

10.1 Photomontages

Photomontages have been prepared by Truescape Visual Communication to illustrate the likely location of the Collector Wind Farm turbines following construction. Five public viewpoints were selected for the Collector Wind Farm (Viewpoints 01 to 05) to illustrate the wind farm from view locations in surrounding areas. Two viewpoints were included for two of the three non associated residences within a 2km distance from proposed wind turbine locations (Viewpoints 101 and 104). The third non associated residence within 2km (R18) has not granted permission to undertake a photomontage from their property.

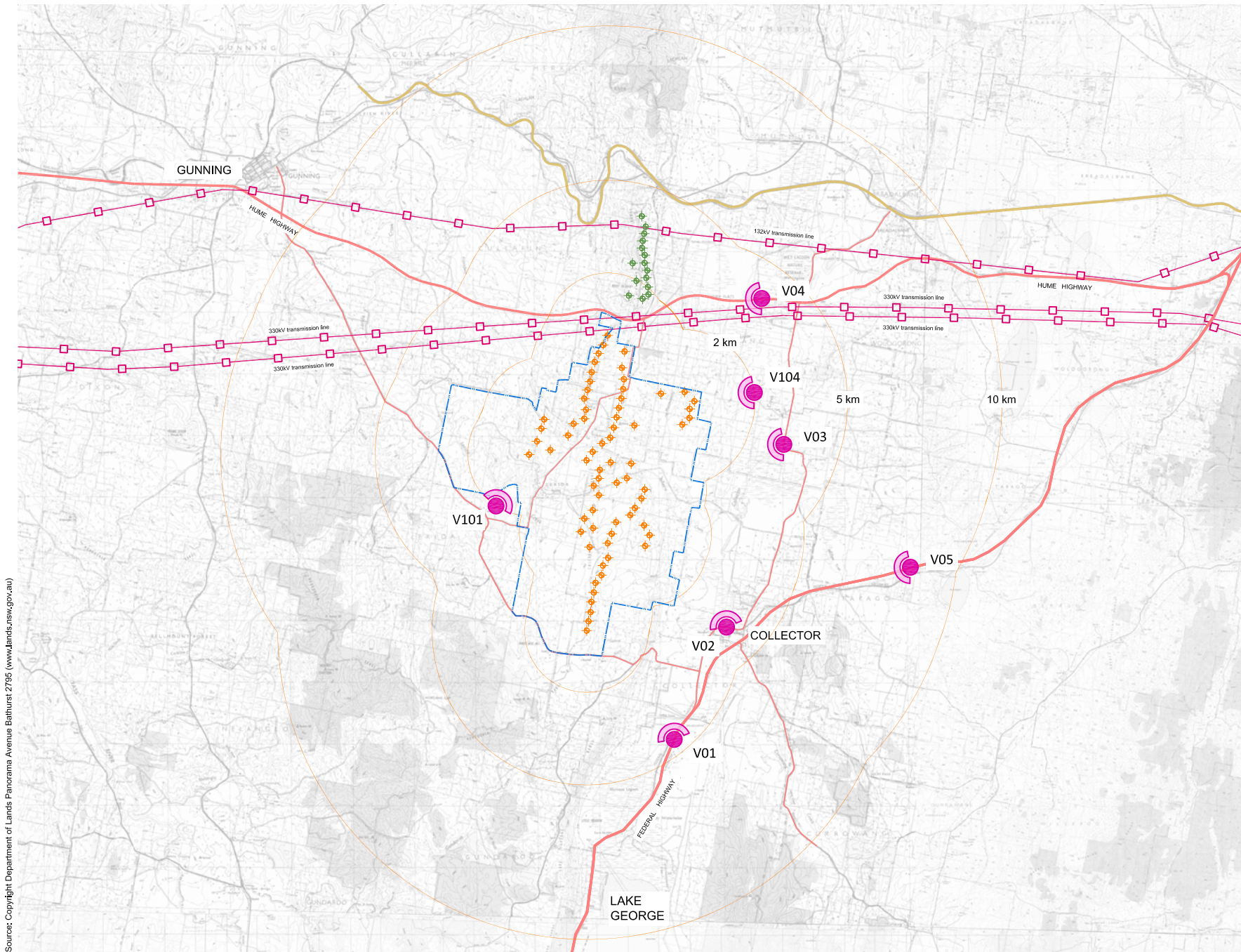
Additional photomontages have been prepared from a number of private residential properties surrounding the project for discussions between the Proponent and non associated property owners but, in accordance with the owners' requests, these photomontages have not been illustrated or included within this LVIA.

The photomontages locations are illustrated in **Figure 19** and presented in the following figures:

- **Figure 20**, Viewpoint 01, view from Federal Highway South of Collector;
- **Figure 21**, Viewpoint 02 view from Bushrangers Hotel, Collector Village;
- **Figure 22**, Viewpoint 03 view from Breadalbane Road;
- **Figure 23**, Viewpoint 04 from Hume Highway;
- **Figure 24**, Viewpoint 05 view from Federal Highway North of Collector;
- **Figure 25**, Viewpoint 101 view from private residence R5; and
- **Figure 26**, Viewpoint 104 view from private residence R16.








The photomontage methodology adopted by Truescape is described in **Appendix B**. Large format copies of each photomontage have been appended to the EA.

The photomontages have been prepared using the former design layout of 69 turbines and do not illustrate the current design layout of 68 turbines following the removal of turbine #64. The photomontages will be updated to reflect the current layout, including micro-siting of individual turbine locations during test of adequacy review and prior to public exhibition.



Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

Legend

-  Photomontage Location
-  Proposed Collector turbine
-  Existing Cullerín turbine
-  Collector Wind Farm Site Boundary
-  Highway or Local Road
-  Main Southern Railway
-  Existing 132/330kV transmission line

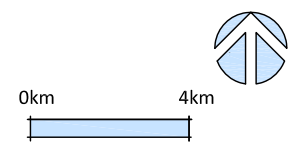


Figure 19
Photomontages Location



COLLECTOR WIND FARM



Photomontage Viewpoint 01 Federal Highway, view north west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 01 Federal Highway - detail view



Photomontage Viewpoint 02 Bushrangers Hotel Collector Village, view north west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 02 Bushrangers Hotel Collector Village - detail view



Photomontage Viewpoint 03 Breadalbane Road, view south west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 03 Breadalbane Road - detail view



Photomontage Viewpoint 04 Hume Highway, view west/south west toward proposed Collector Wind Farm and operational Cullerin Wind Farm

Refer detail below



Photomontage Viewpoint 04 Hume Highway - detail view



Photomontage Viewpoint 05 Federal Highway North of Collector, view west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 05 Federal Highway North of Collector - detail view



Photomontage Viewpoint 101 Private Residence R5, view north east to north west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 101 Private Residence R5, view north east to north west toward proposed Collector Wind Farm - detail view



Photomontage Viewpoint 104 Private Residence R16, view north west to south west toward proposed Collector Wind Farm

Refer detail below



Photomontage Viewpoint 104 Private Residence R16, view north west to south west toward proposed Collector Wind Farm - detail view

11.1 Introduction

The Project may require obstacle marking and lighting at night time or during periods of reduced visibility. The requirement for lighting would be subject to the advice and endorsement of the Civil Aviation Safety Authority (CASA). CASA is currently undertaking a safety study into the risk to aviation posed by wind farms and may develop a new set of guidelines to replace the Advisory Circular with regard to lighting for wind turbines that was withdrawn by CASA in mid 2008.

Although the Proponent does not consider that the installation of night time lighting would be required, the following information has been provided in order to ensure that a full assessment was carried out in accordance with the DGR's.

In accordance with the CASA Advisory Circular two red medium intensity obstacle lights are required on specified turbines at a distance not exceeding 900m with all lights to flash synchronously. To minimise visual impact some shielding of the obstacle lights below the horizontal plane is permitted.

Lighting for aviation safety may also be required prior to and during the construction period, including lighting for large equipment such as cranes.

Potential visual impacts associated with obstacle marking and lighting at night time have not been extensively researched or tested in New South Wales, although some site investigations have been carried out at existing wind farms in Victoria. Investigations have generally concluded that although night time lighting mounted on wind turbines may be visible for a number of kilometres from the wind farm project area, the actual intensity of the lighting appears no greater than other sources of night time lighting, including vehicle head and tail lights.

In order to illustrate the potential visual effect of turbine mounted lighting a series of night time photographs were taken of the Cullerin Wind Farm in the New South Wales Southern Tablelands. These were taken at distances of 500m, 3.5km and 17km from the turbines and are illustrated in **Figures 27, 28 and 29**. Each night time view is presented below a corresponding day time photograph taken from the same photo location. It should be noted that following community consultation, and the preparation of an aeronautical impact risk assessment, Origin Energy removed night time obstacle lighting from the Cullerin wind turbines.

11.2 Existing light sources

A small number of existing night time light sources occur within the Collector Wind Farm viewshed, and include residential and general lighting around Collector.

Localised lighting is associated with a small number of dispersed homesteads located within the project boundary, but lighting is unlikely to be visually prominent and does not emit any significant illumination beyond immediate areas surrounding residential and agricultural buildings.

Lights from vehicles travelling along the local roads provide dynamic and temporary sources of light.

11.3 Potential light sources

The main potential light sources associated with the Project would include:

- Night lights of control and auxiliary buildings; and
- Night time obstacle lights mounted on some wind turbines.

In accordance with the withdrawn CASA Advisory Circular (Refer **Appendix A**) two red medium intensity obstacle lights were required on specified turbines at a distance not exceeding 900m and all lights were to flash synchronously. To minimise visual impact some shielding of the obstacle lights below the horizontal plane was permitted. Lighting for aviation safety could also be required prior to and during the construction period, including lighting for large equipment such as cranes.

In addition to the standard level of lighting required for normal security and safety, lighting could also be required for scheduled or emergency maintenance around the control building, substation and wind turbine areas.

As the visibility of the substation and control room would be largely contained by the surrounding landform, it is unlikely that light spill from these sources would be visible from the majority of surrounding view locations including surrounding residences.

11.4 Potential view locations and impact

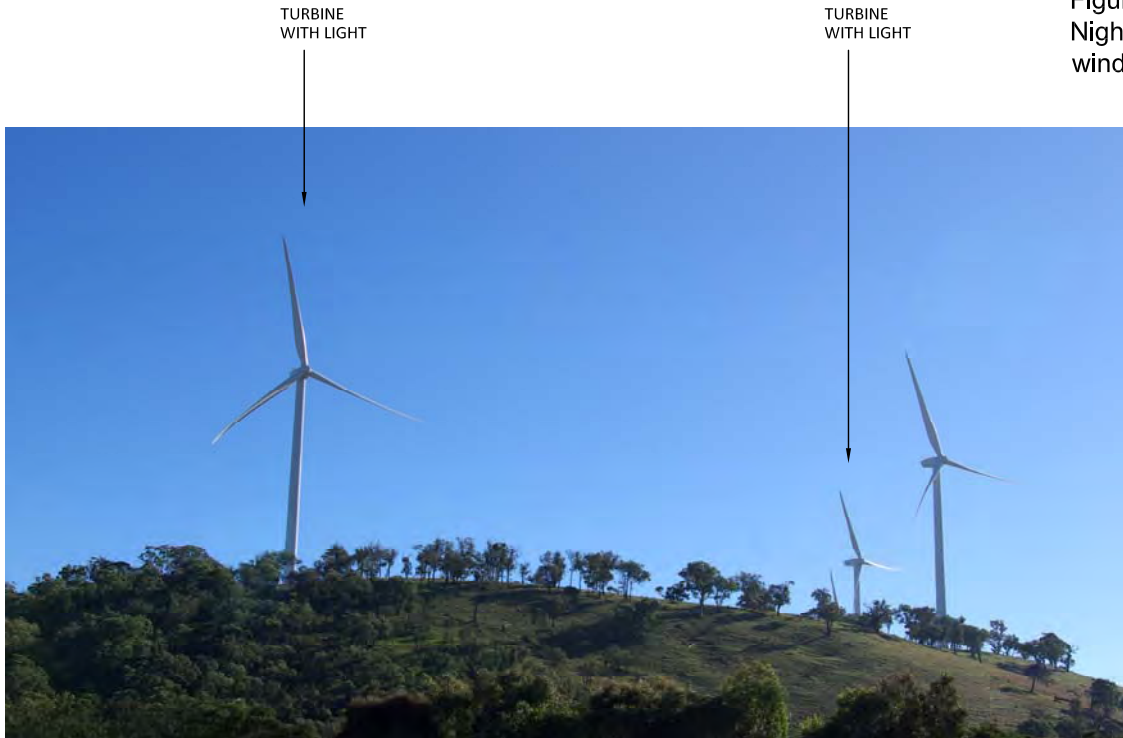
The categories of potential view locations that could be impacted by night time lighting generally include residents and motorists.

Night time lighting associated with the wind farm is unlikely to have a significant visual impact on the majority of public view locations. Whilst obstacle lighting would be visible to motorists travelling along the local roads, the duration of visibility would tend to be very short and partially screened by undulating landform along some sections of local road corridors and influenced by the direction of travel.

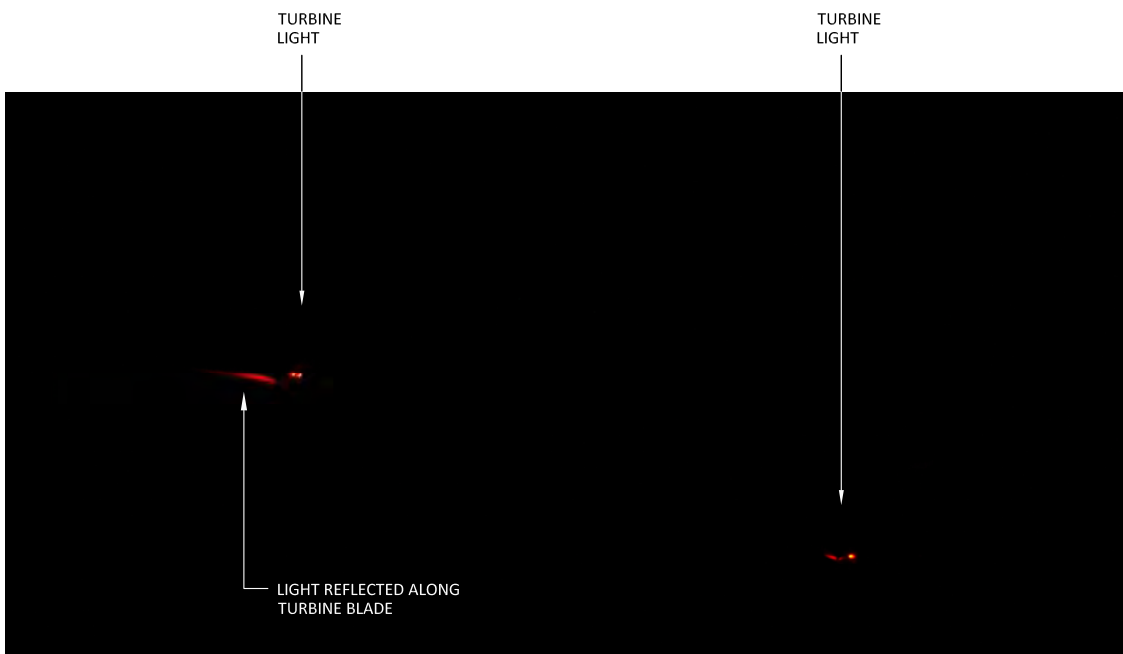
Night time obstacle lighting associated with the wind farm would be visible from a number of the residential view locations surrounding the Collector Wind Farm; however, topography and screening by vegetation and screen planting around residential dwellings would screen or partially obscure views toward night time obstacle lighting.

Irrespective of the total number of visible lights, obstacle lighting is more likely to be noticeable from exterior areas surrounding residences rather than from within residences, where internal lighting tends to reflect and mirror views in windows, or where exterior views would be obscured when curtains and blinds are closed.

Figure 27
Night Lighting Cullerin
wind farm at 500m



DAY TIME VIEW FROM HUME HIGHWAY TOWARD
CULLERIN WIND FARM AT AROUND 500M

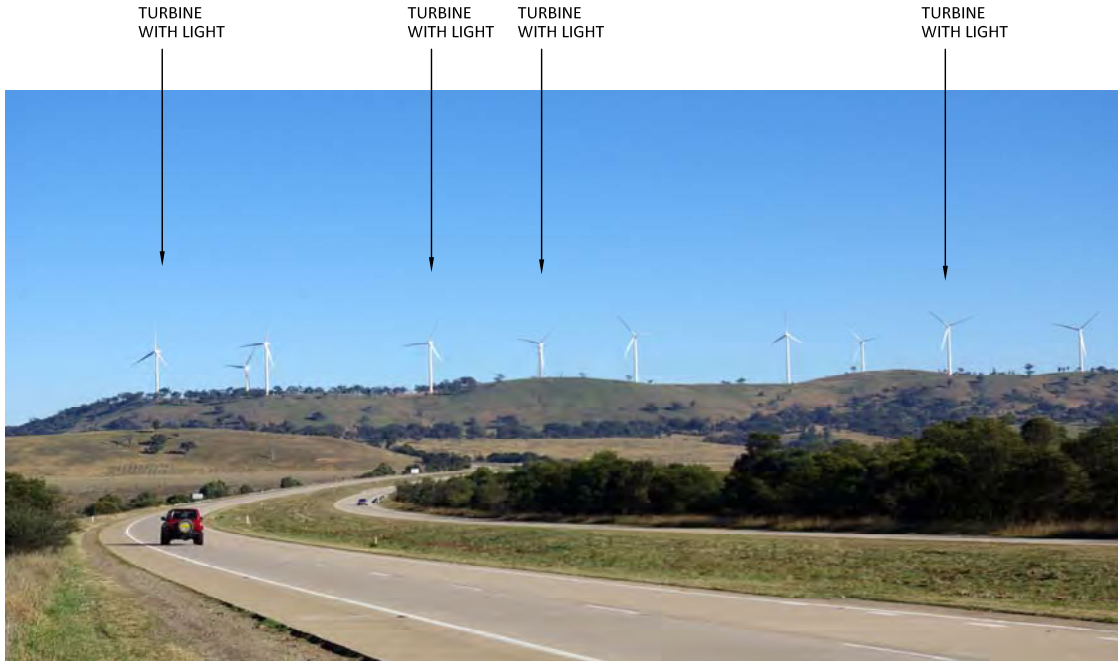


NIGHT TIME VIEW FROM HUME HIGHWAY TOWARD
CULLERIN WIND FARM AT AROUND 500M

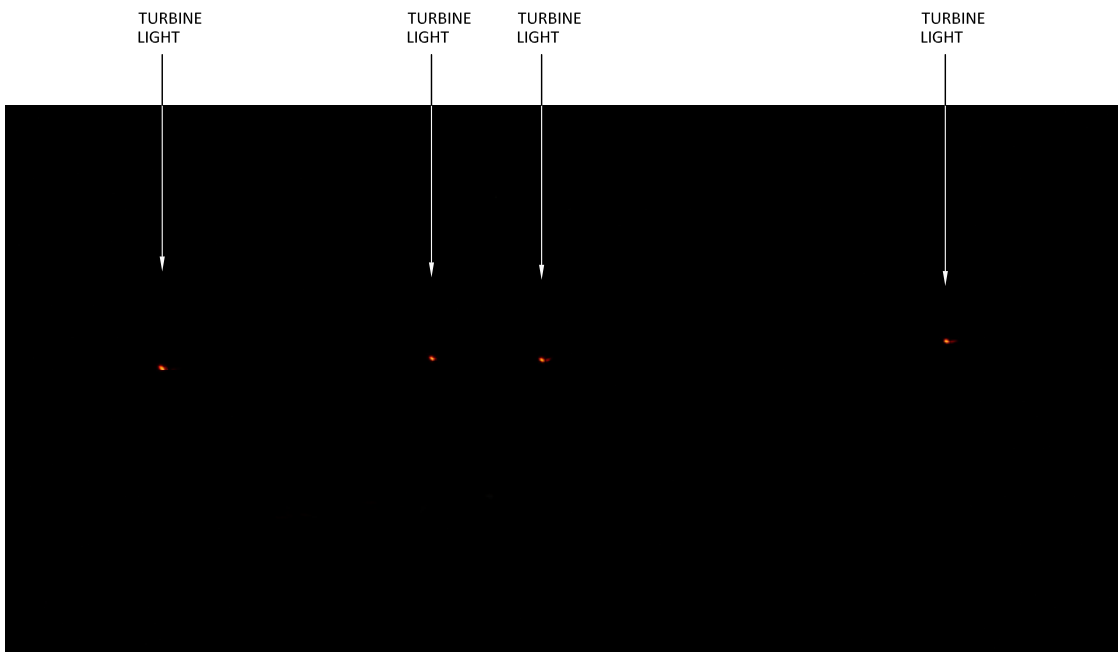
CULLERIN WIND FARM NIGHT TIME LIGHTING .
VIEW WEST FROM HUME HIGHWAY AT AROUND
500M DISTANCE.

COLLECTOR WIND FARM

Figure 28
Night Lighting Cullerin
wind farm at 3.5km



DAY TIME VIEW FROM HUME HIGHWAY TOWARD
CULLERIN WIND FARM AT AROUND 3.5KM

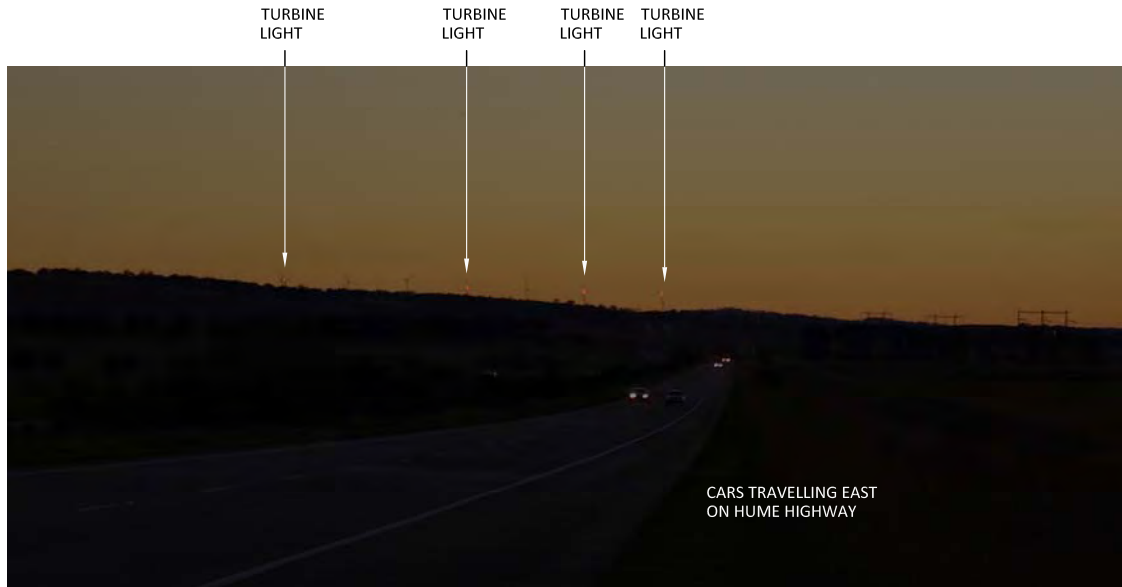


NIGHT TIME VIEW FROM HUME HIGHWAY TOWARD
CULLERIN WIND FARM AT AROUND 3.5KM

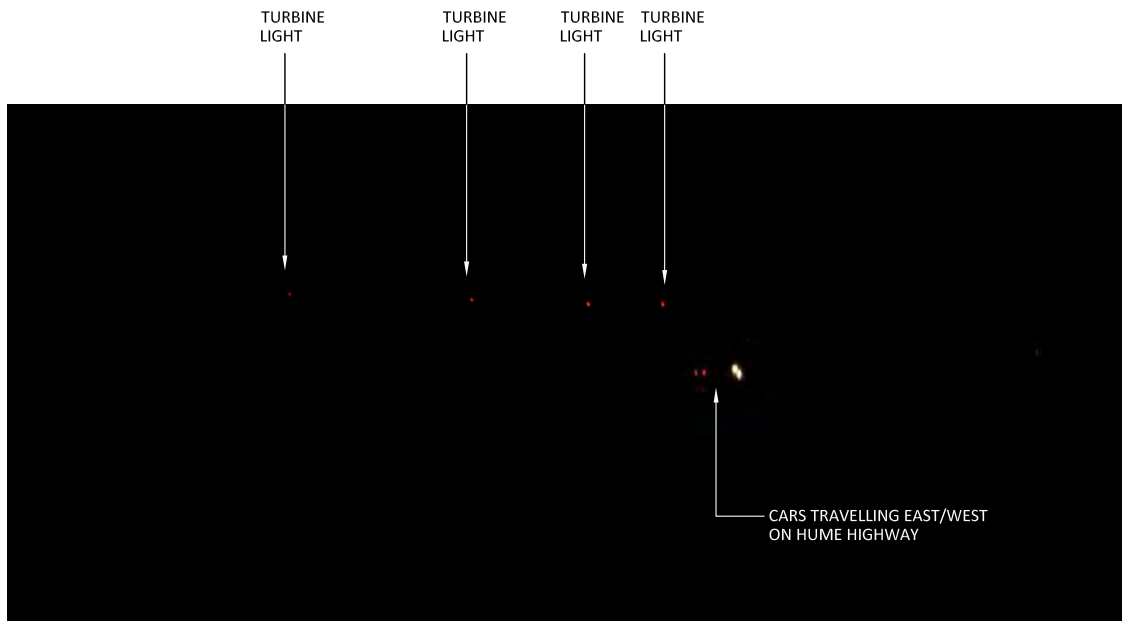
CULLERIN WIND FARM NIGHT TIME LIGHTING .
VIEW WEST FROM HUME HIGHWAY AT AROUND
3.5KM DISTANCE.

COLLECTOR WIND FARM

Figure 29
Night Lighting Cullerin
wind farm at 17km



VIEW WEST AT DUSK FROM HUME HIGHWAY TOWARD
CULLERIN WIND FARM AT AROUND 17.5KM



VIEW WEST AFTER DARK FROM HUME HIGHWAY
TOWARD CULLERIN WIND FARM AT AROUND 17.5KM

CULLERIN WIND FARM NIGHT TIME LIGHTING .
VIEW WEST FROM HUME HIGHWAY AT AROUND
17KM DISTANCE.

COLLECTOR WIND FARM

12.1 Introduction

The Project would include a range of electrical infrastructure to collect and distribute electricity generated by the wind turbines. Electrical works would include:

- Substation with transformer (total area around 150mx50m);
- Transmission line connection (around 250m) between substation and existing 330kV transmission line; and
- Underground and overhead 33kV and control cables.

A typical arrangement for a wind farm substation is illustrated in **Plate 7** and demonstrates the relatively small scale development required for this component of the electrical infrastructure.

The majority of electrical connections between the wind turbines would be via underground cabling. Small sections of 33kV overhead reticulation could be required within the site boundary; however, the scale of these structures would be similar to existing domestic distribution utility infrastructure found throughout the surrounding landscape.



Plate 7 – Typical wind farm substation

12.2 Substation

The Collector Wind Farm substation would be situated in close proximity to the existing TransGrid 330kV transmission line spanning the northern portion of the project site. This location would

minimise the distance of overhead transmission line required to connect to the substation to the grid. The substation, which would be located within a fenced compound of 50m by 150m, is proposed to be located near the Projects northern-most wind turbine. A substation at this potential location would not be expected to result in any significant visual impact from surrounding view locations.

12.3 Transmission Line

Electricity generated by the Project would be connected to the grid via an overhead 330kV transmission line which would extend for around 250m to connect to the existing 330kV TransGrid transmission line running east to west alongside the Hume Highway north of the Project.

The environmental impacts of the transmission line connection will be assessed under Part 5 of the EP&A Act by TransGrid, who will be the proponent for this item.

Overall, this LVIA has determined that the electrical infrastructure associated with the Collector Wind Farm would be unlikely to have a significant visual impact on surrounding view locations.

13.1 Potential visual impacts

Potential visual impacts could occur during both pre-construction and the construction phases of the project. The Project construction phase is likely to occur over a period of around 18 months, although the extent and nature of pre-construction and construction activities would vary at different locations within the project area.



Plate 8 - Illustrating typical general construction activities during turbine construction



Plate 9 - Illustrating general construction activities at the Capital Wind Farm site, including views toward cranes, partial construction of towers and laydown areas.

The key pre-construction and construction activities that would be visible from areas surrounding the proposed wind farm include:

- Ongoing detailed site assessment including sub surface geotechnical investigations;
- Various civil works to upgrade local roads and access point;
- Construction facilities, including portable structures and laydown areas;
- Various construction and directional signage;
- Mobilisation of rock crushing and concrete batching plant (if required);
- Excavation and earthworks; and
- Various construction activities including erection of wind turbines, monitoring masts and substation with associated electrical infrastructure works.

The majority of pre-construction and construction activities, some of which would result in physical changes to the landscape (which have been assessed in this LVIA report), are generally temporary in nature and for the most restricted to various discrete areas within or beyond the immediate wind farm project area. The majority of pre-construction and construction activities would be unlikely to result in an unacceptable level of visual impact for their duration and temporary nature.