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Junction Rivers Wind Project

Environmental Impact Statement

final

May 2024

JUNCTION RIVERS WIND PROJECT

Environmental Impact Statement

FINAL

Prepared by Umwelt (Australia) Pty Ltd
on behalf of BayWa r.e. Projects Australia Pty Ltd

Project Director:	Paul Douglass
Project Manager	Lachlan Sweeney
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This report was prepared using Umwelt's
ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No	Reviewer Name	Review Date	Approver Name	Approved Date
Final	Paul Douglass	27/05/2024	Paul Douglass	27/05/2024

Junction Rivers Wind Project

summary

What is the Project?

The Junction Rivers Wind Project (the Project) is a 750MW renewable energy project being developed by Junction Rivers Pty Ltd (as a subsidiary of Windlab Developments Pty Ltd and hereafter referred to as Windlab). Located within the New South Wales South West Renewable Energy Zone (SW REZ), the Project can be responsibly developed, connected to either existing transmission infrastructure or the new Project EnergyConnect line under construction, and can produce enough clean, cost-competitive energy to power the equivalent of 434,000 New South Wales (NSW) households by 2029. Once operational, the Project will eliminate more than 2 million tonnes of greenhouse gas emissions from the state's energy generation profile every year.

The Junction Rivers Wind Project is expected to create up to 650 jobs during peak construction and inject $505 million in total economic benefits during the construction and operational phases into the regional economy through local employment, supply and contracting opportunities. Throughout the development phase, the Project has invested more than $60,000 into the community through the Junction Rivers Pilot Community Benefit Fund.

The Project will include the installation, operation, maintenance and decommissioning of up to 96 wind turbine generators, up to four battery energy storage systems (BESS) or up to four static synchronous compensators (STATCOM devices), and ancillary infrastructure, including substations/switching stations, offices and site compounds, underground and overhead transmission lines and access roads.

The Project is located approximately 15 km south of Balranald, 140 km west of Hay and 20 km northeast of the NSW and Victorian border within the southern section of the Murray-Darling Basin. The Project is within the Murray River Local Government Area (LGA) and immediately east of Balranald Shire LGA. The Project is strategically located within the SW REZ, an area identified by the NSW Government as suitable for renewable energy projects due to an abundance of high quality wind and solar resources, proximity to the existing electricity network and relative land use compatibility (**refer to Figure S1**).

A battery energy storage system (BESS) is technology that stores electrical energy in batteries for later use. These systems also help to stabilise the grid and help manage the variability and intermittency of renewable energy sources.

A static synchronous compensator (STATCOM) is a device that regulates voltage at the point of connection, helping to maintain system stability by quickly controlling the amount of reactive power injected into or absorbed from the power system. This technology does not have the capability for storage (as provided by a BESS) but is able to compensate for voltage imbalances and fluctuations.

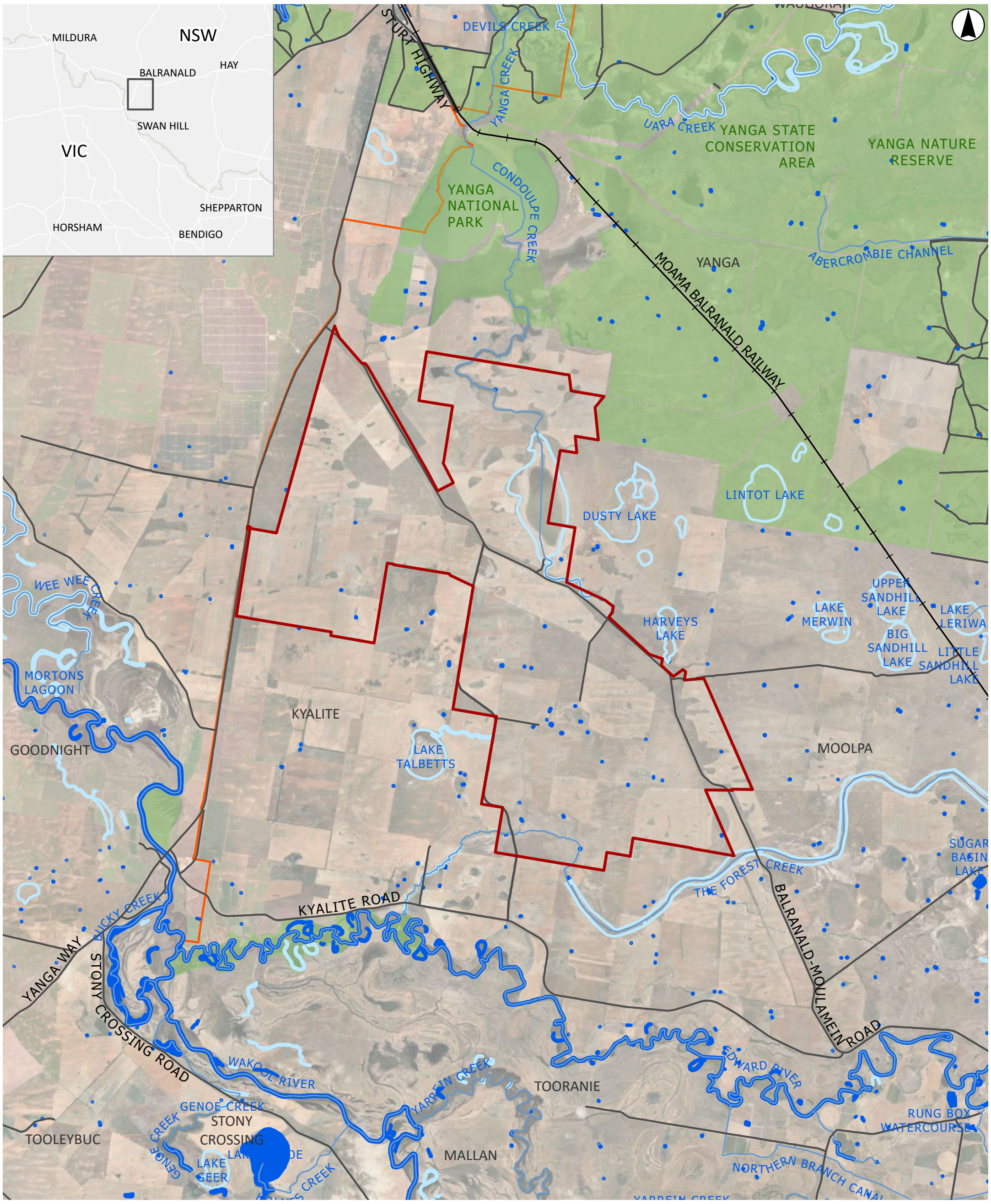
Project life
35 years

Wind turbines
up to 96

BESS or STATCOM
up to 4

Generation capacity up to
750 MW

FIGURE S1 - LOCALITY MAP



Legend

- Project Area
- Local Government Area
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway

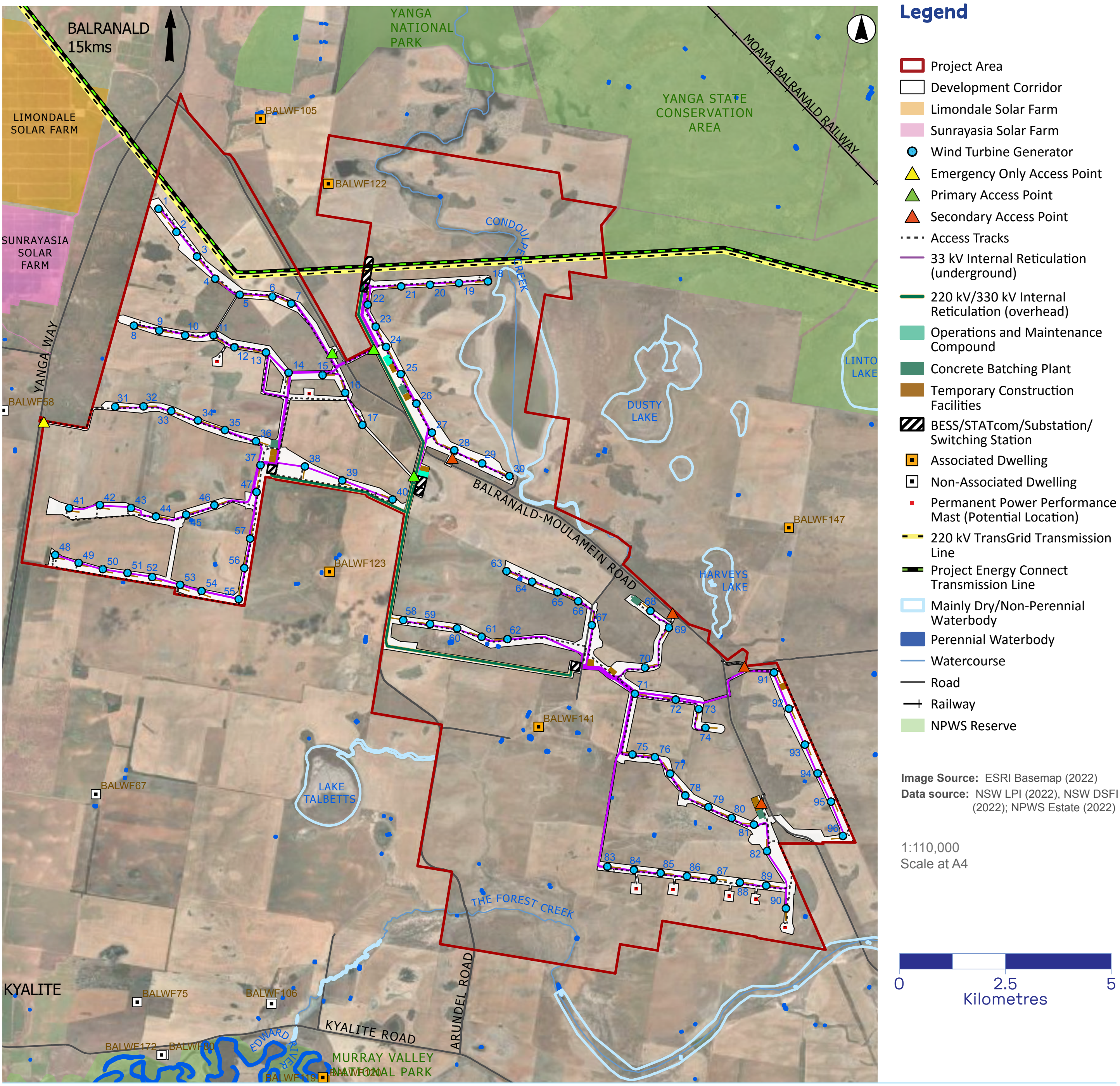
Image Source: ESRI Basemap (2022)
Data source: NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

The proposed Project layout is shown in **Figure S2**. The conceptual layout for the Project has been subject to ongoing refinement with the aim of minimising environmental, cultural and social impacts. This design process has considered community and stakeholder feedback as well as the findings of technical studies.

The Development Footprint of the Project is about 768 ha and is the area in which the Project will be constructed. This sits within a broader Project Area of around 16,367 ha. A buffer area of 100 m has also been included around the Development Footprint to provide an indicative area called the Development Corridor (2,096 ha). The Development Corridor provides flexibility for locating wind turbines and site infrastructure during the detailed design and construction process.

Construction of the Project may be staged, depending on access arrangements for the SW REZ, energy market considerations and commercial factors. Should staging be required, Stage 1 would likely involve the construction of up to 30 wind turbines, connecting into the existing Transgrid 220 kV line in the northern part of the Project Area. Stage 2 would involve the construction of up to 66 wind turbines connecting to the approved 330 kV Project EnergyConnect transmission line (a new electricity transmission line currently under construction, which will connect the South Australian and NSW districts of the National Electricity Market).

FIGURE S2 - PROJECT LAYOUT



Why is the Project needed?

The Junction Rivers Wind Project aligns with both the Commonwealth and NSW Government commitments to increase renewable energy generation and reduce carbon emissions. The Project will help provide cleaner, more cost-efficient and reliable energy generation to assist with meeting current load demand while also reducing greenhouse gas emissions and the impacts of climate change.

THE PROJECT WILL ALSO:

- Contribute total economic benefits during the construction and operational phases of approximately $505 million
- Generate up to 400 full time equivalent (FTE) jobs during the construction phase and approximately 40 FTE jobs during the operational phase
- Provide indirect benefits to local and regional service providers throughout the life of the Project by supporting jobs in transportation, trade supplies, services, accommodation, catering, retail services, etc.
- Provide benefits to the local community through the implementation of a Community Benefit Fund over the life of the Project
- Deliver additional income to host and other associated landowners

What other alternatives were investigated?

During the planning and design phase of the Project, a range of alternatives were considered by Windlab, including the 'do nothing' option (i.e., not developing the Project), alternative locations and different Project layouts.

The **'do nothing' option** would allow for the continued use of the whole Project Area for agricultural purposes and would avoid the environmental and social impacts associated with the Project, but would also forego the identified benefits outlined above and would result in a lost opportunity for landholders to diversify their income streams.

The Project location was selected out of several potential **alternative locations** within the SW REZ due to its:

- Verified and reliable wind energy resource based on four years of wind monitoring data, with a strong night-time profile which compliments regional day-time solar generation.
- Good access to both existing and approved electricity transmission infrastructure – the site is traversed by both the existing Transgrid transmission line and the Project EnergyConnect transmission line (currently under construction).
- Flat and predominantly cleared terrain – this will result in simplified construction and lower capital costs.
- Extensive history of land clearing and disturbance – the site has been heavily disturbed through its historical use for cropping, with much of the site being cleared of native vegetation resulting in its current low conservation value.

Throughout the development of the Project, an iterative design process was used resulting in multiple, **progressive layout** revisions based on the results of specialist studies and community and stakeholder feedback.

THE KEY REVISIONS TO THE PROJECT LAYOUT INCLUDED:

Turbines, access tracks and hardstand areas were repositioned to align with cropping sow and harvest direction to support the continued agricultural productivity of the host land.

Turbines were relocated to avoid areas of Regent Parrot habitat and to maximise the use of previously disturbed land of low conservation value (Category 1 land). Areas of high biodiversity value were also avoided by removing the connection to Balranald Substation and removing turbines from within the Project's most vegetated area.

Turbines and ancillary infrastructure were removed and/or relocated to avoid areas of Aboriginal cultural heritage value adjacent to Condoulpe Lake and along Balranald-Moulamein Road, and the Development Footprint was designed to avoid hearths, mounds and scarred trees with a heritage exclusion zone being established for some items.

Turbines in the southwest of the Project Area were removed to reduce visual impacts to residents around Kyalite and turbines in the north were removed to increase the buffer and reduce visual impacts to the Yanga National Park Estate.

In recognition of the high landscape values of local rivers, the turbine layout was revised to reduce visual impacts from the Edward River. In addition, the number of crossings of ephemeral watercourses required for access tracks and/or cables was also minimised to protect riparian areas.

As a result of the iterative design process the proposed number of turbines for the Project was reduced from 107 to 96.

What is the planning and approval process?

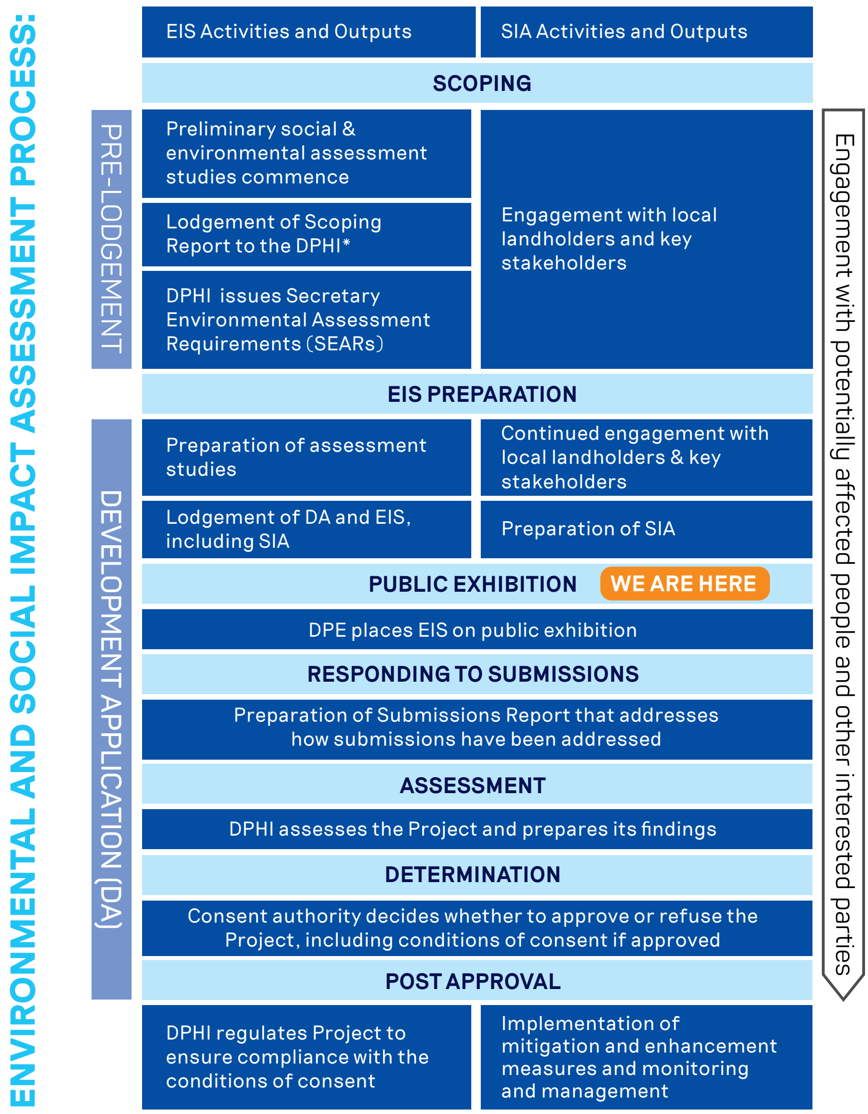
The Project requires approval under both NSW and Commonwealth environmental and planning legislation.

Classified as a State Significant Development (SSD) under NSW planning legislation, the Project requires development consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project also requires assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts on Commonwealth-listed threatened species and communities, and migratory species.

An Environmental Impact Statement (EIS) has been prepared to assess the impacts of the Project, both positive and negative. The EIS has been lodged with the development application to the NSW Department of Planning, Housing and Infrastructure (DPHI) (formerly the Department of Planning and Environment).

Under the EP&A Act all SSD projects require development consent from either the Minister for Planning and Public Spaces or the Independent Planning Commission (IPC). The IPC is the consent authority for projects where the local Council has objected, if there are 50 or more public objections, or if the applicant has disclosed a reportable political donation.

Under the NSW Assessment Bilateral Agreement, the NSW Government will also assess the development application on behalf of the Commonwealth although the Australian Government will make the final approval or refusal decision under the EPBC Act.



*DPHI - Department of Planning, Housing and Infrastructure

How have key stakeholders been consulted?

Windlab recognises the critical importance of stakeholder engagement to the success of the Project and has been liaising with stakeholders since landholder discussions commenced in May 2021. Preliminary landholder discussions led to engagement with a broader group of stakeholders, as the extent of the Project started to form, and continued as the concept design was developed. In addition to community stakeholders, ongoing consultation has been undertaken with Councils and government agencies, service providers, businesses and various non-government organisations and interest groups. This engagement has informed the design of the Project and will be ongoing throughout the assessment process and, if the Project is approved, throughout the life of the Project.

Further engagement has also been undertaken as part of the Social Impact Assessment (SIA) process following the requirements of the NSW Government SIA guidelines and assessment standards.

A Stakeholder Engagement Plan was prepared to provide a structured approach to community consultation for the Project as a fundamental part of achieving a social licence to operate. Engagement mechanisms have included face-to-face Project briefings, community meetings, a community values survey, community drop-in sessions at Balranald and Kyalite, host landholder Q&A sessions, direct emails, letters and phone calls to stakeholders, and targeted engagement around the co-design and submission of grant applications for the $60,000 Junction Rivers Pilot Community Benefit Fund.

Environmental, social and economic assessments

Landscape and visual

A Landscape and Visual Impact Assessment (LVIA) was prepared to assess all components of the Project as well as the cumulative impacts that may arise in combination with other existing and approved developments.

The Project is to be located within a rural landscape, consisting of modified vast plains, with little topographical variation. The Project would therefore become a visual feature of the area due to the addition of vertical turbines in a landscape offering largely unencumbered views across open expanses. However, the degree to which the existing landscape character and significance is altered as a result of the Project is determined by the dominance of the Project in relation to the existing landscape features and by the sensitivity of the individual viewers and the broader community.

The LVIA assessed 16 public viewpoints at varying distances and locations surrounding the Project, including areas of the Yanga National Park Estate. Regionally significant landscape features such as Yanga Homestead, Yanga Woolshed, Regatta Beach Picnic Area and The Willows Campground would remain intact as key landscape features of the area and the LVIA concluded that the Project is unlikely to degrade the scenic value of these landscape features due to the large distance to the Project (over 8 km) and varying degrees of screening vegetation.

Dwelling assessments undertaken for the LVIA show that there are generally limited opportunities to view the Project from non-associated dwellings within 8 km of the Project, however the greatest visual impact is likely to be felt by residents within the immediate vicinity of the Project. Of the six non-associated dwellings within 8 km of the Project that were assessed, five were considered to have a negligible to low visual impact and one dwelling was assessed as having a moderate visual impact rating. Practical and feasible mitigation measures have been proposed for this dwelling, including supplementary vegetation planting.

Assessments of night lighting and blade glint/shadow flicker found impacts would be minimal based on the proposed design and mitigation measures. Cumulative impacts of the Project in combination with the nearby Sunraysia and Limondale solar farms also determined that due to intervening vegetation there will be no cumulative impacts for dwellings or for travellers along Yanga Way.

Overall, the Project was assessed as being compliant with the performance objectives of the *Wind Energy: Visual Assessment Bulletin.*

Throughout the assessments undertaken for the EIS, three categories of nearby private dwellings were identified:

HOST DWELLINGS
Those dwellings located within the Project Area and on land hosting infrastructure associated with the Project. The host landholders have agreements in place with Windlab.

ASSOCIATED DWELLINGS
Dwellings not located on land within the Project Area or hosting infrastructure, however, the Proponent has a negotiated agreement in place with the landowner regarding Project impacts and are therefore associated with the Project.

NON-ASSOCIATED DWELLINGS
Dwellings located outside of the Project Area, not associated with the Project and with no negotiated agreement in place with the landowner.

The consideration of impacts on non-associated landholders/dwellings is a key part of the assessments.

Noise and vibration

A noise and vibration impact assessment was undertaken to assess the Project against baseline background noise. Results indicated that:

CONSTRUCTION NOISE

Predicted construction noise levels were below management levels at all non-associated receivers during all assessed construction activities, with the exception of the construction of access roads. This is the construction activity that typically occurs closest to receiver locations and hence has the highest potential for impacts. In accordance with the guidelines, Windlab will apply all feasible and reasonable work practices during construction and will aim to undertake construction activities during standard recommended construction work hours only, where possible. Potentially impacted residents will be kept informed about the nature of the construction works, the expected noise levels and duration of the activities.

WIND TURBINE NOISE

Two candidate wind turbine models were assessed with the predicted wind turbine noise levels below the relevant NSW criteria at all non-associated receivers for one of the turbine models.

The results of the noise modelling demonstrate that the predicted noise levels for the proposed wind turbine layout are below the relevant NSW criteria for one of the candidate wind turbine models. For the other candidate wind turbine model, predicted noise levels are above the relevant NSW criteria at one non-associated receiver. An example noise curtailment strategy has been developed to demonstrate that compliance with the relevant NSW criteria could be achieved, using sound optimised modes for a limited range of wind conditions.

ANCILLARY INFRASTRUCTURE NOISE

Three different ancillary infrastructure location and configuration options were assessed based on the proposed equipment with the highest noise levels to provide a conservative worst-case assessment. Night time noise trigger levels were exceeded at one associated receiver, noting that an agreement between Windlab and this receiver is in place and can include additional noise controls if required at the tender/procurement stage when more specific detail is available on equipment selection and layout.

ROAD TRAFFIC NOISE

No exceedances were predicted at receivers along either Yanga Way or Balranald-Moulamein Road, however it is noted that while absolute noise levels will comply with criteria, the increase in traffic levels from very low existing levels may result in a noticeable increase in noise during some periods of construction, when the largest increase in traffic will be experienced.

Biodiversity

The Project has undergone multiple design changes since preliminary biodiversity assessments were completed in spring 2021, based on the 'avoid, minimise, offset' hierarchy. Importantly, the Project has been sited such that the majority of wind turbines are located in dryland cropping paddocks generally lacking in native vegetation, with approximately 90% of the Development Footprint on Category 1 (previously cleared/disturbed) land which has a low conservation or habitat value.

The assessment included detailed biodiversity field surveys with the progressive results of the surveys used to refine the design to minimise impacts on biodiversity. Bird and bat surveys were also carried out for up to 24 months to identify species that could potentially be impacted by turbines.

While Windlab has undertaken significant efforts to avoid and minimise impacts to all biodiversity values present within the Development Corridor, any residual impacts will continue to be minimised, mitigated and offset through the duration of the Project. Residual impacts will be:

- Removal of 75.68 ha of native vegetation and flora and fauna habitats, including small areas of two Threatened Ecological Communities (TECs) (*Acacia melvillei* Shrubland TEC (2.03 ha) and Sandhill Pine Woodland TEC (1.17 ha)). This is required for the establishment of essential Project infrastructure.
- Direct impacts to habitat for the Major Mitchell's cockatoo and threatened flora species, Menindee nightshade, Mossgiel daisy and Winged peppercress.
- Removal of 77 scattered paddock trees, of which 53 are hollow-bearing trees.

A comprehensive Biodiversity Management Plan will be prepared for the Project and will include such measures as:

- protecting vegetation outside approved disturbance areas
- salvage of biodiversity features such as hollow logs, fallen timber, rocks and boulders
- ongoing pest control and collection of baseline weed data
- implementation of a Bird and Bat Adaptive Management Plan and ongoing monitoring
- workforce education and training
- mapping and identification of retained tree hollows and stick nests
- pre-clearance and tree felling protocols

Where impacts to biodiversity cannot be avoided, the NSW biodiversity assessment process requires use of the NSW Government online calculator to generate biodiversity credits. These credits are generated from the results of the survey and impact areas. All credits then need to be offset prior to the impact occurring, with the system designed to result in net gain in biodiversity value for NSW.

Windlab has developed an offset strategy for the Project and has a number of options to secure the biodiversity credits needed, including the establishment of two Biodiversity Stewardship Sites, payment into the Biodiversity Conservation Fund and/or purchase of biodiversity credits from the open market. In addition to the required biodiversity credits, Windlab is committed to looking into other opportunities to applying a nature positive development principles to target net gain for biodiversity values impacted by the Project, targeted to the locality of the Project Area.

Aboriginal cultural heritage

The Project Area is located within the Balranald Local Aboriginal Land Council (LALC) area. An Aboriginal Cultural Heritage Assessment was undertaken, in consultation with local Aboriginal stakeholders, to assess the potential impacts of the Project on Aboriginal cultural heritage. This included desktop review and field surveys with assistance from the LALC and other Registered Aboriginal Parties (RAPs).

During field surveys, 80 Aboriginal sites and archaeological features were recorded within the Development Corridor, the majority of which were isolated finds and tree cultural sites.

Significant effort has been invested by Windlab to redesign the Project to avoid landforms and areas which have high archaeological sensitivity including hearths, scar trees and stone artefact locations. Heritage exclusion areas have also been incorporated into the Project design to ensure avoidance of sites of high conservation value where possible. For isolated finds and artefact scatters where avoidance is not possible, collection of the surface stone artefacts will be undertaken prior to construction. Works will be guided by a Cultural Heritage Management Plan which will be prepared in consultation with Heritage NSW and the RAPs.

REMAINS OF LYNWOOD HOMESTEAD - PHOTO CREDIT NGH PTY LTD (2024) REPORT

Historic heritage

A desktop assessment of the potential impacts to historic heritage determined that there are no World, Commonwealth, State or local listed heritage places or items within or in close proximity to the Project Area. The closest listed heritage item is the Yanga Pastoral Station Complex, approximately 9.6 km north of the Project Area.

Four late nineteenth century (circa 1890s) homesteads were constructed within the Project Area of which only Arundel remains occupied. The Lynwood homestead was destroyed in a bushfire in the latter half of the twentieth century. Oldham Park and Tyndale were likely vacated in the late twentieth century. The Development Corridor is in close proximity of the archaeological remains of the Lynwood homestead (approximately 75 m) and Tyndale homestead (approximately 20 m) and exclusion zones will be used to avoid accidental damage during construction.

Transport

Project components such as turbine generators and towers will be transported from Port Adelaide through South Australia and Victoria, then into NSW. The key road network links that would be used by during the construction and operation of the Project are the Sturt Highway between Mildura and Yanga Way, Swan Hill Road, Stony Crossing Road, Yanga Way, Balranald-Moulamein Road and Arundel Road. The Project includes primary access points off Balranald-Moulamein Road and Arundel Road which would be used for standard light and heavy vehicles as well as all Over-Size Over-Mass (OSOM) vehicle deliveries required for the transportation of large wind turbine components. Road upgrade works will be required at site access points and along some sections of the transport route while minor works (e.g., relocation of signage and road lighting and construction of temporary hardstand areas) will be undertaken at some locations to generate space for OSOM vehicle movements.

Most Project traffic will be associated with the construction phase when materials deliveries and the construction workforce will generate higher traffic volumes. Minimal additional traffic movements will be associated with the operational phase. An assessment of cumulative traffic impacts was also undertaken, to account for the combined additional traffic of other projects in the region with overlapping construction periods and transport routes.

Assessments confirmed that the increase in traffic volumes associated with the Project (including cumulative traffic volumes) will have a minor impact on the surrounding road network, with increases greater than 5% on some route sections. These increases are generally a result of the low background traffic volumes currently utilising these routes. Predicted total volumes remain within accepted capacities for two-lane rural roads, and with the planned upgrades the road network has adequate capacity to cater for the additional Project traffic.

A detailed Traffic Management Plan will outline proposed management measures and minimise the impact of the additional Project traffic on the external road network. OSOM vehicle movements will be undertaken under permit, with escort vehicles, and during non-peak periods to reduce impacts.

Water and soils

The Project Area is located on the lower Murrumbidgee floodplain, within the Murrumbidgee and Murray River catchment systems. The Murrumbidgee River is located to the north and west of the Project Area and flows in a south-westerly direction, joining the Murray River about 10 km west of the Project Area. The Murrumbidgee River is the major drainage feature in the vicinity of the Project.

Assessments were undertaken to investigate the potential impacts of the Project in relation to flooding, surface water quality, stream stability, water availability and water sourcing, and groundwater impacts.

Water for construction and operation could be supplied from one or a combination of sources including mains water supplies, groundwater from licensed bores, extraction from the Edward River and harvested runoff from farm dams and/or sediment basins onsite. A water sourcing strategy will be developed during the detailed design phase with the objective of ensuring water use during the construction phase does not result in a loss of supply to adjacent landowners or other water users. During operations a static water supply will also be established and maintained for fire protection purposes.

AVERAGE DAILY WATER DEMAND DURING CONSTRUCTION:

350 kL raw water for dust suppression, concrete production, vehicle/equipment washdown, soil and fill conditioning 20 kL potable water for amenities use

Minimal average daily demand during operations for amenities and equipment washdown

Flood modelling was undertaken for both existing and predicted climate change scenarios. Potential contributions from regional flooding caused by Murray River or Murrumbidgee River breakouts were also investigated but the Project Area is at a sufficient elevation that it is not at risk of regional flooding. Modelling for a range of different flood events showed that most Project infrastructure is located outside areas of predicted flooding for all but the Probable Maximum Flood (PMF) event. Detailed design of the Project will consider the results of the flood models, and Windlab has committed to providing adequate freeboard above the relevant flood level for sensitive infrastructure.

Water quality impacts would be most likely during the construction and decommissioning periods when soils are subject to disturbance. Appropriate erosion and sediment control measures will be installed and maintained on site and construction works near waterfront land will be scheduled to avoid works during periods of high rainfall erosivity where ever possible. Where waterway crossings are required for internal access roads and electrical cabling, impacts on stream stability and fish passage will be addressed during the detailed design phase with reference to relevant guidelines and policies.

Based on the depth to groundwater and the expected depth of wind turbine foundations, no interaction with the groundwater table is anticipated and therefore no impacts to groundwater dependent ecosystems or bore water users are predicted.

Air quality

The Project will generally contribute to positive air quality outcomes through reductions in greenhouse gas emissions in comparison to other electricity generating sources, such as traditional coal-fired power stations.

Air emissions from the Project would be primarily associated with construction activities including dust generated through vehicle movements, ground disturbance, vegetation clearing, civil construction activities and plant/vehicle exhaust emissions. These emission sources will be localised and temporary (for the duration of construction) and with appropriate controls will not result in material air quality impacts.

CONTROLS WILL INCLUDE:

- reducing clearing and ground disturbance to minimise exposed areas
- progressively rehabilitating disturbed areas
- application of water and/or dust suppressants
- limit construction activities during windy weather
- dust controls on unsealed roads, concrete batching plants and crushing/screening plants
- speed limits on unsealed access tracks and hardstand areas
- regular inspections and audits

Land

The Project Area contains land suitable for agriculture, and ongoing agricultural activities will be able to continue to coexist with the Project. Windlab has worked closely with host landowners on the Project design and construction timing to minimise disruption to agricultural activities, and has agreements with relevant owners for the lease of the land. These agreements compensate the owners for the areas of land that will be occupied by the Project, noting that the vast majority of each property will remain available for ongoing agricultural activities. Following decommissioning at the end of the operational life of the Project, the site will be rehabilitated to a standard that will allow continued agricultural use.

While the Project will remove a relatively small area of land from agricultural production, it will provide a significant benefit to the landowners through income diversification which will provide consistent off-farm income, including in drought and other periods of low agricultural production. This will support the ongoing sustainability of agricultural activities within the Project Area.

Any potential conflicts between the Project and surrounding land uses (such as additional traffic, increased fire risk, impacts on nearby aviation activities and changes to visual amenity) will be minimal due to the mitigation measures which have been incorporated into the Project.

Social

A Social Impact Assessment was completed to develop an understanding of the potential impacts of the Project from the perspectives of those involved in a personal, community, social or cultural sense. Potential social impacts were assessed based on the likelihood of the impact occurring, the degree of change caused by the impact and the vulnerability of the impacted people.

OVERALL, THE KEY DRIVERS OF SOCIAL CHANGE DUE TO THE PROJECT THAT MAY AFFECT COMMUNITIES IN THE LOCALITY WERE RELATED TO:

- increased economic activity for local/regional businesses and employment opportunities for the local workforce
- opportunities for diversification of income streams for associated landowners
- accommodation and local service availability due to the construction workforce and the combined impacts of multiple projects within the SW REZ
- changes in land use and the presence of new infrastructure, which have implications for visual amenity and altered landscapes
- disruptions due to construction-related activities (such as land clearing, installation of infrastructure, transportation of materials and presence of workers) which can result in noise and air emissions

Windlab has committed to a number of mitigation and enhancement approaches to address social impacts.
The selection of social impact management strategies has considered community feedback, industry benchmarking, strategies proposed in the environmental technical studies, and technical social assessment advice.

Hazards and risks

AVIATION SAFETY

- The Project will not have any impact on operations at Balranald Airport, however approval will be required for increasing minimum safe altitudes at Swan Hill Airport as the Project is located within the buffer zone and the height of the turbines is above minimum obstacle clearance heights.
- Aircraft landing areas (ALA) within proximity of the Project were also assessed with some changes to arrival and departure flight paths at two ALAs required to consider the locations and heights of nearby wind turbines and meteorological masts.
- Due to the height of the wind turbines, the lowest safe altitudes will also need to be increased for the air space in the Project Area, in consultation with Airservices Australia.
- Obstacle lighting will generally not be required for wind turbines or monitoring masts.
- Windlab will continue to liaise closely with all impacted landowners, and aerial agricultural and firefighting operators, to assist in the development of procedures for safe aircraft operations in the vicinity of the Project.

TELECOMMUNICATIONS

- Telecommunication services are unlikely to be materially affected by the Project. This includes television and radio broadcasts, mobile phone services, point to point communication services and radar operations.
- Consultation with service providers will be ongoing throughout the detailed design phase.

ELECTRIC AND MAGNETIC FIELDS

Electric and magnetic fields (EMFs) are created from a wide range of natural and human-made sources. The electrical equipment for the Project, such as transmission lines, transformers and the electrical components found within BESS units, STATCOM facilities, inverters, has the potential to produce extremely low frequency EMFs.

As the closest dwellings are over 1 km from any location where electrical components will be located, and the strength of EMFs decreases rapidly with distance, exposure impacts to the general public will be negligible.

BUSHFIRE

- The presence of wind turbines does not necessarily increase the risk of lightning strikes, which are one of the most common causes of bush/grass fire ignition in the local area. In fact, turbines are designed with protection systems to safely dissipate energy from lightning strikes and remotely controlled shut down systems for adverse weather conditions. The Project will also help improve access for ground-based emergency services via the internal access tracks which have been designed to provide all weather access to large vehicles.
- A Bushfire Emergency Management Plan will be developed for the Project in consultation with the Rural Fire Service and National Parks and Wildlife Service (in relation to the adjoining Yanga National Park). The Plan will identify all potential bush/grass fire risks and control measures including details on asset protection zones, dedicated water supplies and the availability of fire suppression equipment, emergency access arrangements and evacuation plans, and appropriate construction work practices including flammable material storage.

BLADE THROW

For modern wind farms blade throw risk is very low, but consideration of this risk is an important part of the Project design process. The safe operation and structural integrity of wind turbines is governed by recognised international standards and modern wind turbines include control systems to detect failure and initiate shut down procedures. Remote monitoring also allows early detection of potential faults, reducing the risk of serious incidents.

Based on available data, and the separation distances to the nearest dwellings, the level of blade throw risk presented by the Project is very low and well within the bounds of acceptable risk criteria.

PRELIMINARY HAZARD ANALYSIS

An assessment of potential hazardous scenarios associated with the operation of BESS, STATCOM and other electrical equipment was undertaken. The assessment concluded that no offsite impacts were likely and risks at the site boundary would not exceed acceptable risk criteria.

It is noted that the electrical equipment proposed for the Project is universally acknowledged as having a low potential for failure and protection measures are inherent in the system design.

Waste

Waste management during construction and operations will be carried out in accordance with relevant legislation and guidelines and based on the principles of the waste hierarchy:

- prioritising the avoidance of unnecessary resource; consumption
- implementing resource recovery where possible
- considering responsible disposal as a final option

A Waste Management Plan will be implemented on site to manage, reuse, recycle and safely dispose of waste. The potential for cumulative waste impacts due to the large number of projects currently taking place or planned within the SW REZ has been identified and Windlab will continue to liaise with relevant local authorities to ensure efficient waste management.

After the Project is decommissioned, most of the materials will be reclaimed or recycled, given the significant value of the steel, copper, aluminium and other materials. It is important to note that the recycling of wind turbines is an evolving space, with research and experimentation occurring across the world to find ways to recycle components at the end of their operational life. Windlab will determine the best practice to reuse, recycle and dispose of turbine components at the time of decommissioning.

Economic

The Project will involve a capital investment of approximately $1.5 billion in addition to ongoing expenditure in the operational and decommissioning phases. The Project will contribute the following economic outcomes for the region:

- A Community Benefit Fund worth more than $11 million, delivered over 35 years (dollar values to be adjusted to reflect the Consumer Price Index (CPI))
- Average of 650 full time equivalent (FTE) jobs (250 direct and 400 indirect) during construction and 60 FTE jobs (15 direct and 45 indirect) during operations
- New participation opportunities for businesses and workers, having regard for the good match of skills and resources available in the region and Windlab's procurement initiatives
- Injection of approximately $30.1 million in new spending into the economy by construction workers relocating to the region over the construction phase, supporting approximately 38 FTE jobs in the service sector over the construction phase
- Ongoing economic stimulus of approximately $280 million (over 30 years, CPI adjusted) relating to landowner leases and neighbourhood payments, operational wage stimulus and community benefit payments

Conclusion

The Junction Rivers Wind Project is consistent with the principles of ecologically sustainable development, whereby the benefits of the Project in an environmental and socio-economic context outweigh any negative impacts. The Project has been developed using an iterative approach, with refinements based on stakeholder feedback and assessment findings to reach a Project design that avoids and minimises environmental and social impacts. Windlab is committed to continue working with the local community as detailed design progresses.

The Project is consistent with the strategic objectives of both the Commonwealth and NSW Governments by providing large-scale, renewable electricity generation that is both cost-effective and reliable to assist in the reducing greenhouse gas emissions and the impacts of climate change. The site selected for the Project is within the SW REZ, with ready connection to existing and approved electricity transmission infrastructure and in an area of identified wind energy potential. Due to its long agricultural history the Project Area has been heavily disturbed, with much of the Project Area being cleared of native vegetation resulting in its current low conservation and habitat value. The Project is compatible with the ongoing use of the site for agricultural activities.

The Project Area was purposely selected not only as it was close to grid infrastructure, but also as it was expected to have less environmental and social impacts due to it being on cropped land and in an area of very low population density. While there will be some environmental and social impacts associated with the Project, the extent of impact has been minimised through the design process, and where impacts are predicted, Windlab has committed to management, mitigation and offset measures to address these residual impacts.

Given the net benefit and commitment from Windlab to appropriately manage the potential environmental and social impacts associated with the Project, it is considered the Project would result in a net benefit to the region and broader NSW community.

windlab | Junction Rivers | umwelt Environmental & Social Consultants

Glossary and Abbreviations

Term	Definition
ACHA	Aboriginal Cultural Heritage Assessment
ACHCRP	Aboriginal Cultural Heritage Consultation Requirements for Proponents
AEMO	Australian Energy Market Operator
AFAC	Australasian Fire and Emergency Services Council
AGL	Above Ground Level
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHL	Aviation Hazard Lighting
AIA	Aviation Impact Assessment
ALA	Aircraft Landing Area
AMSL	Above Mean Sea Level
Ancillary Infrastructure	All infrastructure necessary for the construction and operation of the Project with the exception of WTGs and BESS/STATcom facilities, including but not limited to: substations, switching stations, permanent and temporary offices and site compounds, storage sheds, permanent O&M compound, underground and overhead electricity transmission lines, permanent power performance masts, communication cables (includes control cables and earthing), water storage tanks, hardstands, internal roads and concrete batching facilities.
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BBAMP	Bird and Bat Adaptive Management Plan
BBUS	Bird and Bat Utilisation Survey
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BFMC	Bush Fire Management Committee
BMP	Biodiversity Management Plan
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
Clearing	As defined in Part 5A of the *Local Land Services Act 2013*.
Commissioning	Includes pre-commissioning checks which will be carried out on high voltage electrical equipment prior to connection to the Transgrid/Project EnergyConnect transmission network. When the Project's electrical system has been energised, the WTGs and BESS/STATcom facilities will be commissioned and put into service. WTGs are commissioned sequentially enabling some WTGs to commence operation prior to the completion of wind farm construction. For the purposes of this EIS the commissioning phase is considered to commence during construction and will end once the final WTG and electrical compound has been fully commissioned.

Term	Definition
Construction	The construction of the Project, including but not limited to the construction of WTGs, BESS/STATcom facilities, temporary calibration meteorological masts, ancillary infrastructure but excluding pre-construction minor works or early works.
CWAS	Construction Workforce and Accommodation Strategy
Development Consent	State significant development consent to carry out the Project granted by the consent authority under the NSW *Environmental Planning and Assessment Act 1979*.
Development Corridor	The area generally bound by a buffer of 100 m radius around the Development Footprint as shown in **Figure 1.3**. The oversail of WTGs may extend beyond this Development Corridor but will be within the Project Area.
Development Footprint	The extent of ground disturbance including earthworks associated with permanent infrastructure and temporary facilities in the Project Area.
Early Works	Includes the following: • undertaking pre-clearance surveys or monitoring programs • installation of signage and/or temporary fencing • protection of environmental and property assets from fire, weeds, and feral animals, including the installation of temporary fencing • installation of temporary site facilities for persons undertaking pre-commencement activities • undertaking geotechnical investigations (including any drilling, drill spoil stockpiling, ground compaction and access construction to enable geotechnical investigations) necessary to determine final Project layout • Aboriginal cultural heritage salvage works.
EDM	Electronic Distance Measuring
EMF	Electric and Magnetic Field
EMI	Electromagnetic Interference
EPL	Environmental Protection Licence under the NSW *Protection of the Environment Operations Act 1997*
ESD	Ecologically Sustainable Development
EWP	Elevated Work Platform
External Road Upgrades	Upgrade of roads external to the Project Area and associated vegetation clearing and/or pruning, required to transport Project-related components and materials to and from the Project Area.
FESM	Fire Extent and Severity Mapping
FTE	Full Time Equivalent
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse Gas
GPS	Geographical Positioning System
Ground Disturbance	Activities that cut into the existing ground surface. This does not include activities that occur on the ground surface including but not limited to driving vehicles on the ground, walking on the ground, undertaking acoustic monitoring, parking vehicles, placing infrastructure or materials such as stockpiles on the ground.
Heavy Vehicle	As defined under the Heavy Vehicle National Law (NSW) but excluding light and medium rigid trucks and buses no more than 8 tonnes and with not more than two axles.

Term	Definition
HHIA	Historical Heritage Impact Assessment
HIPAP 4	Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning
IBRA	Interim Biogeographic Regionalisation of Australia
IEC	International Electrotechnical Commission
Internal Roads	The roads established within the Project Area for the purposes of constructing, operating, maintaining and decommissioning the Project (sometimes referred to as 'tracks' or 'access tracks') and includes all waterway crossings, where located within the boundaries of the Project Area.
IPC	Independent Planning Commission
kV	Kilovolt
LALC	Local Aboriginal Land Council
LCU	Landscape Character Unit
LEP	Local Environment Plan
LGA	Local Government Area
Light Vehicle	Car or rigid truck to eight tonnes gross vehicle mass or bus to 12 seats.
LSALT	Lowest Safe Altitude
LSC	Land and Soil Capability
LVIA	Landscape and Visual Impact Assessment
Micro-siting	The process of locating WTGs, BESS/STATcom, ancillary infrastructure and temporary infrastructure during detailed design without further approval providing: • the ground disturbance remains within the Development Corridor (with the exception of wind monitoring masts) • no WTG is moved more than 100 m from the relevant GPS coordinates shown in **Figure 1.3** • the revised location of the rotor swept area of a WTG is at least 50 m from the canopy of existing hollow-bearing trees; or where the proposed location of the blade of a WTG is already within 50 m of the canopy of existing hollow-bearing trees, the revised location is not any closer to the existing hollow-bearing trees.
ML	Mega Litre
MNES	Matters of National Environmental Significance
MOC	Minimum Obstacle Clearance
MSA	Minimum Safe Altitude
MVNP	Murrumbidgee Valley National Park
MVSCA	Murrumbidgee Valley State Conservation Area
MW	Megawatt
MWh	Megawatt Hour
NASF	National Airports Safeguarding Framework
NEM	National Electricity Market
nm	Nautical Mile
OEMP	Operations Environmental Management Plan
OLS	Obstacle Limitation Surface

Term	Definition
Operation	The carrying out of the approved purpose of the development upon completion of construction but does not include commissioning trials of equipment or use of temporary facilities.
OSOM	Over-Size, Over-Mass
O&M	Operations & Maintenance
PANS-OPS	Procedures for Air Navigation Services – Aircraft Operations
PBP 2019	Planning for Bush fire Protection 2019
PCT	Plant Community Type
Permanent Infrastructure	Infrastructure that will remain in place during the operational phase of the Project, including WTGs, BESS/STATcom facilities, permanent power performance masts, and ancillary infrastructure.
PHA	Preliminary Hazard Analysis
Power Performance Masts/ Temporary Calibration Meteorological Masts	Temporary and permanent masts up to hub height of the WTGs and of a guyed, narrow lattice or tubular steel design and concrete footings for each of the mast and guy wires. Guy wires may extend beyond 100 m from the base of the mast. The final number and location of the masts will be determined post-development consent, post-WTG selection and detailed design. The masts and the guy wires that secure them may need to be located outside of the Development Corridor, however they will remain within the Project Area.
Project	The Junction Rivers Wind Project described in **Section 3.0** of this EIS.
Project Area	The land required for the Project as detailed in **Appendix 2** and shown in **Figure 1.1**, and includes Crown land and Council roads located within the boundary of the Project Area shown in **Figure 1.1**.
RAP	Registered Aboriginal Party
REAP	NSW Renewable Energy Action Plan
RPM	Revolutions Per Minute
RSA	Rotor Swept Area
SEARs	Secretary's Environmental Assessment Requirements
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
SSD	State Significant Development
SSR	Secondary Surveillance Radar
STATcom	Static Synchronous Compensator. Infrastructure that regulates voltage at the point of connection. This technology does not have the capability for storage and there is no active power or energy exchange with the grid.
Substation/Switching Station	Infrastructure required to collect the internal electrical reticulation to increase the voltage for transmission to connect to the grid, and the infrastructure to physically connect to the grid (i.e. switching station). Typically includes step-up transformers, an array of cable marshalling, busbars, switchgear and protection, various voltage and current transformers, operation and facilities building with parking, communication facilities and tower, diesel generator, lighting, a buried earth grid, lightning masts, power conditioning equipment, a reactive power control system, and network support equipment as required and agreed with the relevant transmission network system operator.
SW REZ	South-West Renewable Energy Zone

Term	Definition
TEC	Threatened Ecological Community
Temporary Facilities	Temporary facilities used for the construction, repowering and/or decommissioning of the Project, including but not limited to temporary site offices, amenities, and compounds, rock screening and crushing facilities, concrete or asphalt batching plants, stockpiles and materials storage compounds, temporary field laydown areas and waste storage areas, minor 'work front' construction access roads and temporary meteorological masts.
Temporary Field Laydown Areas	Areas that components may be placed on the ground in preparation for moving or relocating around the Project Area. These areas will mostly not require earthworks and therefore may be outside of, and not included in the Development Footprint. They will occur within the Project Area.
TIA	Telecommunications Impact Assessment
TMP	Traffic Management Plan
TSR	Travelling Stock Reserve
TWC	Temporary Worker Camp
UFP	Unexpected Finds Protocol
VENM	Virgin Excavated Natural Material
VZ	Vegetation Zone
WMO	World Meteorological Organisation
WTG	Wind Turbine Generator
YBRN	Balranald Airport
YSWH	Swan Hill Airport
ZVI	Zone of Visual Influence

EIS Declaration

Project Details

Required Information	Details
Project Name	Junction Rivers Wind Project
Application Number	SSD-30448824
Address of the land in respect of which the development application is made	Balranald-Moulamein Road, Kyalite NSW 2715

Applicant Details

Required Information	Details
Applicant Name	Junction Rivers Pty Limited
Applicant Address	Level 4, 60 Marcus Clarke Street, Canberra, ACT 2601

Details of Person by Whom this EIS was Prepared

Required Information	Details
Name	Lachlan Sweeney
Address	Umwelt (Australia) Pty Limited, 75 York St, Teralba NSW 2284
Professional Qualifications	Bachelor of Science (Hons) Environmental Biology

Declaration by Registered Environmental Assessment Practitioner

Required Information	Details
Name	Amanda Antcliff
Registration Number	42151
Organisation registered with	Planning Institute of Australia
Address	Umwelt (Australia) Pty Limited, 75 York Street, Teralba NSW 2284
Professional Qualifications	Registered Environmental Assessment Practitioner, Planning Institute of Australia Registered Planner and Full Member, Planning Institute of Australia Bachelor of Environmental Science, University of Newcastle Graduate Diploma, Urban and Regional Planning, University of New England

Required Information	Details
Declaration	The undersigned declares that this EIS: • has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021; • contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates; • does not contain information that is false or misleading; • addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project; • identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; • has been prepared having regard to the Department's State Significant Development Guidelines - Preparing an Environmental Impact Statement; • contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; • contains a consolidated description of the project in a single chapter of the EIS; • contains an accurate summary of the findings of any community engagement; and • contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.
Signature	
Date	27 May 2024

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Appendix No. **Appendix Title**

1.0 Introduction

Junction Rivers Pty Ltd (as a subsidiary of Windlab Developments Pty Ltd and hereafter referred to as Windlab) proposes to deliver the Junction Rivers Wind Project (the Project) to provide reliable and cost-competitive energy to customers in New South Wales (NSW). The Project will also contribute to avoiding approximately two million tonnes of greenhouse gas (GHG) emissions associated with energy generation and provide significant economic benefits to the region.

The Project is located approximately 15 kilometres (km) south of Balranald, 140 km west of Hay and 20 km northeast of the NSW and Victorian border within the southern section of the Murray-Darling Basin. The Project is within the Murray River Local Government Area (LGA) (refer to **Figure 1.1**) and immediately east of Balranald Shire LGA.

The NSW Government's Electricity Strategy (DPE 2019) and Electricity Infrastructure Roadmap (DPE 2021) (Electricity Strategy) set out a plan to deliver the state's first five Renewable Energy Zones (REZs). These REZs will play a vital role in delivering affordable, reliable energy generation to help replace the State's existing coal-fired power stations as they come to their scheduled end of operational life. The Project is located within the South-West Renewable Energy Zone (SW REZ) (refer to **Figure 1.2**), which was declared by the NSW Government on 4 November 2022 and identified as a target area for renewable energy development in its Transmission Infrastructure Strategy and Electricity Infrastructure Roadmap. Therefore, the Project is strategically located in an area identified by the NSW Government as suitable for renewable energy projects and will assist the NSW Government in delivering on the objectives for the Electricity Strategy and the SW REZ.

The Project has been designed through a comprehensive process that incorporates community and stakeholder feedback and the findings of environmental and social studies to maximise positive social, economic and environmental outcomes while minimising adverse impacts. Windlab has undertaken extensive engagement with residents in the area and other stakeholders throughout the Project planning and assessment process. The Project design has been informed by use of the avoidance and minimisation hierarchy, as well as an iterative approach incorporating community and other stakeholder feedback (from ongoing engagement undertaken by Windlab since May 2021).

The Project is State Significant Development (SSD) as defined under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and will require development consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Environmental Impact Statement (EIS) provides an assessment of the economic, environmental and social impacts of the Project. This document is intended to assist the community, councils, government agencies and other stakeholders in understanding the Project and its benefits and impacts. This EIS is also intended to provide the necessary information to the consent authority to make an informed decision on the overall merits of the Project.

1.1 Project Overview

Windlab proposes to develop the Project to generate renewable wind energy supply to the National Electricity Market (NEM). The Project will have a capacity of approximately 750 megawatts (MW), with the potential to power approximately 434,000 homes. The Project includes construction and operation of up to 96 wind turbine generators (WTG), up to four battery energy storage systems (BESS) or static synchronous compensators (STATcom), and associated facilities including operation and maintenance buildings, access roads, civil works, electrical infrastructure and temporary facilities for the construction phases (refer to **Figure 1.3**). The key components of the Project include:

- Up to 96 (3 blade) WTGs with a total height (maximum tip height) of up to 300 metres (m).
- Electrical connections between the proposed WTGs and substations/switching stations consisting of a combination of underground cables and overhead powerlines.
- Substations/switching stations and transmission connections to connect the proposed WTGs to the existing 220 kilovolt (kV) transmission line and/or the Project EnergyConnect transmission line.
- Up to four BESS facilities (to a total of 200 MW with a four-hour delivery capacity), or up to four STATcom facilities.
- Other ancillary infrastructure including access roads and tracks, operation and maintenance buildings, construction facilities and other infrastructure that will facilitate the construction and operation of the Project.
- Temporary calibration meteorological masts and permanent power performance masts.
- Temporary on-site concrete batching plant and rock crushing facilities during the construction phases.
- Targeted road network upgrades to facilitate delivery of WTG components to the Project Area as required.

The Project may be constructed in two stages. Stage 1 may see the construction of up to 30 WTGs and required ancillary infrastructure and Stage 2 may see the construction of the remaining WTGs and required ancillary infrastructure. See **Section 3.2** for more information about construction staging.

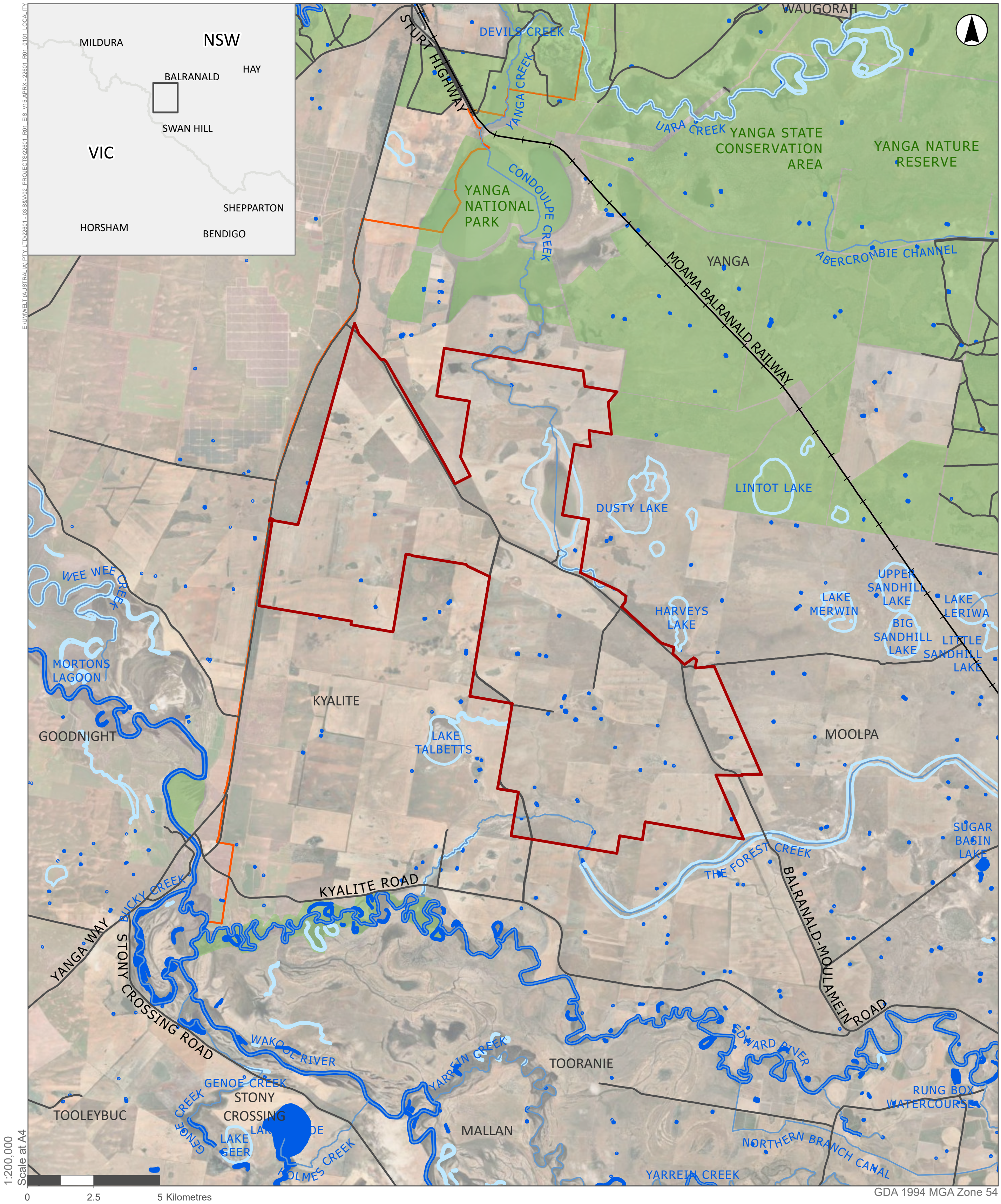
The conceptual layout for WTGs, BESS/STATcom facilities, internal access roads, ancillary infrastructure and temporary facilities associated with the construction of the Project has been subject to ongoing refinement with the aim of minimising associated environmental, cultural and social impacts.

The Project design process has attempted to avoid impacts where possible and mitigate and/or offset where impacts were unavoidable. Mitigation measures have been incorporated into the detailed design of the Project. Iterative design changes for the Project have included:

- avoidance of areas of high Aboriginal cultural heritage significance
- avoidance of threatened ecological communities (TEC) and areas of remnant vegetation

- increased separation distance between neighbouring WTGs and relevant national parks, nature reserves, state conservation areas and regional parks, avian flyways and other areas of high landscape value
- increased separation distance between WTGs and local aircraft landing areas
- reduction of access track waterway crossings.

Refer to **Section 2.6** for further information about how the Project has avoided environmental and social impacts, and to **Appendix 8** for a summary of management and mitigation measures proposed for the Project.



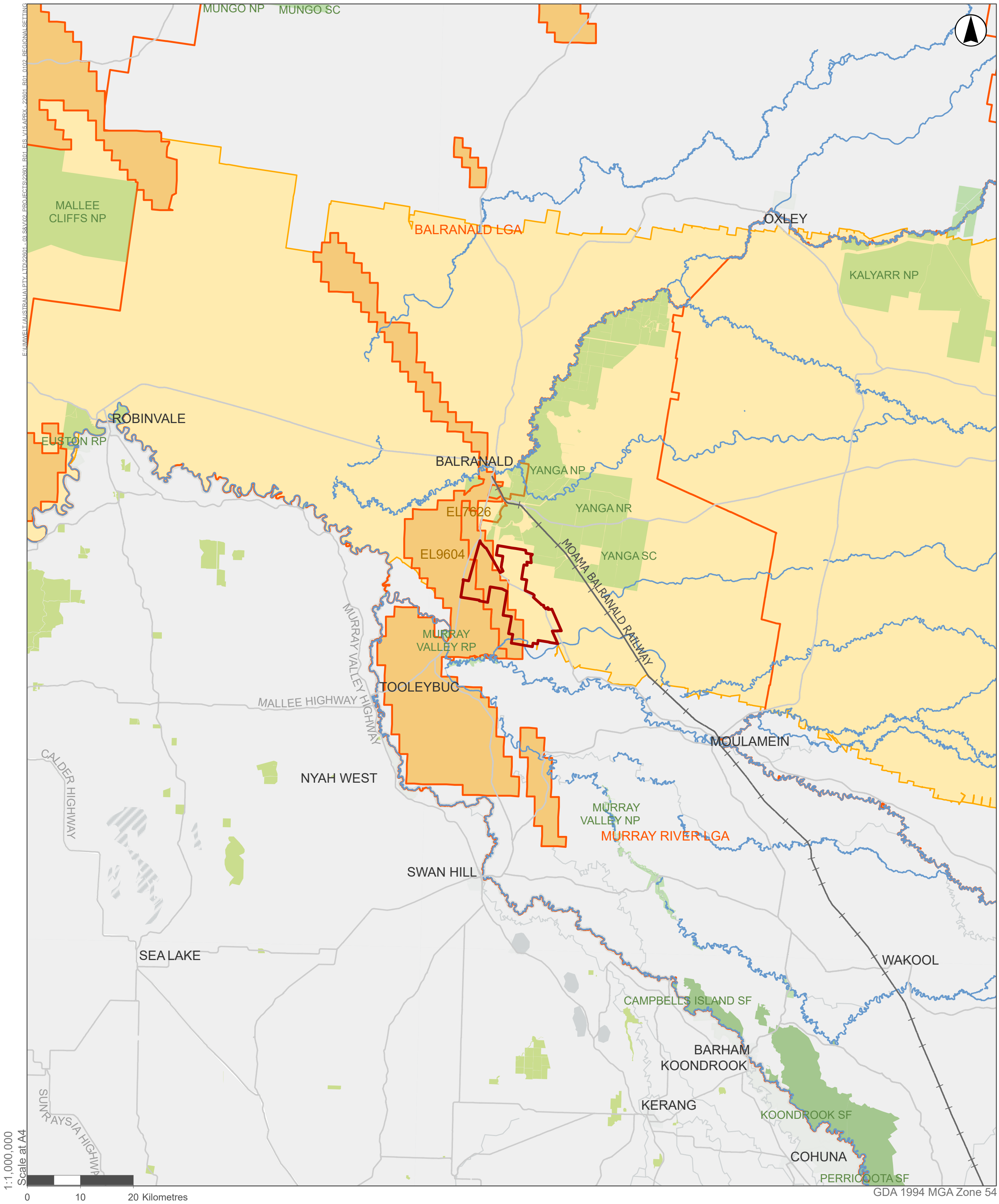
Legend

- Project Area
- Local Government Area
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway

FIGURE 1.1

Locality

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

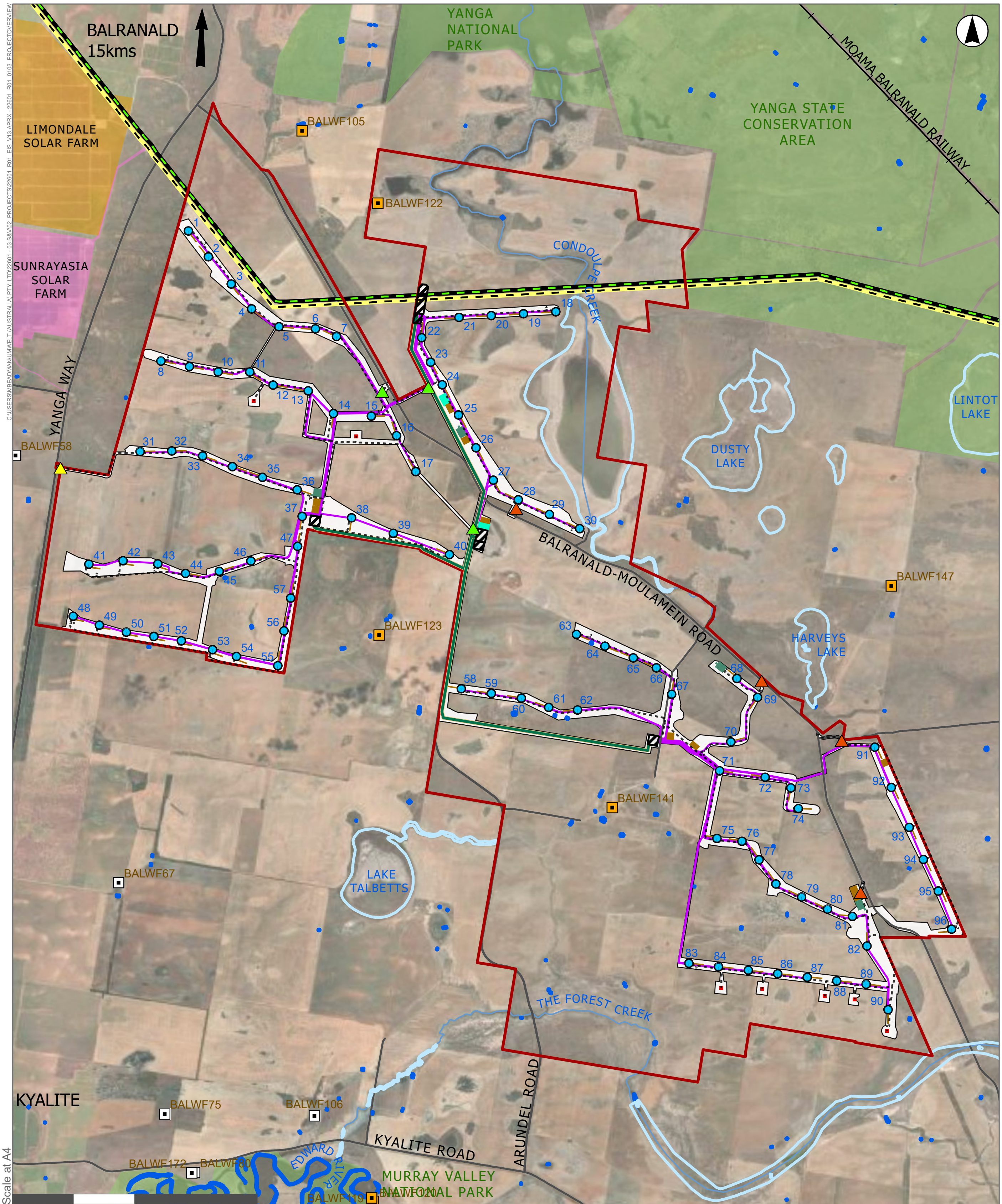
- Project Area
- Local Government Area
- Exploration Licence
- Renewable Energy Zone
- Parks and Reserves
- State Forest
- Watercourse
- Railway

FIGURE 1.2

Regional Setting

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

umwelt



Scale at A4 1:110,000

0 2.5 5 Kilometres

GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Limondale Solar Farm
- Sunrayasia Solar Farm
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- 33 kV Internal Reticulation (underground)
- 220 kV/330 kV Internal Reticulation (overhead)
- Operations and Maintenance Compound
- Concrete Batching Plant
- Temporary Construction Facilities
- BESS/STATcom/Substation/Switching Station
- Associated Dwelling
- Non-Associated Dwelling
- Permanent Power Performance Mast (Potential Location)
- 220 kV TransGrid Transmission Line
- Project Energy Connect Transmission Line
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve

FIGURE 1.3

Project Overview

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

1.2 Project Objectives

The objectives of the Project are to:

- Increase renewable energy generation in NSW and contribute to strategic objectives and targets of the NSW and Commonwealth governments.
- Provide for cleaner reliable electricity generation and assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.
- Provide regional investment in the NSW renewable energy sectors.
- Support communities by providing economic and employment benefits for regional NSW and to reinforce Windlab's commitments under the Clean Energy Council's 'Best Practice Charter' with respect to socially responsible development.
- Develop the Project in a manner which supports long-term productive relationships with the local community, Traditional Owners, regulators, and industry.
- Avoid and minimise environmental, cultural heritage, historic heritage, and social impacts where practical through careful design and best practice environmental protection and impact mitigation.

1.3 The Proponent

The Proponent for the Project is Junction Rivers Pty Ltd, a subsidiary of Windlab Developments Pty Ltd, an Australian, fully integrated renewable energy company. Windlab was established to commercialise world leading atmospheric modelling and wind energy assessment technology, developed by Australia's premier scientific research institute, the Commonwealth Scientific and Industrial Research Organisation (CSIRO). For twenty years, Windlab has owned and exclusively used this world-leading technology and its globally recognised expertise to find, develop, construct and operate renewable energy projects.

Windlab has a record of delivering projects in accordance with applicable environmental legislation, regulation and requirements and is a signatory to the Clean Energy Council's Best Practice Charter for Renewable Energy Projects. Windlab prides itself in developing projects that prioritise social and environmental values while avoiding unnecessary impacts.

Table 1.1 presents the key details of the Proponent.

Table 1.1 Proponent Details

Requirement	Details
Full Name/s	Junction Rivers Pty Limited
Postal Address	Level 4, 60 Marcus Clarke Street, Canberra ACT 2601
Street Address	Level 4, 60 Marcus Clarke Street, Canberra ACT 2601
ABN	35 658 060 523

1.4 Structure of this Report

This EIS has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs), re-issued on 19 December 2023. **Appendix 1** provides the SEARs and where assessment requirements have been addressed in the EIS.

This EIS has also been prepared in consideration of the following guidelines:

- *NSW Wind Energy Guideline for State Significant Wind Energy Development* (DPE, 2016), including:
    - Wind Energy: Visual Assessment Bulletin.
    - Wind Energy: Noise Assessment Bulletin.
- *State significant development guidelines – preparing an environmental impact statement (Appendix B to the state significant development guidelines)* (DPIE, 2022) and referred to hereafter as the DPIE EIS Guideline.
- *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE, 2022).
- *Social Impact Assessment Guideline for State Significant Projects* (DPIE, 2023).
- *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2024) (Engagement Guidelines).

As part of the Department of Planning, Housing and Infrastructure's (DPHI) draft energy policy framework, a revised Wind Energy Guideline (draft) was exhibited for comment from November 2023 to January 2024. DPHI is currently considering submissions with the aim to finalise the guideline later in 2024. As this EIS has been submitted prior to finalisation of the revised guideline and the final form and content of the guideline is not know, the draft guideline has not been applied to this EIS.

This report has the following sections:

- **Summary** – provides a concise summary of the EIS.
- **Section 1.0** – provides an introduction which sets the context for detailed assessment of the Project in the following sections.
- **Section 2.0** – provides the key strategic issues that are relevant to the assessment of the Project.
- **Section 3.0** –provides a comprehensive and consolidated description of the Project.
- **Section 4.0** – provides a summary of the relevant statutory requirements for the Project.
- **Section 5.0** – provides the findings of community engagement that was carried out for the Project during preparation of the EIS and what further engagement will be carried out if the Project is approved.
- **Section 6.0** – provides a detailed summary of the results of the assessment of the potential impacts of the Project.
- **Section 7.0** – provides a justification and evaluation for the Project as a whole.
- **Section 8.0** – provides a list of references used throughout the EIS.

A number of appendices provide detailed technical assessments of the key environmental and social issues related to the Project. The key outcomes of these studies are summarised in this EIS (refer to **Section 6.0**). **Table 1.2** includes a list of the relevant technical assessments and organisations that prepared them.

Table 1.2 Detailed Technical Assessments

Detailed Technical Assessment	Organisation
Aboriginal Cultural Heritage Assessment	NGH Pty Ltd
Avian impact assessment reports (various)	Nature Advisory Pty Ltd
Aviation Impact Assessment	Aviation Projects Pty Ltd
Biodiversity Development Assessment Report	Biosis Pty Ltd
Blade Throw Risk Assessment	Middleton Group Engineering Pty Ltd
Estimated Development Cost Report	Rider Levett Bucknall NSW Pty Ltd
Economic Impact Assessment	Ethos Urban Pty Ltd
Flood Impact Risk Assessment	WRM Water & Environment Pty Ltd
Historical Heritage Impact Assessment	Umwelt (Australia) Pty Ltd
Land Use Conflict Risk Assessment	Umwelt (Australia) Pty Ltd
Landscape and Visual Impact Assessment	Moir Landscape Architecture Pty Ltd
Noise and Vibration Assessment	Marshall Day Acoustics Pty Ltd
Preliminary Hazard Analysis	Riskcon Engineering Pty Ltd
Haulage Route Study	Rex J Andrews Pty Ltd
Social Impact Assessment	Environmental Resources Management Australia Pty Ltd
Telecommunications Impact Assessment Report	Middleton Group Engineering Pty Ltd
Traffic and Transport Assessment	Access Traffic Consulting Pty Ltd
Water Resources Impact Assessment	Umwelt (Australia) Pty Ltd

2.0 Strategic Context

2.1 Renewable Energy Market and Policy Context

2.1.1 Electricity Generation Market

The development of renewable energy projects aligns with global, Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies.

NSW is currently in a transition to build a reliable, cost-competitive and sustainable electricity future to support a growing economy (NSW Government, 2019). The State's five existing coal fired power stations have started to progressively close, with Liddell Power Station having closed in 2023. The remaining four coal fired power stations are all scheduled to retire before 2043 (AEMO, 2019). These power stations provide around three quarters of NSW's electricity supply and two thirds of the firm capacity required during peak demand periods such as summer heat waves. The NSW Government is taking action to deliver cheap, reliable, and clean electricity for homes and businesses in NSW (EnergyCo, 2023a).

The NSW Government has indicated that REZs will play a vital role in delivering affordable energy generation to help prepare the State for the expected retirement of thermal power stations over the coming decades. EnergyCo, the statutory authority responsible for leading the delivery of REZs, has described REZs as modern-day power stations which combine renewable energy generation and energy storage systems, connected to transmission infrastructure via energy hubs (EnergyCo, 2023a). REZs will have a role in providing reliable electricity for homes, businesses and industry in NSW to help replace the State's existing coal fired power stations as they come to their scheduled end of operational life (EnergyCo, 2023a).

Various government strategies, plans and policies such as AEMO's draft Integrated Systems Plan (ISP) (AEMO, 2024), the NSW Transmission Infrastructure Strategy (NSW Government, 2023b) and NSW Electricity Infrastructure Roadmap (NSW Government, 2023a), identify the important role for REZs to provide an effective and economical way to integrate new generation, storage and transmission development (EnergyCo, 2023a).

In Australia in 2020–2021, fossil fuels contributed 71% of the total electricity generation, including coal (51%), gas (18%) and oil (2%). The share of coal in the electricity sector has continued to decline in contrast to the beginning of the century when coal's share of electricity generation exceeded 80%. The contribution of renewable energy to the total national electricity generation increased from 21% in 2019 to 29% in 2020–2021 (DCCEEW, 2022a).

The Clean Energy Regulator estimates that 5.5 gigawatts (GW) of renewable capacity was installed during 2021 with renewable electricity averaging 31.4% of the market share in the national electricity market (NEM) (Clean Energy Regulator, 2022). In 2022, the Clean Energy Regulator expected between 2.5 and 3 GW to be registered from large scale renewable electricity generation (Clean Energy Regulator, 2022).

NSW has a strong pipeline of renewable energy projects which have the potential to contribute to achieving the current transition targets. However, significant investment is required from the private sector to achieve sufficient renewable energy supply that will support NSW's transition to renewable energy and the retirement of the existing fossil fuel generated supply.

The Project will fit within the current strategic direction of the NSW and Australian energy generation market and assist in achieving the planned transition to an increased contribution of renewable energy to Australia's energy needs. As a renewable energy project located within the SW REZ, the Project is located within a defined area planned for renewable energy development by the NSW Government. As an existing renewable energy operator in Australia, Windlab has a track record of delivering large-scale renewable energy projects.

2.1.2 Commonwealth Renewable Energy Commitments

Australia is one of the 193 Parties (192 countries plus the European Union) from around the world participating in the international climate change agreement (the Paris Agreement) (United Nations, n.d.). The Paris Agreement aims to:

- Hold the increase in the global average temperature to below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- Increase the ability (of nations) to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.
- Make finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.

The Paris Agreement seeks to meet its objectives by developing programs and mechanisms that:

- Require participating Parties to prepare and communicate greenhouse gas mitigation contributions. Parties were expected to set mitigation targets for 2020, and then develop new targets every five years. Each successive target is expected to represent a larger mitigation effort than the previous target.
- Promote climate change resilience and adaptation.
- Provide mitigation and adaptation funding to developing countries.
- Foster mitigation and adaptation technology transfer between Parties.
- Require participating Parties to report progress towards their mitigation contributions on an annual basis.

Australia signed the Paris Agreement on 22 April 2016. The obligations under the Paris Agreement will drive national greenhouse gas policy up to 2030. Australia's commitment to the Paris Agreement includes reducing greenhouse gas emissions to 43% below 2005 levels by 2030 (DCCEEW, 2022b).

In September 2022, the Australian Government implemented the Climate Change Act 2022, which sets out legislated commitments for achieving nation-wide greenhouse gas emissions reduction targets.

These targets include:

a. reducing Australia's net greenhouse gas emissions to 43% below 2005 levels by 2030

b. reducing Australia's net greenhouse gas emissions to zero by 2050.

This follows Australia's lodgement of an updated Nationally Determined Contribution with the United Nations Framework Convention on Climate Change (UNFCCC) secretariat in June 2022, as per the obligations under the Paris Agreement. To achieve net-zero greenhouse gas emissions by 2050, the Australian Government developed the Long-Term Emissions Reduction Plan (CoA, 2021), which details the proposed strategies to invest in low emissions technologies across the country, including renewable energy infrastructure.

2.1.3 NSW Renewable Energy Commitments

The NSW Government has developed its NSW Climate Change Policy Framework, which aims to deliver net zero emissions by 2050, and a State that is more resilient and responsive to climate change (OEH, 2016).

Under the NSW Climate Change Policy Framework, NSW has committed to both follow the Paris Agreement and to work to complement national action.

The policy framework is being delivered through:

- the Climate Change Fund
- developing an economic appraisal methodology to value greenhouse gas emissions mitigation
- embedding climate change mitigation and adaptation across government operations
- building on NSW's expansion of renewable energy
- developing action plans and strategies.

In 2013, the NSW Government released the Renewable Energy Action Plan (REAP) and the NSW Energy Efficiency Action Plan (EEAP).

The REAP aimed to increase the generation, storage and use of renewable energy in NSW, at least cost to customers and with maximum benefits to NSW. The three core goals of the REAP were to attract renewable energy investment, build community support for renewable energy and attract and grow expertise in renewable energy. Based on the implementation of the REAP, renewable energy is now well-placed to play a leading role in meeting NSW's energy needs into the future.

Consistent with the national target, the NSW Government's objective is to achieve net zero emissions by 2050. To achieve this, the NSW Government has released:

- The Climate Change (Net Zero Future) Act 2023, which sets out a clear path to deliver net zero by 2050.
- The Electricity Infrastructure Investment Act 2020 (EII Act), which enables the State's 20-year plan to transform our electricity system under the NSW Electricity Strategy (DPIE, 2019) and NSW Electricity Infrastructure Roadmap (the Roadmap) (DPE, 2021) into one that is cheap, clean and reliable.

- The Infrastructure Investment Objectives Report (IIO Report) (AEMO, 2023) which is the NSW Consumer Trustee's plan for meeting the future electricity needs of NSW.
- The Network Infrastructure Strategy (NIS) (EnergyCo, 2023) for the coordination of the network infrastructure required to modernise NSW's energy system over the next 20 years.

Current and future electricity development in NSW is supported though the NSW Government's Electricity Strategy (DPIE, 2019) and the Roadmap which builds on the framework set out in the Electricity Strategy taking an integrated approach to all demand and supply options, including action by households and small businesses, demand management and investment in large-scale, affordable and reliable generation.
The Project is consistent with the objectives of the Electricity Strategy and Infrastructure Road Map, in aiming to provide large-scale renewable electricity generation that is affordable and reliable.

The NSW Electricity Strategy is the NSW Government's plan for a reliable, affordable and sustainable electricity future that supports a growing economy (NSW Government, 2019).

IIO Report (AEMO, 2023) sets out the NSW Consumer Trustee's 20-year Development Pathway for the construction of electricity infrastructure in NSW to achieve the infrastructure investment objectives included in the EII Act in a practically feasible way. The 2023 IIO Report highlights the significant progress in achieving the Infrastructure Investment Objectives but also the need for more investment in new generation, storage and network infrastructure.

The NIS (EnergyCo, 2023) is a strategy for the practical coordination of NSW network infrastructure to connect new generation, firming and storage in NSW's five REZs, and to assist NSW to meet the EII Act objectives.

2.1.4 Regional and Local Renewables Context

Wind energy is recognised to be one of the lowest-cost forms of new build large-scale energy generation and NSW has significant wind resources (AEMO, 2024). The SW REZ has been identified as an optimal location to host renewable energy, noting its strong renewable energy resource potential, proximity to the existing electricity network, and consideration of potential interactions with existing land uses, including agricultural lands and biodiversity conservation (EnergyCo, 2023b).

The Project Area is strategically located within the SW REZ, with Windlab commencing wind monitoring at the Project Area in August 2019 and is ongoing. Windlab's analysis of wind monitoring data over this period of time has indicated that Project Area has a wind resource suitable for a productive wind farm.

The Project will also contribute significant capital investment within the region, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project (e.g. indirect employment creation in local and regional economies would include jobs supported through transportation, trade supplies, services, accommodation, catering, retail services, etc.), deliver additional income to associated landowners, and provide benefits to the local community through a Community Benefit Fund.

2.2 Regional Strategies and Plans

2.2.1 Far West Regional Plan 2036

The Far West Regional Plan 2036 (Far West Plan) is the NSW Government's strategy for guiding land use planning decisions for the Far West to 2036. The vision of the Far West Plan is to create 'A unique part of Western NSW with a diverse economy, an exceptional natural environment and resilient communities' (DPE, 2017).

The supporting goals of the Far West Plan are to create:

- a diverse economy with efficient transport and infrastructure networks
- exceptional semi-arid rangelands traversed by the Barwon-Darling River
- strong and connected communities.

While traditionally anchored in agriculture, mining and tourism, the Far West Plan recognises opportunities are also emerging in other sectors, including renewable energy. The Plan identifies that growth across a range of potential growth sectors will require careful management and planning to provide land use compatibility.

The Far West Plan promotes further development of renewable energy across the region, specifically through Direction 4: 'Diversify energy supply through renewable energy generation'. The region is seen as having significant potential for renewable energy industries with vast open spaces with potential for wind power generation and large-scale solar energy generation. The Far West Plan indicates that growth in renewable energy generation promotes local jobs in smaller communities and provides opportunities for associated industries.

The Far West Plan also aims to protect important agricultural land from land use conflict and fragmentation and manage the interface between important agricultural lands and other land uses.

The Project has been designed to be compatible with existing agricultural pursuits within the Project Area and agricultural use of the land will continue with the wind farm during construction, operation and decommissioning. The provision of income to host landholders will strengthen their ability to invest in their ongoing agricultural operations and provide diversified sources of income during drought or other less productive periods.

The Project is considered to be consistent with the vision of the Far West Plan, particularly in light of the proposed development of renewable energy generation. In particular, the Far West Plan recognises that growth in wind energy, solar energy and bioenergy generation will promote employment and development opportunities in related industries.

2.2.2 Murray River Local Strategic Planning Statement 2020–2040

The Murray River Local Strategic Planning Statement (Murray River Planning Statement) is a 20-year vision for land use planning and growth in the Murray River LGA (Murray River Council, 2020).

Planning themes of the Murray River Planning Statement are around fostering a growing and innovative economy, developing liveable communities with social capital, improving the environment and heritage, and addressing climate change. As part of its strategy, Murray River Council identifies that it aims to promote local renewable energy projects by collaborating with energy providers.

The Project is considered to be consistent with the vision and intent of the Murray River Planning Statement, specifically in relation to the proposed development of renewable energy generation. The Project has been designed to meet the needs of the NSW Government's Electricity Strategy and will contribute to strategies to develop resilience to climate change. The Project has also been designed in consideration of agricultural land uses within the Project Area and limiting potential land use conflicts within the region.

2.2.3 Balranald Shire Council Local Strategic Planning Statement

Although the Project Area is within the Murray River LGA, it is immediately east of Balranald Shire LGA, which includes the town closest to the Project Area, Balranald. The Balranald Shire Council Local Strategic Planning Statement (Balranald Shire Planning Statement) sets the framework for Balranald Shire's economic, social and environmental land use needs over the next 20 years (Balranald Shire Council, 2020).

The Balranald Shire Planning Statement identifies the vision and priorities for future land use within the LGA and establishes actions to achieve the vision and priorities. The vision focusses on:

- Strengthening the capacity and opportunities for the economy.
- Making Balranald shire the best possible place to live, work and invest.
- Achieving outstanding results in managing, enhancing and improving the natural and built environment.

The Balranald Shire Planning Statement acknowledges that developments in renewable energy projects provide opportunities to bolster the economies of relevant townships. Further, the Balranald Shire Planning Statement identifies that favourable conditions including access to transmission infrastructure, land availability and an appropriate climate make the region a competitive location for large-scale renewable energy generation technologies.

The Project is considered to be consistent with the Balranald Shire Planning Statement as it contributes to economic capacity and opportunities for economic growth, and leverages favourable conditions for a large-scale renewable development.

Windlab is committed to providing a Community Benefit Fund to both Murray River Council and Balranald Shire Council in relation to the Project (refer to **Section 2.5.3**).

2.3 Environmental Context

2.3.1 Regional Setting

As outlined in **Section 1.0**, the Project is located approximately 15 km south of Balranald and 140 km west of Hay in the Murray-Darling Basin region of NSW (refer to **Figure 1.2**). The nearest larger population centre is Balranald with a population of 2,208 people (ABS, 2023), which provides a range of services for the region. Balranald is located in the Balranald Shire LGA.

The Project Area is within the Murray River LGA and is adjacent to Balranald Shire LGA. The localities of Yanga, Kyalite and Moolpa are key communities of interest for the Project given their proximity to the Project Area. Yanga, Kyalite and Moolpa are located in the Murray River LGA.

The Sturt Highway is located north of the Project Area and provides for the transportation of passengers and freight between Sydney and Adelaide, and a number of regions adjacent to the route. Other key transportation routes in the locality include Yanga Way, Balranald-Moulamein Road and Kyalite Road (refer to **Figure 1.1**).

2.3.2 Land Use and Ownership

The Project Area and surrounding area is characterised by existing agricultural land use with associated rural residences. Land within and surrounding the Project Area has been subject to extensive vegetation clearing associated with historic agricultural land uses, dating back to European occupation of the landscape since the 1800s. This broad-scale land clearing has resulted in the majority of the Development Corridor generally lacking native vegetation and being Category 1 Land. Agriculture is the predominant land use in the Project Area, primarily intensive cropping (cereals and legumes) and grazing (refer to **Figure 2.1**).

There are seven private landholdings owned by four hosts within the Project Area along with some minor areas of Crown Land easements traversing the Project Area as Travelling Stock Reserves (TSR), roads and waterways (refer to **Figure 2.2**).

The Project Area is zoned RU1 – Primary Production under the Wakool Local Environment Plan (LEP) 2013 (refer to **Figure 2.3**). Land to the north and northeast of the Project Area is zoned C1 – National Parks and Nature Reserves, with a portion of land to the immediate west of the Project Area zoned RU3 Forestry. Land to the south of the Project Area is also zoned RU1 – Primary Production.

Relevant specialist assessments undertaken as part of this EIS have identified three categories of dwellings (refer to **Figure 1.3**):

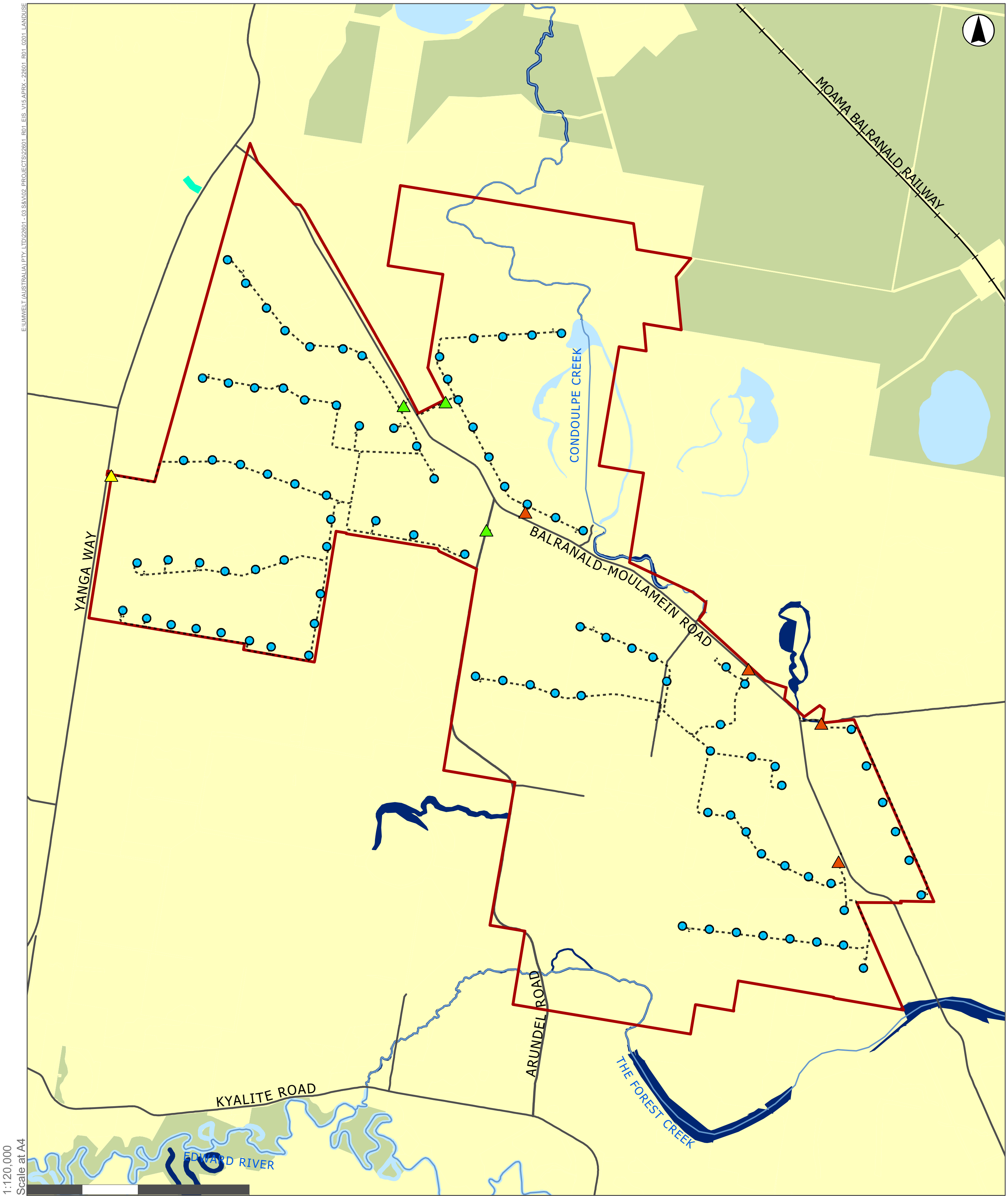
- **Host Dwellings** – those dwellings located within the Project Area and located on land hosting infrastructure associated with the Project. The host landholders have agreements in place with Windlab.

- **Associated Dwellings** – dwellings not located on land within the Project Area or hosting infrastructure, however, the Proponent has a negotiated agreement in place with the landowner regarding Project impacts and are therefore associated with the Project.

- **Non-associated Dwellings** – dwellings located outside of the Project Area, not associated with the Project and with no negotiated agreement in place with the landowner.

There are two existing mineral exploration licences which partly overlap the Project Area, held by Iluka Resources Limited (EL 7626) and Murray Basin Critical Minerals Pty Ltd (EL 9604) (refer to **Figure 1.2**). EL 9097 held by Viewmont Gold Pty Ltd has expired.

A schedule of lands for the Project Area is provided in **Appendix 2**.



GDA 1994 MGA Zone 54

Legend

- Project Area
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- Watercourse
- Road
- Railway

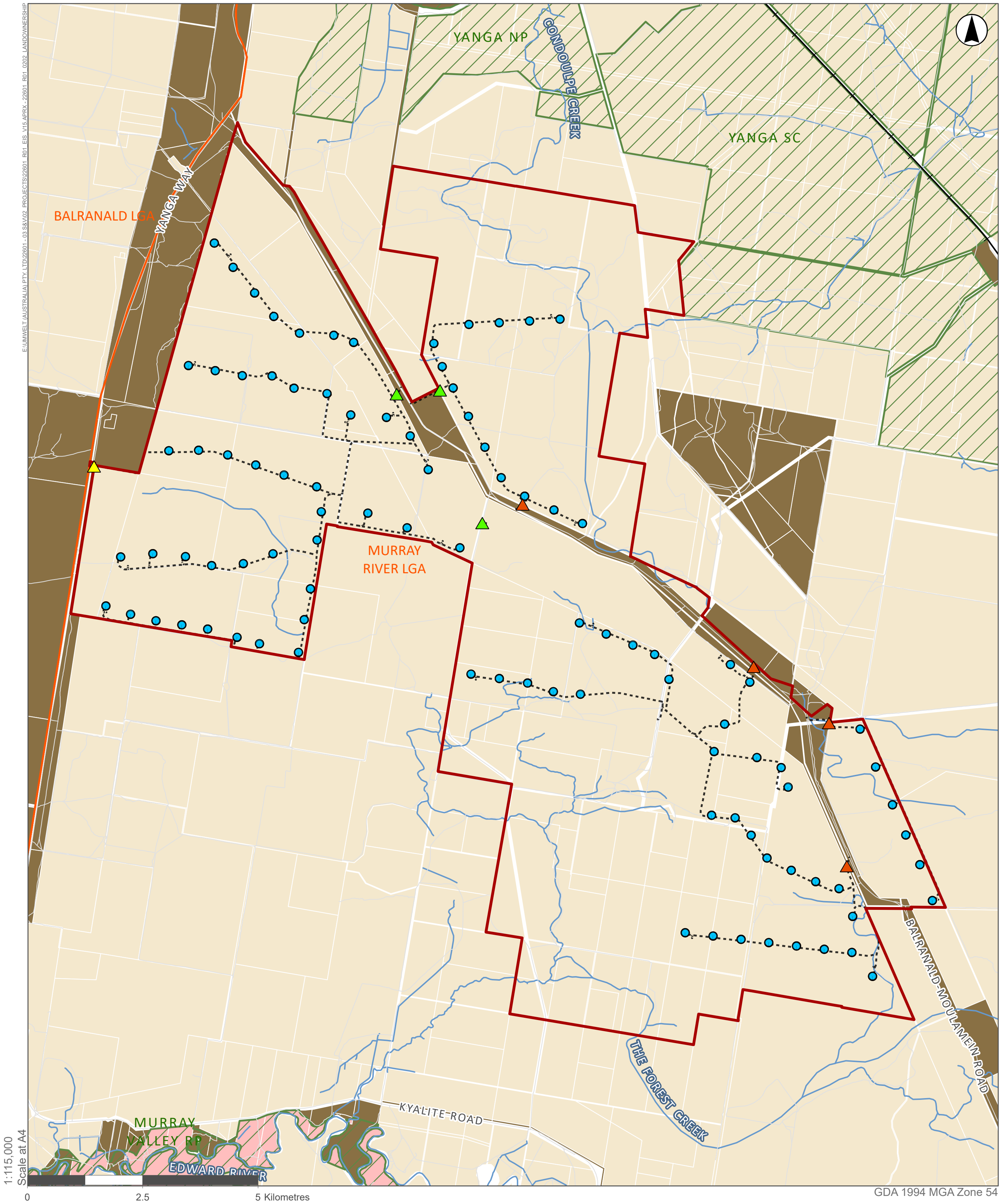
Land Use (2017)

- Nature Conservation
- Agriculture (includes some Residential)
- Infrastructure (Roads/ Electricity Substations and Transmission)
- Waterbody (Lake/ River)
- Marsh/ Wetland

FIGURE 2.1

Land Use

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

Project Area
Wind Turbine Generator
Emergency Only Access Point
Primary Access Point
Secondary Access Point
Access Tracks
Local Government Area
NPWS Reserve
Watercourse
Railway
Road

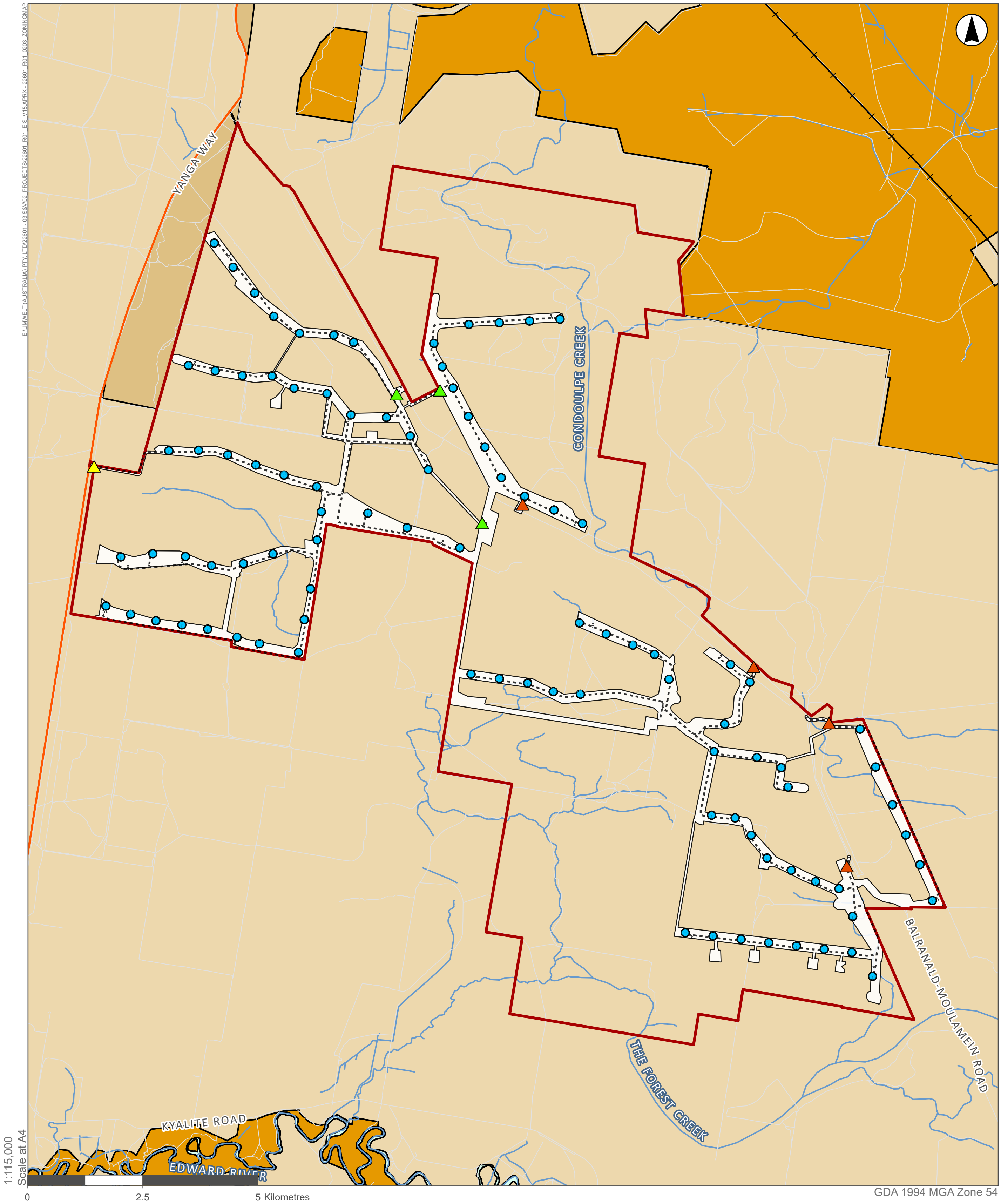
Land Ownership

Crown
NSW Government
Freehold

FIGURE 2.2

Land Ownership

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Local Government Area
- Access Tracks
- Watercourse
- Road
- Railway

EPI Land Zoning

- C1 - National Parks and Nature Reserves
- RU1 - Primary Production
- RU3 - Forestry
- W1 - Natural Waterways

FIGURE 2.3

Zoning Map

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

2.3.3 Natural, Cultural and Built Features

The Project Area falls within the Balranald Local Aboriginal Land Council (LALC) area. There are no currently known native title claims over the Project Area.

The Project Area features flat topography with scattered sand hills. The Project Area has an elevation ranging from 50 m Australian Height Datum (AHD) to 80 m AHD (refer to **Figure 2.4**).

The Project Area is located within the Murray-Darling Basin water catchment, within the Murrumbidgee River Region. There are a number of minor creeks that traverse the Project Area (refer to **Section 6.8**).

No parts of the Project Area are identified in regional scale mapping as Biophysical Strategic Agricultural Land. The land within the Project Area is Class 4, 5, and 6 under the Land and Soil Capability Assessment Scheme (LSC) (refer to **Figure 2.5**). There is approximately 715 ha of Class 4 land located within the Project Area, with approximately 40 ha within the Development Corridor. It is noted that the Development Corridor is a conservative area, and the final Disturbance Footprint will likely be smaller, subject to further detailed design. Where practicable, the proposed disturbance area for the Project will seek to minimise disturbance to areas of Class 4 land as far as practicable (refer to **Section 6.8**).

Directly to the north and northwest of the Project Area is Yanga National Park (approximately 66,734 ha), Yanga Nature Reserve (approximately 1,940 ha), and Yanga State Conservation Area (approximately 34,557 ha). Murray Valley National Park (approximately 40,737 ha) and Murray Valley Regional Park (approximately 9,401 ha) are located south of the Project Area. Each is valued for recreational tourism, heritage values, fishing, hiking, bird watching and scenic views.

Areas of native vegetation within the Project Area are generally in the form of small areas of native grassland/shrubland and isolated paddock trees. The Project Area also features vegetated corridors and small isolated patches of woodland which are typically associated with roadsides and fence lines. The Project Area features varying degrees of biodiversity value, with detailed ecological field surveys identifying seven plant community types (PCT) including two Threatened Ecological Communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) (refer to **Section 6.4**).

An *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 16 April 2024 (**Appendix 3**). The report notes that the following matters of national environmental significance may occur in, or may relate to, the Project Area based on a search of a 10 km buffer of the Project Area:

- Wetlands of International Importance.
- Listed Threatened Species and Ecological Communities.
- Listed Migratory Species.

These Matters of National Environmental Significance (MNES) are addressed in **Section 6.4**.

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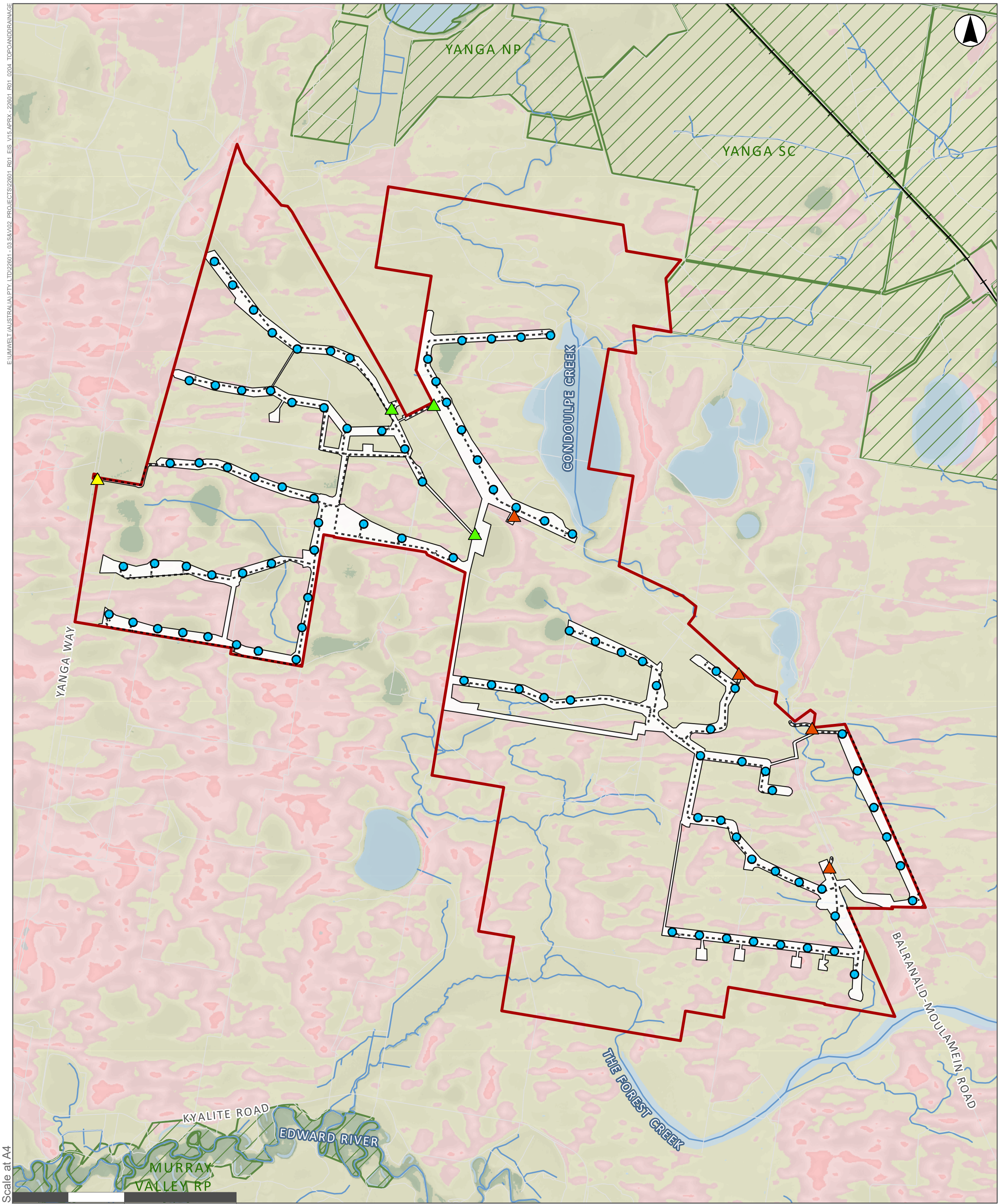

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- NPWS Reserve
- Waterbody
- Watercourse
- Road
- Railway

Elevation m(AHD)

Value

- 50.001 - 55
- 55.001 - 60
- 60.001 - 65
- 65.001 - 70
- 70.001 - 75
- 75.001 - 80

FIGURE 2.4

Topography and Drainage

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

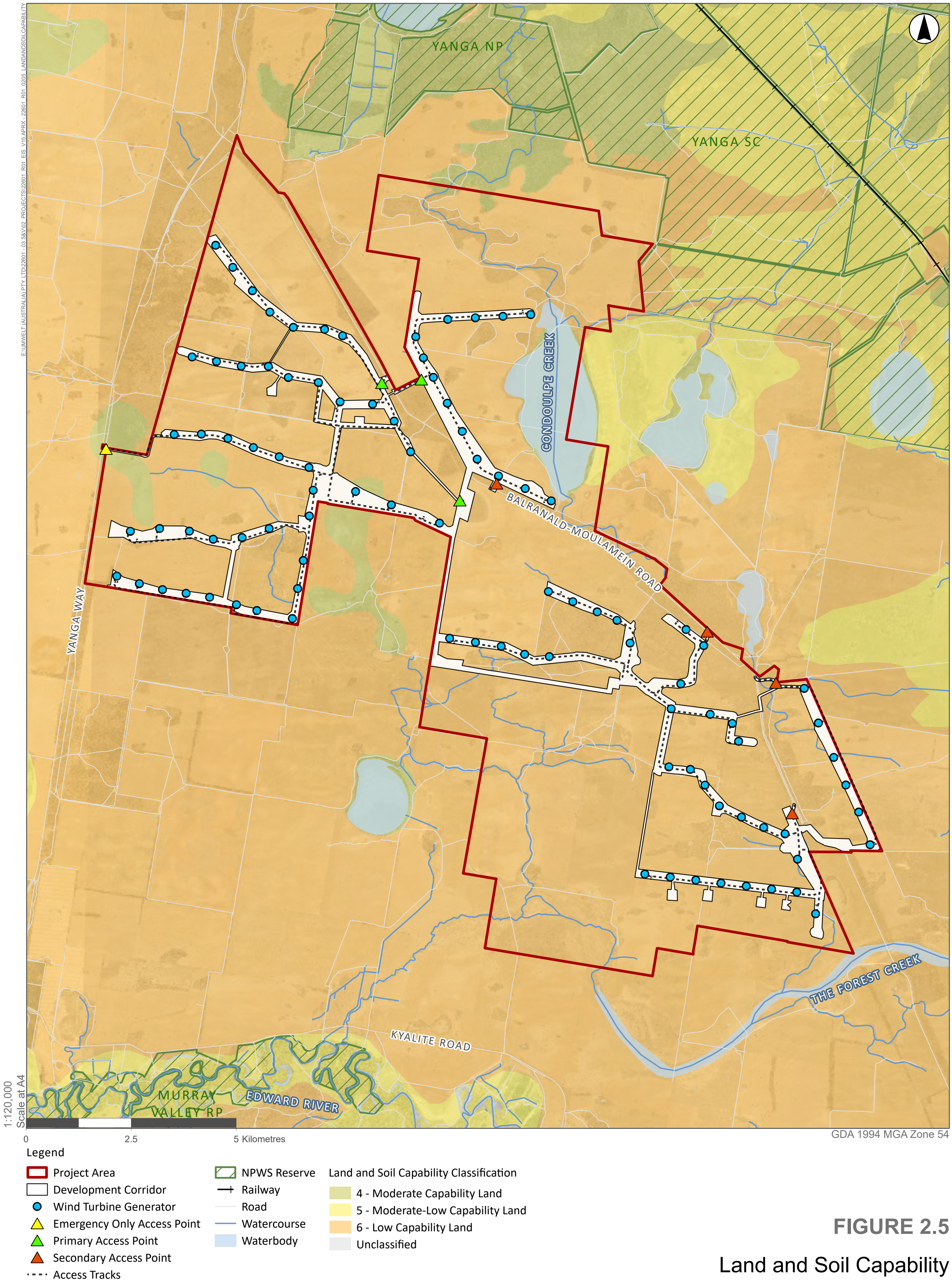

FIGURE 2.5

Land and Soil Capability

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

2.3.4 Key Risks or Hazards

The iterative design process and the assessments undertaken for this EIS have supported the Project design to, wherever possible, avoid, minimise and mitigate potential risks and hazards. Notwithstanding, the nature of the Project (i.e. a wind farm and BESS/STATcom facilities) is such that some risks or hazards cannot be entirely addressed through design, management or mitigation measures.

The Project Area:

- Has not been identified as containing contaminated land.
- Is not located within land considered to be prone to mine subsidence.
- Is not located within a coastal zone.

As outlined in **Section 6.8**, the Project Area is in a location that presents some risk of local catchment flooding under both the existing and climate change conditions modelled.

Although the Project Area is not identified as being bush fire prone by the NSW Rural Fire Service (RFS) bush fire prone land mapping, the Project Area adjoins land to the west and south that is identified as bush fire prone land (RFS, 2021). As discussed in **Section 6.10.3**, the Project Area will be appropriately maintained over the life of the Project for bush/grass fire risks, including vegetation and site maintenance required to maintain Asset Protection Zones (APZs).

Relevant risks and hazards, as well as the associated management and mitigation measures, have been considered and are described in detail in **Section 6.0**. In accordance with the SEARs, relevant assessments have been undertaken of risks and hazards associated with the Project, including:

- aviation safety
- telecommunications
- health
- the battery energy storage systems/STATcom facilities
- dangerous goods
- blade throw.

Where a hazard or risk was unable to be avoided entirely, Windlab has endeavoured to implement all reasonable and feasible management and mitigation measures.

2.4 Cumulative Impacts

The Cumulative Impact Assessment (CIA) Guidelines for State Significant Projects (DPIE, 2022) requires consideration of a project together with the impacts of other relevant future and existing projects in order to determine potential cumulative impacts. The NSW Wind Energy Guideline (DPE, 2016) also identifies the requirement to address cumulative impacts in relation to any other proposed, approved or operating wind energy projects in the vicinity particularly with regard to landscape, noise, biodiversity and traffic impacts.

The CIA Guideline indicates the following future projects should be considered in the cumulative impact assessment:

- changes to existing projects (expansion, modification, closure)
- approved projects (approved but construction has not commenced)
- projects under assessment (application for the project has been exhibited and is currently under assessment)
- related development (development that is required for the project but subject to separate assessment).

For the cumulative impact assessment, a review of other projects (existing and proposed; renewable projects and other major developments) within the region was undertaken. There are a total of 29 other projects within or in the vicinity of the REZ (extending up to approximately 272 km from the Project Area). Of the 29 projects 15 are approved and 14 are proposed (refer to **Table 2.1**). While there are numerous projects currently taking place or undergoing planning assessment within the vicinity of the Project Area, many of these projects have been excluded from consideration in the cumulative assessment due to either distance or timing (i.e., the low likelihood of overlap of construction periods) based on the available information at the time of writing. The projects identified as requiring further consideration as part of the cumulative assessment are identified in **Section 6.15**.

Table 2.1 Other Projects Surrounding the Project Area

Project	Status	Generation Capacity (MW)	Construction Start Date/Potential Construction Start Date	Approximate Distance from Project Area (km)
Project EnergyConnect (NSW – Eastern Section)	Approved	NA	2022	Partly within Project Area
Limondale Solar Farm	Approved	250	Operating (BESS approved)	1
Sunraysia Solar Farm	Approved	200	Operating	1
Keri Keri Solar Farm	Proposed	200	2025	20
Keri Keri Wind Farm	Proposed	906	2025	20
Wilan Wind Farm	Proposed	800	2025	24
Balranald Mineral Sands Mine	Approved	NA	2023	40
Tchelery Wind Farm	Proposed	800	2026	65
Euston Wind Farm	Proposed	700	2026	75
Euston Mineral Sands Project	Proposed	NA	Unknown	75
Baldon Wind Farm	Proposed	1000	2024	90
Pottinger Energy Park	Proposed	750	2026	107
Atlas-Campaspe Mineral Sands Mine	Approved	NA	Operating	108
The Plains Renewable Energy Park	Proposed	400	2026	110
Mallee Wind Farm	Proposed	1000	2025	125
Hay Solar Farm	Approved	110	2024	130
Langs Crossing Solar Farm	Approved	5	Unknown	130

Project	Status	Generation Capacity (MW)	Construction Start Date/Potential Construction Start Date	Approximate Distance from Project Area (km)
Dinawan Energy Hub	Proposed	2500	2025	154
Yanco Delta Wind Farm	Approved	730	2024	159
Currawarra Solar Farm	Approved	195	Unknown	202
Tarleigh Park Solar Farm	Approved	90	Unknown	202
Southdown Solar Farm	Proposed	70	Unknown	202
Darlington Point Energy Storage Systems	Approved	25/50 MWh	Operating	245
Darlington Point Solar Farm	Approved	275	Operating	245
Woodland BESS	Proposed	200/800 MWh	Operating	245
Moama Ethanol Plant	Proposed	NA	Unknown	255
Finley Solar Farm	Approved	170	Operating	256
Coleambally BESS	Approved	200	2024	272
Coleambally Solar Farm	Approved	150	Operating	272

Detailed cumulative assessments for relevant environmental and social aspects have been undertaken for the Project. Assessment outcomes are provided in **Section 6.0**.

2.5 Project Related Agreements

Through the Project design and stakeholder engagement process, Windlab has developed and implemented several Project related agreements which are summarised below.

2.5.1 Host Landholders Agreements

Host landholders will receive annual lease payments to host wind farm infrastructure. These payments are confidential between Windlab and host landowners. There are agreements with four Host Landholders in place for the Project. Host landowners will continue to undertake agricultural activities on their land unaffected by the Project (excluding the areas hosting infrastructure). The impacts of the Project on these residences, whilst noted in some of the technical assessments as relevant, are addressed by the agreements in place.

2.5.2 Neighbour Agreements

In addition to Host Landholder Agreements, Windlab has four agreements in place with neighbouring landowners (identified as 'associated landholders') to address various impacts associated with the Project specific to their dwellings. The agreements were developed in accordance with the Wind Energy Guidelines and have been agreed between Windlab and the relevant landholder. The impacts of the Project on these residences, whilst noted in the technical assessments as relevant, are addressed by the agreements in place.

Windlab are working towards obtaining an additional two neighbour agreements with landholders who own dwellings within 5.9 km of the closest Project turbine. These agreements will be related to noise, visual and aviation related impacts.

2.5.3 Community Benefit Fund

2.5.3.1 Pilot Community Benefit Fund

In 2023 Windlab launched a $60,000 pilot program administered in partnership with a community panel, to truly understand how the fund could deliver the most positive impact throughout the region.

The $60,000 Pilot Community Benefit Fund delivered six capacity building initiatives in 2023:

- BBQ and lighting upgrades, for Goodnight BBQ and Recreational Reserve, in the town of Goodnight.
- Residents lounge refurbishment, Far West Local Health District – Balranald Health Service.
- Let us play rain or shine, Balranald Early Learning Centre Inc.
- Village raw water supply feasibility study, Kyalite Progress and Recreation Reserve Association.
- Fishing Classic assistance and riverfront development, Kyalite Fishing and Sporting Club.
- Annual Christmas Community Fete, St Joseph's Primary School Balranald.

2.5.3.2 Proposed Community Benefit Fund

To continue providing support to councils, registered charities, social enterprises, and not-for-profit entities, if development consent is granted Windlab proposes to establish an ongoing, two-tiered fund that aligns with Windlab's values and ensures the greatest opportunities to positively impact people's lives. Windlab understands that while the Project is located within the Murray River LGA, impacts from the Project will also be experienced in the Balranald LGA and specifically the township of Balranald. As such, Windlab have proposed that the Community Benefit Fund is split across the two Council areas. Windlab is currently in the initial stages of discussions with Murray River Council and Balranald Shire Council about the scope and scale of the Proposed Community Benefit Fund.

The Proposed Community Benefit Fund will be structured based on the size of the Project:

- Stage 1 (30 turbines): up to $120,000 per year, or approximately $4.2 million over 35 years.
- Stage 2 (66 turbines): up to $264,000 per year in addition to Stage 1, or approximately $7.4 million over 35 years.

The funding for 96 turbines would equate to more than $11 million over 35 years. The Proposed Community Benefit Fund dollar values will be adjusted to reflect CPI.

Proposed Community Benefit Fund Categories

The Proposed Community Benefit Fund will be allocated to the discrete categories that appear in **Table 2.2**.

Table 2.2 Proposed Community Benefit Amounts

Category	Amount	Description
Donations, sponsorships, and events	Up to $50,000 per donation, sponsorship and/or event	Small amounts may be awarded outside the defined funding rounds, subject to approval by Project Manager. These are available for small community groups, local events or fundraising initiatives. Examples include: • grassroots initiatives addressing community needs • support for community fundraising and local events • sponsorships for regional events by local organisations. Funding requests in this category will utilise a fast-track approval process.
Community partnerships and legacy projects	Greater than $50,000	Intended for larger regional infrastructure and development initiatives, identified in consultation with community, stakeholders, and government. Focus areas including but not limited to: • social resilience and wellbeing • economic development and diversification • environmental stewardship and conservation.

To determine how the Proposed Community Benefit Fund will be allocated, a merit selection process will be conducted by a panel made up of Windlab representatives, council representatives and broader community representatives. The Panel will be led by an independent chair.

The panel will assess applications against the following criteria:

- Windlab's principles of transparency, respect, genuineness and community
- alignment with councils' priorities including consideration of maintenance cost and potential ratepayer burden
- supporting communities directly impacted by Windlab's project
- supporting under-represented groups including First Nations, hard-to-reach or vulnerable groups
- how the Project involves the local community.

Revision and decision mechanisms will be facilitated by independent reviews by committee members, followed by consensus-building meetings. The merit-based selection panel process ensures that Windlab will be transparent and accountable and will facilitate the allocation of funds to those that are most impacted by the Project.

2.6 Alternatives

During the planning and design phase of the Project, a range of alternatives were considered by Windlab with changes made to the Project based on community feedback and to minimise environmental, cultural and social impacts while maximising the potential for electricity generation. The alternatives considered included the 'do nothing option' (i.e., not developing the Project), alternative locations and different Project layouts.

2.6.1 Do Nothing Option

The Project Area is currently used primarily for intensive cropping and grazing. The ‘do nothing option’ would allow for the continued use of the whole Project Area for agricultural purposes. The ‘do nothing option’ would also mean that the Project is not developed and would therefore forgo the Project’s identified benefits, namely:

- assisting in meeting the NSW and Commonwealth government’s objectives of transitioning to renewable electricity generation
- increased energy security and supply into the NEM
- significant social and economic benefits created through capital investment and provision of direct and indirect employment opportunities during the construction and operation of the Project
- project-related agreements and community benefit initiatives, as described in **Section 2.5**.

Further, the ‘do nothing option’ would also result in a lost opportunity for the landholders to diversify their revenue streams.

The ‘do nothing option’ would avoid the environmental and social impacts associated with the construction, operation and decommissioning of the Project, such as biodiversity impacts, noise, traffic, social amenity impacts and visual impacts amongst other impacts. Whilst impacts will occur with the construction and operation of the Project, these impacts will be managed to acceptable levels through the careful design of the Project and the implementation of the management and mitigation measures outlined throughout **Section 6.0**.

As the NSW government has identified the SW REZ as an area suitable for renewable energy projects and has identified the need for this area to provide a certain energy generation output, should this Project not proceed, an alternative project would need to proceed within the SW REZ to deliver the required energy generation capacity.

Considering the benefits of the Project, that the Project satisfies the principles of ecologically sustainable development (ESD) (refer to **Section 7.0**) and that effective management, mitigation and offsets can be implemented to address the predicted impacts of the Project, the ‘do nothing option’ is not proposed.

Windlab proposes to proceed with the Project subject to obtaining approval.

2.6.2 Alternate Site Locations

The Project location was selected due to reliable wind resource, low density of rural dwellings, position within the SW REZ, proximity to existing and/or proposed transmission infrastructure and existing road network, compatibility with existing agricultural activities, and in consideration of environmental values (much of the site has been historically cleared).

Initially, several locations within the SW REZ were investigated to host a renewable energy project, particularly with a focus on wind energy. Prior to identifying properties which host the Project, several locations along the 220 kV transmission line were explored, specifically east of the current Project Area. The current Project Area supports the existing and future transmission infrastructure and is located directly east of the existing Balranald Substation.

The following environmental and social factors were considered in selecting the current Project location:

- There is low population density. The site was selected to minimise the number of close residential receivers which will assist in managing potential visual and noise impacts.
- Windlab's preliminary consultation with the community was positive.
- The Project is compatible with existing land use. The land is currently used for agricultural activities, predominantly cropping and grazing. There will be minimal impact to these activities once the Project is operational.
- A Land Category Assessment indicated that the Project can maximise the use of Category 1 land, thereby reducing biodiversity impacts.
- The Project will generate significant investment in the broader Murray River and Balranald areas. The site is located 15 km south of the Balranald township and there will be a wide range of opportunities for local contractors and suppliers.
- The Project will invest in the local community throughout the construction and operation. The Junction Rivers Pilot Community Benefit Fund has invested $60,000 into community initiatives.

The following Project-specific factors were considered in selecting the current Project location:

- The site has good access to both existing and proposed electricity transmission infrastructure and is located in the SW REZ. The existing 220 kV TransGrid line and the Project EnergyConnect line both traverse the site.
- The terrain is flat and predominantly cleared, which is expected to result in relatively simple construction and potentially low capital costs. This means that power from the wind farm can be sold at competitive rates, which could help reduce electricity prices.
- The Project Area has an extensive history of land use for cropping and is heavily disturbed.. The Project has been sited such that the majority of wind turbines are located in dry land cropping paddocks generally lacking native vegetation, with approximately 90% of the Development Footprint (680 ha of 768 ha total area) located on Category 1 – Exempt Land. Further to this, of the approximately 90 ha of the Development Footprint located outside Category 1 – Exempt Land, further avoidance has been realised such that impacts will only occur to 75.68 ha of native vegetation.

2.6.3 Alternate Project Layouts

2.6.3.1 Scoping Phase

During the Scoping phase, preliminary specialist studies were undertaken which led to the following design changes:

- Turbines, access tracks and hardstands were repositioned to align with cropping sow and harvest direction to reduce impacts on agricultural activities and support continued agricultural productivity on host land.
- Turbines were relocated to avoid areas of Regent Parrot habitat, and increase the distance to areas of Regent Parrot habitat.

- Turbines were relocated to avoid areas of Aboriginal cultural heritage.
- Turbines in the southwest portion of the Project Area were removed to reduce visual impact to residences around Kyalite.
- The Project layout was revised to remove turbines north of the transmission line to increase the buffer and reduce visual impacts with the Yanga National Park Estate.
- During consultation, local rivers were identified as having high landscape values. To reduce the visual impact from the Edward River, the layout was revised to remove turbines between the southern boundary of the Project Area and Kyalite Road.
- The layout was revised to avoid the high value biodiversity areas identified as part of the preliminary investigations. Notable examples involved removing the connection to the Balranald substation and removing up to seven turbines from within the Project's most vegetated area.
- The layout was revised to minimise the number of potential crossings of ephemeral water courses required for access tracks and/or cables.

2.6.3.2 EIS Phase

During the EIS phase several design changes were implemented to avoid and minimise and mitigate potential impacts where possible. The Scoping Phase considered a layout including 107 turbines, and through the EIS phase the number of turbines was reduced to 96 in order to avoid and minimise impacts. Specific avoidance measures relating to biodiversity, Aboriginal cultural heritage, and agricultural land use were implemented during the EIS phase, as summarised in the following sections.

2.6.3.3 Biodiversity

Project design workshops were held on multiple occasions to work through opportunities and constraints relating to avoidance and minimisation of impacts to biodiversity values through siting of Project infrastructure. Considerations that lead to design changes include:

- Avoidance and/or minimisation of threatened species populations/habitat and TECs – Bitter Quandong, *Austrostipa metatoris*, Yarran Shrubland, Sandhill Pine Woodland, Major Mitchell's Cockatoo and Regent Parrot
- Avoidance of hollow-bearing trees and stick nests.
- Minimising impacts to TSRs
- Preferential location of infrastructure on Category 1 – Exempt Land and areas of existing disturbance.
- Maximising separation between WTGs and tree canopies.
- Maximising separation gaps between WTGs.
- Minimising required disturbance areas through further designs, and minimising the widths required for access tracks and other linear infrastructure components.
- Maximising setbacks from habitat features such as waterbodies and vegetated corridors.

2.6.3.4 Aboriginal Cultural Heritage

The following design changes were implemented during the EIS phase to minimise impacts on Aboriginal cultural heritage values:

- Turbines were removed and relocated to avoid potential high valued areas for Aboriginal cultural heritage.
- Turbines adjacent to Condoulpe Lake were relocated to avoid areas of high value Aboriginal cultural heritage.
- Overhead transmission line infrastructure was relocated from along Balranald-Moulamein Road to along Arundel Road to avoid high value Aboriginal cultural heritage.
- Underground cabling was moved west to avoid Aboriginal cultural heritage items.
- The Development Footprint was designed to avoid hearths, mounds and scarred trees within the Development Corridor, and a heritage exclusion zone was established for some items to ensure no impacts.

2.6.3.5 Agricultural Land Use

The following design changes were implemented during the EIS phase to accommodate existing agricultural land use:

- when turbines were relocated to avoid Regent Parrot habitat, they were also adjusted to align with the prevailing cropping direction, to reduce impacts on agricultural activities.
- to minimise impact to agricultural land use, where possible the Project design has adopted access tracks and hardstand areas that are aligned with the prevailing cropping direction of the Project Area.

2.6.4 Project Area and Development Footprint Evolution

The Project has undergone several design iterations to avoid and minimise potential impacts where possible. The Scoping Report for the Project included a 107 turbine layout, which through the EIS phase has been reduced to 96 to avoid and minimise impacts. The key stages of Project layout evolution over time is summarised in **Table 2.3** and is shown in **Figure 2.6**, **Figure 2.7** and **Figure 2.8**.

Table 2.3 Project Area and Development Footprint Evolution

Timeline	Key Design Iterations	Comments/Mitigation
January 2021	107 WTG layout	General area under investigation for the wind farm when the Project was first developed, including area encompassing four host landholders.
September 2021	Up to 107 WTGs under consideration (as proposed in Scoping Report for Project)	Site refined through wind resource assessment and landowner feedback. Realigned internal track to avoid native vegetation.
August 2022	Up to 98 WTGs under consideration	Ten WTGs relocated in western portion of the Project Area to avoid areas of Aboriginal cultural heritage. Two WTGs adjacent to Condoulpe Lake removed to avoid potential impacts to Aboriginal cultural heritage. Two WTGs removed from the southern portion of the Project Area to avoid areas with Aboriginal cultural heritage values. Three WTG removed from southern portion of Project Area to reduce visual impacts. The internal 330 kV overhead transmission line was relocated to the south to avoid the main remnant woodland stand in the Project Area.
April 2023	Up to 96 WTG under consideration	One WTG removed, and three relocated in western portion of the Project Area to avoid impacts on Regent Parrot habitat. One WTG removed and two WTGs moved southeast portion of the Project Area to avoid high value plant community types. 12 WTGs relocated to align orientation with cropping direction and to reduce biodiversity impact based on identified ecological communities, avoid hearths, mounds and scarred trees within Development Corridor. Five WTGs moved to avoid Regent Parrot habitat, hollow bearing trees, reduce potential noise impacts to nearby receivers. Three turbines moved to reduce impact on agricultural activities. WTG near Condoulpe Lake moved to avoid Aboriginal cultural heritage. WTG in the south also moved to avoid Aboriginal cultural heritage. Moved six turbines to reduce/avoid impacts of nearby aircraft landing area. Removed connection to Balranald substation to avoid vegetation along Yanga Way. Development Footprint was also refined as insights from Aboriginal cultural heritage surveys, biodiversity surveys and landholders' suggestion were incorporated, resulting in the final wind farm layout assessed in this EIS.

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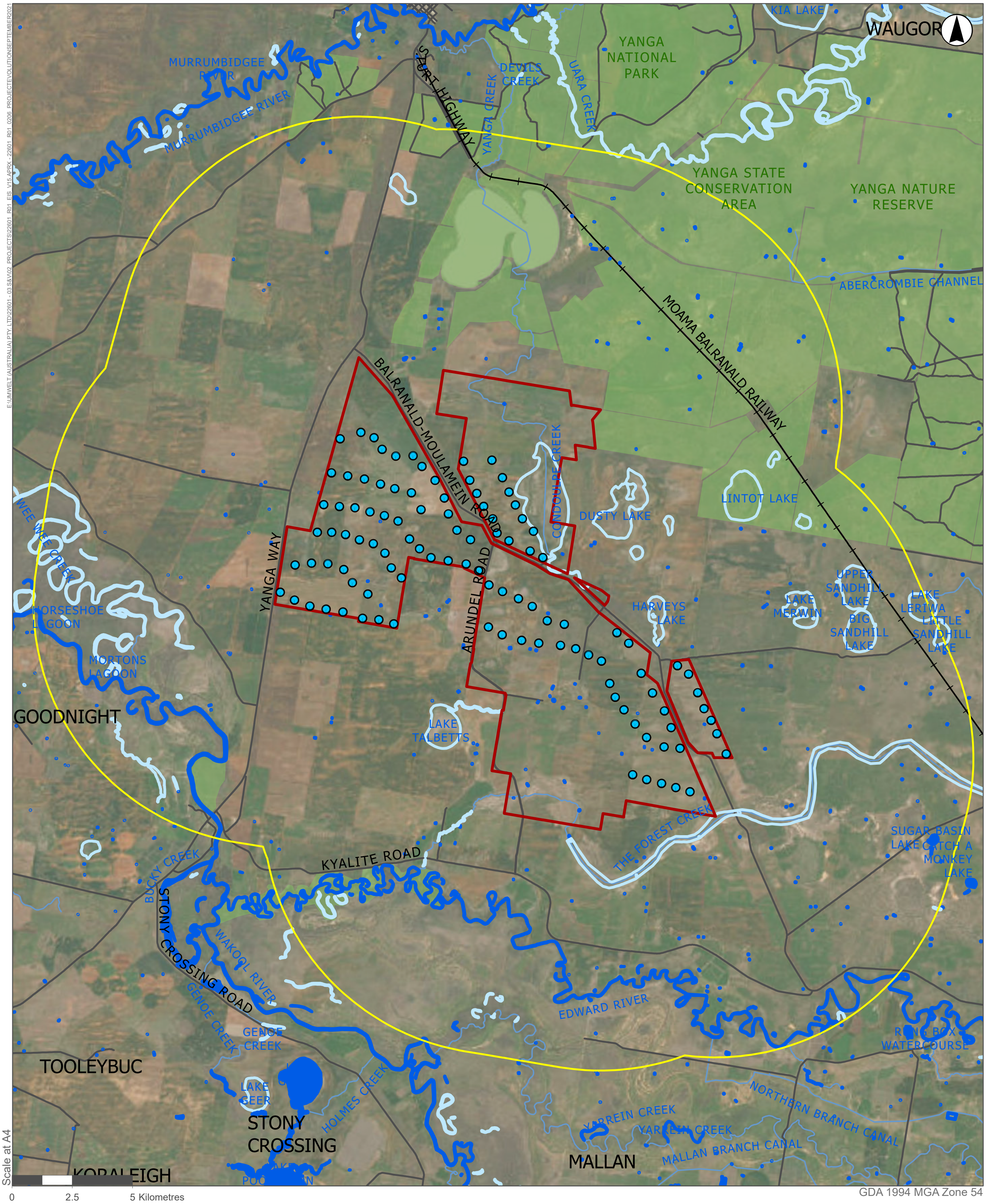
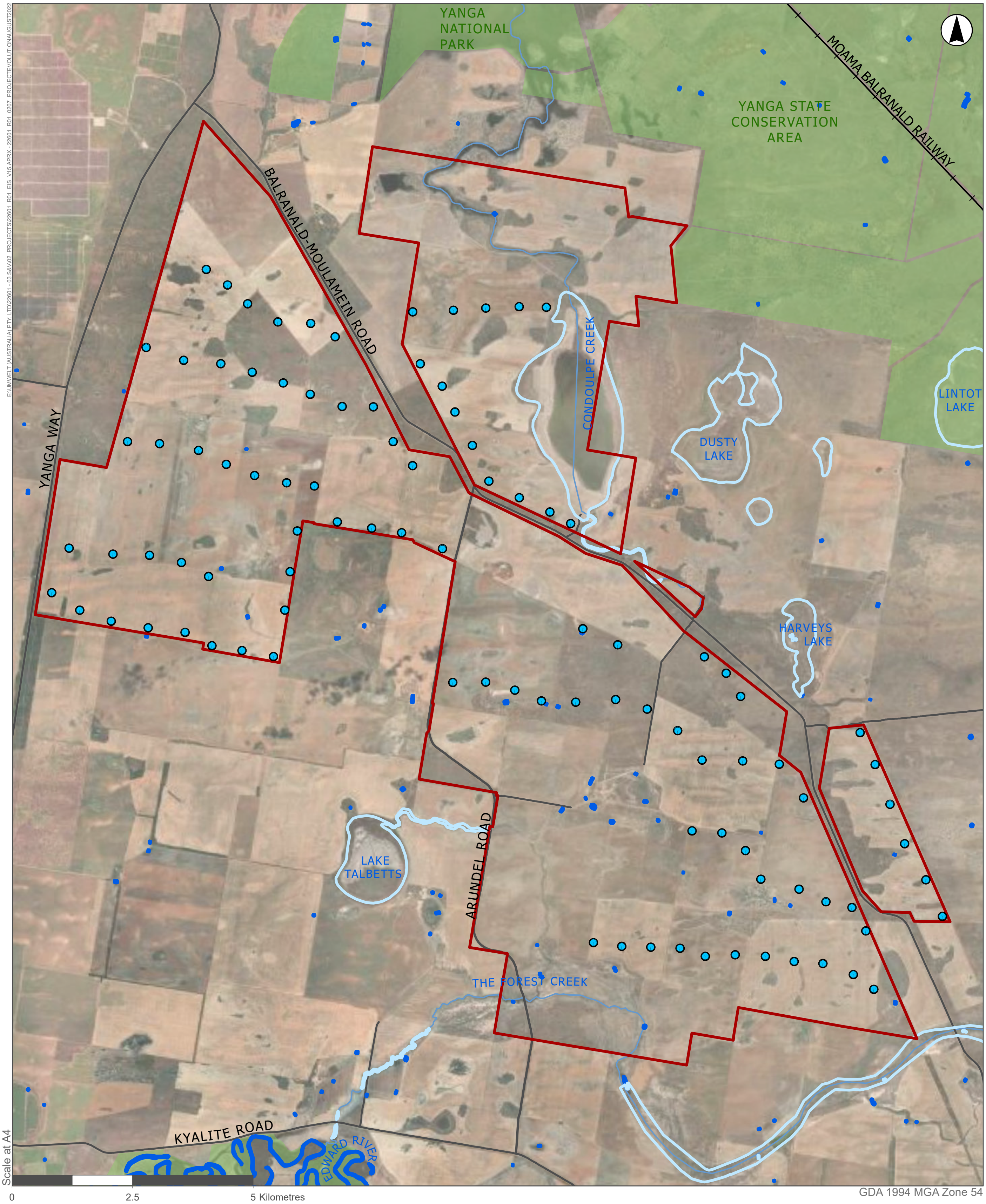


Legend
- Project Area
- Study Area
- Wind Turbine Generator
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway

FIGURE 2.6

Project Area and Development Footprint Evolution - September 2021

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

- Project Area
- Wind Turbine Generator
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway

FIGURE 2.7

Project Area and Development Footprint Evolution - August 2022

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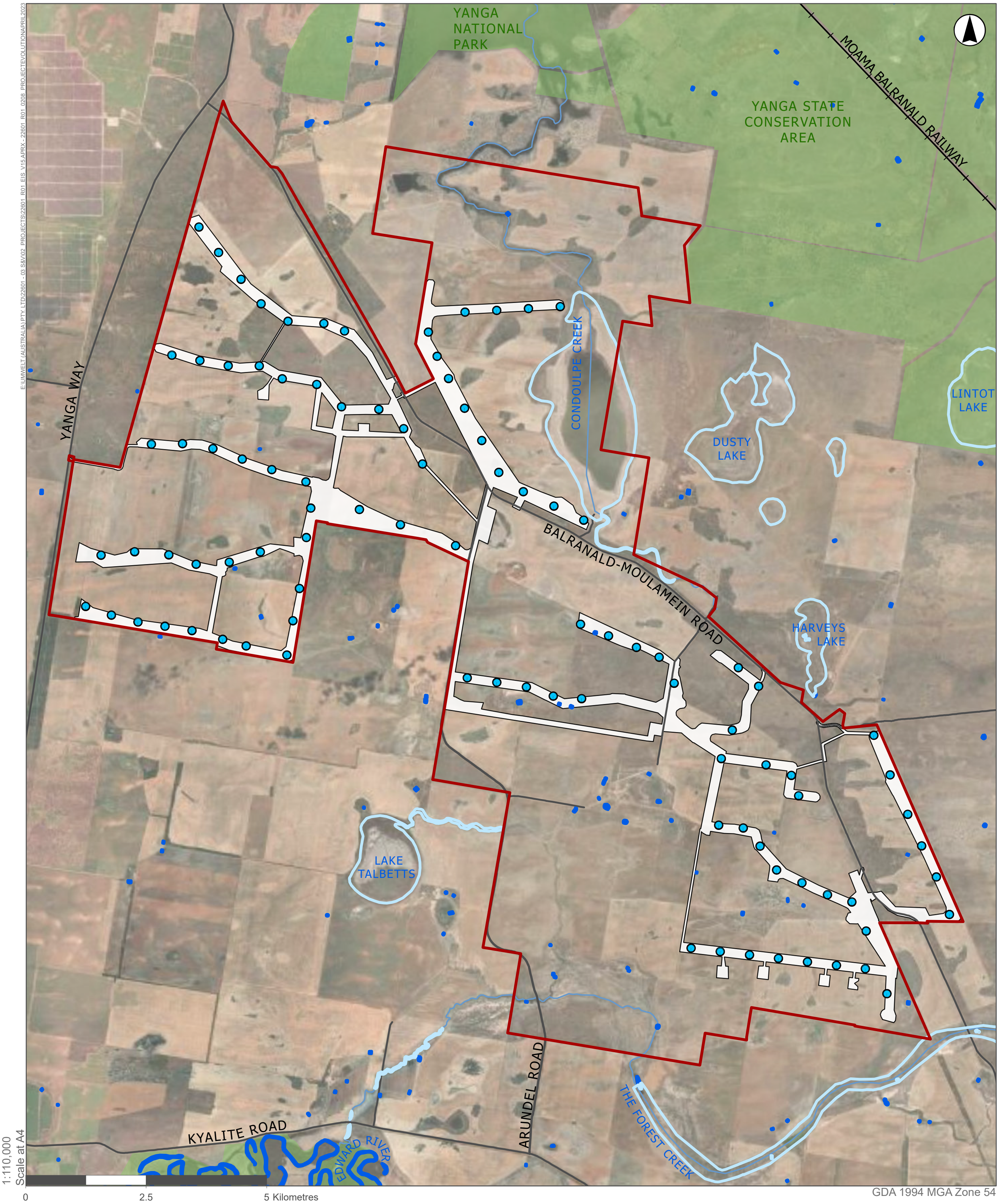


Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway

FIGURE 2.8

Project Area and Development Footprint Evolution - April 2023

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

2.7 Project Justification and Benefits

The expansion of renewable energy generation aligns with both Commonwealth and NSW commitments to increase renewable energy generation and reduce carbon emissions across the NSW and Australian economies. By developing the Project, Windlab aims to provide cleaner reliable energy generation to assist with meeting current load demand while simultaneously reducing GHG emissions and the impacts of climate change.

As discussed in **Section 2.1**, as a renewable energy project located within the SW REZ, the Project is located within a defined area planned for renewable energy development by the NSW Government. The NSW government has indicated that REZs will play a vital role in delivering affordable energy generation to help prepare the State for the expected retirement of thermal power stations over the coming decades.
The Project will contribute to meeting these Federal and NSW Government objectives and is appropriately located.

The Project is consistent with the objectives of the NSW Electricity Strategy (DPIE, 2019) and the Road Map (DPE, 2021), in aiming to provide large-scale renewable electricity generation that is affordable and reliable. With a proposed capacity of approximately 750 megawatts (MW) and the potential to power approximately 434,000 homes, the Project will make a material contribution to the planned energy generation capacity for the SW REZ.

The Project will also contribute significant capital investment within the region (comprised of a capital investment of approximately $1.5 billion), generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project (e.g. indirect employment creation in local and regional economies would include jobs supported through transportation, trade supplies, services, accommodation, catering, retail services, etc.), deliver additional income to host and other associated landowners, and provide benefits to the local community through the implementation of the Community Benefit Fund (refer to **Section 2.5.3** for further details).

Further, Windlab is investigating other opportunities for a 'Nature Positive' (i.e., net biodiversity gain) outcome to benefit biodiversity values impacted by the Project, possibly involving management and restoration of biodiversity habitat, undertaking non-credit generating management actions at locally established Biodiversity Stewardship Sites, targeted installation of nest boxes and artificial hollows and opportunities for year-round availability of surface water to benefit Major Mitchell's Cockatoos, and contribution to regional threatened species monitoring programs or pest control programs.

The Project will provide long-term, strategic benefits to the State of NSW, including:

- renewable energy supply to assist with fulfilling the current obligations under State and Commonwealth renewable energy targets
- providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change
- providing regional investment in the NSW renewable energy sector
- making a positive contribution towards increasing the renewable energy generation capacity of the SW REZ.

The Project will also provide direct financial benefits to the region and local community, including:

- Infrastructure investment of approximately $1.5 billion.
- Creation of 250 direct full time equivalent (FTE) positions (additional 400 indirect employment) on average during the construction phase and 10–15 direct FTE positions (additional 30 indirect employment) during the operational life of the Project.
- Indirect benefits to local services through the construction and operation phases.
- Payments to host and neighbouring landowners via negotiated agreements, resulting in financial contributions to the local community.
- Local community benefits through the implementation of an $11 million Community Benefit Fund over35 years that will invest in local community projects and initiatives to provide direct and targeted local benefits.
- Payment of network infrastructure access fees to EnergyCo for the SW REZ which will include a component to fund community benefit and employment programs.
- Provision of additional regional economic development benefits through a range of initiatives currently being or proposed to be implemented for the Project by Windlab including education, employment and training initiatives, augmenting existing housing opportunities, First Nations land management opportunities and partnership agreements, and facilitation of supply chain participation for regionally based small to medium enterprises.
- Construction workers relocating to the region would be expected to inject approximately $30.1 million in new spending into the economy over the construction phase, supporting approximately 60 FTE jobs (direct and indirect) in the service sector in the three LGAs relevant to the Project over this time.
- Net economic stimulus estimated at approximately $280 million (over the operating life of the Project, Consumer Price Index (CPI) adjusted) relating to operational wage stimulus, host landowner and Neighbour Agreement payments, and Community Benefit Fund payments (including planning agreements).

Windlab has applied an iterative approach through the development of this EIS responding to both environmental and social constraints and community concern through refinement of the layout and the overall Project approach. Through the implementation of best practice management, the potential environmental and social impacts associated with the Project can be appropriately managed. Given the net benefit and commitment from Windlab to appropriately manage the potential environmental and social impacts associated with the Project, it is considered the Project would result in a net benefit to the broader NSW community.

3.0 Project Description

This section describes the layout, location and function of all infrastructure to be constructed and operated as part of the Project. Descriptions of the construction, operation and decommissioning phases of the Project are also provided.

3.1 Project Overview

As outlined in **Section 1.1**, the Project consists of the installation, operation, maintenance and decommissioning of up to 96 WTGs, BESS/STATcom facilities, ancillary infrastructure, and temporary facilities.

The Project is designed to accommodate WTGs up to 300 m in height. Based on current WTG technology, the capacity of each WTG ranges from 5.6 to 8 MW, and the Project is planned to have an installed generating capacity of approximately 750 MW. The Project is planned to connect to the existing 220 kV transmission line and/or the proposed Project EnergyConnect transmission line. The Project may include BESS/STATcom facilities.

Windlab will consider a number of options for Project components when constructing the final iteration of the Project. Project component options are described in **Table 3.1**.

Table 3.1 Project Component Options

Project Componetn	Options
Turbines	Various manufacturers and WTG designs will be considered for the Project.
BESS/STATcom Facilities	The Project may include BESS facilities, or STATcom facilities. Further, the Project may not include either of these facilities.
Construction Stages	The Project may be constructed all at one time, or in two stages (i.e. Stage 1 and Stage 2).
Transport Route from Port Adelaide to Project Area	Four route options have been identified to transport Project components to the Project Area. Project construction may see one or a combination of these routes used.

Considering various options will allow the most suitable components to be chosen, thus optimising the Project generally in accordance with this EIS and within the limits of the development consent, should the Project be approved. Final selection of some or all of the Project components described in **Table 3.1** may not take place until the detailed design phase of the Project. Relevant assessments have considered the worst case for each of the Project components (such as WTG height and blade length, BESS facilities in place of STATcom facilities, turbine noise data etc.).

A peak of 400 full time equivalent (FTE) employees will be required during the four-year construction phase (assuming construction of the entire Project), requiring local services and amenities. During the 35-year operational phase of the Project, 15 FTE employees would be required, typically utilising local professionals or professionals relocating to the region to fill these roles.

A summary of the key Project components is provided in **Table 3.2**.

Table 3.2 Project Overview

Project Components	Summary of the Project
Life of Project	35 years
Project Area	Approximately 16,367 ha, as shown on **Figure 1.3**
Development Corridor	Approximately 2,096 ha, as shown on **Figure 1.3**
Development Footprint (subset of Development Corridor)	Approximately 768 ha, as shown on **Figure 1.3**
WTGs	Up to 96 WTGs (3 blade) with a maximum tip height of up to 300 m
BESS/STATcom Facilities	Up to four BESS facilities (to a total of 200 MW with a four-hour delivery capacity), or up to four STATcom facilities
Ancillary Infrastructure	Ancillary infrastructure for the Project includes, but is not limited to: • substations/switching stations • permanent offices and site compounds • underground and overhead electricity transmission lines • permanent power performance masts • communication cables (includes control cables and earthing) • water storage tanks • hardstands • internal roads.
Temporary Construction Facilities	Temporary construction facilities include, but are not limited to: • concrete batching plants • crushing and screening plant • site compound and office • stockpiles and material storage compounds • temporary field laydown areas • temporary calibration meteorological masts.
Generating Capacity	Total up to approximately 750 MW (consisting of Stage 1 up to approximately 230 MW and Stage 2 up to approximately 520 MW).
Access to Project Area	Eight locations during construction and operation: • Access Point 1: emergency only site access for Stage 2, located on Yanga Way. • Access Point 2: primary site access for eastern portion of Stage 1, located on Balranald-Moulamein Road. • Access Point 3: primary site access for western portion of Stage 1, located on Balranald-Moulamein Road. • Access Point 4: primary site access to BESS/STATcom/substation/switching station, located on Arundel Road. • Access Point 5: secondary site access for Stages 1 and 2, located on Balranald-Moulamein Road. • Access Point 6: secondary site access for Stage 2, located on Balranald-Moulamein Road. • Access Point 7: secondary site access for southern portion of Stage 2 (if required), located on Balranald-Moulamein Road. • Access Point 8: secondary site access for Stage 2 (if required), located on Balranald-Moulamein Road.
Construction Workforce	Peak of 400 FTE positions
Operational Workforce	Approximately 15 direct and 45 indirect FTE positions

Project Components	Summary of the Project
Operational Hours	24 hours, seven days per week
Construction Hours of Operation	Standard hours during construction and decommissioning 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday
Construction Timeframe	Approximately 48 months
Estimated Development Cost	Approximately $1.5 billion

The Project has been designed through a comprehensive process that incorporates community and stakeholder feedback to maximise positive social, economic and environmental outcomes while minimising negative environmental and social impacts.

3.2 Project Staging

As is typical of projects of this scale, construction of the wind farm may be staged if all construction does not take place all at one time. The decision to construct the Project in stages will depend on a number of factors, including but not limited to:

- access arrangements for the SW REZ
- availability of offtake and other energy market considerations
- financing arrangements and other commercial considerations.

3.2.1 Stage 1

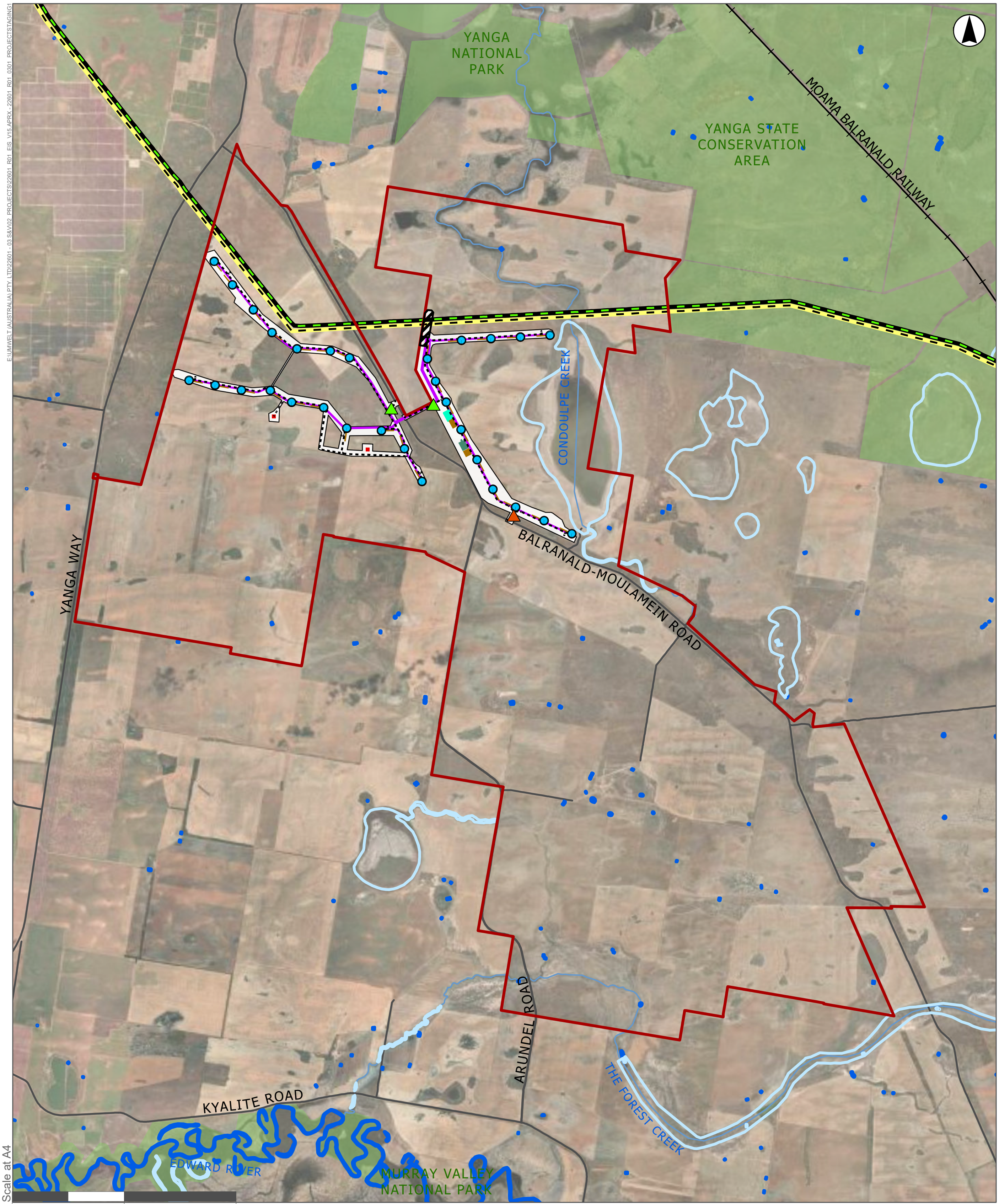
Should the Project be constructed in stages, the first stage would likely connect into the existing Transgrid 220 kV line which traverses the northern part of the Project Area. WTGs and ancillary infrastructure located in the northern part of the Project Area closest to the transmission line would therefore be constructed during Stage 1 (refer to **Figure 3.1**).

The final number of WTGs for Stage 1 will depend on the WTG model selected and the outcome of detailed grid studies. However, initial studies indicate that Stage 1 would comprise up to 30 WTGs and potentially an up-to 75 MW BESS/STATcom facility.

3.2.2 Stage 2

Stage 2 would likely connect to Project EnergyConnect, and will depend on the access scheme defined in the Renewable Energy Zone (South West) Access Scheme Order 2024 which was formally declared by the Minister for Energy on 12 April 2024 (refer to **Figure 3.1**). The balance of WTGs and ancillary infrastructure would be constructed during Stage 2.

Site Access for Stage 1 and Stage 2 is discussed in **Section 3.4.10**.



Scale at A4
1:120,000

0 2.5 5 Kilometres

GDA 1994 MGA Zone 54

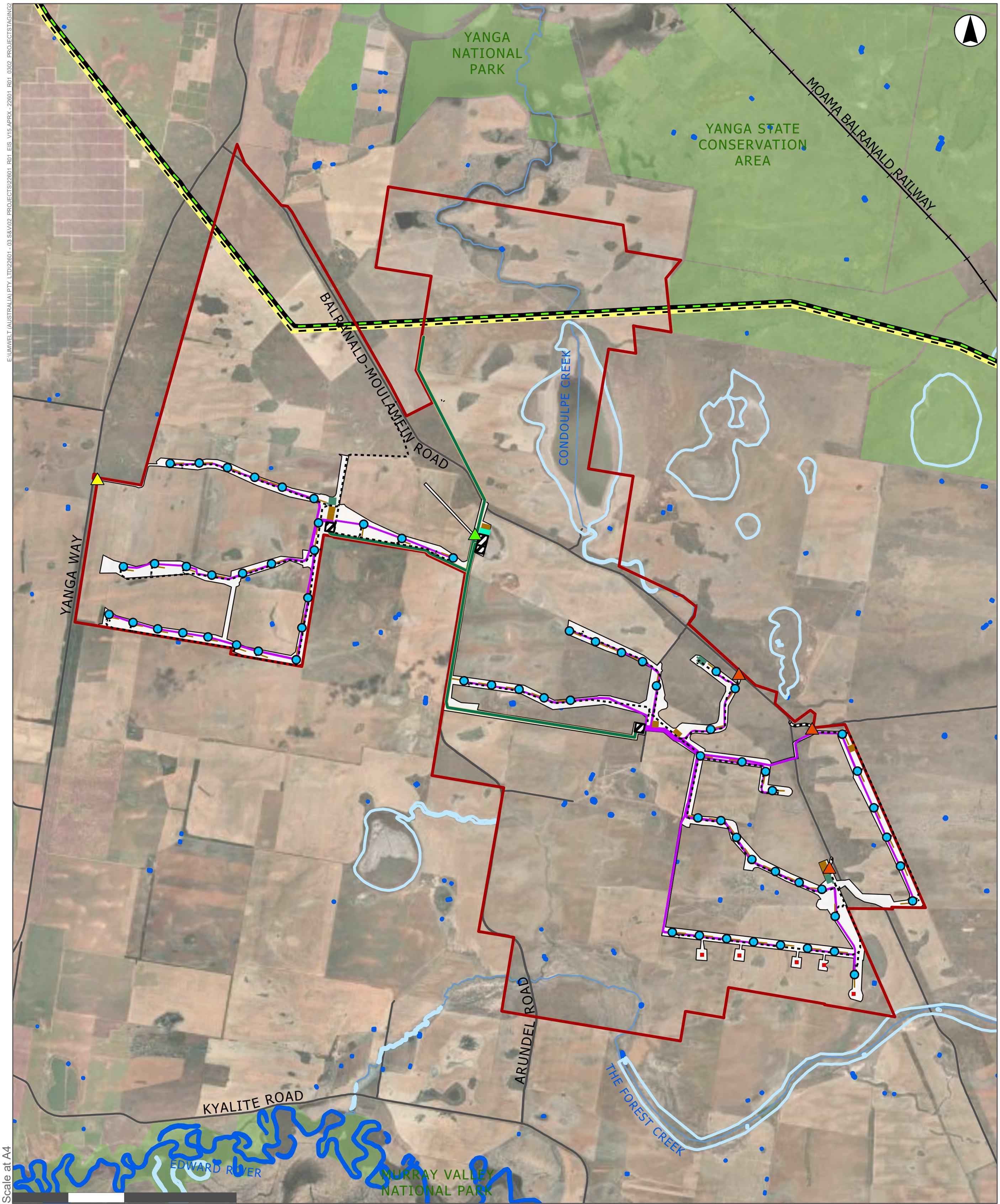
Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Primary Access Point
- Secondary Access Point
- Access Tracks
- 33 kV Internal Reticulation (underground)
- Operations and Maintenance Compound
- Concrete Batching Plant
- Temporary Construction Facilities
- BESS/STATCom/Substation/Switching Station
- Permanent Power Performance Mast (Potential Location)
- 220 kV TransGrid Transmission Line
- Project Energy Connect Transmission Line
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve

FIGURE 3.1

Project Staging (Stage 1)

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- 33 kV Internal Reticulation (underground)
- 330 kV Internal Reticulation (overhead)
- Operations and Maintenance Compound
- Concrete Batching Plant
- Temporary Construction Facilities
- BESS/STATcom/Substation/Switching Station
- Permanent Power Performance Mast (Potential Location)
- 220 kV TransGrid Transmission Line
- Project Energy Connect Transmission Line
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve

FIGURE 3.2

Project Staging
(Stage 2)

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

3.3 Project Area

The Project Area is situated within the Murray River LGA (refer to **Figure 1.2**). The Project Area covers an area of approximately 16,367 ha. A Development Footprint has been determined to be the subject of the assessments detailed in this EIS. The Development Footprint includes all Project components and temporary disturbance areas. The Development Footprint will be refined during detailed design following development consent, should the Project be approved.

The Development Corridor and Development Footprint cover approximately 2,096 ha and 768 ha in area, respectively. The Project seeks approval to locate the Development Footprint within the Development Corridor, and the assessments within this EIS have been undertaken accordingly. The final Development Footprint will be confirmed as part of the final site layout prior to the commencement of construction.

In addition to the Project Area, concept road upgrade designs have been created along the transport route providing a predicted disturbance area for the external road upgrades within NSW (refer to **Section 3.4.14.1**).

Flexibility is required within the approved Project design to allow for micro-siting of the WTGs and site infrastructure as part of the detailed design and construction process to optimise the construction and operation of the Project. This assessment process has included consideration of this flexibility to allow for micro-siting within the Development Corridor.

The Development Footprint has been established in consideration of technical, environmental and social constraints in the immediate vicinity of the Project (refer to **Section 2.6**, including:

- avoidance of areas of high Aboriginal heritage significance
- avoidance of threatened ecological communities (TEC) and areas of remnant vegetation
- increased separation distance between avian flyways and closest WTGs
- increased separation distance between WTGs and local aircraft landing areas
- reduction of access track waterway crossings.

3.4 Project Layout and Design

The key Project components are summarised in **Table 3.3**, with descriptions including key mitigation measures built into the design provided in **Section 3.4.1** to **Section 3.4.16**.

The Project seeks flexibility to refine the final layout and details of infrastructure and components to be installed or constructed, to be undertaken post-approval and finalised prior to the commencement of construction (refer to **Section 3.1**). Flexibility will allow the most suitable types of infrastructure to be chosen and the layout optimised for the Project generally in accordance with this EIS and within the limits of the development consent, should the Project be approved.

Relevant assessments have considered the worst case for each of the Project components (such as WTG height and blade length, etc.). Where components of the physical layout of the Project have the potential to change over time, further detail is provided in the following sections.

Table 3.3 Key Project Components

	Project Component(s)/ Infrastructure	Approximate Dimensions	Quantity	Location	Comments
Temporary (Construction) Facilities	Construction compounds	Overall dimensions up to 240 m x 200 m (4.8 ha)	Up to seven	Refer to **Figure 1.3**	Up to 2.5 ha will be retained for up to two operations and maintenance (O&M) compounds (including carpark areas). Other areas will be progressively rehabilitated following completion of construction.
Temporary (Construction) Facilities	Site office and car park	Up to 200 m x 125 m (2.5 ha)	Up to two	Refer to **Figure 1.3**	Up to 2.5 ha will be retained for up to two operations and maintenance (O&M) compounds (including carpark areas). Other areas will be progressively rehabilitated following completion of construction.
Temporary (Construction) Facilities	Concrete batching plants, including, if necessary, rock crushing and screening facilities	Up to 3.0 ha	Up to three	Refer to **Figure 1.3**	Up to 2.5 ha will be retained for up to two operations and maintenance (O&M) compounds (including carpark areas). Other areas will be progressively rehabilitated following completion of construction.
Temporary (Construction) Facilities	Stockpiles and materials storage compounds	Subject to construction requirements, located within the Development Corridor	Up to seven, plus one per WTG	Refer to **Figure 1.3**	Up to 2.5 ha will be retained for up to two operations and maintenance (O&M) compounds (including carpark areas). Other areas will be progressively rehabilitated following completion of construction.
Temporary (Construction) Facilities	Temporary field laydown areas	Subject to construction requirements	Up to seven, plus one per WTG	Refer to **Figure 1.3**	Up to 2.5 ha will be retained for up to two operations and maintenance (O&M) compounds (including carpark areas). Other areas will be progressively rehabilitated following completion of construction.

	Project Component(s)/ Infrastructure	Approximate Dimensions	Quantity	Location	Comments
Temporary (Construction) Facilities	Temporary calibration meteorological masts	Height: Up to 200 m	Up to seven	Located near or on future WTG positions	Temporary calibration meteorological masts will be replaced with WTGs as construction progresses.
Permanent (Operation) Facilities	Wind turbine generators (WTGs)	Uppermost blade tip: up to 300 m Lowermost blade tip: at least 49 m above ground Blade length: up to 100 m Tower (hub) height: up to 200 m Foundations (excavation size): up to 35 m x 35 m	Up to 96	Refer to **Figure 1.3**. Windlab will micro-site WTGs within 100 m of the indicated locations.	Parameters specified are conceptual upper or lower limits. Specifications will be subject to further design and availability.
Permanent (Operation) Facilities	Hardstands (adjacent to WTGs)	Up to 100 m x 115 m (1.15 ha)	Up to 96	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	Internal roads and drainage	Total Length: approximately 91 km Average Width: 5.5 m to 10 m Total Area: approximately 87 ha	N/A	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	Battery energy storage system/STATcom	Up to 3.2 ha	Up to four	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	Substations/ switching stations	Up to 5 ha	Up to four	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	O&M compound	Up to 2.5 ha	Up to two	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	Overhead transmission lines (high voltage)	Approximately 17 km internal overhead cables of easement width approximately 80 m	N/A	Refer to **Figure 1.3**	Not applicable.
Permanent (Operation) Facilities	Underground transmission cables (medium to low voltage)	Approximately 78 km	N/A	Refer to **Figure 1.3**	Not applicable.

	Project Component(s)/ Infrastructure	Approximate Dimensions	Quantity	Location	Comments
Permanent (Operation) Facilities	Permanent power Performance masts	Height: Up to 200 m	Up to seven	Refer to **Figure 1.3**	Not applicable.
Ancillary Infrastructure	Intersection upgrades and minor treatments for oversize vehicles	Refer to **Section 3.4.14.1**	N/A	Not applicable.	Not applicable.

3.4.1 Temporary Construction Facilities

Temporary construction facilities will consist of:

- construction site offices and compounds
- rock crushing/screening and concrete batching plants
- stockpiles and materials storage compounds
- laydown areas
- construction access roads
- calibration meteorological masts.

All temporary facility sites that are not required for the ongoing operation of the Project will be rehabilitated once they are no longer required. The Project's Biodiversity Management Plan (BMP) will guide rehabilitation activities for the Project, with a focus on returning disturbed areas to a vegetation type consistent with their pre-disturbance type (e.g. pasture will be rehabilitated to pasture, native woodland will be rehabilitated to native woodland, etc.).

Temporary construction facilities are described in further detail in the following subsections.

3.4.1.1 Construction Site Offices and Compounds

The construction phase will require temporary infrastructure such as portable field offices, toilet facilities and parking bays within the temporary construction compound locations. Arrangements will be made for power and communications at the site offices during the construction period. Temporary construction compounds will be typical of those used at construction sites; noting they will not include accommodation facilities. Indicative locations for construction compounds have been identified in **Figure 1.3** within areas identified as Temporary Construction Facilities.

Alternative locations may be sought subject to Project detailed design and construction programming. The final locations will be determined in accordance with the development consent conditions and subsequent management plans and will be within the Development Corridor.

Main temporary site office facilities will be located within the construction compound area of up to 2.25 ha. An indicative layout is shown in **Figure 3.3**.

Up to 5 ha will be retained for up to two operations and maintenance (O&M) compounds (2.5 ha each including carpark areas) for permanent use during the life of the Project.

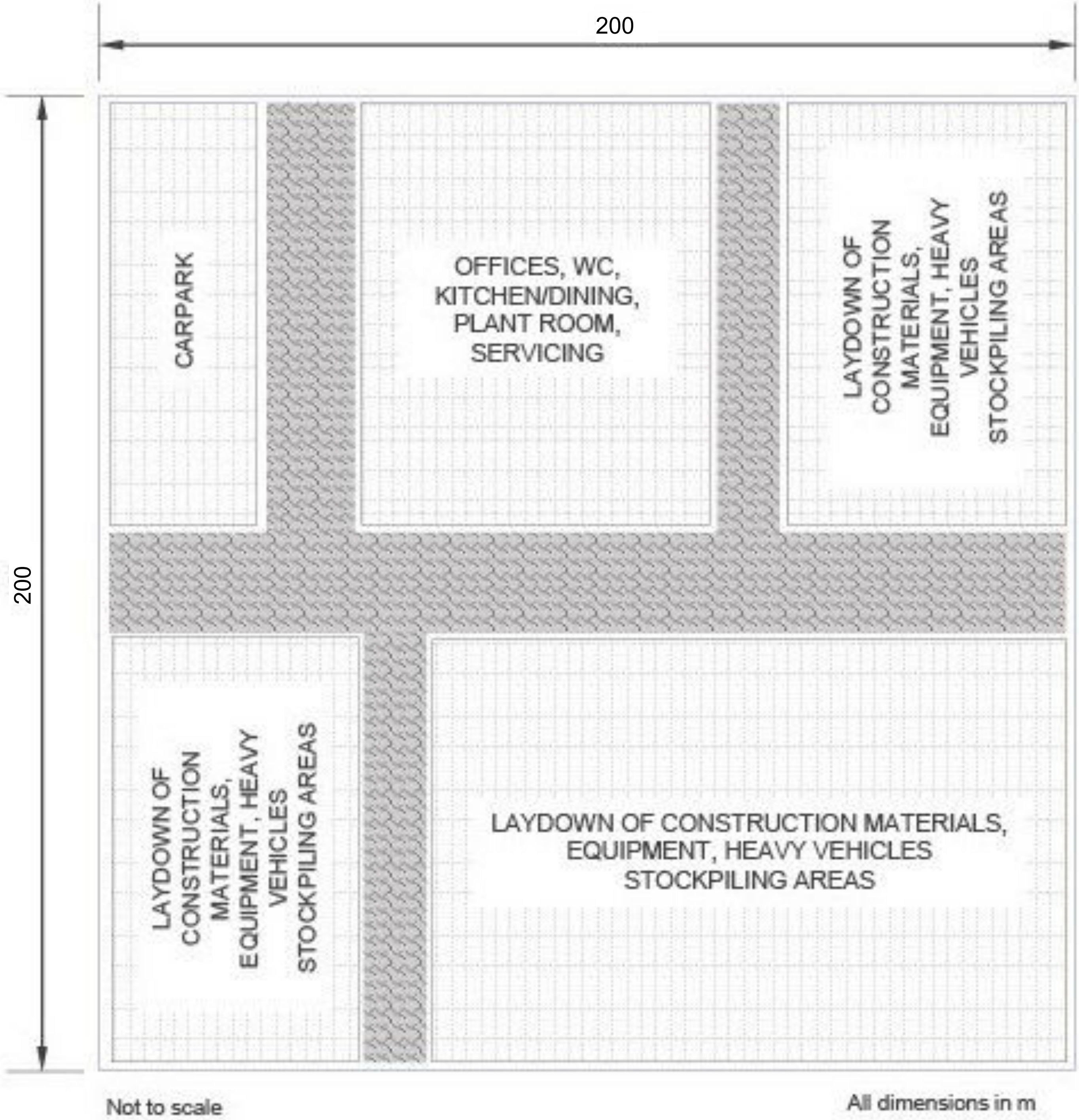


FIGURE 3.3

Indicative Concept for Wind Farm Temporary Construction Site Offices and Compounds

Image Source: Windlab (2024)

Approval is also sought for temporary construction office facilities associated with the access points and substations/switching stations to support the construction of these components of the Project, and to manage the initial works phases including construction of the site access road and main construction compounds.

Portable temporary offices and amenities will be required at construction work fronts. These areas are not shown on **Figure 1.3** as their location will be determined on an as needs basis during the construction phase, however, they will remain within the Development Corridor.

3.4.1.2 Rock Crushing/Screening and Concrete Batching Plants

Temporary rock crushing/screening facilities and concrete batching plants are proposed to process material for the WTG foundations and internal roads. If the extraction and processing thresholds exceed Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act), an Environmental Protection Licence (EPL) will be obtained from the NSW Environment Protection Authority (EPA) for the operation of extraction, rock crushing or concrete batching facilities.

A typical on-site concrete batching facility would occupy an area of up to 3 ha and likely consist of a concrete mixer, cement bins, sand and aggregate stockpiles and storage facilities for various equipment and tools. A crushing facility would consist of a mobile crushing plant and associated stockpiles and working area. Each facility is sized for the use of front-end loaders, delivery of materials and entry and exit of vehicles and to have sufficient storage area for materials for five days batching/crushing.

The location of concrete batching plants are shown on **Figure 1.3**.

Temporary and mobile rock crushing/screening facility may occur in the Project Area alongside batching plants to produce concrete for activities related to WTG foundations, civil and electrical infrastructure, and internal access tracks and maximize the use of locally available materials. Rock materials excavated within the site from activities related to WTG foundations, internal track alignments, etc., will be utilised wherever possible. The excavated materials will be crushed, screened according to sizes, and then graded to segregate them into different categories for the intended use. Stockpiles and Materials Storage Compounds

Stockpiling of materials will be undertaken to maximise construction efficiencies and minimise offsite transportation and disposal. Stockpiles will be established and utilised adjacent to excavations for WTG foundations, internal roads, compounds and laydown areas for the duration of construction. Stockpile and storage requirements have been considered in the Development Corridor.

Fuel and any other chemicals stored in compound areas will be stored in appropriately designed, bunded storage facilities and trucked to plant in the field.

3.4.1.3 Laydown Areas

Laydown areas will be required adjacent to WTG locations, site compounds and internal roads for the storage and assembly of WTG components and equipment within the Development Corridor. Hardstands and crane or equipment assembly areas will be used wherever possible to minimise impacts, however, in some instances separate laydown areas will be required.

The Project will also require temporary laydown areas which will be those areas where components will be placed on the ground in preparation for moving or relocating around the Project Area. Potential locations for temporary laydown areas are located on **Figure 1.3** within areas identified as Temporary Construction Facilities. The final locations of temporary laydown areas will be dependent on detailed design and construction programming. Locations will be selected to minimise environmental and social impacts associated with key values identified in **Section 6.0** and will occur within the Development Corridor.

3.4.1.4 Construction Access Roads

Construction roads, tracks and use of unformed access paths (e.g. light vehicle movements over farmland areas) will be required to facilitate some parts of the Project including, for example, the erection of overhead transmission lines and maintaining environmental management measures.

Construction roads that are not required for the ongoing operation and maintenance works of the Project will be removed and rehabilitated on completion of the construction phase, unless landowners request the roads to remain.

3.4.1.5 Temporary Calibration Meteorological Masts

Up to seven temporary calibration meteorological masts will be installed during the construction period along with the permanent power performance masts to calibrate and verify the data collected from the seven (at most) proposed permanent power performance masts. The temporary calibration meteorological masts will be installed at locations within the Development Corridor, usually (but not always) at a selection of proposed WTG locations ahead of installation of that WTG. The temporary calibration meteorological masts will be solar powered and will feature Global Systems for Mobile Communications (GSM).

The temporary calibration meteorological masts are planned to be removed prior to installation of the WTG at that location.

3.4.2 Wind Turbine Generators

The Project is designed to accommodate WTGs of up to 300 m in height. This allows for WTG advances between the time of this assessment and the commencement of construction.

The WTGs will be three-bladed with the rotor and nacelle mounted on a tower with an internal ladder or lift. The WTGs would be installed at final locations to be confirmed within a 100 m micro-siting buffer of the proposed locations (refer to **Figure 3.4**).

The key components of a WTG include:

- foundations
- towers and nacelle (hub)
- rotor
- blades.

To achieve visual consistency through the landscape, the WTGs will:

- be uniform in the colour, design, similar in height and rotor diameter
- finished in matte-white and non-reflective material to reduce visibility
- not have any unnecessary signage or lighting.

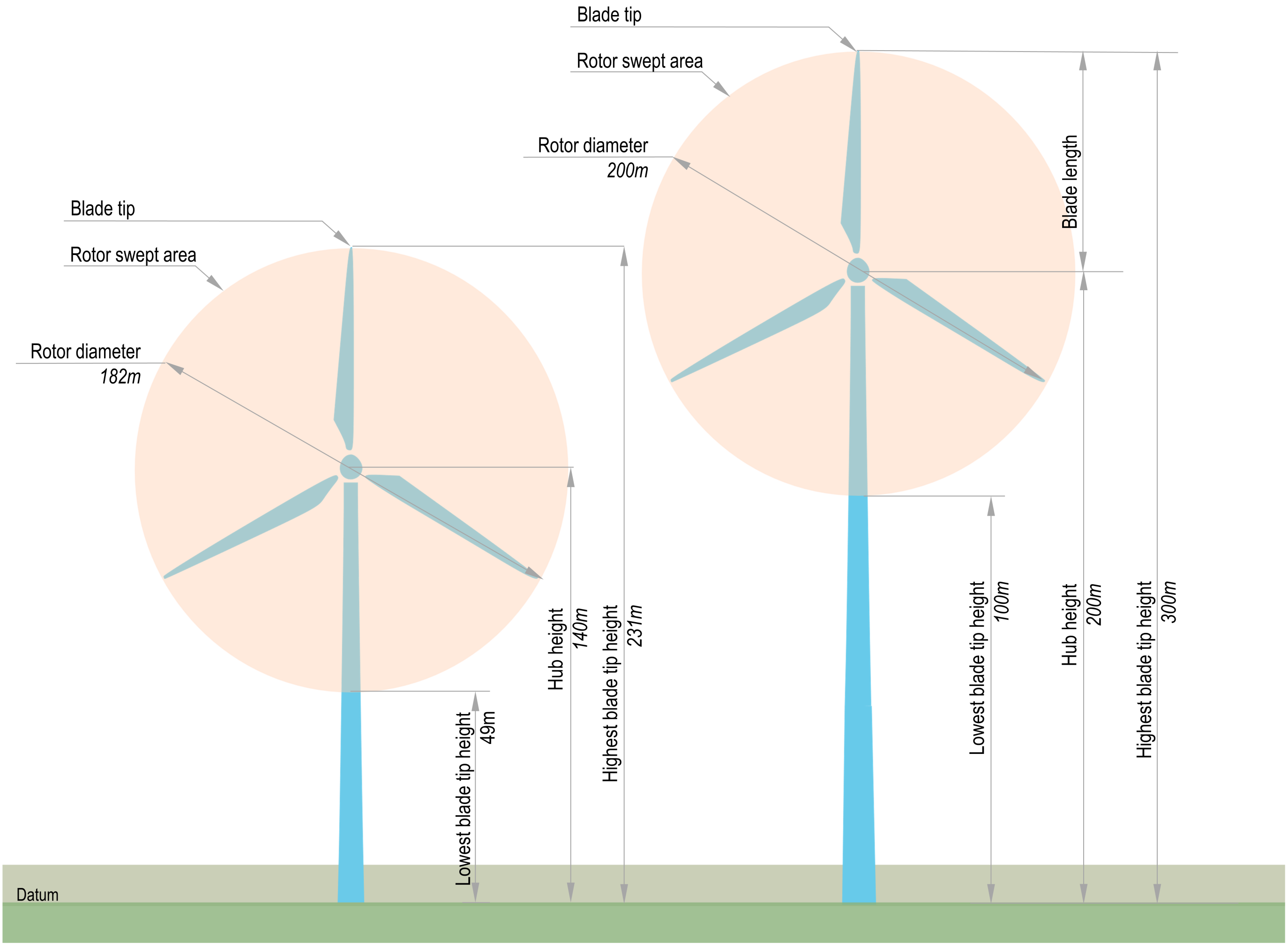


FIGURE 3.4

Example Components of a WTG

Image Source: Windlab (2024)

3.4.2.1 Foundations

Foundations for the WTGs will be either concrete slab or rock anchor, pending geotechnical investigation of the ground conditions across the Project Area. More than one type of WTG foundation may be required for the Project, which will be determined during the detailed design phase.

The excavation required for both types of foundations will be approximately 35 m by 35 m. Low-level blasting may be required where rock is encountered. Blasting would be undertaken by qualified personnel and in accordance with relevant guidelines for blasting.

3.4.2.2 Towers and Nacelle

The tower structure of a WTG is typically constructed out of either a welded steel shell, concrete or a concrete steel hybrid. The towers will be fitted with an internal ladder and/or lift to facilitate access to the nacelle. A range of tower heights are under consideration with the final selection to be undertaken during detailed design, to accommodate the proposed maximum blade tip height of up to 300 m. Atop the tower sits the nacelle to which the hub is mounted, and the blades are attached to the hub. The Project has been designed and assessed based on a maximum hub height of 200 m.

The nacelle is the housing constructed of steel and fibreglass that is mounted on top of the tower. It encloses the gearbox, generator, transformers, motors, brakes, electronic components, wiring and hydraulic and lubricating oil systems.

Weather monitoring equipment located on top of the nacelle will provide data on wind speed and direction for the automatic operation of the WTG. If deemed necessary for the Project, aviation hazard lights can also be fitted to the top of the nacelle, however, these are not currently proposed based on the outcomes of the Aviation Assessment (refer to **Section**).

3.4.2.3 Rotor

The WTG rotor drives the generator within the nacelle producing electrical output. WTGs of the size considered in this EIS begin to generate energy at wind speeds in the order of 3.5 to 4 m per second (m/s) (13 kilometres per hour (kph)) and shut down in wind speeds greater than 25 m/s (90 kph). The rotor typically rotates at approximately 8 revolutions per minute (rpm) at low wind speeds and 20 rpm at higher operational wind speeds.

The Project is designed to include rotors of approximately 200 m in diameter with an individual swept area of approximately 31,415.90 m^2.

3.4.2.4 Blades

WTG blades are typically made from glass fibre reinforced with epoxy or plastic attached to a steel hub and include lightning protection inside the blade. The Project may install single or multi-piece blades dependent on detailed design and the Project's engineering and procurement processes which would be undertaken following Project approval. To allow for expected advancements in available blade lengths, this EIS has considered a maximum single piece blade up to 100 m.

The Project design conservatively assumes a lowermost blade clearance of at least 49 m above the ground based on an up to 200 m rotor diameter installed on an up to 200 m hub height.

3.4.3 Battery Energy Storage or STATcom Facilities

Up to four battery energy storage system (BESS) facilities (to a total of 200 megawatts (MW) with a 4-hour delivery capacity) or up to four STATcom facilities may be constructed as part of the Project.

If BESS facilities are incorporated into the Project, lithium-ion phosphate technology will be utilised. The use of BESS facilities within the Project will allow for active energy exchange with the Project and the grid. The BESS is charged during off-peak hours and discharged during peak hours. The BESS facilities also allow for arbitrage, frequency control and regulating the voltage.

STATcom infrastructure regulates voltage at the point of connection. This technology does not have the capability for storage and there is no active power or energy exchange with the grid.

The area of land proposed for the BESS/STATcom assessed for the Project is up to 3.2 ha.

The BESS/STATcom facilities will be located adjacent to the substations/switching stations. They may be constructed as stand-alone facilities or as combined facilities co-located with other compounds at any or each of the locations shown on **Figure 1.3** as BESS/STATcom/Substation/Switching Station.

3.4.4 Substations/Switching Stations

Substations are required to collect the electricity generated and increase the voltage for transmission to the grid, and to physically connect to the grid (i.e. switching station). Substations/switching stations may be constructed as stand-alone facilities or as combined facilities (refer to **Figure 1.3**). Substations/switching stations will be located within a hardstand area of up to 5 ha, will have a bushfire asset protection zone (APZ) and a security fence.

Emergency backup power for the substations/switching stations will be supplied by an on-site diesel generator and/or batteries to maintain network communications and electrical protection capability in the event of an outage.

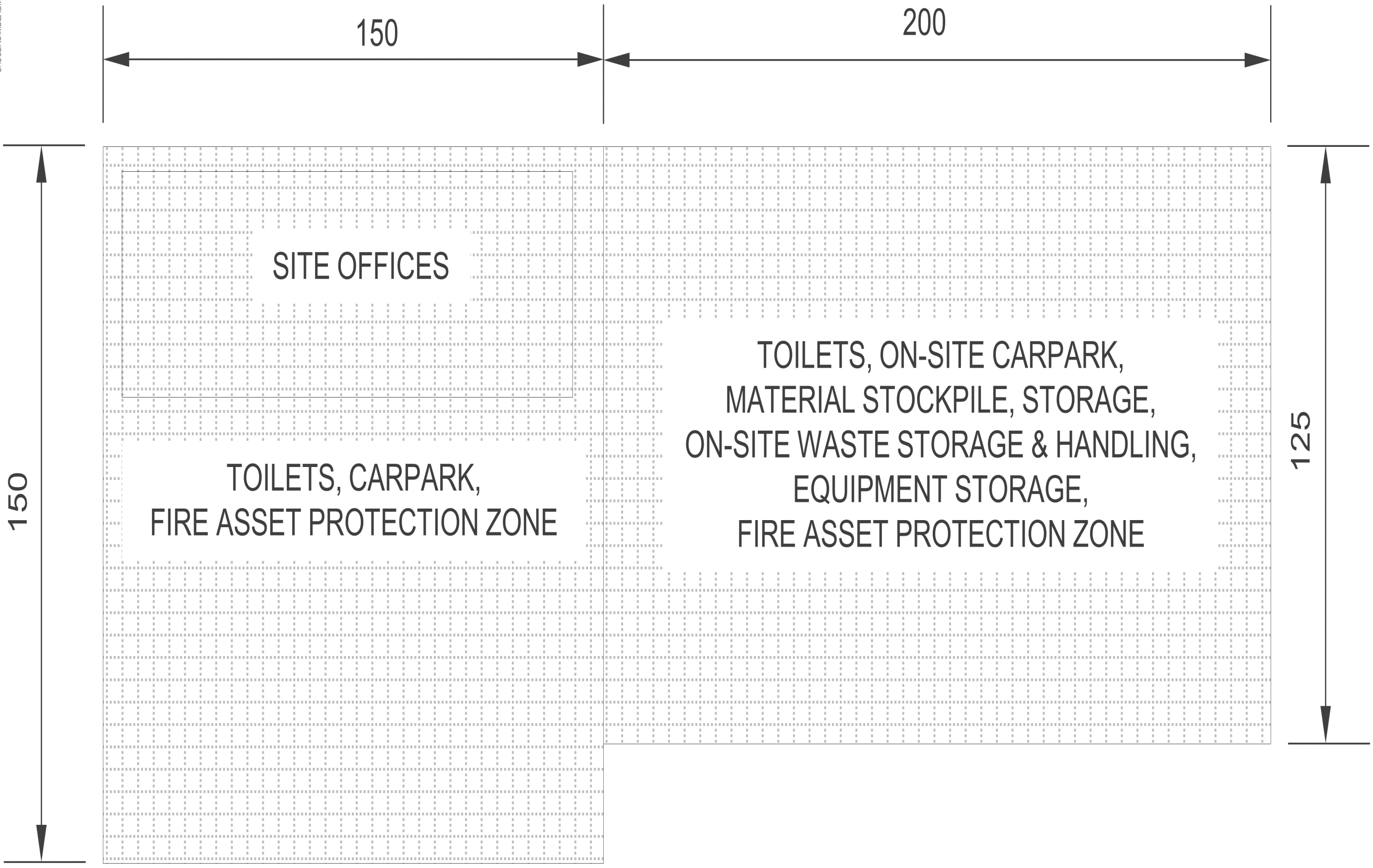
As the substation/switch station transformer(s) may each contain upwards of 50,000 litres (L) of oil, the design will include primary and secondary containment measures so that any spills are captured.

The electrical infrastructure has been designed to minimise the visual impact of the Project by siting the infrastructure away from residences and surrounding public viewpoints as far as practical whilst maintaining the practical and operational needs of the infrastructure.

3.4.5 Operations and Maintenance Compound

Up to two permanent O&M compounds will be established for the day-to-day operation of the Project and each would take up an area up to 2.5 ha, at the indicative locations shown in **Figure 1.3** as Operations and Maintenance Compound. If the Project is constructed in stages, then the second O&M compound may be required.

The O&M compounds will include lay down areas, site operations facilities and services buildings, workshop, storage, parking and other facilities for operations staff. **Figure 3.5** shows an example of an O&M compound and indicative layout. The buildings of the operations compound will include office space, toilet, kitchen, communications equipment, meeting room and routine maintenance stores. The O&M facilities will require a standalone power supply from either the local distribution network, or an on-site generator.



Not to scale

CONCEPT PLAN, NOT FOR CONSTRUCTION

All dimensions in m

FIGURE 3.5

Typical O&M Facility Layout

Image Source: Windlab (2024)

3.4.6 Transmission Lines

A series of underground cables and overhead transmission lines are proposed to transmit the electricity generated by the WTGs and would connect to the existing Transgrid 220 kV line and/or the proposed 330 kV Project EnergyConnect transmission line. Underground cables and overhead transmission lines appear on **Figure 1.3** labelled as Internal Reticulation. The indicative electrical layout includes both underground and overhead reticulation connecting the WTGs, the BESS/STATcom facilities and substations/switching stations to the proposed transmission line connection.

The electricity produced by each WTG would be transformed from low voltage to medium voltage (33 kV or greater) by a transformer generally located at the WTG. The internal electrical network is planned to comprise 33 kV circuits between the WTGs and the closest substation and/or the BESS/STATcom facilities to transmit the electricity produced by the WTGs and a 220 kV or 330 kV transmission line between the on-site substations/switching stations as well as to connect into the TransGrid transmission line or the Project EnergyConnect transmission line. Subject to detailed technical studies, underground cables for electrical reticulation and control cables will be installed between the WTGs, the BESS/STATcom facilities and the substations. When underground, the electrical reticulation generally run parallel to site access tracks.

The final electrical layout will consider opportunities to minimise vegetation clearing and avoid heritage sites, while also considering excavation constraints, ground stability and cost.

The overhead transmission towers will be up to approximately 64 m in height, subject to discussions with TransGrid. Windlab is working closely with landowners to ensure impacts of overhead transmission lines are mitigated where practicable in the Project design.

The underground electrical cables will follow the general layout of the internal roads however they may not be directly adjacent to the internal roads due to design and construction efficiency. Final layouts will be determined during detailed design and be located within the development corridor according to the micro-siting criteria.

3.4.7 Permanent Power Performance Masts

Up to seven permanent power performance masts with a height up to the proposed hub height of the WTGs (i.e. 200 m), will be installed on site. The purpose of these masts is to aid performance monitoring of the WTGs. The permanent power performance masts would be of a guyed, narrow lattice or tubular steel design with concrete footings.

Locations for these masts are yet to be finalised and will be influenced by the final WTG selection. For functional reasons they must be located near to the WTGs but separated by a distance allowing accurate wind measurements. To overcome those separation requirements and select locations for the power performance masts that provide the functionality required, the masts and the guy wires that secure them may need to be located outside of the Development Corridor, however they will remain within the Project Area. The locations will be selected to minimise impacts including consideration of heritage, biodiversity, land use, visual and water impacts within the Project Area, and in consultation with the landowner.

Permanent power performance masts will require a low voltage cable connection for power and a communications cable to be laid. The trench required for this will be approximately 1 m in width and would come from the closest WTG.

3.4.8 Telecommunications Facilities

Telecommunications facilities providing for transmission of voice, data, image, graphic and video information are proposed to be installed on site at standalone locations or onto wind farm infrastructure such as permanent masts.

The telecommunications facilities including masts (if required) may need to be located outside of the Development Corridor, however they will remain within the Project Area. Telecommunication facilities will be sited to avoid key environmental constraints within the Project Area.

3.4.9 Hardstands

Hardstands are required adjacent to each WTG location for the assembly, erection, maintenance, repowering and/or decommissioning of the WTGs. Hardstand dimensions are up to 100 m by 115 m however, this will vary dependent on detailed design, topography, construction methods and the selected WTG model.

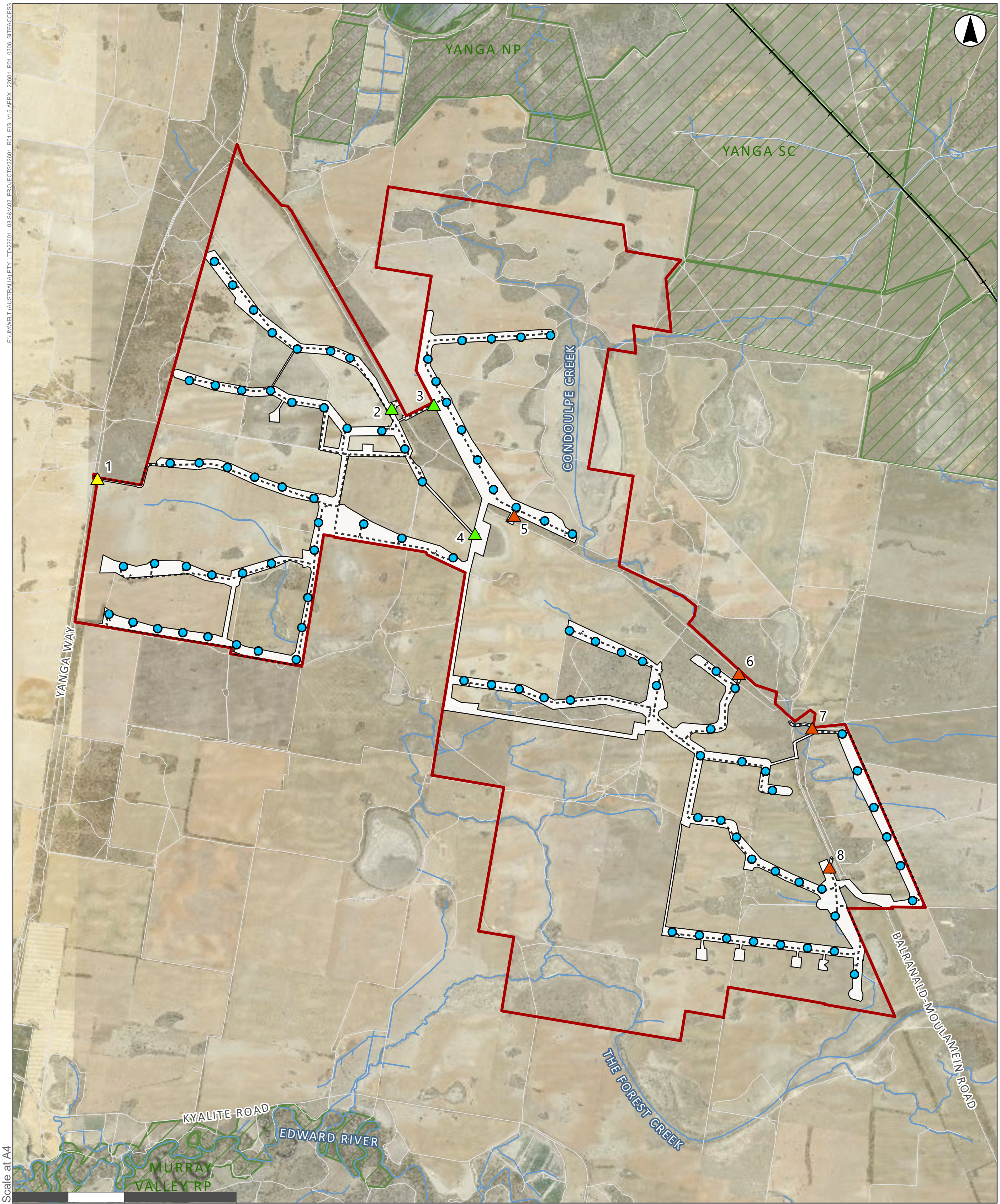
Hardstands will be surfaced with graded aggregate/crushed rock and be maintained throughout the construction and operational life of the Project. Surrounding the hardstand is an area of disturbance included in the Development Footprint which is not a hardstand area but will be used for WTG component laydown and crane structure assembly (among other WTG erection and construction related activities) as well as cut and fill.

3.4.10 Site Access

The Project Area may be accessed from the public road network at eight locations during construction and operation (refer to **Figure 3.6**):

- Access Point 1: emergency only site access for Stage 2, located on Yanga Way.
- Access Point 2: primary site access for eastern portion of Stage 1, located on Balranald-Moulamein Road.
- Access Point 3: primary site access for western portion of Stage 1, located on Balranald-Moulamein Road.
- Access Point 4: primary site access to substation/switching station, located on Arundel Road.
- Access Point 5: secondary site access for Stages 1 and 2, located on Balranald-Moulamein Road.
- Access Point 6: secondary site access for Stage 2, located on Balranald-Moulamein Road.
- Access Point 7: secondary site access for southern portion of Stage 2 (if required), located on Balranald-Moulamein Road.
- Access Point 8: secondary site access for Stage 2 (if required), located on Balranald-Moulamein Road.

As noted above, Access Points 2, 3 and 4 will be the Primary Access Points for Stage 1, while the wider Stage 2 works propose a combination of other access points noted above to service the Project Area.



1:120,000 Scale at A4

0 2.5 5 Kilometres

GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- NPWS Reserve
- Watercourse
- Access Tracks
- Road
- Railway

FIGURE 3.6

Site Access

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

Access from these points will provide for construction vehicle access and will allow mobilisation of plant to several internal work fronts, which will permit site mobilisation and access tracks to be constructed from both ends of the site. This flexibility will deliver construction schedule benefits, thereby reducing the period of construction disturbance to the local community.

Access points to private land would meet minimum rural access standards, be gated and secured, and appropriate warning signs erected. Access to and on public roads will not be restricted unless in accordance with temporary traffic management requirements.

A Traffic Management Plan (TMP) will be prepared during the post approval period in consultation with the relevant roads authorities, Councils, school bus companies, host landowners and neighbouring landowners (where relevant).

Access routes and points for Project transport have been discussed and assessed in the relevant impact assessment sections, including **Section 6.4** (Biodiversity) and **Section 6.5** (Aboriginal Cultural Heritage).

3.4.11 Access Tracks and Internal Roads

Access tracks and internal roads will be established within the Project Area for the construction, operation, repowering and/or decommissioning of the Project. Access tracks have been planned to follow existing farm tracks where practicable, with new tracks to be constructed where necessary. The tracks will have an approximate width of between 5.5 m and 10 m, plus an additional impact area associated with road drainage structures and cut and fill batters. All existing tracks will require a full or partial upgrade to accommodate the construction traffic loads, as well as for maintenance purposes during operation. Access to the Project Area on access tracks would be restricted from public access. The indicative access track network is approximately 91 km in length (for the entire Project) and located wholly within development corridor (refer to **Figure 1.3**).

Culverts may be required to be constructed where internal access roads cross streams. The location of the proposed waterway crossings are discussed further in **Section 6.8**.

If required, detailed design and construction requirements of the road crossings of waterways will be undertaken in consideration of:

- Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.
- Policy and Guidelines for Fish Friendly Waterway Crossings (NSW DPI, 2004).
- Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge, 2003).

3.4.12 Utility Services

The Project will be connected to the transmission network and, when not generating, will draw a minor amount of electricity from the grid. Backup and emergency power at the substations/switching stations may be supplied by a local distribution line, on-site batteries and/or a standalone diesel generator.
Two separate and independent telephone communications facilities (optic fibre and microwave) will be required to be installed between the substations/switching stations to enable safe remote monitoring and control of the Project.

Operational water requirements will be provided to the proposed facilities and auxiliary services building from storage tanks designed to collect water from roof drainage and augmented by potable water delivered by tankers.

An approved septic system or composting system will be installed to treat minor quantities of wastewater associated with operation of the Project, subject to securing the relevant authorisations. Other wastes will be classified and removed from the Project Area to an approved facility (recycling, landfill etc.).
Waste management is described further in.

3.4.13 Signage

Traffic signage required as part of traffic safety during construction will be installed in compliance with relevant regulations and in accordance with any permits obtained for traffic management.

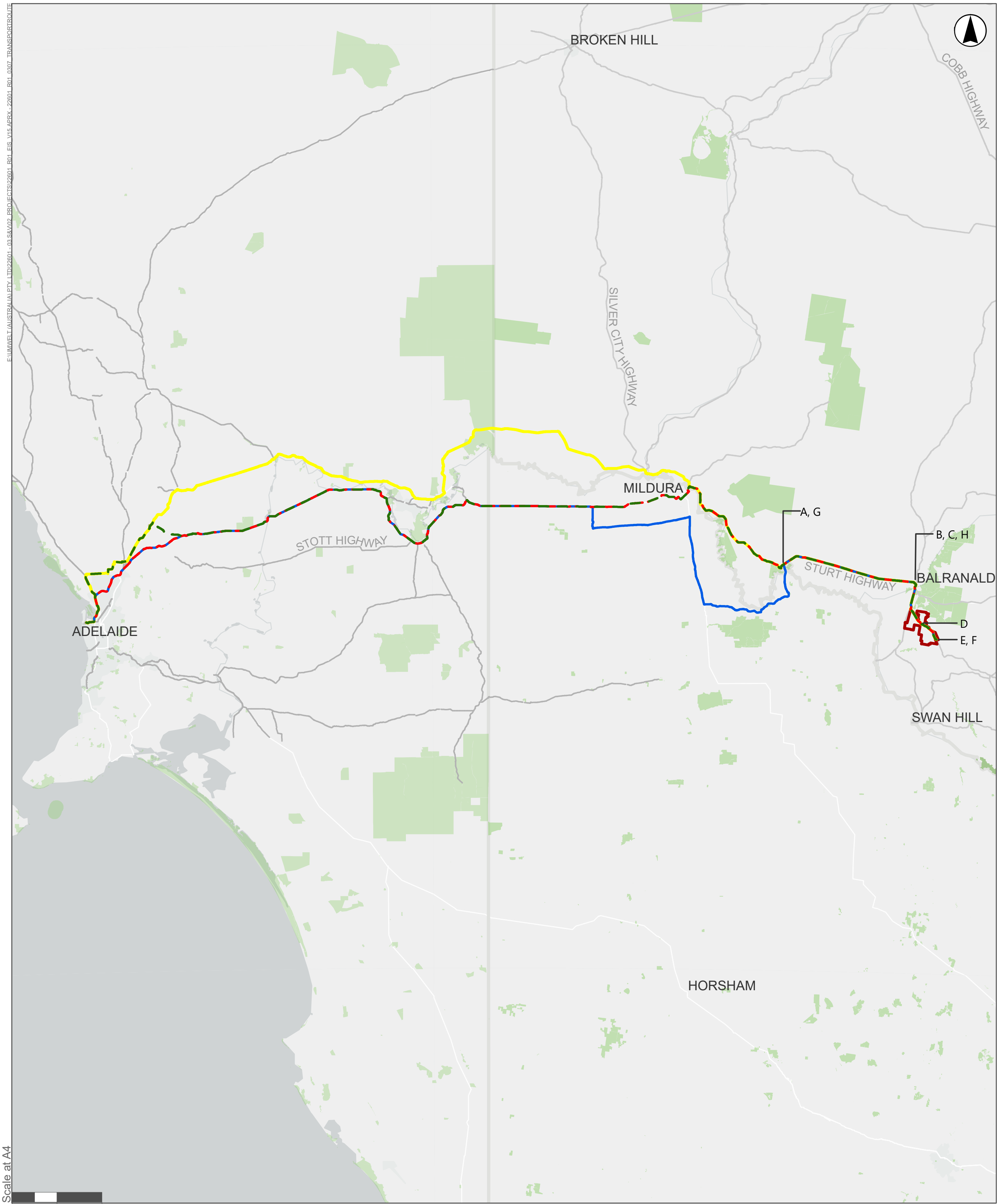
Signage will be erected at critical locations from the outset of construction, directing all vehicles associated with the construction to the Project Area office. Additional signage would be located at or near access points, providing information about the Project, the companies involved and essential safety information and telephone numbers.

Consultation with the relevant local council and Transport for NSW (TfNSW) will be initiated to determine final signage locations.

3.4.14 Ancillary Infrastructure

3.4.14.1 Transport Haulage Route

Over-Size, Over-Mass (OSOM) route options to transport turbine components from Port Adelaide to the Project Area have been assessed in a route study (refer to **Section 6.7**). The four potential route options appear on **Figure 3.7**.



1:3,000,000
Scale at A4

0 25 50 Kilometres

GDA 1994 MGA Zone 54

Legend

- Project Area
- State Forest
- Parks and Reserves
- Route 1
- Route 2
- Route 3
- Route 4

FIGURE 3.6

Vehicle Transport Route from Port Adelaide

Depending on the route selected, the Project requires the upgrade and/or minor treatments to various intersections to cater for OSOM vehicle movements, needed to generate sufficient space for oversized vehicle passage to facilitate the delivery of towers, nacelles and blades, based on a 100 m blade length. These works, specific to locations within NSW, are outlined in **Table 3.4**.

Table 3.4 Potential OSOM Intersection Upgrades and Minor Treatments (NSW)

Route	Location	Procedure	Works	Figure Label
1	Murray Valley Highway onto Sturt Highway, Euston	Right hand turn	Tight corner that cuts back on itself. Large amount of hardstand required. New alignment will require fill to be level with highway. Spotter to guide load throughout intersection. Police to control traffic and pilots to warn traffic.	A
1, 3	Sturt Highway (Market Street) onto Sturt Highway, Balranald	Right hand turn	Large amount of hardstand required along with removal of five trees, two light poles and numerous signs. Median strip to be made trafficable. Spotter to guide load throughout intersection. Police to control traffic and pilots to warn traffic.	B
1	Sturt Highway (Market Street) onto Sturt Hwy, Balranald	Left hand turn	Hardstand required on inside of the corner. Spotter to guide load throughout intersection. Police to control traffic and pilots to warn traffic.	C
1, 2, 3, 4	Balranald-Moulamein Road onto Arundel Rd, Kyalite	Project Access Points	Some vegetation may need to be trimmed/removed on the inside and outside of corner. Adequate swept path to be provided for blades to enter Project Area.	D
1, 2, 3, 4	Balranald-Moulamein Road into Western Project Access Points, Moolpa	Project Access Points	Adequate swept path to be provided for blades to enter Project Area.	E
3	Sturt Highway, Euston	Left hand turn	Median strips to be made trafficable, and signs made removable.	F
4	Sturt Highway roundabout at Carey Street, Euston	Left hand turn	Signs on entry and exit island to be relocated or made removable and islands made trafficable.	G
4	Sturt Highway (Market Street) onto Sturt Highway	Right hand turn	Load to cross incorrect side of roundabout. Median strips to be made trafficable, and signs made removable.	H

Conceptual designs for road upgrades are provided in **Appendix 4**. These designs will be subject to further detailed design and Windlab will liaise with the NSW Government and relevant councils as required in relation to the requirements for the Project.

In addition to these physical works there will also be a number of other approvals and traffic arrangements required that would be undertaken under escort or with appropriate approvals in place. Proposed areas of extended hardstand to accommodate OSOM vehicles are proposed to be temporary and made using road base, subject to detailed design and consultation with TfNSW.

The OSOM route study identified additional road upgrade requirements outside of NSW in the South Australian and Victorian sections of the identified routes. These upgrades will be subject to separate approvals by the relevant regulators in these states.

3.4.15 Components of Physical Layout That May Change

The Project described in this EIS is indicative only and subject to a detailed design process. The proposed layout has been prepared based on the best knowledge available at the time and by applying the avoidance hierarchy approach.

Although up to 96 WTGs are proposed, commercial considerations and technological advancements may lead to fewer than 96 WTGs being constructed and operated, at the discretion of Windlab. All 96 WTG locations have been included in this EIS in order to assess worst case impacts and to allow the flexibility to determine the optimal Project layout within the limits of the development consent, generally in accordance with this EIS. The proposed Project layout presented in this EIS is a product of Windlab's commitment to avoid environmental and social impacts and mitigate any remaining impacts to the maximum extent practicable.

If development consent is granted, preferred suppliers will be selected following a tender and contractor selection process. Any potential supplier will have unique requirements and specifications such as transport vehicle turning radii, access and exit gradients and crane requirements. The final design will only be known following selection of Project components and the completion of the detailed design by the construction contractor post-approval. The ability to micro-site the key Project components within the Development Corridor post-approval is required to enable optimisation of the Project and minimisation of impacts.

Optionality is also provided for the location of compounds, substations/switching stations, BESS/STATcom and electrical design (as shown in **Figure 1.3**) because the selection of these components is subject to the post approval tender, contractor selection, optimisation, detailed design and procurement process. This EIS assumes that each of those areas shown can be interchangeable should the optimisation process direct that a piece of infrastructure would be more efficiently interchanged with another. All areas have therefore been considered in the Development Footprint and subjected to the impact assessment process.

The locations of some Project components are not known at this stage and will be subject to the detailed design and construction phase programming. These are described in the relevant section and include (but are not limited to) temporary calibration meteorological masts, permanent power performance masts (including the location of their power supply cables) and the temporary laydown areas. Those will be located within the Project Area with impact minimisation guiding their placement.

3.4.15.1 Micro-siting Criteria

WTGs, BESS/STATcom facilities, ancillary infrastructure and temporary facilities will be micro-sited post approval during the optimisation, detailed design, and construction phase programming. Final micro-siting may not occur until during the construction period, immediately prior to the activity or construction of that Project component. Any micro-siting will be undertaken to meet the following criteria:

- On-ground impacts are to remain within the Development Corridor shown in **Figure 1.3** (excluding temporary calibration meteorological masts, permanent power performance masts, and temporary laydown areas which may be outside the Development Corridor but will remain within the Project Area).

- No WTG is moved more than 100 m from the relevant Geographical Positioning System (GPS) coordinates shown in **Figure 1.3**, noting that such movements may result in the over sail of the Development Corridor by the WTG rotor.
- The micro-sited location of the WTG, BESS/STATcom facilities, ancillary infrastructure or temporary facilities would not result in any non-compliance with the development consent.

3.4.16 Subdivision

The transmission network operator will require freehold title to the substation lot(s) to proceed with the construction of the relevant electrical connections and infrastructure. The Project will require the subdivision of potentially four new lots to enable ownership of the substations/switching stations to be transferred to the network operator. The transmission network operator will obtain freehold title either through transfer, dedication or acquisition.

The location of the proposed substations/switching stations is shown in **Figure 1.3**. The lot size and configuration is subject to further detailed design and confirmation with the transmission network operator and the landowner during the detailed design phase.

In order to carry out the Project, Windlab will also require separate long-term leases to be granted by each of the registered landholders over parts of existing lots where the WTGs will be constructed. The lease subdivisions are administrative only and there will be no actual subdivision of the relevant titles to create new freehold lots or which could give rise to any new dwelling entitlements.

3.5 Proposed Activities

The proposed activities for each phase of the Project are outlined in **Table 3.5**. Project phasing is considered further in **Section 3.8**.

Table 3.5 Project Phases and Associated Activities

Project Phase	Proposed Activities
Pre-construction Minor Works	Surveys.
Pre-construction Minor Works	Building/road dilapidation surveys.
Pre-construction Minor Works	Investigative drilling (including geotechnical), excavation, or salvage.
Pre-construction Minor Works	Minor clearing or translocation of native vegetation.
Pre-construction Minor Works	Establishment of temporary site office and compounds.
Pre-construction Minor Works	Installation of environmental impact mitigation measures, fencing, enabling works, temporary calibration meteorological masts.
Pre-construction Minor Works	Heritage artefact salvage, biodiversity investigations and pre-clearing surveys, inspections, specific habitat feature removal, and relocation.
Pre-construction Minor Works	Intersection and road upgrades.
Pre-construction Minor Works	Establishment of Project access points, minor access roads and minor adjustments to services/utilities signage, etc. including associated vegetation removal and heritage artefact salvage.

Project Phase	Proposed Activities
Construction Works	Includes all physical works to enable the operation, including, but not limited to, the construction and installation of WTGs, permanent power performance masts, compounds, transmission lines, BESS/STATcom facilities, construction of ancillary infrastructure and establishment or construction of any temporary facilities which were not already established as part of the pre-construction minor works.
Operation and Maintenance	Ongoing operation, monitoring (on-site and remote monitoring) and maintenance of all Project infrastructure and land within the Development Corridor during the operational lifespan of the Project.
Operation and Maintenance	Production of approximately 750 MW of renewable energy.
Operation and Maintenance	Maintenance of land within the Development Corridor.
Operation and Maintenance	Replacement of major components as required, such as WTG blades, may require the use of cranes and ancillary equipment.
Decommissioning	Includes all physical works required for the dismantling and transportation of Project infrastructure and rehabilitation of the Project Area.
Decommissioning	If not required for ongoing farming/fire access purposes, internal roads would be removed.

3.6 Hours of Operation

Generally, the Project will undertake construction or decommissioning activities between:

- 7 am to 6 pm, Monday to Friday.
- 8 am to 1 pm, Saturdays.

Where these standard construction work hours are in force, works may be undertaken outside these hours where the activity is inaudible at non-associated dwellings, for emergency works, time critical delivery of materials or where agreement from the Secretary of Department of Planning, Housing and Infrastructure (DPHI) has been provided.

Certain activities will require work to be conducted outside normal work hours to prevent damage to concrete tower bases and trenches, to reduce the safety risk of open trenches and to reduce the risk of tower self-oscillation. Examples of these activities include:

- **Concrete Pours:** Concrete work is to be carried out as a continuous process (once bases are prepared) for some 8–12 hours per base. This activity includes the operation of the concrete batching plants. Weather conditions play a major role, as the concrete can only be poured at temperatures between 5 and 35°C (depending on specification) and not during rain periods. This may require concrete pours to start early in the day or be completed overnight to avoid peak summer temperatures. Once the bases have been prepared, it is essential that concrete is poured immediately to prevent any damage that may be caused by rain or prolonged exposure.

- **In-ground Electrical Works:** Once electrical trenches have been excavated it is important that cables are laid and trenches backfilled as soon as practicable to avoid damage to the electrical equipment or to the trenches (and surrounding areas) due to exposure to the elements. Safety issues, for people, livestock, and native animals, are also reduced by early backfill of trenches.

- **WTG Installation:** WTG installation is intended to fit into the six-day working week. Due to the designed sequencing of component lifts certain stage/components need to be completed in a specified order which may require early starts or late finishes, considerate of wind conditions. When erecting the tower, once the top of the tower is attached, the nacelle must go on without delay due to the risk of tower self-oscillation. Unfavourable weather can cause delays in mounting the nacelle. Continuing this work outside of standard construction hours will ensure that risk to people, property and the surrounding environment is mitigated. The Project Area is naturally a high wind area and as such Sunday work may be needed to make up for high wind days during the week.

Windlab seeks approval to undertake construction activities outside the normal approved working hours without the approval of the Secretary, subject to the works meeting any of the following criteria:

- activities are inaudible at non-associated dwellings activities are associated with the delivery of WTG components and materials requested by the NSW Police Force or other authorities for safety reasons
- activities are associated with emergency work to avoid the loss of life, property and/or material harm to the environment.

3.7 Materials

Resource requirements for the Project are typical of any new development site, including the provision of cement, aggregate, sand, asphalt, water and road base material.

Procurement of resources required for the Project will be fully determined during the detailed design phase to be undertaken post approval. These resources may be sourced from locations local to the Project and may require the use of public roads not described in **Section 3.4.10**.

The routes used to move the resources through the surrounding towns and road network will be along the major road network and standard heavy vehicle road network, or alternatively along routes permitted by the resource supplier's permitting and approvals process. Flexibility is required to provide the opportunity to locally source required resources and to provide the ability to further define road routes for heavy and light vehicles.

Materials will be sourced locally and as close to the Project Area as practicable to do so, including reusing material excavated from WTG foundations, roadworks and other earthworks where practicable. Topsoil cleared during the construction phase will be used for rehabilitation where practicable. If possible, Windlab may also source materials from land within the Project Area (limited to the Development Footprint), this option would be preferred as it would significantly reduce the haulage of materials on the public road network. Further geotechnical studies are required to determine whether suitable construction material can be sourced within the Development Footprint.

3.7.1 Water

Water requirements will be met in accordance with the provisions of the *Water Management Act 2000* (WM Act) by sourcing water from within the locality where practicable and from a licensed supplier.

The Project's preliminary water requirement estimations are based on engagement with civil designers and Windlab's experience and benchmarking against other projects. It is estimated that approximately 400–500 mega litres (ML) of water may be required over the four-year construction period. Peak daily demand is estimated to be 600–700 kilo litres (kL)/day raw, with 40 kL/day of potable water, and an average daily estimated demand of 300–350 kL/day raw, with 20 kL/day of potable water. The final quantity will depend on detailed design, earthworks quantities as well as environmental conditions at the time.

Windlab has investigated various potential water sources including on site bores, harvested surface water, river sources and potential mains water supply through discussions with Balranald Shire Council and Murray River Council. Based on the estimated average water demand and initial discussions with Balranald Shire Council, it is likely that the majority of water could be sourced from the Balranald Shire Council mains water supply utilising an existing standpipe with an available draw of 30–40 litres/second. Depending on utilisation rates at the time, and to cater for possible higher peak usage, Windlab has discussed options with Balranald Shire Council including installing additional storage tanks either at mains source or within the Project Area to provide a buffer. This will assist with minimising traffic impacts and overuse of the standpipe. The Project will have multiple water tanks within the Development Corridor, to distribute and store water as required and to act as a buffer to temporary variations in water availability.

Windlab is investigating other options to further supplement water supplies. This includes discussions with Murray River Council, who have indicated the possibility of providing supplementary Project water demand from standpipes in Tooleybuc and Moulamein. Windlab is also in discussion with host landowners and neighbours to investigate the potential for extraction from the Edward River and/or Wakool River to provide another alternative source of construction water for the Project.

3.8 Timing

It is anticipated that works associated with the Project could commence within six months of the development consent being granted, should the Project be approved. The timing of construction will be driven by additional permits and authorisations, post-development consent tender, contractor selection, optimisation, detailed design and procurement processes and a final investment decision. An indicative Project timeline appears in **Table 3.6**.

Table 3.6 Anticipated Project Timeline

Phase	Approximate Duration
Pre-construction minor works	Six to 12 months
Construction	48 months
Operation	35 years
Maintenance	Annual and ongoing
Decommissioning	12 months

The Project seeks to provide flexibility, if required, to construct operate and decommission the Project in stages of various sizes or permutations within the parameters of the development consent, should the Project be approved (refer to **Section 3.2**). Staging would be determined post-development consent and subject to detailed design and procurement processes.

This section provides a description of the various phases of the Project lifecycle which would commence following approval.

3.8.1 Construction Works

Construction works will commence following provision of detailed design inputs, which may be staged (refer to **Section 3.2**). Construction includes all physical works to enable the operation, including, but not limited to, the construction and installation of WTGs, BESS/STATcom facilities, ancillary infrastructure and temporary facilities.

Except where identified as being required in advance of site mobilisation, haulage route upgrades will commence at the same time and proceed in parallel with site mobilisation. All works will be completed to the satisfaction of the relevant road authorities.

Construction of the temporary facilities will be undertaken during pre-construction and construction phases. Works will include the erection of temporary infrastructure such as a portable field office, toilet facilities and parking bays within the temporary construction compound, establishment of the rock crushing and batching plant facilities, stockpiles and materials storage as well as temporary laydown areas. Arrangements will be made for power and communications at the site office during the construction period.

3.8.2 Commissioning

Pre-commissioning checks will be carried out on the high voltage electrical equipment prior to connection to the Transgrid/Project EnergyConnect transmission network. When the Project's electrical system has been energised, the WTGs and BESS/STATcom facilities will be commissioned and put into service. WTGs are commissioned sequentially enabling some WTGs to commence operation prior to the completion of wind farm construction. For the purposes of this EIS the commissioning phase is considered to commence during construction and will end once the final WTG and electrical compound has been fully commissioned.

3.8.3 Operations and Maintenance

Once operational, the Project would be monitored both by on-site staff and through remote monitoring. Aspects of the Project operation to be dealt with by on-site staff would include safety management, environmental condition monitoring, landowner management, routine servicing, malfunction rectification and site visits. Those functions to be overseen by remote monitoring include WTG and battery storage performance assessment, Project reporting, remote resetting and maintenance co-ordination. Pro-active computer control systems will monitor the performance of the WTGs and battery storage so that any issues can be dealt with by on-site staff, as appropriate.

Maintenance staff will be on-site throughout the year, making routine checks of the WTGs, BESS/STATcom facilities and ancillary infrastructure on an ongoing basis. Major planned servicing would be carried out approximately twice a year on each WTG. Each major service visit would potentially involve a number of service vehicles on-site. If required, the replacement of major components, such as WTG blades, may require the use of cranes and ancillary equipment.

Management of regrowth and existing vegetation will be necessary within the overhead transmission line corridors to reduce the threat of fire and physical damage to the transmission line, and to allow access for maintenance vehicles. Occasionally, access by medium and heavy vehicles may be required to repair or maintain overhead transmission line components.

3.8.4 Decommissioning

At the end of the operational life of the Project, above ground infrastructure will be dismantled and removed from the Project Area. This may not include the connection infrastructure, subject to approval. To assist in minimising environmental and social impacts, underground cables may remain in place. The land will be returned to near prior condition and use as far as practicable. A compressor and rock crusher may be needed to carry out the cutting work.

Internal roads, if not required for ongoing farming purposes or fire access, would be removed. Access gates, if not required for farming purposes, would also be removed. Individual landowners will be involved in any discussion regarding the removal or hand-over of infrastructure on their property.

3.8.5 Repowering

This EIS has assessed only up to decommissioning and does not include repowering.

After approximately 35 years of operation (or sooner if deemed economically viable) the Project may be repowered, utilising contemporary equipment. Subject to a subsequent project approval process, repowering may extend the life of the Project. Some, or all, of the Project equipment may be repowered depending on the economics at the time. Repowering would require the equivalent transportation and installation equipment and facilities used during the initial construction.

4.0 Statutory Context

This section provides an overview of the statutory context for the Project and discusses the application of key legislation and planning provisions to the Project. The Project requires approval under both NSW and Commonwealth environmental and planning legislation.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary environmental and planning regulatory instrument relevant to the Project at the Commonwealth level. Under the EPBC Act, approval from the Commonwealth Minister for the Environment and Water is required for any action that may have a significant impact on Matters of National Environmental Significance (MNES). If an 'activity' is likely to have a significant impact on a MNES then it may be a 'controlled action' and require approval from the Commonwealth Minister for the Environment and Water. To obtain approval from the Minister, a proposed action must be referred to the Minister via the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). The purpose of a referral is to enable the Minister to decide whether the proposed action will need assessment and approval under the EPBC Act.

The Project was referred under the EPBC Act to the Minister for the Environment and Water via DCCEEW and was determined to be a controlled action (EPBC 2023/09603) on 14 November 2023. The referral determination found that the Project requires assessment and approval under the EPBC Act due to potential impacts on:

- Commonwealth listed threatened species and communities.
- Commonwealth listed migratory species.

The Project will be assessed under the Bilateral Agreement made under section 45 of the EPBC Act between the Commonwealth of Australia and NSW.

The NSW EP&A Act is the primary instrument which regulates the environmental impact assessment and approval process for development in NSW.

The Project requires development consent under Part 4 of the EP&A Act. Being development for the purpose of electricity generation with a capital investment value of more than $30 million, the Project is declared to be SSD under the provisions of the Planning System SEPP. The Development Application will be lodged with DPHI.

In accordance with the DPIE EIS Guideline (DPIE, 2022), **Table 4.1** provides a summary of compliance requirements under Commonwealth, State and local legislation relevant to the Project including NSW SEPPs and LEPs.

A review of relevant mandatory considerations and pre-conditions is provided in **Appendix 5**, identifying the relevant statutory requirements for the Project and indicating where they have been addressed in the EIS.

Table 4.1 Statutory Requirements Summary

Category	Comment
Power to grant approval	Section 4.36 of the EP&A Act provides for the declaration of a project as SSD. Under the EP&A Act, the declaration of a project as SSD can be made by meeting the requirements of a SEPP or by the Minister for Planning and Pubic Spaces. Clause 20 of Schedule 1 of the Planning Systems SEPP prescribes that development for the purpose of 'electricity generating works' that has a capital investment value of more than $30 million is SSD. The Project has a capital investment value of greater than $30 million. Therefore, the Project is declared as SSD and the Development Application for the Project will be subject to the requirements of Division 4.7 of the EP&A Act. The consent authority will be the Minister for Planning and Public Spaces or the Independent Planning Commission (IPC) if public objections to the Project exceed 50; any reportable political donations are made by the Proponent; and/or the Local Council objects to the Project.
Permissibility – State Environmental Planning Policy (Transport and Infrastructure) 2021	Clause 2.36(1)(b) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Infrastructure SEPP) states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Under Clause 2.7(1) of the Infrastructure SEPP, the provisions prevail where there are inconsistencies with any other environmental planning instruments, including Local Environmental Plans (LEPs).
Permissibility – Wakool LEP 2013	As outlined in **Section 2.3**, the Project Area is zoned RU1 Primary Production under Wakool LEP 2013. Electricity generating works are not permitted within the RU1 zoning under the LEP. Due to the operation of Clause 2.36(1)(b) of the Infrastructure SEPP, the Project is permissible with development consent. Consideration of the LEP zoning provisions applying to the land are discussed in **Appendix 5**. Subdivision of land is proposed as part of the Project for the location of substations to provide that they are located on separate land parcels. **Appendix 5** provides further consideration of other relevant Environmental Planning Instruments (EPIs) and how these have been considered in this EIS
Commonwealth Approvals - *Environment Protection and Biodiversity Conservation Act 1999*	Under the EPBC Act, a referral is required to be submitted to the DCCEEW for any 'action' that is considered likely to have a significant impact on any Matter of National Environmental Significance (MNES). A referral was submitted to DCCEEW on 17 October 2023. The Project was determined to be a controlled action under the EPBC Act on 14 November 2023. The controlling provisions were listed threatened species and communities and listed migratory species. The Project will be assessed under the Assessment Bilateral Agreement currently in place between the NSW and Commonwealth Governments, which allows assessment processes under the EP&A Act for certain developments, including SSD, to form the assessment for the EPBC Act to avoid duplication. Supplementary SEARs in relation to the MNES identified in the Commonwealth Minister's 'controlled action' decision were issued by DPE on 20 December 2023. A copy of the supplementary SEARs and where these have been addressed in the EIS is included in **Appendix 1** of this EIS. A decision whether to approve the Project for the purposes of the EPBC Act will be made, based on this assessment documentation, by the Commonwealth Minister for the Environment and Water.

Category	Comment
Commonwealth Approvals – Civil Aviation Regulations 1988	The Civil Aviation Regulations require any potential aviation obstacles and hazards be assessed under the National Airports Safeguarding Framework Guideline D: Managing Wind Turbine Risk to Aircraft and the reporting of tall structures to the Civil Aviation Safety Authority (CASA) and Airservices. A detailed assessment in accordance with the regulations and consultation with the relevant agencies has been undertaken as part of the preparation of the EIS (refer to **Section 5.0** and **Section 6.9.1**).
Commonwealth Approvals – Heavy Vehicle National Law	Approvals are required for the transport of wind turbines and ancillary infrastructure by OSOM vehicles. The requirements for such OSOM transport have been assessed via a route analysis study as part of the EIS (refer to **Section 6.6**).
Other State approvals – Approvals that are not required	Section 4.41 of the EP&A Act specifies authorisations which are not required for approved SSD. Those are listed below: • *Fisheries Management Act 1994* – a permit under section 201, 205 or 219. • *Heritage Act 1977* – an approval under Part 4, or an excavation permit under section 139. • *National Parks and Wildlife Act 1974* – an Aboriginal heritage impact permit under section 90. • *Rural Fires Act 1997* – a bushfire safety authority under section 100B. • *Water Management Act 2000* – a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91.
Other State approvals – Approvals that must be applied consistently	Section 4.42 of the EP&A Act requires that several approvals, if required for a SSD, cannot be refused if a development consent is granted and must be substantially consistent with the terms of any development consent granted for the development. Of particular relevance to the Project, these include: • *Protection of the Environment Operations Act 1997* – an environment protection licence under chapter 3. • *Roads Act 1993* – a consent under section 138 for work within a public road.
Other State approvals – Subdivision	As outlined in **Section 3.4.16**, development consent is required for the subdivision of land for substation lot(s) to proceed with the construction of the relevant electrical connections and infrastructure under the EP&A Act. The areas to be subdivided are zoned RU1 Primary Production under the Wakool LEP 2013 and subdivision is permissible with development consent if the minimum lot size is met (clause 4.1). Under the applicable statutory framework, regardless of the controls set out in an LEP, consent for subdivision can be granted. Refer to Appendix 5 for a summary of all relevant NSW statutory requirements for the Project and where these have been addressed in the EIS.
Pre-conditions to exercising the power to grant consent – *Biodiversity Conservation Act 2016* (BC Act)	Under the BC Act, biodiversity assessment in accordance with the Biodiversity Assessment Method (BAM) is required for any SSD project. A Biodiversity Development Assessment Report (BDAR) in accordance with the BAM has been completed for the Project as discussed in **Section 6.4**. Consultation with the NSW Biodiversity, Conservation and Science (BCS) Division has also been undertaken during the preparation of the EIS, as further discussed in **Section 5.0**.

Category	Comment
Mandatory matters for consideration	Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments, proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the site, and submissions received and the public interest. All relevant matters are addressed in the EIS based on the outcomes of environmental assessments to be undertaken (refer to **Section 6.0**). Mandatory matters for consideration have been addressed in detail in **Appendix 5**.

5.0 Engagement

Windlab recognises the critical importance of engagement to the success of this Project and has been liaising with landholders since February 2020 with other stakeholder discussions commencing in May 2021. Preliminary landholder discussions led to engagement with a broader group of stakeholders, as the extent of the Project started to form, and continued as the concept design was developed. In addition to community stakeholders, ongoing consultation has been undertaken with councils and government agencies, service providers, businesses and various non-government organisations and interest groups. This engagement has informed the design of the Project and will be ongoing throughout the assessment process, and if the Project is approved, throughout the life of the Project.

In addition to the engagement undertaken by Windlab, further engagement has been undertaken as part of the Social Impact Assessment (SIA) prepared by Environmental Resources Management Australia Pty Ltd (ERM) for the Project following the requirements of the NSW Government guidelines and assessment standards including, but not limited to, the *NSW Social Impact Assessment Guideline for State Significant Projects* (SIA Guideline) (DPE, 2023a) and Project SEARs.

An overview of the Stakeholder Engagement Plan (SEP) and various aspects associated with the SIA, including engagement carried out, government agency consultation outcomes, community views and ongoing engagement, is provided in this section. Further detail is provided in the SIA (refer to **Appendix 6**).

5.1 Stakeholder Engagement Plan

Windlab has prepared and implemented a SEP for the Project that outlines engagement principles and has guided the approach to community consultation. The stated purpose of the SEP is to provide a structured approach to stakeholder engagement as a fundamental part of achieving a social licence to operate and to meet statutory obligations to facilitate development approval for the Project.

A stakeholder identification process was undertaken to support the planning and delivery of community and stakeholder consultation. This process identified stakeholders with an interest in the Project, and those potentially directly and indirectly affected by the Project, as well as potential engagement tools to build and maintain positive, trust-based relationships with the local community. The SEP identifies the key messages to be communicated for the Project, noting that that these change as the Project develops, as well as Windlab's approach to benefit sharing with the community.

Engagement undertaken to date for the Project has been consistent with the requirements of the *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2024) (the Engagement Guidelines).

5.2 Engagement Carried Out

The following section summarises the community engagement methods and activities carried out for the Project prior to and during preparation of the EIS.

5.2.1 Key Stakeholders

As explained above, a stakeholder identification process was undertaken for the Project to support the planning and delivery of community and stakeholder consultation, and development of the SIA. This process involved identifying stakeholders with an interest, or those directly and indirectly affected by the Project, including identifying any potentially vulnerable or marginalised groups.

Key stakeholder groups that have been consulted or engaged are outlined in **Figure 5.1** with further detail provided in **Table 5.1**.

Figure 5.1 Key Stakeholder Groups

Table 5.1 Identification of Project Stakeholders

Stakeholder Group	Identified Stakeholders
Host Landholders	Landowners with the potential to host infrastructure, have already engaged in discussion or have already agreed to host infrastructure.
Immediate/Proximal Neighbours	Properties located up to 6 km from the Project Area, with or without dwellings which neighbour the Project Area.
Secondary Neighbours	Properties located between 6 km and 9 km from the Project Area, with or without dwellings.

Stakeholder Group	Identified Stakeholders

Local Communities and Community Groups	Community members and groups who live in surrounding communities but are not Immediate or Secondary Neighbours, including:
	• the local communities of Kyalite, Balranald, Goodnight, and Tooleybuc
	• the regional centres of Moulamein and Swan Hill
	• community groups including:
	    o Kyalite Progress & Recreation Reserve Association
	    o Kyalite Fishing and Sporting Club
	    o Balranald Inc
	    o Growing Business Industry & Tourism Advisory Committee
	    o Strengthening Community Access Inclusion and Wellbeing Advisory Committee
	    o Balranald Beautification Advisory Committee
	    o Ageing Well, Aged Care & Facilities Advisory Committee
	    o Euston Progressive Advisory Committee
	    o Sports and Recreation Advisory Committee
	    o Youth Council, Balranald
	    o Country Education Foundation
	    o Tooleybuc Piangil Action Group
	    o Goodnight Hall and Reserve Committee
	    o Koraleigh Hall and Recreational Reserve
	    o Swan Hill Incorporated
	    o Robinvale and Euston Business Association
	    o Committee for Echuca Moama.

First Nations Groups	Registered Aboriginal Parties (RAPs) as identified through the Aboriginal Cultural Heritage Consultation Requirements for Applicants, including: • Balranald Local Aboriginal Land Council (Balranald, NSW) • Pappin Family Aboriginal Corporation (Balranald, NSW) • Wakool Indigenous Corporation (Balranald, NSW & Parkes NSW) • John Jackson (Balranald, NSW) • Yarkuwa Indigenous Knowledge Centre (Deniliquin, NSW) • Bangerang Aboriginal Corporation (Shepparton, VIC) • Traditional Owners (TOs) • Kelly Family (Balranald, NSW) • Winch Family (Balranald, NSW). Local Services including: • Maari Ma Health Aboriginal Corporation • Moores Buses.
Commonwealth Government	• Department of Climate Change, Energy, the Environment and Water. • Office of the Australian Energy Infrastructure Commissioner • Regional Development Australia – Murray Region.
State Government	Key State Government Authorities and Members of Parliament: • Department of Planning, Housing and Infrastructure • Department of Climate Change, Energy, the Environment and Water (NSW) • DPI – Agriculture, Fisheries • NSW National Parks and Wildlife Service • Department of Regional NSW - Mining, Exploration and Geoscience

Stakeholder Group	Identified Stakeholders
	• Transport for NSW • NSW Environment Protection Authority (EPA) • Member for Murray • NSW Minister for Climate Change, NSW Minister for Energy, NSW Minister for Environment, NSW Minister for Heritage.
Local Government	Murray River Council representatives and executives including but not limited to the following: • CEO • Director Infrastructure • Director Corporate Services • Director Planning and Environment • Director Community and Economic Development • Mayor and Councillors. Balranald Shire Council representatives and executives including but not limited to the following: • Administrator to the Balranald Shire Council • General Manager • Director of Governance, Business & Community Services • Director of Infrastructure & Planning Services.
Commercial Businesses/ Groups/Organisations	• Regional businesses surrounding the Project Area • Robinvale and Euston Business Association.
Emergency Services	Emergency services including: • Police: Deniliquin Police Station, Moulamein Police Station, Balranald Police Station • NSW Fire and Rescue: Balranald • NSW Rural Fire Service: Mid Murray Zone • NSW State Emergency Service (SES) • NSW Fire and Rescue.

5.2.2 Engagement Undertaken

As discussed in **Section 5.0**, Windlab commenced engagement with landholders in February 2020 and other stakeholders in May 2021. This engagement included phone calls, emails and face-to-face meetings conducted by Windlab employees and resulted in the current list of host landholders associated with the Project. Since engagement commenced, Windlab has also completed a range of community engagement activities with other local landholders and key stakeholders. To support this process Windlab engaged a local community engagement specialist.

Windlab has also consulted extensively with Government agencies throughout the EIS process. Consultation with Government agencies has been undertaken through various mechanisms to keep agencies informed of progress and outcomes of the Project. Consultation has included Project briefings, explanation of the scope of specialist assessments and discussion of SEARs requirements, and reporting of results of specialist assessments. Windlab sought relevant Government agency advice throughout the assessment process in order to understand and meet assessment requirements to produce robust assessments for key issues.

The outcomes of community engagement activities undertaken by Windlab during the scoping and EIS preparation phases were reviewed and consolidated to inform the SIA and understand the range of community views, concerns, interests and feedback provided on the Project. This existing information has been complimented by a targeted consultation program for the SIA, undertaken between May 2021 and February 2024 by Windlab, with support from ERM.

A summary of the number of interactions by stakeholder type undertaken during the stakeholder engagement program is presented in **Figure 5.2**. A summary of the activities undertaken during the stakeholder engagement program is presented in **Table 5.2**.

Detailed engagement records for the Project that identify key issues that were raised during stakeholder engagement and where these issues have been addressed in the EIS, as relevant, are provided in **Appendix 7**.

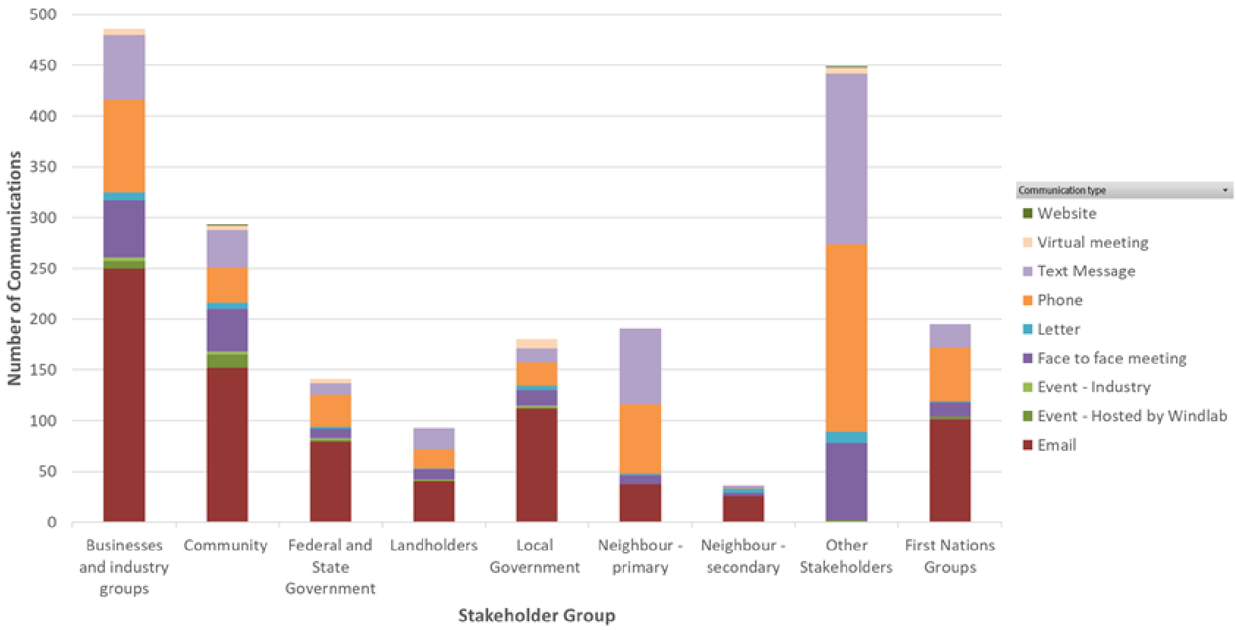


Figure 5.2 Number of Interactions by Stakeholder Type

Table 5.2 Engagement Activity

Date	Activity/Method	Summary
May 2021–June 2021	Government and Local Member briefings • NSW Government – DPE (now DPHI) • Murray River Council • Balranald Shire Council • Local member – State (Helen Dalton) • Local member – Federal (Sussan Ley).	Face to face Project briefings were conducted during the scoping phase. Topics covered included: • the proposed Project location, investment and jobs associated • compatibility with existing agricultural activities • engagement with potential hosts and neighbours • about Windlab, wind as a resource and diversification of the regional economy • potential timelines and next steps.

September 2021	A Community Values Survey was conducted by Windlab to understand current community sentiment about the Project and solicit feedback from stakeholders. The survey was available electronically on the Project website with hardcopies provided at Moulamein Business Centre, Balranald Shire Offices and Kyalite Pub/Store	30 surveys completed by 15 September 2021. Survey outcomes included:
		• farming, community, and family were highly valued by a majority of respondents
		• employment opportunities were also considered important by many respondents
		• perceptions of clean energy:
		  ○ a significant majority sees clean energy as a positive benefit
		  ○ many appreciate the potential for local investment.
		• main concerns:
		  ○ noise issues were identified by a notable portion of respondents
		  ○ effects on flora and fauna
		  ○ concerns regarding land use.
		About a third of the respondents had no concerns about the Project.

July 2021	Community drop-in sessions	• Community Drop-In Sessions were used to share critical Project information and collateral (e.g. brochures, maps, etc).
		• Members of the Project Team were present at these meetings to answer questions from the community members.
		• Community Drop-In Sessions were held at nearby townships including:
		  ○ Balranald (15 km north of the Project Area)
		  ○ Kyalite (10 km south-west of the Project Area).

Date	Activity/Method	Summary

		• The following communication channels were used to notify the community of the Drop-In Session:
		  ○ phone calls and emails to personally notify key stakeholders (neighbours, councils and representatives from key interest groups)
		  ○ posts on Balranald Shire Council Facebook Page (2,700 followers) and Balranald Link Facebook Page (3,300 followers)
		  ○ flyers at Kyalite Pub / Store, Balranald Bakery, Moulamein Business Centre and Balranald Council reception
		  ○ articles in local publications (Balranald Shire newsletter and the Orange Frog) and commercial media (Riverine Grazier and The Guardian)
		  ○ interview on local ABC radio
		  ○ post on Windlab corporate website.
		• Information on the Project and the development assessment process was provided at the Drop-In Sessions. The indicative layout was presented and available for the public to view.
		• Based on feedback from initial engagement, additional information on the construction and operation of a wind farm was also presented.
		A total of 11 people attended the initial Drop-In Sessions (four (4) Immediate/Secondary Neighbours, three (3) Surrounding Community (Community Groups), two (2) Commercial Business Groups/Organisations, and two (2) Local Government representatives). Attendance was comparable to attendance at other similar forums in the area given the COVID-19 concerns at the time.

November 2021–December 2023	Project briefings • Via video: November 2021–December 2023 • Face-to-face: February 2022–December 2023	Project briefings were conducted during the scoping phase with: • Murray River Council, including one briefing with Councillors • Balranald Shire Council • Executive of Chairs Advisory Committee • Growing Business Industry & Tourism Advisory Committee • Strengthening Community Access Inclusion and Wellbeing Advisory Committee • Balranald Beautification Advisory Committee • Ageing Well, Aged Care & Facilities Advisory Committee • Euston Progressive Advisory Committee • Sports and Recreation Advisory Committee • Youth Council, Balranald.

Date	Activity/Method	Summary

February 2022–May 2022	Community values survey	An additional 16 surveys were completed.
		Survey outcomes included:
		• community, and family were highly valued by a majority of respondents
		• employment opportunities were also considered important by many respondents
		• perceptions of clean energy:
		  ○ a significant majority sees clean energy as a positive benefit
		  ○ many appreciate the potential for local investment.
		• main concerns
		  ○ effects on flora and fauna
		  ○ concerns regarding land use
		  ○ visual.
		About half of the respondents had no concerns about the Project.

July 2022	Community meetings • Kyalite Progress and Recreation Reserve Association (KPA) • Kyalite Fishing and Sporting Club	Targeted engagement with committee bearers between September 2021 and December 2022. Feedback was received about how Project development and community funding could be shared with those closest to the Project, including discussion of criteria for allocation of funding across local government boundaries.
September 2022–February 2023	Community Benefits Pilot Program co-design	Targeted in-person engagement was undertaken to co-design criteria and selection process for a Community Benefits Pilot Program. 11 responses were received from groups including Traditional Owners, local committees, and community advisory committees. As a result, Community Benefits Pilot Program criteria, processes, and deadlines were developed and the Program was implemented with community collaboration.
September 2023	Community drop-in Sessions	• Sessions were held at Kyalite (13 September 2023), Tooleybuc (14 September 2023), and Balranald (15 September 2023, two sessions). • Approximately 60 people attended, with a focus on Project value discussions and community feedback on design and operations. • Ten people unable to attend sought information electronically. • Nineteen feedback forms were received, providing insights into community concerns and opportunities.

Date	Activity/Method	Summary
September 2023	Community engagement	• Windlab undertook a community engagement campaign which included visitations/discussions with 23 local businesses (30 people). • Windlab representatives attended a community dinner hosted by a local football/netball club.
30 October 2023	Balranald Shire Council briefing	Points of discussion at the briefing included: • traffic, turbine haulage, construction materials, and staff movements (Windlab advised that the Traffic Impact Assessment (TIA) was underway and road upgrades would be required) • engagement with operators of the workers' camp • potential solutions for water storage; it was clear that further discussions would be needed regarding potable water • collaboration with Balranald Shire Council on the handling of solid and liquid waste • capabilities of Balranald Airport were discussed; it was clear that further exploration of suitable aircraft types would be needed. A proposal for a unified fund across councils without LGA boundary limitations was discussed. Negotiations are ongoing about the number of Balranald Shire Council representatives and terms of collaboration.
2 November 2023	Goodnight BBQ and Recreational Reserve	Committee members provided an update about the Community Benefit Pilot Program, noting that the BBQ upgrade was complete.
2 November 2023	Balranald Multipurpose Health Service	An update about the Community Benefit Pilot Program was provided, including a note that the refurbishment of the aged care residents lounge was complete.
6 November 2023	Murray River Council Briefing	Topics covered at the briefing included: • questions about bridge crossing locations; Robinvale crossing was confirmed • Swan Hill Bridge was discussed, regarding potential upgrades. It was noted that Windlab does not plan to route turbines through Swan Hill/Tooleybuc • a request was made for the Rex J Andrews' Haulage Route Study and the draft Traffic and Transport Impact Assessment report once received • junction design for outbound traffic was considered, pending receipt of the draft Traffic and Transport Assessment. Windlab agreed to explore reducing material imports by assessing site resources, currently planning to source most materials from external quarries south from Mawsons and Coburns.

Date	Activity/Method	Summary
10 November 2023	Kyalite Progress Association	A status report was provided regarding the water project funded by the Community Benefit Pilot Program, including details about the consultant engaged to complete the study. Further details about how licencing works with WaterNSW were discussed.
18 November 2023	St Joseph's School Fete Stall	Windlab conducted engagement at St Joseph's School Fete in Balranald. Approximately 50 interactions were completed, of which 20 included meaningful conversations about potential work, traineeships and the need for families to move to town. Discussion were held with the Growing Business Industry and Tourism Advisory Committee (GBITAC). Areas of interest from the community members attending included: • employment opportunities • potential traineeships available for children of attendees • a desire for families to move into town • potential financial and non-financial community benefits.
23 November 2023	Community Benefit Fund meeting with Balranald Shire Council	Details of this engagement included: • a recap of the Fund was provided, emphasising commitment to benchmarking the Community Benefit Fund costing, aligning with policy and best practice • it was advised that Windlab's proposed Fund amount is based on benchmarking against other projects, and is conditional on Project approval and construction commencement • feedback from Balranald Shire Council and Murray River Councils was received, around working towards a transparent merit selection process for the Fund • DPHI consultation was discussed, around new guidance for wind energy projects.
11 December 2023	Workforce Forum hosted by the Department of Regional NSW addressing the skills shortage in the SW REZ	Delegate priorities included: • understanding the needs of industry growth sectors in the cross border region of southwestern NSW, northwestern Victoria and northeast South Australia • the next key step is for the Department of Regional NSW to populate a Cross-Border Future Workforce road map via a workforce taskforce.
18 December 2023	Briefing to Balranald Shire Council Executive of Chairs	Comments/feedback received on the proposed Community Benefit Fund, discussions included: • alignment with Balranald Shire Councils' priorities • support for communities directly impacted can include assistance with traffic issues • supporting under-represented groups including First Nations, hard-to-reach or vulnerable groups • how the Project involves the local community.

Date	Activity/Method	Summary
22 January 2024	Briefing to Murray River Shire Council Executive Leadership Team	Council priorities included: • concerns about rising expectations due to funding from renewable projects • challenges with asset sales, managing depreciation, and new assets funded by Community Benefit Fund • preference for funding projects not involving Council land to lessen financial burdens • fatigue from repetitive consultations by multiple companies • need for creative benefit solutions that don't increase Council's asset and depreciation burdens.
20 February 2024	Briefing to Murray River Shire Councillors and Executive Leadership Team	Council and elected representatives sought clarification on: • the proposed stages which will determine the proposed community funding, which is dependant on the grid connection and grid capacity. • A merit selection panel would need to include a Council representative committee.
Ongoing	Project website	A dedicated website was created for the Project which provides: • Project overview, including location, timelines and documents (Scoping Report and SEARs) • Project updates and community sessions details • Past news and media releases Phone number and email address for community enquiries.
Ongoing	Dedicated Phone Number and Email	A dedicated phone number and email address were set up in to support the Project. The details are shared on the Project website and publicly available materials such as fact sheets and newsletters.

5.3 Government Agency Consultation Outcomes

A summary of the government agency and authority consultation undertaken to date is included in **Appendix 7**. Consultation with government agencies has been undertaken through various mechanisms throughout the assessment process to keep agencies informed of progress, to confirm assessment requirements and discuss assessment outcomes for the Project.

No significant issues were raised during consultation with any of the agencies or authorities, however, guidance was provided on matters to be assessed in this EIS. Consultation included Project briefings, discussion of the scope of the specialist assessments and SEARs requirements and reporting of specialist assessment results.

Table 5.3 provides a summary of key agency consultation outcomes for the Project.

Windlab has also offered to meet with a number of government agencies that have not indicated a need to meet prior to the submission of the EIS (refer to **Appendix 7**).

Table 5.3 Key Agency Consultation Outcomes

Agency	Key Outcomes	Section Addressed
DPHI	• SEARs and assessment expectations (refer to **Appendix 1** for details).	This EIS
Commonwealth DCCEEW	• Project introduction and site walkover. • Discussion of potential for Controlled Action.	**Section 6.4**
Murray River Council	• Project introduction and subsequent updates. • Discussion of Community Benefit Fund arrangements. • Transportation routes and local road upgrade requirements. • Potential supply of construction water.	**Section 2.5** **Section 3.4.10** **Section 3.7.1**
Balranald Shire Council	• Project introduction and subsequent updates. • Discussion of Community Benefit Fund arrangements. • Transportation routes and local road upgrade requirements. • Potential supply of construction water.	**Section 2.5** **Section 3.4.10** **Section 3.7.1**
Transport for NSW	• Project introduction. • Summary of key transport impacts provided.	**Section 6.7**
Biodiversity, Conservation and Science Directorate	• Determination of Land Category Mapping. • Discussion of survey methodologies. • Discussion of Biodiversity Assessment Results and proposed mitigation and management measures.	**Section 6.4 and Appendix 11**
Crown Lands	• Discussion of Travelling Stock Reserves, Project access upgrades impacting Crown land and landholder consent.	**Section 6.10**
Local Land Services	• Discussion of Project and impact on Travelling Stock Reserves.	**Section 6.10**
Heritage NSW	• Survey methodology and requirement for sub-surface testing program.	**Section 6.5**

Agency	Key Outcomes	Section Addressed
Mining, Exploration and Geoscience	• Sought more information on overlapping exploration licences and contact details of holder.	**Section 2.3.2**
National Parks and Wildlife Service	• Provision of key project details such as Project layout and discussion of visual assessment findings.	**Section 6.2**

5.4 Community Views

During engagement for the Project, Windlab has indicated that the local community has been generally supportive of the Project. This finding has also been reflected during the SIA consultation process. There have been a number of perceived impacts and benefits relating to the Project that have been raised by the community throughout the engagement process. These perceived impacts and benefits have been generally consistent throughout the Scoping and EIS phases of the Project.

Since the conception of the Project, the design has evolved through consideration of technical, environmental, social, and commercial limitations. A 2 km buffer between WTGs and sensitive receivers was used to develop a preliminary layout in advance of detailed investigations and consultation. This design was then discussed with Project stakeholders and subsequently refined to incorporate feedback from stakeholders via the engagement activities conducted. Accordingly, the stakeholder engagement undertaken for the Project, along with the technical studies, have helped to shape the proposed Project layout presented in the EIS.

Based on the stakeholder engagement activities undertaken to-date, there are a number of key issues and/or areas of concern or opportunity identified that have direct relevance to the Project, including:

- community benefits associated with the Project and the general understanding that Windlab will be providing a Community Benefit Fund
- potential noise related impacts associated with construction and operation on nearby stakeholders and livestock
- visual amenity associated with the WTGs and subsequent impact on the character of the landscape
- accommodation and housing availability within the surrounding communities
- impacts to locally important flora and fauna as a result of the Project
- health related impacts during the operations phase of the Project caused by infrasound
- potential to impact on ongoing aerial operations within the region as a result of WTGs (e.g., aerial spraying and implications for the Royal Flying Doctor Service)
- general construction related impacts that may arise during the course of the Project
- ensuring appropriate community engagement is conducted to characterise the community and keep stakeholders informed
- a general perception that the Project will impact upon the value of properties within the vicinity of the Project

- cumulative impacts related to the number of renewable energy projects within the surrounding region
- the use of agricultural land for renewable energy projects and compatibility of uses
- disposal of waste subsequent to the decommissioning of the Project
- tangible and intangible Aboriginal cultural heritage considerations
- employment and training opportunities generated as a consequence of the Project
- transport related issues during the construction phase of the Project, including localised disruptions, haulage route considerations, and the general increase in traffic.

The SIA (refer to **Appendix 6**) expands on the perceived positive and negative impacts raised during consultation and through assessment of the Project, linking them to the categories of stakeholder and community; employment and procurement; local disruptions during construction; accommodation and worker influx; land use and landscape, and cumulative impacts.

The vast majority of community interest in the Project was generated locally and within the surrounding region (within 100 km). Outside of the State and Federal agencies involved, there has been minimal interest beyond the regional scale.

The key perceived impacts and benefits based on the SIA consultation are presented in **Table 5.4**.

Table 5.4 Perceived Community Concerns and Benefits

Category	Concerns	Section Addressed	Benefits	Section Addressed
Strategic context	• Disruption to existing agricultural practices. • Impacts on visual character of the area.	• **Section 6.10** • **Section 6.2**	• Improvements to built features, such as road infrastructure.	• **Section 3.4.1.4**
Justification and evaluation of the Project	• Cumulative impacts of multiple concurrent and nearby major projects.	• **Section 6.15**	• Benefits related to renewable energy.	• **Section 2.0**
Economic, environmental and social impacts of the Project	• Incoming construction workforce placing increased pressure on housing and accommodation availability. • Traffic impacts. • Biodiversity impacts. • Visual amenity impacts. • Noise/vibration amenity impacts. • Health related impacts including infrasound. • Potential decline in property values. • Potential to impact on ongoing aerial operations within the region as a result of WTGs.	• **Section 6.12** • **Section 6.7** • **Section 6.4** • **Section 6.2** • **Section 6.3** • **Section 6.11**	• Benefits to local community through the implementation of a Community Benefit Fund. • Improved employment opportunities generated within the region. • Improved economic and industry diversity. • Improved training opportunities generated within the region.	• **Section 2.5** • **Section 6.12** • **Section 6.13**
Project design	• Increased traffic and road changes impacting the community. • Disposal of waste subsequent to the decommissioning of the Project.	• **Section 6.7** • **Section 6.14**	• Improvements to built features, such as road infrastructure. • Benefits from payments to host landholders and neighbouring landholders (diversifying household income).	• **Section 3.4.1.4** • **Section 6.12** • **Section 6.13**
Issues that are beyond the scope of the Project	• Potential decline in property values.	• **Section 6.12**	• Increased tourism opportunities.	• **Section 6.12**

5.5 Ongoing Engagement

If the Project is approved, Windlab will continue to engage with the community throughout the construction, operation and decommissioning phases of the Project. The approach for ongoing community engagement and public participation will be guided by the following industry and government standards and frameworks:

- The International Association for Public Participation (IAP2)'s Spectrum of Public Participation (2018).
- Clean Energy Council's Enhancing Positive Social Outcomes from Wind Farm Development: Evaluating community engagement and benefit sharing in Australia (2018).
- The Engagement Guidelines.

Windlab will update the existing SEP for the Project prior to construction commencing. The SEP will include requirements to regularly monitor, review and adapt ongoing community engagement strategies over time to ensure it remains effective and encourages community participation.

Ongoing engagement will be undertaken with key stakeholders as outlined in **Table 5.1**.
Ongoing engagement activities will include:

- regular updates to the Project website
- publication and distribution of Project updates, information sheets, fact sheets and/or FAQs to the local community
- phone calls and ongoing face to face meetings with local landowners, including hosts, associated landowners and non-associated landowners
- consultation with First Nations groups, including development and implementation of a First Nations Participation Plan
- community drop-in information sessions
- maintenance of a complaints register
- a Project email address and phone number will remain in place with Windlab representatives addressing feedback and concerns as and when they arise.

Windlab will also ensure that relevant information is publicly available for the life of the Project on its website. This will include, but is not limited to:

- the final layout plans for the Project
- current statutory approvals for the Project
- approved strategies, plans or programs required under conditions of consent
- a comprehensive summary of the monitoring results
- a complaints register
- any independent environmental audits.

6.0 Assessment of Impacts

The identification of key environmental and community issues to be considered in this EIS is based on:

- the environmental and planning context for the locality (refer to **Section 2.0** and **Section 4.0**)
- outcomes of the stakeholder engagement process (refer to **Section 5.0**)
- the SEARs for the Project (refer to **Appendix 1**)
- specialist assessments completed as part of the preparation of this EIS.

Appendix 8 provides a summary of management and mitigation measures proposed for the Project which are included in this section.

6.1 Preliminary Environmental Risk Analysis

A review of relevant environmental and social matters was conducted as part of the Scoping Report prepared for the Project (NGH, 2021), which identified issues to be assessed as part of the EIS and the level of assessment required.

As part of the preliminary environmental and social assessment, potential Project issues were separated into 'key issues' and 'other environmental issues', as presented in the Scoping Report. Key issues are those with potential for high impacts (high constraints) and moderate impacts (moderate constraints) with detailed assessment required to fully understand impacts and identify Project-specific mitigation measures. Other environmental issues are those considered secondary issues for investigation, given the characteristics of the Project and the availability of appropriate mitigation and management measures.

The preliminary environmental and social risk assessment identified a range of issues that required detailed assessment as part of the EIS. Based on preliminary risk assessment, the key issues included:

- **Visual amenity** – specifically the potential for the Project to impact the landscape character of the locality and change the visual amenity to surrounding landholders (refer to **Section 6.2**).
- **Noise amenity** – specifically the noise disturbance to surrounding landholders associated with the operation of the proposed WTGs and ancillary infrastructure, as well as traffic and construction activities (refer to **Section 6.3**).
- **Biodiversity** – the potential to impact native vegetation, threatened and endangered species and result in bird and bat strike (refer to **Section 6.4**).
- **Aboriginal heritage** – the construction and operation of the Project has the potential to impact Aboriginal cultural heritage values (refer to **Section 6.5**).
- **Traffic impacts** – the Project will result in increased traffic associated primarily with the construction phase, including OSOM vehicles (refer to **Section 6.7**).
- **Aviation** – operation of the proposed WTGs and ancillary infrastructure requires assessment of potential hazards to aviation operations (refer to **Section 6.11.1**).

- **Telecommunications** – operation of the proposed WTGs and ancillary infrastructure requires assessment of potential impacts to telecommunications services (refer to **Section 6.11.2**).

- **Social impacts** – the Project has the potential to result in both positive and negative social and economic impacts. Potential positive impacts include local economic stimulus during the construction phase, the implementation of community benefits scheme, employment generation and the diversification of land use during the operations phase. Potential negative impacts include demand on housing and services during construction and changes to visual amenity during operations (refer to **Section 6.12** and **Section 6.13**).

- **Cumulative impacts** – the construction and operation of the Project has the potential to result in cumulative impact within the REZ due to other existing and proposed land uses including other renewable energy related projects (refer to **Section 6.15**).

Other environmental issues not identified as key issues in the preliminary risk assessment but addressed in **Section 6.0** of this EIS in accordance with the SEARs include historic heritage, water and soils, air quality, land, hazards and risks (bushfire, preliminary hazard analysis and blade throw) and waste.

6.2 Landscape and Visual

Moir Landscape Architecture (Moir) has prepared a Landscape and Visual Impact Assessment (LVIA) for all components of the Project utilising a quantitative study methodology in accordance with the guidelines of the *Wind Energy: Visual Assessment Bulletin for State significant wind energy development* (the Bulletin) (DPE, 2016). The LVIA included detailed consideration of potential visual impacts on local residences (including approved developments, lodged development applications and dwelling entitlements), amenity values of Yanga National Park (including Yanga Nature Reserve and Yanga State Conservation Area) and Murray Valley Regional Park, scenic or significant vistas and road corridors in the public domain. The LVIA also considered cumulative impacts of the Project with other existing and proposed developments.

The LVIA is provided in full in **Appendix 9** and a summary of key outcomes of the assessment is provided in the following sections.

6.2.1 Existing Visual Environment

6.2.1.1 Visual Baseline Study

A visual baseline study was undertaken to establish the existing landscape and visual conditions of the locality. In accordance with the Bulletin, the baseline study considered the following inputs in the 'visual catchment' for the Project:

- elements of the landscape important to the community, including public and private viewpoints

- the sensitivity of the viewers who use those viewpoints, and the distances at which they may view the landscape and potential wind turbines and other ancillary infrastructure

- the character of the landscape involved, its key features and the relative scenic quality of the area

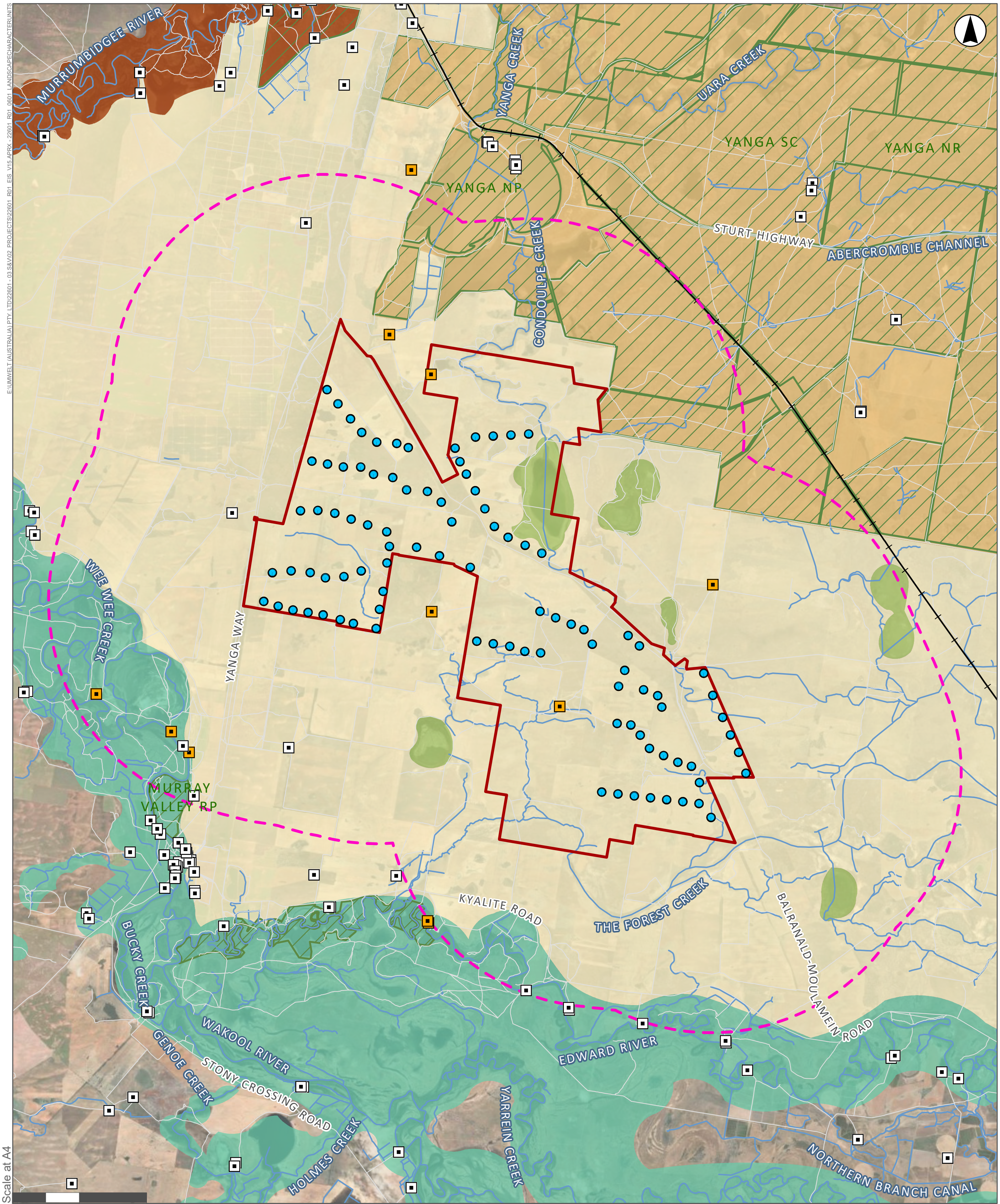
- the location of any existing operational or approved wind and solar energy projects within both a regional and local context.

The LVIA Study Area was categorised into six Landscape Character Units (LCUs). The LCUs are classified by slight variations in geology, topography, land use and vegetation which create distinct character areas. The LCUs were informed by land use patterns, vegetation coverage, topographical maps, site images and site inspection and are described in **Table 6.1** and shown in **Figure 6.1**. The Scenic Quality Ratings of the LCUs range from Moderate/High to Low. The Project Area is entirely within the Agricultural Lands LCU, which has a Scenic Quality Rating of Low.

Table 6.1 Landscape Character Units

Landscape Character Unit	Description	Scenic Quality Rating
LCU01 **Yanga National Park**	This LCU includes largely flat parcels of land with gentle undulations around lakes and rivers and comprises the National Park, Nature Reserve and State Conservation Area that spread over an area of 72,336 hectares. It is characterised by native endemic flora and fauna which are unique to the region. The land is classified as a nature conservation area and has major recreational significance. The Yanga Homestead and historical outbuildings are located with this LCU and are listed under Section 170 of the NSW *Heritage Act 1977*.	Moderate/ High
LCU02 **Murrumbidgee River Plain**	The banks of the Murrumbidgee River are comprised of gentle undulations in an otherwise flat landscape within the region. Land use in the area is mostly grazing and native vegetation areas with pockets of dryland or irrigated cropping, modified pastures and recreational areas in close proximity to the river. A small parcel of the Yanga National Park is located along the River and this includes the Mamanga Campground and Yanga Woolshed sites. Dense vegetation along the river corridor is a unique characteristic of the area.	Moderate
LCU03 **Murray Valley**	Edward River and Wakool River are tributaries of the Murray River. The ecological character of this area is highly significant and is an important wildlife corridor. Some parcels of land are within the Murray Valley National Park, however, the land use is mostly dryland agriculture, irrigated pastures and grazing lands. Vegetation in the area is generally located along rivers and creeklines.	Moderate
LCU04 **Dry Lakes**	Depressions located within or adjacent to the Project Area have created some shallow lakes that remain dry through most of the year. The dry lake beds are comprised of dry, grey cracking clays. Vegetation includes shrubs and low groundcover on the lakes edge. There are no recreational associations with these lakes. The surrounding land is mostly utilised for dryland cropping. Some of the lakes are located within the Yanga State Conservation Area. Lakes include Condoulpe Lake, Dusty Lake, Lintot Lake, Harveys Lake and Lake Talbetts.	Low / Moderate
LCU05 **Agricultural Lands**	This character unit is comprised of the largest number of land parcels and is the predominant character of this region. The land is extensively used for dryland cropping, grazing, irrigated horticulture, pastures and cropping. Vegetation within this LCU has been predominantly cleared, with scattered vegetation located long boundaries and roadsides. The Project Area is located within this LCU.	Low
LCU06 **Town and Settlements**	This character unit is comprised of the towns and settlements that are located within the LVIA Study Area, in particular Balranald and Kyalite. Balranald is a heritage town located on the Murrumbidgee River. Kyalite is a small settlement which consists of rural dwellings and a caravan park.	Low

umwelt



Legend

- Project Area
- Wind Turbine Generator
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Watercourse
- Railway
- Road
- 8000m Turbine Buffer

Landscape Character Units

- LCU01
- LCU02
- LCU03
- LCU04
- LCU05
- LCU06

FIGURE 6.1

Landscape Character Units

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.2.1.2 Preliminary Visual Assessment

To assist in defining the visual catchment for the Project (that is, the area from which the Project is theoretically visible), a Preliminary Assessment was completed as part of the scoping report to provide an early indication of where turbines required careful consideration because of potential visual impacts. This assessment considered both dwellings and key public viewpoints and provided an early indication of where placement of turbines required further assessment and justification, and where consultation with potentially affected landowners needed to be focused. The Preliminary Assessment included analysis of two key visual parameters as per the Bulletin:

- visual magnitude assessment
- multiple wind turbine visibility assessment.

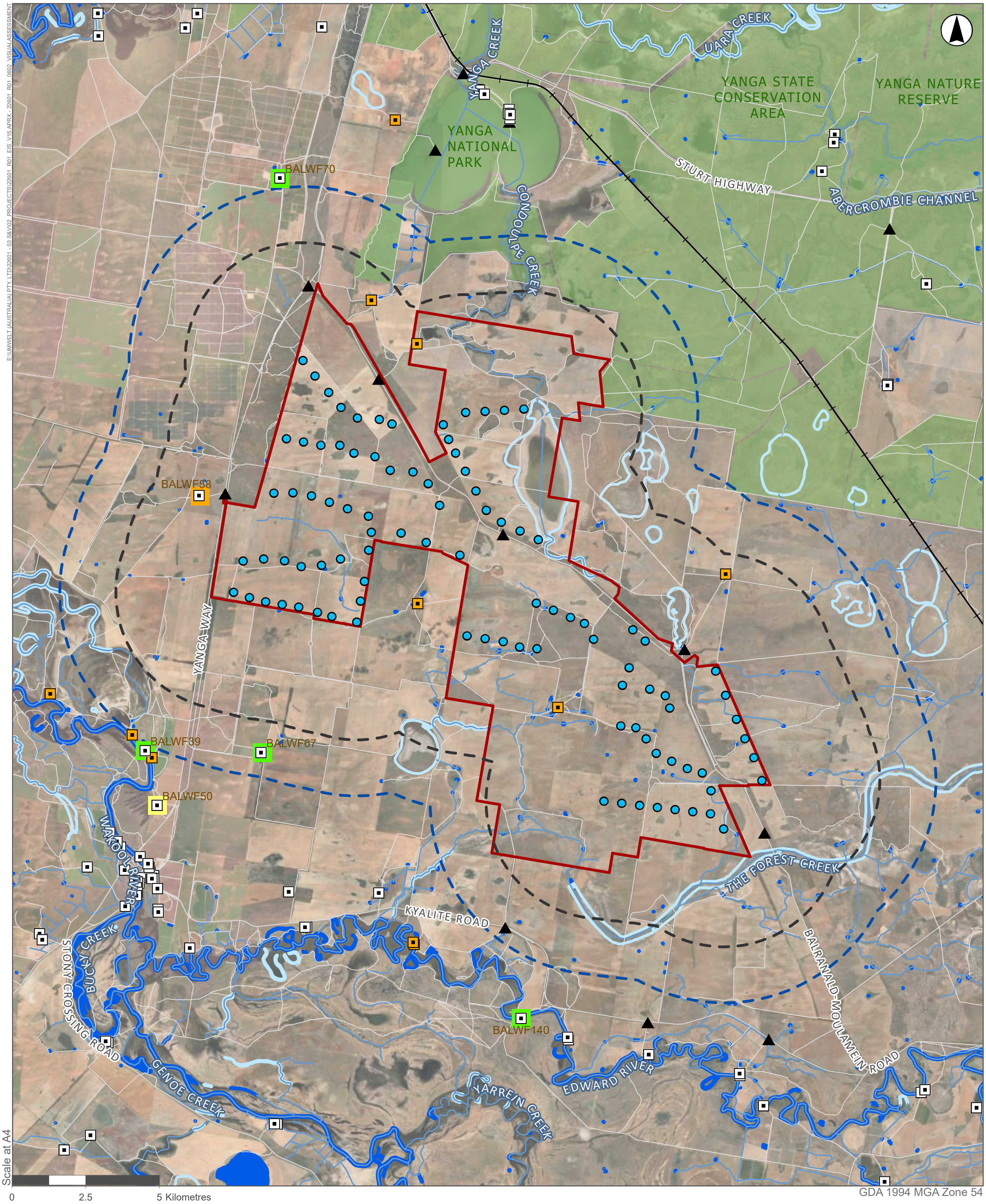
The Visual Bulletin identifies the zones within which proponents should give detailed consideration to the visual impacts on dwellings or key public viewpoints from WTGs based on proposed WTG height (i.e. the taller the WTG the larger the zone of consideration). In accordance with the Visual Bulletin, these zones are determined by a 'black line' (Zone 1 being the zone closest to the WTGs) and a 'blue line' (Zone 2). The proposed WTGs have a maximum tip height of 300 m. As such, buffers of 4,000 m (black line, or Zone 1) and 5,900 m (blue line, or Zone 2) are applicable to the proposed WTGs. Therefore, the Visual Bulletin requires detailed consideration of visual impact on dwellings or key public viewpoints within 5,900 m of each WTG, with particular focus on those within 4,000 m. The mapped black and blue lines determined for the Project in accordance with the Visual Bulletin are shown on **Figure 6.2**.

Within Zone 1 (0–4,000 m) there is one non-associated dwelling (BALWF58), with a moderate visual impact rating. Within Zone 2 (4,000–5,900 m) there is one non-associated dwelling (BALWF67), with a low visual impact rating (refer to **Figure 6.2**). Further detail regarding visual impact ratings is provided in **Section 6.2.2.2**.

The Visual Bulletin also requires a multiple wind turbine visibility assessment to be completed which provides a preliminary indication of potential cumulative impacts arising from the Project by mapping any proposed, existing or approved turbines within 8 km into six sectors of 60°. Where wind turbines were visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the turbines became the focus for assessment in the EIS.

The multiple wind turbine visibility assessment identified one non-associated dwelling with turbines located in up to three 60° sectors (BALWF58) (refer to **Figure 6.2**). In accordance with the Bulletin, this non-associated dwelling was assessed in further detail in the LVIA. There are no other proposed, approved or operational wind farm projects within close proximity to the Project which require consideration when undertaking the multiple wind turbine visibility assessment.

The results of the visual magnitude assessment and multiple wind turbine visibility assessment were used to inform consultation with surrounding landholders, including the establishment of landholder agreements.



Legend

- Project Area
- Wind Turbine Generator
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Railway
- Road
- 4000m Turbine Buffer
- 5900m Turbine Buffer
- Public Viewpoint Locations

Dwellings Visual Assessment

- Moderate VIR
- Low VIR
- Negligible VIR

FIGURE 6.2

Visual Assessment Locations

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.2.1.3 Zone of Visibility

Zone of Visual Influence (ZVI) diagrams were prepared to illustrate the theoretical visibility of the Project to identify areas that required additional analysis. It should be noted that the ZVI diagrams presented a worst case scenario assessment with no vegetation or structures. The ZVI diagrams identified that views to the majority of turbines associated with the Project are likely to be visible from all dwellings within 8 km of the Project. This assessment is based on a consideration of topography alone and does not consider intervening elements such as vegetation and existing structures.

Detailed site investigations (in the form of a viewpoint analysis inventory and dwelling assessments) were undertaken to ground truth the ZVI findings. The LVIA illustrates that existing intervening vegetation which surrounds non-associated dwellings is likely to reduce views of turbines from a number of locations.

6.2.2 Impact Assessment

The Project is to be located within a rural landscape that has not been identified as significant or rare from a technical visual landscape perspective. It is noted, however, that consultation has identified that the existing visual landscape is valued by some members of the local community. The broad landscape character is dominated by established rural land which consists primarily of modified vast plains with little topographical variation. As discussed in **Section 6.2.1.1**, the Scenic Quality Classes of the LCUs within the Study Area have been rated as Moderate/High to Low.

The Project would become a feature of the area due to the addition of vertical turbines in a landscape offering unencumbered views across large expanses. However, the degree to which the existing landscape character and significance is altered as a result of the Project is determined by the dominance of the Project in relation to the existing landscape features.

Areas such as Yanga National Park, Yanga State Conservation Area and Yanga Nature Reserve which are valued for their ecological, recreation and tourism functions will remain intact. Regionally significant landscape features such as Yanga Homestead andYanga Woolshed (part of the Yanga Pastoral Station Complex listed under Section 170 of the NSW Heritage Act 1977), Regatta Beach Picnic Area and The Willows Campground would remain intact as key landscape features of the area and it is unlikely the Project would degrade the scenic value of these landscape features.

An overview of the potential impact of the Project on landscape character is provided in **Table 6.2**.

Table 6.2 Overview of Potential Impacts on Landscape Character Units

Landscape Character Unit	Scenic Quality Rating	Potential Impact on Landscape Character
LCU01 **Yanga National Park**	Moderate/High	This LCU is characterised by expanses of flat terrain with gentle undulations around lakes and rivers and dense woodlands that are unique to this region. Despite the flat topography, dense woodlands will help reduce and mitigate views towards the Project. Views from recreational sites including the Regatta Beach Picnic Area, Yanga Woolshed and the Willows Campground are limited by surrounding vegetation typical of the LCU and distance to the Project. Distant views will be available particularly from Yanga Homestead and the viewing platform where there are gaps in vegetation. Views are likely to be altered in some locations, however due to the distance to the Project, the woodland and water bodies are likely to remain the dominant feature.

Landscape Character Unit	Scenic Quality Rating	Potential Impact on Landscape Character
LCU02 **Murrumbidgee River Plain**	Moderate	This LCU has been defined by the gentle undulations associated with the banks of the Murrumbidgee River. The LCU is located more than 8 km from the Project. Land within the LCU is generally used for grazing and pockets of irrigated or dryland cropping. Views from the public recreation sites including Mamanga Campground and Yanga Woolshed are limited by surrounding vegetation typical of the LCU and distance to the Project. The key features which contribute to the overall landscape character include the Murrumbidgee River and associated dense riparian vegetation, which are likely to remain the key features of views from within the LCU.
LCU03 **Murray Valley**	Moderate	This LCU is defined by the land associated with Edward River and Wakool River to the south and west of the Project. Land within the LCU is mostly used for dryland agriculture, irrigated pastures and grazing. Dense vegetation is located along the rivers and creeklines. Land on the side of the rivers furthest from the Project will have minimal or no views to the Project due to dense vegetation. Views from the land closest to the Project are likely to be partially screened due to patchy vegetation.
LCU04 **Dry Lakes**	Low / Moderate	This LCU is characterised by gentle depressions that form shallow lakes that remain dry through most of the year. The lakes are generally inaccessible to the public as most are located on private properties. Due to the close proximity, views to the Project are likely to be available from most locations.
LCU05 **Agricultural Lands**	Low	This LCU is defined as flat and highly modified land parcels used for dryland and irrigated cropping and grazing. The Project is located within this LCU and will be visible from public roads that are located within the LCU including Yanga Way, Balranald-Moulamein Road and Kyalite Road. Dense roadside vegetation is likely to assist in screening some views from these locations. The LCU has low scenic quality and does not offer any key visual features.
LCU06 **Towns and Settlements**	Low	This LCU is defined as the towns and settlements of Balranald and Kyalite, located within the LVIA Study Area. The typical character of the LCU includes generally flat land with roadside vegetation and vegetation associated with dwellings. Views from the villages are limited by surrounding vegetation typical of the LCU, built form and distance to the Project.

The LVIA found that it is inevitable that the placement of large-scale wind turbines in a rural landscape will alter the existing landscape character of the area to some degree. Although the Project would become a feature of the visual landscape, it is likely the character of areas which are valued for their high landscape quality and utilised for recreation and tourism will remain intact. Regionally, significant landscape features would remain dominant features of the landscape and it is unlikely the Project would degrade the scenic value of these landscape features.

Although the LVIA quantifies the visual impact of the WTGs and ancillary infrastructure, the overall visual impact of the Project will vary greatly depending on the individual viewer's sensitivity to, and acceptance of, change. The sensitivity towards change varies depending on the user's connection with the landscape. For example, visitors to the area may perceive the wind farm as an interesting feature of the landscape. This may contrast with a resident who passes the wind farm daily and who may have a more critical perception of the visual presence of the wind farm.

6.2.2.1 Public Viewpoints

The LVIA assessed 16 public viewpoints at varying distances and locations surrounding the Project (refer to **Figure 6.2**). Each viewpoint was assigned a Visual Influence Zone (VIZ) based on the Viewer Sensitivity Level, Visibility Distance Zone and Scenic Quality Class combinations (refer to the methodology in Section 17.0 of the LVIA in **Appendix 9**). The Bulletin defines Visual Influence Zone 1 (VIZ1) as being associated with those areas with the highest level of visual significance, VIZ2 would have combinations resulting in a moderate VIZ rating while VIZ3 is associated with those landscapes with the lowest level of combined significance.

In accordance with the objectives of the Bulletin, each viewpoint was assessed against the objectives for the VIZ. Of the 16 viewpoint locations assessed, 12 locations were rated as Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply. Four public viewpoints were assessed as Visual Influence Zone 2 (VIZ2) as the Project would be a visible element in the landscape from these locations (VP03, VP04, VP05 and VP09).

For VP09, the Project was assessed as being a visible element in the landscape from this public viewpoint location on Balranald-Moulamein Road. The VIZ2 rating is applicable for this location due to the proximity of the viewing location to the Project.

The remaining viewpoints (VP03, VP04, VP05) are located in Yanga National Park and taken from Yanga Lake Viewing Platform at Yanga Homestead, Yanga Creek Rest Area and Regatta Beach Picnic Area. From these locations, the Project was assessed as being potentially visible but not a dominant feature of the viewpoints due to the large distance to the Project (over 8,000 m) and varying degrees of screening vegetation. The VIZ2 rating is applicable to these locations due to their high sensitivity rating and as a result of Yanga Pastoral Station Complex being listed under NPWS's Section 170 heritage register.

6.2.2.2 Dwellings

The study method used for undertaking the dwelling visual impact assessment is detailed in Section 9.0 of the LVIA in **Appendix 9** and included:

- application of Preliminary Assessment Tools (refer to **Section 6.2.1.2**)
- 3D assessment based on topography alone
- aerial imagery assessment for the identification of intervening elements such as structures, wind break planting or vegetation
- site inspections
- photomontages or wire frame diagrams, for dwellings where potential impacts were identified
- evaluation of VIZ objectives
- visual impact rating
- consideration of mitigation measures.

Although detailed assessment identified a number of dwellings within the visual catchment are likely to have limited or no views of the Project due to topography and/or other screening factors such as vegetation, Windlab offered on-site dwelling assessments to be undertaken for all non-associated dwellings within 5,900 m of the nearest turbine.

A summary of the results of the LVIA dwelling assessments is provided in **Table 6.3**. As part of the Project implementation, additional site assessment and consultation with landowners would be undertaken in all cases to discuss appropriate mitigation measures.

Table 6.3 Dwelling Visual Assessment Results

Zone	Dwelling ID	VIZ	Impact Rating	Assessment Findings/Mitigation Measures
Zone 1 – within the black line (0–4,000 m)	BALWF58	VIZ2	Moderate	Supplementary screen planting implemented to the east of the dwelling would assist in screening views to the visible turbines.
Zone 2 – within the blue line (4,000–5,900 m)	BALWF67	VIZ3	Low	Existing vegetation surrounding the dwelling would fragment views towards the Project. No mitigation required.
Zone 3 – beyond the blue line (5,900–8,000 m)	BALWF39	VIZ2	Low	Existing vegetation and farm buildings are likely to assist in screening views. No mitigation required.
Zone 3 – beyond the blue line (5,900–8,000 m)	BALWF50	VIZ2	Negligible	Existing vegetation will screen views. No mitigation required.
Zone 3 – beyond the blue line (5,900–8,000 m)	BALWF70	VIZ3	Low	Existing vegetation to the south and southeast of the dwelling would assist in fragmenting views towards the project. No mitigation required.
Zone 3 – beyond the blue line (5,900–8,000 m)	BALWF140	VIZ3	Low	Existing vegetation is likely to screen views. No mitigation required.

For the non-associated dwelling BALWF58 rated as having the potential for a moderate visual impact, screen planting is a practical and feasible mitigation measure that would significantly reduce the level of visual impact. Once established, it is anticipated the residual impacts would be acceptable.

6.2.2.3 Dwelling Entitlements

Lots with dwelling entitlements were determined by initially considering all land parcels within 8 km of a WTG. Consideration was then given to land zoning, minimum lot size, and whether the landholder was an associated landowner. Consultation was also undertaken with Murray River and Balranald Shire councils to determine any existing dwelling entitlements or lodged development applications. This process resulted in 30 lots with dwelling entitlements being located within 4,000 metres of the nearest WTG (black line of visual magnitude).

For these 30 lots with dwelling entitlements, an assessment based on topography alone suggests that the majority of the Project's WTGs would be visible from all lots. However, this assessment is based on topography alone and does not account for intervening elements such as vegetation. To determine the lots with dwelling entitlements requiring assessment, consideration was given to the extent of the lot that was in excess of 2,500 m from the nearest WTG. A total of 26 were deemed to have an acceptable portion of the lot outside of the 'setback' and therefore did not require further detailed assessment (Moir 2024).

As a methodology for the assessment of lots with dwelling entitlements is not provided in the Visual Bulletin, the approached to the assessment of the remaining four lots was to undertake a desktop assessment using aerial imagery (Moir 2024). The assessment concluded that there are opportunities to position a dwelling on these lots while ensuring minimal visibility of the Project. It should be noted that the dwelling entitlements identified do not consider any other constraints that may limit the ability to grant consent for a dwelling such as bushfire, flooding or access constraints. As the details of the Project are publicly available, a dwelling can be sited and orientated with well informed consideration of the potential visual impacts resulting from the Project.

6.2.2.4 Ancillary Facilities and Infrastructure

In addition to the proposed wind turbines, the ancillary infrastructure (including access roads, transmission lines and other ancillary structures) is likely to contrast with the existing visual landscape.

Due to the large scale of the proposed wind farm, this infrastructure has the potential to be visible and therefore was considered in the LVIA with the key findings outlined below.

Overhead Transmission Lines

Each of the WTG will be connected to an onsite substation via a network of underground electrical cables with overhead electrical cables connecting the substations to the main substation in the north of the Project Area. The Project will connect to the external transmission network via the substation in the north of the Project Area. As detailed in **Section 3.2**, the Project may be constructed in stages with the first stage connecting into the existing Transgrid 220 kV line. Stage 2 is proposed to connect into Project EnergyConnect 330 kV line.

The Project EnergyConnect transmission line design would be in keeping with the scale and appearance of the existing 220 kV transmission line which traverses the northern part of the Project Area. The high voltage transmission line is an existing element visible in the landscape. As the 330 kV Project EnergyConnect electrical transmission line will be built adjacent to the existing Transgrid 220 kV electrical transmission line, the proposed 330 kV transmission line will visually form part of the overall infrastructure.

Internal Access Roads

Generally, the internal roads have been sited to reduce potential vegetation loss and limit earth work requirements. Due to the existing agricultural land use of the Study Area, farm roads traversing the landscape form a significant part of the existing landscape character. The proposed access roads are likely to be viewed as part of the existing character of the landscape.

Substations/Switching Stations/BESS/STATCOM

As discussed in **Section 3.4**, the Project will include up to four locations for substations/switching Stations/BESS/STATCOM.

There are no non-associated dwellings within 2,000 m of the proposed Substation/Switching Station locations. The electrical infrastructure has been designed to minimise the visual impact of the Project by siting the infrastructure away from residences and surrounding public viewpoints as far as practical whilst maintaining the operational needs of the infrastructure. Following construction, and if warranted, raised earthwork perimeters and/or small areas of native tree planting may be undertaken to screen any parts of the substations that are visible from sensitive receptors.

Permanent Power Performance Masts

As discussed in **Section 3.4**, up to seven Permanent Power Performance Masts are proposed to be located within the Project Area to record wind speed and other meteorological data. The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment. Meteorological masts are generally difficult to discern at a distance and siting of the masts during the detailed design phase will ensure they are set back from nearby residences and public viewing locations to reduce visual impact.

Operations and Maintenance Compounds

As discussed in **Section 3.4**, the Project will include the construction of up to two O&M Compounds with carparks to support the construction and operation of the wind farm. The smaller scale of these ancillary structures, including the proposed construction control room, means they can be screened by topography, existing vegetation or proposed screening vegetation.

Other Temporary Infrastructure

As discussed in **Section 3.4**, the Project will include the following temporary construction elements: site offices and compounds, rock crushing facilities, concrete batching plants, stockpiles, materials storage compounds, field laydown areas, minor 'work front' construction access roads, and calibration meteorological masts.

The visual impacts associated with this infrastructure will be temporary and will occur during the construction phase. No scenic views will be impacted by the construction activity.

6.2.2.5 Photomontages and Wire Frame Diagrams

A photomontage combines a photograph of an existing view with a computer-rendered image of a proposed development to illustrate the likely view as it would be seen in a photograph (not as it would appear to the human eye in the field). Although photomontages are based on a photograph of the existing landscape, it is important to stress that they are not a substitute to visiting a viewpoint in the field. They provide a two-dimensional image that can be compared with an actual view of the landscape to provide information, such as the scale and potential appearance of a proposed development.

Wire frame diagrams are computer generated images based on a digital terrain model that indicate the 3D shape of the landscape in combination with additional elements. They are useful in the wind farm LVIA process as they allow the assessor to compare the position and scale of the turbines to the existing view of a landscape. Wire frame images can be seen as a worst case scenario as they do not take into account factors such as vegetation or building structures. Wire frame diagrams have been utilised in the LVIA to assist in the assessment of the Project from locations that were not able to be accessed.

Where potential impacts were identified, photomontages or wire frame diagrams were prepared from private dwellings and public locations to represent those with potential impacts or to best represent the appearance of the Project from clusters of dwellings.

Fourteen viewpoint locations (nine public viewpoint locations and five private property locations) were selected for the preparation of visual photomontages (refer to **Table 6.4**), based on feedback received from the community and landowners. Exact photomontage locations were selected on-site to represent a worst case scenario for the viewpoint location. Localised screening factors such as vegetation were avoided (where possible) to ensure maximum exposure to the Project. The photomontages are provided in **Photo 6.1** to **Photo 6.15** below.

Table 6.4 Photomontage Locations

Photomontage Type	Photomontage Number	Viewpoint Number	Location
Public Photomontages	Photomontage 01	Viewpoint VP01	Balranald Anzac Park, Balranald
Public Photomontages	Photomontage 02	Viewpoint VP03	Yanga Lake Viewing Platform, Yanga Homestead Access Drive
Public Photomontages	Photomontage 03	Viewpoint VP05	Regatta Beach Picnic Area, Yanga
Public Photomontages	Photomontage 04	Viewpoint VP07	Corner of Balranald-Moulamein Road and Yanga Way, Yanga
Public Photomontages	Photomontage 05 (a and b)	Viewpoint VP09	Balranald-Moulamein Road, Kyalite
Public Photomontages	Photomontage 06	Viewpoint VP011	Balranald-Moulamein Road, Moolpa
Public Photomontages	Photomontage 07	Viewpoint VP013	Kyalite Road, Moolpa
Public Photomontages	Photomontage 08	Viewpoint VP015	Kyalite Boat Ramp Picnic Area, Kyalite
Public Photomontages	Photomontage 09	Viewpoint VP016	Yanga Way, Kyalite
Private Photomontages	Photomontage 10	Dwelling BALWF58 (at Dwelling)	Yanga Way, Kyalite
Private Photomontages	Photomontage 11	Dwelling BALWF67 (at Dwelling)	Yanga Way, Kyalite
Private Photomontages	Photomontage 12	Dwelling BALWF39 (at Driveway)	Jerrong Road, Jerrong
Private Photomontages	Photomontage 13	Dwelling BALWF50 (at Dwelling)	Yanga Way, Kyalite
Private Photomontages	Photomontage 14	Dwelling BALWF70 (at Dwelling)	Yanga Way, Balranald

Photo 6.1 Photomontage 01 Public Viewpoint VP01

Photo 6.2 Photomontage 02 Public Viewpoint VP03

Photo 6.3 Photomontage 03 Public Viewpoint VP05

Photo 6.4 Photomontage 04 Public Viewpoint VP07

Photo 6.5 Photomontage 05a Public Viewpoint VP09

Photo 6.6 Photomontage 05b Public Viewpoint VP09

Photo 6.7 Photomontage 06 Public Viewpoint VP11

Photo 6.8 Photomontage 07 Public Viewpoint VP13

Photo 6.9 Photomontage 08 Public Viewpoint VP15

Photo 6.10 Photomontage 09 Public Viewpoint VP16

Photo 6.11 Photomontage 10 Private Viewpoint BALWF58

Photo 6.12 Photomontage 11 Private Viewpoint BALWF67

Photo 6.13 Photomontage 12 Public Representative Viewpoint BALWF39

Photo 6.14 Photomontage 13 Private Viewpoint BALWF50

Photo 6.15 Photomontage 14 Private Viewpoint BALWF70

6.2.2.6 Shadow Flicker and Blade Glint

Shadow flicker is defined as the visual effect that occurs when rotating turbines cause moving shadows as blades pass in front of the sun. The effect will occur under circumstances where the turbine is located such that at certain times of day the sun's rays pass through the swept area of the rotating blades, potentially affecting the viewpoint. The effect is diminished by the distance of the viewpoint from the turbine. Shadowing is also influenced by increased cloud cover and is dependent on the angle of the sun's rays.

The Visual Bulletin states that 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. As there is no methodology for the assessment of shadow flicker in the Bulletin, the Draft National Wind Farm Development Guidelines (2010) were used to define the parameters for the assessment.

Predictions of theoretical shadow flicker durations at dwellings are based on worst case assumptions and are therefore conservatively high estimates.

Modelling of shadow flicker was conducted using specialist software (Wind Pro), assessing the largest turbine parameters (based on a 300 m maximum tip height) proposed for the Project to represent the worst case impact scenario. The shadow flicker modelling undertaken for the Project is based on topography alone and therefore the extent of impact may be decreased by a number of variables including:

- the aspect of the residence relative to the turbine(s) (window locations, living area locations, etc.)
- the extent of natural or screening vegetation between the turbine(s) and the receptor
- the existence of other screening elements (buildings, structures, etc.) between the turbine(s) and the receptor
- the time of year
- the proportion of daylight hours in which the turbines operate
- the frequency of bright sunshine and cloudless skies (particularly at low elevations above the horizon).

No non-associated dwellings were identified with potential shadow flicker hours.

Blade Glint (also referred to as blade reflectivity) refers to the regular reflection off one or more rotating blades. This can be a temporary effect at any particular location, though the vast bulk of any glint occurs where the viewer is located above the altitude of the turbine hub.

In terms of blade glint, all major wind turbine blade manufacturers currently finish their blades with a low reflectivity treatment which prevents a potentially annoying reflective glint from the surface of the blades and the possibility of a strobing reflection when the turbine blades are spinning. Therefore, the risk of blade glint from a new development is considered to be very low. Windlab has committed to finishing the turbines selected for the Project with a low reflectivity surface treatment in accordance with the requirements of the Bulletin.

6.2.2.7 Night Lighting

Night lighting of turbines and ancillary infrastructure has the potential to extend the visual impact of the Project into the night time. Potential light sources associated with the Project include:

- Aviation Hazard Lighting (AHL) on nacelle of wind turbines (subject to advice from the Civil Aviation Safety Authority (CASA)).
- Night lighting for safety and security on ancillary structures.

Due to the relatively isolated location of the Project Area, very few existing sources of lighting are present in the night time landscape. Some existing lighting associated with homesteads and motor vehicles is dispersed around the locality and isolated receptors experience a dark night sky with minimal light sources.

Dark sky is a valued quality of the rural landscape due to the lack of light pollution. Aviation lighting has the potential to impact on receptors who view the landscape at night, in particular night-sky enthusiasts, photographers, star gazers, campers and some land owners with potential visibility of turbine hubs.

The Aviation Impact Assessment undertaken for the Project (refer to **Section 6.11.1**) included a safety risk assessment and concluded that WTGs and temporary calibration meteorological masts/permanent power performance masts installed in close proximity to a WTG (approximately 900 m) will not require obstacle lighting to maintain an acceptable level of safety to aircraft. Monitoring masts that are installed prior to WTG installation will require obstacle lighting to maintain an acceptable level of safety. This will be confirmed during the detailed design stage and will be installed in accordance with the relevant guidelines.

Night lighting is likely to be required on ancillary infrastructure including O&M compounds, substations/switching stations and facilities buildings. Maintenance lighting will be installed at the substations/switching stations and at the O&M buildings for night work including emergency operations. Continuously operating security lighting would be installed on posts up to 3.5 m high adjacent to the security fencing and O&M buildings. All maintenance lighting will be designed to reduce disturbance to neighbouring properties and will be used only when there are staff onsite or during emergencies. Provided that appropriate design principles are incorporated into the night lighting for ancillary infrastructure (security lighting to be minimised to decrease contrast between wind farm and nigh time landscape, usage of motion detectors, and eliminating light spill onto nearby roads and residences), the LIVA found that it is likely there will be no visual impacts on the existing night time landscape.

6.2.2.8 Cumulative Visual Impacts

The closest proposed or operating wind farm is located more than 8 km away from the Project Area and therefore does not require cumulative visual impact assessment. The LVIA assessed the potential cumulative visual impact of two operating solar farms located on Yanga Way to the west of the Project Area, including Sunraysia Solar Farm and Limondale Solar Farm.

The LVIA provides an assessment of the potential cumulative visibility of the Project in combination with Sunraysia and Limondale solar farms through the use of ZVI diagrams (refer to Figure 30 of the LVIA in **Appendix 9**).

The LVIA found that two non-associated dwellings located within 4 km of the Project and Sunraysia and Limondale solar farms have the potential to view developments simultaneously. The assessment found that one non-associated dwelling (refer to BALWF58 on **Figure 6.2**) will theoretically have views of all three developments and one non-associated dwelling (refer to BALWF70 on **Figure 6.2**) will theoretically have views of the Project and Sunraysia Solar Farm. The assessment is based on topography alone. Due to intervening vegetation, it is likely that there will not be any opportunities to view developments simultaneously and there will be no cumulative impacts for these dwellings.

When travelling between Balranald and Kyalite along Yanga Way, infrastructure associated with Sunraysia and Limondale solar farms is not a noticeable feature of the landscape due to roadside vegetation. Any views towards the solar farms are fleeting and only available for a short period of time. Along the route to the east of the operational solar farms, the Project will be a visible element. The duration of time between motorists experiencing views to each project limits the potential for the sequential views of the Projects to alter the perception of the broader landscape character.

6.2.3 Mitigation Measures

In recognition of impacts related to the Project, and as the key focus for mitigation, Windlab has Project related agreements with landowners for four of the dwellings surrounding the Project (as discussed in **Section 2.5**). These agreements include annual payments to landowners likely to be impacted by the Project, including those affected by visual impacts.

Windlab continues to seek an agreement with the two non-associated landholders within 2.5 km of a Project WTG.

Further mitigation measures incorporated into the design process in conjunction with landscape and visual screening (as discussed in **Section 6.2.2.2**) will have a positive effect on reducing any visual impact of the Project from the non-associated dwellings identified as having a moderate visual impact. Through the implementation of the mitigation methods described below, it will be possible to significantly reduce the visual impact to an acceptable level at all non-associated dwellings:

- turbines will have a matte white, non-reflective finish and consist of three blades with uniformity of colour, design, rotational speed, height and rotor diameter throughout
- unnecessary lighting, signage and logos will be avoided
- appropriate mitigation will be applied to lighting (including sensors, directional lighting and shielding) to reduce any associated impact
- supplementary screen planting implemented to the east of BALWF58, in consultation with the landowner, as outlined in **Table 6.3**.

6.3 Noise and Vibration

An assessment of potential construction and operational noise and vibration impacts associated with the Project has been undertaken by Marshall Day Acoustics Pty Ltd (MDA) in accordance with the SEARs, which specify the following issues to be addressed:

- an assessment of wind turbine noise in accordance with the *NSW Wind Energy: Noise Assessment Bulletin* (DPE, 2016)

- an assessment of noise generated by ancillary infrastructure in accordance with the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017)
- an assessment of construction noise under the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009)
- an assessment of traffic noise under the *NSW Road Noise Policy* (RNP) (DECCW, 2011)
- an assessment of vibration under the *Assessing Vibration: A Technical Guideline* (AVTG) (DECC, 2006)
- an assessment of the cumulative noise impacts (considering other developments in the area).

A copy of the Noise Assessment is provided in **Appendix 10** and key outcomes are summarised below.

6.3.1 Existing Noise Environment

6.3.1.1 Receivers

A total of 14 receivers within 8 km of a Project wind turbine were considered in the noise assessment. This included eight associated receivers i.e., host properties or receivers where an agreement is in place between the landowners and the Proponent. The remaining six receivers, without an agreement with the Proponent, are referred to as non-associated receivers. Receiver locations are shown on **Figure 6.3**.

6.3.1.2 Background Noise Levels

Background noise level information is used to inform the setting of noise limits for the assessment of wind turbine noise under the NSW Noise Assessment Bulletin.

Background noise monitoring was undertaken at four receivers (three associated and one non-associated) in the vicinity of the Project between February and April 2023. Monitoring locations were based on proximity to wind turbines and predicted noise contours from preliminary assessments. The results of the monitoring were then analysed to determine the trend between the background noise levels and the site wind speeds at the proposed hub height of the wind turbines. At the wind speeds when the value of the background noise is above 30 dB L_{A90}, the background noise levels are used to set the noise limits for the Project.

The background noise levels exhibited variations consistent with the rural environment and were characterised by lower background noise levels during the night period. This was particularly evident during periods of lower wind speeds near ground level, resulting in lower background noise levels from wind disturbance of vegetation.

Project noise trigger levels and noise management levels applicable to ancillary infrastructure noise and construction noise assessment also consider background noise levels in line with the NPfI and ICNG. Review of measured background noise levels for the Project shows that L_{A90} noise levels during the day, evening and night periods are typically below 30 dB L_{A90} for extended periods at low wind speeds. The NPfI recognises that very low background noise levels, particularly at night, can present challenges with the derivation of reasonable assessment criteria. In this case the NPfI provides minimum assumed rating background noise levels which are used for derivation of the NPfI project noise trigger levels and ICNG management levels.

6.3.2 Impact Assessment

6.3.2.1 Wind Turbine Noise

Noise Limits

At non-associated receivers, the applicable noise limit in accordance with the NSW Noise Assessment Bulletin is 35 dB L_{A90} or background L_{A90} + 5 dB, whichever is higher. Operational wind turbine noise limits for the day and night time periods are tabulated in Appendix H of the Noise Assessment (refer to **Appendix 10**).

A base reference level of 45 dB L_{Aeq} is applied to all associated receivers. Comparisons to this reference level are provided for information purposes only as noise levels at these locations will ultimately be managed in accordance with the commercial agreements established between the Proponent and the landowners.

Candidate Wind Turbine Model

The model of wind turbine ultimately selected for the Project will be determined based on a range of design requirements. For the proposes of the noise assessment, two candidate wind turbine models (Vestas V162-6.2 and Goldwind GW165-6.0) were considered to assess the viability of achieving compliance with the applicable noise limits, based on noise emission levels that are typical of the size of the wind turbines being considered for the Project. The assessment was based on all wind turbine models using unconstrained generation modes (i.e., no sound optimised operating modes) and with blade serrations, which are now routinely used to reduce wind turbine noise emissions and are the market standard for wind turbines being offered in the Australian market.

Adjustments for tonality were not applied to the predicted noise levels as its occurrence in the noise generated by contemporary wind turbines is unusual, and an analysis of the third octave band data supplied by the manufacturers' specifications did not indicate the presence of tonality at any of the available hub height wind speeds.

Similarly, adjustments for low frequency noise were not applied to the predicted noise levels as calculated low frequency noise levels were below the applicable thresholds for the application of penalties at non-associated receivers.

Predicted Noise Levels

The predicted A-weighted wind turbine noise levels at non-associated receivers are provided in **Table 6.5**. Noise levels presented in **Table 6.5** are for conditions when each wind turbine's noise emissions have reached their highest level. These correspond to hub height wind speeds of 11 m/s and above for both the Vestas and Goldwind turbines, with wind directed from the Project to each receiver.

Table 6.5 Highest predicted wind turbine noise levels at non-associated receivers

Receiver	Predicted noise level (dB L_{Aeq}): Vestas	Predicted noise level (dB L_{Aeq}): Goldwind	Distance to nearest wind turbine (m)	Below 35 dB base criterion?
BALWF39	22.8	28.2	6,163	Yes
BALWF50	21.5	26.9	7,688	Yes
BALWF58	31.1	**36.6**	2,552	**No**
BALWF67	25.8	31.2	5,087	Yes

Receiver	Predicted noise level (dB LAeq): Vestas	Predicted noise level (dB LAeq): Goldwind	Distance to nearest wind turbine (m)	Below 35 dB base criterion?
BALWF70	21.7	27.1	6,248	Yes
BALWF140	20.8	26.2	7,898	Yes

The results in **Table 6.5** show that the predicted wind turbine noise levels are below the NSW Noise Assessment Bulletin minimum criterion of 35 dB LAeq at all non-associated receivers for the Vestas candidate wind turbine (refer **Figure 6.3**) and all but one non-associated receiver (BALWF58) for the Goldwind candidate wind turbine (refer **Figure 6.4**).

Based on this assessment the Vestas candidate wind turbine could be adopted for the Project without a requirement for sound optimised modes or other operational restrictions. For the Goldwind candidate wind turbine, the predicted noise level at BALWF58 is up to 1.6 dB above the base noise limit. Further consideration of the derived noise limits (refer to Appendix H of the NIA in **Appendix 10**) showed that predicted noise levels for this turbine are above the applicable noise limit by up to 1.6 dB for all hub height wind speeds greater than 9 m/s.

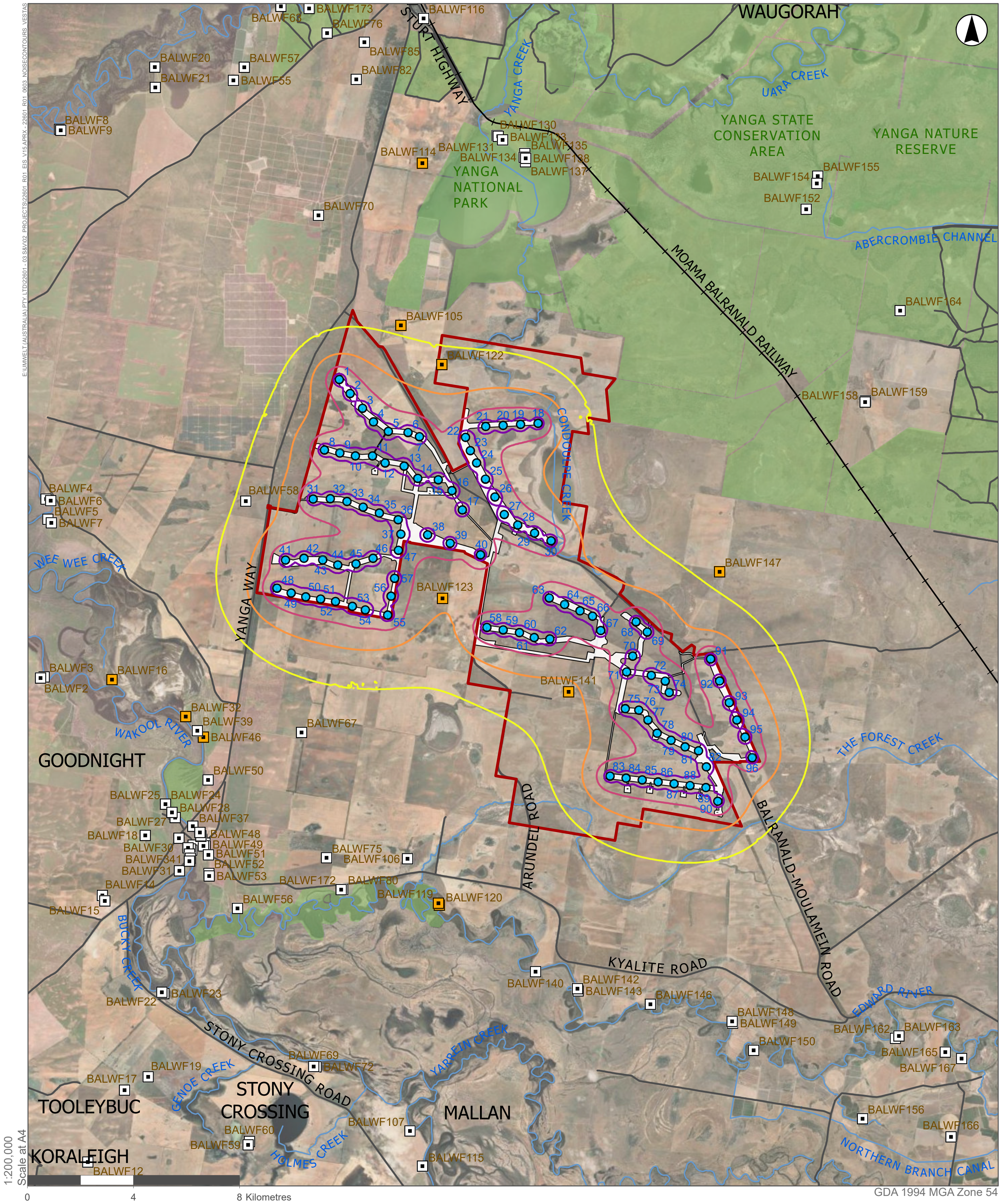
Should the status of BALWF58 change from non-associated to associated, noise from the Project adopting the Goldwind candidate wind turbine could be managed in accordance with the noise provisions of any commercial agreements that are established between the Proponent and the landowners.

Alternatively, additional investigation of sound optimised modes available for the Goldwind candidate wind turbine showed that by employing the mode which offers the most significant noise reduction (identified as SOPM5S), the predicted noise levels would be reduced to below the base noise limit at all receivers.

It is noted that various alternative noise curtailment strategies may be feasible. Detailed consideration of the requirement for curtailment and specific methods will be undertaken during the detailed design stage, once the final wind turbine model is selected.

Predicted wind turbine noise levels for both the Vestas and Goldwind candidate wind turbines at all associated receivers were below the 45 dB LAeq reference level.

These results confirm that the Project can be designed and operated to comply with the operational noise requirements of the NSW Noise Assessment Bulletin, pending specific wind turbine selection.



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Watercourse
- Road
- Railway

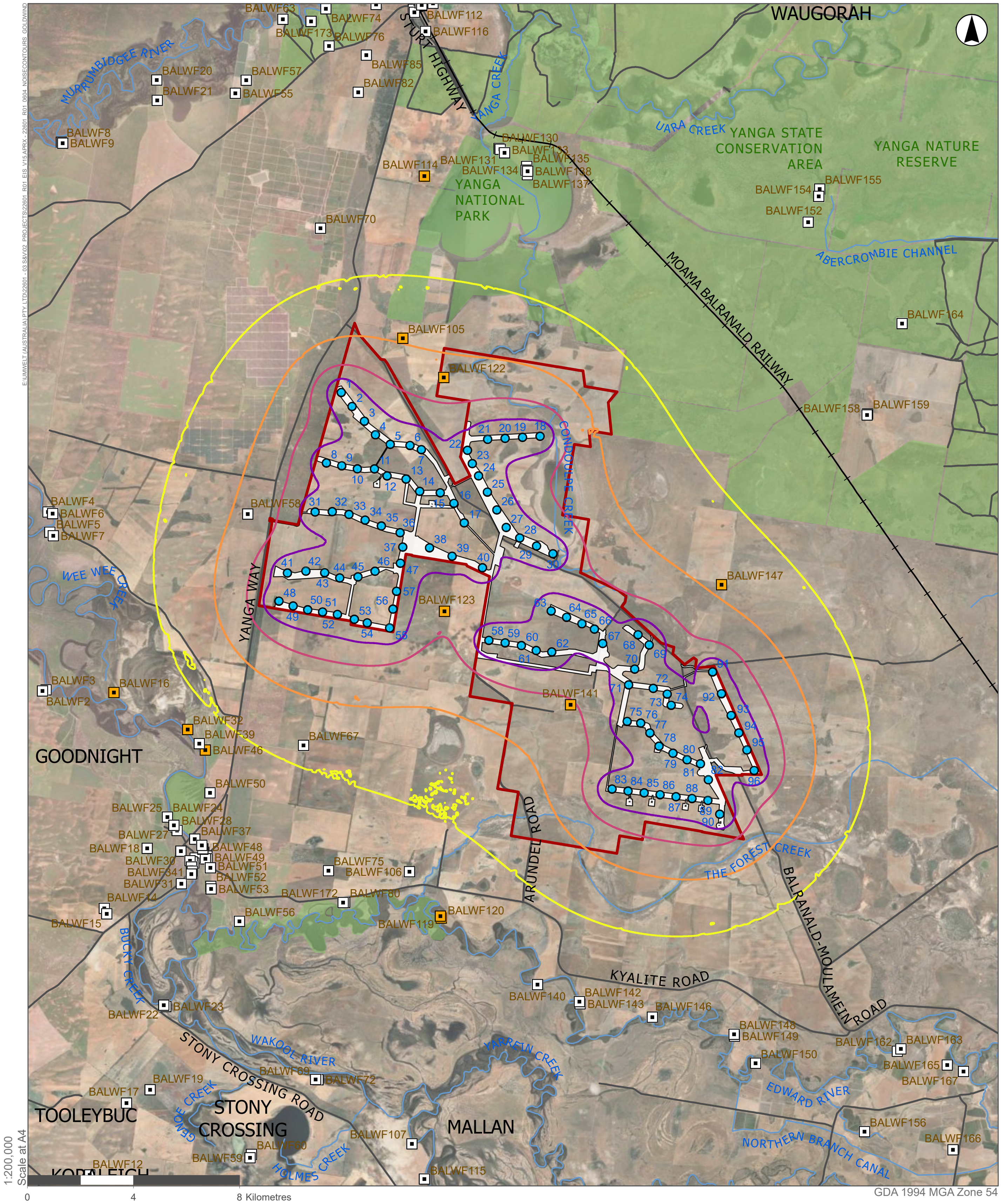
Noise Contours (dBL$_{Aeq}$)

- 30
- 35
- 40
- 45

FIGURE 6.3

Predicted Noise Level Contours for Vestas V162-6.2 Turbine (hub height wind speed of 11 m/s)

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator

Noise Contours (dBL$_{Aeq}$)

- 30
- 35
- 40
- 45
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Watercourse
- Road
- Railway

FIGURE 6.4

Predicted Noise Level Contours for Goldwind GW165-6.0 Turbine (hub height wind speed of 11.5 m/s)

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.3.2.2 BESS/STATCOM and Ancillary Infrastructure Noise

Project Noise Trigger Levels

All receivers were considered to be rural in nature (as defined in the NPfI) and considering the minimum assumed background levels (as discussed in **Section 6.3.1.2** above) the project noise trigger levels that apply to the assessment of ancillary infrastructure are 40 dB $L_{Aeq, 15min}$ in the day time and 35 dB $L_{Aeq, 15min}$ in the evening and night time periods. As the assessed infrastructure will be operated at any time, the most stringent night time noise level of 35 dB $L_{Aeq, 15 min}$ will be the controlling factor for compliance. The assessment of potential sleep disturbance was not considered necessary as the BESS/STATCOM and ancillary infrastructure noise sources typically give rise to steady noise levels and are not typically characterised by brief elevated noise levels which are associated with sleep disturbance.

Modelling Scenarios

BESS/STATCOM and ancillary infrastructure noise sources proposed to be developed as part of the Project are limited to:

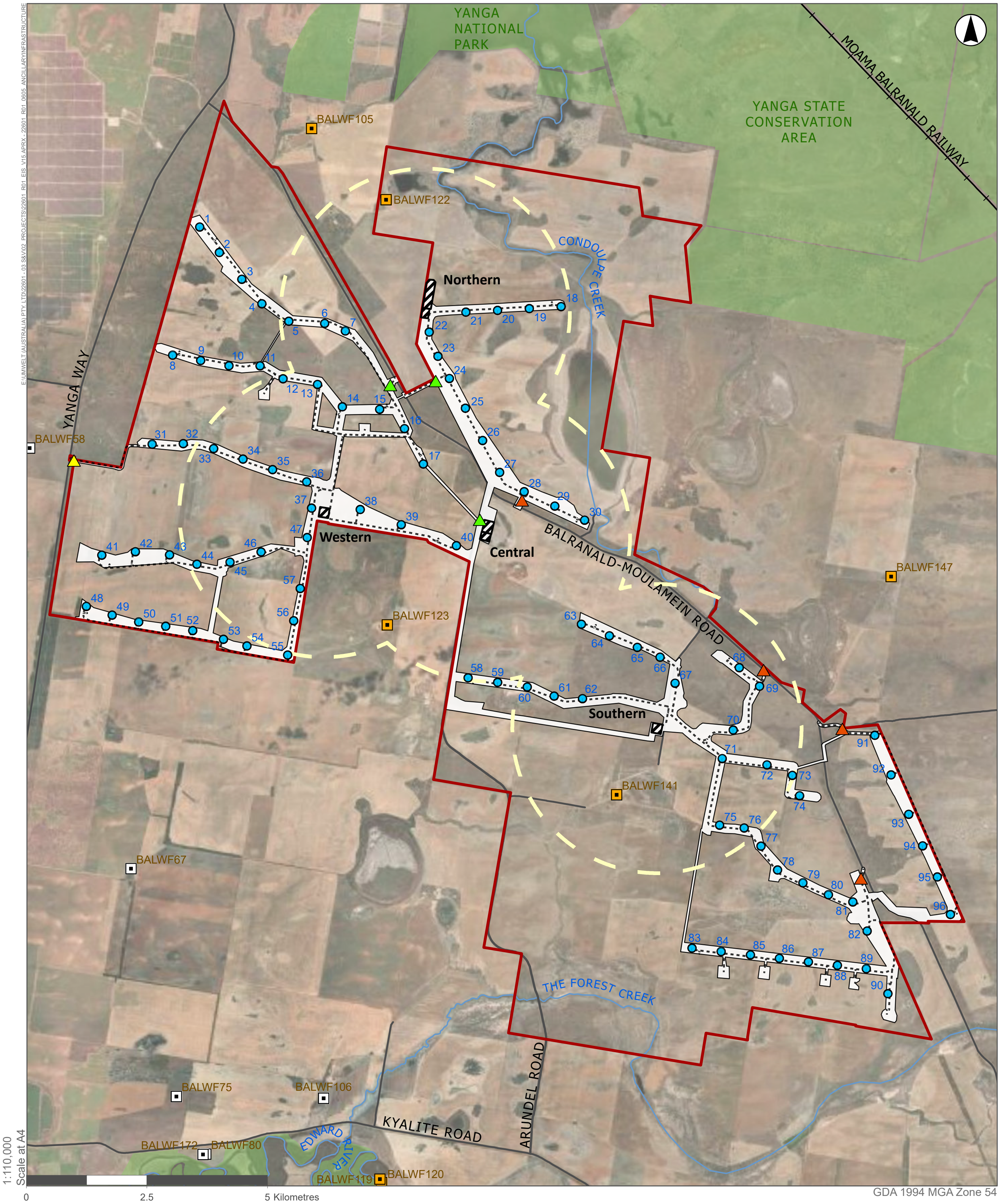
- substations/switching stations and transmission connections to the existing 220 kV TransGrid transmission line and/or the approved 330 kV Project EnergyConnect transmission line, and
- up to four BESS facilities **or** up to four STATCOM facilities.

Through a review of other STATCOM noise assessments MDA confirmed that the noise levels associated with the operation of these devices are typically of a lower level than those associated with the operation of a BESS of the capacity proposed for the Project. For this reason, and to provide a conservative, worst-case assessment, the noise from a BESS of the proposed capacity was assessed. In practical terms, therefore, a STATCOM facility could alternatively be adopted with noise levels at receivers being lower than those predicted by the assessment.

It is noted that in the absence of specific details regarding equipment selection and site layout for ancillary infrastructure, MDA conducted a simplified assessment based on proposed infrastructure locations and configurations for each delivery staging option, resulting in the assessment of three noise scenarios (refer to **Figure 6.5**):

- Scenario 1 – 75 MW BESS in northern location.
- Scenario 2 – 75 MW BESS in northern location and 125 MW BESS in southern location.
- Scenario 3 – 125 MW BESS in central location and 75 MW BESS in southern location.

To provide a conservative assessment in the absence of finalised equipment selections, a modifying factor correction of +5 dB was applied to the predicted noise levels to account for potential tonal characteristics of noise from both the substation transformers and BESS equipment. It should be noted that, in practice, the +5 dB correction is not applicable based on the source noise characteristics but would only be applied if the tonality was measurable at a subject receiver.



GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Scale Line – 3 km
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- BESS/STATcom/Substation/Switching Station
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Watercourse
- Road
- Railway

FIGURE 6.5

Ancillary Infrastructure Layout for Modelling

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

Predicted Noise Levels

Noise levels resulting from the operation of the BESS and ancillary infrastructure have been predicted at all receivers located within 3 km of any proposed ancillary infrastructure location, as per the method described in International Standard *ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613 2:1996). The prediction method is consistent with the guidance provided by the SA Guidelines 2009 (referenced in the NSW Noise Assessment Bulletin) and has been shown to provide a reliable method of predicting the typical upper levels of the noise expected to occur in practice. The results of these predictions are shown in **Table 6.6**.

Table 6.6 Predicted Ancillary Infrastructure Noise Levels – Including +5 dB Tonality Correction

Receiver	Scenario 1 (dB LAeq)	Scenario 2 (dB LAeq)	Scenario 3 (dB LAeq)
BALWF122	21 (26)	21 (26)	< 10
BALWF123	< 10	16 (21)	23 (28)
BALWF141	< 10	33 (38)	31 (36)

The results in **Table 6.6** indicate that the noise level predictions for the BESS and ancillary infrastructure are below the 35 dB LAeq night-time project noise trigger level at all receivers with the exception of BALWF141. For BALWF141 predicted BESS and ancillary infrastructure noise levels are above the night-time project noise trigger level for both Scenario 2 and Scenario 3, by up to 3 dB (when applying the +5 dB tonality correction).

It is noted that all of the receivers identified in **Table 6.6** are associated receivers, however the NPfI does not provide a mechanism for the applicable noise criteria to be adjusted on this basis. Notwithstanding the specifics of any noise agreement that may be established between BALWF141 and the Proponent, additional noise controls and mitigation measures will be investigated during the procurement/tender stage.

A reduction of noise levels in the order of 3 dB or more will be required to establish compliance with the NPfI and this is comfortably in the range of engineering noise controls that may be accommodated into the Project design, which may include the selection of quieter equipment, the provision of physical noise barriers etc. Repeated noise modelling on the basis of more specific locations and equipment specifications is recommended by MDA to eliminate the level of conservatism associated with the simplified modelling approach. Also, tonality at distance of 1.6 km from the nearest ancillary infrastructure location to BALWF141 may be unlikely in practice and the conservative application of a modifying factor correction may not be required.

6.3.2.3 Construction Noise and Vibration

Construction Noise

The ICNG focusses on the implementation of ‘feasible’ and ‘reasonable’ noise reduction measures for the construction phase rather than setting mandatory criteria.

Construction activities associated with the Project will mostly occur at relatively large separating distances from receivers, with most work typically limited to recommended standard hours of work, as defined by the ICNG and reproduced in **Table 6.7** below.

Table 6.7 ICNG Recommended Standard Hours of Work

Work type	Recommended standard hours of work
Normal Construction	Monday to Friday, 7 am to 6 pm Saturday, 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday, 9 am to 5 pm Saturday, 9 am to 1 pm No blasting on Sundays or public holidays

In relation to residential receivers considered in the MDA Noise Assessment, and based on the recommended standard hours, the ICNG provides two primary management levels for consideration in the assessment of noise at residential receivers:

- the noise affected management level ($L_{Aeq\ 15\ min}$) is the NPfI's rating background noise level +10 dB (i.e., 45 dB $L_{Aeq,\ 15\ min}$)
- the highly noise affected management level is prescriptively set at 75 dB $L_{Aeq,\ 15\ min}$.

Where noise from construction works is above the noise affected management level, all feasible and reasonable work practices should be applied. Where the noise from construction works is above the highly noise affected management level, restrictions to the hours of construction may be required.

The noise assessment predicted noise levels associated with each of the main construction tasks at the nearest noise sensitive receivers to provide an indication of the upper range of noise levels. Based on the groupings of major plant items during key construction tasks, the total aggregated noise emissions for the proposed works stages typically range from 115 to 120 dB L_{WA}. These predictions were based on the assumption that each item of plant associated with a task operates simultaneously for the entire duration of an assessment period, thus providing a conservative approach that is unlikely to occur in practice.

The predicted construction noise levels were below both the noise affected and highly noise affected management levels at all associated receivers, and at all but one non-associated receivers during the assessed construction activities.

Noise levels associated with the construction of access roads are predicted to be above the noise affected management level at the nearest non-associated receiver (BALWF58) by a maximum margin of 5 dB. The construction of access roads typically occurs nearest to receiver locations and involves a brief period of elevated noise levels while work is carried out to construct new site access tracks and intersections at site access points. There is one non-associated receiver (BALWF58) located within 1,000 m of the access road construction work. While the duration of construction works for this access road would be limited, the highest predicted noise level at this receiver is expected to be up to 5 dB above the noise affected management level of 45 dB.

It is noted that, depending on environmental factors such as the background noise level and wind direction, construction noise associated with more distant works could also be audible at surrounding receivers. In particular, given the low background noise levels that typically occur in rural environments at low wind speeds, it is possible that construction noise could be higher than the background noise level in some instances.

Therefore, in accordance with the ICNG, the Proponent will apply all feasible and reasonable work practices to meet the noise affected level and inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as relevant contact details.

Construction Vibration

The AVTG provides guidance with respect to the assessment of human comfort due to vibration from construction works. The AVTG indicates that intermittent vibration should be assessed in terms of the Vibration Dose Value (VDV). These values for intermittent construction activities are highly specific to site conditions, equipment selections and operational durations. As such, calculation of VDV levels is not typical or practical at the planning stage but will need to be considered as part of a later detailed vibration assessment.

The AVTG recommends that best management practices in all cases should be implemented to reduce values as far as practicable, and a comprehensive community consultation program should be developed.

Vibration due to some construction operations can be considered continuous depending on the duration and nature of the works. Since the guideline values for continuous vibration are independent of exposure duration, indicative safe working distances can be developed. Section 7.1 of the *Construction Noise & Vibration Guideline* (CNVG) (NSW RMS, 2016) sets out minimum working distances from sensitive receivers for typical items of vibration intensive plant.

No associated or non-associated receivers are located within the indicated minimum working distances therefore no construction vibration impacts are predicted.

Blasting

The accurate estimation of airblast and ground vibration is complex and subject to considerable uncertainty. The blasting process is highly non-linear, and the variability of ground and rock also contributes to the difficulty in obtaining accurate predictions.

As the need for blasting for the Project is yet to be determined, it is not possible provide an estimate of potential airblast and ground vibration levels. However, in the event that blasting is ultimately required, the activities would be addressed in a blasting plan which sets out the management and monitoring measures to be implemented, including identification of the locations where blasting could be conducted, if required. Blast-induced vibration effects are assessed using the Australian and New Zealand Environment Council report, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).

6.3.2.4 Road Traffic Noise

Assessment Criteria

Traffic generation during the operational stage of the Project will be limited and is likely to have negligible noise impacts. Construction traffic volumes vary on the basis of Project staging, therefore the construction stage with the highest traffic volumes (Stage 2) has been selected as the worst-case scenario.

Based on the definitions in the RNP, Yanga Way is considered to be a freeway/arterial/sub-arterial road, and Balranald-Moulamein Road is a local road. The road traffic noise assessment has therefore been based on the relevant RNP criteria for each road category, reproduced in **Table 6.8**.

Table 6.8 Road Traffic Noise Assessment Criteria for Residential Land Uses

Type of Development	Day (7 am to 10 pm)	Night (10 pm to 7 am hrs)
Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	60 dB LAeq, 15 hr (external)	55 dB LAeq, 9 hr (external)
Existing residences affected by additional traffic on existing local roads generated by land use developments	55 dB LAeq, 1 hr (external)	50 dB LAeq, 1 hr (external)

The RNP states that an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person. On this basis, to assess noise impacts from construction traffic, an initial screening test was undertaken by MDA to evaluate whether existing road traffic noise levels would increase beyond this threshold. Where the predicted traffic noise increase is 2 dB or less, no further assessment is conducted, as impacts will be barely perceptible. However, where the road traffic noise levels are predicted to increase by more than 2 dB as a result of additional traffic, consideration is given to the actual noise levels associated with the construction traffic and whether or not these levels comply with the road traffic noise criteria provided in **Table 6.8** above.

Predicted Noise Levels

For both sections of Yanga Way (i.e., north-east of Balranald-Moulamein Road and south-west of Balranald-Moulamein Road), the increase in road traffic is approximately 28-30% when compared to the existing traffic flows. The relative increase in traffic noise levels associated with construction activities is predicted to be below the 2 dB threshold for both sections. Therefore, further detailed noise level predictions and assessments at receivers along Yanga Way were not undertaken.

Balranald-Moulamein Road has very low existing traffic flows and, as such, any increase in flow, for example from two vehicles to four vehicles, may give rise to a large relative increase. The relative traffic noise level increase due to the proposed construction activities is predicted to be above the 2 dB screening threshold. Therefore, further detailed noise level predictions and assessments at receivers along Balranald-Moulamein Road were undertaken.

A summary of the minimum setback distance from Balranald-Moulamein Road, beyond which compliance with the RNP criteria is predicted, is provided in **Table 6.9**.

Table 6.9 Minimum Setback Distances for RNP Compliance

Road	Minimum setback distance for compliance (m)	Identified receivers within minimum setback distance
Balranald-Moulamein Road – day	55	None
Balranald-Moulamein Road – night	100	None

The results in **Table 6.9** above indicate that there are no receivers identified within the minimum setback distance from Balranald-Moulamein Road, within which traffic noise is predicted to exceed the RNP criteria. All the receivers located along Balranald-Moulamein Road are associated landowners. As noted above, while the absolute noise levels are predicted to comply with the RNP criteria at relevant receivers, the increase in traffic levels, from very low existing levels, may result in a noticeable increase in noise during some periods of construction. Therefore, residents on Balranald-Moulamein Road will be included in consultation prior to commencement of construction.

Sleep disturbance impacts from road traffic are not anticipated under the typical working hours during construction. However, for occasions where OSOM deliveries must be carried out during night periods, an external noise level screening threshold of 65 dB LAmax is established to assess the potential for sleep disturbance. A maximum external noise level of 65 dB LAmax or higher is predicted at receivers within 40 m of the OSOM vehicle movements. No receivers were identified within 40 m of Yanga Way or Balranald-Moulamein Road. However, due to the lack of information for site-related traffic volume on roads connecting to Yanga Way or Balranald-Moulamein Road, care needs to be executed where OSOM deliveries are required to pass through other unidentified roads outside typical working hours where receivers may be within 40 m of the roads.

6.3.2.5 Cumulative Noise

Assessment of cumulative wind turbine noise would typically consider noise from wind turbines associated with adjacent or nearby wind farms within 10 km of the Project boundary. Review of information provided by the Proponent indicates that the nearest other known wind farm project is Keri Keri Wind Farm which is located approximately 20 km from the Project area, therefore no cumulative noise impacts are expected. Cumulative ancillary infrastructure noise would be assessed under the NPfI, which uses the project amenity noise levels to protect against cumulative noise impacts. The NPfI states that:

Where the project amenity noise level applies and it can be met, no additional consideration of cumulative industrial noise is required.

On this basis no further consideration is given to noise from the nearby Limondale Solar Farm or Sunraysia Solar Farm, or any other approved or proposed developments, and assessment of cumulative industrial noise under the NPfI is considered satisfied.

6.3.3 Mitigation and Management

6.3.3.1 Operational Noise

In order to ensure that operational noise from the Project is appropriately managed, the following will be implemented:

- The predicted operational wind turbine noise levels will be updated with final layout and sound power levels of the final wind turbine selected for the Project to verify compliance with the criteria in accordance with the NSW Noise Assessment Bulletin.
- The predicted operational ancillary infrastructure noise levels will be updated with the final design and sound power levels of the final equipment selection to verify compliance with the criteria in accordance with the NPfI.
- An Operational Noise Management Plan will be prepared to identify how compliance with the Project's operational noise limits will be demonstrated, including details of testing procedures and reporting time frames following commencement of operations.
- Following construction, compliance monitoring will be conducted to satisfy the NSW Noise Assessment Bulletin including evaluation of special noise characteristics.

While assessments have shown that the Project is expected to satisfy all operational noise limits, consideration will be given to the following contingency strategies if required:

- Procurement contracts – The procurement contract for the supply of wind turbines will typically include specifications for allowable noise emissions, and in the event that these are exceeded the supplier will be required to implement measures to reduce noise levels to the contracted values through the use of appropriate control settings or by rectifying manufacturing defects.
- Noise reduction management strategy – Variable pitch wind turbines (as proposed for this Project) include control functions which enable the noise emissions of the wind turbines to be selectively controlled by adjusting the pitch of the blades. In addition, where required, the wind turbines can be selectively shut down under relevant wind speeds and directions. These types of control measures can be used separately, or in combination, to achieve noise reductions for pre-determined wind speed ranges and directions.

6.3.3.2 Construction Noise

The construction noise and vibration impact assessment conducted by MDA is preliminary only, and once more detailed schedules of plant and equipment, construction methods and work areas are known, a detailed Construction Noise and Vibration Management Plan (CNVMP) will be prepared. The CNVMP will include site and process specific noise management practices to mitigate the impact of construction noise (including traffic and blasting). This will include such measures as:

- universal work practices, including employee training, and site management measures to minimise noise emissions
- community consultation and notification prior to any construction activity outside standard work hours
- plant and equipment selection, maintenance and inspection procedures
- on-site controls (e.g., location of plant, alternatives to reversing alarms)
- work scheduling during recommended standard hours where possible
- transmission path and at-receiver considerations (e.g., acoustic screens or enclosures).

6.4 Biodiversity

A detailed assessment of the biodiversity impacts of the Project has been completed with a Biodiversity Development Assessment Report (BDAR) prepared by Biosis (refer to **Appendix 11**). Potential impacts on biodiversity are identified as a key issue for large scale projects, including wind farms, in regional NSW.

The SEARs require a detailed assessment of biodiversity including:

- An assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (NSW), the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must:

- be prepared using the approved BDAR template
- document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM
- assess impacts associated with transport route road upgrade
- assess impacts on Yanga National Park and any nearby conservation areas and nature reserves.

- An assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994*, and a description of the measures to minimise and rehabilitate impacts, including impacts on Forest Creek, Condoulpe Creek, Lake Condoulpe and Lake Yanga.
- An assessment of the impacts of the development on birds and bats, including blade strike, low air pressure zones at the blade tips (barotrauma), alteration to movement patterns, and cumulative impacts of other wind farms in the vicinity.
- A cumulative impact assessment of biodiversity values in the region from nearby developments.
- If an offset is required, details of the measures proposed to address the offset obligation.

On 14 November 2023, a delegate of the Federal Minister for the Environment and Water, determined that the Project was a controlled action under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) based on likely impacts to listed threatened species and communities (sections 18 and 18A), and listed migratory species (sections 20 and 20A).

The Project will be assessed in accordance with the Bilateral Assessment Agreement between NSW and the Commonwealth Governments and must address the matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations). The Commonwealth has also provided supplementary assessment requirements for the Project (refer to **Appendix 1**) and the BDAR also includes an assessment of the Project's impacts to relevant Matters of National Environmental Significance (MNES).

As discussed in **Section 3.3**, the assessment of the Project has focused on a wider Development Corridor within which flexibility is required for the micro-siting of the Project components which will form the Development Footprint. The Project seeks approval to locate the Development Footprint within the Development Corridor and the BDAR, including all survey effort, has therefore been undertaken accordingly. Any micro-siting would be undertaken in a manner that ensures there is no increase to impacts on biodiversity values, and resultant offsets, as described in the BDAR.

Nature Advisory completed the Project's bird and bat utilisation monitoring and reporting, which was used to inform relevant sections of the BDAR. Windlab also commissioned Nature Advisory to complete targeted surveys and an accompanying risk assessment for the Regent Parrot (*Polytelis anthopeplus*), as well as literature reviews for Australasian Bittern (*Botaurus poiciloptilus*) and regionally relevant waterfowl. These reports are included in **Appendix 11**. The BDAR is included in **Appendix 11** with the key findings summarised in the sections below.

6.4.1 Existing Biodiversity Values

The Project is located within several properties either side of Balranald-Moulamein Road, east of Yanga Way between Balranald and Kyalite. The subject land (i.e., the area to which the BAM has been applied, based on a 500-metre buffer surrounding the Development Corridor) is currently used primarily for dryland cropping with some sheep and cattle grazing. The subject land consists primarily of cultivated agricultural paddocks within the proposed wind farm area, and vegetated/non vegetated public road reserves within the haulage route.

The landscape within this area consists of slightly undulating semi-arid sandplains and peneplains (low relief plains formed by protracted erosion). One ephemeral lake (Condoulpe Lake) is present in the northern extent of the subject land and small agricultural dams are scattered throughout. Vegetation has largely been subject to clearing for cultivation or contains only a grass and shrub layer for grazing. Remnant non-cleared vegetation exists within the subject land as small blocks of woodland or mallee, roadside vegetation corridors, along seasonal watercourses and within depressions subject to periodic inundation. The largest patch of non-cultivated vegetation is a large area of grazed woodland in the centre of the subject land. Seasonal watercourses include Condoulpe Creek (flowing from Condoulpe Lake) and Forest Creek.

Soils vary from aeolian (resulting from the action of the wind) sandy soils on stabilised dunes of slightly higher elevations to clay loam soils on lower elevation areas and depressions subject to inundation. Agricultural infrastructure is present within the subject land and includes sheds, dwellings and water troughs.

The subject land is primarily located in the Murray Darling Depression Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the South Olary Plain IBRA subregion, however there is a minor portion (less than 0.1% of the subject land) which occurs in the Riverina IBRA bioregion.

6.4.1.1 Non-Native Vegetation

The Project has been sited such that the majority of proposed infrastructure is located in dryland cropping paddocks generally lacking native vegetation which have been subject to a long history of agricultural disturbance, with the majority of the subject land located on land mapped as Category 1 – Exempt Land under the NSW *Local Land Services Amendment Act 2016*.

Category 1 – Exempt Land encompasses:

- approximately 79% of the subject land (8,500 hectares of 10,800 hectares total area)
- approximately 86% of the development corridor (1,800 hectares of 2,100 hectares total area)
- approximately 90% of the development footprint (680 hectares of 768 hectares total area).

Areas of non-native vegetation which do not provide habitat for threatened species, were not included for further assessment in the BDAR, in accordance with Section 5.1.1.5 of the BAM (DPIE 2020). Non-native vegetation which does provide habitat for threatened species was assessed as a prescribed impact. Exotic vegetation, including cropped land is known to be utilised by fauna species, such as parrots, raptors and large mammals (e.g., kangaroo) for foraging. Exotic vegetation, although utilised by some fauna species is considered to have a low biodiversity value, therefore impacts to non-native vegetation will not have more than a negligible impact to threatened and non-threatened species.

Similarly, areas of planted native vegetation which exist within the central portion of the subject land and on the Sturt Highway within Balranald (part of the haulage route for the Project) were assessed for habitat values in accordance with Appendix D.2 of the BAM. Habitat features were found to be highly limited due to the location of the trees and the generally high level of disturbance, and no evidence of potential use by threatened species was recorded. Any impacts to threatened species associated with the removal of planted native vegetation were considered negligible.

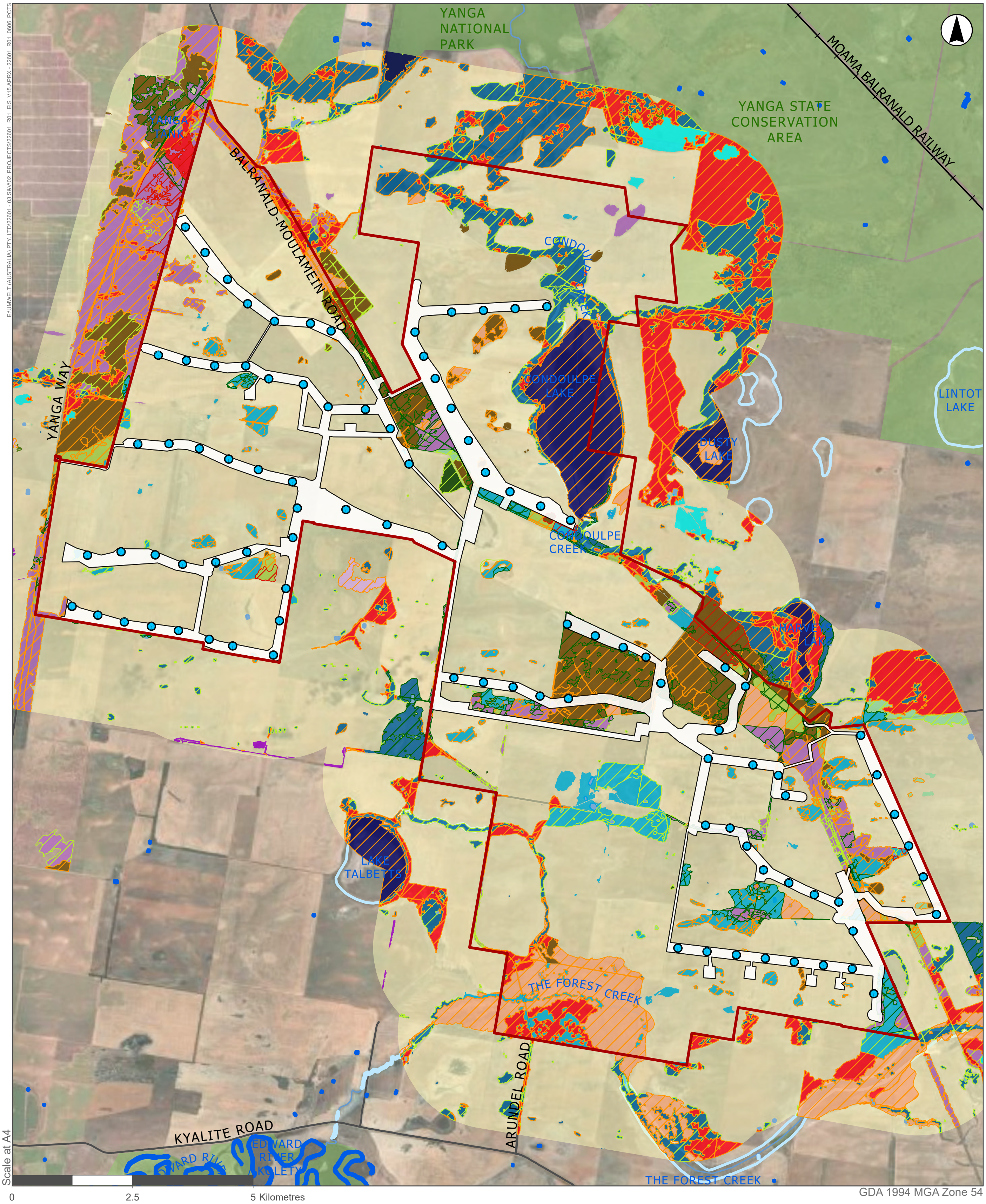
6.4.1.2 Native Vegetation

The extent of native vegetation, threatened ecological communities, and vegetation integrity within the subject land was determined using the results of site investigations by Biosis, previous studies undertaken at the site (NGH 2022) and Section 4 of the BAM (DPIE 2020).

A number of Plant Community Types (PCTs) were identified within the Development Corridor, in various condition types, and these are documented in **Table 6.10** below and shown on **Figure 6.6**. PCTs and associated ecological condition states within the subject land were assigned based on ground-validation (minimum of rapid assessment) and as such there is a high level of confidence in the type of vegetation and habitats present. Detailed descriptions of each PCT are provided in the BDAR (refer to **Appendix 11**).

Table 6.10 Plant Community Types and Vegetation Zones

PCT	Vegetation Zone	Condition	Development Corridor Area (ha)
PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW, Riverina Bioregion and Murray Darling Depression Bioregion	VZ1	Moderate	3.80
PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW, Riverina Bioregion and Murray Darling Depression Bioregion	VZ2	Low	0.36
PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW, Riverina Bioregion and Murray Darling Depression Bioregion	VZ3	Derived Native Grassland (DNG)	2.78
PCT 16 Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW, Riverina Bioregion and Murray Darling Depression Bioregion	VZ4	Paddock Trees	0.21
PCT 21 Slender Cypress Pine - Sugarwood - Western Rosewood open woodland on sandy rises mainly in the Riverina Bioregion and Murray Darling Depression Bioregion	VZ5	Moderate	1.17
PCT 23 Yarran tall open shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones	VZ6	Moderate	2.03
PCT 57 Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion	VZ7	Moderate	0.19
PCT 58 Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	VZ8	High	0.85
PCT 58 Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	VZ9	Moderate	20.91
PCT 58 Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	VZ10	DNG	30.01
PCT 58 Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion	VZ11	Paddock Trees	0.07
PCT 163 Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	VZ12	Moderate	3.58
PCT 170 Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	VZ13	Moderate	4.67
PCT 170 Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	VZ14	Low	0.56
PCT 170 Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	VZ15	DNG	3.50



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve

Plant Community Type

- 13
- 15
- 16
- 17
- 19
- 21
- 23
- 28
- 57
- 58
- 159
- 163
- 164
- 165
- 170
- 173
- 216
- 238
- Planted Vegetation
- Unconfirmed Grassland
- Exotic/ Cropping/ Disturbed

Vegetation Condition

- Low
- Moderate
- High
- Derived Native Grassland
- Paddock Trees
- Planted Natives

FIGURE 6.6

Plant Community Types and Vegetation Zones

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.4.1.3 Threatened Ecological Communities

Two Threatened Ecological Communities (TECs) listed under the BC Act were identified within the subject land and are listed in **Table 6.11** below. No TECs listed under the EPBC Act were determined to occur.

Table 6.11 Threatened Ecological Communities

Name	PCT Association	BC Act status	Area in Development Footprint (ha)
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South-Western Slopes bioregions	PCT 21	Endangered	1.17 ha plus an additional 14 scattered paddock trees
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	PCT 23	Endangered	2.03 ha plus an additional 5 scattered paddock trees

6.4.1.4 Threatened Species

Ecosystem-credit Species

A list of predicted ecosystem-credit species expected to occur within the subject land was generated as per Section 5 of the BAM and is provided in Table 15 of the BDAR (refer to **Appendix 11**). Impacts to these species require assessment, however targeted surveys are not required as these species are assumed to occur, based on the occurrence of the PCTs, habitat constraints, native vegetation cover in the landscape and calculated patch sizes.

Specific biodiversity credits are not generated for impacts on ecosystem-credit species as they are considered under the BAM to be already covered by credits generated for impacts on native vegetation. However, these species were considered when prescribing management and mitigation measures for the Project, and a number have been specifically considered as part of the assessment of prescribed impacts and under the Commonwealth EPBC Act.

Species-credit Species

Species-credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence, or components of their habitat. The BAM calculator used for the BDAR predicts the species-credit species that may occur in the Development Corridor and requires consideration of these species in the assessment. A targeted survey or an expert report is required to confirm the presence of those species within potential habitat present on the subject land, or alternatively the species can be assumed to be present (DPIE 2020).

Targeted threatened species surveys were undertaken by Biosis between September 2022 and March 2023. Further diurnal bird surveys and acoustic microbat surveys were undertaken by Nature Advisory as part of the Bird and Bat Utilisation Surveys (BBUS) completed for the Project, and targeted flora surveys were completed by NHG Consulting in November 2021, during early scoping investigations for the Project.

Table 6.12 provides details of all candidate threatened species considered in the assessment. Further details of targeted surveys, their methods and timing are provided in the BDAR (refer to **Appendix 11**).

Table 6.12 Candidate Threatened Species

Type	Common Name	Species Name
Flora	*Acacia acanthoclada*	Harrow Wattle
Flora	*Austrostipa metatoris*	A spear-grass
Flora	*Brachyscome papillosa*	Mossgiel Daisy
Flora	*Calotis moorei*	A burr-daisy
Flora	*Lasiopetalum behrii*	Pink Velvet Bush
Flora	*Lepidium monoplocoides*	Winged Peppercress
Flora	*Pimelea serpyllifolia subsp. serpyllifolia*	Thyme Rice-Flower
Flora	*Pterostylis cobarensis*	Greenhood Orchid
Flora	*Santalum murrayanum*	Bitter Quandong
Flora	*Solanum karsense*	Menindee Nightshade
Flora	*Swainsona pyrophila*	Yellow Swainson-pea
Flora	*Swainsona sericea*	Silky Swainson-pea
Fauna	*Ardeotis australis*	Australian Bustard
Fauna	*Hamirostra melanosternon* (Breeding)	Black-breasted Buzzard
Fauna	*Burhinus grallarius*	Bush Stone-curlew
Fauna	*Hieraaetus morphnoides* (Breeding)	Little Eagle
Fauna	*Lophochroa leadbeateri* (Breeding)	Major Mitchell's Cockatoo
Fauna	*Lophoictinia isura* (Breeding)	Square-tailed Kite
Fauna	*Haliaeetus leucogaster* (Breeding)	White-bellied Sea-Eagle

6.4.1.5 Aquatic Habitats

Within the subject land, aquatic habitats are limited to farm dams and ephemeral flooded depressions and undefined drainage lines which provide limited habitat opportunities and biodiversity value due to their generally degraded nature as a result of historic agricultural activities.

Assessment of the potential for the subject land to support Groundwater Dependent Ecosystems (GDEs) was undertaken using the Bureau of Meteorology Groundwater Dependent Ecosystems Atlas (http://www.bom.gov.au/water/groundwater/gde/map.shtml). The subject land is not mapped as supporting GDEs associated with an aquifer as outlined in the Risk Assessment Guidelines for Groundwater Dependent Ecosystems (DPI, 2012). Harveys Lake, located 600 m north-east of the subject land is an area of mapped 'Low potential' aquatic GDE, and a mapped wetland. No areas of Groundwater Vulnerability are mapped within the Wakool LEP 2013, however Condoulpe Lake and a watercourse in the south-east of the subject land are identified as areas of Wetland under the Wakool LEP 2013.

6.4.2 Avoidance and Minimisation of Impacts

The Project has implemented design changes prior to and since preliminary biodiversity assessments were completed in spring 2021. The Project layout has been informed through biodiversity field surveys, including targeted flora and fauna surveys and identification of low to high constraint areas.

During initial phases of the Project feasibility planning, other properties and regions within the broader Riverina and South West REZ were considered. Government policy and community pressure has meant future renewable energy development in the South West REZ is now largely focussed on the undeveloped grazing land that supports native vegetation, rather than on the areas of high value agricultural land, therefore making complete avoidance of biodiversity impacts at a landscape and site selection level challenging within the South West REZ. Despite this, a key focus at the site selection stage of the Project was the avoidance and minimisation of impacts to native vegetation. This aim has been considerably well realised with the location of the Project and the relatively low impacts to native vegetation.

The Project has been sited such that the majority of wind turbines are located in dry land cropping paddocks generally lacking native vegetation, with approximately 90% of the Development Footprint (680 ha of 768 ha total area) located on Category 1 – Exempt Land. Further to this, of the approximately 90 ha of the Development Footprint located outside Category 1 – Exempt Land, further avoidance has been realised such that impacts will only occur to 75.68 ha of native vegetation.

Avoidance efforts to date have included:

Project design

- Project design workshops to work through opportunities and constraints relating to avoidance of biodiversity impacts. Priorities for consideration included:
  - avoidance of threatened species populations/habitat and TECs
  - avoidance of hollow bearing trees and stick nests
  - preferential location of infrastructure on Category 1 – Exempt Land and areas of existing disturbance
  - maximising separation between WTGs and Rotor Swept Areas (RSAs)
  - minimising required disturbance through further layout changes and minimising the widths required for access tracks and other linear infrastructure components
  - maximising setbacks from habitat features such as waterbodies and vegetated corridors.
- Reduction in the number of wind turbines from 107 down to 96, with a commensurate reduction in impacts to biodiversity, including a reduction in direct, indirect and prescribed impacts.
- Redesign and reduction of the formerly proposed network connection to the Balranald substation to avoid impacts to:
  - 10 Mile Travelling Stock Reserve (TSR) (noted as a High conservation value TSR by the Local Land Services (LLS))
  - a population of *Austrostipa metatoris* (listed as Vulnerable under both the BC Act and the EPBC Act)
  - known Regent Parrot movement corridor and foraging habitat
  - approximately 12.5 ha of native vegetation comprising PCT 58 and PCT 170 in various condition states.

- Redesign of the Development Footprint to avoid an identified population of Bitter Quandong (*Santalum murrayanum*) by over 45 m from the closest individual which has resulted in:
  - avoidance of impacts to a population of the BC Act Endangered Bitter Quandong supporting 21 individuals
  - avoidance of approximately 4.5 ha of PCT 58 in various condition states
  - in avoiding impacts to both *Austrostipa metatoris* and Bitter Quandong the Project has avoided impacts to all known populations of threatened flora species.
- Redesign of the electrical reticulation/access track east of WTG 62 to avoid two patches (approximately 0.4 ha) of BC Act listed Yarran Shrubland TEC.
- Redesign of proposed network connection and access tracks along the western boundary to avoid impacts to an approximately 2.5 ha patch of Yarran Shrubland TEC.
- Redesign of Balranald-Moulamein Road access to avoid impact to patches of Yarran Shrubland TEC wherever possible.
- Design of Development Footprint between WTG 85 and WTG 86, and WTG 73 to avoid/minimise impacts to patches of Sandhill Pine Woodland TEC.
- Redesign of development corridor and development footprint between WTG 78 and WTG 85 (also relocating WTG 78 north approximately 180 m) to avoid impacts to PCT 16 and PCT 170.
- Redesign of project footprint between WTG 44 and WTG 47 to move infrastructure out of Category 2 – Regulated Land and into Category 1 – Exempt Land, avoiding impacts to approximately 1,100 m lineal metres of native vegetation, including a TEC.
- Redesign of WTG locations to increase the number of WTGs located on Category 1 – Exempt Land from 82 in previous design iterations to 88 in the final design.
- Avoidance of hollow-bearing trees and scattered paddock trees:
  - of the 252 hollow-bearing trees mapped during Major Mitchell's Cockatoo habitat assessment, only 14 occur within the Development Footprint
  - of the 269 scattered paddock trees mapped within the Development Corridor, 165 have been avoided and approximately 30 impacted trees were found not to conform to the definition of scattered trees and became part of 'paddock tree' vegetation zones
  - of the 36 hollow-bearing trees mapped by NGH Consulting only three occur within the Development Footprint
  - the avoidance of paddock trees also directly avoided potential breeding habitat for Major Mitchell's Cockatoo such that no additional habitat was added to the species' habitat polygon on the basis of hollow-bearing trees.
- Redesign of access across Balranald-Moulamein Road near WTG 16 and WTG 25 via the Myall Yards TSR:

- initial design investigated a 200 m wide corridor (approximately 20 ha in total area) through PCT 58, PCT 163 and PCT 170 in various condition states
- final design includes a 30 to 60 m wide area of impact resulting in reduced impacts to moderate condition PCT 58 with the remaining impacts on DNG condition PCT 58 only
- minimisation of impacts to Lillas Dam and Myall Yards TSR, noted as a High conservation value TSR by the LLS.

- Redesign of access from Arundel Road to proposed Collector Substation #2 to utilise Category 1 – Exempt Land, removing approximately 27.5 ha of PCT 16, PCT 170 and Yarran Shrubland TEC from the Development Corridor.
- Relocation of WTGs to avoid known Regent Parrot habitat along the 10 Mile TSR and within patches of mallee woodland along the western boundary to ensure a 100 m blade-free buffer from areas of known habitat (as recommended by Nature Advisory). There was also a commensurate reduction in impact associated with electrical reticulation and access tracks within the southern-most patch of mallee woodland (known Regent Parrot habitat).
- Separation between WTG RSA and habitat features has been maximised such that the potential for bird and bat collision with operational turbines has been reduced to the fullest extent possible.
- Preferential use of existing tracks, roads and fencelines for the location of linear infrastructure.
- Consideration of WTG layout to maximise gaps between RSAs to reduce potential barrier effect and minimise collision risk:
  - the average gap between RSAs along strings of turbines throughout the Project is approximately 450 m while there are numerous gaps of over 1 km allowing movement along habitat corridors and through the wind farm
  - to the south on Condoulpe Lake a large turbine-free buffer zone of over 15 km^2 has been designed to allow movement through the operational wind farm – no gaps are less than 2 km between RSAs with the average gaps in this location being approximately 2.8 km.

Operational impact minimisation strategies

- Seasonal (event-based) turbine curtailments as per the key finding of the Nature Advisory analysis of potential waterbird collision years, to include a 400-metre buffer of non-operational turbines from flooded lake/wetland habitat during flood times to minimise the potential for waterbird collisions at times when these birds are abundant in the landscape.
- Bird and Bat Adaptive Management Plan (BBAMP) and ongoing monitoring.
- Investigations of technology based impact minimisation strategies outlined in the BBAMP including SMART (Song Meter with Analysis and Remote Transfer) system, consideration of radar/optical/camera avian detection technologies.
- Preparation of construction and operational phase management plans including a Biodiversity Management Plan (BMP).

6.4.3 Impact Assessment

As detailed in **Section 6.4.2** above, Windlab has undertaken significant efforts to avoid and minimise impacts to all biodiversity values present within the subject land, and any residual impacts described below will continue to be minimised, mitigated and offset through the duration of the Project.

6.4.3.1 Direct Impacts

Direct impacts arising from the Project include:

- removal of 75.69 ha of native vegetation and flora and fauna habitats in seven native PCTs mapped as 15 separate vegetation zones
- removal of 2.03 ha of *Acacia melvillei* Shrubland TEC and 1.17 ha of Sandhill Pine Woodland TEC.
- removal of 37.40 ha of known forage habitat and assumed breeding habitat for one threatened fauna species, Major Mitchell's Cockatoo
- removal of assumed habitat for three threatened flora species, Menindee Nightshade (2.34 ha), Mossgiel Daisy (3.91 ha) and Winged Peppercress (3.66 ha)
- removal of 17 mapped hollow-bearing trees and 77 scattered paddock trees
- removal of 0.57 ha of planted native vegetation.

A summary of impacts is provided in **Table 6.13**, **Table 6.14** and **Table 6.15** below. These impacts are permanent and will occur over the course of the construction period.

Table 6.13 Summary of Direct Impacts to Vegetation

Zone	PCT	TEC	Area Impacted (ha)
VZ1	PCT 16 Moderate	N/A	3.80
VZ2	PCT 16 Low	N/A	0.36
VZ3	PCT 16 DNG	N/A	2.78
VZ4	PCT 16 Paddock Trees	N/A	0.21
VZ5	PCT 21 Moderate	Sandhill Pine Woodland	1.17
VZ6	PCT 23 Moderate	*Acacia melvillei* Shrubland	2.03
VZ7	PCT 57 Moderate	N/A	0.19
VZ8	PCT 58 High	N/A	0.85
VZ9	PCT 58 Moderate	N/A	20.91
VZ10	PCT 58 DNG	N/A	31.01
VZ11	PCT 58 Paddock Trees	N/A	0.07
VZ12	PCT 163 Moderate	N/A	3.58
VZ13	PCT 170 Moderate	N/A	4.67
VZ14	PCT 170 Low	N/A	0.56
VZ15	PCT 170 DNG	N/A	3.5
N/A	**N/A**	**Total**	**75.69**

The removal of 75.68 ha of native vegetation and habitats is considered a relatively low level of impacts for a project of this scale with a 768 ha (approximate) Development Footprint and equates to less than 10% of the total impact footprint. Impacts will primarily occur to native vegetation in a moderate or lower condition state for over 99% of the impacted native vegetation.

The vegetation to be removed supports habitat for a range of flora and fauna species, including threatened species known and predicted to occur within the subject land (refer to **Table 6.14** below).

Table 6.14 Summary of Direct Impacts to Species-credit Species

Common Name	Scientific Name	Area Impacted (ha)
Menindee nightshade	*Solanum karsense*	2.34 (assumed)
Mossgiel daisy	*Brachyscome papillosa*	3.91 (assumed)
Winged peppercress	*Lepidium monoplocoides*	3.66 (assumed)
Major Mitchell's cockatoo	*Lophochroa leadbeateri*	37.40

An assessment in accordance with the BAM Streamline assessment module – Scattered tree assessment is included within Appendix 7 of the BDAR (refer to **Appendix 11**). The Project will impact upon a total of 77 scattered paddock trees, 53 of which were found to be hollow-bearing trees.

Hollow-bearing trees and scattered paddock trees provide important habitat for more mobile species in fragmented landscapes. The Project has made substantial efforts to avoid scattered paddock trees, with impacts expected to 77 out of the 269 total paddock trees mapped as part of the BDAR assessment.

Table 6.15 Summary of Direct Impacts to Scattered Trees

Class	Associated TEC Impacts	Number of trees impacted
1	N/A	7
2	N/A	11
3	N/A	59
N/A	Trees conforming to Sandhill Pine Woodland	5
N/A	Trees conforming to *Acacia melvillei* Shrubland	14

6.4.3.2 Indirect Impacts

In addition to the direct impacts discussed above, there is the potential for indirect impacts to biodiversity associated with changes to noise, dust, water quality, weeds and pests which may occur during construction and operation. The BDAR assessed all potential indirect impacts and found the likelihood and consequences to be negligible or low, with the exception of two possible impacts which were found to have a low/moderate likelihood and/or consequence:

- loss of specialist breeding habitat supported by hollow-bearing trees and nest trees adjacent to the construction and operational footprint of the Project
- exacerbation of the movement of feral species through the subject land due to improved access.

Impacts will be managed and mitigated through monitoring and adaptive management via the BBAMP and BMP detailing best practice biodiversity management regimes.

6.4.3.3 Prescribed Impacts

The BDAR includes an assessment of all prescribed impacts in accordance with the BAM and the Biodiversity Conservation Regulation 2017. The potential prescribed impacts associated with the Project include impacts to habitat connectivity, wind turbine strikes, and vehicle strikes as described in further detail below.

Habitat Connectivity

Within the subject land, two key features form habitat connectivity, these are riparian areas and native vegetation. The key connectivity features relevant to the subject land are:

- the uncleared riparian corridor following Condoulpe Creek into the Yanga National Park, Yanga Nature Reserve and Yanga State Conservation Area, Yanga Lake and Murrumbidgee River to the north of the Project
- the vegetated road reserves of Balranald-Moulamein Road and Yanga Way leading north through a series of TSRs to the Yanga National Park, Yanga Nature Reserve, Yanga State Conservation Area and Murrumbidgee River and south to the Murray Valley Regional Park, Edwards River and Wakool River.

The Project is expected to reduce the width of habitat connectivity areas, but will not remove any key areas of connectivity. No direct or indirect impacts are expected to occur as a result of the proposed wind farm to the Yanga National Park, Yanga Nature Reserve or the Yanga State Conservation Area. Key connectivity through the subject land to important wildlife corridors will be maintained. The Project will not result in the loss of, or substantial impacts to, key functional corridors within the landscape. It is expected that fauna species will continue to utilise the existing corridors within the subject land and broader landscape, with minor or negligible impact to movement patterns and/or population viability.

Wind Farm Developments

The BDAR includes a detailed assessment to consider the potential impacts from turbine strikes on significant bird and bat species, based on the conclusions of the collision risk assessments undertaken by Nature Advisory and outlined in Section 6 of the BDAR (refer to **Appendix 11**).

In addition to the threat of direct loss of habitat from wind farm construction, wind farm impacts on birds and bats can arise from three potential pathways listed below:

- direct collision of birds and bats with towers and/or operating wind turbine blades at RSA heights
- disturbance effects that exclude birds and bats from habitat within the wind farm
- barrier effects that limit bird and bat movements between essential resources, such as foraging and roosting areas (Nature Advisory 2023).

Based on detailed assessments 37 bird and bat species were considered at risk of operational impact, mainly associated with turbine strike:

- For 11 at risk bird and bat species it is considered more probable than not that a strike event could occur in any year (>50%).
- For one at risk bird species it is considered equally probable that a strike event could or could not occur in any year (50%).
- For 6 at risk bird species it is considered less probable than not that a strike event could occur in any year (<50%).
- For 19 at risk bird species it is considered that an event may occur only in unusual circumstances (less than 5%).

The level at which turbine strike is likely to occur is difficult to predict prior to commissioning of turbines, and as such impacts are considered uncertain. A monitoring and adaptive management approach has been developed to ensure any impacts that may occur are realised as early as possible, mitigation is implemented (where possible) to minimise the potential for the impact to reoccur, and where relevant offset requirements will be calculated for the impacted entities.

Vehicle Strikes

The Project has the potential to result in increased vehicle strikes during the construction and operational phases as a result of increased vehicle moments, and in particular heavy vehicles during construction. Key areas where this is expected to occur are Yanga Way, Balranald-Moulamein Road, Arundel Road and Big Sandhill Road.

The Project is not expected to result in any substantial or significant impacts associated with vehicle strikes and risks can be effectively managed through:

- reduced speed limits during the construction phase on key roads
- minimising the amount of driving undertaken by construction or operational related vehicles between dusk and dawn
- driver awareness training
- on-site measures including reduced speed limits and signage
- vehicle strike protocols outlining steps to be undertaken in the event of a vehicle strike with an animal, including contact phone numbers e.g., WIRES.

6.4.3.4 Aquatic Impacts

The Project does not include works within key areas of aquatic habitat. No works are proposed within at least 600 m of Condoulpe Lake, The Forest Creek (and associated tributaries within the subject land) and the associated areas of Key Fish Habitat.

The Project is not considered an action that would alter the surface drainage, natural drainage systems or flow of watercourses within or adjacent to the subject land.

6.4.3.5 Serious and Irreversible Impacts

In accordance with Clause 6.7 of the BC Regulation an impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

- Principle 1: It will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- Principle 2: It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
- Principle 3: It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

The BDAR concluded that no species recorded or assumed present within the subject land was considered to meet the above principles, and as such no serious and irreversible impacts are expected to occur as a result of the Project.

6.4.4 Biodiversity Credit Impact Summary

Following the application of appropriate avoidance and mitigation measures, the BAM assessment identified that the biodiversity credits listed in **Table 6.16**, **Table 6.17** and **Table 6.18** are required to offset the residual biodiversity impacts of the Project.

In summary, the biodiversity offset credit requirements include:

- 1,351 ecosystem credits
- 1,099 species credits
- 66 scattered tree credits.

Table 6.16 Biodiversity Offset Credit Requirements – Ecosystem Credits

Vegetation Zone	Impact Area (ha)	Credit Requirement
PCT 16_Moderate	3.8	89
PCT 16_Low	0.36	5
PCT 21_Moderate	1.17	38
PCT 23_Moderate	2.03	64
PCT 57_Moderate	0.19	4
PCT 58_High	0.85	34
PCT 58_Moderate	20.91	685
PCT 58_DNG	31.01	241
PCT 58_Paddock_trees	0.07	1
PCT 163_Moderate	3.58	80

Vegetation Zone	Impact Area (ha)	Credit Requirement
PCT 170_Moderate	4.67	104
PCT 170_Low	0.56	6
N/A	**Total**	**1,351**

Table 6.17 Biodiversity Offset Credit Requirements – Species Credits

Species	Vegetation Zone	Impact Area (ha)	Credit Requirement
Mossgiel Daisy *Brachyscome papillosa*	PCT 16_Moderate	2.3	62
Mossgiel Daisy *Brachyscome papillosa*	PCT163_Moderate	1.6	47
Mossgiel Daisy *Brachyscome papillosa*	**N/A**	**Impact Area Subtotal**	**109**
Winged Peppercress *Lepidium monoplocoides*	PCT 16_Moderate	2.2	58
Winged Peppercress *Lepidium monoplocoides*	PCT163_Moderate	1.5	45
Winged Peppercress *Lepidium monoplocoides*	**N/A**	**Impact Area Subtotal**	**103**
Menindee Nightshade *Solanum karsense*	PCT 16_Moderate	2.3	47
Menindee Nightshade *Solanum karsense*	**N/A**	**Impact Area Subtotal**	**47**
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 16_Moderate	2.3	60
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 16_Low	2.3	5
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 16_DNG	2.6	19
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 16_Paddock_trees	0.21	1
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 21_Moderate	0.85	27
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 23_Moderate	1.7	52
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 57_Moderate	0.19	6
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 58_High	0.85	39
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 58_Moderate	9.1	340
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 58_DNG	11	97
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 58_Paddock_trees	0.07	2
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 163_Moderate	1.4	43

Species	Vegetation Zone	Impact Area (ha)	Credit Requirement
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 170_Moderate	4.3	43
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 170_Low	0.48	7
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	PCT 170_DNG	2.1	15
Major Mitchell's Cockatoo *Lophochroa leadbeateri*	**N/A**	**Impact Area Subtotal**	**840**
All Listed Species	**N/A**	**Impact Area Total**	**1,099**

Table 6.18 Biodiversity Offset Credit Requirements – Scattered Trees

PCT	Class	Credit Requirement
PCT 16 – Black Box Grassy Open Woodland Wetland	3	4
PCT 16 – Black Box Grassy Open Woodland Wetland	2	2
PCT 21 – Slender Cypress Pine-Sugarwood-Western Rosewood Open Woodland	3	14
PCT 23 – Yarran Tall Open Shrubland	3	2
PCT 58 – Black Oak-Western Rosewood Open Woodland	3	33
PCT 58 – Black Oak-Western Rosewood Open Woodland	2	3
PCT 170 – Chenopod Sandplain Mallee	3	3
PCT 170 – Chenopod Sandplain Mallee	2	5
Total	**N/A**	**66**

6.4.5 Biodiversity Offset Strategy

In order to secure the biodiversity offset liability expected to be required for the Project's residual unavoidable impacts, Windlab has commenced investigations into the establishment of local Biodiversity Stewardship Sites.

To date, two properties have been subject to desktop and on-ground assessment to determine their suitability for establishment of Biodiversity Stewardship Sites, and to generate offset credits suitable for the Project's requirements:

- Property 1 – An approximately 550 ha land parcel supporting approximately 135 hectares of native vegetation that would be suitable to enter into a Biodiversity Stewardship Agreement. The property is bounded by the Project's Development Corridor to the east and south-west, however suitable setbacks would be possible from the Project to avoid indirect impacts.
- Property 2 – An approximately 350 ha land parcel covered by native vegetation. The property occurs approximately 2.5 km to the south of the Project's Development Corridor.

Following initial field investigations, these sites are expected to be able to provide approximately 37% of ecosystem credit offsets required by the Project. Investigation of these sites will continue, along with other options, including payment to the Biodiversity Conservation Fund and the purchase of credits from the open market.

Windlab is committed to investigating opportunities for a more 'Nature Positive' offset scenario to benefit the biodiversity values impacted by the Project. Such opportunities would generally be targeted to the Project Area and could include:

- Working with landholders and authorities to manage and restore the habitats known to support the avoided local populations of Bitter Quandong and *Austrostipa metatoris*.
- Undertaking additional 'non-credit generating' management actions at any locally established Biodiversity Stewardship Sites, such as revegetation of cleared areas to benefit habitat connectivity and promote the establishment of future nesting/roosting resources for impacted bird and bat species.
- Targeted installation of nest boxes and artificial hollows to benefit Major Michell's Cockatoo.
- Provide opportunities for year-round availability of surface water in close proximity to foraging and nesting habitat for Major Mitchell's Cockatoos within offset sites or the wind farm site.
- Contribute to regional threatened species monitoring programs or pest control programs within the proximal National Parks estate areas.
- Net positive outcomes are one of the main aims of the re-evaluation of environmental offsets outlined in the Commonwealth Government's Nature Positive Plan (DCCEEW 2022) and Windlab is committed to contributing to achieving these goals.

6.4.6 Matters of National Environmental Significance

As discussed in **Section 4.0**, on the 14 November 2023, a delegate of the Federal Minister for the Environment and Water, determined the Junction Rivers Wind Farm was a controlled action under Section 75 of the EPBC Act with the following controlling provisions:

- listed threatened species and communities
- listed migratory species.

Supplementary SEARs were issued following the controlled action declaration, and DCCEEW has determined that there is likely to be a significant impact on the following:

- Major Mitchell's Cockatoo (*Lophochroa leadbeateri leadbeateri*) – Endangered
- Regent Parrot (*Polytelis anthopeplus monarchoides*) – Vulnerable
- Sharp-tailed Sandpiper (*Calidris acuminata*) – Migratory.

Additionally, DCCEEW considered that the following matters protected under Part 3 are possibly at risk of being impacted:

- Plains Wanderer (*Pedionomus torquatus*) – Critically Endangered
- Australian Painted Snipe (*Rostratula australis*) – Endangered
- South-eastern Hooded Robin (*Melanodryas cucullata cucullata*) – Endangered
- Grey Snake (*Hemiaspis damelii*) – Endangered
- Australasian Bittern (*Botaurus poiciloptilus*) – Endangered
- Grey Falcon (*Falco hypoleucos*) – Vulnerable
- Blue-winged Parrot (*Neophema chrysostoma*) – Vulnerable
- Painted Honeyeater (*Grantiella picta*) – Vulnerable
- Malleefowl (*Leipoa ocellata*) – Vulnerable
- Common Greenshank (*Tringa nebularia*) – Migratory.

Assessments of the above species, and additional species identified by Biosis as having a medium or higher likelihood of occurrence in the impact area and that have the potential to be impacted by construction and/or operation of the Project, were undertaken in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (SIG 1.1) (Commonwealth of Australia, 2013).

The likelihood of occurrence of MNES within the subject land and subsequent potential impacts were assessed through both desktop and field-based assessments. **Table 6.19** below provides a summary of assessment outcomes while the full assessments of significance are contained in **Appendix 11**.

Table 6.19 Assessment of Significance Outcomes

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Controlled Action determination – likely to be significantly impacted	Major Mitchell's Cockatoo *Lophochroa leadbeateri*	Removal of at least 17 suitable HBTs[1] supporting potential breeding habitat Removal of up to 39.45 ha of critical habitat.	As a result of these impacts, the Project is considered to have the potential to disrupt the breeding cycle of the local population and reduce the availability and quality of critical habitat. The removal of potential breeding resources is considered to have the potential to interfere with the recovery of the local population. Ongoing operational impacts associated with collision with turbine blades are not considered likely as the species is not commonly recorded at RSH, however habitat sterilisation and more broadscale avoidance of operational wind farm areas is possible. Significant impact considered likely.
Controlled Action determination – likely to be significantly impacted	Regent Parrot *Polytelis anthopeplus monarchoides*	Removal of up to 72 ha of forage habitat considered critical to the survival of the species.	The Project is not considered likely to adversely affect habitat critical to the survival of Regent Parrot based on the avoidance of impacts to primary movement corridors and primary forage habitats. Impacts to secondary and other forage habitats represent only a small fraction of the commensurate habitats available to the species, and impacts will be located away from key habitats, in areas where the species has not been recorded in over two years of survey. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Significant impact considered unlikely through the implementation of impact avoidance and mitigation measures and adaptive management plans.
Controlled Action determination – likely to be significantly impacted	Sharp-tailed Sandpiper *Calidris acuminata*	No areas of breeding or foraging habitat proposed for impact. Potential impacts to individuals through turbine strike.	Turbine strikes are considered unlikely to frequently occur, as this species typically flies well above RSA height, with a steep flight trajectory. Monitoring and adaptive management will be employed to reduce collision risk for this species. Significant impact considered unlikely.
Controlled Action determination – at risk of impact	Plains Wanderer *Pedionomus torquatus*	No areas of breeding or foraging habitat proposed for impact.	Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.

[1] HBT: hollow bearing tree.

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Controlled Action determination – at risk of impact	Australian Painted Snipe *Rostratula australis*	No areas of breeding, and highly limited foraging habitat proposed for impact.	Species was not detected during two years of BBUS survey effort, and is not considered likely to use the habitat present within the subject land. Species also not recorded within the 20 km Nature Advisory (2023) search area, and recent 2023 records occur from wetlands north of Balranald, with radio-tracked birds know to have travelled north from that location. A 400-metre buffer around wind turbines from watercourses and wetlands is considered large enough to prevent collisions, on the rare occasions the species could be present within the subject land. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.
Controlled Action determination – at risk of impact	South-eastern Hooded Robin *Melanodryas cucullata cucullata*	Up to 34.5 ha of potential breeding and foraging woodland habitat.	Species was not detected during two years of BBUS survey effort, or during targeted woodland bird surveys within the subject land. One record of this species occurs around 11 km from the subject land. Species is not considered likely to occur. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem species. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.
Controlled Action determination – at risk of impact	Grey Snake *Hemiaspis damelii*	No areas of breeding or foraging habitat proposed for impact.	Habitat suitable for this species was not identified within the subject land. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.
Controlled Action determination – at risk of impact	Australasian Bittern *Botaurus poiciloptilus*	No areas of breeding or foraging habitat proposed for impact. Potential impacts to individuals through turbine strike.	Turbine strikes are considered unlikely to frequently occur, as this species typically flies well above RSA height, with a steep flight trajectory. Monitoring and adaptive management will be employed to reduce collision risk for this species. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Significant impact considered unlikely.

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Controlled Action determination – at risk of impact	Grey Falcon *Falco hypoleucos*	Up to 75.68 ha of rarely used potential forage habitat, and limited potential breeding habitat to be removed/ impacted.	Species was not detected within the subject land during two years of BBUS survey effort or during targeted woodland bird surveys. The nearest record of this species occurs over 30 km from the subject land. Species is considered to occur only on a transient and infrequent basis. Raptors are at inherent risk of turbine strike, however the frequency with which impacts may occur is considered to be very low. Significant impact considered unlikely due to infrequency of potential collisions and through the implementation of mitigation measures and adaptive management.
Controlled Action determination – at risk of impact	Blue-winged Parrot *Neophema chrysostoma*	Up to 75.68 ha of potential habitat assessed as unlikely to support the species.	Species was not detected during two years of BBUS survey effort, or during targeted woodland bird surveys within the subject land. The nearest record of this species occurs around 30 km from the subject land. Species is not considered likely to occur. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.
Controlled Action determination – at risk of impact	Painted Honeyeater *Grantiella picta*	Up to 75.68 ha of potential habitat assessed as unlikely to support the species.	Species was not detected during two years of BBUS survey effort, or during targeted woodland bird surveys within the subject land. Within a 50 km radius, only two records of this species are present, and both are over 30 km from the subject land. Species is not considered likely to occur, Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Controlled Action determination – at risk of impact	Malleefowl *Leipoa ocellata*	Up to 5.23 ha of potential habitat assessed as unlikely to support the species.	Potential habitat for this species is present in the subject land in the form of sandy soils and semi-arid/arid woodlands, however, this species and its breeding mounds are conspicuous and were not detected during two years of BBUS and targeted woodland bird surveys. A population of this species is not known south of Balranald, with records of the nearest population starting around 30 km from the subject land. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Assessment of significance not undertaken as species is not considered likely to occur within the subject land. No potential significant impact.
Controlled Action determination – at risk of impact	Common Greenshank *Tringa nebularia*	No areas of breeding or foraging habitat proposed for impact.	Turbine strikes are considered unlikely to frequently occur, as this species typically flies well above RSA height, with a steep flight trajectory. Monitoring and adaptive management will be employed to reduce collision risk for this species. Significant impact considered unlikely due to infrequency of collisions, limited impacts to important habitats or an ecologically significant proportion of the population and through the implementation of mitigation measures and adaptive management.
Additional MNES assessed by Biosis	Corben's Long-eared Bat *Nyctophilus corbeni*	Up to 30.37 ha of potential foraging and breeding habitat to be removed/ impacted.	A population of this species has some potential to be present within the subject land, or immediate surrounding areas. This species was not determined through the Nature Advisory assessment, or the BDAR as a species 'At Risk' of wind farm collision. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem species. Significant impact considered unlikely as <1% of the potential habitat that may be used by this species would be impacted by the Project.
Additional MNES assessed by Biosis	Fork-tailed Swift *Apus pacificus*	No areas of breeding or foraging habitat proposed for impact.	Species was not detected during 2 years of BBUS survey effort, or targeted woodland bird surveys within the subject land. This species has been recorded once at Yanga Lake, around 4 km north of the subject land, with <5 isolated records from Balranald and north of Balranald. The species is known to fly regularly at RSA height and has been known to collide with turbines at wind farms elsewhere in NSW and eastern Australia, however the frequency of potential impacts is expected to be very low. Monitoring and adaptive management will be employed to reduce collision risk for this species. Significant impact considered unlikely.

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Additional MNES assessed by Biosis	Caspian Tern *Hydroprogne caspia*	No areas of breeding or foraging habitat proposed for impact.	Species considered nomadic and dispersive in the context of their use of inland habitats, particularly when using ephemeral wetlands and floodwaters. The proportion of flights made at RSA heights is unknown for this species, but known flight behaviour suggests that they spend a considerable proportion of flights at RSA height. Therefore, the presence and use of any aquatic habitat in the subject land near turbines could pose a risk to this species, as it may fly at RSA height in this context. Significant impact considered unlikely due to limited impacts to important habitats or an ecologically significant portion of the population.
Additional MNES assessed by Biosis	Gull-billed Tern *Gelochelidon nilotica*	No areas of breeding or foraging habitat proposed for impact.	Species considered nomadic and dispersive in the context of their use of inland habitats, particularly when using ephemeral wetlands and floodwaters. The proportion of flights made at RSA heights is unknown for this species, but known flight behaviour suggests that they spend a considerable proportion of flights at RSA height. Therefore, the presence and use of any aquatic habitat in the subject land near turbines could pose a risk to this species as it may fly at RSA height in this context. Significant impact considered unlikely due to limited impacts to important habitats or an ecologically significant portion of the population.
Additional MNES assessed by Biosis	Southern Whiteface *Aphelocephala leucopsis*	Up to 32.44 hectares of potential breeding and foraging habitat.	Species habitat that can be considered habitat critical to the survival of the species will be impacted by the Project. However, the local population of the species is not considered an Important Population, and impacts will occur to <1% of the potential habitat that may be used by this species within the assessment area, and around 4% within the subject land. Potential habitat to be impacted has been offset through the bilateral agreement where this species is listed as an ecosystem credit species. Significant impact considered unlikely.
Additional MNES assessed by Biosis	Mossgiel Daisy *Brachyscome papillosa*	Up to 3.9 ha of vegetation where species has been assumed to occur due to survey limitations.	Surveys were completed for these species within the subject land. These species were not identified, however there were a number of localised areas where sufficient survey coverage was unable to be achieved due to access constraints associated with waterlogging and inundation in October 2022, and areas being cleared for agricultural purposes. This has resulted in a requirement for assumed presence. The species were not recorded elsewhere within the subject land and are therefore considered unlikely to occur or be subject to impacts. Assessments of significance were not undertaken as the species are not considered likely to occur within the subject land. No potential significant impact.

xxxx	Impacted entity	Area of impact (ha)	Assessment of Significance Outcome
Additional MNES assessed by Biosis	Winged Peppercress *Lepidium monoplocoides*	Up to 3.7 ha of vegetation where species has been assumed to occur due to survey limitations.	Surveys were completed for these species within the subject land. These species were not identified, however there were a number of localised areas where sufficient survey coverage was unable to be achieved due to access constraints associated with waterlogging and inundation in October 2022, and areas being cleared for agricultural purposes. This has resulted in a requirement for assumed presence. The species were not recorded elsewhere within the subject land and are therefore considered unlikely to occur or be subject to impacts. Assessments of significance were not undertaken as the species are not considered likely to occur within the subject land. No potential significant impact.
Additional MNES assessed by Biosis	Menindee Nightshade *Solanum karsense*	Up to 2.3 ha of vegetation where species has been assumed to occur due to survey limitations.	Surveys were completed for these species within the subject land. These species were not identified, however there were a number of localised areas where sufficient survey coverage was unable to be achieved due to access constraints associated with waterlogging and inundation in October 2022, and areas being cleared for agricultural purposes. This has resulted in a requirement for assumed presence. The species were not recorded elsewhere within the subject land and are therefore considered unlikely to occur or be subject to impacts. Assessments of significance were not undertaken as the species are not considered likely to occur within the subject land. No potential significant impact.
Additional MNES assessed by Biosis	Spear Grass *Austrostipa metatoris*	None. All areas where this species was identified will be avoided by the Project.	Targeted surveys were completed for this species and it was identified in a roadside TSR directly adjacent to the subject land, but was not identified within the subject land. Avoidance principles have been allocated to protect the identified population of this species. The species was not recorded elsewhere within the subject land and is therefore considered unlikely to occur or be subject to impacts. Assessment of significance not undertaken due to avoidance of potential impacts.

Ongoing avoidance, minimisation and mitigation of impacts to biodiversity values will be undertaken through detailed design, construction and operation of the Project. Additional mitigation measures specific to the Major Mitchell's Cockatoo, Regent Parrot and *Austrostipa metatoris* have been identified in Section 12.1.6 of the BDAR (refer to **Appendix 11**).

Impacts to Major Mitchell's Cockatoo as a result of the Project following all efforts to avoid, minimise and mitigate, have been determined as likely to be significant, in accordance with SIG 1.1. As such, offsetting in accordance with the EPBC Act Environmental Offsets Policy (Commonwealth of Australia, 2012) and the EPBC Act is required for this species.

Impacts to the remaining MNES considered as part of this assessment have been determined as not significant, and offsetting is not required. Impacts to all MNES will, however, be offset in accordance with the NSW BOS through either direct establishment of Biodiversity Stewardship Sites to generate biodiversity credits, through securing biodiversity credits from the open market, or from payment to the Biodiversity Conservation Fund (as discussed in **Section 6.4.5** above). Offsets for Major Mitchell's Cockatoo will ensure the requirement for 90% direct offsets will be met.

6.4.7 Fisheries Management Act 1994

An assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the *Fisheries Management Act 1994* (FM Act), was undertaken in accordance with the requirements of the SEARs for the Project.

Key Fish Habitat as mapped by the NSW Department of Primary Industries (DPI) occurs within the subject land and within the adjacent area (DPI, 2013). The Key Fish Habitat runs from Lake Talbetts (west of the subject land), through an unnamed ephemeral watercourse within the subject land and into The Forest Creek where it exits the subject land.

No watercourses within the subject land are identified within the NSW DPI Freshwater Fish Community map (DPI 2023). The nearest mapped freshwater fish community is the Eward River south of the subject land, which is identified as occurring in 'poor' condition. Given this, it is unlikely any watercourses within the subject land would be considered higher than 'very poor' condition.

The subject land falls within the polygon of potential habitat for the Murray Hardhead Cra*terocephalus fluviatilis*, a small freshwater fish listed as Endangered under the EPBC Act and Critically Endangered under the FM Act. Given the disturbed, modified and non-perennial nature of the watercourses within the subject land, it is considered unlikely that this species occurs. This species is known to occur in lakes and billabongs, and may occur within Condoulpe Lake when it holds water and is connected to other waterbodies. Condoulpe Lake within the subject land is identified as a dryland lake, filling only during above average rainfall events and is utilised for agricultural cropping and grazing.

The proposed wind farm does not include works within key areas quaticc habitat. No works are proposed within at least 600 m of Condoulpe Lake, The Forest Creek (and associated tributaries within the subject land) and the associated areas of Key Fish Habitat. The proposed wind farm is not considered an action that would alter the surface drainage, natural drainage systems or flow of watercourses within or adjacent to the subject land. No instream woody debris will be removed and no modification to key areas of aquatic habitat is proposed. As such, a permit under Part 7 of the FM Act is not required.

6.5 Aboriginal Cultural Heritage

The Project Area falls within the Balranald Local Aboriginal Land Council (LALC) area.

An Aboriginal Cultural Heritage Assessment (ACHA) was undertaken by NGH Pty Ltd to assess the potential impact of the Project on Aboriginal cultural heritage (both archaeological and cultural) in consultation with Aboriginal communities.

The ACHA was prepared in accordance with the SEARs and the archaeological assessment followed the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice) (DECCW 2010a). The Aboriginal cultural heritage assessment followed the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (ACHCRP) (DECCW, 2010b).

The full ACHA is included in **Appendix 12** and key findings are summarised in the sections below.

6.5.1 Existing Heritage Environment

The Project Area and nearby Murray and Murrumbidgee rivers would have been a reliable and abundant resource that sustained some of the densest populations of Aboriginal people in Australia with the area from Echuca to the Murray Darling junction occupied by a number of Aboriginal clans with relatively small territories that included a portion of the river and back country. The close proximity to each other also meant that people likely spoke multiple languages and dialects and the ethnographic records show that people travelled extensively.

The Aboriginal people in the area were adept at identifying and utilising resources throughout the year. Terrestrial animals such as possums and kangaroos were noted by early observers as a prime food source and the skins were made into cloaks for warmth. Other food sources include reptiles, birds, fish, crayfish and mussels and insects. Plant foods were equally as important and mostly consisted of roots and tubers, leaves, seeds and fruit. Wood was used to make boomerangs, spears, digging sticks, bark for canoes and shelters, fibre to produce string, and stone to make axes, grinding stones, and spear points. Animals were utilised not only for food, but also for the manufacture of materials.

Searches of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) were conducted in 2021 and 2023. Searches were centred on the Project Area and extended several kilometres out from the Project Area boundary. The results identified 117 Aboriginal sites (15 within the Project Area) and no declared Aboriginal Places (refer to **Section 6.5.4**). Searches of the NSW State Heritage Inventory and Australian Heritage Database were also undertaken. These searches did not identify any previously recorded Aboriginal Places listed within the vicinity of the Project Area. No other previously recorded heritage sites are located within or adjacent to the Project Area.

6.5.2 Consultation

A primary aim of the ACHA was to identify any cultural values within the landscape in which the Project is located so that those values can be recognised and incorporated into the Project’s management and mitigation measures. Consultation with Aboriginal stakeholders was undertaken in accordance with Section 60 of the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2019 and following the process outlined in the ACHCRP. A log and copies of correspondence with Aboriginal community stakeholders is presented in Appendix B of the ACHA (refer to **Appendix 12**).

Consultation was undertaken in four main stages, including:

- Stage 1 – Notification and Registration of Interest.
- Stage 2 – Presentation of Information.
- Stage 3 – Gathering Information about Cultural Significance.
- Stage 4 – Review of the Draft ACHA.

Further details are provided in **Table 6.20**.

Table 6.20 ACHA Consultation Stages

Stage	Details
Stage 1 – Notification and Registration of Interest	In December 2021 and January 2022, individual targeted letters were sent to Aboriginal groups and government agencies, and public advertisement of the Project was undertaken to identify, notify and register Aboriginal people who hold cultural knowledge relevant to the Project Area. As a result, six Registered Aboriginal Parties (RAP) registered an interest in the Project and were part of an active consultation process whereby Aboriginal parties could contribute to culturally appropriate information gathering and the assessment methodology, provide information to enable the cultural significance of Aboriginal objects and/or places to be determined, and to have input into the development of cultural heritage management options.
Stage 2 – Presentation of Information	Information regarding the Project and assessment methodology was provided to the RAPs for comment in February 2022. Comments were requested regarding the proposed methodology and information sought regarding known Aboriginal cultural significance values associated with the Project Area and/or any Aboriginal objects contained therein.
Stage 3 – Gathering Information about Cultural Significance	No response regarding cultural information specific to the Project Area was received in response to the methodology. Information about Aboriginal cultural values was gathered through desktop and field assessment work.
Stage 4 – Review of the Draft ACHA	Project updates were sent to the RAPs throughout the project and in August 2023 a draft version of the ACHA was forwarded to the RAPs for review. The RAPs were specifically invited to comment on the results, the significance assessment and the recommendations. A minimum of 28 days was allowed for responses to the document and all responses were incorporated into the final ACHA.

6.5.3 Survey Method

A detailed survey was undertaken as part of the ACHA in partnership with representatives of the RAPs. In accordance with the Code of Practice, the purpose of the field survey was to record the material traces and evidence of Aboriginal land use that are:

- visible at or on the ground surface
- exposed in section or visible as features
- and to identify those areas where it can be inferred that, although not visible, material traces have a high likelihood of being present under the ground surface.

The Development Corridor was divided into three Mitchell landscape Survey Units which were defined according to landform criteria. The Survey Units were further divided into 218 Survey Transects, covering 33.2% of the Development Corridor.

Field surveys were conducted over 8 weeks during March and April 2022 and April 2023, by NGH archaeologists with the participation of members of the RAPs on foot, targeting the proposed Development Corridor within the Project Area. The field surveys were aimed at locating Aboriginal objects as well as assessing the landscape, prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the archaeological sensitivity of the land.

6.5.4 Results

Searches of relevant heritage registers identified that there are no World, Commonwealth, State or locally listed heritage places or items located within or in proximity to the Project Area. As discussed in **Section 6.5.1**, searches of the Heritage NSW AHIMS were conducted for the Project Area and surrounds. A total of 117 Aboriginal sites and no declared Aboriginal Places were identified, with 15 sites recorded within the Project Area. The previously recorded AHIMS sites within the Project Area are largely in the north-eastern section of the Project Area along Condoulpe Creek. None of the 15 previously recorded AHIMS sites are within or in close proximity (within 400 m) to the Development Corridor (refer to **Figure 6.7**).

The AHIMS search results identify a dominance of scarred trees within the search area and Project Area, especially where there are remnant stands of native trees. It is however considered likely that the dominance of scarred trees recorded in the area is related to lack of surveys in the area and the more conspicuous nature of scarred trees when compared to small artefact scatters, isolated stone artefacts and hearths. It is also possible that the high number of modified trees in the AHIMS search area is reflective of the debate which continues in the local area about Rabbiters Trees (trees that were scarred and marked as part of the poisoning techniques historically used as an attempt to control rabbit numbers in the area) and Leaghur Trees (culturally sacred trees).

During the survey the following site types and archaeological features were recorded: stone artefacts, hearths, oven mounds and tree cultural sites. Where hearths were found in association with high frequencies of artefacts, the naming convention was for the site to be recorded as an artefact scatter. Where hearths were found in isolation or with a low density of stone artefacts in association, the naming convention was for the sites to be recorded as hearths.

A summary of the Aboriginal site types/features and cultural sites recorded during the field survey are provided in **Table 6.21** and their locations shown in **Figure 6.7**. The site descriptions and the archaeological data recorded at these sites is provided in **Appendix 12**.

Table 6.21 Site Types Recorded During Field Survey

Site Type	Number
Isolated finds	37
Tree cultural sites	24
Hearths	9
Artefact scatter	5
Hearth and mound	2
Hearth and Artefact	2
Artefact Scatter, Hearth and mound	1
Total	**80**

The Development Corridor assessed in the ACHA was found to be largely confined to landscapes which generally have deflated surfaces and areas considered to have negligible potential for intact subsurface deposits with high densities of cultural material. As such, there were few landforms, sites or features considered to be Potential Archaeological Deposits (PADs) that warranted subsurface investigation.
The exceptions to this were the mounds and hearth features which were recorded at the sites Burrawong WF AFT 05, Burrawong WF HTH 01, Burrawong WF HTH 03, Burrawong WF HTH 11 and Burrawong WF HTH 12 (refer to **Figure 6.7**) which were noted to be in situ and likely to have some potential for subsurface material and deposit. These five sites were considered to have some further research value and thus higher archaeological conservation value. However, the Development Corridor was revised to exclude several of these locations with the remaining now captured in heritage exclusion zones (refer to **Figure 6.8**) to ensure no harm will occur to these sites. Consequently, no subsurface test excavation was determined to be warranted within the Development Corridor.

Based on the site types and archaeological features recorded, it is likely that the area as a whole was used intermittently over long periods of time for camping while water remained in the landscape, as indicated by the presence of hearths, mounds and stone artefacts. It is most likely that the Aboriginal cultural material recorded within the Project Area reflects the use of the area by small family groups on multiple occasions as they moved through the landscape exploiting the increased range of available resources associated with the prolonged presence of water after annual flooding.

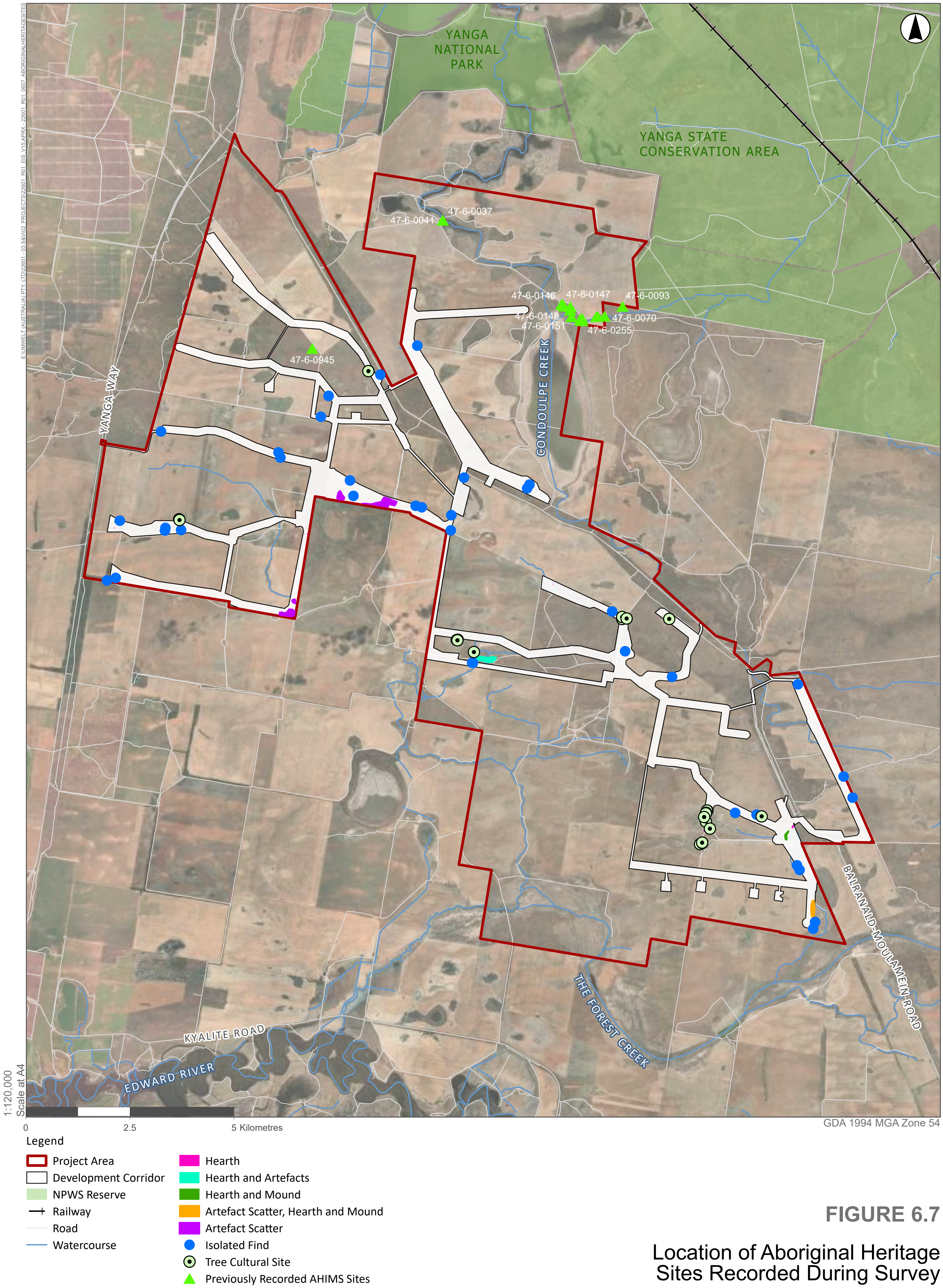
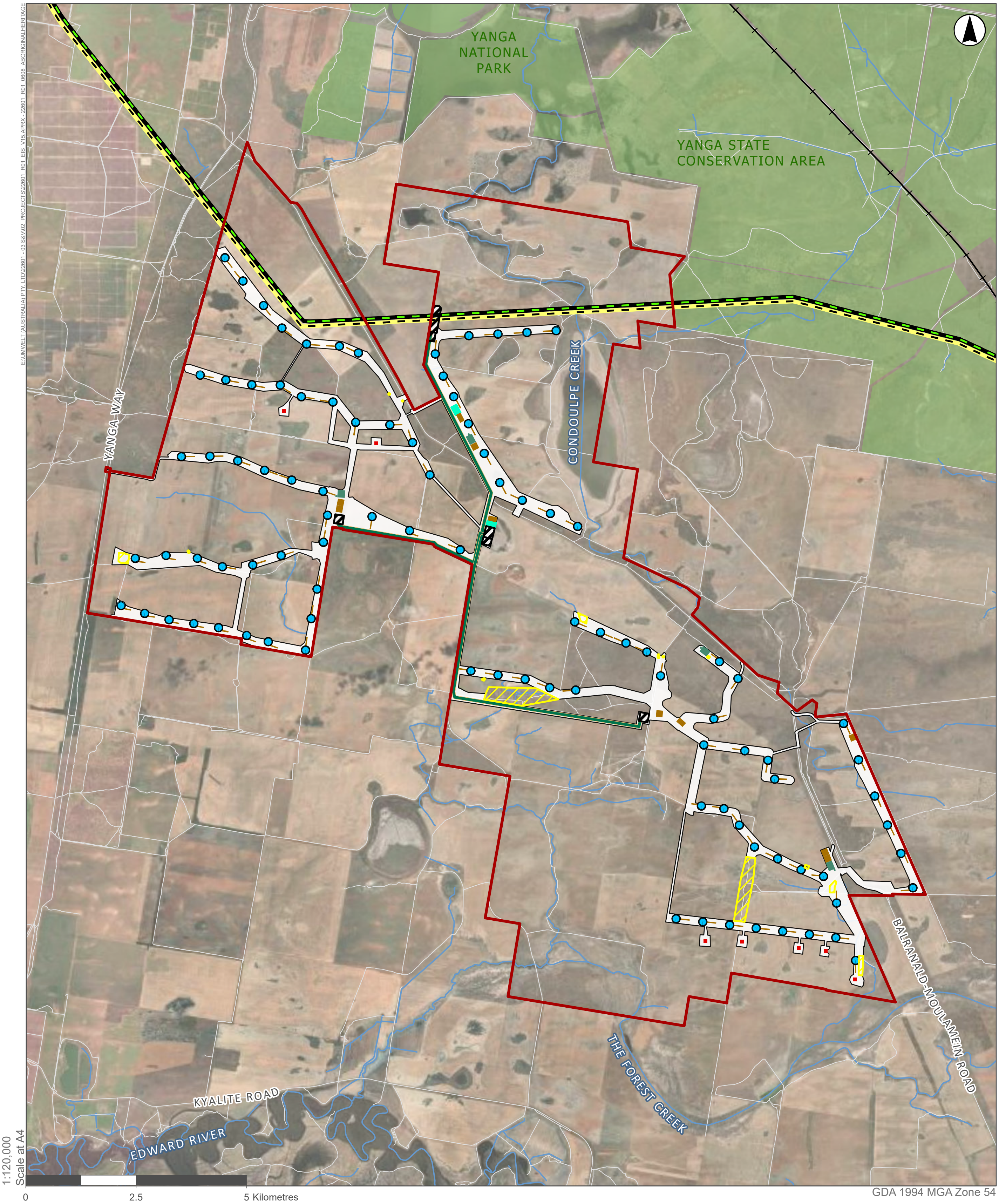


FIGURE 6.7

Location of Aboriginal Heritage Sites Recorded During Survey

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- BESS/STATcom/Substation/Switching Station
- Permanent Power Performance Mast (Potential Location)
- 220 kV TransGrid Transmission Line
- Project Energy Connect Transmission Line
- NPWS Reserve
- Watercourse
- Road
- Railway
- Exclusion Zone

FIGURE 6.8

Overview of Aboriginal Heritage Exclusion Zones

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

Assessment was also undertaken at four potential road intersection upgrades sites required to facilitate the OSOM haulage within the NSW section of the transportation route (refer to **Appendix 12**). An Aboriginal Heritage Due Diligence assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) (Due Diligence Code) was undertaken for the sites. These sites would require works outside of the existing road surface for either hardstand formation or vegetation trimming. The four sites assessed were:

- Intersection of the Murray Valley Highway and Sturt Highway (Euston)
- Intersection of Sturt Highway and the Sturt Highway (Balranald Hospital Lot, Balranald)
- Intersection of Yanga Way and the Balranald-Moulamein Road (Yanga)
- Intersection of the Balranald-Moulamein Road and Arundel Road (Kyalite).

An AHIMS search (January 2024) determined there were no Aboriginal objects or areas of potential archaeological deposit previously recorded within or in proximity to these locations. A desktop assessment concluded that each of the four sites was highly disturbed by the previous construction and ongoing maintenance of the existing roads. The four locations were previously inspected by vehicle by NGH archaeologists during the fieldwork undertaken for the Project. Given the levels of previous disturbance, it was concluded that there was negligible potential for Aboriginal objects to occur at each of the four locations.

6.5.5 Assessment of Significance and Impacts

Land within the Project Area has been highly disturbed through intensive dryland cropping activities that have been undertaken for a number of generations. As stated in **Section 2.6**, the Project has been redesigned to avoid landforms and areas which had high archaeological sensitivity to ensure impacts to Aboriginal heritage were minimised were possible. However, irrespective of prior impacts, the Project will involve ground disturbance and has the potential to cause additional impacts to any Aboriginal objects which may be present. The construction of the Project will result in impacts to any Aboriginal objects located within the Development Footprint.

An opportunity to identify cultural and social value was provided to all RAPs through the consultation process. Feedback while in the field was that all sites and Aboriginal objects hold cultural value to the Aboriginal community and impacts should be avoided where possible. RAPs identified that they would like to see collection of surface artefacts that cannot be avoided by the Project prior to construction works, and that these artefacts should be placed in a safe location to avoid future disturbance.

An assessment of significance was undertaken for the sites with known Aboriginal objects recorded. As per criteria outlined in the ICOMOS Burra Charter (Australian ICOMOS, 2013), the assessment of significance included consideration of cultural, scientific, aesthetic, historic and other values (i.e., educational value) to arrive at an overall value. Of the 80 sites, 24 sites were assessed with an overall value of High, 12 with an overall value of Low to Moderate, and 44 with an overall value of Low. The locations of sites with an overall value of High are shown on **Figure 6.7**.

Table 6.22 provides a summary of the potential impact for all recorded sites within the Development Corridor.

Table 6.22 Summary Harm and the Consequence on Each Site Type Recorded within the Survey Area

Site Type	Type of Harm	Degree of Harm	Consequence of Harm	No. of Sites	% of Site Type
Isolated finds	Direct	Complete	Total loss of value	37	100
Artefact scatters	Direct	Complete	Total loss of value	5	100
Hearths	Direct	Complete	Total loss of value	3	33.3
Hearths	Nil	Nil	No loss of value	6	66.7
Artefact scatter, hearth and mound	Nil	Nil	No loss of value	1	100
Hearth and mound	Nil	Nil	No loss of value	2	100
Hearth and artefact	Nil	Nil	No loss of value	2	100
Tree cultural site	Nil	Nil	No loss of value	24	100
Previously recorded AHIMS sites within the Project Area	Nil	Nil	No loss of value	15	100

Proposed impacts areas will occupy a relatively small footprint within the overall Development Corridor. Windlab has committed to establishing exclusion zones (refer to **Figure 6.7**) throughout the Project Area to avoid impacts to all the Aboriginal sites identified as having high significance.

6.5.6 Mitigation and Management

Windlab will implement the following management and impact mitigation measures relating to Aboriginal heritage:

- The development must avoid all the heritage exclusion zones which are mapped within the Project Area. These heritage exclusion areas should be shown on all construction maps for this Project and if during construction works any ground disturbance activity is proposed within 50 m of any of these heritage exclusion zones then high visibility temporary fencing must be in place along the boundary of the heritage exclusion zone in proximity to the works prior to any ground disturbance and/or construction works commencing nearby to ensure there are no inadvertent impacts to these areas. Given the size of some of these heritage exclusion zones it is acceptable that only the portion of the heritage exclusion zones in proximity to works is demarcated.
- The development must avoid the 24 tree cultural sites recorded during this assessment as Burrawong WF ST 01 to Burrawong WF ST 24. A minimum 20 m buffer must be in place from the trunk of each tree to prevent any inadvertent impacts to the canopy and/or root system of each recorded cultural site.
- The development must avoid the 15 previously registered AHIMS sites within the Project Area which are outside the proposed development corridor for this Project. The AHIMS sites to be avoided are: 47-6-0037, 47-6-0041, 47-6-0093, 47-6-0945, 47-6-0253, 47-6-0147, 47-6-0148, 47-6-0150, 47-6-0255, 47-6-0151, 47-6-0254, 47-6-0146, 47-6-0069, 47-6-0149 and 47-6-0068. No works or access tracks are proposed to be implemented during the Project within proximity (within 50 m) to any of these previously registered AHIMS sites within the Project Area, hence no demarcation of these sites is required as part of the Junction Rivers Wind Project.

- If complete avoidance to any of the isolated finds and artefact scatters recorded within the proposed development corridor is not possible, a reasonable and feasible attempt, through the visual inspection of the site by an archaeologist with an Aboriginal community representative (as selected by the Proponent), must occur in an attempt to collect the surface stone artefacts within the development corridor at each of these recorded locations. This must occur prior to construction, following the development consent which is issued for State Significance Developments.

- Due to ongoing farming practises in the wider Project Area and the potential for delays in the commencement of construction, the ability to undertake the surface collection salvage within the development corridor (outside the heritage exclusion areas) should be facilitated in any conditions of consent issued for this Project. This should occur following the approval of a Cultural Heritage Management Plan for the Project and in accordance with the development consent. The surface collection salvage would be undertaken in line with the methodology provided in Appendix D of the ACHA report.

- A surface collection salvage programme must be attempted at each site with stone artefacts recorded that is approved for impacts prior to the proposed construction works commencing for each stage of works proposed within the development corridor. The surface collection programme may be staged, if required, to conform to the proposed staged approach of construction works.

- The collection and relocation of the surface artefacts and any collected cultural material should be undertaken by an archaeologist with a representative/s of the registered Aboriginal parties, as selected by the Proponent, and be consistent with Requirement 26 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales and/or the wishes of the Registered Aboriginal Parties.

- All objects salvaged must have their long term relocation details submitted to the AHIMS database. An Aboriginal Site Impact Recording Form must be completed and submitted to AHIMS following harm for each site collected or destroyed from salvage and/or construction works as approved in the development consent for the Project.

- A minimum 5 m buffer should be observed around all stone artefact and hearth sites that are being avoided by the Project. If during any Project works any ground disturbance activity is proposed within 50 m of any recorded valid in situ known Aboriginal sites then high visibility temporary fencing must be in placed to demarcate a minimum 5 m buffer around the boundary of the site prior to any works commencing within proximity (within 50 m) of the site.

- Unmitigated impacts can occur to the hearth sites Burrawong WF HTH 06, Burrawong WF HTH 09, Burrawong WF HTH 13 if they cannot be avoided by works.

- All works for the Project must stay within the area assessed for the development corridor and impact areas as detailed in the ACHA to ensure there are no inadvertent impacts to Aboriginal objects. For any proposed future impacts to the Aboriginal sites being avoided and outside the development corridor, as assessed in the ACHA, further assessment and consideration of impacts on Aboriginal Heritage as determined by an archaeologist should occur. Additional Aboriginal consultation and further assessment which may include survey and/or subsurface testing may be required.

- Further archaeological assessment would be required if the proposal activity and development corridor extends beyond the area assessed in the ACHA. This would include consultation with the registered Aboriginal parties and may involve further field survey.
- The Proponent should prepare a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts and objects during the construction of the Project and for the management of known sites within and in proximity to the development corridor which will be avoided. The Plan should include the unexpected finds procedure to manage any objects suspected to be Aboriginal in origin during the construction, maintenance, operation and decommissioning works and include requirements for heritage to be included as part of the site inductions and the monitoring of sites which will be avoided. Preparation of the CHMP should be undertaken in consultation with the Registered Aboriginal Parties.
- In the event that suspected human remains are discovered during the construction of the Project, all work must cease in the immediate vicinity. The appropriate heritage team within Heritage NSW and the local police should be notified. Further assessment would be undertaken to determine if the remains were ancestral Aboriginal remains or not. If the remains are deemed to be ancestral Aboriginal in origin Heritage NSW would be sought to advise the Proponent on the appropriate actions required. An unexpected find protocol for suspected human remains must be included in the CHMP for the Project.
- Prior to any development consent being issued for this Project, the drafted conditions which relate to Aboriginal heritage should be reviewed by a qualified archaeologist to ensure all sites assessed for impacts and avoidance and the management recommendations, as noted in the ACHA, are clearly included and listed in any conditions of consent.

6.6 Historical Heritage

SEARs for the Project require an assessment of the impacts to historic heritage having regard to the *NSW Heritage Manual*. A Historical Heritage Impact Assessment (HHIA) was undertaken by Umwelt and is provided in **Appendix 13** with a summary of the report presented in the following sections.

6.6.1 Methodology

The HHIA was undertaken in accordance with guidelines set out in the *NSW Heritage Manual 1996* (Heritage Office and Department of Urban Affairs & Planning, 1996) and with consideration of the best practice principles contained in:

- *Archaeological Assessment Guidelines* (Department of Urban Affairs and Planning 1996)
- Assessing Significance for Historical Archaeological Sites and 'Relics' (NSW Heritage Branch, Department of Planning 2009)
- *Statements of Heritage Impact* (Heritage Council of NSW 2002)
- The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999 (Australia ICOMOS 2013) (the Burra Charter).

A desktop review of existing and available background documentation, including primary source materials and heritage studies, was undertaken to establish a context for the Project Area. The methodology for the HHIA prescribed parameters for determining historical archaeological potential, determining the extend of disturbance, assessment of significance, and determining impact, as follows:

- determining historical archaeological potential – the likelihood that there may be physical evidence relating to the early development and occupation of the Project Area beneath the current ground surface
- determining the extent of disturbance – using categories of Low disturbance, Moderate disturbance and High disturbance
- assessment of significance for built heritage and archaeology
- determining impact – using categories of Major Adverse, Moderate Adverse, Minor Adverse, Negligible Impact, Minor Positive, Moderate Positive and Major Positive.

6.6.2 Existing Heritage Values

Statutory heritage registers were reviewed as part of the HHIA and identified the following:

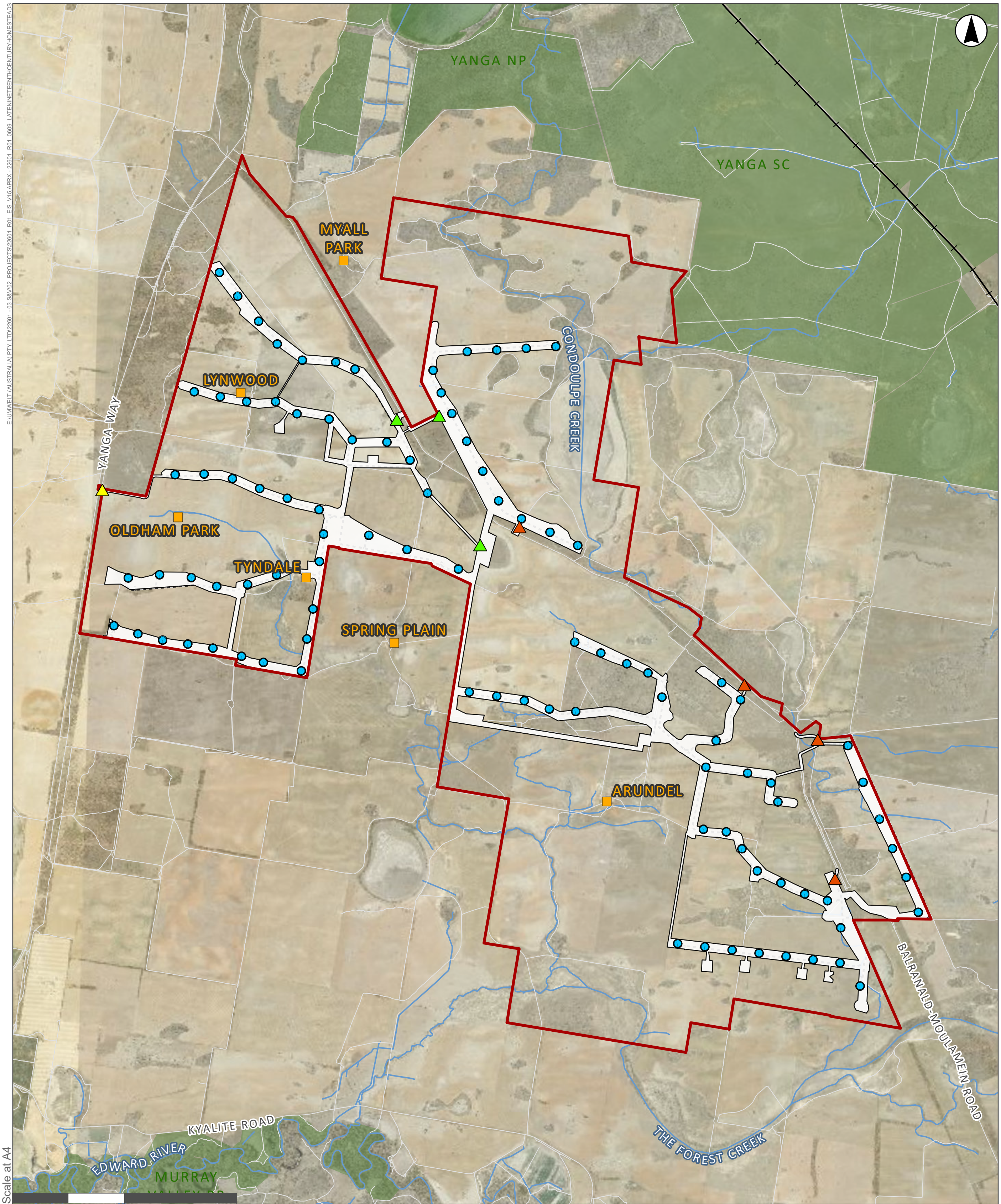
- no Commonwealth or Nationally listed heritage items or places are located within the Project Area
- no State listed heritage items are located within the Project Area
- no items listed on any s170 Heritage and Conservation Registers (NSW State agency heritage registers) are located within the Project Area
- no items listed on Murray LEP 2011, Wakool LEP 2013 and Balranald LEP 2010 are located within the Project Area.

The closest listed heritage item is the Yanga Pastoral Station Complex (DCCEEW HHIMS 10626), approximately 9.6 km north of the Project Area. Several other registered heritage items are located within the township of Balranald approximately 15 km north of the Project Area.

The HHIA includes a detailed account of the historic context of the region surrounding the Project Area, from the time of European arrival in 1817 and the establishment of extensive squatter's runs, through to the break up of the land to smaller holdings including those with homesteads or remains still present in the Project Area today.

Four late nineteenth century (circa 1890s) homesteads were constructed within the Project Area (refer to **Figure 6.9**) of which, only Arundel remains occupied having undergone considerable development with a new dwelling constructed to the southeast of this site. The Lynwood homestead was destroyed in a bushfire in the latter half of the twentieth century. Oldham Park and Tyndale were likely vacated in the late twentieth century and simply allowed to fall into disrepair. Maintenance of the Oldham Park homestead complex appears to continue based on a 1974 aerial photograph, with some decay evident in the 1990 aerial photograph, with total dereliction evident in the 2021 aerial photograph. Tyndale was likely abandoned somewhat earlier, with signs of disrepair already visible in the 1974 aerial photograph.

There is a high potential for archaeological remains at the locations of the Lynwood, Oldham Park, and Tyndale homesteads.



1:120,000 Scale at A4

0 2.5 5 Kilometres

GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- Road
- Watercourse
- Railway
- Late Nineteenth Century Homesteads

FIGURE 6.9

Location of Late Nineteenth Century Homesteads

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.6.3 Heritage Impact Assessment

6.6.3.1 Direct Impacts

As there are no registered heritage items located within the Project Area, there is no physical impact to known heritage items. The Development Corridor is in close proximity of the archaeological remains of Lynwood homestead (approximately 75 m) and Tyndale homestead (approximately 20 m). Depending on the integrity and contents of the archaeological resources, these homesteads may meet the threshold for registration as Local heritage sites under the *Heritage Act 1977*. There may be additional heritage values associated with squatter's huts, agricultural and pastoral structures, and survey markers (refer to **Appendix 13**).

There would be no direct impacts to the archaeological resources of the two homesteads, as they are located outside of the Development Corridor. Mitigation measures to avoid accidental impact are presented in Section X. The Oldham Park homestead archaeological remains and Arundel homestead are over 500 m away from the Development Corridor and would not be physically impacted by the works.

6.6.3.2 Indirect Impacts

The visual impact of the Project on the Yanga Pastoral Station Complex (DCCEEW HHIMS 10607), a s170 Heritage and Conservation Register listed item has been examined. Photomontages prepared by Moir (refer to **Appendix 9**) show the view towards the Project Area from the lookout within the Yanga Complex as it currently appears and how it would appear following construction. The finished wind turbines would be visible from the Yanga Complex, however, they are present as distant views primarily where existing vegetation does not screen the horizon. As such, the wind turbines do not dominate the view nor do they remove focus from the key components of the vista (i.e. the bushland setting and Yanga Lake). From a historical heritage perspective, the impact of the Project on the viewshed of the Yanga Pastoral Station Complex (DCCEEW HHIMS 10607) is considered to be minor adverse.

6.6.4 Mitigation and Management

The following mitigation and management measures are recommended to manage accidental impacts:

- Further investigation – the potential remains for unidentified heritage values to be present in the Project Area. To avoid impact to heritage values that remain unidentified through documentary research, a suitably qualified heritage specialist should conduct a targeted visual assessment of the proposed works footprint, prior to works commencing.
- Exclusion zones for Lynwood, Oldham Park, and Tyndale homesteads. To avoid accidental impact to potential archaeological remains, exclusion zones should be established and examined regularly during construction to ensure ongoing protection.
- Heritage induction – all Project team members and construction contractors to undergo a heritage-specific induction to support the use of the unexpected finds protocol prior to undertaking construction activities within the Project Area.

- Unexpected Finds Protocol – an unexpected finds protocol to be established and followed in the event that any unexpected historical archaeological deposits, artefacts, or structures of potential heritage significance are identified. In the unlikely event that unexpected finds are encountered during the Project, all work in the area will cease and a suitably qualified archaeologist will be contacted to determine an appropriate course of action. Depending on the extent and/or significance of the finds encountered, consultation with Heritage NSW may also be required prior to the re-commencement of works.

6.7 Transport

The SEARs for the Project require:

- An assessment of the construction, operational and decommissioning traffic impacts of the development on the local and State road network.

- Details of the peak and average traffic volumes (including light, heavy and overmass/over-dimensional vehicles) and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials (water, sand and gravel).

- An assessment of the potential traffic impacts of the project on road network function including intersection performance, site access arrangements, site access and haulage routes, and road safety, including school bus routes and school zones.

- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass/overdimensional traffic haulage routes from port) during construction, operation and decommissioning.

- An assessment of the likely transport impacts to the site access and haulage routes, site access point, any rail safety issues, any Crown Land (including existing Travelling Stock Route network), particularly in relation to the capacity and conditions of the roads and use of rail level crossings (and rail safety assessment if required), and impacts to rail underbridges and overbridges.

- A cumulative impact assessment of traffic from nearby developments including Sunraysia Solar Farm, Limondale Solar Farm and Project EnergyConnect.

- Details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from over mass/over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road and/or rail authority.

A Traffic and Transport Assessment was prepared by Access Traffic Consulting Pty Ltd and is contained in **Appendix 14**, with the key outcomes summarised in the following sections. A detailed transport Route Study has also been prepared for the Project by Rex J Andrews Pty Ltd (RJA) (2023) to provide information on the transport route constraints for the movement of OSOM vehicles, and is contained in **Appendix 4**.

6.7.1 Existing Transport Network

As discussed in **Section 3.4.10**, the Project includes primary access points off Balranald-Moulamein Road and Arundel Road. These access points would be used for standard light and heavy vehicles as well as for all OSOM deliveries to the Project Area. The proposed OSOM transport routes to the Project Area from the Port of Adelaide are identified in **Figure 3.7** and discussed in **Section 3.4.1.4**.

Based on the transport routes for the construction and operation phases of the Project, the key road network links in terms of potential impacts were determined to be the section of the Sturt Highway between Mildura and Yanga Way, Swan Hill Road, Stony Crossing Road, Yanga Way, Balranald-Moulamein Road and Arundel Road. Descriptions of the key road network links are provided in **Table 6.23**.

Table 6.23 Key Road Network Links

Road Name	Description
Sturt Highway (A20)	The section of the Sturt Highway critical to the Project is the approximately 165 km length of the link between Mildura and its intersection with Yanga Way, to the south-east of Balranald. The majority of this section of the Sturt Highway is currently operating as a high speed (100 km/hr) two-way, two-lane rural highway, with lower speed (50 km/hr) sections provided through regional townships, such as Balranald, where an urban cross section with wider parking lanes/shoulders is provided in both directions of travel.
Yanga Way (Mallee Highway)	The section of Yanga Way (also known as the Mallee Highway) critical to the Project has been identified as the 49.1 km section spanning between the Sturt Highway in the north to Tooleybuc in the south. The majority of this section of the link currently operates as a high speed (100 km/hr) two-way, two-lane rural highway. In the vicinity of the Project Area, Yanga Way provides one lane of travel in each direction as well as sealed road shoulders typically 0.5–1.0 m in width.
Swan Hill Road	Based on the expected transport routes for the Project, the section of Swan Hill Road relevant to the Project is the 11.1 km length between the Murray Valley Highway in Swan Hill and the intersection with Stony Crossing Road to the north-east and is expected to primarily be utilised for staff and quarry material movements from Swan Hill and Lake Boga respectively. This section of the link currently operates as a high speed (100 km/hr) two-way, two lane rural arterial road with a 6.0–6.5 m wide central sealed pavement and 1 m wide unsealed shoulders.
Stony Crossing Road	The section of the Stony Crossing Road relevant to the Project is the 40.9 km length of the link between Swan Hill Road in the south and Yanga Way in the north, which will primarily be utilised for staff and quarry material movements from Swan Hill and Lake Boga respectively. This section of road is currently operating as a high speed (100 km/hr) two-way, two-lane rural collector road which provides 6.5 m wide sealed pavement with narrow (0.5–1.0 m wide) unsealed shoulders.
Balranald-Moulamein Road	The section of Balranald-Moulamein Road relevant to the Project varies between Stage 1 and Stage 2, with Stage 1 initially utilising the 7.75 km length between Yanga Way and the proposed Site Access 3, while Project traffic for Stage 2 is expected to utilise a longer length (approximately 22.14 km) of the link between Yanga Way and the proposed Site Access 8. The current configuration of Balranald-Moulamein Road varies along its length, with the initial 40 m south-east of Yanga Way providing a sealed two-way, two-lane road section approximately 8 m in length, which then transitions to an unsealed two-way, two-lane local collector carriageway which varies in width between 8.0–10.0 m along the relevant length.

Road Name	Description
Arundel Road	The section of Arundel Road expected to be utilised by Project traffic is the 710 m long length spanning between Balranald-Moulamein Road and the proposed Site Access 4 location, noting that this section of road is only proposed to be utilised during Stage 2 of the Project. The cu rrent configuration of the relevant length of Arundel Road provides a two-way, one-lane unsealed rural access road carriageway, with varying road widths of 4.0–4.5 m.

The Project will require some road upgrade works on the external public road network. These modifications and minor treatments are required to generate space for OSOM vehicle movements as described in **Section 3.4.14** Site access points off Balranald-Moulamein Road, Arundel Road and Yanga Way will require construction works to provide appropriate intersections in accordance with Ausroads Guide to Road Design (2021).

Existing daily traffic data for road sections relevant to the Project were estimated for 2023 from the available historical count data from TfNSW. A conservative background growth of 2% per annum (compound) was then applied to the identified baseline year volumes to establish forecasts of the current (2024) volumes. Estimated daily volumes on Balranald-Moulamein Road were established from observed peak hour traffic volumes on the Balranald-Moulamein Road leg of the Yanga Way / Balranald-Moulamein Road intersection. A conservative estimate of 20vpd (10vpd each direction) was assumed for Arundel Road based on the low volumes observed on site.

Daily traffic data is presented in two directions being Gaz (Gazettal direction of travel or with chainage), and A-Gaz (Against Gazettal direction of travel or against chainage) for relevant road sections, including estimates for heavy vehicles (refer to **Table 6.24**).

Table 6.24 External Road Network Traffic Volumes (2024)

Road Segment Name	Road Segment ID	Road Segment (Start km–End km)	Gaz – Total[2]	Gaz – Heavy Vehicles[3]	A-Gaz – Total[3]	A-Gaz – Heavy Vehicles[3]
A20 Sturt Highway (Mildura to Yanga Way)	98064	0.000–82.400	1,432	382	1,466	395
A20 Sturt Highway (Mildura to Yanga Way)	98064	82.400–162.100	513	302	524	315
A20 Sturt Highway (Mildura to Yanga Way)	T0234	162.100–165.500	513	302	524	315
Yanga Way (Sturt Highway to Tooleybuc)	97488	0.000–11.800	345	92	477	132
Yanga Way (Sturt Highway to Tooleybuc)	97494	11.800–19.800	359	96	361	100
Yanga Way (Sturt Highway to Tooleybuc)	97494	19.800–36.200	359	96	361	100
Yanga Way (Sturt Highway to Tooleybuc)	97207	36.200–49.100	316	110	314	107
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	0.000–6.930	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	6.930–7.750	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	7.750–10.402	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	10.402–11.095	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	11.095–17.340	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	17.340–18.955	26	10	31	16
Balranald-Moulamein Road (Yanga Way to Site Access 8)	MRC	18.955–22.140	26	10	31	16
Arundel Road (Balranald-Moulamein Road to Site Access 4)	-	0.000–0.710	10	4	10	4
Stony Crossing Road (Yanga Way to Swan Hill Road)	97206	0.000–40.900	174	33	176	47
Swan Hill Road (Swan Hill to Stony Crossing Road)	97200	0.000–11.100	451	77	478	80
B400 Murray River Highway (Swan Hill to Lake Boga)	-	0.000–16.000	2,165	208	2,273	203

[2] Gaz (Gazettal direction of travel or with chainage), A-Gaz (Against Gazettal direction of travel or against chainage).

An evaluation of existing road safety was also undertaken based on the TfNSW Centre for Road Safety's crash statistics between 2018 and 2022 for the Sturt Highway north of the Project Area, Yanga Way from Balranald to Tooleybuc, Balranald-Moulamein Road (from Yanga Way, through the Project Area, to northwest of Moolpa), and Stony Crossing Road from Yanga Way to Swan Hill. The search identified six crashes within relevant sections of the network. Two crashes involved minor/other injuries and four were non-casualty (towaway) crashes.

Based on the low number of crashes recorded, the spread of the locations on the network and the type of crashes recorded, it was concluded that there are not any existing road features or design deficiencies likely to be contributing to crashes in the vicinity of the Project Area.

6.7.2 Project Traffic Generation

Traffic movements generated during construction will include OSOM turbine component transport, materials and equipment deliveries, and construction staff movements. Vehicle movements were modelled for Stages 1 and 2 of the construction phase in the Traffic and Transport Assessment, noting that the Project requires a total (Stage 1 and 2) of 1,386 OSOM vehicle movements (plus 2,932 light vehicle escorts) from Port Adelaide for turbine components. Detailed predictions for materials and equipment delivery, and construction staff vehicle movements are presented in **Appendix 14**.

Traffic movements generated during operations include local worker movements and some heavy vehicle movements. The estimated workforce during the proposed 35-year operations phase of the Project is anticipated to consist of a small number of local workers. Additionally, heavy vehicle movements during operations are likely to be extremely low and are considered to be negligible from a traffic engineering or transport planning perspective.

Peak traffic movements to/from the Project Area during the decommissioning phase were conservatively estimated in the Traffic and Transport Assessment to be approximately 70% of the peak construction movements. Noting that these works are likely to occur more than 35 years in the future, when more accurate information is available closer to the start of the decommissioning works, an updated traffic impact assessment will be completed to identify proposed decommissioning works, associated traffic movements, the anticipated impact on the surrounding road network and any management and mitigation required.

The Traffic and Transport Assessment identified a number of projects in the region that may have overlapping periods of construction with the Project, which may lead to cumulative increases in traffic volumes on the critical sections of the Sturt Highway (near Balranald) and/or Yanga Way. The identified projects include:

- Balranald Mineral Sands Project
- Baldon Wind Farm
- Keri Keri Solar Farm
- Keri Keri Wind Farm
- Tchelery Wind Farm
- Wilan Wind Farm.

The Traffic and Transport Assessment notes that additional traffic expected to travel past the Project Area on the Sturt Highway from the identified wind farm projects to the east is anticipated to be limited to approximately 18 vehicles per day for turbine transport from one wind farm only at any one time.
The Traffic and Transport Assessment also identified that while specific project traffic volumes on the relevant road links adjacent to the Project Area have been identified in the Traffic Impact Assessment for the Balranald Mineral Sands Project, no data is available for the other projects identified. An allowance for additional traffic volumes on the Sturt Highway was made in the Traffic and Transport Assessment to account for the potential concurrent traffic from other projects. Refer to **Appendix 14** for detailed vehicle movement estimates for these nearby projects.

6.7.3 Impact Assessment

The Traffic and Transport Assessment determined that the critical elements of the surrounding road network in terms of the potential impact of the Project were the identified road links forming the proposed transport routes for the Project (Sturt Highway between Mildura and Yanga Way, Swan Hill Road, Stony Crossing Road, Yanga Way, Balranald-Moulamein Road and Arundel Road) and the key intersections of Sturt Highway/Yanga Way and Yanga Way/Balranald-Moulamein Road.

Assessment of the impact of the Project on these elements is provided in the following sections.

6.7.3.1 Intersections

Sturt Highway/Yanga Way

Based on the forecast peak hour traffic volumes at the intersection during the critical periods of the construction, operations and decommissioning phases of the Project, the Traffic and Transport Assessment shows that the required intersection treatments are a basic left (BAL) and a short channelised (CHRs) treatment. Based on the expected provision of an AUL and CHRs treatment at the intersection (based on upgrade of right turn treatment as part of the approved Balranald Mineral Sands Project) it is expected that the pre-Project configuration will be adequate to cater for the additional traffic movements associated with the construction (including cumulative assessment), operations and decommissioning phases of the Project.

SIDRA analysis was also undertaken to establish the operational performance of Sturt Highway / Yanga Way intersection for the relevant traffic scenarios for the Stage 1 and Stage 2 construction, operations and decommissioning phases of the Project, considering the AM and PM peak periods at the critical design horizons for each phase. The results indicate that the BAL / CHRs configuration of the Sturt Highway / Yanga Way intersection is expected to operate satisfactorily (Level of Service (LoS) A) during all Project traffic scenarios identified for the Project (including cumulative assessments).

Yanga Way/Balranald-Moulamein Road

Based on the forecast peak hour traffic volumes at the intersection during the critical periods of the construction, operations and decommissioning phases of the Project, the Traffic and Transport Assessment identified that the required intersection treatments are a basic left (BAL) and basic right (BAR) treatment. The required turn treatments at the intersection will be designed generally in accordance with relevant sections of the Austroads *Guide to Road Design* (2021).

In addition, traffic management measures including advisory “truck turning” signage will be installed on the Yanga Way approaches to the intersection during the peak construction phases of each stage of the Project, to highlight to motorists the potential presence of Project traffic at the intersection, including turning heavy vehicles to/from the side road.

Temporary pavement works will be constructed to provide additional hardstand areas to extend the trafficable surface on the north-eastern corner of the intersection to accommodate the swept paths of turbine component transport vehicle movements, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project.

As above, SIDRA analysis was also undertaken to establish the operational performance of the Yanga Way/Balranald-Moulamein Road intersection for the relevant traffic scenarios for the Stage 1 and Stage 2 construction, operations and decommissioning phases of the Project, considering the AM and PM peak periods. The results indicate that the BAL / BAR configuration of the Sturt Highway / Yanga Way intersection is expected to operate satisfactorily (LoS A) during all Project traffic scenarios identified for the Project (including cumulative assessments).

Balranald-Moulamein Road / Arundel Road

Detailed intersection analysis of the operation of the Balranald-Moulamein Road / Arundel Road intersection was not considered necessary as the proposed upgrade works at the intersection ((BAL) and (BAR)) are considered adequate to provide adequate capacity for all Project traffic scenarios, based on the low background and Project traffic volumes forecast at the intersection.

6.7.3.2 Road Network Capacity

The Traffic and Transport Assessment primarily focussed on the road capacity of relevant sections of the Sturt Highway, Yanga Way, Balranald-Moulamein Road, Arundel Road, Stony Crossing Road and Swan Hill Road, as these links are proposed to be utilised by additional traffic generated by the Project.

The Project will lead to increases of greater than 5% on the various sections of the Sturt Highway, Yanga Way, Balranald-Moulamein Road, Arundel Road (Stage 2 only), Stony Crossing Road and Swan Hill Road. The high percentage increases observed are generally as a result of the low background volumes on this section of the road network. The Traffic and Transport Assessment concluded that the existing configurations of these roads provide adequate capacity to cater for the additional traffic volumes generated by the Project.

The proposed upgrade works to the relevant sections of Balranald-Moulamein Road and Arundel Road (as part of Stage 2 works) are expected to provide adequate road configurations (widths) with suitable capacity to accommodate the additional traffic volumes generated by the Project.

As the movement of OSOM vehicles is required to be undertaken under permit (with escort vehicles) and likely out of hours, it is not anticipated that the relatively small increase in daily traffic volumes (up to 17 vehicles per day, including 5 OSOM vehicles) will have a significant ongoing impact on the operation or capacity of the roads forming the proposed turbine transport routes.

A detailed Traffic Management Plan (TMP) will be prepared as part of subsequent stages of the Project.

6.7.3.3 Access Points

An assessment of the location of each access point was undertaken and described in the Traffic and Transport Assessment, noting that adequate sight distances are expected to be available in each direction to/from each access location.

For the access locations from the Murray River Council controlled roads of Balranald-Moulamein Road and Arundel Road, the access points will be constructed generally in accordance with the site access arrangement for articulated vehicles outlined in Austroads *Guide to Road Design Part 4: Intersections and Crossings – General* (2021).

The proposed access location from Yanga Way (Access Point 1) will be arranged generally in accordance with relevant sections of Austroads *Guide to Road Design* (2012), adopting a design speed of 110 km/h and a 26 m B-Double design vehicle.

Additional hardstand areas will be constructed at each Access Point to accommodate the swept path of OSOM turbine transport vehicles, with the exact extents of these additional areas to confirmed in subsequent detailed design phases of the Project.

6.7.3.4 Pavement Impact

Heavy vehicle movements associated with the construction phase of both Stage 1 and Stage 2 of the Project are expected to lead to increases in pavement loadings on the sections of the Sturt Highway, Yanga Way, Balranald-Moulamein Road, Arundel Road, Stony Crossing Road, Swan Hill Road, and Murray River Highway, which form part of the transport routes for the Project.

It is not considered that the temporary increase in traffic on these roads during the construction phases of the Project will lead to a significant impact to the existing road pavements on the relevant sections of Yanga Way, Stony Crossing Road or Swan Hill Road. The proposed upgrade works to the relevant sections of the Murray River Council controlled Balranald-Moulamein Road and Arundel Road for each stage of the Project will provide a suitable road pavement to cater for the expected loading from the forecast Project traffic for the construction phase.

The vast majority of transport routes for OSOM vehicle movements include higher order (and volume), state-controlled roads, so it is expected that the existing road pavements on these links would be more than adequate to cater for the increase in pavement loadings during construction. However, some transport routes propose to use lower order, local government controlled road links. As such further consultation will be undertaken with relevant local government agencies regarding any required mitigation works.

Traffic movements during the operations phase of the Project will have a negligible impact to the operation (and pavement loadings) of all relevant road links.

Although any pavement loading from decommissioning will only be temporary (12-18 months) with no ongoing increase in traffic (or loading), it is expected that the decommissioning phase of the Project will have a minimal impact to the existing road pavements of the external road network. Notwithstanding, an updated traffic impact assessment be completed as part of the required decommissioning and rehabilitation strategy.

Pre and post construction phase dilapidation inspections will be undertaken on the relevant road sections used by Project traffic.

6.7.3.5 Road Safety

A high-level road safety assessment was undertaken to establish existing and post development road safety risks relevant to the Project. The road safety assessment shows that with mitigation measures proposed throughout this section (and summarised in **Section 6.7.4**), no risk score is greater than Medium (refer to **Appendix 14**).

6.7.4 Summary of Mitigation Measures

The following mitigation treatments will be undertaken as part of the Project:

6.7.4.1 Construction Stage 1

- Completion of works along the identified transport route to accommodate the swept paths of the OSOM turbine component transport vehicles, including the relocation of signage and road lighting infrastructure and construction of required temporary hardstand pavement areas as identified in the Preliminary Transport Route Assessment for the Project (refer to **Appendix 4**). It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the turbine component and transport vehicle configurations are confirmed.

- Further consultation with the relevant local government road authorities will be required to establish infrastructure or maintenance agreements to cover any required works to offset the potential pavement impacts of the OSOM vehicle movements for the Project on the lower order, local government controlled road links along the identified OSOM transport routes.

- Pre and post dilapidation inspections to be undertaken on the sections of the local government roads used by Project traffic, with these inspections to be completed by representatives of Windlab and the appropriate council. These inspections are required to identify and document the current condition of the roads (pre-construction) and establish the required maintenance and/or rehabilitation works deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic at the completion of their use.

- Provision of upgrade works to the Yanga Way / Balranald-Moulamein Road intersection to provide basic right (BAR) and basic left (BAL) turn treatments, generally in accordance with Figure 8.2 of Part 4A (rural BAL) and Figure A6 of Part 4 (rural BAR) of Austroads *Guide to Road Design* (2021). Also provision of additional hardstand area required to accommodate OSOM turn movements (as per Rex J Andrews Route Assessment).

- Provision of upgrade works to the section of Balranald-Moulamein Road between Yanga Way and Site Access 5 (Site Access 5 – approximately 11.095 km). These upgrade works are proposed to include road grading and resheeting works to provide a suitable unsealed (gravel) road surface up to 8 m minimum in width (to match the current minimum road width on this link).

- Provision of suitable site access configurations at Site Access 2, 3 and 5 on Balranald-Moulamein Road, with provision for additional hardstand areas as required to accommodate OSOM heavy vehicle movements. It is proposed that these site access points are to be provided generally in accordance with the site access arrangement/configuration outlined in Figure 7.4 of Austroads *Guide to Road Design Part 4: Intersections and Crossings – General* (2021).

- Installation of advisory "truck turning" signage be installed on the approaches to the Yanga Way / Balranald-Moulamein Road intersection, to highlight to motorists the potential for turning heavy vehicles to/from the side road.

- Preparation of a Traffic Management Plan for Stage 1 of the Project outlining proposed management measures and processes to minimise the impact of Project traffic (including OSOM turbine component transport vehicles) on the external road network.

6.7.4.2 Construction Stage 2

- Completion of identified route upgrade works as identified in Rex Andrews route assessment, if previous route works have been remediated upon completion of Stage 1 OSOM haulage operations.

- Provision of basic right (BAR) and basic left (BAL) turn treatments, as well as additional hardstand area required to accommodate OSOM turn movements (as per Rex Andrews Route Assessment), at the proposed Yanga Way / Site Access 1 intersection.

- Provision of upgrade works to the Balranald-Moulamein Road / Arundel Road intersection to provide basic right (BAR) and basic left (BAL) turn treatments, generally in accordance with Figure 8.2 of Part 4A (rural BAL) and Figure A6 of Part 4 (rural BAR) of Austroads *Guide to Road Design* (2021).

- Provision of upgrade works to the section of Balranald-Moulamein Road between Site Access 5 and Site Access 8. These upgrade works are proposed to include road grading and resheeting works to provide a suitable unsealed (gravel) road surface up to 8 m minimum in width.

- Provision of upgrade works to the section of Arundel Road between Balranald-Moulamein Road and Site Access 4. These upgrade works are proposed to include road grading and resheeting works to provide a suitable unsealed (gravel) road surface up to minimum 7 m width (on 9 m formation).

- Pre and post construction phase dilapidation surveys will be required to be undertaken on the relevant sections of Balranald-Moulamein Road (Yanga Way to Site Access 8) and Arundel Road (Balranald-Moulamein Road to Site Access 4). The pre construction inspection is to be undertaken upon the completion of the proposed regrading / resheeting works and is to establish the pre-construction road condition, with the post construction dilapidation survey then used to identify rehabilitation works required to be completed by the Project to bring road conditions / standards on this section of Balranald-Moulamein Road back to the recorded pre construction condition.

- Provision of suitable site access configurations at Site Access 6,7 & 8 on Balranald-Moulamein Road and Site Access 4 of Arundel Road, with provision for additional hardstand areas as required to accommodate OSOM heavy vehicle movements. It is proposed that these site access points are to be provided generally in accordance with the site access arrangement/configuration outlined in Figure 7.4 of Austroads *Guide to Road Design Part 4: Intersections and Crossings – General* (2021).

- Installation of advisory “truck turning” signage be installed on the approaches to the Yanga Way / Balranald-Moulamein Road and Balranald-Moulamein Road / Arundel Road intersections, to highlight to motorists the potential for turning heavy vehicles to/from the side roads.
- Preparation of Traffic Management Plan for Stage 2 of the Project outlining proposed management measures and processes to minimise the impact of Project traffic (including OSOM turbine component transport vehicles) on the external road network.

6.8 Water and Soils

To address the SEARs for the Project in relation to water and soils a Water Resource Impact Assessment (WRIA) was prepared by Umwelt (refer to **Appendix 15**) and a Flood Impact Risk Assessment (FIRA) was prepared by WRM Water & Environment (refer to **Appendix 16**). The Project SEARs for soil and water are:

- An assessment of the likely impacts of the development (including flooding and flood modelling) on surface water and groundwater resources traversing the site and surrounding watercourses (including their Strahler Stream Order), drainage channels, wetlands, riparian land, farm dams, groundwater dependent ecosystems and acid sulfate soils, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts.
- A site water balance for the development, quantify water demand, identify water sources (surface and groundwater), including any licensing requirements, and determine whether an adequate and secure water supply is available for the development.
- Where the project involves works within 40 metres of the high bank of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the *DPI Guidelines for Controlled Activities on Waterfront Land* (2018) and (if necessary) W*hy Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (DPI 2003); and *Policy & Guidelines for Fish Habitat Conservation & Management* (DPI, 2013).
- A description of the measures to minimise surface and groundwater impacts, including how works on erodible soil types would be managed and any contingency requirements to address residual impacts in accordance with the Managing Urban Stormwater: Soils and Construction series of guidelines.

A summary of the key outcomes of the WRIA and FIRA is presented in this section.

6.8.1 Existing Environment

6.8.1.1 Catchment Properties

The Project Area is located on the lower Murrumbidgee floodplain, within the Murrumbidgee and Murray River catchment systems. The Murrumbidgee River is located to the north and west of the Project Area and flows in a south-westerly direction, joining the Murray River about 10 km west of the Project Area.
The Murrumbidgee River is the major drainage feature in the vicinity of the Project.

The Project Area is located within an area of flat topography, varying between about 50 and 80 mAHD, and poorly defined waterways with numerous lakes. The majority of the flow paths within the Project Area are unnamed and generally without a well-defined drainage channel. Watercourses within the Project Area are predominantly 1st and 2nd order streams, with one 3rd order stream (based on the Strahler stream ordering system). The 1st and 2nd order unnamed streams within the Project Area flow towards the south to discharge into The Forest Creek. The Forest Creek, a 3rd order stream, is located towards the southeast of the Project Area, and flows to the southwest, discharging into Edward River, approximately 5 km southwest of the Project Area boundary. The Edward River flows in a southwest direction and discharges into Wakool River, a tributary of the Murray River. In the northern region of the Project Area, Condoulpe Creek, a 1st order stream, flows north through the Project Area into Condoulpe Lake. Condoulpe Creek continues through and north of Condoulpe lake, flowing in a northwestern direction through the Project Area towards Yanga Lake. Yanga Lake, located approximately 5 km north of the Project Area boundary, discharges into Yanga Creek, a tributary of the Murrumbidgee River.

The closest active Bureau of Meteorology (BoM) daily rainfall gauge to the centre of the Project Area with long term continuous records is Balranald (RSL) (BoM Station 049002), approximately 15 km to the north of the Project Area. The Balranald (RSL) gauge covers a continuous record of over 145 years from 1879 to present. Mean annual rainfall is 321 mm with the highest monthly rainfalls occurring between May and October with the highest annual rainfall (692.3 mm) recorded in 1973. Mean annual evaporation is 1,826 mm, which is nearly six times the mean annual rainfall.

Modelled soil properties sourced from Digital soil maps for key soil properties over New South Wales (DPE, 2022) indicate that the Project Area soils:

- are fine textured (sand <70%) and moderately to highly erodible
- have a generally neutral pH and are non-saline
- consist of non-sodic topsoil and are not expected to be dispersive with some slightly sodic subsoils and may exhibit dispersive behaviour
- are likely to be moderately fertile.

There are no known occurrences of acid sulfate soil (ASS) within the Project Area.

6.8.1.2 Groundwater

A Groundwater Dependent Ecosystem (GDE) is an ecosystem which relies on the availability of groundwater to maintain structure and function. Terrestrial (including riparian vegetation) GDEs are dependent on the subsurface presence of groundwater, aquatic (including baseflow systems and swamps) GDEs are dependent on the surface expression of groundwater.

A review of the GDE mapping provided by the BoM (2017) indicates that terrestrial and aquatic GDEs of high, moderate and low potential are identified within and surrounding the hydrological features of the Project Area. The GDEs within and surrounding the Project Area are shown in **Figure 6.10**.

Groundwater vulnerability is described by the NSW Government (2023) as the vulnerability or risk of aquifers to contamination, relating to physical characteristics of the location, such as the depth to the water table and soil type. A review of mapping provided by the NSW Government (2014) identified no areas of groundwater vulnerability within or in close proximity to the Project Area.

There is one current groundwater bore within the northern part of the Project Area with another located outside but close to the northern Project Area boundary (WaterNSW "All Groundwater Map" 2023). There are several other discontinued groundwater bores with varying proximity to the Project Area (refer **Figure 6.10**). The groundwater bores closest to the Project Area boundary have minimum recorded depths ranging from 9.00 metres below ground level (mbgl) to 14.47 mbgl. Geotechnical investigations undertaken by Windlab did not encounter groundwater over the depth of auger drilling within each borehole, or within test pit excavations from surface to termination depth, which ranged from 4.8 m to 9.8 m across the Project Area. Groundwater depth was not able to be inferred during washbore drilling, due to the method of drilling adopted which required water re-circulation within the borehole.

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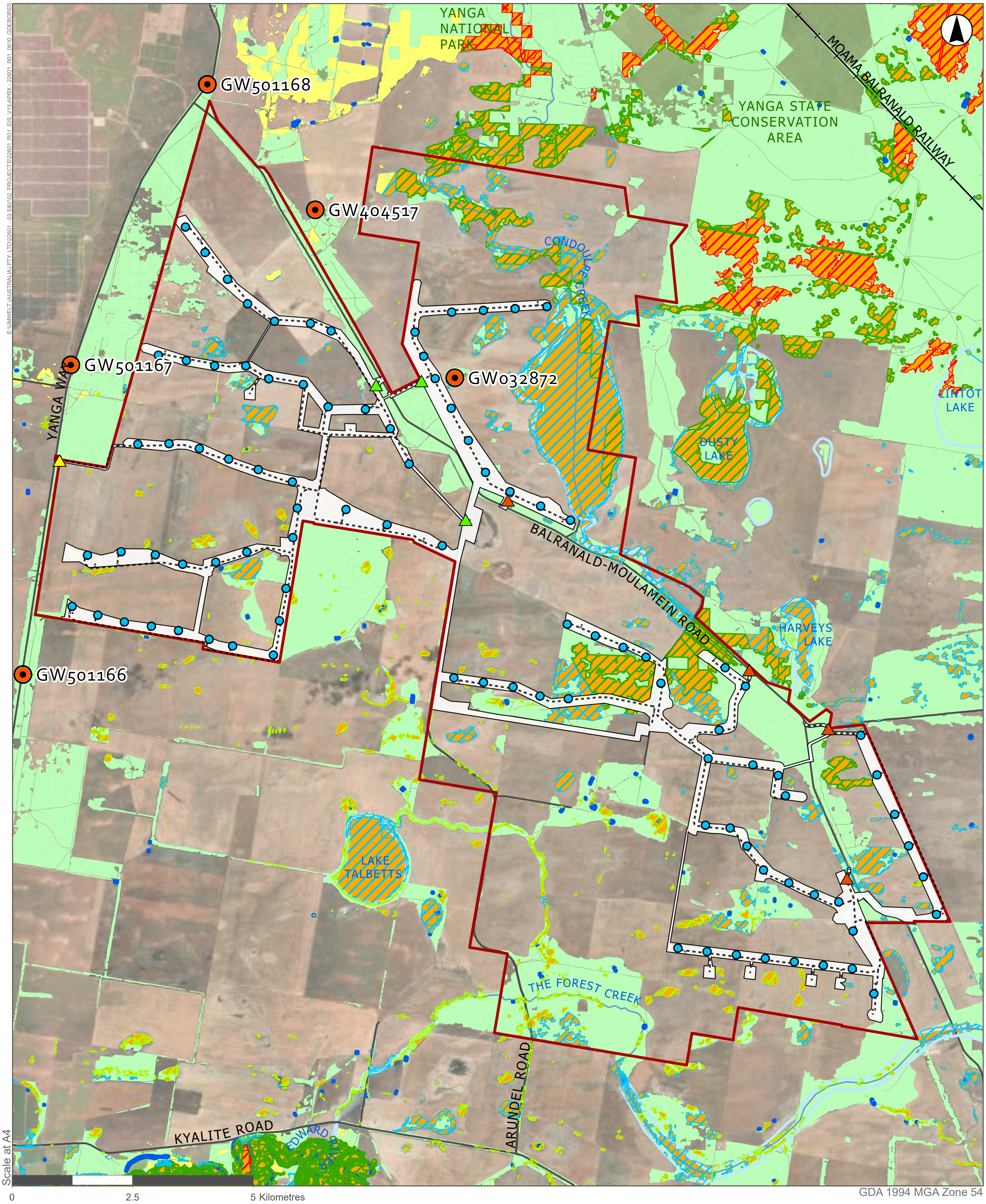

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve
- Groundwater Bores

Terrestrial GDE Probability

- High
- Medium
- Low

Aquatic GDE Probability

- Very High
- High
- Medium
- Low

FIGURE 6.10

Groundwater Dependent Ecosystems and Groundwater Bores

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.8.1.3 Water Extraction and Users

The *Water Management Act 2000* (WM Act) is the key piece of legislation for water resource management in NSW. Under the WM Act, Water Sharing Plans (WSPs) have been developed to protect the environmental health of water sources, whilst securing sustainable access to water for all users. The WSPs specify maximum water abstraction and allocations and provide licensed and unlicensed water users with a clear picture of water availability. All water abstraction in NSW, apart from some exemptions for basic landholder rights extractions and pollution control, must be authorised by a Water Access Licence (WAL).

The Project Area is located within the Murrumbidgee and Murray regions and is therefore subject to the following WSPs.

Murrumbidgee Region

Surface water for the Project within the Murrumbidgee region is managed under the following WSP:

- Murrumbidgee Unregulated River Water Sources 2012 – the Project Area is located within the Murrumbidgee Western Water Source in the Unregulated Murrumbidgee Gogeldrie to Welmby Extraction Management Unit (DPE, 2012).

Groundwater for the Project within the Murrumbidgee region is managed under the following WSPs:

- Murrumbidgee Alluvial Groundwater Sources 2020 – the Project Area is located within the Lower Murrumbidgee Deep Groundwater Source and the Lower Murrumbidgee shallow Groundwater Source (DPE, 2020a).
- NSW Murray-Darling Basin (MDB) Fractured Rock Groundwater Sources 2020 - the Project Area is located within the Lachlan Fold Belt MDB Groundwater Source (DPE, 2020b).

Murray Region

Surface water for the Project within the Murray region is managed under the following WSP:

- Murray Unregulated River Water Sources 2011 - the southern extent of the Project is located within the Murray Below Mulwala Water Source in the Unregulated Middle Murray Extraction Management Unit (DPE, 2011).

Groundwater for the Project within the Murray region is managed under the following WSP:

- Murray Alluvial Groundwater Sources 2020 - the southern extent of the Project is located within the Lower Murray Groundwater Source in the Lower Murray Shallow (Western) Management Zone (DPE, 2020c).

Licensed surface water users within the receiving environment immediately downstream of the Project Area vicinity that may potentially be impacted by the Project are located within the Murrumbidgee Western Water Source and the Murray Below Mulwala Water Source. A search of the NSW Water Register indicates that as of May 2024:

Surface Water

- 25 Water Access Licences (WALs) with a total of 14,960 unit shares were allocated in the Murrumbidgee Western Water Source. The predominant water use for WALs is irrigation.

- 99 WALs with a total of 27,732 unit shares were allocated in the Murray Below Mulwala water source. The predominant water use for WALs is irrigation.

Licensed groundwater users that may potentially be impacted by the Project are located within the Lower Murrumbidgee Deep Groundwater Source, the Lower Murrumbidgee Shallow Groundwater Source, the Lachlan Fold Belt MDB Groundwater Source and the Lower Murray Groundwater Source. A search of the NSW Water Register indicates that for the 2022/2023 financial year:

Groundwater

- 404 WALs with a total of 275,402 unit shares were allocated in the Lower Murrumbidgee Deep Groundwater Source.
- 30 WALs with a total of 5,201 unit shares were allocated in the Lower Murrumbidgee Shallow Groundwater Source.
- 1,111 WALs with a total of approximately 78,314 unit shares were allocated in the Lachlan Fold Belt MDB Groundwater Source.
- 364 WALs with a total of 84,789 unit shares were allocated in the Lower Murray Groundwater Source.

The predominant water use across the WSPs is irrigation.

There are no WALs associated with the host landowners on which the Project is located or immediately downstream of the Project Area.

6.8.2 Project Water Demand, Supply and Disposal

It is estimated that 400–500 mega litres (ML) of water may be required over the four-year construction period. The assumed peak and average daily breakdown of water requirements for the construction period is:

- Peak daily demand of 600–700 kL/day raw with 40 kL/day potable water
- Average daily demand of 300–350 kL/day raw with 20 kL/day of potable water.

The final quantity will depend on detailed design, earthworks quantities as well as environmental conditions at the time.

The Project construction water demands will include:

- soil and fill conditioning
- dust suppression
- concrete production
- concrete washout
- vehicle and equipment wash down
- amenities.

Water for construction and operational phase non-potable water demands could be supplied from one or a combination of the following sources:

- Mains water supply, Balranald Shire Council and potentially Murray River Shire Council (via water truck).
- Harvested runoff from farm dams under agreement with host or local landholders.
- Groundwater from licenced bores under agreement with host or local landholders.
- Extraction from Edward River and/or Wakool River to south of Project Area under agreement with host or local landholders.
- Harvested runoff from disturbed areas captured in excavations or sediment basins/traps constructed to prevent sediment transport off-site.
- Recycling and reusing water.

During operations, up to 0.2 ML per year would be required for ongoing maintenance activities such as amenities and potable purposes by operational staff, and equipment washing down, if required. A static water supply, with the capacity to be determined during the detailed design phase, will also be established and maintained for fire protection.

Potable water demands for all phases of the Project will be supplied via water tanker and stored in on-site water tanks. Potable water storages will be routinely tested to ensure water quality meets the requirements of the Australian Drinking Water Guidelines (ADWG) (National Health and Medical Research Council, 2011) and an appropriate maintenance regime will be implemented to ensure ADWG water quality standards are maintained.

Wastewater generated by amenities during the Project construction phase will be collected in a tanks and periodically removed by a suitably licensed waste contractor. During the operational phase of the Project, the volume of amenities wastewater will be significantly lower than that generated in the construction phase and will be managed by either collection in tanks and periodic removal by a suitably licensed waste contractor or in an on-site wastewater management system.

6.8.3 Impact Assessment

The WRIA and FIRA discusses potential impacts to water resources as a result of the Project in relation to:

- potential impacts to flooding, including flow rates, velocities, and depths
- potential impacts to surface water quality on receiving and downstream waterways
- potential impacts to groundwater, including impacts to downstream users and GDEs
- potential impact on water supply.

6.8.3.1 Flooding Impacts

The flood assessment was undertaken for 10%, 1%, 0.5% and 0.2% Annual Exceedance Probability (AEP) events and the Probably Maximum Flood (PMF). AEP is a measure of the likelihood a flood level or flow will be equalled or exceeded in any given year (note that the 1% AEP event is sometimes referred to as the 1 in 100 year event, however, the AEP terminology is used in this assessment). The PMF is the largest flood that could be conceivably expected to occur at a particular location.

Inundation within the Project Area could occur, exclusively or as a combination of three mechanisms:

- Site runoff: Short duration (< 60 minutes) intense rain failing directly on the Project Area.
- Local catchment flooding: Medium duration (1 hour–6 hours) rain falling on land draining to the Project Area.
- Regional flooding: Long duration (6–72 hours) arriving from rainfall falling on the catchments of the Murrumbidgee or Murray Rivers upstream of the Project Area.

The 2023-03-AC version of the two-dimensional TUFLOW hydrodynamic model (BMT, 2018a) was used to simulate the flow behaviour in the vicinity of the Project Area. The model provided estimates of flood levels, depth, velocities and flood hazard for each of the modelled design events. The hydraulic model was run for both existing and climate change conditions. Climate change modelling was undertaken using the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood-producing rainfall events due to climate change.

The potential contribution of regional flooding caused by Murray or Murrumbidgee River breakouts draining to the Project Area was investigated via a test model. The test model indicated that the Project Area was at a sufficient elevation that it was not at risk of regional flooding.

Flood Modelling Results

Detailed flood modelling results are provided in Appendix A of the FIRA (refer to **Appendix 16**) and summarised below for key modelled events.

10% AEP Event

There is generally no widespread flooding within the Project Area, with active flow paths confined within the watercourses and local depressions. General overland flood flow depths outside of the main waterway alignments are typically shallow at less than 0.1 m. The greatest depths within the watercourses within the Project Area are up to 0.8 m. Most Project infrastructure is outside of the 10% AEP flood level, with two turbines and the central substation/BESS/STATcom area being within this flood level.

Most of the Project Area for this flood event is free from flood hazard with small areas of H1: 'Generally safe for vehicles, people and buildings' within depressions across the Project Area and isolated areas of higher flood hazard (H4 and higher) predicted but generally confined to defined drainage lines and Lake Condoulpe. One turbine and the central substation/BESS/STATcom area are located within the H4: 'Unsafe for vehicles and people' risk category.

1% AEP Event

The general flood inundation extents are increased from the 10% AEP event, with increasing depths and velocities associated with the higher flows. There is water, generally at depths of up to 0.5 m, within depressions across the Project Area with some deeper areas generally within the western part of the Project Area. Most Project infrastructure is outside of the 1% AEP flood level (refer to **Figure 6.11**), with a few turbines located in areas of water depth up to 0.5 m with three turbines located in areas of water depth 1.5–2.0 m. The central substation/BESS/STATcom area is located in a flood depth area of 1.5–2.0 m and Site Access 1 is within flood depth area of 2.0–2.5 m.

The flood hazard for this flood event is very similar to the 10% AEP event, with an increase in the Project Area classified as H1: 'Generally safe for vehicles, people and buildings' within depressions and the lower lying areas of the Project Area. One turbine, the central substation/BESS/STATcom area and Site Access 1 are located within the H4: 'Unsafe for vehicles and people' risk category with three additional turbines in close proximity to the H4 risk category.

Windlab has committed to providing 500 millimetres freeboard above the 1% AEP flood level for the central substation/BESS/STATcom infrastructure, with the details to be determined during the detailed design phase.

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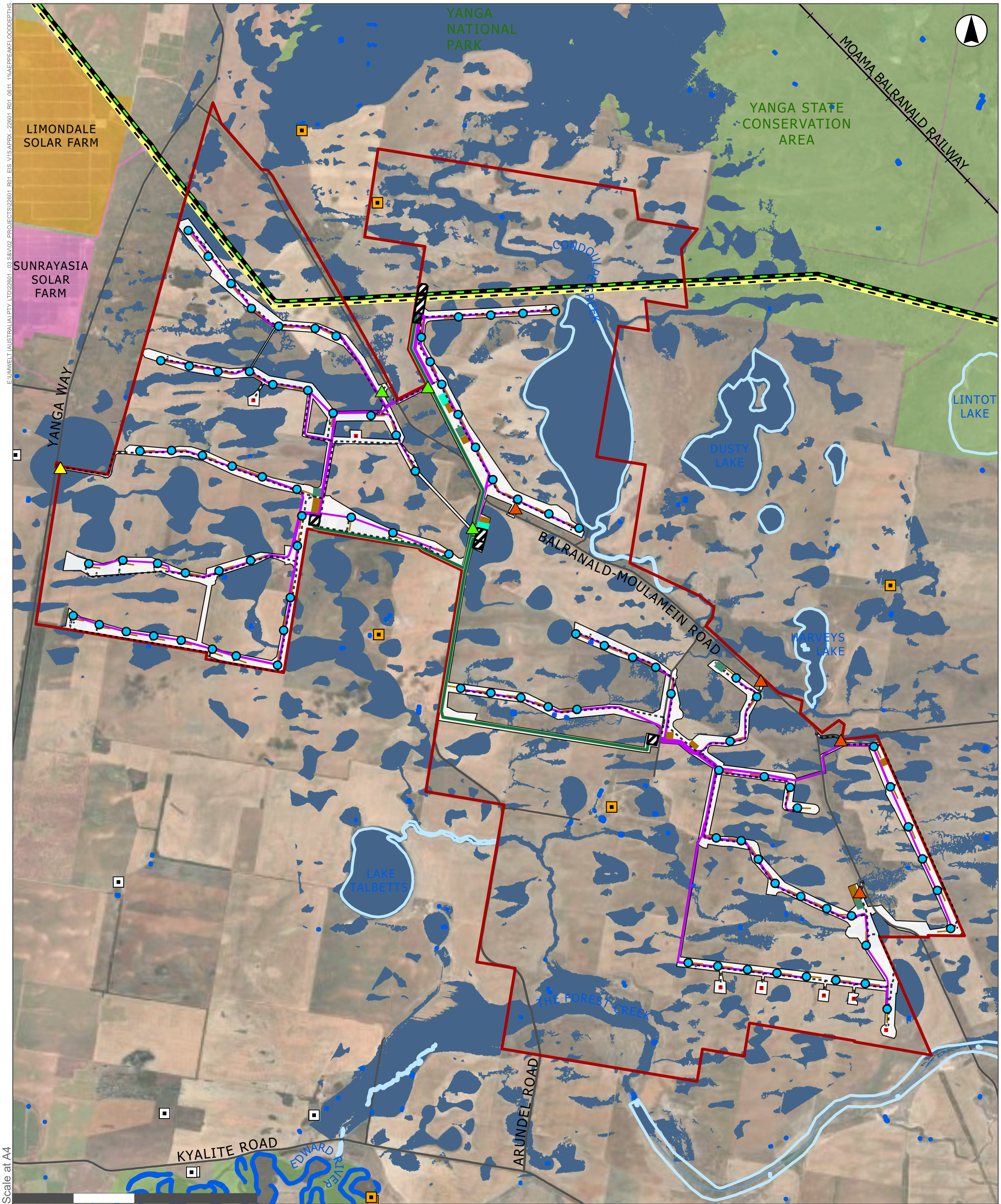

GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Limondale Solar Farm
- Sunrayasia Solar Farm
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- 33 kV Internal Reticulation (underground)
- 330 kV Internal Reticulation (overhead)
- Operations and Maintenance Compound
- Concrete Batching Plant
- Temporary Construction Facilities
- BESS/STATcom/Substation/Switching Station
- Associated Dwelling
- Non-Associated Dwelling
- Permanent Power Performance Mast (Potential Location)
- 220 kV TransGrid Transmission Line
- Project Energy Connect Transmission Line
- Mainly Dry/Non-Perennial Waterbody
- Perennial Waterbody
- Watercourse
- Road
- Railway
- NPWS Reserve
- 1% AEP Flood Depth Extents

FIGURE 6.11

1% AEP Peak Flood Depths (Existing Conditions)

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

Climate Change Modelling

The 0.5% and 0.2% AEP year flood events were used as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change. Results show the flood depths are only marginally larger than those of more frequent events, with a median depth of 0.13 m and a peak depth of 1.7 m, indicating the inundation impact of climate change is not anticipated to be a significant issue for the Project.

PMF Event

The general flood inundation extents have significantly increased from the 0.2% AEP event, with increasing depths predicted throughout the Project Area. The northeastern and southern extent of the Project Area has significant areas of inundation and flood free access to the Project area is not possible.

6.8.3.2 Surface Water Quality Impacts

Construction and Decommissioning

Water quality impacts are most likely to be experienced during the construction and decommissioning stages of the Project when soils would be subject to disturbance due to vegetation removal, excavation works and stockpiling of materials, which can potentially lead to sediments and/or pollutants (e.g. nutrients in the soil) mobilising in runoff and entering local waterways and farm dams.

The key factor influencing the extent of sediment runoff and stormwater pollution is likely to be weather events. The occurrence of a major storm event at a critical phase of the construction period could potentially result in higher levels of turbid runoff. With the implementation of erosion and sediment controls and materials storage and handling requirements (outlined in **Section 6.8.4**) potential water quality impacts would be appropriately managed and are expected to be minor.

In addition, the potential exists for spills (such as hydraulic oil and fuels from equipment or vehicles as well as concrete spills, building materials and chemicals) that could interact with water resources. With the implementation of the control measures outlined in **Section 6.8.4**, potential construction-related soil and water contamination would be appropriately managed and the risk associated with this potential impact is expected to be minor.

During the construction phase there will be a requirement to construct waterway crossings within the Project Area to allow for access tracks to be constructed. Detailed design will be undertaken prior to any works commencing and appropriate erosion and sediment controls implemented (refer to **Section 6.8.4**).

As discussed in **Section 6.8.1.1**, the Project Area includes areas with moderately to highly erodible soils. An erosion hazard assessment was undertaken for the Project Area in accordance with Chapter 4.4.1 of Volume 1 of the ‘Blue Book’ and identified that the Project Area has a low erosion hazard. As such, standard erosion control measures will be applied during construction.

Enhanced erosion control measures would be applied to disturbance areas within the bed and bank of streams and within 40 m of the top of bank defined streams (i.e. waterfront land). It should be noted that the extent of disturbance in these areas will be small when compared to the overall Project Site and appropriate erosion and sediment controls (which are well understood and readily implementable) will limit the potential for erosion related impacts.

Appropriate erosion and sediment controls will be designed, installed and maintained in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Volume 2 (DECC, 2008) (the 'Blue Book'). Construction works timing restrictions will be applied to areas of waterfront land as detailed in Table 3.1 of the WRIA (refer to **Appendix 15**). Where scheduling to avoid works on these areas during periods of high rainfall erosivity is not possible or is impractical, enhanced erosion control measures will be implemented to ensure disturbed lands retain adequate ground cover and management regimes will be established so that works areas can be stabilised within 24 hours if necessary due to forecast rainfall. Further details on erosion and sediment controls are contained in **Section 6.8.4**.

Operations

Water quality impacts during the operational stage are expected to be minimal as the day-to-day activities would be limited to routine maintenance and monitoring. Potential impacts during this phase would be limited to:

- Stormwater runoff from impervious surfaces resulting in localised erosion.
- Accidental spills or discharge through use and storage of chemicals such as fuel.
- Effluent discharges from on-site wastewater management system to receiving groundwater or surface water sources.

Erosion and sedimentation risk during operations will be controlled through the establishment of effective site stabilisation measures following construction and maintenance of access tracks, waterway crossings and other areas susceptible to erosion. All hazardous materials and chemicals will be stored in accordance with relevant Australian standards and other state and local guidelines including the NSW EPA's Storing and Handling Liquids: Environmental Protection – Participants Handbook (DECC, 2007). The on-site wastewater management system will be designed by a an appropriately qualified and experienced specialist in accordance with any local government standards and guidelines.

6.8.3.3 Impacts on Stream Stability, Riparian Health and Fish Passage

While the Project design has aimed to avoid works close to or within waterways where practicable, several waterway crossings will be required for internal access roads and the electrical cabling layout. Project waterway crossings will be designed to minimise impacts on stream stability and fish passage and will be designed with reference to relevant guidelines and policies. During detailed design, consultation will be undertaken with DPI Fisheries to determine if any of the proposed waterway crossings require consideration of fish passage.

6.8.3.4 Water Supply Impacts

A site water balance was completed for the Project (refer to **Appendix 16**). A summary of the site water balance is presented in **Table 6.25**. The water balance indicates that an adequate and secure water supply is available for the Project.

Table 6.25 Site Water Balance Summary

Deman/Supply	Activity	Construction phase (4 years)	Operational (annual)
Water demands	Dust suppression	100 ML (median) 200 ML (dry)	2 ML/a
Water demands	Construction activities	300 ML	-
Water demands	Potable	~1 ML	~0.1 ML/a
Water demands	Total water demand	401 ML–500 ML	2.1 ML/a
Water supply	External raw water (Balranald Shire Council)[3]	350–400 ML[4] acquired from licensed sources or via agreements	0
Water supply	Collected runoff within Project Area[5] (where possible)	0–50 ML[6]	2 ML/a
Water supply	Dry weather contingency	100 ML (dry)	
Water supply	External potable water	1 ML purchased	~0.1 ML purchased

Water sources would be confirmed during detailed design phase and in consultation with suppliers and landholders. A water sourcing strategy will be developed with consideration of all relevant legislation and with the objective of ensuring water used during the construction phase does not result in a loss of supply to adjacent landowners or other water users.

6.8.3.5 Groundwater Impacts

Geotechnical investigations undertaken by Windlab did not encounter groundwater in auger drilling or within test pit excavations to depths of 4.8 m to 9.8 m across the Project Area. Further, groundwater bore data sourced from WaterNSW's real time monitoring website indicates the depth to groundwater in close proximity to the Project boundary ranges from 9.00 to 14.47 mbgl. Given excavations associated with the Project are anticipated to be limited to 5 mbgl (for wind turbine foundations), no interaction with the groundwater table is anticipated during construction or decommissioning. Given the depths to groundwater, any hydrocarbon/chemical spills are unlikely to infiltrate to the groundwater table.

Interactions with the groundwater table are not expected during the operational phase of the Project.

As such, no impacts to groundwater resources or GDEs are expected during the construction, decommissioning or operational phases of the Project.

6.8.4 Mitigation and Management Measures

The mitigation and management measures to be implemented as part of the Project to minimise impacts on water resources are:

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3 Negotiated supply from Balranald Shire Council standpipe.
4 Balance of demand after allowing for captured site runoff.
5 Maximum harvestable right for Project Area is 656 ML/a.
6 Indicative estimate.

6.8.4.1 Flooding

- An Emergency Response Plan (ERP) to be prepared in accordance with the NSW Government's Flood Risk Management Toolkit.
- The ERP is to include consideration of emergency site access/egress specifically under flood conditions, noting the Site Access 1 may not be trafficable in certain flood conditions.
- Flood emergency management procedures and training should be provided for staff working at the Project including a formal induction, annual testing of ERP procedures including review and update.
- Operations staff will have access to the following facilities for early severe weather warnings: The Bureau of Meteorology's "MetEye" and The Bureau of Meteorology's "RSS feeds". Radio and Bureau of Meteorology information will be reviewed frequently for potential major weather events. Facility members and visitors can be notified of potential flooding, road and facility closure.
- If sheltering in place is the selected response action stocking of food and medications is undertaken by occupants according to the maximum possible duration of isolation.
- Evacuation routes will be designed during the detailed design phase and will take into account zones of flood hazard. The Project Area is free from regional riverine flooding from the Murrumbidgee and Murray Rivers, and flood risks are from flash flooding of the local creeks.
- Project infrastructure, such as inverters and battery storage, will be located with a minimum 300 mm freeboard above the maximum 1% AEP flood level. Given the shallow depths across the Project Area, the minor raising of a sensitive location within the Project with a small fill pads is unlikely to result in any adverse impacts offsite.
- Foundations for the wind turbines and transmission lines will be located away from areas that exceed both flood depths of 0.3 m and flow velocities greater than 1.5 m/s. Detailed design of the Project will consider the results of the flood models, in particular the 1% AEP scenario.

6.8.4.2 Surface Water

- No sensitive infrastructure (e.g., substations) will be placed within 20 m of any Strahler 3 or above order stream.
- All waterway crossings will be designed and constructed in accordance with the Department of Primary Industries, Office of Water, Guidelines for riparian corridors on waterfront land and guidelines for watercourse crossings on waterfront land.
- Water sources would be confirmed during detailed design phase and in consultation with suppliers and landholders and be subject to availability. A water sourcing strategy will be developed so that water used during the construction phase does not impact on the availability of water to nearby/downstream landowners water users.
- Any water supplied to the Project from existing water sources will be sourced under agreement with relevant landholders while ensuring WALs, works approvals and water use approvals required under the WM Act (2000) are in place.

- The on-site wastewater management system will be designed by an appropriately qualified and experienced specialist in accordance with any local government standards and guidelines. Site specific soil testing will be undertaken to confirm the suitability and size of the effluent application area.
- A Construction Soil and Water Management Plan (CSWMP) will be prepared in consultation with NSW Water Group to outline measures to manage soil and water impacts associated with the construction and decommissioning works. The CSWMP will provide:
    - Measures to minimise/manage erosion and sediment transport both within the construction footprint and offsite including requirements for the preparation of erosion and sediment control plans (ESCP) for all progressive stages of construction.
    - Measures to manage waste including the classification and handling of spoil.
    - Procedures to manage unexpected finds of contaminated soils.
    - Measures to manage stockpiles of topsoil and spoil including locations, separation of materials and erosion and sediment control measures.
    - Hazardous material storage requirements and measures to manage accidental spills including the requirement to maintain materials such as spill kits.
    - Specific control measures for works on waterfront land which may include timing restrictions and wet weather protocols.
    - Design standards for drainage, erosion and sediment controls.
    - Detailed requirements for rehabilitation of disturbed areas to minimise the risk of ongoing erosion post construction.
    - Erosion and sediment control measures will be implemented and maintained at all work sites in accordance with the principles and requirements in Managing Urban Stormwater - Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008b), commonly referred to as the “Blue Book”.
- An Operational Environmental Management Plan (OEMP) will be developed for the Project, including measures to address potentially adverse impacts on the receiving environment surface water quality during the operational phase. This will include the development and appropriate maintenance of suitable ground cover around wind turbines, and grassed table drains near access tracks to minimise the potential for erosion and export of sediment. Additional measures for the treatment of Project Area stormwater runoff are not considered necessary.
- All hazardous materials and chemicals will be stored in accordance with relevant Australian standards and other state and local guidelines including the NSW EPA’s Storing and Handling Liquids: Environmental Protection – Participants Handbook.

6.9 Air Quality

In relation to the Project, the SEARs require an assessment of risks of dust generation and proposed mitigation measures designed in accordance with the *Approved Methods and Guidelines for the Modelling and Assessment of Air Pollutants in New South Wales* (DECC, 2005).

The Project will generally contribute to positive air quality outcomes through reductions in greenhouse gas emissions in comparison to other electricity generating sources, including traditional coal-fired power stations.

Air emissions from the Project Area would be predominately associated with the proposed construction activities. Construction air emissions would include dust generated through ground disturbance, civil construction activities and plant/vehicle exhaust emissions. These emissions would be temporary, for the duration of the construction phases (i.e. approximately 48 months).

During construction, dust particles and other emissions may be released from a range of activities including:

- vegetation clearing
- upgrades of access tracks and roads
- stockpiles
- open and exposed areas
- excavation works
- mobile concrete batching plants
- rock crushing
- processing and handling of material
- construction activities and associated earthmoving and construction equipment
- loading and unloading of material
- vehicle movements along unsealed roads.

The construction activities that may generate dust will be localised and small at any one time in the context of the overall scale of the Project Area, and with appropriate controls in place as outlined below, are not predicted to result in material air quality impacts.

During operations, the lowest WTG blade edge point for the Project will be approximately 49 m above the ground. While turbine rotation does cause some downstream wake effects (a type of turbulence) for a distance beyond the WTG, the effect is very high above ground, such that it is not noticeable at ground level, and not to a degree that could draw up air to spread dust and seeds.

The primary source of air emissions during operations will be emissions from vehicle movements along site access tracks, however, the risk will be much lower than for construction given the much lower intensity of vehicle movements and can be mitigated via effective road maintenance and vehicle speed management.

With the implementation of the mitigation measures discussed below, the construction and operation phases of the Project are not predicted to result in significant air quality impacts.

6.9.1 Mitigation and Management Measures

The temporary impacts to air quality during construction would be subject to a range of management and mitigation measures through the implementation of a CEMP. The CEMP would be developed during the detailed design and pre-construction phases and would include management measures to limit dust generation and the potential for off-site dust impacts. Specific measures in the CEMP to address air quality impacts will include:

- Minimise the area exposed by construction at any one time by minimising clearing and ground disturbance to the minimum necessary and progressively rehabilitating disturbed areas as construction is completed in each area.
- Minimise dust emissions from areas exposed by construction through the application of water and/or dust suppressants using a water cart or products such as emulsion polymers (as required).
- Locate, shape and seed longer-term topsoil stockpiles in a strategic manner to minimise dust erosion from exposed surfaces.
- Implement and enforce speed limits for construction vehicles and equipment on unsealed access tracks and hardstand areas.
- Limit construction activities during unfavourable (windy) weather conditions.
- Dust controls (such as water sprays or dust capture systems) for the construction phase concrete batching plants.
- Dust controls (such as water sprays or dust capture systems) for the construction phase crushing and screening plants.
- Regular inspections/audits to ensure appropriate air quality controls are being implemented during construction activities.

Air quality emissions during the operations phase would be limited. The OEMP, to be developed during the detailed design phase, will include on-site management measures to limit off-site air quality emissions. Specific measures in the OEMP to address air quality impacts would include:

- implement and enforce speed limits for operations vehicles and equipment on unsealed access tracks and hardstand areas
- minimise dust emissions from exposed areas through the application of water and/or dust suppressants using a water cart (as required)
- limit operational maintenance activities during unfavourable (windy) weather conditions
- regular inspections/audits to ensure appropriate air quality controls are being implemented during operations and maintenance activities.

6.10 Land

The SEARs for the EIS require the following specific issues to be assessed relating to land:

- A detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints.
- An assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including:
    - the impact of the development on Yanga National Park in accordance with the guidelines for *Developments adjacent to National Parks and Wildlife Service lands* (DPIE, 2020)
    - consideration of agricultural land, travelling stock routes, flood prone land, Crown lands, mining, quarries, mineral or petroleum rights
    - a soil survey to determine the soil characteristics and consider the potential for erosion to occur
    - a cumulative impact assessment of nearby developments.
- An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including:
    - consideration of the zoning provisions applying to the land, including subdivision (if required)
    - completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide
    - an assessment of impact on agricultural resources and agricultural production on the site and region.

A LUCRA was prepared for the Project and is provided in **Appendix 17** with a summary provided below.

6.10.1 Land Capability, Soils and Agriculture

The topography of the Project Area primarily features flat terrain with scattered sand hills. The Project Area has an elevation generally ranging from 50 m AHD to 80 m AHD. The Project Area and land south of the Project Area is zoned RU1 – Primary Production under the Wakool LEP 2013 (refer to **Figure 2.3**).
Land north and northeast of the Project Area is zoned C1 – National Parks and Nature Reserves and land immediately west of the Project Area is zoned RU3 – Forestry.

The Project Area and surrounding area is characterised by existing agricultural land use with associated rural residences. Land within and surrounding the Project Area has been subject to extensive vegetation clearing in the past, associated with historic agricultural land uses. Agriculture (cereals, legumes and grazing) is the predominant land use in the Project Area.

6.10.1.1 Land Capability

The land within the Project Area is Class 4, 5, and 6 under the Land and Soil Capability Assessment Scheme (LSC). The LSC assessment scheme uses the biophysical features of the land and soil to derive detailed rating tables for a range of land and soil hazards. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land), and the final LSC class of the land is based on the most limiting hazard (OEH, 2012).

Details about the erosion potential of these land and soil capability categories are included in *The land and soil capability assessment scheme: Second approximation* (OEH, 2012):

- **Class 6 – Low capability land** (15,616.76 ha within the Project Area) Includes land that will be subject to severe wind erosion when cultivated and left exposed. Further, the land may have very severe limitations due to off-site effects such as salinity and the impact of soil erosion on water and air quality. Soil erosion can be very severe without adequate erosion control measures.
- **Class 5 – Moderate-low capability land** (35.22 ha within the Project Area) Includes land that will be subject to wind erosion when cultivated and left bare. Additionally, soil erosion can be severe without adequate erosion control measures.
- **Class 4 – Moderate capability land** (715.25 ha within the Project Area) Includes land that has cropping limitations because of erosion hazard, weak structure, salinity, acidification, shallowness of soils, climate, wetness, stoniness or a combination of these factors. Required erosion control practices include advanced conservation tillage, pasture cropping, well-planned rotations and maintenance of ground cover. Further, erosion problems encountered in these lands include sheet, rill and gully erosion as well as wind erosion and soil structure decline under cropping.

The Project has the potential to impact up to 40.36 ha of Class 4 land within the Development Corridor (14.76 ha within the Development Footprint).

6.10.1.2 Soils

The LUCRA (refer to **Appendix 17**) indicates that the Project Area soils:

- are fine textured (sand <70%)
- are moderately erodible to highly erodible
- have a generally neutral pH
- are non-saline
- consist of non-sodic topsoil, with an ESP <6% and are not expected to be dispersive
- consist of some slightly sodic subsoils, with ESP >6% and may exhibit dispersive behaviour
- have a moderate to high cation exchange capacity but low soil organic carbon and are likely to be moderately fertile.

The LUCRA also notes that there are no known occurrences of acid sulfate soil within the Project Area while the WRIA (refer to **Appendix 15**) has identified that the Project Area has a low erosion hazard.

A geotechnical investigation within the Project Area was conducted between April 2022 and June 2022 by CMW Geosciences. The geotechnical investigation included a soil survey to confirm soil characteristics across the Project Area, with survey results and interpretation appearing in full in Appendix 1 of the LUCRA (refer to **Appendix 17**). Soil samples were taken from eight boreholes and 15 test pit locations throughout the Project Area. The survey included easting and northing coordinates for boreholes and test pits, photographs of soil sampling sites, and data related to the composition of soils. Samples were submitted to a National Association of Testing Authorities (NATA) accredited laboratory for analysis.

The interpretive report prepared by CMW Geosciences (2022) identifies the soils in the Project Area as consisting of the Woorinen Formation as described below:

- Topsoil (typically less than 400 mm) – typically comprised of loose to medium dense clayey sand or silty sand as well as some stiff to very stiff sandy clay.
- Subsoil (clay) – predominantly stiff to hard clay in consistency with fine to medium grained gravel or fine to coarse grained sand. Typically, red brown, pale grey and brown orange or dark brown in colour.
- Subsoil (sand) – weakly to strongly cemented clayey sands, medium dense to very dense. Generally red brown and grey in colour.

Erosion risk can be effectively managed through the implementation of mitigation measures as detailed in the WRIA (refer to **Appendix 15**). Excavation of subsoils will be limited where practicable, and excavated subsoils will be stockpiled and contained with appropriate erosion and sediment controls to avoid potential dispersion and sediment transfer. Disturbance to ground cover will be limited to the minimum necessary for construction purposes and rehabilitated once no longer required.

All construction and decommissioning activities for the Project will be undertaken in accordance with a Construction Soil and Water Management Plan (CSWMP) as detailed in **Section 6.8.4** that identifies erosion and sediment control mitigation measures prior to works commencing. Similarly, the operation of the Project would be in accordance with an OEMP that will detail measures to limit erosion during the operation of the Project.

6.10.1.3 Agriculture

The land within the Project Area is predominantly used for agricultural purposes. There are four private landholdings within the Project Area along with some small areas of Crown Land easements and Council owned roads. Windlab has agreements with relevant owners allowing Windlab to lease the land for the Project which is planned to have a 35-year operating period. These agreements compensate the owners for the areas of land that will be occupied by the Project noting that the vast majority of each property will be available for ongoing agricultural activities. Windlab has consulted with each landholder and designed the Project in consideration of their agricultural operations to seek to minimise impacts.

The Project will extend the current land use from agriculture to include electricity generation. During construction, there may be some limitations to access for safety of people and stock. Once construction is complete, landholders would be able to continue to utilise the vast majority of their properties for ongoing agricultural activities, with only small areas around WTGs and permanent compound areas (e.g. O&M compounds, BESS facilities, STATCOM facilities, substations, switching stations). Following decommissioning, the areas of land use for operations will be rehabilitated and returned to agricultural use.

Although the Project will remove a relatively small area of land from agricultural production, it will provide a significant benefit to landholders through income diversification which will provide consistent income, including periods of drought and low agricultural production. This will support the ongoing diversification and sustainability of agricultural activities within the Project Area.

As outlined in the Economic Assessment (refer to **Section 6.13**), there is not expected to be any loss of employment associated with the Project (including agricultural employment), either directly (onsite) or through the supply chain as agricultural activities will continue largely unhampered during the operational phase.

In summary, there is not anticipated to be a significant impact on agricultural production as a result of the Project with the vast majority of the Project Area remaining in agricultural land use throughout the Project life.

With regards to the ongoing effective management of risks to regional agricultural resources and productivity, Windlab is committed to the ongoing implementation of appropriate biosecurity controls and access controls including:

- Weed management, including that all machinery and equipment will be cleaned thoroughly prior to entering the development footprint. Cleaning will include the removal of all mud and plant matter, followed by washing with high pressure water.
- Fencing and access control, including:
  - During construction, the approved construction footprint will be clearly demarcated and identified during the construction stage with survey pegs and at some locations with flagging, bunting or similar to avoid accidental damage to areas outside of the development footprint.
  - Access control to protect and demarcate areas outside the development footprint from vehicle access, human access, and accidental disturbance.

6.10.2 Project Area Suitability

The Project Area is considered to be a suitable location for a wind farm as it can accommodate the Project having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints.

As discussed in **Section 2.0**, the Project is a direct response to the NSW Government's commitment to transition to renewable electricity generation. The Project Area is strategically located within the SW REZ, with ready connection to existing and approved transmission infrastructure and in an area with identified wind renewable energy source potential. The Project will contribute to the implementation of the NSW Electricity Strategy (DPIE, 2019), which seeks to establish a reliable, affordable and sustainable electricity future for NSW.

The local, regional and State road network surrounding the Project Area has sufficient operating capacity to support the Project and provides good access to the Project Area.

Due to the operation of Clause 2.36(1)(b) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Infrastructure SEPP), the Project is permissible with development consent.

As outlined above, the Project Area contains land suitable for agriculture and ongoing agricultural activities can continue in coexistence with the Project. Due to the agricultural history, the Project Area largely comprises areas that have previously been disturbed and/or historically cleared associated with agricultural land use, reducing the extent of impact on biodiversity as much of the development corridor has previously been cleared. As outlined in **Section 6.10.1**, approximately 90% of the development footprint is Category 1 – Exempt Land.

The Project will provide for a compatible land use and support the ongoing agricultural use of the Project Area. The conceptual layout has been developed to maximise the use of existing disturbed areas and avoid and minimise impact to identified biodiversity and Aboriginal cultural heritage values, as far as practicable. The site selection process has been informed by assessments of the potential impacts of the development on the existing land uses on the site and adjacent land, (including detailed consultation with host landowners regarding placement of access tracks and other wind farm infrastructure in relation to agricultural operations).

In summary, Windlab selected the Project Area as it provides a combination of:

- high quality wind resource
- highly modified land area that has been heavily cleared and disturbed over generations of agricultural practices
- availability of land of a suitable scale for a viable commercial-scale wind farm project and low density of housing
- location within the SW REZ and close proximity to the existing and approved high voltage transmission network
- overall positive sentiment within the local community regarding renewable energy, including interest from landowners in being involved in the wind farm
- access to major transport networks, including the Sturt Highway to the north of the Project Area
- compatible land use zoning within both the Project Area and adjacent landholdings
- environmental and social constraints that can be managed with appropriate mitigation and management
- landscape suitable for minimising the risk of substantial soil erosion during earthworks.

6.10.3 Assessment of Potential Land Use Impacts

The SEARs require the assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including:

- the impact of the development on Yanga National Park
- consideration of agricultural land, travelling stock routes, flood prone land, Crown lands, mining, quarries, mineral or petroleum rights
- a soil survey to determine the soil characteristics and consider the potential for erosion to occur
- a cumulative impact assessment of nearby developments.

Agricultural land is assessed in **Section 6.10.1.3** and a summary of the cumulative impact assessment for the Project is provided in **Section 6.15**. Cumulative social issues including impacts on housing and the capacity of services are addressed in the social impact assessment in **Section 6.12**. The remaining issues are addressed below.

6.10.3.1 Yanga National Park

As outlined in **Section 2.3.3**, Yanga National Park is directly north of the Project Area and is valued for recreational tourism, fishing, hiking, bird watching and scenic views.

The Project is not expected to have any direct impacts on Yanga National Park and the potential for indirect impacts has been assessed in the relevant technical assessments completed as part of this EIS. Consideration of Yanga National Park has been completed as relevant assessments, including:

- noise (refer to **Section 6.3**)
- biodiversity (refer to **Section 6.4**)
- bush fire (refer to **Section 6.11.3**)
- Visual (refer to **Section 6.2**)
- Aviation (refer to **Section 6.11.1**)

An assessment considering the guidelines for *Development adjacent to National Parks and Wildlife Service Lands* (DPIE, 2020) and how they relate to the Project has been undertaken and is provided in **Table 6.26**.

Windlab has consulted with NPWS throughout the preparation of the EIS to determine any particular areas of concern. NPWS have identified that the issues of concern to be assessed in the EIS have been documented in the SEARs.

Table 6.26 Assessment of Impact Risk to Yanga National Park

Issue	Aim	Assessment and Management
Erosion and sediment control	• To prevent erosion and the movement of sediment onto NPWS land	• Detailed erosion and sediment control measures will be implemented during the construction, operation and decommissioning phases of the Project (refer to **Section 6.8**). • Given the layout of the Project and proposed management measures, it is not anticipated that erosion of, and the movement of sediment onto NPWS land would occur as a result of the Project.
Stormwater runoff	• Nutrient levels are minimised, and stormwater flow regimes and patterns mimic natural levels before reaching NPWS land, to ensure no detrimental change to hydrological regimes.	• Details of potential surface water impacts (including the potential for erosion and runoff) are described in **Section 6.8**. • The Project will not result in any increased discharge of stormwater to NPWS land and therefore no impacts are predicted.
Wastewater	• There are no adverse impacts on NPWS land due to wastewater from nearby development.	• The nearest site compound (refer to **Figure 1.3**) will be approximately 3.75 km from Yanga National Park. Wastewater will be collected in tanks and periodically removed by a suitably licensed waste contractor during construction. During operations the systems will either be pump out or envirocycle type irrigation systems. Given the distance no impacts are predicted on the National Park. • Wastewater disposal facilitates will be contained within the specified site compounds and will be designed and operated to the relevant standards. • The Project will not result in the discharge of any wastewater to NPWS land.
Pests, weeds and edge effects	Adjoining or nearby development does not: • lead to increased impacts from invasive species (weeds and pests), domestic pets and stock • facilitate unmanaged visitation, including informal tracks, resulting in negative impacts on cultural or natural heritage values • lead to impacts associated with changes to the nature of the vegetation surrounding the park • impede NPWS access for management purposes, including inappropriate fencing.	• There will be no changes to the existing land uses or boundary controls on the agricultural land adjoining the Yanga National Park (that is, the existing agricultural activities will continue and existing fencing will remain unaffected). • During construction, the approved construction footprint will be clearly demarcated and identified during the construction stage with survey pegs and at some locations with flagging, bunting or similar to avoid accidental damage to areas outside of the development footprint. • All machinery and equipment will be cleaned thoroughly prior to entering the Development Footprint to prevent the importation of plant material or seeds. Cleaning will include the removal of all mud and plant matter, followed by washing with high pressure water. • The CEMP and OEMP will contain provisions for regular inspections relating to weeds and pests and provisions for implementation of controls as necessary.

Issue	Aim	Assessment and Management
Fire and the location of asset protection zones	• All asset protection measures are within the development area, and there is no expectation for NPWS to change its fire management regime for the land it manages.	• Consideration to bush fire risk has been completed and is described in **Section 6.11.3**. • All APZs are contained within the Project Area and do not extend into NPWS land, or rely on actions being undertaken by NPWS.
Boundary encroachments and access through NPWS land	• No pre-construction, construction or post-construction activity occurs on land managed by NPWS. Any access that does occur must be legally authorised and comply with park management objectives.	• NPWS land will not be used for the Project and is not required to gain access to the Project.
Visual, odour, noise, vibration, air quality and amenity impacts	• There is no reduction of amenity on NPWS land due to adjacent development.	• The potential visual, noise and air quality impacts of the Project have been considered in relation to the NPWS land. • No odour impacts are predicted due to the Project. • Vibration and dust generation are likely to occur during construction, however, the assessment of these issues indicated that any impacts will be localised and can be readily managed by standard construction techniques. No impacts are predicted for Yanga National Park. • The construction and operation of the wind farm will result in impacts to the visual landscape as discussed in **Section 6.2**. with respect to Yanga National Park, views are likely to be altered in some locations, however due to the distance to the Project, woodland and water bodies are likely to remain the dominant landscape features. • The potential impacts are not considered likely to impact on the amenity or public enjoyment of the land.
Threats to ecological connectivity and groundwater dependent ecosystems	• Native vegetation and other flora and fauna habitats that provide a linkage, buffer, home range or refuge role on land that is adjacent to parks are maintained and enhanced, where possible. • Groundwater-dependent ecosystems in NPWS land are protected.	• The Project will not disturb habitat within Yanga National Park. • The Project design has considered and incorporated turbine setbacks from vegetation immediately to the west of the Project Area along Yanga Way to help maintain existing north-south ecological connectivity to riverine areas to the south of the Project Area • Terrestrial GDEs have been identified within and surrounding the hydrological features of the Project Area, however no aquatic GDEs were identified within the Project Area. Based on the lack of potential for the Project to interact with groundwater, no impacts to GDEs are expected during the construction, decommissioning or operational phases of the Project.

Issue	Aim	Assessment and Management
Cultural heritage	• Areas and sites of heritage value on NPWS land, including Aboriginal cultural heritage, are protected.	• An ACHA has been completed for the Project with the results described in **Section 6.5**. • The Project will not result in any impacts to areas and sites of heritage value on NPWS land.
Access to parks	• Adjacent developments do not compromise public and NPWS access to parks.	• The Project will not compromise public or NPWS access to Yanga National Park. Access to the Project Area will not be gained from or near the Park.

6.10.3.2 Other Land Use Rights

The Project Area contains potential land use right constraints including TSRs, Crown lands and two mineral exploration titles. A review of potential land use impacts associated with these land uses is provided in **Table 6.27**.

Table 6.27 Land Use Right Impacts

Aspect	Assessment
Travelling Stock Routes	The following TSR lots are within and/or partly within the Project Area, and are managed by Murray Local Land Services (refer to **Appendix 2**): • Lot 83/DP 725897 • Lot 86/DP 725898 • Lot 30/DP 756576 • Lot 45/DP 756576 • Lot 13/DP 756588 • Lot 7002/DP 96884 • Lot 7003/DP 96884 • Lot 7009/DP 96889 • Lot 7302/DP 1157986 • Lot 7303/DP 1157986 • Lot 7304/DP 1157986 • Lot 7308/DP 1158277 • Lot 7301/DP 1159244 • Lot 7300/DP 1159244. Although consultation with landowners has indicated that the local TSRs are rarely, if ever, used, Windlab will continue to consult with landowners to confirm timing, duration and likely route of stock movements along the TSR so they could be scheduled and managed to occur in conjunction with construction activities and traffic movements.
Crown Land	There are some minor areas of Crown Land easements traversing the Project Area as roads and waterways. Consultation with Crown Land has been undertaken during the EIS process. No WTGs have been sited on Crown land.
Mining, Quarrying, Mineral or Petroleum Rights	There are two existing mineral exploration licences which partly overlap the Project Area, held by Iluka Resources Limited (EL 7626) and Murray Basin Critical Minerals Pty Ltd (EL 9604) (refer to **Figure 1.1**). EL 9097 held by Viewmont Gold Pty Ltd has expired. The WTGs associated with the Project are not permanent infrastructure and will not prevent future recovery of any viable resources in the ELs following the end of the Host Landholder Agreements. No part of the Project Area is subject to a mining/production lease.

6.10.4 Compatibility with Existing Land Uses

A LUCRA has been prepared for the Project to identify and assess the potential for land use conflicts with neighbouring land uses and to identify suitable management measures to minimise any potential impacts (refer to **Appendix 17**). The Project is considered to be compatible to coexist with the existing land uses within and surrounding the Project Site which are primarily agriculture.

A summary of the key findings in relation to zoning provisions and potential for land use conflicts is provided below.

6.10.4.1 Zoning Provisions

As outlined in **Section 2.3.2**, the Project Area is zoned RU1 – Primary Production under the Wakool LEP 2013 (refer to **Figure 2.3**). Land to the north and northeast of the Project Area is zoned C1 – National Parks and Nature Reserves, with a portion of land to the immediate west of the Project Area zoned RU3 Forestry. Land to the south of the Project Area is also zoned RU1 – Primary Production.

Electricity generating works are not permitted within the RU1 zoning in Wakool LEP 2013. However, due to the operation of Clause 2.36(1)(b) of the Infrastructure SEPP, the Project is permissible with development consent.

6.10.4.2 Land Use Conflict

A land use risk identification and ranking process has been undertaken as part of the LUCRA in accordance with the DPI *Land Use Conflict Risk Assessment Guide* (2011) (refer to **Appendix 17**).

The Project will modify the existing land use within the Project Area by adding energy generation land use to the existing agricultural land use that will continue, with the two land uses coexisting in the Project Area. The LUCRA identifies potential incompatibilities (in the absence of mitigation measures as required by the LUCRA assessment guidelines) between the surrounding land use and the proposed land use for key Project phases. Potential incompatibilities for each key phase of the Project are discussed in **Table 6.28**.

Table 6.28 Unmitigated Potential Land Use Incompatibilities

Project Phase	Unmitigated Potential Incompatibilities
Construction	• Generation of dust on site due to site preparation and other construction related activities as well as increased traffic movements on unsealed roads which can impact human and environmental health. • Increased traffic movements to and from the Project Area potentially resulting in traffic hazards, particularly on Arundel Road, Balranald-Moulamein Road, and Yanga Road. • Excessive noise generated during construction of the Project above relevant criteria – impacting amenity. • Land erosion as a result of construction activities resulting in sediment runoff entering nearby water bodies, impacting water quality and beneficial use of the water (irrigation or stock water). • Increased traffic volumes potentially impacting/degrading the physical condition of local roads, particularly Arundel Road, Balranald-Moulamein Road, and Yanga Road. • Possibility of vehicles during construction or operation being involved in an accident with livestock or farm machinery on roads. • Increased traffic movements to and from the Project Area potentially disrupting crop harvesting activities of neighbouring farm sites.

Project Phase	Unmitigated Potential Incompatibilities
	• Possible impact to TSRs arising from construction activities, potentially limiting TSR access and usage.
Operation	• Poor weed and invasive pest management associated with the Project that may spread or impact neighbouring land. • Loss of local amenity and visual amenity from the Project. • Increased bushfire risk from within the Project Area due to mechanical failure. • Poorly maintained fences resulting in livestock, native animals or pests accessing the operational wind farm areas. • Wind turbines, temporary calibration meteorological masts, permanent power performance masts, and overhead powerlines potentially preventing private aviation operations including crop and pest spraying within and surrounding the Project Area.
Decommissioning	• Increased traffic volumes potentially impacting/degrading the physical condition of local roads, particularly Arundel Road, Balranald-Moulamein Road, and Yanga Road. • Increased traffic movements to and from the Project Area potentially resulting in traffic hazard. • Excessive noise generated during decommissioning of the Project above relevant criteria – impacting amenity. • Generation of dust on site due to site rehabilitation and other decommissioning related activities as well as increased traffic movements on unsealed roads which can impact human and environmental health. • Inadequate removal of infrastructure including commercial and industrial wastes. • Land not left in an acceptable condition to be utilised for agricultural production following decommissioning.

With the effective implementation of measures outlined in **Section 6.10.5** and throughout this EIS, it is considered that the potential land use conflicts on the surrounding land use and land users would be manageable and minor. Additionally, Windlab will work closely with host landowners on the construction timing and the land will be remediated progressively throughout the construction phase to minimise disruption to agricultural enterprises.

It is also noted that as discussed in **Section 2.5**, in recognition that the Project will result in some amenity impacts on some nearby neighbours, Windlab has entered into Neighbour Agreements to address various impacts associated with the Project specific to their dwellings.

6.10.5 Mitigation and Management Measures

Key land use conflict risks include those associated with traffic (during construction and decommissioning), private aviation operations, bush fire and visual amenity. These issues have been subject to assessment as part of the EIS and appropriate management and mitigation measures have been identified (refer to **Section 6.7**, **Section 6.11.1**, **Section 6.11.3** and **Section 6.2** respectively).

Windlab has committed to implement these management and mitigation measures as part of the Project. With the implementation of these measures, the potential impact of the additional land use on the surrounding land and land users will be minimal. Additionally, should decommissioning be required, all above ground structures not required for the ongoing agricultural use of the land, including the WTGs and associated facilities will be removed and the land rehabilitated so that the areas occupied by the Project can return to agricultural use.

Potential land use impacts will be managed through the establishment and implementation of the following management plans:

- Construction Environmental Management Plan.
- Operational Environmental Management Plan.

The following standalone subplans would be incorporated into the CEMP and OEMP:

- Biodiversity Management Plan (Aquatic and Terrestrial Ecology).
- Emergency Response Plan.
- Heritage Management Plan (Aboriginal and Historic Cultural Heritage).
- Traffic Management Plan.
- Construction Soil and Water Management Plan (including Erosion and Sediment Control Plans).
- Waste Management Plan.
- Decommissioning and Rehabilitation Management Plan.

6.11 Hazards and Risks

The SEARs require the EIS to address the hazards and risks associated with the Project. This includes aviation safety, telecommunications, health, bush fire, a Preliminary Hazard Analysis (PHA), and blade throw. The following sections provide an overview of the outcomes of the relevant assessments undertaken to address the SEARs.

6.11.1 Aviation Safety

An Aviation Impact Assessment (AIA) was prepared by Aviation Projects to review potential aviation impacts associated with the Project and provide aviation safety advice with respect to relevant air safety regulations, guidelines and procedures, and inform and document consultation with relevant aviation agencies.

The SEARs require the AIA to:

- Assess the impact of the development under the National Airports Safeguarding Framework Guideline D: Managing Wind Turbine Risk to Aircraft.
- Provide associated height and co-ordinates for each turbine assessed.
- Assess potential impacts on aviation safety, including cumulative effects of wind farms in the vicinity, potential wake / turbulence issues, the need for aviation hazard lighting and marking, including of wind monitoring masts, considering, defined air traffic routes, aircraft operating heights, approach / departure procedures, radar interference, communication systems, navigation aids, use of emergency helicopter access, and aerial baiting and culling in the National Park.

- Identify aerodromes within 30 km of the turbines and consider the impact to nearby aerodromes and aircraft landing areas.
- Address impacts on obstacle limitation surfaces.
- Assess the impact of the turbines on the safe and efficient aerial application of agricultural fertilisers and pesticides in the vicinity of the turbines and transmission line.

The AIA includes a qualitative risk assessment to determine the need for obstacle lighting and marking, and has been provided to the aviation regulator, Airservices Australia. Consultation was also undertaken with relevant aviation stakeholders including aerodrome operators, Department of Defence, Royal Flying Doctor Service, NSW Rural Fire Service, NPWS, NSW Ambulance, aerial application operators, Murray River Council, Balranald Shire Council and Swan Hill Rural City Council.

Details of the outcomes of the consultation undertaken is provided in **Appendix 18**. None of the stakeholders who responded to the consultation request raised key issues of concern regarding the Project. If the Project is approved there will be a need for further consultation with relevant stakeholders.

6.11.1.1 Assessment Results

The following sections provide a summary of the results of the AIA. The full AIA report is provided in **Appendix 18**.

Planning Considerations

The Murray River Council LEP 2011 and the Wakool LEP 2013 do not incorporate any reference to the development of wind farms or the protection of aeronautical infrastructure.

Certified Airports

There are two certified airports within 30 nautical miles (nm) of the Project:

- Balranald Airport (YBRN) located approximately 16 km (9 nm) to the north of the Project.
- Swan Hill Airport (YSWH) located approximately 48 km (26 nm) to the south of the Project.

Balranald Airport

Balranald Airport is operated by Balranald Shire Council. The airport is not serviced by any instrument approach procedures, therefore, there are no Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS) surfaces at Balranald Airport. For the non-instrument runway at Balranald Airport the maximum lateral extent of the obstacle limitation surface (OLS) is up to 2.7 km for the conical surface and 1.6 km for the take-off and approach surfaces. The Project Area is located beyond the horizontal extent of the OLS. Therefore, the Project will not impact the Balranald Airport OLS.

Swan Hill Airport

Swan Hill Airport is operated by Swan Hill Rural Council. The airport is served by non-precision instrument flight procedures with a minimum safe altitude (MSA) applicable for each instrument approach procedure.

The Project is located within the 25 nm (+5 nm buffer) MSA limits. A minimum obstacle clearance (MOC) of 1000 feet (f)t above the highest obstacle within the relevant protection area is applicable for instrument approach procedures. The maximum height of a WTG for the Project (WTG 85) is 1213.1 ft AMSL (369.74 m AHD). This is higher than the PANS-OPS surface, necessitating an increase to the 25 MSA to 2300 ft to accommodate the wind farm. The commencement altitudes and holding pattern altitudes will also need to be increased to 2300 ft as they are based on the 25 nm MSA. Approval will need to be sought from Swan Hill Rural City Council to increase the minimum altitude for the 25nm MSA and consequential increases to procedure commencement altitudes and holding altitudes.

The Project is located outside the horizontal extent of the circling areas for Swan Hill Airport and hence the circling areas are not infringed.

The instrument approach procedures for Swan Hill Airport commence approximately 15 nm from the airport. The instrument approach procedure flight paths are not located over any part of the proposed wind farm.

Nearby Aircraft Landing Areas

Three aircraft landing areas (ALAs) are located within proximity of the Project Area (refer **Figure 6.12**). A radius of 3 nm is used to assess potential impacts of proposed developments on aircraft operations at or within the vicinity of the ALA. The potential impacts to operation of the ALAs is described below.

ALA 1 (associated landowner)

The ALA 1 is used up to several times a year for recreational flights and potentially agricultural aerial application operations when weather is unfavourable for ground application.

As there are WTGs and power performance masts located within the 1 nm circuit area of this ALA this would likely cause normal flight operations at the ALA to be restricted to taking off to the southwest and landing to the northeast. The WTGs and power performance masts located within 3 nm of the ALA will require detailed consideration by pilots using the ALA to ensure they can conduct their operations safely.

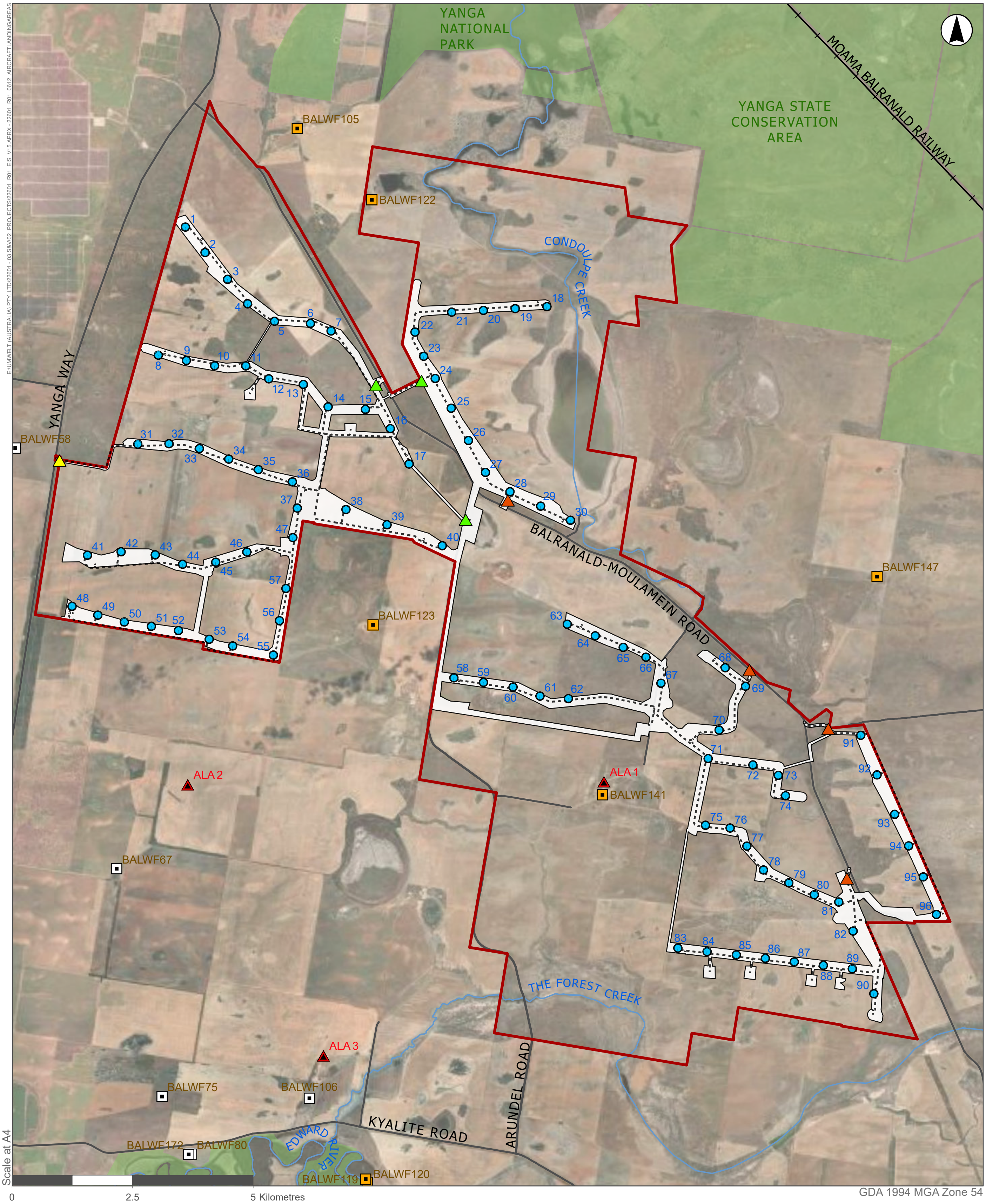
Aerial application aircraft can fly closer to obstacles such as trees, remote buildings and WTGs/masts compared to normal aircraft operations. As such, it is unlikely that aerial application aircraft operations would be limited but would need to take the WTGs and meteorological masts into consideration when planning operations at or near the ALA.

ALA 2 (non-associated landowner)

This ALA is located south of the southern boundary of the Project Area. Several WTGs are located with 3 nm of the ALA with no WTGs or power performance masts within the 1 nm circuit area of the ALA. Pilots would need to consider the WTGs within 3 nm of the ALA when planning their arrival or departure routes to/from the ALA. Operations in the circuit area of the ALA may need to be restricted to the south of the ALA due to downwind turbulence from the WTGs.

ALA 3 (non-associated landowner)

ALA 3 is located more than 3 nm from the closest WTG and approximately 4.4 nm southwest of the highest WTG in the wind farm (WTG 85). There would be no impacts for normal aircraft and aerial application aircraft operating in the circuit area at ALA 3 in relation to circuit heights, arrival and departure flight paths.



Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- Access Tracks
- Associated Dwelling
- Non-Associated Dwelling
- NPWS Reserve
- Watercourse
- Road
- Railway
- Aircraft Landing Areas

FIGURE 6.12

Nearby Aircraft Landing Areas

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

Wake Turbulence Impacts

The AIA has considered adverse turbulence for a conservative distance of 10 rotor diameters (2000 m) from a WTG where wake turbulence could be felt by pilots operating in the circuit area of an aerodrome. This is relevant to the ALA 1 and ALA 2.

For ALA 1, winds from the north, east and possibly the southeast could create downwind turbulence across the circuit area and the runway when the wind turbines are operational and turning. The terrain surrounding the ALA is flat and unlikely to break up this turbulence before it reaches the circuit area or the runway. The possible wake turbulence impacts from WTGs within 2000 m of the runway, combined with the WTGs within 2000 m of the circuit area operations, may reduce the availability of the ALA during most wind conditions.

For ALA 2, winds from the north would be likely to create downwind turbulence across the circuit area when the wind turbines are operational and turning. The terrain surrounding the ALA is flat and unlikely to break up this turbulence before it reaches the circuit area or the runway. The possible wake turbulence impacts from WTGs within 2000 m of the nominal 1 nm circuit area may reduce the availability of the ALA during northerly wind conditions.

Lowest Safe Altitude

The lowest safe altitude (LSALT) for a particular airspace grid or air route is defined as a minimum of 1000 ft clearance above the controlling (highest) obstacle within the relevant airspace grid or air route.

Grid LSALT

The Project Area is located within two airspace grids with a LSALT of 1800 ft above mean sea level (AMSL) which provides clearance above obstacles with heights up to 800 ft AMSL. The highest turbine, WTG85 at a maximum height of 1213.1 ft AMSL infringes the Grid LSALT by 413.1 ft. This would require the grid LSALT to be raised to by 500 ft to 2300 ft AMSL.

The location and "to be constructed" maximum height of the highest WTG must be provided to Airservices Australia to consider an amendment to the Grid LSALT in this area. The amendment is considered unlikely to cause an adverse impact to Instrument flight rule aircraft in the area.

Any wind monitoring mast with a maximum height above 800 ft AMSL would be above the current Grid LSALT maximum obstacle height limit. If constructed prior to the WTGs, the details of the wind monitoring mast would need to be provided to Airservices Australia so that it can increase the Grid LSALT to account for them.

Air Route LSALT

A protection area of approximately 7 nm laterally either side of an air route is used to assess the LSALT for an air route. There are two air routes within 7 nm of the Project Area, being W762 (NATYA to TREST) and H247 (NATYA to TOBOB), with route LSALTs of 2100 ft AMSL and 2000 ft AMSL respectively.

With a maximum height of 1213.1 ft, WTG 85 is 113.1 ft higher than the W762 obstacle height limit and 213.1 ft higher than the H247 obstacle height limit. Both W763 and H247 will require the LSALT to be increased to 2300 ft AMSL.

Airspace Protection

The Project Area is located outside of controlled airspace (wholly within Class G airspace) and is not located in any Prohibited, Restricted and Danger areas. Therefore, the Project will not impact controlled or designated airspace.

Radar

Airservices Australia requires an assessment of the potential for the WTGs to affect radar line of sight. The closest radar facility to the Project Area is the Mt Macedon Secondary Surveillance Radar (SSR), which is located approximately 286 km to the south. The Project Area is outside the range of the Mt Macedon radar and will not impact this facility.

Obstacle Lighting Risk Assessment

The safety risk assessment undertaken for the of the Project concluded that WTGs and temporary/permanent monitoring masts that are installed in close proximity to (approximately 900 m) a WTG will not require obstacle lighting to maintain an acceptable level of safety to aircraft.

Monitoring masts that are installed prior to WTG installation will require obstacle lighting to maintain an acceptable level of safety.

Micrositing

The potential micrositing of the WTGs and WMTs has been considered in the assessment with the estimate of the overall maximum height being based on the highest ground level within 100 m of the nominal WTG and WMT positions. Provided the micrositing is within 100 m of the WTGs and WMTs it is likely to not result in a change in the maximum overall blade tip height of the Project. No further assessment is likely to be required from micrositing and the conclusions of this AIA would remain the same.

6.11.1.2 Management and Mitigation Measures

The following management and mitigation measures will be implemented to address impacts to aviation safety:

- Final design details of WGTs, temporary calibration meteorological masts and permanent power performance masts exceeding 100 m AGL will be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure.
- Final design details of WGT, temporary calibration meteorological mast and permanent power performance mast coordinates and elevation will be provided to Airservices Australia.
- Any obstacles above 100 m AGL (including temporary construction equipment) will be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents.
- Details of the wind farm will be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations.
- To facilitate the flight planning of aerial application operators, details of the Project, including the ‘as constructed’ location and height information of WTGs, temporary calibration meteorological masts, permanent power performance masts and overhead transmission lines will be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.

- Windlab will engage with any local aerial agricultural operators, NPWS and aerial firefighting operators in developing procedures for such aircraft operations in the vicinity of the Project.
- Windlab will notify landowners of the identified landing grounds within 3 nm of the Project Area to determine any impacts from the WTG proximity and potential wake turbulence effects.
- The rotor blades, nacelle and the mast supporting the WTGs will be painted white, typical of most WTGs operational in Australia. No additional marking measures are required for WTGs.
- Consideration will be given to marking temporary calibration meteorological masts and permanent power performance masts in accordance with relevant standards.
- Consideration will be given to lighting temporary calibration meteorological masts and permanent power performance masts installed prior to WTG installation and masts that are greater than 900 m from a WTG with medium intensity steady red obstacle lighting at the top of the mast.
- Overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations will be identified in consultation with local aerial application operators and marked in accordance with relevant standards.

6.11.2 Telecommunications

Telecommunication services, including television and radio broadcasts, mobile phone services and point to point microwave radio communication services occur in proximity to population centres and often traverse locations that are suitable for WTGs. Theoretically, as with any large structure, WTGs have the potential to cause interference with such signals.

The SEARs require the identification of possible effects on telecommunications systems, assessment of impacts and mitigation measures including undertaking a detailed assessment to examine the potential impacts as well as analysis and agreement on the implementation of suitable options to avoid potential disruptions to radio communication services, which may include the installation and maintenance of alternative sites.

A Telecommunications Impact Assessment (TIA) was undertaken by Middleton Group Engineering Pty Ltd (Middleton Group) and is contained in full in **Appendix 19** with the key outcomes summarised in the sections below.

The impact of the Project has been assessed with respect to the following services:

- point-to-point microwave links
- meteorological radar
- mobile voice-based communications
- wireless and satellite internet services
- broadcast and digital radio
- broadcast, digital and satellite television
- trigonometry stations
- GPS.

6.11.2.1 Point-to-Point Links

There is one point-to-point communication link within 2 km of the boundary of the proposed WTGs. The single link carries two licences following the same path belonging to:

- NSW Government Telecommunications Authority.
- Ambulance Service of NSW.

This link passes through the western portion of the Project Area on a north-south alignment. Based on the turbine layout there are no WTGs sited in the near-field zones of any transmitters/receivers, nor are they located in the reflection or scatter zones. Based on analysis undertaken, the turbine layout (including WTG blade diameter) is not sited within the maximum 2nd Fresnel zone of the point-to-point link and therefore no diffraction effects are likely.

The Ambulance Service NSW has confirmed no impact from the Project is expected on its communications link. As the NSW Telecommunications Authority link has a higher frequency and smaller Fresnel zone, it will therefore not experience interference from the WTGs.

Any micro-siting of turbines will ensure that there is no encroachment into the maximum 2nd Fresnel zone of this point-to-point link.

6.11.2.2 Meteorological Radar

The closest Bureau of Meteorology (the Bureau) meteorological radar to the Project Area is located in Rainbow (Victoria), more than 180 km from the closest WTG. The World Meteorological Organisation (WMO) recommends that wind turbines are sited, at a minimum, beyond 5 km from meteorological radars, and preferably beyond 20 km (WMO, 2010).

The Project complies with WMO standards based on distance setbacks from the various meteorological radars in the region. Further, there is excellent coverage from the three radars in the region, giving good visibility of weather events in the wider region. As such, the presence of the WTGs is unlikely to cause adverse performance of the radars.

In consulting with the Bureau it has identified that any impact from the Project on their weather radar network is manageable in normal weather conditions. The Bureau has requested that it be informed of any significant variation in turbine layout, that it be consulted for any planned wind farm shutdown of more than 12 hours and collaboration in the event of severe weather conditions to assist in the endeavour of community safety.

6.11.2.3 Mobile Voice-Based Communications

The nearest mobile phone base tower (Optus) is located approximately 9 km to the south of the Project Area at Kyalite. Other mobile phone base towers owned by Telstra and Optus are located further away from the Project Area to the north and north east. Typically, a signal will not be significantly impacted where the mobile phone base station tower is located more than 1 km from a WTG. The TIA concluded that the Project will not cause any significant impact on the operation of mobile phone base stations.

Within the Project Area there are mobile network services provided by Telstra and Optus and in the immediate vicinity of the WTGs some reduction in signal may occur. This effect can be mitigated by relocating the mobile phone receiver in the order of tens of metres. Beyond the Project Area there will not be any significant impact on the signal.

Optus has confirmed that no impact to its network is expected from the Project (refer to **Appendix 19**). Telstra did not respond to consultation, however, given the Telstra towers are at a greater distance to the Project Area than the Optus towers, it is expected that Telstra will also experience negligible impact to their network.

6.11.2.4 Wireless and Satellite Internet Services

Satellite services will generally only be impacted where receivers are sited in close proximity to WTGs, impeding their view of the sky. There are only two dwellings within 2 km of the turbine layout that may be affected. No non-associated dwellings will be impacted. Windlab will consult with potentially affected associated landowners to determine whether satellite services are currently in use (or expected to be used) and if required manage impacted services.

6.11.2.5 Broadcast and Digital Radio and Television

There are no AM, FM, digital radio, digital television or temporary licence transmitters within a 15 km radius of the Project WTGs therefore impacts to television and radio transmission and reception are not expected.

6.11.2.6 Trigonometrical Stations and GPS

GPS antennas and Electronic Distance Measuring (EDM) devices may be installed at some trigonometrical stations and their performance may be impacted by line of sight or visibility obstructions.

A review of the location of all trigonometrical stations and survey marks in the vicinity of the Project determined that the closest distance between a survey mark and a Project WTG is approximately 355 m (WTG 54). Site works will be designed to avoid the survey mark where possible or alternatively assistance from a registered surveyor will be required to move or remove the survey mark.

Global Navigation Satellite System (GNSS) network mapping provided by Geoscience Australia shows that the nearest GNSS station is located approximately 17 km north of the Project Area. Typically, wind farms have little impact on GNSS sites connection to satellites unless they are in close proximity. Geoscience Australia have confirmed the Project will have no impact on their network (refer to **Appendix 19**).

6.11.3 Bush fire

The Project Area adjoins land to the west and south that is identified as bush fire prone land by the NSW Rural Fire Service (RFS) bush fire prone land mapping (RFS, 2021). The Project Area is not identified as being bush/grass fire prone (refer **Figure 6.13**). The SEARs require:

- the identification of potential hazards and risks associated with bush fires/use of bush fire prone land, including the risks that a wind farm would cause bush fire
- any potential impacts on the aerial fighting of bush fires
- demonstrate compliance with Planning for Bush fire Protection 2019 (PBP, 2019).

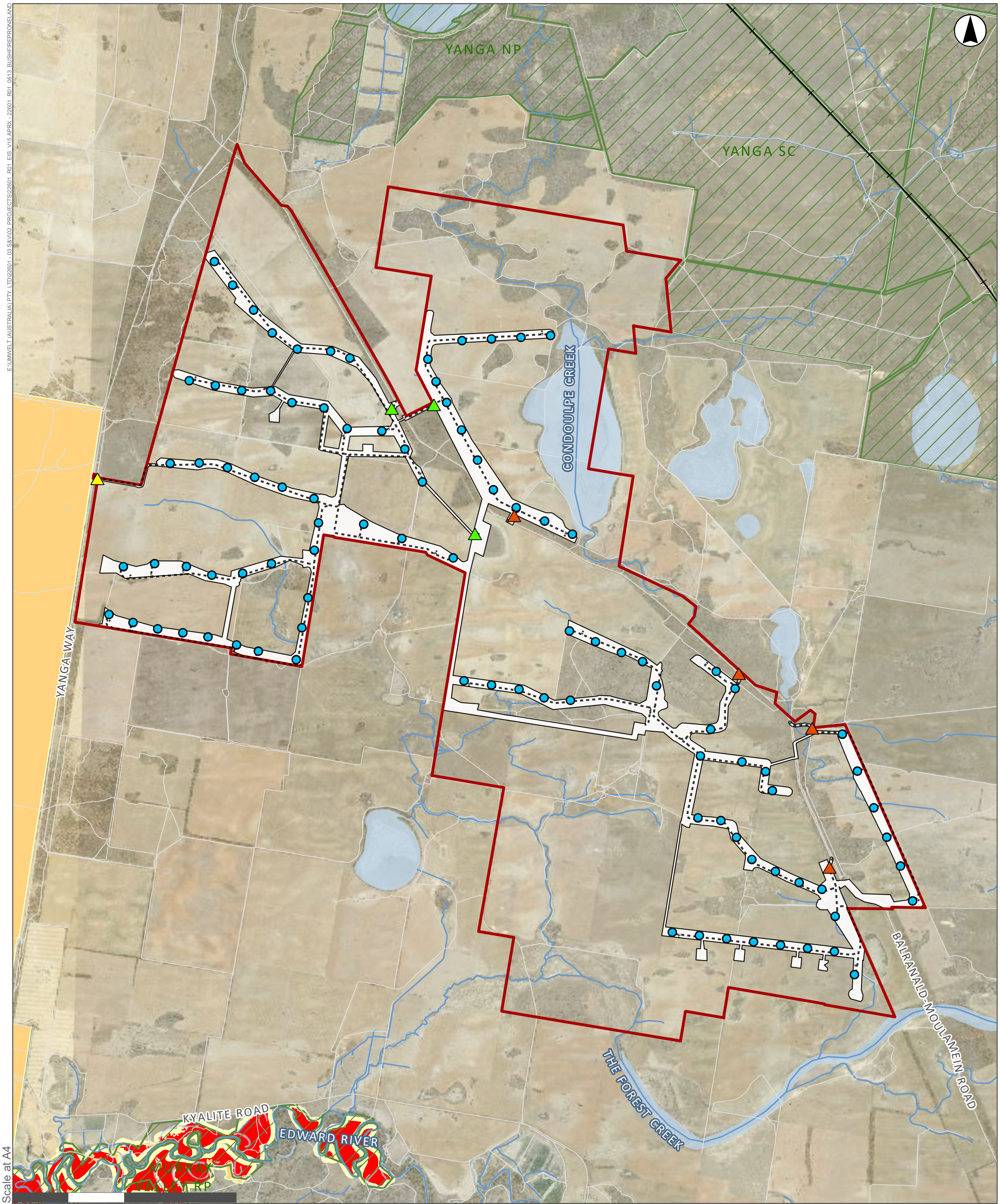
6.11.3.1 Existing Environment

Land within and surrounding the Project Area has been subject to extensive historical vegetation clearing associated with ongoing agricultural land uses. Vegetation across the Project Area generally forms small areas of grassland/shrubland and isolated paddock trees. The Project Area also features vegetated corridors and small isolated patches of woodland which are typically associated with roadsides and fence lines (refer to **Figure 6.6**).

Yanga National Park, Yanga State Conservation Area and Yanga Nature Reserve are located north of the Project Area, adjoining the northeast section of the Project Area. These areas are predominately flat and support a range of vegetation types including grassland, woodland, forested wetlands and forest vegetation. NSW National Parks and Wildlife Services manage the area under the Yanga National Park, Yanga State Conservation Area and Yanga Nature Reserve Plan of Management (NPWS, 2020) which includes bush fire management.

Land directly west of the Project Area is mapped as Category 2 vegetation (lower risk vegetation) and supports predominately grassland with small areas of woodland and scattered trees. An area located approximately 5 km to the south of the Project Area is mapped as Category 1 vegetation (highest risk for bush fire) associated with woodland and forest vegetation located along the Edward River.

The Project Area features flat topography with scattered sand hills with an elevation ranging from about 50 m AHD to 80 m AHD (refer to **Figure 2.4**).



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Scale at A4

0 2.5 5 Kilometres

GDA 1994 MGA Zone 54

Legend

- Project Area
- Development Corridor
- Wind Turbine Generator
- Emergency Only Access Point
- Primary Access Point
- Secondary Access Point
- NPWS Reserve
- Waterbody
- Watercourse
- Access Tracks
- Road
- Railway

NSW Bush Fire Prone Lands

- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 2

FIGURE 6.13

Bush Fire Prone Land

Image Source: ESRI Basemap (2022) **Data source:** NSW LPI (2022), NSW DSFI (2022); NPWS Estate (2022)

6.11.3.2 Bush Fire Threat

The Murray Region has a current average annual accumulated Fire Danger Index Rating classification of 80 (CSIRO, 2023). The average annual accumulated rating is developed from the daily Forest Fires Danger Index which combines a measure of vegetation dryness with air temperature, wind speed and humidity. These daily values over a year are combined to determine the annual accumulated rating.

Average monthly maximum temperatures range between 15.7°C in July and 33.1°C in January. The hottest recorded temperature is 47.4°C (January 2019). Average monthly minimum temperatures range between 3.6°C in July and 16.5°C in January. The mean annual rainfall is 321 mm.

The bush/grass fire season generally commences from October and concludes in March however in some years the season has started as early as September and extending into April. Weather conditions primarily associated with the bush fire season consist of strong north-westerly fronts generated from the interior, which may be extremely dry and hot (RFS 2018). Ignitions in the area surrounding the Project Area are most commonly caused by lightning strike from dry lightning storms, which frequently occur during the summer months (NPWS, 2020) or from accidental ignition.

The Project Area falls within the Mid Murray Zone Bush Fire Management Committee (BFMC) Bush Fire Risk Management Plan (Mid Murray BMFC, 2009). The plan states that the area has on average 250 bush/grass fires per year of which 6-10 on average can be considered major fires. The main source of ignition of these fires are lightning strikes, unattended camp fires, power lines, machinery and traffic, escaped agricultural burns and the use of cutting and welding equipment. The SEED Fire Extent and Severity Mapping (FESM) (Department of Planning and Environment, 2023), has no recorded bush fire incidents within the Project Area.

The remnant vegetation within the Project Area, the adjoining vegetation associated with the Yanga National Park and bush/grass fire prone land and intervening grasslands represent a potential bush/grass fire threat to the Project, through spreading fire. Based on the existing environment the potential bush/grass fire hazards and risks associated with the Project include:

- Construction activities (earth moving equipment, power tools (particularly grinders and welders))
- Operational phase (transmission/BESS/STATcom failure/overheating, ignition from vehicles or machinery)
- Lighting strike
- Accidental ignition (smoking, poor management of camp fires etc)
- Poor site bush/grass fire management and preparedness
- Arson.

Bush/grass fire mitigation and management will be required to appropriately reduce the level of bush/grass fire risk associated with the Project. It should be noted that the presence of WTGs does not necessarily increase the risk of lightning strike, additionally WTGs are designed with appropriate protection systems to safely dissipate energy from lightning strikes into the ground. WTGs are also controlled remotely and programmed to shut down if they are functioning outside of design conditions including heat and high wind speed.

6.11.3.3 Bush Fire Assessment

PBP 2019 requires wind farm developments to have adequate clearances to combustible vegetation as well as adequate access and water supply for firefighting purposes. At a minimum, a 10 m Asset Protection Zone (APZ) is required for the proposed WTGs and associated buildings/infrastructure (with the APZ being maintained to the standard of an Inner Protection Area (IPA)) for the life of the development.

The IPA provides a defendable space within which firefighting efforts can be safely undertaken to defend structures before and after the passage of bush fire. Vegetation within the IPA is required to be well maintained and kept to a minimum level (disconnected vegetation including tree canopies and shrubs, mown grass, ground free of leaves and debris).

Essential equipment associated with the wind farm is also required to be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies and reduce bush fire risk to surrounding land.

Asset Protection Zones

As discussed in **Section 3.4.2**, the proposed WTGs require a foundation (approximately 23 m by 23 m in size) providing an appropriate defendable space between the proposed WTGs and the surrounding vegetation. Appropriate APZs in accordance with PBP 2019 can also be applied to the ancillary infrastructure (BESS/STATcom facilities, site operations and maintenance facility, substations and switching stations). Proposed overhead electrical cabling will include the establishment of a 60 m wide easement. The easement may not be entirely cleared, with vegetation to be removed to maintain a safe clearance and setback from the transmission wires.

The Project Area will be appropriately maintained over the life of the Project including vegetation and site maintenance required to maintain APZs.

Access

Access to the Project Area will be provided via multiple access points, from east to west directly from Balranald-Moulamein Road. Internal access roads would be constructed to accommodate construction, movement of OSOM vehicles, operational traffic movements and emergency access throughout the Project Area. The Project will facilitate improved ground-based emergency services access via the internal access tracks for the Project which are all weather, low gradient and 5 m wide. The indicative location of the access roads is shown on **Figure 1.3**.

Aerial Firefighting

In relation to aerial access for firefighting purposes, the Australasian Fire and Emergency Services Council (AFAC) has developed a national position on wind farms in relation to bush fire prevention, preparedness, response and recovery which is set out in the Wind Farms and Bush Fire Operations (2018) guideline. The Wind Farm and Bush Fire Operations guideline advises that wind farm operators should be responsible for ensuring that the relevant emergency protocols and plans are properly executed in an emergency event.

During an emergency, operators need to react quickly to ensure they can assist and intervene in accordance with their planned procedures, including:

- Liaison with the relevant fire and land management agencies that is ongoing and effective.
- Access is available to the Project Area by emergency services response for on-ground firefighting operations.
- WTGs are shut down as soon as mechanically possible during emergency operations – where possible, blades should be stopped in the ‘Y’ or ‘rabbit ear’ position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.
- Aerial bush fire fighting personnel are required to assess risks posed by aerial obstacles, wake turbulence and moving blades in accordance with routine procedures.

Windlab will prepare and implement a Bush Fire Emergency Management Plan as part of the implementation of the Project. This will address the operational requirements in relation to aerial firefighting and access in relation to the Project Area. Windlab will consult with fire services (aerial and ground) during the preparation of the Bush Fire Management Plan.

The RFS was consulted through the development of the Aviation Impact Assessment for the Project (refer to Section 6.10.1) and has indicated that the Project would have minimal impact on RFS aerial operations.

Water Supply

An appropriate dedicated water supply for bush fire protection will be provided on site in the vicinity of the operations and maintenance facility. The volume and location of the water supply will be subject to consultation with the RFS during the development of the Bush Fire Emergency Management Plan, to be prepared during the detailed design and pre-construction phase of the Project. At a minimum, a 20,000 L dedicated firefighting water tank fitted with a 65 mm Storz fitting would be installed.

This dedicated water supply will be installed at the commencement of construction and a water cart will also be available for use through the construction phase if required.

Mitigation and Management

A Bush Fire Emergency Management Plan will be developed for the Project in accordance with PBP 2019 and in consultation with the RFS (including any requirements in relation to aerial firefighting). Consultation will also be undertaken with NPWS in relation to the adjoining Yanga National Park and associated bush fire management strategy.

The plan will identify all relevant bush/grass fire risks and mitigation measures associated with the construction and operation of the Project, including:

- detailed measures to prevent or mitigate fires igniting, outlining:
    - APZ locations and management requirements
    - any specific construction management requirements
    - access locations, passing bays and any alternate emergency access
    - management requirements in relation to aerial firefighting

- water supply and location and any other bush fire suppression systems (including any drenching systems, static water supply, natural water sources)
- construction work that should not be carried out during total fire bans
- availability of fire-suppression equipment
- storage and maintenance of fuels and other flammable materials.

- notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate
- and appropriate bush fire emergency management and evacuation plan.

The Project will facilitate improved ground-based emergency services access by virtue of the all weather, low gradient access tracks and strategic location of firewater. Additionally, all construction and operational vehicles will be equipped with appropriate fire fighting equipment to act within the limits of equipment and training prior to emergency services arriving on site.

Operational staffing and associated maintenance regimes provide the opportunity for more regular observation of otherwise remote areas of sites, providing efficient reporting of potential bush fire issues.

With the implementation of a Bush Fire Emergency Management Plan in consultation with the RFS and NPWS, it is considered that potential bush/grass fire risk associated with the Project can be appropriately managed.

6.11.4 Electric and Magnetic Fields (EMF) and Health

The SEARs require the consideration and documentation of any potential health issues associated with the Project, having regard to the latest advice of the National Health and Medical Research Council (NHMRC), and including the identification and assessment of potential hazards and risks associated with electric and magnetic fields (EMF) in accordance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields.

6.11.4.1 EMF

EMF has been considered in the PHA prepared for the Project (refer to **Appendix 20**) with a summary provided in this section.

EMFs are associated with a wide range of sources and occur both naturally as well as human made. Naturally occurring EMFs, such as during lightning storms, are generated from Earth's magnetic field. Human-made EMFs are present wherever there is electricity, hence EMFs are present in almost all built environments where electricity is used.

Extremely low frequency (ELF) EMFs occupy the lower part of the electromagnetic spectrum in the frequency range 0-3,000 Hz, which means the current will change direction 0-3,000 times a second. ELF EMF result from electrically charged particles. Artificial sources are the dominant sources of ELF EMF and are usually associated with the generation, distribution and use of electricity at the frequency of 50 Hz in Australia. The electric field is produced by the voltage whereas the magnetic field is produced by the current.

EMFs are created from operational electrical equipment, such as transmission lines, transformers and the electrical components found within BESS units, STATCOM facilities, inverters, etc. This equipment has the potential to produced ELF EMF’s in the range of 30 to 300 Hz.

There are currently no existing standards in Australia for governing the exposure limits to ELF EMFs, however, ICNIRP has provided guidelines around exposure limits for prolonged exposure which limits the exposure to 2,000 milligauss (mG) for members of the public in a 24 hour period.

Table 6.29 provides typical magnetic field measurements and ranges associated with EMF sources. Electric fields around devices are generally close to 0 due to the shielding provided around the equipment. In addition, EMF levels drop away quickly with distance, hence while a value may be measurable at the source, within a short distance the EMF is undetectable.

Table 6.29 EMF Sources and Magnetic Field Strength

Source	Typical Measurement (mG)	Measurement Range (mG)
Television	1	0.2–2
Refrigerator	2	2–5
Kettle	3	2–10
Personal computer	5	2–20
Electric blanket	20	5–30
Hair dryer	25	10–70
Distribution powerline (under the line)	10	2–20
Transmission power line (under the line)	20	10–200
Edge of easement	10	2–50

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) advises that the strength of radiation decreases exponentially with distance from the source, and it will become indistinguishable from background radiation within 50 m of a high voltage power line and within 5 to 10 m of a substation.

The closest receiver (considering associated and non-associated dwellings) is over 1 km from any location where electrical components will be located for the Project providing substantial distance for attenuation of EMFs. Based upon the typical levels which may be generated by transmission equipment the cumulative effect would not exceed the 2,000 mG limit for prolonged exposure. As the strengths of EMF attenuate rapidly with distance, the ICNIRP reference level for exposure to the general public will not be exceeded and impact to the general public in surrounding land uses is negligible.

6.11.4.2 Health

The NHMRC (2015) released an information paper containing independent research on the relationship between wind farms and human health. The three main concerns stemming from the operation of wind farms were identified and investigated in the research paper, being: noise generated by the WTGs, shadow flicker from the turning of the wind blades and EMF. These three issues have been considered in detail in the EIS with no adverse findings in relation to human health identified. Noise is assessed in **Section 6.3** and **Appendix 10**, shadow flicker in **Section 6.2.2.6** and **Appendix 9** and EMF in **Section 6.11.4.1** and **Appendix 20**.

6.11.5 Preliminary Hazard Analysis

The SEARs require a Preliminary Hazard Analysis (PHA) for the BESS, prepared in accordance with the *Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'* (HIPAP No. 6) *and Multi-level Risk Assessment* (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to onsite and off-site receptors to prevent fire propagation and compliance with *Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning* (HIPAP No. 4) (DoP, 2011). The PHA has been undertaken by Riskcon (refer to **Appendix 20**) with the key outcomes summarised in the section below.

6.11.5.1 Assessment Methodology

The *Multi-Level Risk Assessment* (DoP, 2011) approach was used as the basis for the PHA to determine the level of risk assessment required. The approach considered the Project in the context of its location, the quantity and type (i.e. hazardous nature) of Dangerous Goods (DGs) stored and used, and the Project's technical and safety management control. Based on these factors a Level 1 Assessment (qualitative) was selected for the Project. This approach is commensurate with the methodologies recommended in *"Applying SEPP 33" Multi Level Risk Assessment* (DPIE, 2011).

The key steps in the assessment undertaken for the PHA were hazard analysis and consequence analysis. A detailed hazard identification was conducted for the site facilities and operations as recommended in HIPAP No. 6. The hazard identification considered incident type, causes, consequences and safeguards. Where a potential offsite impact was identified, further analysis was undertaken. Where the qualitative review determined that proposed safeguards were adequate to control the hazard, or that the consequence would obviously have no offsite impact, no further analysis was performed.

For those incidents qualitatively identified in the hazard analysis to have a potential offsite impact, a detailed consequence analysis was conducted. The analysis considered the various postulated hazardous incidents and determined impact distances from the incident source. The results were compared to the consequence criteria listed in HIPAP No. 4. Where an incident was identified to not have an offsite impact, or a simple solution was recommended, no further analysis was performed.

6.11.5.2 Risk Assessment

The following hazardous scenarios were considered in the PHA:

- Lithium ion (Li-ion) battery fault, thermal runaway and fire.
- Li-ion battery fire and toxic gas dispersion.

- Electrical equipment failure and fire.
- Transformer internal arcing, oil spill, ignition and bund fire.
- Transformer electrical surge protection failure and explosion.
- STATCOM electrical equipment failure and fire.
- STATCOM transformer internal arcing, oil spill, ignition and bund fire.
- STATCOM transformer electrical surge protection failure and explosion.
- Electromagnetic field impacts.

The battery chemistry for the BESS will be Lithium-Ion phosphate (LFP), considered to be one of the safest battery chemistries within the industry. LFP systems are less susceptible to thermal runaway and fire and heat transfer between cells and modules. The Project BESS would be developed and installed in accordance with the manufacturer's specifications and recommended fire protection systems.

If a BESS failure resulted in a fire, toxic by-products could form, such as carbon dioxide, carbon monoxide and fluorine gases. A detailed consideration of the conditions required for these gases to form and the potential concentrations is presented in **Appendix 20**. In summary, as discussed above, the highly stable and safe battery chemistry and fire protection systems installed mean that the initiating event of a fire is unlikely to occur. Furthermore, in the unlikely event of a fire, it is considered that the concentration of gases generated and dispersion in the environment would not result in any downwind impacts sufficient to cause injury or fatality.

The electrical equipment to be used for the Project is ubiquitous throughout the world with a low potential for failure and does not represent a unique fire scenario. Electrical equipment within the Project Area would be located in an isolated environment with a lack of available mass of combustible/flammable substances in the immediate area surrounding the equipment limiting potential for fire propagation and the probability of a fully developed fire to occur. Equipment such as transformers are fitted with electrical surge protection measures to protect against scenarios that could potentially damage the system and lead to explosion or fire.

For each of the scenarios considered above, it should be noted that the closest dwelling (associated dwelling) is more than 1 km from any substation/switching station/BESS/STATCOM location and no offsite impacts are considered likely. As no observed offsite impacts were considered likely it was concluded that the risks at the site boundary are not considered to exceed the acceptable risk criteria.

6.11.5.3 Available Space for BESS Allocation

As the BESS supplier/manufacturer for the Project has not yet been determined, conservative assumptions were made in the calculation of available space required for individual BESS modules. A single BESS module was assumed to have a footprint of 59 m^2 with a separation requirement of 2.5 m between modules. The available space at each of the potential BESS locations and the maximum number of BESS that could be installed is shown in **Table 6.30.**

Table 6.30 Potential BESS Allocation Areas

BESS Location	Available Area (m^2)	Maximum No. of BESS
North	30,000	500
Central	30,000	500
South	10,000	160
East	10,000	160

The likely number of BESS modules at any one location is 125, hence there is adequate space allocated at each location. If STATCOM is selected as the grid support option this could also be adequately accommodated within the allocated area as a STATCOM requires significantly less space than BESS facilities.

6.11.5.4 Mitigation and Management Measures

The PHA assessment made the following recommendations:

- A standard test method for evaluating thermal runaway fire propagation in BESS (UL9540A report) shall be conducted and its findings submitted to the relevant authority prior to installation.
- Testing to demonstrate clearances required to prevent propagation of fires between separated units.
- BESS to be installed in accordance with manufacturer and UL9540A report recommended clearances based on testing.
- BESS to be installed with fire protection systems specified by the manufacturer and UL9540A report.
- Before construction, detailed design to validate the system can be installed in the Project area whilst meeting the recommended clearances.
- UL testing information shall be made available to the certifying authority. It is noted that a confidentiality agreement may be required.
- The vent covers of the BESS shall be constructed of non-combustible material.
- The vents shall not be located above battery packs within the BESS container.

6.11.6 Blade Throw

Blade throw is defined as an incident where the WTG blade detaches or partially detaches and is thrown into the surrounding area. For modern wind farms, blade throw is a rare occurrence but prudent planning requires that the risk be considered in the design process.

As required by the SEARs, an assessment of potential blade throw risk for the Project has been undertaken by Middleton Group (refer to **Appendix 21**). The purpose of the assessment was to estimate risk to people and BESS/STATCOM facilities associated with a blade failure event. The assessment is based on the likelihood of a human or BESS/STATCOM facility occupying space within the potential impact zone and the likelihood of a blade failure event occurring.

For the purposes of the Project assessment, blade throw is defined as a catastrophic blade failure, which is divided into two types of events: blade drop and fragmentation. Blade drop is defined as detachment of the whole blade or the majority of the blade from the WTG hub. Fragmentation is defined as an event where a smaller blade fragment such as a blade tip or part of the shell detaches from the blade proper. Data suggests that manufacturing defects and lightning are the two key causes of WTG blade failure.

The safe operation and structural integrity of WTGs are typically governed by recognised international standards. The International Electrotechnical Commission (IEC) Standard IEC –1400-1 *Wind turbines – Part 1: Design requirements, Edition 4.0, IEC 61400-1:2019* defines standards for the design of WTGs and affiliated parts with the aim of minimising structural failure and consequential risk of personal injury or damage to property. Two IEC standards apply to the design and certification of WTG blades: *Wind turbines – Part 23: Full-scale structural testing of rotor blades Edition 1.0, IEC 61400-23:2014*, and *Wind energy generation systems – Part 24: Lightning protection, Edition 2.0*, *IEC 61400-24*.

In addition to satisfying these international standards, modern WTGs include control systems designed to detect failure (including a reduction in power output, rotor imbalance, abnormal vibration, etc.) and consequently shutdown the relevant WTG thus preventing a catastrophic failure, i.e., a blade throw event. WTGs also include lightning protection systems.

Windlab will design and implement on-site monitoring and maintenance programs that will allow the Project to be remotely monitored and may assist in the early detection of potential WTG faults, reducing the risk of serious or dangerous problems developing.

Compliance with international standards, implementation of high-quality maintenance programs, and continual improvements in WTG design and materials mean that blade failure is relatively rare for modern WTGs and does not typically result in the detachment of blades or blade fragments.

The blade throw assessment provides an estimate of the risk to human life associated with a blade failure event, based on likelihood of a human occupying space within the potential impact zone at the time of blade failure. Two impact radii are considered – a 300 m radius to account for blade drop events and an 800 m radius to account for fragmentation. It is noted that the distance between the nearest dwelling (associated and non-associated) and a proposed WTG location is approximately 1.9 km. The various models and empirical data examined demonstrate that the risk associated with blade throw for these dwellings is negligible as they are beyond the potential impact area.

Based on the available data, it is estimated that there is a 19.4 million year return period for a blade failure causing a fatality at the Project. Thus, the likelihood of such an event occurring is very low and the level of risk is well within the bounds of being considered acceptable. To provide a risk comparison, *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (HIPAP 4) (NSW Department of Planning, 2011) provides suitable thresholds of acceptability for various land uses. The HIPAP 4 acceptable risk threshold for hospitals, schools, child-care facilities and old age housing is 2 million year return period and for residential, hotels, motels and tourist resorts is a 1 million year return period. This demonstrates that the 19.4 million year return period calculated for the Project is very low and well below acceptable risk limits.

There is a 32,900 year return period for a blade failure impacting the BESS locations in the Project Area. This would be higher if a STATCOM is selected due to the smaller footprint at these locations. This risk calculation exclusively considers the impact on hardware, not risk of fatality which is considered above.

The likelihood of such an event occurring is greater than the acceptable return period, 1 in 10,000 years, for industrial land use.

6.12 Social

Social Impact Assessment (SIA) is an approach to predicting and assessing the likely social consequences of a proposed action and developing options and opportunities to improve outcomes for people. SIA involves understanding impacts from the perspectives of those involved in a personal, community, social or cultural sense, to provide a complete picture of potential impacts, their context, and implications.

A SIA was conducted for the Project by Environmental Resources Management Australia Pty Ltd (ERM), following the requirements of the *NSW Social Impact Assessment Guideline for State Significant Projects* (SIA Guideline) (DPE, 2023a) and the Project SEARs. The SEARs require an assessment of the social impacts in accordance with the SIA Guideline and the *SIA Guideline – Technical Supplement* (DPE, 2023b) and consideration of construction workforce accommodation. The full SIA is contained in **Appendix 6** and a summary of key outcomes is provided in the following sections.

6.12.1 Methodology

The SIA was prepared in accordance with the SIA Guideline (DPE, 2023a) and the Technical Supplement (DPE, 2023b) which aim to improve the rigour applied to SIAs, with a view to minimising impacts and enhancing benefits in-line with good international industry practice. The methodology used for the SIA included five steps:

- scoping
- baseline data collection
- impact assessment
- management measures
- monitoring and evaluation.

In addition to the five steps above, engagement with various stakeholders has been undertaken to provide opportunities to identify, integrate and address social impacts within the detailed Project planning, design and assessment phases. As discussed in **Section 5.0**, Windlab has been consulting with local stakeholders since February 2020, building a presence in the region through meetings with local landowners, neighbouring property owners, Councils, local service providers and relevant Government agencies. Concerns and feedback relating to the Project identified throughout the engagement process have been considered by Windlab and used to inform the refinement of the Project design and the development of this EIS including the proposed management and mitigation measures. The SIA provides a consolidation of community consultation outcomes which have informed the assessment and evaluation of Project-related social impacts and opportunities, and social impact management planning.

The SIA assessed a Social Locality which includes the Project Area, the area surrounding the Project Area wherein noise, visual and other amenity impacts may occur, the haulage routes where similar amenity impacts may be experienced, and the communities and larger population centres that may provide workers or goods and services to the Project. The Social Locality does not include:

- The complete extent of haulage routes from regional ports where State/National highways are to be used by the Project.
- The complete extents of the SW REZ.
- While the city of Swan Hill has been considered in the Social Locality, given its potential to provide goods and services or accommodation options for the Project, the Rural City of Swan Hill LGA has not been included.

6.12.2 Social Baseline

The social baseline assessment undertaken as a component of SIA provides the foundation from which social impacts associated with the Project may be assessed and predicted. The social baseline describes the Social Locality without the Project as per **Table 6.31**.

Table 6.31 Social Baseline

Social Locality Aspect	Detail
Land Use Context	The land uses within the Project Area are generally homogenous with those in the surrounding area, comprising rural and agricultural related uses.
Population Demographics	The Social Locality, inclusive of the Yanga, Kyalite and Moolpa suburbs and localities, is characterised by smaller, relatively homogenous populations, which are typically characteristic of small-scale rural communities.
Economic Profile	Key occupations of employment throughout the Social Locality include professionals, managers, labourers, machinery operators and drivers, clerical and administrative workers, sales workers, community and personal services workers. Key industries throughout the Social Locality include agriculture, forestry and fishing, public administration, safety, health care and social assistance, mining, accommodation and food services, local government administration, agriculture, education, road and freight transport, wine and other alcoholic beverage manufacturing, hospitality, and retail. Employment type varies throughout the Social Locality and includes full-time, part-time, away from work and unemployed.
Housing and Accommodation	The Social Locality has a limited supply and mix of accommodation noting the relatively low number of motels, hotels, guest houses, caravan parks (including cabins) established in the area. Swan Hill provides the largest number of accommodation options, within reasonable proximity to the Project Area and provides regional-level services. There is very little rental property availability within the Social Locality.
Social Infrastructure and Community Wellbeing	Schools and other education institutions, medical services, emergency services, recreational facilities, and community organisations are present throughout the Social Locality. Various services, facilities and organisations are located within Balranald (approximately 15 km north of the Project Area), Tooleybuc (approximately 29 km southwest of the Project Area), Moulamein (approximately 43 km from the Project Area), Swan Hill (approximately 74 km from the Project Area), Robinvale (approximately 104 km from the Project Area) and Euston (approximately 95 km from the Project Area).

Social Locality Aspect	Detail
Access and Connectivity	For both construction and operation of the Project, commuting to the Project will occur most commonly on the Sturt Highway, Yanga Way, Balranald-Moulamein Road and Arundel Road. The Social Locality is serviced by Balranald Airport, Swan Hill Airport and Mildura Airport. Train services are available to the town centre of Swan Hill. Bus companies including NSW TrainLink and Greyhound Australia offer routes that include stops in Balranald.
Cultural Heritage	The Historical Heritage Impact Assessment (HHIA) (refer to **Section 6.6**) notes that the Project Area has been assessed as having high potential to contain archaeological material relating to the late nineteenth homesteads that characterised the landscape (e.g. squatter's huts, workers' accommodation, irrigation channels, survey markers). The Aboriginal Cultural Heritage Assessment (ACHA) (refer to **Section 6.5**) identified the following cultural heritage matters in relation to the Project: • the Project Area is currently and has been historically used for cultivation, meaning that the whole area has been highly disturbed over many years • there is a reasonable number of stone artefacts, fireplaces, mounds, and culturally modified trees present in the Project Area • the ACHA recommends collection of the stone artefacts and avoidance of the remaining archaeological finds in the Project Area • the modified trees were likely scarred by rabbiters in the late 19th and early 20th century, rather than Aboriginal cultural practices (although this conclusion was not universally accepted by all RAPs).
Community Values	In 2021, Windlab conducted a Community Values Survey within the Social Locality. The results indicated that the community identified with its farming heritage (63%) the most, followed by a sense of community and family (57%), and employment opportunities (40%). In 2022, Balranald Shire Council undertook a community survey which sought to understand what the community valued and the results strongly corelated to the values identified in the 2021 Windlab Community Values Survey.

6.12.3 Impact Assessment

Table 6.32 provides details of the potential social impacts for the Project and related management, mitigation, or enhancement measures. In assessing the potential impacts, the SIA considered:

- characteristics of the Project, including the timing, duration and intensity of activities (where known)
- issues/concerns and opportunities raised by stakeholders during the engagement process
- outcomes from technical studies undertaken by the Project (noise, visual, economic, traffic and transport, cultural heritage, etc.).

The impacts have been assessed based on the likelihood of the impact occurring, the magnitude of the impact (degree of change caused by the impact) if it occurs, and the vulnerability of the impacted receptors. Further impact assessment details are presented in Section 6 of the SIA (refer to **Appendix 6**).

Table 6.32 Summary of Social Impact Assessment and Management Measures

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Reduced community cohesion and increased social tensions if appropriate management and/or mitigations are not implemented by the Applicant for construction activities, and the resultant negative mental health and wellbeing impacts to the local community.	Health and Wellbeing	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations	Medium	• Develop and implement a SEP. • Develop and implement a grievance mechanism. • Continue to work with Local Communities and Community Groups in the delivery of the Community Benefit Fund and associated initiatives. • The Project will apply Construction Phase mitigation measures to reduce the impacts that could further exacerbate implications for community cohesion. • Use of varied and/or alternative engagement methods to reduce the potential for stakeholder fatigue and enable the ongoing engagement of stakeholders for the duration of the Construction Phase.	Low
Community engagement for the Project is ineffective with stakeholders feeling as though they have not been heard or are unable to influence Project decisions and management outcomes.	Decision-making Systems; Health and Wellbeing	Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups	Medium	• Develop and implement a SEP. • Develop and implement a grievance mechanism to ensure that concerns / complaints are identified and acted upon.	Low

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Increased demand for labour creates direct and indirect employment opportunities for the local community.	Livelihoods	Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations; First Nations Groups	High	• Develop and implement a CWAS for the Project. The CWAS is to include measures to encourage and set targets for local employment for the EPC Contractor. • Establish and implement a First Nations Participation Plan. • Create awareness amongst the community, in partnership with the Murray River Council, Balranald Shire Council, and Swan Hill Rural City Council, and other partner organisations to foster a better understanding of the ways prospective workers may be able to take part in the Project. This awareness is to be generated using a Project specific website and existing communication channels within the Murray River, Balranald, and Rural City of Swan Hill LGAs. • Work with the EPC Contractor during the construction phase to maximise local employment. • Work with the Murray River Council, Balranald Shire Council, Swan Hill Rural City Council, and the NSW State Government to identify opportunities to support and/or contribute to TAFE courses (or similar) in order to promote the development of complementary skillsets for renewable energy projects within the Social Locality and wider region.	High
Increased demand for goods and services helps to stimulate the local economies. Commercial Businesses/ Groups/ Organisations within the Social Locality benefit from increased economic activity associated with the construction workforce and Project material	Livelihoods	Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations; First Nations Groups	High	• Develop and implement local content initiatives which includes measures to encourage local procurement for the EPC Contractor. • Create awareness amongst the community, in partnership with the Murray River Council, Balranald Shire Council, and Swan Hill Rural City Council, and other partner organisations to foster a better understanding of the ways local/regional businesses may be able to take part in the Project. This awareness is to be generated using a Project specific website and existing communication channels within the Murray River, Balranald, and Rural City of Swan Hill LGAs.	High

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
requirements.				• Work with the EPC Contractor during the Construction Phase to track and report on the local content used for the Project to demonstrate the extent to which local content is being accessed. • Assist respective local/regional Commercial Businesses/Groups/Organisations in becoming 'job ready'.	
Increased demand for labour contributes to skills shortages.	Livelihoods	Commercial Businesses/ Groups/ Organisations; Local Communities and Community Groups	Medium	• Develop and implement the CWAS for the Project. • Monitor for skills shortages within the region and take this into consideration with EPC Contractor recruitment objectives. • Develop and implement a SEP. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders, including in relation to skills shortages and impacts to local/regional Commercial Businesses/Groups/Organisations, are identified and acted upon.	Medium
Construction impacts including visual amenity, dust, and the increased risk of bushfire which influence social amenity and potentially cause a nuisance for stakeholders and/or an impact on community health and wellbeing.	Health and Wellbeing; Surroundings	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups	Medium	• Develop and implement a SEP, inclusive of the requirement to provide frequent updates around local impacts arising from construction related activities to Host Landowners, Immediate Neighbours, Secondary Neighbours, and the Local Communities and Community Groups. • Continue to engage with Immediate Neighbours to ensure that suitable landscaping solutions are implemented to minimize visual impacts, where required. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders during construction are identified and acted upon. • Develop and implement an Environmental Management System (EMS) that will include specific mitigations for Construction Phase impacts.	Medium

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Transportation of materials and equipment to the Project Area has the potential to cause wear and tear on roads, road traffic congestion and community safety impacts for road users along the haulage routes and on local roads. Risk of traffic injury or in the worst case a fatality, resulting from increased vehicle movements during the transportation of goods and workers to and from the Project Area.	Way of Life; Health and Wellbeing; Accessibility	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations	Medium	• Develop and implement a Construction Phase Traffic Management Plan (TMP) which draws on the Project Traffic and Transport Impact Assessment. • Develop and implement a SEP. • Continue to engage with relevant stakeholders to ensure that matters raised in relation to traffic concerns, particularly those that relate to harvest period traffic movements are appropriately considered and incorporated into construction management processes and procedures. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders during construction are identified and acted upon.	Medium
Potential increase in demand for short and long-term accommodation, where the 80% (average of 200 FTE jobs) of workers are expected to be sourced from outside the Economic Study Area, rising to 320 FTE non-local jobs at the Project's peak.	Way of Life	Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations	Very High	• Develop and implement a CWAS for the Project. The CWAS is to include measures to encourage and set targets for local employment for the EPC Contractor. • Continue to engage with the Murray River Council, Balranald Shire Council, and Swan Hill City Council, to understanding pressures experienced by the Social Locality in relation to worker influx and accommodation. • Develop and implement a Worker Code of Conduct to mitigate the potential for increased anti-social behaviour or crime that may potentially arise from an increased number of fly-in fly-out (FIFO)/drive-in drive-out (DIDO) workers. • Develop and implement a SEP, inclusive of the various stakeholders identified in the CWAS.	High

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
				• Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders are identified and acted upon.	
Increased demand for social and emergency services and recreational facilities, where the 80% (average of 200 FTE jobs) of workers are expected to be sourced from outside the Economic Study Area, rising to 320 FTE non-local jobs at the Project's peak.	Way of Life; Accessibility	Local Communities and Community Groups	High	• Continue to engage with Murray River Council, Balranald Shire Council, and Swan Hill City Council to understanding pressures experienced across the Social Locality in relation to worker influx and local resources. • Ongoing engagement with relevant health (e.g. hospitals, medical clinics, etc.) and emergency services (e.g. ambulance, police, RFS, SES, etc.). • Develop and implement a SEP. • Develop and implement a grievance mechanism to ensure that concerns/complaints raised by stakeholders are identified and acted upon.	Medium
Development and implementation of the Community Benefit Fund, a Project-specific community benefit sharing scheme.	Community	Local Communities and Community Groups; Local Government	Very High	• Develop and implement the Junction Rivers Community Benefit Fund, consulting with key stakeholders and potential partners. • Ensure the application and merit-based assessment process for the Junction Rivers Community Benefit Fund is published publicly to instil a sense of transparency and trust in the process for Project stakeholders. • Publish collateral associated with the Junction Rivers Community Benefit Fund to the communities within the Social Locality via various communication methods/channels as per an Operation Phase SEP.	Very High

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Perceived adverse potential health impacts associated with the Project, including noise emissions, exposure to low-level EMF, and bushfire risk.	Health and Wellbeing	Host Landowners; Immediate Neighbours; Secondary Neighbours; First Nations Groups; Local Communities and Community Groups	Medium	• Implementation of a SEP tailored to Operation Phase of the Project will be important to facilitate transparent and meaningful engagement appropriately tailored to stakeholder requirements. • The grievance mechanism should be maintained throughout the life of the Project in order to manage concerns that may arise during operational activities. • Communicate the outcomes of relevant assessments (such as the Noise Impact Assessment) and associated technical management/mitigation measures (if required). • Develop and implement an EMS that will include specific Operation Phase mitigations.	Low
Increased demand for labour associated with the Project creates direct and indirect employment opportunities within the Social Locality. These opportunities, coupled with direct investment, provides long-term economic benefits.	Livelihoods	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; First Nations Groups; Local Government	Medium	• Develop and implement local content initiatives which include local employment goals for the Operation Phase. These initiatives are to be aimed at livelihoods, including people's capacity to sustain themselves through employment. • Develop and implement plans to help identify long-term financial opportunities, including a First Nations Participation Plan. • Create awareness amongst the community, in partnership with the Murray River Council, Balranald Shire Council, and Swan Hill Rural City Council, and other partner organisations to foster a better understanding of the ways prospective workers may be able to take part in the Operation Phase of the Project. This awareness is to be generated using a Project specific website and existing communication channels within the Murray River, Balranald, and Rural City of Swan Hill LGAs.	High

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Demand for locally procured goods and services during the Operation Phase of the Project. Commercial Businesses/Groups/Organisations within the Social Locality benefit from increased economic activity associated with Project operation.	Livelihoods	Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations; First Nations Groups	Medium	• Develop and implement local content initiatives which include local procurement goals for the Operation Phase. • Create awareness amongst the community, in partnership with the Murray River Council, Balranald Shire Council, and Swan Hill Rural City Council, and other partner organisations to foster a better understanding of the ways local/regional businesses may be able to take part in the Project. This awareness is to be generated using a Project specific website and existing communication channels within the Murray River, Balranald, and Rural City of Swan Hill LGAs.	High
Perceived potential impacts to neighbouring property values resulting from altered rural character and visual amenity.	Livelihoods	Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups	Medium	• Implementation of a SEP for the Operation Phase of the Project will be important to facilitate transparent and meaningful engagement that is appropriately tailored to stakeholder requirements. • The grievance mechanism should be maintained throughout the life of the Project in order to manage concerns that may arise during operational activities.	Medium
Perceived incompatibility of the Project with existing land uses which may disrupt and/or prevent existing agricultural/rural operations.	Livelihoods; Health and Wellbeing	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; State Government; Local Government; Commercial Businesses/ Groups/ Organisations; Emergency Services	High	• Implementation of a SEP for the Operation Phase of the Project which will include regular Project updates provided across a variety of platforms (e.g. electronic and hard-copy communication materials) and, where relevant, will seek input from stakeholders on issues that may affect them and which they may help to manage and/or mitigate (e.g. aerial spraying operations, aerial firefighting, etc.). • Communicate the outcomes of relevant assessments (such as the AIA) and associated technical management/mitigation measures. • Work with the Consent Authority to ensure that a workable outcome is achieved via conditions to approval to facilitate continued long-term use of the land for agricultural purposes.	Medium

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
				• The grievance mechanism should be maintained throughout the life of the Project in order to manage concerns that may arise during operational activities. • Develop and implement an EMS that will include specific Operation Phase mitigations, including system and operational monitoring; site management and maintenance responsibilities; and emergency response planning.	
Altered rural character resulting from the Project has the potential to cause stress and anxiety amongst those who can view the Project from their properties, and also affect tourism ventures within the Social Locality.	Surroundings	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; Commercial Business/ Groups/ Organisations	Very High	• Ongoing consultation with Immediate Neighbours to provide screen planting to manage the visual impact of the Project. This may include completion of a localised visual impact assessment where merited. • Communicate the outcomes of relevant assessments (such as the LVIA) and associated technical management/mitigation measures (where required). • Work with local/regional Commercial Businesses/Groups/Organisations and Local Communities and Community Groups to supply, plant, and maintain (for an initial establishment period) landscape screening, where required. • Implementation of a SEP for the Operation Phase of the Project. • The grievance mechanism should be maintained throughout the life of the Project in order to manage concerns that may arise during operational activities.	Medium
Altered landscapes have the potential to impact on tangible and intangible cultural heritage within the Project Area.	Culture	First Nations Groups	Medium	• Develop and Implement a CHMP. • The implementation of a SEP tailored to Operation Phase of the Project will be important to facilitate stakeholder appropriate, transparent, and meaningful engagement with RAPs and First Nations Groups. • The grievance mechanism should be maintained throughout the life of the Project to manage concerns that may arise during operational activities.	Medium

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
Cumulative impacts arising from the transportation of materials and equipment to the Project Area has the potential to cause wear and tear on roads, road traffic congestion and community safety impacts for road users along the haulage routes and on local roads. Risk of traffic injury or in the worst case a fatality, resulting from increased vehicle movements during the transportation of goods and workers to and from the Project Area.	Way of Life; Health and Wellbeing; Accessibility	Host Landowners; Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups; Commercial Businesses/ Groups/ Organisations	High	• Develop and implement a Construction Phase TMP which draws on the Project Traffic and Transport Assessment (Access Traffic Consulting 2024). • Develop and implement a SEP, inclusive of the requirement provide frequent updates around local impacts arising from construction related activities to Host Landowners, Immediate Neighbours, Secondary Neighbours, Local Communities and Community Groups, and Commercial Businesses/Groups/Organisations. • Engage with the proponents of the identified projects with the potential for traffic and transport related cumulative impacts to ascertain an understanding as any particular periods of intense road use by transport vehicles and/or OSOM vehicles. This information can then be disseminated to Project stakeholders as considered relevant. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders are identified and acted upon.	Medium
Cumulative visual amenity impacts from other renewable energy projects within the Social Locality and SW REZ have the potential to diminish local community connection to the landscape and sense of place.	Surroundings	Immediate Neighbours; Secondary Neighbours; Local Communities and Community Groups	High	• Implementation of a SEP for the Operation Phase of the Project. • Communicate the outcomes of relevant assessments (such as the LVIA) and associated technical management/mitigation measures (where required). • The grievance mechanism should be maintained throughout the life of the Project in order to manage concerns that may arise during operational activities.	Medium
Cumulative increase in demand for short and long-term accommodation caused by the influx of	Way of Life	Local Communities and Community Groups; Commercial Businesses/ Groups/	Very High	• Continue to engage with the Murray River Council, Balranald Shire Council, and Swan Hill City Council, to understanding pressures experienced by the Social Locality in relation to worker influx and accommodation.	High

Topic Areas and Potential Impacts	Impact Category	Stakeholders Affected	Pre-Mitigation Impact Significance	Mitigation Measures/Enhancement Opportunities	Residual Impact Significance
workers associated with other projects in the Social Locality and SW REZ.		Organisations		• Engage with the proponents of nearby projects with identified overlapping construction timeframes to ascertain an understanding as to their construction periods and potential options to manage population influx and pressures on short and long-term housing and accommodation within the wider region. • Develop and implement a CWAS for the Project. • Develop and implement a SEP, inclusive of the various stakeholders identified in the CWAS. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders are identified and acted upon.	
Cumulative increase in demand for services and recreational facilities caused by the influx of workers associated with other projects in the Social Locality and SW REZ.	Way of Life; Accessibility	Local Communities and Community Groups	High	• Continue to engage with Murray River Council, Balranald Shire Council, and Swan Hill City Council to understanding pressures experienced across the Social Locality in relation to worker influx and local resources. • Engage with the proponents of nearby projects with identified overlapping construction timeframes to ascertain an understanding as to their construction periods and potential options to manage population influx and pressures on social infrastructure, services, and recreational facilities within the Social Locality. • Ongoing engagement with relevant health (e.g. hospitals, medical clinics, etc.) and emergency services (e.g. ambulance, police, RFS, SES, etc.). • Develop and implement a SEP. • Develop and implement a grievance mechanism to ensure that concerns / complaints raised by stakeholders are identified and acted upon.	High

6.12.3.1 Assessment Summary

Overall, the key drivers of social change that may affect communities in the Social Locality resulting from the Project relate to:

- increased economic activity for local/Regional businesses and employment opportunities for the local workforce
- opportunities for diversification of income streams for associated landowners
- disruptions due to construction related activities (such as land clearing, installation of infrastructure, transportation of materials and presence of workers) which can result in noise and air emissions
- accommodation arrangements for the construction workforce
- changes in land use and the presence of new infrastructure, which have implications for visual amenity and altered landscapes.

Following the 35-year operational timeframe, components of the wind farm may be upgraded to prolong the life of operation or decommissioned, and the land returned to the original land use. It is noted that the potential social impacts associated with the decommissioning of the Project will be similar to construction impacts and will be managed as part of a future Decommissioning and Rehabilitation Plan (or similar).

6.12.4 Social Impact Management

Windlab has committed to a number of mitigation and enhancement approaches to address social impacts as detailed in **Table 6.32**. A summary of the mitigation and enhancement measures to be implemented for the Project is provided below:

- Develop and implement a SEP covering construction and operation phases. SEP to include:
  - regular Project updates provided across a variety of platforms (e.g. electronic and hard-copy communication materials)
  - information around local impacts arising from construction related activities for Host Landowners, Immediate Neighbours, Secondary Neighbours, and the Local Communities and Community Groups.
- Develop and implement the Community Benefit Fund, consulting with key stakeholders and potential partners.
- Work with local communities and community groups in the delivery of the Community Benefit Fund and associated initiatives.
- Ensure the application and merit-based assessment process for the Community Benefit Fund is published publicly to instil a sense of transparency and trust in the process for Project stakeholders.
- Publish collateral associated with the Community Benefit Fund to the communities within the Social Locality via various communication methods/channels as per the operation phase SEP.

- Develop and implement a CWAS for the Project. The CWAS is to include measures to encourage and set targets for local employment for the EPC Contractor.
- Establish and implement a First Nations Participation Plan.
- Apply construction phase mitigation measures to reduce the impacts that could further exacerbate implications for community cohesion.
- Use varied and/or alternative engagement methods to reduce the potential for stakeholder fatigue and enable the ongoing engagement of stakeholders for the duration of the construction phase.
- Develop and implement a grievance mechanism to ensure that concerns / complaints are identified and acted upon.
- Create awareness amongst the community, in partnership with the Murray River Council, Balranald Shire Council, and Swan Hill Rural City Council, and other partner organisations to foster a better understanding of the ways prospective workers may be able to take part in the Project. This awareness is to be generated using a Project specific website and existing communication channels within the Murray River, Balranald, and Rural City of Swan Hill LGAs.
- Work with the EPC Contractor during the construction phase to maximise local employment.
- Work with the Murray River Council, Balranald Shire Council, Swan Hill Rural City Council, and the NSW State Government to identify opportunities to support and/or contribute to TAFE courses (or similar) in order to promote the development of complementary skillsets for renewable energy projects within the Social Locality and wider region.
- Work with the EPC Contractor during the construction phase to track and report on the local content used for the Project to demonstrate the extent to which local content is being accessed.
- Assist respective local/regional Commercial Businesses/Groups/Organisations in becoming ‘job ready’.
- Monitor for skills shortages within the region and take this into consideration with EPC Contractor recruitment objectives.
- Continue to engage with Immediate Neighbours to ensure that suitable landscaping solutions are implemented to minimise visual impacts, where required.
- Develop and implement an EMS that will include specific mitigations for construction phase impacts.
- Develop and implement a construction phase TMP which draws on the Project TTIA.
- Continue to engage with relevant stakeholders to ensure that matters raised in relation to traffic concerns, particularly those that relate to harvest period traffic movements are appropriately considered and incorporated into construction management processes and procedures.
- Continue to engage with the Murray River Council, Balranald Shire Council, and Swan Hill City Council, to understanding pressures experienced by the Social Locality in relation to worker influx and accommodation.

- Develop and implement a Worker Code of Conduct to mitigate the potential for increased anti-social behaviour or crime that may potential arise from an increased number of FIFO/DIDO workers.
- Ongoing engagement with relevant health (e.g. hospitals, medical clinics, etc.) and emergency services (e.g. ambulance, police, RFS, SES, etc.).
- Communicate the outcomes of relevant assessments and associated technical management/mitigation measures (if required).
- Develop and implement local content initiatives which include local employment goals for the operation phase. These initiatives are to be aimed at livelihoods, including people's capacity to sustain themselves through employment.
- Work with the Consent Authority to ensure that a workable outcome is achieved via conditions to approval to facilitate continued long-term use of the land for agricultural purposes.
- Ongoing consultation with Immediate Neighbours to provide screen planning to manage the visual impact of the Project. This may include completion of a localised visual impact assessment where merited.
- Work with local/regional Commercial Businesses/Groups/Organisations and Local Communities and Community Groups to supply, plant, and maintain (for an initial establishment period) landscape screening, where required.
- Develop and Implement a Cultural Heritage Management Plan.
- Engage with the proponents of the identified projects with the potential for traffic and transport related cumulative impacts to ascertain an understanding as any particular periods of intense road use by transport vehicles and/or OSOM vehicles. This information can then be disseminated to Project stakeholders as considered relevant.

6.13 Economic

The Project will result in significant capital expenditure of approximately $1.5 billion to develop the Project, in addition to ongoing expenditure during the operational and decommissioning phases. This expenditure will add to the local, regional and NSW economies, with this contribution being identified as a benefit of the Project during stakeholder consultation.

An Economic Impact Assessment (EIA) was prepared for the Project by Ethos Urban Pty Ltd, in accordance with the SEARs. The assessment addressed the economic benefits and impacts of the Project for the region and the State as a whole. The EIA for the Project is provided in **Appendix 22**, with results summarised in the sections below.

6.13.1 Methodology

The Economic Assessment Study Area comprises the following LGAs:

- Murray River
- Balranald Shire (neighbouring LGA)
- Swan Hill Rural City (neighbouring LGA).

The main regional cities/townships/settlements in the Study Area are all located within a 60-minute drive (approximately) of the Project Site and are therefore expected to be influenced by the Project to varying degrees.

The EIA undertook a baseline analysis of population, labour markets, occupational and business structures and township services for the Study Area and for NSW to allow an assessment of the:

- Capacity and opportunities of townships in the Study Area to participate and service the Project.
- Estimated Project investment and potential for retention of Project investment in the Study Area.
- Direct and indirect Project employment.
- Business and industry participation opportunities, with reference to baseline analysis outcomes regarding workforce size and skills composition and procurement activities.
- Agricultural impacts including employment and production impacts through land consumption and disruption to activities, and benefits to host landowners from new incomes and improved on-site infrastructure.
- Accommodation and housing impacts with reference to the baseline analysis and the estimated number of construction workers that may require accommodation at the Project's peak.
- Cumulative impacts relating to the potential concurrent construction of major infrastructure projects, particularly in relation to the SW REZ.
- Economic stimulus impacts including project wages and spending, landowner rental incomes, neighbour benefit payments, uplift in Council rate revenues, and Windlab's Community Benefits Sharing Program.

Based on this assessment, mitigation measures relating to accommodation, workforce and procurement and community benefit sharing are proposed to maximise the economic benefits of the Project and minimise potential impacts.

6.13.2 Baseline Regional Economic Profile

6.13.2.1 Population

The population of the Study Area (LGAs of Murray River, Balranald Shire and Swan Hill Rural City) totalled 36,410 persons at June 2022 (ABS Estimated Resident Population 2023 release). Over the period 2022-2036, annual population growth in the Study Area is expected to be +0.3% p.a. compared to the NSW growth rate of +1.0% p.a. While the Study Area's projected population growth is comparatively subdued, it is noted that the Murray River LGA is projected to experience an average population growth +1.2% p.a. between 2022–2036 (refer to **Appendix 22**).

6.13.2.2 Labour Force, Occupational and Business Structure

The regional labour market is tight, highlighted by the Study Area's low unemployment rate of 2.7% compared to 3.3% for NSW and 3.7% for Victoria. The Project is likely to require 400 employees during the construction phase (at the Project's peak), with potentially 20% of the workforce sourced within the EIA Study Area, providing new opportunities for unemployed job seekers, subject to appropriate skills match or 'back filling' employment opportunities associated with jobs vacated by workers taking up Project employment.

The latest available employment related census data (ABS Census 2021) shows 36.1% of employed residents in the Study Area were occupied in activities generally associated with the types of skills required for the construction of major utility-scale renewable energy projects (e.g., technicians and trades workers, machinery operators and drivers, and labourers). The representation of these occupations in the Study Area is well above the State average of 28.4%, indicating a generally suitable occupational base for the proposed Project is present in the region.

The Study Area's business structures indicate a good base exists to service the needs of the Project. Although construction-related businesses will likely be the main beneficiaries of the Project, businesses in other sectors supporting the Project (both directly and indirectly) are also likely to benefit.

6.13.2.3 Township Services

The major regional township of Swan Hill has the capacity and labour force to service many aspects of the Project, with smaller settlements such as Balranald, Tooleybuc, Moulamein and Robinvale, also likely to provide labour, accommodation and other general services to the Project.

Accommodation

A review of accommodation options in townships a maximum 60 minutes drivetime from the Project identified a limited supply and mix of accommodation noting a relatively low number of motels, hotels, guest houses, caravan/holiday parks (including cabins) established in the Study Area. Most accommodation options are located in Swan Hill, which is within reasonable proximity to the Project Area and provides regional-level services. More limited options in smaller townships are located closer to the Project Area including Balranald, Tooleybuc, Kyalite, Robinvale, Moulamein and Euston. An overview of commercial accommodation options available in the EIA Study Area is provided in **Table 6.33**.

Table 6.33 Commercial Accommodation located within the EIA Study Area (July 2023)

Township	Establishment	Rooms	Cabins	Total
Swan Hill	19	395	94	489
Balranald	7	93	17	110
Tooleybuc	6	66	7	73
Robinvale	6	60	21	81
Kyalite	1	na	na	na
Moulamein	3	6	8	14
Euston	4	55	13	68
Total	**46**	**675**	**160**	**835**

Source: Ethos Urban; Trip Advisor; STR.

The EIA identified that the Murray River Region averaged annual room occupancy rates of 71.4% in the March Quarter 2023, which are below the NSW occupancy rate of 72.7% for this period. Official room occupancy rates are unavailable at a local level. The March Quarter data includes notable holiday times, therefore, the Murray River Region commercial accommodation sector recorded a vacancy rate of approximately 29.6% over this period, indicating a reasonable supply of room availability, although noting the Murray River Region includes townships beyond the Study Area with comparatively high levels of accommodation including Albury, Moama and Deniliquin. This unoccupied supply is likely to be higher during non-peak seasons.

Private accommodation is often used to support construction worker needs for major projects. This could be through leasing of holiday homes and investment properties, either privately (including Airbnb), or through real estate agents.

The Study Area has a notably higher share of unoccupied dwellings (13.8%) when compared to the average for NSW (9.4%). The Balranald and Murray River municipalities have a significant share of unoccupied dwellings (20.7% and 16.0% respectively) or a total of around 1,120 dwellings (numbers rounded), which is likely related to a large number of holiday homes in this area. Shared private housing accommodation is one potential option for Project workers, with some of the Study Area's unoccupied dwellings having the potential to enter the housing market to support the construction phase of the Project.

Approximately 34 active short-term rentals are advertised on Airbnb and Vrbo (www.airdna.co) in Swan Hill, with no listings in Murray River or Balranald LGAs (July 2023). These active rentals have an average of 3.1 bedrooms per rental. Therefore, in the order of 87 rooms could be available in the Study Area through the short-term rental market, noting that no information is available on occupancy rates for these properties.

Anecdotal information from local community members suggests private term rentals and short-stay private accommodation (Airbnb) was made available within the Balranald township during the construction of the Limondale and Sunraysia solar farms, both located in close proximity to the Project.

A 400-bed temporary worker camp (TWC) is located in Balranald and has previously been used by solar farm developers during the construction phase of the Limondale and the Sunraysia solar farms. The TWC is located in proximity to the Balranald Main Street and offers convenience to key services for construction workers relocating to the area, reflecting the need to 'import' a large workforce to service projects due to limitations (size, skills, availability etc) of the local workforce. The TWC is classified as a permanent accommodation camp and includes the following buildings:

- Office
- Kitchen
- Gym
- Recreation
- Laundry
- Linen.

The constrained nature of accommodation supply in the Study Area and likely small proportion of Project workers able to be sourced locally (20%) will require a range of accommodation responses. Windlab has received written support from the TWC operator in regard to potential use of the facility. As such, the use of the Balranald TWC is the principal solution for housing the Project workforce.

Other township services likely to be required for the Project (trade supplies, equipment hire, fuel, vehicle mechanical services, etc.) are available from regional centres and main townships in Balranald, Kyalite, Tooleybuc, Euston, Swan Hill, Moulamein, and Robinvale.

6.13.3 Assessment of Economic Impacts

The net economic impacts of the Project are summarised in **Table 6.34**. Further details on each aspect of the economic analysis presented in **Table 6.34** are provided in the EIA (refer to **Appendix 22**).

Table 6.34 Net Economic Benefit Assessment

Economic Outcomes	Factor	Value
Negative Economic Outcomes	Temporary loss of agricultural land (35 years)	Approximately 768 ha
Negative Economic Outcomes	Loss of employment (direct and indirect)	0 jobs
Positive Economic Outcomes	Capital investment	+$1.5 billion
Positive Economic Outcomes	Study Area investment (including wage stimulus)	+$230 million (assumes 15% of total investment)
Positive Economic Outcomes	Average construction employment (direct and indirect)	650 FTE jobs (250 FTE direct and 400 FTE indirect) Study Area jobs include: • 50 FTE direct on-site • 80 FTE indirect off-site • Total: 130 FTE.
Positive Economic Outcomes	Operational employment (direct and indirect)	60 FTE jobs (15 FTE direct and 45 FTE indirect) Study Area jobs include: • 15 FTE direct on-site • 9 FTE indirect off-site • Total: 24 FTE
Operational Economic Stimulus	Total net local economic stimulus (operational wage stimulus, Community Fund payments, landowner lease payments, excludes increased Council rates returns)	+$280 million (rounded)
Total Economic Benefits	Construction and Operational Phases	+$505 million (rounded)
Decommissioning Phase	Likely to generate employment, business contract and spending stimulus benefits for the Study Area	Not quantified

Overall, the Project will involve approximately $1.5 billion in investment and have the capacity to supply sufficient clean energy to power the equivalent of approximately 434,000 homes per annum.

The Project would contribute to:

- 650 FTE construction jobs and 60 FTE ongoing jobs (includes direct and indirect jobs).
- New participation opportunities for businesses and workers located in the three LGAs relevant to the Project, having regard for the good match of skills and resources available.
- Construction workers relocating to the region would be expected to inject approximately $30.1 million in new spending into the economy over the construction phase, supporting approximately 38 FTE jobs in the service sector in the three LGAs relevant to the Project over the construction period.
- Net economic stimulus estimated at approximately $280 million (CPI adjusted) relating to operational wage stimulus, Community Fund payments and, landowner lease payments (excluding increased Council rates returns).

6.13.3.1 Accommodation Sector Impacts

Approximately 320 non-local FTE workers may need to be accommodated in the Study Area at the Project's construction peak (which is likely to last for several months and potentially occur multiple times if the construction of the Project is staged). This calculation is based on 80% of the 400 peak on-site FTE workers and represents workers coming from outside the Study Area and requiring accommodation. This level of accommodation relates to the Project's peak only. The average number of non-local staff requiring accommodation across the combined 48 months construction phase is estimated at 200 FTE workers (noting this number will be much lower during periods of low site activity).

The Study Area has a capacity of approximately 840 rooms and cabins in commercial accommodation in locations within a 60-minute drive of the Project Area. Assuming each non-local worker requires individual accommodation, approximately 38% (or 320 rooms) of this accommodation stock would be required at peak times to service the Project (if all workers resided in short-term commercial accommodation). However, this requirement is likely to be much lower as many workers are likely to choose to be accommodated in B&Bs, shared private rentals (e.g., holiday homes, Airbnb), or stay with family or friends (where possible). Additionally, other workers may share motel rooms/cabins/rentals etc to reduce costs.

There are approximately 34 private short-term rentals and 2,130 unoccupied dwellings in the Study Area. Potential likely exists for some of the unoccupied dwellings to be released to the market and support the Project.

While this data indicates that adequate capacity currently exists in the Study Area to accommodate the number of non-local workers expected at the peak of the Project, increased demand from concurrent regional infrastructure projects has significant potential to result in accommodation shortages. There is a risk that a constrained accommodation sector resulting from the cumulative impacts of concurrent infrastructure projects (including the Project) could negatively impact other sectors in the local economy such as tourism.

In view of these factors, the use of the Balranald TWC is the preferred option for housing the Project workforce. The Balranald TWC can accommodate 400 workers and would greatly assist in ensuring no further pressure is put on the Study Area's commercial and short-term accommodation and rental markets.

6.13.3.2 Cumulative Economic Impacts

The Project will likely compete for labour, accommodation, and other resources with major infrastructure projects being constructed concurrently in the Study Area (principally renewable energy projects being driven by investment in the SW REZ). An assessment of potential cumulative economic impacts was undertaken for projects located within 100 km of the Project with the potential to interact/overlap timeframes with the Project. In relation to other projects considered as part of the cumulative impact assessment, the following is noted:

- The development status of projects varies. Some projects are approved but construction has yet to start and other projects are currently going through the planning process therefore, construction timing is uncertain and not all projects may end up proceeding.
- New developments (not yet in the planning system) may emerge in the period prior to construction of the Project.

The assessment identified that potential cumulative impacts would be low (impacts possible but unlikely) during the operation phase for all 13 projects considered. The potential for cumulative impacts in the construction phase was identified as medium (impacts likely, targeted mitigation required) for 10 of the 13 projects considered. For these projects, potential cumulative impacts are possible if there is an overlap of peak construction periods. Economic impacts would include insufficient availability of labour, key services and accommodation in nearby towns.

The above factors indicate potential negative impacts are possible if appropriate management and planning initiatives are not put in place with regards to sourcing labour, services and in accommodating construction workers for the Project. Conversely, the labour and procurement requirements of multiple concurrent renewable energy projects have potential to facilitate the development of a renewable energy skills base that may result in efficiencies and further economic opportunities for the region.

6.13.4 Mitigation and Management

To minimise potential Project impacts and maximise Project benefits, Windlab will develop and implement a Construction Workforce and Accommodation Strategy (CWAS) in consultation with relevant stakeholders (including Balranald and Murray River Councils). The CWAS will include:

- measures to ensure there is sufficient accommodation for the workforce associated with the construction phase of the Project (including utilisation of the Balranald TWC)
- measures to addresses cumulative impacts associated with other development projects
- measures to prioritise the employment of local workers and the procurement of local businesses
- a program to monitor and review the effectiveness of the CWAS including regular monitoring and review during the construction phase.

6.14 Waste

The SEARs require the EIS to identify, quantify and classify the likely waste streams to be generated by the Project during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.

Appropriate and best-practice waste management will be implemented as part of the Project in accordance with the following legislation and guidelines:

- *Protection of the Environment Operations Act 1997* (POEO Act).
- Protection of the Environment Operations (Waste) Regulation 2014.
- *Waste Avoidance and Resource Recovery Act 2001* (WARR Act).

The *Waste Classification Guidelines – Part 1: Classifying wastes* (EPA, 2014a) have also been referred to in the preparation of this assessment.

Best practice waste management involves implementation of resource management hierarchy principles as specified in the WARR Act, and the principles of ecologically sustainable development, which include:

- avoidance of unnecessary resource consumption
- resource recovery (including reuse, reprocessing, recycling and energy recovery)
- disposal, including management of all disposal options in the most environmentally responsible manner in accordance with the *Waste Avoidance and Resource Recovery Strategy 2014–2021* (EPA, 2014b).

6.14.1 Waste Classification

The *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA, 2014a) provide direction on the appropriate classification of waste, specifying requirements for management, transportation, and disposal of each waste category. Should waste be found to be unsuitable for reuse or recycling, disposal methods would be selected based on the classification of the waste material in accordance with the Waste Classification Guidelines.

6.14.1.1 Construction and Operation

The potential waste streams expected to be generated by the Project during the construction and operational phases are quantified in **Table 6.35**.

The construction period of the Project will result in the largest contribution of waste (approximately 95%), most of which will be required to be disposed of off-site. Onsite use of waste would be limited to reuse of excavated materials, including topsoil, excavated rock and sediment recovered from erosion and sediment control devices which will be reused onsite as general fill material or it will be incorporated within landscaping materials, where possible. Waste generated during construction would mainly arise from works associated with site preparation, construction of accessways, landscaping and the construction of operational infrastructure.

The potential impacts associated with waste generation and management during the operational phase would be similar to those for construction, albeit at a much smaller scale. Under the waste definitions in the POEO Act, most of the waste generated during the operational phase would be classified as general solid waste, either putrescible or non-putrescible (refer to **Table 6.35**). Waste streams during the operation of the Project would be limited to minor quantities of putrescible waste from staff amenities, redundant equipment, and general waste from maintenance activities.

Some materials such as fuels and lubricants, redundant equipment and metals may require very infrequent replacement over the operational life of the Project and there will be some disposal of these used materials (e.g. replacement oil) and equipment which has reached its operational life.

Table 6.35 Waste Collection and Expected Waste Types

Activity	Waste Classification	Expected Waste Type
Construction	Liquid Waste	Waste oils, lubricants and liquids, paint, and sewage ablutions.
Construction	General Solid Waste (Non-Putrescible)	Green waste from site establishment and clearing of Development Footprint, spoil from site earthworks, concrete, footings and laydown area waste, timber and packaging (including pallets), plastic packaging, other plastics (PET), cardboard packaging, paper, glass, empty chemical drums, oil spill clean-up material, metal offcuts and damaged metal (ferrous and non-ferrous), electronics and electrical infrastructure, recyclable domestic waste, and PPE.
Construction	General Solid Waste (Putrescible)	Domestic waste.
Operations	Liquid Waste	Waste oils, lubricants and liquids, paint, and sewage ablutions.
Operations	General Solid Waste (Non-Putrescible)	Timber and packaging (including pallets), plastic packaging, other plastics (PET), cardboard packaging, paper, glass, empty chemical drums, paint, oil spill clean-up material, metal offcuts and damaged metal (ferrous and non-ferrous), electronics and electrical infrastructure, recyclable domestic waste, and PPE.
Operations	General Solid Waste (Putrescible)	Domestic waste.

6.14.1.2 Decommissioning

At the end of the operational life of the Project, all above ground infrastructure will be dismantled and removed from the Project Area and recycled in accordance with best practice at the time.

After the assets are removed, most of the materials will be reclaimed or recycled, given the significant value of the steel, copper, aluminium and other materials. It is important to note that the recycling of WTGs is an evolving space with research and experimentation occurring across the world to find ways to recycle WTG components at the end of their life. Windlab has committed to the adoption of best practice to reuse, recycle and dispose of turbine components at the time of decommissioning.

Depending on the type of BESS technology selected for the Project, and based on the rapid rate of change in recycling technology for these items, locally available initiatives will be assessed at the time of replacement/decommissioning.

Solid wastes including non-putrescibles and putrescibles will be generated by decommissioning activities, albeit to a lesser degree compared to the construction phase. Solid wastes including packaging, excess building materials, general refuse, and other non-putrescible wastes will be disposed of using waste management facilities.

6.14.2 Waste Generation, Minimisation and Management Measures

Windlab is committed to ensuring waste generated by the Project is managed in accordance with the waste management hierarchy. While many wastes can be avoided, recycled or reused, some wastes will need to be disposed of at waste and landfill facilities, and in this case Windlab will liaise with the relevant local authorities to work with them to manage cumulative impacts that may result from the waste disposal needs of multiple developments in the region.

The main disposal location for construction waste would be Buronga Landfill located in Mildura, Wentworth LGA. Appropriate cardboard and concrete waste would be delivered to recycling and crushing/repurposing facilities in Mildura, Victoria.

There are several other potential locations for off-site recycling and disposal of construction waste generated by the Project. Murray River Council waste and landfill sites at Moama, Koraleigh, Wakool, and Moulamein are equipped to accept various categories of waste.

Further options for waste disposal include Balranald and Euston Landfills, operated by Balranald Shire Council. These facilities accept mixed waste, green waste, plastics and aluminium, metals, building materials, and electronic waste.

Specific resource recovery facilities and waste collection contractors would be selected during detailed design and contract development stages of the Project and documented in the Construction Environmental Management Plan (CEMP) and Operations Environmental Management Plan (OEMP). An approach to waste management related to the decommissioning phase of the wind farm is not required by the Project SEARs, but would be addressed in a Decommissioning and Rehabilitation Plan to be developed prior to the end of the operational life of the Project. It is highly likely that technological advances in recycling processes for wind farm components will be developed over the next several decades and will inform the Decommissioning and Rehabilitation Plan.

As part of the detailed design and construction phase a Waste Management Plan will be prepared which will include a detailed breakdown of waste types and quantities in accordance with relevant legislation and guidelines.

The Waste Management Plan will outline the measures and strategies to be implemented on site to manage, reuse, recycle and safely dispose of waste including:

- separation and storage of recyclable and non-recyclable materials
- reuse and collection/transportation of waste
- procedures for tracking waste storage and disposal.

On-site waste management will include the appropriate separation and storage of waste streams to enable recycling and reuse wherever possible to reduce associated environmental impacts and impact to the capacity of local waste management facilities.

A Decommissioning and Rehabilitation Plan will be developed for the Project prior to closure which will include a detailed review of the associated waste streams and recycling/disposal options available at the time. At the end of the operational life of the Project, all above ground infrastructure will be dismantled and removed from the Project Area and recycled in accordance with best practice at the time. Some components will be left in-situ such as the WTG tower bases. WTG tower bases would be cut back to below ground level allowing ploughing over or topsoil to be built up over the footing to achieve a similar result. The land will be returned to near prior condition. Underground cables (inert and stable) at a depth greater than 500 mm would be left in-situ to avoid unnecessary ground disturbance. Essential connection infrastructure will also be retained.

Potential management actions that may be required to manage waste have been identified for each potential waste type identified in **Table 6.36**, including indicative quantities (construction and operation phases). The quantities in **Table 6.36** will be confirmed during the detailed design phase of the Project. It is also noted that the majority of the indicative waste quantities are applicable to the construction phase (95%) of the Project, as outlined in **Table 6.36**.

Table 6.36 Indicative Waste Generation and Management Activities – Construction and Operation Phases

Waste type	Classification	Construction Phase	Operation Phase	Management Options
Green waste	General solid waste (putrescible)	N/A – reuse	-	Reused on site where appropriate or recycled.
Spoil from earthworks	General solid waste (non-putrescible) or Virgin Excavated Natural Material (VENM)	N/A – reuse	-	Reused on site where appropriate and/or transferred off site if classified as VENM.
Concrete	General solid waste (non-putrescible)	40 tonnes	-	Separated on site and stored. Reused on site where possible or off site, alternatively transported off site for recycling by appropriately licensed contractor.
Oils and lubricants	Liquid waste	1,000 litres	1,000 litres (per year)	Stored within bunded area in appropriately sized tanks/containers. Collected on a regular basis by a licensed waste contractor(s) and transported to an appropriately licensed facility for recycling.
Paint	Liquid waste	50 litres	50 litres (per year)	Stored appropriately then transported from site and disposed of by appropriately licenced contractor.
Sewage	Liquid waste	800 kL	20 kL (per year)	Treated on site in approved septic system or compositing system with removal of final waste products at appropriate intervals by licensed contractor.

Waste type	Classification	Construction Phase	Operation Phase	Management Options
Vehicle maintenance consumables	General solid waste (non-putrescible)	500 kg	500 kg (for operational life)	Wastes such as batteries and tyres will be separated for collection/recycling by appropriate licensed contractors. Other items that are not able to be recycled will be stored prior to periodic transportation off site to landfill facilities by appropriately licensed contractors.
Plastic packaging	General solid waste (non-putrescible)	60 kg	20 kg (per year)	Separated on site and stored in recycling bins for periodic transportation off site to applicable recycling facilities by appropriately licensed contractor.
Cardboard and paper packaging	General solid waste (non putrescible)	150 tonnes	50 tonnes (for operational life)	Separated on site and stored in recycling bins for periodic transportation off site to applicable recycling facilities by appropriately licensed contractor.
Glass	General solid waste (non-putrescible)	350 kg	50 kg (for operational life)	Separated on site and stored in recycling bins for periodic transportation off site to applicable recycling facilities by appropriately licensed contractor.
General recyclables	General solid waste (non-putrescible)	2 tonnes	2 tonnes (for operational life)	Separated on site and stored in recycling bins for periodic transportation off site to applicable recycling facilities by appropriately licensed contractor.
Timber	General solid waste (non-putrescible)	300 kg	50 kg (for operational life)	Pallets will be returned to suppliers or reused on site where possible. All other timber will be reused on site where possible or stored and transported off site for recycling by appropriately licensed contractor.
General office/ domestic waste	General solid waste (putrescible)	10 tonnes	6 tonnes (for operational life)	Stored in covered bins for periodic transportation offsite to landfill facilities by appropriately licensed contractor. Where located in open areas, the bins would be fitted with animal-proof lids.
PPE	General solid waste (non-putrescible)	1,000 kg	200 kg (for operational life)	PPE will be stored on site for reuse or periodic transportation offsite to applicable recycling facilities by appropriately licensed contractor.
Metals (ferrous and non-ferrous)	General solid waste (non-putrescible)	200 tonnes	-	Scrap metal will be stored on site for transportation to appropriate recycling facilities by appropriately licensed contractor.
Empty chemical/ hydrocarbon drums	General solid waste (non-putrescible)	400 drums	1 drum (per year)	Reused on site or stored for recycling (if possible) then transported to appropriate recycling facilities by appropriately licensed contractor.
Electronics and electrical infrastructure	General solid waste (non-putrescible)	-	80 kg (for operational life)	Where possible components will be reused, sold as scrap, recycled or re-purposed.

6.15 Cumulative Impact Assessment Summary

The *Cumulative Impact Assessment Guidelines for State Significant Projects* (CIA Guidelines) (DPIE, 2021a) require consideration of a project together with the impacts of other relevant future and existing projects in order to determine the potential cumulative impact. The CIA guidelines indicate the following future projects should be considered in the cumulative impact assessment:

- changes to existing projects (expansion, modification, closure)
- approved projects (approved but construction has not commenced)
- projects under assessment (application for the project has been exhibited and is currently under assessment)
- related development (development that is required for the project but subject to separate assessment).

In accordance with the CIA guidelines, a scoping summary was prepared to identify the potential for cumulative impacts to occur as a result of the Project (refer to **Appendix 23**). As discussed in **Section 2.4**, there are 29 renewable energy, infrastructure and other major projects, including the Project EnergyConnect (NSW – Eastern Section), within or in the vicinity of the REZ (extending up to approximately 275 km from the Project Area). Of the 29 projects, 15 are approved and 14 are proposed. Further details on these projects and the potential for cumulative impacts associated with the Project are provided in **Appendix 23**. It should be noted that not all proposed projects will be approved and not all approved renewable projects may get access to the grid.

Due to the nature of wind farm operations, most of the potential cumulative impacts are associated with the construction phase (particularly traffic and social/economic impacts) with some issues such as visual and noise having ongoing impacts that may also be cumulative in nature. Many of the other impacts associated with the operations phase of wind farm projects are generally limited due to separation of the projects, the low employee numbers and minimal works required at this time. While there are many other projects currently taking place or undergoing planning assessment within the vicinity of the Project Area due to its location within the SW REZ, many were excluded from further cumulative assessment due to either distance or timing (i.e., the low likelihood of overlap of construction periods) based on the available information at the time of writing. The projects identified as requiring further consideration as part of the cumulative assessment are outlined in **Table 6.37** below.

For some technical matters, where the Project will only result in minor impacts that can be effectively managed using standard management techniques and design features (e.g. risk and water/soils) and where impact envelopes (where relevant) are contained within the Project Area, the Project is not considered to materially contribute to potential cumulative impacts and therefore these issues have not been highlighted as requiring further cumulative assessment for the Project. This is not to infer that other projects with a higher risk of impact or impact envelope may not contribute to cumulative impacts, rather it is that this Project will not materially contribute to any such cumulative impact and therefore does not require further assessment.

Table 6.37 Cumulative Impact Summary

Type	Project	Detail	Potential Cumulative Impact
Solar Projects	Limondale Solar Farm	Approximately 1 km to Project Area. Operational solar farm.	Cumulative visual impacts were considered possible due to the proximity of the Project. The LVIA identified that two non-associated dwellings would theoretically have the potential to view both Limondale Solar Farm and the Project simultaneously, however, the assessment was based on topography alone. Due to intervening vegetation, it is likely that there will not be any opportunities to view developments simultaneously and that there would be no cumulative impacts for these dwellings.
Solar Projects	Sunraysia Solar Farm	Approximately 1 km to Project Area. Operational solar farm.	Cumulative visual impacts were considered possible due to the proximity of the Project. The LVIA identified that one non-associated dwellings would theoretically have the potential to view both Limondale Solar Farm and the Project simultaneously, however, the assessment was based on topography alone. Due to intervening vegetation, it is likely that there will not be any opportunities to view developments simultaneously and that there would be no cumulative impacts for this dwelling.
Solar Projects	Keri Keri Solar Farm	Approximately 20 km to Project Area. Currently in planning and assessment phase. If approved, construction would be undertaken over 18-24 months commencing in 2024-2025 with a peak construction workforce of 300 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Wind Projects	Baldon Wind Farm	Approximately 40 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be undertaken over a 24-month period commencing in 2024 with a peak construction workforce of 350 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Wind Projects	Euston Wind Farm	Approximately 75 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over 18-24 months commencing in Q2 2025 with a peak construction workforce of 250 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.

Type	Project	Detail	Potential Cumulative Impact
Wind Projects	Keri Keri Wind Farm	Approximately 20 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over 18-24 months commencing in 2024-2025 with a peak construction workforce of 400 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Wind Projects	Pottinger Energy Park	Approximately 107 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over 24-months commencing in 2026	Cumulative impacts are possible if there is an overlap of peak construction periods and if project components are imported via Port Adelaide. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Wind Projects	Tchelery Wind Farm	Approximately 50 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over 30-months commencing in early 2026 with a workforce of 500 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Wind Projects	The Plains Renewable Energy Park	Approximately 110 km from the Project Area. Currently in planning and assessment phase. Unknown construction time frame and workforce details.	Limited information available to assess potential cumulative impacts, however impacts are possible. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns
Wind Projects	Wilan Wind Farm	Approximately 24 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over a 24-month period commencing in late 2024 with a construction workforce of 400 employees.	Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • traffic and transport impacts on the Sturt Highway.
Other Project	Balranald Mineral Sands Mine	Approximately 40 km from the Project Area. Operational mineral sands mine.	Due to the close proximity of the projects, cumulative impacts are possible. Cumulative impacts during construction of the Project may include: • traffic and transport impacts on the Sturt Highway • social and economic impacts affecting the availability of community resources and accommodation in nearby towns.

Type	Project	Detail	Potential Cumulative Impact
Other Project	Euston Mineral Sands Project	Approximately 75 km from the Project Area. Currently in planning and assessment phase. If approved, construction would be over 18-months commencing in 2026 with a construction workforce of 250-300 employees.	Due to the close proximity of the projects, cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • traffic and transport impacts on the Sturt Highway • social and economic impacts affecting the availability of community resources and accommodation in nearby towns.
Other Project	Project EnergyConnect (NSW - Eastern Section)	Partly within Project Area. Approved. Construction underway on some sections of the alignment. Likely 18-month construction period with a peak construction workforce of 500 employees.	Due to the close proximity of the projects, cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include: • traffic and transport impacts on the Sturt Highway, Yanga Way and Balranald-Moulamein Road (including traffic noise) • social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns • biodiversity impacts due to close proximity to the Project. Cumulative impacts during operations may include visual and risk/hazard related impacts.

As outlined in **Table 6.37** and **Appendix 23**, the key potential cumulative impacts associated with the Project relate to:

- cumulative social and economic impacts including accommodation, impacts on local services and economic benefits, focussed during the construction phase of the Project
- traffic impacts, with the cumulative impact focus primarily on the State road network including the Sturt Highway and the broader transport route to the site, including for OSOM vehicles (focussed in the construction phase of the Project)
- cumulative visual impacts of the Project combined with other projects in the viewshed
- cumulative waste management impacts due to the needs of multiple projects in the region, in particular associated with construction activities
- cumulative biodiversity impacts.

The cumulative impacts associated with the Project have been addressed in the relevant specialist assessments and the relevant key findings are summarised in this EIS. Detailed cumulative assessment has been undertaken where potential for impact has been identified, with standard level cumulative impact assessment being undertaken for a number of issues. Summaries of the key assessment findings for the identified cumulative impact issues are provided in the sections below.

6.15.1 Social and Economic

As identified in **Section 6.12** and **Section 6.13**, issues such as impacts on housing availability, services and capacity within the towns and communities are key issues requiring careful management. The SIA process included assessment of cumulative social impacts with the findings outlined in the SIA, with the EIA including detailed assessment of housing and accommodation availability for the construction phase.

Effective management of these cumulative impacts will require action by the NSW Government as part of the implementation of the SW REZ and each of the Project proponents. Windlab has made a number of commitments regarding how it will manage its contribution to these cumulative impacts including a range of measures to minimise the negative social impacts (such as implementation of a Construction Workforce Accommodation Strategy) and maximise the positive social impacts (such as the Community Benefit Fund, regional economic contribution and employment benefits). These measures are discussed in **Section 6.12.4**.

Windlab recognises that a number of social impacts of the Project are of a cumulative nature and therefore cannot be addressed by Windlab in isolation. There is a responsibility for proponents developing projects in the SW REZ, alongside the NSW Government, to consider these impacts and develop strategies for appropriate management, mitigation and enhancement. Windlab is committed to being part of the solution for cumulative social impacts and in addition to implementing the measures discussed above, Windlab will collaborate with local Councils, the NSW Government and other proponents and stakeholders to minimise negative cumulative impacts and maximise positive impacts.

6.15.2 Traffic

A key cumulative issue is the increased traffic on transport routes in the region which will be used by multiple projects (e.g. the Sturt Highway and the OSOM transport route from Port Adelaide). The TIA found that there is ample spare capacity on the local road network for the Project, however, some upgrades to the local network are required to cater for the Project. Windlab has committed to undertake these works in consultation with the relevant roads authorities (TfNSW and Councils). With these upgrades and the proposed construction traffic management measures, whilst there will be material increases in local traffic volumes during the construction phase, the TIA found that the local road network will operate at an acceptable level of service.

With regard to the State road network and transport route from Port Adelaide, the TIA and OSOM Route Assessment identified that upgrade works will be required. These upgrades will likely contribute improve traffic conditions on the broader road network and provide sufficient capacity for cumulative traffic. The TIA identified that the Sturt Highway has ample spare capacity to cater for estimated future traffic volumes.

6.15.3 Visual

Cumulative visual impacts were assessed as part of the detailed LVIA completed for the Project. There are two key aspects of this assessment, being cumulative impacts on views from local residences and public viewing locations and the broader impacts on the visual character of the region. The cumulative assessment findings are discussed in **Section 6.2.2.8**.

The LVIA found that two non-associated dwellings located within 4 km of the Project and Sunraysia and Limondale solar farms have the potential to view developments simultaneously. The assessment found that one non-associated dwelling will theoretically have views of all three developments and one non-associated dwelling will theoretically have views of the Project and Sunraysia Solar Farm. The assessment is based on topography alone. Due to intervening vegetation, it is likely that there will not be any opportunities to view developments simultaneously and there will be no cumulative impacts for these dwellings.

When travelling between Balranald and Kyalite along Yanga Way, infrastructure associated with Sunraysia and Limondale solar farms is not a noticeable feature of the landscape due to roadside vegetation.
Any views towards the solar farms are fleeting and only available for a short period of time. Along the route to the east of the operational solar farms, the Project will be a visible element. The duration of time between motorists experiencing views to each project limits the potential for the sequential views of the Projects to alter the perception of the broader landscape character.

6.15.4 Waste

The Project, along with the other projects in the region, will require disposal of waste particularly during the construction phase and ultimately at decommissioning phase. While many wastes can be avoided, recycled or reused, some wastes will need to be disposed of to landfill, and in this case Windlab has committed to liaise with the relevant local authorities to work with them to manage cumulative impacts that may result from the waste disposal needs of multiple developments in the region. As discussed in **Section 6.13.1**, there are several options for disposal of waste related to the Project.

Windlab has committed to the development of a Waste Management Plan for the Project including liaison with local recycling and waste management providers. Windlab has also committed to address decommissioning phase waste disposal and management as part of a Decommissioning and Rehabilitation Plan.

6.15.5 Land Use

With the implementation of the SW REZ there will be changes to land use on land parcels occupied by renewable energy projects. This is primarily associated with existing areas of agricultural land. This change is consistent with the strategic planning for the region as identified by the location of the SW REZ. For wind farm and SW REZ transmission projects, the land use change will typically be partial, with these projects typically only impacting part of the land parcels. Solar farms typically occupy a larger portion of the land as they are not linear in nature.

The Project will modify the existing land use within the Project Area by adding energy generation land use to the existing agricultural land use that will continue, with the two land uses coexisting in the Project Area. Windlab has agreements with relevant owners allowing Windlab to lease the land for the Project which is planned to have a 35-year operating period. These agreements compensate the owners for the areas of land that will be occupied by the Project noting that the vast majority of each property will remain available for ongoing agricultural activities. Windlab has consulted with each landholder and designed the Project in consideration of their agricultural operations to seek to minimise impacts.

Once construction is complete, landholders within the Project Area will be able to continue to utilise the vast majority of the properties for ongoing agricultural activities, with only small areas around WTGs and permanent compound areas (e.g. O&M compounds, substations, battery storage etc.) to be occupied by the Project. Following decommissioning, the areas of land used for operations will be rehabilitated and returned to agricultural use.

Whilst the Project will remove a relatively small area of land from agricultural production, the Project will provide a significant benefit to the landowners through income diversification which will provide consistent off-farm income, including in drought and other periods of low agricultural production. This will support the ongoing sustainability of agricultural activities within the Project Area.

In summary, there is not anticipated to be a significant impact on agricultural production as a result of the Project with the vast majority of the Project Area remaining in productive agricultural land use throughout the Project life. Therefore, the Project is not considered to make a material contribution to the loss of agricultural land to the region, whilst noting that some loss will occur.

6.15.6 Biodiversity

There are a number of major projects occurring in the region and many of these will result in some clearing of native vegetation. As outlined in **Section 6.4**, the Project will also result in clearing of native vegetation although the extent of clearing has been minimised as a key focus of the design process and due to the vast majority of the Project being constructed on previously cleared land. Most of the surrounding projects in the region are a reasonable distance from the Project, and due to the agricultural character of the landscape many of these projects will be primarily located on previously cleared agricultural land.

The Project has minimised its contribution to cumulative biodiversity impacts through reducing the area of required clearing of native vegetation through the design process and through the planned implementation of management and mitigation measures during the construction phase. As outlined in **Section 6.4.2**, approximately 90% of the Development Footprint is in cleared and Category 1 land. The Project will also provide biodiversity offsets in accordance with the NSW BOS for all residual impacts to biodiversity. This scheme, which applies to the Project and all of the other State Significant projects in the region, is designed to ensure that there is no net loss to biodiversity in NSW. The offsets policy therefore addresses cumulative biodiversity impacts.

6.15.7 Heritage

Similar to biodiversity discussed above, there are a number of major projects occurring in the region and many of these may impact on heritage values. The contribution of the Project to this cumulative impact issue has been addressed through Windlab's commitment to avoid impacts on the more significant heritage sites identified in the development corridor, and through the implementation of mitigation measures for the sites to be impacted. This will include salvaging artefacts and undertaking recording and analysis to add to the record of heritage values for the region.

7.0 Project Justification

This section provides a conclusion to the EIS. It includes discussion of the justification for the Project, taking into consideration the associated environmental and social impacts and the suitability of the site, to assist the consent authority to determine whether or not the Project is in the public interest.

7.1 Environmental, Social and Economic Impacts

As discussed in **Section 1.0** and **Section 2.6**, the Project has been designed using an iterative approach, commencing with landowner discussions, local wind monitoring and preliminary constraint studies to gain an understanding of the suitability of the site for a wind farm development. The conceptual layout of the Project including the WTGs, electrical reticulation infrastructure, BESS/STATCOM locations, internal access roads and other supporting infrastructure has been subject to ongoing refinement with the aim of addressing feedback from landholders and minimising associated environmental and social impacts.

The environmental, social and economic impacts of the Project have been identified and subject to a detailed environmental assessment based on:

- assessment of the site characteristics (existing environment)
- consultation with stakeholders and government agencies
- engagement with the local community
- application of the principles of ESD, including the precautionary principle, inter-generational equity and conservation of biological diversity and ecological integrity
- expert technical assessment.

The key issues identified were subject to comprehensive specialist assessment to identify the potential impacts of the Project on the existing environment. These assessments are detailed in **Section 6.0** and the appendices to this EIS.

Windlab has refined the Project based on feedback received from relevant stakeholders throughout its development and in response to the outcomes of the technical assessments. Windlab has considered a range of alternatives in planning the Project and in determining the concept layout included in this EIS. The preliminary WTG layout and infrastructure design was subject to a number of iterations in order to minimise environmental and social impacts. The assessment findings outlined in **Section 6.0** indicate that while there will be environmental and social impacts associated with the Project, the extent of impact has been minimised through the design process and where impacts are predicted, Windlab has committed to management, mitigation and offset measures to address these residual impacts.

The detailed impact assessment undertaken concludes that with the implementation of feasible and reasonable mitigation measures, the Project can proceed within acceptable environmental standards.

7.2 Suitability of the Project Area

As discussed in **Section 2.0**, the Project is a direct response to the NSW Government's commitment to transition to renewable electricity generation. The Project Area is strategically located within the SW REZ, with ready connection to existing and approved transmission infrastructure and in an area with valuable wind energy resource. The Project will contribute to the implementation of the NSW Electricity Strategy (DPIE, 2019) which seeks to establish a reliable, affordable and sustainable electricity future for NSW.

The Sturt Highway is located approximately 10 km to the north of the Project Area and is the primary connection between Sydney and Adelaide, connecting multiple regions along the route. The Sturt Highway in connection with the local road network has sufficient operating capacity to support the Project and provides good access to the Project Area.

The Project will provide for a compatible land use and support the ongoing agricultural use of the Project Area. The conceptual layout has been developed to maximise the use of existing disturbed areas to avoid and minimise impact to identified biodiversity and Aboriginal cultural heritage values, as far as practicable. The site selection process has been informed by assessments of the potential impacts of the Project on the existing land uses in the Project Area and adjacent land, as well as an assessment of the compatibility of the Project with the existing land uses, during construction, operation and after decommissioning. Due to the agricultural history, the Project Area largely comprises of areas that have previously been disturbed and/or historically cleared associated with agricultural land use, reducing the extent of impact on biodiversity as approximately 90% of the Development Corridor has previously been cleared.

Windlab is committed to working with the local community throughout the life of the Project. Windlab is in the process of developing and implementing several Project related agreements to ensure the Project provides benefits to the local community. Host landholders will receive annual lease payments to host wind farm infrastructure. These payments address the Project related impacts on these land holdings and dwellings. There are four Host Agreements currently in place for the Project. Host landowners will continue to undertake agricultural activities on their land, generally unaffected by the Project (excluding the specific areas hosting infrastructure and some disruption during construction work on each individual property).

In addition to Host Agreements, Windlab has four Neighbour Agreements (four dwellings) in place with neighbouring landowners (associated landholders) to address various impacts associated with the Project specific to their dwellings. The agreements were developed in accordance with the Wind Energy Guidelines and have been agreed between Windlab and the relevant landholder. Collectively these agreements mitigate the impact of the Project on host and neighbouring landholders.

In summary, Windlab selected the Project Area as it provides a combination of:

- high quality wind resource
- availability of land of a suitable scale for a viable commercial-scale wind farm project with a low density of housing
- location within the SW REZ and close proximity to existing and approved high voltage transmission network
- overall positive sentiment within the local community regarding renewable energy, including interest from landowners in being involved in the wind farm

- access to major transport networks, including the Sturt Highway north of the Project Area
- compatible land use zoning within the Project Area
- environmental constraints that can be managed with appropriate mitigation and management
- landscape suitable for minimising the risk of substantial soil erosion during earthworks.

7.3 Ecologically Sustainable Development

An objective of the EP&A Act is to encourage ecologically sustainable development (ESD) within NSW. This section provides an assessment of the Project in relation to the principles of ESD.

To justify the Project with regard to the principles of ESD, the benefits of the Project in an environmental and socio-economic context should outweigh any negative impacts. The principles of ESD encompass the following:

- the precautionary principle
- inter-generational equity
- conservation of biological diversity
- valuation and pricing of resources.

Essentially, ESD requires that current and future generations should live in an environment that is of the same or improved quality than the one that is inherited.

7.3.1 The Precautionary Principle

The EP&A Regulation defines the precautionary principle as:

> *'if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*
>
> *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
>
> *(ii) an assessment of the risk-weighted consequences of various options.'*

In order to achieve a level of scientific certainty in relation to the potential impacts associated with the Project, this EIS has undertaken an extensive evaluation of all the key components of the Project. Detailed assessment of all key issues and necessary mitigation and management measures have been conducted and are comprehensively documented in this EIS.

The preparation of this EIS has involved a detailed analysis of the existing environment (refer to **Section 2.3** and **Section 6.0**), and the use of desktop analysis, site-specific survey and monitoring and scientific modelling (where relevant) to assess and determine potential impacts as a result of the Project.

The decision-making process for the design/refinement, impact assessment and development of management and mitigation measures has been transparent in the following respects. Government authorities, landholders potentially affected by the Project, the local community, the Aboriginal community and other stakeholders have been consulted during EIS preparation (refer to **Section 5.0**). This has enabled comment and discussion regarding potential environmental and social impacts and proposed management and mitigation measures. This process also provided for community feedback to inform the refinement of the Project. As discussed in **Section 2.6**, this involved a number of refinements to the Project to accommodate stakeholder feedback.

The community has been engaged throughout the development and assessment of the Project through a range of mechanisms including face to face meetings, community newsletters, website and community drop-in sessions (refer to **Section 5.0**), which provided stakeholders with both information and the opportunity to provide feedback in relation to the Project.

The EIS has been undertaken on the basis of the best available scientific information about the Project Area and has been informed by site-specific survey, monitoring, modelling and environmental and social assessment. Any uncertainty in the data used for the assessment has been appropriately identified, an appropriate assumption has been applied to represent a conservative analysis to assess a range of potential impact scenarios. Extensive management and mitigation measures will be implemented, including monitoring programs to measure predicted against actual impacts of the Project (refer to **Appendix 8**).

Windlab will prepare and implement a CEMP and OEMP, which will provide best practice management and will incorporate all mitigation and management measures identified in this EIS. Additionally, the Project will be subject to an independent auditing and verification process consistent with relevant requirements for SSD projects.

Windlab will report on monitoring outcomes and compliance with the development consent, should the Project be approved. It is expected any development consent would include non-compliance notification procedures. Windlab will make the following information publicly available on its website as relevant to the stage of the Project:

- a comprehensive summary of the monitoring results, which will be reported in accordance with the various plans and programs approved under a development consent
- the annual Statement of Compliance with an EPL
- any independent environmental audit.

7.3.2 Intergenerational Equity

The EP&A Regulation defines the principal of intergenerational equity as:

> *'that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.'*

Intergenerational equity refers to equality between generations. It requires that the needs and requirements of today's generations do not compromise the needs and requirements of future generations in terms of health, biodiversity and productivity.

As discussed in **Section 2.0**, NSW is currently in a transition to increase renewable electricity generation which will replace existing coal-fired power stations scheduled to retire by 2043. A key objective of the Project is to contribute to this goal through providing a source of renewable, reliable power to NSW consumers whilst also assisting in reducing greenhouse gas emissions.

Residual environmental impacts will be addressed through the implementation of a CEMP and OEMP, to apply best practice management incorporating all identified mitigation and management measures identified in this EIS.

7.3.3 Conservation of Biological Diversity

The EP&A Regulation identifies that the principle of conservation of biological diversity and ecological integrity should be a fundamental consideration in the decision-making process. The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. All environmental components, ecosystems and habitat values potentially affected by the Project are described in this EIS (refer **Section 6.4** and **Appendix 11**) and measures to ameliorate any negative impacts are outlined in **Appendix 8**.

A large part of the Project Area comprises areas that have previously been disturbed and/or historically cleared for agricultural land use. The conceptual layout has been developed to maximise the use of existing disturbed areas and avoid and minimise impact to identified biodiversity. Following the application of avoidance and mitigation measures, the BAM assessment has identified the biodiversity credit requirement to offset the impacts of the residual impacts of the Project and the required management and mitigation measures to be implemented, including the Bird and Bat Adaptive Management Plan which will provide for the ongoing adaptive management of impacts on key species. The principle of Conservation of Biological Diversity is considered to be satisfied.

7.3.4 Valuation and Pricing of Resources

The goal of improved valuation of natural capital has been included in Agenda 21 of Australia's Intergovernmental Agreement on the Environment.

The principle has been defined in the EP&A Regulation as:

> *'that environmental factors should be included in the valuation of assets and services, such as:*
>
> *(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
>
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
>
> *(iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems'*

Windlab has intrinsically valued the environmental resources by designing the Project to avoid and minimise potential environmental and social impacts as much as practicable. For example, the proposed Disturbance Footprint has been designed to avoid areas of TECs and known Aboriginal cultural heritage sites, where practicable.

Project considerations have included the costs of management measures to minimise potential environmental and social impacts. There will also be additional costs associated with establishing and managing ecological offsets to reduce the magnitude of ecological impacts.

The Project will provide cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change.

Potential for air quality impacts will be predominately related to the construction phase of the Project. Appropriate air quality management measures will be incorporated into the CEMP and OEMP to manage air quality with a particular focus on minimising dust generation during construction.

Construction noise levels are predicted to be below both the noise affected and highly noise affected management levels at all non-associated receivers during all assessed construction activities, with the exception of the construction of access roads. There is one non-associated receiver located within 1,000 m of the access road construction work with predicted noise level expected to be up to 5 dB above the noise affected management level of 45 dB. The duration of construction works for this access road would be limited.

The results of the operational noise modelling demonstrate that the predicted noise levels for the proposed wind turbine layout are below the relevant NSW criteria for one of the candidate wind turbine models. For the other candidate wind turbine model, predicted noise levels are above the relevant NSW criteria at one non-associated receiver. An example noise curtailment strategy has been developed to demonstrate that compliance with the relevant NSW criteria could be achieved, using sound optimised modes for a limited range of wind conditions.

The CEMP and OEMP will also include relevant noise management, mitigation and monitoring measures.

The relevant erosion and sediment control measures outlined in **Section 6.8** will be incorporated into the CEMP, developed in accordance with relevant legislation and guidelines to control and manage potential impacts to surface water.

Appropriate and best-practice waste management will be implemented as part of the Project.

The construction and operation of the Project will be subject to an Environment Protection Licence which will include conditions that relate to pollution prevention and monitoring.

Where residual impacts remain, mitigation measures (refer to **Appendix 8**) are proposed to further reduce potential impacts on the environment.

7.4 Conclusion

As outlined in **Section 7.3**, the Project is consistent with the principles of ESD. The Project is also consistent with the objectives of the NSW Electricity Strategy (DPIE, 2019) and Infrastructure Road Map (NSW Government, 2023a), in aiming to provide large-scale renewable electricity generation that is affordable and reliable. With a proposed capacity of approximately 750 MW and the potential to power approximately 434,000 homes, the Project will make a material contribution to the planned energy generation capacity for the SW REZ.

The Project will also contribute significant capital investment within NSW and the south west region, generate jobs during the construction and operational phases, provide indirect benefits to local services throughout the life of the Project (e.g. indirect employment creation in local and regional economies would include jobs supported through transportation, trade supplies, services, accommodation, catering, retail services, etc.), deliver additional income to host and other associated landowners, and provide benefits to the local community through the implementation of the Community Benefit Program.

The assessment findings outlined in **Section 6.0** indicate that while there will be environmental and social impacts associated with the Project, the extent of impact has been minimised through the design process and where impacts are predicted, Windlab has committed to management, mitigation and offset measures to address these residual impacts.

The Project will provide long-term, strategic benefits to the State of NSW, including:

- renewable energy supply to assist with fulfilling the current obligations under State and Commonwealth renewable energy targets
- providing for cleaner reliable electricity generation, assisting with meeting current load demand while reducing greenhouse gas emissions and the impacts of climate change
- providing regional investment in the NSW renewable energy sector
- making a positive contribution towards increasing the renewable energy generation capacity of the SW REZ.

The Project will also provide direct financial benefits to the region and local community, including:

- Infrastructure investment of approximately $1.5 billion.
- Creation of 250 direct full time equivalent (FTE) positions (additional 400 indirect employment) on average during the construction phase and 15 direct FTE positions (additional 45 indirect employment) during the 35-year operational life of the Project.
- Indirect benefits to local services through the construction and operation phases.
- Payments to host and neighbouring landowners via negotiated agreements.
- Local community benefits through the implementation of a Community Benefit Program that will invest in local community projects and initiatives to provide direct and targeted local benefits.

- Provision of additional regional economic development benefits through a range of initiatives currently being or proposed to be implemented for the Project by Windlab including education, employment and training initiatives, First Nations employment opportunities, and facilitation of supply chain participation for locally based small to medium enterprises.
- Construction workers relocating to the region would be expected to inject approximately $30.1 million in new spending into the economy over the construction phase, supporting approximately 38 FTE jobs (direct and indirect) in the service sector in the three LGAs relevant to the Project over this time.
- Net economic stimulus estimated at approximately $280 million (over the operational life of the Project, CPI adjusted) relating to operational wage stimulus, host landowner and Neighbour Agreement payments and Community Benefit Program payments.

In developing the Project, Windlab has considered and responded to environmental and social constraints identified through the EIS process and refined the Project design. The Project will contribute to renewable energy supply and assist in meeting renewable energy targets while providing investment in the local, regional and NSW economies. Through the implementation of best practice management, the potential environmental and social impacts associated with the Project can be appropriately managed. Given the net benefit and commitment from Windlab to appropriately manage the potential environmental and social impacts associated with the Project, it is considered the Project would result in a net benefit to the region and broader NSW community.

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