

Appendix H Landscape Character and Visual Impact Assessment



Beryl Battery Energy Storage System

Landscape Character and Visual Impact Assessment



April 2024

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Appendix A: Photomontages - Views from Beryl Road

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Definitions and Abbreviations

Associated dwellings	Dwellings on land that is owned by the host landholder and associated with the Project.
BESS	Battery energy storage system
BESS area	The portion of the disturbance footprint containing the battery enclosures/containers, power conversion systems and ancillary infrastructure.
BESS switchroom and transformer	The portion of the disturbance footprint containing the two switchrooms and transformer bays including oil retention bunds, indoor medium voltage switchgear units, control rooms housed in buildings, and other ancillary infrastructure.
Disturbance footprint	The extent of actual surface disturbance proposed by the Project and assessed in the EIS. All operational components of the Project will be within the disturbance footprint. The disturbance footprint is the outcome of the iterative process outlined in this EIS.
DCP	Development Control Plan
DPHI	Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
ha	Hectares
km	Kilometres
kV	Kilovolt
Landscape	‘A holistic area comprised of its various parts including landform, vegetation, buildings, villages, towns, cities and infrastructure.’ (NSW DPE 2022)
Landscape character zone	Zones of landscape that have... ‘common distinguishing visual characteristics including landforms and major land cover patterns. These patterns are formed by combinations of vegetation, water bodies, landforms and land use, from which the key landscape features can also be identified.’ (NSW DPE 2022)
LGA	Local government area
LEP	Local Environmental Plan
LSPS	Local Strategic Planning Statement
MW	Megawatts
Project area	5 Holleys Lane, Gulgong, NSW (Lot 297 DP 755434), a portion of Beryl Road and a section of Beryl Substation in the Transgrid managed landholding (Lot 1, DP 523876).
PV	Photovoltaic
REZ	Renewable Energy Zone
SEARs	Secretary’s Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
Temporary construction laydown area	Temporary area for storing equipment, materials and plant used during construction.
The Project	An inclusive term covering the entirety of the Beryl Battery Energy Storage System which refers to all of the elements that comprise the Project for which approval is sought.
Transmission network	Existing electrical transmission infrastructure network.

1. Introduction

1.1. Overview

Ratch-Australia Corporation (RAC) is proposing to develop the Beryl Battery Energy Storage System (BESS) including associated infrastructure for network connection in Gulgong, New South Wales (NSW) (the Project). The BESS would have a capacity of up to 100 megawatts (MW) with two hours of storage (100 MW/200 megawatt hours (MWh)). The Project would connect to the National Energy Market (NEM) via a 132 kilovolt (kV) underground cable to the existing Transgrid Beryl 132/66 kV Substation (Beryl Substation) located adjacent to the southern boundary of the Project area.

The Project would store variable renewable energy from the NEM (National Electricity Market) in periods where supply exceeds demand such that it can be dispatched at times of greater need, providing network stability and grid forming capabilities.

The Project would primarily be located at 5 Holleys Lane, Gulgong (Lot 297 DP755434) approximately 6.3 kilometres (km) west of the Gulgong township, in the Mid-Western Regional Council local government area (LGA) and Central-West Orana Renewable Energy Zone (CWO REZ). The Project would also include upgrade works to the existing Beryl Substation in the Transgrid managed landholding (Lot 1, DP523876).

The location of the Project is shown in **Figure 1-1**. The Project description and proposed layout is presented in **Chapter 3**.



Key:

- Project area
- Disturbance footprint
- BESS area
- Contour (5m)
- Contour (1m)

- Screening vegetation
- Access Road
- Associated dwelling
- Neighbouring dwelling

Existing transmission lines:

- 330 kV
- 132 kV
- 66 kV

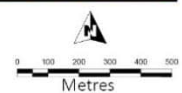


FIGURE 1-1 PROJECT LOCATION

2. Scope requirements and assessment approach

2.1. Assessment requirements

This assessment has been prepared to address the NSW Planning Secretary's Environmental Assessment Requirements (SEARs) for the Project, issued on 28 September 2023 by the Department of Planning, Housing and Infrastructure (DPHI). The SEARs identify matters which must be addressed in the EIS and essentially form its terms of reference.

The relevant SEAR for this assessment is:

'Visual – including a detailed assessment of the likely visual impacts of all components of the project (including transmission lines, substations and any other ancillary infrastructure) on surrounding residences and key locations, scenic or significant vistas and road corridors in the public domain and provide details of measures to mitigate and/or manage potential impacts, (including consideration of Mid-Western Regional Council's (Council) comments on the SEARs).'

Further to the above, Council's comments on the SEARs related to visual amenity were:

Council requests specific details be provided to adequately assess any visual amenity impacts that may be experienced by residents within local proximity of the project. It is anticipated that amenity will be key areas of concern for adjoining neighbours and residents. Where impacts are expected, it is requested that the Proponent provide a thorough analysis of these impacts and details on the proposed mitigation measures and management practices that will be implemented.

Council requests a comprehensive native vegetation and landscaping plan be established to ensure that the value of the natural environment, together with flexibility in land use or development, is maximised.

Consultation with Council's Environment department would be welcome to discuss suitable native vegetation endemic to the region.

To address these requirements, this assessment includes:

- An assessment of impacts on:
 - landscape character (refer to chapter 6)
 - views from the public domain (including scenic or significant vistas and road corridors) (refer to section 7.2)
 - views from surrounding dwellings, including residents within local proximity of the Project (refer to section 7.4)
 - Views at night (refer to section 7.3)
- Identification of potential cumulative landscape and visual impacts (refer to chapter 8).
- Identification of management measures to mitigate visual impacts (refer to chapter 10).

A native vegetation and landscape plan has been prepared for the Project, developed using the plant species mix provided by Mid Western Regional Council's Environmental department on 01 February 2024. This plan is provided at Appendix C.

2.2. Guidance for landscape character and visual impact assessment

This landscape character and visual impact assessment draws upon the relevant guidance contained in the following documents:

- *Guidance note EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment* (TfNSW 2020),
- *Large-Scale Solar Energy Guideline* (NSW DPE 2022), including the *Technical Supplement – Landscape and Visual Impact Assessment* ('Technical Supplement'), and
- *The Guidance Note for Landscape and Visual Assessment* (GNLVA), (Australian Institute of Landscape Architects, 2018).

The approach to this assessment is included in the body of this report (refer to section 6.1, 7.2.1, 7.3.1 and 7.4.1).

2.3. Study area

The study area for the landscape character and visual impact assessment will extend to:

- one kilometre for landscape character
- one kilometre for public domain views
- two kilometres for private dwelling views.

These distances are smaller than the distance recommended in the *Large-Scale Solar Farm Guideline, Technical Supplement* (2022), due to the relatively small scale and footprint of a BESS, in comparison to a solar farm.

3. Project overview

3.1. Project components

The Project consists of the construction and operation of a BESS immediately north of existing Beryl Substation. The key Project components of the Project are:

- **BESS area** – the portion of the disturbance footprint containing the battery enclosures, power conversion systems and ancillary infrastructure;
- **BESS switchroom and transformer** – the portion of the disturbance footprint containing the BESS switchrooms, transformer bays and other ancillary infrastructure such as the harmonics filter, emergency diesel generator and water tanks;
- **Operations and Maintenance area** – the portion of the disturbance footprint containing the operations and maintenance building and carpark;
- **Roads and surfaces** – new Project access intersection on Beryl Road, bitumen internal access roads and parking areas, and gravel hardstand elsewhere (including BESS and switchroom / transformer areas);
- **Fencing** – Up to 3 metre tall chainmesh security fencing with barbed wire top and gates surrounding the operational area
- **Screening vegetation** – native screen planting with canopy trees is proposed along all sides of the Project area (refer to Figure 3-1, Figure 3-1 and Attachment C Native vegetation and Landscape Plan).

Site preparation works would include the removal of all vegetation removal within the disturbance footprint, including grasses and pasture, and minor earthworks to level the disturbance footprint and construct a flat platform on which to install the battery enclosures. Two temporary laydown areas, which will include a construction compound, are included in the disturbance footprint (refer to Figure 3-1).

The Beryl BESS would operate 24 hours a day, seven days a week. Although the Project will be monitored and controlled remotely during operation, routine maintenance will be periodically performed on-site. On-site maintenance activities will only require limited personnel.

All lighting would be designed and operated in accordance with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting, and incorporate measures, where reasonable, to meet the design principles contained in the *Dark Sky Planning Guideline, Protecting the observing conditions at Siding Springs Observatory* (NSW DPE 2023) (Refer Section 4.1.3 of this report).

The BESS would be operational for a period of approximately 30 years after which time the BESS may be removed and the Project would be decommissioned. Decommissioning would include the removal of all above ground infrastructure and the remediation of the Project area.

The infrastructure may be upgraded rather than decommissioned and the lifespan extended.

The layout of the BESS and associated infrastructure, including the proposed screening vegetation, is shown on Figure 3-1.

3.2. Design assumptions for this assessment

The following assumptions have been used in developing a 3D model for the Project.

BESS area

- Approximately 240 battery containers battery enclosures (about 14 metres long x three metres wide x three metres high), and approximately 120 inverter stations, separated into rows.
- The battery enclosures and inverter stations have been modelled at 4 metres high, as a worst case scenario.

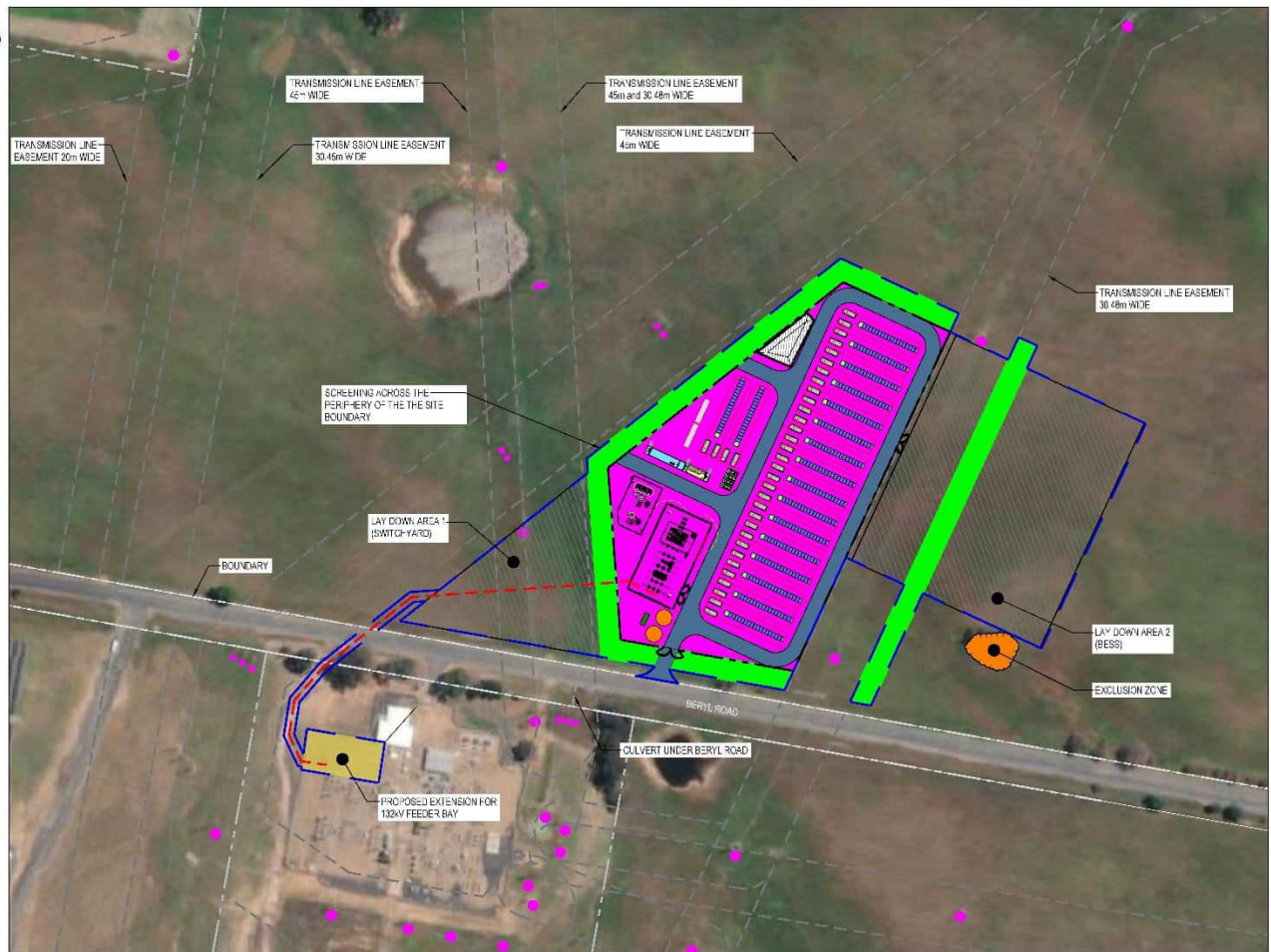
BESS switchrooms and transformer

Building/structures have been modelled at the following heights:

- Switchrooms (five metres high)
- Transformers and connection infrastructure (seven metres high)
- two water tanks (six metres high x seven metres wide).

Operations and Maintenance area

Building up to five metres tall.



LEGEND:

- BATTERY STORAGE (BESS)
- LAYDOWN AREA
- SCREENING AREA
- ROAD
- DISTURBANCE FOOTPRINT 41253m²
- 132kV POWER LINE (UG CABLE)
- 66kV TRANSMISSION LINE EASEMENT
- BOUNDARY FENCE 18620m²
- EXISTING 66kV POLE

LOCATIONS HAVE BEEN BASED ON CADASTRAL INFORMATION AVAILABLE. LOCATIONS TO BE CONFIRMED FOLLOWING SITE SURVEY.

FIGURE 3-1 BERYL BESS DEVELOPMENT PLAN

4. Planning context

There are several state and local government planning documents which provide relevant guidance for the consideration of landscape character and visual impact and also set out the desired planning outcomes for the study area. These are summarised in the following paragraphs.

4.1. State and regional planning documents

4.1.1. Central West and Orana Regional Plan

The *Central West Orana Regional Plan 2041* (NSW DPE, 2022) is intended to guide the NSW Government's land use planning priorities and decisions over the next 20 years, including the region's '*stunning natural landscapes with vibrant regional cities and centres, historic towns and villages*' (p.5).

The vision for the Central West and Orana region, is that ... *'The character and identity of the region is celebrated and protected. Scenic landscapes ranging from the globally recognised Blue Mountains and the western plains to unique local settings such as the communities of Wellington and Coonabarabran which enjoy vistas to Mt Arthur Reserve and the Warrumbungle Range, provide aesthetic, social and economic value to the region.'* (p.12)

Objective 2 supports the State's... '*transition to Net Zero by 2050 and deliver the Central-West Orana Renewable Energy Zone*' (p.20), through renewable electricity generation, transmission and storage s. In relation to renewable energy projects, the plan notes there are ... '*concerns about projects impacting on the rural landscape and visual catchment values of the regional cities in particular*' (p.21). There are no regional cities within the study area.

Objective 9 aims to... '*Ensure site selection and design embraces and respects the region's landscapes, character and cultural heritage*'. It further states that '*Visual landscapes and settings can be impacted through activities such as residential development encroaching on scenic backdrops and ridge lines and infrastructure development such as renewable energy projects.*' (p.50)

4.1.2. Central West Orana Renewable Energy Zone

The Project is located in the CWO REZ. This REZ was formally declared in 2021. The REZ is described as a 'modern-day power station' (NSW Treasury Energy Co, 2023). The intention is that the REZ will combine renewable energy generation (such as wind and solar), with storage (such as batteries) and transmission (high-voltage poles and wires).

4.1.3. Dark Sky Planning Guideline, Protecting the observing conditions at Siding Spring

The study area is subject to the *Dark Sky Planning Guideline, Protecting the observing conditions at Siding Spring* (NSW DPE 2023). This document provides guidance to protect the night sky in the vicinity of the Siding Spring Observatory.

The Siding Spring Observatory is about 100 kilometres from the study area however, the site is located within the Dark Sky Region.

The guideline suggests a number of design principles that should be followed in the Dark Sky Region to protect the observing conditions at Siding Spring. These are:

- Principle 1 - Eliminate upward spill light
- Principle 2 - Direct light downwards, not upwards
- Principle 3 - Use shielded fittings
- Principle 4 - Avoid over lighting
- Principle 5 - Switch lights off when not required
- Principle 6 - Use energy efficient bulbs
- Principle 7 - Use asymmetric beams (when floodlights are required)
- Principle 8 - Ensure lights are not directed towards reflective surfaces
- Principle 9 - Use warm white colours.

This Project will be designed to meet these guidelines.

4.2. Local Government planning

The Project is located in the Mid-Western Regional Council LGA. Relevant parts of the Mid-Western Regional Council Local Strategic Planning Statement (LSPS), Local Environmental Plan (LEP) and Development Control Plan (DCP) are summarised in the following sections.

4.2.1. Mid-Western Regional Council Local Strategic Planning Statement

Our Place 2040 Mid-Western Regional Local Strategic Planning Statement (Mid-Western Regional Council, 2020) sets out the vision for the area in 2036 and the actions that will be taken to achieve this vision. It provides the land-use planning framework for the LGA, based around five themes. Each theme includes planning priorities, objectives and actions to ‘provide for sustainable growth and development, having regard to the Region’s unique heritage, environment and rural character’. (p.10)

The Project is located about 6.3 km west of Gulgong. Gulgong is identified as one of four towns in the region. The Castlereagh Highway runs through the centre of the Region, extending northwest from Gulgong. To the east of the Project (around 1.5 km northeast of the Project area), part of the Castlereagh Highway is identified as a ‘Main Entrance Corridor’ to Gulgong in the Gulgong structure plan (Figure 5, p.14). The Project will not be visible from this entrance corridor.

Planning Priority 3 aims to ... ‘maintain and promote the aesthetic appeal of the towns and villages within the Region’ (p.17). It further states that ... ‘The unique landscapes surrounding the towns and village are highly valued and contribute to the overall appeal of the Region.’ (p.21). This Project is over 5 km from Gulgong, and the township is beyond the study area for this Project.

4.2.2. Mid-Western Regional Council Local Environmental Plan 2012

Two of the eight aims of this plan are relevant to the assessment of landscape character and visual amenity, including:

To encourage the proper management, development and conservation of resources within Mid-Western Regional by protecting, enhancing and conserving...

(v) scenic values (clause 1.2(2)(b)).

To protect the settings of Mudgee, Gulgong, Kandos and Rylstone by—

(iii) promoting urban and rural uses that minimise land use conflict and adverse impacts on amenity, and

(iv) conserving the significant visual elements that contribute to the character of the towns, such as elevated land and the rural character of the main entry corridors into the towns (clause 1.2(2)).

This assessment will consider the scenic values of the study area, noting that the Project is not located on elevated land and is not seen from the entry corridor to Gulgong.

Land use zoning

The Project area is zoned RU1 Primary Production. An objective of this zone is ... ‘To maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area’s open rural landscapes and environmental and cultural heritage values.’ (Land Use Table, Zone RU1 objectives)

Land to the north, east and west of the Project is zoned R5 Large Lot Residential, currently consisting mainly of farmland with scattered rural dwellings on acreage and larger lots. An objective of the R5 zoned land is... “to provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality” (Land Use Table, Zone R5 objectives).

This assessment will consider potential influence of the Project on the visual amenity, landscape and scenic quality of the area, from surrounding dwellings, including existing and future dwellings in the RU1 and R5 zoned land.

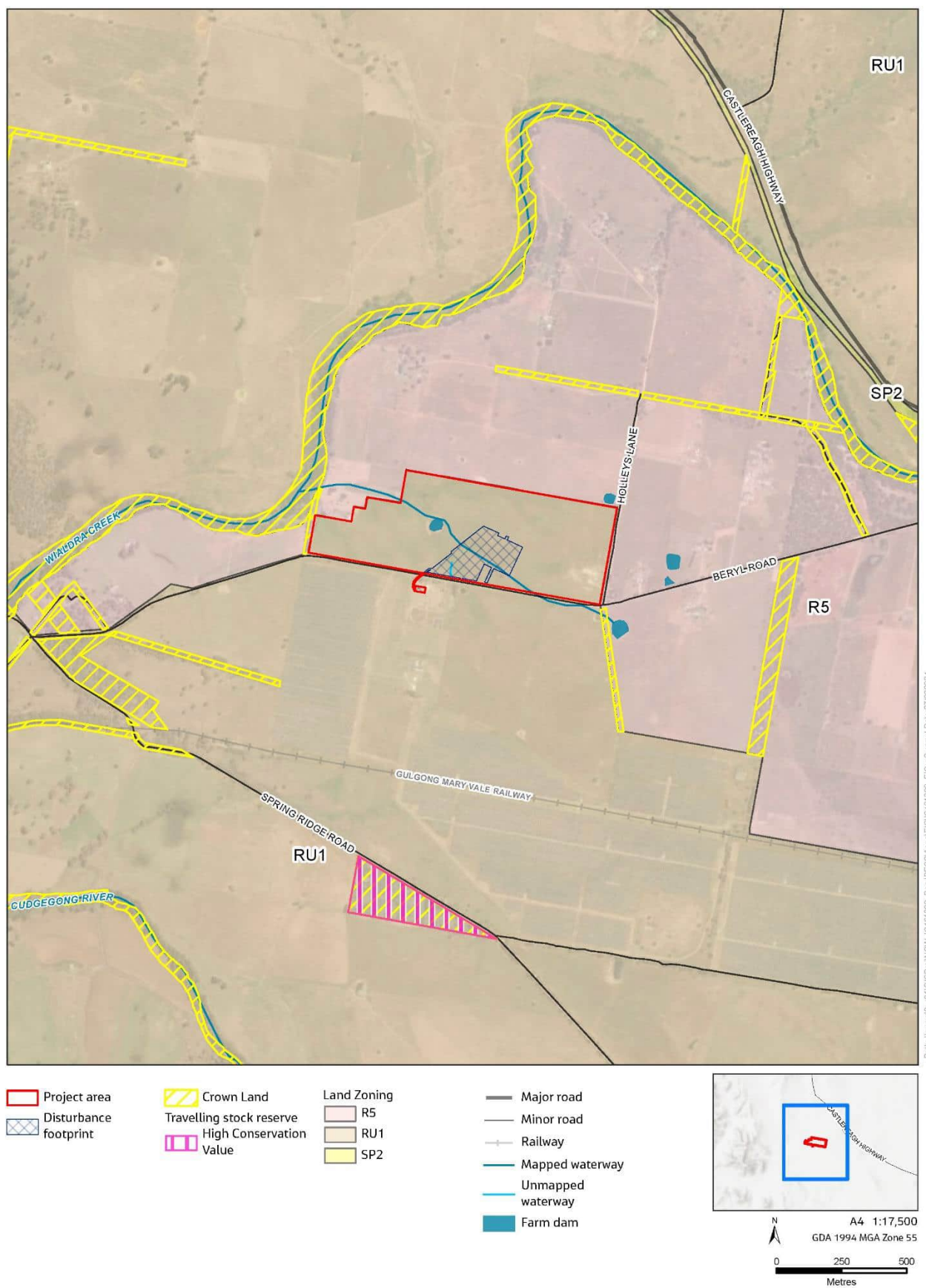


FIGURE 4-1 LAND USE ZONING PLAN

Heritage

No State or local heritage listed places have been identified within the Project area or study area.

The closest heritage item is 'The Lagoon' property homestead (local heritage item number I391), located around 2.3 km to the east of the Project, near Wialdra Creek. The heritage conservation clause aims to *'conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views'* (cl. 5.10). There would be no impact on this property.

4.2.3. Mid-Western Regional Council Development Control Plan 2013

Part 6: Development in Rural Areas

Part 6 of the DCP provides planning controls for areas zoned for rural use (RU1 Primary Production), which includes the Project area. Section 6.5: Solar Energy Farms provides specific controls for 'electricity generating works', however, there are no specific requirements that relate to BESS projects (section 6.5, page 79).

5. Existing environment

The Project is located in a gently undulating, rural landscape around 6.3 km west of the town of Gulgong (refer to Figure 1-1).

The Project is located to the north of Beryl Road on the plains of Wialdra Creek. The landform gently slopes in a north westerly direction, towards Wialdra Creek (refer to Figure 5-1). Historically, the Project and surrounding area has undergone extensive vegetation clearing associated with pastoral grazing and cropping practices. Dense riparian vegetation along Wialdra Creek, provide a visual separation between this rural area and areas to the north.

Beryl Substation is located to the south of the Project, on the southern side of Beryl Road. Beryl Solar Farm is located to the south of this substation, between Beryl and Spring Ridge roads, and includes panel arrays, a substation, overhead electricity transmission, internal access tracks, project office and maintenance building, fencing and an access road off Beryl Road (refer to Figure 1-1).

There are four transmission lines crossing through the Project area generally in a north-south direction connecting to Beryl Substation south of the Project (refer to Figure 1-1).

The Castlereagh Highway is located around 1.5 km northeast of the Project, extending in a northwest direction from the town of Gulgong.

The Gulgong Mary Vale railway is located to the south of the Project and is no longer used.

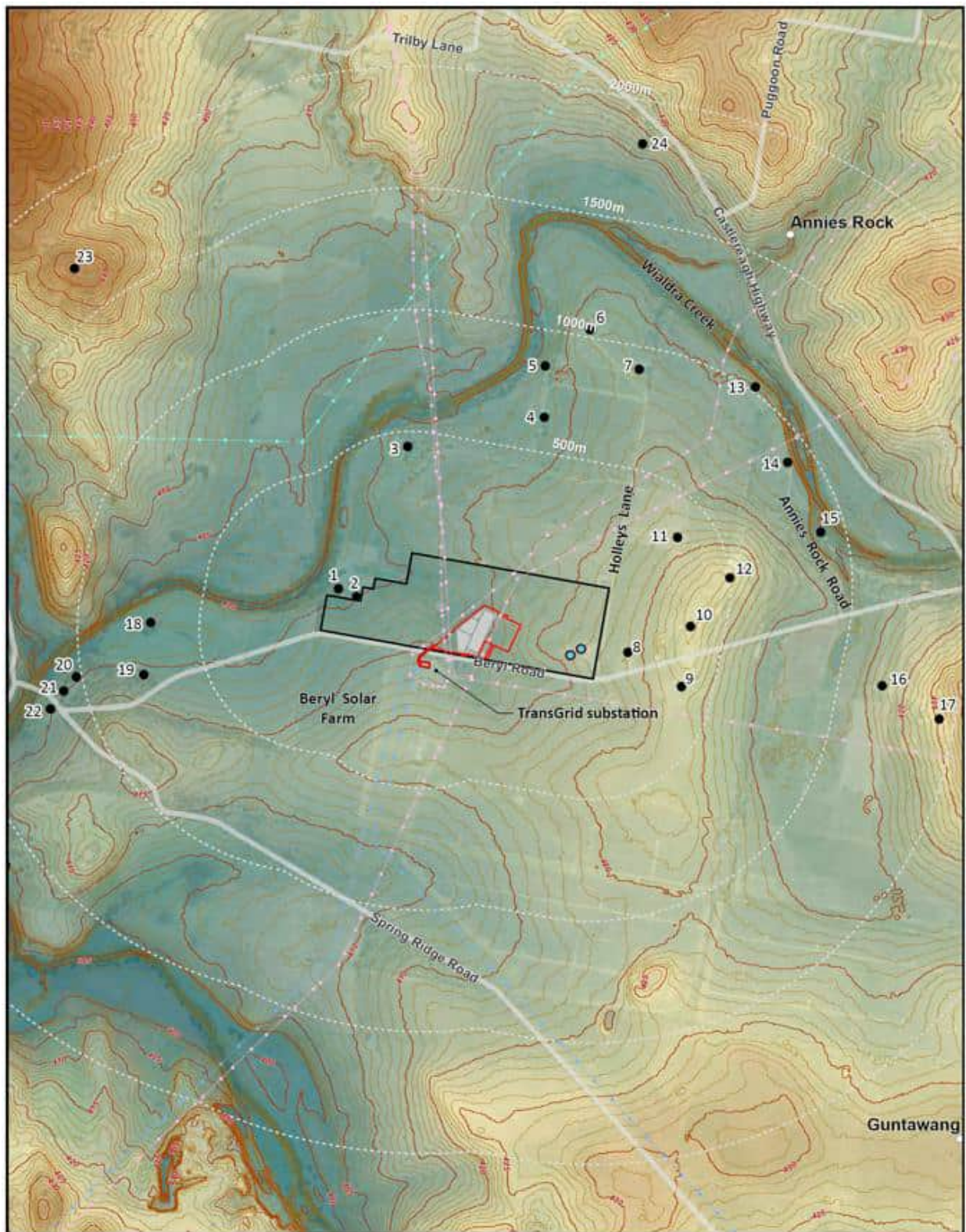


FIGURE 5-1 TOPOGRAPHY

6. Landscape character assessment

6.1. Approach

This assessment of landscape character has been undertaken in the following steps:

- Identify **landscape character zone(s)** of the Project area and surrounding study area
- Describe the **existing conditions** of each landscape character zone
- Identify the **sensitivity** of the landscape character zone
- Identify the **magnitude of change** created by the Project
- Combine these factors to assign a level of **landscape character impact**.

The following pages outline the findings of this assessment and impacts on landscape character.

6.1.1.1. Landscape sensitivity

The sensitivity of a landscape is described by NSW DPE in the Technical Supplement as ... *'the capacity of a landscape or viewpoint to absorb the impacts from a proposed land use change and/or built form'* (NSW DPE 2022). Generally, the sensitivity level assigned to a landscape will also reflect the valued characteristics of landscape such as scenic quality value and rarity.

A frame of reference for the scenic quality values of landscapes in NSW have been provided in the Technical Supplement (NSW DPE, 2022). This includes a description of the typical characteristics of the landscape features which contribute to scenic quality. These descriptions are provided in Table 6-1.

From this frame of reference, a matrix has been developed that combines scenic quality rankings from the Technical Supplement (NSW DPE, 2022) with the absorption capacity of the landscape, to determine a sensitivity level (refer to Table 6-2).

6.1.1.2. Magnitude of change

The changes to landscape character that would occur as a result of the Project are assigned a magnitude of change level. The Technical Supplement (NSW DPE, 2022) recommends that the magnitude of change for landscape character considers the:

- *Size and scale of the change, 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*
- *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 site to larger scales where the project may influence several landscape characters zones*
- *duration and reversibility of the effects on the landscape.'* (NSW DPE, 2022)

Table 6-3 Includes examples of the size and scale, geographical area, duration and reversibility factors that contribute to assigning a magnitude of change level.

6.1.1.3. Assigning impact levels

A landscape impact level has been determined for each landscape character zone by combining the sensitivity and magnitude level according to the matrix presented in Table 6-4.

This matrix is based on the impact rating matrix contained in the ... *Technical Supplement – Landscape and Visual Assessment*, NSW DPE 2022 (Table 9 Visual impact matrix, p.28, NSW DPE 2022), with the addition of a negligible magnitude of change level where there is no change. This matrix has been used as there is no specific impact matrix identified for landscape character impact levels.

TABLE 6-1 FRAME OF REFERENCE FOR SCENIC QUALITY VALUES (TABLE 6, PAGE 26, NSW DPE 2022)

Landscape feature	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 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.	Predominantly open forest of 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.
Waterbodies	Absence of natural waterbody. Farm dams, irrigation canals or stormwater infrastructure.	Intermittent streams, lakes and rivers, swamps and reservoirs	Visually prominent lakes, reservoirs, rivers, streams, wetlands and swamps
Social / cultural	Places of worship, cemeteries / memorial parks, private open space	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 6-2 LANDSCAPE SENSITIVITY LEVELS

Sensitivity level	Details
High	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of high scenic quality (refer to Table 6-1) These landscapes have a low inherent capability to absorb changes from the project.
Moderate	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of moderate scenic quality (refer to Table 6-1) These landscapes have a moderate inherent capability to absorb changes from the project.
Low	Landscape character includes features (landform, vegetation, waterbodies, social/cultural, human presence) which have low scenic quality values (refer to Table 6-1) These landscapes have a high inherent capability to absorb changes from the project.

TABLE 6-3 MAGNITUDE OF CHANGE LEVELS

Magnitude level	Size and scale	Geographical area	Duration and reversibility
High	<p>Extensive loss of existing landscape elements</p> <p>The lost landscape elements make a substantial contribution to the character of the landscape</p> <p>The project would become a major element in the landscape and dominant in the visual catchment</p> <p>The project fundamentally changes the key characteristics of the landscape, which are critical to its distinctive character</p>	<p>Very large geographical area impacted</p> <p>This would result in an extensive and / or severe change in landscape values.</p>	<p>Permanent change</p> <p>Irreversible changes to the landscape</p>
Moderate	<p>Moderate extent of existing landscape elements will be lost</p> <p>The lost landscape elements make a considerable contribution to the character of the landscape</p> <p>The project would become a major element in the landscape and somewhat dominant in the visual catchment</p> <p>The project results in moderate changes the key characteristics of the landscape, which are critical to its distinctive character</p>	<p>Large geographical area impacted</p> <p>This would result in a considerable and / or unsympathetic change in landscape values.</p>	<p>Long term change</p> <p>Changes are somewhat reversible</p>
Low	<p>Small extent of existing landscape elements will be lost</p> <p>The lost landscape elements make a notable contribution to the character of the landscape</p> <p>The project would become a minor element in the landscape and would somewhat prominent in the visual catchment</p> <p>The project results in minor changes the key characteristics of the landscape, which are important to its distinctive character</p>	<p>Moderate geographical area impacted</p> <p>It would result in a slight change in landscape values.</p>	<p>Medium term change</p> <p>Changes are reversible</p>
Very low	<p>Very small extent of existing landscape elements will be lost</p> <p>The landscape elements do not make a particular contribution to the character of the landscape</p> <p>The project would become a very minor element in the landscape and would not be prominent in the visual catchment</p> <p>The project results in very minor changes the characteristics of the landscape, which are not particularly important to its distinctive character</p>	<p>Very small geographical area impacted</p> <p>If there is a change, it would not be perceived as altering the landscape values.</p>	<p>Short term change</p> <p>Changes are entirely reversible</p>
Negligible	<p>The project would not change the landscape characteristics, or</p> <p>There would be improvement to the landscape character as a result of the project.</p>	No direct impact	No change

TABLE 6-4 LANDSCAPE IMPACT LEVELS

	High sensitivity	Moderate sensitivity	Low sensitivity
High magnitude	High	Moderate	Moderate
Moderate magnitude	Moderate	Moderate	Low
Low magnitude	Moderate	Low	Low
Very low magnitude	Low	Low	Very low
Negligible	Negligible	Negligible	Negligible

6.2. Assessment of landscape character

6.2.1. Landscape character of the study area

The landscape assessment begins with the identification of landscape character zones.

‘Landscape character zones should divide the landscape based on common distinguishing visual characteristics including landforms and major land cover patterns. These patterns are formed by combinations of vegetation, water bodies, landforms and land use, from which the key landscape features can also be identified.’ (Page 10, NSW DPE 2022)

The study area has one homogeneous landscape character of flat to gently undulating rural landscape associated with the flood plain of Wialdra Creek. The study area is described as the Wialdra Creek rural plain landscape character zone (LCZ1).

The landform in this zone is gently undulating and consists of low-lying rural plains alongside Wialdra Creek. This landscape includes large areas that are cleared of vegetation for rural uses, including grazing pastures and dryland arable paddocks with associated rural dwellings. There are groups of smaller rural lifestyle holdings to the north-west and east of the Project, zoned R5 Large Lot Residential.

The trees in this landscape are generally scattered in paddocks, and more densely grouped along paddock boundaries, roads and particularly along Wialdra Creek. The dwellings in this landscape are also located near agricultural buildings and often surrounded by vegetation within gardens.

The Castlereagh Highway passes through this landscape character zone, around 1.5 km northeast of the Project, with the landscape either side of the road forming the fore and middle ground areas of approach to Gulgong. Beryl Road is located along the southern boundary of the Project area, providing access to local properties.

The southern part of this landscape includes an operational solar farm development, Beryl Solar Farm, which includes panel arrays, switchrooms and transformer, setback from the road. Beryl Substation is located immediately south of the Project, with large scale electrical structures. There are also existing transmission lines crossing this landscape, influencing the character of this zone.



FIGURE 6-1 VEGETATION ALONG WIALDRA CREEK



FIGURE 6-2 EXISTING BERYL SUBSTATION



FIGURE 6-3 VIEW FROM BERYL ROAD ACROSS FLAT FIELDS
CROSSED BY EXISTING TRANSMISSION

6.2.2. Assessment of landscape character impact

The existing landscape within the Project area comprises landscape qualities and features of predominantly low scenic quality, and an overall low sensitivity. This landscape has the capacity to absorb changes due to the existing scenic quality and characteristics of the study area.

The magnitude of change is low as the Project elements are of a size and scale that is compatible with the existing built structures in the area, occupies a small geographical area, which is located adjacent to other existing energy infrastructure, and is reversible i.e. the landscape could be restored if the BESS was removed.

The analysis undertaken for the assessment of impacts on the Wialdra Creek rural plain Landscape Character Zone (LCZ1) is presented in Table 6-5.

Overall, during operation there would be a **low landscape character impact** on the Wialdra Creek rural plain LCZ. This is because of the low scenic quality, low landscape sensitivity and low magnitude of change.



FIGURE 6-4 VIEW ACROSS FLAT FIELDS WITH VEGETATION MOSTLY AROUND DWELLINGS, ALONG ROADS AND SOME FIELD BOUNDARIES

During construction, and decommissioning, there would be construction activity that would contrast with the existing character of the area. During this time there would be a potentially greater character impact for the duration of the works.

TABLE 6-5 LANDSCAPE CHARACTER IMPACT ASSESSMENT – WIALDRA CREEK RURAL PLAIN LANDSCAPE CHARACTER ZONE (LCZ1)

Landscape sensitivity	Low	
Absorption capacity	High inherent capability to absorb changes from the Project due to existing presence of electricity infrastructure and rural structures, flat landform, and absence of vegetation i.e. (Disturbance area already cleared).	Low
Scenic quality	Landscape of predominantly low scenic quality comprising:	
Landform	Flat to gently undulating, no topographical features	Low
Vegetation	Vegetation mostly cleared for agricultural use	Low
Waterbodies	Waterbodies include Wialdra Creek and farm dams	Low-moderate
Social / cultural	Modified landscape with presence of electricity infrastructure, no notable heritage values	Low
Human presence	Dispersed dwellings, presence of electricity infrastructure, lower scale and trafficked roads	Low
Magnitude of change	Low	
Size and scale	Project would become a minor element in the landscape and would not be prominent in the visual catchment.	Low
Geographical area	Project would impact a small geographical area of this landscape character zone and result in a slight change in landscape values.	Low
Duration and reversibility	Medium to long term change, with changes that are reversible.	Low
Landscape character impact	Low	

7. Visual impact assessment

7.1. Visual catchment

The visual catchment is the theoretical area from which the Project may be seen. The visual catchment area identifies areas where there is the potential for a direct line of sight between the Project and surrounding areas.

The visual catchment has been created in GIS using the height of key components of the Project in a modelled landscape, using in GIS software. The visual catchment has been created with a digital surface model, including landform and vegetation information to show areas that would potentially have views to the Project (refer to Figure 7-1).

The visual catchment mapping shows the screening effect of the trees located along roads, along Wialdra Creek and in paddocks surrounding the Project, which would restrict and filter views from the north, east, south and west.

Generally, the visual catchment shows the potential for views extending:

- To the paddocks and rural properties to the north to about 250 metres, and then small areas of the fields to the north of Wialdra Creek about two kilometres away
- To Holleys Lane in the east and across fields to about one kilometre away
- To Beryl Road and extending across the paddocks and rural properties to the south, adjacent to the Beryl Solar Farm, mainly within five kilometres of the Project.
- Across the fields to the west of the Project, south of Wialdra Creek, and blocked by existing vegetation surrounding the dwellings and along field boundaries.

This visual catchment was used to inform fieldwork and the selection of viewpoints for the assessment of public domain views and views from private dwellings.



FIGURE 7-1 VISUAL CATCHMENT (USING DIGITAL SURFACE MODEL)

7.2. Impact on views from the public domain

7.2.1. Approach

Views have been selected from within the visual catchment to represent the range of locations from which the Project would be seen from the public domain. These viewing locations have prioritised locations where there would be a larger number of potential viewers, such as public roads.

An assessment of each public domain view has been undertaken in the following steps:

- Describe the existing view
- Identify the visual sensitivity:
 - Determine the viewpoint sensitivity of the view (refer Table 7-1)
 - Determine the scenic quality of the view (refer Table 7-2)
 - Combine the viewpoint sensitivity and scenic quality rating to determine the viewpoint sensitivity (refer Table 7-3)
- Identify the magnitude of change created by the Project (refer Table 7-4)
- Combine the viewpoint sensitivity and magnitude of change characteristics to assign a level of visual impact (refer Table 7-5).

This methodology is explained more fully in the following paragraphs.

Visual sensitivity

Visual sensitivity combines viewpoint sensitivity with the scenic quality of the view. Table 7-1 includes the viewpoint sensitivity levels as described in the Technical Supplement (NSW DPE 2022).

Table 7-2 describes the scenic quality values of landscapes (Technical Supplement (NSW DPE 2022)) and explains the sensitivity levels that have been used for this assessment.

These factors have been combined to assign a visual sensitivity according to the visual sensitivity matrix in Table 7-3. This table is based on the 'Visual sensitivity matrix' contained in the Technical Supplement (NSW DPE 2022 (Table 8, p.28, NSW DPE, 2022)).

Magnitude of change

Magnitude is the:

... 'measurement of the scale, form and character of a development project when compared to the existing condition. In the case of visual assessment this also relates to how far the proposal is from the viewer.' (TfNSW 2020)

The magnitude of change considers the extent of change resulting from the Project and the compatibility of these new elements with the surrounding landscape.

Magnitude of change will be determined by characteristics of the view, such as distance, landform, backdrop, intervening vegetation etc. There are also characteristics of the Project which are: scale, form and line/alignment. Changes to a view can result in an improvement or reduction in visual amenity.

A high magnitude of change would result if the development contrasts strongly with the existing characteristics of the view. A low magnitude of change occurs if there is a high level of integration of form, line, shape, pattern, colour or texture values between the Project and its visual setting.

In some circumstances, there may be a visible change to a view which does not alter the amenity of the view. This would be due to the compatibility of the Project and capacity of the view to accommodate the change without losing valued elements. Figure 7-4 lists the categories used to describe the magnitude of change.

Assigning impact levels

A visual impact level has been determined for each view by combining the sensitivity and magnitude level according to the matrix presented in Table 7-5.

This matrix is generally based on the 'Visual sensitivity matrix' contained in the Technical Supplement (NSW DPE 2022 (Table 8, p.28, NSW DPE, 2022)).

TABLE 7-1 VIEWPOINT SENSITIVITY LEVELS

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
Transport / infrastructure	Local sealed and unsealed roads Passenger rail lines with daily daylight services State highways, freeways and classified main roads Walking tracks and navigable waterways	Tourist roads and scenic drives Walking tracks and navigable waterways	N/A	N/A
Social / cultural	Private recreation areas and sporting fields (defined as land zoned RE2)	Cemeteries, memorial parks	Tourist and visitor accommodation and places of worship (such as bed and breakfasts, motels, hotels) Tourist uses in tourist areas (land zoned SP3) Publicly accessible green and open spaces including picnic areas, parks, public recreation areas Town centres and central business districts	N/A

TABLE 7-2 SCENIC QUALITY LEVELS

Scenic quality level	Description
Low scenic quality	Landscape character includes features (landform, vegetation, waterbodies, social/cultural, human presence) which have scenic quality values of predominantly of low scenic quality (refer to Table 6-1). These landscapes have a high inherent capability to absorb changes
Moderate scenic quality	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of moderate scenic quality (refer to Table 6-1). Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are a mix of moderate sensitivity. These landscapes have a moderate inherent capability to absorb
High scenic quality	Landscape features (landform, vegetation, waterbodies, social/cultural, human presence) are predominantly of high scenic quality (refer to Table 6-1). These landscapes have a low inherent capability to absorb changes

TABLE 7-3 VISUAL SENSITIVITY MATRIX

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

TABLE 7-4 MAGNITUDE OF CHANGE LEVELS

Magnitude level	Description
High	The project is visually dominant and / or contrasts substantially with the character of the view. It would result in a substantial change in the amenity of the view.
Moderate	The project is somewhat prominent and / or is not compatible with the character of the view. It would result in a noticeable change in the amenity of the view.
Low	The project is not visually prominent and / or is visually compatible with the character of the view. It would result in a slight change in the amenity of the view.
Negligible	The project is not visible, is not visually prominent in the view and / or is compatible with the character of the view. It would result in no perceived change in the amenity of the view.

TABLE 7-5 VISUAL IMPACT LEVELS

	High sensitivity	Moderate sensitivity	Low sensitivity	Very low sensitivity
High magnitude	High	High – moderate	Moderate	Moderate – low
Moderate magnitude	High – moderate	Moderate	Moderate – low	Low
Low magnitude	Moderate	Moderate-low	Low	Low
Negligible magnitude	Negligible	Negligible	Negligible	Negligible

7.2.2. Assessment of representative viewpoints

Viewpoints to the Project from the public domain are limited, due small number of publicly accessible roads in the study area. One view has been selected along Beryl Road, where the Project would be prominent. This view is located to the west of the Project, near the access road to the existing Beryl Substation.

An assessment of visual impact has been summarised in the following pages.

7.2.2.1. Viewpoint 1: View east from Beryl Road



FIGURE 7-2 VIEWPOINT 1: VIEW EAST FROM BERYL ROAD, EXISTING VIEW



FIGURE 7-3 VIEWPOINT 1: VIEW EAST FROM BERYL ROAD, PHOTOMONTAGE (WITHOUT SCREENING VEGETATION)

Existing conditions: In this view, refer to Figure 7-2, the landform is generally flat and consists of fields mostly cleared of vegetation for rural uses. There are several rural dwellings visible in the background of view, north of Beryl Road, alongside Holleys Lane (dwellings associated with this Project). Several transmission lines cross this view, linking to Beryl Substation, which is to the south of Beryl Road and would also be visible from this location.

Visual sensitivity: **Very low**

Viewpoint sensitivity: *Very low*

Beryl Road is a sealed local road extending between the Castlereagh Highway and Spring Ridge Road, providing access to local properties in this area and traveling to Gulgong from Mebul. This view is experienced by a relatively low number of receivers for a short duration from a moving vehicle.

Scenic quality: *Low*

This view includes flat landform, scattered and distant vegetation, and the presence of existing rural buildings and transmission lines crossing the view in multiple directions.

Visual impact during construction: The Project would be located about 200 metres to the east of this location, in the middle ground of view, occupying part of the field north of Beryl Road.

The entire disturbance footprint would be seen in this view from Beryl Road. One construction compound and two laydown areas would be established to the east and west of the Project, under the existing transmission lines. Between these areas, works to install the BESS would be seen, including vehicles and machinery used to prepare and install the BESS enclosures, inverters, transformer and switching station gantry columns and beams. Works to install the operations and maintenance area would also be prominent, including the construction of a building up to around five metres tall, internal access roads and carparking areas.

This construction activity would be seen in the middle and background of the view. Although the works would contrast with the rural character of this view, it would be seen in the context of existing transmission lines and in a sequence of views that includes the existing Beryl Substation and solar farm.

Overall, there would be a noticeable change to the amenity of the view and a moderate magnitude of change. This would result in a **low visual impact** during construction.

Visual impact during operation (day one):

The constructed Project would be seen in the middle ground of this view, between the existing transmission line easements. It would be set back from the road and prominent in this view due to the openness of the current view (refer to Figure 7-3).

The BESS enclosures/containers would be low rise and comprise a small part of the vertical field of view, however, it would obstruct views to the distant vegetation. The BESS switchrooms would also be visible in this view, including transformer bays with gantry columns and beams.

The large water tanks would be most prominent in this view, due to their size and proximity to the road. The operations and maintenance building would also be visible as large agricultural scale sheds, set back and in the western part of the disturbance footprint. The water tanks and buildings would be finished in a neutral colour to reduce their prominence and provide some visual relief from the otherwise grey and white structures.

The entire facility would be enclosed by security fencing, and there would be a new access track and hardstand visible.

The BESS infrastructure would be a prominent built feature in the middle ground of this view, occupying what was previously an open paddock. The BESS would include a uniform layout of enclosures/containers and supporting infrastructure, contrasting somewhat with the shapes and forms of the surrounding landscape and changing the character of this view.

The Project would be seen in the context of existing transmission structures, a substation and solar farm, and viewed against a backdrop of vegetation along Wialdra Creek, assisting with its absorption into this view. Overall, there would be a moderate magnitude of change to views from this location and a **low visual impact**.



FIGURE 7-4 VIEWPOINT 1: VIEW EAST FROM BERYL ROAD, PHOTOMONTAGE WITH SCREENING VEGETATION SHOWN

Visual impact during operation (including screening vegetation):

Screening vegetation would be provided around the perimeter of the facility, including along Beryl Road and the western perimeter (refer Figure 7-4).

Assuming heights of three metres for shrubs and five metres for trees, this vegetation would largely screen views of Project. This additional vegetation would introduce a mix of shrubs and trees in a linear pattern that would be compatible with the character of the view, which includes corridors of vegetation following Holleys lane and some field boundaries. The magnitude of change would be negligible as the view would be obstructed and the treatment consistent with the landscape character of the area.

Overall, there would be a **negligible visual impact**.

Visual impact during decommissioning (including screening vegetation):

The screening vegetation would be well established during the decommissioning phase of the Project.

There would be some additional vehicles and equipment seen accessing the site and potentially glimpsed above or through the screening vegetation.

However, this activity would be largely out of view and there would continue to be a negligible magnitude of change.

Overall, there would be a **negligible visual impact** during decommissioning.

7.3. Impact on views at night

7.3.1. Approach

The assessment of night-time impact has been carried out with a similar methodology to the daytime assessment. However, the assessment also draws upon the guidance contained within AS/NZS 4282:2019 *Control of the obtrusive effects of outdoor lighting* (2019).

AS/NZS 4282 identifies environmental zones which are useful for categorising night-time landscape settings. This methodology uses these environmental zones to describe the existing night-time visual condition and assign a sensitivity to these settings.

7.3.1.1. Night-time visual sensitivity

The environmental zone (defined in AS/NZS 4282) which best describes the existing night-time visual condition of the Project area has been selected. These zones are typical night-time settings and reflect the predominant light level of each landscape character zone. Each environmental zone is assigned a level of sensitivity as described in Table 7-6.

TABLE 7-6 ENVIRONMENTAL ZONE SENSITIVITY – NIGHT-TIME

Environmental Zones (AS/NZS 4282:2019)		
Sensitivity level	Description	Examples
High	A0: Intrinsically dark	UNESCO Starlight Reserve IDA Dark Sky Parks Major optical observatories No road lighting – unless specifically required by the road controlling authority
High	A1: Dark	Relatively uninhabited rural areas No road lighting – unless specifically required by the road controlling authority
Moderate	A2: Low district brightness	Sparsely inhabited rural and semi-rural areas
Low	A3: Medium district brightness	Suburban areas in towns and cities
Very low	A4: High district brightness areas	Town and city centres and other commercial areas Residential areas abutting commercial areas

7.3.1.2. Night-time magnitude of change

The magnitude of change that would be expected within each landscape character zone at night is then identified.

Table 7-7 lists the categories used to describe the visual magnitude of change at night.

TABLE 7-7 VISUAL MAGNITUDE OF CHANGE LEVELS — NIGHT-TIME

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

7.3.1.3. Assigning impact levels

An assessment of visual impact has been made by combining the visual sensitivity and magnitude of change levels for the Project area and surrounding landscape and assigning an impact level (refer to Table 7-5).

7.3.2. Assessment of views at night

Sensitivity of views at night: At night, the Project area and surrounding landscape would have a relatively low level of lighting. There would be some light emitted from the scattered rural residences and outbuildings. This would include clusters of residences and along Beryl Road and Holleys Lane where there would also be vehicles travelling along roads and accessing properties. There would also be moving headlights from vehicles using the Castlereagh Highway where there is a greater concentration of traffic.

There would be a general sky glow above Gulgong, located about 6.3 km to the southeast of the Project, which would not noticeably influence the character of the study area. Overall, the Project area and surrounding landscape has low district brightness (A2) and a moderate visual sensitivity at night (refer to Table 7-6).

Night time visual impact during construction: The Project does not propose any construction at night. There may, however, be infrequent after hours deliveries or vehicles accessing the disturbance footprint early in the morning during winter. There may also be some security lighting established during construction that would introduce some additional lighting to the Project area.

Overall, however, any lighting would be set back from surrounding dwellings and seen in the context of headlights from vehicles using Beryl Road. Overall, there would be a **negligible** visual impact at night during construction.

Night time visual impact during operation: During operation, there would be some minor security lighting provided within the fenced Project area. This may include lighting mounted outside the operations and maintenance building. This lighting would meet the requirements of AS/NZS 4282:2019 *Control of the obtrusive effects of outdoor lighting* and would not noticeably alter the prevailing light levels in the study area.

There would not be any direct light spill on private dwellings due to the large distance between the Project and neighbouring dwellings. There would also be limited potential for additional sky glow and upward projected light with the implementation of

cut off light fittings as would be expected for a design complying with the Australian Standards.

Overall, there would be a low magnitude of change to a landscape of moderate visual sensitivity, and a **low visual impact** at night during operation.

Night time visual impact during operation (including screening vegetation):

The screening vegetation which would be provided around the perimeter of the facility would reduce the visibility of light sources from Beryl Road and surrounding residence. There may be some minor sky glow seen above the Project, however overall, there would be **negligible** visual impact at night in the long term as the vegetation establishes and matures.

7.4. Impact on views from surrounding residences

This section provides an assessment of the impact on views from private residences in close proximity to the Project.

7.4.1. Approach

The assessment of views from private dwellings has been undertaken in the following steps:

- Identify potential dwellings within two kilometres of the Project and confirm dwellings that would have a view to the Project (Refer to Figure 7-1 and Table 7-9).
- Identify visual sensitivity by combining:
 - viewpoint sensitivity (refer to Table 7-1, as described in the Technical Supplement (NSW DPE 2022)) and
 - scenic quality (refer to Table 7-2)
 - to determine visual sensitivity (refer to Table 7-3).
- Describe the likely magnitude change to the view (refer to Table 7-4)
- Identify potential visual impact (refer to Table 7-5)
- Describe any mitigation measures proposed to reduce any impacts (refer to Section 8).

If the potential for a moderate to high visual impact was identified, further detailed visual assessment was undertaken. Refer to Figure 7-1 for location of dwellings.

TABLE 7-8 VIEWPOINT SENSITIVITY

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
Residential	No place of residence present	Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4, and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3, and C4) Dwellings used for residential purposes located on land zoned IN1 and IN2.	Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4, and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3, and C4)	Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5)

7.4.2. Assessment of views from residences

7.4.2.1. Private view impacts during operation

Dwellings within two kilometres of the Project have been considered for potential view impacts. These dwellings are shown on Figure 7-1. Beyond two kilometres, the Project is unlikely to be prominent in views, and therefore unlikely to cause an impact on private views.

Note, there are two associated dwellings at 5 Holleys Lane located to the east of the Project, as shown on Figure 7-1. These dwellings have not been assessed for visual impact as they are associated with the Project.

The town of Gulgong is located around 6.3 km east of the Project. Dwellings in town are unlikely to experience views of the BESS due to distance and intervening landform and vegetation.

The neighbouring dwellings within two kilometres have been reviewed for those which would have a potential view to the Project, based on the preliminary visual catchment analysis (refer to Figure 7-1 and Table 7-9).

Those dwellings with a potential view to the Project have been further analysed in Table 7-10. To support this analysis, aerial photographs, visibility diagrams, photomontages and 3D model views have been provided in **Attachment A**.

7.4.2.2. Private view impacts during construction and decommissioning

During construction and decommissioning, there would be construction vehicles, large-scale equipment and construction activities in the Project area. This will include a temporary construction compound and site laydown, located within the disturbance footprint. During this time there would be a potentially greater visual impacts for the duration of the works.

Similarly, during decommissioning, there would be vehicles and large-scale equipment used to dismantle and remove the Project infrastructure. However, at this time, the screening vegetation would be well established, and this activity is unlikely to result in a noticeable visual impact.

TABLE 7-9 PRELIMINARY ASSESSMENT OF DWELLINGS WITHIN TWO KILOMETRES OF THE PROJECT

No.	Address	Potential view to the Project (Y/N)
1	278 Beryl Road	Y
2	278 Beryl Road	Y
3	83 Holleys Lane	Y
4	115 Holleys Lane	Y
5	117 Holleys Lane	N
6	119 Holleys Lane	N
7	125 Holleys Lane	N
8	148 Beryl Road	Y
9	121 Beryl Road	N
10	126 Beryl Road	Y
11	58 Holleys Lane	Y
12	114 Beryl Road	N
13	1318 Castlereagh Highway	N
14	50 Annies Rock Road	N
15	16 Beryl Road	N
16	35 Beryl Road	N
17	3 Beryl Road	N
18	334 Beryl Road	N
19	360 Beryl Road	N
20	15 Lobley Lane	N
21	5 Lobley Lane	N
22	577 Spring Ridge Road	N
23	123 Spring Ridge Road	N
24	635 Castlereagh Highway	N

TABLE 7-10 DETAILED VIEWPOINT ASSESSMENT – VIEWS FROM SURROUNDING RESIDENCES

Dwelling number / location		Distance	Existing view	Viewpoint sensitivity	Scenic quality	Visual sensitivity	Magnitude of change	Visual impact	Visual impact with screening vegetation in place
1	278 Beryl Road	500m	View from rear deck orientated north across a flat rural landscape to Wialdra Creek. Views to east contain existing local and district scale transmission poles and wires.	Moderate Primary view from dwelling on land zoned R5. Panoramic northerly view from deck / outdoor living area.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Moderate	Low Existing vegetation and structures within the eastern part of this property, would mostly obstruct views towards the Project. (refer to Appendix B). A small portion of the northern part of the Project would be visible in the background of the view from the deck, on the eastern most part of a mainly north oriented view. The Project would be glimpsed in the background of views and seen in the context of the existing transmission towers.	Moderate -low	Negligible The proposed landscape screening would substantially reduce visibility of the Project, mostly screening the Project as shown in the photomontage (refer to Appendix B). The magnitude of change would be negligible.
2	278 Beryl Road	400m	View from rear of house across flat rural landscape. Views contain existing local and district scale transmission poles and wires and the existing Beryl Substation on Beryl Road.	Low Secondary view from dwelling on land zoned R5. Partly obstructed view from informal outdoor area near sheds.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Low	Low The western side of the Project would be visible in the middle to background of this view, seen across a flat, open rural field. (refer to Appendix B). The Project would be seen in the context of the existing transmission lines which converge in the vicinity of the Project and the existing Beryl Substation.	Low	Negligible The proposed landscape screening would substantially reduce visibility of the Project, mostly screening the Project as shown in the photomontage (refer to Appendix B). The magnitude of change would be negligible.

Dwelling number / location		Distance	Existing view	Viewpoint sensitivity	Scenic quality	Visual sensitivity	Magnitude of change	Visual impact	Visual impact with screening vegetation in place
3	83 Holleys Lane	730m	Views to surrounding rural landscape partially enclosed by vegetation surrounding the dwelling and on intervening field boundaries. Views to south and southeast contain existing local and district scale transmission poles and wires. View to hills and mountains enclose views to the west.	Low Secondary view from dwelling on land zoned R5. Currently location of bedroom / future dwelling expansion and deck identified for this location. Primary view is towards Wialdra Creek and the backdrop of hills to the west.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Low	Low The Project would be visible in the middle to background of this view, seen within the context of existing transmission lines. (refer to Appendix B). Existing vegetation within the garden and on intervening paddocks would partly obstruct the view of the Project.	Low	Negligible The proposed landscape screening would substantially reduce visibility of the Project, mostly screening the Project as shown in the photomontage (refer to Appendix B). The magnitude of change would be negligible.
4	115 Holleys Lane	815m	View from garden entertainment areas to the rear of this dwelling. The view includes surrounding garden vegetation and the rural landscape. Existing view includes local and district scale transmission poles and wires to the south. View to the south include Beryl Road, the existing Beryl Substation and solar farm in the background.	Moderate Primary view from dwelling on land zoned R5.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Moderate	Negligible Intervening landform (including the dam) and vegetation within the garden and on adjacent paddocks would almost completely obstruct views towards the Project (refer to Appendix B). Any visible glimpses would be located in the middle to background of views and seen in the context of the existing transmission poles and wires, Beryl Substation and solar farm.	Negligible	Negligible The proposed landscape screening would further screen any visible glimpses to the Project, mostly screening the Project as shown in the photomontage (refer to Appendix B). The magnitude of change would be negligible.

Dwelling number / location		Distance	Existing view	Viewpoint sensitivity	Scenic quality	Visual sensitivity	Magnitude of change	Visual impact	Visual impact with screening vegetation in place
8	148 Beryl Road	550m	Primary views appear to be orientated to the north. Views west, towards the Project would include Holleys Lane, lined with mature trees, existing dwellings, sheds and vegetation at 5 Holleys Lane (associated with the Project).	Low Secondary view from dwelling on land zoned R5.	Low Flat landform, large trees and vegetation, existing houses, and farm structures, some presence of existing transmission lines.	Low	Negligible Intervening trees on Holleys Lane, structures and trees on neighbouring property (5 Holleys Lane) would screen views to the Project. Any glimpses to the Project would be viewed in the background.	Negligible	Negligible The proposed landscape screening would further screen any glimpses to the Project.
10	126 Beryl Road (existing dwelling)	760m	Views from dwelling partly screened by vegetation within the property with some views to the surrounding fields. Views to west are enclosed by existing shed. Some existing local and district scale transmission poles and wires visible.	Low Secondary view from dwelling on land zoned R5.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Low	Negligible Existing vegetation within the garden of this property and within adjacent paddocks, as well as the existing shed would largely obstruct views towards the Project (refer to Appendix B). If visible, the Project would be glimpsed in the background of views and seen in the context of the existing transmission and solar farm infrastructure.	Negligible	Negligible N/A
	126 Beryl Road (future proposed dwelling)	800m	View west across rural landscape with hills and mountain range, a local visual feature, in the far background. Existing local and district scale transmission poles and wires and existing solar farm is visible in the middle to background.	Identified future dwelling location (no DA approval) on land zoned R5.	Low Flat landform, sparse vegetation, existing energy infrastructure, houses, and farm structures visible.	Low	Negligible The Project would be located in the middle to background of the view, seen in the context of existing transmission and solar farm infrastructure (refer to Appendix B). The Project would be set well below the backdrop of hills and only a small portion of the rural landscape would be changed.	Negligible	Negligible The proposed landscape screening would further reduce the visibility of the Project, mostly screening the Project, as shown in the photomontage (refer to Appendix B). The magnitude of change would continue to be negligible.

Dwelling number / location		Distance	Existing view	Viewpoint sensitivity	Scenic quality	Visual sensitivity	Magnitude of change	Visual impact	Visual impact with screening vegetation in place
11	58 Holleys Lane	790m	Primary views appear to be north and northwest towards Wialdra Creek. There are existing poles and wires crossing this view. Views west and southwest from dwelling towards Project include some screening by trees on Holleys Lane.	Low Secondary view from dwelling on land zoned R5.	Low Flat landform, sparse vegetation, existing presence of energy infrastructure, houses, and farm structures.	Low	Negligible Undulating landform and existing vegetation within the garden of this property and within adjacent paddocks, would largely obstruct views towards the Project. If visible, the Project would be glimpsed in the background of views and seen in the context of the existing transmission infrastructure. Refer to Appendix B , image illustrating view from future dwelling 10 as representative of view with similar approximate distance and angle.	Negligible	Negligible The proposed landscape screening would further reduce visibility of the Project, mostly screening the Project. Refer to Appendix B , image illustrating view from future dwelling 10 as representative of view with similar approximate distance and angle.

7.5. Summary of visual impacts

This assessment identified:

- a **low visual impact** from Beryl Road (refer to Viewpoint 1, section 7.2.2.1) during both construction and operation.
- a **moderate-low impact** on views from dwelling no. 1 (278 Beryl Road) and a **low impact** on views from dwelling no. 2 (278 Beryl Road) (refer Table 7-11).
- a **low impact** on views from dwelling no. 3 (83 Holleys Lane) (refer Table 7-11).
- All remaining dwellings would either have no view or a **negligible impact** on views (refer Table 7-11).

During construction, and decommissioning, there would be construction activity that would contrast somewhat with the existing character of the area. During this time there would be a potentially greater character impact temporarily for the duration of the works.

TABLE 7-11 SUMMARY OF VIEWS FROM SURROUNDING RESIDENCES

	Dwelling location	Visual impact	Visual impact with screening vegetation in place
1	278 Beryl Road	Moderate - low	Negligible
2	278 Beryl Road	Low	Negligible
3	83 Holleys Lane	Low	Negligible
4	115 Holleys Lane	Negligible	Negligible
8	148 Beryl Road	Negligible	Negligible
10	126 Beryl Road (existing dwelling)	Negligible	Negligible
10	126 Beryl Road (future proposed dwelling)	Negligible	Negligible
11	58 Holleys Lane	Negligible	Negligible

9. Cumulative impacts

Due to the scale of the BESS, the cumulative effects of the Project in relation to other projects within the study area and beyond (to about five kilometres) have been considered.

Other projects (proposed, approved or operational) that have the potential for a cumulative landscape character or visual impact with this Project are:

- Beryl Solar Farm,
- Bellambi Heights BESS, and
- Mavis Solar Farm.

The following sections describe these potential impacts qualitatively.

9.1. Cumulative effects on Landscape character

9.1.1. Existing energy generating infrastructure - Beryl Solar Farm

The landscape character of the study area is strongly influenced by existing energy generating and transmission infrastructure, including the operational Beryl Solar Farm. The proposed Beryl BESS Project would further increase the presence of energy related infrastructure in this area, resulting in a potential cumulative effect during operation.

The contribution of the Beryl BESS to this effect would be small, with the greater effect being caused by the existing Beryl Substation, Beryl Solar Farm and converging transmission lines.

9.1.2. Future energy generating infrastructure - Bellambi Heights BESS and Mavis Solar Farm

The proposed Bellambi Heights BESS is located about two kilometres to the northeast of the Beryl BESS, and the proposed Mavis Solar Farm is located about two kilometres east of the proposed Beryl BESS Project. Both are located to the east of the Castlereagh Highway on undulating rural land.

Distance as well as the intervening vegetation and landform, separates these Projects. The Bellambi BESS and Mavis Solar Farm are therefore associated with a different landscape character zone.

These landscape character zones are both transitioning to incorporate energy generation, transmission and storage, however, together there would be a potential cumulative effect on landscape character on the wider landscape caused by these projects. With the BESS projects contributing a small amount to this cumulative effect, and there being a potentially larger contribution from the proposed Mavis Solar Farm.

9.2. Cumulative visual impacts

9.2.1. Existing energy generating infrastructure – Beryl Solar Farm

The proposed Beryl BESS will be seen together with the Beryl Solar Farm from a small number of private property and publicly accessible locations.

9.2.1.1. Views from Beryl Road

In views from Beryl Road, the Project would be seen together with the constructed Beryl Solar Farm. This includes views from both east and westbound traffic for a section of the road. In these views there would be the existing Beryl Substation and overhead transmission, as well as the solar farm and proposed Beryl BESS. The solar farm is mostly set back in views from Beryl Road, with a short section to the west of the existing substation, located adjacent to and largely unscreened from the road.

During construction and during the early years of operation, the Beryl BESS Project would also be visible in relatively close proximity to Beryl Road. This road, however, is a local route and has a low visual sensitivity. There is the potential for a cumulative impact on views from Beryl Road as the Projects are seen sequentially during this time.

In the longer term, however, the proposed native screening vegetation will reduce the visibility of the Beryl BESS Project in views from Beryl Road. It is also expected that the screening vegetation associated with the Beryl Solar Farm along Beryl Road, will be successfully established and will reduce the visibility of this Project from the road, reducing the cumulative visual effect.

9.2.1.2. Views from surrounding dwellings

The existing Beryl Solar Farm is visible from a number of properties that would also have a view to the Beryl BESS Project. This includes dwellings no. 1, 2, and 3, 4 and several identified future house locations.

The visibility of the existing solar farm from these dwellings was observed and considered to be negligible (based on our understanding of the visibility thresholds established by the Large-Scale Solar Guideline, Technical Supplement, DPE, 2022).

The existing solar farm is identified in the photomontages shown in Appendix B. Notably, the view from dwelling 3 illustrates that the Beryl BESS Project would obstruct part of the existing view to the Beryl Solar Farm from the location of the future house extension.

There is, however, the potential for a cumulative effect on views towards the existing Beryl Solar Farm together with the Beryl BESS Project from these residential dwellings during construction and operation.

9.2.2. Future energy generating infrastructure - Bellambi Heights BESS and Mavis Solar Farm

The Bellambi Heights BESS and Mavis Solar Farm are unlikely to be visible together with the Beryl BESS from any public viewing location.

The Bellambi Heights BESS, Mavis Solar Farm and Beryl BESS would have limited visibility, if any, from the Castlereagh Highway. The Bellambi Heights BESS and Beryl BESS are unlikely to be visible from views on the outskirts of Gulgong or the elevated Flirtation Hill, Gulgong. The visibility of the Mavis Solar Farm is not yet known (the project EIS is under preparation); however, it is likely to be visible from local roads and areas of Gulgong that do not have a view to the Beryl BESS. As such, there would be no cumulative visual impact caused by these Projects together.

There are no dwellings from which the Beryl BESS would be prominent that would also see the Bellambi BESS project. Noting, that there may be dwellings over two kilometres from the Project to the north, that would have distant views to the Beryl Solar Farm, Bellambi Heights BESS and potentially the proposed Mavis Solar Farm.

If the Beryl BESS Project were visible from these locations, it's contribution to this cumulative effect would be small.

9.2.4. Summary of potential cumulative effects

Relevant development	Potential cumulative landscape character and visual impacts during construction	Potential cumulative landscape character and visual impacts during operation	Risk of cumulative impact
Beryl Solar Farm	N/A this project is operational.	<p>Landscape character</p> <ul style="list-style-type: none"> ▪ This operational development strongly influences the existing locality. ▪ The Project would increase the presence of energy infrastructure in the area. ▪ Given the scale of the Project as a BESS, the contribution to cumulative landscape character impacts would be minor, in comparison to existing infrastructure already in the area. 	Potential cumulative landscape character impact when the project is operational.
	N/A this project is operational.	<p>Visual</p> <ul style="list-style-type: none"> ▪ The Project would be seen together with the Beryl Solar Farm from Beryl Road, and some nearby private dwellings. ▪ When viewed together, the solar farm and BESS would be seen within an area with existing energy infrastructure, including the existing substation and several converging transmission lines. ▪ The solar farm is not visually prominent from those private dwellings which would have a view to the Project, so the effect would be small and localised. 	Potential cumulative visual impact when the project is operational
Mavis Solar Farm	<p>Landscape character</p> <ul style="list-style-type: none"> ▪ This development would be over 1 km from the Project, on the east of the Castlereagh Highway, with intervening vegetation and landform separating these landscape character areas. ▪ Given the distance and its position north of the Wialdra Creek on more undulating landform, it is associated with a different landscape character zone than the Project. ▪ There is the potential for construction vehicle activity on multiple local roads and the Castlereagh Highway that may temporarily alter the rural landscape character of the areas to the north and south of Wialdra Creek. 	<p>Landscape character</p> <ul style="list-style-type: none"> ▪ The landscape character surrounding this proposed solar farm and the Project would result in a landscape character impact in their respective localities. ▪ The Beryl BESS to this cumulative effect would make a small contribution to this effect, with a greater potential for landscape character change from the proposed Mavis Solar Farm. 	Potential cumulative landscape character impacts during construction and when the project is operational

Relevant development	Potential cumulative landscape character and visual impacts during construction	Potential cumulative landscape character and visual impacts during operation	Risk of cumulative impact
	<ul style="list-style-type: none"> The Project would make a small contribution to any cumulative effect during construction. 		
	<p>Visual</p> <ul style="list-style-type: none"> The visibility of the Mavis Solar Farm is not yet known (the project EIS is under preparation); however, it is likely to be visible from local roads and areas of Gulgong that do not have a view to the Beryl BESS. It is expected that there would not be any locations where the projects would be visible together or sequentially. There would not be a cumulative visual impact caused by these Projects together during construction. 	<p>Visual</p> <ul style="list-style-type: none"> Unlikely to be visible together with the Beryl BESS from any public viewing location. The Beryl BESS is unlikely to be prominent in views from any private dwelling in the study area, during operation. 	No cumulative visual impacts anticipated
Bellambi Heights BESS	<p>Landscape Character</p> <ul style="list-style-type: none"> This development would be located 2 km from the Project with vegetation associated with Wialdra Creek and landform separating these areas. Given the distance and the more undulating landform of the areas north of Wialdra Creek, this project is located within a different landscape character zone than the Project. There would be a small effect on landscape character of the respective localities. There is the potential for construction vehicle activity on multiple local roads and the Castlereagh Highway that may temporarily alter the rural landscape character of the areas to the north and south of Wialdra Creek. The Project would make a small contribution to any cumulative effect during construction. 	<p>Landscape Character</p> <ul style="list-style-type: none"> There would be a small effect on landscape character of the respective localities. Together these projects contribute to the transformation of the rural landscapes of this area transitioning to accommodate additional energy infrastructure. Each project would make a small contribution to this cumulative effect. 	Potential cumulative landscape character impacts during construction and when the project is operational
	<p>Visual</p> <ul style="list-style-type: none"> This development will be located 2 km from the Project with intervening vegetation and landform restricting views to the project. There would not be a cumulative effect on views during construction. 	<p>Visual</p> <ul style="list-style-type: none"> Would not be visible together with the Beryl BESS from any public viewing location. The Beryl BESS is unlikely to be prominent in views from any private dwelling in the study area, during operation. 	No cumulative visual impacts anticipated

10. Mitigation

This section summarises how the Project design has addressed mitigation measures and identifies further methods to avoid, mitigate or offset the landscape character and visual impacts of the Project.

10.1. How potential impacts have been avoided/minimised

The following measures have been incorporated into the design of the Project:

- The Project has been designed to fit between the existing transmission lines.
- The layout has minimised the width of the Project in views from the north, by orienting the batteries into north-south rows, and creating a compact layout, that minimises the perimeter of the Project area.
- The Project has been located in an area that is close to existing electricity infrastructure and maximises the distance from the areas where most dwellings exist.

TABLE 10-1 MITIGATION MEASURES

ID	Identified mitigation measure	Project phase
LV1	All lighting, used during construction and operation, would be designed and operated in accordance with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.	Construction and operation
LV2	This Project will seek to adopt the principles contained in the <i>Dark Sky Planning Guideline, Protecting the observing conditions at Siding Spring</i> (NSW DPE 2023) where possible.	Construction and operation
LV3	Buildings to be painted a colour to match the local landscape (such as Colourbond Cottage Green, Woodland grey, Pale Eucalypt or similar) to reduce their prominence in any views to the Project.	Design
LV4	A landscape management plan will be prepared to guide the installation, establishment and maintenance of the proposed native vegetation and landscape works.	Design and construction
LV5	The establishment period activities would be undertaken until the planting achieves an overall average height of 1 to 1.2 metres high.	Construction
LV6	The installation of landscape works should be undertaken following major construction activity to avoid the potential for soil compaction and direct damage to establishing vegetation. If early planting of screening vegetation is required, the planted areas are to be fenced off to ensure no construction equipment or vehicle access that may damage the planted areas. Access for the landscape contractor to undertake establishment and maintenance activities is to be provided at all times.	Construction

10.2. Proposed additional mitigation measures

The application of good practice during construction and operation of the Project would further minimise landscape character and visual impacts.

The following mitigation measures should be considered to further reduce the potential visual impacts identified in this assessment (refer to Table 9-1).

References

Mid-Western Regional Council, 2020, *Our Place 2040 Mid-Western Regional Local Strategic Planning Statement* (LSPS), URL:

<https://www.midwestern.nsw.gov.au/Council/Policies-plans-and-reporting/Plans-and-strategies/Mid-Western-Regional-Council-Local-Strategic-Planning-Statement> (accessed 08/11/2023).

Mid-Western Regional Council, 2013, *Mid-Western Regional Council Development Control Plan 2013*, URL:

<https://www.midwestern.nsw.gov.au/Council/Policies-plans-and-reporting/Plans-and-strategies/Development-Control-Plan-2013> (accessed 08/11/2023).

NSW DPE, 2022, *Technical Supplement - Landscape and Visual Impact Assessment Large-Scale Solar Energy Guideline*, URL:

<https://www.planning.nsw.gov.au/Policy-and-Legislation/Renewable-Energy> (accessed 08/11/2023).

NSW DPE, 2022, *Central West and Orana Regional Plan 2041*, URL:

<https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/Central-West-and-Orana/Central-West-and-Orana-Regional-Plan-2041> (accessed 08/11/2023).

NSW DPE 2023, *Dark Sky Planning Guideline, Protecting the observing conditions at Siding Spring*, URL: <https://www.planning.nsw.gov.au/policy-and-legislation/environment-and-heritage/dark-sky/dark-sky-planning-guideline> (accessed 14/03/2024).

NSW Treasury Energy Co, 2023, *Renewable Energy Zones*, URL:

<https://www.energyco.nsw.gov.au/renewable-energy-zones> (accessed 08/11/2023).

TfNSW, Centre for Urban Design, 2020, Guideline for landscape character and visual impact assessment, Environmental impact assessment practice note EIA-N04, 2020

Landscape Institute and Institute of Environmental Management & Assessment, 2013, *Guideline for landscape and visual impact assessment*.

Appendix A: Photomontages - view from Beryl Road

Viewpoint 1:
View east from Beryl Road, existing view



26mm focal length



Beryl Battery Energy Storage System

Landscape and visual impact assessment

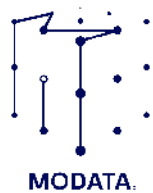
Date: March 2024

Viewpoint 1:
View east from Beryl Road, operational view without screening vegetation



Photomontage - 26mm focal length

Viewpoint 1:
View east from Beryl Road, operational view with screening vegetation shown



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Photomontage

26mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)

Date: March 2024

Appendix B: Photomontages - views from private properties

Dwelling no. 1:
278 Beryl Road

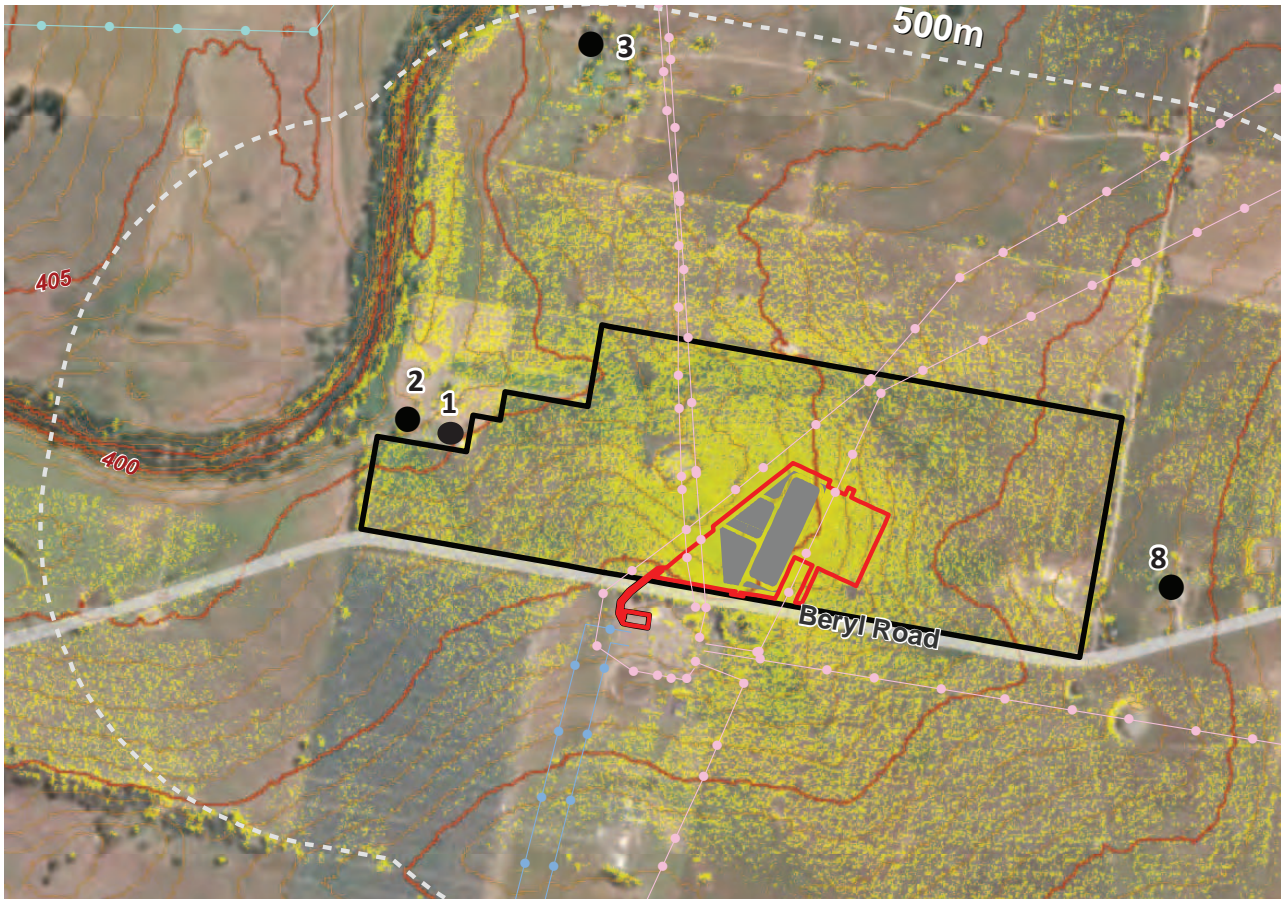


Existing view from second dwelling, 180 degree panorama

- Key
- Project area
 - Dwelling location
 - ↻ 180-degree panoramic photograph location

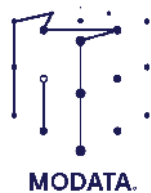


Aerial photograph showing view location



Visual catchment diagram

Dwelling no. 1:
278 Beryl Road



Beryl Battery Energy Storage System

Landscape and visual impact assessment

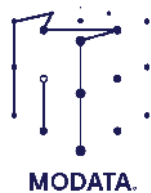
Existing view
50mm focal length

Date: March 2024

Dwelling no. 1:
278 Beryl Road



Operational view without screening vegetation shown
50mm focal length



Beryl Battery Energy Storage System

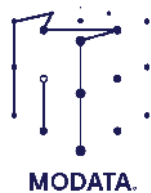
Landscape and visual impact assessment

Date: March 2024

Dwelling no. 1:
278 Beryl Road



Location of Project



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Operational view with screening vegetation shown
50mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)

Date: March 2024

Dwelling no. 2:
278 Beryl Road



Existing view from primary dwelling, 180 degree panorama

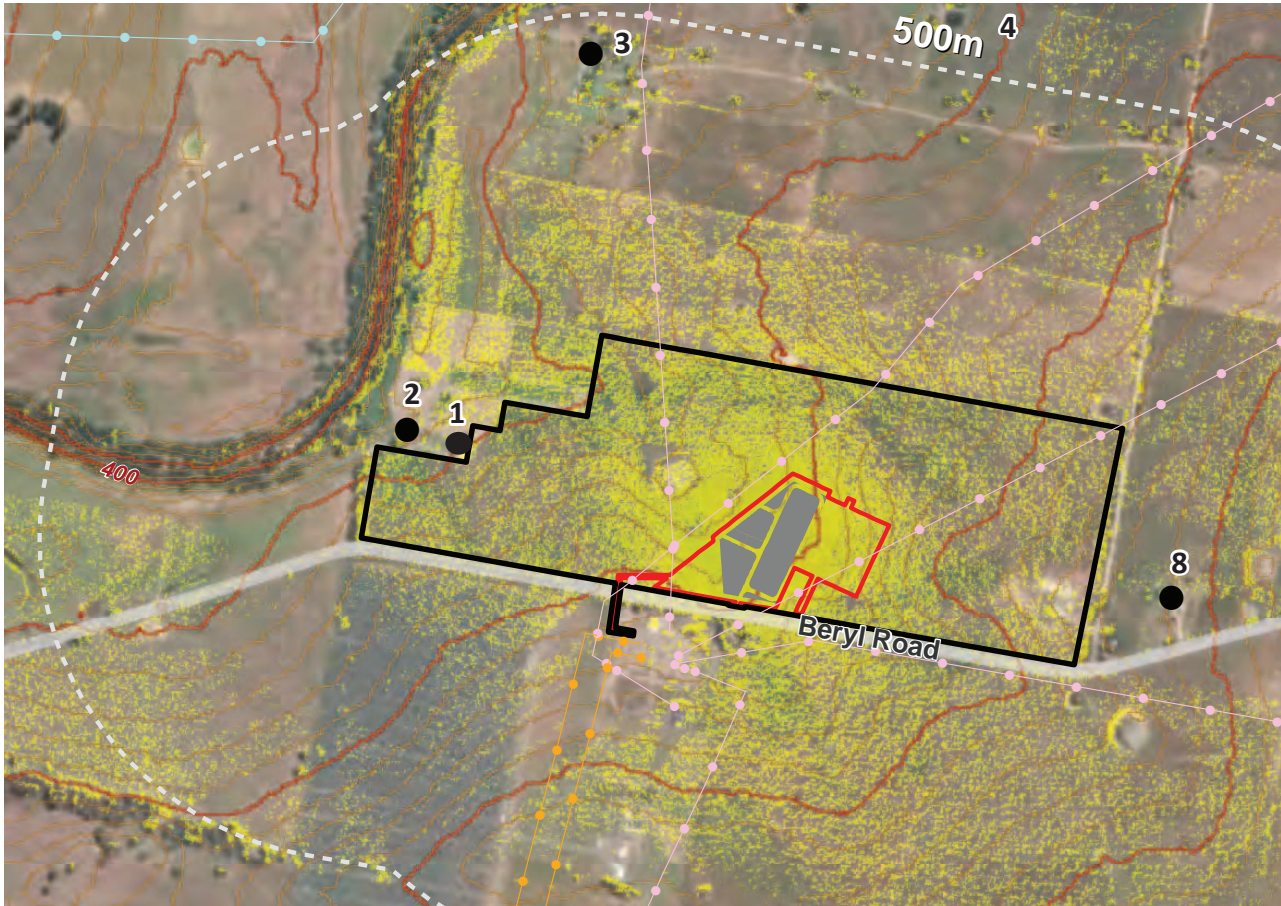
Key

Project area

180-degree panoramic photograph location



Aerial photograph showing view location



Visual catchment diagram

Dwelling no. 2:
278 Beryl Road



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Existing view
50mm focal length

Date: March 2024

Dwelling no. 2:
278 Beryl Road



Operational view without screening vegetation shown
50mm focal length



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Date: March 2024

Dwelling no. 2:
278 Beryl Road



Location of Project

Operational view with screening vegetation shown

50mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Date: March 2024

Dwelling no. 3

83 Holleys Lane, Gulgong

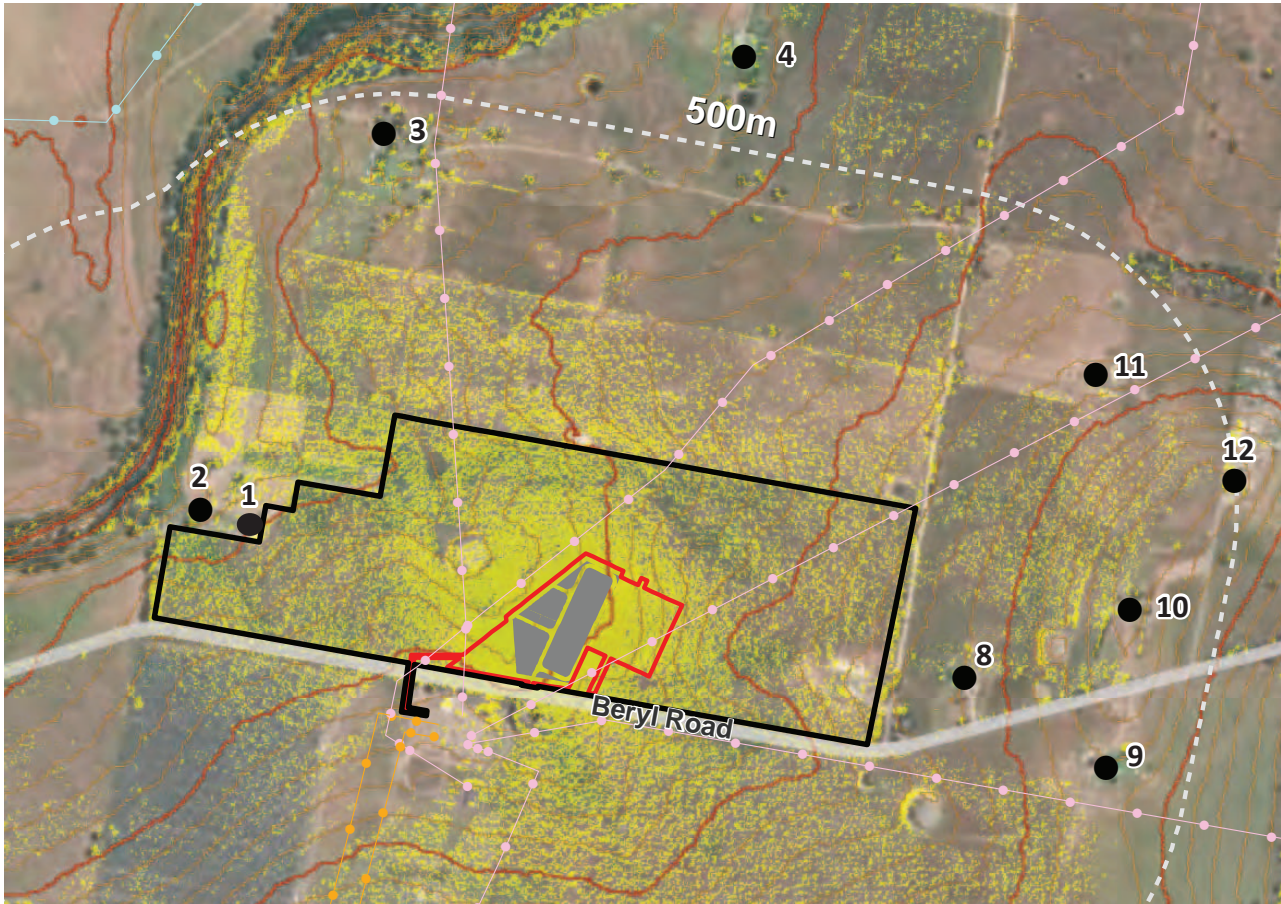


Existing view, 180 degree panorama

- Key
- Project area
 - Existing 66kV transmission line
 - ↔ 180-degree panoramic photograph location



Aerial photograph showing view location



Visual catchment diagram





Operational view without screening vegetation shown
50mm focal length



Location of Project

Operational view with screening vegetation shown

50mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)



Beryl Battery Energy Storage System

Landscape and visual impact assessment


Date: March 2024

Dwelling no. 4
115 Holleys Lane, Gulgong



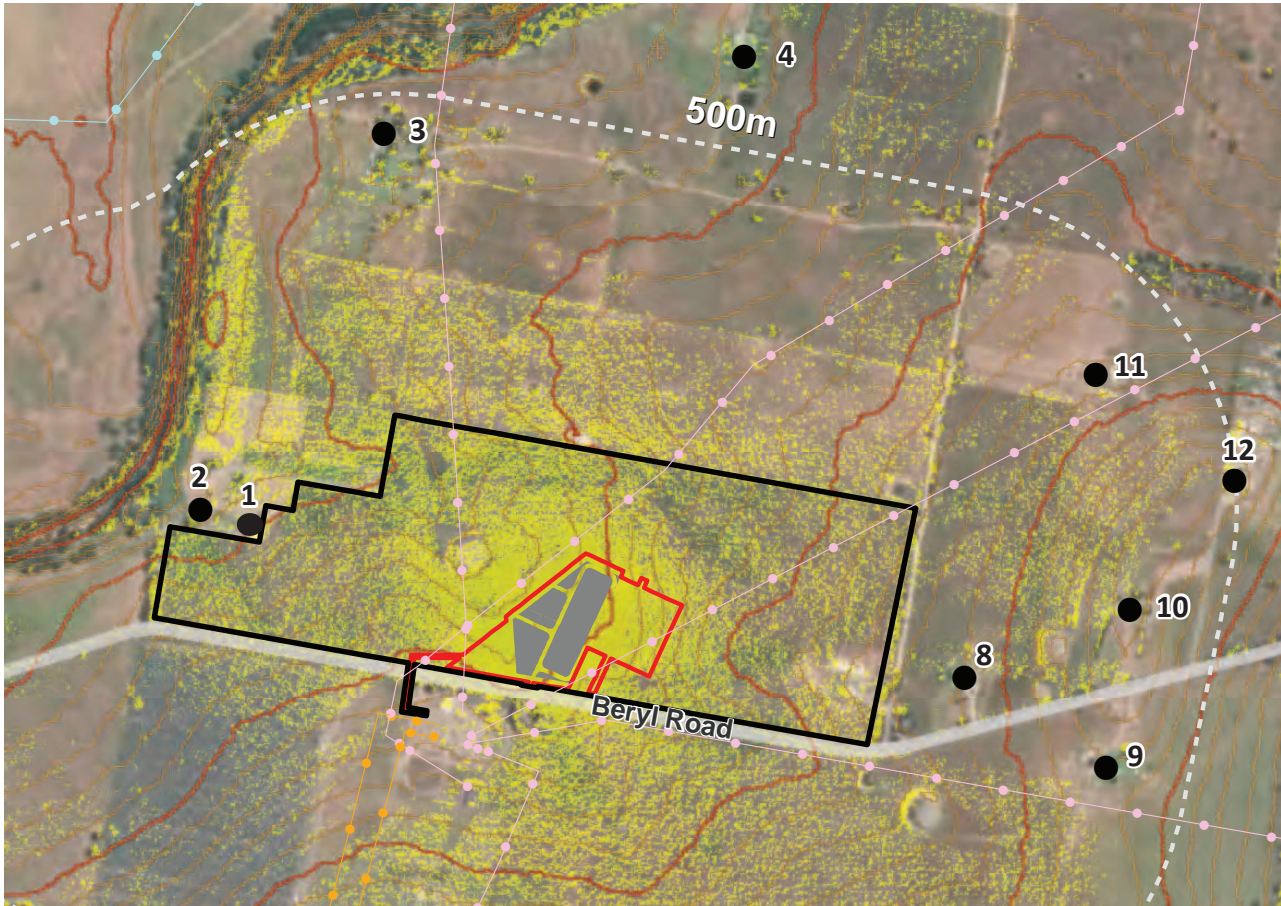
Existing view, 180 degree
panorama

Key

 180-degree panoramic
photograph location



Aerial photograph showing view location



Visual catchment diagram

Dwelling no. 4

115 Holleys Lane, Gulgong



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Existing view

50mm focal length

Date: March 2024



Location of Project



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Operational view - Project highlighted
50mm focal length - (Yellow screened by landform, red above landform)

Date: March 2024

Dwelling no. 4
115 Holleys Lane, Gulgong



Operational view without screening vegetation shown
50mm focal length



Dwelling no. 4
115 Holleys Lane, Gulgong



Operational view with screening vegetation shown

50mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)




Beryl Battery Energy Storage System

Landscape and visual impact assessment

Date: March 2024

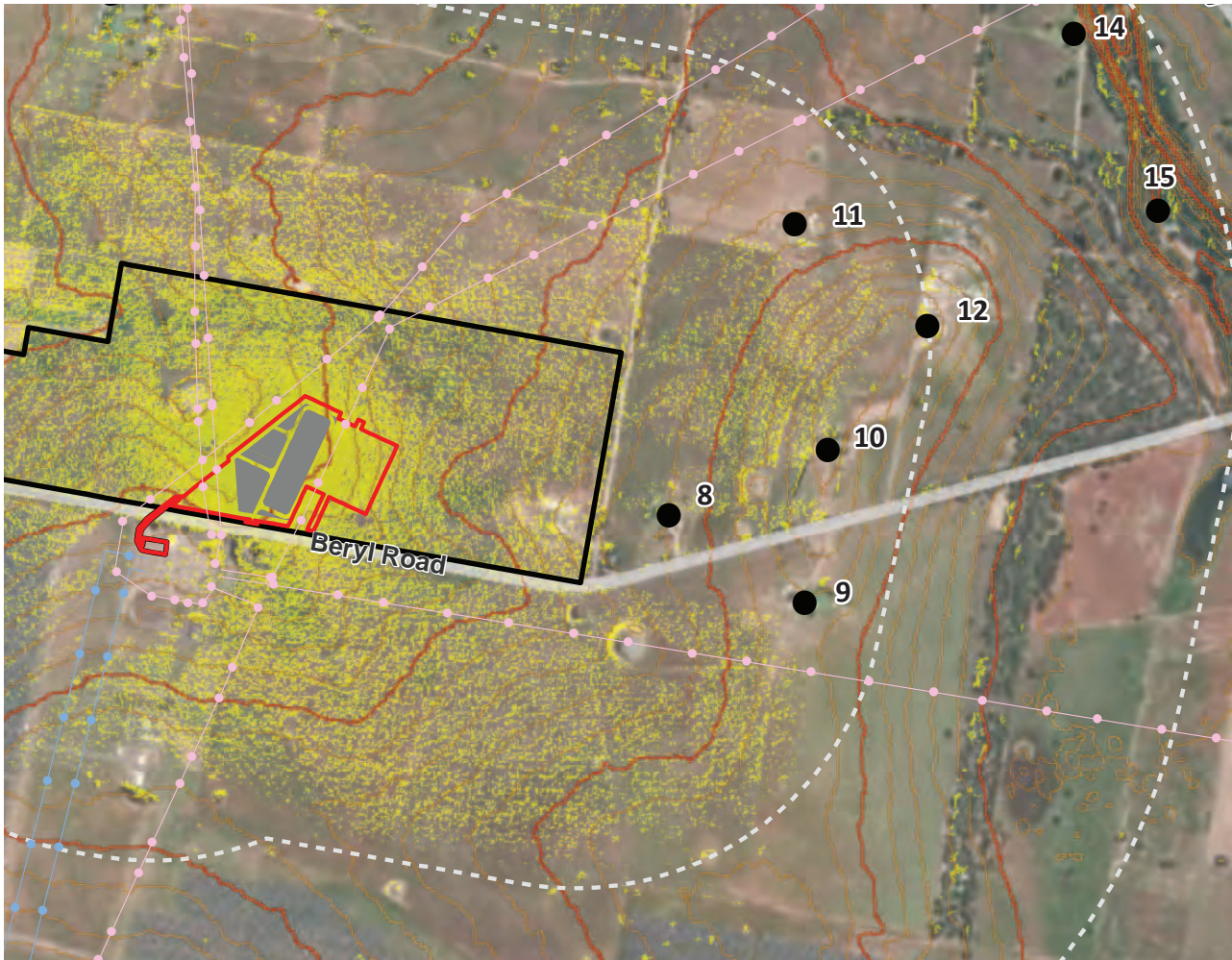
Dwelling no. 8
148 Beryl Road, Gulgong

Key

 Likely main outlook from dwelling



Detailed aerial showing dwelling orientation




Visual catchment diagram

Dwelling no. 10
126 Beryl Road, Gulgong



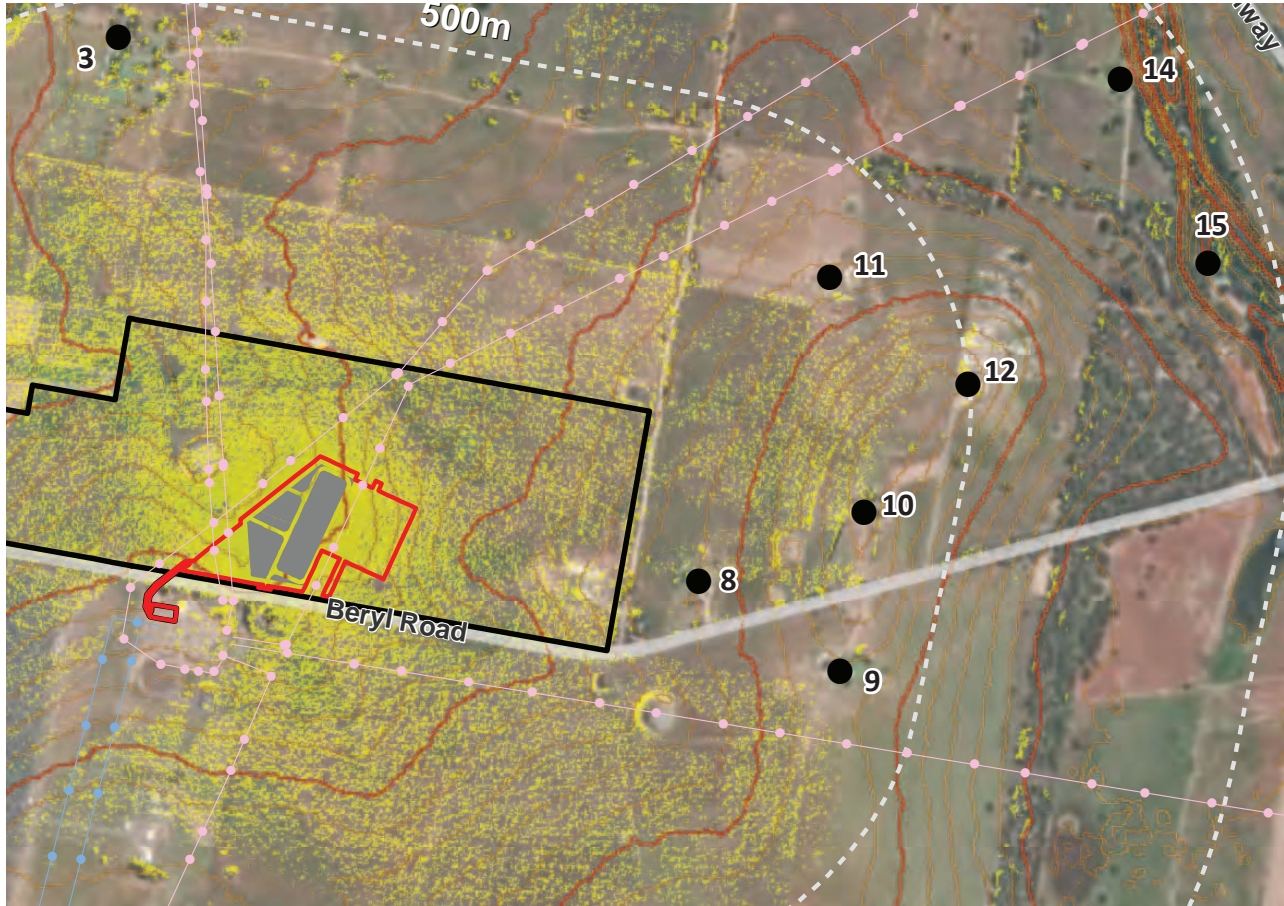
Existing panoramic view from potential future dwelling

Key

 180-degree panoramic photograph location



Aerial photograph showing view location



Detail from visual catchment diagram

Dwelling no. 10

126 Beryl Road, Gulgong



Beryl Battery Energy Storage System

Landscape and visual impact assessment

Existing view

50mm focal length

Date: March 2024



Location of Project

Operational view without screening vegetation shown
50mm focal length



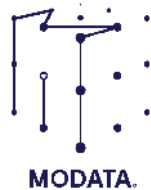
Beryl Battery Energy Storage System

Landscape and visual impact assessment

Date: March 2024



Location of Project



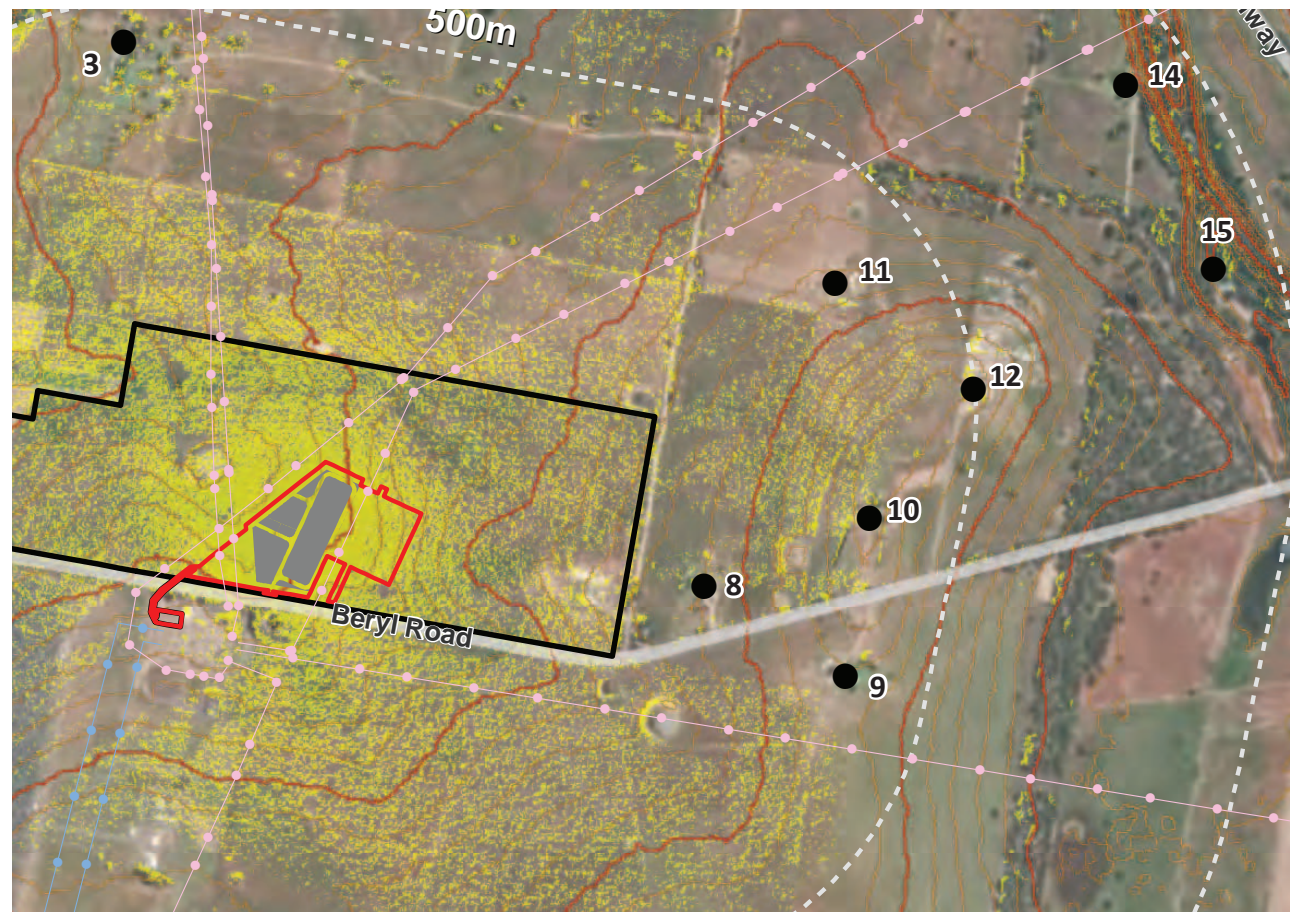
Beryl Battery Energy Storage System

Landscape and visual impact assessment

Operational view with screening vegetation shown
50mm focal length - Screening vegetation shown (shrubs at 3 metres and trees at 5 metres tall)

Date: March 2024

Dwelling no. 11
58 Hollys Lane, Gulgong



Detail from visual catchment diagram



Detailed aerial showing dwelling orientation

Key
Likely main outlook from dwelling

Appendix C: Native vegetation and landscape plan

Beryl BESS

Native Vegetation and Landscape Plan

Issue: E

d: 29.04.2024



Document Control Sheet

Project: Beryl BESS
Report Title: Native Vegetation and Landscape Plan

Authors: Philip Kleinschmidt, Anthony Simmers
Approved by: Philip Kleinschmidt

File Location: Z:\Synergy\Projects\23\23146 Beryl BESS\03 Working\02 InDesign

Revision	Date	Approved
Rev A	02.02.2024	PK
Rev B	05.02.2024	PK
Rev C	27.03.2024	PK
Rev D	17.04.2024	PK
Rev E	29.04.2024	PK

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1.0 Native Vegetation and Landscape Plan



2.0 Landscape Type - Native screen planting

General Notes

A mix of native trees, and shrubs with a dense and compact habit have been selected to provide maximum screening effect.

The plant list has been prepared from the following sources:

- Watershed Landcare Incorporated, Native Species Revegetation. A guide for the Mid Western Regional Council Area.
- NSW Government, Local Land Services, 2016, Planting your patch. A guide to revegetation on your property.

The plant list includes a mix of long-lived species, and fast growing 'pioneer species' such as Acacia and Dodonea. Pioneer species establish quickly and form an effective visual screen in the short term. While some of these pioneer species are relatively short lived (i.e. 7-12 years), they will disperse seed and new plants will regenerate so that a self-sustaining vegetation screen is maintained over the long term. Pioneer species assist with weed management, fix nitrogen in the soil and support the growth of longer-lived species, such as Eucalypts.

Revegetation Notes

- Revegetation works shall be scheduled for seasons when evaporation and plant transpiration are low, typically autumn through to early spring. Only plant when there is a good soil moisture profile.
- The revegetation contractor shall engage a suitably qualified Agronomist to undertake soil testing and prepare written recommendations for soil amelioration suitable for the specified planting.
- Planting area to be slashed and sprayed with a knock-down herbicide.
- Soil to be ripped to 300mm depth in a minimum of two passes. Rip subsoil parallel to the contours where possible. Do not rip if subsoil is wet or plastic.
- Incorporate ameliorants strictly in accordance with the Agronomist's written recommendations.
- Cultivation or harrow planting area to break-up larger soil clods and reduce air-pockets.
- Planting areas to be covered with 100mm thick well composted organic mulch (to hold moisture and suppress weeds)
- Planting areas to be closed off from grazing pressure with stock fencing
- Plants shall be container stock. Plants shall be vigorous, well established, of good form, not soft or forced, free from disease and insect pests. They shall have large healthy root systems, not root bound and all trees with a single leading shoot appropriate to their natural form. All plants are sun hardened to the site climatic conditions.
- Controlled / slow-release fertilizer, minimum 6 month, shall be placed in each planting hole at the time of planting in accordance with the manufacturer's application rate.
- Plants shall be installed with a biodegradable 'tree guard' (Grow tube) or similar. Nom 450mm high, staked in accordance with the manufacturer's written recommendations.
- Actively maintain the planting during 12 week establishment period, followed by a 21 month monitoring period (total of 24 months)

Activities during establishment and monitoring periods shall include:

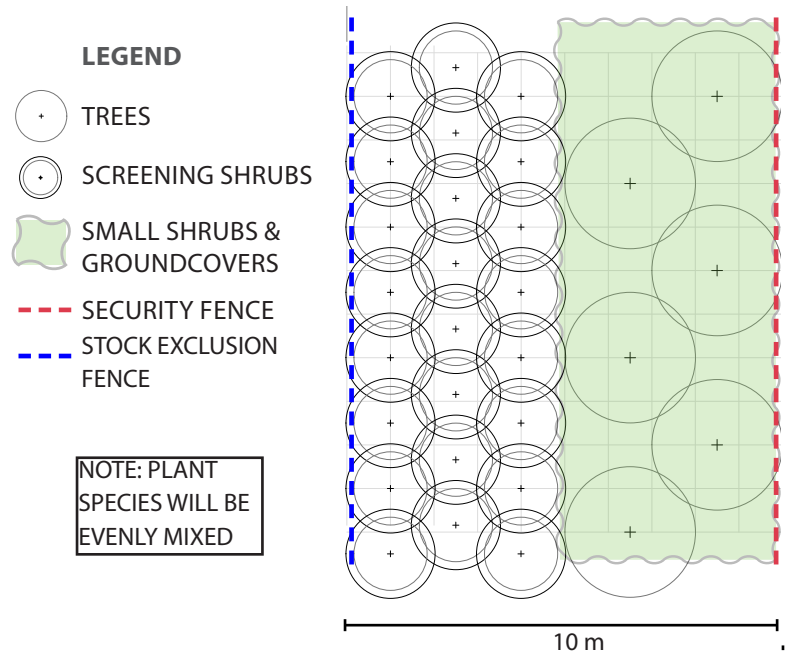
- Maintaining moisture levels to prevent plants from drying out and to provide optimum conditions for plant establishment and growth.
- Managing weed infestations. Weed control preferably by hand removal or by registered application of herbicide.
- Replacing dead and missing plants with identical species. If a particular plant species has a high mortality rate consideration may be given to a substitution of a more suitable plant species.
- Replacing damaged or missing tree guards and ensure that trees and guards are secure to their stakes.
- Removing tree guards when the plants are established
- Provide slow-release fertilising (3–6 month) of plant material suffering discoloration by placing fertiliser around plant stem or use spiking method to reduce surface weed growth.
- Monitor all plants for health and disease. Where necessary seek written recommendations from a suitably qualified horticulturalist and implement accordingly.

Plant Species List

Scientific Name	Common Name	Height at Maturity
Canopy Trees		
<i>Acacia dealbata</i>	Silver Wattle	10m
<i>Angophora floribunda</i>	Rough-barked apple	10-20m
<i>Brachychiton populneus</i>	Kurrajong	10m
<i>Eucalyptus albens</i>	White box	15-20m
<i>Eucalyptus blakelyi</i>	Blakelys Red Gum	20m
<i>Eucalyptus bridgensiana</i>	Apple box	20m
<i>Eucalyptus conica</i>	Fuzzy box	20m
<i>Eucalyptus goniocalyx</i>	Bundy Box	15m
<i>Eucalyptus melliodora</i>	Yellow box	20m
<i>Eucalyptus microcarpa</i>	Western Grey Box	25m
<i>Eucalyptus moluccana</i>	Grey Box	20m
Screening Shrubs		
<i>Acacia buxifolia</i>	Box Leaf Wattle	1-4m
<i>Acacia decora</i>	Western Golden Wattle	1-4m
<i>Acacia difformis</i>	Drooping Wattle	1-6m
<i>Acacia hakeoides</i>	Hakea Wattle	1-6m
<i>Acacia implexa</i>	Hickory Wattle	5-12m
<i>Acacia spectabilis</i>	Mudgee Wattle	1-4m
<i>Dodonaea viscosa 'angustifolia'</i>	Sticky Hop Bush	5m
<i>Dodonaea viscosa 'cuneata'</i>	Wedge-leaf Hop Bush	1-3m
Small Shrubs & Groundcovers		
<i>Lomandra longifolia</i>	Spiny-headed Mat-Rush	
<i>Austrostipa verticillata</i>	Slender Bamboo Grass	
<i>Bothriochloa macra</i>	Red Grass	
<i>Gahnia aspera</i>	Rough Saw-sedge	
<i>Microlaena stipoides</i>	Weeping Grass	
<i>Themda australis</i>	Kangaroo Grass	

Typical Plant Set out Detail (Indicative)

Trees and shrubs will be staggered to maximise the screening effect as per the following diagram.



3.0 Typical Section A

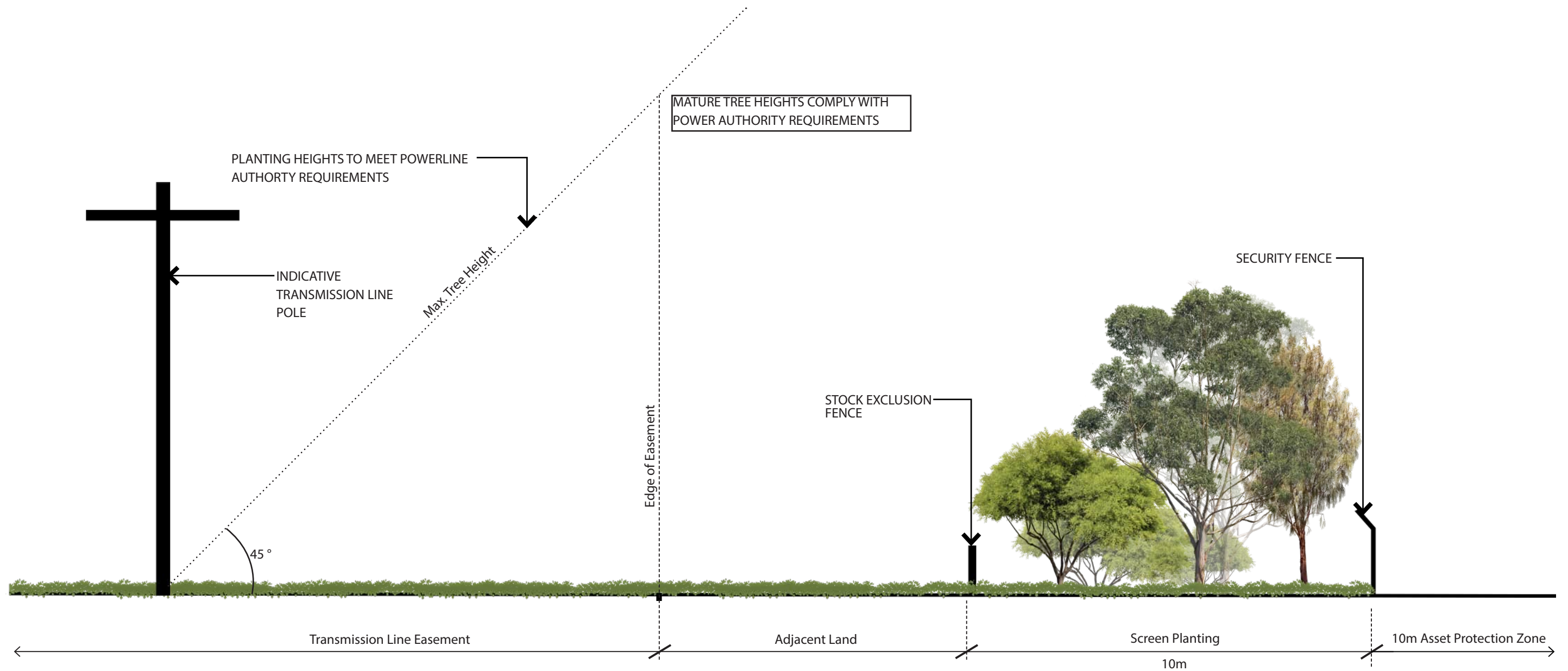


TYPICAL SECTION A (INDICATIVE)

Scale 1:100 @ A3



3.1 Typical Section B



MATURE TREE HEIGHTS COMPLY WITH POWER AUTHORITY REQUIREMENTS

PLANTING HEIGHTS TO MEET POWERLINE AUTHORITY REQUIREMENTS

INDICATIVE TRANSMISSION LINE POLE

Max. Tree Height

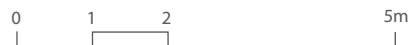
Edge of Easement

STOCK EXCLUSION FENCE

SECURITY FENCE

TYPICAL SECTION B (INDICATIVE)

Scale 1:100 @ A3



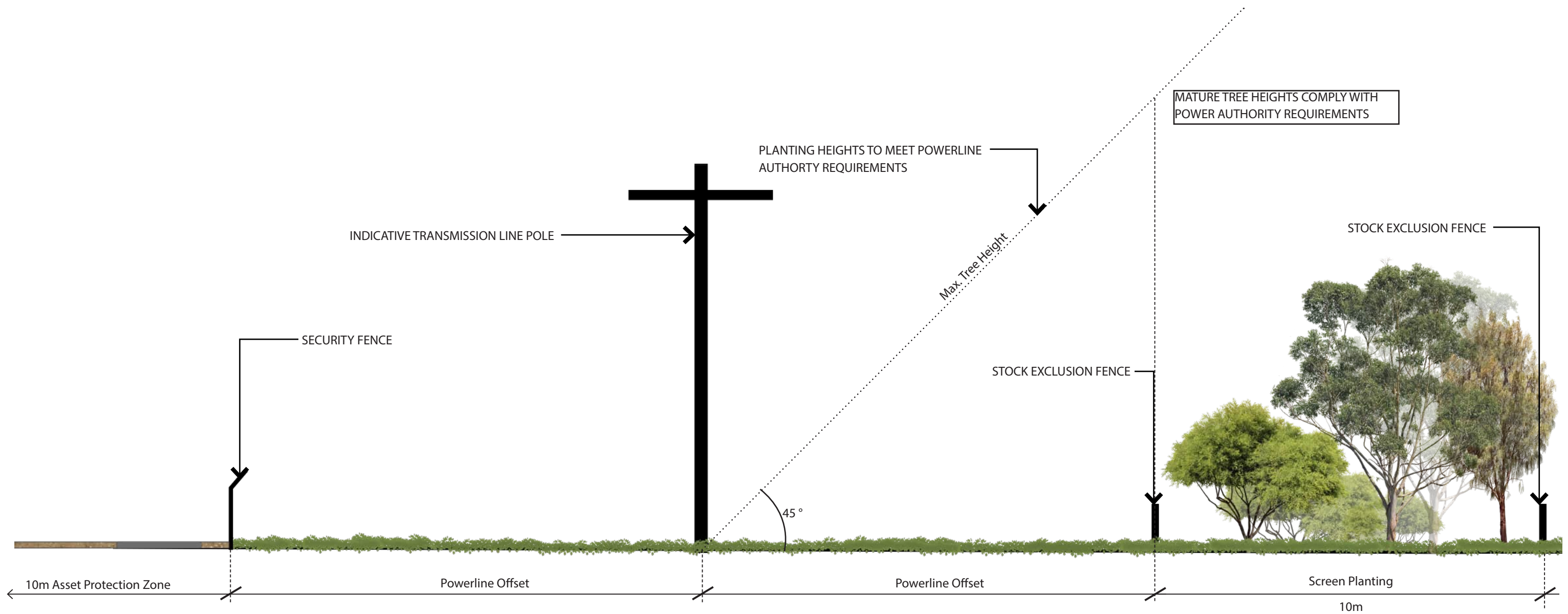
3.2 Typical Section C



TYPICAL SECTION C (INDICATIVE)

Scale 1:100 @ A3 0 1 2 5m

3.3 Typical Section D

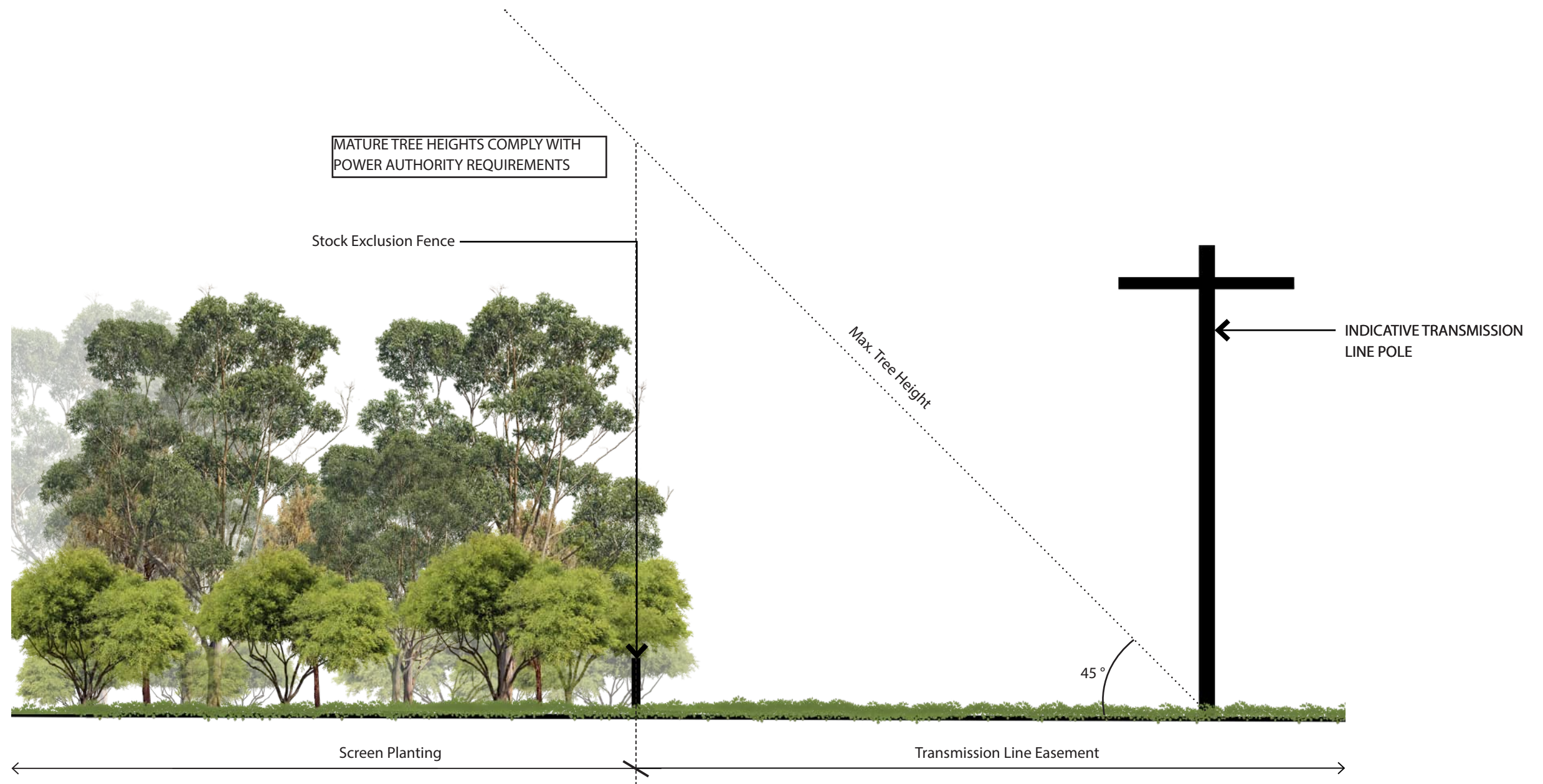


TYPICAL SECTION D (INDICATIVE)

Scale 1:100 @ A3



3.4 Typical Section E



TYPICAL SECTION E (INDICATIVE)

Scale 1:100 @ A3

