APPENDIX K LANDSCAPE AND VISUAL IMPACT ASSESSMENT

moir
landscape architecture

Keri Keri Wind Farm

Landscape and Visual Impact Assessment

Keri Keri Wind Farm

Landscape and Visual Impact Assessment

Prepared for
Acciona Energy Australia

Issue
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Date
21.03.2024

Project Number
2224

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Executive Summary

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

The Site is located in the Riverina region of New South Wales, approximately 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay. The Project includes the construction, operation, maintenance and decommissioning of up to 155 Wind Turbine Generators (WTGs) with a maximum blade tip height of up to 291.5 metres.

In addition to the wind turbines, the Project consists of ancillary infrastructure including access tracks, road upgrades, underground and overhead electricity cabling, high voltage transmission line, substations, easements for connections, battery energy storage system, switching station, quarrying locations, concrete batching plants, workers accommodation camp and an operations and maintenance facility. The point of connection into the grid is expected to be via the proposed 330kV NSW-SA interconnector known as 'Project EnergyConnect' that is being undertaken by ElectraNet and TransGrid.

Moir LA have utilised a quantitative study methodology that is in accordance with the requirements of the *NSW Wind Energy: Visual Assessment Bulletin* (2016) (referred to hereafter as 'the Bulletin'). Relevant literature and guidelines relating to large scale energy projects and Moir LA's previous experience on large scale infrastructure projects were also infleuntial in developing the Study Method.

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

Field work was undertaken by Moir LA to understand the visual context of the proposal and to inform a visual baseline which the Project has been assessed against. The assessment determined that the regional landscape character, that is typical of the Southwest NSW and Riverina region, is defined by extensive flat open landscapes utilised for grazing and dryland or irrigated cropping. 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.

The Scenic Quality Ratings are utilised in defining Visual Influence Zones which are assessed against objectives outlined in the Bulletin.

The Bulletin states that, generally, 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, in conjunction with community consultation identified the key landscape features and viewpoints within the Study Area.

The open and flat nature of the landscape will afford expansive, open views of the Project from most public locations, however, the existing landscape character is considered to be of low scenic quality due to it being highly modified and lacking in distinct landscape features. Surrounding settlements are scattered and large tracts of land are generally uninhabited. Windbreak vegetation and ancillary structures around the dwellings play an important role in limiting views of the Project. The assessment found the Project would change the character of the surrounding landscape, however, the landscape was not determined to be sensitive, rare or natural.

In accordance with the Bulletin, Moir LA applied the Preliminary Assessment Tools to the Project Layout to determine dwelling receptors that require detailed assessment. The assessment identified a total of 13 non-associated dwellings within 8,000m of the nearest turbine, of which two (2) non-associated dwellings are located within the blue line of visual magnitude (5,700 m of the nearest turbine). Site inspections and desktop assessment identified that:

- Two (2) non-associated dwellings have the potential for moderate visual impact
- Seven (7) non-associated dwellings were assessed as having a low visual impact rating
- Four (4) non-associated dwellings were assessed as having a negligible or nil visual impact rating

Practical and feasible mitigation measures have been proposed for each of the two (2) non-associated dwellings with a moderate visual impact rating. The proposed mitigation methods recommended in the report will assist in reducing the visual impact from these dwellings. Mitigation measures in keeping with the existing character include screen planting and supplementary planting of existing vegetation.

The Project has been assessed against the Visual Performance Objectives as per the Bulletin.

01

Introduction

1.0 Introduction

1.1 Introduction

This Landscape and Visual Impact Assessment (LVIA) has been prepared for the Keri Keri Wind Farm (referred to hereafter as 'the Project') for Acciona Energy Australia Global Pty Ltd (the Applicant). The Applicant is seeking State Significant Development (SSD) consent for the Project under Part 4, Division 4.7 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

This LVIA supplements the Environmental Impact Statement (EIS) prepared by Environmental Resources Management Pty Ltd (ERM) for the Project, and is required to be prepared as part of the SSD consent process.

The Project involves the construction, operation, maintenance and decommissioning of:

- Up to 155 Wind Turbine Generators (WTG) with a hub height of 200 metres (m) and maximum height tip height of 291.5 m (vertical tip);
- Battery energy storage system (BESS) with capacity of approximately 200 megawatt (MW) / 800 MW hours (MWh);
- Electrical reticulation, on-site substations and switchyard; and
- Other ancillary infrastructure including (but not limited to) internal access tracks, road upgrades, meteorological masts, and operation and maintenance (O&M) buildings.

The purpose of this report is to provide 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. 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 potential impacts resulting from the proposed development.

This LVIA has been prepared in accordance with the *Wind Energy: Visual Assessment Bulletin December* (2016), referred to hereafter as 'the Bulletin'. This LVIA forms a part of the Environmental Impact Statement (EIS) to be submitted to the Department of Planning and Environment (DPE). This information will assist the community and the DPE to understand and assess the likely visual impacts.

1.2 Relevant Experience

The Bulletin states: *the proponent is expected to engage professionals from relevant natural resource management and design professions (for example environmental planners, geographers, landscape architects, architects, or other visual resource specialists), with demonstrated experience and capabilities in visual assessment to carry out a wind energy project visual assessment* (DPE, 2016).

Moir LA is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact Assessments (LVIAs). Our team has extensive experience in undertaking LVIAs for large scale infrastructure projects, including the mining industry, sustainable energy sector and commercial developments in visually sensitive areas. Our capabilities include digital terrain modelling, viewshed assessment, photomontage development, landscape character assessment and community consultation.

Our team has extensive experience in undertaking LVIAs for wind energy projects. In the context of our experience and with guidance from the Bulletin 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:

- *Liverpool Range Wind Farm Modification* (Coolah, 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)
- *Lord Howe Island Wind Turbines* (Lord Howe Island, New South Wales)
- *Cherry Tree Wind Farm* (Seymour, Victoria)
- *Lakeland Wind Farm* (Lakeland, Queensland)
- *Hills of Gold Wind Farm* (Nundle, New South Wales)
- *Jeremiah Wind Farm* (Adjungbilly, New South Wales)
- *Valley of the Winds Wind Farm* (Coolah, New South Wales)

02

Study Method

2.0 Study Method

2.1 Secretary's Environmental Assessment Requirements (SEARs)

The Project is classified as State Significant Development (SSD) and will be assessed and determined under the provisions of the EP&A Act.

Secretary's Environmental Assessment Requirements (SEARs) issued on the 14th of April 2022 for the Project state the EIS must address the following specific issues for the wind farm and associated infrastructure relating to potential visual impacts:

"Landscape and Visual – including a detailed assessment of the visual impacts of all components of the project (including turbines, transmission lines, substations, battery energy storage system, and any other ancillary infrastructure in accordance with the NSW Wind Energy: Visual Assessment Bulletin (DPE, 2016), including detailed consideration of potential visual impacts on local residences (including approved developments, lodged development applications and dwelling entitlements), amenity values of the Yanga State Conservation Area, scenic or significant vistas and road corridors in the public domain." (DPE, 2022).

A brief overview of the requirements of the Bulletin for State Significant Wind Energy Development is provided in **Section 2.2**.

2.2 Wind Energy: Visual Assessment Bulletin

The Bulletin was adopted by the then DPE in December 2016. The Bulletin has been developed to guide the appropriate location of wind energy development in NSW and to establish an assessment framework for the assessment of visual impacts associated with wind energy.

The objectives of the Bulletin are to:

- Provide the community, industry and decision-makers with a framework for visual impact analysis and assessment that is focused on minimising and managing the most significant impacts;
- Facilitate improved wind turbine and ancillary infrastructure siting and design during the pre-lodgement phase of a project, and encourage early consideration of visual impacts to minimise conflicts and delays where possible, and provide for a better planning outcomes;
- Provide the community and other stakeholders with greater clarity on the process along with an opportunity to integrate community landscape values into the assessment process; and
- Provide greater consistency in assessment by outlining appropriate assessment terminology.

The visual assessment process is broken into two main stages:

Stage 1: Preliminary Environmental Assessment and
Stage 2: LVIA to inform the EIS

This LVIA responds to the requirements of Stage 2 of the Bulletin. The Preliminary Visual Impact Assessment (PVIA) prepared for Stage 1 was undertaken by Moir LA in March 2022 and the findings of that assessment have been included in this report.

2.3 Overview of the Study Method

In accordance with the Bulletin, the visual assessment includes:

- A baseline study that includes analysis of the landscape character, scenic quality and visibility from viewpoints of different sensitivity levels;
- Establishment of visual influence zones from viewpoints using data collected in the baseline study;
- Assessment of the proposed layout against visual performance objectives; and
- Justification for the final proposed layout and identification of mitigation and management measures.

Moir LA have formulated a quantitative study methodology with regards to the Bulletin and with consideration of previous experience on large scale infrastructure projects and relevant literature and guidelines relating to large scale energy projects.

Extensive field work and photographic survey work for the study was undertaken in November 2022 and March 2023 from public and private properties.

2.4 Report Structure

The flow chart on the following page provides a high level overview of the LVIA process utilised to undertake the assessment. **Table 1** provides an outline of the report structure, a brief overview of the objectives of the Bulletin and a summary of how these have been addressed in the LVIA.

Detailed methodologies for each section of the assessment have been included in the relevant chapters of the report.

2.5 LVIA Process



Project Overview

Provide an overview of the aspects of the Project and the parameters against which the assessment is based.



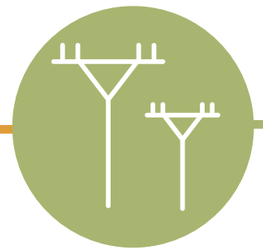
Visual Baseline Study

Comprehensive assessment of the existing landscape character to determine the baseline against which the Project will be assessment against. Input from the community to determine landscape values is integral in this phase.



Define the Visual Catchment

Determine the visual catchment through the use of Preliminary Assessment Tools and GIS mapping to determine the extent of visibility and identify areas upon which to undertake detailed assessment.



Other Considerations

Assessment of other aspects which have the potential to contribute to the visual impact. This includes: an assessment of associated infrastructure, cumulative impact from surrounding Projects and night lighting.



Visualisations

The use of visualisation tools (including photomontages and wire frame diagrams) to assist in the assessment of the Project.



Key Viewpoint Analysis

Undertake assessments from key viewing locations identified within the ‘visual catchment’ to determine the impact of the Project. This includes an assessment from public and private viewing locations.



Summary and Recommendations

Summary of the findings of the report and preliminary recommendations for reducing the identified impacts.

Landscape and Visual Impact Assessment Report Structure:

PROJECT OVERVIEW	**Section 3.0: Project Overview**	**The Bulletin Requirements Addressed:**
	• Detailed Project Description • Wind Turbine Design • Associated Infrastructure	• The VIA is to include a full description of the proposed wind energy project design, the layout, structural elements and scenarios being considered.
VISUAL BASELINE STUDY	**Section 4.0: Community Consultation**	**Visual Bulletin Requirements Addressed:**
	• Community Consultation Process • Community Landscape Values • Community Perception	• The proponent is to further consult with the community to verify the community consultation findings from the scoping and design stage.
	Section 5.0: Visual Baseline Study	**Visual Bulletin Requirements Addressed:**
	• Detailed assessment of Landscape Character and Key Features of the Region • Landscape Character Unit Classification • Application of Scenic Quality Class Ratings	• A visual baseline study must be undertaken to establish the existing landscape and visual conditions. The baseline study is prepared and evaluated by the proponent prior to undertaking any visual analysis. • Describe, assess and map these factors in written and graphic forms supported by photographic representations of the area. • Identify Scenic Quality Classes.
VISUAL CATCHMENT	**Section 6.0: Preliminary Assessment Tools**	**Visual Bulletin Requirements Addressed:**

	Define the Visual Catchment of the Project:
	• Preliminary Assessment Tools:
	  • Visual Magnitude
	  • Multiple Wind Turbine Effect
		• Visual Magnitude Assessment: Mapping the dwellings, key viewpoints and proposed turbines at scale to establish the potential visual magnitude.
		• Map into six sectors of 60º any proposed turbines and any existing or approved turbines within each dwelling or key public viewpoint.

	Section 7.0: Zone of Visual Influence	**Visual Bulletin Requirements Addressed:**
	• Zone of Visual Influence (ZVI)	• Establish the theoretical 'zone of visual influence' of the proposal (the area from which the proposal is theoretically visible or the 'visual catchment').
KEY VIEWPOINT ASSESSMENT	**Section 8.0: Public Viewpoint Analysis**	**Visual Bulletin Requirements Addressed:**
	• Assessment of viewpoints from areas identified within the visual catchment. **Refer to Appendix B - Public Viewpoint Analysis**	• All key public viewpoints and individual dwellings within the 'visual catchment' should be identified and assessed. • The visual performance objectives form the principle framework and guide for assessing the proposed wind energy project when applied to individual viewpoints.
	Section 9.0: Dwelling Assessment Overview	**Visual Bulletin Requirements Addressed:**
	• Assessment and summary of visual impacts from key viewpoints of dwellings located within visual catchment. **Refer to Appendix C - Dwelling Assessments**	• All key public viewpoints and individual dwellings within the 'visual catchment' should be identified and assessed.
VISUALISATIONS	**Section 10.0: Photomontage & WIre Frame Diagrams**	**Visual Bulletin Requirements Addressed:**
	• Photomontage selection process • Photomontage development process **Refer to Appendix D - Photomontages & Wire Frame Diagrams**	• Photomontages shall be prepared in accordance with the Scottish Natural Heritage Visual Representation of Wind Farms. • The visual assessment needs to include a concise description of the complete methodology used to create any photomontages presented in the visual assessment.
OTHER ASPECTS	**Section 11.0 Night Lighting**	**Visual Bulletin Requirements Addressed:**
	• Night Lighting Assessment	• Consider whether any obstacle lighting required is likely to result in any significant increase in visual impacts.
	Section 12.0 Cumulative Visual Impacts	**Visual Bulletin Requirements Addressed:**
	• Cumulative Visual Impacts	• Address potential cumulative impacts of wind energy projects in the region (the wind energy project as well as existing and approved projects).
	Section 13.0 Associated Infrastructure	**Visual Bulletin Requirements Addressed:**
	• Overview of impact resulting from Associated infrastructure	• The assessment of visual impacts from all ancillary facilities and infrastructure will be required.
	Section 14.0 Visual Impact on Landscape Character	**Visual Bulletin Requirements Addressed:**
	• Overview of Landscape Character Units with regards to Visual Performance Objectives • Summary of impact on Landscape Character	• Assess the Project using Visual Performance Objectives.
SUMMARY AND RECOMMENDATIONS	**Section 15.0 Mitigation Methods**	**Visual Bulletin Requirements Addressed:**
	• Mitigation Methods for Residences	• An outline of any mitigation and management options proposed, including consultation with affected property owners regarding the proposed mitigation works.
	Section 16.0 Visual Performance Evaluation	**Visual Bulletin Requirements Addressed:**
	• Evaluation of Visual Performance Objectives	• An assessment of the proposed wind energy project against each visual performance objective.
	Section 17.0 Conclusion	

Table 1 Report Structure

2.6 Additional Literature

In addition to the Bulletin, the following literature assisted in the formulation of the study methodology and where relevant have been referenced in the report:

- Scottish Natural Heritage, Visual Representation of Wind Farms - Good Practice Guidance (February, 2017)
- Environment Protection and Heritage Council, Draft National Wind Farm Development Guidelines (July 2010)
- Landscape Institute and Institute of Environmental Management & Assessment, Guidelines for Landscape and Visual Impact Assessment Third edition (2013)
- Clean Energy Council, Best Practice Guidelines for Wind Energy Development (June, 2018)

2.7 Policy Considerations

2.7.1 Local Government Policies

The Project is located entirely within the extents of the former Wakool Shire Council Local Government Area (LGA) that now forms part of Murray River Council LGA. The Draft Murray River Local Environment Plan (LEP) 2021 states that both Wakool LEP 2013 and Murray LEP 2021 continue to apply to the former Council areas, and therefore, policies and objectives of the Wakool LEP 2013 will be applicable for the Project.

The proposal is a SSD and will be assessed as such by the NSW DPE. However, relevant local government policies outlined in the Draft Murray River LEP (2021) has also been considered.

2.7.2 NSW Roads and Maritime Services

The LVIA includes an assessment of shadow flicker, blade glint and reflectivity to consider impacts on road users. This has been included in **Section 11.0** of this LVIA.

2.7.3 Civil Aviation Safety Authority

The Aviation Impact Assessment states that obstacle lighting is required for temporary meteorological masts and/or any other permanent masts not in proximity of the turbine. The LVIA includes an assessment of potential visual impact associated with night lighting on the temporary meteorological masts in accordance with the Civil Aviation Safety Authority (CASA). Refer to **Section 12.0** of this LVIA.

03

Project Overview

3.0 Project Overview

3.1 Regional Context

The Project is situated about 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay in the Murray River Local Government Area (LGA) (refer Figure 1). The Project is located within the South West Renewable Energy Zone (REZ) and is directly south of the Sturt Highway on land that is predominately used for sheep grazing and cropping (refer to **Figure 2**). The Project extends over an area of approximately 18,012 hectares (ha) across 66 freehold land parcels (Project Area).

The under-construction Project EnergyConnect intersects the Project Area. Project EnergyConnect is a new 900 km TL (interconnector) that will connect power grids across three (3) Australian states between Wagga Wagga in NSW and Robertstown in SA, with a connection to Red Cliffs in VIC. The Applicant intends to bid for Access Rights to this interconnector. The 330 kV overhead TL will connect the Project to Project EnergyConnect.

The landscape character of the surrounding area is predominantly defined by extensive, flat and generally treeless land parcels that are used for grazing and cropping which are typical of the Hay plains.

Currently there are no operational renewable energy projects in the region. However, the region presents opportunities for development of wind and solar farm sites. Several wind farms proposed for the region are in preliminary planning stages. The potential cumulative impacts of these have been discussed in **Section 13.0** of this report.

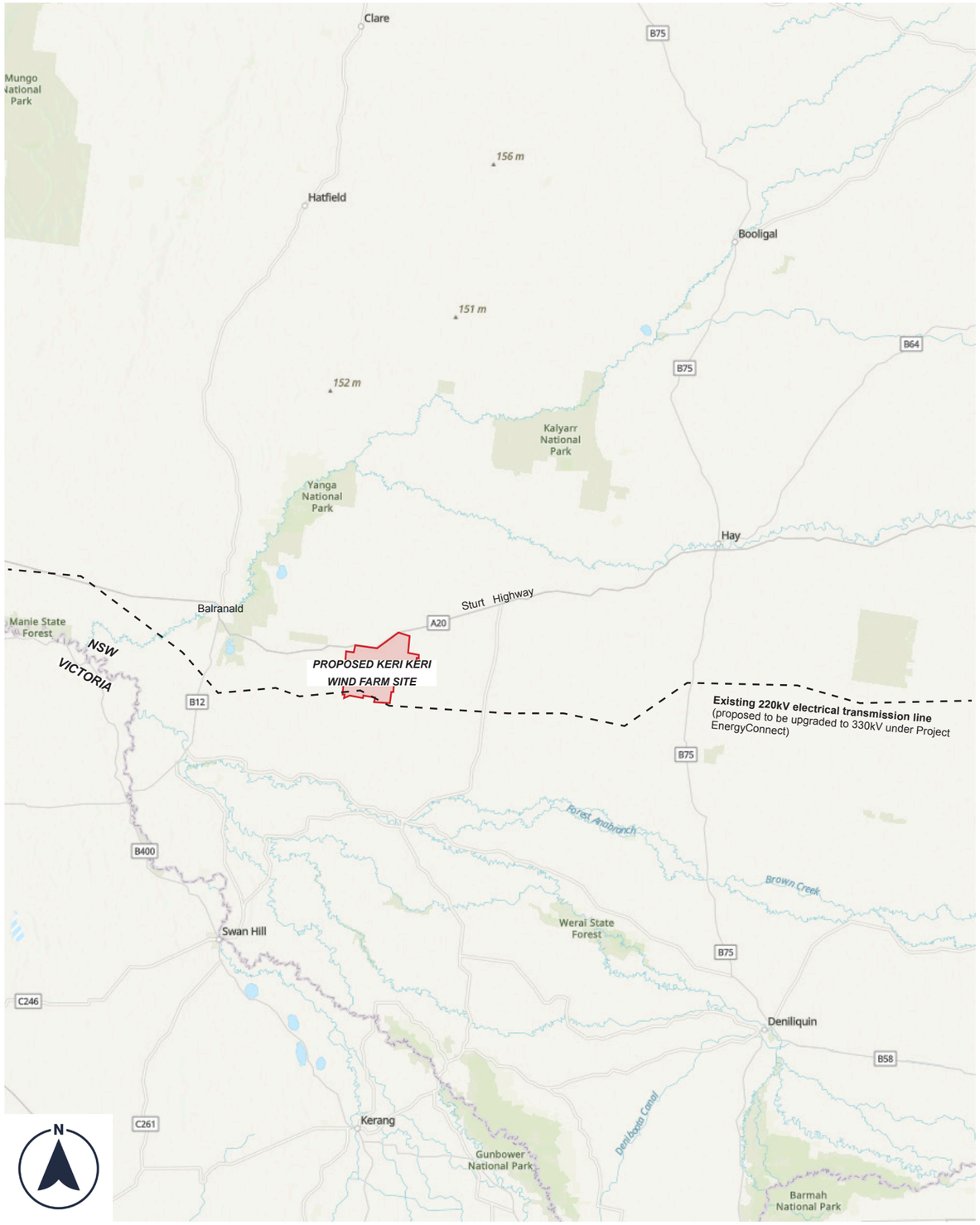


Figure 2 Regional Context (Map Source: ESRI Maps 2022) (Not to scale)

3.2 The Study Area

The Study Area refers to the land associated with and surrounding the Project. For the purpose of this report, the Study Area is loosely defined by an 8,000 m radius around the Project; however, assessment of land outside of this radius will be undertaken as necessary since the area is defined by a flat topographic character. The Study Area is located adjacent to and on the eastern side of Yanga State Conservation Area (SCA) (see **Figure 3**).

3.3 The Project Area

The Project Area includes three (3) separate freehold properties with 66 allotments covering approximately 18,012 hectares (ha). Most of the Project Area is used for sheep grazing (see **Figure 3** and **Figure 4**). Elevation across the Project Area ranges from between 68 m and 72 m above sea level and is predominantly characterised by the flat character similar to the Hay Plains. Ephemeral creeks and drainage lines cross the Project Area and most of these drain into the Murrumbidgee River. The Project Area is currently used for agricultural purposes and is located on land associated with the Keri Keri Merino Stud.

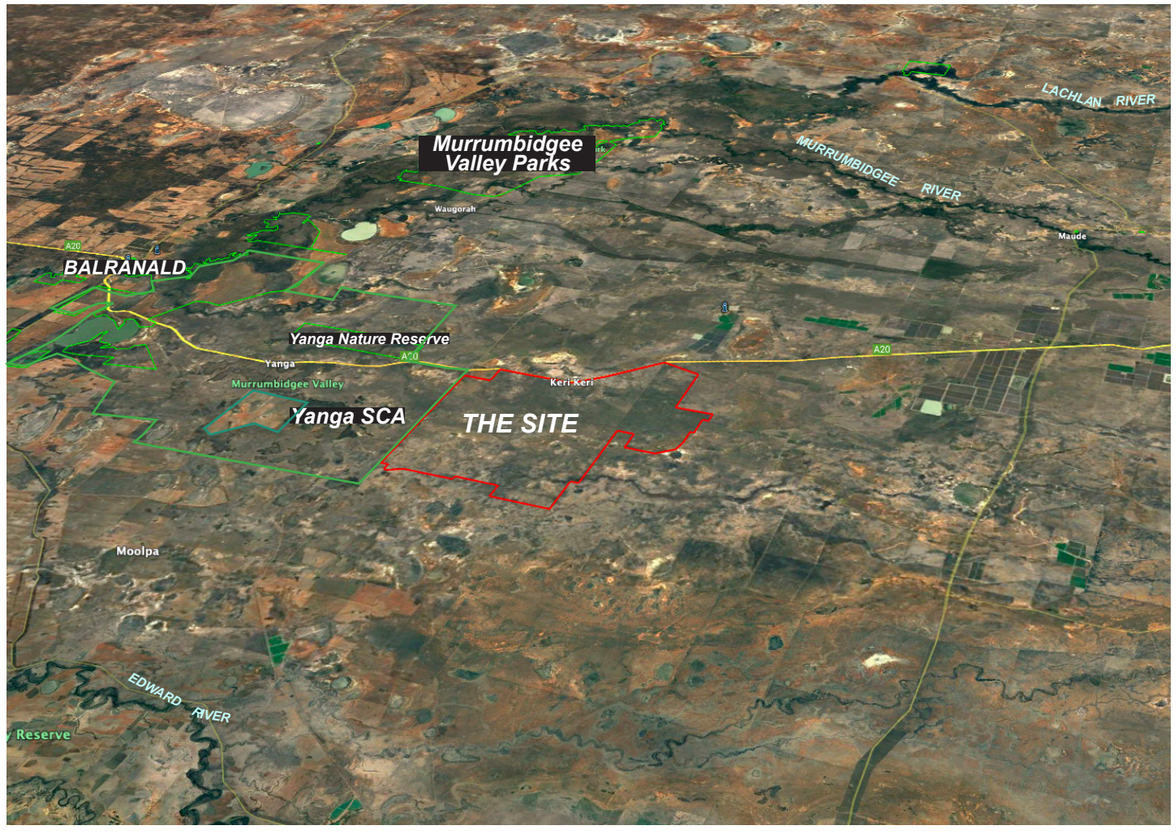


Figure 3 Birds Eye View of the Site (Map Source: Google Maps 2022)

3.4 The Project

The Project involves the construction, operation, maintenance, and decommissioning of a wind farm, with up to 155 wind turbine generators (WTGs), together with associated and ancillary infrastructure.

The Project consists of the following key components:

- Up to 155 WTGs, each comprising:
  - Three blades mounted to a rotor hub (hub height of 200 m) on a nacelle above a tubular steel tower, with a blade tip height (blade length plus hub height) of up to 291.5 m AGL;
  - A gearbox and generator assembly housed in the nacelle; and
  - Adjacent hardstands for use as crane pads, assembly and laydown areas;
- Electrical infrastructure comprising:
  - A battery energy storage system (BESS) of up to 200 MW/800 MWh (approximately four hours of storage);
  - Three 33/330 kV electrical substations, including control room, communications tower, transformers, circuit breakers, switches, lighting protection and other ancillary equipment;
  - 64.5 km of overhead 33 kV and 175.3 km of underground 33 kV electrical reticulation connecting the WTGs to the onsite substations (where practicable, these are generally following site access tracks);
  - 20.0 km of 330 kV overhead transmission line connecting the three substations to a new electrical switchyard (including circuit breakers, switches and other ancillary equipment) to provide connection to the planned NSW-SA interconnector, Project EnergyConnect currently under construction;
- Ancillary infrastructure:
  - Four site access points with one along Sturt Highway and three along Keri Keri Road;
  - Three operations and maintenance (O&M) facilities and four security huts;
  - Four biosecurity wash bays;
  - Internal access tracks connecting the WTGs and associated Project infrastructure with the public road network;
  - Decommissioning of four temporary meteorological monitoring masts and installation of up to four permanent meteorological monitoring masts for power testing. The permanent monitoring masts will be located close to a WTG location and will have a maximum height of approximately 159 m AGL; and
- Upgrades to public roads and intersections required for the delivery of oversize and overmass (OSOM) WTG components, transformers and associated construction-phase materials and vehicular movements.

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

- Two temporary construction site compounds, comprising site buildings and facilities for construction contractors / equipment, site offices, car parking and amenities for the construction

workforce;

- Mobile concrete batching plants to supply concrete for WTG footings and substation construction works;
- Earthworks for access tracks, WTG platforms and foundations;
- Borrow pit and rock crushing facilities for the generation of suitable aggregate for concrete batching and/or for access track and hardstand construction;
- One workers' accommodation compound and carpark;
- Hardstand laydown areas for the storage of construction materials, plant, and equipment;
- Up to four temporary meteorological monitoring masts. The temporary monitoring masts will be located close to a WTG location with a maximum height of approximately 159 m AGL;
- External water supply and storage for concrete batching and construction activities;
- The transport, storage and handling of fuels, oils and other hazardous materials for construction and operation of wind farm infrastructure; and
- Beneficial reuse of materials won from within the Disturbance Footprint during cut and fill and WTG foundation excavation works for use in access track, hardstands and foundation material.

Ultimately the Project will be decommissioned and the Project Area will be rehabilitated.

The Project

Proposed Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- Main Road
- Minor Road
- LGA boundary
- Existing 220kV electrical transmission line (to be upgraded to 330kV under Project EnergyConnect)
- Nature Reserve / State Conservation Area
- Proposed substation and Operations & Maintenance Facility locations
- Proposed swtiching station location
- Proposed BESS location
- Proposed internal transmission line connection to grid

Existing 220kV electrical transmission line
(proposed to be upgraded to 330kV under Project EnergyConnect)

N

0 2 4 6 8 10km

Figure 4 The Project (Map Source: SIX Maps 2020)

3.5 Wind Turbine Design

This report considers a maximum blade tip height of 291.5 metres as a worst case scenario. The turbine specification are outlined below:

- A generating capacity of 5.7 MW;
- 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 up to 291.5 m AGL;
- a gearbox and generator assembly housed in a nacelle; and
- adjacent hardstands for use as crane pads and assembly and laydown areas.

Table 2 provides an overview of dimensions of the turbine components that have been used for this assessment. To best represent a worst case scenario, the maximum hub height of 200 metres has been used for modelling and visualisation purposes in this report. **Figure 5** illustrates the turbine parameters utilised for this report. **Image 1** shows the appearance of a typical wind turbine.

Wind Turbine Components		
Project Component	**Dimensions used in LVIA:**	**Quantity**
Uppermost Blade Tip	291.5 m AGL	155
Tower (hub) height	200 m	
Blade length	91.5 m (including nacelle)	
Swept Area	26,302 sqm	

Table 2 Wind Turbine Parameters for Visual Assessment

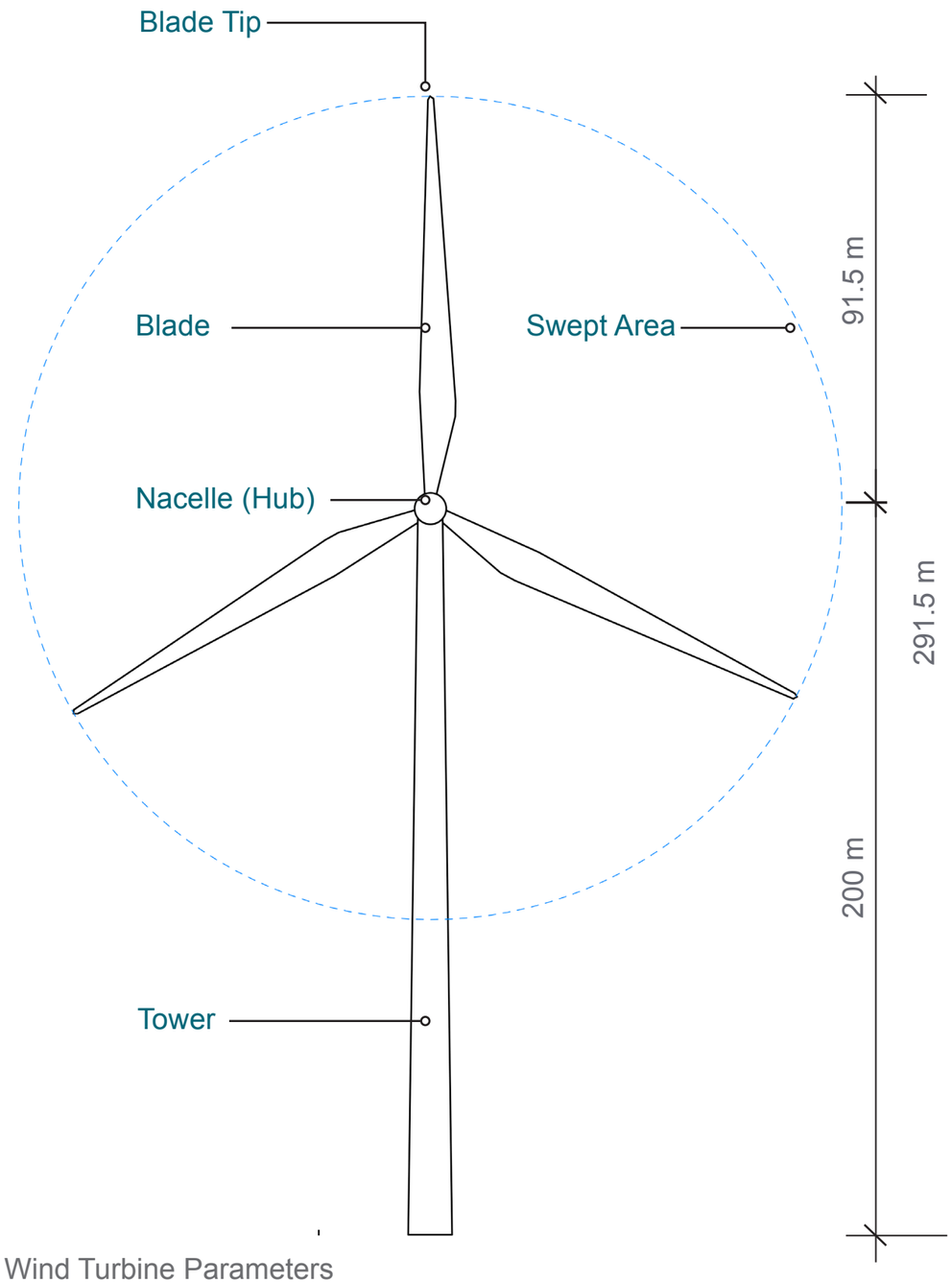


Figure 5 Wind Turbine Parameters

3.6 Associated Infrastructure

In addition to the turbines, the following provides an overview of the associated infrastructure components proposed for the Project which may contribute to the visual impact. An overview of the assessment of the potential visual impacts resulting from the associated infrastructure has been provided in **Section 15.0** of this report.

Ancillary Infrastructure

Project Component	Description	Quantity
New 330 kV transmission line	Towers up to 70 m high, spaced approx. 500 m (subject to terrain), with 60 m easement	**20.0 km**
Underground 33 kV lines	Trenching for underground electrical lines will be approx. 0.6 m wide per circuit by 1.0 m deep.	**175.3 km**
Overhead 33 kV lines	Where ground conditions are not suitable for open cut trench installation, overhead single circuit electricity lines will be installed using concrete poles, with 30 m easement	**64.5 km**
33/330 kV Substation	Construction of on-site electrical substations (collector substation and connection substation) 200 m x 300 m + 35 m APZ all sides	**3**
Switchyard	200 m x 300 m + 35 m APZ all sides	**1**
200 MW/800 MWh BESS	400 m x 300 m + 35 m APZ all sides	**1**
O&M Facility including carpark	100 m x 100 m + 35 m APZ all aides	**3**
Security hut	20 m x 20 m near each site access point	**4**
Biosecurity wash bays	70 m x 110 m near each site access point	**4**
New internal access tracks and drainage	Approximately 15 m wide formation including 5.5 m roadway plus shoulders and drainage as required.	**148.3 km**
Transport route and site access	Site access off Keri Keri Road and Sturt Highway. Upgrades will be required at several locations along the route.	**N/A**
Permanent meteorological masts (with concrete footings for mast and guy wires)	Sensor height at 159 m on approximately 3 m x 3 m concrete foundation.	**4**

Temporary Facilities

Project Component	Description	Quantity
Concrete batching plants	150 m x 100 m + 15 m batters	**2**
Laydown Areas	200 m x 150 m + 15 m batters	**3**
Borrow pit	200 m x 200 m + 15 m batters	**1**
Construction compound (site office, car parking and storage areas)	100 m x 100 m + 15 m batters	**2**
Temporary meteorological masts (with concrete footings for mast and guy wires)	Sensor height at 159 m on approximately 3 m x 3 m concrete foundation.	**4**
APZ requirements	Min. 20 m per meteorological mast Min. 20 m all sides of buildings	**N/A**

Other Project elements

Project Component	Description
Duration and start of construction phase	Commencing late 2027 for approximately 24 months Peak construction activities to occur over approximately 12 months Mechanical completion: Late 2029 Testing/commissioning completion: Late 2029
Construction hours	Monday to Friday: 7.00 am to 6.00 pm; Saturday: 8.00 am to 6.00 pm; and No works on Sunday or public holidays.
Construction workforce	Up to 650 FTE
Duration of operation phase	30 years
Operational workforce	Approximately 12 long-term service and maintenance jobs will be created during Project operation.
Decommissioning	2055 or later subject to approval

Table 3 Associated Infrastructure



Image 1 Typical transmission tower (Source: ERM)



Image 2 Indicative BESS (Source: ERM) (HOLD - ACCIONA TO PROVIDE IMAGE)



Image 4 Typical Substation (Source: ERM)



Image 3 Typical Switchyard (Source: ERM)



Image 5 Typical Operations and Maintenance Facility (Source: ERM)

04

Community Consultation

4.0 Community Consultation

4.1 Overview of Community Consultation

In accordance with the Bulletin: *community consultation at this early stage may be broad, but should include discussions about the proposed project area, likely corridors of development, or preliminary turbine layouts and must involve people from the visual catchment* (DPE, 2016).

The purpose of community consultation is to:
- Establish key landscape features
- Defined areas of scenic quality and
- Identify key public viewpoints valued by that community.

Extensive community consultation has been undertaken to date. Results of consultation undertaken during the life of the Project have been utilised to inform the LVIA including the previous community consultation sessions help in the scoping phase.

Understanding of the community perception towards the proposed development is an intrinsic component of the Landscape and Visual Impact Assessment process. A CSIRO study published in 2012: *Exploring community acceptance of rural wind farms* in Australia provides a snapshot of community acceptance levels regarding Australian wind farms from a variety of stakeholder perspectives. It found levels of acceptance among the public are highly subjective and can differ depending on location, local context and place attachment.

In accordance with the Bulletin, community consultation has been undertaken by members of the Acciona Project team. This has included face-to-face meetings; on-line presentations; public information sessions; provision of printed material including Factsheets, Flyers; a website; an On-Line Engagement Hub; emails, phone calls and a questionnaire. Represented stakeholders have included Murray River Council, Balranald Shire Council and Hay Shire Council, as well as local business groups, associated and non-associated landholders, located within the vicinity of the Project Area. The engagement survey was also placed on the Project website. As of 23 February 2022, a total of six (6) engagement surveys have been completed, the results of which have been outlined in the following section.

None of the engagement survey respondents identified that likely visual changes to the landscape were a concern.

During consultation with the Murray River Regional Council, it was noted that the Project would be visible for some residents within the LGA; however, Council did not express particular concerns in relation to visual amenity.

Information obtained from respondents and attendees to the presentations and information sessions, described the area as flat plains with no trees, '*therefore a perfect place for a wind farm*'.

4.2.1 Landscape Features and Values

In addition to a review of existing landscape maps and detailed field work undertaken by Moir LA (see **Section 5.0**) the community consultation questionnaire asked respondents to identify key landscape features of importance to them. There were four (4) responses (from the six completed questionnaires) to the question: '*What are the key landscape features of importance to you in the area? Which of these features do you value most highly?*'. The following landscape features were identified by the community:

- River Environs
- Big tree on the river
- Heritage Village
- Cultural Heritage
- Flat Plains

A comparative assessment of the Project with other wind farms proposed in the area will help identify cumulative impacts of these developments in relation to the identified key landscape values. This has been discussed in **Section 13.0** of the LVIA.

4.2.2 Key Public Viewpoints

Key viewpoints identified by the community for further assessment include:

- The Willows Campground, Yanga SCA
- Willowvale Rest Area, Sturt Highway

Where possible, these features and viewpoints have been mapped in **Section 5.0**.

05
Visual Baseline Study

5.0 Visual Baseline Study

5.1 Visual Baseline Study

In accordance with the Bulletin:

"A visual baseline study must be undertaken to establish the existing landscape and visual conditions. This forms the basis of determining the level of impacts of a proposed wind energy project. The baseline study is prepared and evaluated by the proponent prior to undertaking any visual analysis." (DPE, 2016).

A PVIA was undertaken by Moir LA as part of Stage 1: Preliminary Environmental Assessment (pre-lodgement). In accordance with the Bulletin a preliminary landscape baseline study was prepared. Moir LA have developed upon the study undertaken in the PVIA to provide a detailed baseline study for the LVIA.

In accordance with the Bulletin, the Visual Baseline Study should consider the following inputs in the 'visual catchment' for the Project:

- elements of the landscape important to the community, including public and private viewpoints;
- the sensitivity of the viewers who use those viewpoints, and the distances at which they may view the landscape and potential wind turbines and other ancillary facilities;
- the character of the landscape associated, its key features and the relative scenic quality of the area; and
- the location of any existing operational or approved wind energy projects within both a regional and local context, including any nearby surrounding wind energy projects within eight kilometres which may have the potential to create direct or indirect visual impacts between the proposed and any other operational, approved or proposed wind energy projects.

The purpose of the Visual Baseline Study is to establish the existing landscape and visual conditions through descriptions, mapping and photographic representations. The study method for undertaking the Visual Baseline Study has been established in accordance with Appendix A of the Bulletin (DPE, 2016) where relevant and in conjunction with previous experience on large scale wind energy projects.

Table 4 provides an overview of the methodology used to establish a quantitative approach to defining and assessing the landscape character.

Visual Baseline Study Inputs as per the Bulletin and relevant section of this LVIA:	
Landscape Character Type	
• *Describe the broad area of land in which the wind energy project is located.*	**Refer to Section 5.2**
Sensitive Land Use Designations	
• *Map Layer identifying National and State Sensitive Land use Designations and LEP Zones.*	**Refer to Section 5.3**
Key Landscape Features	
• *Identify areas of visual interest or quality that stand out visually in the landscape.*	**Refer to Section 5.4**
Landscape Character Unit Classification	
• *Landscape is categorised into Landscape Character Units (LCU) and Scenic Quality Ratings are applied to each LCU.*	**Refer to Section 5.6**
Visibility Distance Zones	
• *Undertake visibility or view shed mapping when assessing what may be visible from a given viewpoint looking in all directions.*	**Refer to Section 7.0**
Viewpoint Inventory and Sensitivity Levels	
• *Undertake a viewpoint inventory from public and private locations and establish the Visual Influence Zones for each.*	**Refer to Section 8.0**

Table 4 Visual Baseline Study Inputs as per the Bulletin

5.2 Bioregion Context

The Project sits within the Riverina IBRA Bioregion (see **Figure 6**) in southwest NSW. The Yanga State Conservation Area (SCA) exhibits characteristics of the Riverina IBRA Bioregion's Murrumbidgee subregion. The area is characterised by extensive saltbush plains with small depressions and isolated low rises. The topography is generally flat, with very minor, isolated rises of coarse-textured aeolian material (Walker, 1991). Grey cracking clays, red-brown earths and compact brown clays are dominant in the region (NPWS, 2003). The plains are dominated by saltbush with old man saltbush, cottonbush, myall and grasses. Vegetation communities on channels and swamps include Black Box (*Eucalyptus largiflorens*) and Lignum (*Duma florulenta*). A detailed description of this character is defined in **Section 5.3** of this report.

Opposite: Images 6 - 8 illustrate the typical character of the landscape within the Study Area.

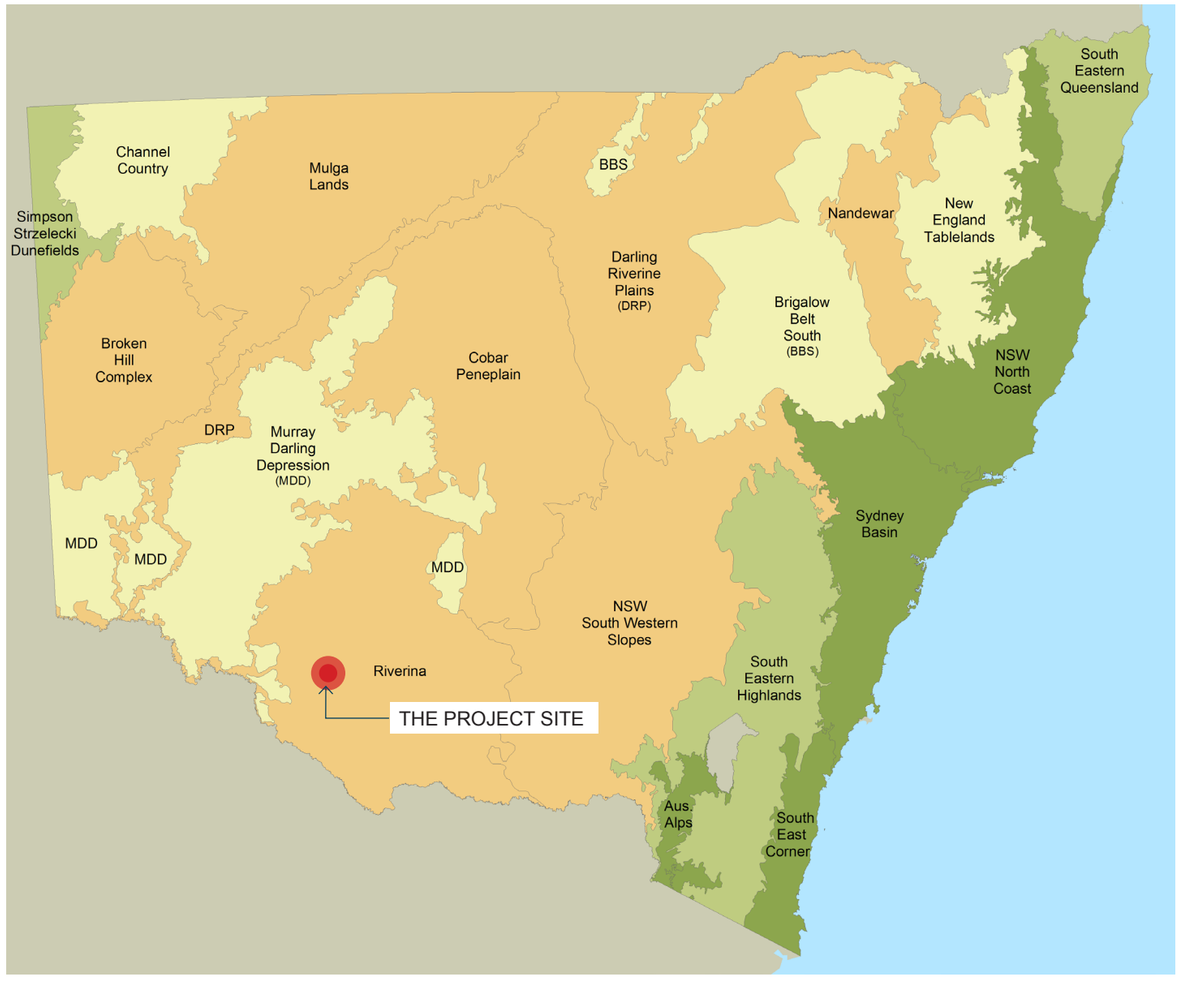


Figure 6 Bioregions of New South Wales
(Source: NSW Department of Planning, Industry and Environment, 2012)



Image 6 Riverina saltbush plains.



Image 7 Typical character of the Riverina plains intermittent stands of Black Box and Lignum trees, saltbushes and grasses.



Image 8 Taller vegetation such as black box trees and lignum shrubs typical of the region.

5.3 Sensitive Land Use Designations

5.2.1 Land Use Zoning

The Project Area is located within the extents of Murray River Council which is an amalgamation of former Wakool Shire Council and Murray Council. The Draft Murray River LEP 2021 states that the objectives laid out in the former LEPs continue to apply to the land within the Murray River LGA. Hence, the Project has been assessed against the objectives of the Wakool Shire LEP 2013.

The Project is located at the convergence of the Hay Shire, Murray River Council areas, with the Edward River Council LGA located to the east. The northern-most boundary of the Project Area sits on the Murray River LGA boundary. The following gives an overview of the main land use zoning within the Study Area (see **Figure 7**):

RU1 - Primary Production

The Project Area and majority of the surrounding land is zoned RU1 - Primary Production. The Wakool Shire LEP 2013 states the following objectives of the RU1 zoning relevant to the visual impact assessment:

- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To allow the development of contemporary non-agricultural land uses that are compatible with the character of the zone.*

C1 - National Parks and Nature Reserves

Yanga National Park, Nature Reserve and State Conservation Area (SCA) are categorised as *C1- National Parks and Nature Reserves*.

According to the Yanga National Park, Nature Reserve and State Conservation Area Plan of Management 2020, the area, referred to as 'the parks' in the Plan of Management, signifies '*a unique transition between landscapes formed by fluvial processes to the east and aeolian processes to the west*' (NPWS, 2020). The State Conservation Area's landscape, biological, cultural and educational values are as follows:

- *Due to the varying landscape processes that occurred in the area, an unusual landform, vegetation and soil types sit side-by-side.*
- *The parks are one of the most biologically diverse areas in the Riverina region most famous for the large-scale river red gum conservation in NSW. Other prominent vegetation includes black box woodlands, lignum shrublands, nitre goosefoot shrubland and three endangered ecological communities.*
- *Rich Aboriginal associations highlight the cultural significance of the parks. Recorded Aboriginal heritage sites include burial sites, modified trees, artefacts, middens, earth mounds, spiritual sites and creation stories.*
- *The parks form a rich cultural landscape which have multi-layered historical associations - both indigenous and colonial - in the form of historic structures, plants, managed woodlands and recreational areas. Community values of the parks continue to thrive with various recreational associations in Yanga Lake and Murrumbidgee River/Valley surrounds.*
- *The region provides immense opportunity for environmental restoration, education and continuing research into recovery processes.*

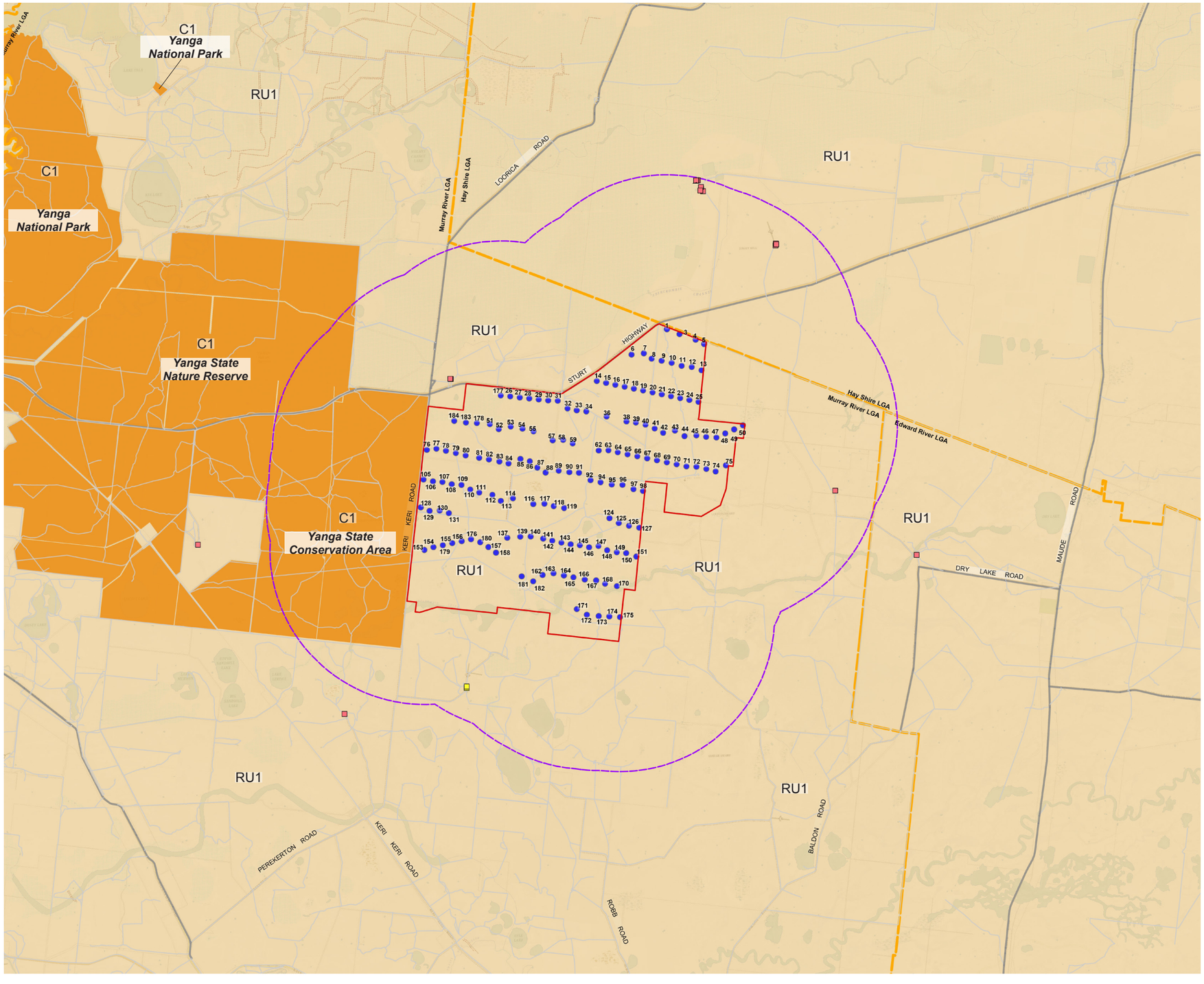
5.2.2 Land Use

Land use within and around the Project Area is predominately comprised of agricultural production activities including grazing over native vegetation pastures (see **Figure 8**).

Yanga SCA and Nature Reserve are classified as lands under minimal use due to their significant natural, landscape, cultural and educational values.

Areas surrounding the SCA and the Reserve consist of natural and improved pastures, dryland and irrigated cropping.

Irrigated cropping and pastures are prevalent to the northeast-east of the Project Area. These areas are flat and open.



Land Zoning

Proposed Keri Keri Wind Farm

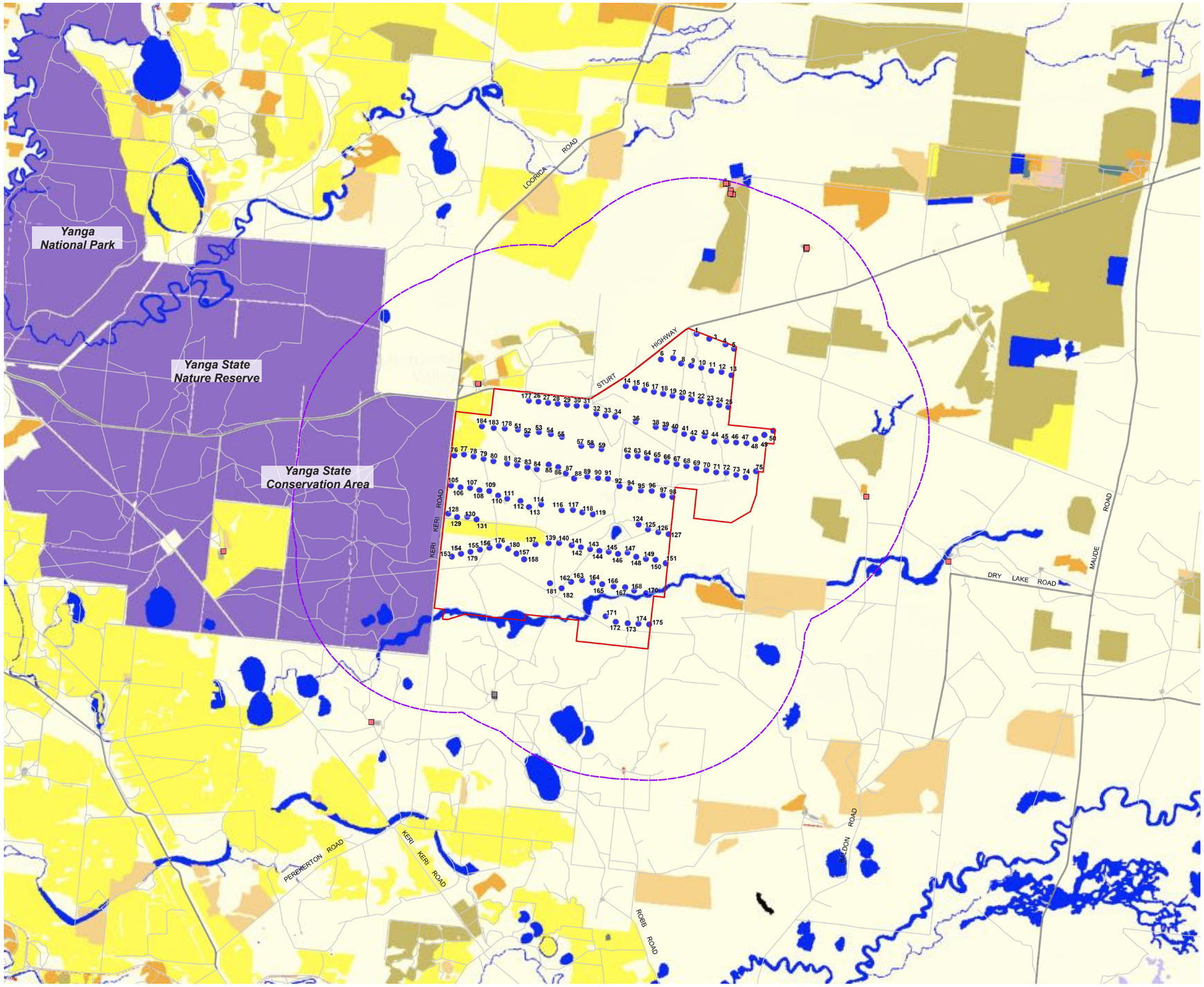
LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- Main Road
- Minor Road
- LGA boundary
- 8,000 m from nearest turbine
- RU1 - Primary Production
- C1 - National Parks & Nature Reserves

N

0 2 4 6 8 10km

Figure 7 Land Zoning
(Sources: Wakool Shire LEP 2011, Hay Shire LEP 2011) (Map Source: Six Maps 2020, Wakool Shire LEP 2013, Hay Shire LEP 2011, Conargo LEP 2013)



Land Use

Proposed Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- Main Road
- Minor Road
- LGA boundary
- 8,000m from nearest turbine
- Irrigated cropping
- Minimal Use
- Grazing, modified pastures
- Grazing, native vegetation
- Dryland cropping
- Irrigated pastures
- Rural residential & farm infrastructure
- Waterform

N

0 2 4 6 8 10km

Figure 8 Land uses within and around the Project Area (Map Source: eSpade, 2022)

5.4 Key Features & Viewpoints

The Bulletin states: "*proponents must identify key landscape features, dwelling locations and key public viewpoints. The following section provides an overview of the key features identified within and around the Study Area"* (DPE, 2016). Refer to **Figure 9**.

Geology and Landform

The region is made up of Quaternary alluvial sediments with shallow and small depressions that are as deep as 2 m. These depressions form a number of dry lakes studded in the landscape. In some areas these depressions form large scale swamps. The landform is also characterised by isolated low rises formed by aeolian processes, i.e., through wind action (Environment NSW, 2011). The landform is generally flat with dry distributary channels and floodplains (NPWS, 2003).

Vegetation Character

Lack of water and dry, arid conditions support scattered stands of belah trees, saltbush and speargrass communities (NPWS, 2003). Saltbush varieties dominate the region with typically very sparse tall canopy tree species, thus yielding clear, open views of the expanse (Environment NSW, 2011). The lack of tall canopy species allows higher wind speeds with continual wind actions on the landscape. Mid-canopy species such as lignum and nitre goosefoot are occasionally visible in the landscape (Environment NSW, 2011) and are favoured for emu grazing. Predominance of low-storey vegetation allows easier grazing opportunities for sheep, thus rendering the area favourable for livestock grazing. Tall canopy cover is most prominent within the extents of the Yanga National Park, Nature Reserve and the central and western parts of Yanga SCA.

Creeks, Swamps and Dry Lakes

Lakes and creeklines of region are seasonal and generally remain dry through most of the year. Dry creeks and lakes in proximity of the Project Area include Abercrombie Creek, Forest Creek, Dry Lake and Gunyah Swamp. They feed into the Murrumbidgee River catchment.

Abcercrombie Creek channel generally runs east-west and is located on the southern side of the Project Area. It feeds into Dry Lake and Lake Leriwa (Refer to **Figure 9**).

Lakes or depressions are generally shallow and defined by low-storey, scrubby vegetation such as saltbush and canegrass species (Environment NSW, 2011). Creek floodplains, on the other hand, are defined by scattered clumps of blackbox trees, belah trees, saltbush, bluebush, speargrass and forbs (Environment NSW, 2011).



Image 9 Saltbush and emu bush plains that are used extensively for emu,kangaroo and sheep grazing.



Image 10 Saltbush-dominated vegetation expanses typical of the Study Area.



Image 11 Typical character of Abercrombie Creek channel defined by lignum and blackbox trees

Nature Reserves, State Conservation Area and National Park

Yanga National Park, Nature Reserve and SCA are located to the west of the Project Area. For the purposes of this assessment, the areas that exhibit characteristics of the National Park, Nature Reserve and SCA is called Yanga Parks. The SCA exhibits characteristics of the Riverina IBRA Bioregion's Murrumbidgee subregion. The National Park, Nature Reserve and SCA are one of the examples of undisturbed patch of dense belah, mallee, rosewood and sugarwood communities with abundant grasses and dillon bush (NPWS, 2003; NPWS, 2020).

The National Park, Nature Reserve and SCA also has significant historic and cultural associations such as Aboriginal burial sites, middens, spiritual sites, woolsheds and other structures established during colonial settlement. This region also hosts biologically diverse areas that provide habitat for 24 threatened species (NPWS, 2020).

Campgrounds and Points of Interest

The Willows Picnic Area and Campground and Willows Visitor Access Trail recreational areas are located within the Yanga SCA. They offer opportunities for short bushwalks, birdwatching, camping and rest /picnic areas.

The Willowvale Rest Area is located on the northern side of the Project along the Sturt Highway and it serves as a rest spot for commuters travelling between the towns of Hay or Balranald. For the purposes of this LVIA, an assessment of impacts on Willowvale Rest Area will be relevant due to its proximity to the Project Area.

Access Roads

Sturt Highway is a main road connecting various towns such as Balranald and Hay and is located to the north of the Project Area, generally running east west. It also provides access to dwellings and farmsteads, and to Yanga Nature Reserve and SCA.

Dry Lake Road is a minor road that runs generally north - south and is located to the east of the Project Area. It provides access to dwellings on the eastern side of Project Area. It connects the Sturt Highway and the settlement of Moulamein which is located approximately 28 km south of the Project Area.

Keri Keri Road is a low use road that runs generally north - south and is located to the west of the Project Area. It provides access to dwellings on the southern side of Project Area.

Loorica Road is a low use road that runs generally north - south and is located to the north of the Project Area.



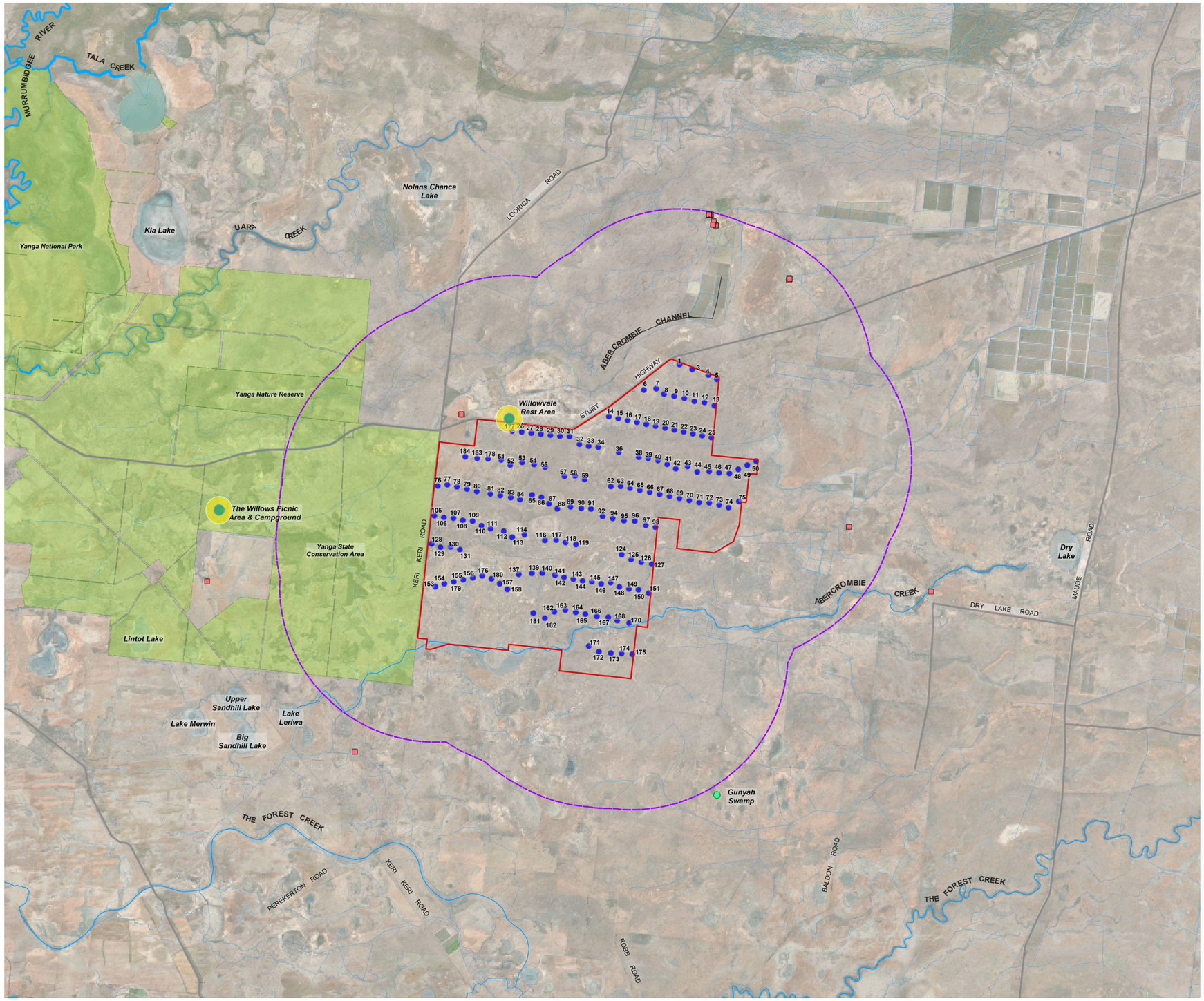
Image 12 Willow and mallee vegetation communities near the Willows campground in Yanga SCA.



Image 13 Typical character of Yanga SCA on the western side of Keri Keri Road and adjacent to the Project Area. Existing conditions currently defined by extensive tracts of saltbush, grasses and intermittent shrubs, which contrasts the character of the SCA further to the west near The Willows Picnic Area and the Campground.



Image 14 Willows Picnic Area & Campground - characterized by dense vegetation within the SCA



Landscape Features & Key Viewpoints

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Non-associated dwellings
- Main Road
- Minor Road
- 8000 m from turbines
- National Park / SCA / Nature Reserve
- Points of Interest
- Swamp
- Rivers, creeks and channels

N

0 2 4 6 8 10km

Figure 9 Landscape Features and Key Viewpoints (Map Source: Six Maps 2020)

5.5 Scenic Quality Class Rating

The Bulletin states: "(...) *the baseline study inputs, including key landscape features and sensitive land use designations, should lead to the identification of Scenic Quality Classes. Scenic quality refers to the relative scenic or aesthetic value of the landscape based on the relative presence or absence of key landscape features known to be associated with community perceptions of high, moderate or low scenic quality. It is both a subjective and complex process undertaken by experts in visual impact assessment, taking into account community values identified in early community consultation."* (DPE, 2016)

In accordance with the Bulletin, a Scenic Quality 'frame of reference' has been formulated by Moir LA (**Table 5**) utilising *An Approach To Landscape Sensitivity Assessment* by Natural England (Tudor, 2019). The frame of reference developed for Keri Keri Wind Farm is in keeping with the example frame of reference provided in the Bulletin.

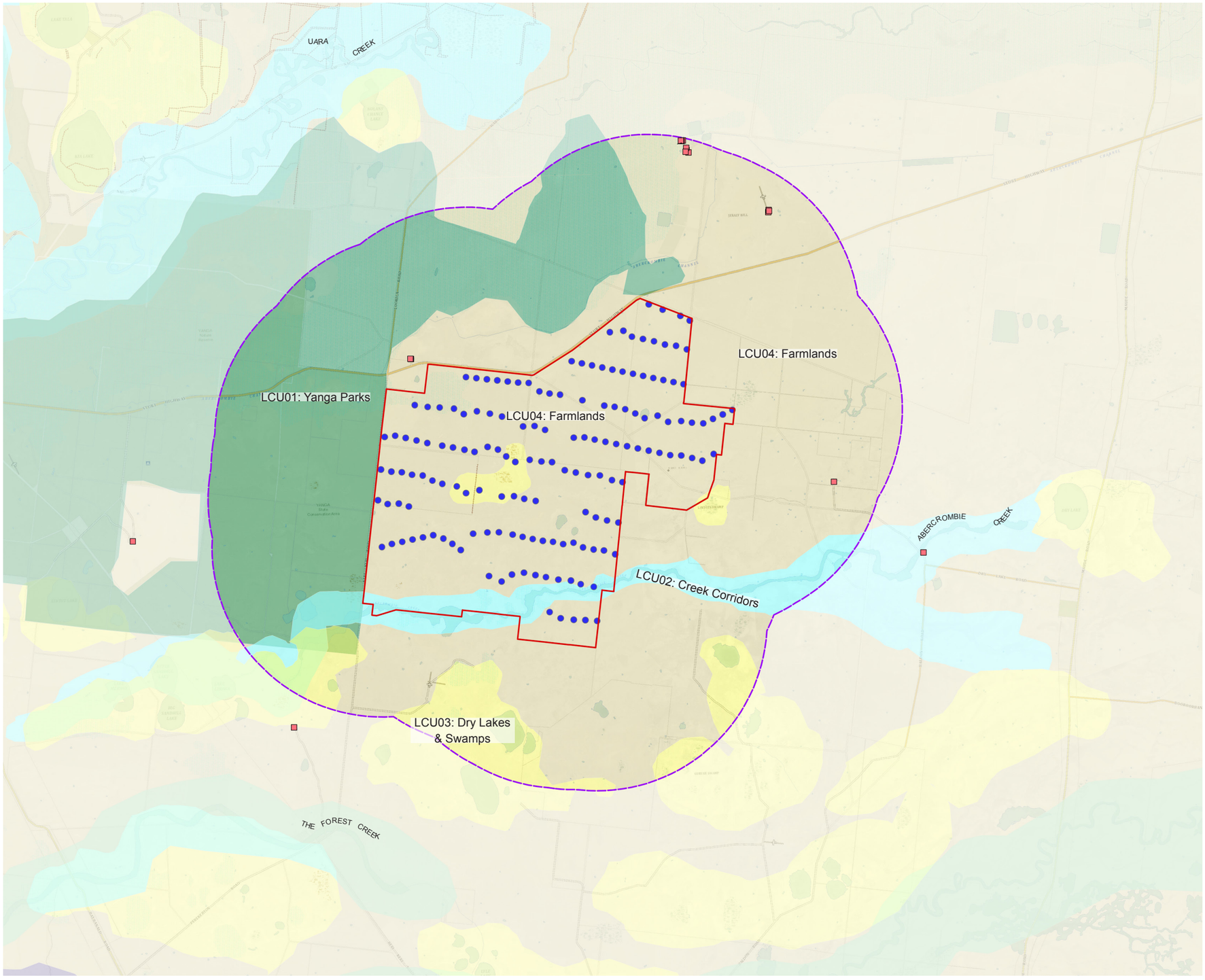
Each category of the 'frame of reference' has been quantified for each Landscape Character Unit (LCU) (summarised in **Table 6**) to determine a Scenic Quality Rating of **low**, **moderate** or **high.** The resulting Scenic Quality Rating is used to assist in defining the Visual Influence Zones in accordance with the Bulletin (refer to matrix in **Appendix A**).

5.6 Landscape Character Unit Classification

An assessment considering the land use and existing landscape features and condition identified four (4) key LCUs present within the Study Area. These include the Murrumbidgee Valley Parks LCU, Creek Corridors LCU, Dry Lake and Swamps LCU and Farmlands LCU (refer to **Figure 9**).

SCENIC QUALITY RATING FRAME OF REFERENCE		
LOW	**MODERATE**	**HIGH**
LAND FORM		
- Flat Topography - Absence of Landscape Features - Open, broad extents of spaces		- Diversity in Topographical Range - Unique Landscape Features - Intimate spaces
WATER FORMS		
- 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 5 Scenic Quality Rating Frame of Reference (adapted from DPE, 2016 and Tudor, 2019)



Landscape Character Units

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Non-associated dwellings within 10 km of Project Area
- Main Road
- Minor Road
- 8000 m from turbines
- LCU01: Yanga Parks
- LCU02: Creek Corridors
- LCU03: Dry Lakes & Swamps
- LCU04: Farmlands

N

0 2 4 6 8 10km

Figure 10 Landscape Character Units (Map Source: Six Maps 2020)



Image 15 The Willows Picnic Area and Campground.



Image 16 Yanga SCA & Nature Reserve defined by open expanses of native woodlands.



Image 17 Vegetation corridor associated with the Abercrombie Creek as seen along Keri Keri Road.



Image 18 Stands of black box trees featuring within creek corridors.



Image 19 Dry lake beds with low ground cover vegetation and an absence of trees.



Image 20 View of Dry Lake which is located east of the Project Area.

LCU01: Yanga Parks

This LCU is defined by the vegetated Riverina plains that fall within the extents of the Yanga National Park, Nature Reserve and SCA.

Land within the National Park, Nature Reserve and SCA is subjected to minimal use and represents unique characteristics defined by the flat topography and intact mallee, black box and belah woodlands.

The Willows Picnic Area and Campground and Willows Visitor Access Trail recreational areas feature within this LCU.

Scenic quality rating: Moderate
See Images 15 and 16.

LCU02: Creek Corridors

The LCU is defined by creek corridors and drainage channels such as Abercrombie Creek that traverse the area. The corridors generally remain dry outside of peak rainfall periods.

Vegetation within this LCU includes stands of black box and other endemic species including speargrass and saltbush following creek corridors.

Topography is generally flat with some shallow depressions.

Scenic quality rating: Moderate
See Images 17 and 18.

LCU03: Dry Lakes & Swamps

The LCU is defined by the dry lakes and swamps featuring on flat and shallow sub-circular depressions.

The dry lakes and swamps are characterised by dry, grey cracking clays and scribbly groundcovers,

The character of vegetation includes swathes of nitre goosefoot and lignum shrubs, saltbush, canegrass and dillonbush.

Scenic quality rating: Low
See Images 19 and 20.



Image 21 Open, flat land parcels with scrubby groundcovers and grasses typical of the LCU.



Image 22 Farmlands south of Keri Keri Station - open, grassy and scrubby grazing lands.

LCU04: Farmlands

The LCU is the most dominant in the region and is defined by the flat, cleared, open parcels used for sheep and cattle grazing.

Vegetation is generally sparse with little to no tree cover and extents of saltbush, speargrass and forbs.

Land use includes large areas of grazing, dryland cropping and modified and irrigated pastures.

Scenic quality rating: Low

See Images 21 and 22.

Landscape Character Units												
LCU:	Name:	Key Landscape Features:	Key locations:	Application of Scenic Quality Rating Frame of Reference:								Scenic Quality Rating:
					Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCU01	Yanga Parks	Undisturbed forested areas, flat , recreational areas	The Willows Picnic Area and Campground, The Willows Visitor Access Trail.	H M L								MODERATE
LCU02	Creek Corridors	Seasonal creeklines and waterways grasses and shrubs with groupings of trees, flat with topographical depressions	Abercrombie Creek and channel, Forest Creek.	H M L								MODERATE
LCU03	Dry Lakes and Swamps	Gentle semi-circular depressions, seasonal lake and swamps, vegetation includes shrubs and groundcovers	Dry Lake.	H M L								LOW
LCU04	Farmlands	Flat, open expanses, sparse tree cover, large tracts of grass and bush, grazing lands	Willowvale Rest Area, Sturt Highway, Keri Keri Road, Maude Road.	H M L								LOW

Table 7 Overview of LCU Scenic Quality Ratings

06

Preliminary Assessment Tools

6.0 Preliminary Assessment Tools

6.1 Overview of Preliminary Assessment Tools

To assist in defining the visual catchment, preliminary assessment tools have been developed in the Bulletin. In accordance with the Bulletin, the purpose of the preliminary assessment tools are: *"to provide an early indication of where turbines require careful consideration because of potential visual impacts. The tools apply to both dwellings and key public viewpoints in the study area. The tools provide an early indication of where placement of turbines will require further assessment and justification, and where consultation with potentially affected landowners needs to be focused – including discussions for landholder agreements"* (DPE, 2016).

The preliminary assessment tools involve analysis of two key visual parameters:

1. Visual Magnitude (Refer to **Section 6.2**)
2. Multiple Wind Turbine Tool (Refer to **Section 6.4**)

The Bulletin states: *Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of mitigation and management measures being employed to reduce impacts. This assessment may identify that factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project* (DPE, 2016).

Dwellings identified through the application of the Preliminary Assessment tools have been assessed in detail in **Appendix C** of this LVIA.

6.2 Preliminary Assessment Tool 1: Visual Magnitude

The Visual Magnitude Threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints as shown in **Figure 11**.

In accordance with the Bulletin: *proposed turbines below the black line must be identified along with the dwellings or key public viewpoints as part of the request for SEARs* (DPE, 2016). The proposed wind turbines are based on a worst case scenario with a tip height of *291.5 metres*. The 'black line 'intersects at a distance of ***3900 metres*** and the 'blue line' intersects at ***5700 metres***.

For the purpose of the Preliminary Assessment, the Visual Magnitude thresholds are based on a 2D assessment of the Project alone. Further assessment indicates factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the Project from residences.

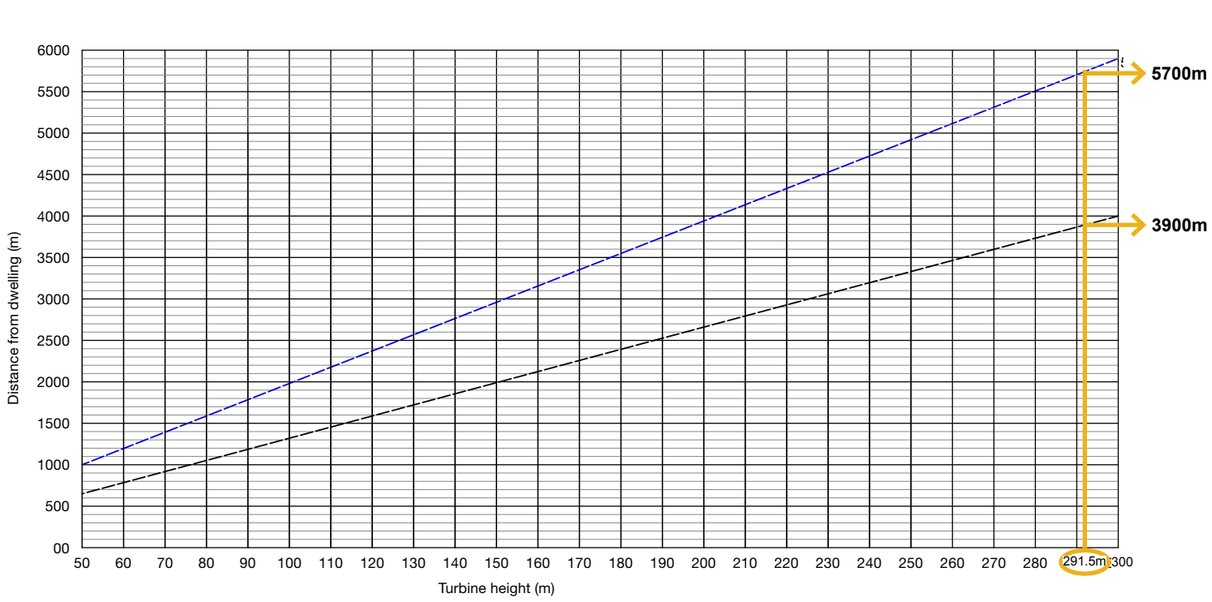
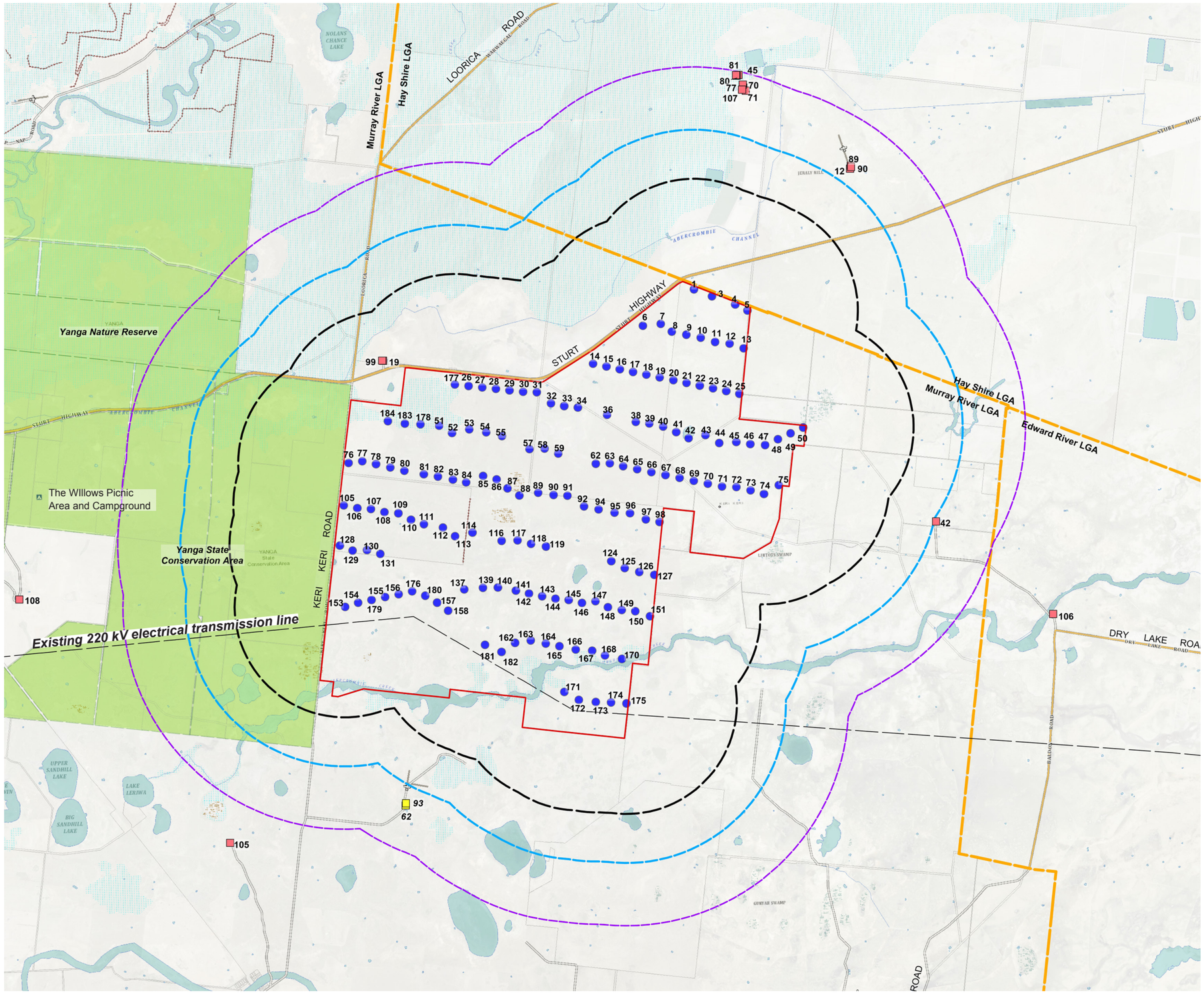


Figure 11 Preliminary Assessment Tool 1: Visual Magnitude thresholds for Project Layout (Source: DPE, 2016)

Visual Magnitude

Keri Keri Wind Farm



LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 3900m from turbine
- 5700m from turbine
- 8000m from turbine
- Main Road
- Minor Road
- Nature Reserve / State Conservation Area

N

0 2 4 6 8 10km

Figure 12 Preliminary Assessment Tool 1: Visual Magnitude (Map Source: Six Maps 2020)

6.3 Results of Preliminary Assessment Tool 1: Visual Magnitude

Application of the Preliminary Assessment Tools identified dwellings which require further assessment. A total of 13 non-associated dwellings have been identified within 8,000m of the nearest turbine.

Non-associated dwellings identified within 3,900 metres and between 3,900 - 5,700 metres of the nearest proposed turbine are shown on **Figure 12.**

Of the two (2) non-associated dwellings identified within 5,700 metres of the nearest turbine:

- *Two (2)* non-associated dwellings have been identified within 3,900 metres of a proposed wind turbine location (within the black line). See **Table 7.**
- *No* non-associated dwellings are located within 3,900 - 5,700 metres of a proposed wind turbine (within the blue line).
- *11* non-associated dwellings are located within 5,700 - 8,000 metres of a proposed wind turbine (within the blue line). See **Table 7.**

Detailed assessments of representative dwellings from which the Project will be visible have been assessed in **Section 9.0** and detailed assessments have been provided in **Appendix C**.

Non-associated dwellings within 3900 metres of nearest WTG (Black Line of Visual Magnitude)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 3900m
99	2.20 km	184	12
19	2.20 km	184	10

Non-associated dwellings within 5700 - 8000 metres of nearest WTG

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 8000m
42	5.92 km	75	11
12	6.41 km	5	6
89	6.50 km	5	6
90	6.48 km	5	6
71	7.52 km	1	4
107	7.52 km	1	4
70	7.71 km	1	3
77	7.75 km	1	2
80	7.90 km	1	1
81	7.99 km	1	1
45	8.00 km	1	1

Non-associated dwellings in excess of 8000 metres of nearest WTG

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 8000m
106	9.65 km	75	Nil
105	11.16 km	153	Nil
108	11.82 km	128	Nil

Table 7 Dwellings within 8,000 m of the nearest turbine

6.4 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

The Multiple Wind Turbine Tool provides a preliminary indication of potential cumulative impacts arising from the proposed wind energy project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight kilometres of each dwelling or key public viewpoint. **Figure 13** below provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors.

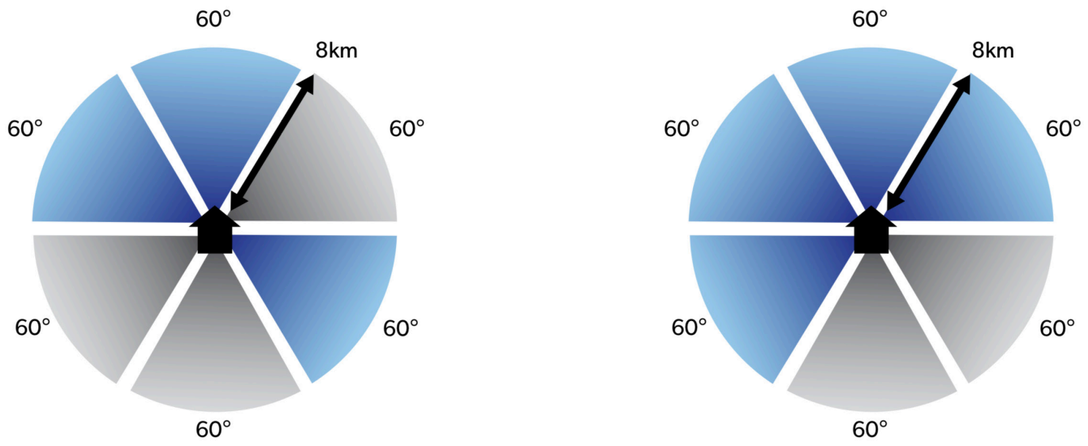


Figure 13 Preliminary Assessment Tool 2: Multiple Wind Turbines
(Source: Visual Assessment Bulletin)

In accordance with the Bulletin where wind turbines are visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the proponents must identify the turbines, relative dwelling and key public viewpoint, along with the relative distance and submit these to the Department as part of the request for SEARs. These turbines will become a focus for assessment in the EIS.

Figure 14 provides an overview of the number of 60º sectors visible from each of the dwellings identified within 8 kilometres.

6.5 Results of Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

The Project is located in the proximity of other proposed wind farm projects such as Wilan Wind Farm (WWF) and Baldon Wind Farm (BWF). As of April 2023 and based on the information available on the Major Projects website, SEARs have been issued for both projects which are currently in the EIS preparation phase. It is important that this assessment considers the potential cumulative effects of surrounding renewable energy projects through the application of the Multiple Wind Turbine Tool.

The turbines utilised for the assessment of the WWF and BWF are associated with the project layouts which are available in the public domain (accessed via NSW Planning Portal's *Major Projects* website, accessed in April 2023). **Figure 14** shows their location with respect to the Project. An overview of potential cumulative impacts of these wind farm projects has been discussed in **Section 13.0**.

The 2D Multiple Wind Turbine Tool was applied to key public viewpoints such as the Willowvale Rest Area and the Willows Picnic Area and Campground that were identified in the **Section 5.0** of this report (see **Figure 14**). This assessment, however, is a 2D assessment that helps identify locations that require further investigation. Application of this tool identified the following:

- Views of turbines associated with all three wind farm projects will be available in up to six (6) 60 degree sectors (up to 180º) at Willowvale Rest Area.

When applied, the 2D Multiple Wind Turbine Tool identified that all 13 non-associated dwellings within 8 km of the Project will have views of turbines associated with the Project and the surrounding wind farms in multiple 60 degree sectors. The following summary is based on a 2D assessment and takes into account turbines associated with the Project, WWF and BWF:

Dwellings with views of turbines in up to three (3) 60 degree sectors:

- One (1) non-associated dwelling (dwelling 106) was identified as having views in up to three (3) 60 degree sectors. However, this dwellings is not located within 8 km of the Project The dwelling will have views of turbines associated BWF. An assessment of potential impacts on this dwelling is included in **Section 13.0**.

Dwellings with views of turbines in up to four (4) 60 degree sectors:

- 10 non-associated dwellings within 8 km of the Project have views of turbines within up to four (4) 60 degree sectors. Of these,
  - Seven (7) non-associated dwellings have views of turbines associated with all three wind farms, i.e., BWF, WWF and the Project.
  - Three (3) non-associated dwellings have views of turbines associated with BWF and the Project.

All 10 non-associated dwellings are located outside the blue line of visual magnitude for the Project. An assessment of potential impacts on these dwellings is included in **Section 13.0**.

Dwellings with views of turbines in up to five (5) 60 degree sectors:

- One(1) non-associated dwelling (dwelling 42) within 8 km of the Project will have views of turbines within up to five (5) 60 degree sectors. The dwelling is located outside the blue line of visual magnitude for the Project. It should be noted that this dwelling is associated with the BWF project as per the information available on the Major Projects website (DPE, 2023). An assessment of potential impacts on this dwelling is included in **Section 13.0**.

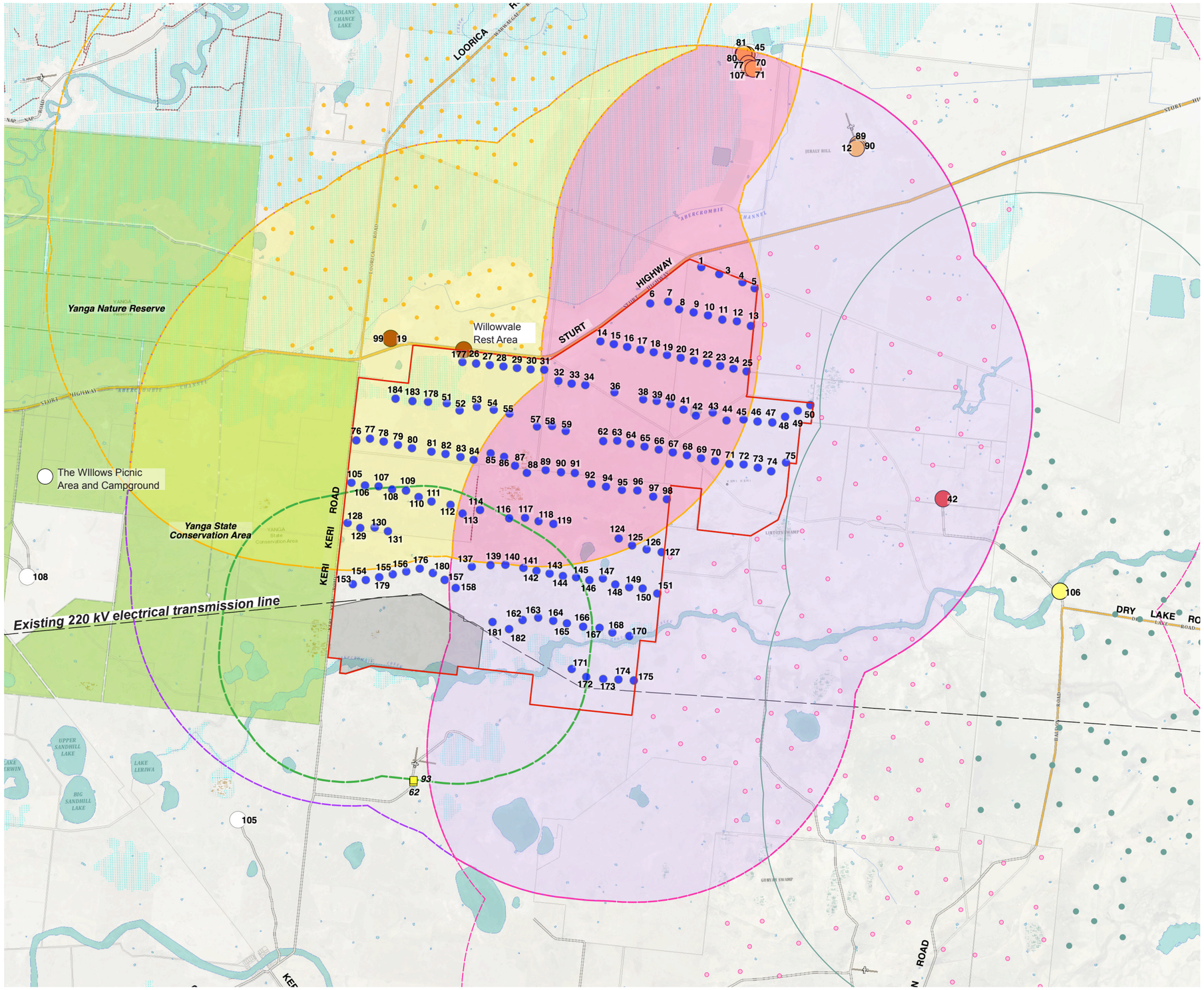
Dwellings with views of turbines in up to six (6) 60 degree sectors:

- Two (2) non-associated dwellings (dwellings 99 and 19) will have views of turbines associated with the Project and WWF within up to six (6) 60 degree sectors. These dwellings are located within the black line of visual magnitude. It should be noted that these dwellings are associated with the WWF project as per the information available on the Major Projects website (DPE, 2023). An assessment of potential impacts on these dwellings is included in **Section 13.0**.

It should be noted that the multiple wind turbine tool is a 2D assessment tool and does not consider intervening elements such as topography, vegetation, structures. Existing screening factors (including vegetation and structures) are likely to reduce visibility of the turbines in many instances. In accordance with the Bulletin, these non-associated dwellings have been assessed in further detail in **Appendix C**.

Multiple Wind Turbine Tool

Keri Keri Wind Farm



LEGEND

- Project Area
- Proposed 291.5m Keri Keri Wind Farm (KKWF) turbine
- Proposed Baldon Wind Farm (BWF) Turbine Location
- Proposed Wilan Wind Farm (WWF) Turbine Location
- Proposed Tchelery Wind Farm (TWF) Turbine Location
- Associated Dwelling
- 8000m from nearest Keri Keri Wind Farm (KKWF) turbine
- 8000m from nearest Baldon Wind Farm (BWF) turbine
- 8000m from nearest Wilan Wind Farm (WWF) turbine
- 8000m from nearest Tchelery Wind Farm (TWF) turbine
- Area with dwellings within 8000m of KKWF & WWF
- Area with dwellings within 8000m of KKWF & BWF
- Area with dwellings within 8000m of KKWF, WWF & BWF
- Main Road
- Minor Road

NON-ASSOCIATED DWELLINGS AND KEY PUBLIC VIEWPOINTS

NUMBER OF 60º SECTORS:

- Receptors in excess of 8 kilometres
- One (1) 60º Sector (60º)
- Up to Two (2) 60º Sectors (120º)
- Up to Three (3) 60º Sectors (180º)
- Up to Four (4) 60º Sectors (240º)
- Up to Five (5) 60º Sectors (300º)
- Up to Six (6) 60º Sectors (360º)

N

0 2 4 6 8 10km

Figure 14 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool (Map Source: Six Maps 2020)

07

Zone of Visual Influence

7.0 Zone of Visual Influence

7.1 Zone of Visual Influence

The Bulletin states:
'the use of Geographic Information Systems (GIS) to facilitate the application of the tools will streamline the evaluation phase of the evaluation phase of a project during the pre-lodgement stage. This can also assist in refining the number of turbines and viewpoints that will ultimately need more detailed assessment.'

Two (2) Zone of Visual Influence (ZVI) diagrams have been prepared for the Project to illustrate the theoretical visibility of the proposed turbines.

Figure 15 depicts the areas of land from which the proposed development may be visible at a blade tip height of 291.5m and provides an indicative number of visible wind turbines.

Figure 16 depicts the areas of land from which the proposed turbines would theoretically be visible from a hub height of 200m.

The ZVI Diagram represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI usually 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 (The Landscape Institute and the institute of Environmental Management and Assessment, 2002).

The ZVI has been determined through the use of digital topographic information and 3D modelling software WindPro. The ZVI has been assessed to approximately 10 km from the Project. Although it is possible for the development to be visible from further than 10 km away, it is generally accepted that beyond 10km visibility is greatly diminished (Sullivan et.al., 2012, Bishop, 2002, Shang and Bishop, 1999).

7.2 Summary of Zone of Visual Influence

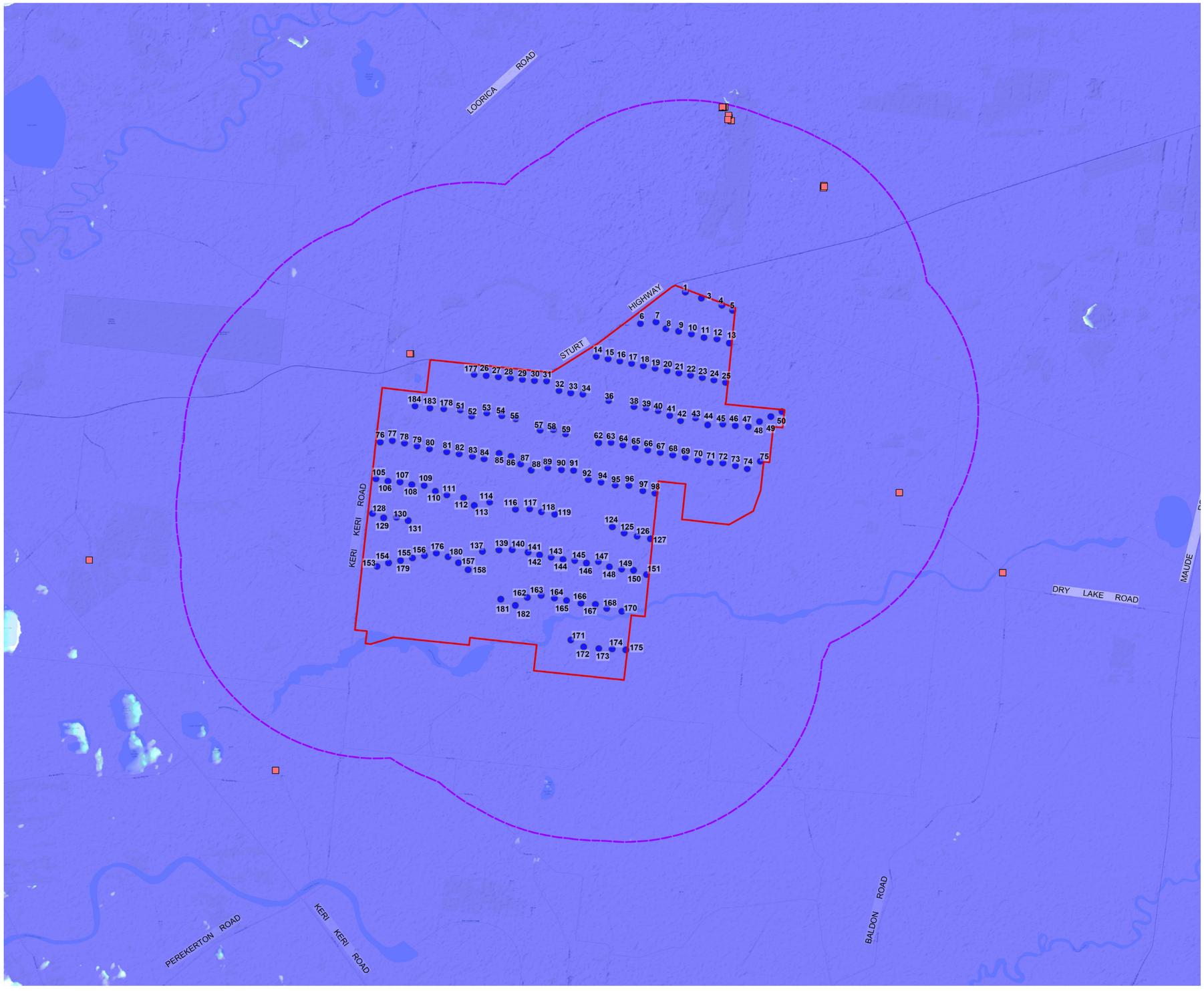
The following provides a brief summary of the Zone of Visual Influence diagrams prepared for Project:

- Due to the relatively flat topography that characterizes this landscape, the majority of turbines associated with the Project are likely to be visible from most areas around the Project Area.
- Certain areas such as the dry lake systems that form a part of the Yanga Parks and parts of the Murrumbidgee Valley that are located generally northwest/west of the Project Area have been identified in the ZVI as areas with views limited by topography.
- Views to the majority of turbines associated with the Project are likely to be available for all dwellings within 8 kilometres of the wind turbines. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.
- Following the development of the ZVI, detailed site investigations (in the form of a viewpoint analysis inventory and dwelling assessments) have been undertaken to ground truth the findings (see ***Appendix B***). Preliminary viewpoint analysis (from 10 public locations) and assessment of 5 representative sensitive receptors have been included in ***Appendix A*** and ***Appendix B***. These assessments illustrate existing intervening vegetation that surrounds non-associated dwellings is likely to reduce views of turbines from a number of locations.
- Further detailed assessment from areas identified in the ZVI will be undertaken in the EIS Phase of the assessment.

It is important to reiterate this is a preliminary ZVI and is based on a worse case scenario assessment with no vegetation or structures. The ZVI figures have been utilised to identify areas which require additional analysis. Ground truthing has been undertaken from these locations during the field work analysis. Public viewpoint locations with potential to view the Project have been assessed and are presented in **Section 8.0**.

Zone of Visual Influence Blade Tip Height: 291.5m

Keri Keri Wind Farm



LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 8000m from turbine
- Main Road

ZVI Number of Visible Turbines (at blade tip):

- **0**
- **1 - 52**
- **53 - 105**
- **106 - 155**

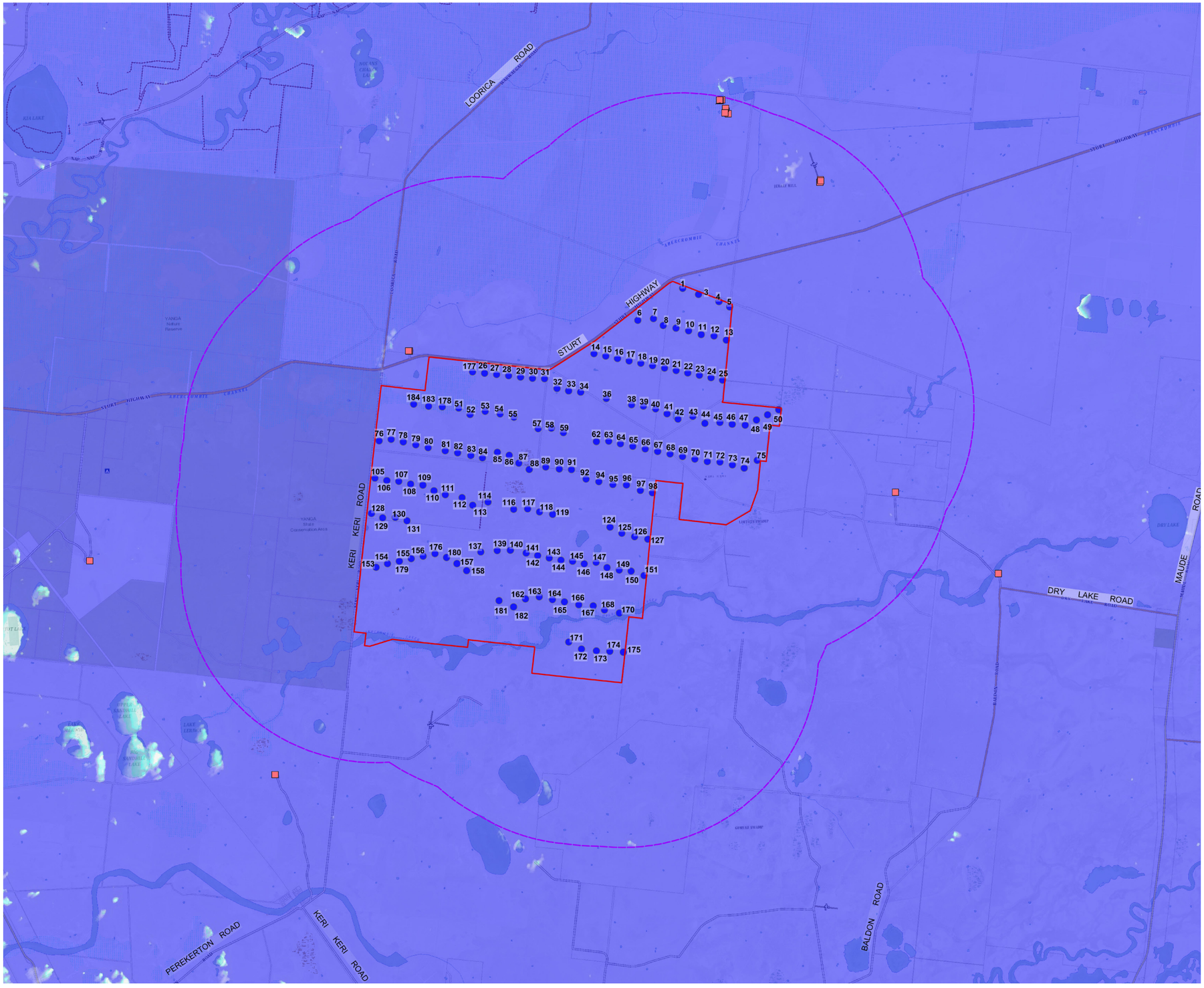
Note:

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

N

0 2 4 6 8 10km

Figure 15 Zone of Visual Influence (Blade Tip Height 291.5m) (Map Source: Six Maps 2020)



Zone of Visual Influence Hub Height: 200m

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 8000m from turbine
- Main Road

ZVI Number of Visible Turbines (at hub height):

- 0
- 1 - 52
- 53 - 105
- 106 - 155

Note:

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

N

0 2 4 6 8 10km

Figure 15 Zone of Visual Influence (Hub Height 200m) (Map Source: Six Maps 2020)

08

Public Viewpoint Analysis

8.0 Public Viewpoint Analysis

8.1 Overview of Public Viewpoint Analysis

In accordance with the Bulletin *'all key public viewpoints and individual dwellings within the 'visual catchment' should be identified and assessed'*.

A total of 13 viewpoints were taken from public locations during the field work process. Viewpoints were carefully selected to be representative of the range of views within the Study Area. The selection of viewpoints is generally informed by the topographical maps, field work observations and other relevant influences such as access, residences, landscape character and the popularity of vantage points. Viewpoints are selected to illustrate a combination of the following;

- viewpoints identified by the community in community consultation phase of scoping paper,
- present landscape character types,
- areas of potentially high landscape or scenic value,
- range of distances,
- varying aspects and elevations,
- varying extent of wind farm visibility (full and partial visibility), and
- sequential views along specific routes.

It is important to note that viewpoints for this LVIA study have been taken predominantly from accessible public land (typically roads and rest areas) which were identified as having a potentially high visual impact through the desktop review process.

The viewpoint locations assessed for the Project have included key viewpoints identified through the community engagement process undertaken by the Proponent.
Selected viewpoint assessment locations are shown on **Figure 17**.

8.2 Public Viewpoint Analysis Methodology

Once the viewpoints had been selected, panoramic photographs are taken in accordance with the standards outlined in the Scottish Natural Heritage Visual Representation of Wind Farms Guidance Version 2.2.

Photographs used for viewpoints are taken on a level tripod at a height of 150 cm (to represent eye level). Photographs were 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. Parameters for the photography is provided in **Table 8**.

The visual impact of the viewpoint was assessed both on site and through a desktop assessment utilising with the topographic and aerial information to ensure accuracy.

The locations of the viewpoints have been identified in **Figure 17** and the general viewing direction of each viewpoint is identified on the map on each viewpoint.

Viewpoint analysis prepared for the Project from public locations has been included as ***Appendix B.***

Photography Specifications:	
Camera Make and Model:	**Canon EOS 5D Mark IV Full Frame Digital SLR**
Lens:	**EF50mm f/1.2L USM**
Focal Length:	**50mm f/0**
Aperture Setting:	**f/6.3 - 10**
Tripod Height:	**150cm**

Table 8 Photography Specifications

8.3 Visual Influence Zone (VIZ)

Visual Influence Zones have been established from the Project Area from dwellings and key viewpoints. This establishes the relative landscape significance against which the potential impacts of wind turbines may be assessed. The Visibility Distance Zone, Viewer Sensitivity Level and Scenic Quality Class of each viewpoint have been assessed which, when combined, result in an overall Visual Influence Zone (see **Figure 18** below and refer to tables in **Section 17.0**). An evaluation using the corresponding visual performance objectives (Table 2 of the Bulletin) has been included for each viewpoint.

For each viewpoint, the potential visual impact was analysed through the use of a combination of the 3D terrain modelling, topographic maps and on site analysis.

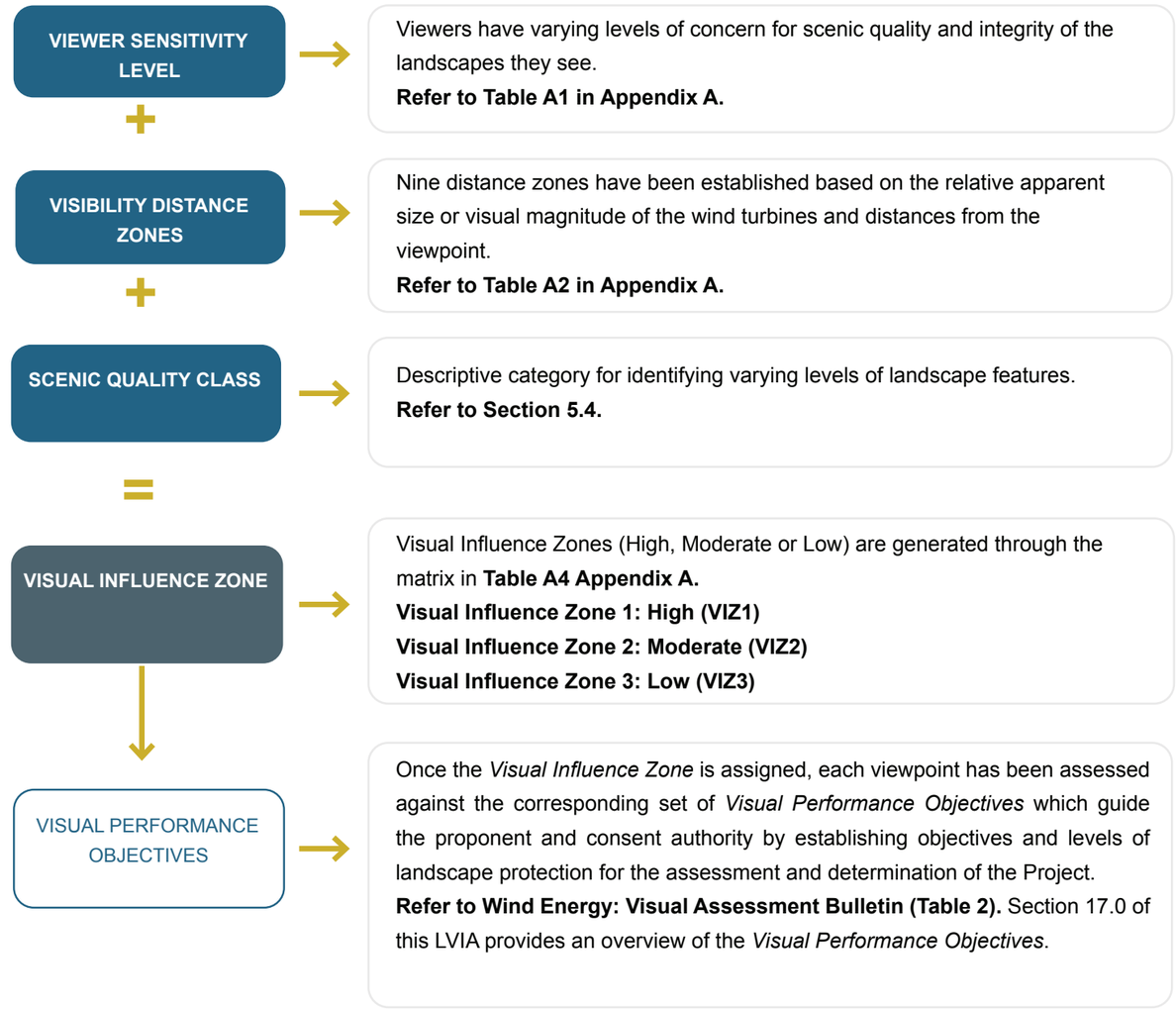


Figure 16 Methodology for determining Visual Influence Zone (VIZ)

Public Viewpoint Analysis Locations

Keri Keri Wind Farm

- Project Area
- Proposed 291.5 m turbine location
- Non-associated Dwellings
- 3,900 m from turbine
- 5,700m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road
- LGA Boundary
- Preliminary Viewpoint Analysis Location

N

0 2 4 6 8 10km

Figure 17 Public Viewpoint Analysis Locations (Map Source: Six Maps 2020)

8.4 Summary of Public Viewpoint Analysis

The 13 public viewpoints assessed for the purpose of this LVIA were taken from varying distances and locations surrounding the Project. This included various key locations such as the Willowvale Rest Area along Sturt Highway and the Willowvale Picnic Area in Yanga State Conservation Area.

Each viewpoint was assigned a Visual Influence Zone (VIZ) based on their Viewer Sensitivity Level, Visibility Distance Zone and Scenic Quality Class combinations (refer to the methodology in **Section 17.0**). In accordance with the objectives of the Bulletin, each viewpoint was assessed against the objectives for the VIZ. The following provides a brief overview of the viewpoint analysis (refer to **Appendix B**).

Photomontages have been prepared for eight (8) public viewpoints to illustrate the potential visual impacts refer to **Section 9.0** and **Appendix D**.

The Visual Influence Zone (VIZ) was identified for 13 viewpoint locations within the Study Area and where required the landscape scenic integrity was assessed in accordance with the relevant visual performance objectives. The following provides an overview of the findings:

Visual Influence Zone 2 (VIZ2):

Four (4) public viewpoints were assessed as being Visual Influence Zone 2 (VIZ2). The Project was assessed as being a visible element in the landscape from three (3) public viewpoint locations (VP01, VP03 and VP07). The fourth public viewing location (VP08) is located at the Willows Campground. The VIZ2 rating is applicable to this location because of the viewer sensitivity level.

Photomontages have been prepared for VP01, VP03, VP07 and VP08 to demonstrate the impact on the visual catchment at these locations. The following gives an overview of the visual impact at these locations:

- Willowvale Rest Area (refer to Photomontage 01 - Appendix D) is located on the Sturt Highway. The turbines will be clearly visible at this location. However, it should be noted that the surrounding lands are predominantly used for grazing and cropping as part of commercial operations. The Rest Area does not offer views to any key landscape features.

- The Willows Picnic Area and Campground (refer to Photomontage 05 - Appendix D) is located within the Yanga SCA. Since the picnic area and campground are classified as a recreation site, the viewer sensitivity level is high. Hence, the Visual Influence Zone rating is VIZ2. The photomontage prepared for this location identified that no turbines will be visible at this location due to existing intervening vegetation.

- Two viewpoints located on the Sturt Highway (refer to Photomontage 07 and Photomontage 8 - Appendix D) generally represent views along the highway. Due to proximity of the Project, the Visual Influence Zone rating is VIZ2. It should be noted that the surrounding lands are predominantly used for grazing and are not inhabited extensively. The Sturt Highway provides access between Hay and Balranald. It is used by transport vehicles, locals and travellers. The Highway in this location does not offer views to any key landscape features or viewing locations apart from the Willows Picnic Area and Campground which is located approximately 9,000 m west of the Project.

Visual Influence Zone 3 (VIZ3):

Nine (9) public viewpoint locations were rated as VIZ3 in accordance with the methodology in the Bulletin. There are no performance objectives for VIZ3 rated viewpoints.

09

Dwelling Assessments

9.0 Dwelling Assessments

9.1 Overview of Dwelling Assessment

9.1.1 Dwelling Assessment Requirements

The Bulletin states: ***all key public viewpoints and individual dwellings within the 'visual catchment' should be identified and assessed.***

The SEARs state the LVIA must include a ***detailed consideration of potential visual impacts on local residences (including approved developments, lodged development applications and dwelling entitlements)***

Non-associated Dwellings:

The Preliminary Assessment Tools (***Section 6.0***) defined the 'visual catchment' and identified non-associated residences within the Study Area which require further assessment. These include:

- Two (2) non-associated dwellings (dwellings 99 and 19) within 3,900 metres of the nearest Project-related turbine (black line of visual magnitude).
- No non-associated dwellings were identified within 3,900 - 5,700 metres of the nearest Project-related turbine (blue line of visual magnitude).
- 11 non-associated dwellings were identified within 8,000 metres of the nearest Project-related turbine. Detailed dwelling assessments for these 11 dwellings have been included in **Appendix C** to identify potential visual impacts since the existing landscape character is defined by flat plains with scattered vegetation.
- In addition to the above mentioned 13 non-associated dwellings, detailed assessments have been included for three (3) additional dwellings (dwellings 105, 106 and 108) that were identified in the broader Study Area.

Approved Developments and Lodged Development Applications:

As of April 2023, no approved developments or lodged Development Applications were identified within 10 km of the Project.

Dwelling Entitlements:

As of March 2024, a total of eight (8) lots with dwelling entitlements were identified within 5.7 km of the nearest wind turbine in the Murray River and Hay Shire Council LGAs. An assessment based on the topography alone suggests that all lots have the potential for views to the majority of the Project. ***Section 9.4*** provides an overview of the percentage of each 'Zone of Visual Influence band' for each lot identified within 5.7 km of the nearest turbine and provides recommendations for the siting of any future proposed developments on these lots.

9.2 Study Method for Dwelling Assessments

In accordance with the Bulletin 'sensitive receptors have been identified through the use of the preliminary assessment tools'. As a result, Moir LA have undertaken detailed dwelling assessment for these sensitive dwelling receptors.

With the advice of Moir LA, the Applicant offered on site dwelling assessments to be undertaken for all non-associated dwellings within 12,000 m of the nearest turbine.

The Bulletin states: *The black and blue lines are not determinative of acceptability. Instead, they provide a basis for the assessment to be undertaken. There may be reasons why the proposed turbine will not have the impact as identified by (the visual magnitude thresholds) and detailed justification can be provided for proposed turbines... for example ground truthing may identify that existing vegetation or topography will screen views to a proposed turbine'*.

Further detailed assessment identified a number of dwellings within the visual catchment that are likely to have limited or no views to the Project due to screening factors such as vegetation and ancillary structures.

Table 10 provides an overview of the study method for undertaking the dwelling assessment for each dwelling identified within the visual catchment.

Study Method	Process
Step 1: Application of Preliminary Assessment Tools	Preliminary Assessment Tools were applied in accordance with the Bulletin at each dwelling to assess the following two parameters: - Visual Magnitude (identify the number of turbines within blue and black lines) - Multiple 60º Sector Assessment (identify the number of 60º sectors based on a 2D assessment).
Step 2. 3D Assessment (based on topography alone)	Using 3D modelling, Moir LA identified turbines which will not be visible from the dwelling due to topography. As a result the extent of visibility is generally decreased when compared to the 2D assessment. The application of the Preliminary Assessment Tools are updated to account for 3D modelling.
Step 3. Aerial Imagery	Information on the extent of visibility extracted from the 3D model is then 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 turbines and identifies any intervening elements (such as structures, wind break planting or vegetation) which may reduce the potential visibility.
Step 4. Site Inspection	Where access was granted, Moir LA attended the property to undertake a site inspection to ground truth potential screening factors that were identified on aerial imagery. This included photographic assessment from the dwelling. During the site inspection Moir LA identified potential intervening elements including vegetation and structures.
Step 5: Photomontage / Wire Frame Diagrams	Where potential impacts were identified, photomontages or wire frame diagrams were prepared from dwellings to represent those with potential impacts or to best represent the appearance of the Project from clusters of dwellings.
Step 6. Evaluation of VIZ Objectives	In accordance with the Bulletin, the Visual Influence Zone was defined and the relevant objectives were evaluated for each dwelling based on the assessment.
Step 7. Visual Impact Rating	A visual impact rating is applied to each dwelling with regards to the parameters outlined in **Section 10.3 (Table 11).**
Step 8. Consideration of mitigation methods	For non-associated dwellings where by the Project has the potential to cause visual impact, mitigation methods have been suggested. **Refer to Section 16.**

Table 10 Dwelling Assessment Process

9.3 Visual Impact Rating Methodology

The Bulletin states: *The Department adopts the widely accepted and commonly utilised approach that visual impact can be determined from a combination of receiver sensitivity and the magnitude of visual effect. This approach is documented in numerous Australian and international guidelines, and is considered to be industry best practice.*

In addition to assessing against the visual performance objectives outlined in the Bulletin, Moir LA have developed a framework for defining and rating the level of visual impact from each dwelling.

The framework in **Table 11** 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 professional experience in undertaking LVIA's for wind energy projects.

Published in 2013, the GLVIA3 is well established as providing 'best practice guidance' when undertaking Landscape and Visual Impact Assessment (LVIA). RVAA is a stage beyond LVIA and focusses exclusively on private views and private visual amenity. Considerations outlined in the RVVA which provide a framework for describing and evaluating the predicted magnitude of visual change and related visual amenity effects include:

- 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: RVVA, 2019).

VISUAL IMPACT RATING - RESIDENCES				
	NEGLIGIBLE	**LOW**	**MODERATE**	**HIGH**
Distance	The Project may be partially visible but very difficult to discern due to distance and / or intervening elements.	Turbines may be visible in distance or very partially visible in the foreground.	Turbines maybe visible in the middle ground or a small number may be visible in the near ground.	Turbines are 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 11 Visual Impact Rating Methodology - Residences

Detailed Dwelling Assessment Locations

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 3900m from turbine
- 5700m from turbine
- 8000m from turbine
- Main Road
- Minor Road
- LGA boundary

DWELLING IMPACT RATINGS:

- Negligible Visual Impact Rating
- Low Visual Impact Rating
- Moderate Visual Impact Rating
- High Visual Impact Rating

Detailed Dwelling Assessments prepared for the Project have been included as Appendix C.

N

0 2 4 6 8 10km

Figure 18 Dwelling Assessment Locations (Map Source: Six Maps 2020)

Non-associated dwellings within 3,900 metres of nearest WTG (Black Line of Visual Magnitude)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 3,900 m:	Theoretical number of 60º sectors (Based on 2D Assessment):	Number of 60º sectors (Based on 3D Assessment):	Number of potentially visible turbines (based on topography alone):	Visual Influence Zone Rating:	Visual Impact Rating:	Assessment Notes:
99	2.2 km	184	10	Two (2)	Two (2)	155 All at hub height	VIZ2	MODERATE	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD01 & Appendix C.1.). Dwelling is surrounded by dense vegetation in its foreground and this will limit majority of the views of the Project. The Project has the potential to be visible, however, changes in the landscape can be reduced over time through the employment of mitigation measures.
19	2.2 km	184	10	Two (2)	Two (2)	155 All at hub height	VIZ2	MODERATE	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD02 & Appendix C.2.). Vegetation in dwelling's foreground likely to limit visibility of majority of the turbines. Some turbines are likely to be visible in up to one (1) 60 degree sector. The Project has the potential to be visible, however, changes in the landscape can be reduced over time through the employment of mitigation measures.

Non-associated dwellings between 5,700 - 8,000 metres of nearest WTG (Beyond Blue Line of Visual Magnitude and within 8,000 metres of nearest turbine)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 8,000 m	Theoretical number of 60º sectors (Based on 2D Assessment):	Number of 60º sectors (Based on 3D Assessment):	Number of potentially visible turbines (based on topography alone):	Visual Influence Zone Rating:	Visual Impact Rating:	Assessment Notes:
42	5.92 km	75	11	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Moir LA prepared wireframe diagram (Refer to Appendix C.3.). Dwelling is surrounded by rows of windbreak vegetation in the west which is likely to limit majority of the views. Potential visual impact is likely to be low.
12	6.41 km	5	6	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Aerial imagery indicates that dwelling orientated to the north and is surrounded by patchy vegetation to the southwest (Refer Appendix C.4.). Views are likely to be distant and limited by existing screening elements.
89	6.50 km	5	6	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Aerial imagery indicates that dwelling orientated to the west (Refer Appendix C.5.). Vegetation associated with dwelling 90 will limit views. Potential visual impact is assessed as low.
90	6.48 km	5	6	One (1)	One (1)	155 All at hub height	VIZ3	NEGLIGIBLE	Aerial imagery indicates that dwelling orientated to the west and is surrounded by dense windbreak vegetation to the west/ southwest (Refer Appendix C.6.). Views are likely to be limited by existing screening elements.
71	7.52 km	1	4	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD06 & Appendix C.7.). Vegetation in dwelling's foreground likely to limit visibility of majority of the turbines. Partial views of some turbines are likely to be visible in up to one (1) 60 degree sector. Potential visual impact is low.
107	7.52 km	1	4	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Moir LA attended the dwelling in November 2022 and the landowner allowed photography from worker's office. Existing conditions around dwelling 107 are defined by patchy stands of vegetation that partially limit views of turbines. Partial views of some turbines are likely to be visible in up to one (1) 60 degree sector.
70	7.71 km	1	3	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD05 & Appendix C.9.). Vegetation in dwelling's foreground and middleground will limit visibility of the Project. Partial views of some turbines are likely to be visible in up to one (1) 60 degree sector. Potential visual impact is low.
77	7.75 km	1	2	One (1)	One (1)	155 All at hub height	VIZ3	LOW	Aerial imagery indicates that dwelling orientated to the south. Views of Project are likely to be screened by vegetation associated with dwelling 70 and 107 (Refer Appendix C.10.). Potential visual impact is low.
80	7.90 km	1	1	One (1)	One (1)	155 All at hub height	VIZ3	NEGLIGIBLE	Aerial imagery indicates that dwelling orientated to the east. Views of Project are likely to be screened by windbreak vegetation along southern boundary of dwelling (Refer Appendix C.11.). Potential visual impact is negligible.
81	7.99 km	1	1	One (1)	One (1)	155 All at hub height	VIZ3	NEGLIGIBLE	Aerial imagery indicates that dwelling orientated to the east and is surrounded by dense vegetation. Views of Project are likely to be screened by the vegetation (Refer Appendix C.12.). Potential visual impact is negligible.
45	8.00 km	1	1	One (1)	One (1)	155 All at hub height	VIZ3	NEGLIGIBLE	Aerial imagery indicates that dwelling orientated to the south and is surrounded by windbreak vegetation. Views of Project are likely to be screened by existing screening elements (Refer Appendix C.13.). Potential visual impact is negligible.

Non-associated dwellings beyond 8,000 metres of nearest WTG									
Dwelling ID:	**Distance to nearest Turbine:**	**Nearest Turbine:**	**Number of turbines within 8,000 m:**	**Theoretical number of 60º sectors (Based on 2D Assessment):**	**Number of 60º sectors (Based on 3D Assessment):**	**Number of potentially visible turbines (based on topography alone):**	**Visual Influence Zone Rating:**	**Visual Impact Rating:**	**Assessment Notes:**
106	**9.65 km**	**75**	**Nil**	**Nil**	**One (1)**	**155** All at hub height	**VIZ3**	**NEGLIGIBLE**	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD04 & Appendix C.14.). Vegetation in dwelling's foreground will limit visibility of all turbines. Potential visual impact is negligible.
105	**11.16 km**	**153**	**Nil**	**Nil**	**One (1)**	**155** All at hub height	**VIZ3**	**NEGLIGIBLE**	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD03 & Appendix C.15.). Vegetation in dwelling's foreground will limit visibility of majority of the turbines. Partial views of some turbines will be visible in up to one (1) 60 degree sector. Potential visual impact is negligible.
108	**11.82 km**	**128**	**Nil**	**Nil**	**One (1)**	**155** All at hub height	**VIZ3**	**NEGLIGIBLE**	Moir LA attended the dwelling in November 2022 (Refer to Photomontage PD07 & Appendix C.16.). Scattered vegetation in dwelling's foreground will limit visibility of majority of the turbines. Views of turbines will be visible in up to one (1) 60 degree sector but these will be distant and difficult to discern. Potential visual impact is negligible.

Table 12 (Continued) Summary of Assessment of Non-associated Dwellings

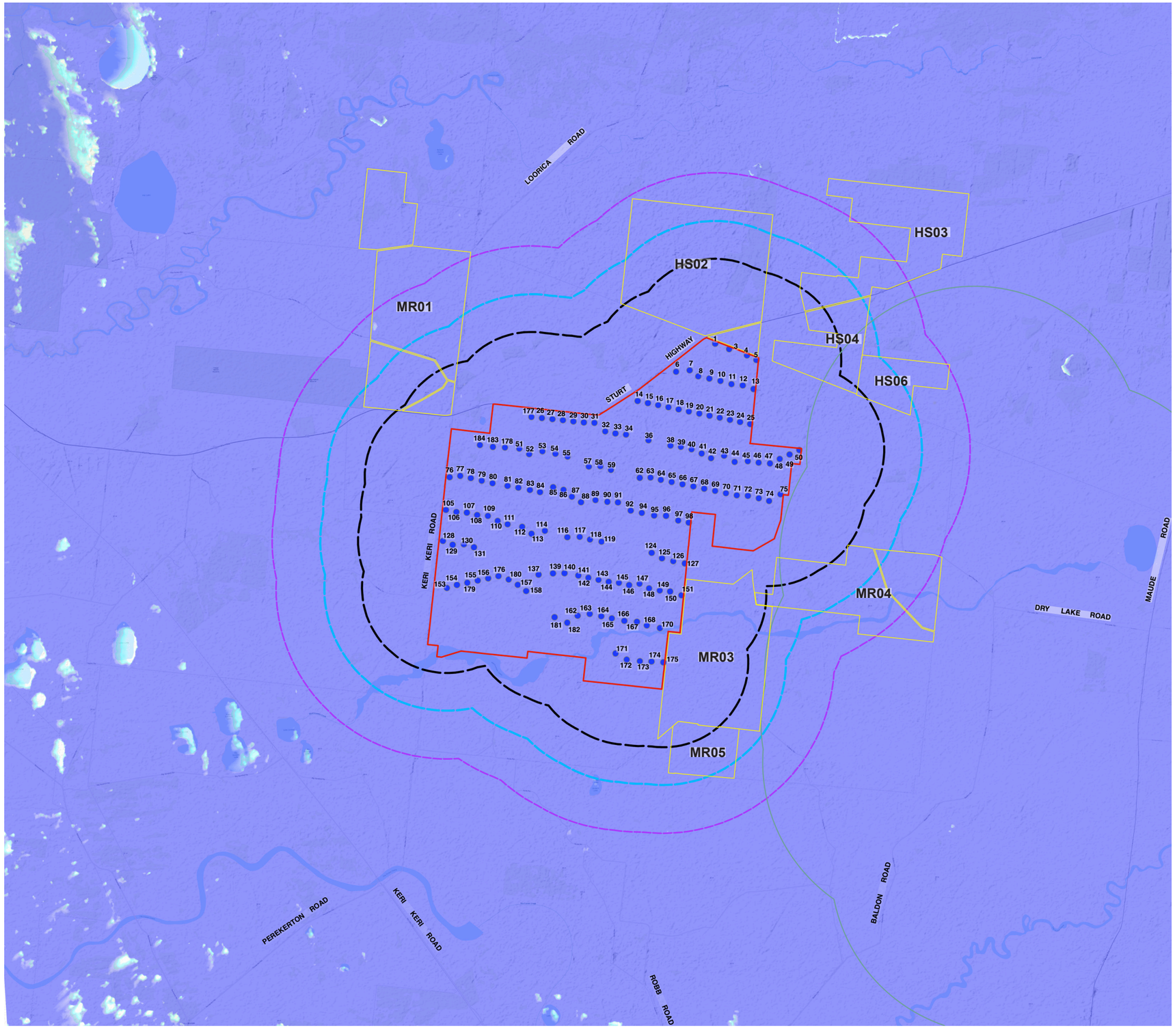
9.4 Overview of Lots with Dwelling Entitlements

Figure 19 shows all lots with dwelling entitlements located within 5.7 km of the nearest wind turbine. A ZVI model has been overlaid to illustrate the number of potentially visible turbines for each lot (based on topography alone). It is important to understand that the ZVI model represents a bare ground scenario and does not consider intervening elements such as vegetation and structures.

Table 13 provides an overview of the percentage of each 'Zone of Visual Influence band' for each lot. The bands refer to the number of potentially visible turbines as per the **Figure 19**.

MLA Reference	Lot / DP & Address:	LGA:	Lot Size:	Percentage of Lot Covered by 'ZVI Band':				Assessment Notes:
				Nil	1 - < 53 turbines	53 - < 106 turbines	106 - < =155 turbines	
HS0	**Lot 06 / DP751229** Sturt Highway Keri Keri 2711	**HS**	3974 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	Half the lot is located beyond the black line (3900 m) and the other half is within black line. It is recommended that structures are sited further away to the north further away from Sturt Highway for reduced visual impacts from the Project.
HS03	**Lot 02 / DP235870** Sturt Highway Keri Keri 2711	**HS**	2325.5 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	Majority of the lot is located beyond the blue line (5700m). Potential visual impact is likely to be low if screen planting is proposed around any dwelling. It is recommended that structures are sited further away to the northeast closer to Sturt Highway for reduced visual impacts from the Project.
HS04	**Lot 01 / DP235870** Sturt Highway Keri Keri 2711	**HS**	1133 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	The lot is located within the blue line (5700m) and a part of it is located within 3900m. It is recommended that structures are sited further away to the northeast closer to Sturt Highway for reduced visual impacts. Screen planting near proposed dwelling would be beneficial in limiting views.
HS06	**Lot 06 / DP751225** Sturt Highway Maude 2711	**HS**	785.5 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	Half the lot is located beyond the blue line (5700 m) and the other half is within blue line. It is recommended that structures are sited further away to the north for reduced visual impacts from the Project.
MR01	**Lot 08 / DP751215** Sturt Highway Keri Keri 2711	**MR**	4134 ha	**0.0%**	**0.04%**	**0.16%**	**99.8%**	Majority of the Project will be visible on this lot. Approximately half the lot is located beyond the blue line (5700 m). Potential visual impact is likely to be low if screen planting is proposed around any dwellings. It is recommended that structures are sited further away to the northwest near Loorica Lake for reduced visual impacts from the Project.
MR03	**Lot 29 / DP756595** Baldon Road Keri Keri 2711	**MR**	3110 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	Majority of the lot is located within the black line (3900 m). Potential visual impact is likely to be moderate - high if a dwelling is sited on the western side of the lot. It is recommended that structures are sited further away to the east and planting is proposed around any dwellings for reduced visual impacts from the Project.
MR04	**Lot 73 / DP756601** Dry Lake Road Keri Keri 2711	**MR**	2576 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	The lot is located partly within and partly beyond the blue line (5700m). A small percentage is located within black line (3900 m). It is recommended that structures are sited further away to the east and closer to Dry Lake Road for reduced visual impacts. Screen planting near proposed dwelling would be beneficial in limiting views.
MR05	**Lot 30 / DP756595** Baldon Road Keri Keri 2711	**MR**	756.8 ha	**0.0%**	**0.0%**	**0.0%**	**100%**	Majority of the lot is located within the blue line (5700 m). Potential visual impact is likely to be high if a dwelling is sited on the northwestern side of the lot. It is recommended that structures are sited further away to the east and planting is proposed around any dwellings for reduced visual impacts from the Project.

Table 13 Summary of Assessment of lots with dwelling entitlements



Lots with Dwelling Entitlements

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- 3900m from turbine
- 5700m from turbine
- 8000m from turbine
- Road
- Lots with dwelling entitlements

Number of visible turbines (at tip height)
(Based on topography alone):

- 0
- 1 - < 53
- 53 - < 106
- 106 - <= 155

Note:

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

N

0 2 4 6 8 10km

Figure 19 Lots with Dwelling Entitlements

9.5 Summary of Dwelling Assessment

An overview of the visual assessment for each of the representative dwellings and detailed assessments have been included in **Appendix C**. The following provides a summary of the assessment and proposed recommendations in accordance with the Bulletin.

9.4.1 Dwellings within 3,900 metres of the nearest turbine

A total of two (2) non-associated dwellings were identified within 3,900 metres of a proposed turbine. Detailed dwelling assessment has been undertaken for both non-associated dwellings within 3,900 m of the nearest turbine that are likely to have highest visual impacts.

Of the two (2) non-associated dwellings within 3,900 m the assessment found:

- Both Dwelling 19 and Dwelling 99 were assessed as having a moderate visual impact rating.

Both non-associated dwellings located within 3,900 m of the nearest turbine were assessed as being Visual Influence Zone 2 (VIZ2). In accordance with the Bulletin, objectives for VIZ2 receptors within the black line (3,900 m) of the nearest turbine are to: *Manage impacts as far as practicable, justify residual impacts.*

Practical and feasible mitigation measures for dwellings 19 and 99 could be impletmented at these dwellings in consultation with the landowners to further reduce the visibility of the Project. An overview of indicative mitigation measures for these dwellings have been included in **Appendix E.**

9.4.2 Dwellings in excess of 5,700 metres of the nearest turbine

A total of 11 non-associated dwellings were identified beyond 5,700 metres of a proposed turbine. Detailed dwelling assessments have been undertaken for all of these non-associated dwellings.

Of the 11 non-associated dwellings located beyond 5,700 m the assessment found:

- Four (4) were assessed as having negligible visual impact rating,
- Seven (7) were assessed as having low visual impact rating,

All non-associated dwellings located beyond 5,700 m of the nearest turbine were assessed as being Visual Influence Zone 3 (VIZ3). In accordance with the Bulletin, visual performance objectives for VIZ2 and VIZ3 receptors between the black line (3,900 m) and blue line (5,700 m) of the nearest turbine are to: *Consider screening between the blue line and the black line.* Since no dwellings are located between the black and blue lines, no visual performance objectives have been noted. Wherever possible, screen planting has been proposed to reduce potential visual impacts from the dwelling.

The Bulletin states: "*where relatively close clustering of houses belonging to different landowners or occupants occur, representative viewpoints may be selected and assessed in lieu of every single dwelling in the following types of areas:*

- *rural residential clusters;*
- *rural villages; and*
- *urban residential and commercial areas*." (DPE, 2106).

In addition to the detailed assessment of dwellings identified within the visual catchment, Moir LA undertook an extensive Public Viewpoint Analysis which provides representative visual assessments from dwellings in excess of 5,700 m of the Project (refer to **Section 8.0** and **Appendix B**).

9.4.3 Lots with Dwelling Entitlements

An overview of the visual assessment for 15 lots with dwelling entitlements were identified within 5,700m of the nearest turbine (blue line of visual magnitude). No approved Development Applications were identified within the overall Study Area. An assessment based on topography alone suggests that the majority of the Project will be visible on all lots with dwelling entitlements. However, highest impacts are likely to be experienced on the following lots:

- HS02 (Lot 06 / DP751229),
- HS04 (Lot 01 / DP235870),
- MR01 (Lot 08 / DP751215),
- MR03 (Lot 29 / DP756595),
- MR04 (Lot 73 / DP756601)

It is recommended that dwellings are sited further away from the Project as per the recommendations provided in **Table 13**. Screen planting around any future dwellings will also help limit visual impacts of the Project.

10

Photomontages and Wire Frame Diagrams

10.0 Photomontages and Wire Frame Diagrams

10.1 Overview of Photomontages and Wire Frame Diagrams

10.1.1 Photomontages

The Bulletin states: Photomontages shall be prepared in accordance with the Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.1 December 2014 guidelines, noting they are generally consistent with the Land and Environment Court's Photomontage Policy. The visual assessment needs to include a concise description of the complete methodology used to create any photomontages presented in the visual assessment.

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.

Photomontages prepared for the Project have been included as Appendix D.

10.1.2 Wire Frame Diagrams

A wire frame is a computer generated image based on a digital terrain model, that indicate the 3D shape of the landscape in combination with additional elements. They are a valuable tool in the wind farm LVIA process as they allow the assessor to compare the position and scale of the turbines 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, building structures.

Wire frame diagrams have been utilised in this LVIA to assist in the assessment of the Project from inaccessible locations. In instances where access to a location was not available, wire frame diagrams have been utilised as an assessment tool to provide a worst case scenario view of the proposal.

10.2 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 stakeholders 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 turbines and the distance to the turbines, but can never be 100% accurate;
- A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.

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

10.3 Photomontage Selection Process

Indicative viewpoints have been selected for the preparation of photomontages from public locations and private dwelling locations to best illustrate the potential appearance of the proposed wind farm from varying distances and locations with differing views in public locations (refer to **Figure 21**).

Public Photomontage Locations:

A total of ***eight (8) public viewpoint locations*** selected for the preparation of visual photomontages are based on feedback received from the community. 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.

Private Photomontage Locations:

Seven (7) photomontages have been prepared from private properties. The locations selected were based on those that granted access.

Public Receptor Photomontages		
Photomontage 01	Viewpoint PM01	Willowvale Rest Area, Sturt Hwy, Keri Keri
Photomontage 02	Viewpoint PM02	Keri Keri Rd, Keri Keri
Photomontage 03	Viewpoint PM03	Sturt Hwy, Keri Keri
Photomontage 04	Viewpoint PM04	Sturt Hwy, Keri Keri
Photomontage 05	Viewpoint PM05	The Willows Picnic Area, Yanga Nature Reserve
Photomontage 06	Viewpoint PM06	Maude Rd, Moulamein
Photomontage 07	Viewpoint PM07	Sturt Highway, Maude
Photomontage 08	Viewpoint PM08	Sturt Highway, Maude
Private Receptor Photomontages		
Photomontage 09	PD01	'Willow Vale', Keri Keri
Photomontage 10	PD02	'Willow Vale', Keri Keri
Photomontage 11	PD03	'Tchelerey', Keri Keri
Photomontage 12	PD04	'Perekerten', Maude
Photomontage 13	PD05	'Hells Gate' and 'Loorica', Maude
Photomontage 14	PD06	'Hells Gate' and 'Loorica', Maude
Photomontage 15	PD07	47 Impimi Road, Yanga

Table 13 Overview of Photomontage and Wire Frame Locations

10.4 Photomontage Development Methodology

The process for generating the photomontages involves computer generation of a wire frame perspective view of the wind turbines and the topography from each viewpoint. As per the requirements of the Bulletin, 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 20**.

The photomontages are based on a worst case scenario of a maximum turbine height dimension of 291.5 m with a hub height of 200 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 Site is developed in Wind Pro. The wind turbines 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 precisely.

Step 3: Render Photomontage

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

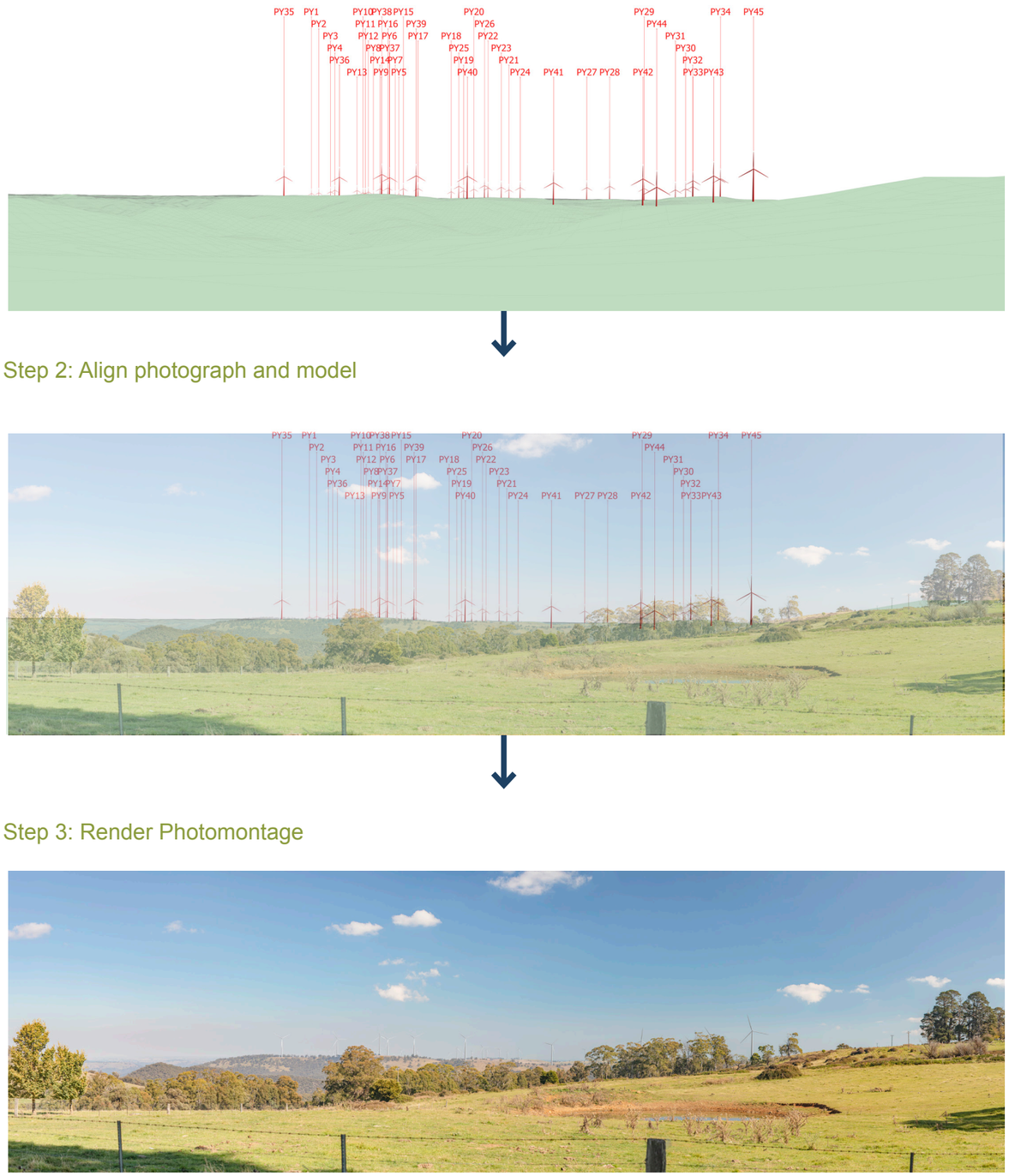
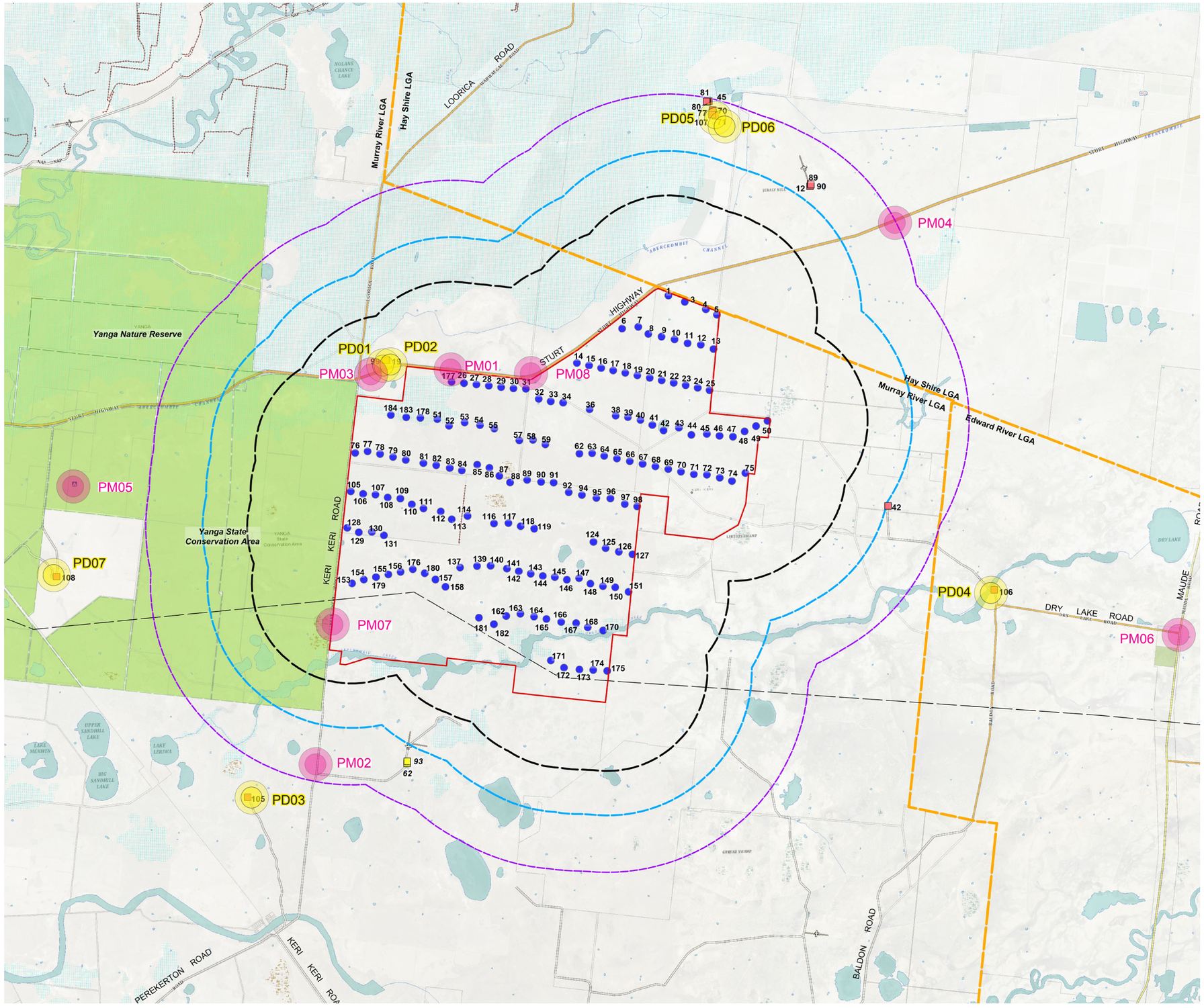


Figure 20 Photomontage Development Process

Photomontage and Wire Frame Diagram Locations

Keri Keri Wind Farm



LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 3,900 m from turbine
- 5,700m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road
- PD03 Photomontage locations (private receptors)
- PM03 Photomontage locations (public receptors)

Photomontages prepared for the Project have been included as Appendix D.

N

0 2 4 6 8 10km

Figure 21 Photomontages and Wire Frame Diagram Locations (Map Source: Six Maps 2020)

11

Night Lighting Assessment

11.0 Night Lighting Assessment

11.1 Overview of Night 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. The Aviation Impact Assessment states that obstacle lighting is required on the following:

- Temporary meteorological masts, and
- any permanent masts that are not in proximity to a turbine.

In addition, it is likely that night lighting for safety and security on ancillary structures such as Operations and Maintenance (O & M) facilities will be required. Continuously operating security lighting would be installed on posts up to 3.5 m high adjacent to security fencing and O&M facility.

11.2 Aviation Hazard Lighting

The requirement of aviation hazard lighting (AHL) on meteorological masts for the Project is subject to the advice of the Civil Aviation Safety Authority (CASA). It is noted that the turbines proposed for the Project will possibly be up to 291.5 m in height and CASA generally recommends night lighting if an obstacle exceeds 160 metres 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 turbine 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 wind turbines should be lit to indicate the extent of the group of turbines.
- The interval between obstacle lighted turbines should not exceed 900m, and the most prominent (highest for the terrain) turbine(s) should be lit. (CASA, 2004)

Representative images of aviation lighting (installed in August 2020) on turbines at Biala Wind Farm 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.

Images 22 - 28 illustrate the appearance of night lighting on a dark rural landscape at intervals after sunset.



Image 22: View towards Biala Wind Farm - 2.0 Kilometres from turbine at 6:20pm (30 minutes after sunset)



Image 23: View towards Biala Wind Farm - 1.75 Kilometres from turbine at 6:35pm (45 minutes after sunset)

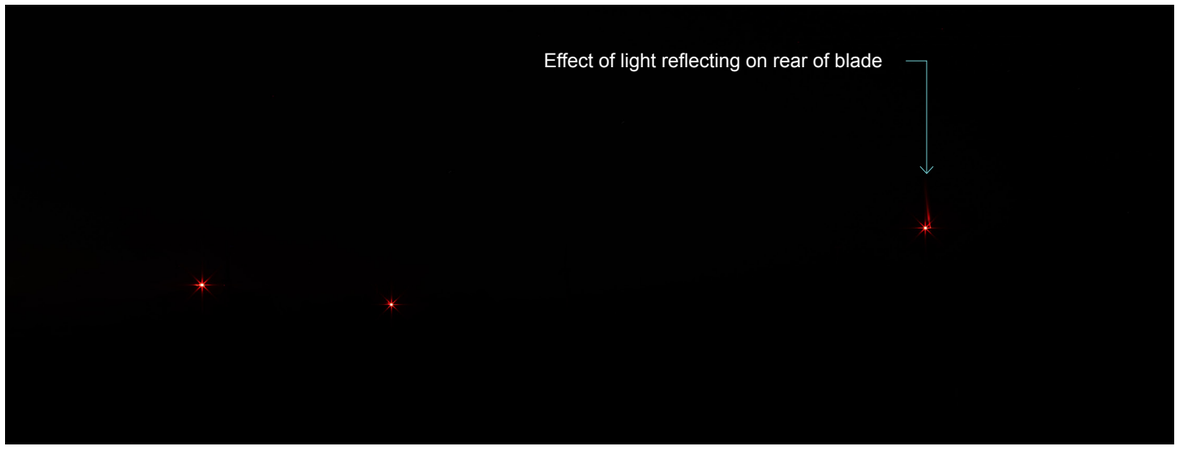


Image 24: View towards Biala Wind Farm - 1.85 Kilometres from turbine at 6:50pm (60 minutes after sunset)



Image 25: View towards Biala Wind Farm - 3.5 Kilometres from turbine



Image 26: View at night towards Biala Wind Farm - 3.5 Kilometres from turbine



Image 27: View towards Biala Wind Farm - 8.5 Kilometres from turbine

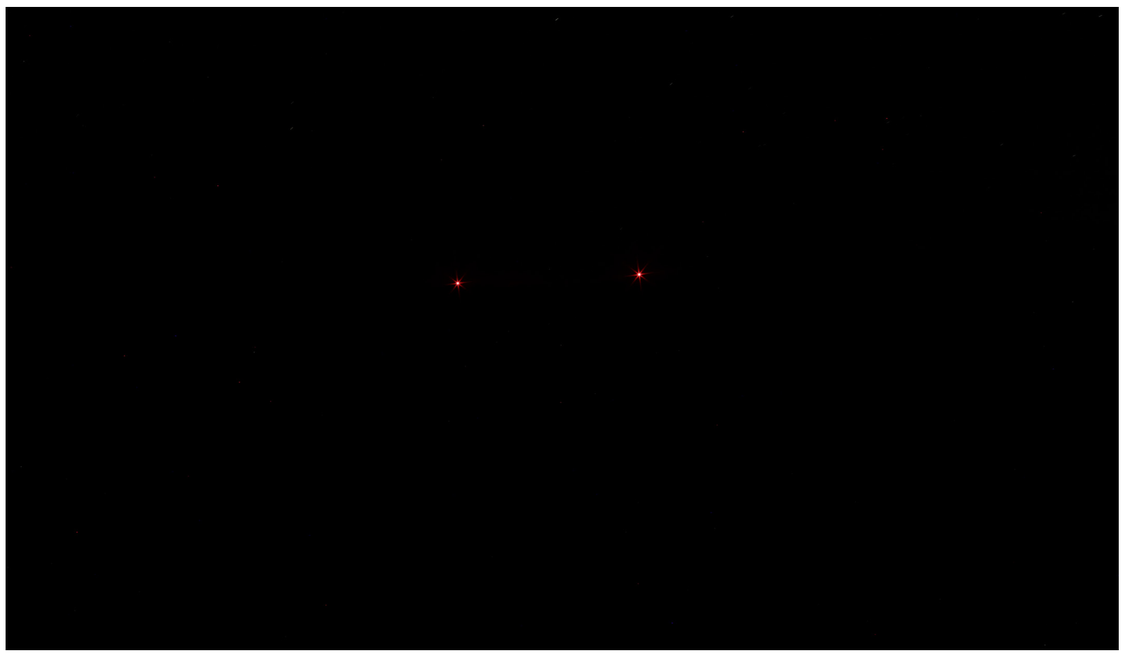


Image 28: View at night towards Biala Wind Farm - 8.5 Kilometres from turbine

11.3 Overview of potential visual impacts from Night lighting

Night lighting of associated infrastructure such as temporary meteorological masts have the potential to extend the visual effect into the night time. Aviation hazard lighting (AHL) have the potential to be visible from distances in excess of 20 kilometres (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 of 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 where people 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 turbines hub.

The visual impact of potential aviation lighting could be reduced by employing mitigation methods outlined in **Section 11.4.** Considering the high elevation of the turbines 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 the ground.

11.4 Recommendations to reduce the potential visual impacts from Night lighting

The Bulletin states: *If such lighting is required, the CASA guidelines recommend that to minimise visual impacts "obstacle lights may be partially shielded, provided it does not compromise their operational effectiveness. Where obstacle lighting is provided, lights should operate at night, and at times of reduced visibility. All obstacle lights on a wind farm should be turned on simultaneously and off simultaneously." The lights should be fully shielded from the view of any dwelling within 2 km. As part of the assessment of visual impacts of wind energy projects, the Department will consider whether any obstacle lighting required is likely to result in any significant increase in visual impacts.*

To assist in the amelioration of the effect of Aviation Hazards Lighting on wind turbines 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 turbines 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 (Refer to **Figure 22**).
- No light should be emitted at or below 10° below horizontal.

Technology in both aviation and wind farm development is constantly evolving. One example of evolving technology is Air Detection Lighting System (ADLS). Although these haven't been utilised in New South Wales, an ADLS has recently been installed at the Lal Lal Wind Farm just east of Ballarat in Victoria. An ADLS is an effective measure to reduce visual impacts, save electricity and improve aviation safety. Aviation lighting is activated when an aircraft approaches within four to six kilometres.

As this technology such as ADLS become more cost effective and readily available, it may become a viable option for the Project.

Over time as wind farm development has occurred throughout New South Wales, there are precedents for the review of the requirement of aviation lightings on a number of wind farms post-construction. In the Upper Lachlan Shire, on November 1, 2010 Cullerin Wind Farm, owned by Origin Energy, switched off turbine aviation lighting after guidelines set out by CASA were withdrawn. Requirement of aviation lighting for Crookwell 2 Wind Farm was reviewed by CASA in 2019 and allowed to be turned off (Crookwell Gazette, 2019).

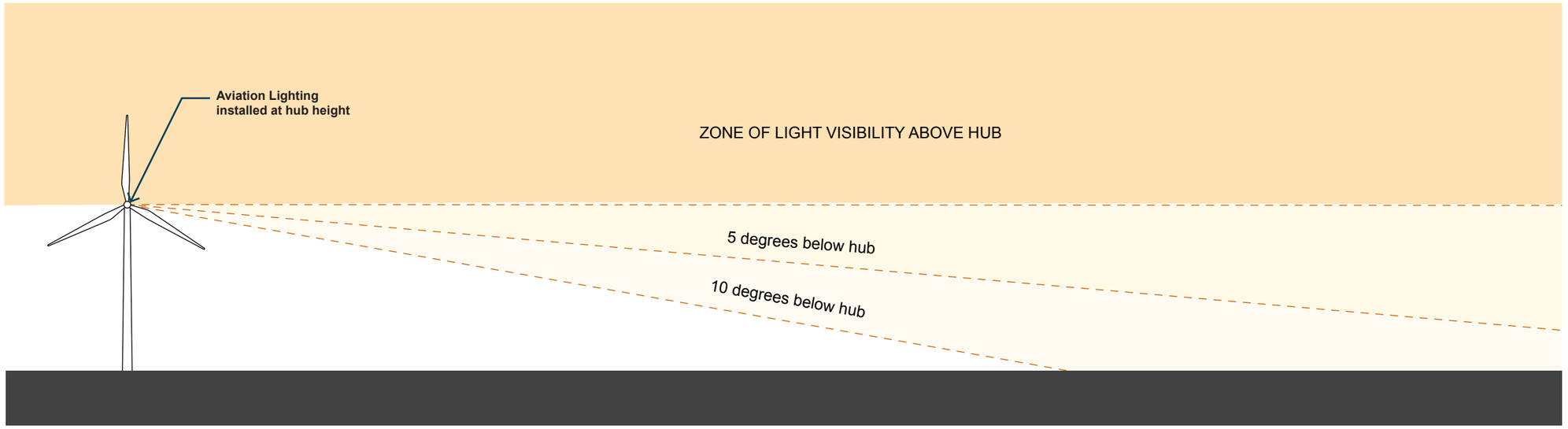


Figure 22 Recommended Light Shielding to reduce lighting spread

11.5 Potential Impacts of Lighting Associated with Ancillary Infrastructure

In addition to lighting on temporary meteorological masts and any permanent masts that are not in proximity of the Project, night lighting is likely to be required on ancillary infrastructure including switching stations, collector substations and facilities buildings.

Maintenance lighting will be installed at the substations and at the O&M building for night work including emergency operations. All maintenance lighting will be designed to reduce disturbance to neighbouring properties and will be used only when there are staff onsite or during emergencies.

Continuously operating security lighting would be installed on posts up to 3.5 m high adjacent to the security fencing and O & M buildings.

It is unlikely the proposed night lighting associated with the ancillary infrastructure would create a noticeable impact on the existing night time landscape.

To assist in the amelioration of the effect of night lighting on ancillary structures the following should be applied:

- Security lighting throughout the wind farm, switching station and the substation should be minimised to decrease the contrast between the wind farm and the night time landscape of the area.
- Motion detectors should be used to activate night time security lighting when required.
- Lighting is to be designed to ensure it does not spill onto nearby roads or residences.

If design principles are incorporated into the night lighting for Ancillary Infrastructure, it is likely there will be no visual impacts resulting from night lighting of Ancillary Structures.

1. Control the level of lighting:
• Only use lighting for areas that require lighting ie. paths, building entry points.
• Reduce the duration of lighting:
• Switch off lighting when not required
• Consider the use of sensors to activate lighting and timers to switch off lighting

2. Lighting Design:
• Use the lowest intensity required for the job
• Use energy efficient bulbs and warm colours
• Direct light downwards
• Ensure lights are not directed at reflective surfaces
• Use non-reflective dark coloured surfaces to reduce reflection of lighting **(Figure 23)**
• Keep lights close to the ground and / or directed downwards **(Figure 24)**
• Use light shield fittings to avoid light spill (refer to **Figure 25**).

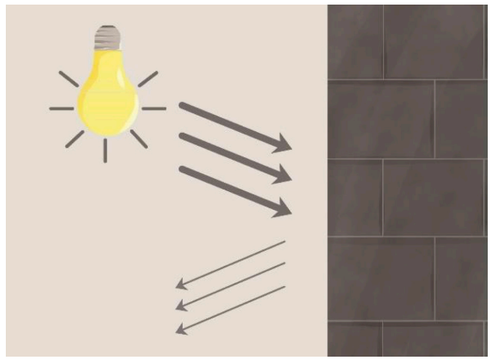


Figure 23 Surface Reflectivity
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

In accordance with the recommendations of the LVIA, ancillary structures are to painted in a dark non-reflective paint to reduce any potential reflectivity from light and remain sympathetic to the surrounding landscape.

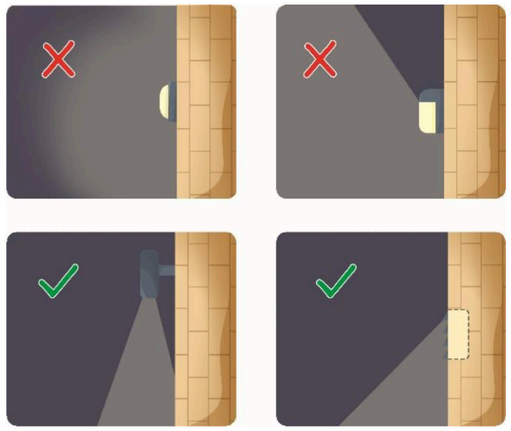


Figure 24 Downward Lighting
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

Where possible, lighting is to be directed downwards.

Where possible, lighting should be fully or partially shielded to prevent spill into surrounding areas.

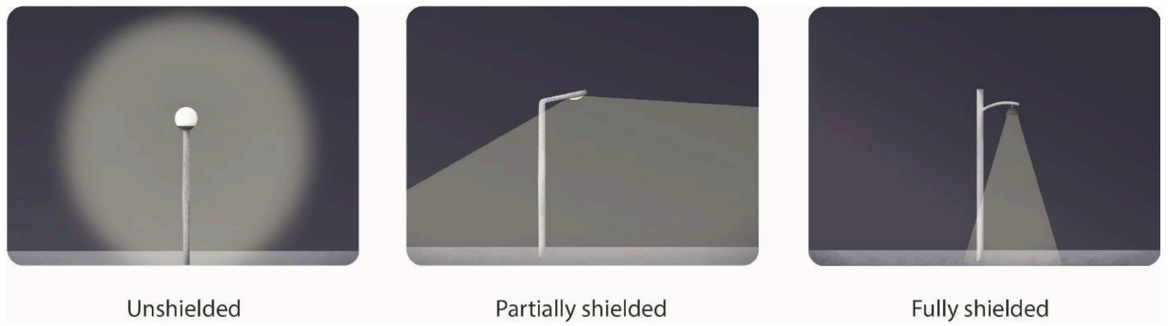


Figure 25 Light Shielding
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

12

Shadow Flicker & Blade Glint Assessment

12.0 Shadow Flicker and Blade Glint Assessment

12.1 Overview of Shadow Flicker

Shadow flicker is defined as the visual effect that occurs when rotating turbines cause moving shadows as the blades pass in front of the sun. The effect will occur under circumstances where the turbine 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 turbine. 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).

The Bulletin states: *The shadow flicker caused by certain sun angles in relation to the rotation of wind turbine blades on dwellings will be limited to 30 hours per year, and may require mitigation measures such as amended siting and design of turbines to minimise the amount of shadow flicker.*

12.2 Shadow Flicker Assessment Methodology

As there is no methodology for the assessment of shadow flicker in the Bulletin, Moir LA have referred to the Draft National Wind Energy Guidelines (2010) to define the parameters for the assessment.

Modelling of the shadow flicker was conducted using specialist industry software (Wind Pro), assessing the largest turbine (based on a 291.5 m maximum tip height) proposed for the Project to represent the worst case impact scenario. Refer to **Figure 26**.

The parameters used for the Shadow Flicker Assessment are as follows:
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 turbine(s) (window locations, living area locations etc);
- the extent of natural or screening vegetation between the turbine(s) and the receptor;
- the existence of other screening elements (buildings, structures etc) between the turbine(s) and the receptor;
- the time of year;
- the proportion of daylight hours in which the turbines operate, and;
- the frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).

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	1.7 meters
Grid size	1 meter

Table 14 Shadow Flicker Assessment Parameters

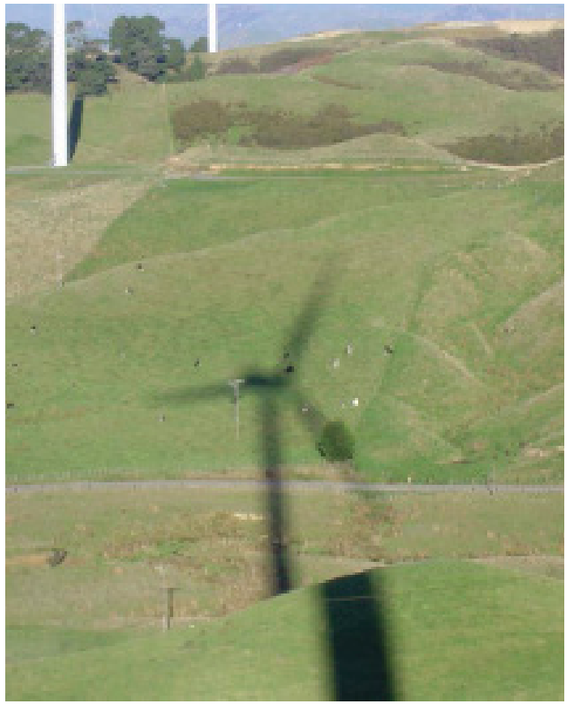


Image 18. Example of shadow intensity variation with distance.

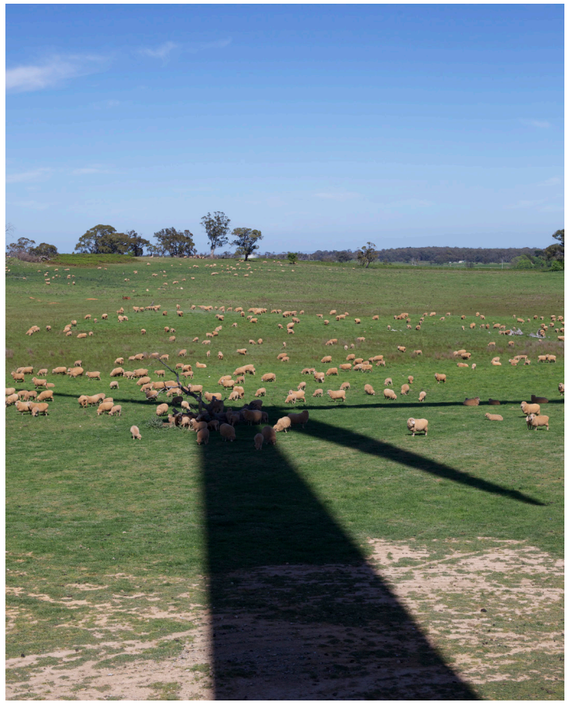


Image 19. Example of shadow flicker from base of turbine.

12.3 Results of Shadow Flicker Assessment

The Bulletin states: *the shadow flicker caused by certain sun angles in relation to the rotation of wind turbine blades on dwellings will be limited to 30 hours per year, and may require mitigation methods such as amend siting and design of turbines to minimise the amount of shadow flicker.*

No non-associated dwellings were identified with potential shadow flicker hours. As per the shadow flicker assessment conducted for the Project, there will be no shadow flicker affect on non-associated dwellings.

The assessment identified that Willowvale Rest Area is likely to experience 30 - <100 hours of shadow flicker per year. In accordance with the Bulletin, shadow flicker should be limited to 30 hours per year for dwellings. No limitations have been identified for public areas that are likely to experience shadow flicker for over 30 hours per year.

Although there are no guidelines in the Bulletin relating to the acceptable level of shadow flicker on road users, shadow flicker has the potential to cause annoyance to commuters. The shadow flicker assessment identified extents of Sturt Highway, Keri Keri Road and a small section of Loorica Road which have the potential to experience shadow flicker. The impact, however, will be temporary.

Shadow Flicker Assessment

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Non-associated Dwelling
- Main Road
- Minor Road

Number of Hours of potential Shadow Flicker per year:

- 0
- 0.1 - <10 Hours
- 10 - < 30 Hours
- 30 - < 100 Hours
- 100 - < 500 Hours
- 500 - < 1,000 Hours
- 1,000 - 2,000 Hours

Assumptions for shadow calculations :
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values.

The calculated times are “worst case” given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset.
- The rotor plane is always perpendicular to the line from the WTG to the sun.
- The WTG is always operating.

N

0 2 4 6 8 10km

Figure 26 Shadow Flicker Assessment (Map Source: Six Maps 2020)

13

Cumulative Impact Assessment

13.0 Cumulative Impact Assessment

13.1 Overview of Cumulative Visual Impacts

The NSW Cumulative Impact Assessment Guidelines for SSD Projects state that *"Cumulative impacts are a result of incremental, sustained and combined effects of human action and natural variations over time and can be both positive and negative. They can be caused by the compounding effects of a single project or multiple projects in an area, and by the accumulation of effects from past, current and future activities as they arise."* (DPE, 2022a).

It is acknowledged that the existing landscape character will potentially be altered by nearby wind and solar farms which are expected to occur within renewable energy zones, and therefore, a cumulative impact assessment is required.

The Bulletin states: "*The visual assessment must assess, in accordance with the SEARs, the overall and broader landscape impacts of the proposed wind energy project. It will also address potential cumulative impacts of wind energy projects in the region (the proposed wind energy project, as well as existing and approved projects).*" (DPE, 2016).

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future (Landscape Institute et al, 2008). Cumulative effects may also affect the way a landscape is experienced and can be positive or negative. Where they comprise benefits, they may be considered to form part of the mitigation measures.

In addition to the requirements of the above mentioned guidelines, Moir LA have assessed the potential cumulative visual impacts on the broader landscape character and regional context that the Project forms part of.

Cumulative impact assessment has several dimensions:

- The impact of the wind farm, when added to the combined impacts of all other existing developments such as wind and solar farms, and the environmental characteristics of the area.
- The impact of this development in the context of the potential for development of wind energy developments in the local, regional and national context.
- The impact of developments which are ancillary to, or otherwise associated with the proposed wind farm eg. the development of transmission lines.
- The potential for future development of wind farms in the region.

The re-occurrence of wind farms, solar farms and infrastructure within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed or along a journey. As these developments prevail, it is important to determine whether the effect of multiple developments within the region would combine to become a dominant or defining visual element, altering the perception of the overall landscape character.

13.2 Nearby Renewable Energy Projects

The Project is located within the SW REZ. The REZ has been identified by the NSW Governments Electricity Strategy. The REZ is expected to play a vital role in the delivery of affordable energy to the community across NSW (Energy NSW, 2022). The renewable energy projects currently proposed in the region are outlined in **Table 15** and shown on **Figure 27**.

	Project	Distance to nearest turbine or solar panel*	Project Size *Estimated	Planning Status (as of April 2023)*
1	**Wilan Wind Farm**	760 m north	138 turbines	SEARs issued: December 2022
2	**Baldon Wind Farm**	350 m west	157 turbines	SEARs issued: July 2022
3	**Keri Keri Solar Farm**	200 m south (Located within extents of Keri Keri Renewable	1322 hectares (approx)	SEARs issued: April 2022
4	**Tchelery Wind Farm**	8.326 km east	Up to 120 turbines	SEARs issued: July 2023
5	**Junction Rivers Wind Farm**	20.5 km southwest	107 turbines	SEARs issued: December 2021
6	**The Plains Wind Farm**	54 km east	226 turbines	SEARs issued: December 2022
7	**The Plains Solar Farm**	59 km east	2156 hectares (approx)	SEARs issued: December 2022
8	**Bullawah Wind Farm**	90 km east	170 turbines	SEARs issued: December 2022
9	**Pottinger Wind and Solar Farm**	80 km east	200 + Turbines	SEARs issued: June 2023
	Other projects in the area located in excess of 100 km from the Project:			
10	**Dinawan Wind Farm**	approx. 125 km east	250 turbines	SEARs issued: December 2022
11	**Dinawan Solar Farm**	approx. 152 km southeast	2500 hectares (approx)	SEARs issued: December 2022
12	**Yanco Delta Wind Farm**	approx. 155 km southeast	208 turbines	Approved
13	**Argoon Wind Farm**	approx. 160 km east	106 Turbines	SEARs issued: December 2023

Table 15 Summary of nearby renewable energy projects

*Note: Information available on NSW Major Project Database accessed March 2024.

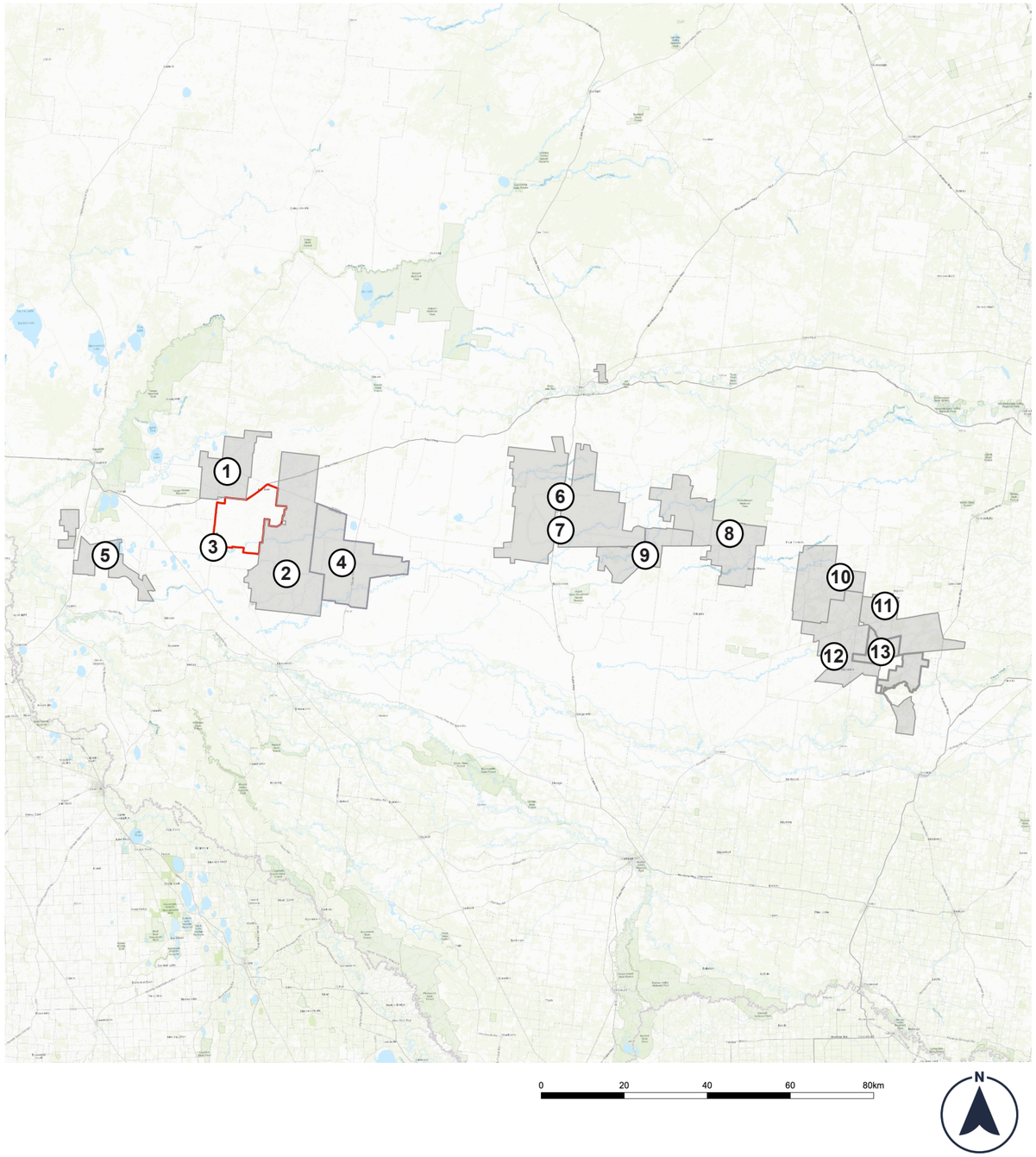


Figure 27 Projects located within the SW REZ
(Information available on NSW Major Projects Database accessed March 2024)

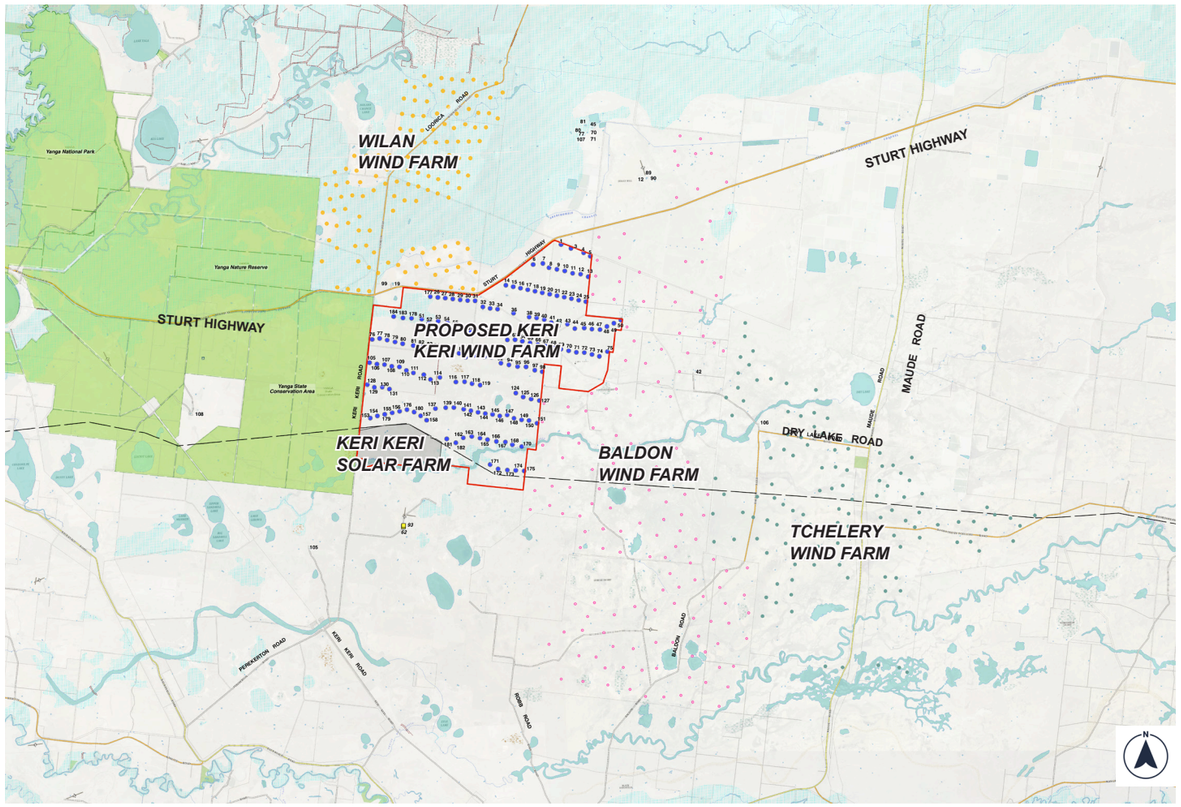


Figure 28 Renewable Energy Projects within proximity of the Project (Map Source: Six Maps, 2020)

13.3 Cumulative Impact Assessment of Nearby Renewable Energy Projects

The Bulletin states: *"The application of the cumulative tools to a distance of eight kilometres from a dwelling or public viewpoint is based on visibility research conducted by Sullivan et. al. (2012), Bishop (2002), Shang and Bishop (1999) and others. At eight kilometres, turbines and objects recede into the background in terms of visibility"* (DPE, 2016).

Figure 28 shows that the proposed renewable energy projects that are located in proximity of the Project Therefore, the potential cumulative visual impact considers a total of three (3) proposed renewable energy projects that are located within eight kilometres of the Project. These include: Baldon Wind Farm, Wilan Wind Farm and Keri Keri Solar Farm. The Multiple Wind Turbine Tool (MWTT) can help identify dwellings and public viewpoint locations that are likely to have cumulative impacts (refer to Section 13.3.1, Section 13.3.2 and Table 16).

The following provides a brief overview of the proposed layouts for the surrounding renewable energy projects:

Wilan Wind Farm

The nearest proposed wind farm to the Project is the Wilan Wind Farm (WWF), which is located north of and adjacent to the Project Area. The nearest WWF turbine is located 780 m north of turbine 31 of the Project. SEARs were issued for the WWF project in December 2022. There is potential to view WWF and the Project simultaneously, especially along the Sturt Highway and at Willowvale Rest Area.

Baldon Wind Farm

The proposed layout for Baldon Wind Farm (BWF) indicates that it is located east of and adjacent to the Project Area. The nearest BWF turbine is located 350 m west of turbine 151 of the Project . SEARs were issued for the BWF project in July 2022. There is potential to view BWF and the Project simultaneously, especially along the Sturt Highway and Dry Lake Road.

Keri Keri Solar Farm

The proposed Keri Keri Solar Farm (KKSF) forms part of the overall Keri Keri Renewable Energy Project. The solar farm is currently proposed to be located on the southwest corner of the overall Project Area (refer to **Figure 28**). SEARs were issued for the BWF project in April 2022. There is potential to view KKSF and the Project simultaneously, especially along Keri Keri Road.

13.3.1 Cumulative Impact Assessment of Nearby Wind Farm Projects

The existing topographic character of the region allows clear, open views of surrounds. It is likely that the Project, BWF and WWF will be clearly visible along the Sturt Highway. **Figure 29** represents the location of the surrounding wind farm projects and receptors located within 8,000 m of the nearest turbines of all three wind farm projects.

The Multiple Wind Turbine Tool (MWTT) has been applied to surrounding dwellings and key public viewpoints to help identify cumulative visual impacts (refer to **Figure 29**).

Table 16 provides an overview of the dwellings located in proximity of the three wind farm projects. A brief overview of existing screening factors around these dwellings is also discussed.

As per **Figure 29**, the highest level of visibility of all three wind farm projects is likely to occur along the Sturt Highway and at dwellings 45, 80-81, 70-71, 77 and 107. However, it should be noted that existing intervening elements such as vegetation and structures are likely to limit views from these dwellings. It is likely that these dwellings will view the majority of BWF and WWF. Views of the Project are likely to be distant (refer **Appendix C**).

Other receptors such as dwellings 42, 12, 89 and 90 are likely to view the majority of BWF and are likely to have distant views of the Project. Dwelling 42 is likely to be associated with BWF.

Dwellings 19 and 99 are likely to view the majority of WWF and the Project. It should be noted that as per the current information available on the Major Projects website, dwellings 19 and 99 are associated with WWF (DPE, 2023).

Willowvale Rest Area which is located on Sturt Highway is a public rest area located on the route between Hay and Balranald. The Project and WWF will have a high visual impact at this location. It should be noted that the rest stop does not offer views to any key landscape or scenic features. The surrounding lands are highly modified and are used for grazing and cropping. The existing character around this location is defined by intensive agricultural land use and is determined to be of low scenic quality.

Figure 30 and **Figure 31** represent wireframe diagrams that were prepared to demonstrate the potential visibility of the three wind farm projects from two public viewing locations on the Sturt Highway that are likely to have the highest visual impact. A site visit conducted by Moir LA identified the character and scenic quality rating of the surrounding land which falls within the extents of LCU04: Farmlands (refer to Section 5.6). As per the assessment in **Section 5.0** of this report, it was determined that the LCU is of low scenic quality.

13.3.2 Cumulative Impact Assessment of Nearby Solar Farm Project

Figure 29 identifies the location of the proposed KKSF project in relation to the Project. In accordance with the *Large-Scale Solar Energy Guideline August 2022* and the *Technical Supplement - Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline August 2022,* a radius of 4,000m from the nearest proposed solar panel has been considered in order to identify receptors that are likely to be impacted by KKSF and the Project (DPE, 2022b and DPE, 2022c).

No dwellings or key public viewing locations were identified within 4,000 m of the KKSF panels. The nearest dwellings are dwellings 93 and 62 which have been identified as associated dwellings for the Project.

Keri Keri Road is the nearest publicly accessible road which runs north - south and is located adjacent to KKSF and the Project. Keri Keri Road is a low use rural road that is utilised predominantly by residents and farm workers to access the surrounding farmlands. No destinations or key viewing locations were identified in proximity of the KKSF. Further assessment of the impact on viewing locations on Keri Keri Road and impacts on the surrounding character have been discussed in **Appendix B**.

13.3.3 Cumulative Impact Assessment of Transmission Lines

The *Draft Renewable Energy Zone (South West) Access Scheme Order 2023* has been established by the NSW Office of Energy and Climate Change to coordinate the development and delivery of electricity in the SW REZ. The existing 220 kV electrical transmission line is proposed to be upgraded to 330 kV electrical transmission line as part of 'Project EnergyConnect' that is being undertaken by ElectraNet and TransGrid.

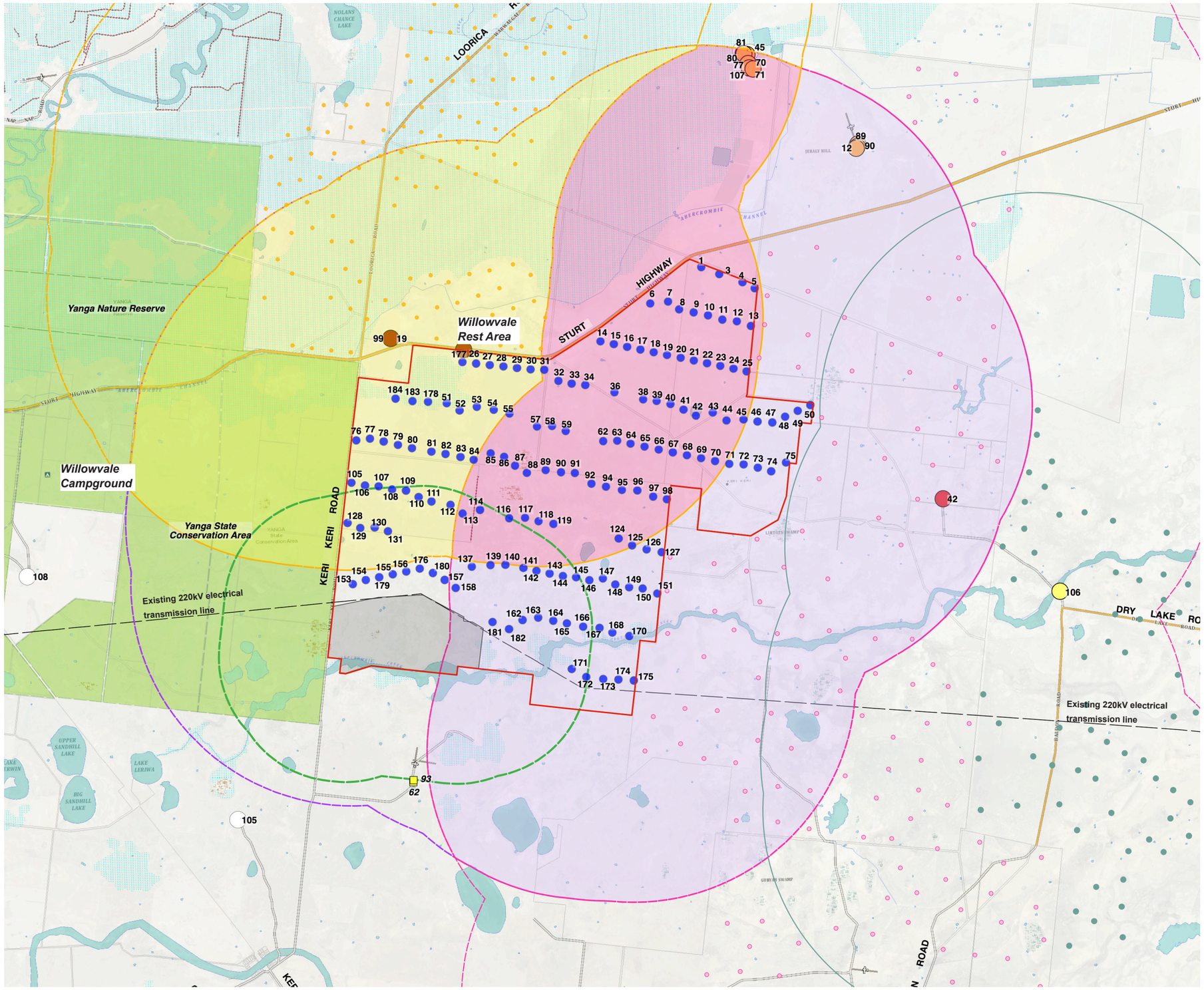
Relevant to the Project, the existing transmission line runs in a generally east - west direction and is located on the southern side of the Project Area. Little detail is provided on the upgrade of the existing 220 kV electrical transmission line at this stage and it is assumed the cumulative impacts will be considered in the future detailed design phase of the proposed transmission line infrastructure.

Dwelling ID	Distance to nearest WTG:	Number of 60º Sectors (Based on a 2D Cumulative Assessment):	Number of 60º Sectors associated with the Project (based on 3D Assessment):	Number of 60º Sectors associated with surrounding wind farm (BWF or WWF) (based on 3D Assessment):	Existing conditions (as per Google Earth Aerial Imagery 2022):
Non-associated receptors with no turbines within 8,000m:					
108	**11.92 km (the Project)**	Nil	Nil	Nil	Existing scattered vegetation in dwelling foreground to east
105	**9.62 km (the Project)**	Nil	Nil	Nil	Existing scattered vegetation and sheds in dwelling foreground to north/northeast
Non-associated receptors with turbines in up to three (3) 60º Sectors (up to 180º):					
106	**5.28 km (BWF)**	Three (3) 60º Sectors (up to 180º)	Nil	Three (3) 60º Sectors (up to 180º) (BWF only)	Highest impacts likely to be associated with BWF. KKWF likely to be visible in background. Existing vegetation around dwelling likely to limit views.
Non-associated receptors with turbines in up to four (4) 60º Sectors (up to 240º):					
81	**5.96 km (WWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) Two (2) 60º Sectors (up to 120º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
80	**5.82 km (WWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) Two (2) 60º Sectors (up to 120º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
45	**6.00 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) Two (2) 60º Sectors (up to 120º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
77	**5.82 km (WWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) One (1) 60º Sector (up to 60º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Limited intervening elements around dwelling.
70	**6.00 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) One (1) 60º Sector (up to 60º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
107	**5.95 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) One (1) 60º Sector (up to 60º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
71	**6.08 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Two (2) 60º Sectors (up to 120º) (BWF) One (1) 60º Sector (up to 60º) (WWF)	Highest impacts likely to be associated with BWF and WWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
89	**2.24 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Four (4) 60º Sectors (up to 240º) (BWF only)	Highest impacts likely to be associated with BWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation to the north which is likely to limit views.
12	**2.24 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Four (4) 60º Sectors (up to 240º) (BWF only)	Highest impacts likely to be associated with BWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
90	**2.24 km (BWF)**	Four (4) 60º Sectors (up to 240º)	One (1) 60º Sector (up to 60º)	Four (4) 60º Sectors (up to 240º) (BWF only)	Highest impacts likely to be associated with BWF. KKWF likely to be visible in background. Dwelling surrounded by vegetation which is likely to limit views.
Non-associated receptors with turbines in up to five (5) 60º Sectors (up to 300º):					
42	**0.93 km (BWF)**	Five (5) 60º Sectors (up to 300º)	One (1) 60º Sector (up to 60º)	Five (5) 60º Sectors (up to 300º) (BWF only)	Highest impacts likely to be associated with BWF. KKWF likely to be visible in background. Dwelling is associated with BWF. Dwelling is currently not inhabited.
Non-associated receptors with turbines in up to six (6) 60º Sectors (up to 360º):					
99	**1.09 km (WWF)**	Six (6) 60º Sectors (up to 360º)	Two (2) 60º Sectors (up to 120º)	Five (5) 60º Sectors (up to 300º) (WWF only)	Highest impacts likely to be associated with both WWF and KKWF. Note: As per the information currently available on Major Projects Website, dwelling is associated with WWF (DPE, 2023).
19	**1.09 km (WWF)**	Six (6) 60º Sectors (up to 360º)	Two (2) 60º Sectors (up to 120º)	Five (5) 60º Sectors (up to 300º) (WWF only)	Highest impacts likely to be associated with both WWF and KKWF. Note: As per the information currently available on Major Projects Website, dwelling is associated with WWF (DPE, 2023).
Willowvale Rest Area	**0.45 km (the Project)**	Six (6) 60º Sectors (up to 360º)	Four (4) 60º Sectors (up to 240º)	Four (4) 60º Sectors (up to 240º) (WWF only)	Highest impacts likely to be associated with both WWF and KKWF. Note: The rest area is located on Sturt Highway between the towns of Hay and Balranald. No key landscape features were identified in proximity of this location. The surrounding landscape character is defined by expansive tracts of land with sparse vegetation. Surrounding lands are used extensively for grazing and cropping.

Table 16 Non-associated dwellings and key public viewpoints (receptors) within 8,000 m of surrounding wind farm projects identified using Multiple Wind Turbine Tool

Cumulative Visual Impact

Keri Keri Wind Farm



LEGEND

- Project Area
- Proposed 291.5m Keri Keri Wind Farm (KKWF) turbine
- Proposed Baldon Wind Farm (BWF) Turbine Location
- Proposed Wilan Wind Farm (WWF) Turbine Location
- Proposed Keri Keri Solar Farm (KKSF) Project location
- Associated Dwelling
- 8000m from nearest Keri Keri Wind Farm (KKWF) turbine
- 8000m from nearest Baldon Wind Farm (BWF) turbine
- 8000m from nearest Wilan Wind Farm (WWF) turbine
- 4000m from nearest Keri Keri Solar Farm (KKSF) panels
- Area with dwellings within 8000m of KKWF & WWF
- Area with dwellings within 8000m of KKWF & BWF
- Area with dwellings within 8000m of KKWF, WWF & BWF
- Main Road
- Minor Road

NON-ASSOCIATED DWELLINGS AND KEY PUBLIC VIEWPOINTS

NUMBER OF 60º SECTORS:

- Receptors in excess of 8 kilometres
- One (1) 60º Sector (60º)
- Up to Two (2) 60º Sectors (120º)
- Up to Three (3) 60º Sectors (180º)
- Up to Four (4) 60º Sectors (180º)
- Up to Five (5) 60º Sectors (180º)
- Up to Six (6) 60º Sectors (180º)

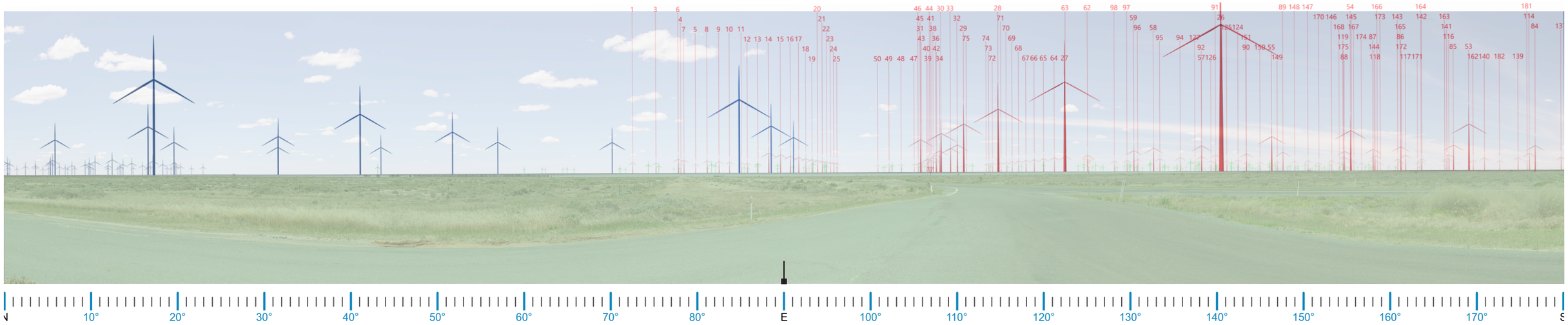
N

0 2 4 6 8 10km

Figure 29 Cumulative visual impact on surrounding receptors (Map Source: Six Maps 2020)



Existing View | 180º Baseline Panorama



Wireframe Diagram Overlay looking East

Turbine associated with the Project

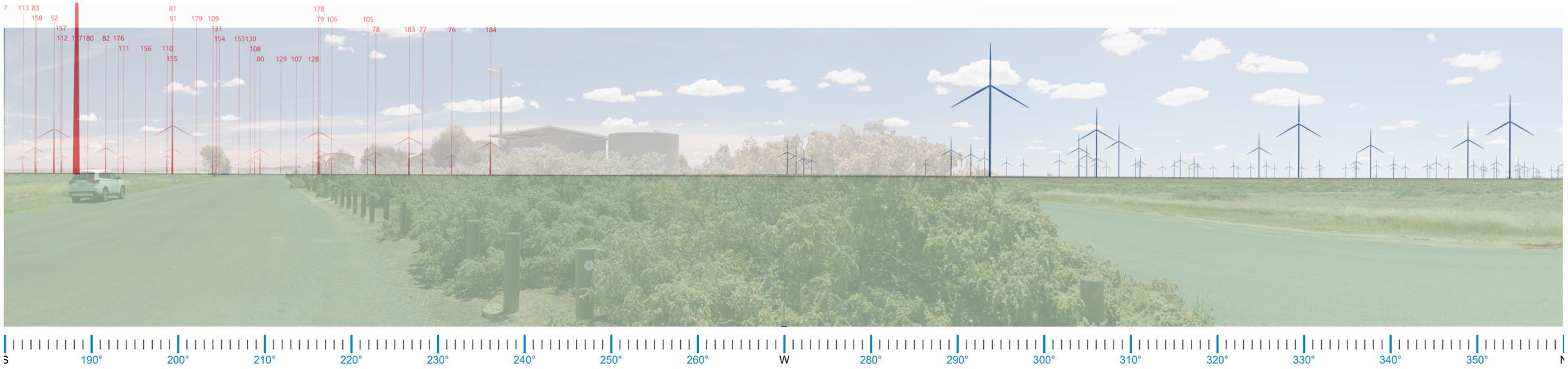
Turbine associated with BWF

Turbine associated with WWF

Figure 30a Wire frame diagram - Cumulative Visual Impact from Willowvale Rest Area



Existing View | 180º Baseline Panorama



Wireframe Diagram Overlay looking West

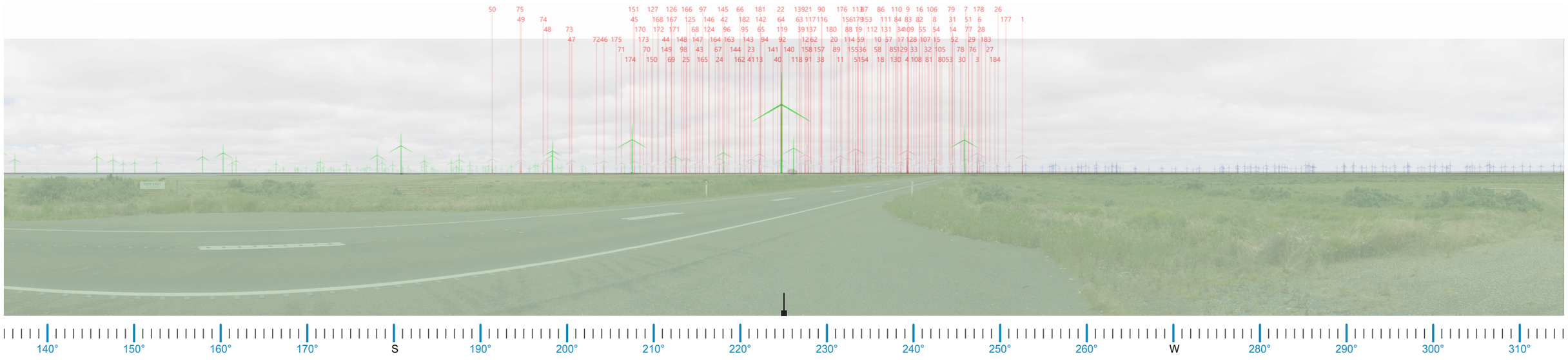
Turbine associated with the Project

Turbine associated with BWF

Figure 30b Wire frame diagram - Cumulative Visual Impact from Willowvale Rest Area



Existing View | 180º Baseline Panorama



Wireframe Diagram Overlay looking South west

Turbine associated with the Project

Turbine associated with BWF

Turbine associated with WWF

Figure 31 Wire frame diagram - Cumulative Visual Impact from Sturt Highway

13.4 Cumulative Visual Impact on the Broader Landscape Character

The New South Wales Government has identified five (5) Renewable Energy Zones (REZ) in regional areas of NSW. The Project is located within the SW REZ. The proposed land use associated with the Project is consistent with the NSW Government Policy for this area, however, visual impacts are to be reduced where possible. The existing landscape character of the region allows for optimum harvest of wind energy due to the large expanse of flat, treeless land parcels that are mostly uninhabited and cause minimal obstructions in the landscape.

The re-occurrence of wind farms within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. As wind farm developments prevail it is important to determine whether the cumulative effect of wind farms and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the regions landscape character.

The MWTT and wireframe diagrams prepared illustrate the extent of theoretical visibility of the Project combined with nearby major wind farm projects. These suggest that simultaneous views of all three wind farm projects is likely to occur along a stretch of approximately 30 km along the Sturt Highway between Hay and Balranald.

The assessment found that majority of the non-associated dwellings located within 8,000 m of the three wind farm projects are likely to have views of turbines in multiple 60 degree sectors (refer **Figure 29**). **Table 16** identifies that the majority of these dwellings have views of turbines associated with BWF and WWF. Dwellings 99 and19, and the Willowvale Rest Area were the only receptors identified as having high cumulative impacts as a result of the of the Project and WWF. It is noted that dwellings 99 and 19 are associated with the WWF project (DPE, 2023). It is also noted that the Willowvale Rest Area is a public rest stop on the Sturt Highway and is located in an area of low scenic quality. The rest stop does not offer views to any key landscape features. The surrounding landscape character is defined by vast, flat and generally treeless expanses of land used for agricultural activities such as grazing and cropping.

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

Ongoing community consultation identified the Willows Picnic Area and Campground as a key recreation location which is located approximately 9,000 m west of the Project and WWF. Due to the existing landscape character of this recreation site and distance to the projects, views to all three (3) wind farm projects will be limited.

When travelling between Hay and Balranald along the Sturt Highway, the existing visual character is defined by flat, generally treeless, expansive lands used for agricultural activities such as grazing and cropping. The existing landscape is associated with commercial agricultural activity and is a highly modified landscape with low scenic quality.

Turbines associated with all three wind farm projects would be visible and, due to the lack of any significant landscape features, the wind farms have the potential to become a defining character element along this route. It is noted that no scenic or key landscape features will be impacted by the projects.

The assessment also considered the potential impacts of KKSF. No key viewing locations or dwellings were identified in proximity of the solar farm. Also relevant to the Project, the existing transmission line runs in a generally east - west direction and is located on the southern side of the Project Area. Little detail is provided on the upgrade of the existing 220 kV electrical transmission line at this stage and it is assumed the cumulative impacts will be considered in the future detailed design phase.

14

Associated Infrastructure

14.0 Assessment of Associated Infrastructure

14.1 Overview of Associated Infrastructure

The Bulletin states: *"the assessment of visual impacts from all ancillary facilities and infrastructure will be required."*

In addition to the proposed wind turbines, the associated infrastructure (as described in **Section 3.4** of this report) is likely to contrast with the existing visual landscape. Due to the large scale and elevated siting of the proposed wind farm, 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 in this section of the report.

14.2 Transmission Lines

14.2.1 High voltage transmission lines

A 330 kV single or double circuit, three phase, twin conductor bundle overhead transmission line of approximately 20 km will connect the Project to a new switchyard which will be located to the south of the Project Area (refer to **Figure 32**). The overhead 330 kV transmission line will up to 70 m high and will comprise of single circuit lattice steel tower, spaced approximately 500 m apart. The transmission line will form part of a 60 m wide easement with unformed tracks and up to 15 m wide access tracks (equivalent to farm track) to facilitate operational access by TransGrid for maintenance, repair and hazard reduction.

Alternatively, the transmission line would utilise a monopole design instead of a steel lattice tower. Monoples would be up to a height of 50 m and spaced approximately 200 - 250 m apart (subject to terrain conditions).

Access to the transmission line for construction will be via property access and farm tracks.

The proposed transmission line design is in keeping with the scale and appearance of existing 220 kV transmission line which is located south of the Project Area. The high voltage transmission line is an existing element visible in the landscape. Since the existing transmission line is proposed to be upgraded to 330 kV under Project EnergyConnect, the proposed 330kV transmission line will visually form part of the overall infrastructure.

14.2.2 Medium voltage reticulation

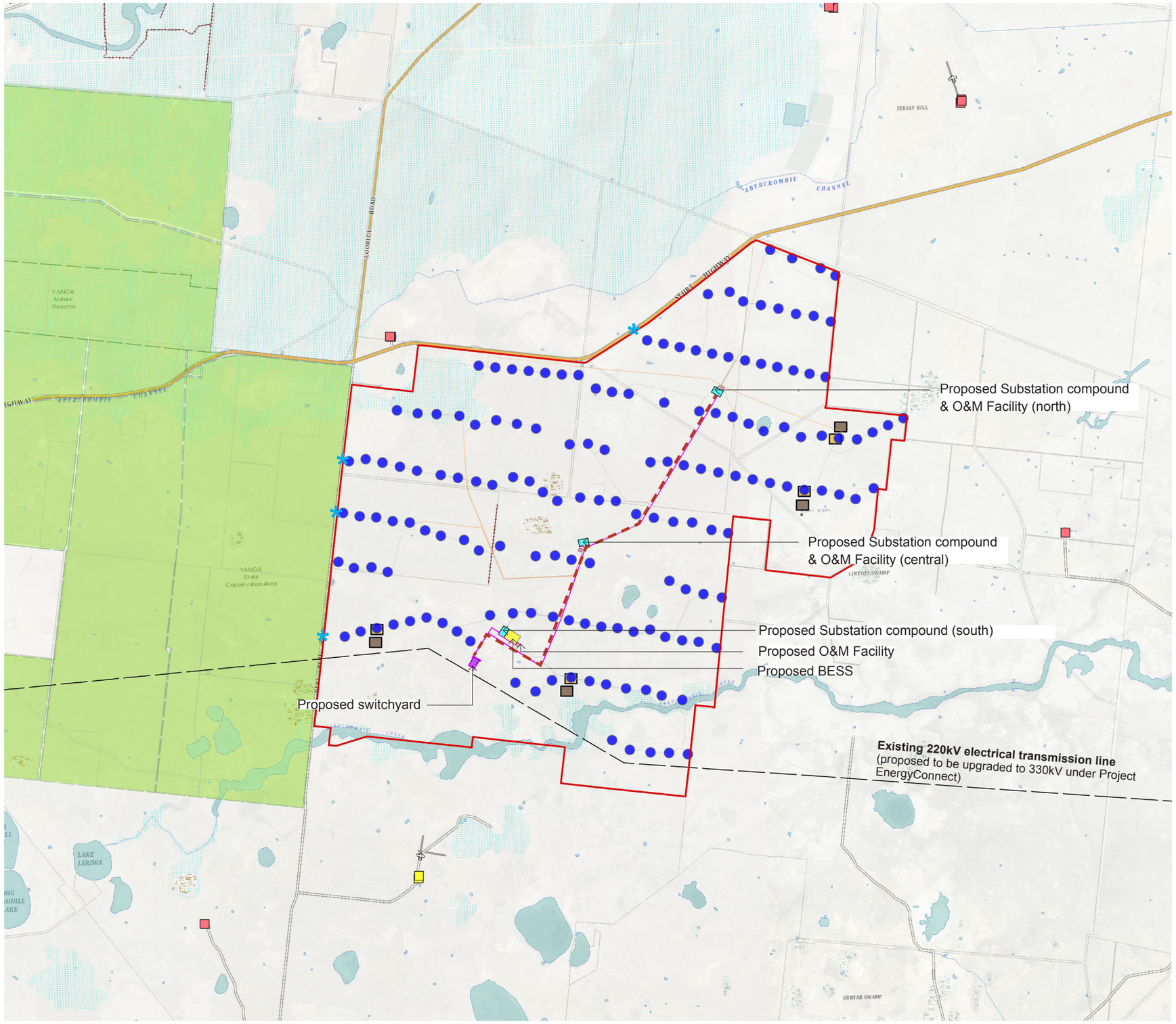
The turbines will be connected via a system comprising a network of approximately 175.3 km of underground 33 kV lines and 64.5 km of 33 kV overhead electrical cables, reticulating power from each WTG to the onsite substations. Wherever possible, the cabling will be in underground trenches that will run parallel to the access track. Where ground conditions are not suitable for underground cabling, overhead single circuit electricity lines will be installed using concrete poles. The aboveground conductors may have orange balls for visual identification.

While it is recommended that majority of the reticulation should be underground, the following mitigation methods to be considered during detailed design phase include:

- *Utilise existing transmission lines where possible.*
- *The route for any proposed overhead transmission lines should be chosen to reduce visibility from surrounding areas. Where possible, use non-reflective materials for overhead electrical cabling. Visual identification elements should be non-reflective to avoid visual interference.*
- *Plan route to minimise vegetation loss.*
- *Use of subtle colours and a low reflectivity surface treatment on power poles to ensure that glint is minimised.*



Image 29. Existing 220kV Transmission Line is a visible element in the landscape



Associated Infrastructure

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- Main Road
- Minor Road
- Existing 220kV electrical transmission line (to be upgraded to 330kV under Project EnergyConnect)
- Nature Reserve / State Conservation Area
- Proposed 330 kV transmission line connection (HV)
- Permanent Meteorological Masts
- Temporary Meteorological Masts
- Access Point

N

0 2 4 6 8 10km

Figure 32 Associated Infrastructure (Map Source: Six Maps 2020)

14.3 Internal Access Roads

Internal access roads will be constructed to provide access to the proposed turbine locations and other infrastructure including the transmission line and will require construction of up to approximately 148.3 km. This includes upgrades to some existing access tracks currently formed within the Project Area and the establishment of new access tracks. Access to the Project Area is proposed via Keri Keri Road and off Sturt Highway.

Generally, the internal roads have been sited to reduce potential vegetation loss and limit earth work requirements. It is proposed that the internal access track network will connect to existing Council roads. Due to the existing agricultural land use of the Study Area, farm roads traversing the landscape form a significant part of the existing landscape character. The proposed access roads are likely to be viewed as part of the existing character of the landscape. Mitigation measures for reducing residual visual impact resulting from the construction of access roads include:

- *Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines 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.*



Image 30. Example of unsealed farm road typical of the landscape character in the area

14.4 On-site Substations

Substations

The Project will include three (3) 330 kV substations (requiring an area of 100 m x 100 m) and two (2) 132 kV collector substations to transform the 33 kV received from the internal electrical reticulation. The internal structures within the fenced substation compound will include:

- Control room (up to a height of 5 m),
- Two 33/330 kV transformers (up to a height of 10 m),
- Up to 10 lightening protection masts (up to 25 m high)
- circuit breakers, switches and disconnectors (up to 10 m high)
- communication tower (up to 80 m high).
- a 35 m bushfire asset protection zone (APZ) will surround the substation

The three substations will be connected via internal reticulation and will have an overall HV connection to the switching substation that will feed into the existing 220 kV transmission line.

The substation compounds are located in the northern, central and southern parts of the Project Area (refer to **Figure 32**). Wherever possible, the substation locations have been setback from roads and sited in locations that have been cleared. The northern substation compound is located approximately 3.5 km away from the Sturt Highway.

Although the substation compound will be visible from the Sturt Highway, the existing character around the proposed substation site is currently defined by flat, treeless land which is used for grazing and cropping. The landscape character is highly modified and the existing visual quality is poor and no scenic views will be obliterated by the proposed infrastructure.

Switchyard

One (1) switchyard of 200 m X 300 m is proposed in the southern part of the Project Area. The switchyard will connect the proposed 330 kV transmission line to the planned NSW - SA interconnector. A 35 m bushfire asset protection zone (APZ) will surround the switchyard.

The switchyard is proposed to be located approximately 4.6 km east of Keri Keri Road and 9 km south of the Sturt Highway. It is likely that the switching station will not be discernible from the Sturt Highway. Although the switchyard will be visible from Keri Keri Road, it should be noted that the road is currently used for farm access and once the Project is operational, the road will be used for infrastructure access. No other receptors will be impacted by the switchyard. No key views will be impacted by the switchyard.

14.5 Meteorological Monitoring Masts

Four (4) temporary meteorological monitoring masts are proposed to be located within the Project Area prior to construction of the Project. These are currently located at the proposed location for turbines 46, 71, 155 and 163 (refer to **Figure 32**).

Four (4) permanent meteorological monitoring masts are proposed to be located within the Project Area to record wind speed and other meteorological data. These will be located in proximity of the above mentioned turbine locations and will assist in verifying performance of the WTGs during the operation of the Project.

The Project also comprises of the decommissioning and removal of four existing meteorological masts used during project development to measure the wind resource of the Project Area.

The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment and will have a height of approximately 159 m AGL. Night lighting will also be installed on the temporary meteorological masts.

Meteorological masts are generally difficult to discern due to their form. The proposed temporary and permanent meteorological masts have been set back from nearby residences and public viewing locations. **Figure 32** shows that the northern masts are sited approximately 6 km south of the Sturt Highway and the southern met masts are located approximately 2 km east of Keri Keri Road. The nearest residence (ie, associated dwellings 93 and 62) are located approximately 7 km south of the southern met masts. No key viewing locations will be impacted by the met masts.

14.6 Operations and Maintenance (O&M) Facility

Three (3) O & M facilities, approximately 100 m x 100 m, with carparks and a 35 m surrounding APZ, will be constructed to support the construction and operation of the wind farm. These will be located in proximity of the proposed substation locations in the south of the Project Area (adjacent to the BESS), central part of the Project Area (adjacent to the southern collector substation) and north of the Project Area (adjacent to the northern collector substation).

Maintenance lighting will be installed at the substations and at the O & M facilities for night work including emergency operations. **Section 11.0** provides recommendations for the night lighting fixtures.

The smaller scale of ancillary structures including the proposed construction control room have the ability to be screened by topography, existing vegetation or proposed screening vegetation. 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.*
- *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.*

14.7 BESS

A BESS of up to 200 MW/800 MWh (approximately four hours of storage has been proposed on the southern side of the Project Area (refer to **Figure 32**). The BESS will cover an approximate area of 400 m x 300 m. The BESS will also include a gravel surface and a 35 m APZ to minimise bushfire risks. Screen planting can be provided outside the 35 m APZ as a means to limit views. The model and design specification of the BESS will be determined during detailed design.

The BESS is proposed to be located approximately 5.5 km east of Keri Keri Road and 8.5 km south of the Sturt Highway. It is likely that the BESS will not be discernible from the Sturt Highway. Views of the BESS are likely to be available along Keri Keri Road and no other receptors in the area. No key scenic views will be impacted by the BESS.

14.8 Other Temporary infrastructure

In addition, temporary infrastructure elements such as:

- Two (2) on-site concrete batching plants,
- Up to three (3) laydown areas,
- Borrow pit and rock crushing facilities,
- Two (2) construction compounds (including site office, car parking and storage areas)
- Four (4) temporary meteorological masts with concrete footings for mast and guy wires with 3 m x 3m concrete foundation.
- One workers' accommodation compound and carpark,

The visual impacts associated with these facilities will be temporary and will occur during the construction phase. No scenic views will be impacted by the construction activity.

15

Overview of Impact on Landscape Character

15.0 Overview of Visual Impact on Landscape Character

15.1 Overview of Visual Impact on Landscape Character

The proposed development is to be located within a predominantly rural landscape that has not been identified as significant or rare. The broad landscape character is dominated by established rural land which consists of modified vast plains with little topographical variation. Generally, the Scenic Quality Classes of the Landscape Character Units (LCU) within the Study Area have been rated as moderate or low (refer to **Section 5.0**).

Shallow depressions forming dry lakes, swamps and creeklines provide slight variations in topography and vegetation height, but these hydrological features do not occupy a large percentage of the Study Area and are, in most cases, ephemeral.

The assessment has determined that the proposed wind farm would become a feature of the visual landscape due to the addition of vertical turbines in a landscape offering unencumbered views across large expanses.

Areas such as Yanga SCA and Nature Reserve, which are valued for their ecological, recreation and tourism functions will remain intact. Regionally significant landscape features such as Yanga SCA and recreational sites such as Willowvale Campground and Picnic Area that are associated with the SCA (as identified in **Section 5.0** of this report) would remain intact as key landscape features of the area and it is unlikely the Project would degrade the scenic value of these landscape features.

15.2 Overview of the Visual Impact on LCUs

Table 14 provides an overview of the assessment of the potential visual impacts on the existing landscape character of the local area for each LCU as defined in Section 5.6 of this report. An evaluation of the potential visual impacts has been undertaken using the visual performance objectives as outlined in the Bulletin.

Of the four (4) LCU's identified and assessed, the Project is likely to be visible from all character areas to varying degrees. Due to the flat topography surrounding the Project Area, low vegetation typical of the region and the lack of built structures, there is little in the current landscape to impede views of the Project Area.

Overview of Impacts on Landscape Character Units

LCU:	Key Landscape Features:	Scenic Quality Rating:	Overview of Impact on Landscape Character:	Landscape Scenic Integrity:
LCU01 **Yanga Parks**	**Undisturbed forested areas, flat ,** **recreational areas**	Moderate	The LCU is characterised by expanses of flat terrain and dense woodlands that are unique to this region. Views on the Project are likely to be limited from locations within the LCU due to the dense vegetation. The Project is not likely to change the existing character of the LCU. The Project will not disrupt views to any key landscape features or viewpoints located within the LCU. An assessment of potential impacts on recreational sites such as the Willows Picnic Area and Campground states that the potential visual impact on the existing landscape character is likely to be low to nil.	Views from this LCU are often contained by the unique vegetation that defines this LCU. Despite the flat topography, dense woodlands will help reduce and mitigate views towards the Project. Recreational camp sites such as the Willows Picnic Area and Campground will have minor or no visual impact due to vegetation in the foreground. The landscape scenic integrity is likely to remain intact since the Project will not be visible from within the LCU.
LCU02 **Creek Corridors**	**Seasonal creeklines and waterways** **grasses and shrubs with groupings of trees,** **flat with topographical depressions**	Moderate	The LCU is characterised by very gentle undulations within the creek corridor. The creek corridors are seasonal and generally hold flood overflows within the overall Murrumbidgee catchment. Patchy tree/shrub cover is prominent. The vegetation acts as a landmark in an otherwise flat, open landscape. Views on the Project are likely to be partially screened from locations within the LCU due to the patchy vegetation. The Project is likely to have a moderate impact on the existing character of the LCU. No key viewpoints were identified within the LCU.	Views towards the Project will be partially available within this LCU because of the relatively flat topographic character. Patches of vegetation along creek corridors, however, may help screen views in certain areas. Vegetation is generally different by clumps of mid-height canopy cover and saltbush. No key viewpoints were identified within the Creek Corridors LCU. It is likely that the Project will have a moderate impact on the landscape scenic integrity of this LCU because the Project contrasts to the character of this LCU.
LCU03 **Dry Lakes and Swamps**	**Gentle semi-circular depressions,** **seasonal lake and swamps,** **vegetation includes shrubs and groundcovers**	Low	The LCU is characterised by flat, semi-circular, gentle depressions covered in saltbush and grasses. Views of the Project are likely to be available from most locations within the LCU. The Project is likely to have a moderate to low impact on the existing character of the LCU. No key viewpoints were identified within the LCU.	Views of the Project from the Dry Lakes & Swamps LCU will be available from most locations. The flat, low-lying character allows open views. Existing shrubs may help reduce the visual impact in certain areas. It is likely that the Project will have a moderate to low impact on the landscape scenic integrity of this LCU.
LCU04 **Farmlands**	**Flat, open expanses,** **sparse tree cover, large tracts of grass and bush,** **grazing lands**	Low	The LCU is characterised by flat, expansive, treeless lands. Views of the Project are will be available from most locations within the LCU. The LCU has low scenic quality and does not offer any key visual features. The landscape is extensively modified and is used for grazing and cropping. No key viewpoints were identified within the LCU.	The Project is located within the Farmlands LCU which is also the most prominent character of the region. Isolated dwellings are scattered across the farmlands. Land is predominantly used for agricultural activities include grazing pastures and dryland cropping. Views are generally open with minimal obtrusive elements. Although the Project will be visually prominent in the LCU, the Project will have a low impact on the scenic integrity of this LCU.

Table 17 Overview of Impact on Landscape Character Units

16
Mitigation Measures

16.0 Mitigation Measures

16.1 Overview of Mitigation Measures

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;
- Secondary measures designed to specifically address the remaining (residual) negative (adverse) effects of the final development proposals (The Landscape Institute et al 2008).

It is important to note that the mitigation methods proposed in this report are made notwithstanding those relating to other aspects that have been assessed to inform the EIS for the Project. 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.

Mitigation methods considered for associated infrastructure has been included in Section 14.0.

16.2 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.

16.2.1 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 turbines 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 turbines 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 turbine types, densities and layout geometry to minimise the visual impacts.
- The lines of turbines should reflect the contours of the natural landscape as best as possible.
- Ensure the turbines 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 above design principles have been considered in the siting of the proposed turbines to provide a balanced appearance along the ridgelines.

16.2.2 Wind Turbine Design and Colouring

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

The important factors to achieving a visual consistency through the landscape include:

- Uniformity in the colour, design, 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.

16.3 Mitigation Measures - Residences

In accordance with the Bulletin, a detailed assessment of dwellings identified within the visual catchment has been undertaken and (where possible) mitigation methods have been recommended to assist in reducing any residual impacts.

Of the 13 non-associated dwellings assessed within 8,000 m from the nearest turbine, a total of two (2) non-associated dwellings were identified through the visual assessment as having the potential for a moderate impact (dwellings 99 and 19). Mitigation measures have been suggested for these two (2) non-associated dwellings.

Proposed mitigation measures have been included in **Appendix E** and will be undertaken in consultation with the relevant landowners. Principles for screen planting and supplementary planting have been included below. These principles can be implemented to reduce the potential visual impacts at dwellings in excess of 5,700 m of the nearest turbine post construction if deemed necessary.

16.3.1 Residence Screen Planting

In circumstances where residences are subject to visual impact, screen planting is an option proposed to assist in mitigating views of turbines. As the viewing location of the Project would be generally fixed there is opportunity to significantly reduce potential visual impact from the Project.

In order to achieve visual screening planting between the intrusive element and a homestead, tree planting could 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 turbines.

16.3.2 Residence Supplementary Planting

Due to the vegetated character of areas surrounding Dwellings 99 and 19, views to the Project are likely to be fragmented to a certain extent by the existing vegetation in the dwellings' foreground. Where turbines are located close to the dwelling or existing intervening vegetation is thin, provision of supplementary planting has been identified as a mitigation method.

For example, the existing vegetation around dwelling 19 helps limit views of turbines in up to one (1) 60 degree sector. Provision of supplementary planting in keeping with the existing landscape character and along the dwelling's driveway would further reduce potential visibility of turbines in the south easterly direction (refer to Appendix E.2.).

Dwelling 99 is surrounded by dense vegetation in the foreground to the south and south east. It is likely that additional screen planting in the dwelling's foreground would not contribute to screening views of the blade tips and hubs of the nearest turbines in the south east direction (refer to Appendix E.1.). Provision of supplementary planting next to the shed in the south, however, could potentially reduce visibility of the turbines.

16.4 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. For example, the existing windbreak vegetation around the dwellings can be strengthened and additional screen planting can help limit views at dwellings. Generally, no key landscape features or views have been identified from dwellings that are likely to have high or moderate visual impacts.

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.

17

Evaluation of Visual Performance Objectives

17.0 Evaluation of Visual Performance Objectives

17.1 Overview of Visual Performance Objectives

In accordance with the Bulletin: *"the visual assessment requires an evaluation of the proposed wind energy project and its various components, turbines and ancillary facilities against the visual performance objectives of the Project (refer to Table 2 of the Bulletin), using a combination of desktop and field evaluations. The visual performance objectives are used as a framework for evaluation that enables potential impacts and management options to be considered objectively, against the varying levels of landscape significance established by the baseline study. Application of the visual performance objectives will allow for a transparent and robust assessment process."* (DPE, 2016).

The following tables provides a summary of the evaluation of each of the visual performance objectives and identifies the relevant sections of the LVIA where visual performance objectives are addressed.

Visual Magnitude - Visual Performance Objectives		
Visual Influence Zone 1 Objectives:	**Visual Influence Zone 2 Objectives:**	**Visual Influence Zone 3 Objectives:**
Avoid turbines or provide detailed justification of turbines below the blue line (3,900 m for Keri Keri WF)	Manage impacts as far as practicable, justify residual impacts, and describe proposed mitigation measures below the black line (5,700 m for Keri Keri WF). Consider screening between the blue line and the black line.	Consider screening below the black line (within 3,900 m).
Summary of LVIA Evaluation		
Two (2) non-associated dwellings identified within 3,900 m of the nearest turbine were assessed as being 'Visual Influence Zone 2'. No dwellings were identified within 3,900 - 5,700 m of the nearest turbine. **Dwellings within 3,900 m (below the black line):** • Two (2) non-associated dwellings were identified within 3,900 metres of a proposed turbine. • All non-associated dwellings within 3,900 m of the nearest turbine were assessed as being Visual Influence Zone 2 (VIZ2). • Two (2) non-associated dwellings were rated as having a moderate visual impact. Screen planting has been proposed in accordance with the Bulletin to reduce the potential visual impacts from these two (2) non-associated dwellings. • The objectives for VIZ2 receptors within 3,900 m of the nearest turbine are to: *Manage impacts as far as practicable, justify residual impacts.* **Refer to Section 6.0: Preliminary Assessment Tools and Appendix E: Mitigation Measures.**		

Table 18 Evaluation of Visual Performance Objectives - Visual Magnitude

Landscape Scenic Integrity		
Visual Influence Zone 1 Objectives:	**Visual Influence Zone 2**	**Visual Influence Zone 3**
Wind turbines should not cause more than a low level modification of the visual catchment. Turbines are seen as either very small and/ or faint, or as of a size and colour contrast (under clear, haze-free atmospheric conditions) that they would not compete with major elements of the existing visual catchment.	Wind turbines should not cause significant modification of the visual catchment. Turbines may be visually apparent and could become a major element in the landscape but should not dominate the existing visual catchment.	No Visual Performance objective applies.
Summary of LVIA Evaluation		

The landscape scenic integrity was assessed in Section 8.0, Section 14.0, Appendix B and Appendix C of the report. The following provides a summary of the findings:

Public Viewpoint Analysis:

- The Visual Influence Zone (VIZ) was identified for 13 key viewpoint locations within the Study Area and, where required, the landscape scenic integrity was assessed in accordance with the relevant visual performance objectives. Of the 13 viewpoint locations assessed, nine (9) locations were rated as being Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply.
- Four (4) public viewpoints were assessed as being Visual Influence Zone 2 (VIZ2). The following provides an overview of the assessment:
  - It was assessed that the Project will not be visible from one (1) public viewing location (VP08) which corresponds to the Willows Picnic Area and Campground. A photomontage has been prepared from this location to demonstrate that the turbines will not form part of the existing visual catchment due to the existing dense vegetation.
  - The Project was assessed as being a visible element in the landscape from three (3) public viewpoint locations (VP01, VP03 and VP07). Photomontages have been prepared for these locations demonstrating that the turbines will dominate the existing visual catchment. It should be noted that these viewpoints are located on Sturt Highway. The surrounding character is defined by a distinct lack of landscape features, low scenic quality and a highly modified landscape character.

Refer to Section 8.0, Appendix B: Public Viewpoint Analysis and Appendix D: Photomontages (Public Receptors)

Dwelling Assessments:

- Both non-associated dwellings assessed within 3,900 m of the nearest turbine are rated as Visual Influence Zone 2 (VIZ2). The potential impacts on the scenic integrity for each of the dwellings has been assessed in accordance with the objectives of the Bulletin (as outlined above).
- The assessment found the scenic integrity of the landscape will not be significantly modified as a result of the Project. The turbines have the potential to become a noticeable element in the landscape from dwelling 19 and 99. Mitigation measures have been proposed to reduce the impact. It is likely that the proposed screening will reduce the potential visual impact.

Refer to Section 9.0 and Appendix C: Detailed Dwelling Assessment

Landscape Character:

The potential for the Project to affect the Scenic Integrity of the existing landscape character was summarised for each Landscape Character Unit in Section 14.0 of the LVIA. The existing character of the region is predominantly defined by vast tracts of open, flat agricultural land that is generally treeless and the land use is driven by commercial agricultural operations. No scenic or key landscape features were identified within the Study Area.

The Project has the ability to dramatically transform the existing visual character of the Study Area since the turbines will be a visually prominent element in the flat, open landscape. However, it should be noted that once constructed, the Project will allow the continuation of the existing character of agricultural production with the addition of a new land use, ie., energy production.

Refer to Section 15.0: Overview of Impact on Landscape Character.

Table 19. Landscape Scenic Integrity - Evaluation of Visual Performance Objectives

Multiple Wind Turbine Effects

Objectives (Applies to all Visual Influence Zones)

- Avoid views to the proposed, existing and approved turbines within eight kilometres from Level 1 and Level 2 viewpoints, exceeding the following thresholds, or provide detailed justification:
- Level 1: (High Sensitivity) - Wind Turbines visible within the effective horizontal views of two or more 60º sectors.
- Level 2: (Moderate Sensitivity) - Wind Turbines visible within the effective horizontal views in three or more 60º sectors.

Summary of LVIA Evaluation

- All viewers identified using the Multiple Wind Turbine Effect Tool (based on 2D plan assessment) are Level 2 Sensitivity (Rural Dwelling). The Bulletin recommends further assessment to Rural Dwellings (Level 2 Sensitivity) identified as having the potential to view more than two (2) 60º sectors when using the Multiple Effect Tool.
- As discussed in Table 16 of this report, all dwellings within 8,000m of the Project are likely to have views of turbines in up to two (2) 60 degree sectors, which is deemed acceptable in accordance with the Bulletin.

Refer to Section 6.0: Preliminary Assessment Tools

Table 20. Multiple Wind Turbine Effects - Evaluation of Visual Performance Objectives

Shadow Flicker and Blade Glint - Visual Performance Objectives

Objectives (Applies to all Visual Influence Zones)

- Minimise shadow flicker to not more than 30 hours per year and utilise available mitigation options to minimise shadow flicker.
- Finish turbine blades with a low reflectivity surface treatment to ensure that blade glint is minimised.

Summary of LVIA Evaluation

A Shadow Flicker Assessment was undertaken. The assessment concluded no non-associated dwellings will be subject to shadow flicker exceeding 30 hours per year.

The shadow flicker and Willowvale Rest Area is likely to be 30 - <100 hours per year. No limitations have been identified for public areas that are likely to experience shadow flicker over 30 hours per year.

Refer to Section 12.0: Shadow Flicker Assessment

Table 21. Shadow Flicker & Blade Glint - Evaluation of Visual Performance Objectives

Aviation Hazard Lighting
Objectives (Applies to all Visual Influence Zones)
Objective Applies to all Visual Influence Zones • Aviation Hazard Lighting (AHL) must meet the requirements of Australian Standard AS 4282 - 1997 and any prescribed or notified CASA requirement. Shield all AHL within 2 kilometres of any dwellings. Avoid strobe lighting.
Summary of LVIA Evaluation
• The visual effect from night lighting has the potential to have a visual impact on receptors including motorists and residents in the area. • Night lighting is proposed to be installed on temporary meteorological masts and permanent monitoring masts not located in proximity of the turbines. No AHL has been proposed for the turbines. • Mitigation methods for other ancillary infrastructure have been outlined in Section 11.0. **Refer to Section 11.0 Night Lighting Assessment.**

Table 22. Aviation Hazard Lighting - Evaluation of Visual Performance Objectives

18

Conclusion

18.0 Conclusion

The NSW Government has identified five (5) Renewable Energy Zones (REZ) in regional areas of NSW and the Project is located within the SW REZ. The Project contrasts with the existing landscape character of the region which is typically rural, grazing land which is highly modified and lacks key landscape and scenic features. It is inevitable that the placement of large scale wind turbines in a rural landscape will dramatically alter the existing landscape character of the area.

With all visual impact assessments the objective is not to determine whether the Project is visible or not visible, but to determine how the Project will impact on the existing visual amenity, landscape character and scenic quality. It has been identified that although the Project will be a visually prominent element in the landscape, views to key scenic or landscape features will be not be impacted because the predominant character of the region is defined by highly modified lands of low scenic quality. Once operational, the Project will allow the continuation of existing agricultural activity and add another land use, i.e., wind energy production.

Although this LVIA quantifies the visual impact of the turbines and ancillary infrastructure, the overall visual impact of the Project will vary greatly depending on the individual viewer's sensitivity to and acceptance of change. The sensitivity towards change varies greatly depending on the user's connection with the landscape. For example, visitors to the area may perceive the wind farm as an interesting feature of the landscape which is otherwise defined by flat, large expanses that lack key features. This may contrast with a resident who passes the wind farm daily who may have a more critical perception of the visual presence of the wind farm.

The visual impact of the turbines are reduced as the distance of the vantage point from the Project is increased. This has been established through the preparation of photomontages from locations at varying distances. Although the area is characterised by large, flat tracts of land that are generally treeless, it is understood that the visibility decreases as one move further away from the turbines.

The LVIA concludes there are limited opportunities to view the Project from non-associated dwellings within 8,000 m of the Project. However, the greatest visual effect is most likely to be felt by residents in the immediate vicinity of the Project. Of the 13 non-associated dwellings within 8,000 m of the Project that were assessed, 11 are likely to have a negligible - low visual impact. Two (2) non-associated dwellings are likely to have a moderate visual impact rating.

Mitigation methods incorporated into the design process in conjunction with landscape and visual screening can be implemented to reduce visual impacts at the non-associated dwellings identified as having a moderate visual impact. However, it should be noted that the provision of additional screen planting as a mitigation method requires further consultation with the landowner.

Overall, the Willowvale Rest Area was identified as a point of interest within 8,000m of the nearest turbine. However, the Rest Area does not offer views to any key landscape or scenic features. Although the Project will be a dominant feature in the views from this location, the existing character which is defined by large tracts of open, flat agricultural lands will continue to co-exist with the Project. Another point of interested identified in the area is the Willows Picnic Area and Campground within the Yanga SCA is located approximately 9,000 m west of the Project. The assessment identified that the key recreation site is not likely to have any visual impacts due to the flat topography and dense vegetation.

It was also identified that the Project will impact the overall and broader landscape character. Although the Project will be visually prominent in the landscape, the landscape has been determined to be of low scenic quality and devoid of significant landscape features. The modification and clearing of the plains for agricultural use combined with the flat topography the landscape is in essence a blank canvas where any contrasting addition, particularly one of the scale of a wind farm, is likely to become a defining character element. This however will not diminish the existing agricultural character.

The potential cumulative visual impact assessment of proposed renewable energy projects in the area concluded that it is likely that the re-occurrence of wind farms within this region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. Since the Project is located in SW REZ, it is likely that the region will be developed for wind energy production due to largely uninhabited lands and conditions that favour wind energy harvestation. The Project is located in an area of low scenic quality that offers no key features in the landscape. It should also be noted that the development of wind farms will allow the continuation of the existing primary production activities, as well as provide opportunity for energy production.

Wind turbines can be considered a temporary installation in the landscape due to their modular construction and relatively low impact during the construction phase. When implemented with appropriate environmental management, the development of wind farms can be undertaken with low impact on the surrounding environment whilst providing positive local, regional and national benefits.

On evaluation, it is the opinion of Moir LA that with mitigation measures implemented, the Project is compliant with the performance objectives of the Bulletin.

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A

Visual Influence Zone Study Method

VIEWER SENSITIVITY LEVEL

Level 1 **Sensitivity:** **High**	• Residential areas and rural villages • Recreation, cultural or scenic sites and viewpoints of National or State significance. • Any buildings, historic rural homesteads/residences on the State or local Government Heritage List
Level 2 **Sensitivity:** **Moderate**	• Rural dwelling • Tourist and visitor accommodation (definition in Standard Instrument Local Environmental Plan) • Recreation, cultural or scenic sites and viewpoints of regional significance
Level 3 **Sensitivity:** **Low**	• Interstate and state passenger rail lines with daily daylight services • State highways, freeways and classified main roads, classified tourist roads • Land management roads with occasional recreation traffic • Walking tracks of moderate local significance or infrequent recreation usage • Other low use and low concern viewpoints and travel routes • Navigable waterways

VISIBILITY DISTANCE ZONES

0 – 500 m	Near Foreground (**NF**)	Zone of Greatest Visual Influence
500 m – 1 km	Mid Foreground (**MF**)	
1 – 2 km	Far Foreground (**FF**)	
2 – 4 km	Near Middleground (**NM**)	
4 – 8 km	Far Middleground (**FM**)	
8 – 12 km	Near Background (**NB**)	
12 – 20 km	Mid Background (**MB**)	
20 – 32+ km	Far Background (**FB**)	Zone of Least Visual Influence

SCENIC QUALITY CLASS

LOW MODERATE HIGH

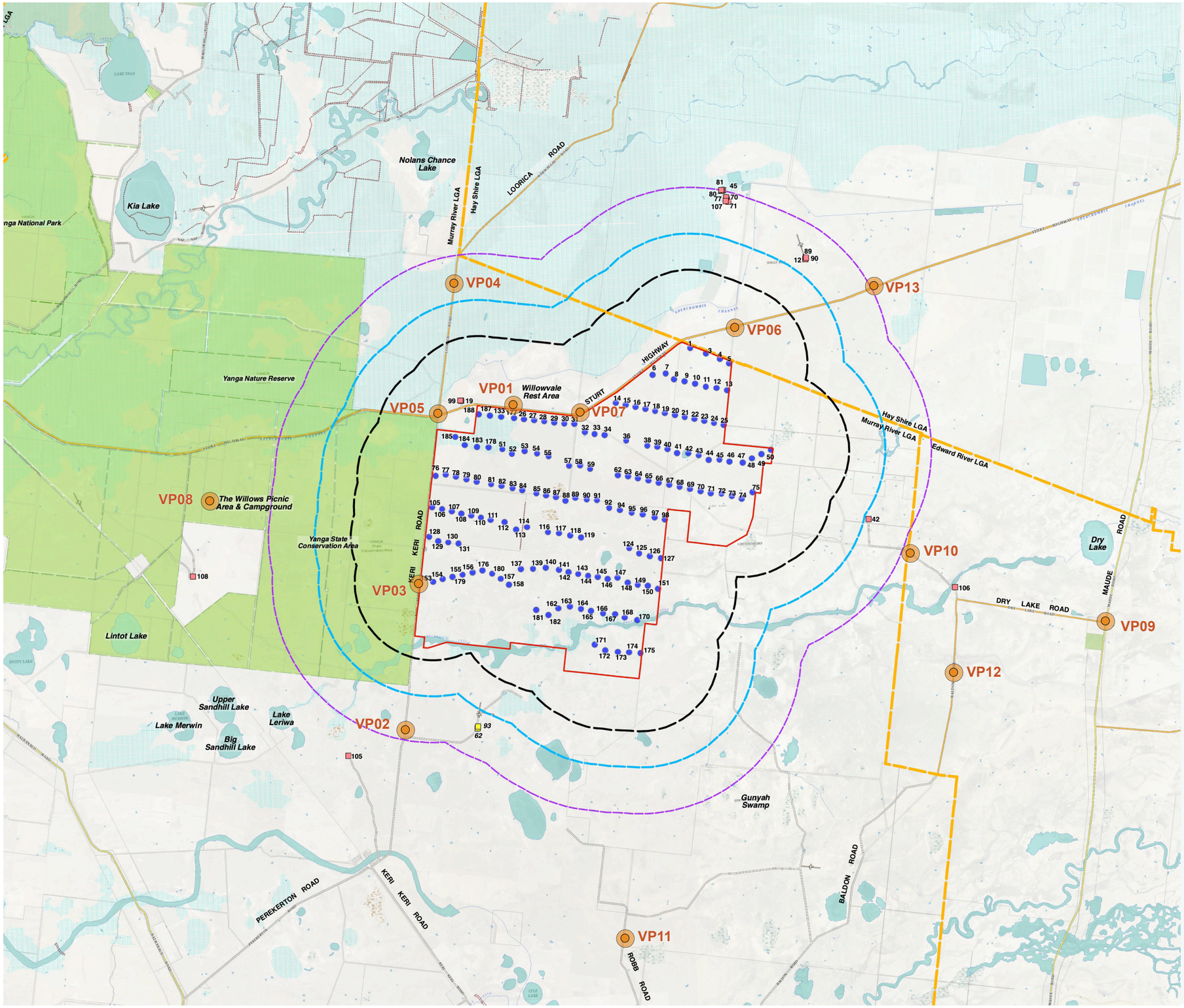
Landform
Waterbodies
Vegetation
Human Influence
Activity
Rarity
Relationship with adjoining landscapes

VISUAL INFLUENCE ZONE MATRIX

VIEWER SENSITIVITY LEVEL - VISIBILITY DISTANCE ZONE		**SCENIC QUALITY CLASS** HIGH	MODERATE	LOW
LEVEL 1 HIGH SENSITIVITY VIEWPOINTS				
Near Foreground (**NF**)	0 – 500 m	VIZ1	VIZ1	VIZ1
Mid Foreground (**MF**)	500 m – 1 km	VIZ1	VIZ1	VIZ1
Far Foreground (**FF**)	1 – 2 km	VIZ1	VIZ1	VIZ1
Near Middleground (**NM**)	2 – 4 km	VIZ1	VIZ2	VIZ2
Far Middleground (**FM**)	4 – 8 km	VIZ2	VIZ2	VIZ2
Near Background (**NB**)	8 – 12 km	VIZ2	VIZ2	VIZ2
Mid Background (**MB**)	12 – 20 km	VIZ2	VIZ2	VIZ3
Far Background (**FB**)	20 – 32+ km	VIZ2	VIZ2	VIZ3
LEVEL 2 MODERATE SENSITIVITY VIEWPOINTS				
Near Foreground (**NF**)	0 – 500 m	VIZ1	VIZ1	VIZ1
Mid Foreground (**MF**)	500 m – 1 km	VIZ1	VIZ1	VIZ1
Far Foreground (**FF**)	1 – 2 km	VIZ1	VIZ1	VIZ2
Near Middleground (**NM**)	2 – 4 km	VIZ2	VIZ2	VIZ2
Far Middleground (**FM**)	4 – 8 km	VIZ2	VIZ2	VIZ3
Near Background (**NB**)	8 – 12 km	VIZ2	VIZ3	VIZ3
Mid Background (**MB**)	12 – 20 km	VIZ2	VIZ3	VIZ3
Far Background (**FB**)	20 – 32+ km	VIZ3	VIZ3	VIZ3
LEVEL 3 LOW SENSITIVITY VIEWPOINTS				
Near Foreground (**NF**)	0 – 500 m	VIZ1	VIZ1	VIZ2
Mid Foreground (**MF**)	500 m – 1 km	VIZ2	VIZ2	VIZ2
Far Foreground (**FF**)	1 – 2 km	VIZ2	VIZ2	VIZ3
Near Middleground (**NM**)	2 – 4 km	VIZ2	VIZ3	VIZ3
Far Middleground (**FM**)	4 – 8 km	VIZ2	VIZ3	VIZ3
Near Background (**NB**)	8 – 12 km	VIZ3	VIZ3	VIZ3
Mid Background (**MB**)	12 – 20 km	VIZ3	VIZ3	VIZ3
Far Background (**FB**)	20 – 32+ km	VIZ3	VIZ3	VIZ3
Areas not visible		VIZ3	VIZ3	VIZ3

B

Public Viewpoint Analysis



Public Viewpoint Analysis Locations

Keri Keri Wind Farm

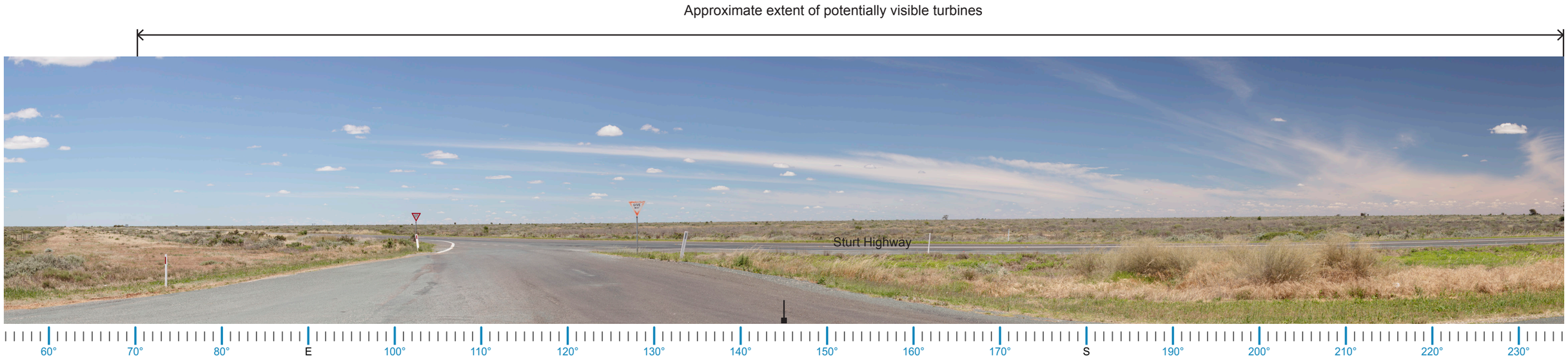
- Project Area
- Proposed 291.5 m Turbine Location
- Non-associated Dwellings
- 3,900 m from turbine
- 5,700m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road
- LGA Boundary
- Public Viewpoint Analysis Location

N

0 2 4 6 8 10km

Appendix B Public Viewpoint Analysis Locations (Map Source: Six Maps 2020)

VP01 Willowvale Rest Area, Sturt Highway, Keri Keri



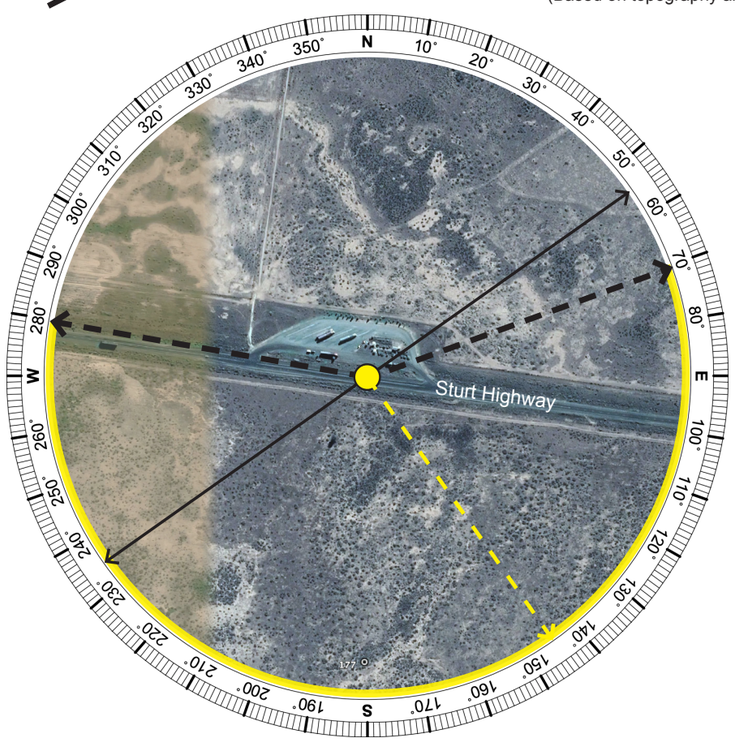
LEGEND

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:
Willowvale Rest Area, Sturt Highway, Keri Keri	70m
Coordinates:	Viewing Direction:
34°43'25.24"S 143°55'42.21"E	Generally southeast
Distance to nearest WTG:	Visibility Distance Zone:
0.50 km	**Mid Foreground (MF)**
Land Use:	Viewer Sensitivity Level:
Major Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ2

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

This viewpoint was taken from Willowvale Rest Area. The rest area is used for commuters travelling between Hay and Balradald, along the Sturt Highway. The rest area and facilities are intended to serve as a temporary stop.

Surrounding land is flat and generally used for livestock grazing. The vegetation includes grasses and saltbush typical of the region with little to no tree coverage present.

The Sturt Highway is visible in the middleground of the view and generally runs in an east west direction. Views are open and expansive with little screening factors.

Potential Visual Impact:

Views across flat, expansive grasslands define this character unit. The majority of the Project is likely to be visible in the foreground of the view from this location due to the distance to the Project and lack of vegetation and other intervening elements.

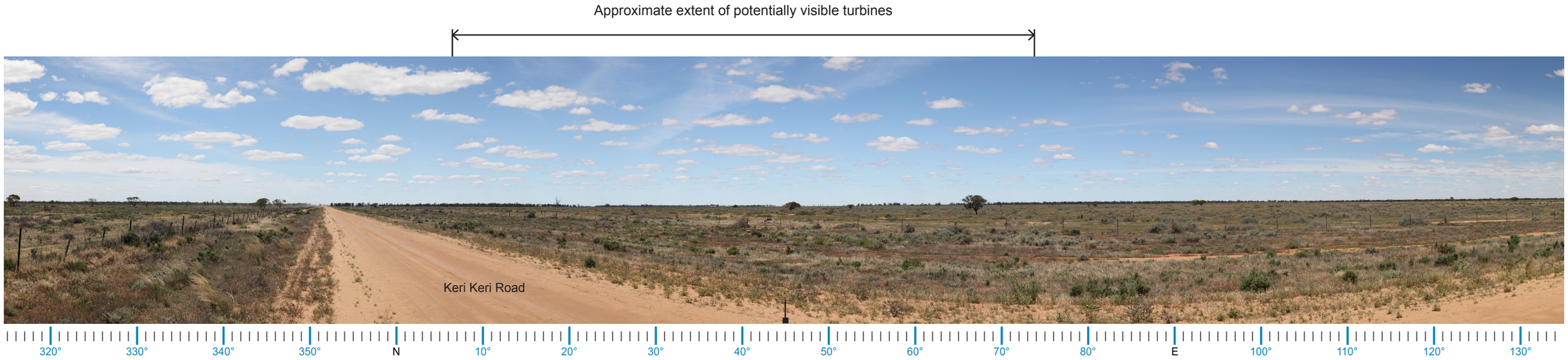
Visual Performance Objectives:

Visual Magnitude: The viewpoint is located within the 'black line' (3,900m).

Landscape Scenic Integrity: The Project is likely to result in the modification of the visual catchment from this location. Turbines are likely to be a major element in the landscape**.**

Key Feature Disruption: The key features at this location include views across flat and open expanses. Whilst this feature is likely to remain in tact, it is likely that the Project will also become a key feature of the view from this location.

VP02 Keri Keri Road, Keri Keri



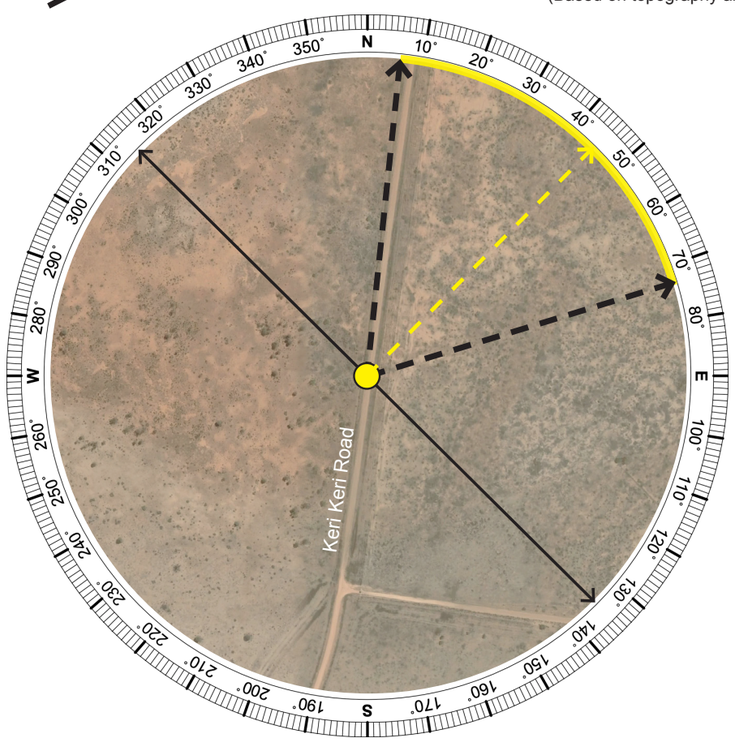
LEGEND

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:
Keri Keri Road, Keri Keri	68m
Coordinates:	Viewing Direction:
34°51'57.26"S 143°51'50.56"E	Northeast
Distance to nearest WTG:	Visibility Distance Zone:
7.35 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Low use road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

This viewpoint is located on Keri Keri Road, which is a low-use, unsealed road that provides access to Dwellings 91-92 & 62.

The landscape is defined by flat grazing paddocks, with open and expansive views across native grasslands. Scattered singular trees dot the middleground of the view.

Stands of tree cover associated with Keri Keri homestead and the Abercrombie Creek are visible in the background of the view, with the dominant vegetation character defined by saltbush and scrubby groundcovers.

Potential Visual Impact:

Views across flat and expansive grasslands are key characteristics of this viewpoint.

The Project is likely to be visible in the background of the view from this location due to the lack of vegetation and other intervening elements.

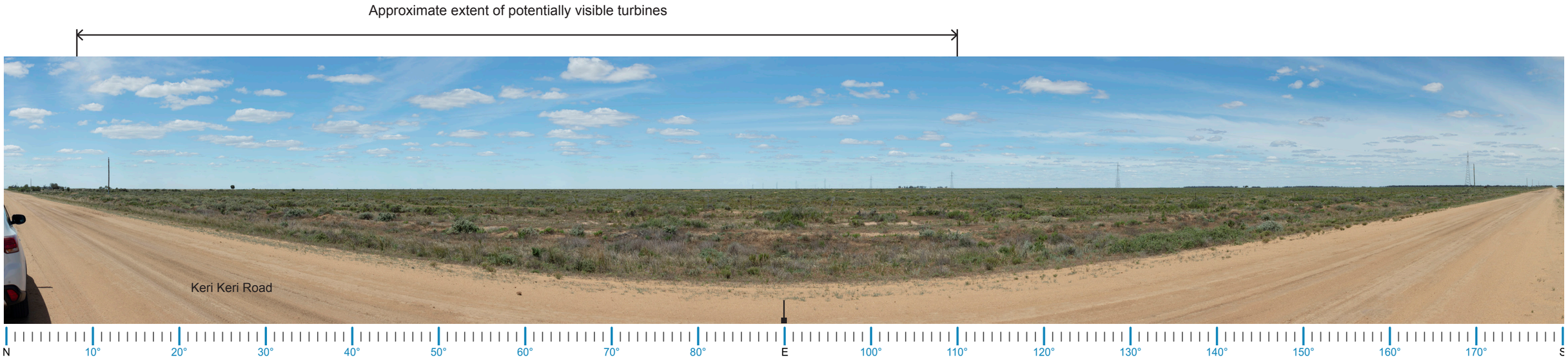
However, due to distance, the Project is likely to make up a small portion of the view and may be difficult to discern.

Refer to Appendix D, PM02.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to the Rating (VIZ3).

VP03 Intersection of Keri Keri & Parkers Trail, Keri Keri



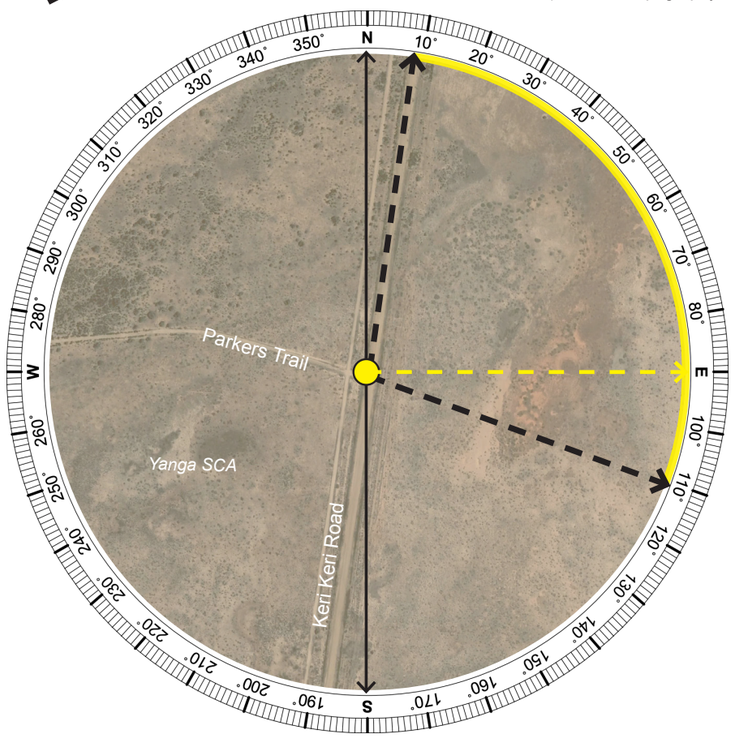
LEGEND

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:
Intersection of Keri Keri & Parkers Trail, Keri Keri	68m
Coordinates:	Viewing Direction:
34°48'3.97"S 143°52'26.47"E	East
Distance to nearest WTG:	Visibility Distance Zone:
0.24 km	**Near Foreground (NF)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ2

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

Viewpoint from the intersection of Keri Keri Road and Parkers Trail. Keri Keri Road is a low-use, unsealed road providing access to the Yanga National Park, Nature Reserve and SCA. Surrounding land is flat and generally used for cropping and grazing.

The vegetation includes scrubby groundcovers typical of the region with minimal tree coverage. Riparian vegetation associated with Abercrombie Creek can be seen in the north in the background of the view.

Transmission lines are an existing feature of the landscape and are visible in the background of the view. Views are open and expansive with little screening factors.

Potential Visual Impact:

Views across flat, expansive grasslands define the character of the view. It is likely a large portion of the Project will be visible in the foreground of the view from this location, due to the distance to the nearest turbines and the lack of screening factors.

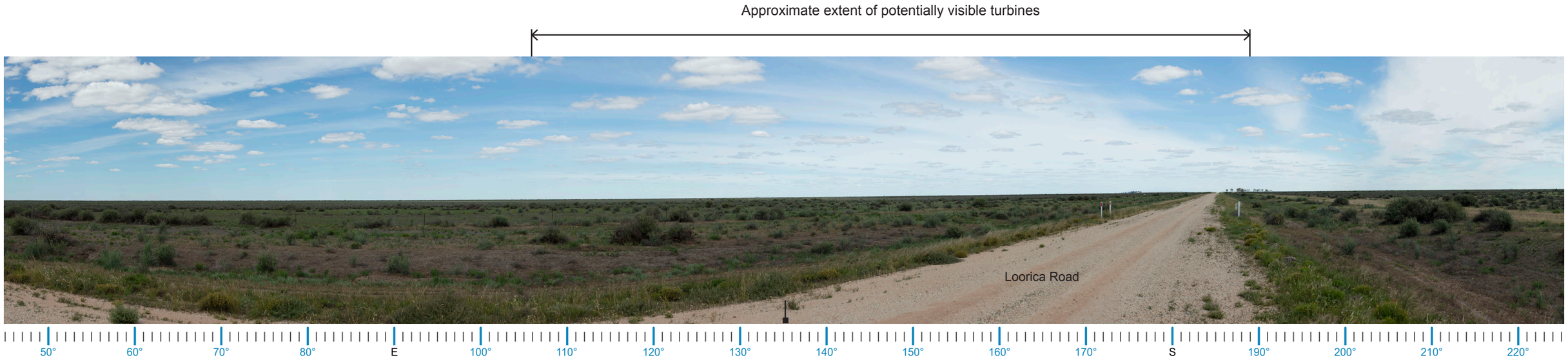
Visual Performance Objectives:

Visual Magnitude: The viewpoint is located within the 'black line' (3,900m).

Landscape Scenic Integrity: The Project is likely to result in the modification of the visual catchment from this location. Turbines are likely to be a major element in the landscape.

Key Feature Disruption: The key features from this location includes views across flat and open expanses. Whilst this feature is likely to remain in tact, it is likely that the Project will also become a key feature of the view from this location.

VP04 Loorica Road, Keri Keri



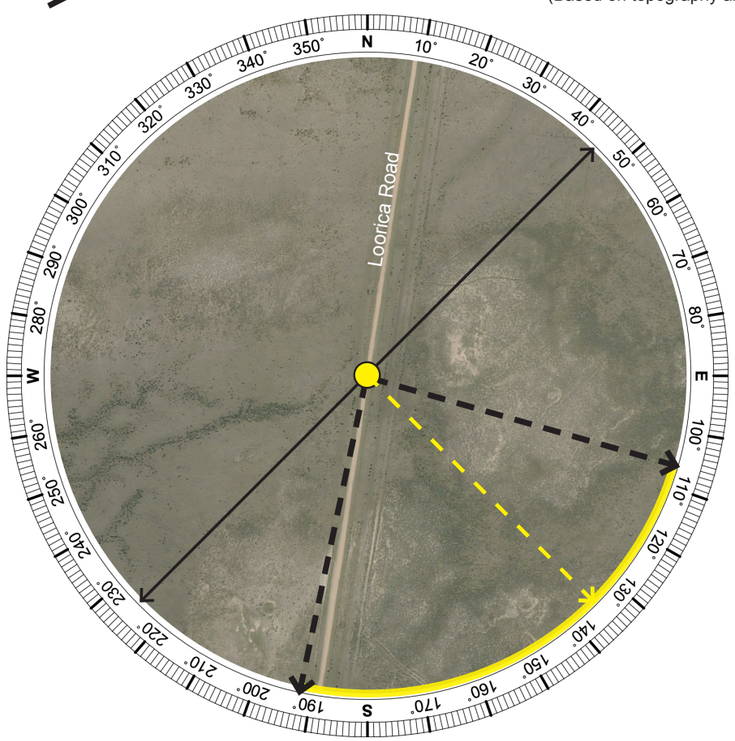
LEGEND

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:
Loorica Road, Keri Keri	71m
Coordinates:	Viewing Direction:
34°39'56.05"S 143°53'54.44"E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
7.49 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU01: Murrumbidgee Valley Parks	**Moderate**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

This viewpoint is located on Loorica Road. Loorica Road is a low-use, unsealed road that connects isolated dwellings to the Sturt Highway.

The terrain is generally flat with open, expansive views and forms part of the floodplains of the Murrumbidgee Valley Parks.

Vegetation is characterised by scrubby, low-growing blue bush and saltbush species typical of the Riverina Bioregion.

The lands are utilised for sheep grazing.

Potential Visual Impact:

Clear, open and expansive views characterise vistas from this location. The Project is likely to be visible in the background of the view from this location due to the flat topography and lack of screening factors. However, due to distance, the Project is likely to make up a small portion of the view and may be difficult to discern.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP05 Intersection of Sturt Highway & Loorica Road, Keri Keri

Approximate extent of potentially visible turbines



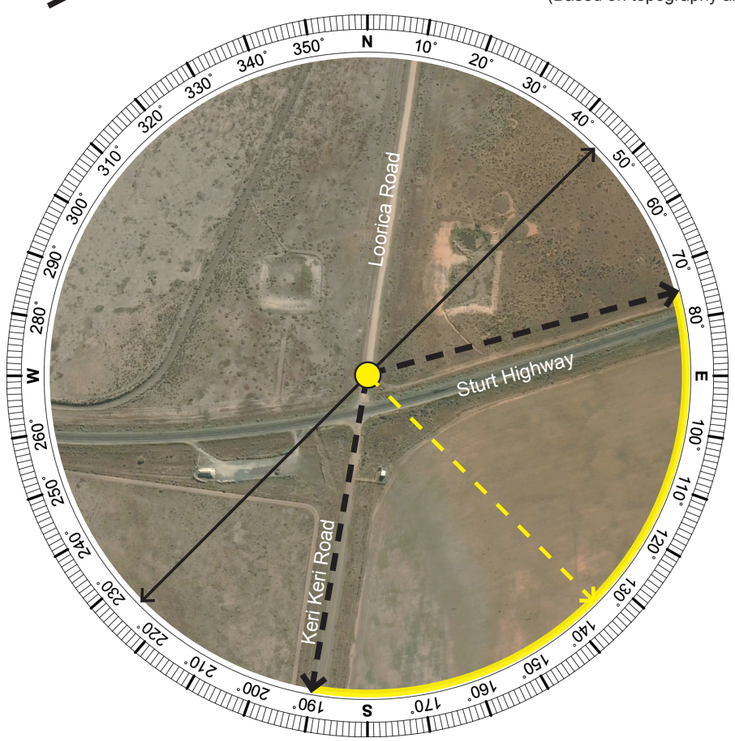
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP05

Viewpoint Summary:	
Location:	Elevation:
Intersection of Sturt Highway & Loorica Road, Keri Keri	69m
Coordinates:	Viewing Direction:
34°43'30.98"S 143°53'14.96"E	Southeast
Distance to nearest WTG:	Visibility Distance Zone:
2.84 km	**Near Middleground (NM)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

The viewpoint is located at the intersection of Loorica Road and Sturt Highway, near Dwellings 19 & 99.

Loorica Road is a low-use, unsealed road connecting dwellings to the Sturt Highway. The surrounding landscape is generally flat and utilised for grazing activities.

Vegetation is characterised by scrubby, low-growing blue bush and saltbush species typical of the Riverina Bioregion. Isolated stands of tree coverage are visible in the middleground of the view.

Existing infrastructure including powerpoles and a junction box are visible in the middleground of the view.

Potential Visual Impact:

Views across flat and expansive grasslands define the character of the view.

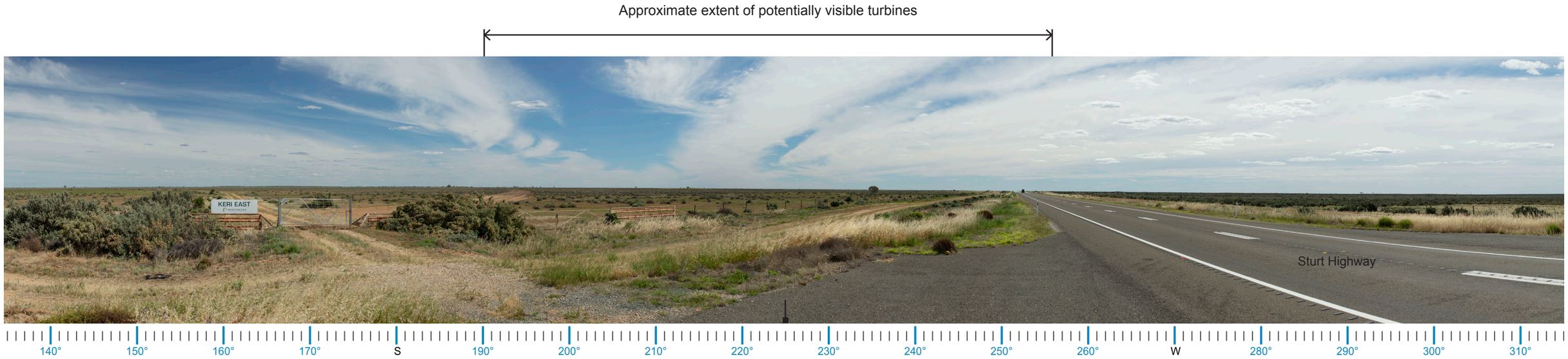
It is likely a large proportion of the Project will be visible in the foreground of the view from this location due to the distance to the nearest turbines, and the lack of screening factors.

Refer to Appendix D, PM03.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP06 Sturt Highway, Maude



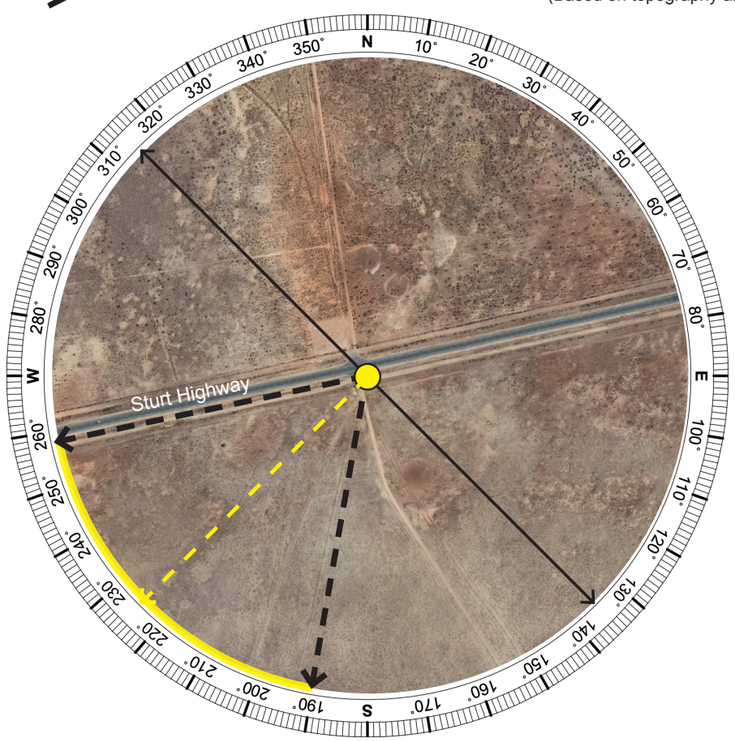
LEGEND

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:
Sturt Highway, Maude	74m
Coordinates:	Viewing Direction:
32°11'4.92"S 149°37'29.56"E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
4.15 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

The viewpoint is from Sturt Highway near Dwelling 42 and opposite the entrance gate of Dwellings 12,89-90.

The Sturt Highway is the main connecting road between Hay and Balranald. The surrounding landscape is flat and utilised for sheep and cattle grazing. Vegetation is characterised by native scrubby species typical of the Riverina Bioregion.

Potential Visual Impact:

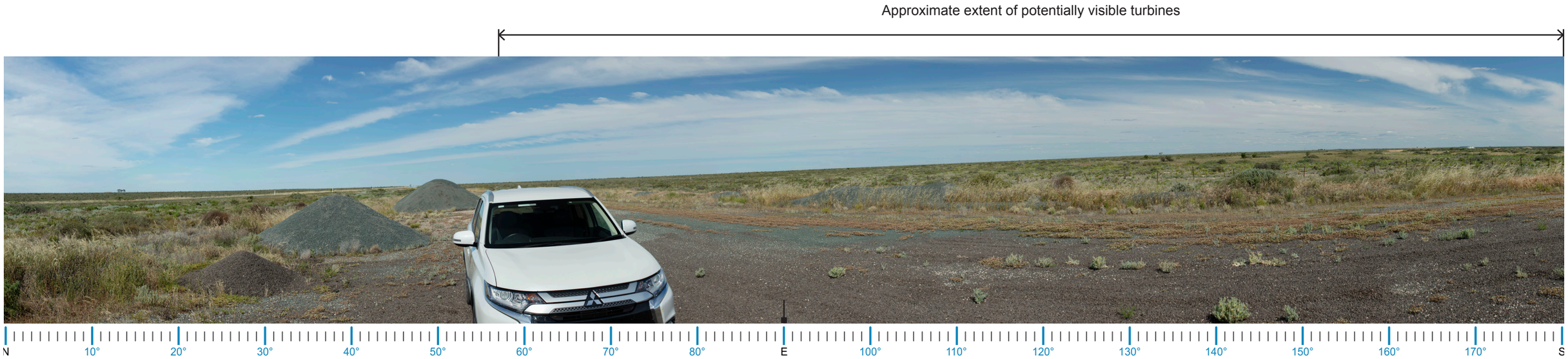
Views across flat and expansive grasslands define the character of the view.

It is likely a large proportion of the Project will be visible in the middleground of the view from this location due to the lack of screening factors.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP07a Sturt Highway, Keri Keri (East)



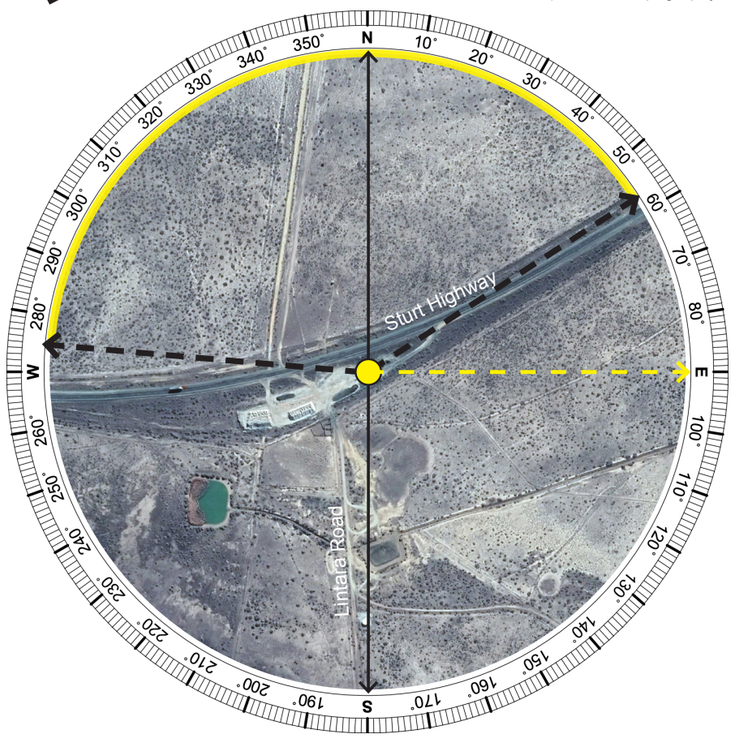
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP07a

Viewpoint Summary:

Location:	Elevation:
Sturt Highway, Keri Keri	70m
Coordinates:	**Viewing Direction:**
34°43'36.70"S 143°57'53.56"E	East
Distance to nearest WTG:	**Visibility Distance Zone:**
0.55 km	**Mid Foreground (MF)**
Land Use:	**Viewer Sensitivity Level:**
Major road	**Level 3: Low**
LCU:	**Scenic Quality Rating:**
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ2

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

The viewpoint is located just off the Sturt Highway at the intersection of Lintara Road. The Sturt Highway is the main connecting road between Hay and Balranald.

The surrounding landscape is flat and utilised for grazing. Vegetation is characterised by native grassland and scrubby species typical of the Riverina Bioregion.

Views from the location are generally open and expansive. The Project is visible in the foreground of the view.

Potential Visual Impact:

Open and expansive views characterise views from this location.

It is likely that the majority of the Project will be visible from this location due to distance to the Project and lack of existing screening factors.

Visual Performance Objectives:

Visual Magnitude: The viewpoint is located within the 'black line' (3,900m).

Landscape Scenic Integrity: The Project is likely to result in the modification of the visual catchment from this location. Turbines are likely to be a major element in the landscape.

Key Feature Disruption: The key features from this location includes views across flat and open expanses. Whilst this feature is likely to remain intact, it is likely that the Project will also become a key feature of the view from this location.

VP07b Sturt Highway, Keri Keri (South)

Approximate extent of potentially visible turbines



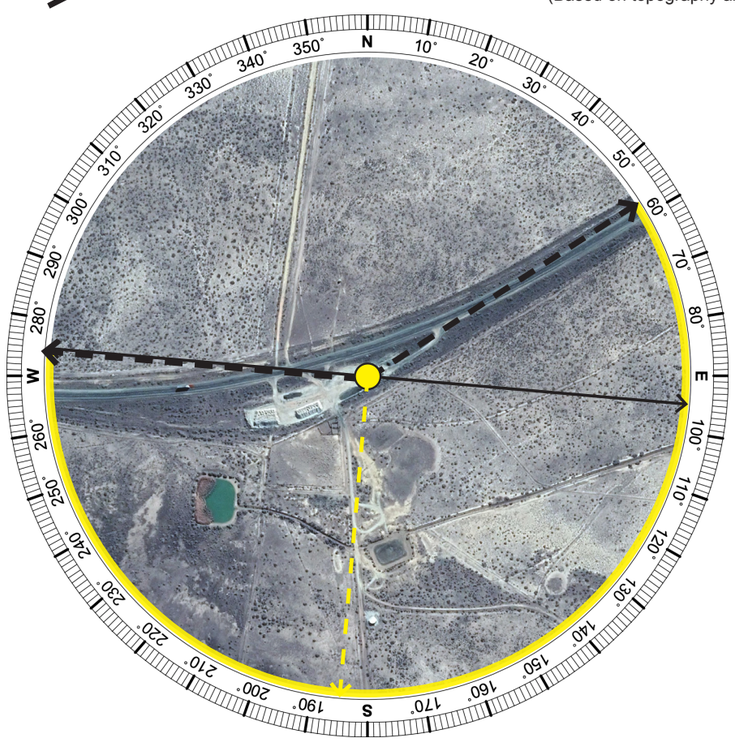
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP07b

Viewpoint Summary:	
Location:	Elevation:
Sturt Highway, Keri Keri	70m
Coordinates:	Viewing Direction:
34°43’36.70”S 143°57’53.56”E	South
Distance to nearest WTG:	Visibility Distance Zone:
0.55 km	**Mid Foreground (MF)**
Land Use:	Viewer Sensitivity Level:
Major road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ2

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

This viewpoint is located just off the Sturt Highway at the intersection of Lintara Road. The Sturt Highway is the main connecting road between Hay and Balranald.

The surrounding landscape is flat and utilised for grazing. Vegetation is characterised by native grassland and scrubby species typical of the Riverina Bioregion.

Views from the location are generally open and expansive. The Project is visible in the foreground of the view.

Potential Visual Impact:

Open and expansive views characterise views from this location. It is likely that the majority of the Project will be visible from this location due to distance to the Project and lack of existing screening factors.

Visual Performance Objectives:

Visual Magnitude: The viewpoint is located within the ‘black line’ (3,900m).

Landscape Scenic Integrity: The Project is likely to result in the modification of the visual catchment from this location. Turbines are likely to be a major element in the landscape.

Key Feature Disruption: The key features from this location include views across flat and open expanses. Whilst this feature is likely to remain intact, it is likely that the Project will also become a key feature of the view from this location.

VP08 The Willows Picnic Area and Campground, Yanga SCA

Approximate extent of potentially visible turbines



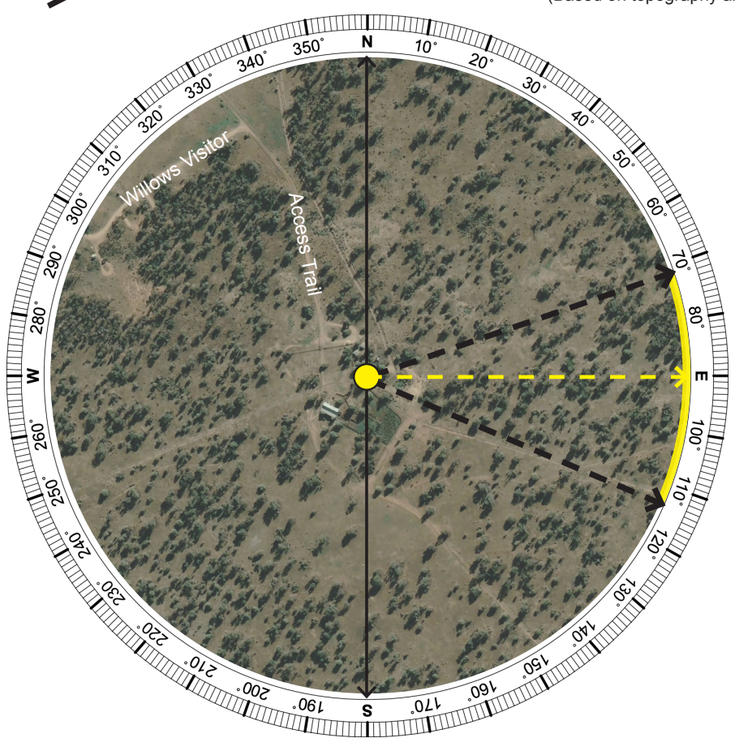
LEGEND

Viewing direction and centre of panorama

Extent of panorama

Direction of potentially visible turbines

Extent of visible turbines
(Based on topography alone)



VIEWPOINT VP08

Viewpoint Summary:	
Location:	Elevation:
The Willows Picnic Area and Campground, Yanga SCA.	67m
Coordinates:	Viewing Direction:
34°45'45.86"S 143°45'54.05"E	East
Distance to nearest WTG:	Visibility Distance Zone:
10.69 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Recreation Site	**Level 1: High**
LCU:	Scenic Quality Rating:
LCU01: Murrumbidgee Valley Parks	**Moderate**

Visual Influence Zone:

VIZ2

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

This viewpoint is located at the Willows Picnic Area and Campground located in Yanga SCA. The viewpoint location is classified as Level 1: High sensitivity in accordance with the Bulletin.

Landscapes associated with Yanga National Park, Reserve and State Conservation Area are subjected to minimal use and represent unique characteristics defined by flat topography and dense mallee, black box and belah woodlands, which are visible in the foreground of the view.

Due to the existing vegetation and intervening structures, views from this location are generally contained.

Potential Visual Impact:

It is unlikely that the Project will be visible at this location due to existing screening factors characteristic of the area. In accordance with the Bulletin, the viewpoint is categorised as VIZ. Visual Performance Objectives will apply to this viewpoint.

Visual Performance Objectives:

Visual Magnitude: The viewpoint is located beyond 8000 m of the nearest turbine.

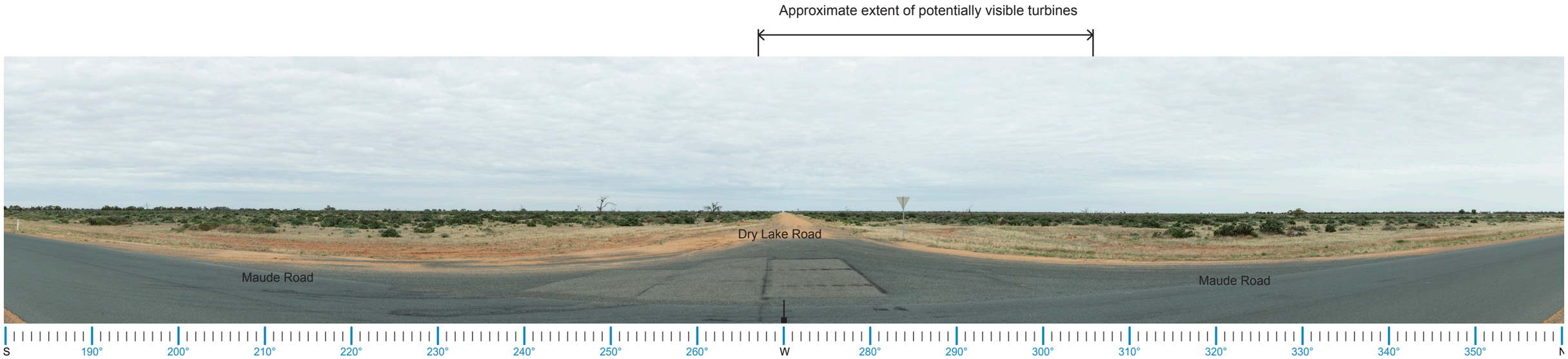
Landscape Scenic Integrity: Views toward the Project are likely to be screened by the existing vegetation. As a result, the Project is unlikely to cause modification to the existing visual catchment from this location.

Key Feature Disruption: The key features of views from this location include flat topography contrasted with dense tree lined areas.

The existing features of the area are unlikely to be disrupted as a result of the Project.

Refer to Appendix D, PM05.

VP09 Intersection of Maude Road & Dry Lake Road



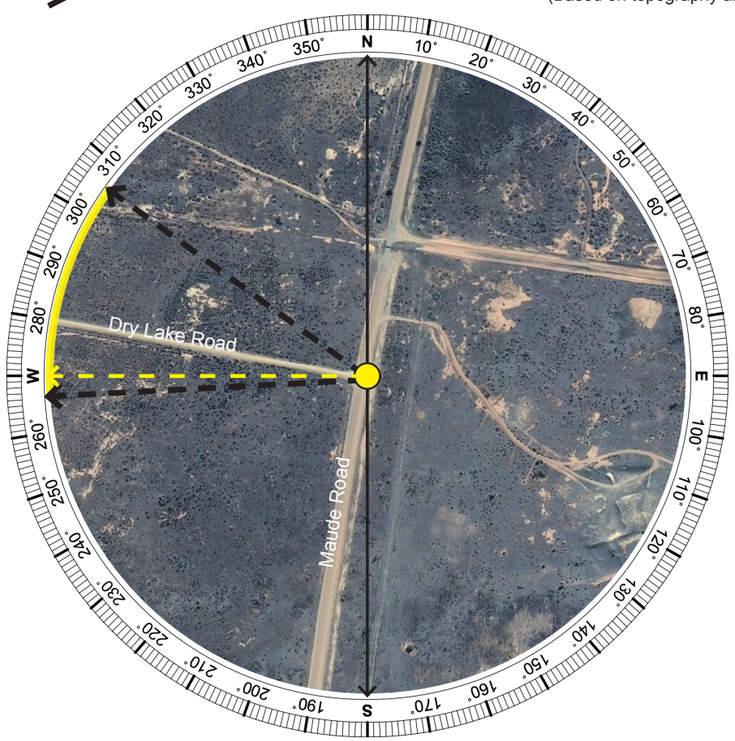
LEGEND

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:
Intersection of Maude Road & Dry Lake Road	75m
Coordinates:	Viewing Direction:
34°49'38.08"S 144°14'48.88"E	West
Distance to nearest WTG:	Visibility Distance Zone:
18.69 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Moderate Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

Viewpoint from Muade Road west towards Dry Lake Road. Maude Road is a low to moderate-use road that connects the Sturt Highway to Moulamein and other areas near Edward River.

The surrounding land is characterised by flat, open, native vegetation that is used for sheep and emu grazing. Vegetation is typical of the region and consists of lignum, saltbushes and grasses. Isolated stands of trees are visible in the distance.

Views are generally open and expansive.The Project is located toward the west, in the distance of the viewpoint.

Potential Visual Impact:

The viewpoint is located in excess of 18 km from the Project. The ZVI assessment identified that up to 158 turbines may be visible from this location.

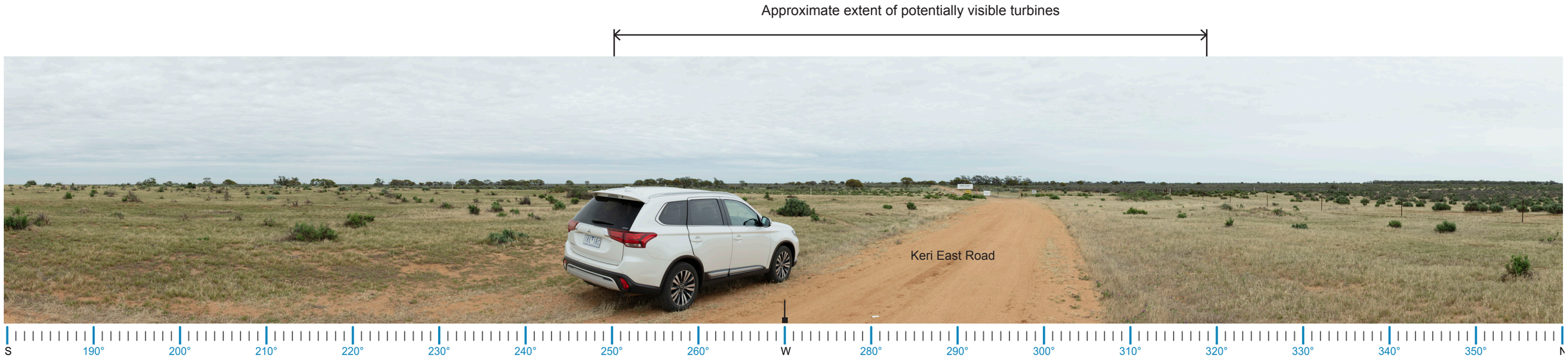
However, due to the distance it is likely the Project will occupy a small portion of views. Views are likely to be distant and fleeting when traveling along Maude Road. The turbines will be difficult to discern.

Refer to Appendix D, PM06

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP10 Keri East Road, Moulamein



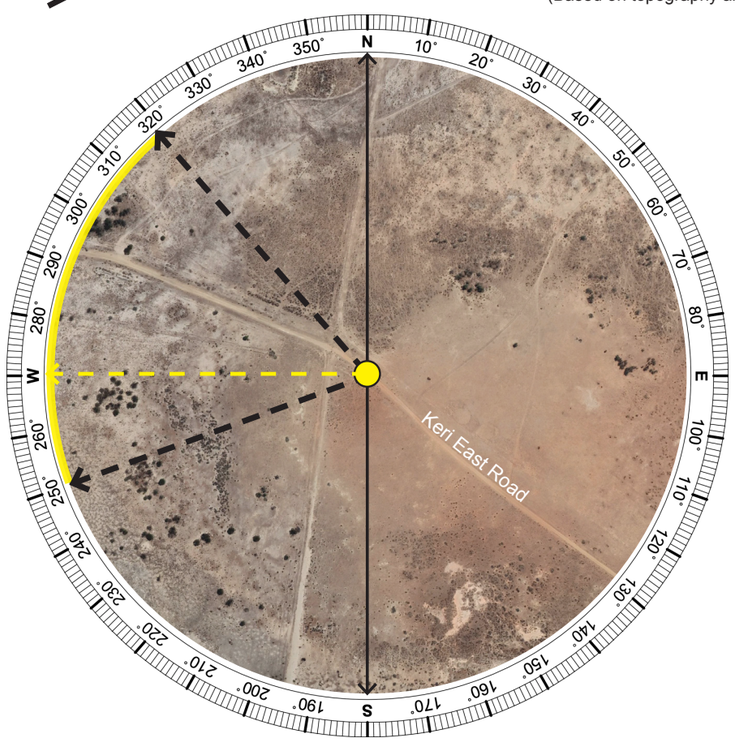
LEGEND

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:
Keri East Road, Moulamein	73m
Coordinates:	Viewing Direction:
34°47’35.32”S 144° 8’27.05”E	West
Distance to nearest WTG:	Visibility Distance Zone:
8.39 km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

Viewpoint from Keri East Road, near the entrance gate of Dwelling 42 in Keri Keri.

The surrounding topography is generally flat, covered by grasses and scrubby groundcovers. The predominant land use is grazing for sheep and other livestock, with agricultural fencing visible.

Views are open and unhindered, with very few limiting factors. Intermittent patches of tree cover are visible, one of which is toward the south and associated with Abercrombie Creek.

Potential Visual Impact:

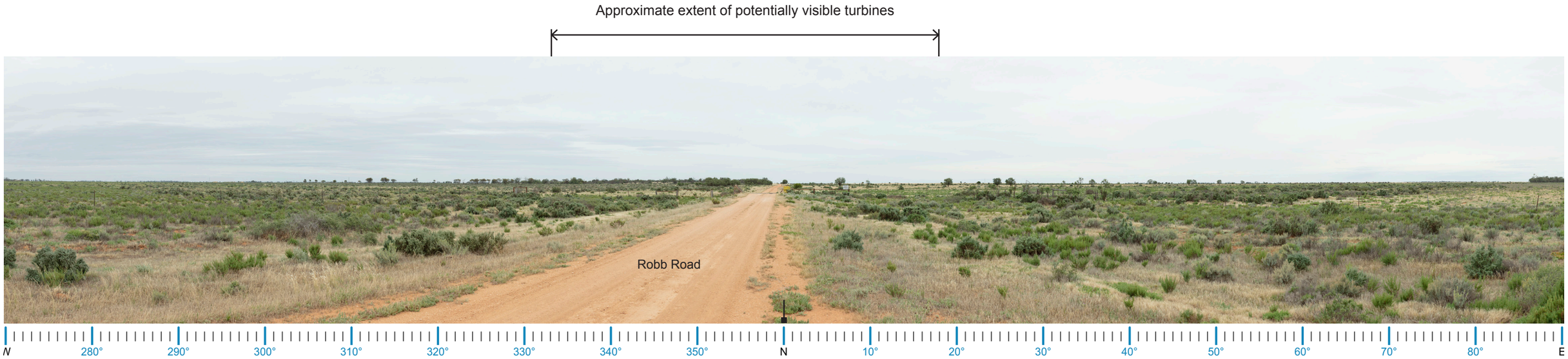
The Project is located at approximately 8.39 km from this location. Turbines are likely to be visible in the background of the view from this location, due to the lack of vegetation and other intervening elements.

However, due to the vast distance the Project is likely to make up a small portion of the view and may be difficult to discern.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP11 Robb Road, Keri Keri



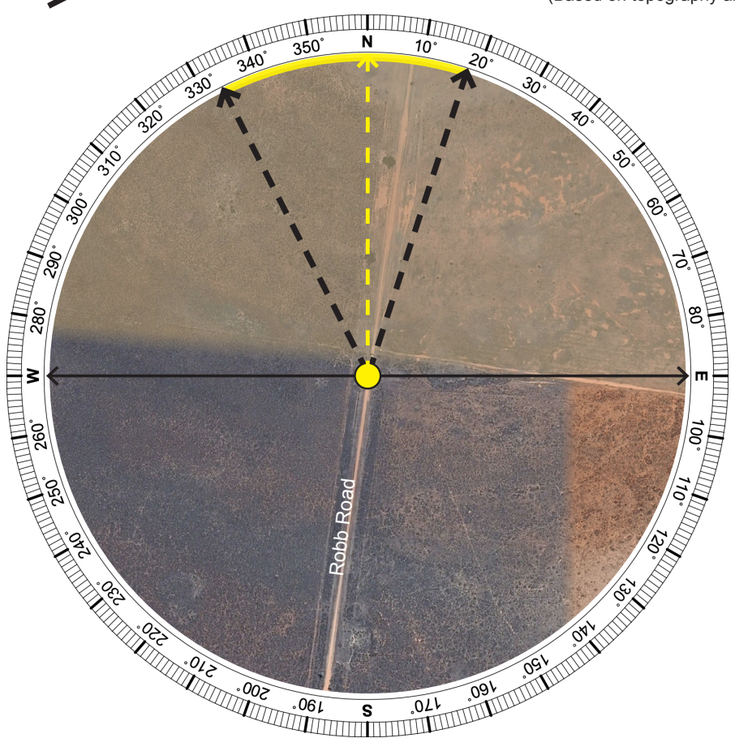
LEGEND

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:
Robb Road, Keri Keri	69m
Coordinates:	Viewing Direction:
34°57'56.00"S 143°58'43.63"E	North
Distance to nearest WTG:	Visibility Distance Zone:
14.61km	**Near Background (NB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Existing Landscape Character Description:

Viewpoint from Robb Road at the entrance to Dwelling 65.

The landscape is characterised by flat topography.

Predominant land uses include irrigated and grazing pastures used for livestock grazing.

The vegetation is consistent with the bioregion and includes native grasses and low salt bush communities. Dense tree coverage associated with existing waterways can be seen in the distance to the north of the view.

Views are generally open and expansive.

The Project is located in the background to the north of the view.

Potential Visual Impact:

The Project is located approximately 14.61 km from the viewpoint.

An assessment based on topography alone suggests that views toward up to 158 turbines may be available from this location.

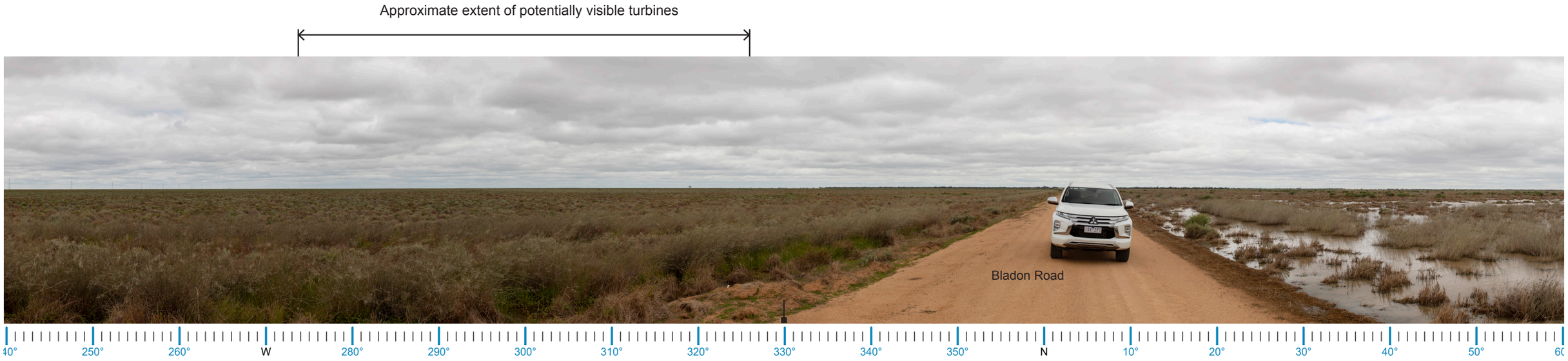
However, due to the distance it is likely the Project will occupy a small portion of views. Views are likely to be distant and fleeting. The turbines will be difficult to discern.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

Aerial Image Source: GoogleEarth 2021

VP12 Baldon Road, Moulamein



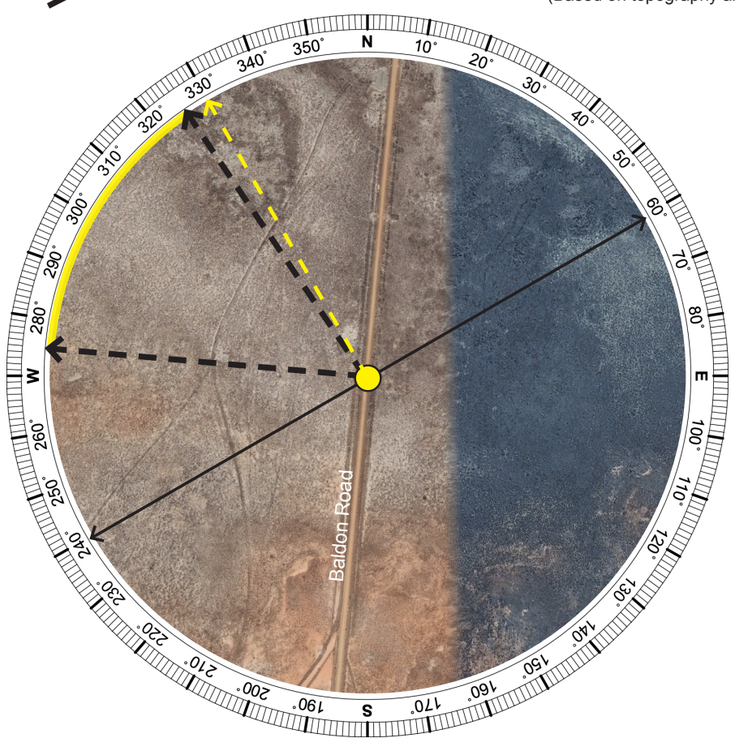
LEGEND

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:
Baldon Road, Moulamein	72m
Coordinates:	Viewing Direction:
34°50’43.12”S 144° 9’48.13”E	Northwest
Distance to nearest WTG:	Visibility Distance Zone:
13.33 km	**Mid Background (MB)**
Land Use:	Viewer Sensitivity Level:
Low Use Road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

Viewpoint from Baldon Road in Moulamein. Baldon Road is a low-use, unsealed road connecting isolated dwellings to the Sturt Highway.

The landscape is characterised by flat expanses of native scrubby vegetation associated with ephemeral creeklines and water bodies.

Lack of trees and other screening factors allows for open and expansive views.

Potential Visual Impact:

The Project is located approximately 13.33 km from the viewpoint.

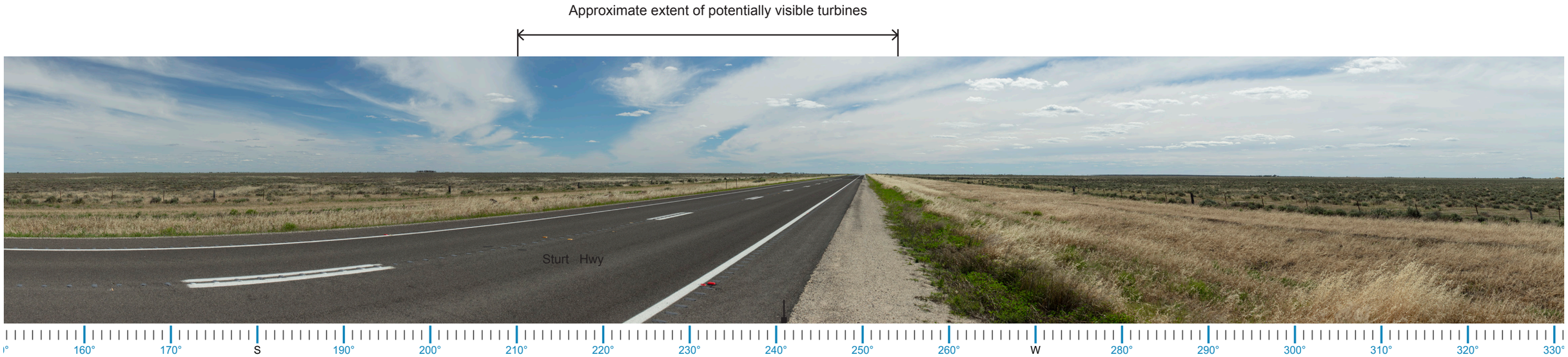
An assessment based on topography alone suggests that views toward up to 158 turbines may be available from this location.

However, due to the distance it is likely the Project will occupy a small portion of views. Views are likely to be distant and fleeting. The turbines will be difficult to discern.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

VP13 Sturt Highway, Keri Keri



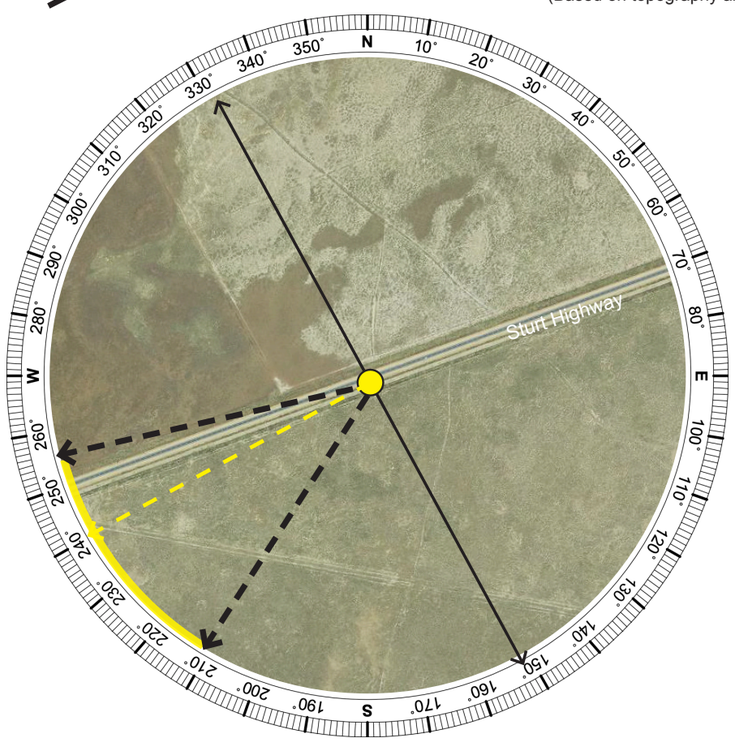
LEGEND

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:
Sturt Highway, Keri Keri	73m
Coordinates:	Viewing Direction:
34°40’28.78”S 144° 7’28.93”E	Southwest
Distance to nearest WTG:	Visibility Distance Zone:
7.90 km	**Far Middleground (FM)**
Land Use:	Viewer Sensitivity Level:
Major road	**Level 3: Low**
LCU:	Scenic Quality Rating:
LCU04: Farmlands	**Low**

Visual Influence Zone:

VIZ3

Aerial Image Source: GoogleEarth 2021

Existing Landscape Character Description:

The viewpoint is from Sturt Highway. The Sturt Highway is the main connecting road between Hay and Balranald.

The surrounding landscape is flat and utilised for sheep and cattle grazing. Vegetation is characterised by native scrubby species typical of the Riverina Bioregion.

Lack of trees and other screening factors allows open and expansive views that are typical of the area.

Potential Visual Impact:

The Project is located approximately 7.9 km from the viewpoint.

An assessment based on topography alone suggests that views toward up to 158 turbines may be available from this location.

However, due to the distance it is likely the Project will occupy a small portion of views. Views are likely to be distant and fleeting while travelling along this section of Sturt Highway. The turbines will be difficult to discern.

Visual Performance Objectives:

No visual performance objectives apply to this viewpoint due to VIZ3.

C

Detailed Dwelling Assessments

Detailed Dwelling Assessment Locations

Keri Keri Wind Farm

LEGEND

- Project Area
- Proposed 291.5 m turbine location
- Associated Dwelling
- Non-associated Dwelling
- 3900m from turbine
- 5700m from turbine
- 8000m from turbine
- Main Road
- Minor Road
- LGA boundary

DWELLING IMPACT RATINGS:

- Negligible Visual Impact Rating
- Low Visual Impact Rating
- Moderate Visual Impact Rating
- High Visual Impact Rating

Detailed Dwelling Assessments prepared for the Project have been included as Appendix C.

N

0 2 4 6 8 10km

Figure 18 Dwelling Assessment Locations (Map Source: Six Maps 2020)

C.1. Dwelling Assessment **Dwelling 99 Willow Vale, Keri Keri**

DWELLING 99			
Nearest proposed turbine (km):	**2.20 km**	**Visibility Distance Zone:**	**Far Foreground (FM)**
Number of proposed turbines within black line (3,900 m):	**12**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**2**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**2**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ2**

Visual Impact Rating: Moderate

Assessment Notes:

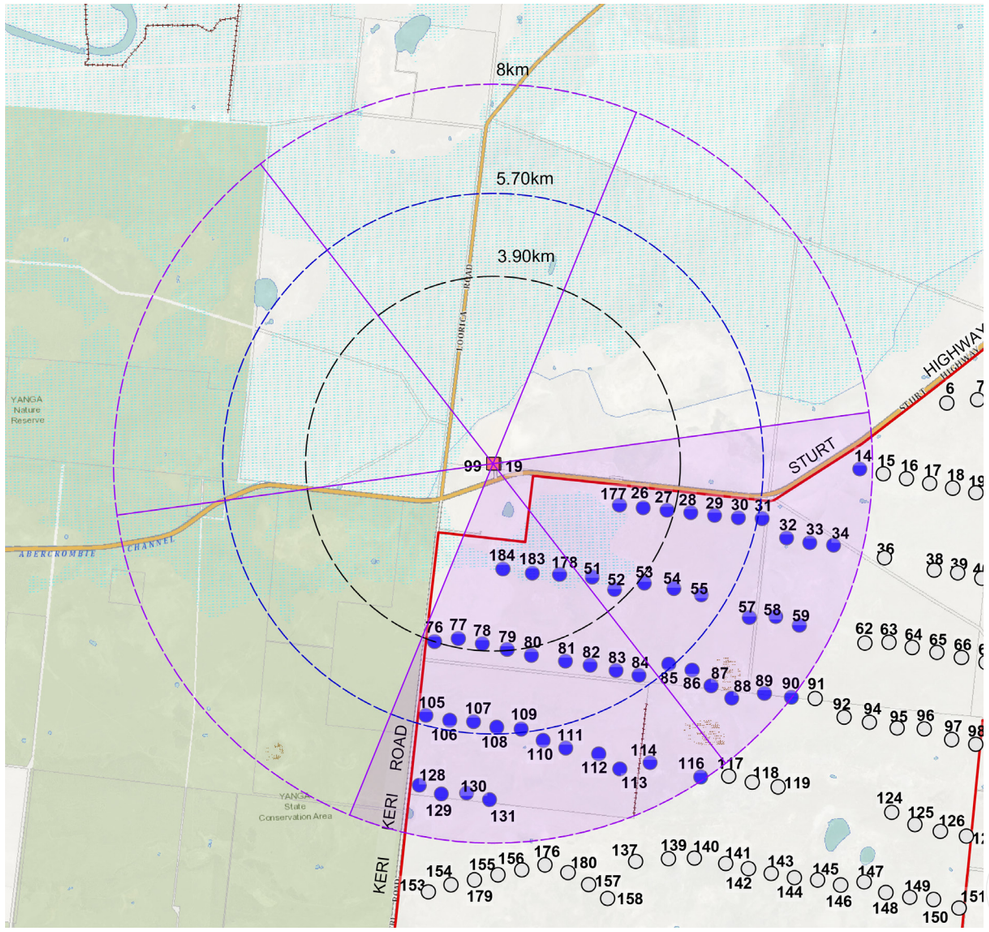
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022. Through consultation with the landowner a representative viewpoint location was identified on the southern side of dwelling near gate. A photomontage has been prepared from this location (refer to PM01). As identified in the viewpoint panorama, existing vegetation in the dwelling's foreground to the south will limit most views of the Project. Nearest turbines, however, are likely to be visible in the foreground from the dwelling curtilage due to their proximity to the dwelling. There are 10 turbines within the black line of visual magnitude of this dwelling. It is noted that the dwelling is considered as an associated dwelling for the Wilan Wind Farm project. The visual impact rating has been assessed as **moderate** from this dwelling.

Visual Performance Objectives Evaluation (VIZ2):

Visual Magnitude: 12 turbines are located within the black line of visual magnitude. 16 turbines are located between the black & blue lines of visual magnitude.
Multiple Wind Turbine Effect: Turbines have the potential to be visible in up to two (2) 60 degree sectors.
Landscape Scenic Integrity: The existing scenic quality at this location is defined by large, flat, expansive lands used for cropping and grazing. The scenic quality is low. The Project will have a moderate impact on scenic integrity at this location due to the visual prominence of the proposed turbines.
Key Feature Disruption: No key features were identified at this location.

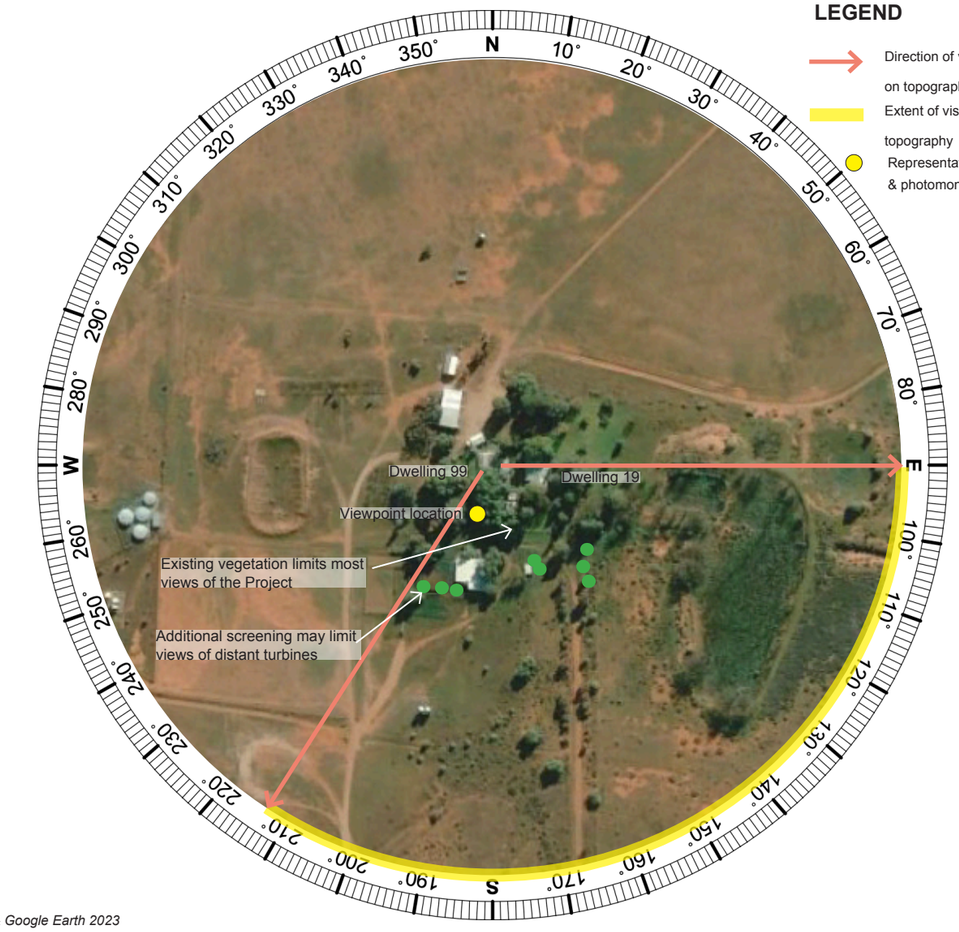
Mitigation Measures:

Existing screening factors contribute to limiting views to turbines in the southerly direction. Provision of screen planting along the shed's southern boundary can help partially limit views of turbines to the south. Provision of additional screen planting along the dwelling driveway to the southeast will partially limit views to closest turbines in the southeast (refer Appendix E.1.). Consultation with the landowner would be required to discuss appropriate mitigation methods.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography
- Representative viewpoint & photomontage location

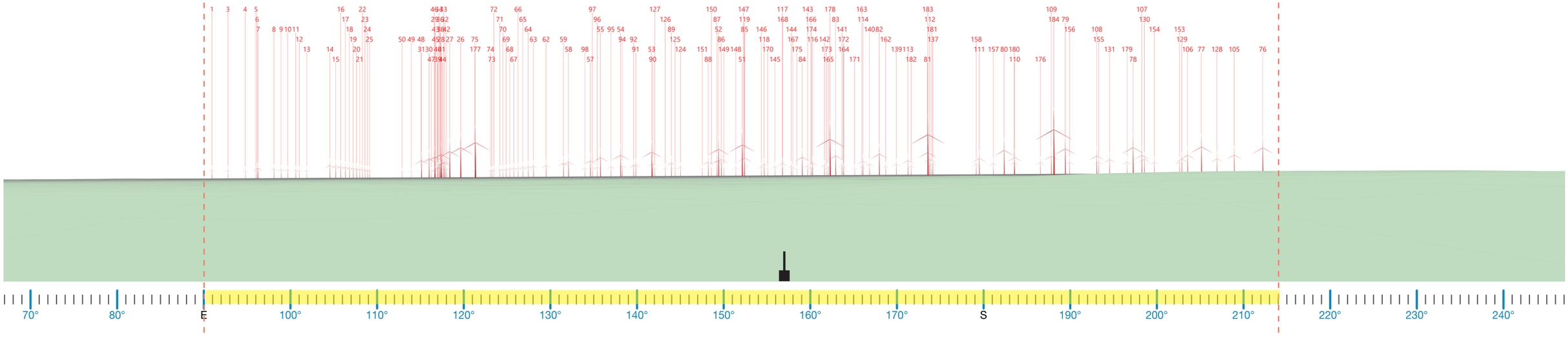
Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.1. Dwelling Assessment **Dwelling 99 Willow Vale, Keri Keri**



Proposed View - 180 degree field of view

Wire Frame Diagram indicates that all turbines will be visible generally in the southeast (assessment based on topography alone). Views of the Project will be limited by existing vegetation and structures and it is likely that up to 15 turbines will be visible at the dwelling. Additional screen planting can further help limit views of the Project.



Proposed Wire Frame Diagram - 180 degree field of view

C.2. Dwelling Assessment **Dwelling 19 Willow Vale, Keri Keri**

DWELLING 19			
Nearest proposed turbine (km):	**2.20 km**	**Visibility Distance Zone:**	**Far Foreground (FM)**
Number of proposed turbines within black line (3,900 m):	**10**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**2**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**2**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ2**

Visual Impact Rating: Moderate

Assessment Notes:

An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022. Through consultation with the landowner a representative viewpoint location was identified on the southern side of dwelling. A photomontage has been prepared from this location (refer to PM02). As identified in the photomontage, existing vegetation in the dwelling's foreground to the south will limit views of turbines to up to one (1) 60 degree sector. The Project has the ability to alter the existing visual character at this location due to the visual prominence of the nearest turbines. There are 10 turbines within the black line of visual magnitude and 16 within the black and blue lines of this dwelling. It is noted that the dwelling is considered as an associated dwelling for the Wilan Wind Farm project. The visual impact rating has been assessed as **moderate** from this dwelling.

Visual Performance Objectives Evaluation (VIZ2):

Visual Magnitude: 15 turbines are located within the black line of visual magnitude. 16 turbines are located between the black & blue lines of visual magnitude.

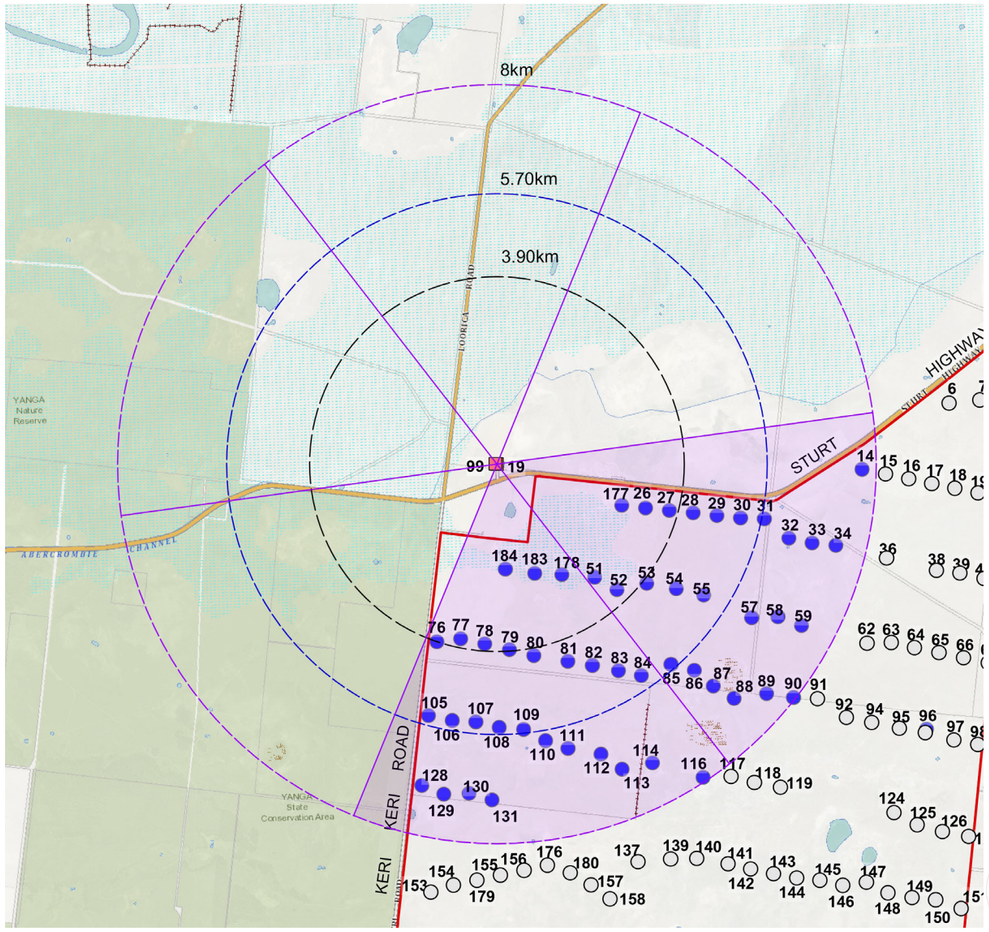
Multiple Wind Turbine Effect: Turbines have the potential to be visible in up to two (2) 60 degree sectors.

Landscape Scenic Integrity: The existing scenic quality at this location is defined by large, flat, expansive lands used for cropping and grazing. The scenic quality is low. The Project will have a moderate impact on scenic integrity at this location due to the visual prominence of the proposed turbines.

Key Feature Disruption: No key features were identified at this location.

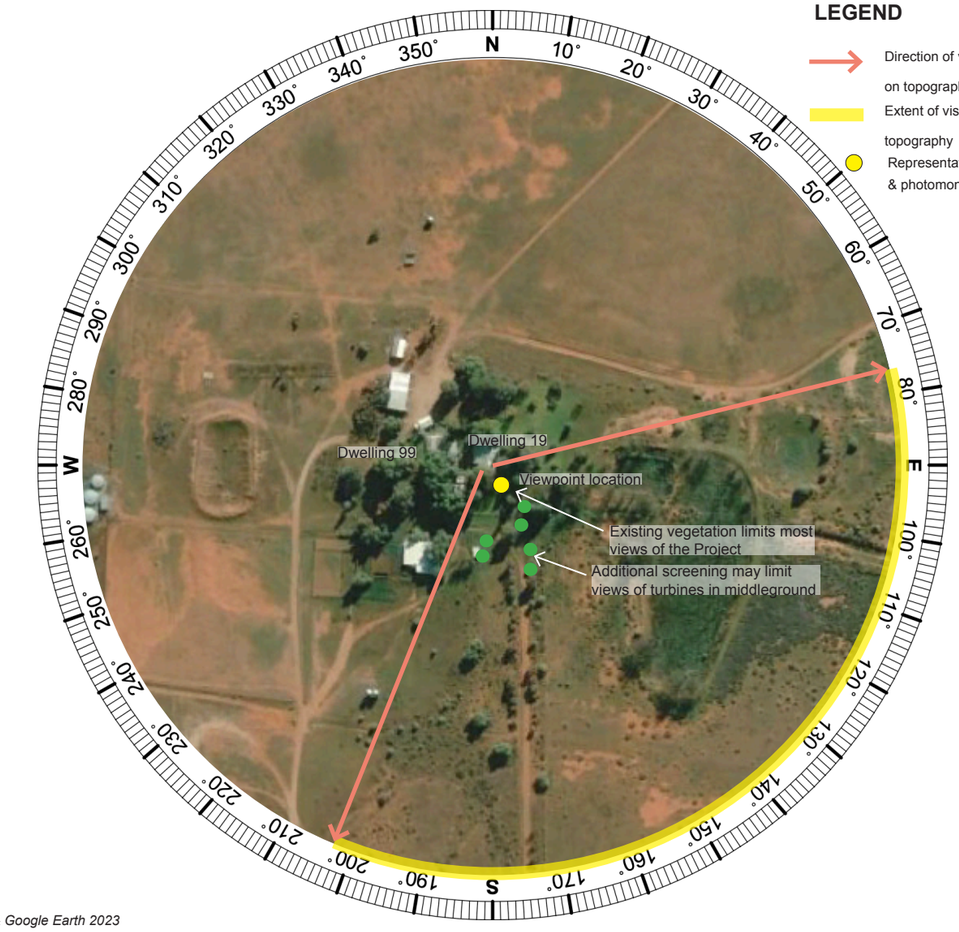
Mitigation Measures:

Existing screening factors contribute to limiting views of turbines. It is likely that the views will be in up to one (1) 60 degree sector due to existing vegetation (refer to PM02), and this is deemed acceptable in accordance with the Bulletin. Provision of screen planting along the driveway can further help limit views (refer Appendix E.2.). Consultation with the landowner would be required to discuss appropriate mitigation methods.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

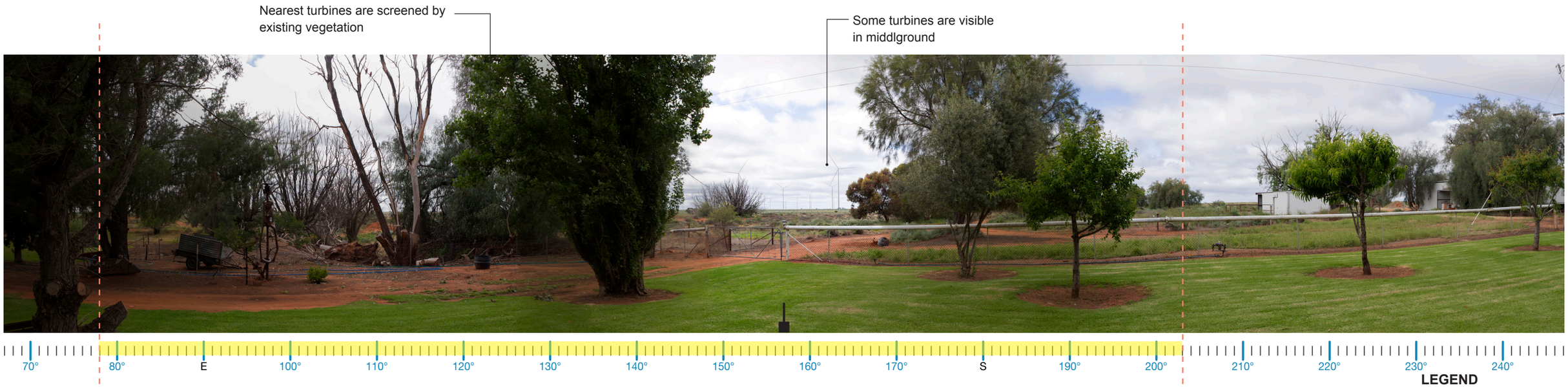


LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography
- Representative viewpoint & photomontage location

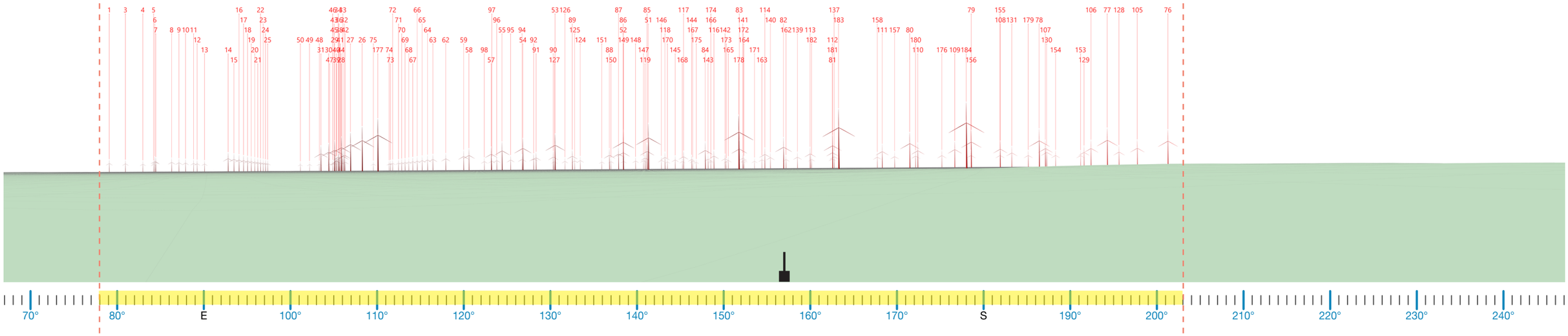
Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.2. Dwelling Assessment **Dwelling 19 Willow Vale, Keri Keri**



Proposed View - 180 degree field of view

Wire Frame Diagram indicates that all turbines will be visible generally in the southeast (assessment based on topography alone). Views of the Project will be limited by existing vegetation and structures and it is likely that up to 16 turbines will be visible at the dwelling. Additional screen planting can further help limit views of the Project.



Proposed Wire Frame Diagram - 180 degree field of view

C.3. Dwelling Assessment **Dwelling 42 Keri East Road, Keri Keri**

DWELLING 42			
Nearest proposed turbine (km):	**5.92 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**11**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

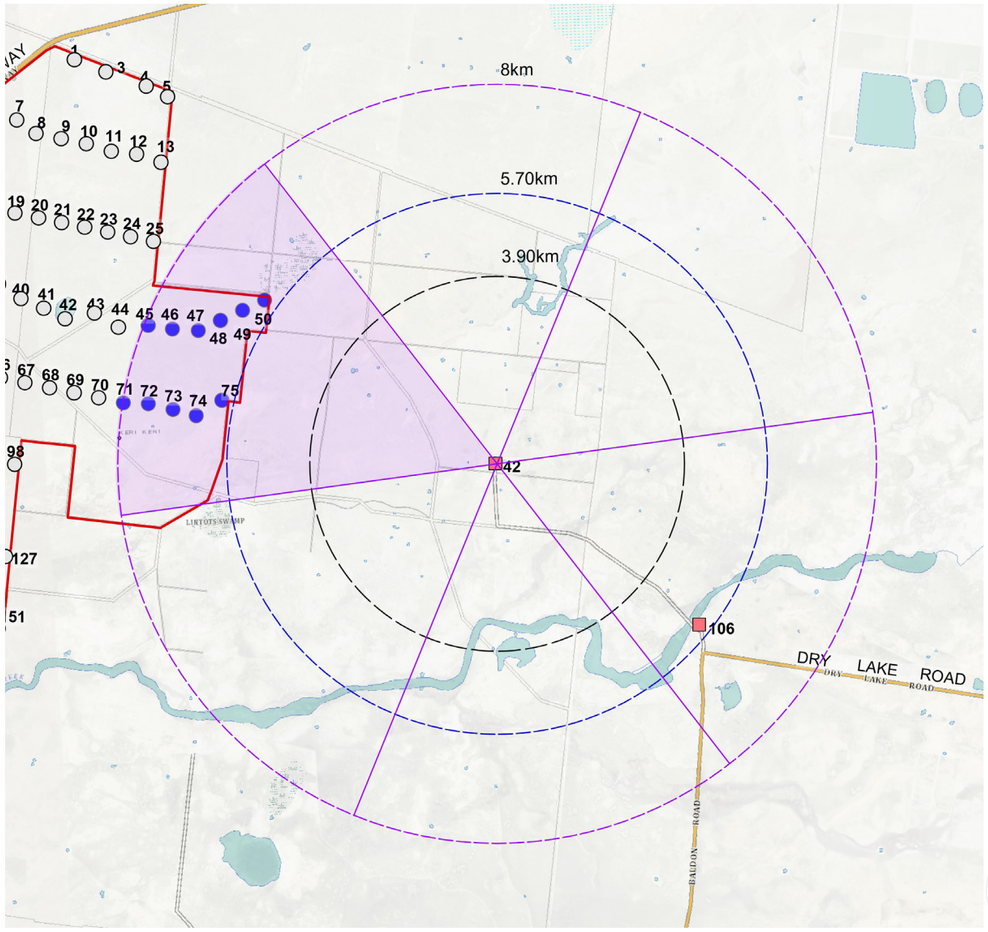
Moir LA offered to attend dwelling in November 2022 and March 2023 but access to the property was not available. Aerial imagery indicates that the dwelling is orientated to the south and existing windbreak vegetation in the dwelling's foreground to the west will limit most views of the Project. The Project is likely to be visible in up to one (1) 60 degree sector and may be visible in peripheral views. Turbines are likely to be a minor element in the secondary views from the property. Existing screening elements contribute to reducing potential visibility. There are 11 turbines located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

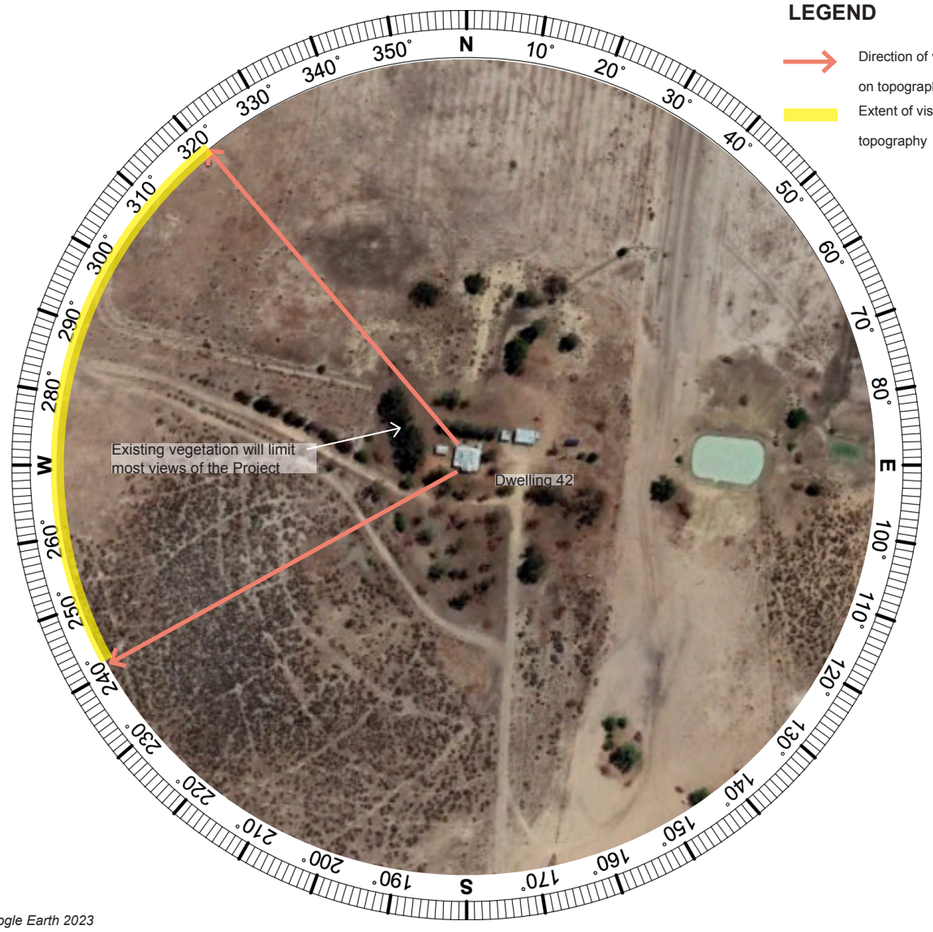
Mitigation Measures:

No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



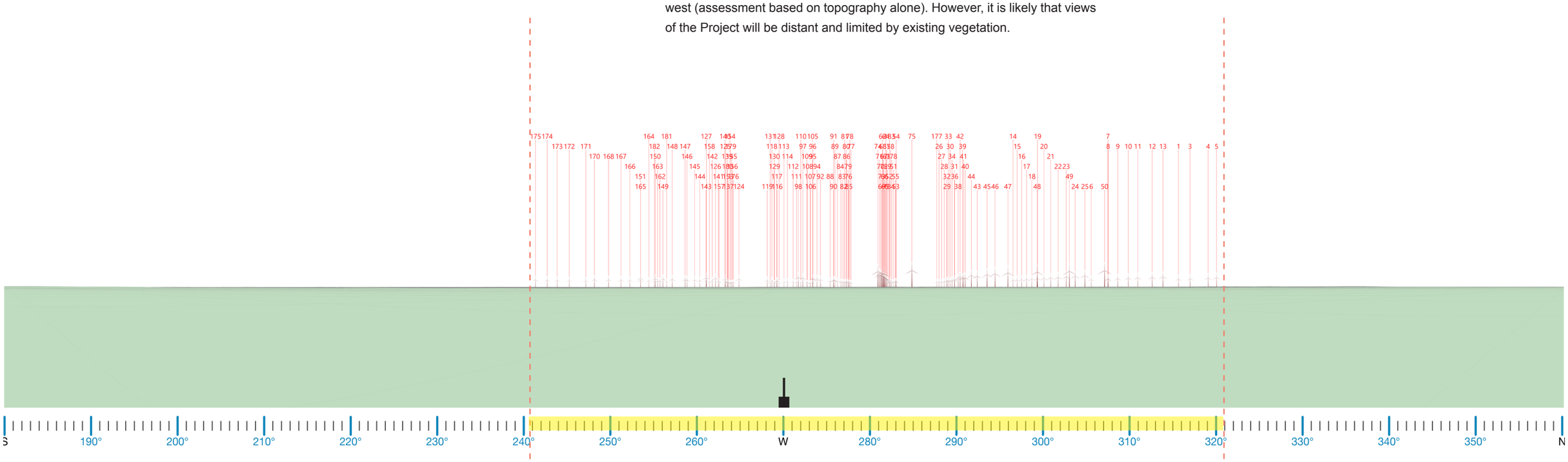
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.3. Dwelling Assessment **Dwelling 42 Keri East Road, Keri Keri**

Wire Frame Diagram indicates that all turbines will be visible generally in the west (assessment based on topography alone). However, it is likely that views of the Project will be distant and limited by existing vegetation.



Proposed Wire Frame Diagram - 180 degree field of view

C.4. Dwelling Assessment **Dwelling 12 Sturt Highway, Maude**

DWELLING 12			
Nearest proposed turbine (km):	**6.43 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**6**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

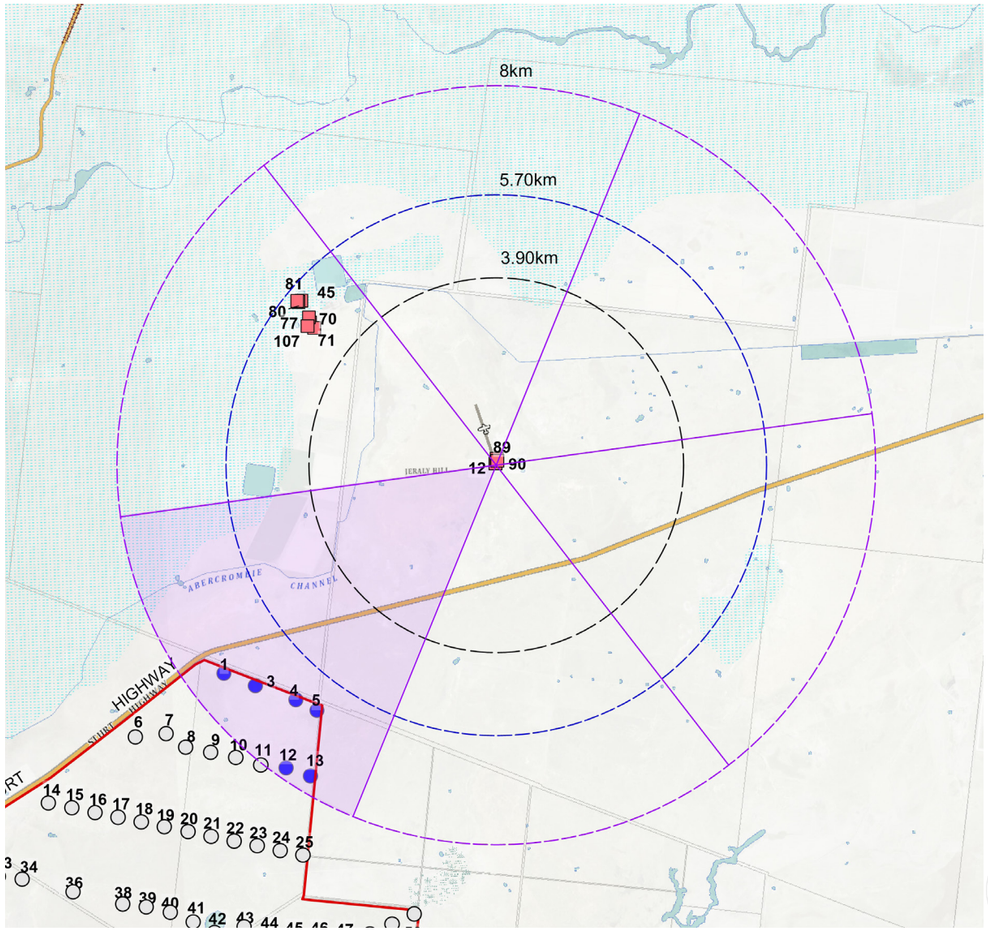
Moir LA offered to attend dwelling in November 2022 and March 2023 but access to the property was not available. Aerial imagery indicates that the dwelling is orientated to the north and existing vegetation in the dwelling's foreground to the southwest will limit most views of the Project. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector and may be visible in peripheral views. Turbines are likely to be a minor element in the secondary views from the property. There are six (6) turbines located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

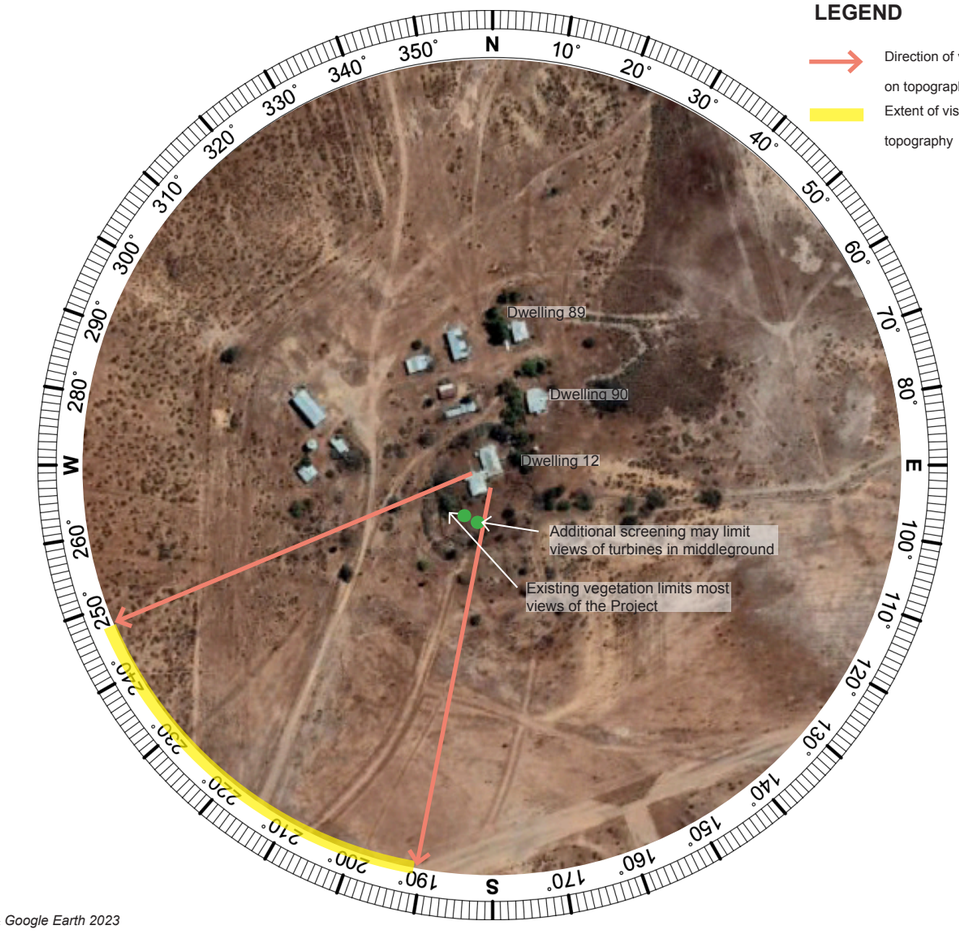
Mitigation Measures:

Existing screening factors contribute to reducing potential visibility of Project. There is opportunity to further limit views. Consultation with the landowner will be required to discuss appropriate mitigation methods.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



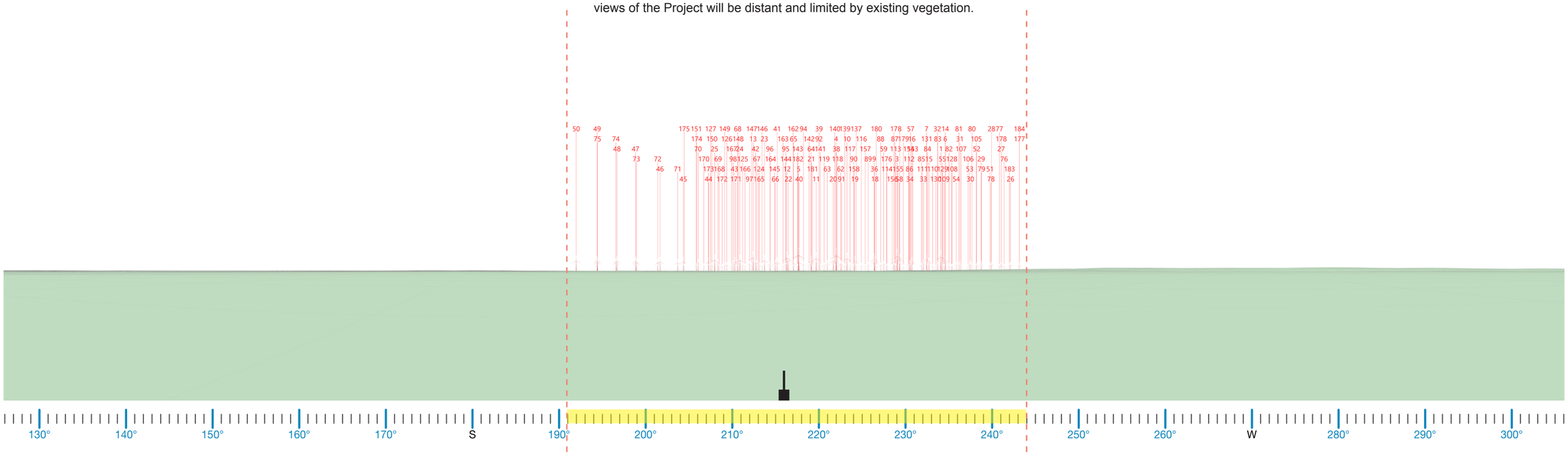
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.4. Dwelling Assessment **Dwelling 12 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the southwest (assessment based on topography alone). However, it is likely that views of the Project will be distant and limited by existing vegetation.



Proposed Wire Frame Diagram - 180 degree field of view

C.5. Dwelling Assessment **Dwelling 89 Sturt Highway, Maude**

DWELLING 89			
Nearest proposed turbine (km):	**6.53 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**6**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

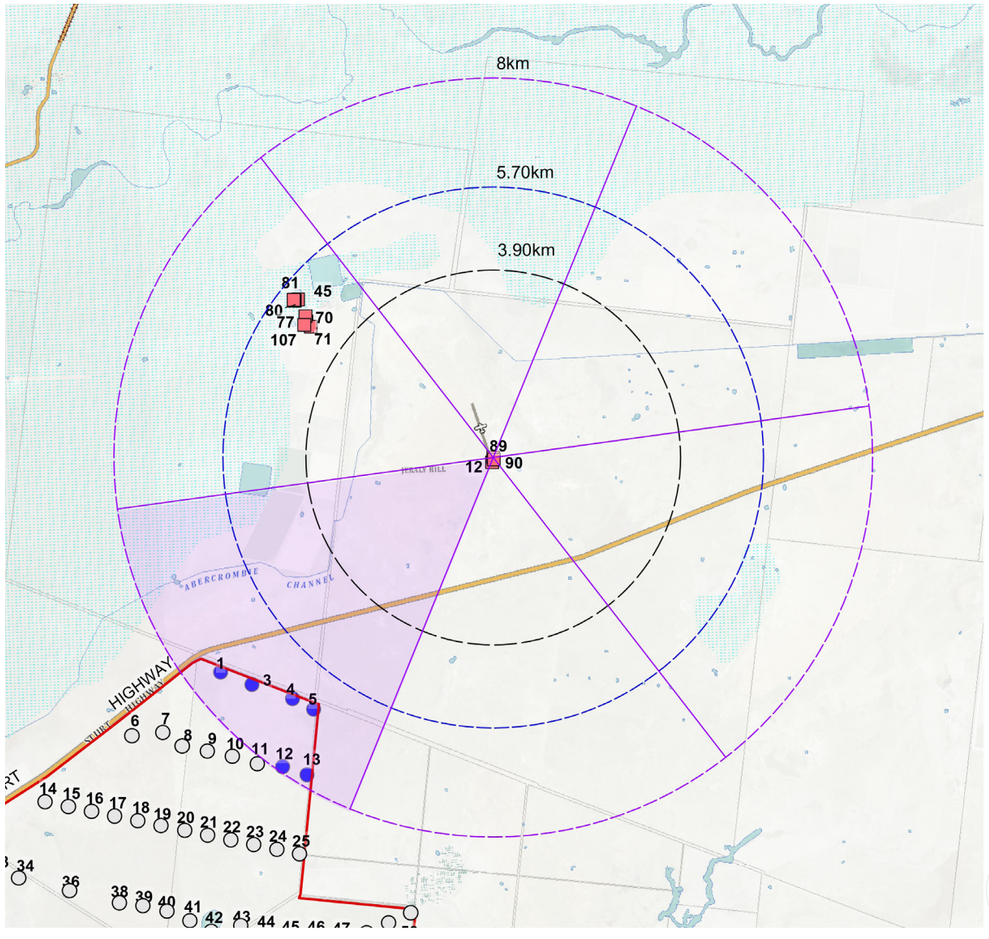
Moir LA offered to attend dwelling in November 2022 and March 2023 but access to the property was not available. Aerial imagery indicates that the dwelling is orientated to the south and existing vegetation and structures in the dwelling's foreground will limit most views of the Project. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector and may be visible in peripheral views. Turbines are likely to be a minor element in the primary views from the property. There are six (6) turbines located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

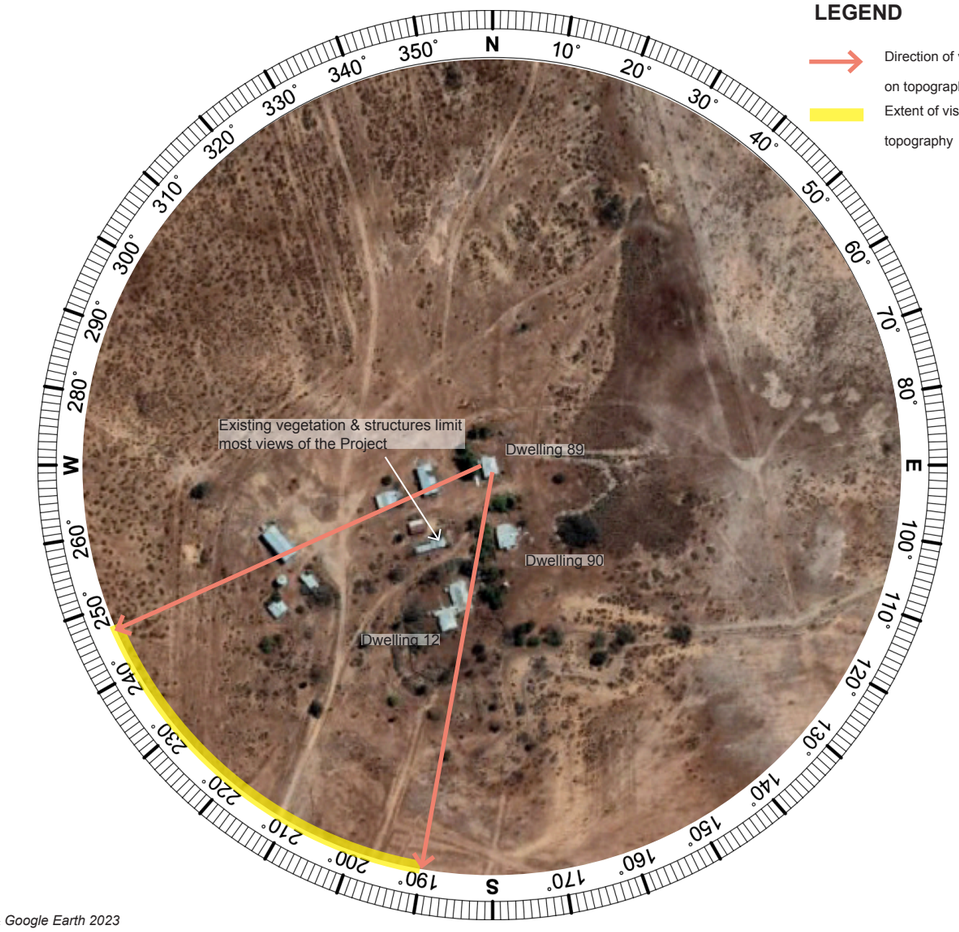
Mitigation Measures:

Existing screening factors contribute to reducing potential visibility of Project. No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



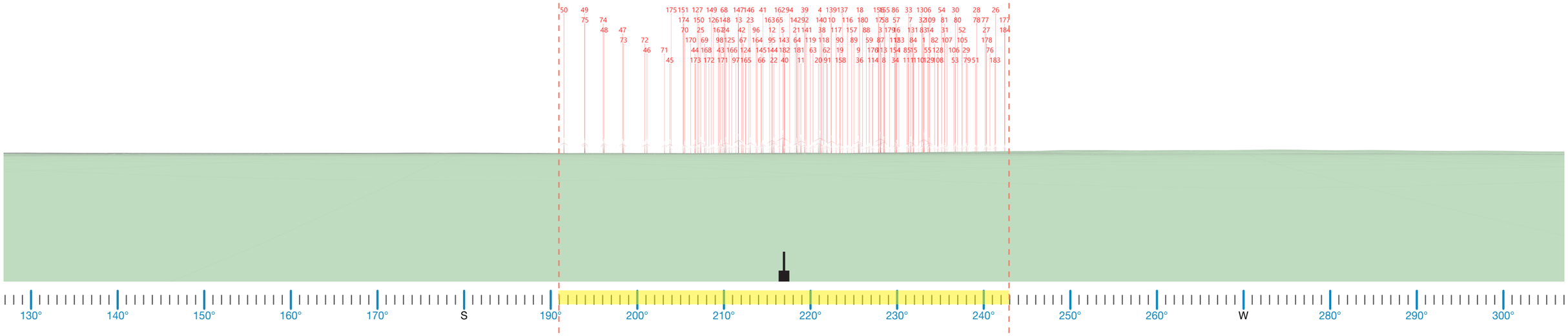
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.5. Dwelling Assessment **Dwelling 89 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the southwest (assessment based on topography alone). However, it is likely that views of the Project will be distant and limited by existing vegetation.



Proposed Wire Frame Diagram - 180 degree field of view

C.6. Dwelling Assessment **Dwelling 90 Sturt Highway, Maude**

DWELLING 90			
Nearest proposed turbine (km):	**6.50 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**6**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

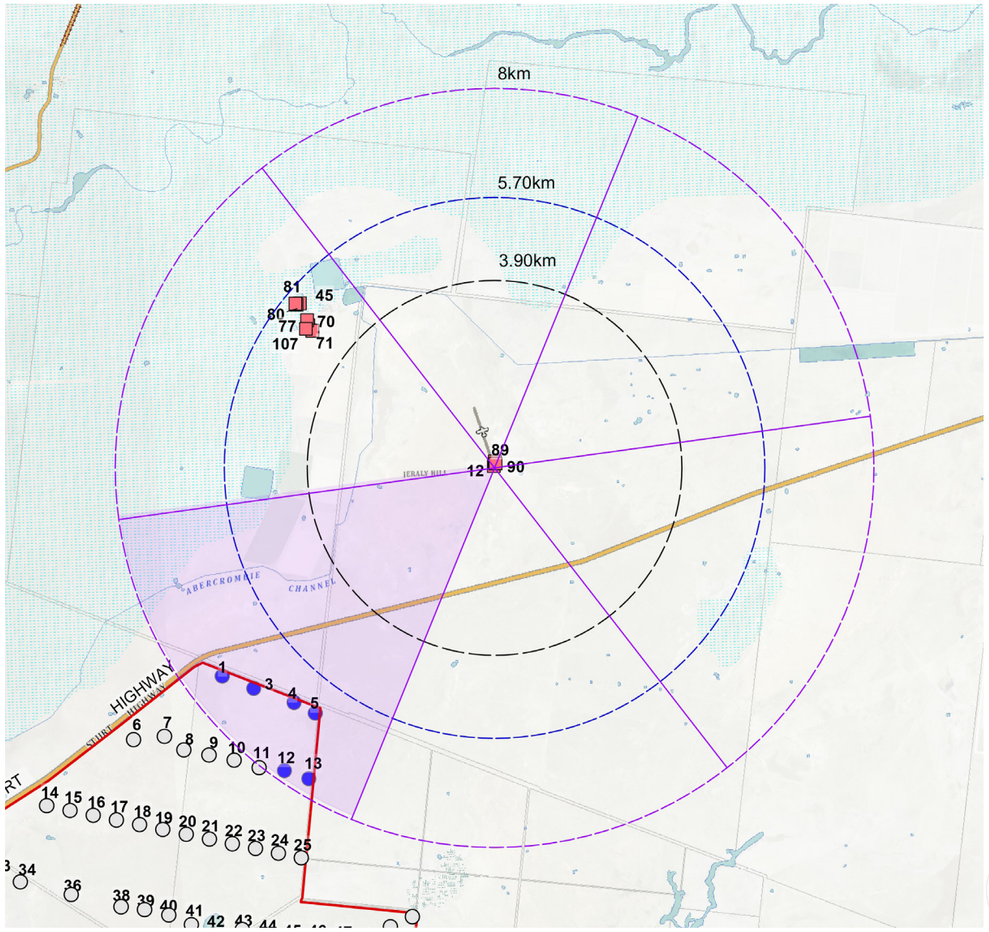
Moir LA offered to attend dwelling in November 2022 and March 2023 but access to the property was not available. Aerial imagery indicates that the dwelling is surrounded by dense windbreak vegetation and sheds to the southwest. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. It is likely that the vegetation will limit views to majority of the Project. The visual impact resulting from the Project has been rated as **Negligible** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

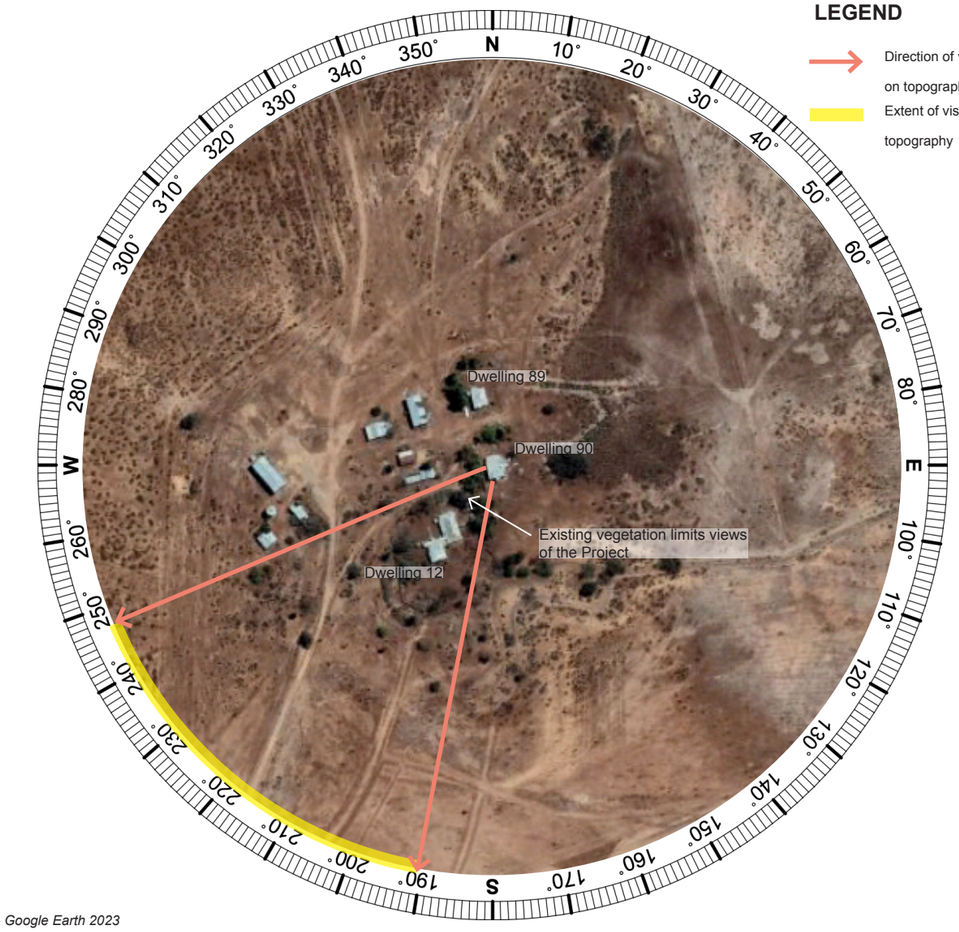
Mitigation Measures:

No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



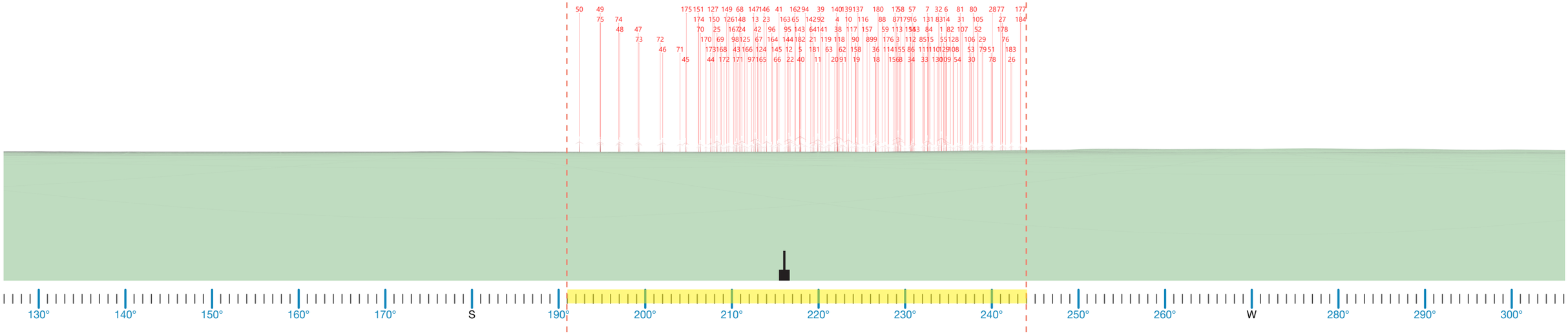
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.6. Dwelling Assessment **Dwelling 90 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the southwest (assessment based on topography alone). However, it is likely that views of the Project will be limited by existing vegetation.



Proposed Wire Frame Diagram - 180 degree field of view

C.7. Dwelling Assessment **Dwelling 71 Sturt Highway, Maude**

DWELLING 71			
Nearest proposed turbine (km):	**7.56 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**4**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

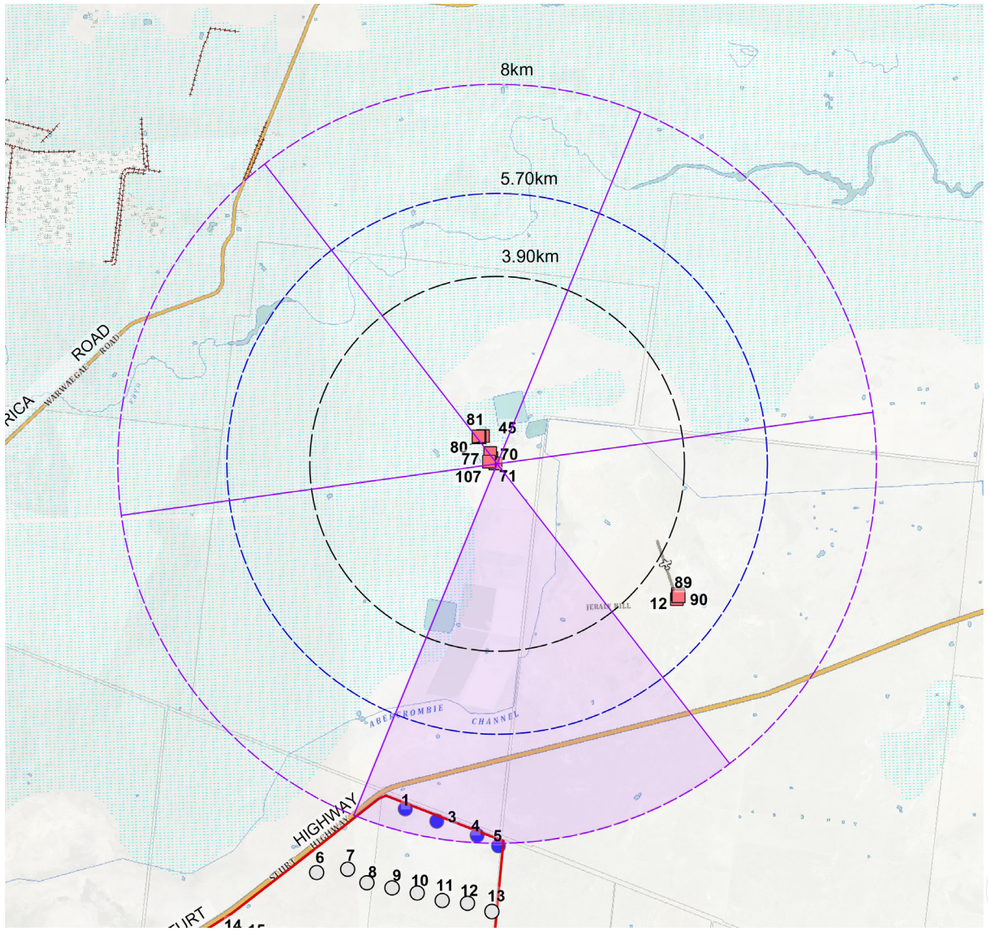
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken near the property to prepare a photomontage. The viewpoint location was chosen through consultation with the landowner. Existing vegetation in the dwelling's foreground will limit most views of the Project. Turbines are located in the far middleground and most views of the Project will be screened by existing vegetation. It is likely that the Project will have a low impact on the existing visual character at this location. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector and there are four (4) turbines within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

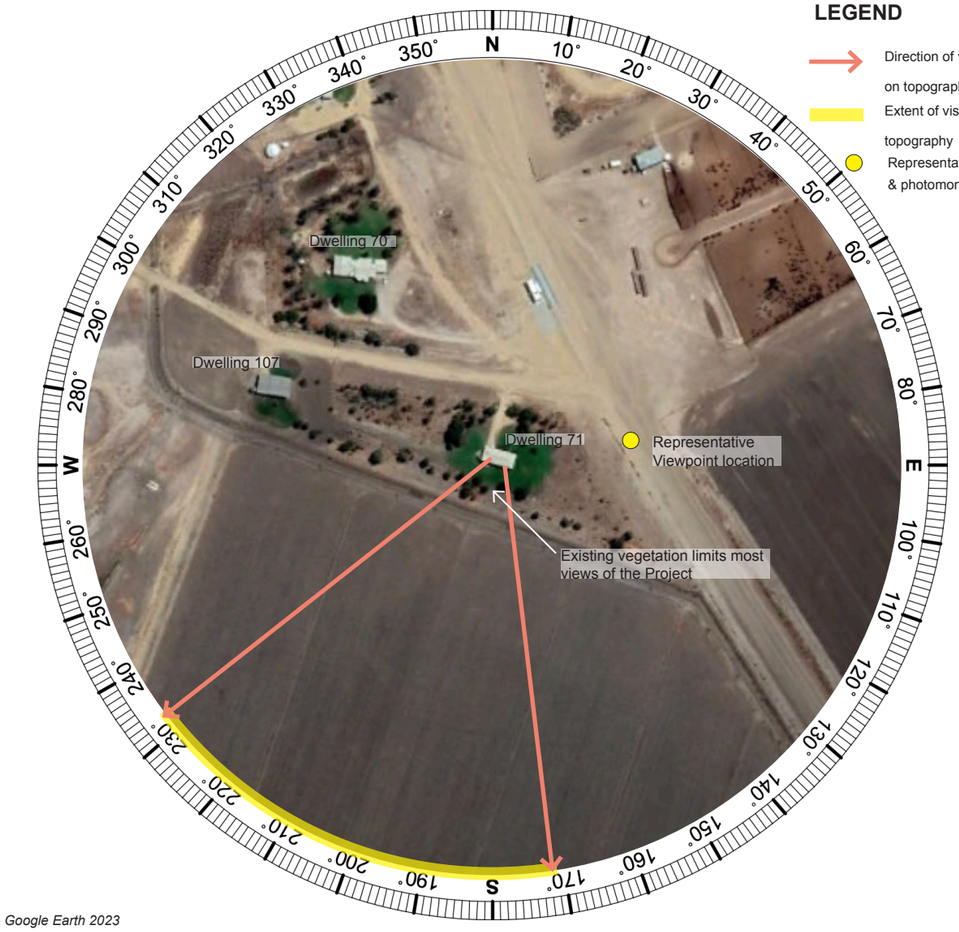
Mitigation Measures:

Existing screening factors contribute to reducing potential visibility of Project. No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

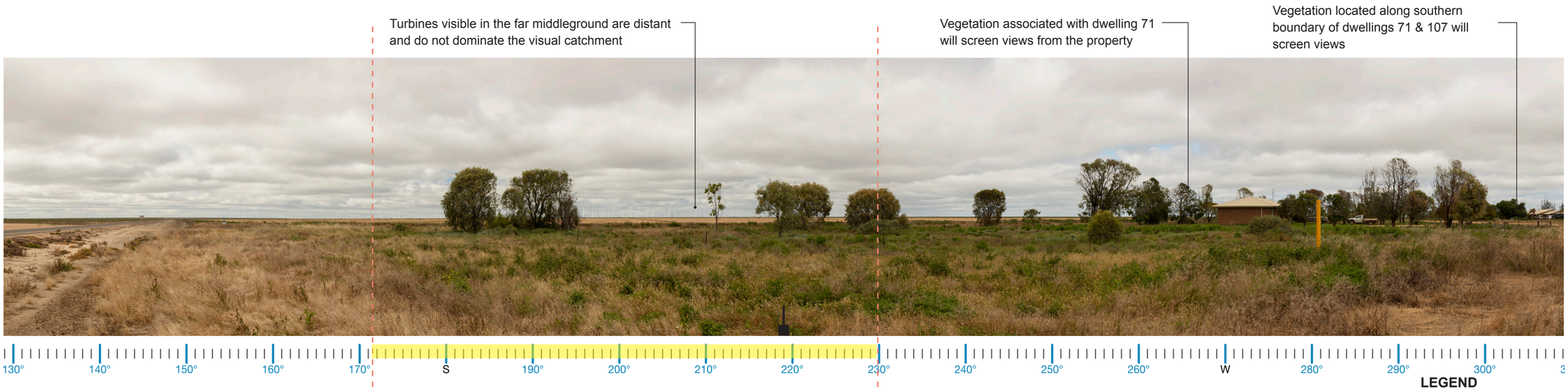


LEGEND

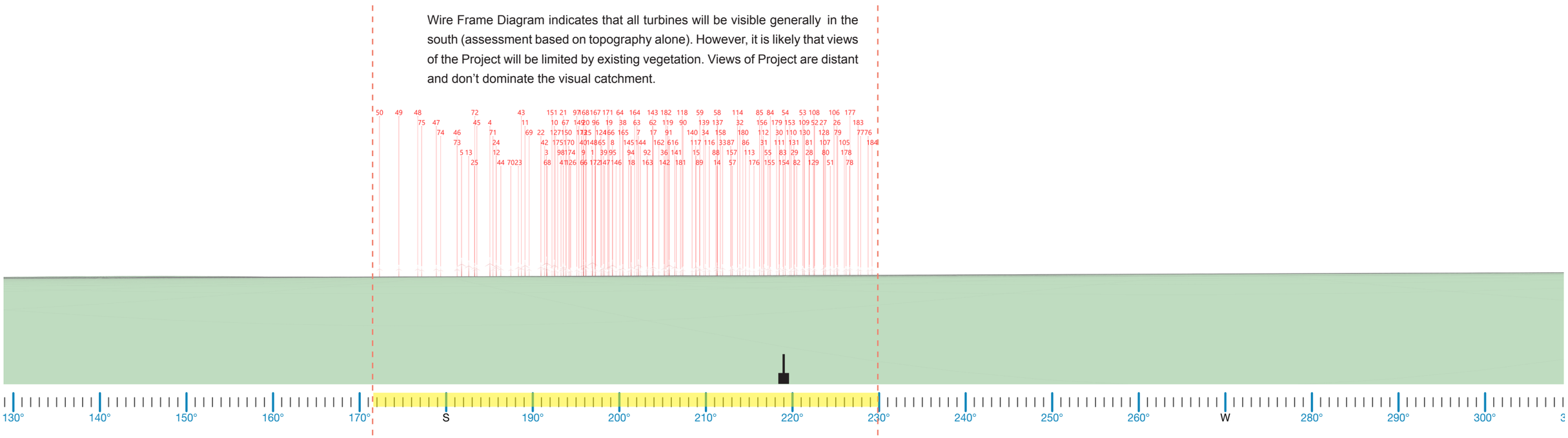
- Direction of visible turbines based on topography
- Extent of visible turbines based on topography
- Representative viewpoint & photomontage location

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.7. Dwelling Assessment **Dwelling 71 Sturt Highway, Maude**



Proposed View - 180 degree field of view



Proposed Wire Frame Diagram - 180 degree field of view

C.8. Dwelling Assessment **Dwelling 107 Sturt Highway, Maude**

DWELLING 107			
Nearest proposed turbine (km):	**7.55 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**4**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

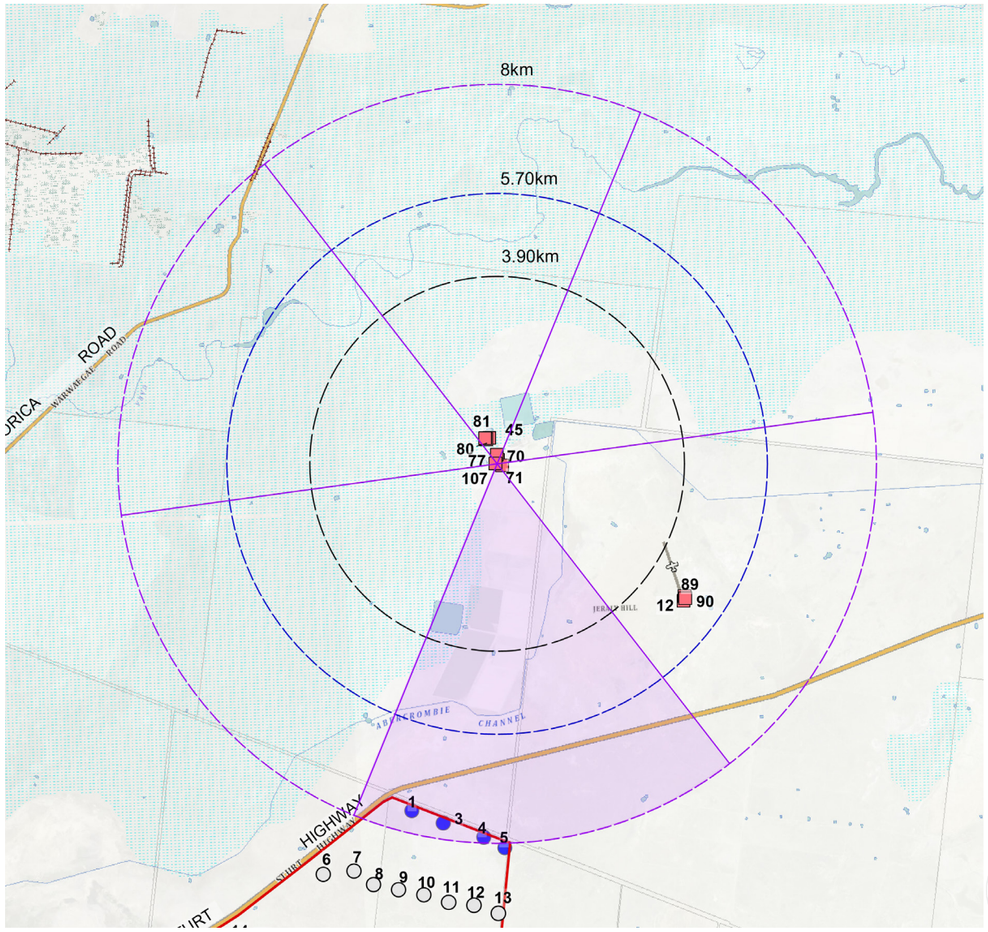
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken near the workers' cabin after consulting the landowner. Turbines are located in the far middleground and most views of the Project will be distant. It is likely that the Project will have a low impact on the existing visual character at this location. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector and there are four (4) turbines within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

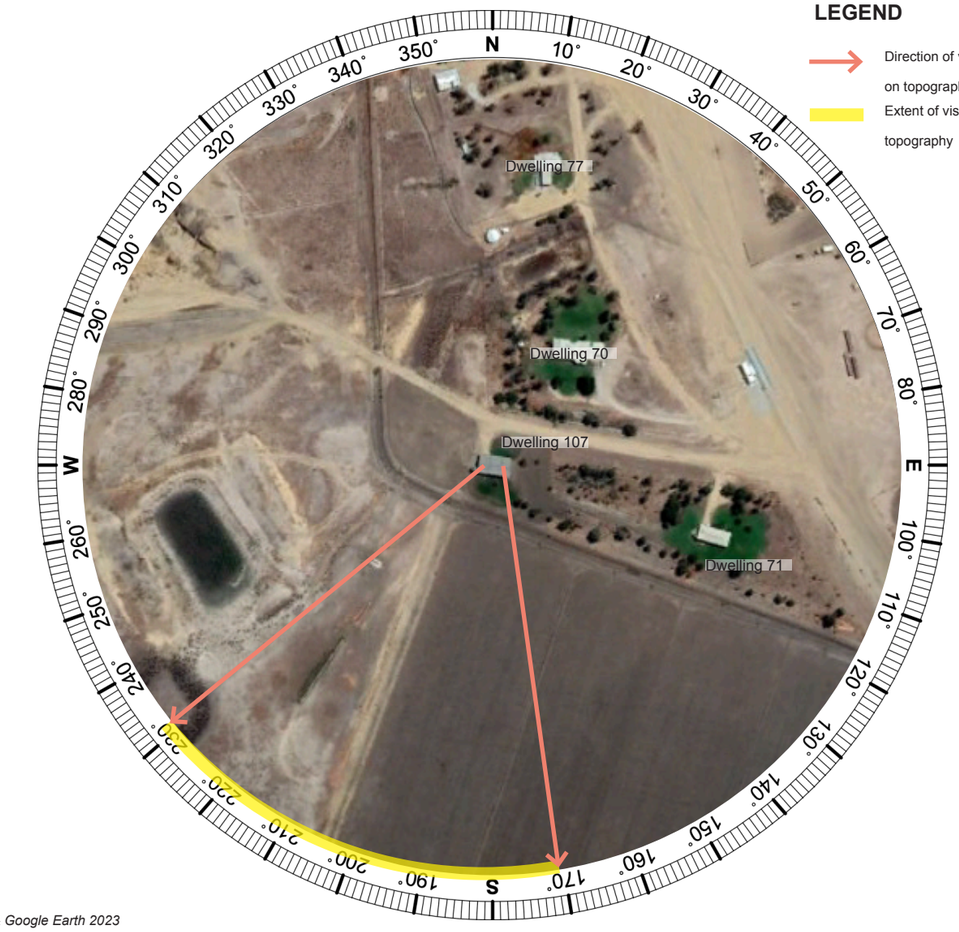
Mitigation Measures:

There is opportunity to further limit views through the provision of screen planting. Consultation with the landowner will be required to discuss appropriate mitigation methods.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



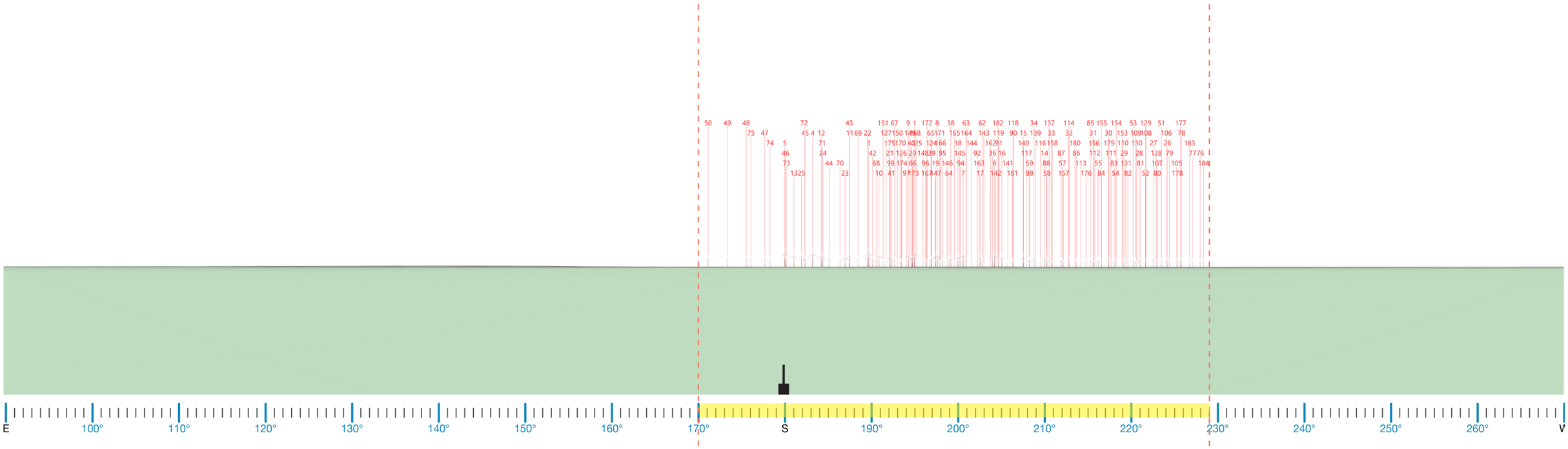
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.8. Dwelling Assessment **Dwelling 107 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the southwest (assessment based on topography alone). Views of Project are distant and don't dominate the visual catchment.



Proposed Wire Frame Diagram - 180 degree field of view

C.9. Dwelling Assessment **Dwelling 70 Sturt Highway, Maude**

DWELLING 70			
Nearest proposed turbine (km):	**7.62 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**3**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

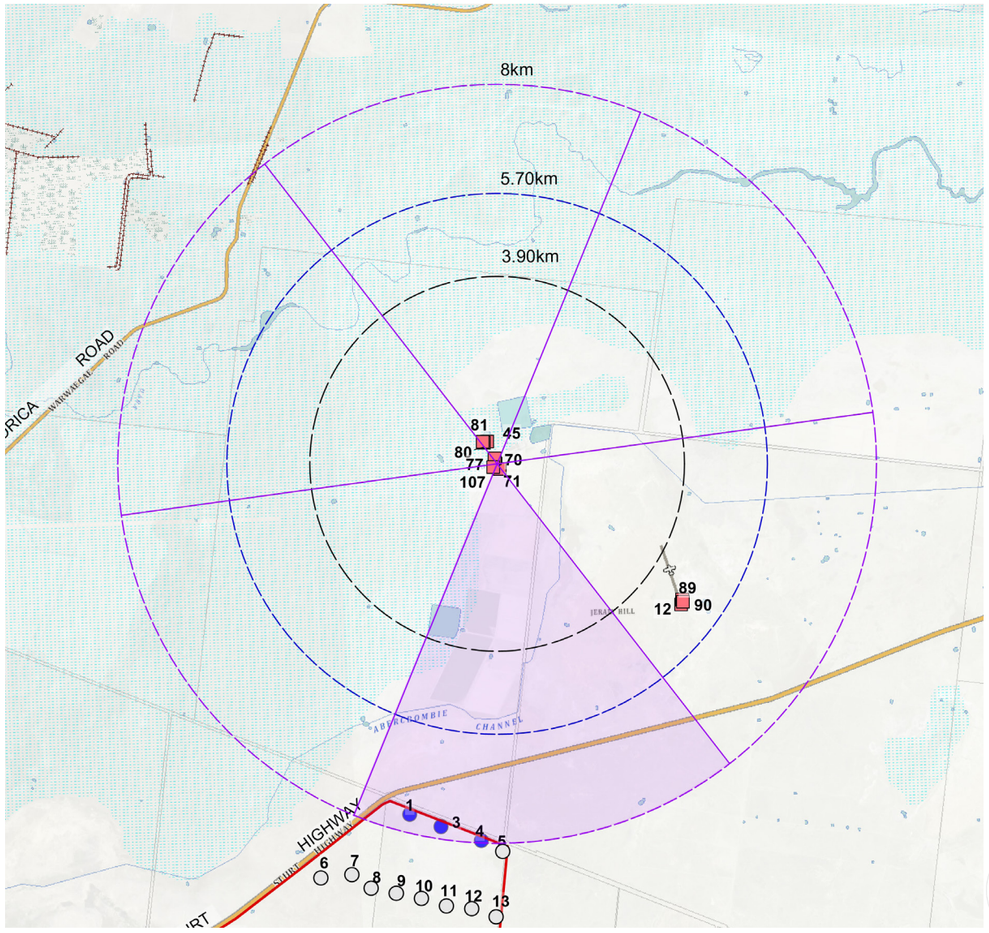
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken near the workers' cabin after consulting the landowner. A photomontage has been prepared for this viewpoint. Existing vegetation in the dwelling's foreground will limit most views of the Project. Turbines are located in the far middleground and most views of the Project will be screened by existing vegetation. It is likely that the Project will have a low impact on the existing visual character at this location. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. There are three (3) turbines within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

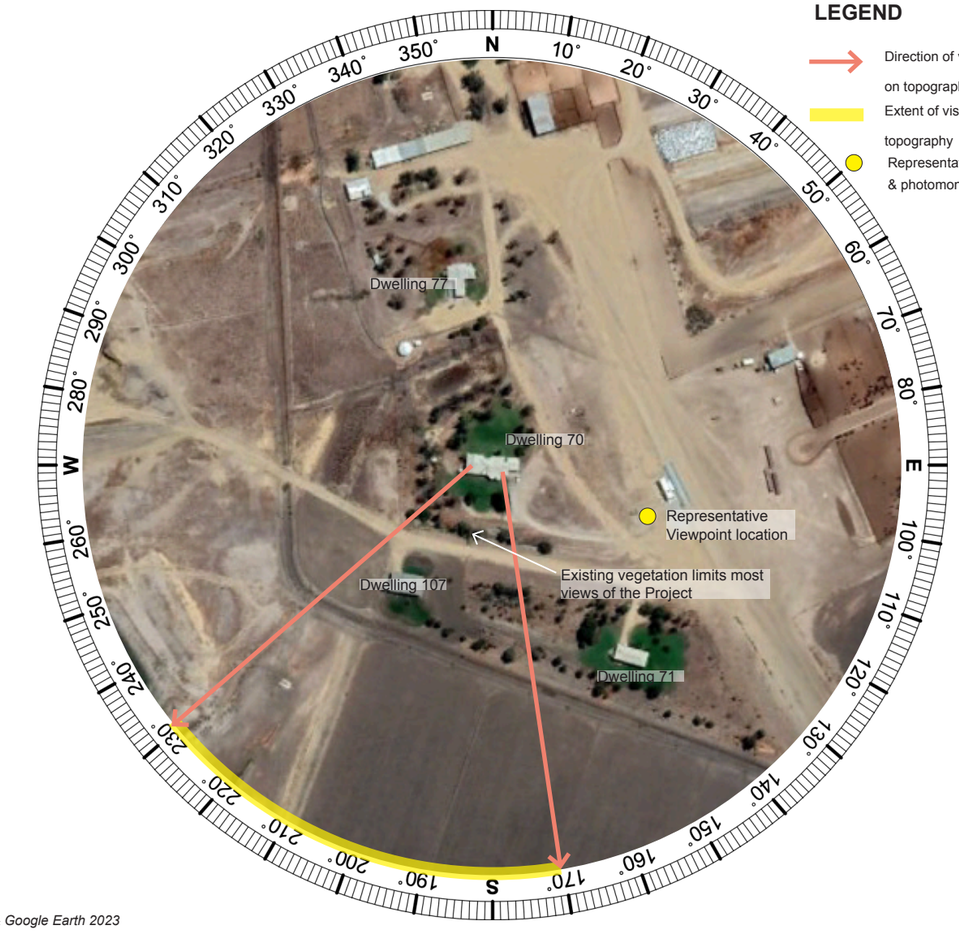
Mitigation Measures:

Existing screening factors contribute to reducing potential visibility of Project. No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



LEGEND

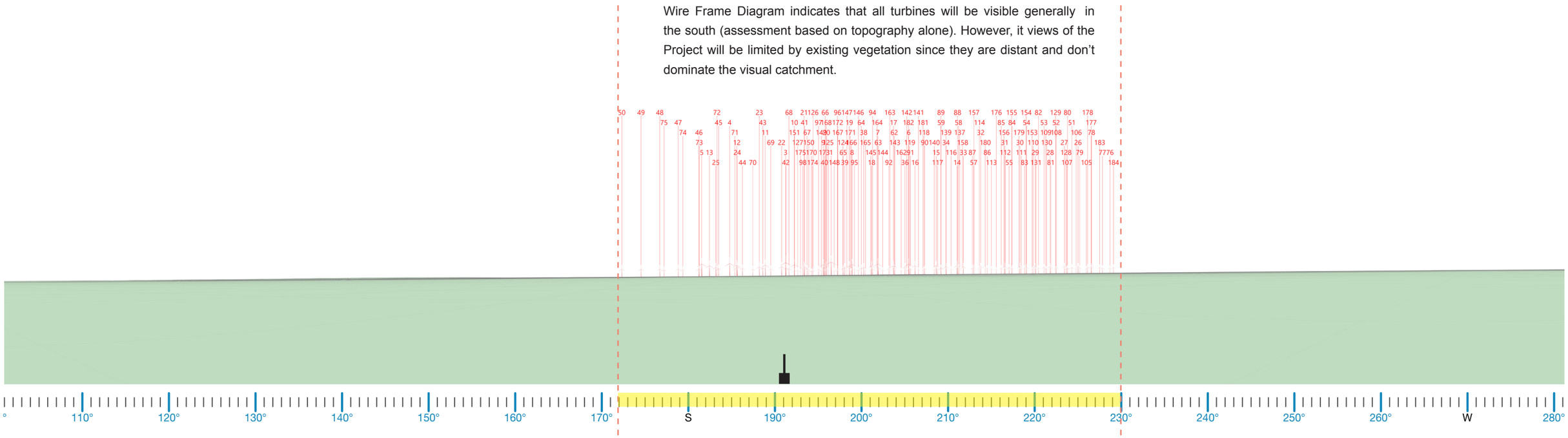
- Direction of visible turbines based on topography
- Extent of visible turbines based on topography
- Representative viewpoint & photomontage location

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.9. Dwelling Assessment **Dwelling 70 Sturt Highway, Maude**



Proposed View - 180 degree field of view



Proposed Wire Frame Diagram - 180 degree field of view

C.10. Dwelling Assessment **Dwelling 77 Sturt Highway, Maude**

DWELLING 77			
Nearest proposed turbine (km):	**7.73 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**2**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Low

Assessment Notes:

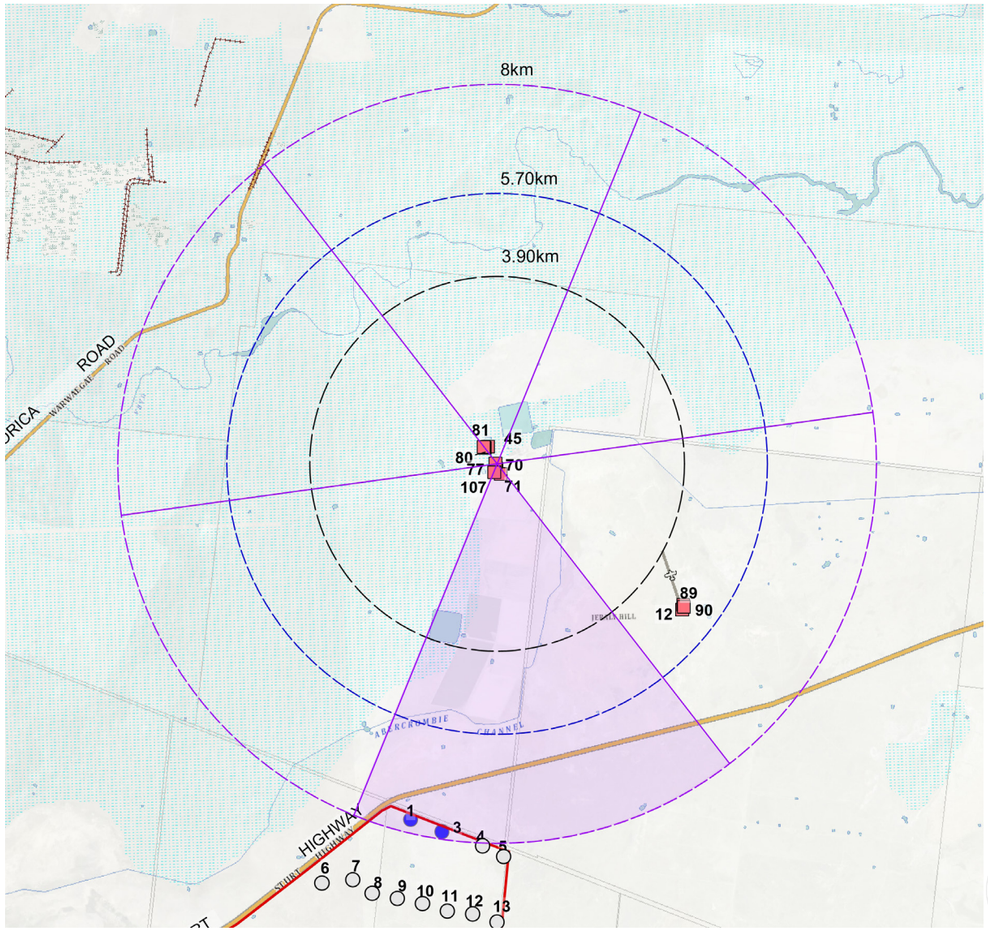
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken near the workers' cabin after consulting the landowner. Turbines are located in the far middleground and most views of the Project will be distant. It is likely that the Project will have a low level of contrast to the existing landscape when viewed at this location. It is likely that the Project will have a low impact on the existing visual character at this location. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. There are two (2) turbines within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Low**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

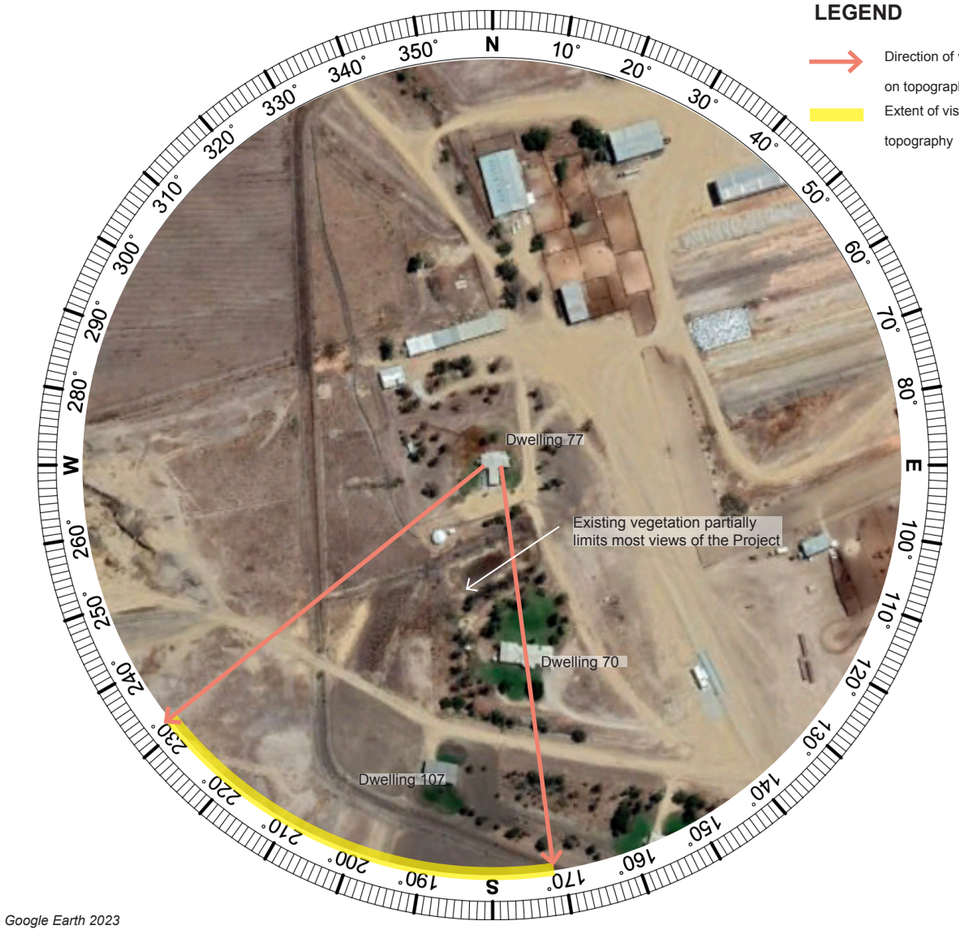
Mitigation Measures:

Existing screening factors contribute to reducing potential visibility of Project. No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



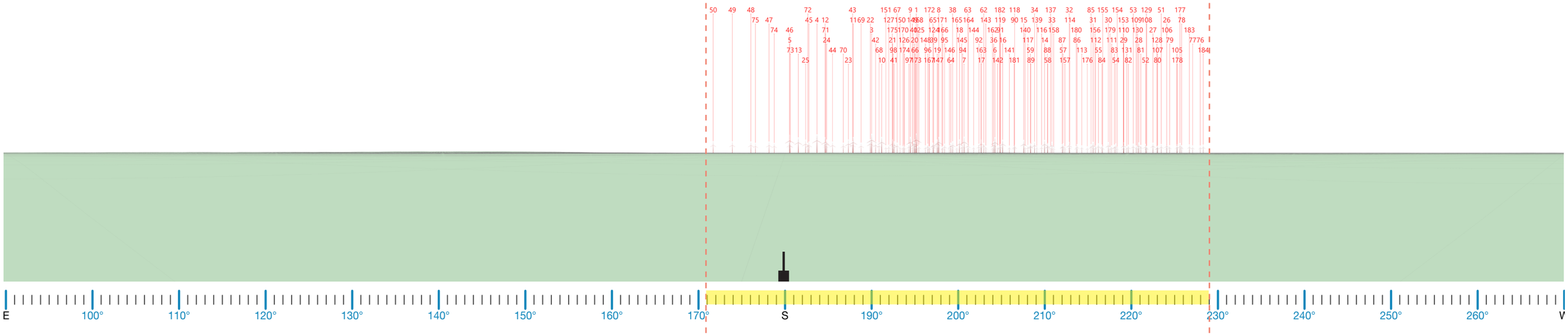
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.10. Dwelling Assessment **Dwelling 77 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the south (assessment based on topography alone). Views of the Project are distant and don't dominate the visual catchment. It is likely that majority of the views will be limited by existing vegetation and structures.



Proposed Wire Frame Diagram - 180 degree field of view

C.11. Dwelling Assessment **Dwelling 80 Sturt Highway, Maude**

DWELLING 80			
Nearest proposed turbine (km):	**8.01 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**1**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

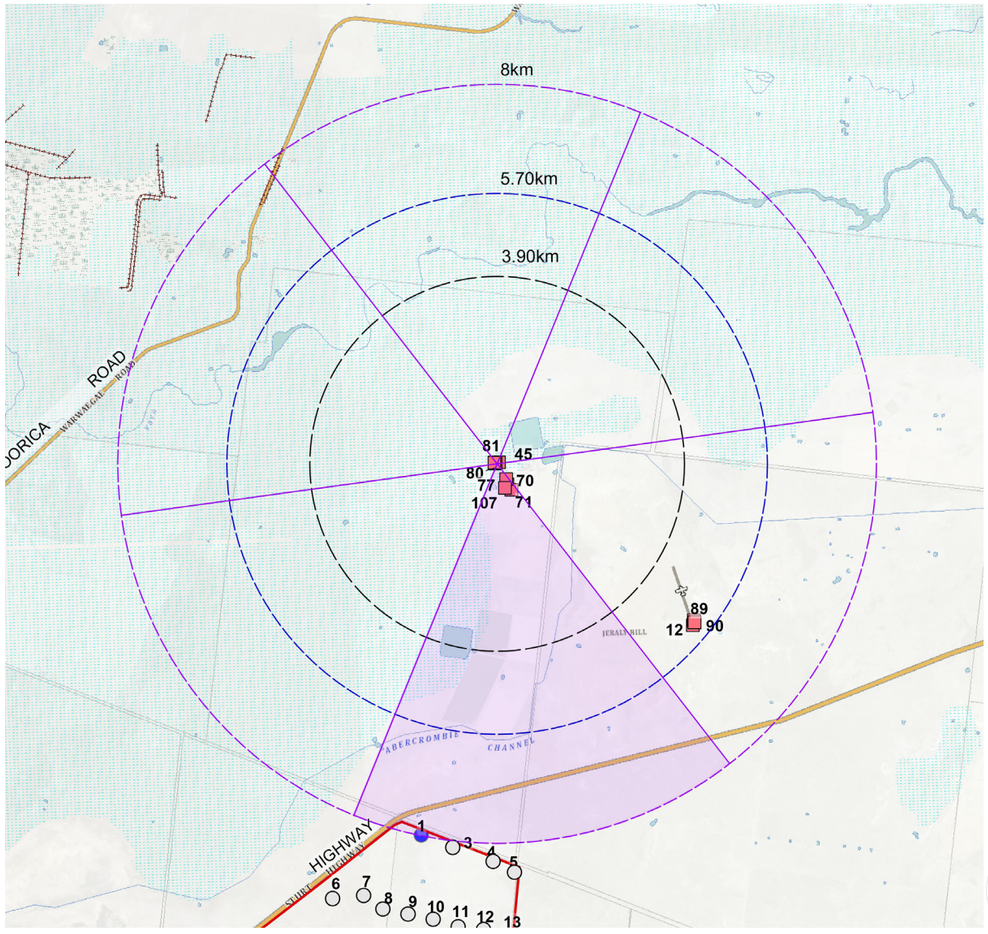
Aerial imagery indicates that the dwelling is orientated east-west and existing vegetation and structures in the dwelling's foreground will limit most views of the Project in the south. The Project is likely to be a minor element in the secondary views from the property. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. There is one (1) turbine located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Negligible** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

Mitigation Measures:

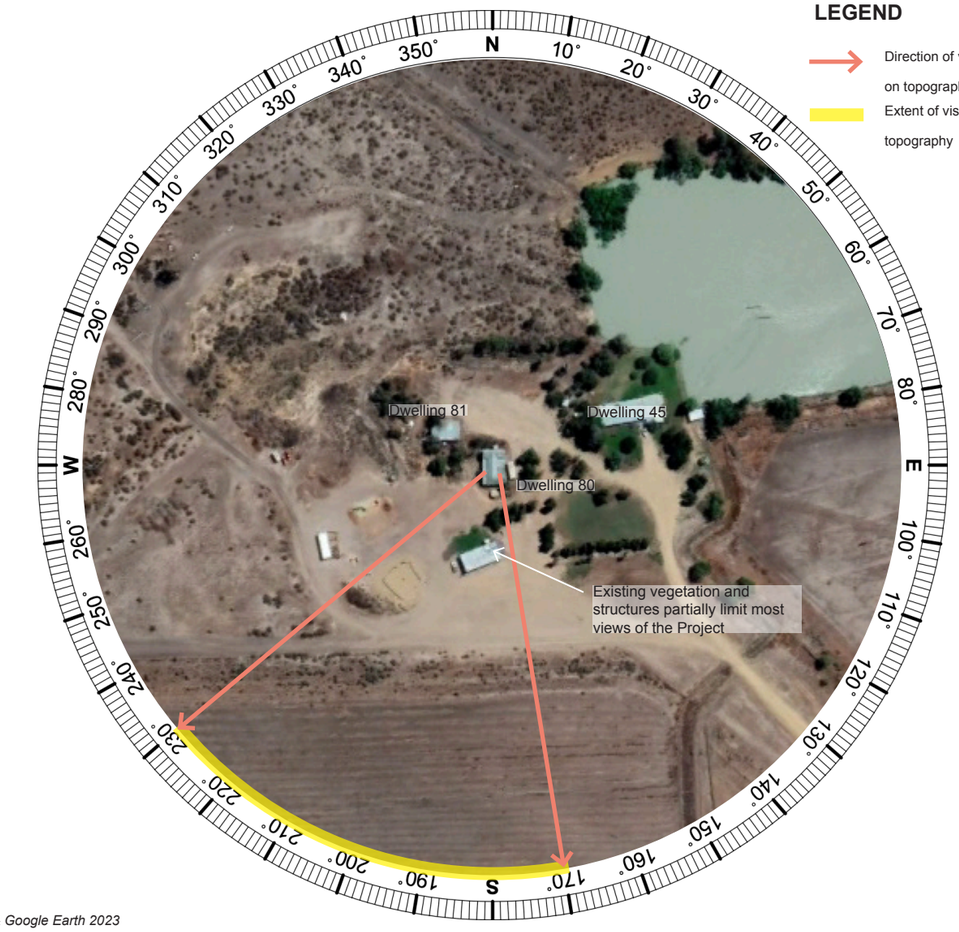
Existing screening factors contribute to reducing potential visibility of Project. No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

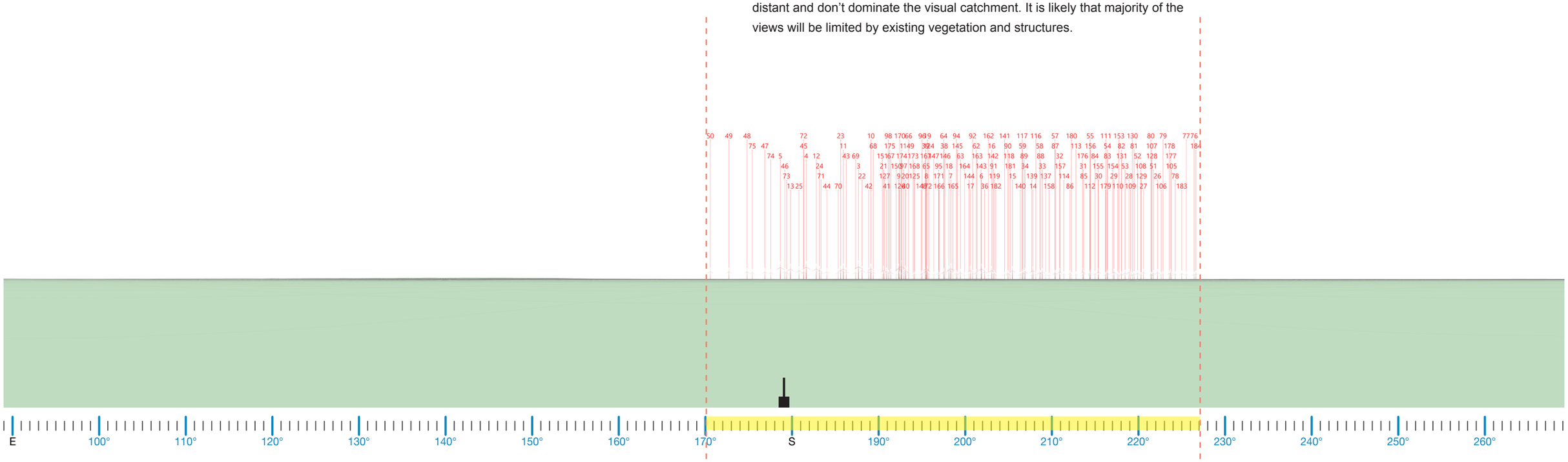


LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

C.11. Dwelling Assessment **Dwelling 80 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the south (assessment based on topography alone). Views of the Project are distant and don't dominate the visual catchment. It is likely that majority of the views will be limited by existing vegetation and structures.



Proposed Wire Frame Diagram - 180 degree field of view

C.12. Dwelling Assessment **Dwelling 81 Sturt Highway, Maude**

DWELLING 81			
Nearest proposed turbine (km):	**8.02 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**1**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** all at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

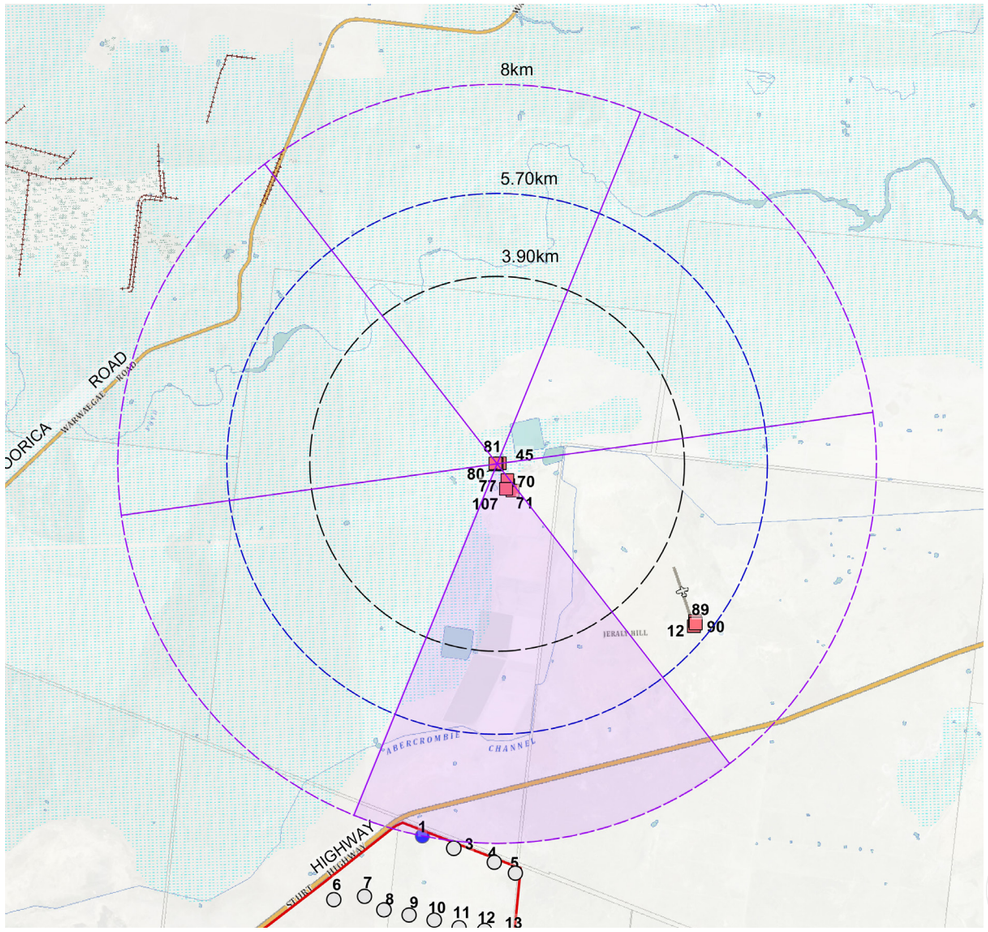
Aerial imagery indicates that the dwelling is orientated to the east and existing vegetation in the dwelling's foreground will limit most views of the Project in the south. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. There is one (1) turbine located within 8,000 m of this dwelling. It is likely that the Project will not be visible at this dwelling. The visual impact resulting from the Project has been rated as **Negligible** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

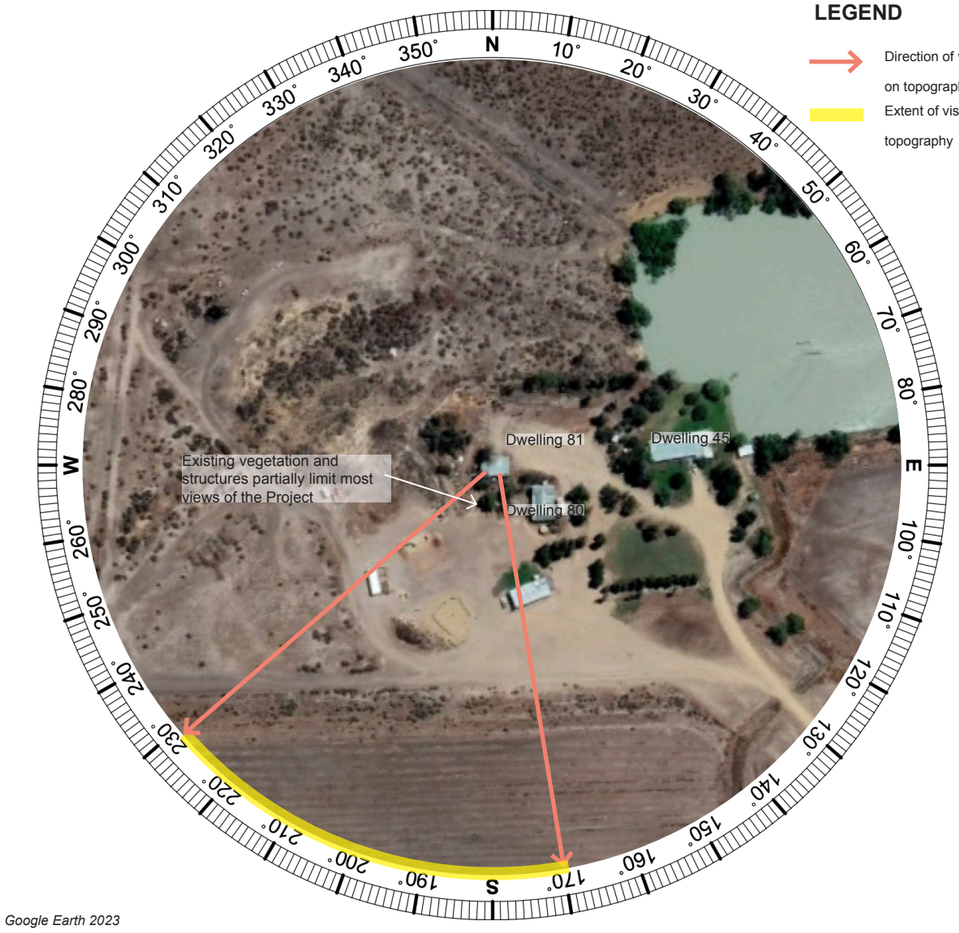
Mitigation Measures:

No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



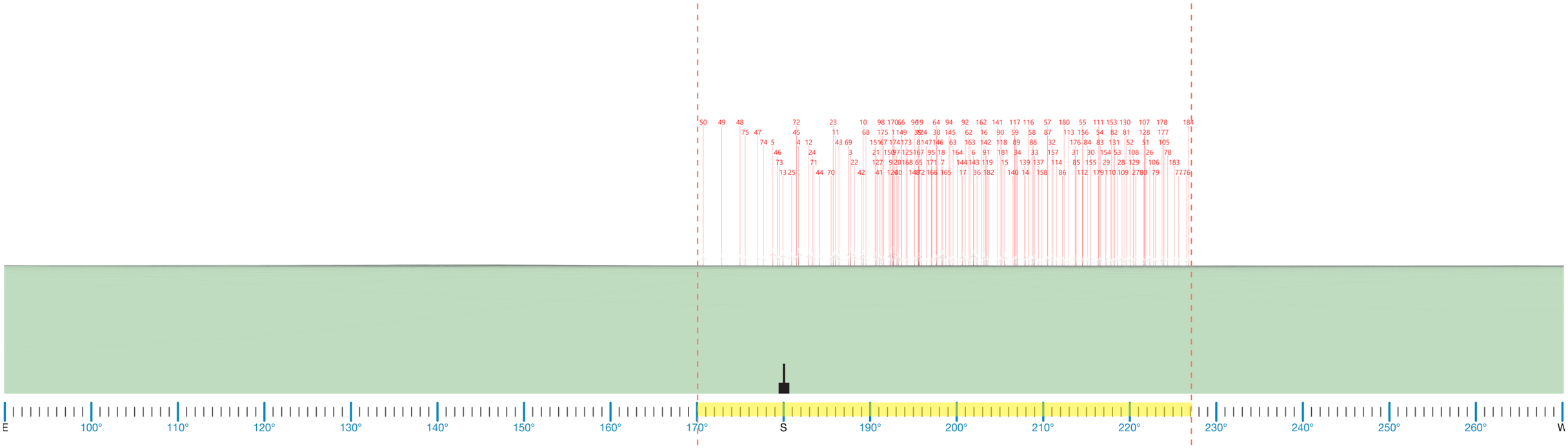
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.12. Dwelling Assessment **Dwelling 81 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the south (assessment based on topography alone). It is likely that existing vegetation will limit all views of the Project.



Proposed Wire Frame Diagram - 180 degree field of view

C.13. Dwelling Assessment **Dwelling 45 Sturt Highway, Maude**

DWELLING 45			
Nearest proposed turbine (km):	**8.05 km**	**Visibility Distance Zone:**	**Far Middleground (FM)**
Number of proposed turbines within 8000 m:	**1**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**1**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

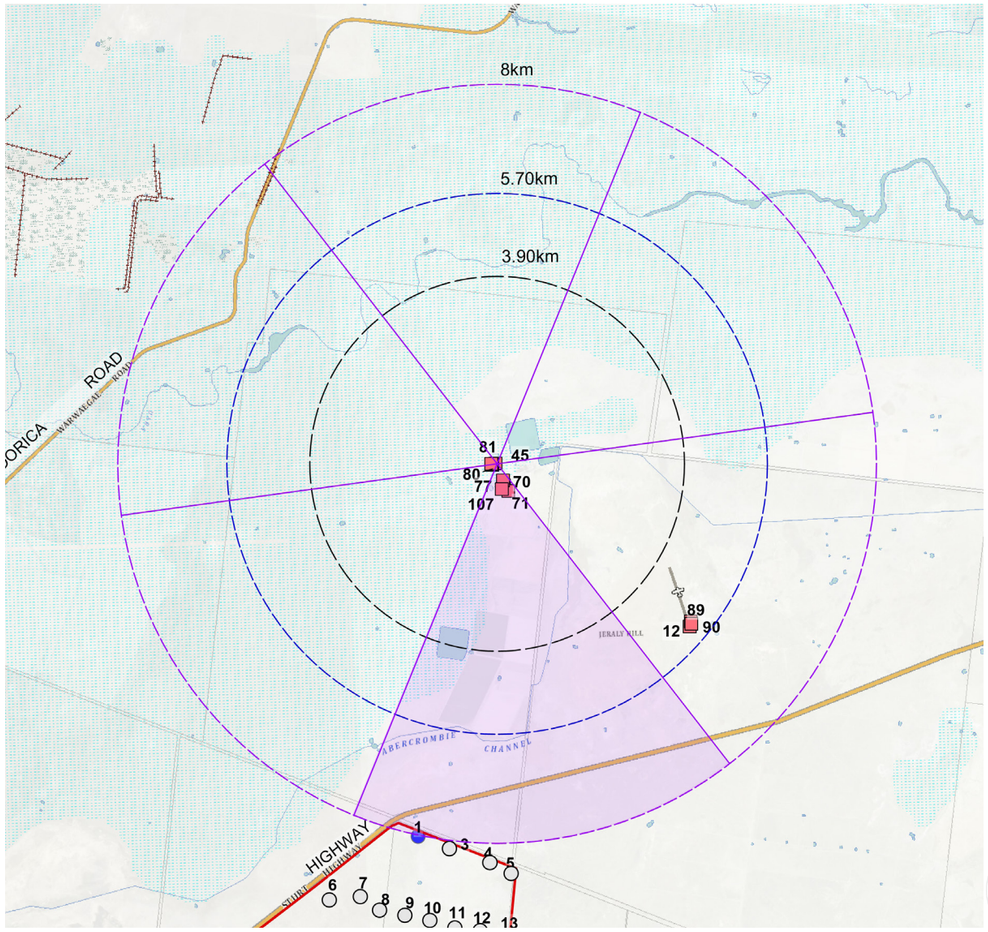
Aerial imagery indicates that the dwelling is orientated to the south and existing vegetation in the dwelling's foreground will limit most views of the Project in the south. 2D assessment suggests that the Project is likely to be visible in up to one (1) 60 degree sector. There is one (1) turbine located within 8,000 m of this dwelling. It is likely that the Project will not be visible at this dwelling. The visual impact resulting from the Project has been rated as **Negligible** from this dwelling.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

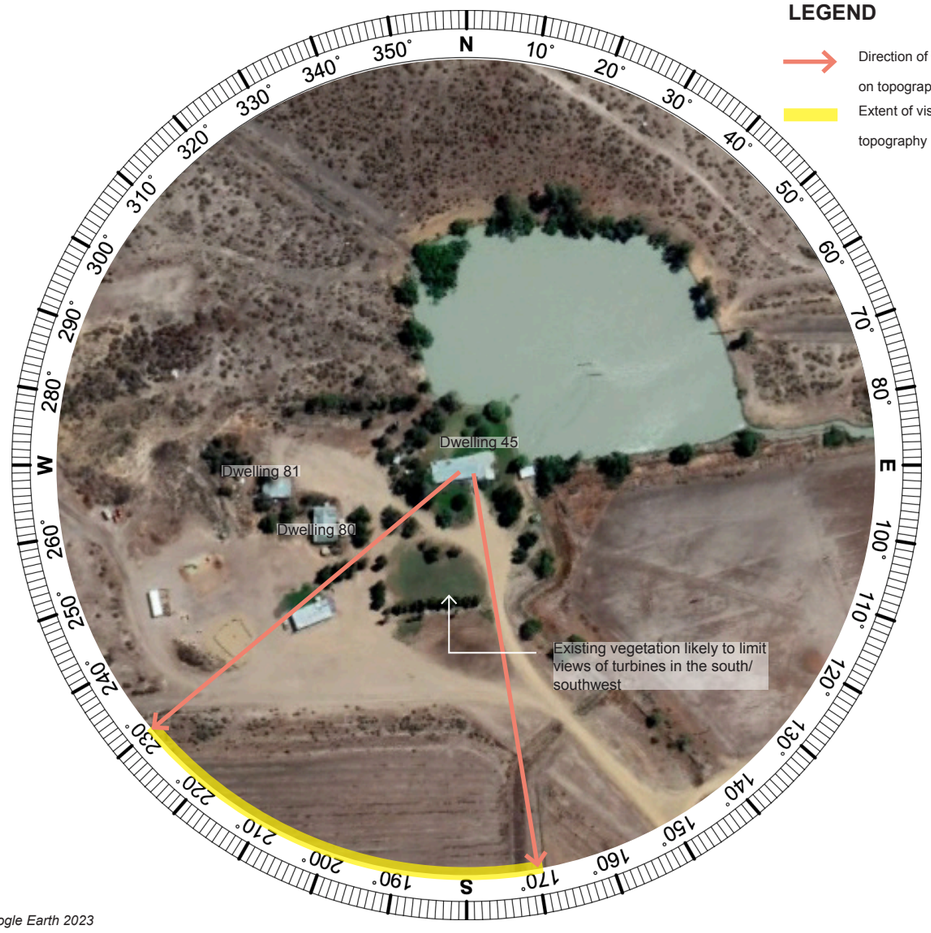
Mitigation Measures:

No mitigation required.



LEGEND

- 291.5m Turbine within 8,000 m
- Turbine located in excess of 8,000 m
- Non-associated Dwelling
- Associated Dwelling
- 3,900 m from nearest turbine (Black Line)
- 5,700 m from nearest turbine (Blue Line)
- 8,000 m from nearest turbine
- 60º sector
- 60º sector with turbines



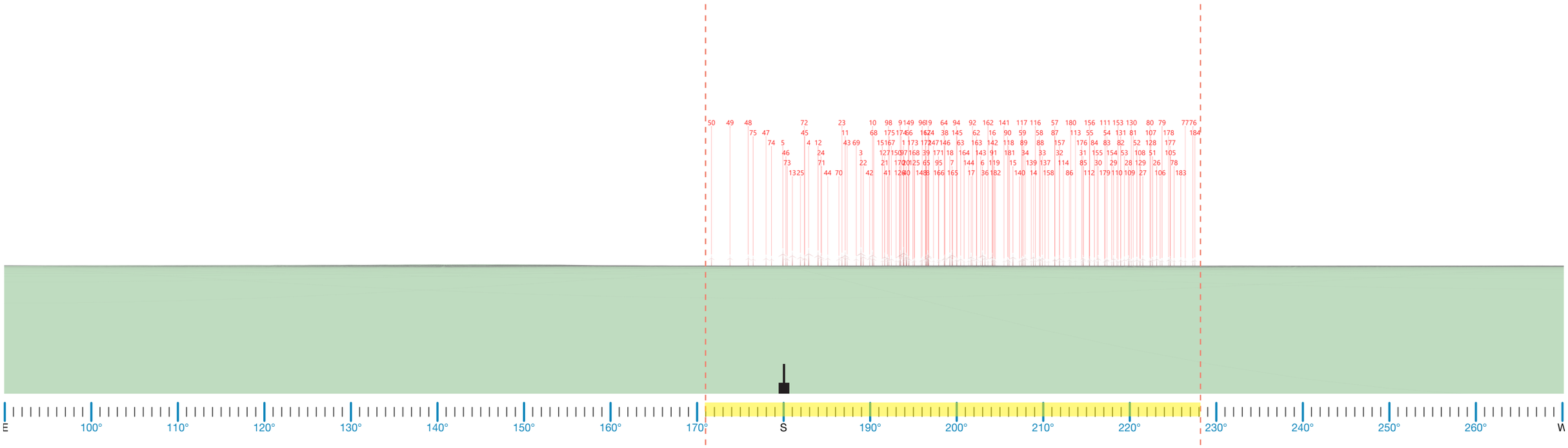
LEGEND

- Direction of visible turbines based on topography
- Extent of visible turbines based on topography

Aerial image sources: ESRI Topographic Maps & Google Earth 2023

C.13. Dwelling Assessment **Dwelling 45 Sturt Highway, Maude**

Wire Frame Diagram indicates that all turbines will be visible generally in the south (assessment based on topography alone). It is likely that existing vegetation will limit all views of the Project.



Proposed Wire Frame Diagram - 180 degree field of view

C.14. Dwelling Assessment **Dwelling 105 Keri Keri Road, Moolpa**

DWELLING 105			
Nearest proposed turbine (km):	**9.63 km**	**Visibility Distance Zone:**	**Near Background (NB)**
Number of proposed turbines within 8000 m:	**Nil**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**Nil**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**2**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

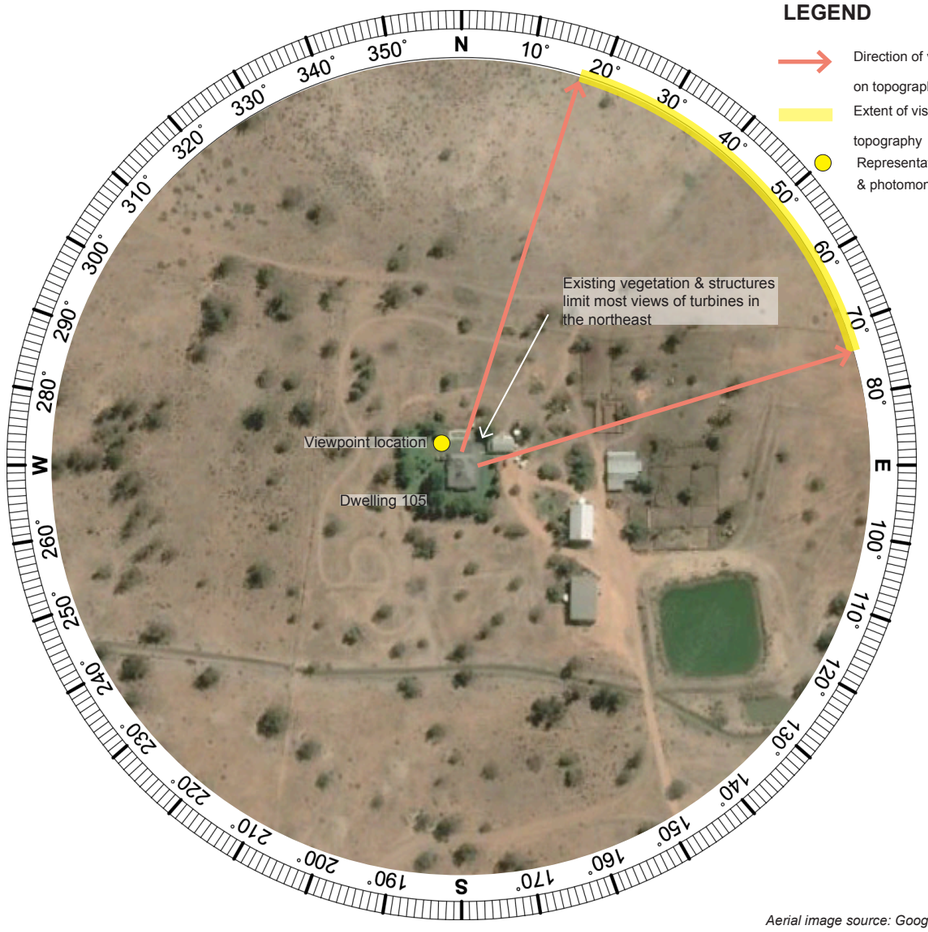
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken from the property to prepare a photomontage. Turbines are located in the near background. Views of the Project will be distant. The Project will result in a low level of contrast to the existing landscape character as viewed from the dwelling. No turbines are located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Negligible**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

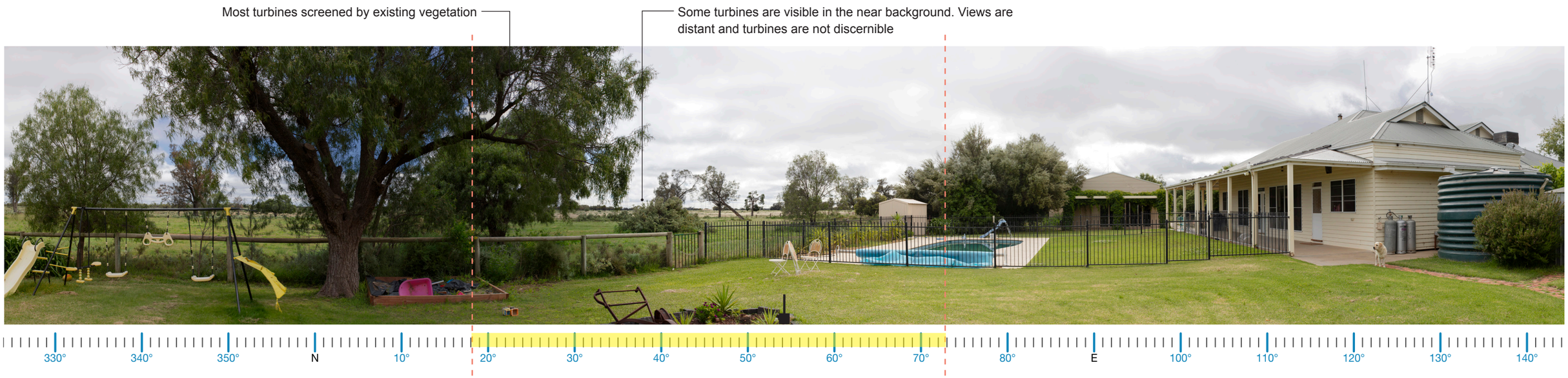
Mitigation Measures:

No mitigation required.

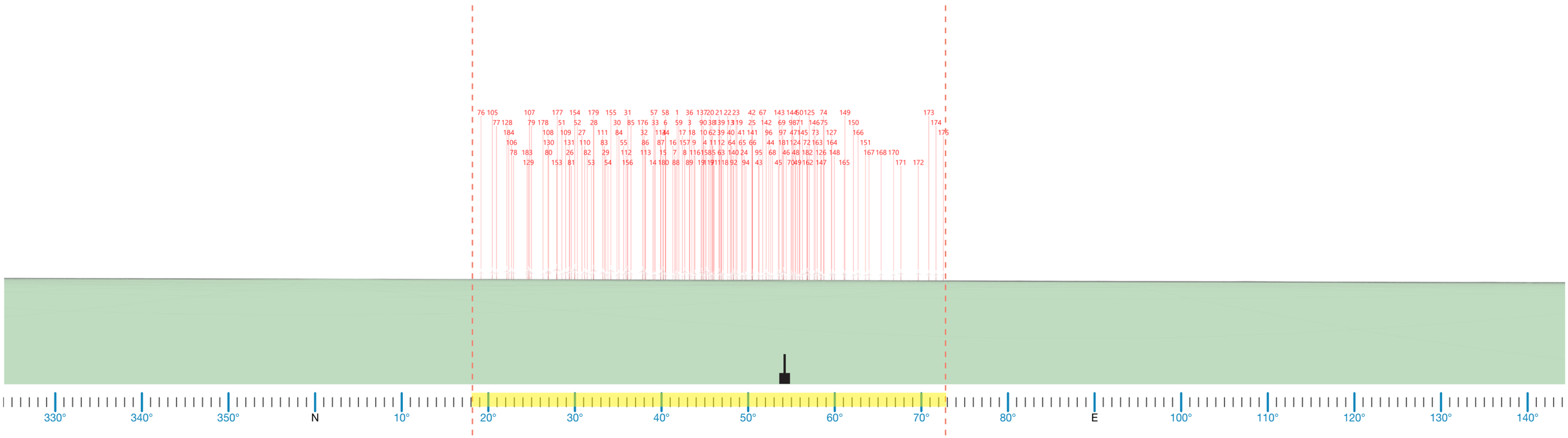


Aerial image source: Google Earth 2023

C.14. Dwelling Assessment **Dwelling 105 Keri Keri Road, Moolpa**



Proposed View - 180 degree field of view



Proposed Wire Frame Diagram - 180 degree field of view

C.15. Dwelling Assessment **Dwelling 106 Keri East Road, Moulamein**

DWELLING 106			
Nearest proposed turbine (km):	**11.10 km**	**Visibility Distance Zone:**	**Near Background (NB)**
Number of proposed turbines within 8000 m:	**Nil**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**Nil**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**2**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

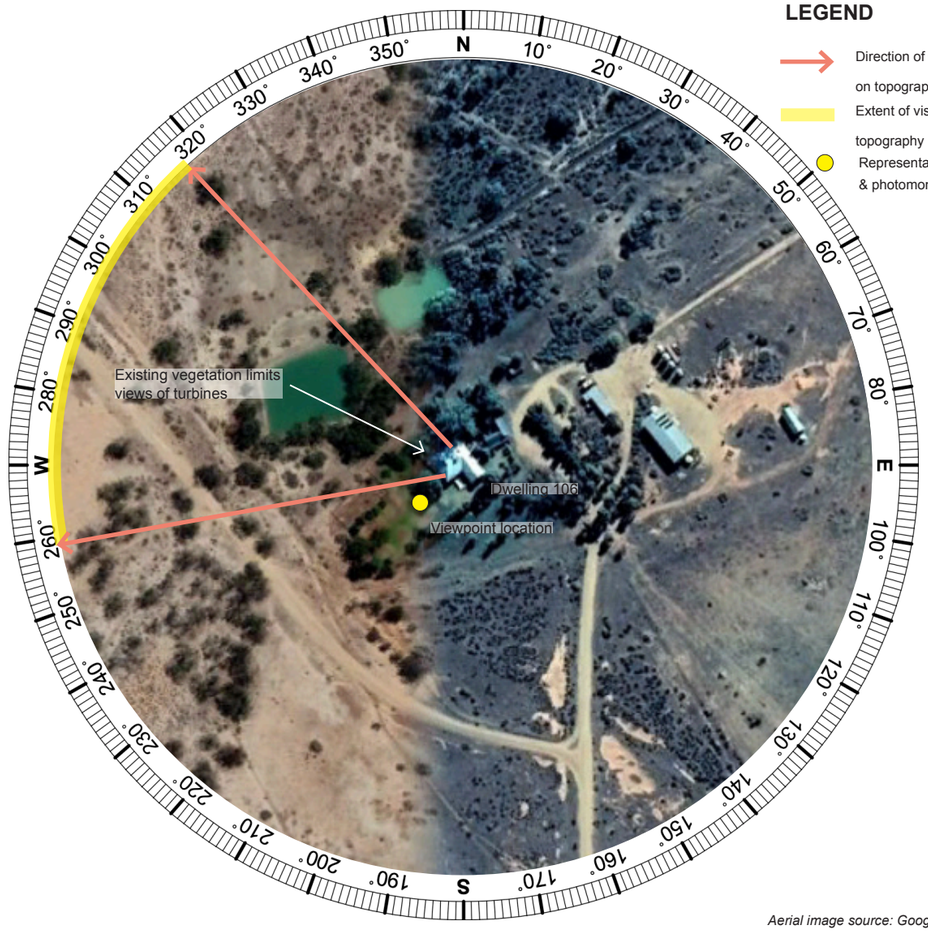
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in November 2022 and a representative viewpoint was taken from the property to prepare a photomontage. Turbines are located in the near background. Views of the Project will be distant and will be screened entirely by existing vegetation. No turbines are located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Negligible**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

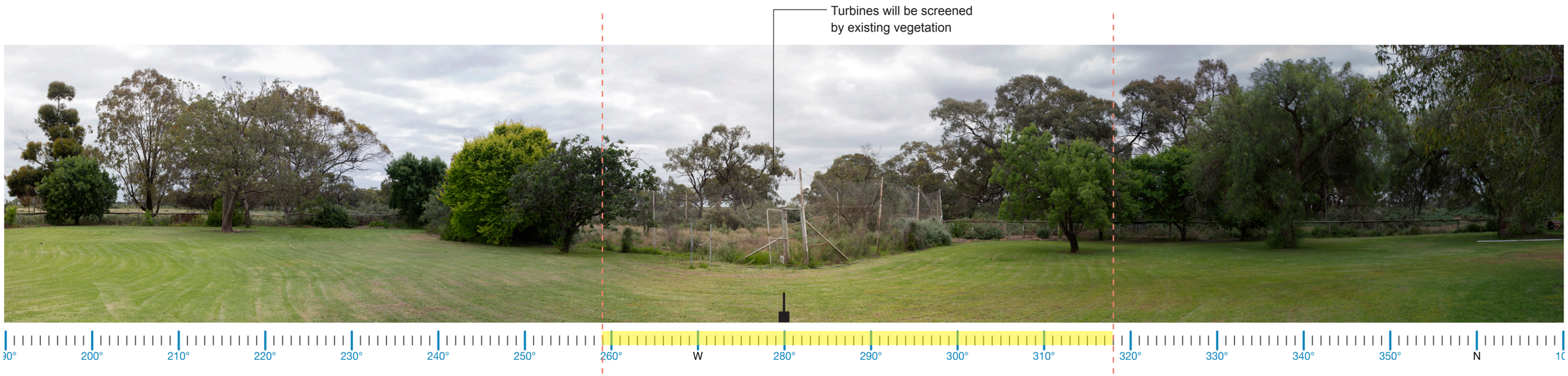
Mitigation Measures:

No mitigation required.

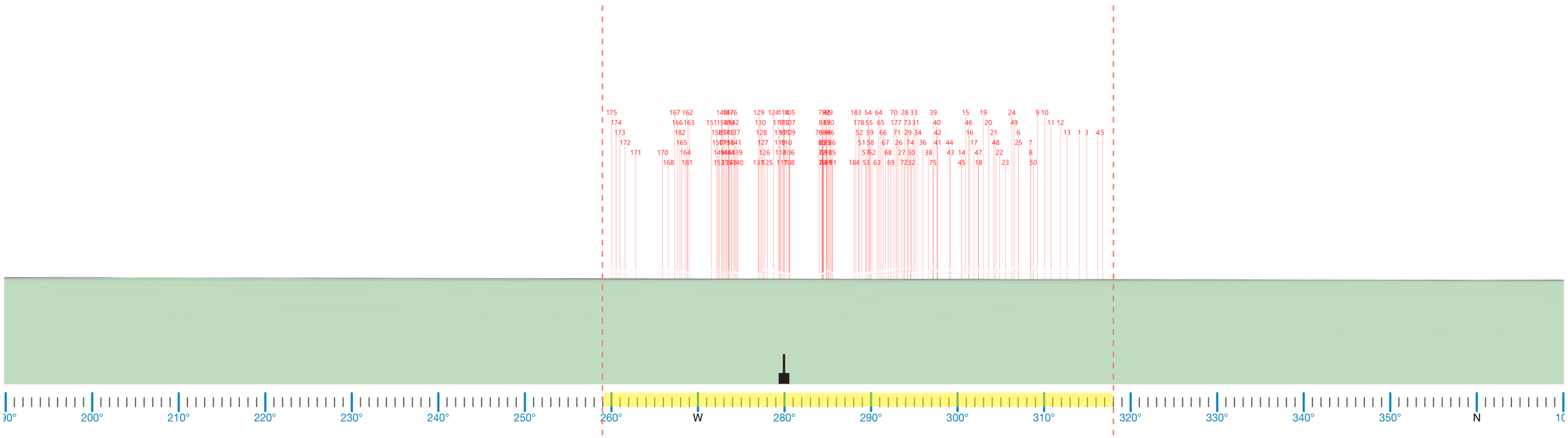


Aerial image source: Google Earth 2023

C.15. Dwelling Assessment **Dwelling 106 Keri East Road, Moulamein**



Proposed View - 180 degree field of view



Proposed Wire Frame Diagram - 180 degree field of view

C.16. Dwelling Assessment **Dwelling 108**

DWELLING 108			
Nearest proposed turbine (km):	**11.82 km**	**Visibility Distance Zone:**	**Near Background (NB)**
Number of proposed turbines within 8000 m:	**Nil**	**Viewer Sensitivity Zone:**	**Level 2: Moderate (Rural Dwelling)**
Number of theoretical 60º Sectors (Based on 2D Plan):	**Nil**	**Landscape Character Unit:**	**LCU04: Farmlands**
Number of visible 60º Sectors (Based on 3D Assessment):	**1**	**Scenic Quality Rating:**	**Low**
Number of potentially visible turbines (Based on topography alone)	**155** All at hub height	**Visual Influence Zone:**	**VIZ3**

Visual Impact Rating: Negligible

Assessment Notes:

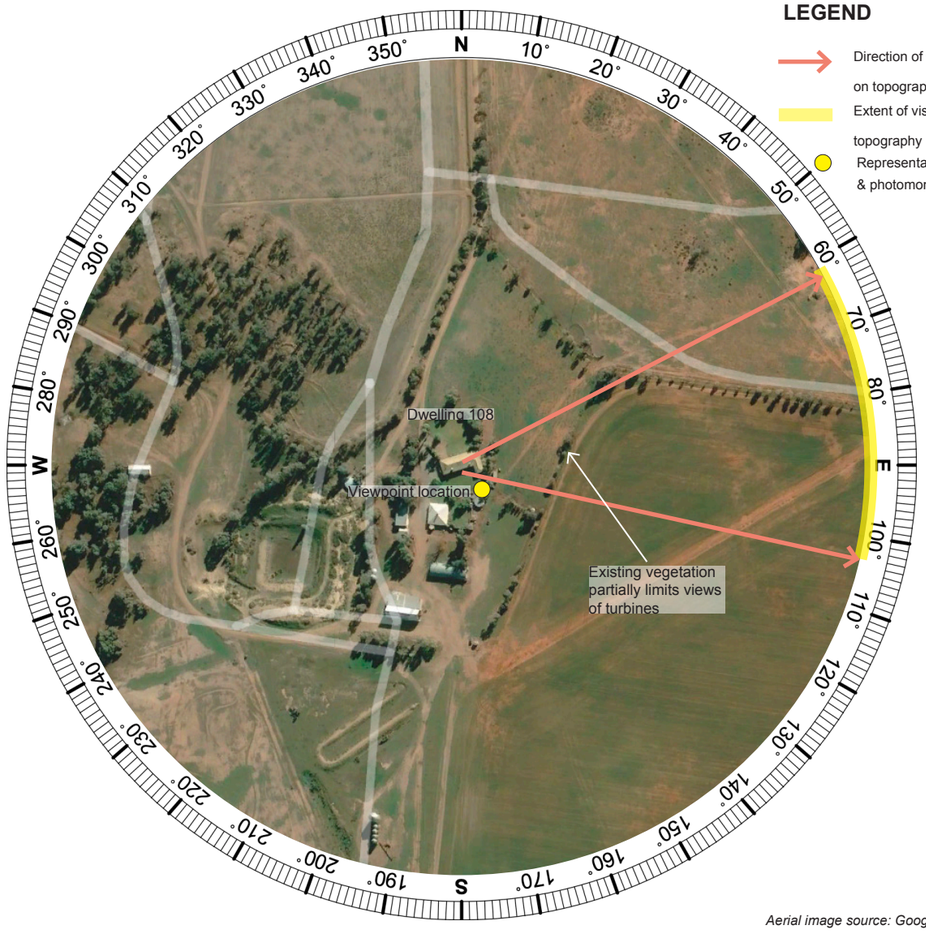
An assessment based on topography alone identified all turbines would be visible from this dwelling. Moir LA visited the dwelling in March 2023 and a representative viewpoint was taken from the property to prepare a photomontage. Turbines are located in the near background. Views of the Project will be distant and will be partially screened by existing vegetation located in the dwelling's foreground. No turbines are located within 8,000 m of this dwelling. The visual impact resulting from the Project has been rated as **Negligible**.

Visual Performance Objectives Evaluation (VIZ3):

No visual performance objectives apply to this dwelling because of the Visual Influence Zone rating (VIZ3).

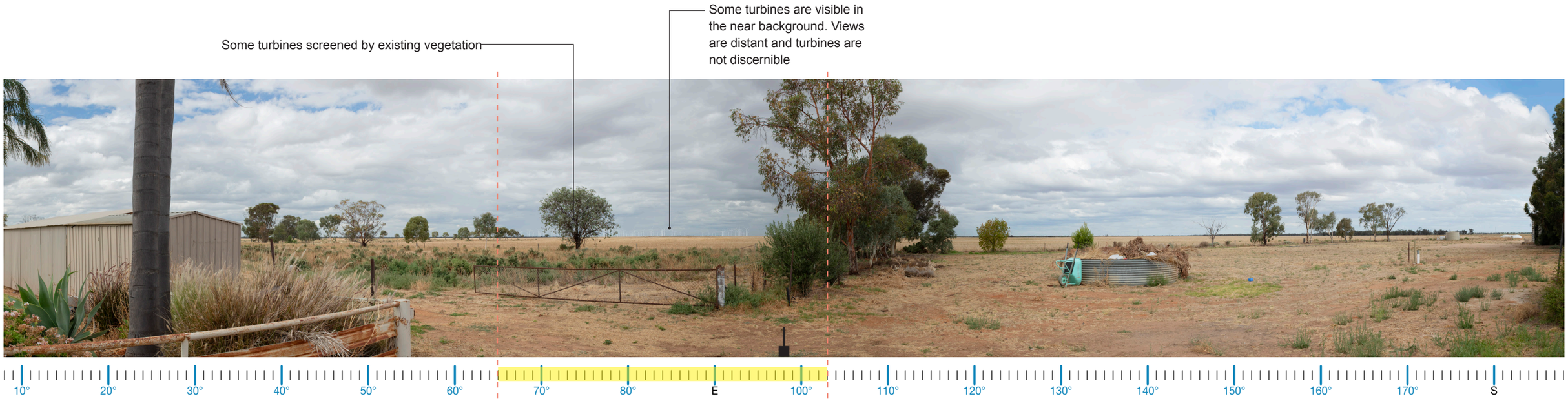
Mitigation Measures:

No mitigation required.

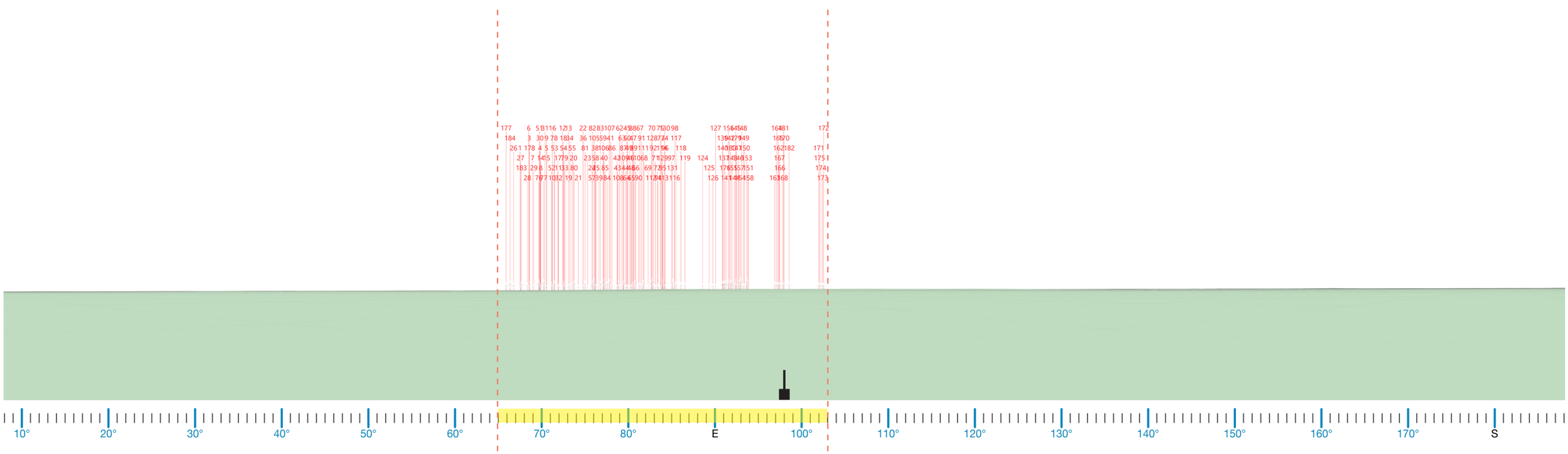


Aerial image source: Google Earth 2023

C.16. Dwelling Assessment **Dwelling 108**



Proposed View - 180 degree field of view



Proposed Wire Frame Diagram - 180 degree field of view

D

Photomontages & Wireframe Diagrams (Public Receptors)

Photomontage Locations (Public receptors)

Keri Keri Wind Farm

LEGEND

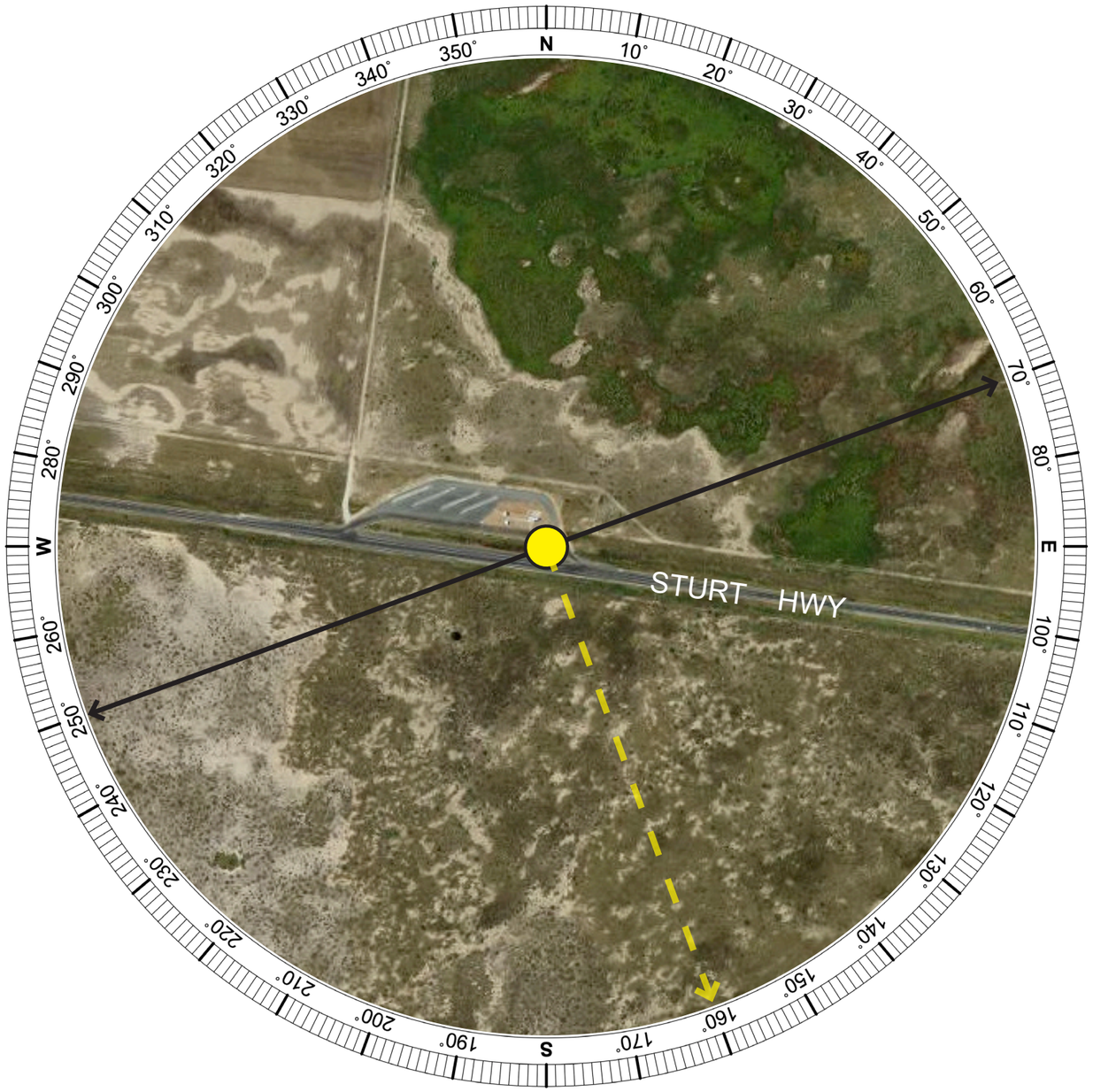
- Project Area
- Proposed 291.5 m Turbine Location
- Associated Dwelling
- Non-associated Dwelling
- 3,900 m from turbine
- 5,700m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road
- PM03 Photomontage locations (public receptors)

N

0 2 4 6 8 10km

Figure Photomontage locations (public receptors) (Map Source: Six Maps 2020)

Photomontage 01 Public Viewpoint PM01 - Willowvale Rest Area



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 01

Location:

Willowvale Rest Area, Sturt Hwy, Keri Keri

Photograph Date and Time:

22nd Nov 2021 1:20pm

Coordinates:

34°43'25.24"S 143°55'42.21"E

Distance to Nearest Visible WTG:

0.46 km

Viewing Direction:

South

Elevation:

63m

Photomontage 01 Public Viewpoint PM01

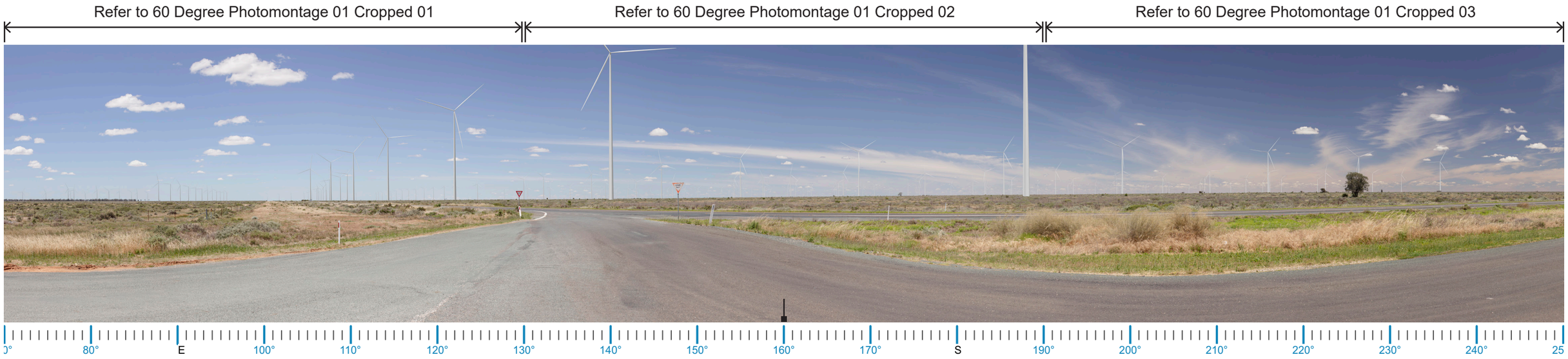


Existing View | 180º Baseline Panorama

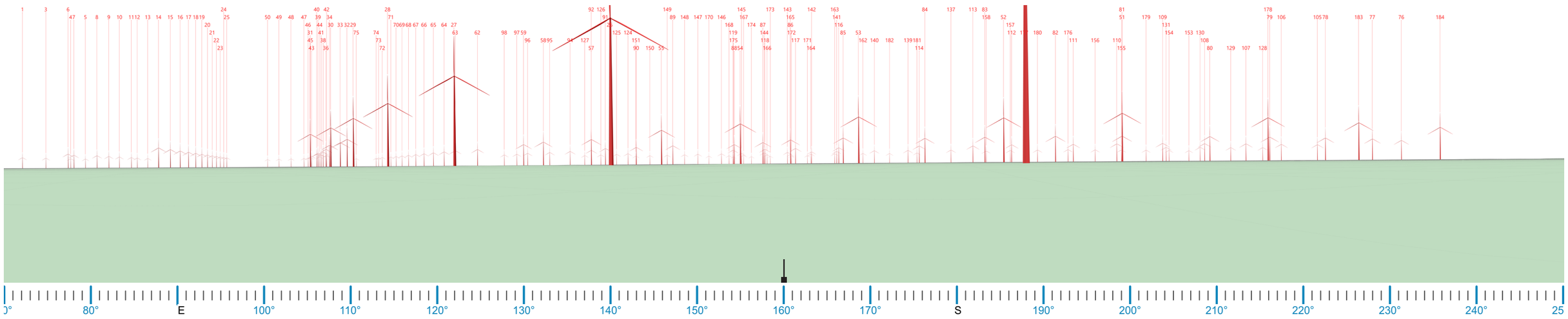


Proposed View | 180º Photomontage

Photomontage 01 Public Viewpoint PM01

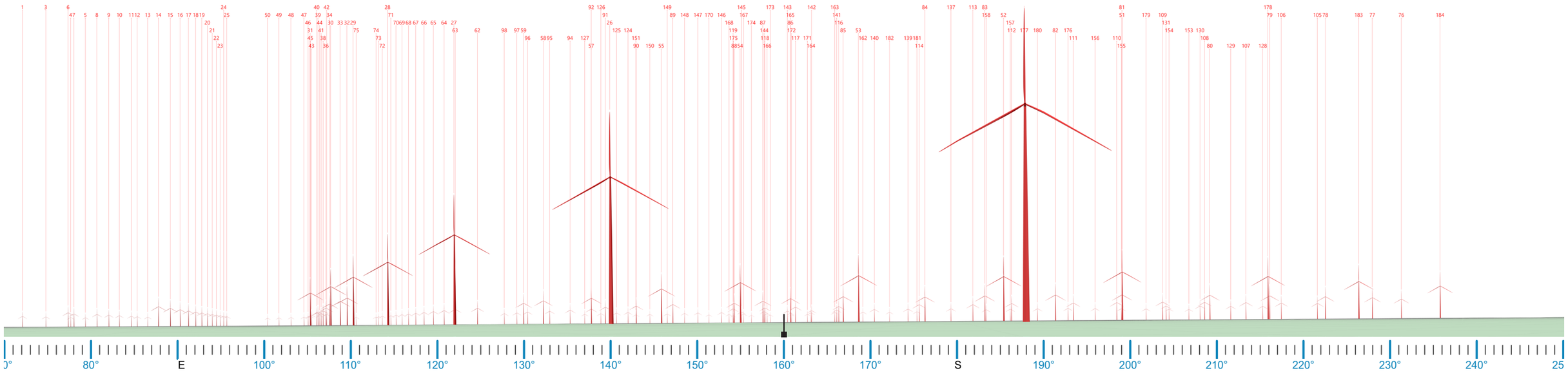


Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 01 Public Viewpoint PM01



Wireframe Diagram (Modified)

Photomontage 01 Public Viewpoint PM01



60º Photomontage 01 Cropped 01

Photomontage 01 Public Viewpoint PM01



130° 140° 150° 160° 170° S 190°

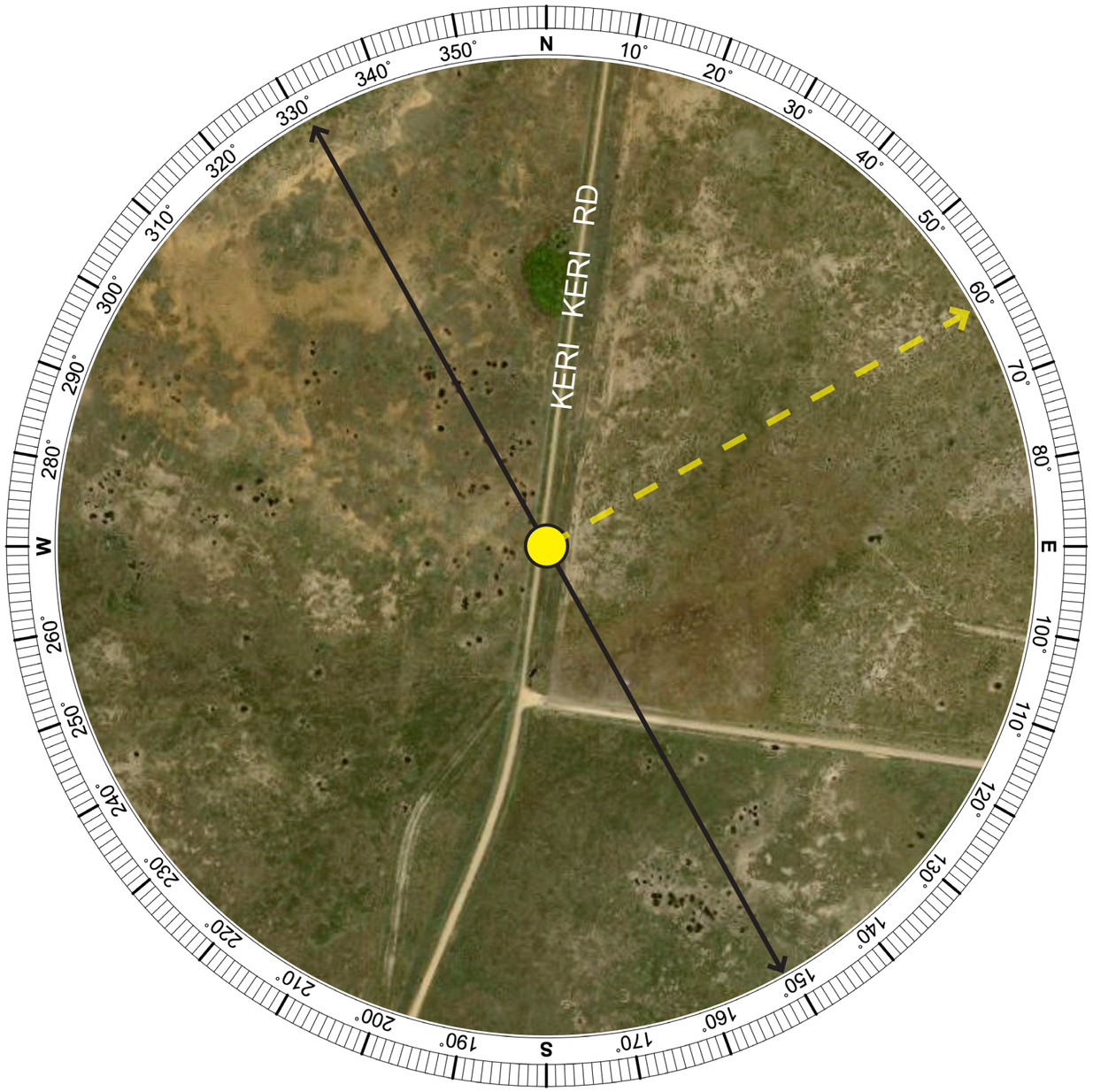
60º Photomontage 01 Cropped 02

Photomontage 01 Public Viewpoint PM01



60º Photomontage 01 Cropped 03

Photomontage 02 Public Viewpoint PM02



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 02

Location:

Keri Keri Rd, Keri Keri

Photograph Date and Time:

22nd Nov 2021 2:15pm

Coordinates:

34°51’57.26”S 143°51’50.56”E

Distance to Nearest Visible WTG:

7.5 km

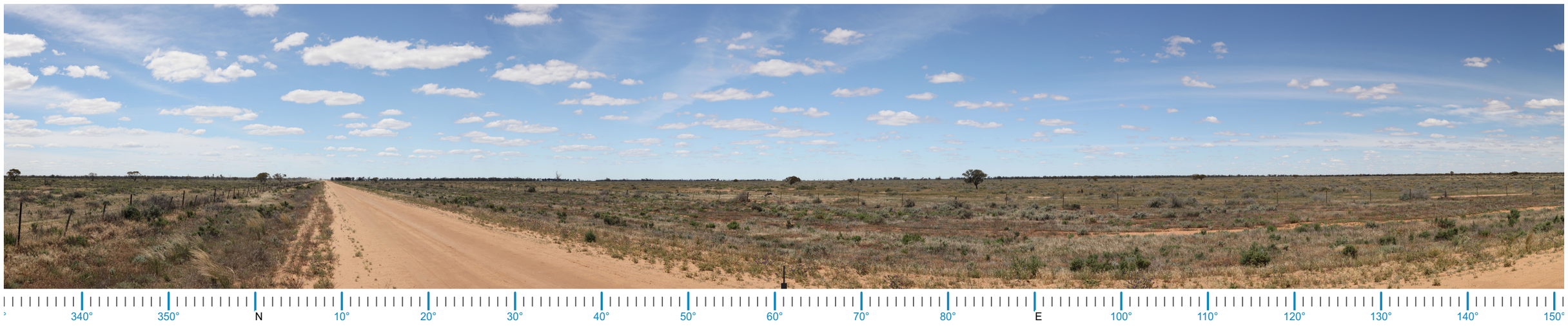
Viewing Direction:

Northeast

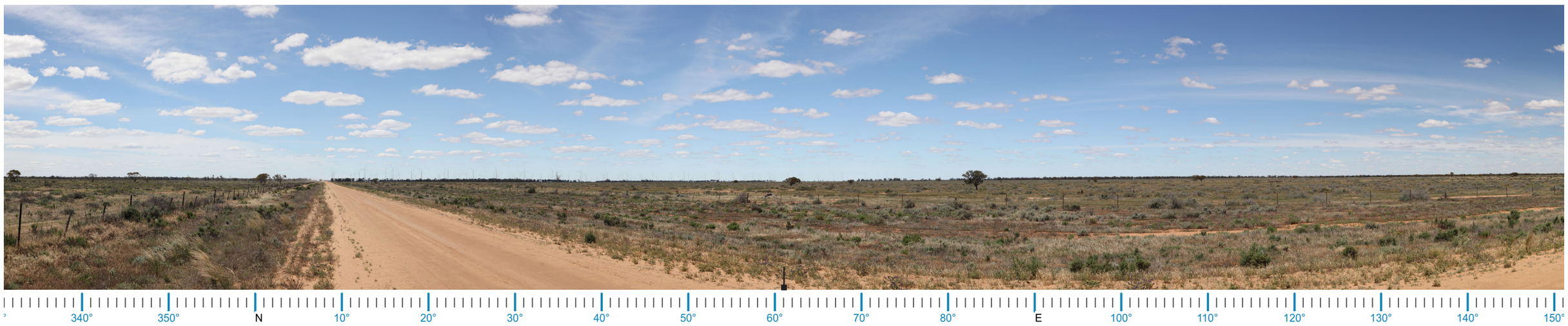
Elevation:

75m

Photomontage 02 Public Viewpoint PM02

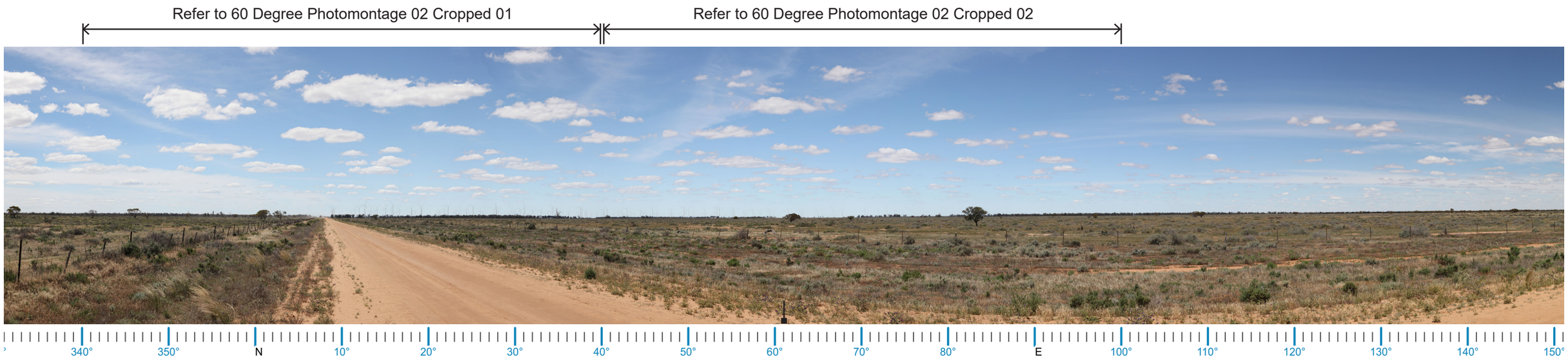


Existing View | 180º Baseline Panorama

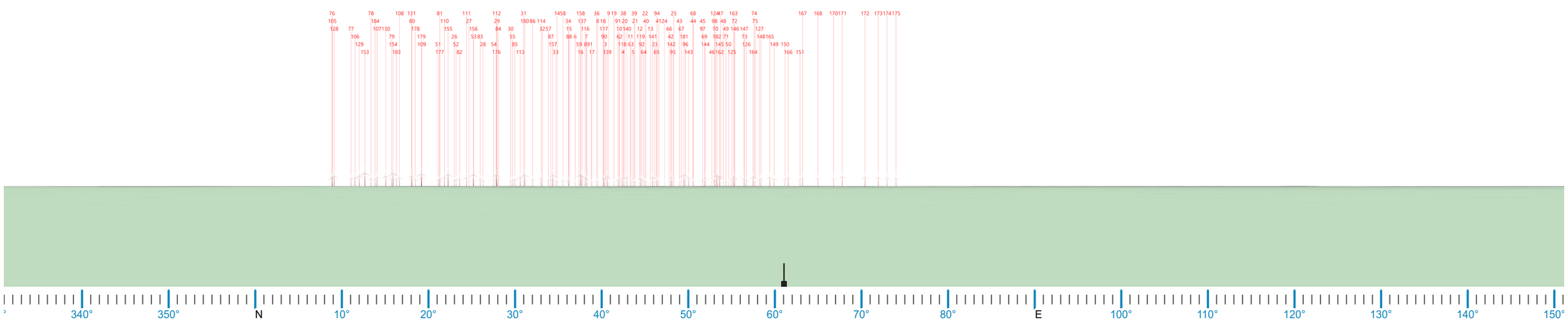


Proposed View | 180º Photomontage

Photomontage 02 Public Viewpoint PM02



Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 02 Public Viewpoint PM02



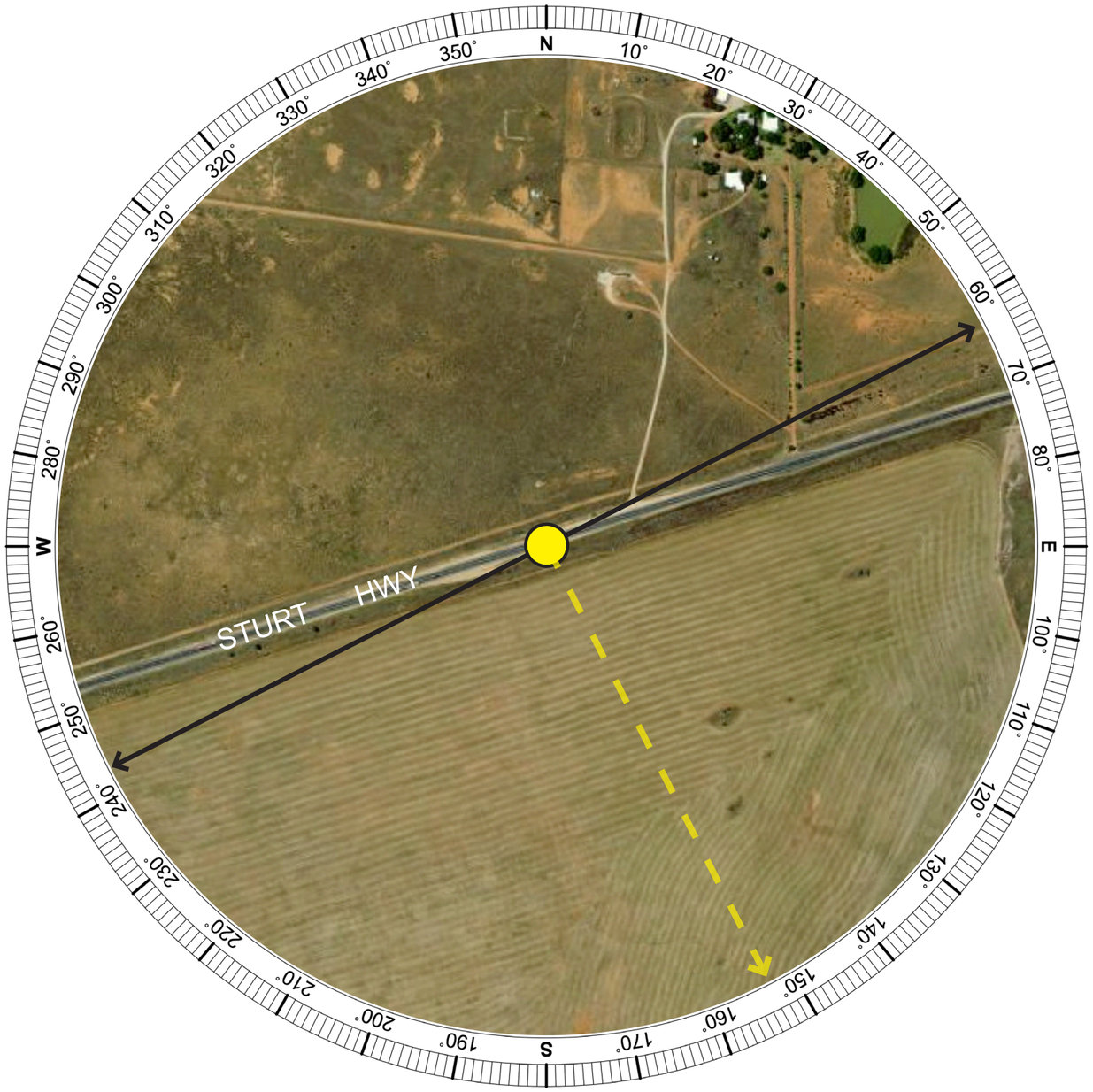
60º Photomontage 02 Cropped 01

Photomontage 02 Public Viewpoint PM02



60º Photomontage 02 Cropped 02

Photomontage 03 Public Viewpoint PM03



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 03

Location:

Sturt Hwy, Keri Keri

Photograph Date and Time:

22nd Nov 2021 3:15pm

Coordinates:

34°43'24.64"S 143°53'46.72"E

Distance to Nearest Visible WTG:

1.8 km

Viewing Direction:

Southeast

Elevation:

73m

Photomontage 03 Public Viewpoint PM03

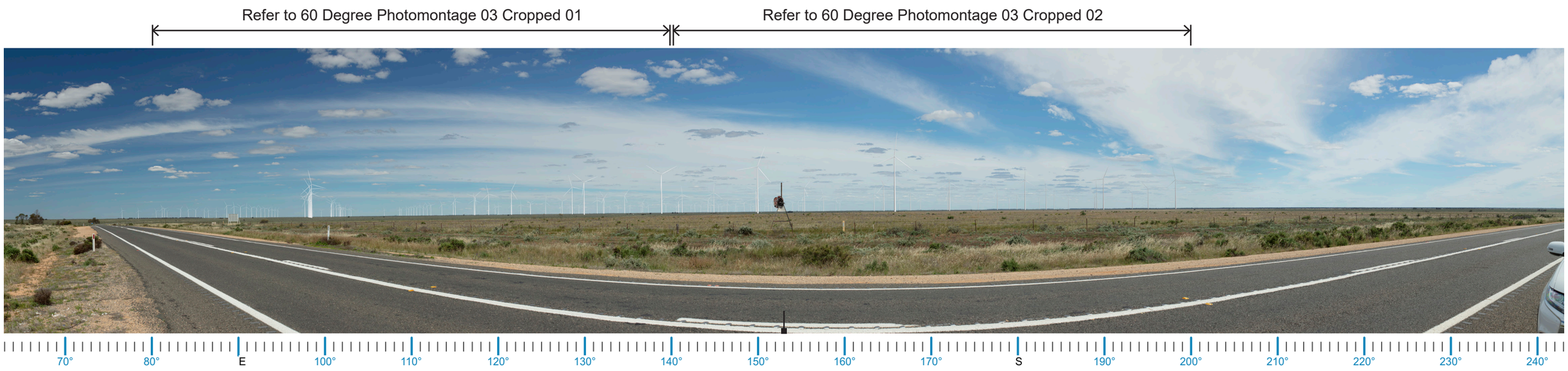


Existing View | 180º Baseline Panorama

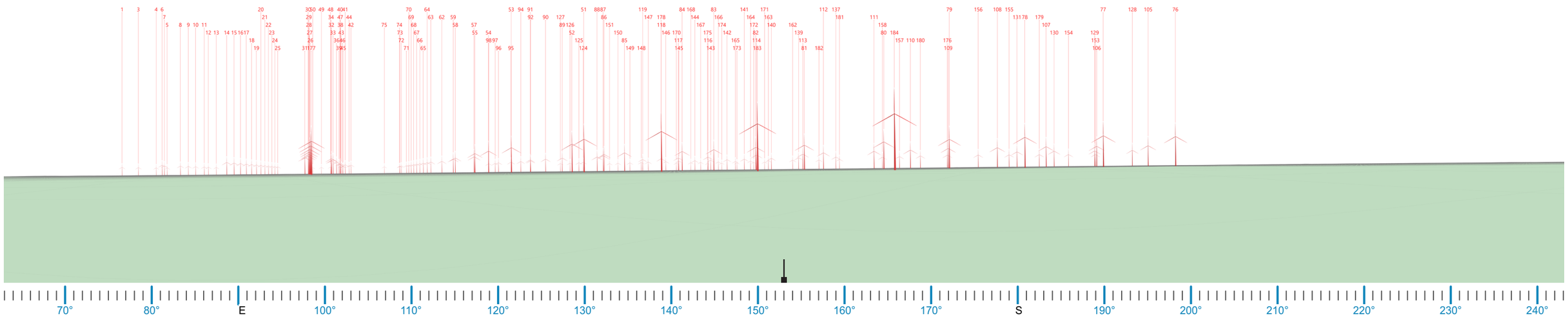


Proposed View | 180º Photomontage

Photomontage 03 Public Viewpoint PM03



Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 03 Public Viewpoint PM03



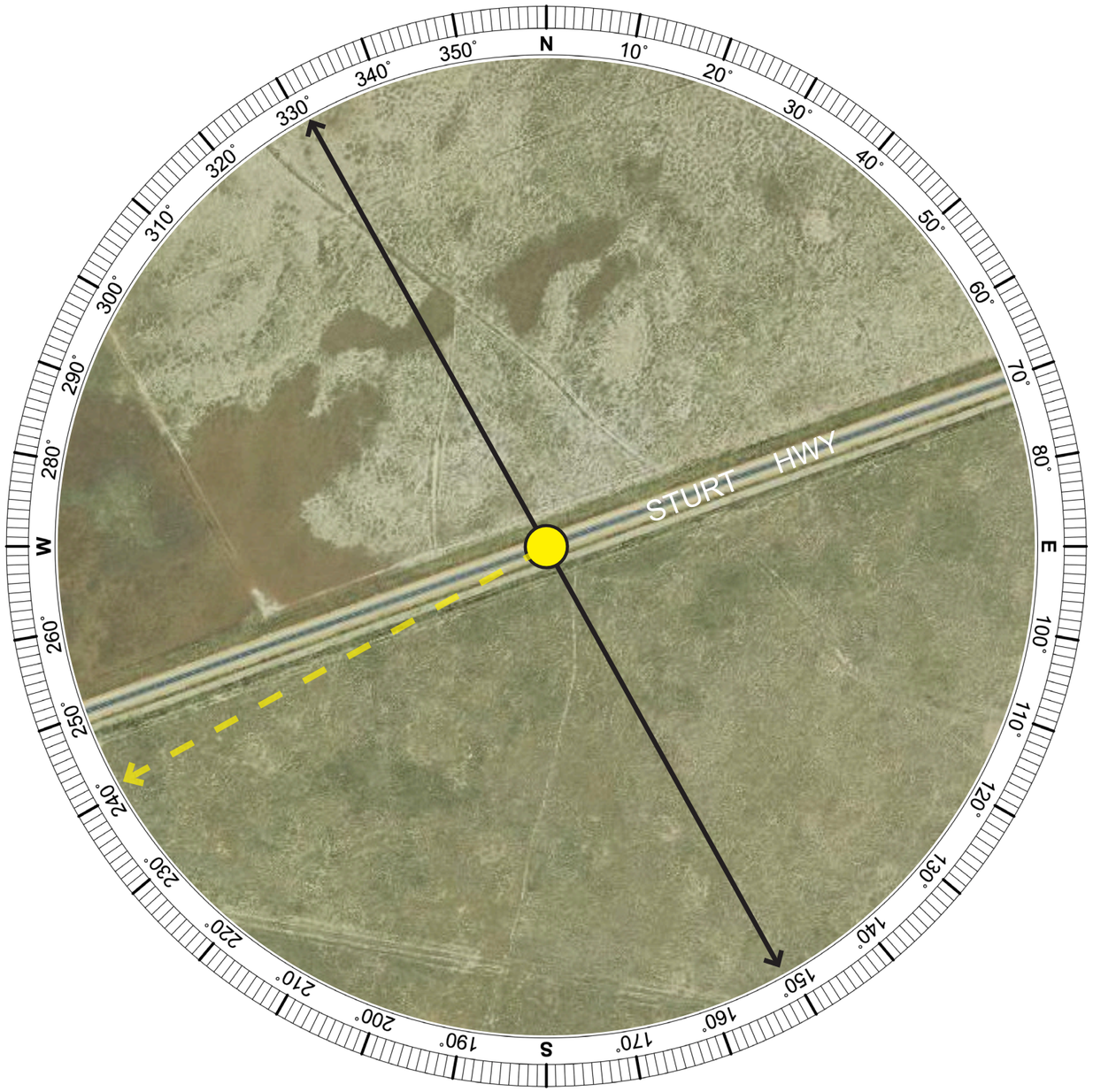
60º Photomontage 03 Cropped 01

Photomontage 03 Public Viewpoint PM03



60º Photomontage 03 Cropped 02

Photomontage 04 Public Viewpoint PM04



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 04

Location:

Sturt Hwy, Keri Keri

Photograph Date and Time:

22nd Nov 2021 3:50pm

Coordinates:

34°40'28.78"S 144° 7'28.93"E

Distance to Nearest Visible WTG:

7.9km

Viewing Direction:

Southwest

Elevation:

73m

Photomontage 04 Public Viewpoint PM04

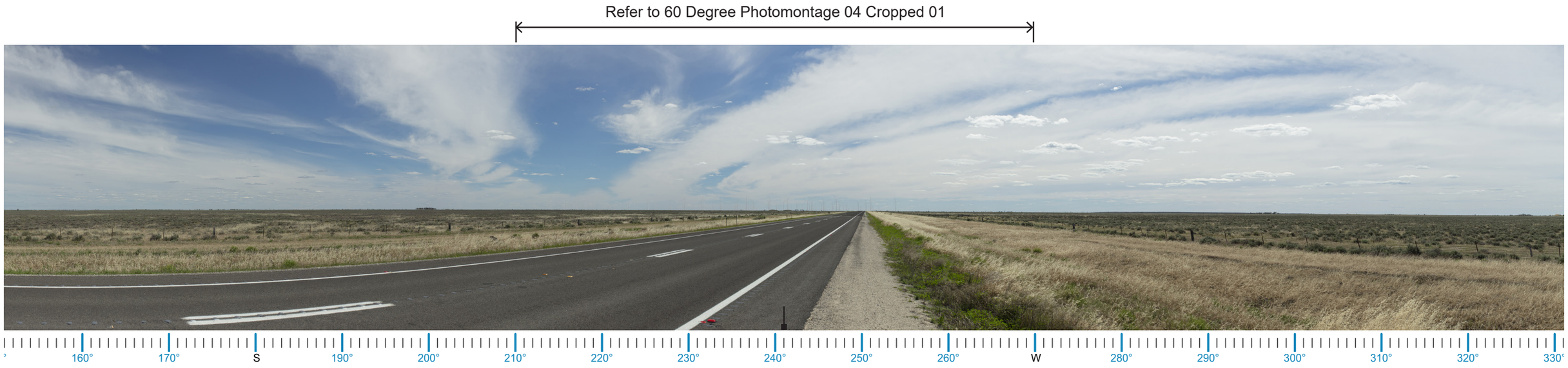


Existing View | 180º Baseline Panorama

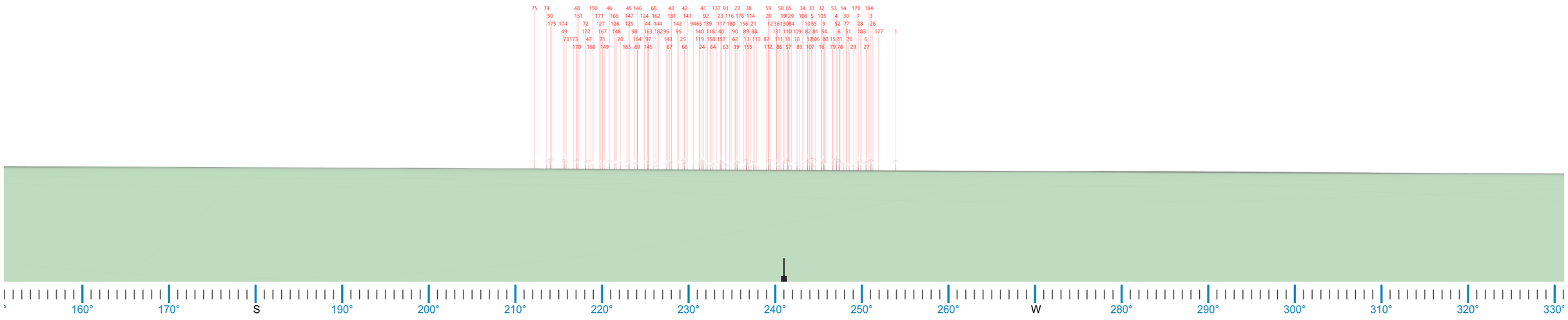


Proposed View | 180º Photomontage

Photomontage 04 Public Viewpoint PM04



Proposed View | 180º Photomontage



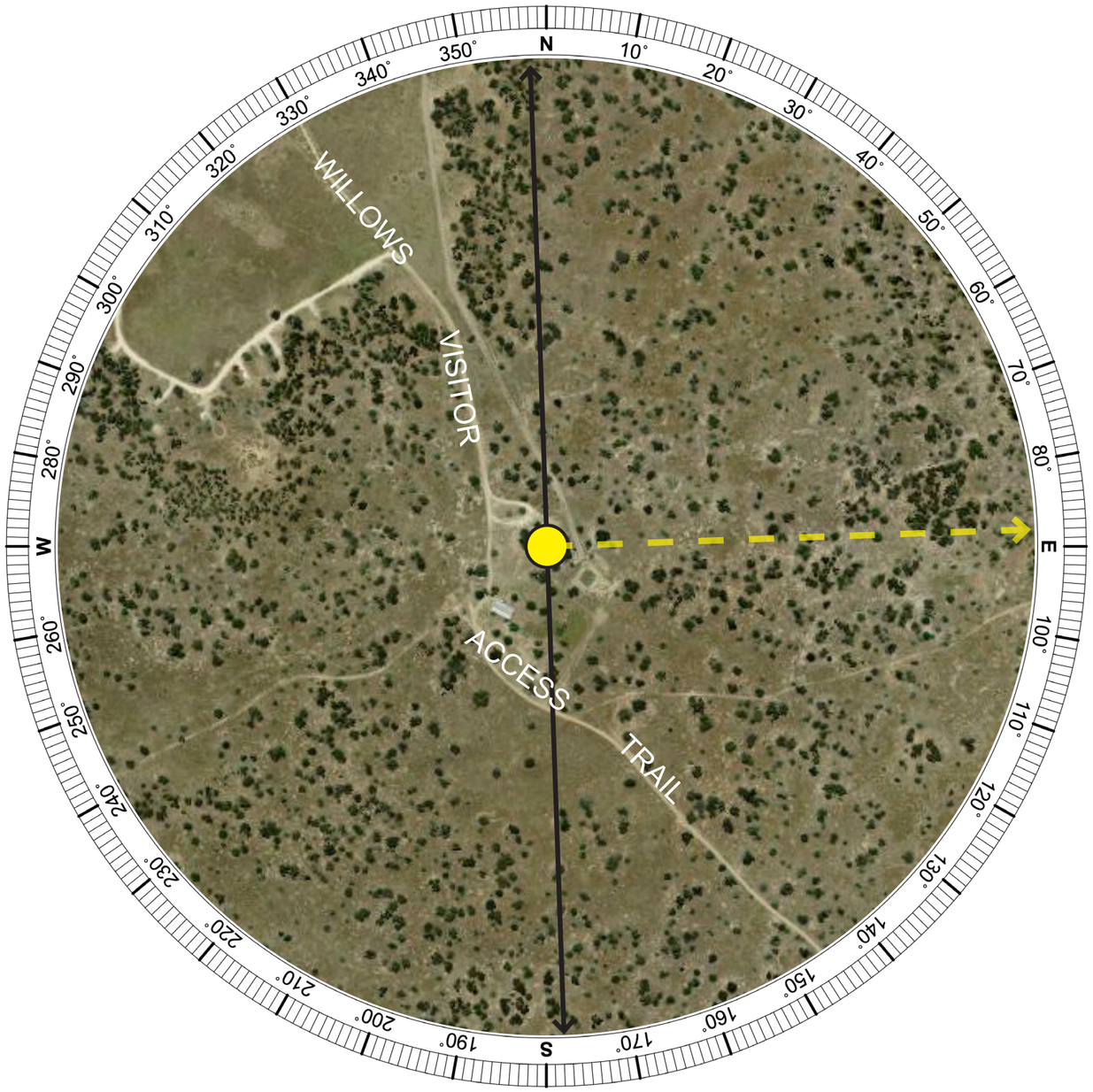
Wireframe Diagram

Photomontage 04 Public Viewpoint PM04



60º Photomontage 04 Cropped 01

Photomontage 05 Public Viewpoint PM05 - The Willows Picnic Area & Campground, Yanga SCA



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 05

Location:

The Willows Picnic Area and Campground, Yanga SCA

Photograph Date and Time:

22nd Nov 2021 4:45pm

Coordinates:

34°45’45.86”S 143°45’54.05”E

Distance to Nearest Visible WTG:

10.7 km

Viewing Direction:

East

Elevation:

66m

Photomontage 05 Public Viewpoint PM05 - The Willows Picnic Area & Campground, Yanga SCA

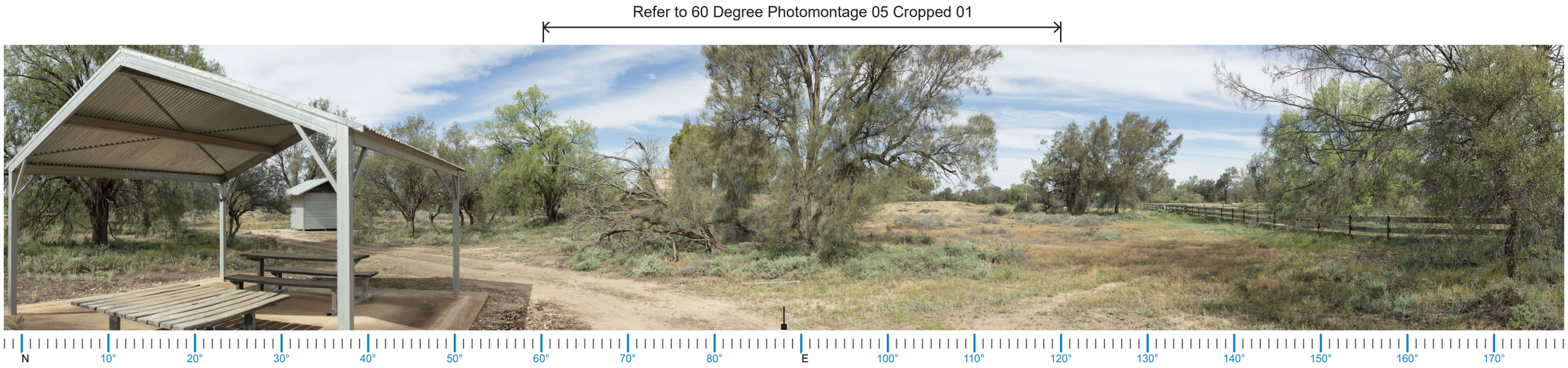


Existing View | 180º Baseline Panorama

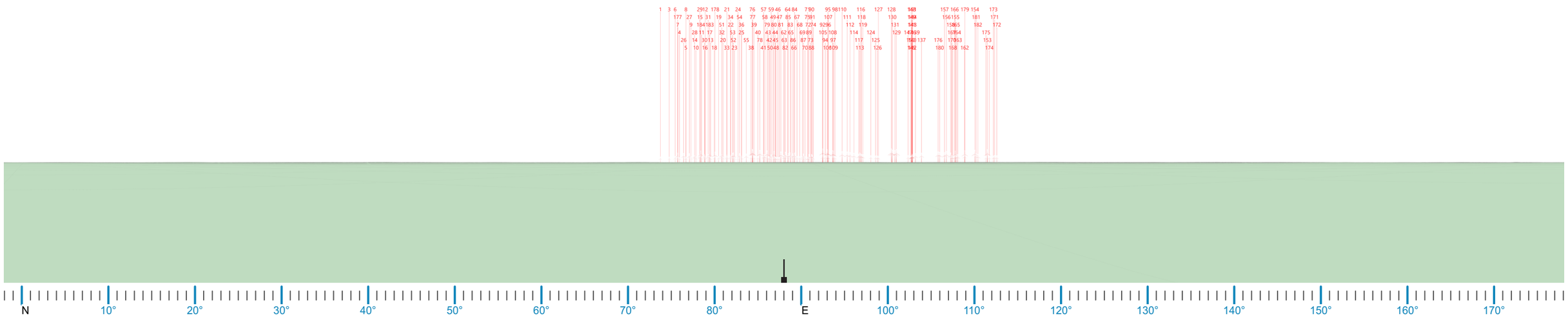


Proposed View | 180º Photomontage

Photomontage 05 Public Viewpoint PM05 - The Willows Picnic Area & Campground, Yanga SCA



Proposed View | 180º Photomontage



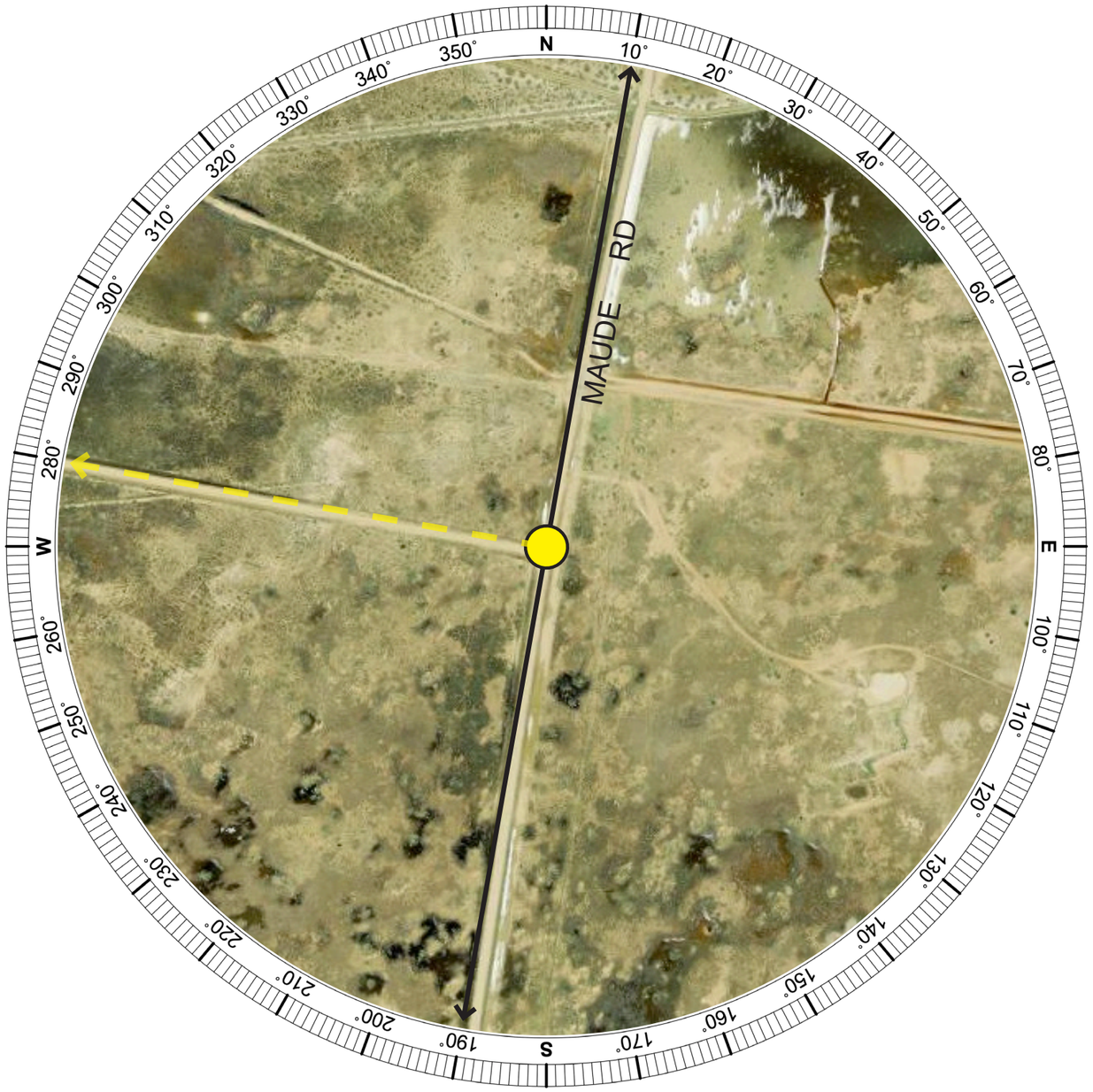
Wireframe Diagram

Photomontage 05 Public Viewpoint PM05



60º Photomontage 05 Cropped 01

Photomontage 06 Public Viewpoint PM06



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 06

Location:

Maude Rd, Moulamein

Photograph Date and Time:

23rd Nov 2021 9:35am

Coordinates:

34°49'38.08"S 144°14'48.88"E

Distance to Nearest Visible WTG:

18.7 km

Viewing Direction:

West

Elevation:

87m

Photomontage 06 Public Viewpoint PM06

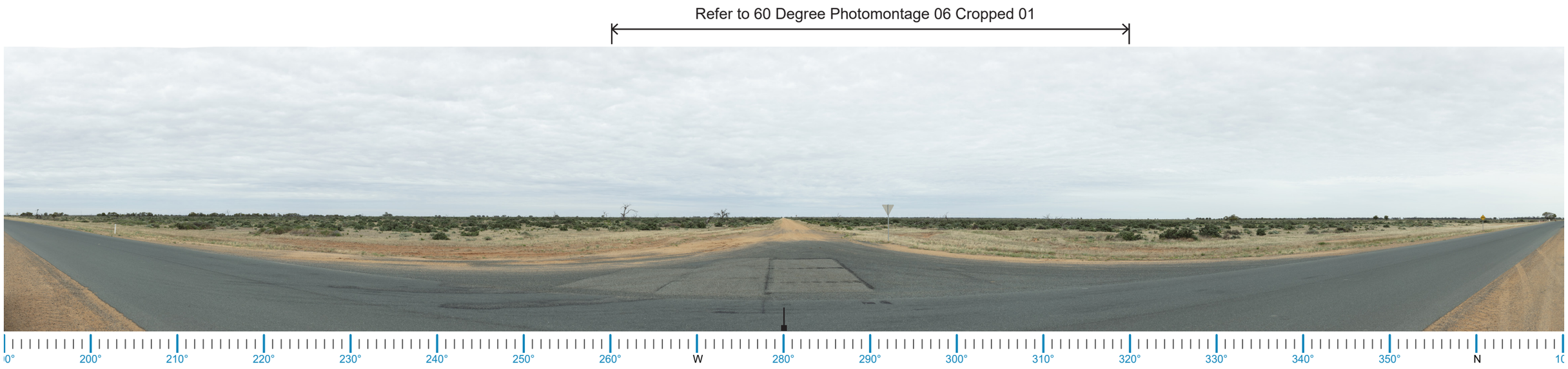


Existing View | 180º Baseline Panorama

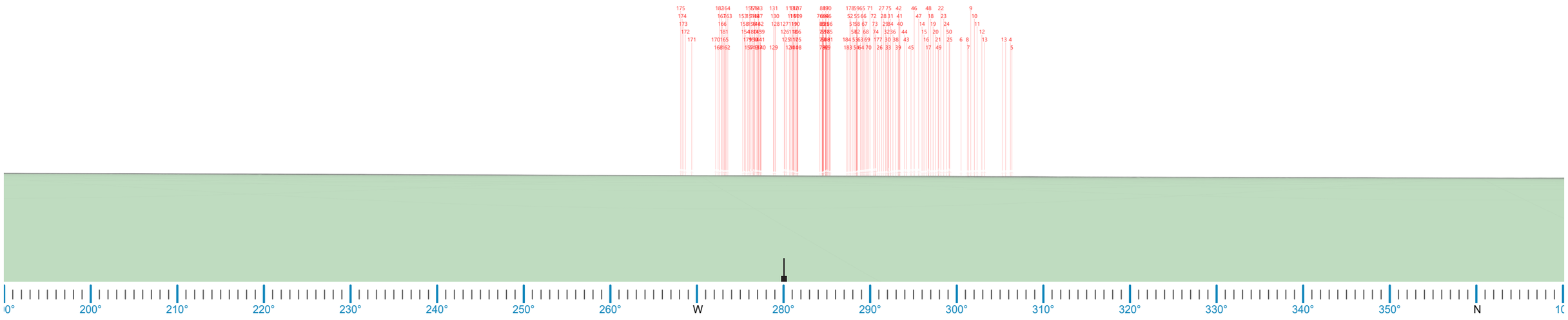


Proposed View | 180º Photomontage

Photomontage 06 Public Viewpoint PM06



Proposed View | 180º Photomontage



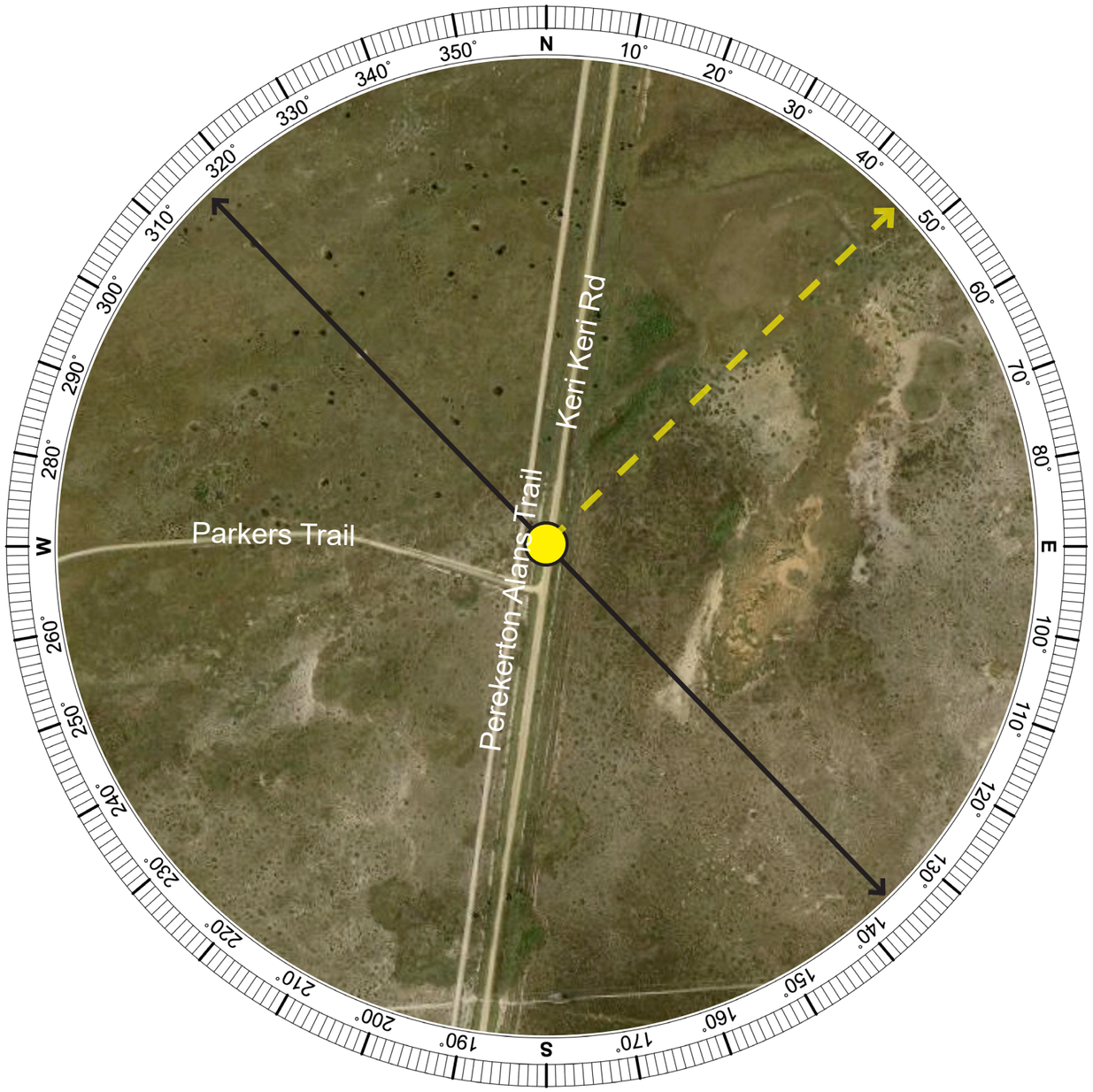
Wireframe Diagram

Photomontage 06 Public Viewpoint PM06



60º Photomontage 06 Cropped 01

Photomontage 07 Public Viewpoint PM07



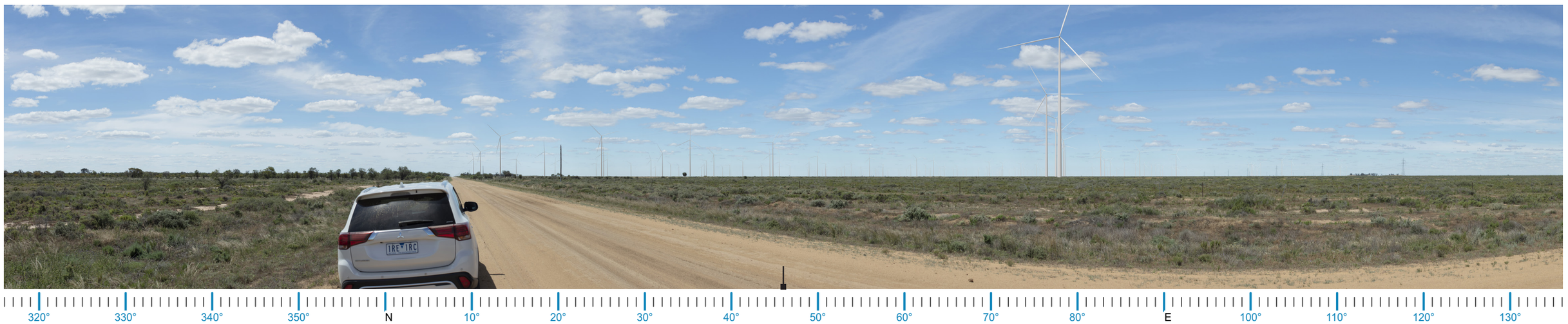
Photomontage 07
Location:
Keri Keri Rd, Keri Keri
Photograph Date and Time:
22rd Nov 2021 10:21am
Coordinates:
34°48'3.97"S 143°52'26.47"E
Distance to Nearest Visible WTG:
0.71 km
Viewing Direction:
Northeast
Elevation:
69m

Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 07 Public Viewpoint PM07

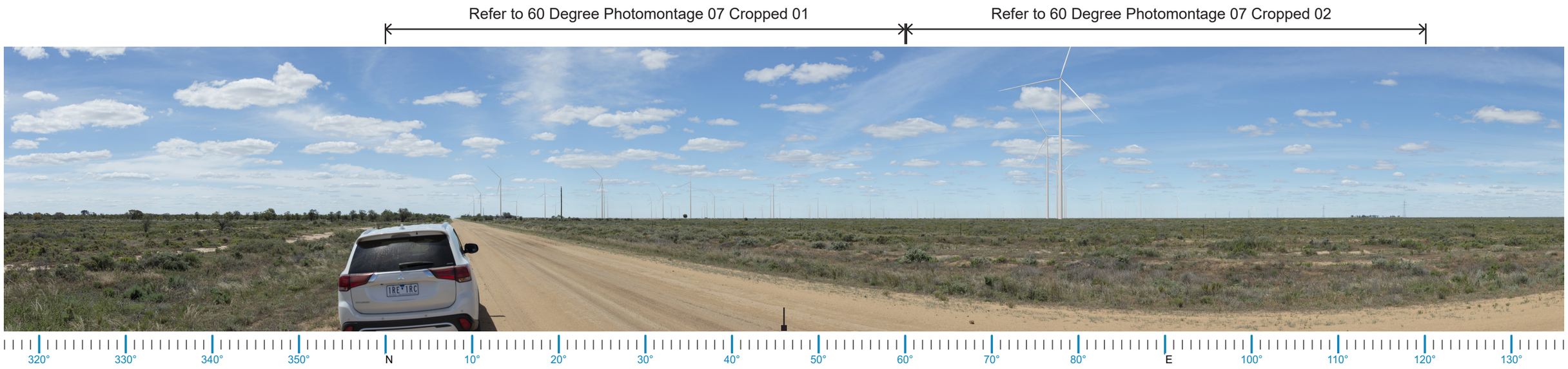


Existing View | 180º Baseline Panorama

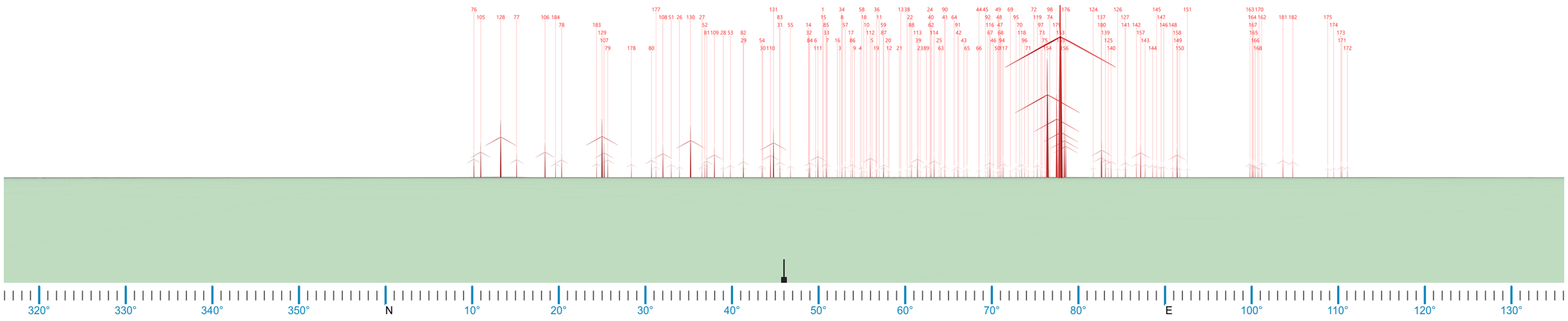


Proposed View | 180º Photomontage

Photomontage 07 Public Viewpoint PM07



Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 07 Public Viewpoint PM07



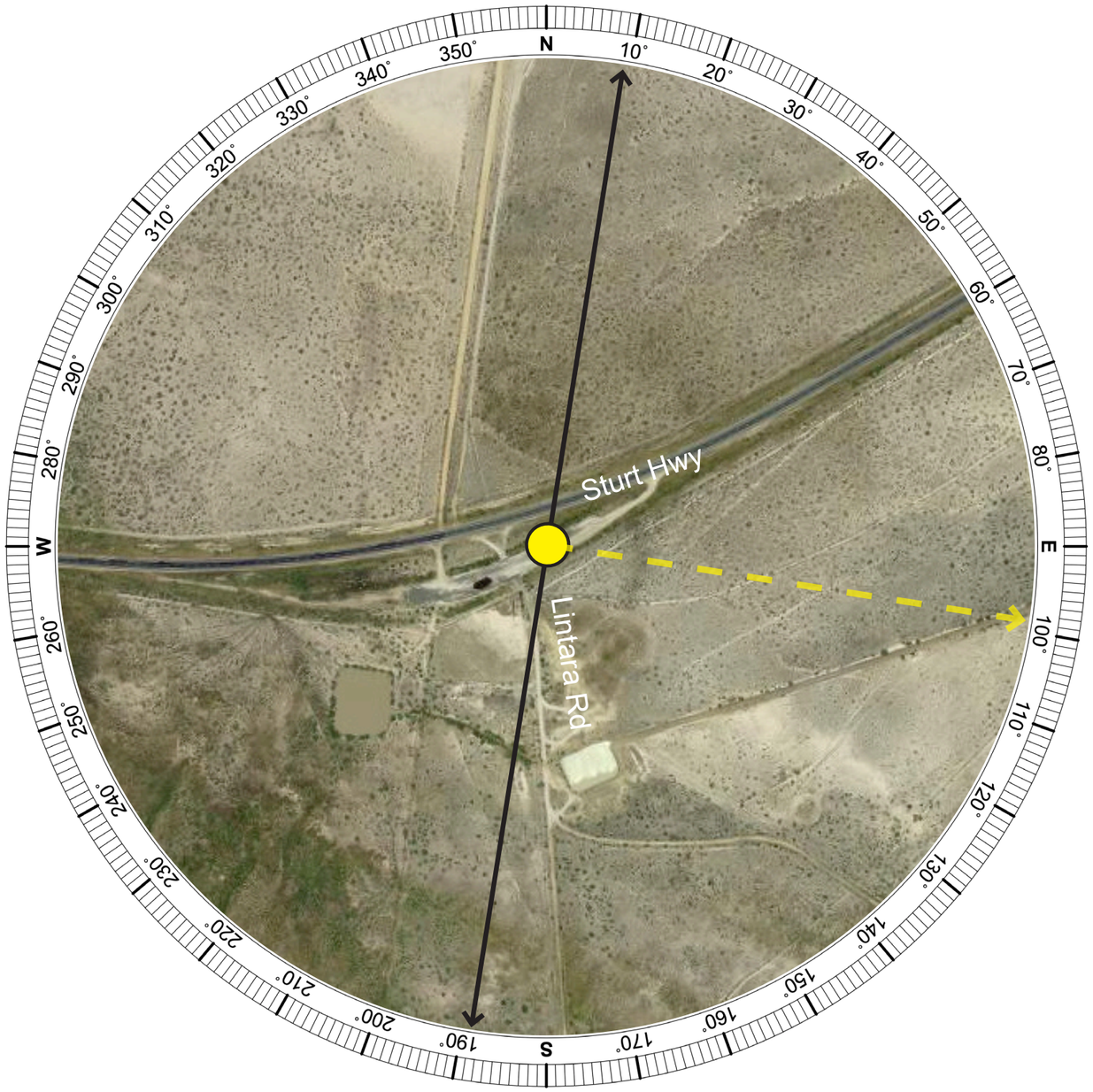
60º Photomontage 07 Cropped 01

Photomontage 07 Public Viewpoint PM07



60º Photomontage 07 Cropped 02

Photomontage 08a Public Viewpoint PM08a



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 08a

Location:

Lintara Rd, Keri Keri

Photograph Date and Time:

22rd Nov 2021 3:28pm

Coordinates:

34°43'36.70"S 143°57'53.56"E

Distance to Nearest Visible WTG:

0.88 km

Viewing Direction:

East

Elevation:

70 m

Photomontage 08a Public Viewpoint PM08a

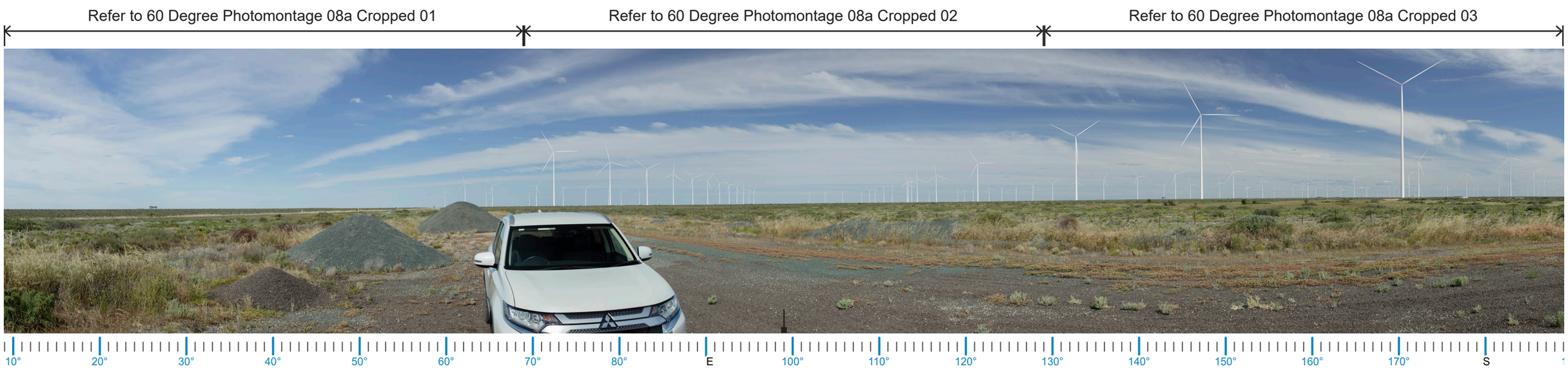


Existing View | 180º Baseline Panorama

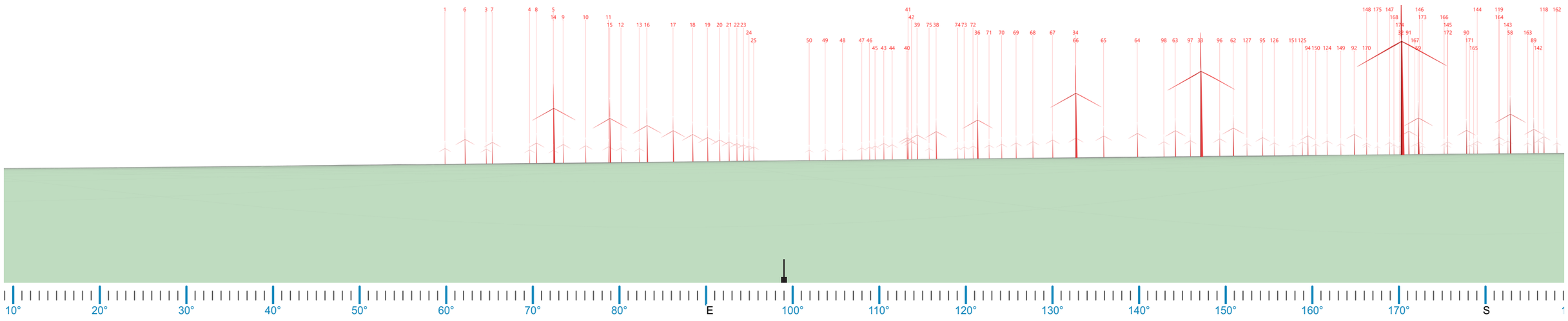


Proposed View | 180º Photomontage

Photomontage 08a Public Viewpoint PM08a



Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 08a Public Viewpoint PM08a



60º Photomontage 08a Cropped 01

Photomontage 08a Public Viewpoint PM08a



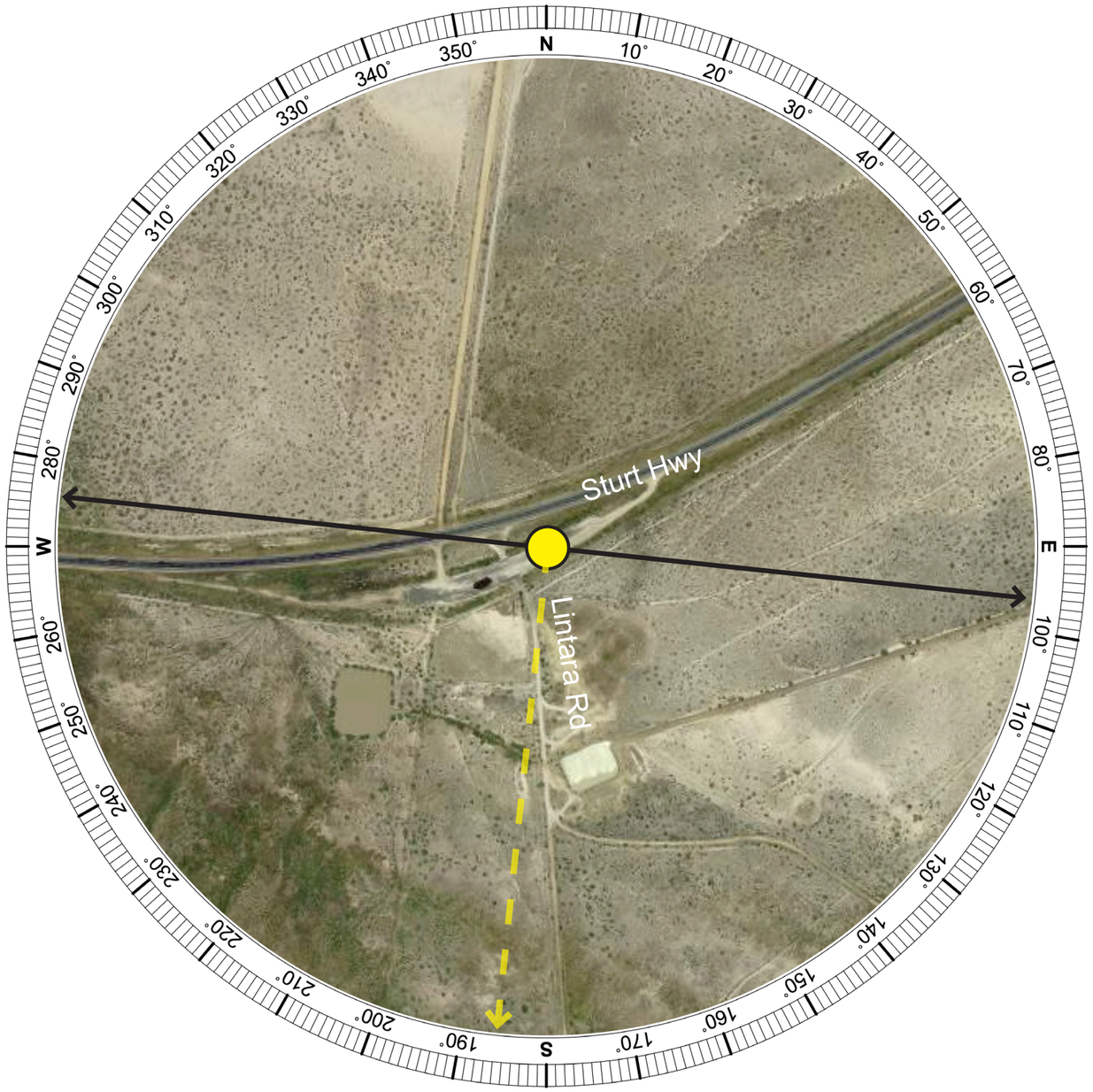
60º Photomontage 08a Cropped 02

Photomontage 08a Public Viewpoint PM08a



60º Photomontage 08a Cropped 03

Photomontage 08b Public Viewpoint PM08b



Aerial Image - Photomontage Location (Aerial Image Source: Google Earth 2022)

Photomontage 08b

Location:

Lintara Rd, Keri Keri

Photograph Date and Time:

22rd Nov 2021 3:28pm

Coordinates:

34°43’36.70”S 143°57’53.56”E

Distance to Nearest Visible WTG:

0.57 km

Viewing Direction:

South

Elevation:

70 m

Photomontage 08b Public Viewpoint PM08b

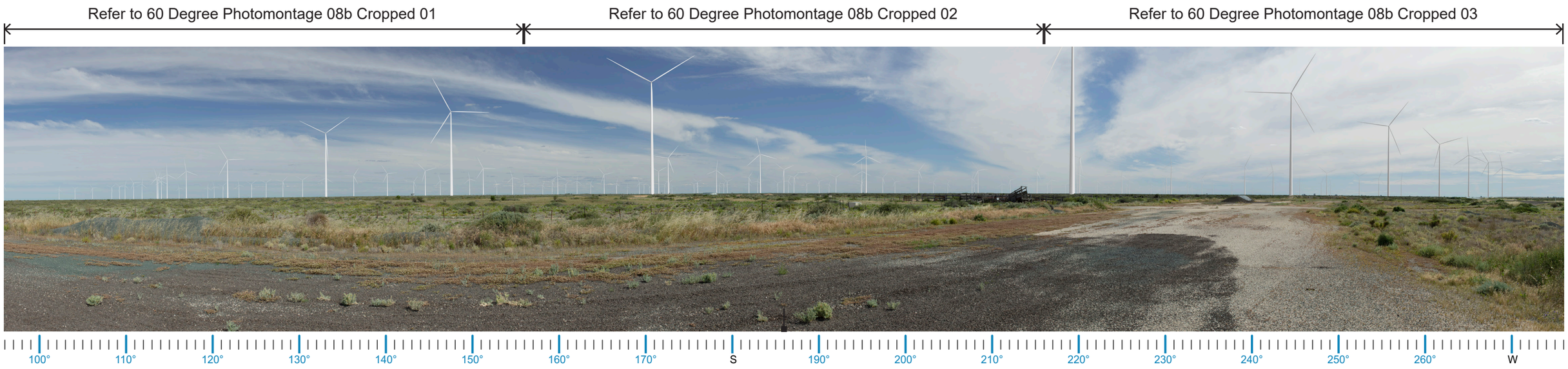


Existing View | 180º Baseline Panorama

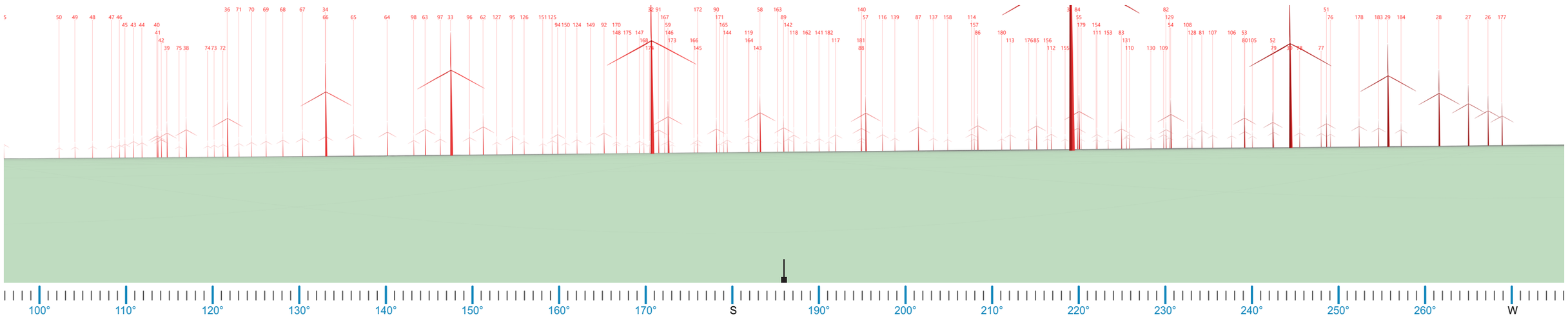


Proposed View | 180º Photomontage

Photomontage 08b Public Viewpoint PM08b



Proposed View | 180º Photomontage



Wireframe Diagram

Photomontage 08b Public Viewpoint PM08b



60º Photomontage 08b Cropped 01

Photomontage 08b Public Viewpoint PM08b



60º Photomontage 08b Cropped 02

Photomontage 08b Public Viewpoint PM08b



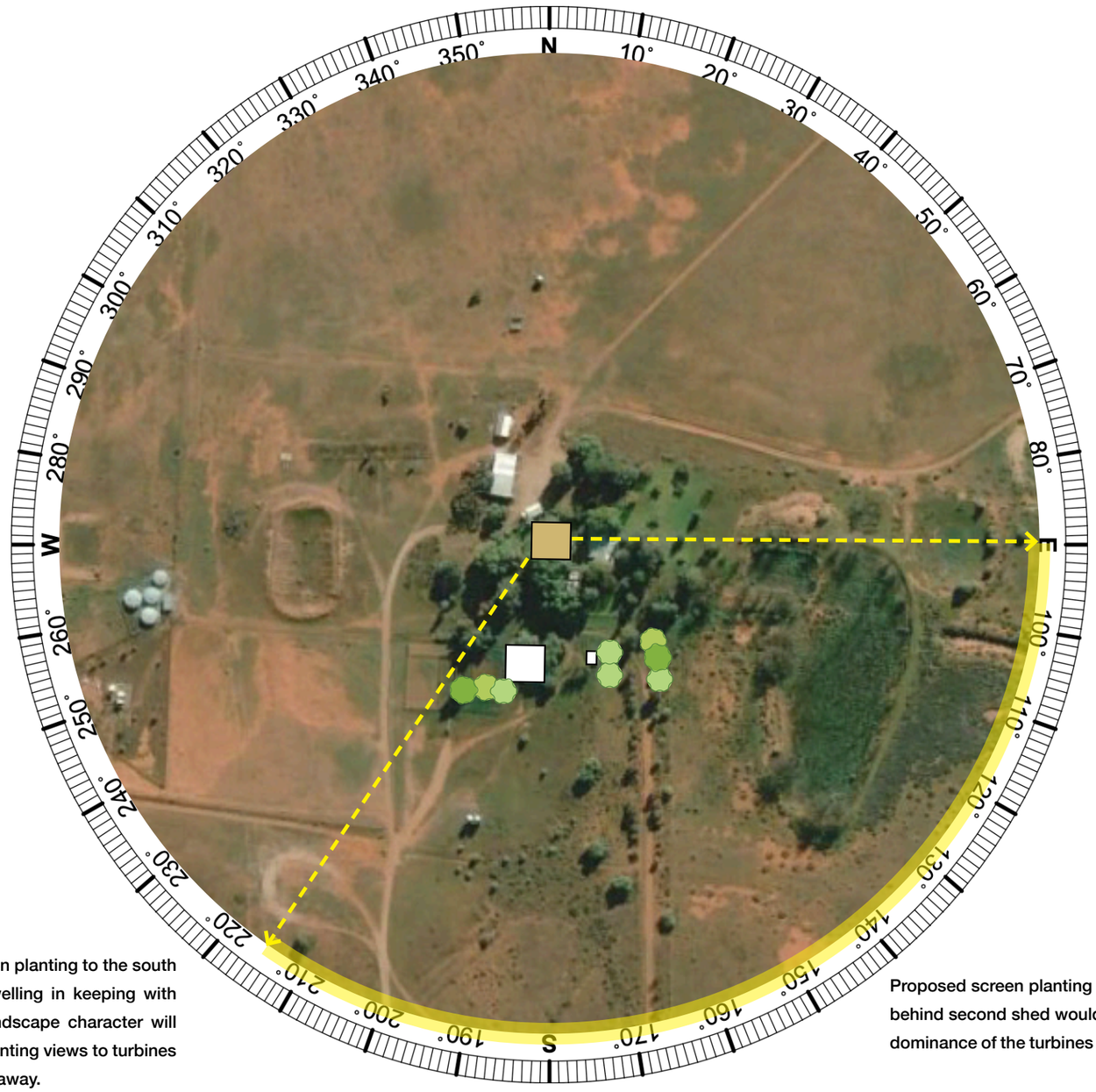
60º Photomontage 08b Cropped 03

E

Mitigation Measures
Non-associated Dwellings

Dwelling 99

Recommended Mitigation Measures



Proposed screen planting to the south west of the dwelling in keeping with the existing landscape character will assist in fragmenting views to turbines located further away.

Proposed screen planting to the south east behind second shed would help reduce the dominance of the turbines in the landscape.

Visual Screening Notes:

The example is presented solely to illustrate the effectiveness of on-site screen planting from a dwelling with a moderate or high visual impact rating.

The same principles can be applied to dwellings with a low visual impact if deemed necessary.

Where access was granted through previous site visits, assessments have been undertaken from the dwelling / curtilage. Where access was not permitted, assumptions have been made based on aerial imagery alone.

Where possible, screen planting has been shown as far as practically possible from the dwelling to maintain desirable outlooks whilst ensuring adequate screening.

Visual screening location is indicative only and is proposed to be undertaken in consultation with the landowner post construction.

LEGEND

- Dwelling Location
- Intervening Structure
- Existing intervening vegetation
- Extent of visible turbines (within 8,000 m)
- Direction and extent of visible turbines
- Indicative location of proposed vegetation for visual screening

Dwelling 99

Proposed View | 180º Photomontage - Without Mitigation Measures Implemented

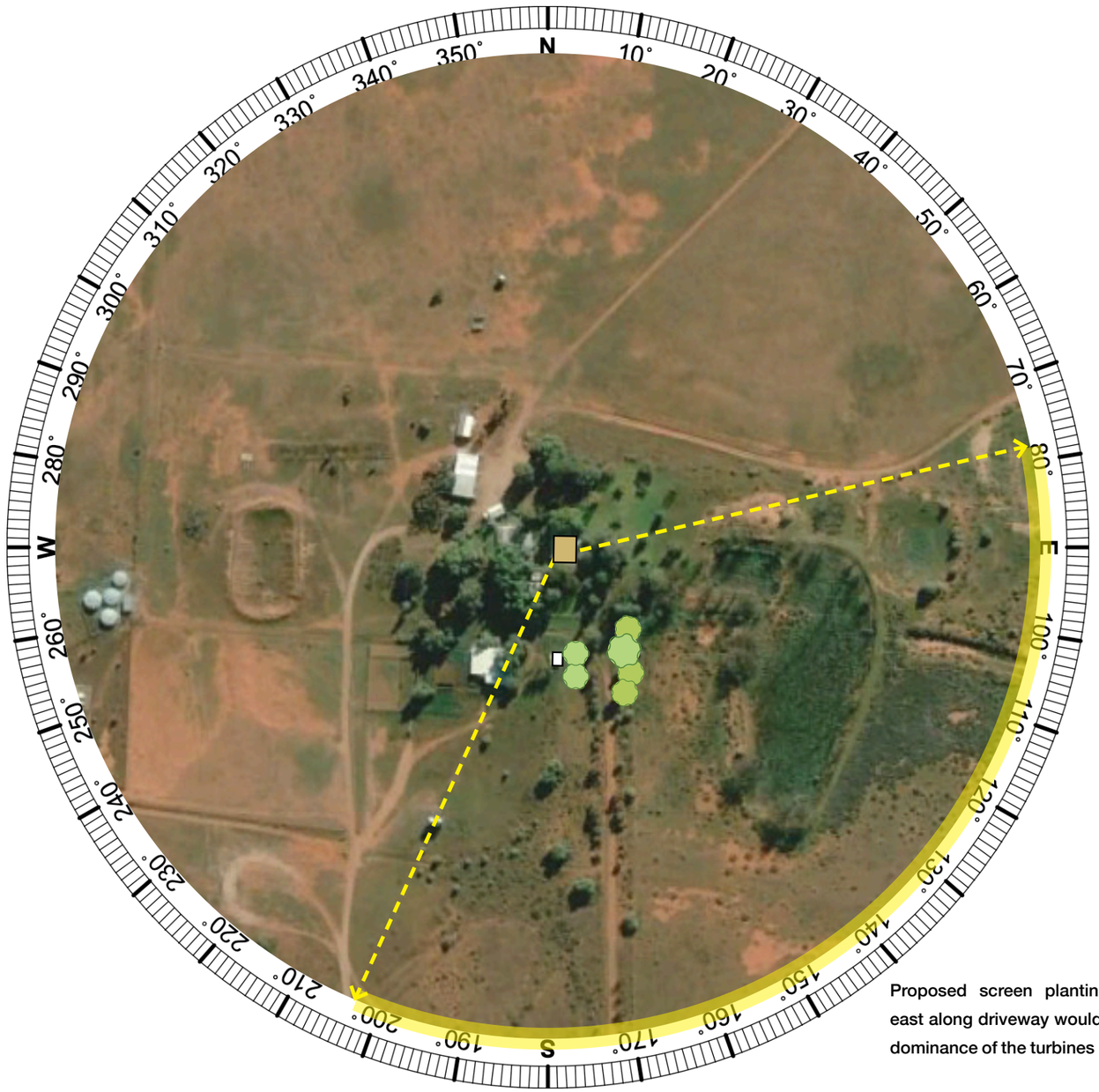




Proposed View | 180º Photomontage - With Mitigation Measures Implemented

Dwelling 19

Recommended Mitigation Measures



Proposed screen planting to the south east along driveway would help reduce the dominance of the turbines in the landscape.

Visual Screening Notes:

The example is presented solely to illustrate the effectiveness of on-site screen planting from a dwelling with a moderate or high visual impact rating.

The same principles can be applied to dwellings with a low visual impact if deemed necessary.

Where access was granted through previous site visits, assessments have been undertaken from the dwelling / curtilage. Where access was not permitted, assumptions have been made based on aerial imagery alone.

Where possible, screen planting has been shown as far as practically possible from the dwelling to maintain desirable outlooks whilst ensuring adequate screening.

Visual screening location is indicative only and is proposed to be undertaken in consultation with the landowner post construction.

LEGEND

- Dwelling Location
- Intervening Structure
- Existing intervening vegetation
- Extent of visible turbines (within 8,000 m)
- Direction and extent of visible turbines
- Indicative location of proposed vegetation for visual screening

Dwelling 19

Proposed View | 180º Photomontage - Without Mitigation Measures Implemented





Proposed View | 180º Photomontage - With Mitigation Measures Implemented