



Paling Yards Wind Farm

Landscape and Visual Impact Assessment

Paling Yard Wind Farm

Landscape and Visual Impact Assessment

Prepared for
Tract

Issue
13

Date
04.09.23

Project Number
2130

Revision	Date	Author	Checked	Comment
04	14.09.22	AR	DM	For review
05	28.10.22	AR/SB	DM	For review
06	01.12.22	AR/SB	DM	Updated For review
07	21.02.23	AL	DM	Updated For review
08	22.02.23	AL	DM	Updated For review
09	20.04.23	AL	MED	Updated For review
10	02.05.23	AL	MED	Updated For review
11	19.05.23	AL	MED	Updated For review
12	03.08.23	AL	MED	Updated For review
13	04.09.23	AL	MED	For Submission



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Executive Summary

Moir Landscape Architecture (Moir LA) have been commissioned by TRACT on behalf of Global Power Generation Australia Pty Ltd to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Paling Yards Wind Farm (the Project).

The Site is located on the western extent of the Great Dividing Range in NSW, 60 km south of Oberon, 60 km north of Goulburn in NSW and approximately 140 km west of Sydney. The Project includes the construction, operation and decommissioning of a wind farm with an estimated capacity 287 megawatts (MW) and a maximum blade tip height of up to 240 metres.

In addition to the wind turbines, ancillary infrastructure including access tracks, road upgrades, underground and overhead electricity cabling, high voltage transmission line, substations, easements for connections, potential battery energy storage system, switching station, quarrying locations, concrete batching plants, potential workers accommodation village, operations and maintenance facility and grid connection to the existing 330 kV transmission line have been assessed in this LVIA.

Moir Landscape Architecture have utilised a quantitative study methodology with regards to the guidelines of the Wind Energy: Visual Assessment Bulletin (the Bulletin). Relevant literature and guidelines relating to large scale energy projects and Moir Landscape Architecture's previous experience on large scale infrastructure projects has also been considered in 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 visual performance objectives outlined in the Bulletin.

Field work was undertaken by Moir Landscape Architecture to

develop a visual baseline against which the Project has been assessed. The assessment determined the regional landscape character is typical of the Central-West Tablelands region characterised by agricultural land predominately utilised for grazing, with some areas of remnant vegetation. The landscape was categorised into six (6) 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 / high.

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

The Bulletin states 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.

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

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 10 non-involved dwellings within the blue line of visual magnitude (4,750 m of the nearest turbine). Site inspections and desktop assessment identified:

- Two (2) non-involved dwellings have the potential for a high visual impact
- One (1) non-involved dwellings have the potential for a moderate visual impact
- Three (3) non-involved dwellings were assessed as having a low visual impact rating
- Four (4) non-involved dwellings were assessed as having a negligible or nil visual impact rating

Practical and feasible mitigation measures have been proposed for each of the three (3) non-involved dwellings with a moderate or high visual impact rating. The proposed mitigation methods recommended in the report will assist in significantly reducing the visual impacts resulting from the majority of these dwellings. Mitigation measures in keeping with the existing character include screen planting and supplementary planting of existing vegetation.

On evaluation, the Project is compliant with the performance objectives as per the Visual Assessment Bulletin.

01

Introduction



1.0 Introduction

1.1 Introduction

Moir Landscape Architecture have been commissioned by TRACT to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Paling Yards Wind Farm (referred to hereafter as ‘the Project’).

The Project will include:

- the construction, operation and decommissioning of a wind farm with an estimated capacity 287 megawatts (MW), a maximum of 47 turbines and a maximum height of up to 240 m (to blade tip); and
- ancillary infrastructure, including site offices, internal roads, underground and overhead cabling, and a substation.

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*. This LVIA forms a part of the Environmental Impact Statement (EIS) to be submitted to the Department of Planning, Industry 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.*

Moir Landscape Architecture Pty Ltd is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact Assessments. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments 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, photo montage development, landscape character assessment and community consultation.

Our team has extensive experience in undertaking LVIA's for wind energy projects. In the context of our experience and with guidance from the Visual Assessment Bulletin we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project. Relevant experience includes the preparation of LVIA's for the following Wind Energy Projects:

- *Liverpool Range Wind Farm Modification* (Coolah, New South Wales)
- *Crudine Ridge Wind Farm* (New South Wales)
- *Bodangora Wind Farm* (Bodangora, New South Wales)
- *Capital II Wind Farm* (Bungendore, New South Wales)
- *Ungula 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 Environmental Planning and Assessment Act 1979.

Secretary's Environmental Assessment Requirements (SEARs) issued on the 9th of March 2022 for the Project state the EIS must address the following specific issues for the wind farm and associated infrastructure:

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 Abercrombie National Park, scenic or significant vistas and road corridors in the public domain.

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

2.2 Wind Energy: Visual Assessment Bulletin

The Wind Energy: Visual Assessment Bulletin for State Significant Wind Energy Development (referred to hereafter as 'the Bulletin') was adopted by the then Department of Planning and Environment 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. Visual impacts are one of a range of issues considered in the assessment and determination of wind energy projects.

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 outcome;
- 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 and methodologies.

The visual assessment process is broken into two main stages:

Stage 1: Preliminary Environmental Assessment and Stage 2: 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 October 2021 and the findings of the assessment undertaken have been included in this report.

2.3 Overview of the Study Method

In accordance with the Visual Assessment 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 Landscape Architecture have formulated a quantitative study methodology with regards to the Visual Assessment Bulletin and with consideration of previous experience on large scale infrastructure projects and relevant literature and guidelines relating to large scale energy projects.

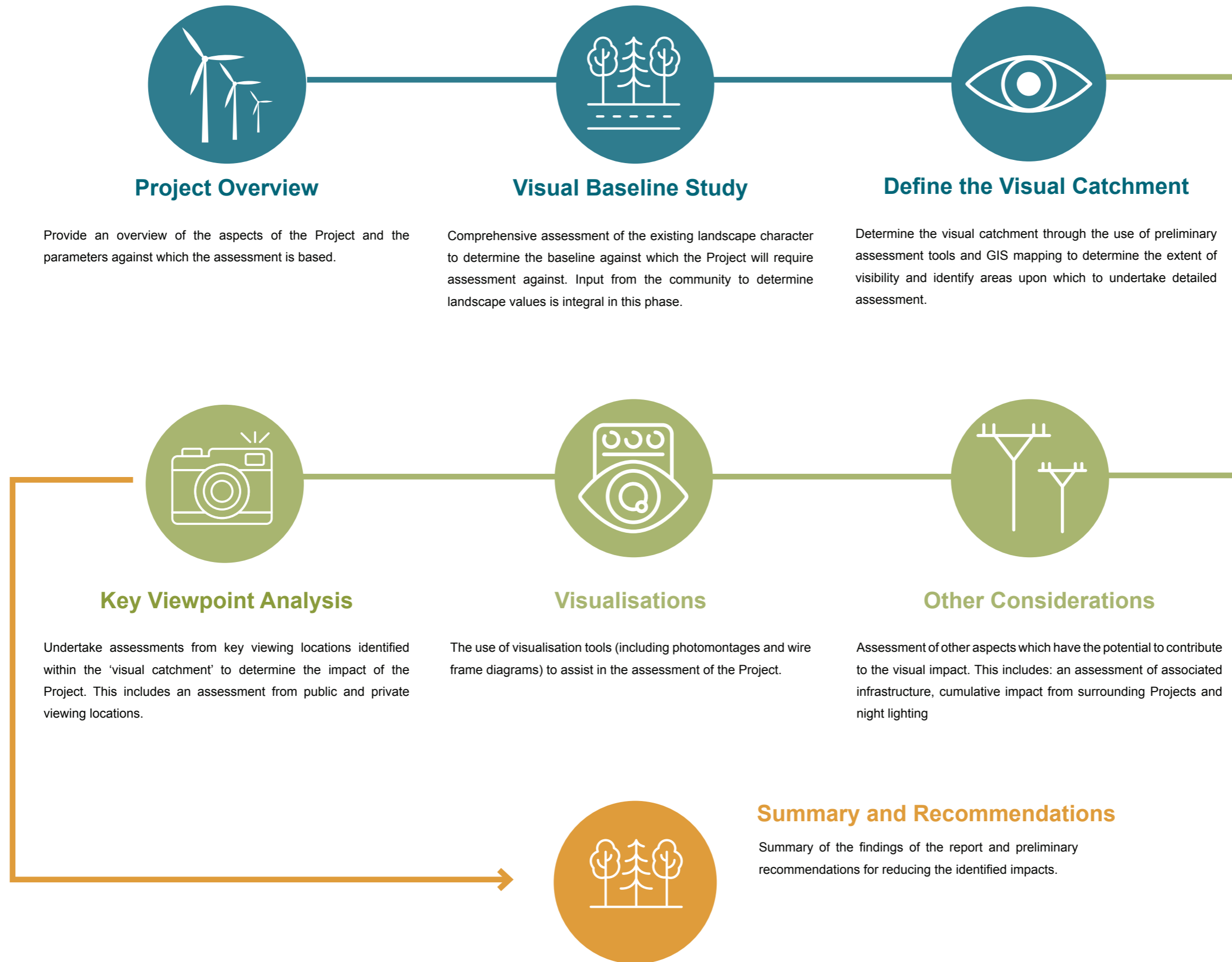
Extensive field work and photographic survey work for the study was undertaken in March, May and December 2021 from public and private properties.

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 part of the assessment have been included in the relevant chapters of the report.

2.5 Landscape and Visual Impact Assessment (LVIA) Process



Landscape and Visual Impact Assessment Report Structure:		
PROJECT	Section 3.0: Project Overview	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Detailed Project Description Wind Turbine Design Associated Infrastructure 	<ul style="list-style-type: none"> 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:
	<ul style="list-style-type: none"> Community Consultation Process Community Landscape Values Community Perception 	<ul style="list-style-type: none"> The proponent is to further consult with the community to verify the community consultation findings from the scoping and design stage.
VISUAL BASELINE STUDY	Section 5.0: Visual Baseline Study	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Detailed assessment of Landscape Character and Key Features of the Region Landscape Character Unit Classification Application of Scenic Quality Class Ratings 	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Preliminary Assessment Tools: <ul style="list-style-type: none"> Visual Magnitude Multiple Wind Turbine Effect 	<ul style="list-style-type: none"> Visual Magnitude Assessment: Mapping the dwellings, key viewpoints and proposed turbines at scale to establish the potential visual magnitude. Map into six sectors of 60° any proposed turbines and any existing or approved turbines within each dwelling or key public viewpoint.
VISUAL CATCHMENT	Section 7.0 - Zone of Visibility	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Zone of Visibility (ZVI) 	<ul style="list-style-type: none"> Establish the theoretical 'zone of visual influence' of the proposal (the area from which the proposal is theoretically visible or the 'visual catchment').
KEY RECEPTOR 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	<ul style="list-style-type: none"> 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.
KEY RECEPTOR ASSESSMENT	Section 9.0: Dwelling Assessment Overview	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Summary of impact on Dwellings Refer to Appendix C - Dwelling Assessments	<ul style="list-style-type: none"> 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:
	<ul style="list-style-type: none"> Photomontage selection process Photomontage development process Refer to Appendix D - Photomontages & Wire Frame Diagrams	<ul style="list-style-type: none"> 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:
	<ul style="list-style-type: none"> Night Lighting Assessment 	<ul style="list-style-type: none"> Consider whether any obstacle lighting required is likely to result in any significant increase in visual impacts.
OTHER ASPECTS	Section 12.0 Cumulative Visual Impacts	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Cumulative Visual Impacts 	<ul style="list-style-type: none"> Address potential cumulative impacts of wind energy projects in the region (the wind energy project as well as existing and approved projects).
OTHER ASPECTS	Section 13.0 Associated Infrastructure	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Overview of impact resulting from Associated infrastructure 	<ul style="list-style-type: none"> the assessment of visual impacts from all ancillary facilities and infrastructure will be required.
OTHER ASPECTS	Section 14.0 Visual Impact on Landscape Character	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Overview of LCUs with regards to Visual Performance Objectives Summary of impact on Landscape Character 	<ul style="list-style-type: none"> Assess the Project using visual performance objectives.
SUMMARY AND RECOMMENDATIONS	Section 15.0 Mitigation Methods	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Wind Farm Design Mitigation Methods for Residences 	<ul style="list-style-type: none"> An outline of any mitigation and management options proposed, including consultation with affected property owners regarding the proposed mitigation works
SUMMARY AND RECOMMENDATIONS	Section 16.0 Visual Performance Evaluation	Visual Bulletin Requirements Addressed:
	<ul style="list-style-type: none"> Evaluation of Visual Performance Objectives 	<ul style="list-style-type: none"> An assessment of the proposed wind energy project against each visual performance objective and demonstration of whether each objective is achieved and how the standard has been achieved.
SUMMARY AND RECOMMENDATIONS	Section 17.0 Conclusion	

Table 1 Report Structure

2.6 Additional Literature

In addition to the Bulletin, the following literature has 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 proposal is considered as a State Significant Development (SSD) and will be assessed as such by the NSW DPE, however relevant local government policies outlined in the Warrumbungle Shire Local Environment plan (LEP) of 2013 have also been considered. The Project is located entirely within the extents of Warrumbungle Shire Local Government Area (LGA) .

2.7.2 NSW Roads and Maritime Services

The assessment of shadow flicker, blade glint and reflectivity is 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 LVIA includes an assessment of potential visual impact associated with night lighting in accordance with the Civil Aviation Safety Authority (CASA). Refer to **Section 11.0** of this LVIA.

03

Project Overview



3.0 Project Overview

3.1 Regional Context

The site is located on the western extent of the Great Dividing Range in NSW, 60 km south of Oberon, 60 km north of Goulburn in NSW and approximately 140 km west of Sydney (see **Figure 2**).

The surrounding area is predominantly National Park with the eastern edge of the site bordered by the Abercrombie National Park to the west. The site is situated in the Oberon Local Government Area (LGA).

The area is heavily undulating with some steep slopes. The site is bisected by Abercrombie Road which links the towns of Oberon and Taralga. The closest towns are Porters Retreat and Curraweela which have township populations of approximately 180 and 320 respectively. Several water courses traverse the area including the Abercrombie River which flows into the Lachlan River. The Abercrombie River forms the southern boundary of the site.

The site is approximately 40km to the north-east of the existing Crookwell 1 and Crookwell 2 Wind Farms and 26 km to the north east of the existing Taralga Wind Farm.

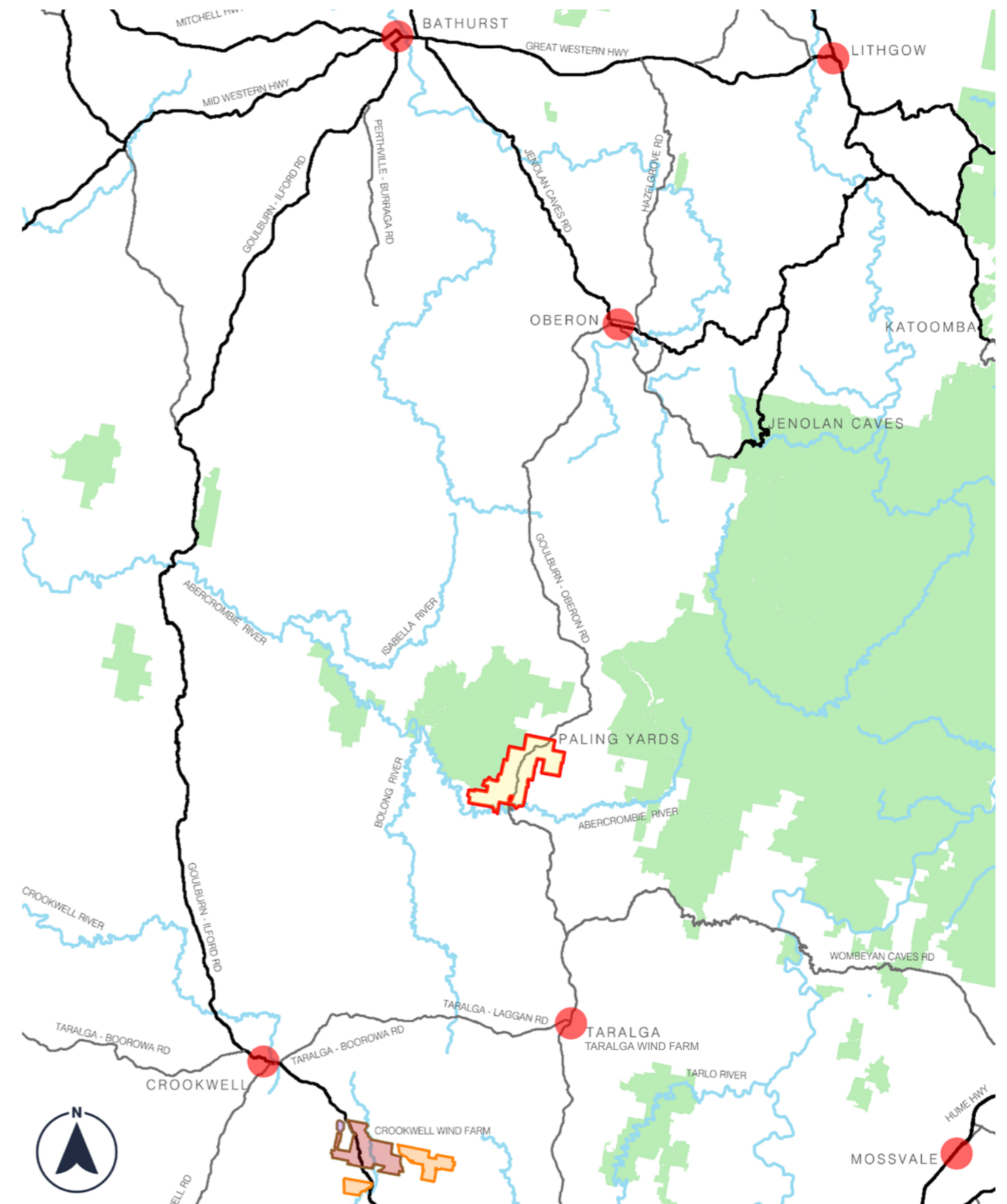


Figure 2 Regional Context (Map Source: Google Maps 2022)

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 km radius around the Project, however assessment of land outside of this radius will be undertaken as necessary. The Study Area is bordered by National Parks and land to the south-east all of which are heavily vegetated.

3.3 The Project Site

The Project Site (referred to as the site) includes four (4) separate land holdings, including 'Mingary Park', 'Paling Yards', 'Middle Station' and 'Hilltop'. Most of the site has been cleared of native vegetation although scattered trees are common within the site and thicker vegetation exists near the site's boundary (see **Figure 3**). The site ranges from between 900 m and 1065 m above sea level with significant slopes in many areas. Several ephemeral creeks and drainage lines cross the site which drains into the Abercrombie River. The site is currently used for agricultural purposes (predominantly for sheep and cattle grazing).

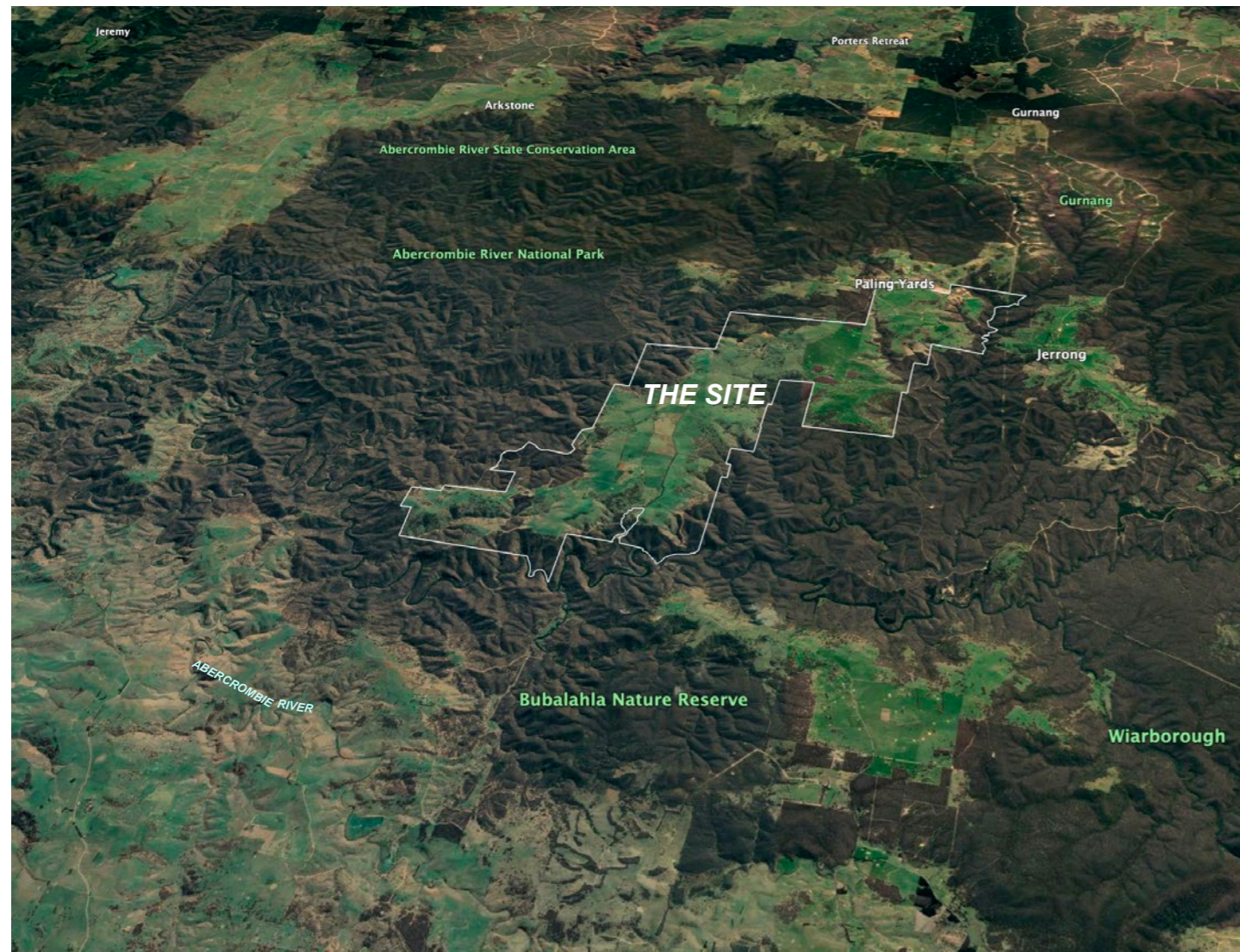


Figure 3 Birds Eye View of the Site (Map Source: Google Maps 2022)

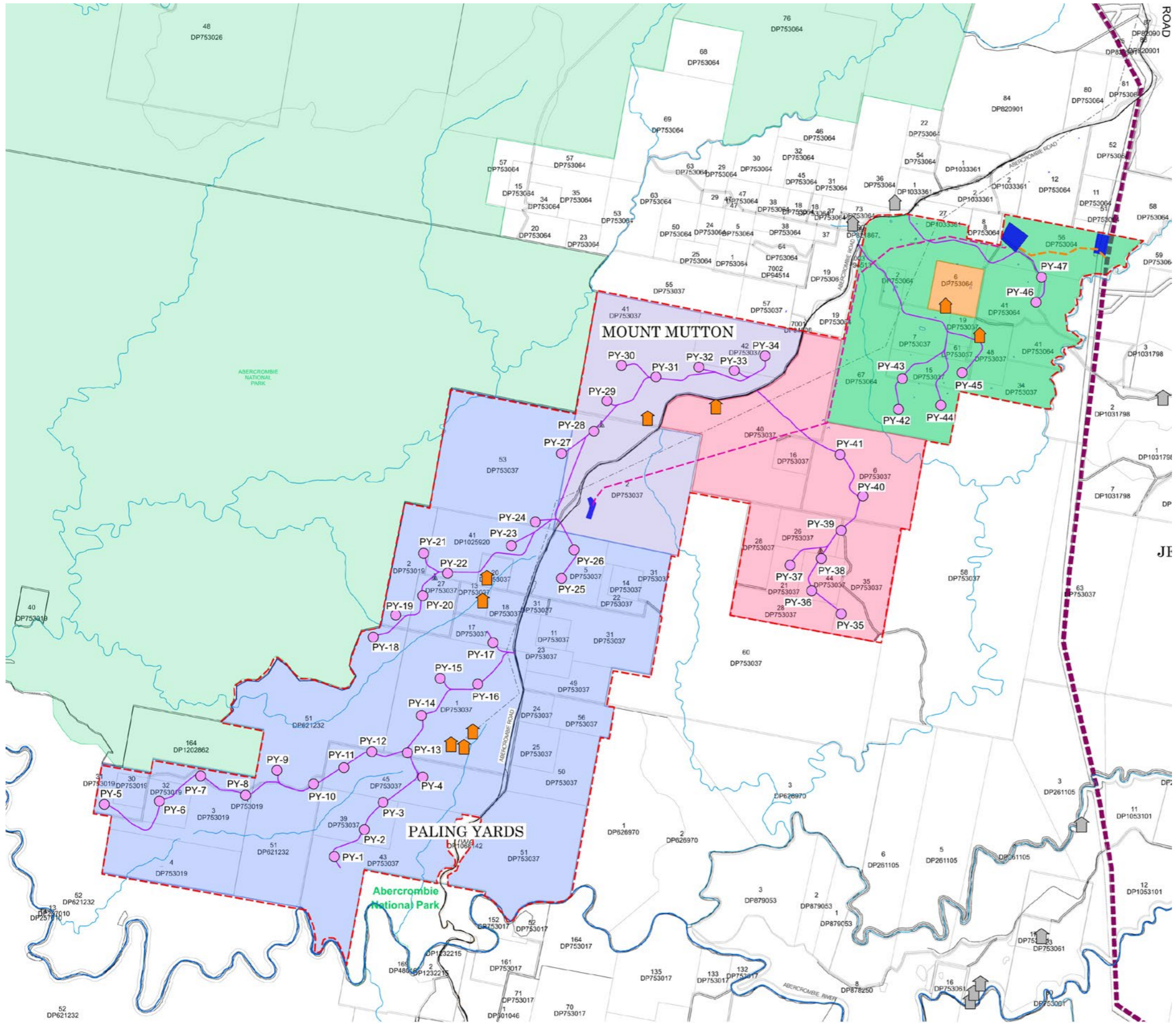
3.4 The Project

The proposed Paling Yards Wind Farm project (the Project) will deliver much needed renewable energy to the region and the overall push to reduce carbon emissions and achieve a net-zero emissions target. The proposal will comprise up to 47 wind turbines, providing a total generation capacity of up to 287 MW.

Whilst the approximate number of turbines that the site can accommodate is expected to be up to 47 wind turbines, the location of the individual turbines will be informed and resolved by the next phase of environmental investigations (see **Figure 4**). The proposed Paling Yards Wind Farm comprises of the following:

- Up to 47 individual wind turbines
- The approximate maximum blade tip height will be up to 240 m;
- Internal unsealed tracks for turbine access;
- Upgrades to local road infrastructure including several access points from Abercrombie Road;
- An on-site 33/132kV collector substation, including control room, maintenance building, switchgear and associated control systems;
- Approximately 8km of 132kV overhead powerline (with a total easement measuring 40-45m to connect the collector substation to the switching substation (including control room and other associated grid connection facilities);
- An on-site 132/500kV switching substation to connect to the existing 500kV Mount Piper to Bannaby transmission line (including control room and other associated grid connection facilities);
- Cut-in works on the 500kV Mt Piper-Bannaby transmission line to connect it to the switching substation, resulting in a section of approximately 1km of 500kV transmission line (with a total easement width of 70m);
- An underground electrical and communication cable network linking turbines to each other and the proposed substation;
- A temporary concrete batching plant to supply concrete for the foundations of the turbines and other associated structures;
- Potential for obstacle lighting to selected turbines;
- Potential for native vegetation removal in some areas and additional vegetation planting to provide screening.

The Project Proposed Paling Yards Wind Farm



LEGEND

- - - Project Boundary
- Proposed 240 m Turbine Location
- 🏠 Involved Dwelling
- 🏠 Non-involved Dwelling
- 🏠 Substation Location
- Main Road
- - - Minor Road
- National Park / Nature Reserve
- - - Existing 500kV Transmission Line
- - - Proposed 500kV Extension
- - - Proposed 132kV Extension
- Land Owner 1
- Land Owner 2
- Land Owner 3
- Land Owner 4
- Land Owner 5

Figure 4 The Project (Map Source: TRACT, 2022)

3.5 Wind Turbine Design

The proposed turbines selected for the Project has not yet been confirmed, this report considers a maximum blade tip height of up to 240 metres as a worst case scenario.

- A generating capacity of 6.1 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 240 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 155 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	240 metres AGL	47
Tower (hub) height	155 metres	
Blade length	79 metres (including nacelle)	
Swept Area	19,607 m	

Table 2 Wind Turbine Parameters for Visual Assessment

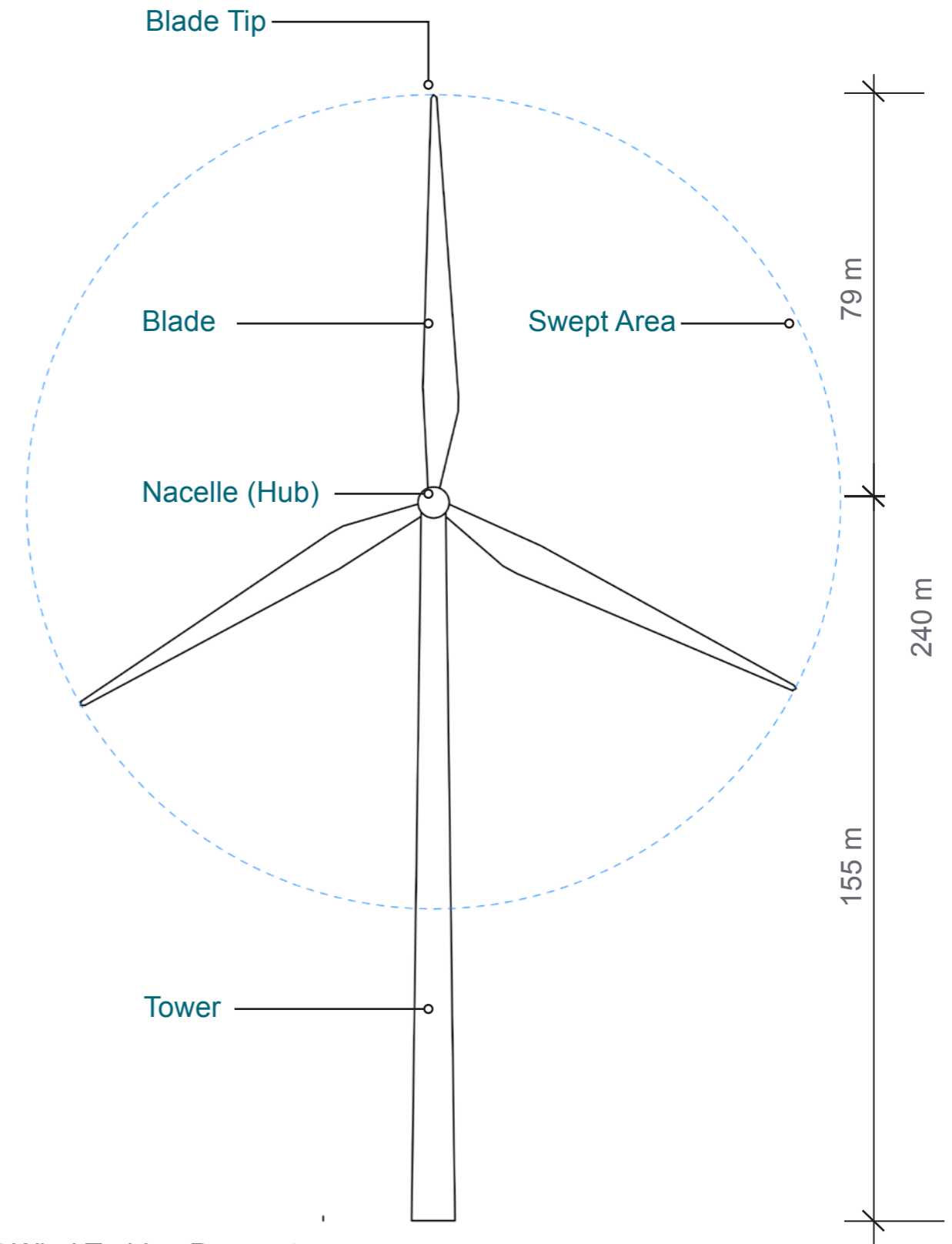


Figure 5 Wind Turbine Parameters

3.6 Associated Infrastructure

In addition to the turbines, the following provides an overview of the permanent associated infrastructure components proposed for the Project which may contribute to the visual impact of the proposal. An overview of the assessment of the potential visual impacts resulting from the associated infrastructure has been provided in **Section 13** of this report.

Associated Infrastructure	
Project Component	Description
On-site substations	Construction of on-site electrical substations (collector substation and connection substation)
Overhead Transmission Lines	A combination of 132 kV and 550 kV lines approximately 9 km in length.
Construction Control Room	Maintenance Building, switchgear and associated control systems in the vicinity of the wind turbines.
Meteorological monitoring masts	Three (3) Wind monitoring masts
Internal & External Roads	Upgrade to existing local road infrastructure and internal unsealed tracks

Table 3 Associated Infrastructure

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

- construction compounds;
- laydown areas; and
- concrete batching plants.



Image 1 Typical Wind Turbine Design (Gullen Range Wind Farm)



Image 2 Typical Substation (Source: NGH)



Image 3 Crane Hardstand Area (Source: NGH)



Image 4 Transmission Line (Source: NGH)



Image 5 Operations and Maintenance Facility (Source: NGH)

04

Community Consultation



4.0 Community Consultation

4.1 Overview of Community Consultation

In accordance with the Visual Assessment 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.

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.

Due to the lengthy time frame of the Project, extensive community consultation has been undertaken to date. Results of consultation undertaken during the life of the Project have been utilised to inform the PVIA including: previous LVIA studies, Socioeconomic studies and submissions to the 2014 EIS.

An EIS was prepared and submitted on 27 January 2014, with the public exhibition taking place between the periods of March-May 2014. The DA received a total of 24 submissions from both the general public and other interested stakeholders. The Response to Submissions Report, together with an Additional Information Report, was finalised and submitted to DPE in April 2020.

Following further detailed discussions on the project between the Proponent and DPE, the previous DA was withdrawn. It was agreed as part of these discussions that due to recent technological advancements in the design of wind turbine equipment, and the amount of time which has passed since submission of the original DA and EIS, it would be best to submit a new application to the Department for consideration and assessment. This new proposal would also provide the opportunity for a new round of community engagement.

In January 2021, calls were made by GPG to property owners within a 5km radius of the proposed project site. The landowners were informed of the intention to submit a new application to DPE. During the phone calls general feedback from the community regarding the wind farm were also asked and noted.

In February 2021, a site visit was carried out by GPG to drop the letters to inform the intention to submit a new application to DPE to the all the landowners for those who were not contactable via phone.

In July 2021, GPG visited the host landowners and discussed about the updated layout and the timeline.

In July 2021, A specialist community consultation firm has been engaged by GPG for the project and started to formulate the initial stage of CSE plan.

In August 2021, GPG started contacting neighbours for discussion of neighbour agreement.

In Sept 2021, Project update in form of newsletter were sent to the community member within 5km by GPG via Australia post and email where possible. GPG has sent project update to both Oberon City Council and Upper Lachlan Council.

Community engagement has continued through the Project and amendments to the Project layout were made based on consultation feedback and stakeholder advice.

Face to face community information sessions were held on the 28th and 29th of July 2022.

- Undertake early and proactive community engagement with nearby residents and the wider community to identify and address any concerns.
- Ensure the layout for the wind farm is designed to minimise potential visual and audible impact, reflecting community feedback and planning requirements.

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.

A Preliminary Visual Impact Assessment (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 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 involved, 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* 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:

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 5.5**

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**

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**

Table 4 Visual Baseline Study Inputs

5.2 Bioregion Context

The Project Area is located within the South Eastern Highlands Bioregion. The South Eastern Highlands bioregion lies just inland from the coastal bioregions of the South East Corner and the Sydney Basin, bounded by the Australian Alps and South Western Slopes bioregions to the south and west.

The South Eastern Highlands Bioregion covers the dissected ranges and plateau of the Great Dividing Range that are topographically lower than the Australian Alps, which lie to the southwest. The bioregion includes the towns of Orange, Bathurst and Lithgow in the north, Goulburn, Queanbeyan and Yass in the centre and Cooma, Jindabyne and Bombala in the south.

Images 6 - 8 illustrate the typical character of the landscape within the Study Area, which is consistent with the character of the NSW South Eastern Highlands Bioregion.

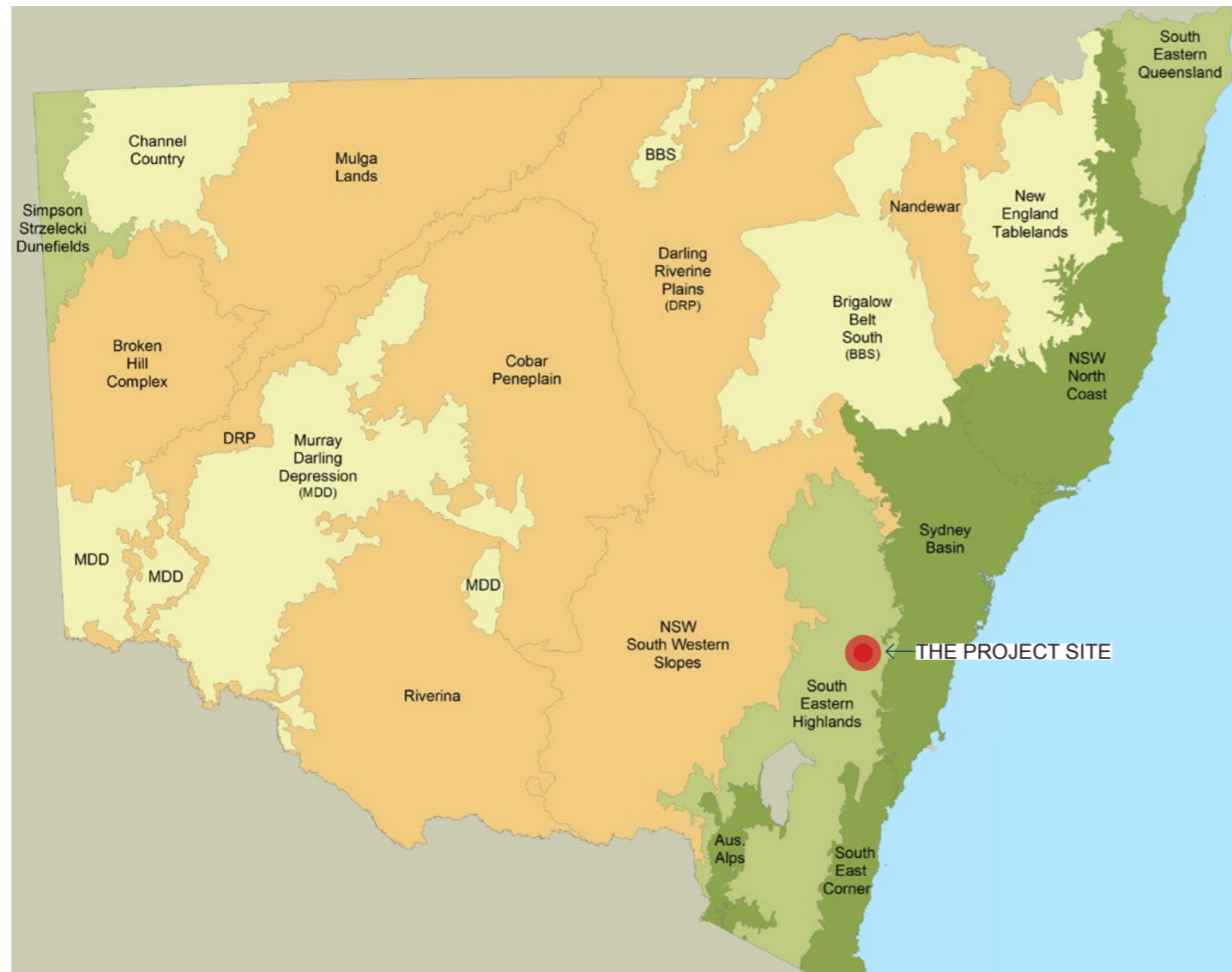


Figure 5 Bioregions of New South Wales
(Source: NSW Department of Planning, Industry and Environment, 2012)



Image 6 Topography Typical of the Study Area



Image 7 Dense vegetated hills typical of the Study Area

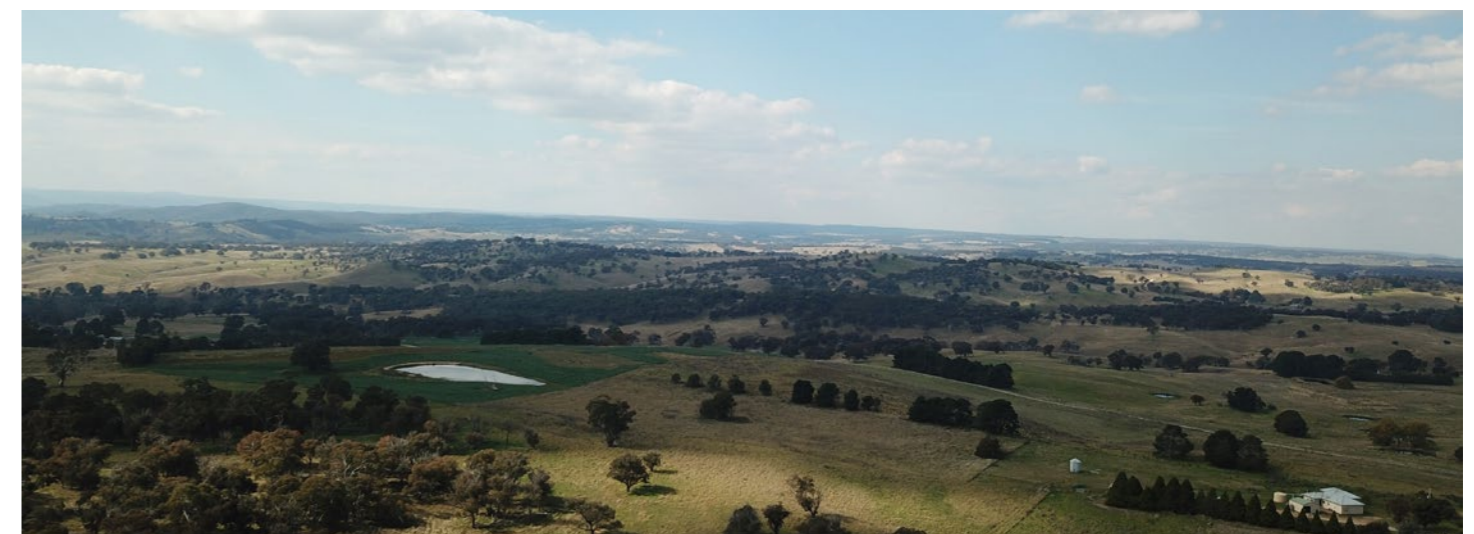


Image 8 Cleared grazing land typical of the Study Area

5.3 Sensitive Land Use Designations

The Project is located within the Oberon Local Government Area and Upper Lachlan Shire is located to the south of the Project Site. The following provides an overview of the land use zoning within the Study Area and its immediate surrounds as shown on **Figure 6**.

5.3.1 RU1 Primary Production

The Project Site and land immediately east of the Project Site is predominately zoned RU1 - Primary Production under the Oberon Local Environment Plan 2013.

The objectives of the RU1 zoning include:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- 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 enable other forms of development associated with primary production activities, which may require an isolated location or which support tourism or recreational activities.

5.3.2 RU2 Rural Landscape

Land to the south of the Project associated with the Upper Lachlan Shires predominately zoned RU1 - Primary Production under the Upper Lachlan Local Environment Plan 2010.

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To maintain the rural landscape character of the land.
- To provide for a range of compatible land uses, including extensive agriculture.
- To preserve environmentally sensitive areas including waterways and prevent inappropriate development likely to result in environmental harm.
- To protect the Pejar catchment area from inappropriate land uses and activities and minimise risk to water quality.
- To minimise the visual impact of development on the rural landscape.
- To minimise the impact of development on the existing agricultural landscape character.
- To protect and enhance the water quality of watercourses and groundwater systems and to reduce land degradation.
- To maintain areas of high conservation value vegetation.

5.3.3 RU3 Forestry

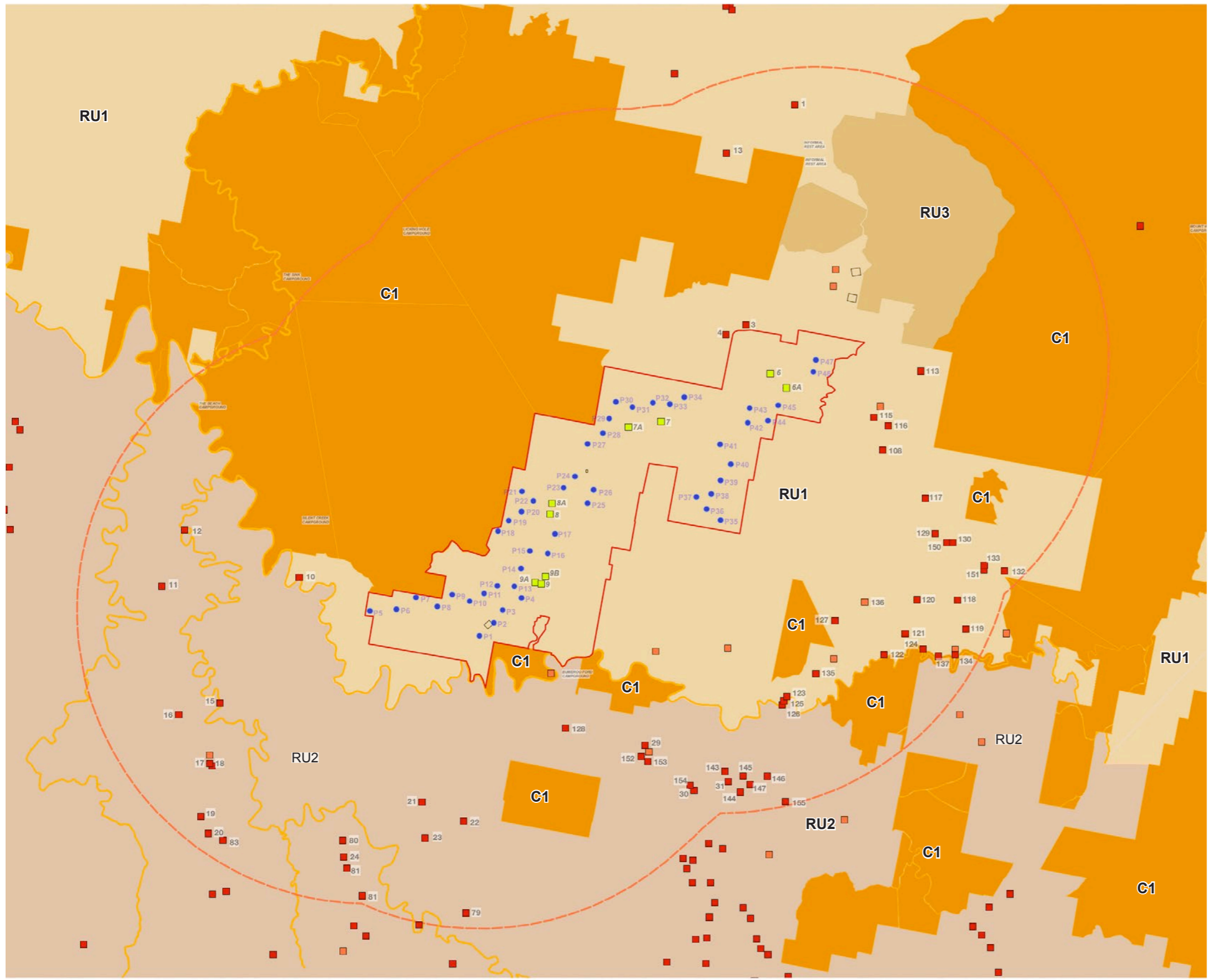
To the north east of the Project Site is the Gurnang State Forest which is zoned RU3 Forestry to enable development for forestry purposes and other development that is compatible with forestry land uses.

5.3.4 C1 National Parks and Nature Reserves

Land immediately west of the Project, southeast and to the east of the Project Area have been zoned as C1 - National Parks and Nature Reserves these include:

- Abercrombie River National Park
- Blue Mountains National Park
- Bubahla Nature Reserve
- Wairborough Nature Reserve

Land in these areas are reserved under the National Parks and Wildlife Act 1974 to protect their environmental significance. The EIS phase will refer to the Guidelines for development adjoining NPWS lands for general information on NPWS's expectations in relation to development that has the potential to impact NPWS lands.



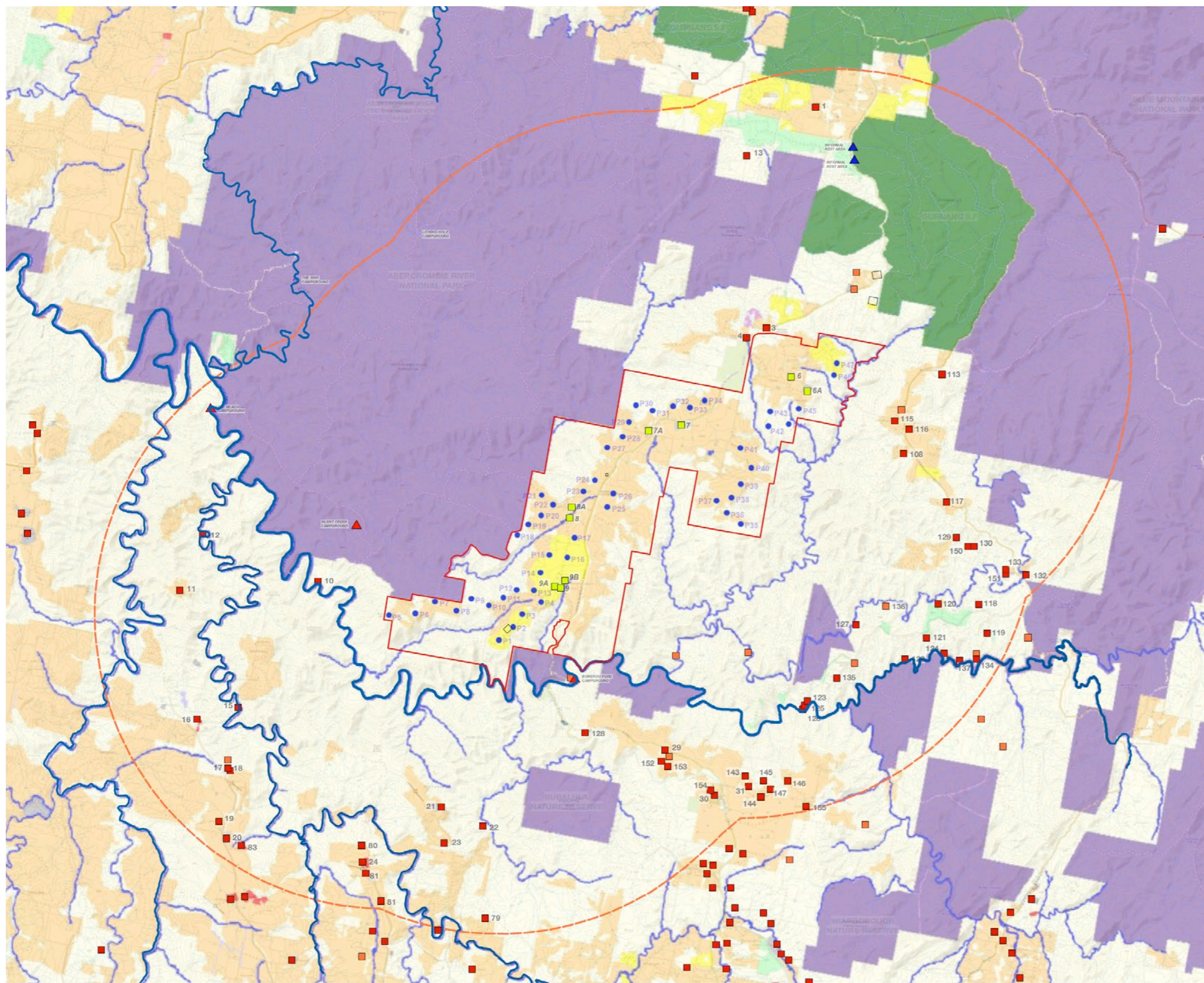
Land Zoning

Paling Yards Wind Farm

- LEGEND**
- Project Boundary
 - Proposed 240 m Turbine Location
 - Involved Dwelling
 - Non-involved Dwelling
 - Ambiguous Building
 - RU1 Primary Production
 - RU2 Rural Landscape
 - RU3 Forestry
 - E1 National Parks and Nature Reserves
 - 8,000 m from nearest turbine



Figure 6 Land Zoning



Land Use

Paling Yards Wind Farm

- LEGEND**
- Project Boundary
 - Proposed 240 m Turbine Location
 - Involved Dwelling
 - Non-involved Dwelling
 - Ambiguous Building
 - Main Road
 - Minor Road
 - - - 8000 m from turbine
- Land Use:**
- Dryland Cropping
 - Grazing, native vegetation
 - Grazing, modified pastures
 - Nature Conservation
 - Minimal Use
 - Grazing, modified pasture
 - Plantation forestry
 - Water



Figure 7 Land Use

5.4 Key Landscape Features & Key Viewing Locations

The Bulletin states proponents must identify key landscape features, dwelling locations and key public viewpoints (refer to **Figure 8**). The following section provides an overview of the key features identified.

5.4.1 Rivers and creeks

The Abercrombie River runs for a total distance of 130km from its source near Mount Werong till its confluence with Lachlan River in Cowra. It provides habitat for platypus and water rats. A number of significant creek lines and rivulets flood the river plain and form a part of the unique riparian character of this area. Abercrombie River is one of the most significant features of the landscape that runs along the southern boundary of the Project Area. Significant creeks that drain the floodplain include Burra Burra Creek, Mount Werong Creek, Wiarborough Creek and Manus Creek.

5.4.2 National Parks and Nature Reserves

The north-eastern boundary of the Project Area is bordered by the Abercrombie River National Park. The Park covers an area of 19,000 hectares and comprises of two other nature reserves - the Razorback Nature Reserve and Copperhannia Nature Reserve. The Park is characterized by diverse vegetation communities that are characteristic of montane and tableland species and remnant bushland within the south-western Central Tablelands of NSW (NPWS, 2002).

To the east of the Project Area is the Blue Mountains National Park. The Park is characterized by undulating hills with dry sclerophyll vegetation. The Mount Werong area of this Park covers the headwaters of the Abercrombie River. This area along with the Razorback Nature Reserve and Copperhannia Nature Reserve plays an important role in conserving the character of one of the most important river systems in this region.

5.4.3 State Forest

The Gurnang State Forest is located to the northeast of the Project Area and covers an area of about 23,000 hectares. The State Forest is used for commercial forestry and is a highly modified landscape. It is also used for recreational activities such as authorised hunting.



Image 9 Blue Mountains National Park



Image 10 Abercrombie River viewed from Bummaroo Campground

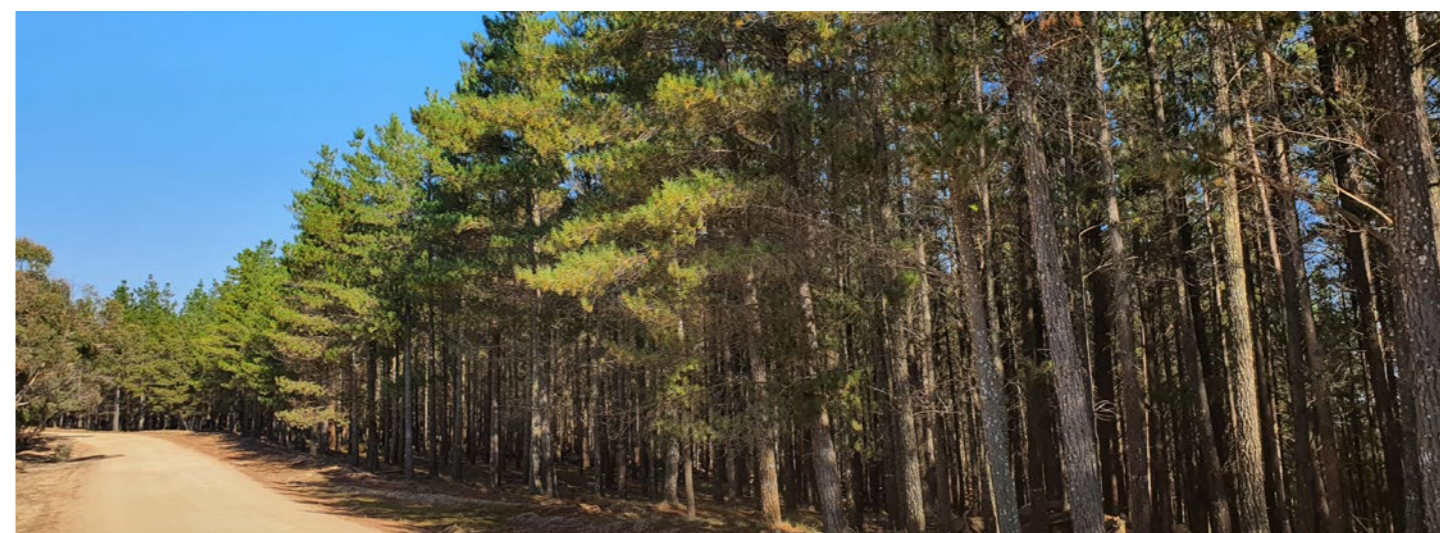


Image 11 Typical plantation associated with the State Forest

5.4.4 Topography

Central Tablelands region is a key livestock and agricultural production hub that is characterized by an undulating to hilly topography. The Project Area is located on a raised tableland that ranges from 800m-1000m AHD in elevation. The surrounding region is predominantly undulating towards the north and steep with densely vegetated slopes towards the south (Environment NSW, n.d.). The high elevation of the Project Area makes it prominent in an otherwise undulating landscape. Settlements located to the southwest and south of the Project Site have views looking onto the raised tablelands.

5.4.5 Scenic lookouts / Points of interest

Significant points of interest include the Wombeyan Caves precinct which offers recreational opportunities such as camping, fishing, swimming and bush walking. Broughton's Lookout is located near Wombeyan Caves within the extents of Blue Mountains National Park. Most of these points of interest can be accessed by 4WD tracks and trails that run along the rugged, steep topography of the National Parks and Nature Reserves.

5.4.6 Walking tracks and Campgrounds

Abercrombie River National Park and the Blue Mountains National Park offer many scenic trails and campgrounds for their visitors. Some of these are the:

- Bummaroo Ford Campground,
- Silent Creek Campground,
- The Sink Campground,
- The Beach Campground,
- Licking Hole Campground and;
- Mount Werong Campground

5.4.7 Access Roads

Abercrombie Road is the main road that runs through the Project Area roughly in the north-south direction. Proposed turbines will be located along the stretch of the road that runs through Paling Yards. The road serves as a major connector between Black Springs, Oberon and Curraweela, Taralga and other towns. The road negotiates through a rough and steep topography around the Abercrombie River valley area and is used by trucks, recreation vehicles and cars. Abercrombie Road forms apart of the scenic tourist drive between Goulburn and Oberon.



Image 12 Topography typical of the Study Area



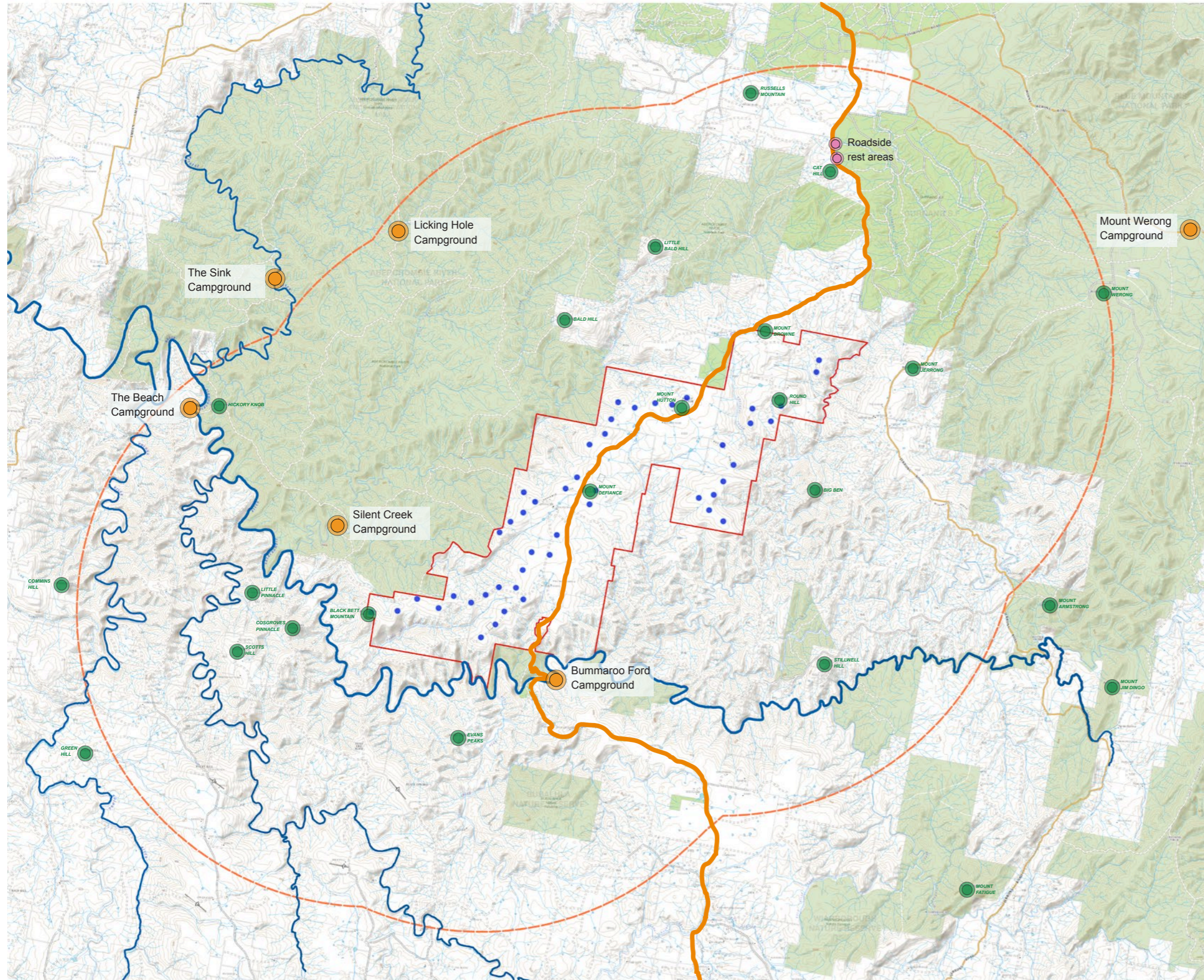
Image 13 Taralga Township



Image 14 Abercrombie Road

Landscape Features & Key Viewpoints

Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Main Road
- Minor Road
- - - 8000 m from turbine

Landscape Features:

- Rivers
- ~ Creekline
- State Forest
- National Park
- High Point
- Abercrombie Road

Key Viewing Locations

- Campgrounds
- Rest Area



Figure 8 Landscape Features and Key Viewpoints (Map Source: Six Maps 2022)

5.5 Landscape Character Unit Classification

Due to the large scale of the Study Area and varying landscape character the Study Area has been categorised into six (6) Landscape Character Units to assist in the assessment.

The Landscape Character Units (LCU) are classified by slight variations in the landscapes geology, topography, land use and vegetation which create distinct character areas within the Study Area. The LCUs have been informed by land use patterns, vegetation coverage, topographical maps, site images and site inspection.

The general extent of the LCUs are shown on **Figure 9**. The Scenic Quality 'frame of reference' has been applied to each LCU (refer to **Table 6**).

5.6 Scenic Quality Class Rating

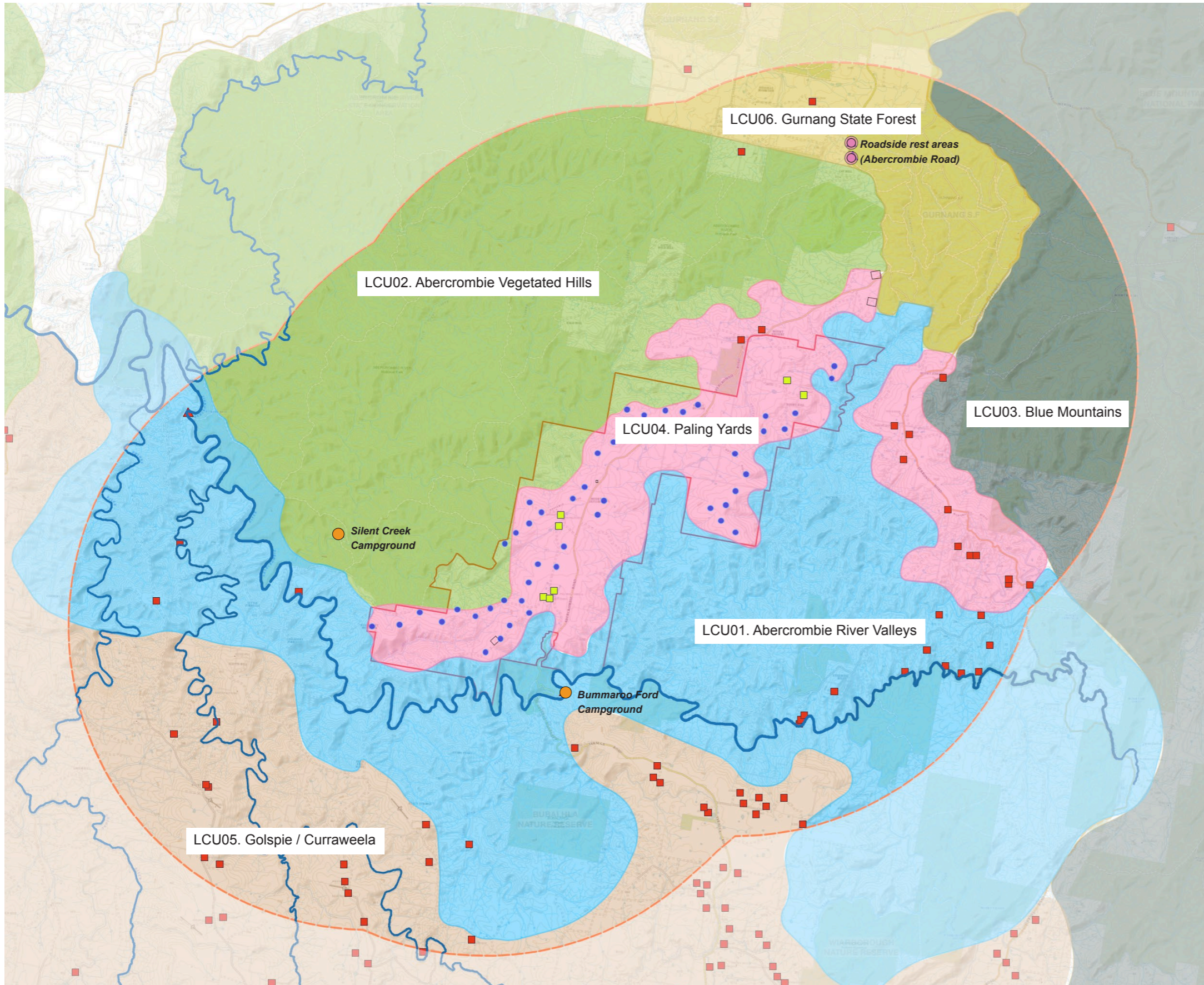
The Bulletin states: the baseline study inputs, including key landscape features and sensitive land use designations, should lead to the identification of Scenic Quality Classes. Scenic quality refers to the relative scenic or aesthetic value of the landscape based on the relative presence or absence 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.

In accordance with the Bulletin, a Scenic Quality ‘frame of reference’ has been formulated by Moir Landscape Architecture (**Table 5**) utilising An approach to landscape sensitivity assessment by Natural England. The frame of reference developed for Valley of the Winds 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 (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**).

SCENIC QUALITY RATING FRAME OF REFERENCE		
LOW	MODERATE	HIGH
LAND FORM		
- Flat Topography		- Diversity in Topographical Range
- Absence of Landscape Features		- Unique Landscape Features
- Open, broad extents of spaces		- Intimate spaces
WATER FORMS		
- Absence of Water		- Presence of Water
		- Visually prominent lakes, reservoirs, rivers streams and swamps.
VEGETATION		
- Absence of vegetation		- Abundant vegetation
- Lack of diversity		- High diversity
- Land cleared of endemic vegetation		- High retention of endemic vegetation.
- Low level of connection between vegetation and landscape / topography		- High level of connectivity between natural landscape and landforms.
HUMAN INFLUENCE		
- High population.		- Low / dispersed population
- High density in settlement		- No settlement
- High presence of Infrastructure		- Absence of infrastructure
- High levels of landscape modification		- Landscape in natural state
ACTIVITY		
- High levels of traffic movement		- Low traffic movement
- Presence of freight and passenger transport networks		- Absence of freight and passenger transport
- Presence of production or industry.		- 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		- High visibility with adjoining landscapes.
- Low variability between adjoining landscapes.		- High variability and contrast with adjoining landscapes
- Landscape features do not contribute to amenity from adjoining landscapes		- Landscape features contribute significantly to amenity of adjoining landscapes

Table 5 Scenic Quality Rating Frame of Reference



Landscape Character Units

Paling Yards Wind Farm

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- 8000 m from turbine

Landscape Features:

- ~ Rivers
- ~ Creekline

Points of Interest:

- Campgrounds
- Rest Area

Landscape Character Units:

- LCU01. Abercrombie River Valley
- LCU02. Abercrombie Vegetated Hills
- LCU03. Blue Mountains
- LCU04. Paling Yards / Jerrong
- LCU05. Golspie / Curraweela
- LCU06. Gurnang State Forest

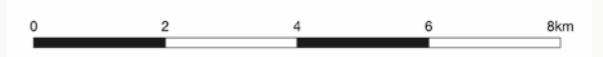


Figure 9 Landscape Character Units (Map Source: Six Maps 2022)



Image 15 Typical character of Abercrombie River Valley

LCU01: Abercrombie River Valley

The Abercrombie River Valley is located south of the Project Site and borders the southern boundary of the Project Site. The River runs for a distance of 42 km and, along with other waterways such as Silent Creek and Retreat River, forms the Lachlan River catchment (NPWS, 2002). The river valley comprises of deep, steep hills with dense vegetation that is relatively untouched. The river surrounds are extensively used for recreational activities such as camping, picnicking, swimming and fishing. Prominent camp grounds include Silent Creek Campground, Bummaroo Ford Campground, and The Beach Campground.



Image 16 Birds eye view of Abercrombie River National Park

LCU02: Abercrombie Vegetated Hills

The Abercrombie River National Park is located immediately west of the Project Site. For the purpose of this PVIA, the Abercrombie River National Park and adjoining vegetated hills has been defined as a character typology. The Abercrombie Vegetated Hills has unique vegetation communities that it hosts within its boundaries. The National Park supports diverse and important riparian vegetation communities which are characteristic of montane, tableland and western slopes species and also comprises of a large parcel of remnant bushland vegetation that is typical of the dry tablelands region (NPWS, 2002).

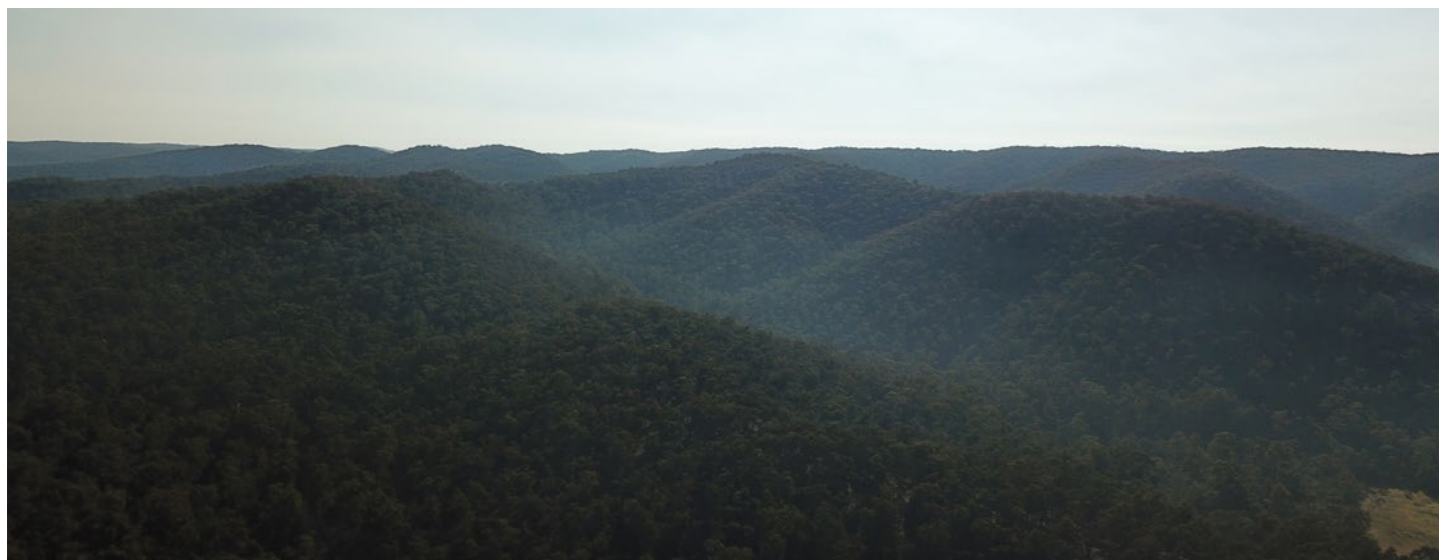


Image 17 Birds eye views of Blue Mountains National Park LCU

LCU03: Blue Mountains

Located to the east of the Project Site, the Blue Mountains National Park forms another character unit in the immediate vicinity of the Project Site. It is characterized by densely vegetated hilltops that rise at the same elevation as the Project Site. The topography is steep and undulating with prominent recreational spots such as Mount Werong Campground, Mount Jim Dingo and Mount Armstrong. Certain parts of the National Park are inhabited by low density rural settlements. Majority of the vegetation in the area forms a part of the dry sclerophyll forests.

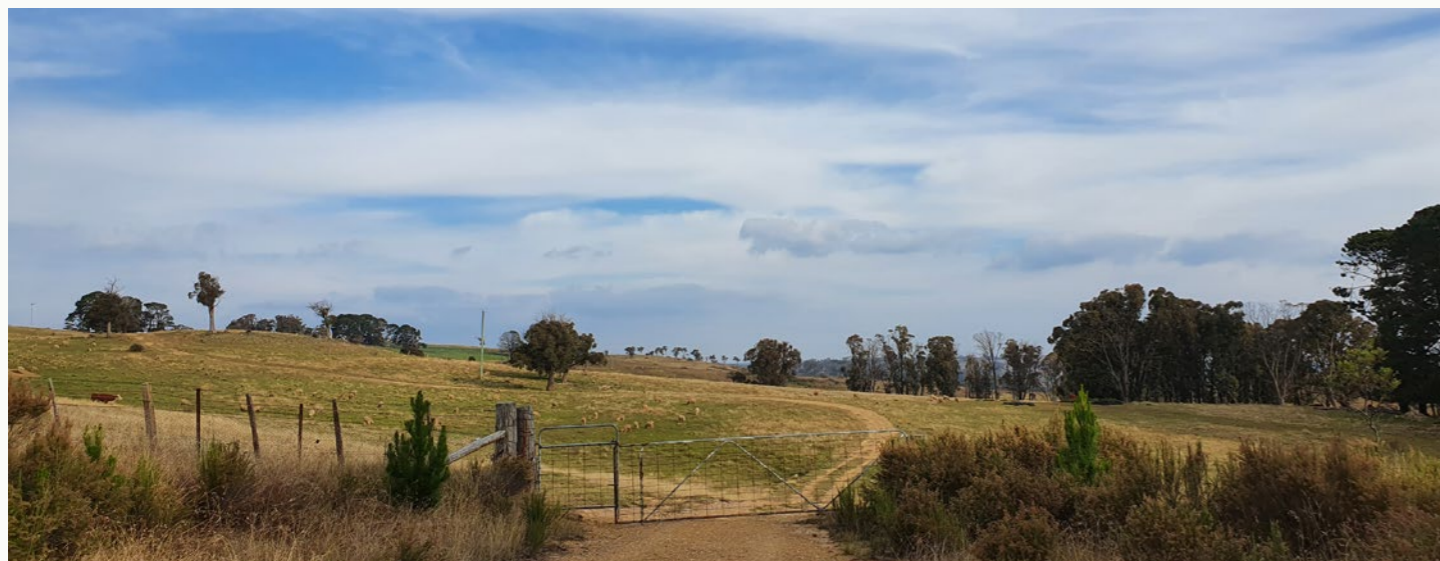


Image 18 Character of Paling Yards / Jerrong LCU

LCU04: Paling Yards / Jerrong

The Central West Tablelands which is characterized by gently undulating to steep, rough country forms the most prominent part of the Project Site. It runs roughly North-South and comprises of cleared, undulating hills that are extensively used for livestock grazing. The altitude is 800-1000m AHD and it stands as a feature amidst the surrounding undulating topography. Abercrombie Road is the main connector that runs north-south and cuts across the landscape character unit and it changes to Taralga Road beyond the Abercrombie River. It is an important road that connects towns such as Oberon, Black Springs, Curraweela and Taralga.



Image 19 Pastoral character of Golspie and Curraweela

LCU05: Golspie / Curraweela

Towns such as Golspie and Curraweela are located in the Upper Lachlan Shire and are set over a gently undulating topography which is lower than the elevation of Paling Yards. The population of both these towns engage in livestock farming. As per the 2016 Census, the population of Golspie was 58 and that of Curraweela was 47 (ABS, 2017). Agricultural activity in these areas predominantly operates in the areas of grain-sheep and grain-cattle farming, specialised sheep and beef cattle farming and horse farming. The gently undulating landform hosts more settlements than those in Paling Yards around the Project Site Area.



Image 20 & 21 Plantation forestry and harvested land within Gurnang State Forest

LCU06: Gurnang State Forest

Gurnang State Forest is located northeast of the Project Site Area. It covers an area of 23,000 hectares and is primarily used for plantation forestry and also offers opportunities for authorised hunting. Surrounding settlements include Jerrong, Paling Yards, Porters Retreat and Jaunter. The landscape is highly modified for commercial forestry and supports the communities that live in close proximity to this area.

Landscape Character Units

LCU:	Name:	Key Landscape Features:	Key Viewpoints:	Application of Scenic Quality Rating Frame of Reference:							Scenic Quality Rating:	
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes		
LCU01	Abercrombie River Valley	Abercrombie River	Bummaroo Ford Campground The Beach Campground	H	●	●	●	●	●	●	●	MODERATE
				M								
				L								
LCU02	Abercrombie Vegetated Hills	Vegetated Ranges	Silent Creek Campground Licking Hole Campground The Sink Campground	H	●		●	●	●	●	●	MODERATE / HIGH
				M		●				●		
				L								
LCU03	Blue Mountains	Vegetated Ranges	Mount Werong Campground	H	●		●		●	●	●	MODERATE / HIGH
				M		●		●				
				L								
LCU04	Paling Yards / Jerrong	Rural Land Local high points	Abercrombie Road Jerrong Road	H								MODERATE
				M	●			●	●	●	●	
				L		●	●					
LCU05	Golspie / Curraweela	Bolong River Burra Burra Creek	Taralga Road	H								LOW / MODERATE
				M			●	●	●	●	●	
				L	●	●						
LCU06	Gurnang State Forest	Forest	No Public Access	H								LOW
				M	●							
				L		●	●	●	●	●	●	

Table 6 Overview of Landscape Character Unit 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.

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**)

Once defined, 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.

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 10**.

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*. The proposed wind turbines are based on a worst case scenario with a tip height of up to 240 metres. The 'black line' intersects at a distance of 3,200 metres and the 'blue line' intersects at 4,750 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.

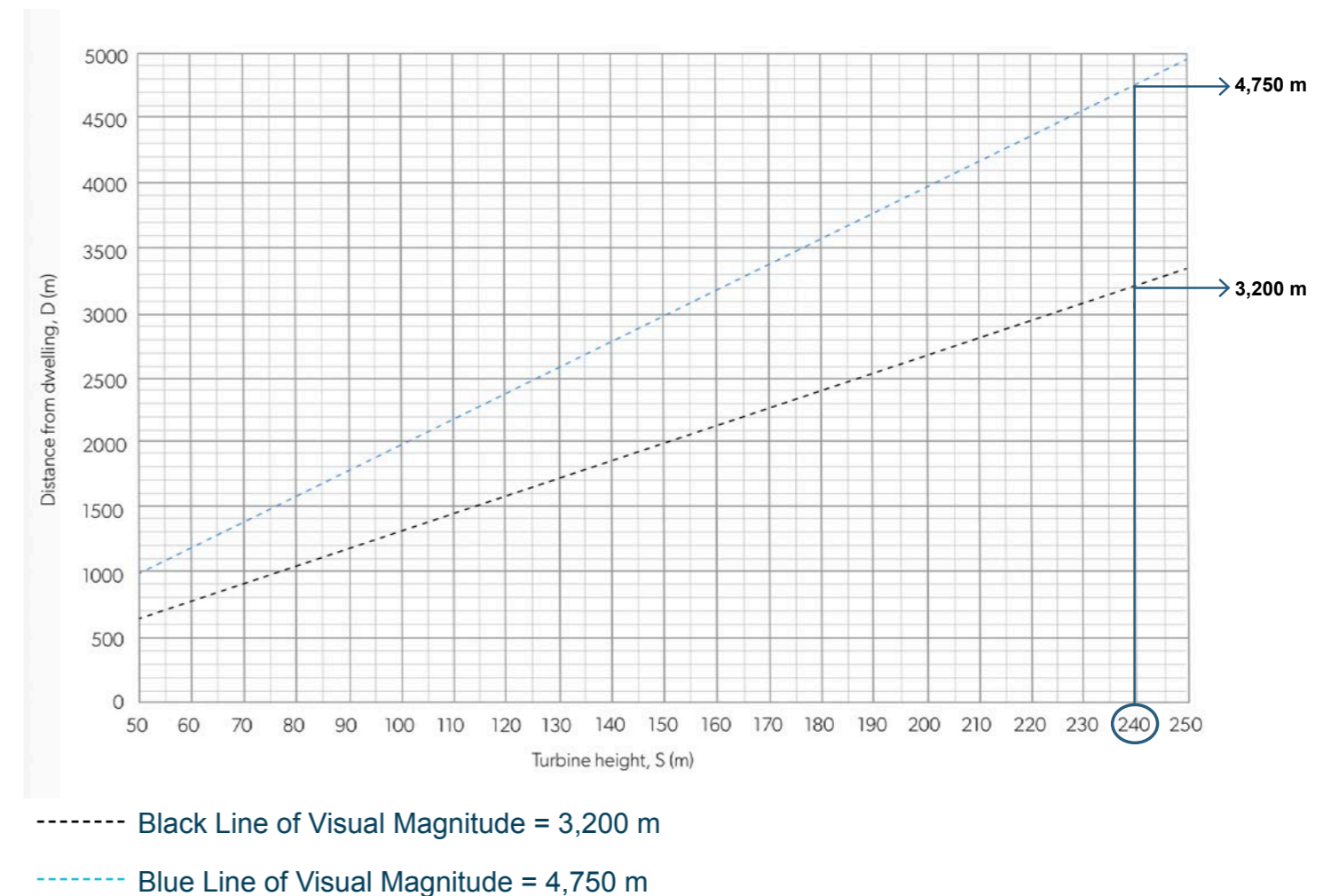
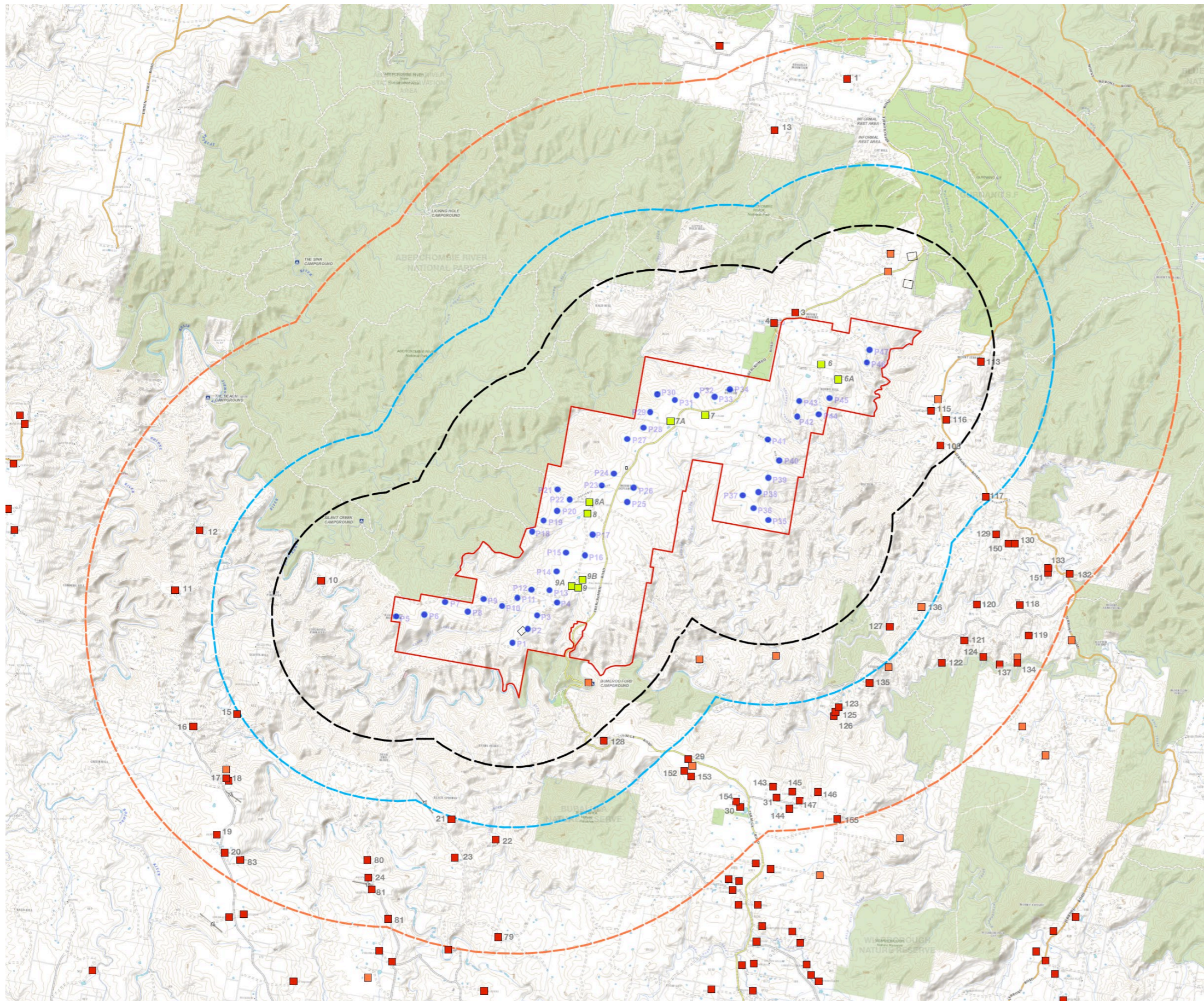


Figure 10 Preliminary Assessment Tool 1: Visual Magnitude thresholds for Project Layout
(Source: Visual Assessment Bulletin)

Visual Magnitude Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Ambiguous Building
- 3,200 m from turbine
- 4,750 m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road

Note:

Preliminary Assessment Tool 1: Visual Magnitude is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing turbines.

Figure 11 Preliminary Assessment Tool 1: Visual Magnitude (Map Source: Six Maps 2022)

6.3 Results of Preliminary Assessment Tool 1: Visual Magnitude

Application of the Preliminary Assessment Tools to the Valley of the Winds Wind Farm Project identified dwellings which require further assessment in accordance with the Bulletin. A total of 10 non-involved dwellings have been identified through the use of the preliminary assessment tools for further assessment.

Non-involved dwellings identified within 3,200 metres and between 3,200 - 4,750 metres of the nearest proposed turbine are shown on **Figure 11**.

Of the 10 non-involved dwellings identified within 4,750 metres of the nearest turbine:

- *Seven (7)* non-involved dwellings have been identified within 3,200 metres of a proposed wind turbine location (within the black line). See **Table 7**.
- *Three (3)* non-involved dwellings are located within 3,200 - 4,750 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-involved dwellings within 3,200 metres of nearest WTG (Black Line of Visual Magnitude)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 3,200 m
4	2.14 km	P34	10
3	2.15 km	P47	8
115	2.05 km	P46	4
116	2.49 km	P46	3
10	2.16 km	P5	2
108	2.84 km	P46	3
113	2.88 km	P47	2

Non-involved dwellings within 4,750 metres of nearest WTG (Blue Line of Visual Magnitude)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 4,750 m
117	4.55 km	P46	1
127	4.13 km	P35	1
128	3.45 km	P1	9

Table 7 Dwellings within Black and Blue Line of Visual Magnitude

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 12** below provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors.

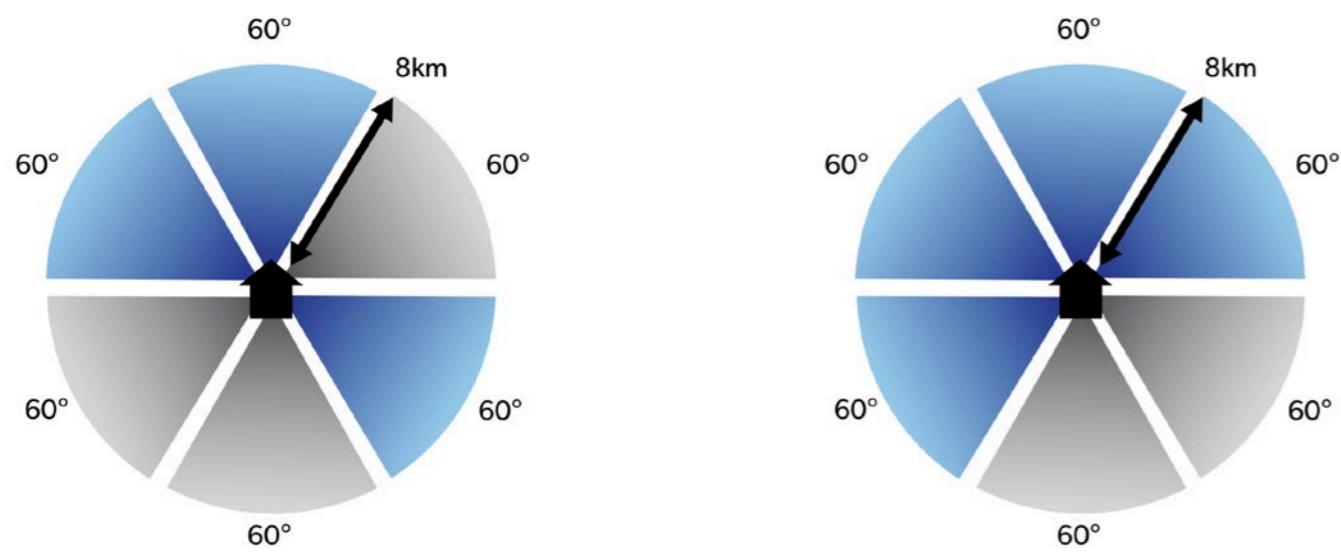


Figure 12 Preliminary Assessment Tool 2: Multiple Wind Turbines

(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 13 provides an overview of the number of 60° sectors visible from each of the dwellings identified within 8 kilometres.

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

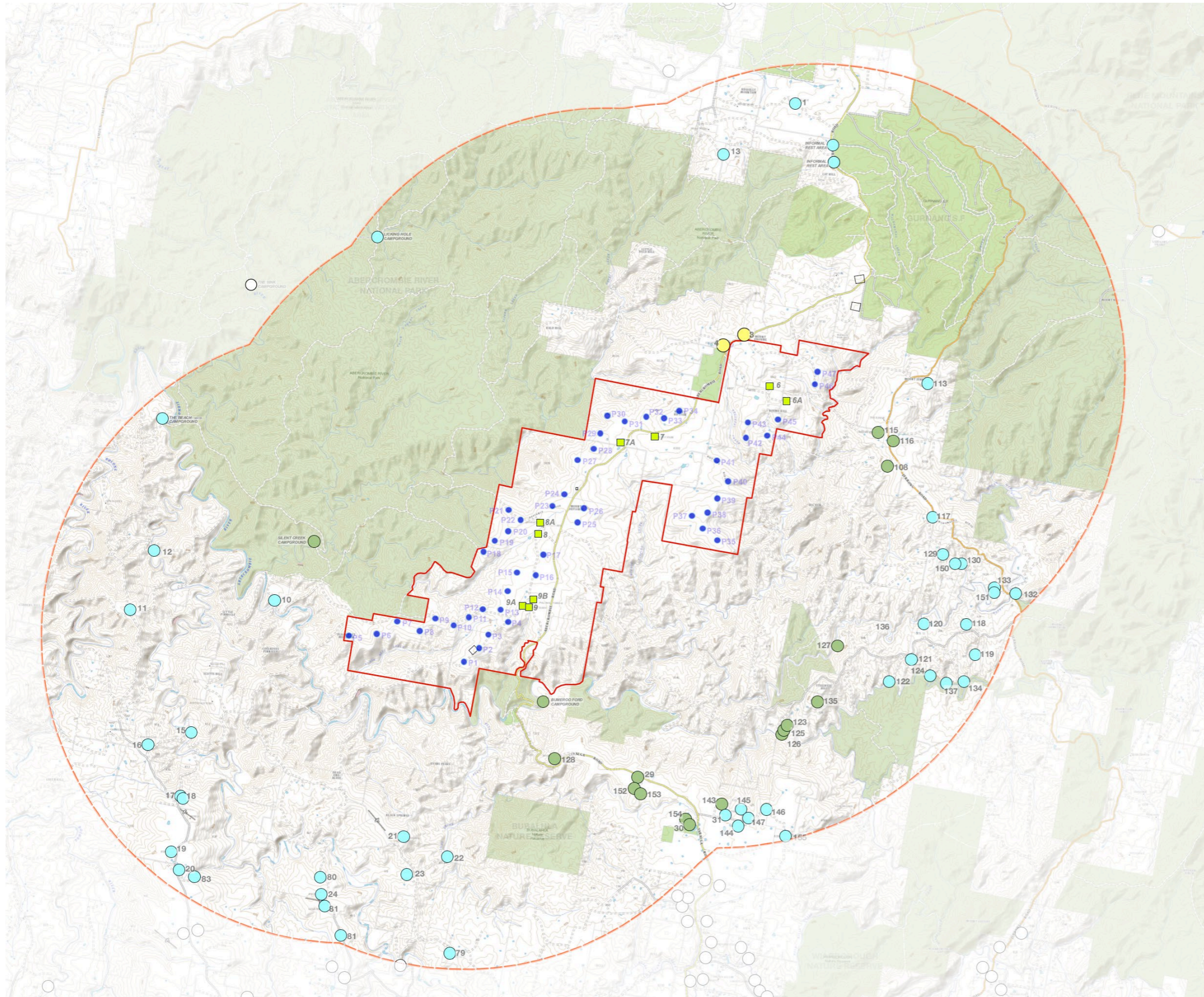
When applied to the Project, the 2D Multiple Wind Turbine Tool (see **Figure 13**) identified a total of two (2) non-involved dwellings with turbines located in three (3) 60 degree sectors. All remaining non-involved dwellings had turbines within one (1) or two (2) 60 degree sectors which is deemed an acceptable level in accordance with the Bulletin. There are no other proposed, approved, or operational wind farm projects within close proximity to the Project which require consideration when applying the Multiple Wind Turbine Tool.

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

- Two (2) non-involved dwellings have been identified as having up to three (3) 60 degree sectors visible (based on a 2D assessment alone): Dwellings 3 and 4.
- Dwelling 4 was identified as having turbines in up to three (3) 60 degree sectors, detailed assessment identified intervening vegetation is likely to reduce the extent of visible turbines to less than two (2) 60 degree sectors.
- Dwelling 3 was identified as having turbines in up to three (3) 60 degree sectors. Detailed assessment of this dwelling identified existing wind break planting surrounding the dwelling will screen views to the Project.

In accordance with the Bulletin, these non-involved dwellings have been assessed in further detailed in **Appendix C**.

Multiple Wind Turbine Tool Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- 8,000 m from turbine
- Main Road
- Minor Road

NON-INVOLVED DWELLINGS

NUMBER OF 60° SECTORS:

- Dwelling in excess of 8 kilometres
- One (1) 60° Sector (60°)
- Up to Two (2) 60° Sectors (120°)
- Up to Three (3) 60° Sectors (180°)



Figure 13 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool (Map Source: Six Maps 2022)

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 14 depicts the areas of land from which the proposed development may be visible at a blade tip height of 240 m and provides an indicative number of visible wind turbines.

Figure 15 depicts the areas of land from which the proposed turbines would theoretically be visible from a hub height of 155 m.

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 10km from the project. Although it is possible for the development to be visible from further than 10km away, it is generally accepted that beyond 10km visibility is greatly diminished.

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 undulating topography that characterises the landscape, there are large areas of land in the Study Area, from which the Project will be screened by topography.
- Views to the Project will be unavailable from valley floors associated with Abercrombie River National Park.
- Views to the Project are unlikely to be available or will be limited from a large percentage of dwellings associated with Jerrong Road to the east of the Project Site.
- The ZVI diagrams indicate views to the Project have the potential to be available from elevated land to the south of the Project Site associated with Taralga Road and from the south west from land associated with Levels Road.







It is important to reiterate this is a preliminary ZVI is based on a worst 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: 240 m Paling Yards Wind Farm

LEGEND

-  Project Boundary
-  Proposed 240 m Turbine Location
-  Involved Dwelling
-  Non-involved Dwelling
-  8000 m from turbine
-  Main Road

ZVI Number of Visible Turbines (at blade tip):

-  0
-  1 - 14
-  15 - 24
-  25 - 34
-  35 - 44
-  45 - 47

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.

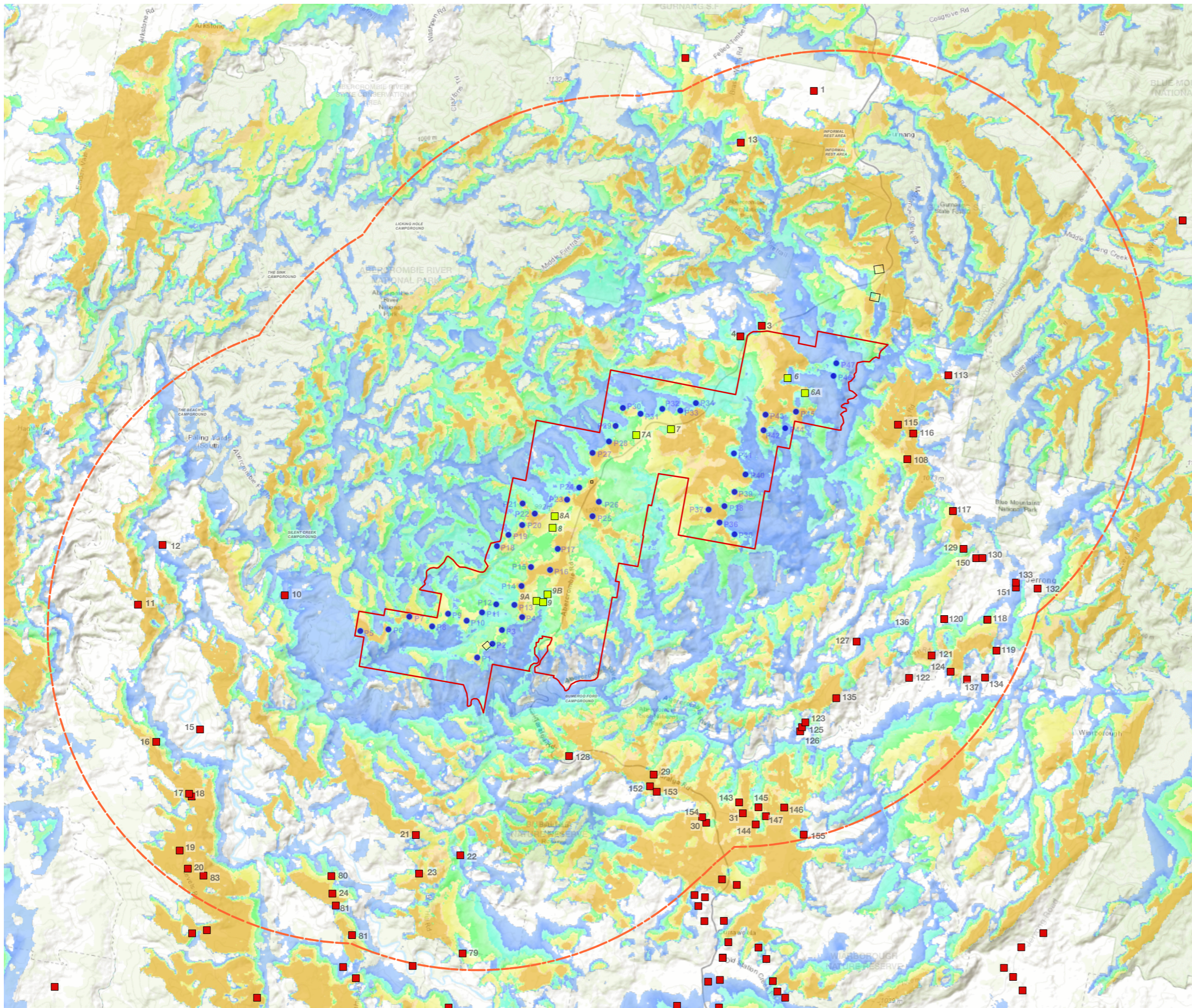
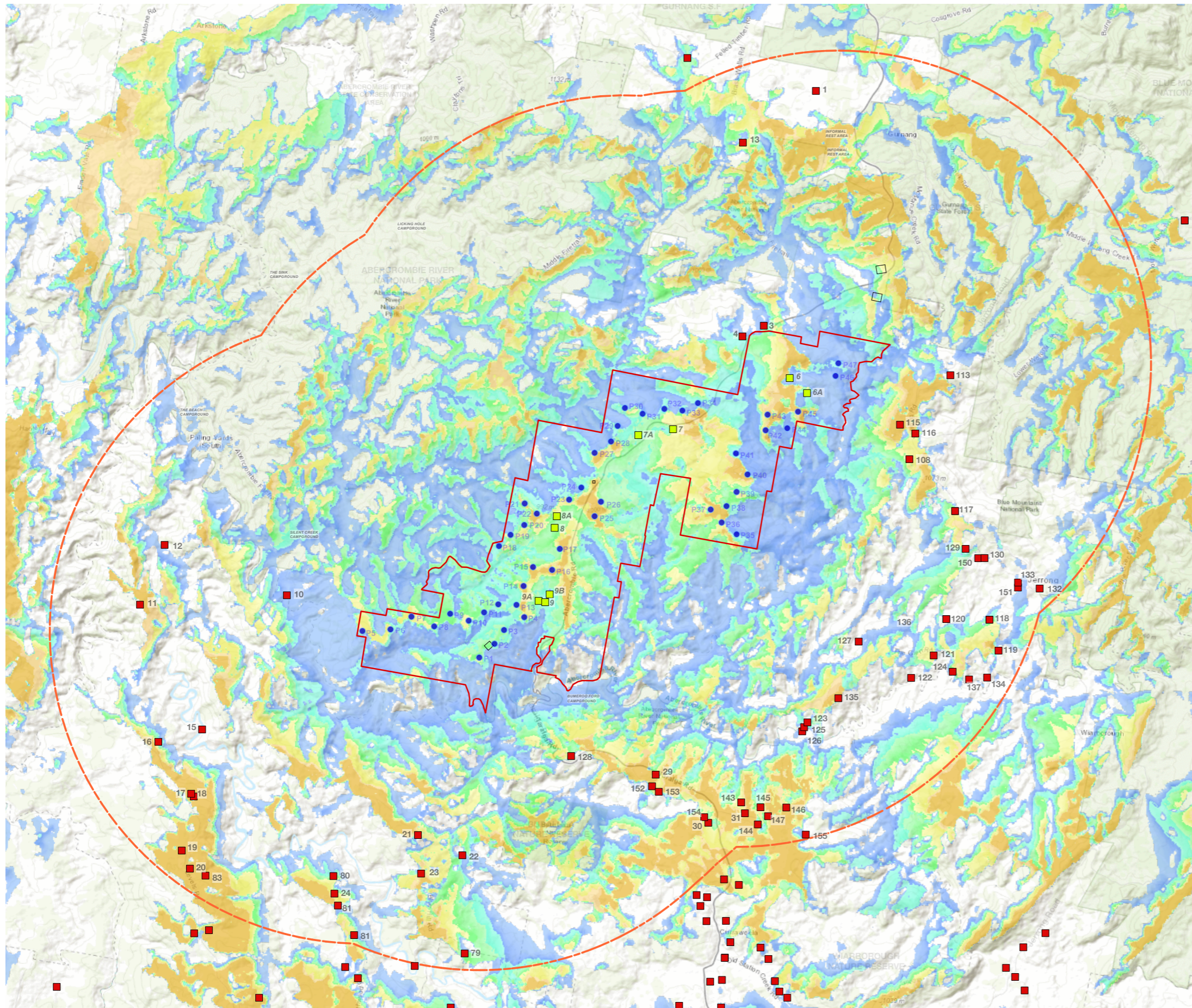


Figure 14 Zone of Visual Influence (Blade Tip Height 240 m)



Zone of Visual Influence

Hub Height: 155 m

Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- 8000 m from turbine
- Main Road

ZVI Number of Visible Turbines (at blade tip):

	0
	1 - 14
	15 - 24
	25 - 34
	35 - 44
	45 - 47

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.



Figure 15 Zone of Visual Influence (Hub Height 155 m)

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 20 viewpoints were taken from public locations during the field work process. Viewpoints have been 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 accessible public land (typically walking tracks, roads and lookouts) which were identified as having a potentially high visual impact through the desktop review process.

A desktop assessment was prepared for four (4) public viewpoint locations within the Abercrombie River National Park due to limited access at the time of field work.

The viewpoint locations assessed for the Project have included key viewpoints identified through the extensive community engagement throughout the development.

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 16** below and refer to tables in **Section 16.0**). An evaluation using the corresponding visual performance objectives (Table 2 of the Visual Assessment 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.

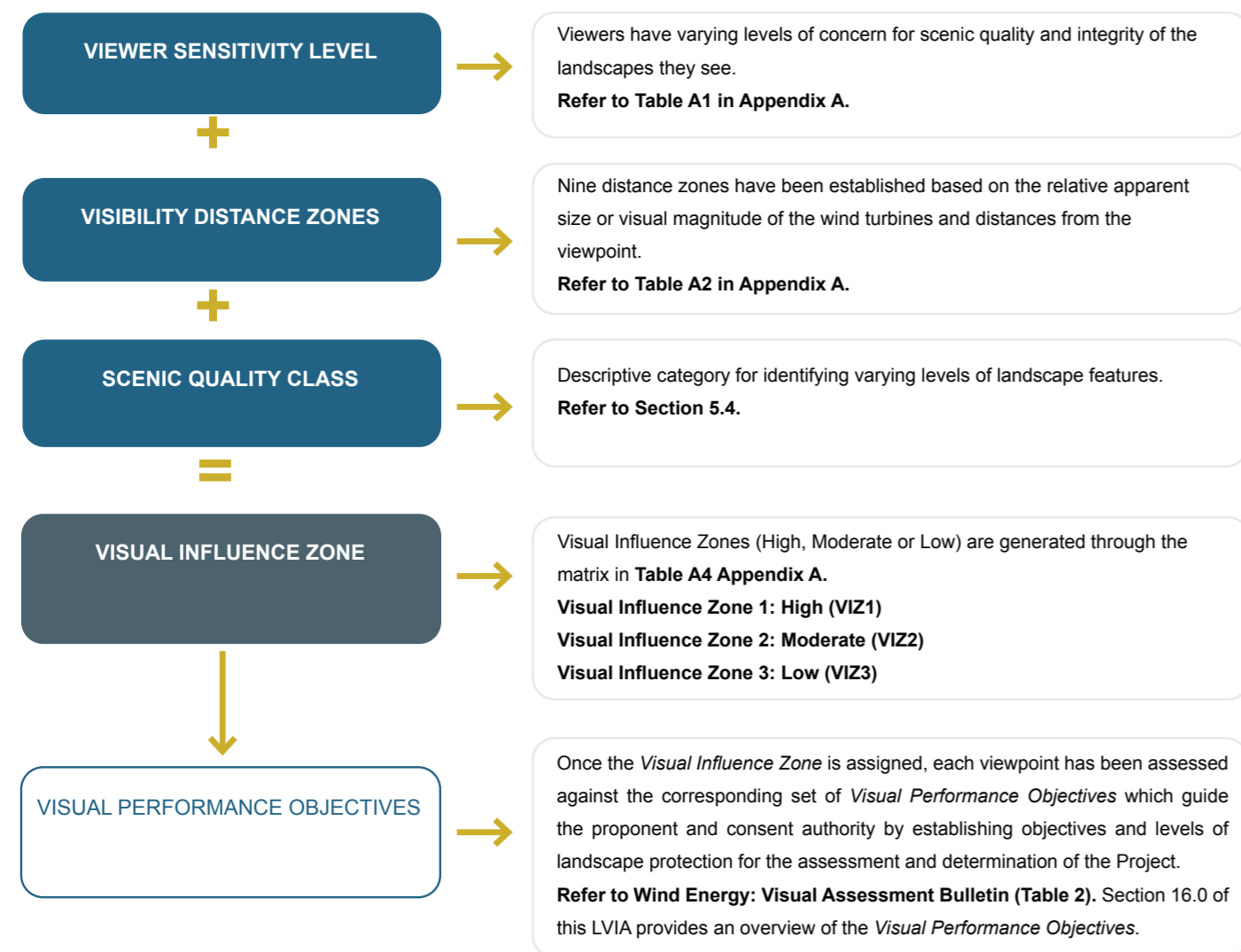
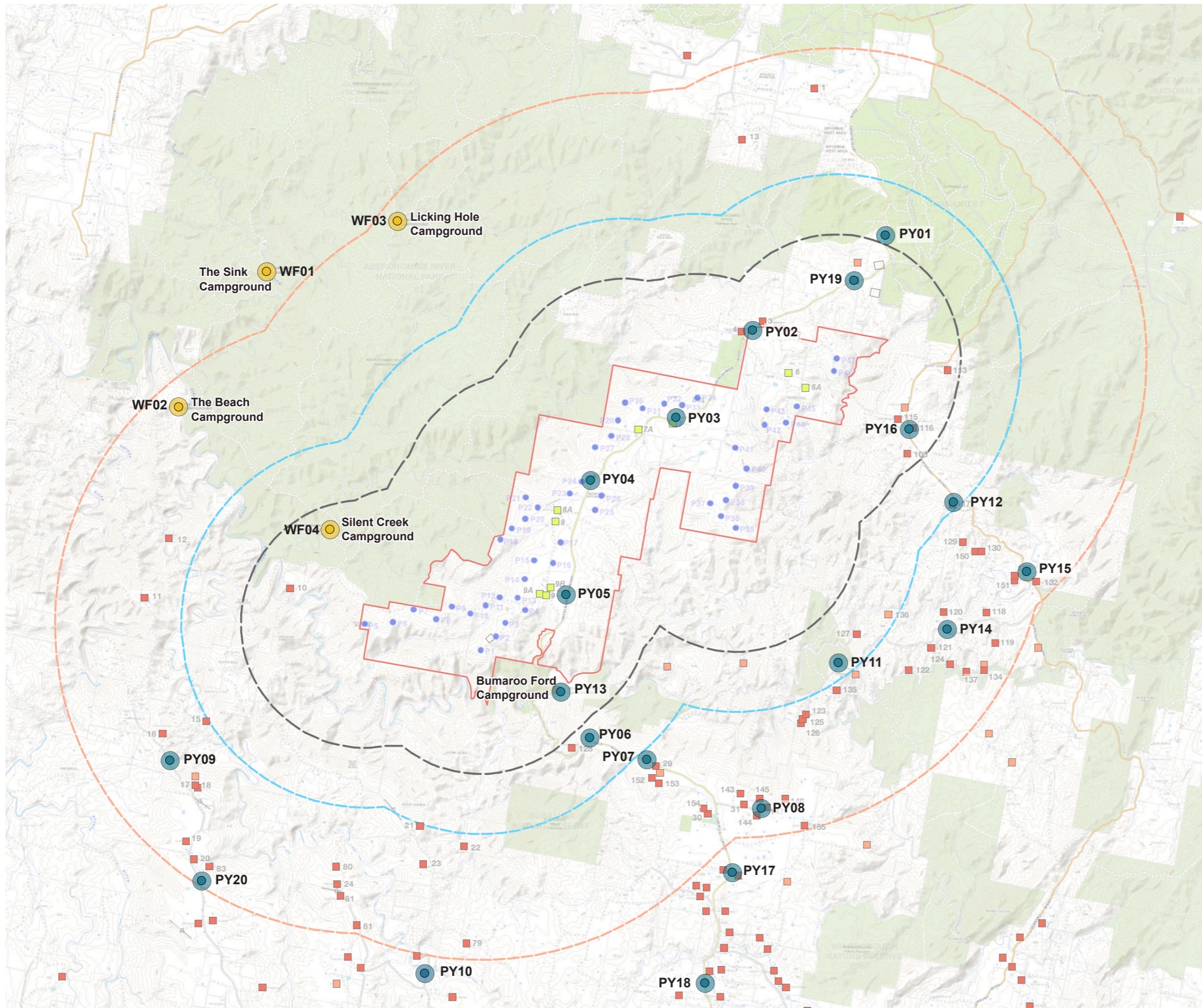


Figure 16 Methodology for determining Visual Influence Zone (VIZ)

Public Viewpoint Analysis Locations

Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Ambiguous Dwelling
- 3,200 m from turbine
- 4,750 m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road
- Public Viewpoint Analysis Location - **Refer to Appendix B**
- Public Wire Frame Analysis Location - **Refer to Table 9 & Appendix D**



Figure 17 Public Viewpoint Analysis Locations

8.4 Public Viewpoint Locations - Abercrombie National Park

SEARs issued for the Project request the LVIA include a “detailed consideration of potential visual impacts on amenity values of the Abercrombie National Park”.

Five (5) public viewpoint locations have been identified within the Abercrombie River National Park for detailed assessment in this LVIA. The potential visual impact from these locations has been summarised in **Table 9**.

A detailed assessment of the Abercrombie River National Park has been included in **Section 14.0** of this report.

Public Viewpoints within Abercrombie River National Park

Viewpoint	Distance to nearest turbine:	Theoretical number of 60° sectors (Based on 2D Assessment):	Number of 60° sectors (Based on 3D Assessment)	Number of potentially visible turbines:	Visual Influence Zone:	Assessment Notes:	Refer to:
Bummaroo Ford Camping Area	2.13 km	Two (2)	One (1)	7 5 at hub 2 blades	VIZ1	A site inspection was undertaken from this viewpoint location on 23rd of May 2022. Viewpoint Analysis from this location has been provided as PY13 (Appendix B). A photomontage has been prepared - Refer to Photomontage 03, Appendix D.	Public Viewpoint PY13 - Appendix B
The Sink Campground	8.88km (PY21)	N/A	N/A	Nil	VIZ2	The Project will not be visible from this location due to topography.	Wire Frame Diagram 01 - Appendix D
The Beach Campground	7.43km (PY5)	One (1)	One (1)	Nil	VIZ2	The Project will not be visible from this location due to topography.	Wire Frame Diagram 02 - Appendix D
Licking Hole Campground	7.56km (PY30)	One (1)	One (1)	Nil	VIZ2	The Project will not be visible from this location due to topography.	Wire Frame Diagram 03 - Appendix D
Silent Creek Campground	2.61km (PY5)	Two (2)	One (1)	5 2 at hub 3 blades	VIZ1	The wire frame diagram prepared from the Silent Creek Campground identified up to five (5) turbines would be visible to the south east based on topography alone. Vegetation on the ridge to the south east is likely to screen views to the blade tips. Aerial imagery indicates dense riparian vegetation associated with Abercrombie River which is likely to fragment views to the two (2) turbines at hub height.	Wire Frame Diagram 04 - Appendix D

Table 9 Abercrombie National Park Viewpoint Locations

8.5 Summary of Public Viewpoint Analysis

The 24 public viewpoints assessed for the purpose of this LVIA were taken from varying distances and locations surrounding the Project. This includes the desktop assessment prepared for four (4) public viewpoint locations within the Abercrombie River National Park due to limited access (refer to **Table 9**).

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 16.0**). 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 undertaken from six (6) public viewpoints to illustrate the potential visual impacts refer to **Section 10.0** and **Appendix D**.

The Visual Influence Zone (VIZ) was identified for 24 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 24 viewpoint locations assessed, 14 locations were rated as being Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply.

Visual Influence Zone 1 (VIZ1):

Five (5) public viewpoints were rated as Visual Influence Zone 1 (VIZ1). Three (3) of these locations are on Abercrombie Road and are rated as being VIZ1 due to the close proximity to the Project (PY03, PY04 & PY05). Two (2) public viewpoints (Bumaroo Campground and Silent Creek Campground) have been rated as VIZ1 due to the recreational land use and close proximity to the Project. A wire frame diagram was prepared from Silent Creek Campground (refer to Wire Frame Diagram 04 - Appendix D) and a photomontage was prepared from Bumaroo Campground to assist the assessment on the impact from these locations (refer to Photomontage 04 - Appendix D).

The assessment found there is a low level of modification to the visual catchment from both Silent Creek Campground and Bumaroo Campground. The major elements of the campgrounds would remain the dominant feature of the visual catchment.

Visual Influence Zone 2 (VIZ2):

Five (5) public viewpoints were assessed as being Visual Influence Zone 2 (VIZ2). The Project was assessed as being a visible element in the landscape from two (2) public viewpoint locations (PY11 & PY19) Photomontages have been prepared from these locations demonstrating the turbines will not dominate the existing visual catchment (refer to Photomontage 02 and 06 - **Appendix D**).

The three (3) remaining public viewpoint locations are all associated with Abercrombie River National Park: the Sink Campground, the Beach Campground and Licking Hole Campground. Wire frame diagrams prepared from these locations identified views to the Project would be screened by topography (refer to Wire Frame Diagram 01, 02 and 03 - **Appendix D**).

Visual Influence Zone 3 (VIZ3):

14 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-involved Dwellings:

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

- Seven (7) non-involved dwellings within 3,200 metres of the nearest turbine associated with the Project.
- Three (3) non-involved dwellings within 3,200 - 4,750 metres of the nearest turbine associated with the Project.

Dwelling Entitlements:

Discussions between the Proponent and Oberon Council indicate that no development applications (approved or recently lodged) were identified in the region as of 20th April 2023.

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, GPG offered on site dwelling assessments to be undertaken for all non-involved dwellings within 4,750 m of the nearest turbine.

The Visual Assessment 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.

Selected viewpoint assessment locations are shown on **Figure 15**.

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 are likely to have limited or no views to the Project due to topography and / or other screening factors such as vegetation.

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	<p>Preliminary Assessment Tools were applied in accordance with the Bulletin from each dwelling to assess the following two parameters:</p> <ul style="list-style-type: none"> - Visual Magnitude (identify the number of turbines within blue and black lines) - Multiple 60° Sector Assessment (identify the number of 60° sectors based on a 2D assessment).
Step 2. 3D Assessment (based on topography alone)	<p>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.</p>
Step 3. Aerial Imagery	<p>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.</p>
Step 4. Site Inspection	<p>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.</p>
Step 5: Photomontage / Wire Frame Diagrams	<p>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.</p>
Step 6. Evaluation of VIZ Objectives	<p>In accordance with the Bulletin, the Visual Influence Zone was defined and the relevant objectives were evaluated for each dwelling based on the assessment.</p>
Step 7. Visual Impact Rating	<p>A visual impact rating is applied to each dwelling with regards to the parameters outlined in Section 9.3 (Table 11).</p>
Step 8. Consideration of mitigation methods	<p>For non-associated dwellings where by the Project has the potential to cause visual impact, mitigation methods have been suggested.</p> <p>Refer to Section 15.</p>

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 extensive 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		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 but very difficult to discern due to distance and / or intervening elements.	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

Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Ambiguous Building
- 3,200 m from turbine
- 4,750 m from turbine
- 8,000 m from turbine
- Main Road
- Minor Road

DWELLING IMPACT RATINGS:

- Nil / 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.

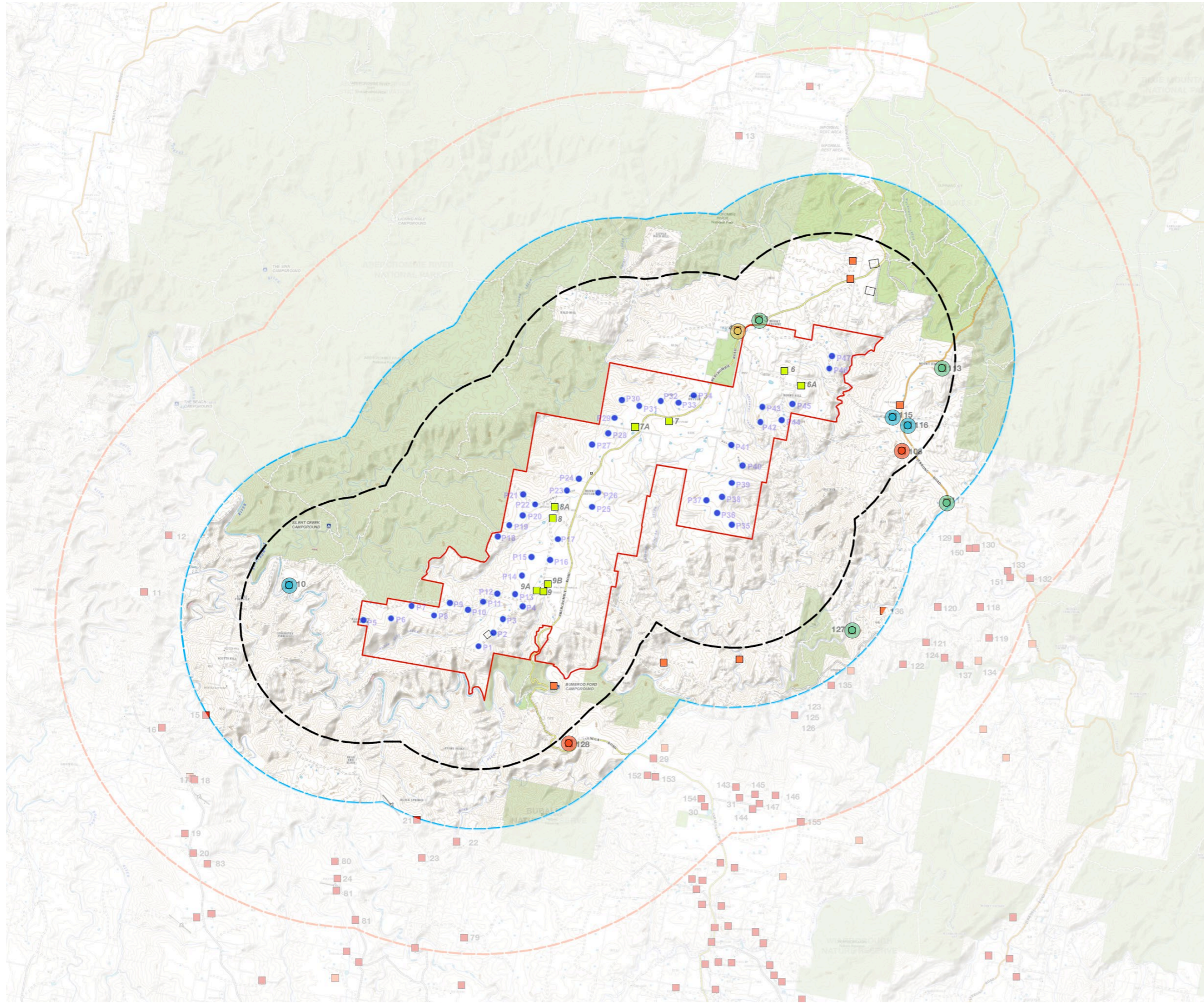
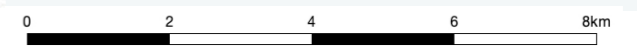


Figure 18 Dwelling Assessment Locations

Non-involved dwellings within 3,200 metres of nearest WTG (Black Line of Visual Magnitude)

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 3,200 m	Turbines within 3,200 m:	Number of turbines within 4,750 m:	Turbines within 4,750 m:	Theoretical number of 60° sectors (Based on 2D Assessment):	Number of 60° sectors (Based on 3D Assessment)	Number of potentially visible turbines:	Shadow Flicker:	Visual Impact Rating:	Assessment Notes:
4	2.14 km	P34	10	P32, P33, P34, P41, P42, P43, P44, P45, P46, P47	8	P28, P29, P30, P31, P37, P38, P39, P40	Three (3)	Three (3)	40 10 at tip 30 at hub	N/A	MODERATE	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.1.
3	2.15 km	P47	8	P33, P34, P42, P43, P44, P45, P46, P47	7	P29, P30, P31, P32, P39, P40, P41	Three (3)	Two (2)	44 11 at tip 33 at hub	N/A	NEGLIGIBLE	A desktop assessment was undertaken for this dwelling. Refer to Appendix C.2.
115	2.05 km	P46	4	P44, P45, P46, P47	5	P39, P41, P42, P43, P44	Two (2)	Two (2)	47 1 at tip 46 at hub	N/A	LOW	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.3.
116	2.49 km	P46	3	P45, P46, P47	5	P40, P41, P42, P43, P44	Two (2)	Two (2)	47 5 at tip 42 at hub	N/A	LOW	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.4.
10	2.16 km	P5	2	P5, P6	4	P7, P8, P9, P10	One (1)	One (1)	13 6 at tip 7 at hub	N/A	LOW	Moir LA attended the dwelling on 24th May 2022. Refer to Appendix C.5.
108	2.84 km	P46	3	P45, P46, P47	6	P39, P40, P41, P42, P43, P44	Two (2)	Two (2)	46 11 at tip 35 at hub	N/A	HIGH	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.6.
113	2.88 km	P47	2	P46, P47	2	P44, P45	One (1)	One (1)	42 21 at tip 21 at hub	N/A	NIL	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.7.

Table 12 Summary of Non-involved Dwelling Assessment within 3,200 m of nearest turbine

Non-involved dwellings within 3,200 - 4,750 metres of nearest WTG (Blue Line of Visual Magnitude)

Dwelling ID:	Distance to nearest turbine:	Nearest Turbine:	Number of turbines within 3,200 m	Number of turbines within 4,750 m	Turbines within 4,750 m:	Theoretical number of 60° sectors (Based on 2D Assessment)	Number of 60° sectors (Based on 3D Assessment)	Number of potentially visible turbines:	Shadow Flicker:	Visual Impact Rating:	Assessment Notes:
117	4.55 km	P46	Nil	1	P46	One (1)	One (1)	45 0 at tip 45 at hub	N/A	NEGLIGIBLE	Moir LA attended the dwelling on 23rd May 2022. Refer to Appendix C.8.
127	4.13 km	P35	Nil	2	P35, P36	Two (2)	Nil (0)	0 0 at tip 0 at hub	N/A	NIL	A desktop assessment was undertaken for this dwelling. Refer to Appendix C.9
128	3.45 km	P1	Nil	9	P1, P2, P3, P4, P10, P11, P12, P13, P14	Two (2)	Two (2)	45 3 at tip 42 at hub	N/A	HIGH	A desktop assessment was undertaken for this dwelling. Refer to Appendix C.10

Table 13 Summary of Non-involved Dwelling Assessment within 4,750 m of nearest turbine

9.4 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 3,200 metres of the nearest turbine

A total of seven (7) non-involved dwellings were identified within 3,200 metres of a proposed turbine. Representative dwelling assessment have been undertaken for all seven (7) non-involved dwellings within 3,200 of the nearest turbine.

Of the seven (7) non-involved dwellings within 3,200 m the assessment found:

- Two (2) were rated as nil / negligible visual impact rating,
- Three (3) were rated as having a low visual impact rating,
- One (1) was assessed as having a moderate visual impact rating (Dwelling 4).
- One (1) was assessed as having a high visual impact rating (Dwelling 108).

All non-involved dwellings located within 3,200 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 (3,200 m) of the nearest turbine are to: *Manage impacts as far as practicable, justify residual impacts*.

Practical and feasible mitigation measures have been recommended for two (2) non-involved dwellings rated as having the potential for a moderate or high visual impact rating (Dwelling 3 and 108). The proposed mitigation measures would significantly reduce the level of visual impact. Once established, it is anticipated the residual impacts would be acceptable.

9.4.2 Dwellings within 3,200 - 4,750 metres of the nearest turbine

A total of three (3) non-involved dwellings were identified within 3,200 - 4,750 metres of a proposed turbine. Detailed dwelling assessments have been undertaken for three (3) non-involved dwellings within the 3,200 - 4,750 metres of the nearest turbine.

Of the three (3) non-involved dwellings between 3,200 - 4,750 m the assessment found:

- Two (2) were assessed as having nil / negligible visual impact rating,
- One (1) was assessed as having a high visual impact rating (Dwelling 128).

All non-involved dwellings located between 3,200 m - 4,750 m of the nearest turbine were assessed as being Visual Influence Zone 2 (VIZ2). In accordance with the Bulletin, objectives for VIZ2 receptors between the black line (3,200 m) and blue line (4,750 m) of the nearest turbine are to: *Consider screening between the blue line and the black line*. In accordance with the Bulletin, screen planting has been proposed for dwelling 128 to reduce potential visual impacts from the dwelling.

9.4.3 Dwellings in excess of 4,750 metres of the nearest turbine

No non-involved dwellings were identified in excess of 4,750 metres with the potential to view turbines in three (3) or more 60 degree sectors.

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.

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 4,750 metres of the Project (refer to **Section 8.0**).

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 20**).

Public Photomontage Locations:

A total of **seven (7) 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:

Six (6) photomontages have been prepared from private properties. The locations selected were based on those that granted access.

Public Photomontages		
Photomontage 01	Viewpoint PY03	Abercrombie Road, Paling Yards
Photomontage 02	Viewpoint PY011	The Glen Road, Jerrong
Photomontage 03	Viewpoint PY13	Bummaroo Ford Campground
Photomontage 04	Viewpoint PY16	Jerrong Road, Jerrong
Photomontage 05	Viewpoint PY07	Taralga Road, Curraweela
Photomontage 06	Viewpoint PY18	Taralga Road, Curraweela
Photomontage 07	Viewpoint PY19	Abercrombie Road, Paling Yards
Private Photomontages		
Photomontage 08	Dwelling 115	1370 Jeerong Road, Jeerong
Photomontage 09	Dwelling 4 (At Driveway)	6024 Abercrombie Road, Paling Yards
Photomontage 10	Dwelling 117	1634 Jerrong Road, Jerrong
Photomontage 11	Dwelling 128	Taralga Road, Curraweela
Photomontage 12	Dwelling 4 (At Dwelling)	6024 Abercrombie Road, Paling Yards
Wire Frame Diagrams		
Wire Frame 01	-	The Sink Campground, Abercrombie River National Park
Wire Frame 02	-	The Beach Campground, Abercrombie River National Park
Wire Frame 03	-	Licking Hole Campground, Abercrombie River National Park
Wire Frame 04	-	Silent Creek Campground, Abercrombie River National Park

Table 14 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 19**.

The photomontages are based on a worst case scenario of a maximum turbine height dimension of 240 m with a hub height of 155 m and rotor diameter of 170 m, without the inclusion of the proposed mitigation methods.

Moir Landscape Architecture 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.

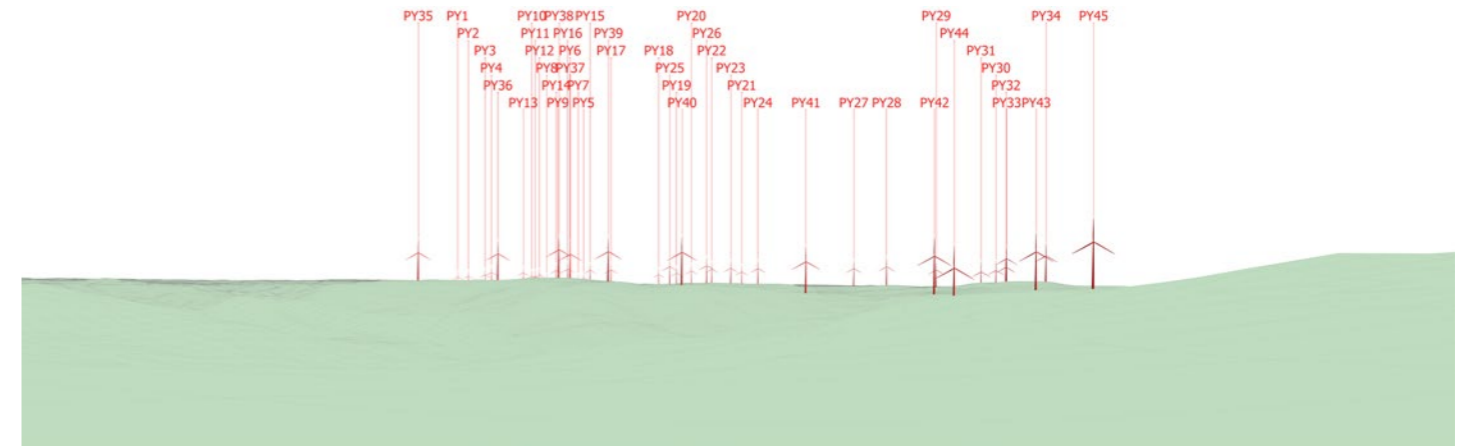
Step 2: Align Photograph and Model

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.

Step 1: Develop 3D Model (Wire Frame Diagram)



Step 2: Align photograph and model



Step 3: Render Photomontage

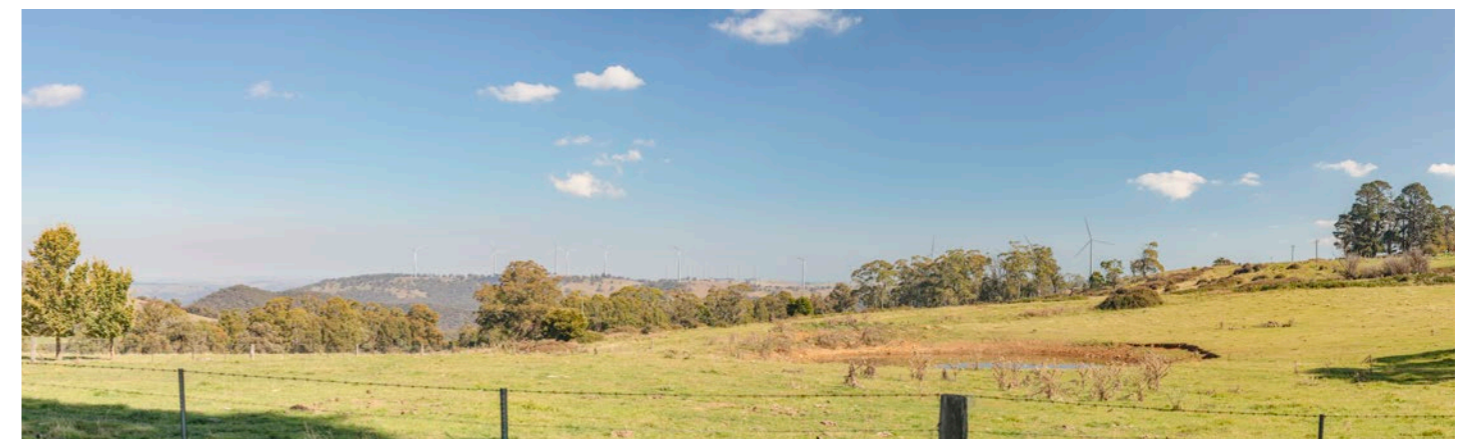
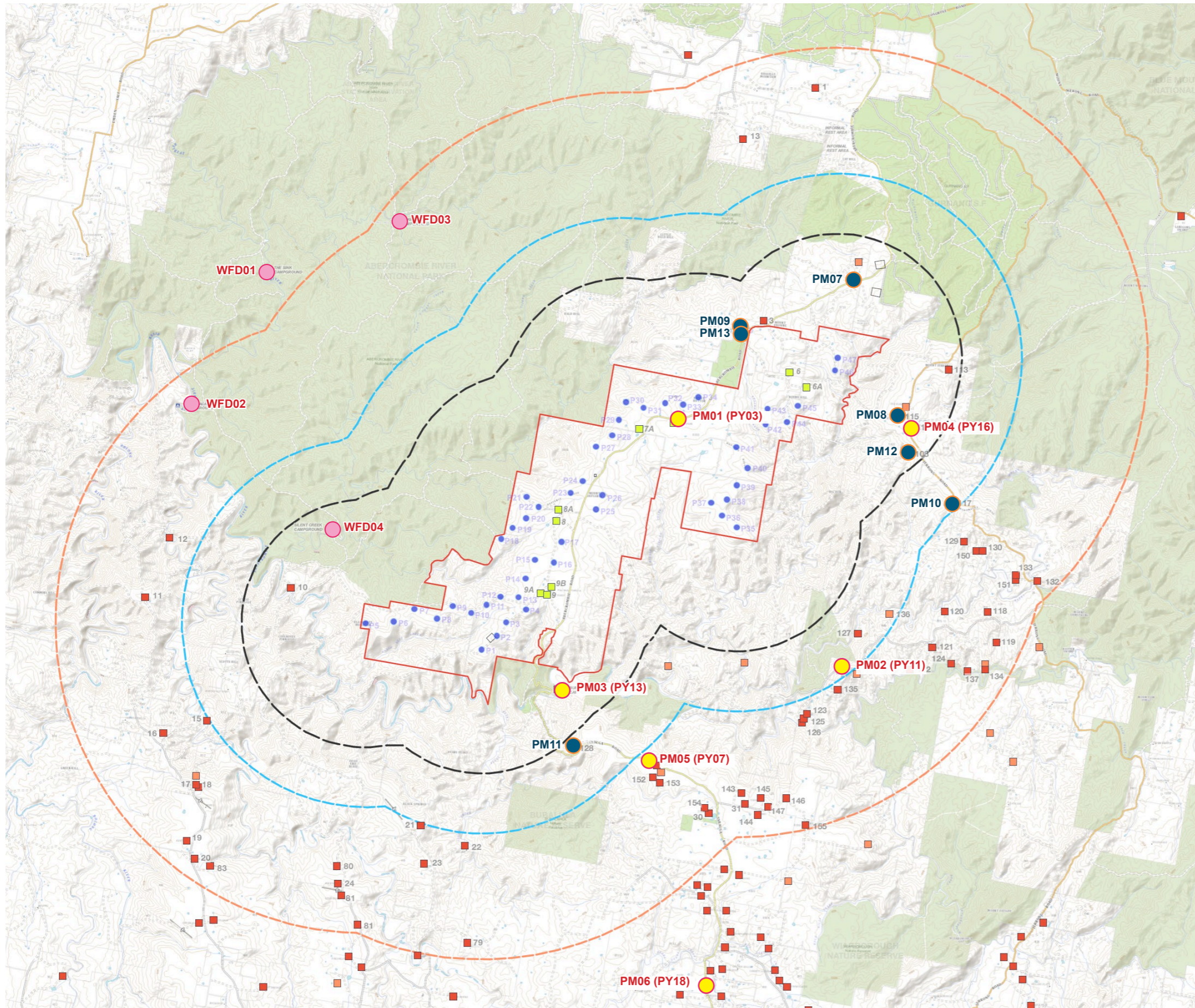


Figure 19 Photomontage Development Process

Photomontage and Wire Frame Diagram Locations Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Ambiguous Building
- - - - 3,200 m from turbine
- - - - 4,750 m from turbine
- - - - 8,000 m from turbine
- Main Road
- Minor Road
- PM01 Public Photomontage Locations
- PM01 Private Property Photomontage Location
- WFD01 Public Wire Frame Diagram Locations

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



Figure 20 Photomontages and Wire Frame Diagram Locations

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. Potential light sources include:

- Aviation Hazard Lighting (AHL) on nacelle of wind turbines (height of up to 155 metres AGL)
- Night lighting for safety and security on ancillary structures.

11.2 Aviation Hazard Lighting

The requirement of aviation hazard lighting (AHL) on wind turbines 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 240 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)

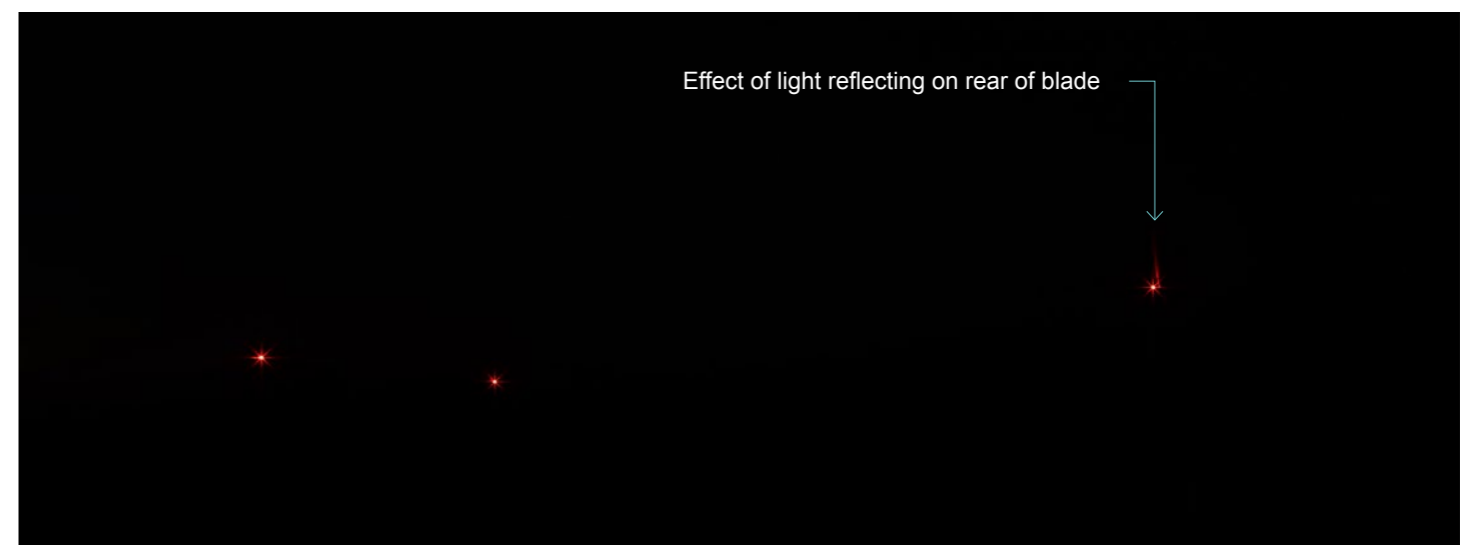


Image 24: View towards Biala Wind Farm - 1.85 Kilometres from turbine at 6:50pm (60 minutes after sunset)



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



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



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

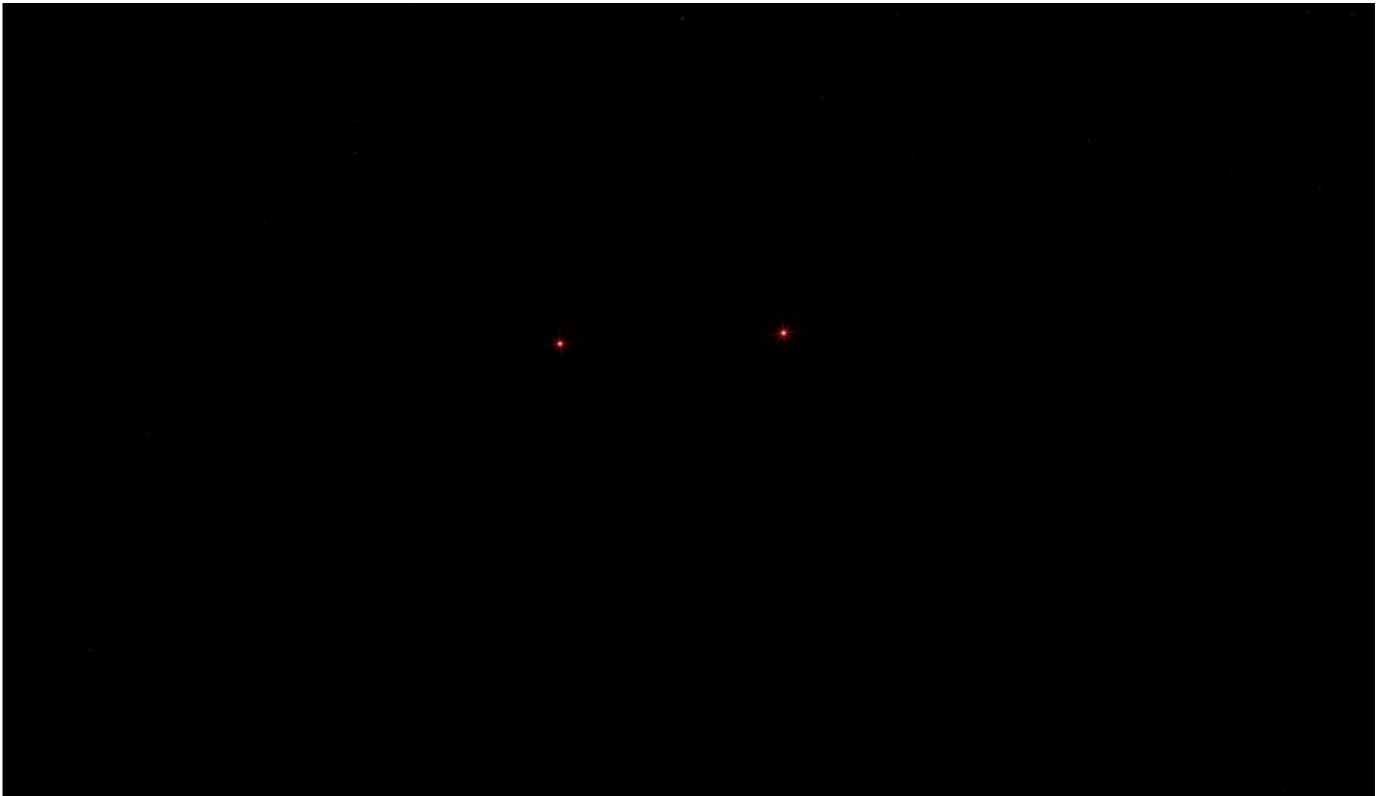


Image 28: View at night towards Biala Wind Farm - 8.5 Kilometres from turbine

11.3 Overview of potential visual impacts from Night lighting

Night lighting of turbines and associated infrastructure has the potential to extend the visual effect into the night time. Aviation hazard lighting has the potential to be visible from distances in excess of 20 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 people who experience the night landscape outdoors. Dark sky is a valued quality of the rural landscape, due to the lack of light pollution. Aviation lighting has the potential to impact on receptors who view the landscape at night, in particular night-sky enthusiasts, photographers, star gazers, campers and some land owners with potential visibility of the 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 a close proximity.

The Uungula Wind Farm (located to the east of Wellington in NSW) was approved in May 2021 with a recommendation to include low intensity aviation lighting (200 candela) which is considerably lower than the 2,000 candela required by international standards.

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 2km. 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 21**).
- 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 Air Detection Lighting Systems 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).

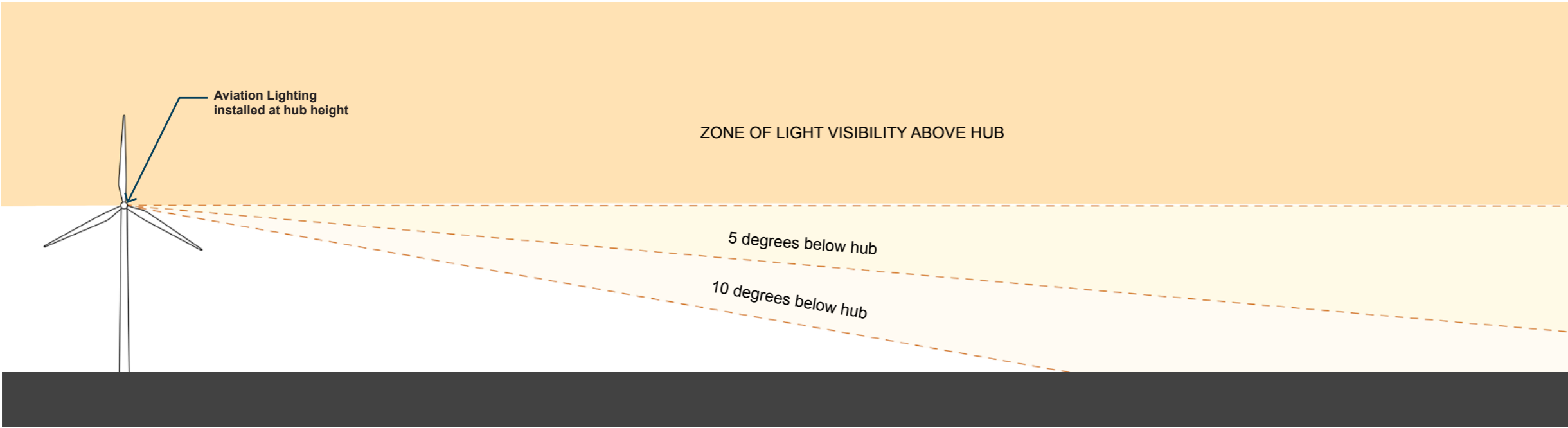


Figure 21 Recommended Light Shielding to reduce lighting spread

11.5 Potential Impacts of Lighting Associated with Ancillary Infrastructure

In addition to aviation hazard lighting on wind turbines, 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 22**)
- Keep lights close to the ground and / or directed downwards (**Figure 23**)
- Use light shield fittings to avoid light spill (refer to **Figure 24**).

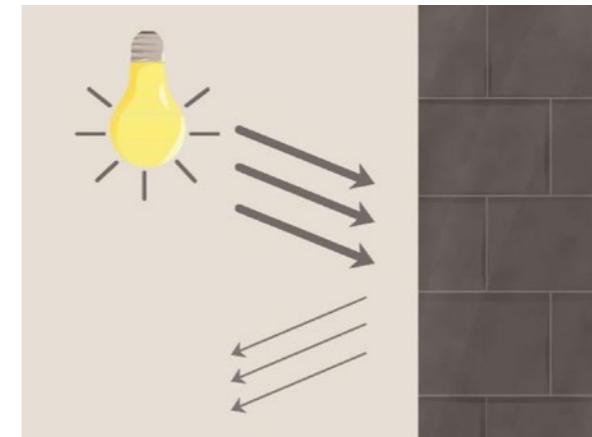
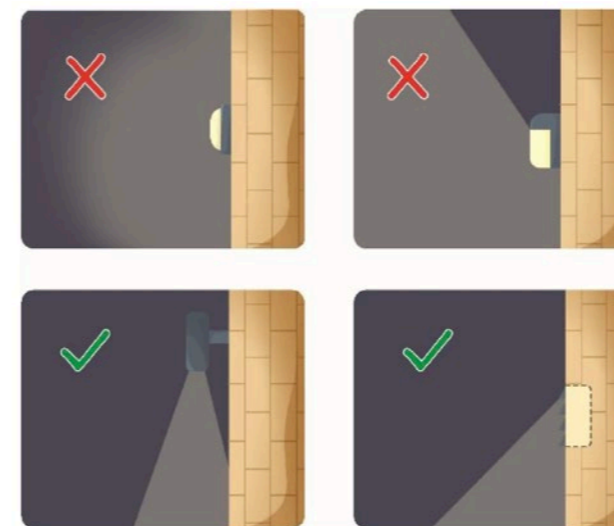


Figure 22 Surface Reflectivity

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 be painted in a dark non-reflective paint to reduce any potential reflectivity from light and remain sympathetic to the surrounding landscape.



Where possible, lighting is to be directed downwards.

Figure 23 Downward Lighting

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

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

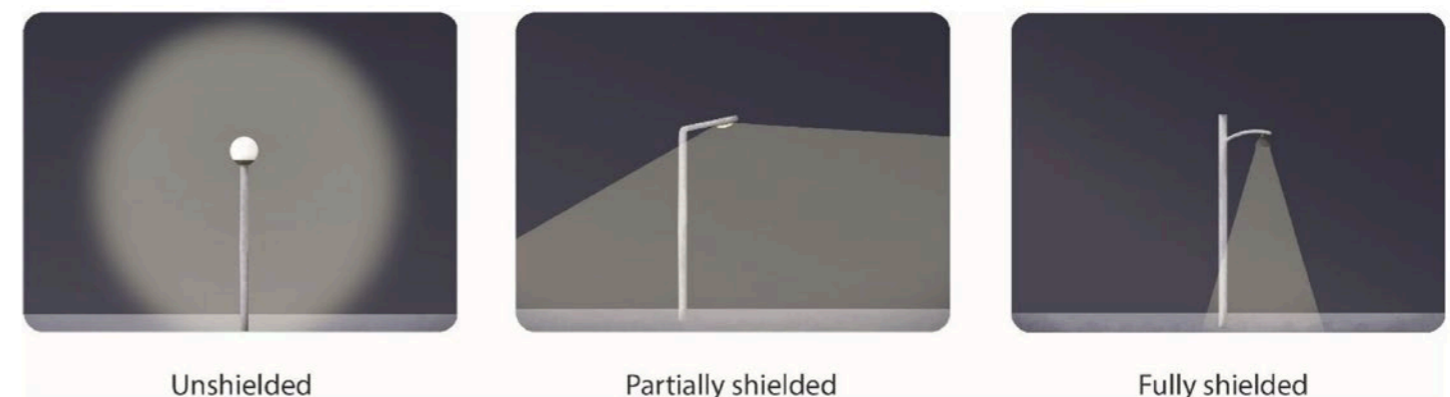


Figure 24 Light Shielding

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

12

Cumulative Impact Assessment



12.0 Cumulative Impact Assessment

12.1 Overview of Cumulative Visual Impacts

The Visual Assessment 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).

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.

The Draft Planning NSW Guidelines state that “*Cumulative impacts may result from a number of activities with similar impacts interacting with the environment in a region. They may also be caused by the synergistic and antagonistic effects of different individual impacts interacting with each other and may be due to temporal or spatial characteristics of the activities impacts.*”

It is important the proposed Paling Yards Wind Farm considers the potential cumulative effects on the immediate and broader regional context it forms part of.

A cumulative impact assessment has several dimensions:

- The impact of the wind farm, when added to the combined impacts of all other existing developments and environmental characteristics of the area.
- The impact of this development in the context of the potential for 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.

12.2 Nearby Wind Farm Projects

Taralga Wind Farm

The nearest constructed and operating wind farm to the Project is the Taralga Wind Farm, which is located approximately 26 kilometres south of the Project Site.

Crookwell 1, 2 and 3 Wind Farms

Crookwell 1 and 2 Wind Farms are currently in operation approximately 38 kilometres south south west of the proposed Paling Yard Wind Farm. Crookwell 3 Wind Farm was approved in October 2020 and is yet to commence construction.

12.3 Cumulative Impact with Nearby Wind Farms

Taralga Wind Farm

The Taralga Wind Farm (TWF Project) is situated approximately 25 kilometres to the south of the Paling Yards Wind Farm (PYWF) Site. The TWF Project is located on ridgelines east of the Taralga township, in the Southern Tablelands of NSW.

Although there are no opportunities for multiple wind turbines to be visible (in accordance with the requirements of the preliminary assessment tools of the Bulletin), due to the topography, there may be opportunities to view both projects simultaneously. Therefore, further assessment has been undertaken ensure a thorough analysis of potential cumulative visual impacts is undertaken.

To assist in the cumulative visual impact assessment, a Zone of Visual Influence (ZVI) has been prepared to illustrate areas from which there is the potential to view both Projects (based on topography alone). The Zone of Visual Influence demonstrates areas of land from which turbines associated with the TWF Project, PYWF Project or potential to view both Projects simultaneously. Refer to **Figure 26**.

Crookwell 1, 2 & 3 Wind Farm

Figure 27 provides a high level assessment of the potential visibility of Crookwell 1, 2 and 3 and Paling Yards Wind Farms through the use of a ZVI diagram. The ZVI diagram indicates some small pockets of uninhabited land may have the potential to view the two Projects concurrently, however due to the distance between the projects (exceeding 37 kilometres) the cumulative visual impact is likely to be negligible.

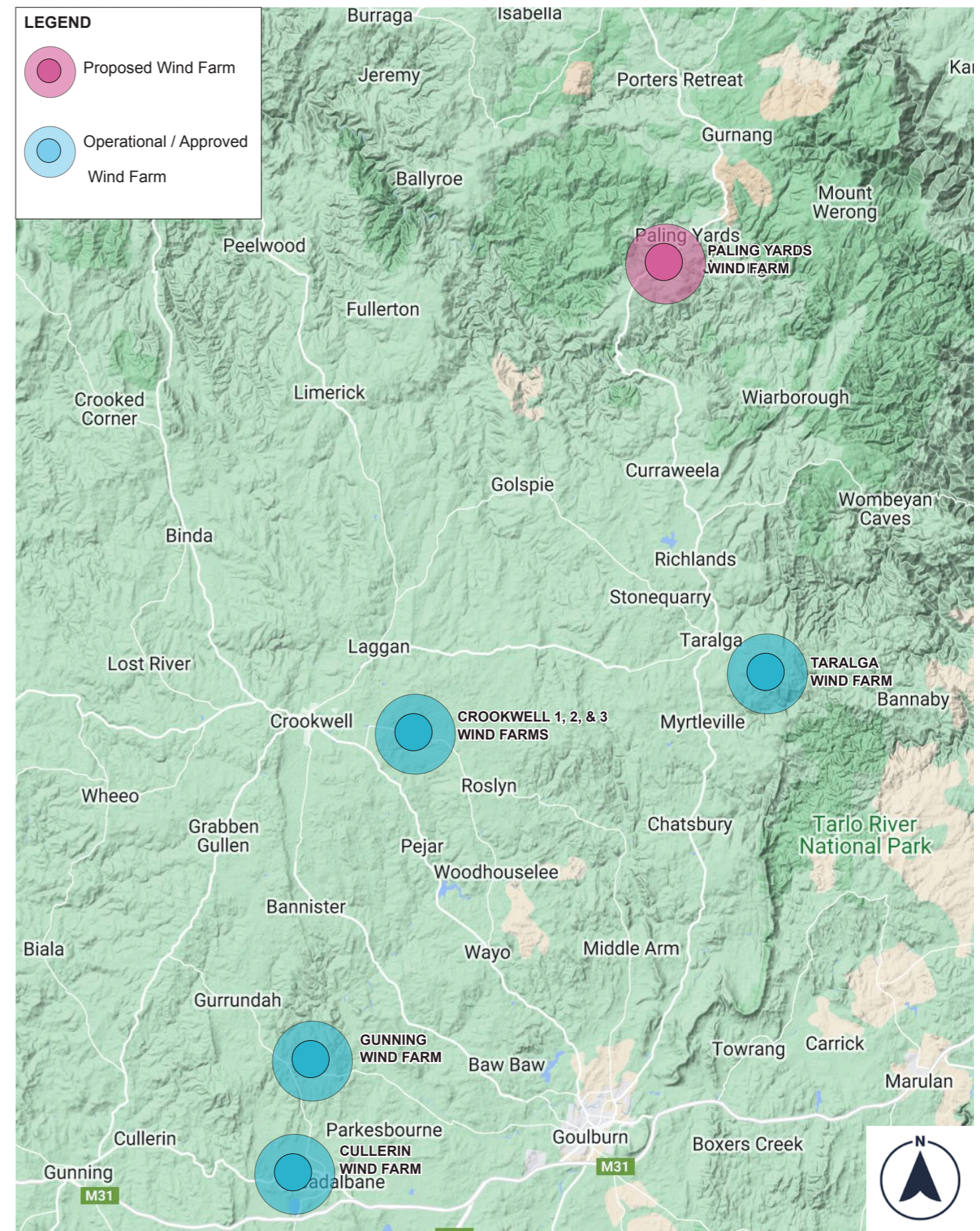
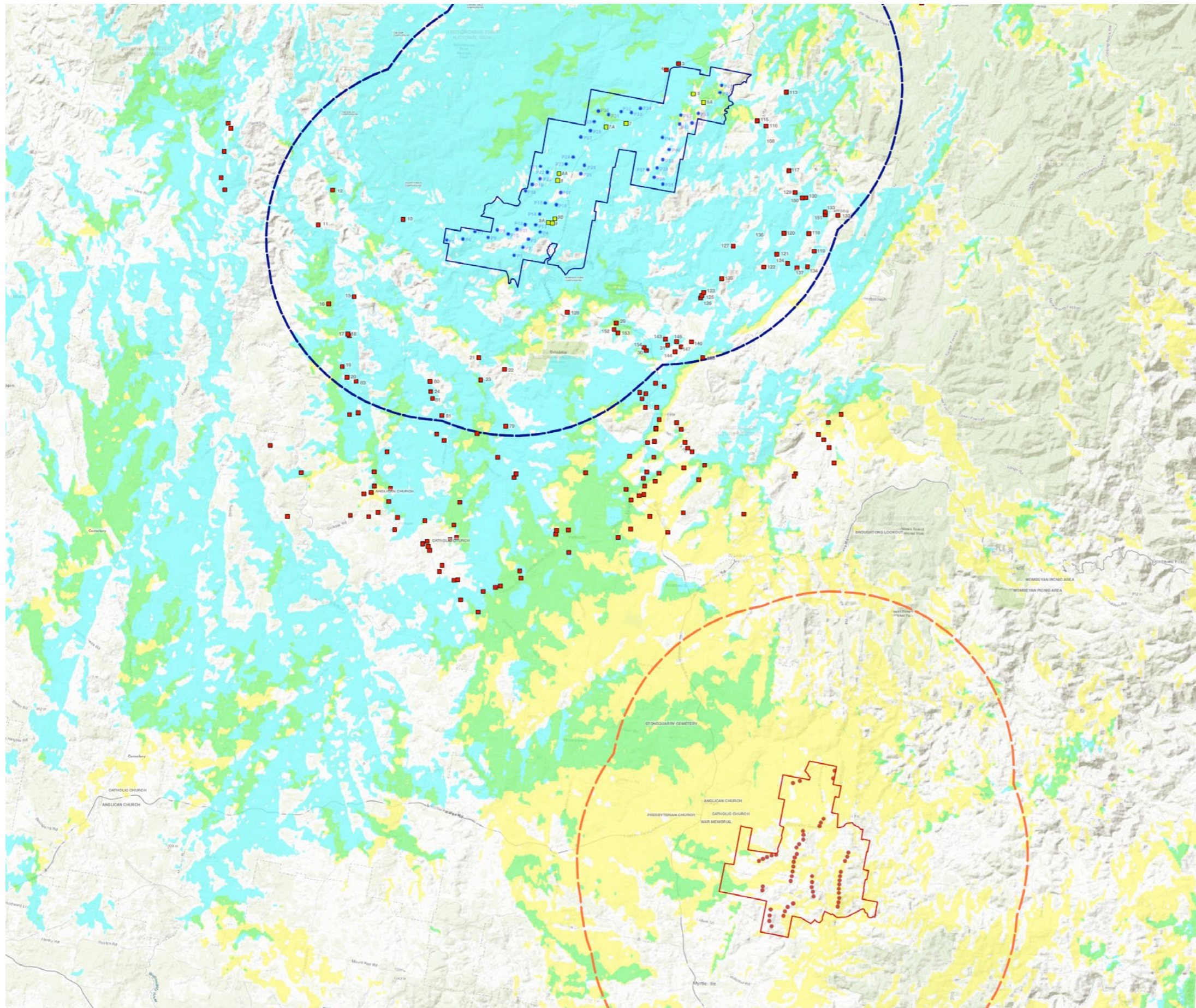


Figure 25 Wind Farms in the region



Cumulative ZVI Paling Yards & Taralga Wind Farm

LEGEND

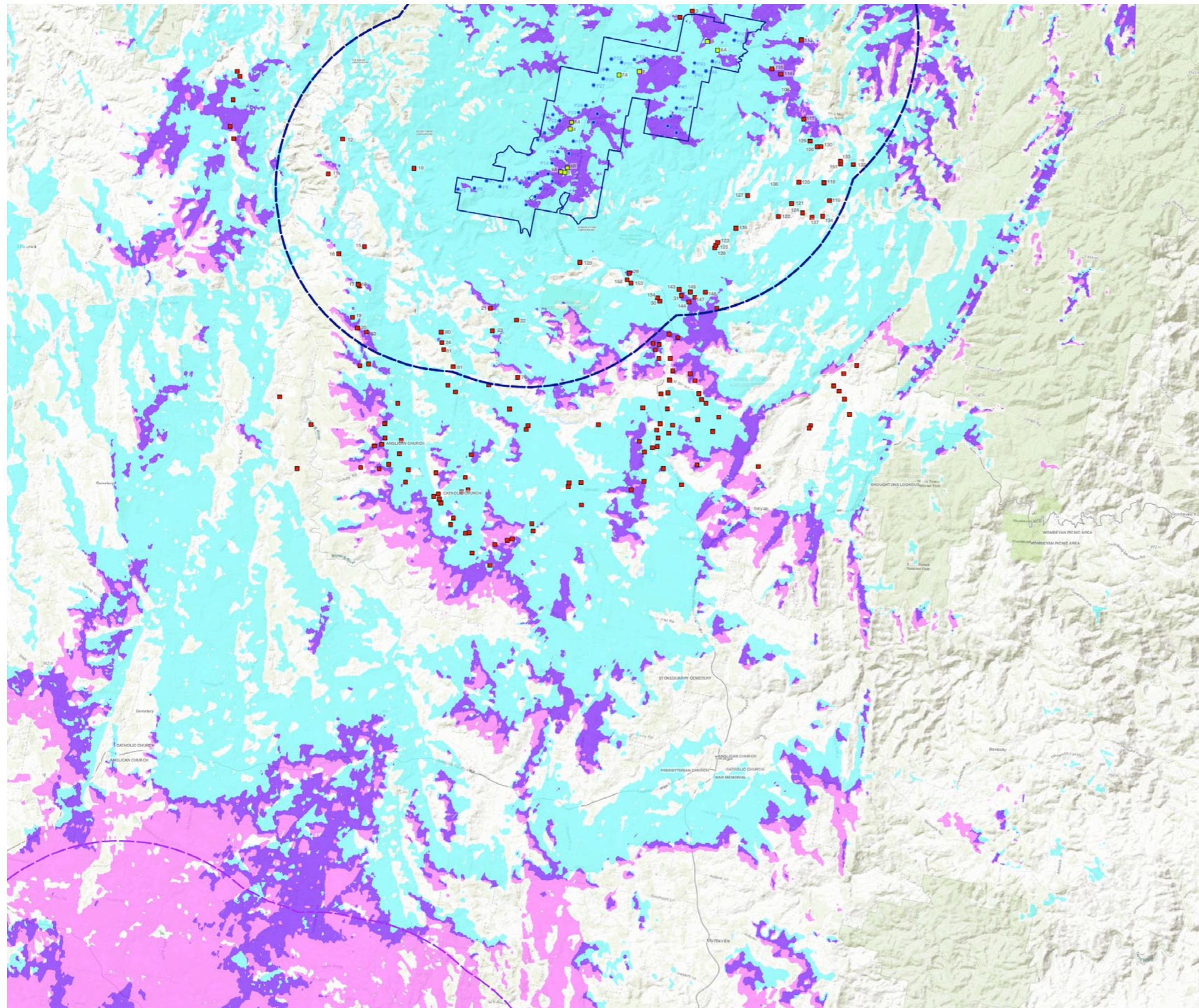
- Involved Dwelling
- Non-involved Dwelling
- Proposed Turbine Location - Paling Yards Wind Farm (PYWF)
- 8,000 m from PYWF turbine
- PYWF Project Boundary
- Operational Turbine Location - Taralga Wind Farm (TWF)
- 8,000 m from TWF turbine
- TWF Project Boundary

ZVI LEGEND:

- **Paling Yards Wind Farm Visible**
(Based on topography alone)
- **Taralga Wind Farm Visible**
(Based on topography alone)
- **Paling Yards & Taralga Wind Farm Visible**
(Based on topography alone)



Figure 26 Cumulative Zone of Visual Influence - Paling Yards and Taralga Turbines



Cumulative Zone of Visual Influence Paling Yards & Crookwell 1, 2 & 3 Wind Farm

LEGEND

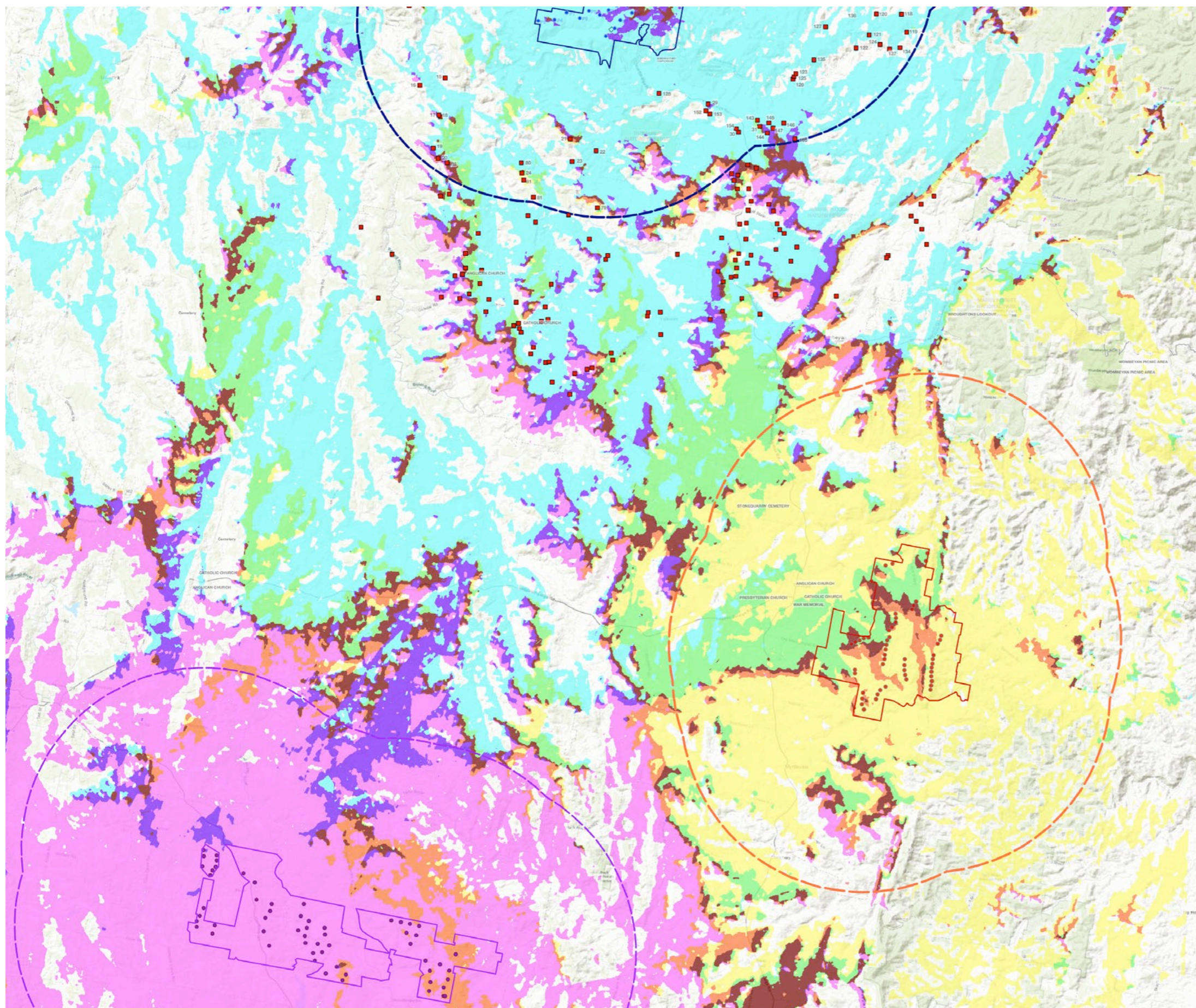
- Involved Dwelling
- Non-involved Dwelling
- Proposed Turbine Location - Paling Yards Wind Farm (PYWF)
- 8,000 m from PYWF turbine
- PYWF Project Boundary
- Operational Turbine Location - Crookwell 1, 2 & 3 Wind Farm (CWF)
- 8,000 m from CWF turbine
- CWF Project Boundary

ZVI LEGEND:

- **Paling Yards Turbines Visible**
(Based on topography alone)
- **Crookwell 1, 2 & 3 Turbines Visible**
(Based on topography alone)
- **Paling Yards & Crookwell 1, 2 & 3 Turbines Visible**
(Based on topography alone)



Figure 27 Cumulative Zone of Visual Influence Paling Yards & Crookwell 1, 2 & 3 Turbines



Cumulative Zone of Visual Influence Paling Yards, Crookwell 1, 2 & 3 and Taralga Wind Farm

LEGEND

- Involved Dwelling
- Non-involved Dwelling
- Proposed Turbine Location - Paling Yards Wind Farm (PYWF)
- 8,000 m from PYWF turbine
- PYWF Project Boundary
- Operational Turbine Location - Taralga Wind Farm (TWF)
- 8,000 m from TWF turbine
- TWF Project Boundary
- Operational Turbine Location - Crookwell 1, 2 & 3 Wind Farm (CWF)
- 8,000 m from CWF turbine
- CWF Project Boundary

ZVI LEGEND:

- Paling Yards Turbines Visible
- Crookwell 1, 2 & 3 Turbines Visible
- Crookwell 1, 2 & 3 Turbines Visible
- Taralga Turbines Visible
- Paling Yard & Taralga Turbines Visible
- Crookwell 1, 2, 3 & Taralga Turbines Visible
- Paling Yards, Taralga and Crookwell Turbines Visible



Figure 28 Cumulative Zone of Visual Influence Paling Yards, Taralga and Crookwell 1, 2 & 3 Turbines

12.4 Cumulative Visual Impact on the Broader Landscape Character

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 general landscape character.

The existing landscape character of the region allows for optimum harvest of wind energy due to elevated topography, expanses of uninhabited land and minimal obstructions in the landscape. These characteristics are beneficial to the output of wind energy and it is inevitable that over time this will be utilised.

The cumulative visual impact assessment has concluded that due to topography there are very limited opportunities to view any additional wind farms simultaneously from a static viewpoint in the foreseeable future. Cumulative impacts associated with other wind farm projects will be negligible.

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 or walking tracks) this may result in a change in the overall perception of the 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).

When travelling from Goulburn to Oberon (or vice versa) along Taralga Road, turbines associated with the Taralga Wind Farm are a noticeable feature of the landscape for a short period of time. The Taralga Wind Farm sits to the east of Taralga Road. Further along the route, the Paling Yards Wind Farm will be a visible element along Abercrombie Road. The distance between the Paling Yards Wind Farm and Taralga Wind Farm exceeds 30 kilometres when travelling by road. The travel time between the two projects is approximately 30 minutes. The duration of time between motorists experiencing views to each project limits the potential for the sequential views of the Projects to alter the perception of the broader landscape character.

13

Associated Infrastructure



13.0 Assessment of Associated Infrastructure

13.1 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.

An existing 500kV TL is located to the north east of the Project site (refer **Image 29**).

13.2 Transmission Lines

Each of the turbines will be connected to an onsite collector substation via a 33kV underground reticulation network. The 132kV collector substation is then connected to the 500kV substation via ~8km of 132kV overhead line. The 500kV substation is then connected to the existing 500kV overhead line by ~1km of overhead cabling (refer to **Figure 34**). Poles for the overhead line are set approximately 200 - 250 m apart, with heights of 40m for the 132kV portion and 65m for the 500kV portion.

Proposed 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.*
- *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.*

Figure 32 depicts the areas of land from which the proposed substations (location option A) may be visible and an indicative range of visibility. **Figure 33** depicts the areas of land from which the proposed substations (location option B) may be visible and an indicative range of visibility. The assessment considers topography alone and does not account for intervening elements such as vegetation and structures. The ZVI depicts that some receivers in close proximity to the substations will have higher visibility, however, undulating topography and surrounding dense vegetation are likely to reduce views to substations. Substation option A is likely to be more visible than option B.

Figure 34 depicts the areas of land from which the proposed TL's (location option A) may be visible and provides an indicative range of visibility. **Figure 35** depicts the areas of land from which the proposed TL (location option B) may be visible and provides an indicative range of visibility. The assessment considers topography alone and does not account for intervening elements such as vegetation and structures.

The ZVI depicts that receivers in close proximity to the proposed TL's and further to the north and northeast will have higher visibility of the TL's. It should be noted that the TL's have been sited on an undulating terrain and are surrounded by dense vegetation. Existing screening factors will play an important role in limiting views of certain extents to the TL's.

The ZVI depicts that receivers on the eastern side will have limited views of the TL's due to the undulating topographic character. Receivers along Jerrong Road are likely to have low visibility due to topography.

Receivers within close proximity of the TL's along Abercrombie Road will have higher visibility of the TL, however it is likely that only certain stretches of the TL's will be visible in some locations due to existing vegetation and topography. The ZVI depicts that Option A including the 500kV TL extension is likely to be more visible than Option A due to the increased pole heights and easement width.

The proposed TL design is in keeping with the scale and appearance of existing power lines which are an existing element in the landscape.

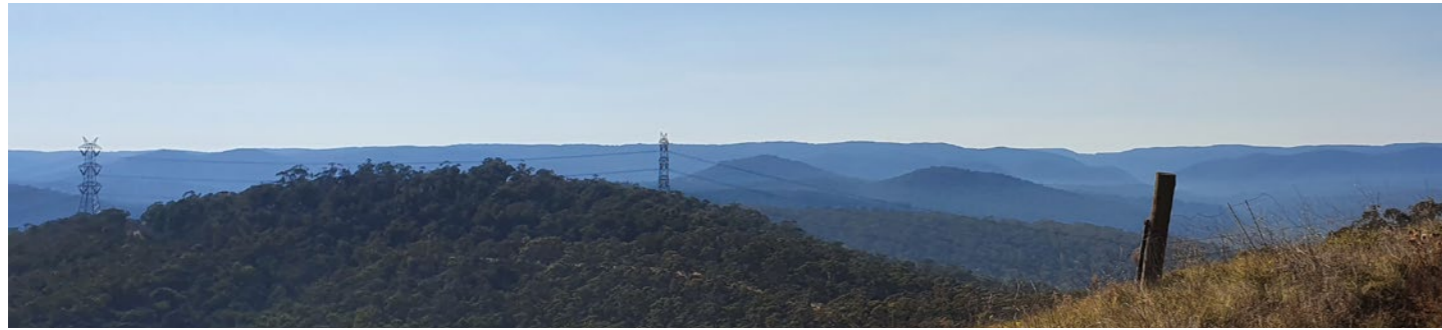


Image 29. Existing 500kV Transmission Lines are a visible element in the landscape

Dwelling ID:	Option A - ZVI level of visibility (based on topography alone):	Option B - ZVI level of visibility (based on topography alone):	Assessment:
13	Low - Moderate	-	Dense vegetation surrounding the dwelling is likely to screen views to the substations.
143	Low	Moderate - High	Dense vegetation to the north of the dwelling is likely to screen views to the substations.
144	Low - Moderate	Moderate - High	Dense vegetation to the north of the dwelling is likely to assist in screening views to the substations.
145	Low - Moderate	Low - Moderate	Dense vegetation to the north of the dwelling is likely to screen views to the substations.
147	Low - Moderate	Low - Moderate	Dense vegetation to the north of the dwelling is likely to screen views to the substations.
146	Moderate	High	The nearest substation is located approximately 9.4 km northwest of the dwelling at its nearest point. Distant views to parts of the substations are likely to be available, however will be difficult to discern.
31	Low	High	Dense vegetation to the north of the dwelling is likely to screen views to the substations.
19	Low	-	Existing vegetation to the northeast of the dwelling is likely to screen views to the substations.
20	Low	-	Vegetation surrounding the dwelling is likely to assist in screening distant views to the substations.
83	Low	-	The nearest substation is located approximately 14.0 km northeast of the dwelling at its nearest point. Views towards parts of the transmission lines are likely to be available from this dwelling to the northeast, however will be difficult to discern.
29	-	High	The nearest substation is located approximately 7.4 km northwest of the dwelling at its nearest point. Views towards the substations may be available from this dwelling, however vegetation to the north of the dwelling is likely to assist in fragmenting views.

Table 15. Overview of Potential Visual Impacts of non-involved dwellings within 8,000 metres of nearest WTG - Proposed Substations Option A and B

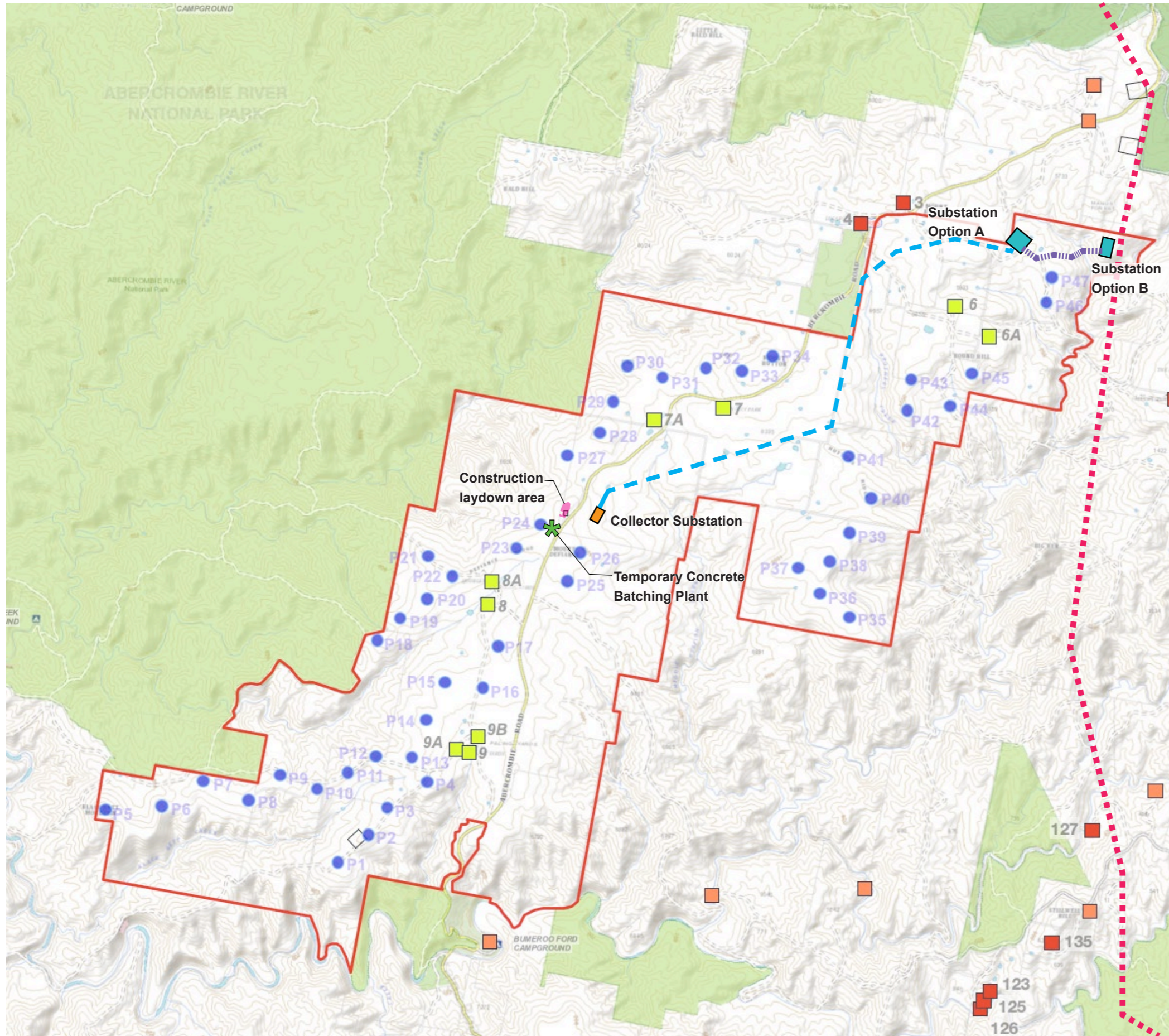
Dwelling ID:	Option A - ZVI level of visibility (based on topography alone):	Option B - ZVI level of visibility (based on topography alone):	Assessment:
3	Low	Low	The proposed transmission line is approximately 0.5 km south east of the dwelling at its nearest point. Dense vegetation to the south/southeast of the dwelling is likely to assist in screening views to the transmission lines, however it may be partially visible to the east.
4	Low - Moderate	Low - Moderate	The proposed transmission line is approximately 0.55 km south east of the dwelling at its nearest point. Dense vegetation to the south and east of the dwelling is likely to screen views to the transmission lines.
13	Low - Moderate	Low - Moderate	Dense vegetation surrounding the dwelling is likely to screen views to the transmission lines.

108	Moderate	Moderate	The proposed transmission line is approximately 3.0 km west of the dwelling at its nearest point. Views towards parts of the transmission lines are likely to be available from this dwelling to the west/northwest.
117	Low	Low	Dense vegetation to the west/northwest of the dwelling is likely to screen views to the transmission lines.
29	Moderate	Moderate	Vegetation to the north of the dwelling is likely to fragment views to the transmission lines.
30	Low - Moderate	Low - Moderate	Vegetation surrounding the dwelling is likely to screen views to the transmission lines.
31	Moderate	Moderate	Dense vegetation to the north of the dwelling is likely to screen views to the transmission lines.
154	Low - Moderate	Low - Moderate	Vegetation to the north of the dwelling is likely to assist in screening views to the transmission lines.
143	Moderate	Moderate	Dense vegetation to the north of the dwelling is likely to screen views to the transmission lines.
144	Moderate	Moderate	Dense vegetation to the north of the dwelling is likely to assist in screening views to the transmission lines.
145	Moderate	Moderate	Dense vegetation to the north of the dwelling is likely to screen views to the transmission lines.
146	Moderate	Moderate	The proposed transmission line is located approximately 9.4 km northwest of the dwelling at its nearest point. Distant views to parts of the transmission lines are likely to be available, however will be difficult to discern.
147	Moderate	Moderate	Dense vegetation to the north of the dwelling is likely to assist in screen views to the transmission lines.
21	Moderate	Moderate	The proposed transmission line is located approximately 10.4 km northeast of the dwelling at its nearest point. Distant views to parts of the transmission lines are likely to be available, however scattered vegetation surrounding the dwelling is likely to assist in fragmenting views.
81	Moderate	Moderate	The proposed transmission line is located approximately 12.8 km northeast of the dwelling at its nearest point. Distant views to parts of the transmission lines are likely to be available, however scattered vegetation to the north of the dwelling is likely to assist in fragmenting views.
83	Low - Moderate	Low - Moderate	The proposed transmission line is approximately 14.0 km northeast of the dwelling at its nearest point. Views towards parts of the transmission lines are likely to be available from this dwelling to the northeast, however will be difficult to discern.
20	Moderate	Moderate	Vegetation surrounding the dwelling is likely to assist in screening distant views to the transmission lines.
19	Low	Low	Existing vegetation to the northeast of the dwelling is likely to screen views to the transmission lines.
18	Low	Low	The proposed transmission line is located approximately 13.4 km northeast of the dwelling at its nearest point. Distant views to parts of the transmission lines are likely to be available, however will be difficult to discern.
17	Low	Low	Vegetation surrounding the dwelling is likely to assist in screening distant views to the transmission lines.
11	Low	Low	The proposed transmission line is located approximately 12.5 km northeast of the dwelling at its nearest point. Distant views to parts of the transmission lines may be available, however existing vegetation to the northeast is likely to assist in screening views.

Table 16. Overview of Potential Visual Impacts of non-involved dwellings within 8,000 metres of nearest WTG - Proposed Transmission Lines Option A and B

Associated Infrastructure

Paling Yards Wind Farm



LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- - - Existing 500kV Transmission Line
- - - Proposed 500kV Extension
- - - Proposed 132kV Extension
- Substation Location Option
- Collector Substation Location
- Construction laydown area
- ✱ Temporary Concrete Batching Plant



Figure 29 Associated Infrastructure

Associated Infrastructure (Substation Options) Paling Yards Wind Farm

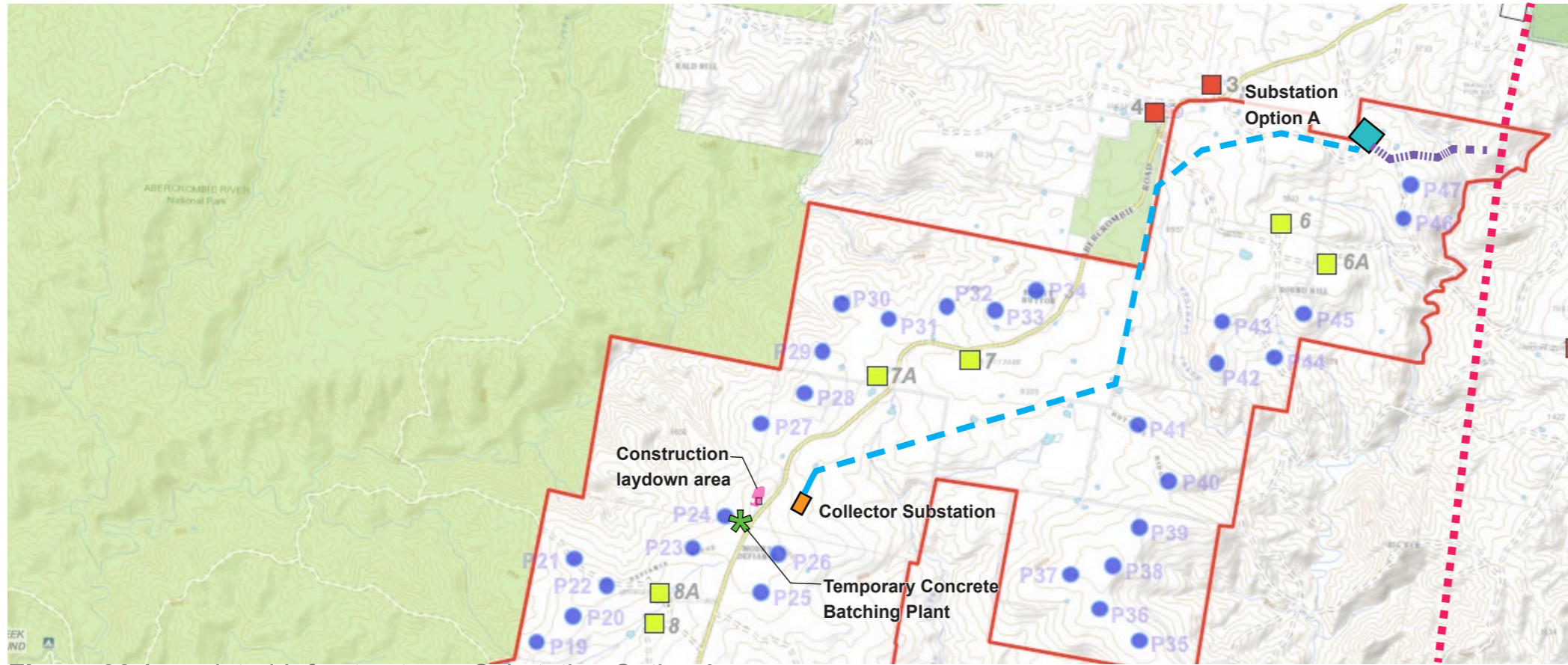


Figure 30 Associated Infrastructure - Substation Option A

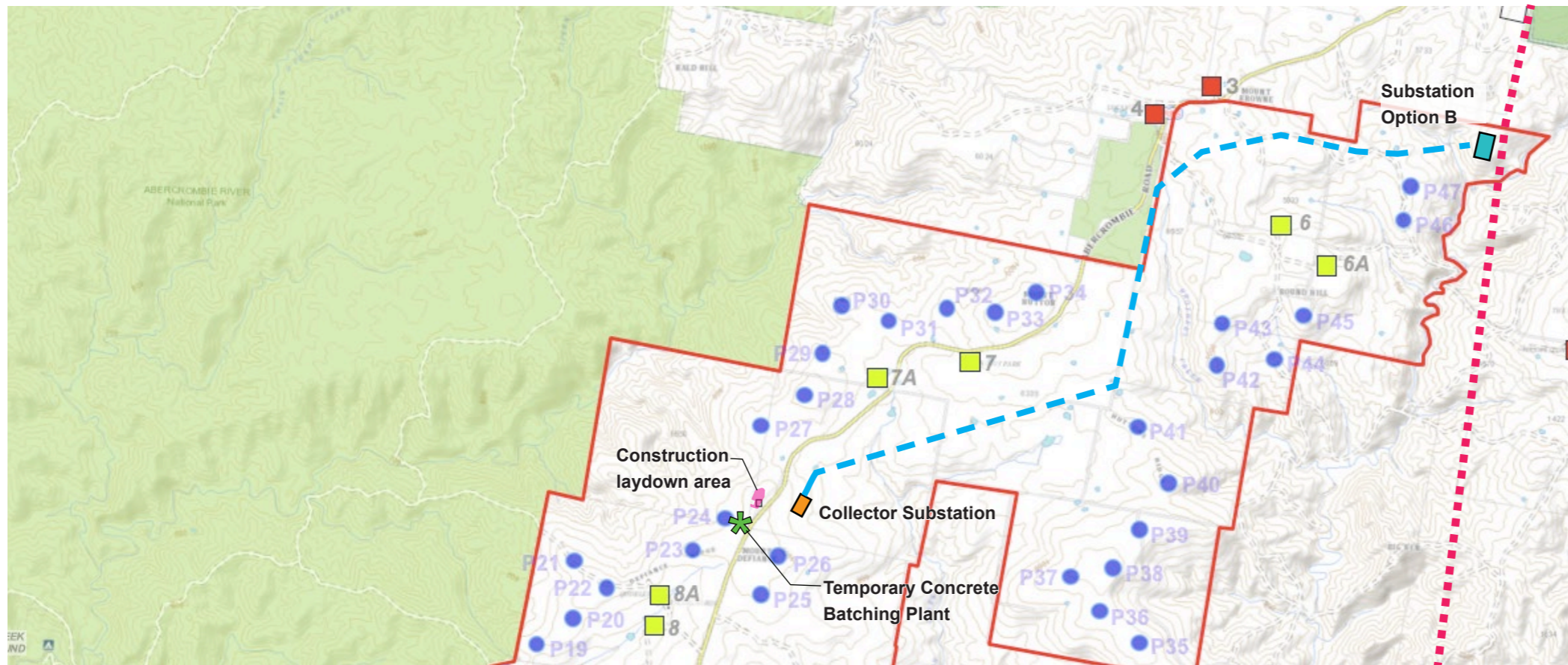
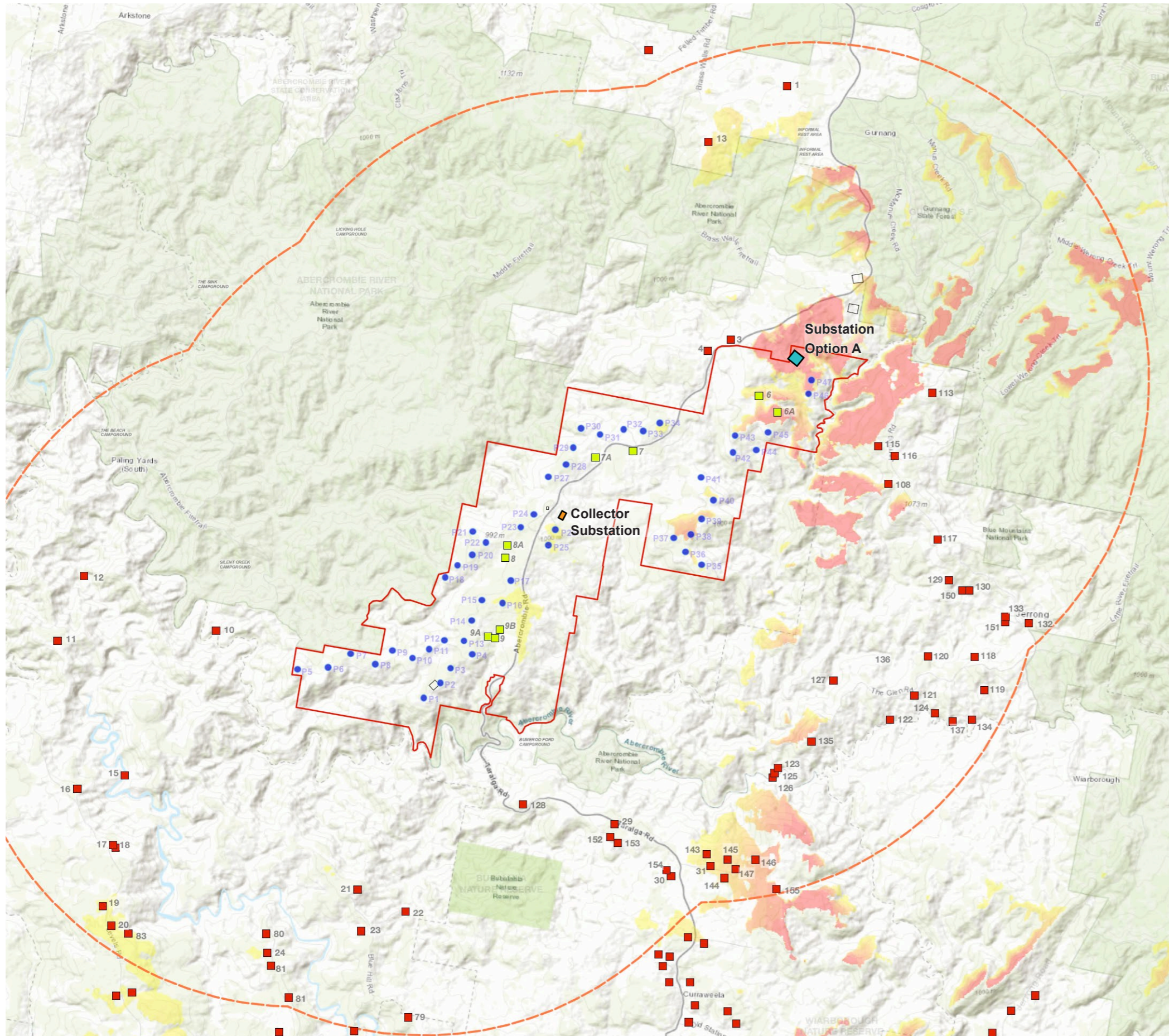


Figure 31 Associated Infrastructure - Substation Option B

- LEGEND**
- Project Boundary
 - Proposed 240 m Turbine Location
 - Involved Dwelling
 - Non-involved Dwelling
 - Main Road
 - Minor Road
 - - - Existing 500kV Transmission Line
 - . . - Proposed 500kV Extension
 - - - - Proposed 132kV Extension
 - Substation Location Option
 - Collector Substation Location
 - Construction laydown area
 - ★ Temporary Concrete Batching Plant





Zone of Visual Influence (Proposed Substations Option A) Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- Substation Location Option
- Collector Substation Location

ZVI Level of Visibility:

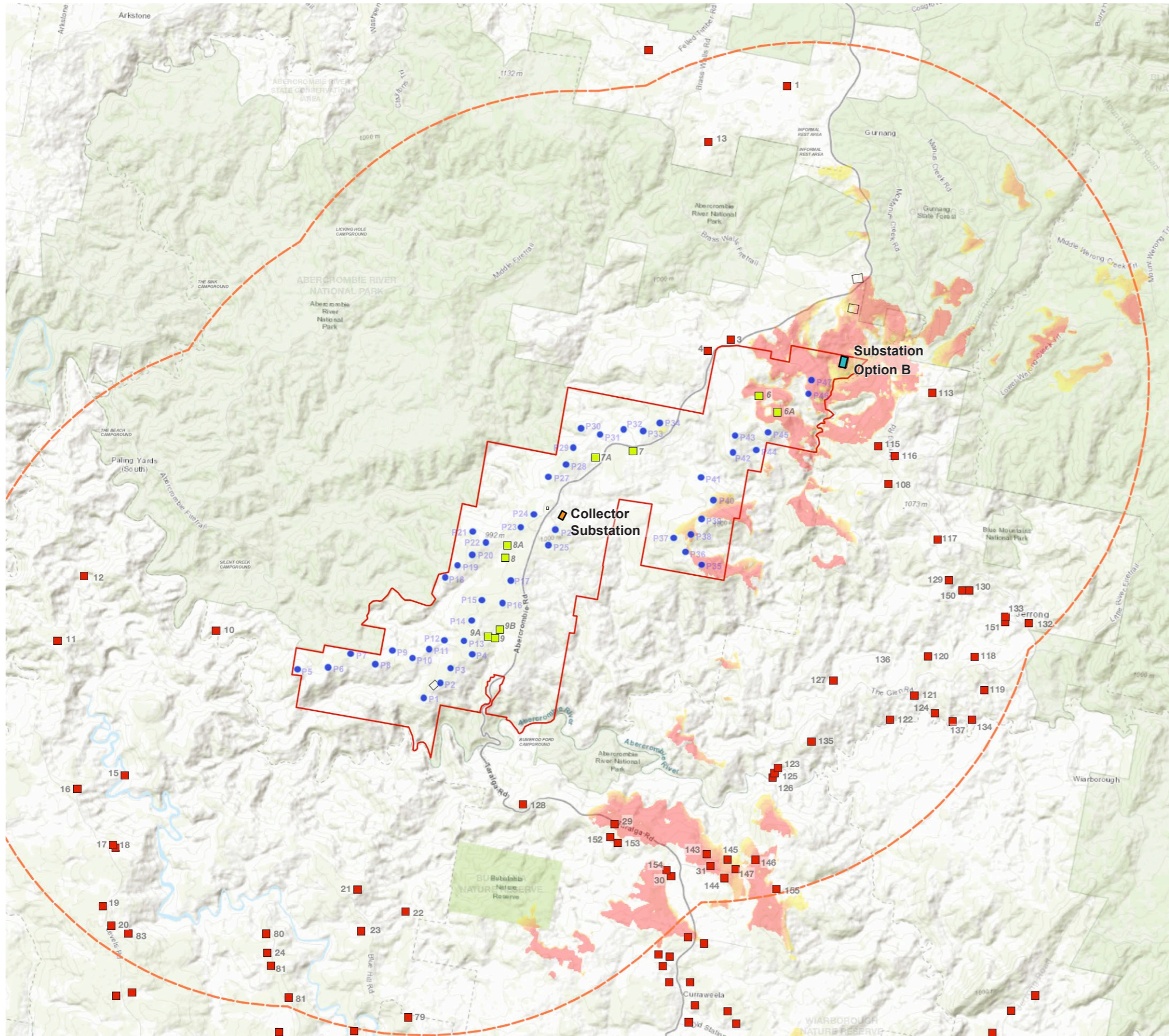
- 0
- Low Visibility
- Moderate Visibility
- High Visibility

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.



Figure 32 Zone of Visual Influence (Proposed Substations Option A)



Zone of Visual Influence (Proposed Substations Option B) Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- Substation Location Option
- Collector Substation Location

ZVI Level of Visibility:

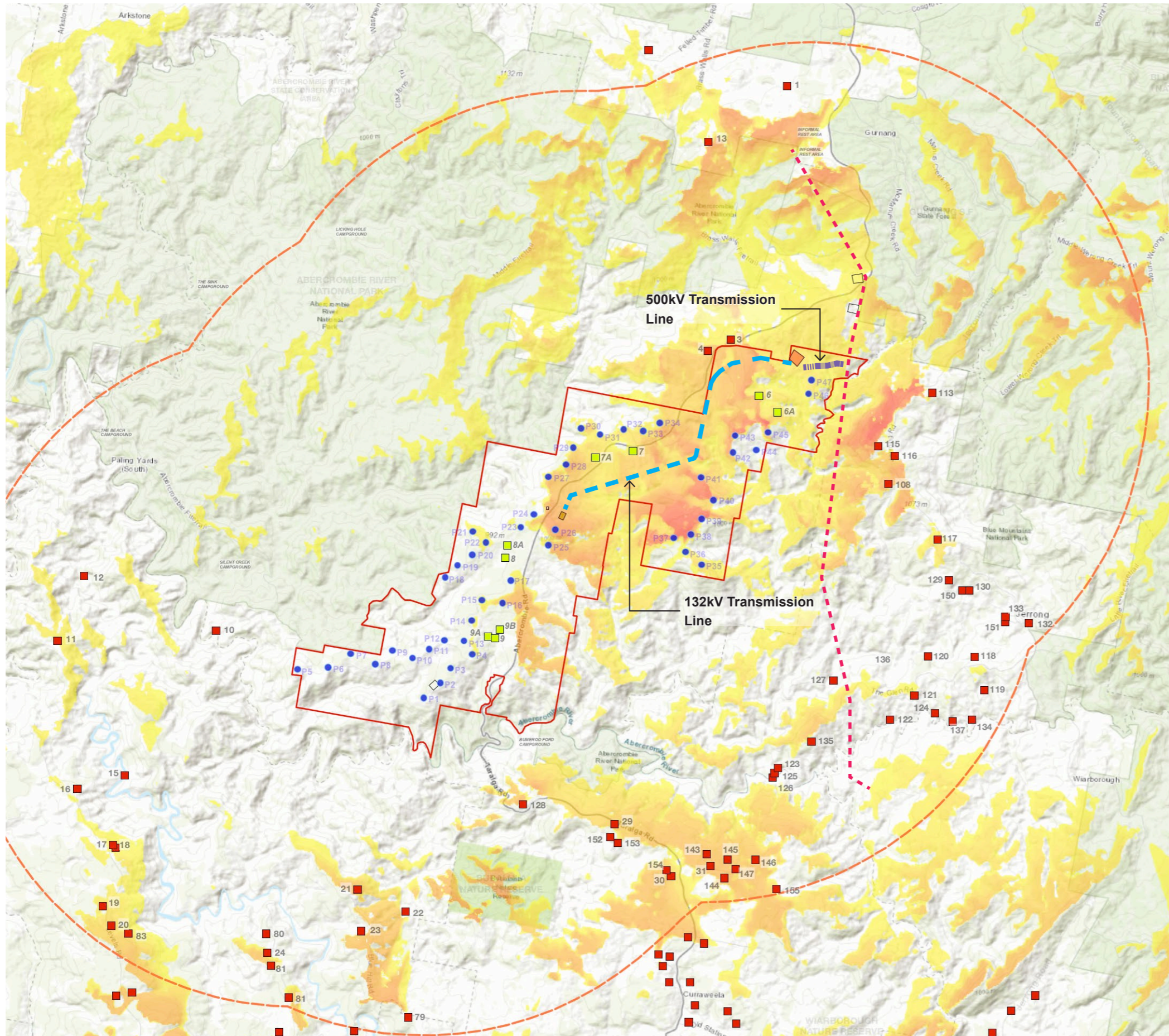
- 0
- Low Visibility
- Moderate Visibility
- High Visibility

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.



Figure 33 Zone of Visual Influence (Proposed Substations Option B)



Zone of Visual Influence (Proposed Transmission Lines Option A) Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- Existing 500kV Transmission Line
- Proposed 500kV Extension
- Proposed 132kV Extension

ZVI Level of Visibility:

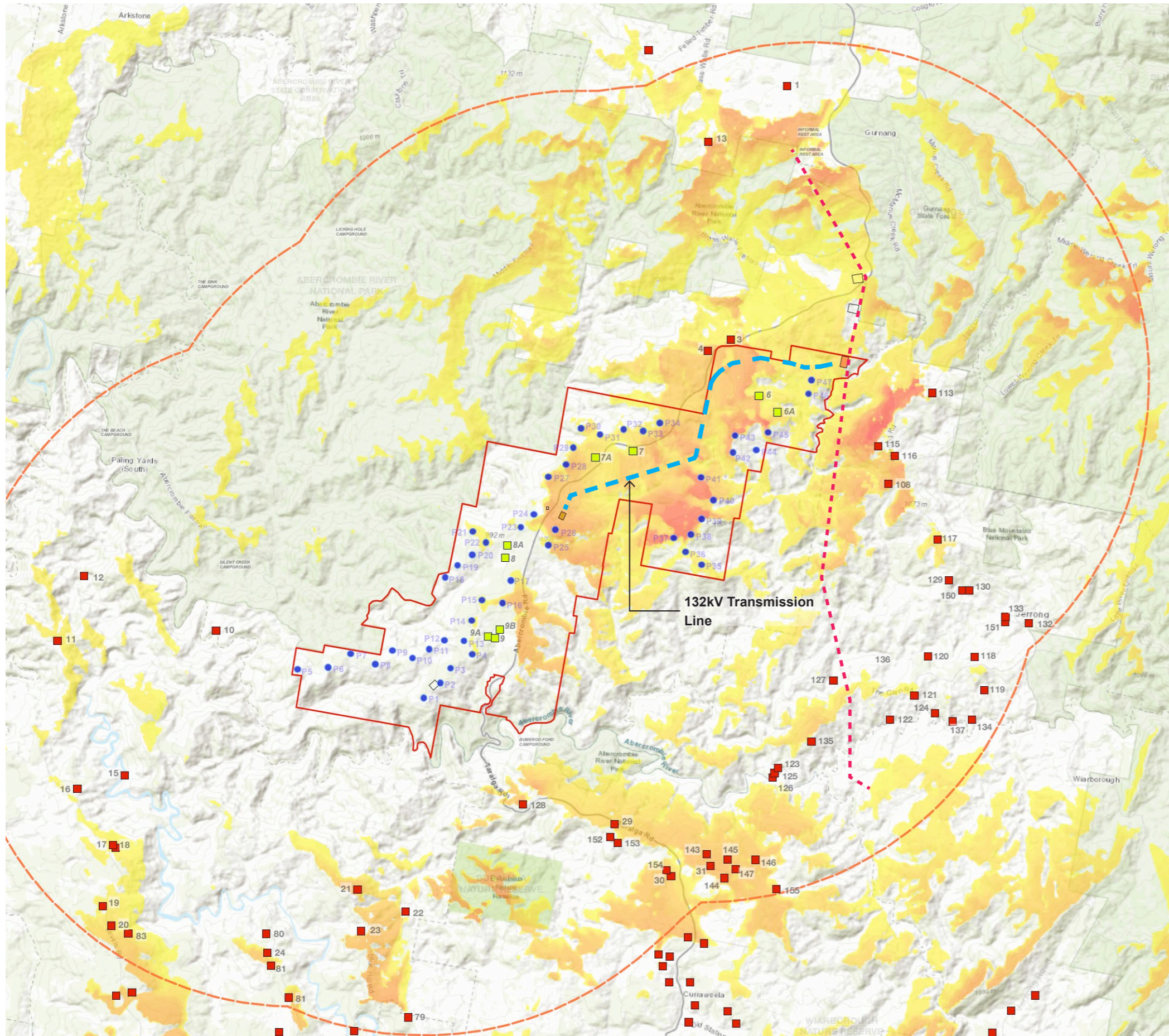
- 0
- Low Visibility
- Moderate Visibility
- High Visibility

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.



Figure 34 Zone of Visual Influence (Proposed Transmission Lines Option A)



Zone of Visual Influence (Proposed Transmission Line Option B) Paling Yards Wind Farm

LEGEND

- Project Boundary
- Proposed 240 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- Main Road
- Minor Road
- Existing 500kV Transmission Line
- Proposed 132kV Extension

ZVI Level of Visibility:

- 0
- Low Visibility
- Moderate Visibility
- High Visibility

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.



Figure 35 Zone of Visual Influence (Proposed Transmission Lines Option B)

13.3 Internal Access Roads

Access roads are proposed on site between the wind turbines and connecting to existing arterial roads. Access to the Project Area is proposed via the existing land owner access point off Abercrombie Road.

Internal access roads will be constructed to provide access to the proposed turbine locations. This includes upgrades to some existing access tracks currently formed within the Project Area and the establishment of new access tracks. Micro-siting of the internal roads to be undertaken as part of the detailed design and construction process within the development corridor. The access roads are generally unsealed surface.

Generally, the internal roads have been sited to reduce potential vegetation loss and limit earth work requirements. 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

13.4 On-site Substations

Substation

The Project will include one substation located at one of two sites (refer to **Figure 29**). Two (2) potential site options have been included to provide flexibility in the detailed design process. The two site options are located in the north eastern area of the Site close to the existing 500kV transmission line.

There are two (2) non-involved dwellings within 2,000 m of the proposed substation locations (Dwellings 3 and 4). Both substation locations have been setback from roads and sited in locations that have been previously cleared. Views to the substation location are likely to be difficult to discern due to a combination of vegetation and topography.

Collector Substation

One (1) collector substation is proposed near Abercrombie Road. It is proposed landscape screening is planted along the western side of the collector substation to reduce the potential visual impacts from Abercrombie Road.



Image 31. Example of screen planting to mitigate a substation

13.5 Meteorological Monitoring Masts

Three (3) meteorological monitoring masts are proposed to be located within the Project Area to record wind speed and other meteorological data. The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment. Meteorological masts are generally difficult to discern at a distance and siting of the masts during the detailed design phase will ensure they are set back from nearby residences and public viewing locations to reduce visual impact.

13.6 Construction Control Room

A permanent construction control room will be constructed to support the construction and operation of the wind farm.

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

Overview of Impact on Landscape Character



14.0 Overview of Impact on Landscape Character

14.1 Overview of Visual Impacts 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 primarily of modified undulating hills. Generally, the Scenic Quality Classes of the Landscape Character Units (LCU) within the Study Area have been rated as moderate or high with one area defined as low (refer to **Section 5.0**).

The fact that the proposed wind turbines are generally positioned within a landscape that has remained largely unchanged for decades means that the potential for contrast is significant. There is little doubt that the Winterbourne Wind Farm, regardless of how visible it actually is, would become a feature of the area. However, the degree to which the existing landscape character and significance is altered as a result of the proposal, is determined by the dominance of the proposal in relation to the existing landscape features.

It is undeniable the proposed wind farm would become a feature of the visual landscape. However, it is likely the character of areas which are valued for their high landscape quality and utilised for recreation and tourism will remain intact. Regionally, significant landscape features identified in **Section 5.0** of this report, would remain dominant features of the landscape and it is unlikely the proposal would degrade the scenic value of these landscape features.

14.2 Overview of the Visual Impact on LCUs

Table 17 provides an overview of the assessment of the potential visual impacts on the existing landscape character of the local area for each Landscape Character Unit (LCU) as defined in **Section 5.5** 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 six (6) LCU's identified and assessed, the Project is likely to be visible from all, to varying degrees. Due to the undulating topography surrounding the Project Site, there are limited opportunities to view the Project in its entirety.

Overview of Impacts on Landscape Character Units

LCU:	Scenic Quality Rating:	Overview of Impact on Landscape Character:	Overview of Impact on Key Landscape Features:	Refer to:
LCU01 Abercrombie River Valley	Moderate	The Abercrombie River Valley LCU is characterised by the vegetated hills and valleys associated with Abercrombie River and associated tributaries. The topography of the LCU is steeply undulating and views to the Project are likely to be limited by a combination of topography and vegetation. Access within the LCU is limited, and the area is mostly uninhabited. The Glen Road runs through the LCU, however views from the road are limited by vegetation typical of the LCU. A number of dwellings are located along the valley floor and views from these dwellings are contained by topography. The Project is unlikely to impact upon the existing character of the LCU.	Abercrombie River	Viewpoint PY13: Bummaroo Ford Campground The Beach Campground
LCU02 Abercrombie Vegetated Hills	Moderate / High	The Abercrombie Vegetated Hills LCU has been defined as the land to the west of the Project generally associated with Abercrombie River National Park. The typical character of the LCU includes steep, undulating and densely vegetated slopes that cut deep in the landscape. Access within the National Park is limited to tracks accessible to experienced four wheel drive vehicles. Views from the tracks are limited by surrounding vegetation typical of the LCU. Several campgrounds are located within the LCU and have been assessed in this LVIA.	Vegetated Ranges	Silent Creek Campground Licking Hole Campground The Sink Campground
LCU03 Blue Mountains	Moderate / High	The Blue Mountains LCU is characterised as the vegetated undulating hills associated with the Blue Mountains National Park. Views from the LCU are limited by topography and vegetation. The Project is unlikely to be visible from the LCU and will not alter the existing character of the LCU.	Vegetated Ranges	Mount Werong Campground
LCU04 Paling Yards / Jerrong	Moderate	The Paling Yards / Jerrong LCU is generally defined by the largely cleared land associated with Paling Yards and Jerrong that supports cattle and sheep grazing. The Project is predominately sited within the area of the LCU associated with Paling Yards. The Project will result in a change to the existing landscape character from rural grazing land to a landscape with a dominant wind energy use. Publicly accessible land is generally limited to Abercrombie Road and Jerrong Road. The Project is anticipated to be a dominant element from some locations along Abercrombie Road. Views from Jerrong Road are likely to be limited by topographic changes and roadside vegetation.	Rural Land Local high points	Abercrombie Road Jerrong Road
LCU05 Golspie / Curraweela	Low / Moderate	The Golspie / Curraweela LCU is defined as the largely cleared land to the south of the Project associated with Golspie and Curraweela. The landscape supports cattle and sheep grazing. Land in this areas is undulating with roads and associated rural residential dwellings generally located along the ridgeline. Taralga Road and Levels Road and associated dwellings are located within the LCUs. Distant views to the Project may be available from some locations along the roads, however the Project would form a small element in the landscape and the character of the LCU would remain intact.	Bolong River Burra Burra Creek	Taralga Road
LCU06 Gurnang State Forest	Low	The Gurnang LCU is defined as the land associated with plantation forestry to the north of the Project. The LCU is a highly modified landscape with a low scenic quality rating. There is no public access available within the state forest, with access limited to Abercrombie Road and Jerrong Road. Views to the Project will be limited by a combination of topography and vegetation associated with the plantations. The Project will not alter the existing character of the Gurnang LCU.	Forest	No Public Access

Table 17 Overview of Impact on Landscape Character Units

15

Mitigation Measures



15.0 Mitigation Measures

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

Mitigation methods considered for associated infrastructure has been included in Section 13.0.

15.2 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.

15.2.1 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.

15.2.2 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, rotational speed, height and rotor diameter.
- The use of simple muted colours and non-reflective materials to reduce distant visibility and avoid drawing the eye.
- Blades, nacelle and tower to appear as the same colour.
- Avoidance of unnecessary lighting, signage, logos etc.

15.3 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 10 non-involved dwellings assessed within the blue line of visual magnitude (4,750 m from the nearest turbine) a total of three (3) non-involved dwellings residences were identified through the visual assessment as having the potential for a moderate or high visual impact (Dwellings 3, 108 & 128). Mitigation measures have been suggested for the three (3) non-involved dwellings.

Proposed mitigation measures have been included as **Appendix E** and will be undertaken in consultation with the associated landowners. Principles for screen planting and supplementary planting have been included as follows. These principles can be implemented to reduce the potential visual impacts at dwellings in excess of 4,750 m of the nearest turbine post construction is deemed necessary.

15.3.1 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 from residential properties. As the viewing location of the proposal would be generally fixed there is opportunity to significantly reduce potential visual impact from the proposal.

In order to achieve visual screening planting between the intrusive element and the 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.

15.3.2 Residence Supplementary Planting

Due to the vegetated character of areas surrounding the Project Area the Project is likely to be fragmented or screened by vegetation from a number of dwellings. Where turbines are located close to the dwelling or existing intervening vegetation is thin, supplementary planting is a mitigation method that has been identified. Supplementary planting in keeping with the existing landscape character would further reduce potential visibility and ensure longevity of the intervening vegetation.

Existing scattered vegetation obstructs views towards some wind turbines from this location. Existing vegetation is scattered in the middle ground. Where screening may be required from a static position (ie. kitchen / living room window) screen planting sited away from the residence ensures desirable views across land are retained where possible, whilst selectively screening views to WTGs.

15.4 Landscaping Principles

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

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

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

16

Evaluation of Visual Performance Objectives

16.0 Evaluation of Visual Performance Objectives

16.1 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.”

The following tables provides a brief 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 (4,750 m for Paling Yards WF)	Manage impacts as far as practicable, justify residual impacts, and describe proposed mitigation measures below the black line (3,200 m for Paling Yards WF). Consider screening between the blue line and the black line.	Consider screening below the black line (within 3,200 m).

Summary of LVIA Evaluation

All 10 non-involved dwellings identified within 4,750 m of the nearest turbine were assessed as being 'Visual Influence Zone 2'.

Dwellings within 3,200 m (below the black line):

- Seven (7) non-involved dwellings were identified within 3,200 metres of a proposed turbine.
- All non-involved dwellings within 3,200 m of the nearest turbine were assessed as being Visual Influence Zone 2 (VIZ2).
- Of the dwellings assessed, five (5) were assessed as having a nil, negligible, low visual impact rating.
- One (1) non-involved dwelling was rated as having a high visual impact rating and one (1) was rated as having a moderate visual impact. Screen planting has been proposed in accordance with the Visual Assessment Bulletin to reduce the potential visual impacts from these two (2) non-involved dwellings.
- The objectives for VIZ2 receptors within 3,200 m of the nearest turbine are to: *Manage impacts as far as practicable, justify residual impacts.*

Dwellings within 3,200 m - 4,750 m (between the blue and black line):

- Three (3) non-involved dwellings were identified between 3,200 - 4,750 metres of the nearest proposed turbine (between the black and blue line of visual magnitude).
- All non-involved dwellings located between 3,200 m - 4,750 m of the nearest turbine were assessed as being Visual Influence Zone 2 (VIZ2).
- The objectives for VIZ2 receptors between the black line (3,200 m) and blue line (4,750 m) of the nearest turbine are to: Consider screening between the blue line and the black line.
- Of the dwellings assessed, two (2) were assessed as having a negligible or no visual impact rating. One (1) non-involved dwelling was rated as having a high visual impact rating. Screen planting has been proposed in accordance with the Visual Assessment Bulletin to reduce the potential visual impacts from this location.

Refer to Section 6.0: Preliminary Assessment Tools

Table 14 Evaluation of Visual Performance Objectives - Visual Magnitude

Landscape Scenic Integrity

Visual Influence Zone 1 Objectives:	Visual Influence Zone 2 Objectives:	Visual Influence Zone 3 Objectives:
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 throughout various sections of the report. The following provides a summary of the findings:

Public Viewpoint Analysis:

- The Visual Influence Zone (VIZ) was identified for 20 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 20 viewpoint locations assessed, 14 locations were rated as being Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply.
- Two (2) public viewpoints were assessed as being Visual Influence Zone 2 (VIZ2), the Project was assessed as being a visible element in the landscape from these two (2) public viewpoint locations (PY11 & PY19). Photomontages have been prepared from these locations demonstrating the turbines will not dominate the existing visual catchment.
- Four (4) public viewpoint locations were assessed as Visual Influence Zone 1 (VIZ1). Three (3) of these locations are on Abercrombie Road and are rated as being VIZ1 due to the close proximity to the Project (PY03, PY04 & PY05). One (1) public viewpoint - PY13 was rated as VIZ1 due to the recreational land use and close proximity to the Project. A photomontage was prepared from this location to assist the assessment on the impact on the scenic integrity of this location. The assessment found there is a low level of modification to the visual catchment from the northern most point of the Bumaroo Campground. The major elements of the campground would remain the dominant feature of the visual catchment.

Refer to Section 8.0 and Appendix B: Public Viewpoint Analysis

Dwelling Assessments:

- All 10 non-involved dwellings assessed within 4,750 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 major element in the landscape from the three (3) non-involved dwellings assessed as having a moderate or high visual impact, however mitigation measures have been proposed to reduce the impact and ensure they do not dominate the existing visual catchment.

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. The LVIA concluded that whilst the Project is likely to be a visible element in the landscape, the scenic integrity of the existing landscape character is likely to remain intact.

Refer to Section 14.0: Overview of Impact on Landscape Character.

Table 15. Landscape Scenic Integrity - Evaluation of Visual Performance Objectives

Key Feature Disruption

Visual Influence Zone 1 Objectives:	Visual Influence Zone 2 Objectives:	Visual Influence Zone 3 Objectives:
Avoid wind turbines or ancillary facilities that result in the removal or visual alteration/disruption of identified key landscape features. This includes any major or visually significant landform, waterform, vegetation or cultural features that have visual prominence or are focal points.	Minimise impact of wind turbines or ancillary facilities that result in the removal or visual alteration/disruption of identified key landscape features. This includes any major or visually significant landform, waterform, vegetation or cultural features that have visual prominence or are focal points.	No Visual Performance objective applies.

Summary of LVIA Evaluation

Key Landscape Features are identified in **Section 5.0**. The key features were identified through a combination of community consultation and landscape character assessment. The LVIA has assessed the key features of the area and it has been concluded that whilst the Project may impact views from some areas, key features identified through the landscape baseline study will remain the dominant features of the landscape. The potential impact on key landscape features was assessed throughout various sections of the report. The following provides a summary of the findings:

Public Viewpoint Analysis:

- The Visual Influence Zone (VIZ) was identified for 20 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 20 viewpoint locations assessed, 14 locations were rated as being Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply.
- Two (2) public viewpoints were assessed as being Visual Influence Zone 2 (VIZ2), the Project was assessed as being a visible element in the landscape from these two (2) public viewpoint locations (PY11 & PY19). Photomontages have been prepared from these locations demonstrating the turbines will not alter the key landscape features of the landscape.
- Four (4) public viewpoint locations were assessed as Visual Influence Zone 1 (VIZ1). Three (3) of these locations are on Abercrombie Road and are rated as being VIZ1 due to the close proximity to the Project (PY03, PY04 & PY05). One (1) public viewpoint - PY13 was rated as VIZ1 due to the recreational land use and close proximity to the Project. A photomontage was prepared from this location to assist the assessment on the impact on the key landscape features. The assessment found the surrounding vegetated ranges, riparian vegetation, Abercrombie River will remain the focal points within the Campground.

Refer to Section 8.0 and Appendix B: Public Viewpoint Analysis

Dwelling Assessments:

- All 10 non-involved dwellings assessed within 4,750 m of the nearest turbine are rated as Visual Influence Zone 2 (VIZ2). The potential impacts on the key landscape features for each of the dwellings has been assessed in accordance with the objectives of the Bulletin (as outlined above).
- The assessment found that the key landscape features of the landscape will not be significantly modified as a result of the Project. The turbines have the potential to become a major element in the landscape from the three (3) non-involved dwellings assessed as having a moderate or high visual impact, however mitigation measures have been proposed to reduce the impact and ensure they do not become the visually prominent element in the landscape.

Refer to Section 9.0 and Appendix C: Detailed Dwelling Assessment

Landscape Character:

The potential for the project to affect key landscape features of the existing landscape character was summarised for each Landscape Character Unit. The LVIA concluded that whilst the Project is likely to be a visible element in the landscape, the existing landscape features will retain visual prominence in the visual catchment.

Refer to Section 14.0: Overview of Impact on Landscape Character.

Table 16. Key Feature Disruption - 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 60° sectors.
- Level 2: (Moderate Sensitivity) - Wind Turbines visible within the effective horizontal views in three or more 60° 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) 60° sectors when using the Multiple Effect Tool.
- Based on a 2D Assessment, two (2) non-involved dwellings have turbines located within up to three (3) 60 degree sectors (Dwelling 3 and 4)
- All other non-involved dwellings and public viewpoint receptors have turbines located within two (2) or less 60 degree sectors which is deemed acceptable.
- Dwelling 4 was identified as having turbines in up to three (3) 60 degree sectors, detailed assessment identified intervening vegetation is likely to reduce the extent of visible turbines to less than two (2) 60 degree sectors.
- Dwelling 3 was identified as having turbines in up to three (3) 60 degree sectors. Detailed assessment of this dwelling identified existing wind break planting surrounding the dwelling will screen views to the Project.

Refer to Section 6.0: Preliminary Assessment Tools

Table 17. 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 by DNV-GL

The Report concluded no non-associated dwellings will be subject to shadow flicker exceeding 30 hours per year.

Refer to Shadow Flicker Assessment Report - Prepared by DNV-GL.

Table 18. 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.
- Mitigation methods have been outlined in **Section 11.0**.
- Shielding will be installed on all turbines with aviation lighting to reduce impact for dwellings within 2 kilometres. There are no non-involved dwellings within 2km of a proposed turbine.

Refer to Section 11.0 Night Lighting Assessment.

Table 19. Aviation Hazard Lighting - Evaluation of Visual Performance Objectives

17.0 Conclusion

It is inevitable that the placement of large scale wind turbines in a rural landscape will alter the existing landscape character of the area to some degree. The Project contrasts with the existing landscape character of the region which is typically rural, pastoral land with large expanses of vegetation.

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. If there is potential for negative impact, this impact, and any mitigation methods must be investigated in order to reduce the impact to an acceptable level.

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. 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. The topography surrounding the wind turbines significantly alters the visibility of the proposed development from many vantage points. Within the local setting, a combination of the topography and local influences such as existing natural and introduced vegetation significantly reduce visibility towards the Project.

The greatest visual effect is most likely to be felt by residents in the immediate vicinity of the wind farm. The LVIA concludes there are limited opportunities to view the Project from non-involved dwellings within 4,750 m of the Project. Of the 10 non-involved dwellings assessed, seven (7) are likely to have no views to the Project or a negligible - low visual impact. One (1) non-involved dwelling is likely to have a moderate visual impact, and two (2) dwellings have been assessed as having a high visual impact rating.

Mitigation methods incorporated into the design process in conjunction with landscape and visual screening will have a positive effect on reducing any visual impact of proposed wind farm from the non-associated dwellings identified as having a moderate or high visual impact. Through mitigation methods described it will be possible to significantly reduce the visual impact to an acceptable level at all non-involved dwellings.

Due to their simplicity in form (especially when compared to transmission lines, towers and associated infrastructure) 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 professional opinion of Moir Landscape Architecture that with mitigation measures implemented, the Project is compliant with the performance objectives as per the Visual Assessment Bulletin.

A

Visual Influence Zone
Study Method

VIEWER SENSITIVITY LEVEL

Level 1 Sensitivity: High	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)	
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)	

SCENIC QUALITY CLASS

LOW	MODERATE	HIGH
Landform		
Waterbodies		
Vegetation		
Human Influence		
Activity		
Rarity		
Relationship with adjoining landscapes		

VISUAL INFLUENCE ZONE MATRIX

VIEWER SENSITIVITY LEVEL		SCENIC QUALITY CLASS		
- VISIBILITY DISTANCE ZONE		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