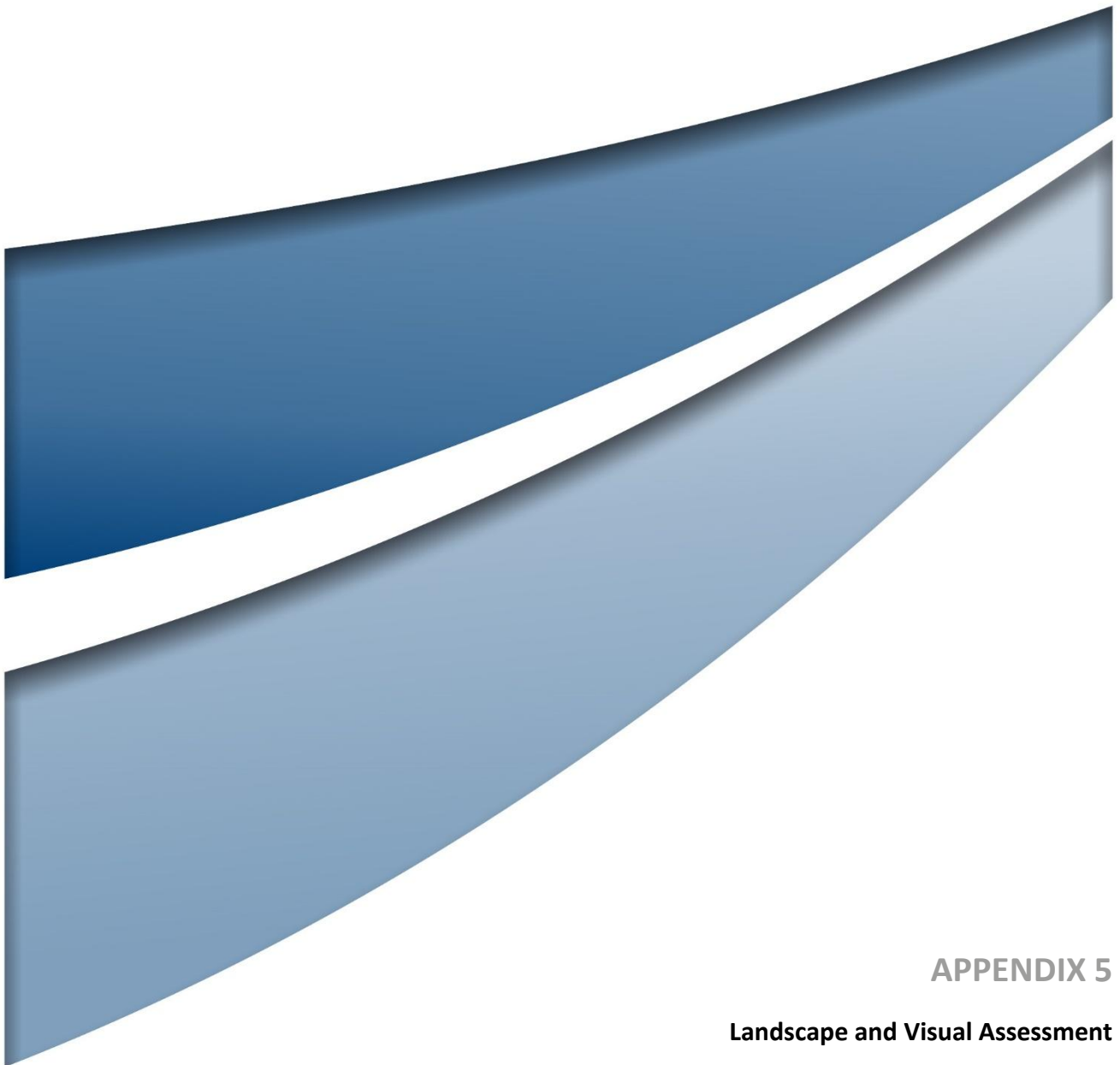




APPENDIX 5

Landscape and Visual Assessment



Wattle Creek BESS - SSD 63345458

Landscape & Visual Impact Assessment



Acknowledgement of Country

Moir Landscape Architecture acknowledge the traditional custodians of the lands and waters of Australia, most notably the Awabakal Nation in which our office resides and the Gundungurra Nation, the traditional owners of the lands on which this Project resides. We acknowledge their contribution to our community and their deep connection to the land. We pay our respects to Elders both past and present.

Executive Summary

Moir Landscape Architecture (Moir LA) has prepared this Landscape and Visual Impact Assessment (LVIA) of the Wattle Creek Battery Energy Storage System (BESS) (the Project) for Spark Renewables Pty Ltd (the Applicant).

The Project involves the installation, operation and decommissioning of a large scale BESS and associated infrastructure, which has been assessed in this LVIA.

Moir LA has applied a quantitative study methodology in accordance with the Department of Planning, Housing & Infrastructure (DPHI) Large- Scale Solar Energy Guideline, August 2022 (referred to hereafter as 'the Guideline') and conforming with the Technical Supplement - Landscape and Visual Impact Assessment (referred to hereafter as the 'Technical Supplement'). The guideline is applied to Solar Farms as well as their associated infrastructure such as a BESS.

The LVIA includes a comprehensive assessment of the existing landscape character, scenic quality and visibility of the Project. Visual influence zones have been established from viewpoints and sensitive receptors and assessed against visual performance objectives outlined in the Guideline.

Moir LA attended the site in February 2023 and March 2024 to undertake analysis and a photographic survey to determine the landscape character and establish a visual baseline. The assessment determined that the region's landscape is typical of the NSW South Eastern Highlands Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, characterised by parcels of land modified to support pastoral activities, interspersed amongst undulating hills and diverse vegetation. The landscape was divided into three (3) specific Landscape Character Zones (LCZ) where a quantitative frame of reference was applied to establish the Scenic quality rating of these, ranging from low to moderate. The Scenic Quality Ratings were utilised in defining Visual Influence Zones which were assessed against objectives outlined in the Guideline and the Technical Supplement.

In accordance with the Guidelines and the Technical Supplement, Moir LA applied the preliminary assessment tools to the project layout to determine dwelling receptors that require detailed assessment.

The assessment identified that the three (3) non-associated residences within 2.5 km would not experience a line of sight to the BESS but suggests potential visibility of associated infrastructure (see section 8.0). One (1) photomontage was prepared to showcase the extent of the BESS and the transmission lines in a worst case scenario.

Of the ten (10) viewpoints from public roads and rail lines within 2.5 km with a line of sight to the Project, all ratings resulted in 'very low', where one (1) resulted in a rating of 'low'. Two (2) photomontages were prepared to showcase the extent of the BESS and transmission lines in a worst case scenario.

Upon completing the assessment in its entirety, completing each step as outlined in Section 2.0, all public and private receptors were assessed as having a 'low' visual impact overall. This was achieved primarily due to intervening vegetation between the receptor and the Project and existing transmission lines providing as a pre-existing visual element within the landscape.

By performance objectives outlined in the Guidelines and the Technical Supplement, a 'low' visual impact does not require mitigation.

Wattle Creek BESS

Landscape & Visual Impact Assessment

Prepared for
Umwelt Pty Ltd

Issue
G

Date
05/03/25

Project Number
2415

Revision	Date	Author	Checked	Comment
A	30/05/24	AW ES	TB	For Review
B	03/09/24	AW ES	TB	For Review
C	16/09/24	AW ES	MED	For Review
D	20/09/24	AW ES	JR TB	For Submission
E	09/10/24	ES	JR TB	Minor Amendments
F	04/03/25	TS	AR	Figure Updates
G	05/03/25	ES		Minor Amendments



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Glossary & Terminology

Applicant

The party (i.e. Spark Renewables) applying for the development

Associated Dwelling

A landholder who has reached an agreement with the Applicant in relation to the Project but will not host project related infrastructure on their land

Bioregion

An ecologically and geographically defined area characterised by its combination of geological features, climate, flora, and fauna

Community Consultation

The process of engaging with the local community and stakeholders to gather feedback, address concerns, and involve the public in the decision-making process of the Project

Cumulative Visual Impacts

The combined effects of multiple projects on the visual catchment in which the Project is proposed over time

Geographical Information Systems (GIS)

A system that captures, stores, analyses, manages and present data link to specific locations. This spatial data is linked to a digital database

Host Landowner

A landholder who will (subject to finalisation of an agreement with the Applicant) host infrastructure on their land, also referred to as ‘involved’ landholders

Land Zoning

The classification of land for specific uses or activities - typically regulated by local environment planning documentation and/or relevant SEPP documentation

Land Use

The way the existing land is utilised, including but not limited to residential, commercial, industrial, agricultural, or conservation purposes

Landscape and Visual Impact Assessment (LVIA)

A technical assessment to identify and assess the potential visual effects resulting from the Project on the landscape, individual receivers and on the overall visual amenity of the region in which the Project is sited

Landscape

All the visible features, including landform, vegetation, buildings and infrastructure, contained within a holistic area

Landscape Character

Landscape character refers to the distinct and recognisable pattern of physical elements that occur consistently in a particular landscape. The landscape character of an area is generally defined by the most dominant landscape element or unique combination of elements that occur within that landscape. It reflects how particular combinations of geology, landforms, soils, vegetation, land use and human settlements create a particular sense of place for different areas within the landscape

Landscape Character Units

An area of landscape with similar properties or strongly defined spatial qualities that are distinct from areas immediately nearby within the Study Area

Mitigation Measures

Potential strategies or actions implemented to minimise or offset the adverse visual impacts of the Project

Non-Associated Dwelling

A dwelling owned by a non-associated landholder

Photographic Survey & Fieldwork

A systematic process of collecting visual data in the form of photographs and surveys taken from various viewpoints within the Study Area to document the existing visual conditions

Preliminary Visual Impact Assessment (PVIA)

An initial high level assessment which is used to inform the LVIA

The Project

The proposed development that is the subject of the LVIA assessment.

Project Area

The Site where the Project is proposed

Renewable Energy Zone (SW-REZ)

A designated area to support renewable energy development as declared in the Electricity Infrastructure Investment Act 2020

Secretary’s Environmental Assessment Requirements (SEARs)

Secretary’s Environmental Assessment Requirements (SEARs) outlines the environmental assessment requirements for State Significant Projects. The SEARs will normally include specific requirements for landscape character and visual impact assessments

State Environmental Planning Policies (SEPPs)

Legislation and policies at both the state and local levels that determine the regulations governing the development of activities on a property. State Environmental Planning Policies (SEPPs) are applicable statewide, while Local Environmental Plans (LEPs) establish the specific planning regulations for individual local government areas

Study Area

The geographical region or area under consideration in the preparation of a PVIA, LVIA or VIA assessment.

Viewpoint

A specific location from which a view or landscape is observed. A viewpoint location is the geographic location or physical position (in GPS format) where the viewpoint was captured

Visual Amenity

The overall visual quality of a landscape that considers factors including but not limited to views, natural features, and the built environment

Visual Baseline

A desktop assessment and onsite photographic surveys/fieldwork that describes and captures the existing environmental conditions in which any future changes can be measured against

Viewshed

The geographical area from which a particular view can be observed.

Visual Effects

The effects on specific views and on the general visual amenity experienced by receptors

Visual Impact

The observable and measurable change in the visual catchment caused by the Project. This is determined by considering the visual sensitivity and magnitude of change

Visual Magnitude

The degree of visual change resulting from the Project, including but not limited to the size, scale, compatibility and duration of effect

Visual Receivers / Receptors

Individuals and / or defined groups of people who have the potential to be affected by the Project

Visual Sensitivity

The susceptibility of a landscape or visual resource to absorb impacts from a Project, land use change or the introduction of a new element into the landscape

Visual Impact Assessment (VIA)

The process for determining the day-to-day visual effects of a Project on people’s views from the private and public domain.

Visualisation

A computer-generated simulation, photomontage or other technique illustrating the predicted appearance and/or massing of the Project within the existing landscape.

Zone of Visual Influence (ZVI)

The extent of landscape area from which the Project can potentially be theoretically viewed based on topography alone.

Abbreviations

AGL	Above Ground Level
BESS	Battery Energy Storage System
DPHI	Department of Housing and Infrastructure
EIS	Environmental Impact Statement
IBRA	Interim Biogeographic Regionalisation of Australia
kV	Kilovolt
LALC	Local Aboriginal Land Council
LCU	Landscape Character Unit/Zone/s
LEP	Local Environmental Plan
LGA	Local Government Area
LVIA	Landscape Visual Impact Assessment
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEH	Office of Environment and Heritage
PV	Photovoltaic/ Solar Panels
PVIA	Preliminary Visual Impact Assessment
REZ	Renewable Energy Zone
SEARS	Secretary’s Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
ZVI	Zone of Visual Influence



1.0 Introduction

1.1 Background

Moir Landscape Architecture (Moir LA) have been commissioned by Umwelt Pty Ltd on behalf of Spark Renewables Pty Ltd 'the Applicant' to prepare a Landscape & Visual Impact Assessment for Wattle Creek BESS referred to hereafter as 'the Project'. The Project sits within the broader Wattle Creek Energy Hub Project where the BESS components are subject to separate approval processes to that of the PV generation facility. The Project is located on Arthursleigh Farm (Lot 3 of DP 1120270), approximately 80 kilometres (km) west of Wollongong and 15 km northwest of Marulan (refer to **Figure 01**) within the Wingecarribee Shire Council Local Government Area (LGA).

The purpose of this LVIA report is to provide a qualitative and quantitative assessment of the visibility and potential visual impacts of the Project. The LVIA will support the statutory approval process for the Project, and is intended to accompany and inform the Environment Impact Statement (EIS).

This LVIA report provides a comprehensive assessment of visibility and potential visual impacts associated with the Project, including the landscape character, landscape values, landscape amenity and any significant scenic vistas.

Fieldwork was undertaken in **March 2023**, **May 2023** and **March 2024** using key viewpoints within the localised region as defined by the Study Method in **Section 2.0** of this report. The report details the results of fieldwork, documents the assessment of the landscape character and visual setting, and makes recommendations to assist in the mitigation of any potential impacts resulting from the proposed development.

1.2 Relevant Experience

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and LVIAs. Our team has extensive experience in undertaking LVIAs for large-scale infrastructure projects, including the renewables, industrial and commercial developments in visually sensitive areas. Our capabilities include digital terrain modelling, viewshed assessment, photomontage development, landscape character assessments and community consultation.

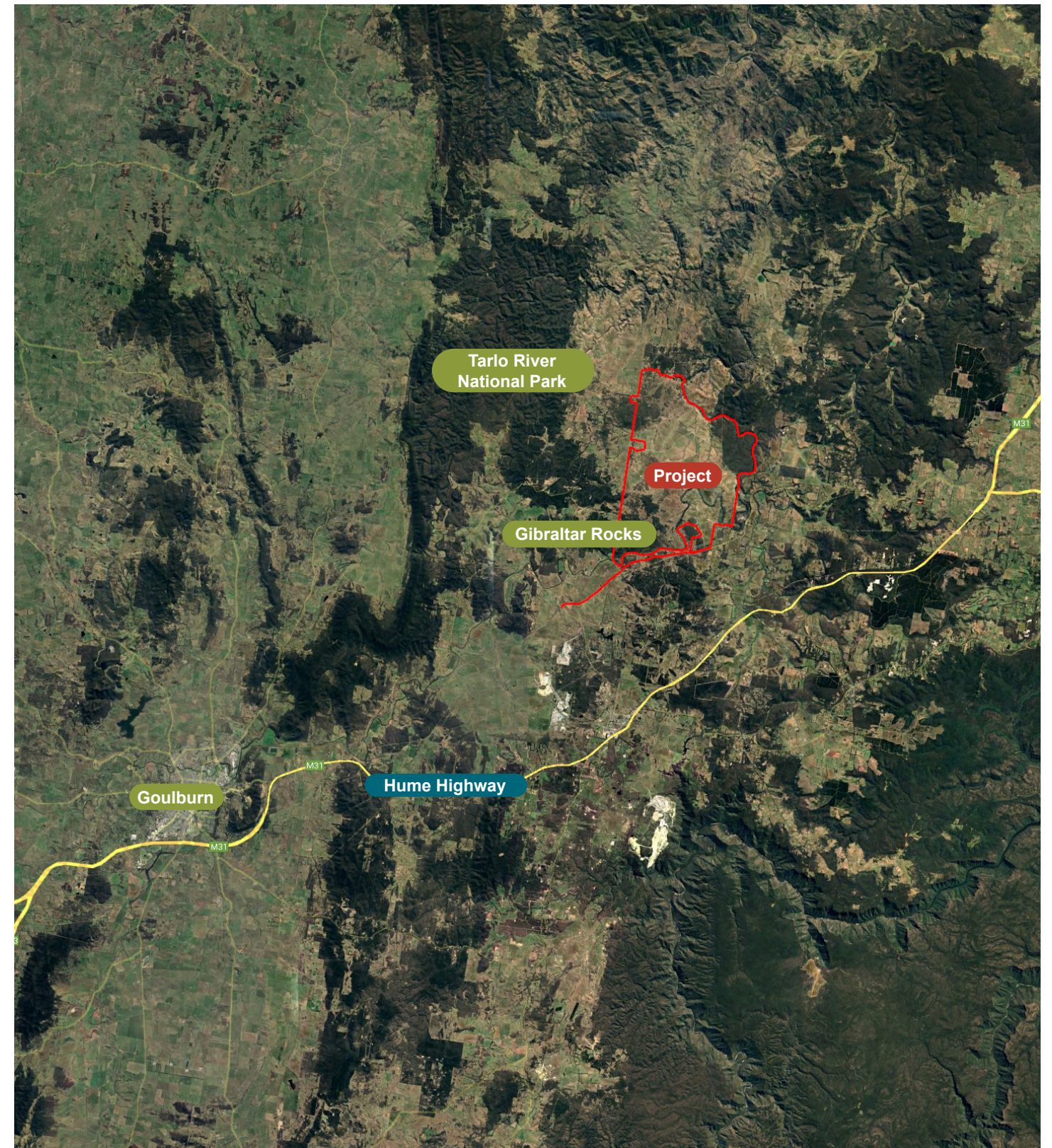


Figure 01 – Regional Context
Imagery Source: Google Earth, 2024.

1.3 Report Structure

The following table provides an outline of the report structure and a summary the elements addressed in the LVIA. Detailed methodologies for each section of the assessment have been included in the relevant chapters of the report.

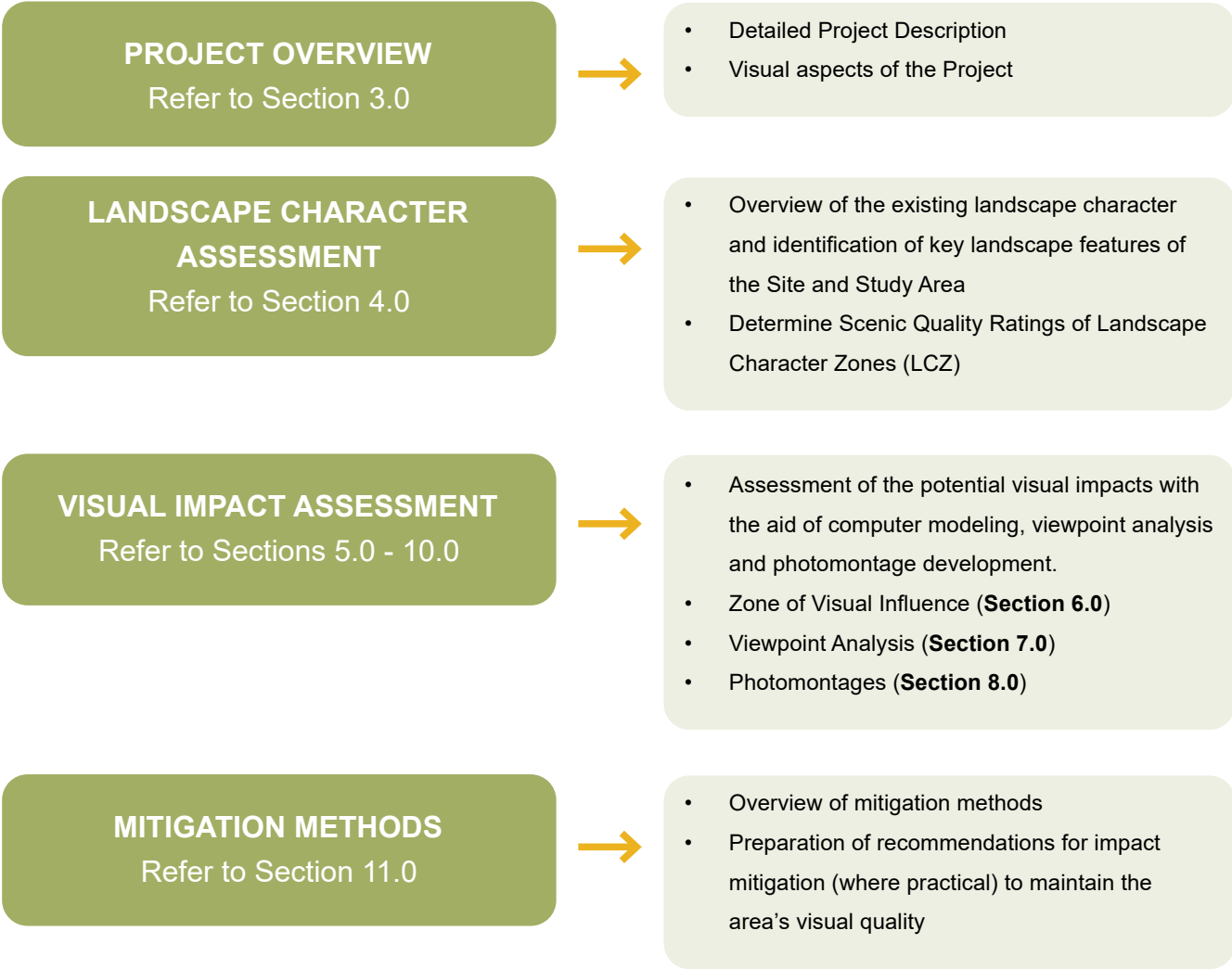
Visual Impact Assessment Report Structure	
Section 2.0: Study Method	Overview of Study Method utilised for the LVIA
Section 3.0: Project Overview	Project Description and overview of the Project and all components to be assessed within the LVIA
Section 4.0: Existing Landscape Character	Establish the existing landscape and visual conditions prior to undertaking any visual assessment
Section 5.0: Zone of Visual Influence	Assessment to identify potential visual impacts
Section 6.0: Viewpoint Analysis	Assessment of key viewpoints within the visual catchment and Study Area
Section 7.0: Photomontages	Preparation photomontages to illustrate the appearance of the Project
Section 8.0: Visual Impact Assessment	Assessment of the visual impacts resulting from the Project
Section 9.0: Nightlighting	Overview of potential nightlighting sources
Section 10.0 Cumulative Visual Impacts	Assessment of cumulative visual impacts of associated infrastructure
Section 11.0: Mitigation Recommendations	An outline of proposed mitigation and management options
Section 12.0: Conclusion	

Table 01 – Report Structure

2.0 Study Method

2.1 Overview of the Study Method

The following provides an overview of the Study Method utilised for undertaking the LVIA. This methodology is based on the relevant policies, frameworks and our experience in undertaking LVIA for large infrastructure projects. The LVIA was undertaken in the stages as noted below:



2.2 Landscape Character Assessment

Landscape Character refers to the distinct and recognisable pattern of elements that occur consistently in a particular landscape. The Landscape Character of an area is generally defined by the most dominant landscape element or unique combination of elements that occur within that landscape. It *‘reflects how particular combinations of geology, landforms, soils, vegetation, land use and human settlements create a particular sense of place for different areas within the landscape’* (Landscape Institute, 2013).

The Landscape Character of the Study Area has been assessed at a regional, local and site scale. This assessment will utilise existing topographic maps, site imagery and land use maps using 2.5 km as the defined 'Study Area' from the Project Area.

2.2.1 Landscape Character Zones and Scenic Quality

Once the Landscape Character has been assessed, the LCZ can be identified within the Study Area.

Scenic Quality refers to the *‘relative scenic, cultural or aesthetic value of the landscape within the viewshed based on the presence or absence of key landscape features’* (DPHI, 2022). Each category of the 'Frame of Reference' (refer to **Table 02**) has been quantified for each LCZ to determine a 'Scenic Quality' rating of **‘High’**, **‘Moderate’** or **‘Low’**.

Viewpoint Type	Low Scenic Quality	Moderate Scenic Quality	High Scenic Quality
Landform	- Large expanses of flat or gently undulating terrain. - Indistinct, dissected or unbroken landforms that provide little illusion of spatial definition or landmarks with which to orient	- Steep, hilly and undulating ranges that are not visually dominant - Broad shallow valleys - Moderately deep gorges or moderately steep valley walls - Minor rock outcrops	- Isolated peaks, steep rocky ridges, cones or escarpments with distinctive form and/or colour contrast that become focal points - Large areas of distinctive rock outcrops or boulders Well defined, steep sided valley gorges
Vegetation	- 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	- Predominantly open forest or woodland combined with some natural openings in patterns that offer some visual relief - Vegetative stands that exhibit a range of size, form, colour, texture and spacing including human influenced vegetation such as vineyards, and orchards	- Strongly defined patterns with combinations of native forest, naturally appearing openings, streamside vegetation and/or scattered exotics - Distinctive stands of vegetation that may create unusual forms, colours or textures in comparison to surrounding vegetation
Waterbodies	- Absence of natural waterbody - Farm dams, irrigation canals or stormwater infrastructure	Intermittent streams, lakes, rivers, swamps and reservoirs	- Visually prominent lakes, reservoirs, rivers, streams, wetlands and swamps - Presence of harbour, inlet, bay or open ocean
Social & Cultural	Places of worship, cemeteries/ memorial parks, private open spaces	- Local heritage sites - Distinguishable entry ways to a regional city identified in the Transport and Infrastructure SEPP	- Culturally important sites, world heritage areas, national parks/ reserves, - Commonwealth and state heritage sites
Human Presence	Dominating presence of infrastructure, human settlements, highly modified landscapes and higher density populations such as regional cities, industrial areas, agricultural transport or electricity infrastructure	Dispersed yet evident presence of human settlement such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure	- Natural/undisturbed landscape - Minimal evidence of human presence and production

Table 02 – Scenic Quality Frame of Reference

Source: Adapted from the DPHI Technical Supplement - LVIA

2.2.2 Receptor Sensitivity Rating

Receptor sensitivity relates to the relative importance of receptors (refer to **Table 03**) and the value that the community or visitors may place on landscapes viewed from public use areas, public travel ways and private receptors such as dwellings. The sensitivity of each viewpoint is placed into one of four (4) sensitivity ratings (**‘Very Low’**, **‘Low’**, **‘Moderate’**, **‘High’**). The intent is to classify the viewer sensitivity on the LCZ in which the Project is being viewed and assessed based on the Landscape Character Assessment.

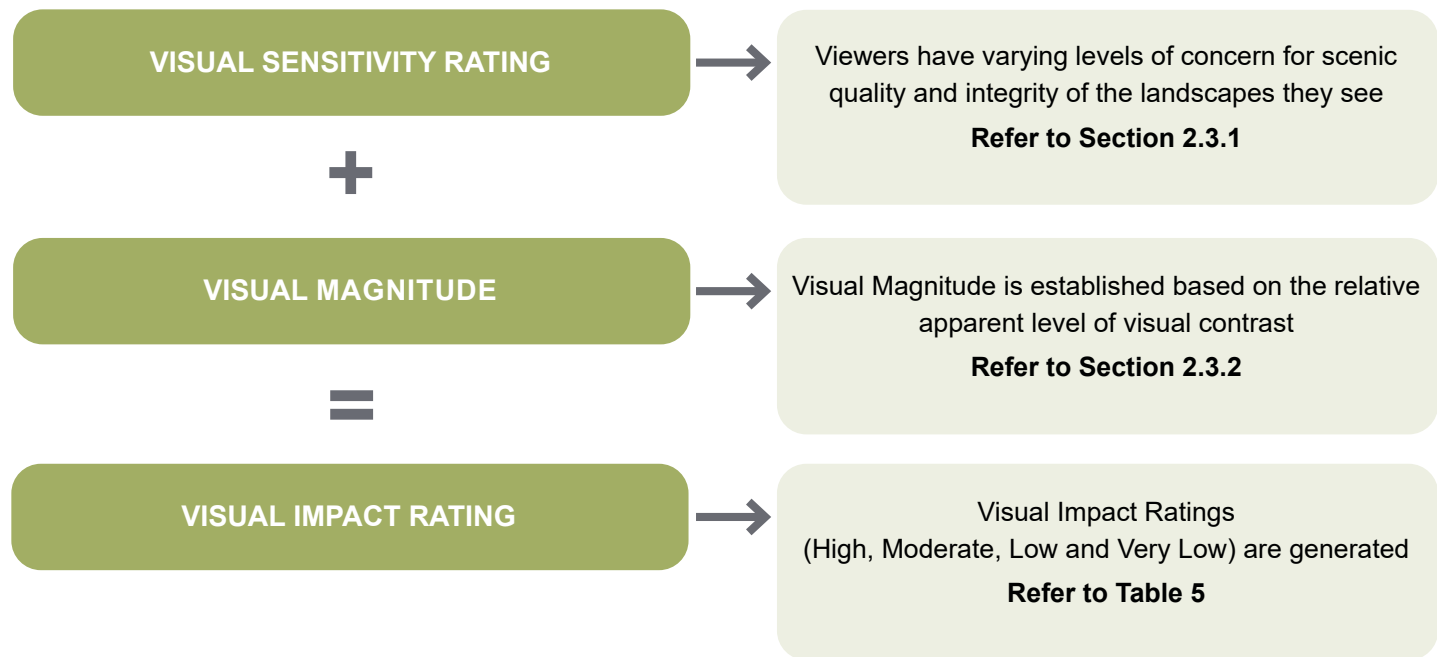
Receptor Sensitivity Rating	
Very Low	- Local sealed and unsealed roads - Passenger rail lines with daily daylight services - State highways, freeways and classified main roads - Walking tracks and navigable waterways
Low	- Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3 and C4) - Tourist roads and scenic drives - Walking tracks and navigable waterways - Cemeteries, memorial parks
Moderate	- 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) - Tourist and visitor accommodation and places of worship (such as bed and breakfasts, motels, hotels) - Tourist uses in tourist areas (zoned SP3) - Publicly accessible green and open spaces including picnic areas, parks, public recreation areas - Town centres and central business districts
High	- Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5) - Historic rural homesteads/residences on the national, state or local heritage list

Table 03 – Receptor Sensitivity Rating

Source: Adapted from the DPHI Technical Supplement - LVIA

2.3 Visual Impact Assessment

The potential visual impact of the Project is then assessed based on the relationship between the visual sensitivity (refer to **Section 2.3.1**) and visual magnitude (refer to **Section 2.3.2**).



2.3.1 Visual Sensitivity

Sensitivity refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to change. Visual Sensitivity, defined by the Department of Planning, Housing and Infrastructure (DPHI) ‘refers to the quality of the existing view and how sensitive the view is to the proposed change’. The ‘visual sensitivity is determined by identifying the sensitivity of each viewpoint and categorising the scenic quality of the area in view’ (DPHI, 2022).

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewing time decreases;
- Visual sensitivity decreases as the number of potential viewers decreases; and
- Visual sensitivity can also be related to viewer activity (e.g. a person viewing a Project Site whilst engaged in recreational activities will be more effected by change than someone passing a scene in a car travelling to a desired destination).

Visual Sensitivity ratings are defined as ‘**High**’, ‘**Moderate**’ and ‘**Low**’ based on the Scenic Quality and Receptor Sensitivity.

VISUAL SENSITIVITY RATING				
		SCENIC QUALITY Landscape Character Zones		
		High	Moderate	Low
RECEPTOR SENSITIVITY	High	High	High	Moderate
	Moderate	High	Moderate	Moderate
	Low	Moderate	Low	Low
	Very Low	Low	Very Low	Very Low

Table 04 – Visual Sensitivity Rating

2.3.2 Visual Magnitude

Visual magnitude refers to the extent of change that will be experienced by receptors. Factors that are considered when assessing the magnitude of change include (AILA, 2018):

- *the proportion of the view / landscape effected;*
- *extent of the area over which the change occurs;*
- *the size and scale of the change;*
- *the rate and duration of the change; and*
- *the level of contrast and compatibility.*

2.3.3 Visual Impact

Visual Impact refers to the change in appearance of the landscape as a result of the Project. Visual Impact is the combined effect of visual sensitivity and visual magnitude. Various combinations of visual sensitivity and visual magnitude will result an overall visual impacts (refer to **Table 05**).

This process involves a qualitative assessment of the conclusions of visual impact ratings for each viewpoint. The analysis takes into consideration other relevant influencing factors not easily addressed through the process of quantitative analysis.

VISUAL IMPACT RATING					
		VISUAL MAGNITUDE			
		High	Moderate	Low	Very Low
VISUAL SENSITIVITY	High	High	Moderate	Moderate	Low
	Moderate	Moderate	Moderate	Low	Low
	Low	Moderate	Low	Low	Very Low
	Very Low	Low	Low	Very Low	Very Low

Table 05 – Visual Impact Rating
Source: MLA, 2023

2.4 Guideline and Statutory Framework

An overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this LVIA is provided in the following section.

2.4.1 Secretary's Environmental Assessment Requirements (SEARs)

SEARs have been issued for the Project on the 22nd of December 2023. The requirements for 'Landscape & Visual' as part of the SEARs are outlined as follows:

- *including a detailed assessment of the likely visual impacts (including night lighting) of all components of the project (including transmission lines and any other ancillary infrastructure) on surrounding residences, scenic or significant vistas and road corridors in the public domain and provide details of measures to mitigate and/or manage potential impacts.*

3.0 Project Overview

3.1 Project Area

The Project is located at 1001 Canyonleigh Road (the primary access road to the Project) in Brayton NSW within the Wattle Creek Energy Hub Project Area (refer to **Figure 02**).

3.2 The Project

The Project comprises the installation, operation, maintenance and decommissioning of a large-scale BESS, supported by associated infrastructure. The Project will have a capacity of up to approximately 350 MW (AC or DC coupled) and will have provision for up to four (4) hours of storage (1400 MWh), with the aim of providing both storage as well as firming capacity to the NEM and assisting in grid stability by providing frequency control ancillary services. The design of the BESS will allow for the storage and exportation of renewable energy within the network so that it can be used during times of peak demand.

Two transmission line options are being investigated, to allow for optionality during the assessment process and greater flexibility in the connection design. Only one transmission option will be constructed for the standalone BESS. The two transmission options are assessed separately and are shown on **Figure 03**.

The conceptual project layout represents a development footprint of approximately 75 ha, including associated ancillary infrastructure (i.e. substations, the operations and maintenance facility, test bed and both transmission line corridors for optionality). The conceptual project layout is shown on **Figure 03**, with the indicative project components are outlined in **Table 06**.

Project component(s) / infrastructure	Approximate dimensions and/or capacity	Quantity
BESS Modules		
Maximum height	3 m	Approximately 370
Minimum height	1.5 m	
Containers	Approximately 3.85 MWh per container (number and size of units is subject to detailed design and tender)	
Ancillary Infrastructure		
Overhead transmission lines	Up to 7 km of internal overhead cables i.e. high voltage transmission lines from the solar farm to the grid connection point (two transmission alignments currently being investigated)	2 options

Table 06 – Project Components

3.3 Study Area

The Study Area for this Project has been defined for this Project to an extent of 2.5 km (refer to **Figure 04**). The visual baseline assessment has been undertaken within the Study Area, where the scenic quality of the landscape character with the Study Area will be determined to understand the visual sensitivity (refer to **Section 04**) The Study Area is based on the maximum extents of BESS. It is noted that the associated infrastructure, including the overhead transmission, are assessed in **Section 11.0** of the report..



Image 01 – Typical BESS

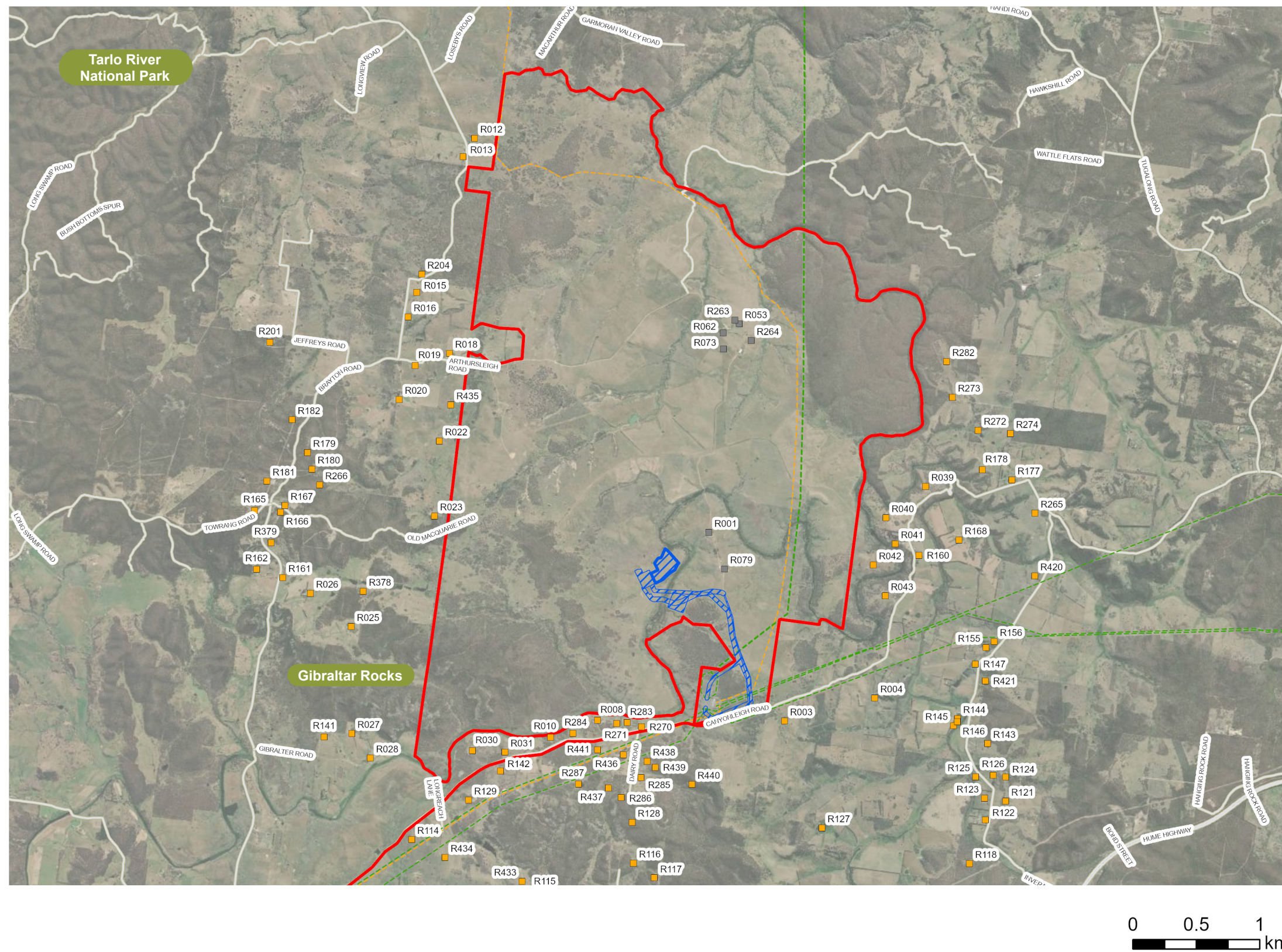


Figure 02 – Project Area
Basemap Source: ESRI, 2024

Project Layout

Refer to Section 3.2

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- ▨ BESS Development Footprint
- BESS Area
- ┐ Transmission Line Option 1
- ┐ Transmission Line Option 2
- - - Existing Transmission Lines (Transgrid)
- - - Existing Transmission Lines (Non Transgrid)
- Roads

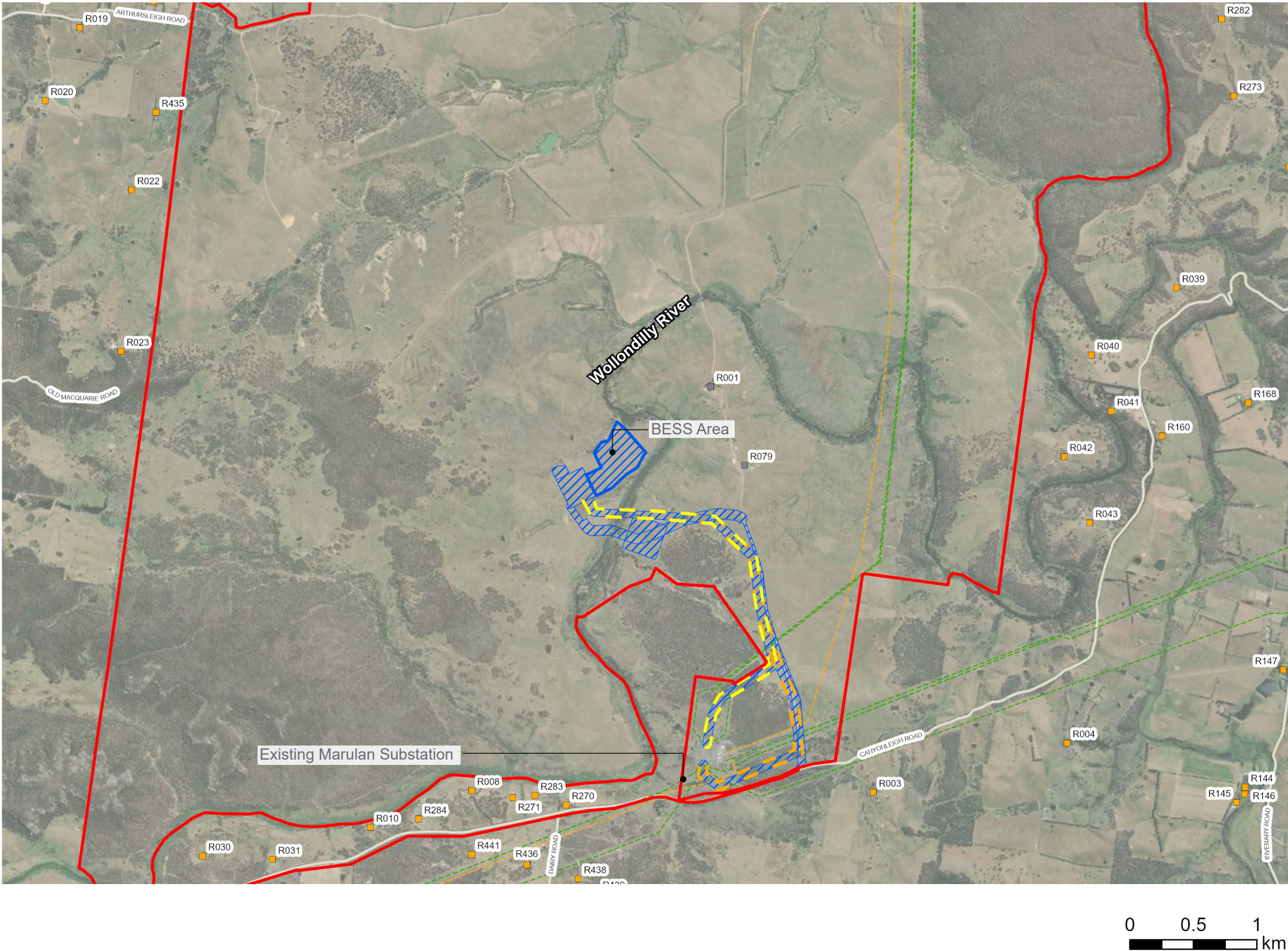
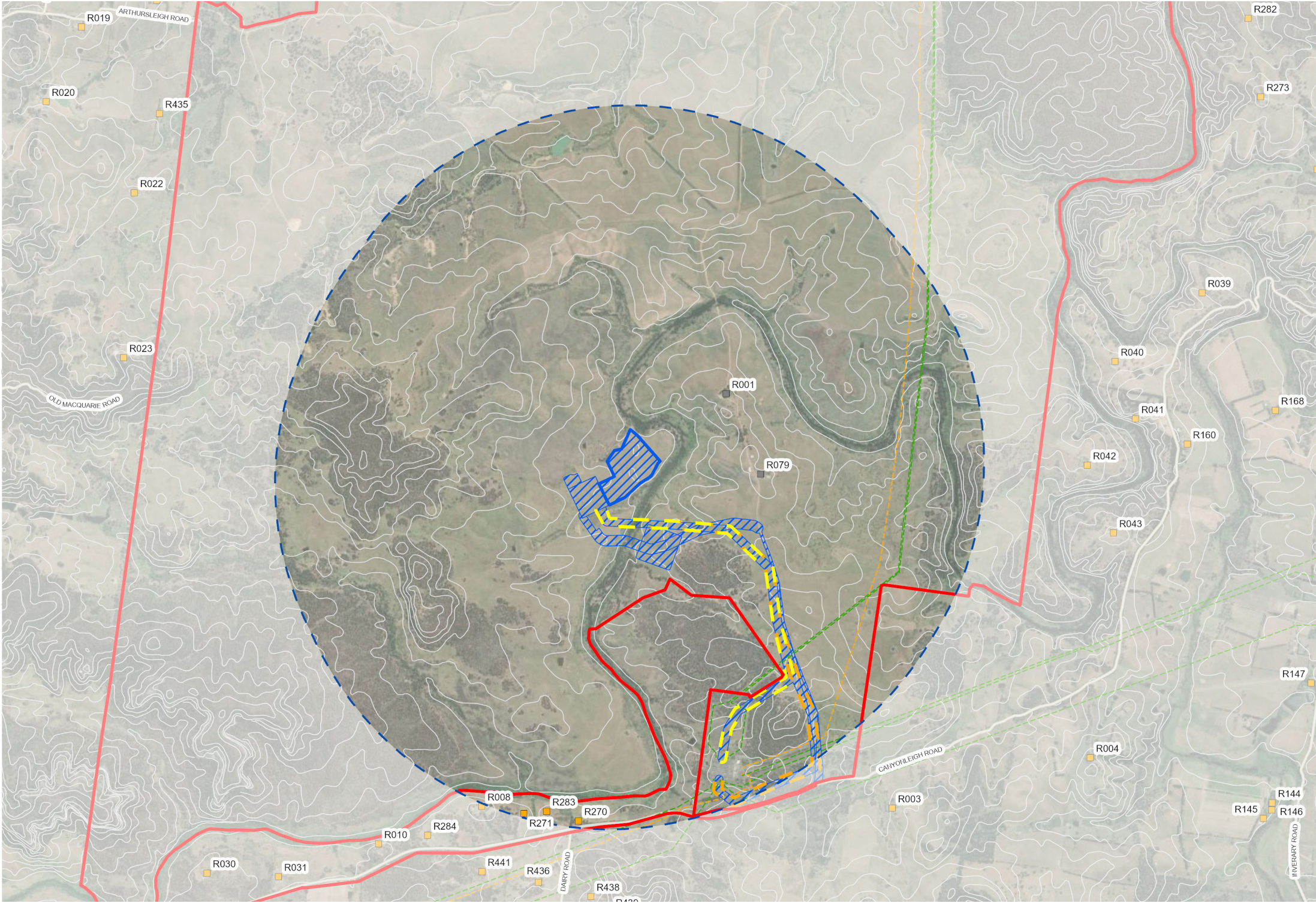


Figure 03 – Project Layout
Basemap Source: ESRI, 2024





Study Area

Refer to Section 3.3

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- ▭ Project Area
- ▨ BESS Development Footprint
- ▭ BESS Area
- ▭ Study Area (2.5 km from BESS Area)
- ▭ Transmission Line Option 2
- ▭ Transmission Line Option 1
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads
- Contour

Figure 04 – Study Area
Basemap Source: ESRI, 2024



4.0 Existing Landscape Character

4.1 Existing Landscape Character Analysis

The purpose of the landscape character analysis is to establish the landscape and visual conditions through descriptions, mapping and photographic representation to capture the sense of place for the Project. The intent is to provide a baseline against which the potential visual impacts of the Project can be assessed.

The Study Method for undertaking the landscape character analysis has been established in the ‘*Guideline for Landscape Character and Visual Impact Assessment*’ (TNSW, 2023) in conjunction with the *Technical Supplement - Landscape & Visual Impact Assessments for Large Scale Solar Projects* (DPHI, 2022).

4.2 Bioregion Context

The Project is located in the South Eastern Slopes Bioregion, which includes most of the ACT and extends south into Victoria (refer to **Figure 05**). The bioregion is bounded by four (4) other regions which includes:

- the South East Corner and Sydney Basin bioregions to the east;
- the South Western Slopes bioregion to the West;
- the Australian Alps bioregion to the south.

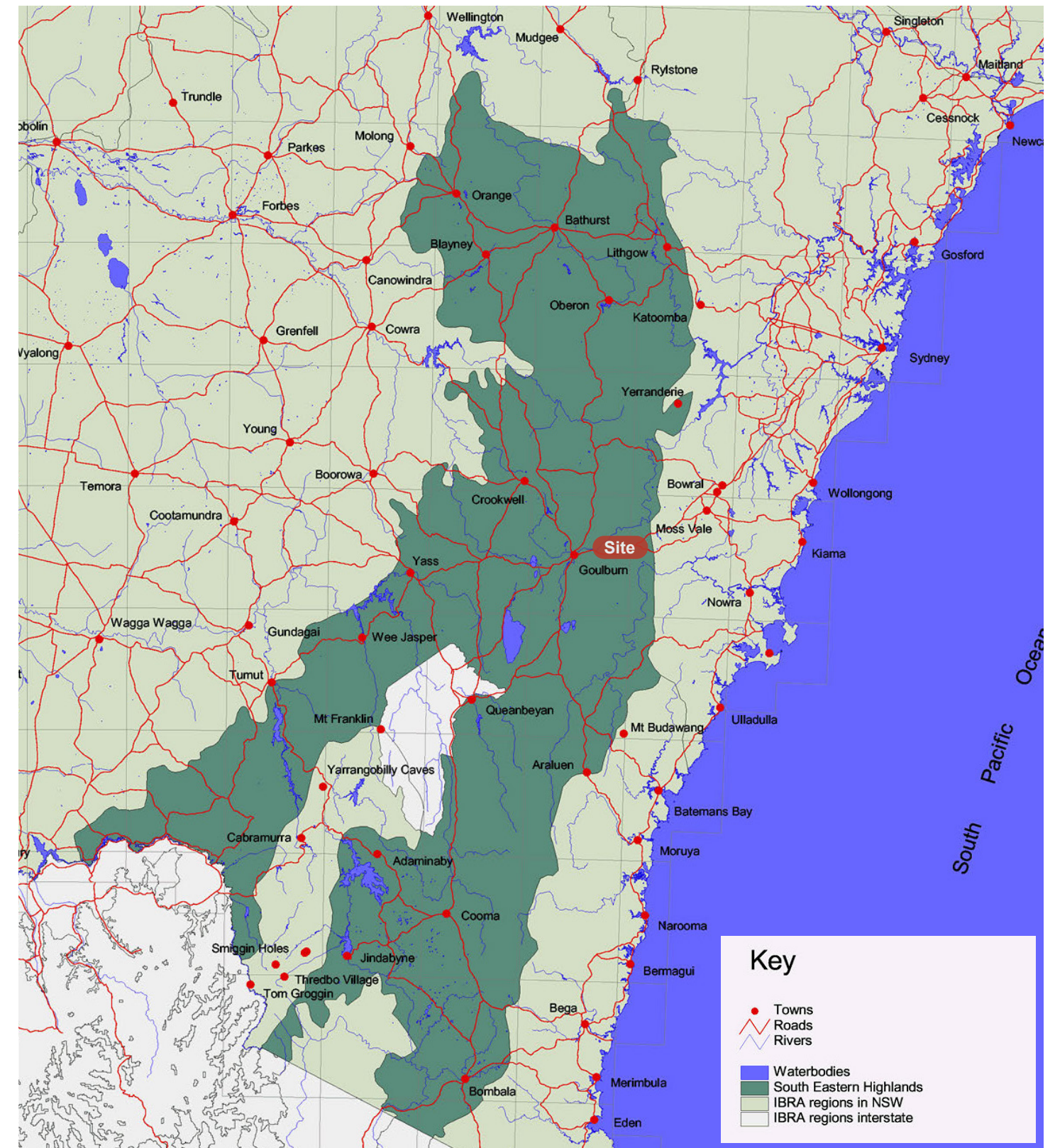


Figure 05 – The South Eastern Highlands Bioregion
Imagery Source: NPWS 2003

The Bioregion extends from Cooma, Jindabyne and Bombala in the south, to Goulburn, Queanbeyan and Yass in the centre to Orange, Bathurst and Lithgow to the north.

The Project is located within the 'Bungonia' sub-bioregion which features include -

- **Geology** - *Primarily fine-grained Palaeozoic sedimentary and meta-sedimentary rocks, with minor areas of acid volcanics and limestone. Areas of Tertiary river terrestrial sediments and low sandsheets in the south with very limited basalt.*
- **Characteristic Landforms** - *Distant plateau with steep, deep margins on the Great Escarpment dropping into the Shoalhaven River. Strong linear ridges on resistant sandstones and volcanic wide valleys*
- **Vegetation** - *Mottled gum, broad-leaved peppermint, white gum, red stringbark and black ash (forest and woodlands). Snow gums and snow grass in cold packets. Black she-oak is common in the understorey and regeneration areas, with a limited distribution of argyle apple..*

(NPWS, 2003)

4.3 Land Zoning

The three main zoning categories within the vicinity of the Study Area include RU1 Primary Production, RU2 Rural Landscape and C1 National Parks and Nature Reserves.

4.3.1 RU1 - Primary Production

Land classified as RU1 - Primary Production is zoned immediately east. Visual objectives of this zone include:

- *To protect, manage and restore areas with high conservation, scientific, cultural or aesthetic value.*

4.3.2 RU2 - Rural Landscape

The Project is zoned as RU2 Rural Landscape, with the Project Area being utilised for commercial grazing and as a research and teaching resource for the University of Sydney. Visual objectives of this zone include:

- *To maintain the rural landscape character of the land.*
- *To protect, manage and restore areas with high conservation, scientific, cultural or aesthetic value.*

4.3.3 C1 - National Parks and Nature Reserves

Land located to the north and northwest of the Study Area is zoned as C1- National Parks and Nature Reserves associated specifically with Kerrawary Nature Reserve and Tarlo River National Park. There are no visual objectives outlined under this zone.

4.4 Land Use

Main land use within the Study Area is predominantly utilised for grazing on native pastures and modified pastures. Other land uses include cropping, and residential and farm infrastructure.

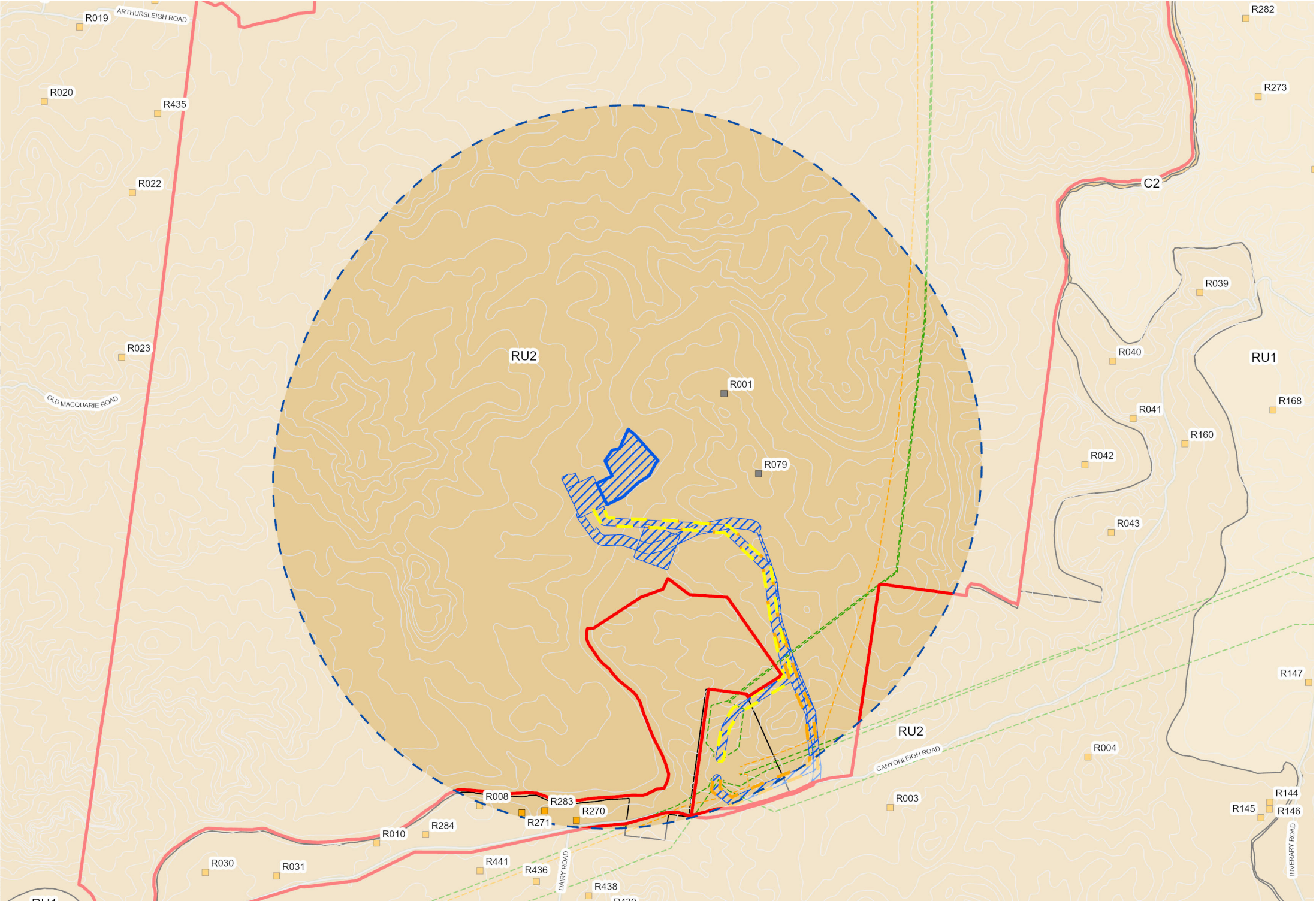
In the regional context outside the Study Area - nature conservation activities occur within the Tarlo River National Park, Cookbundoon Nature Reserve and Kerrawary Nature Reserve.



Image 02 – Modified Pastures & Wollondilly River



Image 03 – Gently Undulating Pastures



Land Zoning

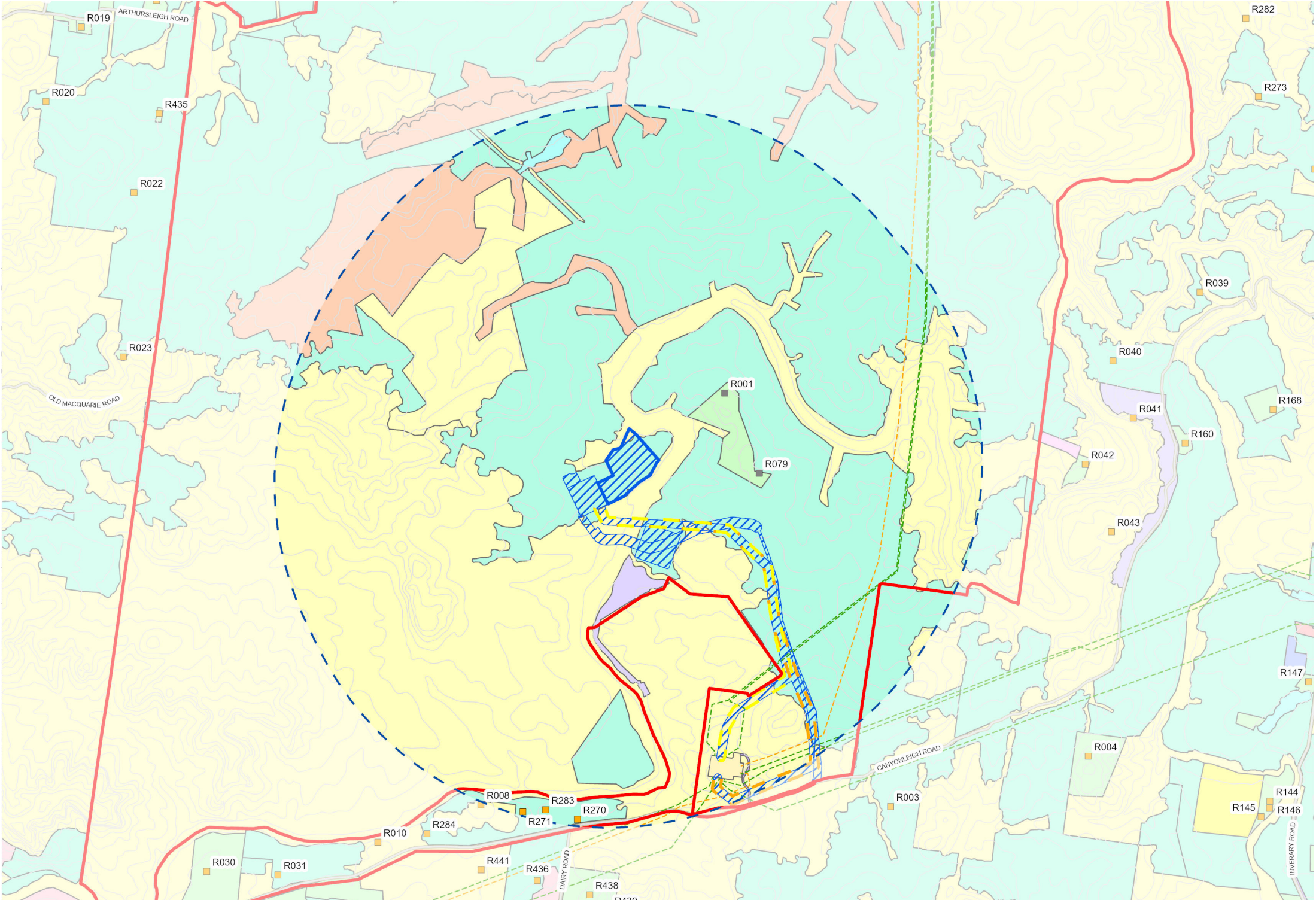
Refer to Section 4.3

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- C2 - Environmental Conservation; C2, Environmental Management
- RU1 - Primary Production
- RU2 - Rural Landscape
- Transmission Line Option 2
- Transmission Line Option 1
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads

Figure 06 – Land Zoning
Basemap Source: ESRI, 2024





Land Use

Refer to Section 4.4

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- 1.2.0 Managed resource protection
- 2.1.0 Grazing native vegetation
- 3.1.0 Plantation forests
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 3.4.0 Perennial horticulture
- 4.2.0 Grazing irrigated modified pastures
- 4.4.0 Irrigated perennial horticulture
- 5.2.0 Intensive animal production
- 5.4.0 Residential and farm infrastructure
- 5.6.0 Utilities
- 5.7.0 Transport and communication
- 6.2.0 Reservoir/dam
- Transmission Line Option 2
- Transmission Line Option 1
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads
- Contour

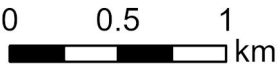


Figure 07 – Land Use
Basemap Source: ESRI, 2024



4.5 Key Landscape Features

4.5.1 Heritage & Points of Interest

No heritage items were identified within the Study Area. Heritage items within the regional context include Tarlo River National Park (I160), Marble Quarry (I005), Brayton Cemetery (I004) and 'Lockyersleigh' Homestead & Gardens (I035).

Big Hill Church and Graveyard are located along Arthursleigh Road in Big Hill (**Image 07**), providing points of interest within this predominantly rural agricultural landscape. It was noted as a place of significance during community consultation. Big Hill Church consists of a single-storey stone building with associated cemetery.

4.5.2 Topography

The topography within the Study Area is generally undulating, and the hills consist of patchy vegetation predominantly used for grazing (**Image 04**).

Cookbundoon Range is a key ridgeline within the regional context, providing a visual backdrop to the areas within the Study Area.

Community consultation identified Gibraltar Rocks as a key landscape feature due to the visual rock formations, which are located approximately 4km west of the Project - outside the Study Area.

4.5.3 Hydrological Character

Within the regional context - the Tarlo River is a key watercourse traversing through the Tarlo River National Park. Riparian vegetation along this waterway is distinct with aquatic and swamp vegetation species forming diverse habitat areas near this location.

The Tarlo River flows into the Wollondilly River (**Image 05**), which continues to make its way through the landscape, traversing through the Study Area. The Wollondilly River Weir provides a vehicle crossing and public viewing opportunity.



Image 04 – Undulating Hills



Image 05 – Wollondilly River

4.5.4 Vegetation

The region typically contains grasslands devoted to grazing, protected areas, and state forests planted with *Pinus radiata*. Dry sclerophyll forests are evident within Tarlo River National Park near the Project Area. Within the riparian corridor of the Wollondilly River, Sheoak (*Casuarina*), Red Bloodwood (*Corymbia gummifera*), and Turpentine (*Syncarpia glomulifera*) dominate the canopy within this zone.

The vegetation character surrounding the Project consists of dense pockets of bushland and pine varieties.

4.5.5 Roads

The Project Area is located on the northern side of Canyonleigh Road. Canyonleigh Road is a local unsealed road that runs east to west and provides access to the Hume Highway.

4.5.6 Infrastructure

Marulan Substation is located off Canyonleigh Road to the south of the Project Area (see **Image 08**).



Image 07 – Big Hill Church and Graveyard



Image 06 – Gibraltar Rocks



Image 08 – Marulan Substaton

5.0 Landscape Character Zones

5.1 Identify Landscape Character Zones

The Technical Supplement states: *"If the landscape includes distinct areas that have different qualities, the Study Area should be broken down into different character zones - Landscape character zones (LCZs). Landscape Character Zones should divide the landscape based on common distinguishing visual characteristics. These patterns are formed by combinations of vegetation, water bodies, landforms and land use, from which key landscape features can also be identified".*

Figure 08 provides a schematic representation of what defines a Landscape Character Zone (LCZ). **Figure 09** shows the LCZs identified within the 2.5 km of the Project Area. Descriptions of each LCZ is provided in **Section 5.4**.



Figure 08 – Defining Landscape Character Zones
Source: Adapted from DPHI, 2022

5.2 Determining Scenic Quality

The Guideline states: "Scenic quality refers to the relative scenic, cultural or aesthetic value of the landscape within the viewshed based on the presence or absence of key landscape features known to be associated with community perceptions of low, moderate, or high scenic quality. It is typically a complex process undertaken by experts in visual impact assessment and must take community values into consideration" (DPHI, 2022)

The baseline analysis and landscape character assessment have been used to inform the classification of scenic quality values. A scenic quality rating has been applied to each LCZ based on the visual reference for scenic quality values provided in the Technical Supplement (as presented in **Table 07**).

The scenic quality has assisted in determining the sensitivity of each LCZ.

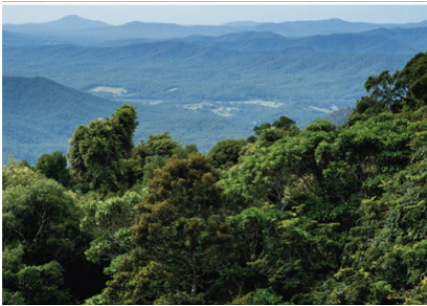
SCENIC QUALITY VALUES			
	LOW SCENIC QUALITY	MODERATE SCENIC QUALITY	HIGH SCENIC QUALITY
LANDFORM			
VEGETATION			
WATERBODIES			
SOCIAL/CULTURAL			
HUMAN PRESENCE			

Table 07 – Visual Reference of Scenic Quality Values

5.3 Impacts Landscape Character Zones

The Technical Supplement states: *"Applicants should determine the impact of the Project on each Landscape Character Zone by evaluating the sensitivity of the landscape and the magnitude of the project's effects in that area. The sensitivity and magnitude should be assigned a rating (low, moderate or high) that can be used to determine the overall landscape character impact on any given zone. Rationale for the ratings must be provided as part of the assessment"* (DPHI, 2022).

The following provides an overview of determining the sensitivity of a LCZ and the magnitude of effect resulting from the Project. The overall level of landscape character impact has been assessed using the matrix in **Table 08**

5.3.1 Determine Sensitivity

The Technical Supplement states: *"The sensitivity of the landscape character type should be rated based on the inherent capability of the area to absorb changes from the project"* (DPHI, 2022). For the purpose of this report, the scenic quality of the LCZ has been taken into consideration when determining the sensitivity.

5.3.2 Determine Magnitude

The Technical Supplement provides guidance on considerations for analysing and rating the magnitude of a project. These include:

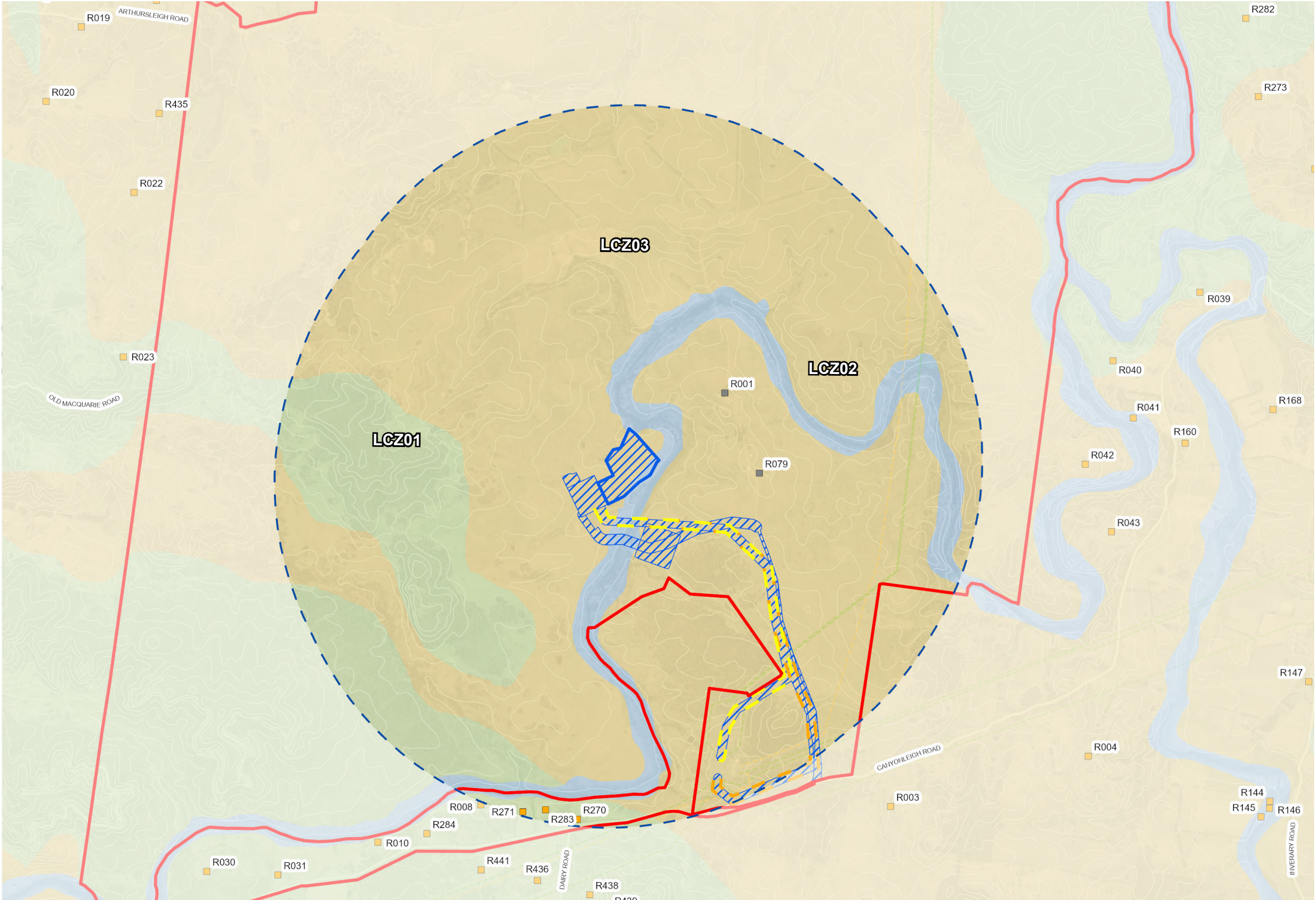
- size and scale including:
- the extent of existing landscape elements that may be lost and the contribution of that element to the character of the landscape;
- the extent to which the project becomes a minor or major element in the landscape and its dominance in the visual catchment;
- the extent to which the project changes the key characteristics of the landscape, which are critical to its distinctive character; and
- geographical area - the area of the landscape over which the effects will be experienced, having regard to the nature and scale of the project's effects. This could vary from the immediate setting of the Project Area to larger scales where the project may influence several landscape characters zones; and
- duration and reversibility of the effects on the landscape.

5.3.3 Determine Impact on LCZ

The overall level of landscape character impact has been assessed using the matrix in **Table 09**.

VISUAL SENSITIVITY					
MAGNITUDE		HIGH	MODERATE	LOW	VERY LOW
	VERY HIGH	HIGH	HIGH	MODERATE	MODERATE
	HIGH	HIGH	MODERATE	MODERATE	LOW
	MODERATE	MODERATE	MODERATE	LOW	LOW
	LOW	MODERATE	LOW	LOW	VERY LOW
	VERY LOW	LOW	LOW	VERY LOW	VERY LOW

Table 08 – Visual Impact Matrix



Landscape Character Zones

Refer to Section 4.6

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- ▭ Project Area
- ▨ BESS Development Footprint
- ▭ BESS Area
- ▭ Study Area (2.5 km from BESS Area)
- ▭ Transmission Line Option 2
- ▭ Transmission Line Option 1
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads
- Contour
- ▭ LCZ02 - Rivers
- ▭ LCZ01 - National Parks & Vegetated Hills
- ▭ LCZ03 - Grazing, Pastures & Rural Properties

Figure 09 – Landscape Character Zones
Basemap Source: ESRI, 2024



5.4 LCZ Descriptions

LCZ01 - National Parks & Vegetated Hills

Endemic vegetation communities characterise this LCZ on higher elevations. This character exists in Tarlo River National Park (outside the Study Area to the Northwest), with 12 vegetation communities previously mapped. Kerrawary and Cookbundoon Nature Reserve (outside the Study Area to the West) also contain important vegetation collections specific to the area.

Scenic Quality - **Moderate**

LCZ02 - Rivers

The Wollondilly River transverses through the landscape in and around the Study Area. Both steep and gradual topographical rises surround these waterways, which are lined with riparian vegetation that differs from the character of LCZ01.

Scenic Quality - **Moderate**

LCZ03 - Grazing, Pastures & Rural

Properties

This LCZ is defined by vast, open land parcels that are utilised for native as well as modified grazing pastures and cropping areas (irrigated and dry). The LCZ constitutes one of the predominant characteristics of the region. It comprises of open plains with isolated stands of trees.

Scenic Quality - **Low**



Image 09 – Tarlo River National Park



Image 12 – Typical Vegetation Character within LCZ01



Image 10 – Wollondilly River & Riparian Vegetation Character



Image 13 – Wollondilly River



Image 11 – Open Pastures & Rural Properties



Image 14 – Modified Grazing Pastures

6.0 Zone of Visual Influence

6.1 Zone of Visual Influence Overview

An initial visibility assessment was undertaken utilising Zone of Visual Influence (ZVI) mapping. This tool assists in defining the 'Visual Catchment' for the Project.

The ZVI represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI is a desktop tool intended to make the fieldwork and assessment more efficient by clearly excluding areas that are screened by topography. Fieldwork assessments are then undertaken predominantly within the areas with the potential for visual impacts.

The ZVI presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility (LIIEMA, 2002). As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. This form of mapping is acknowledged as providing a worst case scenario and is used purely as a desktop assessment tool to determine areas for further investigation.

6.2 Zone of Visual Influence Summary

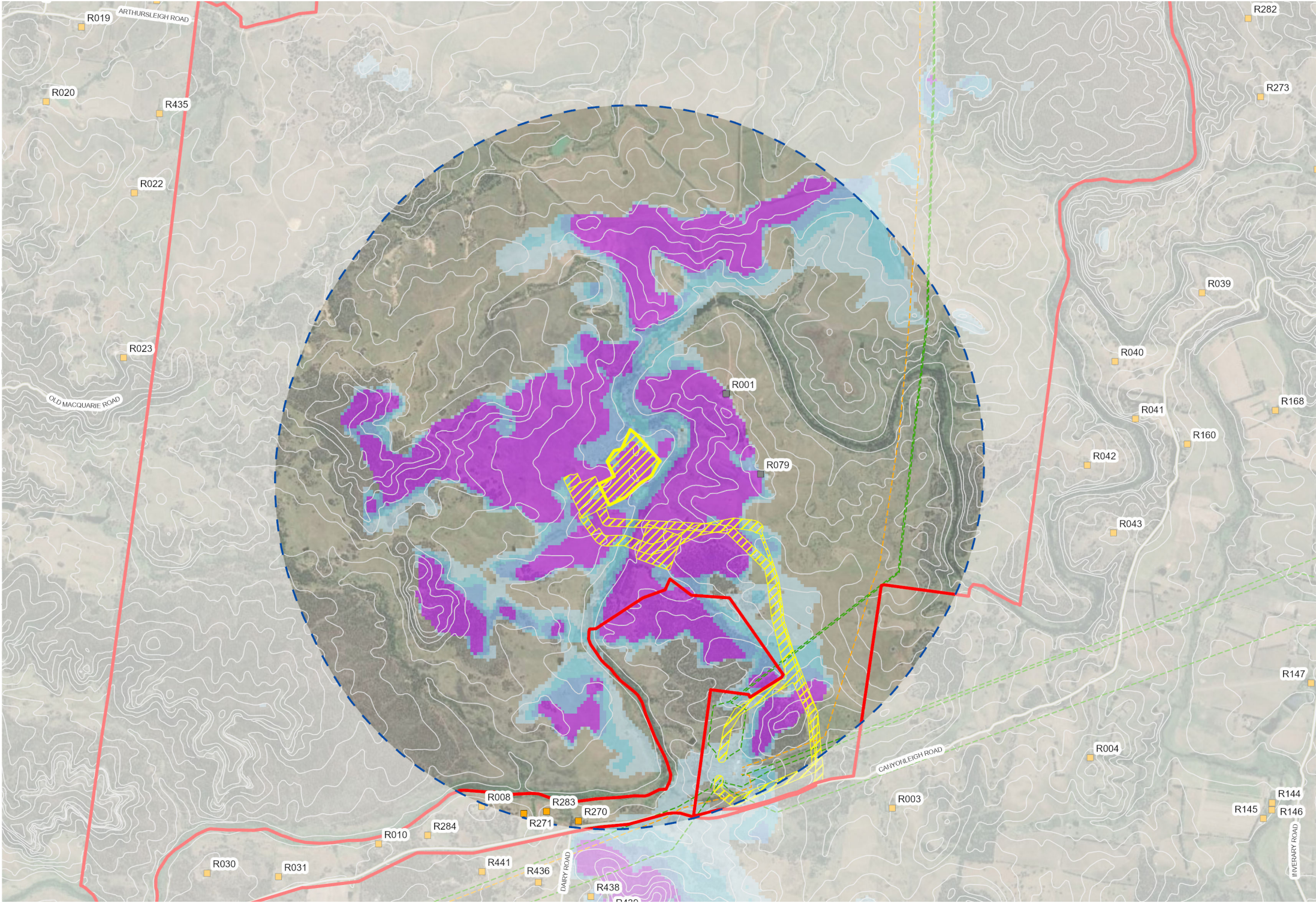
The ZVIs have been prepared based on the maximum BESS height of 3 m (refer to **Figure 10**).

Summary of Findings:

- The location of the BESS is central to the Project Area, therefore, majority of visibility is contained within the constraints of the Project Area with the exception of Canyonleigh Road and land associated with Marulan Substation and the proposed Marulan Gas Fired Power Station to the south.
- Land to the immediate south and southeast of the BESS, within the Project Boundary may have potential views of the whole Project.
- The lower elevation decreases potential visibility along the Wollondilly River compared to the adjoining pastures.
- There will be no visibility of the BESS along the majority of Canyonleigh Road, except a section of Canyonleigh Road to the south of Marulan Substation.
- The undulating topography within the Study Area contains many areas where the Project is not visible outside the Project Area's extent (as shown in **Figure 04**). No non-associated dwellings were identified as having visibility of the BESS.

The ZVI has been used to identify areas of potentially high visibility which will inform fieldwork ground truthing and the viewpoint analysis (refer to **Section 7.0**) to identify locations requiring detailed assessments.

It is noted that existing screening including structures or vegetation were not been considered within the preparation of the ZVIs. Further assessment and fieldwork ground truthing is required to determine the potential visual impacts in the aforementioned locations.



Zone of Visual Influence

Refer to Section 6.0

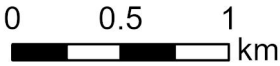
LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads
- Contour

VISIBILITY

- 1% - 25% Visibility
- 25% - 50% Visibility
- 50% - 75% Visibility
- 75% - 100% Visibility

NOTE
ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.



7.0 Viewpoint Analysis

7.1 Viewpoint Analysis Methodology

The viewpoint analysis considers the likely visual impacts of the Project on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

Once the viewpoints were selected, panoramic photographs were taken on a level tripod at a height of 150cm (to represent eye level). Photographs were taken with a Canon EOS R5 Mirrorless Camera through a 50mm fixed focal lens which closely represents the central field of vision of the human eye.

The visual impact of the viewpoint are then assessed both on site and with the topographic and aerial information to ensure accuracy. For each viewpoint, the potential visual impacts are analysed through a combination of the 3D terrain modelling, topographic maps and on site analysis. Viewpoint photographs and analysis have been included in the following pages. The findings of the viewpoint analysis have been quantified and are summarised in **Table 09**.

7.2 Viewpoint Analysis Methodology

The locations of the viewpoints have been identified in **Figure 11**. Viewings direction of the viewpoints are noted on each viewpoint sheet. The selection of the viewpoints has been informed by topographical maps, fieldwork observations and other relevant influences such as access, landscape character and the popularity of vantage points.

A total of ten (10) viewpoints were selected from publicly accessible locations to represent a range of views surrounding the Project Area, noting that there are limited opportunities to view the Project Area within the local region, with the exception of Canyonleigh Road and at the entry to the Project Area.

Viewpoints are selected to illustrate a combination of the following:

- Areas of high landscape or scenic value
- Visual composition (eg. focused or panoramic views, simple or complex landscape pattern)
- Range of distances
- Varying aspects
- Various elevations
- Various extent of development visibility (full and partial visibility)
- Views from major routes

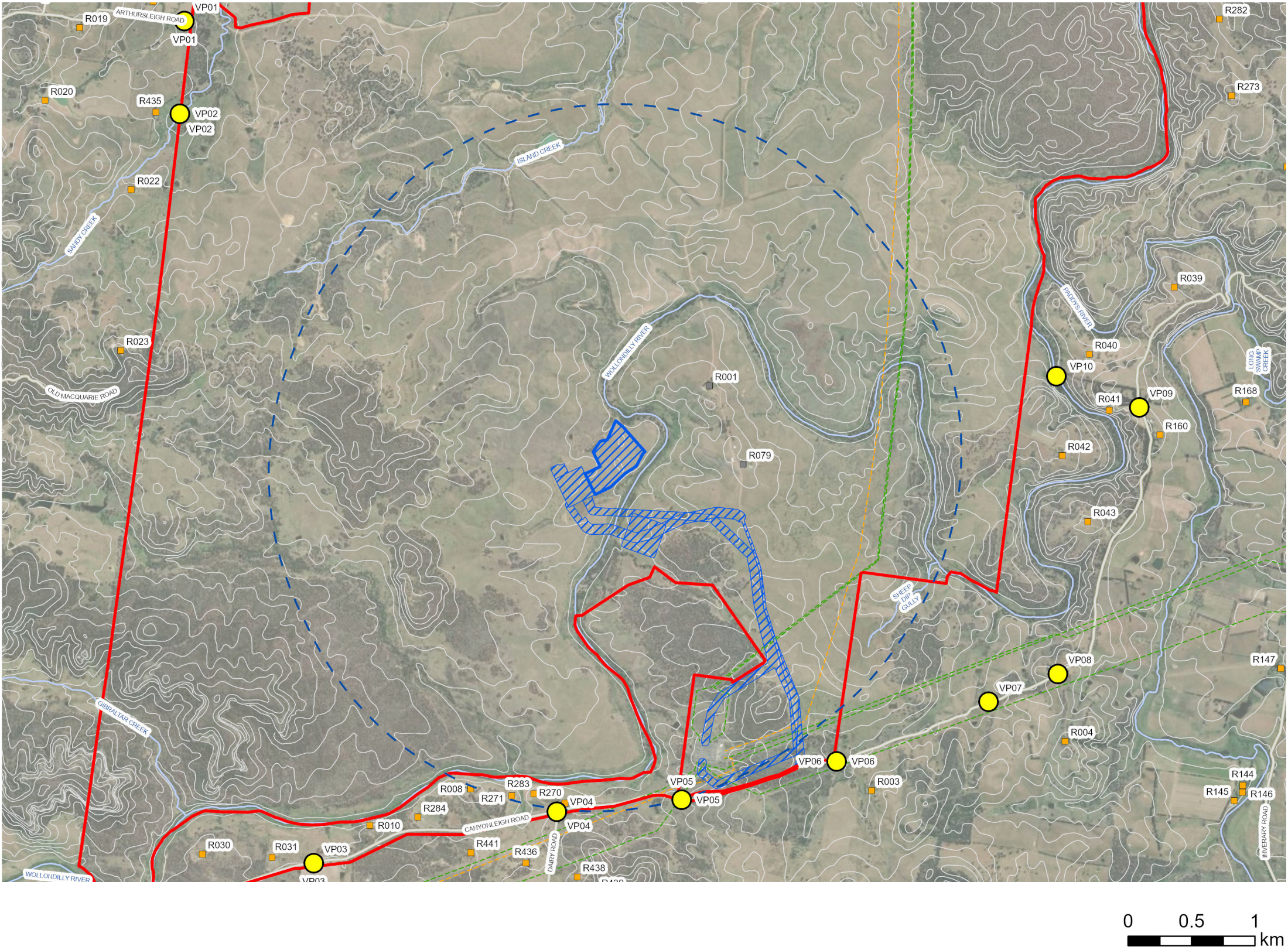


Figure 11 – Viewpoint Locations
Basemap Source: ESRI, 2024

Viewpoint Locations

Refer to Section 7.2

LEGEND

- Public Viewpoint Locations Requiring Preliminary Assessment
- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Watercourse
- Roads
- Contour



7.3 Viewpoint Analysis Methodology

As discussed in the rationale for the viewpoint selection process, these viewpoints are representative of the worst case scenario. For each viewpoint, the potential visual impacts are analysed through a combination of topographic maps and on site analysis. The visual sensitivity and visual magnitude of each viewpoint have been assessed which, when combined, results in an overall visual impact for the viewpoint (refer to **Table 09**).

Of the ten (10) viewpoints assessed as part of the landscape character and visual impact assessment, all viewpoints resulted in a 'Very Low' visual impact rating, with the exception of VP08, resulting in a 'Low' visual impact rating.

VIEWPOINT	LOCATION	VISUAL SENSITIVITY	VISUAL MAGNITUDE	POTENTIAL VISUAL IMPACT
VP01	Arthursleigh Rd, Big Hill NSW	LOW	NIL	VERY LOW
VP02	Arthursleigh Rd, Big Hill NSW	LOW	NIL	VERY LOW
VP03	Canyonleigh Road, Brayton NSW	LOW	NIL	VERY LOW
VP04	Canyonleigh Road, Brayton NSW	LOW	VERY LOW	VERY LOW
VP05	Canyonleigh Road, Brayton NSW	LOW	VERY LOW	VERY LOW
VP06	Canyonleigh Road, Brayton NSW	LOW	VERY LOW	VERY LOW
VP07	Canyonleigh Road, Brayton NSW	LOW	VERY LOW	VERY LOW
VP08	Canyonleigh Road, Brayton NSW	LOW	LOW	LOW
VP09	Canyonleigh Road, Brayton NSW	LOW	NIL	VERY LOW
VP10	Canyonleigh Road, Brayton NSW	VERY LOW	NIL	VERY LOW

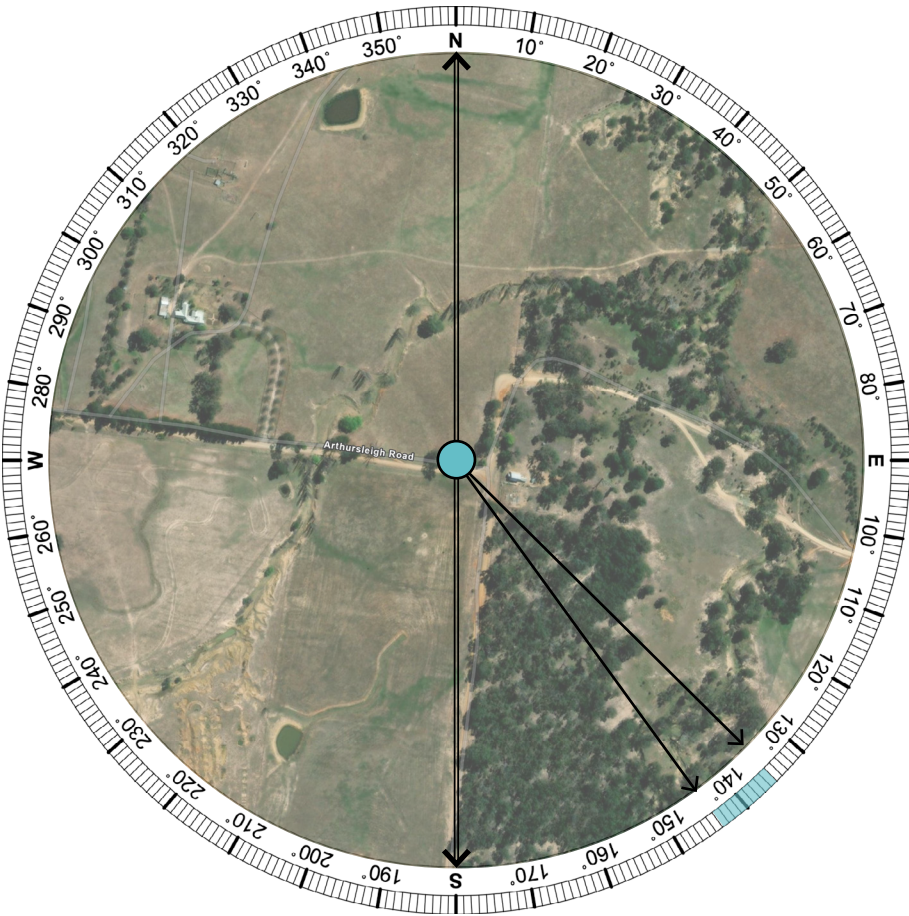
Table 09 – Visual Impact Ratings Results
Note these ratings are based on the visibility assessment criteria outlined in the Study Method of this VIA report.

Viewpoint:
VP01 Arthursleigh Rd, Big Hill NSW

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Arthursleigh Rd, Big Hill NSW	627 m
Coordinates:	Distance to Project:
34°33'44.23"S 150° 0'33.96"E	4.57 km
Viewing Direction:	
East	
Visual Sensitivity:	
Low	
Visual Magnitude:	
Nil	
Visual Impact:	
Very Low	

- LEGEND**
- ➡ Direction of Panorama
 - ➡ Extent of Panorama
 - ➡ Approximate Extent of Project

Existing Landscape Character Description:

This viewpoint is located along the unsealed Arthursleigh Road near Big Hill United Church and Graveyard.

The topography is gently undulating with scattered vegetation surrounding the church in the middle ground of this view.

The surrounding land in the foreground is used for agricultural practices, specifically grazing, due to the modified pastures.

The key features of this view are the Big Hill Church and the established vegetation in the middle ground.

The distant ridgeline is fragmented in the background.

Potential Visual Impact:

This viewpoint, a representative perspective of Big Hill United Church, was selected as a local place of significance noted by residents during community consultation.

To the left of the Church is a proposed secondary site access location. Visually, this will not alter the area's existing landscape character.

From this location, the Project and associated ancillary infrastructure is not visible.

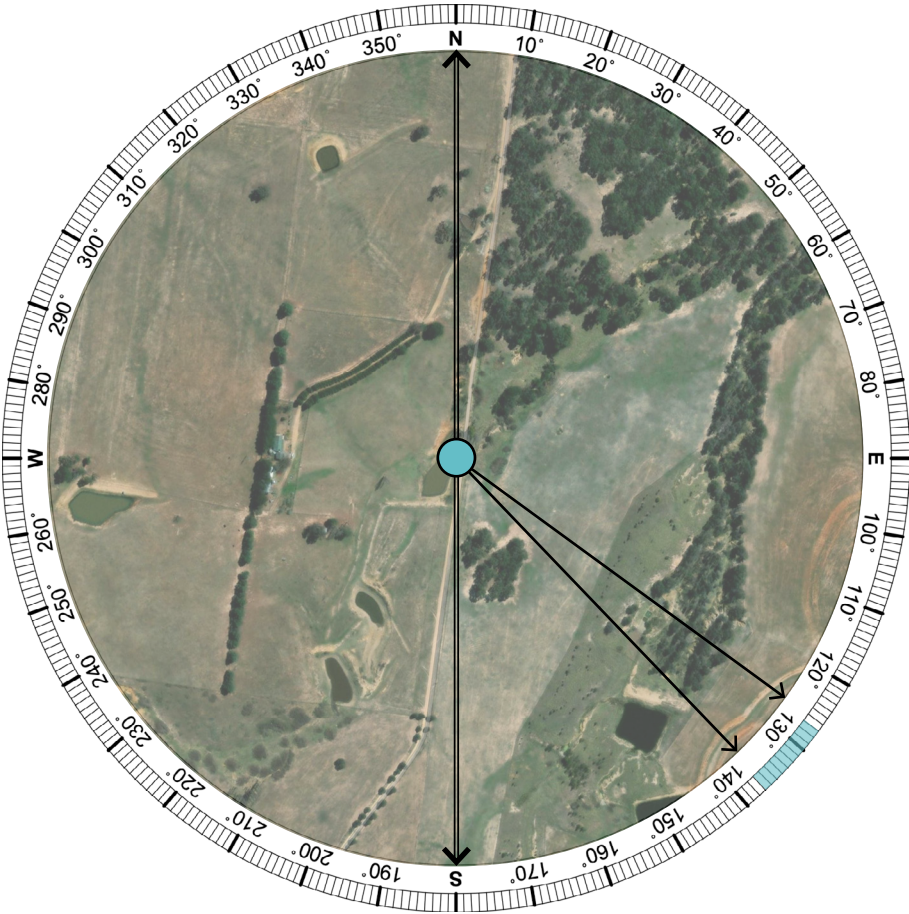
The visual magnitude of change is **Nil**, resulting in a **Very Low** visual impact.

Viewpoint:
VP02 Arthursleigh Rd, Big Hill NSW

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Arthursleigh Rd, Big Hill NSW	634 m
Coordinates:	Distance to Project:
34°34'7.71"S 150° 0'30.69"E	4.06 km

Viewing Direction:
East

Visual Sensitivity:
Low

Visual Magnitude:
Nil

Visual Impact:
Very Low

Existing Landscape Character Description:

This viewpoint is located off Arthursleigh Road, to the south of Big Hill Church, near non-associated dwelling R022.

The surrounding land is characterised by gently undulating hills used for agricultural practices, specifically grazing.

Clusters of scattered vegetation are located in adjoining pastures, with dense vegetation aligning localised ridgeline in the background of this view to the east.

Potential Visual Impact:

From this location, the Project and associated ancillary infrastructure is not visible.

The visual magnitude of change is **Nil**, resulting in a **Very Low** visual impact.

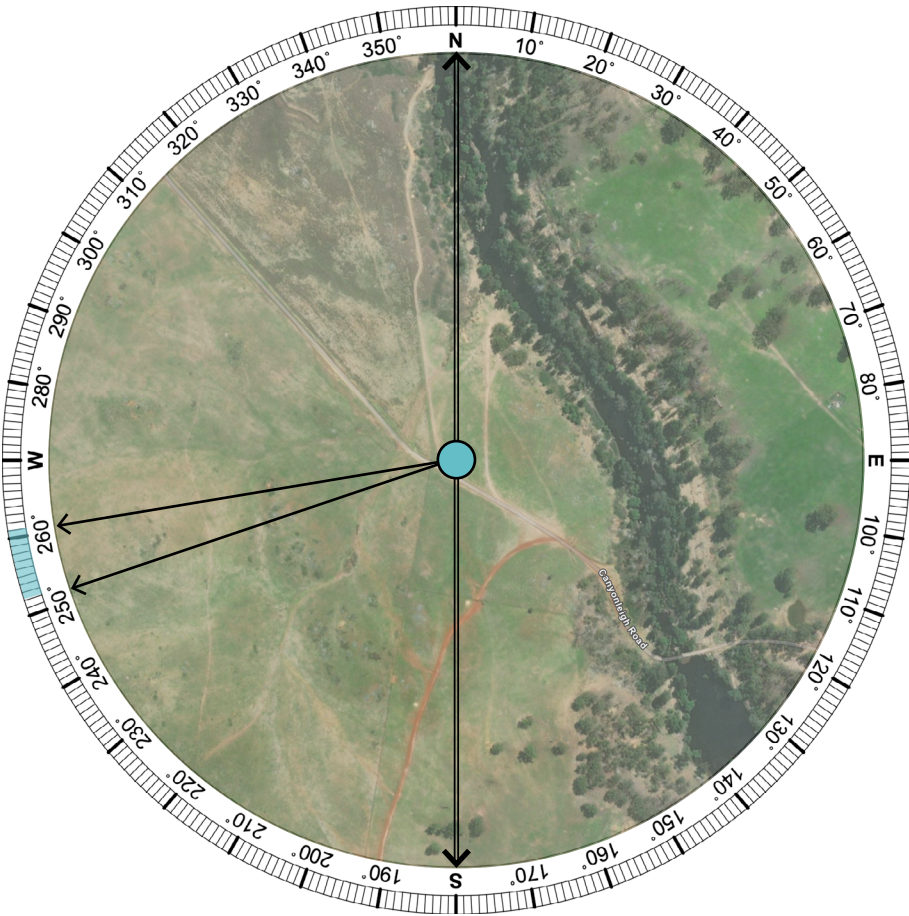
- LEGEND**
- ➡ Direction of Panorama
 - Extent of Panorama
 - Approximate Extent of Project

Viewpoint:
VP03 Canyonleigh Road, Brayton NSW

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	582 m
Coordinates:	Distance to Project:
34°35'15.52"S 150° 4'51.27"E	3.11 km
Viewing Direction:	
West	
Visual Sensitivity:	
Low	
Visual Magnitude:	
Nil	
Visual Impact:	
Very Low	

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road at the entrance of the Arthursleigh property (the Project Site), northwest of Wollondilly River Weir.

The surrounding land is predominantly undulating and utilised for agricultural practices, specifically grazing.

The majority of the view is cleared of vegetation, with scattered trees dotted along the distance of ridgeline in the background of this view.

Existing electrical infrastructure, specifically transmission lines and power lines, form part of the existing landscape character.

Potential Visual Impact:

From this location, the Project and associated ancillary infrastructure is not visible.

The visual magnitude of change is **Nil**, resulting in a **Very Low** visual impact.

- LEGEND**
- ➡ Direction of Panorama
 - ➡ Extent of Panorama
 - ➡ Approximate Extent of Project

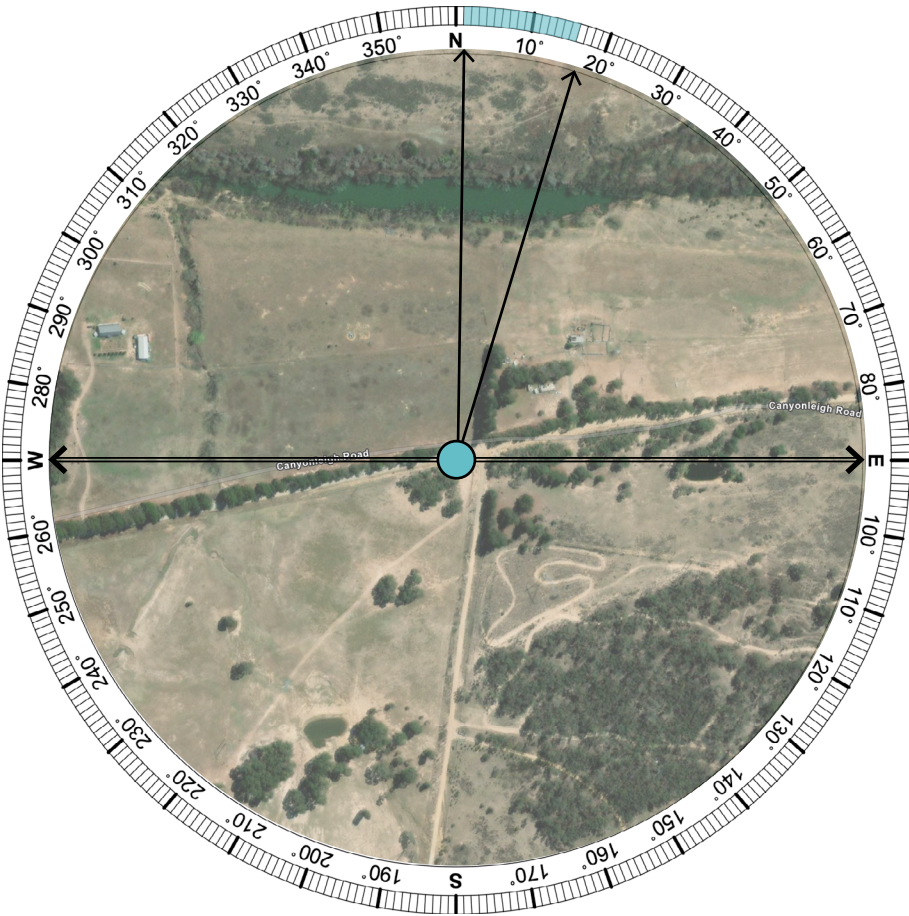
Viewpoint:
VP04 Canyonleigh Road, Brayton NSW

NOTE:
The Project is not visible from this location due to intervening topography

Approximate Extent of Transmission Line



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	600 m
Coordinates:	Distance to Project:
34°37'9.03"S 150° 2'19.90"E	2.39 km
Viewing Direction:	
North	
Visual Sensitivity:	
Low	
Visual Magnitude:	
Very Low	
Visual Impact:	
Very Low	

LEGEND

- Direction of Panorama
- Extent of Panorama
- Approximate Extent of Project

Existing Landscape Character Description:

This viewpoint is located along Canyonleigh Road, on the entry driveway of non-associated dwelling R270, and near the Dairy Road intersection.

The topography is gently undulating, forming distant vegetated hills northwest of this view. Scattered vegetation and modified pastures for agricultural practices are evident in the middle ground and foreground to the north.

Dense vegetation is evident around the dwelling R270 and the road corridor from the northeast.

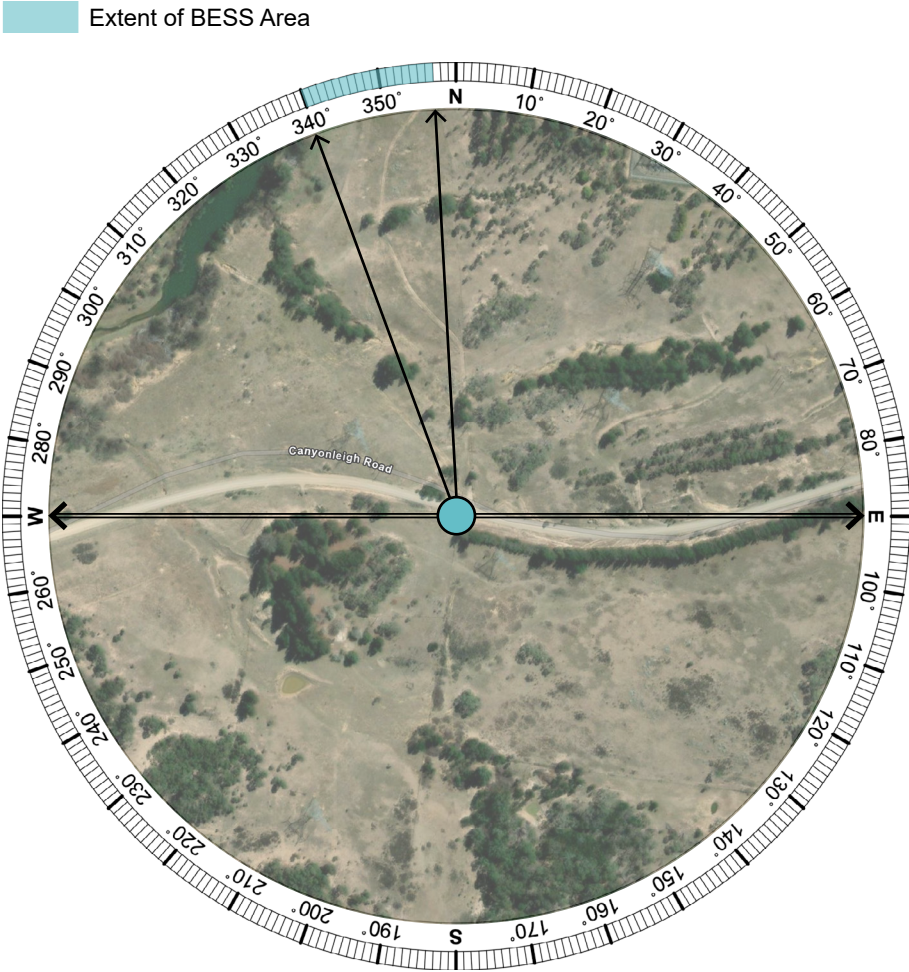
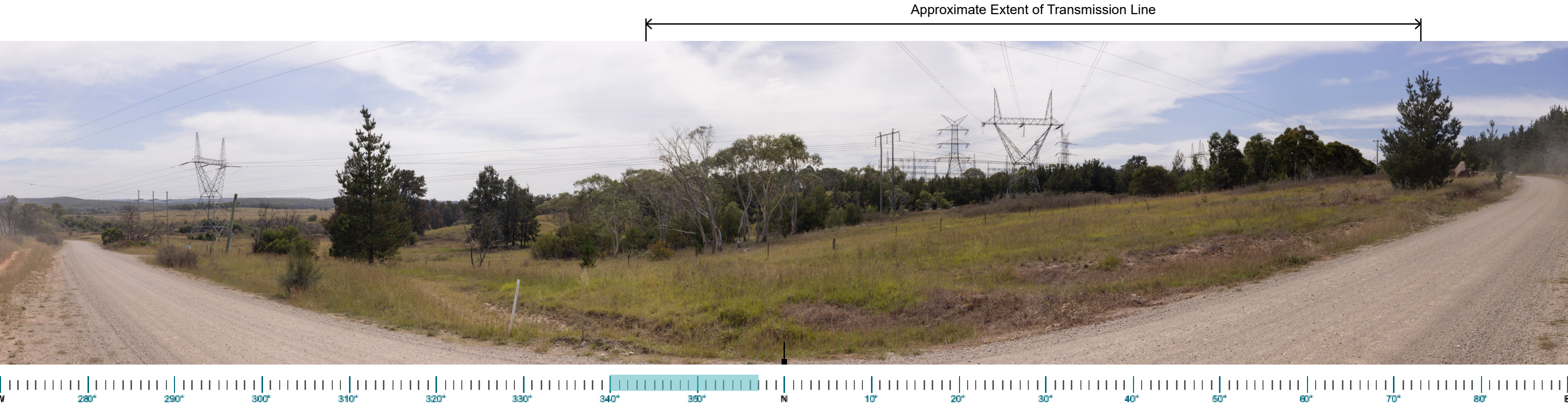
Existing powerlines form part of the visual landscape of this location, with the dense vegetation in the middle ground being a key landscape feature of this view.

Potential Visual Impact:

From this location, the BESS will be screened by intervening topography. Ancillary infrastructure, specifically the overhead transmission line, may be visible; however, it will be heavily filtered by vegetation along Canyonleigh Road to the northeast.

The visual magnitude of change is **Very Low**, resulting in a **Very Low** visual impact.

Viewpoint:
VP05 Canyonleigh Road, Brayton NSW



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	605 m
Coordinates:	Distance to Project:
34°37'6.77"S 150° 2'58.60"E	2.44 km
Viewing Direction:	
North	
Visual Sensitivity:	
Low	
Visual Magnitude:	
Very Low	
Visual Impact:	
Very Low	

- LEGEND**
- ➡ Direction of Panorama
 - ➡ Extent of Panorama
 - ➡ Approximate Extent of Project

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road, southwest of the Marulan substation.

The surrounding land is characterised by gently undulating topography, connecting to the vegetated hills in the distant west.

Clusters of scattered vegetation are located in adjoining pastures in the foreground, with dense vegetation blocking the views of the vegetated hills in the background.

This viewpoint is captured on a low-use road, with multiple existing power lines and transmission lines associated with the power station forming part of the visual landscape of this location.

Potential Visual Impact:

From this location, the BESS will be screened by intervening vegetation in the middleground of this view. Ancillary infrastructure, specifically the overhead transmission line, may be visible; however, it will be heavily filtered by intervening vegetation and existing transmission infrastructure associated with the existing Marulan Substation to the northeast. It will be difficult to distinguish the proposed transmission line as it is already a visual element in the landscape.

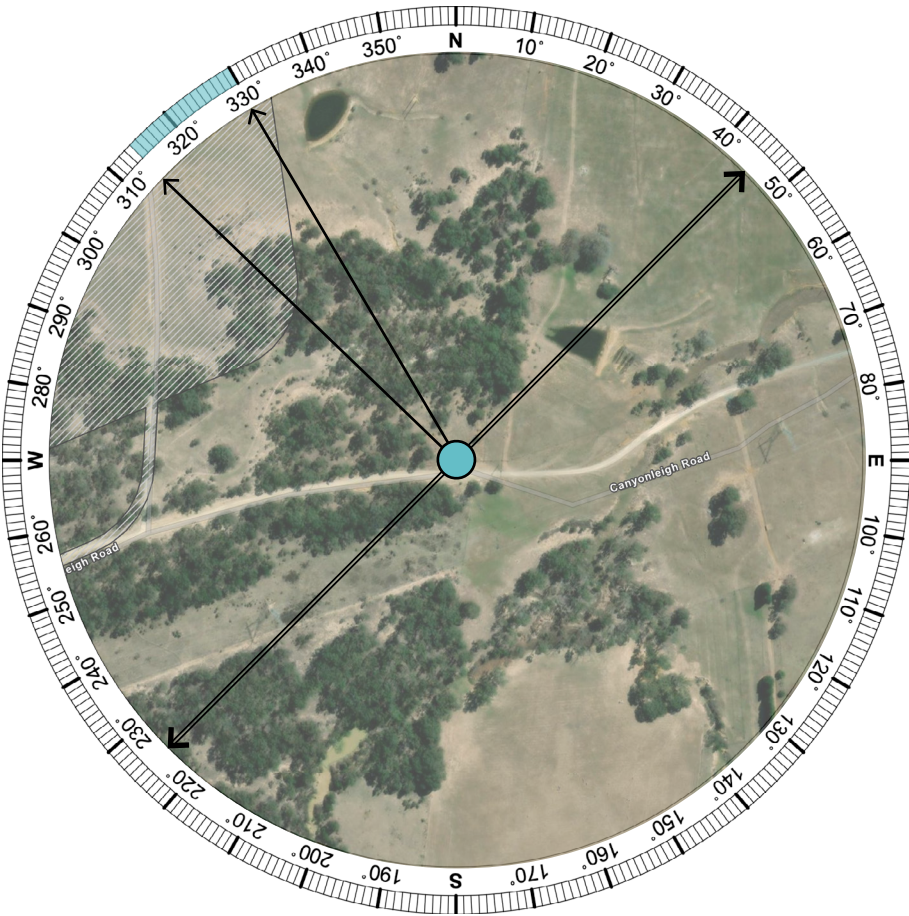
The visual magnitude of change is **Very Low**, resulting in a **Very Low** visual impact.

Viewpoint:
VP06 Canyonleigh Road, Brayton NSW

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	622 m
Coordinates:	Distance to Project:
34°36'58.12"S 150° 3'47.47"E	2.76 km

Viewing Direction:
Northwest

Visual Sensitivity:
Low

Visual Magnitude:
Very Low

Visual Impact:
Very Low

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road near non-associated dwelling R003.

The surrounding land is characterised by its gently undulating topography used for agricultural practices, specifically grazing.

Existing transmission and power lines form part of the visual landscape of this location, with the dense vegetation in the middle ground being the key feature of this view.

Potential Visual Impact:

From this location, the BESS will be screened by intervening topography.

Ancillary infrastructure, specifically the overhead transmission line, may be visible; however, it will be heavily filtered by vegetation in the middleground of this view.

The visual magnitude of change is **Very Low**, resulting in a **Very Low** visual impact.

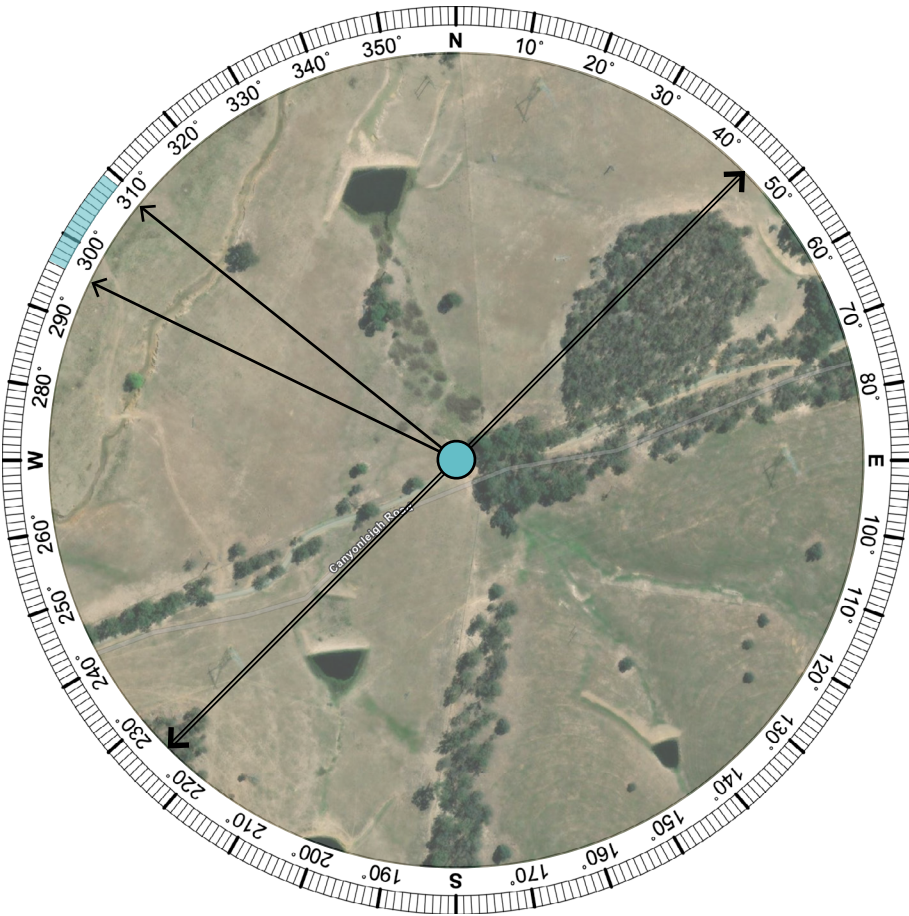
- LEGEND**
- ➡ Direction of Panorama
 - ➡ Extent of Panorama
 - ➡ Approximate Extent of Project

Viewpoint:
VP07 Canyonleigh Road, Brayton NSW

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	595 m
Coordinates:	Distance to Project:
34°36'44.06"S 150° 4'34.44"E	3.26 km

Viewing Direction:
Northwest

Visual Sensitivity:
Low

Visual Magnitude:
Very Low

Visual Impact:
Very Low

- LEGEND**
- ➡ Direction of Panorama
 - Extent of Panorama
 - Approximate Extent of Project

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road.

The surrounding landscape is characterised by gently undulating hills, with scattered clusters of vegetation and modified pastures in the middle and foreground of this view.

The cluster of dense vegetation and the transmission lines on the middle ground form a part of the visual landscape of this view.

Potential Visual Impact:

From this location, the BESS will be screened by intervening topography.

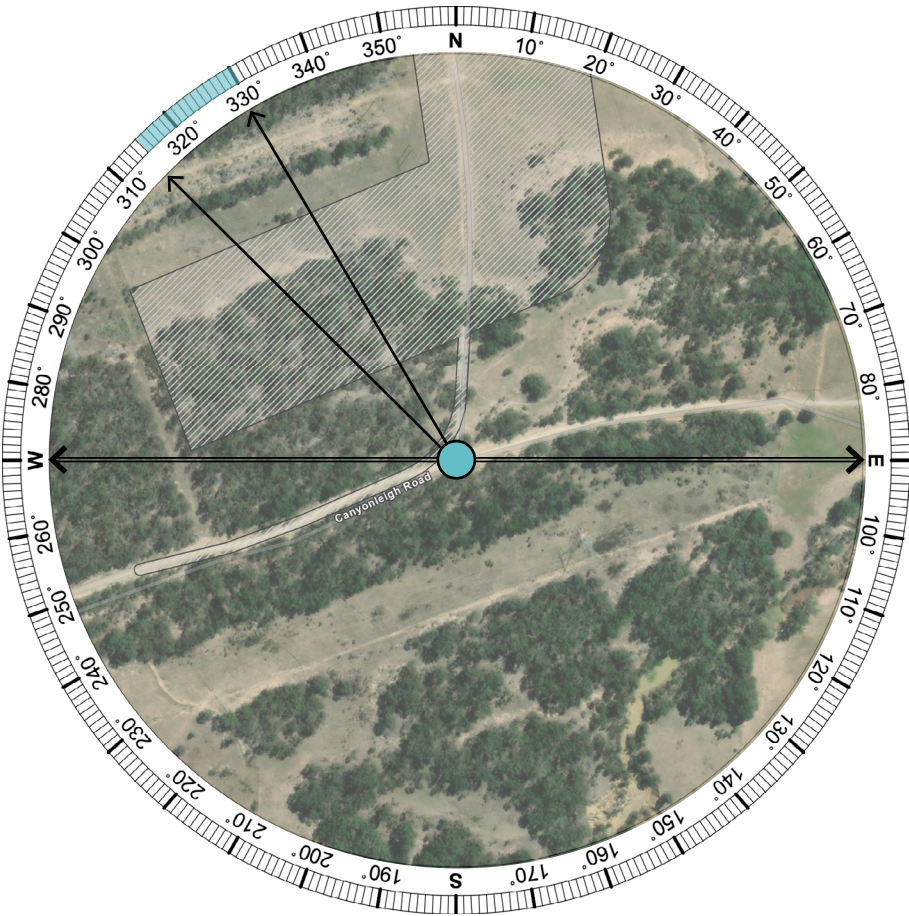
Ancillary infrastructure, specifically the overhead transmission line, will be visible in the background of this view behind the existing transmission line. It will be difficult for a viewer to distinguish the proposed transmission line, as these transmission lines already form part of the visual character.

The visual magnitude of change is **Very Low**, resulting in a **Very Low** visual impact.

Viewpoint:
VP08 Canyonleigh Road, Brayton NSW



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	636 m
Coordinates:	Distance to Project:
34°36'59.86"S 150° 3'36.75"E	2.63 km
Viewing Direction:	
North	
Visual Sensitivity:	
Low	
Visual Magnitude:	
Low	
Visual Impact:	
Low	

- LEGEND**
- ➡ Direction of Panorama
 - Extent of Panorama
 - Approximate Extent of Project

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road at the entrance of the Arthursleigh property (the Project Site).

The topography is gently undulating, with dense vegetation surrounding the road corridor of Cayonleigh Road.

Electrical infrastructure forms part of the existing landscape character from this location.

Potential Visual Impact:

The BESS will not be visible from this location due to intervening topography.

This viewpoint has been captured at the entry to the Project. Minor upgrades are proposed at the entry to the site as part of the EIS. However, there will be a negligible visual impact resulting from the road modifications.

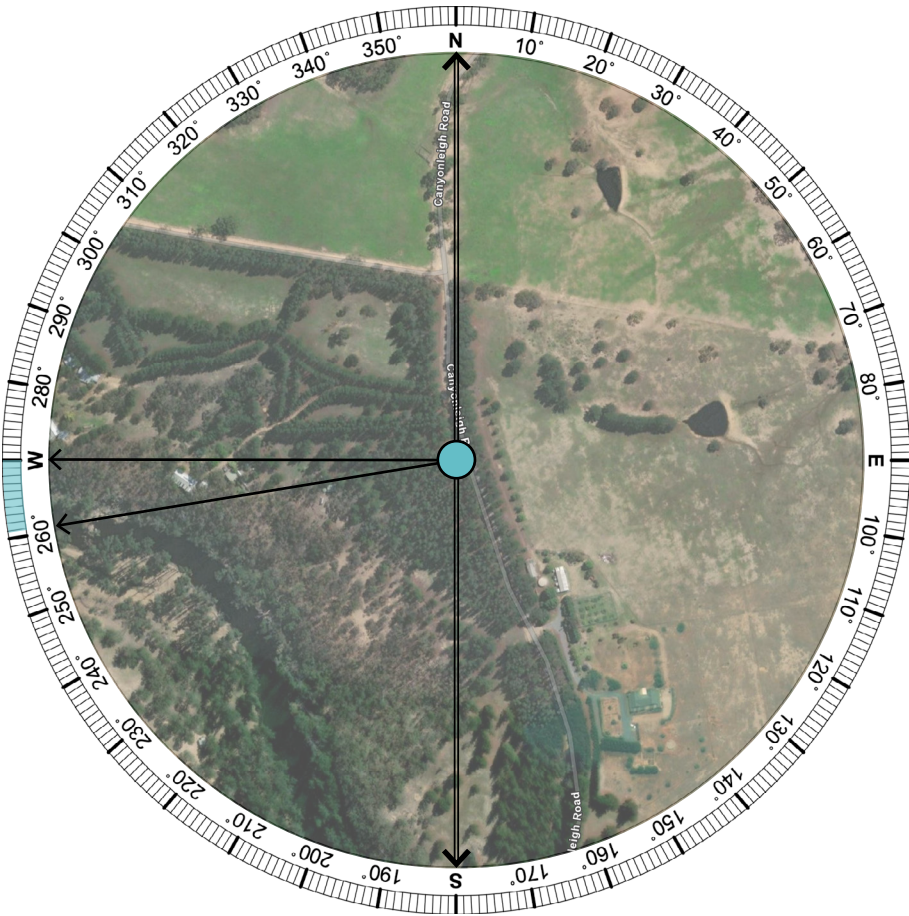
Due to the viewpoint's proximity, the proposed overhead transmission infrastructure will be a new element in this landscape. However, it is unlikely to diminish its character, as existing transmission corridors are already a defining element in the surrounding landscape associated with the Marulan Substation (Refer to **VP05**).

The visual magnitude of change is **Low**, resulting in a **Low** visual impact.

Viewpoint:
VP09 Canyonleigh Road, Brayton NSW



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Canyonleigh Road, Brayton NSW	612 m
Coordinates:	Distance to Project:
34°35'30.25"S 150° 5'24.64"E	3.89 km

Viewing Direction:
West

Visual Sensitivity:
Low

Visual Magnitude:
Very Low

Visual Impact:
Very Low

- LEGEND**
- ➡ Direction of Panorama
 - ↔ Extent of Panorama
 - Approximate Extent of Project

Existing Landscape Character Description:

The viewpoint is located along Canyonleigh Road near the driveway entrance of non-associated dwelling R041.

The surrounding landscape is gently undulating with scattered clusters of vegetation. The land adjacent to the road is cleared for agricultural practices. The sloping topography to the west conceals some of the vegetation and agricultural infrastructure.

Existing agricultural building infrastructures and power lines form a small part of the visual landscape of this view, with the open views to the west and the dense vegetation to the northwest being a distinguishable feature.

Potential Visual Impact:

From this location, the BESS will be screened by intervening topography. Ancillary infrastructure, specifically the overhead transmission line, may be visible in the background of this view; however, it will be heavily filtered by intervening vegetation to the west

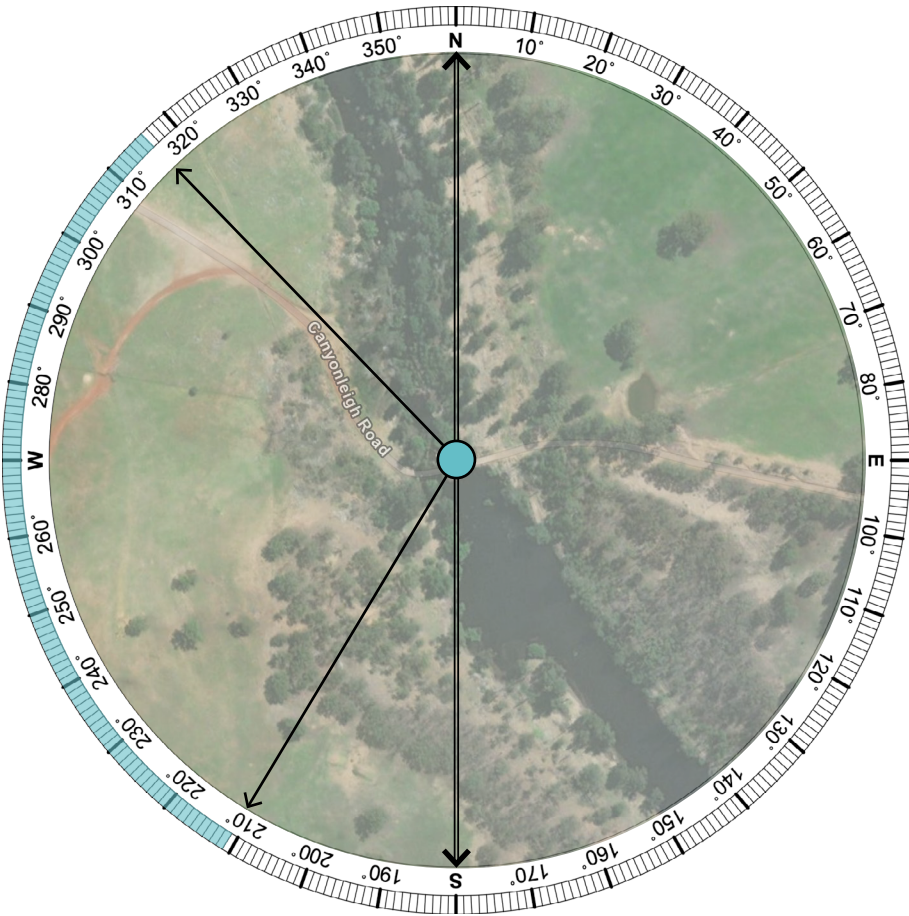
The visual magnitude of change is **Very Low**, resulting in a **Very Low** visual impact.

Viewpoint:
VP10 Wollondilly River Weir, Brayton

NOTE:
The Project is not visible from this location due to intervening topography



Extent of BESS Area



Aerial Source: Google Earth, 2023

Viewpoint Summary:

Location:	Elevation:
Wollondilly River Weir, Brayton	579 m
Coordinates:	Distance to Project:
34°35'21.38"S 150° 4'59.01"E	3.33 km

Viewing Direction:
West

Visual Sensitivity:
Low

Visual Magnitude:
Nil

Visual Impact:
Very Low

Existing Landscape Character Description:

The viewpoint was captured on the Wollondilly River Weir.

The topography adjacent to the river weir is gently undulating. Dense vegetation along the river bank and the river is one of the key features of the visual landscape of this view.

Potential Visual Impact:

This viewpoint, a representative perspective from Wollondilly River Weir as selected as a local place of significance noted by residents during community consultation.

From this location, the Project is screened by intervening topography.

The visual magnitude of change is **Nil**, resulting in a **Very Low** visual impact.

- LEGEND**
- ➡ Direction of Panorama
 - ↔ Extent of Panorama
 - Approximate Extent of Project

8.0 Photomontages

8.1 Overview of Photomontages

A photomontage is a visualisation based on the superimposition of the Project onto a viewpoint photograph for the purpose of creating a realistic representation of proposed or potential changes to a view (Horner, 2006). Photomontages have been utilised in this VIA to assist in the visual impact assessment of the Project.

8.2 Wireframe Diagrams

A wireframe is a computed generated image based on a digital terrain model, that indicate the 3D shape of the landscape in combination with additional elements. They are a valuable tool in the VIA process as they allow the assessor to compare the position and scale of the Project to the existing view of a landscape (Scottish Natural Heritage, 2017). Wireframe diagrams can be seen as a worst case scenario as they do not take into account factors such as vegetation, building structures. Wireframe diagrams have been utilised in this VIA to verify photomontages.

8.3 Photomontage Development Process

The process for generating these images involves computer generation of a wire frame perspective view of the Project. This process includes:

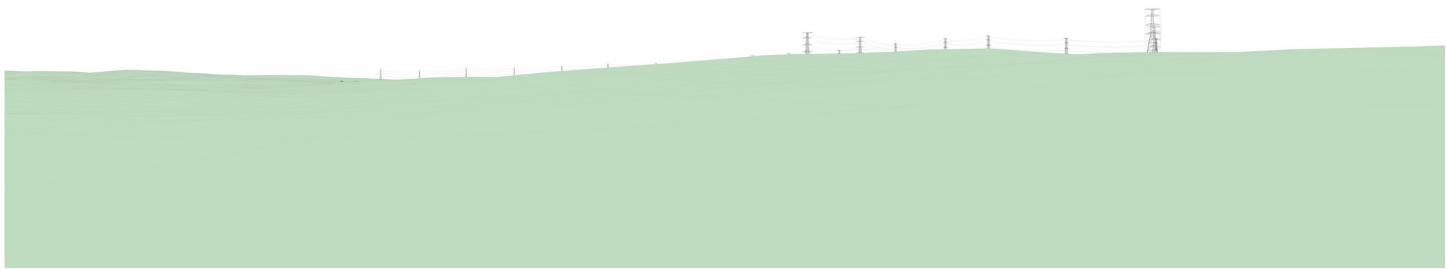
- Capturing viewpoints with a Canon EOS R5 Mirrorless Camera through a 50mm fixed focal lens;
- Building a wireframe model of the Project;
- Matching the wireframe model to the viewpoint using rendering software; and
- Rendering the model into viewpoint to a realistic level

These photomontages are based on photography from key public viewpoints that are included within **Section 7.0**. It is noted that a 50mm fixed focal lens closely represents the central field of vision of the human eye. The process for photomontage development is demonstrated in **Figure 11**.

8.4 Photomontage Selection

As there was no opportunity to view the BESS outside the Project Area - photomontage overlays were prepared for **VP05** (Canyonleigh Road) and **VP08** (Project Site Entry) to show the BESS sitting in the context of these viewpoints, including ancillary infrastructure.

Step 1: Develop 3D Model



Detailed 3D model of the Site is developed in a modelling software. The Project is modelled and sited in the 3D model to scale.

Step 2: Align Photograph and Model



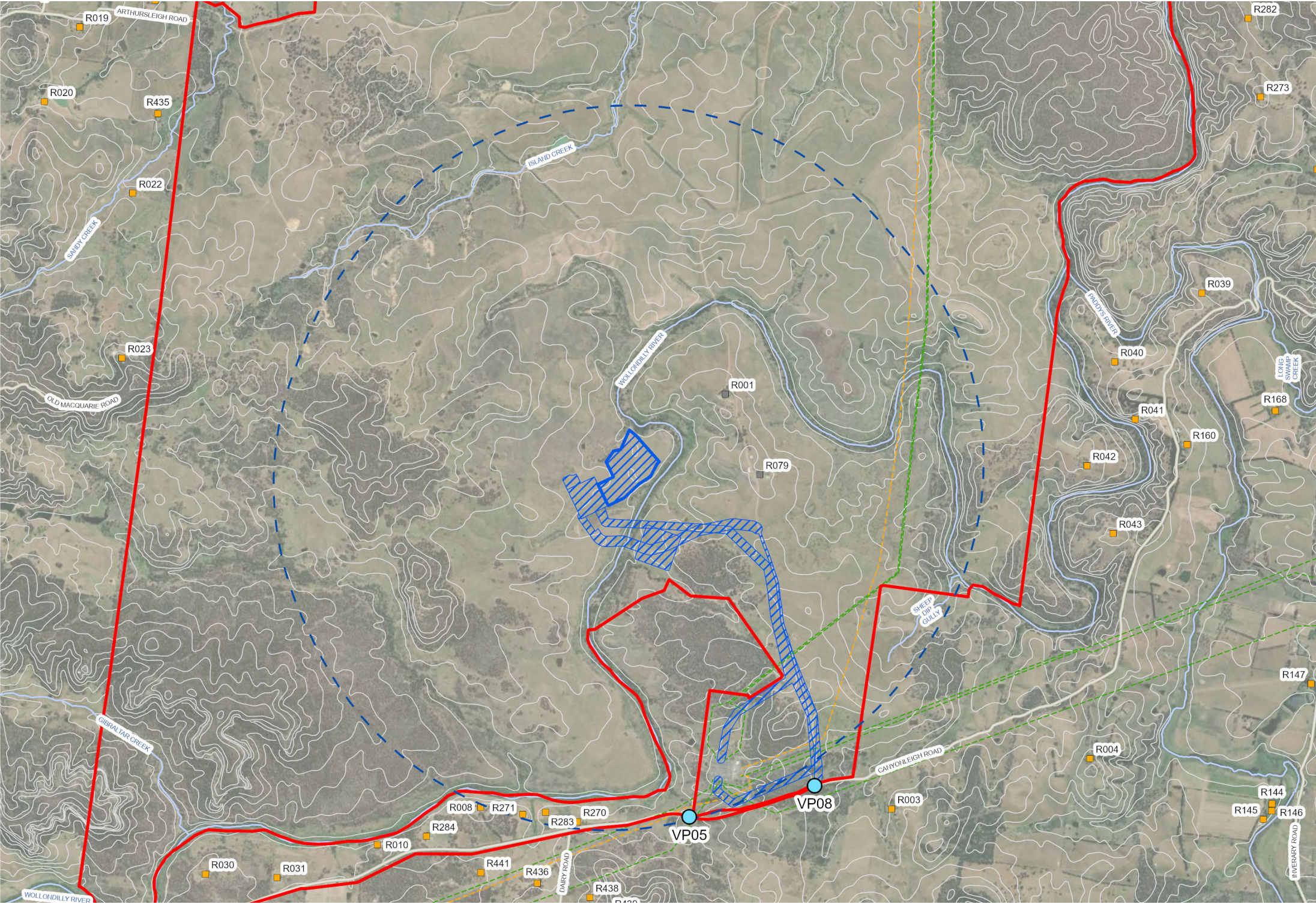
The digital panorama is imported into the modelling software and EXIF properties of the file are inserted automatically defining all relevant visualisation information as e.g. type of camera lens used, field of view for panoramas, the position and direction. Topography, control points, obstacle objects that can be used as reference to calibrate the model camera very precisely.

Step 3: Render Photomontage



The software calculates the position of the sun based on the time and date of photograph and renders the Project in accordance with the specific weather conditions and position of the sun. Once rendered, detailed removal of intervening elements (such as vegetation) is undertaken to provide an accurate representation of the Project.

Figure 12 – Photomontage Development Process



Photomontage Locations

Refer to Section 8.4

LEGEND

- Photomontage Location
- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Watercourse
- Roads
- Contour

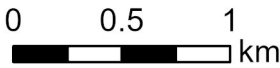


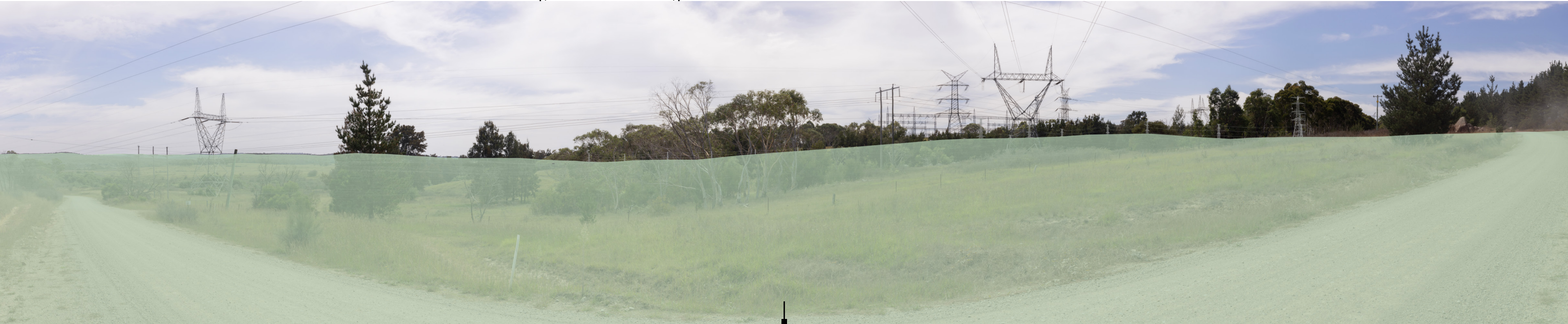
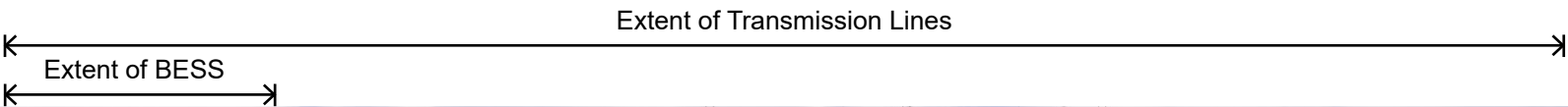
Figure 13 – Photomontage Locations
Basemap Source: ESRI, 2024.



VP05 Canyonleigh Road, Brayton NSW

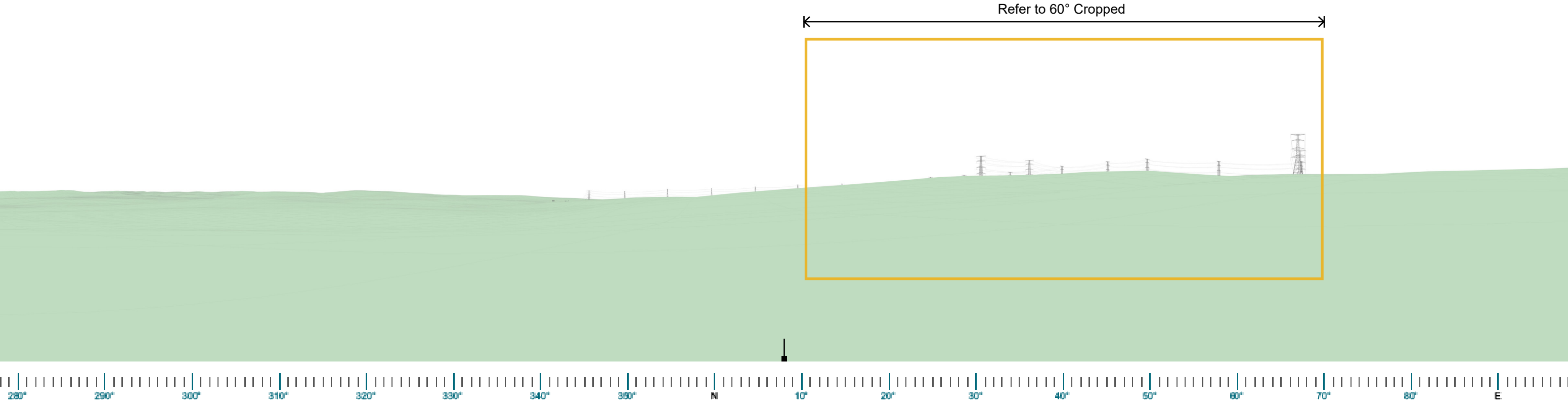


180° Existing View



180° Proposed View Overlay

VP05 Canyonleigh Road, Brayton NSW



180° Wireframe

NOTE:
The BESS is not visible from this location due to intervening topography & vegetation



180° Proposed View

VP05 Canyonleigh Road, Brayton NSW

NOTE:
The proposed transmission line is visible beyond the existing infrastructure associated with the existing Marulan Substation.



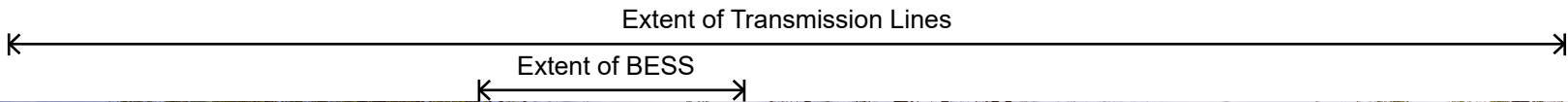
60° Cropped

 Extent of Transmission Line Visibility

VP08 Canyonleigh Road, Brayton NSW

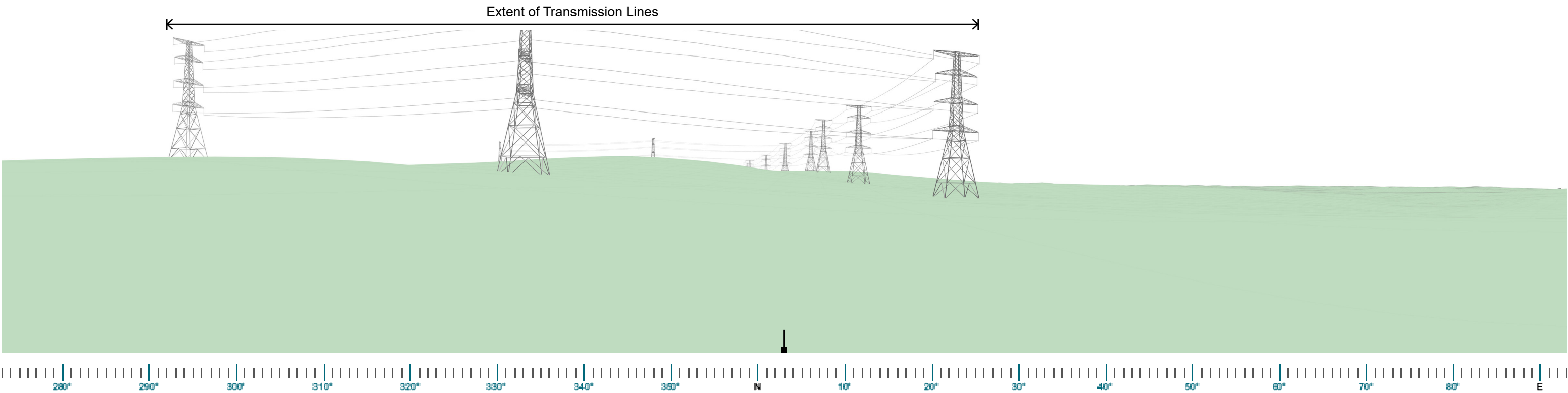


180° Existing View



180° Proposed View Overlay

VP08 Canyonleigh Road, Brayton NSW



Extent of Visible Components

9.0 Visual Impact Assessment

9.1 Overview of Visual Impacts

In addition to the photographic viewpoint assessment, the following section provides an overview of the potential visibility from areas surrounding the Project. This is by no means an exhaustive description of the visibility from every locality, it is intended to provide an overall assessment of the potential visual impact on areas potentially effected by the Project.

9.2 Overview of Visual Impacts on Public Land

The Project will result in a 'Low' to 'Very Low' visual modification to the existing landscape character. Due to the existing topographic and vegetation character screening views towards the Project, there are minimal opportunities to view the BESS from publicly accessible areas outside the Project Area, including the majority of Canyonleigh Road.

A higher visual magnitude is generally associated with views located at proximity, which includes VP08, which was captured at the Project Area entry where the proposed overhead transmission line will be a visual element (see VP08). It is to be noted that the existing transmission infrastructure is already a visual element within the landscape, and the introduction of the new overhead transmission line of a similar size and scale is in keeping with the existing transmission lines in the area. As a result, the transmission lines will result in a low contrast with the existing landscape features and character.

9.3 Overview of Visual Impacts on Non-Associated Dwelling

Four (4) non-associated dwellings, identified as R008, R270, R271 and R283 were identified in the Study Area. The ZVI confirms that the BESS is not visible from these non-associated dwellings. The ZVI does suggest visibility of the transmission line component of the Project (see **Figure 20**) however It is likely that the construction and operation of the overhead transmission lines will integrate with the existing landscape and is unlikely to alter or diminish the visual quality of key landscape features within the Study Area (see **VP08** and **Section 11.2.1**).

Refer to the LVIA, prepared by Moir LA for Wattle Creek Solar Farm, for a detailed assessment of these non-associated dwellings related to the PV Array.

9.4 Summary of Landscape Character Zones

Landscape Character Assessment					
LCZ:	Name:	Scenic Quality Rating:	Sensitivity:	Magnitude:	Landscape Character Impact:
LCZ01	National Parks & Vegetated Hills	MODERATE	MODERATE This LCZ consists of endemic vegetation communities located within Tarlo River National Park. The topography within this LCZ ranges in elevation, undulating to form localised ridgelines that provide a backdrop to the surrounding plains, including Gibraltar Rocks. The LCZ has the ability to retain its existing visual quality.	LOW The disturbance area relating to the Project is generally sited to avoid areas located within this LCZ. Due to the low vertical scale of the Project, it is unlikely to compete visually with the localised ridgelines and vegetation clusters that are key landscape features of this LCZ.	LOW
LCZ02	Rivers	MODERATE	MODERATE This LCZ consists of several watercourses, including the Wollondilly River, Tarlo River, and Paddys River. The edges of these watercourses have steep and gradual topographical rises and are lined with riparian vegetation that differs from that of LCZ01. The LCZ has the ability to retain its existing visual quality.	LOW The disturbance area relating to the Project is generally sited to avoid areas located within this LCZ. The Project will be visible when viewed from select areas of this LCZ, specifically within the Project Area. Due to the low vertical scale of the Project, it is unlikely to compete visually with the riparian vegetation corridors or the watercourse itself.	LOW
LCZ03	Grazing, Pastures & Rural Properties	LOW	LOW Human modification is evident within this LCZ, which consists of grazing, clearing pastures, farming infrastructure, and rural properties. The human modification experienced within this LCZ allows it to absorb the potential change envisaged by the Project.	LOW The Project is located predominantly within this LCZ but is not expected to compete visually with other elements that contribute to it, including the existing electrical infrastructure, including transmission lines and substations.	LOW

Table 10 – Landscape Character Assessment Summary

10.0 Nightlighting

10.1 Overview of Potential Night Lighting Sources

Due to the relatively rural location of the Project Area, minimal existing sources of lighting are present in the night-time landscape of the Study Area. Existing lighting associated with rural dwellings, Marulan Substation (including ancillary infrastructure) and motor vehicles are dispersed around the Study Area. Lighting impacts resulting from the Project are unlikely to be experienced inside a dwelling as internal lights reflect on windows and limit views to the exterior at night. Isolated receptors within the Study Area experience a night sky with minimal light sources.

The requirements for nightlighting of ancillary infrastructure for this Project are generally limited to security lighting to the substation and within the operations & maintenance facility. The light sources are limited to low-level lighting for security, night-time maintenance and emergency purposes. No permanently illuminated lighting will be installed. The proposed ancillary infrastructure has been carefully sited to minimise visibility from existing receptors and publicly accessible viewpoints. It is unlikely the proposed nightlighting associated with the ancillary infrastructure would create a noticeable impact on the existing night-time landscape.

10.2 Design Principles

The following recommendations have been developed considering the principles outlined in relevant best practice guidelines for lighting design. The Dark Sky Planning Guidelines (hereafter referred to as the Dark Sky Guidelines) (DPHI, 2023) provide guidelines for lighting practices that support the maintenance of a dark sky and improve lighting practices. The Dark Sky Guidelines are related to developments within 200 km of the Siding Spring Observatory. The Project is located outside this zone; however, these guidelines provide relevant guidance to reduce potential light pollution that can be applied to lighting design for the ancillary infrastructure associated with the Project. The National Light Pollution Guidelines for Wildlife (DEE, 2023) may also be considered during the detailed design phase for nightlighting considerations.

Control the Level of Lighting

- Only use lighting for areas that require lighting, i.e. paths and building entry points.
- Reduce the duration of lighting.
- Switch off lighting when not required.
- Consider using sensors to activate lighting and timers to switch off lighting.

Lighting Design

- Use the lowest intensity required for the job.
- Use energy-efficient bulbs and warm colours.
- Direct light downwards to eliminate.
- Ensure lights are not directed at reflective surfaces.
- Use non-reflective dark-coloured surfaces to reduce the reflection of lighting (**Figure 15**).
- Keep lights close to the ground and directed downwards (**Figure 16**).
- Use light shield fittings to avoid light spills (**Figure 14**).

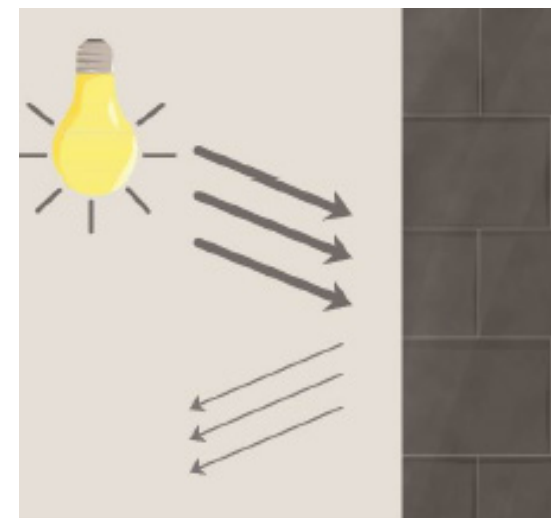


Figure 15 – Surface Reflectivity

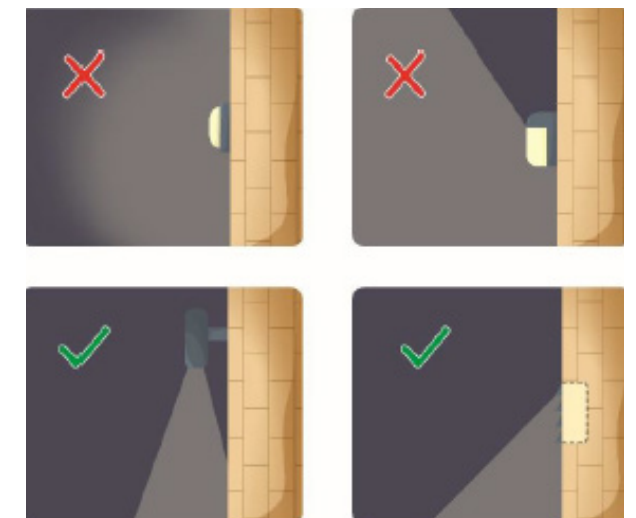


Figure 16 – Downward Lighting



Figure 14 – Light Shielding

Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife 2020

11.0 Cumulative Visual Impacts

11.1 Overview Cumulative Visual Impacts

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future (Landscape Institute, 2013). Cumulative effects may also affect the way a landscape is experienced and can be positive or negative. Where they comprise benefits, they may be considered to form part of the mitigation measures.

Wattle Creek Solar Farm will involve constructing, operating and decommissioning a Photovoltaic (PV) solar facility. It is noted that all components that form part of the Project, including ancillary infrastructure is identified and assessed in a separate assessment (SSD-63344210).

A cumulative impact assessment has several dimensions:

- The impact of the proposed development when added to the combined impacts of all other existing developments and environmental characteristics of the area.
- The impact of this development in the context of the potential for other infrastructure developments in the local, regional and national context.
- The impact of developments which are ancillary to or otherwise associated with the proposed Facility eg. the development of substations and associated infrastructure.

The potential cumulative visual impact must also be assessed in relation to the potential visual impact when viewed sequentially. If the Project is viewed in succession as a traveller moves through the landscape (eg. motorist travel routes) this may result in a change in the overall perception of the landscape character. The viewer may only see one development at a time, but if each successive stretch of the road is dominated by views of a development, then that can be argued to be a cumulative visual impact (EPHC, 2010).

Table 11 and **Figure 17** details the cumulative consideration of 20 large scale Projects located within 40 km of the Project.

11.1.1 Wattle Creek Solar Farm

Wattle Creek BESS Solar Farm comprisesThe Project comprises a large-scale solar PV generation facility supported by associated infrastructure.

As shown in the cumulative viewshed (**Figure 18**), there are limited opportunities to view both the Project (BESS) and Wattle Creek Solar Farm outside the Project Area. Dense vegetation between Canyonleigh Road and the Project Area will likely screen a clear view of Wattle Creek BESS and will not increase the occupied cell out or overall visual impact from this location. Refer to VP05 in Appendix A for a detailed visual impact statement.

As shown in **B.10** (refer to **Appendix B**), non-associated dwelling R128 has a distant view of the Project due to its elevated position. It is to be noted that the BESS is located within the Project Area of Wattle Creek Energy Hub. The vertical scale of the BESS is less than that of the PV Array and, therefore, will not increase the occupied cell count or the overall visual impact of this dwelling from a cumulative perspective.

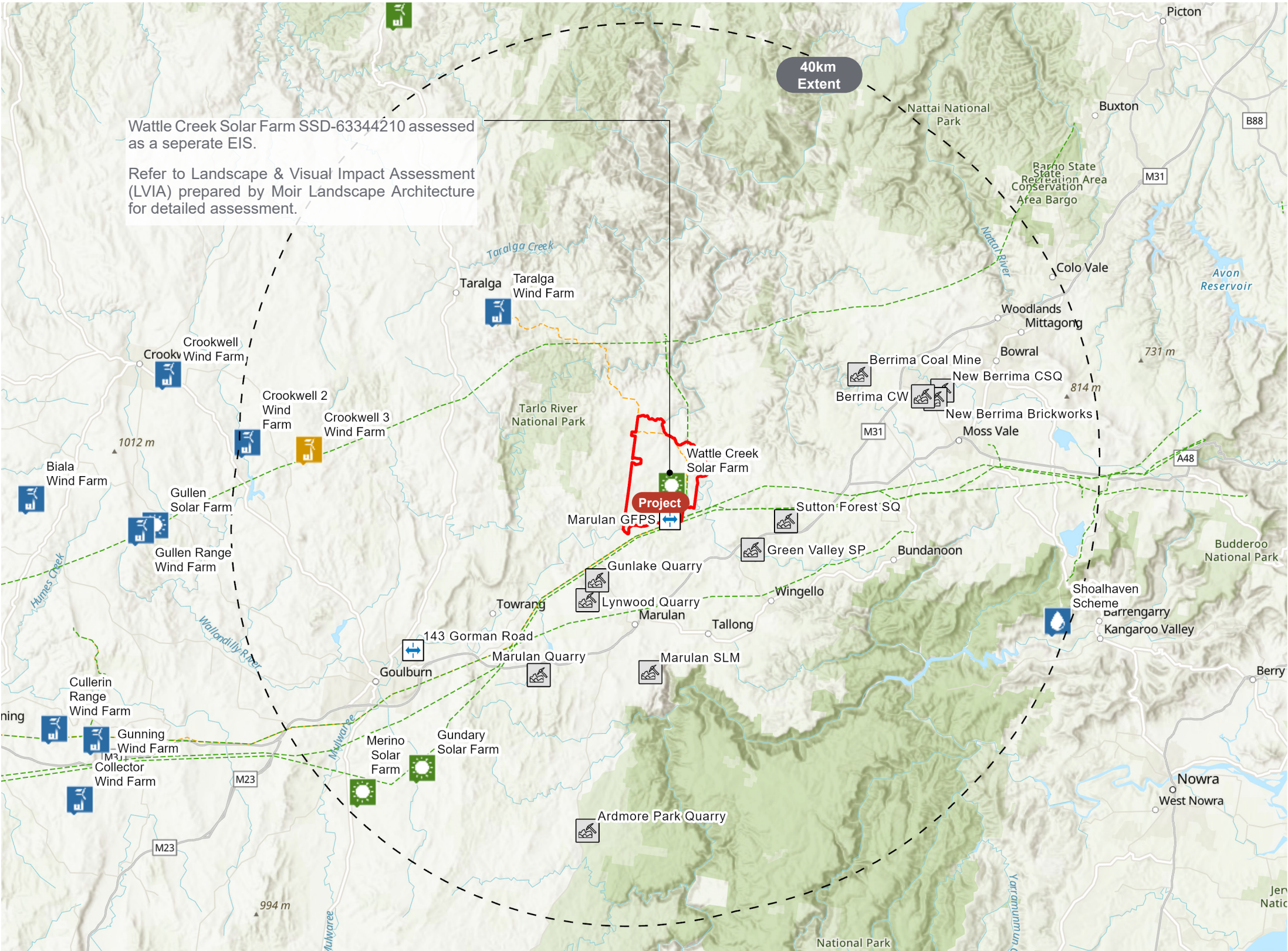
11.1.2 Marulan Substation

Marulan Substation is an existing substation located along Canyonleigh Road within the Project Area. The Project is proposed to utilise this infrastructure, connecting to the existing substation. When viewed in conjunction with the Project, the visual impact remains low on account of existing character and short viewing times where the ZVI assessment has indicated visibility. Refer to **VP05** in **Appendix A**, where the worst case effect of the Marulan Substation and the Project has been showcased.

Large Scale Energy Development (within 40 km of the Project)			
Project	Distance & Direction from the Project	Generation Capacity (MW)	Planning Status & Cumulative Consideration
Wattle Creek Solar Farm	At Project Area (less than 1 km away)	265 MW (AC)	Proposed (Cumulative Impacts to be assessed)
Marulan Gas-Fired Power Station 1	At Project Area (less than 1 km away)	350MW	Approved (Due to proximity, the Marulan Gas Fired Power Station will be visible in conjunction with the Project)
Gunlake Quarry	approx. 6 km (Southwest)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to intervening vegetation between Gunlake Quarry and the Project)
Marulan Solar Farm	approx. 7 km (Southeast)	100MW	Proposed (Cumulative Impacts will be Negligible/NIL as there is no opportunity to view the Project and Marulan Solar Farm simultaneously within the Study Area)
Green Valley Sand Project	approx. 7 km (Southeast)	-	Approved (Cumulative Impacts are Negligible/NIL as there is no opportunity to view the Project and Green Valley Sand Project simultaneously within the Study Area)
Lynwood Quarry	approx. 8 km (Southwest)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to topography)
Sutton Forest Sand Quarry	appx. 10 km (East)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to intervening vegetation between Gunlake Quarry and the Project)
Marulan South Limestone Mine	approx. 14 km (South)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to topography)
Berrima Coal Mine	approx. 18 km (Northeast)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)
Tarlaga Wind Farm	approx. 20 km (Northwest)	107MW	Operational (Cumulative Impacts will be Negligible/NIL due to distance)
Berrima Cement Works	appx. 23 km (Northeast)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)

New Berrima Brickworks Facility	appx. 24 km (Northeast)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)
Goulburn Sewerage Collection, Treatment and Disposal (143 Gorman Road)	approx. 25 km (southwest)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)
New Berrima Clay Shale Quarry	appx. 25 km (Northeast)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)
Gundry Solar Farm	approx. 28 km (Southeast)	165MW	Approval (Cumulative Impacts will be Negligible/NIL due to distance)
Merino Solar Farm	approx. 28 km (Southeast)	450MW	Proposed (Cumulative Impacts will be Negligible/NIL due to distance)
Ardmore Park Quarry	approx. 30 km (south)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)
Crookwell Wind Farm	approx. 32 km (West)	149MW	Operational (Extension under Determination) (Cumulative Impacts will be Negligible/NIL due to distance)
Marulan Quarry	approx. 34 km (southwest)	-	Approved (Cumulative Impacts will likely be Negligible/NIL due to distance)

Table 11 – Large Scale Energy Development (within 40 km of the Project)



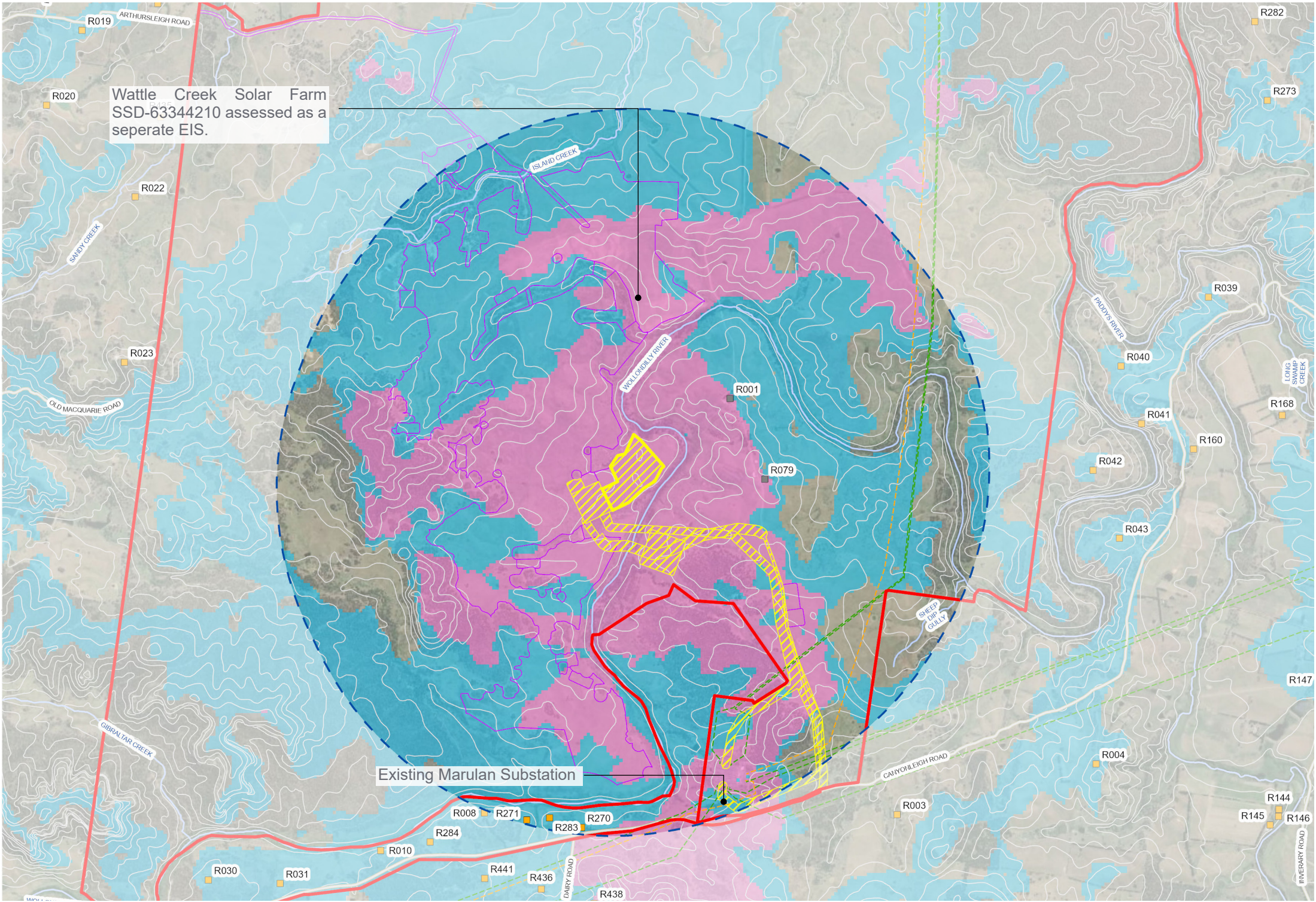
Nearby Large-Scale Energy Projects

Refer to Section 9.10

LEGEND

- Project Area
- Study Area (5 km PV Array)
- Visual Magnitude (40 km from Project Area)
- Other
- Quarry / Mine
- Hydro - In Planning
- Hydro - Operational
- Wind - Under Construction
- Wind - Operational
- Wind - In Planning
- Solar - Operational
- Solar - In Planning
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)

Figure 17 – Nearby Large-Scale Energy Projects
Basemap Source: ESRI, 2024



Cumulative Zone of Visual Influence

Refer to Section 11.0

LEGEND

- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Watercourse
- Solar Disturbance Area (SSD-63344210 assessed separately)
- Roads
- Contour

VISIBILITY

- Wattle Creek Solar Farm
- Wattle Creek Solar Farm & Wattle Creek BESS
- Wattle Creek BESS

NOTE

There is no opportunity to view Wattle Creek BESS singularly; it can only be viewed combined with Wattle Creek Solar Farm.

NOTE

ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

Figure 18 – Cumulative Zone of visual Influence
Basemap Source: ESRI, 2024

11.2 Assessment of Ancillary Infrastructure

11.2.1 Electrical Reticulation and Grid Connection

The assessment considers two overhead 330 kV transmission line options and will connect the Project's on-site substations to the Marulan Substation, located southeast of the Project near Canyonleigh Road. The transmission towers are expected to be up to 60m high. The transmission towers will likely be a visible feature in the landscape. It should be noted that the existing transmission lines are a visual feature of the existing landscape near the Project and the Marulan Substation. It is likely that the construction and operation of the overhead transmission lines will integrate with the existing landscape and is unlikely to alter or diminish the visual quality of key landscape features within the Study Area. Impacts associated with overhead transmission lines are considered low.

11.2.2 Substation

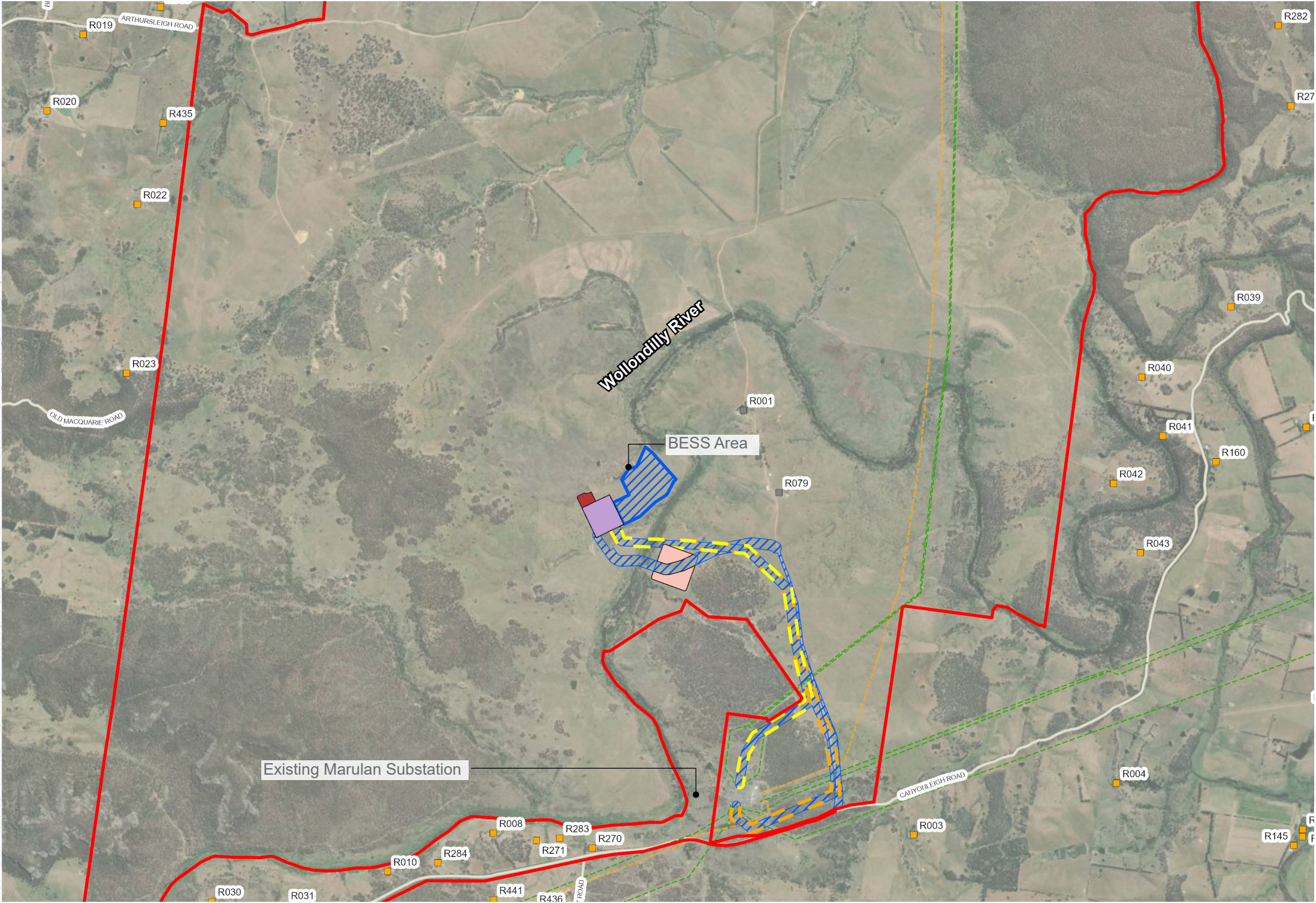
The Project will include one (1) onsite Substation Collector, approx. 6ha sited 2 km northwest of the existing Marulan Substation on the western side of the Wollondilly River. This substation will connect the Solar Farm via transmission lines to the Marulan Substation.

Marulan Substation and associated transmission lines are already a feature when travelling along Canyonleigh Road due to the development's close proximity to this unsealed road. Due to its distance from Canyonleigh Road, the proposed substation associated with the Project will likely be filtered by vegetation associated with Wollondilly River and Canyonleigh Road. Outside Canyonleigh Road, there are minimal opportunities to view the substation.

11.2.3 Site Access and Facilities

Site access has been proposed off Canyonleigh Road and a secondary access point off Arthursleigh Road near Big Hill Uniting Church. Public road upgrade works are required near the Canyonleigh Road property entry to facilitate access to the development footprint. Private internal roads will traverse the disturbance area from the proposed site access points.

Facilities for the operation of the Project include the O&M Building - including a staff office, amenities, equipment and maintenance sheds, laydown areas, storage facilities and parking. The appearance of these facilities would be similar to the existing farm structures with the landscape and facilities associated with the Marulan Substation. It would, therefore, be a low visual modification.



Associated Infrastructure

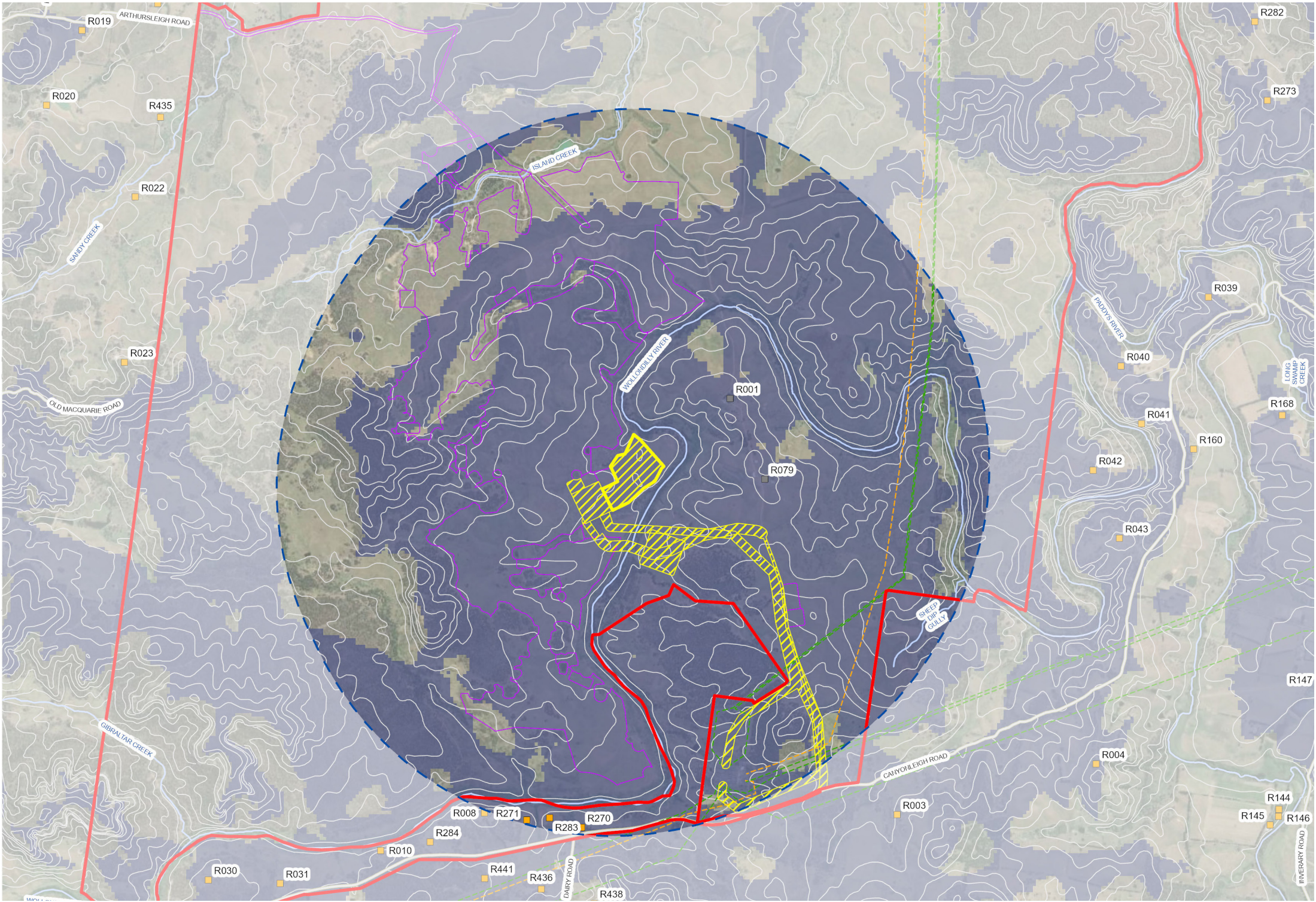
Refer to Section 11.2

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- O&M Facility
- Substation
- Transmission Line Option 1
- Transmission Line Option 2
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Roads
- Laydown Area

Figure 19 – Project Layout
Basemap Source: ESRI, 2024





Transmission Line Visibility

Refer to Section 11.2.1

LEGEND

- Dwelling (Associated)
- Dwellings (Non-Associated)
- Project Area
- BESS Development Footprint
- BESS Area
- Study Area (2.5 km from BESS Area)
- Existing Transmission Lines (Transgrid)
- Existing Transmission Lines (Non Transgrid)
- Watercourse
- Solar Disturbance Area (SSD-63344210 assessed separately)
- Roads
- Contour

VISIBILITY

- Transmission Line

NOTE
ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

Figure 20 – Cumulative Zone of visual Influence
Basemap Source: ESRI, 2024

Cumulative Photomontage:

VP05 Canyonleigh Road, Brayton NSW



180° Existing View

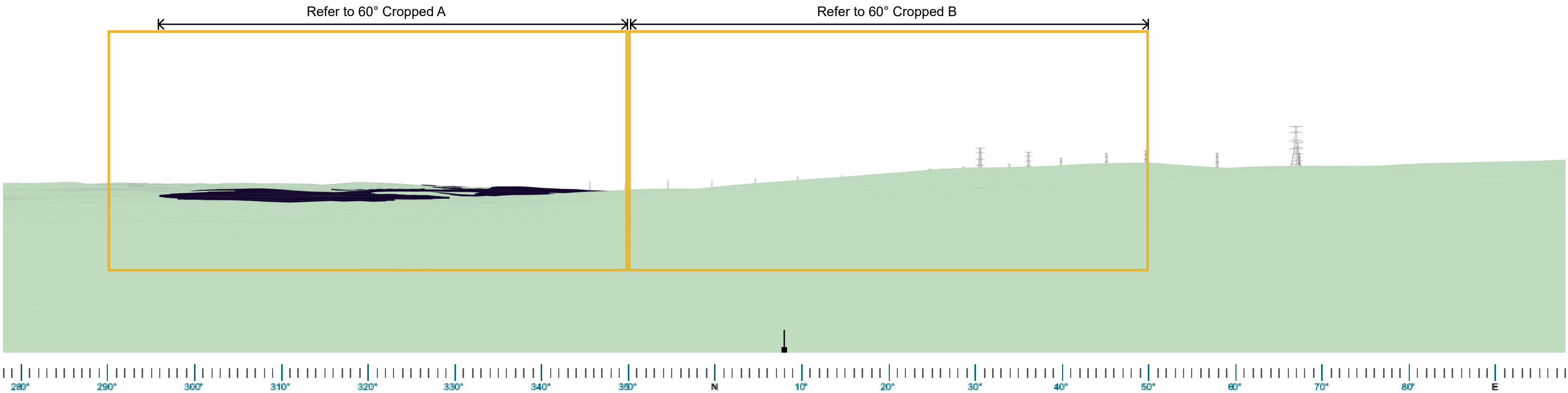
Extent of Transmission lines



180° Proposed View Overlay

Cumulative Photomontage:

VP05 Canyonleigh Road, Brayton NSW



180° Wireframe



180° Proposed View

Extent of visibility Wattle Creek BESS & Transmission Line

Extent of visibility Wattle Creek Solar Farm

Cumulative Photomontage:

VP05 Canyonleigh Road, Brayton NSW



60° Cropped A

Extent of visibility Wattle Creek BESS & Transmission Line

Extent of visibility Wattle Creek Solar Farm

Cumulative Photomontage:

VP05 Canyonleigh Road, Brayton NSW



60° Cropped B

Extent of visibility Wattle Creek BESS & Transmission Line Extent of visibility Wattle Creek Solar Farm

12.0 Mitigation Recommendations

12.1 Recommended Mitigation Methods

As discussed in **Section 9.0**, opportunities to view the Project are limited and as a result there are limited publicly accessible areas or private receptors that are likely to experience unacceptable or direct visual impacts located within the Study Area. Views towards the transmission lines are available at areas in proximity to the transmission lines. Transmission lines are an existing feature in the landscape within the area, and as such the Project is expected to appear as in keeping with the existing landscape features of the area. As a result, no mitigation is required on site.

12.2 Design Considerations & Onsite Mitigation

Although no mitigation is recommended in line with the findings of the assessment, the following suggestions will assist in achieving a lower visual impact:

- Existing vegetation generally present around the Project Area will be retained and protected to maintain the existing level of screening and to reduce the overall visual impact.
- Incorporated setbacks to infrastructure to allow for onsite screening where required in the form of perimeter planting.
- Consideration of the height of ancillary structures to ensure the Project does not contrast significantly with surrounding landscape.
- The colours of the ancillary structures will be considered in detail design phase to ensure minimal contrast and to help blend into the surrounding landscape to the extent practicable.

13.0 Conclusion

13.1 Overall Summary

With all visual impact assessments the objective is not to determine whether the Project is visible or not visible, it is to determine how the Project will impact on existing visual amenity, landscape character and scenic quality. The intent of the LVIA report is to determine if there is a potential for a negative impact on these factors, and investigated if and how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

The viewpoint assessment determined that there are limited opportunities to view the Project from publicly accessible land and roads. Overall, one viewpoint, VP08 resulted in 'Low', all other viewpoints resulted in a rating of 'Very Low'. No further assessment or mitigation is required from the public viewpoints, however, two photomontages have been included for community consultation to visualise a worst case scenario (refer to **VP05** and **VP08**)

Further assessment using photomontages and wireframes demonstrate that generally where opportunity to view the Project may exist, a combination of existing vegetation and topography minimises the extent of view impacted.

An assessment was undertaken to determine the potential impacts to the existing landscape character within the Study Area. The assessment found that the dominant landscape character of the area includes modified pastures predominantly for grazing with interspersed with intermittent vegetated hills and ridge lines. The assessment determined that due to the surrounding vegetation and undulating topography, views toward the Project are limited. As a result, the Project is not likely to impact the existing character of the Study Area or modify the key landscape features.

As a result of the low visibility toward the Project, no mitigation measures are required. However, to assist in further reducing any potential visual impacts associated with the Project in the surrounding area, a number of design considerations are outlined in **Section 12.0**.

The assessment determines that the Project can be undertaken without impacting the existing landscape character of the area and little to no impact on nearby public and private viewing locations.

