

# NARRAGAMBA SOLAR PROJECT

Scoping Report: Traffic and Transport

30 JUNE 2023



SCT Consulting acknowledges the traditional owners of the lands on which we work. We pay our respects to Elders past, present and emerging.



# **Quality Assurance**

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# 1.0 Introduction

## 1.1 Project background

The Narragamba Solar Project (the project) will include the construction, operation and decommissioning of an approximately 320-megawatt (AC) solar project with the capacity to power approximately 160,400 homes. It will supply the National Energy Market (NEM) via a dedicated 330kV transmission line connecting to the Merotherie energy hub proposed to be constructed by Energy Corporation of NSW (EnergyCo), on behalf of the CWO REZ Network Operator.

# 1.2 Site context

**Figure 1-1** indicates the location of the project site along Merotherie Road, about 15km north of Gulgong, within the Mid-Western Regional Local Government Area (LGA). The site is zoned as RU1 Primary Production in the Mid-Western Regional Council Local Environmental Plan (LEP) and is currently being used for sheep and cattle grazing.







Site boundary



Source: Ramboll and SCT Consulting, 2023

# 1.3 Purpose of report

This report has been prepared to support a request to the NSW Department of Planning and Environment (DPE) for the Secretary's Environmental Assessment Requirements (SEARs) for the project. The SEARs would guide the preparation of an Environmental Impact Statement (EIS) for the proposal under Part 4 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act).

This transport scoping review provides an initial assessment of the nature and extent of traffic and transport implications of the development on the surrounding transport network during construction and operations, and outlines any mitigation measures required to minimise impacts, if necessary. The report also outlines the next steps and proposed approach for the traffic and transport assessment for the EIS.

# 1.4 Project overview

The project is located north of the approved Stubbo Solar Project. The project will be connected via a dedicated 330kV transmission line to the Merotherie energy hub, both proposed by EnergyCo on behalf of the CWO REZ Network Operator.

The indicative site footprint and features are shown in **Figure 1-2**. Ongoing refinement of the proposed layout and technology would continue throughout the EIS process in response to engineering design refinements, landholder negotiations and outcomes of environmental and social assessments, to minimise potential impacts where possible.





Source: Ramboll, 2023

### 1.4.1 Project components

The project would include the following key components:

- Approximately 832,000 photovoltaic modules (solar panels) using a single axis tracker racking system
- Electrical infrastructure, including:
  - approximately 55 power conversion units (PCUs) which include inverters for converting direct current (DC) power to alternating current (AC)
  - onsite substation containing main transformers and associated switchgear
  - overhead and underground electrical reticulation connecting the solar project elements
  - connection from the onsite substation to the Merotherie energy hub proposed by EnergyCo on behalf of the CWO REZ Network Operator. The dedicated 330 kV transmission infrastructure to connect the project to the Merotherie energy hub would form part of the CWO-REZ Infrastructure and is assessed in the EIS currently being prepared by EnergyCo.
  - potential battery energy storage system (BESS), which may be distributed amongst the solar array area (if DC coupled) or co-located in an area near the substation (if AC coupled). This would be confirmed in the EIS.
- Other permanent onsite ancillary infrastructure, including:
  - operational and maintenance facility
  - a temperature-controlled spare parts storage facility
  - supervisory control and data acquisition (SCADA) facilities for remote monitoring of the solar project
  - a workshop and associated infrastructure
  - access roads, both to the project and internal access roads
  - car parking area
  - security fencing and landscaping.
- Temporary construction ancillary infrastructure, including:
  - construction compounds.
  - laydown areas.
  - parking areas.
  - access tracks and associated infrastructure, including gates and fencing.
  - potential construction workforce accommodation.

The operational lifespan of the project is indicatively 25 years, with potential for major upgrades, including repowering. At the end of its operational life, the project would be decommissioned and land that is impacted by the project would be appropriately rehabilitated in consultation with the affected landholders.

#### 1.4.2 Access track network

The project would require an access track network to enable both access to the site from the surrounding road network and access between infrastructure within the site. The internal access track network would comprise internal tracks of approximately four metres wide between the solar arrays and PCUs to allow for sufficient vehicle manoeuvring, including large vehicle deliveries. Gates would be installed where the access tracks meet the perimeter road to restrict access.

The access track network would be appropriately designed, constructed, and maintained to allow for necessary access to solar and electrical infrastructure for all stages of the project. The design of the access network, including access points from the public road network, is subject to detailed design. The design would seek to avoid areas of high environmental impact where possible such as avoiding roadside native vegetation.

The solar project site would be accessed from Merotherie Road via the Golden Highway. Access would likely be from the northwest corner of the study area; however, this would be confirmed in the EIS.

# 1.5 Report structure

This report has been structured into the following sections:

- Section 1.0 introduces this report, its context and purpose.
- Section 2.0 describes the existing transport conditions in and around the site for all modes of transport.
- Section 3.0 outlines the initial assessment of the nature and extent of potential transport impacts from the development, as well as the cumulative impact with nearby developments.
- Section 4.0 presents the proposed methodology for analysis to confirm and quantify the impacts in the EIS.

A review of scoping reports and SEARs for previous renewable energy projects was undertaken to inform the approach to the traffic and transport assessment. The following guidelines were also referenced and would be used in the traffic and transport assessment for the EIS:

- Guide to Traffic Generating Developments version 2.2 (RTA, 2002).
- Guide to Road Design Part 3: Geometric Design (Austroads, 2016).
- Guide to Road Design Part 4: Intersections and Crossings: General (Austroads, 2017).
- Guide to Traffic Management Part 3: Transport Study and Analysis Methods (Austroads, 2020).
- Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings (Austroads, 2020).
- Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020).
- Unsealed Roads Manual (Australian Roads Research Board, 2009).
- Large-Scale Solar Energy Guideline (NSW Department of Planning, Industry and Environment, 2022).

# 2.0 Existing conditions

### 2.1 Surrounding road network

The proposed site access route is shown in **Figure 2-1**. The site is proposed to be accessed from the northwest via the Golden Highway and Merotherie Road.

- The Golden Highway (B84) is a State Road movement corridor that connects to the New England Freeway near Maitland in the east and Dubbo to the west. It has one lane in each direction at the intersection with Merotherie Road and a posted speed limit of 100km/h.
- Merotherie Road is a local road that intersects with the Golden Highway to the north and Barneys Reef Road to the south. Satellite and street level imagery indicate that the road is unsealed with an approximate width in some locations of 5m and with no posted speed limit.

The exact haulage route for heavy vehicles, worker access route for the construction, operation and decommissioning of the project will be confirmed in the EIS. This will require consultation with the Mid Western Regional Council, Warrumbungle Shire Council and Transport for New South Wales.

Based on traffic data collected in 2021 along the Golden Highway just outside of Merriwa, about 85km from the site, the two-way traffic volume was about 270 vehicles per hour during the AM peak (8-9AM) and about 330 vehicles per hour in the PM peak (3-4PM). No traffic data is currently publicly available for Merotherie Road or the surrounding local roads.

Austroads *Guide to Traffic Management Part 3: Transport Study and Analysis Methods* indicates that rural roads can accommodate a two-way peak hourly volume of about 3,600 vehicles per hour. These roads would thus be operating with significant spare capacity; however, volumes will be confirmed by traffic surveys in the traffic and transport assessment to be undertaken as part of the EIS.



#### Figure 2-1 Proposed Site Access Route

Legend

Site boundary Proposed Site Access Route

0 2 4 km

© SCT Consulting, OpenStreetMap contributors, SIX Maps

Source: Ramboll and SCT Consulting, 2023

## 2.2 Intersection layout

The intersection of the Golden Highway and Merotherie Road is a priority-controlled T-intersection. As shown in **Figure 2-2** and **Figure 2-3**, the Golden Highway is a two lane, two way road with no turning bays for vehicles wishing to turn into Merotherie Road from the Golden Highway. Similarly, Merotherie Road does not have turning bays, although the road widens at the intersection such that left and right turns can queue independently and simultaneously. Sight lines appear satisfactory, with sufficient sight distance of oncoming traffic, free from visual obstructions that could obscure potential hazards.

Figure 2-2: View looking west along the Golden Highway at the intersection with Merotherie Road



Source: Google Street View, 2023

Figure 2-3: View looking east along the Golden Highway at the intersection with Merotherie Road



Source: Google Street View, 2023

# 2.3 Public transport network

There are no regular public bus services in the vicinity of the project site.

Eastend Bus Service operates several school bus services to and from Gulgong, one of which travels in a loop along Cope Road, Blue Springs Road, Merotherie Road and Barneys Reef Road, with associated school bus stops located along the route. Hodgen's Bus Service (Dunedoo) operates a school bus service along Barneys Reef Road, Birriwa Bus Route North<sup>1</sup>.

# 2.4 Walking and cycling network

Given the rural setting of the area with very limited pedestrian demands, there are minimal active transport facilities within the vicinity of the project site.

The Central West Cycle (CWC) trail is a recreational cycle loop around the central west of NSW of about 400km. **Figure 2-4** illustrates the 58km section between Gulgong and Dunedoo, which partly runs on Merotherie Road to the west of the site. Consultation will be undertaken with the CWC stakeholders.



Figure 2-4: Gulgong to Dunedoo cycle trail

<sup>&</sup>lt;sup>1</sup> EMM, Birriwa Solar and Battery Project Traffic Impact Assessment, July 2022

# 3.0 Potential traffic and transport impacts

# 3.1 Construction phase

The greatest impact on traffic conditions or operations is expected to be during the construction period when workers and heavy vehicles would access the site frequently. Construction is expected to commence in Quarter 4 of 2025 (subject to timing of the approval process and detailed design). Construction is expected to take approximately 20-24 months.

### 3.1.1 Haulage routes and traffic movements

Investigations into the most suitable access route for construction would be undertaken in consultation with Mid-Western Regional Council, Warrumbungle Shire Council, Transport for NSW, EnergyCo and the CWO REZ Network Operator. Other councils will be consulted as appropriate.

It is anticipated that construction materials and infrastructure would be largely transported to the study area via road from the Port of Newcastle or from the Port of Sydney. Assuming the origin is Newcastle, trucks would use the following route: Bourke Street  $\rightarrow$  Hannell Street  $\rightarrow$  Industrial Drive  $\rightarrow$  Maitland Road  $\rightarrow$  New England Highway  $\rightarrow$  John Renshaw Drive  $\rightarrow$  Hunter Expressway  $\rightarrow$  New England Highway  $\rightarrow$  Golden Highway  $\rightarrow$  Merotherie Road.

Deliveries may also come from Sydney or the North Coast (subject to resource supplier selection and port capabilities and fees, etc). Deliveries coming from Sydney are expected to use the M1 Motorway to the Hunter Expressway and then use the same route as deliveries coming from Newcastle. Deliveries from the North Coast would use the Pacific Highway to Maitland Road then use the same route as deliveries coming from Newcastle.

It is anticipated that materials would primarily arrive via the most effective route and be transported to site by heavy vehicles up to B-double in size, however some oversize over mass (OSOM) vehicles may also be required.

To support the CWO-REZ Transmission Project and connecting projects, EnergyCo has carried out investigations to understand the scope of road upgrades required to facilitate construction of projects proposed in the REZ. While EnergyCo is not the proponent for generation projects, they have taken a leading role in coordinating the delivery of required upgrades between the Port of Newcastle and the CWO-REZ. It is expected that local road upgrades would typically be specific to individual projects, however the requirements for local road upgrades would be supported by EnergyCo assisting with planning and delivery (Energy Corporation of NSW, 2023). It is expected the EIS for Narragamba Solar project will refer to the assessment undertaken by EnergyCo for the haulage route between Newcastle and the intersection with Merotherie Road.

During peak construction periods for the Narragamba Solar Project, about 400 full-time employees are expected to be required. It is estimated that the project could require around 250 light vehicles and 100 heavy vehicles per day during the peak construction period. OSOM vehicles will be required for deliveries of transformers and other major equipment. These construction traffic volumes would be further investigated and refined in the EIS. The number of light and heavy vehicles accessing the site daily would be dependent on the potential provision of worker accommodation close to the site, transport arrangements to and from site for workers, and equipment, material and infrastructure delivery rates by vehicles.

### 3.1.2 Potential construction phase impacts

The project may result in the following impacts during construction, which will be assessed further in the traffic and transport assessment for the EIS:

Roadway impacts and upgrades – Given the low daily traffic volumes on the access routes, Austroads Guide to Road Design Part 3 Geometric Design, which specifies road width design standards for low volume roads (generally rural) based on daily traffic volumes, would apply. An assessment of total daily volume, along with an assessment of required sight lines on the haulage and worker access route with the addition of the project construction vehicles, will be undertaken to indicate if any road paving or widening is required.

An assessment of current road conditions will be undertaken to determine if any widening, resurfacing, maintenance or sealing is required. Some public road upgrades would likely be required to facilitate construction traffic. These would be confirmed during the EIS, but it is expected that these would include Merotherie Road from its intersection with the Golden Highway to the project site access.

Any road upgrade requirements would be considered in conjunction with any proposed road upgrades that would form part of the CWO-REZ Transmission Project or any other proposed renewable generation projects in the area, if relevant (see **section 3.1.3**).

- Intersection performance impacts The intersection level of service along the haulage route and worker access route is unlikely to be an issue due to the low traffic volumes expected when combining the projected future existing traffic volumes along these routes with the traffic expected to be generated by the project during construction. However, a review of queuing will be undertaken in the EIS to confirm that queueing by turning vehicles is not negatively impacting intersection operations.
- Intersection warrants Most rural intersections are priority controlled with basic left / right turn treatments. Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings specifies warrants for intersection turning bays at an intersection, based on a combination of peak hour through and turning traffic movements. Those intersections selected for site access, worker and haulage routes that do not have turning bays would be assessed against the warrants using peak hour traffic volumes with the addition of the project construction vehicles. The site access point on Merotherie Road would need to comply with Rural Property Access requirements as specified in the Austroads Guide to Road Design.
- Safe intersection sight distance (SISD) SISD is defined by Austroads Guide to Road Design Part 4A as the "minimum sight distance that should be provided on a major road at any intersection". A review of the SISD at the proposed new access point on Merotherie Road will be undertaken for the project as part of the EIS. An initial review indicates the intersection of the Golden Highway and Merotherie Road has a fairly straight alignment with no obstacles blocking the line of sight.
- OSOM impacts The Golden Highway is a TfNSW approved B-double route for vehicles over 50 tonnes and 25/26 metres in length. Castlereagh Highway, Ulan Road and Barneys Reef Road (with restrictions) up until it joins Merotherie Road are also approved B-double routes. However, this project will require transportation of project infrastructure, such as transformers, using OSOM vehicles via the Golden Highway and Merotherie Road. Turning requirements at intersections and potential upgrades to Merotherie Road will be assessed as part of the EIS.
- Transmission line installation Transmission infrastructure from the site substation to the Merotherie energy hub is proposed. The transmission infrastructure to connect the project to the Merotherie Hub would be assessed as part of the CWO-REZ Transmission Project.
- Parking impacts and property access Impacts to existing parking provisions on local public roads are expected to be insignificant, as temporary construction parking within the project site, as well as permanent site parking is proposed. However, there may be temporary impacts to property access along the haulage and worker route associated with road widening or road intersection upgrades that may be required. Potential impacts to property access as well as parking will be further assessed in the EIS.
- Public transport / school bus transport impacts Project-associated construction traffic volumes are generally
  expected to be low enough to not impact any bus operations, when combined with future existing traffic
  conditions based. Impacts to public/school bus transport will be assessed further in the EIS when expected
  traffic volumes will be confirmed.
- Active transport impacts Due to the rural nature of the area surrounding the site, condition of the existing roads, and distance from any town centres, active transport demand is unlikely to be high and therefore impacts are not likely to be significant. While the project would generate additional traffic movements at proposed accommodation locations in townships, where there are likely to be more significant pedestrian and cycle demands, the construction workforce trips would occur before 7am and after 6pm. These periods are typically outside the normal peak period for walking and cycling activities and so minimal pedestrian or cycle impacts are expected. However, there is a potential for temporary disruption to active transport associated with road or road intersection upgrades that may be required along the haulage route. Impacts to active transport will be further assessed in the EIS.
- Rail crossing impacts No impact on rail corridor or level crossings is anticipated as the rail line does not intersect the haulage or worker access routes.
- Road safety impacts An initial analysis of crash data along the proposed site access and haulage route from the Golden Highway and Merotherie Road, indicates 14 crashes on the Golden Highway between Castlereagh Highway and Ulan Road from 2017 to 2021, ranging from fatal to non-casualty (towaway). A serious collision was recorded in 2019 at the intersection of Merotherie Road and the Golden Highway, while a single head-on collision of moderate severity was recorded in 2017 along Merotherie Road.

A review and safety assessment of crash data (along the proposed haulage route and worker access route) will be undertaken to determine if there are any accident clusters or existing safety issues. The current state of Merotherie Road may need investigation to determine its impact on safety and whether upgrades are required. There is also still a risk of construction traffic interacting with general traffic, with elevated risk when construction-related vehicles are entering and leaving construction sites. Given the likely low local traffic volumes, these risks are low. Impacts on road safety for all users during construction would be mitigated through the provision of a Construction Traffic Management Plan (CTMP) to be developed once the project is approved, which would be developed in consultation with Transport for NSW and Councils.

The assessment will refer to any relevant assessment carried out by EnergyCo and the CWO REZ Network Operator as part of the CWO REZ.

#### 3.1.3 Cumulative impacts from other developments

#### 3.1.3.1 Stubbo Solar Project

The Stubbo Solar Project was granted development consent in June 2021. As of April 2023, ACEN Australia Pty Ltd, responsible for delivery of the Stubbo Solar Project, has confirmed that site access works have begun, with major works expected to begin in 2023 and for the project to be operational in 2025.

The haulage and worker access routes for the Stubbo Solar Project are from the south of the site using the following roads:

- Blue Springs Road
- Cope Road
- Ulan Road
- Golden Highway.

Aside from the Golden Highway, these roads currently do not overlap with the Golden Highway/Merotherie Road access route proposed for the Narragamba Solar Project. Reassessment may be needed if the access routes for Narragamba Solar Project are changed and overlap with those of Stubbo Solar Project.

Based on the proposed timing and access routes, construction of Narragamba Solar Project, with its expected commencement date of late 2025, is unlikely to overlap and experience cumulative impacts with the construction of Stubbo Solar Project.

#### 3.1.3.2 Birriwa Solar and Battery Project

The Birriwa Solar and Battery Project is a proposed solar electricity generation and BESS project. The project is located within Birriwa and Merotherie approximately 20km (via the Golden Highway and Castlereagh Highway) from the Narragamba Solar Project site. The project will be accessed via Castlereagh Highway, Barneys Reef Road and Birriwa Bus Route<sup>2</sup>.

The Birriwa Solar and Battery Project Traffic Impact Assessment expects 65% of light vehicle traffic will come from the south (Mudgee and Gulgong) via Castlereagh Highway and 35% from the north (Dunedoo and Dubbo) via Castlereagh Highway. Heavy vehicle movements are expected to be 75% from Newcastle accessing the site from the north along the Golden Highway and 25% from Sydney accessed by Castlereagh Highway.

The Golden Highway is the only road shared by the proposed access route for the Narragamba Solar Project with approximately 11 heavy vehicles passing the intersection of Merotherie Road and the Golden Highway. Therefore, cumulative impacts would likely be minimal. At the time of preparation of this report, ACEN Australia is considering assessing a workers accommodation camp for the purpose of servicing the Birriwa Solar and Battery Project as well as other projects in the CWO REZ. The workers camp would be located off Merotherie Road, and therefore cumulative impacts would exist. These will be addressed in both the Birriwa Solar and Battery Project Amendment Report and the Narragamba Solar Project EIS.

<sup>&</sup>lt;sup>2</sup> EMM, Birriwa Solar and Battery Project Traffic Impact Assessment, July 2022

#### 3.1.3.3 Barneys Reef Wind Farm

Barneys Reef Wind Farm is a proposed wind renewable energy project located about 12km north of Gulgong. It is expected to comprise about 63 wind turbines with construction expected to last 28 months with peak construction expected to last 7-14 months. Three access routes to the project area have been proposed, two of which coincide with the Narragamba Solar Project access route along Merotherie Road.

The access points are currently proposed to be at the intersection of Merotherie Road and Birkalla Road, a second access point further south, close to where Merotherie Road joins Barneys Reef Road, and the third access point to the west along Gingers Lane via the Castlereagh Highway. Trips generated as a result of the construction and operation of the wind farm are expected to come from the Golden Highway.

The project is still at the EIS preparation stage. The Barneys Reef Wind Farm Scoping Report<sup>3</sup> does not provide potential traffic volumes generated as a result of the construction, operation and decommission of the project. Traffic volumes and access routes will be investigated and confirmed in the EIS phase.

#### 3.1.3.4 Merotherie Energy Hub

There is currently little publicly available information on this project, which is being developed by EnergyCo. However, there is likely to be an overlap with the access route along Merotherie Road. Any road upgrade requirements would be considered in conjunction with any proposed road upgrades that would form part of the CWO-REZ Transmission Project.

## 3.2 Operations phase

Site traffic demand will decrease after construction is complete and operations commence. Once the project is operational, most of the vehicles accessing the site would be light vehicles, aside from some heavy vehicles that may be required to undertake maintenance activities and repairs.

Approximately ten full-time employees are expected during operation and ongoing maintenance. With operational traffic likely to be up to ten vehicles per average day or 20 vehicle movements per day. Due to the expected low volume of vehicle movements associated with the project during operation, there would likely be minimal impact from operational traffic.

## 3.3 Decommissioning phase

The operational lifespan of the project is indicatively 25 years with provision for extension if granted. Traffic demand during decommissioning is unknown at this stage, however it is expected to either be lower or equivalent to the construction period. Therefore, impacts are anticipated to be either be similar or less than those expected during construction with similar or reduced mitigation measures required. Potential impacts resulting from decommissioning of the project will be assessed in further detail in the EIS.

<sup>&</sup>lt;sup>3</sup> UMWELT, Barneys Reef Wind Farm Scoping Report, July 2021

# 4.0 Assessment approach

The traffic and transport impact assessment approach in the EIS would include:

- Review of local council traffic and road policies, in consultation with Mid-Western Regional Council and Warrumbungle Shire Council.
- Conducting traffic surveys to assess existing road usage at key intersections, in consultation with EnergyCo and Transport for NSW.
- Assessment of existing traffic and transport network through:
  - Traffic volumes along the access routes
  - Review and safety assessment of crash data (along the access routes)
  - Safe intersection sight distance assessment at site access points
  - Assessment of critical intersections using Austroads intersection warrants
  - Review of public transport / school transport services
  - Review of active transport facilities
  - Review of existing parking provisions and property access.
- Quantitative assessment of construction traffic impacts, including potential requirements for OSOM vehicles, to confirm the impacts on traffic and transport conditions and property access, and the requirement for any mitigation measures, such as roadway or intersection upgrades. The assessment will cover the items listed in section 3.1, and will also include consideration of the regional haulage route and will refer to any relevant assessment undertaken by EnergyCo. Potential cumulative impacts associated with other developments will also be assessed in further detail.
- Qualitative assessment of operational traffic impacts, due to the minimal impacts expected during the operational phase.
- Qualitative assessment of decommissioning traffic impacts due to the traffic volumes or future conditions being unknown for this phase.
- Ongoing consultation with EnergyCo and the CWO REZ Network Operator.

The traffic and transport assessment in the EIS will identify mitigation measures, which will include the development of a Construction Traffic Management Plan (CTMP) in consultation with TfNSW and the local Councils. The CTMP would include any other required mitigation measures.



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