EnergyCo

# Central-West Orana Renewable Energy Zone Transmission project

## Amendment Report

March 2024

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NSW GOVERNMENT

# Acknowledgement of Country

The Energy Corporation of NSW acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Central-West Orana Renewable Energy Zone Transmission project

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# Glossary

| Term | Definition |
|---|---|
| Access road | Permanent access roads to switching stations and energy hubs. |
| Access track | Temporary and permanent access tracks along and to transmission lines. |
| Amendment | A change in what the Proponent is seeking approval for made during the assessment. It requires changes to the project description in the EIS. |
| Brake and winch site | 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 towers along a transmission line corridor. 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 project. It does not need to be maintained for ongoing operation and/or maintenance of the transmission line. |
| Central-West Orana Renewable Energy Zone | A geographic area of around 20,000 square kilometres centred on the regional towns of Dubbo and Dunedoo and extending west to Narromine and east beyond Mudgee and to Wellington in the south and Gilgandra in the north, that will combine renewable energy generation, storage and transmission infrastructure to deliver energy to electricity consumers. |
| Construction area | The area that would be directly impacted by the construction of the project, including (but not limited to) transmission towers and lines, brake and winch sites, access roads to the switching stations and energy hubs, access tracks, energy hubs, switching stations, communications infrastructure, workforce accommodation camps, worker amenities and parking, construction compounds, laydown and staging areas. |
| Construction compound | An area used as the base for construction activities, usually for the storage of plant, equipment and materials, and/or construction site offices and worker facilities. It can also comprise concrete batching plant, crushing, grinding and screening plant, testing laboratory and wastewater treatment plant. |
| Construction routes | Roads used by construction vehicles (light and heavy). |
| Consumer Trustee | The *Electricity Infrastructure Investment Act 2020* (NSW) establishes the NSW Consumer Trustee as an independent statutory role with various planning, advisory and procurement functions which must be conducted in the long-term financial interests of NSW electricity customers. Australian Energy Market Operator services, as the NSW Consumer Trustee, runs competitive tenders for Long-Term Energy Services Agreements and Renewable Energy Zone Access Rights to support investment, construction and operation of renewable energy generation and long duration storage infrastructure in NSW. |
| Single circuit transmission lines | Transmission lines which typically comprise three conductor bundles along with earthing and communications wires, carried by a single tower set. For 330 kilovolt (kV) lines, each conductor bundle typically comprises two conductor cables (six conductor cables in total). |
| Enabling works | Activities that would be carried out before the start of substantial construction in order to make ready the key construction sites (including workforce accommodation camps and compounds), facilitate the commencement of substantial construction, manage specific features or issues and collect additional information required to finalise the final design and construction methodology. |
| Energy hub | A substation where energy exported from renewable energy generation projects is aggregated, transformed to 500 kV (where required) and exported to the transmission network. |
| EnergyCo | The Energy Corporation of New South Wales constituted by section 7 of the *Energy and Utilities Administration Act 1987* as the NSW Government statutory authority responsible for the delivery of NSW's Renewable Energy Zones. |

| Term | Definition |
|---|---|
| Operation area | The area that would be occupied by permanent components of the project and/or maintained, including transmission line easements, transmission lines and towers, energy hubs, switching stations, communications infrastructure, access roads to the switching stations and energy hubs, maintenance facilities and permanent access tracks to the easements. |
| The project | The Central-West Orana REZ Transmission project as described in this EIS and as amended by this Amendment Report. |
| Refinement | A change that fits within the limits set by the project description and does not change what the Proponent is seeking approval for and/or does not require an amendment to the application for the project. |
| Renewable Energy Zone | A geographic area identified and declared by the NSW Government as a Renewable Energy Zone. |
| Double circuit transmission lines | Transmission lines which typically comprise six conductor bundles along with earthing and communications wires, carried by a single tower set. For 500 kV lines, each conductor typically comprises four conductor cables (24 conductor cables in total). For 330 kV lines, each conductor typically comprises two conductor cables (12 conductor cables in total). |
| Substation | A facility used to increase or decrease voltages between incoming and outgoing transmission lines (e.g. 330 kV to 500 kV). |
| Switching station | A facility used to connect two or more distinct transmission lines of the same designated voltage. |
| Transmission line easement | An area surrounding and including the transmission lines which is a legal 'right of way' and allows for ongoing access and maintenance of the transmission lines. Landowners can typically continue to use most of the land within transmission line easements, subject to some restrictions for safety and operational reasons |
| Transmission tower | A freestanding steel lattice tower (tension tower or suspension tower) or monopole. |
| Twin transmission lines | A pair of single or double circuit transmission lines running parallel. |
| Workforce accommodation camps | Areas that would be constructed and operated during construction to house the construction workforce. |

# Abbreviations

| Term | Definition |
|---|---|
| ABS | Australian Bureau of Statistics |
| AC | Alternating Current |
| ACHA | Aboriginal Cultural Heritage Assessment |
| ACHMP | Aboriginal Cultural Heritage Management Plan |
| AEMO | Australian Energy Market Operator |
| AEP | Annual Exceedance Probability |
| AER | Australian Energy Regulator |
| AFG | Aboriginal Focus Group |
| AHD | Australian Height Datum |
| AHIMS | Aboriginal Heritage Information Management System |
| ALA | Aircraft Landing Areas |
| ANZECC | Australian and New Zealand Environment Conservation Council |
| ANZS | Australian and New Zealand Standard |
| ANZSIC | Australian and New Zealand Standard Industrial Classification |
| APZ | Asset Protection Zone |
| ARI | Average Recurrence Interval |
| ARMCANZ | Australian and New Zealand Guidelines for Fresh and Marine Water Quality |
| ARPANSA | Australian Radiation Protection and Nuclear Safety Agency |
| AUL | Auxiliary Left Turn |
| AVTG | Assessing Vibration: A Technical Guideline |
| BAL | Bushfire Attack Level |
| BAM | Biodiversity Assessment Method |
| BCS | Biodiversity Conservation and Science |
| BDAR | Biodiversity Development Assessment Report |
| BESS | Battery Energy Storage System |
| BOM | Bureau of Meteorology |
| BSAL | Biophysical Strategic Agricultural Land |
| CASA | Civil Aviation Safety Authority |
| CEC | Clean Energy Council |
| CEMP | Construction Environmental Management Plan |
| CMSC | Coal Mine Subsidence Compensation |
| CNVG | Construction Noise and Vibration Guideline |
| CNVMP | Construction Noise and Vibration Management sub-plan |
| CSSI | Critical State Significant Infrastructure |
| CTF | Controlled Traffic Farming |

| Term | Definition |
|---|---|
| DA | Development Application |
| DC | Direct Current |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DIDO | Drive-n-Drive-Out |
| DISER | Department of Industry, Science, Energy and Resources |
| DPHI | Department of Planning, Housing and Infrastructure |
| DPI | Department of Primary Industries |
| DPE | Department of Planning & Environment |
| EIS | Environmental Impact Statement |
| EMF | Electric and Magnetic Field |
| EP&A Act | *Environmental Planning and Assessment Act 1979 (NSW)* |
| EPA | NSW Environment Protection Authority |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* |
| EPI | Environmental Planning Instruments |
| ESD | Ecological Sustainable Development |
| FCNSW | Forestry Corporation NSW |
| FIFO | Fly-In-Fly-Out |
| FM Act | *Fisheries Management Act 1994 (NSW)* |
| GDE | Groundwater Dependant Ecosystems |
| GPS | Global Positioning System |
| GRIT | Generation of Regional Input Output Tables |
| HHMP | Historical Heritage Management Sub-Plan |
| HV | High Voltage |
| ICNG | Interim Construction Noise Guideline |
| ICNIRP | International Commission for Non-Ionizing Radiation Protection |
| ICOMOS | International Council on Monuments and Sites |
| IDA | International Dark Sky Park |
| IRSAD | Index of Relative Socio-economic Advantage and Disadvantage |
| ISP | Integrated Systems Plan |
| IVMS | In-Vehicle Monitoring System |
| LALC | Local Aboriginal Land Council |
| LEP | Local Environmental Plan |
| LGA | Local Government Areas |
| LLS | Local Land Services |
| LLS Act | *Local Land Services Act 2013 (NSW)* |
| LSC | Land and Soil Capability assessment scheme |
| MCP | Moolarben Coal Project |
| MDB | Murray-Darling Basin |

| Term | Definition |
|---|---|
| MNES | Matters of National Environmental Significance |
| NASAG | National Airports Safeguarding Advisory Group |
| NEM | National Energy Market |
| NHL | National Heritage List |
| NHVR | National Heavy Vehicle Regulator |
| NML | Noise Management Level |
| NP&W Act | *National Parks and Wildlife Act 1974 (NSW)* |
| NSW | New South Wales |
| NTSCORP | Native Title Service Provider for Aboriginal Traditional Owners in New South Wales and the Australian Capital Territory |
| OEH | Office of Environment and Heritage (former) |
| OEMP | Operational Environmental Management Plan |
| OJD | Ovine Johns Disease |
| OLS | Obstacle Limitation Surfaces |
| OOHW | Out of Hours Works |
| OSOM | Oversize and overmass |
| PAD | Potential Archaeological Deposits |
| PCT | Plant Community Type |
| PNTL | Project Noise Trigger Level |
| POEO Act | *Protection of the Environment Operations Act 1997 (NSW)* |
| QLD | Queensland |
| RAV | Restricted Access Vehicles |
| RBL | Rating Background Level |
| REZ | Renewable Energy Zone |
| RFS | Rural Fire Service |
| RNP | NSW Road Noise Policy |
| SBP | Strategic Benefit Payment |
| SEAR | Secretary's Environmental Assessment Requirement |
| SEPP | State Environmental Planning Policy |
| SES | State Emergency Services |
| SF6 | Sulfur hexafluoride |
| SIA | Social Impact Assessment |
| SIMP | Social Impact Management Plan |
| SMS | Safety Management System |
| SSAL | State Significant Agricultural Land |
| SSI | State Significant Infrastructure |
| TEC | Threatened Ecological Community |
| TRRA | Three Rivers Regional Assembly |

| Term | Definition |
|---|---|
| TSR | Travelling Stock Reserve |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| WAL | Water Access Licence |
| WARR Act | *Waste Avoidance and Resource Recovery Act 2001 (NSW)* |
| WHL | World Heritage List |
| WHS | Work Health and Safety |
| WM Act | *Water Management Act 2000 (NSW)* |

# Executive summary

## Background

Energy Corporation of NSW (EnergyCo) is proposing the construction and operation of new electricity transmission infrastructure, new energy hubs and switching stations and ancillary works, all of which are required to connect new renewable energy generation and storage projects within the Central-West Orana REZ to the NSW transmission network (the project). The project is located within the Warrumbungle, Mid-Western Regional, Dubbo Regional and Upper Hunter local government areas (LGAs) and generally extends north to south from Cassilis to Wollar and east to west from Cassilis to Goolma.

An Environmental Impact Statement (EIS) was prepared to support EnergyCo's application for approval of the project in accordance with the requirements of Division 5.2, Part 5 of the EP&A Act.

A Response to Submissions Report (Submissions Report) has been prepared to identify and respond to feedback received during the public exhibition of the EIS and will be submitted to DPHI concurrently with this Amendment Report.

EnergyCo is proposing a number of amendments and refinements to the project in response to community, government and stakeholder engagement, consideration of submissions received during EIS exhibition, and ongoing development of the design and construction methodology for the project. The amendments and refinements also confirm certain elements of the project that were highlighted as options or opportunities in the EIS.

This Amendment Report describes and assesses the potential environmental impacts that may occur as a result of the proposed amendments and refinements and identifies how those impacts would be managed and mitigated.

## Approval process and EIS

The project was declared to be critical State significant infrastructure (CSSI) under section 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) by the (then) NSW Minister for Planning and Public Spaces on 23 November 2020. The project is listed in Schedule 5, Clause 23 of the State Environmental Planning Policy (SEPP) (Planning Systems) 2021 (Planning Systems SEPP) and is subject to approval by the NSW Minister for Planning and Public Spaces under Division 5.2, Part 5 of the EP&A Act.

An EIS was prepared to support EnergyCo's application for approval of the project (the exhibited project) in accordance with the requirements of Division 5.2, Part 5 of the EP&A Act. It addressed the requirements of Division 5, Part 8 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), the Secretary's Environmental Assessment Requirements (SEARs) for the project issued on 7 October 2022 and the Supplementary SEARs issued on 28 March 2023. The EIS was placed on public exhibition by the then NSW Department of Planning and Environment (DPE) (now the NSW Department of Planning, Housing and Infrastructure (DPHI)) for six weeks between 28 September to 8 November 2023.

A referral under the Commonwealth EPBC Act was also submitted on 2 February 2023 (EPBC 2022/09353). The DCCEEW (Cth), as a delegate for the Australian Minister for the Environment and Water, determined the project to be a controlled action on 2 March 2023 and that it would be assessed in accordance with the NSW Assessment Bilateral Agreement under Part 9 of the EPBC Act. As such, the project also requires approval from the Australian Minister for the Environment and Water under the EPBC Act.

The EIS was placed on public exhibition by the then DPE (now the DPHI) for six weeks between 28 September to 8 November 2023. The original 28 day exhibition period was extended by two weeks (to a total of 42 days) to give the community more time to provide feedback.

During the public exhibition period, government agencies, stakeholders and the community had the opportunity to make a written submission to the DPHI for consideration in its assessment of the project. Consultation activities were conducted during this time to:

- involve stakeholders and the broader community in the EIS exhibition activities
- encourage parties to engage with the information contained in the EIS
- provide guidance on the submissions process
- identify the process to make a submission.

A Submissions Report has been prepared to respond to the submissions received as part of the EIS exhibition.

In accordance with clause 179(2) of the EP&A Regulation, an application may, with the approval of the Planning Secretary, be amended at any time before the application is approved.

The proposed amendments and refinements do not change the permissibility of the project or its declaration as CSSI. The assessment and approval requirements under the EP&A Act, including pre-conditions and mandatory considerations, are described in sections 4.2 and 4.3 of the EIS.

Some of the proposed amendments would introduce new impacts on matters of national environmental significance (MNES) outside of the original referral area. In order to capture these additional impacts, an application under section 156A of the EPBC Act will be submitted to the DCCEEW (Cth) requesting a variation to the project described in the original EPBC referral. The variation request will include all relevant information prescribed by section 5.08 of the Environment Protection and Biodiversity Conservation Regulations 2000, and identify the change in impacts to MNES as a result of the applicable proposed amendments compared to the project described in the EPBC referral.

## Description of proposed amendments

The proposed amendments and refinements to the project that have been described and assessed in this Amendment Report include:

- changes to the 500 kV and 330 kV transmission line alignments
- relocating five 330 kV switching stations and providing an additional 330 kV switching station
- a construction compound at the Neeleys Lane workforce accommodation camp, including materials storage and laydown facilities
- additional brake and winch sites (to facilitate transmission line conductor installation) and changes to the location of brake and winch sites identified as part of the exhibited project
- confirming the locations of microwave repeater sites
- refining the alignments of access roads at the energy hubs and New Wollar Switching Station
- refining the alignments of access tracks and providing additional access tracks along and to the transmission lines
- refining the alignment and design of local road and intersection upgrades, including bridge and drainage works
- removing the option for one 200 megawatts/400 megawatts per hour battery energy storage system (BESS) at the Merotherie Energy Hub as a replacement for a synchronous condenser
- adding crushing, grinding and screening plant at switching station M1, at the end of the Cassilis connection.

The proposed amendments to the project as described in the EIS (inclusive of the proposed alignment and other refinements and clarification to the EIS project) are collectively referred to in this report as the 'amended project'.

# Purpose of this report

This Amendment Report has been prepared for the purposes of clause 179(3) of the EP&A Regulation, having regard to the Department of Planning and Environment's *State Significant Infrastructure (SSI) Guidelines: preparing an amendment report* (DPE, 2022c).

The purpose of this Amendment Report is to describe the proposed amendments and refinements to the project since the exhibition of the EIS (the exhibited project), and assess the potential impacts of the amended project. This report considers whether the proposed amendments would result in any changes to the potential environmental impacts described by and assessed in the EIS, and whether any changes to the mitigation measures are required as a result. This report has been informed by additional environmental impact assessments for key issues where potential changes to previously identified environmental impacts have been identified, including biodiversity, Aboriginal heritage, landscape character and visual amenity, noise, traffic and transport and flooding.

This report is to be read in conjunction with the Submissions Report on issues raised in submissions received in response to the exhibition of the EIS.

Since the project is considered a controlled action, this Amendment Report will also be provided to DCCEEW (Cth) as part of the package of information for the assessment and determination of the project.

# Assessment of impacts of the proposed amendments

## Land use and property

The amended project would result in an overall increase of the construction area by around 70 hectares, to a total of around 4,050 hectares. The land use impacts of the amended project are unchanged from those described in the EIS for the exhibited project. However, there has been changes to the extent of impacts to the following land uses within the construction area as follows:

- increase in impacts to agricultural land use by around 95 hectares
- changes to the construction area within land subject to mining leases in the Moolarben coal mine, to minimise impact on mining operations
- a minor alignment change to avoid potential impacts associated with the Mudgee Mine Subsidence District.

There would be no changes to the assessed impacts on nature conservation (protected areas) and biodiversity offset areas, mineral exploration, aviation, electrical infrastructure, other utilities, travelling stock routes or Crown Land (including Aboriginal land claims), or future land uses.

The potential impacts of the amended project on land use and property during operation would be consistent with the impacts identified in the EIS.

## Agriculture

Potential impacts to agricultural land from the amended project is attributed to the additional 95 hectares of agricultural land that would potentially be utilised for construction activities. This increase would result from amendments to the transmission line alignment to minimise potential visual impacts on nearby residential dwellings, in response to feedback received from impacted landowners. As noted in the EIS, impacts to agricultural operations such as livestock grazing would be restricted during construction activities. However due to the intermittent and transient nature of transmission line construction agricultural operation can continue in accordance with property management plans. The amended project would result in a small decrease (around 2.3 per cent) in the assessed loss of agricultural productivity during construction, with a total productivity loss of around $3.95 million (decreased from around $4.04 million for the exhibited project) or $1.32 million per year (decreased from around $1.35 million per year for the exhibited project). This loss is equivalent to about 0.2 per cent of the total gross value of agricultural production across the four impacted local government areas (LGAs).

The amended project would also result in a minor increase (around 20 hectares) in impacts to Biophysical Strategic Agricultural Land (BSAL) within the construction area, to around 170 hectares. As noted above, this increase is due to amendments to the transmission line alignment to minimise potential visual impacts on nearby residential dwellings, to respond to feedback received from impacted landowners. Around 50 hectares of this BSAL would be directly impacted, which is a minor increase of around four hectares from the EIS.

The amended project would not change the amount of agricultural land located within the operation area (2,440 hectares), however would result in a small reduction in the area of direct impacts to agricultural land during operation, which has been reduced by 30 hectares (or 3.6 percent) to around 795 hectares. The amended project would reduce the estimated agricultural productivity loss during operation from around $317,550 per year to around $285,900 per year. This represents around 0.04 per cent of the total annual gross value of agricultural production across the four impacted LGAs.

## Landscape character and visual amenity

Impacts on the landscape character areas assessed in the EIS would generally remain unchanged, apart from reduced impacts to the forested hills landscape area due to the relocation of switching station M3 and its associated transmission line. Additional landscape character impacts have been identified in the undulating rural hills landscape character area due to the inclusion of an additional landscape character zone to account for the Botobolar microwave repeater site. Negligible to low-moderate impacts on landscape character are predicted at this location during the daytime and night time.

The amended project would result in a reduction in daytime visual impacts from two publicly accessible viewpoints along Dapper Road during construction and operation, due to the realignment of the Goolma connection away from Dapper Road. The visual impact levels for the remaining public viewpoints and the viewpoint from the air would remain unchanged from the EIS.

Visual impacts during construction and operation have increased in locations where private dwellings would have increased visibility of construction activity or operational infrastructure such as transmission lines. Similarly, visual impacts during construction and operation have decreased where private dwellings and public viewpoints would have reduced visibility of project infrastructure as a result of the amended project. Additional visual impacts have also been identified during construction and operation, due to the reclassification of previously identified receivers or the identification of new receivers since the exhibition of the EIS.

Increased visual impacts during construction are predicted at 11 dwellings (including two newly identified dwellings) during the daytime and five dwellings (including two newly identified dwellings) during the night time, due to increased views of the amended project alignment and the Neeleys Lane workforce accommodation camp and construction compound. Additional daytime visual impacts are also expected during construction at four newly identified dwellings near the Botobolar microwave repeater site.

Changes to daytime operational visual impacts include a reduction in visual impacts at seven dwellings, an increase in visual impacts at four dwellings, and additional visual impacts at four newly identified dwellings (three dwellings with a low visual impact and one dwelling with a high visual impact). The changes in daytime visual impacts are mainly due to the amended project alignment, the relocation of switching stations and the confirmation of the microwave repeater site at Botobolar. Overall, considering the proposed amendments and refinements, 12 host properties and two non-host properties would experience a high visual impact, and eight host properties and 11 non-host properties would experience a moderate visual impact.

Increased night time visual impacts are predicted at three dwellings, and additional night time visual impacts are predicted at two dwellings, due to the amended project alignment near the Elong Elong Energy Hub and relocated switching stations.

Overall, daytime operational impacts for the amended project would include a high visual impact at 14 dwellings (increased from 13 dwellings in the EIS), a moderate visual impact at 19 dwellings (decreased from 20 dwellings in the EIS) and a low visual impact at 50 dwellings (increased from 49 dwellings in the EIS).

## Biodiversity

Additional field surveys of previously unsurveyed areas and amended construction areas have been undertaken since the exhibition of the EIS. The additional field surveys has resulted in around 89 per cent survey coverage of the updated biodiversity study area. The remaining around 12 per cent of the study area was not surveyed due to access constraints or absence of native vegetation or habitat for threatened species.

Native vegetation covers around 65 per cent of the amended construction area (increased from 58 per cent in the EIS), with the remaining areas consisting of buildings and roads, cropping land and pastures dominated by exotic pasture species. Construction of the amended project would result in direct impacts to around 1,227 hectares of native vegetation, which is an increase from the 1,032 hectares identified in the EIS. This increase is due to the amended project alignment, additional survey of previously inaccessible areas resulting in assumptions being revised, and more conservative assessment of areas subject to partial clearing from the project. Twenty-six plant community types (PCTs) would be directly impacted during construction, which is an increase from the 22 PCTs identified in the EIS.

The amended project would result in a reduction in direct impacts on threatened ecological communities (TECs), and threatened flora and fauna species. Three of the 26 PCTs are listed as threatened ecological communities (TECs) under the NSW *Biodiversity Conservation Act 2016* (BC Act) (decreased from four PCTs in the EIS) and two PCTs are listed as TECs under the EPBC Act (decreased from three PCTs in the EIS). Consistent with the EIS, two of the three impacted TECs are listed as being at risk of serious and irreversible impact. In addition, construction of the amended project has the potential to directly impact 30 threatened flora and fauna species, or their habitats, compared to 33 in the EIS.

Potential indirect impacts on biodiversity and potential impacts on aquatic ecology during construction, and impacts on biodiversity during operation, are consistent with the impacts identified in the EIS.

Biodiversity offsets would be required for impacts to PCTs, threatened species or populations, as indicated in the EIS. The offset obligation for the amended project has been calculated based on the amended project, and the project is expected to require the following biodiversity credits:

- 41,276 species credits (decreased from 52,089 credits in the EIS)
- 22,915 ecosystem credits (increased from 21,434 credits in the EIS)
- 16 ecosystem credits (scattered trees) (decreased from 163 credits in the EIS)
- 301 additional species credits proposed for Squirrel Glider due to impacts to habitat connectivity (prescribed impact)
- an additional 3,776 ecosystem credits proposed to be provided to account for indirect impacts to threatened bird species through indirect impacts due to line strike and EMF.

The proposed strategy to retire biodiversity offsets for the amended project remains consistent with that described in the EIS.

## Aboriginal heritage

Additional field investigations of previously uninspected areas and amended construction areas were undertaken over a three month period by archaeologists and 14 registered Aboriginal parties. The additional field surveys has resulted in a 94 per cent survey coverage of the amended construction area by linear pedestrian transects.

Fifty Aboriginal sites and places were identified within the amended construction area (an increase of four Aboriginal sites and places from the EIS), including sites within the exhibited construction area but which could not be accessed at the time of EIS preparation, but have since been surveyed and confirmed.

Aboriginal heritage sites within the amended construction area include nine rockshelters, five culturally modified trees, 15 grinding grooves sites, four high density artefact scatters, six moderate density artefact scatters, 10 centres of past activity characterised by high densities of sub-surface artefacts, and a background artefact scatter consisting of 160 previously identified sites and low density artefact sites. This is compared with the EIS that identified eight rockshelters, nine culturally modified trees, 11 grinding grooves, five high density artefact scatters, seven moderate density artefact scatters, six centres of past activity characterised by high densities of sub-surface artefacts. Newly identified Aboriginal heritage items include an extensive and regionally significant grinding groove site, a potentially culturally modified tree, a rockshelter, and refinements and revisions of previously identified areas of potential buried cultural material next to nine major watercourses crossed by the amended construction area.

The field investigations confirmed that the area within a 150 metre buffer around major watercourses, such as Laheys Creek, Sandy Creek and Tallawang Creek, were major centres of past activity and therefore considered areas of high archaeological potential. Smaller watercourses show less activity and are now considered of low significance.

Overall, nine sites are identified as of high significance, 38 of moderate significance and three of low significance. This is generally consistent with the findings of the significance assessment in the EIS that identified 10 sites of high significance, 30 sites of moderate significance and three sites of low significance.

Consistent with the EIS, all of the Aboriginal sites and places within the amended construction area have been assessed as potentially subject to direct and indirect impacts from construction and operation of the project resulting in their complete or partial loss.

The project design and construction methodology would continue to be refined to avoid or reduce impacts to Aboriginal sites, as described in the EIS. This would include investigating further micro-siting of project infrastructure and construction activities to avoid or minimise impacts to sites of high significance, such as rockshelters, grinding grooves, culturally modified trees and areas

within 150 metres of Laheys Creek, Sandy Creek and Tallawang Creek within the construction area. It is considered that 23 Aboriginal sites of moderate to high significance would be avoided through this process (compared to nine Aboriginal sites in the EIS), including Aboriginal sites previously identified in the EIS and newly identified sites. This would result in a 46 per cent reduction in potential impacts on Aboriginal sites for the amended project. Direct impacts are expected to occur at 27 Aboriginal sites (compared to 37 Aboriginal sites in the EIS), as well as the low density stone artefact background scatter within the amended construction area, resulting in their complete loss of value. This reduction in impacts are due to the amended project alignment, as well as the reclassification of sites. Archaeological salvage excavations will be carried at tower locations within 150 metres of Laheys Creek, Sandy Creek, Tallawang Creek, Wilpinjong Creek and Bora Creek.

## Non-Aboriginal heritage

Impacts to listed and potential heritage items identified as part of the EIS have not changed as a result of the amended project. However, two additional potential archaeological sites have been identified within the amended construction area from heritage specialists undertaking field surveys as part of the additional Aboriginal heritage field survey. The identified items include a potential nineteenth-century occupation site and a potential former gold and mineral mining/processing site. Another potential archaeological site, a sports oval with cricket pitch (non-extant) has been identified outside the amended construction area. A ground penetrating radar survey also identified potential graves and surviving architectural fabric (in the form of foundations/footings) sites within three previously identified sites. These potential unlisted heritage sites are subject to additional field survey and significance assessment to determine their significance, and to confirm the approach to managing any potential impacts to these items.

The amended project may result in direct impacts (full or partial disturbance) to the newly identified potential archaeological sites, graves and surviving architectural fabric located wholly or partially within the amended construction area. Direct impacts to these sites would be avoided where practicable. If direct impacts cannot be avoided, further archaeological assessment would be required to confirm the level of significance of the sites, to establish if they meet the threshold for relics under the *Heritage Act 1977* and require archaeological excavation.

## Economic

The amended project would result in a small decrease (around 2.3 per cent) in the assessed loss of agricultural productivity during construction, with a total productivity loss from around $1.35 million per year to around $1.32 million per year over a three year period. This loss is equivalent to around 0.2 per cent of the total gross value of agricultural production across the four impacted LGAs.

The amended project would also result in a small decrease (around 10 per cent) in the estimated agricultural productivity loss during operation, from around $317,550 per year to around $285,900 per year. This represents around 0.04 per cent of the total annual gross value of agricultural production across the four impacted LGAs.

## Noise and vibration

There would be minor changes in airborne noise impacts for most construction activities as a result of the amended project. As indicated in the EIS, noise levels are predicted to comply with noise criteria during daytime (standard) hours at the majority of noise sensitive receivers in the study area.

Consistent with the EIS, airborne noise impacts at energy hubs and switching stations would be minor for most construction activities during the daytime and night time. Noise levels are predicted to reduce slightly as a result of the amended project, with exceedances of noise criteria predicted to occur at 13 sensitive receivers, instead of sensitive 14 receivers as indicated in the EIS.

Noise levels for the amended project are predicted to be highest during earthworks associated with the construction of foundations for the transmission line towers, as indicated in the EIS. The number of sensitive receivers that may experience exceedances of noise criteria outside of standard hours (144 receivers) as a result of construction of the amended project remains unchanged from the EIS. The majority of these exceedances are considered to be minor. Only one sensitive receiver would be highly noise affected as a result of construction of the amended project, consistent with the findings of the EIS.

The amended project would result in minor increases to the predicted noise levels from construction traffic along Ulan Road, however no change in the number of affected sensitive receivers is predicted to occur.

Refinements to the project alignment would also result in minor changes to construction vibration impacts. Potential human comfort impacts would reduce, with the potential for impacts to be experienced at one sensitive receiver, instead of two receivers as indicated in the EIS. An additional five structures and four heritage would potentially be impacted by vibration during construction, due to the identification of new and reclassified sensitive receivers and refinements to the project alignment that would decrease the distance between the project and receivers.

Noise impacts from the operation of transmission lines, energy hubs and switching stations would reduce as a result of the amended project. Noise impacts from the operation of the transmission line, associated with corona noise discharges, may potentially impact one sensitive receiver (negligible impact), instead of two receivers as indicated in the EIS. Two sensitive receivers near switching stations are predicted to be affected by infrequent and brief noises from circuit breaker switches, instead of three receivers as indicated in the EIS.

## Hazard and risk

The provision of a construction compound at the Neeleys Lane workforce accommodation camp would introduce potential hazards and risks associated with the storage and transport of dangerous goods and hazardous materials at the compound and its haulage routes. However, the hazardous materials and dangerous goods associated with this construction compound are not expected to be required in significant quantities and would not exceed the threshold quantities outlined in *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (NSW Department of Planning (DoP), 2011).

The potential hazards and risks of the amended project in relation to bushfire, mine subsidence, aviation safety, electric and magnetic fields, and impacts to utilities during construction remain unchanged from the exhibited project, as described and assessed in the EIS.

## Traffic and transport

Minor changes are proposed to the construction routes for the amended project. This includes the addition of the use of additional roads to access the microwave repeater sites and a new access track leading to the transmission line easement.

The provision of a construction compound at the Neeleys Lane workforce accommodation camp would result in a minor increase in construction vehicle movements indicated in the EIS (an additional 10 vehicle movements per hour). The majority of the key intersections that form part of the project construction routes would continue to operate at near free flowing conditions as indicated in the EIS, with only some intersections expected to experience a minor decrease in performance.

Adjustments to three intersections and all of the access gates may be required to provide additional turning capacity as a result of increased vehicular movements during construction, including the Neeleys Lane/Ulan Road, Golden Highway/Ulan Road and Merotherie Road/Golden Highway intersections. The need for these adjustments would be confirmed during detailed construction planning and based on final workforce numbers. Temporary speed limits would also be implemented during construction at some intersections and access gates along the project's construction routes to ensure sufficient sight distance for road users in these locations.

Potential traffic impacts during operation remain unchanged from the EIS.

## Hydrology and flooding

Construction activities associated with the amended project would have the potential to result in additional flood risk and impacts on flood behaviour, and potential impacts on geomorphology, due to the construction of the new bridges across the Talbragar River along Merotherie Road and Laheys Creek along Spring Ridge Road as part of the local road and intersection upgrades that form part of the amended project.

During operation, the amended project would result in geomorphic changes to the Talbragar River and Laheys Creek, due to the introduction of bridge infrastructure, such as bridge piers, within the watercourses. This would be confined to the area surrounding permanent infrastructure.

The new bridges over the Talbragar River and Laheys Creek and the upgrades to Merotherie Road and Spring Ridge Road would also result in a localised increase in flow velocity within the road corridor and minor changes to flood behaviour outside the road corridor during operation. To mitigate these impacts, design measures would be adopted during detailed design that are aimed at managing scour potential within the road corridor and controlling external catchment runoff.

## Contamination

The amended project would not introduce any additional contamination risks during construction or operation of the project.

## Air quality

Amendments and refinements to the transmission line alignments would reduce dust impacts for sensitive receivers at several locations, as it would increase the distance between these receivers and dust generating activities associated with construction of the amended project such as earthworks, construction and track out from trucks.

Other potential air quality impacts of the amended project during construction, including dust impacts along construction routes, impacts associated with gaseous emissions generated from the use of vehicles, plant and machinery and odour generation, would be consistent with the impacts identified in the EIS.

Potential air quality impacts of the amended project during operation would remain unchanged from the EIS.

## Cumulative impacts

Since the exhibition of the EIS, the planning status, environmental assessment documentation and/or estimated construction and operation timeframes of relevant future projects identified in the cumulative impact assessment have been updated as these projects progress through the planning system. As a consequence, eight additional projects have been identified that would result in cumulative impacts in combination with the project.

The amended project is expected to result in minor changes to the project's contribution to cumulative impacts. The most substantial increases in cumulative impacts would result from the eight additional projects, and are associated with:

- land use, property and agriculture
- landscape character and visual amenity
- biodiversity
- Aboriginal heritage
- socio-economic
- noise and vibration
- traffic.

As indicated in the EIS, each of these projects will be required to mitigate its own impacts to acceptable levels, minimising the overall contribution to cumulative impacts. EnergyCo, as part of working groups involving representatives from councils and agencies, will continue to assess and prioritise recommendations, including the identification of funding sources and lead agency responsibilities and implementation timeframes, as outlined in the Implementation Plan.

# Mitigation measures

The measures proposed to mitigate and manage the potential impacts of the project is provided in Appendix E (Updated mitigation measures). These measures have been revised in response to submissions raised during public exhibition of the EIS and project amendments and refinements made following exhibition of the EIS.

# Conclusion

EnergyCo is proposing a number of amendments and refinements to the project in response to community, government and stakeholder engagement, consideration of submissions received during EIS exhibition, and ongoing development of the design and construction methodology for the project. The amended project would minimise the potential impacts of the project where practicable, particularly in relation to land use and property, visual amenity, noise and traffic and access.

The mitigation measures identified in the EIS have been updated to manage and minimise any additional potential impacts of the amended project.

During the continued development of the design and the construction methodology, opportunities to further minimise potential impacts would be sought and ongoing input from stakeholders and the community would be, taken into account. The potential residual construction and operational impacts of the amended project are considered manageable with the implementation of the proposed mitigation and management measures.

# 1 Introduction

This chapter provides a background to, and description of the key features of the project as described in the EIS, an overview of the proposed amendments and refinements to the project and a summary of the exhibition of the EIS, and outlines the purpose and structure of this report.

## 1.1 Background

### 1.1.1 Renewable energy zones

New South Wales (NSW) is currently undergoing an energy sector transformation that will change how we generate and use energy. The National Electricity Market (NEM) (managed by the Australian Energy Market Operator (AEMO)) is transitioning from a system dominated by a small number of large coal-fired generators located close to metropolitan centres, to one of diverse renewable energy generation and storage in areas with strong renewable energy resource potential and located close to the existing electricity network.

The New South Wales (NSW) Government is leading the development of Renewable Energy Zones (REZs) to deliver renewable energy generation and storage, supported by high voltage transmission infrastructure across NSW. REZs connect renewable energy generation and storage systems to transmission infrastructure via energy hubs and will play a vital role in delivering clean, affordable and reliable electricity for homes, businesses and industry in NSW to help replace the State's existing coal-fired power stations as they come to the end of their operational life.

Various government strategies, plans and policies such as AEMO's 2022 Integrated Systems Plan (ISP) (AEMO, 2022), the Transmission Infrastructure Strategy 2018 (Department of Planning and Environment (DPE), 2018), the Electricity Infrastructure Roadmap (DPE, 2020) and the NSW Network Infrastructure Strategy (EnergyCo, 2023b), identify the important role for REZs to provide an effective and economical way to integrate new generation, storage and transmission development. The NSW Electricity Infrastructure Roadmap also identifies five regions prioritised for the development of REZs: the Central-West Orana, South-West, New England, Hunter-Central Coast and Illawarra regions of NSW.

### 1.1.2 Central-West Orana REZ

The Central-West Orana REZ is around 20,000 square kilometres in size and centred on the regional towns of Dubbo and Dunedoo, on the land of the Wiradjuri, Wailwan and Gamilaroi peoples. The Central-West Orana region has a strong mix of energy resources and significant investor interest, with more than 27 gigawatts of projects identified in response to a registration of interest (ROI) process in June 2020. The number of responses to the ROI reflects the strong level of interest in the REZ and helps ensure only the most competitive projects will be able to access the new transmission infrastructure through the Consumer Trustee's competitive tender processes.

As NSW's first REZ, the Central-West Orana REZ will play a pivotal role in underpinning NSW's transition to a clean, affordable, and reliable energy sector. The Central-West Orana REZ was formally declared on 5 November 2021 under section 19(1) of the Electricity Infrastructure Investment Act 2020. Under the declaration, the Energy Corporation of NSW (EnergyCo) was appointed by the NSW Government as the Infrastructure Planner responsible for coordinating the development of generation and network infrastructure.

The original Central-West Orana REZ declaration provided for an initial intended network capacity of three gigawatts. The NSW Government amended the REZ declaration in December 2023 to increase the intended network capacity to six gigawatts, which would allow for more renewable energy from solar, wind and storage projects to be distributed through the NSW transmission network.

The proposed declaration amendment is consistent with the NSW Network Infrastructure Strategy (EnergyCo, 2023b) which identifies options to increase network capacity to 4.5 gigawatts initially under Stage 1 and up to six gigawatts by 2038 under Stage 2. The project would enable 4.5 gigawatts of new network capacity to be unlocked initially. Other transmission infrastructure beyond the scope of the EIS may be required to provide a network capacity beyond 4.5 gigawatts, and would be subject to separate planning approval. The proposed amendment also supports recent modelling by AEMO in its Draft 2023 Infrastructure Investment Objectives Report (AEMO, 2023) showing more network capacity will be needed to meet NSW's future energy needs as coal-fired power stations progressively retire.

## 1.2 The project

As the existing transmission network in the Central-West Orana region is not capable of transferring the amount of electricity expected to be generated from new renewable energy generation and storage projects in the Central-West Orana REZ, the development of new transmission infrastructure is required to provide additional electricity transfer capacity in the region to connect these projects to the NEM.

EnergyCo is proposing the construction and operation of new electricity transmission infrastructure, new energy hubs and switching stations and ancillary works required to connect new renewable energy generation and storage projects within the Central-West Orana REZ to the NSW transmission network (the project). The project is located within the Warrumbungle, Mid-Western Regional, Dubbo Regional and Upper Hunter local government areas (LGAs) and generally extends north to south from Cassilis to Wollar and east to west from Cassilis to Goolma.

The project would enable 4.5 gigawatts of new network capacity to be unlocked initially. Other transmission infrastructure beyond the scope of the EIS may be required to provide a network capacity beyond 4.5 gigawatts, and would be subject to separate planning approval. It would enable renewable energy generators to access new transmission infrastructure within the Central-West Orana REZ to export electricity to the NSW transmission network (as part of the National Electricity Market (NEM)). Importantly, the development of renewable energy generation projects in the Central-West Orana REZ is the responsibility of private generators and subject to separate planning and environmental approvals.

### 1.2.1 EIS exhibition

An Environmental Impact Statement (EIS) was prepared to support EnergyCo's application for approval of the project 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 then NSW Department of Planning and Environment (DPE) (now the NSW Department of Planning, Housing and Infrastructure (DPHI)) for six weeks between 28 September to 8 November 2023. The original 28 day exhibition period was extended by two weeks (to a total of 42 days) to give the community more time to provide feedback.

During the public exhibition period, government agencies, stakeholders and the community had the opportunity to make a written submission to the DPHI for consideration in its assessment of the project. Consultation activities were conducted during this time 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 DPHI, and were accepted via electronic submission or by post. A Response to Submissions Report (Submissions Report) has been prepared to respond to the submissions received as part of this process.

### 1.2.2 The project (as exhibited)

The project as described in the publicly exhibited EIS (hereafter referred to as the 'exhibited project') included the following features:

- a new switching station (the New Wollar Switching Station), located at Wollar to connect the project to the existing 500 kilovolts (kV) transmission network
- around 90 kilometres of twin double circuit 500 kV transmission lines and associated infrastructure to connect the two energy hubs to the existing NSW transmission network via the New Wollar Switching Station
- energy hubs at Merotherie and Elong Elong (including a potential battery storage option at the Merotherie Energy Hub) to connect renewable energy generation projects within the Central-West Orana REZ to the 500 kV network infrastructure
- around 150 kilometres of single circuit, double circuit and twin double circuit 330 kV transmission lines, to connect renewable energy generation projects within the Central-West Orana REZ to the two energy hubs
- thirteen switching stations along the 330 kV network infrastructure at Cassilis, Coolah, Leadville, Merotherie, Tallawang, Dunedoo, Cobbora and Goolma, to transfer the energy generated from the renewable energy generation projects within the Central-West Orana REZ onto the project's 330 kV network infrastructure
- underground fibre optic communication cables along the 330 kV and 500 kV transmission lines between the energy hubs and switching stations
- construction of microwave repeater sites at locations along the alignment, as well as off the alignment at Botobolar, to provide a communications link between the project and the existing electricity transmission and distribution network
- a maintenance facility within the Merotherie Energy Hub to support the operational requirements of the project
- establishment of new, and upgrade of existing access tracks for transmission lines, energy hubs, switching stations and other ancillary works areas within the construction area (such as temporary waterway crossings, laydown and staging areas, earthwork material sites with crushing, grinding and screening plants, concrete batching plants, brake/winch sites, site offices and workforce accommodation camps)
- property adjustment works to facilitate access to the transmission lines and switching stations. These works include the relocation of existing infrastructure on properties that are impacted by the project
- utility adjustments required for the construction of the transmission network infrastructure, along with other adjustments to existing communications, water and wastewater utilities. This would include adjustments to existing Transgrid and Essential Energy transmission infrastructure. This includes adjustments to Transgrid's 500 kV transmission lines 5A3 (Bayswater to Mount Piper) and 5A5 (Wollar to Mount Piper) to provide a connection to the existing NSW transmission network, including new transmission line towers along the Transgrid network along the frontage of the New Wollar Switching Station, and other locations where there is an interface with Transgrid's network.

### 1.2.3 The project (as amended)

In response to community, government and stakeholder engagement, consideration of submissions received during EIS exhibition, and ongoing development of the design and construction methodology for the project, EnergyCo is proposing a number of amendments and refinements to the exhibited project.

The amendments and refinements to the exhibited project also confirm certain elements of the project that were highlighted as options or opportunities in the EIS (hereafter referred to as 'the EIS alignment'). The proposed amendments would minimise the potential impacts of the project where practicable.

The proposed amendments to the project as described in the EIS (inclusive of the proposed alignment and other refinements and clarification to the EIS project) are collectively referred to in this report as the 'amended project'.

The key amendments and refinements to the project include:

- changes to the 500 kV and 330 kV transmission line alignments
- relocating five 330 kV switching stations and providing an additional 330 kV switching station
- a construction compound at the Neeleys Lane workforce accommodation camp, including materials storage and laydown facilities
- additional brake and winch sites (to facilitate transmission line conductor installation) and changes to the location of brake and winch sites identified as part of the exhibited project
- confirming the locations of microwave repeater sites
- refining the alignments of access roads at the energy hubs and New Wollar Switching Station
- refining the alignments of access tracks and providing additional access tracks along and to the transmission lines
- refining the alignment and design of local road and intersection upgrades, including bridge and drainage works
- removing the option for one 200 megawatts/400 megawatts per hour battery energy storage system (BESS) at the Merotherie Energy Hub as a replacement for a synchronous condenser
- adding crushing, grinding and screening plant at switching station M1, at the end of the Cassilis connection.

Further information about the proposed amendments and refinements is provided in Chapter 3. A detailed description of the amended project is provided in Appendix A (Updated project description) and updated maps of the amended project are provided in Appendix B (Updated project description mapping).

## 1.3 Purpose and structure of this Amendment Report

This Amendment Report has been prepared for the purposes of clause 179(3) of the EP&A Regulation, having regard to the Department of Planning and Environment's *State Significant Infrastructure (SSI) Guidelines: preparing an amendment report* (DPE, 2022c).

The purpose of this Amendment Report is to describe the proposed amendments to the project since the exhibition of the EIS, and assess the potential impacts of the amended project. This report considers whether the proposed amendments would result in any changes to the impacts described by the EIS, and whether any changes to the mitigation measures are required. This report has been informed by additional impact assessments for key issues where potential changes to impacts have

been identified, including biodiversity, heritage, landscape character and visual amenity, noise, traffic and transport and flooding.

This report is to be read in conjunction with the Submissions Report on issues raised in submissions received in response to the exhibition of the EIS.

The structure of the Amendment Report is outlined in Table 1-1.

Table 1-1 Structure of this report

| Chapter | Description |
|---|---|
| Chapter 1 | **Introduction (this chapter)**<br>Provides a background to the project, and an overview of the key features of the project as described in the EIS and the proposed amendments to the project. The chapter also outlines the overall structure and content of the Amendment Report. |
| Chapter 2 | **Strategic context**<br>Provides an overview of the strategic context and need for the project and any changes from the EIS as a result of the proposed amendments. |
| Chapter 3 | **Description of amendments**<br>Provides a description of, and justification for, the proposed amendments. |
| Chapter 4 | **Statutory context**<br>Provides an overview of the statutory context for the project, including any changes from the EIS as a result of the proposed amendments, and the next steps in the approval process. |
| Chapter 5 | **Assessment of impacts**<br>Provides a summary of additional assessment carried out for the amended project, and a description of the potential impacts of the proposed amendments. This chapter also outlines the proposed mitigation measures for the amended project. |
| Chapters 6 | **Justification of amendment project**<br>Provides a justification and evaluation of the amended project as a whole, having regard to its environmental and social impacts and the principles of ecologically sustainable development. |
| Chapter 7 | **References**<br>Provides a list of references used to inform the Amendment Report. |
| **Appendices** | |
| Appendix A | Updated project description |
| Appendix B | Updated project description mapping |
| Appendix C | Project amendments mapping |
| Appendix D | Updated statutory compliance requirements |
| Appendix E | Updated mitigation measures |
| Appendix F | Landscape Character and Visual Impact Assessment Addendum |
| Appendix G | Updated Biodiversity Development Assessment Report |
| Appendix H | Aboriginal Cultural Heritage Assessment Report Addendum |
| Appendix I | Noise and Vibration Impact Assessment Addendum |
| Appendix J | Traffic and Transport Impact Assessment Addendum |
| Appendix K | Flooding Assessment Addendum |
| Appendix L | Updated Cumulative Impact Assessment |
| Appendix M | Ground Penetrating Radar Report |

# 2 Strategic context

The strategic context of, need for, and objectives of the project is described in Chapter 2 (Strategic context) of the EIS. This chapter provides an overview of the strategic context for the project and provides a summary of the statutory requirement changes that would occur as a result of the proposed design amendments and refinements.

## 2.1 Project need

The Australian Government is committed to coordinated global action to reduce greenhouse gas emissions in line with the Paris Agreement and has set targets to reduce emissions by 43 per cent below 2005 levels by 2030 and to net zero by 2050. These targets are supported by the Australian Government's *Powering Australia Plan* (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2022), which aims to generate 82 per cent of Australia's electricity from renewable sources by 2030. Independently, the NSW Government has set a goal to achieve net-zero emissions by 2050 (NSW Department of Planning, Industry and Environment (DPIE), 2020). Achieving these goals requires transformative low emissions technologies to be deployed at scale across all sectors of the economy. This includes the electricity generation sector which is currently Australia's largest source of greenhouse gas emissions, accounting for 33 per cent of Australia's total annual emissions in 2020 (Climate Change Authority, 2020).

With the rise in cleaner and lower cost renewable energy generation, coal-fired generation is facing increasing market, financial and operating pressures. Coal-fired electricity generation is being withdrawn faster than anticipated (Australian Energy Market Operator (AEMO), 2022), with large coal-fired power plants, such as the Eraring and Bayswater power stations, closing ahead of originally anticipated retirement dates (Eraring power station to potentially close by 2025 and Bayswater power station to close by 2033). The *Draft 2024 Integrated System Plan* (AEMO, 2024) estimates that around 90 per cent of the NEM's coal-fired generators is forecast to retire by 2035, with all coal-fired generators retired by 2038. However, coal retirements may occur even earlier than this forecast, as they have in the past. This highlights the urgent need to develop and connect new renewable energy to the NEM, to continue to have enough energy to meet future demand, while meeting Australia's carbon emissions policy commitments.

Current interest in new energy generation projects in the NEM exceeds the existing transmission network capacity in several locations, meaning that not all projects would be able to connect to the network. The transmission grid therefore needs targeted augmentation, including strategically placed large-scale interconnectors and transmission line extensions, to balance resources and unlock REZs in new regions. The existing transmission network is not capable of transferring the scale of new electricity generation identified for the Central-West Orana REZ. Development of new electricity generation and storage projects in the Central-West Orana REZ will require new high voltage transmission infrastructure to connect to and provide enough capacity to meet demand.

Further information about the strategic need for the project is provided in Chapter 2 (Strategic context) of the EIS. The amended project remains consistent with the strategic need for the project as described in the EIS and summarised above.

## 2.2 Government plans and policies

Section 2.2 of the EIS outlined the strategic planning response to the identified challenges facing the existing energy market, including consideration of the project against both NSW and Australian Government policy contexts, such as its alignment with the:

- Australian Government's climate change policy set out in *Australia's Nationally Determined Contribution Communication 2022* (Australian Government Department of Industry, Science, Energy and Resources (DISER), 2022) and *Australia's Long-Term Emissions Reduction Plan* (DISER, 2021)
- Australian Government's *2022 Integrated Systems Plan* (2022 ISP) (AEMO, 2022) and *Draft 2024 Integrated Systems Plan* (2024 Draft ISP) (AEMO, 2024)
- *NSW Network Infrastructure Strategy* (EnergyCo, 2023b)
- *NSW Transmission Infrastructure Strategy* (DPE, 2018a)
- *NSW Electricity Strategy* (DPIE, 2019)
- *NSW Electricity Infrastructure Roadmap* (DPE, 2020)
- (NSW) *State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
- *NSW Climate Change Policy Framework* (NSW Office of Environment and Heritage (OEH), 2016)
- *Central West and Orana Regional Plan 2041* (DPE, 2022a).

The Draft 2024 ISP estimates that over 125 gigawatts of new gridscale renewables are needed by 2050, in addition to the current 19 gigawatts capacity, as most of Australia's coal-fired generation will likely retire by 2038. As such, the NSW transmission network (as part of the NEM) needs to identify and connect to new low emission energy generation sources to continue to have enough energy to meet future demand, while meeting Australia's carbon emissions policy commitments (DISER, 2021).

Various government strategies, plans and policies such as AEMO's 2022 ISP (AEMO, 2022) and 2024 Draft ISP (AEMO, 2024), the *NSW Transmission Infrastructure Strategy* (DPE, 2018a), the *NSW Electricity Infrastructure Roadmap* (DPE, 2020) and the *NSW Network Infrastructure Strategy* (EnergyCo, 2023b), identify the important role for REZs to provide an effective and economical way to integrate new generation, storage and transmission development. The Central-West Orana region is one of five regions prioritised for the development of REZs in NSW in the *NSW Electricity Infrastructure Roadmap* (DPE, 2020).

The Central-West Orana REZ was formally declared on 5 November 2021 under the *Electricity Infrastructure Investment Act 2020* (NSW), which provides for an initial intended network capacity of three gigawatts. As NSW's first REZ, the Central-West Orana REZ will play a pivotal role in underpinning NSW's transition to a clean, affordable and reliable energy sector.

The *NSW Network Infrastructure Strategy* (EnergyCo, 2023b) identified a need to increase network capacity in the Central-West Orana REZ in response to increasing demand for electricity. The strategy outlined options to increase the network capacity of the Central-West Orana REZ from three gigawatts up to 4.5 gigawatts initially under Stage 1, and to six gigawatts by 2038 under Stage 2. This supports modelling in the *Draft 2023 Infrastructure Investment Objectives Report* (AEMO Services, 2023a), and confirmed in the *2023 Infrastructure Investment Objectives Report* (AEMO Services, 2023b), showing more network capacity will be needed to meet NSW's future energy needs as coal-fired power stations progressively retire.

To align with this requirement, the NSW Government amended the Central-West Orana REZ declaration in December 2023 to increase the intended network capacity to 6 gigawatts to allow for more renewable energy from solar, wind and storage projects to be distributed through the NSW transmission network.

The project would enable 4.5 gigawatts of new network capacity to be unlocked initially, to enable renewable energy generators within the Central-West Orana REZ, who are successful in their bids to access the new transmission infrastructure, to export electricity to the rest of the NSW transmission network. Other transmission infrastructure beyond the scope of the EIS may be required to provide a network capacity beyond 4.5 gigawatts, and would be subject to separate planning approval.

Overall, the proposed amendments and refinements identified in this Amendment Report would fall within the same strategic context as was previously discussed in the EIS, and would be consistent with the aims and objectives of the strategic planning and policy documents included in Table 2-1 and Table 2-2 of the EIS.

## 2.3 Regional context

The project is located within the Central-West Orana region, which is the second largest region in NSW. The region includes some of Australia's most important ecosystems, some of which also have significant Aboriginal cultural importance, large rivers, marshes, wetlands, a World Heritage Area, national parks and groundwater systems.

The Central-West Orana region consists of 19 LGAs, with the majority of the region's population living in or around regional centres, including Dubbo, Mudgee, Wellington, Gulgong and Dunedoo. The remainder of the population lives in smaller towns and rural localities, including Wollar, Ulan, Uarbry, Cassilis and Coolah.

Land tenure in the region is predominantly freehold, with some areas of Commonwealth land and Crown land, including road reserves, rail corridors, travelling stock reserves, State forests and national parks.

Aboriginal communities in the region retain a strong link with Country and include Traditional Owners and Custodians of the Wiradjuri, Wongaibon, Wailwan (also known as Weilwan and Wayilwan), Gamilaroi (also known as Gamilaraay and Kamilaroi), Ngiyampaa, Dharug and Gundungurra countries that the region sits within.

The top five regional industries, in order of economic contribution, are mining, agriculture, forestry and fishing, health care and social assistance, manufacturing and education and training. Mining and agriculture underpin the region's economy and together create just over one fifth of the region's economic output.

A number of renewable energy projects are currently proposed, approved or under construction within the Central-West Orana REZ. In addition to renewable energy projects, several mining projects in and around Ulan and Wilpinjong are operational and subject to proposed or approved expansions.

Further detailed information about the regional context of the project is provided in Section 2.3 of the EIS. The regional context remains applicable to the amended project.

## 2.4 Project objectives

The project challenges, corresponding objectives and overall project outcomes are summarised from a strategic perspective in project design and delivery perspective in Figure 2-1 and Figure 2-2. The objectives respond to the project need and the strategic and regional context of the Central-West Orana REZ summarised in the preceding sections.

These objectives remain applicable to the amended project.

| Strategic | | |
|---|---|---|
| **Challenges** | **Objectives** | **Outcomes** |
| **Ability to meet emission reduction targets set by the NSW Government and the Australian Government** | • Support government decarbonisation targets and the transition of the NEM from traditional energy sources to lower emission alternatives based on renewable energy. | • Reduced emissions and a greater mix of renewable energy in the NEM. |
| **Planned closure of aging major coal-fired power generators over the coming decade will create power shortages if this generation capacity is not replaced** | • Develop the architecture for the Central-West Orana REZ so that it encourages delivery of, and reduce barriers to the development of viable grid-scale renewable energy projects within the REZ in the near term to deliver a source of affordable and reliable energy.<br>• Deliver the Central-West Orana Transmission Project, a key element of the NSW Electricity Strategy and Electricity Infrastructure Roadmap, by the mid 2020's before the retirement of key coal-fired power stations.<br>• Provide high-capacity connections to mature grid-scale generation projects within the Central-West Orana REZ to enable earlier delivery of bulk power. | • Improved reliability and energy security, by delivering large amounts of new energy supply into the NEM.<br>• Unlock major investment in new renewable energy and regional economies.<br>• Placing downward pressure on customer bills through lower energy generation costs and increased competition. |
| **Increased demand for electricity as technology and industry shifts towards electrification** | • Design the Central-West Orana REZ to meet current bulk energy demands and enable efficient expansion to meet future demand as this grows. | • Network infrastructure that will:<br>– meet current and future needs efficiently, reducing ongoing impacts to the community by building it right the first time; and<br>– support ongoing development and investment in renewable energy projects within the REZ to meet growth in demand. |
| **Traditional sources of inertia and stability in the network are lost as fossil fuel generators are retired** | • Design the Central-West Orana REZ to address issues of inertia and stability by including equipment and technology within the design of the Central-West Orana REZ to ensure stability and reliability. | • Delivery of a transmission network that can efficiently and reliably deliver bulk power from renewable sources at reliability levels consumers expect of the NEM. |

Figure 2-1 Strategic project challenges, objectives and outcomes

| Project | | |
|---|---|---|
| **Challenges** | **Objectives** | **Outcomes** |
| **Delivering a project that minimises impacts to local communities along the transmission route during construction and operation** | • Engage in open and honest dialogue with the community and stakeholders during the development and delivery of the project, to improve the design and reduce impacts to the community and landowners where reasonable and feasible.<br>• Through corridor development and refinement, avoid large centres of population.<br>• Work with landowners to identify how the project may impact their properties and businesses and develop measures to manage and mitigate those impacts. | • Deliver a project that is supported by the local community and landowners by engaging in an open and transparent consultation process through the development of the projects design, as well as its construction and operation. |
| **Potential for the project to result in conflict with other valued land uses such as agriculture** | • Plan for, design and deliver a project that:<br>– Seeks to utilise previously disturbed land to avoid and minimise impacts to other valued land uses.<br>– Minimises the amount of prime agricultural land required for construction and permanent operational infrastructure.<br>– Allows for continued agricultural land uses and farming practices within the Central-West Orana REZ. | • Impacts to agricultural land and farming practices would be avoided and minimised as much as possible throughout construction and operation of the project. |
| **Cumulative impacts of network infrastructure and generation projects** | • Plan and deliver transmission and generation projects in a coordinated manner and in consultation with stakeholders, including generators.<br>• Reduce cumulative impacts from construction and operation of the project with other renewable energy projects in the Central-West Orana REZ. | • Efficient and coordinated delivery of network infrastructure and generation projects.<br>• Reduced impacts on local communities during construction and operation. |
| **Potential for the project to result in adverse environmental impacts** | • Plan for, design and deliver a project that protects natural and cultural resources, and minimises impacts to:<br>– natural systems, including biodiversity<br>– Aboriginal and non-Aboriginal cultural heritage<br>– visual amenity<br>– water resources and water quality.<br>• Implement strategies to mitigate and offset impacts and to recreate important environmental values in the region. | • Environmental impacts of the project during construction and operation would be avoided and minimised where feasible.<br>• The scale of the project allows new environmental values to be recreated for the benefit of the region.<br>• The project will support the delivery of viable grid-scale renewable energy to reduce the need for fossil fuel generators. |

Figure 2-2 Project design and delivery challenges, objectives and outcomes

# 3 Description of amendments, refinements and clarifications

This chapter describes the proposed changes associated with the amended project, and provides a summary of amendments, refinements and clarifications that have been made to the project following public exhibition of the EIS. An updated project description, taking into account the proposed amendments, clarifications and refinements is provided in Appendix A (Updated project description).

## 3.1 Overview

EnergyCo is proposing a number of amendments and refinements to the exhibited project as a result of:

- feedback in the submissions received during EIS exhibition
- community, government and stakeholder engagement activities
- ongoing development of the design and construction methodology of the project.

An amendment involves change(s) to the project description as included in the exhibited EIS. As a result, changes to what the proponent is seeking approval for are required, along with an amendment to the CSSI application for the project.

Refinements are changes that fit within the limits set by the project description of the exhibited project, and do not change what the proponent is seeking approval for and/or would not require an amendment to the CSSI application for the project.

The amendments and refinements to the exhibited project also confirm certain elements of the project that were highlighted as options or opportunities in the EIS (hereafter referred to as 'the EIS alignment'). The amendments and refinements would further minimise the potential impacts of the project where practicable, particularly in relation to land use and property, traffic and access, visual impacts and biodiversity.

The amendments and refinements to the project as described in the EIS (inclusive of the additional information and clarifications for the EIS project) are collectively referred to in this report as the 'amended project'.

The key amendments and refinements include:

- changes to the 500 kV and 330 kV transmission line alignments
- relocating five 330 kV switching stations and providing an additional 330 kV switching station
- a construction compound at the Neeleys Lane workforce accommodation camp, including materials storage and laydown facilities
- additional brake and winch sites (to facilitate transmission line conductor installation) and changes to the location of brake and winch sites identified as part of the exhibited project

- confirming the locations of microwave repeater sites
- refining the alignments of access roads at the energy hubs and New Wollar Switching Station
- refining the alignments of access tracks and providing additional access tracks along and to the transmission lines
- refining the alignment and design of local road and intersection upgrades, including bridge and drainage works
- removing the option for one 200 megawatts/400 megawatts per hour battery energy storage system (BESS) at the Merotherie Energy Hub as a replacement for a synchronous condenser
- adding crushing, grinding and screening plant at switching station M1, at the end of the Cassilis connection.

It is noted that upon appointment, the Network Operator for the project is intending to change the name of the New Wollar Switching Station to the Barigan Creek Switching Station. The intention of the name change is to provide further separation of the project from the existing Wollar substation, which is located along Transgrid's transmission line infrastructure. In this regard, all references to the New Wollar Switching Station in this Amendment Report are taken to be interchangeable with any reference to the Barigan Creek Switching Station.

Table 3-1 provides an overview of the amendments and refinements proposed as part of this amendment report.

Figure 3-1 provides an overview of the location of the key amendments and refinements to the EIS project following public exhibition. Detailed maps showing the key amendments and refinements are provided in Appendix C (Project amendments mapping). Further information about the proposed amendments and refinements is provided in the following sections.

*State significant infrastructure guidelines – preparing an amendment report* (Amendment Report Guidelines) (DPE, 2022c) recommends that changes to a project by a proponent following the public exhibition of an EIS are identified as either amendments or refinements. The Amendment Report Guidelines characterise an amendment as a change that requires an amendment of the project description in the EIS, and therefore a change in what the proponent is seeking approval for. Conversely, a refinement represents a change to the project that fits within the limits set by the project description and does not change what the proponent is seeking approval for. Sections 3.2 and 3.3 provide detailed descriptions of the proposed amendments and refinements to the project (respectively).

In addition to the amendments and refinements, there are also a number of clarifications and additional information developed as a result of ongoing design and construction methodology development, submissions received during exhibition of the EIS, minor errors identified in the EIS, and further assessment that has been undertaken since exhibition of the EIS. These aspects are discussed in Section 3.4.

Table 3-1 Overview of proposed amendments and refinements to the exhibited project

| Project feature | Amendment | Refinement | Subject to further assessment | Reference to description of project feature |
|---|---|---|---|---|
| Changes to the 500 kV and 330 kV transmission line alignments and 330 kV switching stations | ✓ | | ✓ | Section 3.2.1 |
| Construction compound at the Neeleys Lane workforce accommodation camp | ✓ | | ✓ | Section 3.2.2 |
| Changes to brake and winch sites | ✓ | | ✓ | Section 3.2.3 |
| Changes to microwave repeater sites | ✓ | | ✓ | Section 3.2.4 |
| Removal of potential BESS at the Merotherie Energy Hub | | ✓ | ✓ | Section 3.3.1 |
| Minor changes to the 500 kV and 330 kV transmission line alignments | | ✓ | ✓ | Section 3.3.2 |
| Access roads and access tracks | | ✓ | ✓* | Section 3.3.3 |
| Local road and intersection upgrades | | ✓ | ✓ | Section 3.3.4 |
| Crushing, grinding and screening sites | | ✓ | ✓ | Section 3.3.5 |

*Only the refinements associated with changes to access tracks is subject to further assessment as part of this Amendment Report.

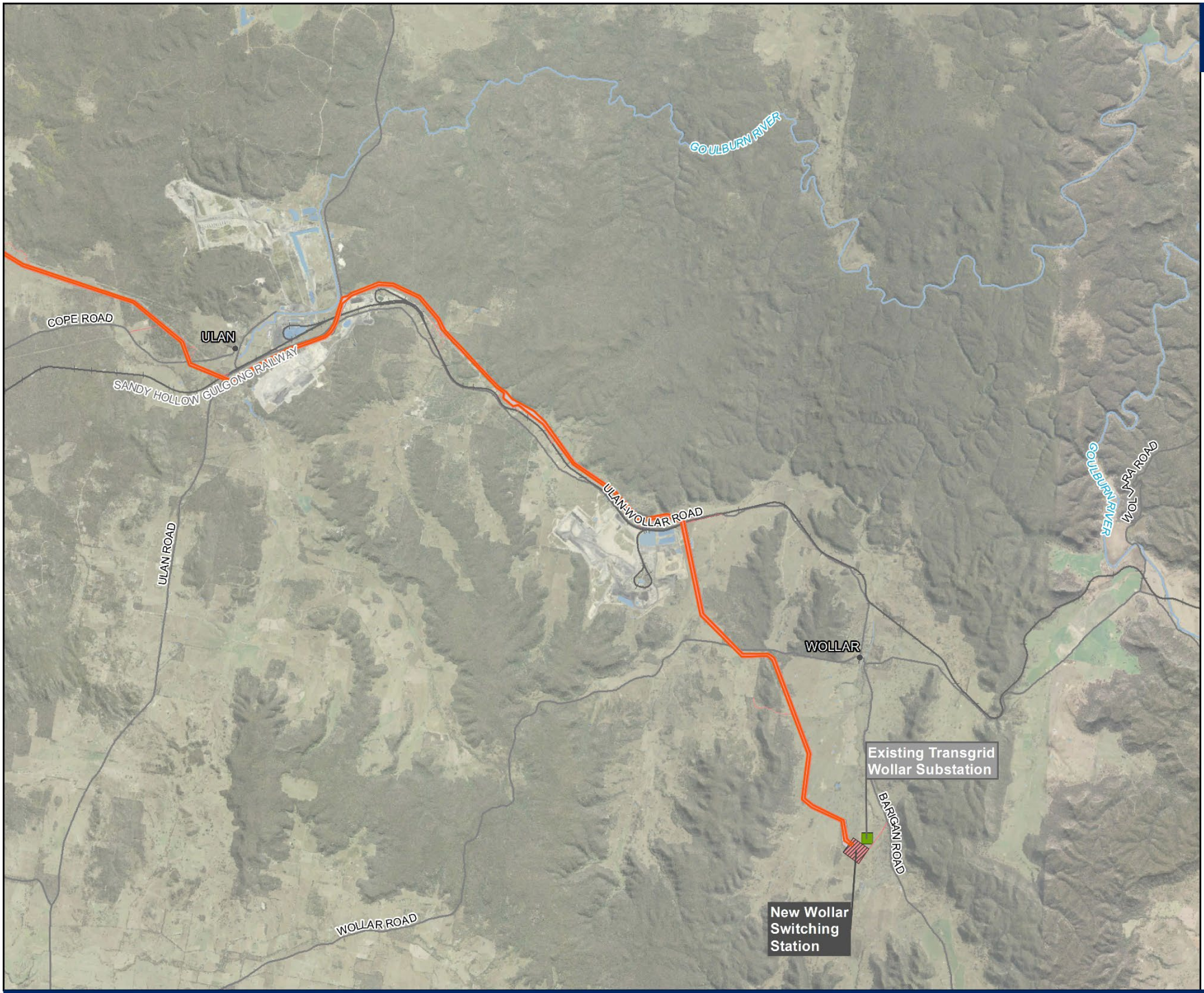
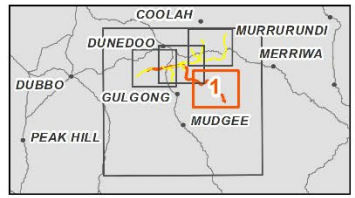



**Figure 3-1**
Key amendments of the project (operational features)
Map 1 of 5

**Legend**

- Amended operation area
- Exhibited operation area
- Energy hub / 500 kV switching station
- 500 kV transmission line
- Existing substation
- Road
- Railway
- Watercourse
- Water body

*Note: The amended operation area is indicative and subject to detailed design*




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
1:160,000
Data sources: WSP, EnergyCo, NSWSS

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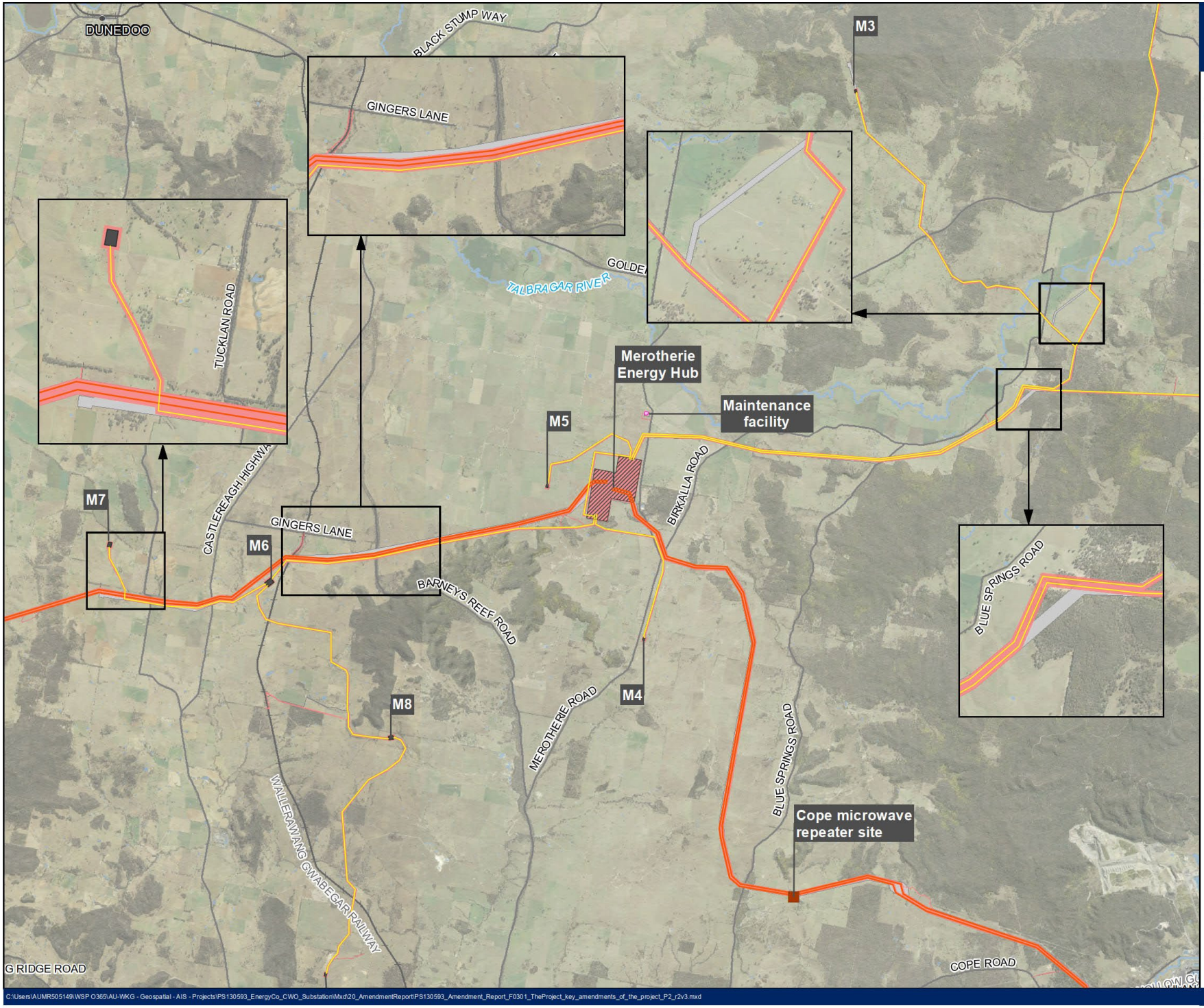
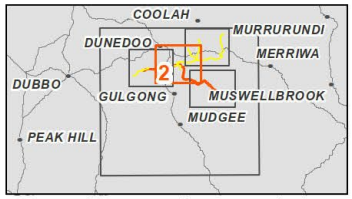



**Figure 3-1**
Key amendments of the project (operational features)
Map 2 of 5

## Legend

- Amended operation area
- Exhibited operation area
- Energy hub / 500 kV switching station
- Microwave repeater site
- Maintenance facility
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Road
- Railway
- Watercourse
- Water body

*Note: The amended operation area is indicative and subject to detailed design*

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Data sources: WSP, EnergyCo, NSWSS

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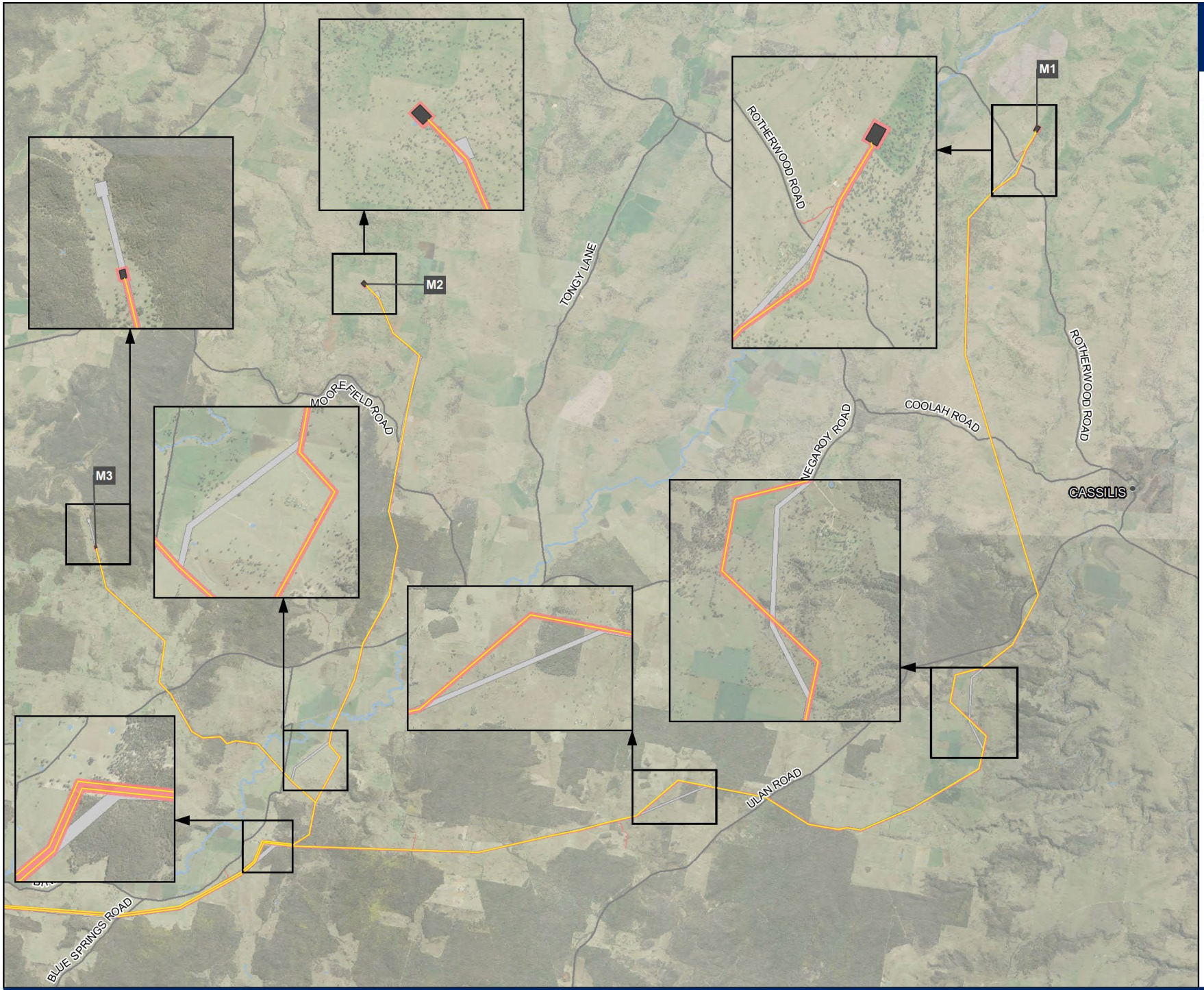
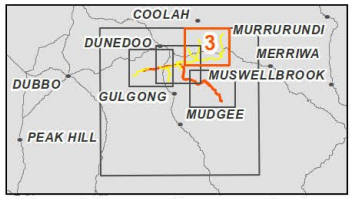



**Figure 3-1**
Key amendments of the project
(operational features)
Map 3 of 5

**Legend**

- Amended operation area
- Exhibited operation area
- 330 kV switching station
- 330 kV transmission line
- Road
- Watercourse
- Water body

*Note: The amended operation area is indicative and subject to detailed design*

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Data sources: WSP, EnergyCo, NSWSS

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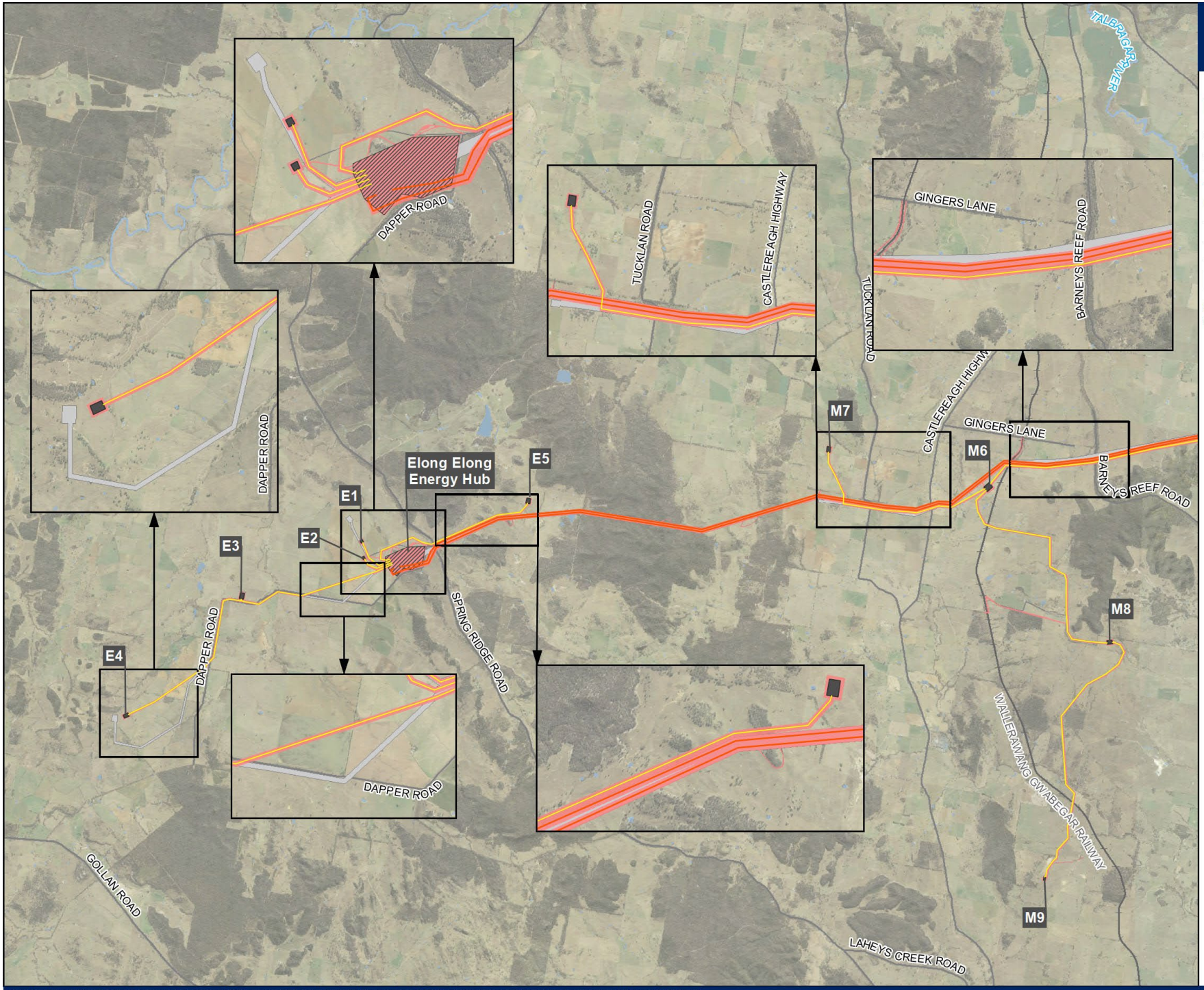
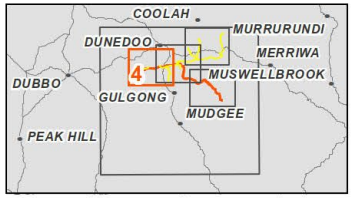



**Figure 3-1**
Key amendments of the project
(operational features)
Map 4 of 5

## Legend

- Amended operation area
- Exhibited operation area
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Road
- Railway
- Watercourse
- Water body

*Note: The amended operation area is indicative and subject to detailed design*

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Scale ratio correct when printed at A4

1:160,000

Data sources: WSP, EnergyCo, NSWSS

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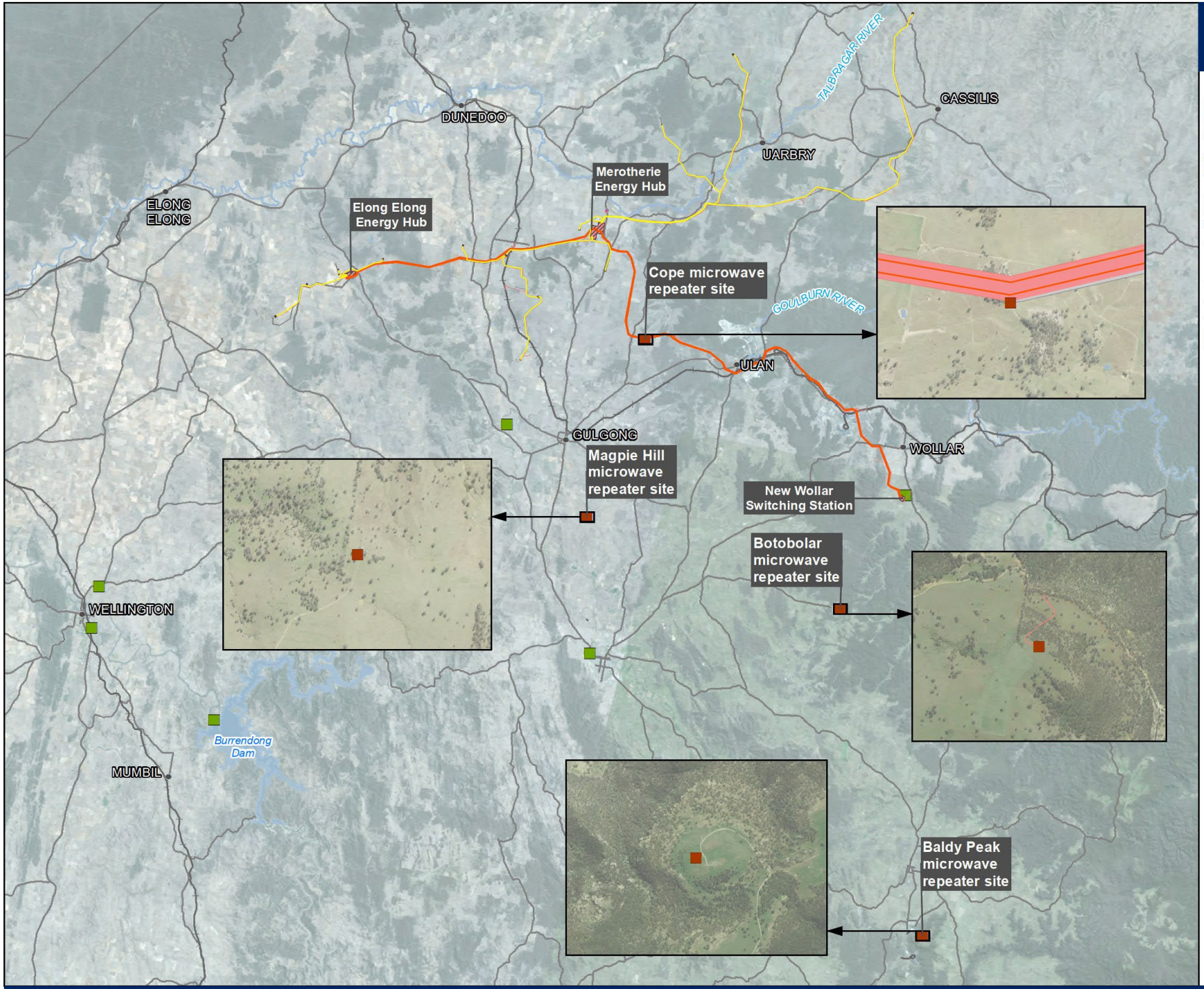
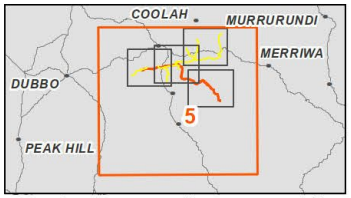



**Figure 3-1**
Key amendments of the project (operational features)
Map 5 of 5

## Legend

- Amended operation area
- Exhibited operation area
- Energy hub / 500 kV switching station
- Maintenance facility
- Microwave repeater site
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Existing substation
- Road
- Railway
- Watercourse
- Water body

*Note: The amended operation area is indicative and subject to detailed design*

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Scale ratio correct when printed at A4

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Data sources: WSP, EnergyCo, NSWSS

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## 3.2 Proposed amendments

This section provides a description of the proposed amendments to the exhibited project. An assessment of the potential impacts associated with these amendments, and any changes to the environmental impact assessment described in the EIS, is provided in Chapter 5.

### 3.2.1 Changes to the 500 kV and 330 kV transmission line alignments and 330 kV switching station locations

#### Exhibited project

Section 3.2.1 of the EIS provided a general overview of the proposed transmission line alignment, referred to as the 500 kV network infrastructure and the 330 kV network infrastructure.

The transmission line network infrastructure that would be provided as part of the project would include:

- twin double circuit 500 kV transmission lines and towers, which extend for around 90 kilometres, to connect the Merotherie and Elong Elong energy hubs to the NEM via the New Wollar Switching Station. The Merotherie Energy Hub — Elong Elong Energy Hub connection would be built as part of this project to operate at 500 kV; however, would initially operate at 330 kV until a time when 500 kV operations at the Elong Elong Energy Hub commence
- 330 kV network infrastructure around 150 kilometres in length, connecting selected renewable energy generation projects within the REZ to the Merotherie Energy Hub and Elong Elong Energy Hub. The 330 kV network infrastructure consists of single circuit and double circuit 330 kV transmission lines and towers, extending from the Merotherie and Elong Elong energy hubs to nearby renewable energy generation projects.

In some locations the 500 kV network would run alongside the 330 kV network.

Section 3.2.4 of the EIS provided a general overview of the 330 kV switching stations proposed for the project. Thirteen 330 kV switching stations would be provided along the 330 kV network infrastructure at Cassilis (switching station M1), Coolah (switching station M2), Leadville (switching station M3), Merotherie (switching stations M4 and M5), Tallawang (switching stations M6, M7, M8 and M9), Cobbora (switching stations E1 and E2) and Goolma (switching stations E3 and E4). Each switching station site would typically comprise a switchyard and other support equipment and infrastructure, including auxiliary service buildings, roads, drainage, fencing and lighting.

The alignment of the 500 kV and 330 kV network infrastructure, and the location of the 330 kV switching stations were shown in Figure 3-2 and Appendix B-2 of the EIS.

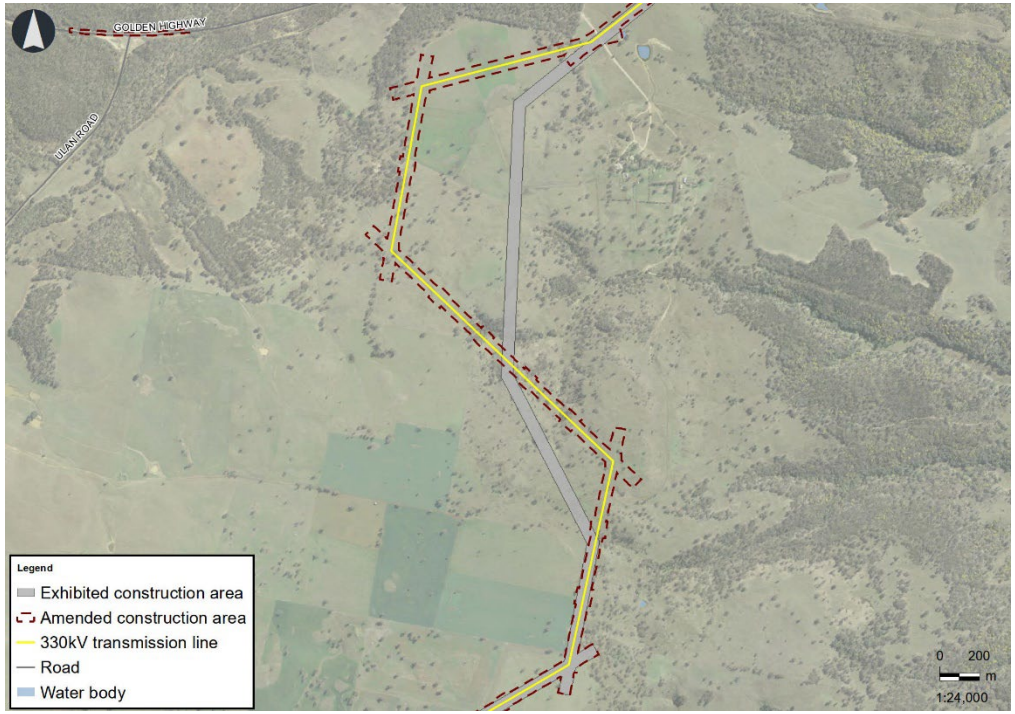
#### Description of the amendments

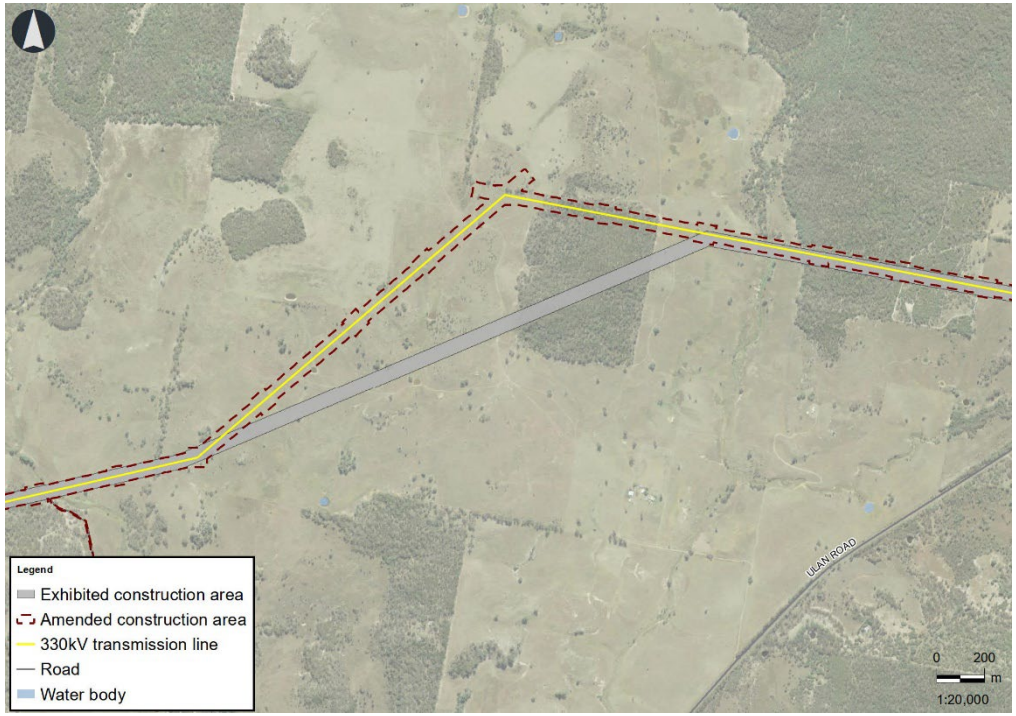
A number of changes to the 500 kV and 330 kV transmission line alignments and 330 kV switching station locations are proposed as a result of continued design development since exhibition of the EIS.

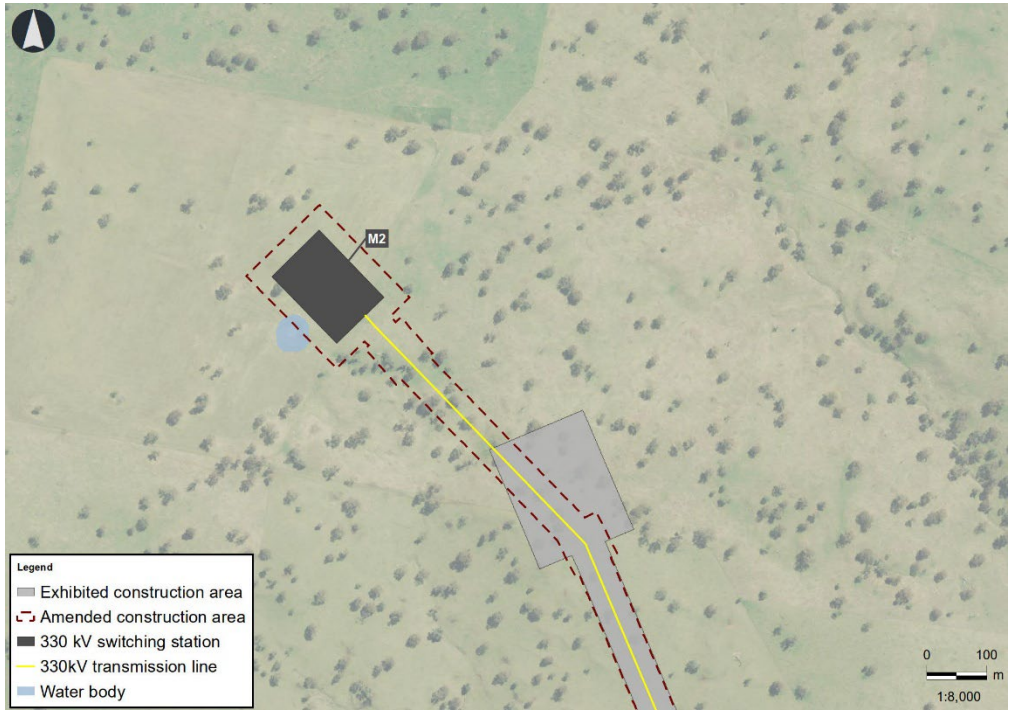
The proposed amendments, including their justification, advantages and impacts when compared to the exhibited project, are described in Table 3-2. An overview of the location of these amendments is provided in Figure 3-1. Detailed maps showing the amendments to the 500 kV and 330 kV transmission compared to the exhibited project are provided in Appendix C (Project amendments mapping).

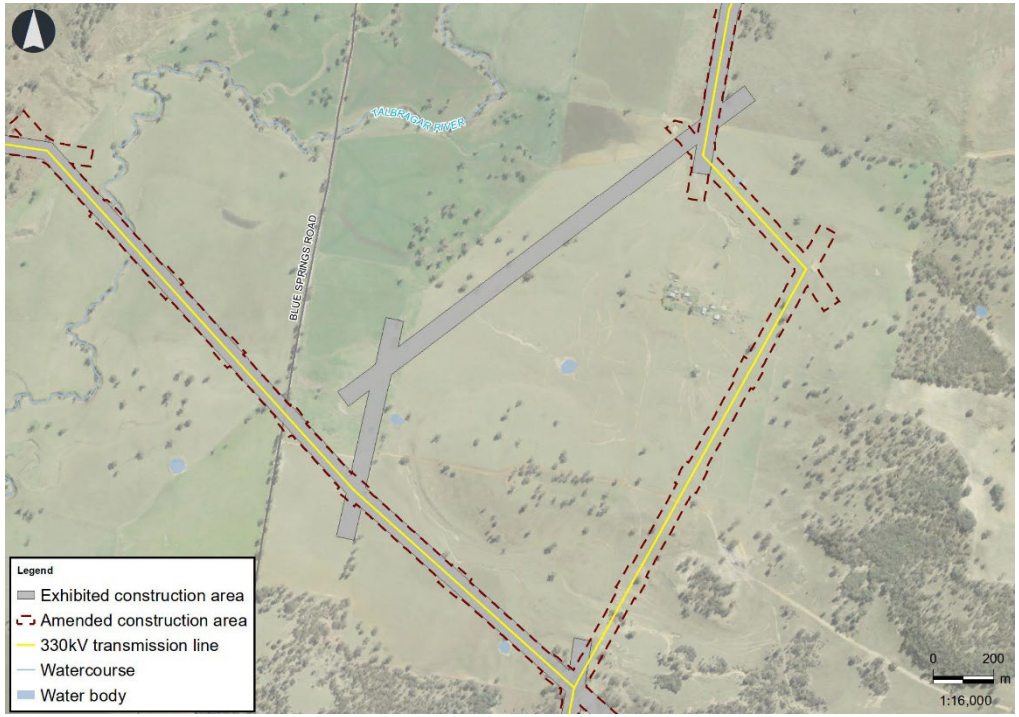
Table 3-2 Proposed amendments to 500 kV and 330 kV infrastructure

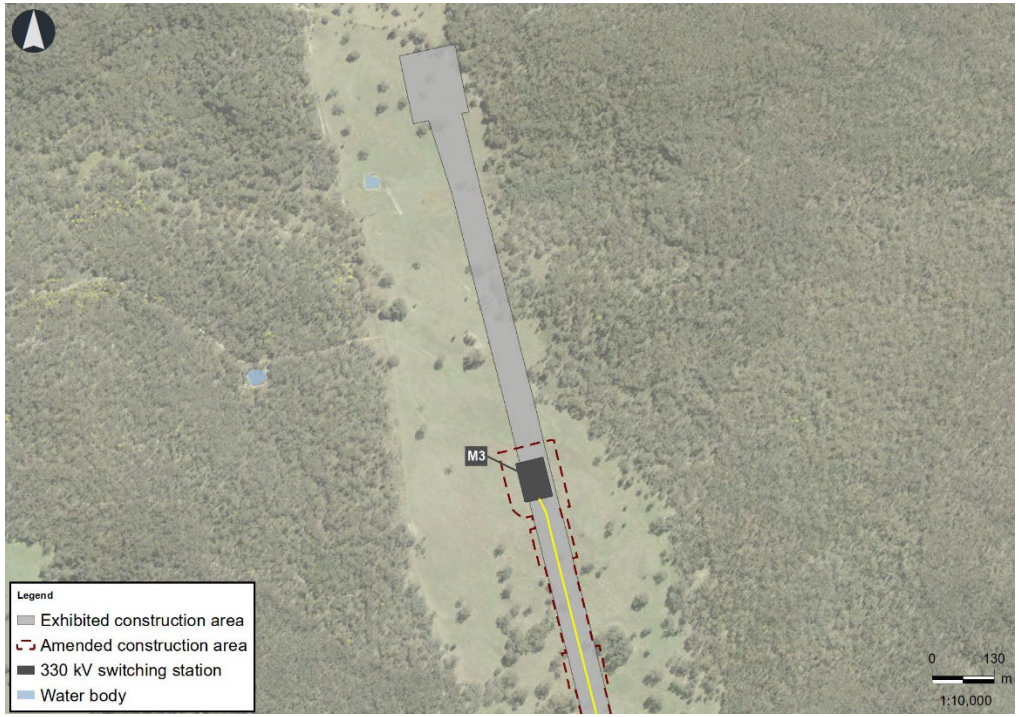
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Cassilis connection | It is proposed to move the alignment of the 330 kV transmission line near Rotherwood Road, Cassilis to the southeast, that would reduce the length of the transmission line by around 70 m. | The amendments would respond to feedback received from impacted landowners regarding the transmission line alignment of the exhibited project, and would minimise potential visual impacts of the project at nearby residential dwellings. |  | Inset 16 in Figure C-2 |

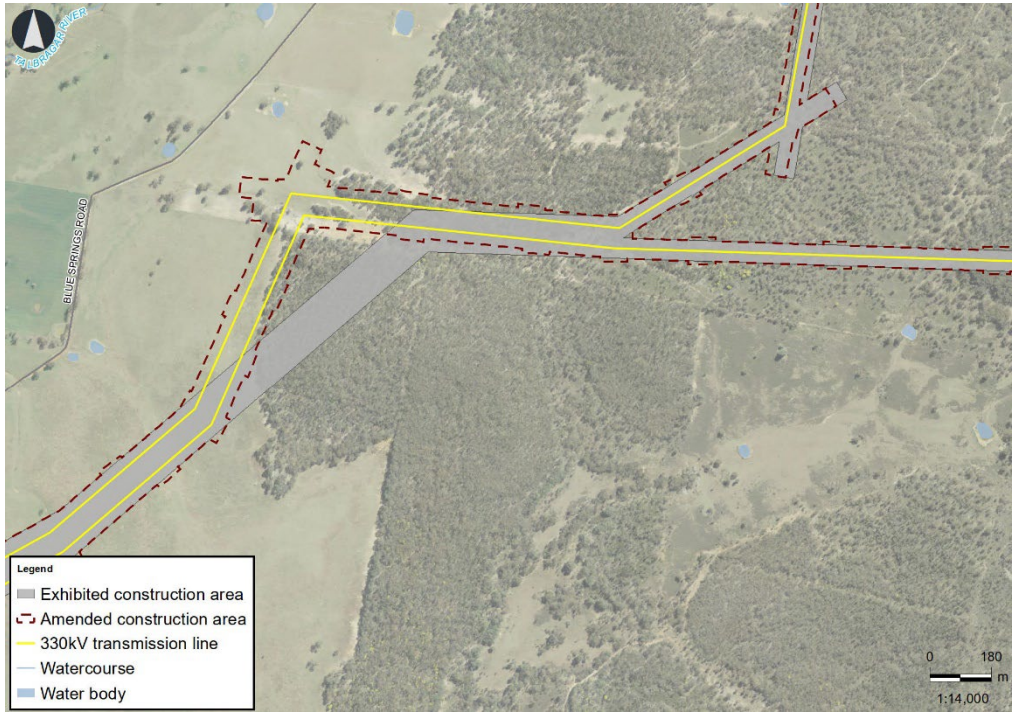
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| | It is proposed to move two sections of the alignment of the 330 kV transmission line just south of Golden Highway, Cassilis to the west and to the east respectively, that would increase the length of the transmission line by around 880 m. | The amendments would respond to feedback received from impacted landowners regarding the transmission line alignment of the exhibited project, and would minimise potential visual impacts of the project at nearby residential dwellings. |  | Inset 15 in Figure C-2 |

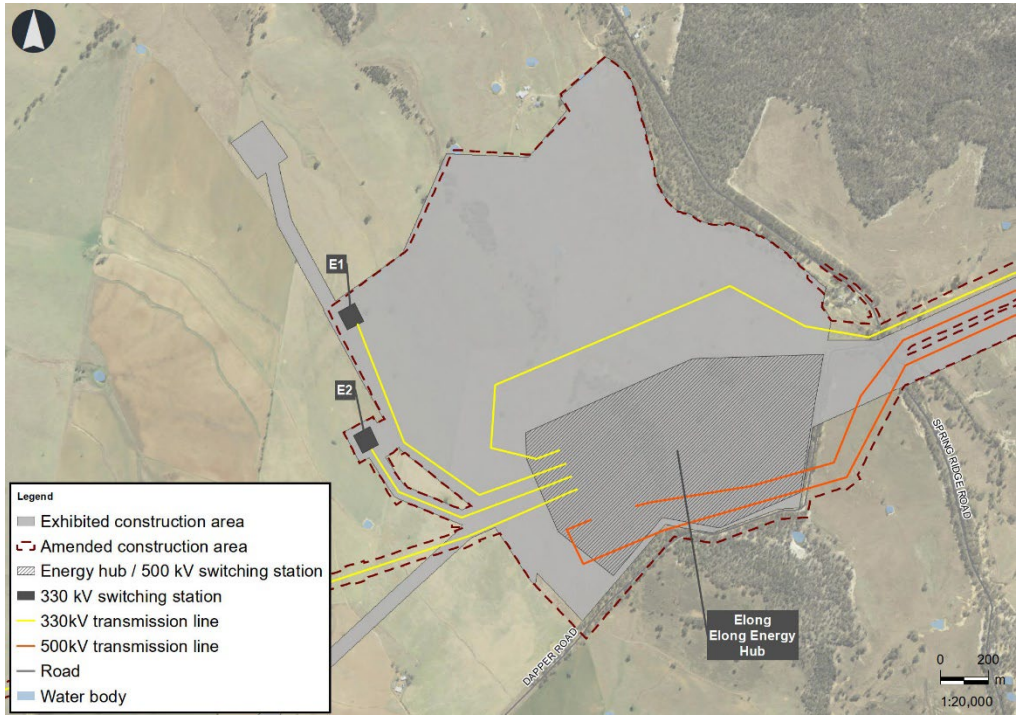
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| | It is proposed to move the alignment of the 330 kV transmission line between Turill Bus Route and Ulan Road, Turill to the north, that would increase the length of the transmission line by around 230 m. | The amendments would respond to feedback received from impacted landowners regarding the transmission line alignment of the exhibited project, and would minimise potential visual impacts of the project at nearby residential dwellings. The change also avoids bisecting a vegetated area. |  | Inset 13 in Figure C-2 |

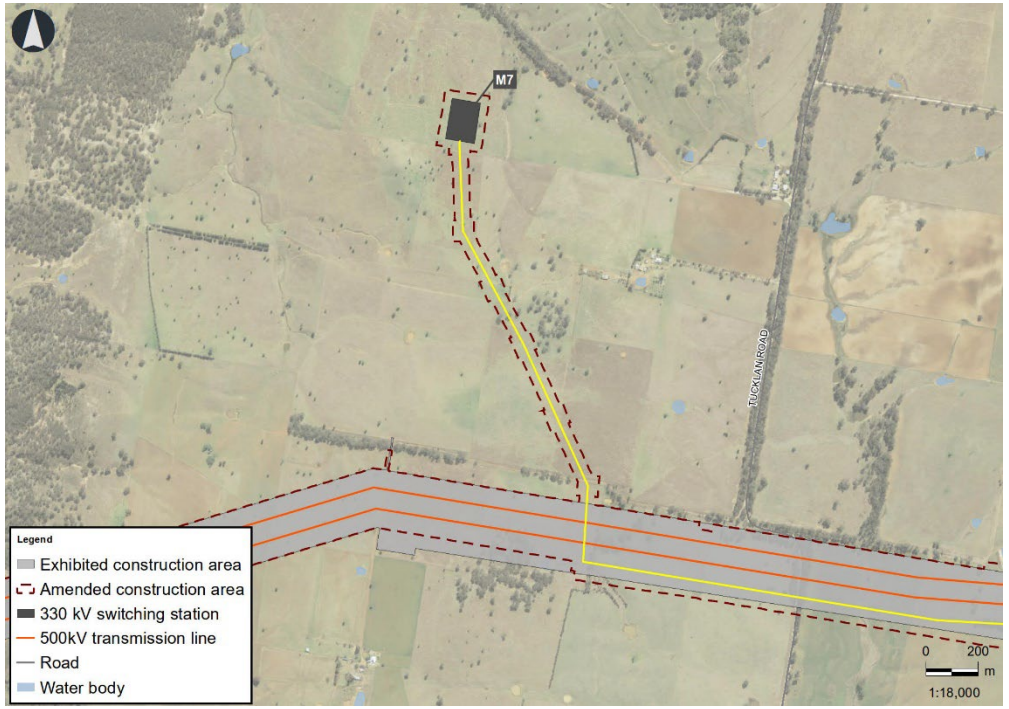
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Coolah connection and switching station M2 | It is proposed to relocate switching station M2 in Coolah further to the northwest by around 350 m, that would increase the length of the 330 kV transmission line by around 510 m to connect to the switching station in its new location. | The amendments would respond to feedback received from the Valley of the Winds wind farm developer. |  | Inset 12 in Figure C-2 |

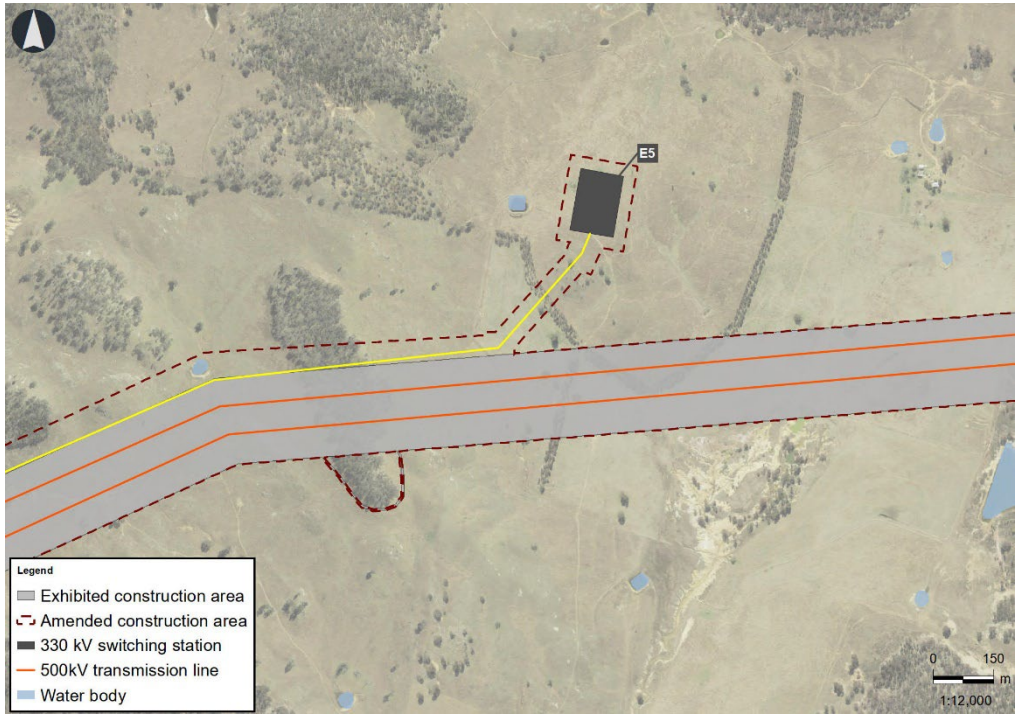
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| | It is proposed to move the alignment of the 330 kV transmission line north of Cliffdale Road, Uarbry to the southeast, that would increase the length of the transmission line by around 1.45 km. | The amendments would respond to feedback received from impacted landowners regarding the transmission line alignment of the exhibited project, and would minimise potential visual impacts of the project at nearby residential dwellings. |  | Inset 10 in Figure C-2 |

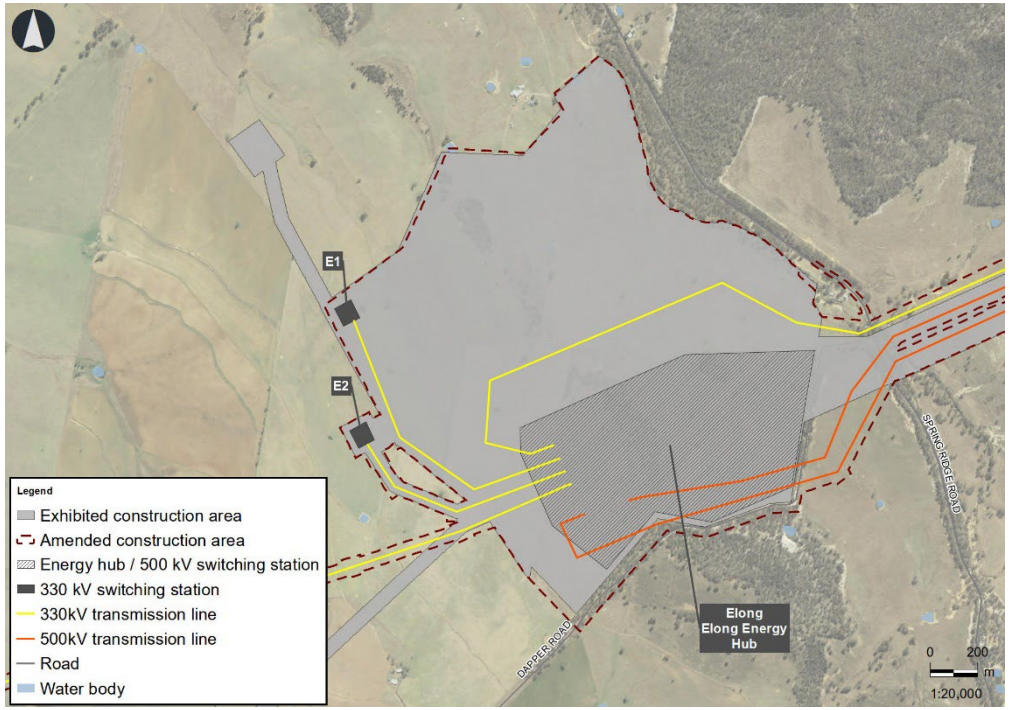
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Leadville connection and switching station M3 | It is proposed to relocate switching station M3 in Leadville to the southeast by around 770 m, that would reduce the length of the 330 kV transmission line by around 820 m to connect to the switching station in its new location. | The amendments would respond to feedback received from the Valley of the Winds wind farm developer. |  | Inset 11 in Figure C-2 |

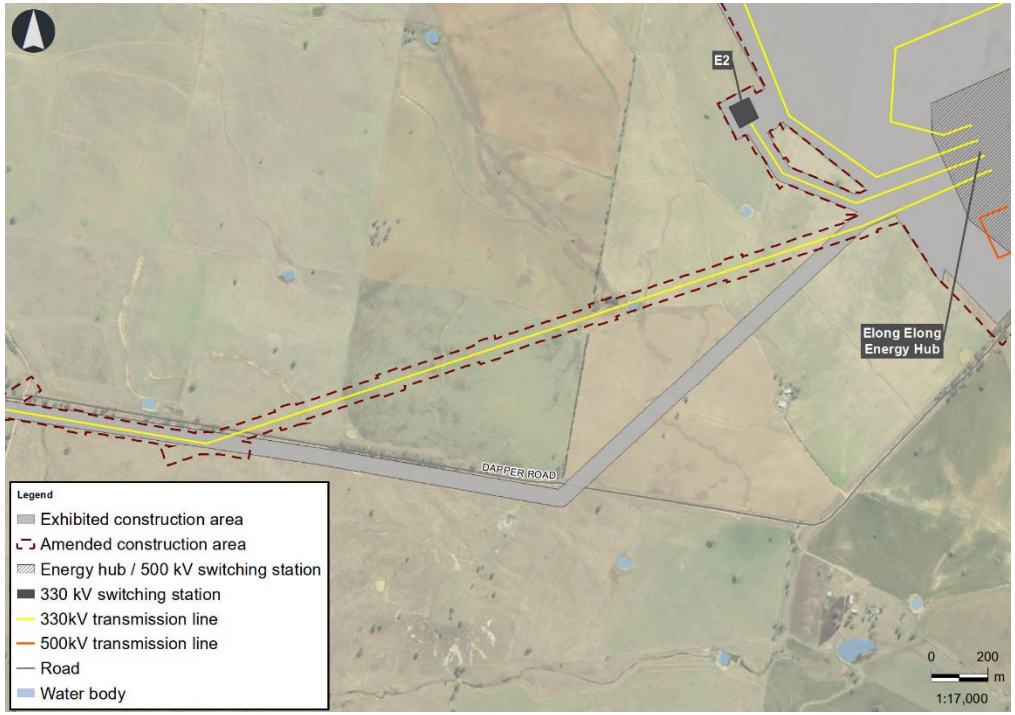
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Twin 330 kV transmission lines extending northeast from Merotherie Energy Hub to form the Cassilis, Coolah and Leadville connections | It is proposed to move the alignment of the twin 330 kV transmission line in Bungaba (around 500 m west of where the twin lines diverge to form the Cassilis, Coolah and Leadville connections) to the northwest, that would increase the length of the transmission lines by around 210 m. | The amendments would move the transmission line alignment so that it is located outside of the Mudgee Mine Subsidence District and reduce impacts on vegetation clearing. |  | Inset 9 in Figure C-2 |

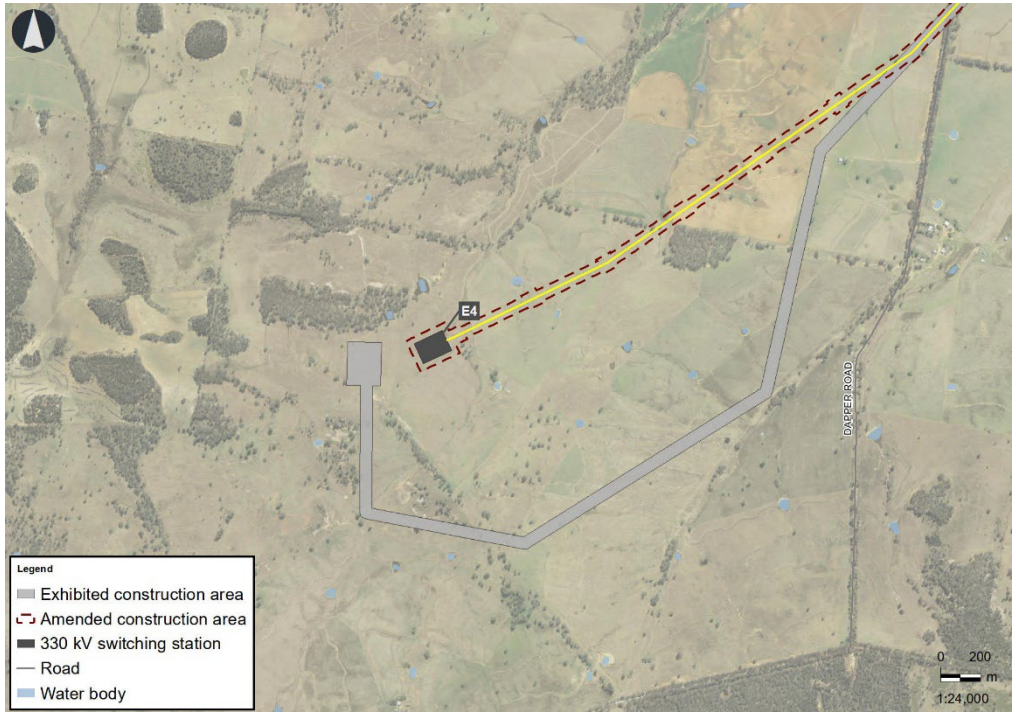
| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Merotherie Energy Hub — Elong Elong Energy Hub connection | It is proposed to amend the twin 500 kV transmission line alignment to run along the southern side of the Elong Elong Energy Hub, and extend the construction area along the southern side of the energy hub. This would increase the lengths of the two 500 kV transmission lines by around 935 m and 1.5 km each. | The amendment would optimise the design of the project for operation at 330 kV. |  | Inset 22 in Figure C-2 |

| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Tallawang west connection and switching station M7 | It is proposed to relocate switching station M7 in Dunedoo to the north by around 1.5 km. This would increase the length of the 330 kV transmission line by around 1 km to connect to the switching station at its new location. | The amendments would respond to feedback received from the Orana wind farm developer. |  | Inset 18 in Figure C-2 |

| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| New 330 kV transmission line and switching station E5 | It is proposed to provide additional 330 kV transmission infrastructure as part of the project to connect to the western cluster of the proposed Orana wind farm project. The additional 330 kV transmission infrastructure would consist of a single circuit 330 kV transmission line extending eastwards for around seven kilometres from the Elong Elong Energy Hub to a new switching station E5 (referred to as the Dunedoo connection). | The amendments would respond to feedback received from the Orana wind farm developer. |  | Inset 23 in Figure C-2 |

| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Cobbora north connection and switching station E1 | It is proposed to relocate switching station E1 around 690 m to the southeast. This would reduce the length of the 330 kV transmission line by around 755 m to connect to the switching station in its new location. | The amendments would respond to feedback received from the Cobbora solar farm developer regarding the location of switching station E1 and the alignment of its associated transmission line in the exhibited project. |  | Inset 22 in Figure C-2 |

| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| Goolma connection and switching station E4 | It is proposed to move the 330 kV transmission line alignment of the Goolma connection east of the Elong Elong Energy Hub to the north, that would reduce the length of this transmission line by around 260 m. | The amendments would respond to feedback received from impacted landowners regarding the transmission line alignment of the exhibited project, and would minimise potential visual impacts of the project at nearby residential dwellings. |  | Inset 21 of Figure C-2 |

| Project feature | Proposed amendments | Justification and impacts of proposed amendments | Figure | Reference to detailed figure in Appendix C |
|---|---|---|---|---|
| | It is proposed to relocate switching station E4 in Goolma around 200 m to the east. This would reduce the length of the 330 kV transmission line by around 2 km to connect to the switching station in its new location via a more direct route. | The amendments would respond to feedback received from the Spicers Creek wind farm developer, and would minimise potential visual impacts of the project at nearby residential dwellings. |  | Inset 24 in Figure C-2 |

### 3.2.2 Construction compound at Neeleys Lane workforce accommodation camp

#### Exhibited project

Section 3.5.7 of the EIS provided a general overview of the construction compounds and other ancillary construction support facilities proposed for the project.

Three main construction compounds would be required, one at each of the energy hubs and one at the New Wollar Switching Station, to support the construction of the project. In addition to the proposed main construction compounds, ancillary construction support facilities would be required at the 330 kV switching station sites, along the transmission line easement (including at each transmission line tower site), and at the Neeleys Lane workforce accommodation camp.

The indicative layout and location of the construction compounds were shown in Figure 3-17 to Figure 3-19 and Appendix B-1 of the EIS.

#### Description of the amendments

As a result of further development of the construction methodology of the project, a construction compound is proposed at the Neeleys Lane workforce accommodation camp. The construction compound would be provided within the construction area of the exhibited project and would include materials storage and laydown facilities, staff facilities (office, lunch room and amenities), aggregate bins, workshops, parking areas and fencing. The use of the construction compound in this location would be consistent with the proposed hours of construction identified in the EIS.

Figure 3-2 shows the location of the construction compound at the Neeleys Lane workforce accommodation camp.


Central-West Orana REZ Transmission

**Figure 3-2**
Indicative layout of the construction compound at Neeleys Lane workforce accommodation camp

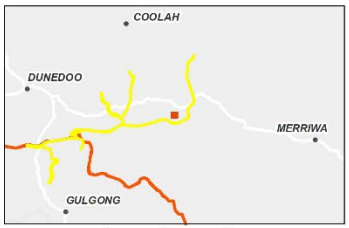
**Legend**

- Construction area
- Construction compound
- Workforce accommodation camp
- Cadastre
- Public road upgrade
- Access in/out
- State road
- Watercourse

**Sensitive receivers**

- House

*Note: Location of construction features are indicative and would be confirmed during detailed design*




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
1:6,000
Data sources: WSP, EnergyCo, NSWSS

GDA 2020

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### 3.2.3 Changes to brake and winch sites

#### Exhibited project

Section 3.5.6 of the EIS provided a general overview of the proposed brake and winch sites for the project. Brake and winch sites are required at intervals along the alignment to facilitate installation of the conductors on the transmission line towers (stringing).

Brake and winch sites would be required in selected locations where the transmission line alignment includes a direction change. A brake and winch site would provide an area for plant and equipment to be located, to spool and winch a conductor into place on an erected transmission line tower. Brake and winch sites would generally be around 150 metres in length and 70 metres wide, though they would vary significantly based on the height of the adjacent tower and the existing topography.

The brake and winch sites for the project were shown in Appendix B-2 of the EIS.

#### Description of the amendments

Amendments to the size and location of brake and winch sites of the exhibited project, as well as additional brake and winch sites are proposed as a result of ongoing refinement of the project design since exhibition of the EIS and further development of the construction methodology. The amended and additional brake and winch sites would improve constructability of the project and would increase the construction area for the project.

Detailed maps showing the amended and additional brake and winch sites for the amended project compared to the exhibited project are provided in Appendix C (Project amendments mapping).

### 3.2.4 Changes to microwave repeater sites

#### Exhibited project

Section 3.2.5 of the EIS provided a general overview of the new microwave repeater network that would be established as part of the project, which would provide a secondary communications link between the project and the existing electricity transmission and distribution network.

The EIS considered a new antenna pole or tower outside of the operation area at a location that would provide line-of-sight access between the New Wollar Switching Station and existing microwave towers in the vicinity of the project. It was anticipated that it would be located on Crown Land near Botobolar, around 14 kilometres southwest of the operation area at its closest point, near Wollar. The indicative location of the Botobolar microwave repeater site was shown in Figure 3-1 and Figure 3-9 of the EIS. The EIS also assumed that an additional tower would also be required along the alignment within the operation area, between the Merotherie Energy Hub and New Wollar Switching Station, but a specific location had not been confirmed at the time.

The microwave towers would comprise an antenna on a pole or lattice tower, around 20 metres in height (dependent on line-of-sight requirements). The antenna would be powered by a new solar panel array which would be established around the base of the tower.

## Description of the amendments

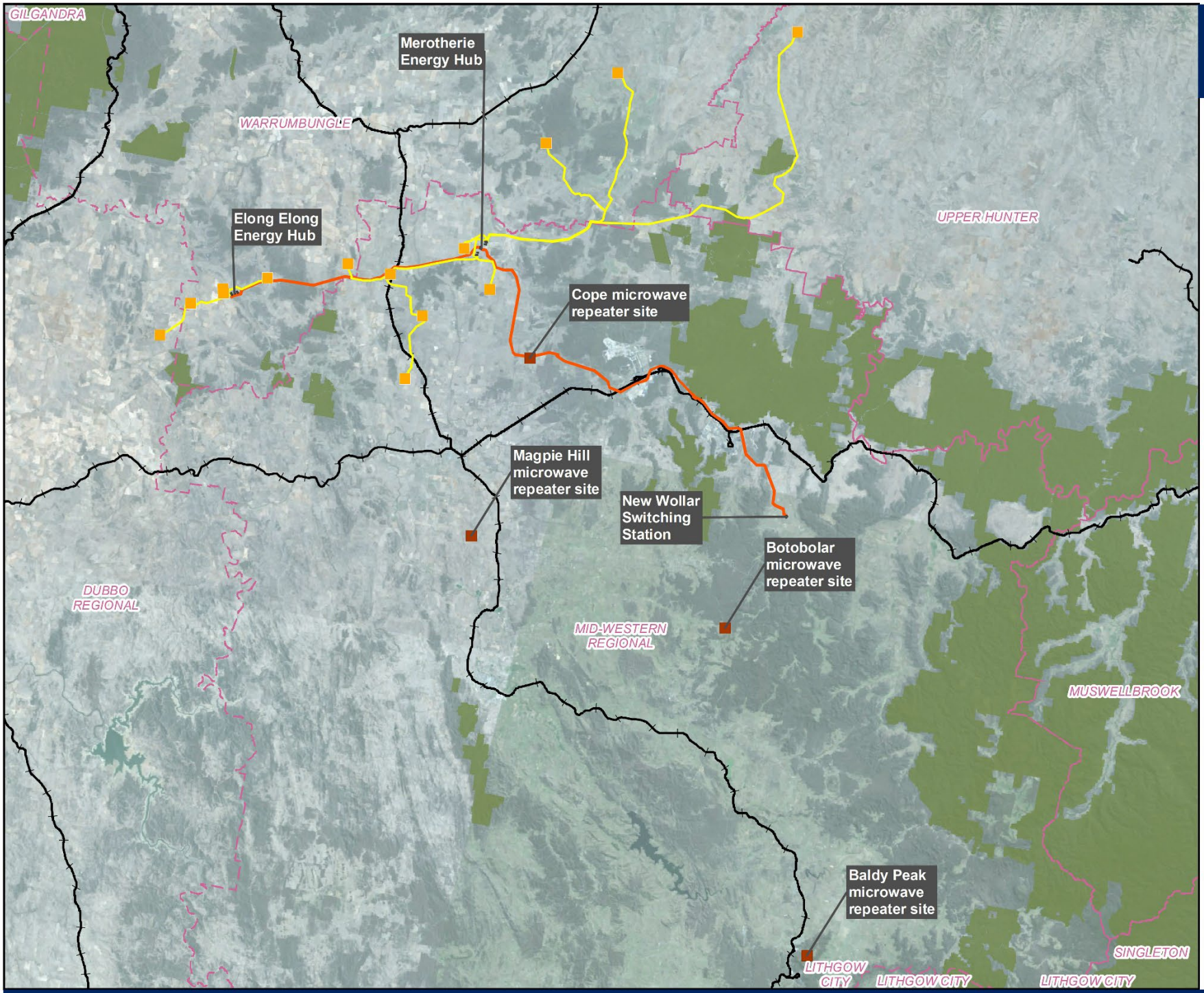
A new antenna pole or tower would be established at an existing microwave repeater site at Botobolar, as described in the EIS.

The new microwave repeater site along the 500 kV New Wollar Switching Station — Merotherie Energy Hub connection, as described in the EIS, would be indicatively be installed along the southern side of the 500 kV transmission line easement, just east of Blue Springs Road, Cope. The site would be around 16 metres in length and 15 metres wide. The majority of this site would be located within the construction area as described in the EIS, and any additional potential impacts are anticipated to be minimal (refer to Chapter 5). The location of this site will be confirmed during detailed construction planning and feasibility investigations. If the location of this site is changed, any impacts additional to those identified in the EIS and Amendment Report will be subject to further assessment, if required.

Additional microwave equipment (microwave antennas) would also be installed at two existing microwave repeater sites outside of the operation area, at Baldy Peak in Kandos and Magpie Hill in Galambine.

The microwave towers would comprise an antenna on a pole or lattice tower, around 20 metres in height (reduced from 40 metres in the EIS). The proposed microwave infrastructure and back-up power supplies would improve telecommunication signals and ensure the stability of the communications system over long distances.

Figure 3-3 shows an overview of the new and existing microwave repeater sites that would be utilised by the amended project. Detailed maps showing the new and existing microwave repeater sites for the amended project are provided in Appendix C (Project amendments mapping).

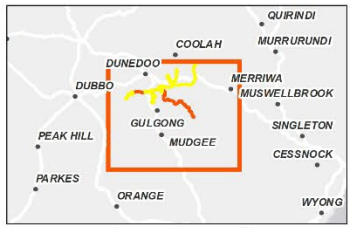



Central-West Orana REZ Transmission

**Figure 3-3**
Microwave repeater sites for amended project

**Legend**

- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line and easement
- 330 kV transmission line and easement
- Microwave repeater site
- Railway
- Local Government Area
- NPWS Estate




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
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Data sources: WSP, EnergyCo, NSWSS

GDA 2020

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## 3.3 Proposed 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 5.

### 3.3.1 Removal of option to include BESS at the Merotherie Energy Hub

#### Exhibited project

Section 3.2.4 of the EIS provided an overview of the key electrical components of the energy hubs. The Merotherie Energy Hub included an option to have one 200 megawatts/400 megawatts per hour battery energy storage system (BESS) which could replace one of the four synchronous condensers at the energy hub. The BESS would consist of a series of containerised or stacked Lithium-ion or Lithium-ion phosphate type battery cells located within enclosures (or units) together with associated control systems.

#### Description of the proposed refinements

The option to have one 200 megawatts/400 megawatts per hour BESS replace one synchronous condenser at the Merotherie Energy Hub has been removed as a result of further design development. A Preliminary Hazard Analysis is therefore no longer required for the project to assess the potential hazard and risk of the use of Lithium-ion battery pack containers in the BESS (refer to Section 16.5.5 of the EIS). The updated mitigation measures to avoid or minimise potential hazards and risks of the project are provided in Appendix E (Updated mitigation measures).

### 3.3.2 Minor changes to 500 kV and 330 kV transmission line alignments

#### Exhibited project

A general overview of the proposed 500 kV and 330 kV transmission line alignments for the project as described in the EIS is provided in Section 3.2.1.

#### Description of the proposed refinements

Minor changes to the 500 kV and 330 kV transmission line alignments are proposed in a number of locations to improve alignment with the surveyed cadastre, and respond to feedback received leading up to and during the exhibition of the EIS.

Detailed maps showing refinements to the 500 kV and 330 kV transmission line alignments compared to the exhibited project are provided in Appendix C (Project amendments mapping).

### 3.3.3 Access roads and access tracks

#### Exhibited project

Section 3.2.4 of the EIS provided a general overview of the proposed access roads and access tracks for the project.

Access roads are sealed private roads to provide access to the energy hubs at Merotherie and Elong Elong, the maintenance facility at Merotherie, New Wollar Switching Station and switching station E2 from the nearest public road. Permanent access to the energy hubs, maintenance facility and switching stations would be via new and/or upgraded access roads from private access points from the nearest public road. The existing access road to the existing Transgrid Wollar Substation would be extended to provide access to the New Wollar Switching Station. The existing access road to the existing Transgrid Wollar Substation would only be upgraded if this was determined to be required during detailed design.

Access tracks are unsealed tracks that would provide access along and to the transmission line easements from the nearest public road.

The alignment of the access roads and access tracks were shown in Appendix B-2 of the EIS.

#### Description of the proposed refinements

Minor changes to the alignment of access roads to the energy hubs, New Wollar Switching Station and switching station E2 are proposed in response to further design development of the energy hubs and switching stations.

Refinements to the alignment of access tracks and additional access tracks are also proposed to improve constructability of the project while minimising the potential impacts and construction cost of the project. Some of the additional access tracks that would be utilised by the amended project are existing access tracks.

Detailed maps showing refinements to the alignment of access roads and access tracks compared to the exhibited project are provided in Appendix C (Project amendments mapping). The exact location, type and extent of access roads and access tracks would be refined and confirmed during detailed construction planning with consideration of factors such as the detailed design, topography and environmental constraints, and in consultation with the affected landowners and relevant roads authorities as relevant. Any impacts additional to those identified in the EIS and Amendment Report will be subject to further assessment, if required.

### 3.3.4 Local road and intersection upgrades

#### Exhibited project

Sections 3.2.4 and 1.4.2 of the EIS provided a general overview of the local road and intersection upgrades proposed for the project. The EIS indicated that local road and intersection upgrades would be required at the following locations to ensure safe access to construction sites and accommodate the movement of oversize and overmass (OSOM) equipment for the project (refer to Section 3.4.3 for a clarification on these works), subject to expected traffic volumes and turn warrant assessment. The local road and intersection upgrades included:

- a section of Merotherie Road
- a section of Spring Ridge Road
- a section of Dapper Road
- Spring Ridge Road/Dapper Road intersection
- Neeleys Lane/Ulan Road intersection

- Golden Highway/Ulan Road intersection
- intersection of Merotherie Road with the access road to the Merotherie Energy Hub
- Merotherie Road/Golden Highway intersection
- intersection of Barigan Road with the existing access road to the existing Transgrid Wollar Substation.

The EIS further noted that EnergyCo may assess and determine the above local road and intersection upgrades under Division 5.1 of the EP&A Act to allow these time critical works to be determined and commence construction prior to the determination of the CSSI application.

## Description of the proposed refinements

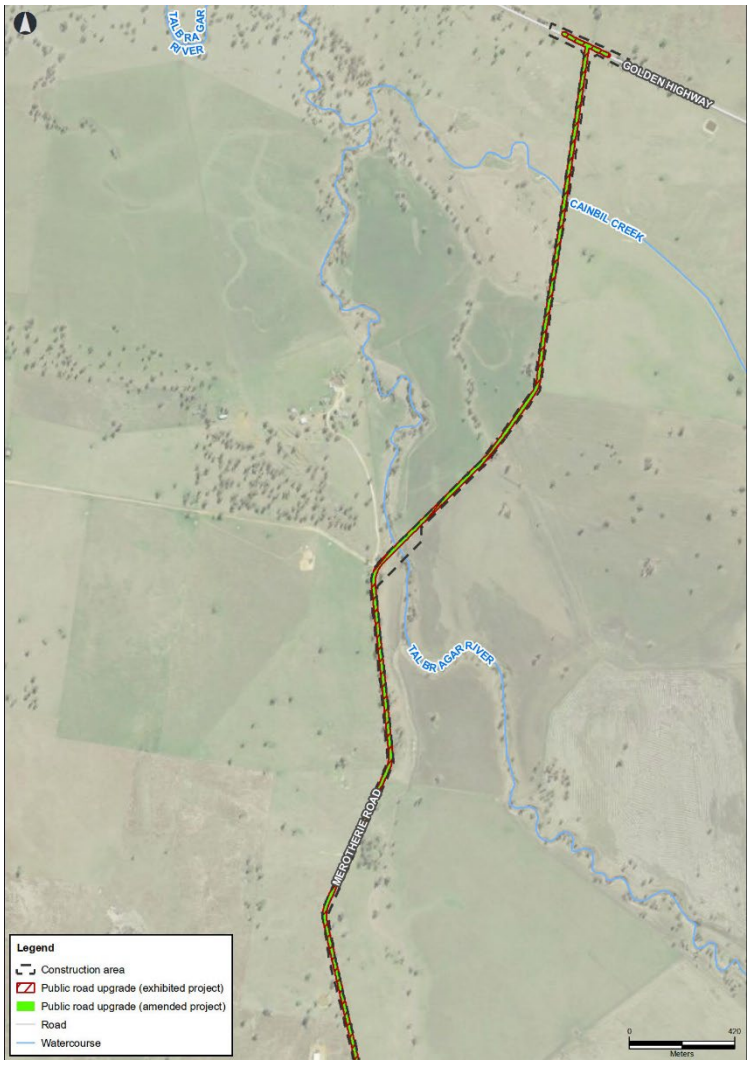
Further refinements to the alignment and design of the local road and intersection upgrades are proposed to consider further design development and minimise the potential impacts of the project where practicable.

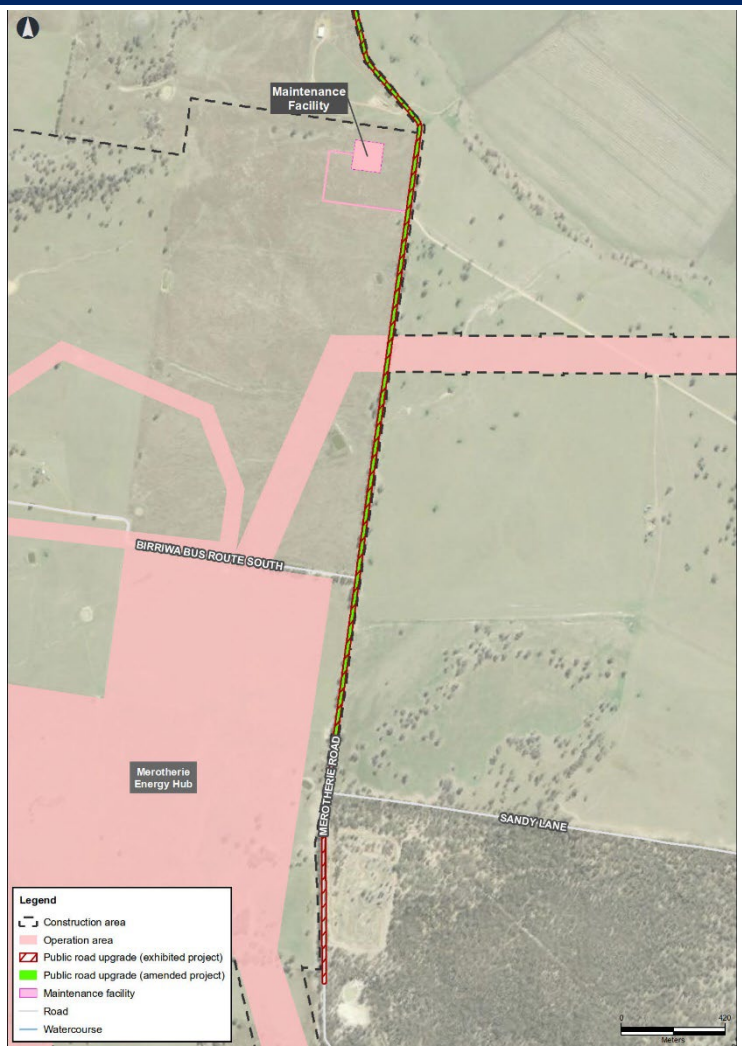
Refinements to the local road and intersection upgrades, including:

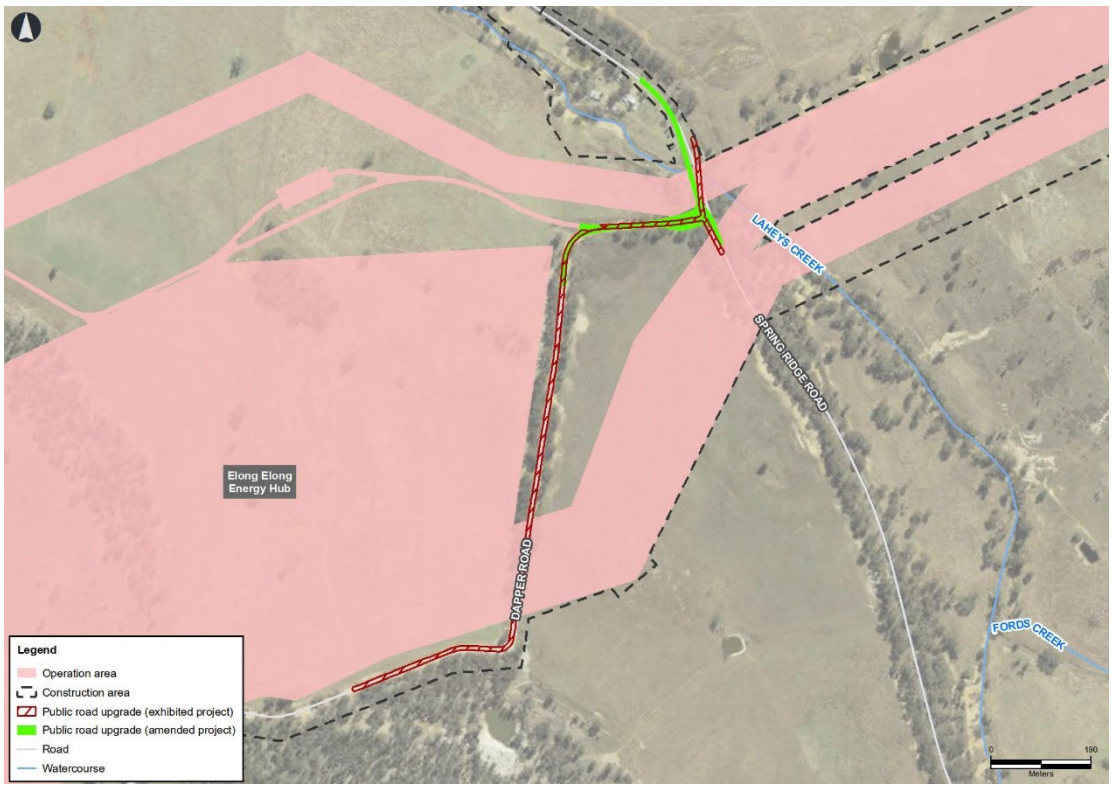
- minor changes to the extent and/or alignment of the local road and intersection upgrades
- installing a new bridge on Merotherie Road at its crossing of the Talbragar River to replace the existing crossing
- installing a new bridge on Spring Ridge Road at its crossing of Laheys Creek to replace the existing causeway
- upgrading drainage infrastructure
- upgrading Neeleys Lane from the Neeleys Lane/Ulan Road intersection to the entrance of the Neeleys Lane workforce accommodation camp
- removing the upgrade of the intersection of Barigan Road with the existing access road to the existing Transgrid Wollar Substation, as these works have already been completed as part of the Wollar solar farm development.

EnergyCo no longer intends to assess and determine these local road and intersection works under Division 5.1 of the EP&A Act, and would determine these works as part of the CSSI application . Changes to the alignments of the local road and intersection upgrades compared to the exhibited project are provided in are shown in Table 3-3. Detailed maps showing refinements to the local road and intersection upgrades compared to the exhibited project are provided in Appendix C (Project amendments mapping).

Table 3-3 Changes to alignments of local road and intersection upgrades

| Description of works | Alignment changes |
|---|---|
| Changes to the extent and alignment of the Merotherie Road upgrade and the upgrade of the intersection of Merotherie Road with the access road to the Merotherie Energy Hub. |  |

| Description of works | Alignment changes |
|---|---|
| Installation of new bridge on Merotherie Road at its crossing of the Talbragar River to replace the existing crossing. |  <br>  |

| Description of works | Alignment changes |
|---|---|
| Changes to the extent and alignment of the Golden Highway/ Merotherie Road intersection upgrade to tie into the Merotherie Road upgrade. |  |
| Changes to the extent and alignment of the Spring Ridge Road and Dapper Road upgrades, and the Spring Ridge Road/Dapper Road intersection upgrade.<br>Installing a new bridge on Spring Ridge Road at its crossing of Laheys Creek to replace the existing causeway. |  |

| Description of works | Alignment changes |
|---|---|
| Upgrading Neeleys Lane from the Neeleys Lane/ Ulan Road intersection to the entrance of the Neeleys Lane workforce accommodation camp.<br>Changes to the extent and alignment of the Neeleys Lane/ Ulan Road intersection upgrade. |  |
| Changes to the extent and alignment of the Golden Highway/ Ulan Road intersection upgrade. |  |

### 3.3.5 Crushing, grinding and screening sites

#### Exhibited project

Section 3.5.6 of the EIS provided a general overview of the crushing, grinding and screening sites proposed for the project. The EIS indicated that crushing, grinding and screening plant would be located at each of the main construction compounds to process material extracted from these sites.

The location of the construction compounds was shown in Figure 3-17 to Figure 3-19 and Appendix B-1 of the EIS.

#### Description of the refinements

An additional crushing, grinding and screening site is proposed at switching station M1 within the construction area of the exhibited project, in response to further development of the construction methodology. The crushing, grinding and screening site would be established to support construction of the Cassilis, Coolah and Leadville connections during the earthworks phase. Around 9,000 tonnes of material would be subject to crushing, grinding and screening activities at the crushing, grinding and screening site over a period of eight months (refer to Section 3.4.2).

The location of switching station M1 is shown in Appendix B (Updated project description mapping).

### 3.3.6 Construction and operation areas

#### Exhibited project

An overview of the operation area and construction area for the project is provided in Table 3-1 and Table 3-6 of the EIS.

The operation area comprises the land on which the permanent infrastructure of the project, including the transmission lines and towers, energy hubs, switching stations, access road to switching station E2 and energy hubs, access tracks to and along easements and communications infrastructure would be located, and includes the full extent of the easements for the transmission lines.

The construction area comprises the land that would be directly impacted by the construction of the project, including all project infrastructure elements (including, but not limited to, the transmission lines and towers, energy hubs, switching stations, access roads to switching stations and energy hubs, access tracks to and along easements, communications infrastructure, workforce accommodation camps, construction compounds, brake and winch sites and laydown and staging areas).

An overview of the project operation area and construction area was shown in Figure 3-1 and Figure 3-11 of the EIS (respectively).

#### Description of the proposed refinements

Refinements to the construction area and operation area are required to accommodate changes to the design of the exhibited project, including:

- changes to the operation area and construction area where changes are proposed to the 500 kV and 330 kV transmission line alignments and 330 kV switching station locations (refer to Section 3.2.1), and access tracks and access roads (refer to Section 3.3.3)
- changes to the construction area due to the additional brake and winch sites, and where changes are proposed to previously identified brake and winch sites (refer to Section 3.2.3)
- changes to the construction area due to proposed changes associated with local road and intersection upgrades (refer to Section 3.3.4)

- an increase in the operation area and construction area along the 500 kV New Wollar Switching Station — Merotherie Energy Hub connection east of Blue Springs Road in Cope, to incorporate the new microwave repeater site (refer to Section 3.2.4).

Detailed maps showing the refinements to the construction area and operation area compared to the exhibited project are provided in Appendix C (Project amendments mapping).

## 3.4 Additional information and clarifications

This section provides additional information and clarifications as a result of ongoing design and construction methodology development, submissions received during exhibition of the EIS, minor errors identified in the EIS, and further assessment that has been undertaken since exhibition of the EIS.

### 3.4.1 Additional sensitive receivers identified

Sensitive receivers for the project were identified in Chapter 3 of Technical paper 3 – Landscape character and visual impact (Technical paper 3), Section 2.2.3 of Technical paper 9 – Noise and vibration (Technical paper 9) and Section 4.2 of Technical paper 18 – Air quality (Technical paper 18) and Section 15.3.1 of the EIS.

Since exhibition of the EIS, further review of detailed aerial imagery and searches of local council development application registers have been undertaken to confirm if there are any unidentified dwellings or newly approved development applications for dwellings in the noise assessment study area that need to be included in the noise assessment.

Sixteen new or reclassified sensitive receivers have been identified for the project, as discussed in sections 5.4.2, 5.9.2 and 5.14.2. An assessment of the potential landscape character and visual amenity, noise and vibration and air quality impacts on these sensitive receivers is provided in sections 5.4.3, 5.9.4 and 5.14.3.

### 3.4.2 Crushing, grinding and screening quantities

Section 3.5.6 of the EIS noted that the final quantity of material subject to crushing, grinding and screening activities would be confirmed as part of detailed construction planning. At the time of EIS preparation, the amount of material was not expected to exceed the threshold quantities that would trigger the need for an Environment Protection Licence (EPL) for this activity under the *Protection of the Environment Operations Act 1997* (POEO Act).

Indicative quantities of material that would be subject to crushing, grinding and screening activities for the project have been further refined as part of the ongoing development of the construction methodology, and are provided in Table 3-4. The final quantity of material that would be subject to crushing, grinding and screening activities would be confirmed as part of detailed construction planning

The project is expected to exceed the threshold quantity that would trigger the requirement for an EPL for crushing, grinding or separating materials under the POEO Act. Further detail about the updated statutory compliance requirements for the amended project is provided in Section 4.3 and Appendix D (Updated statutory compliance requirements).

Table 3-4 Indicative crushing, grinding and screening quantities

| Construction compound location | Anticipated quantity | Expected duration |
|---|---|---|
| New Wollar Switching Station | 40,000 tonnes (t) | 6 months |
| Switching station M1 | 9,000 t | 3 months |
| Merotherie Energy Hub | 62,000 t | 8 months |
| Elong Elong Energy Hub | 19,000 t | 6 months |

### 3.4.3 Clarifications

This section identifies minor errors and discrepancies identified in the EIS. These errors and discrepancies have been identified through the submissions received, review comments from the DPHI or by EnergyCo.

Where relevant, the text provided can be considered to replace the text from the EIS. None of the clarifications presented in Table 3-5 result in a significant change to the environmental impacts assessed in the EIS.

Table 3-5 Clarifications on the EIS

| Chapter/Appendix reference | Error/discrepancy | Clarification |
|---|---|---|
| Chapter 1 (Introduction), Section 1.4.2 | Correction | Text in this section states that an upgrade of the Golden Highway/Spring Ridge Road intersection would be required to ensure safe access to construction sites and the movement of oversize and overmass (OSOM) equipment for the project.<br>This is incorrect, since Section 4.2.2 of Technical paper 13 – Traffic and transport indicated that the intersection layout is adequate to accommodate the predicted traffic demand for the project, therefore an upgrade of the Golden Highway/ Spring Ridge Road intersection would not be required. |
| Chapter 3 (Project description), Figure 3-20 caption<br>Chapter 13 (Social), Section 13.5.1, Table 13-5, Table 13-6, Table 13-20<br>Appendix D (Engagement summary), Table D-1<br>Appendix E (Cumulative impact assessment), Section E3.5.2<br>Technical paper 3 – Visual and landscape character<br>Technical paper 7 – Social<br>Technical paper 9 – Noise and vibration<br>Technical paper 13 – Traffic and transport<br>Technical paper 15 – Flooding<br>Technical paper 18 – Air quality | Correction | Text in these sections, tables and technical papers state that the workforce accommodation camp at Neeleys Lane is located in Cassilis. This is incorrect and should state that the workforce accommodation camp at Neeleys Lane is located within Turill. |
| Chapter 9 (Landscape character and visual amenity), Table 9-9 | Correction | The description of Viewpoint 11 in Table 9-9 is incorrect and should be as follows:<br>Viewpoint 11 – View from Blue Spring Road, Bungaba |

| Chapter/Appendix reference | Error/discrepancy | Clarification |
|---|---|---|
| Chapter 9 (Landscape character and visual amenity), Table 9-11 | Correction | The night time landscape character impact ratings during operation for the following landscape character zones are incorrect in Table 9-11 and should be as follows:<br>FH-01: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Low-moderate'<br>FH-03: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Moderate'.<br>FH-04: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Moderate'.<br>URH-01: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Low-moderate'.<br>URH-02: The impact rating of 'Low' under magnitude of change should be 'High'. The impact rating of 'Low-moderate' under landscape character impact should be 'Moderate-high'.<br>URH-03: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Low-moderate'.<br>URH-04: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Low-moderate'.<br>URH-04: The impact rating of 'Negligible' under magnitude of change should be 'Low'. The impact rating of 'Negligible' under landscape character impact should be 'Low-moderate'.<br>URH-04: The impact rating of 'Low' under magnitude of change should be 'High'. The impact rating of 'Low-moderate' under landscape character impact should be 'Moderate-high'. |
| Chapter 9 (Landscape character and visual amenity), Table 9-13 | Correction | The sensitive receiver at 145 Spir Road, Tallawang (ID 717) was identified in Table 9-13 as not being a project host. This is incorrect and should state that this receiver is a project host. |
| Chapter 15 (Noise and vibration), Section 15.3.1 | Clarification | Text in this section states that one residential receiver is an approved development application for a house that does not currently exist. The text further states that there is also a newly constructed dwelling at 121 Cliffdale Road, Uarbry in proximity to the construction area.<br>These two statements referred to the same location, 121 Cliffdale Road, Uarbry. |
| Chapter 15 (Noise and vibration), Section 15.5.2 | Clarification | Predicted noise exceedances during construction were provided in Appendix B-3 and discussed in Section 5.1.18 of Technical paper 9 – Noise and vibration of the EIS, but not summarised in Section 15,5,2 of the EIS. These exceedances are summarised in Section 5.9.4. |
| Chapter 15 (Noise and vibration), Section 15.5.3 | Correction | In Table 15-20, the predicted exceedances for standard hours in Noise Catchment Area (NCA) 9 state:<br>Exceedances are predicted at up to four residential receivers during multiple construction stages. During the noisiest works (foundations), exceedances are predicted to be:<br>• up to 10 dB at three receivers<br>• greater than 20 dB at one receiver.<br>The text should be updated to:<br>Exceedances are predicted at up to four residential receivers during multiple construction stages. During the noisiest works (foundations multiple construction stages), exceedances are predicted to be:<br>• up to 10 dB at three receivers<br>• up to 20 dB at one receiver. |

| Chapter/Appendix reference | Error/discrepancy | Clarification |
|---|---|---|
| Chapter 15 (Noise and vibration), Section 15.5.4 | Correction | Text in this section states that up to nine structures have been identified within the recommended minimum working distances for potential cosmetic damage. This is incorrect and should state that up to four structures have been identified within the recommended minimum working distances for potential cosmetic damage, as indicated in Table 15-24. |
| Technical paper 4 – Biodiversity Development Assessment Report | Correction | Technical paper 4 of the EIS has not considered a number of existing offset areas committed and established under the State significant infrastructure project approvals for the Ulan, Wilpinjong and Moolarben coal mines that would be impacted by the project.<br>These mine offsets have now been considered in Section 8.6.2 of Appendix G (Updated Biodiversity Development Assessment Report) and includes recommendations for additional offset commitments for the delivery of improved conservation outcomes from the current mine offset commitments. |
| Technical paper 3 – Landscape and visual amenity, Table 6-2 and Table 6-3 | Correction | Receiver 717 was identified in Tables 6-2 and 6-3 as not being a project host. This is incorrect and should state that this receiver is a project host. |
| Technical paper 3 – Visual and landscape character, Section 6.2.3 | Correction | The text in Section 6.2.3 states that at Viewpoint 26 there would be a high magnitude of change to a view of low sensitivity, and a moderate visual impact during construction and operation. This is incorrect and should state that there would be a moderate magnitude of change to a view of low sensitivity, and a low-moderate visual impact during construction and operation. |

### 3.4.4 Potential alternative option for switching station M1

As part of feedback received on the exhibited project, the proponent of the Liverpool Range wind farm has requested a change in location for switching station M1. The location preferred by the wind farm proponent for this switching station is around 400 metres to the southwest of the site identified for the amended project as depicted in Table 3-6.

The alternative location does not currently form part of the amended project, and no assessment of potential environmental impacts has been undertaken. In the event that this option were to be pursued, further environment assessment of potential impacts would be undertaken to confirm the alternative location for switching station M1 is consistent with the project approval.

Table 3-6 Potential alternative option for location of switching station M1

| Description of option | Site of potential alternative option for location of switching station M1 |
|---|---|
| Potential relocation of switching station M1, and realignment of associated 330 kV transmission line |  |

# 4 Statutory context

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

## 4.1 NSW legislation

The project was declared as Critical State significant infrastructure (CSSI) under section 5.13 of the (NSW) EP&A Act and by amendment to Schedule 5 of the NSW State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) with the addition of clause 23. As a CSSI project, the project requires approval from the NSW Minister for Planning and Public Spaces under Division 5.2, Part 5 of the EP&A Act.

An EIS was prepared to support EnergyCo's application for approval of the project in accordance with the requirements of Division 5.2 of the EP&A Act, and with regard to the *State Significant Infrastructure Guidelines – preparing an environmental impact statement: Appendix B to the state significant infrastructure guidelines* (DPE, 2022d). It addressed the requirements of Division 5, Part 8 of the EP&A Regulation, the Secretary's Environmental Assessment Requirements (SEARs) for the project issued on 7 October 2022 and the Supplementary SEARs issued on 28 March 2023.

As described in Section 1.2.1, the EIS was placed on public exhibition for a period of 42 days, commencing 28 September 2023 and concluding on 8 November 2023. 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 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 amendments and refinements to the project (the amended project) and assesses the associated environmental impacts, and has been prepared having regard to the Department of Planning and Environment's *State Significant Infrastructure (SSI) Guidelines: preparing an amendment report* (DPE, 2022c).

## 4.2 Commonwealth legislation

A referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was also submitted on 2 February 2023. The Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW (Cth)) determined the project to be a controlled action on 2 March 2023 and that it would be assessed in accordance with the NSW Assessment Bilateral Agreement under Part 9 of the EPBC Act. As such, the project also requires approval from the Australian Minister for the Environment and Water under the EPBC Act. This Amendment Report would be provided to DCCEEW as part of the package of information to allow them to make their determination regarding the project.

Some of the amendments described in Chapter 3 of this report would introduce new impacts on matters of national environmental significance (MNES) outside of the referral area. In order to capture these additional impacts, an application under section 156A of the EPBC Act will be submitted to the DCCEEW (Cth) requesting a variation to the proposal contained in the original EPBC referral.

The amendments which introduce new and revised impacts to MNES compared to that which was described in the original EPBC referral application generally comprise the following:

- local road upgrades along Merotherie Road between the Golden Highway and the Merotherie Energy Hub (including intersection upgrades (where required), replacement of the existing bridge over the Talbragar River, and upgrading road drainage
- replacement of the existing low weir on Spring Ridge Road, just north of Dapper Road, with a low level bridge or box culvert arrangement), and upgrade of the Spring Ridge Road and Dapper Road intersection.
- potential upgrade of the Ulan Road/Neeleys Lane, and Golden Highway/Ulan Road intersections.

The variation request will include all relevant information prescribed by section 5.08 of the Environment Protection and Biodiversity Conservation Regulations 2000, and identify the new impacts to MNES as a result of the applicable proposed amendments compared to the original proposal described in the EPBC referral.

An overview of the NSW and Commonwealth planning approvals process and current status of the project application within this process is shown in Figure 4-1. Further information about the approval framework for the project is provided in Chapter 4 of the EIS.

## 4.3 Statutory compliance of the amended project

EnergyCo is proposing amendments to the project described in the EIS. This Amendment Report has been prepared in accordance with section 179(3) of the EP&A Regulation.

The proposed amendments do not change the permissibility of the project or its declaration as critical State significant infrastructure. The assessment and approval requirements under the EP&A Act, including pre-conditions and mandatory considerations, are described in sections 4.2 and 4.3 of the EIS.

A summary of the key changes to statutory requirements for the amended project, taking into account the proposed amendments and refinements, is provided in Table 4-1. The detailed updated statutory compliance requirements for the amended project are provided in Appendix D (Updated statutory compliance requirements).

Table 4-1 Summary of key changes to statutory requirements

| Construction compound location | Exhibited project | Amended project |
|---|---|---|
| *Protection of the Environment Operations Act 1997* (POEO Act) | The project is unlikely to meet the requirements of a scheduled activity as defined in Schedule 1 of the POEO Act | The project is likely to exceed the criteria listed in under clause 16, Schedule 1 of the POEO Act (Crushing, grinding or separating), as the project is currently anticipated to process more than 30,000 tonnes of materials per year.<br>The final quantities for crushing and screening would be subject to detailed construction planning. However, based on preliminary quantities, the crushing and screening works would constitute a scheduled activity and require an Environment Protection Licence. |

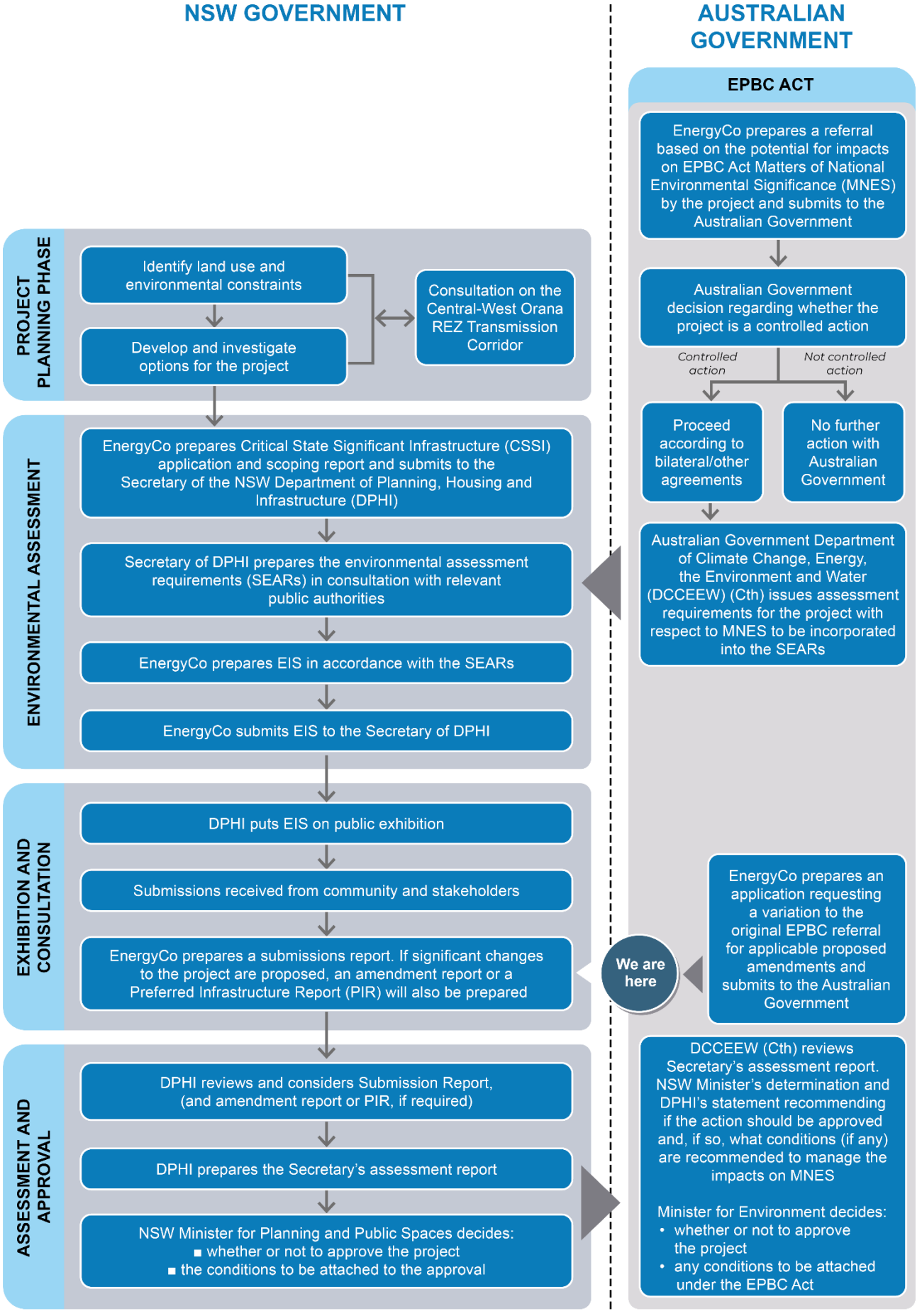



Figure 4-1 Assessment and approval process for the amended project

# 5 Assessment of impacts

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

## 5.1 Assessment approach

The EIS provides an assessment of the potential impacts of the original (exhibited) project in accordance with the SEARs.

An environmental screening assessment was carried out to determine whether the amended project could change the potential impacts in the EIS.

Table 5-1 identifies whether additional environmental assessment of the proposed amendments would be required or if the assessment in the EIS remains applicable. Where the requirement for further assessment has been identified, this has been provided with any new and/or updated environmental mitigation measures in Sections 5.2 to 5.15.

For assessment matters where the EIS remains applicable, no further assessment has been carried out in this amendment report and potential impacts would be managed in accordance with the relevant mitigation measures included in Appendix E (Updated mitigation measures) of this report.

Table 5-1 Screening assessment for proposed amendments

| Assessment matter | Comparison of amended project against the EIS | Further assessment required |
|---|---|---|
| Land use and property | The amendments and refinements to the construction area and operation area, 500 kV and 330 kV infrastructure, access tracks, microwave repeater sites, brake and winch sites and local road and intersection upgrades would involve changes to property access and temporary and permanent land requirements as assessed in the EIS. As a result, there would be changes to potential impacts on land use and property. | Yes – see Section 5.2 |
| Agriculture | The amendments and refinements to the construction area and operation area would involve changes to agricultural operations and the use of agricultural land as assessed in the EIS. | Yes – see Section 5.3 |
| Landscape character and visual amenity | The amendments to the construction area in which construction activities and vegetation removal occur would involve changes to landscape character and visual amenity impacts during construction as assessed in the EIS. The amendments and refinements to the 500 kV and 330 kV infrastructure, access tracks and microwave repeater sites would also involve changes to landscape character and visual amenity as assessed in the EIS. | Yes – see Section 5.4 |
| Biodiversity | The amendments and refinements to the construction area, 500 kV and 330 kV infrastructure, access tracks, brake and winch sites and microwave repeater sites would involve changes to direct and indirect impacts on native vegetation, threatened fauna and flora and aquatic ecology as assessed in the EIS. | Yes – see Section 5.5 |
| Aboriginal heritage | The amendments and refinements to the construction area would involve changes to potential impacts on Aboriginal heritage as assessed in the EIS. | Yes – see Section 5.6 |
| Non-Aboriginal heritage | The amendments and refinements to the construction area would involve changes to potential impacts on Non-Aboriginal heritage as assessed in the EIS. | Yes – see Section 5.6.3 |

| Assessment matter | Comparison of amended project against the EIS | Further assessment required |
|---|---|---|
| Social | The amendments and refinements would not involve changes to social impacts such as way of life, livelihood, community, accessibility, health and wellbeing, culture, surroundings and decision making systems as assessed in the EIS. | No |
| Economic | The amendments and refinements to the construction and operation area would involve changes to loss of agricultural land as assessed by the economic impact assessment undertaken as part of the EIS. As a result, there would be changes to potential economic impacts of the project. | Yes – see Section 5.8 |
| Noise and vibration | The amendments and refinements of the construction area and operation area, 500 kV and 330 kV infrastructure, access roads and access tracks, brake and winch sites, local road and intersection upgrades, the provision of a of a construction compound at the Neeleys Lane workforce accommodation camp and the provision of a crushing, grinding and screening site, would involve changes to noise and vibration as assessed in the EIS. | Yes – see Section 5.9 |
| Hazard and risk | The provision of a construction compound at the Neeleys Lane workforce accommodation camp, changes to the 500 kV and 330 kV transmission line alignments, the removal of the option to include a BESS at the Merotherie Energy Hub and the provision of additional microwave repeater infrastructure would involve changes to hazards and risks as assessed in the EIS. | Yes – see Section 5.10 |
| Traffic and transport | The provision of a construction compound at the Neeleys Lane workforce accommodation camp would involve changes to construction traffic volumes and distribution as assessed in the EIS. | Yes – see Section 5.11 |
| Waste management | The amendments and refinements would not involve changes to the construction methodology or operation of the project such that there would be a change to waste management as assessed in the EIS. | No |
| Hydrology, flooding and water quality | The amendments and refinements to the local road and intersection upgrades would involve changes to hydrology and flooding as assessed in the EIS. | Yes (hydrology and flooding only) – see Section 5.12 |
| Soils and contamination | The amendments and refinements to the 500 kV and 330 kV infrastructure and access tracks in mining areas would involve changes to potential contamination risks as assessed in the EIS.<br>There would be no changes to the construction methodology or operation of the project due to the amendments such that there would be a change to the soil environment as assessed in the EIS. | Yes (contamination only) – see Section 5.13 |
| Groundwater | The amendments and refinements would not involve changes to the construction methodology or operation of the project such that there would be a change to groundwater quality, recharge and flow or availability as assessed in the EIS. | No |
| Air quality | The amendments and refinements to the construction area in which construction activities would occur, and the provision of a construction compound at the Neeleys Lane workforce accommodation camp and crushing, grinding and screening site, would involve changes to air quality as assessed in the EIS. | Yes – see Section 5.14 |
| Climate change and greenhouse gas | The amendments and refinements would not involve changes to the construction methodology or operation of the project such that there would be a change to climate change and greenhouse gas impacts as assessed in the EIS. | No |
| Cumulative impacts | The amendments and refinements involve changes to land use, property and agriculture, landscape character and visual amenity, biodiversity, Aboriginal, social, economic, noise and vibration, traffic and transport, surface water and groundwater supply and air quality impacts of the project as assessed in the EIS.<br>Since the exhibition of the EIS, the planning status, environmental assessment documentation and/or estimated construction and operation timeframes of relevant future projects identified in the cumulative impact assessment have been updated as these projects progress through the planning system.<br>As a result, there would be changes to potential cumulative impacts of the project in combination with other relevant future projects, as identified in the EIS. | Yes – see Section 5.15 |

## 5.2 Land use and property

Chapter 7 (Land use and property) of the EIS assessed the potential impacts of the construction and operation of the project on land use and property. Additional assessment has been undertaken to identify changes to potential land use and property impacts associated with the amended project. The findings of the additional assessment are reported in this section.

### 5.2.1 Assessment approach

The methodology for the assessment for the assessment of land use and property impacts as detailed in Section 7.2 of the EIS was applied to the assessment of the proposed amendments and refinements of the project. Existing environment

The amendments and refinements would not result in any changes to the existing environment as it relates to land use and property, as described in Section 7.3 of the EIS.

### 5.2.2 Assessment of potential impacts

#### Construction

##### Land use changes

The assessment of the impacts of the construction of the project on land use changes is detailed in Section 7.4.1 of the EIS, which identified the requirement for the use of land temporarily for construction, and then permanently for operation. The construction area of the project as detailed in the EIS included all land required to support the construction of the project, which included:

- energy hubs and the New Wollar switching station
- 330 kV switching stations
- transmission line towers
- brake and winch sites
- communication infrastructure
- workforce accommodation camps
- construction compounds
- access roads
- access tracks
- other ancillary facilities.

The amendments and refinements would result in an overall increase in the size of the construction area of around 70 hectares, from around 3,980 hectares to around 4,050 hectares (refer to Table 5-2). As such the degree of changes to land use includes:

- an increase of around 95 hectares of the assumed impact to agricultural land use, increasing from around 3,660 (or 92 per cent of the construction area) to 3,755 hectares (or 93 per cent of the construction area). This increase is mainly attributed to the provision of an additional 330 kV switching station and associated transmission line to connect to the Orana wind farm, to respond to feedback from the wind farm developer, and changes in the alignment of transmission line infrastructure to respond to landowner feedback (refer to Section 3.2.1).

Impacts on agricultural land uses for the amended project include (updated total impact):

  - 1,735 hectares of Agriculture – grazing modified pasture
  - 1,225 hectares of Agriculture – grazing native pasture
  - 795 hectares of Agriculture – cropping

- an increase of around 85 hectares in the biodiversity offset and rehabilitation areas related to mining sites within the construction area from around 98 hectares to 183 hectares of the construction area. This increase included a rehabilitation area and regeneration area associated with Wilpinjong Coal mine that were not accounted for in the EIS but have been considered in this report. The clearing within these offset and rehabilitation and regeneration areas would be limited to the permeant transmission line easement (140 metre width) which is consistent with the clearing extent assessed in the EIS. Offsets for these areas would be based on the extent of clearing. The extent of biodiversity offset and rehabilitation areas within the amended construction area has changed including:
  - the enhancement and conservation areas associated with Wilpinjong Coal Mine have increased from 51.7 hectares to 138.2 hectares
  - the biodiversity offset areas associated with Moolarben Coal Mine have reduced from 41.3 hectares to 37.9 hectares due to the construction area being narrower for the amended project
  - no change to the extent of biodiversity offset area associated with Ulan Coal Mine
- no changes to the assessed impacts on nature conservation (protected areas)
- changes to the construction area within land subject to mining leases in the Moolarben coal mine, to minimise impact on mining operations
- a minor alignment change to avoid potential impacts associated with the Mudgee Mine Subsidence District
- no changes to the assessed impacts on mineral exploration, aviation, electrical infrastructure, other utilities, travelling stock routes or Crown Land (including Aboriginal land claims) or future land use.

Table 5-2 Updated land use within the construction area

| Land use | Total area (Exhibited project) (ha) | Total area (Amended project) (ha) | Proportion of construction area (Amended project) (%) |
|---|---|---|---|
| Agriculture – grazing modified pasture | 1,660 | 1735 | 42.9 |
| Agriculture – grazing native vegetation | 1,225 | 1225 | 30.3 |
| Agriculture – cropping | 775 | 795 | 19.7 |
| Other minimal use[1] | 195 | 180 | 4.4 |
| Mining | 55 | 45 | 1.1 |
| 'Other' land uses[2] | 30 | 35 | <1 |
| Nature conservation (protected areas) | 15 | 15 | <1 |
| Residential and farm infrastructure | 15 | 10 | <1 |
| River | 10 | 10 | <1 |
| **TOTAL** | **3,980** | **4,050** | |

1. Other minimal use refers to areas of land that are largely unused (in the context of the main use) but may have ancillary uses, for example it may be a deliberate decision by the land manager or the result of other circumstances, such as terrain features which make use difficult or prohibitive. It may include defence lands/natural areas, stock routes, residual native cover or land under rehabilitation or restoration (DPE, 2023).
2. In this case, 'Other' land uses include managed resource protection, production of native forests, utilities, transport and communication and reservoirs and dams, which are present land uses in the construction area, however consist of smaller areas.

### Property

The assessment of property impacts from construction is detailed in Section 7.4.2 of the EIS. The amendments and refinement would not result in any substantial changes to the assessed impacts, including the requirement for land acquisition/leasing land, impacts to property access or native title, however there would be some minimisation of property impacts for a number of landowners, due to:

- realignment of discrete sections of the 330 kV and 500 kV transmission line easements
- reductions or increases in the length of 330 kV transmission line easements as a result of the relocation of select switching stations.

## Operation

### Land use changes

The assessment of impacts on land use changes during operation is detailed in Section 7.5.1 of the EIS. The assessment identified the permanent change in the operation area from the existing land use to electrical infrastructure, where energy hubs, switching stations and transmission line towers are located.

The amendments and refinements would not substantially change the amount of land required for the operation of the project, with the total operational area remaining at around 2,665 hectares (subject to ongoing refinement and finalisation as part of continued design development). It is noted, as per the EIS, much of existing land use activities (grazing and cropping) would be able to continue in areas of land under transmission lines, subject to easement conditions.

This amendments and refinements would not result in any changes to the assessed impacts on agricultural land, and no changes to the assessed impact on mapped nature conservation areas (protected areas) and state forests, mining operation and mineral exploration, aviation, stock reserves and crown lands (including TSRs), transport infrastructure, and future land uses.

### Property

The assessment of property impacts from the operation of the project is detailed in Section 7.5.2 of the EIS. The amendments and refinement would not result in any substantial changes to the assessed impacts, including the requirement for freehold land acquisition, the establishment of easements, impact to property access or native title. No additional assessment of operational impacts to property are required.

## 5.2.3 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential impacts on land use and property are listed in Table 5-3. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

Table 5-3 Updated mitigation measures – land use and property

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| LP1 | Land use | The design will continue to be refined to minimise potential impacts on existing land uses and properties as far as practicable. | Detailed design | All locations |
| LP2 | Land requirements | Prior to the commencement of construction, land for the energy hubs will be acquired in consultation with landowners and in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). | Detailed design | Energy hubs |
| LP3 | Impacts to land use | Pre-condition assessments of the construction area will be undertaken to determine the existing condition of assets, infrastructure, utilities and the general condition of the land. This will inform requirements for rehabilitation within Property Management Plans established with landowners. | Pre-construction and construction | Construction area – transmission lines |
| LP4 | Impacts to utilities and services | The location of all services and utilities within the construction area will be confirmed during detailed design, and any required protection or relocation will be designed in consultation with utility providers. | Detailed design | All locations |
| LP5 | Indirect impacts on State forests | EnergyCo will consult with Forestry Corporation of NSW and any relevant stakeholders with regards to access limitations. | Pre-construction | Locations where the project intersects State Forests |
| LP6 | Impacts to travelling stock reserves (TSRs) | Local Land Services will continue to be consulted during detailed design to confirm how impacts on travelling stock reserves will be managed during construction and operation. Alternative access arrangements will be made as required. | Detailed design | Barneys Reef TSR |
| LP7 | Impacts to mine operations | To minimise disruption to mining activities, mine operators will be consulted on construction methodologies and activities as part of continued design development and prior to and during construction activities. This will include consultation relating to:<br>• any adjustments to existing mining-related infrastructure (fences, tracks, mine roads, access tracks etc)<br>• the timing and location of construction works, especially where there are some restrictions on vehicle or construction equipment movements<br>• the timing and location of construction works which have the potential to impact mine operations, such as the stringing of transmission lines over existing mine infrastructure or active mining areas. | Pre-construction and construction | Mining areas |
| LP8 | Impacts to existing biodiversity offset sites | EnergyCo will, in consultation with applicable regulatory authorities, Glencore, YanCoal and Peabody, identify and secure biodiversity offsets for impacts to existing biodiversity offset sites (associated with the Wilpinjong, Moolarben and Ulan coal mines approvals). | Pre-construction and construction | Existing biodiversity offset areas |
| LP9 | Land disturbance | **Areas disturbed by construction** ~~Disturbed areas~~ will be stabilised and appropriately rehabilitated ~~back to pre-construction condition where practical, or as agreed~~ in consultation with the relevant landowner and ~~documented~~ as per any relevant requirements in Property Management Plans. | Construction | Construction area |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| LP10 | Land requirements | The ~~permanent~~ acquisition of land for the switching stations will be carried out by EnergyCo in consultation with landowners and in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). | Detailed design | Switching stations |
| LP11 | Land requirements | Easements will be established for transmission lines by EnergyCo in consultation with landowners and in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) and *Crown Lands Management Act 2016* (NSW) (as relevant) at the completion of construction. | Detailed design | Transmission lines |

## 5.3 Agriculture

Technical paper 2 – Agriculture (Technical paper 2) of the EIS assessed the potential impacts of the construction and operation of the project on Agriculture. The key findings of the assessment were summarised in Chapter 8 (Agriculture) of the EIS.

Additional assessment has been undertaken to identify changes to potential impacts on agriculture associated with the amended project. The findings of the additional assessment are reported in this section.

### 5.3.1 Assessment approach

The methodology for the assessment of agriculture impacts as detailed in Chapter 8 of Technical paper 2 and summarised in Section 8.2 of the EIS.

A desktop assessment was carried out to assess the amendments and refinements. Given the nature of the potential impacts of the amended project, no additional specialist assessment was undertaken with the results of the previous assessment being considered consistent with the amendments and refinements.

### 5.3.2 Existing environment

The amendments and refinements would not result in any changes to the existing environment, which is consistent with Section 8.3 of the EIS.

### 5.3.3 Assessment of potential impacts

#### Construction

The assessment of construction impacts on agriculture is detailed in Section 8.3.1 of the EIS. As discussed, the project would require the use of land (including land currently used for agricultural purposes) both temporarily for construction, and then permanently for operation in areas where permanent infrastructure is proposed, with the level of impact on agricultural activities varying depending on the scale and intensity of construction activities.

### Loss of agricultural land

The amendments and refinements would result in an overall increase in the size of the construction area in land currently used for agricultural purposes from the assessed 3,660 hectares to around 3,755 hectares, an increase of around 95 hectares. This increase would result from amendments to the transmission line alignment to minimise potential visual impacts on nearby residential dwellings, to respond to feedback received from impacted landowners

Consistent with the EIS assessment, for the purpose of estimating total impacts, it has been conservatively assumed the entire construction area (including the transmission line easement) (3,755 hectares used for agriculture) would be unavailable for agricultural activities during the three year construction period. It is noted however that construction activities associated with the transmission line, including transmission tower erection, transmission line stringing and vehicle and machinery movements along access tracks, would be intermittent and would not occur for the full duration at any one location. Agricultural activities would continue to take place in areas not under construction or in rehabilitated areas, in accordance with property management plans. The revised assessment of the amendment and refinements indicates a small decrease in the assessed loss of agricultural productivity (around 2.3 per cent) in the assessed loss of agricultural productivity, with a total productivity loss of around $3.95 million (decreased from around $4.04 million for the exhibited project) or $1.32 million per year (decreased from around $1.35 million per year for the exhibited project). This loss is equivalent to around 0.2 per cent of the total gross value of agricultural production across the four impacted local government areas (LGAs) over the same impact period. The assessed reduction in impacts to agricultural productivity is due to a more detailed assessment of impacts to agricultural land use, using land use mapping, and a more detailed consideration of cropping and grazing lands within the construction area.

Table 5-4 provides a breakdown of construction impacts to agricultural productivity by LGA. As assessed in the EIS, it is noted however, this is an overestimation as construction activities associated with the transmission line, including transmission tower erection, transmission line stringing and vehicle and machinery movements along access tracks, would be intermittent and would not occur for the full duration at any one location. The length of disruption at other structures such as energy hubs and switching stations is expected to be longer (and in some cases permanent).

Table 5-4 Impacts on agricultural productivity during construction

| Local Government Area | Total area of agricultural land within the construction area (hectares) | Loss of agricultural productivity ($ per annum) |
|---|---|---|
| Upper Hunter Shire Council | 245 | $80,045 |
| Warrumbungle Shire Council | 840 | $295,270 |
| Mid-Western Regional Council | 2,650 | $930,470 |
| Dubbo Regional Council | 20 | $10,740 |
| **Total** | **3,755** | **$1,316,525** |

### Important agricultural land

The amendments and refinements would result in a minor increase in the area of Biophysical Strategic Agricultural Land (BSAL) within the construction area, increasing the assessed 150 hectares, to around 170 hectares. This increase would result from amendments to the transmission line infrastructure to minimise potential visual impacts on nearby residential dwellings, to respond to feedback received from impacted landowners (refer to Section 3.2.1). This increase is likely to be consistent for areas of draft State Strategic Agricultural Land (SSAL), however no area data exists for SSAL to determine detailed impacts.

Construction of the project would directly impact around 50 hectares of BSAL, consisting of around 10 hectares for access tracks, up to four hectares for the construction of switching station M7, and around 34 hectares for the construction of transmission line towers and brake and winch sites. The remaining 120 hectares of BSAL within the construction area is located within the transmission line

easements, where continued use of these area may occur subject to the timing and location of planned construction activities.

### Agricultural operations

The amendments and refinements would not result in any general material changes to the assessed impacts on agricultural operations, which included restriction on the movement of landowners, agricultural workers, livestock, or equipment within and across the construction area. This applies on-ground and aerial operations, livestock enterprises, as well as impacts to Travelling stock reserves and livestock routes. It is noted, some of the amendments and refinements would result in a minimisation of potential impacts on some impacted properties.

### Biosecurity

The amendments and refinements would not result any changes to the assessed biosecurity impacts during construction.

## Operation

### Loss of agricultural land

Where permanent infrastructure would be established (e.g., transmission line towers, energy hubs, switching stations and permanent access tracks), the project would result in a permanent change from the existing agricultural land use to electrical infrastructure. For areas within permanent easements, agricultural activities would continue with some activities restricted in accordance with easement conditions.

The amendments and refinements would not change the amount of agricultural land located within the operation area (2,440 hectares), however would result in a small reduction in the area of direct impacts, which has been reduced by 30 hectares (or 3.6 percent) to around 795 hectares.

This includes around:

- 300 hectares for energy hubs and the New Wollar Switching Station
- 190 hectares for access tracks
- 250 hectares for transmission line towers including the required buffer surrounding the tower
- 45 hectares for 330 kV switching stations
- 10 hectares for access roads (to/from switching stations and energy hubs).

The amendments and refinements would result in an estimated reduction in agricultural productivity loss from around $317,550 per year (for the exhibited project) to around $285,900 per year (for the amended project). This represents around 0.04 per cent of the total annual gross value of agricultural production across the four impacted LGAs.

Table 5-5 provides a breakdown of operation impacts to agricultural productivity by LGA.

Table 5-5 Impacts on agricultural productivity during operation

| Local Government Area | Total area of agricultural land within the construction area (hectares) | Loss of agricultural productivity ($ per annum) |
|---|---|---|
| Upper Hunter Shire Council | 55 | $16,800 |
| Warrumbungle Shire Council | 200 | $69,210 |
| Mid-Western Regional Council | 530 | $195,850 |
| Dubbo Regional Council | 10 | $4,040 |
| **Total** | **795** | **$285,900** |

### Important agricultural land

With respect to important agricultural land (BSAL and draft SSAL), the amendments and refinements would not result in change in the overall impacts assessed in the EIS.

### Agricultural productions

The amendments and refinements would not result in any general material changes to the assessed impacts on agricultural operations, which included restriction on the movement of landowners, agricultural workers, livestock, or equipment within and across the construction area. This applies on-ground and aerial operations, livestock enterprises, as well as impacts to TSRs and livestock routes. It is noted, some of the amendments and refinements would result in a minimisation of potential impacts on some impacted properties.

### Biosecurity

The amendments and refinements would not result any changes to the assessed biosecurity impacts during operation.

## 5.3.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential impacts on agriculture are listed in Table 5-6. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

Table 5-6 Updated mitigation measures – agriculture

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AG1 | Access impacts – construction | The location of any additional access tracks (temporary and permanent) will be confirmed in consultation with ~~landowners~~ landholders to minimise impacts on agricultural activities. Where permanent tracks are required, a single access track will be designed to serve both temporary and permanent purposes, where practicable. | Detailed design and construction | All locations |
| AG2 | Impact of structures | Where the positioning of transmission line structures and other associated permanent structures will impact:<br>• cropping land<br>• areas used for set up and pack up of agricultural equipment, entry points and turning areas<br>• farm dams, or<br>• locations of high biosecurity risk.<br>Consultation will be undertaken with the affected landowner to identify opportunities to avoid or minimise these impacts, where practicable, prior to the commencement of relevant works which will impact the applicable area, equipment and/or property infrastructure. | Detailed design and construction | All locations |
| AG3 | Disruption Impacts – Property Management Plans | Individual Property Management Plans will be developed in consultation with each landowner directly affected by construction activities. The intent of the plans is to provide a flexible approach which balances the needs of existing agricultural operations and construction activities. | Detailed design, pre-construction and construction | All relevant properties within the construction area |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| | | The plans will address relevant matters including:<br>• pre- and post-condition surveys<br>• access arrangements and protocols<br>• proposed timing and location of construction works, particularly where some restriction on vehicular, equipment, grazing or livestock movements will be necessary<br>• grazing and cropping activities on and adjacent to the construction area during the construction period<br>• farm infrastructure arrangements<br>• any required adjustments to property infrastructure (fences, access tracks, etc)<br>• noise intensive activities during sensitive periods of the livestock production cycle (e.g. lambing/calving)<br>• vehicle movements and other activities within the vicinity of livestock<br>• movement of stock away from potential stressors created by construction activities<br>• details of any access tracks or other infrastructure provided for temporary construction activities that are to be retained and not restored to the pre-existing condition (where requested by the landholder prior to the completion of construction within the applicable area)<br>• biosecurity requirements.<br>• contact details for the person who will liaise with landowner to provide direct avenues of enquiry for information and issues management.<br>Property Management Plans will be developed prior to the commencement of relevant works which will impact the applicable property, activity, equipment and/or property infrastructure. The requirements of the plans will be adhered to/implemented throughout the construction period. | | |
| AG4 | Disruption Impacts – General | To minimise disruption to agricultural activities:<br>• property infrastructure (such as gates) will be managed in accordance with landowner requirements<br>• any damage to property infrastructure caused by construction will be repaired in a timely manner in consultation with the landowner<br>• use of existing roads, tracks and other existing disturbed areas will be prioritised over the construction of new access tracks where practicable<br>• where access is required across open spaces, either within the easement or to the easement, care will be exercised to ensure that surface disturbance is minimised by confining vehicular and plant movements, as far as possible, to a single route. | Detailed design and construction | All relevant properties within the construction area |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AG5 | Biosecurity – construction | Biosecurity controls will be implemented during construction to minimise the risk of transport or spread of disease, pests or weeds. A Biosecurity Management Plan will be developed addressing the following protocols/matters including:<br>• **review of the latest publicly available weed data including relevant Regional Strategic Weed Management Plans**<br>• **consideration of information on weeds identified in biodiversity studies undertaken for the project**<br>• weed management controls, including inspection and cleaning of plant and equipment, and management of earthworks and clearing activities<br>• development of specific controls where high biosecurity risks are identified. For example appropriate measures will be implemented with respect to foot and mouth disease to control any risk of introduction of the pathogen as a result of project activities<br>• ~~the specific controls applicable to a property will be consistent with property biosecurity plans where they are in place. Agreed protocols will be documented in the Biosecurity Management Plan~~<br>• a monitoring program to track the effectiveness of the controls identified in the Biosecurity Management Plan<br>• consultation with the owners of organic certified properties will be carried out to identify the specific risks and controls required to be implemented<br>• **notification of relevant councils of new infestations of priority weeds listed in the relevant Regional Strategic Weed Management Plans if identified.**<br>**The specific controls applicable to a property will be consistent with approved Property Biosecurity Plans ~~biosecurity plans~~ where they are in place. Property-specific protocols will be documented in the relevant Property Management Plans.**<br>The Biosecurity Management Plan will be prepared in consultation with relevant local council biosecurity officers in relation to the distribution of important weeds and the location of high biosecurity risk areas. | Construction | All locations |
| AG6 | New weed infestations | In the event of new infestations of State priority weeds as a result of construction activities, the relevant control authority will be notified in accordance with the requirements of the *Biosecurity Act 2015* and Biosecurity Regulation 2017. | Construction | All locations |
| AG7 | Access impacts – operation | Fencing and access arrangements, such as locked gates and requirements for opening and closing of gates, will be determined in consultation with landowners. Any damage caused by maintenance activities will be repaired promptly. | Operation | Transmission line |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AG8 | GPS impacts | In the event that nuisance impacts on agricultural precision farming GPS signals arises due to operation of the project, the cause of any such interference will be investigated. Any disruption due to operation of the project will be addressed in consultation with the affected landowner and may include measures such as signal boosting equipment or antenna enhancements (where applicable). | Operation | Transmission line |
| AG9 | Biosecurity – Operation | ~~Biosecurity controls set out in~~ **The Biosecurity Management Plan will be updated for the operational phase and** implemented during operation to minimise the risk of transport or spread of disease, pests or weeds during **operation and** maintenance activities. | Operation | All locations |
| AG10 | Weed management | Where present within the transmission line easement and associated areas for permanent infrastructure, weeds will be managed in accordance with the *Biosecurity Act 2015*. | Operation | All locations |

## 5.4 Landscape character and visual amenity

Technical paper 3 – Visual and landscape character (Technical paper 3) of the EIS assessed the potential landscape character and visual amenity impacts of the project. The key findings of the assessment were summarised in Chapter 9 (Landscape character and visual amenity) of the EIS.

Additional assessment has been undertaken to identify potential changes to landscape character and visual amenity impacts associated with the amended project. The relevant assessment completed to support the Amendment Report is provided in Appendix F (Landscape Character and Visual Impact Assessment Addendum). The findings of this assessment are summarised in this section.

### 5.4.1 Assessment approach

The methodology for the assessment of landscape character and visual amenity impacts as detailed in Technical paper 3 was applied to the assessment of the amended project. The assessment included:

- a review of changes to the statutory context relevant to the revised study area
- revised assessment of the potential impacts to landscape character during the day and at night
- revised assessment of the potential impacts to views from the public domain, private dwellings and from the air
- consideration of the need for changes to and/or additional mitigation measures.

#### Landscape character assessment

The landscape character assessment was carried out using the landscape character types (and zones) identified in Section 5.1 of Technical paper 3 of the EIS. Where the location of the project has changed, the landscape character types (and zones) identified in the have EIS been modified and/or new landscape character types (and zones) have been identified.

### Visual amenity impact assessment

The assessment of visual amenity impacts was undertaken as described in Section 3.5 of Technical paper 3 of the EIS and included:

- a revised visibility analysis, to identify changes to the area from which the amended project is potentially visible
- a revised assessment of visual impacts from the public domain. Where the project has changed, representative viewpoints from the public domain assessed in the EIS have been reassessed. New representative views from the public domain have not been added, due to the minor changes in location of the amended project
- a revised assessment of visual impacts from private dwellings. Where necessary, additional views resulting from the amendments or refinements, or the identification of new or reclassified dwellings, have been assessed to identify the potential visual impacts of the amended project. One additional dwelling (ID 1478) has been included in the detailed visual assessment, as this property was identified as a newly constructed dwelling since the exhibition of the EIS.

To support the assessment of visual impacts, photomontages and 3D modelling have been revised at some viewpoints where a material change to the view was expected. These illustrate impacts at locations where the project would be seen from locations of higher visual sensitivity and also to show a typical view within some of the landscape character types.

## 5.4.2 Existing environment

### Landscape character types and daytime landscape sensitivity

Four broad landscape character types and 16 sub-character zones were identified in the EIS. The location of these landscape character types and zones have been adjusted to reflect the amended project (refer to Appendix C of Appendix F (Landscape Character and Visual Impact Assessment Addendum).

The description of these landscape character types and zones is consistent with the EIS, apart from minor changes to the boundaries of the following landscape character zone (LCZs) in response to the amended project design:

- Spring Ridge and Tuckland forested hills LCZ (FH-05)
- Birriwa to Tallawang undulating rural hills LCZ (URH-02).

An additional landscape character zone has been identified in the Undulating rural hills landscape character type, to take into account the Botobolar microwave repeater site:

- Botobolar undulating rural hills LCZ (URH-8).

The Botobolar undulating rural hills LCZ is located within the Botobolar Valley, north east of Mudgee. The landform is undulating, rising to small hills such as Red Hill and Box Hill. The landform rises to the north, east and south of this LCZ to elevated and highly undulating forested hills. It is a settled landscape, with rural residences scattered sparsely across the foothills and flatter areas along Botobolar Road, Upper Road and Bara Road. There are some existing power line easements crossing this landscape, including 66 kV transmission lines following Botobolar Road and an existing small telecommunications tower at Red Hill.

Botobolar undulating rural hills LCZ (URH-8) was assessed as having low sensitivity.

## Visual catchment

The visibility of the amended project is determined by the landform, and screening effect of existing building and vegetation cover. Consistent with the visual catchment of the EIS, there would be greater potential visibility of the amended project in areas where the landform is flatter and there is less vegetation. The potential visibility of the amended project is discussed in Section 6.2.1 of Appendix F (Landscape Character and Visual Impact Assessment Addendum).

## Public viewpoints

There are no additional public viewpoints required to confirm the visual impacts of the amended project.

Seven of the 26 viewpoints identified in the EIS were identified as being relevant to the amendments and refinements:

- Viewpoint 1: View southwest from Barigan Road
- Viewpoint 12: View from Blue Springs Road north, Uarbry
- Viewpoint 15: View north from Ulan Road, Cassilis
- Viewpoint 20: View west from Tucklan Road
- Viewpoint 22: Views from Spring Ridge Road
- Viewpoint 24: Views from Dapper Road east
- Viewpoint 26: View northwest from Dapper Road west.

The visual sensitivity of these viewpoints remains unchanged from the EIS. A description and images of these viewpoints are provided in Section 6.2.3 of Appendix F (Landscape Character and Visual Impact Assessment Addendum), and the location of these viewpoints are shown in Appendix E of Appendix F (Landscape Character and Visual Impact Assessment Addendum).

The visual sensitivity of the viewpoint from the air (to represent recreational flights operating from Dubbo Airport and Mudgee Airports) remains unchanged from the EIS.

## Private views

Since exhibition of the EIS, further review of detailed aerial imagery and searches of local council development application registers have been undertaken to confirm if any there are any unidentified dwellings or newly approved development applications for dwellings in the landscape character and visual amenity assessment study area that need to be included in the assessment, or structures/dwellings that need to be reclassified and reconsidered in the assessment. This has resulted in the identification of additional and reclassified dwellings that have been considered in this assessment.

### 5.4.3 Assessment of potential impacts

## Construction

#### Landscape character impacts

The daytime and night time landscape character impacts for the Terraban Gap forested hills landscape character zone (FH-3) would reduce as follows, due to the relocation of switching station M3 and its associated transmission line:

- the daytime impact rating would reduce from moderate to negligible
- the night time impact rating would reduce from moderate-high to negligible.

The daytime and night time landscape character impacts for the new Botobolar undulating rural hills LCZ (URH-7) would be as follows:

- the daytime impact rating would be low-moderate (with a moderate magnitude of change)
- the night time impact rating would be negligible (with a negligible magnitude of change).

The impact ratings for the remaining landscape character zones would remain unchanged from the EIS.

#### Visual amenity impacts

##### Visual amenity impacts – public viewpoints

The visual impact at two public viewpoints would reduce due to the relocation of the transmission line (Goolma connection) further away from Dapper Road as part of the amended project:

- the visual impact on Viewpoint 24 (view from Dapper Road east) would reduce from moderate to low-moderate
- the visual impact on Viewpoint 26 (view northwest from Dapper Road west) would reduce from low-moderate to low (refer to correction in Section 3.4.3).

The visual impact levels for the remaining public viewpoints and the viewpoint from the air would remain unchanged from the Chapter 9 (Landscape character and visual amenity) and Section 6.2 of Technical paper 3 of the EIS.

##### Visual amenity impacts – private dwellings during daytime

The following changes to the potential daytime visual impacts have been identified for the amended project during construction:

- the extent of construction activity at the Elong Elong Energy Hub would result in an increase in views of the project from two dwellings (sensitive receiver ID 611 and ID 719) compared to what was assessed in the EIS, due to changes in the alignment of the transmission lines, the provision of additional towers to the north and south of the energy hub, and vegetation clearing along Dapper Road
- one dwelling (ID 1103) that would have a view of the Neeleys Lane workforce accommodation camp as described in the EIS, would also have filtered views of the construction compound at the workforce accommodation camp site through trees, including site preparation works, the installation of temporary infrastructure, and the operation of the compound during construction
- additional visual impacts due to the identification of two new/reclassified receivers (ID 1139 and ID 1142) for the amended project (refer to Section 3.4.3). Dwelling 1139, located around 400 metres from the construction area, may have filtered views to the Neeleys Lane workforce accommodation camp and construction compound through trees where the landform does not intervene. Dwelling 1142 would have less visibility of the Neeleys Lane workforce accommodation camp and construction compound, as it is located over a kilometre from the site and is separated from the site by vegetation and Ulan Road

- additional visual impacts associated with the Botobolar microwave repeater site. This would include the potential for views of the construction works at the site from four dwellings (ID 1487, ID 1488, ID 1489 and ID 1490), located between 500 metres and a kilometre from the site
- increased impacts at two dwellings (ID 792 and 772), due to the relocation of switching station M7 and its associated 330 kV transmission line of the Tallawang west connection to connect to the Orana wind farm.

The microwave repeater site in Cope would be located around a kilometre from nearby dwellings and would be visible together with the exhibited project. Construction works at the microwave repeater site would be generally consistent with the character of the construction works associated with the adjacent transmission infrastructure and is not considered to result in any additional visual impacts from private dwellings. The attachment of microwave repeater infrastructure on existing towers at Magpie Hill and Baldy Peak is not expected to have a noticeable visual impact on private views during construction.

#### Visual amenity impacts – private dwellings at night time

The following changes to the potential night time visual impacts have been identified for the amended project during construction:

- the extent of construction activity at the Elong Elong Energy Hub would increase in views from two dwellings (ID 611 and ID 719) as described in the EIS, due to changes in the alignment of the transmission lines, and vegetation clearing along Dapper Road
- lighting associated with the operation of the construction compound at the Neeleys Lane workforce accommodation camp may be visible from one dwelling (ID 1103), that could have filtered views of the site through trees along Ulan Road
- additional visual impacts due to the identification of two new/reclassified receivers (ID 1139 and ID 1142) for the amended project (refer to Section 3.4.3). Dwelling 1139, located around 400 metres from the construction area, may have filtered views to the Neeleys Lane workforce accommodation camp and construction compound through trees where landform does not intervene. Dwelling 1142 would have less visibility of the Neeleys Lane workforce accommodation camp and construction compound, as it is located over a kilometre from the site and is separated from the site by vegetation and Ulan Road.

Construction at the microwave repeater sites are intended to be undertaken during standard working hours. Any works required outside of standard working hours would be temporary and minor, or would be subject to further environmental assessment if required.

## Operation

### Landscape character impacts

The daytime and night time landscape character impacts for the Terraban Gap forested hills landscape character zone (FH-3) would reduce as follows, due to the relocation of switching station M3 and its associated transmission line:

- the daytime impact rating would reduce from moderate to negligible
- the night time impact rating would reduce from moderate to negligible (refer to Section 3.4.3 on correction of night time impact rating in EIS).

The daytime and night time landscape character impacts for the Botobolar undulating rural hills LCZ (URH-7) would be as follows:

- the daytime impact rating would be low-moderate (with a moderate magnitude of change)
- the night time impact rating would be negligible (with a negligible magnitude of change).

The impact ratings for the remaining landscape character zones would remain unchanged from the EIS.

### Visual amenity impacts

#### Visual amenity impacts – public viewpoints

The visual impact on two public viewpoints would reduce due to the relocation of the transmission line (Goolma connection) further away from Dapper Road:

- the visual impact on Viewpoint 24 (view from Dapper Road east) would reduce from moderate to low-moderate
- the visual impact on Viewpoint 26 (view northwest from Dapper Road west) would reduce from low-moderate to low (refer to correction in Section 3.4.3).

The visual impact levels for the remaining public viewpoints and the viewpoint from the air would remain unchanged from the EIS.

#### Visual amenity impacts – private dwellings during daytime

Visual amenity impact levels at private dwellings have increased in locations where there is an increased visibility of transmission line towers as a result of the adjustment of transmission line alignments as part of the amended project. Similarly, visual amenity impact levels have decreased where private dwellings would have reduced visibility of project infrastructure as a result of the amendments and refinements.

Changes to daytime visual impacts are summarised in Table 5-7. The updated daytime visual impacts for all dwellings are shown in Figure 5-1. The amendments and refinements would result in the following changes to visual amenity impact levels during the daytime (pre-mitigation) since the exhibition of the EIS:

- an increase in the visual impact on views from four dwellings:
  - for one dwelling (ID 719), the visual impact would increase from moderate to high, due to the relocation of switching station E1, changes in the alignment of the transmission lines and the provision of additional towers to the north of the Elong Elong Energy Hub. This property would not host project infrastructure
  - for one dwelling (ID 611), the visual impact would increase from low to moderate, due to the changes in the alignment of the transmission lines and the provision of additional towers to the south of the Elong Elong Energy Hub. This property would not host project infrastructure
  - for two dwellings (ID 792 and ID 772), the visual impact would increase from negligible to low, due to the relocation of switching station M7 and the associated realignment of the Tallawang west connection
- a decrease in the impact on views from seven dwellings:
  - for one dwelling (ID 538), the visual impact would reduce from high to moderate
  - for two dwellings (ID 1066 and ID 705), the visual impact would reduce from moderate to low
  - for four dwellings (ID 1044, ID 1159, ID 1163/1162 and ID 1480), the visual impact would reduce from low to negligible
- new visual impacts at four additional dwellings:
  - one dwelling (ID 371) would experience a high visual impact, due to its proximity to and unobstructed views of the project. This receiver was identified as a shed in the EIS but has since been reclassified as a dwelling
  - one dwelling (ID 1487), located near the Coolah connection, would experience a low visual impact as views would largely be screened by existing vegetation and structures around the dwelling
  - two dwellings (ID 1489 and ID 1490), located near the Botobolar microwave repeater site, would experience a low visual impact as views would largely be screened by existing vegetation.

Table 5-7 Changes in daytime visual impacts during operation (pre-mitigation)

| Receiver ID | Distance to amended project (metres) | Project host | Visual sensitivity | Changes to view with amended project | Visual impact level – Exhibited project | Visual impact level – Amended project | Change to impact |
|---|---|---|---|---|---|---|---|
| 371 | 280 | Yes | Moderate | There would be a double row of 500 kV transmission towers, in the middle ground of views. There would be several towers, that are up to 85 metres high, at about 800 metres from this dwelling.<br>The amended project would alter the amenity of views from this dwelling, and there would be a moderate magnitude of change on views from this private dwelling. | – | High | New impact |
| 1487 | 450 | No | Low | Relocation of the transmission line alignment to the east of this dwelling. Views to the project would be largely screened by existing vegetation and sheds surrounding the dwelling.<br>Overall, there would be a low magnitude of change and a low visual impact. | - | Low | New impact |
| 1044 | 1045 | No | Moderate | The transmission line alignment has been relocated north beyond the intervening landform, reducing the visibility of the project from this dwelling.<br>Overall, the amended project would be largely out of view from the dwelling, so the magnitude of change to views from this dwelling would reduce to negligible, and there would be a negligible visual impact. | Low | Negligible | Reduced impact |
| 1066 | 600 | No | Moderate | The transmission line alignment has been relocated north beyond the intervening landform, reducing the visibility of the project from this dwelling.<br>Overall, the magnitude of change to views from this dwelling would reduce to low with the amended project, and there would be a low visual impact | Moderate | Low | Reduced impact |

| Receiver ID | Distance to amended project (metres) | Project host | Visual sensitivity | Changes to view with amended project | Visual impact level – Exhibited project | Visual impact level – Amended project | Change to impact |
|---|---|---|---|---|---|---|---|
| 1159 | 1,050 | Yes | Low | The transmission line alignment has been moved west and away from this dwelling.<br>The transmission towers would be increased to 58 metre pole towers on straight sections and 63 metre lattice towers at corners.<br>The amended project is unlikely to be visible and there would be a negligible magnitude of change, and a negligible visual impact. | Low | Negligible | Reduced impact |
| 1163/ 1162 | 1,050 | Yes | Low | The transmission line alignment has been moved west and away from this dwelling. The transmission towers would be increased to 58 metre pole towers on straight sections and 63 metre lattice towers at corners.<br>The amended project is unlikely to be visible and there would be a negligible magnitude of change, and a negligible visual impact. | Low | Negligible | Reduced impact |
| 1480 | 220 | Yes | Low | The transmission line alignment has been moved west and away from this dwelling. The transmission towers would be increased to 58 metre pole towers on straight sections and 63 metre lattice towers at corners.<br>As the project is unlikely to be visible, there would be a negligible magnitude of change, and a negligible visual impact. | Low | Negligible | Reduced impact |
| 772 | 571 | No | Moderate | The new 330 kV transmission line and relocated Switching Station (M7) would be visible from this dwelling, potentially visible to the north and northwest, extending into the background of the view. However, the primary view from this private dwelling is north east and looking away from the amended project, with intervening landform and vegetation to the south and southwest limiting views of the amended project.<br>Overall, there would be a low magnitude of change, and a low visual impact from this dwelling. | Negligible | Low | Increased impact |

| Receiver ID | Distance to amended project (metres) | Project host | Visual sensitivity | Changes to view with amended project | Visual impact level – Exhibited project | Visual impact level – Amended project | Change to impact |
|---|---|---|---|---|---|---|---|
| 792 | 1,160 | No | Moderate | The revised 330 kV transmission line alignment and relocated Switching Station (M7) would be, potentially visible from this dwelling to the west, in the background of the view. Intervening landform and vegetation to the south and southwest would limit views of the project.<br>Overall, there would be a low magnitude of change, and a low visual impact from this dwelling. | Negligible | Low | Increased impact |
| 705 | 530 | No | Moderate | Switching Station (M7), and a section of 330 kV transmission line relocated away from this dwelling. Overall, the magnitude of change would reduce to low. | Moderate | Low | Reduced impact |
| 611 | 1,100 | Yes | Moderate | There would be additional 500 kV transmission towers in the vicinity of the energy hub. The alignment would be realigned closer, to about one kilometre north west of this dwelling, and include the removal of trees along Laheys Creek Road. This would open up views to the Elong Elong Energy Hub and increase the number of visible towers from this dwelling. Overall, there would be a moderate magnitude of change and a moderate visual impact. | Low | Moderate | Increased impact |
| 719 | 980 | Yes | Moderate | Switching station E1 would be moved further south and away from this dwelling. However, there would be an additional 330 kV transmission line about one kilometre from the dwelling, viewed in the vicinity of the energy hub infrastructure. There would also be additional transmission towers for the 500 kV transmission line which has been realigned to the south of the energy hub. The further tree removal along Laheys Creek Road would also be visible. Overall, there would be more infrastructure visible, and further visual clutter in the background of views from this dwelling and a high magnitude of change. | Moderate | High | Increased impact |

| Receiver ID | Distance to amended project (metres) | Project host | Visual sensitivity | Changes to view with amended project | Visual impact level – Exhibited project | Visual impact level – Amended project | Change to impact |
|---|---|---|---|---|---|---|---|
| 539 | 560 | Yes | Moderate | The transmission line alignment has been moved about 500 metres north and away from this dwelling, reducing the scale of the transmission line in views from this dwelling.<br>Overall, the magnitude of change to views from this dwelling would reduce to moderate, and there would be a moderate visual impact. | High | Moderate | Reduced impact |
| 1489 | 440 | N | Low | Appears to be secondary view, with the project located on the hill, behind this dwelling. Some intervening vegetation would reduce the visibility of the microwave tower and infrastructure. | - | Low | New impact |
| 1490 | 500 | N | Low | Appears to be secondary view, with the project located on the hill, behind this dwelling. The microwave tower and infrastructure would be more visible due to the limited intervening vegetation. | - | Low | New impact |

### Visual amenity impacts – private dwellings at night time

During operation, there is the potential for two dwellings (ID 719 and ID 611) near the Elong Elong Energy Hub to experience increased visual amenity impacts at night, due to the increased views to low-level lighting at the energy hub as a result of the removal of vegetation along Laheys Creek Road.

The relocated switching stations would also have low-level lighting for security and maintenance access to allow for unplanned works, faults and emergency access at night. Nearby dwellings with views to the switching stations would have the potential for views to this lighting at night.

No other changes to night time visual impacts during operation as described in the EIS are expected.

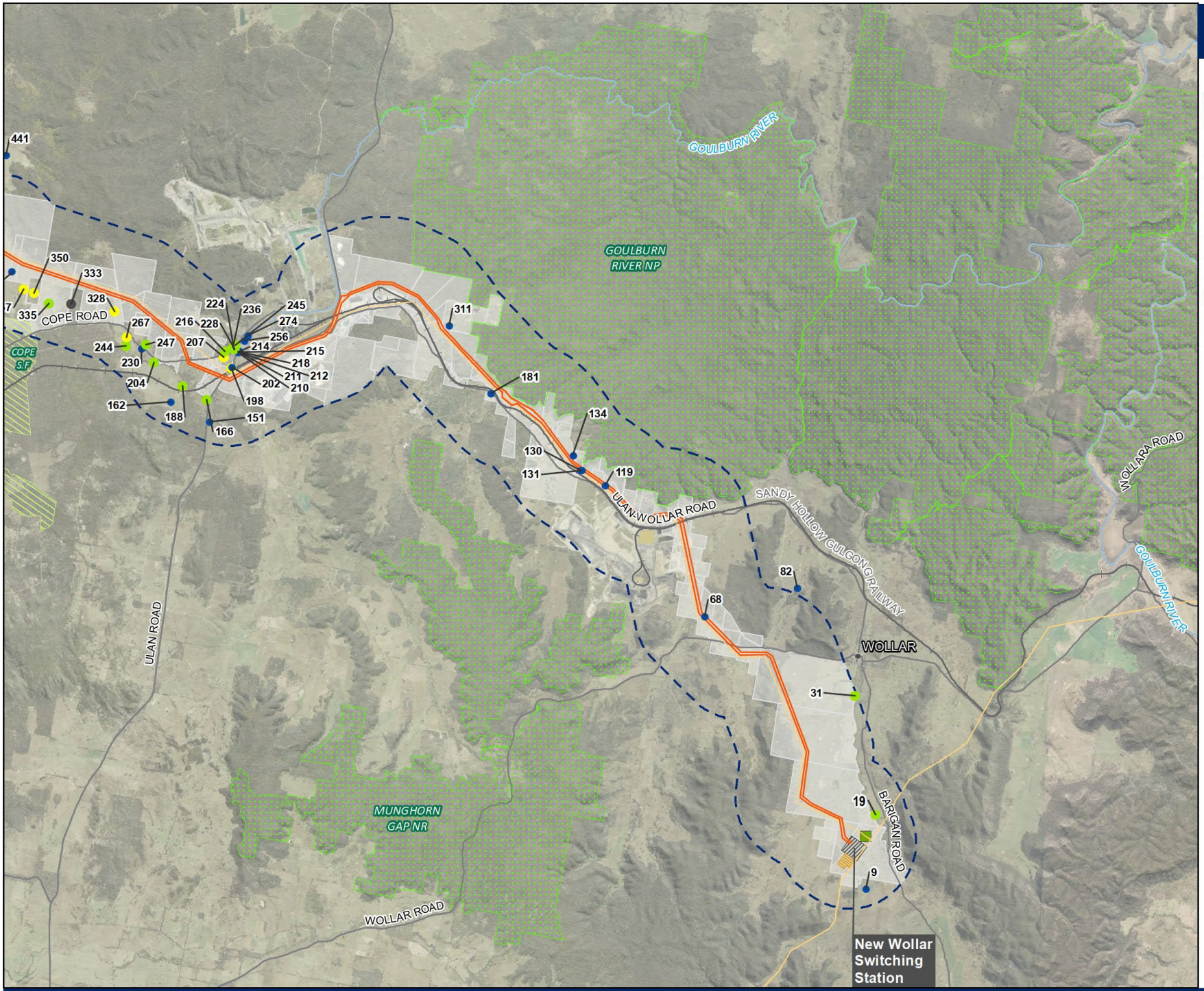


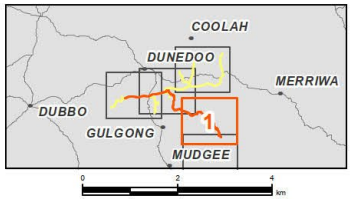

**Figure 5-1**
Visual impacts to private views
Page 1 of 4

## Legend

- Study area
- Construction compound
- Energy hub / 500 kV switching station
- 500 kV transmission line
- Existing substation
- Existing transmission line
- Road
- Railway
- Watercourse
- NPWS estate
- State Forest
- Host property

**Dwelling assessment result**

- Moderate
- Low
- Negligible
- Non-assesed dwellings

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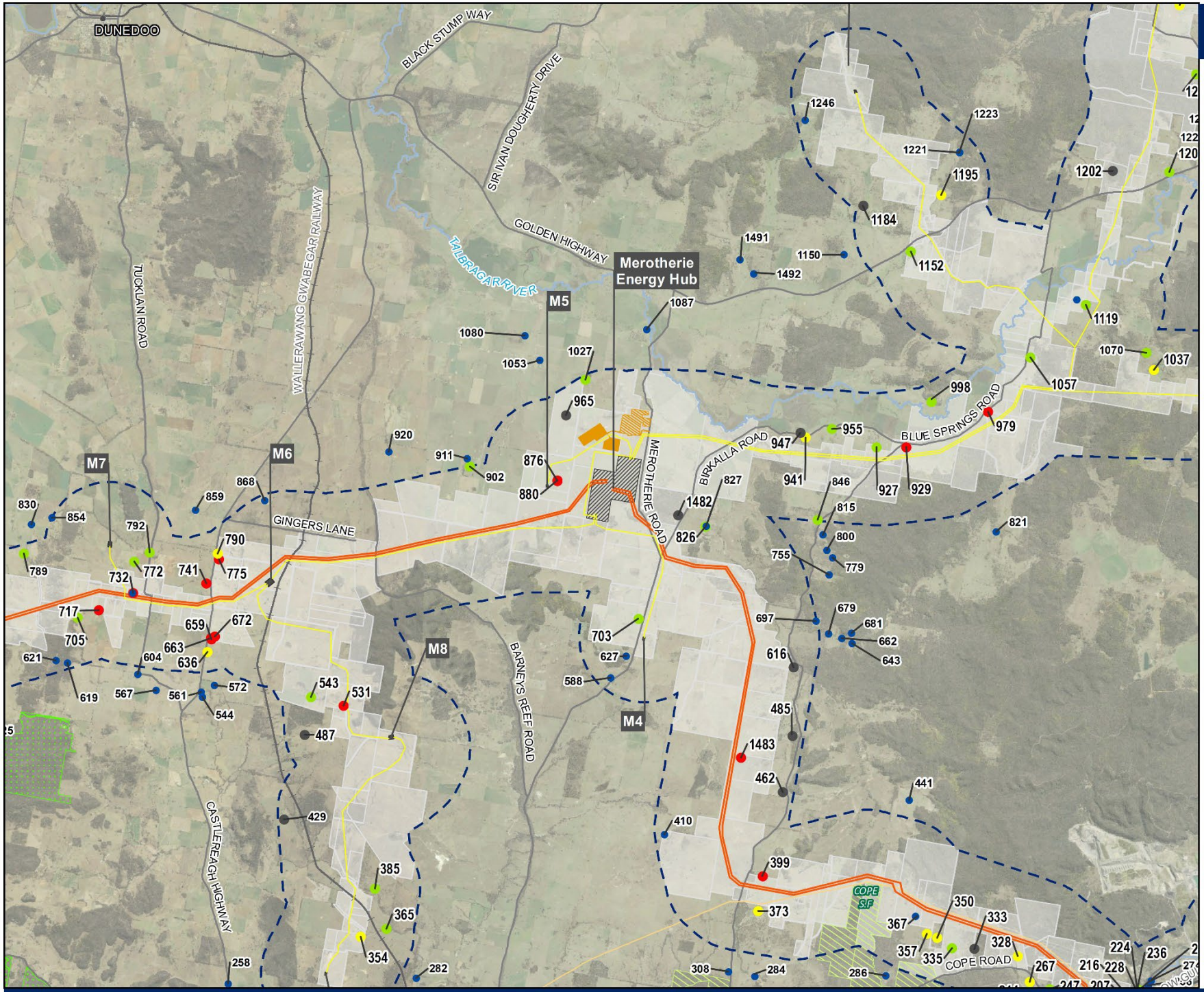


**Figure 5-1**
Visual impacts to private views
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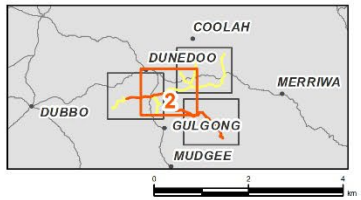
## Legend

- Study area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- 330 kV switching station
- 330 kV transmission line
- 500 kV transmission line
- Existing transmission line
- Road
- Railway
- Watercourse
- NPWS estate
- State Forest
- Host property

**Dwelling assessment result**

- High
- Moderate
- Low
- Negligible
- Non-assesed dwellings

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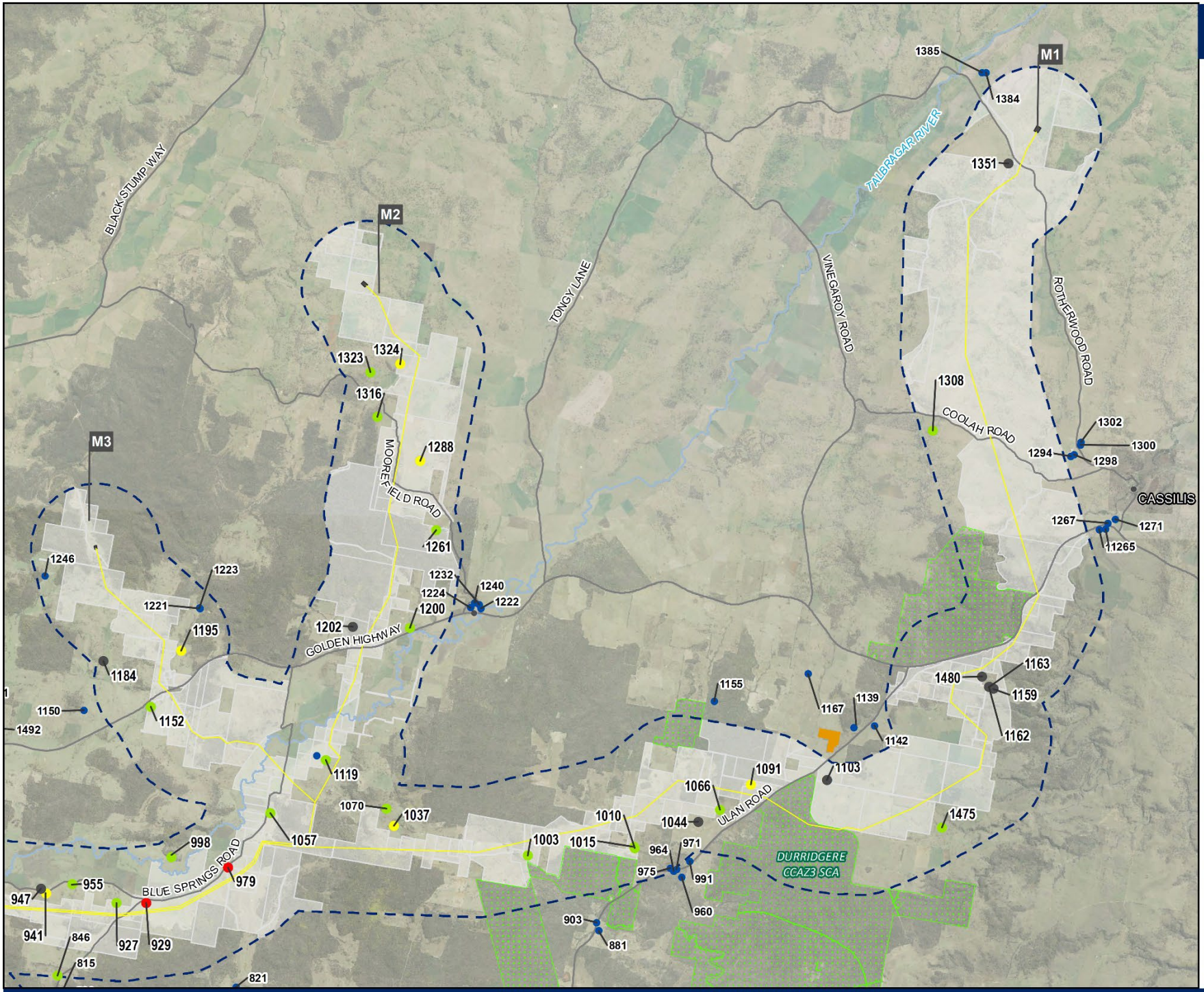


**Figure 5-1**
Visual impacts to private views
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## Legend

- Study area
- Workforce accommodation camp
- 330 kV switching station
- 330 kV transmission line
- 500 kV transmission line
- Road
- Watercourse
- NPWS estate
- Host property

**Dwelling assessment result**

- High
- Moderate
- Low
- Negligible
- Non-assesed dwellings

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

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Data sources: WSP, NSWSS, IRIS, EnergyCo

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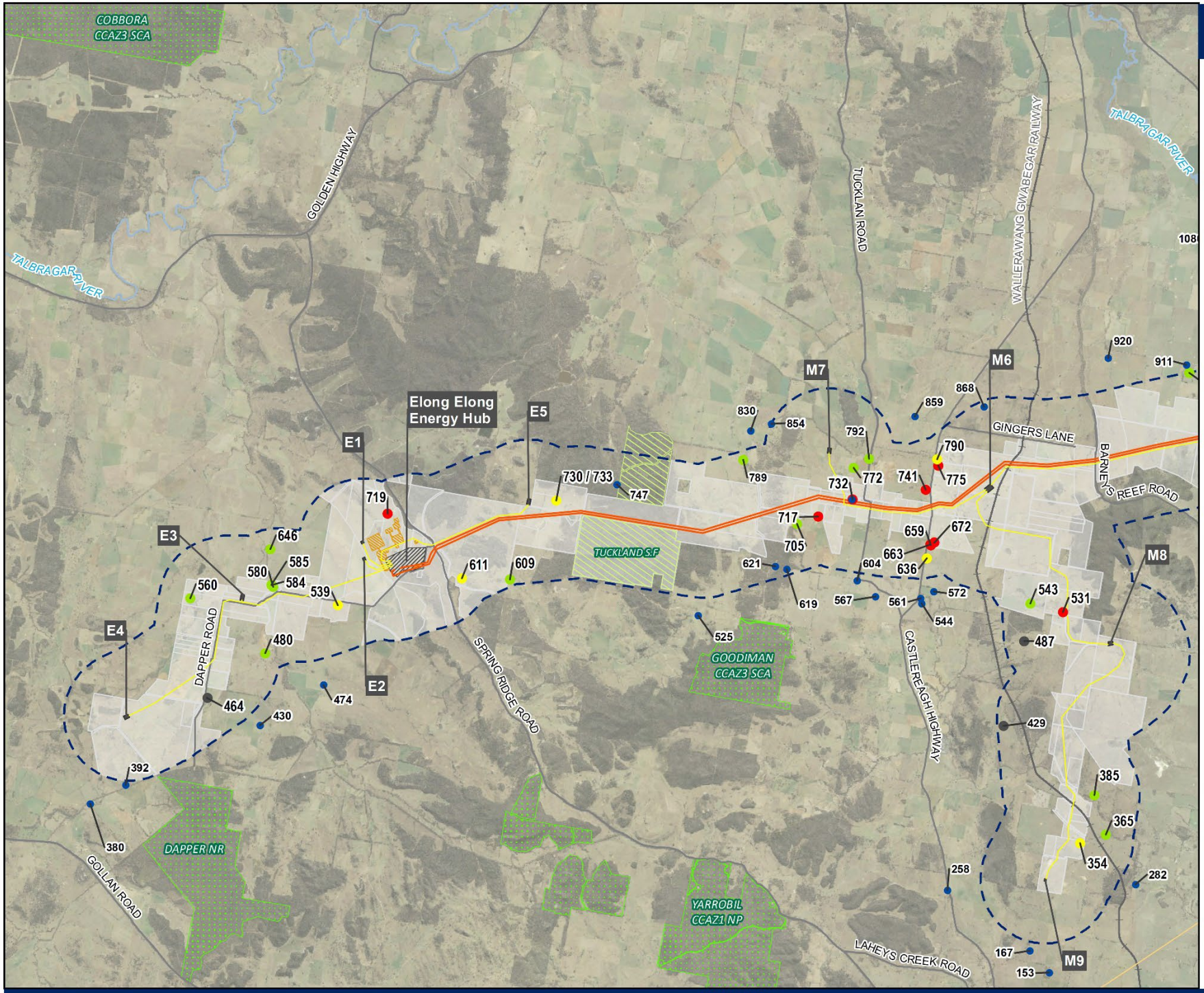


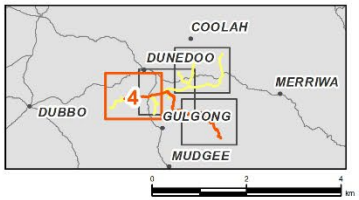

**Figure 5-1**
Visual impacts to private views
Page 4 of 4

## Legend

- Study area
- Construction compound
- Energy hub / 500 kV switching station
- 330 kV switching station
- 330 kV transmission line
- 500 kV transmission line
- Existing transmission line
- Road
- Railway
- Watercourse
- NPWS estate
- State Forest
- Host property

**Dwelling assessment result**

- High
- Moderate
- Low
- Negligible
- Non-assesed dwellings




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:160,000

Data sources: WSP, NSWSS, IRIS, EnergyCo

C:\Users\AUMR505149\WSP O365\AU-WKG - Geospatial - AIS - Projects\PS130593_EnergyCo_CWO_Substation\Mxd\20_AmendmentReport\PS130593_VIS_F0601_VisualImpacts_r2v1.mxd

### 5.4.4 Updated or additional mitigation measures

No changes to mitigation measures identified in the EIS are required to address the potential landscape character and visual amenity impacts of the amended project. The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

## 5.5 Biodiversity

Technical paper 4 – Biodiversity Development Assessment Report (Technical paper 4) of the EIS assessed the potential biodiversity impacts of the construction and operation of the exhibited project, with the key findings of the assessment summarised in Chapter 10 (Biodiversity) of the EIS.

Additional assessment has been undertaken to identify changes to potential biodiversity impacts associated with the amended project and to incorporate additional field investigations of areas which were not accessible during the preparation of Technical paper 4. The relevant assessment completed to support the Amendment Report is provided in Appendix G (Updated Biodiversity Development Assessment Report) (Updated BDAR). The findings of this assessment are summarised in this section.

### 5.5.1 Assessment approach

The methodology for the updated biodiversity assessment is consistent with that undertaken for the exhibited project. Additional field surveys of previously unsurveyed areas of the exhibited project, and additional areas affected by the proposed amendments and refinements were undertaken to fill gaps in the field survey coverage undertaken for Technical paper 4. The additional surveys targeted native vegetation and threatened flora and fauna species in accordance with the Biodiversity Assessment Method (BAM) (DPIE, 2020b).

Since the EIS, an additional area of around 1,335 hectares has been surveyed, bringing the total survey coverage to around 89 per cent of the updated biodiversity study area. Access constraints limited survey coverage for around eight per cent or around 253 hectares of the biodiversity study area. The remaining three per cent of the updated biodiversity study area (100 hectares) was not surveyed due to the absence of native vegetation, or absence of habitat for threatened species. Where this has occurred, the assessment has applied a cautious approach and assumed presence for threatened species (where relevant) or has relied upon existing mapping and aerial photography for plant community types (PCTs).

### 5.5.2 Existing environment

The additional field surveys, further analysis of field data and amendments to the construction area have collectively refined the extent of biodiversity values recorded or predicted to occur. The key changes from the EIS and Technical paper 4 are the extent of native vegetation, the composition of PCTs and the assumed and recorded presence of threatened flora and fauna species.

#### Native and exotic vegetation

Native vegetation coverage has increased from 58 per cent as identified in the EIS to around 65 per cent of the updated biodiversity study area, with the remaining areas consisting of buildings and roads, cropping land that has recently been ploughed and seeded, and improved pastures

dominated by exotic pasture species. These areas are considered to be cleared of native vegetation (for the purposes of the *Local Land Services Act 2013* (NSW)) and therefore were excluded from the biodiversity assessment, including the BAM calculator (BAM-C). A revised land categorisation assessment was undertaken based largely on a review of the draft Native Vegetation Regulatory (NVR) map, combined with field data to identify areas of Category 1 land which are excluded from assessment under the BAM. This on ground verification and comparison to the Draft NVR map resulted in an increase in the area of Category 2 land to that identified in the exhibited BDAR.

In the revised BDAR, 26 PCTs are found to occur in the updated biodiversity study area across four Interim Biogeographic Regionalisation for Australia (IBRA) regions. The Wollemi IBRA subregion was added to the assessment with the inclusion of the Botobolar microwave repeater site. The increase in number of PCTs is due to the proposed amendments to the construction area and revision of data. The total area covered by PCTs within the updated BDAR subject land has increased from 1,603 hectares to approximately 1,978 hectares. The PCTs are in varying condition, ranging from poor to excellent in condition or are otherwise classified as moderate/good, thinned, derived native grassland or derived native shrubland. Derived native grassland or shrubland captures instances where the trees of the original PCT have been cleared but the remaining grasslands or shrub layer are dominated by native species. Vegetation zones that do not require an offset have been specifically identified. Detailed mapping of PCTs within the study area is included in Figure 14-7 of the Updated BDAR.

Based on the PCTs present and their condition, combined with other features including geology and soil types as outlined in the Final Determinations, there are three threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2026* (BC Act) and two TECs listed under the EPBC Act in the updated BDAR subject land that would be impacted. The project would no longer impact the BC Act listed Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion TEC or the EPBC Act listed Central Hunter Valley eucalypt forest and woodland TEC.

Sixteen scattered trees, as defined in the BAM, have been identified in the updated BDAR subject land (refer to Figure 14-10 of Technical paper 4). Scattered trees have been classified according to the associated PCT and have been assessed consistent with the BAM. Planted native vegetation such as windbreaks have also been identified and mapped.

## Threatened flora species

The revised assessment indicates that the threatened plant species *Acacia ausfeldii, Leucochrysum albicans* subsp*. tricolor, Dichanthium setosum, Eucalyptus camaldulensis* endangered population, *Pomaderris queenslandica,* and *Eucalyptus nicholii* are known to occur within the updated BDAR subject land and would be impacted.

The additional threatened flora species recorded since the EIS are *Pomaderris queenslandica* and *Eucalyptus nicholii.* Further populations of the threatened plant species *Acacia ausfeldii* and *Leucochrysum albicans* subsp*. tricolor* were identified at Ulan. One threatened species *Eucalyptus cannonii* was removed from the assessment based on advice from the National Herbarium of NSW based on the collection and provision of better fruiting and flowering material.

Ten further threatened flora species have been assumed to occur within the updated BDAR subject land in accordance with the BAM based on the presence of potentially suitable habitat and inability to adequately survey the habitat. Of the 16 threatened flora species and populations recorded or assumed to be present in the updated BDAR subject land, 10 are listed on the EPBC Act.

Further detail on the species present or assumed to occur within the study area is provided in Chapter 5 of Technical paper 4.

### Threatened fauna species

The revised assessment indicates that the threatened animal species Regent Honeyeater, Glossy Black-Cockatoo, Little Eagle, Masked Owl, Barking Owl, Eastern Pygmy-Possum, Squirrel Glider, Large-eared Pied Bat, Large Bent-winged Bat, Eastern Cave Bat, and Pink-tailed Legless Lizard are known to occur within the updated BDAR subject land.

The additional threatened fauna species confirmed as present within the updated BDAR subject land, based on the additional targeted surveys, are Eastern Pygmy-Possum (listed as vulnerable under the BC Act) and Pink-tailed Legless Lizard (listed as vulnerable under the BC Act and EPBC Act). These two species were recorded on Moolarben Mine land in the Kerrabee IBRA subregion.

The updated BDAR subject land is still within the mapped important habitat area for Regent Honeyeater (*Anthochaera Phrygia*). The Regent Honeyeater is a critically endangered species under the BC Act and EPBC Act. No visual observations of this species were made during the survey periods, but it is assumed present due to the impact to areas of habitat mapped by the important habitat mapping.

Revision of PCT mapping based on data analysis, further targeted surveys, and access to additional areas of the updated BDAR subject land since the EIS indicates that a further six threatened animal species are predicted to occur. Presence of habitat for these species has been assumed in accordance with the BAM, based on the presence of potentially suitable habitat and inability to adequately survey the habitat. These species include Striped Legless Lizard, Pale-headed Snake, Key's Matchstick Grasshopper, Southern Myotis, Koala and Superb Parrot.

Of the 15 threatened fauna species and populations recorded or assumed to be present in the updated BDAR subject land, seven are listed as threatened under the EPBC Act.

### Aquatic ecology

As discussed in Section 5.12.2, the watercourses crossed by the amended project are generally consistent with the EIS and Technical paper 4. No additional aquatic environments including species and populations have been identified. The groundwater dependent ecosystems within the study area are also consistent with the EIS.

## 5.5.3 Assessment of potential impacts

This section presents the potential residual impacts of the amended project on biodiversity which have not been avoided based on design development to date. Key impacts on biodiversity during construction include the clearing of native vegetation, the removal of threatened species and/or their habitats, and indirect impacts that can impact adjacent vegetation or habitats due to disturbance by construction nearby or as a result of the spread of a weed or pathogen. Impacts to habitat connectivity and indirect impacts from bird line strike and electromagnetic field (EMF) impacts are also considered. Direct and indirect impacts have increased proportional with the increase to PCT impact, due to the revised design, re-analysis of data, and changes due to less reliance on assumptions due to increased survey access since the EIS.

## Construction

### Native vegetation

Construction of the amended project would result in direct impacts to around 1,227 hectares of native vegetation including areas of TECs, which is an increase from the 1,032 hectares identified in the EIS (an increase in impact of 195 hectares). The native clearing extent from the amended project has increased due to the:

- proposed amendments to the construction area
- additional survey of previously inaccessible areas resulting assumptions being revised
- more conservative assessment of areas subject to partial clearing from the project.

The updated direct impacts to native vegetation include:

- around 768 hectares of full clearing (Disturbance area A) (previously assessed at 592 hectares) within the updated BDAR subject land (such as access tracks along the transmission line, energy hubs, switching stations, brake and winch sites, accommodation camps, and construction compounds). At locations where permanent infrastructure would be constructed (i.e. energy hubs, switching stations and transmission line towers), these impacts, would likely be permanent. In areas where permanent infrastructure would not be located (i.e. accommodation camps, brake and winch sites), these areas are expected to naturally regenerate following construction
- around 456 hectares of partial clearing (Disturbance area B) (previously assessed at 433 hectares) within the easement, where vegetation with growth height up to two metres would remain (such as the areas between and adjacent to transmission line towers, or areas around individual construction facilities including compounds and workforce accommodation camps)
- around three hectares within a hazard tree zone (Disturbance area HZ), where trees within the risk category height range of 20 to 30 metres are considered for structural stability, with trees that pose a risk of falling removed.

Where partial clearing occurs in Disturbance areas B and HZ, the integrity of the remaining vegetation would be impacted in terms of its composition and condition (structural and function). However, it would avoid total loss of species richness of the PCT, encourage continued presence of native species in these areas and limit the colonisation opportunities for introduced species.

Two of the three impacted TECs are listed as being at risk of serious and irreversible impact (SAII) as indicated in Table 5-8. The impacts to TECs has increased in line with the increased impact to related PCTs due to the proposed amendments to the construction area, survey of previously inaccessible areas resulting assumptions being revised, and a more conservative assessment of areas subject to partial clearing from the project.

Offsets for full and partial clearing, indirect impacts to threatened bird species from line strike and EMF, and prescribed impacts to habitat connectivity would be required and are outlined in Section 5.5.5, noting some PCTs would not require offsets in accordance with the BAM. Opportunities to further reduce the impacts to native vegetation, particularly TECs, would be considered during detailed design.

Table 5-8 Summary of direct impacts of the amended project on TECs

| Threatened ecological community (TEC) | | PCT | Exhibited project direct impact (ha) | | Amended project direct impact (ha) | | SAII Entity |
|---|---|---|---|---|---|---|---|
| BC Act | EPBC Act | | BC Act | EPBC Act | BC Act | EPBC Act | |
| Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions | Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia | PCT 81 | 20.26 | 5.98 | 13.70 | 5.32 | N/A |
| Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions | N/A | PCT 202 | 2.99 | NA | 4.44 | – | Yes |
| White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions | White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland | PCTs 266, 277, 281, 330, 401, 483, 589, 599, 618 | 575.95 | 287.45 | 718.50 | 444.28 | Yes |
| **Totals:** | | | **599.20** | **293.43** | **736.64** | **449.60** | |

## Threatened flora species

Sixteen threatened flora species listed under the BC Act and/or EPBC Act would be directly impacted by the amended project, and would require an offset (as per the BAM) (refer to Table 5-9).

Two threatened flora species are identified as being at risk of an SAII. This includes *Euphrasia arguta* and *Indigofera efoliata*. These species are assumed to occur based on the presence of potential habitat, though the likelihood of a population of either species being present in the amended construction area is low (refer to Technical paper 4).

Table 5-9 Direct impacts of the amended project on threatened flora species or populations (species credit species)

| Scientific name/Common name | Listing[1] | | Loss of habitat (ha) or individuals (known presence) | Loss of habitat (ha) or individuals (assumed presence) | SAII Entity |
|---|---|---|---|---|---|
| | BC Act | EPBC Act | | | |
| *Acacia ausfeldii*/Ausfeld's Wattle | V | – | 17.58 | 3.38 | No |
| *Diuris tricolor* / Pine Donkey Orchid | E | - | 0 | 26.38 | |
| *Dichanthium setosum*/Bluegrass | V | V | 4.57 | 2.28 | No |
| *Eucalyptus camaldulensis* – endangered population/ Eucalyptus camaldulensis population in the Hunter catchment | E | – | 5.6 | 0 | No |
| *Euphrasia arguta*/Euphrasia arguta | CE | CE | 0 | 107.75 | Yes |
| *Homoranthus darwinioides*/Fairy Bells | V | V | 0 | 1.25 | No |
| *Indigofera efoliata*/Leafless Indigo | E | E | 0 | 0.82 | Yes |

| Scientific name/Common name | Listing[1] | | Loss of habitat (ha) or individuals (known presence) | Loss of habitat (ha) or individuals (assumed presence) | SAII Entity |
|---|---|---|---|---|---|
| | BC Act | EPBC Act | | | |
| *Leucochrysum albicans var. tricolor*/ Hoary Sunray | E | E | 6 plants | 0 | No |
| *Pomaderris queenslandica*/Scant Pomaderris | E | E | 0.57 | 1.81 | No |
| *Swainsona recta*/Small Purple-pea | E | E | 0 | 53.68 | No |
| *Swainsona sericea*/Silky Swainson-pea | V | – | 0 | 128.9 | No |
| *Tylophora linearis* | V | E | 0 | 12.37 | No |
| *Thesium australe*/*Austral Toadflax* | V | V | 0 | 0.54 | No |
| *Pomaderris cotoneaster* | E | E | 0 | 9.92 | No |
| *Zieria ingramii* / Keith's Zieria | E | E | 0 | 1.9 | No |
| *Prasophyllum petilum*/Tarengo Leek Orchid | | | | 76.3 | No |

1. V – Vulnerable, E – Endangered, CE – Critically endangered

### Threatened fauna species

Fourteen threatened fauna species listed under the BC Act would be directly impacted by the amended project and require an offset (as per the BAM requirements) (refer to Table 5-10). Three threatened fauna species are identified as being at risk of a SAII including the Regent Honeyeater, Large-eared Pied Bat and Eastern Cave Bat.

The amended project would impact around 111 hectares of mapped 'important habitat' for the Regent Honeyeater, which represents around 0.33 per cent of the species' geographical range. This would result in localised fragmentation of the species habitat. However the population is not currently considered to be severely fragmented (based on EPBC Act criteria and regulations), and therefore there is no evidence that the population would become unviable as a result of the amended project's construction.

The amended project would directly impact some areas located within 100 metres of potential breeding habitat for two threatened microbat species. While this would comprise potential foraging habitat, it would not result in the removal of any assumed breeding habitat features such as caves.

Table 5-10 Summary of direct impacts of the amended project on threatened fauna species (species credit species)

| Scientific name/Common name | Listing[1] | | Loss of habitat (ha) (known presence) | Loss of habitat (ha) (assumed presence) | SAII Entity |
|---|---|---|---|---|---|
| | BC Act | EPBC Act | | | |
| *Anthochaera phrygia*/Regent Honeyeater | CE | CE, M | 110.7 | 0 | Yes |
| *Aprasia parapulchella*/ Pink-tailed Legless Lizard | V | V | 23.16 | 0 | N/A |
| *Calyptorhynchus lathami*/ Glossy Black-Cockatoo | V | V | 0 | 18.42 | N/A |
| *Cercartetus nanus*/Eastern Pygmy-possum | V | – | 235.76 | 0 | N/A |
| *Chalinolobus dwyeri*/Large-eared Pied Bat | V | V | 66.53 | 0 | Yes |
| *Delma impar*/Striped Legless Lizard | V | V | 0 | 27.3 | N/A |
| *Hieraaetus morphnoides*/Little Eagle | V | – | 1.4 | 0 | N/A |
| *Hoplocephalus bitorquatus*/ Pale-headed Snake | V | – | 0 | 133.7 | N/A |
| *Keyacris scurra*/ Key's Matchstick Grasshopper | E | E | 0 | 80.32 | N/A |
| *Myotis macropus*/Southern Myotis | E | V | 0 | 0.02 | N/A |
| *Petaurus norfolcensis*/Squirrel Glider | V | – | 420.7 | 0 | N/A |

| Scientific name/Common name | Listing[1] | | Loss of habitat (ha) (known presence) | Loss of habitat (ha) (assumed presence) | SAII Entity |
|---|---|---|---|---|---|
| | BC Act | EPBC Act | | | |
| *Phascolarctos cinereus*/Koala | E | E | 0 | 110.58 | N/A |
| *Tyto novaehollandiae*/Masked Owl | V | – | 0 | 15.8 | N/A |
| *Vespadelus troughtoni*/Eastern Cave Bat | V | – | 53.6 | 0 | Yes |
| *Polytelis swainsonii*/Superb Parrot | V | V | 0 | 3.4 | N/A |

1. V – Vulnerable, E – Endangered, CE – Critically endangered, M - Migratory

### Fauna habitat and connectivity

The removal of vegetation communities would impact fauna due to the removal of foraging and breeding habitats and impact habitat connectivity as described in the EIS and Technical paper 4.

The 16 scattered trees located within the amended construction area would be removed and would be offset in accordance with the BAM. Most of these trees contain hollows that have the potential to provide habitat for native fauna.

Construction of the amended project has the potential to impact habitat connectivity for the Squirrel Glider, threatened woodland birds and threatened bat species where the transmission line easement intersects areas of native vegetation as described in Technical paper 4. During construction, the transmission line corridor would be permeable and impacts to connectivity would be minor. The amendments do not increase connectivity impacts as the connectivity impacts are comparable to that assessed in the EIS.

The mitigation measures outlined in the BDAR that apply to Squirrel Glider are considered appropriate. However, in order to address any uncertainties around the impacts to connectivity for this species in the landscape, due to impacts to the tree canopy layer, additional prescribed impact credits are proposed.

### Aquatic ecology

The potential impacts to aquatic ecology are consistent with those identified in the EIS and Technical paper 4.

### Indirect impacts

The indirect impacts on biodiversity with a potential negligible to moderate consequence as result of the amended project are consistent with the EIS and Technical paper 4 including:

- inadvertent impacts on adjacent habitat or vegetation (moderate)
- reduced viability of adjacent habitat due to edge effects (negligible)
- reduced viability of adjacent habitat due to noise, dust or light spill (negligible)
- transport of weeds and pathogens from the site to adjacent vegetation (negligible)
- increased risk of starvation, exposure and loss of shade or shelter (negligible)
- loss of breeding habitats (moderate)
- trampling of threatened flora species (low)
- increased risk of fire (low).

## Operation

The amended project would have limited ongoing biodiversity impacts once operational. The key potential operational impacts are associated with access to the operation area for the maintenance of infrastructure, ongoing vegetation management, collision with transmission lines, and the potential for impacts of EMF on local fauna populations. These impacts are generally consistent with those described in the EIS and Technical paper 4.

#### Indirect impacts from bird line strike and EMF

Given uncertainty around indirect operational impacts, additional biodiversity offsets (over and above the biodiversity offsets required by the BAM for direct impacts) have been calculated for the following at risk species as determined by a risk assessment:

- White-bellied Sea-Eagle
- Little Eagle
- Square-tailed Kite
- Superb Parrot.

### 5.5.4 Updated or additional mitigation measures

The development of the design of the amended project has sought to balance the various potential environmental and social constraints of the updated biodiversity study area with engineering limitations and project cost. This includes maximising the avoidance and/or minimisation of biodiversity impacts where practicable as described in EIS Chapter 10 and Section 6 of the Updated BDAR. The Updated BDAR provides a more detailed account of avoidance and minimisation measures that have been taken during the design phase and presents measures to further minimise impacts to biodiversity values through implementation of measures targeted to impacted TECs and threatened species including:

- a detailed micro-siting process designed to avoid and minimise impacts to TECs and threatened species at the site level during detailed design
- pre-clearing surveys to identify clearing extents, biodiversity exclusion zones, marking of hollow-bearing trees, and confirmation that nest boxes are in place. Pre-clearing surveys are also important to determine the actual impact to species with assumed presence
- clearly demarcating areas to be retained as 'no go areas'. 'No go area' demarcation devices will be important in the avoidance and minimisation of impacts to threatened species and habitats that are to be retained adjacent to a disturbance area.

Monitoring to ensure compliance with the approved impact. A revised Biodiversity Assessment Method (BAM-C) calculation on the project's final disturbance to biodiversity post construction will be completed. Any additional credit liability identified will be met as part of the biodiversity offset requirements within the biodiversity offset package. This is an important step to ensure clearing limits are complied with so that no inadvertent impacts to PCTs, TECs or threatened species occurs.

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential impacts on biodiversity are listed in Table 5-11. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

Table 5-11 Updated mitigation measures – biodiversity

| Reference | Impact/issue | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| B1 | Avoidance of threatened species and threatened ecological communities | ~~Sensitive areas to be avoided during detailed design and sensitive areas (including species polygons, buffered threatened species locations (including off site features adjacent to the subject land and areas of Threatened Ecological Communities) will be identified on sensitive area plans using spatial data.~~<br>**The locations of threatened ecological communities and habitat for threatened species will be considered and potential impacts avoided or minimised to the greatest extent practicable during finalisation of the detailed design and construction methodology. This will include**:<br>• micro siting of transmission line infrastructure **within the biodiversity study area**<br>• prioritising disturbance in areas with a Vegetation Integrity score <17 as per section 9 of the Biodiversity Assessment Method (2020).<br>**Sensitive areas to be avoided during detailed design and sensitive areas (including species polygons, buffered threatened species locations and areas of Threatened Ecological Communities) will be identified on sensitive area plans using spatial data.** | Detailed design<br>Pre-construction | Identified sensitive areas |
| B2 | Avoidance of threatened species and threatened ecological communities | Prior to construction activities taking place within the Little Eagle nest buffer and during the breeding season (from Spring until after young and fledged in early Summer), an ecologist will be engaged to determine if the species is present. If present, an impact assessment of proposed activities will be completed to determine what, if any, activities can take place within the buffer area, and what mitigation measures need to be implemented. Measures may include cessation of certain activities, amending the construction methodology including selecting alternative plant or equipment. | Detailed design<br>Pre-construction | Within Little Eagle tree nest buffer area(s) |
| B3 | Avoidance of threatened species and threatened ecological communities | Prior to construction activities taking place within 100 m of rocky areas containing caves, overhangs or crevices, cliffs or escarpments and during the breeding season for the Large-eared Pied Bat, Eastern Cave Bat, Large Bent-winged Bat (November to February), an ecologist will be engaged to determine if the species are present. If present, an impact assessment of proposed activities will be completed to determine what, if any, activities can take place within the 100 m and what mitigation measures need to be implemented. Measures may include cessation of certain activities, amending the construction methodology including selecting alternative plant or equipment. | Detailed design<br>Pre-construction | Within 100 metres of rocky areas containing caves, or overhangs or crevices, cliffs or escarpments as mapped by Technical paper 4 – Biodiversity Development Assessment Report |
| B4 | Micro-siting of associated works and access tracks | Micro-siting of **temporary** construction infrastructure (including site offices, compounds and access tracks) will be undertaken to minimise vegetation clearing and disturbance of watercourses. This will include:<br>• prioritising areas of low biodiversity value<br>• utilising existing access tracks, where feasible<br>• locating waterway crossings at narrow width locations<br>• minimising the quantity of cut and fill activities. | Pre-construction<br>Construction | All locations |

| Reference | Impact/issue | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| B5 | Connectivity corridors | Connectivity corridors~~, are to be investigated in the form of installation of under-transmission line glider poles (in accordance with clearance requirements for transmission lines and infrastructure)~~**in the form of installation of under-transmission line glider poles (in accordance with clearance requirements for transmission lines and infrastructure)** where the construction area will impact habitat connectivity for arboreal species (see Appendix J of Technical paper 4 – Biodiversity Development Assessment Report for an examination of regional and terrestrial habitat connectivity and target species for mitigation), **are to be investigated and installed in appropriate locations**. The exact location and design of under-transmission line glider poles and/or rope bridges will be nominated as part of a Connectivity Strategy guided by the locations of habitat connectivity outlined in Figure 14-14 and 14-15 of Technical paper 4 – Biodiversity Development Assessment Report. Where poles are proposed to be installed on land adjacent to the easement, they will be subject to landowner agreement and captured in the property management plan.<br>This strategy will require ongoing management of connectivity corridors. | Pre-construction (Connectivity Strategy)<br>Construction<br>Operation (Corridor Management) | Relevant locations |
| B6 | Impacts on availability of nesting hollows | A Supplementary Hollow and Nest Strategy will be developed and implemented for the creation of nest boxes or other hollow creation method to provide alternative roosting and/or nesting habitat for threatened fauna displaced during clearing. ~~A target ratio for the provision of three artificial hollows/nest boxes for every occupied hollow removed will be implemented. Where supplementary hollows are proposed to be established on land adjacent to the easement, these will be subject to landowner agreement and captured in any property management plan.~~<br>**Nest box/hollows are to be installed prior to commencement of clearing works where practicable in each construction area.**<br>**Where supplementary hollows are proposed to be established on land adjacent to the easement, these will be subject to landowner agreement and captured in any property management plan.** | ~~Nest box/hollows are to be installed at least 3 months prior to commencement of clearing works where practicable in each construction area.~~<br>**Pre-construction**<br>**Construction** | Relevant locations |
| B7 | Biosecurity impacts | A Biosecurity Management Plan will be prepared in accordance with mitigation measure AG5. | Pre-construction<br>Construction | All locations |

| Reference | Impact/issue | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| B8 | Biodiversity impacts | A Biodiversity Management Plan will be prepared and implemented for the duration of construction. The plan is to include (as a minimum):<br>• **a protocol for identifying and demarcating, prior to clearing commencement at each location,** the location and extent of areas of vegetation clearance and habitat disturbance, and how these will be suitably demarcated on site<br>• **a protocol for identifying and demarcating, prior to clearing commencement at each location,** the location and extent of areas to be protected (e.g. retained vegetation, hollow-bearing trees, nests, burrows and other habitat features**),** ~~(~~including applicable buffers to habitat features~~)~~ ~~located inside the construction area or in close proximity to the clearing areas~~<br>• measures to be implemented on site to clearly demarcate areas to be retained as 'no go areas' ~~with suitable fencing or equivalent exclusion barrier.~~ | Pre-construction<br>~~To be installed prior to the commencement of clearing works in each construction area.~~<br>~~'No go area' fencing and other tags/marks must be maintained throughout the construction phase.~~<br>**Construction**. | All locations |
| B9 | Tree protection measures | Tree protection measures are to be installed and maintained **as necessary for trees to be retained within and in the vicinity of energy hubs, construction compounds and accommodation camps,** in accordance with *AS 4970-2009 – Protection of Trees in Development Sites* throughout construction. | Pre-construction | Applicable trees within **and in the vicinity of the energy hubs, construction compounds and accommodation camps** |
| B10 | Pre-clearing surveys | Pre-clearing surveys are to be completed prior to clearing at each location by a suitability qualified ecologist.<br>The proposed clearing extents will be marked out on site prior to the pre-clearing surveys. **Pre-clearing surveys are to be carried out prior to the commencement of clearing works in each construction area.**<br>**During the surveys, the ecologist will:**<br>• **survey areas of 'Assumed Habitat' for SAII entities and confirm clearing extent of habitat**<br>• survey the proposed clearing extent<br>• **within 48 hours prior to clearing,** identify any fauna that will require relocation prior to clearing, including inspection of any built structures and wooden fence posts to be demolished<br>• confirm ~~the location and mark out the extents of any~~ **that** biodiversity exclusion zones **are physically demarcated**<br>• confirm that hollow-bearing trees within and adjacent to the clearing extents are prominently marked/tagged; and<br>• 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. | ~~Within 48 hours prior to the commencement of clearing works in each construction area.~~<br>**Pre-construction**<br>**Construction** | All locations |

| Reference | Impact/issue | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| B11 | Ecology inductions, toolbox talks, targeted training | All relevant project personnel, including relevant sub-contractors are to be trained on biodiversity management protocols and 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.<br>Inductions and training must be completed prior to commencement of work for all relevant personnel. ~~Toolbox talks will be undertaken daily or as required.~~ | Construction | All locations |
| B12 | Retention of understorey vegetation in riparian areas | Understorey vegetation is to be protected within vegetated riparian zones where reasonable and feasible (within the definition of *Water Management Act 2000*). Vegetation clearing will be limited to the tree stratum and shrubs above two metres in height only, with root systems and trunk bases being retained in-situ. | **Construction** ~~N/A~~ | Riparian environments disturbed as part of construction |
| B13 | Rehabilitation of riparian areas | A Riparian Vegetation Management Plan (RVMP) will be developed and implemented for the project to manage activities within vegetated riparian zones to minimise impacts to aquatic environments. The plan will be prepared ~~within 3 months~~ prior **to and implemented during** any disturbance to a riparian area.<br>The plan will identify the measures to be implemented to minimise impacts from construction activities (such as temporary and permanent waterway crossings) within riparian and aquatic environments. ~~A schedule of works will be stipulated within the approved RVMP~~. Riparian areas subject to disturbance will be progressively stabilised and rehabilitated. | Pre-construction<br>Construction | Riparian environments disturbed as part of construction |
| B14 | Installation of bird diverters | Bird diverters will be installed **on transmission lines** within one kilometre (at a minimum) of wetland/riverine habitats to reduce impacts on aerial fauna species from collision with transmission lines and infrastructure. The exact position and diverter model will be finalised during detailed design.<br>Installation of the bird diverters will occur within two weeks of transmission line installation or as soon as practical, and will remain in place and/or replaced as required. | Construction | Relevant locations |
| B15 | Vegetation offsets requirements | The predicted clearing of native vegetation by the project identified in **Chapter 8 of** ~~Technical paper 4~~ **–the updated** Biodiversity Development Assessment Report **(in Appendix G of the Amendment Report)** will be monitored against the recorded clearing. A revised Biodiversity Assessment Method (BAM-C) calculation on the project's final disturbance to biodiversity post construction will be completed. Any additional credit liability identified will be met as part of the biodiversity offset requirements within the biodiversity offset package. | Construction<br>**Operation** | Construction area |
| B16 | Unexpected finds | A species unexpected finds protocol will be implemented if threatened ecological communities or flora and fauna species, not assessed in the biodiversity assessment, are identified in the disturbance area. | Construction | Construction area |

| Reference | Impact/issue | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| B17 | Water quality, watercourse geomor-phology and aquatic habitat | Watercourse crossings will be designed to minimise disturbance and harm within riparian corridors and rehabilitate aquatic habitat to achieve a 'no net loss' of habitat within the affected area and catchment as a whole, in accordance with the following guidelines:<br>• *Guidelines for controlled activities on waterfront land* (DPE, 2018b)<br>• *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull & Witheridge, 2003)<br>• *Policy and guidelines for fish habitat conservation and management* (DPI, 2013). | Pre-construction and construction | All locations |
| B18 | Operational guidelines and procedures | Develop and implement guidelines and procedures for maintenance of the project during operation as part of the OEMP or equivalent.<br>These guidelines and procedures will cover the following:<br>• vegetation clearing and maintenance commitments in the Biodiversity Development Assessment Report and Environmental Impact Statement<br>• avoiding access and disturbance in areas of high biodiversity conservation significance; outside of the areas required for construction and<br>• avoiding maintenance of vegetation that does not need to be maintained during operation. | Prior to **operation**<br>Operation | Operation area |
| B19 | Minimise indirect impacts from light spill | Lighting designs to be in accordance with the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023). | Detailed design | Operation area |

### 5.5.5 Offsets

Chapter 11 of the Updated BDAR provides a summary of the ecosystem credits, species credits and scattered tree credits required for the amended project. The amended project's offset obligation for the indicative amended construction area of the project has been calculated to require the following biodiversity credits:

- 41,276 species credits
- 22,915 ecosystem credits
- 16 ecosystem credits (scattered trees)
- 301 additional species credits proposed for Squirrel Glider due to impacts to habitat connectivity (prescribed impact)
- an additional 3,776 ecosystem credits proposed to be provided to account for indirect impacts to threatened bird species through indirect impacts due to line strike and EMF.

The Biodiversity Offsets Scheme, established under the BC Act, is the framework for offsetting unavoidable impacts on biodiversity from development. The offsets required for full and partial clearing of native vegetation have been estimated for project would need to be secured in accordance with the Biodiversity Offset Scheme.

EnergyCo's strategy to secure biodiversity offsets comprises four options of:

- establishing a biodiversity stewardship site(s) on lands with like for like biodiversity values to those impacted by the project
- working with the Credit Supply Taskforce to purchase and retire biodiversity credits
- purchasing and retirement of existing biodiversity credits currently available on the biodiversity credit register
- making a payment into the Biodiversity Conservation Fund.

EnergyCo's preferred option is to establish biodiversity stewardship agreements with landowners in proximity to the project. However, to provide increased flexibility, EnergyCo is also seeking to purchase available credits through the Credit Supply Taskforce, or on the open market, and where all options are exhausted, payment into the Biodiversity Conservation Fund. EnergyCo has been in discussions with the Credit Supply Taskforce regarding the type and quantum of required biodiversity credits.

Subject to ongoing interest and detailed biodiversity surveys, the biodiversity stewardship agreements would address around half of the project's biodiversity offset liability, or most of the project ecosystem credits. It is noted that around 60 per cent of the project's offset liability relates to species credits, which aren't always present at biodiversity stewardship sites, or historically available on the market. If species credits cannot be retired through stewardship agreements, purchased on the open market or through the Taskforce, EnergyCo would need to pay into the Biodiversity Conservation Fund.

Determining the appropriate compensation for the impacts to existing mining offset sites is outside the scope of the BAM. As such, EnergyCo is investigating a land-based ratio offset package that takes into consideration the condition of the existing biodiversity values and the required mining offset objectives.

EnergyCo has been in discussions with a number of landowners to confirm interest in biodiversity stewardship agreements. The following properties have been acquired:

- a 684 hectare property adjacent to Goulburn River National Park to offset the mining offset areas
- a 1,708 hectare property Capertee National Park to offset the surplus Regent Honeyeater credit requirements.

EnergyCo is currently negotiating a biodiversity stewardship agreement with a landowner within the Central-West Orana REZ that is assessed as delivering another large portion of the project's offset liability.

The proposed strategy to retire biodiversity offsets for the project remains consistent with that described in the EIS and Technical paper 4. Since the exhibition of the EIS, EnergyCo has been in discussions with a number of landowners to confirm interest in biodiversity stewardship agreements. Properties have already been identified near Goulburn River National Park to offset the mining offset areas and near Capertee National Park to offset the entire Regent Honeyeater credit requirements.

## 5.6 Aboriginal heritage

Technical paper 5 – Aboriginal cultural heritage assessment report (Technical paper 5) of the EIS assessed the potential Aboriginal heritage impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 11 (Aboriginal heritage) of the EIS.

Additional assessment has been undertaken to identify changes to potential Aboriginal heritage impacts associated with the amended project. The relevant assessment completed to support the Amendment Report is provided in Appendix H (Aboriginal Cultural Heritage Assessment Report Addendum). The findings of this assessment are summarised in this section.

### 5.6.1 Assessment approach

The methodology for the updated Aboriginal heritage assessment is consistent with that undertaken for the exhibited project, and was undertaken in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (NSW Department of Environment, Climate Change and Water (DECCW), 2010). Additional field investigations have been undertaken for the assessment, including:

- additional field surveys of previously uninspected areas of the exhibited and amended construction areas, to fill any gaps in the field survey coverage undertaken for the Aboriginal heritage assessment for the exhibited project. The additional 254 kilometres of surveys were undertaken between 9 October 2023 and 15 December 2023, and resulted in a coverage of 94 per cent of the amended construction area. The remaining unsurveyed six per cent of the amended construction area represents small disconnected areas primarily located in Tallawang and the southern end of the Valley of the Winds wind farm where access is limited. These works were undertaken by EMM archaeologists, with participation of 14 RAPs, primarily locally based Wiradjuri and Gomeroi traditional owners
- further investigation of tentatively classified culturally modified trees by a specialist arboriculturist, to determine whether they are of anthropogenic origin
- additional test excavation to further identify and understand any buried cultural deposits within the amended construction area. Given the undulating slope and moderate to steep landforms dominating the construction area, these investigations focussed on the 14 creek corridors identified in the EIS as having high potential for surface and/or buried cultural materials. Nine of these creek corridors were further investigated.

### 5.6.2 Existing environment

The additional field surveys identified 50 Aboriginal sites within the amended construction area (increased by four from the EIS) as described in Table 5-12 and shown in Figure 5-2. This included sites within the exhibited construction area that could not be accessed at the time. The identified sites include:

- nine rockshelters (increased by one from the EIS), including eight previously documented and one newly identified
- five culturally modified trees (decreased by four from the EIS), including two previously documented and three newly identified
- 15 grinding grooves sites (increased by four from the EIS), including 11 previously documented and four newly identified
- four high density artefact scatters (decreased by one from the EIS) (defined as having a density of more than 100 artefacts per square metre)
- six moderate density artefact scatters (decreased by one from the EIS) (defined as having a density of between around 20 to 50 artefacts per square metre)

- 10 centres of past activity, characterised by high densities of sub surface artefacts (increased by four from the EIS) near major watercourses, including Laheys Creek, Tallawang Creek and Sandy Creek
- a background artefact scatter, consisting of 160 of the previously documented isolated and low density stone artefact sites.

The field investigations confirmed that some creek lines were more heavily utilised than others in the past, with only three of the nine investigated exceeding background scatter levels, including Laheys Creek, Sandy Creek and Tallawang Creek. Together, excavations on these three creek lines represent more than 70 per cent of the total artefacts recovered. Smaller watercourses show less activity and are now considered of low significance.

## Significance assessment

A significance assessment of the identified Aboriginal sites was completed to determine their overall significance based on their assessed scientific, historical, social and cultural, and aesthetic significance. The results of the additional assessment are generally consistent with the findings of the significance assessment in the EIS. The significance assessment outcomes for the sites within the amended construction area are:

- Nine sites were considered to have high scientific significance and 37 were considered to be of moderate scientific significance. Four Aboriginal sites were considered to have low scientific significance.
- No specific sites or places have been identified that meet the criterion of historical significance.
- The majority of the Aboriginal sites identified were considered to have moderate social significance. Four sites were considered to have a high social significance including a rockshelter, grinding groove and three artefact scatters.
- The majority of the Aboriginal sites identified have no inherent aesthetic value as they consist of artefact scatters in disturbed rural areas. Twenty-one of the sites were identified to have a low aesthetic significance.

Considering the scientific, historical, social and cultural, and aesthetic significance outcomes, nine sites are identified as of high significance, 38 of moderate significance and three of low significance. This is compared with the EIS that identified 10 sites of high significance, 30 sites of moderate significance and three sites of low significance.

Table 5-12 provides a summary of the significance values for each Aboriginal site and place identified. Sites added or changed since the exhibition of the EIS are presented in **bold**. Cultural sites rankings are based on the cultural mapping report presented in Attachment D of Appendix H (Aboriginal Cultural Heritage Assessment Report Addendum). While all sites identified were of value to the Aboriginal participants, some were identified as having more significance than others. Sites requiring further investigation and/or validation are ranked based on the assumption the site proves valid. However, their significance should be revisited when further analysis and classification of them occurs. These values are presented in red in Table 5-12 to demonstrate their tentative status.

The assessment indicates that larger creeklines that would be traversed by the project, such as Laheys Creek, Sandy Creek and Tallawang Creek, were major centres of past activity and were more heavily utilised than others. However, there is also some evidence supporting the ongoing use of smaller creeklines such as Sportsmans Hollow Creek, Browns Creek (TP #245), and Cockabutta Creek. The investigations also indicate that a number of creeklines such as Whites Creek, Prospect Creek and Planters Creek, were not used extensively in the past, and these areas have been reclassified as being of low significance.

Further investigation of the 14 tentatively identified cultural modified trees in the EIS indicates that five of the trees failed to meet thresholds indicative of anthropogenic origin, while four of the trees were found to have been previously destroyed by mining activity. Five of the trees could not be accessed, and have remained tentatively classified.

Table 5-12 Cultural significance and potential impacts on Aboriginal objects and/or sites within the amended construction area

| Site | AHIMS # | Site type | Cultural significance[1,2] | | | | | Activity of harm[3] | Consequence of harm |
|---|---|---|---|---|---|---|---|---|---|
| | | | Scientific | Aesthetic | Historical | Social | Overall | | |
| S1MC487 | #36-3-3794 | Rockshelter | Low | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| UWF SU51/L3 | #36-3-0449 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| WCP137 | #36-3-0570 | Rockshelter | High | – | – | High | High | Direct impact* | Complete loss of value |
| S1MC488 | #36-3-3790 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| SNI-RS01 | #36-3-4029 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| SNI-RS02 | #36-3-4028 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| SNI-RS03 | #36-2-0675 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| SNI-RS04 | #36-2-0674 | Rockshelter | Moderate | – | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| **SNI-RS06** | – | **Rockshelter** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact* | Complete loss of value |
| **Birriwa Bus Route South ST-1** | **# 36-3-3918** | **Culturally modified tree** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact* | Complete loss of value |
| SNI-CMT02 | #36-3-4034 | Culturally modified tree | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| **SNI-CMT04** | – | **Culturally modified tree** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| **SNI-CMT16** | – | **Culturally modified tree** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| **SNI-CMT19** | – | **Culturally modified tree** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| **Argyll No.3 (SNI-GG14 / SNI-SA01)** | **#36-3-0111** | **Grinding groove with stone arrangement and water hole** | **High** | **Low** | – | **High** | **High** | Direct impact* | Complete loss of value |
| SNI-GG01 | #36-3-4048 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| SNI-GG02 | #36-3-4031 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG03 | #36-3-3968 / #36-3-4038 (duplicate recording) | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |

| Site | AHIMS # | Site type | Cultural significance[1,2] | | | | | Activity of harm[3] | Consequence of harm |
|---|---|---|---|---|---|---|---|---|---|
| | | | Scientific | Aesthetic | Historical | Social | Overall | | |
| SNI-GG04 | #36-3-4044 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG05 | #36-3-4043 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG06 | #36-3-4042 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG07 | #36-3-4045 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG08 | #36-3-4046 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG09 | – | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| SNI-GG15 | #36-3-4047 | Grinding groove | Moderate | Low | – | Moderate | Moderate | Direct impact* | Complete loss of value |
| **SNI-GG16** | – | **Grinding groove** | **Moderate** | **Low** | – | **Moderate** | **Moderate** | Direct impact* | Complete loss of value |
| **SNI-GG17** | – | **Grinding groove** | **Moderate** | **Low** | – | **Moderate** | **Moderate** | Direct impact* | Complete loss of value |
| SNI-AS65 | #36-3-4027 | Grinding groove, low density artefact scatter and PAD | Moderate | Low | – | Moderate | Moderate | Direct impact* | Partial loss of value |
| **SNI-IF104** | – | **Grinding groove artefact (isolated find)** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| SNI-AS41 | #36-2-0678 | High density artefact scatter | High | Low | – | Moderate | High | Direct impact | Complete loss of value |
| SNI-AS43 | #36-3-4030 | High density artefact scatter | High | Low | – | Moderate | High | Direct impact | Complete loss of value |
| SNI-AS57 | #36-2-0677 | High density artefact scatter | High | Low | – | Moderate | High | Direct impact | Complete loss of value |
| **SNI-AS101** | **#36-3-1140 / #36-3-1141 (previously identified in the EIS)** | **High density artefact scatter** | **High** | **Low** | – | **Moderate** | **High** | Direct impact* | Complete loss of value |
| WCP220 | #36-3-0496 | Moderate density artefact scatter | Low | – | – | Low | Low | Direct impact | Complete loss of value |
| WCP227 | #36-3-0503 | Moderate density artefact scatter | Low | – | – | Low | Low | Direct impact | Complete loss of value |

| Site | AHIMS # | Site type | Cultural significance[1,2] | | | | | Activity of harm[3] | Consequence of harm |
|---|---|---|---|---|---|---|---|---|---|
| | | | Scientific | Aesthetic | Historical | Social | Overall | | |
| WC OS 17 with PAD | #36-3-0658 | Moderate density artefact scatter | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| WCP260 | #36-3-0793 | Moderate density artefact scatter | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| **SNI-AS71** | – | **Moderate density artefact scatter** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| SNI-AS02 | #36-2-0676 | Moderate density artefact scatter | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| SNI-FA02 | #36-2-0680 | High density artefact scatter, and deposit | High | Low | – | High | High | Direct impact | Complete loss of value |
| SNI-FA04 | #36-3-4040 | Moderate density artefact scatter, and deposit | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| **SNI-FA05 (previously identified in EIS) / SNI-AS80** | – | **High density artefact scatter, and deposit** | **High** | **Low** | – | **High** | **High** | Direct impact | Complete loss of value |
| SNI-FA06 | #36-2-0683 | Moderate density artefact scatter, and deposit | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| SNI-FA07 | #36-3-4041 | High density artefact scatter, and deposit | Moderate | – | – | Moderate | Moderate | Direct impact | Complete loss of value |
| **SNI-FA08** | – | **Moderate density artefact scatter, and deposit** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| **SNI-FA09** | – | **Moderate density artefact scatter, and deposit** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| **SNI-FA10** | – | **Moderate density artefact scatter, and deposit** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |

| Site | AHIMS # | Site type | Cultural significance[1,2] | | | | | Activity of harm[3] | Consequence of harm |
|---|---|---|---|---|---|---|---|---|---|
| | | | Scientific | Aesthetic | Historical | Social | Overall | | |
| SNI-FA11 / SNI-AS91 | – | **High density artefact scatter, and deposit** | **Moderate** | – | – | **Moderate** | **Moderate** | Direct impact | Complete loss of value |
| SNI-FA12 | – | **High density artefact scatter, and deposit** | **High** | **Low** | – | **High** | **High** | Direct impact | Complete loss of value |
| SNI-BS1 (previously identified in the EIS) | See note 4 | **Low density artefact scatter** | **Low** | – | – | **Low** | **Low** | Direct impact | Complete loss of value |

Notes:

1. Sites added or changed since the exhibition of the EIS ACHAR are presented in **bold**
2. Cultural sites rankings are based on the cultural mapping report presented in Attachment D of the ACHAR. While all sites identified were of value to the Aboriginal participants, some were clearly of more significance than others. Greater significance was also given to those that had broader regional analogues. Sites requiring further investigation and/or validation, are ranked based on the assumption the site proves valid. However, their significance should be revisited when further analysis and classification of them occurs. These values are presented in red to demonstrate their tentative status.
3. Sites proposed for impact avoidance or minimisation through mitigation measures have been indicated with an asterisk (*)
4. SNI-BS1 incorporates #36-3-0353, #36-3-0497, #36-3-0634, #36-3-0691,#36-3-0815, #36-3-0816, #36-3-0817, #36-3-0818, #36-3-0819, #36-3-0820, #36-3-0821, #36-3-1047, #36-3-1048, #36-3-1049, #36-3-1050, #36-3-1051, #36-3-1053, #36-3-1054, #36-3-1055, #36-3-1058, #36-3-1062, #36-3-1063, #36-3-1064, #36-3-1065, #36-3-1066, #36-3-1067, #36-3-1068, #36-3-1090, #36-3-1402, #36-3-1404, #36-3-1428, #36-3-3406, #36-3-1052, #36-3-1056, #36-3-1057, #36-3-1401, #26-3-2514, #36-3-3291, #36-3-3523, **#36-2-0627, #36-3-3917**, SNI-IF01-15 inclusive, SNI-IF17, SNI-IF20, SNI-IF28, SNI-IF33, SNI-IF39, SNI-IF41, SNI-IF43, SNI-IF47, SNI-IF48, SNI-IF51, SNI-IF56, SNI-IF58, SNI-IF62, SNI-IF65, #36-3-0336, #36-3-0470, #36-3-0498, #36-3-0569, #36-3-0660, #36-3-0139, #36-3-1403, #36-3-2833, #36-3-3182, #36-3-3227, #36-3-3233, #36-3-3432, #36-3-3805, #36-3-3828, #36-3-3832, #36-3-3833, #36-3-3835, **#36-2-0533, #36-2-0580, #36-3-1396**, SNI-AS01, SNI-AS03-07 inclusive, SNI-AS09, SNI-AS012-13 inclusive, SNI-AS15, SNI-AS17, SNI-AS29, SNI-AS31, SNI-AS37, SNI-AS40, SNI-AS51-52 inclusive, SNI-AS61, SNI-AS66, SNI-AS68-70 inclusive, SNI-AS72-73 inclusive, SNI-AS76-77 inclusive, SNI-Q01, **SNI-FA01,** SNI-AS79, SNI-AS83, SNI-AS87-90, SNI-AS92, SNI-AS95, SNI-AS97, SNI-AS99, **#36-3-0685/SNI-FA03, #36-3-0720/SNI-AS100, #36-2-0613, #36-3-3884**.

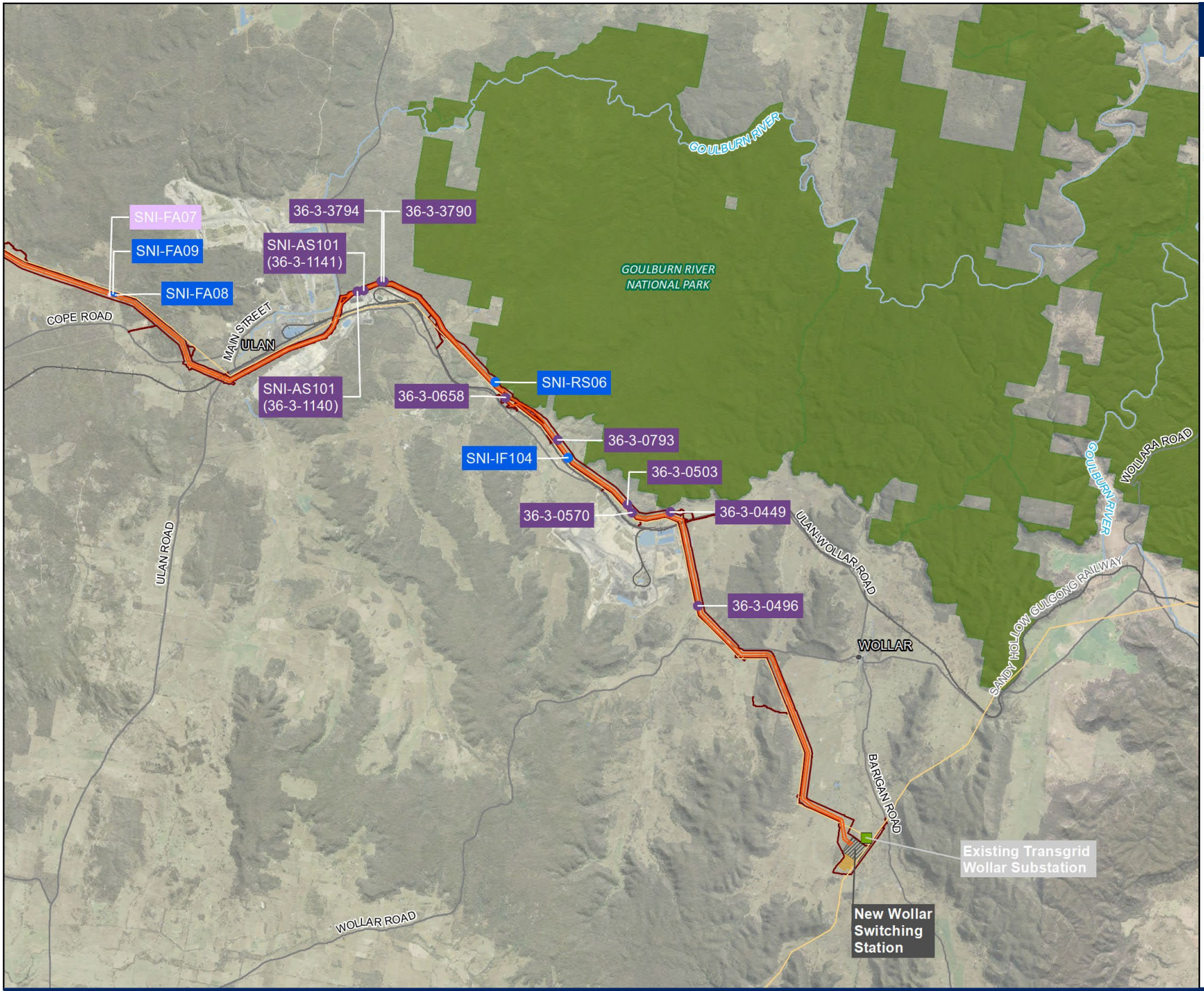


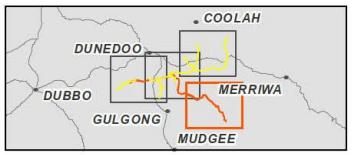

**Figure 5-2**
Aboriginal sites
Map 1 of 4

## Legend

- Construction area
- Construction compound
- Energy hub / 500 kV switching station
- 500 kV transmission line
- Existing substation
- Existing Transgrid Wollar Substation
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body
- NPWS estate

**Aboriginal sites**

- AHIMS
- Newly identified/re-assessed sites since the EIS
- Site identified in EIS




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:160,000

Data sources: WSP, EnergyCo, NSWSS, EMM

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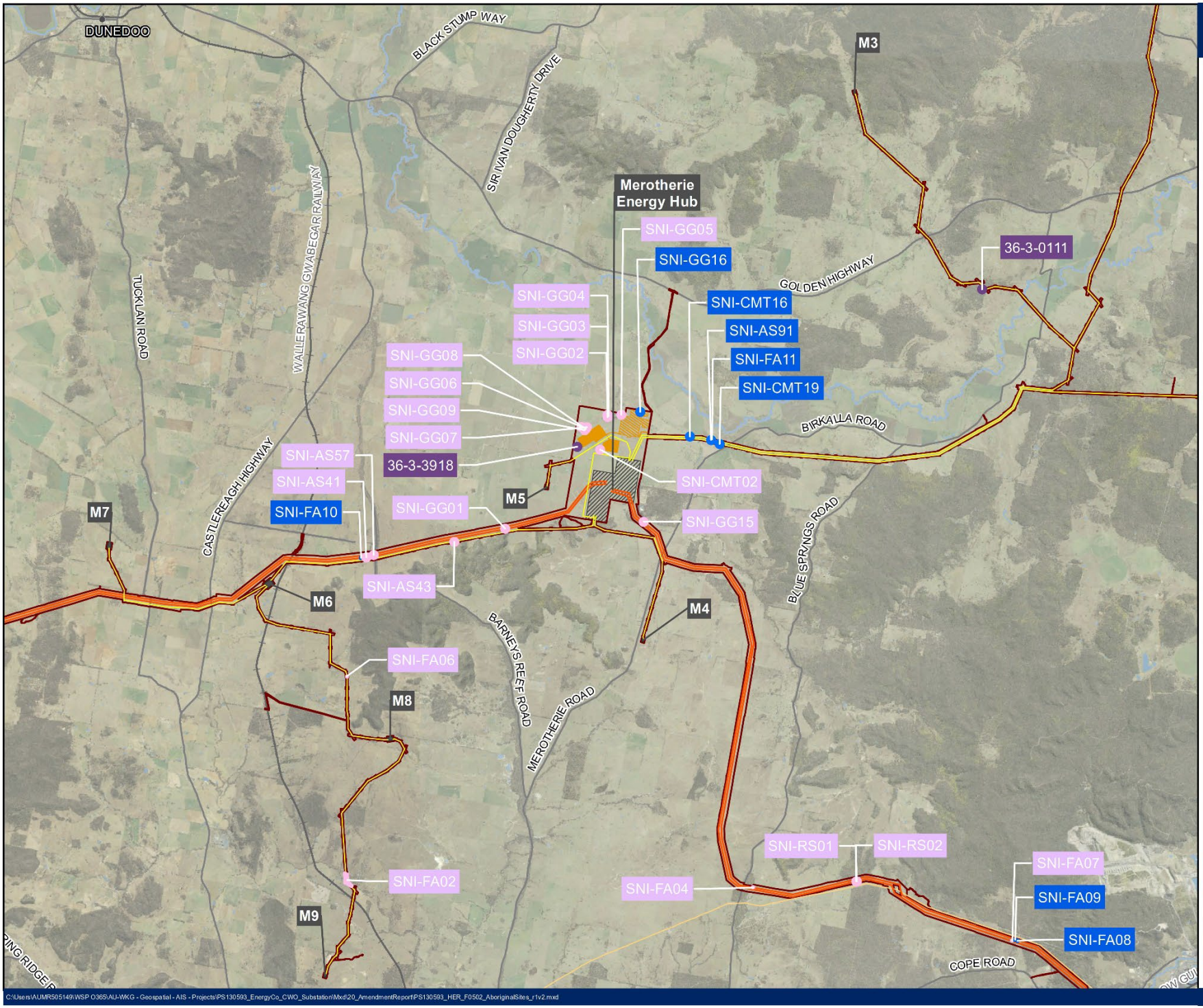


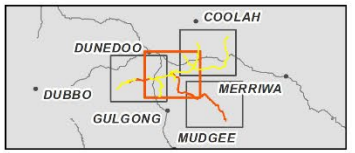

**Figure 5-2**
Aboriginal sites
Map 2 of 4

## Legend

- Construction area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body

**Aboriginal sites**

- AHIMS
- Newly identified/re-assessed sites since the EIS
- Site identified in EIS




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:160,000

Data sources: WSP, EnergyCo, NSWSS, EMM

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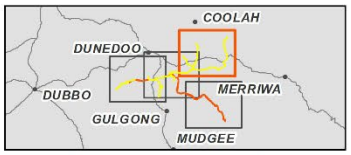
**Figure 5-2**
Aboriginal sites
Map 3 of 4

## Legend

- Construction area
- Construction compound
- Workforce accommodation camp
- 330 kV switching station
- 330 kV transmission line
- State road
- Watercourse
- Water body

**Aboriginal sites**

- AHIMS
- Newly identified/re-assessed sites since the EIS
- Site identified in EIS




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

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Data sources: WSP, EnergyCo, NSWSS, EMM

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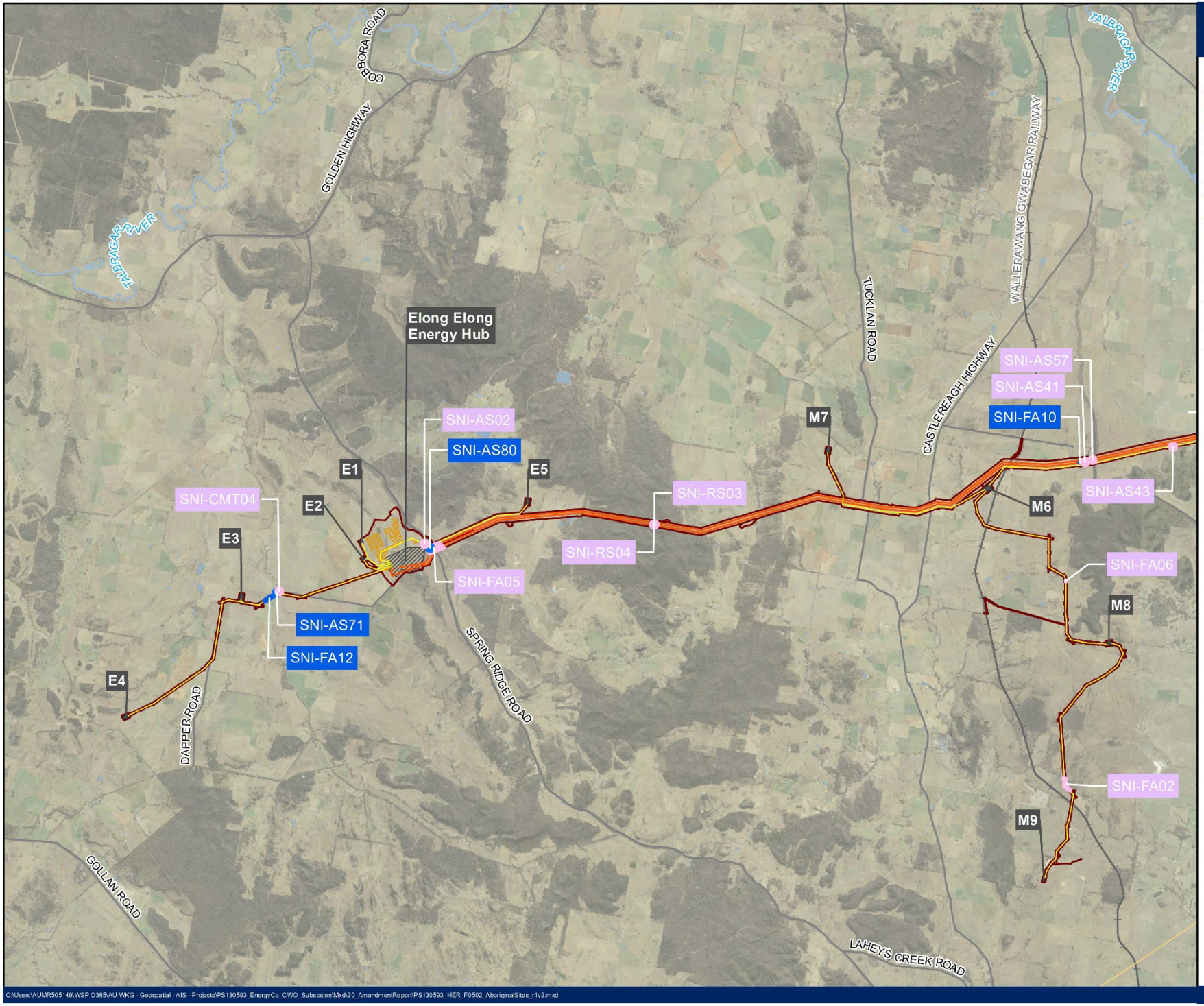



**Figure 5-2**
Aboriginal sites
Map 4 of 4

## Legend

- Construction area
- Construction compound
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body

**Aboriginal sites**

- AHIMS
- Newly identified/re-assessed sites since the EIS
- Site identified in EIS

## 5.6.3 Assessment of potential impacts

The potential impacts to Aboriginal sites and places within the amended construction area from construction and operation are described in Table 5-12.

All 50 Aboriginal sites identified within the amended construction area would potentially be subject to direct impact, resulting in their complete loss, compared to 37 Aboriginal sites within the exhibited construction area as described in the EIS. This increase in the number of sites potentially directly impacted by the project is due to the amendments to the exhibited construction area and the additional surveys which identified sites in areas that could not be accessed for the EIS. It should be noted that there is around 224 hectares of the amended construction area within the remaining 150 metre zone of archaeological sensitivity that have not been subject to field surveys due to access restrictions at the time of preparing this assessment, including 146 hectares that relates to Wilpinjong Creek. Areas around Deadmans Creek are now outside of the construction area and would no longer be affected by the project. Potential impacts to the background scatter remain largely unchanged as directly and wholly impacted, and it is expected that this background artefact scatter would be encountered across much of the amended construction area.

Three Aboriginal sites (SNI-CS4, SNI-CS5, SNI-CS6) and two travelling routes (#1 and #5) were identified in the EIS as being subject to potential visual impacts from the project, and this remains unchanged for the amended project. In addition, Aboriginal sites SNI-GG02 to SNI-GG09 (inclusive) and SNI-AS65, may have their aesthetic value impacted by the amended project although this may potentially be avoided by the final project design.

### Avoidance and minimisation of impacts

The project design and construction methodology would continue to be refined to avoid or reduce impacts to Aboriginal sites, as described in the EIS. This would include investigating further micro-siting of project infrastructure and construction activities to avoid or minimise impacts to sites of high significance, such as rockshelters, grinding grooves, culturally modified trees and areas within 150 metres of Laheys Creek, Sandy Creek and Tallawang Creek within the construction area.

It is considered that 23 Aboriginal sites of moderate to high significance would be avoided through this process, including Aboriginal sites previously identified in the EIS and newly identified sites. This would result in a 46 per cent reduction in potential impacts on Aboriginal sites for the amended project, including two sites of high significance and 21 sites of moderate significance. This is an increase from the EIS, which predicted only nine sites as being avoidable. Potential direct impacts on 27 of the identified Aboriginal sites (54 per cent) are unlikely to be avoided, including five culturally modified trees, nine high density artefact scatters, 11 moderate density artefact scatters and the background artefact scatter.

Archaeological salvage excavations will be carried at tower locations within 150 metres of Laheys Creek, Sandy Creek, Tallawang Creek, Wilpinjong Creek and Bora Creek.

## 5.6.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential impacts on Aboriginal heritage are listed in Table 5-13. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures)

Table 5-13 Updated mitigation measures – Aboriginal heritage

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AH1 | Impact avoidance and minimisation | The project will avoid impacts to the following identified Aboriginal objects and/or sites within the construction area:<br>• the proposed workforce accommodation camps and construction activities at the Merotherie Energy Hub will establish a heritage protection zone to avoid SNI-GG02 **to SNI-GG09** inclusive<br>• the proposed workforce accommodation camps and construction activities at Neeleys Lane will establish a heritage protection zone to avoid SNI-AS65<br>• **the proposed construction activities at brake and winch sites near the Talbragar River will establish a heritage protection zone to avoid direct impacts to Argyll No.3 (#36-3-0111)**<br>• a protection zone will also be implemented at the Elong Elong energy hub to protect cultural material within 150 m of ~~the eastern bank of~~ Laheys Creek (excluding the unavoidable impacts associated with the crossing of Laheys Creek by the transmission corridor, which will be minimised~~),~~ **and ground disturbance associated with upgrades and maintenance along Spring Ridge Road and Dapper Road).**<br>Some guiding principles for consideration of avoidance are presented in Appendix ~~F~~ **E of the Addendum Aboriginal Cultural Heritage Assessment Report (ACHAR) (Appendix H of the Amendment Report).**~~of Technical paper 5 (Aboriginal cultural heritage assessment report)~~**Any site-specific avoidance measures developed to address this commitment would be integrated into AH4.** | Pre-construction<br>Construction | SNI-GG02 – GG09 inclusive, SNI-AS65; Argyll No.3 (#36-3-0111), and 150 m of Laheys Creek |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AH2 | Impact avoidance and minimisation | The project will investigate the micro-siting of project infrastructure and construction activities in consultation with an Aboriginal heritage specialist to avoid or minimise impacts to:<br>• rockshelters (#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive)<br>• grinding groove sites (SNI-GG01, SNI-GG15 and SNI-GG16-17 **inclusive**)<br>• a culturally modified tree (SNI-CMT02) **following validation (AH7)**<br>• high-density **and/or significant** stone artefact sites (#36 3 1140, #36 3 1141**, SNI-FA02, SNI-FA05/SNI-AS80, SNI-FA12, SNI-IF104)**~~, and~~<br>• **within** 150 m of ~~Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsman Hollow Creek~~, Deadmans Creek, Bora Creek, Cumbo Creek, ~~Cockabutta Creek, Planters Creek,~~ Wilpinjong Creek, Tallawang Creek **(north crossing)**, Copes Creek **and Laheys Creek**.<br>Some guiding principles for consideration of avoidance and/or impact minimisation are presented in Appendix ~~F~~ **E of the Addendum Aboriginal Cultural Heritage Assessment Report (ACHAR) (Appendix H of the Amendment Report). Management and any site-specific mitigation measures developed to address this commitment would be integrated into AH4.** | Pre-construction<br>Construction | #36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive, SNI-GG01, SNI-GG15, **SNI-GG16-17 inclusive,** SNI-CMT02, **SNI-AS101** (#36-3-1140, #36-3-1141**), SNI-FA02, SNI-FA05/ SNI-AS80, SNI-FA12, SNI-IF104, and** areas within 150 m of ~~Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek~~, Deadmans Creek, Bora Creek, Cumbo Creek, ~~Cockabutta Creek, Planters Creek,~~ Wilpinjong Creek, Tallawang Creek **(north crossing),** Copes Creek **and Laheys Creek.** |
| AH3 | Impact avoidance and minimisation | On-Country meetings will be undertaken with participating Elders and key knowledge-holders of the project to discuss **efforts to conserve and communicate appropriate important information about** ~~any potential view line impacts of the project and~~ places of cultural **value intersected by the project** ~~and their subsequent management.~~<br>**If identified, feasible and reasonable measures would be developed in consultation with the Elders and key-knowledge-holders and integrated into AH4~~8~~.** | Pre-construction<br>Construction | SNI-CS4 – CS6 inclusive, and travelling routes #1 and #5 where they intersect the construction area. |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AH4 | Cultural heritage management | An Aboriginal Cultural Heritage Management Plan (ACHMP) ~~will be developed by an Aboriginal heritage specialist in consultation with the Registered Aboriginal Parties (RAPs) and Heritage NSW.~~ **will be jointly prepared by the proponent and a suitably qualified heritage professional, with the latter providing archaeological and cultural heritage inputs and requirements, and final endorsement of the document. The ACHMP would be developed in consultation with the Registered Aboriginal Parties (RAPs) and Heritage NSW.**<br>The contents and guiding principles for the management of identified site types for the ACHMP are presented in Appendix ~~F~~ **E** of Technical paper 5 (Aboriginal cultural heritage assessment report), and include:<br>• processes, timing, communication methods and project involvement for maintaining Aboriginal community consultation and participation through the remainder of the project<br>• inputs and content of a cultural heritage induction package for all construction personnel and subcontractors<br>• descriptions and methods for archaeological test/salvage excavations of rockshelters, stone artefact scatters, potential archaeological deposits, and cultural deposits that will be adversely affected by the project<br>• descriptions and methods for surface collection of identified isolated objects and stone artefact scatters that will be adversely affected by the project<br>• descriptions and method for mitigation and/or recovery of grinding grooves and culturally modified trees that will be adversely affected by the project<br>• delineating and protecting Aboriginal and cultural sites within or in close proximity to the construction area, including clear marking, appropriate screen for any gender-specific areas, surface protection, etc<br>• procedures for managing the unexpected discovery of Aboriginal objects, sites and/or human remains during the project<br>• procedures for the curation and long-term management of recovered cultural materials<br>• methods of post-excavation analysis and reporting of the archaeological investigations, including suitable collection and processing of stone artefacts, palaeo-environmental, chronological and other soils from archaeological activities; and<br>• a monitoring regime for implementing the above measures. | Pre-construction Construction | Construction area, and all identified Aboriginal objects, sites and deposits in ~~the~~ Chapter **5** ~~9~~ of ~~Technical paper 5~~ **the Addendum ACHAR** that will be adversely impacted by the project. |
| ~~AH5~~ | ~~Cultural heritage management~~ | ~~Additional archaeological field survey will be undertaken of the portions of the construction area inaccessible during the Aboriginal cultural heritage assessment. Any identified Aboriginal objects, sites, places and/or deposits during these works will be integrated into the ACHMP (AH4).~~ | ~~Pre-construction~~ | ~~Previously unsurveyed portions of the construction area~~ |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| ~~AH6~~ | ~~Cultural heritage management~~ | ~~Where construction is unable to avoid areas within 150 m of Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjong Creek, Tallawang Creek and Copes Creek, archaeological test excavations will be undertaken.~~<br>~~Test excavations will adopt the methods outlined in Appendix F and/or developed in the ACHMP (AH4). The findings of the test excavations will be integrated into the ACHMP (AH4).~~ | ~~Pre-construction~~ | ~~The construction area, where it is located within 150 m of Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjong Creek, Tallawang Creek and Copes Creek~~ |
| AH~~7~~5 | Cultural heritage management | An inspection will be undertaken by a qualified arboriculturist of all tentatively identified culturally modified trees to confirm whether they have formed through anthropogenic or natural processes. ~~Where identified as of cultural formation, they will be integrated into the ACHMP (AH04).~~<br>The findings ~~of~~ **from** this ~~investigation~~ **inspection** and subsequent management of the trees confirmed as being culturally modified will be integrated into the ACHMP (AH04) as required. | Pre-construction | ~~#36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643,~~<br>**#36-3-3918,**<br>~~SNI-CMT01,~~<br>SNI-CMT02,<br>~~SNI-CMT06, SNI-CMT08, SNI-CMT11, SNI-CMT13, SNI-CMT15~~<br>SNI-CMT04,<br>SNI-CMT16,<br>SNI-CMT19 |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AH~~86~~ | Cultural heritage management | Archival recording will be undertaken of all rockshelters, grinding grooves, and culturally modified trees that may be adversely impacted by the project.<br>Archival recording will be undertaken in accordance with relevant Heritage NSW guidelines **and submitted to the Heritage NSW AHIMS database.** | Pre-construction | #36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive,<br>~~SNI-GG01, SNI-GG15,~~ **SNI-RS-06,**<br>**SNI-GG01-GG09 inclusive, SNI-GG15 - GG17 inclusive,**<br>**Argyll No.3 (#36-3-0111)**<br>**SNI-AS65; and as required for the following: AH05:**<br>**#36-3-3918, SNI-CMT02, SNI-CMT04, SNI-CMT16, SNI-CMT19**<br>~~#36-3-1140, #36-3-114; and as required following AH03: #36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643, SNI-CMT01, SNI-CMT02, SNI-CMT03, SNI-CMT06, SNI-CMT08, SNI-CMT11, SNI-CMT13, SNI-CMT15~~ |
| AH~~97~~ | Heritage interpretation | An Aboriginal heritage-interpretation strategy and plan will be developed by an Aboriginal heritage specialist, in consultation with Registered Aboriginal Parties, which will identify the interpretive values of the construction area (and specifically Aboriginal heritage values) and provide direction for interpretive installations and devices.<br>The contents and guiding principles for the management of the strategy and plan are presented in Appendix ~~F~~**E** of Technical paper 5 and include the need to incorporate Registered Aboriginal Parties' views on traditional and contemporary values, local ethnographic and post-Contact information, and archaeological data developed for the project. | Construction<br>Post-construction | Construction area |
| AH~~108~~ | Aboriginal engagement | Consultation will be maintained with the Registered Aboriginal Parties ~~during the finalisation of the assessment process and subsequent stages of the project~~ where cultural heritage requires management. | Pre-construction<br>Construction | **All Aboriginal objects, sites and places** |

## 5.7 Non-Aboriginal heritage

Technical paper 6 – Non-Aboriginal heritage assessment (Technical paper 6) of the EIS assessed the potential non-Aboriginal heritage impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 12 (Non-Aboriginal heritage) of the EIS.

Additional assessment has been undertaken to identify changes to potential non-Aboriginal heritage impacts associated with the amended project. The findings of this assessment are summarised in this section.

### 5.7.1 Assessment approach

The methodology for the updated non-Aboriginal heritage assessment involved:

- review of historical and current documents, aerials and maps to identify land use and potential evidence of heritage items in areas of the amended study area that extent outside the exhibited study area. The amended study area consists of the amended construction area of the project with a one kilometre buffer, consistent with the EIS
- consideration of observations made during field investigations associated with the Aboriginal heritage field surveys (refer to Section 5.6.1)
- interpretation of data from a ground penetrating radar survey carried out on 8 July 2023 (provided in Appendix M), to assess the potential for unmarked graves within three non-Aboriginal heritage sites previously identified in the EIS. The ground penetrating radar investigation utilised advanced technology allowing for detailed tomographic imaging up to 2.5 metres below the surface. Despite challenges posed by recent rainfall and clay soil composition, the survey aimed to visualise subsurface features and assess the presence of human burials and other underground elements. Interpretation of the ground penetrating radar data involved the analysis of each subsurface anomaly identified during the ground penetrating radar survey, following established historic conventions related to nineteenth-century graves. This encompassed factors such as the placement, orientation, dimensions, and depth of each anomaly. Subsequently, each interpreted anomaly was graded for confidence, categorised as high, moderate, or low, based on the level of certainty derived from the interpretation process
- consideration of the need for further mitigation measures.

### 5.7.2 Existing environment

The database and register searches did not identify any additional listed non-Aboriginal heritage items within the amended study area, which is consistent with the findings of the EIS. There are no heritage items within the amended construction area listed on the Commonwealth Heritage List, National Heritage List, Register of National Estate, State Heritage Register and Section 170 Registers.

The archaeological potential of the amended construction area has been assessed from the available historical documentation. In most cases, the documentation did not identify any areas that would indicate high potential for earlier structures, and therefore archaeological sites. However, given that the region was initially historically taken up by squatters and then converted to pastoral runs, there is potential for unmapped structures to exist in the amended construction area. These structures may have been in the form of shepherds' huts, sheep folds, and wool/shearing sheds. Other structures or features related to squatting or early pastoral activities may also exist.

Additional field surveys of the amended construction area carried out as part of the Aboriginal cultural heritage assessment identified two new potential archaeological sites in the amended construction area, including:

- a potential former gold and mineral mining/processing site (CWO-23-HH01 – Coolah metallurgical processing and mining sites), identified near the relocated switching station M2 and the associated realigned transmission line. The site is located partly within the amended construction area. The site is identified as having high archaeological potential, as it contains potential evidence of several slag piles (indicating a processing site), possible fossicking holes/pits, and potential sluicing pits/historic infrastructure. One embedded brick and two small timber uprights were also noted on one of the mounds
- a potential nineteenth-century occupation site (CWO-23-HH02 - Sportsmans Hollow Creek archaeological site) on the northern bank of Sportsmans Hollow Creek, Ulan near the Merotherie Energy Hub—Elong Elong Energy Hub connection. The site is located within the amended construction area around 820 metres southwest of Ulan along the north-west bank of Sportsmans Hollow Creek. The site is identified as having high archaeological potential, as it shows evidence of three areas of previous occupation:
  - a small outbuilding structure
  - a main structure. A lower terrace extending towards the north edge of the creek suggests that this flat terrace could have been a small vegetable garden, although this could not be confirmed
  - separate kitchen or similar structure.

As outlined in revised mitigation measure HH3, if sites CWO-23-HH01 and CWO-23-HH02 cannot be avoided through detailed design, a site inspection assessment will be completed in accordance with NSW guidelines for items to determine their cultural heritage sensitivity.

A review of historical aerial photographs from 1964 also identified a sports oval with cricket pitch (non-extant) adjacent to and associated with the Cope Road archaeological site (CWO-22-HH14) identified in the EIS. The Cope Road archaeological site and sports oval is located around 120 metres northeast of the amended construction area, around 800 metres west of Ulan along Ulan Road. Historical records, including sales listings for the property, do not clearly reference the cricket pitch. As such, the relationship between site CWO-22-H14 and the sports oval remains unknown at this time.

### Potential graves

The ground penetrating radar survey was completed at three non-Aboriginal sites previously identified in the EIS along the Tallawang west connection:

- Spir Road Cottage (CWO-22-HH08)
- Tallawang Union Church (CWO-22-HH09b)
- Tallawang Catholic Churches (CWO-22-HH09).

The ground penetrating radar results are presented in Appendix M.

One location with a high confidence for a potential grave and five sites with a moderate confidence for potential graves were identified in the Tallawang Union Church site. Five locations with a moderate confidence for potential graves were identified in the Tallawang Catholic Churches site. One location with a low confidence for a potential grave was identified at Spir Road Cottage.

The ground penetrating radar data also identified three potential locations of surviving architectural fabric in the form of foundations/footings in the Tallawang Catholic Churches site, and five potential locations of surviving architectural fabric in the Tallawang Union Church site.

## 5.7.3 Assessment of potential impacts

### Construction

- Potential additional direct impacts to non-Aboriginal heritage that may occur areas a result of the amendments and refinements. There is potential for disturbance of the following demolition newly identified archaeological sites during construction:
  - Coolah metallurgical processing and mining sites (CWO-23-HH01), located near switching station M2 and its associated transmission line
  - Sportsmans Hollow Creek archaeological site (CWO-23-HH02), located near the Merotherie Energy Hub — Elong Elong Energy Hub connection
  - potential graves and surviving architectural fabric at sites previously identified in the EIS along the Tallawang west connection, including Spir Road Cottage (CWO-22-HH08), Tallawang Union Church (CWO-22-HH09b) and Tallawang Catholic Churches (CWO-22-HH09).

Direct impacts to the newly identified archaeological sites would be avoided where practicable. If direct impacts cannot be avoided, further archaeological assessment would be required to confirm the level of significance of the sites, to establish if they meet the threshold for relics under the *Heritage Act 1977* and require archaeological excavation.

### Operation

Consistent with the EIS, the amended project would be unlikely to have any direct impacts to non-Aboriginal heritage items during operation, as activities would primarily involve routine inspection and maintenance of transmission lines, towers and easements.

## 5.7.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential impacts on non-Aboriginal heritage are listed in Table 5-14. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures)

Table 5-14 Updated mitigation measures – non-Aboriginal heritage

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH1 | Avoidance of direct impacts to Tallawang Creek Archaeological Site 02 | Prior to construction, an exclusion barrier (e.g. fencing or suitable alternative) will be installed to prevent construction activities or access into the portion of CWO-22-HH11 which extends into the construction area. The barrier would be maintained for the duration of construction. | Pre-construction<br>Construction | CWO-22-HH011 |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH2 | Minimisation of direct impacts | Construction methodologies will be refined to avoid and/or minimise direct impacts to listed and potential historic heritage items where reasonable and feasible.<br>~~[1] The final mitigation measure for the Tallawang Union and Catholic Churches (HH09b and HH09c) and cemetery depend on the outcome of the non-intrusive geophysical investigations~~ | Pre-construction<br>Construction | CWO-22-HH03<br>CWO-22-HH05a<br>CWO-22-HH05b<br>CWO-22-HH08<br>CWO-22-HH09a<br>CWO-22-HH09b[1]<br>CWO-22-HH09c[1]<br>CWO-22-HH10<br>CWO-22-HH13<br>CWO-22-HH16<br>CWO-22-HH18<br>CWO-22-HH19<br>CWO-22-HH20<br>CWO-22-HH21<br>CWO-22-HH14<br>CWO-23-H01<br>CWO-23-H02 |
| HH3 | Minimisation and management of indirect impacts | Construction methodologies will be refined to avoid and/or minimise indirect impacts to listed and potential historic heritage items where reasonable and feasible. | Pre-construction<br>Construction | CWO-22-HH06<br>CWO-22-HH22<br>CWO-22-HH23 |
| **HH4** | **Cultural heritage management** | **Cultural Heritage Sensitivity Assessment**<br>**If sites CWO-23-HH01 and CWO-23-HH02 cannot be avoided through detailed design, a site inspection assessment will be completed in accordance with NSW guidelines for items to determine their cultural heritage sensitivity.** | **Pre-construction** | **CWO-23-HH01**<br>**CWO-23-HH02** |
| HH4~~5~~ | Cultural heritage management | **Archival recording**<br>If avoidance **of sensitive sites** cannot be established during the detail**ed** design stage, **where determined to have state or local significance in accordance with HH4,** an archival recording will be completed in accordance with ~~the following~~ **NSW** guidelines and be lodged with the Heritage NSW and local councils for access to researchers~~.~~<br>~~• photographic recording of heritage items using film or digital capture (Heritage Office, 2006), and~~<br>~~how to prepare archival records of heritage items (NSW Heritage Office, 1998).~~ | Pre-construction | CWO-22-HH08<br>CWO-22-HH10<br>CWO-22-HH18<br>CWO-22-HH19<br>CWO-22-HH14<br>~~CWO-23-H01~~<br>~~CWO-23-H02~~ |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH~~56~~ | Cultural heritage management | **Archaeological test excavation**<br>If direct impacts to a heritage item cannot be reasonably and feasibly avoided during the detailed design stage, a program of archaeological test excavation will be undertaken (where the extent of the archaeological deposit is not known). This will include development of:<br>• a detailed archaeological research design<br>• consultation with Heritage NSW<br>• systematic test excavation of historical archaeological sites that meet the 'relics' threshold identified for impact<br>• where archaeological deposits are uncovered, sampled recovery of historic heritage relics will occur prior to disturbance. Once recorded and analysed artefacts will be offered to local heritage society/museum.<br>A detailed excavation method and research design for this process will be included in the Historic Heritage Management Plan (HHMP). | Pre-construction<br>Construction | CWO-22-HH03<br>CWO-22-HH05a<br>~~CWO-22-HH09a~~<br>~~CWO-22-HH09b[1]~~<br>~~CWO-22-HH09c[1]~~<br>CWO-22-HH13<br>CWO-22-HH16 |
| HH~~67~~ | Cultural heritage management | **Archaeological salvage excavation**<br>Salvage excavation will be undertaken on archaeological sites subject to direct impacts where the extent of the archaeological deposit is known. This will include development of:<br>• a detailed archaeological research design<br>• consultation with Heritage NSW<br>• systematic salvage excavation of historical archaeological sites. Once recorded and analysed, salvaged artefacts will be offered to local heritage society/museum.<br>A detailed excavation method and research design for this process will be included in the HHMP.<br>~~[1] The final mitigation measure for the Tallawang Union and Catholic Churches (HH09b and HH09c) and cemetery depend on the outcome of the non-intrusive geophysical investigations~~ | Pre-construction | CWO-22-HH03<br>CWO-22-HH05a<br>CWO-22-HH09a<br>CWO-22-HH09b<br>CWO-22-HH09c<br>CWO-22-HH13<br>CWO-22-HH16 |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH~~7~~8 | Cultural heritage management | **Unexpected finds procedure**<br>Any items of potential heritage conservation significance or human remains discovered during construction and operation will be managed in accordance with an Unexpected Finds Procedure. ~~Work in the vicinity of the find will stop if objects such as bonded bricks, timber or stones appearing in formation indicating a wall or floor for instance are found, or if soil with artefacts concentrations, is excavated~~. A description of the types of finds that will stop works within the vicinity of the finds will be determined prior to construction as part of the HHMP and staff involved in excavation work will be informed about how to apply it. **Finds would include objects such as bonded bricks, timber or stones appearing in formation indicating a wall or floor for instance are found or excavated soil with artefact concentrations.**<br>The unexpected finds procedure will include actions such as:<br>• stop work procedures and exclusion buffers<br>• utilising the advice of a technical specialist<br>• consultation with Heritage NSW<br>• protocols for continuing work in the area after assessment.<br>~~[1] The final mitigation measure for the Tallawang Union and Catholic Churches (HH09b and HH09c) and cemetery depend on the outcome of the non-intrusive geophysical investigations~~ | Pre-construction<br>Construction | ~~CWO-22-HH03~~<br>~~CWO-22-HH05a~~<br>~~CWO-22-HH05b~~<br>~~CWO-22-HH09a~~<br>~~CWO-22-HH09b~~[1]<br>~~CWO-22-HH09c~~[1]<br>~~CWO-22-HH10~~<br>~~CWO-22-HH11~~<br>~~CWO-22-HH17~~<br>~~CWO-22-HH20~~<br>~~CWO-22-HH21~~<br>~~CWO-22-HH14~~<br>~~CWO-23-H01~~<br>~~CWO-23-H02~~<br>**Construction area** |
| HH~~8~~9 | **Avoidance of impacts to** Laheys Creek Cemetery | A structural assessment of the standing headstones will be undertaken to determine if additional conservation works may be required to mitigate nearby construction works.<br>**Prior to and during any activities with the potential to generate vibration levels that exceed tolerance levels identified by the structural assessment, a vibration monitor will be installed within the cemetery at the closest point to construction works to confirm that vibration levels are compliant with applicable criteria.**<br>Vibration monitoring would be discontinued if it indicates that the risk exceeding the tolerance levels is negligible. | Pre-construction<br>Construction | CWO-22-HH06 |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH~~9~~10 | Avoidance of ~~direct and indirect~~ impacts to Laheys Creek Cemetery | Prior to construction **in the vicinity of CWO-22-HH06 (Laheys Creek Cemetery)**, an exclusion **area of a suitable minimum width, as confirmed by a vibration assessment,** ~~barrier (e.g. fence or suitable alternative)~~ will be installed ~~to provide a minimum 100 metre exclusion buffer around the heritage item~~ to ensure ~~direct and indirect~~impacts to the cemetery are avoided.<br>The **initial** nominated exclusion buffer for CWO-22-HH06 ~~may be reduced~~ **will be determined** on the following basis:<br>• a report from a structural engineer assesses the stability of the headstones in the cemetery and **identify vibration tolerance levels to avoid damage; and**<br>• **the report** ~~can~~ **must certify that the proposed exclusion** ~~a reduced~~ **buffer** ~~exclusion area~~ **is sufficient** ~~is unlikely cause~~ **to avoid damage to the items.**<br>• ~~the headstones identified as being at risk of collapse are stabilised and conserved; and/or~~<br>**If a reduction in the initial exclusion area is required:**<br>• **a structural engineer must certify that the proposed revised exclusion buffer is sufficient to avoid damage to the items.**<br>• ~~a report from a structural engineer assesses the stability of the headstones in the cemetery; and~~<br>• ~~the report can certify that a reduced buffer is unlikely to cause damage; and/or~~<br>• **if vibration-generating works are unavoidable within the exclusion buffer, headstones identified as being at risk of collapse will be stabilised and conserved.**<br>• the report can provide and certify vibration criteria, vibration monitoring equipment is installed and vibration criteria are not exceeded; and<br>• any damage sustained to the cemetery during construction or in the succeeding 12-month period **will be** ~~is~~ repaired and **rectified** ~~conserved~~ by the proponent. | Pre-construction<br>Construction | CWO-22-HH06 |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HH11 | Avoidance of impacts to Upper Tallawang Catholic Church and Union Church Cemeteries | To avoid harm to any relics present, Restricted Zones will be established around the suspected graves and buried architecture within specific areas of the Tallawang Catholic Church lots. To implement this recommendation:<br>• The detailed design and construction methodology will be developed to avoid excavation and ground disturbance within the Restricted Zones to the greatest extent practicable.<br>• Subsurface anomaly confidence locations identified in the Ground Penetrating Radar Interpretation Report (EMM 2024) will be marked out within the construction area using non-intrusive (i.e. non-ground-penetrating) methods prior to project-related activities commencing in the vicinity.<br>• Heavy vehicle access within the Restricted Zones will be limited to only essential movements to support other construction activities required within the zones.<br>• A clearing approach will be developed and implemented within the Restricted Zones to avoid accessing the subsurface anomaly confidence locations and minimise ground/subsurface disturbance generally during the clearing process, where feasible and reasonable.<br>• If surface activities in the immediate vicinity of the subsurface anomaly confidence locations are unavoidable, implementing protective measures (for example using road plates) to prevent ground disturbance and minimise potential compaction.<br>• Heritage specialist surveillance of any excavations required in the immediate vicinity of the Moderate High subsurface anomaly confidence locations. | Pre-construction<br>Construction | CWO-22-HH09b<br>CWO-22-HH09c |

## 5.8 Economic

Technical paper 8 – Economic (Technical paper 8) of the EIS assessed the potential impacts of the construction and operation of the project on Economics. The key findings of the assessment were summarised in Chapter 14 (Economics) of the EIS.

Additional assessment has been undertaken to identify changes to potential economic impacts associated with the amended project. The findings of the additional assessment are reported in this section.

### 5.8.1 Assessment approach

The methodology for the updated construction economic assessment is generally consistent with that undertaken for the exhibited project.

A desktop assessment was carried out to assess the amendments and refinements. Given the nature of the potential impacts of the amended project, no additional specialist assessment was undertaken with the results of the previous assessment being considered consistent with the amendments and refinements.

## 5.8.2 Existing environment

The amendments and refinements would not result in any changes to the existing environment, which is consistent with consistent with Section 14.2 of the EIS.

## 5.8.3 Assessment of potential impacts

### Construction

The assessment of the economic impacts of the construction of the project is detailed in Section 14.3 of the EIS. The construction of the project would generate economic activity within the regional and NSW economy, and would also result in some contraction in agricultural activity in the construction area.

The amendments and refinements would not result in any material changes to the assessed construction expenditure and workforce.

As discussed in Section 5.3.3, impacts associated the displacement of agricultural land would result in a marginal decrease (around 2.3 per cent) in the assessed loss of productivity decreasing from $1.35 million per year to $1.32 million per year over a three year period. The amendments and refinements would not noticeably change the assessed level of total economic effect from the displacement of agriculture when considering both indirect and direct effect, which largely remains consistent with the EIS.

### Operation

The assessment of the economic impacts of the construction of the project is detailed in Section 14.4 of the EIS. Operation of the project would result in economic activity in the electricity transmission, distribution, on selling and electricity market operation sector. Operation would also result in some contraction in agricultural activity in part of the operation area, due to the loss of agricultural land where permanent infrastructure would be established. However, for areas within the permanent transmission line easements, agricultural activities such as grazing and cropping would continue subject to certain restrictions (refer to Section 8.5.1 of the EIS).

The amendments and refinements would not result in any major changes to the assessed construction expenditure and workforce.

As discussed in Section 5.3.3, the amendments and refinements would result in a marginally reduced loss of productivity due to direct impacts, which is estimated to be around $285,900 over a year (representing around 0.04 per cent of the total annual gross value of agricultural production across the four impacted LGAs), based on the 2022 economic environment. This figure was compared with a previous loss of $317,550 in annual agricultural productivity.

The amendments and refinements would not noticeably change the assessed level of total economic effect from the displacement of agriculture when considering both indirect and direct effect, which largely remains consistent with the EIS.

## 5.8.4 Updated or additional mitigation measures

No changes to mitigation measures identified in the EIS are required to address the potential economic impacts of the amended project. The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

# 5.9 Noise and vibration

Technical paper 9 – Noise and Vibration (Technical paper 9) of the EIS assessed the potential noise and vibration impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 15 (Noise and vibration) of the EIS.

Additional assessment has been undertaken to identify changes to potential noise and vibration impacts associated with the amended project. The relevant assessment completed to support this Amendment Report is provided in Appendix I (Noise and Vibration Impact Assessment Addendum). The findings of this assessment are summarised in the section below.

## 5.9.1 Assessment approach

### Construction noise and vibration

The methodology for the updated construction noise and vibration assessment is generally consistent with that undertaken for the exhibited project. Minor changes to the methodology, as described in Appendix I, included the following to address the project amendments and refinements:

- A minor increase in the study area was required for the construction assessment to ensure all sensitive receivers near the amended construction area are included in the modelling.
- Identification of new or reclassified sensitive receivers within the updated study area. Since exhibition of the EIS, further review of detailed aerial imagery and searches of local council development application registers have been undertaken to confirm if any there are any unidentified dwellings or newly approved development applications for dwellings in the noise assessment study area that need to be included in the noise assessment.
- Adjustments have been made to the construction activities and construction noise scenarios considered in the construction assessment, due to the following amendments and refinements:
    - provision of a construction compound at the Neeleys Lane workforce accommodation camp
    - confirmation of the locations and details of the microwave repeater sites. The construction of the two new microwave repeater sites at Botobolar and Cope has been assumed to involve one construction scenario. The potential impacts from these two microwave repeater sites were calculated using spreadsheet-based noise prediction methods. This methodology is considered suitable due to the combination of the small study area, short-term construction periods, and the large separation distances to the nearest receivers. It is also assumed that the installation of additional microwave infrastructure to the existing sites at Magpie Hill and Baldy Peak would involve minimal noise-generating equipment. Furthermore, these existing sites are isolated and likely more than 1,400 metres from the nearest sensitive receivers, and therefore unlikely to result in additional noise or vibration impacts
    - local road and intersection upgrades. The methodology for the assessment of noise and vibration impacts of the proposed local road and intersection upgrades is consistent with the methodology presented in Technical paper 9 and Chapter 15 (Noise and vibration) of the EIS
    - provision of additional access tracks and brake and winch sites.

Although an additional crushing, grinding and screening site is proposed at switching station M1, rock-crushing plant was already considered in the EIS assessment at all energy hubs and switching stations as part of the access and earthworks work stage (refer to Table 2-4 of Technical paper 9). As such, no additional noise and vibration impact assessment for this activity was considered necessary as part of the addendum noise and vibration impact assessment.

### Construction road traffic noise

The provision of a construction compound at the Neeleys Lane workforce accommodation camp would change construction traffic volumes to and from this location. Up to 32 light vehicle movements and 34 heavy vehicle movements would be generated at the site during the peak hour, which would result in 66 traffic movements during the peak hour (an increase of 10 traffic movements from the exhibited project). No other changes in indicative peak hour construction vehicle movements are anticipated for the amended project.

### Construction vibration

The construction of microwave repeater sites is likely to require the use of a vibratory pile driver to install the microwave radio towers.

Table 5-15 indicates the minimum working distances for a vibratory pile driver, as per the *Construction Noise and Vibration Guideline* (Transport for NSW, 2022) (CNVG) (refer to Section 15.4.3 of the EIS). The minimum working distances presented are indicative and would vary depending on the item of plant and local geotechnical conditions. The cosmetic damage thresholds apply to typical buildings under typical geotechnical conditions.

Table 5-15 Minimum working distances for vibration intensive plant

| Plant item | Rating/description | Minimum working distance (metres) | | |
|---|---|---|---|---|
| | | Cosmetic damage (BS 7385)1 | Heritage (DIN 4150-3)2 | Human response (AVTG)3 |
| Vibratory pile driver | Driven piling | 20 | 50 | 100 |

1. *British Standard BS 7385-2:1993 – Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration* (British Standard Institution, 1993) (BS 7385)
2. DIN 4150-3 Structural Vibration Part 3: Effects of Vibration on Structures (Deutsches Institut für Normung, 1999) (DIN 4150-3)
3. *Assessing Vibration: A Technical Guideline* (NSW Department of Environment and Conservation, 2006) (AVTG)

## Operational noise

### Corona noise from transmission lines

The methodology for the assessment of corona noise impacts during operation is consistent with the methodology presented in the Technical paper 9.

### Energy hubs

The option to have one 200 megawatts/400 megawatts per hour BESS replace one synchronous condenser at the Merotherie Energy Hub has been removed in the amended project. The updated SWLs for the primary noise generating equipment at the energy hub are provided in Table 5-16.

Table 5-16 Updated sound power levels for the primary noise generating equipment at the Merotherie Energy Hub

| Equipment | Number of plant (indicative) | Sound Power Level dB per unit $L_{Aeq(15\ minutes)}$ | Sound Power Level dB per unit $L_{Amax\ (15\ minutes)}$ |
|---|---|---|---|
| Power transformers | 5 | 90 | – |
| Synchronous condenser | 4 (3 in EIS) | 93 | – |
| Circuit breaker switches | – | – | 115 |
| **Total** | | **101** | **115** |

### Microwave repeaters

The only operational noise sources at the microwave repeater sites would be air-conditioning units to maintain appropriate temperatures of the on-site equipment. As the closest receiver (ID 1485) is around 525 metres away from the Botobolar microwave repeater site, no operational noise impacts are predicted, and operational noise impacts from the microwave repeater sites do not require further discussion or assessment as part of the addendum noise and vibration impact assessment for the project.

## 5.9.2 Existing environment

### Study area

Minor changes were made to the study area due to the amendments and refinements, including refinements to the project alignment and the addition of project components which are located outside of the study area that was adopted for the noise and vibration assessment of the for the exhibited project (for example, microwave repeater sites) (refer to Appendix A of Appendix I (Noise and vibration impact assessment addendum)).

### Sensitive receivers

Sensitive receivers with the potential to be impacted by noise and vibration during construction and operation of the project were identified in Chapter 15 (Noise and vibration) of the EIS and Appendix A-2 of Technical paper 9.

Section 15.3.1 of the EIS noted that a potential residential receiver, an approved development application for a house at 121 Cliffdale Road, Uarbry, was not included in the noise assessment, as it was identified in the final stages of the preparation of the assessment (refer to clarification to this section in Section 3.4.1).

Since exhibition of the EIS, further review of detailed aerial imagery and searches of local council development application registers have been undertaken to confirm if any there are any unidentified dwellings or newly approved development applications for dwellings in the noise assessment study area that need to be included in the noise assessment.

A number of sensitive structures that were considered in Technical paper 6 – Non-Aboriginal heritage (Technical paper 6) of the EIS, but not included in Technical paper 9 have also been included in this assessment.

As a result, sixteen new or reclassified sensitive receivers have been identified for the amended project, including:

- four new sensitive receivers (residential properties) near the Botobolar microwave repeater site (ID 1488, ID 1489, ID 1490 and ID 1493)
- two new sensitive receivers (residential properties) (ID 1491 and ID 1492) in NCA 5, near Merotherie Road
- a reclassified sensitive receiver (residential property) (ID 1139) in NCA 4, located near Ulan Road around 500 metres from the Neeleys Lane workforce accommodation camp. This receiver was not initially identified as a noise sensitive receiver in the EIS
- a new sensitive receiver (residential property) (ID 1487) in NCA 6, at 121 Cliffdale Road, Uarbry, around 500 metres from the transmission line easement. This receiver was identified as a newly constructed house in the EIS (refer to clarification to this section in Section 3.4.1)
- one reclassified sensitive receiver (ID 371) in NCA 4, located near the transmission line easement east of Blue Springs Road. This receiver was previously identified as a shed in the EIS (ID 367) and has been reclassified as a residential property

- two non-Aboriginal heritage items (ID 731 and ID 732) in NCA 3, located near the transmission line easement on Spir Road
- four new sensitive receivers (existing cemeteries), including Wollar Anglican Cemetery (ID 39) and Wollar Cemetery (ID 62) in NCA 8, Ulan Cemetery (ID 265) in NCA 7, and Uarbry Cemetery (ID 1241) in NCA 6. These receivers have been classified as passive recreation in accordance with the *Interim Construction Noise Guideline (*DECCW, 2009) (ICNG)
- one new non-residential sensitive receiver, Dapper Fire Station (ID 726) in NCA 2, located near the Elong Elong Energy Hub. This receiver is an existing facility that was not assessed in the EIS, and has been classified as an industrial building in accordance with the ICNG.

The non-Aboriginal heritage items are not considered noise sensitive as it is understood they are uninhabited and were assessed for potential vibration impacts only.

## 5.9.3 Assessment criteria

### Construction noise

Additional construction and operational noise criteria have been established for the project to consider the new and reclassified sensitive receivers. The new non-residential receivers would be classified as the following in accordance with the ICNG and *Noise Policy for Industry* (NSW Environment Protection Authority, 2017) (NPfI):

- cemeteries are classified as passive recreation
- Dapper Fire Station is classified as industrial.

The ICNG NMLs for these non-residential sensitive receivers are provided in Table 5-17.

Table 5-17 Construction NMLS for non-residential receivers

| Equipment | NMLs ($L_{eq(15\ min)}$) dBA) |
|---|---|
| Passive recreation (when in use) | External noise level – 60 |
| Industrial | External noise level – 75 |

### Operation noise

The project amenity noise levels (ANLs) that have been adopted for the new non-residential sensitive receivers are provided in Table 5-18.

Table 5-18 Amended project amenity noise levels

| Location | Type of receiver | Recommended amenity noise level (ANL) dB $L_{Aeq,period}$ | Project amenity noise level (ANL –5 dB) dB $L_{Aeq,period}$[1,2,3] | Project adjusted ANL dB $L_{Aeq,\ period}$[3] | | |
|---|---|---|---|---|---|---|
| | | | | Day | Evening | Night |
| Cemetery | Passive recreation | When in use | 45 | 45 | – | – |
| Dapper Fire Station | Industrial | When in use | 65 | 65 | 65 | 65 |

Notes:

1. A -5 dB factor is applied to project amenity noise levels to ensure that industrial noise levels at noise sensitive receivers (existing plus new) remain within the recommended amenity noise levels specified in the NPfI
2. Amenity levels for non-residential receivers only apply when the premises are in use
3. Day: 7 am – 6 pm, Monday to Saturday; or 8 am – 6 pm, Sundays and public holidays; Evening: 6 pm – 10 pm; Night: the remaining periods.

## 5.9.4 Assessment of potential impacts

### Construction noise

#### Airborne noise

There would be minor changes in airborne noise impacts for most construction activities as a result of the amendments and refinements. inconsistent with the findings of the EIS, noise levels are predicted to comply with NMLs during daytime (standard) hours at the majority of noise sensitive receivers in the study area during construction of the amended project. If works are required outside standard working hours, however, noise levels are predicted to be more noticeable and predicted to exceed NMLs at some receivers. The predicted noise levels also represent the worst-case scenario in which the loudest construction plant and equipment is operating at the closest point to receivers within the relevant section of the construction area. In practice, actual construction noise levels at individual receivers would be lower for most of the construction period as not all noisy equipment would be operating concurrently or in the same location and noise generating activities are undertaken at varying locations within the construction area.

Changes to predicted NML exceedances are summarised for each NCA in the following sections. A detailed breakdown of the predicted construction noise exceedances for each works stage is provided in Appendix B-4 of Appendix I (Noise and Vibration Impact Assessment Addendum).

Noise levels are predicted to be highest during earthworks associated with the construction of foundations for the transmission line towers. Noise levels during this stage have been predicted to exceed NMLs at up to 75 sensitive receivers (increased by one from the EIS) located along the transmission alignment during standard working hours. The majority of these exceedances are considered minor (53 of these exceedances are <10 dB above NMLs). Only one sensitive receiver would be highly noise affected (>75 dBA) as indicated in the EIS, however the receiver that would be highly noise affected has changed from the EIS (now sensitive receiver ID 531, instead of ID 539 as assessed as part of the exhibited project). Where the foundations work stage is undertaken outside of standard hours (including the daytime periods of Saturday afternoons and Sundays), exceedances may occur at up to 144 properties as indicated in the EIS. Most exceedances are predicted to occur in NCA 4, which represents isolated rural properties across the alignment.

No noise exceedances were predicted for non-residential sensitive receivers, as indicated in the EIS.

No changes are predicted to the potential risk for construction noise impacts to occur from concurrent construction activities as a result of the amendments and refinements.

NCA 1

The predicted changes in exceedances of NMLs in NCA 1 are summarised in Table 5-19 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-3. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-19 Summary of changes to predicted noise exceedances in NCA 1 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | Exceedances are predicted at up to six receivers during multiple construction stages (no change from the exhibited project). During the noisiest works (construction of foundations), changes to exceedances are predicted to be:<br>• up to 10 dB at three receivers (increased from two receivers)<br>• up to 20 dB at three receivers (no change)<br>• no receivers would be highly noise affected (greater than 75 dB) (one receiver was highly noise affected in the exhibited project). | Exceedances are predicted at up to nine receivers (decreased from 12 receivers) during multiple construction stages. During the noisiest works (construction of foundations), the changes to exceedances are predicted to be:<br>• up to 5 dB at three receivers (decreased from four receivers)<br>• up to 15 dB at four receivers (increased from three receivers)<br>• up to 25 dB at three receivers (no change)<br>• greater than 25 dB at three receivers (increased from one receiver)<br>• no receivers would be highly noise affected (greater than 75 dB) (one receiver was highly noise affected in the exhibited project). | No change. |
| Elong Elong Energy Hub | No change | Exceedances of up to 5 dB are predicted at one receiver during multiple construction stages (not just earthworks as in exhibited project). | No change |
| Switching station E1 | No change | Exceedances of up to 5 dB at one receiver (decreased from two receivers) are predicted during multiple construction stages (not just earthworks as in exhibited project). | No change |
| Switching station E2 | No change. | Exceedances of up to 15 dB (increased from 5 dB) are predicted at one receiver during earthworks. | No change |
| Switching station E3 | Exceedances of up to 10 dB are predicted at three receivers (increased from one receiver) during multiple construction stages. | Exceedances are predicted at up to six receivers (increased from four receivers) during multiple construction stages. During the noisiest works (earthworks), the exceedances are predicted to be up to 15 dB at these receivers (no change). | Exceedances of the sleep disturbance criterion is predicted at up to six receivers (increased from four receivers) during the noisiest works (earthworks). |
| Switching station E4 | No change. | No change. | No change. |

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to five receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 10 dB at two receivers<br>• up to 20 dB at three receivers. | Exceedances are predicted at up to eight receivers during both construction stages. During the noisiest works (vegetation clearance), exceedances are predicted to be:<br>• up to 5 dB at two receivers<br>• up to 15 dB at three receivers<br>• up to 25 dB at three receivers. | Exceedances of the sleep disturbance criterion is predicted at eight receivers during the noisiest works (earthworks). |
| **Elong Elong construction compound** | **No exceedances are predicted.** | **Exceedances of up to 5 dB at one receiver are predicted during multiple construction stages.** | **No exceedances are predicted.** |

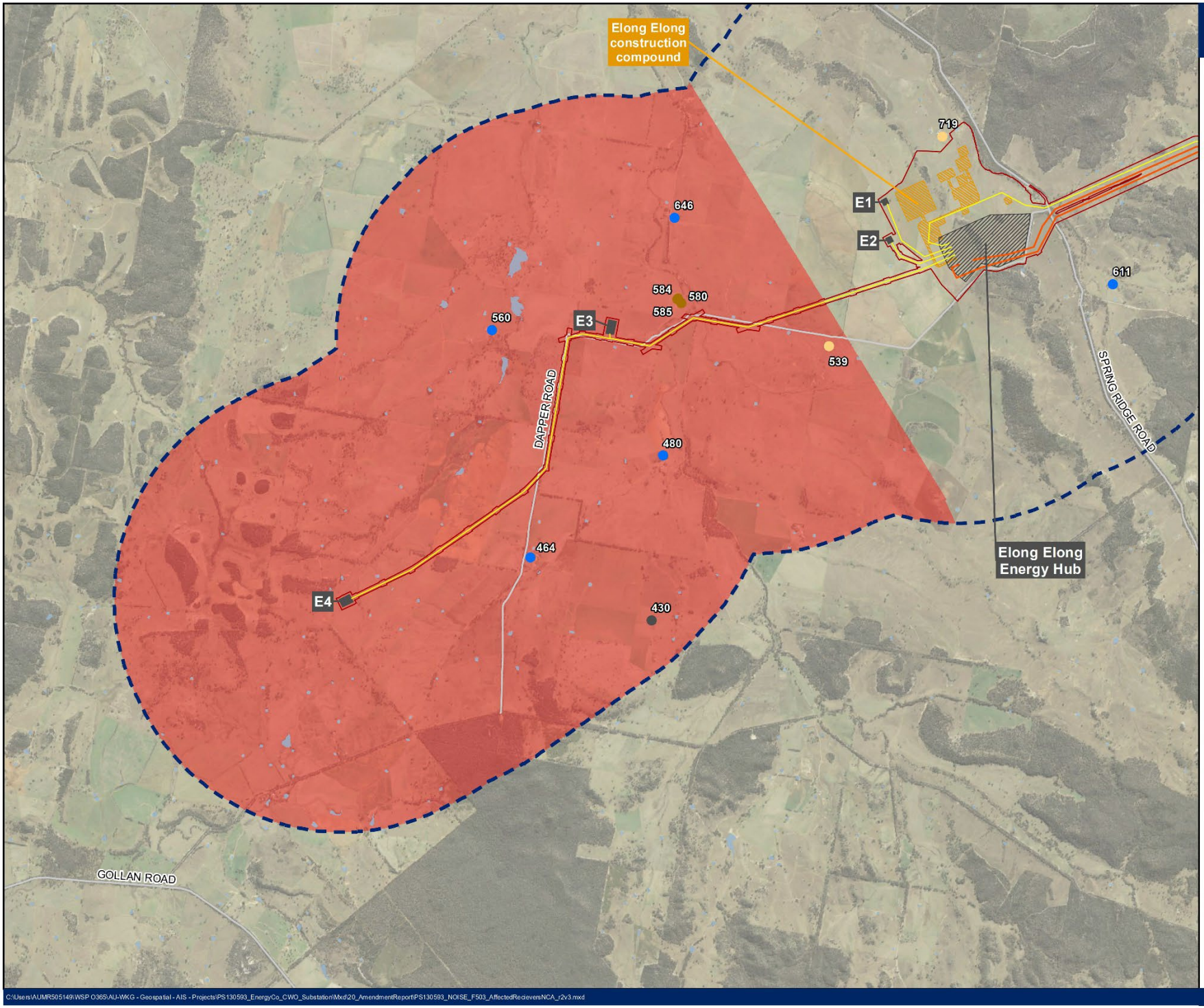


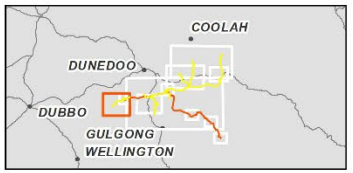

**Figure 5-3**
Construction noise exceedance during OOH in NCA 1

## Legend

- Amended study area
- Construction area
- Construction compound
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- State road
- Water body
- NCA 1

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)

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Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

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Data sources: WSP, EnergyCo, NSWSS

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NCA 2

The predicted changes in exceedances of NMLs in NCA 2 are summarised in Table 5-20 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-4. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-20 Summary of changes to predicted noise exceedances in NCA 2 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | Exceedances of up to 10 dB are predicted at two receivers during the construction of foundations (no exceedances were predicted for the exhibited project). | No change. | No change. |
| Elong Elong construction compound | Exceedances of up to 20 dB at one receiver is predicted during multiple construction stages (no exceedances were predicted for the exhibited project). | Exceedances are predicted at up to two receivers during multiple construction stages (no change). During the noisiest works (multiple construction stages, not just the operation of the compound as in exhibited project), the exceedances are predicted to be:<br>• up to 5 dB at one receiver (no change)<br>• up to 25 dB at one receiver (increased from 15 dB for the exhibited project). | No change. |
| Elong Elong Energy Hub | No change. | No change. | No change. |
| Switching station E1 | No change. | No change. | No change. |
| Switching station E2 | No change. | No change. | No change. |
| Access tracks (refer to Section 3.4.3) | No exceedances are predicted. | Exceedances are predicted at up to three receivers during both construction stages. During both construction stages, exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 15 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at two receivers during both construction stages. |
| **Switching station E5** | **No exceedances are predicted.** | **Exceedances of up to 5 dB are predicted at one receiver during earthworks.** | **No exceedances are predicted.** |
| **Local road and intersection upgrades** | No exceedances are predicted. | **Exceedances are predicted at up to three receivers during multiple construction stages. During the noisiest works (earthworks), exceedances are predicted to be:**<br>• **up to 5 dB at one receiver**<br>• **up to 15 dB at two receivers.** | **Exceedances of the sleep disturbance criterion is predicted at two receivers during the noisiest works (earthworks).** |

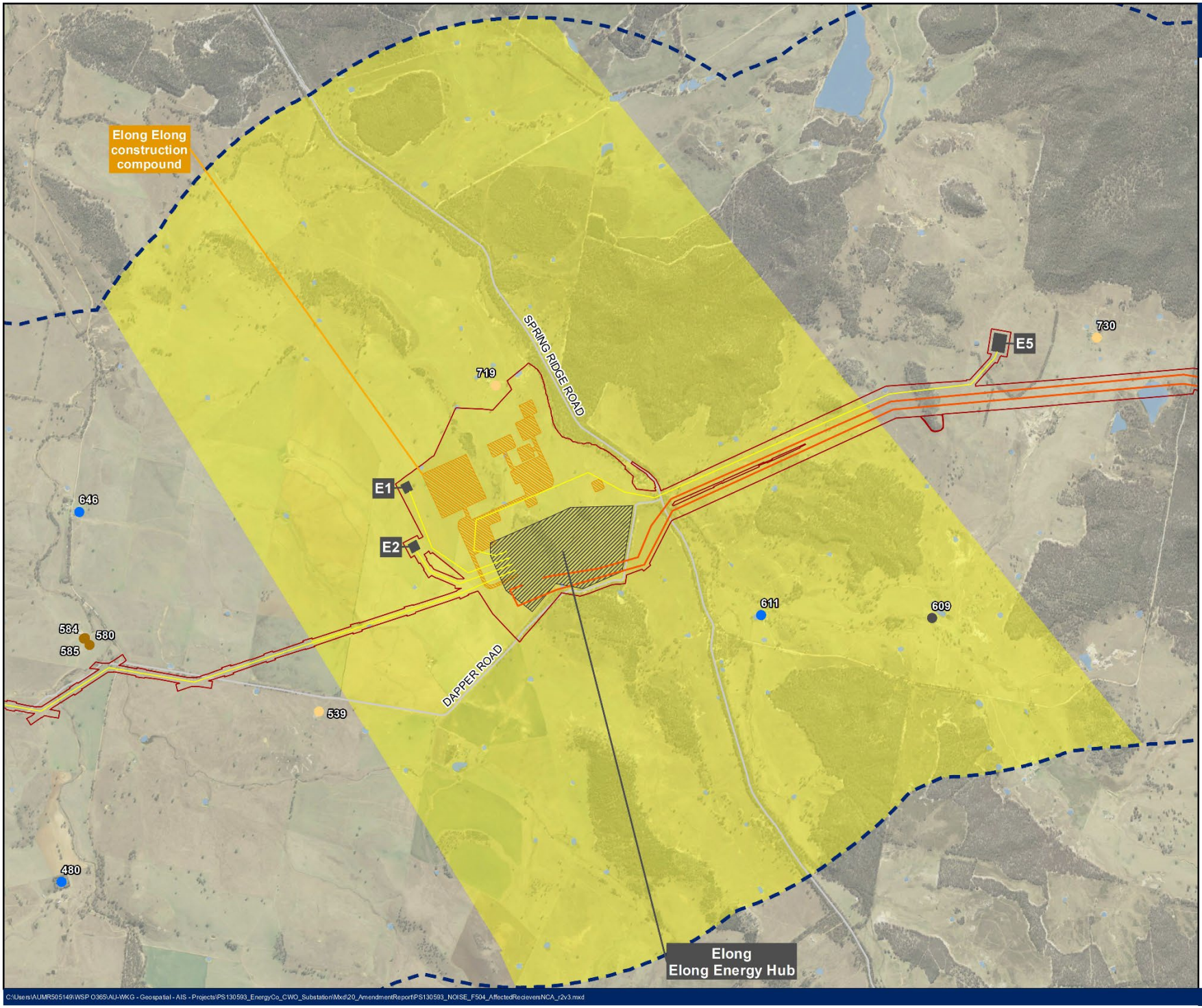


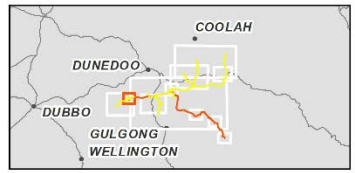

**Figure 5-4**
Construction noise exceedance during OOH in NCA 2

## Legend

- Amended study area
- Construction area
- Construction compound
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- State road
- Water body
- NCA 2

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)




0 0.55 1.1 km

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:45,000

Data sources: WSP 2023, EnergyCo, NSWSS

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### NCA 3

The predicted changes in exceedances of NMLs in NCA 3 are summarised in Table 5-21 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-5.

Table 5-21 Summary of changes to predicted noise exceedances in NCA 3 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change. | Exceedances are predicted at up to 13 receivers (decreased from 15 receivers) during multiple construction stages. During the noisiest works (construction of foundations), the exceedances are predicted to be:<br>• up to 5 dB at five receivers (no change)<br>• up to 15 dB at seven receivers (no change)<br>• up to 25 dB at one receiver (no change). | Exceedances of the sleep disturbance criterion is predicted at 10 receivers (increased from eight receivers) during the noisiest works. |
| Switching station M6 | No change. | No change. | No change. |
| Switching station M7 | Exceedances of up to 10 dB at one receiver is predicted during earthworks (no exceedances were predicted for the exhibited project). | Exceedances are predicted at up to two receivers during multiple construction stages (no change). During the noisiest works (earthworks), the exceedances are predicted to be:<br>• up to 5 dB at one receiver (no change)<br>• up to 15 dB (increased from 5 dB) at one receiver. | No change. |
| Access tracks (refer to Section 3.4.3) | Exceedances of up to 10 dB are predicted at one receiver during both construction stages. | Exceedances are predicted at up to 14 receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at seven receivers<br>• up to 15 dB at seven receivers. | Exceedances of the sleep disturbance criterion is predicted at eight receivers during the noisiest works (earthworks). |

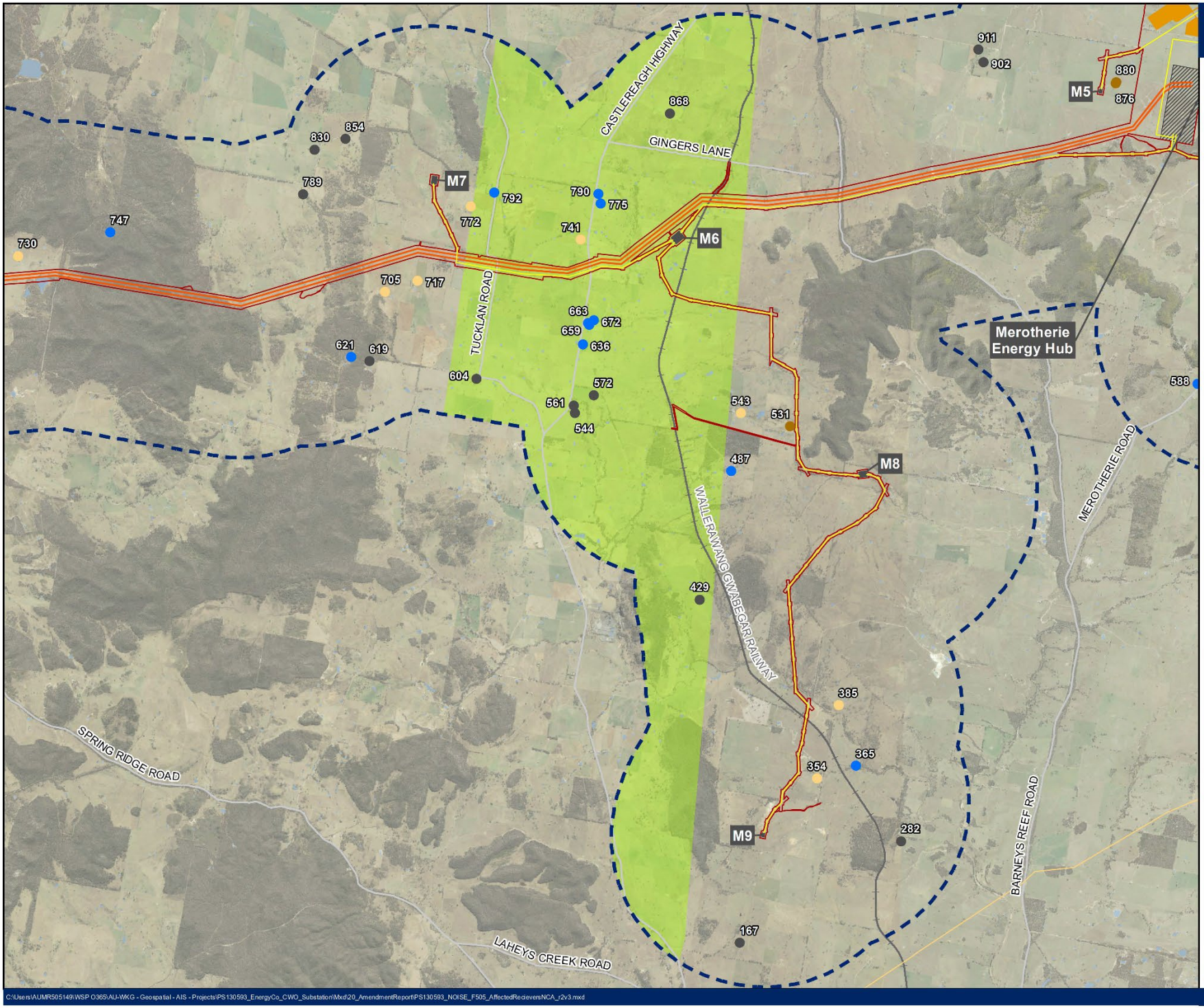


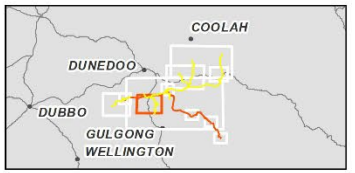

**Figure 5-5**
Construction noise exceedance during OOH in NCA 3

## Legend

- Amended study area
- Construction area
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Existing transmission line
- State road
- Railway
- Water body
- NCA 3

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)




Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
1:105,000
Data sources: WSP, EnergyCo, NSWSS

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### NCA 4

The predicted changes in exceedances of NMLs in NCA 4 are summarised in Table 5-22 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-6. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-22 Summary of changes to predicted noise exceedances in NCA 4 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | Exceedances are predicted at up to 28 receivers (decreased from 30 receivers) during multiple construction stages. During the noisiest works (construction of foundations), exceedances are predicted to be:<br>• up to 10 dB at 18 receivers (decreased from 19 receivers)<br>• up to 20 dB at nine receivers (decreased from 10 receivers)<br>• greater than 20 dB at one receiver (no change). | Exceedances are predicted at up to 60 receivers (increased from 58 receivers) during construction of foundations. During these works, the exceedances are predicted to be:<br>• up to 5 dB at 20 receivers (increased from 19 receivers)<br>• up to 15 dB at 20 receivers (increased from 18 receivers)<br>• up to 25 dB at 15 receivers (no change)<br>• greater than 25 dB at five receivers (decreased from six receivers)<br>• one receiver would be highly noise affected (greater than 75 dB) (no receivers were highly noise affected in the exhibited project). | Exceedances of the sleep disturbance criterion is predicted at 41 receivers (decreased from 44 receivers) during the noisiest works (construction of foundations). |
| Neeleys Lane workforce accommodation camp | No change. | Exceedances are predicted at three receivers (increased from two receivers) during construction of the facility. During these works, the exceedances are predicted to be:<br>• up to 25 dB at 1 receiver<br>• up to 15 dB at 2 receivers (no change). | Exceedances of the sleep disturbance criterion is predicted at three receivers (increased from two receivers) during construction of the facility. |
| Switching station M4 | No change. | No change. | No change. |
| Switching station M5 | No change. | No change. | No change. |
| Switching station M7 | One receiver (decreased from two receivers) is predicted to have exceedances during multiple construction stages. Exceedances of up to 10 dB are predicted at this receiver. No exceedances up to 20 dB are predicted as in exhibited project. | Exceedances are predicted at up to five receivers (decreased from six receivers) during multiple construction stages. During the noisiest works (earthworks), the exceedances are predicted to be:<br>• up to 5 dB at four receivers (increased from three receivers)<br>• up to 15 dB at one receiver (decreased from two receivers).<br>No exceedances of up to 25 dB are predicted as in exhibited project. | Exceedances of the sleep disturbance criterion is predicted at two receivers (decreased from three receivers) during the noisiest works (earthworks). |
| Switching station M8 | No change. | No change. | No change. |
| Switching station M9 | No change. | No change. | No change. |

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to 30 receivers during multiple construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 10 dB at 20 receivers<br>• up to 20 dB at eight receivers<br>• greater than 20 dB at two receivers. | Exceedances are predicted at up to 55 receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at 20 receivers<br>• up to 15 dB at 18 receivers<br>• up to 25 dB at 15 receivers<br>• greater than 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at 37 receivers during the noisiest works (earthworks). |
| Neeleys Lane construction compound | Exceedances of up to 10 dB are predicted at two receivers during operation of the compound. | Three receivers are predicted to have exceedances during multiple construction stages. During the noisiest works (operation), the exceedances are predicted to be up to 15 dB at three receivers. | Exceedances of the sleep disturbance criterion is predicted at three receivers during the noisiest works (operation). |
| Switching station E5 | Exceedances of up to 10 dB are predicted at one receiver during multiple construction stages. | Exceedances are predicted at up to two receivers during multiple construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 25 dB at one receiver. | Exceedances of the sleep disturbance criterion is predicted at one receiver during the noisiest works (earthworks). |
| Local road and intersection upgrades | Exceedances are predicted at up to two receivers during multiple construction stages. During the noisiest works (earthworks), exceedances are predicted to be up to 10 dB at two receivers. | Exceedances are predicted at up to four receivers during the noisiest works (earthworks). During these works, exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 15 dB at two receivers<br>• up to 25 dB at one receiver. | Exceedances of the sleep disturbance criterion is predicted at three receivers during the noisiest works (earthworks). |

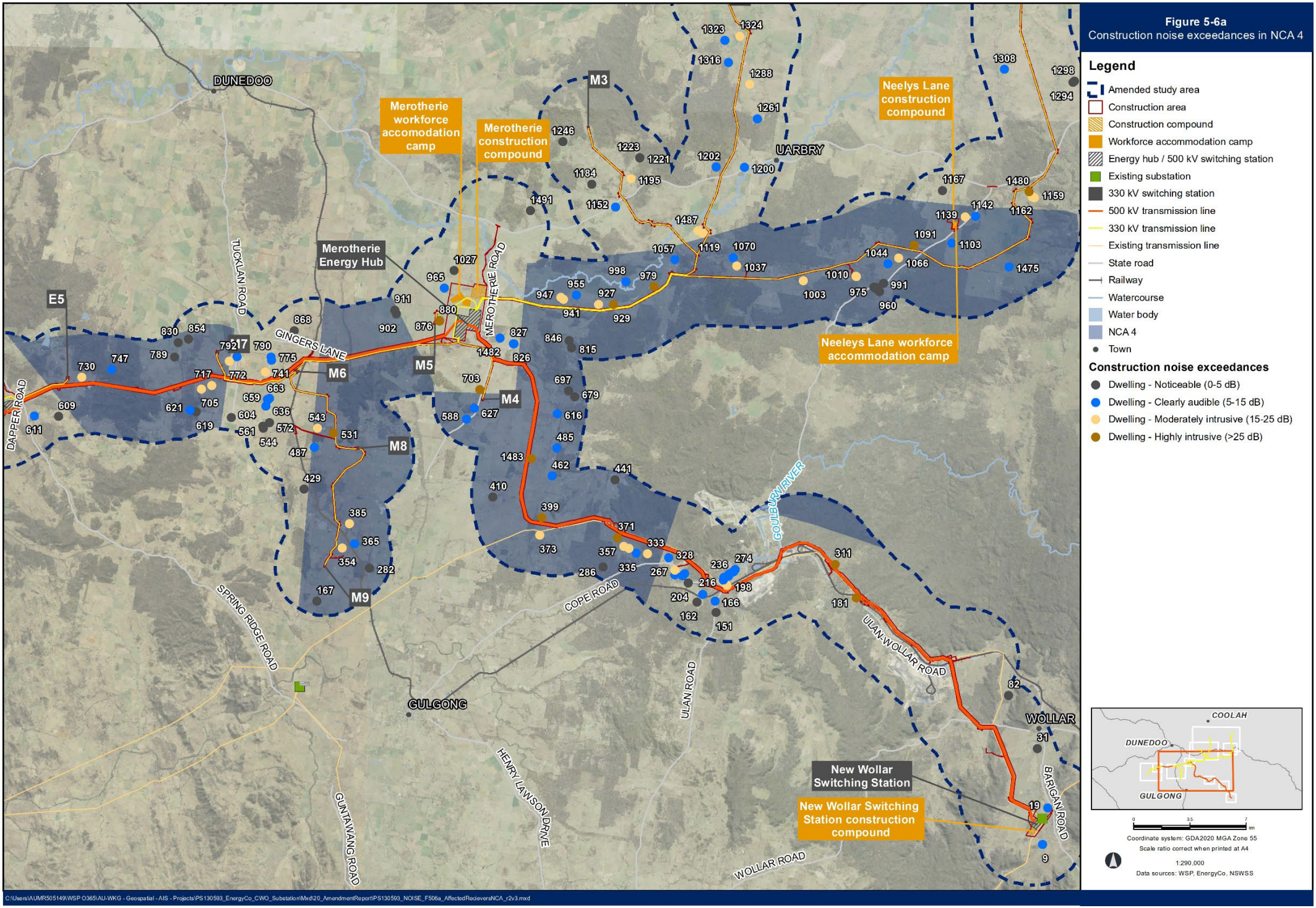


**Figure 5-6a**
Construction noise exceedances in NCA 4

## Legend

- Amended study area
- Construction area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- Existing substation
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body
- NCA 4
- Town

### Construction noise exceedances

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:290,000

Data sources: WSP, EnergyCo, NSWSS

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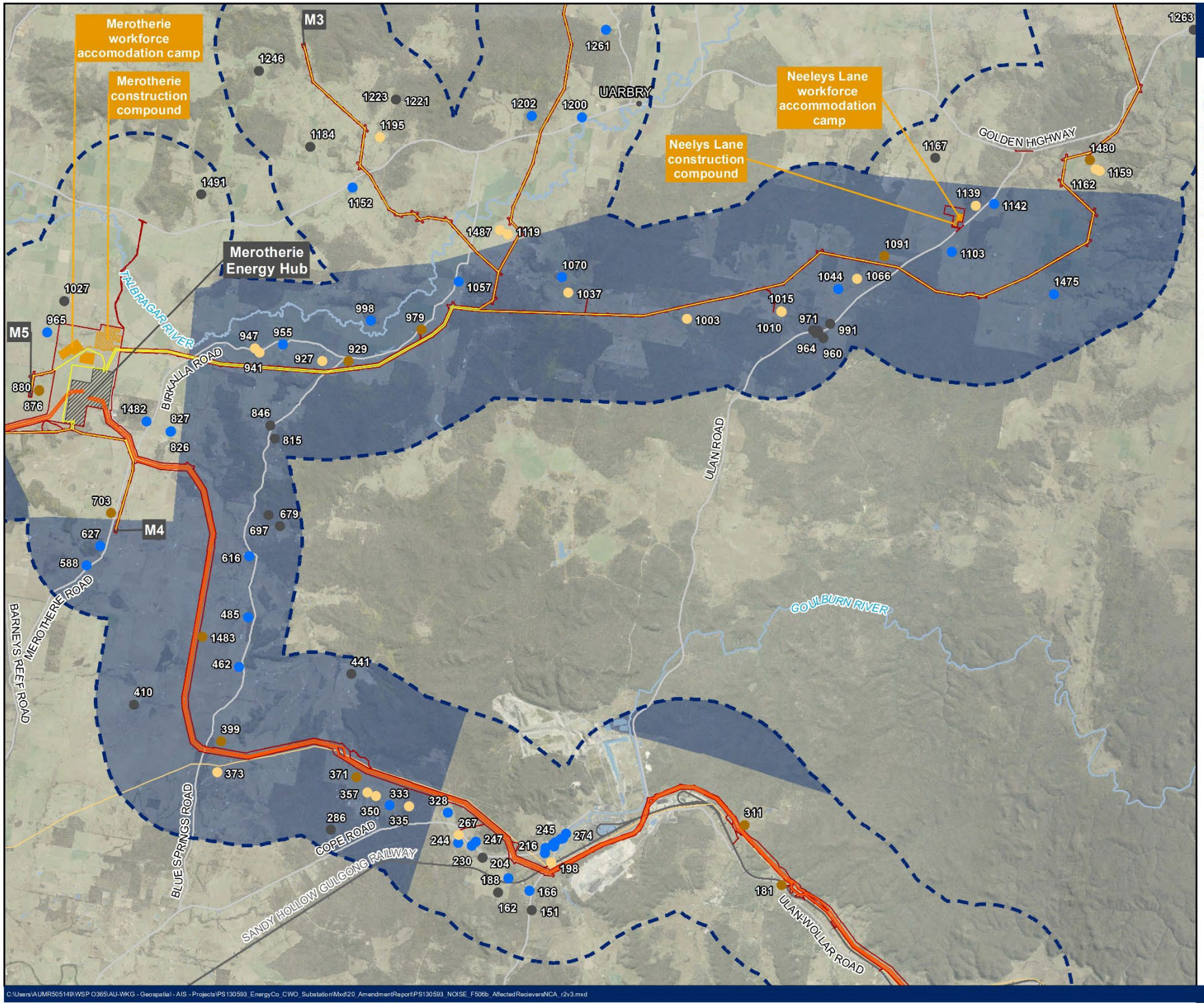
Merotherie workforce accomodation camp
Merotherie construction compound
Merotherie Energy Hub
Neeleys Lane workforce accommodation camp
Neelys Lane construction compound
M3
M4
M5
UARBRY
GOLDEN HIGHWAY
TALBRAGAR RIVER
BIRKALLA ROAD
ULAN ROAD
GOULBURN RIVER
MEROTHERIE ROAD
BARNEYS REEF ROAD
BLUE SPRINGS ROAD
COPE ROAD
SANDY HOLLOW GULGONG RAILWAY
ULAN-WOLLAR ROAD
1246
1261
1263
1223
1221
1202
1200
1195
1184
1167
1480
1159
1162
1491
1152
1139
1142
1487
1119
1091
1103
1070
1037
1044
1066
1475
1027
1057
998
979
1003
1015
1010
971
991
964
960
965
947
955
927
929
941
880
876
1482
827
826
846
815
703
679
697
627
588
616
485
1483
462
441
410
399
373
371
357
333
328
350
335
286
267
244
247
245
274
216
230
204
198
188
166
162
151
311
181
Figure 5-6b
Construction noise exceedances in NCA 4
Legend
Amended study area
Construction area
Construction compound
Workforce accommodation camp
Energy hub / 500 kV switching station
330 kV switching station
500 kV transmission line
330 kV transmission line
Existing transmission line
State road
Railway
Watercourse
Water body
NCA 4
Town
Construction noise exceedances
ExcdCat
Dwelling - Noticeable (0-5 dB)
Dwelling - Clearly audible (5-15 dB)
Dwelling - Moderately intrusive (15-25 dB)
Dwelling - Highly intrusive (>25 dB)
COOLAH
DUNEDOO
GULGONG
0
2
4
km
Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
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NCA 5

The predicted changes in exceedances of NMLs in NCA 5 are summarised in Table 5-23 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-7. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-23 Summary of changes to predicted noise exceedances in NCA 5 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change. | Exceedances are predicted at up to eight receivers during multiple construction stages (no change). During the noisiest works (construction of foundations), the exceedances are predicted to be:<br>• up to 5 dB at one receiver (no change)<br>• up to 15 dB at four receivers (no change)<br>• greater than 25 dB (increased from up to 25 dB) at three receivers. | No change. |
| Merotherie Energy Hub | No change. | No change. | Exceedances of the sleep disturbance criterion is predicted at up to four receivers (increased from three receivers) during the noisiest works (earthworks). |
| Merotherie construction compound | No change. | Exceedances are predicted at up to three receivers (decreased from five receivers) during operation of the compound (multiple construction stages in the exhibited project). The exceedances are predicted to be up to 5 dB at three receivers. | No exceedances of the sleep disturbance criterion are predicted (exceedances were predicted at two receivers for the exhibited project). |
| Merotherie workforce accommodation camp | No change. | No change. | No change. |
| Switching station M4 | No change. | No change. | No change. |
| Switching station M5 | No change. | No change. | No change. |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to four receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 10 dB at one receiver<br>• up to 20 dB at three receivers. | Exceedances are predicted at up to eight receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 15 dB at four receivers<br>• up to 25 dB at one receiver<br>• greater than 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at seven receivers during both construction stages. |
| **Local road and intersection upgrades** | **No exceedances are predicted.** | **Exceedances are predicted at up to six receivers during the noisiest work stage (earthworks). During these works, exceedances are predicted to be:**<br>• **up to 5 dB at five receivers**<br>• **up to 15 dB at one receiver.** | **Exceedances of the sleep disturbance criterion is predicted at one receiver during the noisiest works (earthworks).** |

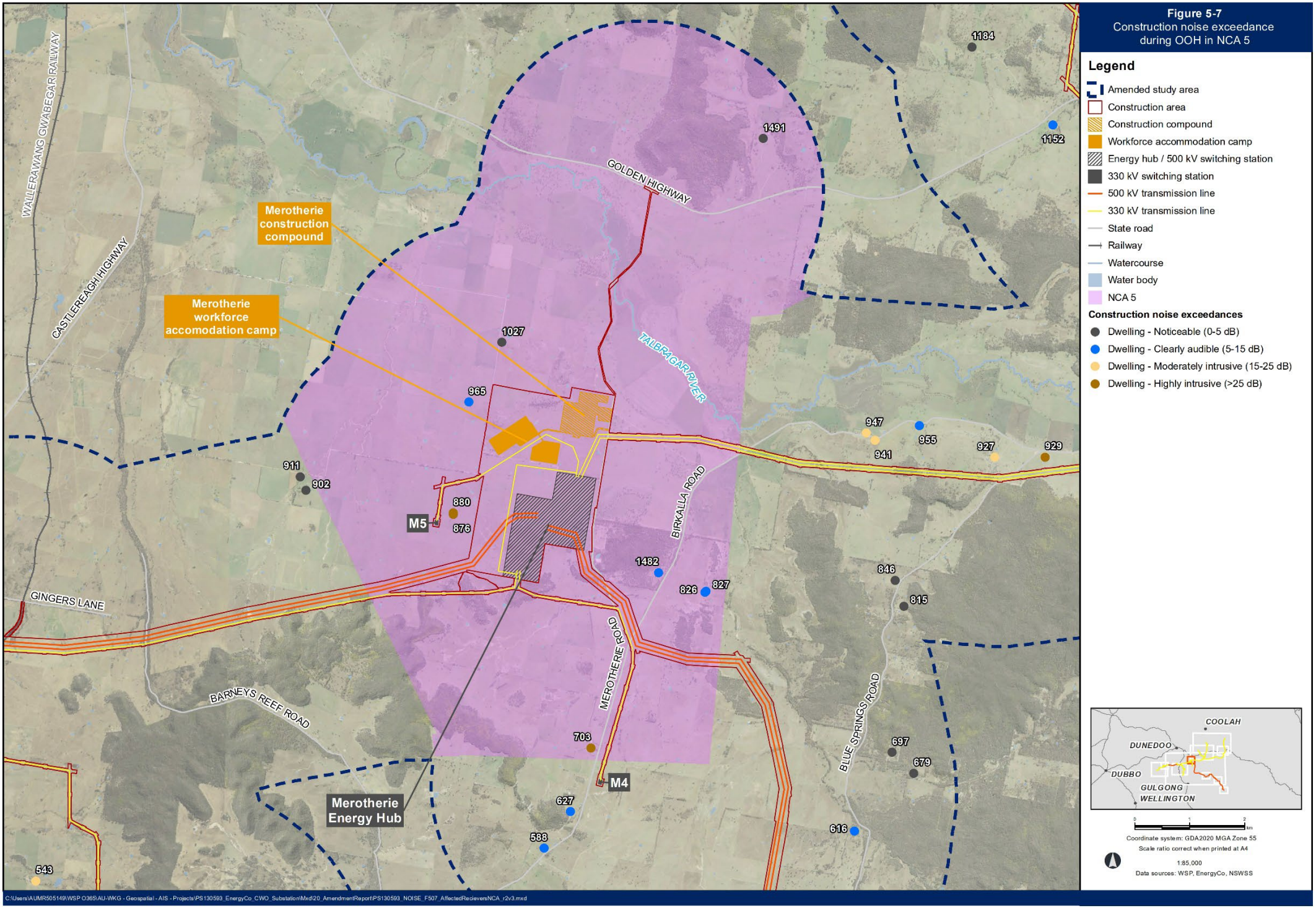



**Figure 5-7**
Construction noise exceedance during OOH in NCA 5

## Legend

- Amended study area
- Construction area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- State road
- Railway
- Watercourse
- Water body
- NCA 5

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)

### NCA 6

The predicted changes in exceedances of NMLs in NCA 6 are summarised in Table 5-24 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-8. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-24 Summary of changes to predicted noise exceedances in NCA 6 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | Exceedances are predicted at up to six receivers (increased from five receivers) during multiple construction stages. During the noisiest works (construction of foundations), exceedances are predicted to be:<br>• up to 10 dB at four receivers (no change)<br>• up to 20 dB at two receivers (increased from one receiver). | Exceedances are predicted at up to 10 receivers (increased from nine receivers) during multiple construction stages. During the noisiest works (construction of foundations), the exceedances are predicted to be:<br>• up to 5 dB at three receivers (no change)<br>• up to 15 dB at four receivers (no change)<br>• up to 25 dB at three receivers (increased from two receivers). | Exceedances of the sleep disturbance criterion is predicted at 10 receivers (increased from nine receivers) during the noisiest works (construction of foundations). |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to five receivers during both construction stages. Exceedances during both construction stages are predicted to be:<br>• up to 10 dB at four receivers<br>• up to 20 dB at one receiver. | Exceedances are predicted at up to 10 receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at four receivers<br>• up to 15 dB at four receivers<br>• up to 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at up to nine receivers during the noisiest works (earthworks). |
| **Local road and intersection upgrades** | **Exceedances are predicted at one receiver during multiple construction stages. During the noisiest works (earthworks), exceedances are predicted to be up to 20 dB at this receiver.** | **Exceedances are predicted at up to two receivers during multiple construction stages. During the noisiest works (earthworks), the exceedances are predicted to be:**<br>• **up to 5 dB at one receiver**<br>• **up to 25 dB at one receiver.** | **Exceedances of the sleep disturbance criterion is predicted at one receiver during multiple construction stages.** |

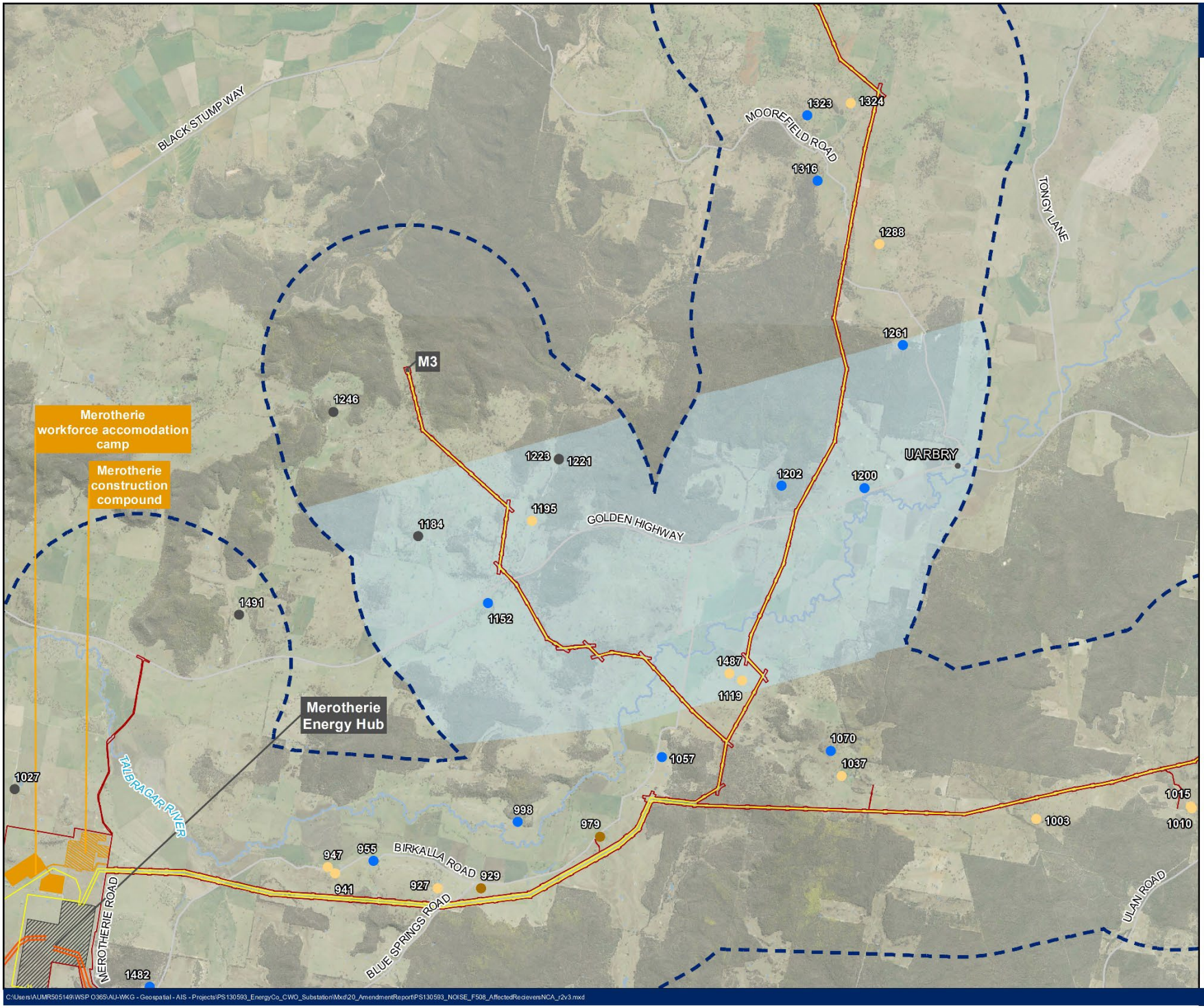


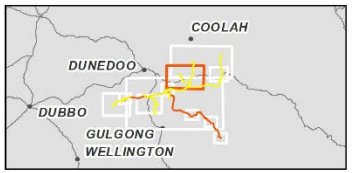

**Figure 5-8**
Construction noise exceedance during OOH in NCA 6

## Legend

- Amended study area
- Construction area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- State road
- Watercourse
- Water body
- NCA 6

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)




Coordinate system: GDA2020 MGA Zone 55
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1:110,000
Data sources: WSP, EnergyCo, NSWSS

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### NCA 7

The predicted changes in exceedances of NMLs in NCA 7 are summarised in Table 5-25 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-9.

Table 5-25 Summary of changes to predicted noise exceedances in NCA 7 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change. | No change. | No change. |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to eight receivers during both construction stages. Exceedances during the noisiest works (earthworks) are predicted to be:<br>• up to 10 dB at seven receivers<br>• up to 20 dB at one receiver. | Exceedances are predicted at up to 18 receivers during both construction stages. During the noisiest works (vegetation clearance), exceedances are predicted to be:<br>• up to 5 dB at 12 receivers<br>• up to 15 dB at four receivers<br>• up to 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at up to 18 receivers during the noisiest works (earthworks). |

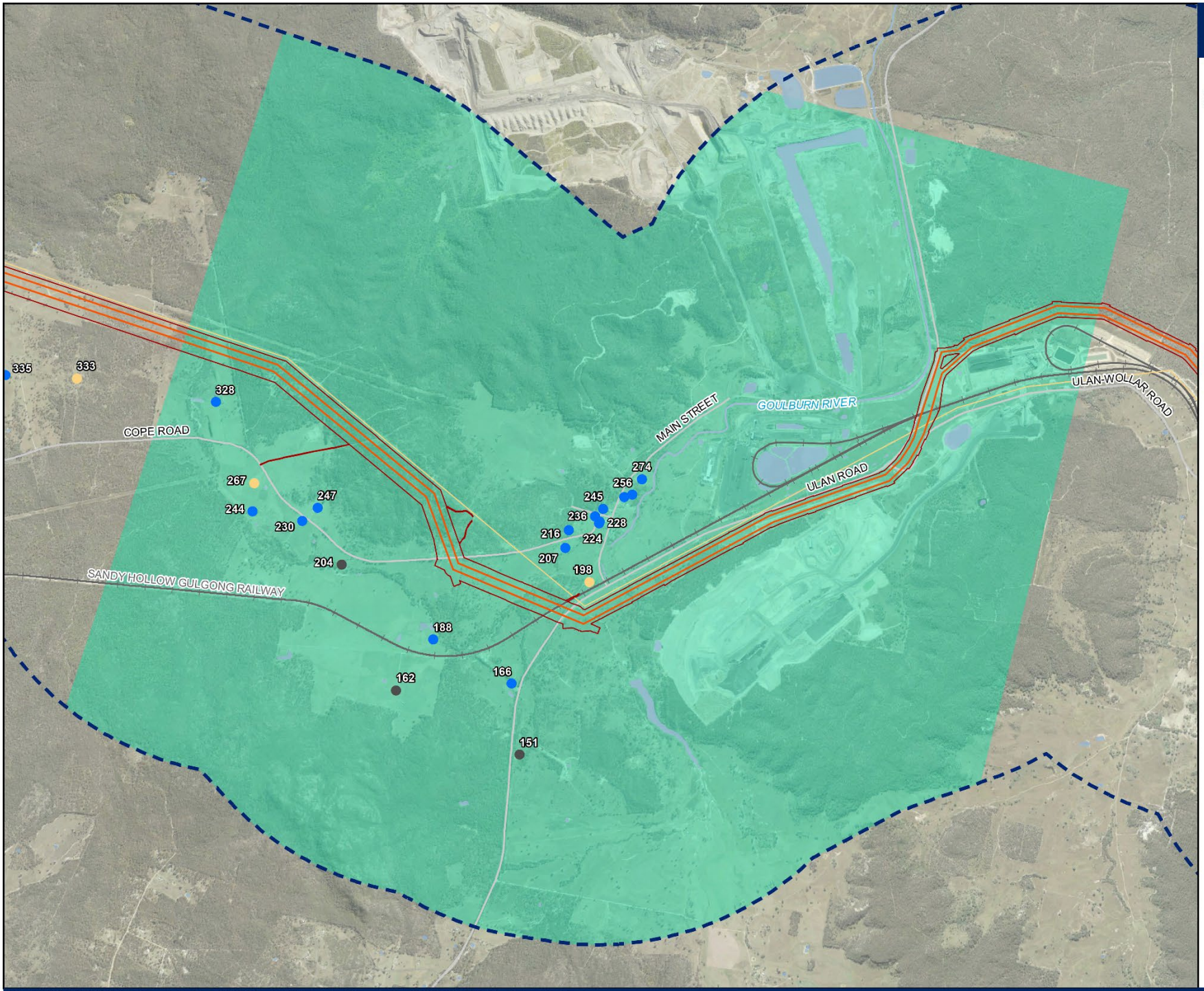


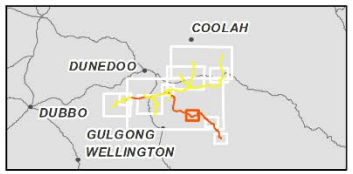

**Figure 5-9**
Construction noise exceedance during OOH in NCA 7

## Legend

- Amended study area
- Construction area
- 500 kV transmission line
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body
- NCA 7

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)




0 0.6 1.2 km

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

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Data sources: WSP, EnergyCo, NSWSS

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### NCA 8

The predicted changes in exceedances of NMLs in NCA 8 are summarised in Table 5-26 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-10.

Table 5-26 Summary of changes to predicted noise exceedances in NCA 8 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change. | No change. | No change. |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to two receivers during both construction stages. Exceedances during the noisiest works (vegetation clearance) are predicted to be up to 20 dB at two receivers. | Exceedances are predicted at up to four receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at two receivers<br>• greater than 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at up to two receivers during the noisiest works (earthworks). |

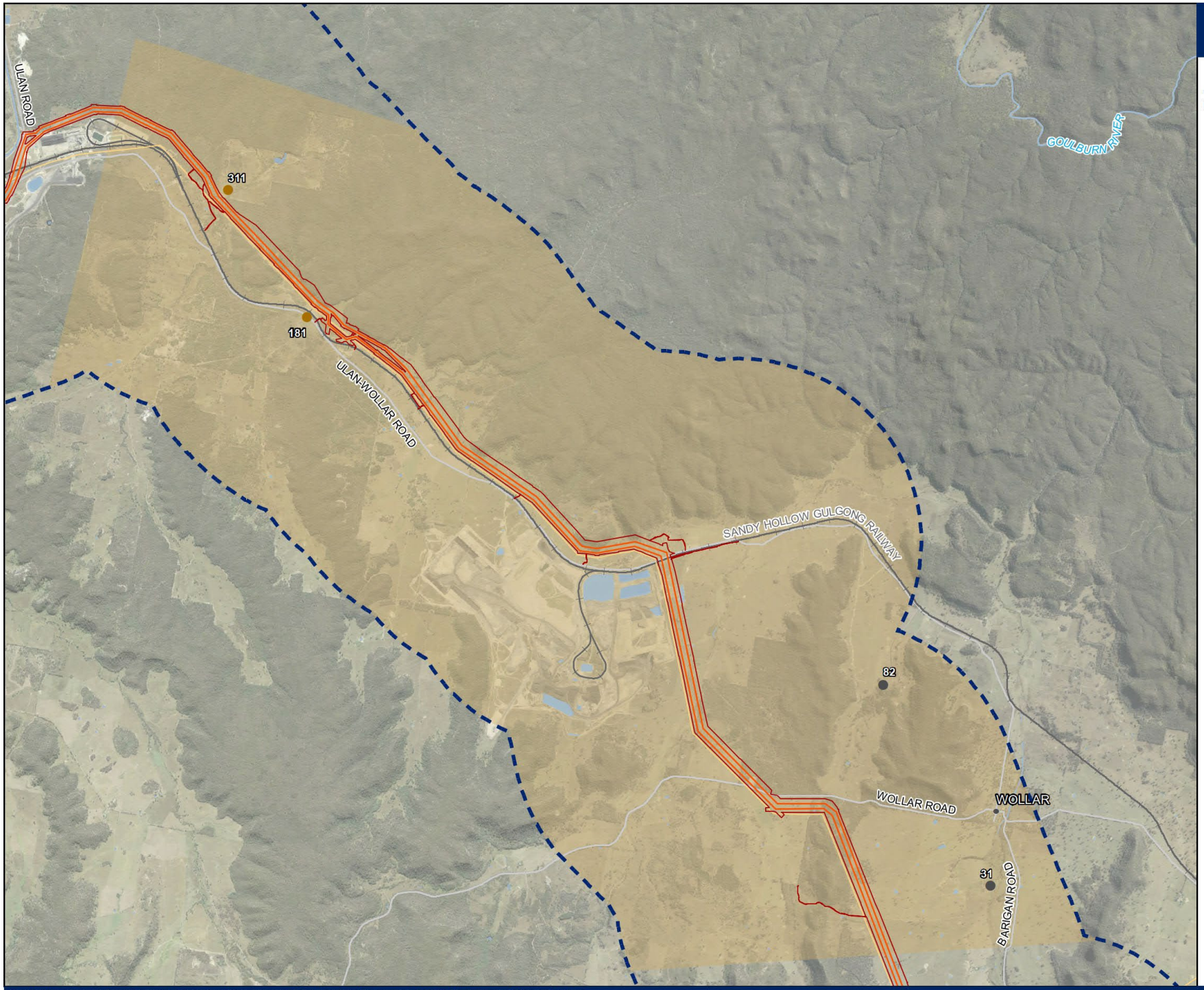


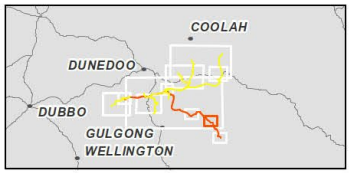

**Figure 5-10**
Construction noise exceedance during OOH in NCA 8

## Legend

- Amended study area
- Construction area
- 500 kV transmission line
- Existing transmission line
- State road
- Railway
- Watercourse
- Water body
- NCA 8

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Highly intrusive (>25 dB)




0 1 2 km

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:85,000

Data sources: WSP, EnergyCo, NSWSS

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### NCA 9

The predicted changes in exceedances of NMLs in NCA 9 are summarised in Table 5-27 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-11. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-27 Summary of changes to predicted noise exceedances in NCA 9 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change (refer to correction in Section 3.4.3). | No change. | No change. |
| Neeleys Lane workforce accommodation camp | No change. | No exceedances are predicted (exceedances of up to 5 dB were predicted at one receiver for the exhibited project). | No exceedances of the sleep disturbance criterion are predicted (exceedances of the sleep disturbance criterion were predicted at one receiver for the exhibited project). |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to four receivers during both construction stages. Exceedances during both construction stages are predicted to be:<br>• up to 10 dB at three receivers<br>• up to 20 dB at one receiver. | Exceedances are predicted at up to five receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 15 dB at three receivers<br>• up to 25 dB at one receiver. | Exceedances of the sleep disturbance criterion is predicted at up to four receivers during both construction stages. |
| **Neeleys Lane construction compound** | **No exceedances are predicted.** | **Exceedances of up to 5 dB are predicted at one receiver during operation of the compound.** | **No exceedances of the sleep disturbance criterion are predicted.** |
| **Local road and intersection upgrades** | **No exceedances are predicted.** | **Exceedances of up to 5 dB are predicted at one receiver during earthworks.** | **No exceedances of the sleep disturbance criterion are predicted.** |

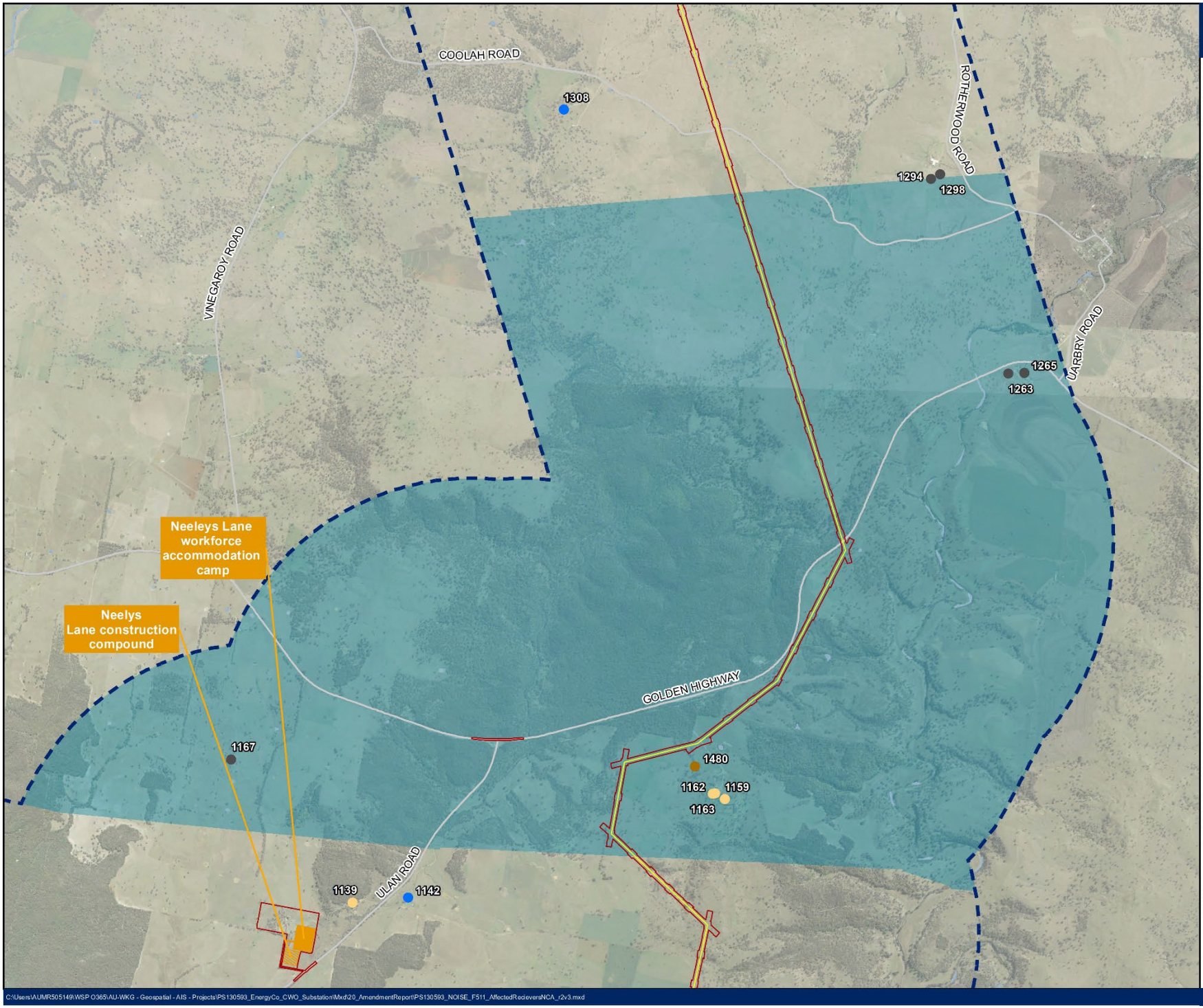


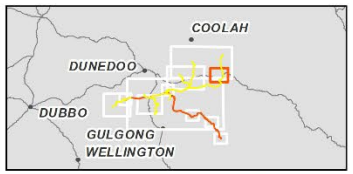

**Figure 5-11**
Construction noise exceedance during OOH in NCA 9

## Legend

- Amended study area
- Construction area
- Construction compound
- Workforce accommodation camp
- State road
- Watercourse
- Water body
- NCA 9

**Construction noise exceedances**

- Dwelling - Noticeable (0-5 dB)
- Dwelling - Clearly audible (5-15 dB)
- Dwelling - Moderately intrusive (15-25 dB)
- Dwelling - Highly intrusive (>25 dB)




0 0.75 1.5 km

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:60,000

Data sources: WSP, EnergyCo, NSWSS

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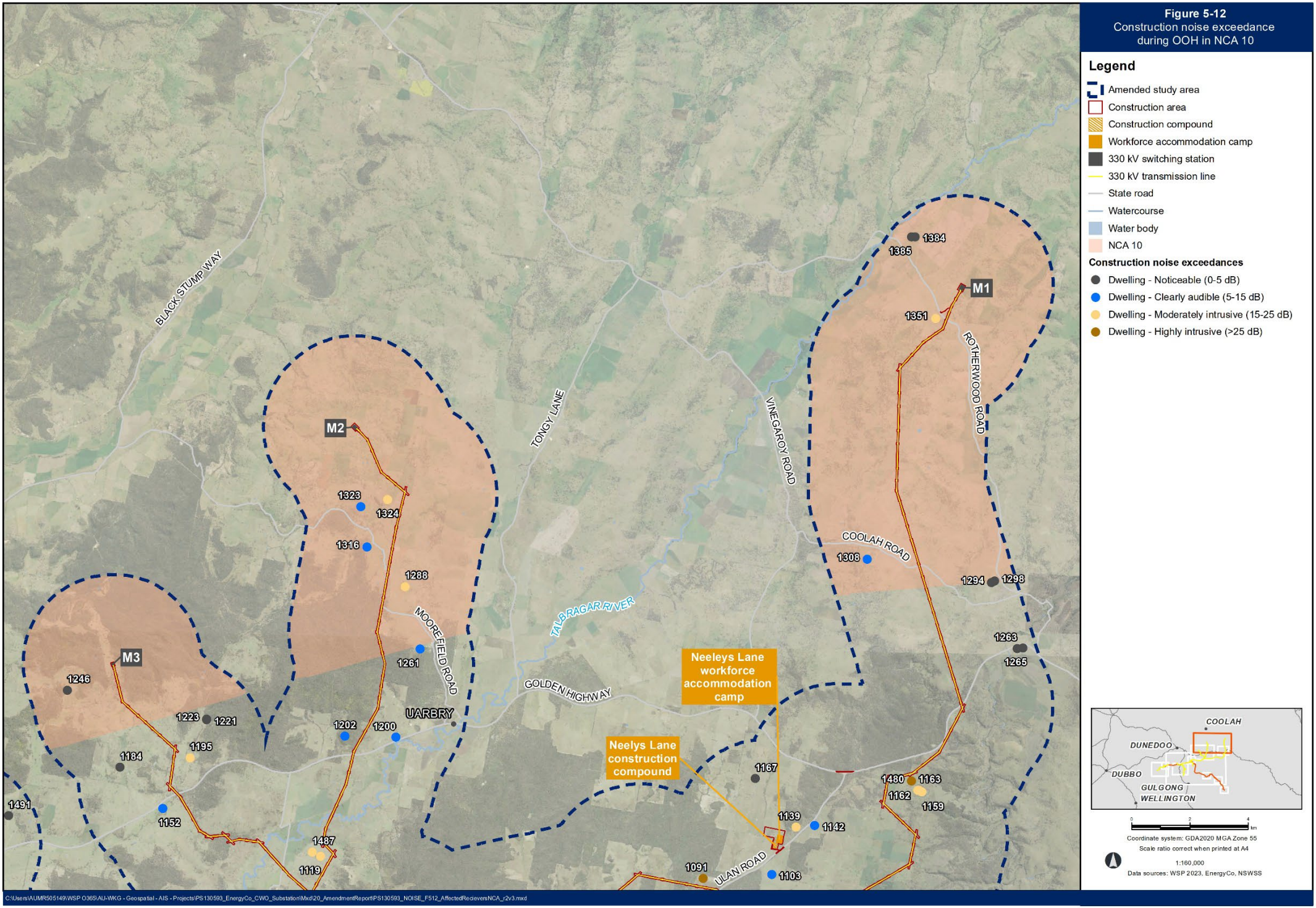
NCA 10

The predicted changes in exceedances of NMLs in NCA 10 are summarised Table 5-28 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-12.

Table 5-28 Summary of changes to predicted noise exceedances in NCA 10 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | Exceedances are predicted at up to four receivers during multiple construction stages (no change). During the noisiest works (construction of foundations and demobilisation), exceedances are predicted to be up to 10 dB at four receivers (increased by one receiver). No exceedances up to 20 dB are predicted as in exhibited project. | Exceedances are predicted at up to 10 receivers during multiple construction stages (no change). During the noisiest works (construction of foundations), the exceedances are predicted to be:<br>• up to 5 dB at four receivers (no change)<br>• up to 15 dB at three receivers (no change)<br>• up to 25 dB at three receivers (increased from two receivers).<br>No exceedances greater than 25 dB are predicted as in exhibited project. | Exceedances of the sleep disturbance criterion is predicted at up to six receivers (decreased from seven receivers) during the noisiest works (construction of foundations). |
| Switching station M1 | No change. | No change. | No change. |
| Switching station M2 | No change. | No change. | No change. |
| Switching station M3 | No change. | No change. | No change. |
| Access tracks (refer to Section 3.4.3) | Exceedances are predicted at up to four receivers during both construction stages. During the noisiest works (earthworks), exceedances are predicted to be:<br>• up to 10 dB at three receivers<br>• up to 20 dB at one receiver. | Exceedances are predicted at up to seven receivers during both construction stages. During the noisiest works (earthworks), the exceedances are predicted to be:<br>• up to 5 dB at two receivers<br>• up to 15 dB at three receivers<br>• up to 25 dB at two receivers. | Exceedances of the sleep disturbance criterion is predicted at up to four receivers during the noisiest works (earthworks). |


BLACK STUMP WAY
TONGY LANE
VINEGAROY ROAD
ROTHERWOOD ROAD
COOLAH ROAD
MOOREFIELD ROAD
TALBRAGAR RIVER
GOLDEN HIGHWAY
ULAN ROAD
UARBRY
M1
M2
M3
Neeleys Lane workforce accommodation camp
Neeleys Lane construction compound
1384
1385
1351
1308
1294
1298
1263
1265
1323
1324
1316
1288
1261
1246
1223
1221
1202
1200
1195
1184
1491
1152
1487
1119
1167
1480
1163
1162
1159
1139
1142
1091
1103
Figure 5-12
Construction noise exceedance during OOH in NCA 10
Legend
Amended study area
Construction area
Construction compound
Workforce accommodation camp
330 kV switching station
330 kV transmission line
State road
Watercourse
Water body
NCA 10
Construction noise exceedances
Dwelling - Noticeable (0-5 dB)
Dwelling - Clearly audible (5-15 dB)
Dwelling - Moderately intrusive (15-25 dB)
Dwelling - Highly intrusive (>25 dB)
COOLAH
DUNEDOO
DUBBO
GULGONG
WELLINGTON
0
2
4
km
Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4
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Data sources: WSP 2023, EnergyCo, NSWSS
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NCA 11

The predicted changes in exceedances of NMLs in NCA 11 are summarised in Table 5-29 and the maximum temporary potential exceedances at receivers during construction are shown in Figure 5-13. Impacts additional to those that were assessed for the exhibited project are shown in **bold**.

Table 5-29 Summary of changes to predicted noise exceedances in NCA 11 during construction

| Component | Summary of predicted exceedances of NMLs | | Summary of sleep disturbance exceedances |
|---|---|---|---|
| | Standard hours | Out of hours | |
| Transmission lines | No change. | No change. | No change. |
| New Wollar Switching Station | No change. | Exceedances are predicted at two receivers (no change). Exceedances of up to 15 dB are predicted during all construction stages except commissioning (exceedances of up to 15 dB were predicted during all the construction stages in the exhibited project). | Exceedances of the sleep disturbance criterion is a predicted at up to two receivers during all construction stages except commissioning (exceedances of the sleep disturbance criterion were predicted at two receivers during all the construction stages in the exhibited project). |
| New Wollar Switching Station construction compound | No change. | Exceedances are predicted at two receivers during multiple construction stages (no change). During the noisiest works (operation of the compound), the exceedances are predicted to be up to 15 dB at two receivers (exceedances of up to 5 dB at one receiver and up to 15 dB at one receiver were predicted for the exhibited project). | No change. |
| Access tracks (refer to Section 3.4.3) | No exceedances are predicted. | Exceedances are predicted at up to two receivers during both construction stages. The exceedances are predicted to be:<br>• up to 5 dB at one receiver<br>• up to 15 dB at one receiver. | Exceedances of the sleep disturbance criterion is predicted at up to two receivers during the noisiest works (earthworks). |
| **Local road and intersection upgrades** | **Exceedances are predicted at one receiver during multiple construction stages. During the noisiest works (earthworks and paving and asphalting), exceedances are predicted to be up to 20 dB at this receiver.** | **Exceedances are predicted at up to two receivers during multiple construction stages. During the noisiest works (earthworks), the exceedances are predicted to be:**<br>• **up to 5 dB at one receiver**<br>• **greater than 25 dB at one receiver.** | **Exceedances of the sleep disturbance criterion is predicted at one receiver during multiple construction stages.** |

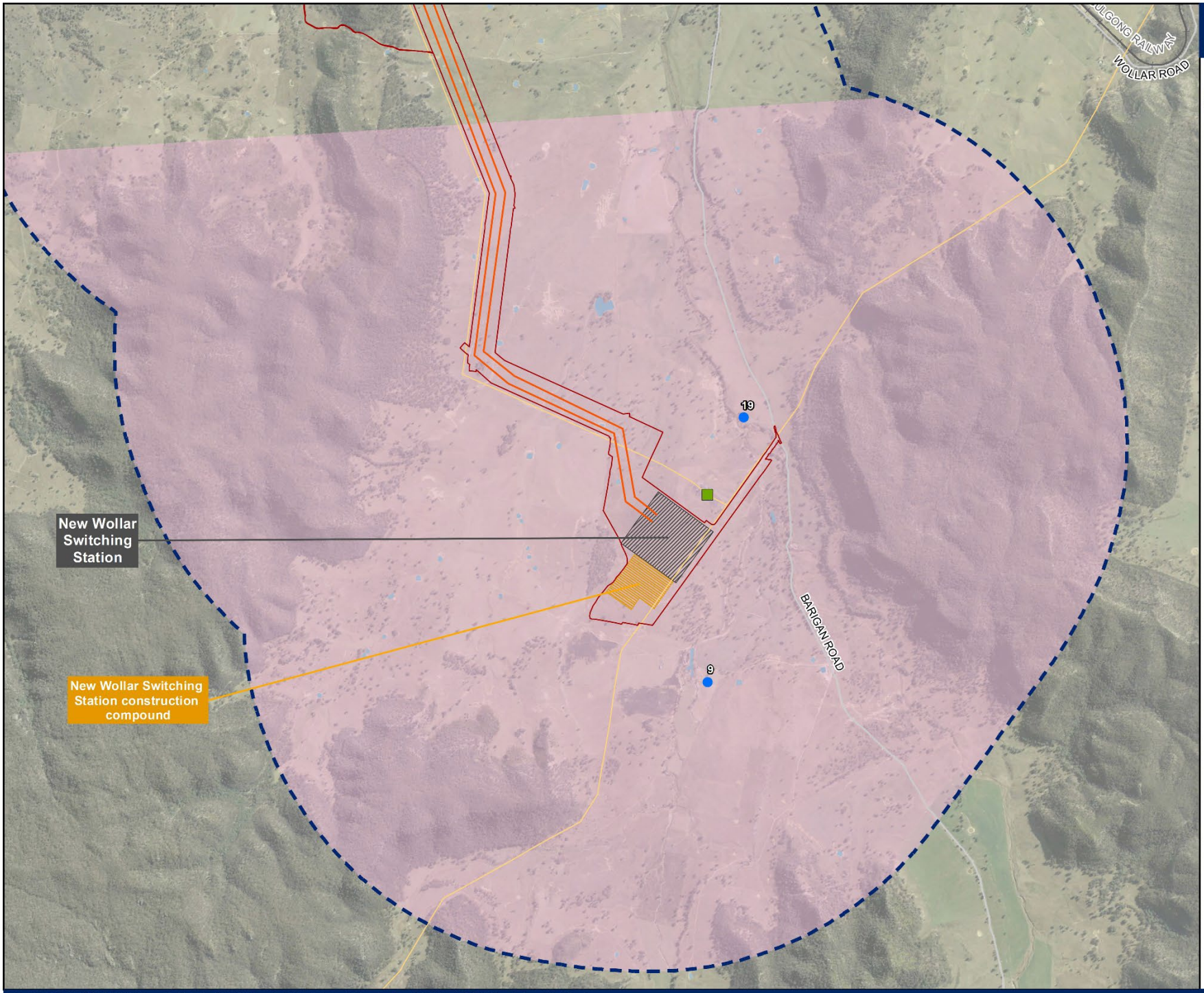


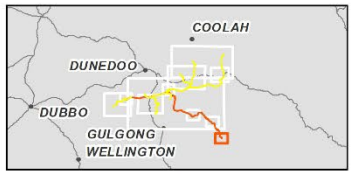

**Figure 5-13**
Construction noise exceedance during OOH in NCA 11

## Legend

- Amended study area
- Construction area
- Construction compound
- Energy hub / 500 kV switching station
- 500 kV transmission line
- Existing substation
- Existing transmission line
- State road
- Railway
- Water body
- NCA 11

**Construction noise exceedances**

- Dwelling - Clearly audible (5-15 dB)




0 0.55 1.1 km

Coordinate system: GDA2020 MGA Zone 55
Scale ratio correct when printed at A4

1:45,000

Data sources: WSP, EnergyCo, NSWSS

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### Road traffic noise

The amendments and refinements would result in minor changes to the predicted noise levels from construction traffic along Ulan Road (Main Street, Ulan to Golden Highway), however no change in the number of affected sensitive receivers is predicted to occur. No changes are predicted on other construction routes for the amended project.

The predicted noise exceedances, particularly during the night-time on local roads, are high as existing traffic volumes are low and the addition of even low volumes of construction vehicles can result in a relatively large increase in road traffic noise. Typical noise levels are likely to be lower than the predicted exceedances, as construction traffic would vary according to the stage of construction and the location of construction activity in the construction area. The predicted noise levels from construction traffic represent a worst-case scenario.

A summary of the changes to predicted impacts of construction traffic along Ulan Road (Main Street, Ulan to Golden Highway) is provided in Table 5-30, and the updated locations of predicted construction traffic noise exceedances for the project are shown in Figure 5-14.

Table 5-30 Changes to predicted impacts of construction traffic along key construction routes

| Construction route section | Highest impacted receiver noise level (and increase on existing) (dBA) | | Summary of noise impacts |
|---|---|---|---|
| | Daytime | Night-time | |
| Ulan Road (Main Street, Ulan to Golden Highway) | 62 (increased from 60 in EIS) (+5) | 60 (increased from 58 in EIS) (+6) | Exceedances are predicted at three receivers during both daytime and night time hours (only at night in exhibited project), all of which are directly adjacent to Ulan Road. The most impacted receiver would experience 60 dBA at night. No other exceedances were predicted in this area. |

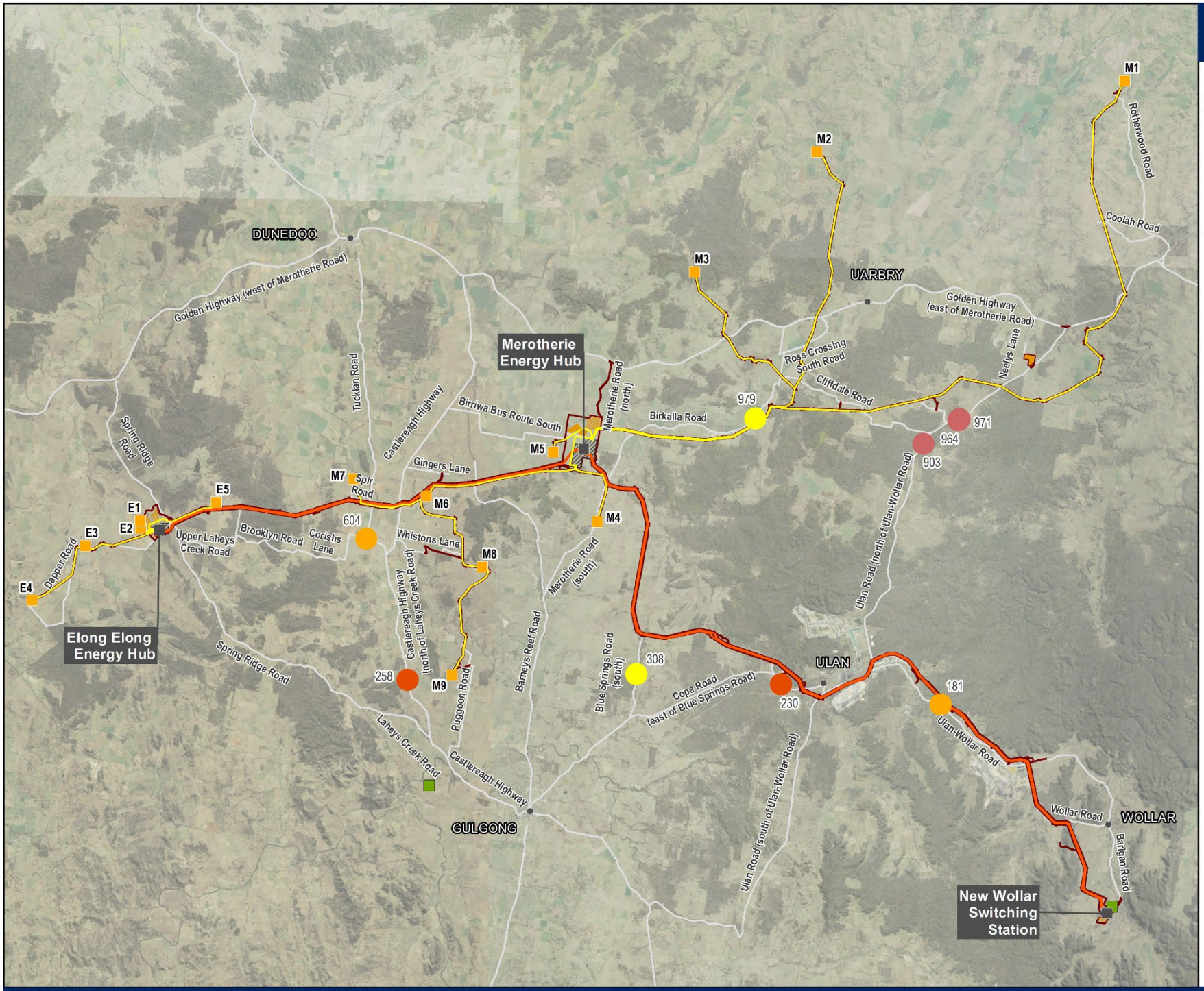


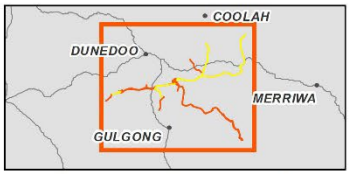

Figure 5-14
Construction traffic noise exceedances

**Legend**

- Construction area
- Construction compound
- Workforce accommodation camp
- Energy hub / 500 kV switching station
- Existing substation
- 330 kV switching station
- 500 kV transmission line
- 330 kV transmission line
- General haulage route

**Construction traffic exceedances**

- Exceedance - Day (>60dB and >2dB increase) and Night (>55dB and >2dB increase)
- Exceedance - night (>55dB and >2dB increase)
- Local Road Exceedance - Day and Night time
- Local Road Night Time Exceedance Only




Coordinate system: GDA2020 MGA Zone 55
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Data sources: WSP 2023

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### Vibration

Refinements to the project alignment, and the identification of new and reclassified sensitive receivers have resulted in minor changes to construction vibration impacts.

Potential human comfort impacts have been reduced, with the potential for impacts to be experienced at one sensitive receiver for the amended project, compared to two receivers for the exhibited project. Consistent with the EIS, these impacts would be due to the construction of transmission lines and access tracks which would be transient and short term.

Up to nine structures (increased from four structures in EIS, see correction in Section 3.4.3) have been identified within the recommended minimum working distances for potential cosmetic damage. Consistent with the EIS, all of these structures are unoccupied structures such as sheds and unoccupied houses.

Three non-Aboriginal heritage items have been identified within the recommended minimum safe working distances in NCA 3 near the transmission line alignment. This has increased from one unlisted non-Aboriginal heritage item for the exhibited project as a result of the identification of new and reclassified sensitive receivers.

One Aboriginal heritage item is expected to be located within the minimum safe working distance in NCA 6 near the transmission line alignment. However, the vibration sensitivity of this site is currently unknown and would be assessed as design progresses and within the Construction Noise and Vibration Management Plan (CNVMP).

A summary of the changes in the predicted number of vibration sensitive receivers and structures impacted is provided in Table 5-31.

Table 5-31 Changes in predicted vibration impacts

| Component | NCA | Predicted number of receivers within minimum working distances for amended project* | | |
|---|---|---|---|---|
| | | Cosmetic damage (BS 7385) | Heritage (DIN 4150-3) | Human comfort (DECCW) |
| Transmission lines | NCA 1 | 0 | 0 | 0 (decreased from 1) |
| | NCA 3 | 0 | 2 (increased from 0) | 0 |
| | NCA 4 | 0 (decreased from 1) | 0 | 1 |
| | NCA 6 | 0 | 1 (increased from 0) | 0 |
| | NCA 8 | 9 (increased from 4) | 1 | 0 |
| Access tracks | NCA 4 | 0 (decreased from 2) | 0 | 1 (decreased from 2) |
| | NCA 8 | 6 | 0 | 0 |

* Predicted number of receivers within minimum working distances for the exhibited project indicated in brackets where different from the amended project

### Blasting

No changes are proposed to blasting for the amended project.

### Operation

#### Corona noise from transmission lines

In the exhibited project, one receiver in NCA 1 would experience a 'moderate' level of exceedance, and one receiver in NCA 4 would experience a 'negligible' level of exceedance during the evening and night time (refer to Section 15.6.1 of the EIS).

The project amendments and refinements would result in a reduction in potential corona noise impacts as there would be no receivers that would experience a 'moderate' level of exceedance as in the exhibited project. One receiver in NCA 4 (ID 531) would still experience a 'negligible' level of exceedance of the project noise trigger level (PNTL) during night time hours.

It should be noted that the identification of exceedances has been undertaken incorporating several conservative factors. Further modelling of audible noise and assessable meteorological conditions would be undertaken by the appointed Network Operator during the detailed design phase for potential corona noise impacts from transmission lines.

#### 330 kV switching stations

Exceedances of the sleep awakening trigger level were predicted for sensitive receivers near switching stations M5 and M7 in the exhibited project (refer to Section 15.6.2 of the EIS).

The project amendments include the relocation of several 330 kV switching stations and the provision of an additional switching station (E5). With the relocation of switching station M7, noise levels would no longer exceed awakening trigger levels at the affected receiver (ID 717) in NCA 4. The predicted exceedances of the awakening trigger level at two receivers due to the operation of switching station M5 remain unchanged from the exhibited project.

#### Energy hubs

No exceedances of the PNTLs or the sleep disturbance and awakening trigger levels were predicted at energy hubs for the exhibited project (refer to Section 15.6.2 of the EIS).

Potential noise impacts of the energy hubs would be reduced for the amended project due to the following project refinements:

- removal of the option to have one 200 megawatts/400 megawatts per hour BESS replace one synchronous condenser at the Merotherie Energy Hub
- minor changes to the operational footprint of the Elong Elong Energy Hub.

## 5.9.5 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential noise and vibration impacts are listed in Table 5-32. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix F (Updated mitigation measures).

Table 5-32 Updated mitigation measures – noise and vibration

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| NV1 | Construction noise (source controls) | As part of development of the detailed design and construction methodology, all reasonable and feasible mitigation measures will be considered, confirmed and implemented to minimise construction noise impacts and to avoid exceedances of the applicable noise goals at adjacent sensitive receivers where practicable. Measures that may achieve this outcome may include, but are not limited to the following:<br>• portable temporary noise screens will be erected adjacent to stationary or long-term static noise sources, or noise generating items, where reasonable and feasible<br>• spotters, "smart" reversing alarms, or broadband reversing alarms will be used in place of traditional tonal beeper reversing alarms, particularly on equipment where reversing alarms are frequently in use such as rollers, loaders or compactors<br>• noise source controls, such as the use of residential class mufflers, will be used reduce noise from all plant including cranes, excavators and trucks<br>• the offset distance between noisy plant items and sensitive receivers will be maximised, where reasonable and feasible<br>• machinery will be operated in a manner which reduces maximum noise level events such **as reduce** shaking of excavator buckets, dropping materials into trucks from height or steel on steel contact<br>• construction plant and equipment will be turned off when not in use<br>• ~~helicopters will not be operated during evening and night-time periods. Where the use of drones is proposed during evening and/or night-time periods, an additional assessment(s) will be undertaken to identify appropriate operational limits to ensure that noise impacts to nearby sensitive receivers are acceptable.~~ | Detailed design<br>Pre-construction<br>Construction | All locations where exceedances of the applicable construction noise criteria are predicted at sensitive receivers |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| NV2 | Construction noise (administrative controls) | Opportunities to reduce exceedances of the applicable construction noise goals through the implementation of administrative controls will be examined, confirmed and implemented where reasonable and feasible. Controls to be considered will include, but not limited to the following:<br>• environmental awareness training and inductions for site personnel will include noise mitigation techniques/measures to be implemented when on site and accessing the site<br>• the avoidance of simultaneous construction activities during transmission line construction in the vicinity of the Energy Hubs will be investigated to minimise potential cumulative noise impacts<br>• plant and equipment will be selected with noise emission levels being a consideration for selection ~~based on noise emission levels. This will include the consideration of alternative stringing methods, such as the use of drones instead of helicopters~~<br>• noise-intensive works will be limited to less sensitive construction hours (i.e. away from early morning and late afternoon periods) as far as practicable, when working in the vicinity of sensitive receivers<br>• plant and equipment will be well maintained to ensure that excessive noise is not generated<br>• the provision of respite periods for helicopter take off/landing will be considered at the construction compounds<br>• a blasting vibration and overpressure assessment will be required as part of any potential blast design. This assessment will determine the Maximum Instantaneous Charge to achieve the recommended ground vibration and overpressure limits. In addition, a Blast Management Strategy will be prepared in accordance with Section 4 of AS 2187.2-2006 for inclusion in the CNVMP<br>• any works undertaken outside standard working hours will be further assessed in accordance with the ICNG and the CNVG during detailed design and an Out of hours works protocol will be developed **and implemented** to mitigate any identified impacts. | Detailed design<br>Pre-construction<br>Construction | All locations where exceedances of the applicable construction noise criteria are predicted at sensitive receivers. |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| NV3 | Construction noise | Opportunities to reduce the impacts associated with construction noise levels through the implementation of proactive community consultation will be examined, confirmed and implemented where reasonable and feasible. Controls to be considered will include, but not limited to the following:<br>• sensitive receivers potentially affected by the works will be notified of the commencement of construction activities at least five days prior to works starting. The notification will inform potentially impacted sensitive receivers of the nature of and duration of works, expected noise levels and contact details of where sensitive receivers can contact can project representatives<br>• the community will be kept regularly informed of noise intensive activities in the immediate area<br>• if noise complaints are received, the complainant will be offered the opportunity for noise monitoring to be carried out to confirm the noise level at the receiver. Where the noise monitoring confirms that the applicable noise predictions are being exceeded, the construction methodology will be reviewed and changes implemented to reduce construction noise levels to be compliant with noise predictions where reasonable and feasible. Additional mitigation measures such as respite periods have been outlined in Table 15-29 of Chapter 15 (Noise and Vibration) of the EIS. | Pre-construction | All locations where exceedances of the applicable construction noise criteria are predicted at sensitive receivers. |
| NV4 | Construction vibration | Where construction is likely to result in vibration levels that exceed relevant criteria at sensitive receivers, mitigation and management will be implemented where practicable and appropriate. **Measures that will be considered and implemented where feasible and reasonable include (but are not limited to):**<br>• avoid the use of vibration-intensive plant at distances where human discomfort will result<br>• substitute lower vibration-intensive plant and methods (for example use a smaller machine, lower power settings or alternative equipment)<br>• sequence operations to avoid or minimise concurrent vibration intensive activities<br>• schedule the use of vibration-sensitive equipment during the least sensitive times of the day<br>• confirm any vibration-sensitive heritage structures that could be impacted by the proposal works<br>• inform and consult with potentially affected receivers about upcoming vibration-intensive activities<br>• **pre and post condition surveys.** | Detailed design<br>Pre-construction | All locations where exceedances of the applicable construction vibration criteria are predicted at sensitive receivers. |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| NV5 | Heritage vibration impacts | Vibration sensitive Aboriginal and non-Aboriginal heritage items which have potential to be impacted by the project works will be confirmed prior to the commencement of vibration generating works in proximity to relevant structures.<br>Suitable, item specific criteria will be developed for heritage items and vibration impacts at these locations will be managed before commencement of construction. This may include the use of alternative construction methods which generate lower levels of ground vibration and the installation of vibration monitors while vibration intensive activities are conducted. | Detailed design | All heritage items where exceedances of the applicable construction vibration criteria are predicted. |
| NV6 | Operational noise | An Operational Noise Review will be prepared to confirm the predicted noise impacts from the project (based on the final infrastructure locations). Where necessary, the operational mitigation measures to be implemented below will be revised so operational noise impacts are compliant with the project noise trigger levels, where feasible and reasonable.<br>Where exceedances of the project specific noise trigger levels are predicted (i.e. transmission lines audible noise), feasible and reasonable operational noise mitigation measures will be further investigated ~~prior to construction,~~ in consultation with the affected receivers. This will include:<br>• Transmission lines<br>— Scheduling of maintenance activities during less sensitive times of day.<br>— Noise control at the receiver, such as 'at property' treatment to upgrade aspects of the dwellings including the façade or ventilation systems.<br>— Monitoring after the commissioning of the project to be conducted at each residence where potential operational noise levels are predicted to exceed project trigger levels.<br>— If additional measures are found to be required during the compliance monitoring, these will be implemented as soon as practicable.<br>• Energy hubs and switching stations<br>— Adoption of lower generating noise equipment (where practicable).<br>— Site layout designed to minimise noise impacts.<br>— Restriction of operational parameters such as cooling fans where meteorological conditions are favourable.<br>— Noise control at the receiver, such as 'at property' treatment to upgrade aspects of the dwellings including the façade or ventilation systems.<br>~~— Monitoring after the commissioning of the project to be conducted at each residence where potential operational noise levels are predicted to exceed project trigger levels.~~<br>~~— If additional measures are found to be required during the compliance monitoring, these will be implemented as soon as practicable.~~<br>**Identified measures will be implemented prior to operation of the relevant infrastructure.** | Pre-construction | All locations |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| | | **In addition, the following will be undertaken:**<br>— Monitoring after the commissioning of the project to be conducted at each residence where potential operational noise levels are predicted to exceed project trigger levels **to compare operational noise levels to predictions.**<br>— If additional measures are found to be required during the compliance monitoring, these will be implemented as soon as practicable. | | |

## 5.10 Hazard and risk

The potential hazards and risks of the project during construction and operation were assessed in the following technical papers of the EIS:

- Technical paper 1 – Aviation
- Technical paper 10 – Bushfire
- Technical paper 11 – Preliminary Hazard Analysis (PHA)
- Technical paper 12 – Electro Magnetic Field Assessment.

The key findings of these assessments were summarised in Chapter 16 (Hazard and risk) of the EIS. Additional assessment has been undertaken to identify changes to potential hazard and risk impacts associated with the amended project. The findings of the additional assessment are reported in this section.

### 5.10.1 Assessment approach

A desktop assessment was carried out to assess the potential changes to the hazards and risks identified as part of the construction and operation of the exhibited EIS as a result of the amendments and refinements. Given the nature of the potential impacts of the amended project, no additional specialist assessment was undertaken with the results of the previous assessment being considered consistent with the amendments and refinements.

### 5.10.2 Existing environment

The existing environment in relation to hazard and risk as summarised in Section 16.3 of the EIS remains relevant to assess the impacts of the amended project.

### 5.10.3 Assessment of potential impacts

#### Construction

The provision of a construction compound at the Neeleys Lane workforce accommodation camp would introduce potential hazards and risks associated with the storage and transport of dangerous goods and hazardous materials at the compound and its haulage routes. The typical hazardous materials and dangerous goods that would be used during construction remain unchanged from the EIS (refer to section 16.4.4).

Hazardous materials and dangerous goods stored at and transported to and/or from the Neeleys Lane construction compound would not exceed the threshold quantities outlined in the *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (NSW Department of Planning (DoP), 2011) ('Applying SEPP 33'). The amended project is therefore not considered a 'potentially hazardous development' as defined by the State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP), which is consistent with the findings of the PHA of the EIS.

The potential hazards and risks of the amended project in relation to bushfire, mine subsidence, aviation safety, electric and magnetic fields, and impacts to utilities during construction, are considered to be consistent with the hazards and risks described in Section 16.4 of the EIS.

### Operation

The amendments and refinements would reduce hazards and risks for the project by:

- avoiding potential mine subsidence impacts associated with the Mudgee Mine Subsidence District in Bungaba, by amending the twin 330 kV transmission line alignment in this location
- removing the option to include a BESS at the Merotherie Energy Hub, which would remove hazards and risks related to dangerous goods and hazardous materials associated with the operation of the BESS
- reducing the potential impacts of the project on the radio network, by providing additional infrastructure at existing microwave repeater sites to improve the transmission of microwave signals.

The potential hazards and risks of the amended project in relation to bushfire, aviation safety, electric and magnetic fields, and storage and transport of dangerous goods and hazardous materials during operation, are considered to be consistent with the hazards and risks described in Section 16.5 of the EIS.

## 5.10.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential hazards and risks are listed in Table 5-33. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix F (Updated mitigation measures).

Table 5-33 Updated mitigation measures – hazard and risk

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| BF1 | Exposure of energy assets to radiant heat beyond the design tolerance of the asset | Asset Protection Zones (APZs) **for appropriate components of** switching stations, energy hubs (including the maintenance facility), **construction compounds and workforce accommodation camps** will be established in accordance with the requirements of the NSW Rural Fire Service's documents Planning for Bushfire Protection 2019 (Appendix 4) and Standards for asset protection zones. **The final design and associated APZs of appropriate components of switching stations and energy hubs (including the maintenance facility), will be developed in consultation with RFS.** | Pre-construction<br>Construction | Key project assets in the operational area that require protection from the impact of radiant heat and direct flame contact associated with a bushfire |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| BF2 | Exposure of energy assets to radiant heat beyond the design tolerance of the asset | Energy hubs, and switching stations, will be designed and constructed in accordance with bushfire attack level 29 in accordance with *AS3959-2018 Construction of Buildings in Bushfire Prone Areas*. | Pre-construction<br>Construction | Operation area |
| BF3 | Insufficient access to the construction and operation area for fire fighting | Access for firefighting appliances will be provided in accordance with Section 2 of the *NSW Rural Fire Service Fire Trails Standards*. | Pre-construction<br>Construction<br>Operation | All locations |
| BF4 | Bushfire risk from construction | Hot work (activities involving high temperatures) and fire risk work (activities involving heat or with the potential to generate sparks) will be undertaken with appropriate safeguards to minimise the risk of ignition and spread of fire from construction activities. ~~including~~ **This may include** suspension of hot work and fire risk work **or implementation of additional controls for such work** on days of elevated fire danger. | Construction | All locations |
| BF5 | Bushfire risk from construction | Firefighting equipment will be maintained and made available for use during the construction phase in accordance with Planning for Bushfire Protection 2019 (NSW RFS 2019) including the following:<br>• static water supply tanks with a minimum volume of 20,000 litres (each) will be provided at the construction compounds and workforce accommodation camps for firefighting purposes<br>• 38 millimetre metal Storz outlets with a gate or ball valve will be provided as an outlet on each of the tanks<br>• non-combustible water tanks and fittings will be used<br>• firefighting equipment (inclusive of a slip on unit) will be maintained at and/or accessible to all active construction site personnel during the declared bushfire danger season and site personnel trained in its use. | Construction | All locations |
| BF6 | Bushfire risk during operation | The APZs will be established at construction sites and managed during operation in accordance with Appendix 4 of *Planning for Bushfire Protection 2019* and the NSW Rural Fire Service's document *Standards for asset protection zones*. | Operation | Energy hubs, switching stations and maintenance facility |
| HR1 | Mine subsidence risk | Detailed design ~~and construction planning~~ **for areas of the transmission alignment that traverse the Mudgee Mine Subsidence District** will be undertaken in accordance with approvals issued by Subsidence Advisory NSW. | Detailed design<br>Pre-construction | Mining areas |
| HR2 | Impacts on underground utilities | The location of all services and utilities within the construction area will be confirmed prior to the commencement of construction (using Before-You-Dig searches, non-destructive digging and/or other appropriate methods). Any required protection or relocation will be designed in consultation with utility providers. | Detailed design<br>Pre-construction | Construction area |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AS1 | Safety of aircraft movements | The final design of the project with transmission line and tower coordinates and elevations will be provided to the following stakeholders prior to construction:<br>• Air Services Australia<br>• Commonwealth Department of Defence<br>• owners of Dalkeith, Tongy and Merotherie aircraft landing areas<br>• NSW National Parks and Wildlife Service<br>• property owners/occupiers within 5.5 km the transmission easement.<br>Additional notification(s) will be undertaken if the final detailed design of the project alters the details previously supplied to these stakeholders, prior to the construction of the modified design elements. | Detailed design | Operation area |
| AS2 | Aerial farming operations | At locations where the transmission lines will impact existing aerial farming operations, consultation will be undertaken with relevant landowners to identify appropriate mitigation arrangements such as the installation of aerial warning markers on the transmission lines (where feasible). | Detailed design | Operation area |
| AS3 | Safety of aircraft movements | The following stakeholders will be notified of the scheduling of the use of cranes (**for transmission tower erection only**), drones and helicopters for the construction of the project, prior to the commencement of relevant works:<br>• Air Services Australia<br>• Commonwealth Department of Defence<br>• property owners/occupiers within 5.5 km the transmission easement<br>• owners at Dalkeith, Tongy and Merotherie aircraft landing areas<br>• NSW Parks and Wildlife Service. | Pre-construction | Operation area |
| HA1 | Storage and use of Dangerous Goods | Dangerous goods will be stored in accordance with suppliers' instructions and relevant legislation, Australian Standards, and applicable guidelines; and may include bulk storage tanks, chemical storage cabinets/containers or impervious bunds. Any storage areas will be designed in accordance with Australian Standard *AS1940: The storage and handling of flammable and combustible liquids* where applicable.<br>All personnel required to work with Dangerous Goods and other hazardous material will be trained in their safe use and handling. | Construction<br>Operation | All locations |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| HA2 | Management of hazardous materials (design) | Further assessment of hazardous materials and dangerous goods will be undertaken during detailed design, when detailed information on material quantities and types, transport movements ~~and BESS design details~~ are known, to ensure the thresholds in Applying SEPP 33 are not exceeded.<br>Safety in design will be considered and implemented in operational design in accordance with a Safety Management System (SMS) based on applicable Australian Standard and guidelines for the Lithium-ion packed batteries and Class 9 Dangerous Goods. | Detailed design | Energy hubs and switching stations |
| ~~HA3~~ | ~~Battery Energy Storage System (BESS) thermal runaway and resultant fire~~ | ~~Prior to construction of the BESS, a Fire Safety Study will be prepared based on the final design of the BESS. The Fire Safety Study will be prepared in accordance with the *Hazardous Industry Planning Advisory Paper No. 2 – 'Fire Safety Study' guideline* (DoP, 2011c).~~ | ~~Detailed design~~ | ~~Merotheric Energy Hub~~ |
| ~~HA4~~ | ~~BESS thermal runaway and resultant fire~~ | ~~The BESS will be installed in accordance with *AS/NZS 5139 Electrical installations – Safety of battery systems for use with power conversion equipment*. Optimal operation conditions of the BESS will be maintained in accordance with the operational design requirements, Australian Standard *AS 1670: Fire detection, warning, control and intercom systems* and Best Practice Guide: Battery Storage Equipment – Electrical Safety Requirements (2018) or equivalent.~~ | ~~Detailed design~~ | ~~Merotheric Energy Hub~~ |
| ~~HA5~~ | ~~Pollutant release~~ | ~~The design of the BESS (if applicable) will identify containment measures to be provided for the containment of cooling water and oils to ensure no offsite discharge occurs.~~ | ~~Detailed design~~ | ~~Merotheric Energy Hub~~ |
| ~~HA6~~ | ~~Pollutants and smoke moving offsite~~ | ~~Emergency procedures will include details for the establishment of a downwind exclusion zone(s) and evacuation protocols to be implemented in the event of a fire at the BESS (depending on the severity of the event).~~ | ~~Operation~~ | ~~Merotheric Energy Hub~~ |

## 5.11 Traffic and transport

Technical paper 13 – Traffic and transport (Technical paper 13) of the EIS assessed the potential traffic and transport impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 17 (Traffic and transport) of the EIS.

Additional assessment has been undertaken to identify changes to potential traffic and transport impacts associated with the amended project. The relevant assessment completed to support the Amendment Report is provided in Appendix J (Traffic and Transport Impact Assessment Addendum). The findings of this assessment are summarised in this section.

### 5.11.1 Study area

All of the amendments and refinements are located within the traffic and transport study area defined in the EIS (refer to Section 17.2.1 of the EIS), and therefore the study area remains unchanged.

### 5.11.2 Assessment approach

The methodology for the updated construction traffic and transport assessment is generally consistent with that undertaken for the exhibited project. Minor changes to the methodology, as described in Appendix J, included the following to address the project amendments and refinements:

- determining any changes to construction routes used by heavy and light vehicles due to the proposed amendments and refinements
- updated analysis of existing conditions of the construction routes, including:
  - consideration of additional intersection surveys completed on 30 November 2023 to understand current traffic demands, conditions and travel patterns
  - updated analysis of crash data for highway, main, regional and local roads using updated Transport for NSW crash data between 2018 and 2022
  - turn warrant assessment of key intersections used by construction vehicles, in accordance with Austroads' *Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2023), to assess whether the existing layout of each intersection is suitable to provide safe access for the existing traffic demand during the AM and PM peak
- assessment of the potential traffic and transport impacts to key construction routes within the study area, associated with the expected construction traffic volumes, including:
  - assessment of the operational performance of key intersections used by construction vehicles using the SIDRA intersection modelling program, to determine if the intersections can safely accommodate construction vehicles during the AM and PM peak. The assessment involved comparing traffic performance indicators, including the Level of Service (LoS) and average delay, for the following two scenarios: the existing intersection performance with existing background traffic volumes (i.e. base case without project construction traffic). Existing traffic volumes at these intersections were determined using survey data or estimated from intersection counts, and traffic lane capacity of the roads determined in accordance with Guide to Traffic Management (refer to sections 3.7 and 4.1.5 of Technical paper 13 for further information)
  - the performance of the same intersection layout with increased background traffic volumes (using a growth value of 1.6%) and the predicted construction traffic volumes
  - updated assessment of the layout of key intersections used by construction vehicles, to determine if the intersections can safely accommodate construction vehicles during the AM and PM peak based on the design speed according to Guide to Traffic Management, or the turn treatments required to ensure the safe operation of the intersections.
  - assessment of Safe Intersection Sight Distance (SISD) compliance for the 2.5 second reaction time for the 100km/hr+10km/hr design speed (which equates to a requirement for 300 metres of SISD in each direction), at the key intersections used by construction vehicles.

## 5.11.3 Existing environment

### Key intersection layouts and volumes

Two additional key intersections that would be used by construction traffic were assessed to determine if the layout of the intersections are suitable in their current arrangement to safely accommodate the existing AM and PM peak hour traffic volumes, based on the design speed according to *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management*. Details of the existing conditions of these two intersections are provided in Table 5-34.

Further consideration and assessment of the potential need for upgrades to intersections as a result of the project construction traffic is provided in Section 5.11.4.

Table 5-34 Overview of key additional intersections considered for the amended project (layout, speed and volumes)

| Intersection | Type of intersection | Speed limit (km/h) | Surveyed volume AM / PM vehicles per hour (vph) (total)* | Aggregate daily traffic AM / PM vehicles per day (vpd) (total)* | Current arrangement** |
|---|---|---|---|---|---|
| Cassilis Road/ Golden Highway | T-intersection | 100 | 125 vph / 133 vph [a] | 1250 vpd / 1330 vpd [a] | BAL and CHR |
| Golden Highway/ Castlereagh Highway | T-intersection | 100 | 189 vph / 207 vph [b] | 1890 vpd / 2070 vpd [b] | AUL and CHR |

* excluding the 1.6% growth value applied onto State road

** BAL – basic left turn, AUL – auxiliary left turn and CHR – channelised right turn

Volumes are reported for the following periods for the AM and PM periods:

a: 9 am – 10 am, 4:30 pm – 5:30 pm

b: 9 am – 10 am, 3 pm – 4 pm

### Crash analysis

Table 5-35 provides a summary of the revised crash analysis for highway, main, regional and local roads between 2018–2022. There was a total of 64 crashes along the proposed project construction routes, with the majority of the crashes occurring in mid-block locations (around 81 per cent) and along highways (around 19 per cent). No crashes occurred on Wollar Road whereas the majority of the crashes occurred on the Golden Highway. The most common degree of crash (or crash severity) was no casualty (36 per cent) and the least common degree of crash involved a fatality or minor/other injury (9.5 per cent each). Further details are outlined in Section 4.4 of Technical paper 13.

Table 5-35 Crash summary along construction route by degree of severity along the various construction routes between 2018 – 2022

| Degree of crash | Highways | | Main roads | | Regional roads | Local roads | Total |
|---|---|---|---|---|---|---|---|
| | Number of crashes on Golden Highway | Number of crashes on Castlereagh Highway | Number of crashes on Cope Road | Number of crashes on Ulan Road | Number of crashes on Wollar Road | Number of crashes | |
| Fatal | 3 | 1 | 1 | 0 | 0 | 1 | 6 |
| Injury | 8 | 2 | 0 | 0 | 0 | 1 | 11 |
| Moderate injury | 10 | 3 | 1 | 1 | 0 | 3 | 18 |
| Minor injury/other injury | 1 | 0 | 0 | 4 | 0 | 1 | 6 |
| No casualty | 14 | 4 | 0 | 5 | 0 | 0 | 23 |
| Total | 36 | 10 | 2 | 10 | 0 | 6 | 64 |
| **Location of crash** | | | | | | | |
| Intersection | 8 | 2 | 0 | 2 | 0 | 0 | 12 |
| Mid-block | 28 | 8 | 2 | 8 | 0 | 6 | 52 |

## 5.11.4 Assessment of potential impacts

### Construction

#### Construction routes

Minor changes are proposed to the construction routes for the amended project as a result of the amendments and refinements. These changes involve the addition of the following roads as part of the construction routes for the amended project:

- Upper Cumbo Road, due to the addition of an access track leading from Upper Cumbo Road to the transmission line construction area. Construction vehicles would travel on Upper Cumbo Road from its intersection with Wollar Road to the access track
- roads (or sections of roads) to access the microwave repeater sites that are not part of the construction routes for the exhibited project:
  - Botobolar: Ulan Road, Wollar Road and Botobolar Road
  - Cope: Merotherie Road, Birkalla Road, Blue Springs Road and an existing access track
  - Magpie Hill: Ulan Road, Cope Road, Castlereagh Highway and an existing access track
  - Baldy Peak: Ulan Road, Lue Road, Bylong Valley Way, Cooper Drive, Cement Avenue, Charbon Road and an existing access track.

#### Traffic volumes and road capacity and efficiency

The provision of a construction compound at the Neeleys Lane workforce accommodation camp would increase the heavy vehicle traffic movements generated by the site. Up to 34 heavy vehicle movements would be generated during the peak hour (an increase of 10 vehicle movements from the exhibited project), which would result in 66 traffic movements during the peak hour. Estimates of the maximum number of construction vehicle movements per hour associated with the construction compound at the Neeleys Lane workforce accommodation camp are presented in Table 5-36.

The construction activities at the microwave repeater sites are generally limited to minor works, including the installation of a microwave tower (assembled on-site) and satellite dish (refer to Section 3.2.4). These works would use general access vehicles only (i.e. up to a 19 metre semi-trailer). It is envisaged that up to 20 vehicles per day (40 movements daily) and around two vehicles during the peak period would be needed to access each of the microwave repeater sites to install the microwave repeater infrastructure. These movements would be spread out across the day. The installations at the microwave repeater sites are anticipated to take between three to six months to complete, but would be confirmed during the detailed design phase. The limited number of vehicles required for these works would not be likely to result in adverse impact to road capacity.

Table 5-36 Updated construction vehicle movements per hour (indicative) during peak construction

| Site | Movement per hour | | | Movement per day* | | |
|---|---|---|---|---|---|---|
| | Light vehicle | Heavy vehicle | Total | Light vehicle | Heavy vehicle | Total |
| Neeleys Lane workforce accommodation camp and construction compound | 32 | 34 (increased by 10) | 66 (increased by 10) | 410 (increased by 114) | 290 (increased by 220) | 700 (increased by 334) |

* Traffic movements would be distributed throughout the day

### Access tracks

The refined access tracks (refer to Section 3.3.3) would maintain the use of access points as described in the EIS. The refinements to the alignment of access tracks and additional access tracks proposed (refer to Section 3.3.3) would not generate any additional traffic movements on the construction routes. The location, type and extent of any additional access tracks and access points required on the construction routes above those identified in this report will be confirmed during detailed construction planning in consultation with the affected landowner and the relevant roads authority. Any impacts additional to those identified in the EIS and Amendment Report will be subject to further assessment, if required.

### Intersection performance

A comparison of traffic performance of key intersections along the project construction routes under existing conditions and with construction traffic is provided in Table 5-37. **Bold** text denotes where there has been a change in the LoS along an assessed intersection.

The additional traffic movements would bring a noticeable change to the local road environment; however all intersections would still operate stably. The majority of the key intersections that form part of the project construction routes would continue to operate at Los A. Some intersection legs are expected to experience a minor decrease in performance, from LoS A to LoS B, or from LoS B to LoS C. At the Spring Ridge Road/Golden Highway intersection, traffic turning from Spring Ridge Road onto the Golden Highway during the PM peak would experience a decrease from LoS A to LoS C as a result of construction vehicle movements.

Despite the reduced LoS, key intersections along the project construction routes would still operate at near free flowing conditions, although drivers would be required to exercise more care and vigilance when navigating these intersections. The amendments and refinements would therefore have only minor temporary impacts during construction, with intersections operating at acceptable levels.

Table 5-37 Intersection performance during construction

| Location | Intersection approach | Average delay (existing) (seconds per vehicle) | | Level of Service (existing) | | Average delay (predicted) (seconds per vehicle) | | Level of Service (predicted) | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour |
| Neeleys Lane/Ulan Road intersection | Northeast: Ulan Road | 0.1 | 0.1 | LoS A | LoS A | 12.1 | 7.6 | **LoS B** | LoS A |
| | Northwest: Neeleys Lane | 8.4 | 8.0 | LoS A | LoS A | 8.7 | 8.1 | LoS A | LoS A |
| | Southwest: Ulan Road | 7.8 | 7.8 | LoS A | LoS A | 10.5 | 7.8 | **LoS B** | LoS A |
| Merotherie Energy Hub access road/ Merotherie Road | North: Merotherie Road | 7.4 | 7.4 | LoS A | LoS A | 10.3 | 7.7 | **LoS B** | LoS A |
| | South: Merotherie Road | 7.8 | 7.8 | LoS A | LoS A | 7.8 | 11.2 | LoS A | LoS A |
| | West: Access Road | 7.8 | 7.8 | LoS A | LoS A | 8.2 | 7.9 | LoS A | **LoS B** |
| Golden Highway/Merotherie Road | South: Merotherie Road | 7.9 | 7.9 | LoS A | LoS A | 8.4 | 8.2 | LoS A | LoS A |
| | East: Golden Highway | 7.8 | 7.8 | LoS A | LoS A | 10.5 | 7.8 | **LoS B** | LoS A |
| | West: Golden Highway | 7.5 | 7.5 | LoS A | LoS A | 11.6 | 7.6 | **LoS B** | LoS A |
| Spring Ridge Road/Dapper Road | Southeast: Spring Ridge Road | 7.8 | 7.8 | LoS A | LoS A | 7.8 | 7.8 | LoS A | LoS A |
| | Northwest: Spring Ridge Road | 7.4 | 7.4 | LoS A | LoS A | 10.2 | 7.4 | **LoS B** | LoS A |
| | Southwest: Dapper Road | 7.9 | 7.8 | LoS A | LoS A | 7.9 | 10.5 | LoS A | **LoS B** |
| Golden Highway/Spring Ridge Road | Southeast: Spring Ridge Road | 9.9 | 9.7 | LoS A | LoS A | 12.4 | 17.0 | **LoS B** | **LoS C** |
| | Northeast: Golden Highway | 7.8 | 7.8 | LoS A | LoS A | 10.4 | 7.8 | **LoS B** | LoS A |
| | Southwest: Golden Highway | 7.6 | 9.2 | LoS A | LoS A | 9.0 | 9.1 | LoS A | LoS A |
| Wollar Road/Barigan Street/ Philip Street | South: Barigan Street | 5.6 | 5.6 | LoS A | LoS A | 5.8 | 5.8 | LoS A | LoS A |
| | East: Wollar Road | 5.6 | 5.6 | LoS A | LoS A | 5.6 | 6.3 | LoS A | LoS A |
| | North: Barigan Street | 5.6 | 5.6 | LoS A | LoS A | 6.8 | 5.9 | LoS A | LoS A |
| | West: Wollar Road | 5.6 | 5.5 | LoS A | LoS A | 5.6 | 6.6 | LoS A | LoS A |

| Location | Intersection approach | Average delay (existing) (seconds per vehicle) | | Level of Service (existing) | | Average delay (predicted) (seconds per vehicle) | | Level of Service (predicted) | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour |
| Ulan Road/Ulan-Wollar Road | Southeast: Ulan-Wollar Road | 10.3 | 6.9 | LoS B | LoS A | 19.3 | 13.9 | **LoS C** | **LoS B** |
| | Northeast: Ulan Road | 7.9 | 7.8 | LoS A | LoS A | 9.5 | 9.1 | LoS A | LoS A |
| | Southwest: Ulan Road | 8.1 | 7.8 | LoS A | LoS A | 9.8 | 8.0 | LoS A | LoS A |
| Golden Highway/Ulan Road | South: Ulan Road | 8.7 | 8.4 | LoS A | LoS A | 10.5 | 11.7 | **LoS B** | **LoS B** |
| | East: Golden Highway | 8.3 | 8.2 | LoS A | LoS A | 9.3 | 8.2 | LoS A | LoS A |
| | West: Golden Highway | 8.2 | 7.7 | LoS A | LoS A | 11.9 | 7.8 | **LoS B** | LoS A |
| Ulan Road/Cope Road | Northeast: Ulan Road | 9.0 | 7.9 | LoS A | LoS A | 11.4 | 8.5 | **LoS B** | LoS A |
| | Northwest: Main Street | 13.7 | 10.0 | LoS B | LoS B | 22.5 | 18.4 | **LoS C** | **LoS C** |
| | Southwest: Ulan Road | 7.8 | 7.8 | LoS A | LoS A | 10.1 | 9.0 | **LoS B** | LoS A |
| Cope Road/Blue Springs Road | Northeast: Cope Road | 7.6 | 7.6 | LoS A | LoS A | 10.8 | 9.7 | **LoS B** | LoS A |
| | Northwest: Blue Springs Road | 4.4 | 4.3 | LoS A | LoS A | 4.7 | 6.3 | LoS A | LoS A |
| | Southwest: Cope Road | 7.8 | 7.8 | LoS A | LoS A | 7.8 | 7.8 | LoS A | LoS A |
| Brooklyn Road/Laheys Creek Road | South: Laheys Creek Road | 7.4 | 7.4 | LoS A | LoS A | 7.4 | 7.4 | **LoS B** | LoS A |
| | East: Brooklyn Road | 7.8 | 7.8 | LoS A | LoS A | 7.8 | 7.8 | LoS A | LoS A |
| | North: Laheys Creek Road | 7.8 | 7.8 | LoS A | LoS A | 7.8 | 7.8 | LoS A | LoS A |
| Castlereagh Highway/Laheys Creek Road | South: Castlereagh Highway | 7.8 | 8.1 | LoS A | LoS A | 7.8 | 8.1 | LoS A | LoS A |
| | North: Castlereagh Highway | 7.5 | 7.6 | LoS A | LoS A | 7.6 | 7.8 | LoS A | LoS A |
| | West: Laheys Creek Road | 8.0 | 8.0 | LoS A | LoS A | 8.1 | 8.2 | LoS A | LoS A |

| Location | Intersection approach | Average delay (existing) (seconds per vehicle) | | Level of Service (existing) | | Average delay (predicted) (seconds per vehicle) | | Level of Service (predicted) | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour |
| Golden Highway/Cassilis Road | Southeast: Golden Highway | 8.0 | 8.0 | LoS A | LoS A | 8.4 | 8.9 | LoS A | LoS A |
| | Northeast: Cassilis Road | 8.0 | 8.0 | LoS A | LoS A | 13.0 | 11.5 | **LoS B** | **LoS B** |
| | Northwest: Golden Highway | 7.8 | 7.8 | LoS A | LoS A | 8.0 | 10.0 | LoS A | LoS A |
| Golden Highway/Castlereagh Highway | South: Castlereagh Highway | 9.8 | 9.7 | LoS A | LoS A | 12.4 | 14.3 | **LoS B** | **LoS B** |
| | East: Golden Highway | 9.0 | 8.6 | LoS A | LoS A | 9.8 | 8.7 | LoS A | LoS A |
| | West: Golden Highway | 8.1 | 8.8 | LoS A | LoS A | 10.8 | 8.3 | **LoS B** | LoS A |
| Golden Highway/Blue Springs Road (north) | South: Blue Springs Road | 5.8 | 5.7 | LoS A | LoS A | 6.5 | 8.6 | LoS A | LoS A |
| | East: Golden Highway | 5.5 | 5.5 | LoS A | LoS A | 6.7 | 5.5 | LoS A | LoS A |
| | West: Golden Highway | 5.6 | 5.6 | LoS A | LoS A | 8.2 | 5.6 | LoS A | LoS A |
| Whistons Lane/Castlereagh Highway | South: Castlereagh Highway | 5.6 | 7.0 | LoS A | LoS A | 8.1 | 6.8 | LoS A | LoS A |
| | East: Whistons Lane | 5.7 | 5.8 | LoS A | LoS A | 6.2 | 8.2 | LoS A | LoS A |
| | North: Castlereagh Highway | 5.5 | 6.7 | LoS A | LoS A | 6.7 | 6.5 | LoS A | LoS A |
| Tucklan Road/Castlereagh Highway | Northeast: Castlereagh Highway | 5.5 | 5.6 | LoS A | LoS A | 6.9 | 5.8 | LoS A | LoS A |
| | Northwest: Tucklan Road | 5.7 | 5.7 | LoS A | LoS A | 6.3 | 7.4 | LoS A | LoS A |
| | Southwest: Castlereagh Highway | 5.5 | 5.5 | LoS A | LoS A | 6.2 | 5.6 | LoS A | LoS A |
| Puggoon Road/Castlereagh Highway | Southeast: Castlereagh Highway | 5.6 | 5.6 | LoS A | LoS A | 5.9 | 5.6 | LoS A | LoS A |
| | Northeast: Puggoon Road | 5.7 | 5.8 | LoS A | LoS A | 5.9 | 7.7 | LoS A | LoS A |
| | Northwest: Castlereagh Highway | 5.5 | 5.5 | LoS A | LoS A | 6.7 | 5.5 | LoS A | LoS A |

| Location | Intersection approach | Average delay (existing) (seconds per vehicle) | | Level of Service (existing) | | Average delay (predicted) (seconds per vehicle) | | Level of Service (predicted) | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour | AM peak hour | PM peak hour |
| Typical access gates on the most potentially impacted section of State Roads (Golden Highway east of Merotherie Road) | South: Access Gate | 5.9 | 5.9 | LoS A | LoS A | 6.8 | 9.8 | LoS A | **LoS B** |
| | East: Golden Highway | 5.6 | 5.6 | LoS A | LoS A | 7.3 | 5.9 | LoS A | LoS A |
| | North: Access Gate | 4.6 | 5.9 | LoS A | LoS A | 6.9 | 9.8 | LoS A | **LoS B** |
| | West: Golden Highway | 5.6 | 5.6 | LoS A | LoS A | 8.2 | 5.6 | LoS A | LoS A |

### Intersection operation and safety

Eleven intersections and all of the access gate locations were examined, to determine if they can accommodate the anticipated construction traffic movements efficiently and safely. The assessment for these intersections is presented in Table 5-38. Three of these intersections and all of the access gate locations were not previously assessed in the EIS (refer to Section 17.4.2 of the EIS) and are indicated in **bold**.

The assessment determined that the existing configurations of eight of the 11 assessed intersections would be appropriate to sufficiently accommodate the additional traffic volumes associated with the project.

All of the access gate locations and three of the 11 assessed intersections have been assessed as likely to require upgrades based on the predicted construction traffic volumes, including:

- Neeleys Lane/Ulan Road intersection
- Merotherie Road/Golden Highway intersection
- Golden Highway/Ulan Road intersection.

Table 5-38 Impacts to intersection operation from construction of the project

| Intersection/access gates | Minimum gap sight distance* | Stopping sight distance* | | Current design | Preferred intersection requirement** | Adjustments required? |
|---|---|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles | | | |
| Neeleys Lane/ Ulan Road intersection | 111–139 m | 165 m | 191 m | BAL and BAR | AUL and CHR(s) | Yes – need to upgrade both left turn and right turn treatment |
| Cassilis Road/ Golden Highway intersection | – | – | – | BAL and CHR | BAL and CHR | No |
| Castlereagh Highway/ Golden Highway intersection | – | – | – | AUL and CHR(s) | BAL and CHR (s) | No |
| Golden Highway/ Spring Ridge Road intersection | 111–139 m | 165 m | 191 m | AUL(s) and BAR | BAR and BAL | No – provided that construction traffic movement limits are imposed. Otherwise, need to upgrade left turn treatment |
| Merotherie Road/ Golden Highway intersection | 111–139 m | 165 m | 191 m | BAL and BAR | BAL and CHR(s) | Yes – need to upgrade right turn treatment to CHR(s) |
| Golden Highway/ Ulan Road intersection | 111–139 m | 165 m | 191 m | AUL and BAR | BAL and CHR(s) | Yes – need to upgrade right turn treatment to CHR(s) |
| Castlereagh Highway/ Laheys Creek Road intersection | 111–139 m | 165 m | 191 m | BAL and BAR | BAL and BAR | No |

| Intersection/access gates | Minimum gap sight distance* | Stopping sight distance* | | Current design | Preferred intersection requirement** | Adjustments required? |
|---|---|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles | | | |
| Golden Highway/ Blue Springs Road intersection | – | – | – | BAL and BAR | BAL and CHR(s) | No – provided that construction traffic movement limits are imposed. Otherwise, need to upgrade right turn treatment |
| Whistons Lane/ Castlereagh Highway intersection | – | – | – | BAL and BAR | BAL and BAR | No |
| Tucklan Road/ Castlereagh Highway intersection | – | – | – | BAL and BAR | BAL and BAR | No |
| Puggoon Road/ Castlereagh Highway intersection | – | – | – | BAL and BAR | BAL and BAR | No |
| Golden Highway (East of Merotherie Road) access gates | – | – | – | No existing intersection configuration | BAL and BAR | Yes – need to construct the preferred intersection treatments |
| Castlereagh Highway access gates | – | – | – | No existing intersection configuration | BAL and BAR | Yes – need to construct the preferred intersection treatments |
| Ulan Road (near Ulan township) access gates | – | – | – | No existing intersection configuration | BAL and CHR for typical north/west access gate<br>BAL and CHR(s) for typical south/east access gate | Yes – need to construct the preferred intersection treatments. The construction traffic movement will be restricted such that only BAR and BAR treatments are required. Otherwise, need to upgrade left and right turn treatment |

| Intersection/access gates | Minimum gap sight distance* | Stopping sight distance* | | Current design | Preferred intersection requirement** | Adjustments required? |
|---|---|---|---|---|---|---|
| | | Light vehicles | Heavy vehicles | | | |
| Ulan Road (north of Ulan-Wollar Road) access gates | – | – | – | No existing intersection configuration | BAL and CHR(s) for typical west access gate<br>AUL(s) and BAR for typical east access gate | Yes – need to construct the preferred intersection treatments. The construction traffic movement will be restricted such that only BAR and BAR treatments are required. Otherwise, need to upgrade left and right turn treatment |
| Wollar Road access gates | – | – | – | No existing intersection configuration | BAL and BAR | Yes – need to construct the preferred intersection treatments |
| Cope Road access gates | – | – | – | No existing intersection configuration | BAL and CHR(s) for typical for typical north access gate<br>BAL and BAR for typical south access gate | Yes – need to construct the preferred intersection treatments. The construction traffic movement will be restricted such that only BAR and BAR treatments are required. Otherwise, need to right turn treatment needs CHR(s) upgrade for typical for typical north access gate |

* Safe intersection sight distance and stopping sight distance only assessed where requested by Transport for NSW in their submission to the EIS

** BAL – basic left turn, BAR – basic right turn, CHL – channelised left turn, CHR – channelised right turn and AUL – auxiliary left turn

### Safe Intersection Sight Distance (SISD)

Thirty-two locations along the amended project's construction routes were assessed for compliance with Safe Intersection Sight Distance (SISD). This is the minimum sight distance which should be provided on a major road at any intersection. The results of this assessment is summarised in Table 5-39.

The assessment identified five intersections and five access gate locations along Castlereagh Highway, Golden Highway, Merotherie Road, Ulan-Wollar Road, Cope Road, Ulan Road and Spring Ridge Road that would not comply with SISD requirements during construction. Temporary speed limits would be implemented at these intersections and access gates, to ensure sufficient sight distance for road users during construction.

Table 5-39 Assessment of Safe Intersection Sight Distance (SISD)

| Intersection/access gates | Safe intersection sight distance requirement | Current sight distance provision | Preferred traffic control or treatment | Adjustments required |
|---|---|---|---|---|
| Neeleys Lane/Ulan Road intersection | 300 m | Satisfactory SISD | None required | No |
| Merotherie Road/access road to Merotherie Energy Hub intersection | 300 m | Insufficient sight distance | Temporary reduced speed limit on Merotherie Road during construction | No |
| Merotherie Road/ Golden Highway intersection | 300 m | Satisfactory SISD | None required | No |
| Spring Ridge Road/ Dapper Road intersection | 300 m | Insufficient sight distance | Temporary reduced speed limit on Spring Ridge Road during construction | No |
| Golden Highway/Spring Ridge Road intersection | 300 m | Satisfactory SISD | None required | No |
| Wollar Road/Barigan Street/ Philip Street intersection | 97 m | Satisfactory SISD | None required | No |
| Ulan Road/Ulan-Wollar Road intersection | 300 m | Insufficient sight distance | Temporary reduced speed limit on Ulan Road during construction | No |
| Golden Highway/Ulan Road intersection | 300 m | Satisfactory SISD | None required | No |
| Ulan Road/Cope Road intersection | 300 m | Satisfactory SISD | None required | No |
| Cope Road/Blue Springs Road intersection | 300 m | Satisfactory SISD | None required | No |
| Brooklyn Road/Laheys Creek Road intersection | 300 m | Satisfactory SISD | None required | No |
| Castlereagh Highway/ Laheys Creek Road intersection | 300 m | Satisfactory SISD | None required | No |
| Golden Highway/Blue Springs Road (north) intersection | 300 m | Satisfactory SISD | None required | No |
| Whistons Lane/ Castlereagh Highway intersection | 300 m | Satisfactory SISD | None required | No |
| Tucklan Road/ Castlereagh Highway intersection | 300 m | Insufficient sight distance | Temporary reduced speed limit on Castlereagh Highway during construction | No |
| Puggoon Road/ Castlereagh Highway intersection | 300 m | Insufficient sight distance | Temporary reduced speed limit on Castlereagh Highway during construction | No |
| 4 Golden Highway (east of Merotherie Road) access gates | 300 m | Insufficient sight distance at one access gate | Temporary reduced speed limit on Golden Highway during construction | No |

| Intersection/access gates | Safe intersection sight distance requirement | Current sight distance provision | Preferred traffic control or treatment | Adjustments required |
|---|---|---|---|---|
| 1 Castlereagh Highway access gate | 300 m | Satisfactory SISD | None required | No |
| 8 Ulan-Wollar Road access gates | 300 m | Insufficient sight distance at 2 access gates<br>Satisfactory SISD at 6 access gates | Temporary reduced speed limit on Ulan-Wollar Road during construction | No |
| 3 Cope Road access gates | 300 m | Insufficient sight distance at 2 access gates<br>Satisfactory SISD at 1 access gate | Temporary reduced speed limit on Cope Road during construction | No |

### Operation

Potential traffic and transport impacts of the amended project during operation would be consistent with the impacts identified in the EIS.

## 5.11.5 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential traffic and transport impacts are listed in Table 5-40. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures)

Table 5-40 Updated mitigation measures – traffic and transport

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| T1 | Intersection ~~and access point~~ upgrades | As part of the detailed design process, an evaluation of the potential need for upgrades to the following intersections will be undertaken as detailed below:<br>• intersection of Ulan Road/Neeleys Lane: Investigate and confirm if short channelised right and/or auxiliary left turn treatments (or suitable alternative) are required for safe access to the ~~satellite~~ workforce accommodation camp<br>• intersection of Golden Highway/Ulan Road: Investigate and confirm if a new short channelised right turn treatment (or suitable alternative) is required to provide safer intersection operation and to accommodate additional increases in traffic demand during construction.<br>• **Intersection of Golden Highway / Blue Springs Road: Investigate option to restrict construction vehicle volumes to levels which avoid the need for implementation of intersection upgrades. Where construction vehicle volumes cannot be limited to provide safe intersection operation, the required turning treatment upgrades (new short channelised right turn treatment or suitable alternative) will be implemented.** | Detailed design | ~~Intersections and access points to construction sites~~<br>**Intersection of Ulan Road/ Neeleys Lane**<br>**Intersection of Golden Highway/ Ulan Road**<br>**Intersection of Golden Highway/ Blue Springs Road**<br>**Typical access gate locations off Ulan Road (near Ulan township)**<br>**Typical access gate locations off Ulan Road (north of Ulan-Wollar Road)** |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| | | • Typical access gates off Cope Road: Construction vehicle movements turning right into access gates on the northern side of Cope Road will be limited to vehicles 25 per hour during the AM peak hour period to ensure safe and efficient traffic movements compatible with a Basic right turn (BAR) treatment. If higher construction vehicle movements are required and are incompatible with a BAR treatment, the required turning treatment upgrades will be implemented.<br>• Typical access gate locations off Ulan Road (near Ulan township): Construction vehicle movements turning into the northwest and southeast access gates will be limited to the following during the AM peak hour period:<br>— left turning vehicles<br>— 18 vehicles per hour (southeast access gates)<br>— 5 vehicles per hour (northwest access gates)<br>— Right turning vehicles – 5 vehicles per hour (all access gates)<br>Turn warrant assessments will be conducted for each hour outside of the AM peak period to determine the maximum number of vehicle movements allowed to ensure safe and efficient traffic movements compatible with a Basic right turn (BAR) and Basic left turn (BAL) treatments. If higher construction vehicle movements are required and are incompatible with BAR / BAL treatments, the required turning treatment upgrades will be implemented.<br>• Typical access gate locations off Ulan Road (north of Ulan-Wollar Road): Construction vehicle movements turning into the northwest and southeast access gates will be limited to during the AM peak hour period:<br>— left turning vehicles - 25 vehicles per hour<br>— right turning vehicles - 5 vehicles per hour<br>• Turn warrant assessments will be conducted for each hour outside of the AM peak period to determine the maximum number of vehicle movements allowed to ensure safe and efficient traffic movements compatible with a Basic right turn (BAR) and Basic left turn (BAL) treatments. If higher construction vehicle movement volumes are required and are incompatible with BAR / BAL treatments, the required turning treatment upgrades will be implemented.<br>Where the intersection upgrades are required, these will be designed and constructed in accordance with Austroads Guidelines, relevant applicable standards and consider the appropriate design vehicles. | | |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| T2 | Road and traffic management | Traffic control plans will be prepared in ~~consultation with the relevant road authorities~~ **for locations where construction-related traffic enters and leaves the public road network for project construction related purposes**. The plans will be implemented by licensed traffic management contractors.<br>Necessary road occupancy licences and road related work approvals will be obtained prior to the commencement of relevant works (including site access and access tracks). | Construction | Construction routes, access tracks, construction compound and workforce accommodation camp accesses |
| T3 | Road safety – design related | All accesses will be designed to accommodate the required construction vehicle(s) requiring access, and in accordance with relevant Austroads guidelines (where applicable) **in consultation with the relevant roads authority**.<br>~~Road safety audits and routine inspections will be completed on a regular basis.~~<br>**Appropriate traffic management and controls may be adopted to facilitate safe site access and egress for vehicles prior to access point installation and upgrading.**<br>**Routine inspections will be completed on a regular basis.** | Construction<br>**Operation** | Construction routes, access tracks, construction compound and workforce accommodation camp accesses |
| T4 | Road safety – driver related | The following road safety measures will be implemented with regard to driver management during construction:<br>• a Driver Code of Conduct will be developed and implemented **for the entire workforce**. The code will define acceptable driver behaviour for proposal personnel to promote road safety and ensure that the impacts of construction-related vehicle movements on local roads and the local community are minimised<br>• ~~in-vehicle monitoring systems (IVMS) will be installed in relevant vehicles to monitor load limits and fatigue management~~<br>• a Driver Fatigue Management Plan will be developed and implemented as part of the Construction Environmental Management Plan, and will incorporate appropriate measures to manage driver fatigue risks, including, but not limited to:<br>— planning of regular breaks<br>— mapping locations of driver rest areas along the proposed construction routes. | Construction | Construction routes, access tracks, construction compound and workforce accommodation camp accesses |
| T5 | Rail safety | Early and ongoing consultation with the ARTC will be undertaken for works which will cross over existing rail lines. Relevant works will only proceed following receipt of applicable approvals/permits, including accreditations for workers requiring access within the rail corridor to undertake construction activities. | Construction | Where the transmission line requires access to rail corridor over railway tracks on select railway lines |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| T6 | Access track condition | Access tracks used for construction sites, construction compounds and workforce accommodation camps will be maintained to safe standard. | Construction | All areas affected by construction including construction routes, access tracks, construction compounds and workforce accommodation camp accesses |
| T7 | Road condition | Pre-construction road dilapidation surveys and routine inspections will be completed along all nominated construction routes on local roads. Where rectification works are required due to project impacts, consultation with the appropriate road authority will be undertaken to confirm the scope of the work required. | Pre-construction<br>Construction | Local roads |
| T8 | Temporary lane closures or temporary road closures | Road Occupancy Licence(s) will be sought for all temporary lane closures (as required **by the relevant roads authority).**<br>Where road closures are likely to result in a significant traffic impact (e.g. short-term full road closure and long-term temporary lane/ road closures), prior consultation will be undertaken with potentially affected stakeholders (e.g. landowners, emergency services, transport services) and relevant approval(s) obtained from the relevant roads authority.<br>Where feasible, temporary road closures will be planned to occur outside of the traffic peak periods to minimise impacts to the road network. | Construction | **All locations where project works will occur within the public road network** ~~roads that intersect with the transmission line alignment (for stringing of transmission lines) or on construction routes~~ |
| T9 | Access to properties | Access to properties will be maintained throughout construction where feasible. Where this is not feasible, temporary alternative access arrangements will be provided following consultation with affected landowners and in accordance with the requirements of the pre-construction and construction Communication and Engagement Plan (as detailed in mitigation measure SI5).<br>Disruptions to property access and traffic will be notified to landowners at least five days prior and in accordance with the relevant community consultation processes outlined in the Construction Environmental Management Plan. | Construction | All areas affected by construction |
| T10 | Pedestrian and cyclist access | The project will actively consult with local bicycle groups, such as Central West Cycle (CWC) during construction, particularly regarding construction routes proposed on CWC's cycling route between Gulgong to Dunedoo.<br>Safe pedestrian and cyclist access will be maintained where the project interacts with existing pedestrian or bicycle facilities. Where this is not feasible, temporary alternative access arrangements will be provided following consultation with affected stakeholders and the relevant roads authority. | Construction | All areas affected by construction. |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| T11 | Heavy vehicles using road network | A Vehicle Movement Plan will be prepared which identifies the construction vehicle route(s) (including OSOM routes) to be used during construction.<br>The Vehicle Movement Plan will also include details of activities of adjoining land uses and awareness of public safety measures (e.g. entering urban areas from the highways) to provide guidance to drivers of construction vehicles travelling to and from project locations.<br>Ongoing consultation will be undertaken with Transport for NSW regarding the use of State roads for OSOM vehicle routes. | Pre-construction<br>Construction | Construction routes. |
| T12 | Access tracks maintenance and safety | The following maintenance and safety measures will be implemented at relevant locations along each of the access tracks, construction compounds and workforce accommodation camp accesses:<br>• appropriate line marking and signage at access points<br>• wheel cleaning facility as required at access points/intersections<br>• signage to indicate trucks turning<br>• potential use of road plates, propping (or similar) over culverts where required<br>• improvements to existing roads at new access points which may include importing or stabilising material if required. | Construction | Access tracks, construction compound and workforce accommodation camp accesses |
| T13 | Access points | Access points on the public road network will be confirmed and implemented in consultation with the relevant roads authority. Establishment of access points will occur in accordance with road occupancy licences (or similar) where issued by the relevant roads authority.<br>For access points that are deficient in Safe Intersection Sight Distance, temporary speed limits would be implemented at these intersections and access gates. This is to ensure sufficient sight distance for road users during construction. Temporary speed limits will be agreed with the relevant road authorities. | Pre-construction<br>Construction | Access point on the public road network |

## 5.12 Hydrology and flooding

Technical paper 14 – Hydrology and water quality (Technical paper 14) and Technical paper 15 – Flooding (Technical paper 15) of the EIS assessed the potential hydrology, flooding and water contamination impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 19.1 (Hydrology, flooding and water quality) of the EIS.

Additional assessment has been undertaken to identify changes to potential hydrology and water quality and flooding impacts associated with the amended project. The relevant flooding assessment completed to support the Amendment Report is provided in Appendix K (Flooding Assessment Addendum). The findings of this assessment are summarised in this section.

## 5.12.1 Assessment approach

### Study area

All of the amendments and refinements are located within the hydrology, flooding and water quality study area defined in the EIS (refer to Section 19.1.2 of the EIS), and therefore the study area remains unchanged.

### Assessment approach

The methodology for the assessment of hydrology, flooding and water quality impacts is generally consistent with that undertaken for the exhibited project.

The assessment methodology involved:

- consideration of the amendments and refinements which would directly impact surface water resources, including crossing of watercourses for local road upgrades
- a qualitative assessment of the potential impacts from construction and operation of the amended project on:
  - hydrology, water supply and water resources
  - geomorphic conditions
  - surface water quality condition
- for the flood impact assessment, this involved:
  - for construction, a revised qualitative assessment of flood risks to the amended project and the potential impact on existing flood behaviour during the one per cent AEP event as a result of the amended project. This included impacts to mainstream flooding and localised overland flooding
  - for operation, a quantitative assessment of the impacts of the new bridges over the Talbragar River and Laheys Creek (proposed as part of the upgrades of Merotherie Road and Spring Ridge Road) on flood behaviour for a range of flood events, with AEPs between 10 per cent and 0.2 per cent, and the PMF. For other components of the project, a revised qualitative assessment was completed. An assessment of climate change on flood behaviour and risks to the project was also completed for sites subject to quantitative assessment. The 0.5 per cent and 0.2 per cent AEP events were adopted as being representative of an increase in rainfall intensity of between 10 and 30 per cent in a one per cent AEP event in accordance with the NSW Government's *Floodplain Risk Management Guideline: Practical Considerations of Climate Change* (NSW DECC, 2007)
- consideration of the need for changes to and/or additional mitigation measures.

## 5.12.2 Existing environment

### Hydrology and water quality

The existing environment for the updated hydrology and water quality assessment is largely consistent with that described in the assessment for the exhibited project (refer to Section 19.1.3 of the EIS). Additional details on geomorphological conditions have been added in the following section to consider the project refinements for Spring Ridge Road (crossing Laheys Creek) as part of the proposed local road upgrades.

#### Geomorphology

The existing geomorphic conditions for the catchments in the study area are described in Section 4.2.2 of Technical paper 14, in accordance with the NSW River Condition Index tool, which is a subset of the NSW River Styles mapping (DPE, 2022d).

The Talbragar River from Uarbry to Elong Elong is described as having a poor geomorphic condition. This condition is a result of direct human disturbance with irreversible change on the Talbragar River, including changes to surface water flows, clearing of vegetation and evidence of erosion of banks.

The NSW River Condition Index tool describes the existing condition of Laheys Creek as moderately sensitive to disturbance, with a poor geomorphic condition and a low potential for recovery.

### Water supply

A high level review and market sounding of water licence availability, volume and cost has been completed (Tactix Sener Group, 2024). The review identified the same surface water and groundwater sources as previously identified for the EIS.

The Lower Talbragar River has one licence near the Elong Elong Energy Hub that could potentially be used for the project.

The review proposed the Cudgegong River surface water general security water licences as a viable option for accessing large volumes of water with minimal impact.

The market sounding of the groundwater sources, indicated a large range in price for permanent licences and temporary licences but identified that the Gunnedah Oxley Basin Murray-Darling Basin and the Talbragar Alluvial water sources would be plausible options.

Mid-Western Regional Council has indicated that they do not have any capacity to supply water for the project.

Wilpinjong coal mine is also identified as having excess water that may be able to be accessed. This potential source would be further investigated, subject to water quality requirements being met for onsite reuse for the project.

### Flooding

The catchment description and existing flooding conditions for the updated flooding assessment is consistent with that described in the assessment for the exhibited project (refer to Section 19.1.3 of the EIS).

## 5.12.3 Assessment of potential impacts

### Construction

#### Hydrology and water quality

The amendments and refinements to the project include the following upgrades to the existing watercourse crossings on Merotherie Road and Spring Ridge Road:

- construction of a new bridge over the Talbragar River on Merotherie Road, downstream (east) of the existing bridge. The existing bridge would be demolished after the opening of the new bridge
- construction of a new bridge on Spring Ridge Road over Laheys Creek, which would replace the existing crossing.

Bridge construction activities within the channels of Talbragar River and Laheys Creek may be at a higher risk of impacts during flood events due to higher flow velocities in the main channels compared to surrounding areas.

Temporary structures required to construct the bridges, such as temporary crossings, crane pads and temporary working platforms, have the potential to obstruct flows and result in erosion of sediments, or change flow paths within channels that are already degraded (refer to Section 5.12.2).

Due to the existing poor condition of the Talbragar River and Laheys Creek, the construction of the new bridge crossings has the potential to result in erosion and changes in the shape of the channel both upstream and downstream of the works.

Any changes to the morphology of the watercourses during construction would be remediated as part of construction demobilisation. With the implementation of the updated mitigation measures described in Section 5.12.4, potential impacts to the geomorphology of these watercourses would be minimal.

The potential impacts on hydrology and water quality associated with the remainder of the amendments and refinements would generally be consistent with the exhibited project, and do not require further assessment.

### Flooding

Consistent with Section 5.1 of Technical paper 15 and Section 19.1.3 of the EIS, parts of the amended project construction area would be subject to flooding. Additional flood risk for the amended project when compared to the exhibited project is related to the construction of the new bridges over the Talbragar River and Laheys Creek. These construction work areas would be inundated by floodwater during a 10 per cent Annual Exceedance Probability (AEP) event to depths and velocities that would be hazardous to construction personnel, plant and material.

Construction activities associated with the amended project would have the potential to result in additional impacts on flood behaviour when compared to the exhibited project, due to the construction of the new bridges over the Talbragar River along Merotherie Road and Laheys Creek along Spring Ridge Road.

The flooding assessment has indicated a section of the construction area at the Elong Elong Energy Hub construction compound that would be affected by mainstream flooding from Laheys Creek. The construction compound layout at the Elong Elong Energy Hub would be assessed against flood risks and located outside of mainstream flooding as practicable (refer to mitigation measures in Section 5.12.4).

Mitigation measures proposed to manage the additional risks of flooding to construction activities and facilities as are outlined in Section 5.12.4. Further investigation would need to be undertaken during continued design development and detailed construction planning, as layouts and staging diagrams are further developed.

## Operation

### Hydrology and water quality

During operation, potential impacts on hydrology and water quality as a result of the amendments and refinements include:

- geomorphic changes to the Talbragar River and Laheys Creek, that would result from the introduction of bridge elements such as abutments, in-channel bridge piers and scour protection. These geomorphic changes would continue until each watercourse has reached a new geomorphic condition within the river channel and floodplain
- increased sediment load in runoff from additional permanent access tracks.

Permanent changes to the geomorphology of the Talbragar River and Laheys Creek would be limited to the area immediately surrounding the permanent infrastructure. With the implementation of the updated mitigation measures described in Section 5.12.4, potential impacts to the geomorphology of these watercourses would be minimal.

Sedimentation resulting from additional access tracks would be managed in accordance with the mitigation measures previously identified in the EIS, and potential impacts are expected to be negligible.

### Flooding

The new bridges over the Talbragar River and Laheys Creek would result in localised increases in flow velocities within the road corridors of Merotherie Road and Spring Ridge Road, with only minor changes to flood behaviour in areas outside the road corridor. Changes near the new Merotherie Road and Spring Ridge Road bridges during the one per cent AEP, 10 per cent AEP and PMF flood events are summarised in Table 5-41 and Table 5-42. Design measures such as scour protection would be incorporated into the road design to manage the increase in scour potential within the road corridor.

Impacts on flood behaviour as a result of changes to the alignment and extent of the energy hubs, New Wollar Switching Station, transmission line easements and 330 kV switching stations would be consistent with the EIS.

Changes in the road footprint and levels associated with the widening and sealing of Merotherie Road and Spring Ridge Road have the potential to obstruct floodwaters and alter overland flow patterns, which in turn may impact on the extent, duration and depth of inundation as well as flow velocities in areas outside the road corridor. To mitigate these impacts, design measures would be adopted during detailed design that are aimed at controlling external catchment runoff. These measures would include table drains along the upslope side of the road that would discharge to existing and new transverse drainage structures at drainage line crossings. The design will adopt drainage measures as required to manage any resulting adverse impacts on the depth, velocity and duration of inundation external to the road corridor such as augmentation of existing transverse drainage structures, additional drainage crossings and level spreaders, and energy dissipation and scour protection.

Table 5-41 Changes in flood behaviour at the new Merotherie Road bridge

| Flooding feature | Change in flood behaviour |
|---|---|
| Peak flood levels | Changes in peak 1% AEP flood levels immediately south (upstream) of the eastern approach to the new bridge would typically be less than 0.02 m, whereas changes in peak 10% AEP flood levels would typically be less than 0.03 m. These increases in peak flood levels can be attributed to the raised level of the eastern approach to the new bridge compared to existing road levels. The impacted area consists of cleared pastoral land zoned for primary production on the western overbank of the Talbragar River.<br>There would be either no change or a slight reduction in peak flood levels to the north (downstream) of the new bridge during the 10% and 1% AEP floods.<br>There would be no change in PMF levels upstream or downstream of the new bridge. |
| Peak flow velocities | Increases in peak flow velocities in downstream areas (north of the energy hub) would typically be less than 10% during the 10% AEP and 1% AEP flood events, except for the area within the road corridor in the immediate vicinity of the new bridge. |
| Duration and extent of inundation | Increases in the duration of flooding during the 10% and 1% AEP flood events would typically be less than 1 hour. There would be no significant changes in the extent of flooding. |

Table 5-42 Changes in flood behaviour at the new Spring Ridge Road bridge

| Flooding feature | Change in flood behaviour |
|---|---|
| Peak flood levels | Changes in peak 10% AEP flood levels immediately west (downstream) of the eastern approach to the new bridge would typically be less than 0.02 m. The impacted area would be located on cleared pastoral land zoned for primary production.<br>There would be either no change or a slight reduction in peak flood levels to the east (upstream) of the new bridge during the 10% and 1% AEP floods. This can be attributed to the approaches to the new bridge being in cut, which more than offsets the loss of watercourse area attributable to the bridge deck and piers.<br>There would be no change in PMF levels upstream or downstream of the new bridge. |
| Peak flow velocities | Increases in peak flow velocities in downstream areas (north of the energy hub) would typically be less than 10% during the 10% AEP and 1% AEP flood events, except for the area within the road corridor in the immediate vicinity of the new bridge. |
| Duration and extent of inundation | Increases in the duration of flooding during the 10% and 1% AEP flood events would typically be less than 1 hour. There would be no significant changes in the extent of flooding. |

### 5.12.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential hydrology, flooding and water quality impacts are listed in Table 5-43. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

Table 5-43 Updated mitigation measures – hydrology, flooding and water quality

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| WA1 | Construction water supply | Construction water supply arrangements will be confirmed during continued design development and detailed construction planning, based on further investigations that include ongoing consultation with water suppliers to access the local reticulated network, use of treated mine water, and use of water tanks within construction compounds. | Detailed design and pre-construction | All locations |
| WA2 | Construction water supply | Opportunities to minimise water demand will be further explored during detailed design and construction planning **and adopted where practicable,** including:<br>• capture and use rainwater at construction compounds and/or workforce accommodation camps<br>• use of treated mine water, subject to any onsite reuse requirements<br>• reuse/recycling of construction water (for example, water could be reused onsite for dust suppression, to assist with compaction)<br>• treated wastewater and/or groundwater inflows<br>• the use of additives in concrete mixtures to reduce the amount of water required<br>• identification of alternative construction techniques which will reduce water use (where practicable). | Detailed design and pre-construction | All locations |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| WA3 | Watercourse geomorphology | Where relevant, permanent ~~erosion~~ **surface water** control measures will be designed and implemented at relevant energy hubs, switching stations and transmission line towers to minimise potential scour and erosion risks associated with surface water runoff during operation. | Detailed design, ~~and~~ construction **and Operation** | Energy hubs, switching stations and transmission line towers |
| WA4 | Dispersion of sediment into the environment | Areas disturbed as a result of construction activities will be managed in accordance with the requirements of *Managing Urban Stormwater Soils and Construction* (4th Edition) (Landcom, 2004).<br>This will include the implementation of a range of erosion and sediment control measures which may include:<br>• drainage control measures, e.g. flow diversion banks, straw bale berms and rock-lined chutes<br>• sediment control measures, e.g. sediment fences, traps and basins and impervious covers<br>• erosion control measures, e.g. covering of stockpiles, erosion control blankets, dust suppression measures (e.g. water trucks) and revegetation<br>• **progressive and timely stabilisation of disturbed surfaces with the potential to generate sediment.** | Construction | All locations |
| WA5 | Water quality | A water quality monitoring program for construction will be prepared and implemented to monitor water quality conditions at perennial watercourses that the transmission lines will cross, and to facilitate monitoring of any changes in water quality that could be attributable to the project during construction. The program will detail:<br>• water quality objectives and criteria for the project, in accordance with the *Murray–Darling Basin Plan 2012* (Murray–Darling Basin Authority, 2012) and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000* (ANZECC/ARMCANZ, 2000)<br>• frequency, location and duration of sampling, as minimum will include at least two monitoring locations located downstream and upstream of the project on the ~~Talbragar River,~~ Talbragar River at Elong Elong (412042), Cudgegong River at Yamble Bridge (421019) and Wollar Creek<br>• monitoring for total dissolved solids, dissolved oxygen, electrical conductivity, total suspended solids, total nitrogen and total phosphorus.<br>In the event of exceedances of the project water quality criteria, soil and water management measures adopted as part of the Construction Environmental Management Plan will be reviewed and revised accordingly. | Pre-construction and construction | ~~Relevant locations~~ **Talbragar River at Elong Elong (412042), Cudgegong River at Yamble Bridge (421019) and Wollar Creek** |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| FL1 | Flooding | Detailed construction planning will consider flood risk at construction sites and support facilities, including:<br>• reviewing construction work area layouts and staging construction activities in order to avoid or minimise obstruction of overland flow paths and limiting the extent of flow diversion required<br>• designing the layout of construction facilities and implementing stormwater management controls during their establishment in order to manage the impact of flooding on construction personnel, equipment and materials<br>• identifying and applying measures to not worsen flood impacts on the community and on other property and infrastructure during construction up to and including the 1% AEP flood event where practicable. Where warranted by the scale and nature of the proposed works this will include flood modelling and assessment to assess the extent of potential impacts and therefore the scope of mitigation measures that may be required<br>• measures to mitigate alterations to local runoff conditions due to construction activities. | Detailed design | All locations |
| FL2 | Flood behaviour (construction) | Stockpiles will be located in areas which are not subject to frequent inundation by floodwater, ideally outside the 10% AEP flood extent. The exact level of flood risk accepted at stockpile sites will depend on the duration of stockpiling operations, the type of material stored, the nature of the receiving drainage lines and also the extent to which it will impact flooding conditions in adjacent development. | Construction | All locations |
| FL3 | Flood safety | Construction compounds and workforce accommodation will be located outside high flood hazard areas based on a 1% AEP flood event. | Detailed design | Construction compounds and workforce accommodation camps |
| FL4 | Emergency management | Flood emergency management measures for construction of the project will be prepared and incorporated into relevant environmental and/or safety management documentation. This will include:<br>• contingency planning for construction facilities that are located in areas that are inundated by mainstream flooding during a 1% AEP event<br>• for construction facilities located within the floodplain the identification of how flood related risks to personal safety and damage to construction facilities and equipment will be managed<br>• procedures to monitor accurate and timely weather data, and disseminate warnings to construction personnel of impending flood producing rain. | Pre-construction | All locations |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| FL5 | Climate change adaptation | The impact of the project on flood behaviour will be confirmed during detailed design. This will include consideration of future climate change. | Detailed design | All locations |
| FL6 | Impacts to existing flooding regime | The project will be designed to minimise adverse flood related impacts on:<br>• surrounding development for storms up to 1% AEP in intensity<br>• critical infrastructure, vulnerable development or increases in risk to life due to a significant increase in flood hazard for floods up to the PMF. | Detailed design | All locations |
| FL7 | Flood impacts | The energy hubs and switching stations will be designed to manage adverse impacts on the receiving drainage lines as a result of changes in the depth, velocity, extent and duration of flow during storms up to 1% AEP in intensity. | Detailed design | Energy hubs and switching stations |
| FL8 | Flood impacts | The energy hubs and switching stations, including their access road connections to existing roads, will be designed to ensure that the existing level of flood immunity of the road network is maintained and increases in flood depths and hazards along the road network are minimised. | Detailed design | Energy hubs and switching stations |
| FL9 | Waterway impacts | Localised increases in flow velocities at drainage outlets and waterway crossings will be mitigated through the provision of scour protection and energy dissipation measures. | Detailed design and construction | All locations |
| FL10 | Flood impacts | Detailed construction planning would consider flood risk associated with the construction of the new bridges over the Talbragar River and Laheys Creek, including the following:<br>• Flood emergency management procedures for the construction of the new bridges would be prepared and incorporated into the relevant environmental and/or safety management documentation that would include:<br>— procedures to monitor accurate and timely weather data, and disseminate warnings to construction personnel of impending flood producing rain, and<br>— procedures for the safe evacuation of construction personnel and machinery following the dissemination of flood warnings.<br>• Temporary working platforms that would be required to construct the new bridges would be constructed using clean rock fill and installed in a manner that minimises their impact on the inbank area of the watercourses.<br>• The layout of temporary access roads, working platforms and other temporary works required to construct the bridges will be designed and staged in order to manage their impact on flood behaviour. | Detailed design and construction | Upgrade of local roads that service the Merotherie and Elong Elong Energy Hubs |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| FL11 | Waterway impacts | Localised increases in flow velocities at the new bridges over the Talbragar River and Laheys Creek would be mitigated through the provision of scour protection measures. | Detailed design and construction | Upgrade of local roads that service the Merotherie and Elong Elong Energy Hubs |
| FL12 | Flood impacts | The upgrades to the local roads that service the Merotherie and Elong Elong Energy Hubs would be designed such that:<br>• the existing level of flood immunity of the road is maintained or improved, and<br>• during storm events that result in overtopping of the road, there is no significant increase in the depth and hazardous nature of flooding. | Detailed design | Upgrade of local roads that service the Merotherie and Elong Elong Energy Hubs |
| FL13 | Flood impacts | A detailed flood assessment would be carried out of the upgrades to the local roads that service the Merotherie and Elong Elong Energy Hubs to inform the scope of drainage measures to be incorporated into their design in order manage any adverse impacts on the depth, velocity and duration of inundation external to the road corridors. | Detailed design | Upgrade of local roads that service the Merotherie and Elong Elong Energy Hubs |

## 5.13 Contamination

Technical paper 16 – Air quality (Technical paper 16) of the EIS assessed the potential contamination impacts of the construction and operation of the project. The key findings of the assessment were summarised in Chapter 19.2 (Soils and contamination) of the EIS.

Additional assessment has been undertaken to identify changes to potential contamination impacts associated with the amended project. The findings of this assessment are summarised in this section.

### 5.13.1 Assessment approach

The methodology for the assessment of contamination impacts as detailed in Technical paper 16 was applied to the assessment of the amended project.

The assessment consisted of a preliminary (Phase 1) desktop investigation and included:

- identification of new potential areas of environmental concern, based on searches of relevant public databases to identify potential current and former contamination sources
- a review of agricultural land uses within the revised study area
- revised assessment of the potential impacts on human health and environmental receivers
- recommendations on further assessment (if required), in accordance with relevant guidelines.
- consideration of the need for further mitigation measures.

### 5.13.2 Existing environment

Additional areas of the amended project consist of undisturbed native vegetation and/or grazing land. No new areas of contamination concern have been identified within these areas.

### 5.13.3 Assessment of potential impacts

No new potentially contaminating activities have been identified within the revised study area. The amended project would not introduce any additional risks to either the exposure of contaminated soil and groundwater due to the construction and operation of the project or risks of contamination by project activities.

### 5.13.4 Updated or additional mitigation measures

No changes to mitigation measures identified in the EIS are required to address the potential contamination impacts of the amended project. The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

## 5.14 Air quality

Technical paper 18 – Air quality (Technical paper 18) of the EIS assessed the potential impacts of the construction and operation of the project on air quality. The key findings of the assessment were summarised in Chapter 19.4 (Air quality) of the EIS. Additional assessment has been undertaken to identify changes to potential air quality impacts associated with the amended project. The findings of the additional assessment are reported in this section.

### 5.14.1 Assessment approach

A desktop assessment was carried out to assess the amendments and refinements. Given the nature of the potential impacts of the amended project, no additional specialist assessment was undertaken with the results of the previous assessment being considered consistent with the proposed amendments.

### 5.14.2 Existing environment

The amendments and refinements would increase the distance between the project and sensitive receivers in a number of locations, resulting in a decrease in sensitivity of these receivers to dust impacts.

Since exhibition of the EIS, further review of detailed aerial imagery and searches of local council development application registers have been undertaken to confirm if any there are any unidentified dwellings or newly approved development applications for dwellings in the air quality assessment study area that need to be included in the air quality assessment. This has resulted in the identification of three additional sensitive receivers.

One additional sensitive receiver (ID 1119) has been identified around 320 metres of the refined construction area along the Coolah connection, just north of Cliffdale Road. This sensitive receiver was previously outside of the air quality assessment study area. Another additional sensitive receiver (ID 371) has been identified around 255 metres from the refined construction area along the New Wollar Switching Station — Merotherie Energy Hub connection, just east of Blue Springs Road, due to the reclassification of this receiver and another sensitive receiver (ID 367).

The existing environment in relation to climate and meteorology and ambient air quality as summarised in Section 19.4.3 of the EIS remains relevant to assess the impacts of the amended project.

## 5.14.3 Assessment of potential impacts

### Construction

Amendments and refinements to the 500 kV and 330 kV transmission line alignments would reduce dust impacts for sensitive receivers at several locations, as it would increase the distance between these receivers and dust generating activities such as earthworks, construction and track out from trucks.

The two additional sensitive receivers would have a low sensitivity to dust soiling and human health impacts in accordance with the *Guidance on the assessment of dust from demolition and construction* (Institute of Air Quality Management (IAQM), 2014) (IAQM Guidance), as they would be located between 100 and 350 metres from the construction area (refer to Table 3-2 of Technical paper 18). The risk of dust impacts from earthworks, construction and dust impacts from track out from trucks at these locations are considered to be low in the worst case scenario (dust emissions of a large magnitude), in accordance with Table 3-4 and Table 3-5 of Technical paper 18. Potential dust impacts would be temporary in nature and would be substantially reduced with the implementation of standard mitigation measures, as identified in Appendix E (Updated mitigation measures).

Potential dust impacts along construction routes, potential impacts associated with gaseous emissions generated from the use of vehicles, plant and machinery and potential odour generation for the amended project would be consistent with the impacts identified in the EIS.

### Operation

Potential air quality impacts of the amended project during operation would be consistent with the impacts identified in the EIS.

## 5.14.4 Updated or additional mitigation measures

The updated mitigation measures that would be implemented for the amended project to avoid and/or minimise potential air quality impacts are listed in Table 5-44. The changes are presented in **bold** text (for new text) or strikethrough text (for deleted text). The consolidated list of mitigation measures for the amended project is provided in Appendix E (Updated mitigation measures).

Table 5-44 Updated mitigation measures – air quality

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| AQ1 | Dust generation – general | Management measures to prevent or minimise dust generation and impacts to the local community and environment will include (but not be limited to):<br>• use of water sprays or dust suppression surfactants as required for dust suppression where required and appropriate<br>• adjusting the intensity of activities based on observed dust levels and weather forecasts<br>• minimising the amount of material stockpiled and position stockpiles away from surrounding receivers<br>• project construction vehicle movements are to adhere to designated entry/exit routes and parking areas<br>• implementation of measures to minimise the tracking of material onto sealed roads (e.g., wheel wash)<br>• covering of loads<br>• stabilising disturbed areas as soon as practicable, including new access routes | Construction | All locations |

| Reference | Impact | Mitigation measures | Timing | Applicable location(s) |
|---|---|---|---|---|
| | | • minimising the extent of disturbance as far as practicable<br>• regularly conducting visual inspections of dust emissions and applying additional controls as required<br>• where practicable minimise concurrent construction activities near sensitive receivers that have a greater potential of the risk of dust impact. | | |
| AQ2 | Vehicle and plant emissions | Where feasible, construction vehicles and machinery will be fitted with appropriate emission control equipment and maintained in a proper and efficient manner. | Construction | All locations |
| AQ3 | Dust emissions from concrete batching plants | Measures will be implemented at concrete batching plants to minimise emissions to air as far as practicable. The measures will be regularly inspected with additional controls implemented as required. Measures to minimise emissions to air from concrete batching plants may include:<br>• all aggregate and sand will be stored appropriately in storage bins or bays to minimise dust generation, and material will not exceed the height of the bay<br>• cement silos and hoppers will be fitted with dust filters<br>• all inspection points and hatches will be fully sealed<br>• all dry raw materials to be transferred into the bowl of an agitator via front end loaders by maintaining adequate moisture levels and/or an enclosed conveyor<br>• cement silos will be fitted with fitted with an emergency pressure alert and automatic cut off protection to prevent overfill<br>• transfer of cement from storage to batching will occur via sealed steel augers. | Construction | Concrete batching plant(s) |
| AQ4 | Dust emissions from crushing and screening plant | To minimise dust emissions associated with the proposed crushing and screening activities, the following measures will be implemented:<br>• ensure screen covers are fitted to the screening operations<br>• control dust emissions from screening operations using water sprinklers, where required and appropriate<br>• inspect the water sprinklers on a regular basis to ensure operational efficiency<br>• where practicable, install wind breaks in appropriate locations adjacent to the dust generating equipment and processes<br>• prior to screening, dampen the rocks during dry weather conditions. | Construction | Crushing and screening |
| AQ5 | ~~Vehicle~~**Dust** emissions along construction routes | During high wind conditions (wind speeds greater than ~~5~~**8** metres per second), reduced speed limits for project heavy vehicles on unsealed roads will be implemented **in the vicinity of sensitive receivers.** | Construction | Construction routes |

## 5.15 Cumulative impacts

Appendix E (Cumulative impact assessment) of the EIS assessed the potential cumulative impacts associated with the construction and operation of the project. The key findings of the assessment were summarised in Chapter 20 (Cumulative impacts) of the EIS.

Additional assessment has been undertaken to identify changes to potential cumulative impacts associated with the amended project. The relevant assessment completed to support the Amendment Report is provided in Appendix L (Updated Cumulative Impact Assessment). The findings of the additional assessment are reported in this section.

### 5.15.1 Assessment approach

Since the exhibition of the EIS, the planning status, environmental assessment documentation and/or estimated construction and operation timeframes of relevant future projects identified in the cumulative impact assessment have been updated as these projects progress through the planning system. A number of emerging development proposals have also become relevant future projects, in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (Cumulative Impact Assessment Guidelines) (NSW Department of Planning, Industry and Environment (DPIE), 2022).

Furthermore, the local road and intersection upgrades would be determined as part of the CSSI application, instead of being assessed and determined under Division 5.1 of the EP&A Act (refer to Section 1.4 of the EIS).

The updated list of relevant future projects that met the Cumulative Impact Assessment Guidelines screening criteria for consideration in the updated cumulative impact assessment is provided in Table L-3 of Appendix L (Updated cumulative impact assessment). Eight additional projects were identified for the assessment, including:

- Narragamba solar farm
- Bellambi Beights BESS
- Goulburn River solar farm
- Burrendong wind farm
- Orana BESS
- Wollar solar farm
- Blain Road solar farm
- Wilpinjong coal mine Extension and Modification 2.

Issues not further considered in the assessment (refer to Section E2.3.1 of Appendix E (Cumulative impact assessment) of the EIS) and the level of assessment carried out for assessed issues (refer to Section E2.3.2 of Appendix E (Cumulative impact assessment) of the EIS) remain relevant to assess the impacts of the amended project.

### 5.15.2 Assessment of potential impacts

The assessment of cumulative impacts that have been considered in the cumulative impact assessment are described in the following sections. The methodology for each of these assessments as described in Section E3 of Appendix E (Cumulative impact assessment) of the EIS was applied to assess the impacts of the amended project.

The potential cumulative bushfire risk and hazard and waste management impacts of the amended project, in combination with the updated list of relevant future projects, are considered to be consistent with those described in the EIS and are not further discussed here.

## Land use, property and agriculture

### Construction

The proposed project amendments and refinements would result in an overall increase in the size of the construction area in land currently used for agricultural purposes from the assessed 3,660 hectares to around hectares, an increase of around 95 hectares.

The amended project would result in an estimated loss of agricultural production of around $1.32 million per year, which is a decrease from the estimated loss of agricultural production of $1.35 million per year for the exhibited project. This represents around 0.2 per cent of the total annual gross value of agricultural production across the four impacted LGAs. As described in the EIS, this is considered a 'worst case' impact as it is expected that agricultural land uses (such as grazing) would continue within parts of the construction area, subject to the timing and location of construction activities, and the ability to implement safe access arrangements.

The proposed project amendments and refinements would not result in any general material changes to the assessed impacts on agricultural operations, which included restriction on the movement of landowners, agricultural workers, livestock, or equipment within and across the construction area.

Eight additional relevant future projects have been considered in the cumulative land use, property and agriculture assessment. A summary of the potential cumulative land use, property and agriculture impacts for these projects during construction is provided in Table L-7 in Appendix L (Updated Cumulative impact assessment).

### Operation

The proposed project amendments and refinements would result in an estimated reduction in agricultural productivity loss of around $285,900, a decrease from the estimated loss of agricultural production of $317,550 per year for the exhibited project. This represents around 0.04 per cent (decreased from 0.05 per cent for the exhibited project) of the total annual gross value of agricultural production across the four impacted LGAs.

Land within the transmission line easements for this project, and immediately next to the easements, would remain available for agricultural activities such as grazing and cropping, however, would be subject to certain restrictions for safety and operational reasons, as described in the EIS. The proposed project amendments and refinements would not result in any general material changes to the assessed impacts on agricultural operations, which included restriction on aerial agricultural operations.

Eight additional relevant future projects have been considered in the cumulative land use, property and agriculture assessment. A summary of the potential cumulative land use, property and agriculture impacts for these projects during operation is provided in Table L-7 in Appendix L (Updated Cumulative impact assessment).

## Landscape and visual

If approved, there would likely be cumulative landscape and visual impacts associated with this project and the relevant future projects, due to the proximity and associated potential for the projects to be seen together and change the character of the surrounding landscape.

The cumulative impacts have been assessed for six geographical areas (one additional area from the EIS), due to the close proximity of relevant future projects to this project in these areas, the cumulative impact of these projects on landscape character and the potential overlap in visibility between the projects during construction and operation:

- south (Gulgong and Mudgee) (additional area, to consider the microwave repeater sites at Botobolar, Magpie Hill and Baldy Peak)
- southeast (Ulan and Bungaba)
- northeast (Cassilis and Turill)
- north (Leadville, Coolah and Uarbry)
- central (Merotherie, Birriwa, Barneys Reef, Stubbo and Tallawang)
- west (Elong Elong, Cobbora, Gollan, Goolma and Dunedoo).

Table 5-45 provides a summary of the potential cumulative landscape character and visual impacts within these geographical areas during construction and operation. The additional area and additional projects considered in the assessment are indicated in **bold**.

Construction periods of relevant future projects near the north eastern, central and western sections of this project are likely to overlap with this project over several years. Construction activities for the relevant future projects and this project would extend across large areas of the landscape, and would contrast with the rural amenity and scenic quality of the existing rural landscape. These activities would be seen from several dwellings and local roads, including at night where construction lighting is required.

The most substantial cumulative landscape character and visual impacts would be experienced

- in the landscapes between Gulgong and Dunedoo
- between Tallawang and Spicers Creek (the central and western sections of the project), where multiple renewable energy projects are proposed in combination with this project
- in the landscapes between Cassilis and Leadville (the northeastern section of the project), where two large wind farm projects are proposed in combination with this project.

Views of these projects would be prominent and contrast with the undulating rural and forested hills of the surrounding landscape, including at night, when some private dwellings would have views of operational lighting at switching stations, energy hubs and operations and maintenance buildings.

Table 5-45 Potential cumulative landscape character and visual impacts during construction and operation

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| **South – Gulgong and Mudgee**<br>• **Blain Road solar farm**<br>• **Orana BESS**<br>• **Burrendong wind farm** | Construction:<br>The Blain Road solar farm, near Mudgee, and Orana BESS, near Wellington, are located at a considerable distance (around 35 km) from this project's study area. The Burrendong wind farm would be located around 40 km from the project, in the vicinity of Wellington. The landscapes where these projects are located, are not experienced together with the landscapes through which this project passes. No cumulative impacts are expected from these projects.<br>Operation:<br>The Blain Road solar farm and Orana BESS are not expected to result in cumulative impacts on landscape character due to their small scale and considerable distance from the project's study area.<br>The Burrendong wind farm is also not expected to result in cumulative impacts on landscape character as it is a considerable distance from the project's study area. | During construction and operation, the Blain Road solar farm, Orana BESS and Burrendong wind farm would not be seen together with the project nor sequentially during the day, due to their considerable distance from the project study area, and cumulative visual impacts are not expected during the day. There may be some minor lighting during construction and some scattered, low-level lighting required for these projects' operation at night. Overall, cumulative visual impacts are not expected during the night. |
| **Southeast** – Ulan and Bungaba<br>• Ulan coal mine Modification 6<br>• **Wilpinjong coal mine Extension and Modification 2**<br>• **Wollar solar farm**<br>• **Goulburn River solar farm** | Construction:<br>Where construction periods overlap, this project in combination with the Ulan coal mine Modification 6, Wilpinjong coal mine Extension and Modification 2 and Wollar solar farm would result in cumulative landscape character impacts to the Durridgere, Goulburn River and Munghorn Gap landscape character zone (LCZ) (FH-02), Ulan mining LCZ (M-01), Talbragar River rural valley landscape character zone (LCZ) (RV-03) and Wollar rural valley LCZ (RV-01), due to the removal of bushland vegetation, the use of large-scale machinery and vehicles, landform changes and the construction of surface infrastructure.<br>Night lighting at the Wilpinjong coal mine Extension and Modification 2 may be experienced together with lighting from this project and would result in a cumulative landscape character impact on the Ulan mining LCZ and the Durridgere, Goulburn River and Munghorn Gap forested hills LCZ. However, the Ulan mining LCZ has very low sensitivity (refer to Table 9-3 of the EIS) and any cumulative impacts would be minimal in this landscape.<br>There would be limited lighting associated with the Wollar solar farm. This lighting together with lighting for this project during construction would have a minor cumulative effect on the Wollar rural valley LCZ at night.<br>The Goulburn River solar farm would be located in a landscape separated from the project study area and would not have a cumulative landscape character impact together with this project during the day or night. | Construction:<br>If approved, construction of the Ulan coal mine Modification 6 may be seen sequentially and together with this project in the area south of Blue Springs Road, Bungaba. Construction activities for these projects, including vegetation removal, earthworks, construction of project infrastructure and vehicles and machinery travelling along access tracks and construction routes, may be seen from sections of local roads such Blue Springs Road, and from nearby rural properties. These construction activities would contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts.<br>The Wilpinjong coal mine Extension and Modification 2 would be visible together with this project in views from Ulan-Wollar Road during construction. There would be a cumulative visual impact where these projects are seen together and sequentially. However due to the low sensitivity of these views, the visual impact is considered to be low.<br>Construction of the Wollar solar farm is likely to be complete when this project commences construction. However, the project would be viewed together with the Wollar solar farm and there would be a cumulative effect on views from Baragan Road during project construction. |

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| | Operation:<br>The Wilpinjong coal mine Extension and Modification 2 together with this project would expand the character of mining activity in the Durridgere, Goulburn River and Munghorn Gap landscape character zone (LCZ) (FH-02), and reduce the area of the forested hills landscape. This change in character would be mostly attributed to the mining activity and this project's contribution to cumulative landscape character impact is expected to be minor. The mining activity proposed for the Ulan coal mine Modification 6 would be underground, and the extent of vegetation removed, and additional infrastructure would not, together with this transmission project, result in a cumulative landscape character impact.<br>The Wollar solar farm would be seen sequentially and together with this project in the Wollar rural valley LCZ (RV-01). Views of these projects would be prominent and contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts.<br>There would be direct views of night lighting at the Wilpinjong coal mine Extension and Modification 2 from Ulan-Wollar Road. This lighting would be seen together with lighting for this project, but the cumulative effect would be mostly attributed to the mine. While the majority of the mining activity at Ulan coal mine and associated lighting would be underground, there would be some external lighting provided for the surface infrastructure that may cause a cumulative landscape character impact on the Talbragar River rural valley LCZ at night. There would be limited operational lighting associated with the Wollar solar farm. This lighting together with the limited lighting for this project at the New Wollar Switching Station would have a minor cumulative effect on the Wollar rural valley LCZ at night.<br>The Goulburn River solar farm would be located in a landscape separated from the project study area and would not have a cumulative landscape character impact together with this project during the day or night. | The Goulburn River solar farm would be located over 10 kilometres from the project study area. No cumulative visual impacts are expected as a result of the solar farm and this project during construction.<br>Operation:<br>Although most of the Ulan coal mine Modification 6 project infrastructure would be located underground, some surface infrastructure such as haulage roads would be seen in addition to transmission infrastructure of this project from sections of local roads such Blue Springs Road, and from nearby rural properties. This infrastructure would contrast with the existing rural amenity and scenic quality of this area, resulting in potential cumulative visual impacts. There is the potential for cumulative visual impacts as the Ulan coal mine Modification 6 project would be seen together with this project from two private dwellings.<br>The Wilpinjong coal mine Extension and Modification 2 would be visible together with this project in views from Ulan-Wollar Road during operation. There would be a cumulative visual impact where these projects are seen together and sequentially while driving through the mining area. However, due to the low sensitivity of these views, the visual impact is considered to be low.<br>This project would be viewed together with the Wollar solar farm and there would be a cumulative effect on views from Baragan Road during project construction.<br>The Goulburn River solar farm would be located over 10 km from the study area and would not be seen together or sequentially with this project. No cumulative visual impacts are expected as a result of the solar farm and this project during operation. |

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| **Northeast** – Cassilis and Turill<br>• Liverpool Range wind farm | Construction:<br>The construction program for the Liverpool Range wind farm is likely to overlap with construction of this project for several years. There is the potential for cumulative impacts on landscape character where construction activities would take place near the Cassilis connection and switching station M1, in the Cassilis to Coolah undulating rural hills LCZ (URH-5). This change in landscape character would be mostly due to the construction of the wind farm, as the wind farm would require construction activity of a larger scale and over a broader area, with a relatively small contribution by the Central-West Orana REZ Transmission project. Changes to landscape character would be associated with the use of large-scale machinery and vehicles, landform changes, the removal of vegetation, the installation of project infrastructure and widespread road and access track upgrades.<br>At night, there is the potential for cumulative landscape character impacts in the Cassilis to Coolah undulating rural hills LCZ, due to the construction lighting required for this project and the Liverpool Range wind farm. One private dwelling, which is associated with the Liverpool Range wind farm project and would host transmission line infrastructure for the Central-West Orana REZ Transmission project, is likely to have views of this construction lighting.<br>Operation:<br>This project and the Liverpool Range wind farm would introduce energy and electricity infrastructure, access tracks and upgraded roads into a landscape where there is currently limited built development and a prevailing undulating rural landscape character. This infrastructure would change the landscape character to one where the presence of energy and electricity infrastructure is more frequently encountered and prominent, resulting in a cumulative landscape character impact. The contribution of the Central-West Orana REZ Transmission project to this change in landscape character would be greater in the vicinity of the Cassilis connection and switching station M1 where these projects would be seen together.<br>The Liverpool Range wind farm is unlikely to require aviation obstacle lighting on the wind turbines, however, there would be low intensity night lighting at the substations, control and auxiliary buildings of the wind farm. Low-level lighting is required for the Central-West Orana REZ Transmission project at the Cassilis connection and switching station M1, where these projects would be seen together. Together these projects would slightly increase the lighting levels within parts of the Cassilis to Coolah undulating rural hills LCZ at night, and result in a potential cumulative landscape character impact. One private dwelling, which is associated with the Liverpool Range wind farm project, and would also host transmission line infrastructure for the Central-West Orana REZ Transmission project, is likely to have views of this operational lighting. | Construction:<br>The construction of the approved Liverpool Range wind farm would be seen sequentially and together with this project in undulating rural hills north of Cassilis, for several years. Construction activities for these projects, including vegetation removal, earthworks, construction of project infrastructure and vehicles and machinery travelling along access tracks and construction routes, may be seen from sections of local roads such Rotherwood Road and Coolah Road, and from nearby rural properties between Cassilis and Coolah. These construction activities would contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts.<br>Operation:<br>This project and the operational Liverpool Range wind farm would be seen sequentially and together from sections of local roads such Rotherwood Road and Coolah Road, and from nearby rural properties between Cassilis and Coolah. The Liverpool Range wind farm proposes multiple wind turbines around four times the height of this project's transmission line towers. Views of these projects would be prominent and contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts. One private dwelling, which is associated with the Liverpool Range wind farm project, and would also host transmission line infrastructure for the Central-West Orana REZ Transmission project, is likely to have views of this project and the wind farm. |

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| **Northeast** – Leadville, Coolah and Uarbry<br>• Valley of the Winds wind farm | Construction:<br>The construction program for the Valley of the Winds wind farm is likely to overlap with construction of this project for several years. There is the potential for cumulative impacts on landscape character where construction activities would take place near the Coolah and Leadville connections and switching stations M2 and M3, in the Uarbry and Tongy undulating rural hills LCZs (URH-3 and URH-4). This character change would be mostly due to the construction of the wind farm, as the wind farm would require construction activity over a much larger scale and broader area than the Central-West Orana REZ Transmission project. Changes to landscape character would be associated with the use of large-scale machinery and vehicles, landform changes, the removal of vegetation, the installation of project infrastructure and widespread road and access track upgrades as a result of this project and the wind farm project.<br>At night, there is the potential for cumulative landscape character impacts in the Uarbry and Tongy undulating rural hills LCZs, due to construction lighting required for this project and the Valley of the Winds wind farm. Nearby private dwellings, including one dwelling which is associated with the Valley of the Winds wind farm project and would host transmission line infrastructure for the Central-West Orana REZ Transmission project, are likely to have views of this construction lighting.<br>Operation:<br>This project and the Valley of the Winds wind farm would introduce energy and electricity infrastructure, access tracks and upgraded roads into a landscape where there is currently limited built development and a prevailing undulating rural landscape character. This infrastructure would change the landscape character to one where the presence of energy and electricity infrastructure is more frequently encountered and prominent, resulting in cumulative landscape character impact. The contribution of the Central-West Orana REZ Transmission project to this change in landscape character would be greater in the vicinity of the Coolah connection and switching station M2, where these projects would be seen together.<br>The Valley of the Winds wind farm may require aviation obstacle lighting on the wind turbines, as well as low intensity night lighting at the switching stations, substations, control and operations and maintenance buildings of the wind farm. Low-level lighting is required for the Central-West Orana REZ Transmission project at the Cassilis connection and switching stations M2 and M3, where these projects would be seen together. Together these projects would increase the lighting levels within parts of the Uarbry and Tongy undulating rural hills LCZs at night, and result in a potential cumulative landscape character impact. Nearby private dwellings, including one dwelling which is associated with the Valley of the Winds wind farm project and would host transmission line infrastructure for the Central-West Orana REZ Transmission project, are likely to have views of this operational lighting. | Construction:<br>If approved, construction of the Valley of the Winds wind farm would be seen sequentially and together with this project in this area north of Uarbry, for several years. Construction activities for these projects, including vegetation removal, earthworks, construction of project infrastructure and vehicles and machinery travelling along access tracks and construction routes, may be seen from sections of local roads such Moorefield Road, and from nearby rural properties. These construction activities would contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts.<br>Operation:<br>The operational Valley of the Winds wind farm would be seen sequentially and together with this project in undulating rural and forested hills north of Uarbry. The Valley of the Winds wind farm proposes multiple wind turbines around four times the height of this project's transmission line towers. The projects would be seen from sections of Moorefield Road and from nearby rural properties south of Coolah and around Leadville. View of these projects would be prominent and contrast with the rural amenity and scenic quality of the surrounding landscape, resulting in potential cumulative visual impacts. One private dwelling, which would host both wind farm project infrastructure and transmission line infrastructure for the Central-West Orana REZ Transmission project, is likely to have views of this project and the wind farm. |

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| **Central** – Merotherie, Birriwa, Barneys Reef, Stubbo and Tallawang<br>• Birriwa solar farm<br>• Barneys Reef wind farm<br>• Stubbo solar farm<br>• Tallawang solar farm<br>• **Narragamba solar farm**<br>• **Bellambi Heights BESS** | Construction:<br>In the landscapes between Gulgong and Dunedoo, multiple renewable energy projects are proposed/approved near this project, and the construction periods of these projects are likely to overlap with this project over several years. This project, in combination with the relevant future projects, would gradually transform the predominantly rural landscape character of the Narragamba to Blue Springs LCZ (URH-1), Barneys Reef forested hills LCZ (FH-04) and Birriwa to Tallawang undulating rural hills LCZ (URH-2) to a landscape where the construction and installation of energy and electricity infrastructure characterises large areas of the landscape. Cumulative impacts on landscape character would be associated with earthworks, vegetation removal, construction of the project infrastructure and the movement of machinery and vehicles.<br>At night, there is the potential for cumulative landscape character impacts on the Narragamba to Blue Springs LCZ, Birriwa to Tallawang undulating rural hills LCZ and Barneys Reef forested hills LCZ, due to construction lighting required for this project and the relevant future projects. Several private dwellings near the Merotherie Energy Hub would have views of construction lighting from this project and the Birriwa solar farm. Several private dwellings near the Castlereagh Highway would have views of construction lighting from this project and the Barneys Reef wind farm.<br>Operation:<br>This project, in combination with the relevant future projects would transform the Narragamba to Blue Springs LCZ, Barneys Reef forested hills LCZ and Birriwa to Tallawang undulating rural hills LCZ from predominantly rural to having a prevailing character of renewable energy infrastructure, due to the introduction of solar panel arrays, switching and substations, BESS facilities, workshops maintenance and operations buildings, maintenance access tracks and upgraded roads into the landscape. The contribution of this project to this change in character would be greater in the vicinity of the Merotherie Energy Hub and in areas to the west of the energy hub.<br>At night the relevant future projects are likely to include low-level lighting for safety and security at ancillary structures such as the switching stations, battery storages and permanent operations and maintenance buildings.<br>Several private dwellings near the Merotherie Energy Hub may have views of operational night lighting from this project and the Birriwa solar farm. Some of these dwellings would be associated with the solar farm project or host transmission line infrastructure for this project. Around six to eight private dwellings near the Castlereagh Highway may have views of operational lighting from this project and the Barneys Reef wind farm. | Construction:<br>The construction of the approved Stubbo solar farm and the proposed Birriwa solar farm and Narragamba solar farm could potentially overlap with this project for several years in the area northeast of Gulgong, in the vicinity of Blue Springs Road. Construction of the remaining relevant future projects could potentially be seen sequentially and together with construction of the project in areas between Gulgong and Dunedoo. Cumulative visual impacts may occur as construction activities would be spread across a large area and viewed against the hills at Barneys Reef, which would impact the existing rural amenity and scenic quality of views in this area. In particular this would affect views from the Castlereagh Highway, where large scale construction would be seen for an extended duration on both sides of the highway.<br>The Bellambi Heights BESS would not be visible from the Castlereagh Highway and would not have a cumulative visual impact in combination with this project during construction.<br>Operation:<br>In this area north and northeast of Gulgong, the relevant future projects would extend across a large area of undulating rural landscape and would be viewed against a backdrop of hills at Barneys Reef. The projects would be viewed sequentially and together, from nearby roads, such as the Castlereagh Highway, and rural properties, including private dwellings. Cumulative visual impacts may occur as the scale, proximity and extent of this project and the relevant future projects would contrast with the rural amenity and scenic quality of existing views, which do not currently contain large-scale built features or infrastructure.<br>Two private dwellings near the Merotherie Energy Hub may have views of this project together with the Birriwa solar farm. Around six private dwellings near the Castlereagh Highway, some of which are not associated with either of these projects, may have views of this project and the Barneys Reef wind farm.<br>The Bellambi Heights BESS would not be visible from the Castlereagh Highway and would not have a cumulative visual impact in combination with this project during operation. |

| Location and relevant future projects | Cumulative landscape character impacts | Cumulative visual impacts |
|---|---|---|
| **West** – Elong Elong, Cobbora, Gollan, Goolma and Dunedoo<br>• Orana wind farm<br>• Sandy Creek solar farm<br>• Cobbora solar farm<br>• Dapper solar farm<br>• Spicers Creek wind farm | Construction:<br>In the landscapes between Tallawang and Spicers Creek, multiple renewable energy projects are proposed near this project, and the construction periods of these projects are likely to overlap with this project over several years. This project, in combination with the relevant future projects, would gradually transform the predominantly rural landscape character of the Dapper and Elong undulating rural hills LCZ (URH-6) and Spring Ridge and Tuckland forested hills LCZ (URH-2) to a landscape where the construction and installation of energy and electricity infrastructure characterises large areas of the landscape. Cumulative impacts on landscape character would be associated with earthworks, vegetation removal, construction of the project infrastructure and the movement of machinery and vehicles.<br>Operation:<br>This project, in combination with the relevant future projects, would transform the Narragamba to Blue Springs and Birriwa to Tallawang undulating rural hills LCZs from predominantly rural to having a prevailing character of renewable energy infrastructure, due to the introduction of solar panel arrays, switching and substations, BESS facilities, workshops, maintenance and operations buildings, maintenance access tracks and upgraded roads into the landscape. | Construction:<br>Multiple renewable energy projects are proposed in the rural area west of the Castlereagh Highway, between Tallawang and Spicers Creek. If approved, construction of these projects would be seen sequentially and together with the project in this area, for around two to three years. The works at multiple construction sites would be visible, including leveling works, foundation construction and presence of vehicles and machinery travelling along access tracks and construction routes. As this area is fairly remote, the projects would be seen from sections of local roads such Spring Ridge Road and Dapper Road, and from nearby rural properties. The construction activities would extend across a large part of this rural area and contrast with the rural amenity and scenic quality of the existing rural landscape, resulting in potential cumulative visual impacts.<br>Operation:<br>In this area between Tallawang and Spicers Creek, the relevant future projects and this project would extend across a large area of undulating rural landscape. These projects would be viewed sequentially and together, from nearby roads such as the Spring Ridge Road and Dapper Road and from rural properties, including private dwellings. There is the potential for cumulative visual impacts due to the scale, proximity and extent of this project and the relevant future projects, and their contrast with the rural amenity and scenic quality of the existing rural landscape, that do not currently contain large scale built features or infrastructure.<br>Around five dwellings would have views of this project and the Orana wind farm, of which several would host infrastructure for this project and/or the wind farm project. Around 10 dwellings in the vicinity of the Elong Elong Energy Hub would have views of this project, the Spicers Creek wind farm and Sandy Creek, Cobbora and Dapper solar farms, most of which would also host one of these projects. |

## Biodiversity

Relevant future projects that were considered relevant future projects for the cumulative biodiversity impact assessment are identified in Table L-3 of Appendix L.

## Cumulative impacts on native vegetation, threatened and migratory species and threatened ecological communities

Table 5-46 provides a summary of the total impact on native vegetation, Threatened Ecological Communities (TECs) and threatened species for each relevant future project (based on publicly available information). Additional impacts from the additional relevant future projects assessed and changes to the planning status of projects previously assessed in the EIS are shown in **bold**.

Consistent with the EIS, six of the relevant future projects are in the early planning stages and the likely impacts of these projects are currently unknown, however biodiversity impacts from all of these projects can be expected. The total ecosystem credit and species credit requirements for each project are also provided to provide an overview of cumulative offset requirements.

Due to the variance in impacts between projects, the total native vegetation impact is considered to represent impact to threatened species habitats, and the species credit requirement is considered to represent the level of impact to threatened species.

The direct cumulative impact on native vegetation as a result of this project, in combination with the relevant future projects, is estimated to be 24,251 hectares. The cumulative ecosystem credit requirement is 198,868 credits and the cumulative species credit requirement is 376,216 credits.

Table 5-46 Potential cumulative impacts of relevant future projects on native vegetation, TECs and threatened species

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| **Related development** | | | | | | |
| Liverpool Range wind farm | 1,790 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland. | Ausfeld's wattle<br>*Silky swainson-pea*<br>Glossy black-cockatoo<br>Large-eared pied-bat<br>Square-tailed kite<br>Squirrel glider<br>Eastern cave bat | 30,101 | 20,405 |
| Valley of the Winds wind farm | 1,340.78 | Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Large-eared Pied Bat<br>Large Bent-winged Bat<br>Barking Owl<br>Squirrel Glider<br>*Acacia ausfeldii*<br>Bush Stone-curlew<br>Gang-gang Cockatoo<br>Glossy Black-Cockatoo<br>Eastern Pygmy-possum<br>*Commersonia procumbens*<br>*Cynanchum elegans*<br>Pale-headed Snake<br>Stephens' Banded Snake<br>Square-tailed Kite<br>*Monotaxis macrophylla*<br>Greater Glider<br>Brush-tailed Rock-wallaby<br>Koala<br>*Prasophyllum petilum*<br>*Prasophyllum sp. Wybong*<br>Grey-headed Flying-fox<br>*Tylophora linearis*<br>Masked Owl<br>Eastern Cave Bat | 8,966 | 19,688 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Narragamba solar farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. | Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Unknown | Unknown | Unknown |
| Barneys Reef wind farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | Not identified in Scoping Report | Not identified in Scoping Report | Unknown | Unknown | Unknown |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Birriwa solar farm | 368.71 | Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Large-eared Pied Bat<br>Barking Owl<br>Powerful Owl<br>Koala<br>Masked Owl<br>*Acacia ausfeldii*<br>Bush-stone Curlew<br>Glossy Black Cockatoo<br>Eastern Pygmy Possum<br>*Dichanthium setosum*<br>*Diuris tricolor*<br>*Euphrasia arguta*<br>White-bellied Sea Eagle<br>Little Eagle<br>Major Mitchells Cockatoo<br>Square-tailed Kite<br>Squirrel Glider<br>Brush-tailed Phascogale<br>Superb Parrot<br>*Prasophyllum petilum*<br>*Prasophyllum sp. Wybong*<br>*Swainsona sericea* | 281 | 350 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Tallawang solar farm | 41.89 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands<br>Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. | No Species Credit Species recorded | 1,124 | 0 |
| Cobbora solar farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | Possible: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>Possible: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Possible: Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions | Possible: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>Possible: White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Unknown | Unknown | Unknown |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Sandy Creek solar farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | Possible: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>Possible: Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions<br>Possible: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Possible: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>Possible: White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Unknown | Unknown | Unknown |
| Dapper solar farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | Possible-likely: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Likely: Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions. | Possible-likely: White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Unknown | Unknown | Unknown |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Spicers Creek wind farm | 269.2 | Possible: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>Possible: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Possible: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>Possible: White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Superb parrot<br>Glossy black-cockatoo<br>Barking Owl | 7,927 | 2,282 |
| Orana wind farm | Unknown<br>This project is in the 'Prepare EIS' stage; Limited information available | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands<br>Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. | Unknown | Unknown | Unknown |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| **Proposed projects** | | | | | | |
| Bellambi Heights BESS | 1.12 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | None recorded | No Species Credit Species recorded | 2 | 0 |
| Goulburn River solar farm | 795.69 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Regent Honeyeater<br>Barking Owl | 4,778 | 1,553 |
| Burrendong wind farm | 855 | Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.<br>White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Pink-tailed Legless Lizard<br>Spear-grass<br>Bush Stone-curlew<br>Eastern Pygmy possum<br>Sloane's Froglet<br>Pine Donkey Orchid<br>Pale-headed Snake<br>Key's Matchstick Grasshopper<br>Barking Owl<br>Powerful Owl<br>Squirrel Glider<br>Brush-tailed Phascogale<br>Koala<br>Small Purple-pea<br>Silky Swainson-pea<br>Masked Owl | 17,771 | 27,662 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Wellington South BESS | 9.47 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | None recorded | Pink-tailed Legless Lizard<br>Bush-stone Curlew<br>Gang-gang Cockatoo<br>Euphrasia arguta<br>Key's Matchstick Grasshopper<br>Squirrel Glider<br>Brush-tailed Phascogale<br>Koala<br>Superb Parrot | 27 | 108 |
| Orana BESS | 10.62 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | None recorded | Pink-tailed Legless Lizard<br>Masked Owl | 0 | 38 |
| Dubbo firming power station | 1.2 | White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Box Gum Woodland (Critically Endangered Ecological Community) and Pine Donkey Orchids (diuris tricolor), listed as vulnerable. | None recorded | None impacted | 5 | 0 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| **Approved projects** | | | | | | |
| Wollar solar farm | 367.5 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Austfeld's Wattle<br>Large-leafed Monotaxis<br>*Commersonia procumbens*<br>Bush Stone-curlew<br>Gang-gang Cockatoo<br>Barking Owl<br>Powerful Owl<br>Masked Owl<br>Squirrel Glider<br>Large-eared Pied Bat<br>Brush-tailed<br>Phascogale<br>Koala | 713 | 544 |
| Stubbo solar farm | 5.53 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands | Barking Owl | 87 | 66 |
| Bowdens silver mine | 381.71 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands | Koala<br>Squirrel Glider<br>Regent Honeyeater<br>*Acacia ausfeldii* | 23,019 | 45,946 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Inland Rail (Narromine to Narrabri) | 1,732 | Myall Woodland in the Darling Riverine Plains, Brigalow Bet South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions | Hunter Valley Weeping Myall (*Acacia pendula*) Woodland | Pterostylis cobarensis<br>*Commersonia procumbens*<br>*Bertya opponens*<br>*Polygala linariifolia*<br>*Diuris tricolor*<br>*Swainsona murrayana*<br>*Lepidium aschersonii*<br>*Tylophora linearis*<br>*Lepidium monoplocoides*<br>Barking Owl<br>Bush-stone Curlew<br>Eastern Pygmy Possum<br>Glossy Black Cockatoo | 34,820 | 160,421 |
| Dunedoo solar farm | 8.4 | White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | No Species Credit Species recorded | 19 | 0 |
| Apsley BESS | 212 | White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | N/A | No Species Credit Species Recorded | 0 | 0 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Forest Glen solar farm | 1,650 | Fuzzy Box Woodland on Alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions. | N/A | *Bush-stone Curlew*<br>*Commersonia procumbens*<br>*Dichanthium setosum*<br>*Diuris tricolor*<br>*White-bellied Sea-Eagle*<br>*Little Eagle*<br>*Homoranthus darwinioides*<br>*Indigofera efoliata*<br>*Major Mitchell's Cockatoo*<br>*Square-tailed Kite*<br>*Monotaxis macrophylla*<br>*Barking Owl*<br>*Squirrel Glider*<br>*Koala*<br>*Superb Parrot*<br>*Prasophyllum sp. Wybong*<br>*Pterostylis cobarensis*<br>*Swainsona sericea*<br>*Tylophora linearis* | 95 | 0 |
| Uungula wind farm | 639 | White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | *Koala*<br>*Squirrel Glider*<br>*Acacia ausfeldii*<br>*Dichanthium setosum*<br>*Swainsona sericea*<br>*Swainsona recta*<br>*Zieria obcordate*<br>*Brush-tailed Rock-wallaby*<br>*Eastern Pygmy Possum*<br>*Regent Honeyeater* | 26,988 | 6,705 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| Maryvale solar farm | 1.2 | White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | N/A | *Little Eagle*<br>*Swift Parrot*<br>*Regent Honeyeater*<br>*Little Lorikeet*<br>*Scarlet Robin*<br>*Flame Robin* | 124.25 | 0 |
| Blain Road solar farm | 3 | None recorded | None recorded | No Species Credit Species recorded | 0 | 0 |
| Geurie solar farm | <1 | N/A | N/A | N/A | 0 | 0 |
| Dubbo solar farm | Unlikely to impact.<br>No expected impacts to TECs or native species predicted. | N/A | N/A | None | 0 | 0 |
| Gilgandra solar farm | None | N/A | N/A | Black-breasted Buzzard<br>Eastern Pygmy-possum<br>Koala<br>*Goodenia macbarronii* | 0 | 0 |
| Wahroonga solar farm | Unlikely to Impact.<br>No expected impact to TECs or native species is predicted. | N/A | N/A | None | 0 | 0 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| **Changes to existing projects** | | | | | | |
| Moolarben coal mine OC3 Extension and Moolarben Stage 2 - Modification 4 - UG2 | 624.18 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions<br>Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion Vulnerable Ecological Community. | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands<br>Central Hunter Valley eucalypt forest and woodland. | None | 0 | 0 |
| Ulan coal mine Modification 6 | Unknown<br>Environmental Impact Assessment yet to be completed | Possibly: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Possibly: White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | None | 0 | 0 |
| Wilpinjong coal mine Extension and Modification 2 | 354 | White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, and Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions | White Box - Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. | Ozothamnus tesselatus<br>Regent Honeyeater<br>Koala | 15,314 | 48,871 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| **Sub-totals** | | | | | | |
| Related development, proposed and approved projects | 23,024 | N/A | N/A | N/A | 172,161 | 334,639 |
| **Central-West Orana Renewable Energy Zone Transmission project (this project)** | | | | | | |
| This project | 1,227 | Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions<br>Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions<br>White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. | Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia<br>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. | *Acacia ausfeldii* (Ausfeld's Wattle)<br>*Anthochaera phrygia (Regent Honeyeater)*<br>*Aprasia parapulchella (Pink-tailed Legless Lizard)*<br>*Calyptorhynchus lathami (Glossy Black Cockatoo)*<br>*Cercartetus nanus (Eastern Pygmy Possum)*<br>*Chalinolobus dwyeri (Large-eared Pied Bat)*<br>*Delma impar (Striped Legless Lizard)*<br>*Dichanthium setosum (Bluegrass)*<br>*Diuris tricolor (Pine Donkey Orchid)*<br>*Eucalyptus camaldulensis* - endangered population<br>*Euphrasia arguta Hieraaetus morphnoides (Little Eagle)*<br>*Homoranthus darwinioides (Fairy Bells)*<br>*Hoplocephalus bitorquatus (Pale-headed Snake)*<br>*Indigofera efoliata (Leafless Indigo)* | 26,707 | 41,577 |

| Project | Known or estimated native vegetation impacts (ha) | TECs impacted | | Species Credit Species impacted | Native vegetation offsets (Ecosystem credits) total | Threatened species offsets (Species credits) total |
|---|---|---|---|---|---|---|
| | | BC Act | EPBC Act | | | |
| | | | | *Keyacris scurra (Key's Matchstick Grasshopper)*<br>*Leucochrysum albicans subsp. tricolor (Hoary Sunray)*<br>*Myotis macropus (Southern Myotis)*<br>*Petaurus norfolcensis (Squirrel Glider)*<br>*Petrogale penicillata (Brush-tailed Rock-wallaby)*<br>*Phascolarctos cinereus (Koala)*<br>*Polytelis swainsonii (Superb Parrot)*<br>*Pomaderris cotoneaster*<br>*Pomaderris queenslandica (Scant Pomaderris)*<br>*Prasophyllum petilum (Tarengo Leek Orchid)*<br>*Swainsona recta (Small Purple-pea)*<br>*Swainsona sericea (Silky Swainson-pea)*<br>*Thesium australe (Austral Toadflax)*<br>*Tylophora linearis*<br>*Tyto novaehollandiae (Masked Owl)*<br>*Vespadelus troughtoni (Eastern Cave Bat)*<br>*Zieria ingramii (Keith's Zieria)..* | | |
| **Cumulative biodiversity impacts** | | | | | | |
| **Cumulative totals** | 24,251 | N/A | N/A | N/A | 198,868 | 376,216 |

## Cumulative impacts on groundwater dependent ecosystems

No changes to the potential cumulative impacts on groundwater dependent ecosystems (GDEs), as described in the EIS, have been identified as a result of the additional relevant future projects assessed.

## Cumulative impacts on wildlife connectivity and habitat corridors

Table 5-47 outlines the potential cumulative impacts to wildlife connectivity and habitat corridors. Additional impacts from the additional relevant future projects assessed and changes to the planning status of projects previously assessed in the EIS are shown in **bold**. No changes to the potential cumulative impacts on wildlife connectivity and habitat corridors, as described in the EIS, have been identified as a result of the additional relevant future projects assessed.

Table 5-47 Potential impacts on key relevant future projects on wildlife connectivity and habitat corridors

| Project | Impacts on wildlife connectivity and habitat corridors |
|---|---|
| Liverpool Range wind farm | The project area is located in a region of NSW that has been extensively modified and disturbed as a result of a long history of agricultural land uses. Specifically, the project area is comprised of agricultural landscapes on the valley floors and low slopes, with substantial areas of intact vegetation associated with the network of public reserves, upper slopes and ridgetops.<br>Much of the project area occur where the connectivity of native vegetation and habitat corridors has been previously compromised by historical agricultural land uses. However, there are specific locations within the project area where substantial areas of intact native vegetation and associated fauna habitat is recognised to occur. This occurs primarily to the north (private land) and east (Coolah Tops National Park) of the project area; and north, east (Durridgere SCA, State Forest land, National Park Land – The Drip, Goulburn River National Park) and west of the external transmission line site. It is considered likely that the project could potentially interrupt the connectivity of threated species, but not threatened ecological communities.<br>Of the interruptions to habitat connectivity listed above, those associated with the external transmission line, south of the Golden Highway, are considered to be most substantial. It is in this location of the project area where the project impacts on large intact patches of high quality vegetation. This includes publicly owned reserves as well as land in private ownership. This vegetation provides important habitat connection across the landscape for a range of fauna species and also the passive movement of flora species.<br>The 220 wind turbines proposed as part of the project will introduce an interruption of aerial habitat through the introduction of potential turbine strike and barotrauma (rapid or excessive air-pressure change near moving turbine blades that result in haemorrhaging of the lungs). |
| Valley of the Winds wind farm | Areas of connectivity were identified throughout the project biodiversity study area. Threatened species likely to use these areas of habitat connectivity include Barking Owl, Masked Owl, Squirrel Glider, Dusky Woodswallow, Speckled Warbler and Grey-crowned Babbler (Eastern subspecies). All of these species are highly mobile and will be unaffected by the project.<br>The only species that will be subject to measurable disruption of connectivity will be Squirrel Glider along the southern portion of the transmission line route, where there will be a loss of connectivity between two large patches of burned forest. The remaining two portions of this forest however are both of sufficient size to allow the species to persist. |
| Narragamba solar farm | Impacts to habitat connectivity not yet assessed. Project is in the 'Prepare EIS' stage so there is limited information available. |
| Barneys Reef wind farm | Impacts to habitat connectivity not yet assessed. Project is in the 'Prepare EIS' stage so there is limited information available. |
| Birriwa solar farm | The locality of the project is considered highly fragmented with native vegetation often occurring in isolated patches surrounded by a matrix of agricultural land. A vegetated road corridor provides connectivity along the western extent of the subject land to the ridgeline to the south. Ecosystem and species credit species predicted to occur in the subject land predominantly comprise highly mobile birds and mammals, and therefore most species will not be impacted by fragmentation.<br>The road corridor is known to provide habitat for Koalas, however, fragmentation is unlikely to occur due to the nature of the project. |

| Project | Impacts on wildlife connectivity and habitat corridors |
|---|---|
| Tallawang solar farm | The project area is not an important link for any fauna movement and has not been identified in connectivity mapping. The project area is also not identified within a Priority Investment Area (areas of high environmental value, including core areas of remnant vegetation) and is not identified as an important flyway for migratory species. |
| Cobbora solar farm | Impacts to habitat connectivity not yet assessed. Project is in the 'Prepare EIS' stage so there is limited information available. |
| Sandy Creek solar farm | Impacts to habitat connectivity not yet assessed. Project is in the 'Prepare EIS' stage so there is limited information available. |
| Dapper solar farm | There are no formal biodiversity corridors within the project area. Vegetative connectivity to reserves and larger areas of habitat is fragmented, with about 500–800 m distances across cleared agricultural lands. Patches of woodland vegetation in the project area can provide habitat and refuge (stepping stones between larger patches of woodland) for several native fauna species (birds, microbats, and large macropods). The creek lines and riparian vegetation also provide important linkages for wildlife movement, aquatic species and a water resource. |
| Spicers Creek wind farm | The project area consists of an agricultural landscape, predominantly comprised of grazed grasslands with remnant trees and forested patches and bordered in the southeast by Dapper Nature Reserve. Patches of retained forest and woodland vegetation is present, typically in areas surrounding watercourses and on steeper or rocky less fertile habitats. While the project area occurs in a disturbed agricultural landscape a number of habitat corridors occur across the landscape, varying in quality and width. These corridors provide a linkage of habitat from the project area north to Goonoo SCA and Goonoo National Park, Yarrobil National Park to the east, as well as various other conserved land. |
| Orana wind farm | Impacts to habitat connectivity not yet assessed in detail. Project is in the 'Prepare EIS' stage so there is limited information available in the Preliminary Biodiversity Assessment Report for the project. |
| **Proposed projects** | |
| Bellambi Heights BESS | Native vegetation and fauna habitats are highly fragmented in the project area. The largest most intact, patch of vegetation occurs to the east of the project area and will not be directly or indirectly impacted by the proposal. Ecosystem and species credit fauna species predicted to occur in the subject land predominantly comprise highly mobile birds and mammals, and therefore most species will not be impacted by fragmentation. For the less mobile Key's Matchstick Grasshopper, abundant suitable habitat is available within the locality. The design of the development results in minimal fragmentation and isolation as surrounding suitable habitat remains connected. |
| Goulburn River solar farm | The project would result in some loss of connectivity and habitat fragmentation however all areas likely to be important for habitat connectivity for woodland species have been maintained. The project includes corridors between the development footprint areas which will not be fenced, to enable the persistence of habitat connectivity. Areas of clearing primarily consist of native vegetation composed of scattered canopy trees and areas of derived native grassland composed of highly disturbed agricultural land – consequently species utilising these areas for connectivity are already highly mobile and disturbance tolerant. There will be no overall changes to landscape connectivity for wildlife movement. |
| Burrendong wind farm | The loss of paddock trees and smaller patches within the project area would result in a minor loss of connectivity for more transient species. However, wind turbine generators are to be located on cleared ridges with few scattered trees - these trees are already isolated and would only provide habitat for highly mobile species such as birds. Connectivity will be retained in surrounding areas. |
| Wellington South BESS | Native vegetation and fauna habitats are highly fragmented in the project area. Ecosystem and species credit species predicted to occur in the project area predominantly comprise highly mobile birds and mammals, and therefore most species will not be impacted by fragmentation. For the less mobile Key's Matchstick Grasshopper, abundant suitable habitat is available within the locality. The design of the subject land results in minimal fragmentation and no isolation as surrounding suitable habitat remains connected. |

| Project | Impacts on wildlife connectivity and habitat corridors |
|---|---|
| Orana BESS | The project is likely to impact connectivity for the Pink-tailed Legless-lizard (recorded in the project area) by reducing suitable habitat given the species cryptic nature and living underground. The project is not anticipated to separate the population into two populations and the northern extent of the project area has avoided as much of the surveyed habitat as possible. More mobile threatened species that may occur include birds that are able to move further distances so the project is unlikely to substantially decrease connectivity of foraging habitat for these species. |
| Dubbo firming power station | Impacts to habitat connectivity not yet assessed. Project is in the 'Prepare EIS' stage so there is limited information available. |
| **Approved projects** | |
| Wollar solar farm | Habitat connectivity values within the project area are considered minimal - small patches of Box Gum Woodland directly south of the development site provide some minor connectivity for highly mobile species such as birds, however, canopy connectivity is broken by open paddocks used for grazing and cultivation. The proposed solar farm is also not expected to disrupt connectivity of native grasslands when consideration is given to the large area of native grasslands surrounding the development site that exist within Wollar Valley (~8000 ha). Connectivity impacts to threatened fauna species are considered negligible. |
| Stubbo solar farm | Woodlands within the project area generally have poor connectivity as they are present as isolated paddock trees or small patches. Habitat corridors are present at the periphery of the project area along public road reserves. |
| Bowdens silver mine | The project would result in some loss of connectivity and habitat fragmentation. However, the project is located at the southern extent of a large expanse of native vegetation to the north, which then opens onto an existing fragmented landscape with irregular patches of vegetation. While some level of connectivity would be lost and levels of habitat fragmentation would increase, the landscape would still retain features suitable for landscape connectivity. |
| Inland Rail (Narromine to Narrabri) | The project would be located in a highly fragmented, rural landscape for much of the alignment. Fragmentation of native vegetation and associated fauna habitats in the locality has previously occurred through clearing for agriculture, residences and farm buildings, and construction of linear infrastructure (such as transmission lines and roads). These land uses have created barriers to movement for some fauna species, particularly those that are limited by dispersal abilities and habitat preferences. More mobile species, such as birds and bats, can readily traverse this landscape. The project would exacerbate fragmentation in these areas. There is the potential for impacts on fauna connectivity, particularly in the Pilliga forests. |
| Dunedoo solar farm | The landscape within the project area has been heavily cleared and lacks significant connectivity. However, remnant vegetation does occur in small isolated patches within the farmed landscape. The main source of connectivity throughout the broader region surrounding the project occurs along the watercourse to the south of the project area, Talbragar River, which supplies permanent to semi-permanent water, contains a predominately native understorey and is lined with sparsely distributed *Eucalyptus* and *Casuarina* species. |
| Apsley BESS | No impacts on wildlife connectivity and habitat corridors. |
| Forest Glen solar farm | No state or regionally significant biodiversity links occur within the project area or within the 1,500 m assessment area. Roadside vegetation in the northern section of the project area provides some connectivity through continuous canopy cover.<br>The majority of the project area is situated within unregulated Category 1 Land (255 ha). However, the installation of fencing, road construction and infrastructural development will have some impacts on connectivity. The species most likely impacted by changes to connectivity are those reliant on moving large distances such as Koala, should this species be present within the greater area surrounding the project area.<br>Short term impacts will result in species requiring relocating outside of the project area, while long term impacts could include permanent breaks in connectivity due to installation of fence lines and access roads. The loss of these areas is unlikely to have an impact that could cause a decline in a threatened species, with a modification of their behaviour over time to move within the existing and retained bushland more likely. |
| Uungula wind farm | The project area generally follows ridgelines and will not impact connectivity between the more vegetated valleys. Riparian vegetation is lacking or degraded within the project area and will not be subject to any further disconnection. Establishment of vegetated riparian zones will enhance connectivity in the project area. |

| Project | Impacts on wildlife connectivity and habitat corridors |
|---|---|
| Maryvale solar farm | No vegetation corridors exist within the project area or immediate surrounds. |
| Blain Road solar farm | The development site lies within grasslands modified for agriculture and adjacent to large areas of continuous woody vegetation including Avisford Nature Reserve and Mudgee Common. The remnant woody vegetation serves as the main connectivity component in the landscape – the riparian vegetation of the Cudgegong River is a connectivity corridor but is outside the Assessment Area and is over 1.8 km distant from the nearest connecting woody vegetation.<br>Overall, connectivity across the landscape is limited due to past clearing for agriculture and urban expansion. Due to the nature of the previously cleared grazing land, habitat connectivity is limited with only isolated paddock trees. |
| Geurie solar farm | No impacts on wildlife connectivity and habitat corridors. |
| Dubbo solar farm | No impacts on wildlife connectivity and habitat corridors. |
| Gilgandra solar farm | The project would not affect any State or regional biodiversity links. A corridor of native vegetation is present along the Newell Highway east of the project, which is up to 300 m wide. The project would not affect this link. |
| Wahroonga solar farm | No impacts on wildlife connectivity and habitat corridors. |
| **Changes to existing projects** | |
| Moolarben coal mine OC3 Extension and Moolarben Stage 2 – Modification 4 – UG2 | Habitats are mostly fragmented by past clearing events for agriculture. In the short to medium term further fragmentation is expected. Habitats would be fragmented by clearing for mining.<br>The project area is partially surrounded by the Munghorn Gap Nature Reserve to the east and south which provides habitat connectivity for species to the broader region. Species habitat within the project indicative surface disturbance extent has been previously cleared and is highly fragmented, with only small patches of woodland remaining. The remaining fragmented riparian vegetation along Moolarben Creek and Murdering Creek provides for partial connectivity throughout the project area. Forest and woodland on the steep slopes, rises and ridges surrounding the project indicative surface disturbance extent are well-connected with surrounding habitats, including the adjacent Munghorn Gap Nature Reserve.<br>All threatened species and communities known to occur in the area are likely to benefit from this habitat connectivity outside of the project area. Sufficient habitat connectivity would remain around and through the project indicative surface disturbance extent (e.g. due to the distance from Moolarben Creek and Murdering Creek and other habitat avoidance measures) such that no threatened species are likely to become isolated as a result of the project. The project is not likely to impact well-defined movement patterns for any particular threatened species. |
| Ulan coal mine Modification 6 | The vegetation of the project area has strong connectivity to nearby conservation areas including Goulburn River SCA, Goulburn River National Park, Durridgere SCA and Cope State Forest.<br>The extent of vegetation removal from within the project area is not considered likely to reduce the integrity of current corridors and connectivity. |
| Wilpinjong coal mine Extension and Modification 2 | As outlined in the biodiversity report a portion of the native vegetation within the project area is currently fragmented due to early land clearing for historical agricultural practices. The Goulburn River National Park and Munghorn Gap Nature Reserve are located adjacent to the project, but the project was anticipated to result in minimal further fragmentation within the locality. Revegetation aimed to increase the continuity of woodland vegetation by establishing links between woodland vegetation in the rehabilitation areas, regeneration areas and existing remnant vegetation in the Munghorn Gap Nature Reserve, Goulburn River National Park and the related Enhancement and Conservation Areas. |

| Project | Impacts on wildlife connectivity and habitat corridors |
|---|---|
| **Central-West Orana REZ Transmission project** | |
| Central-West Orana REZ Transmission project | The project is likely to have impacts on habitat connectivity where the alignment bisects vegetation associated with Durridgere SCA east of Ulan Road. Fragmentation impacts to Squirrel Glider habitat may occur where the alignment bisects this vegetation.<br>The project is likely to have impacts on habitat connectivity where the alignment bisects vegetation to the north of Tuckland State Forest. Habitat fragmentation impacts may also be associated with any vegetation removal associated with the Spring Ridge Road corridor and nearby riparian corridor. A number of threatened species were recorded and have habitat along these corridors including threatened woodland birds and Squirrel Glider. The project is also likely to have impacts on habitat connectivity where the project runs between vegetation in Goulburn River National Park and Cope State Forest. The alignment also runs between larger patches of woodland in the locality including Goulburn River National Park and Munghorn Gap Nature Reserve. Threatened bat species and threatened woodland birds that occur within this area have potential to be impacted by further habitat fragmentation.<br>It should however be noted that the project traverses a relatively disturbed landscape that contains three working coal mines and existing powerlines that cut through areas of vegetation. Functional connectivity for bird and bat species remains despite these development having occurred and it is likely that a similar level of functional habitat connectivity would remain after the project is built.<br>The project would result in a highly permeable structure for biodiversity and connectivity is expected to remain largely unaffected for all species. The impacts to connectivity area expected to be permanent, though minor. They are likely to reduce over time as biodiversity acclimatises to the presence of the towers and powerlines. The consequence of the impacts would be minor and non-significant as a result of the design development process. |

## Cumulative impacts on protected lands

Table 5-48 outlines the potential cumulative impacts to protected lands. Additional impacts from the additional relevant future projects assessed and changes to the planning status of projects previously assessed in the EIS are shown in **bold**. No changes to the potential cumulative impacts on protected lands, as described in the EIS, have been identified as a result of the additional relevant future projects assessed.

Table 5-48 Potential impacts of relevant future projects on protected lands

| Project | Impacts on protected lands |
|---|---|
| Liverpool Range wind farm | The proponent altered the proposed location of several wind turbines to increase their distance from Coolah Tops National Park as well as other large patches of woodland and forests outside of the National Park. This recommendation and design change was a direct measure to avoid impacting habitat connectivity and proximity to high conservation value areas. The external transmission line would however impact Durridgere SCA (note that this transmission line would be shared with this project and only one transmission line would be constructed through Durridgere SCA. This is discussed further in Section 2.9 of the EIS). |
| Valley of the Winds wind farm | No impacts on protected lands. |
| Narragamba solar farm | No impacts on protected lands. |
| Barneys Reef wind farm | No impacts on protected lands. |
| Birriwa solar farm | No impacts on protected lands. |
| Tallawang solar farm | No impacts on protected lands. |
| Cobbora solar farm | The nearest national parks to the project site area are the Goulburn River National Park, around 50 km to the east, and the Yarrobil National Park, around 15 km to the southeast. Other areas of environmental conservation in the vicinity of the project area include the Dapper Nature Reserve, Goodiman and Goonoo SCA areas.<br>No impacts on protected lands. |

| Project | Impacts on protected lands |
|---|---|
| Sandy Creek solar farm | The nearest national parks to the project area are the Goulburn River National Park, around 115 km to the southeast, and the Yarrobil National Park, around 17 km to the southwest. The Goonoo SCA is located around 27 km to the west of the project; Goodiman SCA is located around 10 km east; Yarrobil National Park is around 13 km southeast; and Dapper Nature Reserve is around 7 km to the south.<br>No impacts on protected lands. |
| Dapper solar farm | There are several reserves and woodland areas within 10 km of the project area, including Dapper Nature Reserve about 3 km to the south, Yarrobil National Park about 9 km to the southeast, and Tuckland State Forest about 8 km to the northeast.<br>No impacts on protected lands. |
| Spicers Creek wind farm | The project would have direct impacts on protected lands.<br>Due to the project being located adjacent to the Dapper Nature Reserve, an assessment considering the guidelines for Development adjacent to National Parks and Wildlife Service land (NPWS, 2020) and how they relate to the project has been undertaken covering a wide range of potential impacts. |
| Orana wind farm | Within the locality, the following conservation areas have been identified: Goodiman SCA, Yarrobil National Park and Tuckland State Forest.<br>No direct impacts on protected lands. The project is directly adjacent to Goodiman SCA and Tuckland State Forest. |
| **Proposed projects** | |
| Bellambi Heights BESS | No impacts on protected lands. |
| Goulburn River solar farm | No direct impacts are on protected lands. Goulburn River National Park surrounds the project area and indirect impacts would be managed through mitigation measures for the project. |
| Burrendong wind farm | No impacts on protected lands. |
| Wellington South BESS | No impacts on protected lands. |
| Orana BESS | No impacts on protected lands. |
| Dubbo firming power station | No impacts on protected lands. |
| **Approved projects** | |
| Wollar solar farm | No impacts on protected lands. |
| Stubbo solar farm | No impacts on protected lands. |
| Bowdens silver mine | No impacts on protected lands. |
| Inland Rail (Narromine to Narrabri) | The project would not impact any SCAs, reserves or national parks. The project would impact a number of forestry management zones set aside for the protection of specific flora and fauna habitats. These include:<br>• Forestry management zone (FMZ) 1 — flora reserve broomplain. Management of this zone is aimed at preserving the flora and fauna in a natural and undisturbed condition.<br>• FMZ 3A — special value fauna broom/bloodwood. This zone is managed to protect habitat for the Pilliga mouse.<br>• FMZ 3A — special value fauna wattle. This zone is managed to provide areas of structural diversity (mid storey).<br>• FMZ 3B — grassy box woodland. This zone is managed to encourage the same species that are often associated with Inland Grey Box and Box Gum Woodland threatened ecological communities.<br>• FMZ 3B — general habitat mosaic. This zone is managed to protect large-crowned trees which provide areas of structural diversity (overstorey). |
| Dunedoo solar farm | No impacts on protected lands. |
| Apsley BESS | No impacts on protected lands. |

| Project | Impacts on protected lands |
|---|---|
| Forest Glen solar farm | The project is located around 3 km northwest of the Sappa Bulga National Park.<br>No impacts on protected lands. |
| Uungula wind farm | There are 3 State Forests, 2 Nature Reserves, 2 National Parks and 1 Water Supply Reserve within a 30 km radius of the project. An additional three unnamed reserves have been mapped by Geoscience Australia to the north of the project.<br>No impacts on protected lands. |
| Maryvale solar farm | No impacts on protected lands. |
| Blain Road solar farm | No impacts on protected lands. |
| Geurie solar farm | No impacts on protected lands. |
| Dubbo solar farm | No impacts on protected lands. |
| Gilgandra solar farm | No impacts on protected lands. |
| Wahroonga solar farm | No impacts on protected lands. |
| **Changes to existing projects** | |
| Moolarben coal mine OC3 Extension and Stage 2 – Modification 4 – UG2 | The Goulburn River National Park, located around 5 km northeast of the project. The Goulburn River National Park would not be impacted by the project.<br>Portions of the Munghorn Gap Nature Reserve are located directly adjacent to the project area to the east, south and southwest. No impacts on protected lands. |
| Ulan coal mine Modification 6 | There are three large conservation areas within relatively close proximity to the project area:<br>• Durridgere SCA, around 8 km to the east<br>• Goulburn River National Park, around 14 km to the southeast.<br>• Munghorn Gap Nature Reserve, approximately 21 km to the southeast.<br>• Wollemi National Park, around 50 km to the southeast.<br>No impacts on protected lands. |
| Wilpinjong coal mine Extension and Modification 2 | The project does not have direct impacts on protected lands. There is a potential for indirect impacts (i.e., air quality, fire, weeds and pests, edge effects) to occur on the flora and/or fauna in Munghorn Gap Nature Reserve (because it is adjacent to the project). These effects were anticipated to be temporal in nature and managed through mitigation measures. The potential for indirect impacts on the Goulburn River National Park are generally comparable to the approved Wilpinjong Coal Mine because the project would not extend significantly closer to the Goulburn River National Park and no consequential impacts on biodiversity are likely downstream of the project. |
| **Central-West Orana REZ Transmission project (this project)** | |
| Central-West Orana REZ Transmission project (this project) | The project directly impacts the Durridgere SCA.<br>The Goulburn River National Park, Tuckland State Forest and Cope State Forest are located directly adjacent to the project, but there would be no direct impacts to these areas. |

## Aboriginal heritage

Eight additional relevant future projects were identified that would result in cumulative impacts on Aboriginal heritage in combination with this project. The potential impacts of these projects on Aboriginal heritage sites, places and/or deposits are summarised in Table 5-49. No changes to potential impacts on Aboriginal heritage have been identified for the remaining relevant future projects.

This project would result in direct impacts on 50 Aboriginal sites, places and/or deposits within the construction area, resulting in their complete loss. As described in the EIS, these are dominated by subsurface moderate and high density artefact sites in close proximity to some creek corridors (including Laheys Creek, Sandy Creek, Tallawang Creek and Wilpinjong Creek), rockshelters, grinding grooves and culturally modified trees – some only tentatively classified. Of note would be the potential impacts to AHIMS site ID 36-3-0111, a regionally significant grinding groove site on the

banks of the Talbragar River. The project would also directly impact about 224 hectares of creek banks identified as having sub surface potential. A low-density stone artefact background scatter is considered present across the entire construction area and would also be adversely affected where disturbed.

It is considered that 23 Aboriginal sites of moderate to high significance would be avoided through this process, including Aboriginal sites previously identified in the EIS and newly identified sites. This would result in a 46 per cent reduction in potential impacts on Aboriginal sites for the amended project, including two sites of high significance and 21 sites of moderate significance. This is an increase from the EIS, which predicted only nine sites as being avoidable. Potential direct impacts on 27 of the identified Aboriginal sites (54 per cent) are unlikely to be avoided, including five culturally modified trees, nine high density artefact scatters, 11 moderate density artefact scatters and a background artefact scatter.

This project, in combination with the relevant future projects, would result in a potential cumulative loss of between four to 23 per cent (between five and 16 per cent for the exhibited EIS) of the Aboriginal site types identified within the construction area of this project, which include rockshelters, grinding grooves, culturally modified trees and moderate or high significant stone artefact deposits. The project design and construction methodology would continue to be refined to avoid or reduce impacts to Aboriginal sites of high and moderate significance within the construction area. This project, in combination with the relevant future projects, would also result in the protection of numerous cultural heritage sites avoided through design and construction refinement.

If impacts on the 23 Aboriginal sites, places and/or deposits can be minimised or avoided, no cumulative impacts are expected on Aboriginal heritage as a result of the operation of this project in combination with the relevant future projects, as indicated in the EIS.

Table 5-49 Potential cumulative Aboriginal heritage impacts of the additional relevant future projects assessed during construction

| Project | Distance from project | Aboriginal heritage identified | Significance | Aboriginal heritage to be impacted and/or protected |
|---|---|---|---|---|
| Narragamba solar project | Direct overlap | Desktop information indicates that no previously recorded sites are in the project area with the closest site comprising an isolated stone artefact 850 m to the east. | Yet to be assessed. | Yet to be assessed. |
| Wollar solar farm | Adjacent to project at New Wollar Switching Station | A total of 43 Aboriginal sites identified: 25 isolated finds, 12 artefact scatters, 1 grinding groove site, 1 modified tree, 1 cultural site and 2 previously recorded AHIMS sites. | Low to moderate. | The following sites were subject to impact: 15 isolated finds (60% of site type) and 11 artefact scatters (92% of site type). No impacts to grinding grooves, modified tree or previously recorded AHIMS sites. |
| Bellambi Heights BESS | 4 km south of the middle portion of the project | Isolated stone artefact and two low density artefact scatters. | Low and moderate significance. | No impacts to Aboriginal heritage. |

| Project | Distance from project | Aboriginal heritage identified | Significance | Aboriginal heritage to be impacted and/or protected |
|---|---|---|---|---|
| Goulburn River solar farm | 16 km east of the most eastern section of the project | 11 sites – 1 grinding groove site, 4 stone artefact scatters, and 6 isolated artefacts. | Grinding grooves are of moderate significance.<br>3 artefact scatters and 5 isolated finds are of low significance.<br>2 sites (artefact scatter and isolated find) of moderate significance. | 8 sites to be impacted. The grinding grooves site, 1 artefact scatter (low significance) and an isolated artefact (low significance) will not be harmed. |
| Burrendong wind farm | 18 km southwest of western section of project | 102 sites identified comprising: stone artefact scatters, isolated finds, quarry/outcrop sites. | 6 sites assessed as having moderate or high significance, remaining sites low significance | 35 sites to be impacted: 2 of high significance (an isolated find and artefact scatter); 2 of moderate significance (artefact scatters) and 31 of low significance (isolated finds and artefact scatters). |
| Orana BESS | 37 km west of western section of project | No cultural materials identified; site considered to have low potential for Aboriginal sites. | N/A | N/A |
| Blain Road solar farm | 33 km southeast of central section of project | No Aboriginal heritage assessment available. | N/A | N/A |
| Wilpinjong coal mine Extension and Modification 2 | 1 km northeast of southeastern section of project | 296 sites or Potential Archaeological Deposits (PADs) identified and comprise: open artefact sites, rock shelters, scarred trees, waterhole/well. | 3 sites were identified as having high significance (large site complexes and rock shelters). 3 sites assessed as having moderate significance (rock shelter/s open artefact scatter). The majority of the remaining Aboriginal sites identified as having low significance in local context. | Impacts to sites will vary between three 'development zones'. In Zone 1 impact will be total and substantial across 800 hectares. In Zone 2 impacts are estimated over 50% of the 480 hectare area. There is potential for avoidance of impacts to heritage sites within this zone. For Zone 3 the extent of impacts is unknown at this stage as will be subject to future detailed design. |

## Social

### Construction

Additional impacts have been identified in the cumulative social impact assessment as a result of the identification of additional projects that are relevant to the cumulative social impact assessment. The cumulative impact ratings identified in the EIS remain unchanged.

A summary of this project's contribution to potential cumulative social impacts during construction is provided in Table 5-50 (additional impacts for the amended project are indicated in **bold**). The amended project's contribution to potential cumulative impacts would be unchanged from the EIS, and would range from minimal to moderate. Moderate cumulative impacts are discussed in the sections below.

Table 5-50 Potential cumulative social impacts during construction

| Potential impact | Social locality | Project contribution to cumulative impact |
|---|---|---|
| Detrimental effects to community cohesion | Local | Moderate |
| Diminished short term accommodation and housing affordability and availability | Local | Minimal |
| Impacts to sense of safety due to an influx of non-resident workforce | Local | Moderate |
| Diminished sense of place due to cumulative amenity impacts | Local and regional | Minor |
| Changes to the way people move and work due to perceived road delays and reduced sense of safety | Local | Minimal |
| Local business opportunities and economic stimulus due to project procurement opportunities | Local and regional | Moderate |
| Improved livelihoods due to increased local employment opportunities | Local and regional | Moderate |
| Diminished workforce availability due to increased competition with the project for local employees | Local | Moderate |
| **Tourism impacts due to reduced accommodation and changes to landscape and character** | **Local** | **Minor** |
| **Impacts on landowners livelihoods due to biosecurity risks** | **Local** | **Moderate** |
| Impacts on Aboriginal cultural values | Local | Moderate |
| Impacted capacity of health, food, and social services | Local and regional | Moderate |
| **Potential disruption to essential services** | **Local** | **Minor** |
| **Diminished mental health amongst landowners** | **Local** | **Moderate** |
| Changes to the way people enjoy and connect with the environment | Local | Moderate |
| People's capacity to influence decisions regarding changes that may affect their lives | Local and regional | Moderate |

#### Tourism impacts due to reduced accommodation availability and changes to the landscape and character

It is possible that there would be major cumulative impacts to diminished short term accommodation availability and affordability within the local social locality, however availability at caravan parks, pubs and camping sites would not be affected by the relevant future projects as it is deemed not suitable to host workforce under health and safety standards.

During construction, it is anticipated that hosting landowners and landowners neighbouring project infrastructure (within three kilometres) would experience medium impacts to sense of place associated with changes to amenity (air quality, noise and vibration).

Considering the potential cumulative landscape character and visual impacts during construction across multiple project locations and potential cumulative impacts to wildlife connectivity and habitat corridors, it is possible that some tourists could experience some minor changes to the way they enjoy and connect with the environment and could experience potential constraints to finding accommodation. However, it is unlikely that this would result in a major cumulative impact within the local and regional social locality. This project's contribution to this cumulative impact would be minor considering the project's provision of workforce accommodation and the geographical extent of landscape changes.

### Impacts on landowner's livelihoods due to biosecurity threats

Construction of the relevant future projects has the potential to increase biosecurity risks to local agricultural businesses and farmers. The construction periods of three wind farms (Orana, Valley of the Winds and Liverpool Range), six solar farms (Dapper, Sandy Creek, Cobbera, Tallawang, Birriwa and Narragamba) and one BESS (Bellambi Heights) are likely to overlap with the construction period of this project and would be located near the project.

Technical paper 7 – Social (Technical paper 7) identified that landowners who are hosting project infrastructure would likely experience the most significant risks to biodiversity. While landowners neighbouring project infrastructure would be less likely to experience direct biosecurity risks, there is still the possibility of biosecurity risks from neighbouring construction sites and passing project traffic.

Given that 15 relevant future projects would be located near this project, biosecurity risk to local agricultural business and farmers would increase. This project's contribution to this cumulative impact is moderate considering the geographical extent of this project.

### Potential disruption to essential services (communications, gas and electricity)

Technical paper 7 identified potential disruptions to essential services during construction would take place for a short duration and thus would possibly be experienced as a minimal change resulting in a low unmitigated impact.

The construction periods of 10 of the relevant future projects are likely to overlap with the construction period for this project and would be located near the project. These include three wind farms (Orana, Valley of the winds and Liverpool Range), six solar farms (Dapper, Sandy Creek, Cobbera, Tallawang, Birriwa and Narrangamba) and one BESS (Bellambi Heights). It is possible that some of these projects might require short term disruption to essential services. While it is not clear if all 10 projects would cause service disruptions, the Orana wind farm, Valley of the Winds wind farm, and the Narrangamba solar farm would all require utility adjustments. However, it is anticipated that disruptions will be notified in advanced to impacted communities.

Consequently, it is possible that cumulative disruptions are experienced in the local social locality. This project's contribution to this cumulative impact is considered to be minor considering the limited adjustments required to existing utilities for this project.

### Diminished mental health amongst landowners

Technical paper 7 identified medium unmitigated mental health impacts for landowners hosting infrastructure and high impacts for landowners neighbouring project infrastructure.

Out of the 34 relevant future projects, 15 would be located near the project. These include five wind farms (Spicers Creek, Orana, Barneys Reef, Valley of the Winds and Liverpool Range), eight solar farms (Dapper, Sandy Creek, Cobbera, Tallawang, Birriwa, Narrangamba, Ulan and Wollar solar farms), one BESS (Bellambi Heights) and one mining project (Wilpinjong coal mine Extension and Modification 2)

This means that it is possible that neighbouring landowners to the project and the relevant future projects would experience uncertainty, fear and concerns over changes to their lifestyle, the landscape, project land requirements and the value of their properties.

While the 15 relevant future projects have conducted some level of engagement activities to inform and communicate with landowners, and some of them might also consider providing strategic benefits to landowners hosting and neighbouring project infrastructure (such as the Valley of the Winds wind farm, the Liverpool Range wind farm, and the Sandy Creek solar farm), it is still possible there would be some landowners within the local social locality who might experience cumulative changes to their mental health.

This project's contribution to this cumulative impact is moderate considering the geographical extent of this project.

### Operation

Additional impacts have been identified in the cumulative social impact assessment as a result of the identification of additional projects that are relevant to the cumulative social impact assessment. The cumulative impact ratings identified in the EIS remain unchanged.

A summary of this project's contribution to potential cumulative social impacts during operation is provided in Table 5-51 (additional impacts for the amended project are indicated in **bold**). The amended project's contribution to potential cumulative impacts would be unchanged from the EIS, and would range from minimal to major, with the major impact being a cumulative benefit. Moderate cumulative impacts are discussed in the sections below.

Table 5-51 Potential cumulative social impacts during operation

| Potential impact | Social locality | Project contribution to cumulative impact |
|---|---|---|
| **Unequal distribution of impacts and benefits for landowners neighbouring project infrastructure** | **Local** | **Moderate** |
| **Changes to the way landowners enjoy their properties** | **Local** | **Moderate** |
| **Enhanced landowner social and economic livelihoods associated with the Strategic Benefit Payments Scheme** | **Local** | **Moderate** |
| Livelihood impacts due to property management restrictions or alterations | N/A | Moderate |
| **Changes to community cohesion due to community members leaving the region.** | **Local** | **Minor** |
| Potential disruption to telecommunications in the vicinity of transmission infrastructure, including radio, internet, and television | Local | Minimal |
| Increased renewable energy sources and choices | Regional | Major |
| **Stress amongst landowners due to perceived health and safety risks associated with electromagnetic fields** | **Local** | **Moderate** |
| Stress due to perceived bushfire risk | Local | Moderate |
| **Stress amongst neighbouring landowners due to perceived uncertainty in the local property market** | **Local** | **Moderate** |
| Diminished sense of belonging due to loss of aesthetic values and perceived loss of biodiversity | Local | Moderate |
| Diminished sense of safety due to flooding and drainage changes | Local | Minimal |
| Impact to agricultural land and food production for future generations | Local | Minimal |

### Unequal distribution of impacts and benefits for neighbouring landowners

Technical paper 7 anticipated that landowners neighbouring project infrastructure would experience unequal distribution of impacts and benefits, due to potential heightened impacts to health and wellbeing as well as sense of belonging.

Landowners hosting infrastructure are expected to experience enhanced social and economic livelihoods associated with the Strategic Benefit Payments (SBP) Scheme. Neighbouring landowners are, however, ineligible for the SBP Scheme.

Out of the 34 relevant future projects, 15 have been identified in proximity to the project. This means that it is possible that neighbouring landowners to the project and the relevant future projects would experience uncertainty, fear, and concerns over changes to their lifestyle, the landscape, project land needs and the value of their properties.

While the 15 relevant future projects have conducted some level of engagement activities to inform and communicate with landowners, and some of them might also consider providing strategic benefits to landowners hosting and neighbouring project infrastructure, it is still possible there would be some landowners within the local social locality who might not receive direct benefits from any of the relevant future projects.

Consequently, it is possible that some landowners experience cumulative unequal distribution of impacts and benefits. This project's contribution to this cumulative impact is moderate considering the geographical extent of this project.

There would be no anticipated impact in the regional area associated with this project.

### Changes to the way landowners enjoy their properties

Technical paper 7 found that landowners hosting infrastructure and neighbouring landowners may experience changes to the way they use and enjoy their properties.

Out of the 34 relevant future projects, 15 have been identified near the project. This means that it is possible that neighbouring landowners to the relevant future project and landowners hosting project infrastructure may experience cumulative changes to the way they enjoy their properties if any of these relevant future projects are visible from their properties. This project's contribution to this cumulative impact is moderate considering the geographical extent of this project.

There would be no anticipated impact in the regional area associated with this project.

### Enhanced landowner social and economic livelihoods associated with the SBP Scheme

Technical paper 7 identified that landowners hosting infrastructure would almost certainly experience a moderate change to their social and economic livelihoods associated with SBP Scheme, resulting in a high benefit.

Out of the 34 relevant future projects, 15 would be located near the project. Furthermore, all projects within near the project have areas where the transmission line would intersect their project area (except for the Wilpinjong coal mine Extension and Modification 2). As such, there will likely be some landowners hosting multiple projects within their property boundaries. This means that it is possible that landowners hosting project infrastructure and neighbouring any of the relevant future project may receive additional benefits as result of those projects.

This project's contribution to this cumulative impact is moderate considering the geographical extent of this project.

### Stress amongst landowners due to perceived health and safety risks associated with electromagnetic fields (EMFs)

Consultation with landowners hosting the project identified concern regarding the potential for transmission infrastructure to emit EMFs. Perceived health concerns related to potential EMFs associated with the project could be heightened by the cumulative effect of the four additional proposed wind farm projects within proximity of the project.

Public concerns and negative perceptions of adverse health effects associated with wind farms and EMFs have increased alongside the uptake of renewable energy projects globally. It has been argued that 'these fears have not been based on any actual measurement of EMF exposure surrounding existing projects but appear to follow from worries from internet sources and misunderstanding of the science' (McCallum et al., 2014). While wind turbines do emit low levels of EMFs, the National Health and Medical Research Council's (NHMRC) rapid review of wind turbine health impacts states that the "electromagnetic fields produced by the generation and export of electricity from a wind farm do not pose a threat to public health" (NHMRC, 2010). Despite these findings, the association between wind turbines and health, including impacts associated with the emission of EMFs, is highly debated (Knopper et al, 2014).

It is unlikely that cumulative projects such as solar farms, BESS, transport, and mining extension projects would result in additional concerns of harmful EMF radiation.

However, the operation of the four wind farm projects in proximity may have the potential to heighten concerns regarding health and wellbeing impacts associated with EMFs for those landowners who are neighbouring the relevant windfarms and the project. Given the scale of the project and associated concerns related to transmission infrastructure EMFs, the project is likely to have a moderate contribution to this cumulative impact.

It is unlikely that landowners subject to acquisition of easements through mutual agreement would materialise mental health effects, however this may not be the case for neighbouring landowners, and landowners whose may have sections of their property acquired under a compulsory acquisition process who expressed heightened concerns over this topic.

#### Stress amongst neighbouring landowner due to perceived uncertainty in the local property market

Technical paper 7 identified that it is likely that the project neighbouring landowners may experience stress due to perceived changes to property values, resulting in a high unmitigated impact.

As previously outlined, out of the 34 relevant future projects, 15 of the projects would be located near the project. This means that it is possible that neighbouring landowners to the project and the relevant future projects would experience uncertainty, fear, and concerns over changes to their lifestyle, the landscape, project land needs and the value of their properties.

The project's contribution to this impact is moderate given the geographical extent of this project. There would be no anticipated impact in the regional area associated with this project.

## Economic

### Construction

No changes are expected to potential cumulative economic impacts during construction as described in the EIS.

### Operation

This project in combination with the relevant future projects would have a minor cumulative economic impact as a result of the operational workforce requirements for each project. A peak operational workforce of up to 60 personnel would be required for this project, whereas around 10 personnel, on average, would be required for each of the relevant future projects (based on publicly available environmental assessment documentation). The cumulative operational workforce requirements for this project and the relevant future projects would therefore be around 360 personnel.

Operational jobs for this project and the relevant future projects are typically permanent roles and would likely be sourced from within the Central-West Orana region. Similarly to construction workforce requirements, it is likely to provide opportunities for the existing and future regional workforces, attracting middle-and high-skilled workers and families to regional areas, reducing outmigration of the regional workforce to look for employment in cities, and increase regional labour

force participation in the region. This would result in greater job opportunities in the region, which would provide a substantial boost in direct economic activity in the region as well as flow-on economic activity to businesses that are able to supply the goods and services. It would also help address the jobs growth imbalance between Australia's biggest cities. Since operational jobs are likely to filled by those already residing in the region, population increases and increased demand for housing and other social services is likely to be modest and well within normal ranges.

## Noise and vibration

### Construction

Additional impacts have been identified in the cumulative social impact assessment as a result of the identification of additional projects that are relevant to the cumulative social impact assessment, and the amendments and refinements to the project.

A summary of the potential cumulative noise impacts of this project in combination with the relevant future projects during construction is provided in Table 5-52 (additional impacts are indicated in **bold** and changes to impacts identified in the EIS are indicated in brackets). There is a medium to high risk of cumulative noise impacts during construction of this project, mainly during the transmission line works for this project, which is consistent with the exhibited project. The most substantial cumulative noise impacts would occur near Liverpool Range wind farm, Orana wind farm and Barneys Reef solar farm. The extent and magnitude of cumulative noise impacts are highly dependent on the timing and overlap of individual construction activities.

Table 5-52 Potential cumulative impacts during construction

| Project | Potential cumulative noise impacts with this project | Risk of noise impacts |
|---|---|---|
| **Related development** | | |
| Liverpool Range wind farm | Cumulative noise impacts have been predicted during construction activities at up to 32 receivers (increased from 5 receivers), mainly during the transmission line works for this project. The most substantial noise impacts would occur as a result of the Liverpool Range wind farm construction. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| Valley of the Winds wind farm | Cumulative noise impacts have been predicted during construction activities at up to 11 receivers (increased from 3 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. Exceedances are expected across multiple stages of the wind farm construction, with higher noise levels predicted in the earlier stages. | High (Medium in the EIS) |
| **Narragamba solar farm** | **Cumulative noise impacts have been predicted during construction activities at up to 5 receivers, mainly during the transmission line works for this project. During worst case cumulative noise impacts, levels may be up to 3dB louder than the maximum predicted level from either project.** | **Medium** |
| Barneys Reef solar farm | Cumulative noise impacts have been predicted during construction activities at up to 24 receivers (increased from 18 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High |
| Birriwa solar farm | Cumulative noise impacts have been predicted during construction activities at up to 6 receivers (increased from 4 receivers), mainly during the transmission line works for this project. Noise impacts from the Birriwa solar farm are predicted to be minimal. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| Tallawang solar farm | It is predicted that Tallawang solar farm is likely to meet construction noise criteria, and thus cumulative impacts with this project are unlikely. | Nil |

| Project | Potential cumulative noise impacts with this project | Risk of noise impacts |
|---|---|---|
| Orana wind farm | Cumulative noise impacts have been predicted during construction activities at up to 30 receivers (increased from 15 receivers), mainly during the transmission line works for this project. Noise impacts from the Orana wind farm are predicted to be minimal. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| Cobbora solar farm | Cumulative noise impacts have been predicted during construction activities at up to 5 receivers (increased from 4 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | Medium |
| Sandy Creek solar farm | Cumulative noise impacts have been predicted during construction activities at up to 8 receivers (increased from 4 receivers), mainly during the transmission line works for this project, however substantial impacts have been predicted from the Sandy Creek solar farm construction. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| Dapper solar farm | Cumulative noise impacts have been predicted during construction activities at up to 9 receivers (increased from 5 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| Spicers Creek wind farm | Cumulative noise impacts have been predicted during construction activities at up to 6 receivers (increased from 5 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| **Approved projects** | | |
| **Bellambi Heights BESS** | **Cumulative noise impacts have been predicted during construction activities at up to 2 receivers, mainly during the transmission line works for this project. During worst case cumulative noise impacts, levels may be up to 3 dB louder than the maximum predicted level from either project.** | **Medium** |
| Stubbo solar farm | Cumulative noise impacts have been predicted during construction activities at up to 7 receivers (increased from 5 receivers), mainly during the transmission line works for this project. During worst case cumulative noise impacts, noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High (Medium in the EIS) |
| **Wollar solar farm** | **Cumulative noise impacts have been predicted during construction activities at up to 2 receivers, mainly during the transmission line works for this project. During worst case cumulative noise impacts, levels may be up to 3 dB louder than the maximum predicted level from either project.** | **Medium** |
| **Changes to existing projects** | | |
| Moolarben coal mine OC3 Extension and Moolarben Stage 2 - Modification 4 - UG2 | No cumulative noise impacts are expected due to the distance from these projects from this project (unchanged from EIS). | Nil |
| Ulan coal mine Modification 6 | Cumulative construction noise impacts may be noted at up to 5 receivers (decreased from 22 receivers) primarily during the transmission line works for this project. Under worst case cumulative noise levels may be up to 3 dB louder than the maximum predicted level from either project. Out of hours works at Ulan coal mine may impact two (potentially different) receivers under noise-enhancing meteorological conditions, however noise mitigation measures aim to avoid any work outside of standard hours. | Medium (High in the EIS) |

| Project | Potential cumulative noise impacts with this project | Risk of noise impacts |
|---|---|---|
| Wilpinjong coal mine Extension and Modification 2 | Cumulative noise impacts have been predicted during construction activities at up to 3 receivers, mainly during the transmission line works for this project, however noise impacts from Wilpinjong Coal Mine Extension and Modification 2 are not yet known. Under worst case cumulative noise levels may be up to 3 dB louder than the maximum predicted level from either project. | Medium |

### Operation

Operational cumulative noise impacts would be substantially reduced, due to the increased distance of the project from sensitive receivers as a result of the amendments and refinements.

A summary of the potential cumulative noise impacts of this project in combination with the relevant future projects during operation is provided in Table 5-53 (additional impacts are indicated in **bold** and changes to impacts identified in the EIS are indicated in brackets). There is a low to high risk of cumulative noise impacts during operation, which is consistent with the exhibited project. Cumulative noise impacts would mostly be associated with transmission line infrastructure generating corona noise during mild wet and misty weather conditions, which is expected to be unpredictable and temporary. The most substantial cumulative noise impacts would occur near Ulan coal mine Modification 6 and Barneys Reef solar farm.

Table 5-53 Potential cumulative impacts during operation

| Project | Potential cumulative impacts with this project | Risk of impacts |
|---|---|---|
| **Related development** | | |
| Liverpool Range wind farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 5 receivers were predicted to be impacted in the EIS). | Nil (Medium in the EIS) |
| Valley of the Winds wind farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 2 receivers were predicted to be impacted in the EIS). | Nil (Low in the EIS) |
| **Narragamba solar farm** | **No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects.** | **Nil** |
| Barneys Reef solar farm | Cumulative operational noise impacts may be noted at up to 4 receivers (decreased from 18 receivers), primarily during adverse weather conditions generating coronal noise. Under worst case conditions, cumulative noise levels may be up to 3 dB louder than the maximum predicted impact under either project. | Medium |
| Tallawang solar farm | Cumulative operational noise impacts may be noted at a single property (decreased from 4 receivers), primarily during adverse weather conditions generating coronal noise. Under worse case conditions, cumulative noise levels may be up to 3 dB louder than the maximum predicted impact under either project. | Low (Nil in the EIS) |
| Orana wind farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 15 receivers were predicted to be impacted in the EIS). | Nil (Medium in the EIS) |
| Cobbora solar farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 4 receivers were predicted to be impacted in the EIS). | Nil (Low in the EIS) |
| Sandy Creek solar farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 4 receivers were predicted to be impacted in the EIS). | Nil (Medium in the EIS) |
| Dapper solar farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 5 receivers were predicted to be impacted in the EIS). | Nil (Medium in the EIS) |

| Project | Potential cumulative impacts with this project | Risk of impacts |
|---|---|---|
| Spicers Creek wind farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 5 receivers were predicted to be impacted in the EIS). | Nil (Low in the EIS) |
| **Approved projects** | | |
| **Bellambi Heights BESS** | **No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects.** | **Nil** |
| Stubbo solar farm | No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects (up to 5 receivers were predicted to be impacted in the EIS). | Nil (Low in the EIS) |
| **Wollar solar farm** | **No receivers are predicted to be impacted by cumulative operational noise impacts from these two projects.** | **Nil** |
| **Changes to existing projects** | | |
| Moolarben coal mine OC3 Extension and Moolarben Stage 2 – Modification 4 – UG2 | No cumulative noise impacts are expected due to the distance from these projects from this project (unchanged from the EIS). | Nil |
| Ulan coal mine Modification 6 | For receivers potentially impacted by operational impacts from this project, up to 8 receivers (decreased from 22 receivers) may be impacted by cumulative noise from Ulan coal mine Modification 6 project. Noise impacts from the operation of Ulan coal mine Modification 6 are not yet known. Under worst case conditions, cumulative noise levels may be up to 3 dB louder than the maximum predicted level from either project. | High |
| **Wilpinjong coal mine Extension and Modification 2** | **Cumulative operational noise impacts may be noted at a single property, primarily during adverse weather conditions generating coronal noise. Under worse case conditions, cumulative noise levels may be up to 3 dB louder than the maximum predicted impact under either project.** | **Low** |

## Traffic and transport

### Assessment approach

In addition to the methodology outlined in Section E3 of Appendix E (Cumulative impact assessment) of the EIS, an intersection analysis was undertaken using the SIDRA intersection modelling program, to assess the cumulative traffic impacts on the performance of key intersections along the amended project's construction routes.

Cumulative traffic data from the relevant future projects were obtained and applied using the available information in publicly available environmental assessment documentation. The assessment considered the predicted cumulative construction traffic volumes for the relevant future projects in combination with this project with increased background traffic volumes (using a growth value of 1.6%) applied. Intersection performance during the AM Peak and PM peak periods was compared at 16 intersections along this project's construction routes for the following scenarios:

- existing condition: existing intersection performance with existing background traffic volumes from traffic surveys and estimates (i.e. base case without project construction traffic)
- existing condition with traffic from this project: the performance of the same intersection layout with increased background traffic volumes (growth value of 1.6%) and the predicted construction traffic volumes for this project during the peak construction period
- existing condition with cumulative traffic from this project and the relevant future projects: the performance of the same intersection layout with increased background traffic volumes (growth value of 1.6%), the predicted construction traffic volumes for this project and cumulative traffic volumes from the relevant future projects during the peak construction period.

The assessment was based on the assumption that the peak hour of the peak construction period of all of the relevant future projects would coincide with the peak hour of the peak construction period for this project (the year 2026).

### Construction

Eight additional projects were identified that would utilise construction routes proposed by this project. and were therefore considered in the assessment:

- Narragamba solar farm
- Bellambi Heights BESS
- Goulburn River solar farm
- Burrendong wind farm
- Orana BESS
- Blain Road solar farm
- Wollar solar farm
- Wilpinjong coal mine Extension and Modification 2.

The Wilpinjong coal mine Extension and Modification 2 project is currently in operation and its impacts have been included as part of the baseline conditions in the traffic assessment for this project.

A summary of the potential traffic and transport impacts of the eight additional relevant future projects during construction and operation of this project is provided in Table 5-54. The updated quantitative sensitivity assessment of the predicted mid-block road network performance of the impacted construction routes (i.e. routes impacted by this project and the relevant future projects) is provided in Table 5-55.

Table 5-54 Potential traffic impacts of additional relevant future projects during construction and operation

| Project | Access roads used by project and Central-West Orana Transmission project | Potential traffic impacts | |
|---|---|---|---|
| | | Construction | Operation |
| **Narragamba solar farm**<br>Located along Merotherie Road<br>No road or intersection upgrades are proposed. | Golden Highway, Merotherie Road | The project would generate 250 light vehicles and 100 heavy vehicles per day, which would result in an increase of 125 light vehicle and 10 heavy vehicle movements per hour (inbound to the project area in the morning (AM) peak and outbound in the afternoon (PM) peak). | All scheduled and unscheduled maintenance will generate up to 20 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |
| **Bellambi Heights BESS**<br>Located in Beryl<br>Existing access on Castlereagh Highway proposed to be relocated. | Golden Highway, Castlereagh Highway | The project would generate 40 light vehicles and 40 heavy vehicles per day, which would result in an increase of 20 light vehicle and 4 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | Operational traffic would be minimal and generally only involve the movements of light vehicles. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |

| Project | Access roads used by project and Central-West Orana Transmission project | Potential traffic impacts | |
|---|---|---|---|
| | | Construction | Operation |
| **Goulburn River solar farm**<br>Located southwest of Merriwa.<br>Road upgrades to Ringwood Road and Wollar Road proposed. | Golden Highway, Wollar Road | The project would generate 60 light vehicles, 55 heavy vehicles, 15 buses (mini bus) and 2 OSOM vehicles per day, which would result in an increase of 75 light vehicle and 6 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | All scheduled and unscheduled maintenance will generate up to 20 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |
| **Burrendong wind farm**<br>Located southeast of Wellington.<br>Wind turbine components would be transported to the site from Port of Newcastle, travelling on the Hunter Express, Golden Highway and Castlereagh Highway.<br>No road or intersection upgrades are proposed. | Golden Highway, Castlereagh Highway | The project would generate 125 light vehicles, 57 heavy vehicles per day, which would result in an increase of 63 light vehicle and 6 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | All scheduled and unscheduled maintenance will generate up to 30 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |
| **Orana BESS**<br>Located on northeast of Wellington.<br>No road or intersection upgrades are proposed. | Golden Highway | The project would generate 60 light vehicles, 60 heavy vehicles per day, which would result in an increase of 30 light vehicle and 6 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | All scheduled and unscheduled maintenance will generate up to 12 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |
| **Blain Road solar farm**<br>Located near Hill End Road/Castlereagh Highway intersection near Mudgee.<br>No road or intersection upgrades are proposed. | Castlereagh Highway | The project would generate 50 light vehicles, 4 heavy vehicles per day, which would result in an increase of 25 light vehicle and 1 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | All scheduled and unscheduled maintenance will generate up to 4 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |
| **Wollar solar farm**<br>Located south of Wollar.<br>No road or intersection upgrades are proposed. | Golden Highway, Ulan Road, Ulan-Wollar Road, Wollar Road, Barigan Road | The project would generate 100 light vehicles, 84 heavy vehicles per day, which would result in an increase of 80 light vehicle and 16 heavy vehicle movements per hour (inbound to the project area in the AM peak and outbound in the PM peak). | All scheduled and unscheduled maintenance will generate up to 10 vehicle movements per day, largely comprising light vehicles such as utility vehicles and/or vans. These movements can be readily accommodated on the existing road network and potential cumulative impacts are expected to be minor. |

| Project | Access roads used by project and Central-West Orana Transmission project | Potential traffic impacts | |
|---|---|---|---|
| | | Construction | Operation |
| **Wilpinjong coal mine Extension and Modification 2**<br>Located northeast of Mudgee | Golden Highway, Ulan Wollar Road, Ulan Road, Cope Road | Peak construction traffic is already included in background traffic levels and reducing from year 2024. Therefore, there will be no further increases in traffic generated by this project above those already captured in traffic surveys undertaken and hence no increased cumulative traffic assigned to the road network accordingly. | Operational traffic is already included in background traffic levels and reducing from year 2024. |

Table 5-55 Potential cumulative impacts on road performance during construction

| Route | Road classification | Relevant future projects utilising route in combination with the Central-West Orana Transmission project | Traffic volumes (vehicles per hour) of this project during construction (Level of Service) | | | | Additional peak hour vehicle movements generated by relevant future projects | | | | Cumulative traffic volumes (vehicles per hour) with Central-West Orana REZ Transmission project (Level of Service) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM peak hour | | PM peak hour | | AM peak hour | | PM peak hour | | AM peak hour | | PM peak hour | |
| | | | NB/WB[1] | SB/EB[1] | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB |
| Golden Highway (near Spring Ridge Road, west of Dunedoo), Dunedoo | Highway | • Birriwa solar farm<br>• Burrendong wind farm<br>• Orana battery energy storage | 147 vehicles per hour (vph) (LOS A) | 62 vph (LOS A) | 61 vph (LOS A) | 151 vph (LOS A) | 80 | 1 | 1 | 80 | 227 vph 0.13 (LOS A) | 63 vph 0.04 (LOS A) | 62 vph 0.03 (LOS A) | 231 vph 0.13 (LOS A) |
| Golden Highway (between Ulan Road and Merotherie Road), Uarbry | Highway | • Valley of the Winds wind farm<br>• Liverpool Range wind farm<br>• Narragamba solar farm<br>• Bellambi Heights battery energy storage<br>• Burrendong wind farm<br>• Orana battery energy storage<br>• Birriwa solar farm | 122 vph (LOS A) | 42 vph (LOS A) | 46 vph (LOS A) | 110 vph (LOS A) | 325 | 56 | 56 | 325 | 447 vph 0.25 (LOS A) | 98 vph 0.05 (LOS A) | 102 vph 0.06 (LOS A) | 435 vph 0.24 (LOS A) |
| Castlereagh Highway (between Golden Highway and Tucklan Road), Birriwa | Highway | • Birriwa solar farm<br>• Bellambi Heights battery energy storage<br>• Blain Road solar farm | 34 vph (LoS A) | 86 vph (LoS A) | 83 vph (LoS A) | 39 vph (LoS A) | 9 | 118 | 118 | 9 | 43 vph 0.02 (LOS A) | 204 vph 0.11 (LOS A) | 201 vph 0.11 (LOS A) | 48 vph 0.03 (LOS A) |
| Castlereagh Highway (north of Laheys Creek Road), Beryl | Highway | • Tallawang solar farm<br>• Bellambi Heights battery energy storage<br>• Blain Road solar farm | 36 vph (LOS A) | 91 vph (LOS A) | 89 vph (LOS A) | 50 vph (LOS A) | 7 | 106 | 106 | 7 | 43 vph 0.02 (LOS A) | 197 vph 0.11 (LOS A) | 195 vph 0.11 (LOS A) | 57 vph 0.03 (LOS A) |

| Route | Road classification | Relevant future projects utilising route in combination with the Central-West Orana Transmission project | Traffic volumes (vehicles per hour) of this project during construction (Level of Service) | | | | Additional peak hour vehicle movements generated by relevant future projects | | | | Cumulative traffic volumes (vehicles per hour) with Central-West Orana REZ Transmission project (Level of Service) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM peak hour | | PM peak hour | | AM peak hour | | PM peak hour | | AM peak hour | | PM peak hour | |
| | | | NB/WB[1] | SB/EB[1] | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB | NB/WB | SB/EB |
| Merotherie Road (south of Golden Highway) | Local road | • Birriwa solar farm<br>• Barneys Reef solar farm<br>• Narragamba solar farm | 8 vph (LOS A) | 67 vph (LOS A) | 67 vph (LOS A) | 8 vph (LOS A) | 3 | 161 | 161 | 3 | 11 vph 0.01 (LOS A) | 228 vph 0.23 (LOS A) | 228 vph 0.23 (LOS A) | 11 vph 0.01 (LOS A) |
| Cope Road (between Blue Springs Road and Springwood Park Road) | Main road | • Stubbo solar farm | 61 vph (LOS A) | 111 vph (LOS A) | 51 vph (LOS A) | 96 vph (LOS A) | 218 | 24 | 24 | 218 | 279 vph 0.20 (LOS A) | 135 vph 0.10 (LOS A) | 75 vph 0.05 (LOS A) | 314 vph 0.22 (LOS A) |
| Ulan Road near Ulan | Main road | • Stubbo solar farm<br>• Wollar solar farm | 455 vph (LOS B) | 197 vph (LOS A) | 241 vph (LOS A) | 199 vph (LOS A) | 110 | 218 | 218 | 110 | 565 vph 0.40 (LOS B) | 415 vph 0.30 (LOS B) | 459 vph 0.33 (LOS B) | 309 vph 0.22 (LOS A) |

1. NB = Northbound; WB = Westbound; SB = Southbound; EB = Eastbound

#### Intersection performance

The results of the intersection analysis are provided in Appendix A of Appendix L (Updated Cumulative Impact Assessment).

The intersection analysis indicates that for the majority of the 16 assessed intersections, the predicted traffic conditions during the construction of this project in combination with the relevant future projects would be similar to predicted traffic conditions during construction of this project, with most intersections operating at LoS A and LoS B, and some intersections operating at LoS C. For some intersections, there is a decrease in performance when considering the cumulative traffic impacts from the relevant future projects in combination with this project. However, most intersections would still operate at LoS A, LoS B or LoS C under cumulative traffic conditions, with only two intersections, the Ulan Road/Cope Road (Main Street) and Ulan Road/Ulan-Wollar Road intersections, performing at LoS D during the AM peak (which is considered typically acceptable by Transport for NSW). It is important to note:

- the majority of the access intersections required for this project would only be used temporarily during construction for a short duration of time. Once this project is operational, the majority of these intersections would revert back to existing or similar traffic conditions, unless they would be used for maintenance and operation access
- the assessment is based on the assumption that all of the 18 relevant future projects would proceed, and that the peak periods of the peak construction period for all of the projects assessed would coincide with the peak periods of the peak construction period for this project, if they do proceed.

### Operation

No changes are expected to potential cumulative impacts on traffic and transport during operation as described in the EIS.

## Surface water and groundwater supply

### Construction

One additional project, the Narragamba solar farm, has been identified that would have a substantial water demand overlap with the amended project during the construction phase. However, the solar farm project is proposing to source water from commercially treated wastewater, and opportunistically from farm dams within the study area as agreed with landowners hosting project infrastructure, and is therefore not expected to contribute to cumulative impacts on surface water supplies. Therefore the potential cumulative impacts of the amended project and the relevant future projects on surface water and groundwater supply remain unchanged from the EIS.

### Operation

No changes are expected to potential cumulative impacts on surface water and groundwater supply during operation as described in the EIS.

## Air quality

### Construction

Two additional projects have been considered for potential operational cumulative air quality impacts, to reflect the updated list of relevant future projects. The amendments and refinements would increase the distance of the project from sensitive receivers in a number of locations, and would reduce the potential air quality impacts of the amended project (refer to Section 5.14.3), and therefore also reduce the potential cumulative air quality impacts of the project.

An updated summary of the potential cumulative air quality impacts of the amended project in combination with the relevant future projects is provided in Table 5-56 (additional projects considered indicated in **bold**). Consistent with the EIS, the highest potential for cumulative air quality impacts is in the western section of this project, where construction activities for several related development projects may overlap with this project.

Table 5-56 Potential cumulative air quality impacts during construction

| Relevant future project | Cumulative air quality impacts |
|---|---|
| **Related development** | |
| Liverpool Range wind farm | Potential for cumulative impacts given the potential for direct overlap during construction along the Cassilis connection and switching station M1. There is the potential for 2 sensitive receivers to be affected by cumulative air quality impacts from this project and the wind farm project. |
| **Narragamba solar farm** | **Potential for cumulative impacts given the potential for direct overlap during construction of switching station M4 and the New Wollar Switching Station — Merotherie Energy Hub connection. There is the potential for 2 sensitive receivers to be affected by cumulative air quality impacts from this project and the wind farm project. Depending on construction overlap there is also the potential for cumulative impacts from construction works at the Barneys Reef wind farm.** |
| Barneys Reef wind farm | Potential for cumulative impacts given the potential for direct overlap during construction of switching stations M4, M5, M6 and M8 and the Merotherie Energy Hub. There is the potential for 3 sensitive receivers to be affected by cumulative air quality impacts from this project and the wind farm project. Depending on construction overlap there is also the potential for cumulative impacts from construction works from the adjacent Narragamba solar farm. |
| Birriwa solar farm | Potential for cumulative impacts given the potential for direct overlap during construction of switching station M5. There is the potential for 2 sensitive receivers to be affected by cumulative air quality impacts. There is also the potential for cumulative air quality impacts at one receiver depending on the timing and location of construction works at Barneys Reef wind farm (located around 4.2 km to the northwest boundary of Birriwa solar farm). |
| Tallawang solar farm | Potential for cumulative impacts given the potential for direct overlap during construction of switching station M9 and associated transmission line. There is the potential for 1 sensitive receiver to be affected by cumulative air quality impacts. There is also the potential for cumulative impacts from construction works from the adjacent Barneys Reef wind farm depending on construction overlap. |
| Cobbora solar farm | Potential for cumulative impacts given the potential for direct overlap during construction of the Elong Elong Energy Hub, switching stations E1 and E2 and associated transmission line. There is the potential for 1 sensitive receiver to be affected by cumulative air quality impacts. Depending on construction overlap there is also the potential for cumulative impacts from construction works at the adjacent Sandy Creek solar farm and nearby Dapper solar farm and Spicers Creek wind farm. |
| Dapper solar farm | Potential for cumulative impacts given the potential for direct overlap during construction of switching station E3 and its associated transmission line and the transmission line connecting to switching station E4. There is the potential for 2 sensitive receivers to be affected by cumulative air quality impacts. Depending on construction overlap there is also the potential for cumulative impacts from construction works at the adjacent Sandy Creek solar farm and Spicers Creek wind farm, and the nearby Cobbora solar farm. |
| **Approved projects** | |
| **Wollar solar farm** | **Potential for cumulative impacts given the potential for direct overlap during local road upgrades near the New Wollar Switching Station. There is the potential for 1 sensitive receiver to be affected by cumulative air quality impacts.** |
| Stubbo solar farm | Potential for cumulative impacts given the potential for direct overlap during construction of the New Wollar Switching Station — Merotherie Energy Hub connection. There is the potential for 2 sensitive receivers to be affected by cumulative air quality impacts. There is also the potential for cumulative air quality impacts at 1 of these receivers depending on the timing and location of construction works at the adjacent Narragamba solar farm and nearby Barneys Reef wind farm (located around 3.5 km to the northwest boundary of Stubbo wind farm). |

| Relevant future project | Cumulative air quality impacts |
|---|---|
| **Changes to existing projects** | |
| Ulan coal mine Modification 6 | Potential for cumulative impacts given the potential for direct overlap during construction of the transmission line extending northeast of the Merotherie Energy Hub. There is the potential for 1 sensitive receiver to be affected by cumulative air quality impacts. |

### Operation

Potential air quality impacts of the amended project during operation would remain minimal, as described in the EIS.

## 5.15.3 Management of impacts

No changes to the management approach identified in Section 20.3 of the EIS are required to address the potential cumulative impacts of the amended project.

# 6 Justification of amended project

This chapter provides the reasons justifying the carrying out of the amended project, considering the environmental, social and economic impacts assessed in this Amendment Report and the requirements of the EP&A Regulation. The justification incorporates the strategic need for the amended project, demonstrates how the project objectives are achieved and provides an evaluation of the overall findings of the Amendment Report, including how it addresses the relevant statutory requirements.

## 6.1 Statutory considerations

The Central-West Orana REZ Transmission project is CSSI and is subject to assessment and approval from the NSW Minister for Planning and Public Spaces in accordance with Part 5, Division 5.2 of the EP&A Act. The project is also a controlled action under the EPBC Act and requires approval from the Australian Minister for the Environment and Water. In determining that the project is a controlled action, the Australian Government DCCEEW advised that the project will be assessed in accordance with the NSW Assessment Bilateral Agreement under Part 9 of the EPBC Act.

An EIS was prepared to address the requirements of Division 5.2 of the EP&A Act, the SEARs and Supplementary SEARs and Division 5, Part 8 of the EP&A Regulation. The EIS was placed on public exhibition by the DPE between 28 September 2023 and 8 November 2023, and submissions were invited from government agencies, stakeholders and the community.

Since the exhibition of the EIS, EnergyCo has refined the reference design for the project. As described in this report, a number of the amendments are proposed to respond to the issues raised by the community and stakeholders and to avoid and minimise potential environmental impacts. This Amendment Report has been prepared for the purposes of clause 179(3) of the EP&A Regulation, to describe and assess the potential impacts of the amended project and to identify how those impacts would be managed and mitigated. This Amendment Report would be provided to DPE and DCCEEW as part of the package of information to allow them to make their determination regarding the project.

The amendments include changes to the 500 kV and 330 kV transmission line alignments and some 330 kV switching station locations, brake and winch sites, microwave repeater sites, and the provision of a construction compound at the Neeleys Lane workforce accommodation camp. Refinements to the exhibited project include the removal of the option for a BESS at the Merotherie Energy Hub, minor changes to access tracks and local road and intersection upgrades, and the provision of crushing, grinding and screening plant at switching station M1.

Some of the amendments and refinements would introduce new impacts on MNES outside of the referral area (refer to Section 4.2). In order to capture these additional impacts, an application under section 156A of the EPBC Act will be submitted to the DCCEEW (Cth) requesting a variation to the proposal contained in the original EPBC referral.

The variation request will include all relevant information prescribed by section 5.08 of the Environment Protection and Biodiversity Conservation Regulations 2000, and identify the new impacts to MNES as a result of the applicable amendments compared to the original proposal described in the EPBC referral.

A separate Submissions Report has been prepared that includes consideration of the issues raised by the community, stakeholders and government agencies in their submissions and agency advice.

The amendments and refinements relate to and address some of the issues raised within submissions and during consultation, including the potential for property and biodiversity impacts. A description of, and justification for, the amendments and refinements is provided in Chapter 3 (Description of amendments) of this report.

The revised statutory compliance requirements for the project, considering the amendments and refinements, are provided in Appendix D (Updated statutory compliance table).

The proposed amendments do not change the permissibility of the project or its declaration as critical State significant infrastructure. The assessment and approval requirements under the EP&A Act, including pre-conditions and mandatory considerations, are described in sections 4.2 and 4.3 of the EIS.

In addition to the approvals identified in the EIS, an EPL under the POEO Act is likely to be required as the crushing, grinding or separating of materials for the amended project are likely to exceed the thresholds in Schedule 1 of the POEO Act.

The amended project includes the following key amendments and refinements:

- changes to the 500 kV and 330 kV transmission line alignments
- relocating five 330 kV switching stations and providing an additional 330 kV switching station
- a construction compound at the Neeleys Lane workforce accommodation camp, including materials storage and laydown facilities
- additional brake and winch sites (to facilitate transmission line conductor installation) and changes to the location of brake and winch sites identified as part of the exhibited project
- confirming the locations of microwave repeater sites
- refining the alignments of access roads at the energy hubs and New Wollar Switching Station
- refining the alignments of access tracks and providing additional access tracks along and to the transmission lines
- refining the alignment and design of local road and intersection upgrades, including bridge and drainage works
- removing the option for one 200 megawatts/400 megawatts per hour battery energy storage system (BESS) at the Merotherie Energy Hub as a replacement for a synchronous condenser
- adding crushing, grinding and screening plant at switching station M1, at the end of the Cassilis connection.

## 6.2 Strategic considerations

The Australian Government is committed to coordinated global action to reduce greenhouse gas emissions in line with the Paris Agreement and has set targets to reduce emissions by 43 per cent below 2005 levels by 2030 and to net zero by 2050. Independently, the NSW Government has set a goal to achieve net-zero emissions by 2050 (DPIE, 2020a). Achieving these goals requires transformative low emissions technologies to be deployed at scale across all sectors of the economy, including the electricity generation sector which is currently Australia's largest source of greenhouse gas emissions (Climate Change Authority, 2020).

Coal-fired generation is being withdrawn faster than anticipated (AEMO, 2022), due to large coal-fired power plants closing ahead of originally anticipated retirement dates. This highlights the urgent need to develop and connect new renewable energy projects to the National Electricity Market (NEM), to continue to have enough energy to meet future demand, while meeting Australia's carbon emissions policy commitments.

The Central-West Orana REZ was formally declared on 5 November 2021 under the *Electricity Infrastructure Investment Act 2020* (NSW). As NSW's first REZ, the Central-West Orana REZ will play a pivotal role in underpinning NSW's transition to a clean, affordable and reliable energy sector. The Central-West Orana REZ declaration (November 2021) provides for an initial intended network capacity of three gigawatts. The NSW Government is proposing to amend the declaration to increase the intended network capacity to six gigawatts, which would allow for more renewable energy from solar, wind and storage projects to be distributed through the NSW transmission network.

Current interest in new energy generation projects in the NEM exceeds the existing transmission network capacity in several locations, meaning that not all projects would be able to connect to the network. The existing transmission network is not capable of transferring the scale of new electricity generation identified for the Central-West Orana REZ. Development of new electricity generation and storage projects in the Central-West Orana REZ will require new high voltage transmission infrastructure in the region.

The project would enable 4.5 gigawatts of new network capacity to be unlocked initially, which would allow for more renewable energy from solar, wind and storage projects to be distributed through the NSW transmission network. Other transmission infrastructure beyond the scope of the EIS would be required to provide a network capacity beyond 4.5 gigawatts, and would be subject to separate planning approval.

The transition towards renewable energy technology responds to the need to reduce the emission intensity of the electricity sector and to secure alternatives sources of electricity supply to replace coal-fired power, which is scheduled to withdraw from the NEM. Investment in renewable energy projects is focused on regional areas of NSW with the best renewable energy resources. To enable new renewable energy generation to connect to the existing electricity network and to supply clean and affordable electricity to end users, investment in new transmission infrastructure is needed. Projects such as the Central-West Orana REZ Transmission project will strengthen the transmission infrastructure in regional locations and facilitate continued investment in renewable energy.

The amendments and refinements are not considered to change the strategic merit of the project as outlined in the EIS.

## 6.3 Biophysical, economic and social considerations

The project, including the amendments and refinements identified in this Amendment Report, have been developed, 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 project would aim to further avoid and minimise potential impacts on the local and regional environment, and the local community, where practicable.

A project of this scale would inevitably have some impacts on the local environment and community, particularly during construction. The EIS was prepared to assess the potential impacts of the project and develop measures to mitigate the impacts and enhance the benefits of the project. This Amendment Report was prepared to describe and assess the amendments and refinements to the project.

Although the amended project would result in some potential additional impacts compared to the exhibited project, the amended project overall would result in reduced impacts or overall benefits when compared to those assessed in the EIS. The changes to impacts associated with the amended project compared to those described in the EIS are described in the following sections.

To avoid, minimise or manage the potential impacts identified as a result of the amended project, a suite of revised mitigation measures have been identified to guide detailed design, and to manage the construction and operational phases of the project (refer to Appendix E (Updated mitigation measures)). The mitigation measures have been updated to respond to the issues raised in submissions and during ongoing engagement with the community and key stakeholders, and to take in account additional assessment since the EIS was exhibited. With the implementation of the proposed revised mitigation measures, the potential environmental impacts of the amended project are considered to be effectively mitigated.

### 6.3.1 Summary of biophysical impacts

Consistent with the exhibited project, the most significant impact to the biophysical environment arising from the amended project would be on biodiversity due to the extent of vegetation clearing required to facilitate construction and operation of the project. Construction of the amended project would result in direct impacts to around 1,227 hectares of native vegetation, including 26 plant community types (PCT), which constitutes an increase of around 195 hectares from the EIS. Three of the 22 PCTs expected to be impacted are listed as TECs listed under the *Biodiversity Conservation Act 2016* (BC Act) (decreased from four PCTs in the EIS) and two are listed as TECs under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (decreased from three PCTs in the EIS). Consistent with the EIS, two of the three impacted TECs are listed as being at risk of serious and irreversible impact. In addition, construction of the amended project has the potential to directly impact 30 threatened flora and fauna species, or their habitats, compared to 33 in the EIS. Potential indirect impacts on biodiversity and potential impacts on aquatic ecology during construction, and impacts on biodiversity during operation, are consistent with the impacts identified in the EIS.

Biodiversity offsets would be required for impacts to PCTs, threatened species and/or populations, as identified in the EIS. Offsets would be secured in stages to reflect the progressive delivery of the 500 kV and 330 kV network infrastructure. The final offset requirements, strategy and proposed delivery approach would be confirmed by EnergyCo during detailed design and once the final construction area is confirmed.

Other biophysical impacts include potential impacts to flood behaviour and geomorphology of watercourses, due to the construction of two new bridges as part of local road and intersection upgrades. Design measures would be adopted during detailed design that are aimed at managing scour potential within the road corridor and controlling external catchment runoff.

Potential hazards during construction of the project would be temporary and associated with flood risk and flood behaviour and the use, storage and transportation of low volumes of dangerous goods and hazardous materials, due to the construction of the new bridges and the provision of a construction compound at the Neeleys Lane workforce accommodation camp. Mitigation measures, such as considering flood risk and flood behaviour in the design of construction work area layouts and staging, and procedures for the safe handling and storage of dangerous goods, would be implemented to minimise these risks during construction.

### 6.3.2 Summary of economic impacts

Construction and operation of the amended project would provide positive economic activity to the regional and NSW economy.

The amended project would result in a small decrease (of around 2.3 per cent) in the estimated loss of agricultural productivity identified in the EIS during construction. As such, the amended project would reduce the total productivity from around $1.35 million per year to around $1.32 million per year (over a three year period). This loss is equivalent to around 0.2 per cent of the total gross value of agricultural production across the four impacted LGAs.

Likewise, the amended project would result in a small decrease (of around 10 per cent) in the estimated agricultural productivity loss during operation. As such, the amended project would reduce the estimated agricultural productivity from around $317,550 per year to around $285,900 per year (over a one year period). This loss is equivalent to around 0.04 per cent of the total gross value of agricultural production across the four impacted LGAs.

### 6.3.3 Summary of social impacts

The potential social impacts of the amended project, such as way of life, livelihood, community, accessibility, health and wellbeing, culture, surroundings and decision making systems, would remain unchanged from the EIS.

### 6.3.4 Ecologically sustainable development

The project, including the amendments and refinements identified in this Amendment Report, is consistent with the four principles of ecologically sustainable development outlined in clause 193 of the EP&A Regulation.

#### Precautionary principle

The precautionary principle (as defined as in clause 193(2) of the EP&A Regulation) provides that '...if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'. In applying the precautionary principle, public and private decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment
- an assessment of the risk-weighted consequences of various options.

Additional biodiversity and Aboriginal heritage field investigations were undertaken for the amended project with the aim of gathering data on changes to the existing environmental condition of the amended project and surrounding land, due to the amended project design. This field data, along with desktop data, has informed the impact assessments of the amended project, including the evaluation of the environmental risks of alternative options with the aim to avoid or minimise potential impacts as far as reasonably practicable.

The assessments undertaken and documented in this Amendment Report and technical papers are consistent with accepted scientific and assessment methodologies and have considered relevant statutory and agency requirements and guidelines. Where uncertainties were identified in assessment, a conservative approach was applied. For example:

- where access constraints have limited ecology survey coverage of the additional amended project footprint (around eight per cent), the assessment has assumed presence for threatened species or has relied upon existing mapping and aerial photography for PCTs until surveys can be completed
- where the final construction methodology is to be determined, the most conservative assumptions have been used in the noise modelling and vibration assessment for construction and operation.

Consistent with the EIS, the assessment of potential biodiversity impacts considered the potential direct and indirect impacts of the amended project on native vegetation and habitats, threatened species, protected areas and key threatening processes. This included assessment of potential serious and irreversible impacts (SAII) on threatened species, populations, or ecological communities.

Two of the three TECs within the amended project footprint are listed as being at risk of serious and irreversible impact, and direct impacts to one EPBC listed TEC (White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland) are identified as being potentially significant. Two threatened flora species, *Euphrasia arguta* and *Indigofera efoliata*, assumed to be present in the amended construction area are identified as being at risk of an SAII. Three threatened fauna species are also identified as being at risk of an SAII. This includes two threatened microbat species (Eastern Cave Bat (*Vespadelus troughtoni*) and Large-eared Pied Bat (*Chalinolobus dwyeri*)) and the Regent Honeyeater (*Anthochaera phrygia*).

The amended project would impact some areas within 100 metres of potential breeding habitat for two threatened microbat species, which would comprise potential foraging habitat only.

The amended project would impact around 111 hectares of mapped 'important habitat' for the Regent Honeyeater, which represents around 0.33 per cent of the species' geographical range. This would result in localised fragmentation of the species habitat. However, the population is not currently considered to be severely fragmented (based on EPBC Act criteria and regulations), and therefore there is no evidence that the population would become unviable as a result of the amended construction area.

Mitigation and management measures from the EIS have been amended, where appropriate, to minimise and manage potential impacts of the amended project where impacts have not been able to be avoided. Based on the assessments undertaken in the Amendment Report, including the application of mitigation measures, the amended project is not anticipated to result in serious or irreversible damage to the environment.

## Intergenerational equity

The principle of inter-generational equity (as defined in clause 193(4) of the EP&A Regulation) provides that '…the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.'

The project, including the amendments and refinements identified in this Amendment Report, would support the transition of the NSW Transmission System (as part of the NEM) from traditional energy sources to lower emission alternatives based on renewable energy. Reduction of greenhouse gas emissions is a key strategy in slowing the effects of climate change for future generations.

The project would also facilitate the development of the Central-West Orana REZ to meet current bulk energy demands and enable efficient expansion to meet future demand. Improving the reliability of the NEM would benefit current and future generations.

Although the amended project would still result in environmental and social impacts, particularly during construction, the important role of the project in relation to emissions reduction and security of energy supply would benefit current and future generations and help to facilitate intergenerational equity.

## Conservation of biological diversity and ecological integrity

The principle of conservation of biological diversity and ecological integrity (as defined in clause 193(5) of the EP&A Regulation) provides that '…the conservation of biological diversity and ecological integrity should be a fundamental consideration.'

A revised biodiversity assessment was undertaken in accordance with the Biodiversity Assessment Method (DPIE, 2020b) to identify potential adverse impacts on biodiversity. Consistent with the exhibited project, the amended project would result in the clearing of vegetation to facilitate construction and maintain asset protection zones and easements to meet operational safety requirements, including bushfire risk management. The amended construction and operation areas have been refined throughout the development of the amended project to minimise this impact as much as is feasible, and to conserve native vegetation and fauna habitat as far as practicable, while endeavouring to balance the potential for limitations to the project delivery and safe operation. Mitigation measures from the EIS have been amended to minimise and manage significant impacts on native vegetation and flora and fauna. Biodiversity offsets would be implemented to address the impacts that cannot be avoided.

### Improved valuation, pricing and incentive mechanisms

The principle of improved valuation, pricing and incentive mechanisms (as defined in clause 193(6) of the EP&A Regulation) provides that environmental factors should be included in the valuation of assets and services such as:

- polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement
- the users of goods and services should pay prices based on the full life cycle of the costs of providing the goods and services, including the use of natural resources and assets and the ultimate disposal of waste.

Established environmental goals should be pursued in the most cost effective way by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Mitigation measures to minimise and avoid impacts during construction and operation identified in the EIS have been revised (where appropriate) in this Amendment Report. The amendment and implementation of these measures signifies that environmental resources have been included in the valuation of assets and services in the design and assessment of the amended project.

The reference design for the amended project has been developed with an objective of minimising potential impacts on the surrounding environment. The extra cost of designs, project elements, management measures and impact offset or mitigation packages, selected to avoid and minimise environmental and/or social impacts, are included in the total estimated amended project cost.

The costs of design development, mitigation measures and biodiversity offsets, adopted to avoid and minimise environmental and/or social impacts, are included in the total estimated amended project cost.

## 6.4 Justification and conclusion

The amended project comprises the construction and operation of new electricity transmission infrastructure and new energy hubs and switching stations within the Central-West Orana REZ. The amended project would enable 4.5 gigawatts of new network capacity to be unlocked initially. It would enable renewable energy generators within the Central-West Orana REZ to access the new transmission infrastructure to export electricity to the rest of the network. Other transmission infrastructure beyond the scope of the amended project would be required to provide a network capacity beyond 4.5 gigawatts and would be subject to separate planning approval. As such, the amended project is critically important in securing new sources of electricity to replace coal-fired power and in supporting NSW and Commonwealth Government climate change commitments to reduce emissions in the electricity sector, benefitting current and future NSW residents through the provision of a clean, affordable and secure source of electricity.

Projects of this scale and geographical spread inevitably have impacts on the local environment and community, particularly during construction. A number of competing environmental, social and technical constraints are present which have required the adoption of a balanced approach to corridor planning to determine the most appropriate project alignment.

The most significant impact to the biophysical environment from the amended project would be on biodiversity due to the additional vegetation clearing required. While efforts have been made to avoid biodiversity impacts, some impacts have not been able to be avoided and would be addressed through biodiversity offsets. Impacts to flood behaviour and geomorphology of watercourses have the potential to occur during construction of the amended project, however they would be minimised through design measures to manage runoff and minimise flood risk. The amended project is not anticipated to cause impacts that would lead to serious and irreversible environmental damage.

The potential social impacts of the amended project, such as way of life, livelihood, community, accessibility, health and wellbeing, culture, surroundings and decision making systems, would remain unchanged from the EIS.

Construction and operation of the amended project would provide positive economic activity to the regional and NSW economy.

The amended project would result in a small decrease (of around 2.3 per cent) in the estimated loss of agricultural productivity identified in the EIS during construction. This loss is equivalent to around 0.2 per cent of the total gross value of agricultural production across the four impacted LGAs. Likewise, the amended project would result in a small decrease (of around 10 per cent) in the estimated agricultural productivity loss identified in the EIS during operation. This loss is equivalent to around 0.04 per cent of the total gross value of agricultural production across the four impacted LGAs.

A range of mitigation measures identified in Appendix E of this Amendment Report would be implemented during construction and operation to manage and minimise potential impacts.

The amended project is consistent with the principles of ecologically sustainable development identified in the EP&A Regulation as detailed below:

- Precautionary principle: through the integration of environmental considerations into the amended project development and design, the amended project would not cause serious or irreversible environmental damage. The assessment of potential environmental impacts of the amended project area has drawn on a combination of desktop data and additional field investigations which reduces the level of uncertainty of potential impacts.
- Intergenerational equity: the important role of the amended project in relation to emissions reduction and security of energy supply would benefit current and future generations and help to facilitate intergenerational equity.
- Conservation of biological diversity and ecological integrity: while the amended project would result in additional impacts to native vegetation, given its scale and geographic spread, the development of the amended project has sought to avoid areas of high biodiversity value by locating the alignment in previously disturbed areas where possible. Refinement of the design has sought to further minimise biodiversity impacts with biodiversity offsets required for those impacts that cannot be avoided or mitigated.
- Improved valuation, pricing and incentive mechanisms: the costs of amended design development, amended mitigation measures and biodiversity offsets, adopted to avoid and minimise environmental and/or social impacts, are included in the total estimated amended project cost, such that the amended projects are internalised within the amended project cost and act as an incentive to reduce impacts.

Having regard to all of the matters considered in this Amendment Report, it is considered that the amended project is justified, as the need for, and the benefits of the amended project would outweigh the residual impacts.

During the continued development of the amended project design and the construction methodology, opportunities to further minimise potential impacts would be sought and ongoing input from stakeholders and the community would be considered. The potential residual construction and operational impacts of the amended project are considered manageable with the implementation of the amended mitigation and management measures.

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