EnergyCo

Central-West Orana Renewable Energy Zone Transmission project

Amendment Report

Appendix F: Landscape Character and Visual Impact Assessment Addendum

March 2024

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Central-West Orana Renewable Energy Zone Transmission Project

Addendum to Technical Paper 3: Landscape Character and Visual Impact Assessment Addendum

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Addendum to Technical Paper 3: Landscape Character and Visual Impact

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Author: IRIS Visual Planning + Design prepared for WSP

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Date	Version	Prepared by	Checked by	Reviewed by
04/03/2024	For DPHI Lodgement	Suzie Rawlinson Flora Wehl	Suzie Rawlinson	Ben Groth

Digital Data Sources

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Surface analysis: 1 second SRTM Derived Hydrological (DEM-H) version 1.0: Geoscience Australia 2011
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Summary

This addendum to Technical Paper 3: Landscape Character and Visual Impact Assessment, has been prepared to support and inform the Amendment Report (AR) for the amended project.

It contains a revised assessment of the potential landscape character and visual impact from the construction and operation of the Central-West Orana Renewable Energy Zone Transmission project including proposed amendments (the amended project).

The impacts have been assessed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued by the then NSW Department of Planning and Environment (now the NSW Department of Planning, Housing and Infrastructure (DPHI) and against the relevant legislation and guidelines as they apply to landscape character and visual amenity.

Project overview

A series of design amendments and refinements have been completed after the public exhibition of the EIS. In response to further community engagement, consideration of submissions, and ongoing design and construction methodology development, these amendments and refinements provide functional improvements to the design and alignment. They also confirm certain elements of the project that were highlighted as options or opportunities in the EIS. The proposed amendments would minimise the potential impacts of the project where practicable, particularly in relation to land use and property, traffic and access, and biodiversity, and would better align with the project objectives.

Legislative and policy context

Impacts to landscape character and visual amenity from construction and operation of the exhibited project have been assessed with consideration of the relevant legislation and guidelines that were available when the SEARs were issued. These include:

- Guideline for Landscape Character and Visual Impact Assessment EIA-N04, Transport for NSW, 2020
- Guidance Note for Landscape and Visual Assessment, Australian Institute of Landscape Architects Queensland, 2018
- Large-Scale Solar Energy Guideline, Technical Supplement Landscape Character and Visual Impact, Department of Planning and Environment 2022
- Guidelines for Landscape and Visual Impact Assessment, Third Edition, Landscape Institute and Institute of Environmental Management & Assessment, 2013.

Since the preparation of the EIS, a Draft Transmission Guideline, Technical Supplement for Landscape and Visual Impact Assessment (November 2023) has been placed on exhibition by the then NSW DPE (now DPHI). This draft guideline does not apply to the methodology or assessment of this project, which is assessed against the SEARs issued for the project in 2022. However, following the release of this guideline, a review of the guidelines was undertaken and a sample of the results of this assessment were compared against the proposed new guidelines for visual impacts. This review has confirmed that the results of the visual assessment undertaken for the exhibited project were generally consistent with, or more conservative than the assessment would be if the visual impact assessment was undertaken in accordance with the proposed draft guidelines and technical supplement. As the new guidelines are in draft form and do not apply to the amended project, the higher (and more conservative) impacts identified for this project will continue to be used for the assessment of this project and commitments to visual mitigation.

Methodology

This report identifies the potential additional or changed landscape character and visual impacts of the amended project. This includes consideration of the landscape and views previously assessed for the exhibited project in the EIS and, where necessary, additional views to identify the potential visual impacts of the amended project. Additional views from the public realm would not be required to identify the potential visual impacts of the amended project, due to the minor locational changes. However, there were additional private dwelling views identified and assessed.

This assessment includes the following key steps:

- a review of changes to the planning context relevant to the revised study area
- an assessment of the potential impacts to landscape character during the day and at night
- an assessment of the potential impacts to views from the public domain, private dwellings and from the air
- identification of potential mitigation measures to avoid, mitigate and manage any potential impacts of the amended project.

This methodology is consistent with that described in Technical paper 3 of the EIS.

Existing environment

The study area has been slightly adjusted to reflect the changes arising from the amended project. There continues to be four broad landscape character types, and 16 locally specific landscape character zones as described in the EIS for the exhibited project. There is a further landscape character zone identified to cover the project in Botobolar.

There are no changes to the sensitivity of the landscape character zones, during the day or at night, which are of moderate, low and very low landscape sensitivity.

Potential construction impacts

There are some minor changes to the landscape character and visual impacts of the amended project during construction as a result of changes to the construction area. A summary of the impacts, and the changes as a result of the amendment, are described in the following paragraphs.

Landscape character impact

The changes to the daytime landscape character impacts during construction are:

- a reduction in impact on the Terraban Gap forested hills LCZ (FH-3) from **moderate** to **negligible** as construction of the Switching Station (M3) and associated transmission line would be removed from this area.
- a new **low** landscape character impact identified for the Botobolar undulating rural hills (URH-7) due to the works to construct the microwave repeater infrastructure.

Elsewhere, the landscape character impact levels would not change due to the minor extent of the changes between the exhibited project and amended project during construction.

The changes to the night time landscape character impacts during construction are:

- a reduction in impact on the Terraban Gap forested hills LCZ (FH-3) from **moderate** to **negligible** as the project would be removed from this area.

Elsewhere, the level of night works during construction would be consistent with the exhibited project.

Visual impact from the public domain

The changes to the daytime visual impacts during construction are:

- a reduction in impact on Viewpoint 24: Views from Dapper Road east from **Moderate** to **Low-moderate**, and
- a reduction in impact on Viewpoint 26: View north west from Dapper Road west from **Low-moderate** to **Low.**

These reductions are due to the realignment of the Goolma connection transmission away from Dapper Road.

Elsewhere, the visual impact levels would not change due to the minor extent of the changes between the exhibited project and amended project during construction.

Air traffic

Construction of the amended project would be generally visible in the same locations as the exhibited project, be of the same scale and character. Overall, there would be no change to the impact level identified for the exhibited project during construction.

Potential operational impacts

Landscape character impact

The changes to the daytime landscape character impacts during operation are:

- a reduction in impact on the Terraban Gap forested hills LCZ (FH-3) from **moderate** to **negligible** as there would no longer be development in this character area.
- a new **low** landscape character impact identified for the Botobolar undulating rural hills (URH-7) due to the introduction of the microwave repeater site infrastructure.

Elsewhere, the landscape character impact levels would not change due to the minor extent of the changes between the exhibited project and amended project during construction.

The changes to the night time landscape character impacts during operation are:

- a reduction in impact on the Terraban Gap forested hills LCZ (FH-3) from **moderate** to **negligible** as the project would be removed from this area.

Elsewhere, the level of night works during construction would be consistent with the exhibited project.

Visual impact from the public domain

The changes to the daytime visual impact during operation are:

- a reduction in impact on Viewpoint 24: Views from Dapper Road east from **Moderate** to **Low-moderate**, and
- a reduction in impact on Viewpoint 26: View north west from Dapper Road west from **Low-moderate** to **Low.**

These reductions are due to the realignment of the Goolma connection transmission away from Dapper Road.

Elsewhere, the visual impact levels would not change due to the minor extent of the changes between the exhibited project and amended project during construction.

Air traffic

The amended project would be generally visible in the same locations as the exhibited project and there would be no change to the impact level identified for the exhibited project during operation.

Views from surrounding residences

The changes to the visual impacts on views from residences are summarised below.

- a reduction in the impact on views from seven dwellings, including:
  - 1044, changed from low to negligible
  - 1066, changed from moderate to low
  - 1159, changed from low to negligible
  - 1163/1162, changed from low to negligible
  - 1480 changed from low to negligible
  - 705 changed from moderate to low
  - 539 changed from high to moderate.
- An increase in the impact on views from four dwellings, including:
  - 792 changed from negligible to low
  - 772 changed from negligible to low
  - 611 changed from low to moderate
  - 719 increased from moderate to high
- A new impact from four additional dwellings identified since the exhibition of the EIS:
  - 1487 which would have a low visual impact
  - 371 which would have a high visual impact
  - 1489 which would have a low visual impact
  - 1490 which would have low visual impact.

The dwellings at number 719 and 611 would see an increase in visual impacts, due to the increase in the scale of infrastructure proposed in the vicinity of the Elong Elong energy hub. The increase in impact of private dwelling views from negligible to low at dwelling number 792 and 772 are due to the relocation of Switching Station M7 and associated realignment of the of the Tallawang west connection for a future wind energy project.

The additional dwelling number 371, which was misidentified as a shed for the assessment of the exhibited project, would have a high visual impact due to the close proximity and unobstructed view of the amended project. Dwelling 1487 was identified after exhibition of the project and would have a low visual impact due to the relocation of the amended project away from the primary views from this dwelling. Dwellings 1489 and 1490 are located in the vicinity of the Botobolar microwave infrastructure, which accounts for the assessed visual impact.

The reduction in impacts at dwellings number 1044, 1066, 1159, 1163/1162, 1480, 705 and 539 are mainly due to land holder negotiations and project realignment away from these dwellings. Of those increased impacts, dwellings 611 and 719 (increased to a moderate and high potential visual impact respectively), are not host properties.

Management and mitigation measures

The project, including the amendments, is anticipated to have some high and moderate landscape character and visual impacts during construction, which would be reduced through the implementation of mitigation measures outlined within the CEMP and the landscape and visual management sub-plan.

An additional mitigation measure has been proposed to those included in the EIS relating to the establishment of neighbour agreements for non-host properties which are expected to have a medium or high visual impact. The remaining management and mitigation measures continue to be appropriate for the amended project.

Chapter 1: Introduction

1.1 Background

The Energy Corporation of NSW (EnergyCo) is seeking approval for the construction and operation of new electricity transmission infrastructure and new energy hubs and switching stations that are required to connect energy generation and storage projects within the Central West Orana REZ to the existing electricity network.

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.

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 National Energy Market (NEM).

1.2 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.

1.3 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.

The proposed amendments to the project as described in the EIS (inclusive of the proposed alignment and other refinements and clarification to the exhibited project) are collectively referred to in this Landscape Character and Visual Impact Assessment Addendum as the 'amended project'.

The key proposed amendments and refinements of the amended project in comparison to the exhibited project are summarised in Table 1-1. It is noted that the table only includes features of the exhibited project that are subject to amendment or refinement as part of the Amendment Report.

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

Table 1-1 Summary of key amendments and refinements to the exhibited project

Project feature	Summary of exhibited project	Summary of amendment/refinement
Construction area	The area identified in the exhibited project 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, construction compounds, laydown and staging areas.	Changes to the construction area are proposed due to changes to the exhibited project alignment, and the provision of additional project components, including a 330 kV switching station and associated transmission line, microwave repeater sites, access tracks and brake and winch sites.
Operation area	The area identified for the exhibited project 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.	Changes to the operation area are proposed due to changes to the exhibited project alignment, and the provision of additional project components, including a 330 kV switching station and associated transmission line, microwave repeater sites and access tracks.

Project feature	Summary of exhibited project	Summary of amendment/refinement
500 kV and 330 kV transmission line alignments	• a new switching station (the New Wollar Switching Station), located at Wollar to connect the project to the existing 500 kV transmission network • around 90 kilometres of twin double circuit 500 kV transmission lines and associated infrastructure to connect 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.	As per the exhibited project with the following changes: • changes to the 500 kV and 330 kV transmission line alignments (as detailed in the Amendment Report) • removal of potential battery storage option at the Merotherie Energy Hub.
Switching stations	Thirteen switching stations along the 330 kV network infrastructure.	Fourteen switching along the 330 kV network infrastructure, which includes relocation five 330 kV switching stations and provision of an additional 330 kV switching station
Communication cables	Underground fibre optic communication cables along the 330 kV and 500 kV transmission lines between the energy hubs and switching stations.	Underground fibre optic communication cables along the amended alignments for the 330 kV and 500 kV transmission lines between the energy hubs and switching stations
microwave repeater sites	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 new antenna pole or tower would be established at an existing microwave repeater site at Botobolar, as described in the exhibited project • The new microwave repeater site along the 500 kV New Wollar Switching Station—Merotherie Energy Hub connection, as described in the exhibited project, would be provided along the southern side of the 500 kV transmission line easement, just east of Blue Springs Road, Cope. • Additional communications microwave equipment (microwave antennas) is also proposed at two existing microwave repeater sites outside of the operation area, at Baldy Peak in Kandos and Magpie Hill in Galambine.
Construction methods and facilities	• Construction compounds to support the construction of the project would be located at: – New Wollar Switching Station – Merotherie Energy Hub – Elong Elong Energy Hub.	• It is proposed to provide a satellite construction compound at the Neeleys Lane workforce accommodation camp, within the construction area of the exhibited project. The construction compound would include materials storage and laydown facilities • An additional crushing, grinding and screening plant is proposed at switching station M1.

Project feature	Summary of exhibited project	Summary of amendment/refinement
Access roads and access tracks	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).	• Minor changes are proposed to the alignment of access roads to the energy hubs, New Wollar Switching Station and switching station E2. • Minor changes to the alignments of access tracks and additional access tracks (some of which are existing access tracks) are proposed at various locations.
Property adjustments	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.	Property adjustment works to facilitate access to the transmission lines and switching stations due to changes to the exhibited project alignment. These works include the relocation of existing infrastructure on properties that are impacted by the amended project.
Local road and intersection upgrades	The following road and intersection upgrades are required to ensure safe access to construction sites and the movement of oversize and overmass (OSOM) equipment for the project: • Merotherie Road • Spring Ridge Road • Spring Ridge Road/Dapper Road intersection • Golden Highway/Spring Ridge Road intersection • Neeleys Lane/Ulan Road intersection • Golden Highway/Ulan Road intersection • Merotherie Energy Hub Access Road/Merotherie Road intersection • Merotherie Road/Golden Highway intersection The EIS further noted that EnergyCo may assess and determine the above local road, bridge 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.	Refinements to the local road, bridge and intersection upgrades, including: • minor changes to the extent and/or alignment of the local road, bridge and intersection upgrades, including (but not limited to): – 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 • additional works, including: – upgrading Neeleys Lane from the Neeleys Lane / Ulan Road intersection to the entrance of the Neeleys Lane workforce accommodation camp EnergyCo no longer intends to assess and determine these local road, bridge and intersection works under Division 5.1 of the EP&A Act, and would determine these works as part of the CSSI application.

1.4 Statutory context

Environmental planning approval for the project is required in accordance with *the Environmental Planning and Assessment Act 1979* (EP&A Act). The project is also a controlled action and would therefore requires Commonwealth assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Sections 5.12 and 5.13 of the EP&A Act provide for the declaration of State significant infrastructure (SSI) and Critical State significant infrastructure (CSSI). On 23 November 2020, the Minister for Planning made the Environmental Planning and Assessment Amendment (Central-West Orana Renewable Energy Zone Transmission Order) 2020. The Order declares the whole Central-West Orana REZ Transmission project to be CSSI.

This section describes the legislation and policy relevant to the assessment of landscape character and visual impacts.

1.4.1 Legislation

The state and regional planning documents described in the EIS for the exhibited project remain relevant in those areas where there are no changes. The footprint of the exhibited project has changed notably in the Mid-Western Regional Council Area, and the relevant changes are presented in section 1.4.2.1.

1.4.1.1 Environmental Planning and Assessment Act 1979

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. The EIS was placed on public exhibition by the NSW Department of Planning, Housing and Infrastructure and Environment (DPHI – formerly Department of Planning (DPE)) for a period of 42 days, commencing 28 September 2023 and concluding on 8 November 2023. 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.

1.4.1.2 Environment Protection and Biodiversity Conservation Act 1999

A referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was also submitted on 2 February 2023, with the project subsequently declared to be a controlled action on 2 March 2023 requiring approval from the Australian Minister for the Environment and Water under the EPBC Act. The project would therefore be assessed in accordance with the NSW Assessment Bilateral Agreement under Part 9 of the EPBC Act.

In accordance with Section 156A of the EPBC Act, a person may submit an application requesting a variation of the proposal described in the original EPBC referral.

1.4.2 Environmental Planning Instruments

1.4.2.1 Mid-Western Regional Local Environmental Plan 2012

This addendum includes an assessment of microwave infrastructure at Botobolar and Cope which was not assessed for landscape character and visual impacts in the EIS.

The Botobolar microwave repeater would be located near Upper Botobolar Road, around 14 kilometres southwest of the New Wollar Switching Station. The Cope microwave repeater site would be located to the east of Blue Springs Road, beside the 500 kV Coolah connection transmission line and mostly within the construction area described for the exhibited project. Both sites are located on land zoned RU1 and the land use planning objectives for the RU1 zone are unchanged from those described in the EIS for the exhibited project.

There are no areas of mapped visually sensitive land in the landscape and visual study area for the amended project, and no additional heritage items are identified within or near the amended project.

1.4.3 Policies, Standards and Guidelines

Impacts to landscape character and visual amenity from construction and operation of the exhibited project have been assessed with consideration of the relevant legislation and guidelines that were available when the SEARs were issued.

These include:

- Guideline for Landscape Character and Visual Impact Assessment EIA-N04, Transport for NSW, 2020
- Guidance Note for Landscape and Visual Assessment, Australian Institute of Landscape Architects Queensland, 2018
- Large-Scale Solar Energy Guideline, Technical Supplement Landscape Character and Visual Impact, Department of Planning and Environment 2022
- Guidelines for Landscape and Visual Impact Assessment, Third Edition, Landscape Institute and Institute of Environmental Management & Assessment, 2013.

Since the preparation of the EIS, a Draft Transmission Guideline, Technical Supplement for Landscape and Visual Impact Assessment (November 2023) has been placed on exhibition by the then NSW DPE (now DPHI). This draft guideline does not apply to the methodology or assessment of this project, which is assessed against the SEARs issued for the project in 2022. However, following the release of this guideline, a review of the guidelines was undertaken and a sample of the results of this assessment were compared against the proposed new guidelines for visual impacts. This review has confirmed that the results of the visual assessment undertaken for the exhibited project were generally consistent with, or more conservative than the assessment would be if the visual impact assessment was undertaken in accordance with the proposed draft guidelines and technical supplement. As the new guidelines are in draft form and do not apply to the amended project, the higher (and more conservative) impacts identified for this project will continue to be used for the assessment of this project and commitments to visual mitigation.

1.5 Purpose and structure of this addendum

The purpose of this LCVIA addendum is to assess the potential impacts of the project amendments and refinements for the amended project. This report considers whether the proposed amendments and refinements would result in any changes to the predicted landscape character and visual impacts described in the EIS for the exhibited project, and whether any changes to the mitigation measures are required.

This LCVIA addendum is to be read in conjunction with the EIS for the exhibited project and specifically Technical Paper 3 – Landscape character and visual impact (Technical Paper 3).

This LCVIA addendum assesses the potential impacts to landscape character and visual aspects associated with the proposed amendments and refinements to support and inform the Amendment Report.

The structure and content of this LCVIA addendum is as follows

- Chapter 1 – Introduction: Provides an introduction to this LCVIA addendum and a brief overview of the statutory context that apply to the amended project (this chapter).
- Chapter 2 – Methodology: Outlines the methodology used for the preparation of this LCVIA addendum.
- Chapter 3 –Landscape character impact assessment: Describes the potential impacts on landscape character associated with the amended project, during construction and operation, day and night.
- Chapter 4 – Visual impact assessment: Describes the potential visual impacts associated with the amended project, during construction and operation, in the daytime.
- Chapter 5 – Recommended management and mitigation measures: Outlines recommended mitigation and management measures for the amended project.
- Chapter 6 – References: Identifies the key reports and documents used to generate this addendum technical paper.

The appendices to this paper are:

- Appendix A: Site location plan
- Appendix B: Topography plans
- Appendix C: Landscape character plans
- Appendix D: Visibility plans
- Appendix E: Private dwelling detailed assessment
- Appendix F: Combined detailed assessment results plans.

Chapter 2: Methodology

2.1 Guidance for landscape and visual impact assessment

This addendum landscape character and visual impact assessment (LCVIA) addendum identifies the potential additional or changed landscape character and visual impacts of the amended project, compared to the exhibited project. This includes consideration of the landscape and views previously assessed for the exhibited project and, where necessary, additional views to identify the potential visual impacts of the amended project. Additional views from the public realm would not be required to identify the potential visual impacts of the amended project, due to the minor locational changes. However, there were additional private dwelling views identified and assessed.

This assessment includes the following key steps:

- a review of changes to the planning context relevant to the revised study area
- an assessment of the potential impacts to landscape character during the day and at night
- an assessment of the potential impacts to views from the public domain, private dwellings and from the air
- identification of potential mitigation measures to avoid, mitigate and manage impacts of the amended project.

The methodology for the assessment is described in the following sections. This methodology is consistent with that described in Technical Paper 3 of the EIS for the exhibited project.

2.2 Landscape and visual study area

The study area for this LCVIA addendum generally comprises a four kilometre wide corridor centred on the amended project, referred to as the 'landscape and visual study area' or 'study area'. This study area has been slightly adjusted for the amended project.

2.3 Landscape character assessment

The landscape character assessment was carried out using the landscape character types (and zones) identified in Technical Paper 3 of the EIS for the exhibited project. Where the location of the amended project has changed, the landscape character types (and zones) identified in the EIS for the exhibited project have been modified and/or new landscape character types (and zones) have been identified. An assessment of landscape character impact was carried out in the steps shown in Figure 2-1.

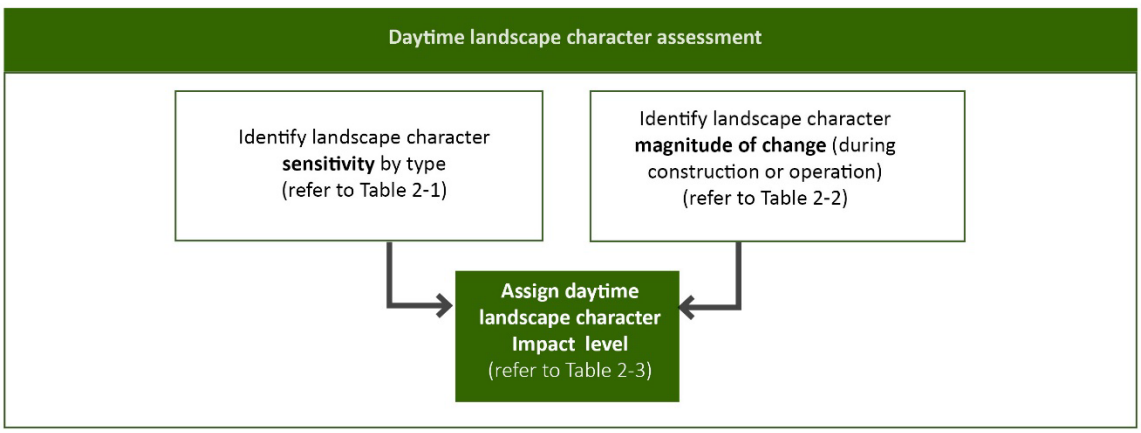

Figure 2-1 Landscape character assessment process

Table 2-1 Landscape character sensitivity levels- daytime

Sensitivity level	Description
Very high	• Landscape feature or place that is strongly valued, nationally iconic and/or protected under national legislation or international policy e.g. World Heritage Areas and National Parks. • Typically includes distinctive, unique and landscape features which are uncommon across the nation and internationally. This may include dramatic landform (isolated peaks, steep rocky ridges, cones, escarpments), distinctive natural water bodies (prominent lakes, reservoirs, rivers, streams, wetlands and swamps, harbour, inlet, bay or open ocean), vegetation and iconic heritage places.
High	• Landscape feature or place that is heavily used and/or is iconic to the State. • Typically includes some unique landscape features which are uncommon within the state, such as dramatic landform, iconic heritage places, attractive natural water bodies and vegetation.
Moderate	• Landscape feature or place that is heavily used and/or valued by residents of a major portion of a city or a non-metropolitan region and/or places with regionally important scenic value or landscape features. • May include landscape features that are uncommon within the region, including: – locally distinctive landform features (hilly and undulating ranges, broad shallow valleys, moderately deep gorges or moderately steep valley walls, and rocky outcrops) – attractive natural waterbodies (streams, lakes, rivers, swamps and reservoirs), – vegetation (native bushland, streamside vegetation, avenues and/or distinctive stands of exotic trees including human influenced vegetation such as vineyards and orchards), – state and local heritage places which contribute to character and/or – a dispersed presence of human settlement (such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure).
Low	• Landscape valued and experienced by concentrations of residents and/or local recreational users and/or places of local scenic value or local landscape features. • May include regionally common landscapes and features such as: – gentle landforms (hilly and undulating ranges, broad shallow valleys, open plains), – modified natural and human made watercourses (streams, lakes, rivers, swamps and reservoirs), scattered or sparsely vegetated (scattered trees in fields with limited variation), – local heritage places and/or a dispersed presence of human settlement (such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure).
Very low	• Places without any particular scenic values or local landscape features, or which are common across the region and beyond. May include: – indistinct landform features (large expanses of flat or gently undulating landform), – limited tree cover such as extensively cleared and cropped areas with very limited variation in colour and texture, – pastoral areas, human created paddocks, pastures or grasslands and associated buildings typical of grazing lands), – human created waterbodies (farm dams, irrigation canals or stormwater infrastructure), – vegetation (native bushland, streamside vegetation, avenues and/or distinctive stands of exotic trees), and/or – dominating presence of human settlement (dominating presence of infrastructure such as solar farms, human settlements, highly modified landscapes such as mines, and higher density populations such as regional cities, industrial areas, agricultural transport or electricity infrastructure).

Table 2-2 Landscape character magnitude of change levels

Magnitude of change level	Description
Very High	• The landscape is altered such that the amended project dominates and/or transforms its character, amenity and/or function. • This would result in an extensive and/or severe change in landscape values, such as extensive vegetation removal, dramatic landform changes, introduction of built elements that are widely visible and contrast substantially with the characteristics of the existing landscape character.
High	• The amended project substantially changes and/or is not compatible with the character, amenity, and function of the landscape. • This would result in an extensive and/or severe change in landscape values, including the removal of large areas of vegetation, dramatic landform changes, introduction of built elements that are widely visible and contrast substantially with the characteristics of the existing landscape character.
Moderate	• The amended project somewhat changes and/or is not compatible with the character, amenity, and function of the landscape. • This would result in a considerable and/or unsympathetic change in landscape values.
Low	• The amended project changes are minor and/or are compatible with the character, amenity, and function of the landscape. • It would result in a slight change in landscape values.
Negligible	• The amended project would not change the character, amenity and/ or function of the landscape. • If there is a change, it would not be perceived as altering the landscape values.

Table 2-3 Landscape character impact levels

		Sensitivity				
		Very high	High	Moderate	Low	Very low
Magnitude	Very high	Very high	Very high	High	Moderate-high	Moderate
	High	Very high	High	Moderate-high	Moderate	Low-moderate
	Moderate	High	Moderate-high	Moderate	Low-moderate	Low
	Low	Moderate-high	Moderate	Low-moderate	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

An assessment of landscape character impact at night was carried out in the steps shown in Figure 2-2.

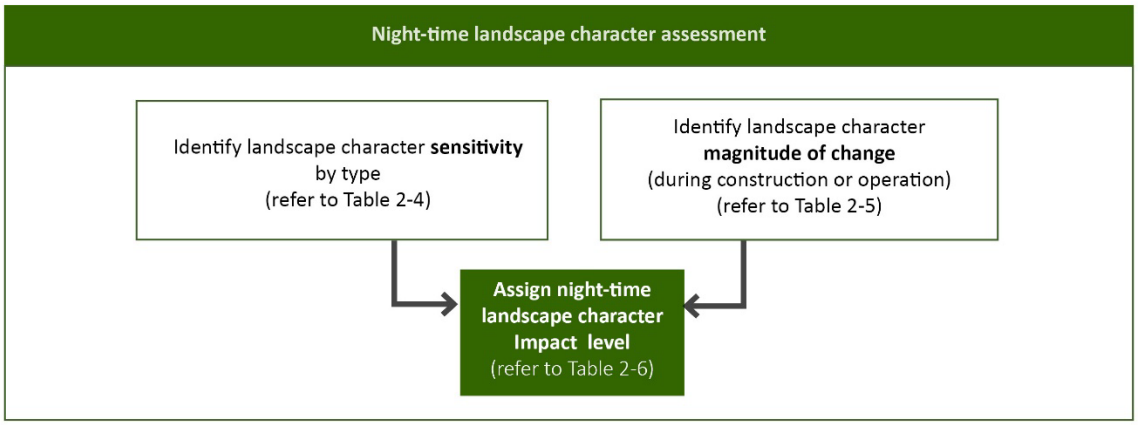

Figure 2-2 Night-time landscape character assessment process

Table 2-4 Landscape character sensitivity levels – night-time

	Environmental zones (AS4282:2019)	
Landscape character sensitivity at night	**Environmental zone**	**Examples**
Very high	A0: Intrinsically dark	• UNESCO Starlight Reserve • IDA Dark Sky Parks • Major optical observatories • No road lighting – unless specifically required by the road controlling authority • NSW Dark Sky Region and 0-12 kilometres from the Siding Spring Observatory
High	A1: Dark	• Relatively uninhabited rural areas • No road lighting – unless specifically required by the road controlling authority • NSW Dark Sky Region and 12-18 kilometres from the Siding Spring Observatory
Moderate	A2: Low district brightness	• Sparsely inhabited rural and semi-rural areas • NSW Dark Sky Region and over-18 kilometres from the Siding Spring Observatory
Low	A3: Medium district brightness	• Suburban areas in towns and cities • Land uses including night lighting such as coal mines and processing plants.
Very low	A4: High district brightness areas	• Town and city centres and other commercial areas • Residential areas abutting commercial areas

Table 2-5 Landscape character magnitude of change levels – night-time

Magnitude	Description
High	• Substantial change to the level of skyglow, glare or light spill expected, and/or • The lighting of the amended project would transform the character of the surrounding setting at night, and/or • The effect of lighting would be experienced over an extensive area.
Moderate	• Alteration to the level of skyglow, glare or light spill would be expected, and/or • The lighting of the amended project would contrast somewhat with the surrounding landscape at night, and/or • The effect of lighting would be experienced across a moderate portion of the landscape
Low	• Alteration to the level of skyglow, glare or light spill would be expected, and/or • The lighting of the amended project would not contrast substantially with the surrounding landscape at night, and or • The effect of lighting would be experienced across a small portion of the landscape.
Negligible	• Either the level of skyglow, glare and light spill is unchanged or • if it is altered, the change is generally unlikely to be perceived by viewers or • compatible with the existing or intended future use of the area.

Table 2-6 Landscape character impact levels – night-time

		Sensitivity (AS4282:2019 Environmental Zone)				
		Very high (A0)	High (A1)	Moderate (A2)	Low (A3)	Very low (A4)
Magnitude	High	Very high	High	Moderate-high	Moderate	Low-moderate
	Moderate	High	Moderate-high	Moderate	Low-moderate	Low
	Low	Moderate-high	Moderate	Low-moderate	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

2.4 Visual impact assessment

The following visual impact assessment includes an assessment of both public and private property views. This assessment was undertaken in the steps shown inFigure 2-3.

2.4.1 Visibility analysis

Visibility analysis was undertaken to identify the area from which the amended project is potentially visible. This visibility analysis used a 3D digital terrain model (i.e. a digital graphic representation of elevation data to represent existing landform) and points at the height of each transmission tower, to identify the areas from which views to the transmission line may be seen. This visibility is limited to a distance of two kilometres from each tower on the alignment, as this is the distance at which there is the potential for towers to be prominent in the view.

The analysis shows areas where a larger part of the amended project is visible, as a progressively darker colour. The model used for this analysis did not include land cover features (i.e. trees and buildings), and therefore identifies a worst-case scenario and is the first step in the analysis process. Visibility plans for the amended project are provided in Appendix D.

2.4.2 Visual impact assessment- public domain

The assessment of visual impacts from the public domain uses a representative viewpoint assessment approach. Representative viewpoints have been selected to show a range of views towards the amended project. Where the project has changed, the views assessed in the EIS for the exhibited project have been either removed (if they are no longer show the project) or reassessed. New representative views have not been added, due to the minor location changes of the amended project.

A viewpoint assessment was carried out by describing the existing view and identifying the sensitivity of the expected viewer and the magnitude of change created by the amended project. Combined, these characteristics of the view are then used to assign a level of potential visual impact. Figure 2-3 outlines the process of this assessment.

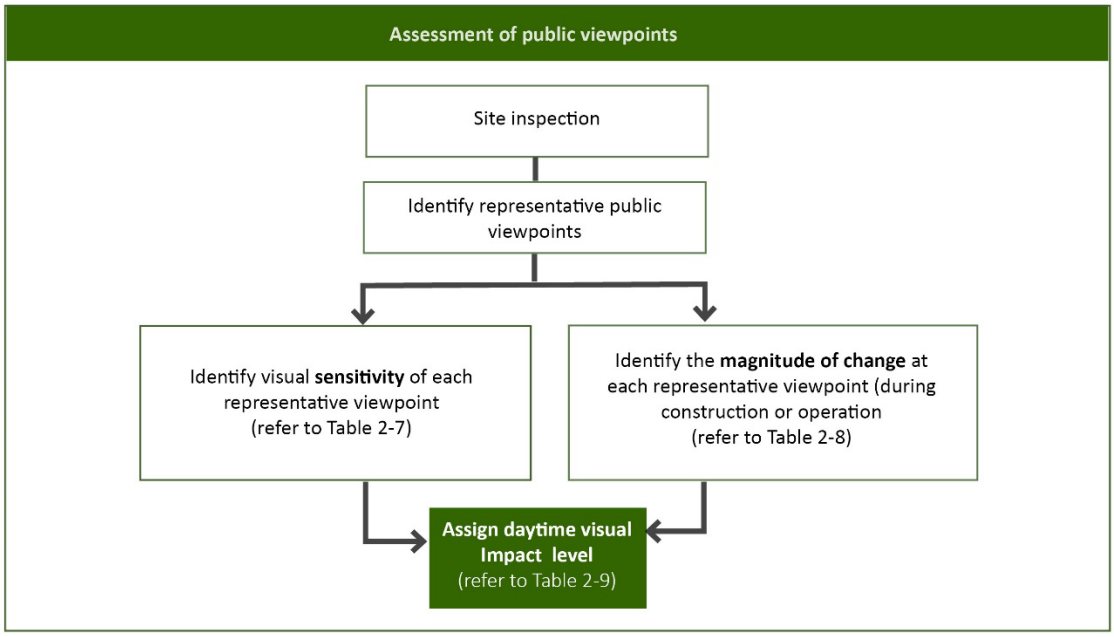

Figure 2-3 Public domain viewpoint assessment process

Table 2-7 Visual sensitivity levels- daytime

Visual sensitivity	Description
Very high	• Heavily experienced view to a national icon, and/or • Views to areas with a scenic value or to landscape features of national importance, and/or • These views are generally unique and uncommon nationally.
High	• Heavily experienced view to a feature or landscape that is iconic to the state, and/or • Views to areas with a scenic value recognised by the state. • These views are generally unique or uncommon within the state.
Moderate	• Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space, and/or • Views to areas of regionally important scenic value or to landscape features of the region. • These views are generally unique or uncommon within the region.
Low	• High quality view experienced by residents and/or local recreational users, and/or road or rail users, and/or • Views to areas of local scenic value or to local landscape features such as Barneys Reef and the Talbragar and Munmurra river valleys. • These views are somewhat common within the landscape.
Very low	• Views where visual amenity is not particularly important to the wider community, such as lower quality views seen from roads. • These views are likely to be common within the landscape.

Table 2-8 Visual magnitude of change levels

Visual magnitude	Description
Very high	• The view is altered such that the amended project visually dominates and transforms the characteristics and scenic quality of the view. • The project would result in a substantial change in the amenity of the view.
High	• The amended project is visually prominent, and/or contrasts with the characteristics and scenic quality of the view. • The amended project would result in a considerable change in the amenity of the view.
Moderate	• The amended project is somewhat prominent and/or is not compatible with the characteristics and scenic quality of the view. • The amended project would result in a noticeable change in the amenity of the view.
Low	• The amended project is not visually prominent and/or is compatible with the characteristics and scenic quality of the view. • The amended project would result in a slight change in the amenity of the view.
Negligible	• The amended project is not visible, is not visually prominent in the view and/or is compatible with the characteristics and scenic quality of the view. • The amended project would result in no perceived change in the amenity of the view.

Table 2-9 Visual impact levels

		Sensitivity				
		Very high	High	Moderate	Low	Very low
Magnitude	Very high	Very high	Very high	High	Moderate-high	Moderate
	High	Very high	High	Moderate-high	Moderate	Low-moderate
	Moderate	High	Moderate-high	Moderate	Low-moderate	Low
	Low	Moderate-high	Moderate	Low-moderate	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

2.4.3 Visual impact assessment- private dwelling detailed assessment

The assessment of visual impact from private dwellings was revised. The approach to private dwelling view assessment is as shown in Figure 2-4.

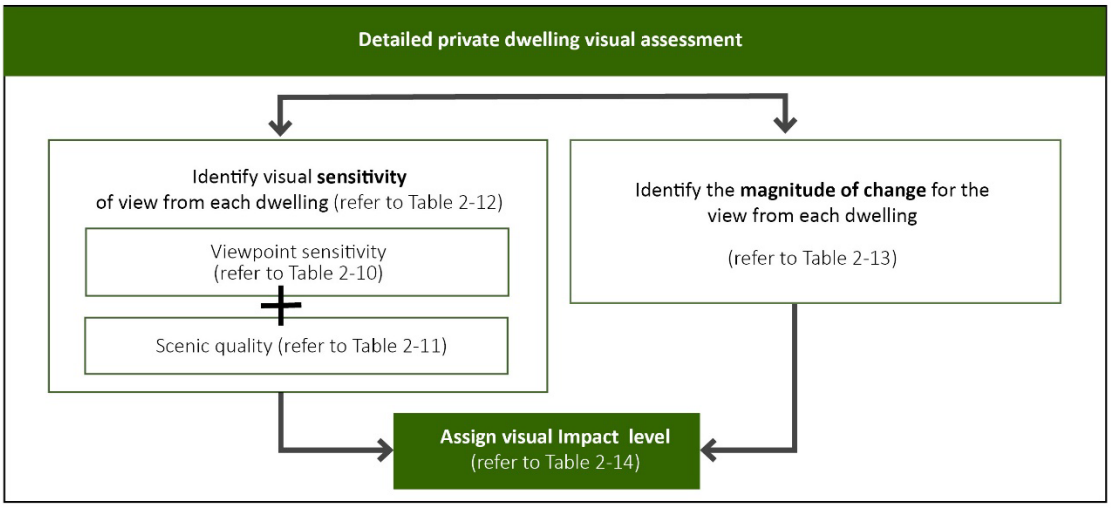

Figure 2-4 Detailed private dwelling visual assessment process

Further details of the process of assessment is contained in the EIS for the exhibited project.

Table 2-10 Residential viewpoint sensitivty levels (Technical Supplement, DPE, 2022)

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
Residential	No place of residence present	Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4, and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3, and C4)	Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4, and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3, and C4)	Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5)

Table 2-11 Scenic quality levels

Scenic quality level	Description
Low scenic quality	Landscape character includes features (landform, vegetation, waterbodies, social/cultural, human presence) which have scenic quality values of predominantly low scenic quality. These landscapes have a high inherent capability to absorb changes from the amended project.
Moderate scenic quality	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of moderate scenic quality. These landscapes have a moderate inherent capability to absorb changes from the amended project.
High scenic quality	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of high scenic quality. These landscapes have a low inherent capability to absorb changes from the amended project.

Table 2-12 Visual sensitivity matrix (Technical Supplement, DPE, 2022)

	High scenic quality	Moderate scenic quality	Low scenic quality
High viewpoint sensitivity	High	High	Moderate
Moderate viewpoint sensitivity	High	Moderate	Moderate
Low viewpoint sensitivity	Moderate	Low	Low
Very low viewpoint sensitivity	Low	Very low	Very low

Table 2-13 Visual magnitude of change levels

Visual magnitude	Description
High	• The view is altered such that the amended project visually dominates and transforms the character of the view. • The project would result in a substantial change in the amenity of the view.
Moderate-High	• The amended project is visually prominent, and/or contrasts with the character of the view. • The project would result in a considerable change in the amenity of the view.
Moderate	• The amended project is somewhat prominent and/or is not compatible with the character of the view. • The amended project would result in a noticeable change in the amenity of the view.
Low	• The amended project is not visually prominent and/or is visually compatible with the character of the view. • The amended project would result in a slight change in the amenity of the view.
Negligible	• The amended project is not visible, is not visually prominent in the view and/or is compatible with the character of the view. • The amended project would result in no perceived change in the amenity of the view.

Table 2-14 Visual impact levels (based on Technical Supplement, DPE, 2022)

	High visual sensitivity	Moderate visual sensitivity	Low visual sensitivity	Very low visual sensitivity
High magnitude	High	High	Moderate	Moderate
Moderate-high magnitude	High	Moderate	Moderate	Low
Moderate magnitude	Moderate	Moderate	Low	Low
Low magnitude	Moderate	Low	Low	Very low

2.5 Mitigation and management measures

Where a visual impact has been identified as a result of the amended project, methods for minimising and managing these impacts have been considered and specific mitigation approaches recommended, where required.

Any new or revised mitigation measures for the amended project have been identified in Chapter 8.

2.6 Photomontages and 3D modelled views

Photomontages have been revised where a material change to the view is expected. These photomontages were prepared for the amended project as described in the EIS. The photomontages and 3D modelled views used in this assessment illustrate the potential impacts of the amended project during operation. The 3D model has been prepared based on indicative designs for all operational infrastructure including the transmission towers, switching stations etc.

2.7 Limitations

This assessment has been undertaken with the following limitations:

- Field work was undertaken during the day and the night time assessment has been made from daytime observations
- The assessment of private dwellings is informed by site inspections from a sample of dwellings, those dwellings not visited have been assessed with consideration of available desktop data, aerial photography and observations from nearby dwellings and roads where possible.
- The amended project design is subject to detail design. Assumptions have been made as to tower designs, heights and locations. Similarly, the detailed layout of infrastructure at the switching stations and energy hubs (including the maintenance facility) is based on assumptions relating to the likely layout and scale of the components.
- Project construction planning would be undertaken by the project construction contractor at a later stage. For this assessment, assumptions have been made as to the scale and types of activities and infrastructure that would be required at the workforce accommodation camps and construction compounds.
- The extent and details of project lighting, required during construction and operation, is not yet defined and is subject to detail design. Assumptions have been made as to the type and extent of lighting required.

Where uncertainty exists the assessment considers a worst-case scenario where possible.

Chapter 3: Landscape character assessment

The following assessment of landscape character impact has been undertaken in accordance with the approach described in section 2.3 of this LCVIA addendum.

3.1 Landscape character types and zones

Four broad landscape character types (and 16 sub-character zones) were identified in the EIS for the exhibited project. The location of these landscape character types and zones have been adjusted to reflect the amended project and area shown in Appendix C.

The description of landscape character types and zones are contained in the EIS for the exhibited project, with minor adjustments to the boundaries of the following landscape character zones for the amended project:

- FH-5: Spring Ridge and Tuckland forested hills LCZ, and
- URH-2: Birriwa to Tallawang undulating rural hills LCZ.

An additional character zone has been identified for the assessment of the Botobolar microwave repeater. This landscape character area is:

- URH-8: Botobolar undulating rural hills LCZ.

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 (refer Appendix B, page B-1).

3.2 Landscape character impacts of the amended project

Where the project has changed, the assessment of the corresponding landscape character zones have been reassessed. The additional character area (URH 8: Botobolar undulating rural hills LCZ) would also be assessed.

The landscape character impact levels are colour coded (in green shades) to reflect the colours shown in impact matrix table in the methodology (refer to Figure 2-3). Any changes to the landscape character impact ratings, between the exhibited project and the amended project, are identified in **bold underlined** text.

Where there has been a change to the impact rating between the exhibited project and amended project, this change is colour coded as blue for a neutral impact, dark blue for a reduced impact, and orange for an increased impact level. Those zones that have not been reassessed and remain as described in the EIS for the exhibited project are shaded in grey.

3.2.1 Changes to the assessment of landscape character during construction

The following table includes a summary of the assessment of the amended project changes on landscape character during construction.

Table 3-1 Summary of Landscape character impacts – during construction

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change between amended and exhibited project
Rural valley landscape character type							
RV-1	Wollar rural valley landscape character zone	Low	• There is a minor widening of the construction area north of the New Wollar Switching Station • Narrowing the construction area just west of the New Wollar Switching Station, minimising the impact to mature stands of vegetation to the west of the switching station	Moderate	Low-moderate	Low-moderate	No change
RV-2	Cumbo rural valley landscape character zone	Low	-	Moderate	-	Low-moderate	-
RV-3	Talbragar River rural valley landscape character zone	Low	• There is a minor realignment of the Coolah connection transmission line alignment and construction area to the east of Blue Springs Road and in the vicinity of Cliffdale Road, slightly reducing the length of the transmission line in this character zone.	High	Moderate	Moderate	No change
RV-4	Munmurra River rural valley landscape character zone	Low	• An additional construction compound would be included at the Neeleys Lane workforce accommodation camp, within the construction area assessed as part of the exhibited project. This construction compound would include materials storage and laydown facilities, staff facilities (office, lunch room and amenities), aggregate bins, workshops, parking areas and fencing. • The amended project includes upgrades to the Neeleys Lane/Ulan Road intersection and upgrades to the access road into the Neeleys Lane workforce accommodation camp and construction compound. These elements would be located within the same footprint and have a similar character.	High	Moderate	Moderate	No change

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change between amended and exhibited project
Forested hills landscape character type							
FH-1	Wollar forested hills landscape character zone	Moderate	-	Low	-	Low-moderate	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills landscape character zone	Moderate	• Minor adjustment to the New Wollar Switching Station—Merotherie Energy Hub connection transmission line alignment. • Narrowing of the construction area within land subject to mining leases near Ulan, in response to engagement with the mine operators to minimise impacts to mining operations.	Moderate	Moderate	Moderate	No change
FH-3	Terraban Gap forested hills landscape character zone	Moderate	• The amended project includes relocating Switching Station (M3) and the project would no longer be located in this landscape character zone.	**Negligible**	**Negligible**	Moderate	Reduced impact
FH-4	Barneys Reef forested hills landscape character zone	Moderate	-	Moderate	-	Moderate	-
FH-5	Spring Ridge and Tuckland forested hills landscape character zone	Moderate	-	Moderate	-	Moderate	-
Mining landscape character type							
M-1	Ulan mining landscape character zone	Very low	• Narrowing of the construction area within land subject to mining leases east of Ulan.	Low	Negligible	Negligible	No change
Undulating rural hills landscape character type							
URH-1	Narragamba to Blue Springs undulating rural hills landscape character zone	Low	• Construction of taller towers for a section of the line, which would have similar visual characteristics to the exhibited project.	Moderate	Low-moderate	Low-moderate	No change

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change between amended and exhibited project
URH-2	Birriwa to Tallawang undulating rural hills landscape character zone	Low	• Relocation of the Switching Station (M7) near Spir Road, and additional Tallawang west connection transmission line extending north, increasing the construction area.	High	Moderate	Moderate	No change
URH-3	Uarbry undulating rural hills landscape character zone	Low	• Switching Station (M3) would be relocated into this character zone, adding to the scale and extent of construction activity in this zone.	Moderate	Low-moderate	Low-moderate	No change
URH-4	Tongy undulating rural hills landscape character zone	Low	• Switching Station (M2) would be relocated slightly to the north west from its location in the exhibited project, increasing the extent of the Coolah connection transmission in this character zone by around 500 metres.	Moderate	Low-moderate	Low-moderate	No change
URH-5	Cassilis to Coolah undulating rural hills landscape character zone	Low	• Minor change to the alignment of the Cassilis connection transmission line crossing near Rotherwood Road.	Moderate	Low-moderate	Low-moderate	No change
URH-6	Dapper and Elong Elons undulating rural hills landscape character zone	Low	• The amended project includes an additional 5 kilometres of 330 kV transmission line (Dunedoo connection), extending along the northern side of the Elong Elong Energy Hub and east to an additional switching station (E5) near Upper Laheys Creek Road. • Minor realignment of the 500 kV Merotherie Energy Hub—Elong Elong Energy Hub connection transmission line between Spring Ridge Road and the Elong Elong Energy Hhub. • The construction area would be expanded slightly and there would be additional vegetation removed in the vicinity of Dapper Road at the Elong Elong Hub • Switching station (E1) would be located closer to the Elong Elong Energy Hub and the length of the Cobbora north connection transmission line leading to this switching station would be reduced.	High	Moderate	Moderate	No change

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change between amended and exhibited project
			• The Goolma connection transmission line would be realigned to reduce its length in the vicinity of Dapper Road, west of Elong Elong Energy Hub. • There would be local road upgrades including a new bridge at the Talbragar River and the Spring Ridge Road causeway.				
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Low	• Establishment of a construction site and construction of a 40 metre high structure, installation of microwave repeater equipment, solar array and cabinets. • Construction and use of access track with some minor earthworks and potential vegetation trimming and removal	Moderate	Low-moderate	N/A	New impact

3.2.2 Changes to the assessment of landscape character during operation

The following table includes a summary of the assessment of the amended project changes on landscape character during operation.

Table 3-2 Summary of Landscape character impacts – during operation

No.	Location	Landscape sensitivity	Changes to the amended project	Magnitude of change	Amended impact level	EIS Impact Level	Change from exhibited project
Rural valley landscape character type							
RV-1	Wollar rural valley landscape character zone	Low	• There is a narrowing of the operation area north of the New Wollar Switching Station and a minor realignment of the New Wollar Switching Station—Merotherie Energy Hub connection transmission lines. • Existing mature stands of vegetation in the vicinity of the switching station would remain.	Moderate	Low-moderate	Low-moderate	No change
RV-2	Cumbo rural valley landscape character zone	Low	-	Moderate	-	Low-moderate	-
RV-3	Talbragar River rural valley landscape character zone	Low	• There is a minor realignment of the Coolah connection transmission line alignment and operation area to the east of Blue Springs Road and in the vicinity of Cliffdale Road, slightly reducing the length of the transmission line in this character zone.	High	Moderate	Moderate	No change
RV-4	Munmurra River rural valley landscape character zone	Low	• Transmission tower changes to include lattice corner towers up to 63 metres and poles along straight sections to 58 metres, which would have similar visual characteristics to the exhibited project.	High	Moderate	Moderate	No change
Forested hills landscape character type							
FH-1	Wollar forested hills landscape character zone	Moderate	-	Low	-	Low-moderate	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills landscape character zone	Moderate	• Minor adjustment to the New Wollar Switching Station—Merotherie Hub connection transmission line alignment, reducing the project area slightly. • Some transmission line towers would increase in height to about 80 metres. Would have similar visual	Moderate	Moderate	Moderate	No change

No.	Location	Landscape sensitivity	Changes to the amended project	Magnitude of change	Amended impact level	EIS Impact Level	Change from exhibited project
			characteristics to the exhibited project.				
FH-3	Terraban Gap forested hills landscape character zone	Moderate	• Switching Station (M3) would be relocated and the project would no longer be in this character zone.	Negligible	Negligible	Moderate	Reduced impact
FH-4	Barneys Reef forested hills landscape character zone	Moderate	-	Moderate	-	Moderate	-
FH-5	Spring Ridge and Tuckland forested hills landscape character zone	Moderate	-	Moderate	-	Moderate	-
Mining landscape character type							
M-1	Ulan mining landscape character zone	Very low	• Some transmission line towers would increase in height to about 80 metres.	Low	Negligible	Negligible	No change
Undulating rural hills landscape character type							
URH-1	Narragamba to Blue Springs undulating rural hills landscape character zone	Low	• Transmission tower changes to increase the tower height for a section of the line to 80 metres, which would have similar visual characteristics to the exhibited project.	Moderate	Low-moderate	Low-moderate	No change
URH-2	Birriwa to Tallawang undulating rural hills landscape character zone	Low	• Relocation of the Switching Station (M7) near Spir Road, and associated realignment of the Tallawang west connection transmission line extending north, slightly increasing the operation area.	High	Moderate	Moderate	No change
URH-3	Uarbry undulating rural hills landscape character zone	Low	• Switching Station (M3) would be relocated into the northern part of this character zone.	Moderate	Low-moderate	Low-moderate	No change
URH-4	Tongy undulating rural hills landscape character zone	Low	• Minor extension of the Coolah connection transmission line to the north west, connecting to the relocated Switching Station (M2), slightly increasing the extent of the Project in this character zone.	Moderate	Low-moderate	Low-moderate	No change

No.	Location	Landscape sensitivity	Changes to the amended project	Magnitude of change	Amended impact level	EIS Impact Level	Change from exhibited project
URH-5	Cassilis to Coolah undulating rural hills landscape character zone	Low	• Minor change to the alignment of the Cassilis connection transmission line crossing near Rotherwood Road. • Transmission tower changes to include lattice corner towers up to 63 metres and poles along straight sections to 58 metres, which would have similar visual characteristics to the exhibited project.	Moderate	Low-moderate	Low-moderate	No change
URH-6	Dapper and Elong Elong undulating rural hills landscape character zone	Low	• There would be an additional 5 kilometres of 330 kV transmission line (Dunedoo connection), extending along the northern side of the Elong Elong Energy Hub and east to an additional switching station (E5) near Upper Laheys Creek Road. • Switching Station (E1) would be relocated to the south, closer to the Elong Elong hub and the length of the Cobbera north connection transmission line leading to this switching station would be reduced. • The Goolma connection transmission line would be realigned to reduce its length in the vicinity of Dapper Road. This results in less vegetation removal along Dapper Road, west of the Elong Elong Hub.	High	Moderate	Moderate	No change
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Low	• New 40 metre high microwave repeater structure and equipment located adjacent to an existing, smaller telecommunications tower at Red Hill • This structure would be more prominent and have a greater influence over the character of this area than existing infrastructure at this location, increasing the level of infrastructure visible, particularly as the tower would rise above the surrounding vegetation. • There would be no appreciable reduction in the amount of vegetation in this area. • The access track would remain as existing, and would be consistent in character with other rural scale roads in this area.	Moderate	Low-moderate	N/A	New impact

3.2.3 Summary of landscape character impacts

Table 3-3 summarises the landscape character impacts of the amended project.

Any changes to impact ratings, between the exhibited project and the amended project, are identified in **bold underline** text. The change in impact level between the exhibited project and the amended project are highlighted in light blue for no change, a dark blue for a decrease, and orange for an increase. Those zones not re-assessed and remain as described in the EIS for the exhibited project are shaded in grey.

Table 3-3 Summary of landscape character impacts

			Construction impact			Operation impact		
No.	Location	Landscape character sensitivity	Amended project	Exhibited project	Change from exhibited project	Amended project	Exhibited project	Change from exhibited project
Rural valley landscape character type								
RV-1	Wollar rural valley	Low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
RV-2	Cumbo rural valley	Low	-	Low-moderate	-	-	Low-moderate	-
RV-3	Talbragar River rural valley	Low	Moderate	Moderate	No change	Moderate	Moderate	No change
RV-4	Munmurra River rural valley	Low	Moderate	Moderate	No change	-	Moderate	-
Forested hills landscape character type								
FH-1	Wollar forested hills	Moderate	-	Low-moderate	-	-	Low-moderate	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills	Moderate	Moderate	Moderate	No change	Moderate	Moderate	No change
FH-3	Terraban Gap forested hills	Moderate	**Negligible**	Moderate	Reduced impact	**Negligible**	Moderate	Reduced impact
FH-4	Barneys Reef forested hills	Moderate	-	Moderate	-	-	Moderate	-
FH-5	Spring Ridge and Tuckland forested hills	Moderate	-	Moderate	-	-	Moderate	-
Mining landscape character type								
M-1	Ulan mining	Very low	Negligible	Negligible	No change	Negligible	Negligible	No change

			Construction impact			Operation impact		
Undulating rural hills landscape character type								
URH-1	Narragamba to Blue Springs undulating rural hills	Low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
URH-2	Birriwa to Tallawang undulating rural hills	Low	Moderate	Moderate	No change	Moderate	Moderate	No change
URH-3	Uarbry undulating rural hills	Low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
URH-4	Tongy undulating rural hills	Low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
URH-5	Cassilis to Coolah undulating rural hills	Low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
URH-6	Dapper and Elong Elons undulating rural hills	Low	Moderate	Moderate	No change	Moderate	Moderate	No change
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Low	Moderate	Low-moderate	New impact	N/A	N/A	N/A

3.3 Landscape character impacts of the amended project at night

The landscape character types and landscape character zones, identified in Section 3.2 of this LCVIA addendum, have been used to assess the night-time impacts of the amended project.

Where the amended project has changed at night, the assessment of the corresponding landscape character zones and areas has been assessed. The colours used for the landscape character impact levels correlate to the colours used in impact matrix table in the methodology (refer to Table 2-6). Any changes to the landscape character impact ratings, between the exhibited project and the amended project, are identified in **bold underlined** text and shaded (e.g. dark blue for a reduced impact level). Those zones that remain as described in the EIS for the exhibited project are shaded in grey.

Note, there would be no visual impact on views from aircraft at night as scenic flights are operated during daylight hours and there is limited lighting proposed as a part of the amended project.

3.3.1 Changes to the assessment of landscape character at night during construction

The following table includes a summary of the assessment of the amended project changes on landscape character during construction.

Table 3-4 Summary of landscape character impacts at night – during construction

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Rural valley landscape character type							
RV-1	Wollar rural valley landscape character zone	Moderate	• There is a minor widening of the construction area north of the New Wollar Switching Station, which may require additional lighting for works occurring outside of standard construction hours.	High	Moderate-high	Moderate-high	No change
RV-2	Cumbo rural valley landscape character zone	Moderate	-	Moderate	-	Moderate	-
RV-3	Talbragar River rural valley landscape character zone	Moderate	• There is a minor realignment of the Coolah connection transmission line alignment and construction area to the east of Blue Springs Road and in the vicinity of Cliffdale Road, slightly reducing the length of the transmission line and associated extent of lighting in this character zone. Note: The use of lighting within the transmission line easement during construction would be limited	Moderate	Moderate	Moderate	No change
RV-4	Munmurra River rural valley landscape character zone	Moderate	• Additional construction compound at the Neeleys Lane workforce accommodation camp, including additional lighting for the materials storage and laydown facilities, staff	High	Moderate-high	Moderate-high	No change

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
			facilities, workshops and parking areas. • Neeleys Lane/Ulan Road intersection upgrade and upgraded access road, which may require lighting.				
Forested hills landscape character type							
FH-1	Wollar forested hills landscape character zone	High	-	Low	-	Moderate	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills landscape character zone	High	• Minor adjustment to the New Wollar Switching Station—Merotherie Energy Hub connection transmission line alignment, which would change the location of lighting along the transmission line easement, including at each transmission line tower site. • Narrowing of the construction area within land subject to mining leases near Ulan, slightly reducing the extent of lighting in this location.	Low	Moderate	Moderate	No change
FH-3	Terraban Gap forested hills landscape character zone	High	• Switching Station (M3) would be relocated, and the amended project would no longer be in this character zone, removing any lighting impacts.	**Negligible**	**Negligible**	Moderate-high	Reduced impact
FH-4	Barneys Reef forested hills landscape character zone	High	-	Moderate	-	Moderate-high	-
FH-5	Spring Ridge and Tuckland forested hills landscape character zone	High	-	Low	-	Moderate	-
Mining landscape character type							
M-1	Ulan mining landscape character zone	Low	• Narrowing of the construction area within land subject to mining leases east of Ulan, slightly reducing the extent of lighting in this location.	Low	Low	Low	No change
Undulating rural hills landscape character type							
URH-1	Narragamba to Blue Springs undulating rural hills landscape character zone	Moderate	-	Moderate	-	Moderate	-

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
URH-2	Birriwa to Tallawang undulating rural hills landscape character zone	Moderate	• Additional Tallawang west transmission line extending north of Spir Road to the relocated Switching Station (M7), slightly increasing and adjusting the location lighting within this character zone.	High	Moderate-high	Moderate-high	No change
URH-3	Uarbry undulating rural hills landscape character zone	Moderate	• Switching Station (M3) would be relocated into this character zone, adding slightly to the level and extent of lighting in this zone.	Moderate	Moderate	Moderate	No change
URH-4	Tongy undulating rural hills landscape character zone	Moderate	• Minor extension to Coolah connection transmission line to the relocated Switching Station (M2), increasing and adjusting the location lighting within this character zone slightly.	Moderate	Moderate	Moderate	No change
URH-5	Cassilis to Coolah undulating rural hills landscape character zone	Moderate	• Minor change to the Cassilis connection transmission line alignment and associated location of lighting near Rotherwood Road.	Moderate	Moderate	Moderate	No change
URH-6	Dapper and Elong undulating rural hills landscape character zone	Moderate	• There would be additional lighting along the new 5 kilometre section of 330 kV line, extending along the northern side of the Elong Elong Energy Hub and east to an additional switching station (E5) near Upper Laheys Creek Road, also requiring additional lighting. • The switching station (E1) would be located closer to the Elong Elong hub and the length of the Cobbora north transmission line leading to this switching station would be reduced, reducing the extent of lighting slightly in this location. • The Goolma connection transmission line west of the Elong Elong hub would be realigned, changing the location of lighting slightly to the north, through a rural field, away from Dapper Road.	High	Moderate-high	Moderate-high	No change
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Low	• The works at this location are proposed to be undertaken during standard work hours.	Negligible	Negligible	N/A	No change

3.3.2 Changes to the assessment of landscape character at night during operation

The following table includes a summary of the assessment of the amended project changes on landscape character during operation.

Table 3-5 Summary of landscape character impacts at night – during operation

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Rural valley landscape character type							
RV-1	Wollar rural valley landscape character zone	Moderate	• The operation area north of the New Wollar Switching Station would be reduced slightly, which may reduce the extent of lighting.	Low	Low-moderate	Low-moderate	No change
RV-2	Cumbo rural valley landscape character zone	Moderate	-	Negligible		Negligible	-
RV-3	Talbragar River rural valley landscape character zone	Moderate	• The Coolah connection transmission line would be realigned to the east of Blue Springs Road and in the vicinity of Cliffdale Road, however there would be no lighting within the corridor.	Negligible	Negligible	Negligible	No change
RV-4	Munmurra River rural valley landscape character zone	Moderate	-	Negligible	-	Negligible	-
Forested hills landscape character type							
FH-1	Wollar forested hills landscape character zone	High	-	Low	-	Low-moderate	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills landscape character zone	High	• No relevant change to the amended project and associated lighting during operation.	High	Moderate	Moderate	No change
FH-3	Terraban Gap forested hills	High	• Switching Station (M3) would be relocated, and the project would no	**Negligible**	**Negligible**	Moderate	Reduced impact

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
	landscape character zone		longer be in this character zone, removing the impact of lighting.				
FH-4	Barneys Reef forested hills landscape character zone	High	-	Low	-	Moderate	-
FH-5	Spring Ridge and Tuckland forested hills landscape character zone	High	-	Negligible	-	Negligible	-
Mining landscape character type							
M-1	Ulan mining landscape character zone	Low	• Some of the New Wollar Switching Station—Merotherie Energy Hub connection transmission line towers would increase in height, however there would be no additional lighting.	Negligible	Negligible	Negligible	No change
Undulating rural hills landscape character type							
URH-1	Narragamba to Blue Springs undulating rural hills landscape character zone	Moderate	-	Low	-	Low-moderate	-
URH-2	Birriwa to Tallawang undulating rural hills landscape character zone	Moderate	• Relocation of the Switching Station (M7) north of Spir Road, changing the location of the operational lighting slightly.	High	Moderate-high	Moderate-high	No change
URH-3	Uarbry undulating rural hills landscape character zone	Moderate	• Switching Station (M3) would be relocated into this character zone, increasing the level of lighting in this character zone.	Low	Low-moderate	Low-moderate	No change
URH-4	Tongy undulating rural hills landscape	Moderate	• The Switching Station (M2) would be relocated slightly to the north west.	Low	Low-moderate	Low-moderate	No change

No.	Location	Landscape character sensitivity	Changes to the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
	character zone						
URH-5	Cassilis to Coolah undulating rural hills landscape character zone	Moderate	-	Low	-	Low-moderate	-
URH-6	Dapper and Elong undulating rural hills landscape character zone	Moderate	• There would be a new switching station (E5) near Upper Laheys Creek Road, requiring additional lighting. • There would be no additional lighting along the new 5 kilometre section of 330 kV line, extending along the northern side of the Elong Elong Energy Hub to the new switching station (E5). • Switching station (E1) would be located closer to the Elong Elong hub, reducing the extent of lighting slightly in this location. • Elsewhere, the amended project would have no relevant change to the lighting during operation.	High	Moderate-high	Moderate-high	No change
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Negligible	• There would be no operational lighting provided at this site.	Negligible	Negligible	N/A	No change

3.3.3 Summary of landscape character impacts at night

The landscape character impacts at night are summarised in Table 3-6. Any changes to impact ratings, between the exhibited project and the amended project, including new impacts, are identified in **bold underline** text and shaded (e.g. dark blue for a reduced impact level). Those areas not re-assessed have been shaded in grey.

Table 3-6 Summary of landscape character impacts at night

			Construction impact			Operation impact		
No.	Location	Landscape character sensitivity	Amended project	Exhibited project	Change from exhibited project	Amended project	Exhibited project	Change from exhibited project
Rural valley landscape character type								
RV-1	Wollar rural valley	Moderate	Moderate-high	Moderate-high	No change	Low-moderate	Low-moderate	No change
RV-2	Cumbo rural valley	Moderate	Moderate	-	-	Negligible	-	-
RV-3	Talbragar River rural valley	Moderate	Moderate	Moderate	No change	Negligible	Negligible	No change
RV-4	Munmurra River rural valley	Moderate	Moderate-high	Moderate-high	No change	Negligible	Negligible	No change
Forested hills landscape character type								
FH-1	Wollar forested hills	High	Moderate	-	-	Low-moderate	-	-
FH-2	Durridgere, Goulburn River and Munghorn Gap forested hills	High	Moderate	Moderate	No change	Moderate	Moderate	No change
FH-3	Terraban Gap forested hills	High	**Negligible**	Moderate-high	Reduced impact	**Negligible**	Moderate	Reduced impact
FH-4	Barneys Reef forested hills	High	Moderate-high	-	-	Moderate	-	-
FH-5	Spring Ridge and Tuckland forested hills	High	Moderate	-	-	Negligible	-	-
Mining landscape character type								
M-1	Ulan mining	Low	Low	Low	No change	Negligible	Negligible	No change
Undulating rural hills landscape character type								
URH-1	Narragamba to Blue Springs undulating rural hills	Moderate	Moderate	-	-	Low-moderate	-	-
URH-2	Birriwa to Tallawang undulating rural hills	Moderate	Moderate-High	Moderate-high	No change	Moderate-high	Moderate-high	No change

			Construction impact			Operation impact		
URH-3	Uarbry undulating rural hills	Moderate	Moderate	Moderate	No change	Low-moderate	Low-moderate	No change
URH-4	Tongy undulating rural hills	Moderate	Moderate	Moderate	No change	Low-moderate	Low-moderate	No change
URH-5	Cassilis to Coolah undulating rural hills	Moderate	-	Moderate	-	-	Low-moderate	-
URH-6	Dapper and Elong Elons undulating rural hills	Moderate	Moderate-High	Moderate-high	No change	Moderate-high	Moderate-high	No change
URH-7	Botobolar undulating rural hills landscape character zone (LCZ)	Low	Negligible	N/A	No change	Negligible	N/A	No change

Chapter 4: Visual impact assessment

4.1 Introduction

The following assessment of visual impact has been undertaken in accordance with the approach described in Section 2.4.2 of this LCVIA addendum, Visual impact assessment – public domain.

4.2 Assessment of daytime visual impacts – public domain

4.2.1 Visibility analysis

The visibility of the amended project is determined by the landform, and screening effect of existing building and vegetation cover. As such, there would be greater potential visibility of the amended project in areas where the landform is flatter and there is less vegetation. The maps at Appendix D show the potential visibility of the amended project. This analysis is based on the maximum heights of the proposed transmission line towers and is identified using a 3D digital terrain model of the landform of the landscape and visual study area.

Generally, the main changes to the visual catchment described in the EIS include:

The visibility of the amended project is determined by the landform, and screening effect of existing building and vegetation cover. As such, there would be greater potential visibility of the amended project in areas where the landform is flatter and there is less vegetation. The maps at Appendix D show the potential visibility of the amended project. This analysis is based on the maximum heights of the proposed transmission line towers and is identified using a 3D digital terrain model of the landform of the landscape and visual study area.

Generally, the main changes to the visual catchment described in the EIS for the exhibited project include:

- Moderate levels of visibility around the amended 330 kV transmission line alignment north of Cliffdale Road, Uarbry (reduced from the Moderate-high visibility in the EIS)
- Low and low-moderate areas of visibility to the north of the M3 switching station would reduce slightly, due to the relocation of this switching station to the south and shortened length of the connecting 330 kV Coolah connection transmission line.
- Low and Low-moderate areas of visibility would increase slightly to the north and west of the realigned 330 kV Cassilis connection transmission line alignment near Turill Bus Route and Ulan Road.
- Low and low-moderate areas of visibility would extend north around Lincoln Road, Tallawang, increasing the extent of these impacts. This is due to the relocated switching station M7 and extension of the associated 330 kV Tallawang west connection transmission line.
- Areas of high visibility (increased from moderate in the exhibited EIS) around the Elong Elong Energy Hub due to a new 330 kV transmission line (Dunedoo connection) and amendment to the twin 500 kV transmission line alignment slightly to the south.
- Low and low-moderate areas of visibility would reduce around Bald Hill Road, Goolma due to the realignment of the 330kVGoolma connection transmission line to the north.

4.2.2 Representative viewpoints

The following section considers any changes to the visual impact of those views from the exhibited project, where the amended project has the potential to alter the impact level. There are no additional public viewpoints required to confirm the visual impacts of the amended project.

The viewpoints from the exhibited EIS that have been reassessed to take into account the changes proposed as part of the amended project are:

- Viewpoint 1: View south west from Barigan Road
- Viewpoint 12: View from Blue Springs Road north
- 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 north west from Dapper Road west.

The location of views that have been assessed in this technical paper are shown in Appendix E. An assessment of each view is contained in Section 4.2.3. In addition, views from the air have been addressed for the whole landscape and visual study area, at Section 4.2.4.

4.2.3 Assessment of representative viewpoints

The following sections include an assessment of each representative view to the amended project and identifies the daytime visual impacts. Any changes to impact ratings, between the exhibited project and the amended project, and new impacts associated with the amended project are identified in **bold underlined** text.

Viewpoint 1: View south west from Barigan Road

Figure 4-1 View south west from Barigan Road, existing view

Visual sensitivity	Changes to view with the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Very low	*Construction:* The construction area has been reduced to retain trees along the access road, in the foreground of the view, and also in the background.	Moderate	Low	Low	No change
	Operation: There would be a minor adjustment to the location of some of the connecting transmission infrastructure, that would not be noticeable in this view.	Moderate	Low	Low	No change

Viewpoint 12: View from Blue Springs Road north

Figure 4-2 View south east from Blue Springs Road, Uarbry, existing view

Visual sensitivity	Changes to view with the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Low	*Construction:* • Construction of 330 kV Coolah and Leadville connection transmission lines would continue to be seen in multiple areas from this location. • A section of the of the Coolah connection construction area would be moved south east and away from this view.	High	Moderate	Moderate	No change
	Operation: • A section of the new 330 kV Coolah connection transmission line easement would be moved south east and further away, so that less towers would be in the middle ground of the view. • There would continue to be two separate visible transmission line easements, with more changes in direction, and transmission line towers of varied heights.	High	Moderate	Moderate	No change

Viewpoint 15: View north from Ulan Road, Cassilis

Figure 4-3 View north from Ulan Road, Cassilis, existing view

Visual sensitivity	Changes to view with the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Very low	*Construction:* • The construction and operation of a workforce accommodation camp (Neeleys Lane) would continue to be seen in the centre of this view. • There would also be an additional construction compound, adding to the temporary structures and activity seen in this view; however, there would be no change in the extent of the construction area at this location. • The workforce accommodation camp would continue to include demountable and modular accommodation structures introducing large-scale construction support facilities into an otherwise rural landscape. • The camp and compound would be prominent and reduce the amenity of this view.	High	Low-moderate	Low-moderate	No change
	Operation: • At the end of construction, the workforce accommodation camp and construction compound would be disassembled and the returned to rural use, restoring the rural character of this view.	Negligible	Negligible	Negligible	No change

Viewpoint 20: View west from Tucklan Road

Figure 4-4 View west from Tucklan Road, existing view

Visual sensitivity	Changes to view with the amended project	*Magnitude of change*	*Impact level – amended project*	*Impact level – exhibited project*	Change from exhibited project
Very low	*Construction:* • Construction of the amended project would continue to be visible crossing over Tucklan Road and extending west, forming a triple row of towers. • Construction would include vegetation removal, large construction equipment and activity. • There would no longer be a new switching station (M7 switching station) visible in the background, however, in the background there would be additional towers with a connection extending north and away from the view.	High	Low-moderate	Low-moderate	No change
	Operation: • There would continue to be three rows of transmission line towers, including both 330 kV and 500 kV towers along the Merotherie Energy Hub—Elong Elong Energy Hub connection, that would be prominent in this view. • There would no longer be a switching station (M7) in the background of view, however, there would be an additional transmission line with 330 kV towers (Tallawang west connection) in the background and extending north (right of view).	High	Low-moderate	Low-moderate	No change

Viewpoint 22: Views from Spring Ridge Road

Figure 4-5 View south west from Spring Ridge Road, existing view

Figure 4-6 View south from Spring Ridge Road, existing view

Visual sensitivity	Changes to view with the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Low	*Construction:* • Project construction activity would continue to be seen prominently in these views near the Elong Elong Energy Hub. • Construction of an additional 330 kV transmission line (Dunedoo connection) would be visible, extending along the north side of the Elong Elong Energy Hub, crossing over Spring Ridge Road. • Views to the 500 kV Merotherie Energy Hub—Elong Elong Energy Hub connection transmission line construction between Spring Ridge Road and the Elong Energy Hub would be realigned to the south. • Switching station (E1) would be relocated to the south, closer to the Elong Elong Energy Hub, reducing the extent of construction activity in northerly views from Spring Ridge Road.	High	Moderate	Moderate	No change
	Operation: • There would be an additional transmission line crossing over Spring Ridge Road (Dunedoo connection), with three rows of transmission line towers now visible, including both 330 kV and 500 kV towers, that would continue to be prominent in this view. • The switching station (E1) would be relocated closer to the Elong Elong Energy Hub and continue to be seen in the background of these views.	High	Moderate	Moderate	No change

Viewpoint 24: Views from Dapper Road east

Figure 4-7 View north from Dapper Road east, existing view

Figure 4-8 View west along Dapper Road east, existing view

Visual sensitivity	Changes to view with the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Low	*Construction:* • A section of the of the 330 kV Goolma connection transmission line would be realigned and extend southwest from the Elong Elong Energy Hub, away from Dapper Road. • Construction of this 330 kV transmission line would continue to be seen in these views, although slightly further away.	Moderate	Low-moderate	Moderate	Reduced impact
	Operation: • A section of the new 330 kV Goolma connection transmission line easement would be moved north west and slightly further away from this section of Dapper Road. • This transmission line would continue to be seen extending to/from the energy hub at Elong Elong.	Moderate	Low-moderate	Moderate	Reduced impact

Viewpoint 26: View north west from Dapper Road west

Figure 4-9 View north west from Dapper Road west, existing view

Visual sensitivity	Changes to magnitude of change	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Low	*Construction:* • Construction of the new Switching Station (E4) would be moved slightly to the east. • Construction of the Goolma connection transmission lines connecting to the Switching Station would be further away, and relocated further away, to the background of this view. • The construction area visible from this location has been reduced.	Low	Low	Low-moderate	Reduced impact
	Operation: • The new Switching Station (E4) would continue to be visible in the background of this view. • The transmission lines connecting to the Switching Station (E4) would be located further away from this view, reducing the prominence of the amended project in this view.	Low	Low	Low-moderate	Reduced impact

4.2.4 Views from the air

Views from the air have been addressed for the whole landscape and visual study area, generally using the daytime visual impact method described in section 2.3. It considers views from the air generally rather than a representative viewpoint. The daytime assessment of views from the air is provided in Table 4-1.

Table 4-1 Summary of daytime visual impacts – views from the air

Visual sensitivity	Changes to views of the amended project	Magnitude of change	Impact level – amended project	Impact level – exhibited project	Change from exhibited project
Moderate	*Construction:* Some adjustments to the location of the exhibited project, including minor realignments to the Coolah connection transmission line easement in the vicinity of Cliffdale Road and near the Elong Elong Energy Hub, minor relocation of some of the Switching Stations (including M2, M3, E1 and E4) and the construction of a new switching station (E5) east of the Elong Elong Energy Hub. Overall, the scale and extent construction activity would generally be consistent with what was identified in the EIS for the exhibited project.	Moderate	Moderate	Moderate	No change
	Operation: The scale and extent character of the proposed infrastructure would be generally consistent with what was identified in the EIS for the exhibited project.	Low	Low-moderate	Low-moderate	No change

4.2.5 Summary of daytime visual impacts

The daytime visual impacts are listed in Table 4-2.

Any changes to impact ratings, between the exhibited project and the amended project, including new impacts, are identified in **bold underline** text and shaded (e.g. dark blue for a reduced impact level). Those viewpoints not re-assessed have been shaded in grey.

Table 4-2 Summary of daytime visual impacts

			Construction impact			Operation impact		
No.	Location	Visual sensitivity	Amended project	Exhibited project	Change from exhibited project	Amended project	Exhibited project	Change from exhibited project
1	View north east from Barigan Road	Very low	Low	Low	No change	Low	Low	No change
2	View west from Barigan Road	Low	-	Low-moderate	-	-	Low-moderate	-
3	Views from Wollar Road	Very low	-	Low-moderate	-	-	Low-moderate	-
4	View west from Wollar-Ulan Road	Very low	-	Low	-	-	Low	-
5	View south west from Main Street, Ulan	Very low	-	Low	-	-	Low	-
6	View south from Blue Springs Road, Stubbo	Very low	-	Low	-	-	Low	-
7	View east from Merotherie Road	Very low	-	Low-moderate	-	-	Low-moderate	-
8	View south from Birriwa Bus Route South	Low	-	Moderate	-	-	Moderate	-
9	View south east from Birriwa Bus Route South	Low	-	Moderate	-	-	Moderate	-
10	View south west from Blue Springs Road	Low	-	Moderate	-	-	Moderate	-
11	View from Blue Springs Road, Bungaba	Low	-	Moderate	-	-	Moderate	-
12	View from Blue Springs Road north	Low	Moderate	Moderate	No change	Moderate	Moderate	No change
13	View north east from the Golden Highway, Leadville	Low	-	Low-moderate	-	-	Low-moderate	-
14	View west from the Golden Highway, Uarbry	Low	-	Low-moderate	-	-	Low-moderate	-

			Construction impact			Operation impact		
15	View from Ulan Road, Cassilis	Very low	Low-moderate	Low-moderate	No change	Negligible	Negligible	No change
16	Views from the Golden Highway, Cassilis	Low	-	Low-moderate	-	-	Low-moderate	-
17	Views from Coolah Road	Low	-	Low-moderate	-	-	Low-moderate	-
18	View east from Rotherwood Road	Low	-	Low-moderate	-	-	Low-moderate	-
19	Views from the Castlereagh Highway, Tallawang	Low	-	Moderate	-	-	Moderate	-
20	View west from Tucklan Road	Very low	Low-moderate	Low-moderate	No change	Low-moderate	Low-moderate	No change
21	View south from Puggoon Road	Low	-	Low-moderate	-	-	Low-moderate	-
22	Views from Spring Ridge Road	Low	Moderate	Moderate	No change	Moderate	Moderate	No change
23	View north west from Dapper Road, near Spring Ridge Road	Low	-	Moderate	-	-	Moderate	-
24	Views from Dapper Road east	Low	Moderate	Low-Moderate	Reduced impact	Moderate	Low-Moderate	Reduced impact
25	View south from Dapper Road	Very low	-	Low	-	-	Low	-
26	View north west from Dapper Road west	Low	Low-moderate	Low	Reduced impact	Low-moderate	Low	Reduced impact
Views from the air								
-	Views from the air	Moderate	Moderate	Moderate	No change	Low-moderate	Low-moderate	No change

4.3 Assessment of visual impact – private dwellings

4.3.1.1 Potential daytime visual impacts during operation

The assessment of views from private dwellings has been revised, following the process identified in Chapter 3 of this technical paper. Some additional visualisations have been prepared and others revised to support this assessment. These are contained in Appendix D. A summary of this assessment is included in Table 6-5.

The changes to the visual impacts on views from residences are summarised below.

- a reduction in the impact on views from seven dwellings, including:
  - 1044, changed from low to negligible
  - 1066, changed from moderate to low
  - 1159, changed from low to negligible
  - 1163/1162, changed from low to negligible
  - 1480 changed from low to negligible
  - 705 changed from moderate to low
  - 539 changed from high to moderate.
- An increase in the impact on views from four dwellings, including:
  - 792 changed from negligible to low
  - 772 changed from negligible to low
  - 611 changed from low to moderate
  - 719 increased from moderate to high.
- A new impact from four additional dwellings identified since the exhibition of the EIS:
  - 1487 which would have a low visual impact, a newly identified dwelling since the exhibition of the EIS
  - 371 which would have a high visual impact. Sensitive receiver ID 367 has been confirmed as a shed by the landowner. The Landscape character and visual impact assessment addendum (Appendix F of the Amendment report) has been updated to include additional sensitive receiver 371.
  - 1489 which would have a low visual impact. This receiver is located near the Botobolar microwave repeater site
  - 1490 which would have low visual impact. This receiver is located near the Botobolar microwave repeater site

The dwellings at number 719 and 611 would increase to high and moderate visual impacts respectively, due to the increase in the scale of infrastructure proposed in the vicinity of the Elong Elong energy hub. The increase in impact of private dwelling views from negligible to low at dwelling number 792 and 772 are due to the relocation of Switching Station M7 and associated realignment of the of the Tallawang west connection for a future wind energy project. However, these two receivers would have a low visual impact as a result of the operation of the project.

The additional dwelling number 371, which was misidentified as a shed for the assessment of the exhibited project, would have a high visual impact due to the close proximity and unobstructed view of the amended project. Dwelling 1487 was identified after exhibition of the project and would have a low visual impact due to the relocation of the amended project away from the primary views from this dwelling. Dwellings 1489 and 1490 are located in the vicinity of the Botobolar microwave infrastructure, which accounts for the additional visual low impact.

The reduction in impacts at dwellings number 1044, 1066, 1159, 1163/1162, 1480, 705 and 539 are mainly due to land holder negotiations and realignments to relocate the project in relation to these dwellings. Of those increased impacts,

dwellings 611 and 719 (increased to a moderate and high potential visual impact respectively), are not host properties. Refer to Appendix D for visualisations that compare the EIS and amended project for dwellings 611 and 719.

The potential daytime visual impacts identified for private dwellings in the exhibited EIS, and the potential daytime visual impacts identified for private dwellings as a result of the amended project are compared in table 6-3.

Table 4-3 Private dwelling visual impacts – comparison between EIS and amended project

Impact level	EIS project assessment results - Number of dwellings	Amended project – number of dwellings
High	13	14
Moderate	20	19
Low	49	50

Of those dwellings with a moderate, high-moderate or high visual impact, fifteen would not host the infrastructure i.e., the project would not be located on the property. Of these non-host dwellings:

- 2 dwellings would have a high-moderate visual impact, and
- 13 dwellings would have a moderate visual impact.

The non-host dwelling view impacts identified for the EIS and amended project are compared in table 6-4.

Table 4-4 Non-host private dwelling visual impacts – comparison between EIS and amended project

Impact level	EIS project assessment results - Number of non-host dwellings	Amended project – number of non-host dwellings
High	2	2
Moderate	13	11
Low	33	38

In the following Table 6-5, the visual impact level of those dwellings on no-host properties have been shaded in green. Any changes to impact ratings, between the exhibited project and the amended project, including new impacts, are identified in bold underline text and shaded (e.g. light blue for no change, dark blue for a reduced impact level, and orange for an increased impact level). Those dwellings that remain as described in the EIS for the exhibited project are shaded in grey.

Table 4-5 Summary of Stage 2 Detailed dwelling view assessment – daytime during operation

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
19	940 (950 in EIS)	Barigan Road, Wollar	N	Moderate	Slight adjustment to the location of the New Wollar Switching Station—Merotherie Energy Hub connection transmission line corridor, would not alter the level of visual impact. Several towers would increase in height to about 85 metres and may be more visible in the background of views from this dwelling. There would continue to be a low magnitude of change and a low visual impact.	Low	Low	Low	Low	No change
31	1,900	Barigan Road, Wollar	Y	Moderate	-	-	-	Low	Low	-
245	780	28 Robison Street, Ulan,	N	Moderate	-	-	-	Low	Low	-
236	750	15 Robison Street, Ulan	N	Moderate	-	-	-	Low	Low	-
228	690	20 Robison Street, Ulan	N	Moderate	-	-	-	Low	Low	-
224	680	18 Robison Street, Ulan	N	Moderate	-	-	-	Low	Low	-
216	670	6 Bent Street, Ulan	N	Moderate	-	-		Low	Low	-
207	500	2236 Cope Road, Cope	N	Moderate	-	-	-	Moderate	Moderate	-
198	220	Main Street, Ulan	N	Moderate	-	-	-	Moderate	Moderate	-
166	760	9-127 Toole Road, Ulan	N	Moderate	-	-	-	Low	Low	-
188	660	3812 Ulan Road, Ulan	N	Moderate	-	-	-	Low	Low	-
204	990	2034 Cope Road, Cope	N	Moderate	-	-	-	Low	Low	-
247	710	1977 Cope Road, Cope	N	Moderate	-	-	-	Low	Low	-

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
244	1,140	1936 Cope Road, Cope	N	Moderate	-	-	-	Low	Low	-
267	920	1910 Cope Road, Cope	N	Moderate	-	-	-	Moderate	Moderate	-
328	420	1863 Cope Road, Cope	Y	Moderate	-	-	-	Moderate	Moderate	-
333	630	1713 Cope Road, Cope	N	Moderate	-	-	-	Negligible	Negligible	-
335	820	1679 Cope Road, Cope	Y	Moderate	-	-	-	Low	Low	-
350	660	1601 Cope Road, Cope	N	Moderate	-	-	-	Moderate	Moderate	-
357	650	1599 Cope Road, Cope	N	Moderate	Some New Wollar Switching Station—Merotherie Energy Hub connection transmission line towers would increase in height, about two kilometres from this private dwelling. This amendment would not alter the magnitude of change or overall level of visual impact at this private dwelling.	Moderate	Moderate	Moderate	Moderate	No change
367	430	1599 Cope Road, Cope	Y	Moderate	Incorrectly identified as a residence in the EIS, and subsequently confirmed to be a non-sensitive use. An assessment of visual impact for this receiver is therefore not required.	N/A	N/A	Low	Low	N/A
371	280	1599 Cope Road, Cope	Y	Moderate	There would be a double row of 500kV transmission towers along the Merotherie Energy Hub connection, 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. 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	High	-	-	New impact
373	640	440 Blue Springs Road, Stubbo	N	Moderate	-	-	-	Moderate	Moderate	-

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
399	290	654 Blue Springs Road, Stubbo	Y	Moderate	Several towers would be increased from 72 metres to about 80 metres high. These taller towers would be seen in the background of views, to the north west of this dwelling, at a distance of about one kilometre.	High	High	High	High	No change
462	1,650	917 Blue Springs Road, Cope	N	Low	Several towers would be increased from 72 metres to about 80 metres high about 1.6 kilometres from this dwelling.	Negligible	Negligible	Negligible	Negligible	No change
485	1,650	1083 Blue Springs Road, Cope	N	Low	-	-	-	Negligible	Negligible	-
1483	160 (210 in EIS)	86 Rissler Road, Stubbo	Y	Moderate	Near this dwelling the New Wollar Switching Station—Merotherie Energy Hub connection transmission line alignment has been adjusted slightly as part of the amended project. There would be an increase in the transmission tower height in the vicinity of this future dwelling, from 72 metres to about 80 metres high. Overall, there would continue to be a high magnitude of change and a high visual impact, consistent with the exhibited EIS.	High	High	High	High	No change
616	1,300	1303 Blue Springs Road, Cope	N	Moderate	-	-	-	Negligible	Negligible	-
826	1,150	82 Birkalla Road, Merotherie	N	Low	-	-	-	Low	Low	-
703	280	677 Merotherie Road, Merotherie	Y	Low	-	-	-	Low	Low	-
1482	760	135 Birkalla Road, Merotherie	Y	Moderate	-	-	-	Negligible	Negligible	-
1027	1,830	951 Birriwa Bus Route North, Merotherie	N	Moderate	-	-	-	Low	Low	-
880 / 876	240	908 Birriwa Bus Route, Merotherie	Y	Moderate	Adjustments to the location of the 500 kV Merotherie Energy Hub—Elong Elong Energy Hub connection transmission line alignment as it	High	High	High	High	No change

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					connects to the Merotherie Energy Hub, bringing it around 100 metres closer to the dwelling (no around 780 metres away). Overall, there would continue to be a high magnitude of change and a high visual impact, consistent with the assessment completed as part of the exhibited EIS.					
902	2,420	Birriwa Bus Route south, Birriwa	N	Low	-	-	-	Moderate	Low	-
965	1,210	Birriwa Bus Route north, Merotherie	Y	Moderate	-	-	-	Negligible	Negligible	-
998	1,410	Blue Springs Road, Leadville	N	Moderate	-	-	-	Low	Low	-
955	800	782 Birkalla Road, Bungaba	N	Low	-	-	-	Low	Low	-
929	210	2178 Blue Springs Road, Bungaba	Y	Low	-	-	-	High	High	-
927	320	944 Birkalla Road, Bungaba	Y	Low	-	-	-	Low	Low	-
941	460	782-944 Birkalla Road, Bungaba	N	Low	-	-	-	Moderate-High	Moderate	-
947	580	675 Birkalla Road, Bungaba	N	Low	-	-	-	Negligible	Negligible	-
846	1,910	1811 Blue Springs Road, Bungaba	N	Moderate	-	-	-	Low	Low	-
979	280	2178-2461 Blue Springs Road, Bungaba	Y	Moderate	The Coolah connection transmission line alignment would be adjusted as part of the amended project to avoid some existing vegetation. This would include additional towers within one kilometre of the dwelling which may be visible. Overall, there would continue to be a high magnitude of change, and a high visual impact from this	High	High	High	High	No change

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					dwelling, consistent with the assessment included as part of the exhibited EIS.					
1152	680	Cliffdale Road, Leadville	Y	Moderate	-	-	-	Low	Low	-
1057	850 (910 in EIS)	549 Blue Springs Road Uarbry	Y	Moderate	The Coolah connection transmission line alignment would be adjusted to avoid some of the existing vegetation. This would result in additional towers being located within one kilometre of the dwelling. However, these towers do not appear to be in the primary view from this dwelling. Overall, there would continue to be a low magnitude of change and a low visual impact.	Low	Low	Low	Low	No change
1195	520	12694 Golden Hwy, Uarbry	N	Moderate	-	-	-	Moderate	Moderate	-
1184	1,700	190 Melrose Road, Leadville	N	Low	-	-	-	Negligible	Negligible	-
1202	510	Golden Highway, Uarbry	Y	Low	-	-	-	Negligible	Negligible	-
1200	990	11880 Golden Highway, Uarbry	N	Moderate	-	-	-	Low	Low	-
1261	1,250	247 Moorefield Road, Uarbry	Y	Low	-	-	-	Low	Low	-
1288	660	1370 Moorefield Road, Uarbry	Y	Moderate	-	-	-	Moderate	Moderate	-
1316	780	1280 Moorefield Road, Uarbry	N	Low	-	-	-	Low	Low	-
1323	1,320	1370 Moorefield Road, Coolah	N	Moderate	-	-	-	Low	Low	-
1324	520	Moorefield Road, Coolah	Y	Moderate	-	-	-	Moderate	Moderate	-
1119	315 (350 in EIS)	121 Cliffdale Road, Uarbry	N	Low	Relocation of the Coolah connection transmission line alignment east of this dwelling as part of the amended project. Would be largely screened by	Low	Low	Moderate	Low	No change

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					existing vegetation and sheds surrounding the dwelling. Overall, there would be a low magnitude of change and a low visual impact.					
1487 (newly assessed dwelling)	450	121 Cliffdale Road, Uarbry	N	Low	Relocation of the Coolah connection 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. Overall, there would be a low magnitude of change and a low visual impact.	**Moderate**	**Low**	-	-	New impact
1070	2,180	390 Cliffdale Road, Uarbry	N	Moderate	-	-	-	Low	Low	-
1010 / 1015	870	140 Turill Bus Route, Turill	N	Moderate	-	-	-	Low	Low	-
1037	1,220	Cliffdale Road, Uarbry	N	Moderate	-	-	-	Moderate	Moderate	-
1003	400	Turill Bus Route, Turill	Y	Low	-	-	-	Low	Low	-
1044	1045 (880 in EIS)	6293 Ulan Road, Turill	N	Moderate	The Coolah connection transmission line alignment has been relocated north beyond the intervening landform, reducing the visibility of the project from this dwelling. 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.	**Negligible**	**Negligible**	Low	Low	Reduced impact
1066	600	6293 Ulan Road, Turill	N	Moderate	The Coolah connection transmission line alignment has been relocated north beyond the intervening landform, reducing the visibility of the project from this dwelling. 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.	**Low**	**Low**	Moderate	Moderate	Reduced impact

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					Refer to Appendix D: Revised private dwelling assessment and photomontages.					
1091	280	6569 Ulan Road, Turill	Y	Moderate	-	-	-	Moderate	Moderate	-
1103	1,410	Ulan Road, Turill	Y	Moderate	-	-	-	Negligible	Negligible	-
1475	930	Summerhill Road, Turill	N	Moderate	-	-	-	Low	Low	-
1159	1100 (650 in EIS)	Golden Highway, Cassilis	Y	Low	The Cassilis connection 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. The amended project is unlikely to be visible and there would be a negligible magnitude of change, and a negligible visual impact.	**Negligible**	**Negligible**	Low	Low	Reduced impact
1163 / 1162	1050 (520 in EIS)	9843 Golden Highway, Cassilis	Y	Low	The Cassilis connection 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. The amended project is unlikely to be visible and there would be a negligible magnitude of change, and a negligible visual impact.	**Negligible**	**Negligible**	Low	Low	Reduced impact
1308	1,600	Coolah Road, Cassilis	N	Moderate	-	-	-	Low	Low	-
1480	220 (140 in EIS)	9843 Golden Highway, Cassilis	Y	Low	The Cassilis connection 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. As the project is unlikely to be visible, there would be a negligible magnitude of change, and a negligible visual impact.	**Negligible**	**Negligible**	Low	Low	Reduced impact

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
1351	325 (220 in EIS)	1089 Rotherwood Road, Cassilis	Y	Low	The Cassilis connection transmission line alignment has been moved east and further 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. As the amended project is unlikely to be visible, there would be a negligible magnitude of change, and a negligible visual impact.	Negligible	Negligible	Negligible	Negligible	No change
741	480	2493 Castlereagh Highway, Tallawang	N	Moderate	-	-	-	High	High	-
790	1,280	2610 Castlereagh Highway, Tallawang	Y	Moderate	-	-	-	Moderate	Moderate	-
775	1,090	2584 Castlereagh Hwy, Tallawang	Y	Moderate	-	-	-	High	High	-
663 / 659	980	2330 Castlereagh Highway, Tallawang	N	Moderate	-	-	-	High	High	-
672	930	2342 Castlereagh Hwy, Tallawang	Y	Moderate	-	-	-	High	High	-
636	1,320	2282 Castlereagh Highway, Tallawang	N	Moderate	-	-	-	Moderate	Moderate	-
772	571 (990 in EIS)	1776 Tucklan Road, Dunedoo	N	Moderate	The new 330 kV transmission line (Dunedoo connection) 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. Overall, there would be a low magnitude of change, and a low visual impact from this dwelling.	Low	Low	Negligible	Negligible	Increased impact

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
789	1,690	327 Laheys Creek Road, Dunedoo	N	Moderate	-	-	-	Low	Low	-
732	20	41 Spir Road, Tallawang	Y	Moderate	Switching Station (M7) would be relocated as part of the amended project and no longer visible from this dwelling. The 330 kV transmission line (Tallawang west connection) extending north would be less visible with the revised alignment, due to the orientation of the primary view and intervening vegetation. Overall, there would continue to be a high magnitude of change, and a high visual impact from this dwelling.	High	High	High	High	No change
792	1160 (1,350 in EIS)	1744 Tucklan Road, Tallawang	N	Moderate	The revised alignment of the 330 kV transmission line (Tallawang west connection) 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. Overall, there would be a low magnitude of change, and a low visual impact from this dwelling.	**Low**	**Low**	Negligible	Negligible	Increased impact
717	490 (400 in EIS)	145 Spir Road, Tallawang	Y	Moderate	Switching Station (M7), and section of the Tallawang east connection 330 kV transmission line would be relocated away from this dwelling, although still visible and extending into the background of the view. Overall, there would continue to be a high magnitude of change, and a high visual impact from this dwelling. Refer to Appendix D: Revised private dwelling assessment and photomontages.	High	High	High	High	No change
705	530	Spir Road, Tallawang	N	Moderate	Switching Station (M7), and section of 330 kV Tallawang west connection transmission line	**Low**	**Low**	Moderate	Moderate	Reduced impact

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					relocated away from this dwelling. Overall, the magnitude of change would reduce to low.					
543	1,110	330 Whistons Lane, Tallawang	Y	Moderate	-	-	-	Low	Low	-
730 (733 confirmed as a shed)	390	1010 Laheys Creek Road, Dunedoo	Y	Moderate	A new Switching Station (E5) and 330 kV transmission line (Dunedoo connection) would be visible, including several towers, within two kilometres of the dwelling. Some intervening vegetation and landform would limit the visibility of these additional elements. Overall, while there would be some additional infrastructure visible, however, there would continue to be a moderate magnitude of change.	Moderate	Moderate	Moderate	Moderate	No change
531	95	330 Whistons Lane, Tallawang	Y	Moderate	-	-	-	High	High	-
487	1,340	250 Whistons Lane, Tallawang	N	Low	-	-	-	Negligible	Negligible	-
429	1,780	1450 Castlereagh Hwy, Tallawang	N	Moderate	-	-	-	Negligible	Negligible	-
385	580	980 Puggoon Road, Tallawang	N	Low	-	-	-	Moderate	Low	-
365	1,120	800 Puggoon Road, Tallawang	N	Low	-	-	-	Low	Low	-
354	350	775 Puggoon Road, Tallawang	N	Low	-	-	-	Moderate	Moderate	-
609	1,750	1420 Laheys Creek Road, Dunedoo	N	Moderate	-	-	-	Low	Low	
611	1,100	1350 Spring Ridge Road, Dunedoo	Y	Moderate	There would be additional 500 kV transmission towers, for the Merotherie Energy Hub—Elong Elong Energy Hub connection, in the vicinity of the energy hub. This connection would be realigned closer, to about one kilometre north west of this dwelling, and include the removal of trees along Laheys Creek	**Moderate**	**Moderate**	Low	Low	Increased impact

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
					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. Refer to Appendix D: Revised private dwelling assessment and photomontages.					
719	980 (1,060 in EIS)	1050 Spring Ridge Road, Cobbora	Y	Moderate	Switching station E1 will be moved further south and away from this dwelling. However, there would be an additional 330 kV transmission line (Dunedoo connection) about one kilometre from the dwelling, viewed in the vicinity of the energy hub infrastructure. There would also be additional transmission towers for the Merotherie Energy Hub—Elong Elong Energy Hub connection 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. Refer to Appendix D: Revised private dwelling assessment and photomontages.	**High**	**High**	Moderate	Moderate	Increased impact
539	560 (55 in EIS)	Dapper Road, Dunedoo	Y	Moderate	The Goolma connection 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. Overall, the magnitude of change to views from this dwelling would reduce to moderate, and there would be a moderate visual impact. Refer to Appendix D: Revised private dwelling assessment and photomontages.	Moderate	Moderate	High	High	Reduced impact
646	1,350	1069 Sandy Creek Road, Cobbora	N	Moderate	-	-	-	Low	Low	-

Receiver ID	Distance to amended project (metres)	Location / address	Project host (Y/N)	Visual sensitivity	Changes to view with amended project	Magnitude of change – Amended project	Visual Impact level – Amended project	Magnitude of change – Exhibited project	Visual impact level – Exhibited project	Change from amended project impact level
580	220	Sandy Creek Road, Dunedoo	Y	Low	-	-	-	Low	Low	-
584/ 585	300	1198 Sandy Creek Road, Cobbora	Y	Low	-	-	-	Low	Low	-
480	1,460	1484 Sandy Creek Road, Dunedoo	N	Moderate	-	-	-	Low	Low	-
464	590	Dapper Road, Dunedoo	N	Moderate	The Goolma connection transmission line alignment would be moved further away from this dwelling. There would continue to be a negligible magnitude of change.	Negligible	Negligible	Negligible	Negligible	No change
560	1,010	Dapper Road, Dunedoo	Y	Moderate	-	-	-	Low	Low	-
1488	620	31 Upper Botobolar Rd Botobolar	N	Low	Appears to be secondary view from this dwelling. Project located on the hill, behind this dwelling reducing its visibility. Some intervening vegetation would reduce the visibility of the microwave tower and infrastructure.	Negligible	Negligible	N/A	N/A	N/A
1489	440	1780 Bara Rd Botobolar	N	Low	Appears to be secondary view, with the project located on the hill, behind this dwelling. Some intervening vegetation reducing the visibility of the microwave tower and infrastructure.	Low	Low	N/A	N/A	New impact
1490	500	1780 Bara Rd, Botobolar	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	Low	N/A	N/A	New impact
1491	550	171 Botobolar Rd, Botobolar	N	Low	Appears to be secondary view from this dwelling. Project located on the hill, behind this dwelling. Dense vegetation would mostly screen the microwave tower and infrastructure.	Negligible	Negligible	N/A	N/A	N/A

4.3.1.2 Potential daytime visual impacts during construction

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 increase in views from dwellings number 611 and 719, where the transmission line connections are realigned to include additional towers to the north and south of the hub, and there would be some additional vegetation clearing along Dapper Road.
- The additional construction compound at the Neeleys Lane workforce accommodation camp at Cassilis may be visible from dwelling number 1103, where there could be glimpses to the site preparation works and installation of temporary infrastructure, through to the operation of the camp, including the compound, during construction.
- Dwelling 1139 and 1142 were identified after the EIS was exhibited. Dwelling number 1139 is located about 430 metres from the Neeleys Lane construction site, and there may be glimpsed views to the Neeleys Lane construction compound and workforce accommodation camp from this dwelling, through trees and where landform does not intervene. Dwelling 1142 is located over a kilometre from the construction site, with intervening trees and vegetation, that would reduce the visibility of the site and prominence of any of the works visible at the Neeleys Lane construction site.
- There would be additional temporary visual impacts associated with construction of the Botobolar microwave repeater site. This would include the potential for views from four dwellings located between 500 metres and a kilometre from the site to the site establishment and construction works.
- Construction of the Cope microwave repeater would be located about a kilometre from nearby dwellings, and visible together with the exhibited project. The works would be generally consistent with the character of construction associated with adjacent transmission infrastructure.
- The attachment of microwave repeater infrastructure on existing towers at Magpie Hill and Baldy Peak would not have a noticeable visual impact during construction.
- During construction there would be the potential for a view to the construction activity from all dwellings identified as having an impact during operation. This includes some increased impacts for the amended project at dwellings number 792 and 772.

4.3.1.3 Potential visual impacts at night during operation

During operation, the transmission line would not require any permanent lighting fixture and would therefore have no additional impacts of the amended project during operation at night.

There is the potential for additional lighting impacts to occur as a result of the amended project, which lighting visible at the Elong Elong Energy Hub from dwellings number 719 and 611 due to the removal of vegetation along Laheys Road, associated with the expansion of the project footprint in this area.

The switching stations relocated in the amended project, would also be lit at night, including low-level lighting for security and maintenance access, to allows for unplanned works, faults and emergency access at night, as required. Nearby dwellings which may experience views to the switching station would also have the potential for views to this lighting at night.

The additional construction compound at the Neeleys Lane workforce accommodation camp would be disassembled at the end of construction and would therefore not have a visual impact at night, during operation.

4.3.1.4 Potential visual impacts at night during construction

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, including night works, would increase in views from dwellings number 611 and 719, where the transmission line connections are realigned, and views would be opened up with additional vegetation clearing along Dapper Road.
- The lighting associated with the additional construction compound at the Neeleys Lane workforce accommodation camp at Cassilis may be visible from dwelling number 1103, where there could be glimpses through intervening trees along Ulan Road.
- Dwelling 1139 and 1142 were identified after the EIS was exhibited. Dwelling number 1139, about 430 metres from the construction site, may have views to the lighting from the Neeleys Lane construction compound and workforce accommodation camp at night over and through trees and where landform does not intervene. Dwelling 1142 is located over a kilometre from the construction site, with intervening trees and vegetation, that would reduce the visibility of the site and the visual prominence of any lighting at the construction site.
- Construction at the microwave repeater sites are intended to be undertaken during standard hours. Any works required outside of standard hours would be temporary and minor or subject to further environmental assessment if required.

Chapter 5: Recommended management and mitigation measures

5.1 Mitigation measures

The project, including the amendments, is anticipated to have some high and moderate landscape character and visual impacts during construction and operation, which would be reduced through the implementation of mitigation measures outlined within the CEMP and the landscape and visual management subplan.

The management and mitigation measures described in the exhibited EIS continue to be appropriate for the amended project, and are listed in Table 5-1.

Table 5-1 Proposed mitigation measures

Reference	Mitigation measures	Timing	Applicable location(s)
LV1	Vegetation clearance for the project will be limited to the minimum extent necessary for construction and operation to maximise existing visual screening and retention of the existing landscape character. Retained vegetation will be clearly demarcated on site as 'no-go zones' prior to the commencement of construction. Personnel will be made aware of no-go zones as part of environmental site induction(s).	Pre-construction, Construction, Operation	Whole of project
LV2	Lighting at construction compounds and workforce accommodation camp(s) will be designed and operated in accordance with Australian and New Zealand Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.	Pre-construction and construction	Construction compound and workforce accommodation camp(s)
LV3	For private dwellings on non-host properties where the project is predicted to have a moderate or high visual impact, reasonable and feasible opportunities to reduce the visual impact (including the provision of screening vegetation) will be investigated. Appropriate visual screening or other options will be confirmed in consultation with the affected landowner (supported by detailed landscape plans where appropriate) and implemented either before or during construction. Maintenance of vegetative screening provided on privately owned land outside of the operation area will be the responsibility of the landowner.	Pre-construction, Construction	Private dwellings on non-host properties with a moderate or high visual impact
LV4	Lighting at the Energy Hubs (including the maintenance facility) and switching stations will be designed and operated in accordance with: • Australian and New Zealand Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting. • the design guidelines contained in the Siding Springs Dark Sky Planning Guideline (DPE 2016). This will include: – eliminating upward spill light – ensuring lighting is directed downwards – using shielded fittings – avoiding overlighting	Pre-construction, Construction, Operation	Merotherie Energy Hub (including the maintenance facility) and Elong Elong Energy Hub.

Reference	Mitigation measures	Timing	Applicable location(s)
	– switching lights off when not required, such as with the use of sensor lights – using energy efficient bulbs – using asymmetric beams if floodlighting is required – ensuring lights are not directed towards reflective surfaces – using warm white colours		

Chapter 6: References

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Appendices

Appendix A:Topography plans

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

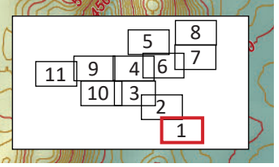
500kV towers:
85m
80m
72m

330kV towers:
67m
63m
58m
54m
52m
49m

E1 / M1 Switching station
Energy hub

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

Wilpinjong Road
Slate Gully Road
Ulan-Wollar Road
Mogo Road
Araluen Road
Araluen Lane
Craigs Gully
Goulburn River National Park
Barigan Street
Wollar
Wollar Road
Cumbo
Upper Cumbo Road
Cumbo Road
Razorback Ridge
Sands Ridge
Back Flat
Left Hand Gully
New Wollar Switching Station
Barigan Road
Castle Rocks
The Forest
Maree Road
Tichular Road
Phillip



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Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Wollar to Wilpinjong)

Appendix A

A-1

0 1 2 3km

north

Ulan
Ulan Road
Main Street
Cope Road
Rocky Knob
Lennox
Goulburn River National Park
Murragamba
Murragamba Road
Carrs Gap
Ulan Road
Lagoons Road
Ridge Road
Ulan-Wollar Road
Dexter Mountain
Spring Flat
Narrow Flat
Bens Flat
Wilpinjong
Munghorn Gap Nature Reserve

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

500kV towers:
85m
80m
72m

Viewpoint location
Private dwelling

E1 / M1 Switching station
Energy hub

Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

5 8 11 9 4 6 7 10 3 2 1

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Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Wilpinjong to Ulan)

Appendix A

A-2

0 1 2 3km

north

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

500kV towers:
- 85m
- 80m
- 72m

330kV towers:
- 67m
- 63m
- 58m
- 54m
- 52m
- 49m

E1 / M1 Switching station
Energy hub

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

Box Hill
Bobadeen Road
Rissler Road
Blue Springs Road
Blue Springs
Cope State Forest
Cope
Governor Road
Cope Road
Carramar Road
Burras Springs
Springwood Park Road
Highett Road
Rocky Knob
Ulan
Main Street
Ulan Road

5 8 11 9 4 6 7 10 3 2 1

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Ulan to Blue Springs)

Appendix A

A-3

0 1 2 3km

north

iris

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

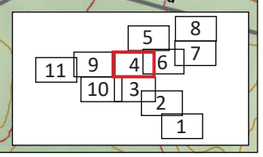
500kV towers:
85m
80m
72m

Viewpoint location
Private dwelling

E1 / M1 Switching station
Energy hub

Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

The Pinnacle
The Springs
Ross Crossing
Cliffdale Road
Merotherie Crossing
Merotherie
Birriwa Bus Route
Birkalla Road
Blue Springs Road
Cockabutta Hill
Merotherie Road
Merotherie Energy Hub
M5
M4
Narragamba
Narragamba Swamp
Bungaba
Bligh
Wonga Roo Road
Bobadeen Road



Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Merotherie to Ross Crossing)

Appendix A

A-4

0 1 2 3km

north

iris

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

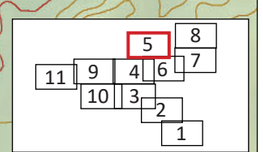
500kV towers:
85m
80m
72m

Viewpoint location
Private dwelling

E1 / M1 Switching station
Energy hub

Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

M2
M3
Terraban
Cainbil Road
Cainbil
Bowman
Uarbry
Golden Highway
Turill Road
Tongy Lane
Carnell Gully



Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Terraban Gap and Tongy)

Appendix A

A-5

0 1 2 3km

north

iris

Golden Highway
Blue Springs Road
The Ross Crossing
Kellys Springs
Neeleys Lane
Golden Highway
Neeleys Lane workforce accommodation camp
Curryall
Black Hill
Yellow Waterholes Gully
Cliffdale Road
Turill Bus Route
Ulan Road
Summerhill Road
Turill
Durridgere CCA Zone 3 State Conservation Area
Green Hills
Queen Road

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

500kV towers:
85m
80m
72m

Viewpoint location
Private dwelling

E1 / M1 Switching station
Energy hub

Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

5 8 7 6 4 9 11 10 3 2 1

iris

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Ross Crossing to Durridgere)

Appendix A

A-6

0 1 2 3km

north

Bligh
Rocks Gully
Iron Pots Waterfall
Turill
Durridgere CCA Zone 3 State Conservation Area
Westons Knobs
Cassilis
Eastern Gully
Collaroy
Neeleys Lane workforce accommodation camp
Yellow Waterholes Gully
Tomimbol Creek
Vinegaroy Road
Neeleys Lane
Ulan Road
Summerhill Road
Rothlenwood Road
Coolah Road
Llangollen Road
Uarbry Road
Golden Highway
Borambil Racecourse Road
Wyoming Road
Willy Wally Road

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

500kV towers:
- 85m
- 80m
- 72m

330kV towers:
- 67m
- 63m
- 58m
- 54m
- 52m
- 49m

E1 / M1 Switching station
Energy hub

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

5 8 11 9 4 6 7 10 3 2 1

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Central-West Orana Renewable Energy Zone Transmission Project

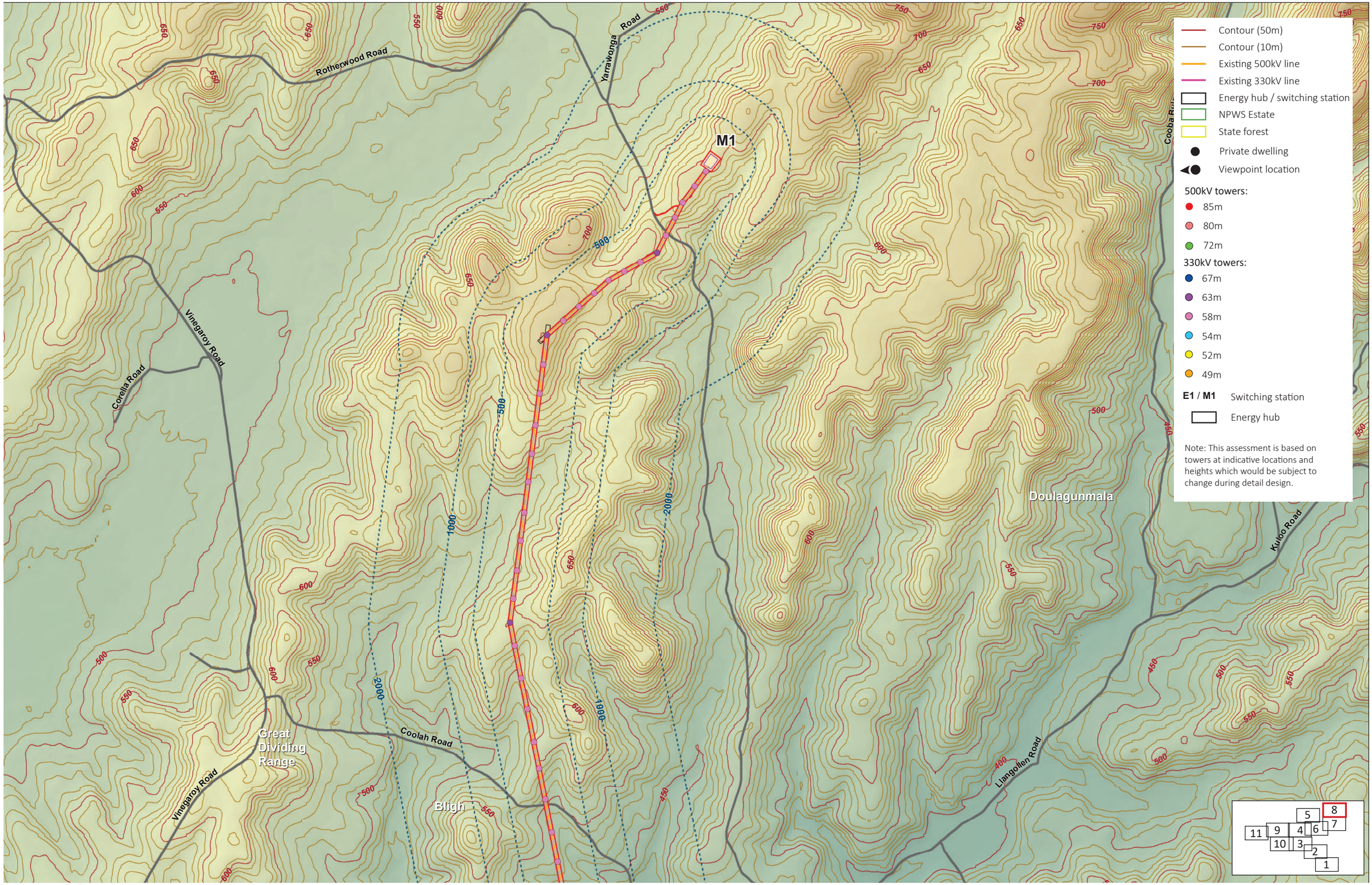
Landscape and visual impact assessment addendum - **Topography** (Durridgere to Cassilis)

Appendix A

A-7

0 1 2 3km

north



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Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Cassillis to Rotherwood Road)

Appendix A

A-8

0 1 2 3km

north

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

500kV towers:
85m
80m
72m

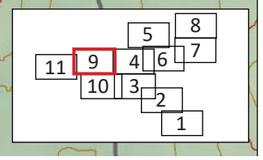
Viewpoint location
Private dwelling

E1 / M1 Switching station
Energy hub

Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

Birriwa Bus Route
Birriwa Station
Birriwa Road
Castlereagh Highway
Tucklan
Avonside Road
Hansells Hill
Rouse
Meruthera
Upper Laheys Creek Road
Lincoln Road
Tucklan Road
Artz Lane
Gingers Lane
M7
Spir Road
M6
Barneys Reef
Barneys Reef Road
Tooraweenah State Forest
Brooklyn Road
Suzanne Road
Corishs Lane
Upper Tallawang
Tallawang Railway Station
Whistons Lane
Tallawang
Goodiman
Goodiman CCA Zone 3 State Conservation Area

450 500 550 600 1000 2000



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Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Merotherie to Tuckland)

Appendix A

A-9

0 1 2 3km

north

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

500kV towers:
- 85m
- 80m
- 72m

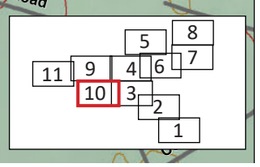
330kV towers:
- 67m
- 63m
- 58m
- 54m
- 52m
- 49m

E1 / M1 Switching station

Energy hub

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

Tallawang
M8
M9
Middle Slapdash Station
Merotherie Road
Honeysett Road
Castlereagh Highway
Barneys Reef Road
Mebul Road
Goodiman
Puggoon
Puggoon Road
Laheys Creek Road
Spring Ridge Road
Jacksons Lane
Stubbo Road
Stubbo
Carramar Road
Trilby Lane
Cope State Forest



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Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Tallawang to Stubbo)

Appendix A

A-10

0 1 2 3km

north

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

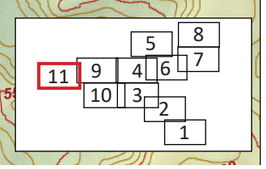
500kV towers:
85m
80m
72m

330kV towers:
67m
63m
58m
54m
52m
49m

E1 / M1 Switching station
Energy hub

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

Sweeneys Lane
Medway
Elong Elong Energy Hub
Laheys Creek
E1
E2
E3
E4
E5
Dapper Road
Dapper
Upper Laheys Creek Road
Brooklyn Road
Mount Dapper
Tuckland
Tuckland State Forest
Spring Ridge Road
Sandy Creek Road
Cobra Hill
Bald Hill Road
Dapper Nature Reserve
Tuckers Gully
Yarrow ECA Zone



Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Topography** (Tuckland to Cobra Hill)

Appendix A

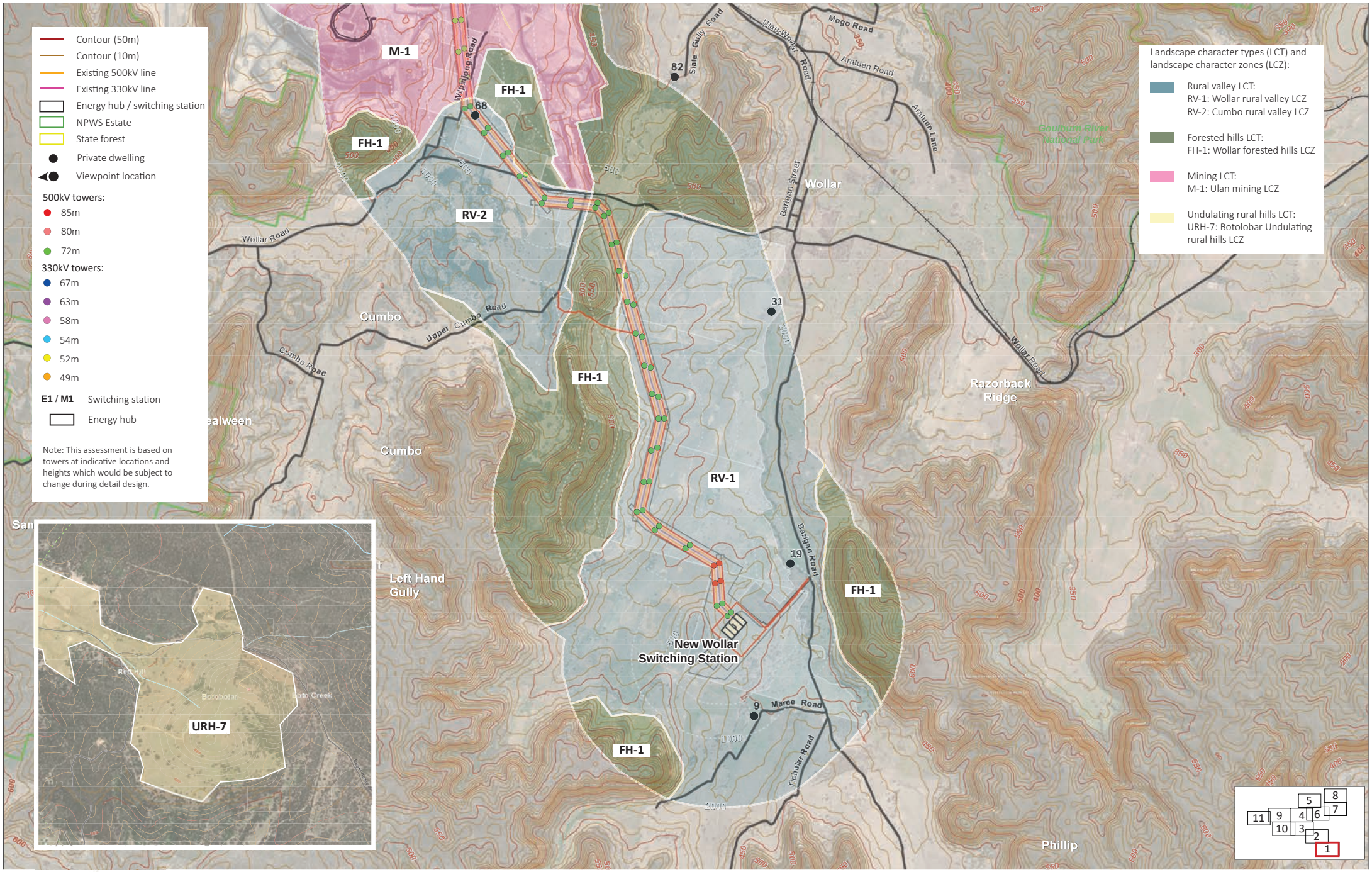
A-11

0 1 2 3km

north

iris

Appendix B:
Landscape character plans



Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Landscape character zones** (Wollar to Wilpinjong)

Appendix B

0 1 2 3km

north

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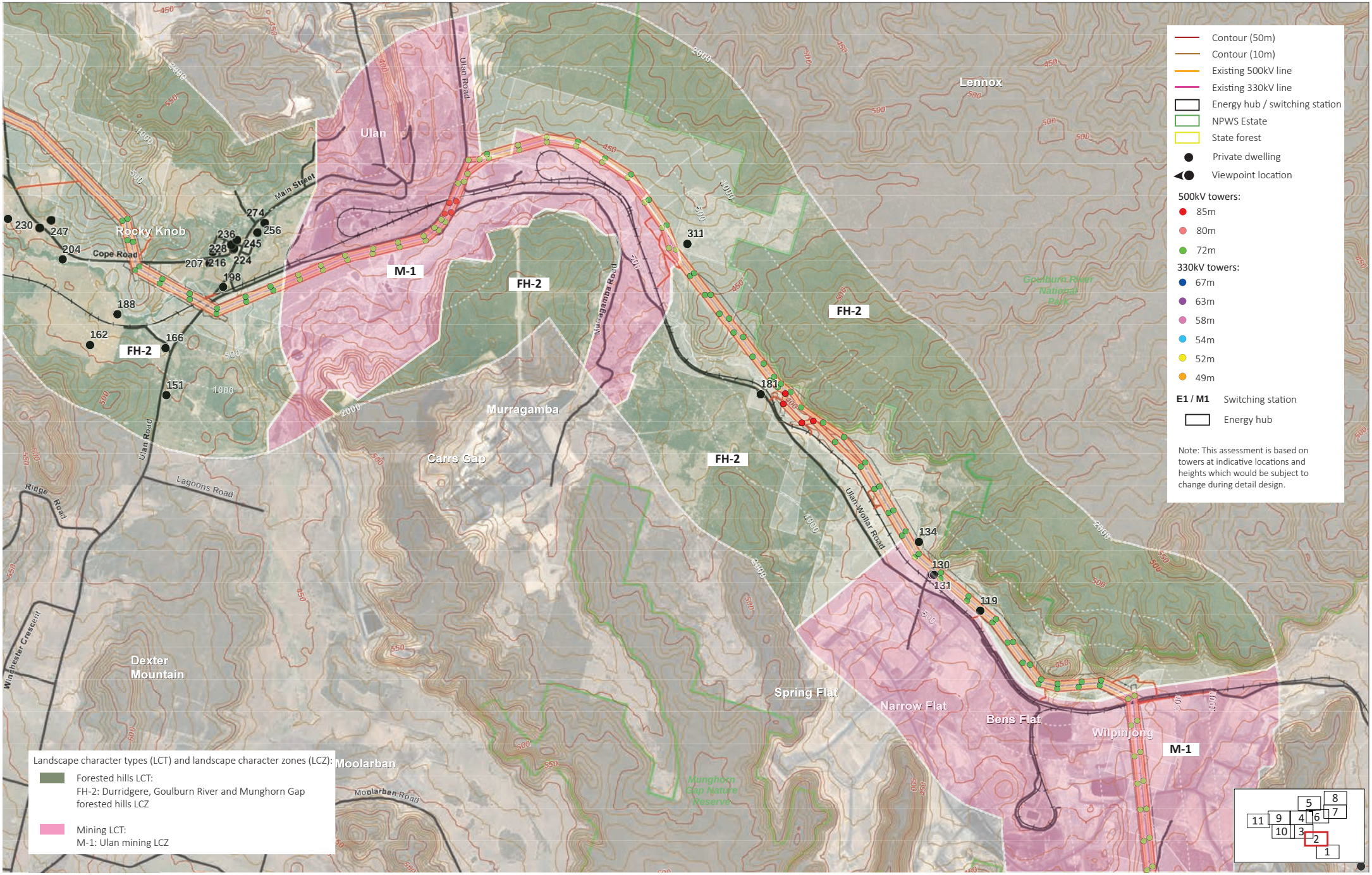


Central-West Orana Renewable Energy Zone Transmission Project

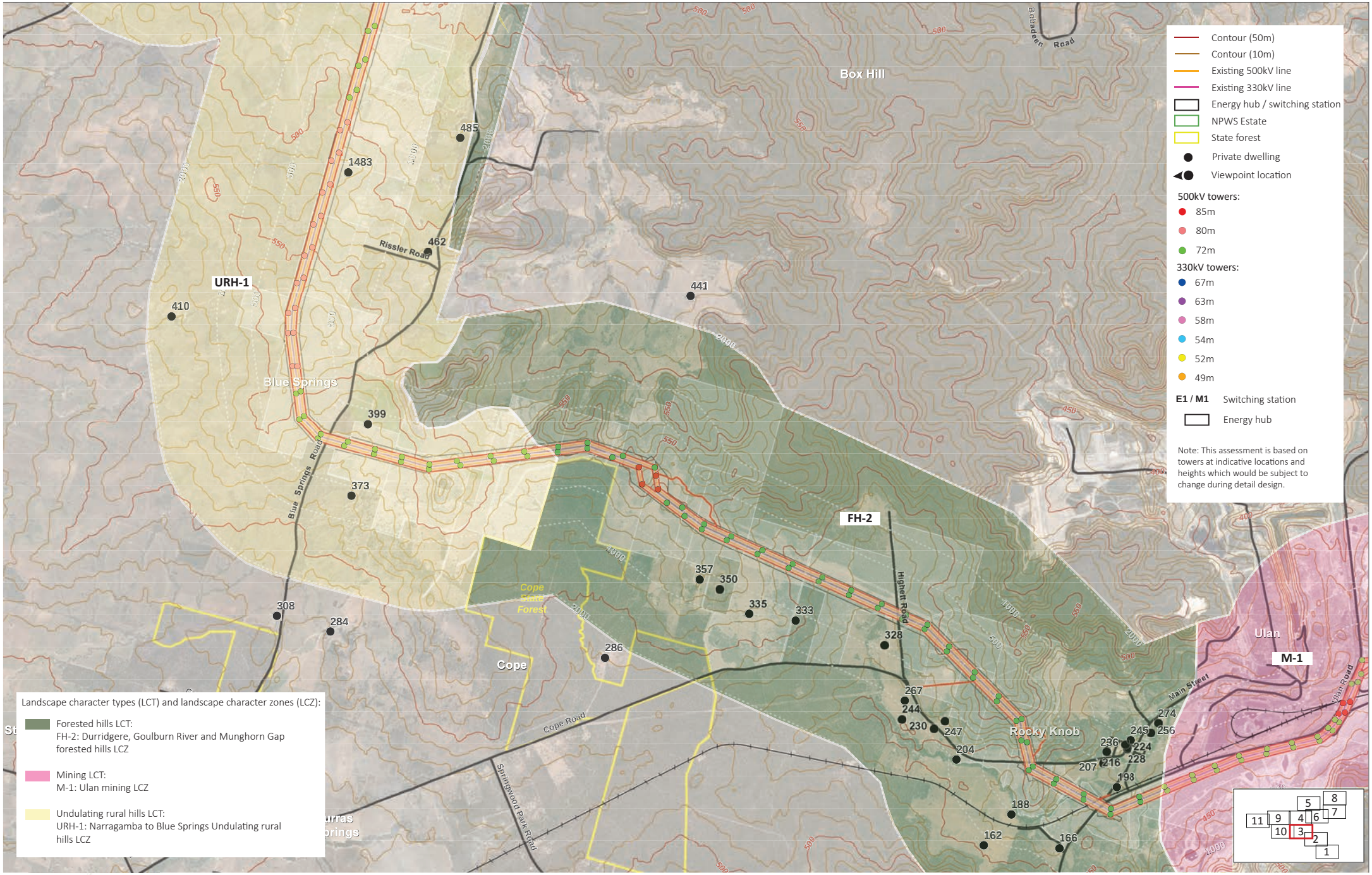
Landscape and visual impact assessment addendum - **Landscape character zones** (Wilpinjong to Ulan)

Appendix B

0 1 2 3km

north

iris



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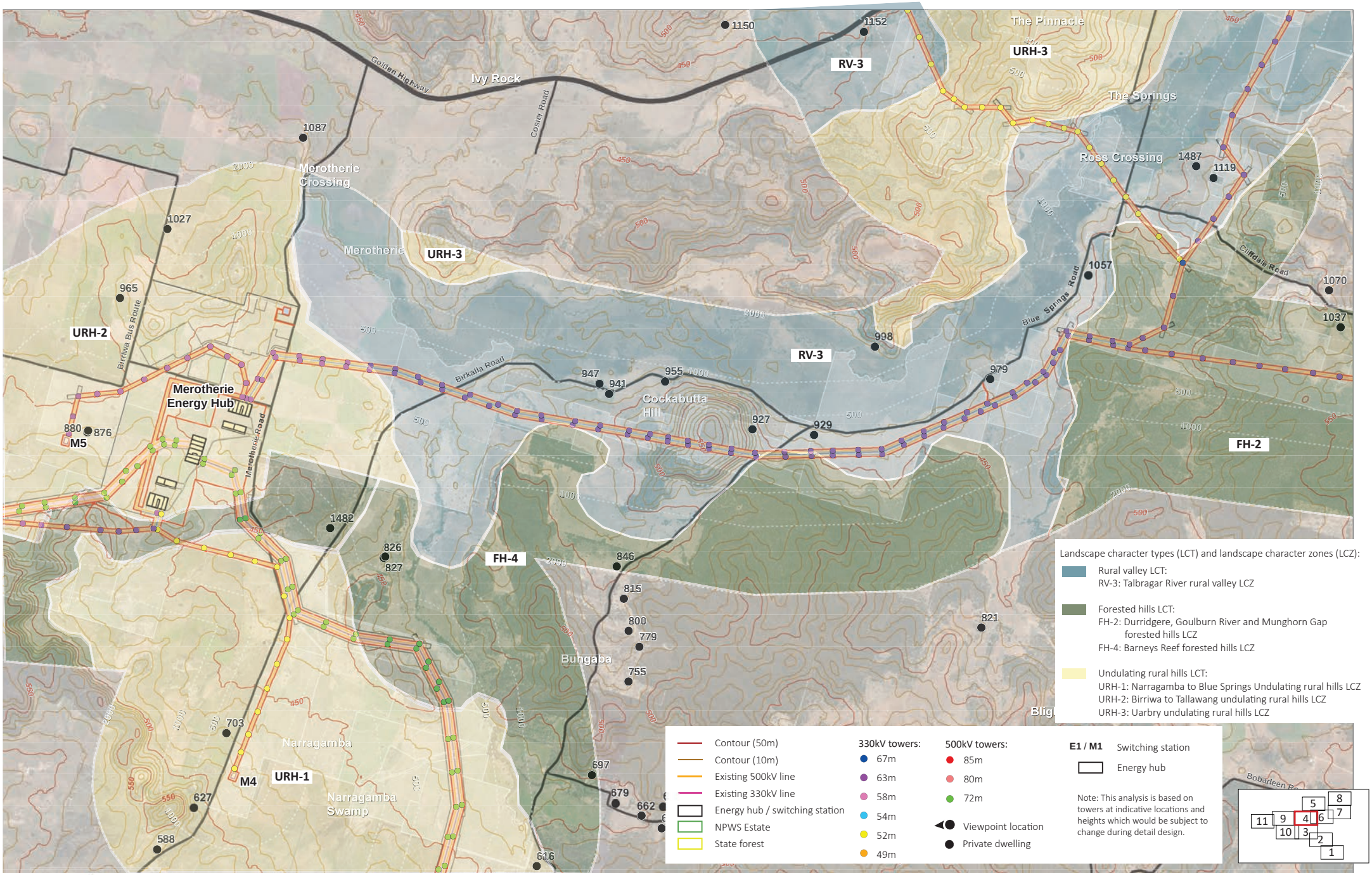
Central-West Orana Renewable Energy Zone Transmission Project

Appendix B

Landscape and visual impact assessment addendum - **Landscape character zones** (Ulan to Blue Springs)



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Central-West Orana Renewable Energy Zone Transmission Project

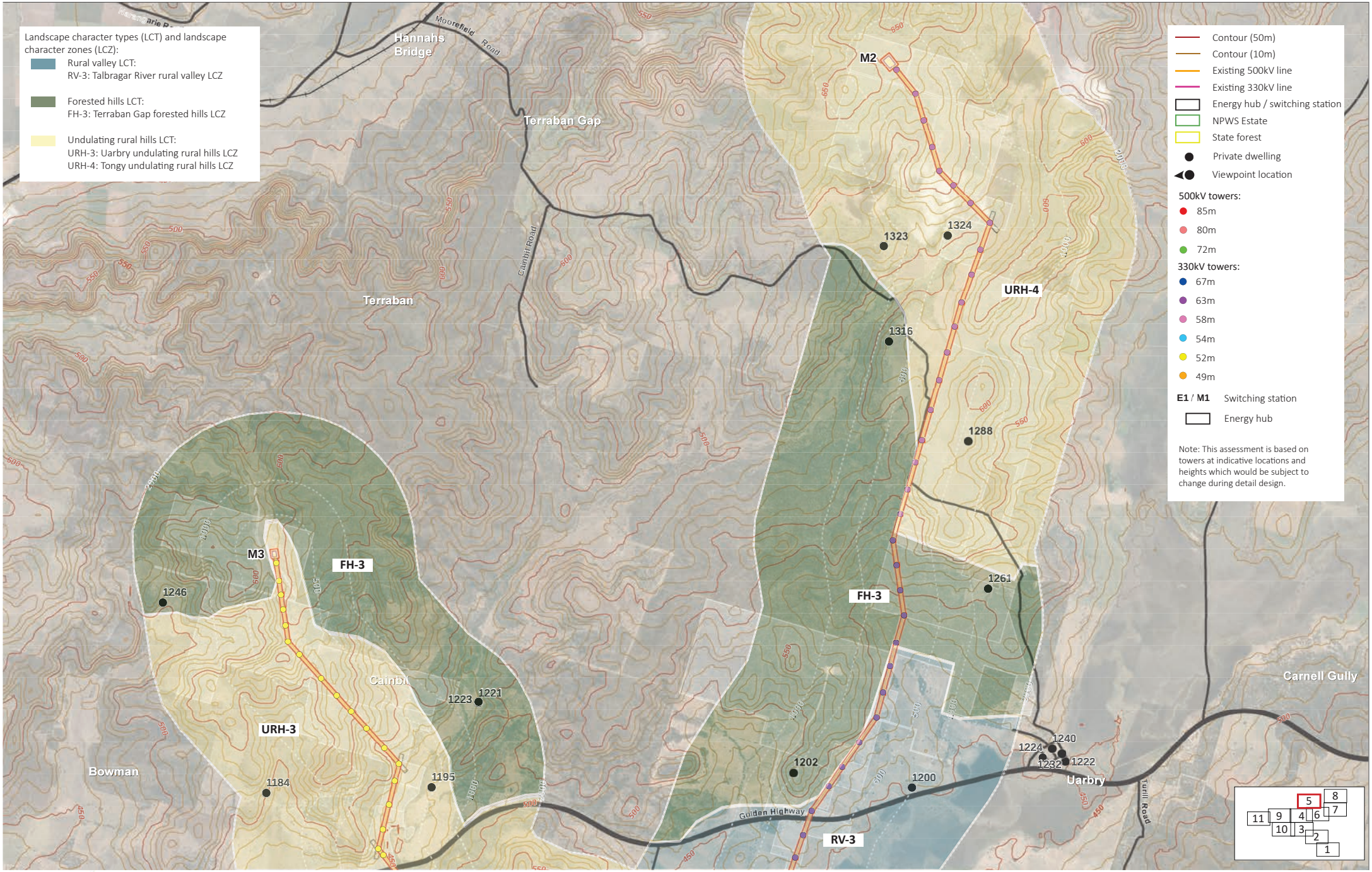
Appendix B

B-4

Landscape and visual impact assessment addendum - **Landscape character zones** (Merotherie to Ross Crossing)

0 1 2 3km

north



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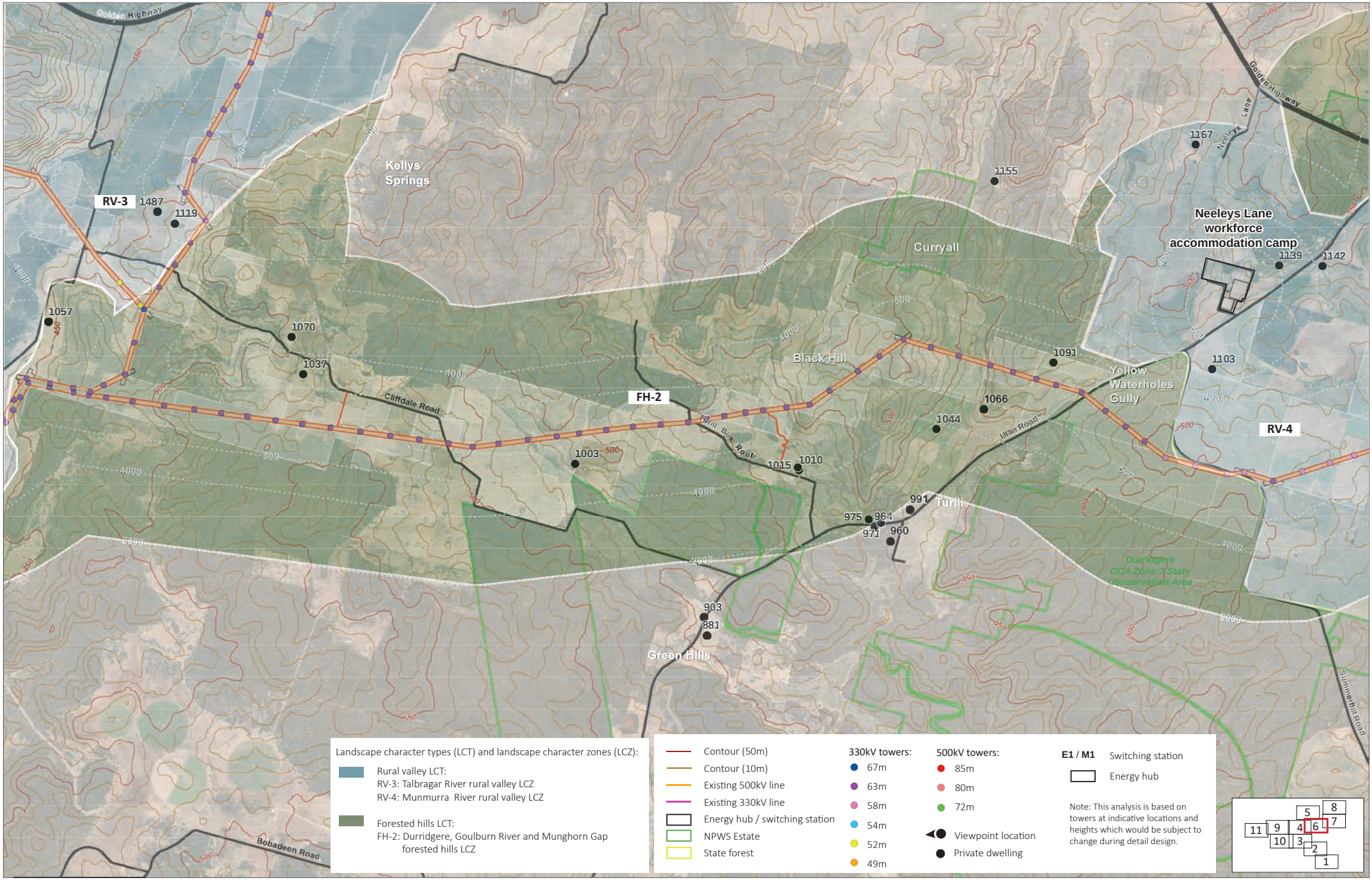
Central-West Orana Renewable Energy Zone Transmission Project

Appendix B

Landscape and visual impact assessment addendum - **Landscape character zones** (Terraban Gap and Tongy)

0 1 2 3km

north



File: CWOREZ-Fig05-AerialPhoto05K-240213_cadastre

iris

Central-West Orana Renewable Energy Zone Transmission Project

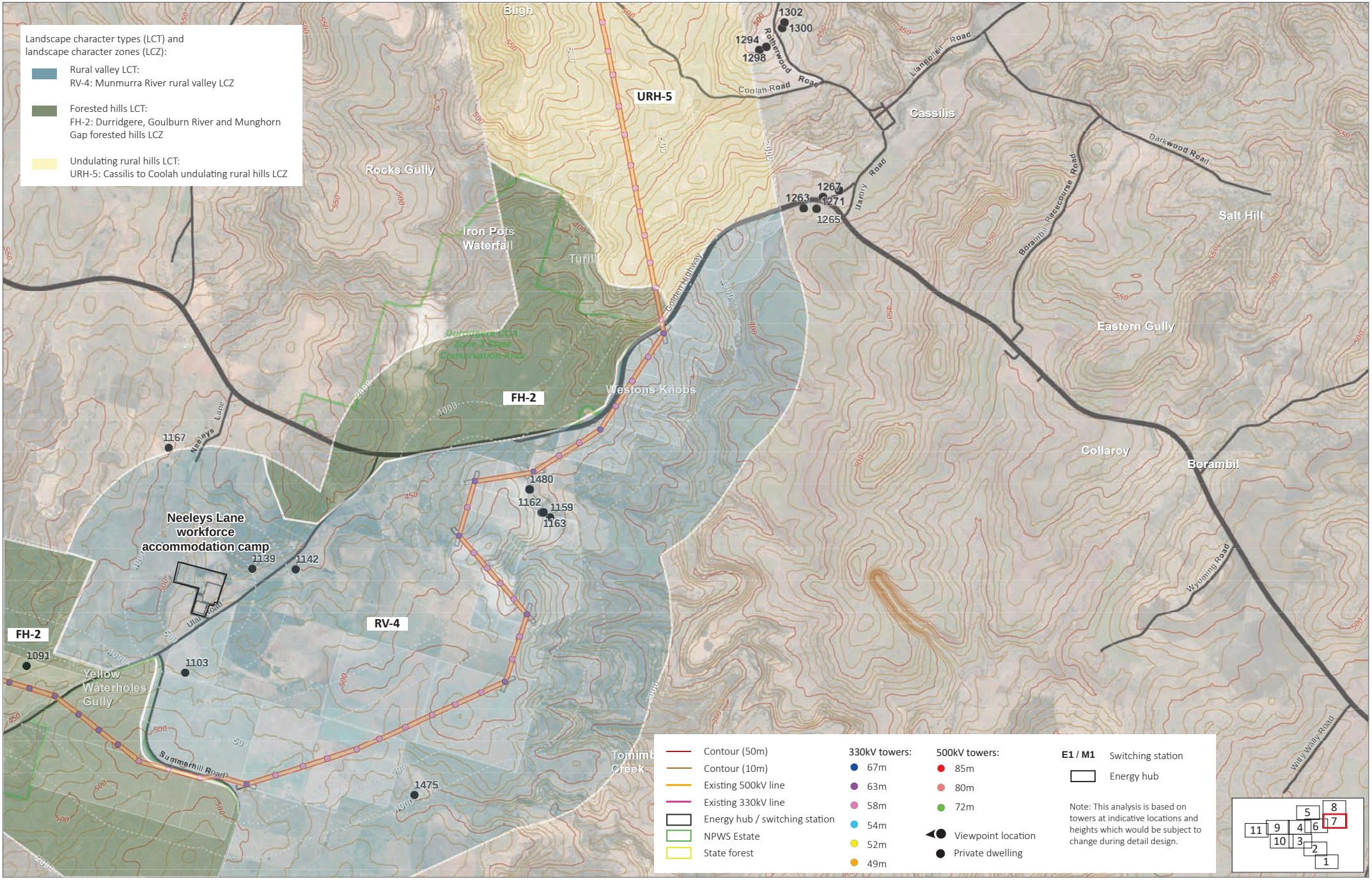
Appendix B

B-6

Landscape and visual impact assessment addendum - **Landscape character zones** (Ross Crossing to Durridgere)

0 1 2 3km

north



File: CWOREZ-Fig05-AerialPhoto50K-240213_cadastre

iris

Central-West Orana Renewable Energy Zone Transmission Project

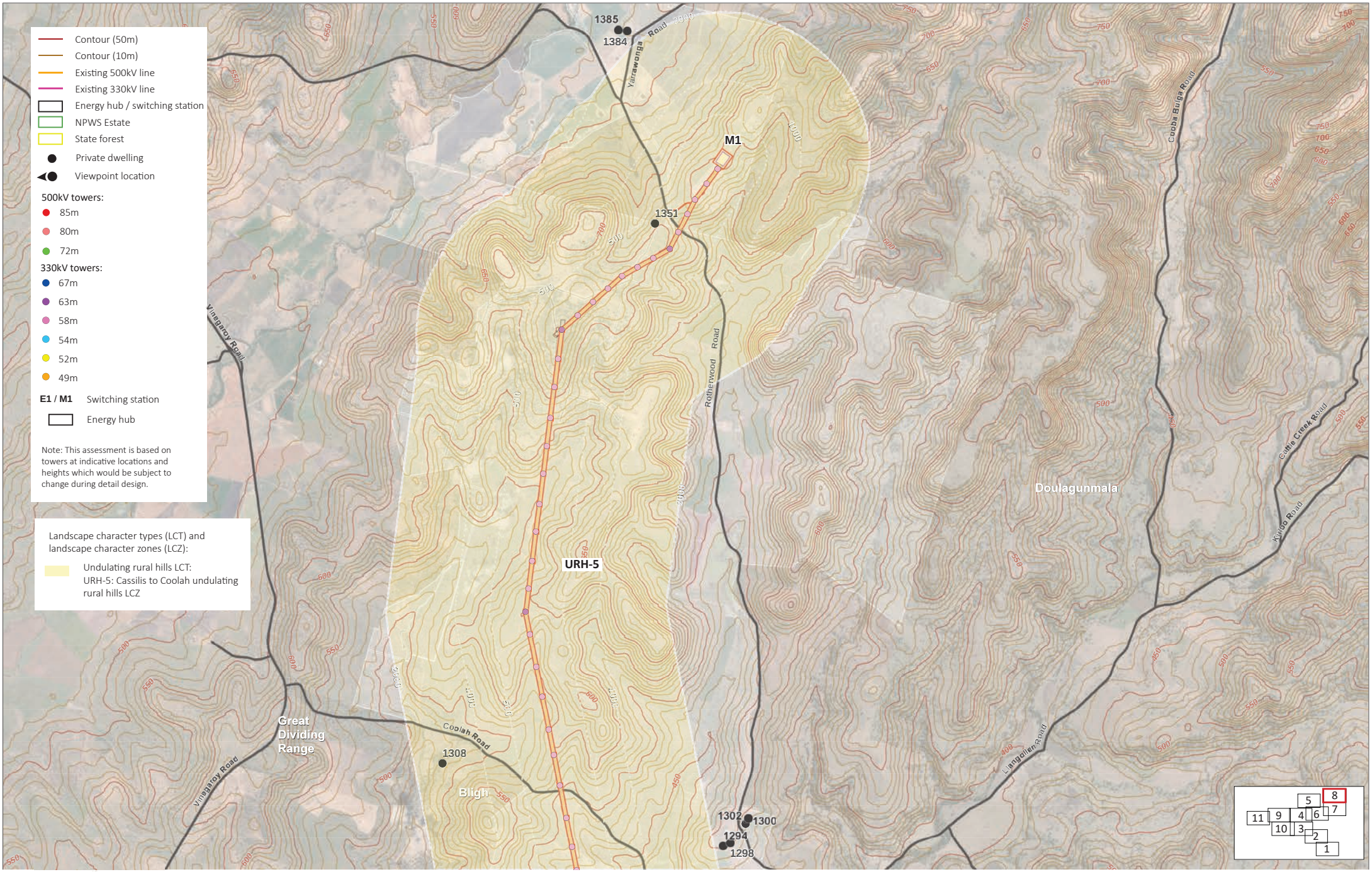
Appendix B

Landscape and visual impact assessment addendum - **Landscape character zones** (Durridgere to Cassilis)

B-7

0 1 2 3km

north



iris

Central-West Orana Renewable Energy Zone Transmission Project

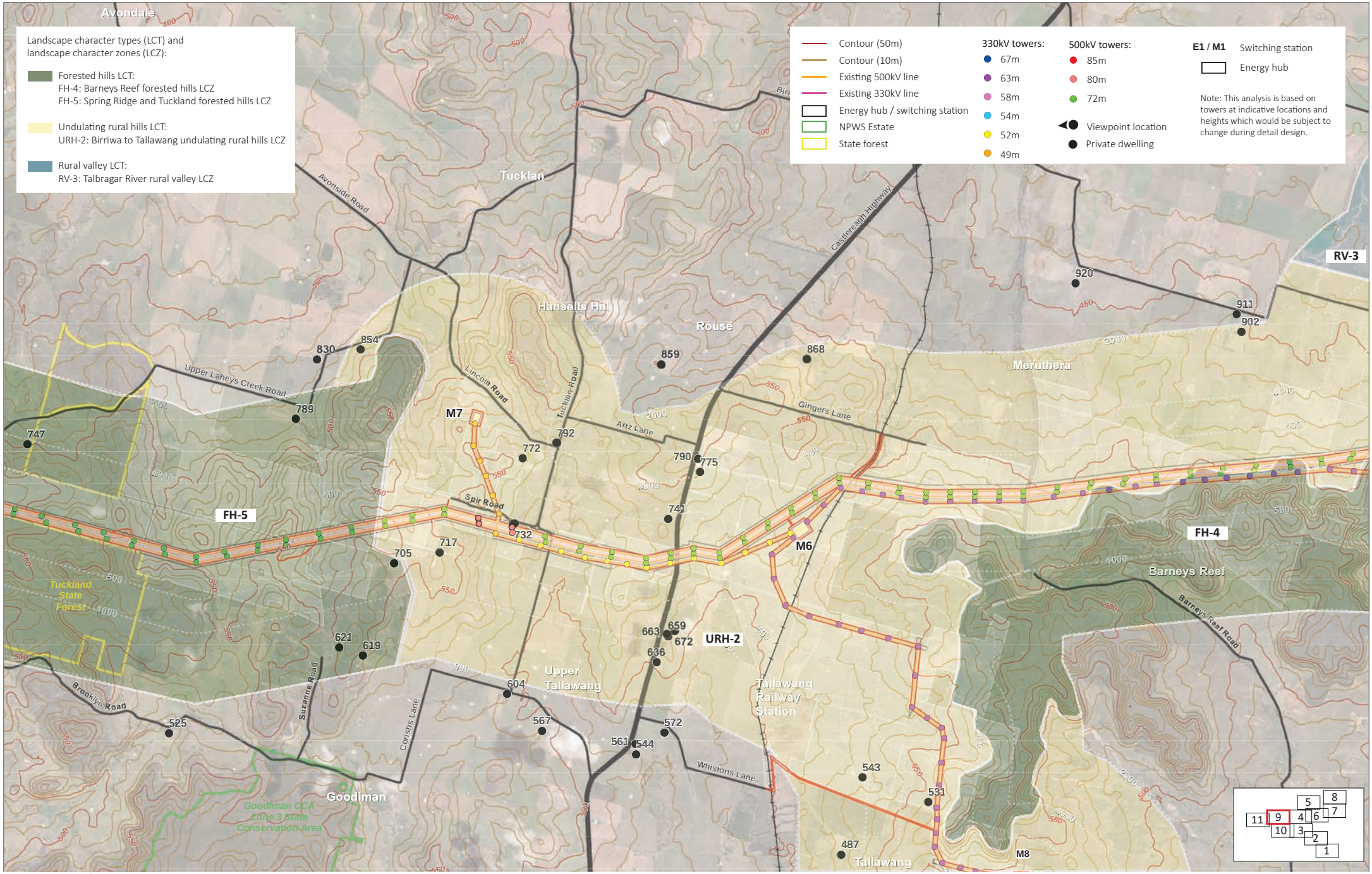
Appendix B

B-8

Landscape and visual impact assessment addendum - **Landscape character zones** (Cassillis to Rotherwood Road)

1 2 3km

north



Central-West Orana Renewable Energy Zone Transmission Project

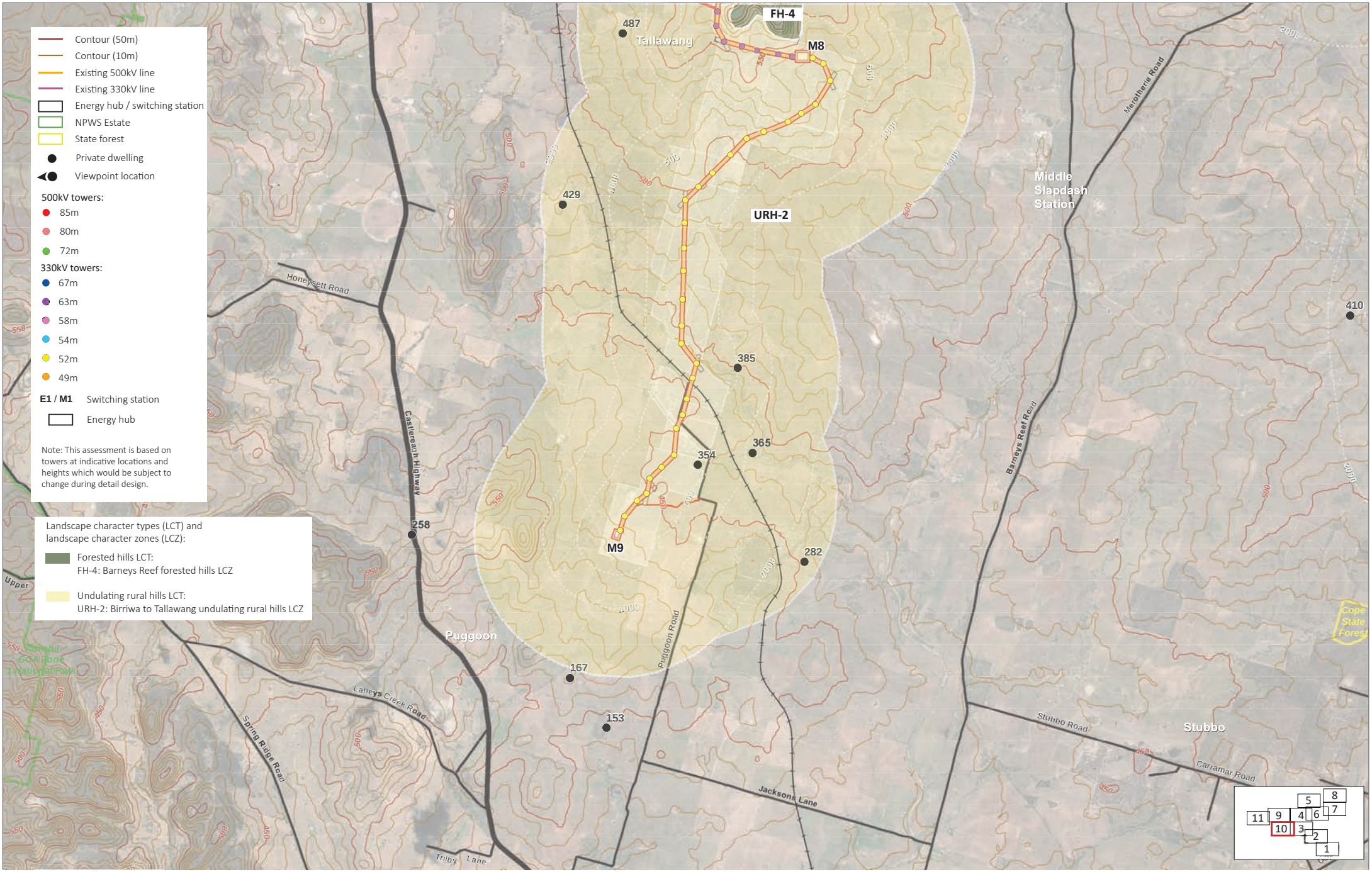
Appendix B

Landscape and visual impact assessment addendum - **Landscape character zones** (Merotherie to Tuckland)

0 1 2 3km

north

iris



iris

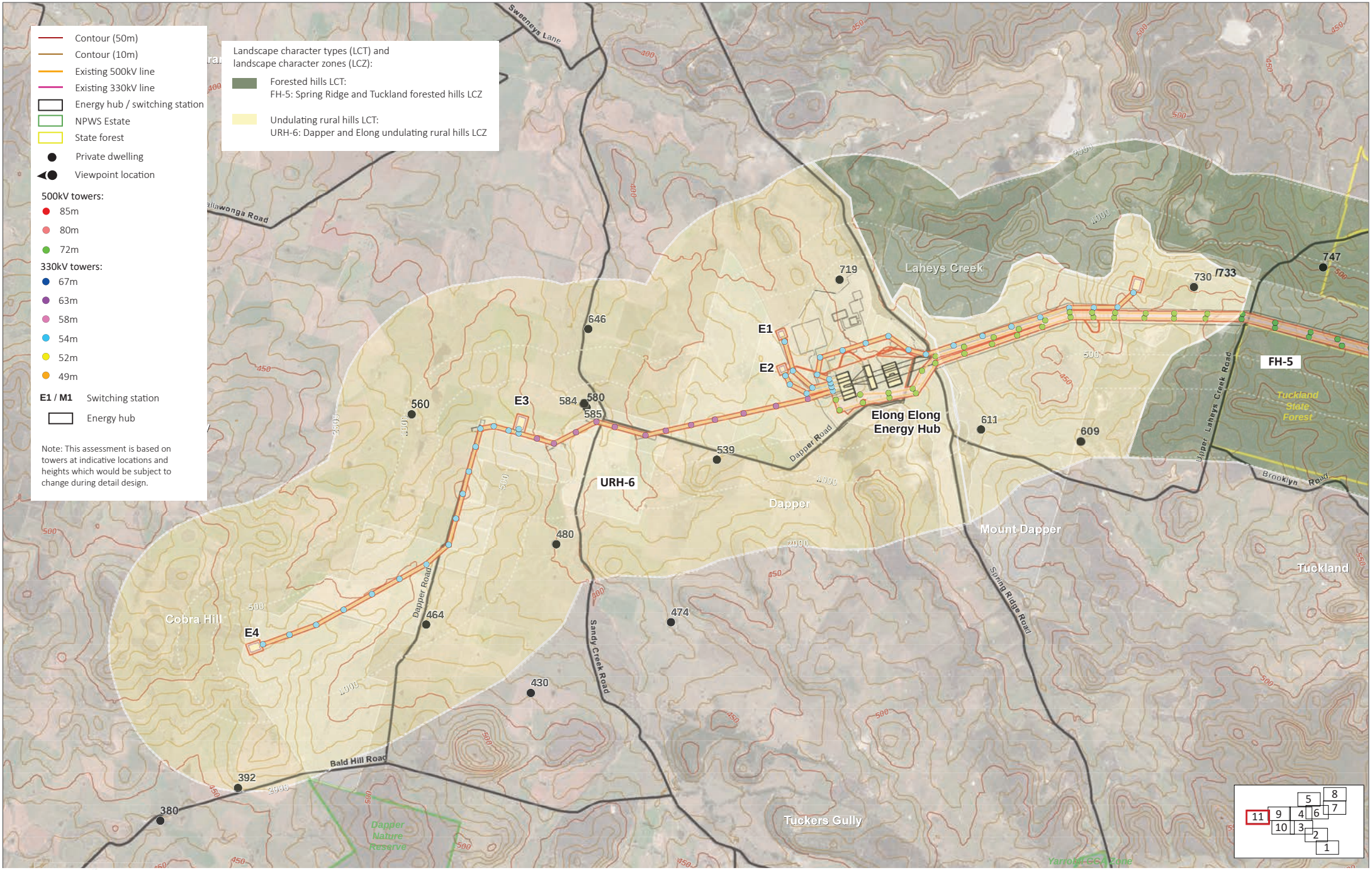
Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Landscape character zones** (Tallawang to Stubbo)

Appendix B

0 1 2 3km

north



iris

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Landscape character zones** (Tuckland to Cobra Hill)

Appendix B

0 1 2 3km

north

Appendix C:
Visibility of towers within 2 kilometres

This analysis is based on towers in indicative locations which would be subject to change during detail design

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

500kV towers:
85m
80m
72m

330kV towers:
67m
63m
58m
54m
52m
49m

Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

Wollar Road
Wilpinjong Road
Slate Gully Road
Ulan-Wollar Road
Mogo Road
Araluen Road
Araluen Lane
Barigan Street
Barigan Road
Cumbo Road
Upper Cumbo Road
Maree Road
Tichular Road
Wollar Road

VP01
VP02
VP03
82
68
31
19
9

New Wollar Switching Station

Goulburn River National Park

Craigs Gully
Wollar
Cumbo
Cumbo
Razorback Ridge
Back Flat
Left Hand Gully
Castle Rocks
The Forest
Phillip

File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Wollar to Wilpinjong)

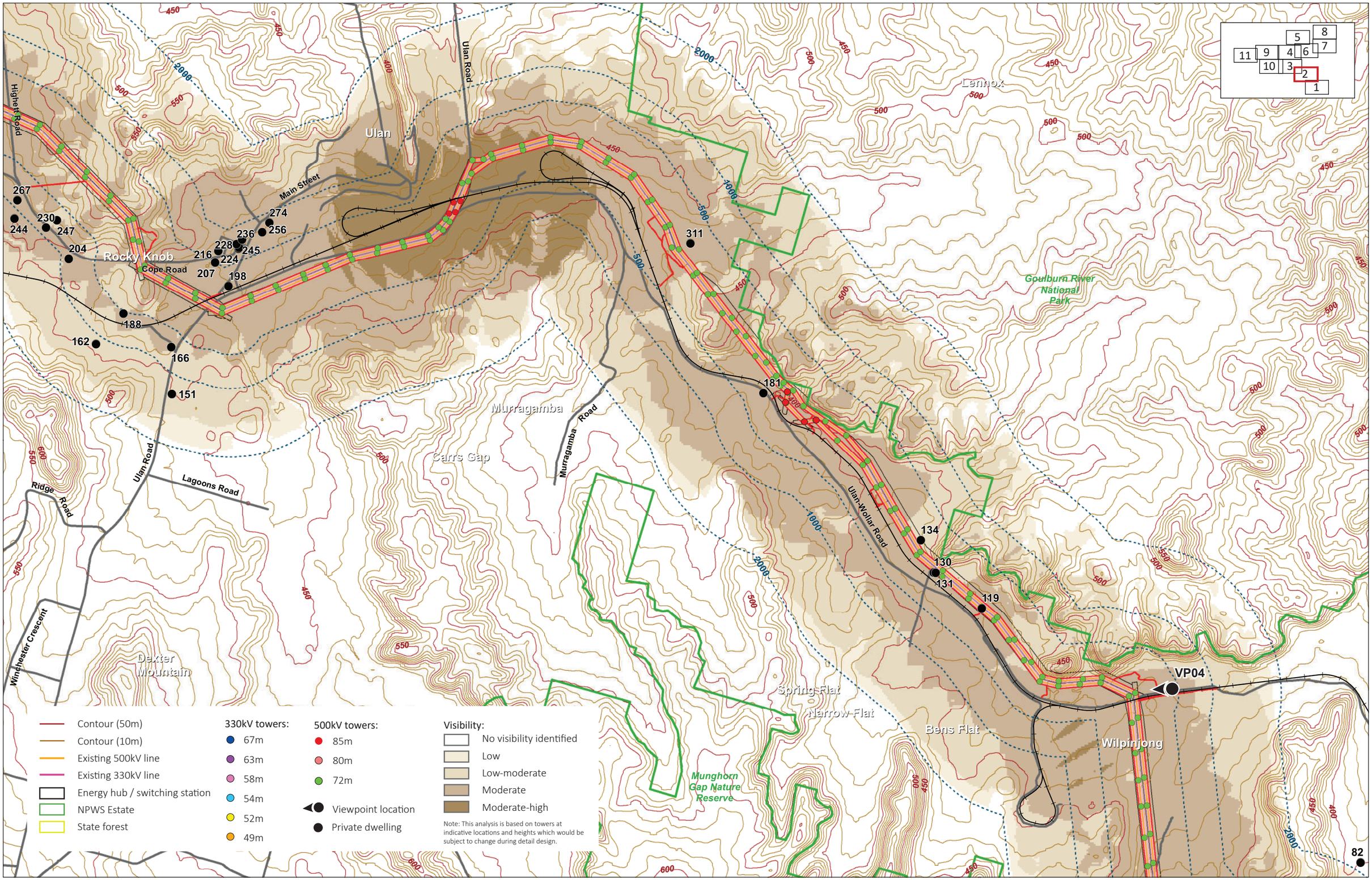
Appendix C

D-1

0 1 2 3km

north

iris



File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

iris

Central-West Orana Renewable Energy Zone Transmission Project

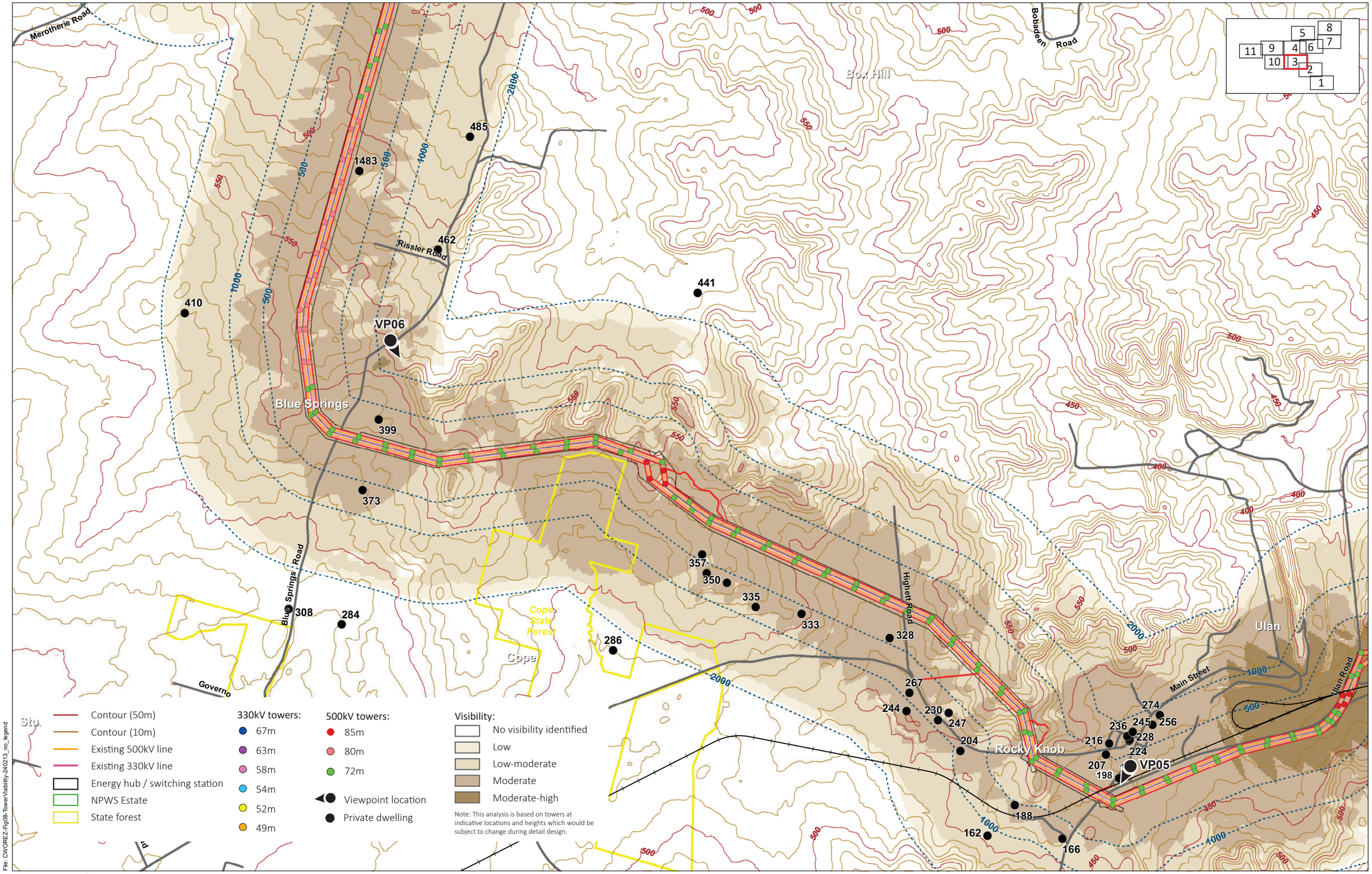
Landscape and visual impact assessment addendum - **Visibility** (Wilpinjong to Ulan)

Appendix C

D-2

0 1 2 3km

north



File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

iris

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Ulan to Blue Springs)

Appendix C

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest

330kV towers:
67m
63m
58m
54m
52m
49m

500kV towers:
85m
80m
72m

Viewpoint location
Private dwelling

Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high

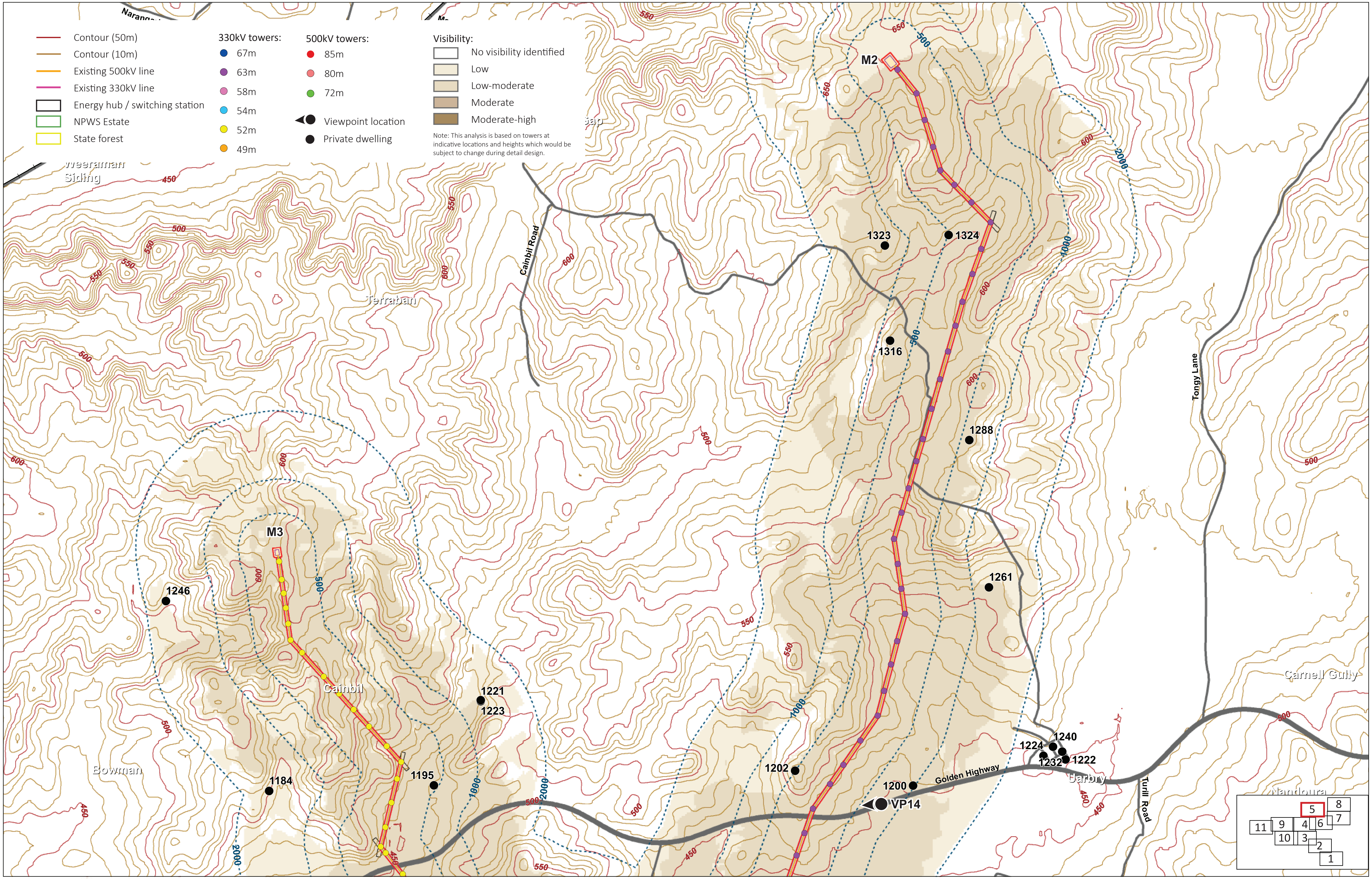
Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.

Merotherie Crossing
Merotherie
Maintenance facility
Workforce accommodation camp
Birriwa Bus Route
Merotherie Energy Hub
Merotherie Road
Birkalla Road
Cockabutta Hill
The Pinnacle
The Springs
Ross Crossing
Cliffdale Road
Blue Springs Road
Narragamba
Narragamba Swamp
Bungaba
Bligh
Wonga Roo Road
Bobadeen Road
M5
M4

VP07
VP08
VP09
VP10
VP11
VP12
VP13

1053
1027
965
876
880
1482
827
826
627
588
703
1150
1152
998
947
941
955
927
929
979
1057
1487
1119
1070
1037
846
815
800
779
755
821
697
679
662
681
643
616

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
330kV towers:
67m
63m
58m
54m
52m
49m
500kV towers:
85m
80m
72m
Viewpoint location
Private dwelling
Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high
Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.
Merotherie Crossing
Merotherie
Maintenance facility
Workforce accommodation camp
Birriwa Bus Route
Merotherie Energy Hub
Merotherie Road
Birkalla Road
Cockabutta Hill
The Pinnacle
The Springs
Ross Crossing
Cliffdale Road
Blue Springs Road
Narragamba
Narragamba Swamp
Bungaba
Bligh
Wonga Roo Road
Bobadeen Road
M5
M4
VP07
VP08
VP09
VP10
VP11
VP12
VP13
1053
1027
965
876
880
1482
827
826
627
588
703
1150
1152
998
947
941
955
927
929
979
1057
1487
1119
1070
1037
846
815
800
779
755
821
697
679
662
681
643
616
5
8
11
9
4
6
7
10
3
2
1
File: CWOREZ-Fig08-TowerVisibility-240213_no_legend
iris
Central-West Orana Renewable Energy Zone Transmission Project
Landscape and visual impact assessment addendum - **Visibility** (Merotherie to Ross Crossing)
Appendix C
D-4
0
1
2
3km
north



Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
330kV towers:
67m
63m
58m
54m
52m
49m
500kV towers:
85m
80m
72m
Viewpoint location
Private dwelling
Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high
Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.
M2
M3
1323
1324
1316
1288
1261
1246
1221
1223
1195
1184
1202
1200
1224
1240
1232
1222
VP14
Terraban
Cainbil
Bowman
Barbry
Nandoura
Carnell Gully
Cainbil Road
Tongy Lane
Golden Highway
Turill Road
Siding

File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

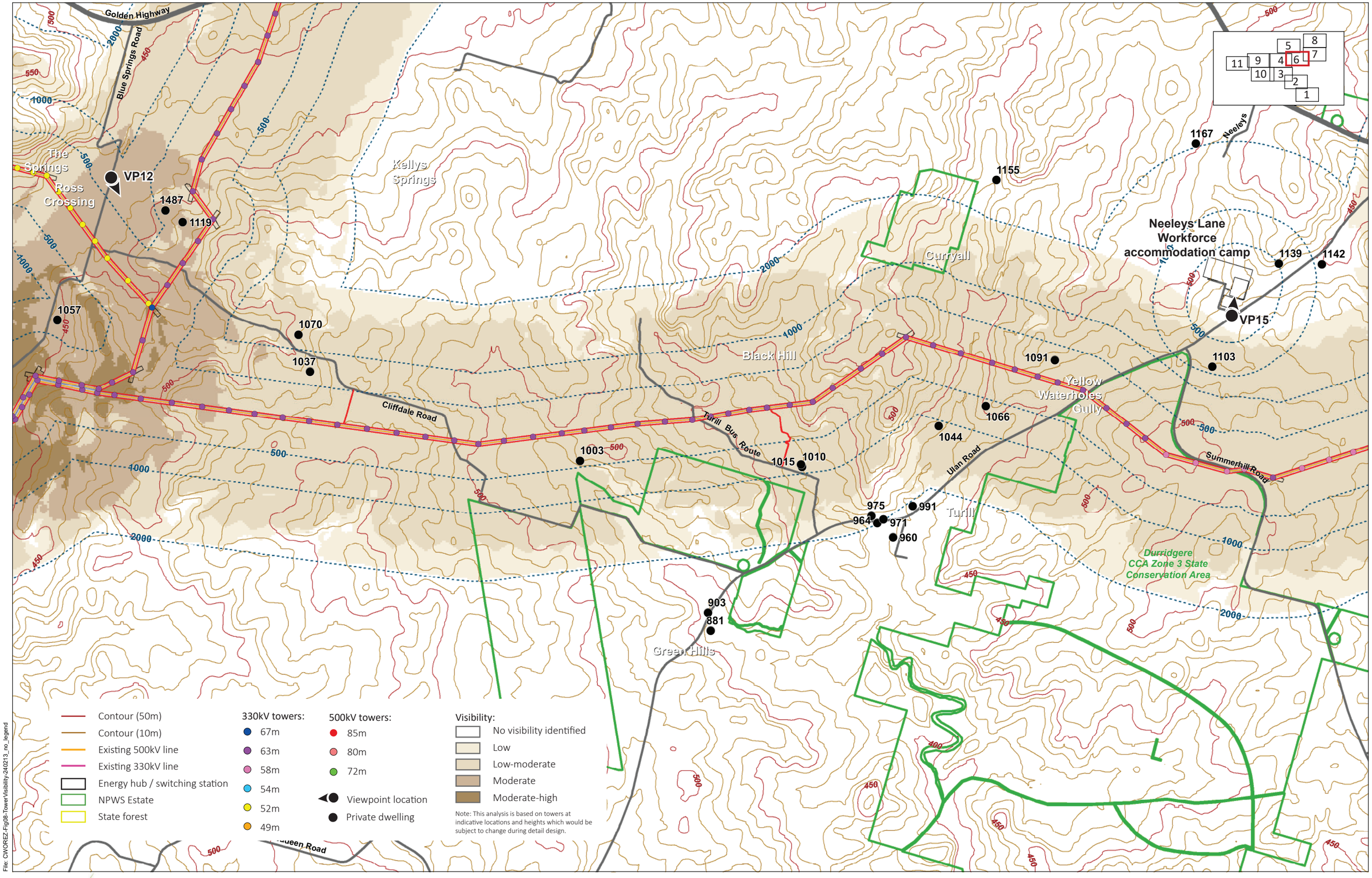
Landscape and visual impact assessment addendum - **Visibility** (Terraban Gap and Tongy)

Appendix C

0 1 2 3km

north

iris



File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

iris

Central-West Orana Renewable Energy Zone Transmission Project

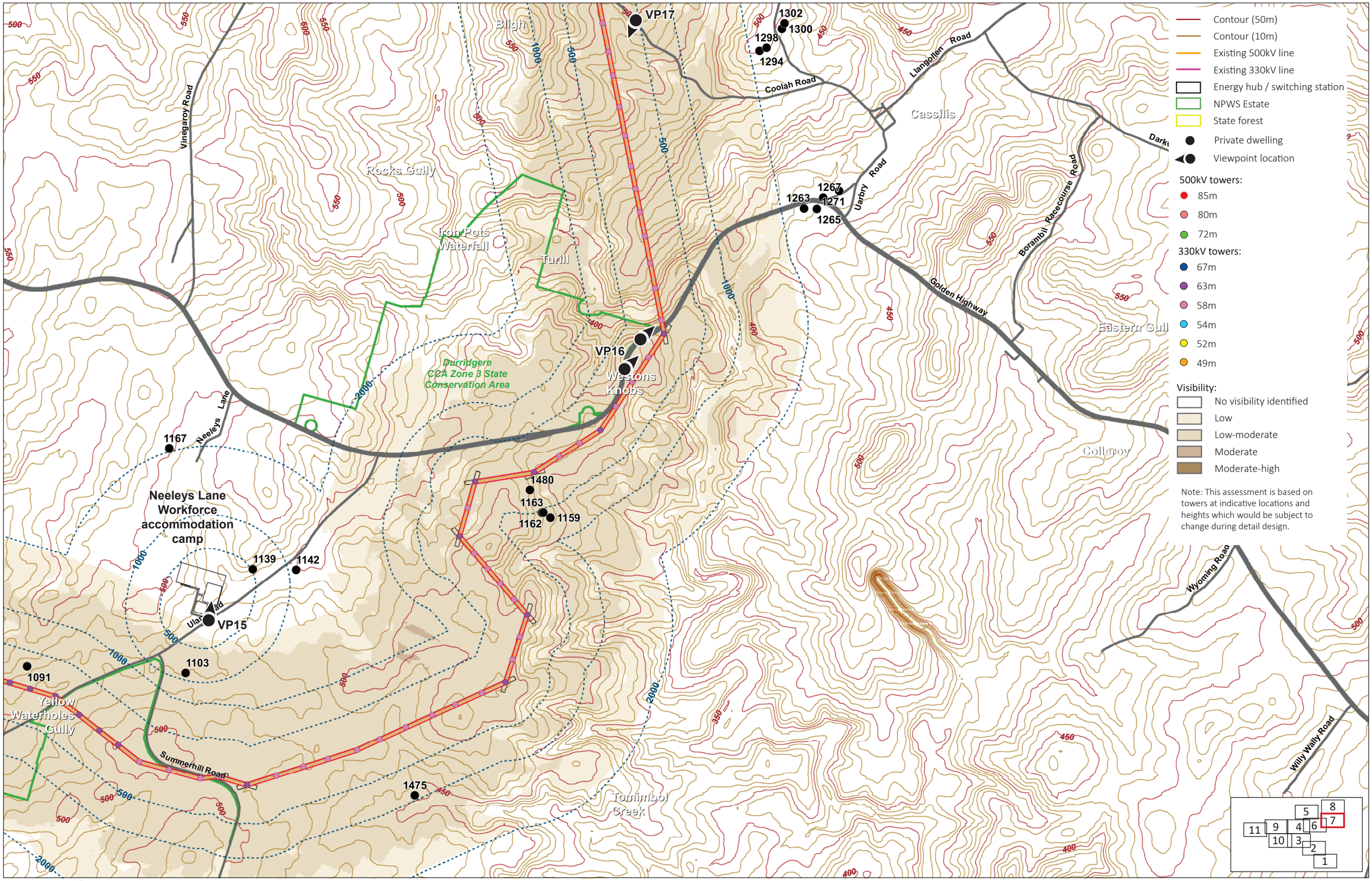
Appendix C

D-6

Landscape and visual impact assessment addendum - **Visibility** (Ross Crossing to Durridgere)

0 1 2 3km

north



File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

iris

Central-West Orana Renewable Energy Zone Transmission Project

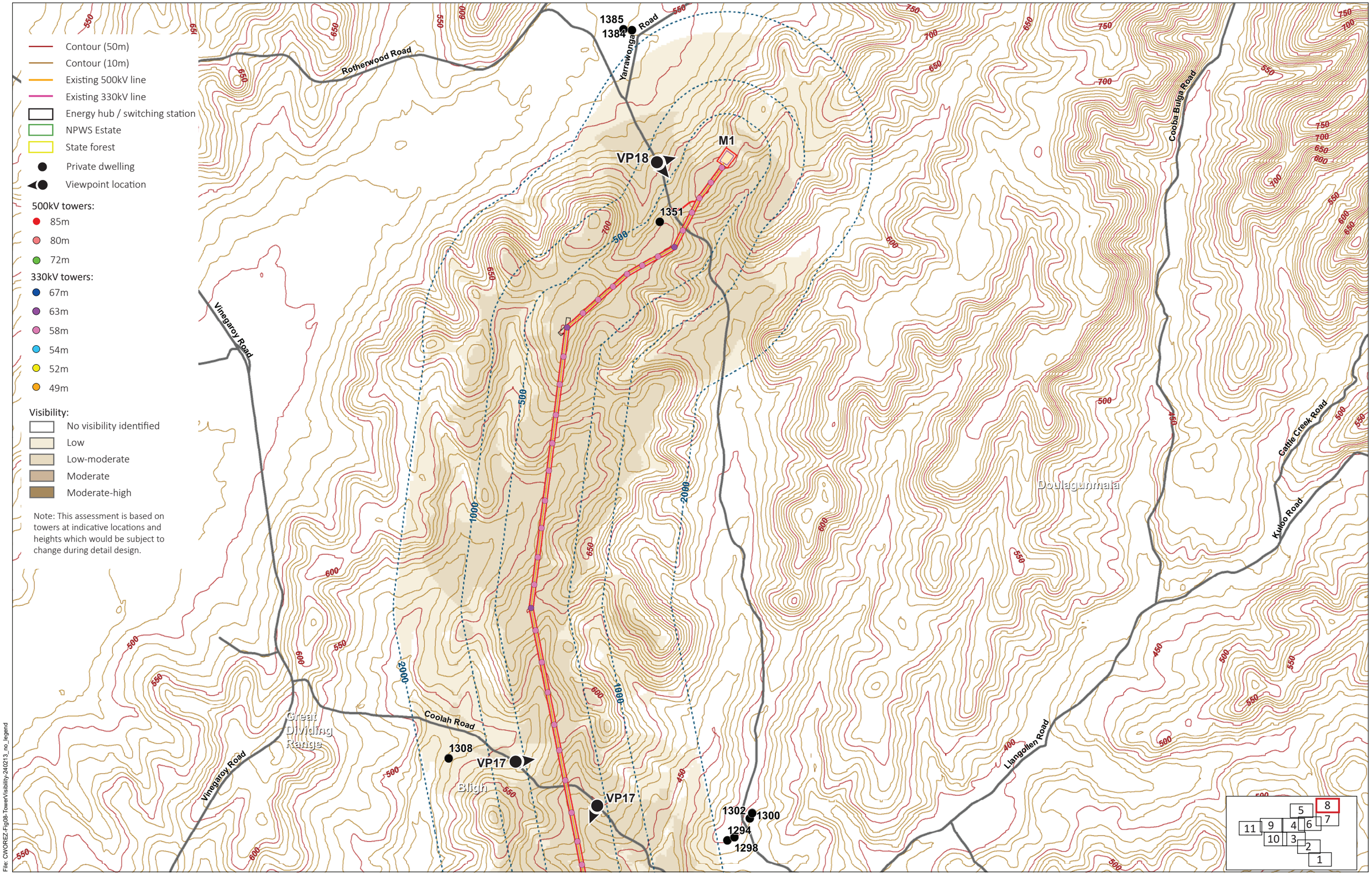
Landscape and visual impact assessment addendum - **Visibility** (Durridgere to Cassilis)

Appendix C

D-7

0 1 2 3km

north



File: C:\OREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Cassillis to Rotherwood Road)

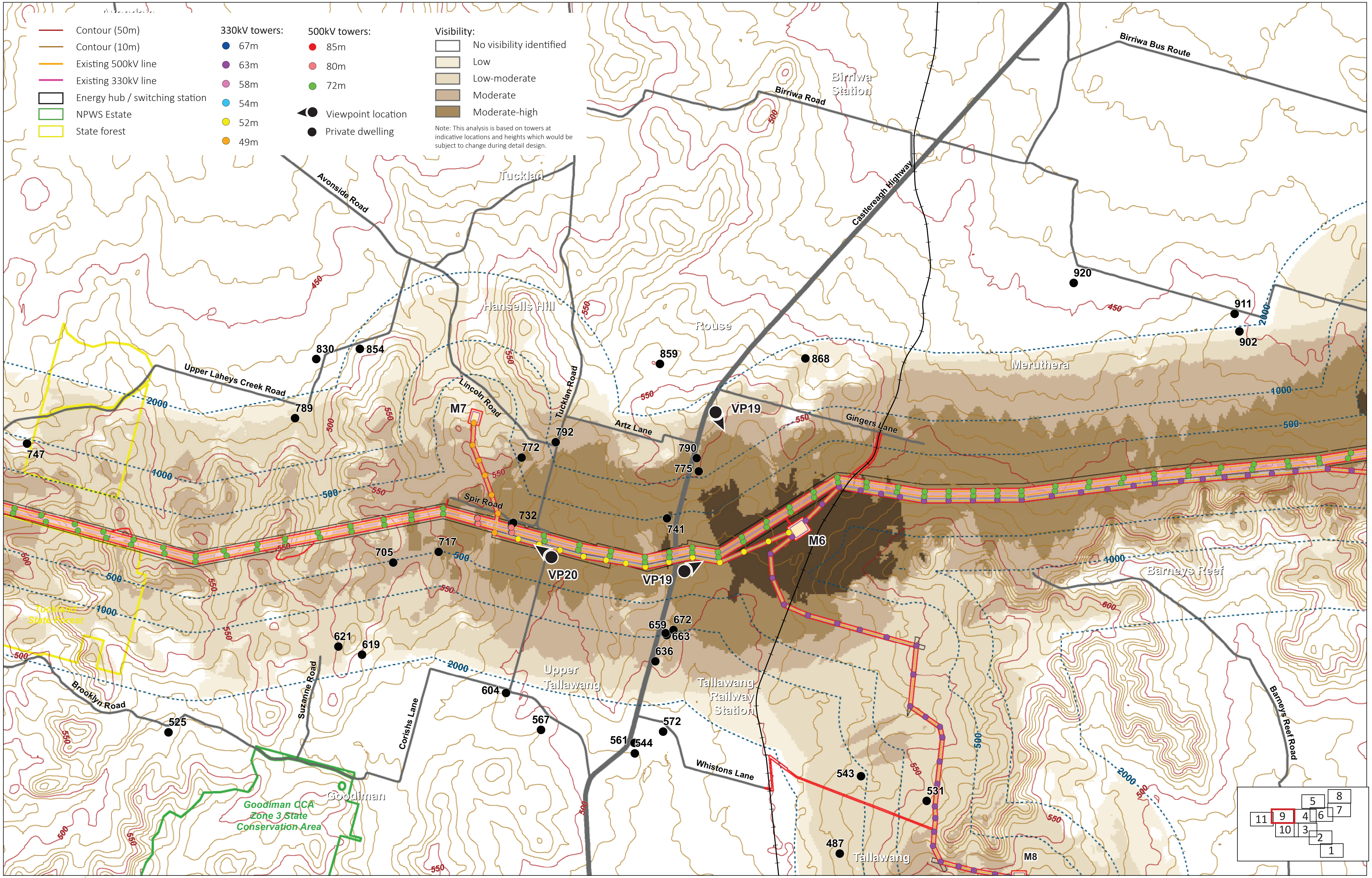
Appendix C

D-8

0 1 2 3km

north

iris


Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
330kV towers:
67m
63m
58m
54m
52m
49m
500kV towers:
85m
80m
72m
Viewpoint location
Private dwelling
Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high
Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.
Birriwa Bus Route
Birriwa Road
Birriwa Station
Castlereagh Highway
Avonside Road
Tuckland
Hansells Hill
Rouse
Merothera
Upper Laheys Creek Road
Lincoln Road
Tucklan Road
Artz Lane
Gingers Lane
Spir Road
M7
M6
M8
VP19
VP20
Barneys Reef
Barneys Reef Road
Tuckland State Forest
Upper Tallawang
Tallawang Railway Station
Tallawang
Brooklyn Road
Suzanne Road
Corishs Lane
Whistons Lane
Goodiman
Goodiman CCA Zone 3 State Conservation Area
File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Merotherie to Tuckland)

Appendix C

0 1 2 3km

north

iris

Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
Private dwelling
Viewpoint location

500kV towers:
85m
80m
72m

330kV towers:
67m
63m
58m
54m
52m
49m

Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high

Note: This assessment is based on towers at indicative locations and heights which would be subject to change during detail design.

487
Tallawang
M8
429
Honeysett Road
Castlereagh Highway
385
VP21
354
365
258
M9
282
VP21
Merotherie Road
Middle Slapdash Station
410
Bameys Reef Road
Upper Mebul Road
Goodiman
Puggoon
Puggoon Road
Yarrabil CCA zone 1 National Park
167
153
Laheys Creek Road
Spring Ridge Road
Trilby Lane
Jacksons Lane
Stubbo Road
Stubbo
Carramar Road
Cape State Forest

File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Tallawang to Stubbo)

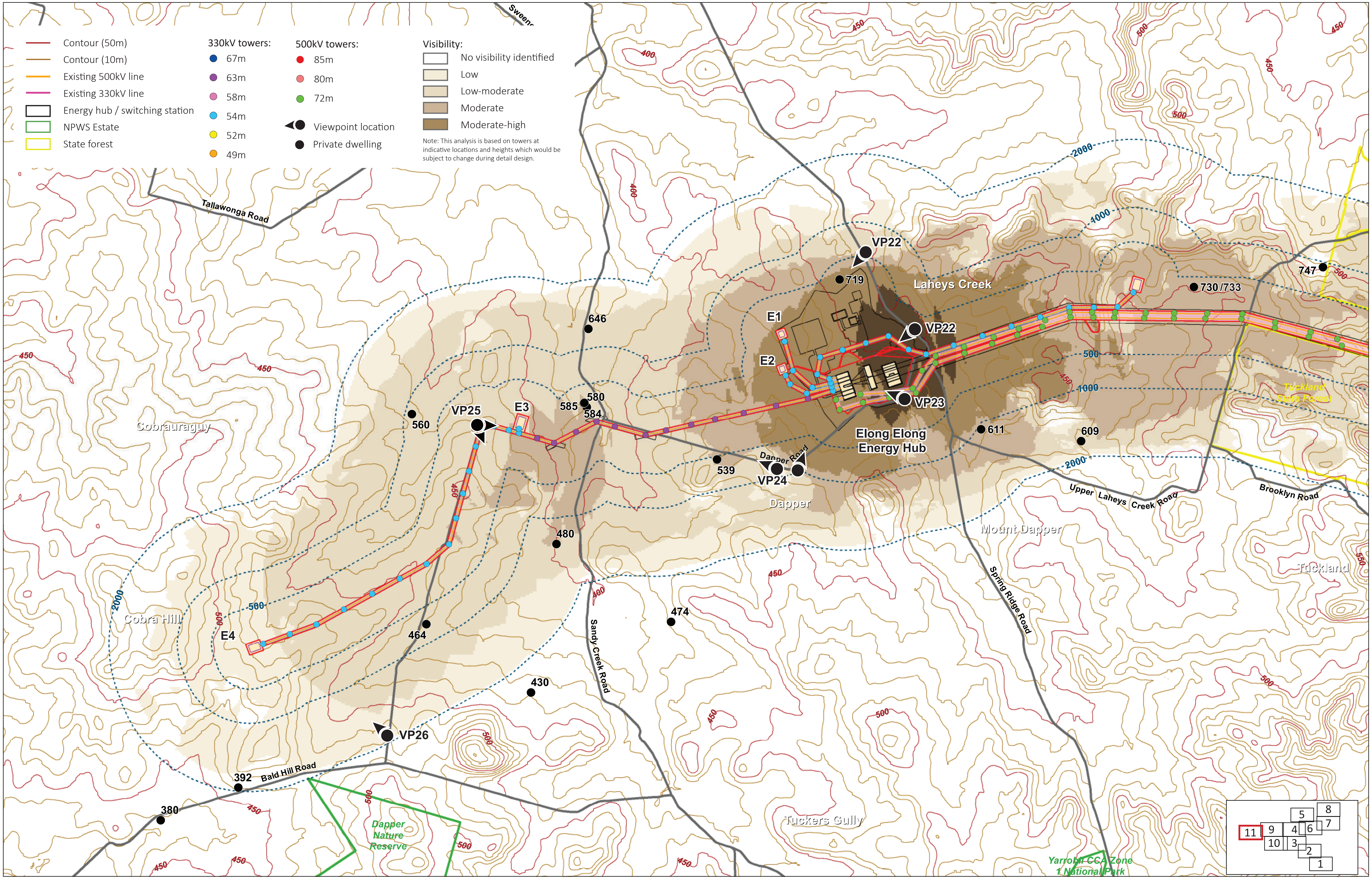
Appendix C

D-10

0 1 2 3km

north

iris



Contour (50m)
Contour (10m)
Existing 500kV line
Existing 330kV line
Energy hub / switching station
NPWS Estate
State forest
330kV towers:
67m
63m
58m
54m
52m
49m
500kV towers:
85m
80m
72m
Viewpoint location
Private dwelling
Visibility:
No visibility identified
Low
Low-moderate
Moderate
Moderate-high
Note: This analysis is based on towers at indicative locations and heights which would be subject to change during detail design.
Tallawonga Road
VP22
719
Laheys Creek
747
730/733
E1
VP22
E2
VP23
646
580
585
584
VP25
E3
560
Cobrauraguy
Elong Elong Energy Hub
611
609
Dapper Road
539
VP24
Dapper
Upper Laheys Creek Road
Brooklyn Road
Tuckland State Forest
Mount Dapper
Tuckland
480
Cobra Hill
E4
464
474
Spring Ridge Road
Sandy Creek Road
430
VP26
392
Bald Hill Road
380
Dapper Nature Reserve
Tuckers Gully
Yarrobil CCA Zone 1 National Park
2000
1000
500
4000
File: CWOREZ-Fig08-TowerVisibility-240213_no_legend

Central-West Orana Renewable Energy Zone Transmission Project

Landscape and visual impact assessment addendum - **Visibility** (Tuckland to Cobra Hill)

Appendix C