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Theodore Wind Farm

Landscape and Visual Impact Assessment

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Landscape and Visual Impact Assessment

Prepared for
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Executive Summary

Moir Landscape Architecture (Moir LA) have been commissioned by ERM, to prepare a Landscape and Visual Impact Assessment (LVIA) on behalf of RWE Renewables Australia Pty Ltd., for the proposed Theodore Wind Farm (the Project).

The Project is a wind farm development located approx. 22 km east of Theodore, in the Banana Shire of Queensland. The Project will include up to 170 wind turbine generators (WTGs) with an expected installed capacity of up to 1152MW, with an anticipated maximum tip height of 270 m.

In addition to the wind WTGs, ancillary infrastructure including access tracks, road upgrades, underground and overhead electricity cabling, high voltage transmission line, substations and battery energy storage system compounds, operations and maintenance facility and grid connection to the existing transmission line network have been assessed in this LVIA.

Moir LA have utilised a quantitative study methodology with regards to the *State Code 23: Wind Farm Development 2022*. Relevant literature and guidelines relating to large scale energy projects and Moir LA's previous experience on large scale infrastructure projects has also been considered in the Study Method.

Field work was undertaken by Moir LA in May 2023 to determine the existing landscape character against which the Project has been assessed. The assessment determined the regional landscape character is typical of the Banana - Auburn Range subregion of the Brigalow Belt IRBA Bioregion.

The Project Area is predominately categorised as grazing native vegetation, with small parcels utilised for cropping. Small portions of land are used for intensive animal production and mining activities. Areas nominated as Production native forests are also present within the Study Area. The Study Area is defined as the land up to 10 km surrounding the Project, measured from the WTGs.

The landscape was categorised into four (4) Landscape Character Units (LCUs). A quantitative frame of reference was applied to establish the Scenic Quality Rating of these LCUs which ranged from low to moderate ratings.

The visual impact of a wind energy project will depend upon the characteristics and values of the existing landscape, the extent to which the existing landscape is changed by the Project and how these changes are perceived by individuals and the broader community. The assessment identified the key landscape features and viewpoints within the 10km Study Area.

Key features which form a part of the existing landscape character assist in reducing the potential for viewing the Project. These include large areas of vegetation on ridgelines and grazing paddocks, undulating topography, roadside vegetation and riparian vegetation associated with creek lines. The assessment found the Project could be undertaken whilst maintaining the key visual features of the landscape.

A detailed assessment was undertaken for a total of 26 public viewpoint locations within the Study Area. The assessment identified opportunities to view the Project varied and the visual impact ratings were generally low. A total of five (5) photomontages were prepared to illustrate the potential visual impacts from representative public viewpoint locations.

No non-associated dwellings were identified within 3.09 km of the nearest WTG. 17 non-associated dwellings are located within 3.09 km - 6.18 km of the nearest proposed WTG. Assessments were undertaken to determine the level of visual impact for all 17 non-associated dwellings. The assessment concluded:

- Eight (8) non-associated dwellings were rated as having a low visual impact.
- Three (3) non-associated dwellings were rated as having a moderate visual impact.

In accordance with the *State Code 23: Wind Farm Development 2022*, an assessment was undertaken to assess potential shadow flicker at existing and proposed land uses surrounding the Project. The assessment identified two (2) associated dwellings (H05 and H09) as having a potential to experience shadow flickers. Detailed assessment of the results indicated that the potential flickering was compliant within the acceptable level of the State Code 23: Wind Farm Development 2022 as these dwellings are located outside the extent of shadows from WTGs (1,139.5 m). No non-associated dwellings were identified to experience potential shadow flicker from the WTGs.

Practical and feasible mitigation measures have been proposed for each of the non-associated dwellings with a moderate or high visual impact rating. The proposed mitigation measures would assist in significantly reducing negative impacts resulting from the majority of these dwellings. Mitigation measures in keeping with the existing character include screen planting and supplementary planting of existing vegetation.

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01
Introduction

1.0 Introduction

1.1 Background

Moir LA have been commissioned by ERM, on behalf of RWE Renewables Australia Pty Ltd., to prepare an LVIA for the proposed Theodore Wind Farm (the Project) approx. 22 kilometres (km) east of the township of Theodore, Queensland (refer to **Figure 01**) within the Banana Shire Council Local Government Area (LGA).

This report provides a comprehensive assessment of visibility and potential visual impacts associated with the Project on the landscape character, landscape values, landscape amenity and any scenic vistas. This information will assist the community and relevant authorities to understand and assess the potential visual impacts.

Survey work for the Study Area was undertaken in May 2023 using key viewpoints and locations with potential views towards the Project Site. The report details the results of the field work, documents the assessment of the landscape character and visual setting, and makes recommendations to assist in the mitigation of any impacts resulting from the proposed development.

1.2 Relevant Experience

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact. Our team has extensive experience in undertaking LVIAs for wind energy projects. In the context of our experience and with reference to the relevant guidelines, we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of LVIAs for the following Wind Energy Projects:

- Lakeland Wind Farm (Lakeland, Queensland)
- Stony Creek Wind Farm (Biggenden, Queensland)
- Crudine Ridge Wind Farm (New South Wales)
- Bodangora Wind Farm (Bodangora, New South Wales)
- Capital II Wind Farm (Bungendore, New South Wales)
- Uungula Wind Farm (Wellington, New South Wales)
- Hills of Gold Wind Farm (Nundle, New South Wales)
- Cherry Tree Wind Farm (Seymour, Victoria)

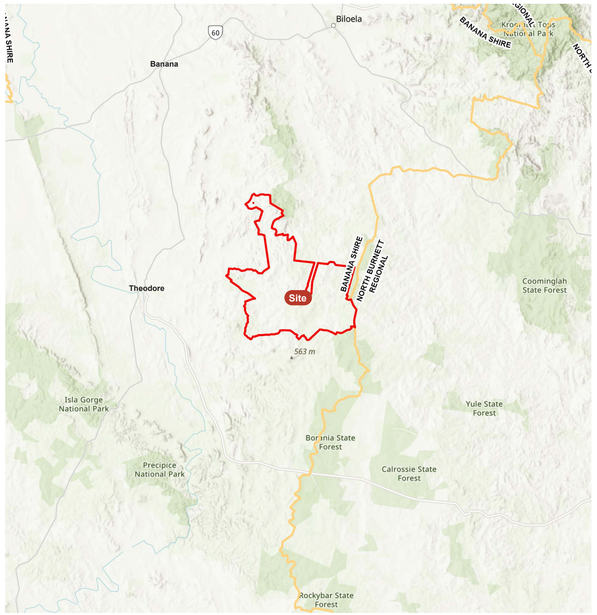


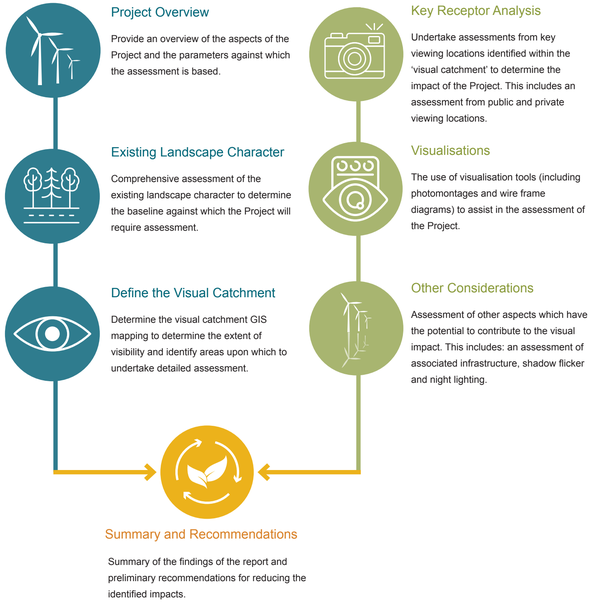
Figure 01 – Project Context
Source: ArcGIS, 2023

02
Study Method

2.0 Study Method

2.1 Overview of the Study Method

The fundamental steps in undertaking a LVIA are as follows:



2.2 Relevant Guidelines and Framework

The following provides an overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this LVIA.

2.2.1 Wind Farm State Code & State Development Assessment Provisions (2022)

The Wind Farm State Code, supported by State Code 23 Wind Farm Development planning guidance, provides a consistent and coordinated, whole-of-government approach to the assessment and regulation of wind farm development across Queensland.

The code and guideline aims to deliver quality renewable energy outcomes whilst protecting communities from adverse impacts as a result of wind farm development. The Wind Farm State Code is contained within the State Development Assessment State Code 23: Wind Farm Development (2022).

Relevant Performance Outcomes:

- *PO4 Development is designed so that the modelled blade shadow flicker impacts on existing or approved sensitive land uses do not exceed 30 hours per annum and 30 minutes per day.*
- *PO9 Development in an area identified by a local government as having high scenic amenity is sited and designed to protect the character, scenic amenity and landscape values of the locality and region.*

A visual assessment should identify and propose measures to avoid or minimise adverse impacts from the development on significant landscape values and scenic amenity, including view corridors and viewpoints. As the Project is located within the Banana Shire Council LGA, the Banana Shire Planning Scheme 2021 has been used to assist with identifying scenic amenity and /or landscape values to be addressed.

The LVIA report includes the following content:
- a description of the potential impacts on the scenic amenity or landscape values and;
- visual simulations or photomontages demonstrating the anticipated visual impact of the development in the context of the surrounding area and from key public viewpoints.

Study Method

2.2.2 AILA Guidance Note for Landscape and Visual Impact Assessment (June 2018)

The Australian Institute of Landscape Architects (AILA) developed guidance notes for the preparation of LVIAs. The purpose of the document is to provide a practical framework for the practice of LVIAs among Registered Landscape Architects working in Queensland. The process for undertaking this LVIA is reflective of the best practice guidelines outlined in the Guidance Note.

2.2.3 Draft National Wind Farms Development Guidelines (July 2010)

The Environment Protection and Heritage Council (EPHC) have developed a draft guideline (July 2010) to provide a consistent framework and methods for assessing issues unique to WTG developments. References to these guidelines have been made throughout the report.

2.2.4 Banana Shire Planning Scheme 2021 (BSPS 2021)

The Banana Shire Planning Scheme 2021 (BSPS 2021) has been developed by Banana Shire Council (July 2021) to manage future development within the LGA. References to these guidelines have been made throughout the report. The Project is located within the Banana Shire Council Local Government Area (LGA). For the purposes of the report, the Banana Shire Planning Scheme (2021) (BSPS 2021) is applicable. Section 2.4.1.1 of the BSPS 2021 states that:

Opportunities to develop renewable energy and allied industries are supported where:
(a) It provides a secure green energy future such as wind, solar or other alternative power;
(b) Long-term economic growth and employment benefits are demonstrated;
(c) Significant natural and cultural areas are avoided;
(d) Impacts on sensitive land uses are managed

In accordance with BSPS 2021, *a Renewable Energy Facility is permitted within a Rural Zone subject to Performance Outcomes (PO) as listed under the Rural Zone Code within the planning scheme* (BSPS 2021).

2.3 Report Structure

Table 01 provides an outline of the report structure. Detailed methodologies for each part of the assessment have been included in the relevant chapters of the report.

Report Structure
Project Overview
• **Section 3.0** Project Overview
Landscape Character Analysis
• **Section 4.0** Existing Landscape Character Analysis
Visual Impact Assessment
• **Section 5.0** Defining the Visual Catchment
• **Section 6.0** Zone of Visual Influence
• **Section 7.0** Viewpoint Analysis
• **Section 8.0** Photomontages
• **Section 9.0** Overview of Dwelling Assessment
• **Section 10.0** Shadow Flicker & Glare Assessment
• **Section 11.0** Assessment of Associated Infrastructure
• **Section 12.0** Aviation Hazard and Nightlighting Assessment
Response to Impacts
• **Section 13.0** Mitigation Measures
• **Section 14.0** Summary

Table 01 – Report Structure

03
Project Overview

3.0 Project Overview

3.1 The Project Site

The Project Site is located 22 km to the east of the township of Theodore, immediately northwest of Trevethan State Forest, west of Montour State Forest and south of Belmont State Forest. The Project will consist of up to 170 WTGs with an anticipated maximum tip height of 270 m above Australian Ground Level (AGL). The Project is proposed to connect to the existing distribution transmission, supplying energy to the National Electricity Market.

The character within the Project Site is typical of the surrounding landscape. Topography is undulating, forming ranges and mountains. The Project is located on land which has been cleared and modified for agricultural activities (see **Image 02**) and vegetated hills (see **Image 01**). Moderate to dense vegetation is predominantly located along the steeper sections of land.

The Project Layout is depicted in **Figure 02**.

3.2 The Study Area

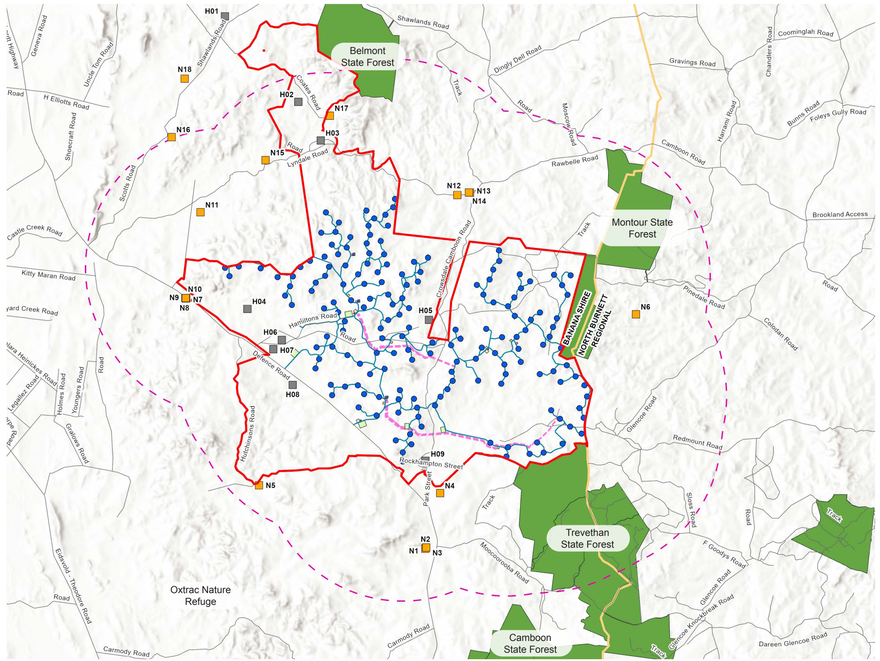
For the purpose of this report, the Study Area is defined as the land up to 10 km surrounding the Project Site. The methodology for determining the Study Area is provided in **Section 5.0**.



Image 01 – Typical landscape character of the Project Area. View looking northeast from Defence Road (Moir LA - 05/2023)



Image 02 – Views over the Project Site from Crowsdale - Camboon Road (Moir LA - 05/2023)



Project Site

Theodore Wind Farm

- Project Boundary
- Associated Dwellings
- Non-associated Dwellings
- Proposed Turbines
- 10km Study Area
- Defined Forests
- LGA Boundary
- Roads and Tracks
- Proposed Substation
- Proposed Switching Station
- O&M Compound
- Proposed Concrete Batching Plant
- Proposed Laydown Areas
- Proposed Site Compound
- Proposed Overhead 33kV Reticulation
- Proposed Access Tracks

0 5 10 15 20 km

Figure 02 – Project Layout
Source: ArcGIS, 2023

3.3 The Project

The proposed development referred to as the Project, would consist of up to 170 wind turbine generators (WTG) each with a capacity of up to 7.2 megawatts (MW).

The Project would also include:

- An internal electrical reticulation network (both overhead and underground);
- Potential Battery Energy Storage System (BESS);
- Substations and Switching stations connected via a 33 kV network;
- New and upgraded access roads;
- Temporary construction facilities (including laydown areas and concrete batching plant); and
- Operation and maintenance buildings.

The Project and components are presented in **Figure 02**. The following provides an overview of all aspects of the proposal to be considered in this LVIA.

3.4 WTG Design

The proposed WTGs under consideration has a maximum blade tip height of 270 m. The WTGs will typically have:

- A 4-7 part tubular steel tower holding the nacelle;
- Three blades mounted to a rotor hub on a tubular steel tower, with a combined height of blade and tower limited to a maximum tip height of 270 m;
- A gearbox and generator assembly housed in a nacelle; and
- Adjacent hardstands for use as crane pads and assembly and laydown areas.

Table 02 provides an overview of dimensions of the WTG components that have been used for this assessment. To best represent a worst case scenario, the maximum hub height of 166 metres has been used for modelling and visualisation purposes in this report (see **Figure 03**). **Image 03** shows a typical WTG and all visual elements referred to in this report.

WTG Components		
Project Component	**Dimensions used in LVIA:**	**Quantity**
Make / Model / Power	Vestas V172 - 7.2MW	**Up to 170**
Uppermost Blade Tip	Up to 270 metres AGL	
Tower (hub) height	Up to 166 metres	
Blade length	Up to 104 metres (including nacelle)	

Table 02 – WTG Dimensions for Visual Assessment

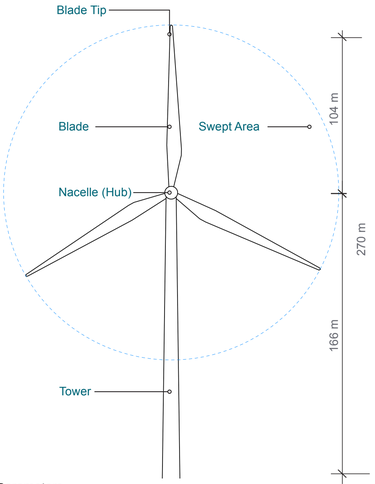


Figure 03 – WTG Parameters

3.5 Associated Infrastructure

In addition to the WTGs, the following provides an overview of the permanent associated infrastructure components proposed for the Project which may contribute to the visual impact of the proposal.

An overview of the assessment of the potential visual impacts resulting from the associated infrastructure has been provided in **Section 11.0** of this report.

The following temporary elements will be required during construction of the Project:

- Temporary site buildings and facilities for construction contractors / equipment, including site offices, car parking and amenities for the construction workforce;
- Temporary concrete batching plants to supply concrete for WTG footings and substation construction works;
- Earthworks for access roads, WTG platforms and foundations and;
- Laydown areas for the temporary storage of construction materials, plant, and equipment construction.

Associated Infrastructure	
Project Component:	**Description:**
Transmission Lines	The Project will connect to the substation and switching stations via a 33 kV overhead transmission line. Refer to **Image 04**.
Substation	Including transformers, insulators, switch yard and other ancillary equipment; Refer to **Image 06**.
Battery Energy Storage System (BESS)	Refer to **Image 07**.
Operations and Maintenance Facility	Refer to **Image 05**.
Internal Reticulation Lines	The internal reticulation lines will be underground and will have negligible visual impact.
Internal private access road network	WTGs and other ancillary elements associated with the Project will be connected through internal private access road network.
Permanent Structures	Permanent Meteorological Masts

Table 03 – Overview of Associated Infrastructure



Image 03 – Typical WTG



Image 04 – Typical Transmission Line



Image 05 – Typical Operations & Maintenance Facility



Image 06 – Typical Substation



Image 07 – Typical BESS

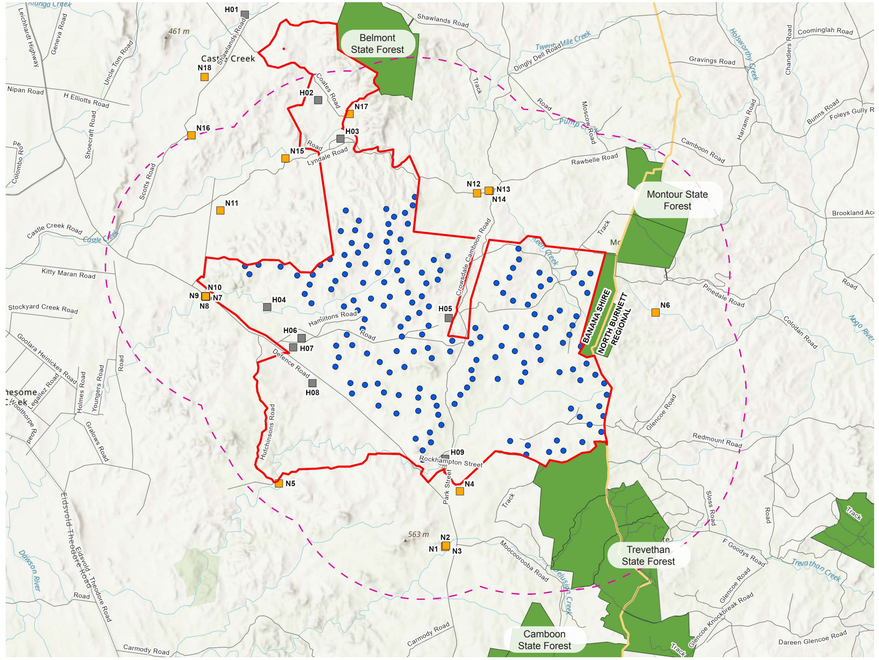


Figure 04 – Study Area
(Source: Queensland Government, 2023)

04
Existing Landscape Character

4.0 Existing Landscape Character

4.1 Existing Landscape Character Analysis

The purpose of the Landscape Character Analysis is to establish the existing landscape and visual conditions through descriptions, mapping and photographic representations. The Study Method for undertaking the Landscape Character Analysis has been established in accordance with the *State Development Assessment State Code 23: Wind Farm Development (2022)* and the *AILA Guidance Notes for Landscape and Visual Impact Assessmen*t where relevant and in conjunction with previous experience on large scale wind energy projects.

4.2 Regional Landscape Character

4.2.1 Bioregion Context

Brigalow Belt IBRA Bioregion, Queensland

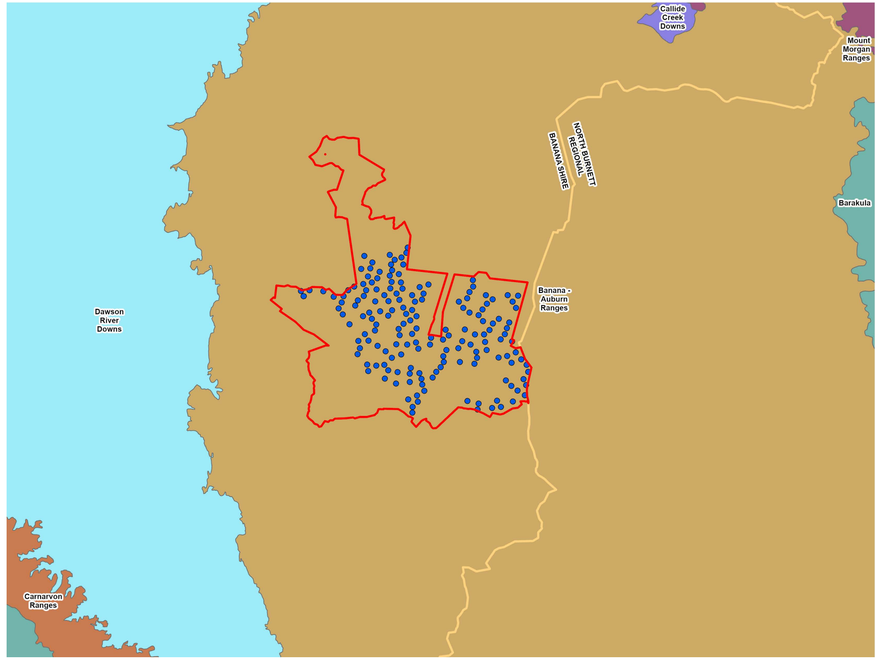
The Project is located within the Brigalow Belt Interim Biogeographic Regionalisation for Australia (IBRA) region of Queensland (see **Figure 05**). Brigalow Belt IBRA bioregion extends from south of Townsville and extends into New South Wales (NSW) (DES 2018). The Brigalow Belt IBRA bioregion consists of 38 Subregions. The Project is located within the Banana - Auburn Ranges IBRA subregion.

Banana - Auburn Ranges Subregion

The Banana-Auburn Ranges IBRA Subregion forms part of the Brigalow Belt South IBRA subregion. The region contains a mix of landscapes ranging from low undulations to hilly areas and deep valleys to flat alluvial plains in the south. Predominant land use within the region includes grazing (DCCEEW 2008).

4.2.2 Land Use

Land Use within the Study Area (see **Figure 05**), as defined by land use mapping produced by the Queensland Government (QSpatial, 2023), predominantly comprises of grazing native vegetation with small parcels of cropping pastures. Small portions of land are used for mining activities. Areas nominated as production native forests are also present within the Study Area. These include defined forest areas such as Trevethan State Forest to the southeast, Montour State Forest to the east and Belmont State Forest to the north.



IBRA Sub-bioregions Context

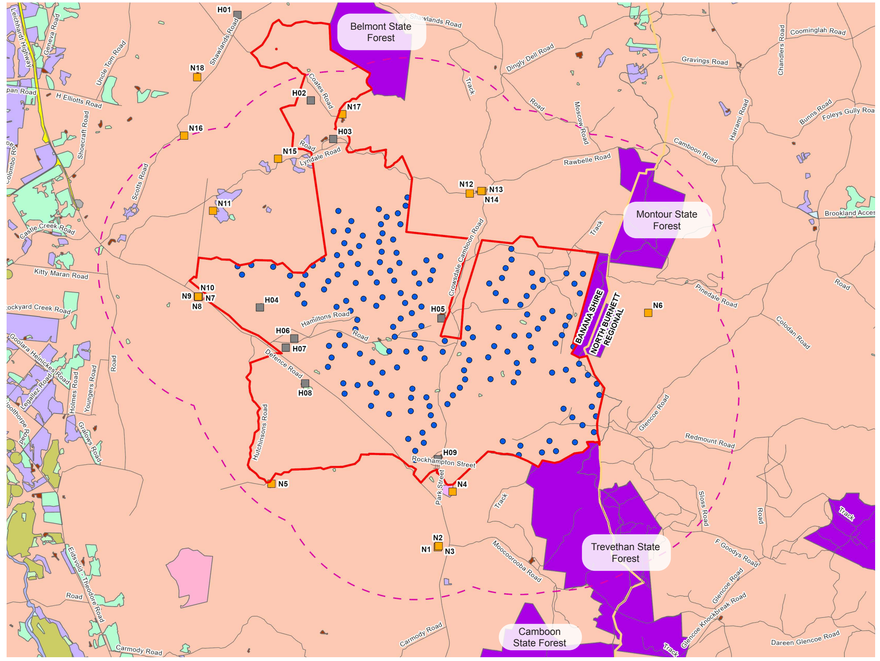
Theodore Wind Farm

- Project Boundary
- Proposed Turbines
- LGA Boundary
- Banana - Auburn Ranges
- Barakula
- Callide Creek Downs
- Carnarvon Ranges
- Dawson River Downs
- Mount Morgan Ranges

Figure 05 – IBRA Sub-bioregions Context
(Data Source: Queensland Spatial Data, 2024)

0 9 17 26 34 km

Existing Landscape Character



Land Use

Theodore Wind Farm

- Project Boundary
- Associated Dwellings
- Non-associated Dwellings
- Proposed Turbines
- 10km Study Area
- Cropping
- Grazing modified pastures
- Grazing native vegetation
- Irrigated cropping
- Managed resource protection
- Marsh/wetland
- Mining
- Other minimal use
- Production native forests
- Reservoir/dam
- Residential and farm infrastructure
- River
- Services
- Transport and communication
- Utilities
- LGA Boundary
- Roads and Tracks

Figure 06 – Land Use
(Data Source: ESRI, 2023; Queensland Spatial Data, 2023)

0 5 10 15 20 km

4.3 Key Landscape Features

4.3.1 Topographic & Hydrological Character

Land within the surrounding region can be classified under *Land Zone 12 - Mesozoic to Proterozoic igneous rocks*. Landform typically consists of extensively undulating rises to steep mountains (Wilson & Taylor 2012).

The Study Area consists of undulating to steep ranges (see **Image 08**). Elevations within the Project Site ranges from 546 m - 300 m. Banana Range (550 m) is located to the north, beyond the Study Area. Some of the steep hills visible within the Study Area are Mt Mungungal (545 m), Mt Kable (505 m), Mt Okangal (525 m), Mt Coangal (465 m), Mt Kandoonan (546 m), Mt Appenben (406 m), Mt Clairvoyant (435 m).

Several creeks also form a part of the character of the Study Area. The most notable creeks in the area include Castle Creek, Seven Mile Creek and Nine Mile Gully. Several lower-order streams flow through the Study Area, draining the elevated regions (see **Image 09**).

Dawson River is the closest primary river system to the Project. It is located approx. 22 km west of the Project.

4.3.2 Vegetation Character

Land has been cleared predominantly for livestock grazing, in some areas.. Vegetation character is consistent with the Brigalow Belt IBRA bioregion. Plant communities are typically open woodlands dominated by Brigalow (Acacia harpophylla) with pockets of Belah (Casuarina cristata) on heavy clay soils (Neldner et al. 2019).



Image 08 – Typical character within the Study Area (Moir LA - 05/2023)



Image 09 – View of Boam Creek. Typical character along creeks within the Study Area (Moir LA - 05/2023)

4.3.3 Roads

A major road corridor in proximity to the Study Area includes Leichhardt Highway to the west. There are several local roads within the Study Area. Defence Road and Crowsdale- Camboon Road intersect the Project and would be potential access points during construction (see **Image 10**). A number of other minor roads within the Study Area include Scotts Road, Lyndale Road, Hamilton Road, Moocoorooba Road and Glencoe Road.

4.3.4 Towns and Urban Centres

Theodore is the closest town, located approx. 22 km (represented by Theodore Post Office) west from the Project. Theodore has a total population of 451 people as per the 2021 ABS Census (Australian Bureau of Statistics, 2021). Other nearby towns located further than 30 kms from the Project include Moura, Banana and Cracow.

4.3.5 Industrial

Theodore lies at the southern end of the coal rich soils of the Bowen Basin. In addition to the agricultural and grazing activities, resource extraction mines form part of the existing character.

One (1) Key Resource Area (KRA) identified as Castle Creek Quarry is located adjacent to Castle Creek Road within the Study Area.

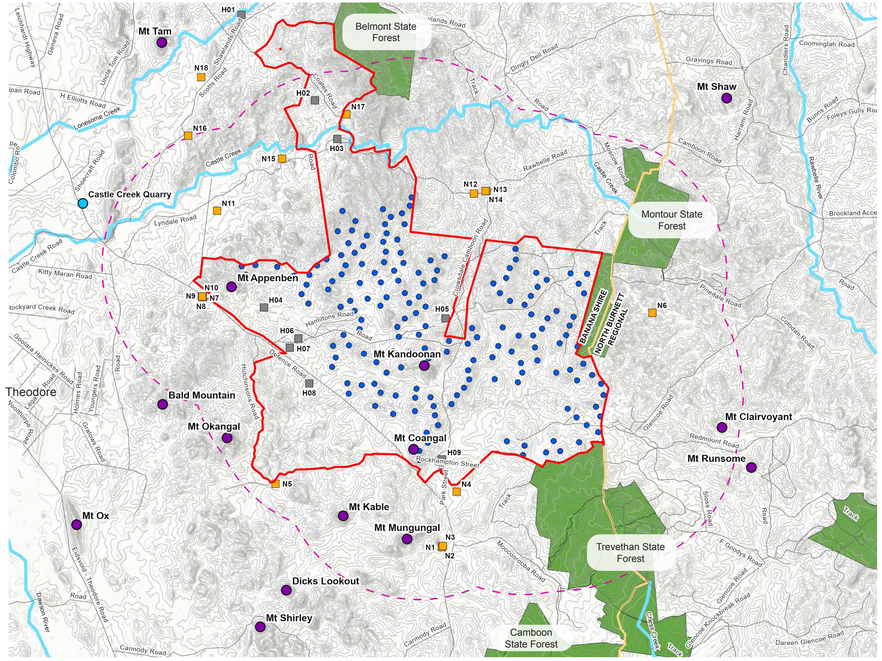
Defined forest area within the Study Area includes Belmont State Forest to the north (7.65 km) (see **Image 11**), Montour State Forest to the east (adjacent to the Project), Trevathan State Forest (adjacent to the Project) and Camboon State Forest to the south (south of the Trevathan State Forest).



Image 10 – Typical character within the Project Site and the intersecting Crowsdale-Camboon Road. (Moir LA - 05/2023)



Image 11 – View of Belmont State Forest. (Moir LA - 05/2023)



Key Landscape Features

Theodore Wind Farm

Figure 07 – Key Landscape Features
(Data Source: ESRI, 2023; Queensland Spatial Data, 2023)

4.4 Landscape Character Units (LCUs)

Landscape Character Units (LCU) refer to areas of homogeneous patterns of visual, physical, environmental and cultural characteristics such as landform, vegetation, water form and land use as well as individual features (Draft National Wind Farm Development Guidelines, 2010).

Due to the large scale of the Study Area and varying landscape character the Study Area has been categorised into four (4), LCUs to assist in the assessment. The LCUs are classified by slight variations in the landscapes geology, topography, land use and vegetation which create distinct character areas within the Study Area. The LCUs have been informed by a combination of land use patterns, vegetation coverage, topographical maps, site images and site inspection.

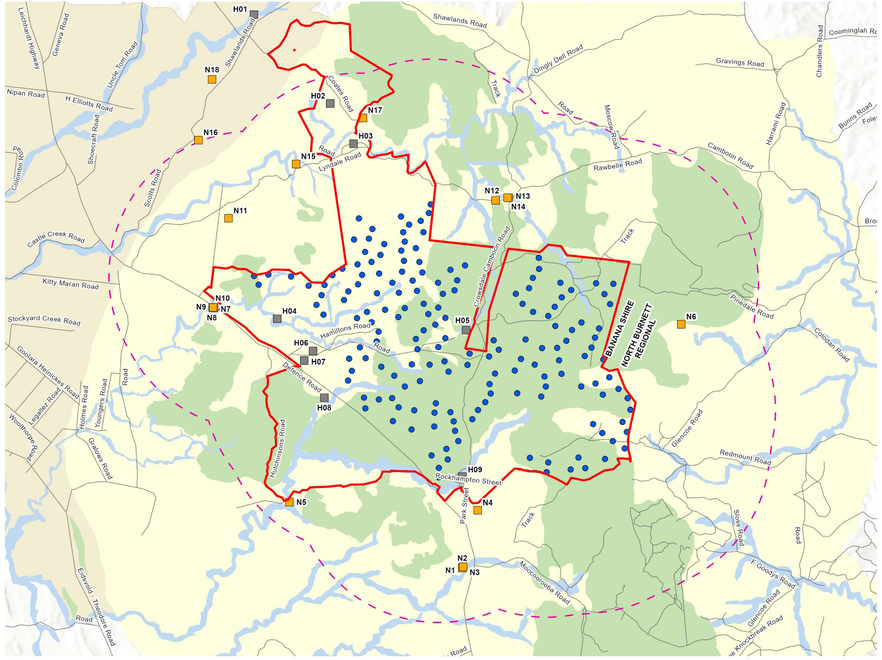
The general extent of the LCUs are shown on **Figure 08** on the following page and detailed description of each LCU has been included below.

The Scenic Quality 'Frame of Reference' has been applied to each LCU (refer to **Table 04**) to determine the level of visual significance. A Scenic Quality 'frame of reference' has been formulated by MLA utilising an approach to landscape sensitivity assessment by Natural England (Tudor & Natural England, 2019).

Each category of the 'Frame of Reference' has been quantified for each LCU (see **Table 04**) to determine a Scenic Quality Rating of Low, Moderate or High.

SCENIC QUALITY RATING		
DESCRIPTION	**LOW** ⟷ **MODERATE** ⟷ **HIGH**	
LANDFORMS	• Flat topography • Absence of landscape features • Open, broad extents of spaces	• Diversity in topographical range • Unique landscape features • Intimate spaces
WATERFORM	• Absence of water	• Presence of water • Visually prominent lakes, reservoirs, rivers streams and swamps.
VEGETATION	• Absence of vegetation • Lack of diversity • Land cleared of endemic vegetation • Low level of connection between vegetation and landscape / topography	• Abundant vegetation • High diversity • High retention of endemic vegetation • High level of connectivity between natural landscape and landforms
HUMAN INFLUENCE	• High population • High density in settlement • High presence of infrastructure • High levels of landscape modification	• Low / dispersed population • No settlement • Absence of infrastructure • Landscape in natural state
ACTIVITY	• High levels of traffic movement • Presence of freight and passenger transport networks • Presence of production or industry	• Low traffic movement • Absence of freight and passenger transport • Absence of production or industry
RARITY	• Typical landscape within a local and regional context	• Unique combination of landscape features in a local and regional context
RELATIONSHIP WITH ADJOINING LANDSCAPES	• Low visible connection with adjoining landscapes • Low variability between adjoining landscapes • Landscape features do not contribute to amenity from adjoining landscapes	• High visibility with adjoining landscapes • High variability and contrast with adjoining landscapes • Landscape features contribute significantly to amenity of adjoining landscapes

Table 04 – Scenic Quality Rating Frame of Reference
(Source: Moir LA)



Landscape Character Units (LCUs)

Theodore Wind Farm

- Project Boundary
- Associated Dwellings
- Non-associated Dwellings
- Proposed Turbines
- 10km Study Area
- LGA Boundary
- Roads and Tracks
- LCU01: Vegetated Hills
- LCU02: Modified Undulating Pastures
- LCU03: River and Creek Systems
- LCU04: Irrigated Pastures

0 5 10 15 20 km

Figure 08 – Landscape Character Units
(Data Source: ESRI, 2023)

4.4.1 LCU01 Vegetated Hills

The landform within LCU01 is undulating, rising to steep mountains and ranges (see **Image 12**). Undulating landscape allows for a network of seasonal creeks that drain the higher regions. Vegetation is abundant and connects the landscape to the landform. Human intervention is minimal, limited to land cleared for road corridor and grazing (see **Image 13**). Traffic activity on roads within this LCU is minimal and is typical across this LCU. These vegetated hills form a background for views from surrounding land with lower elevations. Belmont State Forest, Montour State Forest and Trevethan State Forest are some of the key features of this LCU.



Image 12 – Views of the Project Site and the typical character of this LCU (Moir LA - 05/2023)



Image 13 – Views from LCU01 along Crowsdale - Camboon Road. Vegetation has been cleared for road corridors and transmission easements (Moir LA - 05/2023)

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (Key features within this zone)	KEY VIEWPOINTS		Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU01 - Vegetated Hills	Belmont State Forest, Camboon State Forest, Trevethan State Forest and Montour State Forest	Crowsdale - Camboon Road, Defence Road	H M L								MODERATE

4.4.2 LCU02 Modified Undulating Pastures

Undulating modified land for farming and grazing is a dominant feature within this LCU. Vegetation is scattered throughout this LCU, however land is typically cleared for grazing (see **Image 15**). Built form, road and electrical infrastructure form part of the existing character and provide evidence of human intervention (see **Image 14**). Landscape features in this LCU are limited to open and modified paddocks.



Image 14 – Modified Undulating Pastures (Moir LA - 05/2023)



Image 15 – Views of modified land from a private paddock, typical character within this LCU (Moir LA - 05/2023)

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (Key features within this zone)	KEY VIEWPOINTS		Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU02 - Modified Undulating Pastures	Grazing and cropping pastures.	Open paddocks	H M L								LOW

4.4.3 LCU03 River and Creek Systems

An interspersed network of creeks with dense vegetation forms a dominant character within this LCU (see **Image 16**). Creeks generally drain the higher elevated areas due to the undulating landform. Most creek systems within this LCU are seasonal. These creek systems flow into the Dawson River. Vegetation occurs along the creek embankments and fragments views of the landscape (see **Image 17**). Human influence is limited to concrete creek crossings. There is no evidence of recreational activities associated with the creek systems within the Study area. However, recreational uses have been noted along Dawson River located approx. 22 km from the Project. This is a typical landscape within a local and regional context.



Image 16 – Views of a small creekline and the typical vegetation character within this LCU (Moir LA - 05/2023)



Image 17 – Views of Boam Creek from Defence Road. This is a typical character within this LCU (Moir LA - 05/2023).

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (Key features within this zone)	KEY VIEWPOINTS		Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU03 - River and Creek Systems	Castle Creek, Seven Mile Creek, Nine Mile Gully. Several lower order creeks. Dawson River	Limited recreational areas within this LCU	H M L								MODERATE

4.4.4 LCU04 Irrigated Pastures

Irrigated modified pastures cleared of vegetation forms a dominant feature within this LCU. This LCU is located mostly outside the Study Area. Land has been modified for cultivation and crop production (see **Image 18**). Typically the larger lots of land are modified for grazing with smaller lots utilised for low density dwellings. Built form and infrastructure elements associated with electricity and transport form part of the existing character (see **Image 19**). This is a typical landscape within a local and regional context.



Image 18 – View of irrigated pastures on the edge of Theodore. Landscape is highly modified. (Moir LA - 05/2023)



Image 19 – Views from intersection of Leichhardt Highway and Castle Creek Road. Lands has been modified for farming and grazing (Moir LA - 05/2023)

LANDSCAPE CHARACTER UNIT	KEY LANDSCAPE FEATURES (dominating features within this zone)	KEY VIEWPOINTS		Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU04 - Irrigated Pastures	Irrigated pastures	Irrigated paddocks	H M L								LOW

Existing Landscape Character

4.5 Overview of Visual Impacts on LCUs

LCU	Scenic Quality Rating	Overview of Visual Impacts	Visual Impact Rating
LCU01: Vegetated Hills	**MODERATE**	Elevated tablelands and steep slopes with abundant vegetation. The Project is located within this LCU. Human intervention is minimal, limited to land cleared for road corridors and grazing. Views towards the Project are limited to areas in close proximity. Over the larger extent of this LCU views are fragmented due to a combination of topography and intervening vegetation. The landscape features within this LCU are likely to be altered as a result of the Project.	**Moderate**
LCU02: Modified Undulating Pastures	**LOW**	The Project is located within this LCU. Dominant features within this LCU are the highly modified undulating paddocks utilised for grazing. Views towards the Project are limited to areas in close proximity. Over the larger extent of this LCU views are fragmented due to a combination of topography and intervening vegetation. The key features within this LCU are unlikely to be altered as a result of the Project.	**Low**
LCU03: River and Creek Systems	**MODERATE**	WTGs associated with the Project are sited to avoid the creeks within the Study Area. Seasonal creeks and gullies form part of this LCU. Key features within this LCU include Castle Creek and Dawson River. Characteristics of this LCU are commonly found within the Study Area. This is a typical landscape within a local and regional context. Modifications are limited to creek crossings. Recreational associations identified within this LCU are located along Dawson River within Theodore which is located outside the Study Area. Intervening vegetation will assist in fragmenting views from this LCU.	**Low**
LCU04: Irrigation Pastures	**LOW**	This LCU is mostly located outside the Study Area. Land within this LCU is highly modified for agricultural activities. Typically the larger lots of land are modified for grazing with smaller lots utilised for low density dwellings. Views from this LCU will be limited by a combination of vegetation and built form. As such the features within this LCU will be unaltered as a result of the Project.	**Low**

Table 05 – Overview of Visual Impacts on each LCU

05

Defining the Visual Catchment

5.0 Defining the Visual Catchment

5.1 Defining the Visual Catchment

The visual catchment of the Project has been defined based on the parameters of the accepted extents of human vision which include vertical field of view (refer to **Section 5.1.1**). In order to facilitate an objective assessment of visibility, **Section 5.1.2** provides an outline of the potential visual prominence of the Project in relation to the distance from a receptor. The extent of the Study Area is, therefore, determined by the distance within which the proposed 270 m high WTGs have the potential to be a noticeable element in the view (refer to **Section 5.1.3**).

5.1.1 Viewshed Calculation

Distance zones have been calculated using the parameters of the human eye and are based on the typical line of sight for a person standing at ground level (Tilley and Henry Dreyfuss Associates, 1993 and Panero and Zelnik, 1979). Given the spatial arrangement and layout of the Project, the vertical field of view provides a basis for calculating the extent of the viewshed.

Figure 09 shows that generally, the vertical field of view for a person standing at ground level is between 10° - 15°. The theoretical extent of the viewshed is considered to be a distance at which the tallest component of the Project would take up less than 5% or 0.50 of the general 10° - 15° field of view (Environmental Protection Department, 2018).

It should be noted that this methodology for calculation of the viewshed considers the viewer is in a static position.

With an overall height of up to 270 m, the distance at which a 270 m high WTG would comprise 5% (0.5°) of the vertical field of view is up to 30.94 km.

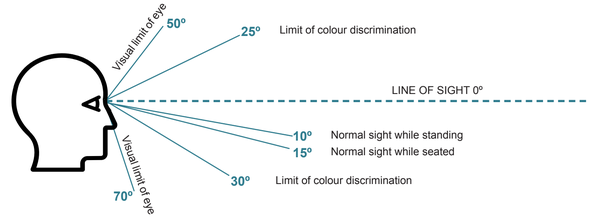


Figure 09 – Human Eye Vertical Line of Sight
Source: Torrejon, Callaghan and Hagras, 2013

Potential Visual Dominance	
Distance from WTG	**Potential visual dominance:**
> 12 km	**Visually Insignificant** A very small element in the landscape which is difficult to discern and is likely to be indiscernible under poor weather conditions. Rotor blade movement is likely to be visible on a clear day.
6 - 12 km	**Potentially Noticeable but will not dominate the landscape** The development may be noticeable. The degree that it intrudes on the view will increase as distance decreases.
2.5 - 6 km	**Potentially Noticeable and can dominate the landscape** The development is likely to be highly noticeable, although the degree of visual intrusion will depend on the landscape setting, intervening elements and the extent of visibility.
1 - 2.5 km	**Highly Visible and will usually dominate the landscape** The development will be highly visible.
< 1 km	**Will always be visually dominant in the landscape** The development will be highly visible.

Table 06 – Potential Visual Dominance in relation to distance and viewshed
Source: EPHC, 2010

5.1.2 Visual Prominence and Distance from the Wind Farm

The visual prominence of a WTG is not equal across an entire viewshed. The distance of a receptor to the closest WTG is a significant factor in determining the visual prominence of the Project. *The Draft National Wind Farm Guidelines* offer guidance based on previous studies that have been undertaken reviewing wind farm developments and the potential visual prominence based on the distance from the nearest wind WTG (EPHC, 2010). **Table 06** outlines the potential visual prominence of the Project in relation to the distance between receptors and the WTGs.

Assessment of the visual scale and prominence of WTGs over a range of distances establishes whether objects are likely to be dominant, noticeable, discernible or insignificant in the viewshed. This has also been demonstrated in photomontages that have been prepared by Moir LA as part of LVIAs for wind farm developments of a similar scale. **Image 20** - **Image 23** illustrate that visual prominence of WTGs varies based on the distance between receptors and WTGs.

The relative visual prominence of WTGs is also based on the parameters of the human eye and the vertical angle of view. The theoretical dominance of an object in a view can be assumed. For example, if a receptor is located closer to a WTG, the WTG is likely to take up a greater vertical field of view for the receptor. **Figure 10** and **Table 07** demonstrate how increasing distance from a project reduces the potential visual prominence and visibility of WTGs based on vertical field of view.

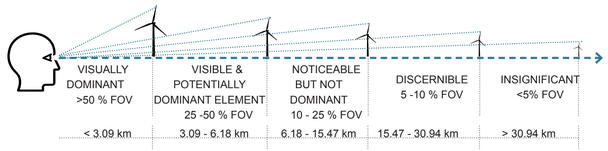


Figure 10 – Vertical Field of View and potential visual dominance
Adapted from Landform Architects, 2022



Image 20 – WTGs located at a distance of 2 km are highly visible and are dominant in scale relative to elements such as fence posts and vegetation visible in the foreground (Source: Moir LA, 2023; NSW Major Projects website).



Image 21 – WTGs located at a distance of 4 km are likely to diminish in scale relative to other elements such as fence posts and intervening vegetation in the foreground (Source: Moir LA, 2023; NSW Major Projects website).



Image 22 – WTGs located at a distance of 6 km are likely to be appear smaller in scale relative to vegetation and structures in the foreground (Source: Moir LA, 2023; NSW Major Projects website).



Image 23 – WTGs located at a distance beyond 6 km are likely to be visible. They appear smaller in scale relative to vegetation and structures in the foreground and middleground (Source: Moir LA, 2023; NSW Major Projects website).

Defining the Visual Catchment

5.1.3 Zone of Visibility

A combination of the vertical field of view and visual prominence have helped identify the zone of visibility and visual catchment for the Project. **Table 07** provides an overview of the distances based on the vertical field of view occupied by a WTG height at 270 m. It states that generally, WTGs are discernible but are not likely to dominate the existing visual setting when they are visible in 0.50 - 2.50 of the field of view, or in this case, if the receptor is located at a distance of 6.18 - 30.94 km from a WTG that has a height of 270 m.

The degree of intrusion of a development to a view depends on the way it integrates with the existing landscape setting. It is assumed that beyond a distance of 30.94 km the WTGs would be minor elements and visually insignificant in the landscape. At a distance of 6.18 - 30.94 km the Project may be discernible, but it will not be a dominant visual element in the landscape.

Considering the existing topographical conditions, the surrounding context and the visual prominence thresholds identified in the *Draft National Wind Farm Guidelines* (EPHC, 2010), this assessment has identified the Study Area to extend up to a distance of 10 km from the nearest WTG as a worst case scenario. Moir LA have, therefore, undertaken a Zone of Visual Influence analysis up to a distance of 10 km to determine the extent of visibility of the Project.

Based on the thresholds for visual prominence identified in **Section 5.1.2**, the assessment identifies receptor locations within 3.09 km and 6.18 km from the nearest WTG (see **Figure 13** and **Figure 16**) that are likely to view the WTGs as noticeable, visible or dominant elements in the existing landscape setting.

Vertical Field of View - Zone of Visibility		
Visual catchment (vertical angle of view)	**Distance from viewer to WTG for this Project**	**Potential visual dominance:**
0.5º (< 5% FOV)	**> 30.94 km**	**Insignificant** A small thin line in the landscape.
0.5 - 1.0º (5 - 10% FOV)	**15.47 - 30.94 km**	**Potentially Noticeable or Discernible** The Project may be noticeable. The degree that it intrudes on the view will be dependent on how well it integrates with the landscape setting.
1.0 - 2.5º (10 - 25% FOV)	**6.18 - 15.47 km**	**Noticeable, but not Dominant** The degree that it intrudes on the view will be dependent on sensitivity of the viewer and the landscape.
2.5 - 5º (25 - 50% FOV)	**3.09 - 6.18 km**	**Visible and Potentially Dominant** The development will be visible, although the degree of visual intrusion will depend on the landscape setting, intervening elements and the extent of visibility. It is likely that beyond 6.41km the WTGs will diminish in scale relative to other elements in the fore and middleground such as fences, intervening structures such as sheds, vegetation, etc.
> 5º (> 50% FOV)	**< 3.09 km**	**Will always be visually dominant** The Project will always be a dominant element in the landscape, unless screened by intervening vegetation or structures.

Table 07 – Vertical Field of View and Zone of Visibility
Adapted from Landform Architects, 2022

06
Zone of Visual Influence

6.0 Zone of Visual Influence

6.1 Zone of Visual Influence Overview

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

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

The ZVI presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility (LIIEMA, 2002). As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information.

6.2 Zone of Visual Influence Summary

Two (2) ZVI figures have been prepared for the Project to illustrate the theoretical visibility of the proposed WTGs. A wind WTG height with a blade tip height of 270 m and a hub height of 166 m has been used to provide a worst case scenario (see **Figure 11** and **Figure 12**).

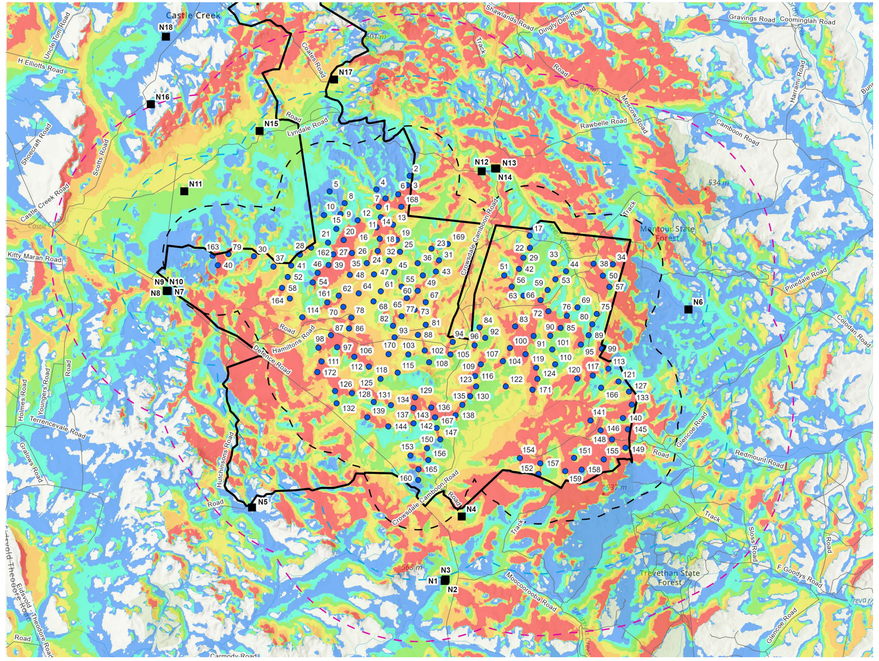
The ZVI diagrams have been determined through the use of digital topographic information and 3D modelling software WindPro. The ZVI has been assessed within the Study Area. Although it is possible for the Project to be visible from further away, it is generally accepted that beyond this distance, the visibility is greatly diminished (see **Section 5.1.3**).

Summary of Findings:

- The ZVI suggests, theoretically, that the visibility of the WTGs is limited to areas immediately adjacent to the Project with views extended to the majority of WTGs to the north and the south.
- Based on the ZVI assessment, some areas to the northeast beyond 6.18 km have visibility to up to 56 WTGs. Topography would limit views to the Project from other areas beyond 6.18 km to the northeast and southwest. To the north, majority of WTGs would be visible.
- The assessment suggests that based on topography alone, dwellings in proximity to the Project would have views of up to 112 WTGs. The undulating topography potentially limits views to other WTGs. A detailed dwelling assessment has been undertaken to determine the number of WTGs visible from each dwelling within the Study Area (see **Table 14**).
- Theoretically, views to the majority of WTGs would be available along Defence Road due to its proximity to the Project. Similarly, views are direct along Crowsdale - Camboon Road are likely to be available, as the road intersects the Project north to south.
- Theodore is located approx. 22 km west of the Project. As such, the WTGs would be indiscernible from Theodore.

The ZVI has been used to identify areas of potentially high visibility which informed the fieldwork for ground truthing and the viewpoint analysis (refer to **Appendix A** and **Figure 13**) to identify locations requiring detailed assessments.

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


Castle Creek
Gravings Road
Coomingan Road
Shetland Road
Down Dale Road
H Elliots Road
Lyndale Road
Castle Creek Road
Scots Road
Rawhelia Road
Cawdron Road
Harrison Road
Kitty Marsh Road
Moir Road
Moir Hamilton Road
Moir Hamilton Road
Mt Hamilton Road
Mt Hamilton Road
Mt

07
Viewpoint Analysis

7.0 Viewpoint Analysis

7.1 Viewpoint Analysis Overview

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

Once the viewpoints have been selected, panoramic photographs are taken on a level tripod at a height of 150cm (to represent eye level). Photographs are taken with a Canon EOS 5D Mark III Full Frame digital SLR through a 50mm fixed focal lens which closely represents the central field of vision of the human eye.

The visual impact of the viewpoints are then assessed both on site and with the topographic and aerial information to ensure accuracy. For each viewpoint, the potential visual impacts are analysed through a combination of the 3D terrain modelling, topographic maps and on site analysis. Viewpoint photographs and analysis have been included as **Appendix A**. The findings of the viewpoint analysis have been quantified and are summarised in **Table 11**.

7.2 Viewpoint Selection Process

The locations of the viewpoints have been identified in **Figure 13**. Viewing direction of the viewpoints are noted on each viewpoint sheet. The selection of the viewpoints has been informed by topographical maps, fieldwork observations and other relevant influences such as access, landscape character and the popularity of vantage points.

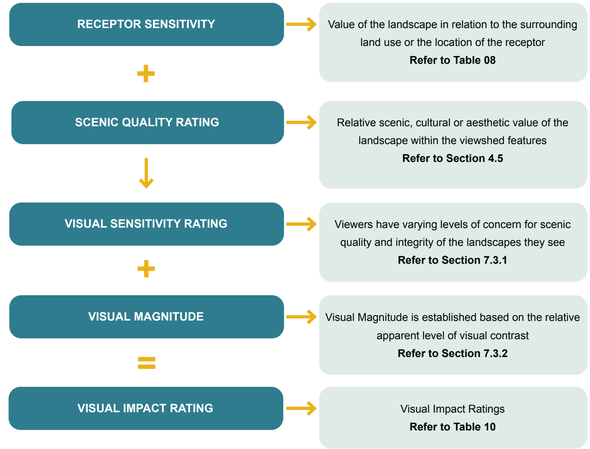
A total of 26 viewpoints were selected from publicly accessible locations to represent a range of views surrounding the Project Area.

Viewpoints are selected to illustrate a combination of the following:

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

7.3 Viewpoint Analysis Methodology

The potential visual impact of the Project is then assessed based on the relationship between the visual sensitivity (refer to **Section 7.3.1**) and visual magnitude (refer to **Section 7.3.2**).



7.3.1 Determine Visual Sensitivity

Visual sensitivity refers to the quality of the existing view and how sensitive the view is to the proposed change. The visual sensitivity is determined through the following three steps:

Step 1: Receptor Sensitivity
Step 2: Scenic Quality
Step 3: Visual Sensitivity

Step 1 - Receptor sensitivity

Receptor sensitivity relates to the relative importance of receptors and the value that the community or visitors may place on landscapes viewed from public use areas, public travel ways and non-associated dwellings. The sensitivity of each viewpoint has been classified into one of four (4) sensitivity ratings (very low, low, moderate, high).

Step 2 - Scenic quality

Scenic quality refers to the relative scenic, cultural or aesthetic value of the landscape within the viewshed based on the presence or absence of key landscape features known to be associated with perceptions of low, moderate, or high scenic quality. It is typically a complex process undertaken by experts in visual impact assessment.

The baseline analysis and landscape character assessment undertaken has been used to inform the scenic quality of each LCU (refer to **Section 4.0**).

Step 3 - Overall Visual sensitivity

Once the viewpoint sensitivity and scenic quality are determined, these can be combined using the visual sensitivity matrix (see **Table 09**) to determine the overall visual sensitivity of each assessable receptors.

	RECEPTOR SENSITIVITY LEVELS AND EXAMPLES			
	VERY LOW SENSITIVITY	**LOW SENSITIVITY**	**MODERATE SENSITIVITY**	**HIGH SENSITIVITY**
RESIDENTIAL	No place of residence present	Secondary view from dwellings in Rural Zone.	Primary view from dwellings in Rural Residential Zone.	Dwellings in General Residential, Township Zone. Historic rural homesteads / residences on the national, state or local heritage list
TRANSPORT / INFRASTRUCTURE	Local sealed and unsealed roads Passenger and fright rail lines	State highways, freeways and classified main roads Walking tracks and navigable waterways	Tourist roads and scenic drives	N/A
SOCIAL / CULTURAL	Private recreation areas and sporting fields	Cemeteries, memorial parks	Tourist and visitor accommodation and places of worship (such as bed and breakfasts, motels, hotels) Tourist uses Community Facilities, Recreation and Open Spaces including picnic areas, parks, public recreation areas District Centres, Principle Centres and Major Centres	N/A

Table 08 – Receptor sensitivity levels and examples
(Source: Adapted from DPE, 2022)

RECEPTOR SENSITIVITY	SCENIC QUALITY RATING		
	HIGH	**MODERATE**	**LOW**
HIGH	HIGH	HIGH	MODERATE
MODERATE	HIGH	MODERATE	MODERATE
LOW	MODERATE	LOW	LOW
VERY LOW	LOW	VERY LOW	VERY LOW

Table 09 – Overall Visual Sensitivity Matrix
(Source: Adapted from DPE, 2022)

7.3.2 Visual Magnitude

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

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

7.3.3 Visual Impact

Visual Impact refers to the change in appearance of the landscape as a result of the Project. Visual Impact is the combined effect of visual sensitivity and visual magnitude. Various combinations of visual sensitivity and visual magnitude will result in an overall visual impacts (see **Table 10**).

7.3.4 Visual Impact Ratings

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

MAGNITUDE RATING	VISUAL SENSITIVITY RATING			
	HIGH	**MODERATE**	**LOW**	**VERY LOW**
VERY HIGH	HIGH	HIGH	MODERATE	MODERATE
HIGH	HIGH	MODERATE	MODERATE	LOW
MODERATE	MODERATE	MODERATE	LOW	LOW
LOW	MODERATE	LOW	LOW	VERY LOW / NEGLIGIBLE
VERY LOW / NEGLIGIBLE	LOW	LOW	VERY LOW / NEGLIGIBLE	VERY LOW / NEGLIGIBLE

Table 10 – Visual Impact Matrix
(Source: Adapted from DPE, 2022)

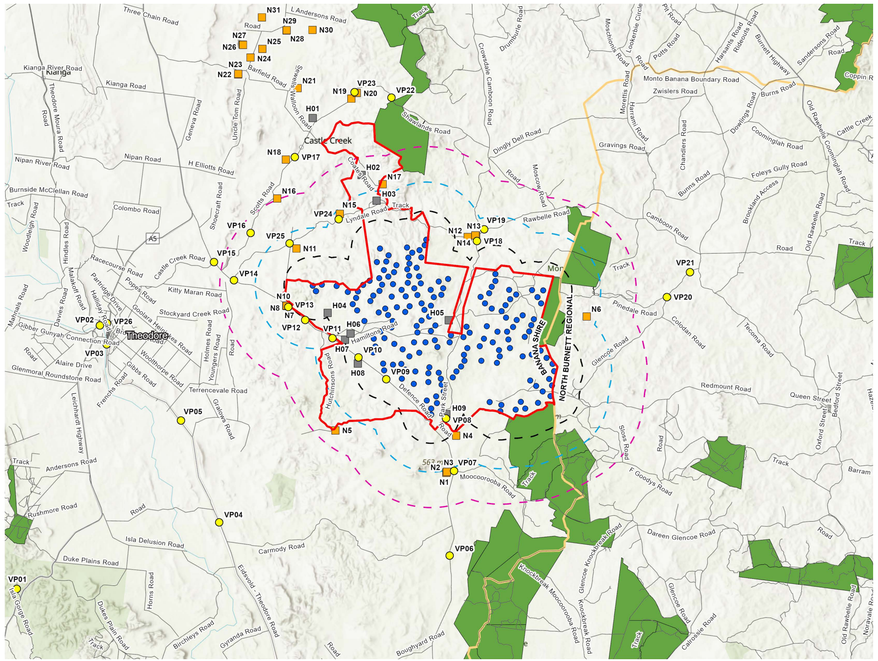


Figure 13 – Viewpoint Location Map
(Data Source: ESRI, 2023)

Viewpoint Analysis

7.4 Overview of Viewpoint Analysis

As discussed in the rationale for the viewpoint selection process, these viewpoints are representative of the worst case scenario. For each viewpoint, the potential visual impacts are analysed through a combination of topographic maps and on site analysis. The visual sensitivity and visual magnitude of each viewpoint has been assessed which, when combined, results in an overall visual impact for the viewpoint (see **Table 10**).

26 public viewpoints assessed for the purpose of this LVIA were taken from varying distances and locations surrounding the Project. A summary of the visual impact ratings for each of the public viewpoint locations assessed, has been provided in **Table 11**.

Of the 26 viewpoints:

- 17 public viewpoint locations were assessed as having a Very Low visual impact rating.
- Nine (9) public viewpoint locations were assessed as having a Low visual impact rating.

Of the 26 public viewpoints assessed, photomontages have been prepared from five (5) viewpoint locations (refer to **Section 8.0**).

A detailed assessment for each viewpoint is provided in **Appendix A**.

VP Analysis ID	Viewing Direction	Location	Approx. distance to nearest WTG	Visual Sensitivity	Visual Magnitude	Visual Impact Rating
VP01	Northeast	Isla Gorge Lookout, Isla Gorge National Park	45 km	MODERATE	VERY LOW	LOW
VP02	East	Dawson River Weir, Banana	25.5 km	LOW	VERY LOW	VERY LOW
VP03	East	The Boulevard, Theodore	25 km	MODERATE	VERY LOW	LOW
VP04	Northeast	Eidsvold Theodore Road, Camboon	24 km	VERY LOW	VERY LOW	VERY LOW
VP05	Northeast	Eidsvold Theodore Road, Lonesome Creek	20 km	VERY LOW	VERY LOW	VERY LOW
VP06	North	Defence Road, Camboon	16 km	VERY LOW	VERY LOW	VERY LOW
VP07	North	Defence Road, Camboon	7 km	VERY LOW	LOW	VERY LOW
VP08	North	Rockhampton Street, Camboon	1.8 km	VERY LOW	MODERATE	LOW
VP09	Northeast	Defence Road, Camboon	0.9 km	VERY LOW	MODERATE	LOW
VP10	Northeast	Defence Road, Camboon	1.0 km	VERY LOW	MODERATE	LOW
VP11	East	Defence Road, Camboon	3 km	VERY LOW	MODERATE	LOW
VP12	East	Defence Road, Camboon	4.2 km	VERY LOW	MODERATE	LOW
VP13	East	Defence Road, Camboon	5.5 km	LOW	LOW	LOW
VP14	East	Defence Road, Camboon	10.5 km	VERY LOW	LOW	VERY LOW
VP15	East	Defence Road, Camboon	13 km	VERY LOW	VERY LOW	VERY LOW
VP16	Southeast	Scotts Road, Castle Creek	10.5 km	VERY LOW	VERY LOW	VERY LOW
VP17	Southeast	Scotts Road, Castle Creek	13 km	VERY LOW	LOW	VERY LOW
VP18	South	Crowsdale Camboon Road, Camboon	4.5 km	VERY LOW	LOW	VERY LOW
VP19	South	Corner Rawbelle Road and Crowsdale Camboon Road, Camboon	5.5 km	VERY LOW	LOW	VERY LOW
VP20	West	Corner Glencoe Road and Pinedale Road, Rawbelle	13.5 km	VERY LOW	LOW	VERY LOW
VP21	West	Glencoe Road, Rawbelle	16.5 km	VERY LOW	VERY LOW	VERY LOW
VP22	South	Shawlands Road, Castle Creek	15.5 km	VERY LOW	VERY LOW	VERY LOW
VP23	South	Shawlands Road, Castle Creek	17 km	VERY LOW	VERY LOW	VERY LOW
VP24	East	Lyndale Road, Camboon	5.3 km	VERY LOW	LOW	LOW
VP25	Southeast	Lyndale Road, Castle Creek	6.5 km	VERY LOW	LOW	LOW
VP26	East	Leichhardt Highway Rest Area, Theodore	22.5 km	MODERATE	VERY LOW	LOW

*Please note the Viewpoint Visual Impact Summary is based on the visibility assessment criteria outlined in Section 7.0 of this report.

Table 11 – Viewpoint Analysis Summary

08
Photomontages

8.0 Photomontages

8.1 Overview of Photomontages

8.1.1 Photomontages

The *Draft National Wind Farm Development Guidelines* define a photomontage as the process of making a composite image by combining elements of real imagery and 3D digitalisation.

A photomontage combines a photograph of an existing view with a computer-rendered image of a proposed development. Photomontages are used to illustrate the likely view of a proposed development as it would be seen in a photograph (not as it would appear to the human eye in the field).

Although photomontages are based on a photograph of the existing landscape, it is important to stress that they are not a substitute to visiting a viewpoint in the field. They are only one tool to aid assessment. They provide a two-dimensional image that can be compared with an actual view of the landscape to provide information, such as the scale and potential appearance of a proposed development.

8.1.2 Wire Frame Diagrams

A wire frame is a computed generated image based on a digital terrain model, that indicates the 3D shape of the landscape in combination with additional elements. They are a valuable tool in the wind farm LVIA process as they allow the assessor to compare the position and scale of the WTGs to the existing view of a landscape (Scottish Natural Heritage, 2017). Wire frame images can be seen as a worst case scenario as they do not take into account factors such as vegetation and building structures.

Wire frame diagrams have been utilised in this LVIA to verify photomontages. These are provided in **Appendix B**.

8.2 Photomontage Development Methodology

The process for generating the photomontages involves computer generation of a wire frame perspective view of the WTGs and the topography from each viewpoint. Photomontages have been prepared in accordance with *the Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.2 February 2017*. The process for photomontage development is demonstrated in **Figure 14**.

The photomontages are based on a worst case scenario of a maximum WTG height dimension of 270 m with a hub height of 166 m and blade length of 104 m, without the inclusion of the proposed mitigation methods.

Moir LA have prepared the photomontages using the most current available version of Wind Pro software using the following process:

Step 1: Develop 3D Model

Detailed 3D model of the Project Site is developed in Wind Pro. The WTGs and associated infrastructure (substations, transmission lines, wind masts etc.) are modelled and sited in the 3D model to scale.

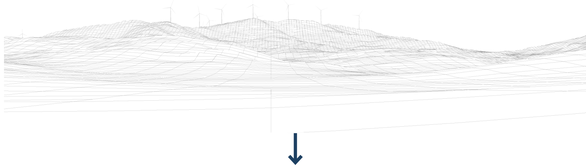
Step 2: Align Photograph and Model

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

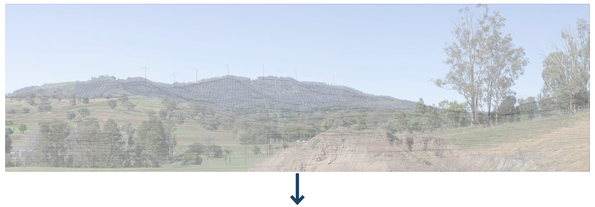
Step 3: Render Photomontage

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

Step 1: Develop 3D Model



Step 2: Align photograph and model



Step 3: Render Photomontage



Figure 14 – Photomontage Development Process

8.3 Photomontage Limitations

Visualisations in themselves can never provide the full picture in terms of potential impacts; they only inform the assessment process by which judgements are made. Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal.

These include:

- A visualisation can never show exactly what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale of the WTGs and the distance to the WTGs, but can never be 100% accurate;
- A static image cannot convey WTG movement, or flicker or reflection from the sun on the WTG blades as they move.

Source: Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.2 February 2017.

8.4 Photomontage Selection Process

A total of five (5) indicative viewpoints have been selected for the preparation of photomontages to best illustrate the potential appearance of the proposed wind farm from varying distances and locations with differing views (see **Figure 15**).

The five (5) public viewpoint locations selected for the preparation of visual photomontages are based on varying distances to the Project (refer to **Appendix B**). Exact photomontage locations were selected on site to represent a worst case scenario for the viewpoint location. Localised screening factors such as vegetation were avoided (where possible) to ensure maximum exposure to the Project.

Photomontages

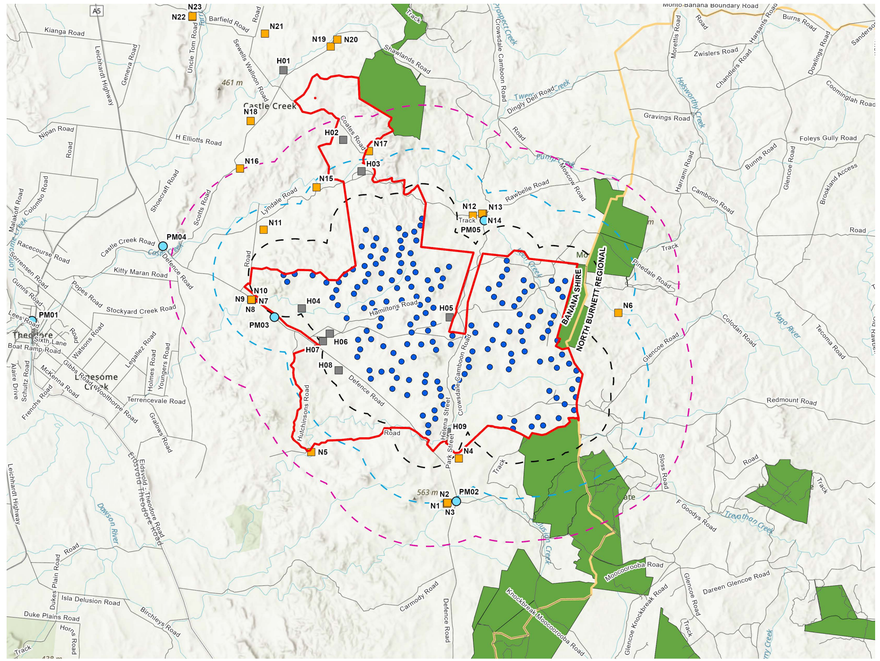


Figure 15 – Photomontage Locations
(Map Source: QGlobe 2020)

Photomontage Locations

Theodore Wind Farm

09
Dwelling Assessment

9.0 Dwelling Assessment

9.1 Visual Impact Rating Methodology for Non-Associated Dwellings

Moir LA have developed a framework for defining and rating the level of visual effect from each dwelling.

The framework in **Table 12** has been prepared with regards to the third edition of the *Guidelines for Landscape and Visual Impact Assessment* (GLVIA3), *Residential Visual Amenity Assessment* (RVAA) and Moir LA's extensive professional experience in undertaking LVIA's. Published in 2013, the GLVIA3 is well established as providing 'best practice guidance' when undertaking LVIA. RVAA is a stage beyond LVIA and focuses exclusively on private views and private visual amenity. Considerations outlined in the RVAA provide a framework for describing and evaluating the predicted magnitude of visual change and related visual amenity effects, which includes:

- *Distance of property from the proposed development having regard to its size / scale and location relative to the property (e.g. on higher or lower ground);*
- *Type and nature of the available views (e.g. panoramic, open, framed, enclosed, focused etc.) and how they may be affected, having regard to seasonal and diurnal variations;*
- *Direction of view / aspect of property affected, having regard to both the main / primary and peripheral / secondary views from the property;*
- *Extent to which development / landscape changes would be visible from the property (or parts of) having regard to views from principal rooms, the domestic curtilage (i.e. garden) and the private access route, taking into account seasonal and diurnal variations;*
- *Scale of change in views having regard to such factors as the loss or addition of features and compositional changes including the proportion of view occupied by the development, taking account of seasonal and diurnal variations;*
- *Degree of contrast or integration of new features or changes in the landscape compared to the existing situation in terms of form, scale and mass, line, height, colour and texture, having regard to seasonal and diurnal variations;*
- *Duration and nature of the changes, whether temporary or permanent, intermittent or continuous, reversible or irreversible etc; and*
- *Mitigation opportunities – consider implications of both embedded and potential further mitigation.*

(Source: RVAA, 2019)

Each non-involved dwelling has been assessed against the framework outlined in **Table 12** to develop an average overall visual impact rating as described in **Table 14**.

DWELLING VISUAL IMPACT RATING				
	VERY LOW	LOW	MODERATE	HIGH
	←			→
Distance	The project will not be visible.	The Project may be visible in distance or very partially visible in the foreground.	The Project maybe visible in the middle ground or a small extent may be visible in the near ground.	The Project will be highly visible in the foreground.
Type of views		Views from the dwelling are not focused on the Project.	Views from the dwelling are not focused entirely on the Project.	Views are focused directly towards the Project.
Direction of view		The Project may be visible in peripheral views or form a very minor element in primary views.	The Project may be visible from, yet will not dominate primary views.	The Project will be highly visible and has the potential to be a dominant element in primary views from the property.
Extent of visibility		The Project may be partially visible or fragmented.	The Project may be visible from the dwelling yet will not significantly alter the existing visual character.	The Project has the potential to significantly alter the existing visual character when viewed from the dwelling.
Scale of change		The Project may be visible yet will not change to the existing visual character.	The Project has the potential to become a noticeable element in the view, yet will not overly diminish the existing visual character.	The Project has the potential to alter the existing visual character.
Degree of contrast		The Project will have a low level of contrast with the existing landscape.	The Project will result in a moderate level of contrast with the existing landscape.	The scale of the Project will result in a high level of contrast with the existing landscape.
Duration of change		Changes are temporary.	Changes to the landscape have the potential to be reduced over time (with the employment of mitigation methods).	Changes to the landscape are continuous and / or irreversible.
Mitigation Options		Existing screening factors contribute to reducing the potential visibility.	Some existing screening factors may contribute to fragmenting the Project or there is opportunity to screen the Project.	Limited opportunities to screen the Project.

Table 12 – Dwelling Visual Impact Rating
(Source: Adapted from GLVIA3,2013)

9.2 Overview of Dwelling Assessment

A total of 17 non-associated dwellings have been identified within the Study Area of the Project (see **Figure 16**).

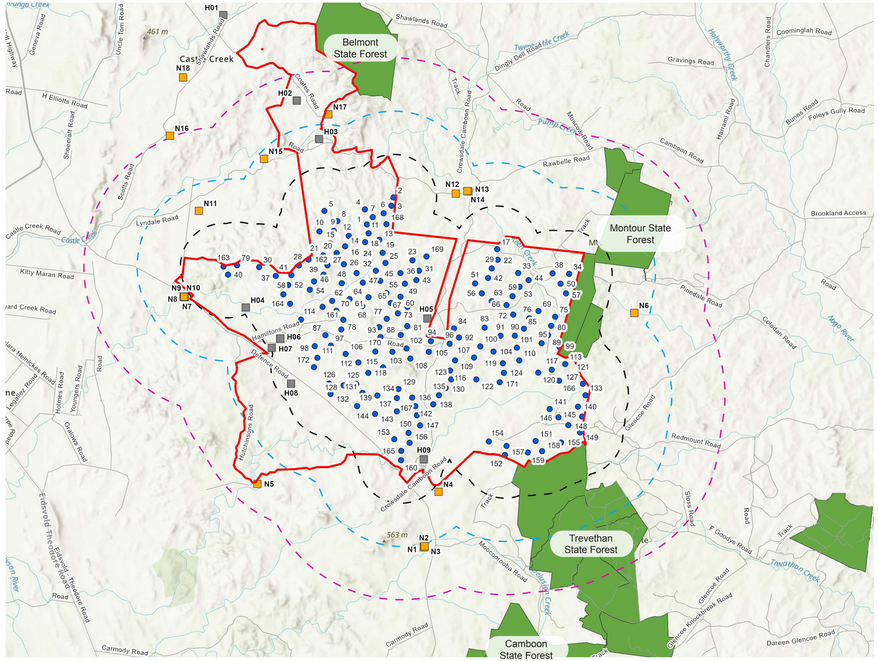
- No non-associated dwellings have been identified within 3.09 km of the nearest proposed WTG.
- 11 non-associated dwellings have been identified within 3.09 - 6.18 km of the nearest proposed WTG (see **Table 14**).
- Six (6) non-associated dwellings have been identified within 6.18 km and the 10 km Study Area.

Table 13 provides an overview of the study method for undertaking the dwelling assessment for each dwelling identified within 6.18 km of the nearest WTG.

Detailed desktop assessments have been provided for reference for each of the non-associated dwellings located within 6.18 km of the nearest WTG. These are provided in **Appendix C**.

Study Method	Process
Step 1. 3D Assessment (based on topography alone)	Using 3D modelling, Moir LA identified WTGs which will be visible from the dwelling based on topography alone. Where WTGs are likely to be visible, additional analysis has been undertaken to determine the extent of visibility.
Step 2. Aerial Imagery	Information on the extent of visibility extracted from the 3D model is overlaid onto a recent aerial image of the dwelling and its surrounds. This provides a detailed assessment of the direction and extent of potentially visible WTGs and identifies any intervening elements (such as structures, wind break planting or vegetation) which may reduce the potential visibility.
Step 3. Visual Impact Rating	A visual impact rating is applied to each dwelling with regards to the parameters outlined in **Table 10.**
Step 4. Consideration of mitigation methods	For non-associated dwellings where the Project has the potential to cause visual impact, mitigation methods have been suggested. Refer to **Section 13.0.**

Table 13 – Dwelling Assessment Study Method



Dwellings Locations

Theodore Wind Farm

Figure 16 – Dwelling Location Map
(Data Source: ESRI, 2023)

Dwelling ID	Location	Approx. distance to nearest WTG (m)	Nearest WTG	Approx No. of potentially visible WTGs	Assessment notes	Visual Impact Rating	Recommendations (Mitigation)
Non-associated dwellings between 3.09 km - 6.18 km from the nearest WTG							
N4	Crowsdale Camboon Road	3,521	160	32 WTGs	The closest WTG is 3.52 km northwest of the dwelling. The assessment suggests that approx. 32 WTGs will be visible from this location. The assessment of the aerial imagery indicates vegetation directly adjacent to the dwelling to the north and northeast will obstruct views of the Project. Scattered vegetation to the northwest will likely assist in filtering views of some WTGs. The resulting visual impact can be rated as low. Refer to **Appendix C.1**.	Low	Mitigation is not required
N6	Pinedale Road	5,093	57	33 WTGs	The closest WTG is located 5.09 km west of the dwelling, which is orientated north-south. Aerial assessment indicates vegetation directly surrounding the dwelling. A shed and storage tank are located to the north and northwest of the dwelling. A combination of these elements are likely to obstruct views toward the WTGs from this dwelling, resulting in a low visual impact. Refer to **Appendix C.2**.	Low	Mitigation is not required
N7	Defence Road	3,492	40	12 WTGs	The closest WTG is located 3.49 km east of the dwelling. The dwelling is orientated northwest–southeast. Aerial assessment indicates vegetation directly surrounding the dwelling in the direction of the Project. Boam Creek is located between the dwelling and the Project. Vegetation along the creek is typical of other creeks in the surrounding area. Views from the dwelling will likely be fragmented by a combination of the vegetation directly adjacent to the dwelling and vegetation associated with Boam Creek, resulting in a low visual impact. Refer to **Appendix C.3**.	Low	Mitigation is not required
N8	Defence Road	3,523	40	12 WTGs	The closest WTG is located 3.52 km east of the dwelling. The dwelling is orientated northwest–southeast. Aerial assessment indicates vegetation associated with N7 located to the east. Boam Creek is located between the dwelling and the Project. Vegetation along the creek is typical of other creeks in the surrounding area. Views to the east from will likely be fragmented by a combination of the vegetation adjacent to the dwelling and that associated with Boam Creek. However some WTGs may be visible to the northeast due to lack of intervening vegetation, resulting in a moderate visual impact. Refer to **Appendix C.4**.	Moderate	Mitigation may be required
N9	Defence Road	3,512	40	12 WTGs	The closest WTG is located 3.51 km east of the dwelling. The dwelling is orientated northwest-southeast. Aerial assessment indicates vegetation associated with N7 located to the east. Boam Creek is located between the dwelling and the Project. Vegetation along the creek is typical of other creeks in the surrounding area. Views to the east will likely be fragmented by a combination of the vegetation adjacent to the dwelling and that associated with Boam Creek. However, some WTGs may be visible to the northeast due to lack of intervening vegetation, resulting in a moderate visual impact. Refer to **Appendix C.5**.	Moderate	Mitigation may be required
N10	Defence Road	3,533	40	12 WTGs	The closest WTG is located approx. 3.53 km to the east of the dwelling. Aerial imagery indicates vegetation directly adjacent to and surrounding the dwelling. This vegetation is likely to fragment views of the Project from this location resulting in a low visual impact. Refer to **Appendix C.6**.	Low	Mitigation is not required
N11	Lyndale Road	4,356	163	13 WTGs	The closest WTG is located 4.35 km to the southeast of the dwelling. Aerial imagery assessment indicates a lack of intervening vegetation surrounding the dwelling. A shed is located to the southeast in the general direction of the view towards the WTGs. This built structure will likely fragment views to some WTGs. However, a lack of intervening vegetation around the dwelling will allow for views to most WTGs, resulting in a moderate visual impact. Refer to **Appendix C.7**.	Moderate	Mitigation may be required
N12	Crowsdale Camboon Road	4,470	2	49 WTGs	The closest WTG is located 4.47 km southwest of the dwelling. Upon assessment of the aerial imagery, the dwelling appears to be a shed. Scattered vegetation surrounds the structure and is present in the general direction of the view towards the WTGs. This vegetation will likely filter views of the Project from the dwelling, resulting in a low visual impact. Refer to **Appendix C.8**.	Low	Mitigation is not required

Table 14 – Dwelling Assessment Table between 3.09 km - 6.18 km of a proposed WTG.

N13	Crowsdale Camboon Road	4,631	17	44 WTGs	The closest WTG is located 4.63 km southwest of the dwelling. Aerial imagery indicates vegetation present in the general direction of the view towards the WTGs. Farming sheds are situated to the southwest of the dwelling. A combination of these elements will obstruct views of the Project from this dwelling, resulting in a low visual impact. Refer to **Appendix C.9**.	Low	Mitigation is not required
N14	Crowsdale Camboon Road	4,676	17	44 WTGs	The closest WTG is located 4.67 km southwest of the dwelling. Aerial imagery indicates vegetation present in the general direction of the view towards the WTGs. Farming sheds surround the dwelling to the south and southwest. A combination of these elements will obstruct views of the Project from this dwelling, resulting in a low visual impact. Refer to **Appendix C.10**.	Low	Mitigation is not required
N15	Lyndale Road	5,718	5	28 WTGs	The closest WTG is located 5.71 km southeast of the dwelling. An assessment of the aerial imagery suggests vegetation is present directly adjacent to the southeast of the dwelling. A shed exists directly to the south of the dwelling. These elements will likely fragment views of most of the WTGs associated with the Project, resulting in a low visual impact. Refer to **Appendix C.11**.	Low	Mitigation is not required

9.3 Summary of Visual Impacts for Non-Associated Dwellings

9.3.1 Overview of non-associated dwellings within 3.09 km:

No non-associated dwelling were identified within 3.09 km of the nearest WTG associated with the Project.

9.3.2 Overview of non-associated dwellings within 3.09 km - 6.18 km:

11 non-associated dwellings have been identified within 3.09 km - 6.18 km of a proposed WTG. Of which:

- Three (3) non-associated dwellings have been rated as having a moderate visual impact.
- Eight (8) non-associated dwellings have been rated as having a low visual impact.

Desktop assessment of all 11 non-associated dwellings has been included in **Appendix C**. Mitigation measures proposed for the dwellings have been summarised in **Section 12.0** of this report.

9.3.3 Overview of non-associated dwellings beyond 6.18 km:

As discussed in **Section 5.0** of this report, WTGs from dwellings beyond 6,410 m will likely be noticeable but will not dominate the view. Intervening vegetation and topography is likely to assist in fragmenting views of the Project from these locations.

In addition to the assessment of dwellings, Moir LA undertook an extensive viewpoint analysis which provides representative public viewpoint assessments from publicly accessible locations close to dwellings in excess of 6.18 km of the Project (see **Section 7.0**).

10
Shadow Flicker Assessment

10.0 Shadow Flicker and Glare Assessment

10.1 Overview of Shadow Flicker

Shadow flicker is defined as the visual effect that occurs when rotating WTGs cause moving shadows as the blades pass in front of the sun. The effect will occur under circumstances where the WTG is located such that at certain times of day the sun's rays pass through the swept area of the rotating blades, potentially affecting the viewpoint. The effect is diminished by the distance of the viewpoint from the WTG. Shadowing is also influenced by increased cloud cover, and is dependent on the angle of the sun's rays (Draft National Wind Farm Development Guidelines, 2016).

10.2 Shadow Flicker Assessment Methodology

Moir LA have referred to the State Code 23: Wind Farm Development Planning Guideline PO4 Shadow flicker to determine the parameters for the assessment of Shadow Flicker.

Modelling of the shadow flicker was conducted using specialist industry software (Wind Pro), assessing the largest WTG (based on a 270 m maximum tip height) proposed for the Project to represent the worst case impact scenario.

The parameters used for the Shadow Flicker Assessment are as follows:

Model Parameter	Setting Used:
Zone of Visual Influence of Shadows	265 x Maximum blade chord
Minimum angle of sun	3 degrees
Shape of the sun	Disk
Time and duration of modelling	One full year
Orientation of the rotor	The rotor plane is always perpendicular to the line from the WTG to the sun
Time step	1 minute
Effects of topography	Included
Receptor Height	1.5 meters
Grid size	1 meter

Table 15 – Shadow Flicker Assessment Parameters

It is important to note the shadow flicker modelling undertaken for the Project is based on topography alone and therefore the extent of impact may be decreased by a number of variables including:

- The aspect of the residence relative to the WTG(s) (window locations, living area locations etc);
- The extent of natural or screening vegetation between the WTG(s) and the receptor;
- The existence of other screening elements (buildings, structures etc) between the WTG(s) and the receptor;
- The time of year;
- The proportion of daylight hours in which the WTGs operate; and
- The frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).



Image 24 – Example of shadow intensity variation with distance.

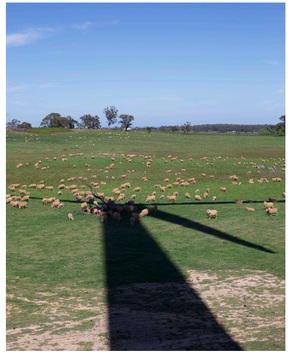


Image 25 – Example of shadow flicker at base of a WTG

Shadow Flicker and Glare Assessment

10.3 Results of Shadow Flicker Assessment on Dwellings

The Code states the proponent must undertake a shadow flicker assessment that identifies the potential impacts and how these may be mitigated or managed. This assessment should consider the potential impacts on existing or approved sensitive land uses, and ensure that any modelled blade shadow flicker impacts affecting a sensitive land use do not exceed 30 hours per annum and 30 minutes per day. The extent of shadows from WTGs based on a distance of 265 m x maximum blade chord (in this case 4.3 metres) is determined to be 1,139.5 metres. The Appendix 2 of the *State Code 23 (SC23) Guidelines* states no assessment is necessary for dwellings beyond 1,139.5 metres.

No non-associated dwellings were identified within a distance of 1,139.5m of the nearest WTG (see **Figure 17**). A total of two (2) associated dwellings (H05 & H09) were identified with potential shadow flicker hours (see **Table 16**). The assessment is based on a worst case scenario considering topography alone.

Dwelling ID	Location	Nearest WTG	Status	Shadow Hours per year	Shadow Days per year	Maximum Shadow Hours per day	Distance to WTG	Impact notes
H05	Crowsdale Camboon Road	81	Host	79:24:00	135	0:56	1,540 m	Within acceptable level
H09	Crowsdale Camboon Road	156	Host	32:28:00	87	0:29	1,556 m	Within acceptable level

Table 16 – Dwellings with potential to experience shadow flicker

Preliminary investigations indicate scattered intervening vegetation surrounding H05 and H09 is likely to fragment shadow flicker effects on these dwellings (see **Figure 17**). It is important to note that these dwellings are located outside the extent of shadows from WTGs (1,139.5 m) (see **Table 16**). The potential to experience potential flicker from the WTGs at these locations will be diminished due to the distance between the dwellings and the nearest WTG.

10.4 Results of Shadow Flicker Assessment on Road Users

Although there are no guidelines in the SC23 Code relating to an acceptable level of shadow flicker on road users, shadow flicker has the potential to cause annoyance to road users.

Defence Road borders the Project to the south. The majority of this road has the potential to experience shadow flicker less than 30 hours per year. Due to its proximity to WTG 132, potential shadow flicker analysed along this route is approx. between 100 hours per year and up to 500 hours per year for only a small portion of this road. Existing vegetation along some parts of this road would provide some screening for receptors (see **Figure 17**).

The Crowsdale - Camboon Road traverses through the Project. Due to its proximity, potential shadow flicker analysed along this route is approx. between 100 hours per year and up to 500 hours per year. Existing vegetation along this road would provide some screening for receptors (see **Figure 17**).

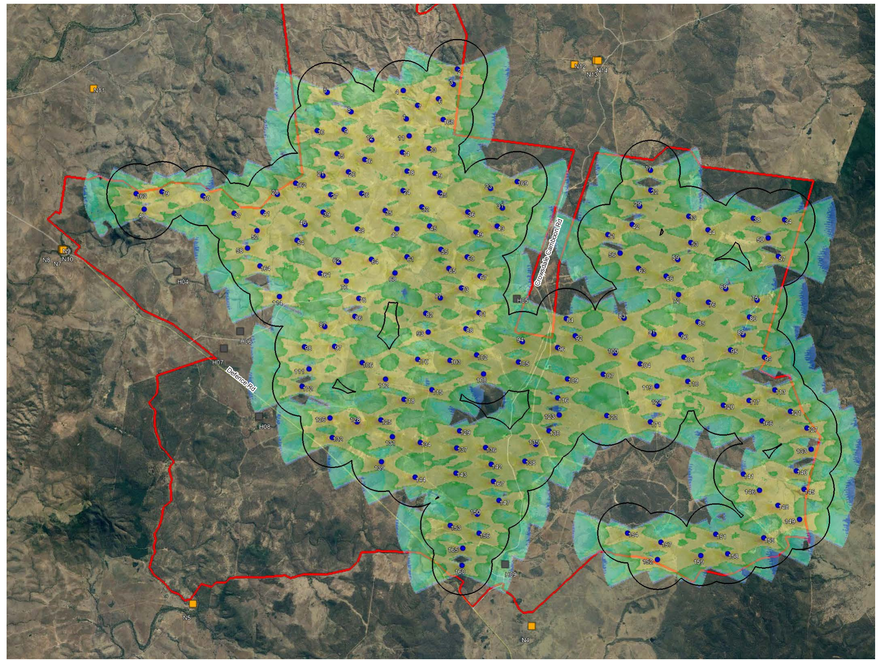
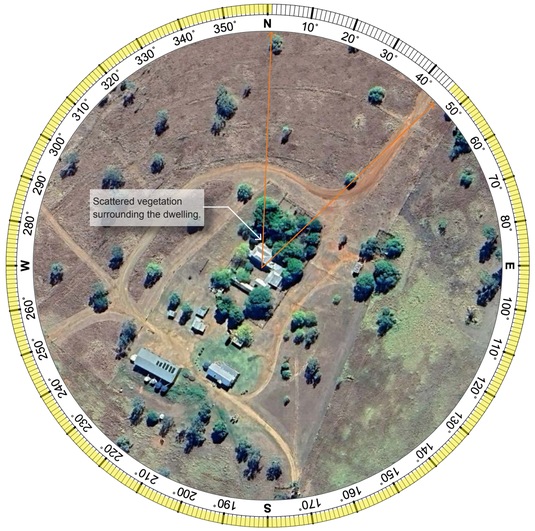


Figure 17 – Shadow Flicker Diagram
(Map Source: Google Earth, 2024)

Dwelling AI37-c



Dwelling AI39-b

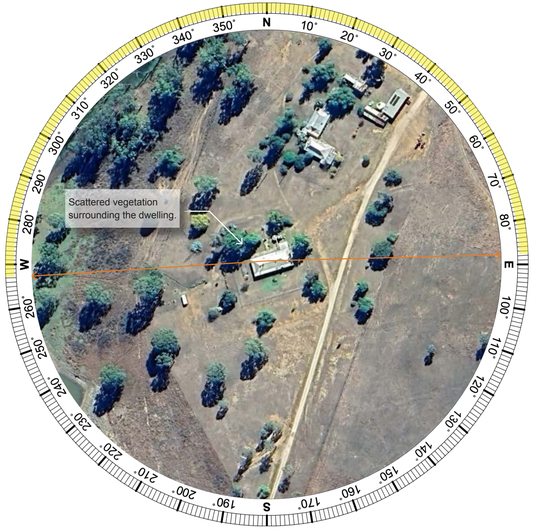


Figure 18 – Existing character around H05 and H09
(Map Source: Google Earth, 2024)

11
Associated Infrastructure

11.0 Assessment of Associated Infrastructure

11.1 Overview of Associated Infrastructure

In addition to the proposed WTGs, the associated infrastructure (as described in **Section 3.5** of this report) has the potential to contrast with the existing visual landscape. Due to the large scale of the Project, access roads, transmission lines and other ancillary structures have the potential to alter the existing visual landscape. An overview of the potential visual impact resulting from associated infrastructure and Project components is provided below.

11.2 Access Roads

Access roads are proposed on site between the WTGs and connecting to existing arterial roads. Access to the Project Site is proposed via Defence Road and Crowsdale Camboon Road. It is likely some improvements to surrounding roads would be completed to accommodate the Project.

The construction and maintenance of the Project will require construction of private access roads to provide access to WTGs. Where possible, the internal road network will be aligned on the route of existing farm or other access roads. The internal roads will be up to approx. 40 m wide, including drainage as required, to support transportation of the WTG components (see **Figure 19**).

Generally, the internal access roads will require clearing of existing vegetation but these will be in keeping with the character of existing roads and tracks visible within the surrounding landscape. The proposed access roads are likely to be viewed as part of the existing character of the landscape and therefore visual impact would be low.

Additional measures for reducing visual impact resulting from the construction of access roads have been considered. These include:

- Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed WTGs to reduce the need for new roads.
- Allow for the provision for down sizing roads or restoring roads to existing condition following construction where possible.
- Any new roads must minimise cut and fill and avoid the loss of vegetation.
- Utilise local materials where possible and practical.

11.3 Ancillary Structures

11.3.1 Substation and Switching Station

Four (4) Substations are proposed to be located within the Project Boundary (see **Figure 19**). If deemed necessary during the detailed design phase, mitigation methods such as screen planting could be employed to reduce any potential visual impacts. Four (4) Switching Stations will be located adjacent to each Substation (see **Figure 19**).

Due to the isolated location of the substation or switching station within the Project Site, the potential visual impact has been rated as negligible.

11.3.2 Site Operations and Maintenance Facility (O&M)

Permanent site operations and maintenance (O&M) facilities are constructed to provide all operations and maintenance activities associated with the Project. The O&M facilities are scattered throughout the Project Site to be located close to each of the substations and switching stations (see **Figure 19**). It is unlikely the O&M facility would be visible from any nearby dwellings. Therefore, the visual impact has been rated as negligible.

The ancillary structures including the proposed substations and site compound have the ability to be screened by existing vegetation or proposed screening vegetation at a later detailed design stage. The following mitigation measures would assist in reducing any residual visual impacts:

- Siting to ensure minimal vegetation loss.
- Consideration should be given to controlling the type and colour of building materials used. Where possible a recessive colour palette is to be used which blends into the existing landscape (see example provided in **Image 26**).
- Avoidance of unnecessary lighting, signage on fences, logos etc.
- Any proposed buildings to be sympathetic to existing architectural elements in the landscape.
- Minimise cut and fill and loss of existing vegetation throughout the construction process.
- Boundary screen planting is an effective mitigation method which could be utilised to ameliorate potential visual impacts resulting from the construction of ancillary structures with a small vertical scale such as collector substations, switching stations and the operations facilities building.



Image 26 – Example of building colour palette sympathetic to the surroundings.

11.4 Transmission Lines

Each of the WTGs will be connected to an onsite substation via a system comprising of underground and overhead electrical cables. 33 kV internal transmission lines are proposed to connect in to the substations (see **Figure 19**). The proposed transmission infrastructure design is in keeping with the scale and appearance of existing power lines which are an existing element in the landscape.

Proposed mitigation methods to be considered during detailed design phase include:

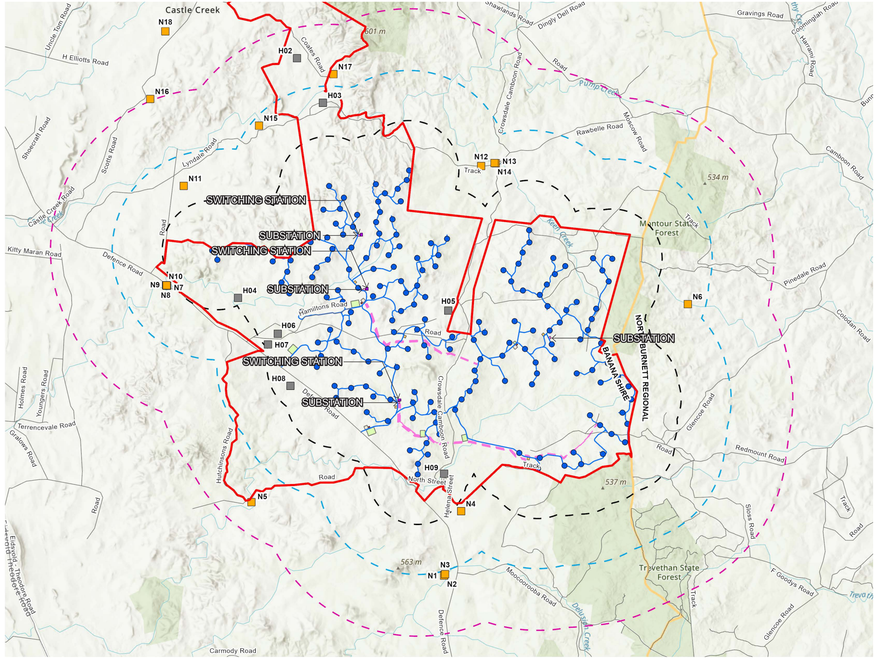
- Utilise existing transmission lines where possible.
- Use of subtle colours and a low reflectivity surface treatment on power poles to ensure that glint is minimised.

Currently, the potential visual impact resulting from the transmission lines is anticipated to be low due to the existing character of the Project Site.

11.5 Temporary Construction Facilities

Temporary construction facilities including concrete batching plants and laydown areas are scattered throughout the Project Site (see **Figure 19**). These facilities are temporary facilities which would be removed upon completion of the construction phase. These facilities will require clearing of existing vegetation and disturbance in the form of earthwork. As such there is a possibility for a visual impact during construction. However, due to the isolated location of these facilities, the resulting visual impact is negligible.

Assessment of Associated Infrastructure



Location of Associated Infrastructure

Theodore Wind Farm

- Project Boundary
- Associated Dwellings
- Non-associated Dwellings
- Proposed Turbines
- 3.09 km Visual Catchment Area
- 6.18 km Visual Catchment Area
- 10km Study Area
- Roads and Tracks
- LGA Boundary
- Proposed Substation
- Proposed Switching Station
- O&M Compund
- Proposed Overhead 33kV Reticulation
- Proposed Concrete Batching Plant
- Proposed Laydown Areas
- Proposed Site Compund
- Proposed Access Tracks

0 4 7 11 14 18 km

Figure 19 – Location of Associated Infrastructure
(Map Source: QGlobe 2020)

12

Aviation Hazard Lighting Assessment

12.0 Aviation Hazard Lighting Assessment

12.1 Overview of Aviation Hazard Lighting

The following section of the report provides an assessment of the visual impacts of potential night lighting of the Project. Night lighting has the potential to result in the alteration of the night time landscape character of the region. Potential light sources include:

- Aviation Hazard Lighting (AHL) on nacelle of WTGs (height of up to 180 metres AGL)
- Night lighting for safety and security on ancillary structures.

12.2 Aviation Hazard Lighting

Aviation assessment has been conducted by Aviation Projects. Findings suggest that obstacle lighting may be required for WTGs in the northwest section of the Project.

The requirement of aviation hazard lighting (AHL) on WTGs for the Project is subject to the advice of the Civil Aviation Safety Authority (CASA). It is noted that the WTGs proposed for the Project will possibly be up to 270 m in height and CASA generally recommends night lighting if an obstacle exceeds 166 m above ground level.

If determined to be required, potential CASA specifications for lighting could include:

- Two flashing red medium intensity obstacle lights should be provided per WTG where required.
- The light fixtures should be mounted sufficiently above the surface of the nacelle so that the lights are not obscured by the rotor hub, and are at a horizontal separation to ensure an unobstructed view of at least one of the lights by a pilot approaching from any direction.
- Sufficient individual WTGs should be lit to indicate the extent of the group of WTGs.
- The interval between obstacle lighted WTGs should not exceed 900m, and the most prominent (highest for the terrain) WTG(s) should be lit. (CASA, 2022)

Representative images of aviation lighting (installed in August 2020) on WTGs at Biala Wind Farm NSW have been included to best illustrate the potential visual appearance of aviation lighting. Photographs of the aviation lighting at varying distances and times have been included in this report.

Image 27 - **Image 33** illustrate the appearance of night lighting on a dark rural landscape at intervals after sunset.



Image 27 – View towards Biala Wind Farm - 2.0 Kilometres from WTG at 6:20pm (30 minutes after sunset)



Image 28 – View towards Biala Wind Farm - 1.75 Kilometres from WTG at 6:35pm (45 minutes after sunset)



Image 29 – View towards Biala Wind Farm - 1.85 Kilometres from WTG at 6:50pm (60 minutes after sunset)



Image 30 – View towards Biala Wind Farm - 3.5 Kilometres from WTG



Image 31 – View towards Biala Wind Farm - 8.5 Kilometres from WTG

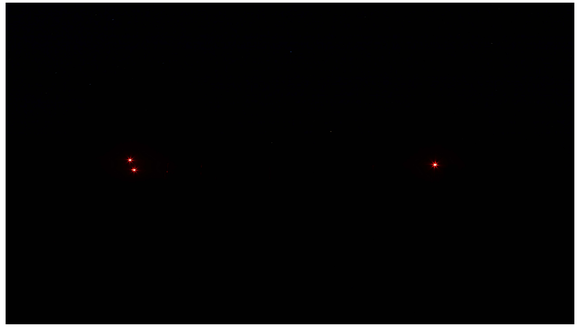


Image 32 – View at night towards Biala Wind Farm - 3.5 Kilometres from WTG

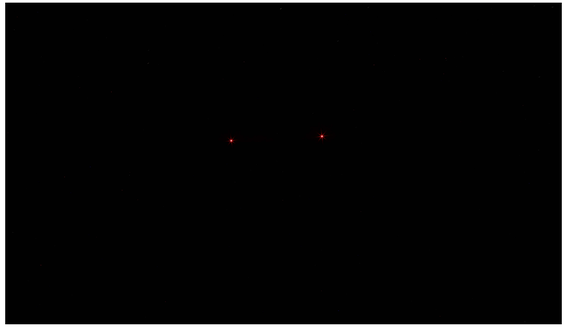


Image 33 – View at night towards Biala Wind Farm - 8.5 Kilometres from WTG

Aviation Hazard Lighting Assessment

12.3 Overview of potential visual impacts from Night lighting

Night lighting of WTGs and associated infrastructure has the potential to extend the visual effect into the night time. Aviation hazard lighting has the potential to be visible from distances in excess of 20 km (Scottish Natural Heritage). However, the distance depends on a number of variables, including light intensity, topography, vegetation coverage and climatic conditions.

Due to the relatively isolated location of the Project, very little existing sources of lighting are present in the night time landscape of the Study Area. Some existing lighting associated with homesteads and motor vehicles is dispersed around the Study Area. Isolated receptors within the Study Area experience a dark night sky with minimal light sources. The impact of night lighting is unlikely to be experienced from inside a dwelling as internal lights reflect on windows and limit views to the exterior at night time.

The highest visual impact is likely to be people who experience the night landscape outdoors. Dark sky is a valued quality of the rural landscape, due to the lack of light pollution. Aviation lighting has the potential to impact on receptors who view the landscape at night, in particular night-sky enthusiasts, photographers, star gazers, campers and some land owners with potential visibility of the WTGs hub.

The visual impact of potential aviation lighting could be reduced by employing mitigation methods outlined in **Section 13.0**. Considering the high elevation of the WTGs and the implementation of shields, the source of visible light is likely to be reduced to ambient lighting as opposed to direct visibility of the light itself when viewed from a close proximity.

12.4 Recommendations to reduce the potential visual impacts

To assist in the amelioration of the effect of Aviation Hazards Lighting on wind WTGs the following should be applied:

- If used, air navigation lighting should be spaced around the outer edges of the wind farm. Lights are not required on every tower. Where possible, careful consideration should be given to the selection of WTGs requiring lighting to avoid unnecessary impact upon residences.
- Treatment of the rear of blades with a non-reflective coating to reduce reflection off the rotating blade at night.
- Use of the lowest candela intensity allowed by CASA.
- According to the CASA requirements, shielding may be provided to restrict the downward spill of light to the ground plane by ensuring that no more than 5% of the nominal light intensity should be emitted at or below 5° below horizontal (see **Figure 20**).
- No light should be emitted at or below 10° below horizontal.

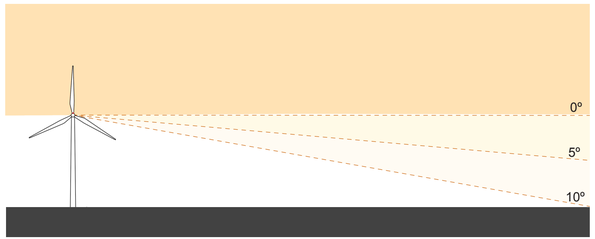


Figure 20 – Recommended Light Shielding to reduce lighting spread

13
Mitigation Measures

13.0 Mitigation Measures

13.1 Overview of Mitigation Methods

This section of the report provides recommendations which seek to achieve a better visual integration of the proposal and the existing visual character at both local and regional scales. The mitigation measures attempt to lessen the visual impact of the proposed wind farm whilst enhancing the visual character of the surrounding environment.

Mitigation measures are best considered as two separate phases. These include:

- Primary measures that form part of the development of the wind farm design through an interactive process; and
- Secondary measures designed to specifically address the remaining (residual) negative (adverse) effects of the final development proposals (The Landscape Institute et al 2013).

It is important to note that the mitigation methods proposed in this report are made notwithstanding issues raised by other consultants (eg. engineering, ecology, geology etc.). During the planning and design phase of a wind farm, mitigation strategies should also be considered to lessen the visual impact of the proposal. This is by no means an exhaustive list, however the adoption of these recommendations will assist considerably in ensuring the proposal contributes positively to the visual quality and character of the area.

13.2 Project Layout and Design

The design of the proposed wind farm is a primary measure of mitigation. The general principles employed through the project design phase can significantly reduce the visual impact. These include siting, access, layout and other principles which directly impact the appearance of the proposed development. General guidelines for the design development of the Project have been outlined in the following section.

13.2.1 Wind Farm Layout and Size

The layout and size of the wind farm is a significant factor in the visual impact on the landscape. According to Stanton (1995) the intrusiveness of a wind farm is not directly proportional to the number of WTGs in an array, and instead, more a factor of design feature. For example, large wind farms may appear less dominating than a smaller project when the large wind farm is subdivided into several visually comprehensible units.

It is suggested that fewer and more widely spaced WTGs present a more pleasing appearance than tightly packed arrays (URBIS, 2009). The following principles should guide the design process of the wind farm:

- Controlling the location of different WTG types, densities and layout geometry to minimise the visual impacts.
- The lines of WTGs should reflect the contours of the natural landscape as best as possible.
- Ensure the WTGs are evenly spaced to give a regular pattern creating a better balance within the landscape.

It is important to note that as a result of community consultation during the development period, the Project has undergone many changes. The resulting layout has a smaller development footprint to those previously considered. The above design principles have been considered in the siting of the proposed WTGs to provide a balanced appearance within the landscape.

13.2.2 WTG Design and Colouring

WTG design and colouring are an important factor. The WTGs will have a matte white finish and consist of three blades which is consistent with the current WTG models being considered.

- The important factors to achieving a visual consistency through the landscape include:
- Uniformity in the colour, design, rotational speed, height and rotor diameter.
- The use of simple muted colours and non-reflective materials to reduce distant visibility and avoid drawing the eye.
- Blades, nacelle and tower to appear as the same colour.
- Avoidance of unnecessary lighting, signage, logos etc.

13.3 Off-site screen planting

In circumstances where residences are subject to a moderate or high level of visual impact, off-site screen planting is an option proposed to assist in mitigating views of WTGs from these properties. As the viewing location of the proposal would generally be fixed, there is opportunity to significantly reduce potential visual impact from the Project.

In order to achieve visual screening between the intrusive element and the dwelling, tree planting could be undertaken. This should be undertaken in consultation with the relevant landowners to ensure that desirable views are not inadvertently eroded or lost in the effort to mitigate views of the WTGs.

An example of how screen planting could be used to mitigate potential views towards visible WTGs from **N9** is shown in **Figure 21**. Note that this is an example only and a detailed analysis would be required to determine the extent of potential visibility, existing planting and orientation of the residence and its primary views.

13.4 Landscaping Principles

The existing character of the landscape allows for a variety of methods of landscaping and visual screening which will remain in keeping with the landscape character. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting is recommended post construction in consultation with the landowner.
- Planting should remain in keeping with existing landscape character.
- Species selection is to be typical of the area.
- Planting layout should avoid screening views of the broader landscape.
- Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.
- Allow natural vegetation to regrow over any areas of disturbance.

Locally native plant species are preferred, as they help to preserve the landscape character and scenic quality of the area as well as building habitat for local fauna. Native species are also well-suited to local conditions (ie. soil, climate, etc.) and will build on the existing vegetation assemblages in the area.

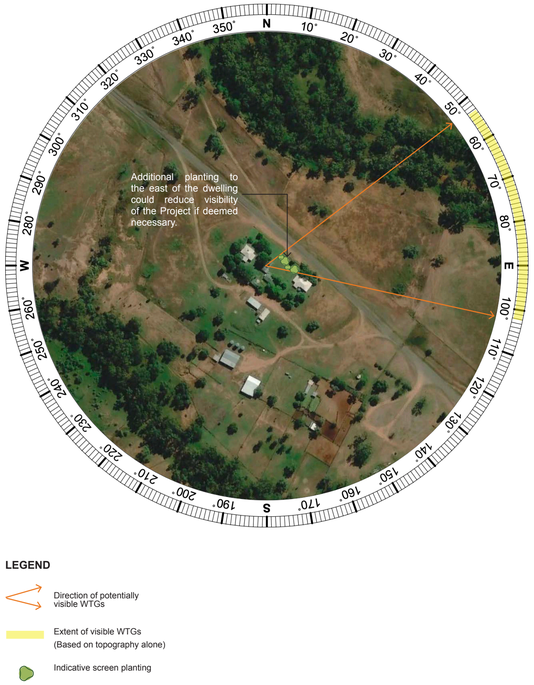


Figure 21 – Example of on-site screen planting at dwelling

14
Summary

14.0 Summary

14.1 Summary

The purpose of this LVIA is to provide a quantitative assessment of the visual impacts resulting from the Project and provide recommendations to reduce potential visual impacts to an acceptable level.

The general character of the Study Area can be categorised as land utilised primarily for grazing native vegetation, with small parcels utilised for cropping. Areas nominated as production forestry border the Project Site to the southeast, east and north. Landform typically consists of undulating to steep ranges with elevations within the Project Site within the range of approx. 300 m - 540 m. Several creeks also form a part of the character of the area. The most notable creeks in the area include Castle Creek, Seven Mile Creek and Nine Mile Gully. Several lower-order streams flow through the Study Area, draining the elevated regions. Dawson River flows approx. 22 km west of the Project.

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

Theoretical visual influence mapping (based on topography alone) suggests that visibility of the WTGs is limited to areas immediately adjacent to the Project with views extended to the north and the south. Based on the ZVI assessment, some areas to the northeast beyond 6.18 km have visibility to up to 56 WTGs. Topography would limit views to the Project from other areas beyond 6.18 km to the northeast and southwest. To the north, majority of WTGs would be visible. Views to the majority of WTGs are along Defence Road due to its proximity to the Project. Similarly, views are open along Crowsdale - Camboon Road as the road intersects the Project. Due to the distance from the Project, the WTGs would be indiscernible from Theodore.

An assessment of the visual impact on public land indicated limited opportunities to view the Project in its entirety due to existing landscape features obscuring views towards the Project. Vegetated ridgelines, undulating topography, roadside vegetation and riparian vegetation associated with creeks, all assist in fragmenting views to the Project. The viewpoint analysis prepared from key public viewpoints determined that due to the limited visibility, the majority of the locations assessed were determined to have either a very low or low visual impact.

A detailed assessment of public viewpoint locations within the Study Area identified limited opportunities to view the Project. Of the 26 public viewpoint locations assessed, 17 viewpoints had a very low visual impact. Nine (9) public viewpoint locations were assessed as having a Low visual impact rating. Although, the potential visual impact is in the range of very to low, visibility towards the Project has been further illustrated through photomontages prepared from five (5) locations selected at varying distances from the Project. Exact photomontage locations were selected on site to represent a worst case scenario for the viewpoint location.

No non-associated dwellings were identified within 3.09 km of the nearest proposed WTG. 11 non-associated dwellings were identified within 3.09 km - 6.18 km of the nearest WTG. Of these, eight (8) dwellings were rated as having low visual impact and three (3) dwellings were rated as having a moderate visual impact as the primary views from these dwellings were impacted due to their proximity to the WTGs and lack of intervening vegetation. Off-site mitigation measures recommended in this report have the potential to limit the visual impact experienced at these dwellings. Recommended mitigation measures are in keeping with the existing character and include screen planting or supplementary planting to ensure the longevity of existing vegetation.

An assessment of the potential affect of Shadow Flicker has been assessed in accordance with the *State Code 23 : Wind Farm Planning Guidelines and Appendix 2 of the SC23 Guidelines*. This assessment identified two (2) associated dwellings with the potential to experience a shadow flicker from the WTGs. These dwellings were located outside the extent of potential shadow flicker (1,139.5 m). No non-associated dwellings were identified to experience potential shadow flicker.

Detailed assessment of these two (2) associated dwellings through aerial imagery indicates vegetation in the direction of the WTGs is likely to reduce the potential to experience shadow flicker. Moreover, the potential to experience shadow flicker will likely be diminished further due to the distance between the dwelling and the WTGs.

Due to the large scale and elevated position of the Project, the Project will likely be visible from areas surrounding the Project Site. However, due to the modified nature of the surrounding area, the existing landscape has the ability to incorporate the Project with a relatively low degree of visual impact. With implementation of the recommended mitigation measures where advised, the Project could be undertaken whilst maintaining the landscape character of the area.

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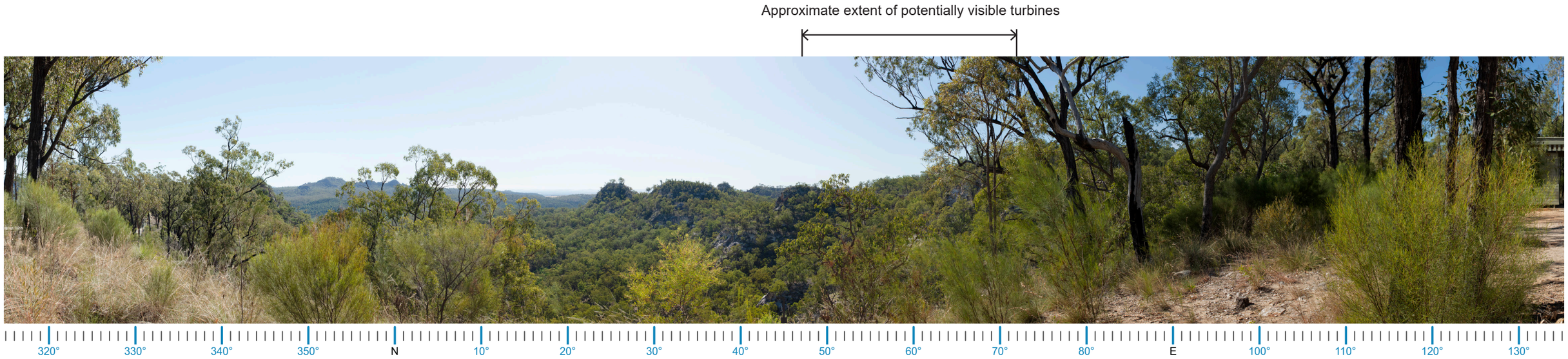
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A

Public Viewpoint Analysis

VP01 Isla Gorge Lookout, Isla



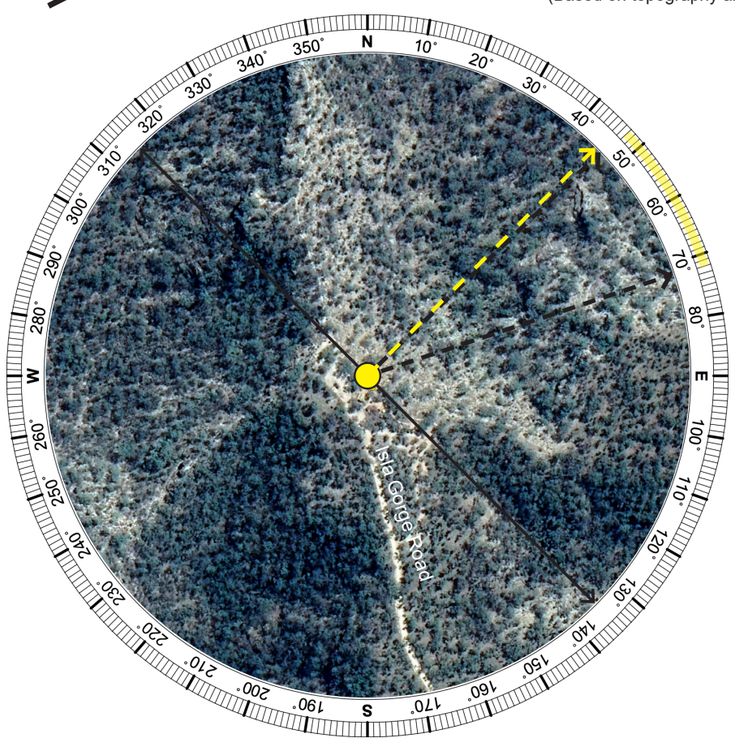
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP01

Viewpoint Summary:	
Location:	Elevation:
Isla Gorge Lookout, Isla	373 m
Coordinates:	Viewing Direction:
25°11'28.06"S 149°58'21.11"E	Northeast
Distance to nearest WTG:	Land Use:
45 km	Recreational
LCU:	Scenic Quality:
LCU01: Vegetated Hills	**MODERATE**
Visual Sensitivity:	
MODERATE	
Visual Magnitude:	Visual Impact:
VERY LOW	**LOW**

Existing Landscape Character Description:

This viewpoint is taken from Isla Gorge Lookout within the Isla Gorge National Park looking northeast towards the Project.

The topography is steep and falls away from the receptor, providing views to hills and valleys to the north/ northeast.

The vegetation is characterised by dense vegetation visible in the foreground, middleground and along mountains in the background.

The surrounding land is used as public recreation. Adjacent to the viewpoint location is Isla Gorge Campground.

The viewpoint is located off Isla Gorge Road which is an unsealed road that provides access to the lookout.

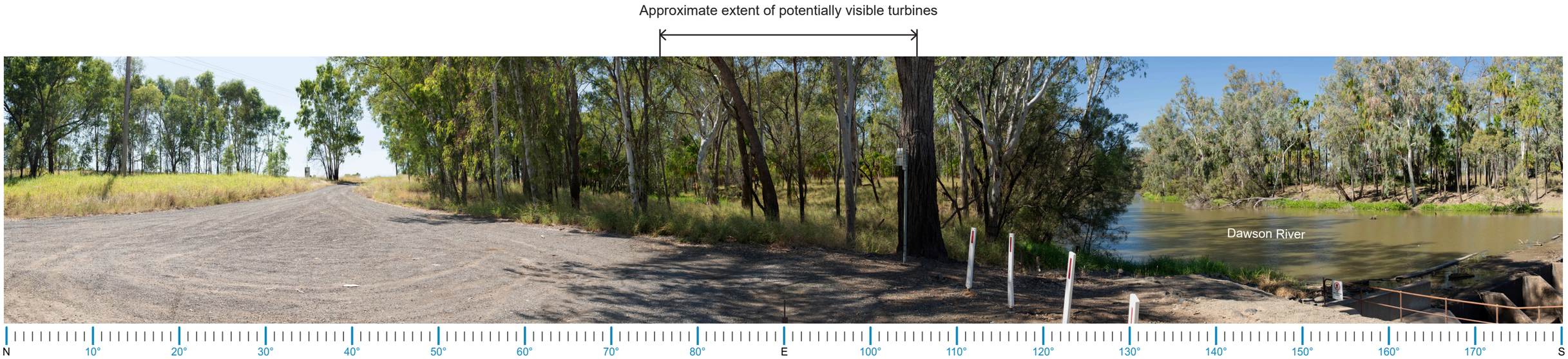
Potential Visual Impact:

Due to a combination of distance and existing vegetation to the northeast, the turbines are unlikely to be visible from this location.

The visual sensitivity is moderate and the visual magnitude is very low. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (09/2023)

VP02 Dawson River Weir, Banana



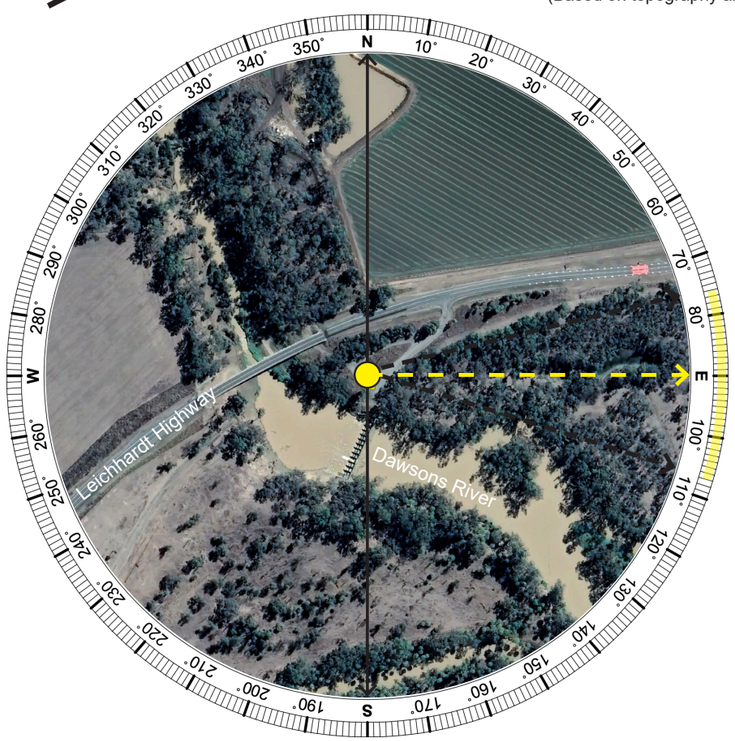
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP02

Viewpoint Summary:	
Location:	Elevation:
Dawson River Weir, Banana	138 m
Coordinates:	Viewing Direction:
24°56’14.90”S 150° 4’2.62”E	East
Distance to nearest WTG:	Land Use:
25.5 km	Recreational
LCU:	Scenic Quality:
LCU03: River and Creek Systems	**MODERATE**
Visual Sensitivity:	
LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken from Dawson River Weir Rest Area looking east towards the Project.

The topography is gently undulating with sloping banks along the river edges.

Dense vegetation associated with the river is visible in the foreground of the view.

Land surrounding this viewpoint is highly modified and predominantly used for grazing .

Potential Visual Impact:

Due to a combination of distance and existing vegetation to the east, the turbines are unlikely to be visible from this location.

The visual sensitivity is low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (09/2021)

VP03 The Boulevard, Theodore

Approximate extent of potentially visible turbines



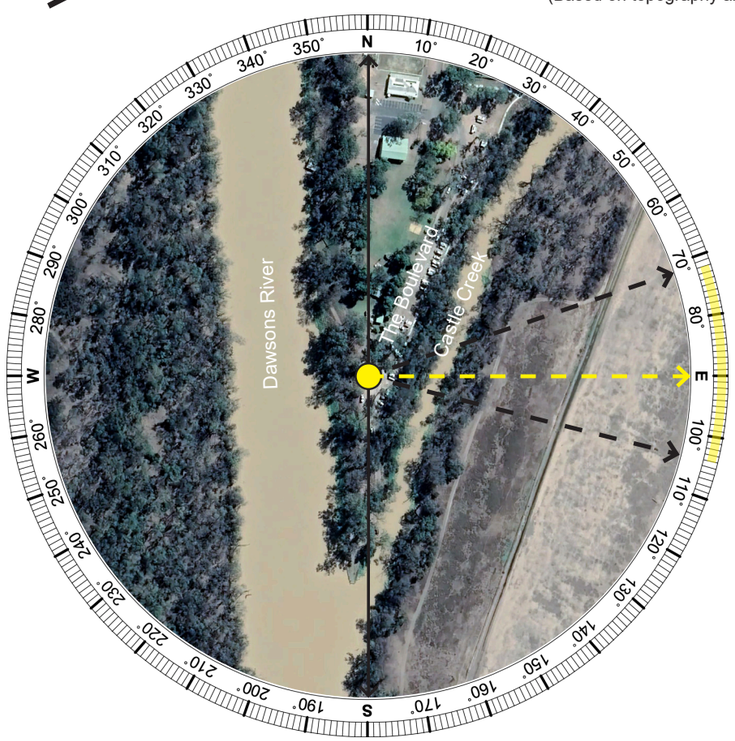
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP03

Viewpoint Summary:	
Location:	Elevation:
The Boulevard, Theodore	142 m
Coordinates:	Viewing Direction:
24°57'21.61"S 150° 4'26.54"E	East
Distance to nearest WTG:	Land Use:
25 km	Recreational
LCU:	Scenic Quality:
LCU03: River and Creek Systems	**MODERATE**
Visual Sensitivity:	
MODERATE	
Visual Magnitude:	Visual Impact:
VERY LOW	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along the Boulevard adjacent to Junction Park looking east towards the Project.

The topography is gently undulating with sloping banks towards Castle Creek.

Vegetation associated with Castle Creek is visible in the foreground of the view to the east.

The Boulevard is a low use road providing access to the park and riverside.

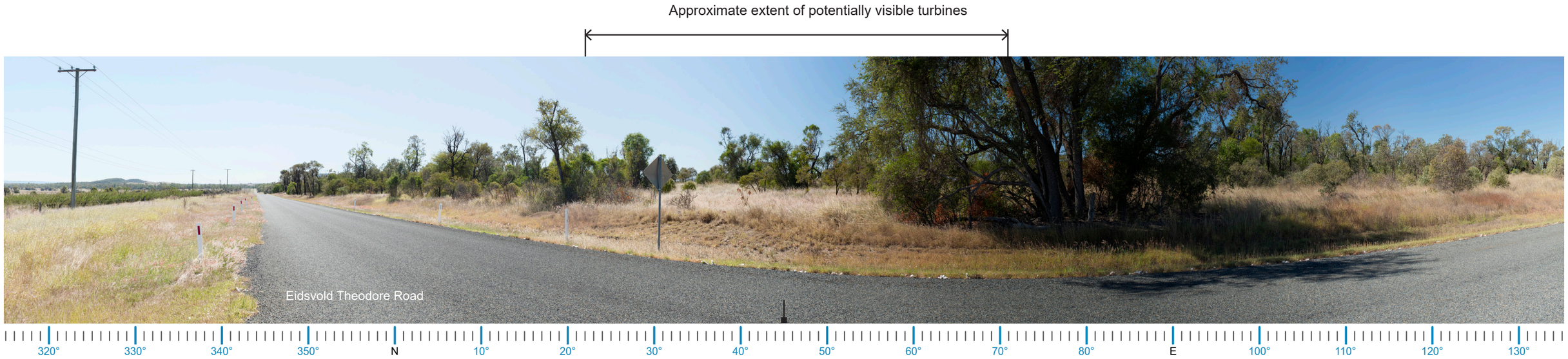
Potential Visual Impact:

Due to a combination of distance and existing vegetation to the east, it is unlikely the turbines will be visible from this location.

The visual sensitivity is moderate and the visual magnitude is very low. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (09/2021)

VP04 Eidsvold Theodore Road, Camboon



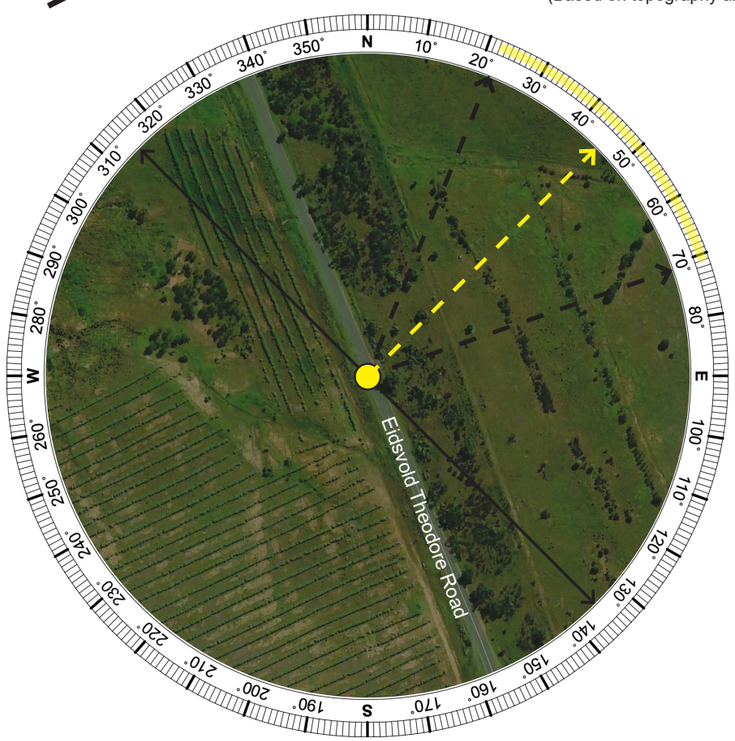
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP04

Viewpoint Summary:	
Location:	Elevation:
Eidsvold Theodore Road, Camboon	185 m
Coordinates:	Viewing Direction:
25° 7’50.86”S 150°11’23.76”E	Northeast
Distance to nearest WTG:	Land Use:
24 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Eidsvold Theodore Road looking northeast towards the Project.

The topography is gently undulating and slopes away to the northwest.

The vegetation is characterised by moderate to dense tree cover and shrubs visible in the foreground of the view.

Eidsvold Theodore Road is low use sealed road connecting the towns of Theodore, Camboon and Cracow.

Land surrounding the viewpoint has been modified for agricultural use.

The visual sensitivity has been rated as very low.

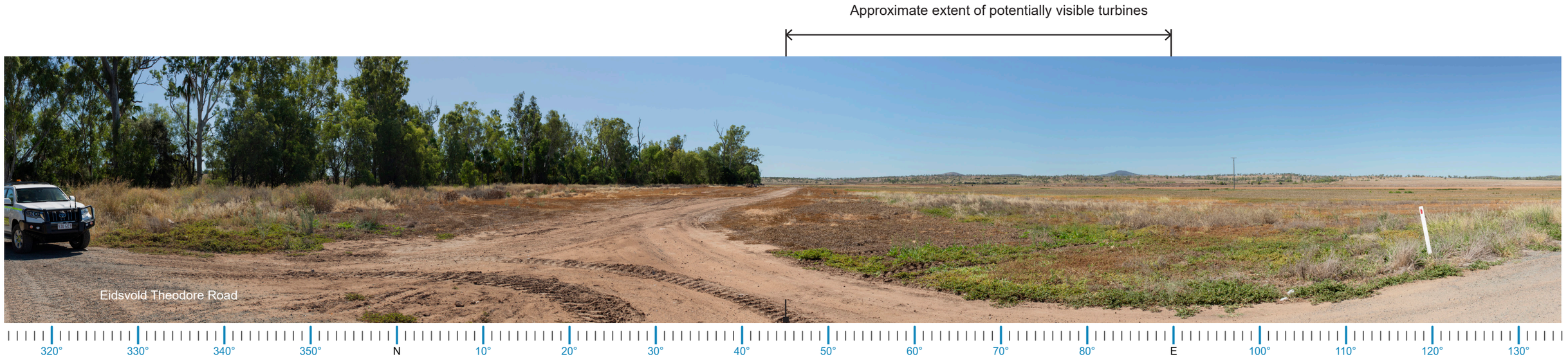
Potential Visual Impact:

Due to a combination of distance and existing vegetation to the northeast, the turbines are unlikely to be visible from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (03/2021)

VP05 Eidsvold Theodore Road, Lonesome Creek



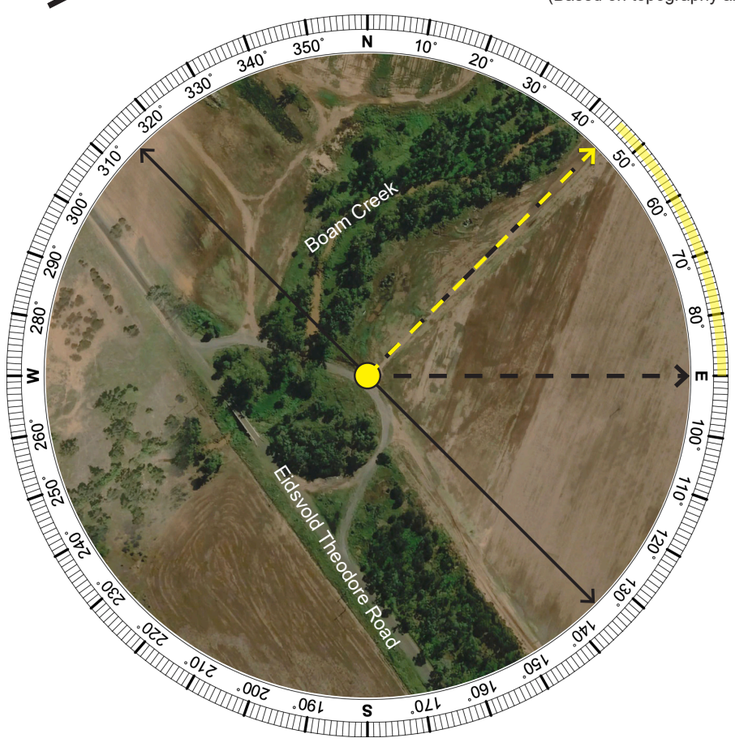
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP05

Viewpoint Summary:	
Location:	Elevation:
Eidsvold Theodore Road, Lonesome Creek	152 m
Coordinates:	Viewing Direction:
25° 1’53.14”S 150° 9’5.33”E	Northeast
Distance to nearest WTG:	Land Use:
20 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Eidsvold Theodore Road looking northeast towards the Project.

The topography is gently undulating.

Vegetation is visible along the edges of Boam Creek to the north and the surrounding landscape is generally cleared.

Eidsvold Theodore Road is low use sealed road connecting the town of Theodore, Camboon and Cracow.

Land surrounding the viewpoint is highly modified and predominantly used for grazing. Power lines are visible in the distance towards the east.

The visual sensitivity has been rated as very low.

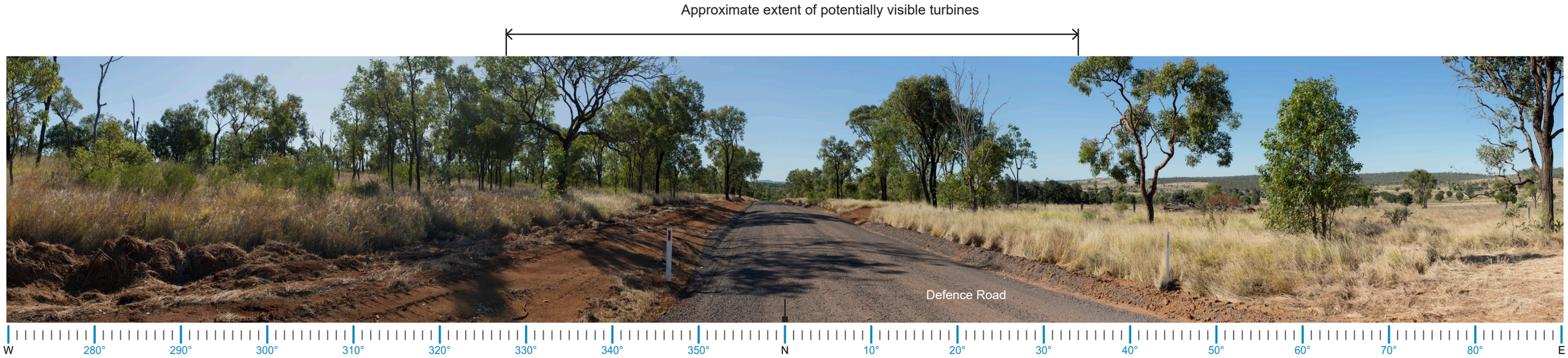
Potential Visual Impact:

The project may be potentially visible, however, due to the distance to the project, the turbines will be difficult to discern.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (03/2021)

VP06 Defence Road, Camboon



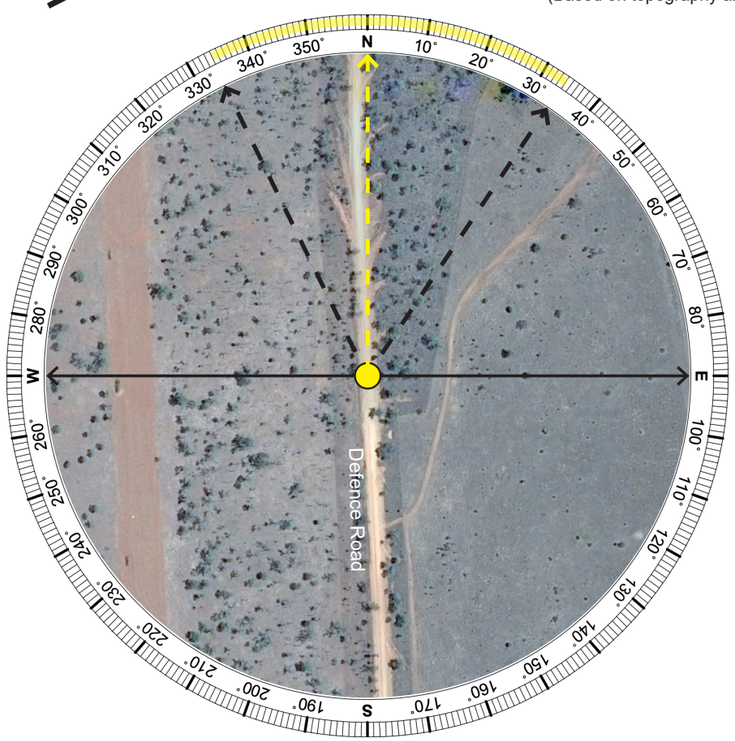
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP06

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	423 m
Coordinates:	Viewing Direction:
25°10'3.81"S 150°26'5.37"E	North
Distance to nearest WTG:	Land Use:
16 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken from Defence Road looking north towards the Project.

The topography is gently undulating.

Scattered vegetation is visible along the road corridor in the foreground. Densely vegetated hills in the distance are associated with Camboon State Forest, visible through breaks in vegetation to the north/northeast.

Defence Road is a local unsealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding this viewpoint is predominantly used for grazing.

The visual sensitivity has been rated as very low.

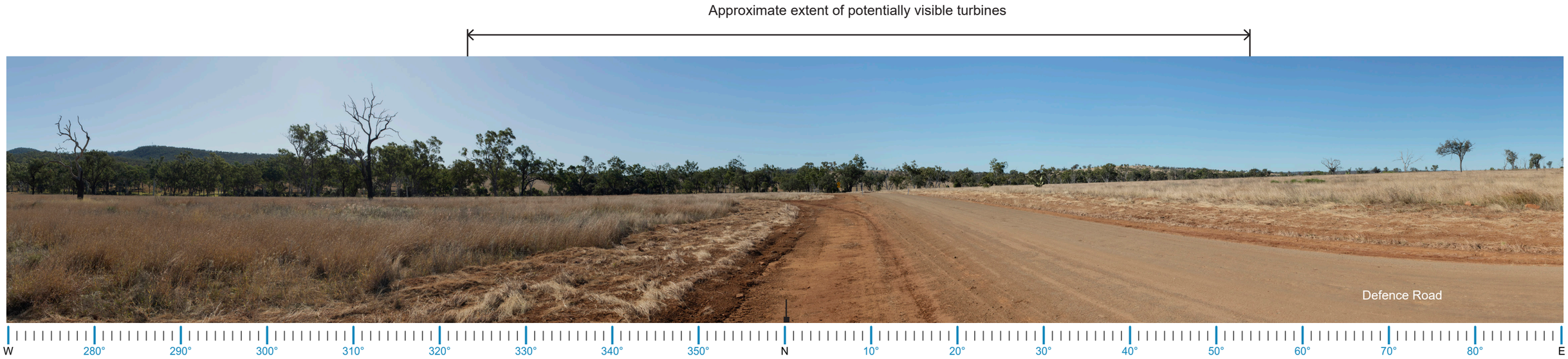
Potential Visual Impact:

Due to a combination of distance and existing vegetation to the north, the turbines are unlikely to be visible from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (05/2023)

VP07 Defence Road, Camboon



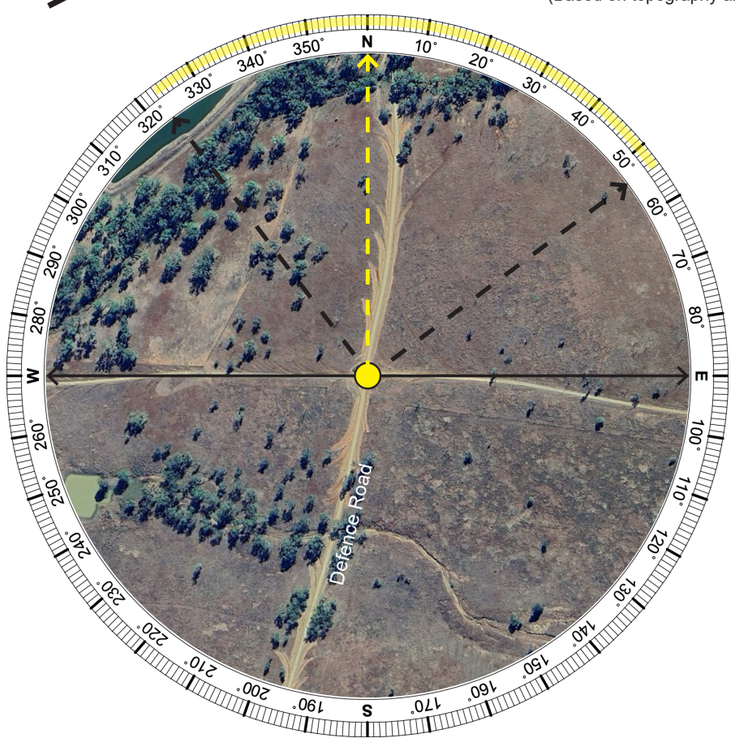
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP07

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	336 m
Coordinates:	Viewing Direction:
25° 5’7.48”S 150°26’28.06”E	North
Distance to nearest WTG:	Land Use:
7.0 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking north towards the Project.

The topography is gently undulating.

Vegetation associated with a creekline is visible in the middleground of the view.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is highly modified and cleared for grazing.

The visual sensitivity has been rated as very low.

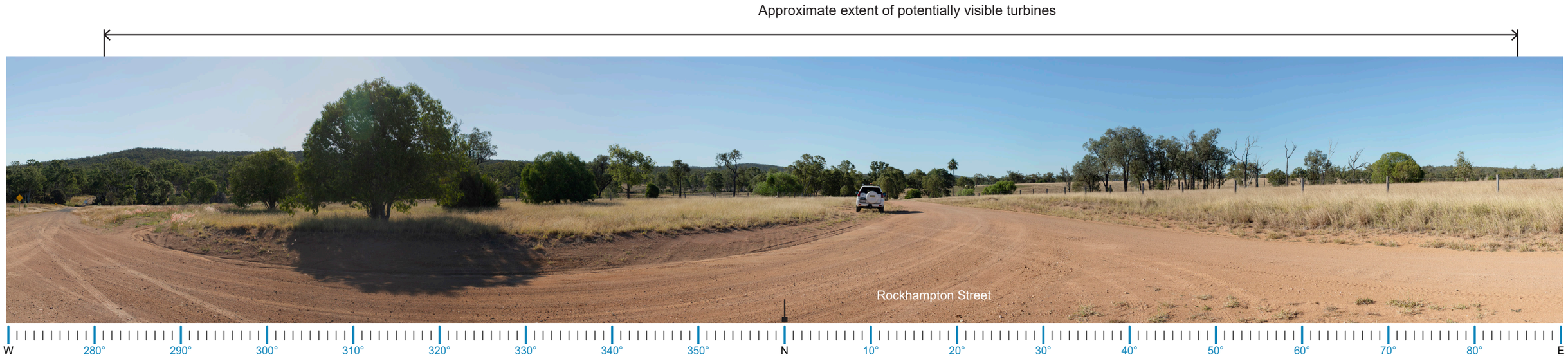
Potential Visual Impact:

A combination of vegetation and topography is likely to screen views toward the majority of the turbines. The turbines are likely to be difficult to discern due to distance and will occupy a small portion of the view.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (05/2023)

VP08 Rockhampton Street, Camboon



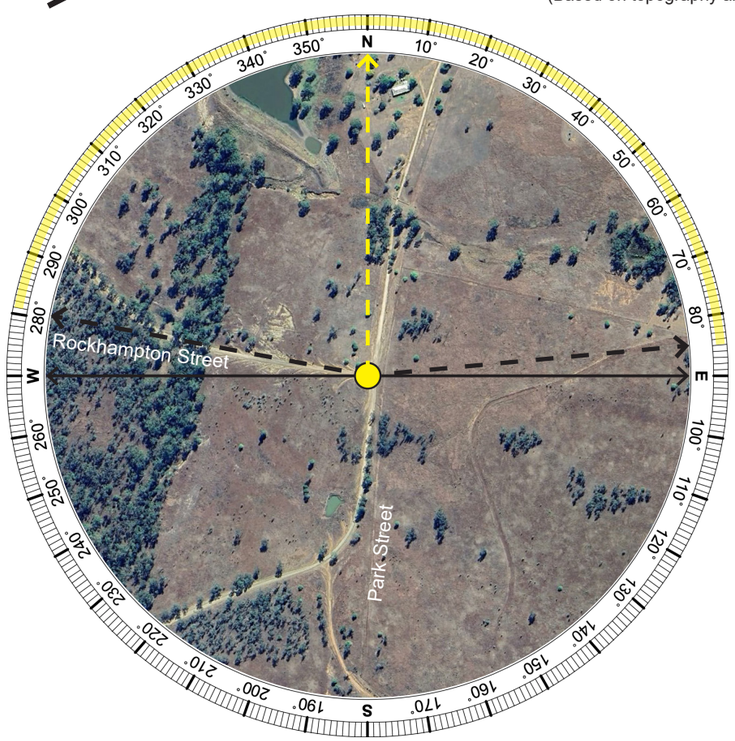
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP08

Viewpoint Summary:	
Location:	Elevation:
Rockhampton Street, Camboon	355 m
Coordinates:	Viewing Direction:
25° 2’4.02”S 150°26’0.89”E	North
Distance to nearest WTG:	Land Use:
1.8 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Rockhampton Street looking north towards the Project.

The topography is gently undulating.

Scattered vegetation associated with a creekline is visible in the middleground of the view and the densely vegetated ridge associated with the Project is visible in the background to the north/northwest

Rockhampton Street is a local unsealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is generally cleared and predominantly used for grazing.

The visual sensitivity has been rated as very low.

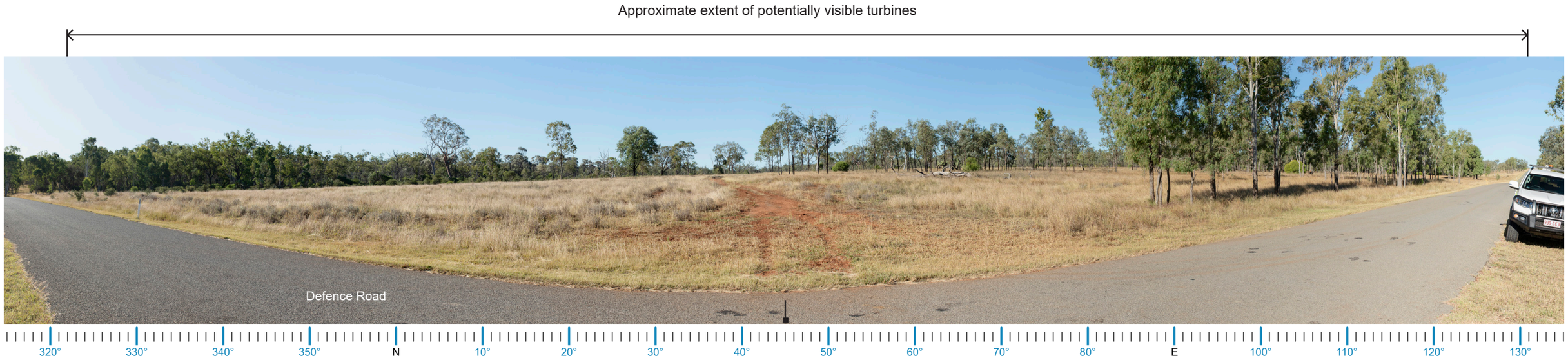
Potential Visual Impact:

Existing vegetation is likely to assist in fragmenting some views towards turbines, particularly to the north. However, due to proximity, the Project has the potential to be a dominant element from this location.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (05/2023)

VP09 Defence Road, Camboon



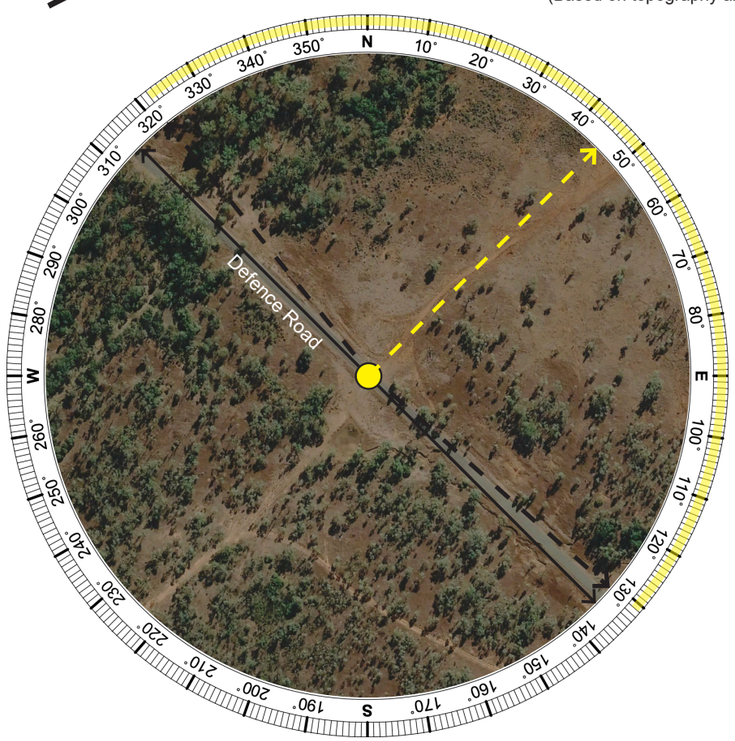
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP09

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	327 m
Coordinates:	Viewing Direction:
24°59'43.07"S 150°22'15.10"E	North East
Distance to nearest WTG:	Land Use:
0.9 km	Local Road
LCU:	Scenic Quality:
LCU01: Vegetated Hills	**MODERATE**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking northeast towards the Project.

The topography is gently undulating.

Scattered vegetation is visible along the road corridor to the northeast and dense vegetation to the northwest.

Defence Road is local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

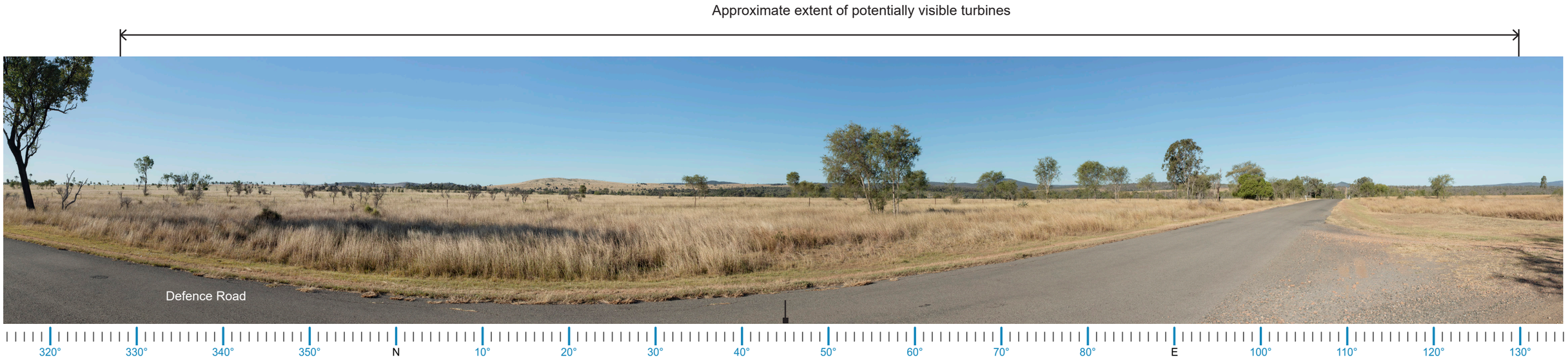
Potential Visual Impact:

A combination of topography and vegetation will assist in screening some views. However, due to the close proximity, portion of view affected and the scale of change experienced from this viewpoint, the Project will likely be a dominant element from this location.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP10 Defence Road, Camboon



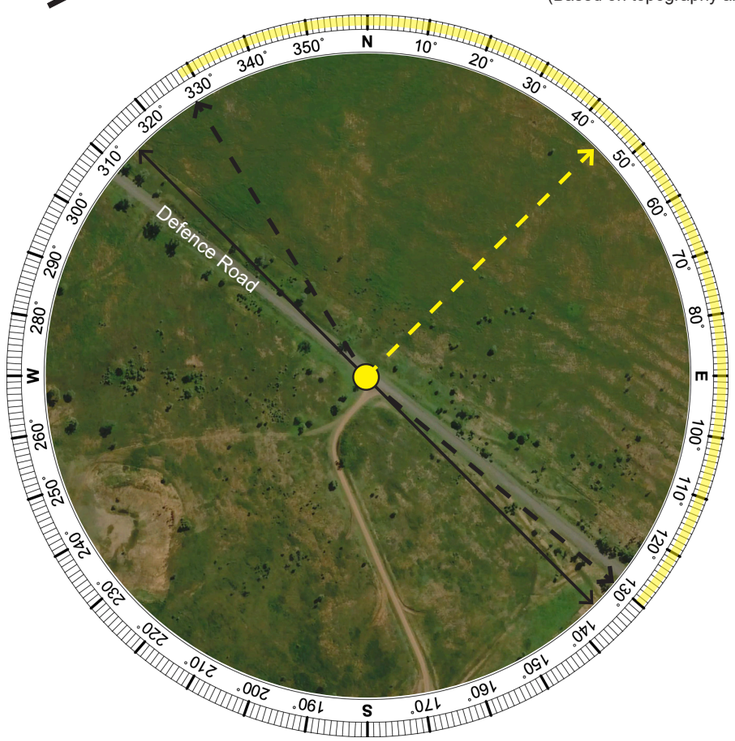
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP10

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	337 m
Coordinates:	Viewing Direction:
24°58'25.09"S 150°20'30.34"E	North East
Distance to nearest WTG:	Land Use:
1.0km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking northeast towards the Project.

The topography is generally flat.

Vegetation is intermittent and generally cleared allowing access to open views to the distant ridgelines. Some scattered vegetation is visible in the foreground of the view.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint has been modified and is predominantly used for grazing.

The visual sensitivity has been rated as very low.

Potential Visual Impact:

Due to the flat topography, lack of intervening vegetation, and close proximity of the project, the Project will be a dominant element from this location. The elements that contribute to the character of the view are likely to remain a key feature.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP11 Defence Road, Camboon

Approximate extent of potentially visible turbines



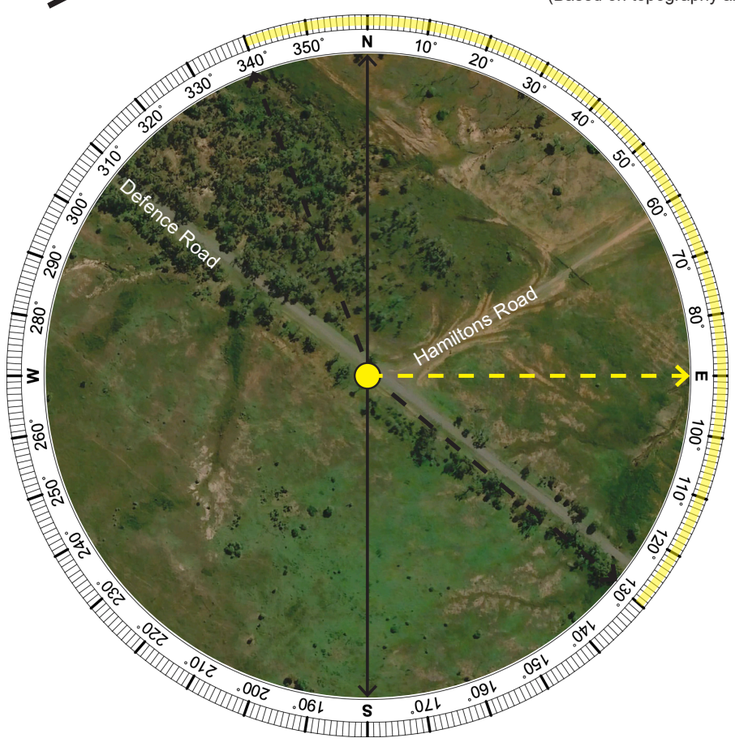
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP11

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	324 m
Coordinates:	Viewing Direction:
24°57'15.84"S 150°18'51.56"E	East
Distance to nearest WTG:	Land Use:
3.0 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking east towards the Project.

The topography is gently undulating.

Vegetation is intermittent and generally cleared towards the northeast/ east.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

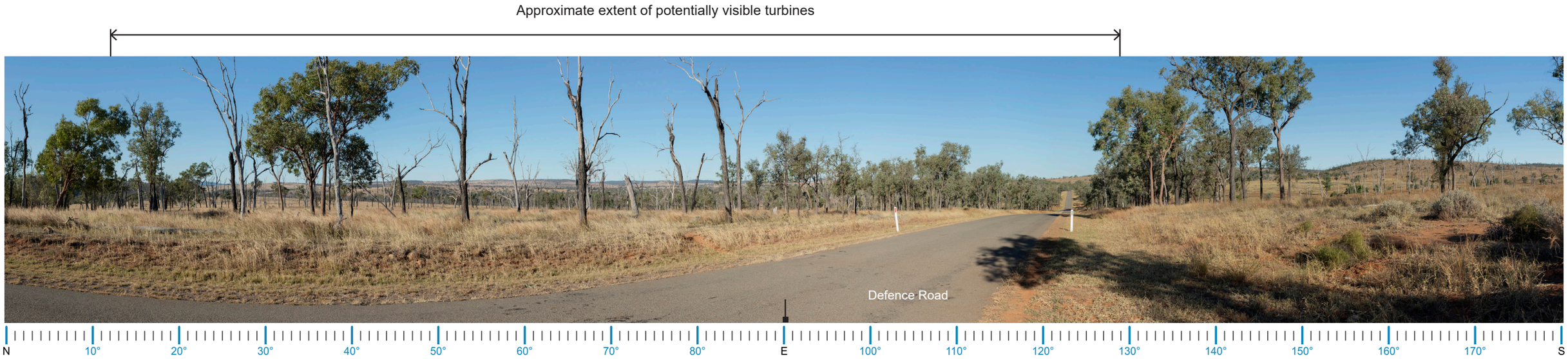
Potential Visual Impact:

Due to the proximity of the Project and lack of intervening vegetation, the Project is likely to be visible from this location. Due to the portion of view affected, it is likely that the Project will be a dominant element from this location.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP12 Defence Road, Camboon



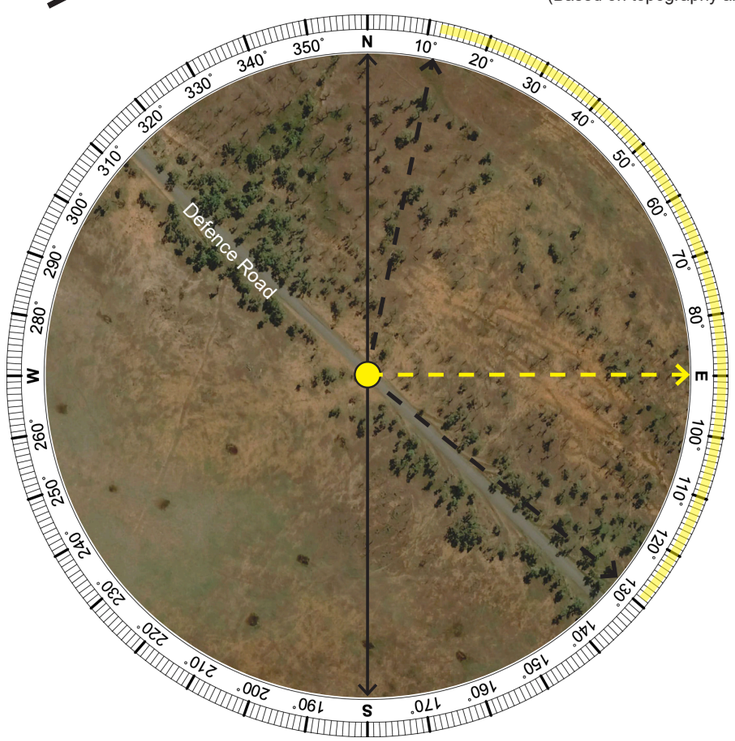
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP12

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	309 m
Coordinates:	Viewing Direction:
24°56'10.58"S 150°17'9.18"E	East
Distance to nearest WTG:	Land Use:
4.2 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking east towards the Project.

The topography is gently undulating.

Scattered vegetation is visible along the road corridor in the foreground of the view.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

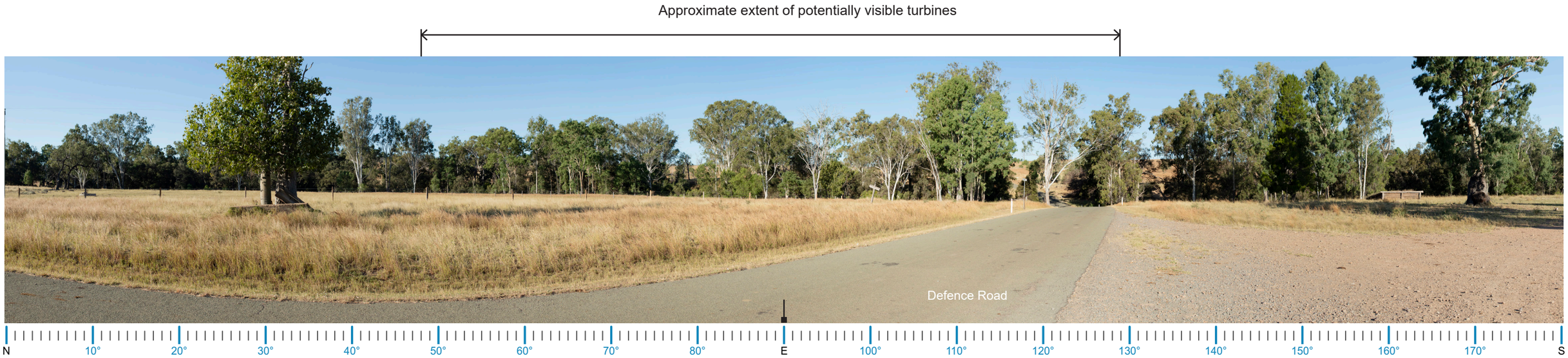
Potential Visual Impact:

Due to the proximity of the turbines, fragmented views are likely to be available between gaps in vegetation to the east from this location.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP13 Defence Road, Camboon



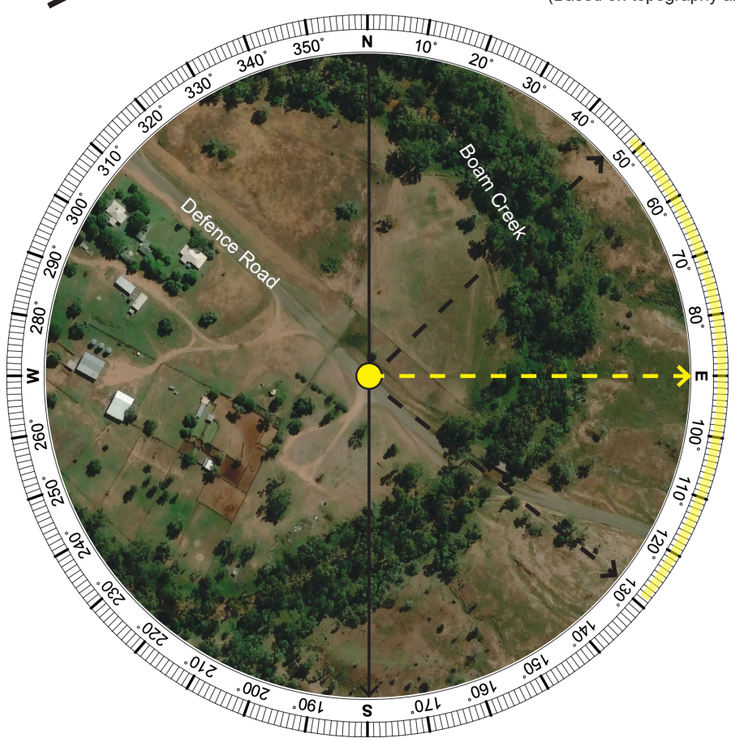
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP13

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	238 m
Coordinates:	Viewing Direction:
24°55'23.60"S 150°16'5.25"E	East
Distance to nearest WTG:	Land Use:
5.5 km	Local Road
LCU:	Scenic Quality:
LCU03: River and Creek Systems	**MODERATE**
Visual Sensitivity:	
LOW	
Visual Magnitude:	Visual Impact:
LOW	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking east towards the Project.

The topography is gently undulating and slopes towards Boam Creek to the east.

Dense vegetation associated with Boam Creek is visible in the middleground of the view.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as low.

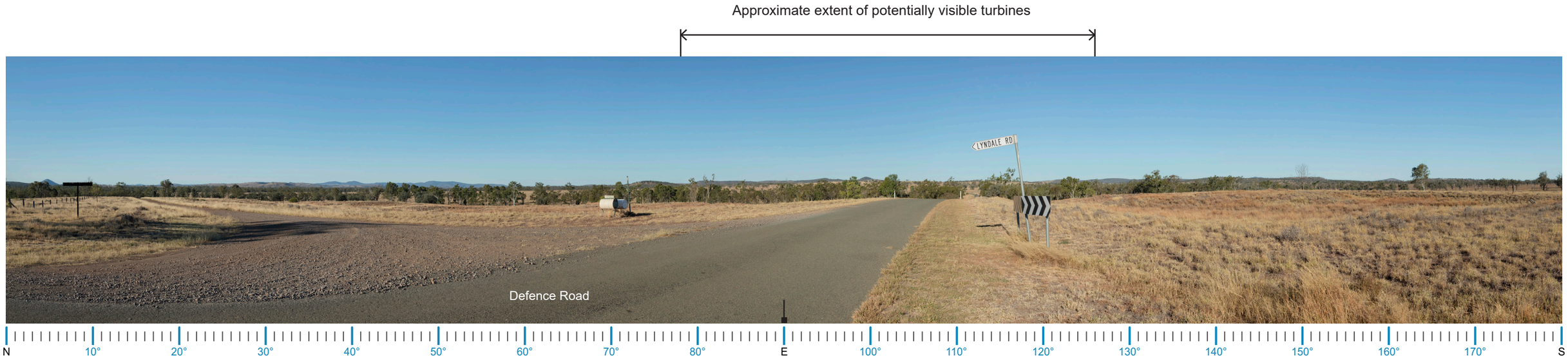
Potential Visual Impact:

Views from this location will likely be screened by dense vegetation and topography in the middleground.

The visual sensitivity is low and the visual magnitude is low. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP14 Defence Road, Camboon



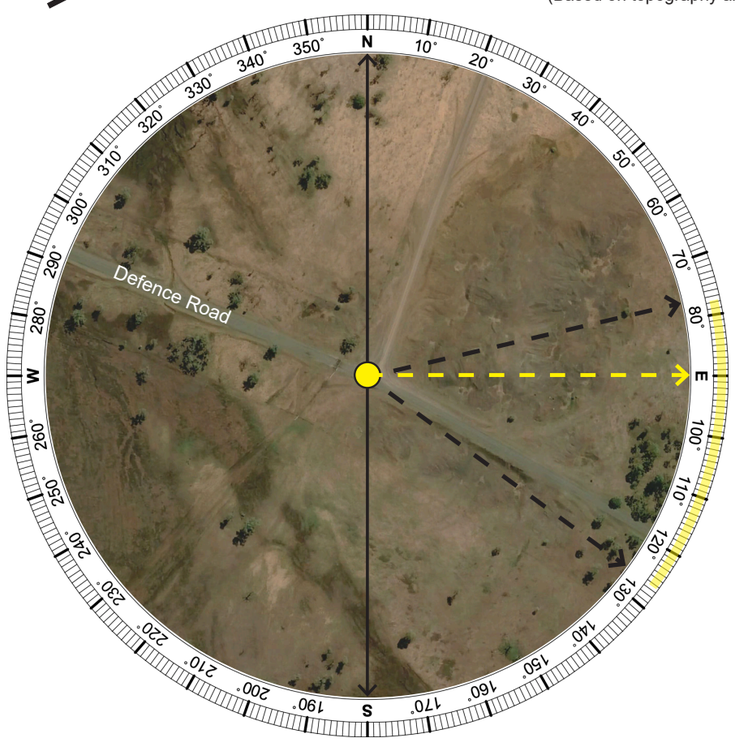
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP14

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	193 m
Coordinates:	Viewing Direction:
24°53'46.99"S 150°12'39.05"E	East
Distance to nearest WTG:	Land Use:
10.5 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking east towards the Project.

The topography is gently undulating.

Vegetation is generally cleared. Dense vegetation associated with Boam Creek is visible in the background of the view. Views to vegetated ridgelines are available in the distance.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

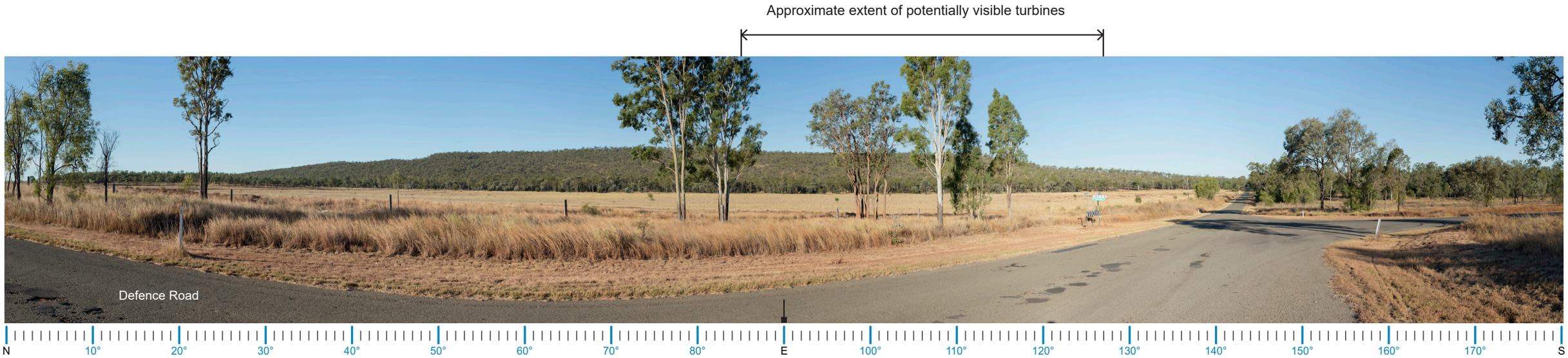
Potential Visual Impact:

Due to a combination of distance and existing vegetation along Boam Creek, the turbines are likely to be difficult to discern.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (03/2021)

VP15 Defence Road, Camboon



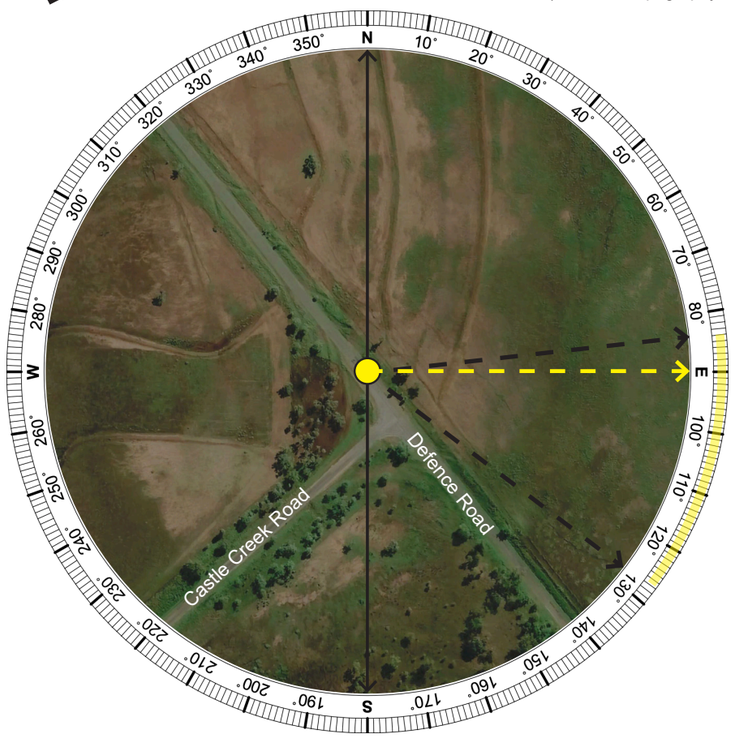
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP15

Viewpoint Summary:	
Location:	Elevation:
Defence Road, Camboon	173m
Coordinates:	Viewing Direction:
24°52'41.33"S 150°11'24.31"E	East
Distance to nearest WTG:	Land Use:
13 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Defence Road looking east towards the Project.

The topography is gently undulating.

Scattered vegetation is visible in the foreground along the road corridor and a densely vegetated ridgeline is visible in the middleground of the view.

Defence Road is a local sealed road connecting the towns of Cracow, Theodore and Banana.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

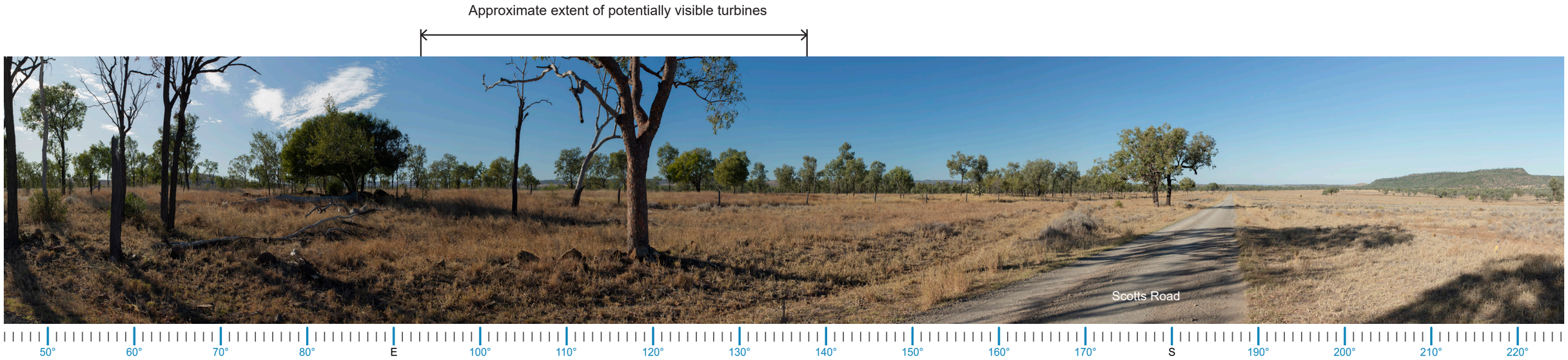
Potential Visual Impact:

Topography is likely to screen views towards the Project from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (03/2021)

VP16 Scotts Road, Castle Creek



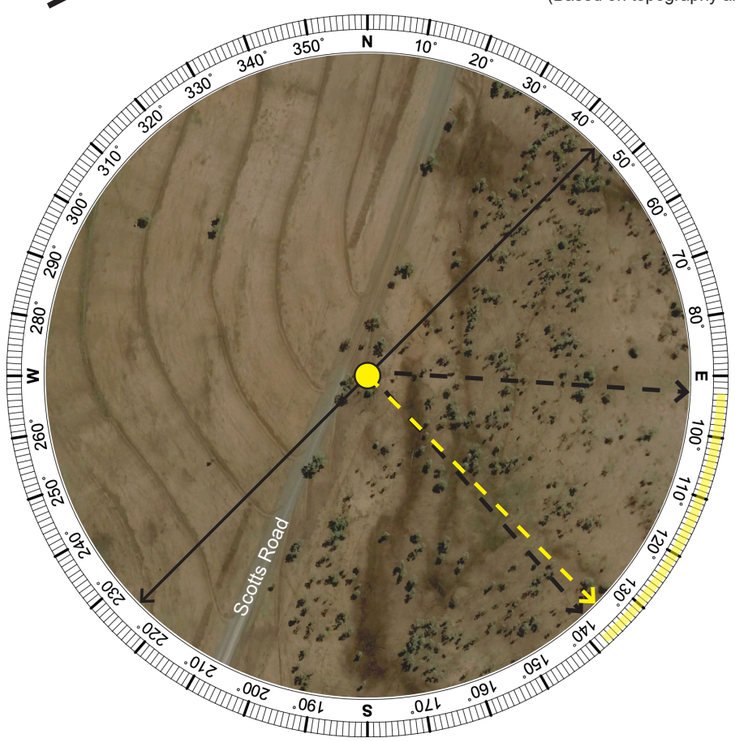
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP16

Viewpoint Summary:	
Location:	Elevation:
Scotts Road, Castle Creek	208 m
Coordinates:	Viewing Direction:
24°51'3.06"S 150°13'46.26"E	Southeast
Distance to nearest WTG:	Land Use:
10.5 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Scotts Road looking southeast towards the Project.

The topography is flat to gently undulating.

Scattered vegetation is visible to the east of the road corridor.

Scotts Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

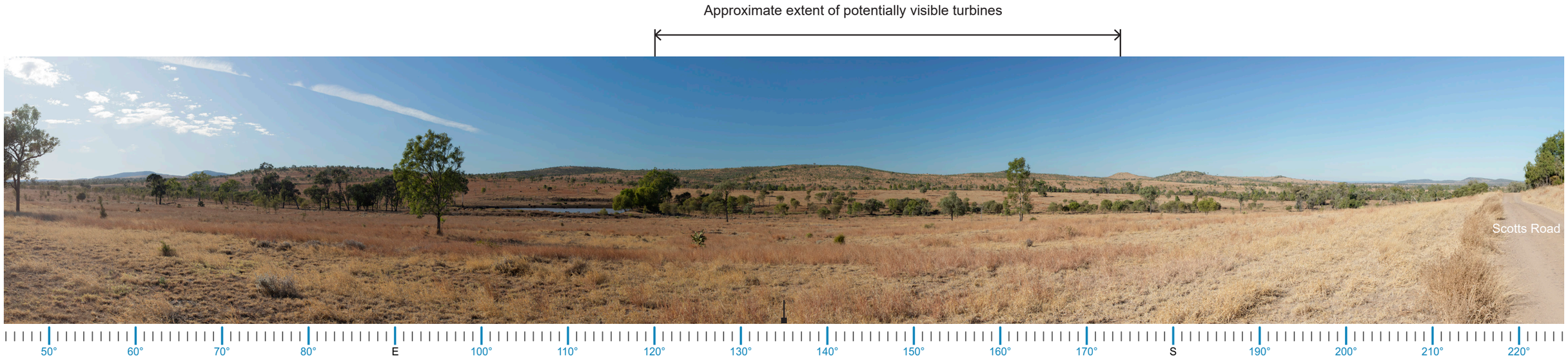
Potential Visual Impact:

Due to a combination of distance and existing screening vegetation to the southeast, the turbines are unlikely to be visible from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (03/2021)

VP17 Scotts Road, Castle Creek



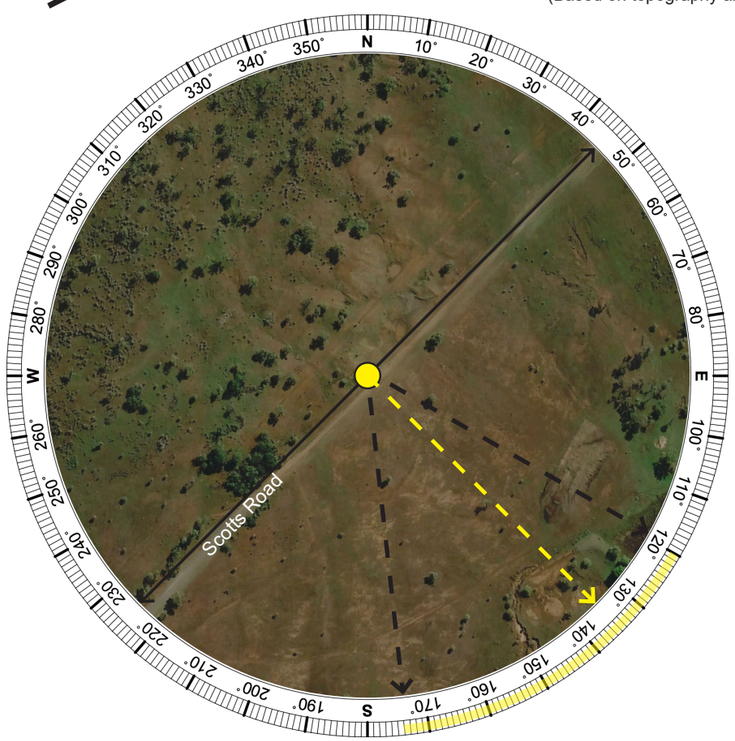
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP17

Viewpoint Summary:	
Location:	Elevation:
Scotts Road, Castle Creek	277 m
Coordinates:	Viewing Direction:
24°46'41.15"S 150°16'41.33"E	Southeast
Distance to nearest WTG:	Land Use:
13 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Scotts Road looking southeast towards the Project.

The topography is gently undulating.

Scattered vegetation is visible in the middleground of the view.

Scotts Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as low.

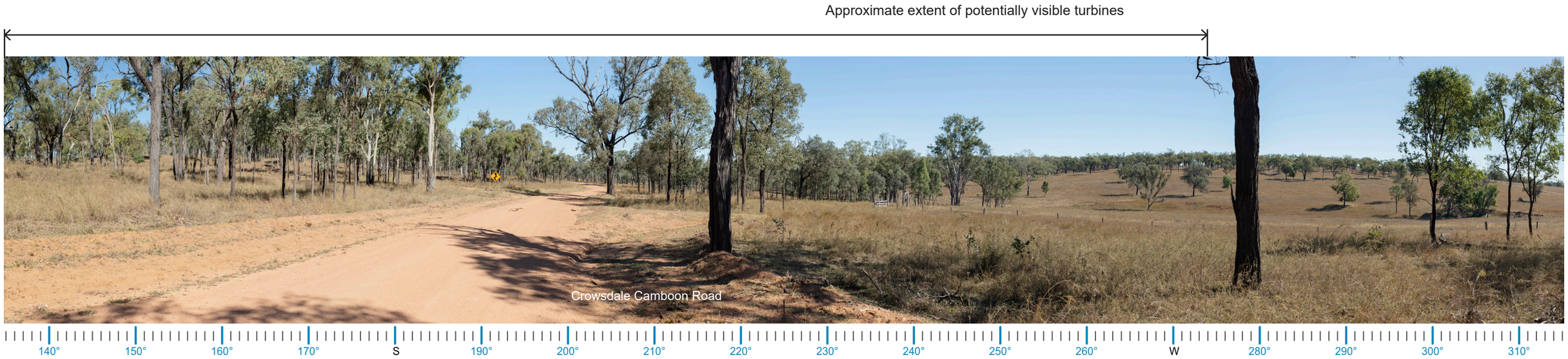
Potential Visual Impact:

Topography is likely to screen views towards the Project from this location.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (07/2023)

VP18 Crowsdale Camboon Road, Camboon



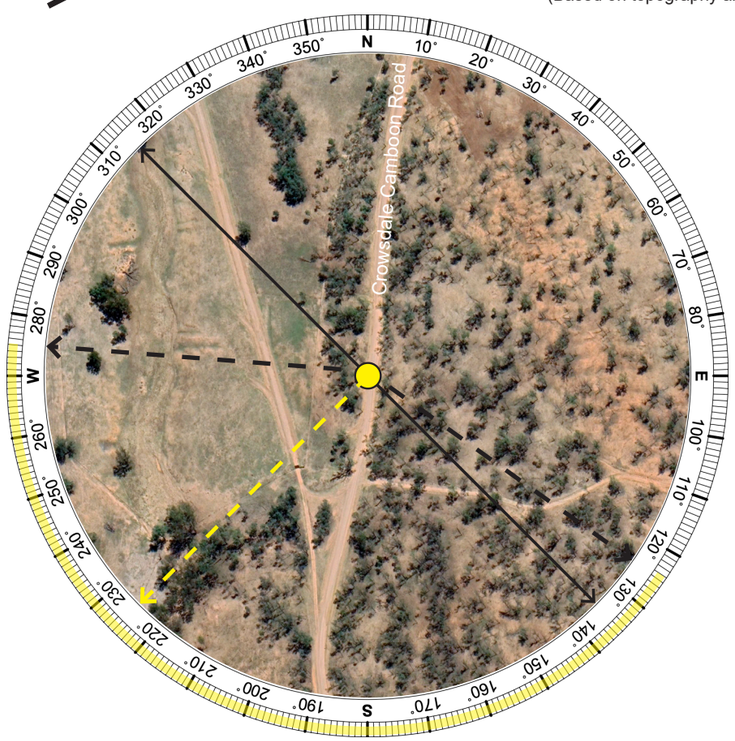
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP18

Viewpoint Summary:	
Location:	Elevation:
Crowsdale Camboon Road, Camboon	344 m
Coordinates:	Viewing Direction:
24°51’46.25”S 150°28’12.76”E	Southwest
Distance to nearest WTG:	Land Use:
4.5 km	Local Road
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken from Crowsdale Camboon Road looking south towards the Project.

The topography is gently undulating.

Scattered vegetation is visible in the foreground of the view.

Crowsdale Camboon Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

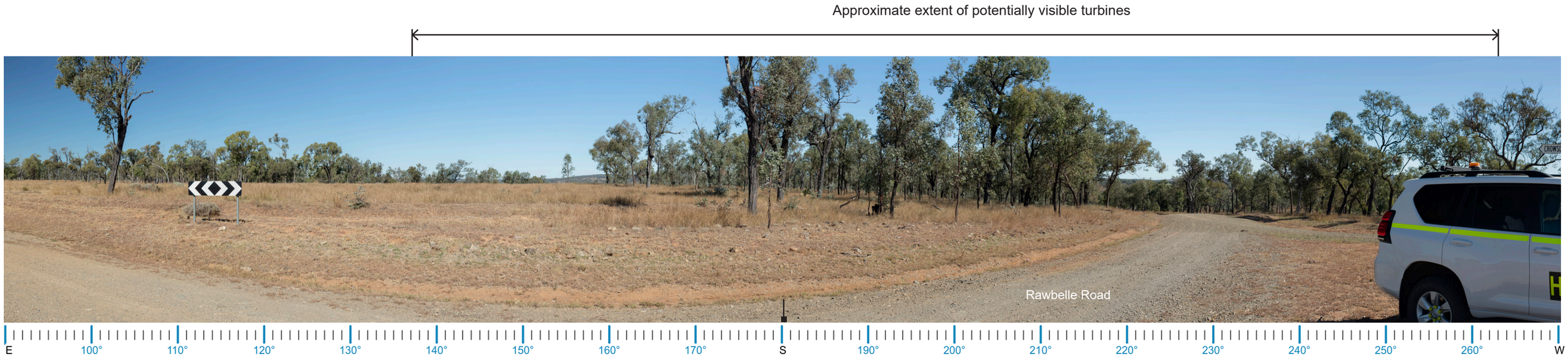
Potential Visual Impact:

Due to a combination of existing vegetation and topography, the majority of views toward the Project are likely to be screened.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (05/2023)

VP19 Corner Rawbelle Road and Crowsdale Camboon Road, Camboon



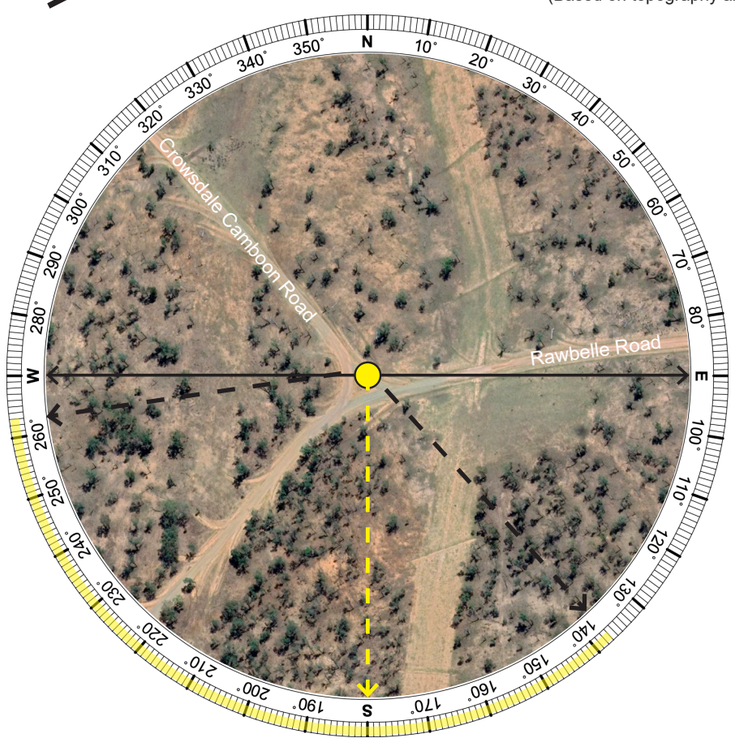
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP19

Viewpoint Summary:	
Location:	Elevation:
Corner Rawbelle Road and Crowsdale Camboon Road, Camboon	367m
Coordinates:	Viewing Direction:
24°51'5.81"S 150°28'41.05"E	South
Distance to nearest WTG:	Land Use:
5.5 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Aerial Image Source: Google Earth (05/2023)

Existing Landscape Character Description:

This viewpoint is taken from the corner of Rawbelle Road and Crowsdale Camboon Road looking south towards the Project.

The topography is gently undulating.

Scattered vegetation is visible along the road corridor in the foreground of the view.

Rawbelle Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

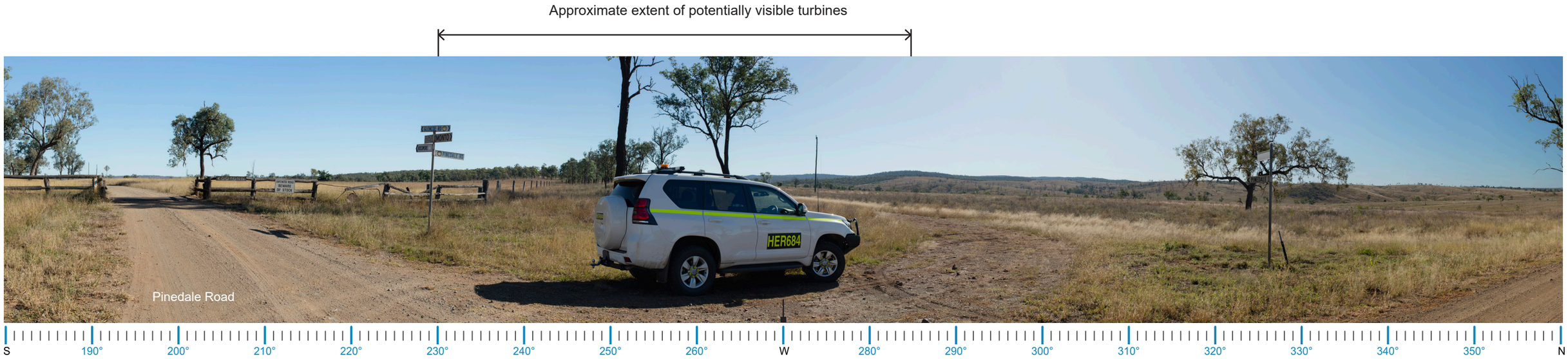
The visual sensitivity has been rated as very low.

Potential Visual Impact:

The turbines may be noticeable but will not form a dominant element in the landscape. Views towards the majority of the turbines will likely be screened by existing vegetation.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

VP20 Corner Glencoe Road and Pinedale Road, Rawbelle



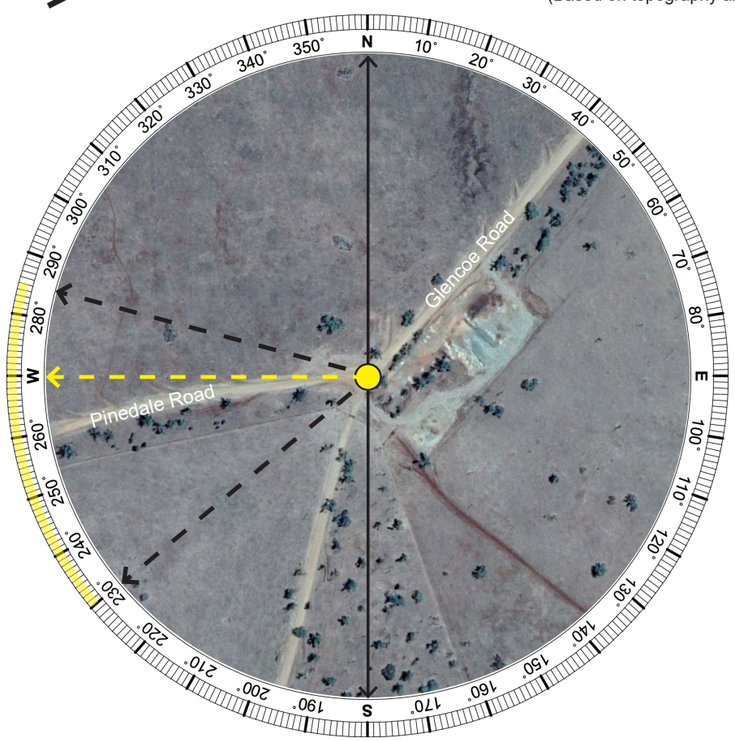
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP20

Viewpoint Summary:	
Location:	Elevation:
Corner Glencoe Road and Pinedale Road, Rawbelle	369 m
Coordinates:	Viewing Direction:
24°55'13.79"S 150°40'15.41"E	West
Distance to nearest WTG:	Land Use:
13.5 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken from the corner of Glencoe Road and Pinedale Road looking west towards the Project.

The topography is gently undulating.

Vegetation in the foreground is generally cleared and scattered roadside vegetation is visible in the middleground to the northwest. Views to vegetated hills are available in the background of the view to the west.

Pinedale Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

Potential Visual Impact:

Due to distance, existing vegetation to the north and topography, the Project is unlikely to result in the modification of the visual catchment from this location.

The visual sensitivity is very low and the visual magnitude is low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (06/2023)

VP21 Glencoe Road, Rawbelle

Approximate extent of potentially visible turbines



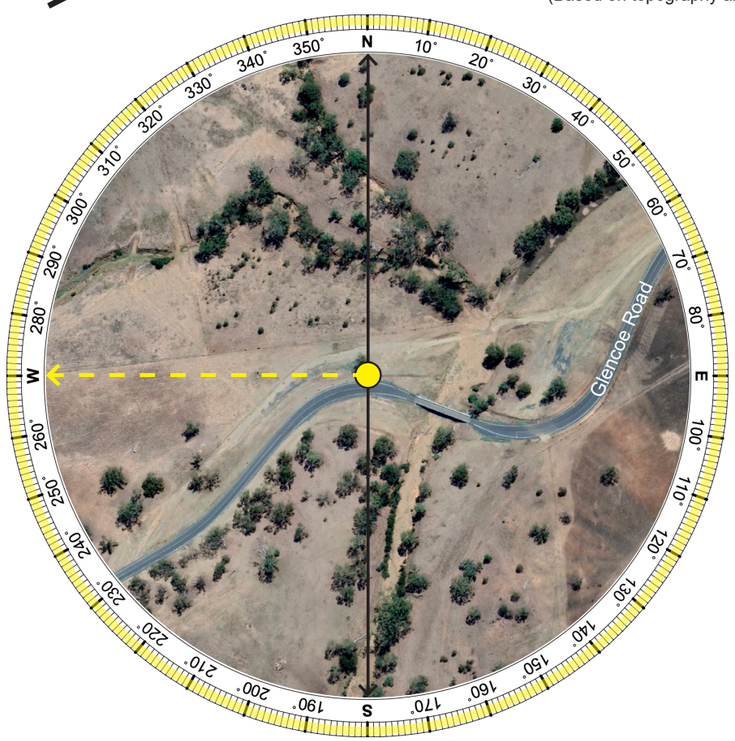
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP21

Viewpoint Summary:	
Location:	Elevation:
Glencoe Road, Rawbelle	299 m
Coordinates:	Viewing Direction:
24°53’48.71”S 150°41’45.98”E	West
Distance to nearest WTG:	Land Use:
16.5 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken from Glencoe Road looking west towards the Project.

The topography is gently undulating.

The land is generally cleared with some vegetation visible in the foreground and middleground of the view.

Glencoe Road is a local sealed road connecting the towns of Harrami and Rawbelle.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

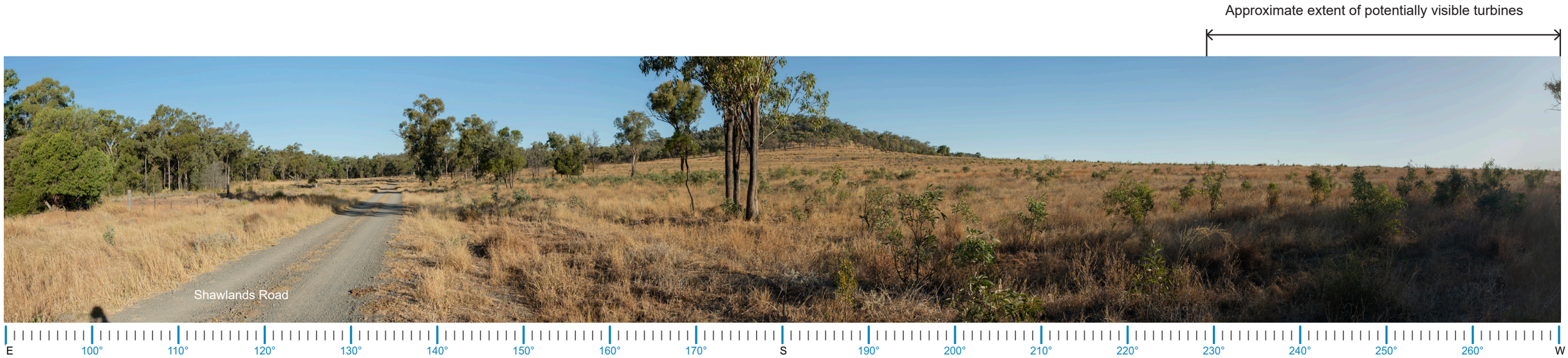
Potential Visual Impact:

Due to a rise in topography to the west, the Project will likely be screened from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (06/2022)

VP22 Shawlands Road, Castle Creek



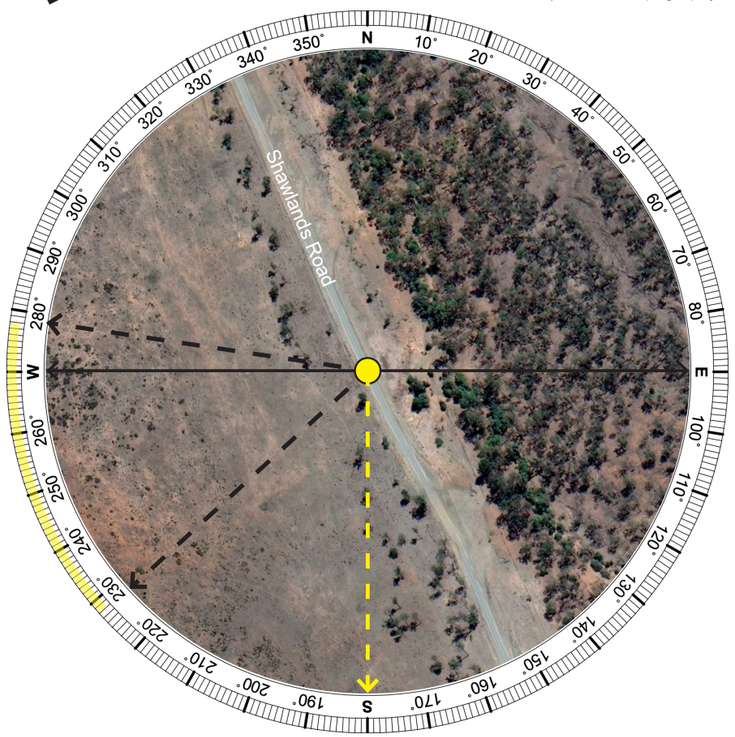
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP22

Viewpoint Summary:	
Location:	Elevation:
Shawlands Road, Castle Creek	395 m
Coordinates:	Viewing Direction:
24°43’20.06”S 150°22’55.11”E	South
Distance to nearest WTG:	Land Use:
15.5 km	Local Road
LCU:	Scenic Quality:
LCU01: Vegetated Hills	**MODERATE**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Shawlands Road looking south towards the Project.

The topography is gently undulating.

Scattered vegetation is visible in the foreground to the south of the view and dense vegetation is visible in the background.

Shawlands Road is a local unsealed road providing connection to agriculture farmland and rural dwellings.

Land surrounding the viewpoint is used for production forestry and grazing.

The visual sensitivity has been rated as very low.

Potential Visual Impact:

Due to a rise in topography to the south, the Project will likely be screened from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (07/2023)

VP23 Shawlands Road, Castle Creek

Approximate extent of potentially visible turbines



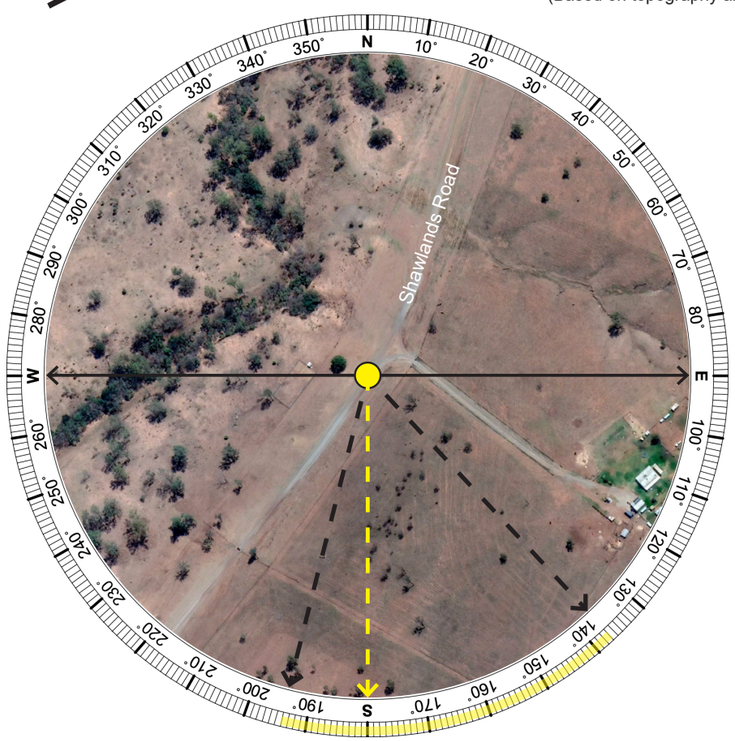
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP23

Viewpoint Summary:	
Location:	Elevation:
Shawlands Road, Castle Creek	319 m
Coordinates:	Viewing Direction:
24°42'58.50"S 150°20'35.30"E	South
Distance to nearest WTG:	Land Use:
17 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
VERY LOW	**VERY LOW**

Existing Landscape Character Description:

This viewpoint is taken along Shawlands Road looking south towards the Project.

The topography is gently undulating.

Scattered vegetation is visible in the middleground of the view from this location.

Shawlands Road is a local unsealed road providing connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

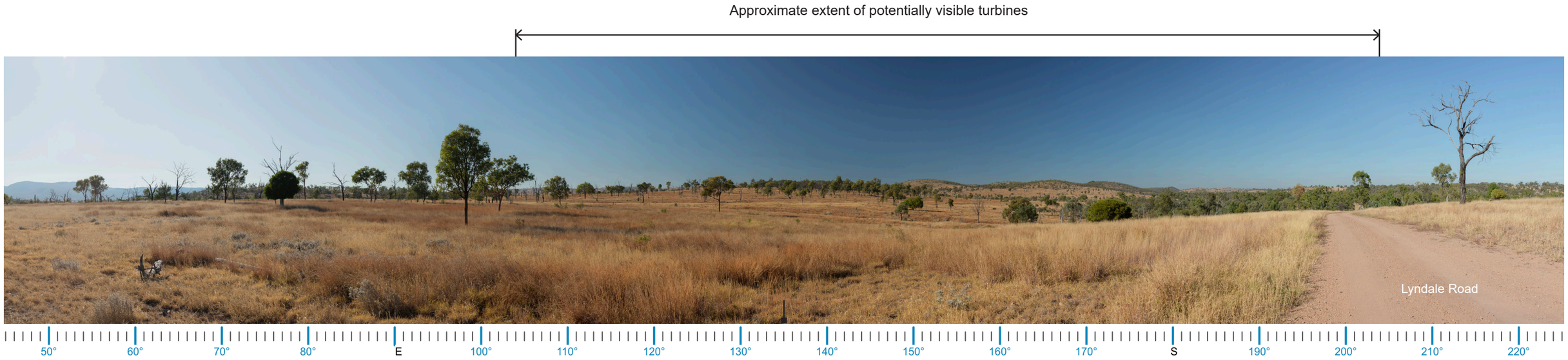
Potential Visual Impact:

Due to a rise in topography to the south, the Project will likely be screened from this location.

The visual sensitivity is very low and the visual magnitude is very low. Therefore, the visual impact rating is determined to be very low.

Aerial Image Source: Google Earth (07/2023)

VP24 Lyndale Road, Camboon



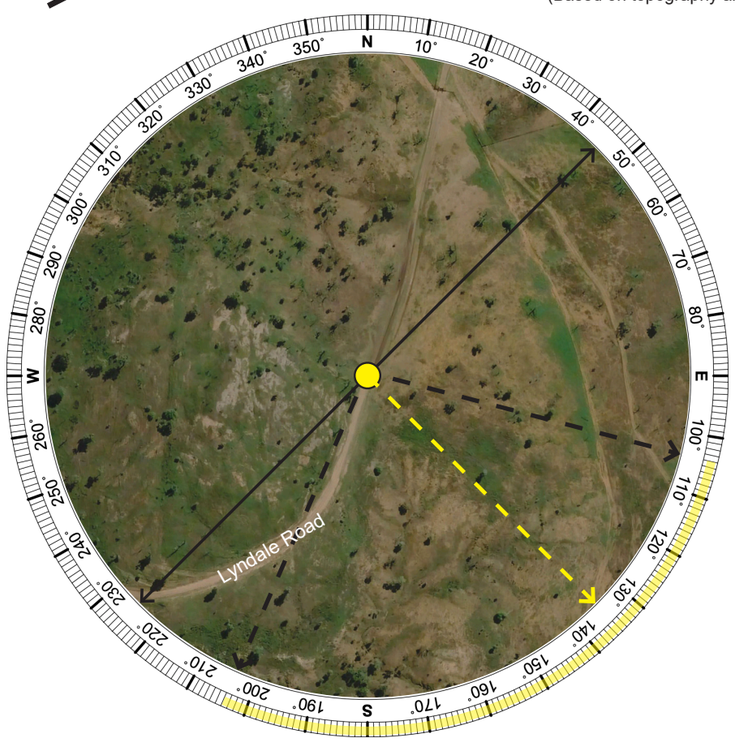
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP24

Viewpoint Summary:	
Location:	Elevation:
Lyndale Road, Camboon	203 m
Coordinates:	Viewing Direction:
24°51'42.19"S 150°16'15.05"E	Southeast
Distance to nearest WTG:	Land Use:
5.3 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken from Lyndale Road looking south towards the Project.

The topography is gently undulating.

Vegetation is intermittent allowing views to vegetated hills to the south. Existing vegetation along Seven Mile Creek is visible to the south.

Lyndale Road is a local unsealed road.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

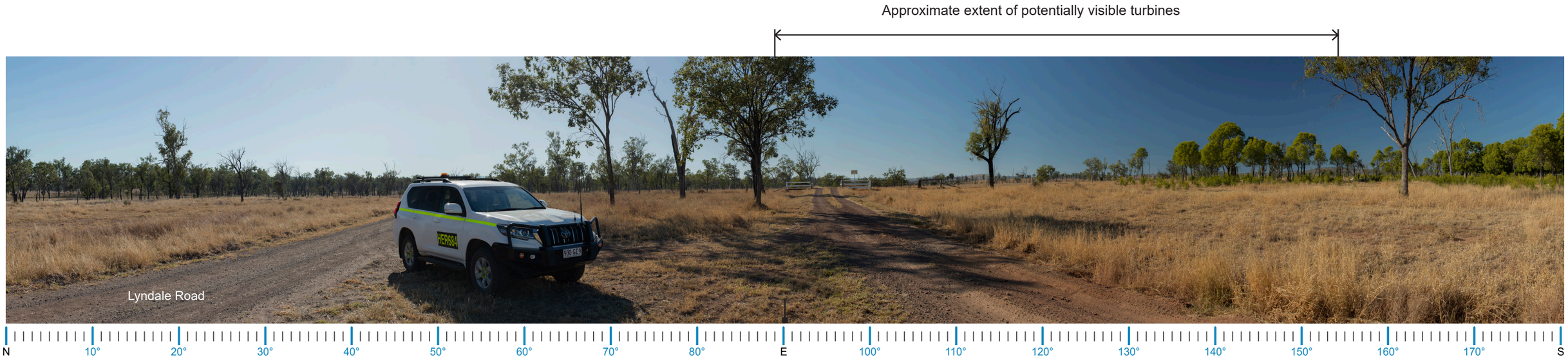
Potential Visual Impact:

Existing vegetation in the background is likely to fragment some views towards the Project. Views towards turbines are likely to be available in the distance, however, they will occupy a small portion of the view from this location.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP25 Lyndale Road, Castle Creek



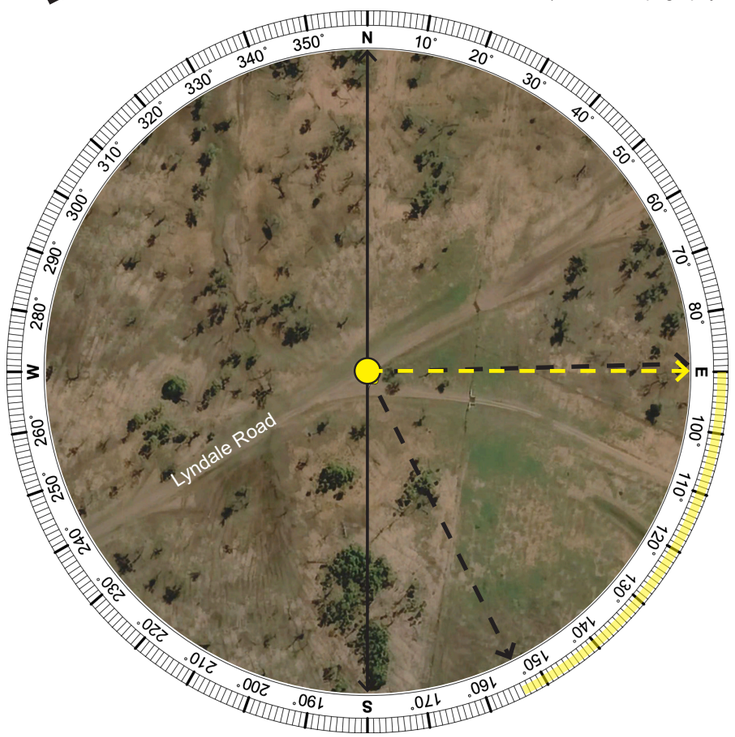
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP25

Viewpoint Summary:	
Location:	Elevation:
Lyndale Road, Camboon	204 m
Coordinates:	Viewing Direction:
24°50'20.84"S 150°19'24.67"E	East
Distance to nearest WTG:	Land Use:
6.5 km	Local Road
LCU:	Scenic Quality:
LCU02: Modified Undulating Pastures	**LOW**
Visual Sensitivity:	
VERY LOW	
Visual Magnitude:	Visual Impact:
MODERATE	**LOW**

Existing Landscape Character Description:

This viewpoint is taken along Lyndale Road looking east towards the Project.

The topography is gently undulating.

Vegetation is visible in the foreground and middleground of the view from this location.

Lyndale Road is a local unsealed road which serves as a connection to agricultural farmland and rural dwellings.

Land surrounding the viewpoint is predominantly used for agricultural activities.

The visual sensitivity has been rated as very low.

Potential Visual Impact:

The Project is likely to occupy a small portion of the view to the east. From this location the views of the Project would be filtered by intervening vegetation and not become a dominant feature in the landscape.

The visual sensitivity is very low and the visual magnitude is moderate. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

VP26 Leichhardt Highway Rest Area, Theodore QLD



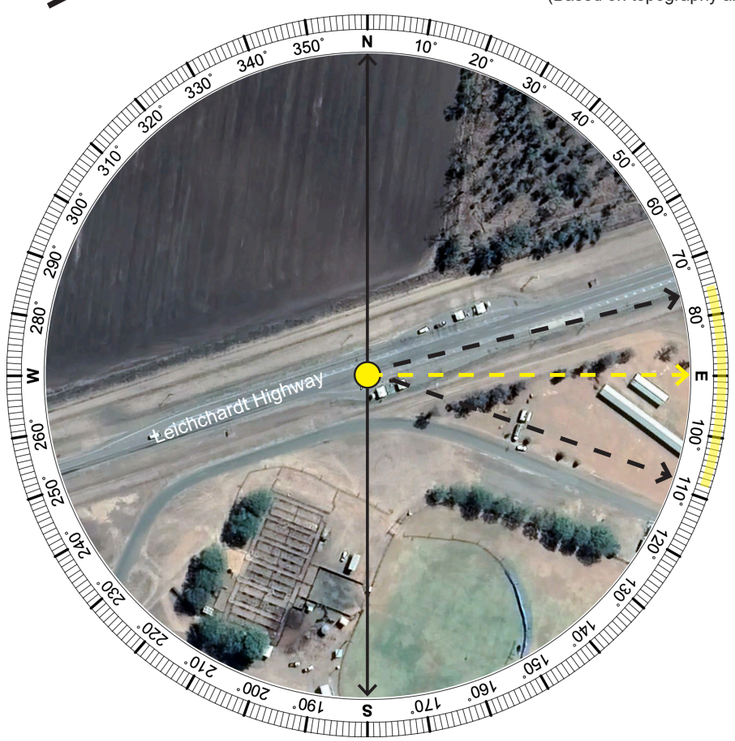
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines (Based on topography alone)



VIEWPOINT VP26

Viewpoint Summary:	
Location:	Elevation:
Leichhardt Highway Rest Area, Theodore QLD	142 m
Coordinates:	Viewing Direction:
24°56'07.09"S 150°04'29.71"E	East
Distance to nearest WTG:	Land Use:
22.5 km	Rest Area
LCU:	Scenic Quality:
LCU04: Irrigated Pastures	**LOW**
Visual Sensitivity:	
MODERATE	
Visual Magnitude:	Visual Impact:
VERY LOW	**LOW**

Existing Landscape Character Description:

This viewpoint is taken at a rest area along Leichhardt Road looking east towards the Project.

The topography is flat with little variation.

Vegetation is visible in the foreground and middleground of the view from this location.

Leichhardt Highway is a major road which serves as a connection for the town of Theodore.

Land surrounding the viewpoint is predominantly cleared and used for agricultural activities.

The visual sensitivity has been rated as Moderate.

Potential Visual Impact:

From this location the views of the Project would be filtered by intervening vegetation and is likely to be indiscernible due to the distance.

The visual sensitivity is Moderate and the visual magnitude is Very Low. Therefore, the visual impact rating is determined to be low.

Aerial Image Source: Google Earth (07/2023)

B

Photomontages

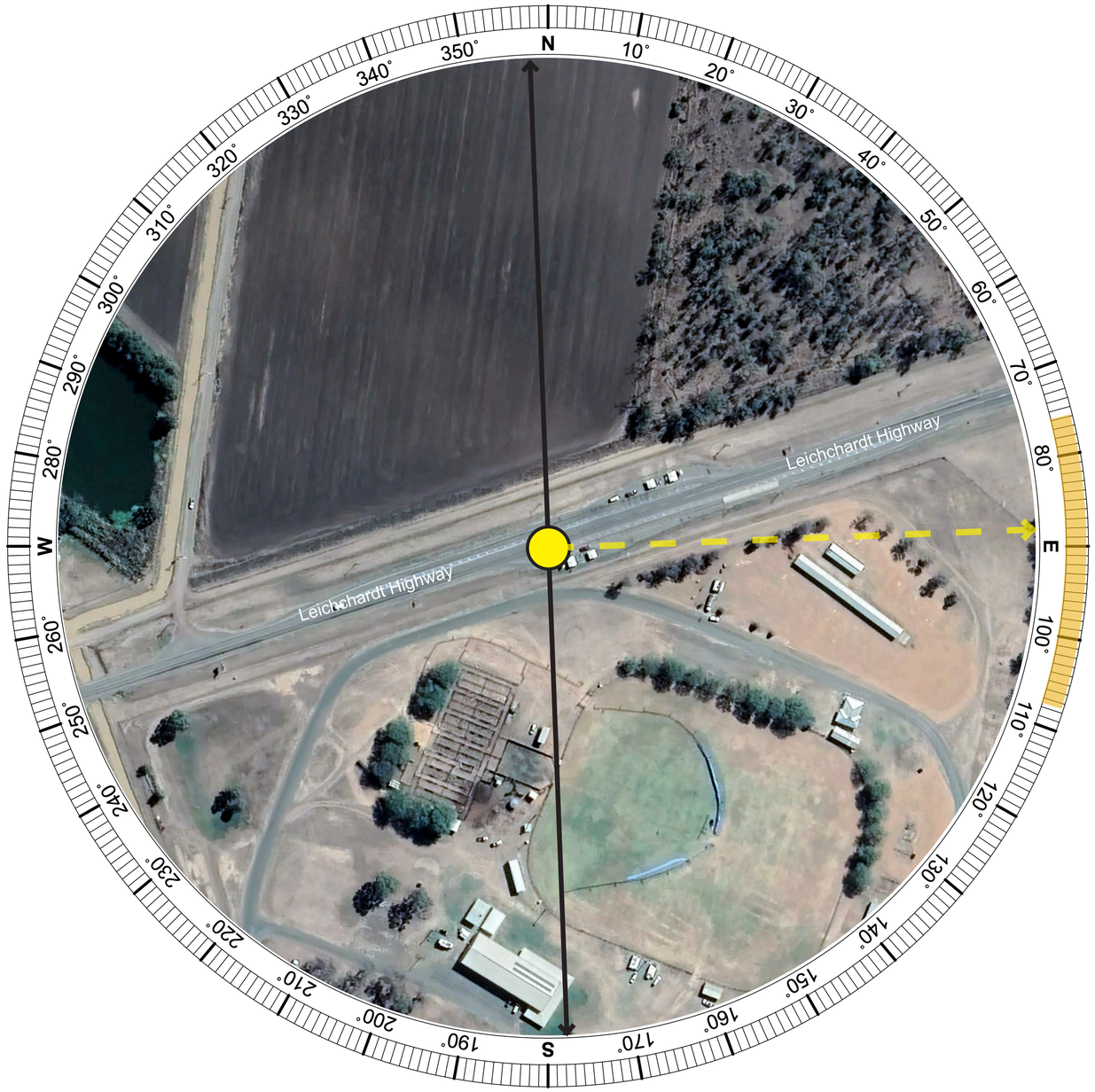
PM01

LEGEND

Viewing direction and centre of photomontage

Extent of photomontage

Approx. extent of visible turbines (based on topography alone)



Photomontage 01

Location:

Leichhardt Highway Rest Area, Theodore QLD

Photograph Date and Time:

8th May 2023 12:14pm

Coordinates:

24°56’07.09”S, 150°04’29.71”E

Distance to Nearest WTG:

22.5 km

Viewing Direction:

East

Elevation:

142 m

Aerial Image Source: ARCGIS 2024

PM01

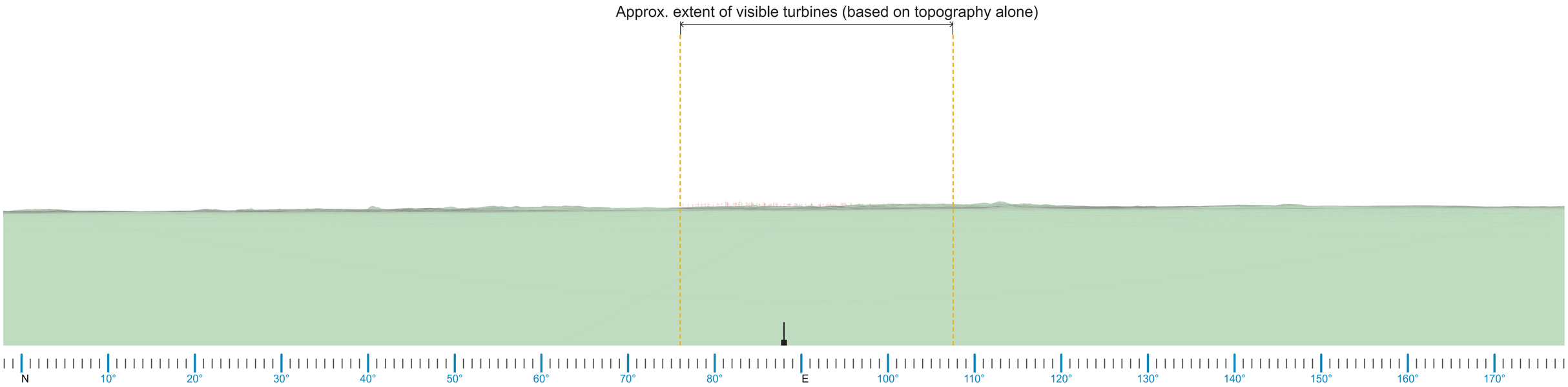


Existing View | 180° Baseline Panorama

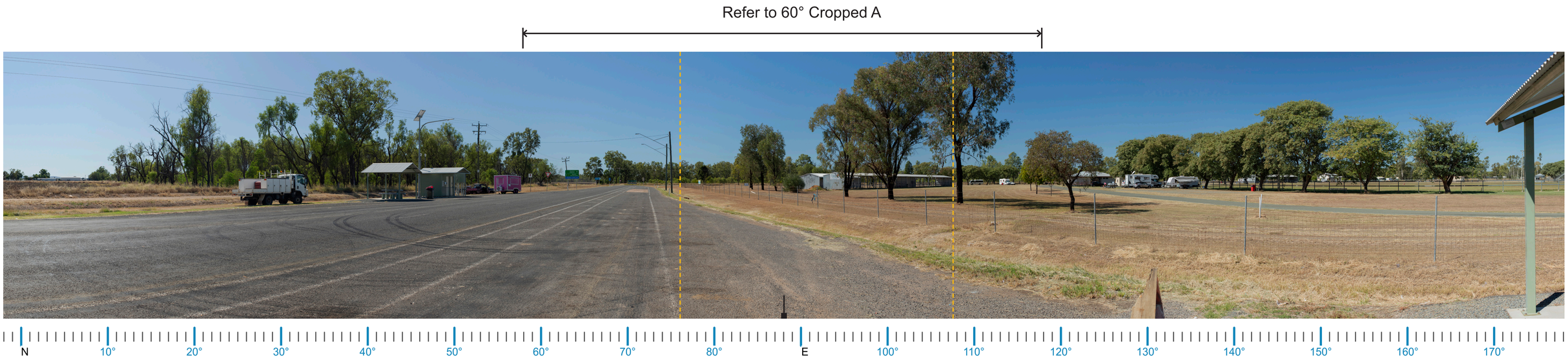


Proposed View | 180° Photomontage

PM01



Wireframe Diagram



Proposed View | 180° Photomontage

PM01A



Proposed View | 60° Cropped (A)

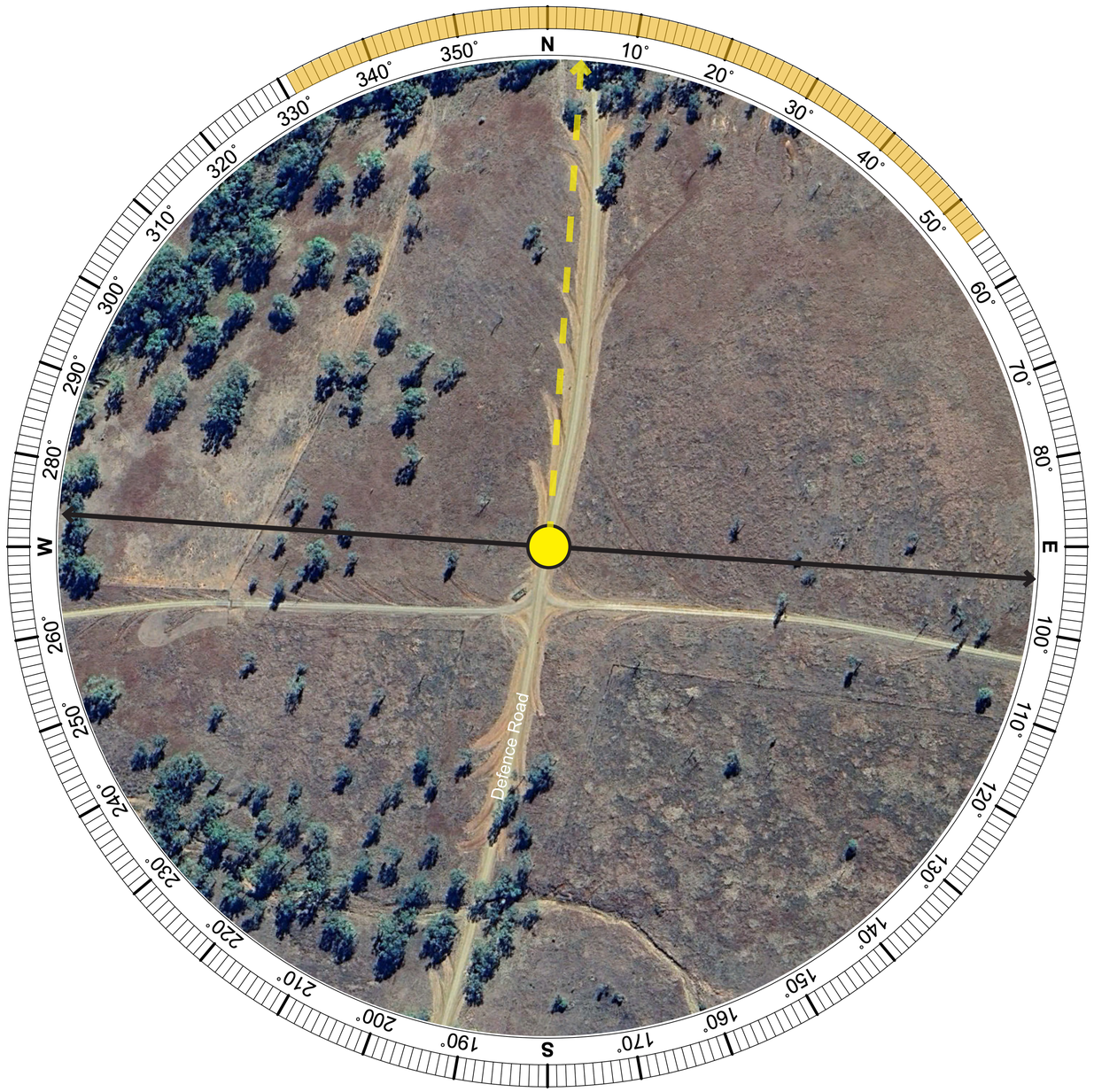
PM02

LEGEND

Viewing direction and centre of photomontage

Extent of photomontage

Approx. extent of visible turbines (based on topography alone)



Aerial Image Source: ARCGIS 2024

Photomontage 02

Location:

Defence Road, Camboon QLD

Photograph Date and Time:

8th May 2023 3:52pm

Coordinates:

25°05’07.48”S, 150°26’28.06”E

Distance to Nearest WTG:

6.6 km

Viewing Direction:

North

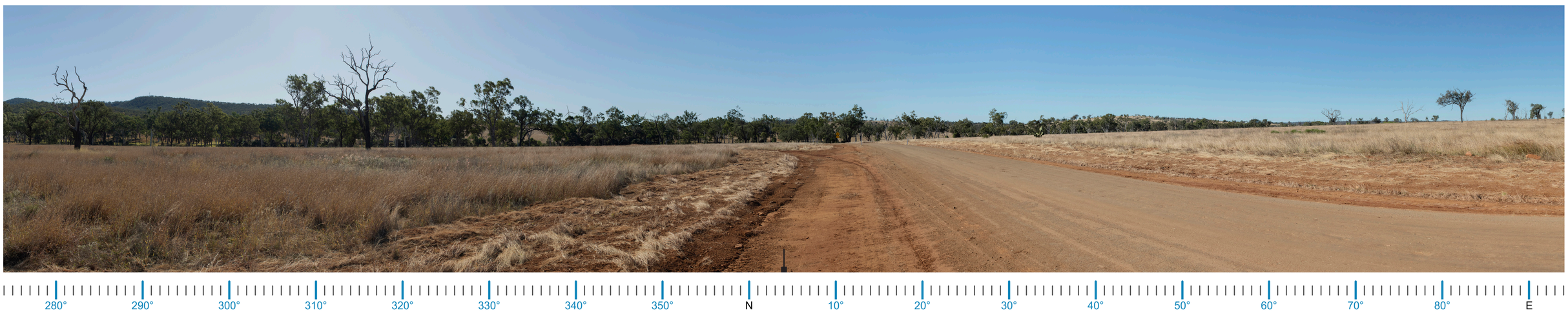
Elevation:

336 m

PM02

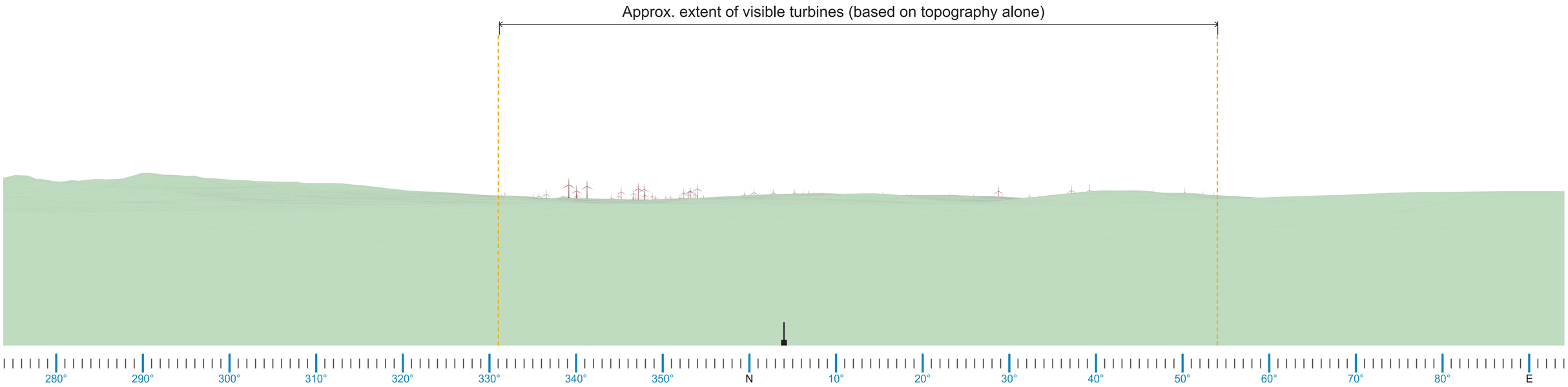


Existing View | 180° Baseline Panorama

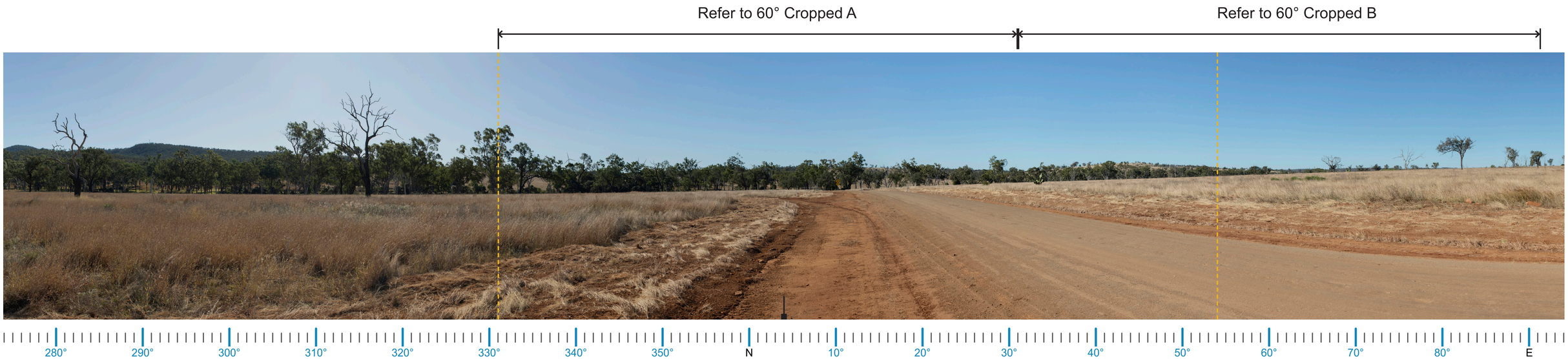


Proposed View | 180° Photomontage

PM02



Wireframe Diagram



Proposed View | 180° Photomontage

PM02A



Proposed View | 60° Cropped (A)

PM02B



Proposed View | 60° Cropped (B)

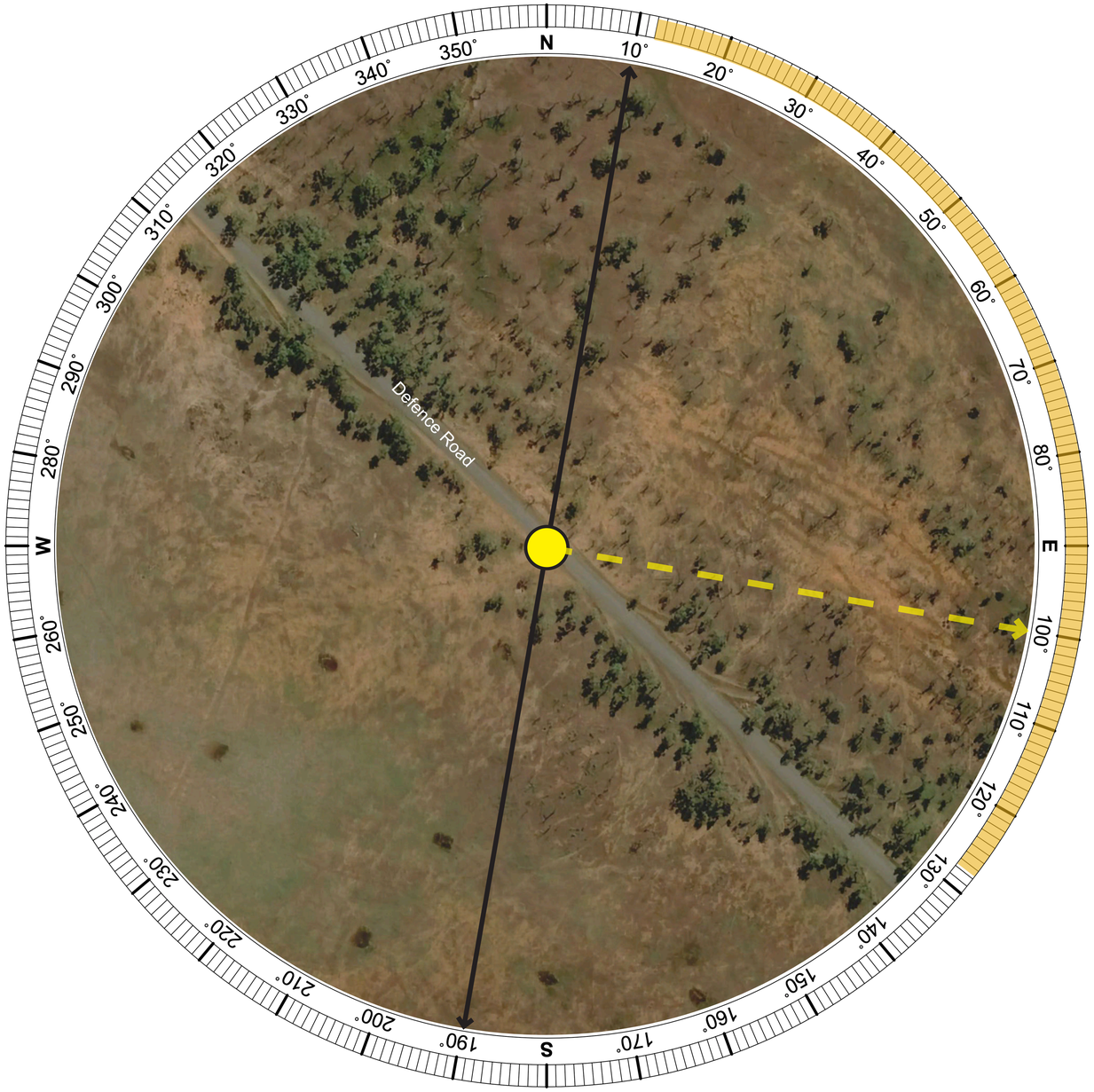
PM03

LEGEND

Viewing direction and centre of photomontage

Extent of photomontage

Approx. extent of visible turbines (based on topography alone)



Photomontage 03

Location:

Defence Road, Camboon QLD

Photograph Date and Time:

8th May 2023 4:43pm

Coordinates:

24°56’10.58”S, 150°17’9.18”E

Distance to Nearest WTG:

3.3 km

Viewing Direction:

East

Elevation:

308 m

Aerial Image Source: ARCGIS 2024

PM03

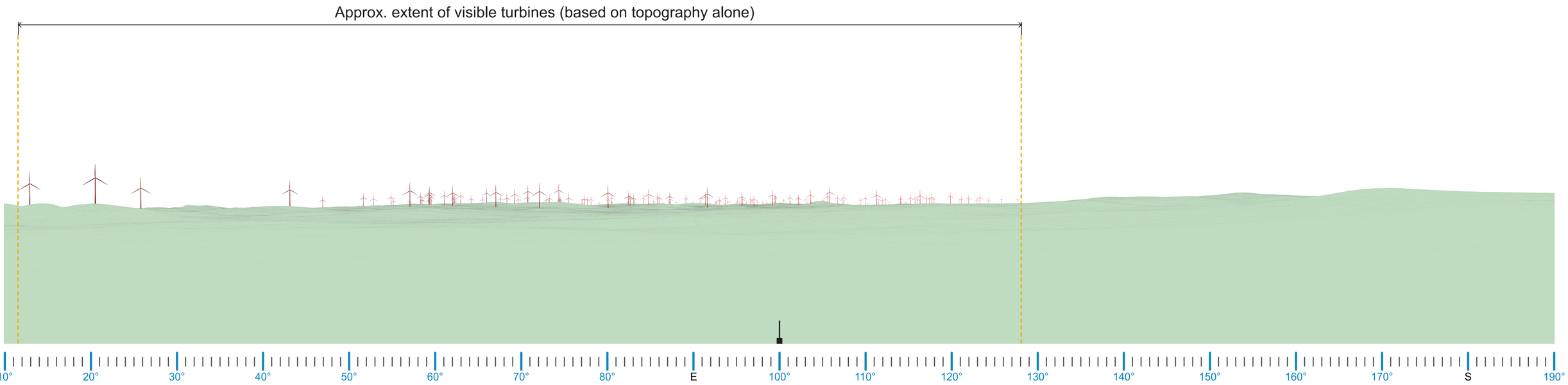


Existing View | 180° Baseline Panorama

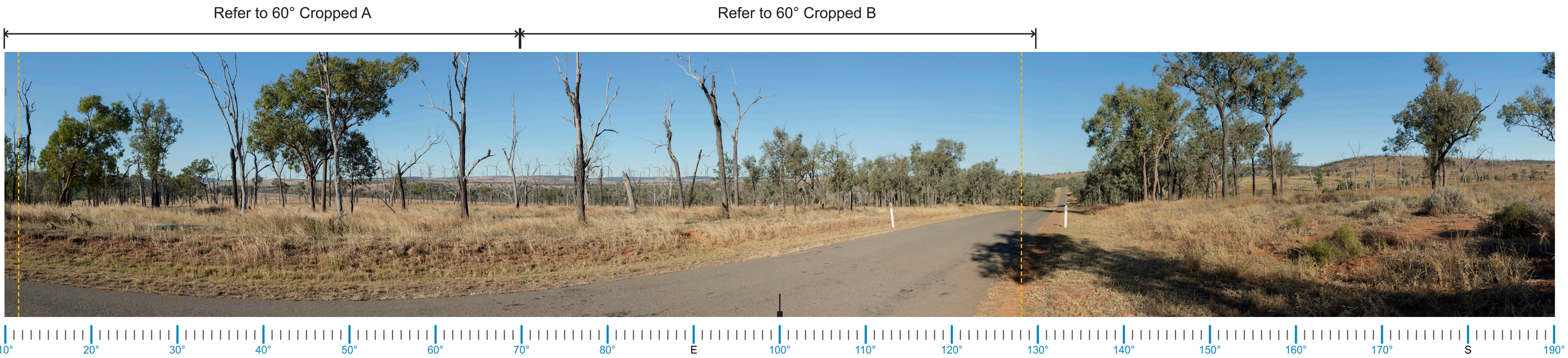


Proposed View | 180° Photomontage

PM03



Wireframe Diagram



Proposed View | 180° Photomontage

PM03A



Proposed View | 60° Cropped (A)

PM03B



Proposed View | 60° Cropped (B)

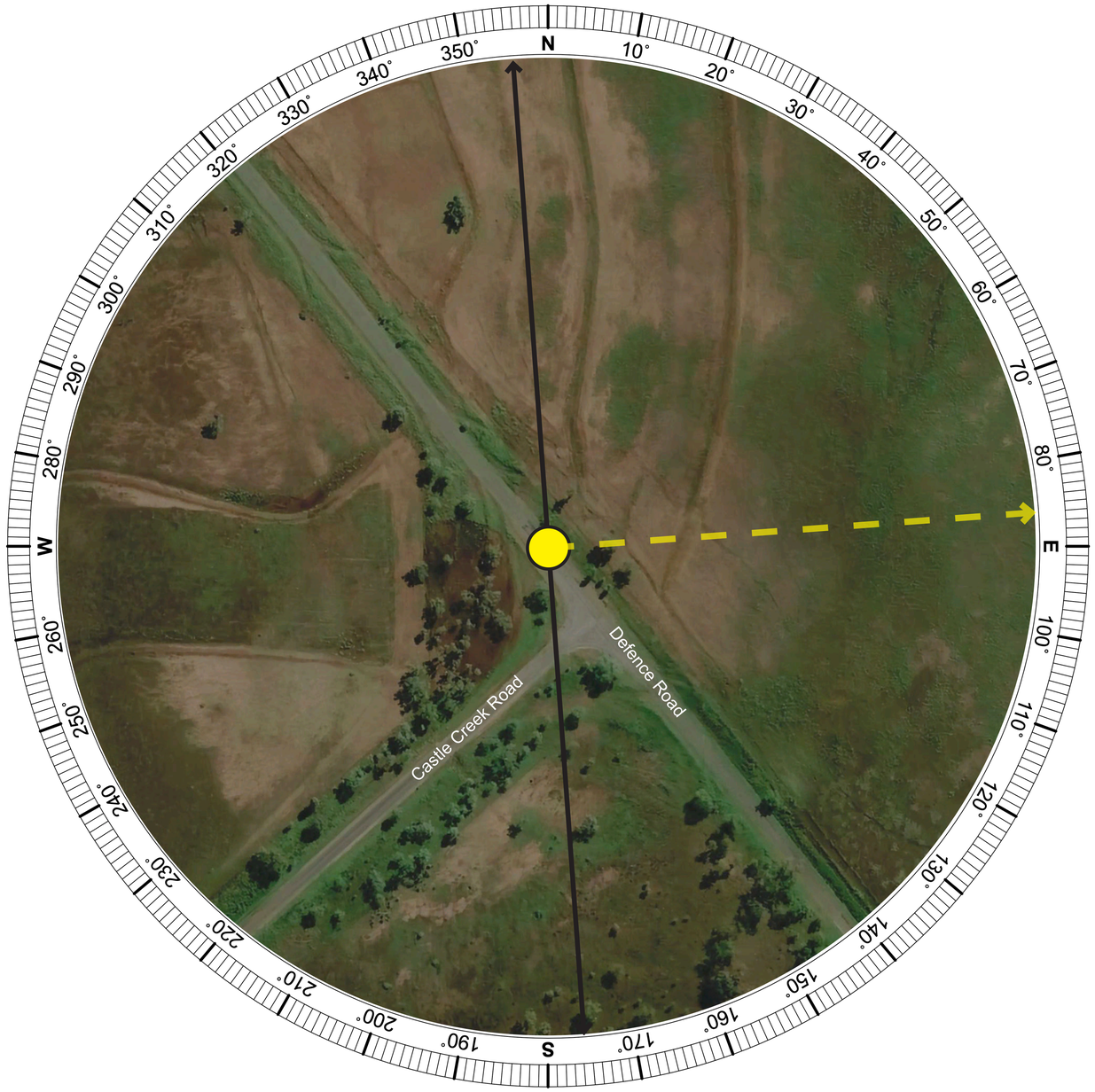
PM04

LEGEND

Viewing direction and centre of photomontage

Extent of photomontage

Approx. extent of visible turbines (based on topography alone)



Aerial Image Source: ARCGIS 2024

Photomontage 04

Location:

Defence Road, Camboon QLD

Photograph Date and Time:

8th May 2023 5:06pm

Coordinates:

24°52’41.33”S, 150°11’24.31”E

Distance to Nearest WTG:

10.9 km

Viewing Direction:

East

Elevation:

173 m

PM04

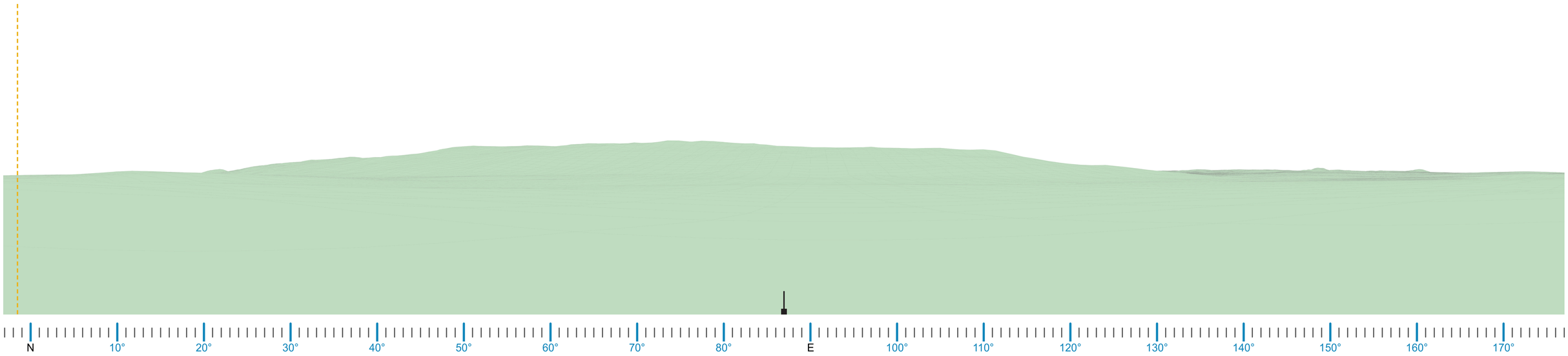


Existing View | 180° Baseline Panorama



Proposed View | 180° Photomontage

PM04



Wireframe Diagram



Proposed View | 180° Photomontage

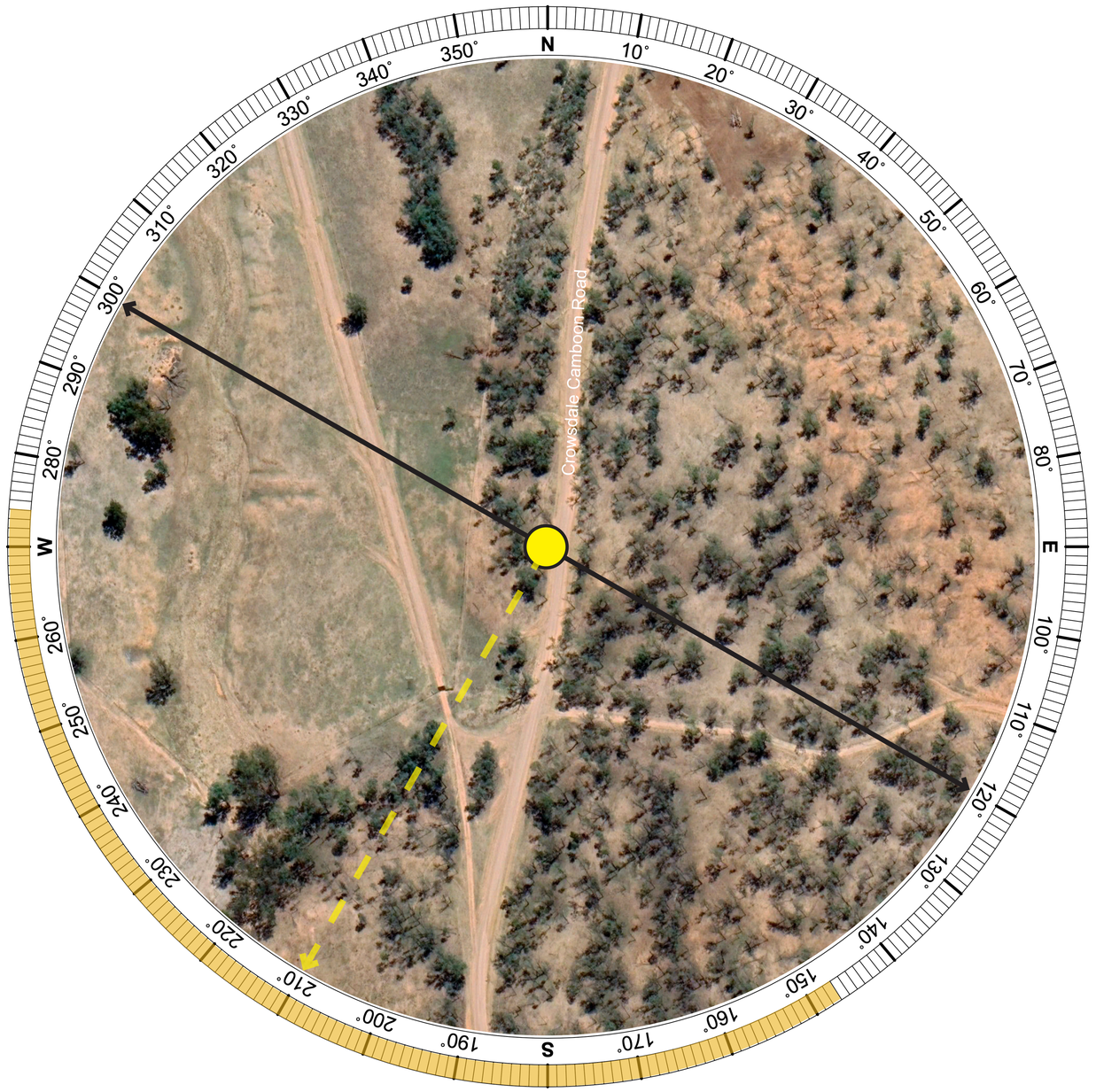
PM05

LEGEND

Viewing direction and centre of photomontage

Extent of photomontage

Approx. extent of visible turbines (based on topography alone)



Aerial Image Source: ARCGIS 2024

Photomontage 05

Location:

Crowsdale Camboon Road, Camboon QLD

Photograph Date and Time:

9th May 2023 2:52pm

Coordinates:

24°51’46.26”S, 150°28’12.86”E

Distance to Nearest WTG:

4.1 km

Viewing Direction:

Southwest

Elevation:

343 m

PM05

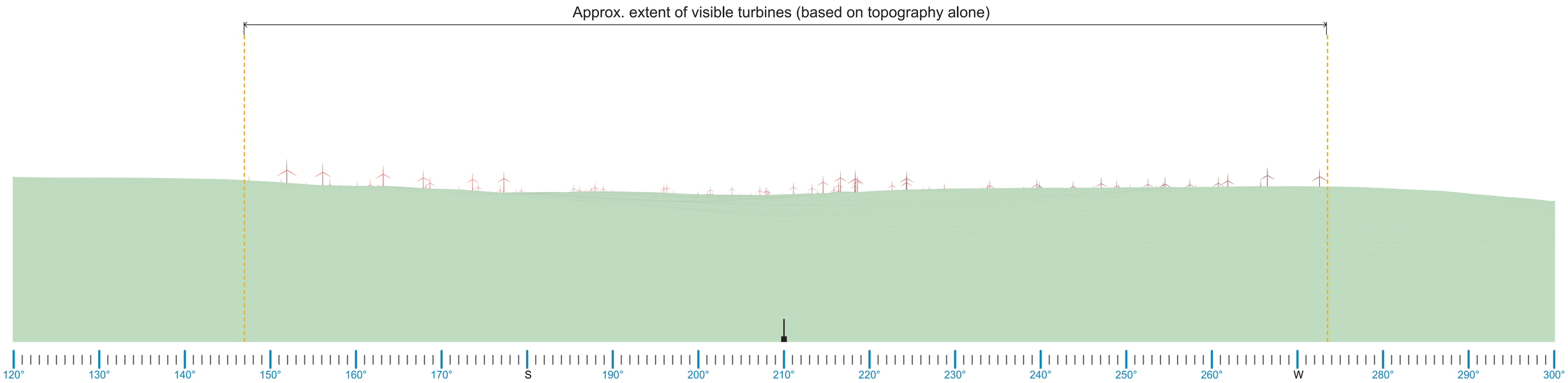


Existing View | 180° Baseline Panorama

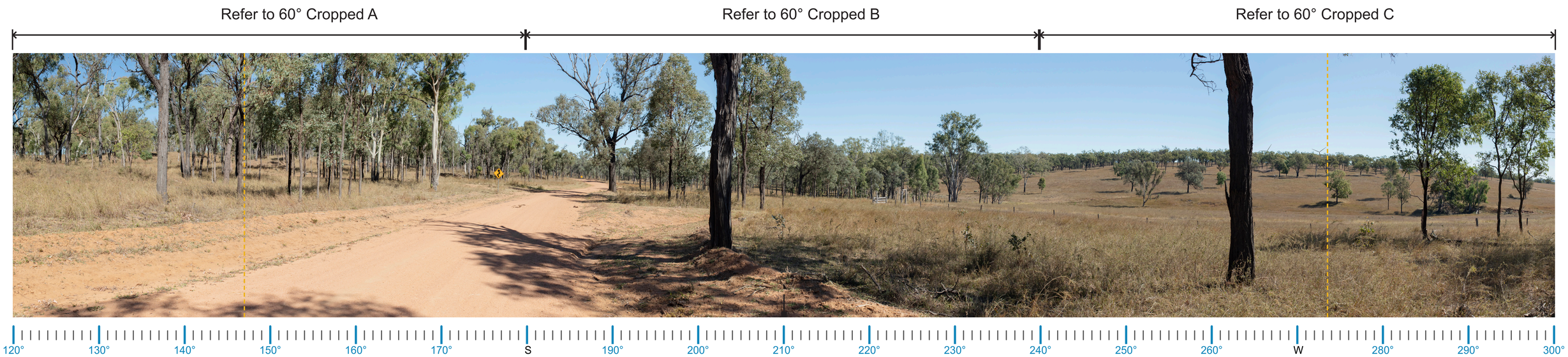


Proposed View | 180° Photomontage

PM05



Wireframe Diagram



Proposed View | 180° Photomontage

PM05A



Proposed View | 60° Cropped (A)

PM05B



Proposed View | 60° Cropped (B)

PM05C

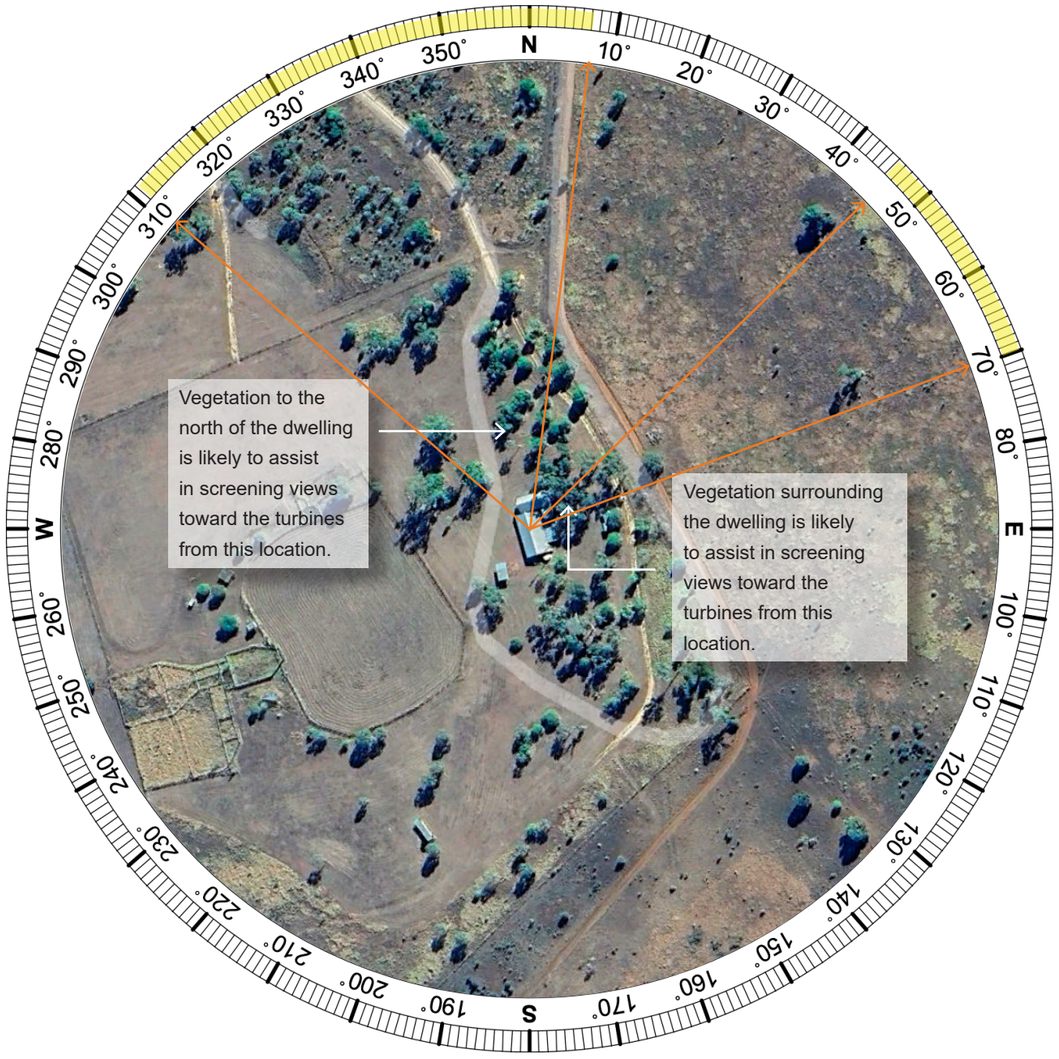


Proposed View | 60° Cropped (C)

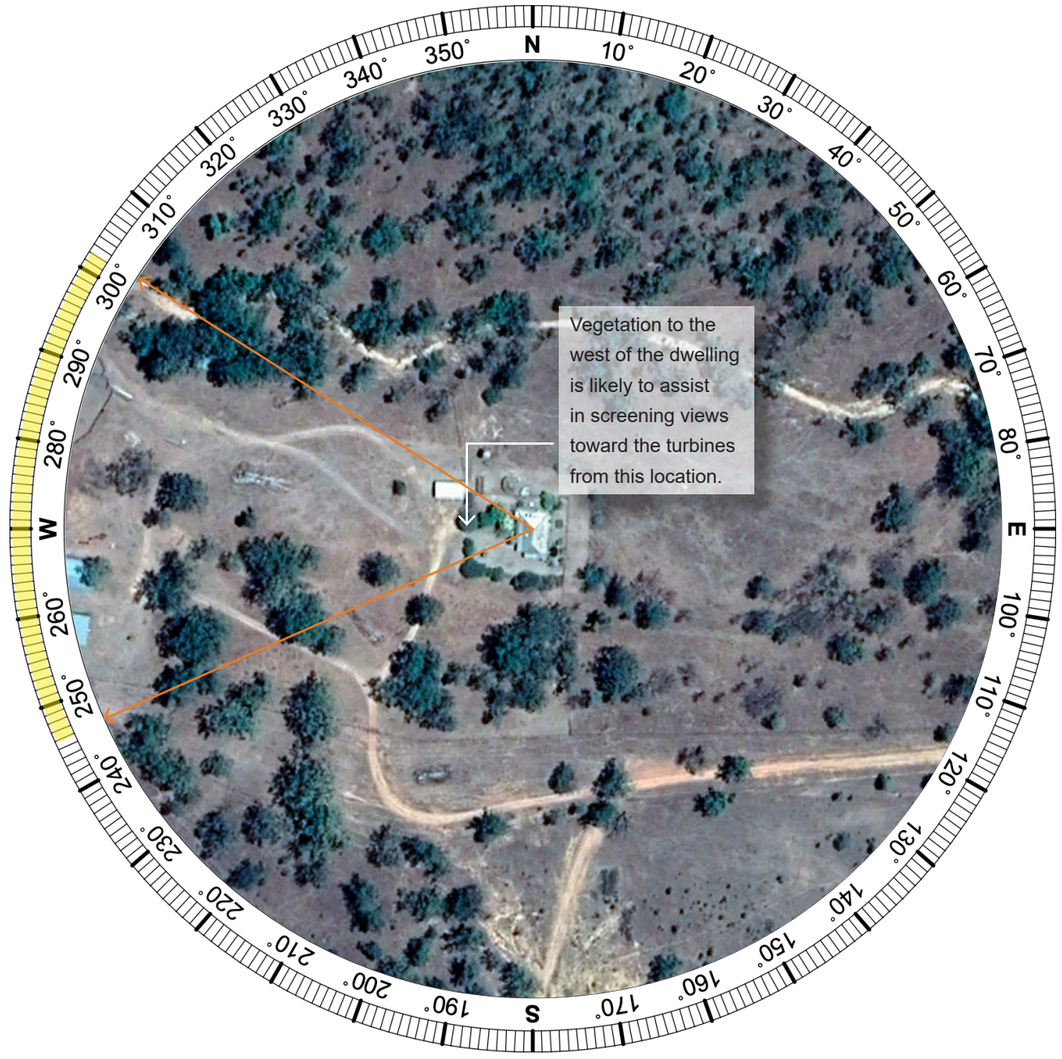
C

Desktop Dwelling Assessments

C.1 Dwelling N4



C.2 Dwelling N6

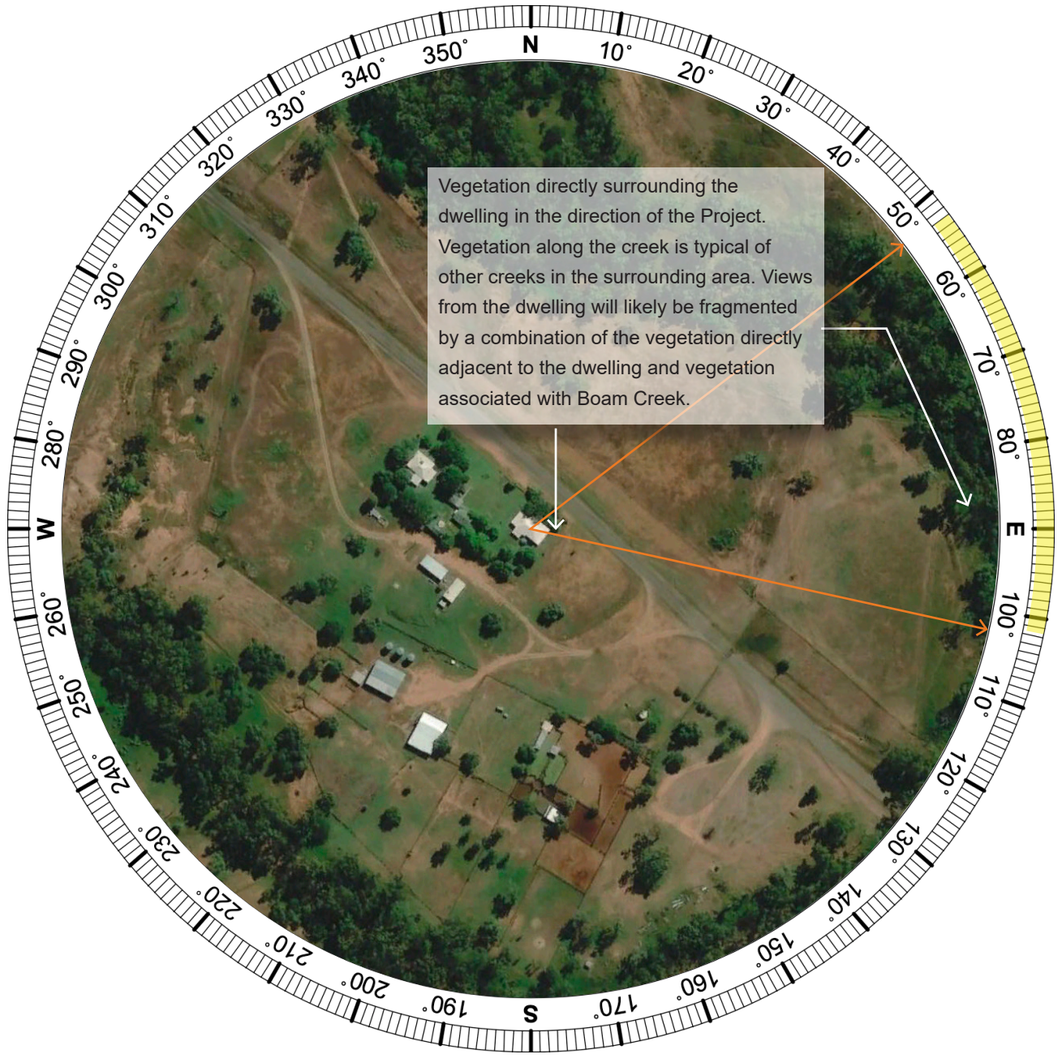


LEGEND

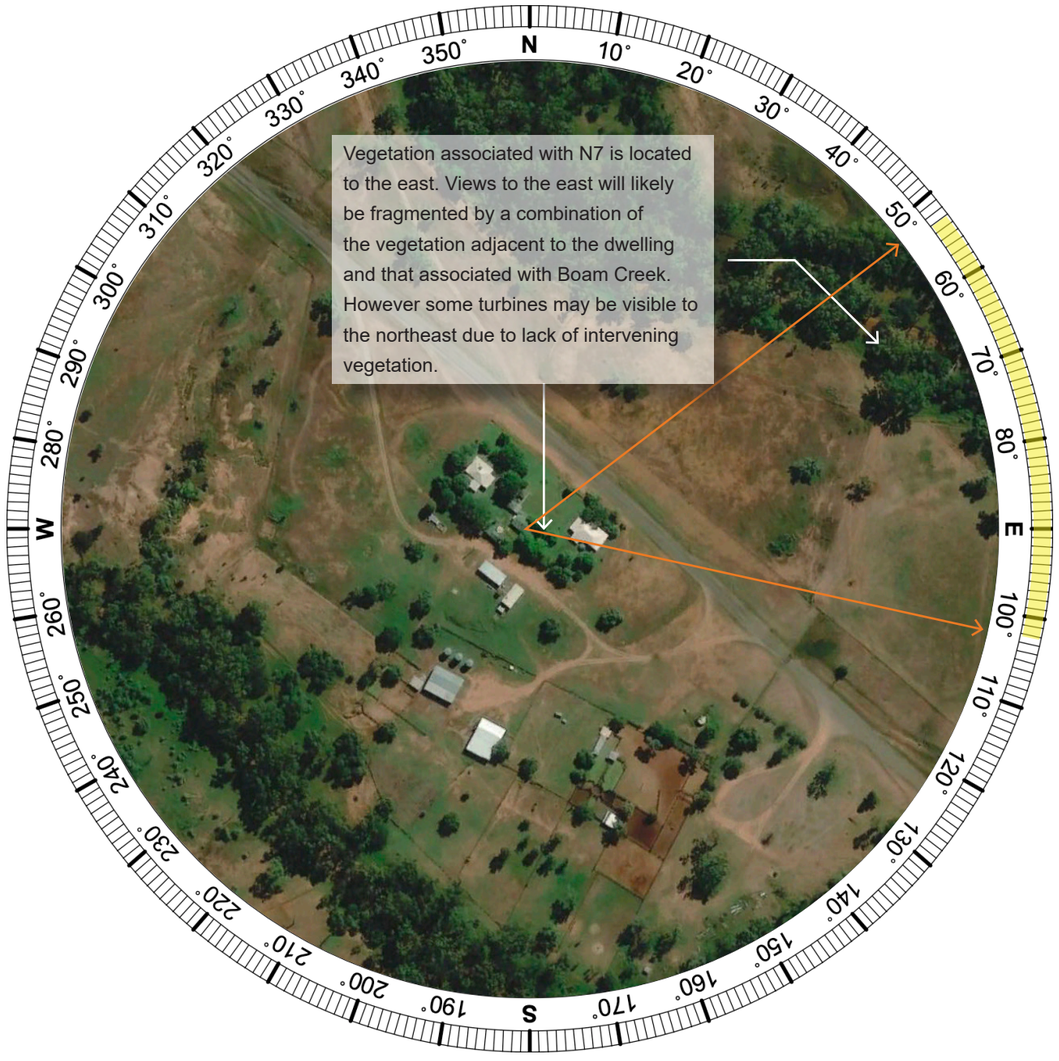
Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)

C.3 Dwelling N7



C.4 Dwelling N8

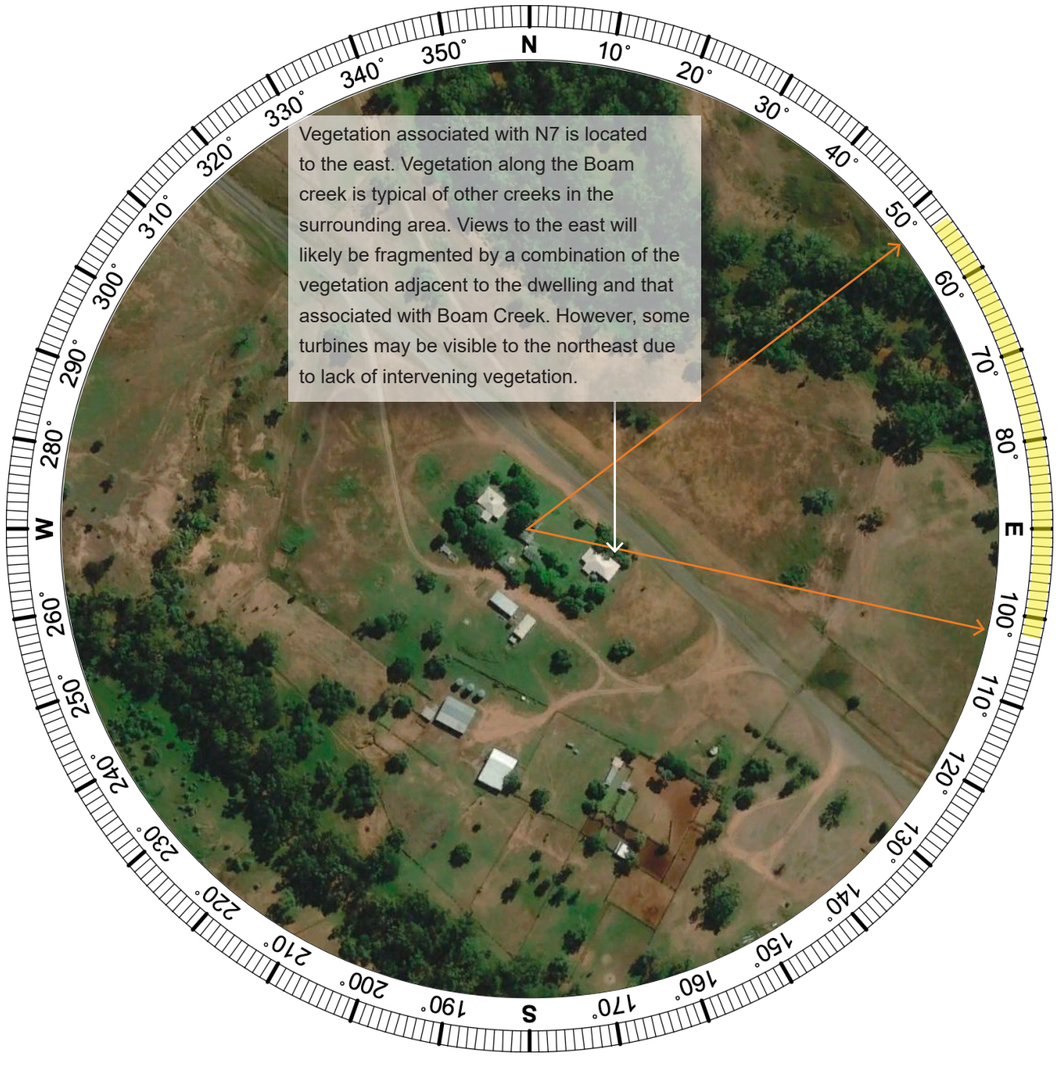


LEGEND

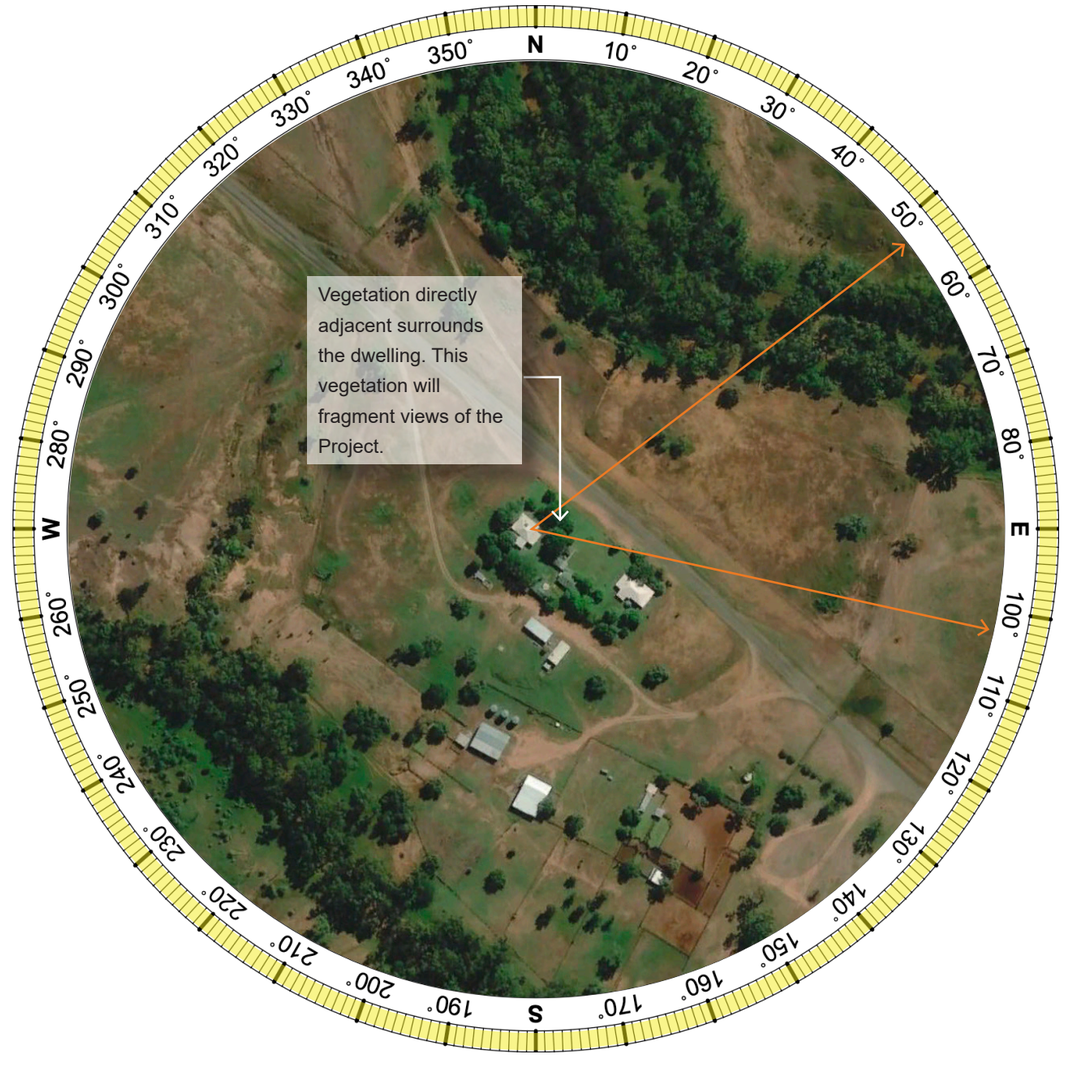
Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)

C.5 Dwelling N9



C.6 Dwelling N10

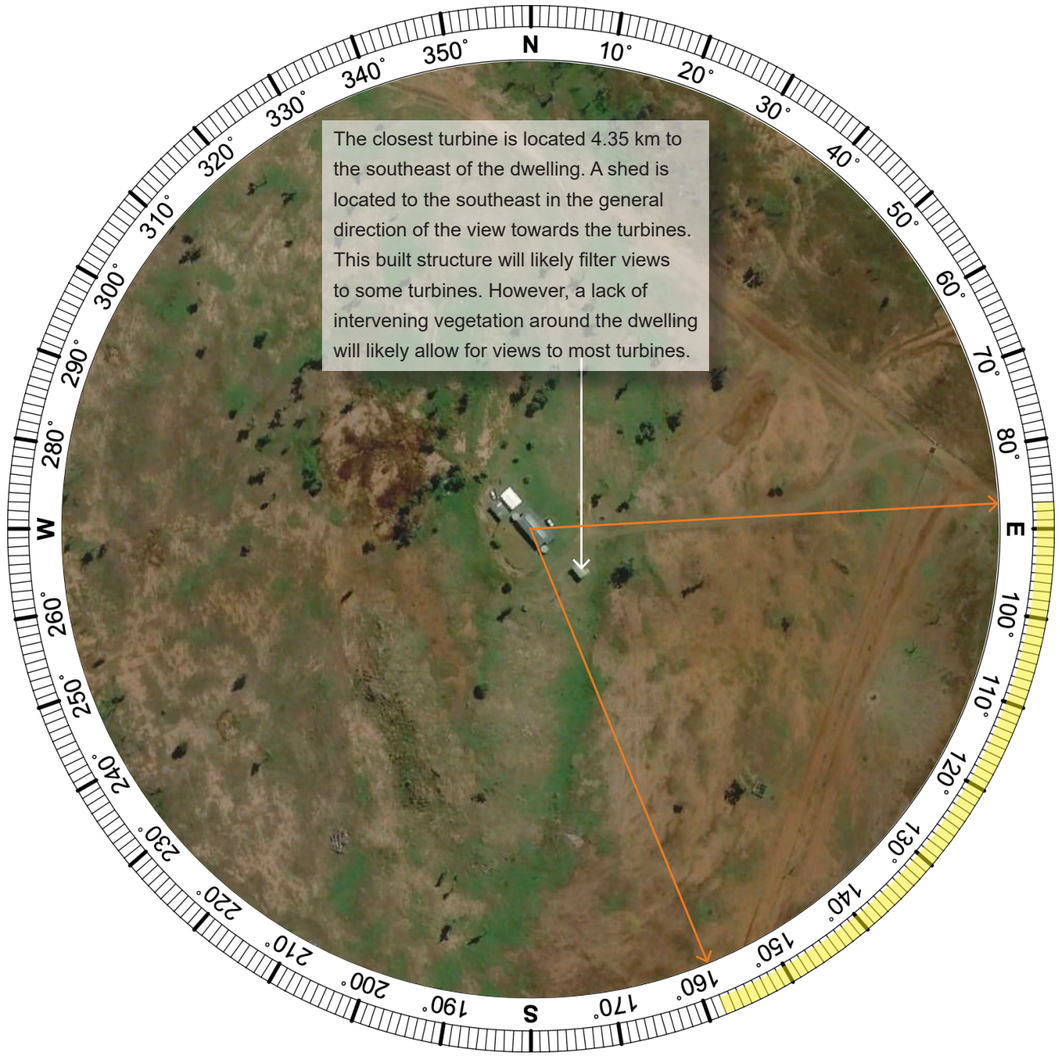


LEGEND

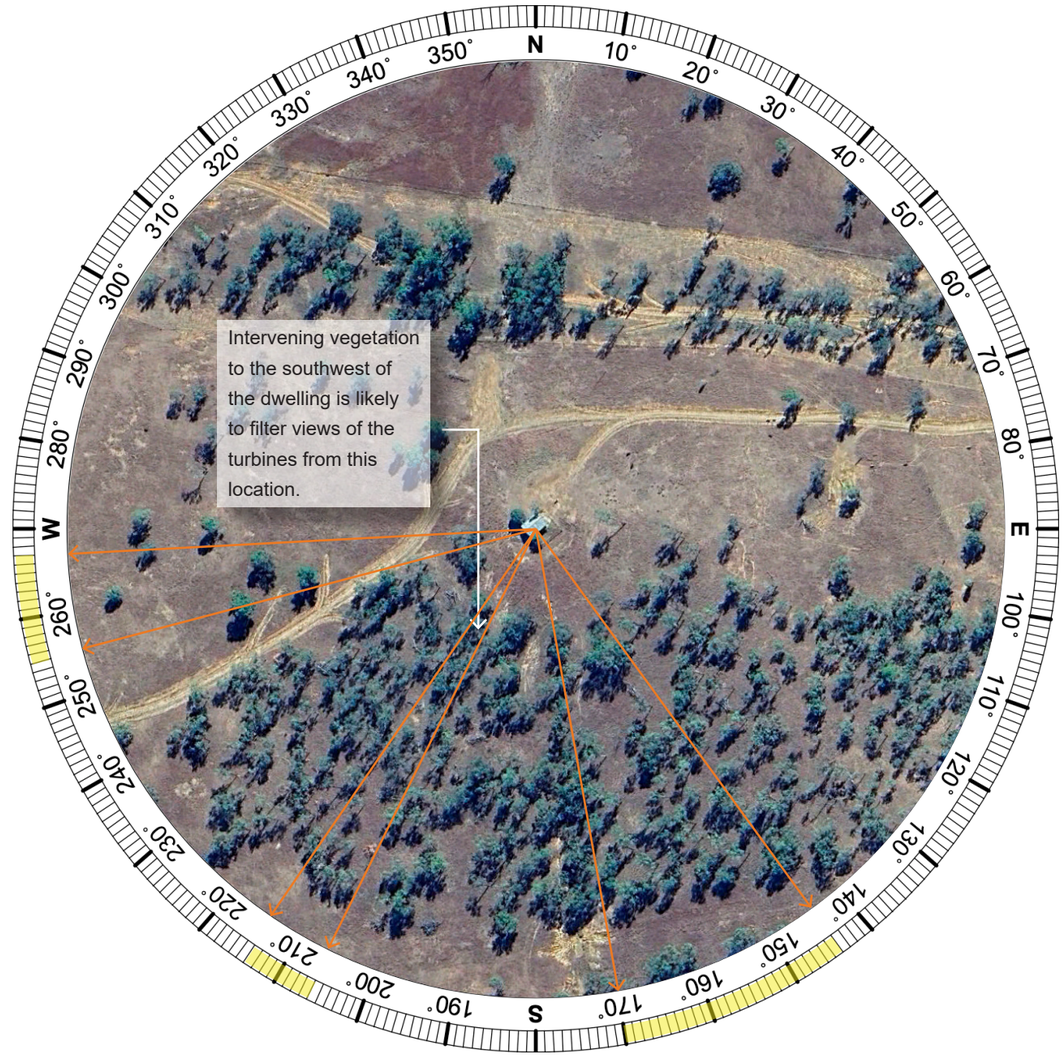
Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)

C.7 Dwelling N11



C.8 Dwelling N12

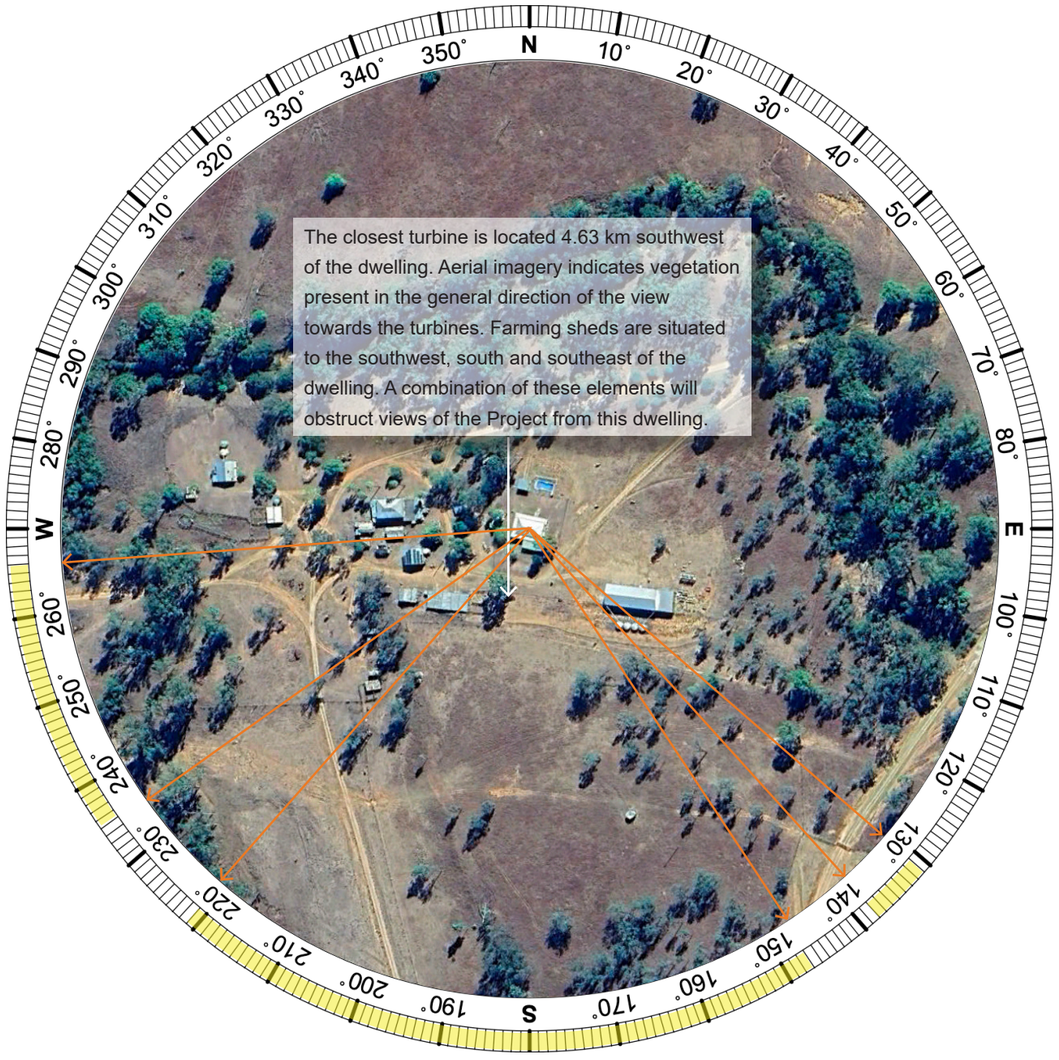


LEGEND

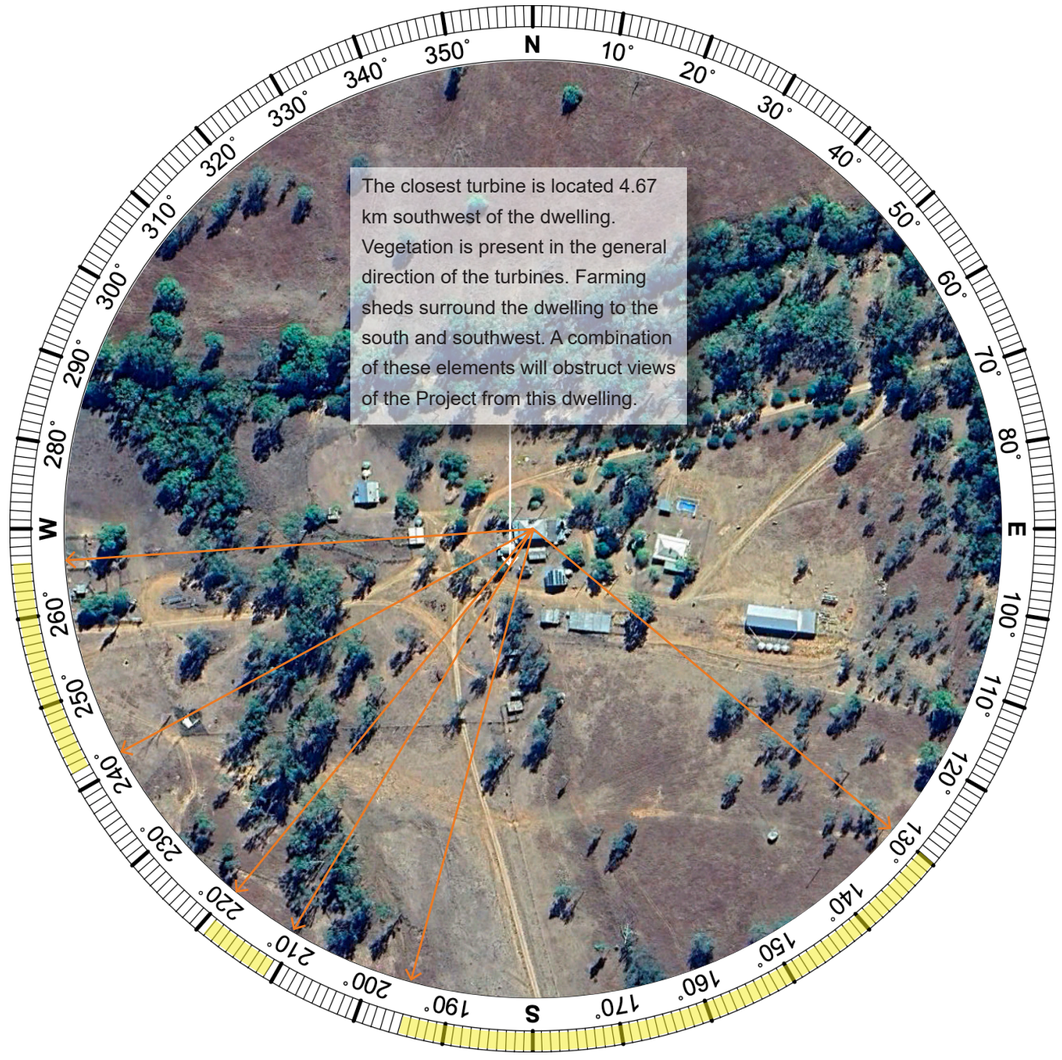
Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)

C.9 Dwelling N13



C.10 Dwelling N14

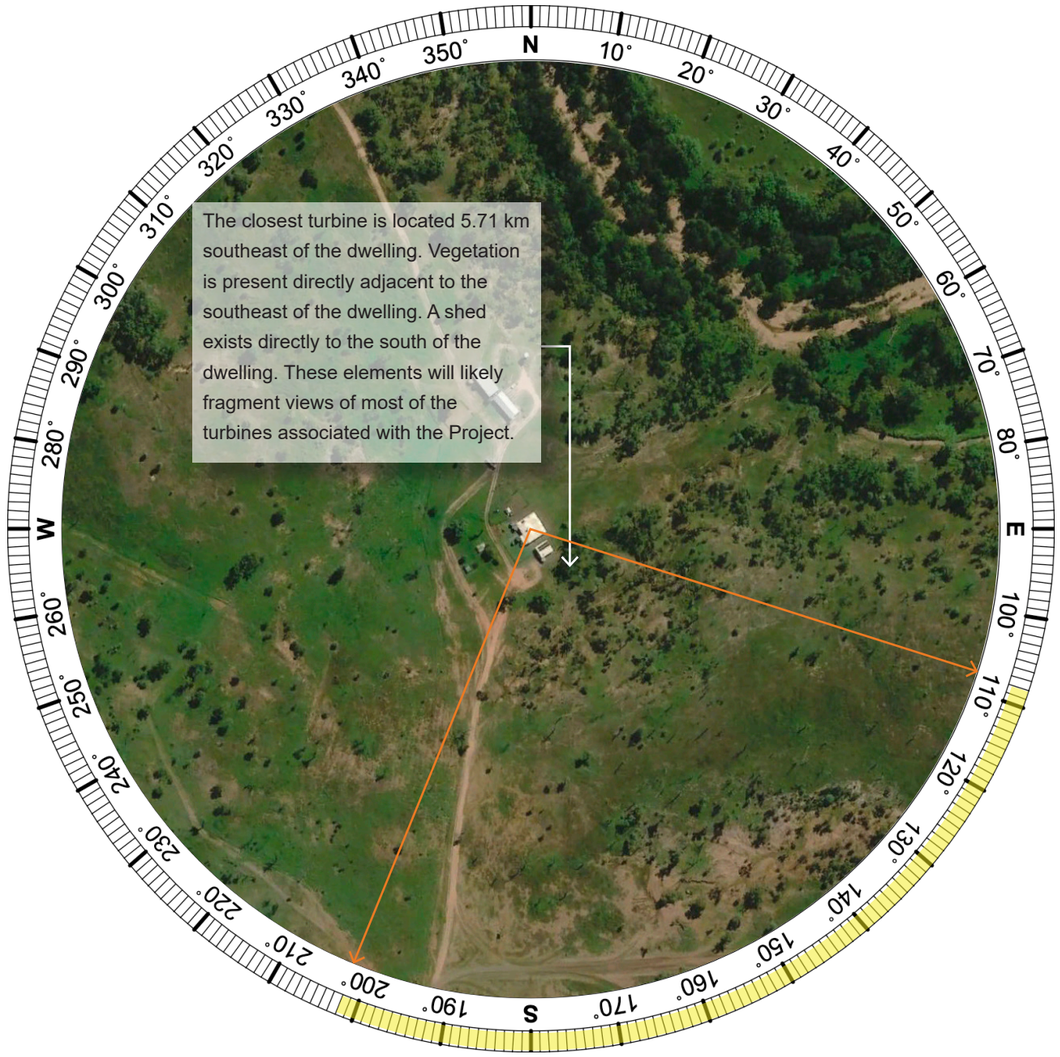


LEGEND

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)

C.11 Dwelling N15



LEGEND

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)