
Valley of the Winds
Renewable Energy from ACEN
Appendix 4
Addendum landscape character and visual impact assessment
RAMBOLL
ACEN Australia

moir
landscape architecture

Valley of the Winds Wind Farm

Addendum to
Landscape and Visual Impact Assessment

Valley of the Winds Wind Farm

Addendum to Landscape and Visual Impact Assessment

Prepared for
Ramboll

Issue
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Contents

1.0 Introduction

1.1 Purpose of this Report

The purpose of this Addendum Report is to provide additional information relevant to the Landscape and Visual Impact Assessment (LVIA) prepared by Moir Landscape Architecture for the Valley of the Winds Wind Farm Project (SSD-10461) referred to hereafter as 'the Project'.

The LVIA was prepared for the Project in February 2022, forming part of the Environmental Impact Statement (EIS) lodged in March 2022. The EIS was on public submission for 28 days (from 23rd of May until the 20th of June 2022) and received submissions in relation to the LVIA.

This Addendum Report has been prepared to provide additional information in response to submissions made during the exhibition period relevant to the LVIA. The report also responds to requests for further information by the Department of Planning and Environment (DPE) in a letter to the proponent dated 14/10/2022.

Since lodging the EIS, ACEN (the Proponent) has made amendments to the 2022 project layout (referred to as the Superseded Layout) in response to matters raised in the submissions and further agency, community and stakeholder consultation. This Addendum Report provides an updated assessment of the revised project layout (referred to as the 'Revised Layout').

For clarity, the report has been separated into two parts:

Part A - Project Layout Amendments

Sections 2.0 - Section 5.0 provide a brief overview of the proposed project layout amendments and assessment of the Revised Layout.

Part B - Response to Submissions
Sections 6.0 - Section 13.0 provide responses to the submissions made during the exhibition period.

Part A

Project Layout Amendments

2.0 Project Layout Amendments

2.1 Proposed Project Layout Amendments

In response to matters raised in the submissions and further agency, community and stakeholder consultation, ACEN proposes to amend the project design to further mitigate environmental and social impacts associated with the proposed wind farm. Since the submission of the EIS in March 2022, the following project amendments have been made:

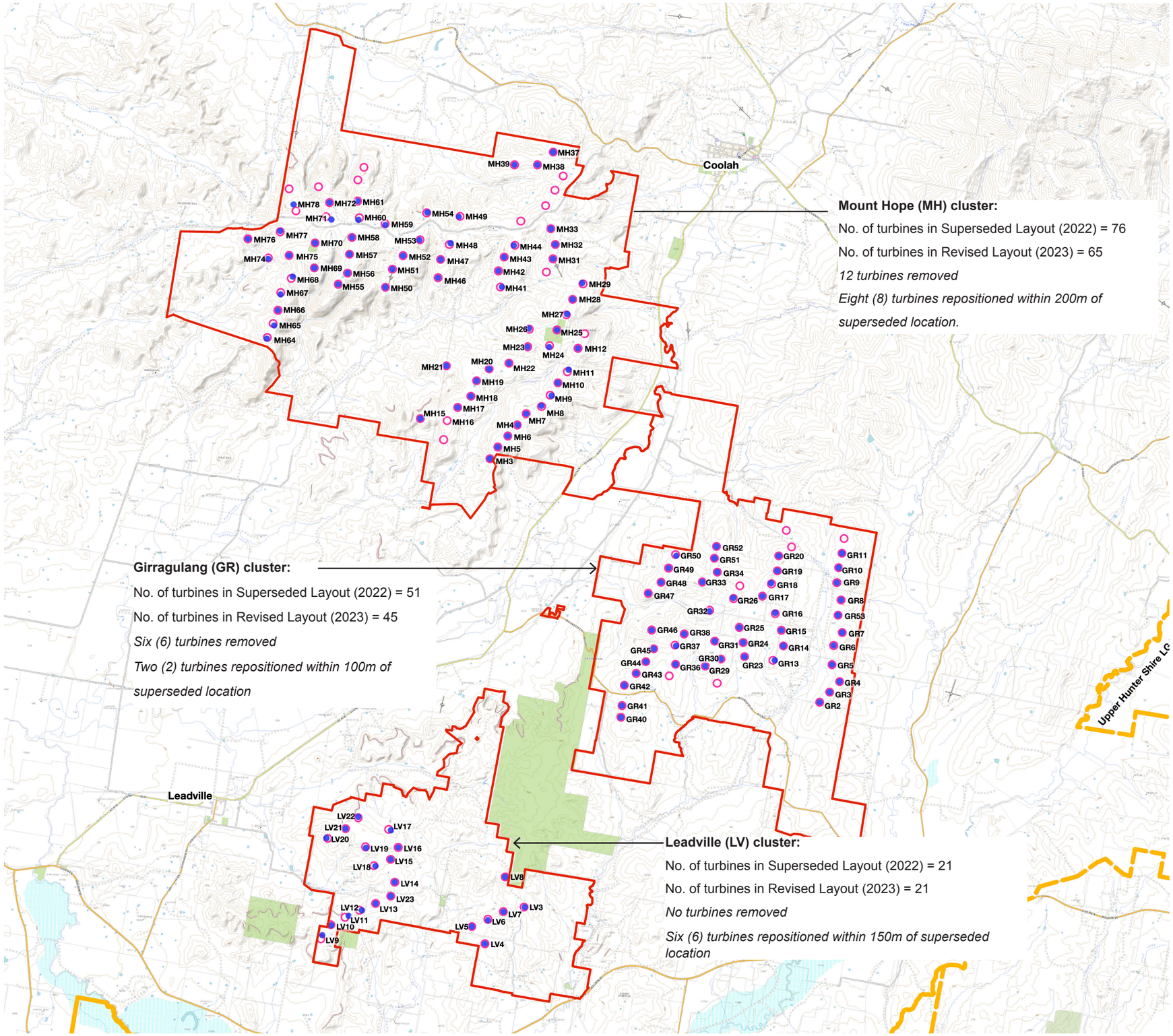
- **Project Layout:**
  - Updated project boundary to remove a property from the Mount Hope cluster.
  - Removal of 17 wind turbines and associated access tracks to reduce amenity impacts for nearby dwellings and biodiversity impacts.
  - Refinement of the layout and construction footprint to further avoid and minimise impacts to Box Gum Woodland and other native vegetation.
- **Ancillary Infrastructure:**
  - Removal of three (3) met masts and relocation of seven (7) others to reduce biodiversity impacts.
  - An additional substation included in the Mount Hope cluster to improve the electrical connectivity.
  - Removal of the overhead transmission line running south from the Girragulang Road and Leadville clusters. This infrastructure will now be delivered by EnergyCo as part of the EnergyCo CWO-REZ Transmission Line project and will be assessed as part of that project by EnergyCo.
- **Amendments to access routes including:**
  - Light vehicle access to the Mount Hope cluster via Neilrex Road removed – a single point of access from Black Stump Way is now proposed.
  - Light vehicle access to the Leadville cluster via the Leadville Stock Route and Wardens Road removed – a single point of access from the Golden Highway is now proposed.
  - Provision of an alternate access route option to the Girragulang Road cluster via the Golden Highway.

An overview of the changes has been provided in **Table 1.**

Project Amendments Summary Table

Element:	Superseded Layout (2022):	Revised Layout (2023):	Variation:
Project Area:			
Wind Farm area (project boundary)	25,902.08 ha	25,056.89 ha	Removal of one property
Construction footprint (disturbance area)	1,318.08 ha	695.00 ha	Reduction of 623.08 ha
Operational infrastructure:			
Wind Turbines	148	131	17 Turbines Removed
Substations and Step Up Facilities	1 x 'collector' substation in Mount Hope cluster	2	Additional substation in the Mount Hope cluster
	1 x 'central' substation in the Girragulang Road cluster	1	Incorporation of step-up facility
	1 x 'collector' substation in the Leadville cluster	1	No change
	1 x step-up facility at the connection to the CWO-REZ Transmission line		Removal of separate step-up as to be incorporated into the central substation at Girragulang Road
Electrical Reticulation	Underground cabling (up to 33kV)	Underground cabling (up to 33kV)	No change
	Up to 20m of overhead transmission for internal connections where required (up to 33kV)	Up to 20m	No change
	Up to 50m of overhead transmission connecting the clusters (up to 330kV)	Up to 50m	No change
	Up to 65m of overhead transmission connecting the wind farm to the CWO-REZ Transmission line (500kV)	0	Removal of transmission line infrastructure from the Project - to be built by EnergyCo
Operation and Maintenance Compound	1	1	No change
Hardstand at each turbine location	148	131	Removal of 17 turbines and associated infrastructure
Meteorological Masts	13	10	Removal of three (3)
Access tracks (Construction and operational tracks)	158.2 km	115.27 km	42.93 km reduction of access tracks associated with removal of 17 turbines
Potential Battery Energy Storage System (BESS)	1 x centralised or decentralised	1 x centralised	No change to the number
Site Access Points	6 (Two for each cluster)	4	Removal of one light vehicle access at each of the Mount Hope and Leadville clusters, and inclusion of an additional access option at Girragulang (only one would be built)

Table 1. Overview of Project Amendments



Mount Hope (MH) cluster:

No. of turbines in Superseded Layout (2022) = 76

No. of turbines in Revised Layout (2023) = 65

12 turbines removed

Eight (8) turbines repositioned within 200m of superseded location.

Girragulang (GR) cluster:

No. of turbines in Superseded Layout (2022) = 51

No. of turbines in Revised Layout (2023) = 45

Six (6) turbines removed

Two (2) turbines repositioned within 100m of superseded location

Leadville (LV) cluster:

No. of turbines in Superseded Layout (2022) = 21

No. of turbines in Revised Layout (2023) = 21

No turbines removed

Six (6) turbines repositioned within 150m of superseded location

Project Layout Amendments

Valley of the Winds Wind Farm

LEGEND

- Project Boundary (Revised 2023 Layout)
- Proposed 250 m Turbine Location (Revised 2023 Layout)
- Proposed 250 m Turbine Location (Superseded 2022 Layout)
- Main Road
- Minor Road
- LGA Boundary

Total number of turbines in Superseded 2022 layout = 148

Total number of turbines in Revised 2023 layout = 131

Total number of turbines reduced = 17

N

0 2 4 6 8 10km

Figure 1. Project Layout Amendments

2.2 Overview of Revised Assessment

Table 2 provides an overview of the detailed assessments that have been updated to provide an assessment of the impacts associated with the Revised Layout and where these are addressed in this Addendum. The results of the Superseded Layout are also presented in these sections for comparative purposes.

Revised Project Assessment	
Updated Assessments:	**Addressed in Addendum:**
Application of Preliminary Assessment Tools	**Section 3.0**
- Visual Magnitude	**Section 3.1**
- Multiple Wind Turbine Tool	**Section 3.3**
Zone of Visual Influence	**Section 4.0**
Dwelling Assessments	**Appendix 5.0 & Appendix A**
Photomontages updated with Revised Layout	**Appendix C**

Table 2 Overview of Revised Assessment

2.3 Overview of Updates to Dwelling Statuses

Since the EIS submission, thirteen (13) dwellings have status changed to 'participating'. One (1) non-participating dwelling was mistakenly identified as an 'associated' property in the EIS (Dwelling 284). Two (2) new dwellings have been identified since the EIS Dwelling 502 (non-participating) and Dwelling 590 (participating). These have been included on figures in this Addendum report for clarity.

This is reflected in the updates to the summaries in the following sections of this Addendum.

Amendments to Dwelling Status		
Dwelling:	**Status:**	**Notes:**
2	**Participating**	Previously within blue line of visual magnitude. Agreement with landowner.
3	**Participating**	Previously within blue line of visual magnitude. Agreement with landowner.
18	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
81	**Participating**	Previously within blue line of visual magnitude. Agreement with landowner.
82	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
83	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
88	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
151	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
179	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
189	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
314	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
324	**Participating**	Previously within blue line of visual magnitude. Agreement with landowner.
505	**Participating**	Previously within black line of visual magnitude. Agreement with landowner.
284	**Non-participating**	Incorrectly shown as 'associated' in EIS submission. **Refer to Appendix B1.**
502	**Non-participating**	Identified post EIS
509	**Participating**	Additional host.

Table 3 Revised Dwelling Status

3.0 Preliminary Assessment Tools

3.1 Visual Magnitude Tool

3.1.1 Application of the Visual Magnitude Tool

In accordance with the Bulletin: proposed turbines below the black line must be identified along with the dwellings or key public viewpoints as part of the request for SEARs.

The proposed wind turbines for the Project are based on a worst case scenario with a tip height of 250 metres. The 'black line 'intersects at a distance of 3,350 metres and the 'blue line' intersects at 4,950 metres.

Superseded 2022 Layout (Refer to Figure 2):

Of the 112 non-participating dwellings identified within 4,950 m of the nearest turbine:

- 42 non-participating dwellings were identified within 3,350 metres of a proposed wind turbine location (within the black line).
- 70 non-participating dwellings were located within 3,350 - 4,950 metres of a proposed wind turbine (within the blue line). This includes 25 dwellings in the settlement of Leadville (Dwellings 152 - 176).

Revised 2023 Layout (Refer to Figure 3):

As a result of the amendments to the layout and updates to dwelling status, a total of 91 non-participating dwellings have been identified within 4,950 m of the Revised Layout.

Of the 91 non-participating dwellings identified within 4,950 m of the nearest turbine:

- 27 non-participating dwellings were identified within 3,350 metres of a proposed wind turbine location (within the black line).
- 64 non-participating dwellings were located within 3,350 - 4,950 metres of a proposed wind turbine (within the blue line). This includes 25 dwellings in the settlement of Leadville (Dwellings 152 - 176).

3.1.2 Results of Revised Visual Magnitude Tool

The revised layout results in the following:

- The number of non-participating dwellings located within the black line of visual magnitude (3,350 m) has been reduced by 15 dwellings.
- The number of non-participating dwellings located between the black and blue line of visual magnitude (3,350 - 4,950 m) has been reduced by six (6) non-participating dwellings.
- The number of turbines located within the blue line of visual magnitude has been reduced for 21 non-participating dwellings.

Results of Revised Application of Visual Magnitude Tool			
Distance from the nearest turbine:	**Superseded Layout (2022):**	**Revised Layout (2023):**	**Variation:**
	Number of non-participating dwellings:		
Within Black Line of Visual Magnitude: 3,350 m	**42**	**27**	**Reduction of 15 non-participating dwellings**
Within Blue Line of Visual Magnitude: 4,950 m	**70**	**64**	**Reduction of six (6) non-participating dwellings**
Total:	**112**	**91**	**Reduction of 21 non-participating dwellings**

Table 4. Results of Revised Visual Magnitude Tool

Visual Magnitude (Superseded Layout 2022)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (Superseded 2022 Layout)
- Non-participating dwellings
- Participating dwellings
- Main Road
- Minor Road
- LGA Boundary
- 3,350m from nearest turbine (black line of visual magnitude)
- 4,950m from nearest turbine (black line of visual magnitude)
- 8,000m from nearest turbine

Results of Visual Magnitude Tool (Superseded 2022 layout):

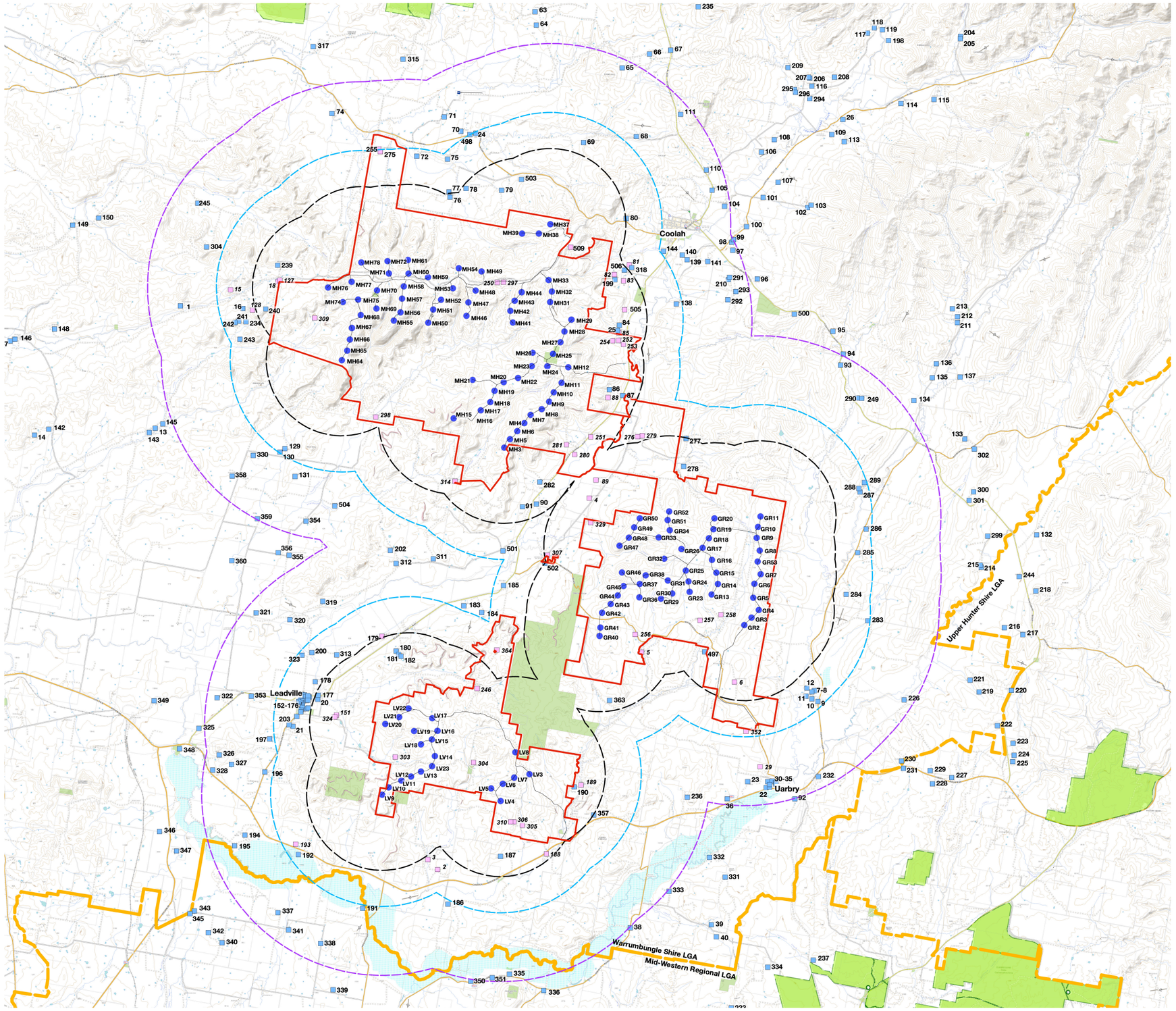
42 Non-participating dwellings within 3,350 m (Black Line)

70 Non-participating dwellings within 4,950 m (Blue Line)

N

0 2 4 6 8 10km

Figure 2. Superseded Visual Magnitude Figure (2022)



Visual Magnitude (Revised Layout 2023)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (Revised 2023 Layout)
- Non-participating dwellings
- Participating dwellings
- Main Road
- Minor Road
- LGA Boundary
- 3,350m from nearest turbine (black line of visual magnitude)
- 4,950m from nearest turbine (black line of visual magnitude)
- 8,000m from nearest turbine

Results of Visual Magnitude Tool (Revised 2023 layout):

33 Non-participating dwellings within 3,350 m (Black Line)

67 Non-participating dwellings within 4,950 m (Blue Line)

N

0 2 4 6 8 10km

Figure 3. Updated Visual Magnitude Figure (2023)

3.2 Multiple Wind Turbine Tool

3.2.1 Application of the Multiple Wind Turbine Tool

The multiple wind turbine tool is based on a 2D assessment and takes into account turbines associated with the proposed Liverpool Range Wind Farm (LRWF) and Barneys Reef Wind Farm (BRWF)*.

Superseded 2022 Layout (Refer to Figure 4):

When applied to the Superseded Layout (2022), the 2D Multiple Wind Turbine Tool identified a total of 30 non-participating dwellings with turbines located in more than two (2) 60 degree sectors.

• 14 non-participating dwellings have turbines associated with VoW Project alone located within up to three (3) 60 degree sectors.
• Eight (8) non-participating dwellings have turbines located within up to four (4) 60 degree sectors.
• Eight (8) non-participating dwellings have up to three (3) 60 degree sectors of turbines associated with the VoW Project and the turbines associated with LRWF (Dwellings 93, 94, 138, 139, 140, 144, 249 and 290).

Note: The EIS submission did not take into account turbines associated with Barneys Reef Wind Farm (BRWF). Six (6) non-participating dwellings have up to two (2) 60 degree sectors of turbines associated with the VoW Project and the turbines associated with BRWF which is deemed acceptable (refer to **Figure 4**).

Revised 2023 Layout (Refer to Figure 5):

When applied to the Revised Layout (2023), the 2D Multiple Wind Turbine Tool identified a total of 24 non-participating dwellings with turbines located in more than two (2) 60 degree sectors.

• 17 non-participating dwellings have turbines associated with VOW Project alone located within up to three (3) 60 degree sectors.
• Three (3) non-participating dwellings have turbines (associated with VoW only) located within up to four (4) 60 degree sectors (Dwellings 185, 278 and 282).
• Five (5) non-participating dwellings have up to three (3) 60 degree sectors of turbines associated with the VoW Project and turbines associated with LRWF (Dwellings 93, 138, 144, 249 and 290).
• Six (6) non-participating dwellings are located within 8,000 m of VoW and BRWF turbines, however turbines are located within two (2) 60 degree sectors which is deemed acceptable (refer to Figure 5).

3.2.2 Results of the Multiple Wind Turbine Tool

The amended layout results in the reduction of the number of non-participating dwellings with turbines located within multiple 60 degree sectors due to the updates in dwelling status. **Table 5** below provides an overview of the reduction of the number of non-participating dwellings with turbines located in multiple 60 degree sectors.

Results of Revised Application of Multiple Wind Turbine Tool

Number of 60 Degree Sectors with Turbines:	Superseded Layout (2022):	Revised Layout (2023):	Variation:
	Number of non-participating dwellings:		
Three (3) 60 Degree Sectors (VOW WF Only)	**14**	**17**	**Increase of three (3) non-participating dwellings**
	76, 77, 78, 79, 86, 87, 88*, 298*, 314*, 311, 501, 184, 497, 363	76, 77, 78, 79, 86, 87, 311, 501, 184, 497, 363, 277, 282, 90, 91, 183, 184	*Note: Increase is due to dwellings that previously had turbines in four (4) 60 degree sectors reduced to three (3) 60 degree sectors.*
Three (3) 60 Degree Sectors (LRWF & VOWWF)	**8**	**5**	**Reduction of three (3) non-participating dwellings**
	93, 94, 138, 139, 140, 144, 249, 290	93, 138, 144, 249, 290	*Note: Reduction is to due removal of turbines associated with the Mount Hope Cluster.*
Four (4) 60 Degree Sectors	**8**	**2**	**Reduction of six (6) non-participating dwellings**
	5*, 90, 91, 183, 185, 277, 278, 282	**185, 278, 282**	*Note: Reduction is to due removal of turbines associated with the Mount Hope Cluster.*
Five (5) 60 Degree Sectors	**0**	**0**	**No variation**
Six (6) 60 Degree Sectors	**0**	**0**	**No variation**

** Denotes dwelling that has changed status from non-participating (during EIS Phase) and is now participating.*

Table 5. Results of Revised Multiple Wind Turbine Tool

Multiple Wind Turbine Tool (Superseded Layout 2022)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Valley of the Winds Wind Farm (VOW) Turbine Location (Superseded 2022 Layout)
- Proposed Liverpool Range Wind Farm (LRWF)Turbine Location (Modified layout)
- Participating dwellings
- 8,000m from nearest VOW turbine
- 8,000m from nearest LRWF turbine
- 8,000m from nearest Barneys Reef Wind Farm (BRWF) turbine
- Area with dwellings within 8,000m of LRWF / BRWF and VOW turbines

NUMBER OF 60º SECTORS WITH TURBINES:

- Dwelling in excess of 8,000 m
- One (1) 60 Degree Sectors
- Two (2) 60 Degree Sectors
- Three (3) 60 Degree Sectors
- Four (4) 60 Degree Sectors

Results of Multiple Wind Turbine Tool (Superseded 2022 layout):

Three (3) 60º Sectors (VOW Only) = 14 Non-participating Dwellings

Three (3) 60º Sectors (VOW + LRWF) = Eight (8) Non-participating Dwellings

Four (4) 60º Sectors (VOW Only) = Eight (8) Non-participating Dwellings

** Note the turbines utilised for the assessment of the LRWF are associated with the Modification Layout which is not yet approved (accessed via Tilt Renewables: Liverpool Range Wind Farm Project website, accessed on 10th February 2022). Turbines utilised for the assessment of Barneys Reef Wind Farm were accessed via Major Projects Planning Portal (April 2023).*

N

0 2 4 6 8 10km

Figure 4. Superseded Layout Multiple Wind Turbine Tool Figure (2022)

Multiple Wind Turbine Tool (Revised Layout 2023)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Valley of the Winds Wind Farm (VOW) Turbine Location (Revised 2023 Layout)
- Proposed Liverpool Range Wind Farm (LRWF)Turbine Location (Modified layout)
- Participating dwellings
- 8,000m from nearest VOW turbine
- 8,000m from nearest LRWF turbine
- 8,000m from nearest Barneys Reef Wind Farm (BRWF) turbine
- Area with dwellings within 8,000m of LRWF / BRWF and VOW turbines

NUMBER OF 60º SECTORS WITH TURBINES:

- Dwelling in excess of 8,000 m
- One (1) 60 Degree Sectors
- Two (2) 60 Degree Sectors
- Three (3) 60 Degree Sectors
- Four (4) 60 Degree Sectors

Results of Multiple Wind Turbine Tool (Revised 2023 layout):

Three (3) 60º Sectors (VOW only) = 17 Non-participating Dwellings

Three (3) 60º Sectors (VOW + LRWF) = Five (5) Non-participating Dwellings

Four (4) 60º Sectors (VOW only) = Three (3) Non-participating Dwellings

** Note the turbines utilised for the assessment of the LRWF are associated with the Modification Layout which is not yet approved (accessed via Tilt Renewables: Liverpool Range Wind Farm Project website, accessed on 10th February 2022). Turbines utilised for the assessment of Barneys Reef Wind Farm were accessed via Major Projects Planning Portal (April 2023).*

N

0 2 4 6 8 10km

Figure 5. Revised Layout Multiple Wind Turbine Tool Figure (2023)

4.0 Zone of Visual Influence

4.1 Overview of Zone of Visual Influence

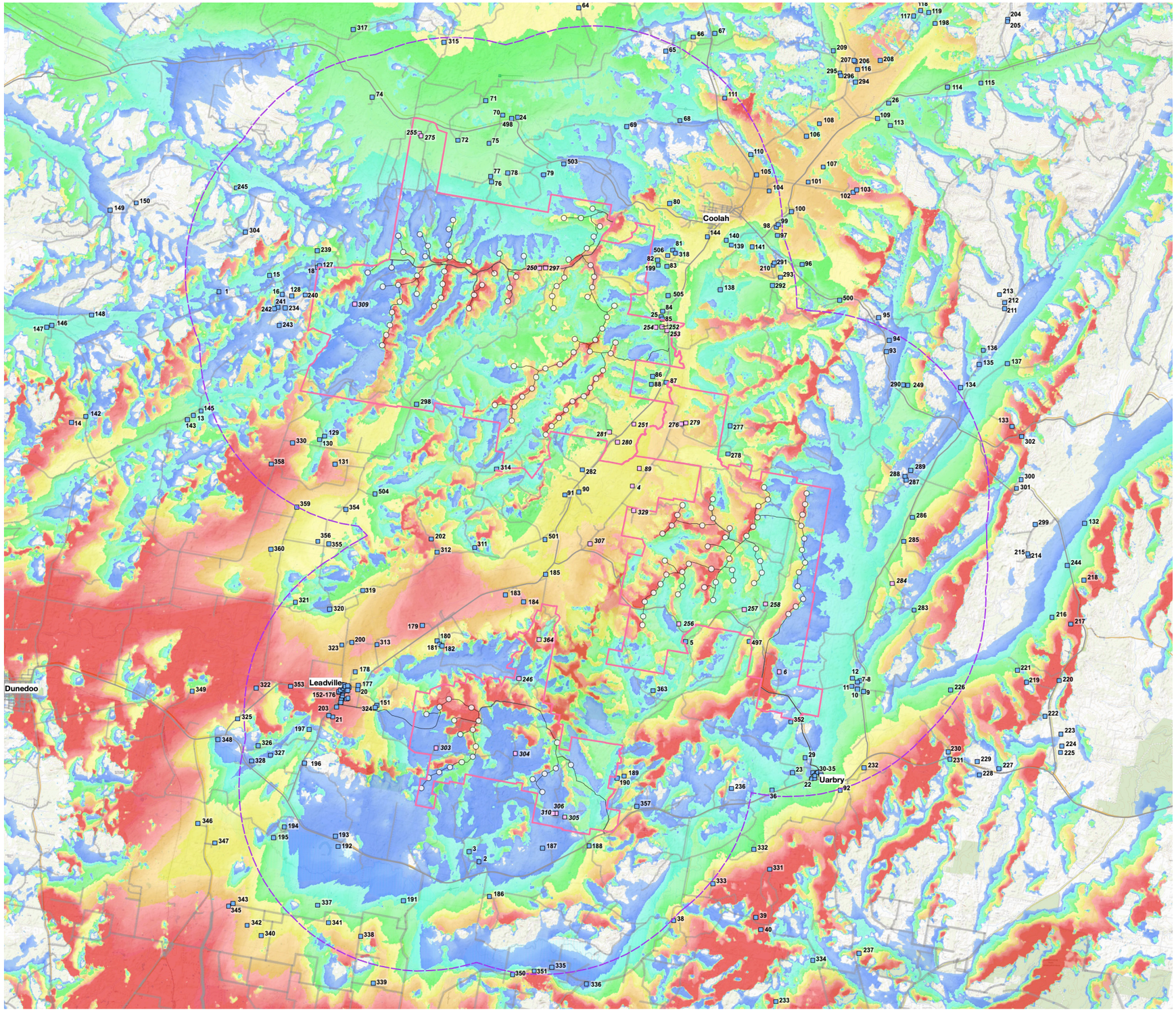
The Zone of Visual Influence (ZVI) represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map (Scottish Natural Heritage, 2017).

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

Figure 6 represents the ZVI for the Superseded Layout (2022) and **Figure 7** represents the ZVI for the Revised Layout (2023). The scale for number of theoretically visible turbines has been updated to relfect the number of turbines in the Revised Layout. The following provides an overview of the findings of the revised ZVI figure:

- Overall, the extent of areas with visibility of the Project is reduced due to the reduction in the number of turbines. Views to the number of turbines has been reduced from Black Stump Road and Leadville.
- The undulating topography allows very limited visibility of the Project in its entirety. Areas with potential to view the Project as a whole are generally in excess of 8km from the Project.
- The highest level of visibility is identified along the top of the ridgelines within the Project site. Land in these areas is predominantly inaccessible private land utilised for agricultural purposes and associated with the Project Site.
- Theoretically, the ZVI indicates that Coolah and Leadville have the potential to view the majority of turbines. This calculation, however, does not consider the impact of distance to clusters that are located further away and intervening elements such as vegetation and structures.

It is important to reiterate that the ZVI is a preliminary assessment tool that identifies areas that have the potential to view turbines for further detailed assessment. The theoretical visibility of the number of turbines associated with the Revised Layout is reduced when compared with the ZVI prepared for the Superseded Layout.



Zone of Visual Influence (Superseded Layout 2022)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (2022 Layout)
- Non-participating dwellings
- Participating dwellings
- Main Road
- Minor Road
- 8,000m from nearest turbine

Number of visible turbines (at blade tip height)

(Based on topography alone):

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 148

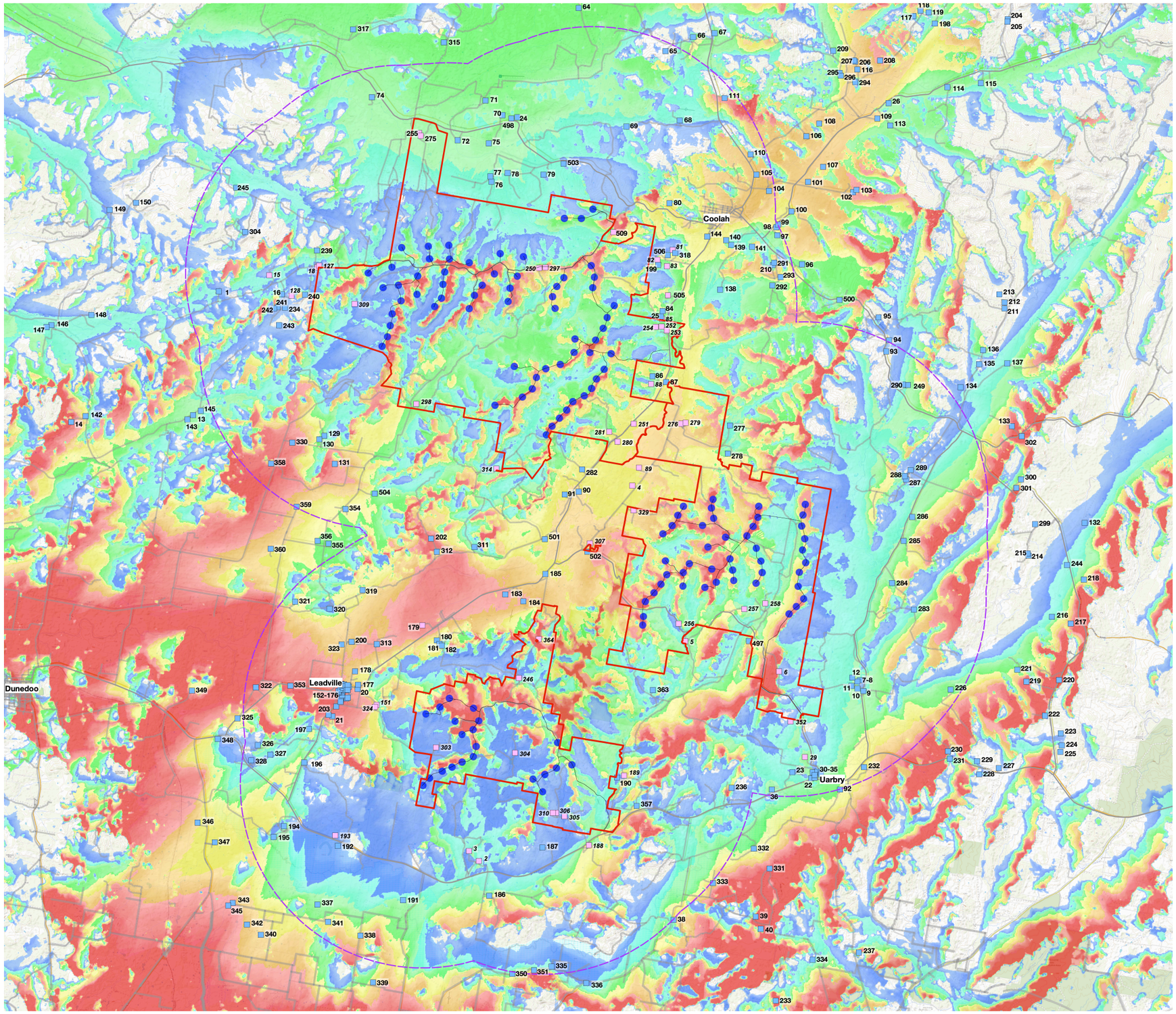
Note:

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

N

0 2 4 6 8 10km

Figure 6. Superseded Zone of Visual Influence Figure (2022)



Zone of Visual Influence (Revised Layout 2023)

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (2023 Layout)
- Non-participating dwellings
- Participating dwellings
- Main Road
- Minor Road
- 8,000m from nearest turbine

Number of visible turbines (at blade tip height)

(Based on topography alone):

- 0
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 131

Note:

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

N

0 2 4 6 8 10km

Figure 7. Revised Zone of Visual Influence Figure (2023)

5.0 Revised Dwelling Assessments

5.1 Overview of Revised Dwelling Assessments

Revised desktop dwelling assessments have been undertaken for all non-participating dwellings within 4,950 metres of the nearest turbine to assess the Revised Layout. The assessment takes into account findings of site inspections undertaken post EIS submission (**refer to Appendix A**).

Appendix A provides a table summarising the dwelling assessments considering the Revised Layout.

The comparative assessment of the Superseded 2022 Layout and the Revised 2023 Layout for all non-participating dwellings within the blue line of visual magnitude (4,950 m) identified the following:

- The number of visible turbines has been reduced for 89% of the non-participating dwellings, the number of visible turbines has remained the same for 9% of non-participating dwellings and has increased for 2% of non-participating dwellings (note: this is due to the inclusion of two additional dwelling assessments and not a result of the revised layout).

- The distance to the nearest turbine remains the same for 38% of the non-participating dwellings, has been reduced for 40% of non-participating dwellings (including dwellings associated with Leadville) and has been increased for 22% of non-participating dwellings (due to the micro siting of turbines).

- The visual impact ratings have been reduced for a total of five (5) dwellings (Dwellings 84, 90, 180, 190 and 199). The visual impact rating has increased for two (2) dwellings from nil to low (Dwellings 498 and 24) as a result of further assessment. An additional two (2) dwellings that were not previously assessed have also been accounted for in the revised assessments (Dwellings 284 and 502).

Further explanation of the revised visual impact ratings has been provided in **Section 7.0.**

Results of Revised Dwelling Assessments

Visual Impact Rating:	Superseded Layout (2022):	Revised Layout (2023):	Variation:
	Number of non-participating dwellings:		
Nil / Negligible:	**24**	**16**	**- 8 dwellings**
Low:	**32**	**32**	**No variation**
Moderate:	**54**	**42**	**- 12 dwellings**
High:	**2**	**1**	**- 1 dwelling**
Not Assessed:	**2** Dwelling 284 Dwelling 502	**0**	
Total Dwellings:	**112**	**91**	**- 21 dwellings**

Table 6. Results of Revised Dwelling Assessments

Part B

Response to Submissions

6.0 Response to Submissions

6.1 Request for Additional Information

6.1.1 Department of Planning and Environment

Table 7 provides an overview of the Department of Planning and Environments (DPE) Requests for Information (RFI) in relation to visual impacts during the exhibition period. The table provides a reference to where the request has been addressed.

Department of Planning and Environment RFIs:	
Request for Information:	**Addressed in Addendum:**
Provide justification of visual impacts on potentially significantly impacted non-associated residences.	**Refer to Section 7.0 & Appendix E**
Consider and justify proposed impacts from (but not necessarily limited to) the following turbines and measures to manage impacts as far as practicable: **Mount Hope Cluster:** MH3, MH5, MH13, MH14, MH15, MH27, MH28, MH29, MH37, MH38, MH39, MH62, MH63 **Girragulang Cluster:** GR2, GR3, GR22, GR21, GR28, GR40, GR41, GR50, GR52 **Leadville Cluster:** LV3, LV4, LV20, LV21, LV22	**Refer to Section 8.0** **Refer to Section 8.1** (Mount Hope Cluster) **Refer to Section 8.2** (Girragulang Cluster) **Refer to Section 8.3** (Leadville Cluster)
Please provide the following: - full impact assessment, including photomontages and/or wireframe, from residence 284, and any other residences not assessed due to error or incorrectly labelled as 'associated' with the development, ensuring to capture all potential views of turbines; and	**Refer to Appendix B**
Update all photomontages to include turbine numbers and blue sky background.	**Refer to Section 9.0 & Appendix C & F**
Aviation: prepare an obstacle lighting plan and assess the visual impact on nearby receivers.	**Refer to Section 10.0**

Table 7. Department of Planning RFIs (Dated 14.10.2022)

6.1.2 Public Submissions

Figure 8 provides a breakdown of the general subcategories of public submissions received relevant to the LVIA during the exhibition phase. **Table 8** provides an overview of where specific concerns have been addressed in the Addendum.

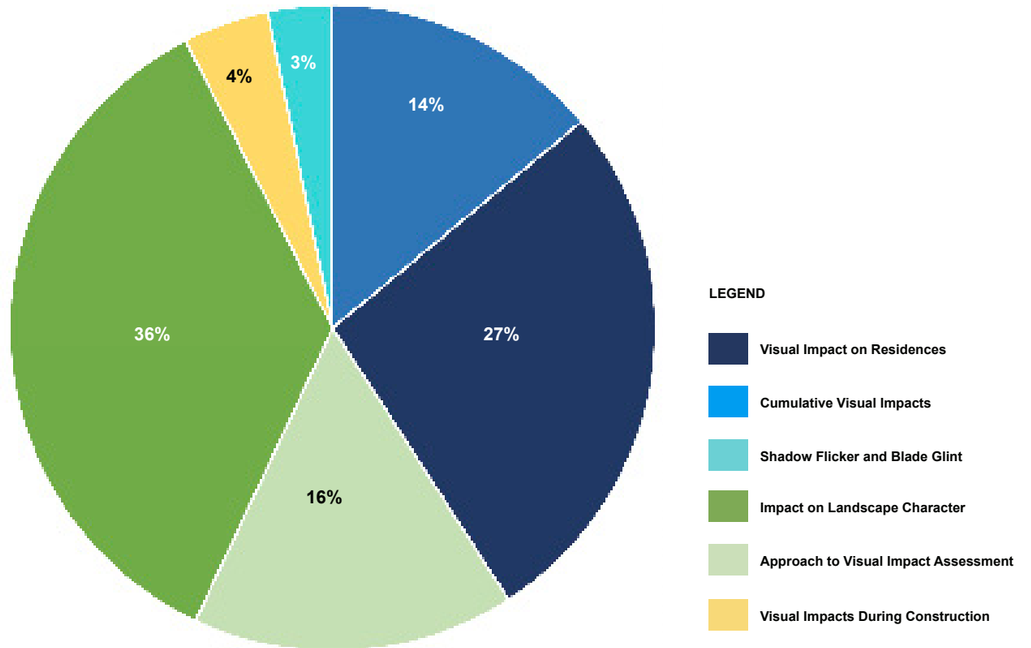


Figure 8. Breakdown of key concerns in Submissions related to Visual Impact

Response to Public Submissions:

Submission:	Response:	Addressed in Addendum:
Visual Impact on Residences: **-** Concerns with the impact on Turee Creek Valley - Concerns with the impact on Tongy Lane	Additional Photomontage prepared from Tongy Lane (Refer to **Photomontage 08 - Appendix C**)	**Refer to Section 7.0:** Additional Dwelling Assessments **Appendix B:** Additional Dwelling Assessments
Approach to Visual Impact Assessment: **Photomontages:** - Lack of photomontages from towns and villages - Concerns regarding the accuracy of photography and photomontage preparation. - Limited number of photomontages from dwellings and public viewpoints. - Lack of photomontages showing the ancillary infrastructure. **Methodology:** **-** Concerns with the approach to the LVIA given the scale of the turbines, noting the Visual Assessment Bulletin does not consider turbines of this scale. - Assessment from dwellings only, no consideration of the farming property.	**Photomontages:** - Photomontages have been prepared representative of Coolah **(Photomontage 04 - Appendix C**) and Leadville (**Photomontage 02 - Appendix C**). - Further information on photomontage preparation methodology has been provided and photomontages have been revised with updated base photography to illustrate visibility with minimal cloud coverage (provided as **Appendix C**). - A number of photomontages prepared from private dwellings have not been made public at the request of the landowner. These have been provided to the DPE and the landowners for consideration. - Additional photomontages have been prepared to illustrate the proposed transmission lines (provided as **Appendix D**). **Methodology:** - Moir LA have undertaken the LVIA in accordance with the Visual Assessment Bulletin in accordance with the SEARs. Consideration of the scale of turbines when applying the visual magnitude tool and defining the visual catchment. - Assessment is required for dwellings due to their level of sensitivity. Land utilised for farming activities has a lower visual sensitivity.	**Refer to Section 9.0:** Photomontage Methodology **Refer to Appendix C:** Updated Photomontages **Refer to Section 11.0:** Assessment of Ancillary Infrastructure **Refer to Appendix D:** Transmission Line Photomontages
Cumulative Visual Impact Assessments: General concerns raised regarding the cumulative visual impacts within the Central-West Orana Renewable Energy Zone (REZ).	Additional Cumulative Impact Assessment has been undertaken, including additional wire frame diagrams illustrating the potential visibility of the Project and Liverpool Range Wind Farm.	**Refer to Section 12.0**
Shadow Flicker and Blade Glint: General concerns around the extent of Shadow Flicker and blade glint. Specific mention of Turee Creek Valley and Tongy Lane.	Revised Shadow Flicker Diagram has been prepared.	**Refer to Section 13.0**

Table 8. Public Submissions Addressed in this Addendum

7.0 Additional Dwelling Assessments

7.1 Additional Dwelling Assessments

This section of the report addresses dwellings that require further assessment, due to additional information or at the request of the DPE or public submissions. Since the submission of the EIS Project, Moir LA have been continuing site inspections from dwellings as access is provided.

In the RFI, the DPE requested the proponent "provide justification of visual impacts on potentially significantly impacted non-associated residences". There are no dwellings identified as 'significantly impacted'. Due to the scale of the Project, a number of residences will have views to the Project, however two (2) dwellings were identified are having a high visual impact rating: Dwelling 84 and Dwelling 277.

The Bulletin states: *Vegetation screening, or the planting of trees and shrubs, to visually screen wind turbines or other potential visual impacts from view may be an option for selected viewpoints*.

Table 9 provides an overview of the non-participating dwellings that were visited to assist with assessments during field work activities prior to, and since the lodgement of the EIS. Where access to dwellings was not granted, wire frame diagrams, representative photographs (from the nearest public roads) and aerial imagery were utilised to assess the potential visual impact.

A number of land owners requested imagery from site assessments not be made available to the public and therefore these were provided to the DPE only.

Appendix A provides an overview of revised assessment undertaken for all dwellings within the blue line of visual magnitude.

Table 10 provides an overview of the additional dwelling assessments.

Field Work Timeline

Field Work Date:	Non-participating dwellings visited:	Representative Public Viewpoint Photographs:
10th February 2021	**7, 8, 10, 11, 12**	
19th March 2021		**79, 171, 180, 181, 182**
10th May 2021		**151, 324**
15th December 2021	**76, 187, 240, 277, 282, 298, 314**	**18, 87, 82, 83, 199, 506, 503**
24th January 2022	**25, 86, 90**	**189, 190**
	EIS SUBMITTED MARCH 2022	
30th June 2022	**75, 497, 202**	
25th January 2023	**185, 284**	**20**

Table 9. Field Work Timeline

Additional Detailed Dwelling Assessments		
Dwelling ID:	**Notes:**	**Refer to:**
284	**Not previously assessed**	**Appendix B1**
Dwelling 11	**Assessment previously undertaken from representative dwelling.**	**Appendix B2**
91	**Previously a linked dwelling.**	**Appendix B3**
177	**Previously a linked dwelling.**	**Appendix B4**
190	**Previously a linked dwelling.**	**Appendix B5**
84	**Reduced visual impact rating**	**Appendix B6**
277	**Assessment previously undertaken and updated to confirm impacts with revised layout.**	**Appendix B7**
278	**Assessment previously undertaken and updated to confirm impacts wth revised layout.**	**Appendix B8**
497	**Previous assessment undertaken from public location since no access was available in EIS phase. Assessment updated with photomontage prepared at dwelling location.**	**Appendix B09**
502	**Previously a linked dwelling.**	**Appendix B10**

Table 10. Overview of additional dwelling assessments

7.2 Revised Visual Impact Ratings

Due to the large scale of the Project and in keeping with the requirements of the Bulletin, representative viewpoints were selected for the LVIA and assessed in lieu of every single dwelling. Through this process, an assessment was provided for a representative dwelling. Assessments for surrounding 'linked dwellings' were made based off the findings of the representative dwelling.

Additional detailed assessment of previously linked dwellings have since been undertaken with the aid of desktop assessment tools (including wire frame diagrams) and photomontages (where access to private properties photography was available). Dwelling Assessments for these dwellings as per **Table 10** have been provided in **Appendix B**.

A large number of dwellings were assessed during the EIS phase based on desktop assessment tools alone, as access to private properties was unavailable. Whilst every measure is made to ensure accuracy in visual impact assessment of dwellings, there are limitations to the accuracy of desktop assessments. Post EIS submission, Moir LA have undertaken additional site visits where access has been granted to nearby dwellings (an overview of field work activities has been provided in **Section 7.0**).

As a result of further assessment and the revision of the project layout, two (2) dwellings have an increased visual impact rating (Dwellings 498 and Dwelling 24). The visual impact ratings have been reduced for a total of five (5) dwellings (Dwellings 84, 90, 180, 190 and 199). An overview of the revised ratings has been provided in **Table 11**.

Mitigation measures have been proposed for a number of dwellings that have been identified through this process (provided in **Appendix E**) and it is expected that once established these will reduce the visual impacts to an acceptable level.

Overview of Revised Visual Impact Ratings			
Dwelling ID:	**Original Visual Impact Rating:**	**Revised Visual Impact Rating:**	**Explanation:**
Reduced Visual Impact Rating:			
Dwelling 84	**High**	**Moderate**	Reduction in the number of visible turbines and further detailed assessment. Refer to **Appendix B**
Dwelling 90	**Moderate**	**Low**	Reduction in the number of visible turbines and further detailed assessment.
Dwelling 180	**Moderate**	**Low**	Previously a linked dwelling. Further assessment identified screening vegetation surrounds dwelling.
Dwelling 190	**Moderate**	**Low**	Previously a linked dwelling. Further assessment identified screening vegetation surrounds dwelling. Refer to **Appendix B**
Dwelling 199	**Moderate**	**Low**	Reduction in the number of visible turbines and further detailed assessment.
Increased Visual Impact Rating:			
Dwelling 284	**N/A**	**Low**	No previous assessment Refer to **Appendix B**
Dwelling 498	**Nil**	**Low**	Further detailed assessment identified turbines visible.
Dwelling 502	**N/A**	**Moderate**	No previous assessment. GR Turbines likely to be visible in the east. Refer to **Appendix B**

Table 11. Overview of revised visual impact ratings

8.0 Justification of Turbines

This section of the Addendum Report provides an assessment of the visual impacts resulting from the turbines identified by the DPE: *"Consider and justify proposed impacts from (but not necessarily limited to) the following turbines and measures to manage impacts as far as practicable"*

8.1 Mount Hope (MH) Cluster

8.1.1 Overview of Amendments to Mount Hope Cluster

The Mount Hope Cluster of turbines had a total of 76 turbines in the Superseded Layout (2022). In response to visual and biodiversity impacts and the RFI from the DPE, a total of eleven (11) turbines have been removed and eight (8) turbines have been repositioned (refer to **Table 12**). The Mount Hope Cluster has a total of 65 turbines under the revised layout. **Figure 9** illustrates the removal and repositioning of turbines.

Mount Hope (MH) Cluster		
Identified by DPE for consideration / justifcation of impacts:	**Turbines Removed:**	**Turbines Retained:**
MH3, MH5		MH3, MH5
MH13, MH14, MH15	MH13, MH14	MH15
MH27, MH28, MH29, MH37, MH38, MH39		MH27, MH28, MH29, MH37, MH38, MH39
MH62, MH63	MH62, MH63	
Turbines removed for visual and / or other reasons:		
	MH16, MH30, MH34, MH35, MH36, MH45, MH73, MH79	

Table 12. Overview of amendments in response to DPE comments on the Mount Hope Cluster

The DPE identified 13 turbines in the Mount Hope Cluster to consider and justify impacts. Four (4) of these turbines have been removed to reduce visual impacts to nearby dwellings. Nine (9) turbines have been retained in the Revised Layout.

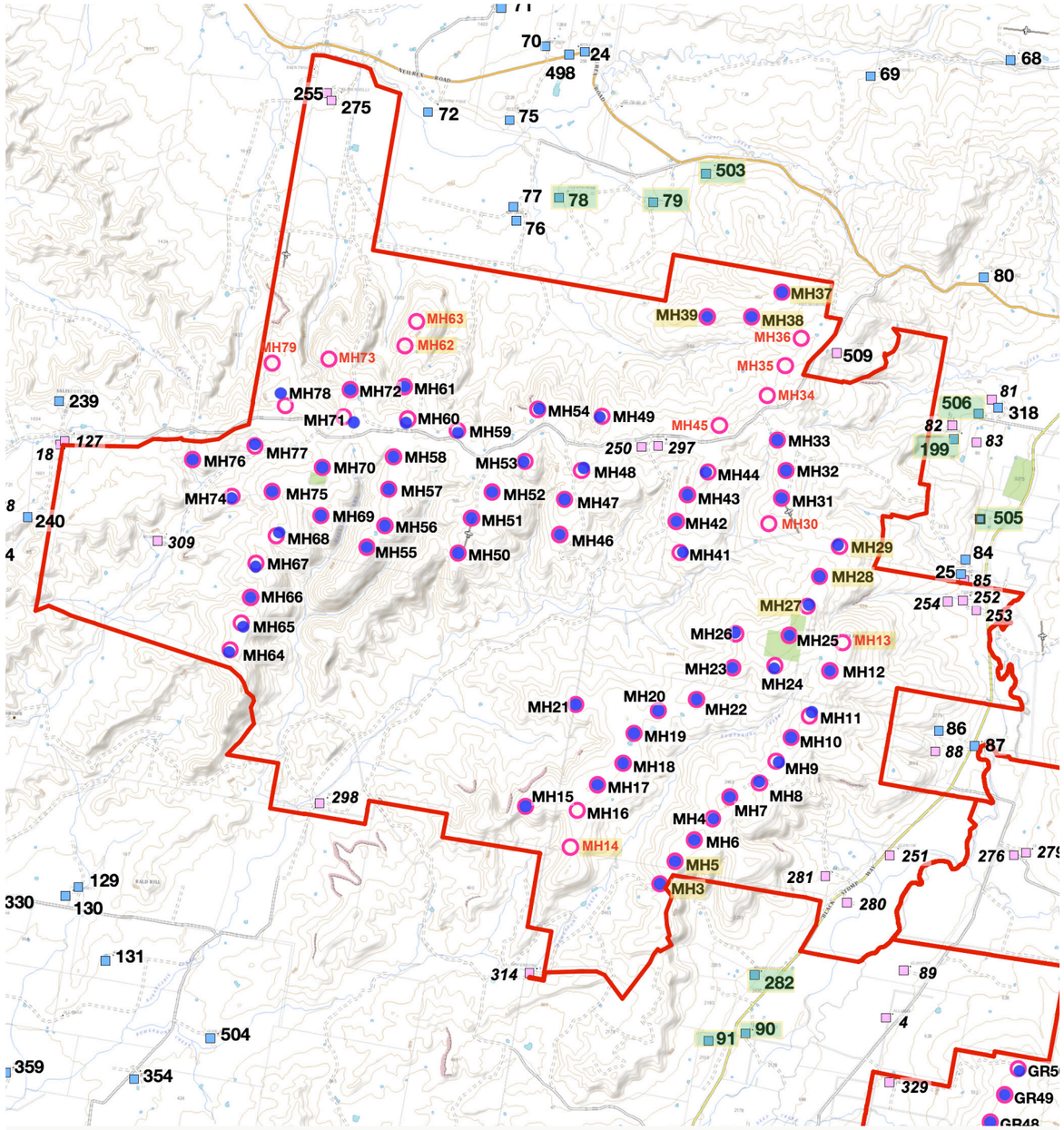


Figure 9. Amendments to Mount Hope Cluster

8.1.2 Justification for retention of turbines MH3 and MH5:

It is understood the request to consider the of removal of turbines MH3 and MH5 is due to the close proximity to the turbines from three (3) non-participating dwellings located to the south of the Mount Hope Cluster (Dwellings 90, 91 and 282). These dwellings are located within 3,350 m of turbines MH3 and MH5.

- **Dwelling 90** is located within 3,350 m of turbines MH3 and MH5. Moir LA attended this dwelling in January 2022 and determined the dwelling is surrounded by vegetation and views to these two turbines would be screened by existing vegetation.

- **Dwelling 91** is located within 3,350 m of turbines MH3 and MH5. Some intervening vegetation may fragment views to the turbines, however additional screen planting (as per **Figure E1 - Appendix E**) would provide sufficient screening once established. No access has been provided to the dwelling and therefore analysis is based on a desktop assessment.

- **Dwelling 282** is located to the south of turbines MH3 and MH5. Moir LA attended this dwelling in December 2021 and determined existing vegetation to the north of the dwelling will screen views to MH3 and MH5.

8.1.3 Justification for retention of turbines MH27, MH28 and MH29:

It is understood the request to consider the of removal of turbines MH27, MH28 and MH29 is due to the close proximity to two (2) non-participating dwellings to the north east (dwellings 199 and 506) and three (3) non-participating dwellings to the east (dwellings 25, 84 and 506). These seven (7) non-participating dwellings are located within 3,350 m of turbines MH27, MH28 and/or MH29.

- **Dwelling 199** is located within the black line of turbines MH28 and MH29. No access was available to the property and therefore Moir LA undertook representative photography from Scully Road at the gate to the dwelling in December 2021. Desktop assessment has identified intervening vegetation is likely to screen views from the dwelling to turbines MH28 and MH29.

- **Dwelling 506** is located within the black line of turbines MH28 and MH29. No access was available to the property and therefore Moir LA undertook representative photography from Scully Road at the gate to the dwelling in December 2021. Desktop assessment has identified the dwelling is elevated and appears to be orientated to the north / south. A water tank and intervening vegetation is located on the south west side of the dwelling which is likely to screen views from the dwelling to turbines MH28 and MH29.

- **Dwelling 25** is located within the black line of turbines MH27, MH28 and MH29. Moir LA attended this dwelling in January 2022 and determined existing vegetation to the west of the dwelling will screen views to turbines MH27, MH28 and MH29.

- **Dwelling 84** is located within 3,350 m of turbines MH27, MH28 and MH29. Some intervening vegetation will fragment views to the turbines, and if deemed necessary, additional screen planting (as per **Appendix E**) would provide sufficient screening once established. No access has been provided to the dwelling and therefore analysis is based on a desktop assessment.

8.1.4 Justification for retention of turbines MH37, MH38 and MH39:

It is understood the request to consider the of removal of turbines MH37, MH38 and MH39 is due to the close proximity three (3) non-participating dwellings to the north east (dwellings 78, 79 and 503). These three (3) non-participating dwellings are located within 3,350 m of turbines MH37, MH38 and/or MH39.

- **Dwelling 78** is located within the black line of turbines MH37, MH38 and MH39. No access has been provided to the dwelling and therefore analysis is based on a desktop assessment, however when considering the extent of vegetation surrounding the dwelling, turbines MH37, MH38 and MH39 would not result in a significant visual impact from this dwelling.

- **Dwelling 79** is located within the black line of turbines MH37, MH38 and MH39. The dwelling is located on a small rise and surrounded by vegetation. No access has been provided to the dwelling and therefore analysis is based on a desktop assessment, however when considering the extent of vegetation surrounding the dwelling, the turbines would not result in a significant visual impact from this dwelling.

- **Dwelling 503** is located within the black line of turbines MH37, MH38 and MH39. Topography screens most views to the Project, however the blade tips of turbines MH37, MH38 and MH39 have the potential to be visible beyond the rise to the south of the dwelling. Moir LA undertook representative photography from Neilrex Road at the gate to the dwelling in December 2021 and confirmed vegetation would screen views to the turbines from this dwelling.

8.1.5 Justification for retention of turbine MH15:

Since the lodgement of the EIS, Dwelling 314 (which was previously within the black line of visual magnitude to turbine MH15) has changed status to a participating dwelling. The nearest non-participating dwelling to MH15 is Dwelling 91. The distance to turbine MH15 from Dwelling 91 is 4,994 metres.

8.2 Girragulang (GR) Cluster

8.2.1 Overview of Amendments to Girragulang Cluster

The Girragulang Cluster of turbines had a total of 51 turbines in the Superseded Layout (2022). In response to visual and biodiverity impacts and the RFI from the DPE, a total of six (6) turbines have been removed and two (2) turbines have been repositioned (refer to **Table 13**). The Girragulang Cluster has a total of 45 turbines in the Revised Layout (2023). **Figure 10** illustrates the removal and repositioning of turbines.

Girragulang Road (GR) Cluster:		
Consider and justify proposed impacts:	**Turbines Removed:**	**Turbines Retained:**
GR2, GR3		GR2, GR3
GR22, GR21, GR28	GR21, GR22, GR28	
GR40, GR41, GR50, GR52		GR40, GR41, GR50, GR52
Turbines removed for visual and / or other reasons:		
	GR12, GR27, GR35	

Table 13. Overview of amendments in response to DPE comments on the Girragulang Road Cluster

The DPE identified nine (9) turbines to consider and justify impacts. Three (3) of these turbines have been removed to reduce visual impacts to nearby dwellings, whilst six (6) have been retained in the Revised Layout.

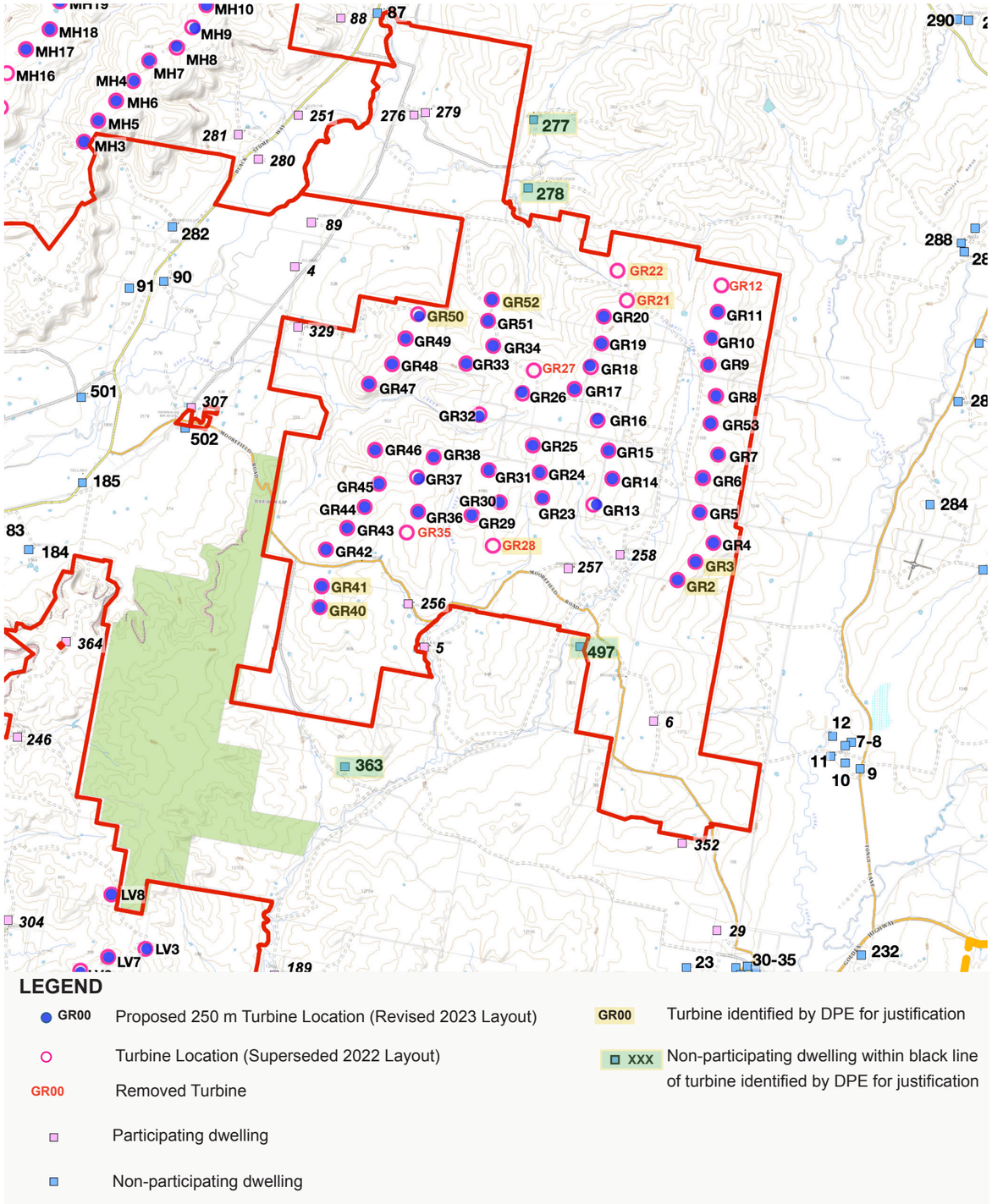


Figure 10. Amendments to Girragulang Road (GR) Cluster

8.2.2 Justification for retention of turbines GR2 and GR3:

It is understood the request to consider the of removal of turbines GR2 and GR3 is due to the close proximity to Dwelling 497 to the south west.

- **Dwelling 497** is located within the black line of GR2, GR3 and eight (8) other turbines. The assessment undertaken in the LVIA by Moir LA in April 2022 identified dense vegetation surrounding the dwelling and assessed the visual impact from property as low. Moir LA has since gained access to the property in June 2022. Whilst ground truthing vegetation surrounding the dwelling it was identified that fragmented views through the vegetation would be available and turbines to the north would be visible. The visual impact rating from this dwelling has been increased to a moderate. Supplementary planting in keeping with the existing vegetation would assist in screening views to the turbines to the north. Once established, additional screen planting (as per **Figure E6 - Appendix E**) would reduce the visibility of turbines GR2 and GR3 from Dwelling 497.

8.2.3 Justification for retention of turbines GR40 and GR41:

It is understood the request to consider the of removal of turbines GR40 and GR41 is due to the close proximity to Dwelling 363 to the south.

- **Dwelling 363** has the potential to view turbines GR40 and GR41 to the north (based on a desktop assessment). The turbines would occupy a very small portion of the view to the north and are likely to be fragmented by intervening vegetation.

8.2.4 Justification for retention of turbines GR50 and GR52:

It is understood the request to consider the of removal of turbines GR50 and GR52 is due to the close proximity to Dwelling 277 and 278 to the north.

- **Dwelling 277** has views to a number of turbines to the south within the black line of visual magnitude. Moir LA visited this property in December 2021 to undertake a site inspection. The visual impact rating was assessed as high due to direct views from the dwelling. The removal of turbines GR50 and GR52 would not result in changes to the visual impact rating from this dwelling. Once established, additional screen planting (as per **Figure E7 - Appendix E**) would reduce the visual impact resulting from of all visible turbines, including GR50 and GR52 from this dwelling.

- **Dwelling 278** is located within the black line of turbines GR50 and GR52. No access has been provided to the dwelling and therefore analysis is based on a desktop assessment, however when considering the extent of vegetation surrounding the dwelling, turbines GR50 and GR52 would not result in a significant visual impact from this dwelling.

8.3 Leadville (LV) Cluster

8.3.1 Overview of Amendments to Leadville Cluster

The Leadville Cluster of turbines had a total of 21 turbines in the Superseded Layout (2022). Moir LA have reviewed the turbines identified by DPE for further consideration and justification, and no turbines have been removed. Six (6) turbines have been repositioned within 150 m of the Superseded Layout location (refer to **Table 14**). The Leadville Cluster has a total of 21 turbines in the Revised Layout (2023). **Figure 11** illustrates the repositioning of turbines.

Leadville (LV) Cluster:		
Consider and justify proposed impacts:	**Turbines Removed:**	**Turbines Retained:**
LV3, LV4, LV20, LV21, LV22	N/A	LV3, LV4, LV20, LV21, LV22

Table 14. Overview of amendments in response to DPE comments on Leadville Cluster

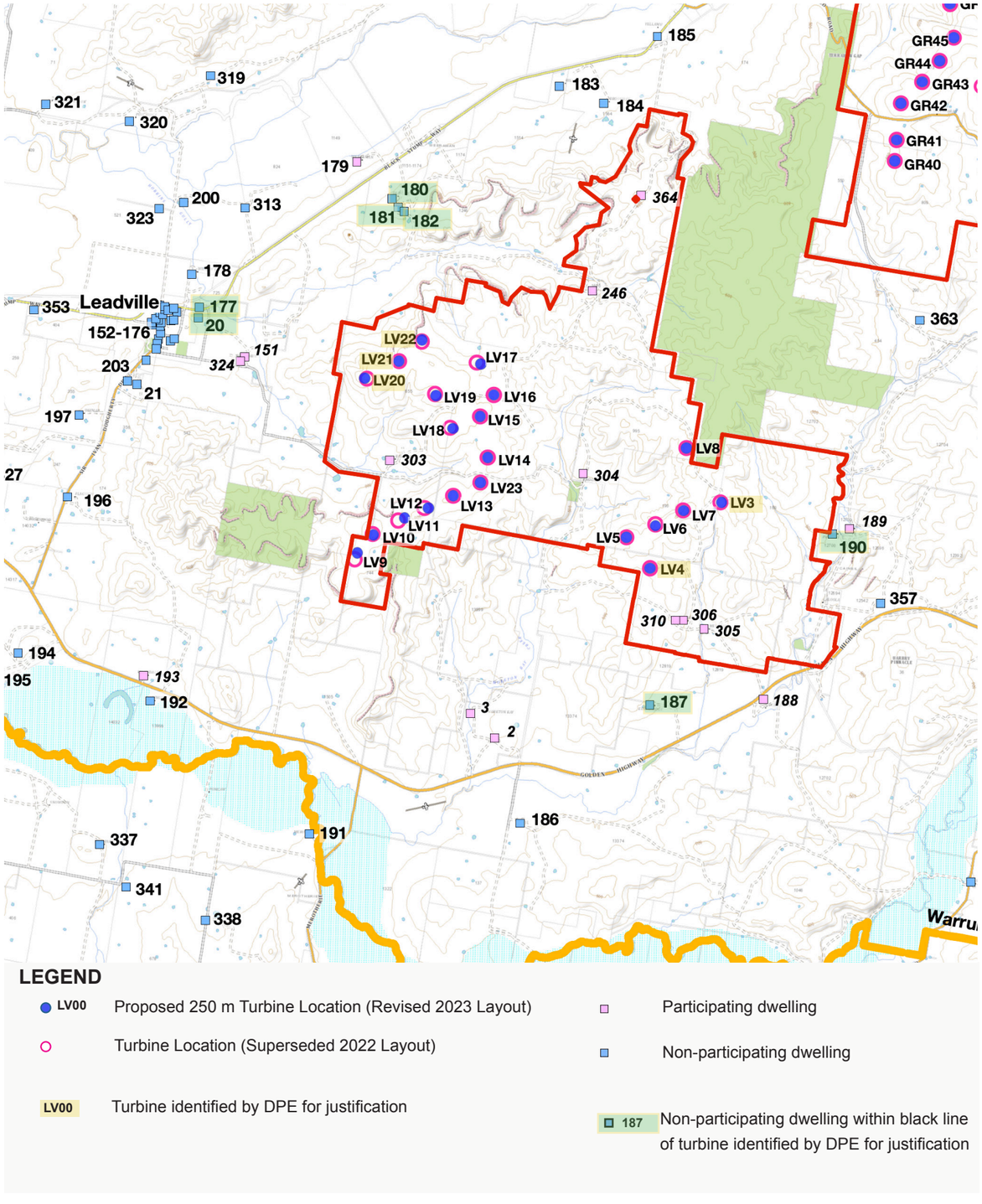


Figure 11. Amendments to Leadville (LV) Cluster

The DPE identified five (5) turbines to 'consider and justify impacts'. Moir LA have undertaken additional assessment of these turbines and all five (5) turbines have been retained in the Revised Layout.

Justification for retention of turbines LV3 and LV4:

It is assumed the request to consider the of removal of turbines LV3 and LV4 would be to reduce the potential visibility from Dwelling 190 which is located to the east of turbine LV3 and Dwelling 187 which is located to the south of turbine LV4.

Views to turbine LV3 and LV4 are screened by topography from Dwelling 190. Refer to **Figure E5 - Appendix E**. The visual impact rating from Dwelling 187 was assessed as low and therefore mitigation measures are deemed unnecessary.

Justification for retention of turbines LV20, LV21 and LV22:

It is assumed the request to consider the of removal of turbines LV20, LV21 and LV22 would be to reduce the potential visibility from non-participating dwellings located to the north west of the Leadville Cluster, (in particular Dwelling 20 and 177) and dwellings to the north (Dwellings 180, 181 and 182). Turbines LV20, LV21 and LV22 are currently within the black line of these five dwellings.

- **Dwelling 20 and 177** were assessed as having a low visual impact due to intervening vegetation limiting views. Views to turbines LV20, LV21 and LV22 will not be dominant elements in the view from these dwellings.

9.0 Updated Photomontages

9.1 Updated Photomontages

All photomontages from public and private viewpoint locations have been updated with the Revised Layout (2023) and are provided in **Appendix C**.

Photomontage Methodology:

A number of submissions were made regarding the authenticity of photomontages. This is a common concern with visualisations of wind farm developments due to the limitation of presenting photomontages on a computer screen as opposed to printed at the correct format and viewed in accordance with the technical requirements.

All photomontages have been prepared in accordance with the Scottish Natural Heritage Guidelines as per the requirements of the Bulletin. It is important to note visualisations in themselves can never provide the full picture in terms of potential impacts; they only inform the assessment process by which judgements are made. Visualisations of wind farms have a number of limitations which stakeholders should be aware of when using them to form a judgement on a wind farm proposal *(Scottish Natural Heritage, 2017).*

Base Photography:

Concerns were raised regarding the weather conditions depicted in the base photography. Moir LA undertook base photography for the preparation of photomontages in the EIS submission over multiple site visits. Great effort was made to ensure clear sky conditions for each trip to Site, however some variations to the sky conditions appear in the viewpoints and photomontages where fine weather conditions could not be aligned with landowners availability.

The DPE requested: “Update all photomontages to include turbine numbers and blue sky background”.

The reality is that wind turbines will not always be viewed against a blue sky background. The appearance of wind turbines will vary depending on the time of day, weather conditions and sky backdrop. Weather conditions recorded in the locality at Dunedoo Post Office Weather Station average a total of 94 cloudy days per year (Bureau of Meteorology, 2023).

When undertaking base photography, there is an importance on photographing the landscape in good weather conditions to ensure the clarity of the photograph. The Scottish Natural Heritage Guidelines state: *One of the most significant difficulties of photographing wind farms, in contrast to other types of development, is that they often appear on the skyline where there can be little contrast between the light-coloured turbines and a light-coloured sky. It is therefore essential that all baseline photographs are taken in good visibility.*

Images 1 - 4 have been included to illustrate the variations to turbine visibility based on differing times of the day and sky conditions. In reality, a blue sky background is not necessarily a worst case scenario view of the turbines. As you look at the horizon, the sky appears much paler in colour and white wind turbines viewed against a blue sky background near to the horizon have limited contrast. **Image 1** illustrates turbines viewed against a blue sky background with limited contrast.

Private Viewpoint Photomontages:

Super imposing a blue sky background onto photos can alter the authenticity of photomontage as detail in the horizon and foreground can become lost and it becomes an unrealistic view of the conditions. In lieu of superimposing blue sky backgrounds onto photomontages from private viewpoint locations, Moir LA have provided the contrasting wire frame overlays to assist with the assessment process. The wire frame overlays have been provided for all private photomontages (refer to **Appendix F**). Each of the wire frame overlays illustrates the Project as a worst case scenario, with turbines coloured black for maximum contrast against the sky backdrop. Each turbine has been displayed with the tip at the highest point, and the rotor facing towards the viewer. The wire frame diagram has been aligned below the wire frame overlays to allow for reference during the assessment.

Public Viewpoint Photomontages:

From publicly accessible viewpoints, Moir LA undertook an additional site visit in January 2023 and developed revised panoramic base photographs for the revised public photomontages. The revised base photography was undertaken in fine weather conditions with good visibility in accordance with the Bulletin (which references the Scottish Natural Heritage Guidelines). These photomontages have been provided in **Appendix C**. A wire frame diagram with turbines labelled has been provided for each photomontage, as per the Scottish Natural Heritage Guidelines. The purpose of the wire frame diagrams are for verification of turbine scale, turbine placement and to provide transparency where turbines may be screened from view by vegetation.

Image 1. *Photo of Crookwell Wind Farm illustrating turbines viewed against a blue sky background*

Image 2. *Photo of Gullen Range Wind Farm at dusk, looking in a east direction with sun on turbines*

Image 3. *Photo of Gullen Range Wind Farm at dusk, looking in a west direction with sun on turbines*

Image 4. *Photo of Crudine Ridge Wind Farm at midday, looking in a north direction*

10.0 Aviation Hazard Lighting

10.1 Overview of Aviation Hazard Lighting

10.1.1 Overview of AHL Requirements - Visual Assessment Bulletin

The Visual Assessment Bulletin States: *"Aviation Hazard Lighting (AHL) must meet the requirements of Australian Standard AS 4282-1997 and any prescribed or notified CASA requirement. Shield all AHL within two kilometres from any dwellings. Avoid strobe lighting."*

During the preparation of the LVIA, it was noted that Aviation Projects undertook an Aviation Impact Assessment and concluded *'the proposed Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft'*.

10.1.2 Overview of CASA Recommendations

During the EIS exhibition phase, Civil Aviation Safety Authority (CASA) submitted feedback on the EIS submission recommending AHL is installed. Their advice was as follows:

> *Due to the height proposed AGL, CASA considers the proposed wind farm likely be a hazard to aviation safety and recommends that the wind farm is obstacle lit. While international standards and the NASF guideline recommend 2,000 candela lighting intensity, CASA would accept 200 candela lighting intensity based on trial installation at another site where 200 CD was found to be sufficient in areas with low back lighting.*
>
> *To minimise lighting impact on local residents CASA would also recommend the installation of radar activated hazard lights or lighting activated by low visibility measuring equipment. If the lighting fails, it should fail in the 'on' condition until it can be rectified.*

10.1.3 Overview of Defence Recommendations

Defence recommends that the Wind Farm be obstacle lit in accordance with Civil Aviation Safety Regulation 139 and the Civil Aviation Safety Authority (CASA) Manual of Standards 139. If Light Emitting Diode (LED) lighting is applied, the frequency range of the LED light emitted should be within the range of wavelengths 665 to 930 nanometres to allow for visibility to persons using night vision devices.

10.2 Aviation Hazard Lighting Assessment

Night lighting is not proposed as part of the Project, however ACEN will continue to consult with CASA during detailed design. To ensure that the potential impacts of night lighting have been considered, a night lighting plan has been developed since the EIS and has been assessed as a worst case assessment. The lighting plan prepared by Aviation Projects has nominated that 92 of 131 turbines have lighting installed at hub height. Leadville Road (LV) Cluster: 17 of 21 turbines, Girragulaung Road (GR) cluster: 30 of 45 Turbines and Mount Hope (MH) cluster: 45 of 65 turbines.

A Zone of Visual Influence (ZVI) has been prepared to illustrate the potential number of visible aviation lights (installed at hub height) from surrounding land. **Figure 12** illustrates the extent of potential visibility of the 92 proposed turbines that have been recommended for the installation of AHL at hub height. It is important to note the ZVI is a very conservative assessment which does not take into account distance between the turbines and dwellings, intervening elements (such as vegetation), or the installation of shielding or the intensity of lighting which would all significantly reduce potential to view the lighting.

The ZVI provides the following results:

- Majority of the dwellings located on the northern, north western, eastern and southern sides of the Project within 4,950 m are shaded blue or green, indicating at most they have the potential to see up to 44 aviation lights.

- The ZVI also indicates that areas along Black Stump Way and Leadville are likely to experience higher visibility of turbines with nightlighting. This, however, is a calculation based on topographical character alone and represents the worst case scenario. It is important to note that the distance limits visibility of objects. For example, the nearest MH cluster turbine is located at a distance of approximately 11 km, and the nearest GR cluster turbine is located at a distance of approximately 10 km from the dwellings in Leadville. It is likely that the large distance will not allow clear visibility of the turbines with night lighting and existing vegetation will limit views. Dwellings along Black Stump Way that are located in the central part of the Project Area are also surrounded by dense vegetation, and therefore, it is likely that visibility will be limited.

There are very limited opportunities to view the Project in its entirety and therefore very limited opportunities to view all proposed aviation lighting installed. It is anticipated that with the mitigation measures implemented (including low intensity and shielding), aviation lighting could be implemented with a negligible visual impact on the surrounding landscape.

Theoretical Visibility of Aviation Hazard (AH) Lighting

Valley of the Winds Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (2023 Layout)
- Proposed 250 m Turbine Location with AH lighting at hub height (Note: this ZVI is assessed at hub height since lighting will be installed on the nacelle of the turbine)
- Non-participating dwellings
- Participating dwellings

Number of visible turbines with AH lighting (at hub height) (Based on topography alone):

- 0
- 1 - 14
- 15 - 29
- 30 - 44
- 45 - 59
- 60 - 74
- 75 - 92

Note:

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

N

0 2 4 6 8 10km

Figure 12. Theoretical Visibility of Turbine Aviation Hazard Lighting

10.3 Aviation Hazard Lighting Recommendations

With consideration of the recommendations for aviation lighting from Defence and CASA, if night lighting was included as part of the project the following recommendations are made:

1. Light Shielding

It is recommended shielding of the downward component of obstacle lighting is undertaken. Section 2.6.5 of the CASA ADVISORY CIRCULAR AC 139.E-05 v1.0 states “Permanent light shielding is also an option to reduce impact on residences within six kilometres of the installation”.
It is recommended shielding in installed to ensure:

(a) no more than 5% of the nominal light intensity is emitted at or below 5° below horizontal

(b) no light is emitted at or below 10° below horizontal

2. Low Intensity Lighting

In Australia, CASA has accepted the use of 200 candela lighting in some circumstances due to a lack of back lighting in regional and rural areas, meaning that a lower intensity light is still visible to pilots at an acceptable distance to permit a pilot to see and avoid the obstacle (CASA, 2021). It is noted that CASA will accept 200 candela lighting intensity for the Valley of the Winds Project.

Table 1 from the CASA Advisory Circular AC139.E-05 V1.0 provides distances at which intensity of light is predicted to be visible. A 2000 candela light is visible at 4,900 m and 32 candela light is visible at up to 2,200 m. It is therefore practical to assume that 200 candela light would be difficult to discern in excess of 3,000 m. However, to ensure a conservative assessment, the ZVI focuses on the visibility of lights on land within the blue line of visual magnitude (4,950 m), as it is likely the lighting would be indiscernible beyond this distance.

3. Reduction of the number of turbines with AHL installed

The lighting plan prepared for the revised layout was developed in response to the recommendations of CASA, limiting the number of turbines requiring lighting to reduce visual impacts.

Night lighting is not proposed as part of the project, ACEN will continue to consult with CASA during detailed design. This assessment has found that the visual impact resulting from aviation lighting could be sufficiently mitigated if necessary.

11.0 Associated Infrastructure

11.1 Associated Infrastructure

Submissions have been made regarding the visual impact resulting from associated infrastructure, in particular the transmission lines. The following section provides additional assessment of the potential visual impacts resulting from proposed infrastructure.

An example of the proposed transmission line design is shown in I**mage 5**.

Image 5. Example of proposed Transmission Line Design

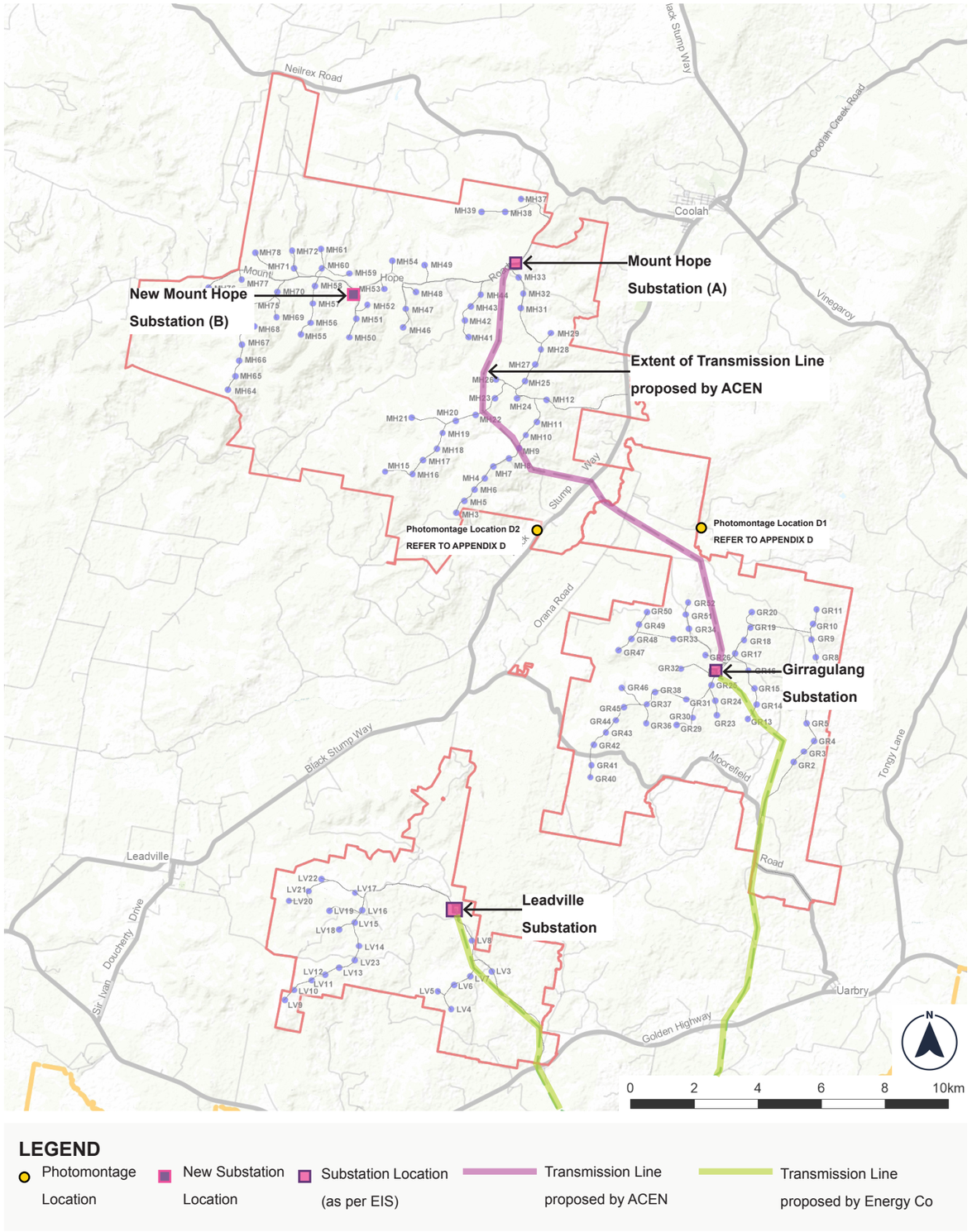


Figure 13. Revised Layout - Associated Infrastructure

11.2 Proposed Transmission Lines

Since the exhibition of the EIS ACEN has undertaken extensive consultation with EnergyCo regarding the proposed Central-West Orana Transmission Line and how the project would connect to that infrastructure. It is confirmed that the overhead transmission line running south from the Girragulang Road, and Leadville clusters will no longer form part of this project. This infrastructure and will be assessed as part of that project by EnergyCo.

The CWO-REZ Transmission Line runs north-west from the existing 500kV network near Merriwa, passing south of Dunedoo before connecting to the existing network east of Wellington. As a Candidate Foundation Generator (CFG) for the CWO-REZ, the project would connect directly to the proposed CWO-REZ transmission line, which will allow for the project's output to be transported to meet loads across the NEM.

The section of transmission line (as shown in pink on **Figure 14**) to be developed by ACEN will largely be located along uninhabited grazing land, with in the Project Site.

Visual Impact from Public Viewpoints:

Figure 14 provides a Zone of Visual Influence (ZVI) diagram illustrating the areas of land surrounding the transmission line with potential to view the poles. The ZVI is prepared based on a height of 65 metres for the transmission poles.

It is important to note, vegetation will reduce the potential to view the transmission towers due to their height. Opportunities to view the transmission line will be restricted by access and topography for the most part, however some publicly accessible land will have visibility of the transmission line.

Refer to **Appendix D** for photomontages prepared to illustrate the proposed transmission line from Collier Road (Photomontage D1) and Black Stump Road (Photomontage D2). Photomontage locations are shown on **Figure 14** and **Figure 15**.

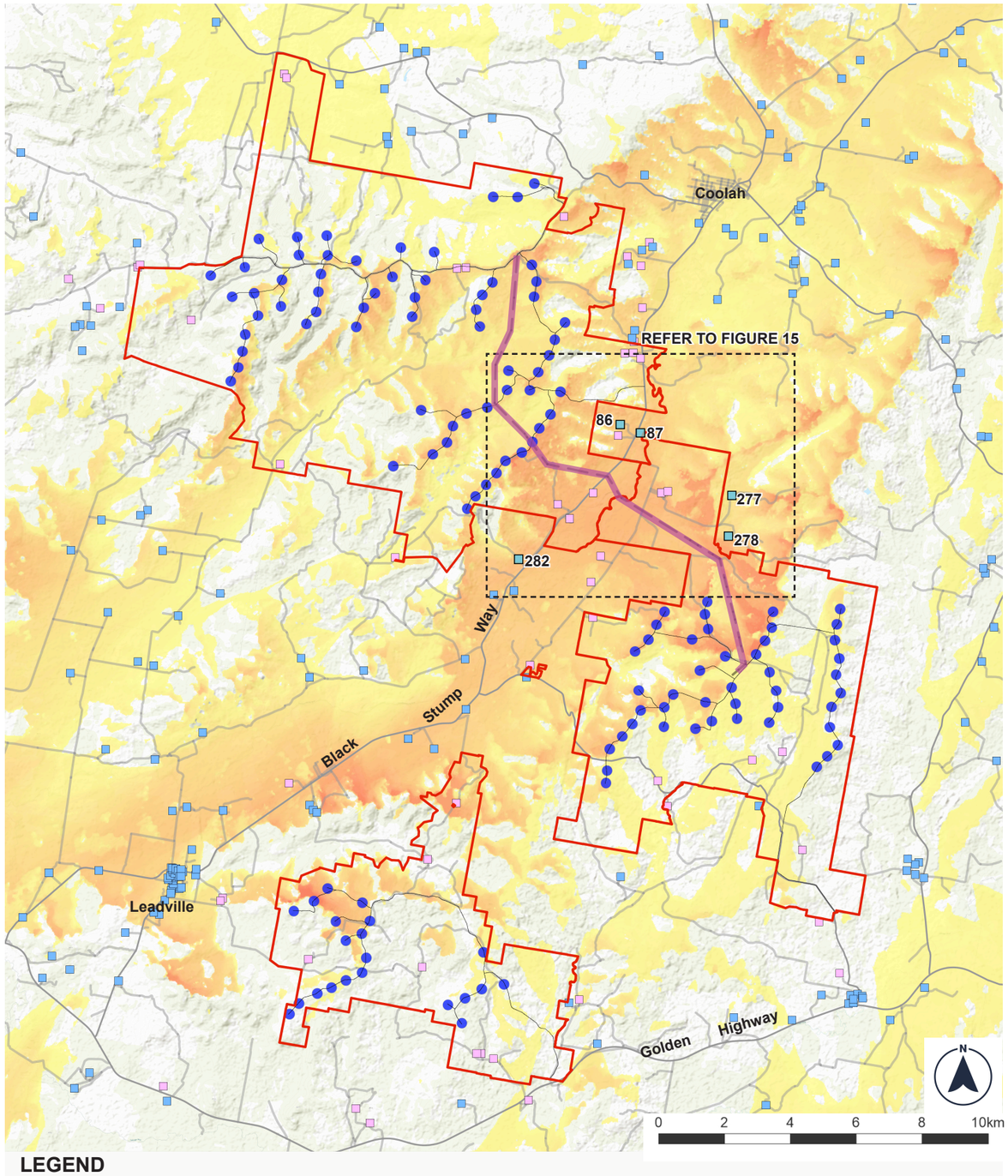


Figure 14. Zone of Visual Influence - Transmission Lines

Visual Impact from Non-Participating Dwellings:

Five (5) dwellings are located within 3 kilometres of the proposed transmission line including: Dwelling 86, Dwelling 87, Dwelling 282, Dwelling 277 and Dwelling 278 (as shown on **Figure 15**).

Views to the proposed transmission lines will be screened by vegetation from Dwelling 282, Dwelling 86 and Dwelling 87.

Figure 15. Extent of Transmission line crossing Black Stump Way

11.3 Substations

Three (3) substation locations were identified in the EIS, one in each cluster (Mount Hope, Girragulang and Leadville). Since the EIS was submitted, an additional substation location had been identified and is proposed in the Mount Hope Cluster (as shown on **Figure 13**).

An example of a similar scale substation design is shown in **Image 2**.

A ZVI diagram has been prepared for each of the substations to provide an analysis of the potential visibility of each substation from surrounding public and private viewpoint locations. The substation ZVI diagrams have been prepared based on a height of 20 metres to provide a worst case scenario assessment.

The ZVI diagrams (**Figures 16 - 19**) illustrate limited visibility on the surrounding landscape. The substations have been sited within the project boundary, away from non-participating residences.

Image 2. Example of a Substation

11.3.1 Mount Hope Substation A

The Mount Hope Substation is located to the south of Mount Hope Road. Mount Hope Road is a minor road with a low frequency of use. No non-participating dwellings are located within 3,000 metres of the substation. A ZVI diagram has been prepared (refer to **Figure 16**) and indicates visibility to the substation will be limited to a small extent of Mount Hope Road. Existing roadside vegetation along Mount Hope Road is likely to fragment views to the substation. Due to the low frequency of use of this road, and existing roadside vegetation, mitigation is not deemed necessary.

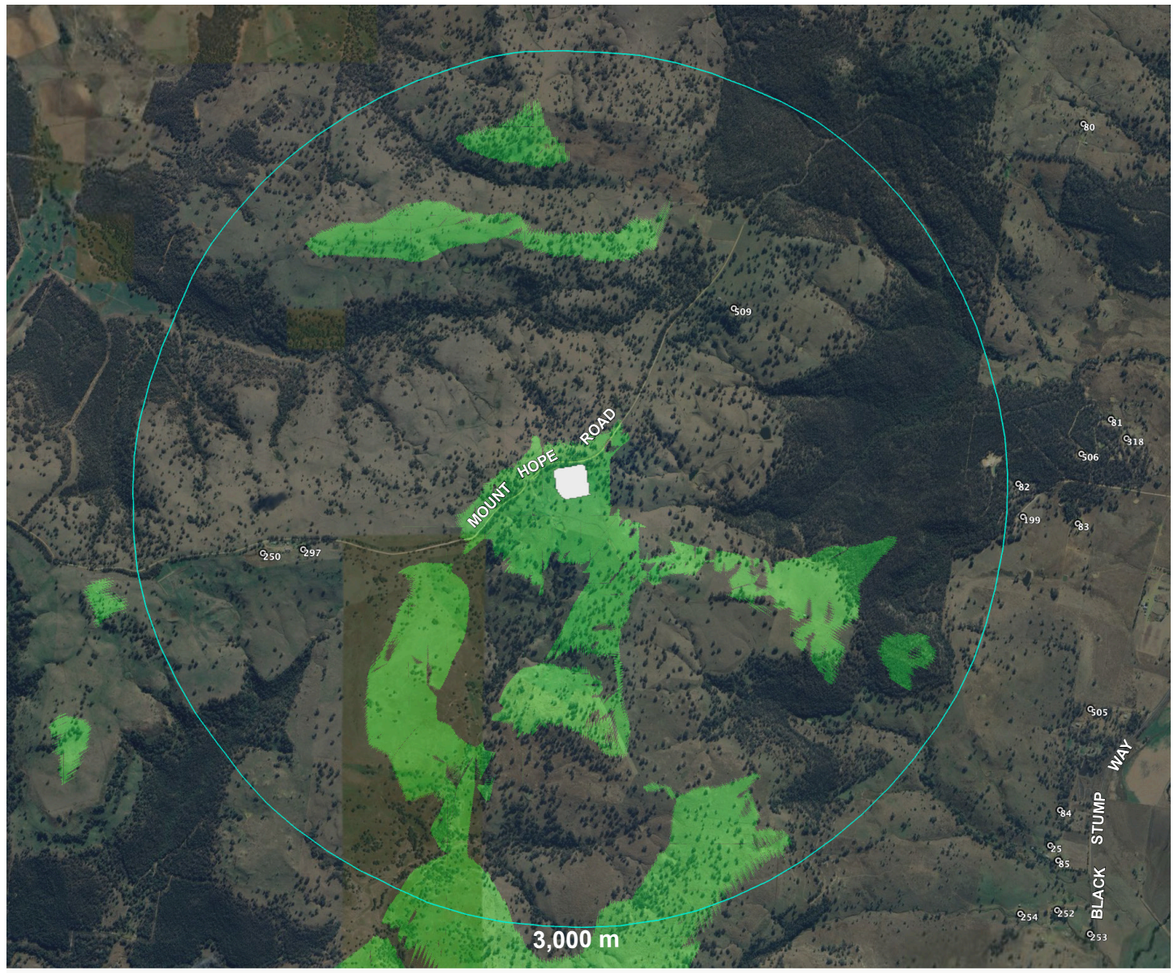


Figure 16. ZVI - Mount Hope (MH) Substation A

11.3.2 Mount Hope Substation B

The additional Mount Hope Substation is located adjacent to Mount Hope Road towards the north of the Mount Hope Cluster of the Project. The substation is approximately 10 kilometres west of Coolah. Mount Hope Road is a minor road with a low frequency of use. The ZVI prepared for the substation (refer to **Figure 17**) indicates potential for visibility along Mount Hope Road. Existing roadside vegetation will fragment views to the substation. Due to the low frequency of use of this road, and existing roadside vegetation, mitigation is not deemed necessary. No non-participating dwellings are located within 3,000

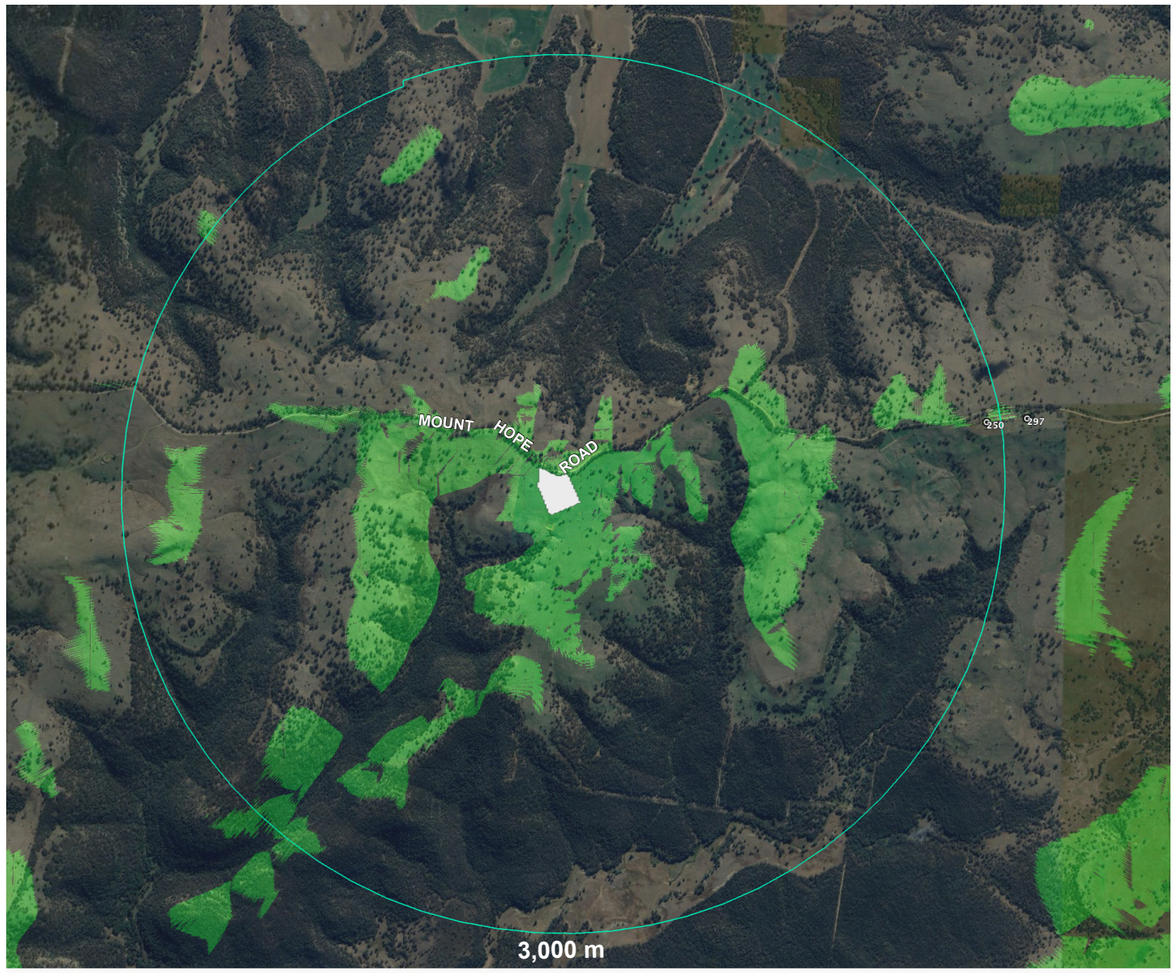


Figure 17. ZVI - Mount Hope Substation B

11.3.3 Girragulang Road Substation

The Girragulang Substation is located on the range associated with the Girragulang Road Cluster of the Project. The substation is set back in excess of 7 kilometres to the east of Black Stump Way. There are no non-participating dwellings within 3,000 metres of the sub. The ZVI prepared for the substation (refer to **Figure 18**) indicates topography will restrict views from most surrounding land. As a result of the siting, the substation will not be discernible and therefore mitigation measures are deemed unnecessary for this substation.

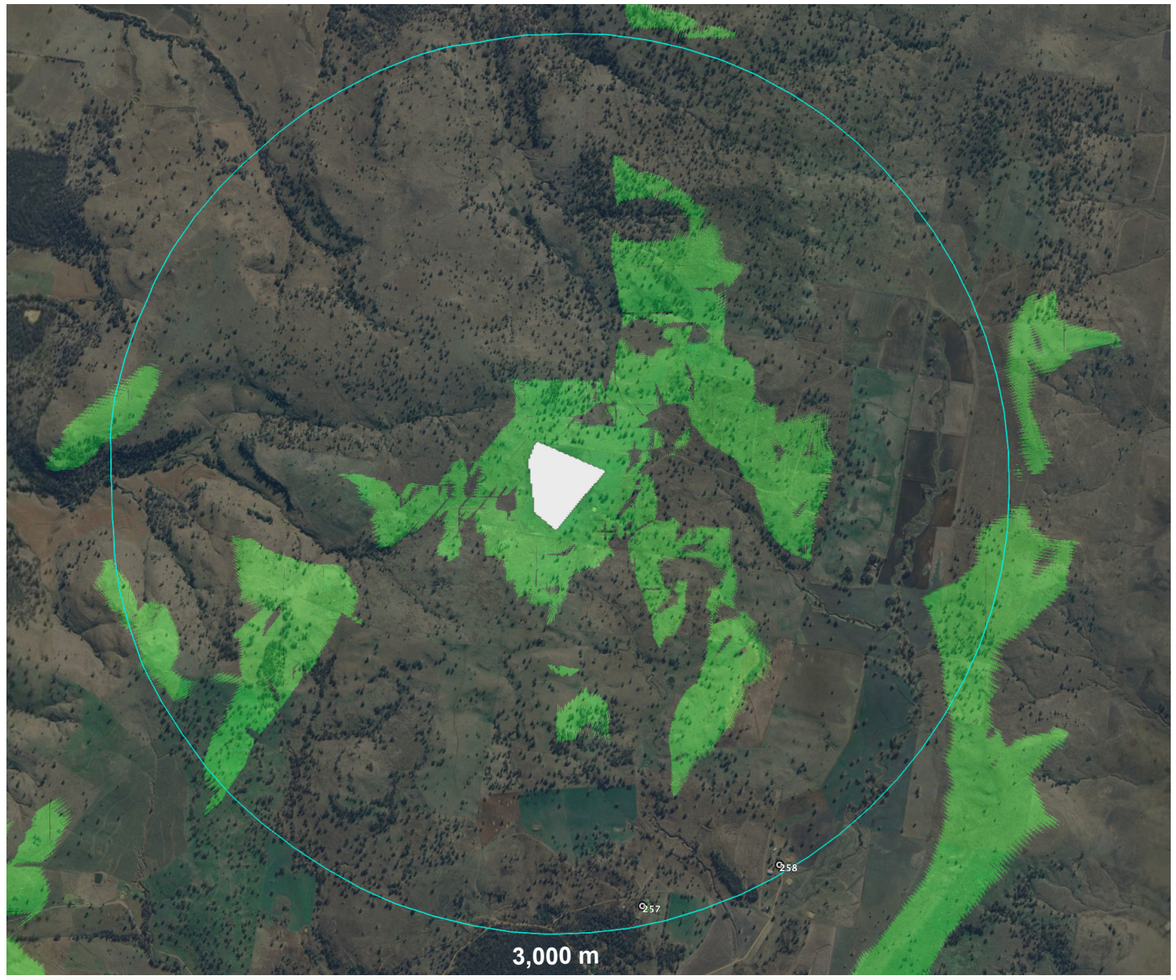


Figure 18. ZVI - Girragulang Road (GR) Substation

11.3.4 Leadville Substation

The Leadville Substation is located on a cleared area of land surrounded by vegetated rises. There are no non-participating dwellings within 3,000 metres of the substation. The ZVI prepared for the substation (refer to **Figure 19**) indicates topography will restrict views from most surrounding land. As a result of the siting, the substation will not be discernible and therefore mitigation measures are deemed unnecessary for this substation.

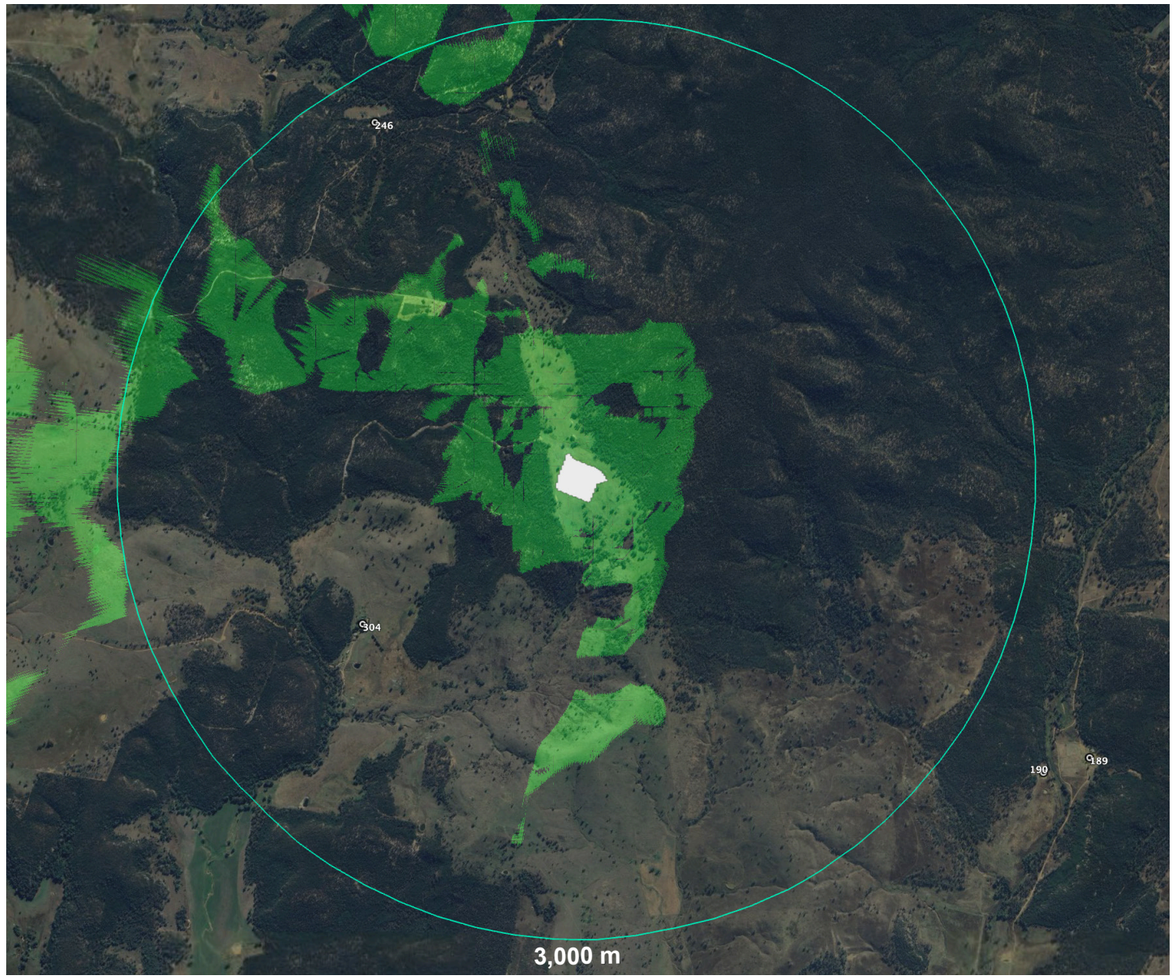


Figure 19. ZVI - Leadville (LV) Substation

12.0 Cumulative Visual Impacts

12.1 Cumulative Impacts: Central-West Orana REZ

Several submissions were made with concerns regarding the cumulative visual impacts resulting from the Liverpool Range Wind Farm (LRWF) and the Valley of the Winds (VOW) Wind Farm Projects. These concerns were generally in relation to the potential for the perception of the broader landscape character to be altered as a result of multiple wind farm projects in the Central-West Orana Region. There is a concern the perception of the area will be altered as wind turbines become a feature in the landscape. The degree to which the perception of the region is altered is highly subjective and down to personal judgement.

At the time of the EIS lodgement, the Bulletin required the Multiple Wind Turbine Tool (MWTT) to identify dwellings requiring assessment of potential cumulative visual impacts. The Bulletin states: *'the cumulative landscape and visual impacts be considered having regard to existing and approved wind energy project located within eight kilometres of the proposed wind energy project'.* An assessment in accordance with the Bulletin using the Multiple Wind Turbine Tool (MWTT) in the LVIA Report (2022) found that there are eight (8) non-participating dwellings located within 8 kilometres of Valley of the Winds and Liverpool Range Wind Farm with turbines located in more than two (2) 60 degree sectors.

Since the lodgement of the EIS in March 2022, DPE has adopted the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE, October 2022). These require an assessment of 'relevant future projects' during the process of preparing the EIS including:

- projects that have received SEARs but have not yet been submitted for assessment
- projects undergoing pre-SEARs consultation with the Department
- projects where there is market interest and the project has been publicly announced, but no formal application steps have been taken
- projects identified in a government plan or strategy (e.g. project identified in the State Infrastructure Strategy).

Due to the location within the Central-West Orana Renewable Energy Zone (REZ) there are a number of proposed Project at varying stages of the development (refer to **Figure 20**). The VoW Project is located within 8 kilometres of the proposed Barneys Reef Wind Farm (located to the south of Golden Highway. Cumulative impacts associated with Orana Wind Farm and the Revised Project will be considered as part of the EIS for the Orana Wind Farm project.

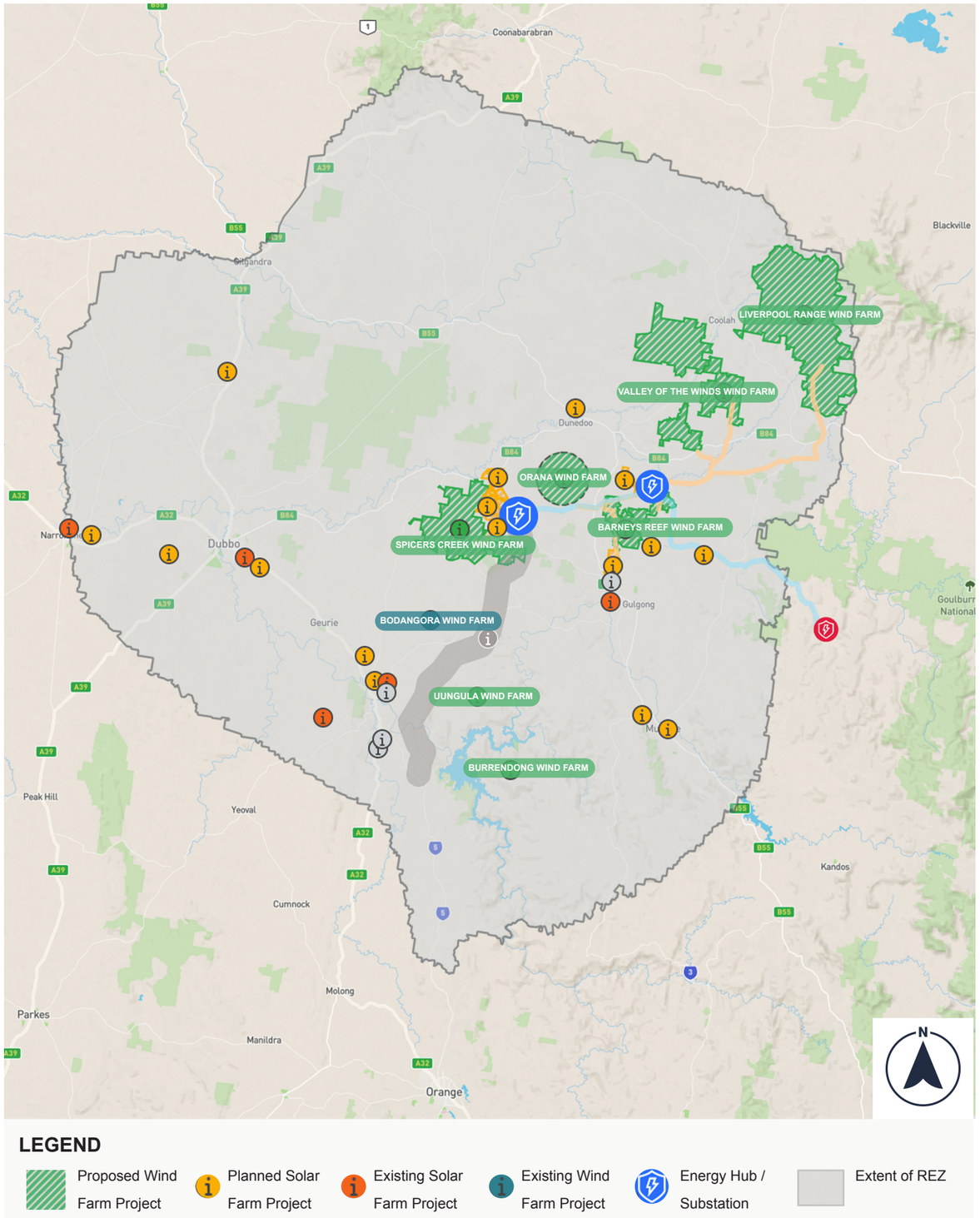


Figure 20. Central-West Orana Renewable Energy Zone (Source: https://www.energyco.nsw.gov.au)

12.2 Cumulative Impacts with Barneys Reef Wind Farm

Barneys Reef Wind Farm had SEARs issued in September 2021.As the Project is still in the EIS phase, detailed assessment of the cumulative visual impacts resulting from the two projects will be required in the Barneys Reef submission. A Zone of Visual Influence (ZVI) diagram has been prepared (see **Figure 21**) based on the information available on the Department of Planning Major Projects Planning Portal in May 2023.

The ZVI diagram indicates potential visibility of both projects from Castlereagh Highway and Golden Highway. Views to Barneys Reef Wind Farm are screened by topography from Leadville Village and Black Stump Way. There is potential to view both projects from dwellings to the south west of Valley of the Winds Project, associated with the village of Birriwa. The extent of visibility and resulting cumulative visual impacts will be required to be assessed in the EIS submission for Barneys Reef.

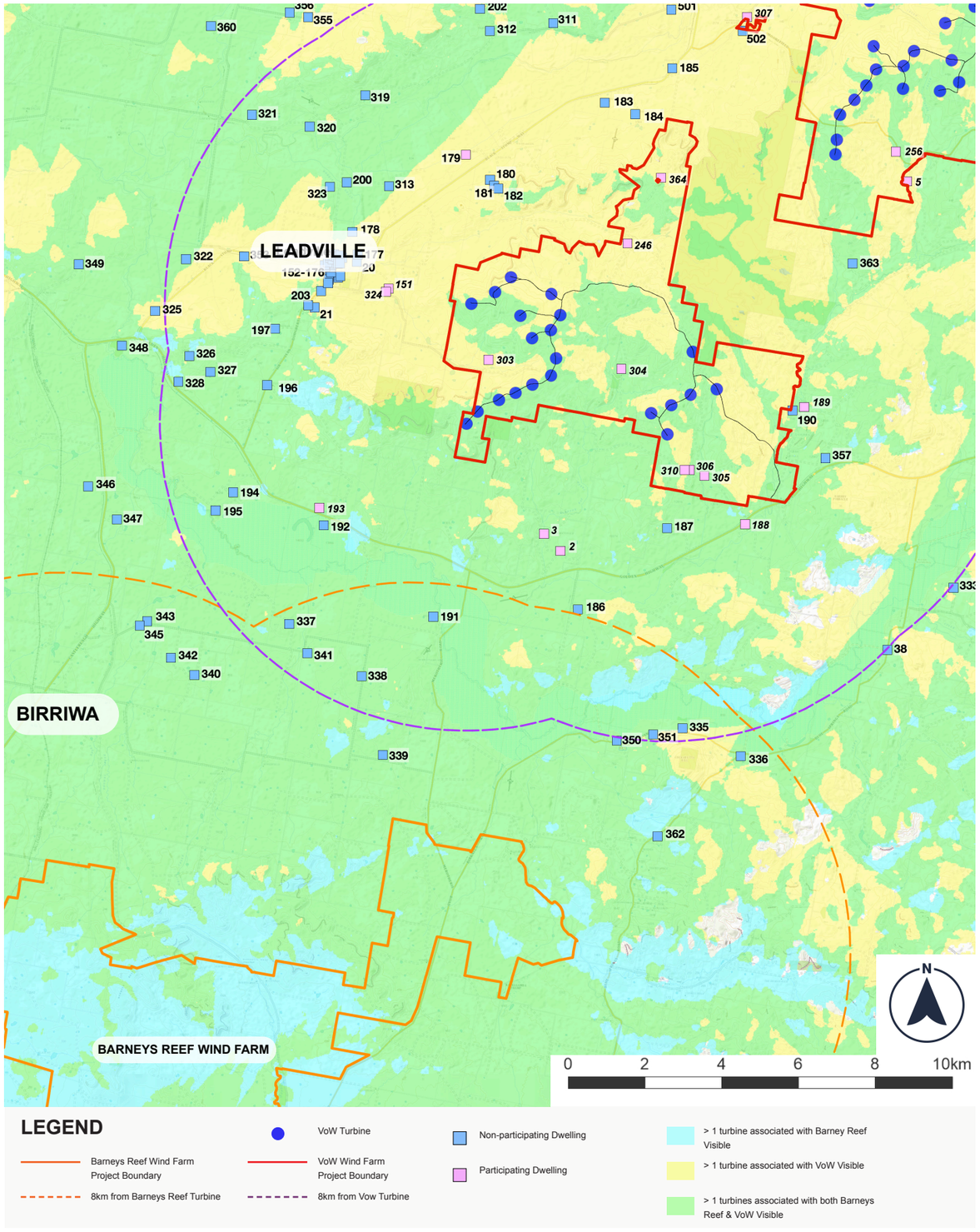


Figure 21. Cumulative Zone of Visual Influence - Barneys Reef & VoW Wind Farms

12.3 Cumulative Impacts with Liverpool Range Wind Farm

Aside from the application of the MWTT the Bulletin does not provide a methodology for further consideration of the cumulative visual impacts on the broader landscape. The Scottish Natural Heritage, *Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments* (Published March 2021) provides a methodology for the assessment of cumulative visual impacts resulting from nearby wind farm projects. There are two main types of cumulative visual impacts 'combined visibility' or 'sequential impacts'.

Combined Visibility:

> *Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Assessments should consider the combined effect of all wind farms which are (or would be) visible from relevant viewpoints. Combined visibility may either be in combination (where several wind farms are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the various wind farms). (Scottish Natural Heritage, 2021).*

Due to the distance between the two projects, opportunities for observers to view the two projects in combination from one viewpoint are restricted by topography and distance. Most opportunities to view the two projects together in closer proximity, views will be in succession. This is the case for areas surrouding and within Coolah with potential to view both Projects. An example of this is the photomontage prepared from Coolaburragundry River Walk, Coolah. Views to the two projects are available, however a viewer would have to turn to see each Project.

Assessment from Coolah found that due to existing built form and vegetation, there would be limited opportunities to view the two Projects concurrently. A wire frame diagram has been prepared (to illustrate a worst case scenario without built form or vegetation). The wire frame diagram (refer to **Figure 24**) indicates the distance between the two projects limits the opportunity to view the Projects concurrently in the one field of view.

Sequential Visibility:

> *Sequential impacts occur when the observer has to move to another viewpoint to see different developments. Sequential impacts should be assessed for travel along regularly-used routes like major roads, railway lines, ferry routes, popular paths, etc. The magnitude of sequential effects will be affected by speed of travel and distance between viewpoints.*

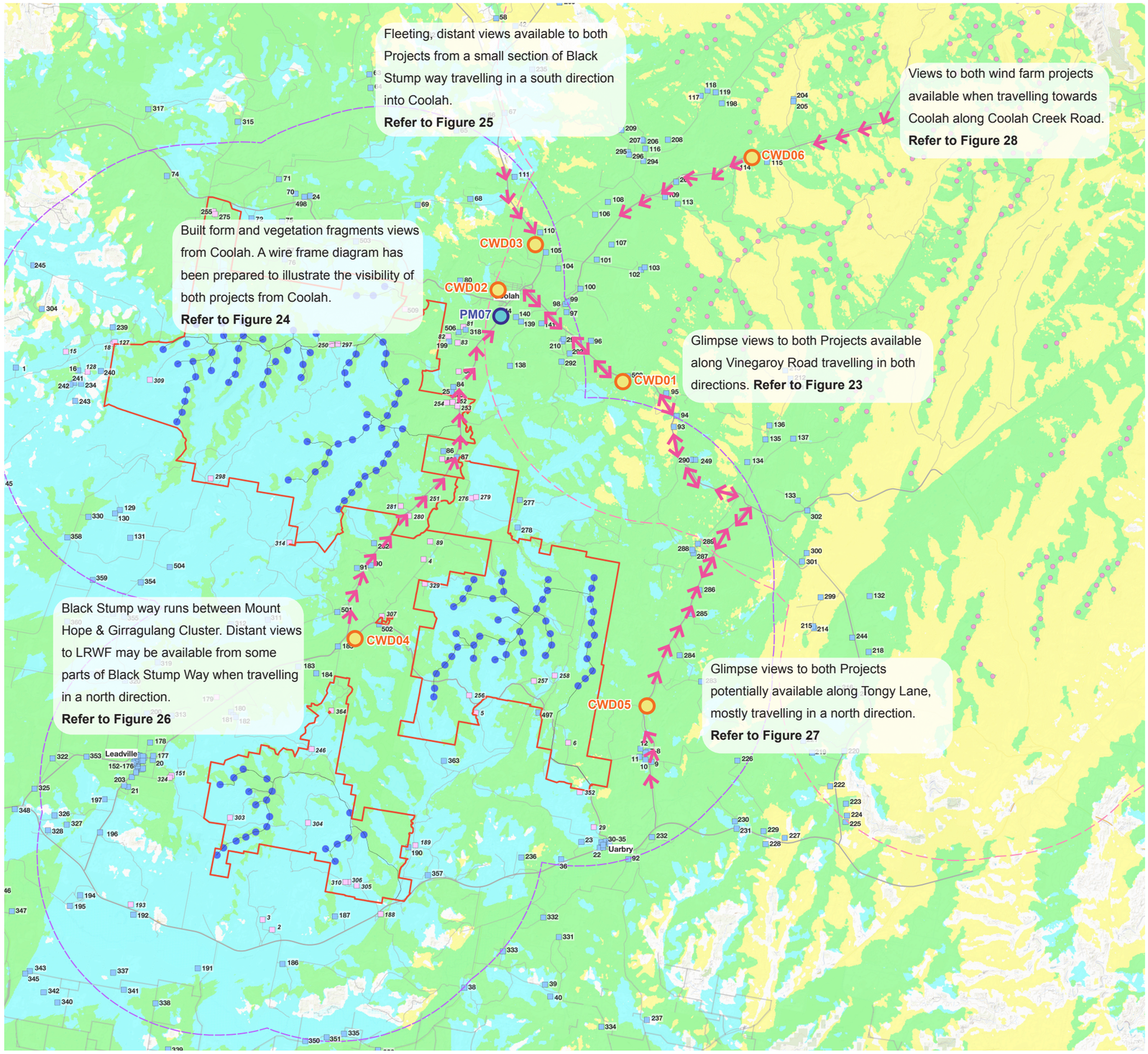
Opportunities for sequential impacts were considered from the following routes in the LVIA: Black Stump Way, Vinegaroy Road and Tongy Lane (as shown on **Figure 22**). Additional consideration of these routes and Coolah Creek Road have been provided in this Addendum.

A wire frame diagram has been prepared from Black Stump Way (refer to **Figure 26**) illustrating that when travelling from Leadville to Coolah, the distance to the LRWF turbines would be at such a range that they would be indiscernible to some viewers given the speed of travel along this road. Views from Black Stump Way heading into Coolah from the north are likely to be distant and limited by topography.

Vinegaroy Road runs through the middle of the two projects. At its closest point, Vinegaroy Road is in excess of 5 kilometres from the nearest turbine associated with VOW and approximately 2 kilometres from the LRWF. There are opportunities to views the two projects from the road, and considering the direction and speed of travel, motorists would have limited opportunities to view both Projects. A wire frame digram has been prepared from the rest area (refer to **Figure 23**).

Views to both projects are available from parts of Tongy Lane (as shown on **Figure 27**). Views to LRWF are distant for the most part. Tongy Lane is a minor route that is largely utilised by locals accessing properties.

Coolah Creek Road runs in a south west direction through the LRWF project towards Coolah. Views to the VoW Project are likely to be available in the far distance when travelling towards Coolah. Refer to **Figure 28.** Due to the distance the turbines would be indiscernible to most motorists.



Cumulative Zone of Visual Influence

Valley of the Winds Wind Farm & Liverpool Range Wind Farm

LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (2023 Layout)
- 8 km from nearest VoW turbine
- Proposed LRWF Turbine
- 8 km from nearest LRWF turbine
- Non-participating dwellings
- Participating dwellings
- Travel Route and direction of travel with potential visibility of both Projects
- CWD01 Cumulative Wire Frame Diagram Location
- Cumulative Photomontage Location

ZVI LEGEND

- > 1 turbine associated with VoW Visible
- > 1 turbine associated with LRWF Visible
- > 1 turbines associated with both LRWF & VOW Visible

N

0 2 4 6 8 10km

Figure 22. Cumulative Visual impact Assessment

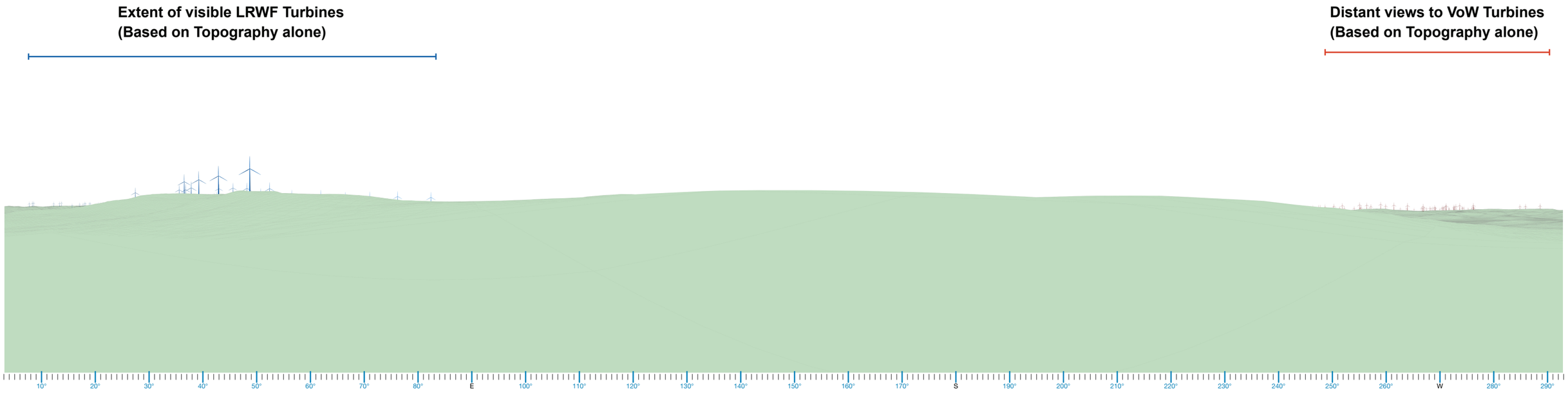


Figure 23. CWD01: Cumulative Wire Frame Diagram - Vinegaroy Road Rest Area

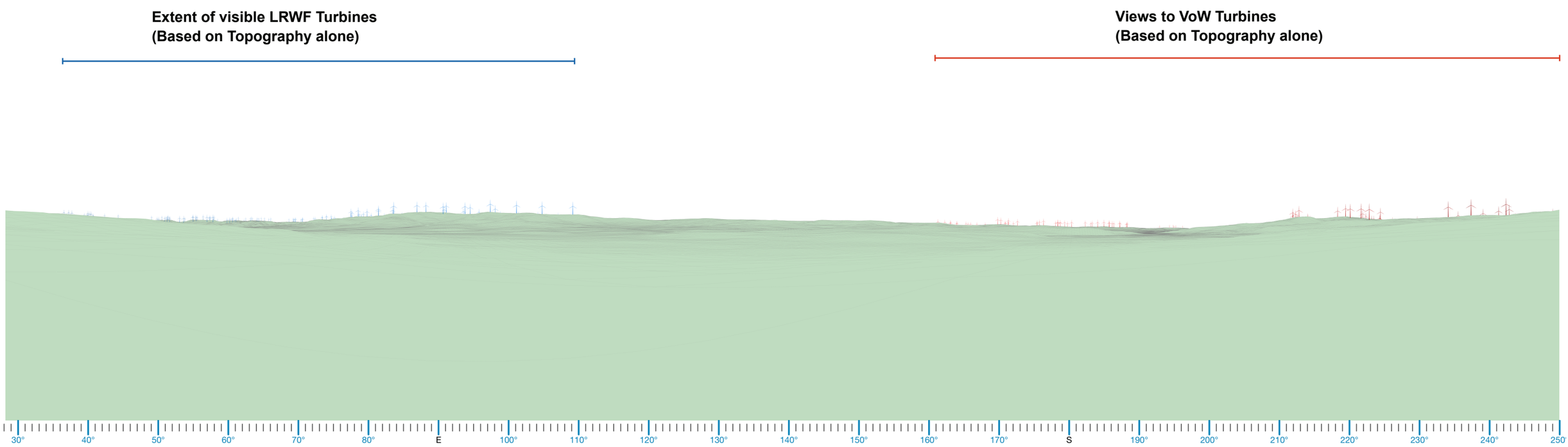


Figure 24. CWD02: Cumulative Wire Frame Diagram - Coolah

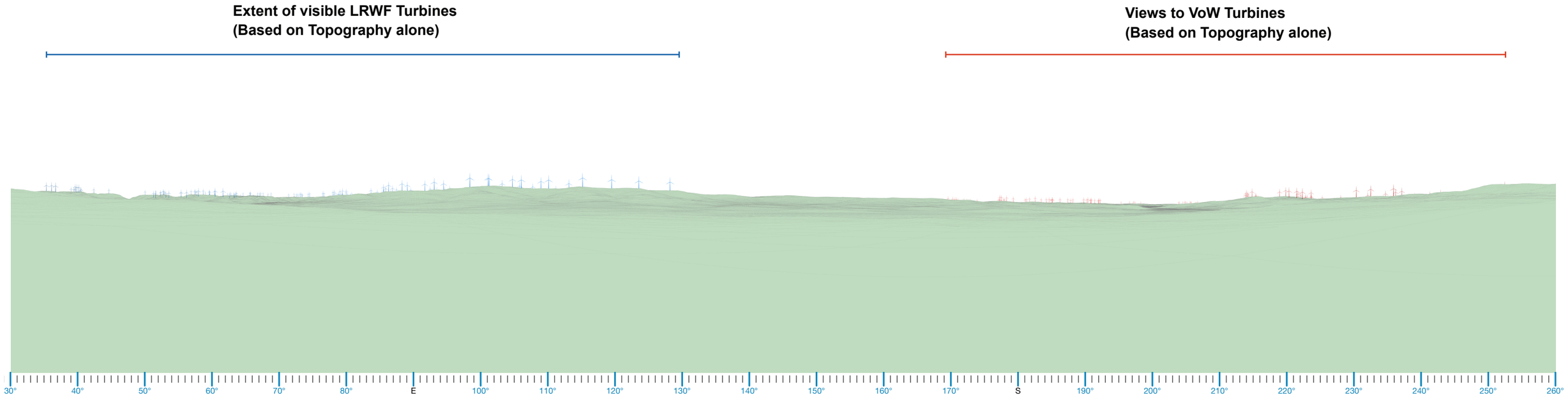


Figure 25. CWD03: Cumulative Wire Frame Diagram - Corner of Black Stump Way and Gundare Road (Heading into Coolah from the north)

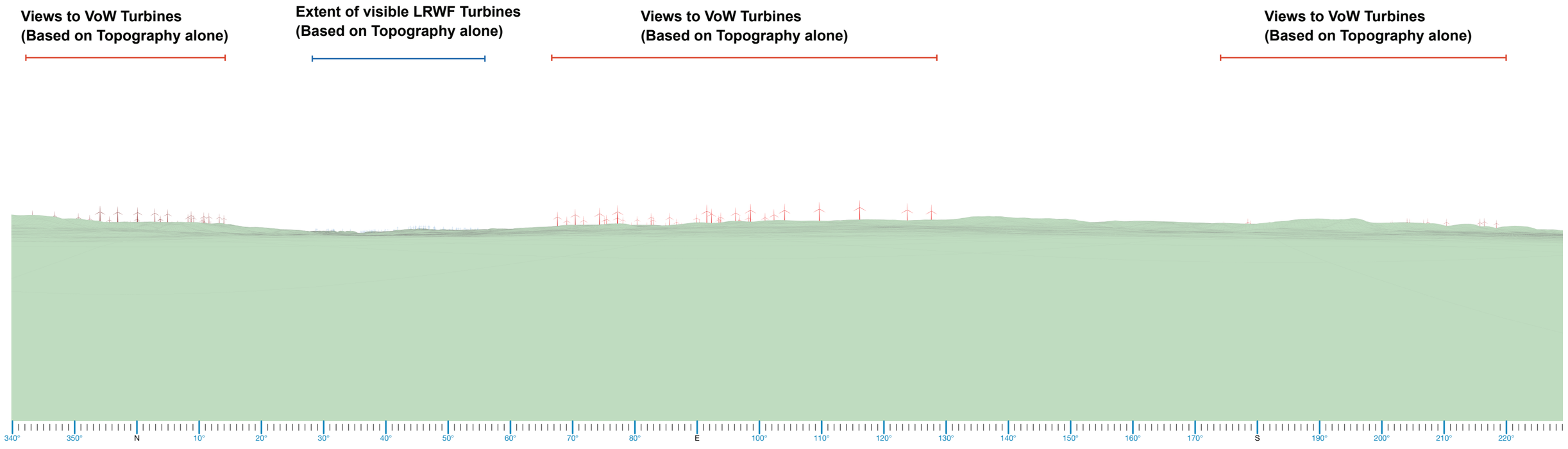


Figure 26. CWD04: Cumulative Wire Frame Diagram - Black Stump Way (Heading into Coolah from Leadville)

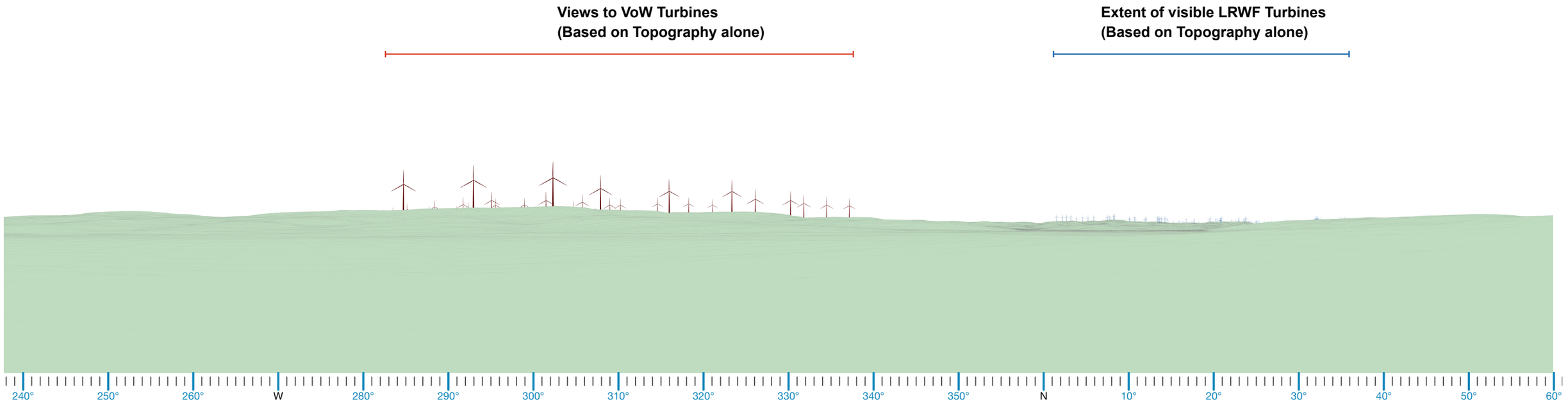


Figure 27. CWD05: Cumulative Wire Frame Diagram - Tongy Lane

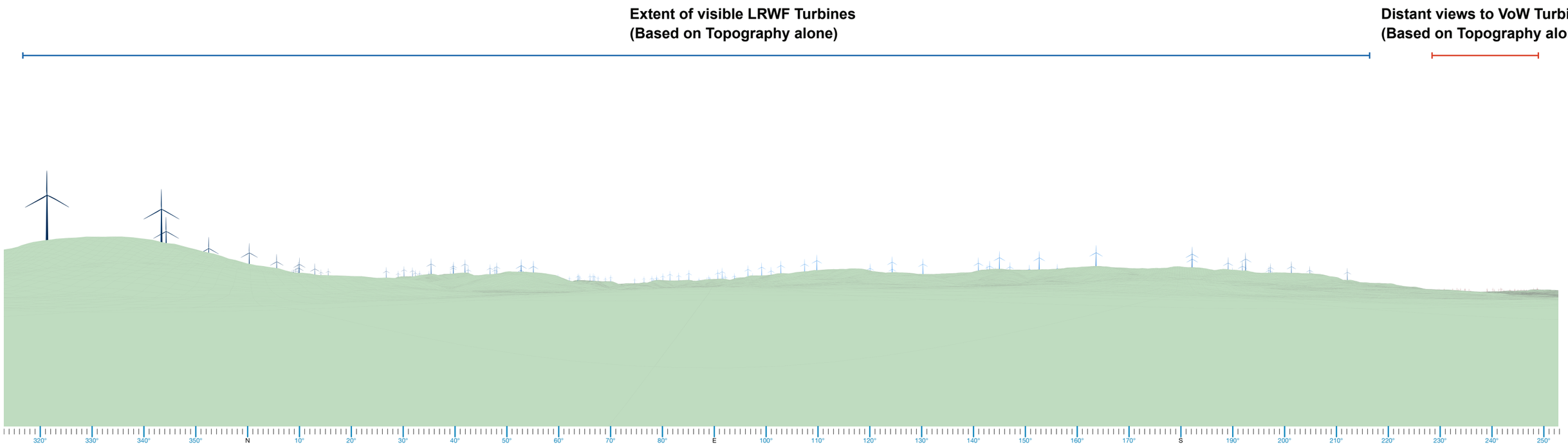


Figure 28. CWD06: Cumulative Wire Frame Diagram - Coolah Creek Road

13.0 Shadow Flicker Assessment

13.1 Shadow Flicker Assessment

Three submissions made reference to concerns of shadow flicker. Specific concerns were raised about the potential for shadow flicker to impact upon workers moving livestock.

As mentioned in Section 2.3, the status of dwellings 5, 18, 85, 88, 127, 151, 189, 324 and 505 has changed to ‘participating’. Hence, these dwellings have been excluded from this assessment.

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

There is no guidance on the acceptable level of shadow flicker on grazing land.

It is important to reiterate the extent of shadow flicker presented in the LVIA and this Addendum (refer to **Figure 29**) represents a worst case scenario. Assumptions for shadow flicker calculations are as follows:

- A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible turbines do not contribute to calculated flicker values.
- The calculated times are “worst case” given by the following assumptions:
  - The sun is shining all the day, from sunrise to sunset (with no cloud coverage).
  - The rotor plane is always perpendicular to the line from the WTG to the sun.
  - The WTG is always operating.

An updated shadow flicker diagram has been prepared for the Revised Layout (2023). **Figure 29** shows that short distances along Black Stump Way and Orana Road are likely to experience 0.1 - <10 hours of shadow flicker per year. There are no guidelines on acceptable shadow flicker along travel routes and public locations.

The shadow flicker diagram and assessment in **Table 15** provides an overview of the revised results of the shadow flicker assessment on non-participating dwelling. Five (5) non-participating dwellings have been identified as having the potential to experience shadow flicker, all of the which will be less than 30 hours per year which is deemed an acceptable level.

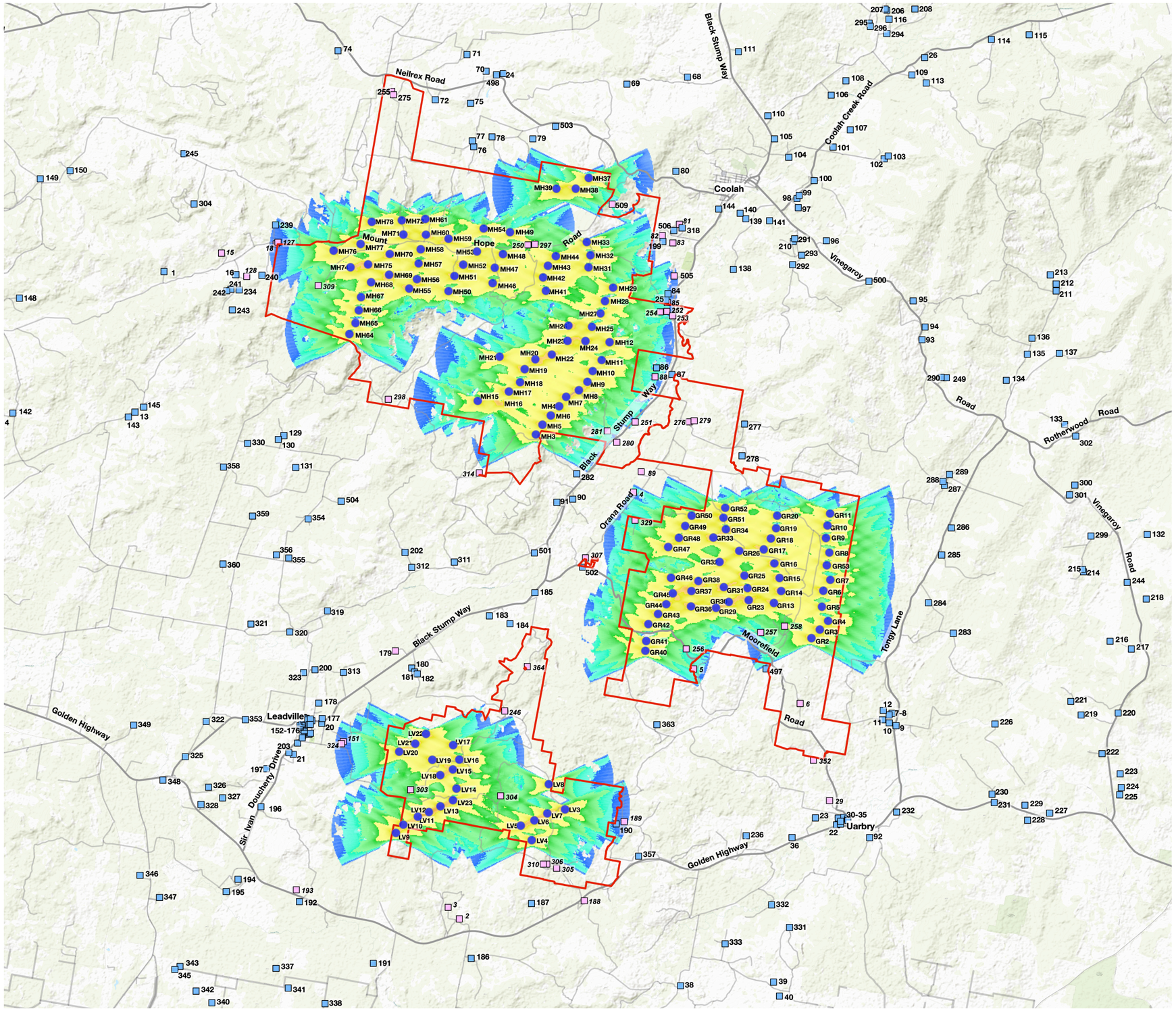
13.0 Shadow Flicker Assessment

ID	Shadow Hours per year (Superseded 2022 layout):	Shadow Hours per year (Revised 2023 layout):	Shadow Days per year (Superseded 2022 layout):	Shadow Days per year (Revised 2023 layout):	Max Shadow Hours per day (Superseded 2022 layout):	Max Shadow Hours per day (Revised 2023 layout):	Assessment Notes:
25	12:00 / Year	**11:45 / Year**	49	**48**	0:20	**0:20**	*Acceptable level (less than 30 hours per year). Reduction in duration of shadow hours per year.*
84	11:44 / Year	**11:29 / Year**	49	**48**	0:20	**0:20**	*Acceptable level (less than 30 hours per year). Reduction in duration of shadow hours per year.*
86	20:36 / Year	**20:36 / Year**	83	**83**	0:21	**0:21**	*Acceptable level (less than 30 hours per year). No variation in duration of shadow hours per year.*
190	7:16 / Year	**7:21 / Year**	28	**28**	0:20	**0:20**	*Acceptable level (less than 30 hours per year). Slight increase in duration of shadow hours per year. However, shadow days per year and shadow hours per day remain the same as assessed for Revised 2023 layout.*
239	9:12 / Year	**9:08 / Year**	50	**50**	0:15	**0:15**	*Acceptable level (less than 30 hours per year). Reduction in duration of shadow hours per year.*

Table 15. Non-participating dwellings with potential to experience shadow flicker

Revised Shadow Flicker Diagram

Valley of the Winds Wind Farm



LEGEND

- Project Boundary
- Proposed 250 m Turbine Location (2023 Layout)
- Non-participating dwelling
- Participating dwelling

Number of hours of potential shadow flicker per year:

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

N

0 2 4 6 8 10km

Figure 29. Revised Shadow Flicker Assessment

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