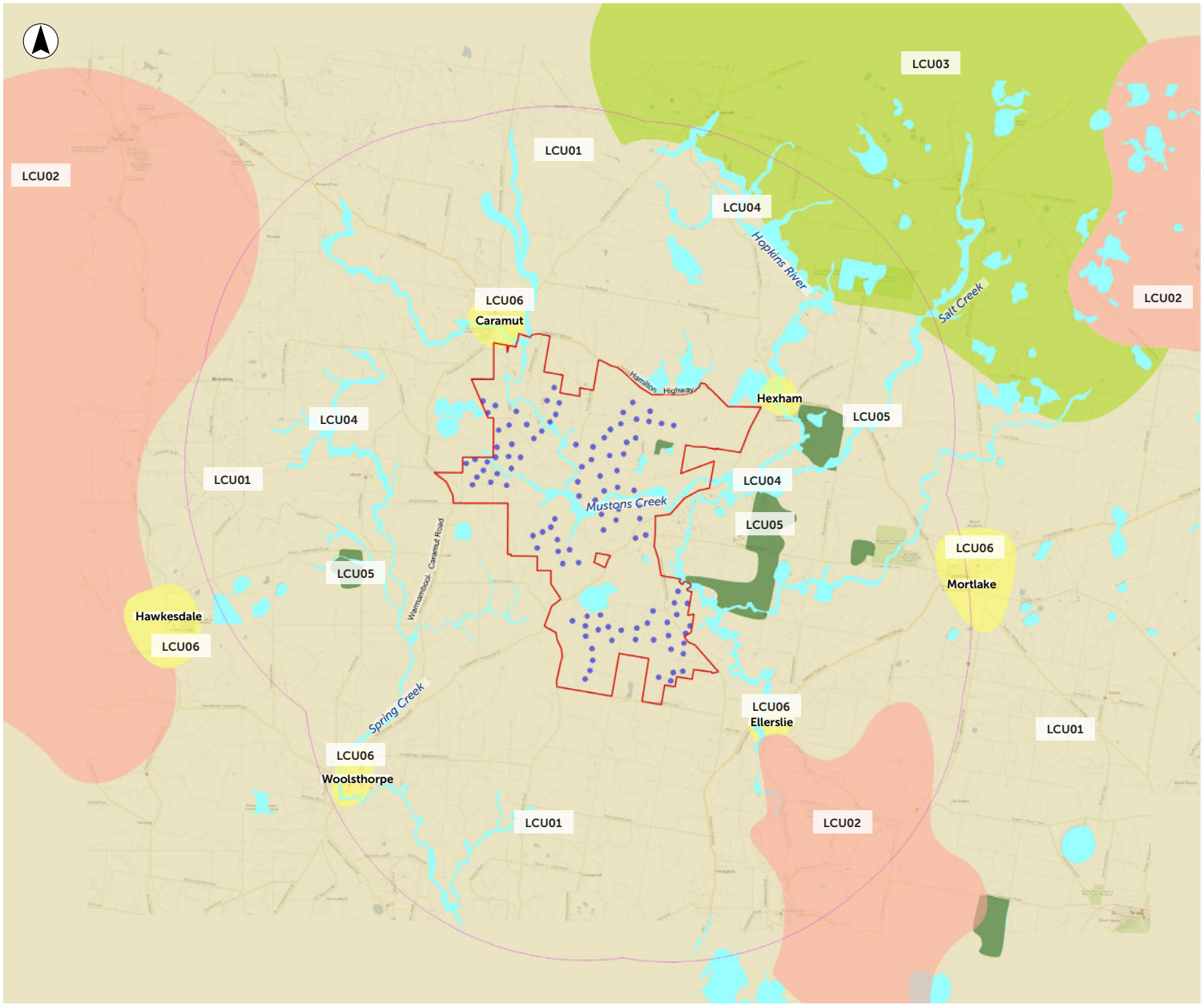


Figure 14.6 Landscape Character Units within the investigation area

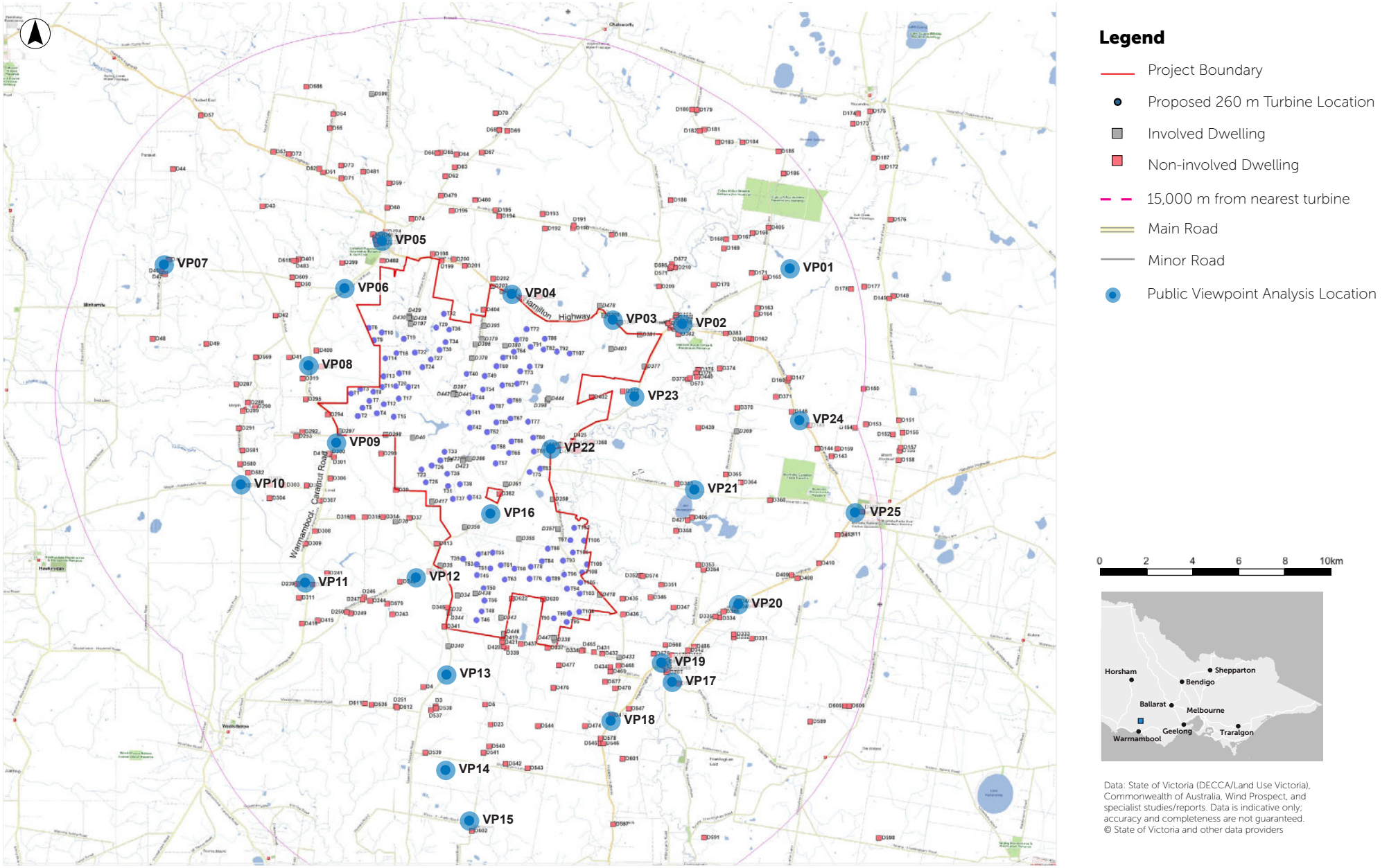
14.6.3 Viewpoints

The public viewpoints selected for the visual impact assessment are summarised in Table 14.7. The location of these viewpoints is shown in Figure 14.7.

Table 14.7 Public viewpoints

Viewpoint	Location	Distance to nearest turbine to viewpoints
VP01	Hexham-Woorndoo Road, Hexham	11.05 kilometres
VP02*	Hamilton Highway, Hexham	4.70 kilometres
VP03	Hamilton Highway, Hexham	2.05 kilometres
VP04*	Intersection of Boorktoi Road and Hamilton Highway, Hexham	1.85 kilometres
VP05*	Hamilton Highway, Caramut	4.25 kilometres
VP06	Intersection of Minhamite-Caramut Road and Warrnambool-Caramut Road, Caramut	2.36 kilometres
VP07	Minhamite-Caramut Road, Caramut	10.80 kilometres
VP08	Intersection of Purdeet Road and Warrnambool-Caramut Road, Caramut	2.50 kilometres
VP09*	Warrnambool-Caramut Road, Minjah	1.90 kilometres
VP10	Minjah-Hawkesdale Road, Minjah	6.70 kilometres
VP11*	Warrnambool-Caramut Road, Woolsthorpe	8.06 kilometres
VP12	Woolsthorpe-Hexham Road, Woolsthorpe	2.63 kilometres
VP13	Grassmere-Hexham Road, Ballangeich	2.96 kilometres
VP14	Intersection of Cooramook Lane and Wilsons Lane, Ballangeich	4.27 kilometres
VP15	Maes-Y-Porth Road, Grassmere	10.42 kilometres
VP16	Woolsthorpe-Hexham Road, Ellerslie	1.34 kilometres
VP17*	Ellerslie Cemetery, Ellerslie-Panmure Road, Ellerslie	5.73 kilometres
VP18	Hexham-Ballangeich Road, Ballangeich	5.53 kilometres
VP19	Ellerslie Memorial Park, Ellerslie	4.85 kilometres
VP20	Hopkins Highway, Ellerslie	7.73 kilometres
VP21	Connewarren Lane, Mortlake	6.00 kilometres
VP22	Intersection of Hexham-Ballangeich Road and Woolsthorpe-Hexham Road, Hexham	0.80 kilometres
VP23	Woolsthorpe-Hexham Road, Hexham	3.50 kilometres
VP24	Hamilton Highway, Mortlake	11.50 kilometres
VP25	Hamilton Highway, Mortlake	13.82 kilometres

**** Photomontage produced for viewpoint***



Data: State of Victoria (DECCA/Land Use Victoria), Commonwealth of Australia, Wind Prospect, and specialist studies/reports. Data is indicative only; accuracy and completeness are not guaranteed.

Figure 14.7 Location of public viewpoint analysis locations within the investigation area

14.6.4 Dwellings

There are 49 non-involved dwellings within three kilometres of a turbine. Of these, 39 dwellings are surrounded by screening elements such as vegetation and structures which will limit views to turbines. The location of these dwellings in relation to the project site is shown in Figure 14.8.

14.6.5 Operating and approved wind farms

Operating and approved wind farms within the investigation area, as well as wind farm proposals where a planning permit application has been lodged, are outlined in Table 14.8.

Table 14.8 **Wind farms operating, approved or pending approval (planning permit application lodged) within the investigation area**

Project status	Project name	Approved or constructed Maximum Turbine Height (blade tip azimuth)	Approx. distance (and direction) to project site
Operating	Mortlake South Wind Farm	186 metres	15 kilometres (southeast)
	Mortons Lane Wind Farm	150 metres	16 kilometres (northwest)
	Salt Creek Wind Farm	150 metres	14 kilometres (northeast)
	Dundonnell Wind Farm	189 metres	28 kilometres (northeast)
Construction completed, pending commissioning	Hawkesdale Wind Farm	180 metres	14 kilometres (southwest)
Approved	Woolsthorpe Wind Farm	180 metres	17 kilometres (southwest)
Pending approval	Mt Fyans Wind Farm	200 metres	4 kilometres (east)
	Darlington Wind Farm	240 metres	24 kilometres (east)

Operating and approved wind farms and existing high voltage transmission lines within the investigation area are shown in Figure 14.9.

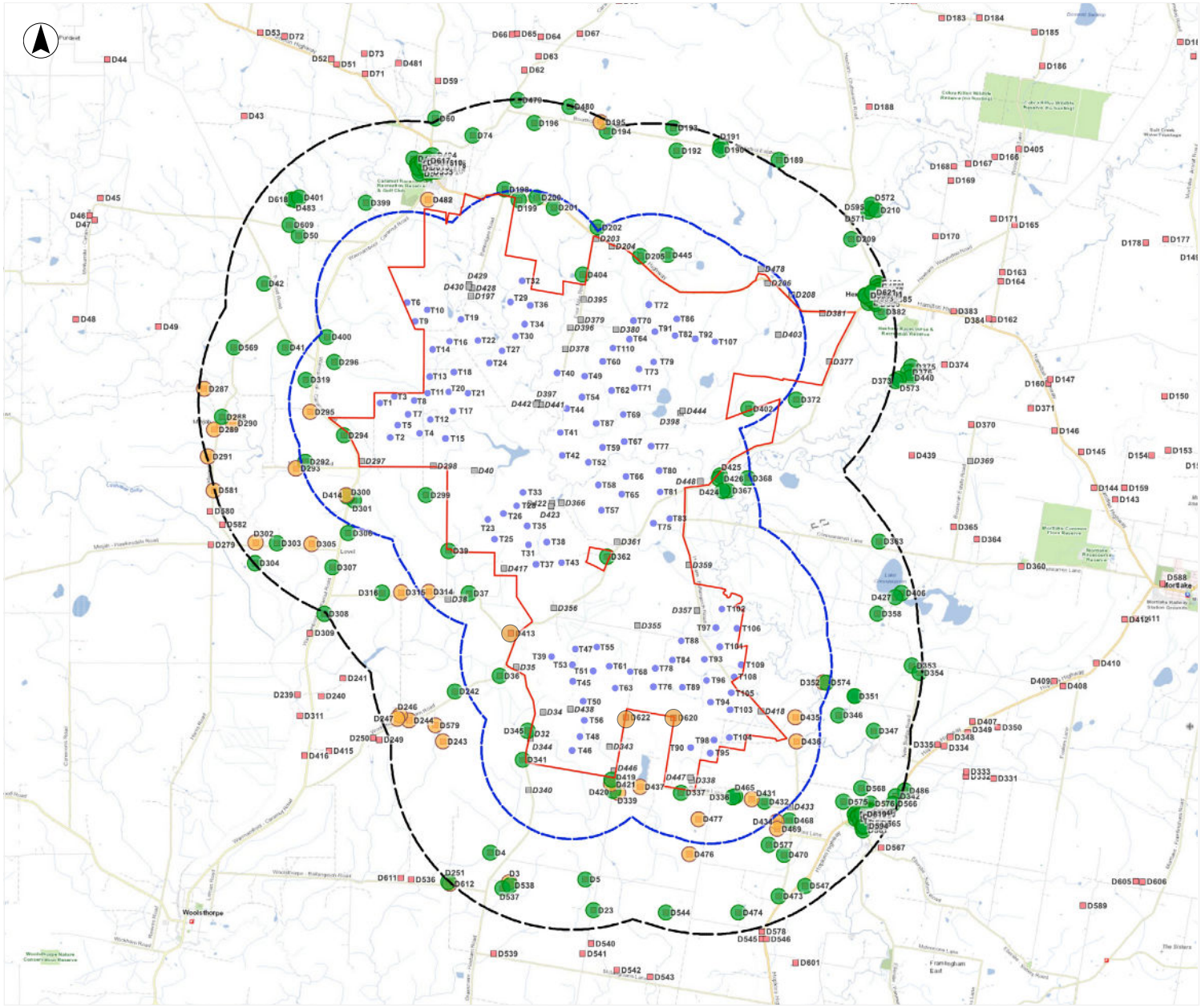


Figure 14.8 Dwellings within three kilometres of a wind turbine

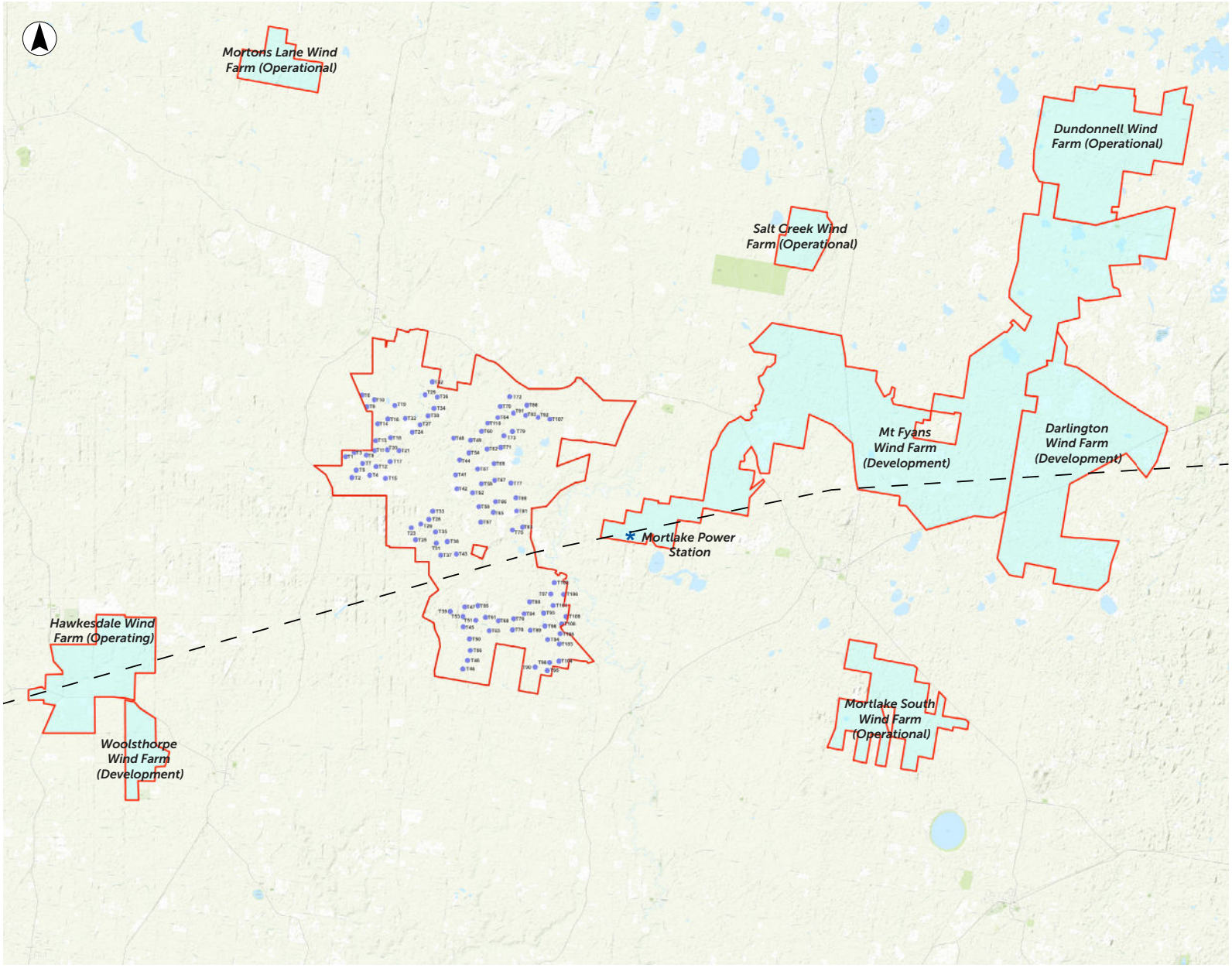


Figure 14.9 Existing operating and approved wind farms

14.7 Impact assessment

14.7.1 Impact pathways

Wind farm developments have the potential to cause visual impacts through changes to the landscape character and visual amenity. The project has the potential to cause visual impact through the following pathways:

- visual impact from publicly available viewpoints
- visual impact from private dwellings
- visual impact to landscape character
- visual impact due to night lighting on nacelle of wind turbines and from ancillary structures (e.g., site offices).

14.7.2 Design mitigation

This section highlights the design mitigation measures that have been adopted to minimise potential impacts of the project on landscape and visual amenity.

Siting and layout

Measures to minimise visual impacts to nearby residential dwellings and townships applied in the project design phase include:

- 1.5-kilometre buffer of non-involved dwellings, to the nearest wind turbine. This buffer distance is greater than the one-kilometre buffer required in the Victoria Planning Provisions
- A minimum three-kilometre buffer of surrounding townships to the nearest project wind turbine.

The layout and size of the wind farm has been designed to minimise the visual impact on the landscape and the and to locate the project infrastructure from sensitive viewing areas and key view lines.

To minimise the visibility of transmission lines, the project design incorporates underground cabling to connect wind turbines to the electricity grid, and utilises existing transmission infrastructure.

Materials and colouring

The turbines have been designed with a matte white (non-reflective) finish. Other factors to achieve visual consistency include uniformity of colour, design, rotational speed, height, and rotor diameter.

14.7.3 Environmental management measures

Where feasible, engineering design measures have been included to avoid potential landscape and visual impacts. The following management measures outlined in Table 14.9 have been proposed to manage these impacts during project design, construction and operation.

Table 14.9 Landscape and visual management measures

Landscape and visual impact	Project phase	Management measures	Number
Potential for the project to have a visual impact from publicly available viewpoints	Construction Operation	**On-site Landscaping Plan** 1. Prior to the commencement of construction, develop an On-site Landscaping Plan to screen substations, buildings and lower infrastructure and minimise visual impacts of the project. This plan will include details of plant species and plant maturity to be used, and a maintenance and monitoring program.	LV01
Potential for the project to have a visual impact to residential dwellings	Construction Operation	**Off-site Landscaping Plan** 1. Prior to the commencement of construction develop an Off-site Landscaping Plan for dwellings within six kilometres of a project turbine to minimise visual impacts of the project through the implementation vegetation screening of eligible dwelling rooms, in consultation with the landowner on a case-by-case basis. 2. Considerations and requirements for the screening of views from residential dwellings will include: a. placement of new landscaping to assist with screening views to project wind turbines b. vegetation height, with consideration of any zone and/or overlay planning requirements c. requirements of the Bushfire Management Overlay, where applicable, maintaining a 20-metre buffer between any landscape mitigation planting and existing vegetation, and a 10-metre buffer from the residence. 3. The Off-Site Landscaping Plan will include details of plant species and plant maturity to be used and a timetable for implementation of the landscaping works, including maintaining the landscaping for a period of at least two years from when the landscaping is planted. Evidence that the landscaping has been maintained will be provided to Moyne Shire Council for signoff that this condition has been satisfied.	LV02
Potential for visual impacts due to aviation obstacle lighting	Operation	**Aviation obstacle lighting design** 1. If aviation obstacle lighting is required, it will be installed as per the requirements of the Civil Aviation Safety Authority (CASA). To limit visual impacts of this lighting, obstacle lighting design prior to the commencement of construction will require: a. applying the lowest intensity obstacle lighting allowed b. applying shielding to restrict the downward spill of light to the ground plane by ensuring that no more than 5% of the nominal light intensity should be emitted at or below 5 degrees below horizontal c. no light to be emitted at or below 10 degrees below horizontal.	LV03

Landscape and visual impact	Project phase	Management measures	Number
Potential for visual impacts due to lighting of ancillary structures	Operation	**Lighting of other on-site facilities** 1. If lighting of other on-site facilities is required, lighting should be designed prior to the commencement of construction as per the requirements of Australian Standard *AS 4282:* Control of the obtrusive effects of outdoor lighting. These measures include: a. minimisation of security lighting throughout the wind farm, switching station and the sub-station to decrease the contrast between the wind farm and the nighttime landscape of the area b. use of motion detectors to activate nighttime security lighting when required, reducing the duration of lighting c. lighting design to ensure it is baffled and directed to the ground so that light spill onto nearby roads or residences is minimised.	LV04

14.7.4 Residual impacts

Following the development of design measures, an assessment of residual impacts was completed, describing the changes to the environment brought about by the construction, operation and eventual decommissioning of the project, and rating the significance of these impacts.

Construction

Construction activities would include the excavation and pouring of the wind turbine foundations, transportation and assembly of the various turbine components, construction of the terminal station and grid connecting infrastructure, upgrading and construction of new access tracks, and establishment of the operations and maintenance facilities. These construction activities would be short in duration and confined to discrete areas across the project site as construction of the project progresses.

Construction activities associated with wind farms can attract positive interest in relation to the construction techniques and methods unique to wind farm construction. For viewers who do not like the appearance of wind farms, the impact of project construction would be high. However, for others this impact would low – positive, although temporary.

Operation

Landscape character

The project is to be located within a predominantly rural landscape that has not been identified as significant or rare. The broad landscape character is dominated by established rural land, which consists primarily of modified flat to gently undulating hills. The project site is largely farming land that has been highly modified. While the project would become a feature of the visual landscape, given the highly modified landscape, it is likely that the broader character of area would remain intact.

The project is unlikely to be a noticeable element in the landscape and would not impact on the character of regional or state significance landscapes.

Table 14.10 provides an assessment of the potential visual impacts on the existing landscape character of the local area for each Landscape Character Unit.

Table 14.10 Impact on Landscape Character Units within the investigation area

Landscape Character Unit	Impact summary
Landscape Character Unit 1 Volcanic Plains	The project would result in a change to the existing landscape character from rural grazing land to a landscape with a dominant wind energy use. Roadside vegetation and windbreak vegetation is likely to limit some views.
Landscape Character Unit 2 Stony Rises	Distant views to the project may be available from some locations along the roads, however the project would form a small element in the landscape and the character of the Landscape Character Unit would remain intact.
Landscape Character Unit 3 Volcanic lakes and swamps	Distant views to the project may be available from some locations along the roads, however the project would form a minor element in the landscape and the character of the Landscape Character Unit would remain intact.
Landscape Character Unit 4 Waterways and wetlands	Views would be available from some locations where in close proximity to the project, however some views would be limited due to the riparian vegetation typical of the Landscape Character Unit.
Landscape Character Unit 5 Plantations	The Landscape Character Unit is a highly modified landscape with a low scenic quality rating. There is no public access available within these plantations. Views to the project would be limited by vegetation associated with the plantations. The project would not alter the existing character of the Landscape Character Unit.
Landscape Character Unit 6 Townships	Although the project is likely to be discernible from some areas within this Landscape Character Unit, it would not dominate the visual catchment. Existing vegetation and built form within the townships are likely to fragment or screen views. Due to the distance, the project would form a minor element in the overall visual landscape.

Viewpoints

The potential visual impact of the project was assessed from 25 public viewpoints from varying distances and locations surrounding the project site. Of the 25 viewpoints:

- Sixteen (16) public viewpoint locations were assessed as having a low visual impact rating
- Three (3) public viewpoint locations were assessed as having a moderate-low visual impact rating
- Six (6) public viewpoint locations were assessed as having a moderate visual impact rating.

A summary of this public viewpoint impact assessment is provided in Table 14.11 below.

Photomontages were produced for six public viewpoint locations, as indicated in Table 14.11. Photomontages produced for VP04 and VP09 are provided in Figure 14.10 and Figure 14.11, respectively. All photomontages are included in Appendix C of Appendix F1 – ***Landscape and Visual Impact Assessment.***

Table 14.11 Summary of visual impact ratings for public viewpoints

Viewpoint	Location	Visual sensitivity	Visual magnitude	Visual impact rating
VP01	Hexham-Woorndoo Road, Hexham	Low	Low	Low
VP02*	Hamilton Highway, Hexham	Low	Low	Low
VP03	Hamilton Highway, Hexham	Low	High	Moderate
VP04*	Intersection of Boorktoi Road and Hamilton Highway, Hexham	Low	High	Moderate
VP05*	Hamilton Highway, Caramut	Moderate	Low	Moderate-low
VP06	Intersection of Minhamite-Caramut Road and Warrnambool-Caramut Road, Caramut	Low	Low	Low
VP07	Minhamite-Caramut Road, Caramut	Low	Low	Low
VP08	Intersection of Purdeet Road and Warrnambool-Caramut Road, Caramut	Low	Low	Low
VP09*	Warrnambool-Caramut Road, Minjah	Low	Low	Low
VP10	Minjah-Hawkesdale Road, Minjah	Low	Low	Low
VP11*	Warrnambool-Caramut Road, Woolsthorpe	Low	Low	Low
VP12	Woolsthorpe-Hexham Road, Woolsthorpe	Low	High	Moderate
VP13	Grassmere-Hexham Road, Ballangeich	Low	Low	Low
VP14	Intersection of Cooramook Lane and Wilsons Lane, Ballangeich	Low	Low	Low
VP15	Maes-Y-Porth Road, Grassmere	Low	Low	Low
VP16	Woolsthorpe-Hexham Road, Ellerslie	Low	Moderate	Moderate-low
VP17*	Ellerslie Cemetery, Ellerslie-Panmure Road, Ellerslie	High	Low	Moderate
VP18	Hexham-Ballangeich Road, Ballangeich	Low	Low	Low
VP19	Ellerslie Memorial Park, Ellerslie	High	Low	Moderate
VP20	Hopkins Highway, Ellerslie	Low	Low	Low
VP21	Connewarren Lane, Mortlake	Low	Low	Low
VP22	Intersection of Hexham-Ballangeich Road and Woolsthorpe-Hexham Road, Hexham	Low	High	Moderate
VP23	Woolsthorpe-Hexham Road, Hexham	Low	Moderate	Moderate-low
VP24	Hamilton Highway, Mortlake	Low	Low	Low
VP25	Hamilton Highway, Mortlake	Low	Low	Low

** Photomontage produced for viewpoint*

Existing View | 180° Baseline Panorama

Proposed View | 180° Photomontage

Figure 14.10 VP04: Intersection of Boorktoi Road and Hamilton Highway, looking south (Top: existing view; Bottom: project photomontage) (Source: Moir Landscape Architecture)