# Spicers Creek Wind Farm

## Environmental Impact Statement

Final
July 2023

Environmental & Social Consultants

# SPICERS CREEK WIND FARM

Environmental Impact Statement

# FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Spicers Creek Wind Farm Pty Ltd

| | |
|---|---|
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# Spicers Creek Wind Farm

## Summary

**This Summary provides a non-technical overview of the Project and assessment outcomes only, and should be read in conjunction with the Environmental Impact Statement (EIS).**

## What is the Project?

Spicers Creek Wind Farm (the Project) is a wind generation project which will provide a reliable and affordable source of electricity and help reduce greenhouse gas emissions associated with energy generation. It will also provide significant economic benefits to the Central West Orana region.

The Project is located approximately 25 km north-west of Gulgong and 35 km north-east of Wellington in NSW, within the Dubbo Regional and Warrumbungle Shire Council areas (refer to **Figure S1** ). The Project is also located within the Central-West Orana Renewable Energy Zone (CWO REZ), one of five areas identified by the NSW Government to target for development of new renewable energy generation, transmission and storage projects. The NSW Government has indicated REZs will play a vital role in delivering affordable energy generation following the retirement of coal power stations over the coming decades.

The Project has gone through a comprehensive design process that considered community and stakeholder feedback, as well as the findings of environmental and social studies. This process aims to maximise positive social, economic and environmental outcomes while minimising any negative impacts.

The Project will have a capacity of 700 megawatts (MW) of renewable energy, and will be able to power around 397,000 NSW homes.

The Project includes the installation, operation and decommissioning of the wind farm.

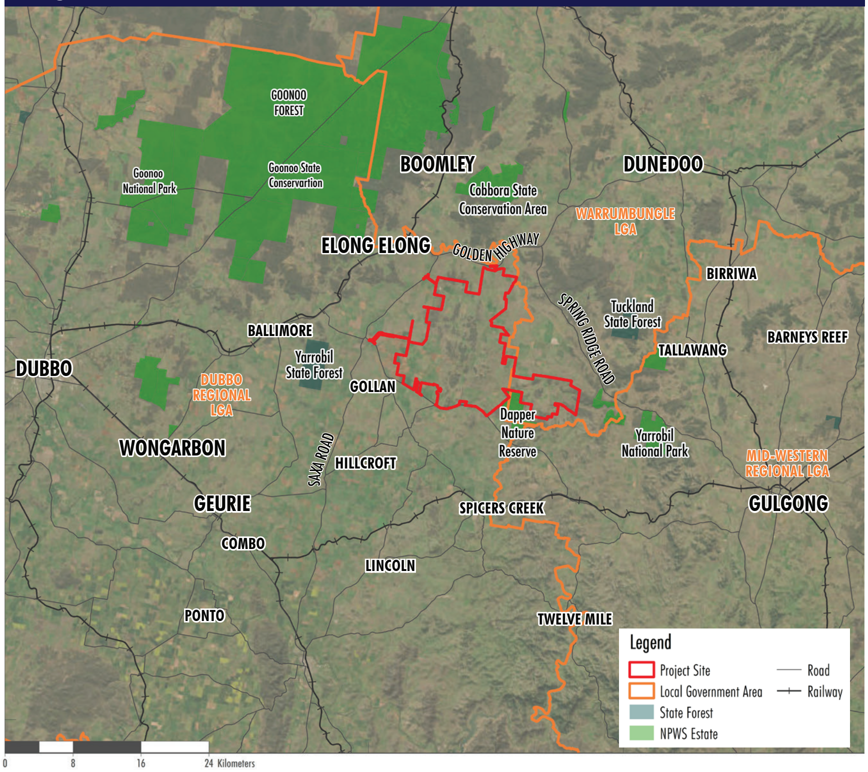
**700MW**

**Expected capacity**

**397k**

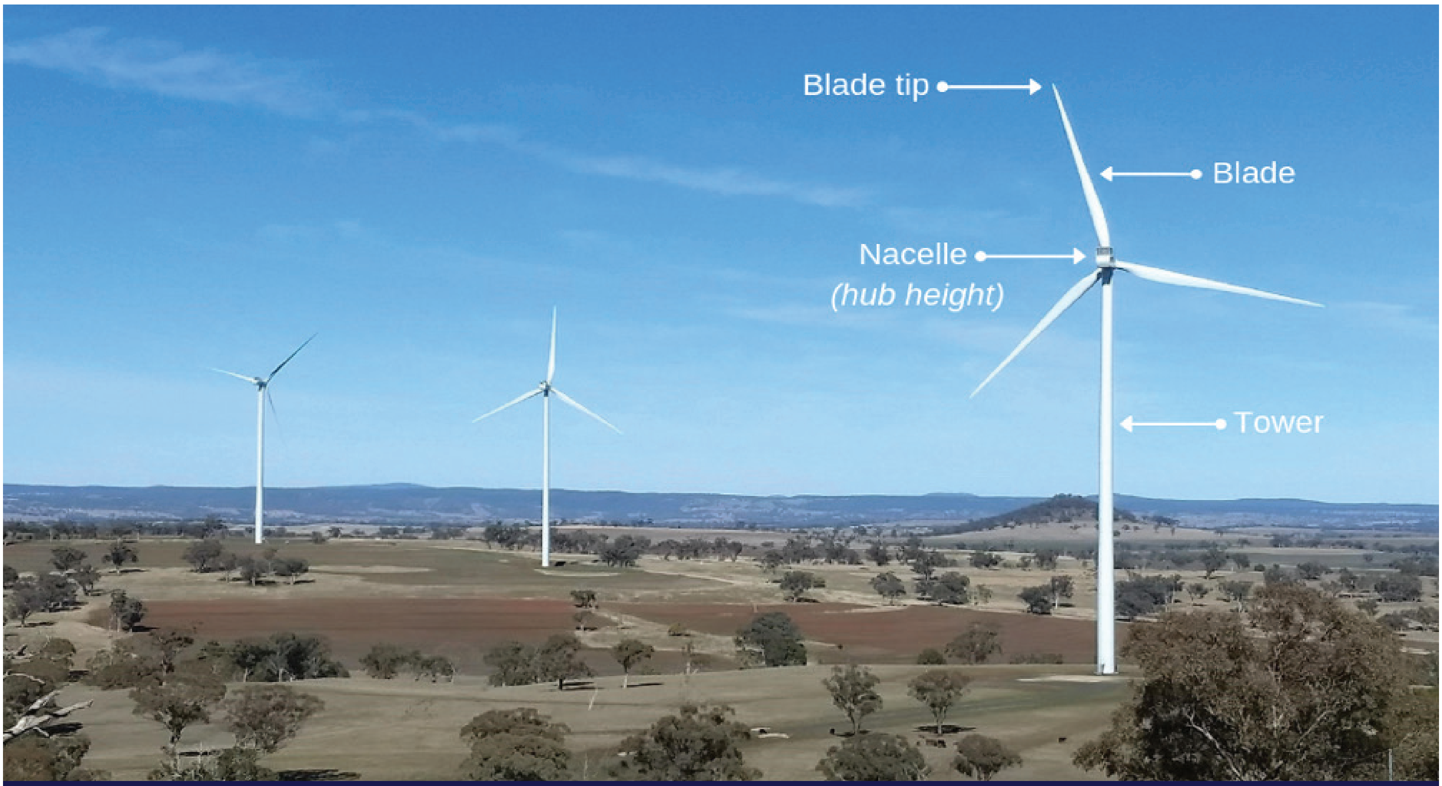
**Expected homes powered**

**Figure S1**



**In summary, the Project includes:**

- Up to 117 wind turbines
- Battery storage
- Roads and tracks
- Local road network upgrades
- Buildings used to operate the wind farm
- Electrical infrastructure to connect the Project to the electricity grid, including underground cables and overhead powerlines, substations and transmission lines
- Temporary construction facilities, including on-site concrete batching plants during the construction phase



**Parts of wind turbine (photo: Sapphire Wind Farm)**

The proposed Project layout is shown in **Figure S2**.

The Development Footprint of the Project, where the work will take place, is about 1,520 ha. This sits within a broader Project Site of around 17,731 ha. The Development Footprint is the area in which the Project will be constructed and includes areas which will only be used temporarily during construction.

This Development Footprint was designed in consideration of environmental, social and engineering constraints, including feedback from landowners and the surrounding community.

A buffer area of 100 m has also been included around the Development Footprint. This is called the Development Corridor (as shown in **Figure S2**). The Development Corridor provides flexibility for locating wind turbines and site infrastructure during the detailed design and construction process.

**17,731 ha**
**Approximate Project Site**

**5,544 ha**
**Approximate Development Corridor**

**1,520 ha**
**Approximate Development Footprint**

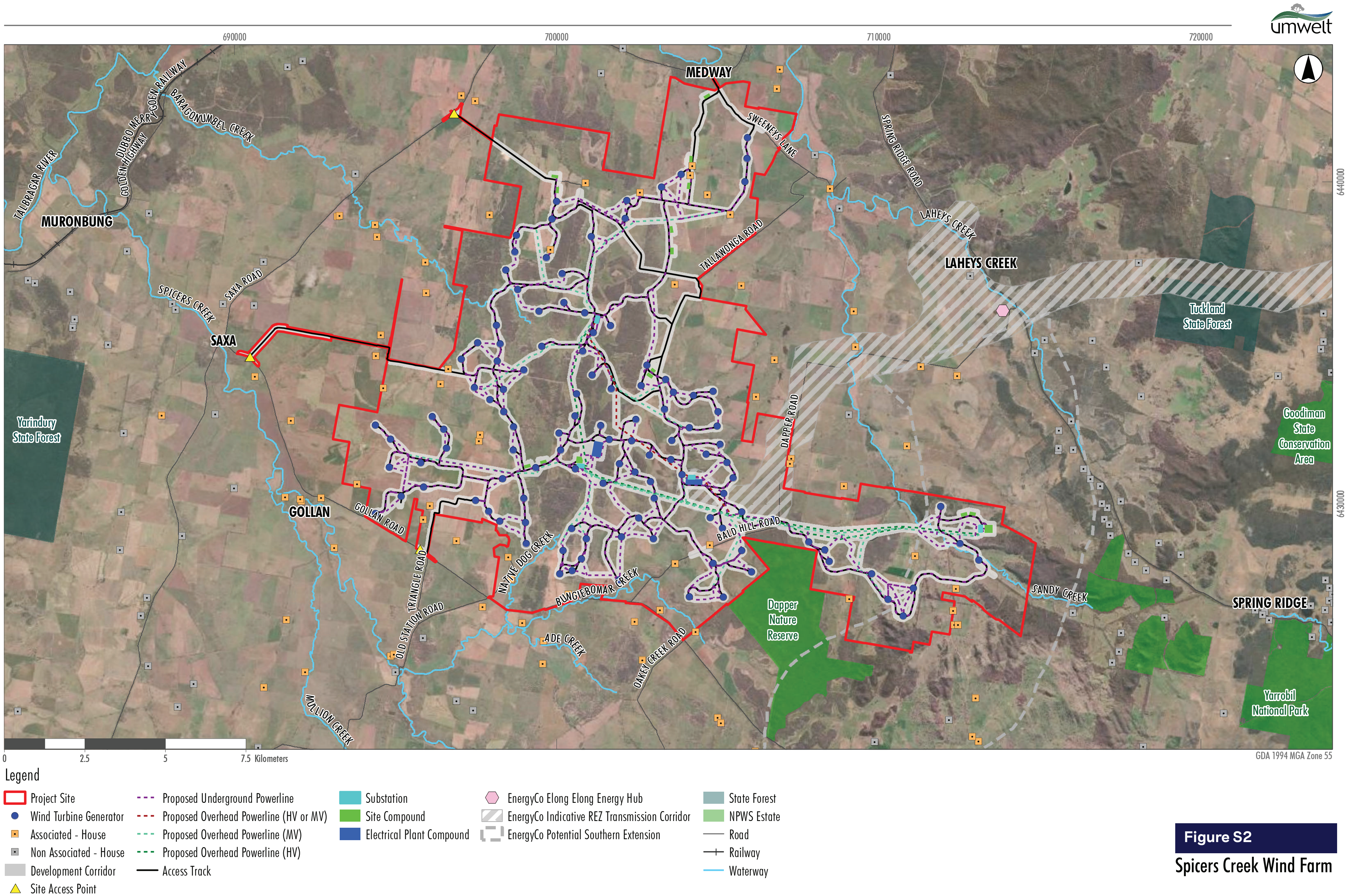



**Figure S2**

Spicers Creek Wind Farm

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

# Why is the Project needed?

Both the Commonwealth and NSW Governments have made commitments to increase renewable energy generation and reduce carbon emissions. The Spicers Creek Wind Farm will help provide cleaner, cheaper and reliable electricity while also reducing greenhouse gas emissions and the impacts of climate change.

As a renewable energy project within the CWO REZ, the Project is located in an area which will be coordinated with other projects and connections to the transmission network. This coordinated approach will contribute significant capital investment and generate jobs during the construction and operational phases, and provide indirect benefits to local businesses throughout the life of the wind farm.

The long-term, strategic benefits of the Project to NSW include:

- Providing regional investment in the NSW renewable energy sector
- Making a positive contribution towards achieving the target of at least 3 GW of renewable energy generation from the CWO REZ

**The regional benefits of the Project include:**

- Creation of 320 direct jobs (plus 520 indirect jobs) during the construction phase and 12 jobs (plus 35 indirect jobs) during the 30-year operational life of the Project
- Local spend at regional businesses throughout construction and operations, such as transport, trades and services, accommodation, catering, and retail services
- Additional income to landowners connected to the Project, such as host and neighbour landowners
- Local community investment through a community benefit sharing program and planning agreements with local Councils
- Consideration of initiatives such as a co-investment program or telecommunication improvements which provide direct and targeted local benefits
- Around $375 million of the infrastructure investment of $2 billion expected to be spent within the region
- Payment of network infrastructure access fees to the Energy Corporation of NSW (EnergyCo) for the CWO REZ which will include a component to fund community benefit and employment programs
- Potential extra regional economic development benefits through initiatives such as education, employment and training initiatives, First Nations land management opportunities and partnership agreements, and facilitation of supply chain participation for regionally based small to medium enterprises

# What other alternatives were investigated?

During the planning and design phase, SQE looked at alternatives, 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.

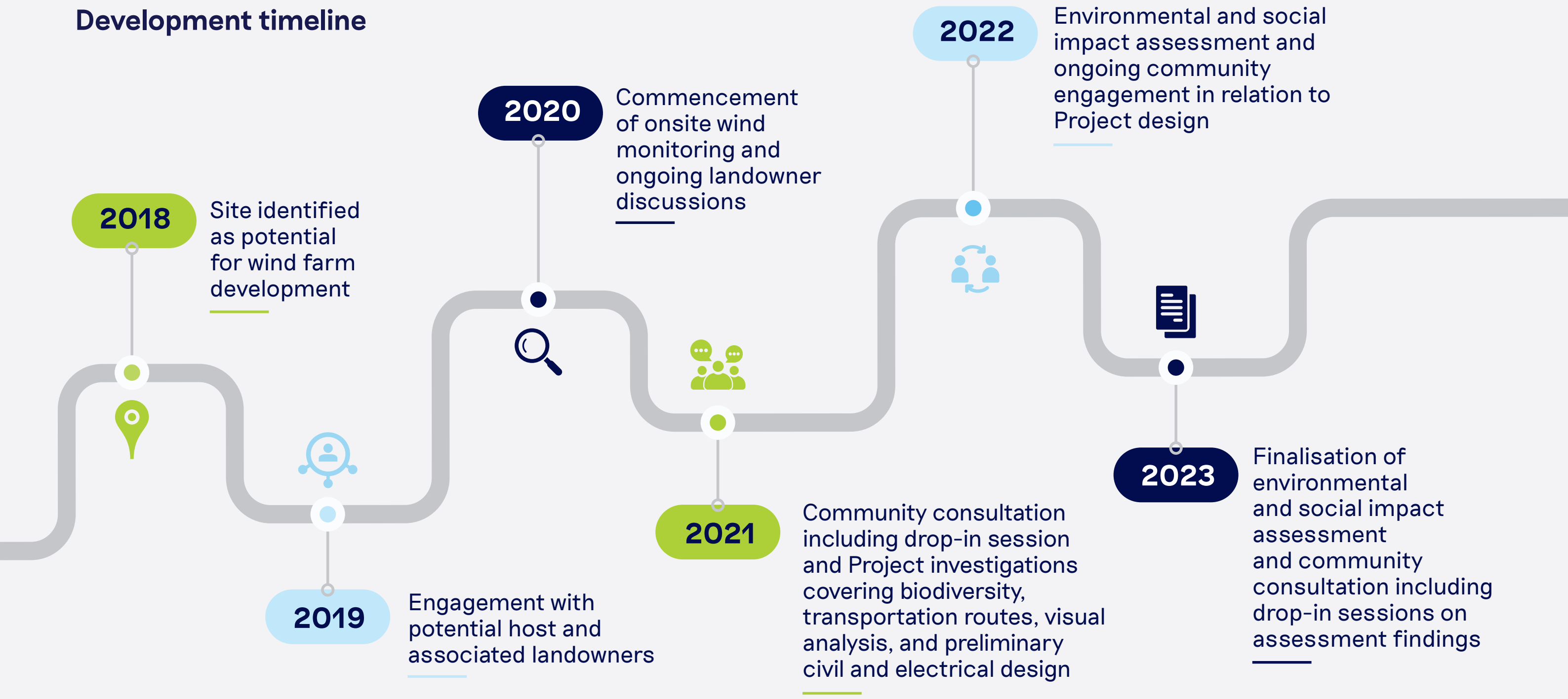
SQE looked at a 'do nothing option' (not developing the Project), alternative locations and different project layouts.

The 'do nothing option' would not deliver the identified benefits and was not the preferred option.

**The Project location has:**

- A reliable wind resource suitable for the development of a commercial scale wind farm
- A low density of surrounding rural residential dwellings
- Proximity to the proposed transmission infrastructure and existing road network
- Mostly cleared landscape

**Development timeline**




**Throughout the development period SQE revised and updated the Project Site and layout to address feedback received. Where a landowner chose not to be involved in the Project, SQE removed these areas from the Project Site and applied a buffer area.**

**To address potential impacts, SQE followed an avoid-minimise-mitigate-offset approach. Firstly, all efforts were made to avoid potential environmental, cultural and social impacts and environmental offsets were only considered after efforts to avoid, minimise and mitigate impacts.**

**Key design process principles included:**

- Minimise vegetation clearing – areas of high conservation value and/or native woodland vegetation were avoided from the start, where practicable. Regional vegetation mapping was integrated into SQE's model for wind turbine placement to focus on avoiding high and medium value vegetation, woodland areas and areas of threatened ecological communities.
- As work progressed and a more detailed understanding of the biodiversity values of the Project Site became available, further updates were made to the design to minimise impact. Whilst not all impacts have been avoided, the scale of impact has been minimised through this process.
- Minimise land disturbance –areas for infrastructure were limited to the minimum area required.
- Protect functional riparian zones (streams and creeks, their banks and immediately adjacent land). Riparian zones were excluded from the developable area (noting that some stream crossings for access are required).
- Use previously disturbed land – as much as possible the Project has been placed on land previously cleared or modified by agricultural development, in consultation with the landowners.
- Protect cultural heritage values – cultural heritage values have been identified and evaluated and impacts avoided where practicable.
- Protect agricultural values – landowner feedback on agricultural values and land use have been fed into the design.
- Minimise direct and indirect impacts – in consultation with landowners, infrastructure has been located away from nearby residences and adjoining properties where practicable.
- Adopt a flexible approach to design – SQE's design process has been iterative and has progressively responded to identified environmental, cultural and social impacts and constraints. This process will continue through the detailed design process for the Project.
- As a result of this iterative design process and after detailed consultation with landowners, the proposed number of turbines for the Project was reduced from 138 to 117.

# What is the planning and approval process?

Spicers Creek Wind Farm requires approval under both NSW and Commonwealth environmental and planning legislation.

Under NSW planning legislation, the Project is a State Significant Development (SSD) and it requires approval 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 Commonwealth listed migratory species.

An EIS has been prepared to outline the Project, its impacts (positive and negative), how these impacts are proposed to be mitigated, managed and offset, as well as its benefits.

The NSW Minister for Planning and Public Spaces (delegated to the Department of Planning and Environment) or the Independent Planning Commission (IPC) will decide if the Project gets approval to proceed. The IPC decides if public objections to the Project exceed 50, any reportable political donations are made by SQE or if the local Councils object to the Project.

## Environmental and social impact assessment process:

| | EIS Activities and Outputs | SIA Activities and Outputs |
|---|---|---|
| | **Scoping** | |
| PRE-LODGEMENT | Preliminary social & environmental assessment studies commence | Engagement with local landholders and key stakeholders |
| PRE-LODGEMENT | Lodgement of Scoping Report to the DPE* | |
| PRE-LODGEMENT | DPE issues Secretary Environmental Assessment Requirements (SEARs) | |
| | **EIS Preparation** | |
| DEVELOPMENT APPLICATION (DA) | Preparation of assessment studies | Continued engagement with local landholders & key stakeholders |
| DEVELOPMENT APPLICATION (DA) | Lodgement of DA and EIS, including SIA | Preparation of SIA |
| | **Public exhibition** | |
| DEVELOPMENT APPLICATION (DA) | DPE places EIS on public exhibition | |
| | **Responding to submissions** | |
| DEVELOPMENT APPLICATION (DA) | Preparation of Submissions Report that addresses how submissions have been addressed | |
| | **Assessment** | |
| DEVELOPMENT APPLICATION (DA) | DPE assesses the Project and prepares its findings | |
| | **Determination** | |
| DEVELOPMENT APPLICATION (DA) | Consent authority decides whether to approve or refuse the Project, including conditions of consent if approved | |
| | **Post approval** | |
| | DPE regulates Project to ensure compliance with the conditions of consent | Implementation of mitigation and enhancement measures and monitoring and management |

Engagement with potentially affected people and other interested parties

We are here

*DPE - Department of Planning and Environment

# How has SQE engaged with stakeholders?

SQE has been consulting with local stakeholders since 2019, building a presence in the region through meetings with local landowners, neighbouring property owners, councils, local service providers and relevant Government agencies.

The outcomes of this community engagement during the early planning phases informed the Project design and the EIS.

The feedback gained has been complemented by a targeted consultation program for the social impact assessment (SIA).

In recognition of the impacts of the Project, and as a key part of the mitigation strategy, SQE has negotiated agreements with many of the landowners surrounding the Project Site. The agreements provide annual payments to landowners likely to be impacted by the Project. Consultation with these landowners is ongoing.


# Environmental, Social and Economic Assessments

Detailed environmental and social assessments were carried out for key issues relevant to the Project. These were based on:

- Legislative and policy requirements
- Stakeholder feedback
- The environmental and social context of the area

The EIS identified two categories of nearby private residences/dwellings: associated and non-associated.

**Associated dwellings** – where SQE has an agreement in place with the landowner regarding Project impacts.

**Non-associated dwellings** – those with no agreement in place.

The consideration of impacts on non-associated dwellings are a key part of the assessments.

Figure S3 – Photomontage of predicted view from location VP06

# Landscape and Visual

Potential reduction in visual amenity was identified by stakeholders as a key potential impact of the Project during the consultation process. This is because wind turbines can be very visible across the natural environment.

The Landscape and Visual Assessment (LVIA) considered the potential visual impacts on local residences, public locations, Dapper Nature Reserve and cumulative impacts resulting from other existing and proposed developments in the area. These assessments were carried out in accordance with the guidelines of the *Wind Energy: Visual Assessment Bulletin for State significant wind energy development* (the Bulletin) (DPE, 2016). The LVIA also looked at potential impacts associated with night lighting and the potential for blade glint and shadow flicker.

The Visual Bulletin identifies zones to examine the visual impacts of a wind farm on dwellings or key public viewpoints. These are based on proposed wind turbine height, so the taller the turbine, the wider the zone of consideration.

As the turbines proposed for the Project have a maximum tip height of 256 m, the two assessment zones were 3,400 m (black line or Zone 1) and 5,000 m (blue line or Zone 2) from each turbine.

Within Zone 1 (0 to 3,400 m) there are three non-associated dwellings, and within Zone 2 (3,400 to 5,000 m) there are 22 non-associated dwellings. The LVIA assessed the potential visual impacts of the Project on each of these dwellings.

## Visual impact assessment of non-associated dwellings

| Potential level of impact | Zone 1 | Zone 2 |
|---|---|---|
| Nil/negligible | 0 | 5 |
| Low | 1 | 10 |
| Moderate | 2 | 4 |

Mitigation measures (including screen planting) have been recommended for the non-associated dwellings with a potential moderate visual impact rating. These measures are expected to significantly reduce the level of visual impact once established. Further site assessments and consultation with the owners of these dwellings regarding mitigation measures will be carried out as part of implementing the Project.

## Visual impact assessment of public viewpoints

16 public viewpoint locations were assessed surrounding the Project. At 15 locations the impact was rated as 'low' visual significance. At one public viewpoint (VP06, Gollan Road at Gollan) the impact was assessed as 'moderate' visual significance as the Project would be dominant in the landscape from this viewpoint (VP06).

Assessments of night lighting and blade glint/shadow flicker found impacts would be minimal based on the proposed design and mitigation measures.

Overall, the assessment found 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. The Project would become a feature of the visual landscape, however, it is likely the character of areas valued for their high landscape quality and used 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.

It is important to keep in mind the overall visual impact of the Project will vary greatly depending on someone's sensitivity to, and acceptance of, change. This sensitivity varies depending on the individual's connection with the landscape.

For example, visitors to the area may perceive the wind farm as an interesting feature of the landscape, while a resident who passes the wind farm daily may have a more critical opinion.

The changes made to the Project during the design process in consultation with nearby landowners, combined with the proposed mitigation measures, will minimse the extent of visual impacts associated with the Project.

# Noise and Vibration

Noise and vibration concerns did not come up frequently during community engagement. This is potentially due to the distance between turbines and non-associated dwellings, as well as the extensive discussions and agreements SQE reached with landowners. Noise is, however, recognised as a common issue for wind farms and therefore a detailed assessment was completed.

Noise and vibration were assessed separately for the construction and operational phases of the Project as the nature of noise will be different in these phases.

### Construction phase findings

- The majority of construction activities will be located some distance from non-associated dwellings and are unlikely to result in significant noise impacts.
- Some impacts will be experienced from construction activities that occur closer to non-associated dwellings such as road upgrade work. The construction noise assessment found noise from these road works would go over the noise affected level of 45 dB(A) at up to three non-associated dwellings but will be well below the highly noise affected level of 75 dB(A) and for a short period of time.
- In accordance with the Construction Noise Guideline, SQE will implement noise management measures to minimise noise during these construction activities, including consultation with the affected residents.
- The traffic noise assessment found there is the potential for a minor exceedance of road traffic noise criteria during the construction phase at one non-associated dwelling on the Golden Highway, although the increase will be barely perceptible to the average person and therefore would not cause any adverse impacts on the amenity at this location. Construction traffic noise management measures will be implemented to minimise impacts.

### Operational phase findings

- Noise level predictions from the turbines show that operational noise levels will meet the noise criteria at all non-associated dwellings, noting that noise may be audible at some of the dwellings.
- Results for noise from ancillary infrastructure (substations, battery storage) during operations were predicted to easily achieve the relevant criteria at all non-associated dwellings.
- The assessment of impacts on recreational activity in Dapper Nature Reserve determined that relevant noise criteria will be achieved at the closest walking trails to the Project.

# Biodiversity

SQE has worked to avoid and minimise biodiversity impacts as part of the Project design and located Project infrastructure in already cleared areas where practicable.

The previously cleared nature of the majority of the Project Site was one of the reasons SQE chose this location. The need to install turbines, substations, access roads and electrical lines means there will be some impact on native vegetation.

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 to identify species that could potentially be impacted by turbines. This included looking at species present at the Project Site and also those that use the airspace surrounding the turbines.

During the construction of the Project, clearing work will impact native vegetation and threatened species habitats within the Development Footprint. This includes impacts to key threatened ecological communities and threatened species including:

### Threatened ecological communities

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands Critically Endangered Ecological Community
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community

### Threatened species

- Barking owl (*Ninox connivens*)
- Superb parrot (*Polytelis swainsonii*)
- Glossy black-cockatoo (*Calyptorhynchus lathami*)

**SQE will deliver a comprehensive biodiversity management plan to minimise the impacts of the Project. This includes:**

- The salvage of biodiversity features including habitat resources like hollow logs, tree hollows, fallen timber and rocks or boulders
- Traffic control, water management, weed management, fencing and access control, bushfire management, erosion and sediment control
- Pre-clearance and tree-felling procedures and non-inhibiting fauna fencing
- Workforce education and training
- A plan to address the impacts on birds and bats linked to turbine strike including a framework for monitoring impacts

**Where impacts to biodiversity can't 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. SQE has developed an offset strategy for the Project and has a number of options to secure the biodiversity credits needed.**

# Aboriginal Cultural Heritage

The Project Site is on the land of the Wiradjuri people within the Dubbo Local Aboriginal Land Council (LALC) area. An Aboriginal cultural heritage assessment was carried out to look at the potential impact of the Project on Aboriginal cultural heritage in consultation with Aboriginal communities. This included a desktop review, field investigations and test excavations by archaeologists with help from the LALC and the other Registered Aboriginal Parties (RAPs).

There are no Commonwealth or World listed heritage places, nor State listed or locally listed heritage places or items within or close to the Project Site.

During field work and consultation, there were no specific cultural values raised by the RAP representatives. During field assessments, a total of 61 stone artefact locales (an area where stone artefacts are visible on the surface), two grinding groove sites and one potential stone artefact procurement area (being an area where Aboriginal people sourced rock for creating stone tools) were recorded.

The majority of the Development Corridor was found to be of very low archaeological potential, however, certain areas such as slopes and flats next to waterways were found to be of higher archaeological potential, as these areas were considered to be suitable for camp sites and similar activities.

The assessment found most Aboriginal artefact locales were of low significance within a local context. There are 12 sites that were assessed as being of low/moderate, moderate or high significance. For these sites, a combination of avoidance and/or salvage is proposed. In addition, SQE will develop a heritage management plan with the RAPs and Heritage NSW to guide the management of heritage values. This will include training for site workers.

# Historic Heritage

An historic heritage assessment looked at the non-Aboriginal heritage values of the Project Site and any potential impacts. It included a desktop review and field investigations.

The assessment found the Project Site is an agricultural/grazing landscape with items recorded in the Development Corridor reflecting rural and farming life. None of the items have State or local heritage significance.

Where historic heritage items occur within the Development Corridor, impacts will be avoided wherever practicable. Where impacts can't be avoided, SQE will develop a historic heritage management plan which will include measures like archival recording of the heritage items.

# Transport

The Project includes two primary site access points to be located on Sweeneys Lane (accessed from the Golden Highway) and Tallawonga Road (accessed from the Golden Highway and Saxa Road). These access points would be used for all over-size, over-mass (OSOM) deliveries to the Project Site as well as for standard heavy and light vehicles. Two secondary site accesses for standard heavy and light vehicles are also proposed from Gollan Road at Binginbar Road and Ben Hoden Road.

Most Project traffic will be during the construction phase when materials and construction workers coming to the site will generate higher traffic volumes. During the operational phase there will be minimal traffic. OSOM traffic movements will be overnight or in non-peak times. Current traffic volumes near the Project Site are not high and all roads have significant additional capacity. Local road users will notice increased traffic during the construction phase.

For most of the construction period, maximum daily traffic generation would be 320 light vehicle trips (one way movements) and up to 66 non-OSOM heavy vehicle trips per day. During peak activities, the maximum daily traffic generation would increase to a maximum of 590 light vehicle trips and up to 106 heavy vehicle trips per day inclusive of 10 OSOM vehicle trips. Even during peak construction activities, all affected public roads would maintain satisfactory levels of service and adequately absorb construction-generated traffic.

**Construction period**

**320**
**Light vehicle**

**66**
**Non-OSOM heavy vehicle**

**Peak construction activities**

**590**
**Light vehicle**

**106**
**Heavy vehicles (including OSOM)**

During Project construction, the increased traffic and in particular, the higher turning movements at the Golden Highway-Sweeneys Lane and Saxa Road-Tallawonga Road intersections mean upgrades to these intersections are proposed. In addition, there are plans to upgrade the Gollan Road junctions.

Traffic generation during operations would be minimal, resulting in a general maximum of up to around 40 trips per day. Consequently, traffic impacts would be negligible during the operational phase.

Traffic generation during decommissioning would be minimal with only marginal changes from existing conditions.

SQE will prepare a traffic management plan before both the construction and decommissioning phases to manage vehicle movements, and to make sure road safety and road network operations are maintained. A specialist licensed transport contractor would be used for all OSOM trips.

The Project Site is located within the CWO REZ and there are other existing and proposed renewable energy projects within the region. Cumulative traffic impacts during the construction phase are a key issue for the development of the REZ.

Key transport routes in the region such as the Golden Highway, will be used by multiple projects, leading to increased traffic.

Near the Project Site, the assessment found that there is ample spare capacity on the local road network for the Project, however, some upgrades to the local network are needed. These upgrades are planned as part of the Project, with some upgrades also to be carried out by the NSW Government on State roads.

The local community identified the completion of road upgrades as a key benefit of the Project. With these upgrades and the proposed construction traffic management measures, the assessment found the local road network will operate at a good level of service, even with increased local traffic volumes during the construction phase.

## Water and Soils

The Project Site is located within the Macquarie-Bogan River system and extends across the catchments of a number of tributary channels of the Talbragar River.

A water resources assessment looked at the impacts of the Project in relation to flooding, surface water quality, stream stability, water supply and groundwater.

### Key findings included:

- There is a low risk of flooding under both the existing and climate change scenario conditions modelled, with minimal risk to changes in internal or external waterway flows. The Project Site is outside major flood hazard areas and the Project won't have any impact on local or broader catchment flood regimes.
- Surface water quality impacts are most likely during the construction and decommissioning stages of the Project, when soils may be disturbed during vegetation removal, excavation works or stockpiling of materials. The use of erosion and sediment controls, and materials storage and handling requirements means potential water quality impacts are expected to be minor. Water quality impacts during the operational stage are expected to be negligible as the day-to-day activities would be limited to routine maintenance and monitoring.
- The Project design generally avoids work close to or within waterways, but some waterway crossings will be needed. These will be designed to minimise impacts on stream stability and fish passage, using relevant guidelines and policies and in consultation with DPI Fisheries.
- A water sourcing strategy will be developed, considering relevant legislation and aiming to ensure water used during the construction phase does not result in a loss of supply to adjacent landowners or other water users.
- As the Project is not predicted to interact with groundwater, there are no impacts predicted to groundwater resources, including groundwater dependent ecosystems and bore water users.

## Land

The selection of the site and design of the Project has included looking at potential impacts of the development on the existing land uses on the site and adjacent land. This includes detailed consultation with host landowners regarding placement of wind turbines, access roads and other wind farm infrastructure in relation to agricultural operations. It has also involved looking at how the development fits with the existing land uses during construction, operation and after decommissioning.

### SQE proposed this site as it has the ideal combination of:

- Land within the CWO REZ suitable for a viable commercial-scale wind farm project, with a low density of housing and in close proximity to the associated proposed high voltage transmission network
- High quality wind resource
- 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 Golden Highway, to the north of the Project Site
- Compatible land use zoning
- Environmental constraints that can be managed with appropriate mitigation and management
- Landscape suitable for minimising the risk of substantial soil erosion during earthworks

The Project Site has land suitable for agriculture and agricultural activities can continue with the Project. Due to the agricultural history, the Project Site has a lot of areas which have previously been disturbed and/or historically cleared. This previous clearing reduces the extent of impact on biodiversity.

SQE has agreements with relevant owners allowing SQE to lease the land for the Project. These agreements compensate the owners for the areas of land that will be occupied by the Project, noting the vast majority of each property will be available for ongoing farming or agricultural activities. SQE has also entered into neighbour agreements with some landholders to address various amenity impacts from the Project specific to their dwellings.

SQE has consulted with each host landowner and designed the Project in consideration of their farming operations to minimise impacts. Following decommissioning at the end of the operational life of the Project, these areas of land will be rehabilitated.

While the Project will remove a relatively small area of land from farming use, it will provide a significant benefit to the landholders through income diversification. This provides consistent income, including in drought or other periods of low agricultural production. This will support the ongoing sustainability of farming activities within the site.

Small sections of the south-east part of the Project Site are identified in regional scale mapping as biophysical strategic agricultural land (BSAL). The Project has been designed to avoid impact to the potential BSAL areas as far as practicable. A minor area of mapped BSAL of around 4.5 ha is within the Development Corridor for the Project as it is close to proposed overhead powerlines. SQE has committed to avoiding all mapped BSAL within the Project Site as part of detailed design.

An assessment of potential impacts and conflicts relating to existing land uses both on the site and on adjacent land areas was carried out and included the assessment of agricultural land, Dapper Nature Reserve, travelling stock routes, Crown Lands and two mineral exploration titles. With the effective implementation of mitigation measures, the assessment found potential conflicts on the surrounding land use and land users would be manageable and minor.

# Case study - Sapphire Wind Farm

**Wind farm and agriculture coexist at Squadron Energy's Sapphire Wind Farm**

Sapphire Wind Farm is the largest operational wind farm in NSW. It is located 18km west of Glen Innes in the New England region and has been operational since 2018.

The 270MW wind farm includes 75 wind turbines and is hosted by 12 landowners on agricultural land. The majority of the land is used for grazing cattle and sheep, with a small amount used for cropping.

The wind farm generates enough electricity to power 148,000 homes and avoid 511,000 tonnes of carbon emissions each year.

# Hazards and Risks

The EIS has addressed the potential hazards and risks associated with the Project through a range of specialist assessments. These include aviation safety, telecommunications, health, bushfire, battery storage, blade throw and risks associated with pipelines.

## Key assessment findings

### Aviation

- The Project Site won't impact on aviation operations at nearby Dubbo and Mudgee airports as it's far enough away from these airports.
- Obstacle lighting isn't needed for wind turbines and meteorological masts.
- The site is partially within a designated military flying zone and the Department of Defence has been consulted to determine any specific restrictions.
- The assessment also looked at agricultural aerial application and aerial firefighting operations to make sure measures are in place to address potential interactions with these activities nearby to the wind farm.

### Blade safety

- Compliance with international standards, implementation of high-quality maintenance programs, and continual improvements in wind turbine design and materials mean that blade failure is relatively rare for modern turbines and does not typically result in the detachment of blades or blade fragments. The assessment found the level of risk presented by the Project for a blade throw event is very low and well below acceptable risk limits.

### Battery storage

- An assessment of the risks associated with battery storage found that no off-site impacts with the potential to cause injury or fatality are predicted. This is because the potential locations of the battery storage facility are well removed from public locations. This includes being over 1.5km from the Project Site boundary, more than 3km from the nearest associated dwelling and more than 5km from the nearest non-associated dwelling.

### Bushfire

- NSW Rural Fire Service has identified the Project Site as bushfire prone land. The assessment found the potential bushfire risk associated with the Project can be appropriately managed through a Bushfire Emergency Management Plan. The Plan will include Asset Protection Zones and the provision of adequate access, water supply and fire suppression equipment, as well as specific construction management practices. New all-weather roads will improve access for ground-based fire fighting in the area in the event of any future fires.

### Gas infrastructure

- A high-pressure natural gas transmission pipeline traverses the Project Site and is located close to planned road upgrade works. Preliminary consultation with the pipeline owner indicates that works can be managed. Protection measures will be developed in consultation with the service provider.

### Human health

- Potential impacts on human health associated with electric and magnetic fields were assessed. It found the Project will comply with the safe limits for general public exposure for electric and magnetic fields.

### Telecommunication

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

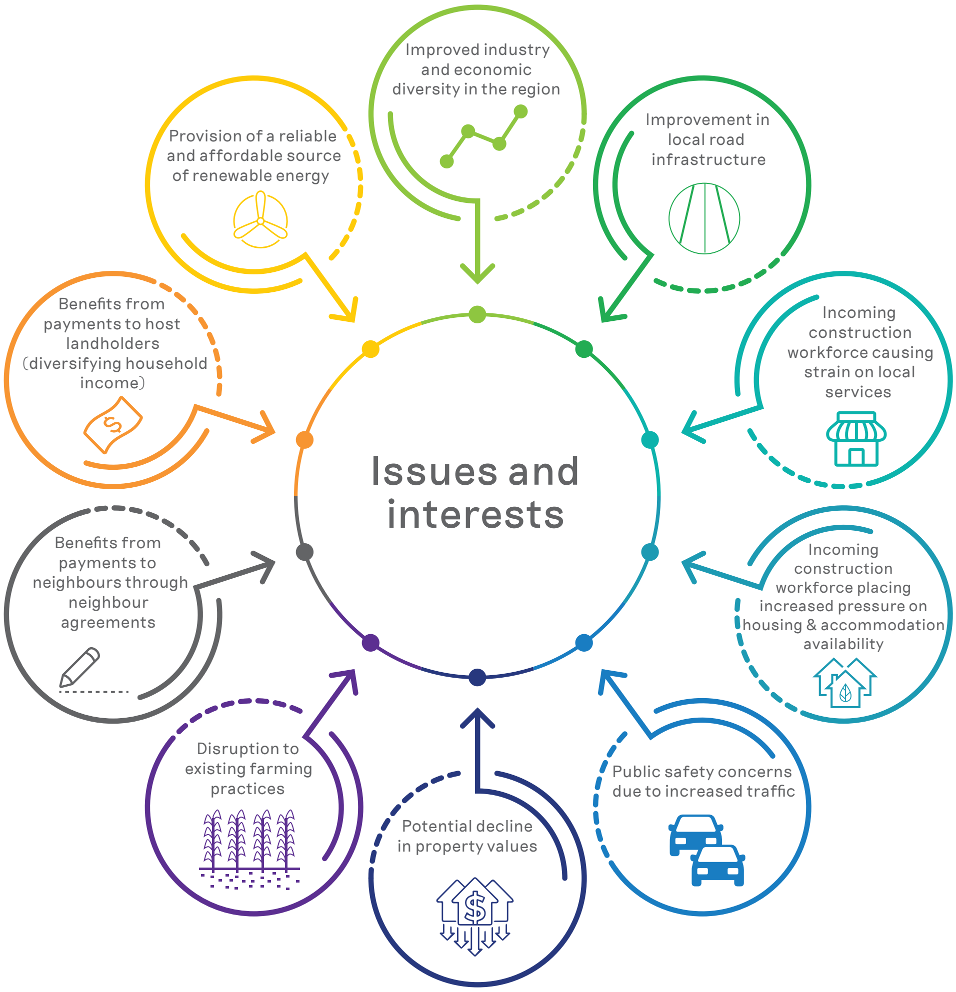
# Social

SQE recognise that as for any large project, the potential impacts on the community need to be considered and measures identified to minimise any negative impacts and maximise positive benefits. To assist in this process a Social Impact Assessment (SIA) was completed as part of the EIS.

Engagement is a key part of an SIA program. It provides opportunities to identify, integrate and address social impacts during the detailed Project planning, design, and assessment phases. SQE has been consulting with local landowners and stakeholders since 2019.

Concerns and feedback relating to the Project have been considered by SQE and the Project team. This information has been used to refine the Project design and develop the EIS, including proposed management and mitigation measures.

Given the Project's location in the CWO REZ, the cumulative impact of concurrent renewable energy and other development projects has been considered in the SIA. The SIA identified that the negative social impacts of the Project can be mitigated or managed to reduce their significance, with positive impacts enhanced if appropriate measures are in place.




### Social impacts that are considered significant include:

- Concerns about the incoming construction workforce causing strain on local services and changes to the composition of the community
- Concerns about public safety due to increased traffic
- Visual amenity concerns related to Project infrastructure and how this affects people's sense of place.

### The benefits of the Project raised by the community include:

- Payments to landholders
- Improvements in local road infrastructure
- Providing a reliable and affordable source of renewable energy.

### SQE has proposed several mitigation and enhancement approaches to address social impacts through the implementation of a benefit sharing program, including:

- Neighbour Agreements – targeted at delivering benefits to proximal neighbours of the Project and those most directly impacted by Project activities
- Community Sponsorship Program – focused on delivering economic support for local organisations and community events
- Planning agreements with local Councils.

### SQE is also investigating further initiatives, including:

- Co-investment program – that would allow members of the local community to invest in the Project and potentially benefit from financial returns on their investment through the operation of the Project
- Telecommunications upgrades – investigating options to assist with improvements in internet and phone connectivity to benefit the Project and the local and regional community.

### Planning Agreements

SQE is committed to entering into planning agreements for the Project with Dubbo Regional and Warrumbungle Shire Councils. SQE has been working with the Councils on the proposed terms of the planning agreements. The total value of the planning agreement will be 1.5% of the Capital Investment Value (CIV) of the Project as approved and committed to for construction by SQE. Division of the funds will be between Dubbo Regional and Warrumbungle Shire Councils based on an agreed proportion, for example the number of turbines within each local government area. Dubbo Regional Council has agreed to the key terms of the proposed planning agreement. SQE is continuing to consult with Warrumbungle Shire Council on a planning agreement.

Due to the large number of potential and proposed renewable energy projects within the region as a result of the CWO REZ, cumulative impacts on the availability of labour, accommodation and community services will be experienced. SQE has made a number of commitments to manage its contribution to these cumulative impacts, including development of a Community Benefit Sharing Program and an Employment and Accommodation Strategy to address these issues.

SQE is committed to being part of the solution for cumulative social impacts and in addition to implementing its own measures, has indicated its desire to continue to collaborate with local Councils, the NSW Government and other proponents and stakeholders to minimise negative cumulative impacts and maximise positive impacts.

## Economics

Spicers Creek Wind Farm will involve around $2 billion in investment and have the capacity to supply sufficient clean energy to power around 397,000 homes per annum, which represents around 12% of all NSW homes.

### The Project would contribute to:

- 840 full time equivalent (FTE) construction jobs and 47 FTE operational jobs (includes direct and indirect jobs).
- New participation opportunities for businesses and workers located in the Dubbo, Warrumbungle and Mid-Western Regional LGAs, which have a good match of skills and resources.
- Around $46.9 million in new spending into the regional economy over the construction phase, due to construction workers relocating to the region. This includes around 235 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 around $410 million (over 30 years of operation, consumer price index adjusted) relating to operational wage stimulus, host landowner and neighbour agreement payments, planning agreements with Dubbo Regional and Warrumbungle Shire Councils and net land tax revenue to Council.

**840**
**Construction jobs**

**47**
**Operational jobs**

**$46.9m**
**New spending into regional economy**

**$410m**
**Net economic stimulus**

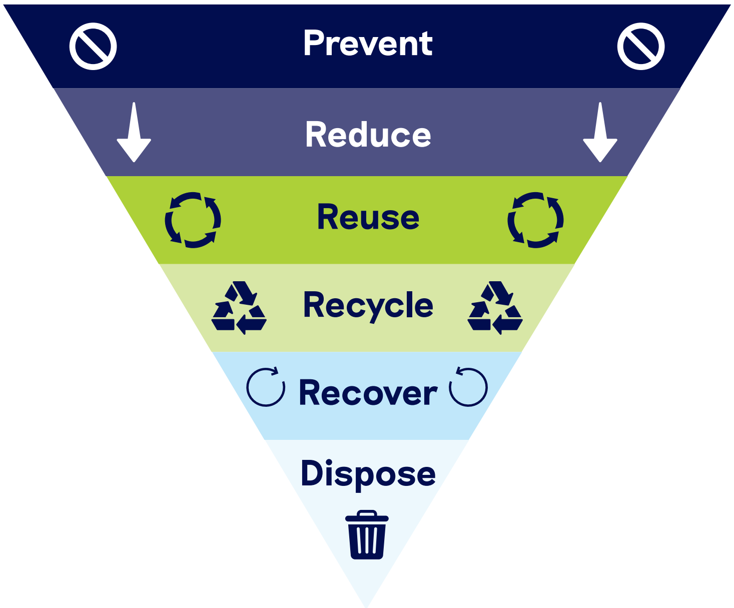
# Waste

## Waste management during construction and operations

Waste management on the Project 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.




## Managing waste during decommissioning

A Decommissioning and Rehabilitation Plan will also be developed for the Project before it ceases operations at the end of its life, 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 site and the land will be returned to near prior condition.

Most of the materials will be reclaimed or recycled, given the significant value of the steel, copper, aluminium and other materials. The recycling of wind turbines is an evolving space with research and experimentation occurring across the world to find ways to recycle turbine components at the end of their life. SQE has committed to the adoption of best practice to reuse, recycle and dispose of turbine components at the time of decommissioning.

# Air Quality

The Project will generally contribute to positive air quality outcomes through reductions in greenhouse gas emissions in comparison to other sources of electricity generation used in NSW, including traditional coal-fired power stations.

Air emissions from the Project Site would mostly be associated with the proposed construction activities and would include dust generated through ground disturbance, civil construction activities and plant/vehicle exhaust emissions.

These emissions would be temporary, for the duration of construction (around 40 months).

### This would be managed through:

- Minimising exposed areas
- Using water and/or dust suppressants as required
- Speed limits for unsealed access tracks
- Limiting construction during windy weather
- Dust controls on concrete batching plants and crushing/screening plant and equipment

Similar measures would also be enforced to manage dust generation during operations as required.

# Conclusion

Spicers Creek Wind Farm has been developed with a view to avoiding and minimising environmental and social impacts where possible, consistent with the principles of ecologically sustainable development.

This approach has resulted in changes to the Project and significant environmental improvements and outcomes as described in the EIS and its supporting technical studies.

Information about the Project has been extensively shared with local communities in a variety of ways. Issues raised during the community consultation process have been addressed through the evolution of the Project design and are identified throughout the EIS. The conceptual layout of the Project has been subject to ongoing refinement with the aim of minimising associated environmental and social impacts and addressing feedback from landholders, neighbours and other stakeholders. SQE will continue to consult and engage with stakeholders as the Project progresses through the assessment phase, and throughout the life of the Project, should it be approved.

## The Project will:

- Contribute significant capital investment within the CWO region
- Generate jobs during the construction and operational phases
- Provide benefits to local services throughout the life of the Project
- Deliver additional income to host and other associated landowners
- Provide benefits to the local community through the implementation of the proposed Community Benefit Sharing Program and planning agreements with local Councils
- Include payment of network infrastructure access fees to EnergyCo for the CWO REZ which will include a component to fund community benefit and employment programs

The assessment findings outlined in the EIS show that while there will be environmental and social impacts associated with the Project, the extent of impact has been minimised through the design process. Where impacts are predicted, SQE has committed to management, mitigation and offset measures to address these impacts.

Through the implementation of best practice management, the potential environmental and social impacts associated with the Project can be appropriately managed, which will also address the community concerns and associated social impacts identified during the stakeholder engagement process.

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

# Key Terms

| Term | Definition |
|---|---|
| **Ancillary Infrastructure** | All infrastructure necessary for the construction and operation of the wind farm and battery storage with the exception of WTGs and battery storage, including but not limited to: substations, switching stations, permanent offices and site compounds, underground and overhead electricity transmission lines, meteorological masts, communication cables (includes control cables and earthing), water storage tanks, hardstands and internal Roads. |
| **APZ** | Asset Protection Zone. |
| **Battery storage** | Compound and technology for storing and discharging energy. Comprised of buildings, shipping containers and other infrastructure to contain the chosen technology and to connect the battery storage infrastructure with the WTGs, and substations via underground and/or overhead cables. |
| **Clearing** | As defined in Part 5A of the *Local Land Services Act 2013*. |
| **Construction** | The construction of the Project, including but not limited to the construction of WTG, battery storage, ancillary infrastructure but excluding pre-construction minor works. |
| **Development Consent** | State significant development consent to carry out the Project granted by the consent authority under the *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**. For the absence of doubt, the oversail of WTGs may extend beyond this Development Corridor but will be within the Project Site. |
| **Development Footprint** | The extent of ground disturbance including earthworks associated with permanent infrastructure and temporary facilities (other than temporary field laydown areas) in the Project Site. |
| **Electrical Plant Compound** | Area containing either or both of battery storage and substation. |
| **External Road Upgrades** | Upgrade of roads external to the Project Site and associated vegetation clearing and/or pruning, required to transport Project-related components and materials to and from the Project Site. |
| **Ground Disturbance** | Activities that cut into the existing ground surface. For the absence of doubt this does not include activities that occur on the ground surface including but not limited to driving vehicles on the ground, 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 2 axles. |
| **Internal Roads** | The roads established within the Project Site 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 Site. |
| **Light Vehicle** | Car or rigid truck to 8 T GVM or bus to 12 seats. |

| Term | Definition |
|---|---|
| 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 of approximately 1 $m^2$ 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 Site. |
| Micro-siting | The process of locating WTGs, battery storage, ancillary infrastructure and temporary infrastructure during detailed design without further approval providing:<br>• the ground disturbance remains within the Development Corridor (with the exception of wind monitoring masts)<br>• no WTG is moved more than 100 metres from the relevant GPS coordinates shown in **Figure 1.3**<br>• the revised location of the blade of a WTG is at least 50 metres from the canopy of existing hollow-bearing trees; or where the proposed location of the blade of a WTG is already within 50 metres of the canopy of existing hollow-bearing trees, the revised location is not any closer to the existing hollow-bearing trees<br>• the meteorological masts are located within the Project Site. |
| 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 vehicle; vehicle configuration which requires a permit from the National Heavy Vehicle Regulator. |
| Permanent Infrastructure | Infrastructure that will remain on the Project site during for the operational phase of the Project, including WTGs, battery storage and ancillary infrastructure. |
| Pre-construction Minor Works | Includes the following activities:<br>• surveys<br>• building/road dilapidation surveys<br>• investigative drilling, excavation or salvage<br>• minor clearing or translocation of native vegetation<br>• establishing temporary site office and compounds<br>• installation of environmental impact mitigation measures, fencing, enabling works, meteorological masts<br>• flora and fauna investigations and pre-clearing surveys, inspections, specific habitat feature removal, relocation<br>• establishing Project Site access points, minor access roads and minor adjustments to services/utilities, signage etc. including associated vegetation removal and heritage artefact salvage. |
| Project | The Spicers Creek Wind Farm described in **Section 3.0** of this EIS. |
| Project Site | The land required for the Project as detailed in **Appendix 2** and shown in **Figure 1.1**, and includes Crown land, Crown waterways, Crown roads and Council roads located within the boundary of the Project Site shown in **Figure 1.1.** |

| Term | Definition |
| --- | --- |
| **Pruning** | The selective removal of certain parts of a tree or shrub such as branches, limbs or foliage. |
| **Site Compound** | Areas used for either temporary facilities or ancillary infrastructure (excluding substations), or a combination of both. |
| **Substations** | 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 TransGrid (or other transmission network system operator). |
| **Telecommunications Facility** | A telecommunications facility is any part of the infrastructure of a telecommunications network or any line, cable, optical fibre, equipment, apparatus, tower, mast, antenna, dish, tunnel, duct, hole, pit, pole or other structure in connection with a telecommunications network. Telecommunications facilities provide for transmission of voice, data, image, graphic and video information between or among points by wire, cable, optical fibre, microwave, radio, satellite or similar facilities. |
| **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 crushing facilities, concrete or asphalt batching plants, stockpiles and materials storage compounds, temporary field laydown 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 Site. These areas will mostly not require earthworks and therefore are outside of, and not included in the Development Footprint. They will occur within the Project Site. |
| **WTG** | Wind Turbine Generator; turbines used for the generation of electricity by wind, including the tower, blades and associated components. |

# EIS Declaration

| Project Details | |
|---|---|
| Project Name | Spicers Creek Wind Farm |
| Application Number | SSD-41134610 |
| Address of the land in respect of which the development application is made | Refer to Schedule of Lands in **Appendix 2** |
| **Applicant Details** | |
| Applicant Name | Spicers Creek Wind Farm Pty Ltd |
| Applicant Address | Level 1, 25 Bolton St, Newcastle NSW 2300 |
| **Details of person by whom this EIS was prepared** | |
| Name | Kirsty Davies |
| Address | Umwelt (Australia) Pty Limited, 75 York St, Teralba NSW 2284 |
| Professional Qualifications | Bachelor of Environmental Science (Hons) |
| **Declaration by Registered Environmental Assessment Practitioner** | |
| Name | John Merrell |
| Registration Number | R80008 |
| Organisation registered with | EIANZ |
| Declaration | The undersigned declares that this EIS:<br>• has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021;<br>• contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates;<br>• does not contain information that is false or misleading;<br>• addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project;<br>• identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments;<br>• has been prepared having regard to the Department's State Significant Development Guidelines – Preparing an Environmental Impact Statement;<br>• 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;<br>• contains a consolidated description of the project in a single chapter of the EIS;<br>• contains an accurate summary of the findings of any community engagement; and<br>• contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole. |
| Signature | |
| Date | 4 July 2023 |

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# Figures

# Photos



# Tables

# Appendices

# 1.0 Introduction

Spicers Creek Wind Farm Pty Ltd proposes to develop the Spicers Creek Wind Farm (the Project) to provide a reliable and affordable source of energy for the people of NSW. The Project will also contribute to reducing greenhouse gas (GHG) emissions associated with energy generation and provide significant economic benefits to the region. Spicers Creek Wind Farm Pty Ltd is the applicant for the development application and is part of the Squadron Energy group of companies (SQE). For ease of reference, the proponent will be referred to as SQE.

The Project is located approximately 25 km north west of Gulgong and 35 km north east of Wellington in the Central West Orana (CWO) region of New South Wales (NSW), within the Dubbo Regional and Warrumbungle Shire Local Government Areas (LGA) (refer to **Figure 1.1**).

The NSW Government's Electricity Strategy and Electricity Infrastructure Roadmap (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 power stations as they come to their scheduled end of operational life. The Project is located within the Central-West Orana Renewable Energy Zone (CWO REZ) (refer to **Figure 1.2**) which is the State's first REZ and was formally declared on 5 November 2021.

Energy Corporation of NSW (EnergyCo), a NSW Government statutory authority, has been appointed under the *Electricity Infrastructure Investment Act 2020* as the Infrastructure Planner responsible for delivering the CWO REZ. EnergyCo is responsible for coordinating REZ transmission, generation, firming and storage projects to deliver efficient, timely and coordinated investment (EnergyCo, 2022a). The CWO REZ is currently in the development phase, with EnergyCo seeking approval for the construction and operation of new high voltage electricity transmission infrastructure that is required to connect energy generation and storage projects within the CWO REZ to the existing electricity network.

The Project is strategically located within the CWO REZ, being an area identified by the NSW Government as suitable for renewable energy projects. The successful delivery of the Project will assist the NSW government in delivering on the objectives for the NSW Electricity Strategy and the CWO 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. SQE has undertaken extensive engagement with residents in the area and other stakeholders throughout the Project planning and assessment process. The Project has been designed using an iterative approach incorporating community and other stakeholder feedback from the ongoing engagement undertaken SQE since 2019, with the design of the Project changing as a result of this feedback as discussed further in **Section 2.6**.

The Project is State significant Development (SSD) as defined under *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and requires 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 environmental, social and economic impacts of the Project. This document is intended to assist the community, Councils, government agencies and other stakeholders to understand 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 Overview of the Project

SQE proposes to develop the Project to generate renewable wind energy to supply to the National Electricity Market (NEM). The Project will have a capacity of approximately 700 megawatts (MW), with the potential to power approximately 397,000 homes. The Project includes the installation, operation and decommissioning of up to 117 wind turbine generators (WTG), battery storage and associated facilities including operation and maintenance buildings, roads, civil works, electrical infrastructure and temporary facilities for the construction phase (refer to **Figure 1.3**).

The key components of the Project include:

- approximately 117 (3 blade) WTGs with a total height (tip height) of up to 256 metres (m)
- electrical connections between the proposed WTGs and substations and battery storage facility consisting of a combination of underground cables and overhead powerlines
- substations and transmission connections to connect the proposed WTGs and battery storage facility to the proposed CWO REZ transmission line (noting that the proposed CWO REZ transmission line is currently subject to a development assessment process led by NSW EnergyCo on behalf of the NSW Government)
- battery storage facility (400 megawatts (MW) with up to 1,800 megawatt hour (MWh) storage capacity)
- other associated infrastructure including, but not limited to, access roads and tracks, operation and maintenance buildings and construction facilities
- temporary on-site concrete batching plants during the construction phase
- targeted road network upgrades to facilitate delivery of wind turbine components to the site as required.

The conceptual layout for WTGs, battery storage facilities, internal access roads, ancillary infrastructure and temporary facilities associated with the Project has been subject to ongoing refinement with the aim of minimising associated environmental, cultural and social impacts. The Project design has avoided impacts where practicable, and included provision for mitigation and offsetting the residual impacts that couldn't be avoided. These mitigation measures have been incorporated into the detailed design of the Project.

Key Project changes have included:

- avoidance of high value vegetation based on regional mapping at early planning phases
- iterative design change to avoid high value vegetation and Aboriginal sites based on biodiversity and archaeological survey outcomes

- iterative design changes to the Project layout including for WTGs, roads and other infrastructure based on host landholder feedback
- removal of WTGs from layout based on neighbouring landowner feedback
- a reduction in the number of WTGs proposed due to the removal of several WTGs based on host and neighbouring landowner feedback and technical study findings.

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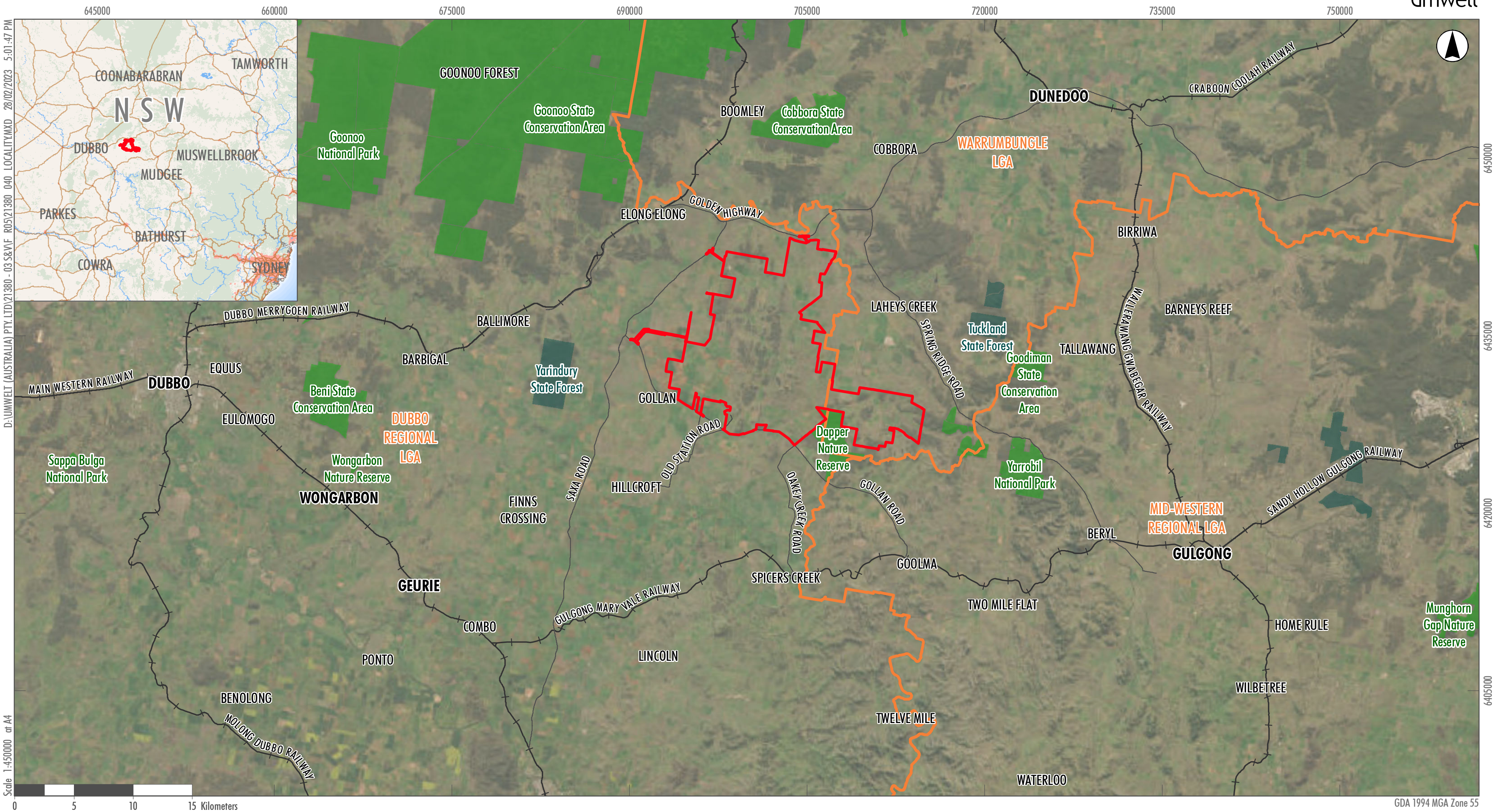


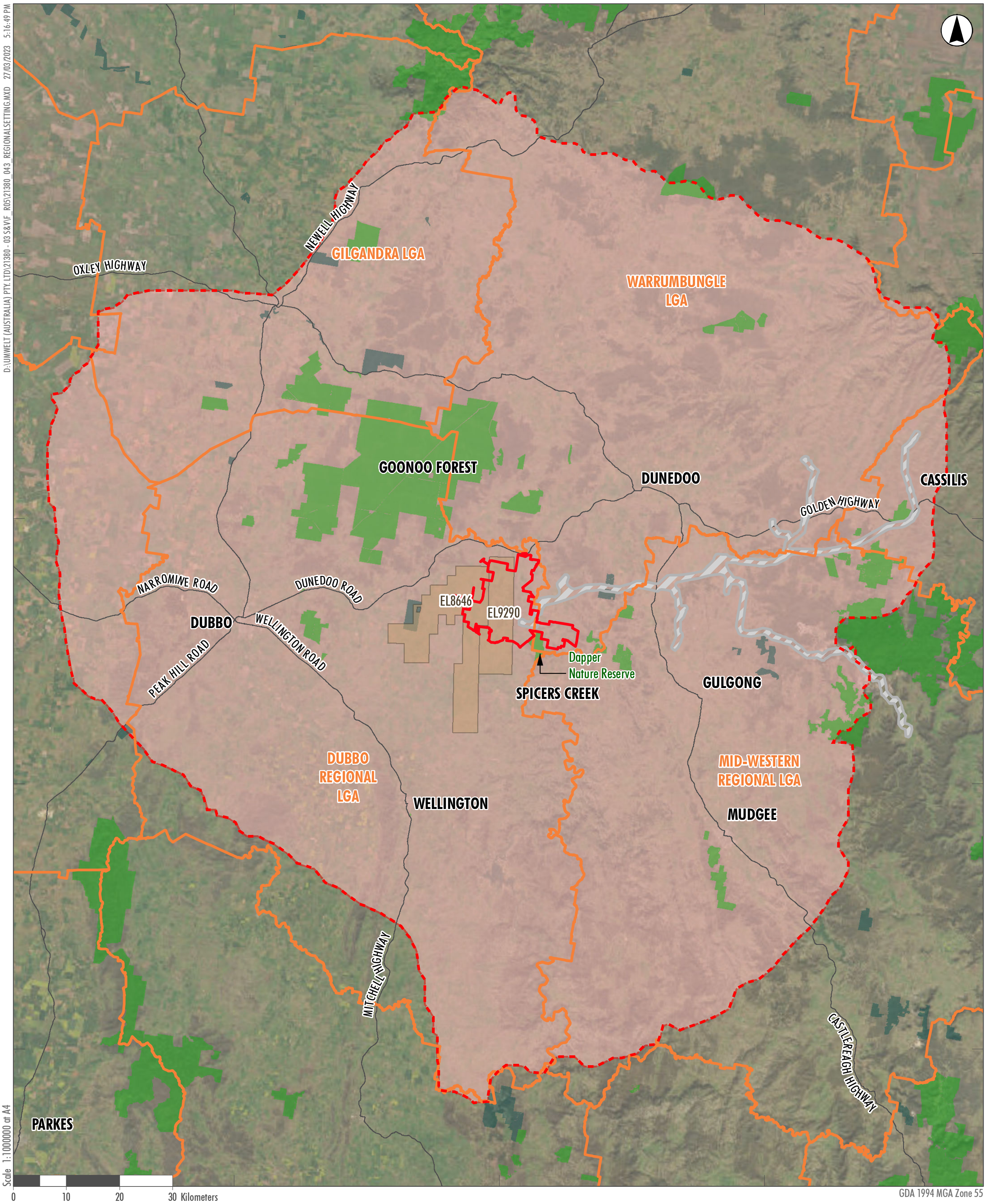

## Legend

- Project Site
- Local Government Area
- NPWS Estate
- State Forest
- Road
- Railway

FIGURE 1.1

**Locality Figure**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

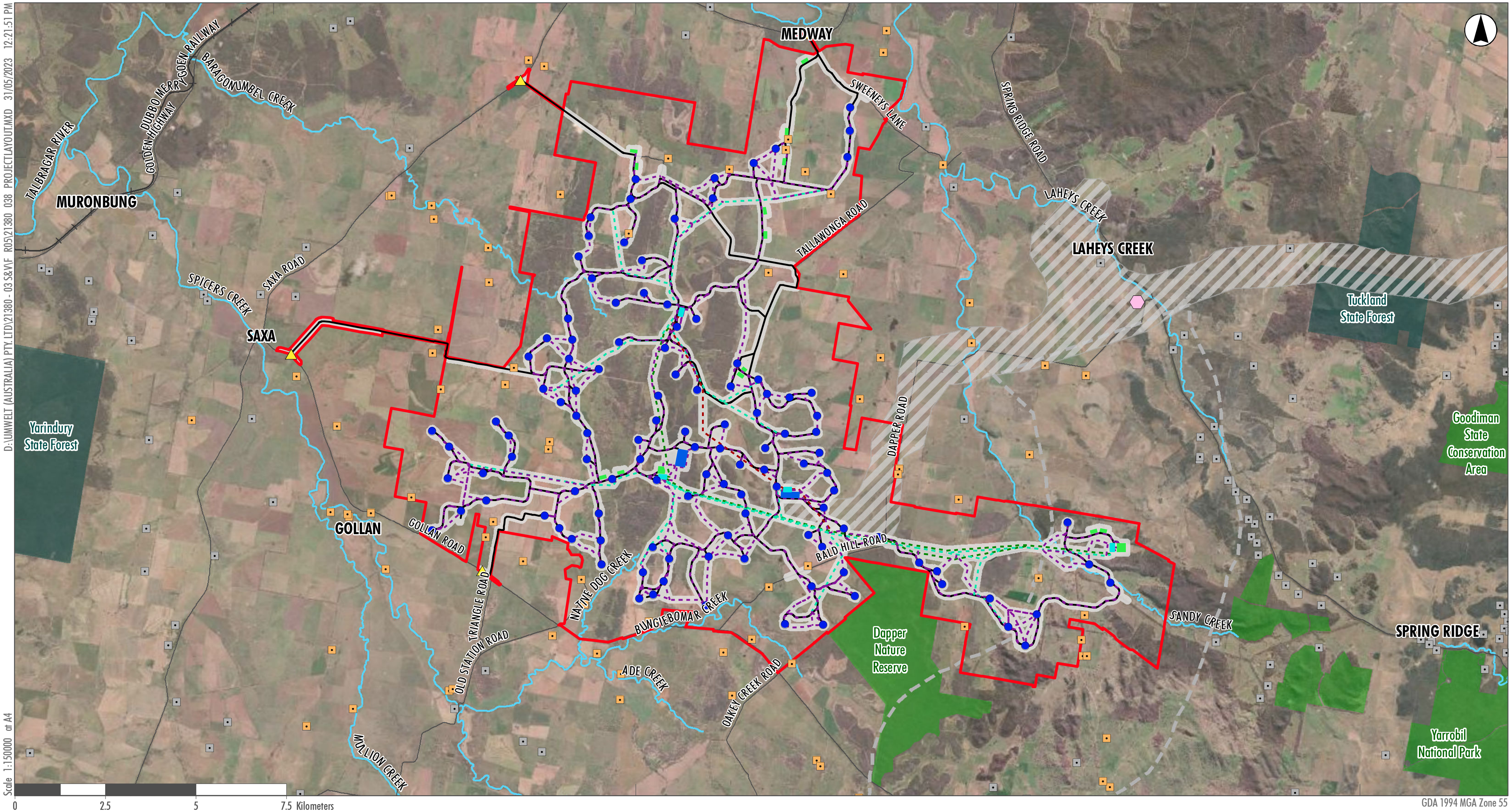



Legend

- Project Site
- Central-West Orana Renewable Energy Zone
- EnergyCo Indicative REZ Transmission Corridor
- Mining Titles
- Local Government Area
- State Forest
- NPWS Estate
- Road

FIGURE 1.2

Regional Setting

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Legend

- Project Site
- Wind Turbine Generator
- Associated - House
- Non Associated - House
- Development Corridor
- Site Access Point
- Proposed Underground Powerline
- Proposed Overhead Powerline (HV or MV)
- Proposed Overhead Powerline (MV)
- Proposed Overhead Powerline (HV)
- Access Track
- Substation
- Site Compound
- Electrical Plant Compound
- EnergyCo Elong Elong Energy Hub
- EnergyCo Indicative REZ Transmission Corridor
- EnergyCo Potential Southern Extension
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 1.3

**Spicers Creek Wind Farm**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

### 1.1.1 Project Objectives

The objectives of the Project are to:

- contribute to the achievement of SQE's goal which is to improve the environment for current and future generations by leading Australia's transition to renewable energy
- establish a reliable and affordable source of renewable energy for the NEM and help reduce GHG emissions from electricity generation
- positively contribute to State and Commonwealth renewable energy goals
- align with the NSW Government's emissions reduction targets and Electricity Strategy
- contribute to achieving the target of at least 3 GW of renewable energy generation from the CWO REZ
- create employment opportunities during Project construction and operations
- contribute to the local, regional and NSW economies with a particular focus on maximising the economic benefits for the CWO region
- maintain partnerships with stakeholders and the community to minimise environmental and social impacts and maximise benefits
- ensure that the highest safety and environmental standards are met during construction and operation of the Project.

## 1.2 The Proponent

The Proponent for the Project is Spicers Creek Wind Farm Pty Ltd, which is part of the Squadron Energy and Tattarang group of companies.

Spicers Creek Wind Farm Pty Ltd was formerly part of CWP Renewables (CWPR). CWPR was acquired by SQE in late 2022 and all CWPR development and operational projects have continued as normal under the SQE brand. SQE is an Australian-owned renewable energy company dedicated to accelerating the decarbonisation of Australia's economy.

SQE develops, operates and owns renewable energy assets in Australia, with 2.4 gigawatts (GW) of renewable energy in operation and a development pipeline of 20 GW.

For the purpose of this EIS, the Proponent will be referred to throughout as SQE, noting that many of the activities discussed occurred when the Proponent was CWPR, prior to the purchase of CWPR by SQE.

**Table 1.1** presents the key details of the Proponent.

**Table 1.1 Proponent Details**

| Requirement | Details |
|---|---|
| Full Name/s | Spicers Creek Wind Farm Pty Ltd |
| Postal Address | PO Box 1708, Newcastle NSW 2300 |
| Street Address (Project Site) | Sweeneys Lane, off Golden Highway, Elong Elong NSW 2831 |
| ABN | 83 648 166 269 |

## 1.3 Structure of this Report

This Environmental Impact Statement (EIS) has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs), issued on 6 May 2022, with Supplementary SEARs issued on 6 February 2022. **Appendix 1** provides the SEARs and where these 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, 2016a), 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), July 2021 (DPIE, 2021a) and referred to hereafter as the DPE EIS Guideline.
- Cumulative Impact Assessment Guidelines for State Significant Projects (DPIE, 2021b).
- Social Impact Assessment Guideline for State Significant Projects (DPE, 2023).
- Undertaking Engagement Guidelines for State Significant Projects (DPE, 2022) (Engagement Guidelines).

This report has the following sections:

- **Section 1.0** introduces the Project, the Proponent and provides an outline of the structure of the document.
- **Section 2.0** outlines the strategic context for the Project, including the justification for the Project, a summary of the locality in which the Project is undertaken and an overview of the environmental and social context.
- **Section 3.0** contains a description of the Project.
- **Section 4.0** summarises the relevant State and Commonwealth statutory context applicable to the approval process for the Project.
- **Section 5.0** describes the stakeholder engagement program for the Project and identifies the environmental and social matters identified during consultation for the EIS.
- **Section 6.0** contains the assessment of environmental and social matters relevant to the Project.
- **Section 7.0** provides a justification and conclusion.
- **Section 8.0** contains the references.

The EIS contains a number of appendices that provide detailed technical assessments of the key environmental and social issues related to the Project (refer to **Table 1.2**). The key outcomes of these studies are summarised in **Section 6.0**.

**Table 1.2 Technical Specialist Assessments**

| Technical Assessment | Technical Specialist |
|---|---|
| Landscape and Visual Impact Assessment | Moir Landscape Architecture |
| Noise and Vibration Impact Assessment | Sonus |
| Biodiversity Development Assessment Report | Umwelt |
| Aboriginal Cultural Heritage Assessment | NSW Archaeology |
| Historic Heritage Assessment | NSW Archaeology |
| Traffic Assessment | Samsa Consulting |
| Route Assessment | Rex J Andrews Engineered Transportation |
| Water Resource Impact Assessment | Umwelt |
| Land Use Conflict Risk Assessment | Umwelt |
| Telecommunications and Electromagnetic Field Assessment | Middleton Group Engineering |
| Blade Throw Risk Assessment | Middleton Group Engineering |
| Preliminary Hazard Assessment | Umwelt |
| Aviation Impact Assessment | Aviation Projects |
| Social Impact Assessment | Umwelt |
| Economic Assessment | Ethos Urban |

# 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 government and NSW government 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, affordable and sustainable electricity future to support a growing economy (NSW Government, 2022). The State's five existing coal fired power stations will progressively close starting from 2022–2023. These power stations currently provide around three quarters of NSW's electricity supply and two thirds of the capacity required during peak demand, such as summer heat waves. In NSW, all five of the coal-fired power stations are scheduled to retire between 2022 and 2043 (AEMO, 2019) beginning with the progressive retirement of Liddell Power Station in 2023. The NSW Government is taking action to lead investment in new renewable generation to ensure an orderly transition away from coal (EnergyCo, 2022b).

As discussed in **Section 1.0**, the NSW Government has indicated that REZs will play a vital role in delivering affordable energy to help prepare the State for the retirement of thermal power stations over the coming decades. EnergyCo is the statutory authority responsible for leading the delivery of REZs. EnergyCo describes REZs as modern day power stations which combine renewable energy generation and energy storage systems, that are connected to transmission infrastructure via energy hubs (EnergyCo, 2022b). The Project will contribute to meeting the NSW Government objectives of providing a secure electricity supply for the people of NSW.

Various government strategies, plans and policies such as Australian Energy Markey Operator's (AEMO) Integrated Systems Plan (ISP) (AEMO, 2022), the NSW Transmission Infrastructure Strategy (DPE, 2018a) and NSW Electricity Infrastructure Roadmap (DPE, 2020), identify the importance of the REZs in providing an effective and economical way to integrate new generation, storage and transmission development (EnergyCo, 2022b).

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 declined since 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, 2022). In 2022, it has been reported that renewables accounted for 34.8% of Australia's electricity demand (Stockhead, 2023). The share of renewables such as wind and solar in Australia's energy mix is planned to continue to increase over the coming years.

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 fits within the current strategic direction of the NSW and Australian energy generation market and will assist in achieving the planned transition to more renewable energy to meet Australia's energy needs. As a renewable energy project located within the CWO 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, SQE has a track record of delivering renewable energy projects through their entire lifecycle, from project inception through to operations.

### 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 (DEECCW, 2022b).

In 2022, the Commonwealth Government stated its ambition to put the country on track to achieve net zero emissions by 2050 (McAllister & Albanese, 2022). Australia's Nationally Determined Contribution (NDC) prescribes an unconditional economy-wide target to reduce greenhouse gas emissions, and states that future policies will target emissions generated from energy use, industrial processes, agriculture, land-use, land-use change and forestry and waste.

### 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.

Current and future electricity development in NSW is supported though the NSW Government's Electricity Strategy (NSW Government, 2020) and the NSW Electricity Infrastructure 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.

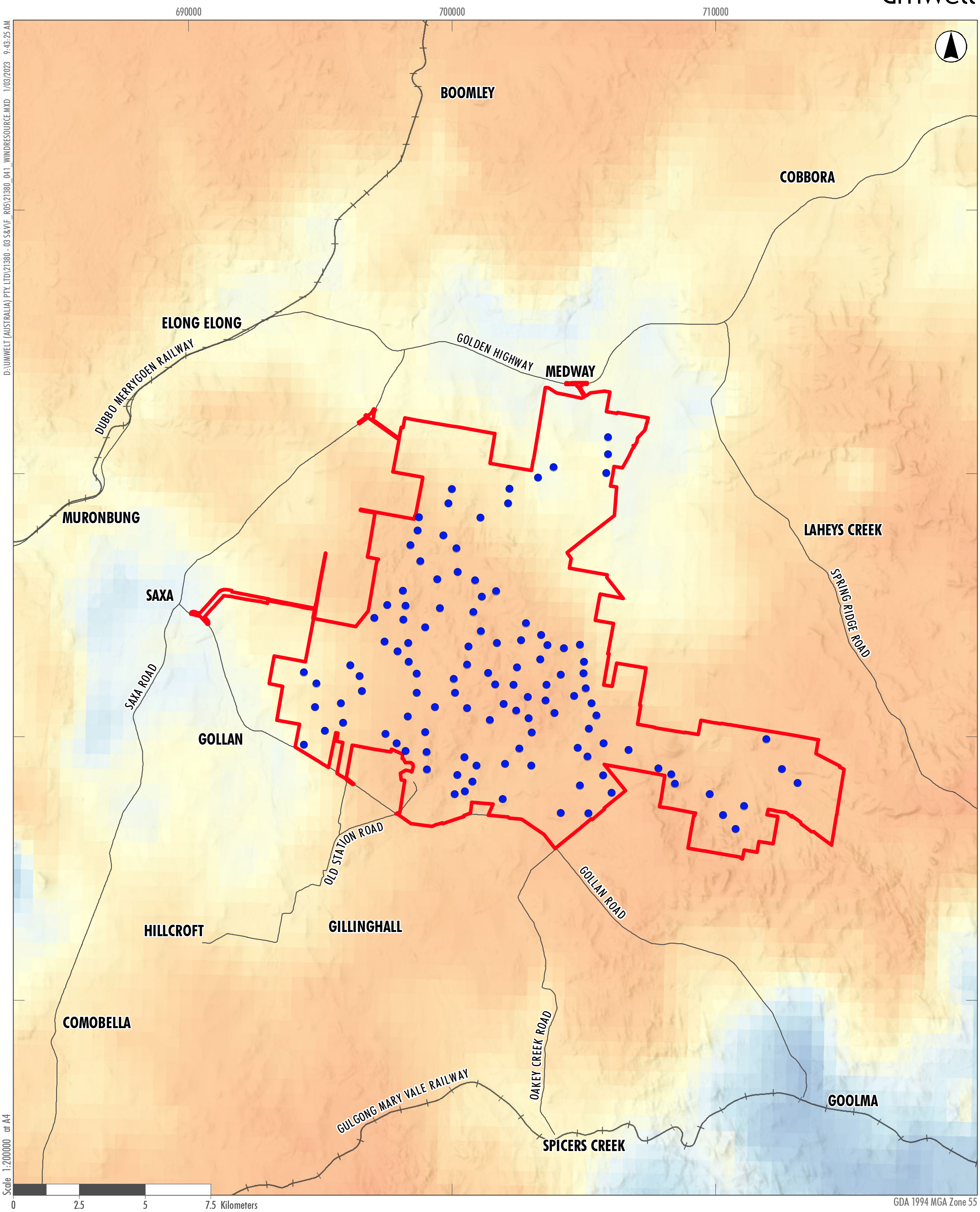
The NSW Electricity Strategy is the NSW Government's plan for a reliable, affordable and sustainable electricity future that supports a growing economy (NSW Government, 2020). The Project Site is located within the CWO REZ as identified within the NSW Government's Electricity Strategy (NSW Government, 2020), (refer to **Figure 1.2**). A target of at least 3 GW of renewable energy generation has been assigned to the first stage of the CWO REZ.

### 2.1.4 Regional and Local Renewables Context

Wind energy is known to be one of the cheapest forms of new build large-scale energy generation and NSW has significant wind resources. The CWO REZ has been identified as a suitable location to support wind energy development with consistently high average wind speeds and close proximity to existing and planned transmission infrastructure (EnergyCo, 2022b).

The Project Site is strategically located within the CWO REZ, in an area mapped as having high wind renewable energy source potential. The Renewable Energy Resource Mapping (DPIE, 2019) is reproduced in **Figure 2.1** which indicates the existing wind resources applicable to the Project Site. The high wind resource makes the location suitable for a productive wind farm.

The Project will also contribute significant capital investment within the CWO 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 the implementation of a Benefit Sharing Program for the Project, including Planning Agreements with local Councils (refer to **Section 2.5** for further details).




Legend

- Project Site
- Wind Turbine Generator
- Road
- Railway

Wind speed (metres per second)

High : 10.2

Low : 2.4

FIGURE 2.1

Wind Resource Mapping

Image Source: ESRI Basemap, Data source: DFSI (2020),

## 2.2 Regional Strategies and Plans

### 2.2.1 Central West and Orana Regional Plan 2036

The Central West and Orana Regional Plan 2036 (CWOR Plan) is the NSW Government's strategy for guiding land use planning decisions for the Central West and Orana Region over the next 14 years. The vision of the CWOR Plan is to 'create a leading and diverse regional economy in NSW, with a vibrant network of centres building on the opportunities of being at the heart of NSW' (DPE, 2017).

The supporting goals of the CWOR Plan are to create:

- the most stunning environment in NSW
- a thriving, interconnected economy
- vibrant and engaged communities
- great housing choice and lifestyle options.

The CWO region's broad range of industries, its location and connections to Sydney, Canberra and Newcastle provide a foundation for a diverse regional economy (DPE, 2017). While traditionally anchored in agriculture, manufacturing and mining, the CWOR 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 CWOR Plan promotes further development of renewable energy across the Central West and Orana, specifically through Direction 9: 'Increase renewable energy generation'. The region is seen as having significant potential for renewable energy industries with vast open spaces and higher altitude tablelands with potential for wind power generation, large-scale solar energy and bioenergy generation. The CWOR Plan indicates that renewable energy generation will also create a more sustainable energy future for the region.

The CWOR 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 Site, including avoiding mapped BSAL land (refer to **Section 6.9**). Ongoing agricultural use of the land will continue with the Project during the construction, operation and decommissioning phases and the provision of income to host and other associated landholders will strengthen their ability to invest in their ongoing agricultural operations and provide alternate sources of income during drought or other less productive periods.

The Project is considered to be consistent with the vision of the CWOR Plan, particularly in light of the proposed development of renewable energy generation. In particular, the CWOR Plan recognises that growth in wind energy, solar energy and bioenergy generation will promote local jobs in smaller communities and development opportunities for associated industries.

### 2.2.2 Dubbo Local Strategic Planning Statement

Adopted on 22 June 2020, the Dubbo Local Strategic Planning Statement (Dubbo Regional Council, 2020) is a 20-year vision for land use planning for Dubbo and Wellington and provides an overarching strategic direction for future land use planning in the Dubbo Regional Council LGA.

Planning themes and priorities of the Local Strategic Planning Statement are around infrastructure, economy, housing, liveability and sustainability. As part of its Statement, Dubbo Regional Council identifies that it aims to increase renewable energy generation in order to diversify the regional economy and promote a sustainable future.

The goals of the Statement are to create:

- the most diverse regional economy in NSW
- a stronger, healthier environment and diverse heritage
- quality freight, transport and infrastructure networks
- dynamic, vibrant and healthy communities.

The Statement acknowledges that the CWO REZ is located within the Dubbo LGA which will promote significant investment in renewable energy in the region. The Statement also recognises that renewable energy generation needs to be managed to minimise impacts on local amenity while accessing the transmission grid (Dubbo Regional Council, 2020). Through the Statement, Dubbo Council aims to:

- collaborate with State agencies and key landowners to deliver key infrastructure projects
- utilise the NSW Government's large-scale energy guideline to advise proponents on the optimum location of new renewable industries
- monitor the sterilisation of productive agricultural land as a result of renewable energy development, with an objective of minimising sterilisation
- investigate and implement Voluntary Planning Agreements (VPAs) with State significant developments to mitigate impacts on local services and facilities.

The Statement also aims to develop resilience to climate change. In this regard, an action in the Statement is to promote and support investment in renewable energy opportunities, including within the CWO REZ (Dubbo Regional Council, 2020).

The Project is considered to be consistent with the vision and intent of the Local Strategic Planning Statement, specifically in relation to the proposed development of renewable energy generation. The Project has also been designed in consideration of agricultural land uses within the Project Site and limiting potential land use conflicts within the region. SQE is committed to entering into a VPA with Dubbo Council in relation to the Project (refer to **Section 2.5.4**).

### 2.2.3 Warrumbungle Shire Council Strategic Planning Statement

While the majority of the Project Site is located within the Dubbo LGA, the south-east portion of the Project Site is located within the Warrumbungle LGA (refer to **Figure 1.2**). The Warrumbungle Shire Council Strategic Planning Statement (Warrumbungle Shire Council, 2019) sets the framework for Warrumbungle Shire's economic, social and environmental land use needs over the next 20 years.

The plan identifies the main priorities and aspirations for future land use within the LGA and establishes objectives and strategies to achieve those objectives. These objectives address social, environmental, economic and civic leadership issues as identified by the Warrumbungle Shire Community Strategic Plan. The goals of the Strategic Planning Statement are to create:

- a spirited and connected community
- a supportive future with growth and resilience
- a healthy environment and community.

Key objectives of the Strategic Planning Statement with relevance to the Project are to protect important agricultural land, including managing land use conflicts on agricultural land, and encourage the co-location of complementary industry alongside agricultural enterprises that enhance the efficiency of the agricultural land use. The Project is considered to be consistent with these objectives as it provides for economic diversity which aids growth and resilience, has been designed in consideration of agricultural land uses within the Project Site with ongoing consultation with landowners, and provides for coexistence with the existing agricultural land uses.

## 2.3 Environmental Context

### 2.3.1 Regional Setting

As outlined in **Section 1.0**, the Project is located approximately 25 km north west of Gulgong and 35 km north east of Wellington in the CWO region of NSW. The nearest larger population centres are Dubbo and Mudgee, which are located approximately 50 km west, and 58 km southeast of the Project Site (refer to **Figure 1.1**). Dubbo has a population of approximately 43,500 (as at the 2021 census) and serves as a large regional centre for the surrounding localities and contains a wide range of services and facilities to support the surrounding population. Mudgee has a population of approximately 12,500 (as at the 2021 census) and is the sub-regional service, commercial and tourism centre for the Mid-Western region.

The Project Site is within the Dubbo Regional and Warrumbungle Shire LGAs, and is adjacent to the Mid-Western Regional LGA. The townships of Wellington, Dunedoo and Gulgong are key communities of interest for the Project given their proximity to the Project Site. The towns of Dubbo and Wellington are located in the Dubbo Regional LGA, the town of Dunedoo is located in the Warrumbungle Shire LGA, and the towns of Gulgong and Mudgee are located in the Mid-Western Regional LGA.

The Golden Highway is located to the north of the Project Site and acts as the primary connection between the Hunter and Orana regions of NSW. Other key road transport infrastructure in the locality include the Castlereagh Highway and Mitchell Highway (refer to **Figure 1.2**).

### 2.3.2 Land Use and Ownership

The Project Site and surrounding area is characterised by existing agricultural land uses with associated rural residences. Land within and surrounding the Project Site has been subject to extensive historical vegetation clearing associated with agricultural land uses. Agriculture is the predominant land use in the Project Site, primarily sheep grazing with some cattle grazing and cropping (refer to **Figure 2.2**).

There are 24 private landholdings within the Project Site along with some small areas of crown land and crown land reserves and Council owned roads (refer to **Figure 2.3**).

The Project Site is primarily zoned RU1 – Primary Production under the Dubbo Regional Local Environmental Plan (LEP) 2022 and the Warrumbungle LEP 2013 (refer to **Figure 2.4**). The Project Site also contains small areas of land zoned SP2 – Infrastructure (refer to **Figure 2.4**), associated with roads including the Golden Highway and Saxa Road. The Dapper Nature Reserve located adjacent to (but outside of) the southern boundary of the Project Site is zoned C1 – National Parks and Nature Reserves.

Relevant specialist assessments undertaken as part of this EIS have identified two categories of dwellings:

- **Associated Dwellings** – dwellings the Proponent has a negotiated agreement in place with the landowner regarding Project impacts and are therefore associated with the Project. Associated dwellings include host dwellings, being dwellings located within the Project Site and located on land hosting infrastructure associated with the Project.
- **Non-associated Dwellings** – dwellings located outside of the Project Site and not associated with the Project.

Dapper Nature Reserve adjoins the Project Site on the southern boundary with a number of other nearby National Parks, Conservation Areas and State Forests in the broader region surrounding the Project Site. The primary purpose of nature reserves is to conserve nature. Nature reserves differ from national parks in that they do not have the provision of visitor use as a management purpose or principle. Dapper Nature Reserve protects an area of important remnant vegetation in an otherwise highly cleared landscape due to clearing for grazing and agricultural development (OEH, 2014). Permission is required to enter Dapper Nature Reserve and access is restricted by locked gates (OEH, 2014).

There are two existing mineral exploration licences which partially overlap with the Project Site, held by Orange Minerals (NSW) Pty Ltd (EL9290) and Monzonite Metals Pty Ltd (EL8646) (refer to **Figure 1.2**). The exploration licences relate to potential Group 1 metallic minerals. It is understood that exploration activities have been undertaken in relation to EL8646, which overlaps with the western extent of the Project Site. There are currently no known proposals relating to any of the exploration licenses within the Project Site.

There is one registered Conservation Agreement within the Project Site over Lot 91 DP 754305. The agreement is registered against the whole lot however, the agreement relates only to a 61 ha 'Conservation Area' within the lot. The management obligations and restrictions only apply to the Conservation Area. All infrastructure has been designed to avoid this area.

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

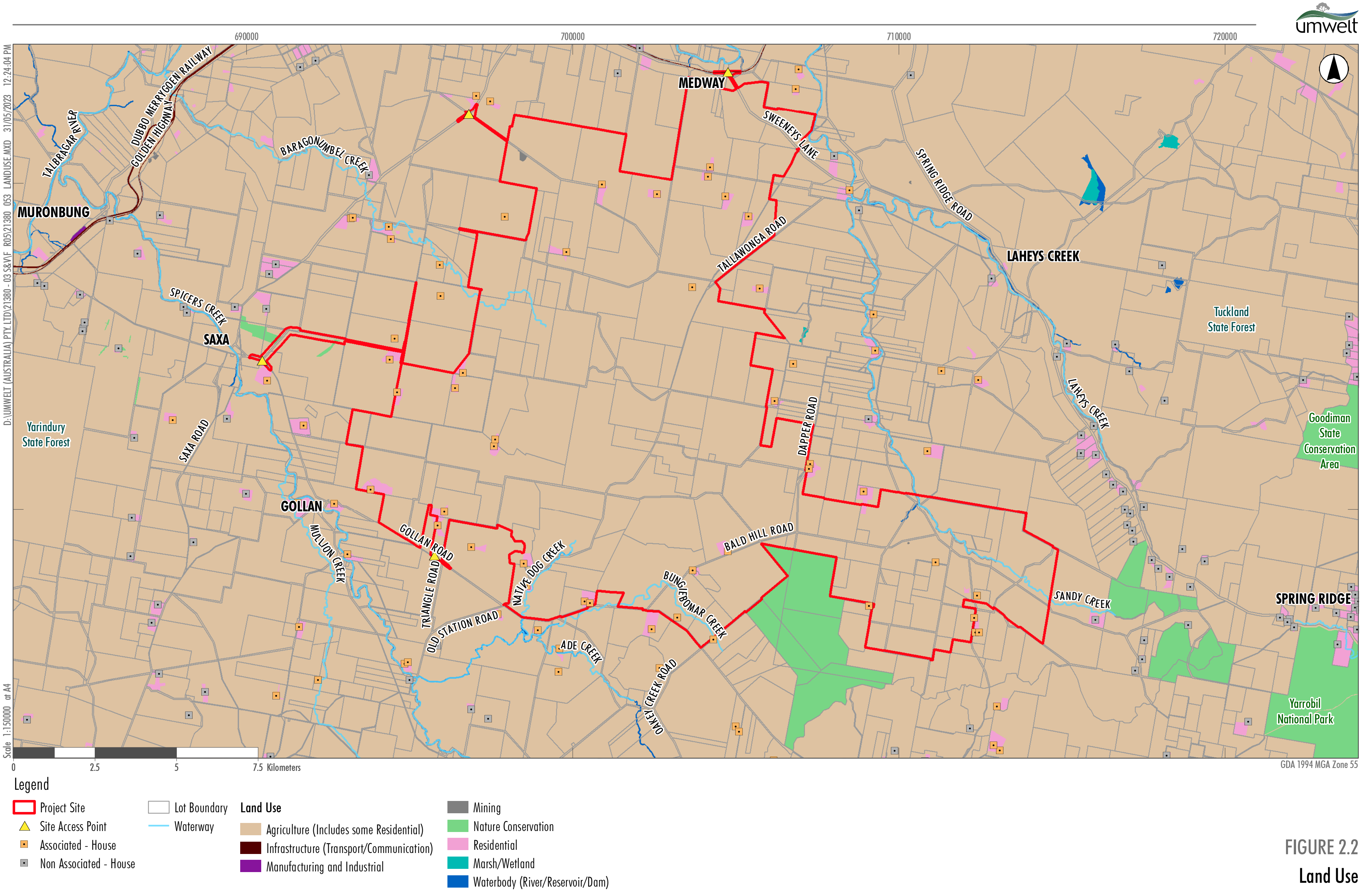
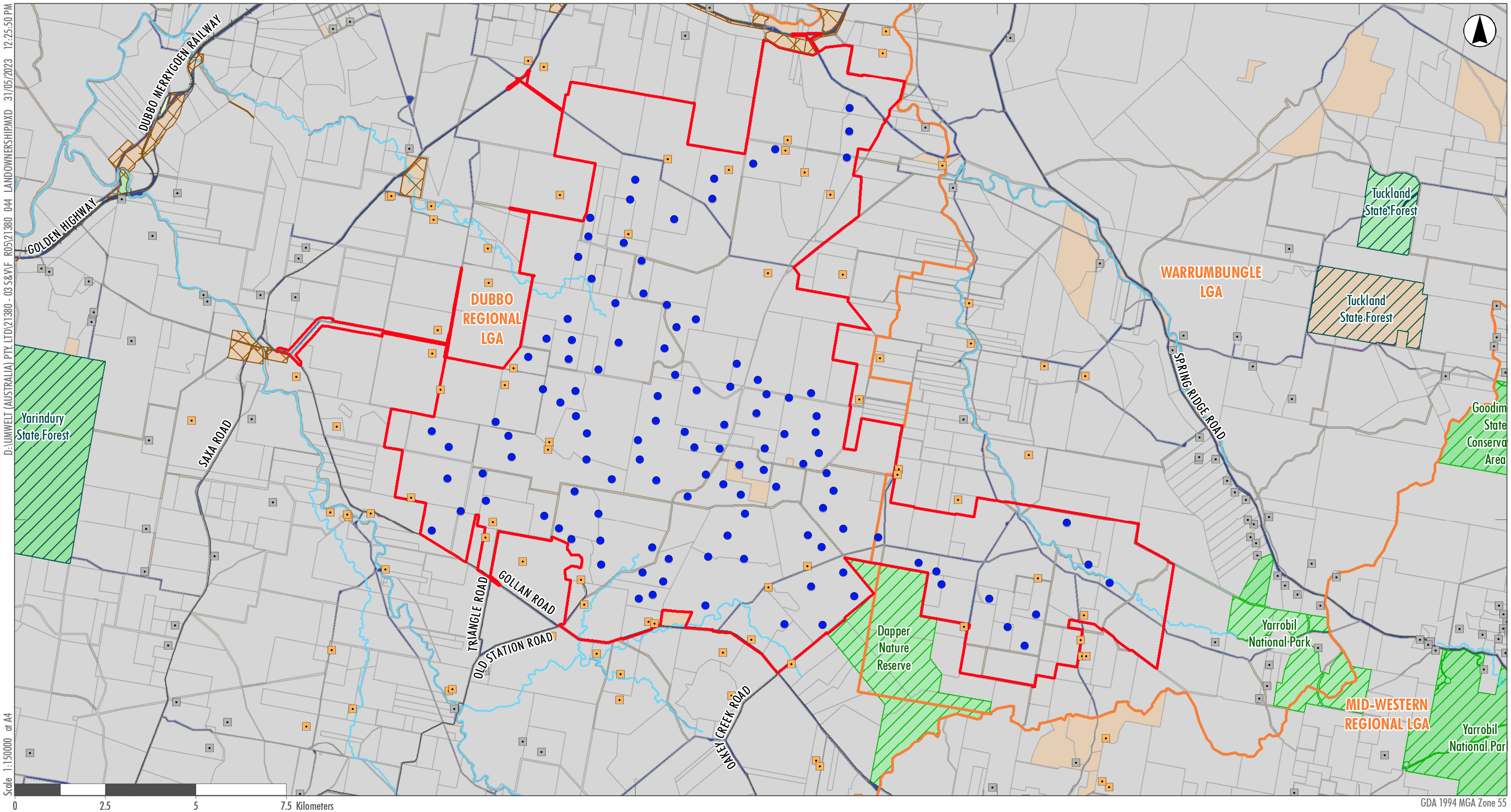



FIGURE 2.2
**Land Use**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022), DPE (2017)




Legend

- Project Site
- Wind Turbine Generator
- Associated - House
- Non Associated - House
- Local Government Area
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

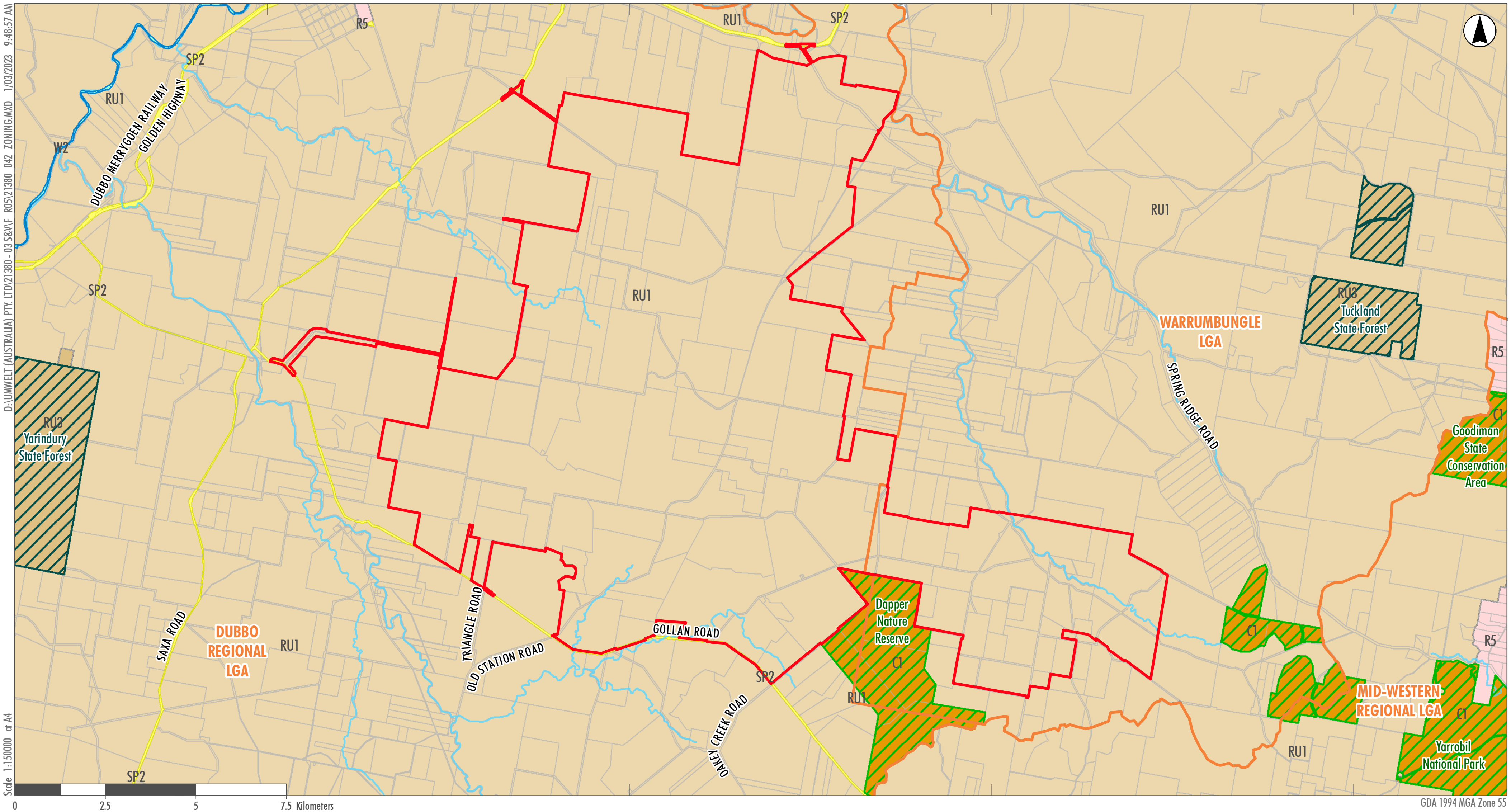
**Land Ownership**

- Private
- Crown Land
- NSW Government
- Local Government Authority
- Shared Crown/ Council
- Travelling Stock or Facility

FIGURE 2.3

**Land Ownership**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)




Legend

- Project Site
- Local Government Area
- State Forest
- NPWS Estate

Zoning

- C1 National Parks and Nature Reserves
- R5 Large Lot Residential
- RU1 Primary Production
- RU3 Forestry
- SP2 Infrastructure
- W2 Recreational Waterways
- Property Boundaries
- Waterway

FIGURE 2.4

**Zoning Map**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

### 2.3.3 Natural, Cultural and Built Features

The Project Site falls on the land of the Wiradjuri people and is within the Dubbo Local Aboriginal Land Council (LALC) area. There are no currently known native title claims over the Project Site. Site-specific social or cultural values were identified during the consultation process and field survey for the cultural heritage assessment of the Project Site (refer to **Section 6.5**).

The topography of the Project Site primarily features undulating terrain with ridgelines separating the intervening valleys. The Project Site has an elevation ranging from 360 m Australian Height Datum (AHD) to 540 m AHD (refer to **Figure 2.5**).

The Project Site is located within the Macquarie-Bogan water catchment, within the Murray-Darling Basin. There are a number of minor creeks that traverse the Project Site (refer to **Section 6.7** for further details). No flood prone land or flood management areas are identified within the Project Site.

Small sections of the south-east part of the Project Site are identified in regional scale mapping as BSAL (refer to **Figure 2.6**). An area of mapped BSAL of approximately 4.5 ha is present within the Development Corridor and 0.15 ha within the Development Footprint for the Project (refer to **Figure 2.6**). SQE will avoid all mapped BSAL within the Project Site as part of detailed design.

The land within the Project Site is Class 3, 5, 6 and 7 under the Land and Soil Capability Assessment Scheme (LSC) (refer to **Figure 2.6**). There is approximately 7,455 ha of Class 3 land located within the Project Site, with approximately 2,235 ha within the Development Corridor. It is noted that the Development Corridor is a conservative area (refer to **Section 3.2**), and the final Disturbance Footprint will be smaller and in the order of 1,520 ha, subject to further detailed design. The proposed disturbance area for the Project will seek to minimise disturbance to areas of Class 3 land as far as practicable (refer to **Section 6.7**).

As outlined in **Section 2.3.2**, Dapper Nature Reserve adjoins the Project Site on the southern boundary. It is understood that Dapper Nature Reserve is not used for recreational purposes and receives small numbers of visitors per year, primarily research groups and birdwatchers (OEH, 2014). Permission is required to enter the Reserve and access is restricted by locked gates (OEH, 2014). Other National Parks, Conservation Areas and State Forests within the vicinity of the Project Site include:

- Yarrobil National Park, approximately 2 km east of the Project Site.
- Goodiman State Conservation Area, approximately 7 km east of the Project Site.
- Tuckland State Forest, approximately 6 km east of the Project Site.
- Cobbora State Conservation Area, approximately 7 km north of the Project Site.
- Goonoo State Conservation Area, approximately 8 km to the northwest of the Project Site.
- Yarindury State Forest, approximately 5 km to the west of the Project Site.

Refer to **Figure 2.2** for locations of these National Parks, Conservation Areas and State Forests.

Areas of native vegetation on the Project Site are present generally in the form of paddock trees, with areas of woodland vegetation on ridgelines, along local roads and drainage lines. The Project Site features varying degrees of biodiversity value and mixed intact and modified woodlands/forests and grasslands. Detailed biodiversity field surveys have identified seven plant community (PCT) types within the Project Site (refer to **Section 6.4**. Six of the PCTs are identified as being associated with Threatened Ecological Communities (TEC) listed under the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Further detail on the biodiversity values of the Project Site are provided in **Section 6.4**.

There are no Commonwealth or World listed heritage places located within or in proximity to the Project Site. There are also no State listed or locally listed heritage places or items located within the Project Site. There are a number of local heritage sites located in the broader area surrounding the Project Site, with the closest located at Gollan approximately 1 km from the Project Site (refer to **Section 6.5.2**).

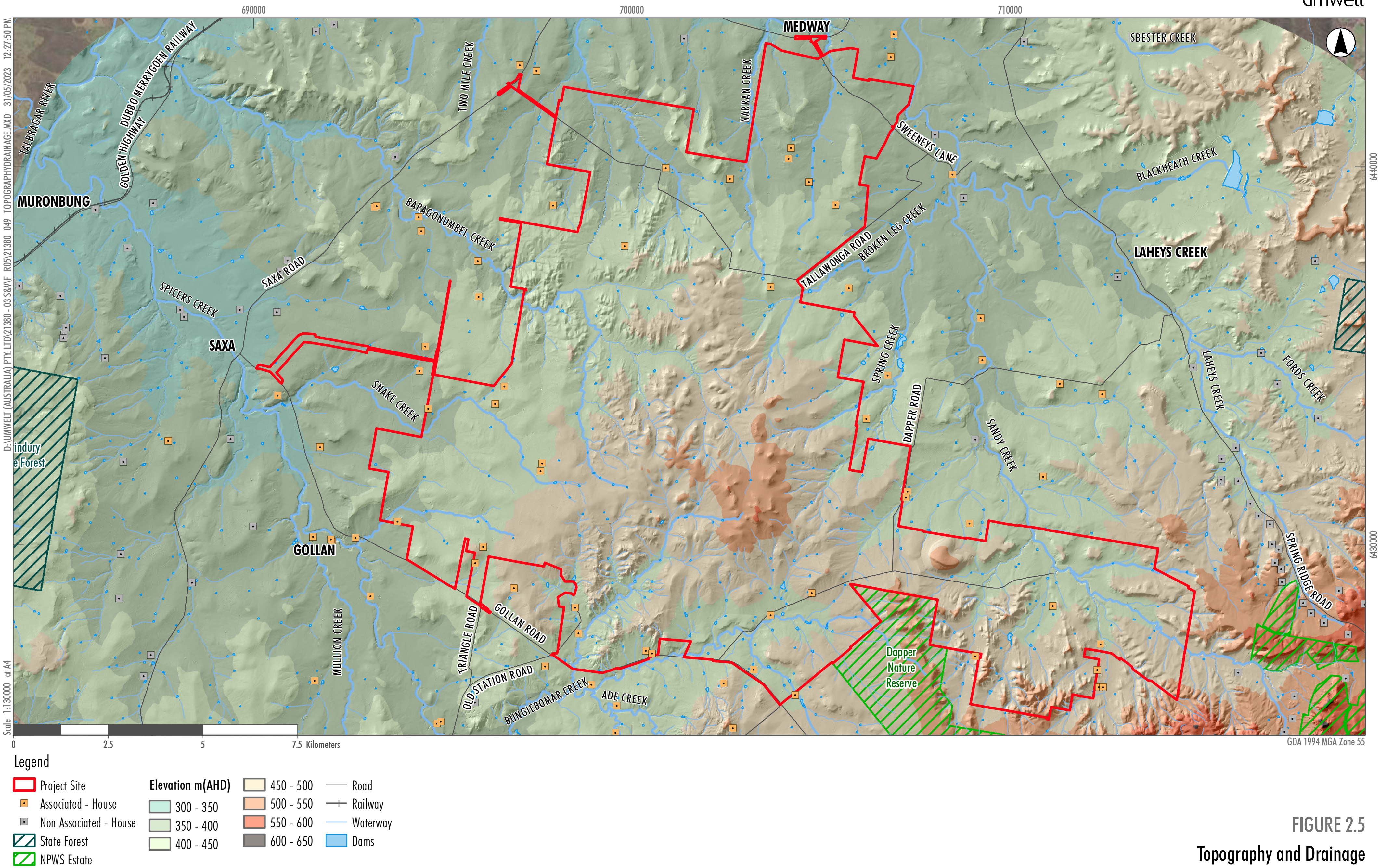
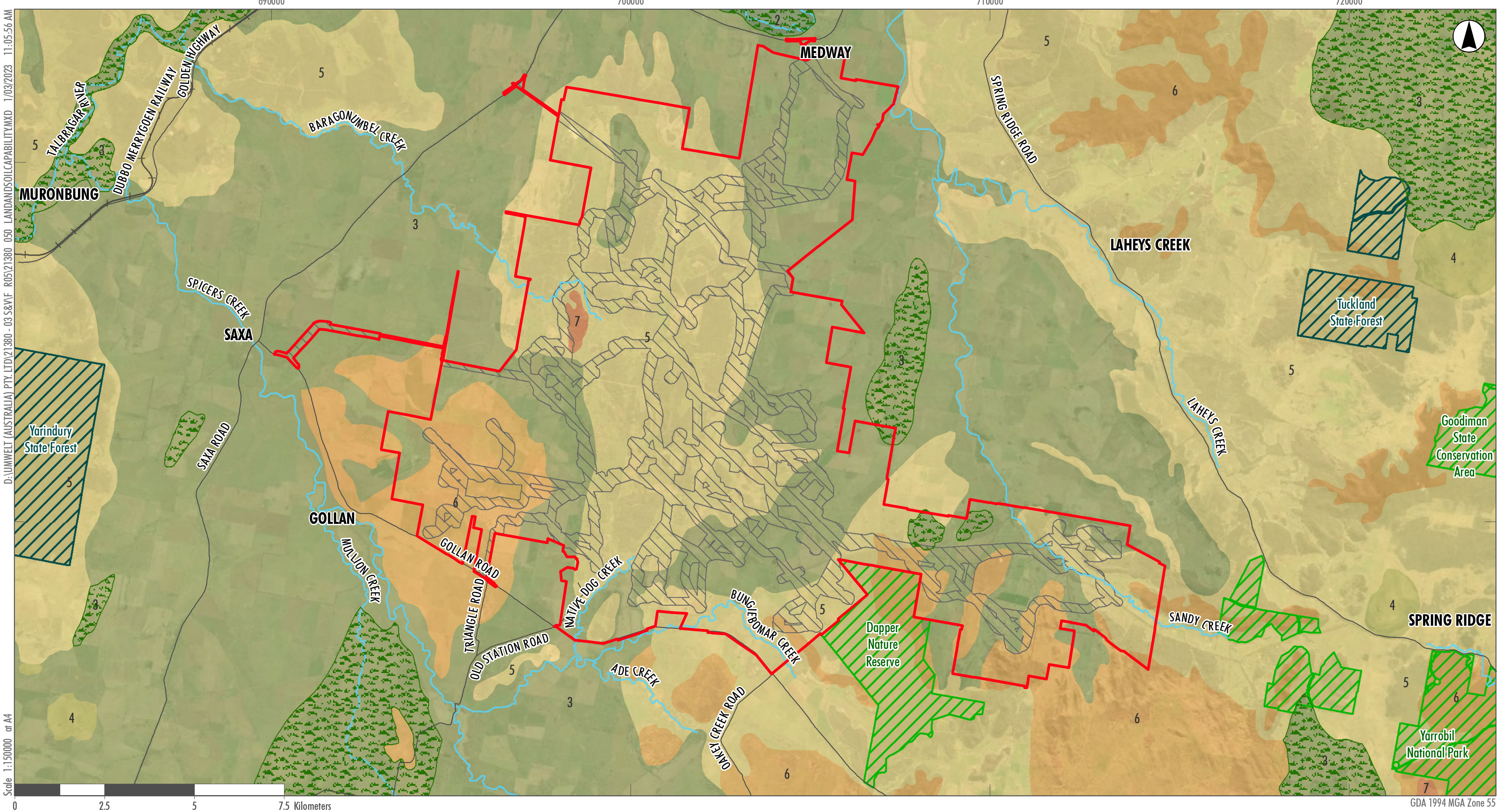



FIGURE 2.5

**Topography and Drainage**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)




Legend

- Project Site
- Development Corridor
- Strategic Agricultural Land - Biophysical
- State Forest
- NPWS Estate

Land and Soil Capability Classification

- 2 - Slight but significant limitations
- 3 - Moderate limitations
- 4 - Moderate to severe limitations
- 5 - Severe limitations
- 6 - Very severe limitations
- 7 - Extremely severe limitations

- Road
- Railway
- Waterway

FIGURE 2.6

Land and Soil Capability

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022), OEH (2021)

### 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 a battery storage facility) is such that some risks or hazards cannot be entirely addressed through design, management or mitigation measures.

The Project Site:

- 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.

The Project Site is located outside areas of major flood hazard. As outlined in **Section 6.7.3**, the Project Site was also found to present a low risk of flooding under both the existing and climate change conditions modelled.

The Project Site is identified as bushfire prone land by the NSW Rural Fire Service (RFS) bushfire prone land mapping (RFS, 2021). As outlined in **Section 6.9.4**, the Project Site will be appropriately maintained over the life of the Project 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 assessment have been undertaken of risks and hazards associated with the Project, including:

- aviation safety
- telecommunications
- electric and magnetic field (EMF)
- battery storage
- blade throw
- pipelines.

Where a hazard or risk was unable to be avoided entirely, SQE 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 (DPE, 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, 2016a) 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).

As part of the cumulative impact assessment process a review of other projects (existing and proposed renewable projects and other major developments) within the region was undertaken. There is a total of 31 renewable, infrastructure and other major projects, including the CWO REZ transmission line project, within or in the vicinity of the REZ (extending up to approximately 75 km from the Project Site). Of the 31 projects 14 are approved and 17 are proposed (refer to **Table 2.1**). **Figure 2.7** shows relevant approved and proposed projects in the vicinity of the Project Site.

**Table 2.1 Major Projects Surrounding the Project Site**

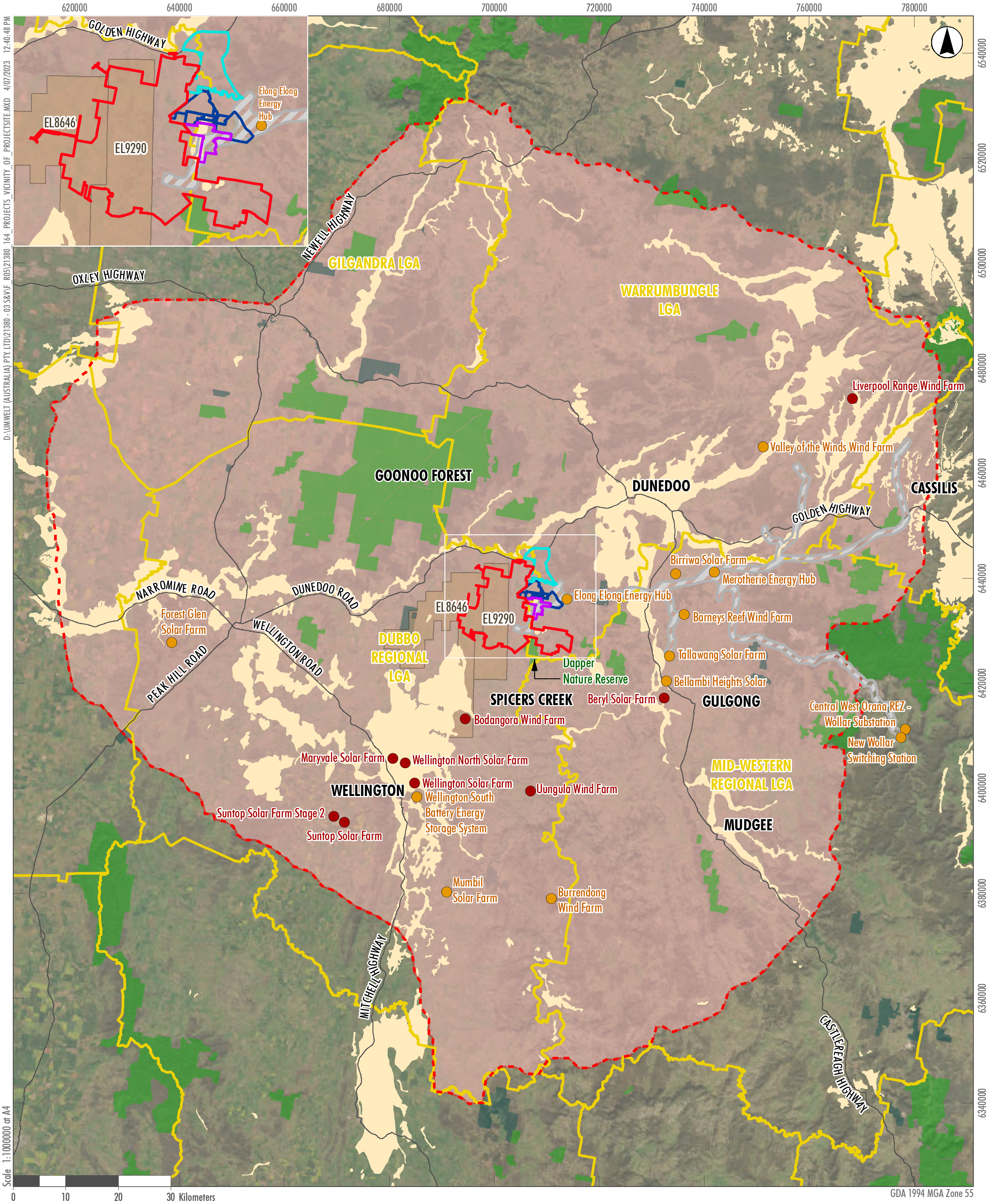
| Project | Status | Generation Capacity (MW) | Construction Start Date/Potential Construction Start Date | Approximate Distance from Project Site (km) |
|---|---|---|---|---|
| Beryl Solar Farm | Approved | 87 | Operating | 19 |
| Bodangora Wind Farm | Approved | 113 | Operating | 14 |
| Dubbo Project (formerly known as the Dubbo Zirconia Mine) Modification 1 | Approved | N/A | No construction required | 42 |
| Dubbo Quarry Continuation Project | Approved | N/A | Unknown | 33.5 |
| Dunedoo Solar Farm | Approved | 55 | Unknown | 23 |
| Liverpool Range Wind Farm | Approved | 960 | Unknown | 75 |
| Maryvale Solar Farm | Approved | 125 | 2023/24 | 27 |
| Stubbo Solar Farm | Approved | 400 | 2023 | 26 |
| Suntop Solar Farm | Approved | 189 | Operating | 42 |
| Uungula Wind Farm* | Approved | 400 | 2023 | 31 |
| Wellington Solar Farm | Approved | 174 | Commence in 2019 | 30 |
| Wellington North Solar Farm | Approved | 300 | Unknown | 27 |
| Wollar Solar Farm | Approved | 290 | Commenced in 2022 | 66 |
| Forest Glen Solar Farm | Approved | 110 | 2023 | 53 |
| Apsley Battery Energy Storage System | Proposed | N/A | 2024 | 42 |
| Barneys Reef Wind Farm | Proposed | 350 | Unknown | 18 |
| Bellambi Heights Solar | Proposed | 200 | Unknown | 19.5 |

| Project | Status | Generation Capacity (MW) | Construction Start Date/Potential Construction Start Date | Approximate Distance from Project Site (km) |
|---|---|---|---|---|
| Birriwa Solar Farm | Proposed | 600 | Unknown | 25 |
| Burrendong Wind Farm | Proposed | 400 | Unknown | 47 |
| Central West Orana REZ – Transmission Line and associated Elong Elong and Merotherie Energy Hubs | Proposed | N/A | 2024 | Adjacent to and overlapping the Project Site |
| Central West Orana REZ – Wollar Substation | Proposed | N/A | 2023/24 | 66 |
| Cobbora Solar Farm | Proposed | 700 | 2023 | Adjacent to the Project Site |
| Dapper Solar Farm | Proposed | 300 | 2025 | Adjacent to the Project Site |
| Dubbo Firming Power Station | Proposed | 77.5 | 2023/24 | 36 |
| Mumbil Solar Farm | Proposed | 150 | Unknown | 48 |
| Orana Battery Energy Storage System | Proposed | N/A | 2023 | 28 |
| Sandy Creek Solar Farm | Proposed | 840 | Unknown | Adjacent to the Project Site |
| Suntop Solar Farm Battery Storage System | Proposed | N/A | Unknown | 44 |
| Tallawang Solar Farm | Proposed | 500 | Unknown | 18.5 |
| Valley of the Winds Wind Farm | Proposed | 800 | Unknown | 52 |
| Wellington South Battery Energy Storage System | Proposed | N/A | 2023 | 31.5 |

* *SQE owned.*

SQE also owns and operates Crudine Ridge Wind Farm south of Mudgee which is 134 MW and approximately 92 km from the Project Site and outside of the CWO REZ boundary.

Detailed cumulative assessments for relevant environmental and social aspects have been undertaken for the Project including in each of the relevant technical studies. Assessment outcomes are provided in throughout **Section 6.0** where relevant, with a summary of findings provided in **Section 6.15**.




Legend

- Project Site
- Central-West Orana Renewable Energy Zone
- EnergyCo Indicative REZ Transmission Corridor
- Approved Renewable Project
- Proposed Renewable Project
- Dapper Solar Farm Boundary
- Cobbora Solar Farm Boundary
- Sandy Creek Solar Farm Boundary
- Biophysical Strategic Agricultural Land
- Mining Titles
- Local Government Area
- State Forest
- NPWS Estate
- Road

FIGURE 2.7

Approved and Proposed Projects in the vicinity of the Project Site

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

## 2.5 Project Related Agreements and Benefit Sharing

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

### 2.5.1 Host Agreements

Host landholders will receive annual lease payments to host wind farm infrastructure. These payments are confidential between SQE and host landowners and address the Project related impacts on these land holdings and dwellings. There are 28 Host Agreements currently in place for the Project. It is noted that some host landholders require more than one agreement for their landholding. Host landowners will continue to undertake agricultural activities on their land excluding the specific areas hosting infrastructure and some disruption during construction work on each individual farm. The impacts of the Project on these dwellings, whilst noted in some of the technical assessments as relevant, are addressed by the agreements in place. Host landowners are considered associated landholders.

### 2.5.2 Neighbour Agreements

In addition to Host Agreements, SQE has 28 Neighbour Agreements (44 dwellings) in place with neighbouring landowners (also 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 SQE and the relevant landholder. The impacts of the Project on these dwellings, whilst noted in the technical assessments as relevant, are addressed by the agreements in place.

### 2.5.3 Planning Agreements

SQE is committed to entering into planning agreements for the Project with Dubbo Regional and Warrumbungle Shire Councils. There has been strong feedback received from the community to date regarding the need to ensure that funds provided to Councils are channelled back to the community within the vicinity of the Project.

SQE has been working with the Councils on the proposed terms of the planning agreements. The total value of the planning agreement will be 1.5% of the Capital Investment Value (CIV) of the Project as approved and committed to for construction by SQE. Division of the funds will be between Dubbo Regional and Warrumbungle Shire Councils based on an agreed proportion, for example the number of WTGs within each LGA.

Dubbo Regional Council has a Renewable Energy Benefit Framework (DRC, 2022) endorsed by Council on 8 December 2022 for large scale wind and solar developments. The Framework outlines the legislation, purpose, community benefit objectives, funding targets and use of funds for community benefits. SQE has offered to enter into a planning agreement with Dubbo Regional Council for the Project consistent with their Framework. On 27 April 2023, Dubbo Regional Council agreed to the key terms of the proposed planning agreement for the Project which is based on a share of the 1.5% of the CIV as approved and committed to for construction by SQE. The planning agreement involves annual funding, from the start of construction, for local projects in the area such as infrastructure projects, including local roads, and for other public purposes and community benefits.

Similarly, SQE is continuing to work closely with Warrumbungle Shire Council on a planning agreement for the Project which reflects community feedback, Council objectives and aligns with the Renewable Energy Benefit Policy (WSC, 2023) endorsed by Council on 18 May 2023.

### 2.5.4 Community Benefit Sharing

SQE is committed to being a positive contributor to the communities where it works and share the benefits of its projects by supporting communities over the long term. SQE does this on its projects through a range of opportunities such as co-investment, planning agreements with local government which often include a community benefit fund component, community sponsorships and grant initiatives, and other regional benefit initiatives.

SQE recognises that each community is different and through partnerships with Councils and local groups, and consultation with the community, it aims to tailor benefits at each project and make a positive lasting contribution to each region. The initiatives that SQE is proposing developing for the Project are discussed below.

**Co-Investment Program**

A Co-Investment Program is currently being considered for the Project. Such a program would allow members of the local community to invest in the Project and potentially benefit from financial returns on their investment through the operation of the Project.

**Telecommunication Upgrades**

SQE recognises that internet and phone connectivity is considered an essential service and that many community members around the Project have indicated that improved connectivity would be tremendously valuable. Although telecommunication is not its core business, SQE is committed to investigating options which may assist to improve connectivity both for their projects as well as the local and regional community.

Following preliminary technical investigation in 2022, a technology was selected for pilot testing for the Project Site, commencing in February 2023 for approximately two months, with equipment housed at two locations. The strength of the Wi-Fi reception (internet and mobile calls using Wi-Fi) was monitored remotely. Feedback has also been sought from landowners as to any improvements in internet connectivity during the trial.

The results of the pilot are being considered and used to determine the next steps and feasibility of larger scale implementation.

**Community Sponsorship Program**

The Spicers Creek Wind Farm community sponsorship program launched in July 2021. The aim of the program is to provide funding or in-kind support to local community organisations and/or community-based activities, events and initiatives. To date, CWPR/SQE have donated $56,300 to local community initiatives, including:

- assisting the Goolma Amenities Committee with contributing to a new ride-on mower to maintain community grounds
- supporting Geurie Lions Club with new catering van equipment and signwriting

- contributing to the refurbishment of the Spicers Creek Community Church building
- upgrades to Dunedoo Sports Club amenities
- sponsorship of the 2022 and 2023 Tunes on the Turf Community Event in Dunedoo
- sponsoring the Gollan Hall Christmas function in 2021 and 2022
- contributing to Goolma Cricket Club player uniforms
- contributing to the Wellington Golf Club end of 2022 function
- contributing to Gulgong Fishing Club to stock Macquarie River
- sponsorship of the Geurie Goats Rugby Club to support mental health awareness
- contribution to the Art for Youth event at Dunedoo Central School.

As outlined in **Section 6.11**, SQE is committed to the ongoing support of the local community through Project related agreements and benefit sharing initiatives for the Spicers Creek Wind Farm.

### 2.5.5 Regional Economic Development

SQE recognises that economic development in the regions in which it operates is vital. Regions vary significantly in population, history, cultural diversity, geography, climate and resources. These combine to create a distinct set of characteristics in each region that requires an approach that recognises the uniqueness of a region and tailors initiatives. Accordingly, SQE recognises that a 'one-size-fits-all' approach is not appropriate.

SQE has an objective to ensure that the economic development catalysed by SQE's investments in renewable energy are evident in-situ, within the communities and economies which host them. To achieve this, SQE considers that the impacts and benefits must be managed and driven locally and the legacy tangible.

The key principles of SQE's economic development approach that will be applied to the Project includes:

- Human capital – a focus on education, skills and employment with particular focus on equitable First Nations and underrepresented group participation.
- Environmental and social sustainability and population – includes improving the environment for future generations as well as efforts to ease the transition of workers into a low unemployment region in a way to maintain cohesion, create new job opportunities, new skills, accommodation services, local education, business and training opportunities.
- Regional business competitiveness – aims to support improving the capacity of regional small and medium enterprises (SMEs), encouraging scaled business practices and providing SMEs and business start-ups with access to shared resources leading to building regional business competitiveness.
- Collaboration with government – effective cross-sector and intergovernmental place-based approaches through formal and informal co-operation between stakeholders can help deliver on shared priorities. This encompasses partnership building and the co-ordination of activities between SQE's commercial interests, balanced with essential social licence and working collaboratively within government frameworks.

SQE propose to meet the key principles outlined above for the Project through a number of initiatives, including:

- A dedicated Regional Economic Lead, based in the CWO region with the aim to achieve increased skills, training, employment and business opportunities for First Nations peoples and communities.
- A commitment to providing education and training opportunity initiatives in the CWO region.
- Implementation of programs to prioritise local employment opportunities and the use of local suppliers.
- Working alongside local and regional communities in preparation for the shared co-design of region-specific Aboriginal Participation Plans.
- Along with the CWO REZ Aboriginal Working Group and the Wellington Aboriginal Action Panel, SQE has committed to use best efforts to work together to ensure that every reasonable opportunity is afforded Aboriginal peoples, businesses, and communities to share and participate in the economic opportunities that present through the construction, operation and maintenance of the Project.

Further details are discussed in **Section 6.11** and **Section 6.12**.

## 2.6 Alternatives

During the planning and design phase of the Project, a range of alternatives were considered by SQE 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.

**Do Nothing Option**

The Project Site is currently used primarily for livestock grazing. The ‘do nothing option’ would allow for the continued use of the whole Project Site 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 sharing 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 CWO REZ as an area suitable for renewable energy projects and has identified the need for this area provide a certain energy generation output, should this Project not proceed, an alternative project would need to proceed within the CWO 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. SQE proposes to proceed with the Project subject to obtaining approval.

**Alternate Site Locations**

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

CWPR (now SQE) identified the Spicers Creek area as having potential for a wind farm development in 2018, prior to the designation of the CWO REZ. At the time, the main constraint was the proximity to the existing transmission infrastructure. Consultation with potential host and associated landholders started in September 2019 via phone calls and face to face meetings conducted by then CWPR (now SQE) employees. Wind monitoring commenced on site in March 2020, to further understand the local wind resource and assess the feasibility of the Project.

Prior to settling on the Project Site, a broader area was investigated, including to the south of Gollan Road. Based on community feedback obtained through ongoing discussions and a Community Drop-In Session in May 2021, as well as a range of feasibility investigations (biodiversity, transportation routes, visual analysis, and civil engineering constraints), this area is not currently being considered.

**Site Selection and Alternate Project Layouts**

During the development of the design of the Project, SQE considered feedback from the community and other stakeholders along with the environmental, cultural and social values of the locality in order to minimise the potential environmental and social impacts of the Project.

The current Project Site with indicative WTG placement and infrastructure design has been informed by discussions with landowners and neighbours, and subject to a number of iterations to incorporate feedback. Where landowners did not wish to be involved in the Project, these areas have been removed from the currently proposed Project layout and a buffer area applied.

The Project Site was selected due to its suitability for a wind farm and the limited environmental and social constraints identified in the initial studies. In designing and assessing the potential impacts of the Project, the following design hierarchy was adopted:

- Avoid – in the first instance, all efforts were made to avoid potential environmental, cultural and social impacts.
- Minimise – where potential impacts could not be avoided, design principles sought to minimise impacts, as far as feasibly practicable.
- Mitigate – mitigation strategies have been identified and will be implemented to manage the extent and severity of the remaining impacts.
- Offset – environmental offsets are only used following all efforts to first avoid, minimise and mitigate impacts.

In addition, the following specific principles were adopted:

- Minimise vegetation clearing – areas of high conservation value and/or native vegetation were strategically avoided from the beginning of the Project design. Regional vegetation mapping was integrated into SQE's model for wind turbine placement to focus on avoiding high and medium value vegetation, woodland areas and areas of threatened ecological communities. As biodiversity fieldwork progressed and a more detailed understanding of the biodiversity values of the Project Site became available, further design adjustments were made to minimise disturbance.
- Minimise land disturbance – design footprints for WTG hardstands, site compounds, substations and ancillary infrastructure were limited to the minimum area required.
- Protect functional riparian zones – higher order (as per Strahler stream ordering) riparian zones were excluded from the developable area (noting that stream crossings for access are required).
- Use previously disturbed land – as much as possible the Project was located on land previously cleared or modified by agricultural development, in consultation with the landowners.
- Protect cultural heritage values – through the identification and evaluation of cultural heritage values at the Project Site.
- Protect agricultural values – the iterative design process has considered and addressed, as far as practicable, landowner feedback on agricultural values and land use. SQE's design objective was to maintain the existing agricultural values, with negotiated leases to offset forgone landholder income while providing diversified income streams for the duration of the Project.
- Minimise direct and indirect impacts – as far as practicable, infrastructure has been located away from nearby residences and adjoining properties.
- Adopt a flexible approach to design – the Project design has been iterative and has progressively responded to identified environmental, cultural and social impacts and constraints. This process will continue through the detailed design process for the Project.

The Project design evolution has included material impact minimisation steps to account for feedback received during discussions with stakeholders, and as knowledge of the Project Site and constraints has increased.

CWPR (now SQE) has worked with the local community since 2019 and has been proactive in responding to community feedback. Before presenting the initial proposed wind farm layout, a Community Drop-In Session was held in May 2021 to hear community perspectives about a wind farm in the area and gather feedback. The investigation area discussed at the Community Drop-In Session is shown in Figure 1 in **Appendix 3**.

Feasibility investigations for the Project including biodiversity, transportation routes and civil and electrical design studies also provided input into the design process. Based on the outcome of these studies and ongoing community feedback to shape the Project layout, in August 2021 it was decided to locate the Project on the northern side of Gollan Road, within the area bounded by the Golden Highway to the north, Saxa Road to the west and the electricity transmission corridor being assessed by Transgrid (at the time) to the east.

Based on the information obtained to that point, in September 2021 the Project layout consisted of 138 WTGs (refer to Figure 2 in **Appendix 3**). Following detailed discussions with potential host landowners, the Project layout was reduced to 126 WTGs in December 2021 (refer to Figure 3 in **Appendix 3**). This revised layout was then discussed with neighbours to the Project with WTGs within 5.9 km from their residence. As a result of neighbour feedback, a further four WTGs were removed in January 2022 (refer to Figure 4 in **Appendix 3**), followed by a further five WTGs in May 2022, bringing the total WTGs in the layout to 117 (refer to Figure 5 in **Appendix 3**). Throughout this process, adjustments were made to the civil and electrical design of the Project, as well as minor WTG placement refinements to take account of further detailed host landowner feedback, as well as constructability and engineering considerations.

The key stages of the evolution of the Project layout over time is shown in **Appendix 3** (Figure 1 to Figure 7) and summarised in **Table 2.2** below.

**Table 2.2 Project Site and Development Footprint Evolution**

| Timeline | Key Design Iterations | Comments/Mitigation |
|---|---|---|
| **May 2021 (Figure 1 in Appendix 3)** | Investigation Area | General area under investigation for the wind farm when the Project was publicly announced, including areas on the southern side of Gollan Road and further east than is now proposed. |
| **September 2021 (Figure 2 in Appendix 3)** | Up to 138 WTGs under consideration | Site refined through wind resource assessment, preliminary constraint assessments (biodiversity, transport routes and civil and electrical design) and community feedback. Investigation area refined to focus on the northern side of Gollan Road. |
| **December 2021 (Figure 3 in Appendix 3)** | Up to 126 WTGs under consideration | Removal of a net of twelve WTGs to reduce visual impact based on host landowner feedback. |
| **January 2022 (Figure 4 of Appendix 3)** | Up to 122 WTGs under consideration (Project option proposed in the Scoping Report (Umwelt, 2022)) | Removal of a further four WTGs to reduce visual impact based on neighbouring landowner feedback. |

| Timeline | Key Design Iterations | Comments/Mitigation |
|---|---|---|
| **May 2022** **(Figure 5 of Appendix 3)** | Up to 117 WTGs proposed | Further consideration of preliminary noise results and neighbour consultation resulting in removal of a further five WTGs, associated access tracks and electrical infrastructure. Adjustment of some WTG positions due to engineering considerations. Civil and electrical design adjustments made to further avoid vegetated areas based on biodiversity survey results. The Development Footprint and Development Corridor buffers were adjusted accordingly. |
| **July 2022** **(Figure 6 of Appendix 3)** | Up to 117 WTGs proposed | Fine tuning of layout with some WTGs and access tracks moved based on host landowner feedback to align with existing farming land use. |
| **September 2022** **(Figure 7 of Appendix 3)** | Up to 117 WTGs proposed (the Project as defined in this EIS) | Refinements based on wind resource assessment and further host landowner consultation resulting in iterative fine tuning (small adjustments to some WTG locations and location of access tracks). Minor Development Footprint and Development Corridor adjustments. |

## 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, SQE 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 CWO 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 and Infrastructure Road Map (NSW Government, 2020), in aiming to provide large-scale renewable electricity generation that is affordable and reliable. With a proposed capacity of approximately 700 megawatts (MW) and the potential to power approximately 397,000 homes, the Project will make a material contribution to the planned energy generation capacity for the CWO REZ.

The Project will also contribute significant capital investment within the CWO 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 planning agreements with local Councils and the Community Benefit Sharing Program(refer to **Section 2.5** for further details).

SQE has refined the Project based on feedback received from relevant stakeholders throughout its development, as outlined in **Section 2.6**. SQE 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, SQE 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 achieving the target of at least 3 GW of renewable energy generation from the CWO REZ.

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

- Infrastructure investment of approximately $2 billion.
- Creation of 320 direct full time equivalent (FTE) positions (additional 520 indirect employment) on average during the construction phase and 12 full time equivalent positions (additional 35 indirect employment) during the 30-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, resulting in financial contributions to the local community.
- Local community benefits through the implementation of a benefit sharing program (including planning agreements, community sponsorships, co-investment program, telecommunication improvements) 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 CWO 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 SQE 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.

# 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 and decommissioning of up to 117 WTGs, battery storage, ancillary infrastructure and temporary facilities.

The Project is designed to accommodate a contemporary WTG up to 256 m in height, with a capacity of approximately 6 MW or greater. The Project is planned to have an installed generation capacity of approximately 700 MW. The Project is planned to connect to the proposed CWO REZ transmission line which is a Critical State Significant Infrastructure (CSSI) project and is subject to approval by the NSW Minister for Planning (EnergyCo, 2022a). The inclusion of the proposed battery storage will allow for the Project to store and dispatch scheduled and reliable energy to and from the Project and the NEM.

A peak of approximately 590 FTE employees will be required during the approximately three-year construction phase, requiring local services and amenities. Twelve (12) FTE employees would be required during the 30-year operational life of the Project, typically utilising local professionals or professionals relocating to the region to fill these roles.

A summary of the key Project elements is provided in **Table 3.1**.

**Table 3.1 Project Overview**

| Project Element | Summary of the Project |
|---|---|
| Life of Project | 30 years |
| Project Site | Approximately 17,731 ha, as shown on **Figure 1.3** |
| Development Corridor | Approximately 5,544 ha, as shown on **Figure 1.3** |
| Development Footprint (subset of Development Corridor) | Approximately 1,520 ha, as shown on **Figure 1.3** |
| WTGs | 117 WTGs (3 blade) with a tip height of up to 256 m |
| Battery Storage | Battery storage facility (400 MW, up to 1,800 MWh of storage) |
| Ancillary Infrastructure | Ancillary infrastructure for the Project includes, but is not limited to:<br>• substations<br>• switching stations<br>• permanent offices and site compounds<br>• underground and overhead electricity transmission lines<br>• wind monitoring masts<br>• permanent meteorological masts<br>• communication facilities and cables (includes control cables and earthing) |

| Project Element | Summary of the Project |
|---|---|
| | • water storage tanks<br>• hardstands<br>• internal roads. |
| Temporary Construction Facilities | Temporary construction facilities include, but are not limited to:<br>• concrete batching plants<br>• crushing and screening plant<br>• site compounds and offices<br>• stockpiles and material storage compounds<br>• temporary field laydown areas<br>• temporary meteorological masts. |
| Generating Capacity | 700 MW |
| Project Site Access | Two main site entry locations:<br>• Sweeneys Lane (accessed directly off the Golden Highway).<br>• Tallawonga Road (accessed from the Golden Highway followed by Saxa Road).<br>Secondary intersections and cross-over locations on Gollan Road. |
| Construction Workforce | Peak of approximately 590 FTE positions (estimated average 323 FTE positions over the duration of construction) |
| Operational Workforce | 12 FTE positions |
| Operational Hours | 24 hours, 7 days per week |
| Construction Hours of Operation | Standard hours during construction and decommissioning 7:00 am to 6:00 pm Monday to Friday, and 8:00 am to 1:00 pm Saturday.<br>Works may be undertaken outside these hours where the activity is inaudible, for emergency works or time critical delivery of materials. |
| Construction Timeframe | Approximately 40 months |
| Capital Investment | Approximately $2 billion |

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

## 3.2 Project Site

The Project Site is situated predominantly within the Dubbo Regional Council LGA and partly in the Warrumbungle Shire Council LGA (refer to **Figure 1.2**) in the NSW State electorates of Dubbo and Barwon. The Project Site encompasses the State suburbs of Elong Elong, Goolma, Gollan and Dunedoo.

The Project Site covers an area of approximately 17,731 ha. Within the Project Site, a Development Footprint has been determined which includes all Project elements and temporary disturbance areas. The Development Footprint has been established in consideration of environmental, social and engineering constraints in the immediate vicinity of the Project, including:

- Dapper Nature Reserve
- areas of mapped BSAL
- biodiversity impacts including threatened ecological communities (TECs) and areas of remnant woodland vegetation
- heritage sites
- waterways
- potential visual impacts
- slope and constructability constraints
- landowner's ongoing usage requirements
- Crown land
- Fresnel zones[1], in relation to communication links.

The Development Footprint will be refined during detailed design following development consent, should the Project be approved. To provide confidence that all land potentially impacted by the Project is assessed in this EIS, a buffer area of approximately 100 m has been created around the Development Footprint to provide a Development Corridor (refer to **Figure 1.3**).

The Development Corridor and Development Footprint cover approximately 5,544 ha and 1,520 ha in area, respectively. To optimise the construction and operation of the Project, flexibility is required to allow for micro-siting the Project layout and associated Development Footprint within the broader Development Corridor that has been assessed in this EIS. This includes micro-siting of the WTGs to within 100 m of the locations proposed in this EIS and micro-siting of site infrastructure during the detailed design and construction process. The Project therefore seeks approval to locate the Development Footprint anywhere 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 Site, concept road upgrade designs have been created for the proposed local road intersection upgrade works (refer to **Section 3.3.4.10**) and the disturbance associated with these works have also been considered in this EIS.

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[1] Fresnel zones define an envelope of influence along the length of a communication link ray line, whereby a rotating wind turbine could adversely impact the signal.

## 3.3 Project Layout and Design

The key Project elements are summarised in **Table 3.2**, with descriptions including key mitigation measures built into the design provided in **Section 3.3.1** to **Section 3.3.8**.

The Project seeks flexibility to refine the final layout and details of infrastructure and elements to be installed or constructed (e.g. WTG model, battery storage technology), during the detailed design process, to be undertaken post-approval and finalised prior to the commencement of construction. This 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 3.2 Key Project Elements

| Project Element(s)/Infrastructure | Approximate Dimensions | Quantity | Location | Comments |
|---|---|---|---|---|
| **Temporary (Construction) Facilities** | | | | |
| Site compounds, which may include:<br>• Site office and compound.<br>• Rock crushing facilities.<br>• Concrete batching plants.<br>• Stockpiles and materials storage compounds.<br>• Temporary field laydown areas. | Overall dimensions approximately 200 m x 100 m | 15 | Refer to **Figure 1.3** | Following the completion of construction, an approximate area of 100 m x 100 m will be retained as O&M compound. Other areas will be progressively rehabilitated following completion of construction. |
| Temporary Meteorological Masts | Height: up to 170 m | 4 | Located near future WTG | The temporary meteorological masts will be replaced with WTGs as construction progresses. |
| Minor 'Work Front' Access Roads | To be located as required within the Disturbance Footprint<br>Average Pavement Width: 6 m (note does not include batters and drainage structures) | N/A | To be determined during construction. | Roads not required for operation would be rehabilitated following completion of construction. |
| **Permanent (Operation) Facilities** | | | | |
| Wind Turbine Generators (WTGs) | Height: up to 256 m<br>Rotor diameter: up to 172 m<br>Uppermost blade tip: 256 m<br>Lowermost blade tip: approximately 50 m<br>Tower (hub) height: 170 m<br>Foundations (excavation size): approximately 30 m x 30 m | 117 | Refer to **Figure 1.3**<br>SQE will micro-site WTGs within 100 m of the indicated locations. | Parameters specified are upper limits. Specifications will be subject to further design and availability. |
| Hardstands (adjacent to WTGs) | Approximately 70 m x 75 m | 117 | Refer to **Figure 1.3** | - |

| Project Element(s)/Infrastructure | Approximate Dimensions | Quantity | Location | Comments |
|---|---|---|---|---|
| Internal Roads and Drainage | Total Length: approximately 165 km<br>Average Pavement Width: 6 m (note does not include batters and drainage structures) | N/A | Refer to **Figure 1.3** | - |
| Electrical Plant Compound (including battery storage) | Approximately 180 m x 525 m or approximately 485 m x 295 m | 2 | Refer to **Figure 1.3** | One battery storage facility at either location. |
| Substations | Approximately 250 m x 250 m | Up to 3 | Refer to **Figure 1.3** | - |
| Operations and Maintenance (O&M) Compound | Approximately 100 m x 100 m | Up to 2 | Refer to **Figure 1.3** | - |
| Overhead transmission lines (medium to low voltage) | Approximately 50 km internal overhead cables of easement width approximately 20 m. | N/A | Refer to **Figure 1.3** | - |
| Underground transmission cables (medium to low voltage) | Approximately 225 km | N/A | Refer to **Figure 1.3** | - |
| Permanent Meteorological Masts | Height: Up to 200 m | 4 [2] | Refer to **Figure 1.3** | - |
| **Ancillary Infrastructure** | | | | |
| External Road Upgrades, including for oversize vehicles | Refer to **Section 3.3.4.10.** | N/A | | - |

[2] Final quantity subject to AEMO requirements relative to final to-be-constructed wind farm layout.

## 3.3.1 Temporary Construction Facilities and Activities

Temporary construction facilities will consist of:

- site offices and compounds
- rock crushing facilities
- concrete batching plants
- stockpiles
- materials storage compounds
- field laydown areas
- minor 'work front' construction access roads
- meteorological masts.

These temporary construction facilities are described in the following subsections.

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.).

SQE will also undertake geotechnical investigations as part of the construction of the Project. These works will occur throughout the Development Corridor as required to inform detailed design and construction activities.

### 3.3.1.1 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. These facilities will typically occupy an area of approximately 200 m by 100 m. Arrangements will be made for power and communications connections to the site offices during the construction period. During construction, sewage will be managed through temporary pump out systems. For permanent O&M facilities, there will be appropriate onsite systems in accordance with Council requirements.

Temporary construction compounds will be typical of that used at construction sites; noting they will not include accommodation facilities. Indicative locations for construction compounds have been identified in **Figure 1.3** as Site Compounds. 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 will be within the Development Corridor.

Temporary site office facilities will occupy an area of approximately 75 by 75 m located within the Development Footprint. An indicative layout is shown in **Figure 3.1**.

An area approximately 100 m by 100 m of the temporary construction compounds will be retained for permanent use during the life of the Project as operations and maintenance compounds.

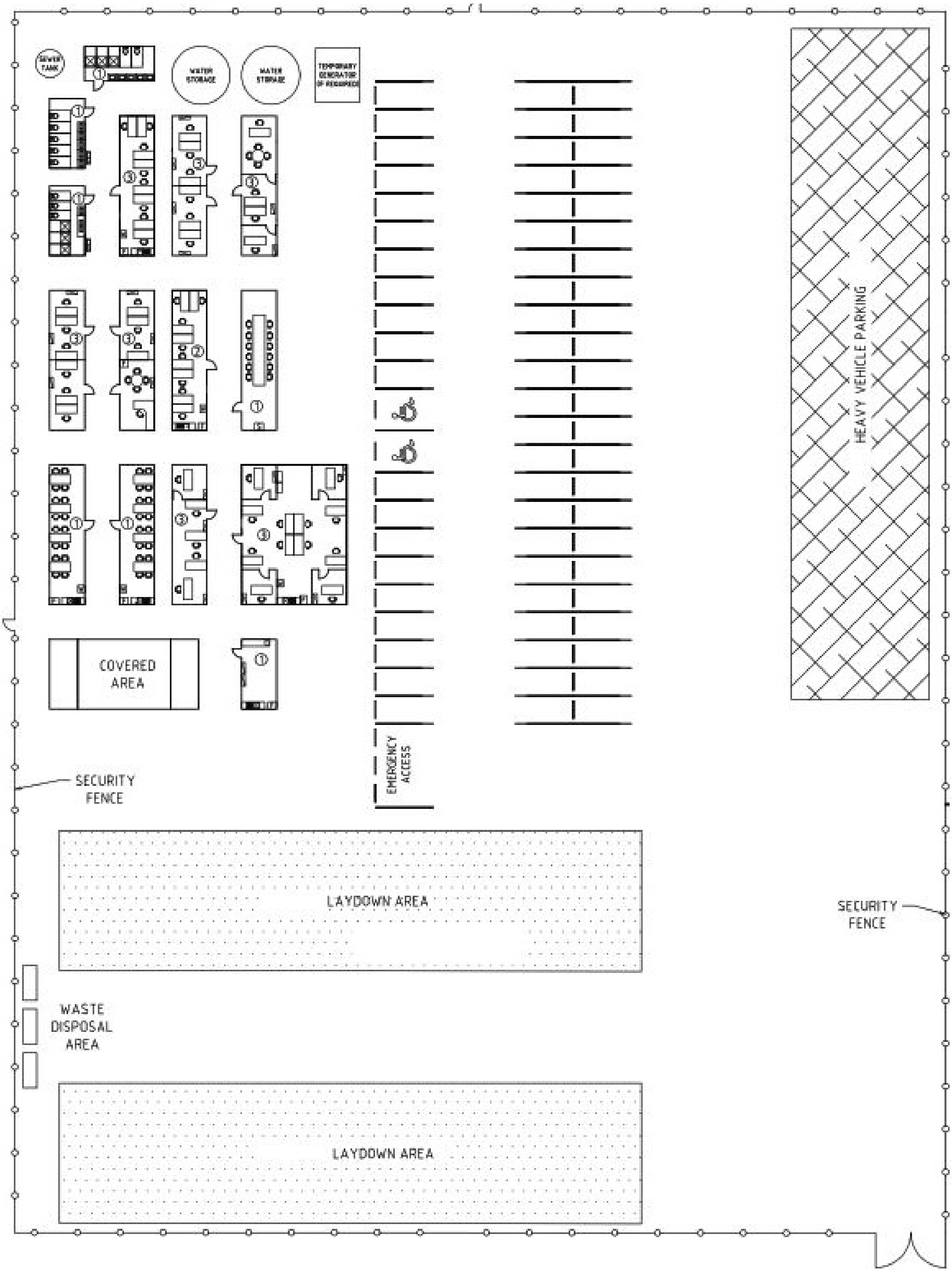



**Figure 3.1 Indicative concept for wind farm temporary construction site offices and compounds**

Approval is also sought for temporary construction office facilities associated with the site entry points and substations 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.

#### 3.3.1.2 Rock Crushing and Concrete Batching Plants

Temporary rock crushing facilities and concrete batching plants are proposed to process excavated material for the WTG foundations, electrical infrastructure and internal roads (and other construction needs) and to product concrete for Project construction activities including WTG foundations.

A typical on-site concrete batching facility would occupy an area of approximately 100 m by 100 m 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 occupy an area of approximately 50 m by 100 m and 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 are for materials for five days batching/crushing.

Suitable locations for such facilities will be located within the Development Footprint, subject to detailed design and construction programming.

Temporary rock crushing may occur throughout the Project Site using mobile plant, if required, following excavation of rock material to reuse in the immediate area and maximise construction efficiency. Material excavated on-site for WTG and compound foundations and internal road alignments will be crushed on-site and used for road base or aggregate subject to meeting the relevant functional specifications.

#### 3.3.1.3 Stockpiles and Materials Storage Compounds

Stockpiling of materials will be undertaken to maximise construction efficiencies and minimise waste being exported from the Project Site, including excavated materials (e.g. topsoil, subsoil, rock) and gravel/roadbase. 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.

#### 3.3.1.4 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 practicable to minimise impacts, however, in some instances separate laydown areas will be required.

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

#### 3.3.1.5 Minor 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.

#### 3.3.1.6 Temporary Meteorological Masts

Four temporary meteorological masts up to a height of 170 m will be installed during the construction period to calibrate and verify the data collected from the four proposed permanent meteorological masts. The temporary meteorological masts will be installed at locations within the Development Corridor, usually (but not always) at a selection of proposed WTG sites ahead of construction. The temporary meteorological masts will require a low voltage power cable connection and a communications cable.

The temporary meteorological masts are planned to be removed when construction of the WTG at that location occurs.

### 3.3.2 Wind Turbine Generators

The Project is designed to accommodate a WTG height of up to 256 m and varying in generation capacity with a nominal capacity of 6 MW assumed for the purposes of this EIS. 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 1.3**).

The key components of a WTG are shown on **Figure 3.2** and include:

- foundations
- towers
- nacelle (hub)
- rotor
- blades
- generator transformer.

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

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

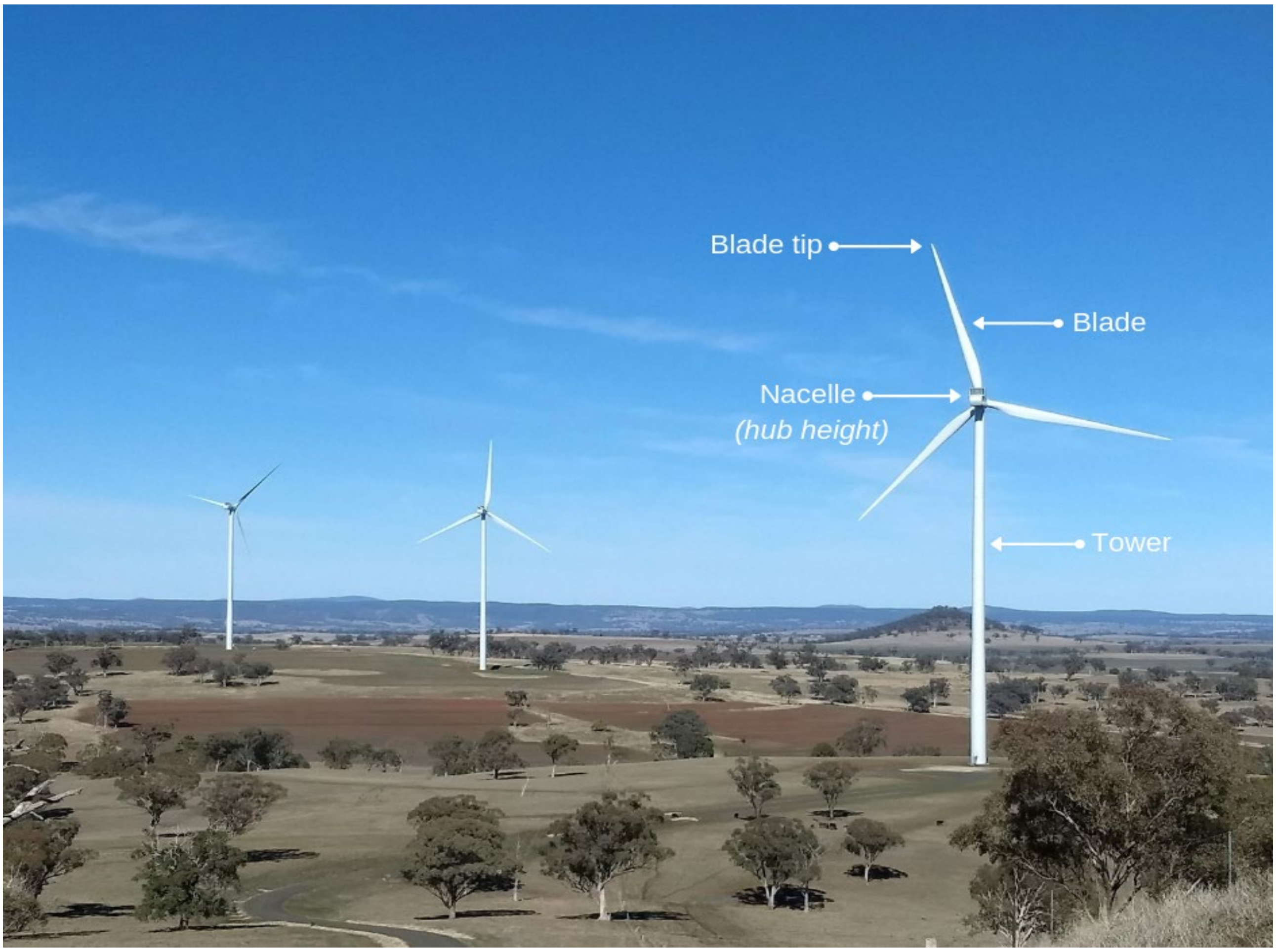



**Figure 3.2 Example Components of a WTG (Sapphire Wind Farm)**

The indicative location and height of each WTG is provided in **Appendix 4**.

#### 3.3.2.1 Foundations

Foundations for the WTGs will be either concrete slab or rock anchor, pending geotechnical investigation of the ground conditions across the Project Site. 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 30 m by 30 m to a depth of approximately 2.5 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.

#### 3.3.2.2 Towers and Nacelle

The tower structure of a WTG is typically constructed out of welded steel, 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 256 m. Atop the tower sits the nacelle to which the rotor is mounted. The Project has been designed and assessed based on a maximum hub height of 170 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 6.9.1**).

#### 3.3.2.3 Rotor

The WTG rotor comprises a central hub, which is the point of connection to the nacelle, attached to the three blades. 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 metres 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 includes designed rotors of approximately 172 m in diameter with an individual swept area of approximately 23,235 $m^2$. It is possible that larger rotors will be required depending on the specifications of blades on the market at the time of construction. If so, the selected WTGs would remain within the 256 m tip height envelope.

#### 3.3.2.4 Blades

WTG blades are typically made from fibreglass 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 single piece blade up to 86.35 m and hub section of approximately 3.3 m, that makes a rotor of 172 m in diameter.

The Project design conservatively assumes a lowermost blade clearance of 50–100 m above the ground based on a up to 172 m rotor installed on a up to 170 m tower.

### 3.3.3 Battery Storage

Battery storage is proposed as part of the Project. Storage adds significant benefits to renewable generation projects because it allows for the dispatch of energy in accordance with market demand and overcomes potential issues associated with intermittency of output. Battery storage proposed for the Project with a storage capacity of 400 MW, with up to 1,800 MWh storage capacity. Two alternative locations have been allowed for and assessed, with the preferred site to be selected during detailed design and notified to the Planning Secretary prior to the commencement of construction.

Due to consistent evolution in battery storage technology, the proposed battery type has not yet been confirmed and will be determined as part of detailed design considering the available technology at that time. Typically, battery storage installations are an area of flat ground, surfaced in road base or gravel, with battery components contained within standard sized shipping containers arranged in rows. The two potential areas of land proposed for the electricity plant compound (which will contain the battery storage) assessed for the Project are approximately 180 m by 525 m and 485 m by 295 m. A range of technologies will be considered, including:

- lithium-ion battery
- flow battery (vanadium, iron chloride, or zinc)
- compressed air.

The battery storage will be connected to the WTGs and substations via underground and/or overhead cables. It may be constructed as a stand-alone facility or as a combined facility co-located with other compounds at any or each of the locations shown on **Figure 1.3** as electrical plant compound.

### 3.3.4 Ancillary Infrastructure

#### 3.3.4.1 Substations

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 may be constructed as a stand-alone facility or as a combined facility co-located with other compounds at any or each of the locations labelled as electrical plant compound (refer to **Figure 1.3**). Substations will be located within a hardstand area of approximately 250 m by 250 m, will have a bushfire asset protection zone (APZ) and a security fence.

Emergency backup power for the substations 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 transformer(s) may each contain upwards of 50,000 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. 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.

#### 3.3.4.2 Operations and Maintenance Compound

Permanent O&M compounds will be established for the day-to-day operation of the Project and would take up an area up to approximately 100 by 100 m, at the indicative locations shown in **Figure 1.3** as 'Site Compounds'.

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 3.3** and **Figure 3.4** show an example of an O&M compound and indicative layout. The buildings of the operations compound will include office space, amenities, kitchen, communications equipment, meeting room and routine maintenance stores. The O&M compound will require a standalone power supply from either the local 11 kV distribution network, or an on-site generator.

**Figure 3.3 Example of an O&M compound and 330 kV/33 kV substation (Sapphire Wind Farm)**

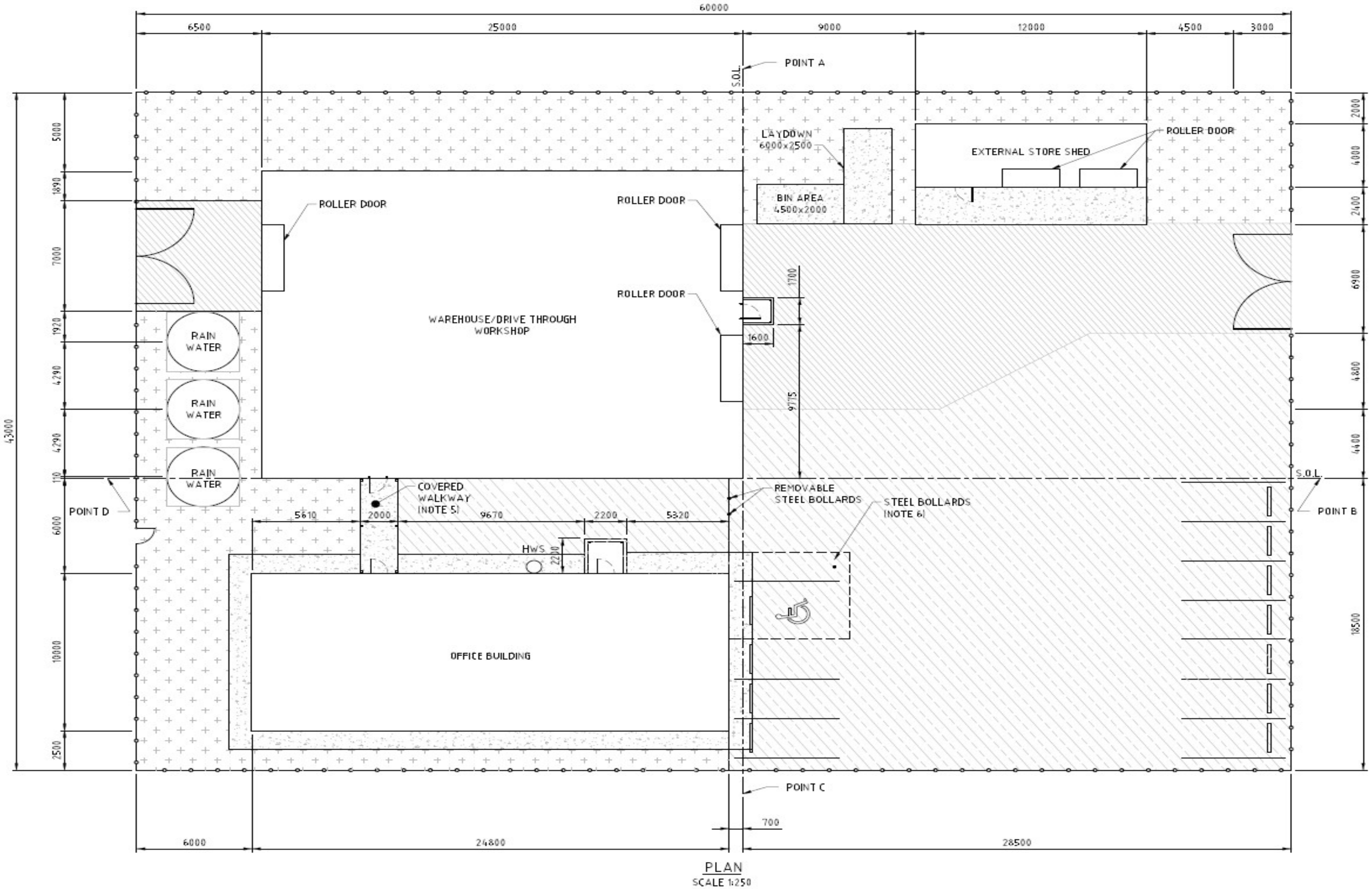



FIGURE 3.4

Typical O&M Facility Layout

### 3.3.4.3 Electrical Network and Transmission Lines

A series of underground and overground electrical network lines are proposed to deliver the electricity generated by the WTGs to the substations and ultimately to connect to the proposed transmission line being developed for the CWO REZ (refer to **Figure 1.3**). The indicative electrical layout includes both underground and overhead reticulation connecting the WTGs, the battery storage and substations to the proposed transmission line.

The internal electrical network is planned to comprise 33 kV circuits between the WTGs, the battery storage and substations. As part of the CWO REZ Transmission project, EnergyCo is seeking approval for a switching station adjacent to one of the Project substations which will then connect into the REZ 500 kV transmission line back to the proposed Elong Elong Energy Hub and to the grid (refer to **Figure 2.7**). EnergyCo's proposed switching station, Elong Elong Energy Hub and electrical distribution infrastructure does not form part of the Project.

Underground electrical network lines and control cables may be installed between the WTGs, the battery storage and the substations. Sections of the proposed overhead transmission lines may need to be placed underground subject to local conditions and conversely sections of the proposed underground transmission lines may need to be placed overhead subject to local conditions.

For the purposes of this EIS, an electrical design has been prepared which considers the worst-case transmission line impacts of the Project, being the largest likely separation distance between the substations and the existing 330 kV transmission line and therefore the longest likely 330 kV overhead easement. Similarly, the underground circuitry for the Project has been conservatively estimated with the longest likely lengths of overhead line connecting the WTG circuits to the substations.

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 lines will be up to approximately 50 m in height, with a typical design details shown in **Table 3.3**. SQE is working closely with landowners to ensure impacts of overhead transmission lines are mitigated where practicable in the Project design. **Figure 3.5** and **Figure 3.6** show the typical overhead transmission line configurations which could be constructed for the Project.

**Table 3.3 Indicative Transmission Line Specifications**

| Voltage | Approximate Easement Width | Approximate Height of Pole | Typical Span Distance (Pole to Pole) |
|---|---|---|---|
| **High voltage (HV)** | | | |
| 330 kV | 60 m | 35–50 m | 200–300 m |
| 132 kV | 45 m | 35–50 m | 200–300 m |
| **Medium Voltage (MV)** | | | |
| 66 kV | 30 m | 30 m | 150–250 m |
| 33 kV | 30 m | 20 m | 150 m |

The underground electrical cables will, where practicable, 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 according to the micro-siting criteria.

**Figure 3.5 Example of a Double-circuit overhead 33 kV transmission line**

**Figure 3.6 Example of double-circuit overhead 330 kV transmission line adjacent to a new single-pole substation tie-in**

The majority of the proposed overhead transmission line locations can be readily accessed during construction via cleared agricultural land, following negotiations with landholders. Complex line construction methods such as helicopter installation and blasting of transmission pole foundations may be required in areas of very complex terrain in some specific circumstances.

In some cases, track creation or enhancement may be required where access cannot be gained or is not considered adequate to support machinery utilised during the construction of the transmission line. A number of creek crossings may also be required to support the required machinery. Crossings not required for future maintenance activities will be decommissioned following the completion of construction works. Those that are required for ongoing use during operations will be designed and constructed in accordance with relevant guidelines.

During construction, temporary field laydown areas will be positioned along the proposed electrical network and transmission routes to store equipment such as transmission poles and conductors. No fuel, oil or chemicals will be stored at these locations.

#### 3.3.4.4 Permanent Meteorological Masts

Four permanent meteorological masts, up to the proposed hub height of the WTGs, will be installed on site. The final number of permanent meteorological masts will be subject to AEMO requirements relative to the final wind farm layout. The purpose of these masts is to aid performance monitoring of the WTGs. The permanent meteorological masts would be of a guyed, narrow lattice or tubular steel design with concrete footings with an expected maximum height of 170 m.

Locations for these masts are yet to be determined 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 meteorological 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 Site. The locations will be selected to minimise impacts including consideration of heritage, biodiversity, land use, visual and water impacts, and in consultation with the landowner.

Permanent meteorological 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.

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

#### 3.3.4.6 Hardstands

Hardstands are required adjacent to each WTG location for the assembly, erection, maintenance, and decommissioning of the WTGs. Indicative hardstand dimensions are approximately 70 m by 75 m, however, this will vary dependent on detailed design, topography, construction methods and the selected WTG model.

Hardstands will be surfaced with pavement material consistent with internal roads and be maintained throughout the construction and operational life of the Project. **Figure 3.7** shows a typical hardstand area adjacent to a WTG footing.

**Figure 3.7 Hardstand, tower footing and blade laydown area (Sapphire Wind Farm)**

#### 3.3.4.7 Internal Roads

Internal roads will be established within the Project Site for the construction, operation, and decommissioning of the Project. Internal roads have been planned to follow existing farm tracks where practicable, with new roads to be constructed where necessary. The roads will have an approximate pavement width of 6 m, plus an additional impact area associated with road drainage structures and cut and fill batters. All existing internal roads 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 Site on Project roads would be restricted from public access. The proposed indicative internal road network is approximately 165 km in length (refer to **Figure 1.3**).

Some steep sections of internal roads may need to be surfaced with asphalt to enable haulage of heavy WTG components, but generally road surfaces will be compacted crushed rock/road base. Culverts will also be required to be constructed where internal access roads cross streams. The location of the proposed waterway crossings are discussed further in **Section 6.7**.

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).
- 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 and Witheridge, 2003).

A number of creek crossings may also be required to support the required machinery access during the construction phase. Crossings not required for future operational activities will be decommissioned following the completion of construction works. Those that are required for ongoing use during operations will be designed and constructed in accordance with relevant guidelines.

There is also the potential for blasting to be required during road construction to remove areas of rock. This may also occur for other construction activities but is most likely for WTG foundations and road construction.

#### 3.3.4.8 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 may be supplied by a local 11 kV 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 to enable safe remote monitoring and control of the Project.

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

Approved septic systems or composting systems 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 Site to an approved facility (landfill, recycling etc). Waste management is described further in **Section 6.13**.

#### 3.3.4.9 Signage

Traffic signage required as part of traffic safety for the Project 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 site to the Project Site office. Additional signage would be located at or near entry points, providing information about the Project, the companies involved and essential safety information and telephone numbers.

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

#### 3.3.4.10 External Road Upgrades

Major turbine components are planned to be delivered to the Port of Newcastle and transported to the Project Site by truck via the Golden Highway. Access to the Project Site will be provided via two proposed primary site access point (refer to **Figure 3.8** and **Section 3.3.8**). The Project requires the upgrade of the following intersections:

- Golden Highway/Sweeneys Lane.
- Golden Highway/Saxa Road.
- Saxa Road/Tallawonga Road.
- Gollan Road/Binginbar Road.
- Gollan Road/Ben Hoden Road.

In March 2023, SQE were advised that upgrades to the State road network to facilitate the transport of over-size, over-mass (OSOM) components from the Port of Newcastle to the Project Site would be undertaken by the NSW government. The required works will be subject to a separate approval pathway and includes the two intersection upgrades off the Golden Highway in the vicinity of the Project:

- Golden Highway/Sweeneys Lane.
- Golden Highway/Saxa Road.

Whilst these intersection works on the State road network (being the Golden Highway intersections) will now be undertaken by the NSW Government, as the Project will use these intersections the upgrade requirements have been considered and assessed as part of this EIS.

The Project proposes the construction of an intersection with basic left (BAL) and short channelised right (CHRs) treatments providing for direct access of an intersection with basic left (BAL) and short channelised right (CHRs) treatments providing for direct access from the Golden Highway at the intersection with Sweeneys Lane. The intersection of the Golden Highway with Saxa Road only requires minor works in the road reserve to provide for swept paths. The conceptual intersection design for the intersection of the site accesses with the Golden Highway is provided in **Appendix 4**. This design will be subject to further detailed design and SQE with liaise with the NSW Government as required in relation to the requirements for the Project.

Two routes are proposed to transport turbine components to the Project Site (refer to **Figure 3.9**). Minor treatments or modifications on the public road network will be required to generate sufficient space for oversized vehicle passage to facilitate the delivery of towers, nacelles and blades, based on a 85 m blade length. The works are outlined in **Table 3.4**. As noted above, SQE is advised that this work will be subject to a separate approval and undertaken by the NSW government, however, these works have been considered in this EIS.

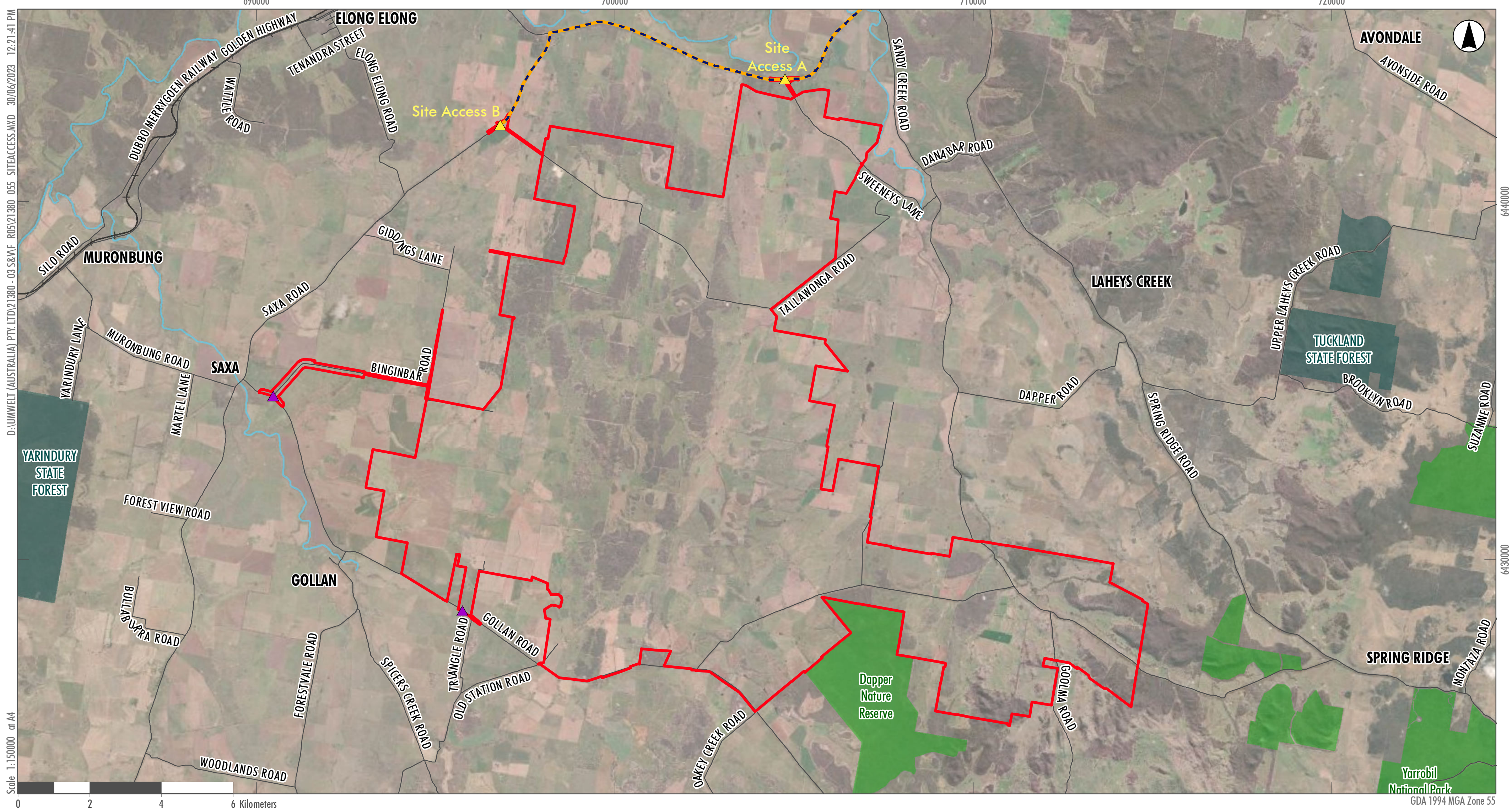
**Table 3.4 Potential OSOM Transport Route Modifications or Minor Treatments**

| Location | Works |
|---|---|
| **Mayfield #4 berth onto Selwyn Street, Mayfield** | Hardstand will need to be added to the left entry and exit of the corner. Some signs will need to be relocated and or made removable and a section of fence will need to be relocated. |
| **Selwyn Street onto Industrial Drive via George Street, Mayfield** | The first right hand turn through George Street will need a sign made removable and a disused pole on the overhang removed. The traffic lights in the centre median will need to be relocated or made to fold down. Some hardstand will need to be placed on the south side of the intersection. |
| **Industrial Drive onto Maitland Road, Mayfield** | Two signs will need to be made removable or relocated. |
| **The New England Highway onto the Golden Highway, Whittingham** | The NSW Government is currently upgrading this intersection. The intersection in its current form has a several signs that would need to be made removable, but no modifications are required on the existing corner. At this stage the data that is available for the upgrades shows that the section of road that would need to be accessed does not change considerably. The upgrade will be monitored and any changes will be reviewed. |
| **Golden Highway intersection with the Putty Road, Whittingham** | Some signs will need to be made removable. |
| **Golden Highway through Jerrys Plains village, Jerry Plains** | Some signs will need to be made removable and some hardstand added. Additionally some trees will need to be trimmed/removed. |
| **Golden Highway onto Denman Road, Denman** | The existing corner will require hardstand to be added and signs made removable. The height of the trees will need to be monitored. |
| **Golden Highway intersection with Wargundy Street, Dunedoo** | The sign on the inside of the corner will need to be relocated. The blades tail swing will need to travel over the top of the existing signals. If these signals are changed then the height will need to be rechecked. |

In addition to these physical works there will also be a number of other approvals (e.g. for rail bridge crossings) and traffic arrangements required that would be undertaken under escort or with appropriate approvals in place (e.g. crossing to the wrong side of the road to avoid obstacles).

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. As discussed above, it is noted that these works will be subject of a separate approved process facilitated by the NSW Government.

The proposed Saxa Road/Tallawonga Road, Gollan Road/Binginbar Road and Gollan Road/Ben Hoden Road intersections require minor upgrades including with BAL and basic right (BAR) treatments. These upgrades will be subject to further detailed design including further consultation with TfNSW and Dubbo Council as part of Project implementation.




Legend

- Project Site
- General Access
- OSOM Access

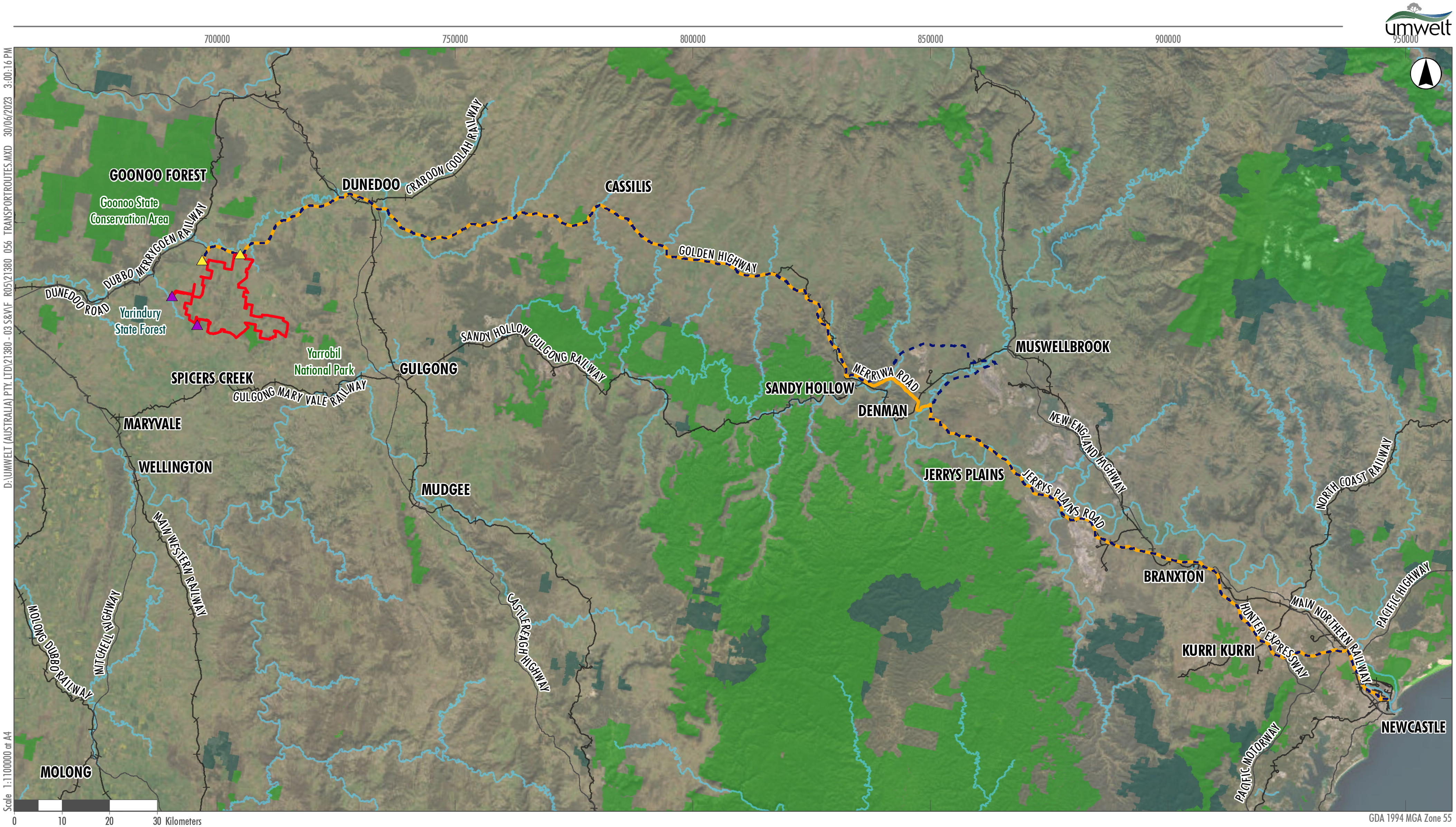
**Wind Turbine Component Road Transport Routes**

- Route 1
- Route 2 (components other than turbine blades that exceed 5.6m in overall height)
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 3.8

**Site Access**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)




Legend

Project Site
General Access
OSOM Access

Wind Turbine Component Road Transport Routes
Route 1
Route 2 (components other than turbine blades that exceed 5.6m in overall height)

State Forest
NPWS Estate
Road
Railway
Waterway

FIGURE 3.9

Road Transport Routes from Port of Newcastle

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

### 3.3.5 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 117 WTGs are proposed, commercial considerations and technological advancements may lead to fewer than 117 WTGs being constructed and operated, at the discretion of the SQE. All 117 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 SQE'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 elements 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, battery storage and electrical network design (as shown in **Figure 1.3**) because the selection of the locations of compounds and substations is subject to the post approval tender, contractor selection, optimisation, geotechnical assessment, 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 elements 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) the meteorological masts (both temporary and permanent and including the location of their power supply cables) and the temporary field laydown areas. Those will be located within the Project Site with impact minimisation guiding their placement.

#### 3.3.5.1 Micro-siting Criteria

WTGs, battery storage, 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 element. 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 meteorological masts, communication facilities and temporary field laydown areas which may be outside the Development Corridor but will remain within the Project Site)
- 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, battery storage, ancillary infrastructure or temporary facilities would not result in any non-compliance with the development consent.

### 3.3.6 Proposed Activities

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

**Table 3.5 Project Phases and Associated Activities**

| Project Phase | Proposed Activities |
|---|---|
| Pre-construction Minor Works | Surveys. |
| | Building/road dilapidation surveys. |
| | Geotechnical investigative drilling and excavation of test pits and bore holes. |
| | Minor clearing of native vegetation. |
| | Establishment of temporary site office and compounds. |
| | Installation of environmental impact mitigation measures, fencing, enabling works, meteorological masts. |
| | Heritage artefact salvage, biodiversity investigations and pre-clearing surveys, inspections, specific habitat feature removal, and relocation. |
| | Intersection and road upgrades on the public road network. |
| | Establishment of Project Site access points, minor access roads and minor adjustments to services/utilities signage, etc. |
| Construction Works | Includes all physical works to enable the operation, including, but not limited to, the construction and installation of WTGs, compounds, electrical network lines, battery storage, 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. |
| | Maintenance of land within the Development Corridor. |
| | 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 Site. |
| | If not required for ongoing farming/fire access purposes, internal roads would be removed. |

### 3.3.7 Hours of Operation

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

- 7:00 am to 6:00 pm, Monday to Friday.
- 8:00 am to 1:00 pm, Saturdays.

Works may be undertaken outside these hours where the activity is inaudible at non-associated residences, for emergency works, time critical delivery of materials, to reduce safety risks or where agreement from the Secretary of DPE has been provided. Examples of these activities include:

- **Concrete Pours:** Concrete pours are 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 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/elements 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 Site is naturally a high wind area and as such Sunday work may be needed to make up for high wind days during the week.

SQE seeks approval to undertake construction activities, including those listed above, 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 residences
- 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 or time critical work to avoid the loss of life, property and/or material harm to the environment.

## 3.3.8 Transport and Site Access

### 3.3.8.1 OSOM Vehicle Transport Route from Port of Entry

OSOM vehicle transport to the Project from the Port of Newcastle has been assessed in a route study discussed in **Section 6.7**. This assessment considers an 85 m blade, being the 'worst case' scenario for the Project. As noted above, the NSW Government has committed to undertake the necessary OSOM transport route modifications from the Port of Newcastle to the CWO REZ to provide for the development of the REZ, including this Project.

The preferred road transport route from the Port of Newcastle to the Project for all components including OSOM and standard construction vehicles that do not exceed 5.6 metres in overall height would be via:

- **Route 1:** Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway (to Dunedoo).

The preferred road transport route from the Port of Newcastle to the Project for components that exceed 5.6 m in overall height, except the WTG blades, (such as WTG tower sections) would be via:

- **Route 2:** Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Golden Highway (to Dunedoo).

The road transport routes from the Port of Newcastle are shown on **Figure 3.9**.

From the Golden Highway at Dunedoo, there are two proposed site access options to the Project Site (refer to **Figure 3.8**):

- **Site Access A:** Golden Highway, Sweeneys Lane.
- **Site Access B:** Golden Highway, Saxa Road, Tallawonga Road.

OSOM, heavy and light vehicle routes will be further defined during the post approval period in the preparation of a Traffic Management Plan (TMP) and in consultation with the relevant roads authorities and Councils.

### 3.3.8.2 Site Access

The Project Site will be accessed from the public road network at the following locations during construction and operation (refer to **Figure 3.8**):

- Sweeneys Lane (accessed directly off the Golden Highway).
- Tallawonga Road (accessed from the Golden Highway followed by Saxa Road).

These will be the main access points for OSOM vehicles and heavy and light vehicles. To limit impacts to road users and the surrounding community, the main Project Site entries on Sweeneys Lane and Tallawonga Road will only be accessed from the Golden Highway as shown in **Figure 3.8**.

The Project Site will also be accessed from the public road network at the following locations by heavy vehicles and light vehicles only (not OSOM vehicles) (refer to **Figure 3.8**):

- Gollan Road onto Binginbar Road.
- Gollan Road onto Ben Hoden Road.

Access from these two points at the southern end of the Project Site will provide for construction vehicle access and allow mobilisation of plant to several internal work fronts to allow site mobilisation and the internal roads 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.

The Development Corridor will crossover existing public roads (internal access tracks, underground powerlines and overhead powerlines), including:

- Dubbo Regional Council roads:
  - Sweeneys Lane.
  - Tallawonga Road.
  - Bald Hill Road.
- Warrumbungle Shire Council roads:
  - Dapper Road.
  - Bald Hill Road.
  - Diehm Road.
  - Sandy Creek Road.
  - Lambing Hill Road.

The Project may also require upgrade works within the road reserve of Binginbar Road, Ben Hoden Road and Murrawega Road, subject to agreement on the road treatment requirements with Dubbo Regional Council.

Access points to private land would 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.

The public road network surrounding the Project Site (including Gollan Road, Binginbar Road, Bald Hill Road, Sandy Creek Road, Dapper Road, Lambing Hill Road, Spring Ridge Road) will not be used by any construction vehicles, except to allow local service and/or resource suppliers the opportunity to participate in the Project.

The Project proposes to allow heavy and light vehicles to use other public roads, but only to:

- undertake pre-construction minor works
- construct necessary intersection upgrades off Gollan Road
- undertake dust suppression
- utilise the secondary intersections and crossovers identified above to facilitate construction and operational vehicles
- procure resources from licensed operators and suppliers which are located along these roads.

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

#### 3.3.8.3 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 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 3.3.8**.

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 Site 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.

**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. If it is not practicable to source water locally, then it will be brought to the Project Site by licensed external water suppliers under contract to the Project.

It is estimated that in the order of 80 to 120 mega litres (ML) of water would be required by the Project to produce the quantity of concrete required for gravity foundations (which can be considered the maximum amount of water required for use in concrete batching) as well as water use for road construction and dust suppression activities during construction. This estimated volume would service all new and upgraded on-site internal road construction and dust suppression activities, including those associated with the unsealed public roads.

The closest town to the Project Site with a potable water supply available is Ballimore. Alternatively, there are several water filling stations in Dubbo and two in Wellington that could supply the Project. Non-potable water may be sourced from participating landowner dams, depending on the conditions at the time.

### 3.3.9 Subdivision

The network operator requires 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 three new lots to enable ownership of the substations to be transferred to the network operator. The network operator will obtain freehold title either through transfer, dedication or acquisition.

**Appendix 4** identifies the potential location of the proposed substations and indicative lot boundaries. The lot size and configuration are conceptual only and is subject to further detailed design and confirmation with the network operator and the landowner during the detailed design phase.

In order to carry out the Project, SQE will also require separate long-term leases (with durations in excess of five years) to be granted by each of the registered landholders over parts of existing lots where the WTGs will be constructed. **Appendix 4** provides figures of the indicative lease subdivisions across the Project Site. The lease subdivision is 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.

## 3.4 Decommissioning

The WTGs have an expected operating life of approximately 30 years and the agreement with the host landowner provide for the operations to continue for 30 years. Following this there are three main options for consideration:

- continued use of the Project Site as a wind farm and battery storage utilising the existing WTGs and other facilities (subject to condition of equipment)
- replacement of the WTGs and battery storage with technology current at that time and continue the use of the Project Site as a wind farm and battery storage for a further term (subject to contractual agreement with landowners and further development consent for the ongoing operation)
- decommission the wind farm and battery storage and remove the WTGs and other infrastructure.

Should decommissioning be required:

- Key stakeholders including relevant landholders would be consulted regarding the decommissioning and rehabilitation plan.
- All above ground structures not required for the ongoing agricultural use of the land, including the WTGs and substations will be removed and the land rehabilitated so that it can return to agricultural use.
- 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.
- Below ground infrastructure, including WTG foundations, hardstands and some cabling may be left in situ and covered in clean fill material, with the land returned to near prior condition and use as far as practicable.

The decommissioning phase would require similar equipment and activities to the construction phase including mobile and heavy equipment (e.g. cranes, earthworks machinery, compressor and rock crusher needed to carry out the cutting work).

Prior to the commencement of decommissioning activities, SQE would prepare a detailed decommissioning plan in consultation with DPE and the local Councils to guide the implementation of the decommissioning works.

## 3.5 Timing

It is anticipated that works associated with the Project will commence within one to five years of development consent being granted, should the Project be approved. Timing may be earlier in line with the requirements of the CWO REZ, if possible. 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 is presented in **Table 3.6** below.

**Table 3.6 Anticipated Project Timeline**

| Phase | Approximate Duration |
|---|---|
| Pre-construction minor works | 6–8 months |
| Construction | 40 months |
| Operation | 30 years |
| Maintenance | Annual and ongoing |
| Decommissioning | After 30 year life, unless a new approval is sort to repower the Project |

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

### 3.5.1 Construction Works

Construction works will commence following provision of detailed design inputs, which may be staged.

The external road upgrades for the OSOM vehicle transport route from Port of entry to the Project Site will be undertaken prior to OSOM vehicle transport, as part of a separate approval and works program by the NSW government (refer **Section 3.3.4.10**). Site establishment and construction works may be undertaken in parallel with the road upgrades subject to preparation, approval and implementation of the Traffic Management Plan (TMP) in consultation with 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 field laydown areas. Arrangements will be made for power and communications at the site office during the construction period.

As noted below, some WTGs will commence operating whilst construction works are still continuing in other areas.

### 3.5.2 Commissioning

Pre-commissioning checks will be carried out on the high voltage electrical equipment prior to connection to the CWO REZ transmission network. When the Project's electrical system has been energised, the WTGs and battery storage 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.

### 3.5.3 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, battery storage 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. 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.

### 3.5.4 Decommissioning

As outlined in **Section 3.4**, at the end of the operational life of the Project, above ground infrastructure will be dismantled and removed from the Project Site.

It is anticipated that the decommissioning and rehabilitation phase, should the entire wind farm be decommissioned, would take approximately 12 months to complete, with the Project Site being returned, as far as practicable, to its condition prior to the commencement of construction.

### 3.5.5 Repowering

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

After approximately 30 years of operation (or sooner if deemed economically viable) the Project may be repowered, utilising contemporary equipment. This will be subject to a subsequent project approval process.

# 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.

The Project was referred under the EPBC Act the Minister via the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and was determined to be a controlled action (EPBC 2022/09387) on 4 January 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 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 the Department of Planning and Environment (DPE).

In accordance with the DPE EIS Guideline (DPE, 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 Homes.<br>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.<br>The consent authority will be the Minister for Planning and Homes 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 Councils object to the Project. |
| **Permissibility** | ***State Environmental Planning Policy (Transport and Infrastructure) 2021***<br>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 LEPs.<br>***Dubbo LEP 2022 and Warrumbungle LEP 2013***<br>As outlined in **Section 2.3.2**, the Project Site is primarily zoned RU1 Primary Production within both the Dubbo LEP 2022 and Warrumbungle LEP 2013. Electricity generating works are not permitted within the RU1 zoning in either LEP, however, due to the operation of Clause 2.36(1)(b) of the Infrastructure SEPP, the Project is permissible with development consent.<br>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.<br>**Appendix 5** provides further consideration of other relevant EPIs and how these have been considered in this EIS. |
| **Commonwealth Approvals** | ***Environment Protection and Biodiversity Conservation Act 1999***<br>Under the *Environment Protection and Biodiversity Conservation Act 1999* (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).<br>A referral was submitted to DCCEEW on 19 October 2022. The Project was determined to be a 'controlled action' under the EPBC Act in January 2023. The controlling provisions were listed threatened species and communities and listed migratory species.<br>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 outlining DECCW's specific assessment requirements for the Project were issued on 6 February 2023. A copy of the supplementary SEARs and where these have been addressed in the EIS is included in **Appendix 1**. 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 |
| --- | --- |
| | ***Civil Aviation Regulations 1988***<br>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**).<br>***Heavy Vehicle National Law***<br>Approvals are required for the transport of wind turbines and associated 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***<br>Section 4.41 of the EP&A Act specifies authorisations which are not required for approved SSD. Those are listed below:<br>• *Fisheries Management Act 1994* – a permit under section 201, 205 or 219.<br>• *Heritage Act 1977* – an approval under Part 4, or an excavation permit under section 139.<br>• *National Parks and Wildlife Act 1974* – an Aboriginal heritage impact permit under section 90.<br>• *Rural Fires Act 1997* – a bushfire safety authority under section 100B.<br>• *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.<br>***Approvals that must be applied consistently***<br>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:<br>• *Protection of the Environment Operations Act 1997* – an environment protection licence under chapter 3.<br>• *Roads Act 1993* – a consent under section 138 for work within a public road.<br>***Subdivision***<br>As outlined in **Section 3.3.9**, 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.<br>The areas to be subdivided are zoned RU1 Primary Production under the Dubbo Regional LEP 2022 and the Warrumbungle 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.<br>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** | Refer to **Appendix 5** for a summary of all relevant pre-conditions to exercising the power to grant consent for the Project and where these have been addressed in the EIS. |

| 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**).<br>Mandatory matters for consideration have been addressed in detail in **Appendix 5**. |

# 5.0 Engagement

SQE is committed to genuine and meaningful engagement with the community, with a focus on developing long-term relationships and maintaining open lines of communication. SQE recognises that early and meaningful consultation with the local community and other stakeholders is fundamental to obtain feedback that can be incorporated into the design and implementation of the Project.

SQE is also a signatory to the Clean Energy Council's Community Engagement Best Practice Charter for Renewable Energy Developments. This involves a voluntary set of commitments that are followed by SQE when developing and operating clean energy projects, including to engage respectfully with the communities in which they plan and operate projects, to be sensitive to environmental and cultural values, and to make a positive contribution to the regions in which they operate.

SQE has been engaging with local stakeholders since 2019, seeking to build relationships and understand perspectives and needs in the region through meetings with local landowners, neighbouring property owners, Councils, local service providers and relevant Government agencies. This ongoing engagement has resulted in numerous changes to the Project design (refer to **Section 2.6**) and has assisted in development of implementation plans for the Project including the management and mitigation measures proposed. As discussed in **Section 2.5**, as part of this engagement process, SQE has also reached agreements with both host landowners and neighbours regarding the Project and mitigation of Project related impacts. These agreements cover a high proportion of the private residences within the vicinity of the Project and are a demonstration of SQEs focus on proactive engagement, mitigating the impacts and sharing the benefits of the Project.

In addition to consultation with community stakeholders, ongoing consultation has been undertaken with the Dubbo Regional and Warrumbungle Shire Councils, government agencies, functional stakeholders (e.g. service providers), businesses and various non-government organisations and interest groups. This includes an engagement process undertaken with the local First Nations communities. This engagement has informed the design of the Project and has been ongoing throughout the assessment process, and if the Project is approved, the engagement will be ongoing during the life of the Project.

In accordance with the SEARs, the EIS must:

- Detail how engagement undertaken was consistent with the Undertaking Engagement Guide: Guidance for State Significant Projects (DPE).
- Describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.

In addition to the engagement undertaken by SQE, further engagement has been undertaken as part of the Social Impact Assessment (SIA) undertaken by Umwelt for the Project following the requirements of the NSW Government guidelines and assessment standards including, but not limited to, the NSW *DPIE Social Impact Assessment Guideline for State Significant Projects* (2021) (the SIA Guideline), the *Undertaking Engagement Guidelines for State Significant Projects* (DPIE, 2021) (the Engagement Guidelines) and the SEARs.

An overview of the Stakeholder Engagement Program including the identified stakeholders, engagement undertaken, and the outcomes of the consultation process is provided below and specifically in relation to the SIA, in **Section 6.11**.

## 5.1 Stakeholder Engagement Plan

SQE has prepared and implemented a Stakeholder Engagement Plan (SEP) for the Project that outlines the objectives and has guided the approach to community engagement.

A stakeholder identification process was undertaken early in the Project to support the planning and delivery of community and stakeholder consultation, and to inform the SIA. This process involved identifying stakeholders with an interest, or those potentially directly and indirectly affected by the Project, including identifying any potentially vulnerable or marginalised groups.

Through the implementation of the SEP, SQE aims to:

- keep the community informed about the Project, its likely impacts and likely benefits, through the provision of accurate and timely information
- provide multiple opportunities and mechanisms for meaningful information exchange with stakeholders
- ensure that the team developing the Project fully understands the local context, including any local impacts that it may have or opportunities that it could provide
- integrate feedback received into the Project planning and design as far as possible
- build and maintain positive, trust-based relationships with the local community.

The SEP provides an overview of SEQ's approach to stakeholder engagement throughout all stages of the Project, outlines the Project and the relevant stakeholders, provides detail on the consultation undertaken to date and outlines various community benefits. The SEP and engagement undertaken to date for the Project is consistent with the requirements of the Engagement Guidelines (DPIE, 2021).

## 5.2 Engagement Carried Out

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

### 5.2.1 Key Stakeholders

Key stakeholder groups involved that have been engaged who were consulted or engaged prior to and during the preparation of the EIS are outlined in **Figure 5.1**. Specifically, SQE has consulted with the stakeholders identified in **Table 5.1**, noting that a number of stakeholders fall within multiple groups, and have been consulted accordingly.


**Figure 5.1 Key Stakeholder Groups**

*Source: CWPR, 2022.*

**Table 5.1 Identified Project Stakeholders**

| Stakeholder Group | Identified Stakeholders |
|---|---|
| **Host Landholders** | • Landholders with the potential to host WTGs and/or Project infrastructure. |
| **Neighbouring Landholders** | • Neighbouring dwellings within 6 km of the potential turbine locations. |
| **Communities within the Locality** | • Local community:<br>○ Goolma<br>○ Gulgong<br>○ Dunedoo. |
| **Government – State and Utilities Providers** | • Crown Lands<br>• Department of Finance, Services, and Innovation – Telco Authority<br>• Department of Planning, Industry and Environment including: |

| Stakeholder Group | Identified Stakeholders |
|---|---|
| | ○ Biodiversity, Conservation and Science Directorate (BCS)<br>○ EnergyCo<br>○ Water Group.<br>• Department of Primary Industries – Agriculture and Fisheries (DPI)<br>• Environment Protection Authority (EPA)<br>• Fire and Rescue NSW<br>• Heritage NSW<br>• NSW Rural Fire Service<br>• Regional NSW – Mining, Exploration and Geoscience (MEG)<br>• Transport for NSW (Transport)<br>• Transgrid<br>• WaterNSW<br>• NSW Energy Sector Board<br>• APA Group. |
| **Government – Federal** | • Airservices Australia<br>• Bureau of Meteorology (BOM)<br>• Civil Aviation Safety Authority (CASA)<br>• DCCEEW<br>• Department of Defence<br>• Australian Energy Market Operator (AEMO). |
| **Local Council** | • Dubbo Regional Council<br>• Warrumbungle Shire Council<br>• Mid-Western Regional Council (neighbouring LGA). |
| **Government – Elected Representatives** | • Andrew Gee MP, Federal Member for Calare<br>• Mark Coulton MP, Federal Member for Parkes<br>• Dugald Saunders MP, NSW Member for Dubbo<br>• Roy Butler MP, NSW Member for Barwon. |
| **Aboriginal Groups** | • CWO REZ First Nations Working Group<br>• NSW Aboriginal Land Council<br>• Mudgee Land Council<br>• Wellington Land Council<br>• Dubbo Land Council<br>• Three Rivers Aboriginal Regional Assembly<br>• Wellington Aboriginal Action Party<br>• Registered Aboriginal Parties (refer to **Section 6.5**). |
| **Community Interest Groups and Community Services** | • Dunedoo Lions Club<br>• Mid Macquarie Landcare<br>• Wellington Lions Club<br>• Geurie Lions Club<br>• Central West Environment Group |

| Stakeholder Group | Identified Stakeholders |
|---|---|
| | • Regional Development Australia, Orana<br>• Rural Fire Service – Gollan, Elong Elong, Geurie<br>• South Dubbo Rotary Club. |
| Schools | • Goolma Public School<br>• TAFE<br>• Charles Sturt University. |
| Industry and Local Business | • Wellington Business Chamber (not currently active)<br>• Gulgong Chamber of Commerce<br>• Dubbo Chamber of Commerce<br>• Orange Minerals (NSW) Pty Ltd<br>• Monzonite Metals Pty Ltd. |
| Other Stakeholders | • Wellington Correctional Centre. |

### 5.2.2 Engagement Undertaken

As outlined in **Section 5.0**, SQE has been consulting with local landholders and stakeholders since 2019. The outcomes of community engagement activities undertaken by SQE 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 complemented by a targeted consultation program for the SIA, undertaken by Umwelt in collaboration with SQE.

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

A summary of the consultation activities undertaken during the stakeholder engagement program is presented in **Table 5.2**.

Detailed engagement tables for the Project that identify the key issues that were raised during stakeholder engagement and where these issues have been addressed in the EIS, as relevant, are provided in **Appendix 6**.

Table 5.2 Engagement Mechanisms

| Mechanism | Details | Target Stakeholders |
| --- | --- | --- |
| **Information Provision** | | |
| Project website | Dedicated Project website page since April 2021 to provide Project information and updates to broader community members. | Near neighbours/landholders<br>Wider community |
| Project phone number/email | Dedicated Project phone number and email address since April 2021 for stakeholders to be able to contact the Project team for information, or to provide feedback throughout the EIS process.<br>Subscription to Project newsletters and updates provided on the Project website. | Near neighbours/landholders<br>Wider community |
| Project newsletters and updates | Project newsletters distributed in May 2021, September 2021, March 2022, September 2022 and February 2023 to provide updates on the Project. The newsletters were distributed to local residents and shared by email to businesses and other key stakeholders.<br>Electronic Project updates were provided to all stakeholders subscribed to receive the updates. In addition to the five Project newsletters distributed, ten electronic Project updates have been provided to date. | Near neighbours/landholders<br>Wider community |
| **Consultation** | | |
| Project briefings | Formal briefings to key stakeholders and government agencies were held regularly, with slide deck to formally introduce or provide updates on the Project.<br>Letters and emails offering meetings to discuss the Project were provided to Elected Representatives, along with the Project newsletters and other electronic updates. Three Project briefings were held with the Member for Dubbo.<br>In the order of 48 Project briefings were held local and State government agencies. Further details are provided in **Appendix 6**. | Local and State government agencies<br>Elected Representatives |
| Personal meetings/interviews | Face to face meetings, phone calls and emails have been (and continue to be) undertaken with potential hosts, near neighbours and other interested stakeholders. A total of 563 stakeholders have been consulted in relation to the Project. | Near neighbours/landholders |

| Mechanism | Details | Target Stakeholders |
| --- | --- | --- |
| | Meetings have been held over the periods of:<br>• September 2019 to May 2021 – individual meetings, emails and phone calls with potential hosts and neighbours to the original investigation area (refer to **Section 2.6**) to discuss wind farms, feasibility investigations, appropriate buffer distances and potential involvement in the wind farm.<br>• May 2021 – meetings to hear community perspectives and obtain feedback on the proposed Project.<br>• May to November 2021 – individual meetings, emails and phone calls with potential hosts and neighbours to the original investigation area (refer to **Section 2.6**) as required to obtain feedback, discuss the studies being undertaken, next steps and answer questions.<br>• November 2021 – discussion of Project layout with host landowners.<br>• January 2022 – discussion of Project layout with neighbouring landowners within 4 km of a proposed WTG location.<br>• June 2022 – meetings to discuss Project updates and obtain feedback with neighbours.<br>• August 2022 – meetings to discuss Project updates with host landowners.<br>• August 2022 – site visit to Crudine Ridge Wind Farm for hosts to experience an operating wind farm and meet with host landowners.<br>• October 2022 and January 2023 – consultation with landowners relating to installation of three wind monitoring masts and extension of the existing mast.<br>• November 2022 – onsite meetings with landowners to discuss Neighbour Agreements with neighbours and accommodation provision opportunities.<br>• November 2022 – First Nations discussions with Wellington Aboriginal Action Panel (WAAP) and Local Aboriginal Land Council (LALC) representatives.<br>• December 2022 – impact and land agreement discussions with all host landowners.<br>• January 2023 – group meeting onsite with host landowners and in-house site supervisor to discuss construction period impacts.<br>• February 2023 – onsite meetings with landowners to discuss Neighbour Agreements and lease agreements. | |
| Service provider interviews | Semi-structured discussions with service providers and local businesses in the area to understand capacity and demand. | Business and Service Providers |

| Mechanism | Details | Target Stakeholders |
|---|---|---|
| Community drop-in session | Six community drop-in sessions were held to provide updates, providing the community members an opportunity to provide perspectives and feedback, present key findings of the engagement and assessment process, present the outcomes of the Project and provide further information on the assessment process. The community drop-in sessions were held on:<br>• 20 May 2021 – Goolma Community Hall attended by 61 people.<br>• 11 April 2022 – Gollan Hall attended by 26 people.<br>• 12 April 2022 – Goolma Community Hall attended by 23 people.<br>• 28 February 2023 – Gollan Hall attended by 19 people.<br>• 28 February 2023 – Goolma Community Hall attended by 16 people.<br>• 1 March 2023 – Dunedoo Hall attended by 4 people.<br>In addition, SQE attended two local shows with information for all SQE local projects including Crudine Ridge, Uungula and Spicers Creek Wind Farms:<br>• 4–5 March 2022 – Mudgee show stall holder.<br>• 11 February 2023 – Dunedoo show stall holder.<br>The drop-in sessions and show stalls allowed for semi-structured discussions to listen to individual concerns, interests, issues and gather feedback to validate impacts and opportunities, including sensitivities, to inform mitigation/enhancement strategies. | Near neighbours/landholders<br>Wider community |
| Online surveys | A community survey was distributed in May 2021 to understand community perceptions on the Project and obtain feedback on the key landscape features and values. A total of 23 responses were provided.<br>A second online survey was undertaken in November 2022 to March 2023 to gather the views and perspectives of the wider community on the Project to validate social impacts. A total of 32 responses were provided. | Near neighbours/landholders<br>Wider community<br>Business and Service Providers |

## 5.3 Government Agency Consultation Outcomes

A summary of the government agency and authority consultation undertaken to date is included in **Appendix 6**. 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.

SQE 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 6**).

**Table 5.3 Key Agency Consultation Outcomes**

| Agency | Key Outcomes | Section Addressed |
|---|---|---|
| **DPE** | • SEARs and assessment expectations (refer to **Appendix 1** for details). | This EIS |
| **Dubbo Regional Council** | • Project introduction and subsequent updates.<br>• Agreement on Planning Agreement terms.<br>• Transportation routes and key intersection designs.<br>• Landowners consent in relation to public roads within the Project Site. | **Section 2.5.3**<br>**Section 3.3.8**, **Section 3.3.4.10** and **Section 3.3.4.7** |
| **Warrumbungle Shire Council** | • Project introduction and subsequent updates.<br>• Consultation in relation to Planning Agreement terms.<br>• Transportation routes.<br>• Landowners consent in relation to public roads within the Project Site. | **Section 2.5.3**<br>**Section 3.3.8** |
| **Mid-Western Regional Council** | • Project overview as a neighbouring Council.<br>• Transportation routes. | **Section 3.3.8** |
| **Transport for NSW** | • Road upgrade design considerations. | **Section 3.3.8**, **Section 3.3.4.10** and **Section 3.3.4.7** |
| **Biodiversity, Conservation and Science Division** | • Agreement on Category 1 mapping.<br>• Agreement of survey methodologies.<br>• BDAR assessment requirement and approach. | **Section 6.4**, **Appendix 6** and **Appendix 10** |
| **Crown Lands** | • Landowners consent in relation to Crown Land within the Project Site. | **Appendix 6** |
| **Heritage NSW** | • Survey methodology and sub-surface testing program adequacy. | **Section 6.5** and **Appendix 11** |

## 5.4 Community Views

During the engagement for the Project, SQE has indicated that in the consultation it has undertaken 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.

Concerns and feedback relating to the Project identified throughout the engagement undertaken by SQE and Umwelt have been considered by SQE in refining the Project design and have been used to inform the preparation of this EIS including proposed management and mitigation measures. As outlined in **Section 2.6**, part of the iterative design process has included removing WTGs from the layout and changes WTGs, roads and other infrastructure based on host and neighbouring landholder feedback.

In accordance with the DPE EIS Guideline, community views on the Project have been considered in the following categories:

- the strategic context, including identifying the key natural and built features that are valued in the area and could be affected by the Project
- the design of the Project and any alternatives considered
- any relevant statutory issues
- community engagement (e.g. the level or quality of engagement carried out during the preparation of the EIS, the community engagement that should be carried out if the Project is approved)
- the economic, environmental and social impacts of the Project
- the justification and evaluation of the Project as a whole (e.g. consistency of project with Government plans, policies or guidelines; merits of the Project)
- issues that are either beyond the scope of the Project (e.g. broader policy issues) or not relevant to the Project.

Based on community surveys undertaken for the SIA (refer to **Section 6.11**), the key themes in community views centre around the justification and evaluation of the Project, strategic context and economic, environmental and social impacts/benefits of the Project. Stakeholders were most concerned about:

- the potential disruption to existing farming practices
- incoming construction workforce causing strain on local services
- public safety due to increased traffic
- potential decline in property values.

In addition to these key issue themes, consultation undertaken by SQE in the early phases of the Project identified potential visual impacts as a key issue theme.

Perceived positive impacts associated with the Project included:

- benefits from payments to host landholders as the most positive contribution
- improvements in local road infrastructure
- provision of a reliable and affordable source of renewable energy.

Community sponsorship and benefit sharing initiatives were also perceived as a key benefit of the Project based on SQE consultation.

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

Consultation undertaken for the SIA has not indicated any concerns in relation to community engagement undertaken for the Project. Feedback during consultation undertaken by SQE suggested that SQEs stakeholder engagement approach was perceived as positive by stakeholders.

The SIA (refer to **Appendix 21**) expands on the perceived positive and negative impacts raised during consultation and through assessment of the Project, linking them to the social impact categories of livelihoods, accessibility, way of life, surroundings, social amenity, engagement and decision making, community, health and well-being and culture outlined in the SIA Guideline (DPIE, 2021).

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.

**Table 5.4 Perceived Community Concerns and Benefits**

| Category | Concerns | Section Addressed | Benefits | Section Addressed |
|---|---|---|---|---|
| **Strategic context** | • Disruption to existing farming practices.<br>• Impacts on visual character of the area. | • **Section 6.9**<br>• **Section 6.2** | • Improvements to built features, such as road infrastructure. | • **Section 3.3.4.7** and **Section 3.3.4.10** |
| **Justification and evaluation of the Project** | • Cumulative impacts of multiple concurrent and nearby major projects. | • **Section 6.15** | • Provision of a reliable and affordable source of renewable energy. | • **Section 2.0** |
| **Economic, environmental and social impacts of the Project** | • Incoming construction workforce causing strain on local services.<br>• Incoming construction workforce placing increased pressure on housing and accommodation availability.<br>• Traffic impacts, including public safety.<br>• Equity of landholder payments and benefits.<br>• Biodiversity impacts.<br>• Visual amenity impacts.<br>• Reduced sense of community/reduced community cohesion as a result of the Project.<br>• Noise/vibration amenity impacts.<br>• Increased stress due to uncertainties associated with the Project.<br>• Concerns relating to physical health.<br>• Potential decline in property values. | • **Section 6.11**<br>• **Section 6.12**<br>• **Section 6.7**<br>• **Section 6.4**<br>• **Section 6.2**<br>• **Section 6.3** | • Benefits to local community through investment/sponsorship.<br>• Improved industry and economic diversity in the region.<br>• Reduced greenhouse gas emissions.<br>• Procurement opportunities for local suppliers.<br>• Employment opportunities during construction and operations.<br>• Increased training and education opportunities for local residents. | • **Section 6.11**<br>• **Section 6.12**<br>• **Section 6.14**<br>• **Section 2.5** |

| Category | Concerns | Section Addressed | Benefits | Section Addressed |
|---|---|---|---|---|
| **Project design** | • Restricted property access as a result of the Project.<br>• Increased traffic and road changes causing disruption/ delays/increase travel time. | • **Section 6.11**<br>• **Section 6.7** | • Improvement in local road infrastructure.<br>• Benefits from payments to host landholders (diversifying household income).<br>• Benefits from payments to neighbours through Neighbour Agreements. | • **Section 3.3.4.7** and **Section 3.3.4.10**<br>• **Section 6.11** and **Section 6.12** |
| **Issues that are beyond the scope of the Project** | • Potential decline in property values. | • **Section 6.11** | • Increased tourism opportunities. | • **Section 6.11** |

## 5.5 Ongoing Engagement

If the Project is approved, SQE 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).
- NSW Government's Undertaking Engagement Guidelines for State Significant Projects (2021).

As outlined in **Section 6.11**, SQE 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**.

Other ongoing engagement activities will include:

- regular updates to the Project website
- distribution of newsletters/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
- community drop-in sessions and attendance at local Shows and events
- letter box drops
- operation of the free call community enquiry line
- maintenance of a complaints register
- the Project email address and free call number will remain in place, and SQE representatives will continue to take responsibility for addressing feedback and concerns as and when they arise.

SQE 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 identification of:

- 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 7** provides a summary of management and mitigation measures proposed for the Project and outlined in this section.

## 6.1 Preliminary Environmental Risk Analysis

A review of the environmental and social matters relevant to the Project was conducted as part of the Scoping Report (Umwelt, 2022) to determine which issues needed to be assessed as part of the EIS and the level of assessment required. The review was undertaken with reference to the categories of assessment matters identified by the DPE Scoping Guideline (DPE, 2022).

As part of the preliminary environmental and social assessment the potential Project issues were separated into 'Key Issues' and 'Other Matters', as presented in the Scoping Report. Key issues are issues where there is a reasonable likelihood that the Project will have a material impact and detailed assessment was required to fully understand such impacts and identify Project-specific mitigation. Other matters are issues which are not of particular concern and are unlikely to have a material impact and/or the measures to manage the impacts are well understood and routinely used on similar projects.

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

- **Visual Amenity** – specifically the potential for the Project to impact the landscape character of the locality and result in loss of visual amenity to surrounding landholders (refer to **Section 6.2**).
- **Noise** – specifically the noise disturbance to surrounding landholders associated with the operation of the proposed WTGs and associated infrastructure, also traffic and construction activities (refer to **Section 6.3**).
- **Biodiversity** – the Project will result in disturbance to native vegetation and loss of habitat, and also has the potential to impact threatened and endangered species associated with bird and bat strike (refer to **Section 6.4**).
- **Aboriginal Cultural and Historic Heritage** – the construction and operation of the Project has the potential to impact Aboriginal cultural heritage and other heritage values of the Project Site (refer to **Section 6.5**).

- **Traffic and Transport** – the Project will result in increased traffic associated primarily with the construction phase, including OSOM vehicles (refer to **Section 6.6**).
- **Risk** – operation of the proposed WTGs and associated infrastructure requires assessment of potential hazards, including impacts to aviation operations, telecommunications and hazard associated with blade throw, electromagnetic fields and bushfire (refer to **Section 6.9**).
- **Socio-Economic Impacts** – the Project has the potential to result in both positive and negative social and economic impacts. Potential positive impacts resulting from social and economic benefits through significant capital expenditure, the implementation of community and neighbour benefit programs, employment generation and use of services, and the potential for some negative social impact due to potential impacts to nearby landholders and demand on the workforce and services (refer to **Section 6.10** and **Section 6.11**).
- **Cumulative Impacts** – the construction and operation of the Project has the potential to result in cumulative impact within the REZ due to the existence of some other existing and proposed land uses including other renewable energy related projects (refer to **Section 6.13**).

Other issues that were not identified as key issues in the preliminary environmental and social risk assessment, but that nevertheless are addressed in this EIS include water and soils, and waste management in accordance with the SEARs.

A detailed assessment of each of the identified environmental and social aspects identified for the Project is provided throughout the remainder of **Section 6.0**.

## 6.2 Landscape and Visual

Wind turbines can create an unavoidable level of visibility and contrast with the natural environment in which they are situated (DPE, 2016). Reduction in visual amenity was identified by stakeholders during the engagement program as a perceived impact of the Project. There were also landholders that indicated they were not concerned about the visual impacts of having visible WTGs in the landscape.

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 the Dapper Nature Reserve, 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 8** and a summary of key outcomes of the assessment is provided in the following section.

### 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:

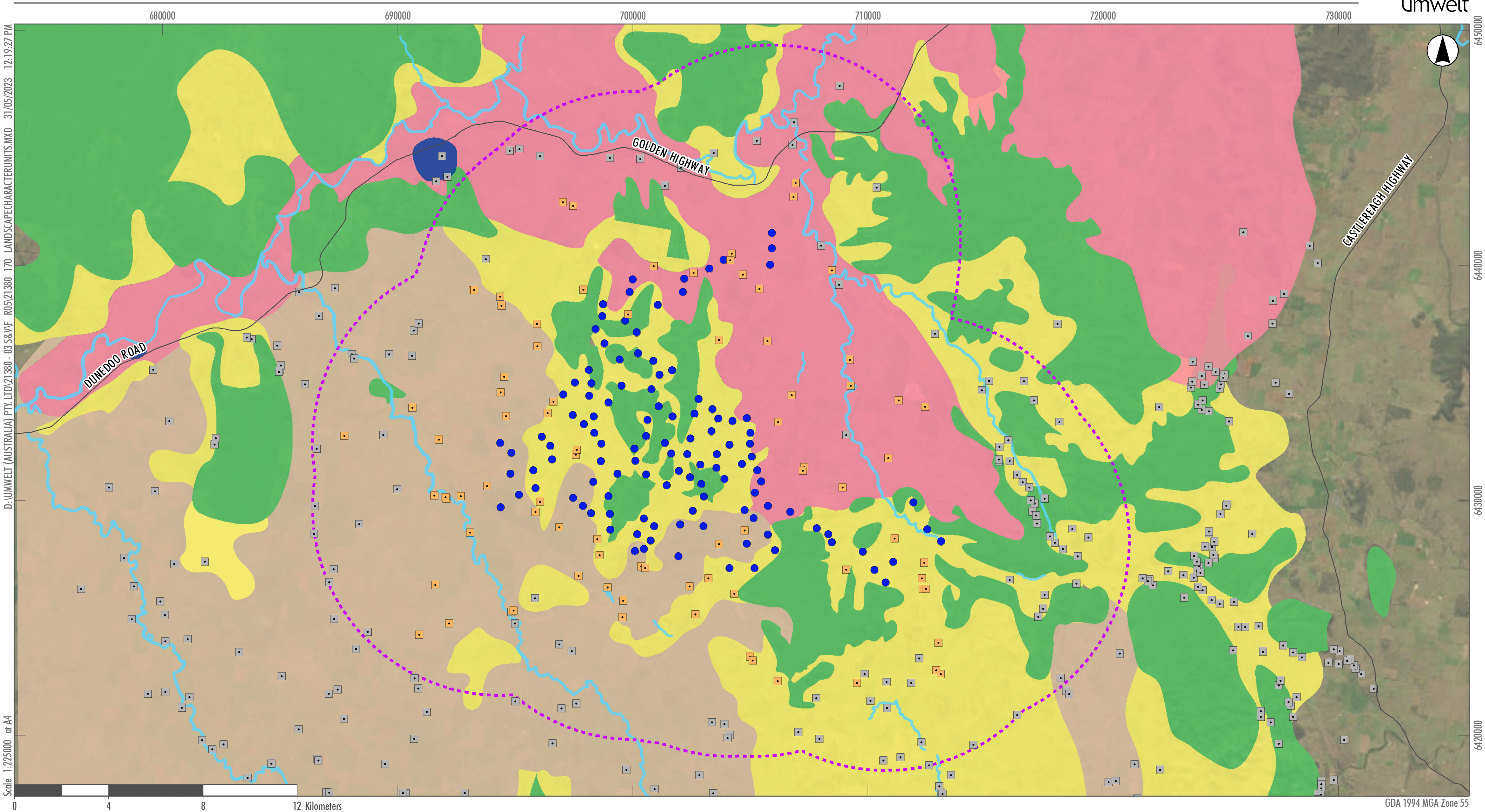
- elements of the landscape important to the community, including public and private viewpoints
- the sensitivity of the viewers who use those viewpoints, and the distances at which they may view the landscape and potential wind turbines and other ancillary facilities
- the character of the landscape 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 Project Site was categorised into six Landscape Character Units (LCU). 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**. Generally, the Scenic Quality Classes of the LCUs have been rated as moderate.

**Table 6.1 Landscape Character Units**

| Landscape Character Unit | Description | Scenic Quality Rating |
|---|---|---|
| **LCU01**<br>**Talbragar Pastures** | Gently undulating to flat cleared grazing and cropping lands and low density rural residences and floodplains associated with the Talbragar River, to the north and east of the Project Site. Scattered patches of vegetation are visible along river and creeklines and dense roadside vegetation can be observed along stretches of the Golden Highway and other minor roadways within the LCU. | Moderate |
| **LCU02**<br>**Towns and Settlements** | Small rural villages including Elong Elong, Goolma and Ballimore characterised by a small number of rural dwellings in addition to a main street featuring limited commercial and retail operations. Views within these towns are generally filtered by the surrounding vegetation associated with the villages. | Low/Moderate |
| **LCU03**<br>**Spicers Creek Pastures** | Generally flat to gently undulating, extensively cleared land located south of the Golden Highway and surrounding Saxa Road. The pastures are supported by Spicers Creek and a number of smaller creeks and isolated dams and land is generally utilised for dryland cropping and livestock grazing. Remnant areas of vegetation can be observed along stretches of Saxa Road and rivers and creeklines, as well as stands of native vegetation within paddocks. | Moderate |

| Landscape Character Unit | Description | Scenic Quality Rating |
|---|---|---|
| **LCU04**<br>**Partially Vegetated Hills** | Remnant woodlands and undulating hillsides which adjoin the densely vegetated hills associated with the surrounding National Parks and Conservation areas. The hillsides have been cleared in certain areas to accommodate agricultural activity that is the predominant land use in the region. | Moderate |
| **LCU05**<br>**Densely Vegetated Ridges and Hillsides** | Characterised by dense native vegetation that is consistent with the character of the surrounding National Parks and undulating hills and ridgelines adjacent including areas of dense remnant woodlands of ironbark, red gum and black cypress pine, which are largely preserved. | Moderate |
| **LCU06**<br>**Rivers and Creeks** | Riparian corridors and fertile soils that run along a number of creeks including Spicers Creek, Spring Valley Creek, Talbragar River and Cudgegong River. Land is generally cleared, flat and used for grazing or cropping with the exception of riparian vegetation associations along the rivers and creeks. | Moderate |




Legend

- 8,000 m from Turbines
- Wind Turbine Generator
- Associated - House
- Non Associated - House
- Road

**Landscape Character Units**

- LCU01 Talbragar Pastures
- LCU02 Towns and Settlements
- LCU03 Spicers Creek Pastures
- LCU04 Partially Vegetated Hills
- LCU05 Densely Vegetated Ridges
- LCU06 Rivers and Creeks

FIGURE 6.1

**Landscape Character Units**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (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 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 – including discussions for landholder agreements. 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’ being Zone 2. The proposed WTGs have a maximum tip height of 256 m. A buffer of 3,400 m (black line or Zone 1) and 5,000 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 5,000 m of each WTG, with particular focus on those within 3,400 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 (0–3,400 m) there are three non-associated dwellings, two with a moderate visual impact rating (SCR003 and SCR010) and one with a low visual impact rating (SL002). Two of the three non-associated dwellings within Zone 1 are associated with Cobbora Solar Farm (SL002 and SCR003).

Within Zone 2 (3,400–5,000 m) there are 32 non-associated dwellings (refer to **Figure 6.2**) with the assessment findings for these dwellings 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 assessment undertaken for the LVIA also considered turbines from the constructed Bodangora Wind Farm which is located approximately 13 km south-west of the Project. The multiple wind turbine visibility assessment identified one non-associated dwelling with turbines located in four 60° sectors (SCR007). In accordance with the Bulletin, this non-involved dwelling was assessed in further detail in the LVIA.

The results of the visual magnitude assessment and multiple wind turbine visibility assessment were used to inform consultation with surrounding residences, including the establishment of landholder agreements. In some instances, where the preliminary visual assessment indicated a higher level of impacts on particular residences, in consultation with the landowner the Project design was amended to address these impacts.

#### 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. Due to the elevated locations of the proposed wind turbines and the blade tip height of 256 m above ground level, the ZVI diagrams depicted a large percentage of land immediately surrounding the Project Site from which turbines would theoretically be visible.

The highest population densities in the area are located along Spring Ridge Road and the ZVI indicates that topography was likely to screen views to the Project from a number of these dwellings. A site inspection also determined that dense vegetation would further reduce visibility. Views to the Project would be limited by topography from the south-east.

### 6.2.2 Impact Assessment

The Project is to be located within a predominantly rural landscape that has not been identified as significant or rare from a technical visual landscape perspective. It is noted, however, that the engagement process has identified that the existing visual landscape is valued by the local community. The broad landscape character is dominated by established rural land which consists primarily of modified undulating hills. Generally, the Scenic Quality Classes of the LCUs within the vicinity of the Project have been rated as moderate (refer to **Section 6.2.1.1**).

The Project and in particular the proposed WTGs are generally positioned within a landscape that has remained largely unchanged for decades meaning that the potential for visual contrast with the current visual landscape is significant. The Project, regardless of how visible it actually is, will become a feature of the area. 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.

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

**Table 6.2 Overview of Impacts on Landscape Character Units**

| Landscape Character Unit | Scenic Quality Rating | Project Visibility and Potential Impact |
|---|---|---|
| **LCU01 Talbragar Pastures** | Moderate | The Talbragar Pastures LCU is characterised by the largely cleared, flat to gently undulating land that supports grazing and cropping. The northern part of the Project is sited within the area of the LCU associated with Spicers Creek.<br>The Project will result in a change to the existing landscape character from rural grazing land to a landscape with a dominant wind energy use. Publicly accessible land is generally limited to Sandy Creek Road, Sweeneys Lane and Golden Highway. The Project is anticipated to be a dominant element from some locations along Sandy Creek Road and Sweeneys Lane. Views to the Project are likely to be available from areas and roads located at close proximity to the turbines. Views are mostly open but filtered by vegetation in certain areas. |

| Landscape Character Unit | Scenic Quality Rating | Project Visibility and Potential Impact |
|---|---|---|
| **LCU02** **Towns and Settlements** | Low/ Moderate | The Towns and Settlements LCU has been defined as the low density rural villages including Elong Elong, Ballimore and Goolma that are driven by agricultural and industrial activity. The typical character of the LCU includes generally flat to gently undulating land with roadside vegetation and vegetation associated with dwellings. Views from the villages are limited by surrounding vegetation typical of the LCU and distance to the Project. |
| **LCU03** **Spicers Creek Pastures** | Moderate | The Spicers Creek Pastures LCU is defined as the largely cleared land to the south of the Golden Highway and surrounding Saxa Road. The landscape supports cattle and sheep grazing. The land is characterised by is flat to gently undulating topography and contains remnant stands of vegetation within paddocks, along the roadside and rivers and creeklines.<br>The south part of the Project is sited within the area of the LCU associated with Spicers Creek. The Project is anticipated to be a dominant element from some locations along Gollan Road. |
| **LCU04** **Partially Vegetated Hills** | Moderate | The Partially Vegetated Hills LCU is generally defined by the remnant woodlands and undulating hillsides with some cleared land associated with agricultural activity. The Project is predominately sited within the area of the LCU.<br>Views to the Project are likely to be available from locations outside of the Project due to the close proximity. However, vegetation typical of this LCU along with existing vegetation associated with the dwellings are likely to reduce the potential visibility from a number of dwellings within this LCU. |
| **LCU05** **Densely Vegetated Ridges and Hillsides** | Moderate | The Densely Vegetated Ridges and Hillsides LCU has been defined as dense native vegetation associated with the Project and surrounding conservation areas. The typical character of the LCU includes undulating and densely vegetated slopes that become steeper in sections.<br>The Project is likely to be visible from some locations within this LCU, however views will be limited due to the surrounding vegetation typical of the LCU. Public access within this LCU is limited. |
| **LCU06** **Rivers and Creeks** | Moderate | The Rivers and Creeks LCU is defined as the land riparian corridors and fertile soils that run along a number of creeks including Spicers Creek, Spring Valley Creek, Talbragar River and Cudgegong River.<br>There is limited public access available within this LCU. Views will be available due to the close proximity to the Project, however some views will be limited due to the riparian vegetation typical of the LCU. |

As discussed in **Section 2.3.2**, land within and surrounding the Project Site has been subject to extensive historical vegetation clearing associated with agricultural land uses. The Project has been designed, in the first instance, to avoid potential environmental, cultural and social impacts. Where impacts could not be avoided, efforts were made to minimise impacts. As outlined in **Section 2.6**, the Project was located on land previously cleared or modified by agricultural development and minimised vegetation clearance as far as practicable. Approximately 82% of the Development Footprint is located within exotic or Category 1 (exempt) land (refer **Appendix 10**).

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. It is undeniable the Project would become a feature of the visual landscape however, 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 15 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 their Viewer Sensitivity Level, Visibility Distance Zone and Scenic Quality Class combinations (refer to the methodology in Section 17.0 of the LVIA in **Appendix 8**). 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 15 viewpoint locations assessed, 14 locations were rated as Visual Influence Zone 3 (VIZ3) and in accordance with the Bulletin, no visual performance objectives apply. One public viewpoint was assessed as Visual Influence Zone 2 (VIZ2) as the Project would be a dominant visible element in the landscape from this viewpoint (VP06).

#### 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 8** 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.

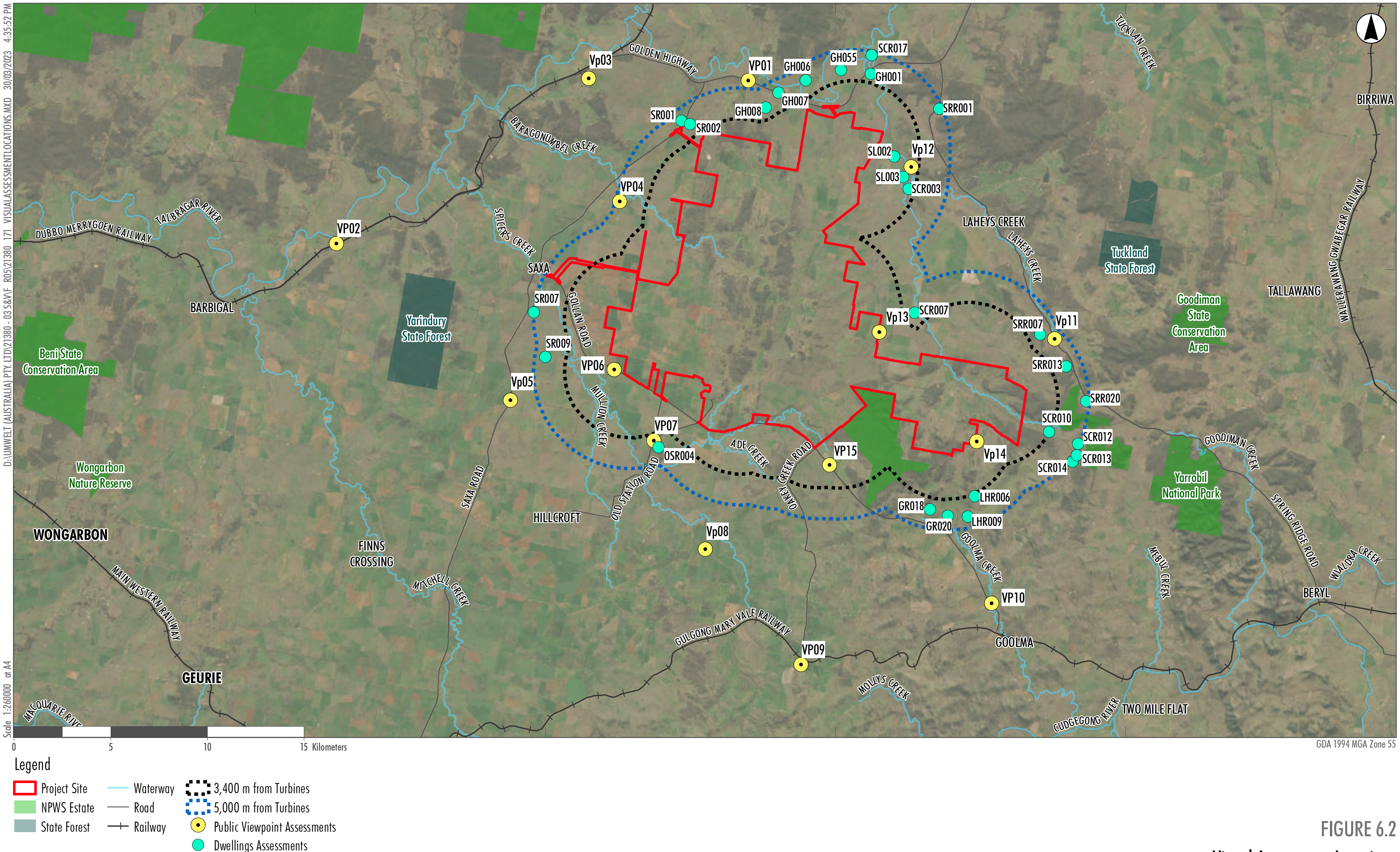



FIGURE 6.2

**Visual Assessment Locations**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

35 non-associated dwellings have been identified within the blue line of visual magnitude (0–5,000 m). Of these, a total of 22 non-associated dwellings were selected for further assessment as part of the LVIA. A site inspection and ZVI determined that topography and vegetation will limit views to the Project at several non-associated dwellings, including along Spring Ridge Road. As a result, representative worst-case scenario viewpoints have been provided for non-associated dwellings along Spring Ridge Road.

Of the 22 non-associated dwellings identified for further assessment:

- Three non-associated dwellings have been identified within Zone 1 (within the black line).
- 19 non-associated dwellings are located within Zone 2 (within the blue line).

Of the three non-associated dwellings within Zone 1, one was assessed as having a low visual impact rating and two were assessed as having a moderate visual impact rating. All three non-associated dwellings located within Zone 1 were assessed as VIZ2.

In accordance with the Bulletin, objectives for VIZ2 receptors within Zone 1 are to manage impacts as far as practicable, and justify residual impacts. Practical and feasible mitigation measures have been recommended for the non-associated dwellings rated as having the potential for a moderate visual impact rating (refer to **Table 6.3**). The LVIA found that the proposed mitigation measures would significantly reduce the level of visual impact and once established, it is anticipated the residual impacts would be acceptable. In all cases, additional site assessment and consultation with landowners would be undertaken to discuss appropriate mitigation measures as part of implementation of the Project.

Of the 19 non-associated dwellings in Zone 2 requiring further assessment, five were assessed as having a nil/negligible visual impact rating, 10 were assessed as having a low visual impact rating and four were assessed as having a moderate visual impact rating (refer to **Table 6.3**).

No non-associated dwellings were identified in excess of 5,000 m with the potential to view turbines in three or more 60° sectors.

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

**Table 6.3 Dwelling Visual Assessment Results**

| Dwelling ID | VIZ | Impact Rating | Assessment Findings/Mitigation Measures |
|---|---|---|---|
| **Zone 1 – within the black line (0–3,400 m)** | | | |
| SCR003 | VIZ2 | Moderate | Supplementary screen planting implemented along the fence line to the west of the dwelling will assist in screening views to the visible turbines. Full screening is achievable and would reduce the visual impact rating to low.<br>It is understood that the dwelling is associated with the Cobbora Solar Farm. |
| SCR010 | VIZ2 | Moderate | Supplementary screen planting implemented to the west of the dwelling will assist in screening views to the visible turbines. |

| Dwelling ID | VIZ | Impact Rating | Assessment Findings/Mitigation Measures |
|---|---|---|---|
| SL002 | VIZ2 | Low | Existing vegetation in the fore and middle ground will screen views. In accordance with Bulletin, the objectives of VIZ2 state that turbines visible within the 'blue line' should be screened. The majority of the turbines within the 'blue line' will be screened by existing vegetation. Views to turbines within the 'black line' are partially screened by existing vegetation. Individual tree plantings would achieve full screening of turbines from this viewpoint.<br>It is understood that the dwelling is associated with the Cobbora Solar Farm. |
| **Zone 2 – within the blue line (3,400–5,000m)** | | | |
| GH008 | VIZ3 | Moderate | Without a site inspection the influence of existing vegetation and farm buildings cannot be determined however they are likely to intervene in views to the Project. Further screen planting would most likely reduce any impacts to low. |
| GH006 | VIZ2 | Moderate | Existing vegetation will assist in screening views. If deemed necessary, screen planting to the south of the dwelling may further help screen views to the Project and reduce the potential visual impact. |
| OSR004 | VIZ2 | Moderate | Supplementary screen planting implemented to the north of the dwelling would assist in screening views to the visible turbines. |
| SR009 | VIZ2 | Moderate | Screen planting implemented to the east of the dwelling may assist in screening views to the visible turbines however this is not the landowner's preferred outcome. SQE will continue to consult with the landowner for alternate appropriate mitigation measures. |
| GH007 | VIZ3 | Low | No mitigation required. |
| GH055 | VIZ2 | Low | No mitigation required. |
| GH001 | VIZ2 | Low | No mitigation required. It is understood the dwelling is associated with the Cobbora Solar Farm. |
| SCR017 | VIZ3 | Low | No mitigation required. |
| SRR001 | VIZ2 | Low | No mitigation required. |
| SCR007 | VIZ3 | Low | No mitigation required. |
| SCR012 | VIZ2 | Low | No mitigation required. |
| LHR009 | VIZ3 | Low | No mitigation required. |
| GR020 | VIZ3 | Low | No mitigation required. |
| OSR007 | VIZ2 | Low | No mitigation required. |
| GR018 | VIZ3 | Negligible | No mitigation required. |
| SRR007 | VIZ2 | Negligible | Existing vegetation and topography will screen views to the Project. |
| SRR013 | VIZ2 | Negligible | Existing vegetation and topography will screen views to the Project. |
| SRR020 | VIZ2 | Negligible | Existing vegetation and topography will screen views to the Project. |
| LHR006 | VIZ3 | Negligible | Existing vegetation and topography will screen views to the Project. |

#### 6.2.2.3 Ancillary Facilities and Infrastructure

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

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

**Overhead Transmission Line**

An overhead transmission line (up to 330 kV) is proposed to dispatch electricity from the Project. This network will connect the onsite substations to the Central-West Orana REZ Transmission project infrastructure to feed into the NEM.

The proposed 330 kV transmission line is typically 50 m high. A 60 m wide cleared easement will be required underneath the transmission line. Due to the scale and nature of the transmission line, it will be visible across the landscape.

Proposed mitigation measures that have been applied in the design phase include utilising existing transmission lines where practicable, planning of transmission line routes to reduce visibility from surrounding areas and minimise vegetation loss where practicable, and the use of subtle colours and low reflectivity surface treatments.

**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 local 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 and Battery Storage**

The Project will include up to three substations (refer to **Figure 1.3**). Four (4) potential site options have been included to provide flexibility in the detailed design process (refer to **Figure 1.3**), although it is expected that only three would be utilised. As a conservative approach, all four potential substation locations and the two potential battery storage locations have been considered to operate concurrently in the assessment (refer to **Figure 1.3**).

There are no non-associated dwellings within 2,000 m of potential proposed substation locations. Potential substation locations have been setback from roads and sited in locations that have been previously cleared. Views to the substation locations will be screened by a combination of vegetation and topography.

**Meteorological Monitoring Masts**

Four meteorological monitoring masts are proposed to be located within the Project Site 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.

**Construction Control Room**

A permanent construction control room will be constructed to support the construction and operation of the wind farm. The smaller scale of ancillary structures including the proposed construction control room have the ability to be screened by topography, existing vegetation or proposed screening vegetation. Further mitigation measures would include siting to ensure minimal cut and fill and vegetation loss, consideration to type and colour of building materials used, avoidance of unnecessary lighting and signage and screen planting.

#### 6.2.2.4 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 a valuable tool 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, building structures. Wire frame diagrams have been utilised in the LVIA to assist in the assessment of the Project from inaccessible locations.

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.

Seven public viewpoint locations (either at a private dwelling or public location) were selected for the preparation of visual photomontages (refer to **Table 6.4**), based on feedback received from the community. 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 6.7** below.

**Table 6.4 Photomontage Locations**

| Photomontage Number | Public Viewpoint Number | Location |
|---|---|---|
| 01 | VP01 | Golden Highway, Elong Elong |
| 02 | VP05 | Saxa Road, Gollan |
| 03 | VP06 | Gollan Road, Gollan |
| 04 | VP10 | Gollan Road, Gollan |
| 05 | VP12 | Sandy Creek Road, Dunedoo |
| 06 | VP14 | Lambing Hill Road, Goolma |
| 07 | VP15 | Gollan Road, Gollan |

**Photo 6.1 Photomontage 01, VP01 looking south**

**Photo 6.2 Photomontage 02, VP05 looking north-east**

**Photo 6.3 Photomontage 03, VP06 looking north-east**

**Photo 6.4 Photomontage 04, VP10 looking north**

**Photo 6.5 Photomontage 05, VP12 looking south-west**

**Photo 6.6 Photomontage 06, VP14 looking north-west**

**Photo 6.7 Photomontage 07, VP15 looking north**

#### 6.2.2.5 Shadow Flicker and Blade Glint

Shadow flicker is defined as the visual effect that occurs when rotating turbines cause moving shadows as the 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 (Environment Protection and Heritage Council (EPHC), 2010).

The Visual Bulletin recommends a shadow flicker limit of 30 hours per year at dwellings in the vicinity of a wind farm. In addition, the Draft National Wind Farm Guidelines (EPHC, 2010) also recommend limits of 30 hours per year on the theoretical shadow flicker duration, and 10 hours per year on the actual shadow flicker duration. 'Theoretical Shadow Flicker' is the theoretical number of hours of shadow flicker experienced annually at a given location. This is calculated using a geometrical model which incorporates the sun path, topographic variation over the area and the WTG details (rotor diameter/hub height). 'Actual Shadow Flicker' considers factors which may reduce the incidence of shadow flicker that are not taken into account in the theoretical shadow flicker duration (such as cloud cover).

Predictions of theoretical shadow flicker durations at dwellings are based on worst case assumptions and are therefore conservatively high estimates. The actual shadow flicker duration likely to be experienced at each dwelling has also been predicted by estimating the possible reduction in shadow flicker due to WTG orientation and cloud cover.

Modelling of shadow flicker was conducted using specialist industry software (Wind Pro), assessing the largest turbine 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).

One non-associated dwelling (SL002) was identified with potential shadow flicker for 28 hours and 10 minutes per year, however this does not exceed the Bulletin recommendation of 30 hours per year.

Although there are no guidelines in the Bulletin relating to the acceptable level of shadow flicker on road users, the assessment also identified extents of Tallawonga Road, Gollan Road, Sandy Creek Road and Bald Hill Road which have the potential to experience shadow flicker which may cause annoyance to commuters.

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. SQE has committed to finishing the turbines selected for the Project with a low reflectivity surface treatment in accordance with the requirements of the Bulletin.

#### 6.2.2.6 Night Lighting

Night lighting of turbines and associated 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 Site, 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 the turbines hub.

As the Project is located within the Dubbo and Warrumbungle LGAs, and is SSD within 200 km of the Siding Spring Observatory, the *Dark Sky Planning Guideline* (DPE, 2016) must be considered before development consent can be granted. The Dark Sky Region in NSW is centred on the Observatory at Siding Spring as its continued operation is dependent on the dark night sky being free from light pollution.

Clause 5.14 (2) of the Dubbo and Warrumbungle LEPs sets out the matters that must be considered when assessing development to protect observing conditions at Siding Springs Observatory and minimise light pollution:

a. the amount and type of light to be emitted as a result of the development and the measures to be taken to minimise light pollution,

b. the impact of those light emissions cumulatively with other light emissions and whether the light emissions are likely to cause a critical level to be reached,

c. whether outside light fittings associated with the development are shielded light fittings,

d. the measures to be taken to minimise dust associated with the development

e. the Dark Sky Planning Guideline.

The Aviation Impact Assessment undertaken for the Project (refer to **Section 6.10.1**) included a safety risk assessment of the Project and concluded that turbines and meteorological masts would not require obstacle lighting to maintain an acceptable level of safety to aircraft. It is noted that this finding is subject to review by CASA, who may recommend lighting.

The *Dark Sky Guideline* provides technical information on good lighting design, use of shielded, downward facing and site appropriate lighting. If required, the visual impact of aviation lighting could be reduced by employing mitigation measures such as shielding to reduce spill of light to surrounding areas and/or the use of lower intensity lighting, as has recently been recommended for the Uungula Wind Farm (east of Wellington in NSW).

Night lighting is also likely to be required on ancillary infrastructure including switching stations, collector substations and facilities buildings. Maintenance lighting will be installed at the substations and at the O&M building for night work including emergency operations. 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 (including the use of motion detectors, shielding and directing of light downwards), and based on the distance to Siding Springs Observatory (approximately 100 km or more) the LIVA found that it is likely there will be no visual impacts on the existing night time landscape.

#### 6.2.2.7 Cumulative Visual Impacts

The LVIA assessed the potential for cumulative visual impacts to occur and identified the need to further consider the cumulative impacts of nearby projects including seven wind farm projects and two solar farm projects within the CWO REZ. Four nearby wind farm projects have been approved (Uungula Wind Farm and Liverpool Range Wind Farm) or are currently operational (Bodangora Wind Farm and Crudine Ridge Wind Farm) and three are proposed and in various stages of the approval process (Valley of the Winds, Barneys Reef and Burrendong Wind Farm). There are also two solar farms (Sandy Creek Solar Farm and Cobbora Solar Farm) which are currently progressing through the approvals process and are in close proximity to the Project, with the potential to view the projects simultaneously. Transmission line infrastructure proposed to connect the CWO REZ to the existing grid has also been considered.

The LVIA provides an assessment of the potential cumulative visibility of the Project in combination with Bodangora and Uungula Wind Farms through the use of ZVI diagrams (refer to Figure 29 and 30 of the LVIA in **Appendix 8**). The ZVI diagram for Bodangora Wind Farm and the Project shows that, due to the topography, there may be opportunities to view both projects simultaneously and further cumulative assessment was undertaken. The ZVI diagram for Uungula Wind Farm and the Project indicates some small pockets of uninhabited land may have the potential to view the two projects concurrently, however, due to the distance between them (exceeding 22 km) the cumulative visual impact is likely to be negligible.

Similar ZVI analysis for the Sandy Creek, Cobbora and Dapper Solar Farms was also undertaken and identified dwellings from which there is potential to view both solar farms and the Project simultaneously due to an absence of intervening topography and/or vegetation.

The cumulative ZVI assessment found that two non-associated dwellings are located within 8 km of both the Spicers Creek and Bodangora Wind Farm Projects, however, both dwellings have turbines located within two or less 60 degree sectors which is deemed acceptable in accordance with the Bulletin. The assessment also found that 15 non-associated dwellings are located within 4 km of the Project, the Sandy Creek Solar Farm, the Cobbora Solar Farm and Dapper Solar Farm, and have the potential to view multiple Projects simultaneously.

The assessment found that:

- five (5) non-associated dwellings will theoretically have views of the Project, Sandy Creek Solar Farm, Cobbora Solar Farm and Dapper Solar Farm
- three (3) non-associated dwellings will theoretically have views of the Project, Cobbora Solar Farm and Sandy Creek Solar Farm
- one (1) non-associated dwelling will theoretically have views of Sandy Creek Solar Farm, Cobbora Solar Farm and Dapper Solar Farm
- four (4) non-associated dwellings will theoretically have views of the Project and Cobbora Solar Farm
- the remaining two (2) dwellings will not have views to the solar farm projects.

The assessment was based on topography alone and it is likely that intervening vegetation will reduce views for the majority of the dwellings. It is noted that three of these non-associated dwellings (SL002, SCR003 and GH001) are associated with the solar farm projects.

The potential cumulative visual impact also requires consideration in relation to the potential visual impact of multiple wind farms when viewed sequentially. If a number of wind farms are viewed in succession as a traveller moves through the landscape this may result in a change in the overall perception of the landscape character. The viewer may only see one wind farm at a time, but if each successive stretch of the road/track is dominated by views of a wind farm, then it can be argued to be a cumulative visual impact (EPHC, 2010). When travelling from Wellington to Gulgong (or vice versa) along Goolma Road, turbines associated with the Bodangora Wind Farm are a noticeable feature of the landscape for a short period of time. Further along the route, the Project will be a visible element along Goolma Road. It is also a similar occurrence when travelling from Wellington to Elong Elong (or vice versa) along Saxa Road. Due to the short duration of views to each development and the separation of distance between viewing opportunities, it is unlikely that the character of the journey from Wellington to Gulgong on Goolma Road will be significantly diminished.

### 6.2.3 Mitigation Measures

In recognition of the impacts of the Project, and as the key focus for mitigation, SQE has Neighbour Agreements with landowners for 44 of the dwellings surrounding the Project (as discussed in **Section 2.5**). The agreements provide annual payments to landowners likely to be impacted by the Project, including those affected by visual impacts.

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
- provision of residence screen planting and/or supplementary plantings, in consultation with landowners, at dwellings as outlined in **Table 6.3**.

## 6.3 Noise and Vibration

Noise and vibration issues from the Project were not raised frequently as a key concern as part of the community engagement program, potentially due to the distances between WTGs and non-associated residences and the extensive proximal landowner discussions and agreements reached by SQE. Noise is, however, recognised as a common key issue for wind farms and therefore a detailed assessment was completed.

A Noise and Vibration Assessment (NVA) was prepared by Sonus Pty Ltd (Sonus) to assess the potential noise and vibration impacts associated with the Project. The assessment addressed the SEARs for the Project which specify the following issues to be assessed for the wind farm and associated infrastructure:

- an assessment of the wind turbine noise in accordance with the *NSW Wind Energy: Noise Assessment Bulletin* (EPA/DPE, 2016)
- an assessment of the noise generated by ancillary infrastructure in accordance with the *NSW Noise Policy for Industry* (EPA, 2017)
- assessment of the construction noise under the *Interim Construction Noise Guideline* (DECC, 2009) and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria)
- assessment of the traffic noise under the *NSW Road Noise Policy* (DECCW, 2011)
- an assessment of vibration under *Assessing Vibration: A Technical Guideline* (DECC, 2006)
- an assessment of the noise impacts on amenity/recreational use of the Dapper Nature Reserve considering the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017)
- assessment of the cumulative noise impacts (considering other developments in the area).

The NVA addresses potential noise impacts associated with the construction and operation of the Project with particular focus on potential noise impacts to non-associated dwellings surrounding the Project Site.

A full copy of the NVA is provided in **Appendix 9** and the key outcomes are summarised in the sections below.

### 6.3.1 Existing Noise Environment

Background noise monitoring was undertaken at seven dwellings in the vicinity of the Project, between June and September 2022. The seven monitoring locations, as shown in **Figure 6.3**, were selected based on preliminary noise predictions of the initial wind farm layout. Preference was given to non-associated dwellings (at the time of the monitoring) with the highest predicted noise levels in each direction of the Project, subject to permission being granted by the landowner to place equipment. These are representative dwellings from each direction surrounding the Project and were selected to adequately categorise the local noise environment.

Local weather loggers were also deployed to collect rainfall and wind speed data to determine the periods when weather directly on the microphone may have influenced the measured background noise levels in the vicinity.

Based on the background noise monitoring conducted, the RBLs have been calculated for each period of the day at each of the monitoring locations. The majority of the calculated RBL values are below the minimum RBL provided under the NPfI. As a result, for the purpose of the NVA, an RBL of 30 dB(A) during the evening and night and 35 dB(A) during the day has conservatively been used.

The background noise levels were then analysed in accordance with the Bulletin to establish the operational noise criteria for non-associated dwellings as described in **Section 6.3.2** below.

### 6.3.2 Impact Assessment

#### 6.3.2.1 Wind Turbine Noise

**Methodology and Criteria**

The SEARs reference the *NSW Wind Energy: Noise Assessment Bulletin* (the Bulletin) for the assessment of operational noise from the wind turbine generators. The Bulletin adopts the South Australian Environment Protection Authority *Wind Farms – Environmental Noise Guidelines* (SA 2009) as the basis for the regulatory noise standard and assessment methodology in NSW.

The criteria set by the Bulletin is defined as:

The predicted equivalent noise level (Laeq,10min), adjusted for tonality and low frequency noise in accordance with these guidelines, should not exceed 35 dB(A) or the background noise (LA90,10min) by more than 5 dB(A), whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between.

The above criteria apply to non-associated residences only. Where a landowner has entered into a commercial agreement with the proponent that addresses noise impacts, the Bulletin does not impose noise criteria. Therefore, while the NVA also provides predicted noise levels at the associated residences, the assessment focusses on the impact on non-associated residences to address the Project's compliance with the criteria set out in the Bulletin.

The Bulletin also prescribes a 5 dB(A) penalty adjustment (added to the measured or predicted noise level) for the presence of repeated and excessive tonality and/or low frequency which occurs for more than 10% of an assessment period. Analysis of the Project data indicates that the proposed turbines do not have tonal characteristics or excessive low frequency noise, therefore, the assessment did not apply any adjustment factors.

Based on the background noise monitoring results, the operational noise criteria for non-associated dwellings are provided in **Table 6.5**. It is noted that **Table 6.5** does not identify the criteria for each surrounding dwelling, instead using representative dwellings from each direction surrounding the Project Site to provide an indication of the range of criteria applicable to the Project.

It is noted that since the time of the background monitoring being completed, the representative locations in **Table 6.5** have all become associated residences.

**Table 6.5 Wind Turbine Noise Criteria (for Non-Associated Dwellings) ($L_{aeq,10min}$)**

| Representative Dwelling ID | Wind speed at 170 m above ground level (m/s) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| FR002 | 35 | 36 | 37 | 38 | 38 | 39 | 39 | 40 | 41 | 42 |
| GR005 | 35 | 35 | 35 | 35 | 35 | 35 | 36 | 38 | 40 | 43 |
| OSR003 | 36 | 37 | 37 | 37 | 38 | 38 | 38 | 38 | 38 | 39 |
| GR006 | 35 | 35 | 35 | 35 | 35 | 36 | 36 | 37 | 38 | 38 |
| LHR003 | 36 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 45 |
| SCR008 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 41 | 42 | 43 |
| GH003 | 35 | 35 | 35 | 35 | 36 | 37 | 37 | 38 | 39 | 39 |

**Impact Assessment**

The predictions of environmental noise from the wind turbines were made using one of the recommended models under SA 2009 for the prediction of wind turbine noise (ISO 9613-2 model and SoundPLAN).

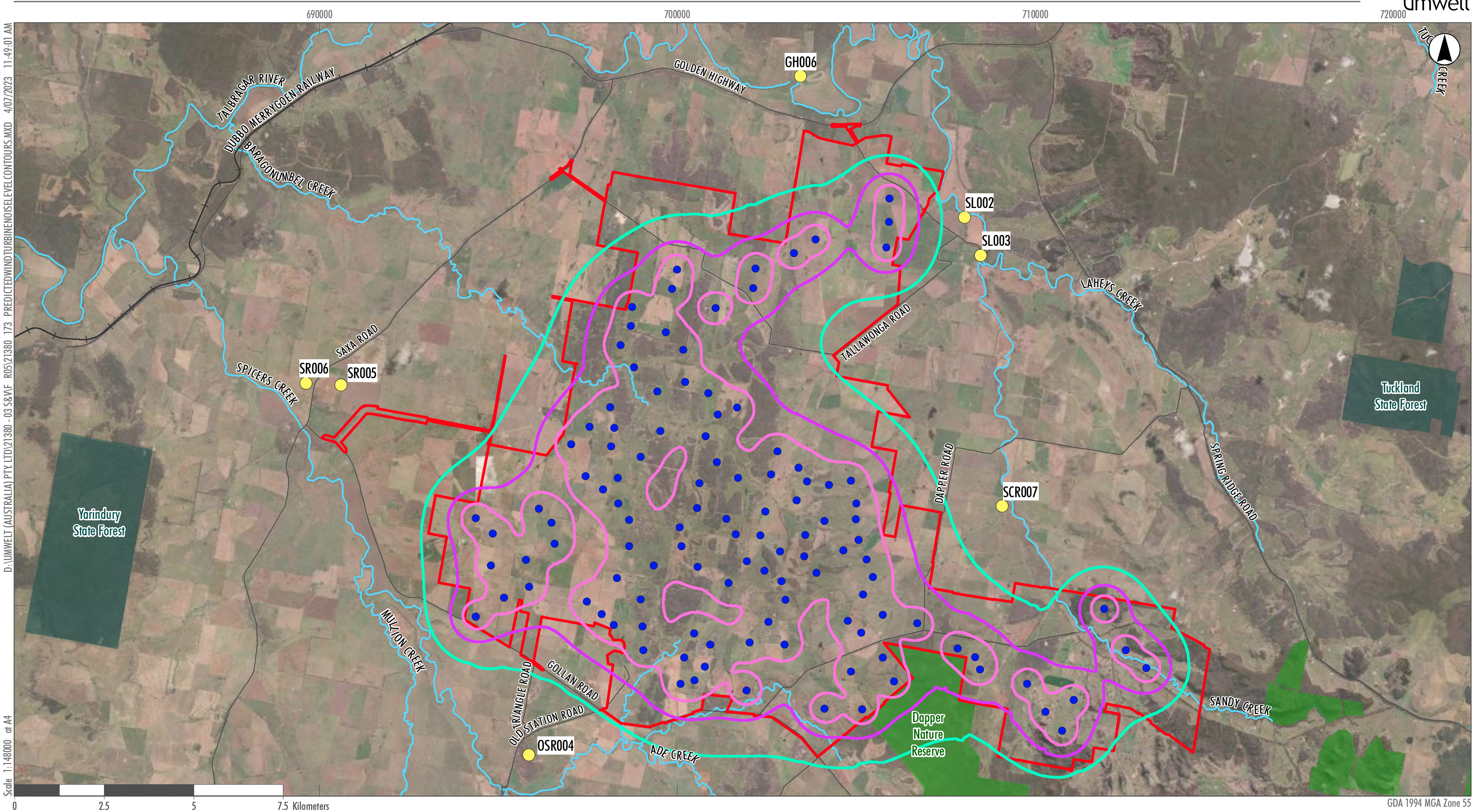
The noise levels from operation of the wind turbines have been predicted for all relevant wind speed scenarios, as outlined in **Table 6.6**. Note that results are only presented for non-associated dwellings where the predicted noise level is greater than 30 dB(A), with the minimum relevant criteria being 35 dB(A). The assessment includes predictions at different wind speeds as the noise impacts from the wind turbines vary depending on the speed with which it is turning.

To represent the results graphically, the predicted noise level contours at a wind speed corresponding to the wind turbine maximum sound power level (11 m/s) are provided in **Figure 6.3**. This figure shows the Laeq,10min noise level which is the average received sound energy from the WTGs at a location over a 10-minute period.

The results of the assessment found that the noise level predictions from the 117 wind turbines will achieve the operational noise criteria at all non-associated dwellings in the vicinity of the Project.

**Table 6.6 Wind Turbine Noise Predictions at Non-Associated Dwellings ($L_{Aeq,10min}$) and Sensitive Receivers**

| Dwelling ID | Hub height integer wind speeds | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 m/s | | 5 m/s | | 6 m/s | | 7 m/s | | 8 m/s | | 9 m/s | | 10 m/s | | 11 m/s | | 12 m/s | |
| | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction | Criterion | Prediction |
| OSR004 | 37 | 18 | 37 | 21 | 37 | 24 | 38 | 26 | 38 | 29 | 38 | 30 | 38 | 30 | 38 | 30 | 39 | 30 |
| SCR007 | 36 | 20 | 37 | 22 | 38 | 25 | 39 | 28 | 40 | 30 | 41 | 31 | 41 | 31 | 42 | 31 | 43 | 31 |
| SL002 | 35 | 19 | 35 | 22 | 35 | 25 | 36 | 28 | 37 | 30 | 37 | 31 | 38 | 32 | 39 | 32 | 39 | 32 |




Legend

- Project Site
- Wind Turbine Generator
- Background Monitoring Locations
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

**Noise Level Contours**

- 35 dB(A)
- 40 dB(A)
- 45 dB(A)

FIGURE 6.3

**Predicted Wind Turbine Noise Level Contours**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

### 6.3.2.2 Ancillary Infrastructure Noise

In addition to the WTGs, there will be a range of other infrastructure as part of the Project. Whilst the noise generation from this ancillary infrastructure is less likely to result in noise impacts than the WTGs, they were also assessed as part of the NVA assessment of potential operational noise impacts.

**Methodology and Criteria**

The SEARs reference the NSW EPA's *Noise Policy for Industry* (the NPfI) for the assessment of noise from ancillary infrastructure such as substations and battery storage facilities.

The NPfI establishes noise trigger levels which, if exceeded, require management measures to be considered to reduce the noise level. The noise trigger levels are based on either the:

- existing background noise environment (intrusiveness noise levels), or
- the amenity for particular land uses (amenity noise levels).

The Project noise trigger levels are the lower of the values provided by the two methods. Based on the background noise monitoring the Project noise trigger levels were calculated (based on the intrusiveness noise levels) as:

- daytime: 40 dB(A)
- evening and night: 35 dB(A).

**Impact Assessment**

Up to three substations and a battery storage facility (located in the electrical compounds) are proposed as part of the Project. Four potential substation locations have been nominated, although it is expected that only three would be utilised, so as a conservative approach all four have been considered to operate concurrently as part of the noise assessment. The main noise sources (transformers at the substations and cooling at the battery storage locations) were assessed against the NPfI criteria.

The highest predicted $L_{Aeq,15min}$ noise level from ancillary infrastructure for a non-associated dwelling is no more than 20 dB(A) (at the nearest non-associated residence SCR007), therefore easily achieving the criteria (35 dB(A) in evening and night periods and 40 dB(A) during the daytime). Therefore, no adverse noise impacts are predicted for ancillary infrastructure.

### 6.3.2.3 Construction Noise and Vibration

There will also be noise generated during the construction phase from the range of equipment undertaking these activities. Construction noise is assessed under a different NSW government guideline and therefore required a separate assessment in the NVA. The approach and findings of the construction noise assessment are outlined in this section.

**Methodology and Criteria**

The SEARs reference the *Interim Construction Noise Guideline* (Construction Noise Guideline) for the assessment of construction noise. This guideline focusses on the implementation of 'feasible' and 'reasonable' noise reduction measures for the construction phase rather than setting mandatory criteria.

The Construction Noise Guideline establishes management levels based on the existing background noise levels, and these are provided in **Table 6.7**.

**Table 6.7 Construction Noise Management Levels**

| Time of Day | Management level, $L_{aeq,15min}$ |
|---|---|
| **Recommended standard hours**<br>Monday to Friday, 7:00 am to 6:00 pm<br>Saturday, 8:00 am to 1:00 pm<br>No work on Sundays or public holidays | Noise affected, 45 dB(A)<br>Highly noise affected, 75 dB(A) |
| **Outside recommended standard hours** | Noise affected, 35 dB(A) |

There is also the potential for some construction activities to result in vibration. For construction activity occurring during the day time, *Assessing Vibration: A Technical Guideline* (DECC, 2006) provides the vibration criteria for dwellings to ensure there are no impacts. Continuous vibration is defined as uninterrupted vibration for an extended period of time (e.g. a compactor operating as part of road construction activities). Intermittent vibration is an interrupted form of continuous vibration, and impulsive vibration is a sudden event or events.

**Impact Assessment**

The equipment and activities on site will vary throughout the construction period, depending on the various stages, required processes and specific construction activities. The predicted noise from construction activity was assessed as a typical worst case (highest noise level) scenario for the various stages of construction, based on weather conditions that are the most conducive for the propagation of noise.

Based on the current conceptual design, separation distances from all non-associated dwellings are:

- 2,100 m or more from the closest proposed wind turbine location (with SL002 being approximately 2,107 m from turbine 3).
- 3,500 m or more from the closest proposed temporary concrete batching and crushing plants (with SCR007 being approximately 3,526 m to the closest plant location). It is noted that these indicative locations have been used for assessment purposes with the final construction facility sites to be determined as part of detailed design and in consideration of noise impact and other issues.
- 1,400 m or more from the closest proposed road upgrade (with SR005 being approximately 1,458 m to the closest upgrade location).

The assessment results show that during recommended standard hours (as defined in **Table 6.7**), the noise management level of 45 dB(A) will be exceeded for some construction activities related to road upgrades at up to three non-associated dwellings (GH006, SR005, SR006). The noise levels at these dwellings will be well below the highly noise affected level of 45 dB(A). In accordance with the Construction Noise Guideline feasible and reasonable work practices will be implemented by SQE to minimise noise during construction, as detailed in **Section 6.3.3**.

The assessment of construction vibration concluded that based on the separation distances between the construction activities and the nearest dwellings being well in excess of 100 m, vibration levels are predicted to easily achieve the criteria.

#### 6.3.2.4 Blasting

There is the potential that blasting may be required as part of construction activities to break up rock encountered in areas requiring excavation. Any such blasts would be localised and likely of a small scale. An assessment of blasting was undertaken as part of the NVA in the event the blasting is required.

**Methodology and Criteria**

Excavation for wind turbine foundations and possibly some other construction works such as road construction may require low-level blasting if rock is encountered. The ANZECC Guidelines provide the following criteria to minimise the annoyance and discomfort to residences from blasting activities:

Airblast overpressure:

- maximum level for airblast overpressure is 115 dB (Lin, Peak)
- the level of 115 dB may be exceeded on up to 5% of the total number of blasts over a period of 12 months, but the level should not exceed 120 dB (Lin, Peak) at any time.

Ground vibration:

- maximum level for ground vibration is 5 mm/sec (peak particle velocity (ppv))
- the ppv level of 5 mm/sec may be exceeded on up to 5% of the total number of blasts over a period of 12 months, but the level should not exceed 10 mm/sec at any time.

In addition, the ANZECC Guidelines also recommend that blasting be restricted to the hours of 9:00 am to 5:00 pm on Monday to Saturday, with no blasting activity on Sunday or public holidays.

**Impact Assessment**

Based on the current separation distances between potential blasting activities and sensitive receptors, any blasting impacts can be readily managed to comply with the relevant overpressure and vibration limits. However, given the range of factors associated with both the generation and control of blasting, in the event that blasting is necessary, SQE will get a blasting specialist to design each blast to achieve the project criteria and implement a monitoring regime to monitor compliance with the blasting criteria.

#### 6.3.2.5 Traffic Noise

As the Project will generate traffic, particularly in the construction phase, the NVA considered the potential impacts of traffic noise.

**Methodology and Criteria**

The NSW Road Noise Policy provides criteria for additional traffic noise generated by land use developments. **Table 6.8** summarises the criteria for both local roads and arterial/sub-arterial roads to be achieved outside, at a distance of 1 m from the facade of a dwelling and at a height of 1.5 m.

**Table 6.8 Road Traffic Noise Criteria**

| Existing residences on: | Day time (7:00 am to 10:00 pm) | Night-time (10:00 pm to 7:00 am) |
|---|---|---|
| Arterial/sub-arterial roads | 60 dB(A) ($L_{eq,15hour}$) | 55 dB(A) ($L_{eq,9hour}$) |
| Local roads | 55 dB(A) ($L_{eq,1hour}$) | 50 dB(A) ($L_{eq,1hour}$) |

**Impact Assessment**

The traffic noise assessment considered specific residences in the vicinity of the Project, as well as a more general assessment based on worst case (closest) setback distances for the remainder of the route.

The assessment concluded there is the potential for the traffic noise criteria to be exceeded at any residence within 85 m or 50 m of an Arterial/Sub-Arterial Road with a high or low speed limit, respectively (i.e. the Golden Highway).

Of the identified dwellings, one non-associated dwelling, GH007, is located within the distances from a road shown above. It is noted that the predicted noise level from the increased volume of traffic associated with the Project is only 1.7 dB(A) higher than the predicted level of noise from the existing traffic. Such an increase (i.e. less than 2 dB(A)) will constitute a minor impact that is barely perceptible to the average person. It is therefore considered that the noise from an increase in traffic will not cause any adverse impacts on the amenity at this location.

It is noted that the extent of residences formally identified does not cover the entire route between the site and Dunedoo. As such, there may be additional residences along the Golden Highway where the traffic noise criteria are exceeded that have not been identified. Given the above, it is anticipated that any increase in traffic noise for these potential residences would also be less than 2 dB(A), and would therefore not result in any adverse impacts on the amenity at these locations.

For residences further from the roads and at times other than the peak of construction, the noise level from traffic will be less than that provided in the table above. Outside of the peak of construction, the noise level will be 3 dB(A) less for every halving of the traffic volume. That is, for 50% of the traffic volume provided above, the noise level will be 3 dB(A) less, for 25% it would be 6 dB(A) less and for 12.5% of the traffic volume above it would be 9 dB(A) less than in the tables.

### 6.3.2.6 Impacts on Dapper Nature Reserve

The SEARs require the assessment of noise impacts on amenity and recreational uses within the Dapper Nature Reserve, using the NPfI. It should be noted that the NPfI specifically excludes the assessment of wind farm noise, however it forms the basis of this assessment for the Project as it was directly referenced by the SEARs. It is also noted that Dapper Nature Reserve is not used for recreational purposes and receives small numbers of visitors per year, primarily research groups and birdwatchers (OEH, 2014). Permission is required to enter the Reserve and access is restricted by locked gates (OEH, 2014).

Whilst the Nature Reserve is not used for recreational purposes, an assessment has been undertaken as directed by the SEARs.

**Methodology and Criteria**

For an area specifically reserved for passive recreation (e.g. national park) the NPfI recommends an amenity level of 50 dB(A). Typically, the project amenity level is determined as 5 dB(A) less than the recommended amenity level to prevent the noise from multiple industrial sources in an area from exceeding the amenity level. It is noted that exceptions can be made to this in situations where cumulative industrial noise is not a necessary consideration because no other industries are present in the area that will affect noise levels at the site in question (i.e. in the context at the Nature Reserve), or likely to be introduced in the future, as is the case for this Project. Therefore, the amenity level required to be achieved within the Dapper Nature Reserve from the operation of the wind farm is 50 dB(A).

The amenity noise level applies over the period of the day where the National Park may be in use. Noise predictions are however made over a 15-minute period. In order to standardise these periods to facilitate a comparison, the NPfI notes that 3 dB should be added to the amenity level to approximate the average noise level over a 15-minute period. Therefore, the relevant criteria for an assessment over a 15-minute period is 53 dB(A).

It is understood that the Dapper Nature Reserve does not contain any camping facilities, consisting only of walking trails that are only accessible by arrangement with the NSW National Parks and Wildlife Service (NPWS). Therefore, the closest walking trails to the site have been chosen as an appropriate assessment location for the noise within the nature reserve. It is noted that the walking trails pass within 300 m of the closest turbine.

**Impact Assessment**

Based on the wind turbine noise predictions provided in **Section 6.3.2.1**, the highest noise levels expected along the walking trails within the nature reserve have been predicted to be 48 dB(A) from the operation of the wind turbines and 32 dB(A) from the operation of the ancillary infrastructure, for a combined total predicted noise level of 48 dB(A). The NPfI also requires consideration of any annoying characteristics of the noise that may be present at the receiver location.

A correction for low frequency noise is applicable for the closest points on the walking trail to the Project. Therefore, an increase of 5 dB(A) to the predicted noise level is required during the evening and night periods and a 2 dB(A) increase during the day period. This will result in a predicted noise level of no more than 53 dB(A) within the nature reserve, thus achieving the relevant criteria of 53 dB(A) during the evening and night periods for this location.

As noted above, whilst this assessment has been completed as required by the SEARs, as the Nature Reserve is not used for recreational purposes, no recreational activity noise impacts are predicted in Dapper Nature Reserve as a result of the Project.

#### 6.3.2.7 Cumulative Noise

As discussed in **Section 2.4**, there are a number of other renewable energy projects located in the vicinity of the Project including proposed solar farms, the CWO REZ transmission project and in the broader area, other wind farms. The nearest wind farm is the Bodangora Wind Farm, which is currently operating approximately 14 km from the Project Site. The worst-case noise level from the combined operation will occur at a point half way between the two wind farms, that is 7 km from either wind farm, where there is an equal contribution from both wind farms. For a residence located 7 km from the Project, a predicted noise level of approximately 23 dB(A) is expected. If it is assumed that the Bodangora Wind Farm will produce a similar level of noise, this will result in a combined noise level of 26 dB(A) at this residence. It is noted that this level is well below the most onerous noise criteria of 35 dB(A) that would apply to the operation of the wind farm. It is noted that this is a highly conservative worst case assessment as the Bodangora Wind Farm is much smaller and has smaller WTGs compared to the Project.

In reality, a residence is unable to be downwind from both wind farms at the same time, therefore the contribution of one wind farm will be significantly less than the other. Where there is a 10 dB(A) difference in the level of noise from the two wind farms, there will be no change in the overall noise level from the addition of the quieter wind farm. Therefore, no cumulative noise impacts associated with other wind farms are predicted.

With regard to the potential for cumulative noise impacts with the nearby solar farms, the noise from the solar farms is assessed against the NPfI for which the project specific noise levels set for each operation consider cumulative noise impacts. The NVIA found that, as the predicted noise level from the ancillary infrastructure is well below the NPfI criteria, there are no adverse cumulative noise impacts predicted from the operation of the Project and the nearby solar farms.

The noise impacts of construction activities are heavily dependent on the scheduling of these activities and the construction timing for the other renewable energy projects in the vicinity uncertain. The Project will manage its contribution to any cumulative construction noise impacts through the proposed CEMP which will include noise management measures and consideration of scheduling of activities to assist in minimising impacts.

## 6.3.3 Mitigation and Management Measures

### 6.3.3.1 Wind Turbines

A pre-construction noise assessment will be undertaken based on the final turbine selection, micro-sited layout, and final WTG sound power levels. Predictions will be compared against the criteria to demonstrate compliance.

It is proposed that noise monitoring will be conducted within 6 months of commencement of operations, or commencement of operation of a stage, to assess compliance with the relevant conditions of consent.

### 6.3.3.2 Ancillary Infrastructure

In order to demonstrate compliance with the SEARs, the assessment of noise from the substations and battery storage facility will be updated if the size of the battery storage or substation transformer(s) is increased or the sound power level changes from that assessed in the noise assessment.

Any updates to the predictions would ensure that the highest equivalent noise level, at a non-associated dwelling, from operation of the battery storage facility and substation transformers will comply with the relevant noise criteria.

### 6.3.3.3 Construction

The following mitigation measures will be implemented for the construction works, as needed to minimise noise impacts. These measures will be incorporated into the Construction Environmental Management Plan that will guide the construction activities and implemented throughout the construction phase.

**Scheduling**

Construction works, including heavy vehicle movements into and out of the site, will generally be restricted to the standard hours of 7:00 am to 6:00 pm Monday to Friday, and between 8:00 am and 1:00 pm on Saturdays.

Works carried out outside of the standard hours will be limited to:

- works that do not cause noise emissions above 35 dB(A) at any nearby non-associated dwellings
- the delivery of materials as requested by Police or other authorities for safety reasons
- emergency work to avoid the loss of lives, property, and/or to prevent environmental harm
- works where the proponent demonstrates and justifies a need to operate outside the recommended standard hours (e.g., concrete pours).

Should any other works be required outside of the specified hours, they will only be carried out with the prior consent of DPE or as otherwise directed in consent conditions.

**Location of Fixed Noise Sources**

Fixed noise sources such as crushing and screening plant, concrete batching plant, generators and compressors will be located at the maximum practicable distance from the nearest dwellings, and where possible, use existing topography (or raw or processed materials) to block line of sight between the fixed noise source and the dwelling.

**Provide Acoustic Screens around Fixed Noise Sources**

Acoustic screens or mounding will be provided for fixed and mobile crushing and screening plant and concrete batching plant should these noise sources need to be located within 2,400 m of a non-associated dwelling and do not have direct line of sight blocked by site topography to that dwelling, in accordance with the following requirements:

- locate the acoustic screens or mounding as close as practicable to the noise source
- construct mounding using excavated soil from the site or use an appropriate acoustic screening material
- construct to a minimum height that blocks direct line of sight between the noise source and any dwellings within 2,400 m
- construct such that air gaps or openings at joints between sections of the acoustic screens are minimised.

**Enclose Generators and Compressors**

Proprietary acoustic enclosures will be provided for site compressors and generators located within 2,400 m of a non-associated dwelling.

**Alternative Processes**

Alternative processes will be investigated and implemented where feasible and reasonable, including for example, hydraulic or chemical splitters as an alternative to impact rock breaking, or the use of broadband reversing alarms in lieu of the high-pitched alarms, subject to an appropriate risk assessment and in accordance with all relevant occupational, health and safety legislative requirements.

**Site Management**

The following site management measures will be implemented:

- Select and locate centralised site activities and material stores as far from dwellings as practicable.
- Care should be taken not to excessively drop materials such as rock, to cause peak noise events, including materials from a height into a truck. Site personnel should be directed as part of a training regime to consider such practices.
- Plant known to emit noise strongly in one direction, such as the exhaust outlet of generator set, shall be orientated so that the noise is directed away from noise sensitive areas if practicable.
- Machines that are used intermittently shall be shut down in the intervening periods between works or throttled down to a minimum.
- Implement worksite induction training to educate staff.

**Equipment and Vehicle Management**

The following equipment and vehicle management measures will be implemented:

- Equipment that has Original Equipment Manufacturer (OEM) mufflers (or better) installed.
- Equipment is well maintained and fitted with adequately maintained silencers which meet the OEM design specifications.
- Silencers and enclosures are intact and maintained.
- Inspect, as part of a monitoring regime, plant and equipment to determine if it is noisier than other similar machines, and replace or rectify as required.

**Community Consultation**

The following noise-related elements will be implemented as part of the overall community consultation process. The aim of the consultation is to provide adequate community awareness and notice of expected construction noise.

The minimum elements will include:

- community information newsletters and phone contact as required, providing details of the construction plan and duration of the construction phases, and contact details of relevant project team members
- signage at site entrances with contact details for enquiries providing a feedback mechanism for the community to submit questions to the construction team, and for the construction team to respond
- regular updates on the construction activities to local authorities to assist in complaint management if necessary.

In addition, prior to any construction activity outside of standard work hours occurring within 1,900 m of a non-associated dwelling, or significant construction traffic periods or impacts on local road conditions:

- contact the local community potentially affected by the proposed works and inform them of the proposed work, the location of the work, the day(s) and date(s) of the work and the hours involved
- this contact will be made a reasonable time before the proposed commencement of the work
- contact details of the project manager and/or site environmental representative will be provided.

#### 6.3.3.4 Blasting

Should blasting be necessary, a blasting specialist will design each blast to achieve the blasting criteria and a monitoring regime will be implemented to monitor compliance.

#### 6.3.3.5 Traffic

In accordance with the general principles of dealing with temporary construction noise impacts as compared to permanent operational noise, where the Road Noise Policy criteria are exceeded (during the peak construction period), the following mitigation measures will be implemented to reduce construction traffic noise:

- communicate with the affected community
- establish and maintain a route into the site so that heavy vehicles do not enter noise sensitive areas for access, where practicable
- incorporate information regarding the route to all drivers prior to accessing the site and the need to minimise impacts through driver operation at certain locations
- schedule construction traffic deliveries such that they are as evenly dispersed as practicable
- restrict heavy vehicle deliveries to the day-time where practical
- implement driver training as part of the induction process including the requirement to avoid excessive acceleration of trucks and the use of truck engine brakes in close proximity to dwellings.

## 6.4 Biodiversity

A detailed assessment of the impacts of the Project has been completed and a Biodiversity Development Assessment Report (BDAR) has been prepared by Umwelt. While not documented as one of the key community concerns regarding the Project, potential impacts on biodiversity are identified as a key issue for large scale projects including wind farms.

The SEARs require a detailed assessment of biodiversity including:

- An assessment of the biodiversity values and the likely biodiversity impacts of the project, including impacts associated with transport route road upgrades and indirect impacts on Dapper Nature Reserve in accordance the *Biodiversity Conservation Act 2016* (NSW), the Biodiversity Assessment Method (BAM) 2020 and documented in a BDAR, including a detailed description of the proposed regime for avoiding, minimising, managing and reporting on the biodiversity impacts of the development over time, and a strategy to offset any residual impacts of the development in accordance with the BC Act.

- 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 to Sandy Creek, Four Mile Creek, Native Dog Creek and others.
- 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.
- If an offset is required, include details of the measures proposed to address the offset obligation.

With regard to the SEARs related to the transport route upgrades, it is noted that the local road upgrades that are part of the Project have been assessed as part of the BDAR, with the upgrades to the State road network and broader OSOM transport route to be covered as part of a separate assessment and approval process by the NSW Government.

On 4 January 2023, a delegate of the Minister for the Environment determined that the Project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) based on likely impacts to listed threatened species and communities and listed migratory species. The Project will be assessed under the Bilateral Agreement between the State and the Commonwealth. As such the Commonwealth has also provided its assessment requirements for the MNES relevant to the Project.

SQE has sought to avoid and minimise biodiversity impacts in the first instance as part of the Project design and has preferentially sited Project infrastructure in already cleared areas where practicable. The previously cleared nature of the majority of the Project Site was one of the reasons SQE selected this location. The lineal nature of the development (i.e. roads and electrical line connecting WTGs etc.) does mean, however, that all native vegetation cannot practicably be avoided and impacts on native vegetation will occur. To provide a conservative assessment of potential impacts on biodiversity, the predicted impacts associated with the Project represent worst-case conservative estimates and opportunities to further reduce biodiversity impacts will be explored during detailed design.

As discussed in **Section 3.2**, the assessment of the Project has focused on a wider Development Corridor which was created by adding a buffer area of approximately 100 m around the Development Footprint. The Development Footprint will be refined during detailed design following development consent, should the Project be approved. To optimise the construction and operation of the Project, flexibility is required to allow for micro-siting the Project layout and associated Development Footprint within the broader Development Corridor that has been assessed in the BDAR. The Project therefore seeks approval to locate the Development Footprint anywhere within the Development Corridor, and the BDAR assessment has been undertaken accordingly.

The BDAR prepared for the Project is contained in **Appendix 10**. The BDAR provides an assessment of the biodiversity values of the Project Site, documents the application of the avoid, minimise and offset framework and assesses the biodiversity impacts of the Project. A summary of key outcomes is provided in the following sections.

The BDAR included a detailed biodiversity field survey that was initially undertaken across a larger initial assessment area and then was refined to focus on the Development Corridor as it was refined down as part of the Project design process. The progressive results of the flora and fauna surveys (including targeted threatened species surveys) and the vegetation mapping were used by SQE to assist in refining the design of the Project to minimise impacts on biodiversity.

Bird and bat utilisation surveys were also undertaken for the Project Site to identify species that could potentially be impacted by WTGs. These surveys included both identifying species present and their utilisation of the airspace that would be impacted by the WTGs.

For impacts to biodiversity that cannot be avoided, the NSW biodiversity assessment process (the BAM) requires use of the NSW Government derived online calculator to generate biodiversity credits. These credits are generated by inputting 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.

### 6.4.1 Existing Biodiversity Values

The Project Site consists of an agricultural landscape, predominantly comprised of grazed grasslands with remnant trees and forested patches and bordered in the south-east by Dapper Nature Reserve. Patches of retained forest and woodland vegetation are present typically in areas surrounding watercourses and on steeper or rocky, less fertile habitats. While the Project Site occurs in a disturbed agricultural landscape a number of habitat corridors occur across the broader landscape, varying in quality and width. These corridors provide a linkage of habitat from the site north to Goonoo State Conservation Area and Goonoo National Park, Yarrobil National Park to the east, and various other areas of conserved land.

#### 6.4.1.1 Native Vegetation

Surveys identified a number of PCTs occurring within the Development Corridor, with various condition types, as well as exotic vegetation/disturbed farming land (identified in the table below as Category 1 Exempt Land which are areas that do not require further assessment in the BDAR). The PCTs in the Development Corridor are identified in **Table 6.9** and their extent is shown in **Figure 6.4**.

**Table 6.9 Plant Community Types and Vegetation Zones**

| Zone | Condition | Development Corridor Area (ha) | Development Footprint Area (ha) |
|---|---|---|---|
| PCT 81 Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion | | | |
| 1 | ModerateGood | 3.7 | 1.0 |
| 2 | Derived Native Grassland (DNG) | 4.1 | 1.7 |
| PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion | | | |
| 3 | ModerateGood | 16.2 | 3.1 |
| 4 | Thinned Canopy | 14.7 | 3.8 |
| 5 | Planted | 19.5 | 5.8 |
| 6 | DNG | 15.1 | 4.0 |
| PCT 267 White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion | | | |
| 7 | ModerateGood | 152.3 | 21.1 |
| 8 | Thinned Canopy | 30.6 | 11.0 |
| 9 | DNG | 62.7 | 16.0 |

| Zone | Condition | Development Corridor Area (ha) | Development Footprint Area (ha) |
|---|---|---|---|
| PCT 272 White Box – Black Cypress Pine – red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes | | | |
| 10 | ModerateGood | 217.7 | 29.5 |
| 11 | Shrubby | 16.9 | 3.1 |
| 12 | Thinned Canopy | 9.5 | 2.5 |
| 13 | DNG | 143.5 | 41.6 |
| PCT 281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion | | | |
| 14 | ModerateGood | 133.5 | 21.6 |
| 15 | DNG | 29.4 | 6.0 |
| PCT 467 Blue-leaved Ironbark – Black Cypress Pine shrubby sandstone open forest in the southern Brigalow Belt South Bioregion (including Goonoo) | | | |
| 16 | ModerateGood | 306.2 | 45.6 |
| 17 | Shrubby | 43.9 | 17.9 |
| 18 | Thinned Canopy | 18.3 | 5.5 |
| 19 | DNG | 81.5 | 24.2 |
| PCT 468 Narrow-leaved Ironbark – Black Cypress Pine +/- Blakely's Red Gum shrubby open forest on sandstone low hills in the southern Brigalow Belt South Bioregion (including Goonoo) | | | |
| 20 | ModerateGood | 28.2 | 1.9 |
| 21 | DNG | 5.4 | 2.1 |
| **Category 1 – Exempt Land** | | **4,165.6** | **1,241.4** |
| **Cleared** | | **19.9** | **8.8** |
| **Water** | | **5.2** | **0.3** |
| **Total area** | | **5,543.2 (rounded to 5,543)** | **1,519.5 (rounded to 1,520)** |

Detailed descriptions of each PCT are provided in the BDAR (refer to **Appendix 10**).

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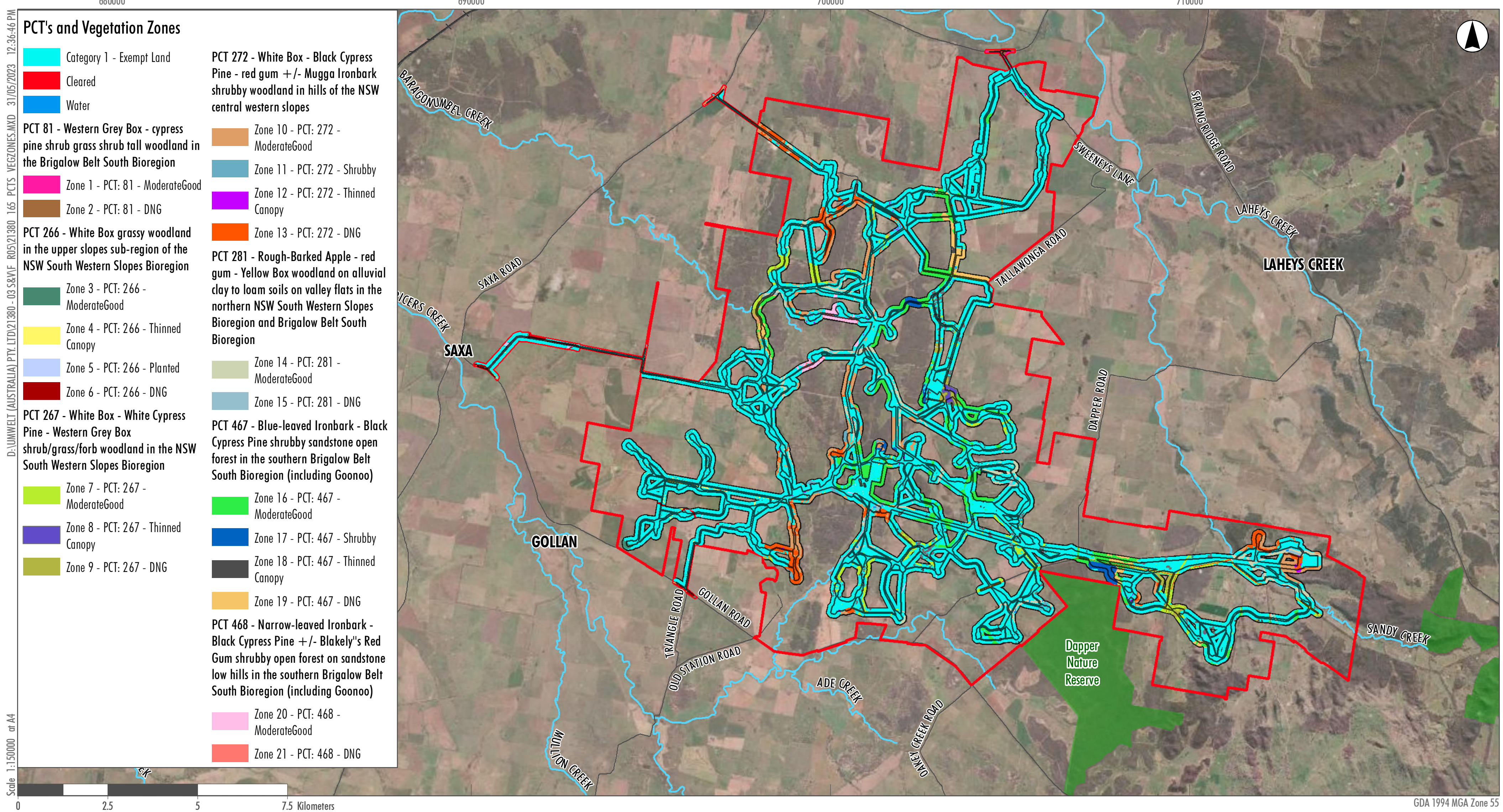


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Scale 1:150000 at A4

## Legend

- Project Site
- Development Corridor
- Development Footprint
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 6.4

**Plant Community Types and Vegetation Zones**

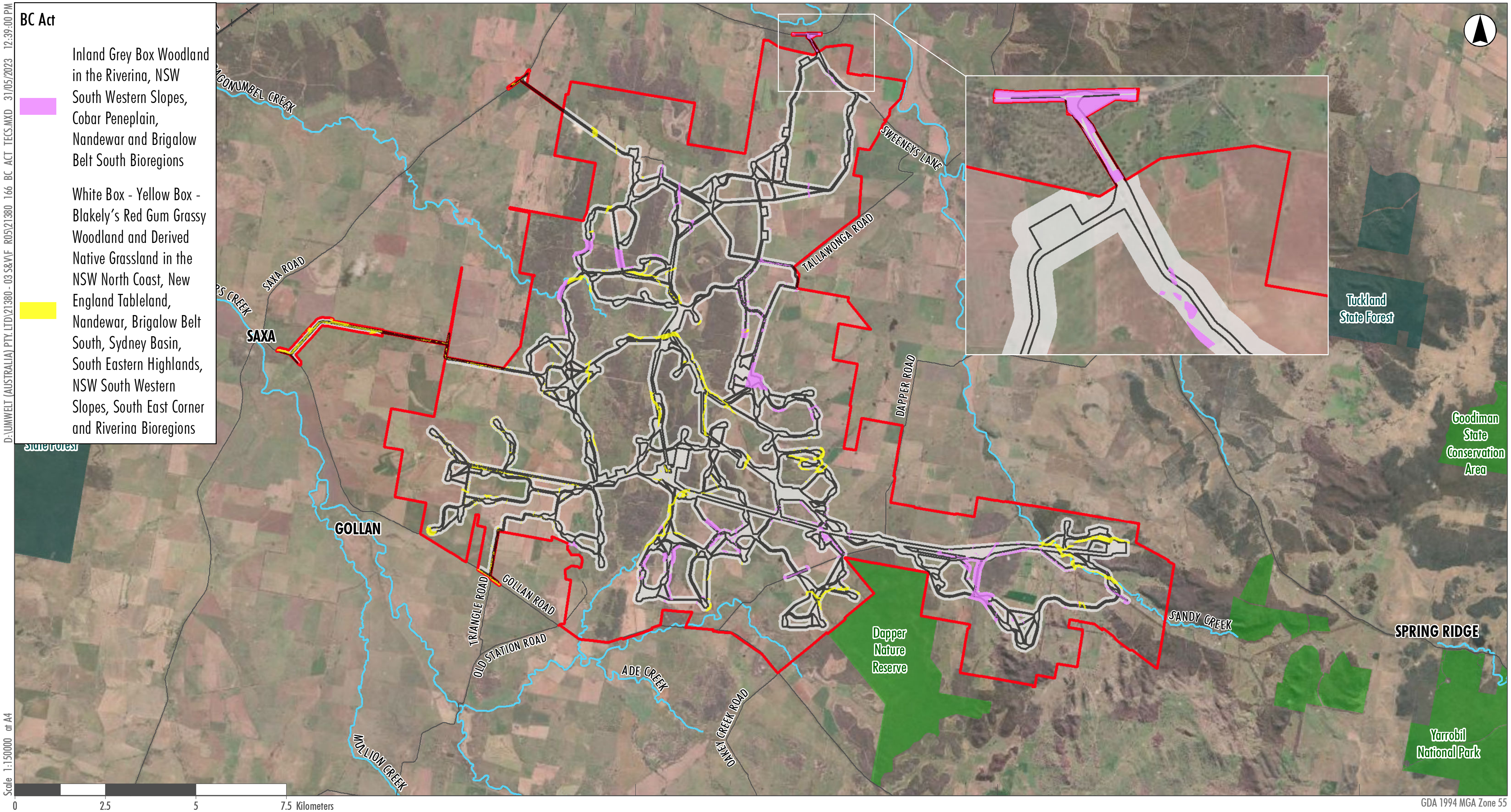
Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

#### 6.4.1.2 Threatened Ecological Communities

Four TECs, including both Critically Endangered Ecological Communities (CEECs) and Endangered Ecological Communities (EECs) were identified within the Development Corridor, and are listed in **Table 6.10** and their extent is shown in **Figure 6.5** and **Figure 6.6**.

**Table 6.10 Potential Threatened Ecological Communities**

| Scientific Name | BC Act Status | EPBC Act Status | Area in Development Corridor (ha) |
|---|---|---|---|
| White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions | CEEC | - | 223.8 |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | - | CEEC | 223.8 |
| Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions | EEC | - | 247.5 |
| Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia | - | EEC | 247.5 |



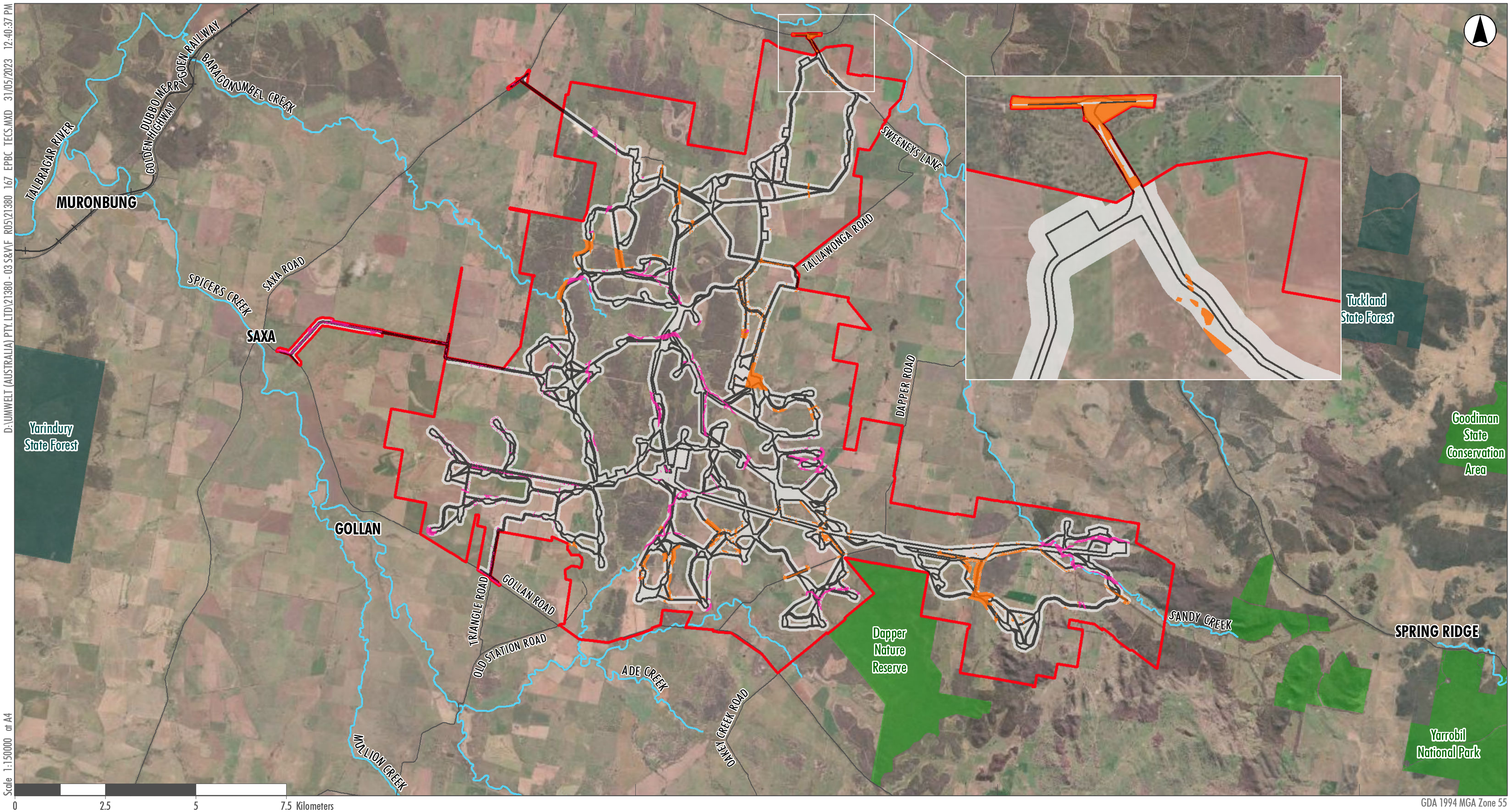

Legend

- Project Site
- Development Corridor
- Development Footprint
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 6.5

BC Act Threatened Ecological Communities

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)




Legend

- Project Site
- Development Corridor
- Development Footprint
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

**EPBC Act**

- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland

FIGURE 6.6

**EPBC Act Threatened Ecological Communities**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

#### 6.4.1.3 Threatened Species

The NSW BAM categorises threatened species as either ecosystem-credit species or species-credit species. Specific survey and assessments are required for species-credit-species as part of the BDAR. Specific biodiversity credits are generated for impacts on species-credit species but not for ecosystem-credit species as they are considered under the BAM to be already covered by credits generated for impacts on native vegetation. 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.

Targeted surveys were undertaken for all potentially occurring threatened flora and fauna species across the Development Corridor to determine their presence or absence with consideration of relevant survey guidelines. The completion of surveys and assessments identified the following threatened species within the Development Corridor and Development Footprint:

- barking owl (Ninox connivens)
- black falcon (*Falco subniger*)
- brown treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)
- dusky woodswallow (Artamus cyanopterus cyanopterus)
- diamond firetail (Stagonopleura guttata)
- glossy black-cockatoo (*Calyptorhynchus lathami*)
- grey-crowned babbler (*Pomatostomus temporalis* subsp. temporalis)
- little eagle (Hieraaetus morphnoides)
- little lorikeet (Glossopsitta pusilla)
- speckled warbler (Chthonicola sagittata)
- spotted harrier (*Circus assimilis*)
- superb parrot (Polytelis swainsonii)
- turquoise parrot (*Neophema pulchella*)
- square-tailed kite (*Lophoictinia isura*)
- white-throated needletail (*Hirundapus caudacutus*).

Of the above threatened species, three are species-credit-species being the barking owl, superb parrot and glossy black-cockatoo.

#### 6.4.1.4 Aquatic Habitats

A NSW Bionet Search returned no known fish records within 10 km of the Development Corridor (DPE 2023). All watercourses within the Development Corridor are ephemeral and habitats within these watercourses were considered marginal for locally occurring fish species.

One of the watercourses within the Development Corridor (Bungiebomar Creek) is classified as 'very poor habitat' in the DPI Key Fish Habitat mapping portal. Bungiebomar Creek is also mapped as potential habitat for southern purple spotted gudgeon (*Mogurnda adspersa*). Marginal habitat for this species is present adjacent to the Development Corridor. The lack of permanent water reduces the likelihood of the species occurring, however, potential habitat was identified in the form of slow-flowing, deeper creeks with rocks, cobbles and overhanging vegetation.

### 6.4.2 Avoidance and Minimisation of Impacts

The biodiversity assessment commenced early in the design process which has allowed initial ecological survey works to inform the design and layout of the Project. To avoid impacts on native vegetation the current design has focused on locating as much of the infrastructure and temporary construction areas within Category 1 – Exempt Land and/or vegetated areas lacking structure such as derived grasslands (that is grasslands that have been derived from the clearing of native woodland/forest communities but that which still contain sufficient species in the remaining groundcover vegetation to be identified as native vegetation) with lower biodiversity value than treed vegetation. The biodiversity assessment team worked closely with SQE to avoid large patches of higher conservation value treed vegetation present in the Project Site where feasible.

Where practicable, previously cleared areas and existing tracks have been prioritised for the location of infrastructure to reduce the overall impacts on remnant vegetation. Impacts are also minimised by the nature of the Project with most of the required infrastructure being narrow linear roads and easements that will still facilitate the movement of fauna species (threatened and non-threatened) and flora genetic material within the landscape.

A summary of the extent and type of vegetation that has been avoided by the Project is provided in **Table 6.11**.

**Table 6.11 Area of Native Vegetation and Threatened Ecological Communities Avoided through SQE's Design Evolution and Impact Minimisation Program**

| Area of Native Vegetation and Threatened Ecological Community | January 2022 Development Corridor (ha) | July 2022 Development Corridor (ha) | Current Development Corridor (ha) |
|---|---|---|---|
| NSW Box Gum Woodland CEEC | 419 | 238 | 224 |
| Inland Grey Box Woodland EEC | 460 | 235 | 248 |
| Native Vegetation | 3,574 | 1,467 | 1,353 |

As detailed in **Table 6.11** the total area of native vegetation occurring in the Development Corridor has reduced considerably during the evolution of the Project design, from a total of 3,574 ha to 1,353 ha. As specified above, the impact minimisation program has focussed on the reduction to serious and irreversible impact (SAII) entities, which comprises NSW Box Gum Woodland. The impact of the Project on NSW Box Gum Woodland has decreased from 419 ha to 224 ha. The overall impact on Inland Grey Box Woodland has decreased from 460 ha to 248 ha, although it is noted that a minor increase in impact to this community occurring between the January 2022 and July 2022 Development Corridor iterations, as impact minimisation was focussed on a reduction to SAII entities.

SQE has also committed to the design and implementation of a comprehensive management strategy to minimise the unavoidable biodiversity impacts of the Project. The following Management Plans will be prepared post-approval as part of the Biodiversity Management strategy and will incorporate the proposed management controls identified in the dot points below:

- Development and implementation of biodiversity management measures as part of the **Construction Environmental Management Plan** (CEMP) which are planned to include salvage of biodiversity features, including habitat resources (e.g., hollow logs, tree hollows, fallen timber and rocks/boulders), pre-clearance and tree-felling procedures, non-inhibiting fauna fencing, traffic control, water management, weed management, fencing and access control, bushfire management, erosion and sediment control and workforce education and training.
- **Bird and Bat Adaptive Management Plan** (BBAMP) – an integral part of managing impacts to bird and bat species and a key mitigation measure to address the impacts associated with turbine strike (refer to **Section 6.4.3.3**). The plan will develop trigger levels and mitigation measures designed to manage impacts, in consultation with BCD, and will provide guidance to develop a framework for monitoring impacts including both baseline and ongoing monitoring.

## 6.4.3 Impact Assessment

### 6.4.3.1 Direct Impacts

The Project will result in residual direct impacts to native vegetation communities and threatened species habitats within the Development Footprint as a result of vegetation clearing works for infrastructure establishment in the construction phase of the Project as detailed in **Table 6.12**.

**Table 6.12 Summary of Residual Direct Impacts on TECs and Species-credit Species**

| Direct Impact | BC Act Status | EPBC Act Status | Potential SAII | Extent of Impact |
|---|---|---|---|---|
| White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands | CEEC | CEEC | Yes | Derived native grassland component = 10.0 ha<br>Woodland = 33.2 ha<br>Total extent = 43.2 ha |
| Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions | EEC | EEC | No | Derived native grassland component = 17.7 ha<br>Woodland component = 31.9 ha<br>Total extent = 49.6 ha |
| barking owl (*Ninox connivens*) | Vulnerable | Not listed | No | Total extent = 14.4 ha |
| superb parrot (*Polytelis swainsonii*) | Vulnerable | Vulnerable | No | Total extent = 40.7 ha |
| glossy black-cockatoo (*Calyptorhynchus lathami*) | Vulnerable | Vulnerable | No | Total extent = 1.2 ha |

Following consultation with DPE in March 2023 in relation to SAIIs and impacts to TECs, an analysis was undertaken to delineate the area of vegetation occurring in road reserves that may be subject to road upgrades. Works associated with road upgrades are generally unable to be avoided as the upgrade works must be undertaken where the existing road is located. Whilst SQE will focus on minimising the impacts associated with these works, it is not practicable for all of these the impacts to be avoided and a conservative estimate of the potential impact area associated with these works has been included in the overall Project impact calculations. The assessment found that approximately 17.3 ha (approximately 40%) of the impact on Box Gum Woodland and approximately 11.8 ha (approximately 24%) of Inland Grey Box Woodland are associated with the road upgrade works.

**Table 6.13** provides a summary of residual direct impacts on PCTs associated with the Project.

**Table 6.13 Summary of Residual Direct Impacts on PCTs**

| Direct Impact | Extent of Impact |
|---|---|
| PCT 81 – Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion | 2.7 ha |
| PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion | 16.7 ha |
| PCT 267 White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion | 48.1 ha |
| PCT 272 White Box – Black Cypress Pine – red gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes | 76.7 ha |
| PCT 281 Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion | 26.6 ha |
| PCT 467 Blue-leaved Ironbark – Black Cypress Pine shrubby sandstone open forest in the southern Brigalow Belt South Bioregion (including Goonoo) | 93.0 ha |
| PCT 468 Narrow-leaved Ironbark – Black Cypress Pine +/- Blakely's Red Gum shrubby open forest on sandstone low hills in the southern Brigalow Belt South Bioregion (including Goonoo) | 4.0 ha |

### 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 noise, dust, water, weeds and pests to occur during construction and operation. This includes the need to consider the potential to result in indirect impacts on biodiversity values of surrounding lands, including Dapper Nature Reserve.

The BDAR considered these potential indirect impacts in detail and identified that significant indirect impacts are not predicted. The BDAR found that these potential indirect impacts will vary depending on the type of impact, the duration and frequency of the impact and the ability of the biodiversity features to respond to these changes. However, all indirect impacts were found to be manageable with appropriate mitigation measures that SQE has committed to implement. No material indirect impacts are expected to occur in relation to surrounding connectivity, corridors or habitat fragmentation, considering the already disturbed nature of the Development Footprint.

### 6.4.3.3 Prescribed Impacts

The BDAR includes an assessment of all prescribed impacts as listed within the Biodiversity Conservation Regulation 2017 (refer to **Appendix 10**). The prescribed impact relevant to the Project is the potential impact to significant bird and bat species due to wind turbine strike.

The BDAR includes a detailed assessment to consider the potential impacts from turbine strikes on significant bird and bat species. The assessment considered 32 species, comprising 19 threatened species (14 bird and 5 bat species) and 13 non-threatened bird species. The 32 species assessed were selected based on:

- being recorded at the Project Site during Bird and Bat Utilisation Surveys (BBUS)
- knowledge of them occurring in the region but not necessarily recorded at the Project Site
- occurrence of highly suitable habitat for the species.

Additionally, based on previous experience and detailed literature review, only aerial fauna species with a moderate or higher risk of being impacted by turbine strike from the Project were considered.

A summary of the qualitative collision risk assessment is provided in **Table 6.14** below with further details available in the BDAR (refer to **Appendix 10**).

**Table 6.14 Qualitative Collision Risk Assessment Summary**

| Common Name | Species Name | Likelihood | Consequence | Risk Rating |
|---|---|---|---|---|
| little eagle | *Hieraaetus morphnoides* | High | Moderate | High |
| superb parrot | *Polytelis swainsonii* | High | Moderate | High |
| white-throated needletail | *Hirundapus caudacutus* | High | Moderate | High |
| black falcon | *Falco subniger* | High | Moderate | High |
| spotted harrier | *Circus assimilis* | High | Moderate | High |
| swift parrot | *Lathamus discolor* | Moderate | High | High |
| barking owl | *Ninox connivens* | High | Moderate | High |
| glossy black cockatoo | *Calyptorhynchus lathami* | High | Moderate | High |
| brown falcon | *Falco berigora* | High | Low | Moderate |
| dusky woodswallow | *Artamus cyanopterus* | High | Low | Moderate |
| little lorikeet | *Glossopsitta pusilla* | Moderate | High | Moderate |
| regent honeyeater | *Anthochaera phrygia* | Moderate | High | Moderate |
| square-tailed kite | *Lophoictinia isura* | Moderate | Moderate | Moderate |
| wedge-tailed eagle | *Aquila audax* | High | Low | Moderate |
| *Common birds<br>apostlebird, Australian magpie, crested pigeon, eastern rosella, grey butcherbird, musk lorikeet, | Common birds*<br>*Struthidea cinerea, Gymnorhina tibicen, Ocyphaps lophotes Platycercus eximius, Cracticus torquatus, Glossopsitta concinna,* | High | Low | Moderate |

| Common Name | Species Name | Likelihood | Consequence | Risk Rating |
|---|---|---|---|---|
| nankeen kestrel, noisy miner, pied currawong, red-rumped parrot, spotted pardalote, striated pardalote, willie wagtail | *Falco cenchroides, Manorina melanocephala, Strepera graculina, Psephotus haematonotus, Pardalotus punctatus, Pardalotus striatus, Rhipidura leucophrys* | | | |
| large bentwing-bat | *Miniopterus schreibersii oceanensis* | Moderate | Moderate | Moderate |
| yellow-bellied sheathtail bat | *Saccolaimus flaviventris* | Moderate | Moderate | Moderate |
| Corben's long-eared bat | *Nyctophilus corbeni* | Moderate | Moderate | Moderate |
| eastern cave bat | *Vespadelus troughtoni* | Moderate | Moderate | Moderate |
| grey headed flying fox | *Pteropus poliocephalus* | High | High | High |

Of the species assessed, nine are rated as high risk and 23 are rated as a moderate risk of being impacted by the Project. No species returned a very high risk ranking.

Species with reported high risk ratings were primarily as a result of:

- the species' relative abundance in the Project Site and their predicted or observed flight behaviour in the Project Site (e.g. large bentwing-bat)
- known susceptibility to blade strike at wind farms in south-east Australia
- potential to fly within the Rotor Swept Area (RSA) and consequence of blade strike to populations of threatened species.

Based on these results, offsets will be required for the prescribed impact of turbine strike on protected animals. The BDAR provides a proposed mechanism for this offset as it is not specified under the BAM.

#### 6.4.3.4 Aquatic Impacts

The Project is predicted to result in a negligible impact to flow in local creeks and no water quality impacts are predicted. Therefore, there is negligible potential for impacting the aquatic ecology and in particular threatened species habitat. An assessment of significance in accordance with the *Fisheries Management Act 1994* (FM Act) is provided in the BDAR, concluding that the Project is unlikely to result in a significant impact on the purple spotted gudgeon. No additional threatened aquatic species, populations or EECs have potential to occur within the Development Corridor.

The surface water and groundwater impacts associated with the Project are not expected to result in an adverse impact on threatened aquatic species, endangered populations or ecological communities listed under the FM Act.

#### 6.4.3.5 Serious and Irreversible Impacts

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (Box Gum Woodland) is listed as a Serious and Irreversible Impact (SAII) entity and was assessed in accordance with the additional impact assessment criteria provided in Subsection 9.1.1 (for ecological communities) of the BAM. 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. The outcome of the SAII assessment indicated that the Project is unlikely to result in a serious and irreversible impact on the CEEC due to the small area of intact woodland of the CEEC that will be impacted.

### 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 6.15** and **Table 6.16** are required to offset the residual biodiversity impacts of the Project.

**Table 6.15 Biodiversity Offset Credits – Ecosystem**

| PCT | Vegetation Formation | No. Credits Required |
|---|---|---|
| PCT 81 – Western Grey Box – cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion | ModerateGood | 39 |
| | DNG | 33 |
| PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion | ModerateGood | 101 |
| | Thinned | 151 |
| | Planted | 226 |
| | DNG | 59 |
| PCT 267 – White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion | ModerateGood | 913 |
| | Thinned | 405 |
| | DNG | 239 |
| PCT 272 – White Box – Black Cypress Pine – Red Gum +/- Mugga Ironbark shrubby woodland in hills of the NSW central western slopes | ModerateGood | 1,121 |
| | Shrubby | 100 |
| | Thinned | 65 |
| | DNG | 993 |
| PCT 281 – Rough-Barked Apple – Red Gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion | ModerateGood | 1,193 |
| | DNG | 174 |
| PCT 467 – Blue-leaved Ironbark – Black Cypress Pine shrubby sandstone open forest in the southern Brigalow Belt South Bioregion (including Goonoo) | ModerateGood | 1,410 |
| | Shrubby | 362 |
| | Thinned | 102 |
| | DNG | 170 |
| PCT 468 – Narrow-leaved Ironbark – Black Cypress Pine +/- Blakely's Red Gum shrubby open forest on sandstone low hills in the southern Brigalow Belt South Bioregion (including Goonoo) | ModerateGood | 46 |
| | DNG | 25 |
| **Total** | | **7,927** |

Table 6.16 Biodiversity Offset Credits – Species

| Species Name | No. Credits Required |
|---|---|
| barking owl (*Ninox connivens*) | 578 |
| superb parrot (*Polytelis swainsonii*) | 1,650 |
| glossy black-cockatoo (*Calyptorhynchus lathami*) | 754 |
| **Total** | **2,282** |

### 6.4.5 Biodiversity Offset Strategy

In accordance with the SEARs, SQE is developing a biodiversity offset strategy in parallel with the biodiversity assessment to ensure that the credit liability of the Project can be acquitted in accordance with the requirements of the Biodiversity Offset Scheme and the Bilateral Agreement and prior to the commencement of construction. The following options are under investigation:

- establishment of Biodiversity Stewardship Sites to generate biodiversity credits
- retirement of credits sourced by the NSW Credit Supply Taskforce (CST) via a credit demand expression of interest
- sourcing and purchase credits available on the market
- payment into the Biodiversity Conservation Fund (BCF) for any residual credits not obtained via methods described above.

As outlined in **Appendix 10**, SQE is currently preparing a business case for two Biodiversity Stewardship Agreements (BSA) on two separate private properties. The business cases include vegetation zone and management zone mapping, a sub-sample of BAM vegetation integrity plots, assessment of potential threatened species habitat, a draft Total Fund Deposit (TFD) and likely credit yield. The business case is designed to contribute to the preparation of a full Biodiversity Stewardship Site Assessment Report (BSSAR) should the properties be deemed suitable for inclusion in the Biodiversity Offset Strategy. Based on initial investigation, the two potential offset sites are estimated to provide over 57% of the offset requirement for the Project. The investigation of these sites is ongoing.

SQE has also sought support from the NSW Credit Supply Taskforce (CST) to source the biodiversity credits required to be offset by the Project via an expression of interest (EOI). The CST is a NSW government entity established in 2022 that is seeking EOIs from proponents who would like assistance in sourcing biodiversity credits. In response to SQE's credit demand EOI, the CST will work proactively with landholders to create the required credits, which can then be sold to SQE at purchase price plus cost recovery. At the time of writing, no feedback on the EOI had been received from the CST.

For credits not sourced through BSAs established by SQE or via the CST, credits may be purchased from market, following to process described below:

- All credits required for the Project will be advertised on the Biodiversity Offsets Scheme (BOS) 'Credit demand register'. Any offers from existing BSAs holders to sell residual credits required will be considered on a value for money basis.

- The BOS 'Credit supply register' will be monitored for credits available in the market. If credits needed are displayed as available, credit holders will be approached with a price offer to purchase those credits.

- SQE will seek the aid of credit brokers operating within the BOS to source available or upcoming credits in the market. Suitable available credits will be assessed on a value for money basis.

SQE may also use payment into the Biodiversity Conservation Fund as a means of acquitting credit obligations. This is most likely to occur for residual credits that were unable to be acquired through stewardship agreements established by SQE entities. A Biodiversity Conservation Fund charge quote for payment into the fund will be sought should the Project be approved.

The offset liability incurred by the Project will be fully acquitted through a combination of the above options. The final breakdown of how the offset liability will be acquitted will continue to develop with land and credit holder negotiations and refinement of the impact footprint. As outlined in **Appendix 10**, current estimates demonstrate that approximately 57% of the total ecosystem credit liability will likely be secured through the establishment of four BSAs currently under consideration. It is likely that sufficient credits can be sought from the market to retire the credit obligation of the Project without having to significantly rely on make payment to the BCF.

### 6.4.6 Matter of National Environmental Significance

As discussed in **Section 4.0**, the Project was referred under the EPBC Act the Minister via DCCEEW and was determined to be a controlled action (EPBC 2022/09387) on 4 January 2023. The decision also confirms that the Project is to be assessed under the bilateral agreement under the EP&A Act.

DCCEEW has determined that the Project is likely to have a significant impact on the following listed threatened species and communities (Section 18 and 18A):

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered Ecological Community (CEEC)

- koala (*Phascolarctos cinereus*) (combined populations of Queensland, New South Wales and the Australian Capital Territory) – Endangered

- regent honeyeater (*Anthochaera phrygia*) – Critically Endangered

- white-throated needletail (*Hirundapus caudacutus*) – Vulnerable

- superb parrot (*Polytelis swainsonii*) – Vulnerable.

And listed migratory species (sections 20 and 20A):

- white-throated needletail (*Hirundapus caudacutus*)

- fork-tailed swift (*Apus pacificus*)

- Latham's snipe (Gallinago hardwickii)

- rufous fantail (Rhipidura rufifrons).

In addition, DEECCW determined that Project may significantly impact on other listed threatened species and communities including but not limited to the following:

- Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – Endangered
- Large-eared pied bat (*Chalinolobus dwyeri*) – Vulnerable
- Corben's long-eared bat (*Nyctophilus corbeni*) – Vulnerable
- Grey-headed flying-fox (*Pteropus poliocephalus*) – Vulnerable
- Painted honeyeater (*Grantiella picta*) – Vulnerable
- South-eastern glossy black-cockatoo (*Calyptorhynchus lathami lathami*) – Vulnerable
- Spotted-tailed quoll (*Dasyurus maculatus maculatus*) (SE mainland population) – Endangered.

A summary of the impacts of the Project on the threatened species identified by DEECCW as being significantly impacted by the Project is provided in **Appendix 10**.

The koala was identified in referral documentation as potentially significantly impacted and the species was identified as a controlling provision under the Controlled Action determination. Further detailed survey and assessment was undertaken for the koala in accordance with the BAM and the species was not recorded and is considered unlikely to occur due to the highly degraded and patchy nature of the potential habitat in the Development Corridor.

**Summary of Assessment of Significance Outcomes**

**Table 6.17** and **Table 6.18** summarise the results of the assessment of significance outcomes for MNES that were considered likely to be significantly impacted by DEECCW, including those entities that 'may' be significantly impacted, as per the controlled action determination. A detailed assessment of significance is provided in **Appendix 10**.

**Table 6.17 Assessment of Significance Outcomes – Threatened Species and Communities**

| Impacted Entity | Area of Impact (ha) | Assessment of Significance Outcome |
|---|---|---|
| **Species and Communities Impacted** | | |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – CEEC | 43.2 | Recorded in the Development Corridor (and Development Footprint). Area of impact based on Development Footprint.<br>Likely to be significant. |
| Superb parrot (*Polytelis swainsonii*) – Vulnerable | 40.7 | Recorded in the Development Corridor. Area of impact based on Development Footprint. Potentially suitable breeding and foraging habitat for the species located with the Development Footprint.<br>Likely to be significant. |

| Impacted Entity | Area of Impact (ha) | Assessment of Significance Outcome |
|---|---|---|
| Regent honeyeater (*Anthochaera Phrygia*) – critically endangered | 104.5 | Not recorded in the Development Corridor. Area of impact based on Development Footprint. Potentially significant.<br>There is no overlap between the Project Site and the state prepared mapped important habitat for this species. The Project Site does not overlap key breeding and foraging locations listed in the Recovery Plan. |
| White-throated needletail (*Hirundapus caudacutus*) – Vulnerable | 129.7 | Recorded in the Development Corridor. Area of impact based on Development Footprint. The Project Site provides foraging habitat.<br>Potentially significant. |
| Large-eared pied bat (*Chalinolobus dwyeri*) – Vulnerable | 90.7 | Not recorded in the Development Corridor. Suitable diurnal roosting habitat has not been identified in the Project Site. It is assumed the Project Site supports potential foraging habitat for the species.<br>Unlikely to be significant. |
| Corben's long-eared bat (*Nyctophilus corbeni*) – Vulnerable | 82.8 | Not recorded in the Development Corridor. Potentially suitable foraging and breeding habitat for the species occurs across the Development Footprint.<br>Unlikely to be significant. |
| Grey-headed flying-fox (*Pteropus poliocephalus*) – Vulnerable | 104.5 | Not recorded in the Development Corridor, but there is potentially suitable habitat for the species within the Project Site.<br>Unlikely to be significant. |
| Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia - Endangered | 49.6 | Recorded in the Development Corridor. Area of impact based on Development Footprint.<br>Potentially significant. |
| **Species and Communities that may be Significantly Impacted** | | |
| Koala (*Phascolarctos cinereus*) (combines populations of Queensland, New South Wales and the Australian Capital Territory) – Endangered | 173.5 of habitat known to be preferred by the koala, however the species was not recorded despite extensive surveys | Not recorded in the Development Corridor, but potentially suitable habitat, though marginal, within the Project Site.<br>Unlikely to be significant. |
| Painted honeyeater (*Grantiella picta*) – Vulnerable | 104.5 | Not recorded in the Development Corridor, but potentially suitable habitat for the species within the Project Site.<br>Unlikely to be significant. |

| Impacted Entity | Area of Impact (ha) | Assessment of Significance Outcome |
|---|---|---|
| South-eastern glossy black-cockatoo (*Calyptorhynchus lathami lathami*) – Vulnerable | 15.7 (potentially suitable breeding and foraging habitat, which includes the 1.2 ha of breeding habitat that is generating a credit liability for the species) | Recorded in the Development Corridor. Area of impact based on Development Footprint. Potentially suitable breeding and foraging habitat for the species across the Development Footprint.<br>Unlikely to be significant. |
| Spotted-tailed quoll (*Dasyurus maculatus maculatus*) (SE mainland population) – Endangered | 69.4 | Not recorded in the Development Corridor, but potentially suitable habitat for the species across the Development Footprint.<br>Unlikely to be significant. |

**Table 6.18 Assessment of Significance Outcomes – Migratory Species**

| Impacted Entity | Summary of Impact | Assessment of Significance Outcome |
|---|---|---|
| White-throated needletail (*Hirundapus caudacutus*) – Migratory (CAMBA, JAMBA, ROKAMBA) | Disruption to migratory routes and potential for mortality during migration | Potentially significant |
| Fork-tailed swift (*Apus pacificus*) – Migratory (CAMBA, JAMBA, ROKAMBA) | | |
| Latham's snipe (*Gallinago hardwickii*) – Migratory (Bonn, JAMBA, ROKAMBA) | | |
| Rufous fantail (*Rhipidura rufifrons*) – Migratory (Bonn) | | |

### MNES Offsets

As outlined in **Section 6.4.5**, SQE is developing a biodiversity offset strategy to ensure that the credit liability of the Project can be acquitted in accordance with the requirements of the Biodiversity Offset Scheme and the Bilateral Agreement.

**Table 6.19** outlines the credit that will be required to offset ecosystems that are relevant to MNES that are predicted to be directly impacted by the Project, as calculated by the BAM. The MNES that were determined by DCCEEW to be significantly or potentially significantly impacted by the Project are included in the credit liability for ecosystem and relevant species-credits required to be offset and therefore all residual impacts on MNES will be offset.

Table 6.19 Ecosystem and Species-credit Species credits relevant for impacted MNES

| MNES | PCTs and Habitats | Area of Impact (ha) | Credits Required |
|---|---|---|---|
| **Threatened Ecological Communities** | | | |
| **Box Gum Woodland** | 281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion | 27.1 | 1,367 |
| | 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion | 16.1 | 537 |
| | **TOTAL** | **43.2** | **1,904** |
| **Inland Grey Box Woodland** | 81 - Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion | 2.7 | 72 |
| | 267 - White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion | 46.9 | 1,557 |
| | **TOTAL** | **49.6** | **1,629** |
| **White-throated needletail** | Potential habitat occurs in the arial space above all woodland in the Development Footprint | 269.2 | All credits generated by the Project will provide habitat for white-throated needletail |
| **Species Credits – known impacts** | | | |
| **Superb parrot (*Polytelis swainsonii*)** | Species polygon | 40.7 | 1,650 |
| **Glossy black-cockatoo (*Calyptorhynchus lathami*)** | Species polygon | 1.2 | 54 |

The Biodiversity Offset Strategy will be developed with consideration of the need to compensate for residual significant impacts to White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands, the superb parrot (*Polytelis swainsonii*) and the glossy black-cockatoo (*Calyptorhynchus lathami*), with the aim to maintain or improve the biodiversity values of the surrounding region in the medium to long term. This aim will be delivered through the securing of in-perpetuity 'like-for-like' land-based offsets and in conjunction with the various impact mitigation and offset strategies that are proposed to be employed as part of the Project.

## 6.5 Aboriginal Cultural Heritage

The Project Site falls on the land of the Wiradjuri people within the Dubbo Local Aboriginal Land Council (LALC) area.

An Aboriginal Cultural Heritage Assessment (ACHA) was undertaken by NSW Archaeology 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* (the Guide) (OEH 2011) and the *Aboriginal cultural heritage consultation requirements for proponents* (ACHCRs) (DECCW 2010b).

The full ACHA is included in **Appendix 11** and key findings are summarised in the sections below.

### 6.5.1 Existing Heritage Environment

The two principal Aboriginal networks of the region surrounding the Project Site are the Gamilaraay (often earlier referred to as the Kamilaroi) and the Wiradjuri peoples.

The Project Site can be characterised as a woodland resource zone. The hills would have possessed limited biodiversity and a general lack of water, and accordingly they are likely to have been utilised by Aboriginal people for a limited range of activities which may have included hunting and gathering, travel through country and possibly ceremonial purposes. Such activities are likely to have resulted in very low if not negligible levels of artefact discard. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity. By comparison, the valleys through which third order streams pass are likely to have possessed greater levels of biodiversity given the likely presence of chains of ponds and possibly also swampy meadows. Such areas are likely to have been favoured camp locations and accordingly the levels of artefact discard, diversity and complexity in valleys within the Project Site are predicted to be correspondingly higher.

Searches of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) were conducted for the Project Site and those parts of the transport corridor where off-road impacts would occur at the commencement of the assessment. Three previously recorded Aboriginal sites were identified within these areas and investigated further during field surveys (refer to **Section 6.5.4** for additional details).

### 6.5.2 Consultation

A major 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. The consultation for the Project followed the ACHCRs (DECCW 2010b) and a log and copies of correspondence with Aboriginal community stakeholders is presented in Appendix 3 of the ACHA (refer to **Appendix 11**).

Consultation was undertaken in four main stages, being:

- 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 Phases**

| Phase | Details |
|---|---|
| **Stage 1 – Notification and Registration of Interest** | In May 2022, individual targeted emails 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 Site.<br>As a result, 14 registered Aboriginal parties (RAPs) 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, proposed consultation process and assessment methodology was provided to the RAPs for comment in June 2022. |
| **Stage 3 – Gathering Information about Cultural Significance** | Information about Aboriginal cultural values was gathered through desktop and field assessment work. It is noted that information about Aboriginal places, areas or objects was not identified as a result of the process of Aboriginal consultation undertaken. No cultural knowledge relating to the Project Site was received despite the explicit request to provide such during the consultation process. No cultural values of the Project Site were indicated by the RAP representatives during the field work. |
| **Stage 4 – Review of the Draft ACHA** | A copy of the draft ACHA was provided to all RAPs in March 2023 with an invitation to review and comment on all aspects of the document, noting that information on cultural significance and any recommendations provided from an Aboriginal cultural perspective would be documented in the final ACHA.<br>Following the RAP review, one response was received Wellington Valley Wiradjuri Aboriginal Corporation (WVWAC) on 2 April 2023. WVWAC advised that the report findings were a true record of what was conducted and what was found and that the WVWAC agree to the findings of the Draft ACHA and Archaeological Report for the Project. |

## 6.5.3 Survey Method

As part of the ACHA a detailed field survey was undertaken 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 (e.g. rock shelters with rock-art)
- 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 90 Survey Units which were defined according to landform morphological criteria and were utilised as a framework for the assessment, analysis and formulation of management and mitigation measures. Consideration was given to how First Nations people are likely to have used each Survey Unit to predict and define the corresponding nature of archaeological evidence resulting from that activity.

Field surveys were conducted over 18 days between 22 August 2022 and 14 September 2022 by two archaeologists with assistance on each day provided by Sites Officers from the Dubbo Local Aboriginal Land Council and RAP groups. The field surveys were aimed at locating Aboriginal objects. An assessment was also made of landscape, prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the archaeological sensitivity of the land.

Following the identification of areas of potential archaeological deposit (that is areas with the potential to contain subsurface artefacts), test excavation was also undertaken in eight of the Survey Units during a ten-day program in December 2022 to confirm the predictive model for the Project Site.

The transport route to the Project Site from the Port of Newcastle was also subject to a desktop assessment (and field assessment where required) to assess any impacts associated with the works required to support OSOM vehicle deliveries to the site.

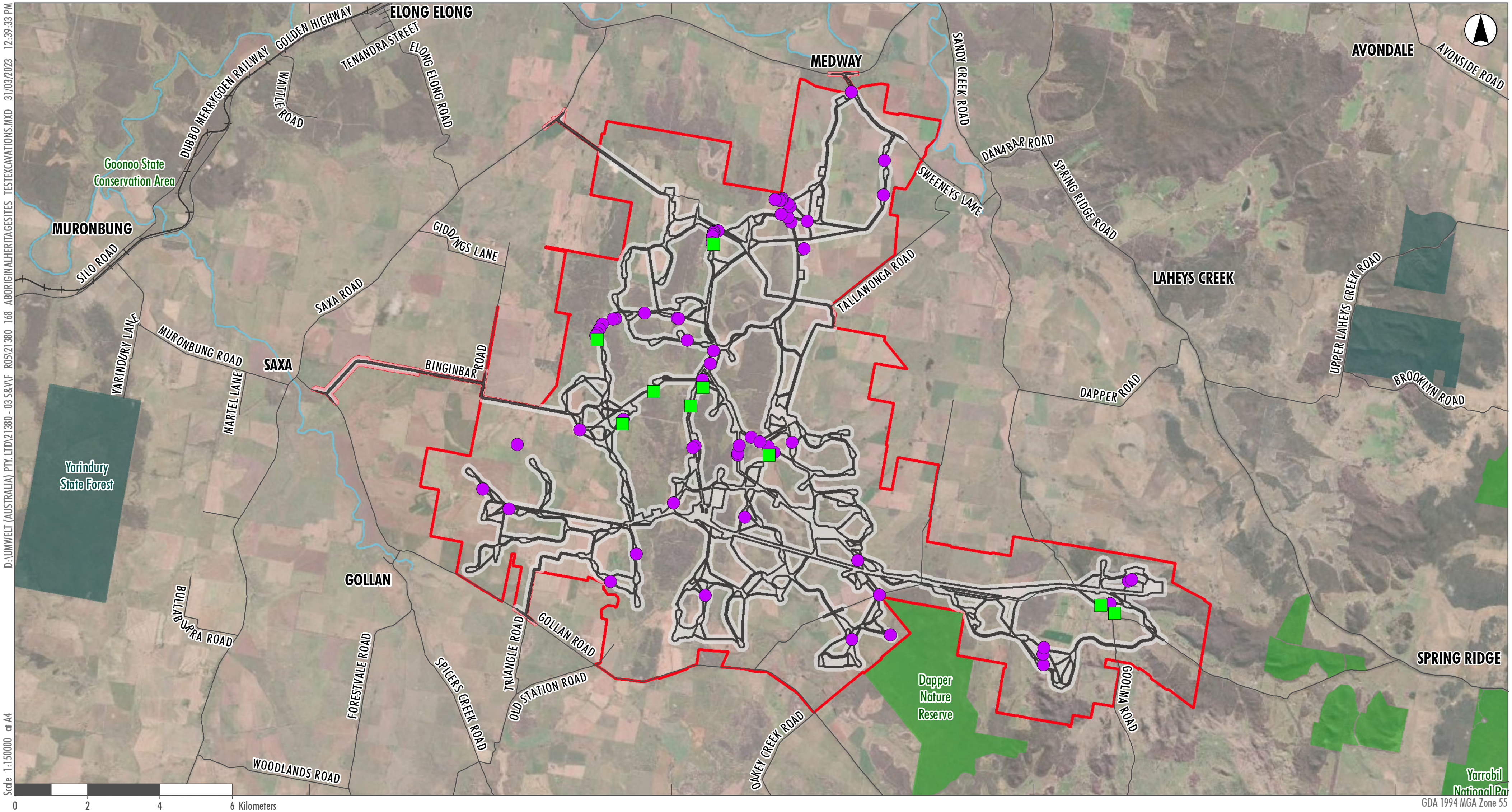
## 6.5.4 Results

Searches of relevant heritage registers identified that there are no Commonwealth or World listed heritage places located within or in proximity to the Project Site, and there are no State listed or locally listed heritage places or items located within the Project Site.

Searches of the Heritage NSW AHIMS were conducted for the Project Site and those parts of the transport corridor where off-road impacts would occur. One previously recorded Aboriginal site was identified within the Project Site (AHIMS site #36-2-0063 identified in 1998) and is described as low density scatter of quartz artefacts in a ploughed wheat field and located 450 m from Medway Creek. This site was inspected during the field survey, however, no artefacts were found. The Gollan Road/Goolma Road AHIMS site search revealed two culturally modified trees, however, a field inspection confirmed that the two trees are outside areas of proposed impact. The Gollan Road into Lambing Hill Road AHIMS site search revealed the presence of one site with restricted access which is not in the area of proposed impact, and a field inspection confirmed that no further Aboriginal sites were present.

During field assessments, a total of 61 stone artefact locales, two grinding groove sites and one potential stone procurement area were recorded (refer to **Figure 6.7**) in addition to the previously recorded AHIMS site. While artefact distribution was found to be generally widespread, significant variability in the density of materials was evident. The majority of the Development Corridor was found to be of very low archaeological potential. In particular, the elevated, exposed ridge crests and simple slopes were generally assessed to contain very low if not negligible artefact distribution. However, certain areas located within lower landforms such as basal slopes and flats in areas adjacent to 3rd order streams were assessed to be of higher archaeological potential and particularly in areas which are stable and without high levels of erosion.

Test excavations were conducted in eight Survey Units (refer to **Figure 6.7** for locations) and a total of 1,156 artefacts were recovered. The results largely corresponded to the original predictions made for each of the Survey Units. The majority of artefacts retrieved were pieces of flaked stone representing material from stone knapping and dominated by locally sourced quartz material.

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Legend

- Project Site
- Development Corridor
- Development Footprint
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway
- Aboriginal Heritage sites
- Test Excavation sites

FIGURE 6.7

**Aboriginal Heritage Sites and Test Excavations**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

### 6.5.5 Assessment of Significance and Impacts

Previous land use in the region has resulted in reasonably significant environmental impacts and a generally degraded landscape as it relates to archaeological resources. Artefact distribution is assessed to be generally negligible, very low or low across the majority of the Development Corridor. 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.

Aboriginal cultural heritage sites are assessed under the following categories of significance, derived from the International Council on Monuments and Sites (ICOMOS) *Burra Charter* (Australian ICOMOS, 1999):

- social or cultural value to contemporary Aboriginal people
- historical value
- scientific/archaeological value
- aesthetic value.

As discussed in **Section 6.5.2**, no social or cultural values were identified during the consultation process and field survey.

The scientific significance of the recorded Aboriginal artefact locales in the Project Site was assessed, with most of the Aboriginal object locales in the Development Corridor being of low significance within a local context. Of the remainder:

- three were assessed as being of high significance (SCWF SU12/L5, SCWF SU20/L1 and SCWF SU33/L1)
- four of moderate significance (SCWF SU2/L1, SCWF SU19/L5, SCWF SU19/L6 and SCWF SU76/L3)
- five of low/moderate significance (SCWF SU25/L1, SCWF SU29/L1, SCWF SU39/L2 and SCWF SU76/L4, SCWF SU80/L2) within a local context.

**Table 6.21** provides a summary of the archaeological significance and potential impact for recorded sites of high, moderate and low/moderate significance within the Development Corridor. SQE has made a commitment to avoid impacts to all high significance sites and the grinding groove site of moderate significance (SCWF SU2/L1), hence the type and degree of harm for these sites is listed as 'nil'. Proposed impacts will be discrete in nature and will occupy a relatively small footprint within the overall Development Corridor. Accordingly, impacts to all other object locales can be considered to be partial in nature, rather than comprehensive, where only part of a particular artefact locale is within the Development Corridor.

**Table 6.21 Archaeological Significance Assessment (excluding low significance objects)**

| Object ID | Artefact density | Significance (local) | Type of harm | Degree of harm |
|---|---|---|---|---|
| SCWF SU12/L5 | Very low | High | Nil | Nil |
| SCWF SU20/L1 | N/A – grinding groove site | High | Nil | Nil |
| SCWF SU33/L1 | Very low | High | Nil | Nil |

| Object ID | Artefact density | Significance (local) | Type of harm | Degree of harm |
|---|---|---|---|---|
| SCWF SU2/L1 | N/A – grinding groove site | Moderate | Nil | Nil |
| SCWF SU19/L5 | Moderate | Moderate | Direct | Partial |
| SCWF SU19/L6 | Moderate | Moderate | Direct | Partial |
| SCWF SU76/L3 | Moderate | Moderate | Direct | Partial |
| SCWF SU25/L1 | N/A – potential stone procurement area | Low/moderate | Direct | Partial |
| SCWF SU29/L1 | Low/moderate | Low/moderate | Direct | Partial |
| SCWF SU39/L2 | Low/moderate | Low/moderate | Direct | Partial |
| SCWF SU76/L4 | Low/moderate | Low/moderate | Direct | Partial |
| SCWF SU80/L2 | Low/moderate | Low/moderate | Direct | Partial |

### 6.5.6 Mitigation and Management Measures

The ACHA concluded that there are no heritage constraints with regard to the Project, however, there is the opportunity to minimise and mitigate impacts. SQE has committed to undertake management and impact mitigation measures for all Aboriginal object locales within the Development Corridor identified as being of high, moderate or low/moderate significance (as identified in **Section 6.5.5** above) and these are detailed in **Table 6.22**.

**Table 6.22 Management and Impact Mitigation**

| Object ID | Artefact density | Significance (local) | Management/Mitigation Measures |
|---|---|---|---|
| SCWF SU12/L5 | Very low | High | Conservation.<br>Locale will be excluded from inadvertent impacts by fencing and clear signage as no go zone. |
| SCWF SU20/L1 | N/A – grinding groove site | High | Conservation.<br>Locale will be excluded from inadvertent impacts by fencing and clear signage as no go zone.<br>Archival recording (orthophotography and surveying) will be undertaken. |
| SCWF SU33/L1 | Very low | High | N/A as there will be no impact to this site. |
| SCWF SU2/L1 | N/A – grinding groove site | Moderate | Conservation.<br>Locale will be excluded from inadvertent impacts by fencing and clear signage as no go zone. |
| SCWF SU19/L5 | Moderate | Moderate | Impacts will be minimised as much as feasible.<br>Locale will be included in an impact mitigation program including artefact collection and salvage excavation. |
| SCWF SU19/L6 | Moderate | Moderate | Impacts will be minimised as much as feasible. |
| SCWF SU76/L3 | Moderate | Moderate | Impacts will be minimised as much as feasible.<br>Locale will be included in an impact mitigation program including artefact collection and salvage excavation. |

| Object ID | Artefact density | Significance (local) | Management/Mitigation Measures |
|---|---|---|---|
| SCWF SU25/L1 | N/A – potential stone procurement area | Low/moderate | Conservation.<br>Locale will be excluded from inadvertent impacts by fencing and clear signage as no go zone. |
| SCWF SU29/L1 | Low/moderate | Low/moderate | Impacts will be minimised as much as feasible. |
| SCWF SU39/L2 | Low/moderate | Low/moderate | Impacts will be minimised as much as feasible. |
| SCWF SU76/L4 | Low/moderate | Low/moderate | Impacts will be minimised as much as feasible. |
| SCWF SU80/L2 | Low/moderate | Low/moderate | Impacts will be minimised as much as feasible. |

There are no areas within the Development Corridor that can be characterised as places with a high probability of possessing subsurface Aboriginal objects with high potential conservation value. Accordingly, further archaeological test excavation is not warranted.

In addition to the locale-specific management measures detailed in **Table 6.22** above, SQE has also committed to the following management measures:

- development of a Heritage Management Plan in consultation with the RAPs and Heritage NSW to guide the management of heritage values for the Project, including incorporating the feedback received during the development of the ACHA (i.e. artefacts will be buried back on-site)
- training of personnel involved in the construction and operational phases of the Project in relevant management measures relating to cultural heritage
- completion of Aboriginal Site Impact Recording Forms for each Aboriginal object/site impacted during construction of the Project and submission to Heritage NSW.

## 6.6 Historic Heritage

A Historic Heritage Impact Assessment (HHIA) was undertaken by NSW Archaeology with the objectives of:

- identifying listed heritage items located in proximity to the Project Site
- describing any historic items recorded during fieldwork
- assessing any areas of historical archaeological potential within or in proximity to the Project Site
- assessing the likelihood, extent and nature of potential impacts to any listed or unlisted items of heritage significance located within or in proximity to the Project Site
- presenting appropriate measures to avoid, manage and/or mitigate any identified impacts.

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:

- The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999 (Australia ICOMOS, 2000) (the Burra Charter).

- Assessing Significance for Historical Archaeological Sites and 'Relics' (NSW Heritage Branch, Department of Planning, 2009).
- *The Historical Archaeology Code of Practice* (NSW Heritage office, Department of Planning, 2006).

The full HHIA is contained in **Appendix 12** and a summary of results provided below.

### 6.6.1 Existing Heritage Values

Statutory heritage registers were reviewed as part of the HIA and identified the following:

- no Commonwealth or Nationally listed heritage items or places are located within the Project Site
- no State listed heritage items are located within the Project Site
- no items listed on any s170 Heritage and Conservation Registers (NSW State agency heritage registers) are located within the Project Site
- no items listed on Schedule 5 of an LEP are located within the Project Site.

Although the Project Site does not contain any listed heritage items there are several local heritage items in the surrounding region. **Table 6.23** below provides details of these items.

**Table 6.23 Listed Local Heritage Items near to the Project Site**

| Local Heritage Item | Listing Details | Location |
|---|---|---|
| **Cobbora Police Station Court House and Gaol** | Warrumbungle LEP | Approximately 8 km to the north-east of the Project Site |
| **Cobbora (Former) School and Residence** | Warrumbungle LEP | Approximately 8 km to the north-east of the Project Site |
| **Cobbora General Cemetery** | Warrumbungle LEP | Approximately 8 km to the north-east of the Project Site |
| **Elong Elong General Cemetery** | Dubbo Regional LEP | Golden Highway, Elong Elong, several kilometres north-west of the Project Site |
| **Gollan Hall & War Memorial** | Dubbo Regional LEP | 36 Gollan Hall Road, Gollan |

The HHIA includes a detailed account of the historic context of the region surrounding the Project Site, from the time of European arrival and the alienation of lands through the exploration of the early 1800s, and the establishment of pastoralism and agriculture, mining, transportation networks, towns and settlements. This review of historic context informed the consideration of the general historic archaeological potential of the area.

### 6.6.2 Methodology

A field survey for historic heritage was undertaken in parallel with the desktop studies. The field survey involved a pedestrian-based inspection of the Development Corridor in tandem with the Aboriginal heritage field surveys in August/September 2022 over 18 days of fieldwork. Field recordings of potential heritage items involved photographic records, mapping with handheld GPS, and observations regarding fabric, artefacts, site condition and archaeological deposits. The aim of these recordings was to compile sufficient information to assess the heritage significance of individual items and the broader landscape.

## 6.6.3 Field Survey Results and Assessment of Significance

The historic items recorded within the Project Site are listed in **Table 6.24** along with the significance assessment of each item.

**Table 6.24 Potential Heritage Items and Assessment of Significance**

| Item ID | Easting | Northing | Description | Significance Assessment |
|---|---|---|---|---|
| SCWF SU4/H1 | 703877 | 6440557 | Old peppercorn trees in 10 x 10 m area. | Does not have significant heritage value |
| SCWF SU10/H1 | 703732 | 6439358 | Old wood power pole alignment | Does not have significant heritage value |
| SCWF SU17/H1 | 698744 | 6437652 | Tree with surveyor's mark | Does not have significant heritage value |
| SCWF SU22/H1 | 697564 | 6434222 | Metal dam scoop | Does not have significant heritage value |
| SCWF SU43/H1 | 704247 | 6433405 | Alignment of wooden fence posts on crown road | Does not have significant heritage value |
| SCWF SU47/H1 | 701049<br>701040 | 6437628<br>6437573 | Historic dam and stone wall | Does not have significant heritage value |
| SCWF SU57/H1 | 699278 | 6936832 | Homestead site in 40 x 40 m area | Does not have significant heritage value |
| SCWF SU71/H1 | 711453 | 6428009 | Vintage farm machinery in 50 x 50 m area | Does not have significant heritage value |

None of the historic items are assessed as having heritage significance under any of the NSW Heritage Council's significance criteria. While all items are components of rural and agricultural life and endeavour, none are important examples in the course or pattern of NSW's cultural or natural history.

## 6.6.4 Impact Assessment, Mitigation and Management

The Project Site is an agricultural/grazing landscape that bears witness to the labour and life of generations of farmers. The historic items recorded in the Development Corridor are testimony to rural life and toil. None of the items are of local or State heritage significance. However, where these items occur within the Development Corridor, the HIA has recommended that they be avoided where feasible or otherwise impact is minimised where practicable. Where avoidance is not practicable, the recommended mitigation measures are provided in **Table 6.25**.

SQE will develop a Heritage Management Plan, in consultation with an archaeologist, to document the procedures for impact management and/or mitigation including heritage management training requirements for site personnel.

**Table 6.25 Management and Impact Mitigation Measures**

| Item ID | Description | Location and Impact | Impact Mitigation |
|---|---|---|---|
| SCWF SU4/H1 | Old peppercorn trees in 10 x 10 m area. | Outside Development Corridor<br>No impacts | None required |
| SCWF SU10/H1 | Old wood power pole alignment | In Development Corridor<br>Impacts possible | Avoid poles if feasible, or remove to adjacent site as per landowner's advice |
| SCWF SU17/H1 | Tree with surveyor's mark | In Development Corridor<br>Impacts possible | Avoid clearance of tree if practical, otherwise undertake archival recording |
| SCWF SU22/H1 | Metal dam scoop | In Development Corridor<br>Impacts possible | Avoid impacts and relocate as per landowner's advice |
| SCWF SU43/H1 | Alignment of wooden fence posts on crown road | In Development Corridor<br>Impacts possible | Avoid fence posts if practical, otherwise undertake archival recording |
| SCWF SU47/H1 | Historic dam and stone wall | In Development Corridor<br>Impacts possible | Avoid impacts or otherwise undertake archival recording |
| SCWF SU57/H1 | Homestead site in 40 x 40 m area | In Development Corridor<br>Impacts possible | Avoid impacts to site if practical otherwise conduct archival recording |
| SCWF SU71/H1 | Vintage farm machinery in 50 x 50 m area | Outside Development Corridor<br>No impacts | None required |

## 6.7 Transport

The impacts of the Project on traffic during the construction phase were identified as a key potential impact by community stakeholders. While stakeholders held concerns for increased traffic and road movements causing disruption to their way of life, potential improvements in local road infrastructure were considered to be one of the Project's potential key benefits.

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 including:

- Details of the peak and average traffic volumes and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials.
- 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 OSOM 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 any 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.

- Details of measures to mitigate and/or manage potential impacts including a schedule of all required road upgrades (including resulting from OSOM traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road and/or rail authority.

A Transport Assessment was prepared by Samsa Consulting Pty Ltd and is contained in **Appendix 13**, with the key outcomes summarised below. A detailed transport Route Study has also been prepared for the Project by Rex J Andrews Pty Ltd (RJA) (2022) to provide information on the transport route constraints for the movement of OSOM vehicles, and is contained in **Appendix 14**.

Rail transport options were considered specifically for OSOM equipment in terms of transporting them part of the way to the site, but are presently not considered a feasible option. The use of rail transport is not proposed and is therefore not considered further in this assessment.

### 6.7.1 Existing Transport Network

As discussed in **Section 3.3.8**, the Project includes two primary site access points to be located on:

- Sweeneys Lane, off the southern side of Golden Highway.

- Tallawonga Road off the eastern side of Saxa Road.

These access points would be used for all OSOM deliveries to the Project Site as well as for standard heavy and light vehicles. Two secondary site accesses for standard heavy and light vehicles only are proposed (refer to **Figure 3.8**), being:

- The northern side of Gollan Road at Binginbar Road.

- Ben Hoden Road off Gollan Road.

The proposed OSOM transport routes to the Project Site from the Port of Newcastle are identified in **Figure 3.9** and discussed in **Section 3.3.8**.

The major road network provides a relatively high standard of road infrastructure, generally suitable for transport by larger/longer articulated vehicles. These routes have relatively wide carriageways and road formations, pavement line marking, and controlled access to side roads.

Classifications and descriptions of key access roads are described in **Table 6.26**.

**Table 6.26 Key Roads**

| Road Name | Classification | Description |
|---|---|---|
| **Golden Highway** | State Highway (B84) | Arterial route from New England Highway between Branxton and Singleton to the Newell Highway at Dubbo, passing through Denman, Merriwa and Dunedoo.<br>Generally a two-lane, undivided road with varying shoulder widths and formations and a 100 km/h speed limit.<br>Pavement condition is generally good while the road environment and alignment are generally conducive to OSOM and heavy vehicle transport. |
| **Saxa Road** | Regional Road (MR353) | Formerly known as Cobbora Road.<br>Regional connection between Mitchell Highway at Wellington and Golden Highway at Elong, providing a major link for local community access including one school bus route (morning and afternoon) servicing schools in Wellington.<br>Single carriageway, two-lane road with a 100 km/h speed limit.<br>Pavement is asphalt in average condition, although there were a number of sections undergoing pavement upgrades at the time of inspection due to significant rainfall in the area compromising the road carriageway surface. |
| **Gollan Road** | Regional Road (RR7512) | Connecting the village of Goolma in the south with Saxa Road and then Golden Highway in the north via Muronbung Road.<br>Single carriageway, two-lane road with a 100 km/hr speed zone.<br>Pavement is asphalt in average condition. |
| **Sweeneys Lane** | Unclassified | Local road providing access to a small number of properties between Golden Highway in the north and Sandy Creek Road to the south-east (approximately 6 km in length). It is an unsealed earth, single carriageway local road with no designated speed zones.<br>Relatively consistent in condition and standard for the majority of its length with an approximate 6 m width and varying shoulder conditions.<br>Sight distance along Golden Highway is substantial with at least 250 m available in both directions along Golden Highway at both locations. |
| **Tallawonga Road** | Unclassified | Local access road with a relatively narrow carriageway width between approximately 3 m to 4 m.<br>Unsealed road surface condition in poor to average condition with numerous sections displaying rutting/potholes and uneven running surfaces due to poor distribution of sub-base material. |

Road upgrade works are likely to be required at a number of locations to accommodate the increased heavy vehicle volumes and OSOM transport vehicles. As described in **Section 3.3.4.10**, these works will include the upgrade of four local intersections (Golden Highway/Sweeneys Lane, Saxa Road/Tallawonga Road, Gollan Road/Binginbar Road, and Gollan Road/Ben Hoden Road) and potential modifications or minor treatments to a series of other locations along the OSOM transport route (as outlined in **Table 3.4**).

Upgrades to the State road network to facilitate the transport of OSOM components from the Port of Newcastle to the Project Site will be undertaken by the NSW government. This will be subject to a separate approval pathway and includes the two intersection upgrades off the Golden Highway (Golden Highway/Sweeneys Lane and Golden Highway/Saxa Road).

Traffic volume data for major roads was obtained from traffic count surveys undertaken during mid-August 2022 (refer to **Table 6.27**). Current 2022 traffic volumes along the minor local road network (Sweeneys Lane, Tallawonga Road, Binginbar Road and Ben Hoden Road) were not surveyed due to the local nature of the roads (property accesses), their very minor use and local road closures at some of the locations at the time of the surveys. All these minor access roads are characterised by the 'closed' nature of their local road network, which results in minimal through traffic flows – estimated maximum daily traffic of 20 vehicles and most likely significantly less.

**Table 6.27 Existing Traffic Volumes**

| Road | Vehicles per day | Vehicles per (peak) hour | Heavy vehicles (%) |
|---|---|---|---|
| Golden Highway (east of Saxa Road) | 960 | 102 | 23 |
| Saxa Road (near Golden Highway) | 420 | 39 | 28 |
| Saxa Road (at Gollan Road) | 650 | 82 | 18 |
| Gollan Road (east of Saxa Road) | 615 | 60 | 16 |

An evaluation of existing road safety was also undertaken based on the TfNSW Centre for Road Safety's crash statistics over the latest five-year recording period (2017 to 2021 inclusive) for the surrounding road network comprising Golden Highway between Sweeneys Lane (Project Site access) in the east to Saxa Road in the west, Saxa Road between Golden Highway in the north and Gollan Road in the south and Gollan Road between Saxa Road in the west and Ben Hoden Road (Project Site access) in the east. The data revealed the following pertinent issues:

- There was a total of 10 crashes recorded over the subject five-year period, including a single fatal crash, a single serious-injury crashes and three moderate-injury crashes. The other incidents were two minor-injury crashes and three non-casualty (tow-away) crashes.
- The majority (8) of the crashes involved vehicles travelling off the road (left or right) including the single fatal crash and all of the four significant injury crashes. The remaining incidents occurred on a straight section of road with the cause indeterminate or resulting from striking an animal on the road.
- Significantly, none of the crashes occurred in the vicinity of any of the proposed primary or secondary site access points for the Project.
- The crash rate for the subject section of road network is approximately 18.4 crashes per 100 million-vehicle-kilometres travelled (100 mvkt), which is considered to be moderate/average for a rural highway area.

In summary, the relevant surrounding rural road network is not considered to present any significant or extraordinary road safety risks or exposure. Nevertheless, SQE recognise that additional traffic volumes associated with the Project and cumulative impacts associated with other projects present additional risks which have been considered in the impact assessment below and in the development of appropriate traffic management measures (refer to **Section 6.7.3**).

## 6.7.2 Assessment of Impacts

### 6.7.2.1 Road Capacity

**Construction**

During the construction phase, several tasks would generate traffic:

- Wind farm component delivery including nacelle, drive-train, blades, hub, tower, substation transformers, substation buildings, switching equipment, overhead transmission lines and WTG erection cranes.
- Construction material delivery including gravel/road base for construction of site access roads, constituent materials for the on-site concrete batch plant, water, steel reinforcement deliveries for foundation construction, steel strands and cabling for the transmission lines, and other miscellaneous materials deliveries for site offices.
- Construction staff transport movements.

Traffic generation used in the Traffic Assessment ranges from a moderate (average) scenario, that would apply for the majority (34 months) of the 40-month construction period, to a conservative (high) scenario, which assumes that peak construction staff numbers would coincide with other peak traffic generating activities, as well as delivery of WTG components. While the conservative (high) scenario could potentially occur, it is more likely that peak access road construction activities would be undertaken during the earlier stages of the construction program and not necessarily coincide with peak construction staff numbers and other peak construction activities such as concrete foundation pours. Nonetheless, this conservative overlap of activities has been adopted to consider a 'worst-case' scenario as well as the more applicable and relevant moderate (average) scenario.

Typically, the conservative (high) traffic generation scenario would result in a maximum daily traffic generation of 590 light vehicle trips and up to 106 heavy vehicle trips per day inclusive of 10 OSOM vehicle trips. For the majority of the construction period, a moderate (average) traffic generation scenario has been assumed where maximum daily traffic generation would be 320 light vehicle trips and up to 66 non-OSOM heavy vehicle trips per day.

To assess the potential impacts on road capacity, the traffic generation of OSOM, heavy and light vehicles have been added to existing daily and peak hour traffic flows to obtain future traffic flows (for both moderate and conservative traffic generation scenarios) along the affected road network.

Future traffic volumes in vehicles per day and vehicles per hour for roads along the preferred transport access route are shown in **Table 6.28**. Note that the figures in brackets are for the conservative (high) traffic generation scenario.

**Table 6.28 Construction Traffic Assessment**

| Traffic Scenario | Golden Highway | Saxa Road | Gollan Road |
|---|---|---|---|
| **Daily traffic (vehicles per day)** | | | |
| **Current traffic:** | | | |
| Light vehicles | 740 | 420 | 520 |
| Heavy vehicles | 220 | 120 | 100 |
| **Project traffic generation:** | | | |
| Light vehicles | 160 (295) | 128 (236) | 128 (236) |
| Heavy vehicles | 66 (106) | 66 (106) | 66 (90) |
| **Combined traffic:** | | | |
| Light vehicles | 900 (1,035) | 548 (656) | 643 (751) |
| Heavy vehicles | 286 (326) | 186 (226) | 166 (190) |
| **Hourly (peak) traffic (vehicles per hour)** | | | |
| **Current traffic:** | | | |
| Light vehicles | 102 | 46 | 50 |
| Heavy vehicles | 23 | 14 | 10 |
| **Project traffic generation:** | | | |
| Light vehicles | 80 (148) | 64 (118) | 64 (118) |
| Heavy vehicles | 16 (31) | 16 (31) | 16 (25) |
| **Combined traffic:** | | | |
| Light vehicles | 182 (250) | 110 (164) | 114 (168) |
| Heavy vehicles | 39 (54) | 30 (45) | 26 (35) |
| **Level of Service** | | | |
| Current LoS | A | A | A |
| Combined traffic LoS | A/B | A/B | A/B |

Road capacity can be expressed and qualified along a section of the road network as its 'level of service' (LoS). The LoS descriptions are as follows:

- LOS A: Free flow conditions, high degree of freedom for drivers to select desired speed and manoeuvre within traffic stream. Individual drivers are virtually unaffected by the presence of others in the traffic stream.
- LOS B: Zone of stable flow, reasonable freedom for drivers to select desired speed and manoeuvre within traffic stream.
- LOS C: Zone of stable flow, but restricted freedom for drivers to select desired speed and manoeuvre within traffic stream.
- LOS D: Approaching unstable flow, severely restricted freedom for drivers to select desired speed and manoeuvre within traffic stream. Small increases in flow generally cause operational problems.

- LOS E: Traffic volumes close to capacity, virtually no freedom to select desired speed or manoeuvre within traffic stream. Unstable flow and minor disturbances and/or small increases in flow would cause operational break-downs.
- LOS F: Forced flow conditions where the amount of traffic approaching a point exceeds that which can pass it. Flow break-down occurs resulting in queuing and delays.

The majority of the rural road network under consideration currently has significant spare capacity and is operating at high levels of service (LoS A). With the additional Project-generated traffic, the affected rural road network would change marginally to LoS B or C, even under the conservative (maximum peak) traffic generation scenario. In summary, the additional heavy vehicles and construction staff traffic during peak construction periods is able to be absorbed by the rural road network with the proposed road infrastructure upgrades at critical locations and construction traffic management.

Road/intersection upgrade works have been designed as part of the Project for:

- Gollan Road/Ben Hoden Road intersection.
- Gollan Road/Binginbar Road intersection.
- Saxa Road/Tallawonga Road intersection.
- Golden Highway/Sweeneys Lane intersection.

The road and intersection upgrades will be undertaken in consultation with, and to the satisfaction of, Dubbo Regional Council, such that all roads and intersections will maintain adequate levels of service. As noted earlier, the Golden Highway/Sweeneys Lane intersection and Golden Highway/Saxa Road intersection will be addressed by the NSW Government as part of a separate process.

**Operation**

Traffic generation during operations would be relatively minor with approximately 10 to 20 operational/ maintenance staff servicing the WTGs, likely to be based in the surrounding local areas. Typically, this would comprise an estimated 12 permanent jobs with others engaged in employment on the site on a periodic basis. Operational traffic would typically consist of 4WD-type service vehicles travelling between individual WTG sites along the internal road network after gaining access off the public road network from the Project Site access locations. Including journey-to-work and home trips, this would amount to a maximum of 40 trips per day, which would readily be absorbed into the spare capacity of the existing road network.

During maintenance activities there would be additional movements including additional heavy vehicle movements, however, these activities would be of short duration and numbers would be relatively small compared to the construction phase and would be absorbed into the spare capacity of the existing road network.

**Decommissioning**

Traffic generation during decommissioning would be similar to traffic generation during construction, with an anticipated maximum of the same order as the moderate (average) traffic generation scenario that would apply for most of the construction period.

Based on the assessment of the road capacity during the construction phase, traffic and road network impacts would be minimal with only marginal changes from existing conditions. Although the road network conditions at the completion of the Project in 30 years are unknown, it is considered that based on current conditions, the road network would have significant spare capacity and be able to accommodate the necessary heavy vehicles to be used during the decommissioning.

**Summary**

The Transport Assessment concluded that with the proposed road network upgrades and implementation of proposed construction traffic management measures (refer to **Section 6.7.3**), the Project would not create any significant adverse impacts with respect to transport issues such as traffic operations, road capacity on the surrounding road network, site access and road safety.

### 6.7.2.2 Site Access and Road Safety

For all OSOM vehicle transport, the Project Site entries will be accessed off the Golden Highway into Sweeneys Lane from the easterly direction only and off Tallawonga Road via Saxa Road from the northerly direction only. For non-OSOM vehicle transport, site access would be available from any approach direction into any of the site access locations dependent on the origin of the delivery. All vehicles generated by construction staff would be accommodated within on-site parking areas.

Available sight distance to/from Sweeneys Lane along the Golden Highway is over 250 m in both directions, which the Transport Assessment found is satisfactory for the 100 km/h speed limit along the highway. The available sight distance to/from Tallawonga Road along Saxa Road is adequate to the south with over 250 m available but marginal to the north with less than 250 m available. For the latter, advance 'side-junction' warning signage has been provided along the Saxa Road approach to Tallawonga Road.

Sight distances at the Gollan Road access locations at Binginbar Road and Ben Hoden Road are generally adequate with at least 250 m available in both travel directions apart from west of Binginbar Road, where there is only approximately 170 m available due to the curved alignment, which is sub-standard for the 100 km/h speed limit. Appropriate 'side-junction' warning signage and delineation will be required to advise approaching traffic of the site access point and the presence of additional turning traffic during the construction period, which will mitigate any road safety impacts. It is noted that the Gollan Road access locations at Binginbar Road and Ben Hoden Road will not be used for OSOM vehicles.

Local intersection widening will be required at the major Project Site access points at the Golden Highway-Sweeneys Lane and Saxa Road-Tallawonga Road T-junctions and at the minor site access points off Gollan Road at Binginbar Road and Ben Hoden Road. Channelised turning lane intersection treatments have also been designed for the Golden Highway-Sweeneys Lane and Saxa Road-Tallawonga Road T-junctions. These two intersections have been designed to allow relevant construction vehicles (including OSOM vehicles) to safely exit/transit from and re-enter the major road network whilst minimising disruption to traffic and maintaining road safety.

There is a school bus stop located on Sweeneys Lane, near the intersection with the Golden Highway. With respect to school bus transport and the relatively minor nature of bus movements (one school bus that completes two runs per day along Saxa Road), construction traffic is anticipated to have minimal impacts on school bus road safety, especially given that the peak construction vehicle (staff) movements would occur before 7:00 am and after 6:00 pm, and thus not coincide with school bus service times. Heavy vehicle and OSOM vehicle movements would also be managed to not coincide with school bus movements.

Consultation with the school bus operator will be undertaken as part of developing the CTMP for the Project to identify any specific management measures required.

Thorough consultation has been undertaken with Council and TfNSW when developing the detailed designs for intersections with public roads and further consultation will be undertaken during the preparation of the Construction Traffic Management Plan (CTMP) for the Project. Based on consultation to date, Dubbo Regional Council has provided support in relation to the proposed site access off Sweeneys Lane.

It is noted that Lot 7008 DP 93442, Lot 7003 DP 93111 and Lot 2 DP 1233468 are part of a Travelling Stock Reserve (TSR), which is managed by Central West Local Land Services. The potential presence of stock along local roads including Sweeneys Lane, Saxa Road and Gollan Road will be communicated to transport operators, delivery drivers and construction staff prior to the commencement of any works and as part of a drivers' code of conduct to be prepared for the Project prior to construction.

#### 6.7.2.3 Cumulative Traffic Impacts

The Project site is located within the CWO REZ and therefore, there are a number of other existing and proposed renewable energy projects within the region in addition to several large coal mining operations.

Notwithstanding the uncertainty of the crossover of project timings and potential cumulative transport operations, the Transport Assessment found that the ample spare capacity available along the major and minor road network including at intersections, would readily be able to accommodate a significant increase in construction-related vehicle trips especially when the above targeted mitigation measures are also implemented.

The Golden Highway is the key transport route relevant to the Project that is subject to cumulative impacts (because future, potential projects are most likely to utilise Golden Highway rather than Saxa Road or Gollan Road). **Table 6.29** shows the available spare capacity for the Golden Highway.

**Table 6.29 Golden Highway Spare Capacity**

| Project-only Component | | | | | | Additional Vehicles to Reach LoS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Scenario | Current Traffic | Current LoS | Project Traffic | Total Traffic | Project LoS | B | C | D | E | F |
| Vehicles per hour | 125 | A | 179 | 304 | B | - | 116 | 356 | 716 | 1,456 |
| Vehicles per day | 960 | A | 401 | 1,361 | A | 1,039 | 3,139 | 5,439 | 9,539 | 17,139 |

To minimise the impact of cumulative construction phase traffic impacts, once the construction dates/timetables are finalised for the Project, the required management measures to minimise cumulative impacts would be clarified and detailed as part of the preparation of the CTMP for the Project. Mitigation measures that are proposed by SQE to address cumulative transport impacts include:

- Scheduling of construction activities and deliveries for the Project in consideration of the scheduling of nearby Projects using the same road network (where scheduling information is available) so that any overlap is suitably managed in order to minimise road transport movements along shared transport routes.

- SQE is committed to working with EnergyCo as the co-ordinating body for the CWO REZ, nearby Projects, transport contractors, roads authorities and the police (as relevant for OSOM vehicle movements) to coordinate transport planning to minimise impacts.
- A commitment to contribute to region-wide traffic management planning (e.g. by provision of suitable information), undertaken by relevant roads authorities (e.g. Council and TfNSW).
- Contributing to road infrastructure upgrade works in the region through its commitment to undertake upgrade works on some of the local roads as part of the Project (refer to **Section 3.3.4.10**).
- Targeted dilapidation and reinstatement programs during the construction phase.
- Community consultation regarding traffic management during the construction phase.

### 6.7.3 Mitigation and Management Measures

SQE will prepare a CTMP in consultation with the relevant roads authorities (TfNSW and Councils) and DPE to guide the management of traffic during the construction phase. The management of heavy vehicle movements during construction would be addressed in CTMP, while the use of a specialised and licensed transport contractor would ensure that the transport of OSOM components would be completed in an appropriate manner.

For management of potential impacts the following traffic management measures would be implemented:

- Engagement of a licensed and experienced transport contractor with experience in transporting similar wind farm component loads. The contractor would be responsible for obtaining all required approvals and permits from the TfNSW and local Councils and for complying with conditions specified in the approvals.
- Development of a CTMP detailing appropriate construction traffic controls and management measures in consultation with Councils and TfNSW. It is acknowledged that, on occasions, local traffic will be inconvenienced however the management measures within the CTMP would endeavour to mitigate impacts as far as practicable. The CTMP would detail the following:
    - Transport routes and vehicle types, including OSOM.
    - Protocol for undertaking road dilapidation surveys including inspection regimes.
    - Measures to be implemented to minimise traffic safety issues and disruption to local road users including consideration of cumulative impacts with other projects.
    - Drivers' code of conduct.
- Undertake road infrastructure upgrade works to allow OSOM transport along the proposed transport routes, in consultation with transport contractor, Councils and TfNSW (subject of a separate approval being undertaken by the NSW Government).
- Prior to commencement of construction, SQE will establish and agree a road dilapidation program with the relevant Council for local roads used by Project construction phase traffic.

- Investigation of the opportunity for a car pooling initiative or provision of bus services for construction staff from nearby population centres to minimise light vehicle movements.
- In order to minimise interruption to the school bus routes, it is planned that OSOM and other heavy vehicle deliveries would occur outside school hours as follows:
  - No OSOM/heavy vehicles will use site accesses between the hours of 8:00 am and 9:30 am on a school day.
  - No OSOM/heavy vehicles will use the site accesses between the hours of 2:30 pm and 4:00 pm on a school day.
  - No OSOM/heavy vehicles will travel past the school bus stop at Sweeneys Lane between the hours of 2:30 pm and 4:00 pm on a school day.
- Assorted lay-by areas/rest stops along the designated OSOM and heavy vehicle transport route (Golden Highway) will be utilised to ensure OSOM vehicles do not restrict traffic flow during any bus operation periods.
- School bus operators will be consulted as part of the development of the CTMP and will be notified of any planned works along school bus routes as per the Project's community consultation plans. Traffic management that restricts traffic flow would be avoided during the period that the school buses are operating along those roads.
- For standard heavy vehicle movements, appropriate notifications will be provided in driver and sub-contractor inductions, particularly with respect to school bus interactions.

## 6.8 Water and Soils

A Water Resources Impact Assessment (WRIA) was prepared by Umwelt to address the SEARs for the Project in relation to water and soils:

- 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.
- An assessment of the likely impacts of the development (including flooding) 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.
- 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) *Why 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.

The WRIA is contained in **Appendix 15** and a summary of key outcomes is provided in this section.

## 6.8.1 Existing Environment

### 6.8.1.1 Catchment Properties

The Project Site is located within the Macquarie-Bogan River system and extends across the catchments of a number of tributary channels of the Talbragar River. The more significant perennial waterways with broader contributing catchment areas within the Project Site include Native Dog Creek (4th order), Bungiebomar Creek (5th Order), Sandy Creek (5th Order) and Four Mile Creek (4th Order) (refer to **Figure 2.5**). In addition to the defined waterway network, there are numerous small farm dams present within the Project Site which may provide for capture and storage of local runoff and local water pooling for extended periods.

The closest active Bureau of Meteorology (BoM) daily rainfall gauge is Elong Elong (Bendeela St) (Gauge 064010), approximately 6 km to the north-west of the Project Site. Records cover a continuous period of over 96 years from 1937 to 2022 and the recorded annual average rainfall over this period is 617 mm, with the highest annual total of 1,243 mm recorded in 1950. The mean and median rainfalls are highest during spring and summer. The average annual evaporation across the Project Site is estimated to be approximately 1,800 mm/year.

A review of NSW DPE soil profile and soil map information indicates that the Project Site varies between multiple soil types (refer to **Section 6.9**). The soil data indicates:

- there are no known occurrences of acid sulfate soil (ASS) within the Project Site
- topsoils are coarse to fine grained, generally non-sodic and non-dispersive with low fertility
- subsoils are likely to be finer grained than topsoils, slightly sodic in upper slopes and possibly dispersive with low fertility
- soils in the Project Site are highly erosive and given the steep topography in the upper slopes, the Project Site is generally considered to have a high erosion hazard.

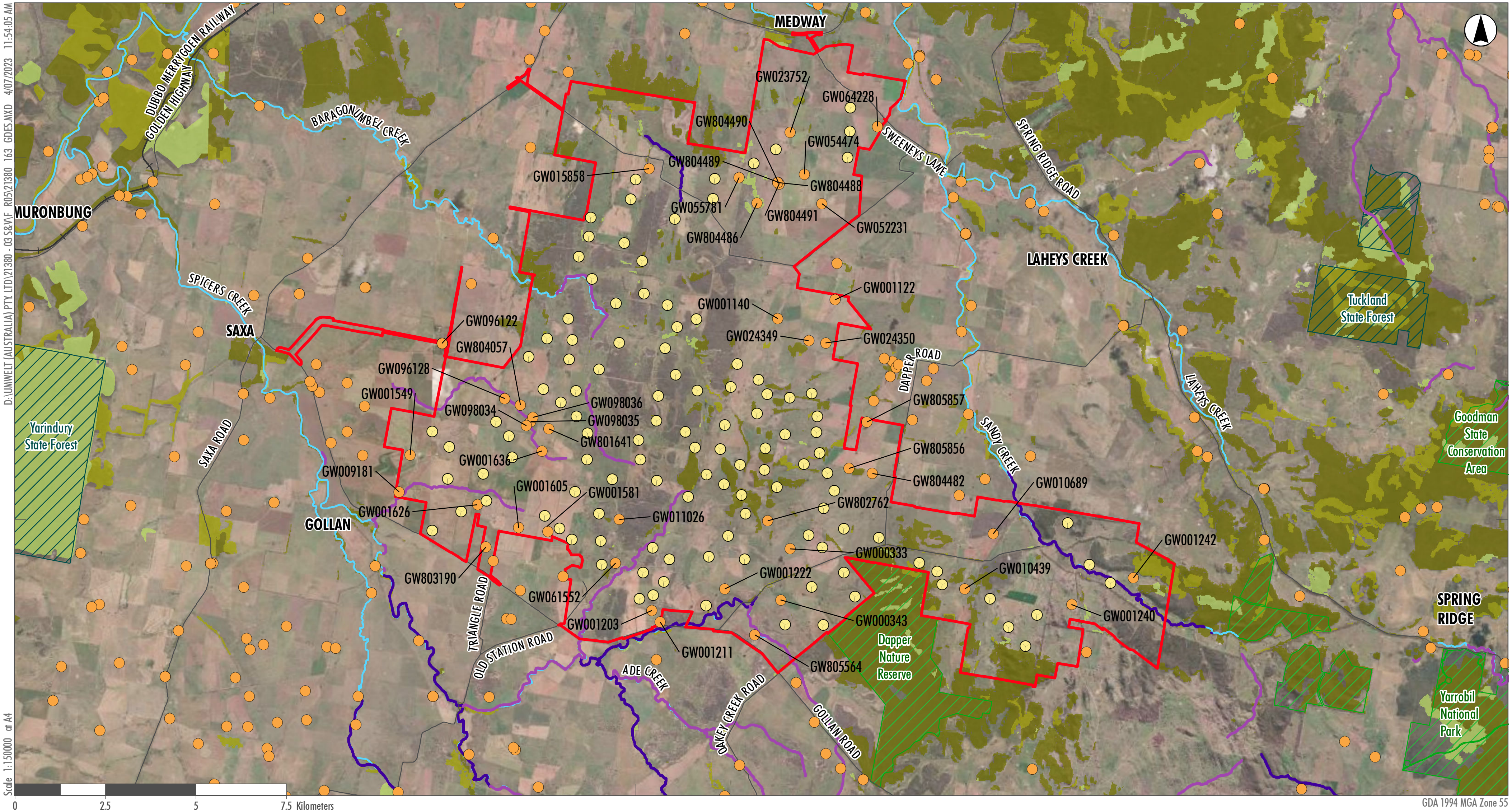
### 6.8.1.2 Groundwater

Groundwater within the Project Site creek systems is noted as 'groundwater vulnerable' in the Dubbo and Warrumbungle LEPs. The objectives of noting an area as 'groundwater vulnerable' are to maintain the hydrological functions of key groundwater systems and to protect vulnerable groundwater resources from depletion and contamination as a result of development.

A number of aquatic and terrestrial groundwater dependent ecosystems (GDEs) have been identified within the Project Site (refer to **Figure 6.8**). The GDE Atlas and Statewide GDE mapping (BoM, 2022) identifies GDEs at different potential levels (based on the likelihood of that flora and fauna actually being groundwater dependent).

No subterranean GDEs are identified within the Project Site. High and moderate potential aquatic GDEs were identified within the Project Site within watercourse alignments. High, moderate and low potential terrestrial GDEs were also identified within the Project Site, as shown on **Figure 6.8**.

There are several WaterNSW registered groundwater bores located within the Project Site that are used for irrigation, stock and domestic water supply purposes. While some bores measure shallow groundwater depths in the lower slopes, the WTGs for the Project are generally located within elevated areas where groundwater depth is greater than 20 m below ground level. It is not expected the excavation of footings for the WTGs would impact groundwater at these locations.

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Scale 1:150000 at A4

## Legend

- Project Site
- Wind Turbine Generator
- National Groundwater Information System Bore Location
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

**Aquatic GDEs**
- High potential for GW interaction
- Moderate potential for GW interaction

**Terrestrial GDEs**
- High potential for GW interaction
- Moderate potential for GW interaction
- Low potential for GW interaction

FIGURE 6.8

**Groundwater Dependent Ecosystems**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022), Bureau of Meteorology (2017)

#### 6.8.1.3 Water Extraction and Users

The *Water Management Act 2000* is the key piece of legislation for water resource management in NSW. Under the 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 Site is subject to WSPs for the following sources:

- Macquarie Bogan Unregulated and Alluvial Water Sources (Lower Talbragar Water Source).
- NSW Murray Darling Basin Fractured Rock Groundwater Sources (Lachlan Fold Belt Murray Darling Basin (MDB) Groundwater Source).
- NSW Murray Darling Basin Porous Rock Groundwater Sources (Gunnedah-Oxley Basin MDB Groundwater Source).

Details of licensed water use and WALs within each water source are provided in the WRIA (refer to **Appendix 15**). A desktop review of the NSW Water Register Water Licences for the lots within the Project Site that have bores (WaterNSW, 2022) identified two existing *Water Act 1912* Licences that have not been converted to WALs. No details relating to the groundwater source, volume of entitlement or water use were provided in the NSW Water Register search results.

A desktop review of the NSW Water Register Water Licences for the lots within the Project Site that have bores (WaterNSW, 2022) identified four works approvals in the Lachlan Fold Belt MDB Groundwater Source and two in the Gunnedah-Oxley Basin MDB Groundwater Source granted under basic landholder rights provisions.

### 6.8.2 Project Water Demand, Supply and Disposal

Water demands for the construction phase of the Project (approximately 40 months) are estimated to be in the order of 80 to 120 ML. The Project construction water demands will include:

- dust suppression
- concrete production
- concrete washout
- vehicle and equipment wash down
- firefighting water provisions
- amenities.

Sources for non-potable water demands to meet construction water demands may include:

- harvested runoff from disturbed areas captured in excavations or sediment basins/traps constructed to prevent sediment transport off-site
- harvested runoff from farm dams under agreement with host or local landholders
- groundwater from licensed bores under agreement with host or local landholders
- purchasing and transporting water to site by tanker.

Where further licenses are needed to access water from these sources or licence amendments are required, these will be secured by SQE prior to the water being used.

All other water sourced from either surface water or groundwater sources to meet Project construction demands will be licensed and managed, as required, in accordance with the requirements of the *Water Management Act 2000*, the Water Management (General) Regulation 2018 and relevant WSPs.

Water demands for the operational phase of the Project will be limited to amenities usage and are expected to be minimal. Operational water requirements will be provided to the proposed facilities and auxiliary services building from a storage tank designed to collect water from roof drainage and augmented by potable water delivered by tankers. Decommissioning phase water demands are also anticipated to be lower than those in the construction phase as there will be no water demand for concrete production.

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 Assessment of Impacts

The WRIA 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 impact on water supply
- potential impacts to groundwater, including impacts to downstream users and GDEs.

#### 6.8.3.1 Flooding Impacts

There are no specific floodplain risk management plans prepared by Dubbo Regional or Warrumbungle Shire LEPs that cover the Project Site. The flood assessment was undertaken in consideration of *Australian Rainfall and Runoff: A Guide to Flood Estimation* (ARR 2019) and with consideration of the relevant provisions of the *NSW Floodplain Development Manual* (2005).

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.

Hydraulic modelling of the Project Site was completed using a two-dimensional (2D) TUFLOW flood model. TUFLOW software is one of the most widely used hydraulic modelling software packages in Australia and is considered an appropriate modelling tool for modelling riverine and local overland flooding.

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.

**Flood Modelling Results**

The Project Site was found to present a low risk of flooding under both the existing and climate change conditions modelled, with minimal risk to changes in internal or external waterway flows. The results of the flood impact assessment have shown that the Project Site is located outside major flood hazard areas. Peak stormwater discharges from the Project Site for impervious areas may increase slightly through the creation of compacted gravel roads and some small operational buildings. However, potential impacts to drainage features and downstream watercourses are considered likely to be minimal due to the relative size of the Project Site in relation to the size of the receiving catchments, and the distributed nature of minor impacts.

Access tracks and cable reticulation are the only works proposed within the watercourses and no other artificial structures are planned to be installed in the creeks within the Project Site. Where waterway crossings (i.e. culvert crossings or causeways) are required, these would be designed and constructed in compliance with the Department of Primary Industries (Office of Water) Guidelines for riparian corridors on waterfront land (2012) and Guidelines for watercourse crossings on waterfront land (2012).

Detailed flood modelling results are provided in Appendix C of the WRIA (refer to **Appendix 15**) and summarised below for key modelled events.

**10% AEP Event**

The 10% AEP modelling results show there is generally no widespread flooding within the Project Site, with active flowpaths typically confined within watercourses and local depressions. Proposed site buildings, substations and turbines will all be located outside the 10% AEP flood extent.

The flood hazard within the Project Site for this flood event is mostly characterised as H1: 'Generally safe for vehicles, people and buildings', with isolated areas of higher flood hazard (H5 and higher) predicted but well confined to the waterways and defined drainage lines.

**1% AEP Event**

The 1% AEP event represents the principal flood planning event for the Project. The general flood inundation patterns and extents are similar to the 10% AEP event discussed above, albeit with increasing depths and velocities associated with the higher flows. Proposed site buildings, substations and turbines are outside the 1% AEP flood extent.

The flood hazard within the site for this flood event is mostly characterised as H1: 'Generally safe for vehicles, people and buildings', and only reaches above this in the waterways and defined drainage lines. Within some of the watercourse alignments, flood hazard classes H5 and H6 are attained and accordingly would represent areas where infrastructure should be avoided.

**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. The general flood inundation patterns and extents are similar to the 1% AEP event described above, albeit with increasing depths and velocities associated with the higher flows. The modelling shows no activation of additional flow paths or extended inundation areas that materially impact on the development.

Proposed site buildings and substations are outside the 0.5% and 0.2% AEP flood extents. Two of the turbines (WTG 17 and 97) are within the 0.2% AEP flood extent, however only shallow depths (<0.3 m), low velocities (<1 m/s) and a low flood hazard (Hazard Category H1) are predicted at these locations. All other turbines are outside the 0.2% AEP flood extent.

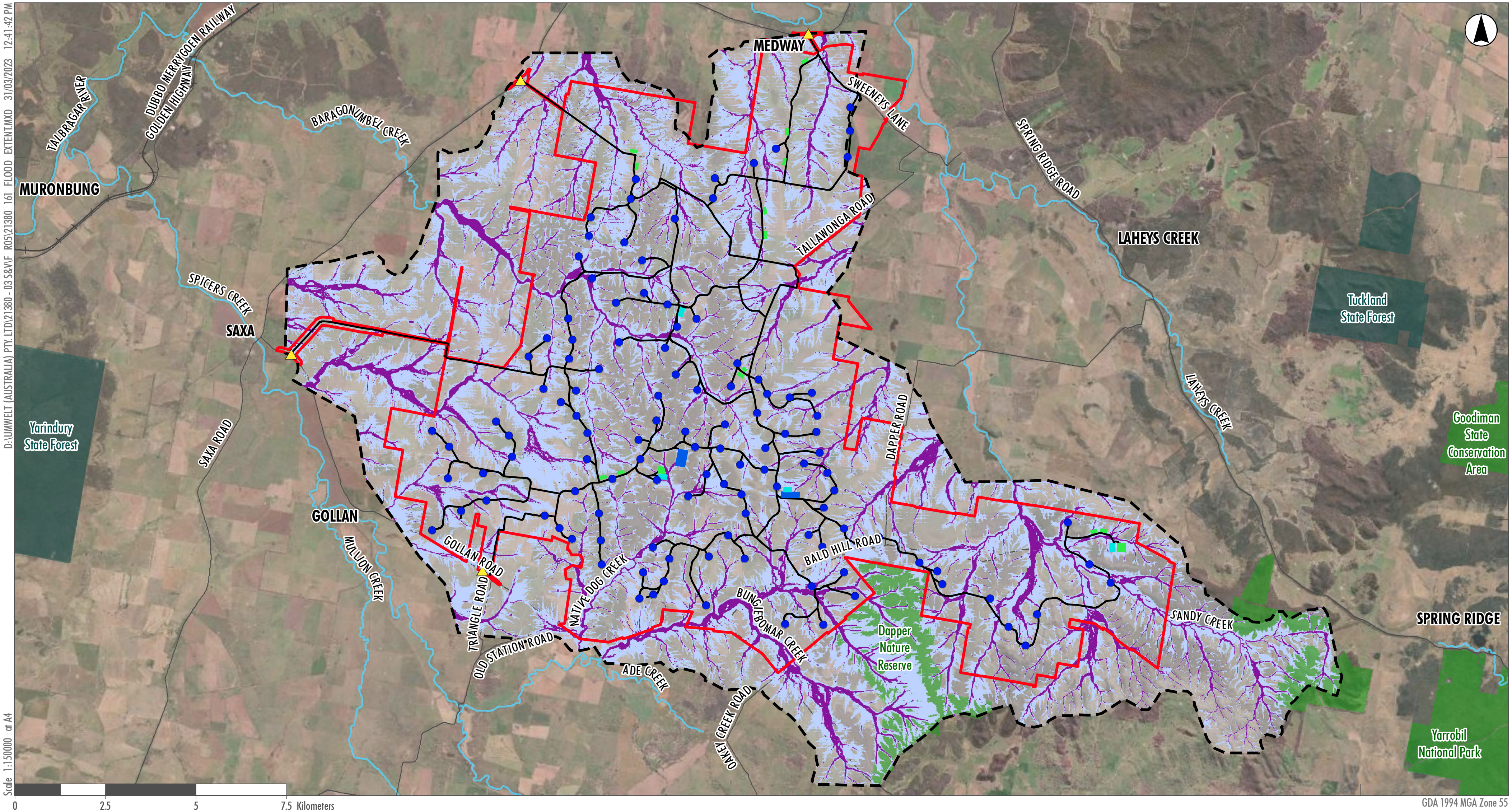
The flood hazard within the site for these flood events is mostly characterised as H1: 'Generally safe for vehicles, people and buildings', and only reaches above this in the waterways and defined drainage lines. Within some of the watercourse alignments, flood hazard classes H5 and H6 are attained and would represent areas where waterway crossings (if required) would be designed accordingly.

**PMF Event**

There is an overall increase in mapped flood extent for the PMF, although a significant proportion of this area is in overland flow areas with flow depth less than 0.3 m.

Flood extents along the defined watercourses and overland flow paths have generally increased for the PMF event, with broader areas of overland sheet flow (up to 0.5 m depth) as a result of extreme rainfall intensity, but still typically confined to the general alignments albeit with increasing flood depth.

A comparison of the 1% AEP and PMF flood inundation extents is shown on **Figure 6.9**.




Legend

- Project Site
- 1% AEP Flood Extent
- PMF Flood Extent
- Model Extent
- Wind Turbine Generator
- Site Access Point
- Substation
- Site Compound
- Electrical Plant Compound
- Access Track
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 6.9

1% AEP and PMF Extents

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

#### 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.

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 Site 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 Site includes areas with highly erodible soils and potentially dispersive soils. An erosion hazard assessment was undertaken for the Project Site in accordance with Chapter 4.4.1 of Volume 1 of the 'Blue Book'. Enhanced erosion control measures would be applied to disturbance areas with steep slopes (greater than 20%) and all 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) are proposed by SQE, which limits the overall 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 with steep slopes and waterfront land as detailed in Table 6.2 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 negligible as the day-to-day activities would be limited to routine maintenance and monitoring. 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.

#### 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 by prioritising placing WTGs and other key infrastructure outside of riparian corridors, several waterway crossings will be required for site access, 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

The Project would require a water supply during the construction and decommissioning phases. The closest town to the Project Site with a potable water source is Ballimore. Alternatively, there are several water filling stations in Dubbo and two in Wellington that could likely better supply the quantities needed for the Project.

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 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

As discussed in **Section 6.8.1.2**, depth to groundwater on the upper slopes of the Project Site is expected to be in excess of 20 m and therefore interception of the groundwater table in these areas is not anticipated. Depth to groundwater on the lower slopes, in particular in close proximity to waterways, has been recorded at between 0.5 and 4 m below ground level and there is potential for interception of groundwater during any excavations in these areas. The nearest proposed turbines to these bores are located at least 600 m upslope with at least an additional 20 m elevation and therefore it is not expected the construction of Project infrastructure would impact groundwater at these locations.

As the Project is not predicted to impact on groundwater, there are no impacts predicted to groundwater resources including GDEs and bore users.

If groundwater is required to be utilised to meet Project water demands, a WAL will be acquired and sufficient entitlement will be sourced through either a controlled allocation of unassigned water or by trading for entitlement on the open market in the relevant groundwater source.

### 6.8.4 Mitigation and Management Measures

As outlined in **Section 6.8.3**, water quality impacts are most likely to be experienced during the construction and decommissioning stages of the Project. Erosion and sedimentation are considered the primary risk to soil and surface water resources for the Project. The key mitigation measure applied during construction and operation of the Project will be the implementation of appropriately designed erosion and sediment controls (ESCs). ESCs 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').

The proposed measures to be implemented as part of the Project to manage and minimise impacts on water resources are:

- The wind turbines located within the flood affected areas for the 0.2% AEP event will be designed to withstand the flood velocities expected in the relevant part of the Project Site.
- No sensitive infrastructure (e.g. substations) will be placed within 20 m of any Strahler 3 or above order streams.
- During detailed design, consultation will be undertaken with DPI Fisheries to determine if any of the proposed waterway crossings require consideration of fish passage. For any crossings that do require consideration of fish passage, the relevant DPI Fisheries guidelines will be considered during the detailed design process.
- A water sourcing strategy will be developed to confirm water sources during the detailed design phase and in consultation with suppliers and landholders.
- The use of any bore water during construction and decommissioning would be agreed with the landholder and relevant licences confirmed and/or obtained.
- A detailed CEMP will be developed during the detailed design phase which will incorporate relevant soil and water management measures. Under these plans, progressive erosion and sediment control plan drawings will be prepared for the Project. The CEMP will include erosion and sediment control measures that will be designed, installed and maintained in accordance with the 'Blue Book' and are likely to include measures such as:
    - Undertake targeted soil testing (in particular, to identify any dispersive soils) to determine topsoil and subsoil properties in high-risk areas to be disturbed (e.g. steep slopes, in close proximity to streams).
    - Requirements for the preparation of progressive erosion and sediment control plans (ESCP) for all progressive stages of construction.
    - Procedures to manage unexpected finds of contaminated soils.
    - Procedures for the management of waste including the classification and handling of spoil.
    - Diversion of clean water around disturbed areas.
    - Staging of works to minimise the extent of ground disturbance at any one time and progressive rehabilitation.
    - Stockpiles managed in accordance with the 'Blue Book'.
    - Constructed batters with maximum slopes consistent with Figure 4.7 of Volume 1 of the 'Blue Book'.
    - Access tracks that are constructed and maintained consistent with Volume 2C Unsealed Roads of the 'Blue Book'.

- Fuels, chemicals and liquids are stored in impervious bunded areas, a minimum of 50 m away from:
  - rivers, creeks or any areas of concentrated water flow
  - flooded or poorly drained areas
  - slopes above 10%, where practicable.
- Procedures to manage accidental spills including the requirement to maintain materials such as spill kits.
- All vehicles and mobile plant will be appropriately maintained and subject to daily pre-start checks for fluid leakage.
- Bunded concrete wash-out bunds lined with plastic sheeting will be provided and sign posted so they are clearly identified by contractors and concrete agitator/pump drivers. No concrete wash-out will occur within 50 m of drainage lines or waterways.
- Inspection and maintenance of installed erosion and sediment controls.
- Monthly upstream and downstream water quality monitoring (visual, pH, electrical conductivity, turbidity and total suspended solids) during construction. Appropriate water quality monitoring location(s) will be identified during preparation of the CEMP.
- Soil amelioration and rehabilitation:
  - minimum 200 mm of topsoil to cover any dispersive subsoils (outside of rocky areas)
  - ameliorate dispersive subsoils with gypsum around hard surfaces (e.g. turbine foundations) where concentrated flows have the potential to erode non-dispersive topsoil
  - use of biodegradable rolled erosion control products (e.g. jute mesh or mat) to provide stability during revegetation of high risk disturbed areas
  - use appropriate species suited to the low fertility soils.
- Undertake trenching in accordance with Volume 2A Installation of Services of the 'Blue Book'.

- For works on waterfront land (within 40 m of top of bank of a defined stream) the following measures will be incorporated into the design of the works and controls included in the Soil and Water Management Plan:
  - A site-specific erosion and sediment control plan will be prepared for all works on waterfront land.
  - Where practicable, infrastructure will be maintained outside of the vegetated riparian zone.
  - Utilise stream crossings for co-location of services to avoid the need to trench through stream beds wherever practicable.
  - Rehabilitate disturbed areas and provide scour protection to bed and banks as required to mitigate any areas with increased potential for erosion due to changes in flow regimes associated with Project infrastructure.
  - Where practicable, undertake works on waterfront land from April to mid-October when fish passage is unlikely to occur.

- The OEMP for the Project will include measures to provide for the ongoing management of surface water quality during the operational phase. This will include the inspections to identify areas of erosion (including within drainage channels) or deteriorated ground cover (vegetated, hardstand or other appropriate cover) across the site and maintenance regimes to repair erosion, restore groundcover and stabilise drainage channels when necessary. Additional measures for the treatment of stormwater quality are not considered necessary.

- All mobile concrete batching plants will be located in appropriately sized bunded areas to contain surface runoff that has the potential to have elevated pH and concentrations of fine sediment. Water captured within the bunds will be utilised for concrete production or removed from site by a suitably licensed waste contractor.

## 6.9 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 the Dapper Nature Reserve in accordance with the guidelines for *Development adjacent to National Parks and Wildlife Service Lands* (DPIE, 2020)
  - consideration of agricultural land, any 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 and sedimentation to occur, and consideration of salinity in this area
  - 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 (LUCRA) in accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide
  - 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 16** with a summary provided below.

### 6.9.1 Soils, Land Capability and Agriculture

As detailed in **Section 2.3**, the Project is located approximately 25 km north west of Gulgong and 35 km north east of Wellington in the CWO region of NSW. The nearest larger population centres are Dubbo and Mudgee, which are located approximately 50 km west, and 58 km southeast of the Project Site (refer to **Figure 1.2**).

The topography of the Project Site primarily features undulating terrain with ridgelines separating the intervening valleys. The Project Site has an elevation ranging from 360 m Australian Height Datum (AHD) to 540 m AHD.

The Project Site is within the Dubbo Regional and Warrumbungle Shire LGAs, and is adjacent to the Mid-Western Regional LGA. The Project Site is primarily zoned RU1 – Primary Production under the Dubbo Regional LEP 2022 and the Warrumbungle LEP 2013 (refer to **Figure 2.4**). The Project Site also contains small areas of land zoned SP2 – Infrastructure, associated with roads including the Golden Highway and Saxa Road. The Dapper Nature Reserve located adjacent to the southern boundary of the Project Site is zoned C1 – National Parks and Nature Reserves.

The Project Site and surrounding area is characterised by existing agricultural land uses with associated rural residences. Land within and surrounding the Project Site has been subject to extensive historical vegetation clearing associated with agricultural land uses. Agriculture is the predominant land use in both the Project Site and surrounding region.

Areas of native vegetation on the Project Site are present generally in the form of paddock trees, with areas of intact vegetation on ridgelines, along local roads and drainage lines. The Project Site features varying degrees of biodiversity value and mixed intact and modified woodlands/forests and grasslands, with much of the site historically cleared for agricultural land uses and consisting of pasture and native grasslands derived from clearing of woodland vegetation (derived native grasslands). Approximately 75% of the Development Corridor and approximately 82% of the Development Footprint is cleared or Category 1 (Exempt Land) land.

There are a number of minor creeks that traverse the Project Site (refer to **Figure 2.5**). As outlined in **Section 2.3.4**, there is no flood prone land or flood management areas identified within the Project Site. A flooding assessment has been completed for the Project with the findings outlined in **Section 6.8.3.1**.

**Soils**

**Figure 6.10** shows the soil landscapes present in the Project Site based on a review of the NSW DPE soil profile and soil map information website, 'eSPADE'. The main soil types found in the Project Site are as follows:

- 'Arthurville' Soil Landscape: gently undulating rises and undulating low hills on shale, tuff, andesite and limestone, with red-brown earths, yellow Podzolic-Solodic soils and some yellow Solodic soils in drainage lines. Limitations include structural degradation of surface soils, high erosion hazard under cultivation and low surface cover.
- 'Ballimore' Soil Landscape: undulating low hills on Ballimore Sandstone, with red-brown earths, non-calcic Brown soils and red and yellow Solodic Soils. Limitations include structural degradation of surface soils and high erosion hazard under cultivation.

- 'Burrendong' Soil Landscape: rolling to steep hills on slate, greywacke and shale, with mainly shallow loams and sands, shallow Red Podzolic soils, Soloths and yellow Solodic Soils. Limitations include steep slopes, very low fertility, rock outcrop and low water holding capacity.
- 'Dapper Hill' Soil Landscape: undulating to rolling low hills on sandstone and shale, with yellow and red Soloths, yellow and red Solodic soils, some Red Podzolic soils and Siliceous Sands. Limitations include very high erosion hazard under cultivation, and low fertility.
- 'Lahey's Creek' Soil Landscape: undulating low hills on sandstone and shale, with yellow Solodic soils, yellow Soloths and some Red Podzolic soils, non-calcic Brown Soils and Siliceous Sands. Limitations include high to very high erosion hazard under cultivation, and low fertility.
- 'Mebul' Soil Landscape: undulating low hills on basalt and dolerite, with Chocolate Soils, non-calcic Brown Soils, Euchrozems, Black Earths, Brown Clays and other Alluvial Soils. Limitations include high erosion hazard under cultivation and low surface cover with high shrink-swell potential.
- 'Mookerawa' Soil Landscape: undulating to rolling low hills often with quartz gravel on slate, greywacke, shale and acidic/siliceous volcanics, with Yellow Soloths, Solodic Soils, Red Podzolic Soils and some shallow brown loams and sandy loams. Limitations include moderate to low fertility, sodic subsoils are common on lower slopes and high to very high erosion hazard under cultivation.
- 'Mullion Creek' Soil Landscape: undulating low hills often with quartz gravel on slate, greywacke, shale and acidic volcanics, with mainly red Podzolic Soils, yellow Soloths and yellow Solodic Soils. Limitations include: low fertility, seasonal waterlogging, high erosion hazard under cultivation, low permeability.
- 'Nanima' Soil Landscape: rolling low hills on andesite, hornfels, shale, tuff and limestone with Non-calcic Brown Soils with shallow loams with small pockets of Terra Rossa Soils. Limitations include: steep slopes, very high erosion hazard under cultivation, moderate to high shrink-swell potential, and aggregated clays may leak in earthworks.
- 'Spring Ridge' Soil Landscape: rolling low hills on sandstone and shale with mainly shallow soils with abundant rock outcrop and surface stone, and soils including yellow and red Soloths, and yellow Solodic Soils. Limitations include: very low fertility, steep slopes, rock outcrops, and very low water holding capacity.

Modelled soil properties and modelled soil erosion (sourced from eSPADE) for the Project Site are presented in **Table 6.30** and **Table 6.31** respectively.

**Table 6.30 Modelled Soil Properties**

| Parameter | Depth 0–30 cm | Depth 30–100 cm | Units | Comments |
|---|---|---|---|---|
| pH ($CaCl_2$) | >4 to 6.5 | >4 to 7.5 | - | Subsoil pH generally greater than topsoil. |
| Electrical Conductivity (EC) | <0.05 to 0.2 | <0.05 to 0.3 | dS/cm | EC generally higher on lower slopes but all soils considered to be non-saline. |
| Clay Fraction | 5 to >50 | 20 to >50 | % | Topsoil predominately 15 to 25% clay.<br>Subsoil predominately 25 to 40% clay. |
| Silt Fraction | >5 to >30 | >5 to >30 | % | Topsoil and subsoil predominately 10 to 15% silt. |

| Parameter | Depth 0–30 cm | Depth 30–100 cm | Units | Comments |
|---|---|---|---|---|
| Sand Fraction | >25 to >85 | <25 to >85 | % | Topsoil generally >50% sand. |
| Exchangeable Sodium Percentage (ESP) | >2 to 7 | >2 to 9 | % | Topsoil and subsoil ESP predominately <6% and are considered generally non-sodic and not likely to be dispersible. >6% in upper slopes so considered slightly sodic and may be dispersive. |
| Organic Carbon (OC) | 0.5 to 3 | 0.25 to 1 | % | Assuming Organic Matter (OM) is 50% OC, the topsoil has low (<1%) to moderate (3%) OM content (a good range is considered to be 3 to 6%). |
| Cation Exchange Capacity (CEC) | <5 to 40 | >5 to 50 | $cmol_c/kg$ | Topsoil predominately in the low CEC range of 5 to 10 $cmol_c/kg$. |

**Table 6.31 Modelled Soil Erosion**

| Parameter | Value | Units | Comments |
|---|---|---|---|
| Soil Erosion (bare) | <20 to <500 | T/ha/y | Slope dependent |
| Revised Universal Soil Loss Equation K Factor | 0.02 to 0.08 | - | Low to highly erodible |

The soil data presented in **Table 6.30** and **Table 6.31** indicates:

- that topsoils are predicted to be coarse to fine grained, generally non-sodic and non-dispersive with low fertility
- subsoils are predicted to be finer grained than topsoils, slightly sodic in upper slopes and possibly dispersive with low fertility
- soils in the Project Site are highly erosive in areas of steep topography in the upper slopes and areas within the bed and bank of streams and within 40 m of the top of bank defined streams (i.e. waterfront land)
- on average, the Project Site is generally considered to have a low erosion hazard.

A soil survey, including field sampling and in-situ soils classification, was conducted in August 2022 by D&N Geotechnical to confirm soil characteristics across the Project Site. Soil sampling was undertaken with reference to the *Australian Soil and Land Survey Field Handbook* (2009) and *The Australian Soil Classification* (Isbell, 2016).

Samples were taken from 20 sampling locations (refer to **Figure 6.10**). The survey included collection of GPS recordings and photographs of soil sampling sites and profiles, and slope and landforms of the sites, as shown in **Appendix 16**. Samples were submitted to a NATA accredited laboratory for analysis.

The soil results indicate:

- there is some erosion potential across the Project Site
- the soils are non-saline and there is not considered to be a salinity issue across the Project Site
- acidity/alkalinity (pH) is not an issue and does not present a barrier to plant growth or issue with construction materials
- phosphorous levels are low which may indicate chemical barrier to plant growth
- soil fertility is generally moderate to low across the Project Site
- some mottling was observed, suggesting intermittent water logging has occurred.

Overall, the analysis confirmed that:

- topsoils are likely to be generally non-sodic and non-dispersive with low fertility
- soils within the Project Site are slightly or non-sodic
- the Project Site is generally considered to have a low erosion hazard on average.

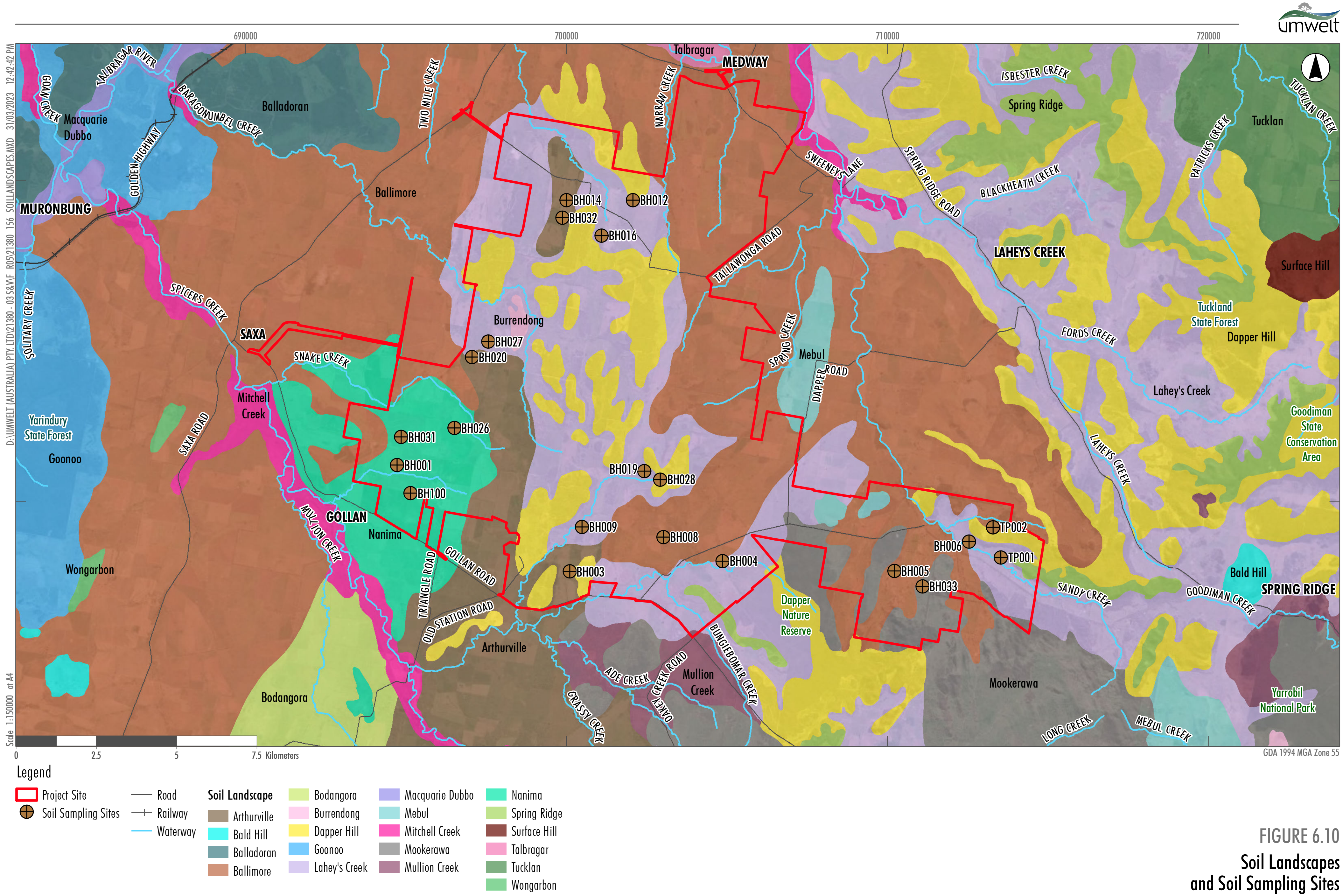



FIGURE 6.10
Soil Landscapes and Soil Sampling Sites

Image Source: ESRI Basemap Data source: NSW FSDF (2022), CWP Renewables (2022), © State Government of NSW and Department of Planning and Environment 2022

### Land and Soil Capability

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.

As discussed in **Section 2.3.3**, the land within the Project Site is Class 3, 5, 6 and 7 under the LSC (refer to **Figure 2.6** and **Table 6.32**). Class 3 land generally has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. Careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation. Class 5, 6 and 7 land is considered to be moderate–low to very low capability land.

**Table 6.32 LSC Classes within the Project Site**

| Class | Area within Project Site (ha) | Area within Development Corridor (ha) | Area within Development Footprint (ha) |
|---|---|---|---|
| Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation) | | | |
| Class 1 – Extremely high capability | 0 | 0 | 0 |
| Class 2 – Very high capability | 0 | 0 | 0 |
| Class 3 – High capability | 7,455 | 2,235 | 595 |
| Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation) | | | |
| Class 4 – Moderate capability | 0 | 0 | 0 |
| Class 5 – Moderate-low capability | 7,971 | 2,675 | 760 |
| Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture) | | | |
| Class 6 – Low capability | 2,233 | 626 | 165 |
| Land generally incapable of agricultural land use (selective forestry and nature conservation) | | | |
| Class 7 – Very low capability | 71 | 8 | 1 |
| Class 8 – Extremely low capability | 0 | 0 | 0 |
| **Total*** | **17,731** | **5,544** | **1,520** |

** Total values may not add due to rounding.*

The Project has the potential to impact up to approximately 8% of the Class 3 land within the Project Site, however, much of this impact is for installation of services (roads, electrical network etc.). The installation of services (e.g. overhead and underground electrical networks) will result in minimal impact to the land or its capability, and will not prevent it from being used for agricultural land uses.

The access roads will result in impacts through removal of topsoil and placement of road construction materials, however, should these roads no longer be required post decommissioning the roads will be removed and the area rehabilitated and agricultural use reinstated for these small impacted areas.
As outlined in **Section 5.0**, SQE has consulted extensively with landowners in relation to the placement of Project infrastructure, including access roads. Access roads have been located to minimise impacts to agricultural operations, as far as practicable, including utilising existing tracks or along fence lines.

The permanent compound areas (e.g. substations, battery storage) and WTG foundations will result in more material impacts to land capability, however, these are small areas in the context of the Project Site and upon decommissioning these areas will be rehabilitated to as close as practicable to the existing condition.

Where practicable, the Development Footprint subject to detailed design for the Project will seek to minimise disturbance to areas of Class 3 land. In areas where impacts will occur for services, the construction process will be managed to keep physical disturbance to the ground to as small an area as practicable. SQE has agreements in place with all landowners where land impacts will occur and it is expected that there will be no long term impacts to overall land capability as a result of the Project.

Small sections of the south-east part of the Project Site are identified in regional scale mapping as BSAL (refer to **Figure 2.6**). The Project has been designed to avoid impact to the potential BSAL areas as far as practicable. A minor area of mapped BSAL of approximately 4.5 ha is present within the Development Corridor for the Project (refer to **Figure 2.6**). The area of BSAL located within the Development Corridor is proximate to proposed overhead powerlines. SQE will avoid all mapped BSAL within the Project Site as part of detailed design.

**Soil Erosion and Sedimentation**

As discussed in **Section 6.9.1**, the analysis concluded that the soils within the Project Site are typically slightly to negligibly dispersive, and slightly or non-sodic.

Due to the presence of sodic and dispersive soils within the Project Site, the risk of erosion on site due to construction activities is considered high, however, this can be effectively managed through the implementation of mitigation measures. Excavation of subsoils should be limited where practicable, and excavated subsoils should 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 an Erosion and Sediment Control Plan (ESCP) as detailed in **Section 6.8.4**. Post approval, a CEMP will be prepared that identifies erosion and sediment control mitigation measures prior to construction 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.

**Agriculture**

The land within the Project Site is predominantly used for agricultural purposes. There are 24 private landholdings within the Project Site along with some small areas of Crown land and Crown land reserves and Council owned roads. SQE has agreements with relevant owners allowing SQE to lease the land for the Project which is planned to have a construction period of approximately 40 months and a 30-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. SQE 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 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.). Following decommissioning, the areas of land use 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 landholder through income diversification which will provide consistent income, including in drought of other periods of low agricultural production. This will support the ongoing sustainability of agricultural activities within the Project Site.

As outlined in the Economics Assessment (refer to **Section 6.12**), there is not expected to be any loss of agricultural employment associated with the Project, 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 Site remaining in agricultural land use throughout the Project life.

With regards to the ongoing effective management of risks to regional agricultural resources and productivity, SQE has implemented biosecurity controls for their work on the Project to date and 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.

### 6.9.2 Project Site Suitability

The Project Site 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 Site is strategically located within the CWO REZ, with ready connection to the proposed transmission infrastructure and in an area with identified wind renewable energy source potential. The wind resources in the area are suitable for efficient wind energy generation. The Project will contribute to the implementation of the NSW Electricity Strategy, which seeks to establish a reliable, affordable and sustainable electricity future for NSW.

The Golden Highway extends along the northern boundary of the Project Site and acts as the primary connection between the Hunter and Orana regions of NSW, and the Port of Newcastle. The Golden Highway has sufficient operating capacity to support the Project and provides good access to the Project Site.

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 Site contains land suitable for agriculture and ongoing agricultural activities can continue in coexistence with the Project. Due to the agricultural history, the Project Site 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 6.9.1**, approximately 82% of the Development Footprint (and approximately 75% of the Development Corridor) is cleared or Category 1 land.

The Project will provide for a compatible land use and support the ongoing agricultural use of the Project Site. 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 roads and other wind farm infrastructure in relation to agricultural operations), as well as an assessment of the compatibility of the development with the existing land uses, during construction, operation and after decommissioning.

In summary, SQE selected the proposed Project Site as it provides the optimal combination of:

- high quality wind resource
- availability of land of a suitable scale for a viable commercial-scale wind farm project and low density of housing
- within the CWO REZ and close proximity to the associated proposed 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 Golden Highway, to the north of the Project Site
- compatible land use zoning within both the Project Site and adjacent landholdings
- environmental constraints that can be managed with appropriate mitigation and management
- landscape suitable for minimising the risk of substantial soil erosion during earthworks.

### 6.9.3 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:

- Dapper Nature Reserve.
- Consideration of agricultural land, any Travelling Stock Routes, flood prone land, Crown lands, mining, quarries, mineral or petroleum rights.
- Potential for erosion and sedimentation to occur, and consideration of salinity in the area.
- A cumulative impact assessment of nearby developments.

Agricultural land is assessed in **Section 6.9.1** 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 6.11**. The remaining issues are addressed below.

**Dapper Nature Reserve**

As outlined in **Section 2.3.3,** Dapper Nature Reserve adjoins the Project Site on the southern boundary. It is understood that Dapper Nature Reserve is not used for recreational purposes and receives small numbers of visitors per year, primarily research groups and birdwatchers. Permission is required to enter the Reserve and access is restricted by locked gates (OEH, 2014).

The Project is not expected to have any direct impacts on the Dapper Nature Reserve and the potential for indirect impacts has been assessed in the relevant technical assessments completed as part of this EIS. Consideration of the Dapper Nature Reserve has been completed as relevant assessments, including:

- noise (refer to **Section 6.3**)
- biodiversity (refer to **Section 6.4**)
- bushfire (refer to **Section 6.10.4**).

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 6.33**.

**Table 6.33 Assessment of Impact Risk to Dapper Nature Reserve**

| Issue | Aim | Assessment and Management |
|---|---|---|
| **Erosion and sediment control** | • To prevent erosion and the movement of sediment onto NPWS land. | • The Dapper Nature Reserve is generally upslope of the Project Site, limiting the potential of any erosion and sediment issues from the Project.<br>• Detailed erosion and sediment control measures will be implemented during the construction, operation and decommissioning phases of the Project (refer to **Section 6.8**).<br>• 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 be caused 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**.<br>• 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 5 km from the Dapper Nature Reserve. 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 enviro-cycle type irrigation systems. Given the distance no impacts are predicted on the Nature Reserve.<br>• Wastewater disposal facilitates will be contained within the specified site compounds and will be designed and operated to the relevant standards.<br>• 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:<br>• lead to increased impacts from invasive species (weeds and pests), domestic pets and stock<br>• facilitate unmanaged visitation, including informal tracks, resulting in negative impacts on cultural or natural heritage values | • The Development Footprint for the Project is set back a minimum of 35 m from NPWS land.<br>• There will be no changes to the existing land uses or boundary controls on the agricultural land adjoining the Dapper Nature Reserve (that is, the existing agricultural activities will continue and existing fencing will remain unaffected).<br>• 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. |

| Issue | Aim | Assessment and Management |
|---|---|---|
| | • lead to impacts associated with changes to the nature of the vegetation surrounding the park<br>• impede NPWS access for management purposes, including inappropriate fencing (refer also to Section 2.10). | • 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.<br>• The CEMP and OEPM will contain provisions for regular inspections relating to weeds and pests and provisions for implementation of controls as necessary. |
| **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 bushfire risk has been completed and is described further in **Section 6.10.4**.<br>• The Project does not involve any bush fire hazard reduction works within NPWS land.<br>• All APZs are contained within the Project Site 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.<br>• As required by the SEARs an assessment of recreational noise impacts was completed for Dapper Nature Reserve. It is noted that these criteria are likely to be not applicable as recreational activities typically do not occur in the Reserve; nevertheless, the Project is predicted to meet the relevant noise criteria for recreational activities should they occur.<br>• No odour impacts are predicted due to the Project.<br>• 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 on Dapper Nature Reserve. |

| Issue | Aim | Assessment and Management |
| --- | --- | --- |
| | | • The construction and operation of the wind farm will result in impacts to the visual landscape as discussed in **Section 6.2**. As there are no recreational areas (and no recreational activities) within Dapper Nature Reserve there are no potential views from recreational areas within the Reserve that may be impacted.<br>• 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.<br>• Groundwater-dependent ecosystems in NPWS land are protected. | • Species movements from Dapper Nature Reserve into the Development Corridor are likely to be limited, considering the fragmented habitats currently present. Fauna species are likely to move in the surrounds by using the vegetated corridors surrounding the Project, rather than in the open grassland areas. As the WTGs would be placed in the grassland areas, impacts to connectivity are unlikely.<br>• the Project is not predicted to impact on groundwater resources within the Project Site and therefore will not impact on GDEs. |
| **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.**<br>• 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. | • Permission is required to enter the Dapper Nature Reserve and access is restricted by locked gates.<br>• The Project will not compromise public or NPWS access to Dapper Nature Reserve. Access to the Project site will not be gained from or near the Nature Reserve. |

### Other land use rights

The Project Site contains potential land use right constraints including a travelling stock route (TSR), Crown lands and two mineral exploration titles. A review of potential land use impacts associated with these land uses is provided in **Table 6.34**.

**Table 6.34 Land use right impacts**

| Aspect | Assessment |
|---|---|
| **Travelling Stock Routes** | Lot 7008 DP 93442, Lot 7003 DP 93111 and Lot 2 DP 1233468 within the Project Site are part of a Travelling Stock Route (TSR), which is managed by Central West Local Land Services (refer to **Figure 2.3**). The TSR is located near two Project Site entries and access will not be impacted by the Project.<br>No impacts to these lands are anticipated as a result of the Project. |
| **Flood Prone Land** | No flood prone land or flood management areas are identified within the Project Site (refer to **Section 6.8**). |
| **Crown Land** | Some parcels of Crown land (including Paper Roads) overlap with the Project Development Corridor. No WTGs have been sited on Crown land.<br>Consultation with Crown Land has been undertaken during the EIS process. The Host Landowner Agreements provide for SQE to make applications, on behalf of host landowners, to close, purchase and transfer Crown Paper Roads within the Development Corridor to adjoining host landowners at no cost to hosts. |
| **Mining, quarrying, mineral or petroleum rights** | There are two existing mineral exploration licences across part of the Project Site, held by Orange Minerals (NSW) Pty Ltd (EL9290) and Monzonite Metals Pty Ltd (EL8646) (refer to **Figure 1.2**). The exploration licences relate to potential Group 1 metallic minerals. It is understood that exploration activities have been undertaken in relation to EL8646.<br>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 Project Host Agreements.<br>No part of the Project Site is subject to a mining/production lease. |

## 6.9.4 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 16**). 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.

#### 6.9.4.1 Zoning Provisions

As outlined in **Section 2.3.2**, the Project Site is primarily zoned RU1 – Primary Production under the Dubbo Regional LEP 2022 and the Warrumbungle LEP 2013 (refer to **Figure 2.4**). The Project Site also contains small areas of land zoned SP2 – Infrastructure, associated with roads including the Golden Highway and Saxa Road. The Dapper Nature Reserve located adjacent to the southern boundary of the Project Site is zoned C1 – National Parks and Nature Reserves (refer to **Figure 2.4**).

Electricity generating works are not permitted within the RU1 zoning in either LEP however, due to the operation of Clause 2.36(1)(b) of the Infrastructure SEPP, the Project is permissible with development consent.

#### 6.9.4.2 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 16**).

The Project will modify the existing land use within the Project Site by adding energy generation land use to the existing agricultural land use that will continue, with the two land uses coexisting in the Project Site. The LUCRA identifies any 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 6.35**.

**Table 6.35 Unmitigated Potential Land Use Incompatibilities**

| Project Phase | Unmitigated Potential Incompatibilities |
|---|---|
| Construction | • Increased noise from construction vehicles (additional to what is reasonably expected from agricultural production).<br>• Dust generated by construction vehicles and during construction activities such as land clearing and site preparation, but predominantly due to additional vehicles using the unsealed roads.<br>• Visual impacts during construction activities (including for passing motorists).<br>• Erosion and sediment runoff and impacts on surface water quality.<br>• Damage to local roads from vehicles, including light vehicles and trucks.<br>• Road incidents with livestock and/or farm machinery crossing or using roads at slow speeds. |
| Operation | • Inadequate management of invasive weeds and feral pests.<br>• Potential loss of local amenity and visual amenity (for surrounding non-associated residents and passing motorists).<br>• Altered bushfire risk profile for surrounding lands due to the presence of the Project. |
| Decommissioning | • Inadequate removal of infrastructure including commercial and industrial waste.<br>• Land not left in an acceptable condition to be utilised for agricultural production.<br>• Increased noise from vehicles (additional to what is reasonably expected from agricultural production) associated with decommissioning activities.<br>• Damage to local roads from vehicles, including light vehicle and trucks.<br>• Road incidents with livestock and/or farm machinery crossing or using roads at slow speeds.<br>• Dust generated by vehicles/machinery during decommissioning activities (such as site rehabilitation). |

With the effective implementation of measures outlined in **Section 6.9.5** 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, SQE 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 2.5.1**, in recognition that the Project will result in some amenity impacts on some nearby neighbours, SQE has entered into Neighbour Agreements to address various impacts associated with the Project specific to their dwellings.

### 6.9.5 Mitigation and Management Measures

Key land use conflict risks include those associated with traffic (during construction and decommissioning), visual amenity and bushfires. 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 6.2**, **Section 6.10.4** and **Section 6.14**).

SQE 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 extended 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 substations will be removed and the land rehabilitated so that the areas occupied by the Project can return to agricultural use.

To ensure compliance and establish performance monitoring of the mitigation and management strategies, the following management plans will be established:

- 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).
- Bushfire Emergency Management Plan.
- Heritage Management Plan (Aboriginal and Historic Cultural Heritage).
- Traffic Management Plan.
- Erosion and Sediment Control Plan (ESCP).
- Waste Management Plan.
- Decommissioning and Rehabilitation Management Plan.

# 6.10 Hazards and Risks

The SEARs require the EIS to address the hazards and risks associated with the Project. This includes aviation safety, telecommunications, health, bushfire, battery storage, blade throw and risks associated with pipelines. The following sections provide an overview of the outcomes of the relevant assessments undertaken to address the SEARs.

## 6.10.1 Aviation Safety

In accordance with the SEARs, 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 documents 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 any aerial baiting and culling in the Nature Reserve.
- 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 and relevant Councils.

### 6.10.1.1 Assessment Results

The following sections provide a summary of the results of the AIA. Further detail is provided in **Appendix 17**.

**Certified Airports**

Certified airports within 30 nautical miles (nm) of the Project include:

- Dubbo Airport (YSDU) located approximately 44 km (24 nm) to the west of the Project Site.
- Mudgee Airport (YMDG) located approximately 43 km (23 nm) to the southeast of the Project Site.

The Project Site is located inside the 25 nm (+5 nm buffer) minimum sector altitude (MSA) of both Dubbo and Mudgee Airports. The highest WTG (WTG 77) has a maximum overall height of 787 m AHD, including a 5 m elevation buffer, which is below the maximum allowable obstacle height and will not impact on the MSA of either airport.

The Project is located beyond the horizontal extent of the circling areas of both Dubbo and Mudgee Airports and will not impact the Obstacle Limitation Surface or Procedures for Air Navigation Services – Aircraft Operations of either airport.

The AIA concluded that the Project Site is located sufficient distance away from nearby certified airports and will not have an impact on the aviation facilities of those airports.

**Planning Considerations**

The Project satisfies the planning provisions of Dubbo Regional Council regarding Dubbo Airport and will not impact current and planned airport operations. The Warrumbungle Shire Council planning provisions do not include any airspace provisions relevant to the Project.

**Active Landing Areas**

There are no active aircraft landing areas (ALA) within 3 nautical miles (nm) of the Project Site. The closest ALA to the Project Site is Wellington, 22 km (12 nm) to the south. Additional ALAs at Gulgong and Dunedoo are both approximately 26 km (14 nm) away. The Project will not impact on the operations of these ALAs.

**Airspace Protection**

The Project Site is located outside of controlled airspace but is partially located within Danger Area D538B. Danger Area D538B is designated for military flying from surface (ground) level to 10,000 feet above mean sea level (ft AMSL) controlled by 453 Squadron at RAAF Base Williamtown.

High-speed low-level military jet aircraft can be expected to operate in this airspace from time to time. The Project Site WTGs and meteorological masts are potentially hazardous objects to low flying military aircraft should they use the area. The Department of Defence has been consulted to determine specific restrictions or requirements for WTG and meteorological mast installation in the Project Site.

**Radar**

The Project Site is located outside the radar line of sight of the nearest Secondary Surveillance Radars and the nearest Bureau of Meteorology radar facility and will not impact these facilities.

**Obstacle Lighting Risk Assessment**

The AIA included a safety risk assessment of the Project and concluded that WTGs and meteorological masts will not require obstacle lighting to maintain an acceptable level of safety to aircraft. Therefore, obstacle lighting is not proposed.

**Aerial Application Operations**

Aerial application operations including such activities as fertiliser, pest and crop spraying are generally conducted under below 500 ft above ground level (AGL), usually between 6.5 ft (2 m) and 100 ft (30.5 m) AGL.

Previous consultation with the Aerial Application Association of Australia (AAAA) by Aviation Projects has concluded that the presence of a wind farm would prevent aerial application operations in that particular area, but safe aerial application operations would still be possible on other parts of properties within the Project Site and neighbouring the Project Site. The use of helicopters enables aerial application operations to be conducted in closer proximity to obstacles than would be possible with fixed wing aircraft due to their greater manoeuvrability. To facilitate the flight planning of aerial application operators, details of the Project, including 'as constructed' location and height information of WTGs, meteorological masts and overhead powerlines will be provided to landowners on an as requested basis for provision to aerial application pilots.

**Aerial Firefighting**

Aerial firefighting operations (firebombing in particular) are sometimes conducted below 500 ft AGL and under certain conditions visibility may be reduced or limited by smoke/haze.

The Australasian Fire Authorities Council (AFAC) has developed a national position on wind farms, their development and operations in relation to bushfire prevention, preparedness, response and recovery, set out in the *Wind Farms and Bushfire Operations* (AFESC, 2018) guideline. The 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:

- ongoing and effective liaison with the relevant fire and land management agencies
- ensuring access is available to the wind farm site by emergency services response for on-ground firefighting operations
- shutting down wind turbines immediately 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.

The relevant operational requirements will be addressed via a Bushfire Emergency Management Plan to be prepared as part of the implementation of the Project in consultation with the RFS.

**Cumulative Impacts**

The nearest operational wind farm to the Project Site is the Bodangora Wind Farm, located 14 km to the south-west, while the nearest planned wind farm project is Barneys Reef Wind Farm, proposed to be located approximately 18 km to the east. At these distances the Project should not introduce additional constraints to the operation of aircraft to and from nearby ALAs in relation to cumulative impacts with those nearby Projects.

**Summary of Key Mitigation Measures**

A summary of the key mitigation measures recommended in the AIA are outlined below.

- Overhead transmission lines and/or supporting poles associated with the Project that are located where they could adversely affect aerial application operations should be identified in consultation with local aerial application operators and marked in accordance with relevant standards where applicable.
- To facilitate the flight planning of aerial application operators, the location and height of 'as constructed' WTGs and meteorological masts will be provided to landowners upon request so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.
- 'As constructed' details of WTGs and meteorological mast coordinates and elevations will be provided to Airservices Australia.
- SQE will engage with local aerial application operators and aerial firefighting operators in developing procedures for such aircraft operations in the vicinity of the Project, noting that there is no statutory requirement to do so.
- Details of the final wind farm layout will be provided to local and regional aircraft operators prior to construction.
- The rotor blades, nacelles and towers of the WTGs will be painted in white, providing sufficient contrast with the surrounding environment and to maintain an acceptable level of safety.
- SQE will mark temporary and permanent meteorological masts according to the requirements set out in the National Airports Safeguarding Framework (NASF) Guideline D, with the exception of the flashing light, which will be installed if a risk assessment indicates it is required.

## 6.10.2 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 utilise the same ridgeline locations that provide ideal sites 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 of the Project on telecommunications systems and identification of any required mitigation measures to avoid potential disruptions to radio communication services.

As part of the early constraints analysis undertaken in the Project design process, SQE commissioned a Preliminary Telecommunication Impact Assessment in the area being investigated for the wind farm.
The services and appropriate buffer distances were incorporated into the GIS for the Project to ensure that modelling for the placement of wind turbines excluded these areas. Further, a Telecommunications Impact Assessment (TIA) was undertaken by Middleton Group Engineering Pty Ltd (Middleton Group) and is contained in full in **Appendix 18** with the key outcomes are 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.

**Point-to-Point Links**

There are four point-to-point communication links found within 2 km of the boundary of the proposed WTGs, owned by:

- RFS
- DPE (BCS)
- NSW Government Telecommunications Authority
- Essential Energy.

Based on the desktop analysis undertaken by Middleton Group and consultation with link owners/managers, the proposed WTGs are not sited in the near-field zones of any transmitters/receivers, nor are they located in the reflection or scatter zones. As such, the Project is unlikely to have a material impact on existing telecommunication services. Nevertheless, consultation with link operators to confirm any required clearances and potential impacts to their services has commenced and is ongoing.

**Meteorological Radar**

The closest Bureau of Meteorology (the Bureau) meteorological radar to the Project Site is located in Yeoval NSW, more than 60 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 five radars in the region, giving good visibility of weather events in the wider region. As such, the presence of the Project is unlikely to cause adverse performance of the radars.

During consultation the Bureau has noted that 62 of the Project WTGs will impact on their Yeoval radar, with their preference being that those WTGs be shut down during certain extreme weather events.

SQE has provided the Bureau with additional information noting compliance with World Meteorological Organisation (WMO) recommendations. SQE has also requested additional information on 'severe weather events', noting that under AEMO regulations, wind farms are often required to continue operation where possible during severe weather events to ensure the supply of electricity to customers.

SQE recognises that this is an issue for the Bureau and will explore alternative solutions. Given this is an Australia-wide issue for all wind farms to consider, SQE also recommended that the Bureau reach out to organisations such as EnergyCo and the Clean Energy Council (CEC). As a result, the Bureau presented the issue at the CEC Wind Directorate on 20 March 2023. Discussions with the Bureau are ongoing.

**Mobile Voice-Based Communications**

With the exception of one Telstra tower (located just within 5 km of the nearest Project WTG) all other mobile phone base stations are located beyond 5 km from the Project's WTGs and therefore outside the potential area of influence for the Project. Typically a signal will not be significantly impacted where the towers are 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.

There are some mobile network services provided by Telstra and Optus within the Project Site and in the immediate vicinity of the WTGs some reduction in signal may occur. This has the potential to affect signal strength for host landholders and potentially along roads within the Project Site. This effect can be mitigated by relocating the mobile phone receiver in the order of tens of metres. Beyond the Project Site there will not be any significant impact on the signal. Consultation and engagement with the mobile service providers (Telstra, Optus and NBN Co), with respect to the potential impacts on their mobile telemetry services, has been initiated by SQE.

**Wireless and Satellite Services**

Satellite services will generally only be impacted where receivers are sited in extremely close proximity to WTGs, impeding their view of the sky. No non-associated dwellings will be impacted, however there are some host landholder dwellings that may be affected. SQE will consult with affected dwelling owners to determine whether satellite services are currently in use (or expected to be used) and in such cases will manage impacted services with host landowners.

**Broadcast and Digital Radio and Television**

There are no AM, FM, digital radio, digital television or temporary licence transmitters within a 5 km radius of the Project WTGs therefore impacts to television and radio transmission and reception are not expected.

**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 300 m (WTG 102). 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 there are no GNSS stations within 20 km of the Project Site, therefore impacts due to the Project are unlikely. This has been confirmed through consultation with Geoscience Australia.

### 6.10.3 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*.

An Electromagnetic Field Assessment Report was prepared by Middleton Group and is contained in **Appendix 18**. The report notes that the advice of the NHMRC regarding EMF exposure has been withdrawn. Responsibility for review of the radiation health series publications has been handed to Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). The EMF exposure guidelines from ARPANSA now explicitly refer to ICNIRP. EMFs occur wherever electricity is produced, transmitted or used, and so are found commonly in everyday life including in household electrical devices. Many of the fundamental components of a wind farm inherently produce varying levels of electromagnetic emissions. In Australia, electrical devices and infrastructure such as transmission lines and substations, operate at a frequency of 50 Hz which falls within the Extremely Low Frequency (ELF) range of EMF between 0 and 300 Hz.

The EMF study assessed the risk to human health by:

- identifying proposed sections of overhead and underground electrical services
- determining the magnetic field strength at locations directly underneath overhead lines and directly above the underground cables and comparing these to assessment criteria for human health risk as specified in the ICNRIP Guidelines.

The limits for exposure to low frequency magnetic fields for the general public are 200 microTesla (µT) for emissions in the 25 Hz to 400 Hz range. Exposure to magnetic field strength greater than the limits specified can cause adverse health effects, although specific exposure duration limits are not specified in the standard.

The following electrical installation scenarios, expected to produce the highest magnetic fields within the Project, were modelled:

- underground cable – double circuit
- 33 kV overhead power line – triple circuit
- 33 kV overhead power line – single circuit, high current (note that this scenario will only occur at the main substation which is not accessible to the general public)
- 330 kV overhead transmission line – single circuit.

In all cases, the magnetic field strength emitted from the cables is less than the safe limit for general public exposure.

The electric field assessment was completed for the worst-case scenario only, that is the highest voltage scenario in which a person would be directly underneath the 330 kV overhead transmission line.
With conductors at a minimum height of 11 m above the ground, the electric field strength is less than the public exposure limits. Therefore, the electric fields generated by the Project will all be less than the public exposure limits. It is noted that these worst-case assessments have been done immediately adjacent to the electrical infrastructure, whereas the public will be generally not be adjacent to the electrical infrastructure and therefore further lowering any risk of EMF impacts.

### 6.10.4 Bushfire

The Project Site is identified as bushfire prone land by the NSW Rural Fire Service (RFS) bushfire prone land mapping (RFS, 2021) (refer to **Figure 6.11**). The SEARs require an assessment of hazards and risk associated with bushfire including:

- the identification of potential hazards and risks associated with bushfires/use of bushfire prone land
- potential impacts on Dapper Nature Reserve including the risks that a windfarm would cause bushfire
- any potential impacts on the aerial fighting of bushfires
- demonstrating compliance with Planning for Bush Fire Protection (PBP) 2019.

Extensive areas across the Project Site have been subject to clearing associated with historical agricultural land uses. Areas of vegetation generally form scattered paddock trees and also areas of intact vegetation on steeper slopes and along ridgelines, along local roads and also along drainage lines. The Project Site supports woodland/forest and grassland vegetation.

The topography of the Project Site primarily features undulating terrain with ridgelines separating the intervening valleys. The Project Site has an elevation ranging from 360 m Australian Height Datum (AHD) to 540 m AHD (refer to **Figure 6.11**).

As outlined in **Section 2.3.2**, the Dapper Nature Reserve adjoins the Project Site on the southern boundary. The Reserve is approximately 999 ha and protects a remnant stand of forest vegetation. The area surrounding the Reserve is predominately cleared with approximately 2.5 km of cleared landscape between the Reserve and areas of remnant vegetation within the Project Site. It is understood that the Reserve receives small numbers of visitors per year, and access is restricted by locked gates (OEH, 2014).
The Reserve is managed under the Dapper Nature Reserve Fire Management Strategy (NPWS, 2009). This fire management strategy covers all bushfire management and mitigation requirements applicable to the Reserve and relevant emergency response procedures.

The Project Site is also located in proximity to a number of National Parks, Conservation Areas and State Forests within the broader vicinity of the Project Site including:

- Yarrobil National Park, approximately 2 km east of the Project Site.
- Goodiman State Conservation Area, approximately 7 km east of the Project Site.
- Tuckland State Forest, approximately 6 km east of the Project Site.
- Cobbora State Conservation Area, approximately 7 km north of the Project Site.

- Goonoo State Conservation Area, approximately 8 km north-west of the Project Site.
- Yarindury State Forest, approximately 5 km west of the Project Site.

Although sufficiently separated from the Project Site, these areas support extensive woodland/forest vegetation with high fuel loads.

The woodland/forest vegetation within the Project Site, the adjoining Dapper Nature Reserve, the surrounding areas of woodland/forest vegetation and intervening grasslands represent the most significant potential bushfire threat to the Project, through sustaining and spreading fire.

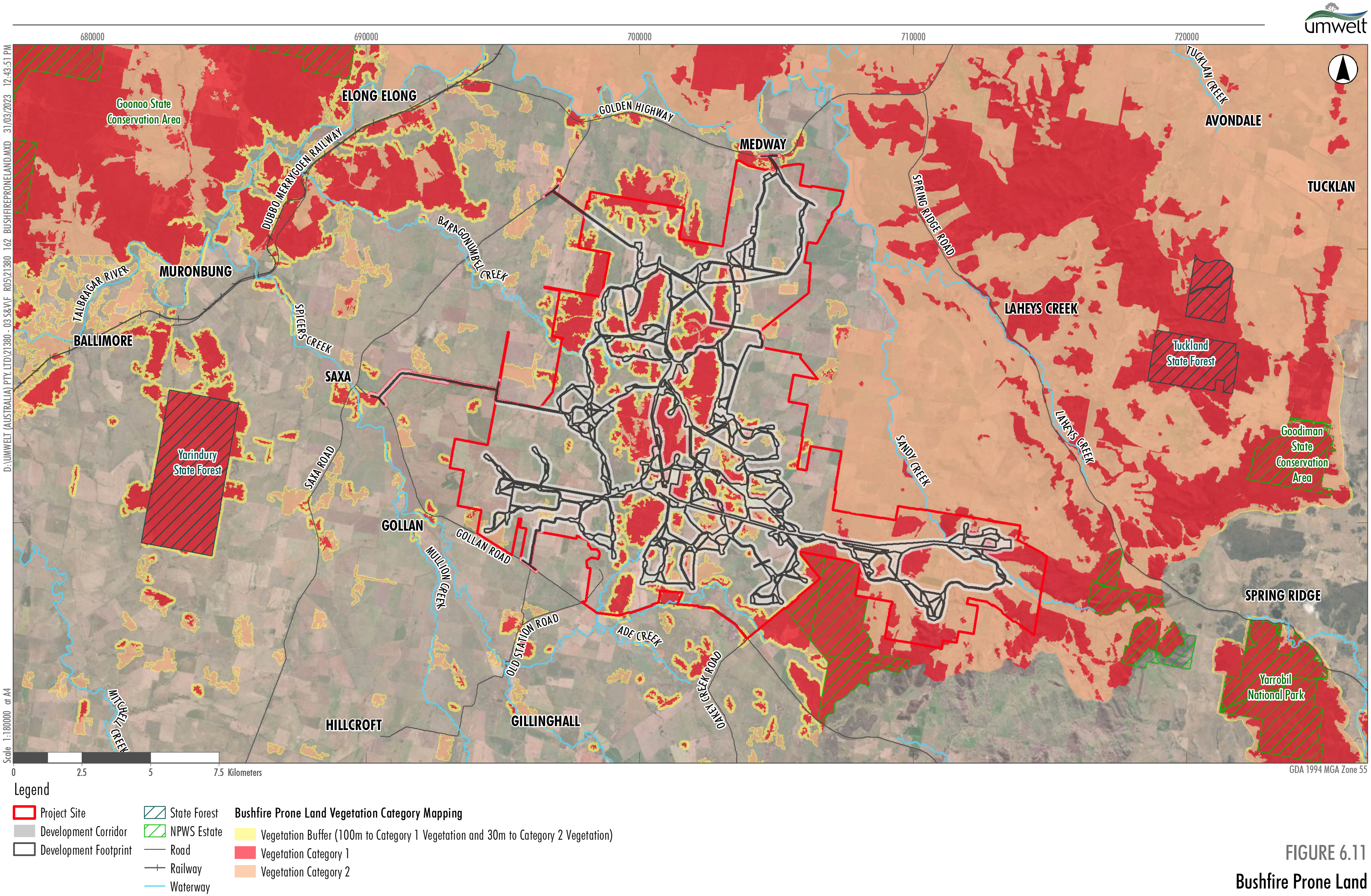



FIGURE 6.11

**Bushfire Prone Land**

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

#### 6.10.4.1 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 bushfire. 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 windfarm is also required to be designed and housed in such a way as to minimise the impact of bushfires on the capabilities of the infrastructure during bush fire emergencies and reduce bushfire risk to surrounding land.

**Asset Protection Zones**

As discussed in **Section 3.3.2.1**, the proposed WTGs require a foundation (approximately 30 m by 30 m in size) providing an appropriate defendable space between the proposed WTGs and the surrounding vegetation. Appropriate APZs can also be applied to the associated infrastructure (site operations and maintenance facility, substation and switching station).

Proposed overhead electrical cabling will include the establishment of an easement with minimum clearing widths of 60 m wide.

The Project Site will be appropriately maintained over the life of the Project including vegetation and site maintenance required to maintain APZs.

**Access**

Access to the Project Site will be provided via multiple access points, from the north (via Sweeneys Lane) from the west (via Saxa Road) and from the south (via Gollan Road). Internal access roads would be constructed to accommodate construction, movement of OSOM vehicles, operational traffic movements and emergency access throughout the Project Site. 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 6 m wide. The indicative location of the access roads is shown on **Figure 1.3**.

**Aerial Firefighting**

In relation to aerial access for fire fighting purposes, the Australasian Fire and Emergency Services Council (AFAC) has developed a national position on wind farms in relation to bushfire prevention, preparedness, response and recovery which is set out in the Wind Farms and Bushfire Operations (2018) guideline.
The Wind Farm and Bushfire Operations guideline advises that windfarm 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 Site by emergency services response for on-ground firefighting operations.
- WTGs are shut down immediately 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 bushfire fighting personnel are required to assess risks posed by aerial obstacles, wake turbulence and moving blades in accordance with routine procedures.

SQE will prepare and implement a Bushfire Emergency Management Plan as part of the implementation of the Project. This will address the operational requirements in relation to aerial fire fighting and access in relation to both the Project Site and the Dapper Nature Reserve. These requirements will be developed in consultation with the RFS and NPWS.

The RFS was consulted through the development of the Aviation Impact Assessment for the Project (refer to **Section 6.9.1**) and has indicated that with regard to aerial firefighting, windfarms are treated like any other potential hazard to aircraft operations. Additionally, aerial firefighting strategies and tactics in relation to the area will continue to be selected based on the fire location, what the fire is threatening and hazard in the area.

**Potential impacts on Dapper Nature Reserve**

As discussed in **Section 6.10.4**, the relevant locations within the Project Site that adjoin the Dapper Nature Reserve are predominately cleared with approximately 2.5 km of cleared landscape between the Dapper Nature Reserve and areas of remnant vegetation within the Project Site. Additionally, the conceptual layout provides for a separation distance of at least 200 m between proposed WTGs and the adjoining vegetation within the Dapper Nature Reserve. This separation distance will provide for a defendable space between the vegetation and proposed infrastructure within the Project Site and the adjoining Dapper Nature Reserve and also assist with preventing the spread of bushfire across the Project Site.

Bushfire risk associated with the Project predominately relates to the construction phase. Appropriate controls will be applied to construction works to manage bushfire threat including establishing restrictions on works that should not be carried out during total fire bans (e.g. hot works), mobile water supply, fire suppression equipment and storage/maintenance of fuel and flammable liquids. These controls will reduce the risk of ignition and spread of bushfire from the Project Site to the adjoining Dapper Nature Reserve. The establishment and maintenance of APZ's around the proposed ancillary infrastructure (substations and electrical reticulation) and separation distances to the Dapper Nature Reserve will also assist with managing the associated bushfire risk during operations.

Permission is required to enter the Dapper Nature Reserve and access is restricted by locked gates (OEH, 2014). Regardless, access to the Dapper Nature Reserve will not be restricted as a result of the Project during construction and operation and appropriate management controls to assist with aerial firefighting as discussed above will also be implemented.

#### Water Supply

An appropriate dedicated water supply for bushfire protection will be provided on site in the vicinity of the site operations and maintenance facility. The volume and location subject of the water supply will be subject to consultation with the RFS during the development of the Bushfire Emergency Management Plan, to be prepared during the detailed design and pre-construction phase of the Project.

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 Bushfire 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 interaction with the Dapper Nature Reserve and associated bushfire management strategy.

The plan will identify all relevant bushfire 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.

Operational staffing and associated maintenance regimes provide the opportunity for more regular observation of otherwise remote areas of sites, so any outbreaks can potentially be reported and acted upon more rapidly.

Further, all site vehicles will be equipped with some fire fighting equipment to act within the limits of equipment and training prior to emergency services arriving on site.

With the implementation of a Bushfire Emergency Management Plan in consultation with the RFS and NPWS, it is considered that potential bushfire risk associated with the Project can be appropriately managed.

## 6.10.5 Preliminary Hazard Analysis

The SEARs require the completion of a preliminary risk screening to inform the preparation of a Preliminary Hazard Analysis (PHA) for the battery storage component of the Project. The PHA has been undertaken by Umwelt (refer to **Appendix 19**) and key outcomes are summarised in the section below.

### 6.10.5.1 Assessment Methodology

The PHA considered the hazards and risks posed to off-site receivers and associated dwellings related to the transport, storage and use of hazardous materials for the Project, including the battery storages, and was prepared in general accordance with *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) and the following guidelines:

- *Applying SEPP 33* (Department of Planning, 2011).
- *Multi-Level Risk Assessment* (Department of Planning, 2011).
- Hazardous Industry Advisory Paper No. 4 –Risk Criteria for Land Use Safety Planning (HIPAP 4) (Department of Planning, 2011).
- Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (HIPAP 6) (Department of Planning, 2011).

The detailed methodology and calculations used to identify and assess the potential hazards are outlined in **Appendix 19**.

### 6.10.5.2 Preliminary Risk Screening

The hazardous materials that will be stored and used for the Project are:

- lithium ion batteries (LIBs) (a Class 9 miscellaneous dangerous good)
- electrical transformer insulating oil (not classified as a dangerous good).

Neither of these hazardous material types has a relevant screening threshold in the Resilience and Hazards SEPP and therefore the use of these materials does not automatically trigger the requirement for a PHA. However, it is known that LIBs may present hazards as a result of manufacturing faults or range of battery abuse scenarios and therefore to maintain a conservative approach with respect to the assessment of hazards and risk, further assessment was considered appropriate and a PHA was completed.

### 6.10.5.3 Risk Assessment

The hazard study identified a range of hazard scenarios which required further assessment including LIB fire, LIB explosion and associated release of gas from such events.

The analysis estimated that the battery modules will need to be located at a distance in excess of 42 m from the Project Site boundary (and any associated dwellings) to meet individual fatality risk criteria.
The analysis estimated that the greatest distance from a battery module at which an individual could be subject to injury is 68 m as a consequence of a LIB explosion scenario at a frequency of less than $10^{-5}$ events per year. That is, provided that the distance from the battery facility to a residence or publicly accessible location is at least 68 metres, there is no risk of death or injury from a battery related hazardous event.

The proposed potential locations of the battery storage facility are over 1,500 m from the Project Site boundary, over 3,000 m from the nearest associated dwelling to the east and over 5,000 m from the nearest non-associated dwelling. Given SQE will locate a battery storage facility at least 68 m from the Project Site boundary and associated dwellings, no off-site impacts with the potential to cause injury or fatality are predicted.

#### 6.10.5.4 Pipeline Easement

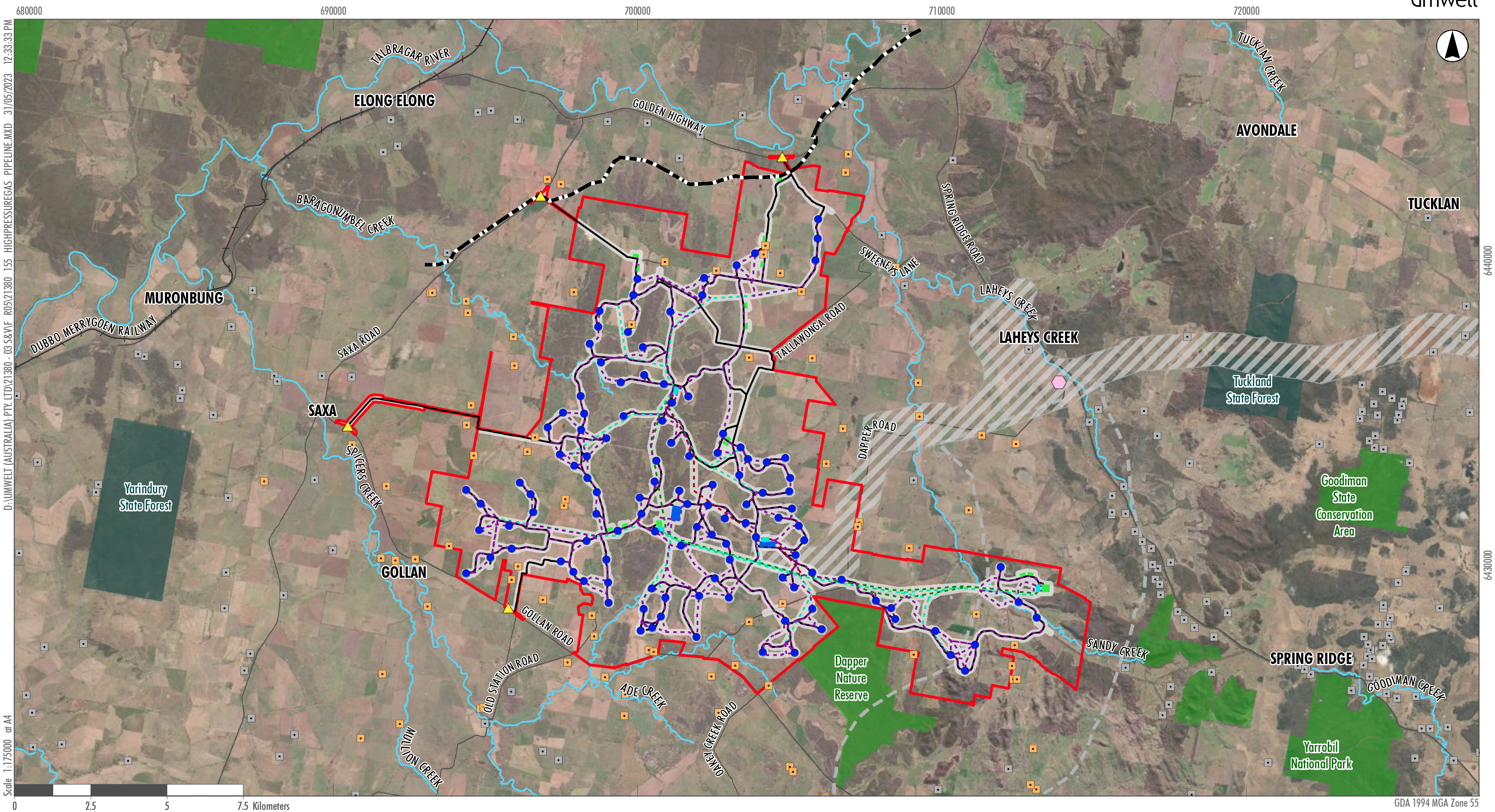
A high pressure natural gas transmission pipeline owned by APA Group (the Central Ranges Pipeline (Pipeline)) traverses the Project Site (refer to **Figure 6.12**). The Pipeline crosses the north-eastern edge of the Project Site and will intersect two of the site access roads and as such, road upgrade works will occur within the Pipeline easement and relevant controls need to be considered to avoid impacts to the Pipeline.

Construction works to upgrade intersections and establish site access roads in the vicinity of the high pressure gas main will be undertaken generally in accordance with NSW Roads and Maritime Services (RMS) work health and safety procedure Working near utilities (RMS, 2017) and in consultation with APA Group. Working near utilities (RMS, 2017) sets out requirements for identifying services, risk assessments (prior to the works and as required should site conditions changed during the works) for the planned works, safe digging practices, hazardous processes (e.g. hot work), backfilling and utility owner (i.e. APA Group) consultation. Safe digging practices include:

- visually locating the pipeline using safe digging practices (e.g. hydro excavation) prior to using power tools or mechanical equipment
- only using manual tools near the pipeline and digging alongside the pipeline rather than above it
- using hand-held power tools to break a paved surface above the pipeline, provided the pipeline is not close to the surface that is to be broken up
- excluding the use of a mechanical excavator within one metre, or greater if required by APA Group, of the pipeline.

Preliminary consultation undertaken by SQE with APA Group indicates that any potential implications associated with the pipeline can be managed appropriately. APA Group will provide the required protection measures for the gas pipeline in consideration of the Project. These protection measures will be considered as part of the detailed design process for the Project, in ongoing consultation with APA Group.

Further detail on the risks and proposed controls associated with road upgrade works in the vicinity of the Pipeline are provided in the PHA (refer to **Appendix 19**).




Legend

- Project Site
- Wind Turbine Generator
- Associated - House
- Non Associated - House
- Development Corridor
- Site Access Point
- Proposed Underground Powerline
- Proposed Overhead Powerline (HV or MV)
- Proposed Overhead Powerline (MV)
- Proposed Overhead Powerline (HV)
- High Pressure Gas Transmission Pipeline
- Access Track
- Substation
- Site Compound
- Electrical Plant Compound
- EnergyCo Elong Elong Energy Hub
- EnergyCo Indicative REZ Transmission Corridor
- EnergyCo Potential Southern Extension
- State Forest
- NPWS Estate
- Road
- Railway
- Waterway

FIGURE 6.12

High Pressure Gas Transmission Pipeline

Image Source: ESRI Basemap Data source: NSW DFSI (2021), CWP Renewables (2022)

#### 6.10.5.5 Mitigation and Management Measures

SQE will implement a range of technical and non-technical risk mitigation and management measures including rigorous design standards and maintenance practices for the battery storage facilities.
The proposed technical mitigation measures are described in detail in Section 7.0 of the PHA (refer to **Appendix 19**) and include:

- Separating the battery storage facility from the Project Site boundary and dwellings by at least 68 m which exceeds the maximum predicted fatality, injury and property damage/accident propagation consequence distances for the modelled LIB hazardous events.
- Purchasing a battery storage facility that is designed and constructed to meet the requirements of the relevant Australian and international standards.
- Ensuring the battery storage facility and management system incorporate adequate instrumentation, interlocks and alarms to minimise the risk of the LIB incubation period (the time at a particular temperature at which thermal runaway is likely to initiate) being approached by shutting down modules/racks and alarming unsafe temperatures or other unsafe conditions.
- Maintaining the separation distances between LIB modules to reduce the risk of accident propagation in accordance with manufacturer's instructions and relevant standards/guidelines.
- Ensuring the LIB modules have a solid aerosol fire suppression system.
- Installing the battery storage facility with a minimum freeboard of 300 mm above the 1% AEP flood level.
- Incorporating lightning protection at the Project Site to reduce the risk of lightning initiating a LIB hazard event.
- Provisioning the Project Site with appropriate fire safety systems (e.g. provision of fire water tanks and hydrant booster sets).
- Providing emergency services with clear access to all areas of the site that may require an emergency response, in particular to battery storage facility components.

Non-technical mitigation measures include the use of an accredited freight company for transportation of LIB components, preparation of a detailed Emergency Plan for the facility, site security for battery facilities and other hazardous materials storage areas, combustible material exclusion zones, site vehicle speed limits, training, hot work/safe work procedures and routine preventative maintenance.

A Final Hazard Analysis and Fire Safety Study will be undertaken as part of the detailed design process to ensure that the separation distances to the Project Site boundary/associated dwellings and mitigation measures are appropriate for the specific battery cell type (i.e. chemistry and capacity) to be used at the Project. A comprehensive Emergency Plan will also be developed and implemented for the Project.

### 6.10.6 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 20**). The purpose of the assessment was to estimate risk to people associated with a blade failure event, based on the likelihood of a human occupying space within the potential impact zone and the likelihood of 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.

Modern WTGs and components supplied by major manufacturers are generally designed and certified in accordance with recognised international standards to ensure structural integrity and safe operation over the lifetime of the WTG. International Electrotechnical Commission (IEC) Standard IEC –1400-1 *Wind turbines – Part 1: Design requirements, Edition 4.0, IEC 61400-1:2019*, establishes the minimum requirements for the design of WTGs and related components with the objective of avoiding structural failure and consequential risk of personal injury or damage to property. IEC standards that apply to the design and certification of WTG blades include *Wind turbines – Part 23: Full-scale structural testing of rotor blades Edition 1.0, IEC 61400-23:2014*, which specifies the requirements for testing the structural integrity of blades, and *Wind energy generation systems – Part 24: Lightning protection, Edition 2.0*, *IEC 61400-24* which describes the requirements for lightning protection systems installed on WTGs.

In addition to meeting the required design and manufacturing standards, modern WTGs incorporate sophisticated control systems that are designed to shut the WTG down during high wind speed conditions and in response to a range of faults or abnormalities detected during operation. These control systems include redundant monitoring and protection systems that are intended to prevent situations where the WTG rotor could accelerate to speeds higher than its rated speed. Other conditions that may indicate a structural blade failure and which will cause a WTG to automatically shut down include abnormal vibration, rotor imbalance, or reduced power output. The WTGs also have lightning protection systems, which prevents damage caused by lightning strikes and is usually limited to the blade surface where it can be seen and repaired during preventative maintenance operations.

Operational monitoring and maintenance programs implemented at wind farms help to increase the likelihood that WTG faults or minor damage are prevented or are detected and rectified at an early stage, thus reducing the risk of serious or dangerous problems developing. SQE will maintain on-site monitoring and maintenance programs, that will allow the Project to be monitored remotely and may assist in detecting potential faults or damage early and quickly.

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 non-associated dwelling to a proposed WTG location is beyond 2 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 15.9 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 15.9 million year return period calculated for the Project is very low and well below acceptable risk limits.

## 6.11 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 Umwelt, following the requirements of the *NSW Social Impact Assessment Guideline for State Significant Projects* (SIA Guideline) (DPE, 2023) and the Project SEARs. The SEARs require an assessment of the social impacts in accordance with the Social Impact Assessment Guideline (DPE) and consideration of construction workforce accommodation. The full SIA is contained in **Appendix 21** and a summary of key outcomes is provided in the following sections.

### 6.11.1 Methodology

Consistent with the SIA Guideline requirements, the SIA process involves three key phases, as illustrated in **Figure 6.13** below.

Engagement is a key component of a SIA program, which affords opportunities to effectively identify, integrate and address social impacts within the detailed Project planning, design and assessment phases. As discussed in **Section 5.0**, SQE has been consulting with local stakeholders since 2019, 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 SQE 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.

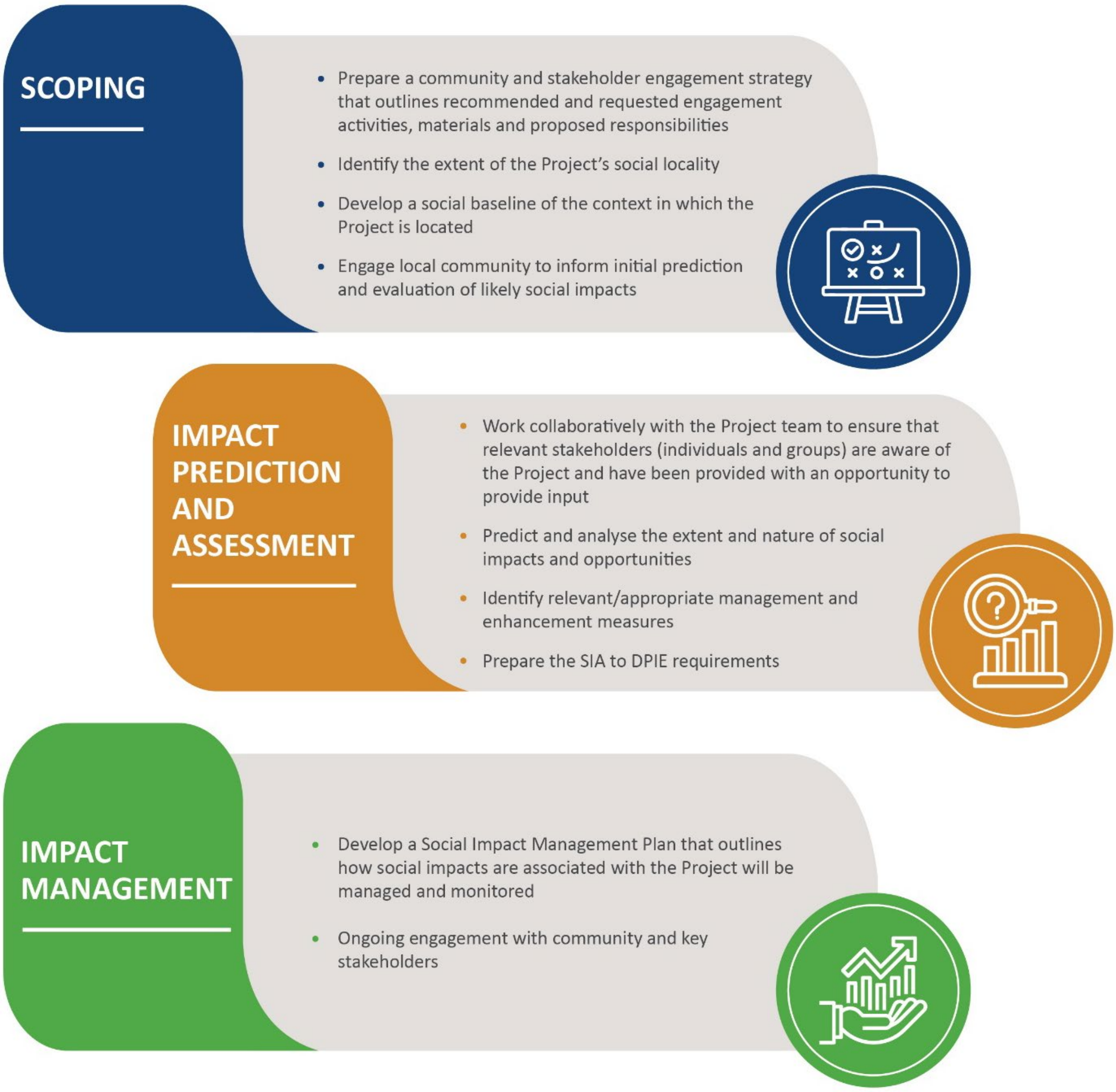



**Figure 6.13 SIA Program Phases**

*© Umwelt, 2023.*

*Note: Social Impact Management Plan only required if included in the Conditions of Consent for the Project upon approval.*

## 6.11.2 Social Baseline Profile

The social baseline is a critical component of SIA as it provides the foundation from which social impacts associated with the Project may be assessed and predicted, with the following components considered:

- Geographic and spatial – identification of communities of interest and relevant stakeholders in the social locality and their respective socio-economic and demographic characteristics and values.
- Governance – an understanding of the relevant governance structures including those of traditional owners and local, State and Federal government jurisdictions.

- Development context – a review of the other major projects and other development factors, as well as previous experiences with comparable projects, to ascertain the response of local communities to potential change processes.
- Key community values, challenges, and priorities – identification of community values through both primary and secondary sources, documentation of current community needs or issues, and goals or priorities, as identified in key strategic planning documents, regional plans or studies as well as within local and regional media.
- Level of vulnerability or resilience across the communities of interest and people's capacity to cope with change.

The social profile developed for the SIA has defined the challenges and opportunities of the community across seven key areas (or capitals) – political, natural, human, cultural, social, economic and physical. A summary is provided in **Table 6.36**.

**Table 6.36 Challenges and Opportunities**

| Challenges | Capital | Opportunities |
|---|---|---|
| • Potential federal member opposition to renewable energy projects. | **Political** | • Future development and land use planning in the area is supported by a range of local and regional strategic planning systems and mechanisms. |
| • Water insecurity and drought-prone land.<br>• Impacts of multiple cumulative developments on natural environment require management and regulation. | **Natural** | • Area has quality agricultural land.<br>• Community members value the natural environment and aesthetic values of the landscape.<br>• Region hosts numerous conservation areas and National Parks. |
| • Population decreasing in Warrumbungle LGA.<br>• Limited tertiary education options.<br>• Ageing population. | **Human** | • Strong representation of Aboriginal and Torres Strait Islander people in the community.<br>• Population increasing in Dubbo Regional and Mid-Western Regional LGAs.<br>• Proportion of residents undertaking tertiary education is increasing.<br>• Dubbo region has a strong technical training and skills base. |
| • The area has an extensive post-colonial occupation resulting in destruction of many Aboriginal sites of cultural significance. | **Cultural** | • There is a long history of European cultural heritage exemplified through heritage buildings and places and the landscape.<br>• Aboriginal people are strongly represented in the social locality through organisations such as the Three Rivers Regional Assembly.<br>• Residents' cultural identity is tied with the landscape and historic land uses contained within the region. |

| Challenges | Capital | Opportunities |
|---|---|---|
| • High crime rates in Dubbo Regional LGA. | **Social** | • Tight-knit community, as described in consultation outcomes.<br>• Low mobility of residents resulting in a sustained sense of community. |
| • Potential for labour force competition due to other renewable projects and mining activity.<br>• Increasing retirement age population leading to decrease in skilled employee base.<br>• Low median weekly household income resulting in less spending in the local economy.<br>• Increasing mortgage repayments and rental prices. | **Economic** | • Region has strong and diverse industries including mining, tourism, and agriculture.<br>• Low cost of living relative to other localities in NSW.<br>• Influx of regional spending and employment opportunities from the CWO REZ bringing economic diversification. |
| • Road infrastructure and road surfaces require upgrade.<br>• Need to increase public transportation options.<br>• Limited health services and difficulties in attracting and retaining health care professionals.<br>• Broadband and mobile coverage need upgrading.<br>• There are a number of other major developments under construction or proposed in the social locality which may place potential strain on existing infrastructure.<br>• Clear need to increase housing stock across the LGA's to accommodate predicted population growth and potential impacts of temporary workforce influx. | **Physical** | • Hospital expansion in Dubbo increasing services and accessibility.<br>• Excellent transport infrastructure linkages to other regional localities and major population centres.<br>• Dubbo Council's plan to increase housing options in the region. |

### 6.11.3 Impact Assessment

**Table 6.37** and **Table 6.38** provide summaries of the evaluation of social impacts for the Project, including both negative and positive social impacts respectively. Social impacts associated with the Project have been evaluated by providing a ranking (e.g. high, medium, low) as defined in the SIA Guideline (DPE 2023).

As key part of the SIA process is that both technical ratings and stakeholder perceptions of impacts are assessed. Stakeholder perception of impact is considered an independent and no less valid component of risk; with stakeholder perceptions often varying between individuals and groups, with no single perception more important than another. However, for the purpose of the SIA the most common, or what is judged to be the general perception/sentiment of a stakeholder group has been used as a measure of perceived stakeholder risk or impact, determined through consultation.

The integration of the outcomes of social technical risk ranking (severity/scale) with stakeholder perceived ranking of impacts (intensity or importance), thus affords a true integration of expert and local knowledge in SIA and enables both types of risk to be addressed in the development of impact mitigation, amelioration and enhancement strategies. This approach is consistent with the requirements of the SIA Guideline, where level of concern/interest and intensity or importance are considered. In the case of some impacts, this risk assessment has involved reference to the relevant technical reports of the EIS (e.g. traffic, visual, noise etc.), however, the associated social impacts have been assessed through the social risking process. It should be noted that the residual social risk ratings represent the risk post implementation of mitigation measures with the majority of negative residual social impacts rated low or medium and most of the positive residual risks rated medium or high.

Given the Project's location in the CWO REZ, the cumulative impact of concurrent renewable energy and other development projects has been considered in the social risk ranking process rather than assessing the impacts of the Project in isolation. Therefore, the findings in this section include cumulative impacts where relevant.

In **Table 6.37** and **Table 6.38** the colour green has been used to represent positive impacts of the Project, with shades of orange to indicate the negative impacts of the Project, including cumulative impacts. Recommended management measures are outlined to address each impact.

## Table 6.37 Social Impact Assessment Summary – Negative Social Impacts

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Signific | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Way of Life**<br>**Livelihoods & Accessibility** | Disruption to existing farming practices | Establishment, operation, and decommissioning of Project infrastructure including ancillary infrastructure. | C, O & D | Proximal landholders including for ancillary infrastructure. | High | Minor | Unlikely | **Low** | Continued implementation of Host Agreements and Neighbour Agreements.<br>Continue to consider landholder needs and activities in construction and operation.<br>Ongoing stakeholder engagement. | **Low** |
| **Livelihoods** | Increased biosecurity risk associated with farming practices | Establishment of Project infrastructure including ancillary infrastructure. | C, O & D | Host landholders<br>Proximal landholders including for ancillary infrastructure. | High | Moderate | Possible | **Medium** | Ongoing land management practices, including pest and weed management and biosecurity protocols throughout construction and operation.<br>Ongoing stakeholder engagement. | **Medium** |
| **Way of Life**<br>**Livelihoods & Accessibility** | Potential fragmentation of properties and restricted property access | Establishment of Project infrastructure including ancillary infrastructure. | C & O | Proximal landholders including for ancillary infrastructure | Low | Minor | Unlikely | **Low** | Continued implementation of Host Agreements and Neighbour Agreements.<br>Continue to consider landholder needs and activities in construction and operation.<br>Ongoing stakeholder engagement. | **Low** |
| **Way of Life**<br>**Community**<br>**Livelihoods** | Reduced community cohesion due to lack of distributional equity. | Payments to host landholders | P, C, O & D | Host landholders<br>Proximal landholders | Moderate | Minor | Possible | **Medium** | Further engagement and ongoing open, transparent, and accessible communication. | **Low** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Community Benefit Program including ongoing targeted Community Sponsorship Program and planning agreements with local Councils.<br>Host and Neighbour Agreements. | |
| **Way of Life**<br>**Livelihoods** | Decline in property values of proximal properties resulting on an impact to livelihoods | Payments to host and proximal landholders, establishment of Project infrastructure, public release of Project plans | P, C, O & D | Proximal landholders | High | Minor | Unlikely | **Low** | Further engagement and ongoing open, transparent, and accessible communication with host and proximal landholders, and broader community.<br>Community Benefit Program including ongoing targeted Community Sponsorship Program and planning agreements with local Councils.<br>Continued implementation of Host and Neighbour Agreements. | **Low** |
| **Way of Life**<br>**Social Amenity**<br>**Surroundings** | Altered landscape affecting people's sense of place (rural character, and impacts on community values) | Establishment of Project infrastructure, particularly WTG installation and operation. | C & O | Proximal landholders, nearby residents, tourists, and tourism operators | Low | Moderate | Likely | **High** | Ongoing consideration of neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis through Host and Neighbour Agreements. | **Medium** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Signific | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Surroundings**<br>**Way of Life** | Visual amenity concerns due to Project infrastructure | Establishment of Project infrastructure, particularly WTG installation and operation. | C & O | Proximal landholders | High | Moderate | Likely | **High** | Continued implementation of Host and Neighbour Agreements.<br>Targeted vegetation screening to be planned in collaboration with affected landholders. | **Medium** |
| | | | C & O | Broader community | Medium | Minor | Possible | **Medium** | Targeted vegetation screening. | **Medium** |
| **Health and Wellbeing** | Increase in anxiety and stress due to uncertainties associated with the Project | Establishment of Project | P & C | Proximal landholders, and the broader community | Low | Minor | Possible | **Medium** | Continue to implement a SEP to ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders throughout the construction process. | **Low** |
| **Health and Wellbeing** | Concerns relating to physical health as a result of hazards associated with the Project | Establishment of Project | P & C | Proximal landholders, and the broader community | Low | Minor | Unlikely | **Low** | Further engagement and ongoing open, transparent, and accessible communication with host and proximal landholders, and broader community.<br>Implement measures outlined in the EIS relating to hazard and risk management. | **Low** |
| **Health and Wellbeing**<br>**Surroundings** | Increased traffic and change in road conditions affect road safety (cumulative) | Establishment and construction of Project infrastructure | C | Broader Community, and road users | High | Major | Likely | **High** | Development and implementation a CEMP, including traffic management measures.<br>Complete road upgrade works as identified by Project traffic assessment. | **Medium** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Contribution to local road maintenance through Planning Agreements with Local Councils.<br>Develop detailed planning transport routes with public safety considerations and information disclosure, notifying residents, considering any sensitive user groups. | |
| **Accessibility**<br>**Surroundings** | Increased traffic resulting in increases disruption and/or increase commuter travel times. | Movement of construction materials & increased traffic due to workforce travel | C | Broader Community, and road users | High | Minor | Likely | **Medium** | As above. | **Low** |
| **Surroundings**<br>**Health and Wellbeing** | Social amenity and way of life impacts due to noise & vibration | Establishment and construction of Project infrastructure | C | Proximal residents | Low | Minor | Possible | **Medium** | Development and implementation of a CEMP to identify controls to be implemented during the construction phase.<br>Construction and operational management controls to be developed in consultation with key stakeholders.<br>Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders. | **Low** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Communication of key SQE contacts from the Construction Team for the community to liaise with as required.<br>Ongoing engagement with local community and key stakeholders. | |
| **Way of Life**<br>**Community** | Changes to local population and the composition and character of the community (cumulative) | Project's construction workforce | C | Broader Community | Medium | Moderate | Likely | **High** | Continue to foster the use of local contractors and suppliers.<br>Ensure appropriate mechanisms to enable open, transparent, and accessible communication of Project information to key stakeholders.<br>Continued use of the expressions of interest database on SQE website.<br>Promote training and upskilling opportunities in the local community. | **Medium** |
| **Accessibility**<br>**Livelihoods**<br>**Way of Life**<br>**Community** | Incoming construction workforce causing increased pressure on local facilities and services particularly housing and accommodation (affordability and availability) (cumulative) | Establishment and construction of Project infrastructure | C | Accommodation providers | High | Major | Likely | **High** | Develop Employment and Accommodation Strategy.<br>Continue to foster the use of local contractors and suppliers.<br>Promote training and upskilling opportunities in the local community.<br>Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers. | **Medium** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Contribution to strategic projects through Planning Agreements with host Councils.<br>Working with Energy Corporation on the access scheme payment framework and the contributions to community benefits (administered by Energy Corporation).<br>Collaboration with other renewable energy proponents. | |
| **Accessibility** | Incoming construction workforce causing increased pressure on local facilities and services particularly local health care and facilities (cumulative) | Establishment and construction of Project infrastructure | C | Health providers | High | Major | Possible | **High** | Finalised Planning Agreements with host Councils.<br>Working with Energy Corporation on the access scheme payment framework and the contributions to community benefits (administered by Energy Corporation).<br>Collaboration with other renewable energy proponents. | **Medium** |
| **Surroundings** | Degradation of environmental values and impacts to local flora and fauna | Construction and operation of Project infrastructure | C & O | Broader community, community and special interest groups, environmental groups | Medium | Minor | Possible | **Medium** | Establishment and implementation of a biodiversity offset strategy. | **Low** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[1] | Affected Stakeholder Group | Perceived Significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Mitigation Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Surroundings** | Potential for environmental degradation associated with pre-construction and decommissioning | Construction, operation and decommissioning of Project infrastructure | C, O & D | Community and special interest groups, environmental groups | Medium | Minor | Unlikely | **Low** | Ongoing environmental management and monitoring.<br>Decommissioning and rehabilitation of the Project Site.<br>Collaboration with industry to explore options for blade recycling. | **Low** |
| **Decision-Making Systems** | Perceived inadequate community consultation affecting people's awareness of construction activities | Community and stakeholder engagement activities | P & C | Broader Community | Low | Minor | Unlikely | **Low** | Ongoing community engagement and community drop-in sessions throughout construction and operation.<br>Continue proactive personal engagement with community members and proximal residents.<br>Continue to build and maintain effective community relationships and implement a range of engagement mechanisms which respond to individual needs as required, prioritising personal and face-to-face consultation. | **Low** |
| **Culture** | Impacts to Aboriginal cultural values and heritage | Construction and operation of Project infrastructure | C & O | Aboriginal community | Medium | Moderate | Unlikely | **Medium** | Implementation of management measures, including avoidance and salvage. | **Medium** |

### Table 6.38 Social Impact Assessment Summary – Positive Social Impacts

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[2] | Affected Stakeholder Group | Perceived significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Enhancement Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Livelihoods** | The provision of jobs and procurement opportunities can increase and/or diversify skills for people in the social locality | Establishment, construction, and operation of Project infrastructure | C, O, & D | Broader Community | High | Minor | Likely | **Medium** | Continue to foster the use of local contractors and suppliers. | **High** |
| **Livelihoods** | The provision of jobs and procurement opportunities resulting in increased economic benefits for local residents | | C, O, & D | Local residents & businesses | Medium | Minor | Likely | **Medium** | Continue to foster the use of local contractors and suppliers. | **High** |
| **Livelihoods** | Procurement of local suppliers, services and contractors could increase commercial activity in local towns which may improve economic capital, local service capacity and township stability | Establishment, construction, and operation of Project infrastructure | C, O, & D | Broader Community,<br>Local service providers and businesses | Medium | Moderate | Likely | **High** | Continue to foster the use of local contractors and suppliers.<br>Coordinate efforts and liaise with key stakeholders to coordinate provision of accommodation and other services or suppliers including opportunities for local contractors and services. | **High** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[2] | Affected Stakeholder Group | Perceived significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Enhancement Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Livelihoods** | Economic benefit through community investment and sponsorship | Community benefit fund | C & O | Broader community, Local service providers, Community groups, Local government, Vulnerable community members | Medium | Minor | Almost certain | **Medium** | Indirect benefits to local services through the construction and operation phases.<br>Payments to host and neighbouring landowners via negotiated agreements, resulting in financial contributions to the local community.<br>Planning Agreements with local Councils and community benefit sharing program.<br>Payment of network infrastructure access fees to EnergyCo for the CWO REZ which will include a component to fund community benefit and employment programs.<br>Promote training and upskilling opportunities in the local community. | **Medium** |

| Social Impact Category | Potential Social Impact on People | Project Aspect/ Activity | Timing/ Duration[2] | Affected Stakeholder Group | Perceived significance | Magnitude | Likelihood | Impact Significance | Existing and Potential Enhancement Measures | Residual Significance |
|---|---|---|---|---|---|---|---|---|---|---|
| **Livelihoods** | Recipients of the community benefit fund could experience improved social capital, community wellbeing and social cohesion, through improved local service provision and targeted support to the community | Community benefit fund | P, C, & O | Broader community, Local service providers, Community groups, Local government, Vulnerable community members | Medium | Minor | Possible | **Medium** | As above. | **Medium** |
| **Livelihoods** | Payments to host and proximal landholders provide for the ability to diversify household income streams | Payments to landholders | P, C, & O | Host Landholders | High | Moderate | Almost certain | **High** | Continue open, transparent, and accessible communication regarding host landholder and negotiated agreements. | **High** |
| **Accessibility** | Provision of a reliable and affordable source of renewable energy | Establishment and operation of Project Infrastructure | O | Broader community, Energy consumers, State and Federal Government | Medium | Moderate | Almost certain | **High** | | **High** |

#### 6.11.3.1 Construction Workforce Accommodation

The SEARs identify construction workforce accommodation as a key issue to be considered in the SIA. As identified in **Table 6.37** this issue was identified as a high social risk from a stakeholder perspective and a high unmitigated social risk from a technical perspective, with a medium level of residual risk following mitigation. This issue was therefore considered in detail in the SIA, with a summary of the key findings provided below.

A concern throughout the consultation process was the potential for population change associated with incoming construction workforces and subsequent strain on local services and infrastructure. The Project is expected to have a peak construction workforce of 587, with an average of 323 people throughout the construction period (approximately 40 months).

SQE has previously sought to achieve a 40% local construction workforce, with this being achieved at Bango Wind Farm, located north of Yass, which had a peak workforce of 320 workers, with upwards of 35% of these workers locally sourced. For this Project, as discussed in the SIA, it is unlikely that a significant proportion of the workforce will be able to be sourced locally given existing workforce constraints and advice from Tier 1 contractors and local Councils. For assessment purposes three scenarios were considered to estimate the likely population impact of the incoming construction workforce across the respective LGAs and subsequent impacts on local service provision.

- Scenario 1 – assumes 10% of the Project workforce will be sourced locally, and a total of 90% of the workforce will migrate to the area for the construction period.
- Scenario 2 – assumes 20% of the Project workforce will be sourced locally, and a total of 80% of the workforce will migrate to the area for the construction period.
- Scenario 3 – is considered an aspirational scenario of 40% local employment and 60% migration into the area. This scenario will be dependent upon appropriate strategies being put in place across the REZ to facilitate local employment and training.

Population change estimates are provided at an LGA level only given there is insufficient data available to accurately model how the incoming workforce (both construction and operational) will be distributed within specific communities in each LGA. It should also be noted that the peak construction workforce number (587) has been utilised in the calculations in **Table 6.39** to represent the highest/worst case impact scenario along with assuming that all incoming employees would reside in each LGA in entirety (which will not occur).

**Table 6.39 Construction Workforce Population Change Estimates – All Scenarios**

| Scenario | Population of LGAs: Dubbo Regional (54,922), Warrumbungle Shire (9,225) and Mid-Western Regional (25,713) | | | |
|---|---|---|---|---|
| | Population increase [3] | % increase in Dubbo Regional population | % increase in Warrumbungle Shire population | % increase in Mid-Western Regional population |
| Scenario 1 (90% migration into LGAs) | 528 | 1.0% | 5.7% | 2.1% |
| Scenario 2 (80% migration into LGAs) | 470 | 0.9% | 5.0% | 1.8% |
| Scenario 3 (60% migration into the LGAs) | 352 | 0.6% | 3.8% | 1.4% |

Burdge (2004) suggests that any increase or decrease in population greater than 5% may be considered a significant population impact. In a highest impact scenario in which there is 80–90% migration into the Warrumbungle LGA alone, this would result in a population change of 5% or 5.7% respectively, however, it is very unlikely that the entire incoming construction workforce will be accommodated in one LGA.

While, the Project alone will not have a significant population change across the Dubbo Regional or Mid-Western Regional LGAs; it is likely that the concurrent construction workforces from projects in the CWO REZ will result in over a 5% change in population in all three LGAs. Therefore, the impacts discussed below are of a cumulative nature.

In relation to the impacts on community services, access to housing and accommodation were most frequently noted during consultation; with housing availability and affordability considered key issues at both a regional and state level. There was also concern raised that further demand for housing may also significantly impact other sectors, such as the health sector and the tourism sector given competition for accommodation by workers and tourists to the area.

The SIA includes an analysis of short-term accommodation supply and occupancy rates. The assessment found that across the relevant LGAs there are approximately 1,973 rooms with a total sleeping capacity of approximately 6,378 and occupancy rates ranging generally between approximately 40% and 60%.
There are also approximately 761 Airbnb properties listed in the social locality with occupation rates ranging between 47% and 67%.

Therefore, given the above data, it can be assumed that approximately 50% of the total sleeping capacity in both short-term accommodation and Airbnbs in each area will be occupied at any given time, without considering any workforces associated with the renewable energy project development.

[3] It is important to note that this population increase assumes workers would not be permanently relocating to the area and therefore does not consider the influx of families associated with the workforce.

In addition, there is a high occupancy rate of private dwellings in the Dubbo LGA (92.2%) with the Warrumbungle Shire and Mid-Western Regional LGAs occupancy rates slightly below state average (82.6% and 85% respectively, compared to 90.6% in NSW), resulting in a total of 4,040 unoccupied dwellings in the social locality. Therefore, there is the possibility of housing some of the construction workforce in share houses, however, this would have the potential to impact accessibility to private housing for residents in the area, which is decreasing in affordability, already limiting accessibility.

There will be multiple concurrent projects seeking to house construction workforces, with peak construction in the REZ likely occurring between 2023 and 2026. In addition, strain on accommodation services is already evident due to the large influx of seasonal and itinerant workers for mining and agribusiness and strong demand for temporary accommodation during peak tourism seasons (Christmas holiday period).

SQE has also identified that existing accommodation facilities will not be sufficient, and is developing initiatives for the Project to support accommodation needs, building on previous initiatives and experiences at their Uungula Wind Farm east of Wellington (construction to commence in 2023). SQE has committed to preparing a Workforce Accommodation Strategy for the Project, which will:

- propose measures to ensure sufficient accommodation is available
- prioritise accommodation which is in travelling distance from the Project Site
- prioritise accommodation that avoids or reduces adverse impacts to the housing market.

Further discussion of the proposed management measures for this issue is provided in **Section 6.11.4.3**.

#### 6.11.3.2 Assessment Summary

The SIA has identified that any negative social impacts of the Project can be mitigated or managed to reduce their significance, with positive impacts enhanced if appropriate measures are put in place. Social impacts associated with the Project that are considered significant include concerns relating to the incoming construction workforce causing strain on local services and changes to the composition of the community, concerns relating to public safety due to increased traffic, and visual amenity concerns related to Project infrastructure and how this affects people’s sense of place. Benefits of the Project raised by the community relate to benefits from payments to landholders, improvements in local road infrastructure, and the provision of a reliable and affordable source of renewable energy.

### 6.11.4 Social Impact Management

SQE has committed to a number of mitigation and enhancement approaches to address social impacts as outlined in the following sections. The selection of social impact management strategies has considered those proposed by the community as part of the Project engagement process; industry benchmarking; strategies proposed in the environmental technical studies; and technical social assessment advice.

#### 6.11.4.1 Community Benefit Sharing

SQE has developed a Community Benefit Sharing Program to support the local community that includes a Community Sponsorship Program, focused on delivering economic support for local organisations and community events.

SQE is also investigating further initiatives, including:

- Co-investment program – that would allow members of the local community to invest in the Project and potentially benefit from financial returns on their investment through the operation of the Project.
- Telecommunications upgrades – investigating options to assist with improvements in internet and phone connectivity to benefit the Project and the local and regional community.

In addition, SQE are committed other Project related agreements which will benefit local communities, including:

- Planning Agreements with Local Councils.
- Neighbour Agreements – targeted at delivering benefits to proximal neighbours of the Project and those most directly impacted by Project activities.

#### 6.11.4.2 Stakeholder Engagement Plan

As identified in **Section 5.1**, SQE has an existing Stakeholder Engagement Plan (SEP), that identifies key stakeholders and outlines the company's approach to engaging key stakeholders throughout the life of the project. SQE is committed to continually reviewing and updating engagement processes to ensure long-term and meaningful relationships are fostered with the communities in which they operated.

Further to the objectives identified in **Section 5.1**, the SEP will be regularly reviewed to evaluate engagement activity and outcomes, identify new stakeholders and incorporate engagement feedback to contribute to improvements in how SQE develops and operates this and other projects.

#### 6.11.4.3 Employment and Accommodation Strategy

To mitigate the impact on housing and accommodation within the region SQE will prepare an Employment and Accommodation Strategy to:

- Propose measures that may be adopted to ensure adequate supply and availability of accommodation to house the Project's construction and operational workforce.
- Ensure that any new accommodation that is developed, is sited within a reasonable distance from the Project Site and in an area that is considered suitable by Local Council(s). For instance, this may include prioritising worker accommodation in Dubbo, and potentially Wellington, to reduce travel time to the site and to minimise associated traffic/road impacts.
- Prioritise accommodation that avoids or reduces adverse social impacts on communities, such as impacts on the local housing market (i.e., given the potential for upward pressure on housing prices and housing availability for residents).
- Identify potential solutions for securing worker accommodation in preparation for the commencement of Project construction.
- Provide a framework and strategies for monitoring and responding to accommodation and employment needs for the Project.

Further to this, the Strategy will seek to:

- Facilitate the employment of local residents, where possible, to reduce impacts of Project related population influx.
- Continue to provide education and training opportunities such as sponsoring positions at Wellington TAFE; working with Training NSW, Energy Co, NSW Skills Board, Regional NSW Council to identify and maximise training opportunities; and ongoing sponsorship of university internships for undergraduates, and scholarships for First Nations tertiary education.
- Ensure adequate assessment of workforce composition and suitability, to minimise issues relating to workforce presence in the locality.
- Augment/re-purpose existing accommodation venues that may otherwise be unoccupied.
- Consider partnerships with existing accommodation providers, including temporary accommodation providers and manufacturers.
- Continue to maintain an accommodation register for private property and business owners to register interest in leasing their properties for worker accommodation or further developing their accommodation business to meet workforce demand.
- In the selection of accommodation options, ensure as far as possible that other industry sectors e.g., tourist accommodation providers, are not disadvantaged by the use of existing accommodation options in the region e.g. hotel/motel accommodation.
- Liaise with local organisations to consider build-to-rent models/approaches for use by workers during the construction phase, with housing then provided back to the community on Project completion.
- Liaise and collaborate with EnergyCo and other renewable energy proponents in the REZ to identify relevant accommodation options, and to fund the infrastructure and services required to support an influx of construction workforces within the region.

#### 6.11.4.4 Management of Cumulative Impacts

It is recognised that a number of social impacts of the Project are of a cumulative nature and therefore cannot be addressed by SQE in isolation. There is a responsibility for proponents developing projects in the CWO REZ, alongside the NSW government, to consider these impacts and develop strategies for appropriate management, mitigation and enhancement. SQE is committed to being part of the solution for cumulative social impacts and in addition to implementing the measures described above, has indicated its desire to continue to collaborate with local Councils, the NSW Government and other proponents and stakeholders to minimise negative cumulative impacts and maximise positive impacts.

## 6.12 Economic

The Project will result in a significant capital expenditure of approximately $2 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 commonly identified as a benefit of the Project in the stakeholder engagement program.

As outlined in **Section 5.3**, community responses regarding the economic impacts of the Project most frequently identified positive economic impacts, particularly relating to diversifying household income through payments under Host Agreements and Neighbour Agreements. However, there were also some community concerns raised in relation to potential negative economic impacts including potential strain on local services due to an influx of the construction workforce and the cumulative effects on local infrastructure and services due to workforce influx across projects in the region.

An Economic Impact Assessment (Economic Assessment) 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 Economic Impact Assessment for the Project is provided in **Appendix 22**, with results summarised in the sections below.

### 6.12.1 Methodology

The Economic Assessment Study Area comprises the following LGAs:

- Dubbo Regional.
- Warrumbungle Shire.
- Mid-Western Regional (neighbouring LGA).

The main regional cities/townships/settlements in the Study Area are all located within a 60-minute drive of the Project Site and are therefore expected to be influenced by the Project to varying degrees.

The Economic Assessment 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 nearby CWO REZ.
- Economic stimulus impacts including project wages and spending, landowner rental incomes, neighbour benefit payments, uplift in Council rate revenues, and Proponent's Community Shared Benefits Strategy payments.

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.

## 6.12.2 Baseline Regional Economic Profile

### 6.12.2.1 Population

The population of the Study Area (LGAs of Dubbo, Warrumbungle and Mid-Western) totalled 90,480 persons at June 2021 (ABS Estimated Resident Population 2022 release). Over the period 2022–2036, annual population growth in the Study Area is expected to be +0.7% pa compared to the NSW growth rate of +1.0% p.a. The Warrumbungle municipality is projected to experience population decline over the coming years (refer to **Appendix 22**). Local investment in large infrastructure projects (such as the Project) that generate new employment opportunities will likely assist in attracting new residents to the region.

### 6.12.2.2 Labour Force, Occupational and Business Structure

The regional labour market is tight, highlighted by the Study Area's low unemployment rate of 3% compared to 5% for NSW as a whole. The Project is likely to require some 590 employees during the construction phase (at the Project's peak), with potentially 20% of the workforce sourced locally, 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. Additionally, the Project has potential to provide new opportunities for workers who are beginning or seeking a transition from mining sectors to the renewable energy sector.

The latest available employment related census data (ABS Census 2016) shows 34% 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 27%, 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.

### 6.12.2.3 Township Services

The major regional townships of Dubbo and Mudgee have the capacity and labour force to service many aspects of the Project, with smaller settlements such as Gulgong, Wellington and Dunedoo, also likely to provide labour, accommodation and other general services to the Project.

**Accommodation**

Concerns relating to the potential for population change associated with the non-local construction workforces, and the associated strain on local services (including accommodation), was a recurring theme during the Project's consultation phase. Underpinning these concerns is the likelihood of cumulative impacts from other renewable energy projects in the region with construction phases which overlap with the Project.

As discussed in **Section 6.11**, a review undertaken by Umwelt in October 2022 indicates that 1,973 short-term accommodation rooms are located in the key Study Area towns of Dubbo, Mudgee, Gulgong, Wellington and Dunedoo.

As outlined in **Appendix 22**:

- Approximately 80% of the construction workforce would likely be non-local (i.e. sourced from the beyond the region.
- On average, approximately 260 workers would require accommodation per month across the construction phase, with this figure increasing to approximately 470 persons at peak construction (assuming each non-local worker occupies one FTE position).
- The Project would utilise approximately 24% of the total commercial accommodation in the key towns.
- Further capacity is available in private rentals (e.g., long-term houses/units, short-term Airbnb), and potentially unoccupied dwellings; some of which may become available to the market to support the Project.

The Project will generate new revenues for commercial accommodation providers and private property owners over the construction phase (especially in off-peak seasons). The demand from concurrent regional infrastructure projects has significant potential to result in accommodation shortages, as highlighted during consultation.

The Study Area has a higher share of unoccupied dwellings (11%) when compared to the NSW average (9%). Mid-Western and Warrumbungle municipalities had a significant share of unoccupied dwellings (15% and 18% respectively).

Large renewable energy projects, such as the Project, tend to lean heavily on the local rental market with most day-to-day workers living in shared accommodation. As a result, local rental markets often reach or almost reach full utilisation and at times require further supply be brought to the market during the construction phase of these projects. Potential exists that the private accommodation demands of multiple concurrent renewable energy projects in the region (including the Project) could result in a shortage of rental supply. Some 761 active short-term rentals are advertised in the region, based on data sourced from www.airdna.co by Umwelt in October 2022. However, it is likely that many of these rooms will already play a role in servicing other visitor sectors including business travellers, tourists, seasonal agriculture workers and the 'visiting friends and family' cohort.

### 6.12.3 Assessment of Economic Impacts

The net economic impacts of the Project, as presented in the Economic Assessment, are summarised in **Table 6.40**. Details on each aspect of the economic analysis presented in **Table 6.40** are provided in the EIA (refer to **Appendix 22**).

**Table 6.40 Net Economic Benefit Assessment**

| Factor | Value |
|---|---|
| **Negative Economic Outcomes** | |
| Temporary loss of agricultural land (30 years) | Approximately 1,520 ha |
| Loss of employment (direct and indirect) | 0 jobs |
| **Positive Economic Outcomes** | |
| Capital investment | +$2,050 million |
| Study Area investment (including wage stimulus) | +$375 million (assumes 15% of total investment) |
| Construction employment (direct and indirect) | 840 FTE total jobs (over 40 months), including:<br>Study Area jobs<br>165 FTE direct on-site<br>105 FTE indirect off-site<br>Total: 270 FTE |
| Operational employment (direct and indirect) | 47 FTE total jobs (for 30 years), including:<br>Study Area jobs<br>12 FTE direct on-site<br>7 FTE indirect off-site<br>Total: 19 FTE |
| **Operational Economic Stimulus – National** | |
| Total net local economic stimulus (operational wage stimulus, Host Agreement and Neighbour Agreement payments, Planning Agreements, Community Benefit Sharing Program payments, other project agreements, increased Council land tax returns) | +$410 million (over 30 years of operation) |
| **Total Economic Benefits** | **+$480 million (40-month construction period plus 30 years operation)** |

Overall, the Project will involve approximately $2 billion in investment and have the capacity to supply sufficient clean energy to power the equivalent of approximately 397,000 homes per annum, which represents approximately 12% of all NSW homes.

The Project would contribute to:

- 840 FTE construction jobs and 47 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 $46.9 million in new spending into the economy over the construction phase, supporting approximately 235 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 $410 million (over 30 years of operation, CPI adjusted) relating to operational wage stimulus, Host Agreement and Neighbour Agreement payments, Community Benefit Sharing Program payments (including planning agreements) and net land tax revenue to Council.

### 6.12.4 Cumulative Economic Impacts

The Economic Assessment includes an assessment of the potential and proposed State Significant projects located within 100 km of the Project Site, as outlined in **Section 6.12**. In relation to cumulative impacts the Project is likely to need to compete for labour, accommodation and other resources with these identified projects subject to the final timing of construction of each project.

The Economic Assessment notes the following in relation to the other relevant projects considered as part of the cumulative impact assessment:

- 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 proposed or planned) may emerge in the period prior to construction of the Project especially as the CWO REZ matures.

The above factors indicate potential negative impacts are possible if appropriate management and planning initiatives are not put in place, particularly in relation to the Project's accommodation needs. Conversely, the labour and procurement requirements of multiple concurrent renewable energy projects have potential to underpin the development of a deep renewable energy skills base that may result in efficiencies and further economic opportunities for the region.

In terms of construction-related businesses, the Economic Assessment indicates that there is capacity including many located in the immediate region. This overall capacity will assist in servicing concurrent infrastructure projects.

The Project, and others in the CWO REZ, also has potential to support workers who are beginning or seeking a transition from mining-related work to renewable energy construction. This transition is predominately driven by various targets to decreased reliance of coal to generate power for economies around the world, including Australia.

### 6.12.5 Mitigation and Management

In order to minimise potential Project impacts and maximise Project benefits, the following mitigation measures will be implemented:

- Development of a Community Benefit Sharing Program (as detailed in **Section 6.11.4.1**).
- Development of an Employment and Accommodation Strategy (as detailed in **Section 6.11.4.3**).
- Implementation of a range of initiatives and commitments relating to procurement and skill development that will build capacity in the local economy, including employment of a dedicated Regional Economic Lead based in the CWO REZ, education and training opportunities, and initiatives to increase opportunities for local suppliers and contractors (as detailed in **Section 6.11.4.3**).

## 6.13 Waste Management

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, 2014) 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, 2014a).

### 6.13.1 Waste Disposal Options

SQE 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 to landfill, and in this case SQE 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.

There are several locations for off-site recycling and disposal of construction waste generated by the Project. Dubbo Regional Council's waste management facilities at Dubbo and Wellington are equipped to accept mixed commercial and industrial waste, including general waste, green waste, recyclables, oil and batteries, noting that large volumes (i.e. vehicles over 3 tonnes) are only accepted at the Dubbo (Whylandra) facility.

Options for waste disposal within Warrumbungle Shire are limited, noting that waste management facilities within the LGA are licenced to primarily service the needs of residents. Warrumbungle Council has advised that it is not in a position to be able to accept waste products from large scale developments such as wind farms. Accordingly, SQE will not consider waste disposal options in the Warrumbungle LGA, unless advised otherwise in the future.

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 CEMP and OEMP.

## 6.13.2 Waste Classification

The Waste Classification Guidelines: Part 1 Classifying Waste (NSW EPA, 2014) 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.

**Construction and Operation**

The potential waste streams expected to be generated by the Project during the construction and operational phases are quantified in **Table 6.41**.

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, demolition, construction of accessways, landscaping and the construction of operational infrastructure.

During operations waste generation would be limited to minor quantities of waste from staff amenities, redundant equipment and maintenance activities. Under the waste definitions in the POEO Act, most of the waste generated during the construction phase would be classified as general solid waste, either putrescible or non-putrescible (refer to **Table 6.41**).

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. 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 6.41 Waste Classification and Expected Waste Types**

| Activity | Waste Classification | Expected Waste Type |
|---|---|---|
| Construction | Liquid Waste | Waste oils, lubricants and liquids, paint, and sewage ablutions. |
| | General Solid Waste (Non-Putrescible) | Green waste from site establishment and clearing of Disturbance Area, 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. |
| | General Solid Waste (Putrescible) | Domestic waste. |

| Activity | Waste Classification | Expected Waste Type |
|---|---|---|
| **Operations** | Liquid Waste | Waste oils, lubricants and liquids, paint, and sewage ablutions. |
| | 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. |
| | General Solid Waste (Putrescible) | Domestic waste. |

**Decommissioning**

At the end of the operational life of the Project, all above ground infrastructure will be dismantled and removed from the Project Site and recycled in accordance with best practice at the time.

Although to a lesser degree compared to the construction phase, solid wastes will be generated by decommissioning activities including non-putrescibles and putrescibles. Solid wastes include packaging, excess building materials, general refuse, and other non-putrescible wastes will be disposed of using waste management facilities.

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 its life. SQE 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 battery storage 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.

### 6.13.3 Waste Generation, Minimisation and Management Measures

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 Site 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 6.42**, including indicative quantities (construction and operations phase). It is noted that the majority of the indicative waste quantities are applicable to the construction phase (95%) of the Project, as outlined in **Table 6.42**.

**Table 6.42 Indicative Waste Generation and Management Activities – Construction and Operation Phase**

| Waste Type | Classification | Indicative Quantity | | Management Actions |
|---|---|---|---|---|
| | | Construction | Operation | |
| **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 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 | 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 | Stored appropriately then transported from site and disposed of by appropriately licenced contractor. |
| **Sewage** | Liquid waste | 800 kL | 600 kL | Treated on site in approved septic system or compositing system with removal of final waste products at appropriate intervals by licensed contractor. |
| **Vehicle maintenance consumables** | General solid waste (non-putrescible) | 500 kg | 500 kg | 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 | 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** | | 150 tonnes | 50 tonnes | |
| **Glass** | | 350 kg | 50 kg | |
| **General recyclables** | | 2 tonnes | 2 tonnes | |

| Waste Type | Classification | Indicative Quantity | | Management Actions |
|---|---|---|---|---|
| | | Construction | Operation | |
| **Timber** | General solid waste (non-putrescible) | 300 kg | 50 kg | 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 | 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 | 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 | | 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 | Where possible components will be reused, sold as scrap, recycled or re-purposed. |

## 6.14 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 Site 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 phase (i.e. approximately 40 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 Site, 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 50 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 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.

### 6.14.1 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 (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.

# 6.15 Cumulative Impact Assessment Summary

The *Cumulative Impact Assessment Guidelines for State Significant Projects* (CIA Guidelines) (DPE, 2022) 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 31 renewable energy, infrastructure and other major projects, including the CWO REZ transmission line project, within or in the vicinity of the REZ (extending up to approximately 75 km from the Project Site). Of the 31 projects, 14 are approved and 17 are proposed. Further details on these projects and the potential for cumulative impacts associated with the Project are provided in **Appendix 23**.

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 Site due to its location within the CWO 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 6.43** 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 Site, 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 6.43 Cumulative Impact Summary

| Project | Detail | Potential Cumulative Impact |
|---|---|---|
| **Solar Projects** | | |
| Sandy Creek Solar Farm | Adjacent to the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 24-month period with a peak construction workforce of 700 employees. | Cumulative impacts are possible due to the proximity of the Project, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• potential for biodiversity impacts due to close proximity to the Project.<br>Cumulative impacts during operations may include visual and noise related impacts. |
| Cobbora Solar Farm | Adjacent to the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 36-month period with a peak construction workforce of 700 employees. | Cumulative impacts are possible due to the proximity of the Project, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• potential for biodiversity impacts due to close proximity to the Project.<br>Cumulative impacts during operations may include visual and noise related impacts. |
| Dapper Solar Farm | Adjacent to the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over an 18–24-month period commencing 2025 with a peak workforce of 350 employees. | Cumulative impacts are possible due to the proximity of the Project, and likely to occur if there is an overlap of peak construction periods. Cumulative construction impacts may include:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• biodiversity impacts due to close proximity to the Project.<br>Cumulative impacts during operation may include visual and noise related impacts. |

| Project | Detail | Potential Cumulative Impact |
| --- | --- | --- |
| Tallawang Solar Farm | 18.5 km from the Project Site.<br>Currently in submissions phase.<br>If approved, construction would be undertaken over a 34-month period with a peak construction workforce of 580 employees. | Cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts may include social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns. |
| Bellambi Heights Solar Farm | 19.5 km from the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 12–36-month period with a peak construction workforce of 400 employees. | Cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts may include social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns. |
| Dunedoo Solar Farm | 23 km from the Project Site.<br>Approved, but currently under appeal.<br>Expected construction period of 10–12 months with peak construction workforce of 100–125 employees. | Cumulative impacts are possible if the project should proceed and if there is an overlap of construction periods. Potential cumulative impacts during construction may include:<br>• traffic and transport impacts on the Golden Highway<br>• social and economic impacts affecting the availability of community resources and accommodation in nearby towns (including waste disposal capacity). |
| Birriwa Solar Farm | 25 km from the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 28-month period with a peak construction workforce of 800 employees. | Cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns. |
| Stubbo Solar Farm | 26 km from the Project Site.<br>Approved, with construction expected to commence in 2023 for a period of 12 months.<br>Peak construction workforce of 400 employees. | Cumulative impacts are possible if there is an overlap of construction periods, although this is unlikely. Potential cumulative impacts during construction may include:<br>• traffic and transport impacts on Golden Highway<br>• social and economic impacts affecting the availability of community resources and accommodation in nearby towns (including waste disposal capacity). |

| Project | Detail | Potential Cumulative Impact |
| --- | --- | --- |
| Maryvale Solar Farm | 27 km from the Project Site.<br>Approved, awaiting determination of Modification 2.<br>Construction period of 12 months expected to commence in 2023/24 with a peak construction workforce of 150 employees. | Cumulative impacts are possible if Modification 2 is approved, and if there is an overlap of construction periods. Potential cumulative impacts during construction may include:<br>• traffic and transport impacts on the Golden Highway<br>• social and economic impacts affecting the availability of community resources and accommodation in nearby towns (including waste disposal capacity). |
| Wellington North Solar Farm | 27 km from the Project Site.<br>Approved, with expected construction period of 18–24 months with a peak construction workforce of 250 employees. | Material cumulative impacts are unlikely due to the absence of shared access routes and unlikely overlap of construction periods. However, cumulative social and economic impacts may affect the availability of community resources (including waste disposal capacity) and accommodation in nearby towns during construction. |
| Forest Glen Solar Farm | 53 km from the Project Site.<br>Approved, with expected construction period of 12–18 months with a peak construction workforce of 200 employees. | Cumulative impacts are possible if there is an overlap of peak construction periods. Cumulative impacts during construction may include:<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• traffic and transport impacts on the Golden Highway. |
| **Wind Projects** | | |
| Bodangora Wind Farm | 14 km from the Project Site.<br>Operational. | Material cumulative impacts are highly unlikely for most issues as the wind farm is operational, however, consideration of visual impacts due to turbine visibility is required. A cumulative visual assessment with Bodangora Wind Farm has been completed (refer to **Section 6.2**). |
| Barneys Reef Wind Farm | 18 km from the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 24–30-month period with a peak construction workforce of 435 employees. | Cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Cumulative impacts during construction may include:<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• traffic and transport impacts on the Golden Highway. |

| Project | Detail | Potential Cumulative Impact |
|---|---|---|
| Uungula Wind Farm | 31 km from the Project Site.<br>Approved, with construction period of 30 months expected to commence in 2023 with a peak construction workforce of 250 employees. | Material cumulative impacts are unlikely due to the absence of overlap of peak construction periods. However, part of the transportation route is share and cumulative impacts during construction may include:<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• traffic and transport impacts on the Golden Highway. |
| Burrendong Wind Farm | 47 km from the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 24-month period with a peak construction workforce of 250 employees. | Cumulative impacts are possible, and likely to occur 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. |
| Valley of the Winds Wind Farm | 52 km from the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 24–42-month period with a peak construction workforce of 400 employees. | Cumulative impacts are possible, and likely to occur if there is an overlap of peak construction periods. Large distance from the Project, however potential cumulative impacts may include:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns. |
| Liverpool Range Wind Farm | 75 km from the Project Site.<br>Approved, awaiting determination of Modification 1.<br>Expected construction period of 24–36 months with a peak construction workforce of 829 employees. | Cumulative impacts are possible if Modification 1 is approved, and if there is an overlap of peak construction periods. Large distance from the Project, however potential cumulative impacts during construction may include:<br>• traffic and transport impacts on Golden Highway<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns. |

| Project | Detail | Potential Cumulative Impact |
| --- | --- | --- |
| **Other Projects** | | |
| CWO REZ transmission infrastructure and Elong Elong and Merotherie Energy Hubs | Adjacent and within the Project Site.<br>Currently in planning and assessment phase.<br>If approved, construction would be undertaken over a 36-month period expected to commence in Q3 2024 with a peak construction workforce of 650 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:<br>• traffic and transport impacts on Golden Highway (including traffic noise)<br>• social and economic impacts affecting the availability of community resources (including waste disposal capacity) and accommodation in nearby towns<br>• biodiversity impacts due to close proximity to the Project.<br>Cumulative impacts during operations may include visual and risk/hazard related impacts. |

As outlined in **Table 6.43** 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 Golden 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 noise impacts with other nearby Projects
- cumulative land use change impacts, including impacts on agricultural land
- cumulative waste management impacts due to the needs of multiple projects in the region, in particular associated with construction activities
- cumulative biodiversity and heritage 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

Social and economic cumulative impacts are key issues for the development of the CWO REZ and are being actively addressed by the NSW Government as part of its planning and implementation of the REZ. As identified in **Section 6.11** and **Section 6.12**, issues such as impacts on housing availability, services and capacity within the towns and communities within the REZ are key issues requiring careful management. The SIA process included assessment of cumulative social impacts with the findings outlined in the SIA, including detailed assessment of housing availability for the construction phase (refer to **Section 6.11.3.1**).

Effective management of these cumulative impacts will require action by the NSW Government as part of the implementation of the REZ and each of the Project proponents. SQE 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 construction workforce accommodation impacts) and maximise the positive social impacts (such as the regional economic contribution and employment benefits). These measures are discussed in **Section 6.11.4** and **Section 6.12.5**.

SQE recognises that a number of social impacts of the Project are of a cumulative nature and therefore cannot be addressed by SQE in isolation. There is a responsibility for proponents developing projects in the CWO REZ, alongside the NSW Government, to consider these impacts and develop strategies for appropriate management, mitigation and enhancement. SQE is committed to being part of the solution for cumulative social impacts and in addition to implementing the measures discussed above, has indicated its desire to continue to 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

Cumulative traffic impacts during the construction phase are a key issue for the development of the REZ and the Project will contribute to this issue. The key cumulative issue is the increased traffic on the key transport routes in the region which will be used by multiple projects (e.g. the Golden Highway and the OSOM transport route from the Port of Newcastle). Near the Project Site the Transport Assessment 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. SQE has committed to undertake these works in consultation with the relevant roads authorities (TfNSW and Councils). The completion of road upgrades was identified as a key benefit of the Project by the local community. 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 Transport Assessment found that the local road network will operate at a good level of service.

With regard to the State road network and transport route from the Port of Newcastle, the Transport Assessment and OSOM Vehicle Route Assessment both identified that upgrade works are required. As discussed in **Section 3.3.4.10**, the NSW Government has taken responsibility for these upgrade works and will undertake these as part of a separate process. These upgrades will improve traffic conditions on the broader road network and provide sufficient capacity for cumulative traffic. The Transport Assessment also found that the Golden 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 6.2.2.7**.

The cumulative assessment found that two non-associated dwellings are located within 8 km of both the Spicers Creek and Bodangora Wind Farm Projects, however both dwellings have turbines located within two or less 60 degree sectors which is deemed acceptable in accordance with the Bulletin. The assessment also found that three non-associated dwellings are located within 3.4 km of the Project (two with moderate visual impact rating and one with low visual impact rating). Three of these dwellings are associated with the Sandy Creek and Cobbora solar farms and have the potential to view Projects simultaneously, although intervening vegetation will reduce views.

The cumulative visual impact assessment also considers the potential visual impact of multiple wind farms when viewed sequentially. If a number of wind farms are viewed in succession as a traveller moves through the landscape this may result in a change in the overall perception of the landscape character. The viewer may only see one wind farm at a time, but if each successive stretch of the road/track is dominated by views of a wind farm, then it can be argued to be a cumulative visual impact (EPHC, 2010). When travelling from Wellington to Gulgong (or vice versa) along Goolma Road, turbines associated with the Bodangora Wind Farm are a noticeable feature of the landscape for a short period of time. Further along the route, the Project will be a visible element along Goolma Road. It is also a similar occurrence when travelling from Wellington to Elong Elong (or vice versa) along Saxa Road. Due to the short duration of views to each development and the separation of distance between viewing opportunities, it is unlikely that the character of the journey from Wellington to Gulgong on Goolma Road will be significantly diminished.

Similar analysis for the Sandy Creek, Cobbora and Dapper Solar Farms was also undertaken and identified dwellings from which there is potential to view both solar farms and the Project simultaneously due to an absence of intervening topography and/or vegetation. The assessment found that 12 non-associated dwellings located within 4 km of the Project, Sandy Creek Solar Farm, Cobbora Solar Farm and Dapper Solar Farm, and have the potential to view the Project with at least one other solar farm simultaneously. The assessment was based on topography alone and it is likely that intervening vegetation will reduce views for the majority of the dwellings. It is noted that four of these non-associated dwellings are associated with the solar farm projects.

### 6.15.4 Noise

Cumulative noise impacts were assessed as part of the Noise and Vibration Assessment for the Project. The assessment considered the potential for cumulative noise impacts associated with other Projects in the local area including proposed solar farms, wind farms and the CWO REZ transmission project.
The cumulative noise assessment identified that:

- The nearest wind farm is Bodangora Wind Farm which is located approximately 14 km from the Project Site and is of sufficient distance that no cumulative noise impacts are predicted.
- No adverse cumulative noise impacts are predicted under the NPfI due to the operation of the Project and the nearby solar farms.
- The potential for cumulative construction noise impacts is heavily dependent on the scheduling of construction activities, however, the Project will manage its construction noise contribution through implementation of appropriate construction noise management measures as part of the CEMP.

### 6.15.5 Land use

With the implementation of the CWO 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 REZ. For the wind farm and 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 Site by adding energy generation land use to the existing agricultural land use that will continue, with the two land uses coexisting in the Project Site. SQE has agreements with relevant owners allowing SQE to lease the land for the Project which is planned to have a construction period of approximately 40 months and a 30-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. SQE 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 Site 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 Site.

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 Site 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 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 SQE 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**, Warrumbungle Council has advised that it is not in a position to be able to accept waste products from large scale developments such as wind farms. Accordingly, SQE will not consider waste disposal options in the Warrumbungle LGA, unless advised otherwise in the future.

SQE has committed to the development of a Waste Management Plan for the Project including liaison with local recycling and waste management providers. SQE is also participating with the broader wind farm industry regarding options for blade recycling or disposal and has committed to address decommissioning phase waste disposal and management as part of a Decommissioning and Rehabilitation Plan.

### 6.15.7 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, however, as discussed above there are three proposed solar farms and the CWO REZ transmission project which will result in some additional clearing in the vicinity of the Project. Again, these projects are 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 6.9**, approximately 82% 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.

## 6.15.8 Heritage

Similar to biodiversity as 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 SQE'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 1.1** 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 confidence in the suitability of the site for a wind farm development. Before presenting a wind farm layout, wider community perspectives and feedback were sought in May 2021 with the first Community Drop-In Session for the Project. Since then, the conceptual layout of the Project including the WTGs, electrical reticulation infrastructure, internal access roads and other supporting infrastructure has been subject to ongoing refinement with the aim of minimising associated environmental and social impacts and addressing feedback from landholders, neighbours and other stakeholders.

As detailed in **Section 6.0**, 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)
- focused consultation with relevant government agencies
- engagement with local community and other stakeholders
- 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.

SQE has refined the Project based on feedback received from relevant stakeholders throughout its development. SQE 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, SQE 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 Site

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 Site is strategically located within the CWO REZ, with ready connection to the proposed 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, which seeks to establish a reliable, affordable and sustainable electricity future for NSW.

The Golden Highway extends along the northern boundary of the Project Site and acts as the primary connection between the Hunter and Orana regions of NSW, and the Port of Newcastle. The Golden Highway has sufficient operating capacity to support the Project and provides good access to the Project Site.

The Project Site contains land suitable for agriculture and ongoing agricultural activities which can continue to coexist with the Project. Due to the agricultural history, the Project Site 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 approximately 75% of the Development Corridor has previously been cleared or is Category 1 land.

The Project will provide for a compatible land use and support the ongoing agricultural use of the Project Site. 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, as well as an assessment of the compatibility of the development with the existing land uses, during construction, operation and after decommissioning.

SQE is committed to working with the local community as part of developing the Project. Through the Project design and stakeholder engagement process, SQE has developed and implemented several Project related agreements to provide for the Project whilst also providing 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 28 Host Agreements currently in place for the Project. Host landowners will continue to undertake agricultural activities on their land 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, SQE has 28 Neighbour Agreements (44 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 SQE and the relevant landholder. Collectively these agreements mitigate the impact of the Project on host and neighbouring landholders.

In summary, SQE selected the proposed Project Site as it provides the optimal combination of:

- high quality wind resource
- availability of land of a suitable scale for a viable commercial-scale wind farm project and low density of housing

- within the CWO REZ and close proximity to the associated proposed 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 Golden Highway, to the north of the Project Site
- compatible land use zoning within both the Project Site and adjacent land holdings
- 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 management procedures 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 and wishes.

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 Site and has been informed by site-specific survey, monitoring, modelling and environmental and social assessment.

Due to the nature of the Project, specific details will be subject to the detailed design phase and will be influenced by the technology applicable at the time. Any uncertainty in the data used for the assessment has been appropriately identified, an appropriate assumption has been applied to represent a conservative worst-case 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 7**).

SQE will prepare and implement a CEMP and OEMP, which will implement best practice management and will incorporate all identified 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.

SQE 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. SQE 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 increased renewable electricity generation which will replace the existing coal-fired power stations which are scheduled to retire between 2022 and 2043. A target of 3 GW of renewable energy generation has been assigned to the CWO REZ and a key objective of the Project is to contribute to this goal through providing a source of affordable, reliable power to NSW consumers whilst also assisting in reducing greenhouse gas emissions.

Any 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 and 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 10**) and measures to ameliorate any negative impacts are outlined in **Appendix 7**.

A large part of the Project Site comprises areas that have previously been disturbed and/or historically cleared associated with the 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'*

SQE 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.

In relation to noise, during standard construction hours there will potentially be noise levels of greater than 45 dB(A) for some activities at a limited number of non-associated residences when activity is occurring in the vicinity. The predicted noise levels are however significantly less than 75 dB(A) which the NVA indicates is the point where there may be strong community reaction to noise. The only activity triggering this exceedance is road upgrades which are also recognised as a key benefit of the Project by the community. As this is localised and linear work, the exceedance will be temporary.

No exceedance of relevant noise criteria for the operation phase is predicted at any non-associated dwelling. The CEMP and OEMP will also include relevant noise management, mitigation and monitoring measures.

The relevant erosion and sediment control measures outlined in **Section 6.8.4** 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 7**) 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 and Infrastructure Road Map (NSW Government, 2020), in aiming to provide large-scale renewable electricity generation that is affordable and reliable. With a proposed capacity of approximately 700 megawatts (MW) and the potential to power approximately 397,000 homes, the Project will make a material contribution to the planned energy generation capacity for the CWO REZ.

The Project will also contribute significant capital investment within the CWO 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 proposed Benefit Sharing Program and planning agreements with local Councils.

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, SQE 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 achieving the target of at least 3 GW of renewable energy generation from the CWO REZ.

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

- Infrastructure investment of approximately $2 billion.
- Creation of 320 direct FTE positions (additional 520 indirect employment) on average during the construction phase and 12 full time equivalent positions (additional 35 indirect employment) during the 30 year operational life of the Project.
- Indirect benefits to local services through the construction and operation phases.

- Payments to host landholders and via Neighbour Agreements, resulting in financial contributions to the local community.
- Local community benefits through the implementation of a benefit sharing program (including community sponsorships, planning agreements, and consideration of a co-investment program and telecommunication improvements) 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 CWO 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 SQE 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 $46.9 million in new spending into the economy over the construction phase, supporting approximately 235 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 $410 million (over 30 years of operation, CPI adjusted) relating to operational wage stimulus, host landowner and Neighbour Agreement payments, Community Benefit Sharing Program payments (including planning agreements) and net land tax revenue to Council.

SQE 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 SQE 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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