

Tandegin Wind Farm

Landscape and Visual Impact Assessment

Collgar Renewables Pty Ltd

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Executive Summary

Aurecon Australasia Pty Ltd (Aurecon) has been engaged by Collgar Renewables Pty Ltd (the Proponent) to facilitate the environmental and planning assessments and approvals for the Tandegin Wind Farm (the Proposal).

The Proposal is located 20 kilometres (km) south east of the town of Merredin and is entirely within the Shire of Merredin, in the Wheatbelt region of Western Australia. The Proposal is approximately 287 km east of Perth and encompasses approximately 12,894 hectares (ha) of agricultural land with areas of remnant native vegetation.

The Proposal consists of a maximum of 50 wind turbine generators (turbines) with a maximum tip height of up to 252 metres (m) above ground level. The proposed turbine array is expected to have a total generating capacity of up to 310 megawatts (MW).

The Proposal will connect into the South-West Interconnected System (SWIS) via a 220 kilovolt (kV) overhead transmission line of approximately 13.5 km in length and up to 60 m in height at 250 to 500 m intervals with a 50 m wide easement. This will link to the existing Collgar Terminal located to the north of the Project Area.

In addition, approximately 40 km of 33 kV overhead transmission line forms part of the 33 kV reticulation from the Tandegin substation to the first wind turbine generator in a collector group, before transitioning to underground cable. The 33 kV overhead transmission lines will be supported by pole structures, 18 to 30 m in height at 50 m intervals with easements ranging between 50 to 115 m wide.

A Battery Energy Storage System (BESS), with maximum capacity to deliver 300 MW (over 6 hours) with an energy storage capacity of 1,800 MWh, is also proposed.

The landscape and visual baseline

The Landscape and Visual Impact Assessment (LVIA) has been prepared with reference to the *Visual Landscape Planning in Western Australia: A Manual for Evaluation Assessment, Siting and Design* (WAPC, 2007) guideline, together with additional supporting guidance.

The LVIA Study Area (hereafter referred to as the Study Area) has been defined as the area within a radius of 10 km from the Project Area boundary. The Study Area captures locations where the Proposal has the highest potential impacts, based upon the height of turbines, topographical characteristics and intervening elements in the surrounding area.

Based on the height of the proposed turbines, the Visual Prominence Zone (VPZ) is up to 3.36 km, which is the broader extent of the Study Area. However, the objective of this LVIA is to identify landscape and visual impacts of higher perceived risk. At distances in excess of 3.36 km, turbines may still be visible but will result in a lower level of perceived visual significance.

The Study Area falls within the Shire of Merredin. Relevant planning policies and legislation have been reviewed to understand any specific landscape or visual designations relating to the Study Area, as well as a desktop study to understand the various physical elements that combine to create landscape and visual character.

The LVIA identifies landscapes of regional value within the Study Area including the Merredin Plateau landscape character subtype. This landscape has been considered in the identification of Landscape Character Zones (LCZs) and key viewpoints.

Landscape and visual assessment findings

The predicted landscape and visual impacts are determined through the combination of sensitivity and level of modification applied by the Proposal as outlined in the methodology, with the resulting impact rating calculated through a determination matrix (refer Section 3.6.4).

Landscape Character Zone impacts

LCZ 1 – Agricultural Pasture: Low impact

The Proposal is located within LCZ 1, a widely dispersed agricultural landscape already supporting wind farm infrastructure at the existing Collgar Wind Farm (CWF) to the north. The presence of the wind farm and its ancillary structures allows farming to continue throughout the wind farm's lifecycle. Low sensitivity is attributed to the absence of specific planning controls designating special landscape value, though openness may be valued by some receptors. Construction impacts are localised and of low contrast to working farmland. Operationally, the turbines extend the established wind farming character southward from the existing CWF without altering land use, landform, or vegetation patterns.

LCZ 2 – Towns and Settlements: Negligible impact

Low sensitivity reflects limited residential numbers and minimal tourism role. The Muntadgin townsite experiences negligible construction impacts due to distance, and operational impacts remain negligible with turbines positioned a minimum of 3.7 km away, ensuring no adverse effects on the settlement.

LCZ 3 – Bushland Reserves and Native Vegetation Patches: Negligible impact

Moderate sensitivity is attributed to valued conservation areas. No infrastructure is proposed within this zone, resulting in negligible construction and operational impacts with no bearing on bushland reserves.

Construction impacts

Construction impacts across all viewpoints (VPs) are assessed as **Negligible to Low impact**.

At the majority of locations, earthworks will not be visible due to distance and intervening vegetation. Crane installation of turbines may be partially visible from dwellings within 3.36 km of the Project Area (VP2, VP4, VP6), representing a temporary and localised change of very low to low magnitude. At VP8, removal of roadside vegetation for construction access would be visible to transiting motorists, though views are brief and predominantly screened by adjacent vegetation. Negligible construction impacts are anticipated at the Muntadgin townsite (VP7) or at more distant viewpoints.

Operational impacts

Operational impacts range from **Negligible to High impact** across assessed receivers.

Visual impact is primarily determined by proximity to turbines, with intervening vegetation, topography, and landform serving as key moderating factors.

- **High Impact:** Two dwelling (R15 and R16/VP6) at 1.5 to 1.56 km distance with minimal screening and turbines occupying over 20° vertical and 45° horizontal field of view.
- **Moderate Impact:** Three dwellings (R11, R17, R32) within the 3.36 km VPZ, partially screened by vegetation and farm structures.
- **Low to Negligible Impact:** Remaining viewpoints and residential receivers benefit from screening vegetation, intervening topography, or location outside the VPZ where turbines diminish in prominence and foreground elements remain dominant. The Muntadgin townsite (VP7) and several dwellings (R6, R12, R14, R19 to R31) experience negligible impacts through effective screening by surrounding vegetation or distance.

Cumulative Impacts

Of five non-associated dwellings assessed for cumulative effects with the existing CWF, the majority experience **Negligible to Very Low** cumulative impacts.

Three dwellings (R12, R17, R19) are assessed as Negligible, with foreground vegetation or adjacent structures effectively screening views of one or both wind farms. Two dwellings (R13, R18) are assessed as Very Low, where the Proposal and CWF span a wide horizontal field of view, but the existing CWF is barely visible at distances approaching or exceeding 8 km.

In all cases, distance to the existing CWF (3.73 to 8.14 km) and intervening vegetation substantially limit the combined visual effect. **No dwelling is assessed as having a cumulative impact above Low.** Motorists on Merredin-Narembene Road and Muntadgin-Tandegin Road would experience sequential cumulative impacts over approximately 12 km but are unlikely to differentiate between turbines of the two wind farms.

Recommendations

The following points are recommended to understand impacts from sensitive private dwellings.

Priority actions:

- One dwelling (R16, represented by VP6) is assessed as High impact at 1.75 km with minimal screening and is the priority for landowner engagement and mitigation.
- Three dwellings (R11, R17, R32, represented by VP4 and VP7) are assessed as Moderate impact within the VPZ. Consultation, ground-truthing of screening value, and visual assessment from each property are recommended.

Mitigation measures:

- For all five Moderate to High impact dwellings, introduction of screening vegetation to the foreground has the potential to reduce visual impacts to Low.
- Two additional dwellings (R5, R33 – currently rated Negligible to Low) are recommended for potential consultation to confirm the effectiveness of existing screening.
- Realignment of construction access at VP8 would reduce roadside vegetation removal.

No further action required:

- The majority of viewpoints and residential receivers experience Low to Negligible visual impacts requiring no further action.
- The remaining dwellings and viewpoints require no further action due to sufficient distance, intervening topography, or existing vegetation screening.

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Glossary

Term or Abbreviation	Definition
Aurecon	Aurecon Australasia Pty Ltd
Development Envelope	Represents the maximum limit of disturbance for construction and operational activities relating to the Proposal. A subset of the Project Area – intended to provide flexibility for further micro-siting and placement of infrastructure.
EE Act	<i>Environment Effects Act 1978</i>
EPBC Act	<i>Environment Protection Biodiversity Conservation Act 1999</i>
ESO	Environmental Significance Overlay
FFG Act	Flora and Fauna Guarantee Act 1988
Foreground	The area that immediately surrounds the Project Area up to a distance of 0.5 kilometres.
FOV	Field of View: referring to either the horizontal or vertical field of view
GIS	Geospatial Information Systems
GPS	Global Positioning System
HO	Heritage Overlay
Indicative footprint	The area of disturbance based on concept design. This is subject to change to accommodate environmental and design constraints.
km	kilometre
LVIA	Landscape and Visual Impact Assessment: The assessment of the impacts of the proposal on landscape and visual values. The LVIA is conducted to determine the likelihood of high impacts and assist in determining further assessment and mitigation measures.
Landscape	Its constituent elements, its character and the way this varies spatially, its geographic extent, its condition, the way the landscape is experienced, and the value attached to it.
LCZ	Landscape Character Zones
m	metre
Study Area	The area designated relevant for assessment of the Proposal, determined by viewshed analysis
SWIS	South West Interconnected System Transmission Plan
the Proposal	Tandegin Wind Farm
Project Area	The total area of land the Proponent has access to through landholder agreements for the purposes of the Proposal.
the Proponent	Collgar Renewables Pty Ltd
Sensitive receptor	Those visual receptors within the Study Area that are likely to view the Project Area from their dwelling, a popular or significant viewing location (such as a lookout).
VIA Bulletin	NSW Wind Energy Visual Assessment Bulletin, 2016
Viewpoint (VP)	Moderate or high sensitivity location from which views to the construction process or components of the Proposal may be possible.
Viewshed	The area visible from a particular viewing location.
Visual amenity	The qualities of a landscape setting that are appreciated and valued by a viewer.
Visual catchment	The area over which an object can be seen within the landscape based on the line of sight.
Visual impact	The result of assessing the sensitivity level of a viewer and the modification level of a development.
VPZ	Visual Prominence Zone or distance of 3.36 km from tall component. Refer Section 3.4.1
Visual sensitivity	The degree to which various user groups would respond to change based on their expectation of a particular experience in a given setting for example the expectation of a high level of visual amenity in a national park.
ZTV	Zone of Theoretical Visibility



1 Introduction

Aurecon Australasia Pty Ltd (Aurecon) has been engaged by Collgar Renewables Pty Ltd (the Proponent) to facilitate the environmental and planning assessments and approvals for the Tandegin Wind Farm (the Proposal), located approximately 20 kilometres (km) south of Merredin and 287 km east of Perth.

The Proposal involves the construction, operation, and eventual decommissioning of a wind farm of up to 310 megawatt (MW) capacity, comprising up to 50 wind turbines with a maximum tip height of 252 metres (m) above ground level, alongside a Battery Energy Storage System (BESS) and ancillary infrastructure.

The Project Area, the broad area in which all construction and operational activities are proposed to take place, encompasses approximately 12,894 hectares (ha) within the Shire of Merredin. The landscape is predominantly cleared agricultural land with areas of remnant native vegetation. An existing wind farm operated by the Proponent, Collgar Wind Farm (CWF) is located directly to the north, meaning wind energy infrastructure already forms part of the established visual baseline in the area.

This report presents a Landscape and Visual Impact Assessment (LVIA) of the Proposal, responding to WA requirements for assessing the landscape and visual impacts of the development.

1.1 Purpose

The purpose of the LVIA is to provide an assessment of any potential impacts to landscape character and visual amenity at construction and operational phases of the Proposal.

Matters required to be considered under the State and Local Planning Framework are identified and addressed in this report.

The LVIA will be undertaken in two stages:

- An assessment of landscape significance to inform the wind farm design process (this report) involving assessments of publicly accessible viewpoints that are representative of sensitive receivers located on private property, and key public viewpoints.
- Further assessment based on finalised layout (if updated) and consultation with private non-associated receivers to determine level of screening from private dwellings.

The scope for the LVIA is to:

- Review existing landscape studies, National and State policies and guidelines;
- Define the initial catchment for potential visual and landscape impact for the proposal (e.g. including initial review of current literature on distance thresholds for visual intrusion of wind turbines)
- Undertake a desktop analysis of the site and its surrounds (up to 10 km radius of the Project Area refer to Section 3.2). Provide analysis of:
 - Landscape Character Zones (LCZs)
 - Significant landforms and scenic features
 - Culturally significant landscape elements.
- Report findings for LCZs
- Undertake Zone of Theoretical Visibility (ZTV) mapping based on initial layout
- Identify sensitive receptors, including dwellings, nearby to the proposed wind farm site
- Identify and categorise dwellings and sensitive viewing locations based on the presence of surrounding vegetation and varying densities
- Define the 'pattern of viewing' of sensitive viewpoints to the windfarm site (e.g. road/touring routes, townships, dwellings, parks and recreational areas, tourism locations, etc) within the viewshed

- Review and assess potential cumulative impacts
- Identification of key sensitive receptors to guide subsequent assessment
- Suggest potential opportunities to reduce or mitigate any potential adverse effects identified relating to wind turbine height and siting.

The LVIA methodology is derived from existing best practice, with reference to:

- *Visual Landscape Planning in Western Australia: A Manual for Evaluation Assessment, Siting and Design*, Western Australian Planning Commission (WAPC) guideline (WAPC, 2007)
- *Wind Energy Guideline, Technical Supplement for Landscape Character and Visual Impact Assessment*, Department of Planning, Housing and Infrastructure, November 2024

1.2 Assumptions and limitations

The following assumptions and limitations apply to this report:

- The LVIA process is designed to be objective, providing a factual description of potential Proposal-related changes. Evaluation of significance of changes and impact, however, necessarily involves qualitative judgement. Accordingly, this assessment integrates objective measurement with professional interpretation, recognising that visual assessment is inherently subjective and that conclusions to perceptual responses to the Study Area will vary between individuals.
- The LVIA is based on the most current Project Area at the time of this report being written (refer Figure 2-2).
- The LVIA is focused on the current land uses and zoning.
- A night-time visual assessment has not been undertaken, which would consider potential warning lights to the tops of turbines.
- Access to sensitive viewpoints on private land, such as residences or accommodation, were not undertaken for this LVIA. Where there are expected impacts to private properties, representative viewpoints are assessed from public viewpoints adjacent the property boundaries looking towards the Project Area to capture the typical existing visual conditions. It is noted that the accuracy of these viewpoint assessments for private lands are limited to what is visible in the viewpoint.
- Community consultation is expected to be undertaken in future stages. Mitigation measures such as planting trees and vegetation to help mitigate views is expected to be agreed to in a consultative process with affected rural dwellings.
- Sensitive receptors have been identified through mapping of dwellings, property titles, desktop street view analysis and verification through field visits.
- Dwellings within 5.6 km of the Proposal's current turbine siting locations have been identified, however the dwellings within 8 km of both CWF and the Project Area are where there a likely visual impacts to occur. The LVIA has identified those private dwelling which are likely to have the highest impact ratings.
- Assessment of transmission infrastructure alignment are excluded – however some commentary has been included on likely impacts.
- Assessment of metrological masts has not been included at a high level based on preliminary information on location and type available at the time of preparing the assessment.
- Assessment of transmission line impact has been based on similar heights and types to existing transmission towers.
- Methodology, program and timing of the construction works are currently indicative and dependent upon planning approvals. Consequently, construction impacts have not been assessed in this report. However, it would be acceptable to predict that there would be impacts during construction and would be similar degree of visual impact to the operational phase assessment findings
- Desktop investigations were undertaken to inform the findings of this report.

- Collgar has commenced and continues to engage with stakeholders potentially impacted by the Proposal, including matters concerning the visual amenity of the environment and other environmental surveys.
- As the design is progressing, where amended positioning may result in noticeable visual impact different to previously discussed with the nearest sensitive receiver, additional investigation of impacts and consultation will be undertaken.
- The LVIA is based on the Proposal Description as outlined in Section 2.1. As the design layout of the Proposal is not yet finalised, the advice contained within this report provides a point in time reference that may be subject to change.
- Since preparation of the photomontages, minor turbine microsite refinements have been undertaken in response to environmental, landholder and engineering requirements. These refinements affect turbine groups visible from VP4, VP6 and VP7. The microsite changes are limited in scale relative to the viewing distances and are not expected to materially alter the overall turbine distribution, visibility envelope or visual assessment outcomes. Accordingly, the photomontages for VP4, VP6 and VP7 remain representative of the expected operational development and continue to provide an appropriate basis for assessment.
- The methodology adopted for this LVIA assumes visual impact is based on zone of theoretical visibility and field of view only (i.e. that if the works would not be seen, there is no impact).
- For the purpose of the assessment, unobstructed viewpoints from publicly accessible locations have been used as a worst-case scenario of potential visual impacts.
- The ZTV mapping taken from the location and height of proposed wind turbines assumes that those areas not highlighted in the mapping, cannot see the wind turbine due to intervening topography.
- The ZTV was generated using contour data, as the publicly available Digital Elevation Model (DEM) offers a lower resolution of approximately 30 metres. In contrast, the contour data from the Western Australian Land Information Authority (Landgate) provides finer detail, with intervals ranging from 5 to 10 m. However, a key limitation of DEMs derived from contour data is the reduced vertical accuracy and spatial resolution. Interpolation between contour lines may fail to capture finer topographic variations present in high-resolution elevation datasets, potentially affecting the accuracy of the visibility analysis.



2 Proposal overview

The following section provides an overview of the Proposal, including highlighting the key infrastructure components, as well as important details regarding construction and operational information for the Proposal.

2.1 Description

The Proposal comprises up to 50 wind turbines with a maximum tip height of 252 m above ground level, and a total generating capacity of up to 310 MW (megawatts), alongside a BESS and associated infrastructure.

The Proposal will connect into the South-West Interconnected System (SWIS) via a 220 kilovolt (kV) overhead transmission line of approximately 13.5 km in length and up to 60 m in height at 250 m to 500 m intervals with a 50 m wide easement. This will link to the existing Collgar Terminal located to the north of the Project Area.

In addition, approximately 40 km of 33 kV overhead transmission line forms part of the 33 kV reticulation from the Tandegin substation to the first wind turbine generator in a collector group, before transitioning to underground cable. The 33 kV overhead transmission lines will be supported by pole structures, 18 to 30 m in height at 50 m intervals with easements ranging between 50 to 115 m wide.

A BESS, with maximum capacity to deliver 300 MW (over 6 hours) with an energy storage capacity of 1,800 MWh, is also proposed.

2.2 Location

The Proposal is located in the Shire of Merredin, Western Australia, approximately 20 km south from the township of Merredin and approximately 287 km east of Perth. The Project Area encompasses approximately 12,894 ha, encompassing associated transmission infrastructure required to connect the Proposal to the existing SWIS energy grid.

Merredin is a small rural township primarily servicing the agriculture and mining sectors. It is the main regional centre in the eastern Wheatbelt and is located along the Great Eastern Highway and the Kalgoorlie–Perth railway corridor. Muntadgin is a small rural locality to the southeast of the Proposal.

The landscape is predominantly characterised by land that has been cleared for farming activity over many decades. There are areas of remnant native vegetation within the Project Area, generally comprising nature reserves, pockets within agricultural fields, and roadside vegetation. The area does not comprise any landscape features however there are a several nearby nature reserves, including Norpa Nature Reserve and Maughan Nature Reserve.

An existing wind farm operated by the Proponent (Collgar Wind Farm) is located directly to the north of the Project Area. The presence of this operational wind farm means that wind energy infrastructure already forms part of the established visual baseline in the area when viewed from the surrounding area.

For the purposes of this LVIA, the Study Area is defined as a 10 km buffer from the Project Area. This is further defined in Section 3.2.

2.3 Infrastructure

The Proposal includes the following permanent and temporary infrastructure; further details on proposed infrastructure are provided in Table 2-1, Figure 2-1 and Figure 2-2.

Table 2-1 Key parameters

Feature	Parameters	Quantity
Turbines		
Maximum tip height	Up to 252 m	50
Maximum single blade length	Up to 91 m	
Maximum hub heights	150 to 164 m	
Rotor swept area	26,016 m²	
Minimum clearance (space between ground and lowest point of blade)	59 m	
Ancillary Infrastructure - Permanent		
BESS (Allsop Road) up to 1,800 MWh	Up to 36 ha	1
Operation and maintenance building	Up to 1 ha	1
Terminal substation	Up to 4 ha	1
Site office	Up to 1.5 ha	1
Hardstand area per turbine	0.6 ha	50
Collector station	Up to 4 ha	4
Meteorological monitoring mast (to be confirmed)	Up to 0.5 ha	1
33kv Internal feeder transmission lines	18 to 30 m high (to be confirmed at detailed design stage) Approximately 50 m apart	Central Easement: ~10 km Southern Easement: ~16 km Western Easement: ~10 km Northern Easement: ~4 km Total: ~40 km
220 kV transmission line	Up to 60 m height Approximately 250 to 500 m apart	13.5 km
Access tracks	Approximately 64 ha	Various
Ancillary Infrastructure – Temporary		
Construction compound including site offices, car parking, storage and amenities.	Up to 10 ha total	5
Accommodation camp area (potential site if required)	Up to 4.4 ha	1
Concrete batching plant	2.25 ha	1
Civil laydown areas	Up to 12 ha	3
Crane hardstand area	0.86 ha	50
Electrical and other equipment laydown areas	Up to 20.08 ha	5

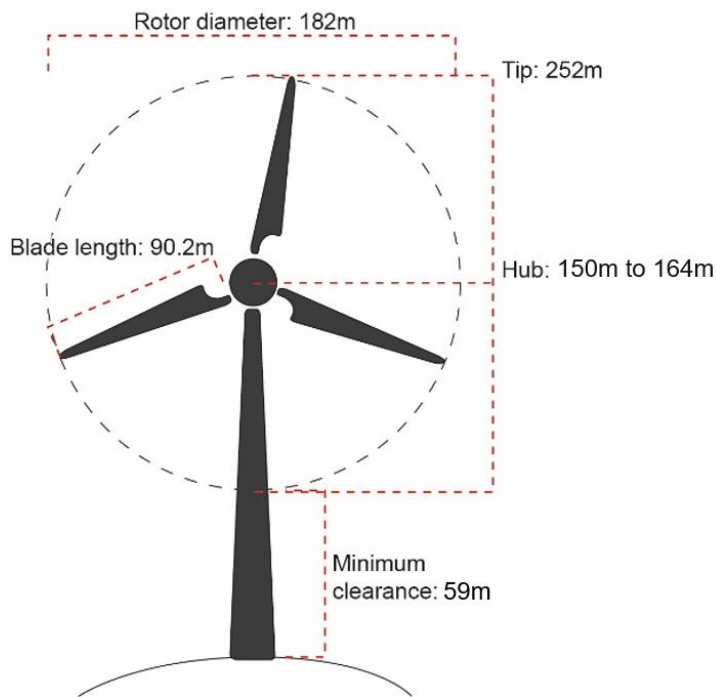


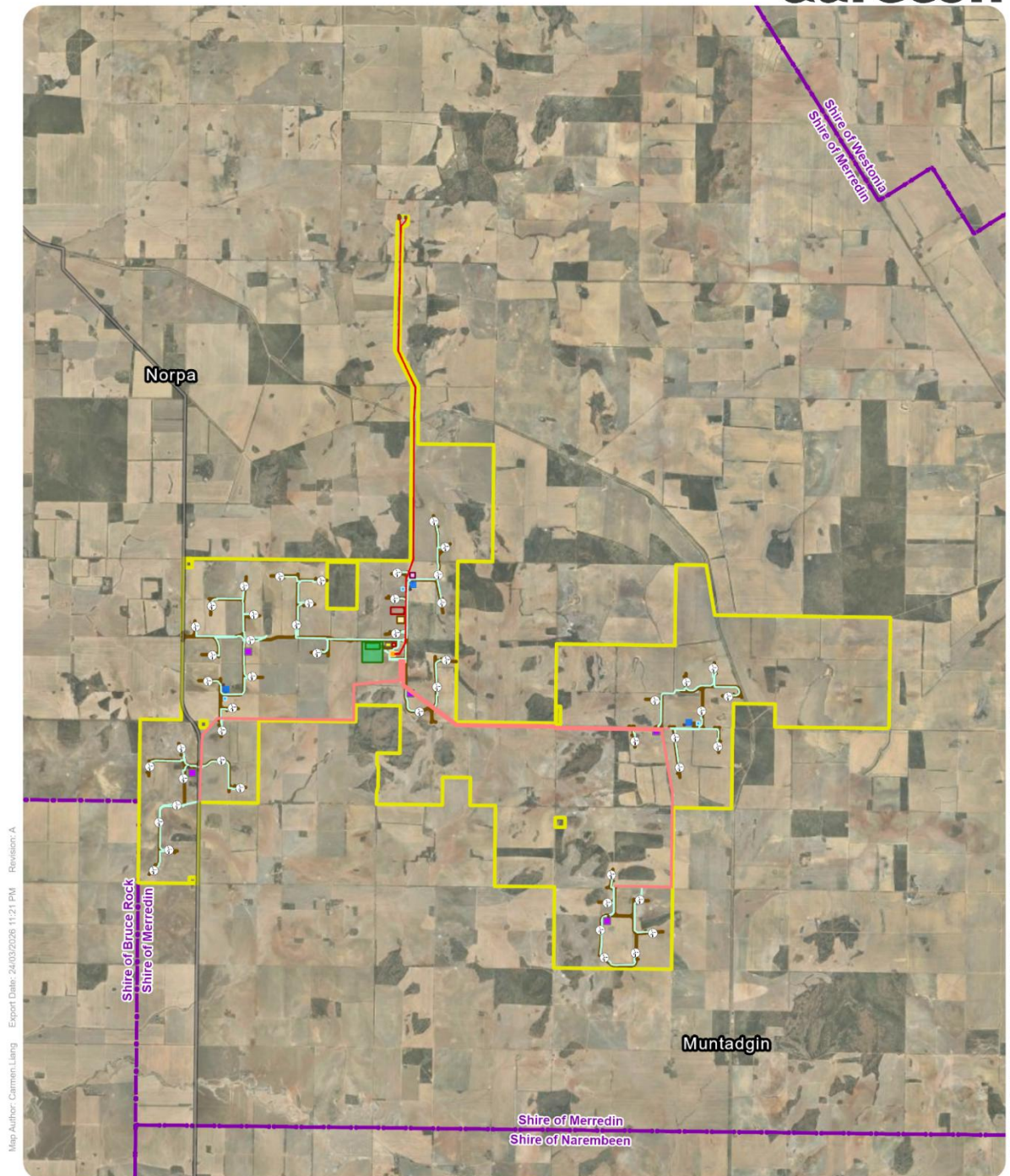
Figure 2-1 Indicative turbine dimensions

2.4 Construction and operational information

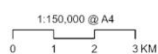
The anticipated construction phase for the Proposal is anticipated to last for approximately 30 months and the operational life of the Proposal is expected to be approximately 30 years. Further information is provided below in Table 2-2.

Table 2-2 Construction and operational information

Construction phase	Proposed timing
Establish site offices, compounds and concrete batching batch plants	4 weeks
Commence gate installation, commence track construction, commence turbine foundation excavations and hard stands	18 months
Commence electrical work, cables, collectors, internal power cables, terminal substation and BESS	18 months
Turbine installation	24 months
Final commissioning and site demobilisation	6 months
Operation of wind farm and BESS	30 years
Decommission and make good	12 months



Sources: Aurecon, Esri Basemap, Landgate



Project: P529171 Issued: 25/08/2026
Projection: GDA2020 MGA Zone 50



Tandegin Wind Farm LVIA Report

Figure : Project Layout

Figure 2-2 Indicative Layout of the Project Area



3 Methodology

This section describes the methodology used to understand the existing conditions and assesses the potential impacts of the Proposal on the landscape character and visual amenity.

3.1 Assessment approach

The LVIA has been prepared to support the anticipated environmental and planning approvals pathway for the Proposal, including a Development Application and anticipated assessment under the *Environment Protection Act 1986* (EP Act) for potential visual and broader landscape impacts. The EP Act referral criteria requires identifying potential significant effects on the environment including;

- Potential extensive or major effects on landscape values of regional importance
- Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.

The LVIA comprises a desktop evaluation of the Proposal and its various components, including turbines and ancillary facilities, as well as identifying sensitive viewpoints with the potential of higher impacts. The structure of the assessment is summarised in Table 3-1.

Table 3-1 LVIA report section description

Section	Description
Section 4 Legislation and policy review	An analysis of legislation and policy related to landscape and visual amenity, from local to National level.
Section 5 Landscape and visual baseline analysis	An analysis of the local context with a focus on landscape features, including topography, land-use, vegetation cover and a review of significant landscapes. The analysis provides geophysical information against which landscape and visual characteristics, are identified including: ■ LCZs ■ Visual Catchment: a desktop analysis to ascertain the visual catchment of the Project Area through the preparation of ZTV mapping. ■ Visual Receivers: identification of public and private receivers within the visual catchment for assessment and rating the level of sensitivity to change.
Section 6 Impact assessment	Understanding of the potential change that may arise and provides a summary of matters for the referral which may require further investigation, assessment, management and mitigation. Landscape Character assessment ■ An analysis of the existing landscape features to divide the landscape into broad homogeneous units to assist with determining the impacts that may result from the Proposal. Visual assessment ■ Assessment of eight representative viewpoints and demonstration of the proposed visual modification through visual simulations. Cumulative assessment ■ Analysis of the sources of potential impact from two or more planned, approved or existing wind farms, experienced by public or private visual receivers.
Section 7 Conclusion and recommendations	Summary of the findings and recommendations from analysis and assessments of the Proposal.

3.1.1 Relevant guidelines

This LVIA has been prepared with reference to the *Visual Landscape Planning in Western Australia: A Manual for Evaluation Assessment, Siting and Design* (WAPC, 2007) guideline, together with additional supporting guidance outlined below.

The WAPC manual provides guidance on the methodology for visual landscape assessments, which this LVIA is consistent with, generally based on the following process:

- Step 1: Determine visual management objectives
- Step 2: Describe proponent development
- Step 3: Describe the potential visual impacts
- Step 4: Develop visual management measures
- Step 5: Prepare final recommendations and options for monitoring.

The methodology of this LVIA involves identification of existing landscape characteristics, visibility analysis, and an assessment of the likely changes and impacts of the Proposal on the specific viewpoints as well as the broader landscape. The assessment also includes identification of groups of stakeholders that may be impacted by the development of the Proposal infrastructure.

3.1.1.1 Supporting guidelines

The following documents have influenced the methodology for this study and are considered best practice within the industry. They set out a clear and systematic approach in documenting the baseline landscape and visual conditions, potential impacts and mitigation.

The below guidelines have been used as a basis for the methodology for this assessment:

- Wind Energy Guideline – Technical Supplement for Landscape and Visual Impact Assessment', NSW Department of Planning, Housing and Infrastructure, November 2024 (the Technical Supplement)
- Australian Wind Energy Association and Australian Council of National Trusts (2007) Wind Farms and Landscape Values: National Assessment Framework; and
- NSW Wind Energy Visual Assessment Bulletin, 2016 (the VIA Bulletin)
- Guidance Note for Landscape and Visual Assessment, Australian Institute of Landscape Architecture 2018
- The Guidance for Landscape and Visual Impact Assessment, Third Edition, 2013, prepared by the Landscape Institute and Institute of Environmental Management and Assessment, UK

The VIA Bulletin and the Technical Supplement are guidelines specifically for the assessment of landscape and visual assessment for wind farms. These have been used to identify assessment parameters including:

- Study Area (refer Section 3.4): identifies those dwellings or key public viewpoints that are within the visual magnitude threshold and therefore more likely to experience a higher magnitude of change in foreground and middle ground views (the Technical Supplement).
- Visual magnitude threshold (refer Section 3.4.1): distances are guided by the height of the turbines and represent the area where potential impacts of the Proposal are likely to be more acute (VIA Bulletin).
- Cumulative assessment of the Study Area (refer Section 3.4.2): identifies effects resulting from changes to the landscape or visual amenity caused by the Proposal in conjunction with other developments or actions that occurred in the past, present or are likely to occur in the foreseeable future (VIA Bulletin).

3.2 Desktop analysis

Desktop analysis was undertaken to identify and review key information sources, and to gain an initial understanding of the landscape character and visual amenity of the Project Area. It was also used to understand initial conditions of sensitive receiver environments and similar publicly accessible areas suitable for field survey review. This included reviewing topography and vegetation cover.

These sources include:

- Relevant planning schemes, policies and guidelines (refer Section 4).
- Digital satellite aerial imagery (accessed February and March 2026 from Google Earth).
- Geospatial information systems (GIS) and cadastral information including roads, property boundaries, rivers and conservation areas etc.
- Other data as provided to the Proposal.

3.3 Field survey

Field surveys were undertaken on 3 March 2026 by environmental planners and urban designers with experience in visual impact assessment site photography.

The field surveys were used to ground truth findings of the desktop assessments, undertake suitable representative viewpoint selection and photography for photomontages and undertake landscape character assessments and photography.

Photography was undertaken with a camera with a built in Global Positioning System (GPS) to capture imagery metadata.

3.4 Study Area identification

Visual effects from the Proposal can extend well beyond the Project Area boundary, due to the large size of the turbines, and because views are potentially available at distant vantage points. Therefore, a LVIA Study Area has been established as the area within a 10 km radius of the Project Area, and will hereafter be referred to in this report as the Study Area.

The Study Area limit has been determined based on the distance that the Proposal components may become indiscernible to the human eye or would occupy a small proportion of the visual field of view (FOV), where impacts would be considered negligible. This threshold is measured at a minimum of 7,200 m based on the Technical Supplement for LVIA as shown in Figure 3-1.

This distance is directly related to the scale and height of the Proposal components and Visual Prominence Rationale (refer Appendix B). The Study Area has been rounded up to 10,000 m for the assessment of landscape character and visual impacts to ensure the worst-case scenario is considered.

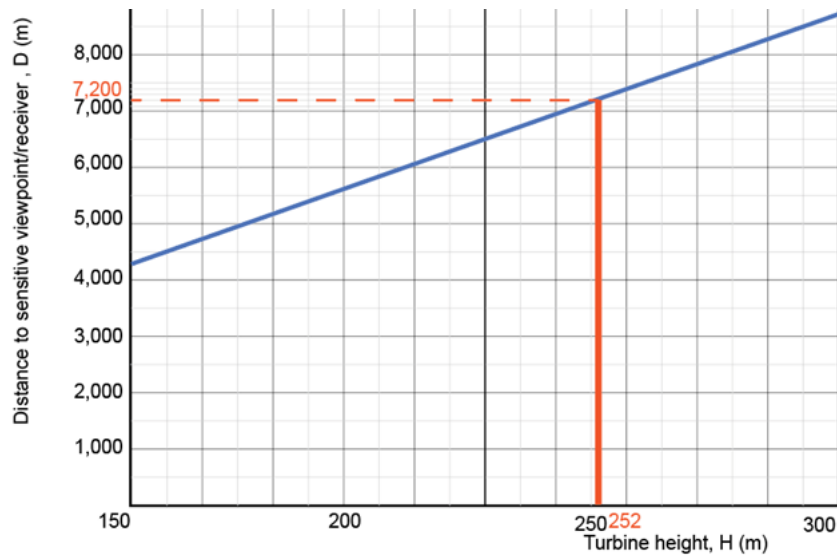


Figure 3-1 Visual Prominence area (adapted from the Technical Supplement for LVIA)

3.4.1 Visual prominence zone

3.4.1.1 Visual magnitude

The visual magnitude rating is determined by the volume of the FOV a project would occupy from a viewpoint.

The area where potential effects of the Proposal are likely to be more acute, is guided by the distance turbines are located from a viewpoint as shown in Figure 3-2 (guided by the VIA Bulletin). The assessment of wind turbines is based on a worst-case scenario, with a maximum tip height of 252 m. The potential for high impacts to these viewpoints increases within the distance from dwelling indicated where the 'black line' intersects at 3,360 m (for private receivers) and 'blue line' intersects at 5,020 m (for public viewpoints) (refer Figure 3-2).

This provides an early indication of where placement of turbines will require further assessment and justification, and/or where consultation with potentially affected landowners needs to be focused.

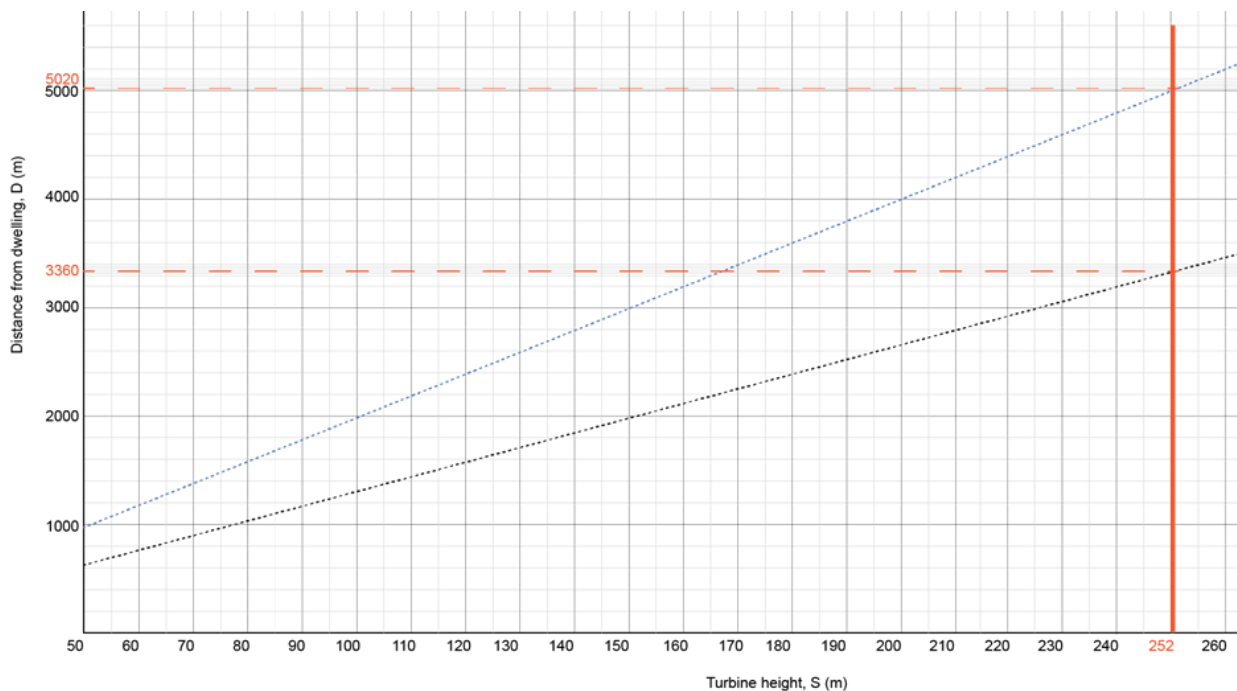


Figure 3-2 Graph indicating visual magnitude thresholds for LVIA (adapted from VIA Bulletin)

3.4.1.2 Identification of Zone of Theoretical Visibility

Within the LVIA Study area, the production of viewshed mapping indicates the ZTV, or the theoretical area from which the mapped components could be visible.

The viewshed mapping provides a preliminary representation of the likely 'worst case' visual envelope of the wind turbine layout currently under investigation. These map outputs illustrate the number of wind turbines potentially visible from within the Study area for the height of turbine at 252 m above ground level.

It should be noted that the outputs of the viewshed is limited to the available terrain data (Digital Elevation Model data (5 m) loaded from ELVIS, Geoscience Australia 2015) and does not consider the screening effect of intervening vegetation or built form. Therefore, the mapping provides an exaggerated indication of the theoretical extent of visibility of wind turbines. The mapping is used to guide the desktop studies and inform field assessments.

These mapping outputs illustrate the number of wind turbines potentially visible from within the Visual Prominence Zone (VPZ) for the following wind turbine elements (refer Figure 3-3):

- Entire height of turbine at 0 to 252 m above ground
- Swept path of rotor at 59 to 252 m height above ground
- Hub to tip at 150 to 252 m height above ground.

It should be noted that the outputs of these ZTV maps are limited to the available terrain data, and do not account for the screening effect of intervening vegetation or built form and therefore provide an exaggerated indication of the theoretical extent of visibility of the wind turbines. They are therefore used primarily to guide the desktop studies and inform future site visit work.

The ZTV assumes a clear line of sight based solely on the input surface, typically a Digital Elevation Model (DEM), considering terrain elevation and an observer height of 1.7 m (standard human height). Visibility is assessed for three turbine height scenarios: foundation level (0 to 252 m), swept path (59 to 252 m), and full blade tip height (150 to 252 m) (refer Figure 3-3). The analysis excludes potential obstructions such as buildings or vegetation unless specifically incorporated and assumes consistent atmospheric conditions and a static terrain surface.

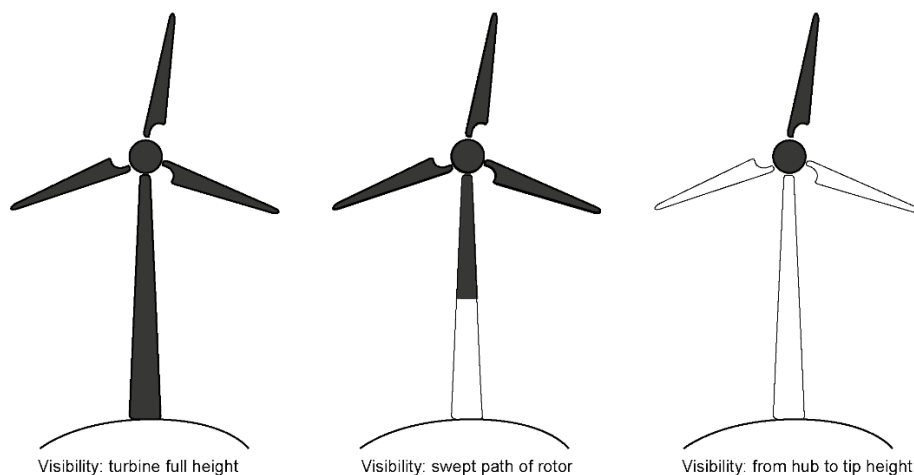


Figure 3-3 Potential visibility of turbines generated within the ZTV mapping

3.4.2 Cumulative impact

The factors in assessing potential cumulative landscape impacts of wind farms on landscapes (Scottish Natural Heritage, 2014), include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.

- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The VIA Bulletin provides a distance of 8 km from a dwelling or public viewpoint for the analysis of cumulative impacts. At 8 km, turbines are likely to visibly recede into the background.

To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the location in which wind turbines are potentially visible from the representative viewpoint are mapped within 360°. Should wind turbines be visible in three or more 60° sectors (refer Figure 3-4), the potential cumulative impacts of multiple turbines should be considered as part of the Environmental Impact Assessment (EIA).

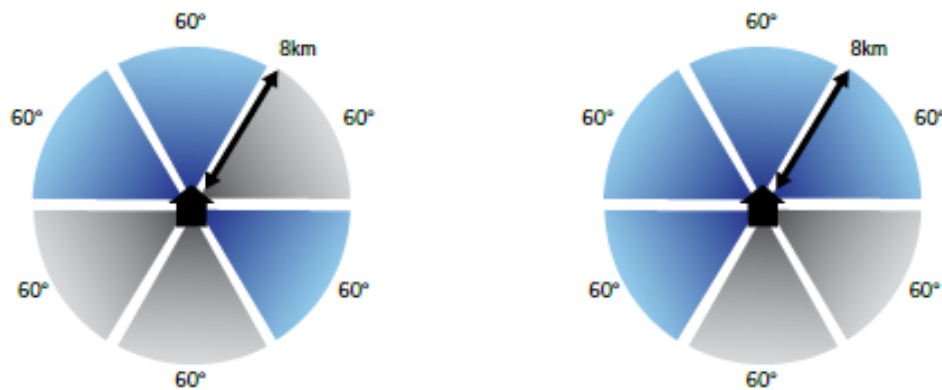


Figure 3-4 Cumulative assessment tool indicating multiple wind turbines within sectors

Source: VIA Bulletin

3.5 The assessment method

The level of visual impact resulting from the Proposal has been assessed against the following components:

- Sensitivity made up of the following:
 - Viewer sensitivity: the sensitivity of the viewer to the development/change and distance from the viewpoint; or
 - Landscape sensitivity: the ability of the landscape setting to absorb the development/change.
- Magnitude of change: how well the development/changed landscape contrasts or blends with the surrounding land use based on varying levels of prominence.

Determining the level of impact involves assigning levels of landscape or visual sensitivity and modification (such as high, medium, low or very low). A determination matrix is then used to assign an overall level of visual impact.

3.5.1 Baseline analysis

A visual baseline study establishes the existing landscape and visual conditions. The baseline study considers the following inputs in the 'visual catchment' for the Proposal:

- Elements of the landscape important to the community, including public and private viewpoints (refer Section 5.4.1)
- 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 (refer Section 3.6.2)
- The character of the landscape, its key features and the relative scenic quality of the area

- 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 8 km 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.

3.5.1.1 Landscape character

The Proposal has the potential to alter the existing landscape character within the Study Area. The existing landscape character therefore forms the baseline against which these potential changes are assessed. Refer to Section 3.6.1 for assigning landscape sensitivity.

Landscape character zones

LCZs describe unifying aspects of the landscape and separate visually distinct landscapes from another.

LCZs are identified through desktop assessment and a site visit, based on consideration of the following attributes:

- Landscape value, i.e., landscape designated for their scenic or landscape importance or valued recreational function
- Landscape elements that contribute to defining character, i.e. residential, commercial and landform
- Landscape character attributes, including scale, grain, perceptual characteristics such as connection to natural landscape, industrial nature of the area
- Observed land uses and current and future land use zones outlined in strategic planning documents and Local Environmental Plans (as described in Section 4.3)
- Topography and vegetation.

The landscape character is defined through:

- Review of the regional landscape context, including the broad land use areas
- Review of the Study Area, including topography, landform and waterways
- Review of ecological and cultural values.

Scenic quality

General principles for scenic quality assessment have been developed in the *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architecture , 2018). Common principles that determine scenic preference and the importance of views include:

- Water and other natural elements are generally preferred over urban or developed scenes
- Mountains and hills are preferred over flat land
- Diversity is generally preferred over uniformity
- Consistence and balance
- Discordant elements which contrast markedly with their surroundings are often regarded as having a detrimental impact on amenity
- Views from public spaces are valued more than views only available from private residences.

These principles are used to assess the degree of impact to potentially affected stakeholders, in determining the reasonable expectations of affected persons.

3.6 Assessment criteria

The potential impacts to landscape character and visual amenity associated with the Proposal have been assessed based on themes of magnitude and sensitivity. These are described below.

3.6.1 Landscape sensitivity

The sensitivity of a landscape is judged based on the extent to which it is considered able to accept change of a particular type and scale without adverse effects on its character. Sensitivity varies according to the type of development and the nature of the landscape, including:

- Its inherent landscape value (condition, perceptual qualities, cultural importance, and any specific values that may apply, such as landscape planning designations)
- The likely congruency of the proposed change (i.e. the extent to which the Proposal may fit or be 'visually absorbed' into the scale, landform, land use, pattern, texture of the existing landscape).

The attributes which influence the sensitivity of landscape character are outlined in Table 3-2.

Table 3-2 Ratings used to assign level of Landscape sensitivity

Landscape sensitivity rating	Description
High	Landscapes which by nature of their character would be unable to accommodate change of the proposed type. Typically, these would be: ■ Of high value with distinct elements and features making a positive contribution to character and sense of place ■ Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale ■ Areas of special recognised value, through use, perception or historic and cultural associations. The extent of alteration would result in the landscape losing significant natural landscape features, its character and/or sense of place. ■ Open, expansive and bare landscapes. ■ Elevated, bare and/or groundcover vegetation. ■ The viewer is highly sensitive to changes in their immediate surroundings such as residents or 'natural' areas such as National Parks.
Medium	Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically, these would be; ■ Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place ■ Locally designated, or their value may be expressed through non-statutory local publications ■ Containing some features of value through use, perception of historic and cultural associations. ■ Likely to contain some features and elements that could not be replaced The extent of alteration would result in the landscape partially losing some natural or designed landscape features, its character and/or sense of place. ■ Open, expansive and moderately vegetated landscapes including canopy trees. ■ Elevated and vegetation landscape including canopy trees. ■ The viewer is moderately sensitive to changes in their immediate surroundings such as users of regional and local reserves.
Low	Landscapes which by nature of their characteristics would be able to accommodate change of the type proposed. Typically, these would be; ■ Not designated ■ Containing few, if any, features of value through use, perception or historic and cultural associations. ■ Likely to contain few, if any, features and elements that could not be replaced. ■ Built-up landscapes typically interspersed with canopy trees. ■ The viewer is aware of the change but not overly sensitive to changes in their immediate surroundings such as users of commercial areas and farming land.

Landscape sensitivity rating	Description
Very Low	Landscapes which by nature of their characteristics would be able to accommodate change of the type proposed. Typically, these would be; ■ Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place ■ Modified landscapes with an abundance of built form and limited natural characteristics. ■ The viewer is aware of the change but not overly sensitive to changes in their immediate surroundings such as users of industrial areas.

3.6.2 Visual sensitivity

Viewer sensitivity at each viewpoints is assessed based upon the following factors:

- The importance (scenic quality) of the view
- Viewer exposure, typically assessed by measuring the number of viewers exposed to the resource change and the type and duration of viewer activity
- The nature of the visual receptor (type and volume of sensitive receptors or viewers) experiencing the view
- Distance of the Proposal from the identified land use area.

The sensitivity ratings applied in this assessment are outlined in Table 3-3.

Table 3-3 Ratings used to assign level of visual sensitivity

Visual sensitivity rating	Description
High	Large numbers of viewers or those with proprietary interest and prolonged viewing opportunities such as residents and users of attractive and/or well-used recreational facilities. Views from a regionally important location such as a scenic lookout whose interest is specifically focussed on the landscape. ■ Residential properties ■ Users of public footpaths or other recreational trails (e.g National Trails) ■ Users of recreational facilities where the purpose of that recreation is the enjoyment of the landscape (e.g. National Parks and designated scenic lookouts) ■ Users of designated tourist routes
Medium	Medium numbers of residents and moderate numbers of visitors with an interest in their environment. Larger numbers of travellers with an interest in their surroundings. ■ Outdoor works ■ Users of scenic roads, railway corridors or waterways ■ Schools and other institutional buildings, and their outdoor areas
Low	Small numbers of visitors with a passing interest in their surroundings. Viewers whose interest is not specifically focussed on the landscape. ■ Indoor workers ■ Users of main roads or arterial roads ■ Users of recreational facilities where the purpose of that recreation is not related to the views ■ Commuters
Very Low	Small numbers of viewers with little interest in their surrounds ■ Industrial workers ■ Road users, farm workers with the Proposal in middle-ground or background views

3.6.3 Magnitude of change

The magnitude of change affecting a landscape or visual receptor depends on the nature, scale and duration of the particular change that is expected to occur. It describes the extent of change and identifies elements which are removed or added, changed in colour or texture, and the compatibility of new elements with the existing landscape. Visual modification can result in an improvement or reduction in visual amenity.

Table 3-4 outlines the four categories of modification used for determining the degree of visual modification potentially resulting from the Proposal which include:

Table 3-4 Criteria for determining the visual modification level

Modification level	Description
High	The Proposal is highly visible and intrusive in regard to the size, scale and geographical extent, and would disrupt views currently experienced from sensitive land use areas and/or strongly contrasts with the existing landscape setting which has limited capacity for change and/or the extent of area over which the changes would be visible from sensitive land use areas is significant.
Moderate	The Proposal partially intrudes in regard to the size, scale and geographical extent or somewhat obstructs current views from sensitive land use areas and/or a noticeable compositional change to the existing landscape setting in which there is moderate capacity for change and/or the extent of area over which the changes would be visible from sensitive land use areas is moderate.
Low	The Proposal is barely perceptible resulting in minor deterioration to the view currently experienced from sensitive land use areas; and/or results in a small change to the existing landscape setting in which change is possible without harm and/or the extent of area over which the changes would be visible from sensitive land use areas is limited.
Very low	There is minimal compositional contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the Proposal and the environment in which it sits. In this situation, the Proposal may be noticeable, but does not markedly contrast with the existing landscape setting and/or the extent of area over which the changes would be visible from sensitive land use areas is negligible.
	There are no views of the Proposal components and as such, there is no impact.

3.6.4 Assigning a level of impact

Impact significance ratings have been determined by combining the sensitivity and magnitude of change assessments, in accordance with the scale defined within Table 3-2 (landscape sensitivity) and Table 3-3 (viewer sensitivity).

Where the Proposal is visible, impacts are rated as low, moderate or high depending on the level of visual modification and viewer sensitivity at each viewpoint. If the Proposal is not visible, the impact is negligible. The overall impact ratings are outlined in Table 3-5.

Table 3-5 Impact determination matrix

Magnitude of change	Viewer sensitivity level			
	High	Moderate	Low	Very Low
High	HIGH	HIGH	MODERATE	LOW
Moderate	HIGH	MODERATE	LOW	VERY LOW
Low	MODERATE	LOW	LOW	VERY LOW
Very Low	LOW	VERY LOW	VERY LOW	VERY LOW

3.6.5 Preparation of visualisations

Visualisations (or photomontages) are prepared from viewpoint photography using specialised digital software to represent the observer's view of the Proposal. These photomontages illustrate the impact assessments described in Section 6.2, with the simulation methodology described in Appendix A.

The visualisations are based on the indicative layout available at the time this report was prepared. Subsequent minor micrositing refinements are not expected to materially affect the visual assessment findings and the visualisations remain representative of the expected operational development.



4 Legislation and policy review

Wind energy developments are required to ensure that developments cause no adverse impacts to significant environmental, cultural, or landscape values. These values are safeguarded under Commonwealth and State legislation. This section provides a comprehensive review of the relevant legislation, policies, and guidelines that apply to this impact assessment.

The State Planning framework includes policies which directly refer to the identification, management and preservation of the natural environment. These policies focus on minimising risks to the natural environment and ensuring that development is sensitively designed to respond to the surrounding landscape.

In addition, State and local policies which relate to the development of renewable energy facilities seek to ensure that these facilities will not negatively impact the surrounding area. These policies generally focus on the ensuring renewable energy facilities minimise potential impact to the environment, natural landscape and urban areas, including the requirement to minimise unwanted, unacceptable or adverse visual impacts.

Based on the current preliminary design, the Proposal achieves compliance with the above policies. By minimising the permanent operational footprint, the Proposal preserves the long-term viability of rural land assets. Comprehensive technical assessments not limited to noise, visual impact, water management, and bushfire risk, demonstrate that the Proposal fulfils the State's objectives for sustainable development while contributing essential renewable energy infrastructure to the SWIS Transmission Plan.

4.1 Commonwealth planning framework

4.1.1 *Environmental Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a national framework for the protection of matters of national environmental significance (MNES), including nationally and internationally important flora, fauna, ecological communities, and heritage places. While the EPBC Act does not specifically require the assessment of landscape character or visual amenity for renewable energy or major infrastructure projects, it may have indirect relevance where visual impacts have the potential to affect the heritage values or setting of MNES, such as World Heritage or National Heritage places.

In the context of the Proposal, no MNES relating to landscape or visual values have been identified that would trigger a detailed assessment under the EPBC Act. Accordingly, the EPBC Act is not considered to be a primary driver of the LVIA, but is acknowledged as part of the broader environmental approvals framework.

4.2 State planning framework

4.2.1 *Environmental Protection Act 1986*

The Environmental Protection Authority (EPA) is an independent statutory authority established under EP Act. The EPA is responsible for independently advising the WA Government on environmental matters, including the assessment of proposals that may have a significant impact on the environment under Part IV of the EP Act.

Visual amenity is considered under the “Social Surroundings” environmental factor during assessment of projects under Part IV of the EP Act. The *Environmental Factor Guideline - Social Surroundings* (EPA, 2023) sets an objective “to protect social surroundings from significant harm”, which encompasses visual amenity. Visual amenity is generally assessed in areas with rich heritage, cultural or social significance due to their natural features or scenic quality.

This LVIA supports the Referral Supporting Document for the Proposal's submission to the EPA under Part IV of the EP Act.

4.2.2 Planning and Development Act 2005

The *Planning and Development Act 2005* (WA) (PD Act) establishes the overarching statutory framework for land use planning and development assessment in WA, within which landscape and visual amenity are key considerations. While the PD Act does not prescribe specific visual or landscape criteria, it enables decision-makers to assess proposals against relevant planning instruments (including local planning schemes, State planning policies and associated guidelines) that explicitly address amenity outcomes. In this context, landscape character, visual impact, and the protection of scenic values are considered as part of the broader “amenity” of an area, with consent authorities required to have due regard to the likely visual effects of development on the surrounding environment, including views, vistas, and the character of rural or natural landscapes. Accordingly, the PD Act provides the legislative basis for ensuring that developments such as wind farms are assessed for their compatibility with the existing landscape setting and their potential to result in adverse visual impacts, with appropriate avoidance, siting, design and mitigation measures to be considered through the development assessment process.

A Development Application (DA), informed by this LVIA, will be submitted to the Shire of Merredin to obtain development approval in accordance with the PD Act.

4.2.3 State Planning Strategy 2050

The State Planning Strategy 2050 (WAPC, 2014) sets a clear vision for WA through development of an overarching plan which divides the state into three sectors. The Project Area is located within the “South West” sector, which the State Planning Strategy identifies as being a global biodiversity hotspot where mining and downstream processing are key economic drivers. The State Planning Strategy requires a balance between maintaining the biodiversity of the region while allowing opportunities for economic growth and development.

An objective of the State Planning Strategy is to “conserve biodiversity, achieve resilient ecosystems, protect significant landscapes and manage the State’s natural resources in a sustainable manner”.

4.2.4 Wheatbelt Regional Planning and Infrastructure Framework

The Wheatbelt Regional Planning and Infrastructure Framework (WAPC, 2015) establishes a vision for the Wheatbelt Region: “The Wheatbelt will have a diverse social and economic base, be a leader in innovation and create new opportunities that confirm it as a key contributor to the State’s prosperity”. The Proposal is located within the Central East Wheatbelt Development Commission sub-region.

The framework notes specific infrastructure upgrades to improve electricity transmission, including Western Power’s planned Mid-West Energy Project that aims to create greater network capacity. For the Wheatbelt this project may facilitate new power generation projects such as wind farms. The Wheatbelt region is noted to already have substantial renewable energy producers, with potential to establish other energy initiatives.

The framework sets out objectives for management and protection of natural amenity. With regard to the Proposal the following objective needs careful consideration:

“Environmental and landscape values that support the social, cultural and economic development of the region, and are managed for current and future generations”.

To achieve this objective, the framework details there is a need to manage the Wheatbelt’s visual landscapes, and the ways in which they are experienced, to protect their valued characteristics. This includes preservation, recognition and promotion of regionally important views through the land use planning system.

The framework also includes the following factors in relation to natural amenity, which WAPC will consider when evaluating proposals in the Wheatbelt:

- Recognise, protect and promote the valued visual characteristics of the Wheatbelt’s urban, rural and natural landscapes.
- Guide the identification, protection and management of local environmental assets, and connections between them

The framework maps some areas of high conservation value landscapes southeast of the town of Merredin and may be subject to the Proposal as shown in Figure 4-1. Further detailed mapping of Planning Overlays (including Conservation values) of the Study Area are included in Figure 4-2 and Figure 5-19. The LVIA has been produced with consideration towards these areas. Areas of significant native vegetation located outside the Project Area include two named reserves:

- Maughan Nature Reserve (R 24367) to the northeast of the Project Area which is approximately 816 ha in size, located near Merredin-Naremben Road.
- Norpa Nature Reserve (R 20504) to the northeast of the Project Area which is approximately 203 ha in size. Described as good representative *Casuarina* shrubland, isolated from other bushland (Muir, 1978).

4.2.5 State Planning Policy 2.0 – Environment and Natural Resources Policy

The State Planning Policy No 2: Environment and Natural Resource Policy (SPP 2.0) elaborates on the importance of protecting and enhancing landscapes by stating that planning strategies, schemes and decision making should:

- Identify and protect landscapes with high natural resource values (such as ecological, aesthetic or geological) and encourage the restoration of degraded landscapes.
- Consider the capacity of landscapes to absorb development and the need for careful planning, siting and design of new development in a way which is sensitive to the character of the landscape.
- Consider the need for a landscape or visual impact assessment for development proposals that may impact upon sensitive landscapes.

This LVIA has been prepared to ensure the Proposal will not adversely impact the value of the surrounding landscape, in accordance with the intent of SPP 2.0. Refer to Figure 4-2 for planning overlays identified within the Study Area.

4.2.6 State Planning Policy 2.5 – Rural Planning

The purpose of the State Planning Policy 2.5 (SPP 2.5) is to protect and preserve WA's rural land assets due to the importance of their economic, natural resource, food production, environmental and landscape values. SPP 2.5 supports the protection of valued landscapes and views within planning schemes, strategies and decision making. It refers to the WAPC's *Visual Landscape Planning in Western Australia Manual 2007* to provide guidance on developments that may give rise to potential impacts on different landscapes, and measures to address those impacts, which this LVIA has been prepared in accordance with. Refer to Figure 4-1 for planning zones identified within the Study Area.

4.2.7 Position Statement: Renewable Energy Facilities

The Position Statement: Renewable Energy Facilities (WAPC, 2020) outlines the WAPC's requirement to support the consistent consideration and provision of renewable energy facilities within WA.

The Position Statement identifies assessment measures to facilitate appropriate development of renewable energy facilities, seeking to ensure they are in areas that minimise potential impact on the environment, natural landscape and urban areas while maximising energy production returns and operational efficiency.

The objectives of the Position Statement are to:

- Guide the establishment of renewable energy facilities to support the State Energy Transformation Strategy (March 2019)
- Outline key planning and environmental considerations for the location, siting and design of renewable energy facilities
- Promote the consistent consideration and assessment of renewable energy facilities

- Facilitate appropriate development of renewable energy facilities while minimising any potential impact upon the environment, natural landscape, and urban areas
- Encourage informed public engagement early in the renewable energy facility planning process.

Relevant to this LVIA, the Position Statement notes that the location and siting of a renewable energy facility may require a visual and landscape assessment that addresses specific criteria. These criteria, where available at the time of the report has informed the assessment in accordance with the following:

- Landscape significance and sensitivity to change, site earthworks, topography, extent of cut and fill, the extent and type of vegetation, clearing and rehabilitation areas, land use patterns, built form character, public amenity and community values
- Likely impact on views including the visibility of the facility using view shed analysis and simulations of views from significant viewing locations including residential areas, major scenic drives and lookouts
- Layout of the facility including the number, height, scale, spacing, colour, surface reflectivity and design of components, including any ancillary buildings, signage, access roads, and incidental facilities
- Measures proposed to minimise unwanted, unacceptable or adverse visual impacts.

As the Proposal matures, further assessment can be undertaken to capture the potential impacts of any changes to scope.

4.2.8 Visual Landscape Planning in Western Australia – A Manual for Evaluation, Assessment, Siting and Design

Visual Landscape Planning in Western Australia – A Manual for Evaluation, Assessment, Siting and Design (WAPC, 2007) provides advice on techniques for incorporating visual landscape planning into the planning system and is intended to be used as a guide so that the practices of visual landscape evaluation and visual impact assessment can continue to evolve and mature over time.

It also includes detailed guidance which address the visual impact considerations necessary for effective land use planning for wind farm developments, relating to the location, siting and design. This LVIA has been prepared in accordance with the requirements of this manual.

4.3 Local Planning Framework

4.3.1 Shire of Merredin Local Planning Strategy (2025)

The Shire of Merredin Local Planning Strategy establishes that land use planning and development within the Shire must balance economic growth with the protection of environmental values, landscape character and local amenity. The Shire of Merredin Local Planning Strategy specifically requires that development, including extractive industries and renewable energy proposals, be managed to avoid adverse impacts on the environment, adjoining land uses and visual amenity, while also identifying and protecting areas with conservation, recreation and landscape value. In addition, tourism planning objectives emphasise the need to protect and enhance the character, landscape and visual qualities of natural and built features, recognising their contribution to local amenity and economic value. Accordingly, the Shire of Merredin Local Planning Strategy provides a clear policy basis for considering landscape character and visual amenity as key factors in the assessment of development proposals.

The LVIA has been produced with consideration towards the Shire of Merredin Local Planning Strategy.

4.3.2 Shire of Merredin Local Planning Scheme No.6

The Shire of Merredin Local Planning Scheme No. 6 (LPS6) provides the statutory framework for assessing development and embeds explicit consideration of landscape character and visual amenity through its aims, zone objectives and development provisions. At a strategic level, LPS6 seeks to protect and enhance the environmental values, character and amenity of both the built and natural environment, establishing a clear basis for considering visual and landscape outcomes in decision-making. This is reinforced through zone objectives which require development to be compatible in character and not detract from local amenity, as well as provisions that promote cohesive streetscape outcomes and built form integration. In addition, LPS6 requires that development, particularly in rural and general farming areas subject to the location of the Proposal, does not adversely impact the character and amenity of the locality, and enables the local government to impose conditions relating to design, siting and streetscape to ensure appropriate visual outcomes. Accordingly, LPS6 establishes a clear statutory expectation that landscape character and visual amenity are key considerations in the assessment and design of development proposals. The LVIA has been produced with consideration towards LPS6.

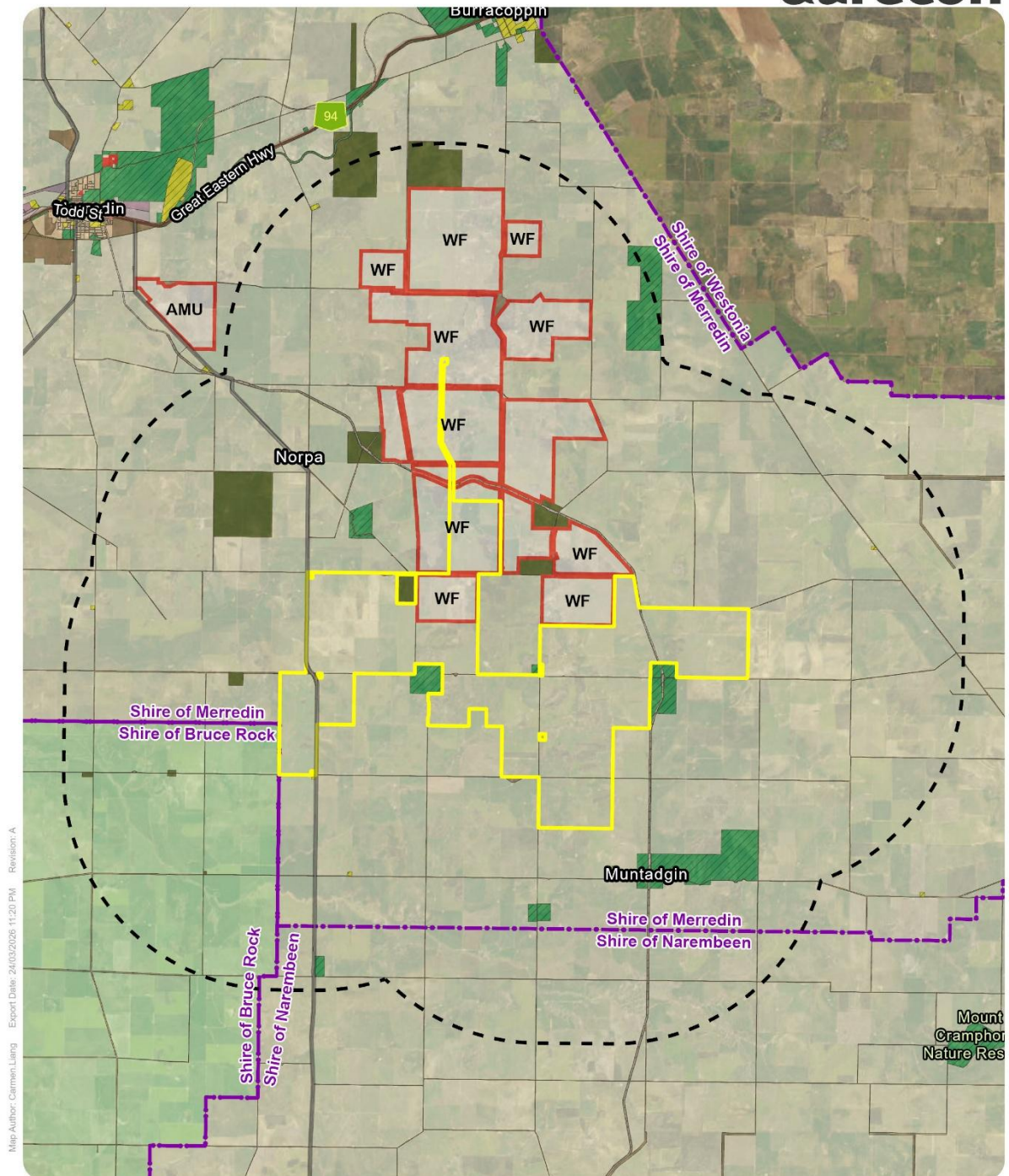
4.3.3 Shire of Merredin Strategic Community Plan

The Shire of Merredin Strategic Community Plan provides high-level direction on community aspirations, economic development and local identity; however, it does not include specific objectives, policies or assessment criteria relating to landscape character or visual amenity. While the document broadly recognises the value of the rural environment to the Shire's character and liveability, it does not establish any statutory or measurable framework for assessing visual impacts. Accordingly, the Strategic Community Plan is of limited relevance to the LVIA for the proposed development.

4.4 Summary of Planning Framework

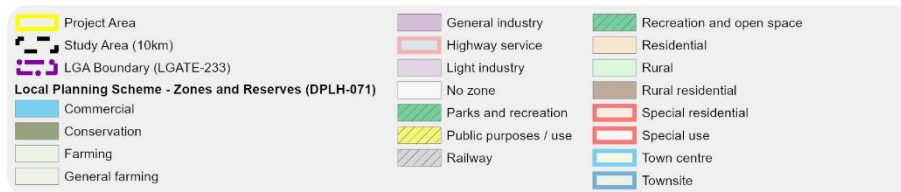
The Proposal has been assessed having regard to the relevant State and Local planning framework, which collectively establishes a clear expectation that development should be appropriately sited and designed to minimise adverse impacts on landscape character and visual amenity. While the overarching legislation does not prescribe specific visual thresholds, it embeds visual amenity within broader considerations of environmental protection, landscape values and local character.

The preparation of the LVIA is consistent with the requirements and intent of applicable State planning policies, regional frameworks and local planning instruments, and demonstrates that visual impacts have been systematically identified, assessed and addressed through appropriate siting, design and mitigation measures.



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Projection: GDA2020 MGA Zone 50

Tandegin Wind Farm LVIA Report

Figure : Planning Zones

Figure 4-1 Planning zones

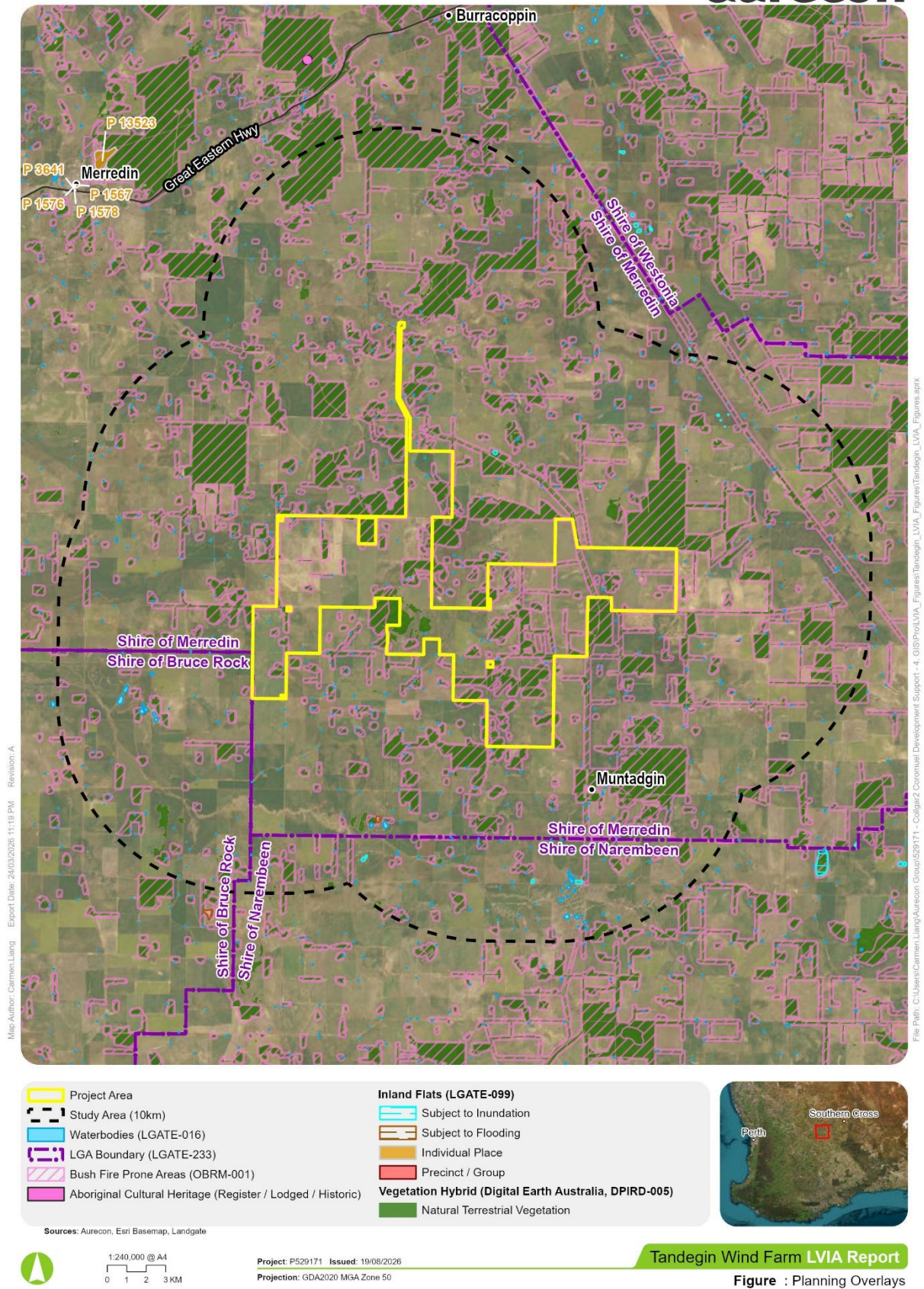


Figure 4-2 Planning overlays



5 Landscape and visual baseline analysis

5.1 Regional landscape context

The Proposal is located approximately 287 km east of Perth in the Wheatbelt region of WA. The nearest major town is Merredin, located approximately 20 km to the north west (refer Figure 5-1).

The Wheatbelt region is dominated by agricultural land use, with extensive clearing leaving scattered remnant vegetation. Surviving vegetation is not only a refuge for wildlife, but in areas become landscape features. This region, part of WA's modified rural agricultural lands, features broad-acre farming with remnant vegetation stands and shelter-belts. Many different crops are grown in the state, from distinct low-lying pastures in the north, to brighter canola in the southern areas.

The Study Area is situated within the Merredin Plateau landscape character subtype, which is characterised by long, uninterrupted panoramas over gently undulating low-lying landscapes, where even modest elevation gains serve as prominent landmarks (Stuart-Street, 1994).

Cultural elements such as windmills, rural housing, old homesteads, water tanks, grapevines, fencing and scattered livestock; contribute to the area's distinct rural character (WAPC, 2007).

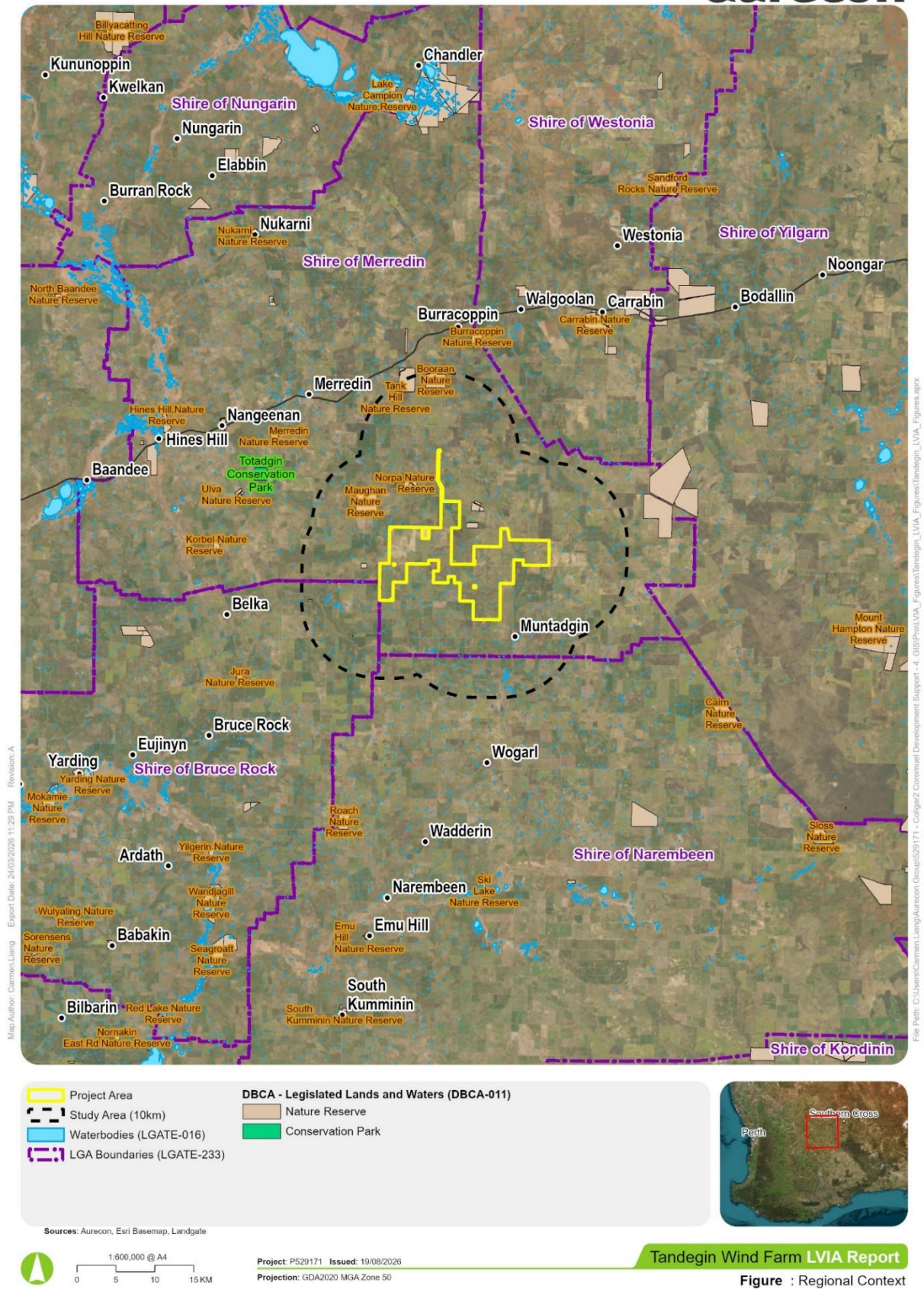


Figure 5-1 Regional Context

5.2 Landscape context

The following section provides a description of the existing conditions, associated land uses and key landscape features within the Study Area.

5.2.1 Land use

The dominant land use of the Wheatbelt is predominantly agriculture, interspersed by several conservation areas (McKenzie, May, & McKenna, 2003).

The Study Area and surrounding areas consist predominantly of land that has been historically heavily cleared of native vegetation is now primarily used and zoned for general farming as is standard in the AVW01 – Merredin Plateau subregion (refer Figure 5-2 and Figure 5-3). There are also many rural dwellings in and around the Project Area that are generally associated with agricultural land use. Farm infrastructure, buildings, and dwellings are dotted throughout the area.

Renewable energy is also a key land use of the Wheatbelt region, with the existing CWF (north of the Project Area) operating within agricultural land since 2011. CWF is connected to the grid via a cut-in to the 220 kV Perth to Kalgoorlie transmission line. The transmission substation is located on farm land 1,200 m north of Bulls Head Road and is accessed by a track.



Figure 5-2 Cleared farmland with remnant vegetation on the horizon



Figure 5-3 Grain silos with tall vegetation in foreground

5.2.1.1 Public lookouts

The CWF Information Display, a public lookout location, is situated north of the Project Area. CWF, which is currently the largest windfarm in WA consisting of 111 turbines with a height of 125 m above ground level occupying a 12,000 ha area, is viewed from this point, with interpretive information available for visitors. The viewpoint also provides extensive almost 360-degree views across the Merredin Plateau.



Figure 5-4 CWF lookout



Figure 5-5 Transmission line

5.2.1.2 Conservation reserves

There are four conservation reserves within the Project Area, including Tandegin Rock (R 30429) and three unnamed reserves (R-23975, R-22651, R-24809). Several other reserves intersect the Study Area (R-15716, R-30516, R-36418, R-25862), as shown in Figure 4-1.

Within the Study Area are two named nature reserves - Maughan Nature Reserve (R-24367) 5 km northwest and Norpa Nature Reserve (R-20504) 5.5 km northwest and many other unnamed reserves scattered throughout. They generally consist of dense native vegetation and a range of soil and landscape forms, which contrast to the surrounding flat and cleared landscape

5.2.1.3 Transport

Several roads surround and intersect with the Study Area (refer Figure 5-1). The key roads include:

- Great Eastern Highway, running in an east-west direction, approximately 18 km to the north of the Project Area. This is a significant route and is also part of the golden pipeline heritage trail named after the historic pipeline that runs alongside the highway. CWF lies between Great Eastern Highway and the Project Area.
- Merredin-Naremben Road (refer Figure 5-6), a north-south connection from Great Eastern Highway to Brookton Highway via the small agricultural town of Naremben. This road runs along the west of the Project Area boundary. There is consistent medium roadside vegetation limiting views, however there are opportunities to view CWF where there are gaps in the roadside vegetation.
- Brissenden Road is to the south of the Project Area boundary. The road has minimal roadside vegetation, providing open views to the surrounding landscape.
- Bulls Head Road runs east west between CWF and to the north of the Project Area.

Additionally, there are several smaller roads and rural access tracks (un-paved) that run through the area.

The Merredin to Yilliminning railway line is located to the north and west of the Project Area, running through the town of Muntadgin (refer Figure 5-7). It is classified as 'not in use', with some areas of the railway line covered by vegetation. Train stations along the railway comprise grain silos and grain storage areas, which are now serviced by road freight.



Figure 5-6 Merredin-Naremben Road to the west of Project Area boundary



Figure 5-7 Railway and siding at Muntadgin

5.2.1.4 Towns and settlements

The townsite of Muntadgin is located to the southeast of the Proposal, alongside the disused railway siding. It has a collection of smaller residential and commercial landholdings; including a hotel, post-office and a recreation centre with a playground. Most buildings are on Crossland Street which runs north-south parallel to the railway line, with some side streets connecting to another parallel street. The town likely provides a community connection point for agricultural workers, with the 'Munty pub' providing a local meeting point (refer Figure 5-9). Harvested wheat is stored alongside the railway on large-paved stands and within a large shed.

The small town is surrounded by medium-tall bush.

In the 2021 census, Muntadgin recorded a population of 39 residents.

Merredin, approximately 20 km to the north, is the closest town for supplies and community facilities (refer Figure 5-8).



Figure 5-8 Merredin



Figure 5-9 Muntadgin and Munty Pub

5.2.2 Topography, landform and waterways

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia's landscapes into large 'bioregions' and 'subregions' based on climate, geology, landform, native vegetation and species information (DCCEEW, 2020). The Study Area lies within the Merredin subregion (AVW01), which occurs in the Avon Wheatbelt bioregion.

The landscape is characterised as a low relief, gently undulating landscape. As shown in Figure 5-18, there is a ridge line at approximately 420 m AHD spanning from the centre-north to middle-east of the Project Area and falling to approximately 350m AHD to the southwest. Expansive flat cropland is only disrupted with lines of dense green and silver vegetation indicating roads or pockets of remnant vegetation (Beecham, 2001).

There are no permanent waterways in the Study Area. The wider Merredin subregion is known for having as being an area of active drainage with some salt lake chains only in very wet years (Beecham, 2001). Narrow agricultural drainage lines are often marked by remnant vegetation (Stuart-Street, 1994).

5.2.3 Ecological Values

The Project Area and broader Study Area are primarily cleared for agricultural purposes, with several reserves and areas of remnant vegetation within the Study Area.

Multiple flora and vegetation assessments have been completed within the Project Area to identify flora and vegetation values within Project Area influence design refinement, inform environmental impact assessments and overall, support the approvals process for the Proposal. Surveys determined that the extent of native vegetation mapped within the Project Area was 1,747 ha (13.6% of total Project Area), comprising of 160 flora species and ten non-native taxa (i.e. weeds).

Across the Project Area, 10 vegetation types were identified, ranging from 'very good' to 'completely degraded' condition. At the time this report was prepared, preliminary survey results indicate the presence of one threatened ecological community (TEC) (the Eucalypt Woodlands of the Western Australian Wheatbelt, listed as Critically Endangered under the EPBC Act and Priority 3 by Department of Biodiversity, Conservation and Attractions (DBCA)) and approximately seven priority listed flora under the *Biodiversity Conservation Act 2016* (BC Act) (WA) (Figure 5-19).

The vegetation is characterised by proteaceous scrub heaths rich in endemic species on residual lateritic uplands and derived sandplains, with mixed eucalypt, *Allocasuarina huegeliana* and Jam–York Gum woodlands on Quaternary alluvial and eluvial soils (Beecham, 2001).

The Project Area is within the Merredin Plateau subregion. The majority of Study Area is cleared of native vegetation due to agricultural land use, however the Project Area is observed to comprise native vegetation within road reserves, to the perimeter of fields, as well as scattered native trees.

The below images (refer Figure 5-10 to Figure 5-15) are within the Study Area and depict typical landform and vegetation.



Figure 5-10 Dry agricultural drainage lines

Source: Aurecon (March 2026)



Figure 5-11 Low relief landscape with remnant vegetation

Source: Aurecon (March 2026)



Figure 5-12 Remnant vegetation to north of the Project Area



Figure 5-13 Dense vegetation near Muntadgin



Figure 5-14 Dense roadside vegetation near Norpa



Figure 5-15 Vegetation at perimeter of grain paddock

Areas of significant native vegetation located outside the Project Area include three named reserves:

- Nature Reserve WA30429 is an unnamed reserve of approximately 117 ha located in the northern extent of the Project Area, approximately 170 m east of the nearest turbine. It is classified as a Strict Nature Reserve (IUCN Category Ia – highest category of protected area) and is managed by the Department of Biodiversity, Conservation and Attractions (DBCA).
- Maughan Nature Reserve (R 24367) to the northeast of the Project Area which is approximately 816 ha in size, located near Merredin-Narembeen Road.
- Norpa Nature Reserve (R 20504) to the northeast of the Project Area which is approximately 203 ha in size. Described as good representative *Causaurina* shrubland, isolated from other bushland (Muir, 1978).

Figure 5-16 to Figure 5-17 are typical examples of the native reserves.



Figure 5-16 Maughan Nature Reserve



Figure 5-17 Remnant bush near R-36418

5.2.4 Aboriginal and European cultural heritage

For further information refer to the *Collgar Renewables Desktop Assessment: Heritage and Aboriginal Engagement*, February 2025 by RFF Australia.

The Project Area is within the South West Settlement Native Title Determination (WCD 2021/010), which includes Ballardong People's Native Title Claim (WC 2000/007). Ballardong Aboriginal Corporation (BAC) is the formally recognised Traditional Owner corporation, as formalised under the South West Settlement.

RFF was engaged to undertake a desktop cultural heritage assessment for the Project Area. They found that the subject land is categorised as a 'significantly altered environment' in agricultural areas and 'moderate to minimally altered environment' where there is remnant bush.

The desktop assessment found that within or proximate to the Proposal site there are:

- No registered Aboriginal sites
- No lodged Aboriginal sites (awaiting assessment)
- No historical Aboriginal site data (indicating previously identified heritage values)
- No formalised Aboriginal Heritage Protected Areas
- No listed or registered non-Aboriginal heritage places or heritage values

There are, however, several registered heritage values, or values under assessment, within or near to the Merredin townsite or proximate to the Proposal. Key sites identified through the desktop heritage assessment included (refer Figure 5-20):

- Rabbit Proof Fence - Around 3.5 km to the eastern-most corner of the Study Area (Subject Land).

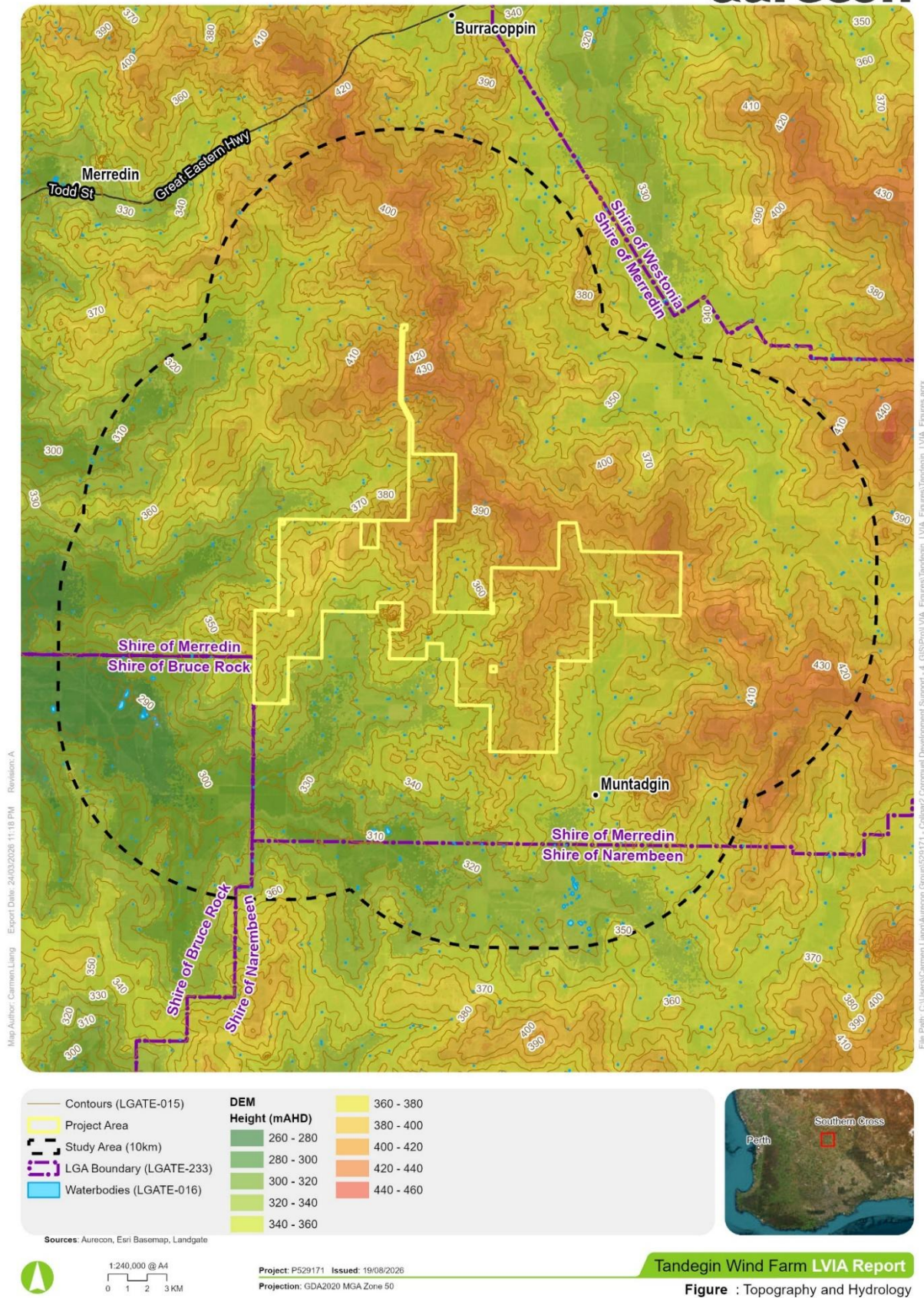


Figure 5-18 Topography and Hydrology

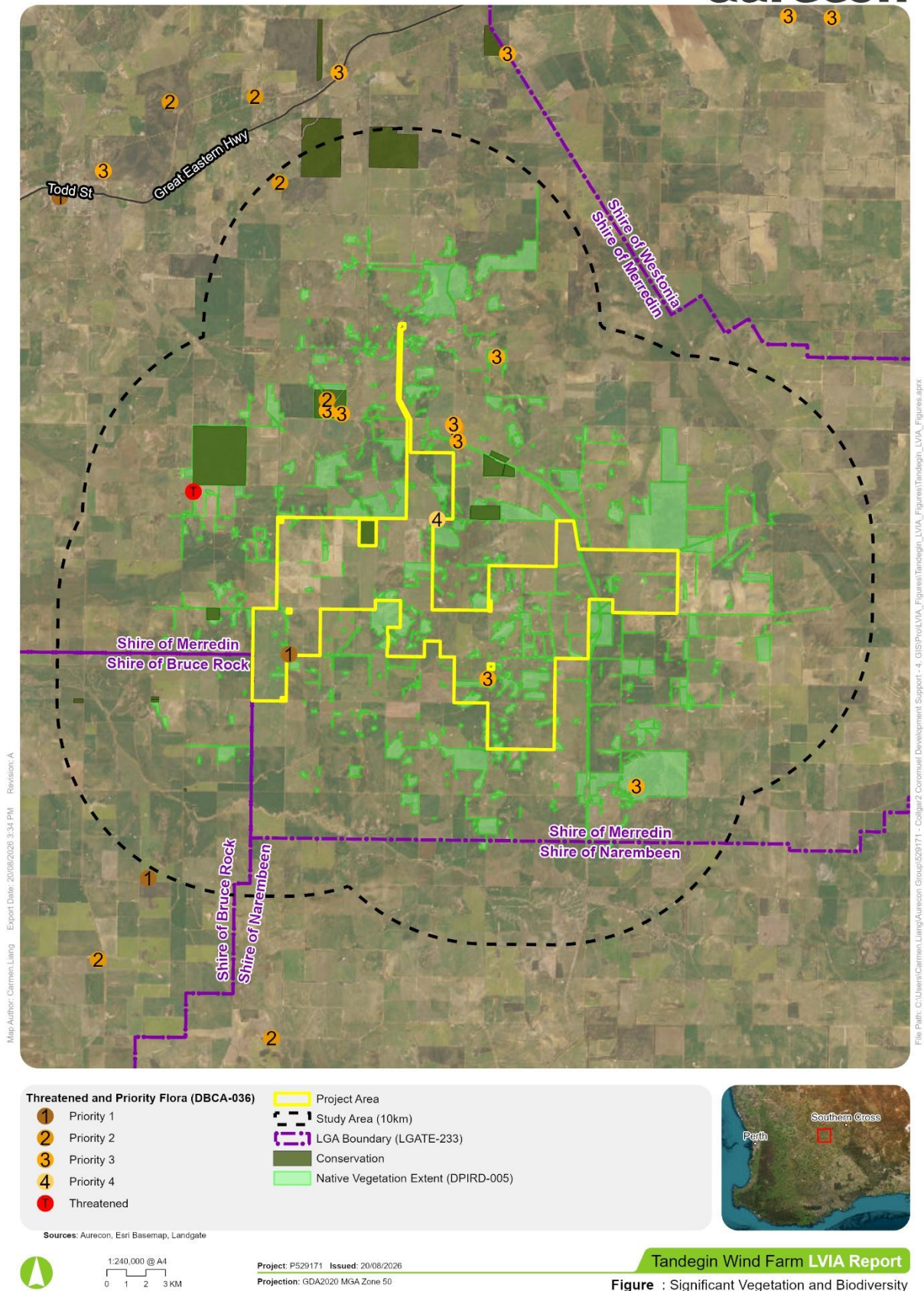
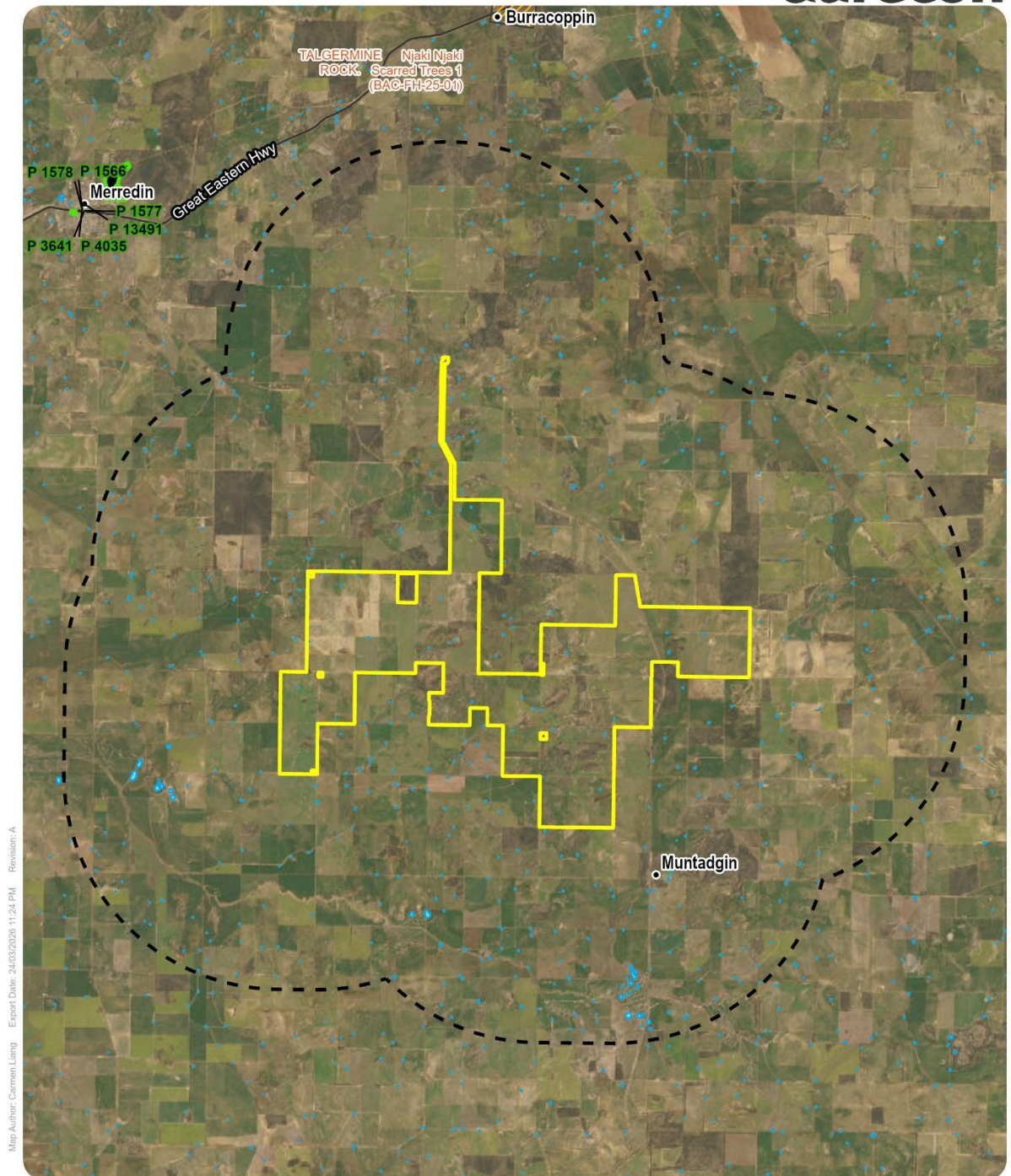


Figure 5-19 Significant vegetation and biodiversity



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- Project Area
- Study Area (10km)
- Individual Place
- Precinct / Group
- Aboriginal Cultural Heritage - Lodged (DPLH-100)
- Waterbodies (LGATE-016)

Sources: Aurecon, Esri Basemap, Landgate



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Project: P529171 Issued: 19/08/2026
Projection: GDA2020 MGA Zone 50



Tandegin Wind Farm LVIA Report

Figure : Heritage

Figure 5-20 Heritage

5.3 Landscape Character Zones

LCZs help to identify unifying aspects of the landscape and distinguish why one landscape is visually distinct from another (refer Section 3.6.1 for assigning landscape sensitivity). The character zones have been determined through a desktop assessment and site visit, conducted on 3 March 2026. Each character type identified is based on the consideration of the following attributes, some of which have been previously described in Section 5.2 (Landscape Context).

- Landscape value, i.e. landscape designated for their scenic or landscape importance or valued recreational function
- Landscape elements that contribute to defining character, i.e. residential, commercial and landform
- Landscape character attributes, including scale, grain, perceptual characteristics such as connection to natural landscape, industrial nature of the area
- Observed land uses and current and future land use zones outlined in strategic planning documents and Local Environmental Plans (as described in Section 4)
- Topography and vegetation.

The LCZs identified within the Study Area are shown in the following section and include (refer Figure 5-21):

- LCZ 1 – Agricultural pasture
- LCZ 2 – Towns and settlements
- LCZ 3 – Bushland reserves and native vegetation patches.

Roads and rail are assumed to take on the character of adjacent LCZs.

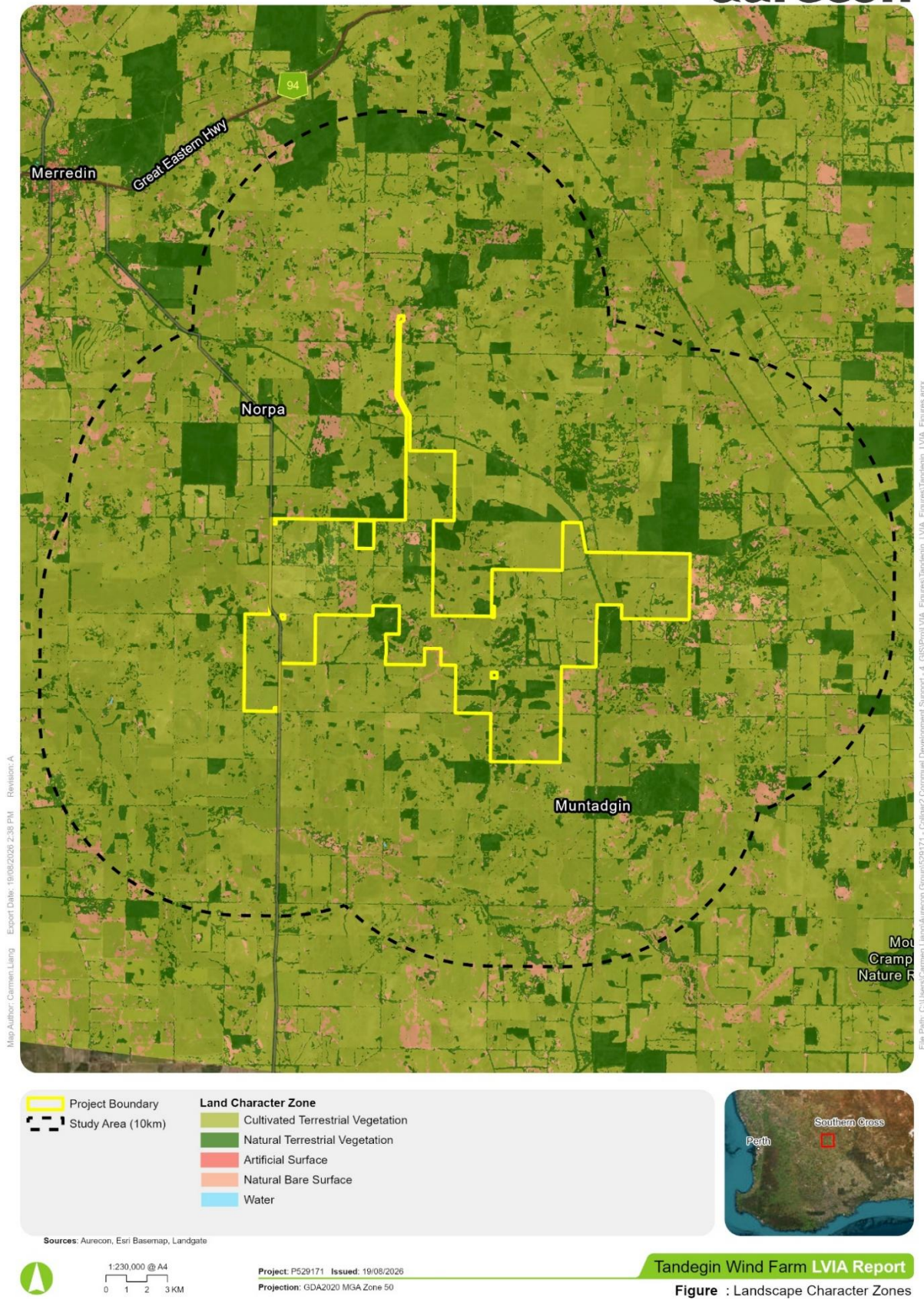


Figure 5-21 Landscape Character Zones within Study Area

5.3.1 LCZ 1: Agricultural pasture

Much of the Study Area is made up of agricultural fields, predominantly planted with grain and cereal crops. The landscape is gently undulating with wide areas of farmland and pockets of remnant vegetation and are mostly cleared of all trees with native vegetation lining fences and roadsides (windrows), and/or have scattered mature trees in varying densities across the pasture. Views across the paddocks are generally very long, especially when on tops of rises, however views from roads are often limited due to mature vegetation along edge of roads.

The residential dwellings associated with the farms and typically set back from roads, with long tree lined driveways and surrounded by vegetation. Auxiliary buildings and infrastructure are scattered across the area and are generally screened with gardens and trees. The main roads are sealed, with tracks generally unsealed.

CWF operates across agriculture pasture to the north of the Project Area, with near similar landscape characteristics to the Proposal. The turbines are creating a new type of productive landscape that is compatible with existing land uses and landform.

Key characteristics:

- Long views over gently undulating fields with a very-far horizon line
- Includes scattered rural dwellings and ancillary farm buildings at very low densities
- Remnant native vegetation occurs throughout the area, mostly along road reserves, in large patches across the landscape, to the perimeter of paddocks, roads and surrounding dwellings (described in LCZ 3).
- The landscape often appears as extensive areas of similar vegetation such as cropland, interspersed with remnant vegetation.
- The overriding impression is that of a highly modified landscape, with human intervention on the landscape clearly visible.

The key landform aesthetic character for the Merredin Plateau sub type (*Stuart-Street, 1994¹*) is described as:

- Gentle undulating lines
- Shallow valleys
- With long open view to midground and often beyond, uninterrupted by gently undulating landform.
- Distant isolated peaks or ranges

The images below (refer Figure 5-22 to Figure 5-25) are within typical scenes within LCZ 1.



Figure 5-22 Farm fencing and remnant native trees



Figure 5-23 Perimeter track to farmland with long views

¹ Stuart-Street, A. (1994). *Reading the remote: Landscape characters of Western Australia*. Department of Conservation and Land Management.



Figure 5-24 Harvested grain paddock



Figure 5-25 Scattered remnant native vegetation within farmland

5.3.2 LCZ 2: Towns and settlements

Within the Study Area, Muntadgin is the only town, with a population of 39 (*census 2021*²). Other nearest regional towns include Merredin to the north of the Study Area.

Muntadgin comprises mostly single storey dwellings on large lots. Amenities include a recreation centre, post office/shop, hotel, church, and a closed school. The town sits beside a railway which previously ran passenger trains and seasonal grain trains but is no longer in use. There is a large grain siding to the east of the railway line. The town is surrounded by dense mature vegetation which obscures mid to long-range views. Trees are irregularly spaced, often lining roads or clustered near properties, providing partial shade and visual screening.

Key characteristics and landscape features:

- Historic rural buildings (i.e. hotel, townhall)
- Areas of significant indigenous and native vegetation.
- Blend of natural and built elements with a strong rural identity (refer Figure 5-27).
- Low density rural to semi-rural infrastructure (refer Figure 5-26).

Refer to Section 5.2.1.4 for additional description.



Figure 5-26 House in Muntadgin



Figure 5-27 Grain siding at Muntadgin

² Australian Bureau of Statistics (2021). *Muntadgin (Suburb and Locality)*, 2021 Census QuickStats. ABS.

5.3.3 LCZ 3: Bushland reserves and native vegetation patches

LCZ 3 is made up of nature and conservation reserves, with patches of remnant and native vegetation found across the Study Area. These remnant vegetation patches contain a wealth of native vegetation and habitat for fauna.

There are no conservation reserves within the Project Area boundary, however there are several reserves within the Study Area. They generally consist of dense native vegetation and a range of soil and landscape forms. Maughan Nature Reserve (816 ha) and Norpa Nature Reserve (203 ha), both to the northeast, are examples of this. Figure 5-28 to Figure 5-31 show some of the local bushland.

The smaller bushland reserves are scattered throughout the Study Area and are of an informal nature. These patches generally have tall canopy coverage that block views to the middle-ground. These reserves areas cumulatively contribute to the bushland character of the area, despite the broad acres of cleared areas as LCZ 1 – Agricultural plains.

Key characteristics and landscape features:

- Areas of significant indigenous and native vegetation.
- Bushland reserves containing native vegetation and fauna.
- Informal reserves for conservation, not comprising public amenities such as walkways or picnic areas.

The key vegetation aesthetic character for the Merredin Plateau sub type (*Stuart-Street, 1994*) is described as:

- The vegetation consists of a mix of flat-topped and skeletonised trees, sturdy inland Wandoo trunks, slender Banksias, and bushy heaths, forming linear roadside reserves with strong diagonal lines and linear silhouettes.
- Texture and scale combine soft swamp oaks and peeling paperbarks with rough Banksia bark, creating a patchy mosaic of remnant heath vegetation channels that minimally enclose views, with extensive woodland depth and distant views unobstructed by landform.



Figure 5-28 Native vegetation with signpost



Figure 5-29 Remnant vegetation near Depot Dam Road



Figure 5-30 Patches of native bushland between paddocks



Figure 5-31 Remnant vegetation near Bulls Head Road

5.4 Visual catchment

The ZTV has been established through mapping, as outlined in the methodology. The ZTV show areas that can see the whole, part and tip of the turbines. These maps, together with desktop analysis and field trips have been used to identify a representation of the likely 'worst case' visual envelope of the wind turbine layout, within a 3.36 km radius of the Project Area boundary (refer Figure 5-32 to Figure 5-34).

The following is relevant when interpreting the findings of the ZTV:

- Topographic constraints are accounted for in the view
- The presence of buildings and vegetation are excluded
- As the ZTV only uses landform, it is considered a worst-case scenario of the potential zone of theoretical visibility
- The ZTV does not take into account the effect of distance. Generally, the greater the distance from the wind farm, the less prominent it will be within the view due to its perceived scale and fading due to atmospheric conditions.
- The ZTV identifies increased visibility due to altitude and ridgelines, as well as decreased visibility caused by intervening topography.

The ZTV is used to guide the selection of representative viewpoints – refer Section 5.4.1.

- Figure 5-32: a low number of turbines within the Project Area are theoretically visible within large parts of the Study Area. The visibility is strongly influenced by the biophysical conditions of the environment. Within the site and surrounding the site areas with higher elevation, or little intervening topography have greater zones of theoretical visibility of entire turbines.
- Figure 5-33: a high number of the turbines are potentially visible within 10 km, with a lower number visible, if at all, at the north to east of the Project Area.
- Figure 5-34: are area of theoretical visibility increases where only the upper portion of turbines are potentially visible.

Many of these theoretical views have the potential to be restricted by vegetation and other screening elements. In particular extensive vegetation in the nature reserves is likely to restrict views of the turbines and therefore have a low impact in these areas. Many of the residential dwellings also have gardens and trees surrounding, creating screening to the Proposal.

As distance from the Project Area increased, especially beyond 7.2 km, wind turbines reduce in scale and visibility, comprising a relatively small part of the overall landscape view, and recede into the background. Locations closer to the Project Area, especially within 3.36 km are likely to incur higher impacts, with turbines taking up greater scale and prominence in the landscape view.

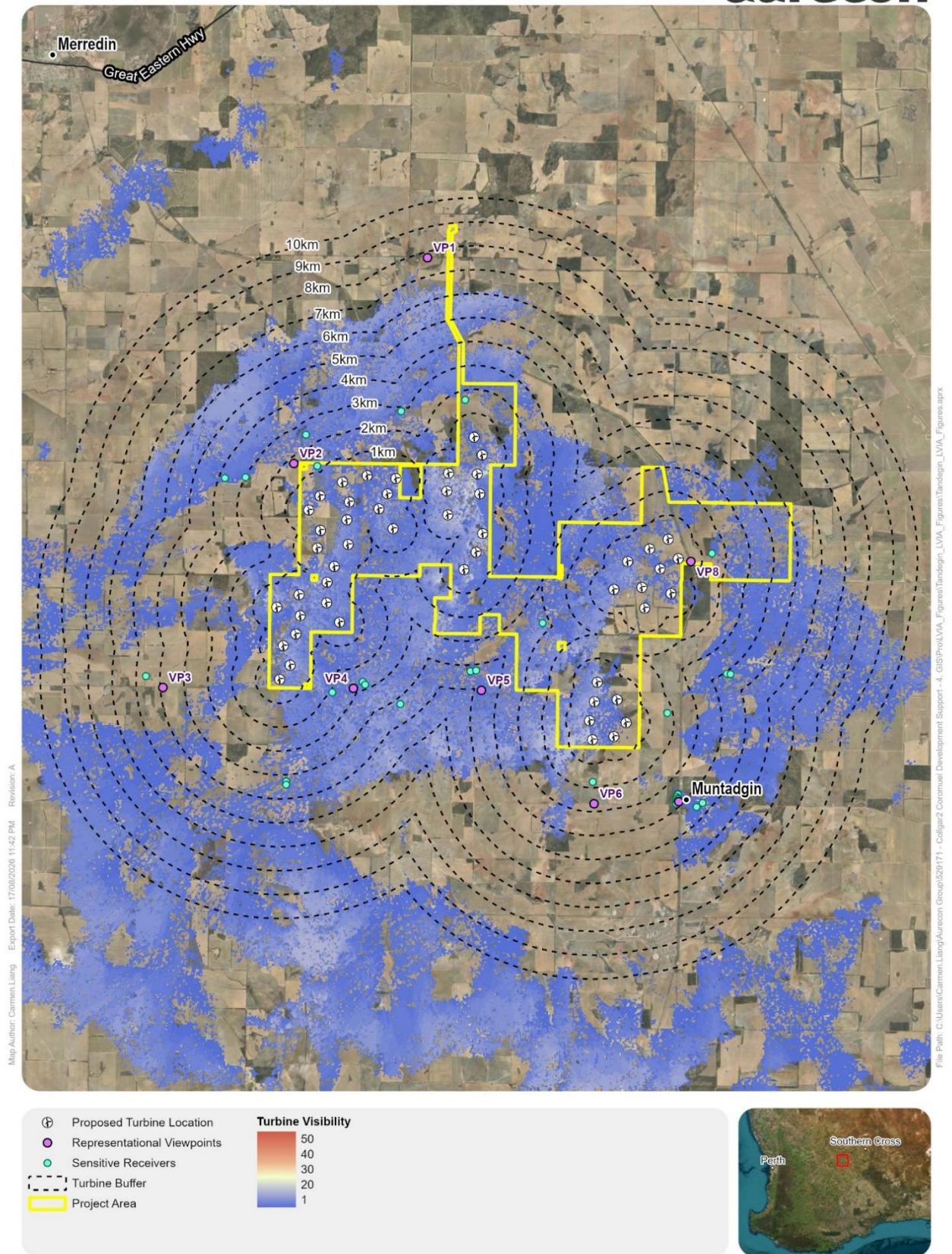


Figure 5-32 ZTV – Turbine entire height

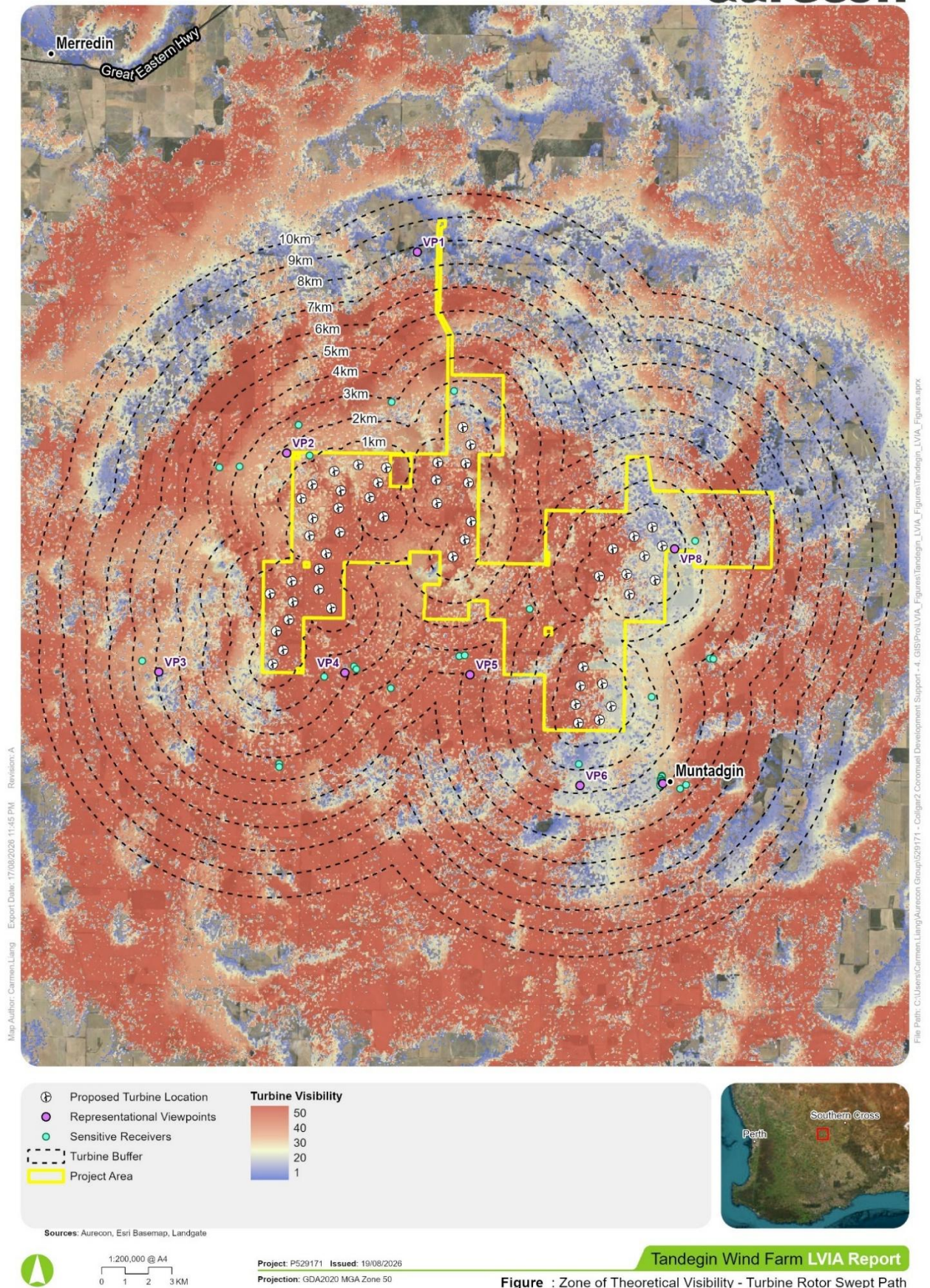


Figure 5-33 ZTV – Turbine rotor swept path

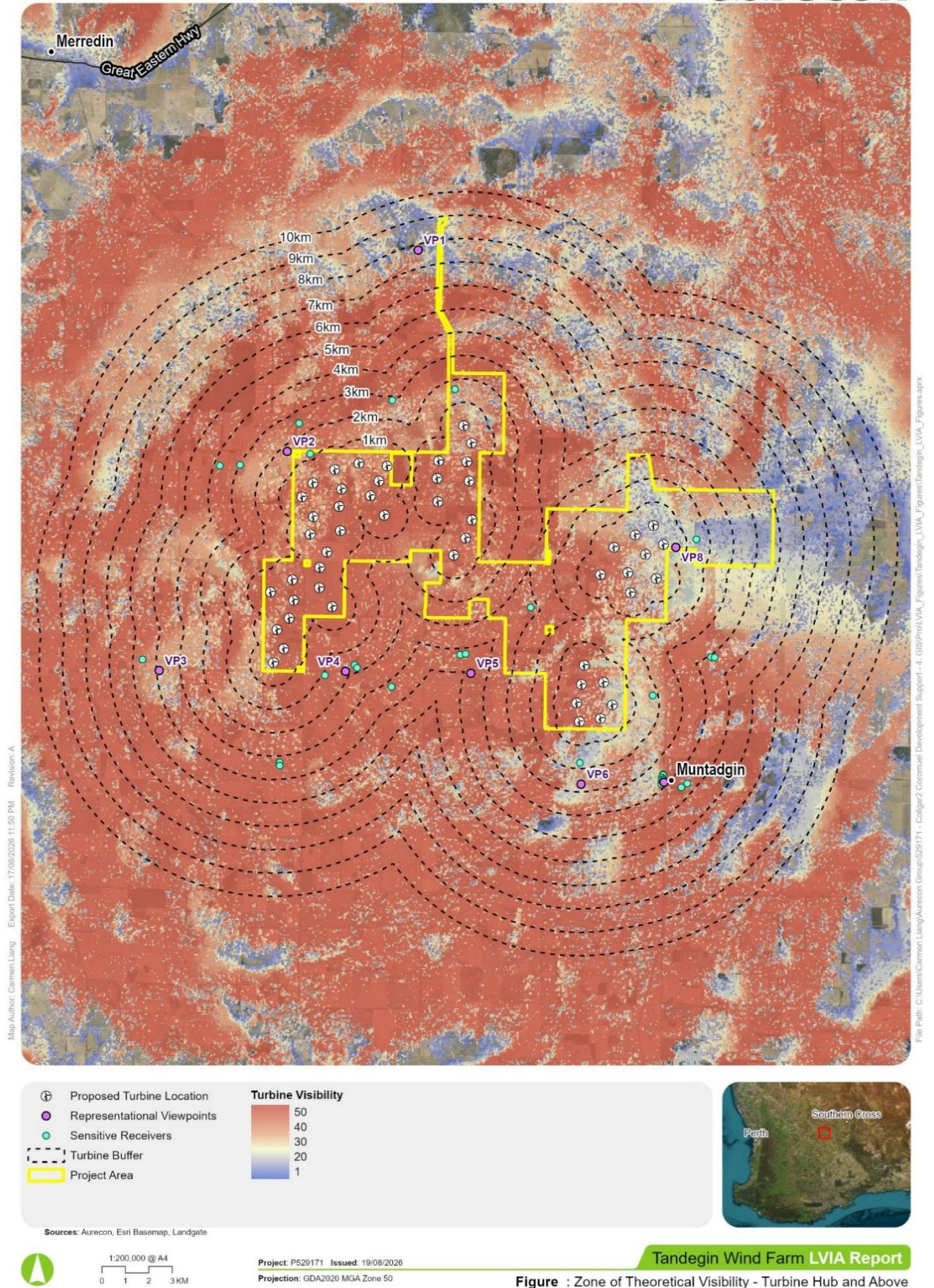


Figure 5-34 ZTV – turbine hub to blade tip

5.4.1 Viewpoint selection

Representative viewpoints are publicly accessible viewpoints that have similar distance, aspect and elevation to identified sensitive receivers. The assessment of these representative viewpoints gain an understanding of likely impacts to these sensitive receivers.

A total of eight representative viewpoints have been identified as a high priority for assessment within the Study Area based on community feedback received by The Proponent, the Proposal design, viewing distance, aspect and significant views.

The locations of the assessed representative viewpoints and sensitive receivers are shown in Figure 5-35, and outlined in Table 5-2. These representative viewpoints were selected based upon a four-stage process:

- Identification within the ZTVs
- Desktop studies identifying places of significance or within close vicinity of potential sensitive receptors, noting, proximity to the turbines. Dwellings located within 3.36 km are likely to have a moderate to high impact and were therefore prioritised for assessment, noting:
 - Residences with low intervening vegetation, such as mature trees and shrubs arounds residences
 - Elevation of residence and elevation of Proposal infrastructure within likely viewpoint.
- Viewpoints that are publicly accessible.

Public photographic viewpoint locations were chosen, that are *similar* or close to the sensitive receivers (residences or public viewpoints). These representative viewpoints and desktop studies were used to undertake the visual assessment. Representative viewpoint locations were selected to best compare similar elevation and distance from turbines, as accessible by the public road network.

There were no significant viewpoints or view corridors identified within the Study Area based on planning overlay or mapped areas.

The details of viewpoint assessments including images of their existing conditions can be found in the following section.

5.4.1.1 Residential receivers

The Proponent has a record of 33 rural residential receivers (R) within 7.2 km of a proposed turbine, which include:

- Four (R1, R2, R3 and R4) of these are located within the Project Area boundary and have been excluded from the viewpoint selection as 'participating properties' in agreement with the Proponent.
- Seven dwellings within the high visibility threshold (3.36 km)
- Twenty two dwellings between 3.36 km and 7.2 km (visibility threshold).

Table 5-1 outlines the number of sensitive receivers identified within the visibility threshold.

Table 5-1 Residential receivers identified in visibility threshold

Residential Receivers ID	Distance from closest turbine	Location	Proposal viewing factors	Within ZTV
R5	2.99 km	Briant Road	Foreground vegetation screening views.	Yes
R11	2.07 km	Brissenden Road, west of Crosthwaite Road	No screening vegetation.	Yes
R17	1.78 km	Merredin-Narembreen Road, north of Muntadgin	Scattered vegetation partially screening views.	Yes
R16	1.56 km	Brissenden Road, southeast of Hendrick Road	Partial screening from farm structures and vegetation.	Yes
R32	2.65 km	Brissenden Road, west of Crosthwaite Road	Partial screening from farm structures and vegetation.	Yes

Residential Receivers ID	Distance from closest turbine	Location	Proposal viewing factors	Within ZTV
R33	2.65 km	Brissenden Road, west of Crosthwaite Road	Foreground vegetation screening views.	Yes
R6	3.75 km	Briant Road	Foreground vegetation screening views.	Yes
R7	5.60 km	Belka East Road	Partial screening from farm structures and vegetation.	Yes
R8	4.27 km	Muntadgin Road, south of Merredin-Narembreen Road	No screening vegetation.	Yes
R9	4.29 km	Muntadgin Road, south of Merredin-Narembreen Road	Scattered vegetation partially screening views.	Yes
R10	4.24 km	Brissenden Road, west of Crosthwaite Road	Foreground vegetation screening views.	Yes
R12	4.36 km	Brissenden Road, west of Crosthwaite Road	Foreground vegetation screening views	Yes
R13	4.36 km	Brissenden Road, west of Crosthwaite Road	Vegetation screening to west, otherwise open views	Yes
R14	3.8 km	Hooper Road, east of Muntadgin	Vegetation screening views outside of town.	Yes
R15	1.5 km	Muntadgin Road, east of Duffy Rd	Partial screening by vegetation in the foreground and middle ground	Yes
R18	4.65 km	Hendrick Road, north of Muntadgin	No screening vegetation.	Yes
R19	4.65 km	Hendrick Road, north of Muntadgin	Vegetation and R19 screening views.	Yes
R20	4.20 km	Hoopers Road, 1 km east of Muntadgin	Vegetation surrounding Muntadgin screening views	Yes
R21	4.20 km	Hoopers Road, 1 km east of Muntadgin	Foreground vegetation screening views	Yes
R22-31	3.75 km	Muntadgin townsite	Vegetation screening views outside of town.	Yes

5.4.1.2 Public receivers

There are no sensitive public receivers, and only one public viewpoint - the CWF information display. Table 5-2 shows all of the representative viewpoints including VP1, representing the CWF information display and VP8, representing a public view from a road at a slightly higher elevation to the Project Area.

5.4.2 Representative viewpoints

Table 5-2 identifies eight viewpoints representative of private and public receivers, selected from the above analysis. The locations of the viewpoints are shown in Figure 5-35.

Table 5-2 Representative viewpoints

Viewpoint	Address	Receiver type	Location relative to Project Area	Coordinates	Distance from nearest turbine
VP1	CWF Information Display shelter	Public receivers: motorists on local road and wind farm visitors	North	-30.841654, 115.671271	7.83 km
VP2	Briant Road	Private receivers: R5 and R6	Northwest	-30.860681, 115.677687	1.8 km
VP3	Belka East Road	Private receiver: R7	West	-30.877328, 115.717842	5 km
VP4	Brissenden Road west of Crosthwaite Road	Private receivers: R32, R33 and R44	South	-30.861581, 115.820605	2.7 km
VP5	Brissenden Road east of Crosthwaite Road	Private receivers: R12 and R13	South	-30.920045, 115.817435	4.9 km
VP6	Muntadgin Road	Private receivers: R15 and R16	South	-30.981371, 115.747962	2.4 km
VP7	Muntadgin Town	Private receivers: R14, R20-R27, R29-R31	Southeast	-30.965305, 115.692310 -	3.8 km
VP8	Muntadgin – Tandegin Road	Public receivers: motorists (locals and workers)	East	-30.839619, 115.603422	0.5 km

Details of viewpoint assessments, including images of their existing conditions, are presented in the following section.

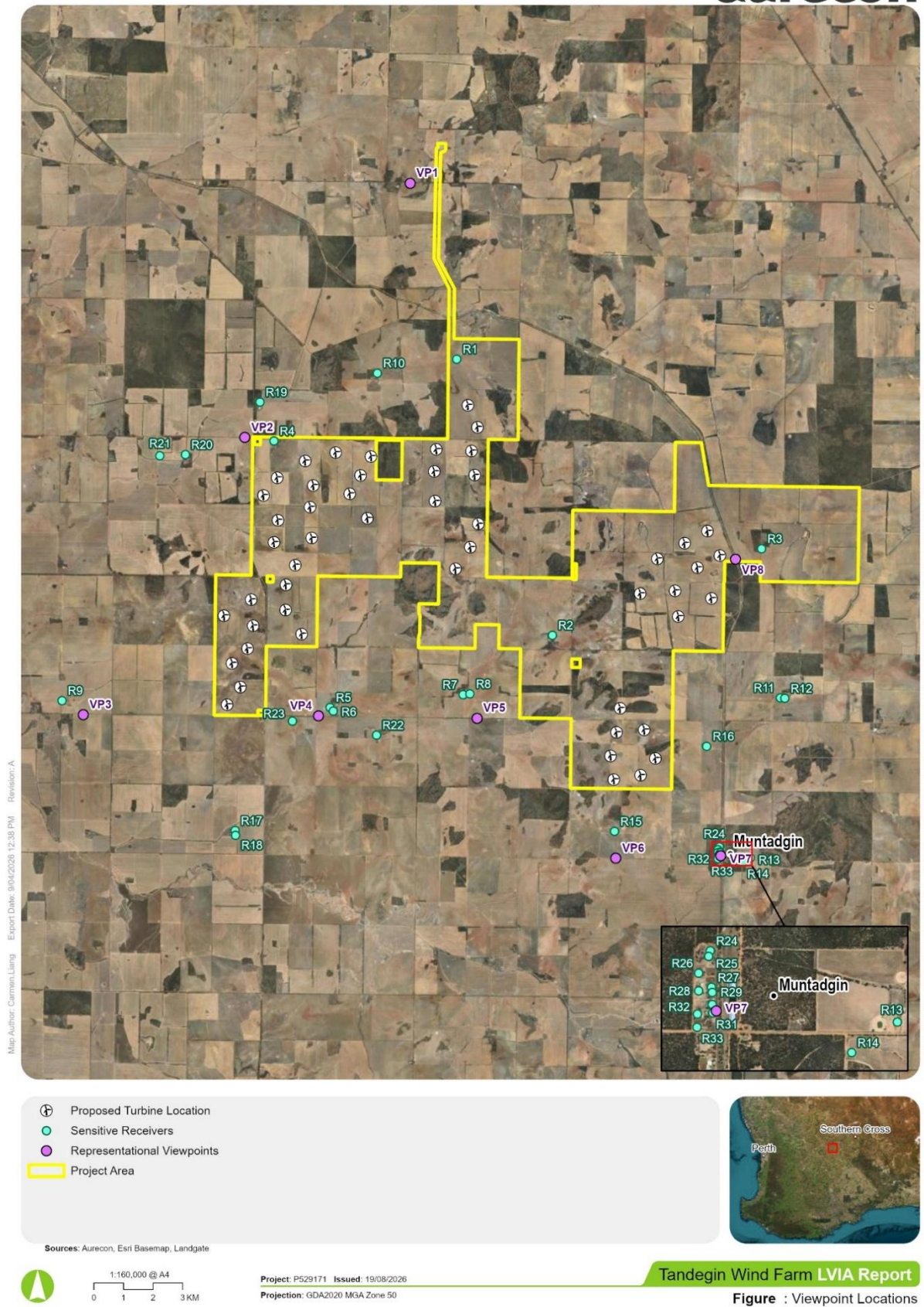


Figure 5-35 Viewpoint locations



6 Potential impacts

This section outlines the impact assessment on the visual components, at operation phase of the Proposal. The assessment of potential visual impacts is based on:

- The sensitivity of the landscape character or view
- The degree of modification or changes to the view as part of the Proposal at the operational phase, as described in the methodology.

The landscape sensitivity is derived from the ability for the character to absorb changes together with the level of modification to provide an impact rating as described in the methodology.

6.1 Potential landscape character impacts

A summary of potential impacts to landscape character is shown in Table 6-1, including matters for the referral which may require further investigation, assessment, management and mitigation.

The Study Area is predominantly located in LCZ 1 - Agricultural pasture, with smaller areas including LCZ 3 – Bushland reserves.

Due to the height of the turbines, there is a potential for landscape character impacts to adjacent LCZs. The potential for impacts arising on these LCZs have been considered during construction and operational phases.

Table 6-1 Assessment of potential impacts to landscape character

Landscape Character Zone	Sensitivity to absorb change	Magnitude of change	
		Construction impacts	Operational impacts
LCZ 1 Agricultural pasture	LOW The sensitivity of the LCZ is considered to be Low due to the following: ■ Whilst farmland is not considered to be of any specific scenic value, some receptors likely place value upon its openness and low built form density. ■ There are no specific planning controls attributing special value to this landscape.	LOW The magnitude of change is considered to be Low due to the following: ■ There is the potential for some vegetation removal along road intersections to transport turbine blades. However, the extent of vegetation removal is expected to be limited in the LCZ. ■ The introduction of earthworks at turbine pads and cranes for installation, are localised low changes of low contrast to the working farmland. ■ Installation of the BESS and transmission line is a localised change, adjacent an existing transmission line.	LOW The magnitude of change is considered to be Low due to the following: ■ The scale and geographical extent of proposed wind turbines will result in them being noticeable from a large area and whilst existing agricultural practices will remain, 'wind farming' will be a prominent element to the character, extended south from the existing CWF. ■ The landform and vegetation patterns will not be altered.
LCZ 2 Towns and settlements	LOW The sensitivity of the LCZ is considered to be Low due to the following: ■ Low residential numbers and villages are not considered primary tourist destinations.	NEGLIGIBLE The magnitude of change is considered to be Negligible, with proposed construction at a distance that will not be noticeable within the town.	NEGLIGIBLE The magnitude of change is considered to be Negligible due to the following: ■ Proposed turbines are a minimum of 3.7 km to the west of Muntadgin. The presence of turbines to the north and west of the town will not have bearing on the town's character.
LCZ 3 Bushland reserves and native vegetation patches	MODERATE The sensitivity of the LCZ is considered to be Moderate due to the following: ■ Valued ecological conservation areas.	NEGLIGIBLE The magnitude of change is considered to be Negligible due to the following: ■ There is no wind farm or ancillary infrastructure proposed within this LCZ and potential effects are likely to be visual.	NEGLIGIBLE The magnitude of change is considered to be Negligible due to the following: ■ The presence of turbines adjacent bushland, introduces built structures of high contrast, though have no bearing on the area of bush.

6.2 Potential visual impacts to private receivers

The below private receivers within the 7.2 km were identified. A desktop assessment has been undertaken to identify the potential visual impacts, based on the distance to the closest Proposal elements and foreground screening.

All private receivers are identified in the ZTV mapping (refer Figure 5-32 to Figure 5-34) as having views (based on topography) of the turbines with the exception of R7, R12, R13 and R17 which have views upwards of the rotor swept path.

The visual sensitivity of the private receiver is considered moderate for all rural dwellings, on or adjacent to working farms.

Table 6-2 Visual assessment of residential receivers

Residential receivers ID	Representative viewpoint	Distance from closest turbine	Proposal viewing factors	Potential magnitude of change	Potential visual impact (operational)	Recommendations
R5	VP4	3.10 km	Foreground vegetation screening views.	Low: the turbines and 33 kV powerlines are likely screened.	LOW	Potential consultation with landowner within VPZ to ground-truth screening value
R11	VP7	4.07 km	No screening vegetation.	Moderate: turbines within VPZ with no screening	MODERATE	Consultation with landowner, ground-truthing screening value and visual assessment from private property
R17	VP4	4.32 km	Scattered vegetation partially screening views.	Moderate: turbines within VPZ with partial screening	MODERATE	Consultation with landowner, ground-truthing screening value and visual assessment from private property
R15	VP6	1.75 km	Low screening value	High: turbines within VPZ with partial screening	HIGH	Consultation with landowner, ground-truthing screening value and visual assessment from private property
R16	VP6	1.75 km	Low screening value	High: turbines and 33 kV powerline within VPZ with partial screening	HIGH	Consultation with landowner, ground-truthing screening value and visual assessment from private property
R32	VP7	3.75 km	Partial screening from farm structures and vegetation.	Moderate: turbines within VPZ with partial screening	MODERATE	Consultation with landowner, ground-truthing screening value and visual assessment from private property
R33	VP7	3.78 km	Foreground vegetation screening views.	Low: the turbines are likely screened	LOW	Potential consultation with landowner within VPZ to ground-truth screening value
R6	VP4	3.25 km	Foreground vegetation screening views.	Very Low: the turbines and 33 kV powerlines are likely screened and outside VPZ	VERY LOW	None – Visual impacts are below moderate
R7	VP5	4.12 km	Partial screening from farm structures and vegetation.	Low: turbines are outside VPZ are partially screened	LOW	None – Visual impacts are below moderate
R8	VP5	4.12 km	No screening vegetation.	Low: turbines are outside VPZ are partially screened	LOW	None – Visual impacts are below moderate

Residential receivers ID	Representative viewpoint	Distance from closest turbine	Proposal viewing factors	Potential magnitude of change	Potential visual impact (operational)	Recommendations
R9	VP3	5.40 km	Scattered vegetation partially screening views.	Low: turbines are outside VPZ are partially screened	LOW	None – Visual impacts are below moderate
R10	VP2	2.73 km	Foreground vegetation screening views.	Low: turbines are outside VPZ are partially screened	LOW	None – Visual impacts are below moderate
R12	VP7	4.17 km	Foreground vegetation screening views	Very Low: turbines are outside VPZ are partially screened	VERY LOW	None – Visual impacts are below moderate
R13	VP7	3.85 km	Vegetation screening to west, otherwise open views	Low: turbines are outside VPZ are partially screened	LOW	None – Visual impacts are below moderate
R18	VP4	4.32 km	No screening vegetation.	Low: turbines visible but not prominent outside of TPZ	LOW	None – Visual impacts are below moderate
R19	VP2	2.35 km	Vegetation and R19 screening views.	Negligible: not visible	NEGLIGIBLE	None – no impacts
R20	VP2	2.84 km	Vegetation surrounding Muntadgin screening views	Negligible: not visible	NEGLIGIBLE	None – no impacts
R21	VP2	3.72 km	Foreground vegetation screening views	Negligible: not visible	NEGLIGIBLE	None – no impacts
R22	VP4	4.88 km	Foreground vegetation screening views.	Low: the turbines are likely screened.	LOW	None – Visual impacts are below moderate
R23	VP4	2.12 km	Foreground vegetation screening views.	Low: the turbines and 33 kV powerlines are likely screened.	VERY LOW	Potential consultation with landowner within VPZ to ground-truth screening value
R24-31	VP7	3.75 km	Vegetation screening views outside of town.	Negligible: not visible	NEGLIGIBLE	None – no impacts
R14	VP7	3.85 km	Vegetation screening views outside of town.	Negligible: not visible	NEGLIGIBLE	None – no impacts

6.3 Viewpoint assessment

6.3.1 Viewpoint 1: CWF Information Display shelter



Figure 6-1 Viewpoint 1: Existing view south from the CWF Information Display shelter, Bulls Head Road

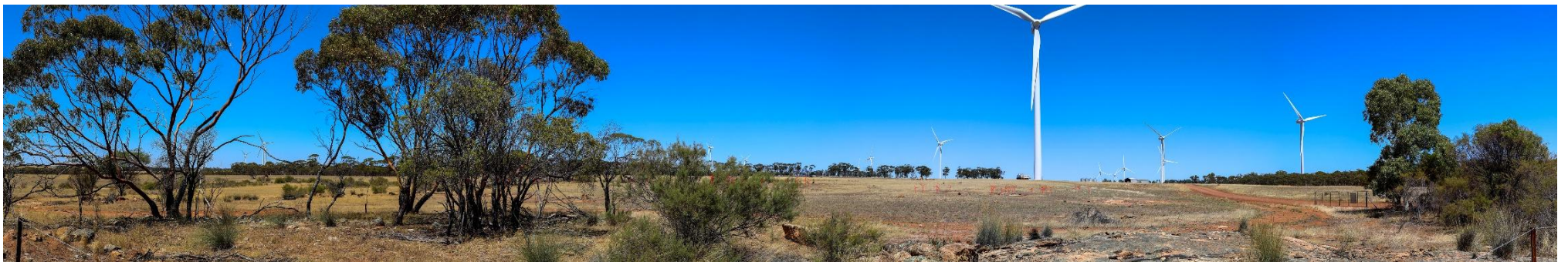


Figure 6-2 Viewpoint 1: Photomontage of proposed view south

Refer to Appendix A: Visual simulations for larger versions of the photomontage.

Viewpoint selection	View from CWF Information Display shelter, with transmission line to the north of the Project Area		
Visual receivers	Motorists: this is a rural-local road, mostly used by locals and workers.		
Viewing distance (m)	500 m west of transmission line. 7,890 m from closest new turbine (T25 southwest)		
Visual baseline	The CWF has an information display shelter for visitors, located to the north side of Bulls Head Road (local road), approximately at the centre of the wind farm. The nearest wind turbine (125 m height) is 100 m to the north and the closest visible in the viewpoint is 320 m southwest. The view is directed across a rural landscape, where the existing wind farm is prominent. In the foreground, sparse native vegetation and dry grasses cover the uneven ground, with a few scattered small shrubs and rocky patches. To the left, a group of taller eucalyptus trees frame the image. In the middleground, a dirt track curves gently through the landscape, leading towards the large white wind turbines of the existing CWF, which dominates the scene. The closest existing turbine in the image is around 300m away. The CWF turbines are spaced across approximately 270° degrees horizontal FOV – northwest to southwest. In the background, a line of trees marks the horizon, providing a natural boundary to the otherwise open and cleared landscape. The overall scene reflects a blend of natural vegetation and farm infrastructure including sheds, fencing and access tracks.		
Land use	Farm zone	Landscape type	LCZ 1 Agricultural pasture
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 0	From hub: 0
Viewpoint discussion	- There are no turbines located in the VPZ of 3.36 km. Proposed turbines are screen by topography and are below the viewpoint horizon line. - The closest proposed turbine is 7.83 km away and is not visible at this distance. - The proposed transmission line is located 530 m to the east of this viewpoint, alongside an existing transmission line, which is screened by intervening topography and vegetation.		
Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Low: local motorists and visitors to CWF	NEGLIGIBLE - Construction works for the closest turbines will not be visible from this viewpoint. - Installation of the HV transmission line will not be visible to the east direction, in foreground views due to intervening topography and foreground vegetation.	NEGLIGIBLE
Operational		NEGLIGIBLE - The proposed turbines are not visible from this viewpoint and not distinguishable from the existing CWF. - The transmission line not visible in the foreground (Distance 530 m) screened by intervening topography and vegetation	NEGLIGIBLE

6.3.2 Viewpoint 2: Briant Road



Figure 6-3 Viewpoint 2: Existing view north of Briant Road



Figure 6-4 Viewpoint 2: Photomontage of proposed view north of Briant Road

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Representative of views near four residential dwellings (R3-R6) to the northwest of the Project Area.		
Visual receivers	This viewpoint is representative of residential receivers R3, R5 and R6 (and one associated dwelling, R4) on Briant or Merredin-Narembene Roads. Dwellings R5 and R6 to the west of this viewpoint have foreground trees screening views outside of the property. A dwelling to the northeast (R3), closest to the Project Area boundary, has no intervening vegetation. Therefore, this viewpoint represents those worst-case impacts, experienced from R3.		
Viewing distance (m)	1,830 m from closest turbine T02 (southeast). R3 is 2.5 km to turbine T0.1		
Visual baseline	The view is directed north towards the Project Area from Briant Road. In the foreground, a large flat paddock of harvested wheat stubble extends broadly across the view, with faint harvesting lines visible across its surface. The paddock is framed on both sides by mature eucalyptus trees. In the middleground, a continuous belt of remnant vegetation forms a strong line on the horizon, sitting at the edge of the paddock and preventing long views. A powerline with timber poles crosses through the middle of the paddock. The overall view is of a large agricultural paddock surrounded by native vegetation, with a moderate sense of containment provided by the framing trees and the continuous middleground treeline.		
Land use	Farm zone	Landscape Type	LCZ 1 Agricultural pasture
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 6	From hub: 6
Viewpoint discussion	■ The closest turbine (T01), at approximately 2.5 km from R3 dwelling, anticipated to be seen above intervening trees. Turbine T02 is 1.8 km from the viewpoint ■ 6 turbines are located within the VPZ of 3.36 km of the viewpoint and would be visible from the swept rotor path. ■ 22 turbines are located between 3.36 km and 7.2 km from the viewpoint and should diminish in prominence. They will vary in the amount of the full turbine and blades seen dependent on intervening topography. There is likely to be intervening vegetation which may partially mitigate the number and extent of turbines visible. ■ The turbine layout spans 100° degrees horizontal FOV. The remnant bush narrows the horizontal visual extents and would limit the number of turbines visible at one time. ■ Two turbines from CWF at 7.6 and 7.9 km away and unlikely to be visible at this distance.		
Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: rural dwellings	Construction earthworks will not be visible from this viewpoint. It is likely that crane installation of the turbines will be partially visible for those turbines within 3.36 km, however, this will be a very low magnitude of change.	VERY LOW
Operational		Up to six turbines are likely to be prominent in the view from the rural dwelling (R3). The turbines are a new element in a view otherwise comprising crop paddocks and stands of native vegetation. The magnitude of change is moderate.	MODERATE

6.3.3 Viewpoint 3: Belka East Road



Figure 6-5 Viewpoint 3: Existing view north east from Belka East Road



Figure 6-6 Viewpoint 3: Photomontage of proposed view north east from Belka East Road

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Representative of views near residential dwelling to the west of the Project Area		
Visual receivers	View is representative of one rural residential dwelling (R7) to the west of the Project Area. This representative viewpoint has been taken close to the dwelling, so it is likely that views from the dwellings will be similar to this representative viewpoint. However, the view east towards the Project Area has intervening scattered vegetation, two large farm sheds and grain silos which will partially screen views.		
Viewing distance (m)	5,030 m from closest turbine (T19 - east)		
Visual baseline	The view is directed east across an open agricultural landscape. In the foreground, a dry, harvested paddock extends towards the horizon, with a dirt access track and fence running along the right edge of the scene. To the right, a line of sparse trees and shrubs borders the paddock, with Belka East Road to the far right. In the middleground, the gently undulating land continues with scattered vegetation, while the background features a low horizon line punctuated by distant trees and power lines. The scene is characterised by large skies, long views, a modified rural environment with minimal built elements.		
Land use	Farm zone	Landscape Type	LCZ 1 Agricultural pasture
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 0	From hub: 0
Viewpoint discussion	■ The closest turbine (T19), at approximately 5.03 km from the viewpoint is anticipated to be seen above intervening trees, with views from R7 dwelling. ■ 0 turbines are located within the VPZ of 3.36 km of the viewpoint. ■ 9 turbines are located between 3.36 km and 7.2 km from the viewpoint and should diminish in prominence. They will vary in the amount of the swept path to tip of turbine are seen dependent on intervening foreground-middleground farm structures and trees. ■ The turbine layout spans 45° degrees horizontal FOV from the east to northeast. The intervening farm structures and trees will narrow the horizontal visual extents and would limit the number of turbines visible at one time. ■ Turbines from CWF at 19.5 km away are unlikely to be visible at this distance.		

Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: rural dwelling	Construction earthworks will not be visible from this viewpoint. It is likely that crane installation of the turbines would be barely noticeable at a distance over 5 km. The magnitude of change negligible.	NEGLIGIBLE
Operational		Up to nine turbines are likely to be barely visible in the view from the rural dwelling (R7), at a distance of 5 to 7.2 km to the east. Foreground elements including farm structures, native vegetation and crop paddocks, will remain dominant in the view. The magnitude of change is very low.	LOW

6.3.4 Viewpoint 4: Brissenden Road west of Crosthwaite Road



Figure 6-7 Viewpoint 4: Existing view north from Brissenden Road



Figure 6-8 Viewpoint 4: Photomontage of proposed view north from Brissenden Road

Figure note: Micrositing has occurred since this photomontage was prepared; minor changes only. The photomontage remains valid for assessment purposes. Refer to viewpoint discussion below.

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Representative of views near rural - residential dwellings to the south of the Project Area		
Visual receivers	This viewpoint is representative of residential receivers R10, R32, R33 and R11 located to the centre-south of the Project Area. The viewpoint is located between R44 and R32/R33, on Brissenden Road and is representative of a clear view in the direction of the Project Area. R33 and R11 have foreground screening vegetation surrounding the dwellings, whereas both R11 and R32 have more open views of the surrounds, through some screening due to intervening vegetation and farm buildings.		
Viewing distance (m)	3,090 m to the nearest turbine (T18 - northwest) R11 is 2,070 m from turbine T18.		
Visual baseline	The view is directed north towards the Project Area from Brissenden Road. In the foreground and middle ground there is a wide open, cleared agricultural field with patches of bare soil and sparse vegetation. Where the road is visible in the foreground there are tall trees on the roadside with open stretches. Visible to the far left and right of the image is the tall vegetation that surrounds the nearby rural dwellings. Trees are seen along the horizon line. Overall the scene comprises a modified agricultural landscape with little visible built structures and some patches of native vegetation.		
Land use	Farm zone	Landscape Type: LCZ 1 Agricultural pasture	
No. of turbines potentially visible within 3.36 km at representative viewpoint	Entire height of turbine: 0	Swept path of rotor: 6	From hub: 6
Viewpoint discussion	■ The closest turbine (T18) is approximately 2.07 km from R44 and T15 is 2.65 km from R33 and R34. ■ Six (6) turbines (T13, T15 to 19) are located within the VPZ of 3.36 km, to the north of the viewpoint. ■ 21 turbines are potentially visible up to 7.2 km away, across approximately 130° horizontal FOV from the west to northeast. ■ Turbines to the east of the Project Area are a distance from 11.2 km from the viewpoint and would be of diminished visual prominence. ■ The intervening farm structures and trees near to the private dwellings will narrow the horizontal visual extents and would limit the number of turbines visible at one time. ■ The BESS and transmission line would not be visible, located from 8 km distance to the northeast. ■ 33 kV powerlines will be noticeable but not dominant from this viewpoint (not shown in the photomontage due to design update and substantially less visual bulk compared to turbine). ■ Turbines from CWF at 12.1 km away are unlikely to be visible at this distance. ■ Minor micro-siting adjustments have been undertaken since preparation of this photomontage, including a small refinement to turbine T12. Due to the viewing distance and the position of T12 outside the primary turbine cluster influencing this viewpoint, the change would not result in a discernible alteration to the photomontage or the visual assessment findings. The photomontage remains representative of the expected operational view.		

Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: rural dwellings	Construction earthworks will not be visible from this viewpoint. It is likely that crane installation of the turbines will be partially visible for those turbines within 3.36 km, however, this will be a very low magnitude of change.	VERY LOW
Operational		Up to six turbines are likely to be prominent in the view from rural dwellings (R11 and R32). The turbines are a new element in a view otherwise comprising crop paddocks, stands of native vegetation and farm structures. The magnitude of change is moderate.	MODERATE

6.3.5 Viewpoint 5: Brissenden Road east of Crosthwaite Road



Figure 6-9 Viewpoint 5: Existing view north from Brissenden Road



Figure 6-10 Viewpoint 5: Photomontage of proposed view north from Brissenden Road

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Representative of views near residential dwellings to the south-center of the Project Area		
Visual receivers	The viewpoint is representative of two rural residential dwellings (R12 and R13) to the middle-south of the Project Area. The dwellings are located up the private driveway (not shown, behind/left of viewpoint), approximately 750 m to the north. The two dwellings are relatively close together. R12 is surrounded by foreground vegetation to the north and east which would screen long views, but R13 has screening only to the west side of the dwelling. The dwellings and the viewpoint sit at a lower elevation to the Project Area, and the Proposal will occupy the small rise in elevation visible in the background. The Project Area boundary wraps around this viewpoint to the west, north and east.		
Viewing distance (m)	4,360 m from closest turbine (T34 to the north)		
Visual baseline	The viewpoint is taken toward the Project Area facing northeast. In the foreground, a wire fence runs parallel to both sides of Brissenden Road. To the left and right of the image are large flat paddocks of dry harvested crops that extends broadly across the scene and into the distance. A very subtle rise in the terrain is discernible in the centre-right of the view. A cluster of mature eucalyptus trees sits at the roadside in the middleground. The horizon line is low and almost continuous, broken only by the silhouettes of distant tree groups. The sky is expansive and the overall view is of a vast, open, broadacre agricultural landscape with very long uninterrupted sightlines, minimal vertical elements, and a strongly horizontal character.		
Land use	Farm zone	Landscape Type: LCZ 1 Agricultural pasture	
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 0	From hub: 0
Viewpoint discussion	■ The closest turbine (T34) is approximately 4.36 km north of R12 and R13. ■ 16 turbines are potentially visible up to 7.2 km away, across approximately 180° degrees horizontal FOV from the northwest to southeast. The turbine layout includes eight turbines to the east to northeast, five to the north and three to the northwest. These turbines could range from visible from the ground up to visible from the swept rotor path. R13 is likely view only those to the north to west, which is 8 turbines. ■ The intervening farm structures and trees near to the private dwellings will narrow the horizontal visual extents and would limit the number of turbines visible at one time. ■ The BESS and transmission line would not be visible, located approximately 6 km to the north due to intervening topography and vegetation. ■ Turbines from CWF at 8 km to the northeast would not be discernible at this distance.		
Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: rural dwellings	Construction earthworks will not be visible at 4.36 km distance. It is likely that crane installation of the turbines would be barely noticeable at a distance. The magnitude of change negligible.	NEGLIGIBLE
Operational		Up to 8 turbines are likely to be barely visible in the view from the rural dwelling (R13), at a distance of 4.36 km. The location of the turbines from the viewpoint make it unlikely for all turbines to be seen, with foreground vegetation screening a wide portion of the horizontal FOV. Foreground elements including farm structures, native vegetation and crop paddocks, will remain dominant in the view. The magnitude of change is Low.	LOW

6.3.6 Viewpoint 6: Muntadgin Road



Figure 6-11 Viewpoint 6: Existing view north from Muntadgin Road



Figure 6-12 Viewpoint 6: Photomontage of proposed view north from Muntadgin Road

Figure note: Micrositing has occurred since this photomontage was prepared; minor changes only. The photomontage remains valid for assessment purposes. Refer to viewpoint discussion below.

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Representative of views near residential dwellings (R15 and R16) to the south of the Project Area.		
Visual receivers	This viewpoint is representative of one rural dwelling located 800 m north of the viewpoint, to the south of the Project Area. The rural dwelling has very little vegetation surrounding it, thus will experience open views of the surrounds. The dwelling is located closer to the Project Area boundary and at a slightly higher elevation, thus views toward the Proposal would be slightly more pronounced.		
Viewing distance (m)	The closest turbine (T49) is 1,560 m from R16, with the viewpoint 2,440 m away.		
Visual baseline	The view is directed north towards the Project Area from Muntadgin Road. The scene comprises a modified agricultural landscape with expansive wheat field stretching from the foreground towards the horizon. A post-and-wire farm fence line runs along the near edge of the paddock. To the right, timber power poles and overhead lines cross the view, and a stand of native trees is partially visible at the far right edge, lining the roadside. There are scattered small farm buildings and silos including the rural dwelling visible in the middle-ground. Low vegetation in the background is located between the dwelling and the closest turbines. The overall view is a highly open, large-scale agricultural landscape with a strong horizontal emphasis, very few vertical elements, and long uninterrupted sightlines across flat terrain.		
Land use	Farm zone	Landscape Type: LCZ 1 Agricultural pasture	
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 7	From hub: 7
Viewpoint discussion	■ The closest turbine (T49), is located 1.5 km north of R15 and (T47), 1.56 west of R16, with four other turbines within the VPZ of 3.36 km. ■ There are three turbines visible between 3.36 km and 7.2 km away, across a narrow horizontal FOV to the north. The turbines are visible from the swept rotor path and above. ■ Other proposed turbines are located a minimum of 7.6 km to the north and would be barely visible due to diminishing visibility. ■ There are minimal intervening vegetation or structures, thus there are clear views towards turbines. ■ The BESS and transmission line would not be visible, located from approximately 12 km to the northwest. ■ 33 kV powerlines will be noticeable but not dominant from this viewpoint (not shown in the photomontage due to design update and substantially less visual bulk compared to turbine). ■ Turbines from CWF at 11 km to the north would not be discernible at this distance. ■ Following preparation of this photomontage, small (up to 300 m) micro-siting adjustments were made to several turbines within the turbine cluster, including T46, T49 and T50. While these turbines form part of the visible turbine group from this viewpoint, the scale of the refinements is small relative to the viewing distance (approximately 1.5 to 7.2 km) and does not materially alter the overall extent, arrangement, prominence or visual composition of the turbine array. Accordingly, the photomontage remains representative of the expected operational view and the conclusions of the visual assessment remain unchanged.		

Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: rural dwelling	Construction earthworks would be barely visible from this viewpoint. It is likely that crane installation of the turbines will be partially visible for those turbines within 3.36 km, presenting a low magnitude of change.	LOW
Operational		Three turbines would be prominent in the view from the rural dwelling (R16). The turbines are a new element in a view otherwise comprising crop paddocks, native vegetation on the horizon and farm structures. The magnitude of change is high, due to the close distance of the turbines which would occupy >20° vertical FOV and approximately 45° horizontal FOV.	HIGH

6.3.7 Viewpoint 7: Muntadgin Town



Figure 6-13 Viewpoint 7: Existing view west from Muntadgin Town



Figure 6-14 Viewpoint 7: Photomontage of proposed view (turbines shown in red)

Figure note: Micrositing has occurred since this photomontage was prepared; minor changes only. The photomontage remains valid for assessment purposes. Refer to viewpoint discussion below.

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	The viewpoint is the only townsite within the Study Area and is representative of potential views from the towns public realm as well as private dwellings.		
Visual receivers	There are 12 dwellings within the townsite, commercial properties and public views from the main road (Crosslands Road). Muntadgin is surrounded by a large patch of remnant vegetation consisting of tall mature eucalypts and dense understory vegetation. Muntadgin and the viewpoint are at a slightly lower elevation to the Project Area with little intervening landform.		
Viewing distance (m)	3,750 m from closest turbine (T50 to the northwest)		
Visual baseline	This viewpoint looks west toward the Project Area from the town of Muntadgin, west of the Munty pub. In the foreground, a wide unsealed dirt road and bare ground extend across the view. To the left, small single-storey rural buildings with corrugated metal roofing are clustered alongside sheds and outbuildings set against a backdrop of dense tree cover. The middleground features a grassy area with scattered low vegetation and a line of medium-height trees extending horizontally across the scene. In the background, taller eucalyptus trees rise against the sky, forming a natural horizon line with a telecommunications tower visible above the treeline. The overall scene presents a highly modified semi-rural environment.		
Land use	Townsite	Landscape Type: LCZ 2 Towns and settlements	
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 0	Swept path of rotor: 0	From hub: 0
Viewpoint discussion	■ The closest turbine (T49), is located 3.75 km northwest. ■ There are seven (7) turbines within 7.2 km, across a narrow horizontal FOV. The turbines are potentially visible from the swept rotor path and above. ■ There is vegetation screening bordering the town and not allowing views of the surrounds. ■ Following preparation of this photomontage, small (up to 300m) micrositeing adjustments were made to several turbines within the turbine cluster, including T46, T49 and T50. These changes do not affect the findings of the assessment, as vegetation surrounding Muntadgin continues to screen views toward the wind farm. The photomontage therefore remains representative of the expected operational view and the conclusions of the visual assessment remain unchanged.		

Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Moderate: Township	Vegetation surrounding the townsite screens views in the direction of the Proposal. Construction will not be visible.	NEGLIGIBLE
Operational		The visual simulation of the turbines demonstrates the ability of the surrounding trees to screen the full height of the turbines. From a distance of 3.75 km, the height of turbines appears to be half the height of middleground screening. The proposed turbines will not be visible.	NEGLIGIBLE

6.3.8 Viewpoint 8: Muntadgin – Tandegin Road



Figure 6-15 Viewpoint 8: Existing view west from Muntadgin - Tandegin Road

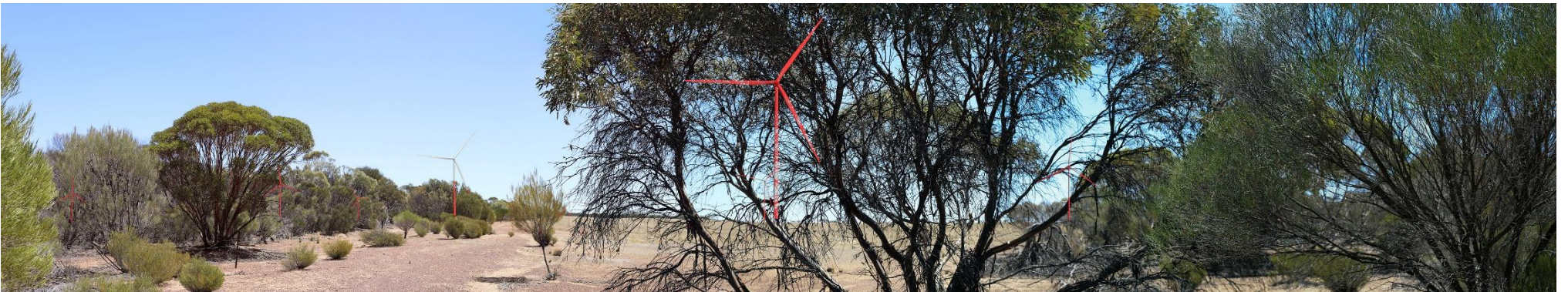


Figure 6-16 Viewpoint 8: Photomontage of proposed view west from Muntadgin - Tandegin Road

Refer to Appendix A: Visual simulations for larger versions of the photomontages.

Viewpoint selection	Public view from Muntadgin-Tandegin Road, adjacent reserve (R-36418) and 950 m to rural dwelling R15 (Proposal-associated and therefore not assessed). The Project Area boundary wraps around this viewpoint to the west, north and east.		
Visual receivers	Representative view from a rural-local road, mostly used by locals and workers.		
Viewing distance (m)	533 m from closest turbine (T38 to the west)		
Visual baseline	The view is directed west toward the Project Area, from a clearance in roadside vegetation. In the foreground, bare reddish-brown earth is visible beneath scattered low native bush. The view is partially obscured by a mallee-type Casuarina tree with a dark, open branching structure. In the middleground, the bush reserve (R-36418) comprises scrubby vegetation scattered across gently undulating ground, with clusters of mature eucalyptus casuarina scrub forming an irregular mid-height canopy. In the background, a gentle slope of cleared farmland is visible through gaps in the tree canopy, meeting an open sky at the horizon. The scene is of a remnant native bushland area within a broader agricultural landscape.		
Land use:	Farming - Rural	Landscape Type : LCZ 1 Agricultural pasture	
No. of turbines potentially visible within 3.36 km	Entire height of turbine: 1	Swept path of rotor: 8	From hub: 8
Viewpoint discussion	■ The viewpoint is enclosed by shrubby remnant vegetation which obscure medium to long views. This is the clearest view from the road, which typically has dense vegetation screening views of the surrounding landscape. ■ There are nine turbines within the VPZ of 3.36 km. The closest turbine (T38) is 500m west with visibility from the ground up. Three turbines are partially visible from the swept rotor upwards, above trees; and five turbines screened by intervening vegetation. ■ Construction access is provided at the viewpoint which would require a portion of roadside vegetation to be removed to allow a turning circle for blade access. This will provide a clearer view from the road at this viewpoint. ■ Other proposed turbines are located a minimum of 8.7 km to the west and would be barely visible due to diminishing visibility. ■ The BESS and transmission line would not be visible, located from approximately 10 km to the northwest. There are 10 turbines from CWF within 8 km to the northwest. These may be partially visible through roadside vegetation by motorists and would be viewed sequentially, resulting in a cumulative impact.		

Visual impact assessment	Visual sensitivity	Magnitude of change	Potential visual impact
Construction	Low: motorists on local road	Removal of roadside vegetation would occur in the foreground for site access to the cluster of nine turbine positions. The earthworks for underground cable arrays and set up of hardstands would be visible in the foreground by transiting motorists. The construction works are predominantly screened by roadside vegetation and the extent of works visible to motorists, though contrasting to the existing pasture, is viewed briefly. The magnitude of change is considered low.	LOW
Operational		Four turbines will be visible from the roadside that are within the VPZ. Views of the turbines at this distance will form prominent change to the view, experienced temporarily by motorists through spaces in roadside vegetation. The magnitude of change is considered moderate.	LOW

6.4 Summary of potential visual impacts

6.4.1 Construction impacts

Based on the Proposal description (refer Section 2.1) the construction impacts are likely to be short term (approximately 30 months). Changes which may have bearing to visual amenity during this time may include more workers in the area and in transit to the Project Area, the presence of large-scale machinery, multiple laydown areas and some removal of vegetation along transport corridors for transport of large components.

Due to the temporary nature of the construction phase works, and the dispersed scale of activities, the impacts are considered to be:

- Landscape Character: Low impact for LCZ 1 Agricultural pasture, experienced within the Project Area. Negligible impact to LCZ 2 Towns and Settlements or LCZ 3, as works are indirect to these areas.
- Visual Amenity: low to very low, or negligible visual impacts from all representative viewpoints.

6.4.1.1 Accommodation camp

The temporary workers Accommodation Camp is proposed in the centre of the Project Area, to the east of Allsop Road, which would be visible (based on visual prominence structure height up to 3 m or a one-storey building) up to 350 m away. The closest sensitive visual receivers are located over 4 km away and would have no visibility of the camp from the dwellings. It is likely that an increase in vehicles will be noticeable for rural dwellings in the area, especially those on Old Muntadgin Road and Briant Road which will likely be used to access the Accommodation Camp and work sites.

The accommodation camp covers a small extents of an otherwise large LCZ 1 Agricultural pasture. Therefore, the temporary change in land use is a negligible change to the character overall.

6.4.1.2 BESS

The BESS is proposed in the centre of the Project Area on Allsop Road, which would be visible (based on visual prominence structure height up to 3 m up to 350 m away. The closest sensitive visual receivers are located over 4 km away and would have no visibility of the BESS from the dwellings.

The landscape character (LCZ 1) will change from agricultural pasture to that comprising electrical components, including the adjacent substation. The modification to the landscape character is a negligible change due to the scale in an otherwise extensive character type.

6.4.2 Operational impacts

The desktop assessment of the 28 non-associated rural residential receivers within 7.2 km of a proposed turbine, resulted in the following:

- Seven dwellings within the high visibility threshold (3.36 km):
 - Two potential high visual impact dwelling (R15 and R16);
 - Three potential moderate visual impact dwellings (R11, R17 and R32)
 - Two potential low visual impact dwellings (R5 and R33); and
- 22 dwellings between 3.36 km and 7.2 km (visibility threshold).
 - Six potential Low visual impact dwellings (R7, R8, R9, R10, R13, R18)
 - Two potential Very Low visual impact dwellings (R6, R12)
 - 14 dwellings with a negligible impact (R14 and R19 to 31)

A summary of the is provided Table 6-3 summarises the potential visual impacts of representative viewpoints, including the number of visible turbines, degree of existing intervening screening, sensitivity level and visual modification. It also identifies potential mitigation measures for consideration in consultation with landowners, and resulting residual impacts. The location of the receptors is indicated in Figure 5-35, with corresponding ZTV maps provided in Section 5.4.

6.4.2.1 Transmission lines

The Proposal will connect into the South-West Interconnected System (SWIS) via a 220 kilovolt (kV) overhead transmission line of approximately 13.5 km in length and up to 60 m in height at 250 m to 500 m intervals with a 50 m wide easement. This will link to the existing Collgar Terminal located to the north of the Project Area.

In addition, approximately 40 km of 33 kV overhead transmission line forms part of the 33 kV reticulation from the Tandegin substation to the first wind turbine generator in a collector group, before transitioning to underground cable. The 33 kV overhead transmission lines will be supported by pole structures, 18 to 30 m in height at 50 m intervals with easements ranging between 50 to 115 m wide.

The potential visual receivers of the transmission line include a dwelling (R01) which is associated with the Proposal and the CWF information display shelter, which has no views of the transmission line due to intervening topography and vegetation as assessed in VP1.

It is noted that impacts in these locations are likely to be minimal given the transmission line will be parallel to an existing transmission line used for CWF.

Table 6-3 Summary of potential visual impacts and mitigation measures

Viewpoint	Distance to nearest turbine	No. turbines visible within 3.36 km of viewpoint				Impact Assessment				Recommendations	
		Full height of turbine	Swept path of rotor	From hub	No. 60 ° sectors proposed turbines <8 km	Visual sensitivity	Existing screening	Magnitude of change	Potential visual impact	Next steps	Potential mitigation and residual impact
VP1	7,890 m	0	0	0	1	LOW: local motorists and visitors to CWF	Intervening topography and partial vegetation screening	NEGLIGIBLE The transmission line cannot be seen from the viewpoint. The distance of the proposed turbines will not be discernible, with existing turbines remaining prominent.	NEGLIGIBLE	None	No impact
VP2	1,830 m	0	6	6	3	MODERATE: rural dwellings	Intervening remnant vegetation treeline and framing eucalyptus trees partially screen views and narrow the visible arc.	MODERATE Six turbines within 3.36 km visible from the swept rotor path upward, with the closest (T02) at 1.8 km seen above the treeline. More distant turbines diminish in prominence. The transmission line is not visible from this viewpoint.	MODERATE	Consultation with property owner to determine screening value and impact from dwelling.	Screening vegetation to foreground of dwelling can potentially reduce visual impact to low
VP3	5,030 m	0	0	0	2	MODERATE: rural dwellings	Intervening scattered vegetation, farm sheds, and grain silos partially screen views towards the Project Area. Sparse roadside trees border the paddock edge.	VERY LOW Nine turbines between 5 km and 7.2 km visible across a narrow 45° arc, diminishing in prominence with distance. Foreground farm structures and vegetation remain dominant in the view.	LOW	None	No change
VP4	2,700 m	7	7	7	2	MODERATE: rural dwellings	Intervening roadside trees, vegetation surrounding nearby dwellings, and farm structures partially screen and narrow views towards the Project Area. Horizon tree line provides some background screening.	MODERATE Six turbines within 3.36 km visible to the north, with the closest (T18) at 2.07 km from R44. A further 21 turbines visible up to 7.2 km across a wide 130° arc, diminishing in prominence with distance. Turbines are a new element in a view otherwise comprising paddocks and native vegetation.	MODERATE	Consultation with property owners to determine screening value and impact from dwellings.	Screening vegetation to foreground of dwelling can potentially reduce visual impact to low
VP5	4,900 m	0	0	0	2	MODERATE: rural dwellings	Intervening topography with a subtle rise between viewpoint and turbines. Foreground vegetation surrounding dwellings screens a wide portion of the field of view. Farm structures and roadside trees further narrow visible extents.	LOW Up to 16 turbines between 4.36 km (closest turbine) and 7.2 km across a wide 180° arc, though unlikely to be seen simultaneously due to screening vegetation. Foreground farm structures, vegetation, and paddocks remain dominant in the view.	LOW	None	No change
VP6	2,440 m	0	7	7	1	MODERATE: rural dwellings	Minimal intervening vegetation or structures, with clear open views towards the turbine locations. Low background vegetation between the dwelling and closest turbines provides limited screening.	HIGH Five turbines within 3.36 km visible from the swept rotor path, with the closest (T49) at 1.56 km from the dwelling. Turbines occupy greater than 20° vertical and approximately 45° horizontal field of view, introducing prominent new vertical elements into an otherwise open, horizontal landscape.	HIGH	Consultation with landowner to determine impact from dwelling.	Screening vegetation to foreground of dwelling can potentially reduce visual impact to low
VP7	3,790 m	0	0	0	1	MODERATE: township	Dense remnant vegetation consisting of tall mature eucalyptus and understory surrounds the townsite, screening views in the direction of the Project Area.	NEGLIGIBLE Seven turbines within 7.2 km, however surrounding vegetation screens the full height of the turbines. The proposed turbines will not be visible from this viewpoint.	NEGLIGIBLE	None	No impact
VP8	503 m	0	9	9	2	LOW: motorists on local road	Dense roadside remnant vegetation comprising mallee-type scrub and eucalyptus provides substantial screening of medium to long views, with only intermittent gaps allowing views towards the Project Area.	MODERATE Four of nine turbines within 3.36 km visible through gaps in roadside vegetation, with the closest (T38) at 533 m. Views are experienced briefly and sequentially by transiting motorists in combination with 10 existing CWF turbines within 8 km which may also be partially visible, contributing to cumulative impact.	LOW	None	Alignment of access entry to the fenceline at the northern side of the paddock would potentially reduce the amount of vegetation removal, reducing the visual impact.

6.5 Cumulative analysis

6.5.1 Overview of cumulative visual impacts

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the Proposal 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, 2002).

The potential cumulative visual impact is considered 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 (i.e. roads or walking tracks) this may result in a change in the overall perception of the landscape character.

The cumulative impact of several wind farm developments in the region with a new wind farm development, will increase the combined visual impact in many locations.

6.5.2 Renewable energy projects

Proposed and existing renewable energy projects within the region include the following wind farms:

- Collgar Wind Farm, neighbouring to the north of the Project Area.

CWF and the Proposal together create one continuous area of wind farm production, extending approximately 30 km along the Merredin-Narembene Road south of Merredin and approximately 17 km east to west. This significant area extends from east of Merredin in the northwest, to Muntadgin in the southeast, creating a visual change in the landscape. The two wind farms are punctuated by a large grid (approximately 5 x 5 km) of local roads which typically align with true compass directions.

6.5.3 Potential for cumulative impacts

Cumulative analysis has been completed to identify dwellings and significant viewpoints within a distance of 8 km from the Proposal and the CWF, in accordance with VIA Bulletin guidance. At 8 km, turbines and objects recede into the background in terms of visibility and thus, cumulative impacts are unlikely.

The receptors identified are predominantly residential rural properties. Most of the rural dwellings located to the north of the Project Area are likely to be affected by cumulative impacts of the Proposal and the existing CWF. The likely receivers are shown in and assessed in Table 6-4.

- Sensitive receptors located in the overlap of the two 8 km buffer zones are likely to have two wind farms visible within 8 km.
- Sensitive receptors located in the non-overlapping area of the existing CWF are located beyond the 8 km visual zone from the Project Area and are unlikely to be impacted by turbines associated with the Proposal.
- Motorists using Merredin-Narembene Road (to the west) and Muntadgin-Tandegin Road (to the east) and are unlikely to differentiate turbines between the two wind farms and will experience sequential cumulative impacts for a span of 12 km (length of Tandegin WF south of CWF).

There is the potential for the 11 rural dwellings in the overlapped area to feel surrounded by wind turbines, with increased local scale cumulative impacts to occur as a result of the Proposal. Of the 11, five (5) of these are outside of the Project Area and therefore not currently associated with the Proposal.

Table 6-4 Assessment of cumulative impacts

Residential Receivers ID	Distance from closest proposed turbine	Distance from closest CWF turbine	Screening factors	Cumulative impact
R12	4.36 km	8.05 km	Foreground vegetation screening views	NEGLIGIBLE CWF is just outside of 8 km to the north with vegetation screening views. Only views of the Project Area are likely for this dwelling.
R13	4.36 km	7.89 km	Vegetation screening to west, otherwise open views	VERY LOW Views of the wind farms span up to 120° horizontal FOV, separated by layout areas and vegetation. The view of the CWF would be barely visible at the distance.
R17	1.78 km	8.14 km	Scattered vegetation partially screening views.	NEGLIGIBLE CWF is just outside of 8 km to the north with vegetation screening views. Only views of the Project Area are likely for this dwelling.
R18	4.65 km	7.49 km	No screening vegetation.	VERY LOW Views of the Project Area span up to 120° horizontal FOV, with CWF located to the background in the northwest. The view of the CWF would be barely visible at the distance.
R19	4.65 km	7.59 km	Vegetation and R18 screening views.	NEGLIGIBLE Views of both wind farms are likely screened from view.

All five dwellings are not close enough to the existing CWF that any turbines would be within the VPZ of 3.36 km, with the closest turbine being 3.73 km away (property R2).

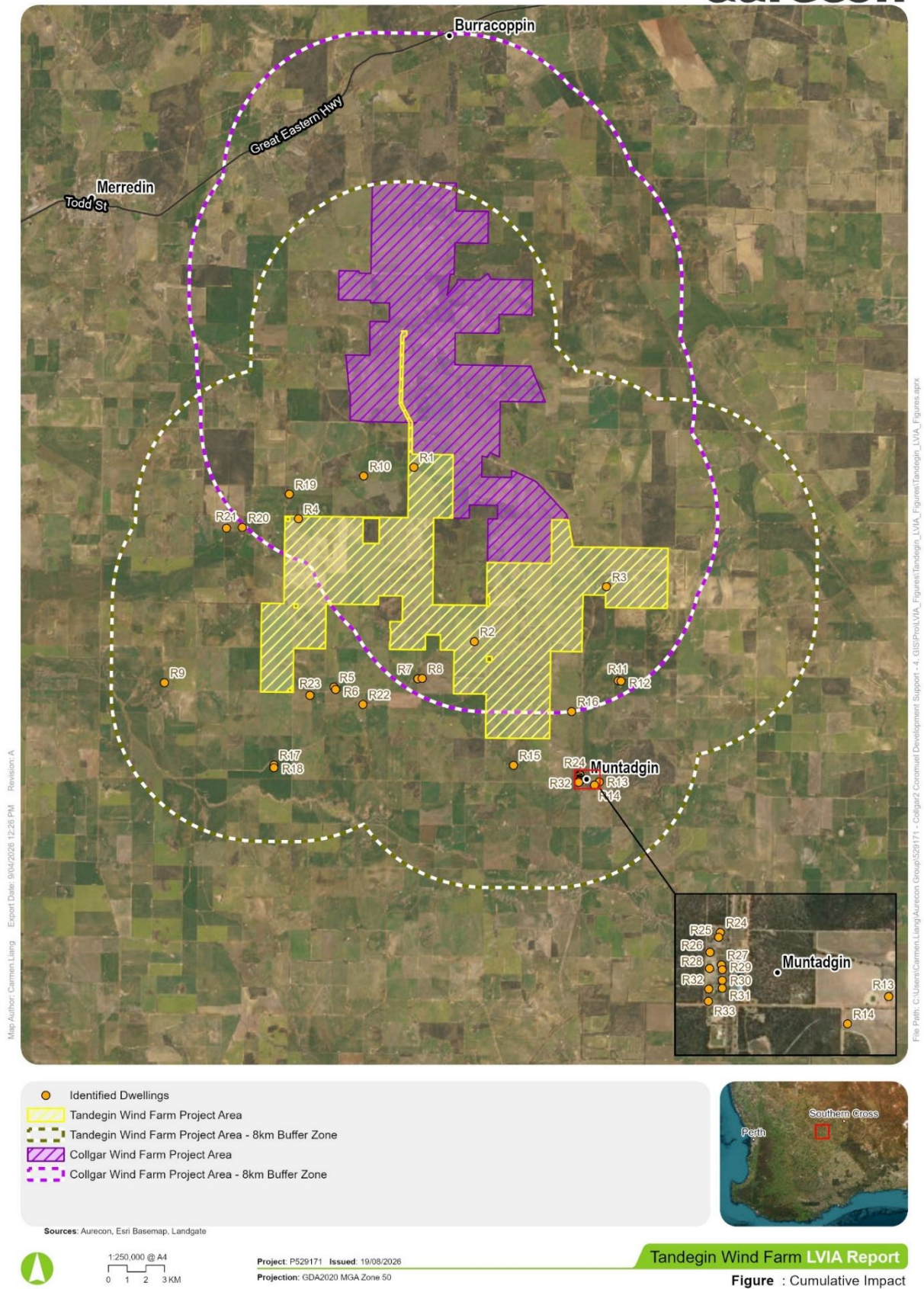


Figure 6-17 Overlapping area for potential visual cumulative impacts from wind turbine



7 Conclusion and recommendations

7.1 LCZ impacts

The Proposal is located within the LCZ 1, with the broader area to the north already supporting wind farm infrastructure at the existing CWF. There are Low impacts to LCZ 1 which is a widely dispersed character. The presence of the wind farm and its ancillary structures still allows farming to occur within the Project Area.

7.2 Construction Impacts

Construction impacts across all viewpoints are assessed as Negligible to Low. At the majority of locations, construction earthworks will not be visible due to distance and intervening vegetation. Crane installation of turbines may be partially visible from dwellings within 3.36 km of the Project Area (VP2, VP4, VP6), however this represents a temporary and localised change of very low to low magnitude. At VP8, removal of roadside vegetation for construction access would be visible to transiting motorists, though views are brief and predominantly screened by adjacent vegetation. Negligible construction impacts are anticipated at the Muntadgin townsite (VP7) or at the more distant viewpoints.

7.3 Operational Impacts

Operational impacts range from Negligible to High across the assessed receivers. One dwelling (R15 and R16/VP6) is assessed as High, with the closest turbine at 1.5 to 1.56 km distance, minimal screening, and turbines occupying over 20° vertical and 45° horizontal field of view. Three dwellings (R11, R17, R32) are assessed as Moderate, with turbines within the 3.36 km VPZ partially screened by vegetation and farm structures. The remaining viewpoints and residential receivers are assessed as Low to Negligible due to screening vegetation, intervening topography or because they are outside of the VPZ where turbines diminish in the view and foreground elements remain dominant. The Muntadgin townsite (VP7) and several dwellings (R6, R12, R14, R19–R31) are assessed as Negligible, with surrounding vegetation or distance effectively screening views of the Project Area. Existing vegetation and intervening topography are the primary factors moderating visual impacts across all receivers.

7.4 Cumulative Impacts

Of the five non-associated dwellings assessed for cumulative impacts, the majority experience Negligible to Very Low cumulative effects. Two dwellings (R12, R19) are assessed as Negligible, with foreground vegetation or adjacent structures effectively screening views of one or both wind farms. Two dwellings (R13, R18) are assessed as Very Low, while one dwelling (R17) is assessed as experiencing moderate impact. The Project Area and CWF span a wide horizontal field of view but the existing CWF is barely visible at distances approaching or exceeding 8 km.

7.5 Recommendations

- The majority of viewpoints and residential receivers experience Low to Negligible visual impacts requiring no further action.
- Two dwelling (R15 and R16, represented by VP6) are assessed as High impact at 1.5 km and 1.56 km distance with minimal screening and are the priority for landowner engagement and mitigation.
- Three dwellings (R11, R17, R32, represented by VP4 and VP6) are assessed as Moderate impact within the VPZ. Consultation, ground-truthing of screening value, and visual assessment from each property are recommended.
- For all five Moderate to High impact dwellings, the introduction of screening vegetation to the foreground has the potential to reduce visual impacts to Low.

- Three additional dwellings (R5, R33 – currently rated Negligible to Low) are recommended for potential consultation to confirm the effectiveness of existing screening.
- Realignment of construction access at VP8 would reduce roadside vegetation removal.
- The remaining dwellings and viewpoints require no further action due to sufficient distance, intervening topography, or existing vegetation screening.

8 References

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Appendices



Appendix A

Visual Simulation methodology

Site photography

A field visit was undertaken in March 2026. Photographs used for viewpoint are taken at a height of 150 cm (representing eye level), through a 50 mm fixed focal lens which closely represents the central field of vision of the human eye. Parameters utilised for photography are outlined in Table A 1. Several overlapping photographs were taken covering a horizontal field of view of 124 degrees (equivalent width of 3.45 photographs) to replicate the field of view of the human eye. The camera has the ability to geo-tag each photo with its location coordinates and elevation.

Table A 1 Photography specifications

Camera make and model	Canon EOS 5D Mark IV Full Frame digital SLR
Focal length	50 mm f/0
Aperture setting	f/6.3 to 10
Tripod height	150 cm

Simulation methodology

The simulations are produced in specialist software EMD WindPRO, which contains the latest wind turbine models, and terrain data. The WindPRO software allows for accuracy testing through aligning topographical features or horizon lines from terrain data with features in the photos. This is used to verify the position and height of turbines.

The process and parameters adopted in the development of the visual simulations are as follows:

- A 3D base model is prepared in Windpro by loading an online digital map of the Project Area location, using Interpolate contour data to Local Digital Elevation Model (DEM).
- Selection of turbine model (as per Figure 2-1) and input of turbine locations. The turbines are positioned in the model, as per the proposed layout, using the georeferenced locations. The turbine type and dimensions are selected from the online Windpro-EMD database. The proposed turbines for the Tandegin Wind Farm are represented at a height of 252 m, with 150 to 164 m hub height and up to 91 m blade length. The elevation at which these are placed is set by the TIN data calculated by the elevation survey data in the base model.
- GPS photographs taken from representative viewpoints are imported into the Windpro model, which automatically place them in the viewpoint location within the model, based on camera information matching view aspect and focal length.
- Panoramic photographs are then imported into the Windpro model, placed to match the coordinates, and elevation of the GPS photograph. Camera settings are manually entered and the Projection option 'Cylindrical (stitched panorama image)' is checked which automatically recognises the 'Tilted turning axis' of the image, for rendering. The 'Field of View' is set at 124 degrees, as equal to that of the panoramic image. This ensures that the scale of the rendered turbines match that of the image. The scale and location of the turbines within the image is checked against the 'control' points or landscape features within the photo. The focus is upon ensuring the size, scale and horizontal expanse of the wind turbines are accurately represented within the view, with potential for some minor horizontal deviation in the actual wind turbine locations remaining.
- The turbines are masked where they fall behind solid objects in the image (landform), to give a realistic impression of the turbines sitting in the landscape. In the simulations, the turbines have been shown in red in front of vegetation to review worst-case scenarios, noting that vegetation may not be present at rural dwellings.
- The render settings are inputted to match the date and time that the photograph was taken. Options on 'weather type' are chosen depending on the output of the render, either clear or cloudy conditions.

Visual simulations

Viewpoint 1



Figure A-1 Viewpoint 1: Existing view looking south from the Collgar Visitor Information shelter



Figure A-2 Viewpoint 1: Proposed view (Tandegin Wind Farm or Transmission Line not visible)

Viewpoint 2: Briant Road



Figure A-3 Viewpoint 2: Existing view north at Briant Road / (image: Aurecon, March 2026)



Figure A-4 Viewpoint 2: Photomontage of Project Area

Viewpoint 3:



Figure A-5 Viewpoint 3: existing view north east from Belka East Road



Figure A-6 Viewpoint 3: Photomontage of Project Area

Viewpoint 4:



Figure A-7 Viewpoint 4: Existing view north from Brissenden Road



Figure A-8 Viewpoint 4: Photomontage of Project Area

Viewpoint 5:



Figure A-9 Viewpoint 5: Existing view north from Brissenden Road



Figure A-10 Viewpoint 5: Photomontage of Project Area

Viewpoint 6:



Figure A-11 Viewpoint 6: View north from Muntadgin Road



Figure A-12 Viewpoint 6: Photomontage of Project Area

Viewpoint 7:



Figure A-13 Viewpoint 7: View west from Muntadgin town



Figure A-14 Viewpoint 7: Photomontage of Project Area

Viewpoint 8:



Figure A-15 Viewpoint 8: View west from Muntadgin - Tandegin Road

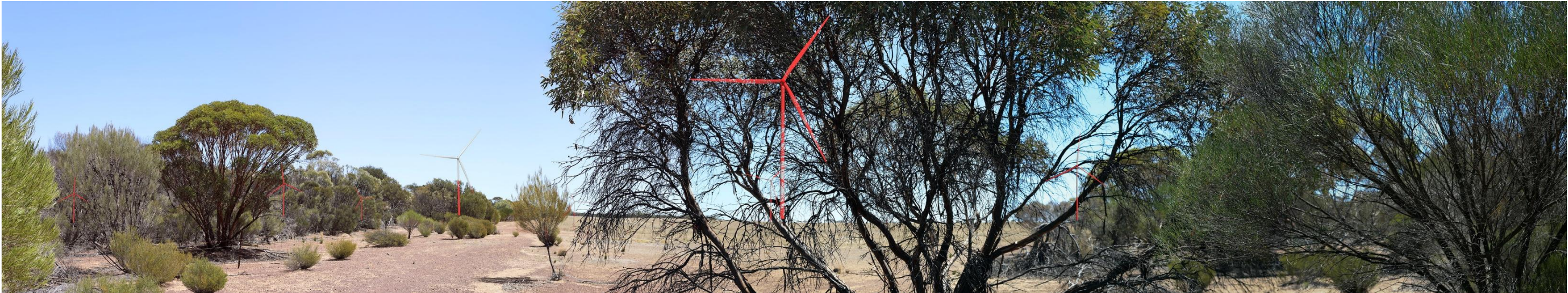


Figure A-16 Viewpoint 8: Photomontage of Project Area

Appendix B

Visual Prominence Rationale

The visual prominence of a development can be determined by understanding the extent to which an object is part of a viewer's static field of view.

The measurement of the field of view is based upon the parameters of human vision outlined below. These provide a basis for assessing and interpreting the visual prominence of a development by comparing the extent to which the development will intrude into the central field of vision (both horizontally and vertically).

These horizontal and vertical fields of view are also interlinked to the viewing distance from the development. The methodology is based on the reduction of the visibility of a development in the distance as the field of view reduces (i.e. the increase in distance between a given viewpoint and the development).

Horizontal line of sight

It is generally accepted that the central field of vision for the human eye covers a horizontal angle of approximately 50 degrees to 60 degrees. Within this angle, both eyes observe an object simultaneously creating a degree of overlap, which is the central field of view (refer Figure B.1). Within the central field of vision, the viewed image is sharp, colours are separately defined and depth perception occurs.

The visual prominence of a development will vary according to the proportion a development occupies the central field of vision.

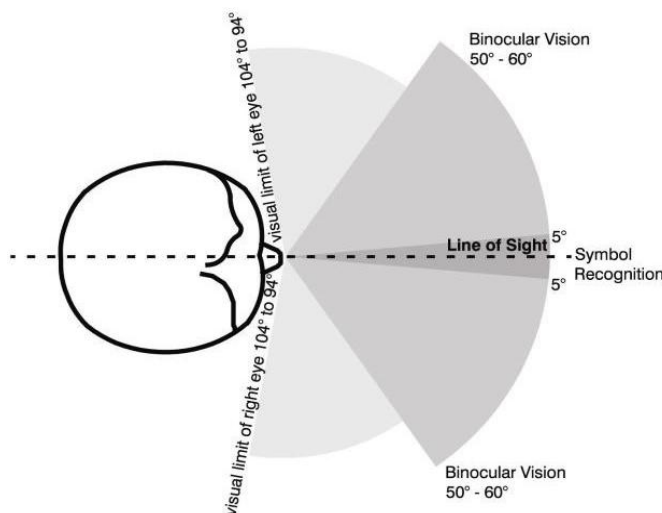


Figure B.1 Horizontal line of sight

Table B 2 outlines the potential visual prominence of a development, dependent upon on how much of the horizontal central field of vision that it occupies.

Table B 2 Visual prominence in horizontal field of view

Degrees of Field of View occupied	Potential visual prominence – horizontal field of view
Less than 5°	Insignificant - Low visual prominence The development would not be highly visible in the view, unless it contrasts strongly with the background.
5° – 30°	Potentially Noticeable – Moderate visual prominence The development may be noticeable. The degree that it intrudes on the view would be dependent on how well it integrates with the landscape setting.
Greater than 30°	Potentially Dominant - High visual prominence The development would be highly noticeable.

Vertical line of sight

As for the horizontal line of sight, there is also a vertical central field of view. If we assume that the horizon is 0° then the eye clearly defines colour, field of view and has image sharpness for an angle of approximately 25° upwards and 30° downwards. However, in reality, the typical line of sight for a standing person at ground level is approximately 10° below the horizon line (refer Figure B.2).

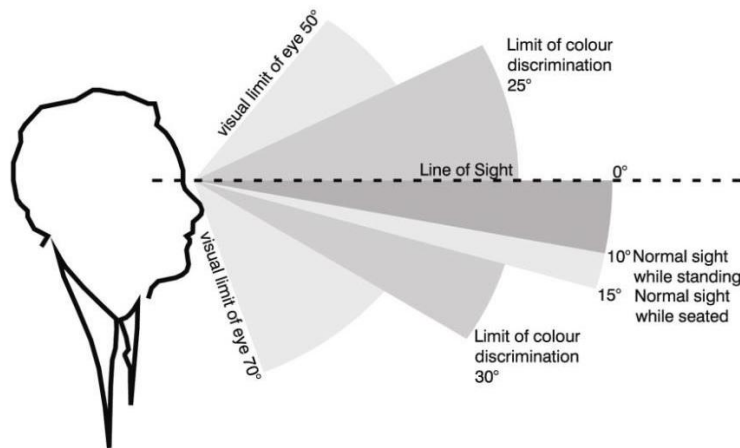


Figure B.2 Vertical line of sight

Objects that occupy a small proportion of the vertical field of view (less than 0.5°) are visible but not dominant, particularly when they occur within landscapes that have been modified by human activity.

Table B 3 demonstrates the potential visual prominence of a development, dependent upon on how much of the vertical central field of vision that it occupies.

Table B 3 Development field of prominence

Degrees of Field of View occupied	Potential visual prominence – vertical field of view
Less than 0.5°	Insignificant - Low visual prominence A small thin line in the landscape and is no longer an easily recognisable element.
0.5° – 2.5°	Potentially Noticeable - Moderate visual prominence The development may be noticeable. The degree that it intrudes on the view would increase as distance reduces and be dependent on how well it integrates with the landscape setting.
Greater than 2.5°	Potentially Dominant - High visual prominence The development would be highly noticeable, although the degree of visual intrusion would depend on the landscape setting and the width / thickness of the object.

Visual prominence in relation to distance and field of view

These horizontal and vertical fields of view are also interlinked to the viewing distance from the development. The viewing distances, foreground, middleground and background, (refer Table B 4) have been established based on previous field studies undertaken by Aurecon. The distances also relate to the distances for the land use types in the viewer sensitivity assessment methodology.

Table B 4 Field of view distance

Distance from a viewer	Potential visual prominence
> 2.0 km (background)	Insignificant The visibility of the development would progressively diminish over greater distances of 2 km with no visibility beyond 5 km due to atmospheric conditions.
Between 0.5 km and 2.0 km (middleground)	Potentially Noticeable The development would be noticeable, reducing with distance. The degree that it intrudes on the view would be dependent on topography and the vegetation within the landscape setting and how well it integrates with the surrounding land-uses.

Distance from a viewer	Potential visual prominence
< 0.5 km (foreground)	Potentially Dominant The development would be highly noticeable, although the degree of visual intrusion would depend on the landscape setting (where not screened by vegetation or buildings) and the width / thickness of the object.

Figure B.3 illustratively demonstrates how the viewshed of a horizontal object is determined by its height and not so much by its width based on the viewing distance from a development. As a viewer moves further away from a horizontal object the width may still be apparent, however the vertical dimension reduces to insignificance.

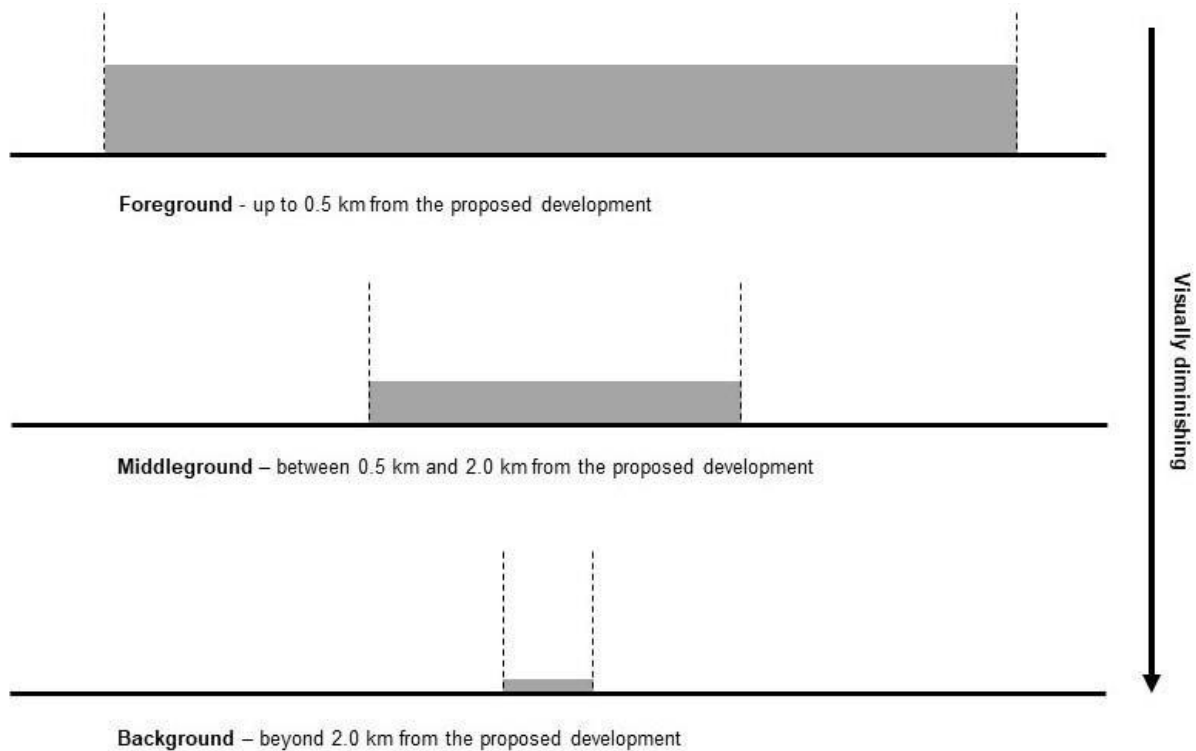


Figure B.3 The reduction in visibility of the horizontal line of sight based on increase in distance from a viewpoint

The same approach can be applied to the vertical field of view. As a viewer moves further away from a vertical object the height may still be apparent, however the vertical dimension reduces to insignificance (refer Figure B.4).

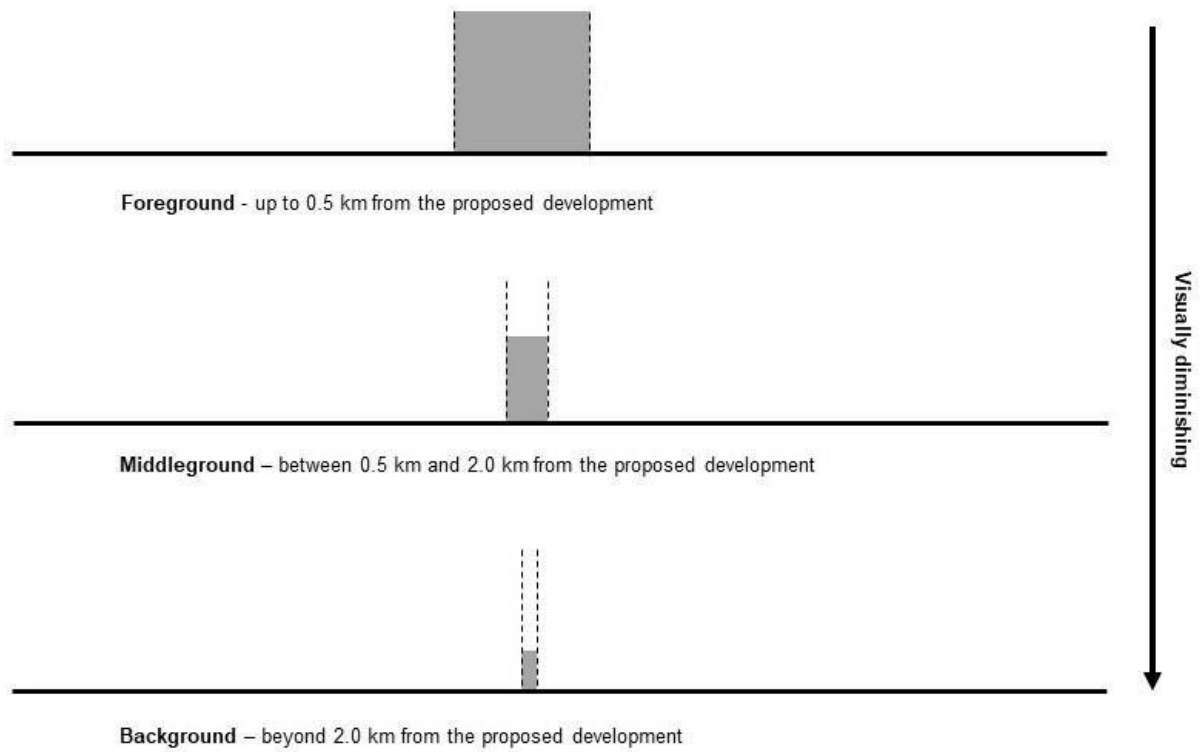


Figure B.4 The reduction in visibility of the vertical line of sight based on increase in distance from a viewpoint

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