~~ 39 potential sources of water have been identified along the length of the proposal which have the potential to support the construction water needs for the proposal. The currently identified water supply points are listed in Table 6-5 and shown in Figure 6-9.

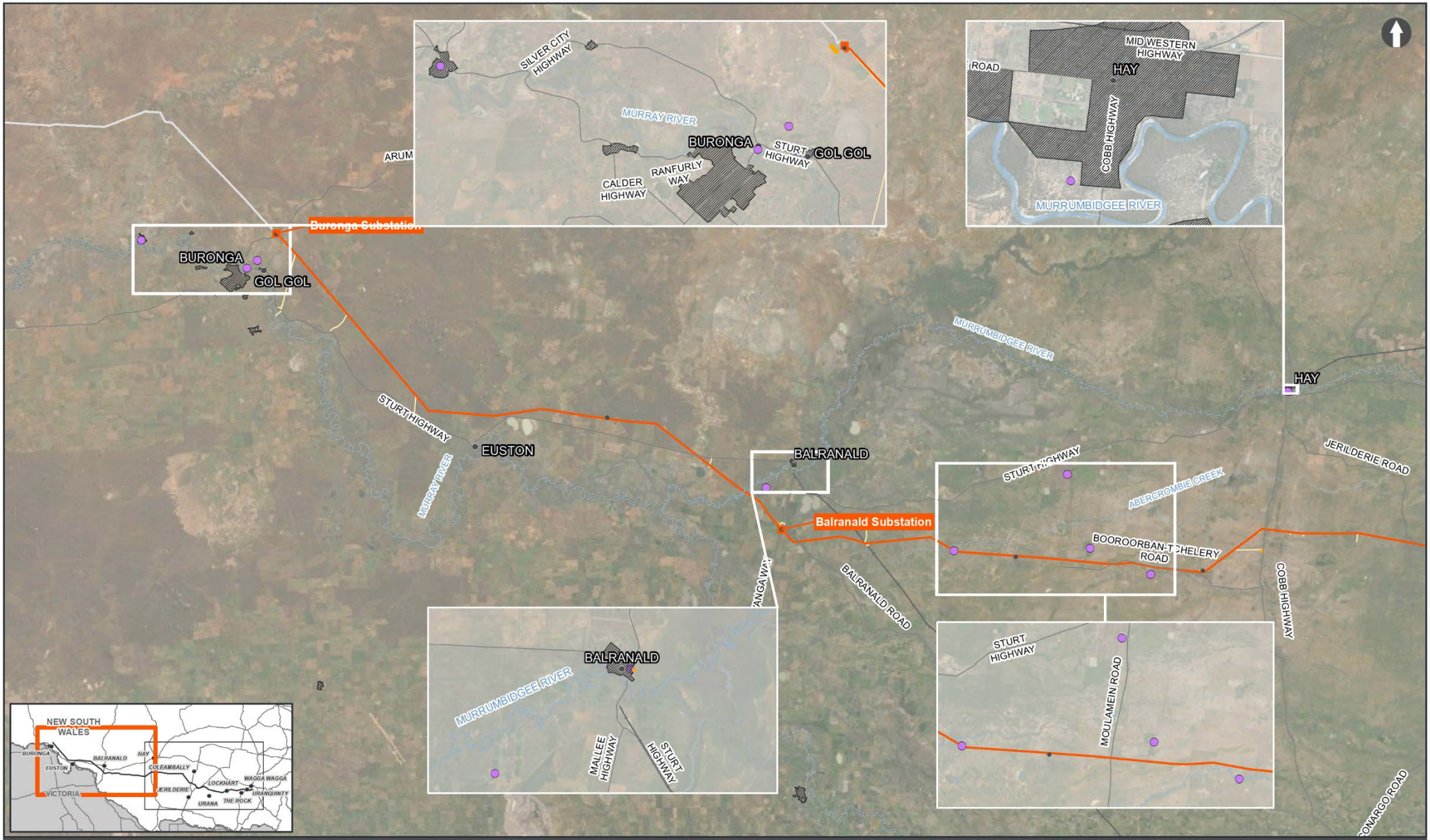


Figure 6-9a

Indicative water supply points (including additional locations)

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Main Construction Compounds and Accommodation Sites
- Access Tracks
- Water Fill Point
- Existing Substation
- Existing Railway
- Built Up Areas
- Waterbody

Sheet 1 of 2

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Source: NSWSS, ESRI, Transgrid, WSP

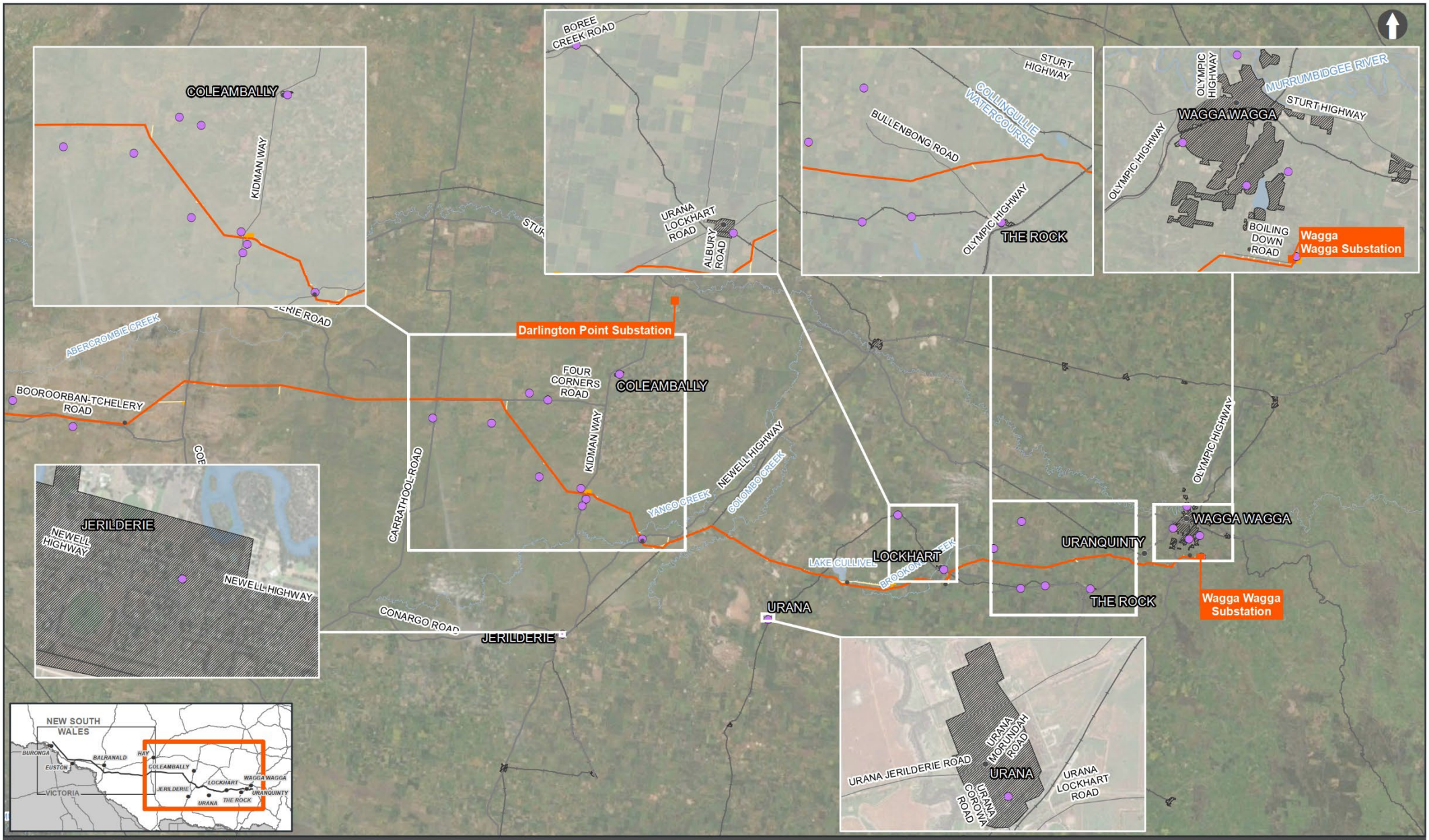

Figure 6-9b

Indicative water supply points (including additional locations)

- EnergyConnect (NSW - Eastern section)
- EnergyConnect (NSW - Western section)
- Main Construction Compounds and Accommodation Sites
- Access Tracks
- Water Fill Point
- Existing Substation
- Existing Railway
- Built Up Areas
- Waterbody

Sheet 2 of 2

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Source: NSWSS, ESRI, Transgrid, WSP

Table 6-5 Indicative water supply points

Location	Water supplier	Type of water supply	Typical use	Connection type	Average number of fills per day (trucks/[total movements])
Modica Crescent, Wentworth	Wentworth Council	Potable	All proposed uses	Standpipe	5 [10]
Beverley Street, Wentworth	Wentworth Council	Potable	All proposed uses (with exception of concrete)	Overhead	3 [6]
River Drive, Buronga	Wentworth Council	Non-potable	Dust suppression, earthworks, washdown	Overhead	3 [6]
Alcheringa Road	Western Murray Irrigation	Non-potable	Dust suppression, earthworks, washdown	Existing	5 [10]
Church Street, Balranald	Balranald Shire Council	Potable	All proposed uses	Standpipe	10 [20]
Wanganella	Edward River Council	Potable (TBC)	All proposed uses	Existing	5 [10]
394, Hay Road, Deniliquin	Edward River Council	Potable	Office/Welfare	Existing	5 [10]
Cadell Street	Hay Shire Council	Potable	All proposed uses	Existing	3 [6]
Pine Street	Hay Shire Council	Potable	All proposed uses	Existing	3 [6]
111 Jerilderie St, Jerilderie	Murrumbidgee Council	Potable	All proposed uses	Existing	5 [10]
3 Bencubbin Av, Coleambally	Murrumbidgee Council	Potable	All proposed uses	Existing	4 [8]
Coleambally to Dinawan	Murrumbidgee Council	Potable	All proposed uses	Existing	10 [20]
Bulgary	Riverina Water	Potable	All proposed uses	Overhead	10 [20]
Boree Creek	Riverina Water	Potable	All proposed uses	Overhead	3 [6]
Urana	Riverina Water	Potable	All proposed uses	Overhead	5 [10]
French Park	Riverina Water	Potable	All proposed uses	Overhead	10 [20]

Location	Water supplier	Type of water supply	Typical use	Connection type	Average number of fills per day (trucks/[total movements])
Tootool	Riverina Water	Potable	All proposed uses	Overhead	10 [20]
Lockhart	Riverina Water	Potable	All proposed uses	Existing	20 [40]
The Rock O/Head	Riverina Water	Potable	All proposed uses	Overhead	10 [20]
The Rock	Riverina Water	Potable	All proposed uses	Existing	10 [20]
Forest Hill	Riverina Water	Potable	All proposed uses (with exception of concrete)	Existing	5 [10]
Lake Albert	Riverina Water	Potable	All proposed uses (with exception of concrete)	Existing	10 [20]
Glenfield	Riverina Water	Potable	All proposed uses (with exception of concrete)	Existing	10 [20]
Ashfords Road	Riverina Water	Potable	Office/Welfare, Dust suppression, earthworks, washdown	New pipe connecting to existing infrastructure	10 [20]
Lockhart-Collinguille Road, Lockhart	Riverina Water	Potable	All proposed uses	New piped connection under Collinguille Road	N/A
~~Kooringal Sewage Treatment Plant~~	~~Wagga Wagga City Council~~	~~Non-potable~~	~~Dust suppression, earthworks, washdown~~	~~Existing~~	~~5 [10]~~
~~Narrung Sewage Treatment Works~~	~~Wagga Wagga City Council~~	~~Non-potable~~	~~Dust suppression, earthworks, washdown~~	~~Existing~~	~~5 [10]~~
~~Gregadoo Waste Management~~	~~Wagga Wagga City Council~~	~~Non-potable~~	~~Dust suppression, earthworks, washdown~~	~~TBC~~	~~15 [30]~~
Ravensworth	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	5 [10]
Moulamein Road, Moulamein	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	5 [10]

Location	Water supplier	Type of water supply	Typical use	Connection type	Average number of fills per day (trucks/[total movements])
Cooinbil, Four Corners Road, Coleambally	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	3 [6]
1254 Four Corners Road Coleambally	Private	Both	Dust suppression, earthworks, washdown	Existing	5 [10]
Wonga	Private	Both	Dust suppression, earthworks, washdown	Existing	5 [10]
Lucerne at Balranald	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	5 [10]
North Bundy, Booroorban-Tchelery Road, Booroorban	Private	Non-potable	Dust suppression, earthworks, washdown	Dam	5 [10]
Cadell Road, Coleambally	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	10 [20]
Mclennons Bore Road, Coleambally	Private	Non-potable	All proposed uses	Existing	10 [20]
Four Corners Road, Mabins Well	Private	Non-potable	All proposed uses	TBC	5 [10]
Red Swamp/ Dinawan Substation	Private	Non-potable	Dust suppression, earthworks, washdown	Existing	15 [30]
Red Swamp/ Dinawan Substation	Private	Non-potable	Dust suppression, earthworks, washdown	Dam	10 [20]
Newell Highway, Bundure	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	10 [20]
Keri Keri Road, Kerri, Kerri	Private	Non-potable	Dust suppression, earthworks, washdown	TBC	5 [10]

These identified sources and volumes available for supply to the proposal would be confirmed during ongoing negotiations with each water supplier. Ongoing consultation with water suppliers may also identify other water sources that may be used for the construction of the proposal which would be secured under standard supply/purchase agreement from existing facilities (no infrastructure amendments needed for them). This may include additional sources of potable water from areas such as Coleambally Irrigation or private water licence holders.

Effluent from the wastewater treatment facilities at the proposed Cobb Highway, Dinawan and Lockhart accommodation camp sites (see below) would also be collected, treated to appropriate standards, and transported via water carts for reuse in dust suppression, compaction of materials or other construction activities which may require and can utilise grey water.

6.9.2.1. Onsite wastewater treatment

In order to manage effluent and greywater from the main accommodation camp sites, wastewater treatment facilities would be constructed at each of the Cobb Highway, Dinawan and Lockhart accommodation camp sites. The systems would be designed to collect wastewater from showers, kitchens, laundries and toilets, with toilet and kitchen facilities located both at the camp and the office areas.

The wastewater treatment facilities would be designed to accommodate the proposed personnel numbers at each accommodation camp site. The wastewater system would treat the effluent produced from both the camp and office facilities.

Wastewater produced during the initial establishment of the camps would be collected and transported to a council wastewater treatment plant. This process would be in place during the site establishment works for the proposal and would cease once the main wastewater treatment facilities are operational.

The proposed wastewater treatment plants would be a generally contained system and would include biological and chemical treatment, filtration and disinfection. Subject to the final design of the wastewater treatment facilities, it is proposed that a sequencing batch reactor type sewage treatment plant be constructed at each of the primary camp sites. The most suitable treatment processes and plant configuration would however be finalised prior to construction.

At site locations outside the accommodation camp sites, welfare facilities would continue to be installed to provide amenity to workers at these locations. Liquid waste would be removed and transported to a licensed facility.

Treatment process

The volume of water to be treated would be dependent on the camp and office occupancies and associated water use at any one time throughout the construction period. A conservative allowance of up to 240 litres per person, per day has been allowed for (consistent with the allowance made for the EnergyConnect – Western Section project). At peak, each accommodation camp would therefore see a potential daily throughput for treatment of between 84,000 litres for a smaller camp such as Lockhart up to 120,0000 litres for a larger camp such as the Dinawan 330kV substation accommodation camp (when at maximum capacity).

An example of the proposed type of wastewater treatment facility is shown in Figure 6-10.

Figure 6-10 Indicative water supply points

The typical operation of the wastewater treatment facilities would include the following steps.

- *Input of wastewater* – Collection of raw water (from sources such as showers, kitchens, laundries and toilets, with toilet and kitchen facilities) through use of pumps. Wastewater would undergo a mechanical screening process to remove all the inorganic material from the sewage and dispose it to the waste bin.

- *Equalisation process* – Pumps would then transfer the raw wastewater to the wastewater treatment facility (into equalisation tanks). The equalisation tanks would provide sufficient storage capacity to control the peak flow and provide the treatment plant with continuous flow.

- *Treatment tanks* – The treatment tank(s) would function in five different modes being: fill, aerobic, anoxic, settle and decant. The treatment tank would cycle through all modes of operation up to four times per day. The storage tanks would be located above ground next to the wastewater treatment system in a bunded area (up to around 110,000 litre total capacity to allow for potential storage during rain events).

- *Final effluent treatment* – Treated effluent would be withdrawn from the tanks and pumped into the final storage and control tank. Additional tanks would be provided in order to increase the storage capacity of up to three days of operation during wet weather conditions.

Effluent from the wastewater treatment facilities would be discharged to a small basin type structure ('turkey's nests'), following which greywater would be collected and transported via water carts for reuse in dust suppression, compaction of materials or other construction activities which may require and can utilise grey water. The turkey's nests would be lined with high density polyethylene/geosynthetic clay liner to avoid potential interaction with groundwater.

Sludge dewatering

All wastewater treatments plants produce sludge that requires disposal on regular intervals. Liquid waste sludge would be transported to a facility licensed to accept the waste.

Final effluent quality

The wastewater treatment system would be designed, maintained and monitored in accordance with *On-site domestic wastewater management, Designing and Installing On-Site Wastewater Systems* (WaterNSW, 2019), *On-site domestic wastewater management - AS/NZS 1547:2012* (Standards Australia and Standards New Zealand, 2012) and the Aust*ralian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)* (National Resource Management Ministerial Council, Environment Protection and Heritage Council and Australian Health Minister's Conference, 2006).

The wastewater treatment facilities would be designed to produce effluent that meets the requirement for dust suppression and use or dispersion for other construction related activities within the construction impact area.

Based on the proposed capacity of the wastewater treatment facilities at each camp site, it is not expected that an environment protection licence would be required under the POEO Act (clause 36 of Schedule 1).

6.9.3. Hazardous materials and chemicals

During construction, various hazardous materials and chemicals would likely be required to be used and/or stored on site. Hazardous materials and chemicals would typically include (but not limited to):

- acetylene, Oxygen, Liquid Petroleum Gas
- adhesives, glues, epoxies, etc.
- concrete and other mortar products
- contact cleaners
- cold-galvanising spray
- fuels, oils and lubricants (such as diesel, unleaded petrol, thinners, oil for electrical equipment, etc.).
- paints and other paint markers
- SF6 gas for electrical equipment.

6.9.4. Other resources and materials

A range of other materials and resources would also be required during the construction of the proposal. Key additional materials and resources would include around:

- 18,700 tonnes of steel for transmission line towers
- 7,555 kilometres of conductor cables
- up to 3,300 cubic metres of concrete for substation works and up to around 30,000 cubic metres of concrete for transmission tower footings.

6.10. Workforce and working hours

6.10.1. Construction workforce

The construction workforce would vary depending on the stage of construction and associated activities. During peak construction activities, the proposal is expected to employ around 500 full time equivalent construction workers. Table 6-6 provides an overview of the anticipated construction workforce for each stage of construction.

Table 6-6 **Anticipated construction workforce**

Phase	Anticipated Workforce (approx.)
Dinawan 330kV substation works and Wagga Wagga substation upgrade and expansion works	
Enabling works	20
Substation access road	25
Main civil construction works	170 to 180
Main electrical construction Works	85
Switchyard surfacing	10
Pre-commissioning	10
Commissioning	30 to 40
Demobilisation	20 to 30
Transmission line works	
Enabling works	80
Transmission line easement construction tracks	110 to 120
Tower foundation installation	40 to 50
Erection of towers	160 to 170
Stringing and clipping of conductors	170 to 180
Commissioning	20 to 30

6.10.2. Construction work hours

Construction work would be carried out seven days per week between 7:00 am and 7:00 pm. The main construction compounds would also operate during these hours. Where sensitive receivers are noise affected by construction works (that is, where construction noise is above the noise management level), works would be carried out within standard construction hours (as defined in the ICNG (DECCW, 2009)) or conducted outside of these hours where such works are required/justifiable in accordance with the ICNG (DECCW, 2009). Refer below for potential out of hours work requirements.

The accommodation camp facilities would be operational 24 hours a day, seven days a week.

The extended construction hours are proposed given the distance to sensitive receivers for the majority of the construction impact area, and the shift arrangements of the workforce given the remote nature of the proposal. Extended working hours would also achieve reductions in the overall duration of construction.

Where the extended hours are proposed for activities in proximity to noise affected sensitive receivers (and the works cannot be undertaken during standard work hours), additional measures would be implemented where works would potentially exceed noise management levels (NMLs) through an out of hours work protocol.

6.10.2.1. Out of hours works

A series of works outside the proposed construction hours for the proposal are anticipated including (but not limited to) the following:

- transmission line construction where this would occur as a crossing of a main road or railway. These locations are expected to have restricted construction hours requiring some night works for activities such as conductor stringing over the crossing(s)
- works where Road Occupancy Licenses (or similar) are required
- transmission line cutover and commissioning
- the delivery of equipment or materials outside standard hours requested by police or other authorities for safety reasons (such as the delivery of transformer units)
- substation assembly (oil filling of the transformers)
- emergency work to avoid the loss of lives and/or property and/or to prevent environmental harm
- work timed to correlate with system planning outages (likely 24-hour operations when required to minimise impact to electrical supply services)
- situations where agreement is reached with affected receivers
- potential utilities adjustment works (in consultation with the requirements of asset operators)
- large concrete pours (including concrete batching plant operation which may require commencement before 7.00 am for early pours).

During detailed construction planning, a program would be determined to identify the required night work periods (including dates and durations). Except for emergencies, construction works would be carried out in accordance with the out of hours work protocol and would not take place outside construction hours without prior notification in line with that protocol.

6.11. Construction traffic volumes, parking and haulage routes

6.11.1. Construction traffic volumes

Construction vehicle movements would comprise vehicles transporting compound and camp infrastructure, equipment and plant, materials, spoil and waste, as well as mini-buses and light vehicles associated with construction workers travelling to and from construction areas. These movements would occur daily across the whole of the proposal. Non-standard or oversized loads would also be required for the substation upgrade and expansion works (such as delivery of transformer units) and transportation of transmission line tower materials.

Indicative daily vehicle movements for the proposal are outlined in Table 6-7. These vehicle movements are based on the expected typical and peak construction period for the proposal. The vehicle movements stated in Table 6-7 would be confirmed during finalisation of the proposal design.

Table 6-7 Indicative vehicle movements

Compound site	Light vehicles (typical)	Light vehicles (maximum)	Heavy vehicles (typical)	Heavy vehicles (maximum)
Buronga construction compound and accommodation camps	80	130	80	200
Balranald construction compound	40	70	100	200
Balranald accommodation camp	100	160	20	60
Cobb Highway construction compound and accommodation camp	100	180	100	200
Dinawan construction compound and accommodation camp	160	250	160	320
Lockhart construction compound and accommodation camp	170	280	170	350
Wagga Wagga construction compound	100	130	100	200

Notes:

1. Indicative daily movements based on current program of works. This is an average and there would be days of increased peak activities which may impact these average/indicative numbers and conversely days of decreased activity.
2. Vehicle movements are combined (i.e. a heavy/light vehicle arriving and leaving a site within a day counts as one movement).
3. Indicative movements assume that most of the workers are based in the camp, staff commuting from local townships.

Construction vehicle traffic would be greatest during the main earthworks and civil construction activities. Most of the light vehicle movements associated with the construction works would generally be limited to construction staff travelling to and from individual sites for work from the worker accommodation sites.

Standard traffic management measures would be employed to minimise short-term traffic impacts expected during construction. These measures would be identified in the construction traffic management plan for the site. In general, vehicle movements would be scheduled outside peak periods wherever possible. However, there would be a need for some vehicle movements during these periods. Worker vehicle movements would also be required during both the morning and afternoon peak hour periods.

Further detail and discussion regarding construction traffic volumes is provided in Chapter 19 and Section 5.2.1 of Technical paper 11.

6.11.2. Construction worker parking

Construction worker parking would primarily be provided within the main construction compound and camp sites as described in Section 6.7. For the construction works at the proposed Dinawan 330kV substation, it is expected that relevant workers would be typically based within the accommodation camp at this work site.

For the transmission line alignments, given the transient nature of these construction works, and potentially long distances, it is expected that workers would typically be transported by bus (or other type of crew vehicle) to site from their relevant accommodation camp. Where other vehicles are used to access these sites, parking spaces for construction personnel would generally be within 30 metres on each tower location site within the identified construction impact area.

6.11.3. Construction haulage routes

6.11.3.1. Routes for the movement of construction equipment and materials (local haulage routes)

Construction vehicle movements would be required along the length of the construction impact area. Where feasible, this would be undertaken within the construction impact area, to minimise impacts on the public road network. However, use of public roads would also be required.

Local haulage routes would use all available public roads where available to access relevant sections of the alignment. These routes would be used by both general construction traffic and for heavy vehicle haulage routes.

Given the scale and number of roads that would be required for the proposed construction haulage routes, the haulage routes have been classified as follows:

- Primary haulage routes – haulage route between ports to the main construction compounds which may involve oversized and overmass transport movements. These roads would also include primary haulage routes between proposed the main construction compounds and accommodation camp sites and ancillary sites.
- Secondary haulage routes – haulage routes between the main construction compounds to the transmission line work area. These routes would not involve the movements of oversized and overmass vehicles.
- Water haulage routes – identified routes proposed to be used by water trucks to travel between water source to the nearest primary or secondary routes (where proposed water fill points are not located on otherwise identified primary or secondary routes.

The routes have been developed to minimise impacts on local roads as far as possible, while providing the most direct route to the road network and meeting specific road requirements (such as specified routes for heavy vehicles). These preliminary haulage routes would be reviewed during finalisation of the proposal design and confirmed ~~following appointment of~~ by the construction contractor prior to commencement of construction.

The proposed haulage routes along the proposal alignment are shown on Figure 6-12. A summary of the impacted roads associated with these haulage routes is provided in Table 6-8. The impacted roads in Table 6-8 have been grouped by local government area. Where a road extends across local government area boundaries, roads have only been identified once.

Table 6-8 Summary of roads required for proposed construction haulage routes

Primary haulage	Secondary haulage	Water haulage
Roads within Wentworth local government area		
Adelaide Street	Dansons Road	Corbett Avenue
Arumpo Road		Melaleuca Street
Silver City Highway (B79)		Modica Cres
Sturt Highway (A20) (Buronga)		Alcheringa Drive
Roads within Balranald local government area		
Market Street	Abbotts Tank Road	
McCabe Street	Benanee Road	
Murray Valley Highway	Euston Prungle Road	
Sturt Highway (between Buronga and Robinvale)	Windomal Road	
Sturt Highway (between Robinvale and Balranald)	~~Church Street~~	
Yanga Way / Balranald-Tooleybuc Road		
Church Street		
Roads within Murray River local government area		
Baratta Street	Baldon Road	
Carne Street	Balranald Road (south of alignment)	
Cedar Avenue	Balranald Road (north of alignment)	
Kyalite Road	Binbinette Road	
Pretty Pine Road (west)	Brougham Street	
Sturt Highway (between Balranald and Cobb Highway)	Impimi Road	
Balranald Road (near Moulamein)	Keri Keri Road (south)	
Moulamein Road	Keri Keri Road (north)	
Tallow Street	Morago Street	
	~~Moulamein Road~~	
	Paterson Street	
	~~Tallow Street~~	
Roads within Hay local government area		
Cobb Highway	Glenhope Road	
Jerilderie Road	Maude Road	
Moama Street	Romani Road	
Sturt Highway (between Cobb Highway and Newell Highway)	~~West Burrabogie Road~~	

Primary haulage	Secondary haulage	Water haulage
West Burrabogie Road		
Roads within Edward River local government area		
~~Booroorban-Tchelery Road~~	Dry Lake Road	
Carrathool Road (south-west of Moonbria Road intersection)	East-West Road	
Hay Road	~~Finley Road~~	
Moonbria Road	Millears Road	
Pretty Pine Road (east)	Monimail Road	
Riverina Highway (west of Finley)	Nesbits Road	
Wandook Road	Warwillah Road	
Davidson Street	Willurah Road	
Charlotte Street	~~Wanderer Street~~	
Ochtertyre Street	Booroorban-Tchelery Road	
Hardinge Street	Carrathool Road (north of Moonbria Road intersection)	
Cobb Highway (south of Deniliquin)		
Finley Road		
Wanderer Street		
Roads within Murrumbidgee local government area		
Conargo Road (in Conargo)	Bundure Road	~~Kidman Way (Near Morundah Road)~~
Four Corners Road	Cadell Road	
Jerilderie Street (Jerilderie)	Colombo Road	
Jerilderie-Urana Road	Crutchs Road	
Liddles Lane	Fernbank Road	
Morundah Road	~~Kidman Way (Near Sturt Highway)~~	
Newell Highway (north of Jerilderie)	Mcdonald Road	
Newell Highway (south of Jerilderie)	Mclennons Bore Road	
North Boundary Road	Six Mile Lane	
Southey Street	Thurowa Road	
Wilson Road	Crosby Road	
Yamma Road	Gilbert Road	
~~Conargo Road (near Sturt Highway)~~	Thurowa Road (north)	
Sturt Highway (within Murrumbidgee LGA)	Conargo Road (near Sturt Highway)	
Kidman Way (Near Sturt Highway)		
Kidman Way (Near Morundah Road)		

Primary haulage	Secondary haulage	Water haulage
Roads within Federation local government area		
~~Back Berrigan Road~~	Barragunda Road	
~~Battens Road~~	Boree Creek Road	
~~Berrigan Oaklands Road~~	Coonong Road	
Brookong Creek Road	Cullivel Road	
Browley Street	Drummond Street	
Chapman Street	Eades Street	
Cocketgedong Road	~~Federation Way (north of Urana)~~	
William Street	~~Federation Way (south of Urana)~~	
Yarrabee Street	Greenvale Road	
Federation Way (north of Urana)	Gums Road	
Federation Way (south of Urana)	Lachlan Street	
Woodhouse Street	Mahonga Road	
	Mallons Road	
	Meritons Road	
	Spraydon Road	
	Strontian Road	
	West Gums Road	
	~~Woodhouse Street~~	
	Riverina Highway (north of Corowa in Federation Council)	
	Honour Ave	
	Boree Creek Road (north of Boree Creek)	
	Richmond Street	
	Back Berrigan Road	
	Battens Road	
	Berrigan Oaklands Road	
Roads within Lockhart local government area		
Bullenburg The Rock Road	Albury Road	~~Andriskes Lane~~
~~Dunlevys Lane~~	Ben Hoffmans Lane	~~French Park-Bullenbung Road~~
East Street	Bidgeemia Road	~~Green Street~~
Lockhart Collingullie Road	Boyds Road/Somervilles Road	~~Hendersons Road~~
Olympic Highway (Between Urana St In The Rock And Yarrangundry St In Uranquinty)	County Boundary Road	~~Lockhart Boree Creek Road~~

Primary haulage	Secondary haulage	Water haulage
Railway Street	Flood Detour Road	~~Lockhart-Kywong Road~~
Urana Street (The Rock)	Ford Street	Old French Park-Bullenbung Road
Urana-Lockhart Road	Frank Westblades Lane	
Olympic Highway (south of The Rock)	Lockhart Road (west of Bullenbong Creek)	
	Lockhart The Rock Road	
	Mangoplah Road	
	Osborne Yerong Creek Road	
	Reid Street	
	Ryans Lane	
	Solider Settlement Road	
	Slys Lane	
	Spanish Avenue	
	Strongs Lane	
	Tenison Lane	
	The Rock Mangoplah Road	
	The Rock-Collingullie Road	
	Tribolets Road	
	Urana Street (Lockhart)	
	Wandella Lane	
	Webbs Lane	
	Yuluma Road	
	Edwards Road	
	Humphries Lane	
	Mortons Lane	
	Napier Road	
	Andriskes Lane	
	Dunlevys Lane	
	French Park-Bullenbung Road	
	Green Street	
	Hendersons Road	
	Lockhart Boree Creek Road	
	Lockhart-Kywong Road	

Primary haulage	Secondary haulage	Water haulage
Roads within Wagga Wagga local government area		
Ashfords Road	~~Dunns Road~~	Billagha Street
Boiling Down Road	~~Elizabeth Avenue~~	Elizabeth Avenue
Brunskill Road	~~Gregadoo Road~~	Inglewood Road
Colin Knott Drive	Hanging Rock Road	Narrung Street
Edward Street	Holbrook Road	~~Olympic Highway (north of Wagga Wagga)~~
Glenfield Road	Old Station Road	~~Olympic Highway (Between Sturt Highway and Yarrangundry Street in Uranquinty)~~
Gregadoo East Road	Oxley Bridge Road	Rohans Road
Hammond Avenue	Rowan Road	The Rock-Narrandera Road
Kooringal Road	Somervilles Road	Travers Street
Lake Albert Road	Uranquinty Cross Road	Vincent Road
Lloyd Road	Key Street	
Lockhart Road (east of Bullenbong Creek)	Ryan Street	
Mitchell Road	Bon Accord Road	
Moorong Street	Kendals Lane	
Pearson Street	Old Trunk Road	
Plumpton Road	Yarragundry Street	
Red Hill Road		
Sturt Highway (east of Wagga Wagga)		
Sturt Highway (between Olympic Highway and Wagga Wagga)		
Tumbarumba Road		
~~Yarragundry Street~~		
Sturt Highway (between Newell Highway and Olympic Highway)		
Bakers Lane		
Bourke Street		
Docker Street		
Dunns Road		
Elizabeth Avenue		

Primary haulage	Secondary haulage	Water haulage
Gregadoo Road		
Olympic Highway (north of Wagga Wagga)		
Olympic Highway (Between Sturt Highway and Yarrangundry Street in Uranquinty)		

Further detail and discussion regarding construction traffic haulage routes is provided in Chapter 19 and section 5.2.2 of Technical paper 11.

6.11.3.2. Oversize and overmass vehicle requirements

Main interstate/long distance haulage routes

Construction materials for the proposal would require transportation from various shipping ports across Australia. While the shipping port locations which would receive each of the anticipated material and proposal equipment deliveries are not confirmed at this stage, locations which have been considered include Newcastle (Port of Newcastle), Wollongong (Port Kembla), Adelaide (Port of Adelaide) and Melbourne (Port of Melbourne). The final haulage routes from each of these locations would be determined by the appointed contractor and they would need to accord with the heavy vehicle haulage guidelines in each of the respective states. Transportation from shipping ports to the construction site would be undertaken on the appropriate restricted freight routes (i.e. restricted access and oversize and overmass vehicle routes).

Haulage routes from port facilities would be expected to include:

- Port of Newcastle – travel from Newcastle to Buronga via Wagga Wagga along the M1 Highway to the Hume Highway (M31) and Sturt Highway (A20) to reach Wagga Wagga prior to accessing other part of the construction impact area as required (such as the proposed Dinawan 330kV substation site via Darlington Point and Kidman Way).
- Port Kembla – travel from Wollongong to Buronga via Wagga Wagga along the Hume Highway (M31) and Sturt Highway (A20) to reach Wagga Wagga prior to accessing other part of the construction impact area as required (such as the proposed Dinawan 330kV substation site via Darlington Point and Kidman Way).
- Port of Adelaide – travel from Adelaide to Buronga via Broken Hill along Silver City Highway (B79), before accessing other part of the construction impact area as required.
- Port of Melbourne – travel from Melbourne to the proposed Dinawan 330kV substation site Bendigo along Calder Highway (A79), Midland Highway (A300) and Goulburn Valley Highway (A39) on the Victorian side, before crossing the Murray River to the Newell Highway (A39) and Kidman Way to access the proposed Dinawan 330kV substation site.

Large scale equipment requirements

Based on the currently available information and design, an indicative overview of the potential extent of large scale equipment (LSE) that would require oversize and overmass vehicles is provided in Table 6-9. This table also provides an anticipated port of delivery for these materials/equipment (subject to further confirmation with the relevant suppliers prior to construction).

Table 6-9 Indicative large scale equipment requirements for oversize and overmass vehicles

Materials	Items	Estimated quantity (i.e. number of trucks)	Length (m)	Width (m)	Height (m)	Weight (t)	Anticipated delivery port
Large scale equipment							
Shunt reactor 50 mega volt ampere	Main body	4	6.5	3.4	4.1	89	Newcastle, Kembla, Geelong/ Melbourne or Adelaide
Shunt reactor 60 mega volt ampere	Main body	4	6.7	3.5	4.1	90	
Synchronous condenser (option 1)	Rotor	4	8.3	5.5	3.6	147	
Synchronous condenser (option 2)	Stator	4	5.3	5.1	4.6	120	
Synchronous condenser (option 3)	Generator	4	10	3.6	3.4	260	
Synchronous condenser (option 4)	Step-up transformer	4	9	3	2.5	160	

6.11.3.3. Containerised material deliveries

In addition to the LSE requirements identified above, the following assumptions have been made in relation to the potential extent of other material and equipment that would be required to be delivered as part of the proposal:

- tower steel (including stubs) would be transported as containerised materials using A-Double transport (refer to Figure 6-11) to the relevant main construction compounds. Redistribution of containers would then occur from these sites as required along the remainder of the construction impact area. It is estimated that a total of around 1,180 containers worth of material would be required (or around 560 A-Double movements)
- conductors would be delivered as rolled, three tonne lots on drums, with six drums per container. It is estimated that a total of around 370 containers would be required (or around 185 A-Double movements)

- OPGW earthwire, insulators, fittings, vibration dampers and other accessories would require around 160 containers (around 80 A-double truck movements)
- reinforcing steel would be bundled as bent or straight bar and delivered as containerised materials. It is estimated that a total of around 150 containers would be required (or around 75 A-Double truck movements
- other non-LSE containers (substation steel etc.) would require around 220 containers for the proposed Dinawan 330kV substation and around 195 containers for the upgraded and expanded Wagga Wagga substation.

Most deliveries would generally be standard, road legal configurations that would travel in accordance with the existing road rules and the appropriate state legislation. It is anticipated most deliveries on site would be received between 7:00 am to 7:00 pm.

Figure 6-11 Indicative example of an A-Double containerised delivery truck

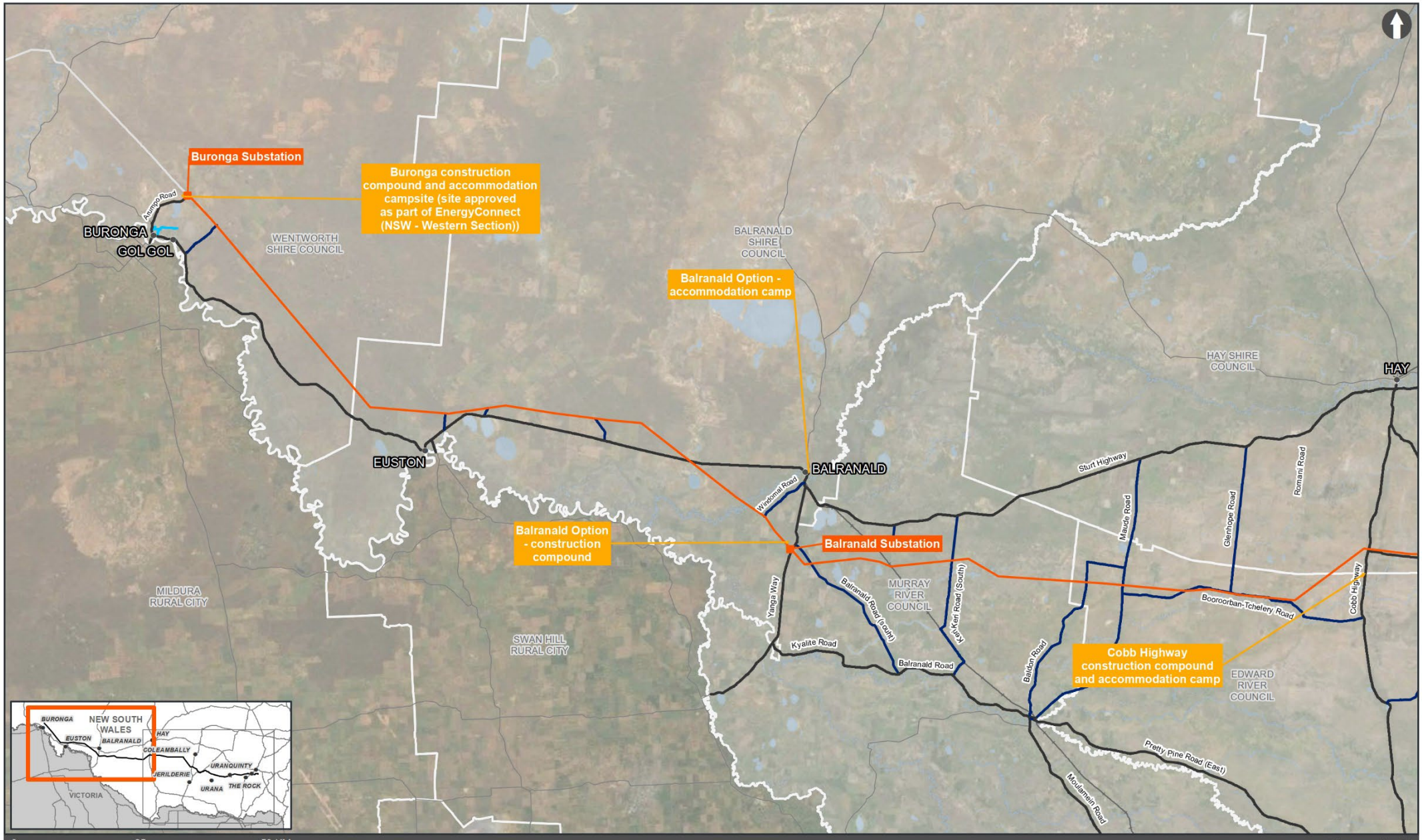

Figure 6-12

Prospective traffic routes within the traffic and transport study area

Sheet 1 of 2

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Source: NSWSS, ESRI, Transgrid, WSP

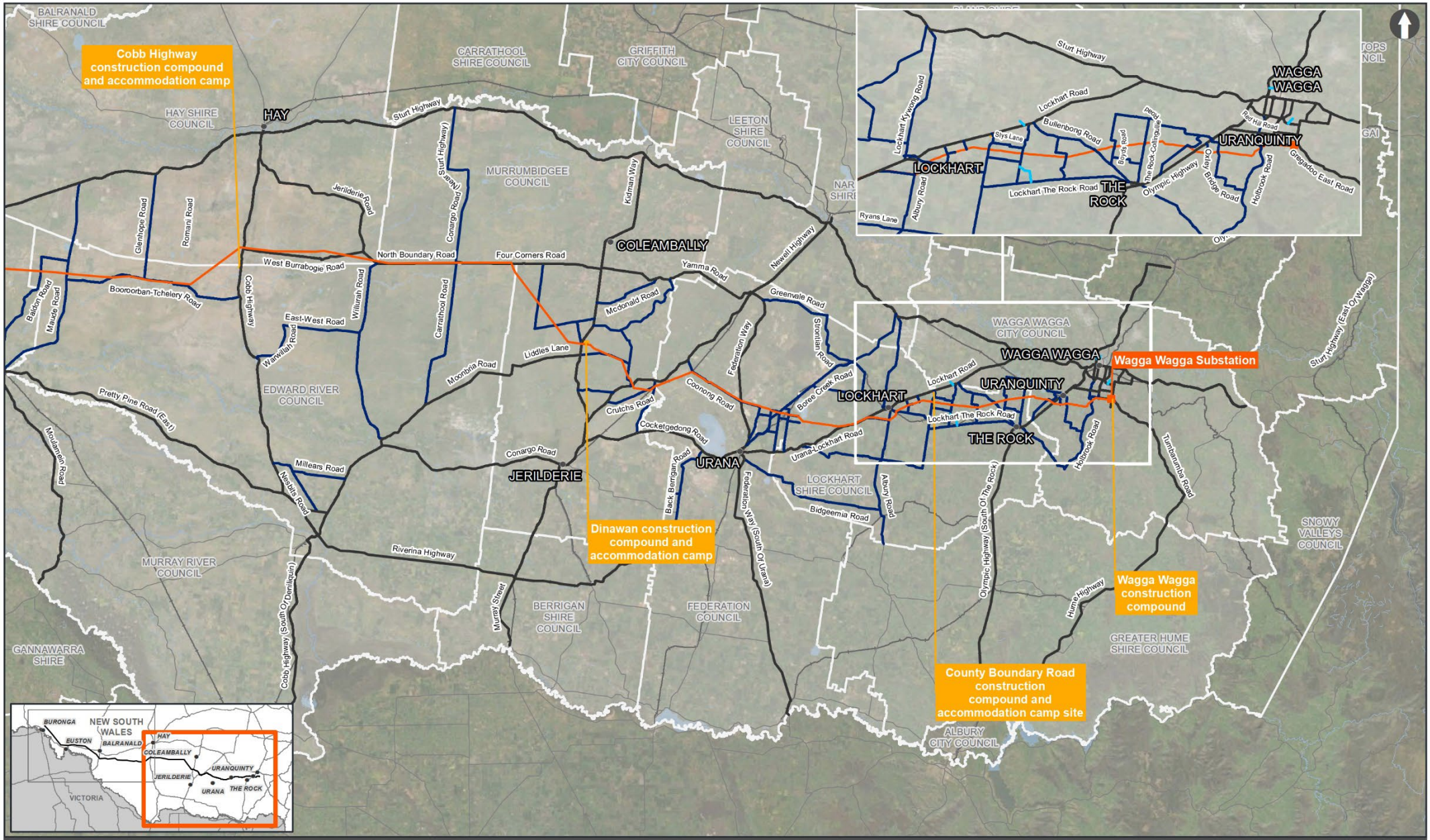

Figure 6-12

Prospective traffic routes within the traffic and transport study area

Sheet 2 of 2

- EnergyConnect (NSW - Eastern Section)
- EnergyConnect (NSW - Western Section)
- Existing Substation
- Main Construction Compounds and Accomodation Sites
- Existing Railway
- Watercourse
- Local Government Areas
- Waterbody

Transport Routes

- Primary Haulage Route
- Secondary Haulage Route
- Water Haulage Route
- Local Haulage Route
- Collector Haulage Route

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Source: NSWSS, ESRI, Transgrid, WSP

Appendix C Revised mitigation measures

C.1 Approach to environmental management

C.1.1 Overall approach

The approach to environmental management for the proposal would be consistent with:

- the environmental management system (EMS) of the construction contractor and Transgrid during construction and operation respectively
- proposal design – measures to avoid and minimise impacts that have been incorporated into the corridor selection and proposal design
- construction and operational environmental management, as described in the following sections. This would be consistent with Transgrid's *HSE Handbook* (Transgrid, 2020) as relevant, which provides the minimum environmental controls for all construction and maintenance works on the Transgrid network
- mitigation measures – the measures are identified as an outcome of this environmental impact assessment.

C.1.2 Design and construction methodology refinement and uncertainties resolution

As outlined in Chapter 5 (Proposal infrastructure and operation) and Chapter 6 (Proposal construction), the proposal study area and indicative construction impact area have been developed to avoid and minimise environmental impacts wherever possible, while providing some flexibility during finalisation of the design and construction methodology. Aspects of the proposal that may be subject to further refinement include:

- the final transmission line component locations, including the specific location, height and type of transmission line towers, location of some access tracks and associated allocations of the subset disturbance area A, A (centreline) and B categories
- final locations and layouts of the main construction compound and accommodation camp sites – including selection of the final site where location options have been provided at Balranald and Lockhart
- final arrangement of the Dinawan 330kV substation facility within the identified parcel of land
- water supply points and other ancillary construction facilities
- construction methods and staging.

Refinements to optimise the design outcomes and construction method would be carried out, where possible, to:

- further avoid or minimise environmental impacts. This includes approaches to avoid or minimise native vegetation clearing, impacts to areas of biodiversity value, and ground disturbance within areas of moderate to high Aboriginal archaeological potential
- respond to community concerns raised during the exhibition of the EIS
- limit impacts on the community during construction and/or operation
- limit the duration of construction
- improve the operation of the proposal.

Generally refinements would be developed and planned to keep disturbance within areas that have been already subject to heritage survey and ecological assessment. Some refinements might however require changes that could disturb locations outside surveyed or assessed areas. In such circumstances additional heritage survey and ecological assessment would occur as required before confirming the change.

These circumstances would include:

- where impacts to a newly identified environmental constraint of very high significance cannot be avoided by simple refinements (i.e. with movement contained in the current surveyed and assessed areas). In relation to environmental constraints of very high significance this would be defined as:
  - Aboriginal heritage:
    > burial sites
    > sites of such significance that the narrative and or understanding of Aboriginal heritage occupation in the region would be substantially changed or enhanced based on its identification and/or its potential for future research
  - Biodiversity:
    > significant unexpected finds of SAII species and/or populations not previously recorded as part of the BDAR for the EIS
- where an additional access track, water supply point or other construction ancillary facility (i.e. brake and winch site) is identified as being required which:
  - does not substantially adversely impact on environmental matters in addition to those presented the EIS
  - any associated landholder is supportive of the required use.

The final design would be reviewed for consistency with the approved proposal. If proposal impacts are not consistent with the approval from the Minister for Planning, approval would be sought from the Minister for any such modifications in accordance with the requirements of Division 5.2 of the EP&A Act.

C.1.3 Construction environmental management approach

The proposed approach to environmental management outlined here is indicative. It is based on the current design and construction methodology, and the types of conditions of approval typically granted in relation to CSSI projects. Depending on the specific conditions of approval, a different approach might be required.

C.1.3.1 Community and stakeholder engagement

A Community and Stakeholder Engagement Management Plan (CSEMP) would be prepared prior to commencement of construction works. The CSEMP would be developed in consultation with the relevant stakeholders. The CSEMP would detail the approach to communication between Transgrid, the construction contractor, the community, community groups, other stakeholders and government authorities.

The CSEMP would:

- identify people, organisations and government authorities to be consulted during the construction works
- set out procedures and mechanisms for the regular distribution of accessible information to keep the community and stakeholders informed of the proposal
- set out the procedures and mechanisms for consulting with relevant councils and government authorities including procedures for nil responses
- describe the method for advertising the telephone line and email address for enquiries relating to the proposal

- set out procedures and mechanisms for response to enquiries and feedback
- include a complaints management system which outlines parameters for recording information on all complaints received during the main construction work
- set out procedures and mechanisms to resolve any issues and disputes that might arise in relation to environmental and stakeholder management associated with the proposal.

C.1.3.2 Enabling works

Enabling works are activities proposed early in the overall construction program for the proposal to facilitate the commencement of substantial construction works and collect information required to finalise aspects of the design and construction methodology. Typical and expected enabling works are described in Section 6.6.1. The construction contractor would confirm the proposed scope and timing of enabling works following confirmation of the conditions of approval for the proposal.

The conditions of approval for CSSI projects typically allow construction staging and require that separate CEMPs are prepared, or existing CEMPs updated as required, to cover each proposed stage. Transgrid anticipates that construction would be staged (refer to Section 6.4), with certain enabling works scheduled to occur ahead of and separate to main construction works. The construction contractor would confirm the approach to construction staging and prepare the required environmental management documentation for each stage in accordance with the conditions of approval.

Minor/low impact enabling works

The conditions of approval for CSSI projects typically require that all construction activities occur in accordance with an approved CEMP. Typical conditions of approval, however, often exclude certain Pre-construction minor works and activities with low potential for environmental and community impacts (minor/low impact activities) from the definition of construction. When this occurs, the minor/low impact activities can occur prior to approval of a CEMP.

Proposed minor/low impact activities for the proposal include:

- investigations (including geotechnical, contamination and other testing/sampling, surveying and the placement of survey pegs/marks)
- installation of fencing, gates, barricades, exclusion zones and other access controls
- installation of environmental controls, mitigation measures and monitoring equipment
- adjustments to roads required to facilitate safe ingress/egress at construction compounds, accommodation camps and laydown areas
- archaeological test excavations carried out in accordance with a test excavation methodology developed in consultation with the relevant Registered Aboriginal Parties in accordance with *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (OEH, 2010) and in accordance with *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010), and any associated salvage
- clearing of vegetation to establish construction compounds, accommodation camps, laydown areas and excavated material sites, and to facilitate other minor/low impact activities
- upgrading existing and creating new access tracks
- excavations and surface preparation required to establish construction compounds, accommodation camps and laydown areas
- establishing excavated material sites
- installation/erection of camp, office and associated welfare facilities

- installation of temporary site sheds, amenities facilities and storage containers to support other minor/low impact activities proposed prior to approval of a relevant CEMP
- batch plant mobilisation, set up and commissioning
- receiving construction plant and equipment on site and materials at laydown areas
- establishing connections at water supply points
- installation of utility service connections to construction locations and ancillary facilities
- protection, adjustment and relocation of utility assets in the vicinity of construction locations, construction compounds and camps, and other ancillary facilities
- other investigations that meet the definition of exempt development provided in *State Environmental Planning Policy (Infrastructure) 2007*.

To be minor/low impact, the activities must:

- not generate noise levels at any noise sensitive receiver above relevant noise management levels developed in accordance with *Interim Construction Noise Guideline* (DECC, 2009) except in circumstances where a prior agreement has been reached with affected sensitive receiver(s) and
- not result in substantial adverse dust impacts at any residences in the vicinity and
- not affect threatened flora species, vegetation that is part of a threatened ecological communities or is critical habitat for a threatened fauna species (other than associated with the implementation of mitigation measures for biodiversity) and
- not involve excavations in PADs (other than the test excavations and salvage referred to above) prior to the completion of required archaeological test excavations at that location and
- not cause soil disturbance within 40 metres of a watercourse (excluding the installation of sediment and erosion controls in accordance with *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom 2004) and Volumes 2A and 2C (DECCW 2008) (commonly referred to as the 'Blue Book')) and
- be carried out (where required) in accordance with Road Occupancy Licences granted by the relevant roads authority.

The conditions of approval might allow other Pre-construction minor works.

Minor/low impact activities would still be subject to the relevant mitigation measures and other environmental commitments in the EIS. The contractor would prepare Environmental Work Method Statements (EWMSs) or similar environmental management documents for minor/low impact activities. The environmental management documents would include all mitigation measures and environmental commitments relevant to the activities. The minor/low impact activities would be carried out in accordance with the relevant environmental management documents.

Activities not described above or that are not excluded from the definition of construction or otherwise provided for in the conditions of approval would occur in accordance with an approved CEMP.

Other enabling works

Other enabling works that are construction by definition in the conditions of approval would be covered by a CEMP or CEMPs. Any CEMP(s) prepared for enabling works would guide the approach to environmental management during the works and would consider and address all relevant mitigation measures from the EIS and the conditions of approval that are relevant to the works.

The contractor would confirm the approach to and scope of enabling works and associated timings.

C.1.3.3 Main construction works

Main construction works would occur in accordance with an approved CEMP prepared in accordance with the conditions of approval. Where the construction contractor proposes to construct the proposal in stages, a CEMP would be prepared for each stage or an existing CEMP updated to cover each upcoming stage.

Each CEMP would include:

- a description of the construction contractor's environmental policy and objectives for construction
- a description of the activities to be undertaken during construction
- reference to all relevant statutory and other obligations, including consents, licences, approvals and voluntary agreements required
- environmental targets and measurable performance indicators which compliance would be monitored against
- roles and responsibilities for all personnel and contractors to be employed on site with regards to the planning, implementation, maintenance and monitoring of environmental controls
- specific mitigation measures and controls that would be applied to avoid and minimise environmental impacts
- required sub–plans (as detailed later in this section), which clearly set out the objectives of the sub–plan, relevant conditions of approval and mitigation measures
- processes for managing non–compliance (including corrective and preventative actions)
- procedures for complaints handling and ongoing communication with the community
- inspection, monitoring and auditing requirements, including procedures for regular environmental inspections and monitoring, auditing and review of the performance of environmental controls, and compliance tracking and reporting
- incident and contingency management requirements
- details of environmental records
- induction and training requirements for all personnel and contractors.

The CEMP would be adaptive, establishing a continuous cycle of monitoring, assessment, investigation and corrective actions. This process would be used to continuously evaluate and monitor the effectiveness of the environmental management measures proposed in this EIS and identify the corrective actions to be carried out should such measures be identified as being ineffective. The latest version of the approved CEMP (as annotated from time to time), would be available for all personnel and on request for inspection/audit personnel.

A program of independent audits would be developed as part of the CEMP and implemented by the construction contractor. The program would monitor and report on compliance with the EIS, Submissions Report, Amendment Report, relevant conditions of approval, and licences and permits applicable to the proposal.

Outline of sub-plans

Table C-1 outlines the sub-plans that would be contained within the CEMP. Sub-plans may be replaced by a procedure where appropriate (i.e. when considering the scale and scope of the works), or merged with another sub-plan to streamline the CEMP. The conditions of approval for the proposal may require different and/or additional matters to be addressed in the CEMP or sub-plans.

Table C-1 Outline of CEMP sub-plans

Sub–plan	Purpose and requirement
Biodiversity	The sub-plan would set out measures to minimise and manage impacts on biodiversity. It would include (as a minimum): • measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna • procedures for clearing of vegetation, including Pre-clearing inspections and procedures for the relocation of fauna • procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas • weed management • rehabilitation strategies including progressive rehabilitation, and measures for the management and maintenance of rehabilitated areas (including duration) • protocols for unexpected EECs or threatened flora and fauna during construction, including stop work procedures • monitoring requirements and compliance management.
Heritage	The sub-plan would set out the measures to manage any impacts on historic and Aboriginal heritage items/sites. It would include (as a minimum): • appropriate heritage mitigation measures, including identification, protection and/or management of heritage items/sites within or adjacent to construction areas (including additional investigations, recordings, or measures to protect items/sites that would not be directly impacted in the vicinity of construction works) • procedures for unexpected finds, including procedures for dealing with human remains • compliance management • induction requirements for construction personnel.
Noise and vibration	The sub-plan would identify procedures and measures that would be implemented to mitigate and manage construction noise and vibration impacts at sensitive receivers. It would include but is not limited to: • examine feasible and reasonable noise mitigation where management levels are exceeded • examine feasible and reasonable noise measures to manage traffic noise impacts on public roads where exceedances above 2 dB are identified • develop associated noise and vibration monitoring programs, as required • develop proactive and reactive strategies for dealing with any noise complaints • outline community consultation measures including notification requirements • include an out of hours works protocol.

Sub–plan	Purpose and requirement
Air quality	The sub-plan would include measures to minimise dust and other emissions during construction. It would include (as a minimum): • measures to minimise the potential for dust emissions, including dust suppression • air quality monitoring requirements and compliance management. This includes monitoring of meteorological conditions in order to implement appropriate responses to changing weather conditions, and regular visual inspections.
Soil and water	The sub-plan would set out measures to mitigate and manage impacts on soil and water, including water quality and potential contaminated soils. It would include (as a minimum): • measures to minimise impacts to soil and water, and to maintain water quality of surrounding surface watercourses. This includes details of erosion and sediment controls, diversion of runoff around disturbed areas and stockpiles, salinity and acid sulfate soils control measures, as well as minimising areas of disturbance and progressive rehabilitation of disturbed areas • stockpile management procedures, including procedures to segregate wastes and contaminated soil • materials tracking and record keeping • unexpected finds protocols for contaminated materials (e.g. soils, building materials and water) and acid sulfate soils • storage of chemicals and other hazardous materials • spill management procedures • measures to minimise water use during construction • a flood emergency management procedure which would provide a series of activities that need to take place should a flood event occur. These activities would focus on the flood emergency and then during the recovery period to assist with starting work again as soon as possible after the flood event.
Traffic and transport	The sub-plan would be prepared in consultation with relevant local councils and Transport for NSW to identify the key management and response strategies to potential transport network disruptions that may arise due to the proposal. It would include (as a minimum): • measures to minimise disruption to pedestrians, cyclists and motorists • management of safe vehicle access/egress from construction compounds and other construction work areas • measures to manage oversize and overmass vehicle movements during construction, which would consider activities of adjoining land uses and safety of the public, such as entering urban areas from rural highways • management of long–distance travel through driver fatigue management measures • measures to provide safe access to existing properties during construction, or provision of suitable alternatives.
Waste management	The sub-plan would set out waste management strategies that would be implemented in accordance with the waste management hierarchy of avoid, minimise, re–use and dispose. The plan would include but is not limited to: • targets for the recovery, recycling and re–use of construction waste • procedures for the assessment, classification, management and disposal of waste • waste tracking and compliance management.

C.1.4 Operational environmental management approach

The operation of the proposal would be managed through the practices, procedures and processes outlined in this EIS (with this document taking precedence for the implementation requirements should a discrepancy be identified), within Transgrid's EMS, Environmental Assessment Framework (EAF), environmental checklists, as well as its *HSE Handbook* and *Complaints Handling Policy* (Transgrid, November 2019).

Details of the environmental constraints identified as part of this EIS, that are relevant to the ongoing operation and maintenance of the asset, would be included in the appropriate Transgrid Geographical Information Systems (GIS). Due diligence environmental checks, including review of environmental information generated from GIS where relevant, would be undertaken with required protection measures identified and confirmed before any maintenance works are carried out.

C.1.5 Summary of mitigation measures

A summary of the measures proposed to mitigate and manage the potential impacts of the proposal is provided in Table C-2. These measures have been revised in response to submissions raised during public exhibition of the EIS and design refinements made following exhibition.

If the proposal is approved, the proposal would be undertaken in accordance with the conditions of approval and the final list of mitigation measures. In the event of any inconsistencies between the mitigation measures presented in this appendix and the associated Technical papers, the measures presented in this appendix would take precedence.

Table C-2 Summary of proposed mitigation measures

Reference	Mitigation measures	Timing	Application location(s)
Biodiversity			
B1	Impacts to matters of biodiversity conservation significance would be avoided to the greatest extent practicable during finalisation of the design and construction methodology for the proposal. Micro-siting of the transmission line infrastructure and associated construction working areas and other areas of disturbance would occur to avoid impacts wherever practicable. Site features with the highest biodiversity conservation significance, in particular, threatened species recorded and their habitat would be given the highest priority. Spatial data (species polygons for species credit species) and buffered threatened species locations would be provided to the design and construction teams and considered in detailed construction planning. Associated mapping would be included on sensitive area plans and provided to the construction workforce.	Pre-construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
B2	If refinements to the proposal design and construction methodology or additional field surveys result in increased ~~changed~~ impacts to biodiversity which are not included in this BDAR, these would be assessed in accordance with the requirements of the BAM by an accredited assessor.	Pre-construction and construction	All locations
B3	Opportunities to locate site offices, compounds and ancillary facilities in areas of limited biodiversity value (e.g. cleared land or areas of native vegetation with vegetation integrity scores of less than 17 in accordance with the NSW Government Biodiversity Assessment Method Operational Manual) would be prioritised during finalisation of the design and construction methodology.	Pre-construction	All locations
B4	Existing tracks and clearings would be used, where possible, to limit the construction of new tracks. Where this is not possible, the design would seek to minimise impacts to native vegetation, including cut and fill, as a priority.	Pre-construction and construction	Transmission line corridor
B5	Transmission line towers ~~structures~~ would be located and constructed to minimise impact to vegetated riparian corridors.	Pre-construction	Transmission line within the riparian corridor as defined by "Guidelines for riparian corridors on waterfront land" (DPI – Office of Water, July 2012) of Murrumbidgee River
B6	Conductor line-marking techniques would be implemented during design refinement to minimise bird strike. Use of bird diverters, most likely consisting of the "flapper" variety, would be implemented. Positioning and exact diverter model would be finalised during design refinement and would be developed as part of a Connectivity Strategy. ~~but~~ At minimum these would be used within one kilometre of wetland/riverine habitats to reduce impacts on aerial fauna species from collision and allow safer passage within these areas.	Pre-construction and construction	Transmission line – within one kilometre of wetland/riverine habitats (refer to Key Waterbodies list in Section 3.1.3) ~~(i.e. Murrumbidgee River)~~

Reference	Mitigation measures	Timing	Application location(s)
B7	A series of 20-metre-wide connectivity corridors would be established near tower locations that occur in woodland vegetation. These would occur at strategic locations that would be developed as part of a Connectivity Strategy~~ under the Biodiversity Management Plan~~, targeting the following locations (wherever practicable): • key riparian crossings • areas of the alignment joining proposed biodiversity stewardship sites and or conservation reserve estate; and • areas of existing dense mallee/belah. These connectivity corridors would involve native vegetation retention up to the 10 metre or 20 metre (for 330kV and 500kV lines, respectively) wide temporary construction centreline clearing zone to better facilitate woodland connectivity. Vegetation heights to be retained would be determined in accordance with vegetation clearing requirements at each location. Any biodiversity credit liabilities to related to retained vegetation such as the connectivity corridors would be considered in final BAM calculations (refer to mitigation measure B2 and Section 12.4 of the Biodiversity offset strategy). In addition to these measures, installation of under-transmission glider poles in five locations (refer to Figure 9.6 of the Revised BDAR) will be implemented to assist Squirrel Glider movement at important locations for this species.	Pre-construction	All locations and for Squirrel Glider at (at locations as identified in the Revised BDAR)
B8	Nest boxes would be provided to provide alternative roosting and/or nesting habitat for threatened fauna displaced during clearing in accordance with a Supplementary Hollow and Nest Strategy. The strategy would include the following requirements: • survey of tree hollows and nests within the proposed clearing extents • identify the size, type, number and location of nest boxes required based on the results of the ecological surveys and active hollow resources in adjacent areas • appropriately sized nest boxes would be installed within the vicinity of hollow–bearing trees (subject to landowner agreement and suitable existing trees being present) no more than two weeks prior to clearing of the tree • nest boxes would also include the re–use of existing hollows salvaged prior to or during clearing where practicable; and • measures to address and manage nests (such as raptor nests) prior to clearing.	Pre-construction and construction	All locations where hollow bearing trees are being removed

Reference	Mitigation measures	Timing	Application location(s)
B9	Pre-clearing surveys would be completed prior to clearing at each location by a suitability qualified ecologist. The proposed clearing extents would be marked out on site prior to the pre-clearing surveys. During the surveys, the ecologist would: • survey the proposed clearing extent • identify any fauna that would require relocation prior to clearing • confirm the location and mark out the extents of any biodiversity exclusion zones • confirm that hollow–bearing trees within and adjacent to the clearing extents are prominently marked/tagged~~; and~~ • confirm that nest boxes are in place (where required) in suitable locations adjacent to areas to be cleared, or suitable locations for installation have been identified; and • survey and confirm the presence of raptor nests within and adjacent to the clearing extents.	Pre-construction at relevant sites	All locations
B10	The results of the pre-clearing surveys would be used to update and confirm the accuracy of sensitive area maps.	Pre-construction	All locations
B11	Biodiversity exclusion zones for retained vegetation would be confirmed by a suitably qualified ecologist and identified as 'No disturbance' zones prior to the commencement of clearing or any site activity that could damage the vegetation within the exclusion zone. 'No disturbance' zones would consider: • identified Plains–wanderer habitat • identified threatened flora populations; and • PCTs in disturbance area B that are not of a growth form height that would ever require management. Biodiversity exclusion zones would be physically marked and demarcated, and included on sensitive area maps, prior to clearing.	Pre-construction	All locations
B12	In circumstances where a tree that would exceed the vegetation clearing requirements is identified within one of the biodiversity conservation zones relating to the Plains-wanderer habitat areas then this tree would be subject to removal to ground level (i.e. tree height cut back but rootball to be retained in place) using methods that minimise potential impact to key habitat and to ensure avoidance of impact to bird individuals. This would occur under supervision of an ecologist.	Construction and operation	All areas of key Plains Wanderer primary habitat

Reference	Mitigation measures	Timing	Application location(s)
B13 ~~B12~~	A Plains-wanderer specific protocol would be developed to ensure that all project staff are aware of the sensitivities around this critically endangered species and to ensure that all specific requirements in relation to protection, avoidance, management and observation of individual Plains-wanderers are considered, in association with BCD staff. This protocol will be implemented during all proposal activities in Plains-wanderer habitat.	Pre-construction	All locations
B14 ~~B13~~	All relevant project personnel, including relevant sub–contractors would be trained on biodiversity management protocols and the requirements for the project, through inductions, toolbox talks and targeted training, and provided with sensitive area maps (showing clearing boundaries and exclusion zones) and updates as required.	Construction	All locations
B15 ~~B14~~	The predicted clearing of native vegetation by the proposal would be monitored against the recorded clearing. A revised BAM–C calculation on the project's final project disturbance post construction would be completed and any additional credit liability identified would be met as part of the biodiversity offset requirements within the biodiversity offset package.	Construction	All locations
B16 ~~B15~~	Shrub or ground stratum native vegetation within vegetated riparian zones (within the definition of *Water Management Act 2000*) of defined riparian areas would be protected to the greatest extent practicable, with vegetation clearing ideally limited to the tree stratum only, with trunk bases being retained in-situ.	Construction	Transmission line within the riparian corridor as defined by "Guidelines for riparian corridors on waterfront land" (DPI – Office of Water, July 2012)
B17 ~~B16~~	Activities within vegetated riparian zones would be managed to minimise impacts to aquatic environments. Riparian areas subject to disturbance would be progressively stabilised and rehabilitated.	Construction	Transmission line within the riparian corridor as defined by "Guidelines for riparian corridors on waterfront land"

Reference	Mitigation measures	Timing	Application location(s)
B18 ~~B17~~	A species unexpected finds protocol would be implemented if threatened ecological communities, flora and fauna species, not identified ~~assessed~~ in the biodiversity assessment, are identified in the disturbance area.	Construction	All locations
B19 ~~B18~~	Clearing of any hollow bearing trees within the mapped PCT 8 and PCT 11 vegetation at the crossing point of the Murrumbidgee River would be undertaken outside of the period between September and December to avoid key breeding periods of the Regent Parrot.	Construction	Murrumbidgee River
B20 ~~B19~~	Features of high biodiversity conservation significance within the operational easement, including biodiversity exclusions zones identified during construction and retained habitat for threatened species, would be recorded in Transgrid's GIS. The GIS information will be reviewed during the planning of all maintenance or other future activities that could cause disturbance.	Operation	All locations
B21 ~~B20~~	Develop and implement guidelines and procedures for operation and maintenance of the proposal that address the following: • vegetation clearing and maintenance commitments in the BDAR and EIS • avoiding access and disturbance in biodiversity exclusion zones identified during the construction • avoiding access and disturbance in areas of high biodiversity conservation significance; and • avoiding maintenance of vegetation that does not need to be maintained during operation. Provide training to relevant Transgrid operational personnel and vegetation maintenance contractors regarding the operational and maintenance guidelines and procedures.	Operation	All locations
B22	Special biodiversity protection zone – *Pimelea serpyllifolia* subsp. *serpyllifolia* (Thyme Rice–flower). Between towers 660-663 a bespoke construction methodology would be employed which would avoid impacts to known individuals of *Pimelea serpyllifolia* subsp. *serpyllifolia* (Thyme Rice-flower) and minimise impact as far as practicable to the species' habitat. This methodology would include at a minimum: • pre-clearing threatened flora survey for areas which would be cleared or impacted to identify and clearly mark all *Pimelea serpyllifolia* subsp. *serpyllifolia* (Thyme Rice-flower) individuals • pre-clearing induction of all contractors that work in this area to discuss this special biodiversity protection zone	Construction	Between towers 660–663

Reference	Mitigation measures	Timing	Application location(s)
	• during clearing an ecologist shall be on site at all times to monitor activities within this special biodiversity protection zone • access being prioritised from existing tracks • clearing restricted to the identified tower 660–663 worksite locations and short new perpendicular access track sections. These would provide access between the existing access track along the proposal alignment and the tower 660–663 worksite locations • alternative line installation techniques which do not require clearing of disturbance area A (centreline). The final clearing methodology would be developed in accordance with the commitment in mitigation measure B1.		
B23	Special biodiversity protection zone – *Pilularia novae-hollandiae* (Austral Pillwort) Between towers 161–162 a bespoke construction methodology would be employed which would avoid impacts to known individuals of *Pilularia novae-hollandiae* (Austral Pillwort) individuals and minimise impact as far as practicable to the species habitat. This methodology would include at a minimum: • pre-clearing threatened flora survey for areas which would be cleared or impacted to identify and clearly mark all *Pilularia novae-hollandiae* (Austral Pillwort) individuals • pre-clearing induction of all contractors that work in this area to discuss this special biodiversity protection zone • during clearing an ecologist shall be on site at all times to monitor activities within this special biodiversity protection zone • access being prioritised from existing tracks • clearing restricted to the identified tower 161 and 162 worksite locations and short new perpendicular access track sections. These would provide access between the existing access track along the proposal alignment and the tower 161 and 162 worksite locations • alternative line installation techniques which do not require clearing of disturbance area A (centreline). The final clearing methodology would be developed in accordance with the commitment in mitigation measure B1.	Construction	Between towers 161–162

Reference	Mitigation measures	Timing	Application location(s)
B24	Special biodiversity protection zone – Natural Grasslands of the Murray Valley Plains. Between towers 241–242 a bespoke construction methodology would be employed which would minimise impacts as far as practical to the mapped Natural Grasslands of the Murray Valley Plains – Critically Endangered TEC located between the tower 241 and 242 location worksites. This methodology would include at a minimum: • pre-clearing induction of all contractors that work in this area to discuss this special biodiversity protection zone • during clearing an ecologist shall be on site at all times to monitor activities within this special biodiversity protection zone • access being prioritised from existing tracks • clearing being restricted to the identified tower 241 and 242 worksite locations and short new perpendicular access track sections. These would provide access between the existing access track along the proposal alignment and the tower 241 and 242 worksite locations • alternative line installation techniques which do not require clearing of disturbance area A (centreline). The final clearing methodology would be developed in accordance with the commitment in mitigation measure B1.	Construction	Between towers 241–242
B25	The opportunity to stockpile and supply felled trees for Key Fish Habitat rehabilitation or improvement works would be discussed with DPI Fisheries.	Construction	Strahler stream orders 4 and above as identified in Section 3.1.2.
B26	Special biodiversity protection zone – Property Vegetation Plan (PVP) on holding identified by Transgrid as H114 (location of towers 243–249). Between towers 243–249 a bespoke construction methodology would be employed which would minimise impacts as far as practical to the mapped PVP located between the tower 243 and 249 location worksites. This methodology would include at a minimum: • pre-clearing induction of all contractors that work in this area to discuss this special biodiversity protection zone • during clearing an ecologist shall be on site at all times to monitor activities within this special biodiversity protection zone • access being prioritised from existing tracks	Construction	Between towers 243–249

Reference	Mitigation measures	Timing	Application location(s)
	• clearing being restricted to the identified tower 243–249 worksite locations and short new perpendicular access track sections. These would provide access between the existing access track along the proposal alignment and the tower 243–249 locations • alternative line installation techniques which do not require clearing of disturbance area A (centreline). The final clearing methodology would be developed in accordance with the commitment in mitigation measure B1.		
Aboriginal heritage			
AH1	The finalisation of the proposal design and construction methodology, and associated final disturbance areas, would be developed to avoid harm to features/items of moderate or above Aboriginal heritage significance as far as practical. The objective is to further reduce potential impacts through tower location and design refinement and construction methodology. Avoidance and minimisation of harm to features/items and Potential Archaeological Deposits (PADs) are to be prioritised.	Pre-construction impacts	All locations
AH2	Aboriginal stakeholder consultation would be carried out in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). Engagement with Registered Aboriginal Parties (RAPs) would consist of the following: • Aboriginal heritage site surveys (AH3) – review of proposed methodologies and involvement in the survey activities in the field (for ground or vegetation disturbance outside of previously surveyed areas) • test excavation activities (AH4) – review of proposed methodologies and involvement in the test excavation activities in the field • review of the draft addendum report/s to the ACHAR (relating to surveys (AH3), test excavations (AH4) and scar trees (AH5)), and consultation on the draft reports • provision of final addendum report/s to the ACHAR to RAPs (AH3, AH4, AH5) • involvement in establishment of Aboriginal heritage exclusion zones prior to construction commencing at each location (AH7). Further cultural information would be gathered during consultation undertaken in association with these activities.	Pre-construction impacts	All locations

Reference	Mitigation measures	Timing	Application location(s)
AH3	Additional assessment would occur in accordance with the *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW* (2010) for areas where ground disturbing activities and/or where hazard/high risk tree removal are required in locations outside of the previously surveyed heritage survey area. Where required, additional heritage surveys would be carried out with the RAPs prior to ground disturbing activities occurring in any such areas. If no Aboriginal objects are found or if Aboriginal objects are found and they would not be impacted, then a letter report would be prepared by an archaeologist that documents the findings and gives clearance to proceed. Where Aboriginal objects, scarred trees or area of PAD are located and would be impacted, a draft survey addendum report/s to the ACHAR would be prepared for the survey areas. The report(s) would: • detail findings of the survey activities • detail where test excavation is required in accordance with AH4 • outline any additional mitigation strategies beyond those required by AH4 to A13 ~~AH14~~ • be presented to the RAPs for comment. Final reports would be provided to RAPs and to Heritage NSW for their information prior to the commencement of ground disturbing activities in these locations.	Pre-construction impacts	All locations (outside of the previously surveyed heritage survey area) and in identified areas of hazard/high risk tree removal
AH4	An archaeological subsurface test excavation program would be carried out in parts of any PADs where project activities would have direct impact and a test excavation program has not already been completed in the area of impact. Direct impacts include grading of tracks and construction areas, excavation for tower construction and tree removal that includes the root ball. Should the finalisation of the project design and construction methodology identify activities that would result in direct impacts are required in PADs PEC–E–PAD07, PEC–E–PAD12, PEC–E–PAD14, PEC–E–PAD16, PEC–E–PAD33 and PEC–E–PAD43, archaeological subsurface test excavation would need to occur before there is any direct impact within the relevant PAD. The purpose of the test excavations would be to determine the presence or absence and significance of intact subsurface archaeological deposits to inform design development and construction planning and/or requirements for salvage activities.	Pre-construction impact in the PAD	PAD areas ~~PEC–E–PAD01~~ ~~PEC–E–PAD02~~ ~~PEC–E–PAD03~~ ~~PEC–E–PAD04~~ ~~PEC–E–PAD05~~ ~~PEC–E–PAD06~~ ~~PEC–E–PAD08~~ ~~PEC–E–PAD09~~ ~~PEC–E–PAD17~~

Reference	Mitigation measures	Timing	Application location(s)
	Test excavations works would be carried out in accordance with a methodology that is presented to and consulted on with the RAPs. Test excavation addendum report/s to the ACHAR would be prepared to detail the findings of the test excavation activities. ~~A test excavation program would be carried out in the parts of any PADs where direct impact is likely. The purpose of the test excavations would be to determine the presence or absence and significance of subsurface archaeological deposits to inform design development and construction planning.~~ ~~Test excavations works would be carried out in accordance with a methodology that is presented to and consulted on with the RAPs.~~ ~~Test excavation addendum report/s to the ACHAR which would detail findings of the test excavation activities.~~		~~PEC–E–PAD18~~ ~~PEC–E–PAD19~~ ~~PEC–E–PAD20~~ ~~PEC–E–PAD21~~ ~~PEC–E–PAD22~~ ~~PEC–E–PAD23~~ ~~PEC–E–PAD24~~ ~~PEC–E–PAD25~~ ~~PEC–E–PAD26~~ ~~PEC–E–PAD27~~ ~~PEC–E–PAD29~~ ~~PEC–E–PAD35~~ ~~PEC–E–PAD40~~
AH5	Harm to scarred trees (including those of cultural significance) would be avoided where possible through design development and construction planning. Scarred trees must only be removed to directly facilitate construction of permanent infrastructure and/or to meet *Vegetation Clearance Requirements at Maximum Line Operating Conditions* (Transgrid, 2003). If the removal of a scarred tree cannot be avoided, the tree would be subject to 3D scanning, followed by salvage of the scarred trunk. The results of this assessment would be reported on in addendum reports. Reports would be provided to RAPs for comment and to Heritage NSW.	Pre-construction impacts	PEC–E–03 PEC–E–42 PEC–E–77 PEC–E–76 PEC–E–17 PEC–E–48 PEC–E–49 Boiling Down Road 1 (AHIMS #56–1–0001) D–B#22; Booroorban (AHIMS #48–5–0022) (confirmation required may already be destroyed)

Reference	Mitigation measures	Timing	Application location(s)
AH6	All portions of artefact scatters and isolated finds that are to be directly impacted would require surface collection and salvage prior to construction commencement in those areas. Hearths would be the subject of photographic recording and samples taken of hearth material prior to disturbance. Additionally, based on the outcomes of the test excavations, the parts of PADs with confirmed intact subsurface archaeological deposits that would be harmed by project activities would be subject to ~~surface~~ salvage excavation ~~collection or salvage~~ prior to those ~~the commencement of ground disturbing~~ activities commencing. ~~within the PAD.~~ Items of archaeological significance would be managed in accordance with measures set out in AH12. The activities would be documented in a salvage report.	Pre-construction impacts	All artefact scatters, hearths and PADs PADs requiring salvage excavations: PEC–E–PAD03 PEC–E–PAD18 PEC–E–PAD22 PEC–E–PAD40
AH7	Aboriginal heritage exclusion zones would be established to protect sites, including: • known features/items of significance that have been identified to remain in–situ throughout construction (and not subject AH6) • scarred trees that are to remain in–situ. • any portions of PADs that become a known site following subsurface testing and which are identified for no impact. Suitable controls would be identified in the Heritage Management sub–plan, which may include temporary site fencing and sediment control. Aboriginal heritage zones would be demarcated by a suitably qualified archaeologist in consultation with the RAPs prior to the commencement of construction at each location. PADs in locations where vegetation clearing is required but there would be no ground disturbance would be managed through construction methodologies and would not be delineated as exclusion zones. These methodologies would be developed in the Heritage Management sub–plan.	Pre-construction impacts	All sites confirmed with the final construction impact area and disturbance areas to not be directly impacted
AH8	Any existing access tracks in areas of PAD that require upgrading for use during construction would not be the subject of direct ground disturbance such as grading. The methodology to be used for the upgrade would be designed to avoid this disturbance and may include laying of geotextile on the surface. If avoidance is not possible, then additional test excavation would be required and salvage completed as necessary prior to works commencing (in accordance with AH4 and AH6).	Construction	Locations where existing access tracks are required to be upgraded in areas of sites and PADs

Reference	Mitigation measures	Timing	Application location(s)
AH9	Construction planning and management would make sure that indirect impacts that could potentially result in a loss of known heritage values due to harm would not occur. Indirect harm could result from physical disturbance from surface water drainage or construction workers driving over sites that are to be protected.	Construction	All locations
AH10	Cultural heritage awareness training would be carried out for all personnel working on the proposal prior to the personnel participating in construction activities. The training shall cover features of heritage significance within and adjacent to proposal locations and proposal protocols that must be complied with to minimise and manage potential impacts to those features.	Construction	All locations
AH11	If at any time during construction, any items of potential Aboriginal archaeological or cultural heritage significance, or human remains are discovered outside of previously recorded sites or PAD, they would be managed in accordance with an ~~the~~ Aboriginal heritage unexpected finds protocol ~~(refer to~~ aligned with the protocol in Appendix 3 of the Revised Aboriginal Cultural Heritage Report. ~~Technical Paper 2).~~	Construction	All locations
AH12	~~A temporary repository of any retrieved archaeological material and Aboriginal objects would be appropriately secured under the care of the archaeological consultant.~~ Retrieved archaeological materials would be stored in appropriate, secure facilities confirmed in consultation with the relevant Aboriginal stakeholders. The strategy for the long–term conservation of salvaged or collected Aboriginal objects would be determined in consultation with the RAPs.	Construction	As relevant
AH13	Features/items of heritage significance that would remain in–situ within the transmission line easement would be mapped and recorded within GIS systems managed by Transgrid and would be entered on the NSW Aboriginal Heritage Information Management System (AHIMS). Relevant Transgrid systems and procedures would be updated as required with protocols that would be implemented during operation to ensure that impacts to the features/items of significance do not occur during maintenance activities.	Operation	Transmission line

Reference	Mitigation measures	Timing	Application location(s)
Historic heritage			
NAH1	The final construction methodology would be developed to avoid or minimise harm to heritage items PEC–E–H1 (Survey Marker Tree) and the sheep yards on the Yanga Pastoral Station Complex as far as practicable. If harm to these items can be avoided, temporary exclusion fencing would be installed to protect any elements of these items to be retained during construction. If harm to the sheep yards on the Yanga Pastoral Station Complex cannot be avoided, consultation would occur with NPWS. Where requested, archival recording of the sheep yards would occur, and the records would be provided to NPWS.	Pre-construction and construction	Transmission line
NAH2	The final construction methodology would be developed to avoid ground disturbance within the curtilage of PEC–E–H3 (Bundure railway station dwelling artefact scatter) where practicable. If ground disturbance within the curtilage can be avoided, temporary exclusion fencing would be installed to protect relevant parts of the item from harm during construction. If ground disturbance within the curtilage cannot be avoided during construction, the parts of the artefact scatter that could be harmed would be salvaged and analysed and managed in accordance with their determined significance, prior to the commencement of any activity that could harm the heritage items present.	Pre-construction and construction	Transmission line
NAH3	The locations of known heritage items in close proximity to the construction impact area and the relevant protocols to avoid and manage any potential harm to the items would be communicated to all relevant construction personnel prior to construction commencing in that area.	Pre-construction and construction	Transmission line
~~NAH4~~	~~PEC–E–H4 would be subject to heritage survey and assessment when site access is available.~~ ~~If the site is found to contain or has the potential to contain features of heritage conservation significance, the final construction methodology would be adjusted as far as practicable to avoid harm. If harm can be avoided, temporary exclusion fencing would be installed to protect relevant parts of the site during construction.~~	~~Pre-construction and construction~~ This mitigation measure has been completed – refer to section 3.3.3	~~Transmission line~~

Reference	Mitigation measures	Timing	Application location(s)
	~~If parts of the site that contain or have the potential to contain features of heritage conservation significance would be subject to ground disturbance during construction, an archaeologist would recommend appropriate measure mitigation/management measures, which might include archaeological excavation and salvage (where appropriate). The archaeologist's recommendations would be implemented prior to the commencement of any activity that could harm the features of heritage conservation significance.~~		
~~NAH5~~ NAH4	During design refinement, the final location of transmission line structures and construction facilities would be determined with the aim to avoid or minimise impacts on all items assessed as having heritage significance, where feasible and reasonable. Items of moderate or high significance would be prioritised for avoidance or impact minimisation. Where impacts are not avoided, further assessment by an archaeologist would occur and be documented in an addendum non–Aboriginal heritage assessment.	Pre-construction	All locations
~~NAH6~~ NAH5	If at any time during construction, any items of potential historic heritage archaeological significance, or human remains are discovered, they would be managed in accordance with an unanticipated discovery protocol that is aligned with the protocol in Appendix 1 of Technical paper 3.	Construction	All locations
~~NAH7~~ NAH6	Features/items of heritage significance that would remain in–situ within the transmission line easement and along access tracks would be mapped and recorded within GIS systems managed by Transgrid to reduce the potential for inadvertent impacts to occur during maintenance activities.	Operational	Transmission line and access tracks
~~NAH8~~ NAH7	Relevant Transgrid systems and procedures would be updated as required with protocols to avoid harm to heritage items and implemented during operation.	Operational	Transmission line and access tracks
Land use and property			
LP1	Access tracks (temporary and permanent) would be confirmed in consultation with landholders to minimise impacts on agricultural activities to the greatest extent possible. Where permanent tracks are required, ~~a single~~ access tracks would be designed to serve both temporary and permanent purposes, where possible.	Pre-construction and construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
LP2	Transmission line towers ~~structures~~ (and associated permanent structures or construction compounds) would be located where possible to avoid or minimise impacts, or as agreed with the affected landholder, on: • cropping and irrigated horticultural land • areas used for set up and pack up of agricultural equipment, entry points and turning areas • drainage catchments for farm dams • locations of high biosecurity risk.	Pre-construction	All locations
LP3	To minimise disruption to agricultural activities: • landholders would be consulted regarding any required adjustments to property infrastructure (fences, access tracks, etc) and the proposed timing and location of construction works, especially where some restriction on vehicular or stock movements would be necessary. Appropriate arrangements would be negotiated with the affected parties and documented in a Property Management Plan (or equivalent). Measures would be put in place prior to any such disruption. • property infrastructure (such as gates) would be managed in accordance with landholder requirements, (provided access is not limited or restricted) • any damage to property infrastructure caused by construction would be repaired promptly • use of existing roads, tracks and other existing disturbed areas would be prioritised. • where access is required across open spaces, care would be exercised to ensure that minimum damage is caused to the surface by confining vehicular or plant movement, as far as possible, to one route.	Pre-construction and construction	All locations
LP4	Consultation would be undertaken with relevant landowners who utilise aerial farming operations to identify appropriate mitigation arrangements (where feasible) such as the installation of aerial warning markers on the transmission lines.	Pre-construction and construction	Transmission line
LP5	Disturbed areas would be stabilised and appropriately rehabilitated (i.e. as close as possible ~~back~~ to Pre-impacted conditions) as soon as feasible and reasonable following the completion of construction at each location. This would be carried out in consultation with the relevant landowner.	Construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
LP6	Procedures would be implemented so that potential impacts or conflicts between livestock and construction activities are appropriately managed. Procedures would be developed in consultation with affected landholders and would include management of: • noise intensive activities during sensitive periods within the livestock production cycle (such as lambing and calving) • vehicle movements and other activities within the vicinity of livestock • movement of stock away from potential stressors created by construction activities.	Construction	Transmission line
LP7	Biosecurity controls would be implemented during construction to minimise the risk of off–site transport or spread of disease, pests or weeds. Controls would include (but not limited to): • inspections and cleaning of vehicles, machinery, and personnel equipment prior to movement on and off construction work areas or between properties • minimising movements across adjoining farmland including trip numbers and locations • additional measures where localised areas of high biosecurity risks have been identified. The specific controls applicable to a property would be identified in consultation with the affected landholder. The effectiveness of these controls would be monitored in a manner and time interval consistent with the level of risk on each property.	Construction	All locations
LP8	Where present in locations that would accessed for construction activities, weeds would be managed in consultation with the relevant landholder. Consultation would also occur with the relevant authority (~~LLS~~ Local Land Services, the relevant local council, or NSW DPI) in relation to notifiable weeds.	Construction	All locations
LP9	In the event of new infestations of notifiable weeds as a result of construction activities, the relevant control authority would be notified as per *Biosecurity Act 2015* and Biosecurity Regulation 2017.	Construction	All locations
LP10	Prior to the commencement of works within Travelling Stock Reserves (TSR), LLS will be notified of work within TSRs during the construction phase so that lessee, stock handlers and other permit holders can be notified of any potential impacts to stock movements.	Construction	Transmission line

Reference	Mitigation measures	Timing	Application location(s)
~~LP10~~ LP11	Fencing and access arrangements, such as locked gates, would be determined in consultation with landholders (where required such as around the new substation and optical repeater sites). Management of access including opening and closing of gates would be done in accordance with landholder requirements. Any damage caused by maintenance activities would be repaired promptly.	Operation	Transmission line
~~LP11~~ LP12	If landholders indicate adverse effects on agricultural precision farming GPS signals due to operation of the project within 12 months from commencement of operation, the claims would be investigated. Any disruption due to operation of the project would be addressed in consultation with the affected landholder. Where it is identified there is a disruption, Transgrid would investigate and implement mitigation measures (such as signal boosting equipment) in consultation with the affected operator.	Operation	Transmission line
~~LP12~~ LP13	Biosecurity controls, confirmed in consultation with the affected landholders, would be implemented during operation to minimise the risk of off–site transport or spread of disease, pests or weeds during maintenance activities.	Operation	All locations
~~LP13~~ LP14	Where present within the operational transmission line easement and associated areas for permanent infrastructure, weeds would be managed in accordance with the *Biosecurity Act 2015*.	Operation	All locations
Landscape and visual amenity			
LV1	Opportunities for the retention and protection of existing trees within the disturbance area would be identified during detailed construction planning. Identified trees of high conservation significance would be retained and protected where practicable.	Pre-construction	Whole of proposal
LV2	Temporary and permanent access would be designed to minimise vegetation removal, changes to landform, and visual impacts where practicable.	Pre-construction	Whole of proposal
LV3	Lighting at construction compounds and accommodation camps would be designed and operated in accordance with AS4282–2019 Control of the obtrusive effects of outdoor lighting.	Pre-construction and construction	Construction compound and accommoda-tion camps

Reference	Mitigation measures	Timing	Application location(s)
LV4	Works within the Tree Protection Zones of retained trees within or immediately adjacent to the disturbance area would be planned with consideration of the tree protection measures outlined in ~~managed in accordance with~~ AS4970–2009 Protection of Trees on Development Sites. ~~where~~ Practicable and appropriate measures would be implemented to minimise the impact of the works on the long–term health of these trees.	Pre-construction	Whole of proposal
LV5	For residences where the project is predicted to have a high or very high visual impact, opportunities for screening vegetation would be investigated. Appropriate visual screening or other options would be confirmed in consultation with the affected landholder and implemented during construction. Vegetative screening would be maintained by the landholder.	Construction	Transmission line
LV6	Lighting at the substations would be designed and operated in accordance with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.	Operation	Dinawan 330kV substation and Wagga Wagga substation upgrade/ expansion
Social			
SE1	A Community and Stakeholder Engagement Management Plan (CSEMP) would be implemented. This would include: • appropriate communication and engagement tools and approaches to engage with councils, landholders, community groups in service communities, emergency services and the broader community • complaint handling processes in line with the Transgrid Complaints Handling Policy.	Pre-construction and construction	All locations
SE2	Land and Property Access Officers would be appointed for affected landholders to provide direct avenues of enquiry for information and issues management.	Construction	Line affected landholders along the alignment

Reference	Mitigation measures	Timing	Application location(s)
SE3	A Local Business and Employment Strategy would be implemented to guide local opportunities during construction, and where possible, align with existing plans and strategies of regional study area LGAs, and Transgrid's Reconciliation Action Plan. The strategy would be developed in consultation with ~~regional study area~~ the affected local councils and would take into account current unemployment trends across the region. The strategy would include initiatives for: • local supplier and labour procurement targets • Aboriginal workforce and business participation • training and upskilling programs for local labour force • transitioning the local workforce following the completion of construction.	Pre-construction and construction	All locations
SE4	A Workforce Management Plan would be developed for ~~each~~ the accommodation camps in consultation with relevant councils, social infrastructure managers and community service providers in nearby service communities. The plan would identify potential constraints in local service provision and mechanisms to promote workforce health and wellbeing and integration into the affected service community without affecting access for residents. It would include: • a list of recreation facilities, sports teams and organisations that workers could utilise • social service providers, including medical and allied health providers • local initiatives that facilitate non–resident workforce and community interactions at local venues, events and community projects. The plan would be reviewed every six months in collaboration with councils to identify and manage any emergent issues.	Pre-construction	Service communities – likely Balranald, Hay, Jerilderie, Coleambally, Lockhart and Wagga Wagga
SE5	If proposal construction coincides with the construction of ~~other~~ the projects around Wagga Wagga identified as part of the cumulative impacts assessment (or newly identified projects of a similar scale), a workforce accommodation strategy for the proposal would be implemented and would be informed by an additional review of existing housing and accommodation capacity relative to the proposal workforce needs.	Pre-construction and construction	Wagga Wagga LGA

Reference	Mitigation measures	Timing	Application location(s)
SE6	The long–term rental market in Wagga Wagga would not be used to satisfy short term (less than six months) accommodation needs for the construction workforce in Wagga Wagga.	Construction	Wagga Wagga LGA
SE7	Cultural Heritage and awareness training would be provided to all construction workers during the onboarding process.	Construction	Whole proposal
Economic			
EC1	The positive local employment and business opportunities would be maximised via promotion of local workforce participation and the preparation and implementation of an ~~Local~~ Industry Participation Plan ~~and Australian Industry Participation Plan~~.	Pre-construction and construction	All locations
EC2	The proposal team would collaborate with the local Councils and local chambers of commerce to: • inform local business of the goods and services required of the proposal, the service provision opportunities and compliance requirements of business to be able to secure contracts • encourage local business to meet the requirements of the proposal for supply contracts.	Pre-construction and construction	All locations
Hydrology, flooding and water quality			
HF1	Permanent operational infrastructure and landforms within the transmission line easement would be designed and implemented/formed to minimise any potential scour and erosion risks associated with surface water runoff. Drainage infrastructure at substations would be designed to not materially worsen flood impacts on property and infrastructure.	Pre-construction and construction	All locations
HF2	Detailed construction planning would consider flood risk at construction areas. This would include: • identifying measures that would be implemented to not worsen flood impacts downstream and on other property and infrastructure during construction up to and including the five per cent AEP design flood event, and • confirming site layouts to avoid or minimise obstruction of overland flow paths and to limit the extent of flow diversion required. Practicable measures identified to minimise potential flood risks at construction areas would be implemented.	Pre-construction and construction	Transmission line and construction sites within flood prone land

Reference	Mitigation measures	Timing	Application location(s)
HF3	A detailed assessment would be undertaken to confirm that the bench level of the final design of the Dinawan 330kV Substation will be above the 100 year average recurrence interval (ARI) design and that a 200 year ARI design flood would not impede substation function. The assessment would consider a spills/overflows from the detention basin on the irrigation channel to the east of the substation location and a potential failure of the basin embankment. The bench level and design of the substation would be adjusted to ensure compliance with Transgrid's design standards.	Pre-construction	Dinawan 330kV Substation
~~HF3~~ HF4	A water quality monitoring program would be implemented to establish baseline water quality conditions at perennial watercourses that the transmission lines would cross, and to facilitate monitoring of any changes in water quality that may be attributable to the proposal during construction. The frequency, location and duration of sampling would be detailed in the monitoring program, but would include: • at a minimum two monitoring locations (one located upstream and one downstream of the transmission line crossing) of the proposal on Colombo Creek • downstream monitoring on the Murrumbidgee River with consideration of existing upstream WaterNSW gauges (including gauge 410130) • monitoring for total dissolved solids, total suspended solids, total nitrogen and total phosphorus. Sampling in the Murrumbidgee River and Colombo Creek would commence at least six months prior to the commencement of ground disturbing activities within the riparian zone at each respective location and then monthly during construction until completion of rehabilitation works in the respective areas. If there are exceedances of water quality criteria, then measures adopted as part of ~~HF5~~ HF6 would be reviewed and revised. Monitoring would continue monthly during construction at each respective location until completion of rehabilitation works in the respective areas.	Pre-construction and construction	Upstream and downstream of the crossing transmission line crossing for Murrumbidgee River, Colombo Creek, Irrigation channel near Dinawan 330kV substation site (between Coleambally Irrigation Area and Yanco Creek)
~~HF4~~ HF5	Water supply options and management would occur in accordance with agreements between the construction contractor and relevant suppliers.	Construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
~~HF5~~ HF6	A Soil and Water CEMP sub–plan would be developed in consultation with a Certified Professional in Erosion and Sediment Control and implemented during construction. The plan would detail the processes, responsibilities and measures to manage potential soil and water quality impacts in accordance with the principles and requirements in: • *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004), and *Volumes 2A and 2C* (DECCW, 2008), commonly referred to as the 'Blue Book' • *Best Practice Erosion and Sediment Control* (IESCA – 2008) • Transgrid's Environmental Guidance Notes • *Guidelines for Controlled Activities on Waterfront Land* (~~DPI, 2012a~~ NRAR, 2018). The Soil and Water CEMP Sub–plan would contain appropriate measures (as a minimum) to: • minimise the extent of ground disturbance • divert surface water runoff around construction locations • install erosion controls within construction locations • collect and filter sediment from surface water runoff within construction locations • manage stockpiles to minimise erosion and sediment transport • manage saline and ASS (if present) • minimise the potential of soil and water quality impacts during storage of project wastes and potentially polluting substances • minimise the duration of soil exposure and progressively rehabilitate and stabilised disturbed areas • manage unexpected finds of contaminated materials • manage spills to reduce and address soil and water contamination.	Construction	All locations
~~HF6~~ HF7	Maintenance works in the vicinity of waterways would be conducted in accordance with Transgrid's Environmental Guidance Notes.	Operation	Transmission lines

Reference	Mitigation measures	Timing	Application location(s)
Air quality			
AQ1	To minimise particulate and gaseous emissions during construction, the following measures (as a minimum) would be implemented where practicable and appropriate: • use of water sprays or surfactants as required for dust suppression • adjust the intensity of dust generating activities based on observed dust levels and weather forecasts • protect stockpiled materials from wind erosion to minimise dust generation and position stockpiles as far as practicable away from any nearby receptors • limit vehicle movements to designated entry/exit routes and parking areas • implement measures to minimise the tracking of dust generating material onto paved roads • inspect and clean paved roads in the vicinity of site access points as required to minimise dust generation (up to 100 metres either side of the access point) • cover the loads of potential dust producing materials • minimise the extent of ground disturbance as far as practicable • stabilise disturbed areas as soon as practicable. The effectiveness of the installed controls would be monitored, and additional controls implemented as required to address any performance issues identified.	Construction	All locations
AQ2	Ensure that all vehicles and machinery are fitted with appropriate emission control equipment and maintained in a proper and efficient manner in line with guidelines contained in the National Environment Protection (Diesel Vehicle Emissions) Measure 2009.	Construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
AQ3	To minimise emissions from concrete batching plants, the following measures (as a minimum) would be considered and implemented where practicable and appropriate: • store all aggregate and sand in appropriate storage bins or bays to minimise dust generation, and ensure that the material does not exceed the height of the bay • fit cement silos and hoppers with dust filters and emergency pressure alert and automatic cut off overfill protection • fully seal all inspection points and hatches • ensure that all transfer methods adopted address and minimise potential dust generation • transfer of cement from storage to batching using sealed steel augers. The effectiveness of the installed controls would be monitored and additional controls implemented as required to address any performance issues identified.	Construction	Concrete batching plant(s)
AQ4	To minimise dust emissions during screening activities, the following measures (as a minimum) would be considered and implemented where practicable and appropriate: • ensure screen covers are fitted to the screening equipment • control dust emissions from screening activities using water sprinklers, where required and appropriate • inspect the water sprinklers on a regular basis and maintain as required to ensure operational efficiency • where practicable, install wind breaks in appropriate locations adjacent to the dust generating equipment and processes • prior to screening, dampen the rocks during dry weather conditions. The effectiveness of the installed controls would be visually monitored and additional controls implemented as required to address any performance issues identified.	Construction	Dinawan 330kV substation earthworks material site

Reference	Mitigation measures	Timing	Application location(s)
AQ5	To minimise potential odour emissions and impacts from the wastewater treatment plants, the following measures would be considered and implemented where practicable and appropriate: • prevent excessive inorganic material accumulating on the screens by disposing of screened material in waste bins on a regular basis • place waste bins containing screened material and sludge as far away as practicable from the construction compound and accommodation sites • ensure waste bins are fully closed at all times • remove screened material and sludge from site at regular intervals and dispose in an appropriate manner. The effectiveness of the installed controls would be monitored and additional controls implemented as required to address any performance issues identified.	Construction	Cobb Highway, Dinawan and Lockhart construction compound and accommodation sites
AQ6	During atmospheric conditions that are conducive to dust generation, dust generation from project–related traffic movements on unsealed roads and access tracks (routes) in close proximity to sensitive receivers would be visually monitored. Where dust from project–related traffic movements is impacting or has the potential to impact the sensitive receivers, measures to minimise dust emissions and potential associated amenity impacts would be implemented. The following measures would be implemented where practicable and appropriate: • lower the speed of project–related traffic along the routes • apply dust suppression (for example using water carts or the application soil binders) on appropriate sections of the route in the vicinity of potentially affected sensitive receivers. The effectiveness of the implemented controls would be visually monitored and additional controls identified and implemented as required and where practicable such as. • minimise the volume of project–related traffic using the routes • use alternative routes. The measures would remain implemented until more suitable atmospheric conditions prevail or the controls are no longer required to minimise potential dust impacts.	Construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
Noise and vibration			
NV1	A Construction Noise and Vibration Management Plan (CNVMP) would be prepared by the construction contractor prior to construction works commencing and would (as a minimum) identify: • all noise and vibration sensitive receivers • feasible and reasonable noise mitigation where management levels are likely to be exceeded • feasible and reasonable noise measures to manage traffic noise impacts on public roads where impacts are identified at any sensitive receiver due to proposal–related traffic • feasible and reasonable vibration mitigation where vibration criteria are likely to be exceeded • describe associated noise and vibration monitoring programs • refer to complaint handling protocols for complaints related to construction noise and vibration • outline community consultation measures including notification requirements. This CNVMP would be implemented for the duration of construction.	Pre-construction	All locations
NV2	Where noise from construction is likely to result in noise affected receivers, mitigation and management measures would be implemented where practicable and appropriate. This would include (but is not limited to) the following measures: • select quieter plant and equipment and use alternative construction methods to minimise noise levels • plan and schedule concurrent noisy activities to minimise the number of items of noisy plant operating at one time and cumulative noise levels • install screens or use barriers to mitigate noise from stationary noise sources • maximise the offset distance between noisy plant and orient equipment away from sensitive receivers • use noise source controls, such as residential class mufflers, to reduce noise from all regularly–used plant including cranes, excavators and trucks • use alternative reversing alarms in place of traditional beeper reversing alarms during works outside standard construction hours where noise impacts have been predicted • turn off machinery when not in use	Pre-construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
	• ensure equipment is well maintained and not generating excessive noise • operate machinery in a manner which reduces maximum noise level events, such as shaking excavator buckets, loading trucks from a height, steel on steel contact and dragging materials across hard surfaces • provide awareness training regarding noise mitigation measures to be implemented • notify and consult with potentially affected receivers about upcoming noisy activities • ensure that noise affected receivers outside standard construction hours and highly noise affected sensitive receivers are provided with appropriate respite.		
NV3	Where construction is likely to result in vibration levels that exceed relevant criteria at sensitive receivers, mitigation and management measures would be implemented where practicable and appropriate. This would include (but is not limited to) the following measures: • avoid the use of vibration–intensive plant at distances where human discomfort would result • substitute lower vibration–intensive plant and methods (for example use a smaller machine, lower power settings or alternative equipment) • sequence operations to avoid or minimise concurrent vibration–intensive activities • schedule the use of vibration–sensitive equipment during the least sensitive times of the day • confirm any vibration–sensitive heritage structures that could be impacted by the proposal works. Develop site–specific measures to avoid vibration impacts and implement the measures during vibration–intensive activities in the vicinity • inform and consult with potentially affected receivers about upcoming vibration–intensive activities.	Pre-construction and construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
NV4	Where noise from construction–related traffic is likely to result in road traffic noise increases of more than 2 dB at affected receivers, mitigation and management measures would be implemented where practicable and appropriate. This would include (but is not limited to) the following measures: • minimise proposal–related traffic movements along the route • minimise speeds for proposal–related traffic in the vicinity of affected receivers • avoid compression braking and the use of air brakes in the vicinity of affected receivers • implement driver training and measures to ensure driver awareness, speed limits, driver behaviour and designated routes are effectively communicated • limit traffic movements to daytime periods as far as possible and minimise traffic movements outside standard construction hours.	Pre-construction and construction	All locations
NV5	Activities likely to generate noise levels that exceed applicable noise management levels at sensitive receivers would be scheduled during standard construction hours wherever practicable. Other activities required outside standard construction hours that are likely to generate noise levels that exceed applicable noise management levels at any nearby sensitive receivers would be carried out in accordance with an out of hours works protocol (Mitigation measure NV6).	Construction	All locations, excluding the operation of the accommoda-tion camps
NV6	Develop and implement an out of hours works (OOHW) protocol that details how the proposal would identify, assess and approve out of hours works outside standard construction hours that are likely to generate noise levels that exceed the relevant noise management levels at sensitive receivers. The protocol would include provisions to: • carry out additional assessments for works proposed outside standard construction hours to confirm predicted noise levels • minimise noise levels outside standard construction hours • carry out the noisiest activities as early as possible in the work shift where practicable • identify appropriate respite for noise affected receivers (where required) • notify and engage with potentially affected receivers about upcoming works outside standard construction hours and address any associated complaints.	Construction	All locations, excluding operation of the accommoda-tion camps

Reference	Mitigation measures	Timing	Application location(s)
	The OOHW protocol would not apply to the operation of the accommodation camps. Prior to works outside standard construction hours, engagement and consultation would occur with potentially affected receivers regarding various mitigation and management measures. Based on this consultation, appropriate mitigation and management options would be considered and implemented where feasible and reasonable to minimise the impacts.		
NV7	Where residences or other sensitive receivers/structures are within the minimum working distances for vibration, different construction methods with lower source vibration levels would be investigated and implemented, where feasible. Attended vibration measurements would be undertaken at the start of the works to determine actual vibration levels at the structure. Works would cease if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.	Pre-construction and construction	All locations
NV8	Prior to the commencement of blasting, a Blast Management Strategy would be developed. The strategy would describe the process that would be used to design each blast (depths and Maximum Instantaneous Charge for each location etc) to comply with relevant noise and vibration criteria at any nearby sensitive receivers. The strategy would also detail noise and vibration monitoring and landholder notification requirements for blasting. The strategy would be implemented for all blasting.	Construction	Blasting locations
NV9	Investigate any complaints regarding construction noise and vibration to determine if actual noise and vibration levels are as predicted and that appropriate mitigation measures have been implemented. Where required, identify and implement appropriate additional mitigation measures.	Construction	Blasting locations
NV10	For each residence where potential operational noise levels are predicted to exceed project trigger levels, noise monitoring to confirm actual operational noise levels would be carried out: • within six months of the commencement of operation (where meteorological conditions permit); and • at the request of the landowner of the residence at any time within two (2) years after the commencement of operation.	Operation	All locations

Reference	Mitigation measures	Timing	Application location(s)
	The noise monitoring would occur during weather/atmospheric conditions conducive to generating the corona effect. For residences where the monitoring identifies operational noise levels in excess 35 dB(A) LAeq,15min and internal noise levels in excess of 25 dB(A) as a result, consultation would occur with the landowner of the affected residence to identity if treatment is required and, if so, confirm appropriate treatments. Once appropriate treatments have been confirmed in consultation with the landholder, the treatments would be implemented within 12 months. For the 500kV line between Dinawan 330kV substation and Wagga Wagga substation this assessment would be required to occur once the line is operational at the initial 330kV voltage and subsequently once the line is increased in operational capacity to 500kV (at a point in the future following the required additional network upgrades).		
Traffic and access			
TA1	A Traffic and Transport Management sub–plan would be developed and implemented. The sub–plan would detail how potential proposal–related traffic and access impacts during construction would be minimised and managed. This plan would be prepared in consultation with the local councils and Transport for NSW.	Pre-construction and construction	All locations
TA2	The Traffic and Transport Management sub–plan would outline the process for obtaining road occupancy licences, and preparing and implementing traffic management plans and traffic controls plans, as required by the relevant roads authority, for road works. Road occupancy licences would be obtained prior to any such occupancy.	Pre-construction and construction	All locations
TA3	Any permits required under the National Heavy Vehicle Law for oversized and overmass vehicle movements associated with the proposal would be obtained from the National Heavy Vehicle Regulator. Permit applications would be supported by a Vehicle Movement Plan prepared to identify the proposed heavy vehicle route(s). The plan would consider activities of adjoining land uses and safety of the public, particularly when entering urban areas from rural highways.	Pre-construction and construction	Construction haulage routes, access/ egress points to access tracks and main construction compound and accommoda-tion camps.

Reference	Mitigation measures	Timing	Application location(s)
TA4	Measures that are required to address potential road safety issues associated with proposal–related use of access routes would be identified in consultation with the relevant roads authority. Any road upgrade works to facilitate construction of the proposal would be designed in accordance with Austroads guidelines as relevant. The Traffic and Transport Management sub–plan would include a program for monitoring road safety along proposal access routes and addressing any construction–related issues identified.	Pre-construction	Construction haulage routes, access tracks, main construction compound and accommoda-tion camp accesses
TA5	A Driver Code of Conduct would be developed and implemented. The code would: • define acceptable driver behaviour for proposal personnel to promote road safety • address fatigue management • ensure that the impacts of construction–related vehicle movements on local roads and the local community are minimised.	Construction	Construction haulage routes, access tracks, main construction compound and accommoda-tion camp accesses
TA6	Consultation with rail authorities (operators) would occur for all proposal activities required in active rail corridors. The consultation would confirm authority requirements (such as track occupancy authorisations) and necessary requirements for staff working within the rail corridor (accreditations). All works in active rail corridors would occur in accordance with the identified requirements.	Pre-construction and construction	Where the transmission line requires access within the rail corridor.
TA7	Road condition surveys would be carried out for all local roads that would be used as construction haulage routes, in consultation with the relevant roads authority. The surveys would be carried out prior to the road being used by heavy vehicles to support construction of the proposal. A road condition monitoring and maintenance program would be developed in consultation with the relevant roads authority for all local roads used as construction haulage routes and implemented for the duration of construction. Post–construction road condition surveys would be carried out for local roads used as a construction haulage route when use by construction vehicles ceases. Damage to the roads (and other infrastructure such as stock grids) that is attributed to the proposal would be addressed in consultation with the relevant roads authority and within three months of construction use concluding or as otherwise agreed with the relevant roads authority. Roads would be reinstated to equivalent or better condition.	Pre-construction and construction	All sealed local roads (within the vicinity or 200 m of the proposal) and/or all unsealed roads on haulage routes.

Reference	Mitigation measures	Timing	Application location(s)
TA8	Actions to ensure that existing road structures proposed to be used during construction are suitable for the proposed use would be investigated and implemented where required. These would include: • while establishing access tracks, a suitably qualified engineer would assess the existing structures for suitability considering structure type, condition, vehicle types, loading and frequency of use • if structures are deemed unsuitable, the following alternatives would be considered and implemented where practicable and appropriate: - alternative routes (access via easement) - alternative vehicle types (smaller loads) - temporary works (e.g. propping, or similar) in consultation with asset owners Any damage to road structures caused by proposal–related heavy vehicle usage would be rectified at the conclusion of use.	Pre-construction and construction	Existing bridge and drainage/ culvert assets
~~TA8~~ TA9	A Community Communications Strategy would be developed and implemented to manage communications in order to engage and notify local communities of major works that could disrupt the road network. The Community Communication Strategy would be developed in conjunction with the Traffic and Transport Management sub–plan to detail the methodology, frequency and response measures in relaying information to the community and for addressing community concerns. All affected communities would be notified in advance of any disruptions to the transport network. This may be in the form of variable message signs, website notices, public notices in local publications and personal correspondence.	Pre-construction and construction	All locations
~~TA9~~ TA10	Road Occupancy Licence(s) would be sought for all temporary lane closures (as required~~) with the~~ by the relevant roads authority)~~ prior to construction~~. Associated activities within the road reserve would occur in accordance with the relevant licences. Any road closures with significant impact, such as short–term full road closure and long–term temporary lane/road closures would be assessed on a case–by–case basis, and approval sought from the relevant road authority. Where feasible, temporary road closures are to be planned outside of the traffic peak periods to minimise impact to the road network.	Construction	All roads that intersect with the transmission line alignment (for stringing of transmission lines) or on haulage routes.

Reference	Mitigation measures	Timing	Application location(s)
~~TA10~~ TA11	Vehicle Movement Plans would be prepared as part of the Traffic and Transport Management sub–plan and implemented for all proposal heavy vehicle routes. The plans would identify the allowable heavy vehicle routes and include travel directions, permitted intersection turning movements, speeds, approved parking and lay–up areas, maximum allowable types/size of trucks and any traffic control required. The requirements of Vehicle Movement Plan would be communicated to all construction heavy vehicle drivers.	Construction	All roads on haulage routes, as identified in Table 4.4 of Technical paper 4.
~~TA11~~ TA12	Significant traffic generating developments in the vicinity of the proposal would be identified. Consultation would occur with those developments and the relevant roads authority regarding proposal–related vehicle movements and road works. Measures to address any potentially significant cumulative traffic and access impacts would be identified and implemented.	Construction	All locations
~~TA12~~ TA13	The appointed Construction Contractor would coordinate and appropriately manage movements on the alternative route options and communicate the changes to the affected residents and the council as part of the communication process of the Traffic and Transport Management sub–plan. This would be implemented should local road closures be required and alternative route provided.	Construction	Local roads as identified in Table 4.4 of Technical paper 4.
~~TA13~~ TA14	A Fatigue Management Plan would be developed and implemented for proposal that addresses driver fatigue and associated regulatory requirements. This plan is to be implemented during construction.	Construction	All roads on haulage routes, as identified in Table 4.4 of Technical paper 4.
~~TA14~~ TA15	Road and surface conditions and the traffic controls implemented at each proposal site access/egress point from the sealed road network would be monitored during construction. Any identified issues would be rectified.	Construction	Access/egress points to access tracks and the main construction compound and accommoda-tion camps

Reference	Mitigation measures	Timing	Application location(s)
TA16	Existing connections to the public road network would be considered for use when access to construction locations via private land is required. Existing site access points would be used for construction access where feasible and reasonable and in consultation with the relevant landholder. Consultation with the relevant roads authority would occur for all new site access points.	Pre-construction and construction	Access/ egress points to access tracks
TA17	Temporary access points within the road reserve that are not required for operational reasons would be removed and restored in consultation with the relevant roads authority following the completion of construction.	Construction	Access/ egress points to access tracks
~~TA15~~ TA18	Construction access tracks would be retained for operational access, where required and practicable in consultation with the relevant landholder.	Operation	Access tracks
Hazards and risk			
HR1	The proposal would be designed and constructed in accordance with the *Guidelines for Limiting Exposure to Time–Varying Electric and Magnetic Fields (1 Hz) – 100 kHz)* (ICNIRP, 2010). The design would meet the EMF exposure guidelines set out in Table 19–2 of the EIS and worst case scenarios within Transgrid's *Transmission Line Design Manual – Major New Build*.	Pre-construction	All locations
HR2	A minimum 50–metre–wide managed APZ would be provided to the hazard perimeter of the fixed construction equipment and camp site buildings unless an alternative fire protection approach that achieves the same level of bushfire risk management is identified by a suitably qualified specialist. Any APZ would be regularly maintained to provide a maximum grass height of ~~100 millimetres –~~ up to 150 millimetres during the prescribed Bushfire Danger Period and when the grassland fuel reaches 70 per cent cured. Vegetation inside the main construction compounds and accommodation camp sites would be regularly maintained to a maximum height of 75 millimetres.	Pre-construction and construction	Main construction compounds and accommoda-tion camps

Reference	Mitigation measures	Timing	Application location(s)
HR3	Buildings within the construction compound and camp site would be constructed to comply with Section 3 and Section 5 (BAL 12.5) of *Construction of Buildings in Bushfire Prone Areas – AS 3959:2018* (Standards Australia, 2018). The sub–floor space of each building would be enclosed with stainless steel flymesh securely fixed to the external wall(s) and buried into the ground, unless an alternative fire protection approach that achieves the same level of bushfire risk management is identified by a suitably qualified specialist.	Pre-construction and construction	Main construction compounds and accommoda-tion camps
HR4	Water for fire–fighting operations would be confirmed ~~prior to during construction~~ with consideration to occupancy density and site layout. This would include onsite static water supply and fire–fighting hose reels when working in areas where vehicles may travel through environments such as areas of: • known rocks where equipment such as bulldozers and excavators may create sparks • long cured (dry) vegetation (grass and crops). All weather access having a minimum width of four metres would be provided to the static water supply tanks.	Pre-construction and construction	Main construction compounds and accommoda-tion camps
HR5	Appropriate construction methods and protection measures for crossing of the high–pressure gas transmission pipeline west Olympic Highway would be confirmed in consultation with APA Group and implemented during construction activities in the vicinity.	Pre-construction and construction	High–pressure gas transmission pipeline crossing, west of Olympic Highway
HR6	Security measures would be implemented to minimise the risk of ignition leading to bushfire(s). Sources of potential ignition would be secured at the end of each shift or as sites are left unattended.	Construction	Main construction compound and accommoda-tion camp sites
HR7	Consultation with emergency services (the NSW Rural Fire Service and Fire and Rescue NSW) would be undertaken prior to construction to ensure emergency access provisions are provided during operation.	Construction	All locations
HR8	Prior to occupation of the construction camps and offices, all bushfire protection and mitigation measures would be certified as compliant with relevant regulatory requirements by a suitably qualified bushfire consultant.	Construction (prior to camp occupation)	All locations

Reference	Mitigation measures	Timing	Application location(s)
HR9	Controls to minimise potential ignition of vegetation would be implemented and a water supply (suitable extinguisher) and trained operator on hand during all outdoor hot works/grinding activities, and during vegetation slashing within and adjacent to the construction compounds and accommodation camps. No outdoor hot works would be undertaken during periods of Total Fire Ban and Catastrophic Fire Weather Days unless there is a suitable fire suppression unit present on site and only with prior agreement with local fire services.	Construction	All locations
HR10	To reduce the level of risk of ignition of the surrounding vegetation Transgrid would need to ~~engage~~ implement appropriate measures to ensure fire–fighting resources are available before blasting occurs.	Construction	All locations blasting proposed
HR11	All chemicals, fuels or other hazardous substances would be stored in accordance with the supplier's instructions and relevant legislation, Australian Standards and applicable guidelines. The capacity of any bunded area shall be at least 130 per cent of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s shall be shown on the site plans.	Construction	All locations
HR12	Equipment would be checked in accordance with Australian Standard requirements for potential electrical faults, including faulty power leads and generators.	Construction	All locations
HR13	Dangerous goods and hazardous substances would be transported in accordance with relevant legislation and codes, including the *Dangerous Goods (Road and Rail Transport) Act 2008*, Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998 and the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission, 2018).	Construction	All locations
HR14	Appropriate spill containment equipment would be provided and located at strategic, accessible locations.	Construction	All locations
HR15	Security measures would be implemented to minimise the risk of arson within and adjoining construction areas. The location of appropriate security measures would be determined using a risk–based approach.	Construction	All locations

Reference	Mitigation measures	Timing	Application location(s)
HR16	An Emergency Management and Response Plan would be prepared for construction that contains: • the procedures and protocols to ensure to appropriate responses to foreseeable on–site and off–site emergencies, including (but not limited to): - fire and hazardous material incidents - bushfire emergency including evacuation or relocation of workers to nominated safe refuge zones during a bushfire emergency either within or remote to the work zone • appropriate risk controls to mitigate potential risks to the health and safety of site personnel and first responders • protocols for the management of bushfire risk during construction, including fuel loads in the vicinity of proposal facilities. This includes restriction and/or prevention of certain activities that present bushfire risks on days with a fire danger rating of equal to or greater than 'high', and as directed by relevant state authorities • training requirements for construction workers, including training on bushfire risks and preventative actions (such as risks associated with operation (and maintenance) of vehicles, plant and equipment). The Emergency Management and Response Plan would be prepared for the entire project but would contain site–specific information procedures and protocols as required for individual sites. The plan would be developed in consultation with Fire and Rescue NSW and the District Office of the Rural Fire Service. A minimum of two up–to–date copies would be kept in an accessible, dedicated location at each accommodation camp and construction compound. The Emergency Management and Response Plan would be implemented in the event of an emergency situation.	Construction	All locations
~~HR16~~ HR17	All chemicals or other hazardous substances at the Dinawan 330kV substation and existing Wagga Wagga substation would be stored in bunded and weatherproof facilities away from drainage lines, and in accordance with supplier's instructions and relevant legislation, Australian Standards and applicable guidelines. The capacity of the bunded area would be at least 130 per cent of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s would be shown on the site plans.	Operation	Dinawan 330kV substation

Reference	Mitigation measures	Timing	Application location(s)
~~HR17~~ HR18	Emergency spill procedures would be implemented to avoid and manage accidental spillages of fuels, chemicals or fluids during operation and maintenance activities in accordance with the Transgrid's HSE Guideline. Environmental spill kits would be provided at strategic, accessible locations, and staff would be trained in spill response procedures.	Operation	All locations
~~HR18~~ HR19	The Wagga Wagga substation Emergency Response Manual would be updated to include the new proposed design and required revised emergency response procedures.	Pre-operation	Wagga Wagga substation
~~HR19~~ HR20	An Emergency Response Manual would be prepared for the proposed Dinawan 330kV substation and include emergency response procedures.	Pre-operation	Dinawan 330kV substation
~~HR20~~ HR21	The proposal would be designed, operated and maintained in accordance with Transgrid's Bushfire Risk Management Plan. This includes reduction in fuel loads, management of APZs and inspections of infrastructure.	Operation	All locations
Soils, contamination and groundwater			
SCG1	Construction materials would be selected to withstand high saline soil and groundwater environment (where applicable).	Pre-construction and construction at relevant site(s)	Locations mapped as moderate to high–risk salinity.
SCG2	Disturbance to areas of medium risk of contamination would be avoided or minimised where practicable during construction. Disturbance to these areas refers to intrusive work, such as excavation. Where disturbance cannot be avoided, potential impacts would be minimised during finalisation of the design and construction methodology where practicable. Areas of medium risk of contamination that would be disturbed by construction activities would be further investigated including completion of a site inspection. Based on the outcome of the site inspection, where considered to be required, a Phase 2 investigation would be completed in accordance with National Environmental Protection Measure 2013. Additional mitigation measures identified through further investigation would also be implemented.	Pre-construction at relevant site(s)	Cleared agricultural land, potential quarry and PFAS sites.

Reference	Mitigation measures	Timing	Application location(s)
SCG3	Direct impacts to registered bores would be avoided, where possible. If the bores are: • not required to be ~~removed~~ impacted during construction, then they would be clearly demarcated with a 5 by 5 metre construction exclusion zone • are to be ~~removed~~ impacted during construction or unavoidably damaged, then make good provisions would apply in consultation with the registered bore owner.	Pre-construction and construction at relevant site(s)	Registered bores (refer Table 21 7)
SCG4	Prior to carrying out any blasting, a desktop assessment would be carried out to identify any high potential GDEs and registered bores in the vicinity that might be affected. Potential impacts to the GDEs and bores would be assessed using the latest available location data. The assessment would: • assess any high potential GDEs and registered bores within 50 metres of a blasting site against the minimum impact criteria of the *Aquifer Interference Policy* (2012) • identify any necessary measures to monitor blasting and mitigate ~~and monitor~~ any potential significant impacts. The measures would be implemented prior to and during the blasting (as relevant). Where the assessment identifies potentially significant impacts to high potential GDEs and bores due to blasting that cannot be mitigated, alternative lesser impact construction methodologies or engineering solutions would be investigated and implemented.	Construction (prior to blasting) at relevant site(s)	Finalised blasting locations if within 50 metres of high potential GDEs
SCG5	Construction materials, spoil and waste would be suitably stored to minimise the potential for soil, groundwater or water quality impacts.	Construction	All
SCG6	Prior to ground disturbance in areas of ~~PASS~~ potential acid sulfate soils (ASS) occurrence (e.g. in low lying areas surrounding former or current lakes and river beds), testing would be carried out to determine the presence of actual and/or potential ASS. If ASS are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* (ASSMAC, 1998) and Transgrid's HSE Guideline.	Construction	All areas identified as potential ASS.

Reference	Mitigation measures	Timing	Application location(s)
SCG7	Prior to ground disturbance, a visual inspection would be undertaken for the presence of saline soils. Areas of known or suspected salinity would be subject to further testing as required. If salinity is confirmed, excavated soils would be managed in accordance with *Book 4 Dryland Salinity: Productive use of Saline Land and Water* (NSW Department of Environment and Climate Change, 2008b) and the *Salinity Training Manual* (DPI, 2014) to manage salinity impacts. Erosion controls would be implemented in accordance with *The Blue Book* (Landcom, 2004).	Construction	All
SCG8	All chemicals, fuels or other hazardous substances would be stored in accordance with the supplier's instructions and relevant legislation, Australian Standards and applicable guidelines. The capacity of any bunded area shall be at least 130 per cent of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s shall be shown on the site plans.	Construction and operation	All (construction) Dinawan and Wagga substations (operation)
SCG9	The discovery of previously unidentified contaminated material would be managed in accordance with an unexpected contamination finds procedure.	Construction	All
SCG10	A site–specific risk assessment would occur for locations where there is a risk of encountering Unexploded Ordnance (UXO). The risk assessment would be carried out prior to any activities that could interact with UXO. This would include field verification to validate the historical assessment of UXO contamination and identify appropriate mitigation practices. The risk assessment would occur with input from an appropriate UXO specialist and would identify if and when an explosives engineer is required during site activities. An unexpected finds procedure would be implemented. The procedure would specify the actions that site personnel must take to minimise the risk to and from any UXO encountered. The management actions identified in the risk assessment would be implemented prior to and during all relevant site activities. All personnel conducting intrusive works within an identified UXO area would be provided with appropriate safety and awareness briefing(s) prior to the participating in the intrusive works.	Pre-construction and construction	All

Reference	Mitigation measures	Timing	Application location(s)
SCG11	If groundwater is encountered during piling or excavations, and dewatering is required, any dewatering volumes would be recorded by the contractor and reported annually for each groundwater source by the water calendar year (July to June). Records would be ~~(and~~ made available to the relevant authority – such as DPIE or DPI – upon request~~)~~.	Construction	All locations
SCG12	Environmental spill kits containing spill response materials suitable for the works being undertaken would be available at the proposed Dinawan and Wagga substations with extras available to be carried in vehicles for use at maintenance work sites.	Operation	Dinawan and Wagga substations
Waste management and resources			
WM1	The proposal would achieve an Infrastructure Sustainability Council verified 'Design' and 'As–built' rating of Excellent under v1.2 of the IS rating tool.	Pre-construction and construction	All locations
WM2	Measures to minimise excess spoil generation would be investigated at finalisation of the proposal's design and construction methodology. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material on–site.	Pre-construction and construction	All locations
WM3	Opportunities to re–use or recycle construction and demolition waste would be investigated during finalisation of the proposal's design and construction methodology.	Pre-construction and construction	All locations
WM4	All waste would be assessed, classified, managed and disposed of in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).	Construction	All locations
WM5	Waste streams would be segregated, where feasible, to avoid cross–contamination of materials and maximise reuse and recycling opportunities.	Construction	All locations
WM6	All waste generated and surplus spoil to be removed from the construction of the proposal would be transported to appropriately licensed waste disposal or transfer facilities or other facilities lawfully able to accept materials.	Construction	All locations
WM7	Waste during operations would be managed in accordance with Transgrid's existing Environmental Management System and processes for the identification, classification, handling and management of waste.	Operation	All locations
WM8	All waste would be assessed, classified, managed and disposed of in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).	Operation	All locations

Reference	Mitigation measures	Timing	Application location(s)
Cumulative impacts			
CI1	Consultation with relevant roads authority would occur in relation to road use.	Construction	All locations
CI2	Consultation with relevant local councils and other water supply operators would occur in relation to the proposal's water supply strategy to ensure there is effective management of these demands during construction and operation.	Pre-construction	All locations
SE5	If proposal construction coincides with the construction of other projects around Wagga Wagga, a workforce accommodation strategy for the proposal would be implemented and would be informed by an additional review of existing housing and accommodation capacity relative to the proposal workforce needs.	Pre-construction	Wagga Wagga LGA
TA11	Significant traffic generating developments in the vicinity of the proposal would be identified. Consultation would occur with those developments and the relevant roads authority regarding proposal–related vehicle movements and road works. Measures to address any potentially significant cumulative traffic and access impacts would be identified and implemented.	Construction	All locations
Aviation impacts			
AV1	The concept design of the transmission line tower coordinates and elevations would be provided to: • the Wagga Wagga Airport Manager to enable the Airport Manager to note the transmission line segment that infringes the Wagga Wagga Airport OLS and pass the details to CASA for assessment • Airservices Australia • the Department of Defence. Further notification is to occur if the finalised design of the proposal alters the details as supplied to the above authorities.	Pre-construction	Wagga Wagga LGA
AV2	To facilitate the flight planning of aerial application operators, details of the finalised design of the proposal, including location and height information of transmission lines should be provided to land holders so that, when asked for hazard information on their property, the land holder may provide the aerial application pilot with all relevant information. This applies to land holders who will have the proposed transmission line over their properties, and to landowners with property boundaries immediately adjacent to the proposed transmission line.	Pre-construction and construction	All locations