Appendix H
Traffic and transport assessment

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Birriwa Solar and Battery Project Modification

Traffic Impact Assessment

Prepared for ACEN Australia Pty Ltd

June 2025

Birriwa Solar and Battery Project Modification

Traffic Impact Assessment

ACEN Australia Pty Ltd

E240117 RP#7

June 2025

Version	Date	Prepared by	Reviewed by	Comments
V1	29 April 2025	Fan Fang Abdullah Uddin	Abdullah Uddin Nicole Armit	Draft for ACENs review
V2	5 June 2025	Fan Fang Abdullah Uddin	Abdullah Uddin Nicole Armit	Final report

Approved by

Abdullah Uddin
Associate Traffic Engineer
5 June 2025

Level 10 201 Pacific Highway
St Leonards NSW 2065
ABN: 28 141 736 558

Executive Summary

ES1 Introduction

ACEN Australia Pty Ltd (ACEN) has approval to develop the Birriwa Solar and Battery Project, a large-scale solar facility with a 600 megawatt (MW) capacity and a 600 MW, two-hour duration battery energy storage system (BESS). The project, approved by the NSW Independent Planning Commission on 16 August 2024 (SSD-29508870), is located 15 kilometres (km) southeast of Dunedoo in the Central-West Orana region of New South Wales, within the Mid-Western Regional LGA.

ACEN is seeking approval to modify development consent SSD-29508870 to include additional lots, an alternative access route and upgrade to part of the existing Birriwa Bus Route South, an increase in capacity of the approved temporary accommodation facility, and an increase in the storage capacity and duration of the BESS (the modification, Mod 1). A modification report (EMM 2025) has been prepared to support the application to modify SSD-29508870. This traffic impact assessment has been prepared to support the modification application.

ES2 Existing conditions

If approved, the modified project will be accessed via a network of roads, including the Golden Highway, Merotherie Road, and Birriwa Bus Route South. Intersection counts were conducted at the Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South intersections between 7:00 am and 6:00 pm on Wednesday, 21 February 2024. The traffic data indicated low traffic volumes on Golden Highway near Merotherie Road, with very low volumes (almost no vehicles) on Merotherie Road and Birriwa Bus Route South. Between 2019 and 2023, one rear-end collision occurred in 2019 at the Golden Highway/Merotherie Road intersection, and one off-road left turn collision occurred in 2020 on Golden Highway, approximately 660 metres (m) west of Merotherie Road.

Public transport access is very limited in the area. School bus services operated by Eastend Bus Service travel along Golden Highway, while Hodgen's Bus Service operates along Birriwa Bus Route South. The entire length of Birriwa Bus Route South from Merotherie Road forms part of the Central West Cycle Trail. Due to the rural nature of the area, there are no pedestrian or formal parking facilities near the site.

ES3 Traffic generation

The modification seeks to increase the total number of daily vehicle movements to and from the site during pre-construction and construction, from 120 to 156 daily heavy vehicle trips, split between the approved access via Barneys Reef Road and the proposed alternative access via Merotherie Road. The proposed alternative access will be used primarily for pre-construction and construction access to the accommodation facility and BESS, while the approved access will be primarily used for construction of the solar infrastructure and BESS.

It is anticipated that up to 90 heavy vehicles of the 156 will access the site per day via the alternative Merotherie Road access during peak periods. These peak movements via the alternative access will not coincide with the peak movements along the approved access route via Barneys Reef Road, such that the combined total heavy vehicles travelling to and from the site on any given day during pre-construction and construction will not exceed 156 (i.e. 312 movements). Note that Merotherie Road will not be used by heavy vehicles requiring an escort. Such over size over mass (OSOM) vehicles will travel to site via the approved access of Barneys Reef Road/Birriwa Bus Route South.

No changes are proposed to the approved volume of heavy vehicles that may access the site via the approved access route off Barneys Reef Road (120 heavy vehicles, or 240 movements). Where these peak movements are required along Barneys Reef Road, movements along Merotherie Road will also be such that they do not exceed the total of 156 trips/312 movements. This traffic assessment therefore does not consider the Castlereagh Highway/Barneys Reef Road intersection, given no changes are proposed.

Notwithstanding the above, this traffic assessment has been undertaken based on the conservative scenario of all heavy vehicles travelling via the alternative Merotherie Road access route during pre-construction and construction, to ensure full sensitivity testing.

ES4 Assessment of impacts

This report assesses the traffic impacts of the proposed modification related to the addition of an alternative access route to the project via Merotherie Road and Birriwa Bus Route South, and an increase in the peak construction workforce (and associated increase in vehicle movements), focusing on key roads and intersections in the vicinity, including the Golden Highway, Merotherie Road, and Birriwa Bus Route South. The assessment also considers road safety, as well as impacts on public transport, cyclists, and pedestrians. Key findings include:

- SIDRA modelling shows that the impact of project-related vehicles on the Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South intersections will result in generally good Levels of Service (LOS) of either A (existing) or B (with development), with 90% spare capacity to accommodate additional traffic under the proposed development traffic scenario.

- For this modification, the Golden Highway/Merotherie Road intersection requires an upgrade to a basic left-turn (BAL) treatment, with a 35 m widened shoulder and a channelised right-turn (CHR(s)) treatment, with a 104 m short right-turn lane. However, this intersection will be upgraded prior to construction starting with equivalent left and right turn bays on Golden Highway as part of the EnergyCo CWO Renewable Energy Zone (REZ) Transmission Project (Merotherie Energy Hub). The construction works to upgrade this intersection has commenced on 28 April 2025.

- The Merotherie Road/Birriwa Bus Route South intersection will be upgraded to the satisfaction of Mid-Western Regional Council.

- Upgrades to relevant sections of both Merotherie Road and Birriwa Bus Route South will be required. The section of Merotherie Road upgrade will be undertaken prior to construction commencing by the Network Operator as part of CWO REZ Transmission Project (Merotherie Energy Hub), and the section of Birriwa Bus Route South will be upgraded by ACEN to the satisfaction of Mid-Western Regional Council.

- Measures will be implemented to ensure cyclist safety along Birriwa Bus Route South.

- Intersection sight distances generally meet the rural minimum requirement set by the *Austroads Guide to Road Design*.

- There is no change in OSOM movements from the original approval. Hence, an update of the OSOM assessment is not required.

A detailed Traffic Management Plan (TMP) including a Driver Code of Conduct will be prepared prior to commencement of construction, which will incorporate traffic measures to be implemented throughout the project's construction period. In the Driver Code of Conduct, school bus and cyclist safety will be highlighted within and at the vicinity of the site.

Assuming the recommendations outlined in Chapter 6 are implemented, the proposed development is not expected to have significant adverse impacts to the regional or local traffic networks.

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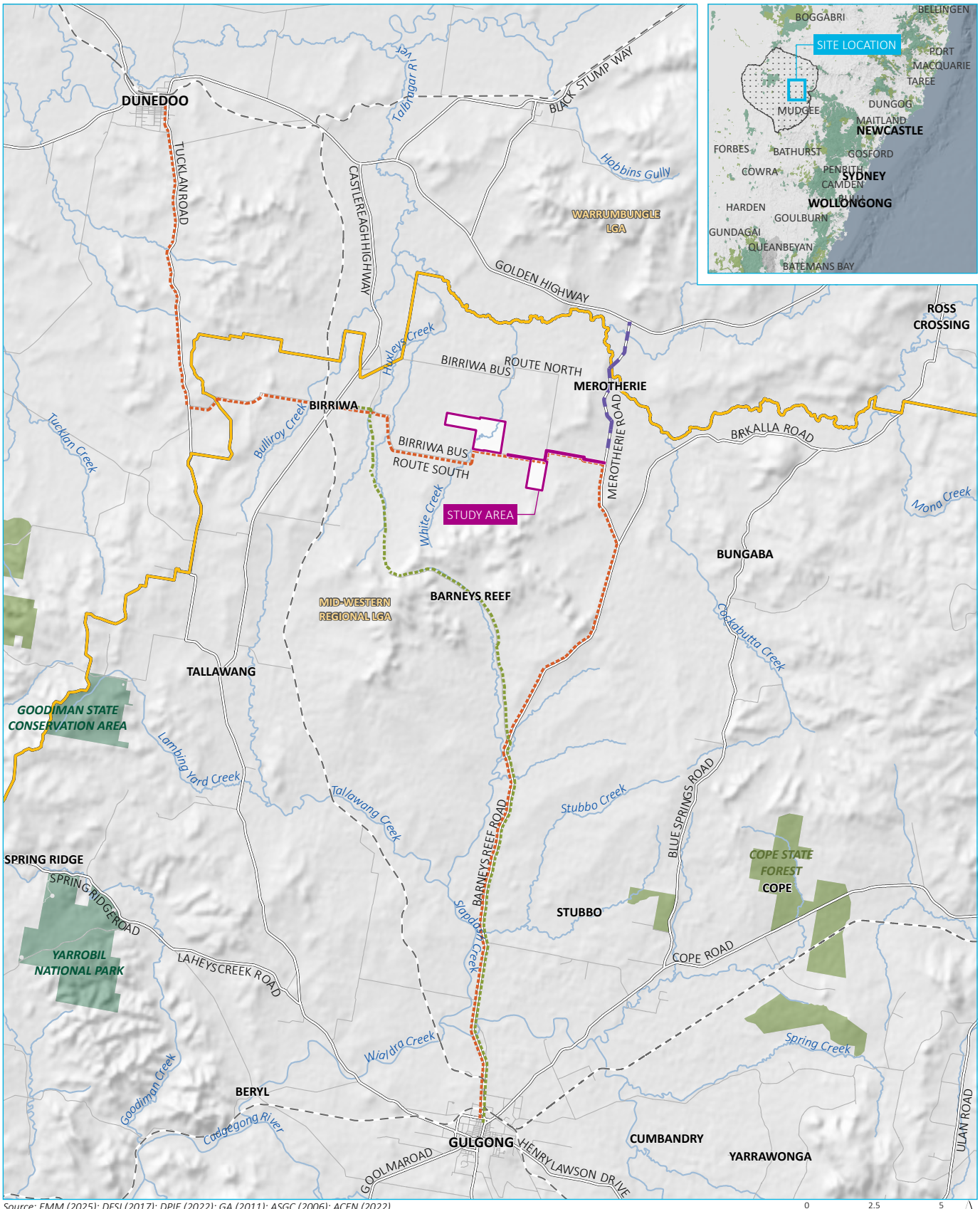
1 Introduction

ACEN Australia Pty Ltd (ACEN) has approval to develop the Birriwa Solar and Battery Project, a large scale solar photovoltaic (PV) electricity generation facility along with battery storage and associated infrastructure, including the construction of a temporary accommodation facility (the project). The solar component of the project will have an indicative capacity of around 600 megawatts (MW) and will include a centralised battery energy storage system (BESS) of up to 600 MW for a two-hour duration (1,200 MWh). The project (SSD-29508870) was approved on 16 August 2024 by the NSW Independent Planning Commission, with development consent conditions.

The project site is approximately 15 kilometres (km) south-east of Dunedoo, in the Central-West Orana (CWO) region of New South Wales (NSW), in the localities of Birriwa and Merotherie (refer to Figure 1.1 and Figure 1.2). It is situated within the Mid-Western Regional Local Government Area (LGA). Part of the approved transport access route to the project site via the Castlereagh Highway is situated within the Warrumbungle Shire LGA. The project is within the CWO Renewable Energy Zone (REZ).

ACEN is seeking approval to modify development consent SSD-29508870 to include additional lots, an alternative access route and upgrade to part of the existing Birriwa Bus Route South, an increase in capacity of the approved temporary accommodation facility, and an increase in the storage capacity and duration of the BESS.

A modification report (EMM 2025) has been prepared to support the application to modify SSD-29508870.



Source: EMM (2025); DFSI (2017); DPIE (2022); GA (2011); ASGC (2006); ACEN (2022)

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KEY

- Study area

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Local government area
- Central West Orana Renewable Energy Zone (see inset)
- NPWS reserve
- State forest
- Merotherie Road- Golden Highway connection

Central West Cycle (CWC) Trail

- CWC main route- Gulgong to Dunedoo
- CWC alternate route- Slap Dash Creek side trail

Regional context

Birriwa Solar Farm Modification
Traffic Impact Assessment
Figure 1.1

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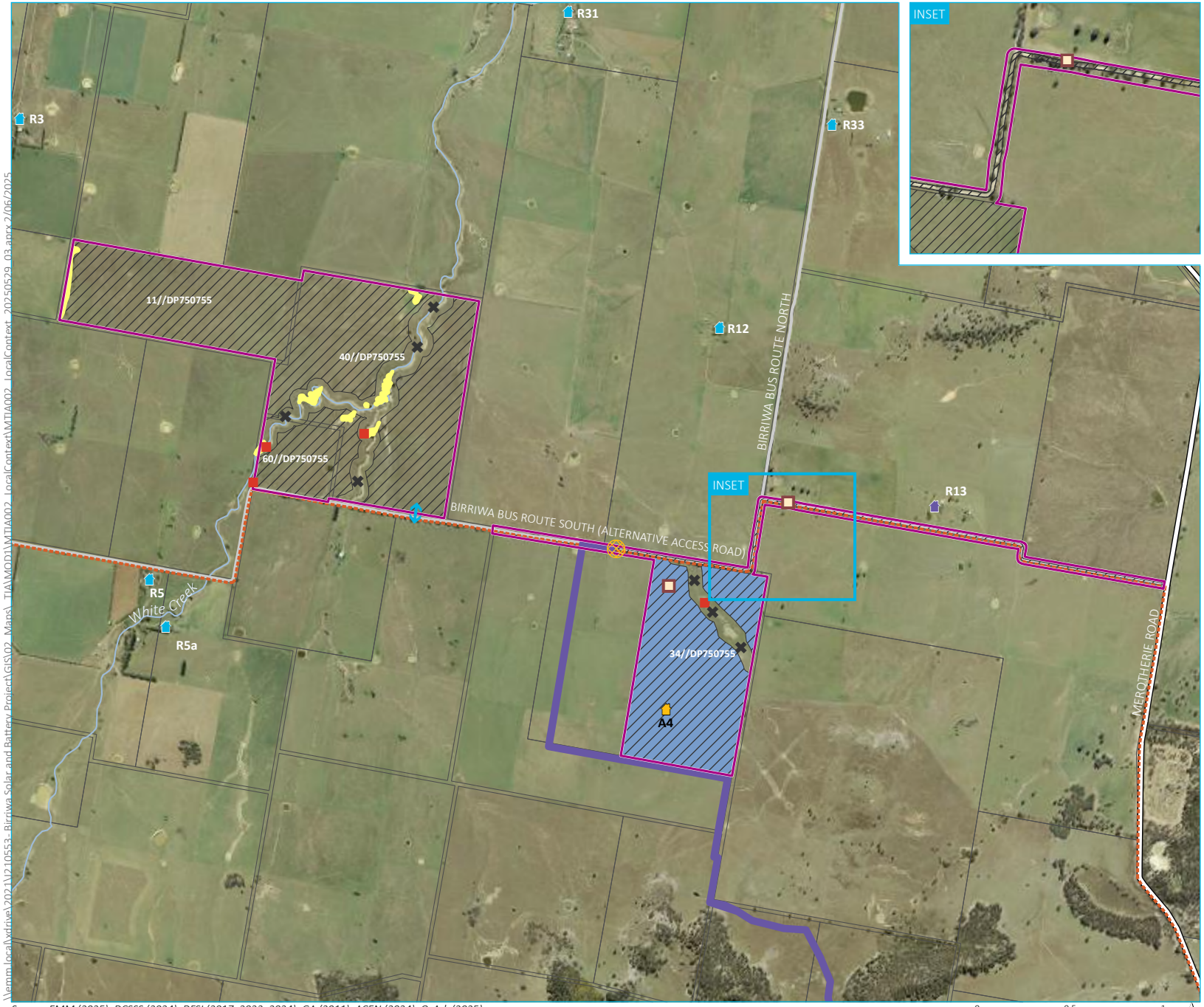
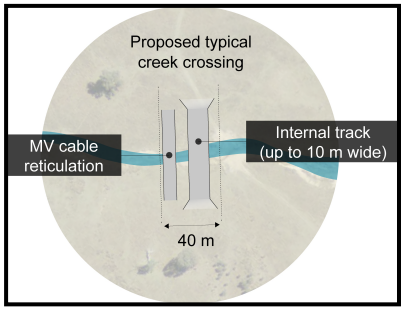


KEY

- Modification area
- Modification development footprint
- Vegetation to be retained
- Secondary access point
- Internal access track
- Proposed extension for operational infrastructure area including substation, operational facility and BESS
- Aboriginal heritage site (to be avoided)
- Aboriginal heritage site (to be salvaged/managed)
- Potential public road crossing location
- Potential creek crossing point (refer to inset below)

Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Dwelling not associated with the project (EnergyCo building)
- Major road
- Minor road
- Named watercourse
- Central West Cycle (CWC) Trail main route- Gulgong to Dunedoo
- Cadastral boundary



Source: EMM (2025); DCSSS (2024); DFSI (2017, 2023, 2024); GA (2011); ACEN (2024); OzArk (2025)

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Local context

Birriwa Solar Farm Modification
Traffic Impact Assessment
Figure 1.2

EMM
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2 Modification overview

2.1 Approved project

The approved project comprises the following key components:

- installation of approximately 1 million solar PV panels and associated mounting infrastructure
- a BESS with a capacity of up to 600 MW and a storage duration of up to 2 hours (1,200 MWh)
- an on-site substation with a connection voltage of up to 500 kilovolts (kV)
- electrical collection and conversion systems, including inverter and transformer units, switchyard, control room and staff car park
- underground and aboveground cables
- an operational infrastructure area, including demountable and permanent offices, amenities, and equipment sheds
- internal access roads
- a temporary construction compound (during construction and decommissioning phases)
- an access route upgrade from Castlereagh Highway to the project site via Barneys Reef Road and Birriwa Bus Route South
- a temporary accommodation facility to provide accommodation for up to 500 construction staff during the construction phase of the project
- an emergency access track providing alternative access to the accommodation facility, suitable for emergency vehicles.

In relation to traffic and vehicle movements, Part B Condition B1 of the development consent (SSD-29508870) stipulates that the project must ensure that:

a) the development does not generate more than:

   i) 120 heavy vehicle movements a day (a maximum of 27 heavy vehicle movements per hour) during construction, upgrading, or decommissioning;

   ii) a total of six movements of heavy vehicles requiring escort during construction, upgrading, or decommissioning;

b) length of any vehicles (excluding heavy vehicles requiring escort) used for the development does not exceed 26 m;

unless the Planning Secretary agrees otherwise.

In accordance with Condition B3 and B4 (access route), unless the Planning Secretary agrees otherwise, all heavy vehicles and heavy vehicles requiring escort must travel to and from the site via Castlereagh Highway, Barneys Reef Road and Birriwa Bus Route South. Vehicles associated with the construction, operation, upgrading and decommissioning of the development must not use Merotherie Road, Birriwa Bus Route North or parts of Birriwa Bus Route South not part of the proposed public road crossings or shown as part of the access route in Figure 1 Appendix 5 of SSD-29508870. Condition B5 states that all vehicles must enter and exit the site visa the site exit point off Birriwa Bus Route South as identified in Appendix 1 of the development consent (i.e. accessed via Barneys Reef Road).

The full traffic assessment (EMM 2023) of the approved project can be found on the Major Projects website: https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-63046215%2120231218T023023.917%20GMT

2.2 Modification

ACEN is seeking to modify SSD-29508870, pursuant to section 4.55(2) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to:

- Increase the project area and development footprint to include three additional lots (Lot 11/DP 750755, Lot 40/DP 750755, Lot 60/DP 750755) and the remaining part of Lot 34/DP 750755, allowing for additional land to be used for solar generation, BESS, and associated ancillary infrastructure, as needed. Modifying the project area and development footprint across additional neighbouring lots will enable flexibility in design and construction, optimisation of the solar array and BESS layout, and will allow sufficient space for maintenance.

- Increase the storage capacity and duration of the BESS from up to 600 MW for a two-hour duration up to 900 MW for a four-hour duration. The additional capacity will allow the project to increase its energy storage potential, providing additional firming support and greater network system strength.

- Increase the project area and development footprint to allow for an upgrade to part of the existing Birriwa Bus Route South Road from the Golden Highway via Merotherie Road, for use as an alternative access route. It also includes a public road crossing along Birriwa Bus Route South to allow construction and operation traffic to access different areas of the project with limited impacts on Birriwa Bus Route South. This upgrade will enable access to the project for the purpose of constructing and operating the approved temporary accommodation facility, as well as the BESS. Oversize over-mass vehicles will continue to access the project area, via the approved primary access point (i.e. Castlereagh Highway-Barneys Reef Road-Birriwa Bus Route South).

- Increase the approved project's accommodation facility capacity from 500 workers to 650 workers, within the approved accommodation footprint (up to an additional 150 workers will reside at the accommodation facility in peak construction periods).

- Amend the schedule of lands to include three additional neighbouring lots.

- Increase the total number of daily vehicle movements to and from the site during pre-construction and construction, from 120 to 156 daily heavy vehicle trips, split between the approved access via Barneys Reef Road and the proposed alternative access via Merotherie Road. Correction of wording errors in the consent conditions from "vehicle movements" to "vehicle trips".

With respect to traffic and transport, no changes are proposed to the type of heavy vehicles travelling to the site as approved by SSD-29508870, and specifically in Condition B1 (as described above in Section 2.1). Changes are however proposed to the volume of movements and access route.

Regarding the volume of movements, the peak construction workforce is proposed to increase by up to 30% as part of the modification, from 500 to 650 construction workers. Heavy vehicle movements during peak construction periods are also therefore anticipated to be 30% greater than approved, as described further in Section 4.3. It is anticipated that up to 90 heavy vehicles of the proposed total of 156 will access the site per day via the alternative Merotherie Road access during peak periods. These peak movements via the alternative access will not coincide with the peak movements along the approved access route via Barneys Reef Road, such that the combined total heavy vehicles travelling to and from the site on any given day during pre-construction and construction will not exceed 156 (i.e. 312 movements). No changes are proposed to the approved volume of heavy vehicles that may access the site via the approved access route off Barneys Reef Road (120 heavy vehicles, or 240 movements).

Changes are also proposed as part of the modification to Conditions B3 and B4 (access route) and B5 (site access). As noted above, a modification to the development consent is sought to allow vehicles associated with the project to travel to, and access the site via, Merotherie Road and Birriwa Bus Route South, as well as maintaining the approved route of the Castlereagh Highway/Barneys Beef Road/Birriwa Bus Route South access route.

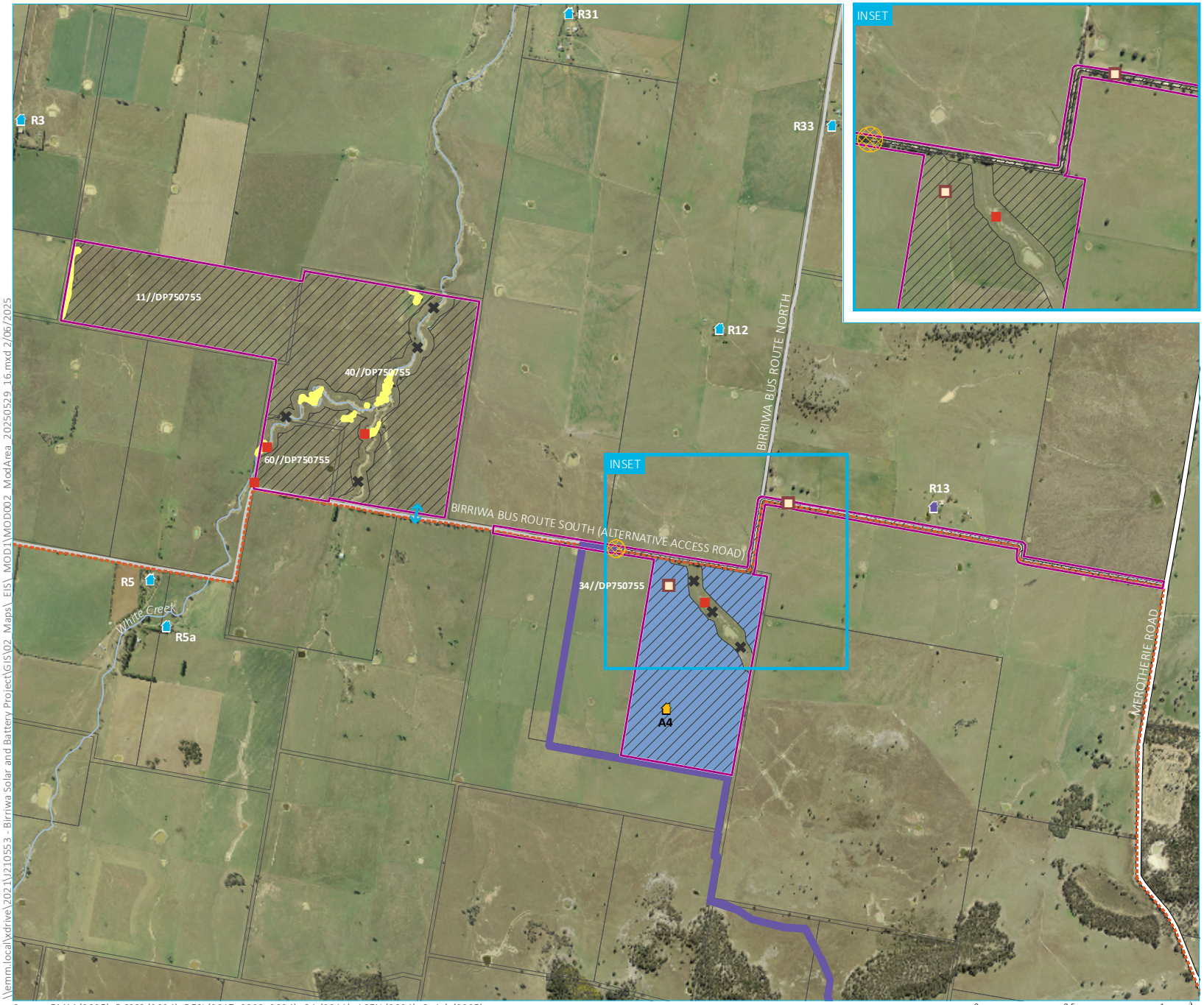
2.3 Modification area

The modification area includes three additional lots adjacent to the project area within the Mid-Western Regional LGA (Lot 11/DP 750755, Lot 40/DP 750755, Lot 60/DP 750755) and the remaining part of Lot 34/DP 750755, as well as the road upgrade corridor along the portion of Birriwa Bus Route South from Merotherie Road to the proposed alternate access point (as shown on Figure 2.1).

The road upgrade corridor is the area of direct impact for public road upgrade works along the access route, which comprises part of Birriwa Bus Route South (connecting the proposed alternate access point to the project with Merotherie Road). It also includes a public road crossing along Birriwa Bus Route South to allow construction and operation traffic to access different areas of the project with limited impacts on Birriwa Bus Route South.

The intersection at Merotherie Road/Birriwa Bus Route South and a section of Birriwa Bus Route South will require an upgrade to provide safe access to the development footprint during the project construction.

The Golden Highway/Merotherie Road intersection and the section of Merotherie Road between Golden Highway and Birriwa Bus Route South will be upgraded as part of the approved EnergyCo CWO REZ Transmission development. No project related light and heavy vehicles is proposed to travel along Merotherie Road south of Birriwa Bus Route South.



KEY

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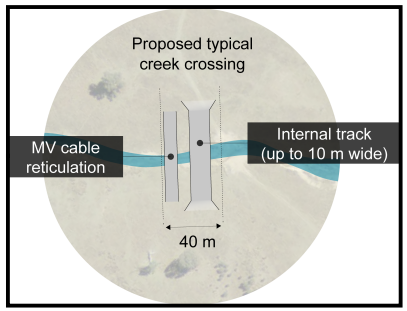
- Internal access track
- Proposed extension for operational infrastructure area including substation, operational facility and BESS
- Aboriginal heritage site (to be avoided)
- Aboriginal heritage site (to be salvaged/managed)
- Potential public road crossing location
- Potential creek crossing point (refer to inset below)

Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Dwelling not associated with the project (EnergyCo building)
- Major road
- Minor road
- Named watercourse
- Central West Cycle (CWC) Trail main route - Gulgong to Dunedoo
- Cadastral boundary



Modification area

Source: EMM (2025); DCSSS (2024); DFSI (2017, 2023, 2024); GA (2011); ACEN (2024); OzArk (2025)

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Birriwa Solar Farm Modifiction
Traffic Impact Assessment
Figure 2.1

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2.4 Construction

2.4.1 Duration and hours

The construction phase of the project is expected to take approximately 28 months from the commencement of site establishment works.

The construction of the project will generally include the following overlapping stages:

- road upgrades
- site establishment, including construction of the temporary accommodation facility
- construction (including temporary construction ancillary facilities)
- BESS and substation installation
- commissioning and testing.

In accordance with Condition B22 of the development consent, unless the Planning Secretary agrees otherwise, construction activities will be undertaken during construction hours as follows:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm on Saturdays
- no works on Sundays or NSW public holidays.

The following activities may be undertaken outside the hours specified above, in accordance with Condition B23:

- commissioning activities that are inaudible at non-associated residences
- the delivery or dispatch of materials as requested by the NSW Police Force or other public authorities for safety reasons, or
- emergency work to avoid the loss of life, property or prevent material harm to the environment.

Condition B24 of the development consent allows the hours of construction specified in Condition B22 to be varied with the prior written approval of the Planning Secretary.

2.4.2 Workforce

The modification proposes to increase the peak construction workforce from 500 up to 650 full-time equivalent staff. Out of the peak construction workforce of 650, it is anticipated that approximately 10% (65) will be local workers, which may be driving to the site daily. It is assumed that all local workers will be driving to and from the site during peak hours. The onsite workers residing in the accommodation facility will not be required to drive on the public road network on a daily basis. These workers will work on roster and are not expected to drive to/from the facility during the peak traffic hours.

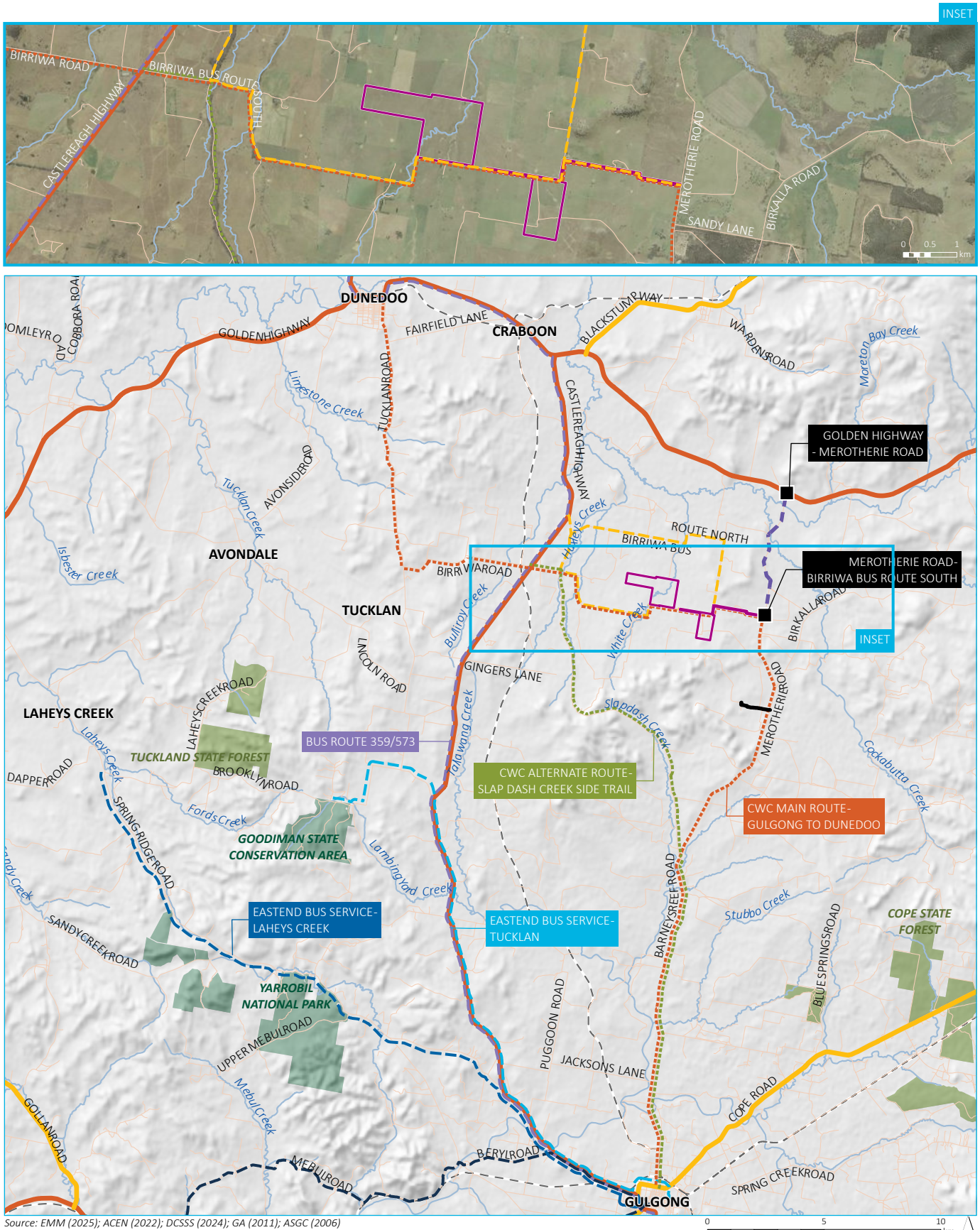
3 Existing conditions

3.1 Road network

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

- State Roads – freeways and primary arterials (TfNSW managed)
- Regional Roads – secondary or sub arterials (council managed and part funded by the State)
- Local Roads – collector and local access roads (council managed).

Key roads in the vicinity of the project include the Golden Highway (State Road), Merotherie Road (Local Road) and Birriwa Bus Route South (Local Road) which are shown in Figure 3.1. Road geometry descriptions for each of the roads are provided in Table 3.1 to Table 3.3.



Source: EMM (2025); ACEN (2022); DCSSS (2024); GA (2011); ASGC (2006)

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KEY

- Study area (project area)
- Intersection assessed in the TIA
- Proposed accomodation access

Existing environment

- Rail line
- Named watercourse
- NPWS reserve
- State forest
- Merotherie Road- Golden Highway connection

NSW classified road

- State road
- Regional road
- Local road

Bus route- public

- Bus route 359/573

Eastend Bus Service- school

- Goolma
- Laheys Creek
- Tucklan

Hodgen's Bus Service- school

- Dunedoo (approximate route)

Central West Cycle (CWC) trail

- CWC main route- Gulgong to Dunedoo
- CWC alternate route- Slap Dash Creek side trail

Road network and traffic characteristics

Birriwa Solar Farm Modification
Traffic Impact Assessment
Figure 3.1

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Table 3.1 Golden Highway (B84)

Aspect	Description
Road classification and connectivity	State Road between Castlereagh Highway, Dunedoo (west) to New England Highway, Belford (east)
Alignment	Generally east-west
Number of lanes	One lane each way with additional capacity at key intersections
Carriageway type	Sealed road
Carriageway width	Approximately 8.5 metres (m) near Merotherie Road
Posted speed limit	100 kilometres per hour (km/h) in rural sections of the highway
Heavy vehicle access	Approved for 26 m B-doubles
Traffic function	Provides arterial connection between townships

Source: Google Street View

Figure 3.2 Golden Highway looking east towards Merotherie Road

Table 3.2 Merotherie Road

Aspect	Description
Road classification and connectivity	Local Road between Golden Highway (north) and Barneys Reef Road (south)
Alignment	Generally north-south
Number of lanes	One lane each way
Carriageway type	Unsealed road (with the exception of the first 20 m from the Golden Highway which is sealed)
Carriageway width	Approximately 8.5 m wide
Speed limit	Default speed limit of 100 km/h; however, drive to conditions
Heavy vehicle access	Approved for heavy vehicles up to 19 m long under 50 tonnes
Traffic function	Carries local traffic
Additional comments	There are a number of moderate bends at various sections of this road. The road is currently being upgraded as part of CWO REZ Transmission Project (Merotherie Energy Hub).

Source: Google Street View

Figure 3.3 Merotherie Road looking south near Golden Highway

Table 3.3 Birriwa Bus Route South

Aspect	Description
Road classification and connectivity	Local road between the Castlereagh Highway (west) and Merotherie Road (east)
Alignment	Generally east-west
Number of lanes	One lane each way
Carriageway type	Unsealed road
Carriageway width	Approximately 5 m wide
Speed limit	Default speed limit is currently 100 km/h
Heavy vehicle access	Approved for heavy vehicles up to 19 m long under 50 tonnes
Traffic function	Carries local traffic
Additional comments	There are a number of 90 degree bends at various sections of this road and existing mature trees on both sides of the road.

Source: Google Street View

Figure 3.4 Birriwa Bus Route South looking west from Merotherie Road

3.2 Key intersections

Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South have been assessed as the project related construction and operational traffic will use these intersections. The location of the intersections is shown in Figure 3.1. Intersection geometry details are presented in Table 3.4 and Table 3.5 and intersection aerial views in Figure 3.5 and Figure 3.6.

Table 3.4 Golden Highway/Merotherie Road intersection

Aspect	Description
Location from the site	Approximately 8.5 km north of the site
Intersection control	Priority control (give-way) intersection
Major road	Golden Highway
East approach	One lane on approach and one lane on departure
West approach	One lane on approach and one lane on departure
South approach	A shared approached and departure lane with sufficient road width
Pedestrian connectivity	No pedestrian connectivity provided on any approach
Traffic function	Predominantly carries regional traffic
Speed limit	100 km/hour along Golden Highway
Additional comments	The intersection does not comply with the current Austroads standard (see Section 5.2.1). The intersection is currently being upgraded as part of CWO REZ Transmission Project (Merotherie Energy Hub).

Source: Google Maps

Figure 3.5 Golden Highway/Merotherie Road intersection

Table 3.5 Merotherie Road /Birriwa Bus Route South intersection

Aspect	Description
Location from the site	Approximately 3 km east of the site
Intersection control	Priority control (give-way) intersection which a mature tree at the middle separating the inbound and outbound traffic onto Birriwa Bus Route South
Major road	Merotherie Road
North approach	A shared approach and departure lane
South approach	A shared approach and departure lane
West approach	A shared approach and departure lane
Pedestrian connectivity	No pedestrian connectivity provided on any approach
Traffic function	Predominantly carries local traffic
Speed limit	Default speed limit of 100 km/hour along Merotherie Road
Additional comments	The intersection does not comply with current Austroads standard (see Section 5.2.2).

Source: Google Maps

Figure 3.6 Merotherie Road/Birriwa Bus Route South intersection

3.3 Existing traffic volumes

The Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South intersections were surveyed between 7:00 am and 6:00 pm on Wednesday, 21 February 2024.

The survey results indicate that the peak hours are:

- Golden Highway/Merotherie Road:
  - AM peak hour: 10.30 am to 11.30 am
  - PM peak hour: 12.00 pm to 1.00 pm
- Merotherie Road/Birriwa Bus Route South:
  - AM peak hour: 7.00 am to 8.00 am
  - PM peak hour: 4.15 pm to 5.15 pm.

The surveyed traffic volumes during the AM and PM peak hours are summarised in Figure 3.7. As there is no consistent pattern for the existing peak traffic hours due to the rural nature of the locality, the AM and PM peak traffic hours for the larger intersection are applied for both the analysed intersections. Hence, the analysed peak period is dominated by the Golden Highway/Merotherie Road intersection traffic conditions.

The data in the Figure 3.7 shows that the Golden Highway/Merotherie Road intersection carried under 100 vehicles in both the peak hours with a slightly eastbound dominant flow in the AM peak and vice versa in the PM peak. The existing traffic volume at Merotherie Road/Birriwa Bus Route South is very low, with less than five vehicles in both the AM and PM peak hours.

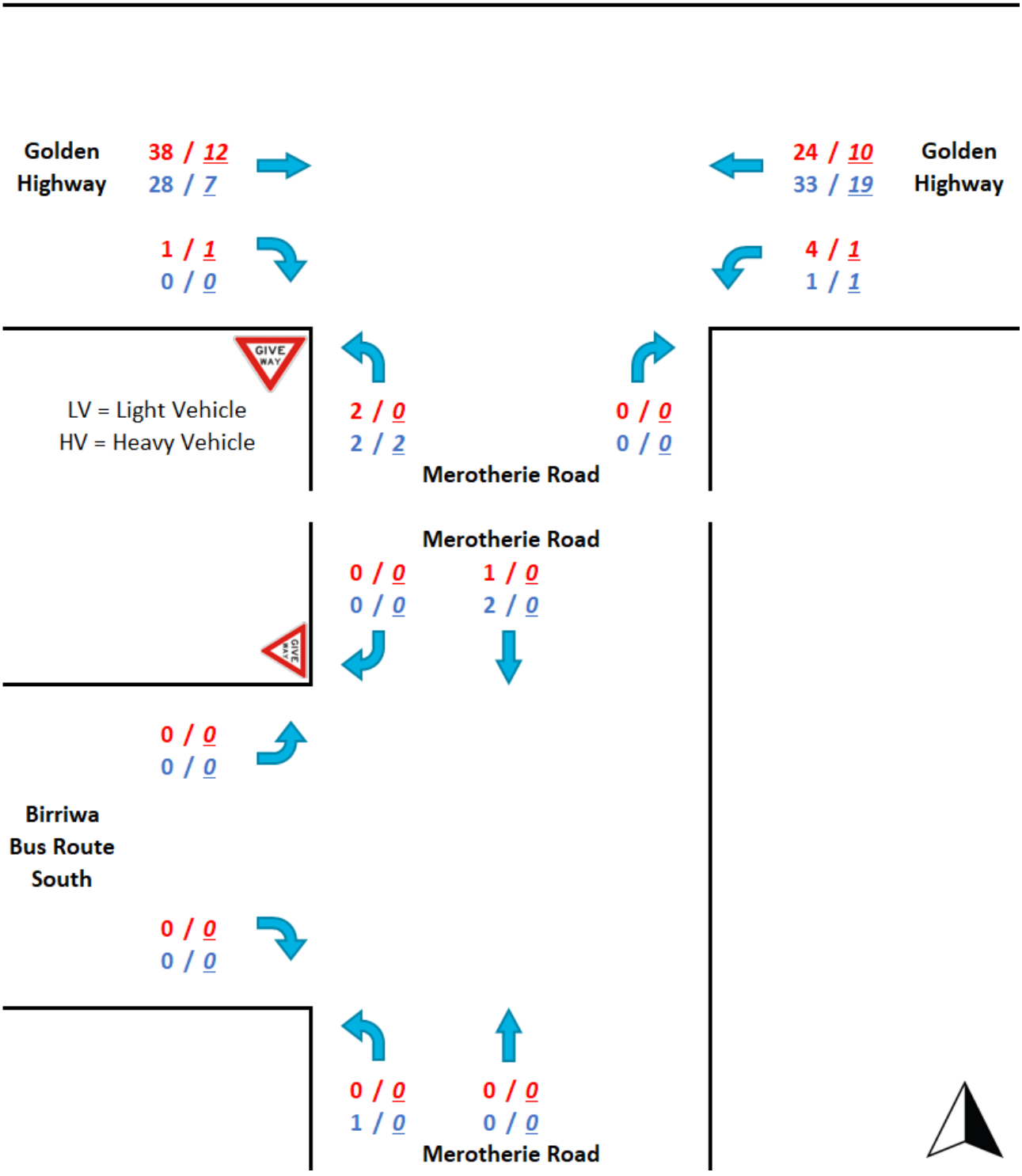


Figure 3.7 **2024 existing AM and PM peak hour traffic volumes**

3.4 Crash analysis

Crash data from TfNSW Centre for Road Safety interactive history [1]database for the last five years between 2019 and 2023 has been studied in the vicinity of the site and is presented in Figure 3.8.

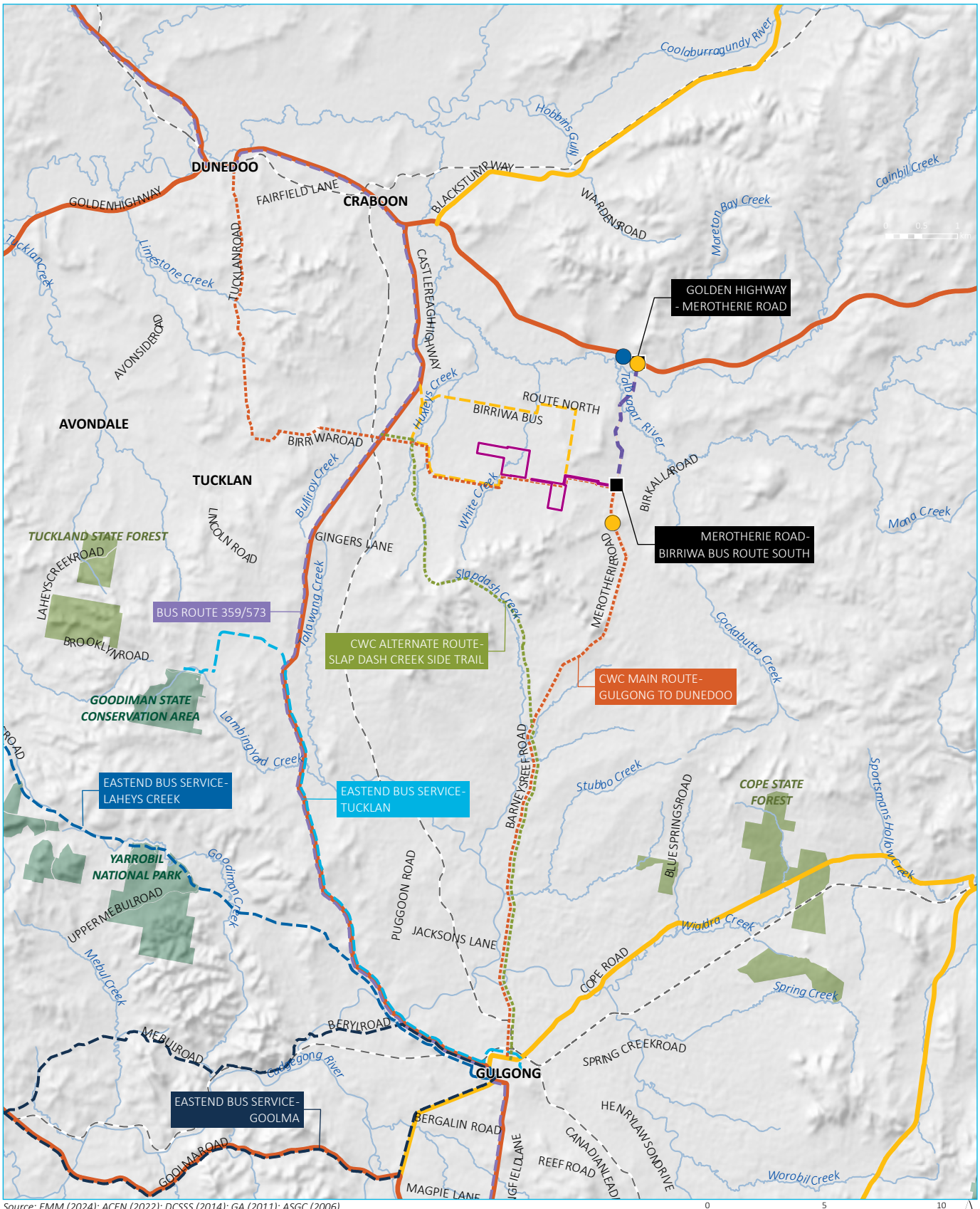
The crashes are categorised based on the severity of the crashes as follows:

- fatal
- serious injury
- moderate injury
- minor/other injury
- non-casualty (e.g. towaway).

The crash history shows that there was one rear end type crash in 2019 at the Golden Highway/Merotherie Road intersection. In 2020, there was another non-casualty (off road to left) crash on Golden Highway, approximately 660 m west of Merotherie Road. Apart from these two crashes, there is no other recorded crash along Merotherie Road or Birriwa Bus Route South along the haulage route.

The overall crash rate for the Golden Highway in the vicinity of the Merotherie Road intersection is considered to be low over the five-year period, which indicates there is no current road safety issue at the adjoining road network that requires immediate attention.

[1] https://www.transport.nsw.gov.au/roadsafety/statistics/interactive-crash-statistics



Source: EMM (2024); ACEN (2022); DCSSS (2014); GA (2011); ASGC (2006)

\\emm.local\xdrive\2021\J210553- Birriwa Solar and Battery Project\GIS\02_Maps_TIA\MOD1\MTIA004_CrashData\MTIA004_CrashData_20250410_02.aprx 10/04/2025

KEY

- Study area (project area)
- Intersection assessed in the TIA

Existing environment

- Rail line
- Named watercourse
- NPWS reserve
- State forest
- Merotherie Road- Golden Highway connection

Degree of crash (site vicinity only)

- Serious Injury
- Minor/Other Injury
- Non-casualty (towaway)

NSW classified road

- State road
- Regional road
- Local road

Bus route- public

- Bus route 359/573

Eastend Bus Service- school

- Goolma
- Laheys Creek
- Tucklan

Hodgen's Bus Service- school

- Dunedoo (approximate route)

Central West Cycle (CWC) trail

- CWC main route- Gulgong to Dunedoo
- CWC alternate route- Slap Dash Creek side trail

Crash data along the haulage route

Birriwa Solar Farm Modification
Traffic Impact Assessment
Figure 3.8

EMM creating opportunities

3.5 Public transport

3.5.1 Buses

There are no regular public bus services in the vicinity of the project site. School buses operate along Golden Highway by Eastend Bus Service. Hodgen's Bus Service (Dunedoo) operates a service along Birriwa Bus Route South and Birriwa Bus Route North providing student transport to local schools in Dunedoo.

3.5.2 Trains

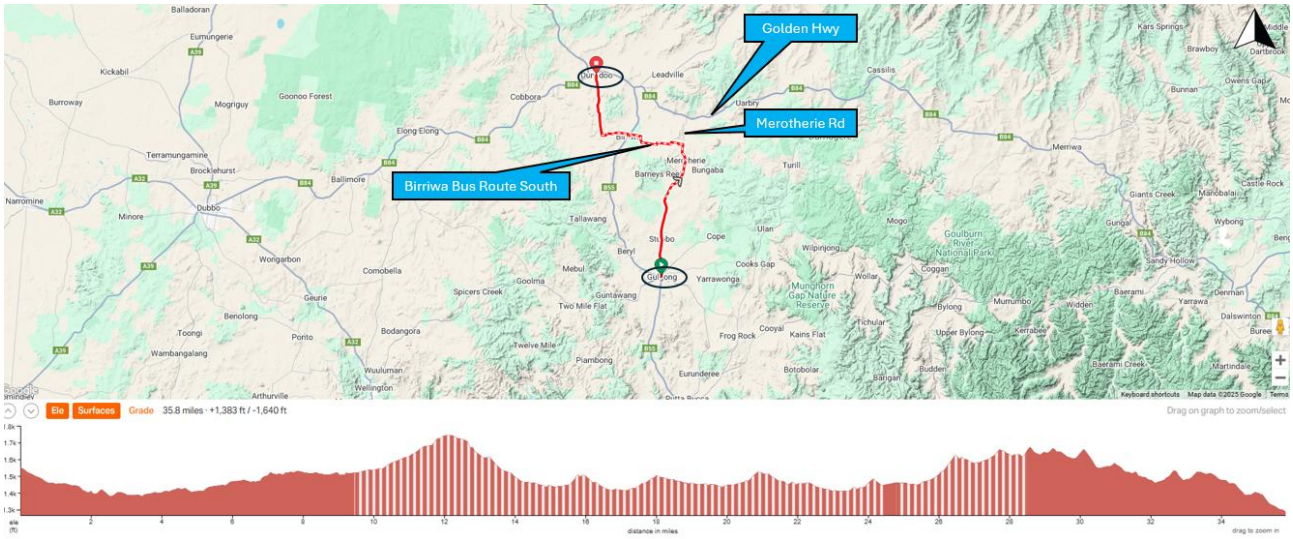
Birriwa train station is located approximately 7 km west of the site. The station has been closed since 5 March 1974.

3.6 Active transport

The 58 km Gulgong and Dunedoo Central West Cycling Trail[2] (CWCT) travels via Merotherie Road (south of Birriwa Bus Route South) and Birriwa Bus Route South, as shown on Figure 3.9.

As the haulage route intersects with this cycling trail, consultation is ongoing with CWCT[3]. Appropriate mitigation measures and driver awareness, such as appropriate signposting, is discussed in Chapter 6 to ensure safety of recreational cyclists.

There are no pedestrian facilities in the vicinity of the study area due to the rural nature of the area.



Source: Central West Cycle Trail

Figure 3.9 Gulgong to Dunedoo cycling trail

3.7 Parking

There is no formal parking demand in the vicinity of the study area given the rural nature of the area.

2 https://centralwestcycletrail.com.au/maps/

3 Email correspondences between ACEN and CWS dated 7 April, 14 April, 27 April, 28 April, 9 May and 29 May 2025

4 Traffic generation and distribution

4.1 Site peak vs network peak traffic volumes

As per Transport for NSW's (TfNSW) advice on the approved Birriwa Solar and Battery project, the traffic assessment has been undertaken based on the background traffic volumes during the network peak times while applying the project's traffic volumes during the site peak times. This means this traffic assessment is very conservative (worst case scenario).

4.2 Development year

Based on the current project schedule, the peak construction activities are expected to occur in 2029, and therefore all traffic assessments have been undertaken for that year. As per TfNSW's instructions on Castlereagh Highway, a 1.6% per annum linear growth has been applied to Golden Highway due to the close proximity of these two highways. For simplicity, a similar growth rate has been applied Merotherie Road and Birriwa Bus Route South. Based on the adopted growth rate, 2029 baseline traffic volumes are presented in Figure 4.1.

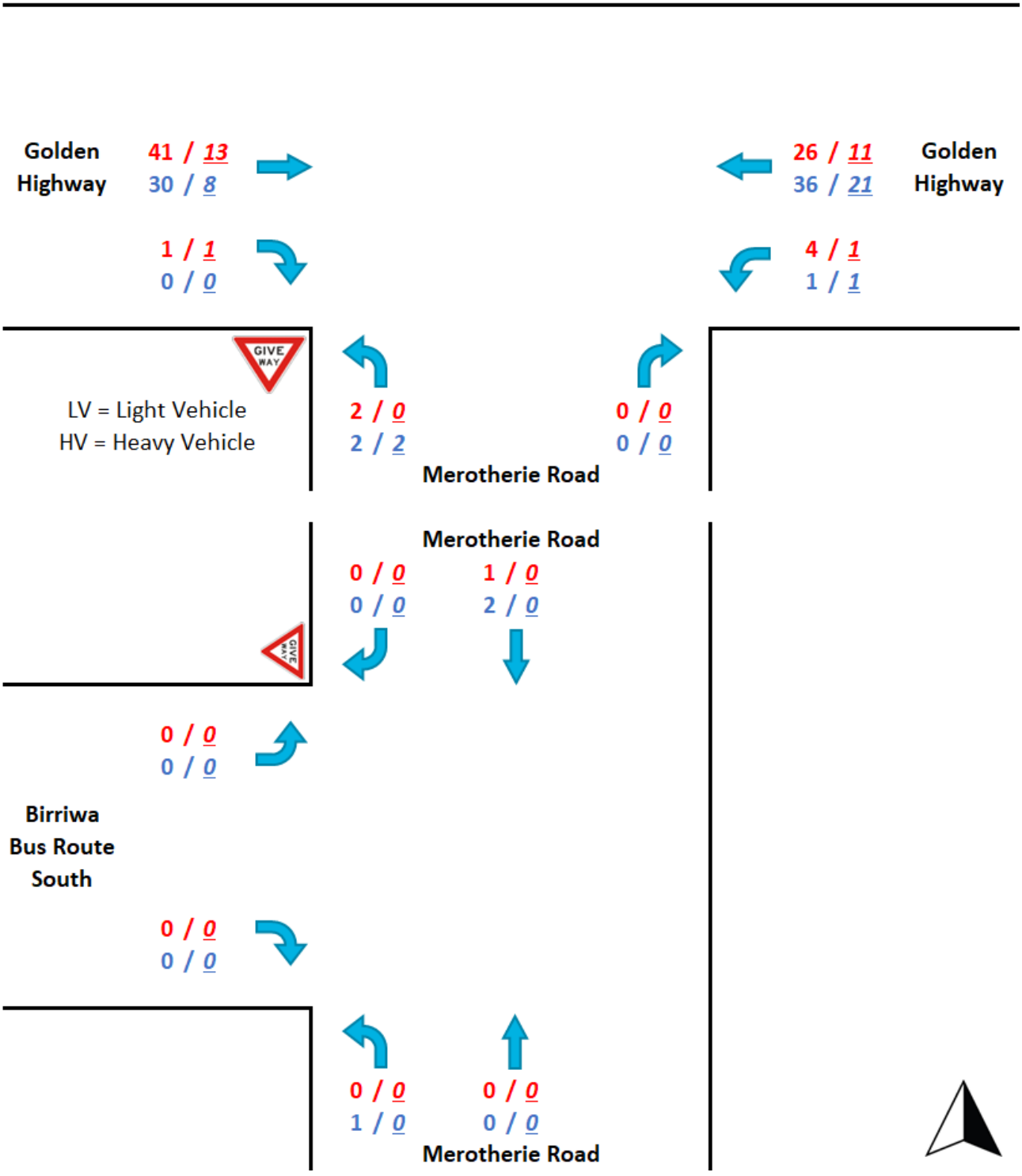


Figure 4.1 **2029 baseline AM and PM peak hour traffic volumes**

4.3 Traffic generation and distribution

4.3.1 Construction of the accommodation facility

The construction of the accommodation facility will occur prior to construction of the BESS component of the project.

As such, traffic associated with the construction of the accommodation facility is not included in the analysis for the modification.

4.3.2 Traffic distribution

The heavy vehicle movements to and from the site will be split between the approved access via Barneys Reef Road and the proposed alternative access via Merotherie Road. The proposed alternative access will be used primarily for pre-construction and construction access to the accommodation facility and BESS, while the approved access will be primarily used for construction of the solar infrastructure and BESS.

The likely traffic distribution in terms of site access during the various stages of the project is described below:

- Proposed alternative access: Golden Highway – Merotherie Road - Birriwa Bus Route South route:
  - construction of the accommodation facility - light and heavy vehicles
  - BESS construction - heavy vehicles (excluding heavy vehicles requiring an escort)
  - solar and BESS construction - light vehicles
  - operation of the accommodation facility - light and heavy vehicles.
- Approved access: Castlereagh Highway – Barneys Beef Road – Birriwa Bus Route South
  - solar and BESS construction – light and heavy vehicles (including heavy vehicles requiring an escort).

The anticipated traffic distribution including volumes is shown in Table 4.1.

4.3.3 Traffic generation for construction of the solar and BESS project

a Heavy vehicles

As part of the modification, the peak construction workforce is proposed to increase by up to 30%, from 500 to 650 construction workers. As a conservative approach, heavy vehicle movements are also anticipated to be 30% greater than approved, at 156 daily heavy vehicle trips (312 movements).

As previously described, it is anticipated that up to 90 heavy vehicles of the 156 will access the site per day via the alternative Merotherie Road access during peak periods. These peak movements via the alternative access will not coincide with the peak movements along the approved access route via Barneys Reef Road, such that the combined total heavy vehicles travelling to and from the site on any given day during pre-construction and construction will not exceed 156 (i.e. 312 movements). Note that Merotherie Road will not be used by heavy vehicles requiring an escort. Such vehicles (OSOM) will travel to site via the approved access of Barneys Reef Road/Birriwa Bus Route South.

No changes are proposed to the approved volume of heavy vehicles that may access the site via the approved access route off Barneys Reef Road (120 heavy vehicles, or 240 movements). Where these peak movements are required along Barneys Reef Road, movements along Merotherie Road will be such that they do not exceed the total of 156 trips/312 movements to the site.

Notwithstanding the above, this TIA has been undertaken based on the conservative scenario of all heavy vehicles travelling via the alternative Merotherie Road access route during pre-construction and construction, to ensure full sensitivity testing.

A summary of the traffic assumptions for heavy vehicle generation for this TIA associated with the modified project are:

- a total of 156 daily heavy vehicle trips is assumed, all travelling to/from the north via Merotherie Road. At the Golden Highway, a 50%/50% split is assumed between eastbound and westbound directions
- 20% of all daily heavy vehicle trips are assumed to occur during the AM and PM peak hours. This includes heavy vehicles associated with the operation of the accommodation facility during the construction phase of the project.

This results in a total of 36 heavy vehicle trips per peak hour, including those related to the accommodation facility operations. These 36 heavy vehicle trips equates to 24 trips for the construction of the BESS and solar facility and 8 trips for operation of the accommodation facility (see Section 4.3.4a).

b Light vehicles

For light vehicle generation, the following traffic assumptions have been made:

- Total number of construction workers at peak construction activities: 650.
- The number of construction workers residing at the accommodation facility at any given time: 585 (90%), assuming a local workforce component of 10%.
- Local workers who will drive to the site on daily basis: 65 (10%) (i.e. 65 daily light vehicle trips, AM inbound and PM outbound), all travelling to/from the north along Merotherie Road. At Golden Highway, it is assumed to be 50%/50% split to the east and west along the highway.

As a conservative assessment, all local workers are assumed to be arriving and departing the site during the peak hours.

4.3.4 Traffic generation due to operation of the accommodation facility

a Heavy vehicles

Once operational, the accommodation facility will be used 24 hours a day, 7 day a week.

During the operation of the accommodation facility, approximately 250 L of potable water per person per day will be required.

Assuming the accommodation facility is operating at full capacity (i.e. 650 people), approximately 162,500 litres (L) of water will be required per day (250 L x 650 people). It is anticipated that water will be delivered weekly to the site by truck (truck capacity of 20,000 L). Based on a 20,000 L water truck, this equates to around 8 heavy vehicle trips (16 movements) per day. It is anticipated that a similar amount of heavy vehicle movements per day will be generated for the delivery of fuel and collection of sewage and waste.

Based on the above assessment 16 daily trips (32 movements) are anticipated. As a conservative approach, it is assumed that 50% of the trips will occur during the network peak hours. The inbound and outbound traffic distribution is assumed to be split 50%/50% in the peak hours on both directions of Golden Highway. Inbound and outbound traffic movements will occur at the same peak hour.

Based on these assumptions, the following heavy vehicle generation is anticipated at the Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South intersections:

Golden Highway/Merotherie Road

- Heavy vehicles travelling to/from the east: 8 (both AM and PM peaks, with 4 inbound and 4 outbound movements).
- Heavy vehicles travelling to/from the west: 8 (both AM and PM peaks, with 4 inbound and 4 outbound movements).

Merotherie Road/Birriwa Bus Route South

- Heavy vehicles travelling to/from north: 16 (both AM and PM peaks where 8 inbound and 8 outbound movements).

The above volumes have been added in the traffic generation for the project (see Figure 4.2).

b Light vehicles

Once the accommodation facility is operational, construction workers will travel to and from the facility for their shifts via shuttle buses, along the internal access track between the accommodation facility and the rest of the project area. It is estimated that there will be approximately 17 shuttle bus trips per day (34 movements) transporting the construction workforce. As these traffic movements will not occur on any public roads, these movements have not been considered in the traffic assessment. While not in use, the shuttle buses will be parked within the project area.

It is acknowledged that workers will travel in and out of the site during weekly/fortnightly roster changeover; however, these movements are not anticipated to occur during the network peak hours, hence not considered in this traffic assessment. It is anticipated that roster changeover may occur on Saturday or Sunday outside of peak hours. It is also acknowledged that non-local workers may use light vehicles to drive into town after a shift. These movements are likely to be ad hoc and unlikely to occur in the peak traffic periods. This traffic impact assessment has assessed the worst-case scenario for peak traffic periods.

The light vehicle movements during operation of the accommodation facility are the movements that will occur during the construction of the project and have been described above in Section 4.3.3b (i.e. 65 daily trips).

4.3.5 Traffic movement summary

Based on the above discussions, the peak hour traffic generation due to the modified project (including construction of the project and operation of the accommodation facility) is shown in Figure 4.2.

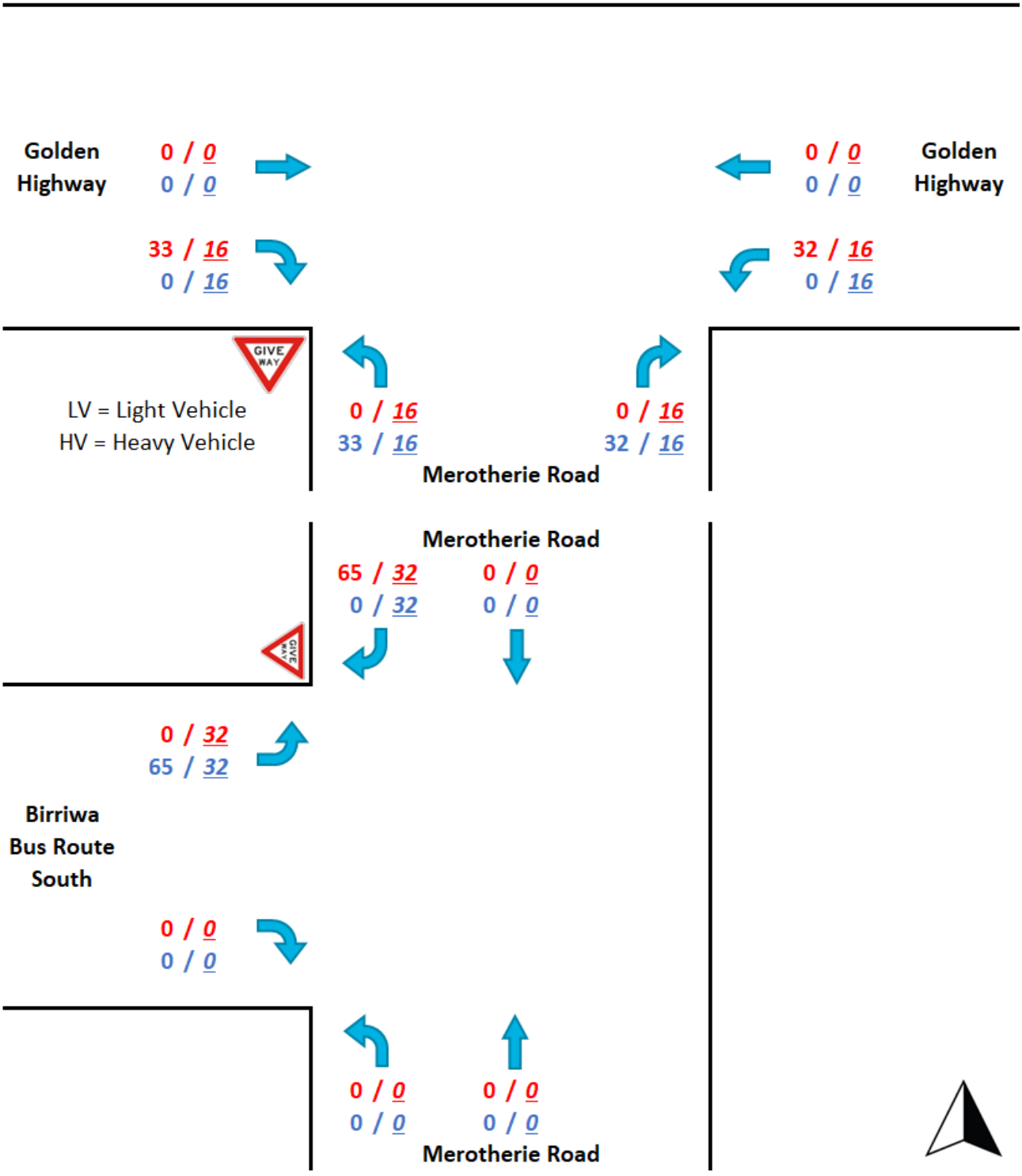


Figure 4.2 2029 construction AM and PM peak hour traffic volumes (construction of the BESS & solar farm and operation of the accommodation facility)

The traffic movements associated with modification are also summarised in Table 4.1. Key assumptions are:

- for the construction of the BESS and solar infrastructure - 20% of daily heavy vehicles generating during the peak hours
- for the operation of the accommodation facility - 50% of daily heavy vehicles generating during the peak hours
- for the construction of the BESS and solar, light vehicles generation AM peak inbound and PM peak outbound - all movements generating during the AM and PM peak hours.

Table 4.1 Estimated daily and peak hourly vehicle movement/trips for the modification

Peak stage of the project	Route	Vehicle type	Daily		Peak hourly			
					AM		PM	
			Trips	Movements	Trips	Movements	Trips	Movements
Pre-construction								
Pre-construction (establishment of the accommodation facility)	Merotherie Rd/Birriwa Bus Route South	Heavy vehicles	90*	180	- *Peak hour will be avoided*	- *Peak hour will be avoided*	- *Peak hour will be avoided*	- *Peak hour will be avoided*
Pre-construction (establishment of the accommodation facility)	Merotherie Rd/Birriwa Bus Route South	Light vehicles	40	80	40	40	40	40
Pre-construction total traffic volumes	**Merotherie Rd/Birriwa Bus Route South**	**Heavy and light vehicles**	**130**	**260**	**40**	**40**	**40**	**40**
Construction								
Construction (solar and BESS)	Castlereagh Hwy/Barneys Reef Rd	Heavy vehicles	66	132	13	26	13	26
Construction (BESS)	Merotherie Rd/Birriwa Bus Route South	Heavy vehicles	74	148	15	30	15	30
Construction (operation of the accommodation facility during the construction phase of the solar and BESS)	Merotherie Rd/Birriwa Bus Route South	Heavy vehicles	16	32	8	16	8	16
	Merotherie Rd/Birriwa Bus Route South	Light vehicles	65	130	65	65	65	65

Peak stage of the project	Route	Vehicle type	Daily		Peak hourly			
					AM		PM	
			Trips	Movements	Trips	Movements	Trips	Movements
Construction total traffic volumes	**Castlereagh Hwy/Barneys Reef Rd**	**Heavy vehicles**	**66**	**132**	**13**	**26**	**13**	**26**
	Merotherie Rd/Birriwa Bus Route South	**Heavy vehicles**	**90**	**310**	**88**	**111**	**88**	**111**
	Merotherie Rd/Birriwa Bus Route South	**Light vehicles**	**65**	**130**	**65**	**65**	**65**	**65**

Note: *It is anticipated that up to 90 heavy vehicles will be required to access the site during pre-construction activities and construction via the alternative Merotherie Road access. It is assumed these movements will not occur during peak hour. The majority of heavy vehicles movements during pre-construction will occur over a few days during the delivery of the accommodation modules.

4.4 Nearby developments for cumulative traffic impact assessment

4.4.1 Concurrent developments

For the cumulative traffic assessment, a detailed investigation of the Major Projects website and project specific websites reveal that there are three concurrent developments with construction timings currently proposed for the year 2029, which is the anticipated year of peak construction for the project (Table 4.2). However, of these three developments, only one is expected to impact the road network associated with the modified project: the Sandy Creek Solar Farm and BESS Project.

Traffic volumes have been sourced from table 4.15 of the Traffic Impact Assessment for the Sandy Creek Project, located on DPHI's Major Projects website[4]. The peak hour traffic volumes are shown in Figure 4.3, which has been applied to the cumulative assessment for 2029 to ensure a conservative approach. The report states that 80% of heavy vehicles are to/from the Dunedoo and Merriwa direction in the east. Based on this it is assumed that half of the heavy vehicle traffic will be generating from Dunedoo and the remaining half from Merriwa and further east. Consequently, 40% of the heavy vehicles are adopted for this assessment.

In relation to the light vehicles, the Sandy Creek report states that 20% of traffic will be generated to/from the east (Dunedoo/Merriwa). Similar to heavy vehicle, it is assumed that out of the 20% traffic from the east, half will be generated from Dunedoo (10%) and the remaining half will be generated from Merriwa (10%). These heavy and light vehicle traffic has been adopted for the cumulative traffic impact.

Only the Golden Highway/Merotherie Road intersection has been assessed for cumulative traffic as there is no other concurrent development traffic along Merotherie Road or Birriwa Bus Route South.

[4] https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-70990459%2120241029T050424.341%20GMT

Table 4.2 Nearby developments to the Birriwa project site

Project name	Approximate distance from Birriwa Project site	Development phase and NSW planning portal status (where relevant)	Construction timing
EnergyCo Central West Orana (CWO) Renewable Energy Zone (REZ) Transmission project (Merotherie Energy Hub)	0 (adjacent)	Approved	Q1 2025 – Q2 2028
Spicers Creek Windfarm	25 km	Approved	Q1 2026 – **Q2 2029**
Orana Windfarm	12 km	Prepare EIS	N/A
Bellambi Heights BESS	21 km	Approved	Q2 2025 – Q2 2028
Tallawang Solar Farm	16 km	Under assessment	Q2 2026 – **Q1 2029**
Sandy Creek Solar Farm and BESS	**23 km**	**Under assessment**	**Q2 2027 – Q4 2029**
Narragamba Solar Farm	2 km	Prepare EIS	Q4 2028 – Q3 2030
Valley of the Winds Windfarm	14 km	Referred to the IPC	Q1 2026 – Q1 2028
Wellington South BESS	65 km	Approved	Stage 1 Q2 2025 – Q2 2026 Stage 2 Q4 2026 – Q4 2027
Orana BESS	65 km	Approved	Under construction – Q1 2026
Burrendong Windfarm	70 km	Response to submissions	Q4 2026 – Q4 2028
Apsley BESS	80 km	Approved	Q3 2025- Q3 2026
Forest Glen solar farm	100 km	Approved, modification under assessment	Q2 2025 – Q3 2026
Dubbo firming power station	90 km	Approved	Q4 2025 – Q3 2027
Liverpool Range wind farm	38 km	Approved, modification approved	Q4 2025 – Q4 2028
Dunedoo Solar Farm	13.5 km	Approved	Construction timing unknown
Beryl Solar farm	24 km	Operational	N/A
Bodangora Wind Farm	48 km	Operational	N/A
Stubbo Solar Farm	14 km	Approved	Under construction Q2 2023 – Q4 2025.
Uungula Windfarm	55 km	Approved	Under construction Q1 2025 - Q4 2027
Wellington Solar Farm	70 km	Operational	N/A
Geurie solar farm	80 km	Approved	Construction timing unknown
Maryvale Solar Farm	70 km	Approved	Q2/Q3 2025 – Q2 2027
Wellington North Solar Farm	70 km	Operational	N/A

AM Peak Hour LV / *HV*
PM Peak Hour LV / *HV*

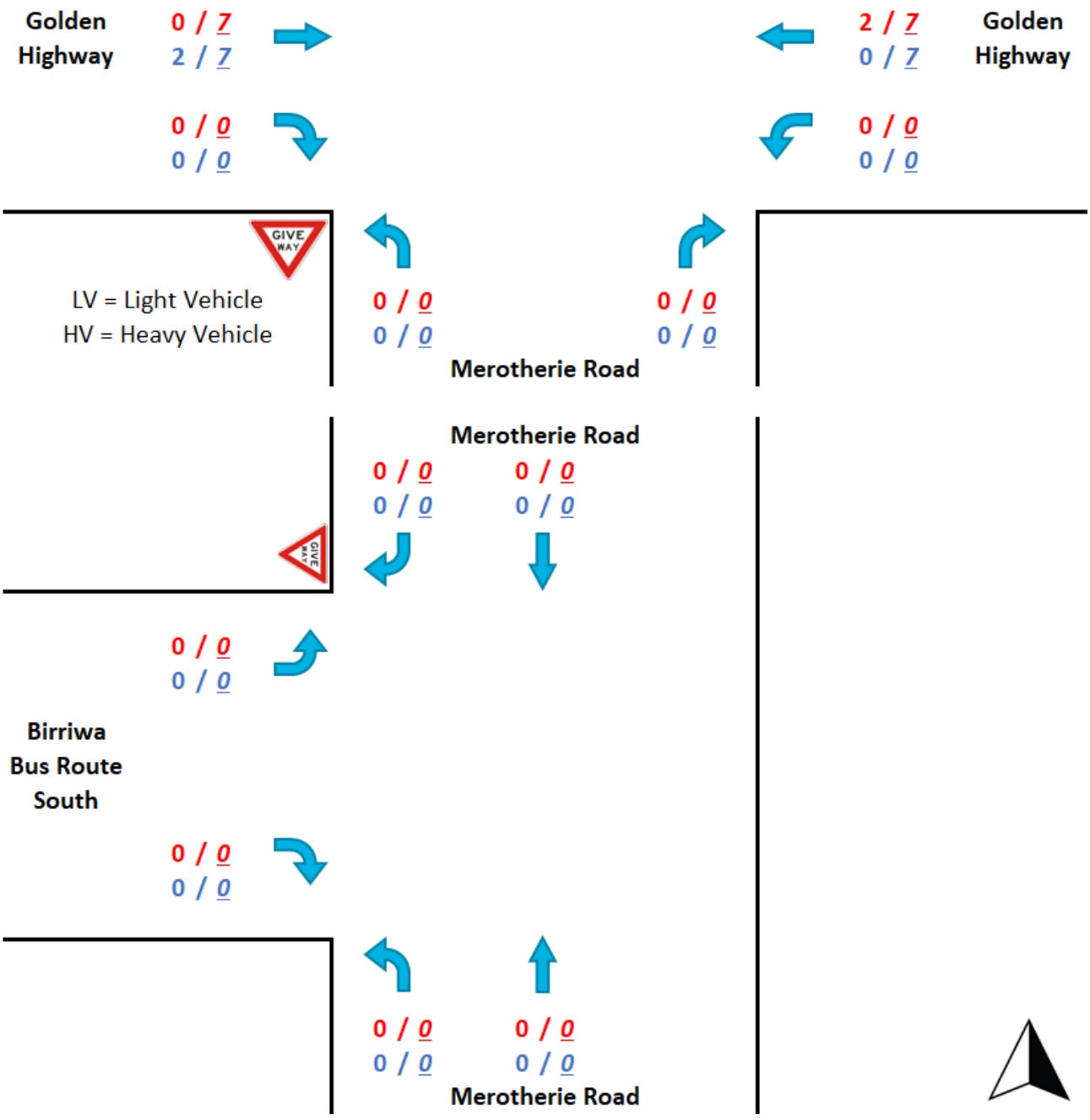


Figure 4.3 **2029 cumulative AM and PM peak hour traffic volumes**

4.4.2 Potential overlap of construction activities with CWO REZ Transmission Project

The Traffic and Transport Management Plan (Rev 04[5]) released in May 2025 (ACEREZ 2025) for the CWO REZ Transmission Project provides a detailed timeline of construction for the Merotherie Energy Hub and Merotherie workforce accommodation facility, which are adjacent to the Birriwa Solar and Battery Project. The construction of the Merotherie workforce accommodation facility as outlined in Figure 4.4 (Table 2.2 of the ACEREZ TMP) is anticipated to fall between the period of October 2025 and 2028. If this was to extend, or the Applicant was to start construction earlier than planned once detailed design is complete, there is a possibility that the construction of the project may overlap with the construction of the Merotherie Energy Hub and construction and/or operation of the Network Operator's workforce accommodation facility as part of the CWO REZ Transmission Project.

TABLE 2-5 PLANNED CONSTRUCTION AND ASSOCIATED TRAFFIC MOVEMENTS

Merotherie Site activities (Approx. camp capacity / Anticipated occupation)	Approx. movement per hour			Approx. movement per day		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
Jan - March 2025 (0/0)*	5	1	6	20	5	25
April 2025 (50/30)**	8	20	28	20	175	25
May 2025 (100/35)	9	20	29	24	175	199
June 2025 (200/40)	10	20	30	28	175	203
July 2025 (300/300)	20	20	40	60	175	235
October 2025 - 2028 (1200/1200)***	44	33	77	376	431	808

* Denotes access under B32 agreement with relevant road authorities

** From April (subject to WAD approval) Merotherie Intersection upgrade must commence before any increase in vehicle movements.

*** Denotes potential peak capacity of camp during construction – not expected until 2026

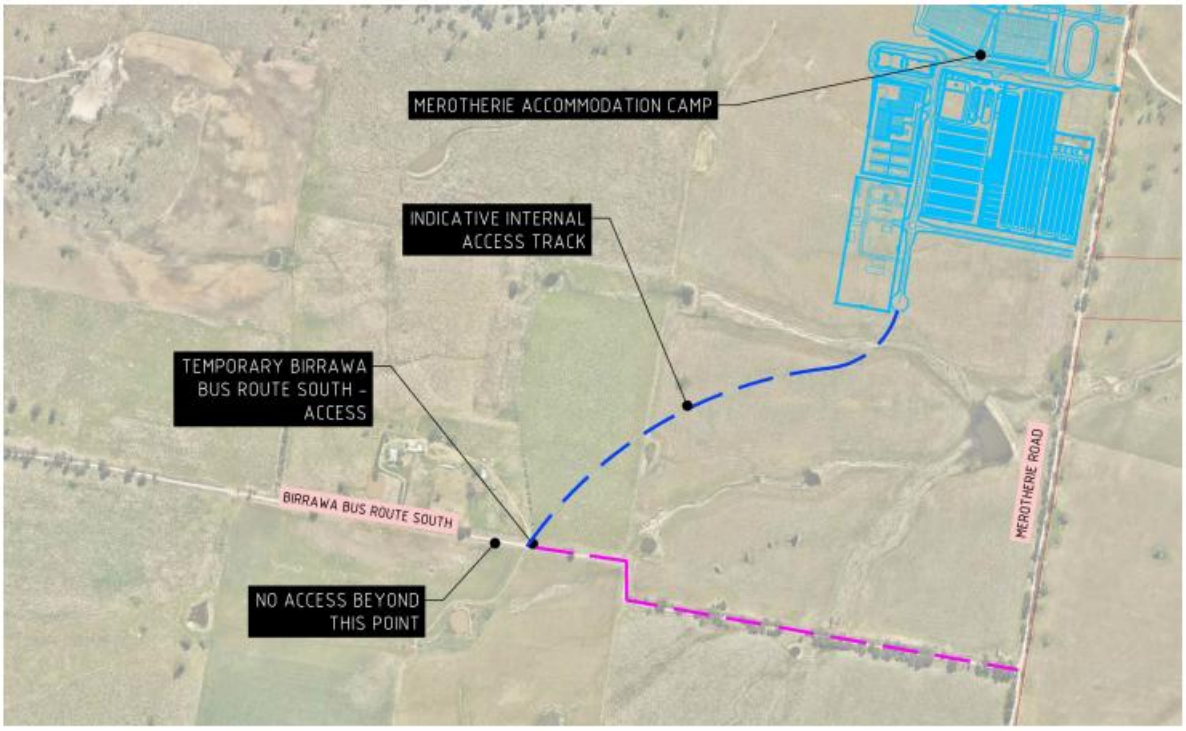
Source:
https://media.caapp.com.au/pdf/ZCcsXctIZH5m/e3eab40e-1ab2-4593-a2da-e0af0d631064/Merotherie%20Transport%20Strategy.pdf

Figure 4.4 Timeline for construction of the Merotherie Energy Hub and Merotherie workforce accommodation facility

In relation to potential cumulative traffic impacts, there are three aspects to consider: the Merotherie Road/Birriwa Bus Route South intersection, the Golden Highway/Merotherie Road intersection, and the required upgrades along Merotherie Road between the Golden Highway and Birriwa Bus Route South. These aspects are considered below and are based on the latest information available (May 2025) outlined in the Network Operator's Traffic and Transport Management Plan and Merotherie Transport Strategy.

[5] https://media.caapp.com.au/pdf/ZCcsXctIZH5m/e3eab40e-1ab2-4593-a2da-e0af0d631064/Merotherie%20Transport%20Strategy.pdf

The construction of the Network Operator's workforce accommodation facility at Merotherie will only require a temporary access from Birriwa Bus Route South, as outlined in Figure 4.5 (figure 2.7 of the Network Operator's TMP). Once the Network Operator has completed its vehicular access on Merotherie Road, this temporary access on Birriwa Bus Route South will be ceased as it will no longer be required. Therefore, during the construction of the Merotherie Energy Hub and operation of the Network Operator's workforce accommodation facility, no vehicles will be accessing the Merotherie Road/Birriwa Bus Route South intersection as associated vehicles will turn right into the proposed access driveway before reaching the Merotherie Road/Birriwa Bus Route South intersection. Hence, there will be no cumulative traffic or impact associated with Merotherie Road/Birriwa Bus Route South intersection between the Birriwa Solar and Battery Project and the CWO REZ Transmission Project (Merotherie Energy Hub and Merotherie workforce accommodation facility).



Source: https://media.caapp.com.au/pdf/ZCcsXctIZH5m/e3eab40e-1ab2-4593-a2da-0af0d631064/Merotherie%20Transport%20Strategy.pdf

Figure 4.5 Temporary use of Birriwa Bus Route South during construction of the Merotherie Energy Hub and Merotherie workforce accommodation facility

In relation to the potential cumulative traffic impact on the Golden Highway/Merotherie Road intersection, table 5.5 of the Network Operator's TMP (ACEREZ 2025) states that there will be a maximum of 44 light vehicles and 33 heavy vehicles during the peak hours (Figure 4.6).

Site	Movement per hour			Movement per day		
	Light vehicle	Heavy vehicle	Total	Light vehicle	Heavy vehicle	Total
New Wollar Switching Station*	4	20	24	44	198	242
Merotherie Energy Hub and workforce accommodation camp	44	33	77	376	431	808
Neelys Lane workforce accommodation camp	32	24	56	296	70	366
Elong Elong Energy Hub*	4	20	24	44	198	242
330kV switching stations (typical)	12	1	13	34	38	72
Access gate (typical) (along transmission line)	12	20	32	148	194	342

Source:
https://media.caapp.com.au/pdf/TKXHMPOcqyfy/bb3bce0f-a86c-4a18-aebe-7a262271e405/Traffic%20and%20Transport%20Management%20Plan.pdf

Figure 4.6 Peak hourly and daily traffic movements for Merotherie Energy Hub and the Merotherie workforce accommodation facility

The Golden Highway/Merotherie Road intersection is currently being upgraded by the Network Operator as per the Traffic Management Plans, with a channelised left and right turn bays on the Golden Highway. This is the maximum order of turn treatment as per Austroads. Therefore, if construction traffic movements related to the project were to coincide with construction of the CWO REZ Transmission Project, given this intersection is being upgraded to the highest level of treatment, no further upgrade would be required.

Similarly, in relation to the upgrade of Merotherie Road (between the Golden Highway and Birriwa Bus Route South), the Austroads road width requirements relating to the cumulative effect of 90 daily vehicles from the project with the estimated 808 daily traffic volumes from the CWO REZ Transmission Project, would remain the same (see Table 5.54), and no additional upgrade would be required beyond that being undertaken by the Network Operator.

4.5 2029 baseline and construction traffic

Based on the anticipated 2029 baseline, construction and cumulative traffic volumes, the peak hour traffic volumes at Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South are presented in Figure 4.7.

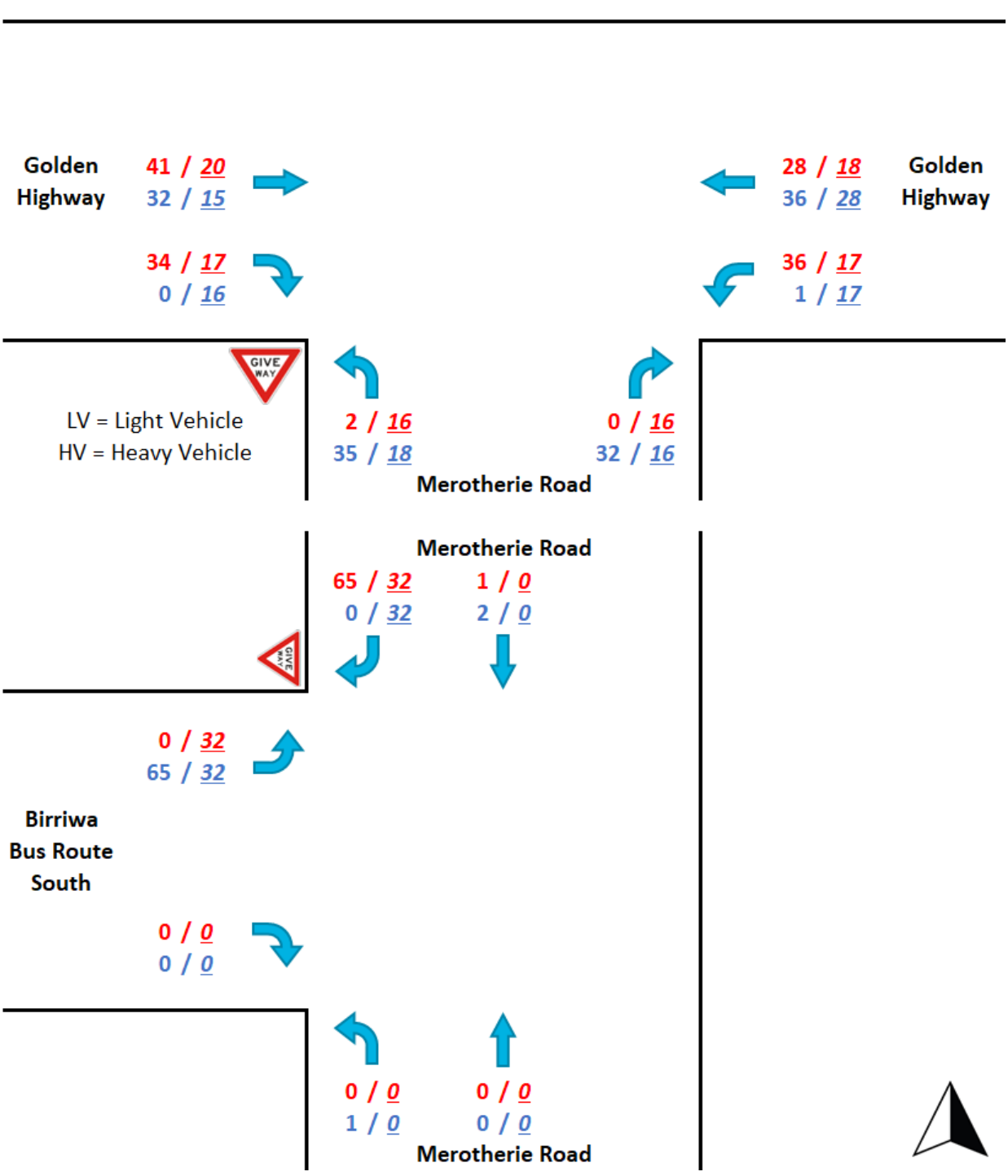


Figure 4.7 **2029 baseline + construction + cumulative traffic AM and PM peak hour traffic volumes**

4.6 Consultation with the road authorities and road users

Consultation occurred with Mid-Western Regional Council in relation to the road upgrade as part of this project. Council is generally supportive on the road design which is minimise the impacts on the roadside environment, and in particular on hollow bearing trees. It is agreed that the road design will be undertaken as per council satisfaction as stated in their letter dated 17 April 2025 (Attachment C).

Consultation also occurred with Warrumbungle Shire Council, although the modification does not involve any public road upgrades within the council area. Discussions were focuses on traffic numbers, maintenance requirements during construction of the project and the CWO REZ and timing of construction and operation of the project.

Ongoing consultation has also been occurring with users of the local road network, including the Central West Cycle Trail group and local residents.

Ongoing discussions with the Network Operator and with EnergyCo for a better coordination of construction traffic and efficiency of traffic control measures, including consistency in the preparation and implementation of the relevant Traffic Management Plans.

Detail of engagement and outcomes are outlined in section 5.4 of the Birriwa Solar and Battery Project Modification Report (EMM 2025).

5 Traffic impact assessment

5.1 Intersection performance

The key intersection has been modelled with the SIDRA Intersection 10 software, a micro-analytical tool for individual intersections and linked intersection-network modelling. The modelling is based on the cumulative traffic volumes presented in Figure 4.7. SIDRA provides the following performance indicators:

- Degree of saturation (DOS) – the total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (e.g. 0.8 = 80% saturation). In practice the target degrees of saturation of 0.90 for signals, 0.85 for roundabouts and 0.80 for unsignalised intersections are generally agreed to. These are usually called 'practical degrees of saturation'.
- Average delay (DEL) – the average delay in seconds encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- Level of service (LOS) – this is a categorisation of average delay, intended for simple reference.
- 95% queue lengths (Q95) – is defined to be the queue length in metres that has only a 5% probability of being exceeded during the analysed period. It transforms the average delay into measurable distance units.

The LOS is a good indicator of overall performance for individual intersections, with each level summarised in Table 5.1.

Table 5.1 Intersection LOS standards

Level of service	Average delay (seconds per vehicle)	Traffic signals, roundabout	Priority intersection ('Stop' and 'Give Way')
A	<14	Good operation	Good operations
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At traffic signals, incidents will cause extensive delays Roundabouts require other control mode	At capacity; required other control mode
F	>71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; required other control mode

Source: *RTA Guide to Traffic Generating Development* (RTA 2002)

SIDRA modelling for the key intersection has been conducted for the following scenarios:

- 2029 (Baseline) – surveyed traffic volumes only with 1.6% per annum linear growth.
- 2029 (Baseline + Construction + Cumulative) – combined surveyed and project traffic volumes.

The following abbreviations are used for the vehicle movements:

- TH: through movement
- LT: left turn
- RT: right turn.

The SIDRA results for the key intersections are presented in Section 5.1.1. Detailed SIDRA results can be found in Attachment B.

5.1.1 SIDRA modelling results

SIDRA results for Golden Highway/Merotherie Road are provided in Table 5.2.

Table 5.2 2029 SIDRA modelling result for Golden Highway/Merotherie Road intersection

Control: Priority controlled	AM peak					PM Peak				
Scenarios	**Intersection volume**	**DEL(s)**	**LOS**	**DOS**	**Q95 in m (approach)**	**Intersection volume**	**DEL(s)**	**LOS**	**DOS**	**Q95 in m (approach)**
Baseline	106	8.8	A	0.036	0.1 (RT from west)	108	9.4	A	0.040	0.2 (LT from south)
Baseline + project + cumulative	258	12.1	B	0.081	2.0 (RT from south)	259	10.9	B	0.099	1.7 (RT from west)

Key findings:

- In the AM and PM, the intersection performs satisfactorily within capacity with LOS A or B and DoS <0.1 for all scenarios.
- In the highest traffic (construction impacts) scenario, the intersection still has approximately 90% additional capacity after accommodating the additional traffic generated by the project.

SIDRA results for Merotherie Road/Birriwa Bus Route South are provided in Table 5.3.

Table 5.3 2026 SIDRA modelling result for Merotherie Road/Birriwa Bus Route South intersection

Control: Priority controlled	AM peak					PM Peak				
Scenarios	**Intersection volume**	**DEL(s)**	**LOS**	**DOS**	**Q95 in m (approach)**	**Intersection volume**	**DEL(s)**	**LOS**	**DOS**	**Q95 in m (approach)**
Baseline	6	7.8	A	0.001	N/A	7	7.8	A	0.002	N/A
Baseline + project (no cumulative traffic at this intersection)	140	10.4	B	0.067	1.6 (LT from west)	141	10.2	B	0.074	1.7 (RT from north)

Key findings:

- In the AM and PM, the intersection performs satisfactorily within capacity with LOS A or B and DoS <0.1 for all scenarios.
- In the highest traffic (construction impacts) scenario, the intersection still has approximately 90% additional capacity after accommodating the additional traffic generated by the project.

The details of the intersection results are attached in Attachment B.

5.2 Austroads turn warrant assessments

Intersection operations are assessed from a combination of the peak hourly through and turning traffic movements that occur at each intersection. This determines the need for additional intersection turning lanes (e.g. basic, auxiliary lane and channelised) in accordance with the current intersection design standards *Guide to Road Design Part 4a, Unsignalised and Signalised Intersections* (Austroads 2023, the Standard) (Figure 5.1), where:

- Curve 1 (red line) represents the boundary between a basic right turn (BAR) and a channelised short right turn (CHR(S)) turn treatment and between a basic left turn (BAL) and an auxiliary short left turn (AUL(S)) turn treatment.
- Curve 2 (blue line) represents the boundary between a CHR(S) and a full length CHR treatment and between an AUL(S) and a full length AUL or CHL treatment. The choice of CHL over an AUL will depend on factors such as the need to change the give way rule in favour of other manoeuvres at the intersection and the need to define more appropriately the driving path by reducing the area of bitumen surfacing.

Figure 5.1 contains two graphs for the selection of turn treatments on roads with a design speed more than or equal to 100 km/h, which is appropriate for high-speed rural roads.

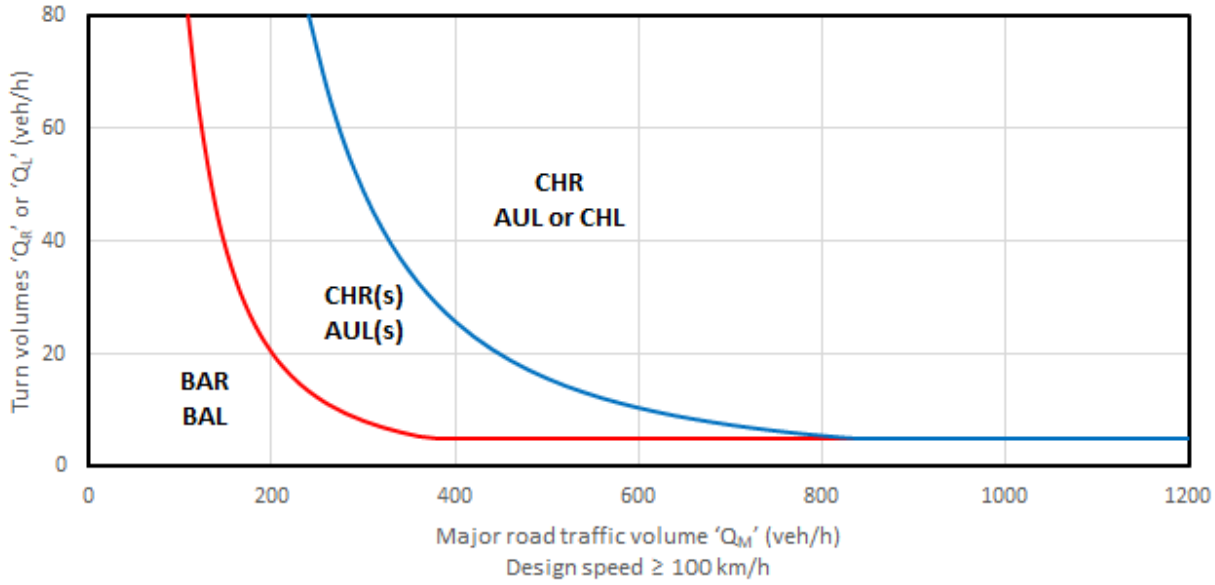


Figure 5.1 Austroads warrant design charts for high-speed rural intersection turning lanes

The Standard recommends intersections should be designed for a travel speed 10 km/h greater than the posted speed limit.

To ensure conservative results, the warrant for turn treatments was assessed using the 2029 baseline + construction + cumulative traffic volumes (Figure 4.7), representing the worst-case scenario.

5.2.1 Golden Highway/Merotherie Road based on the cumulative traffic

The Golden Highway near Merotherie Road has a speed limit of 100 km/h, and therefore a design speed of 110 km/h is considered. Future project vehicles are assumed to be coming from both the east and west on Golden Highway. Therefore, an assessment is required for both a possible left and right turn bay from Golden Highway. The left and right turn treatment warrant design charts for cumulative traffic are shown in Figure 5.2 and Figure 5.3.

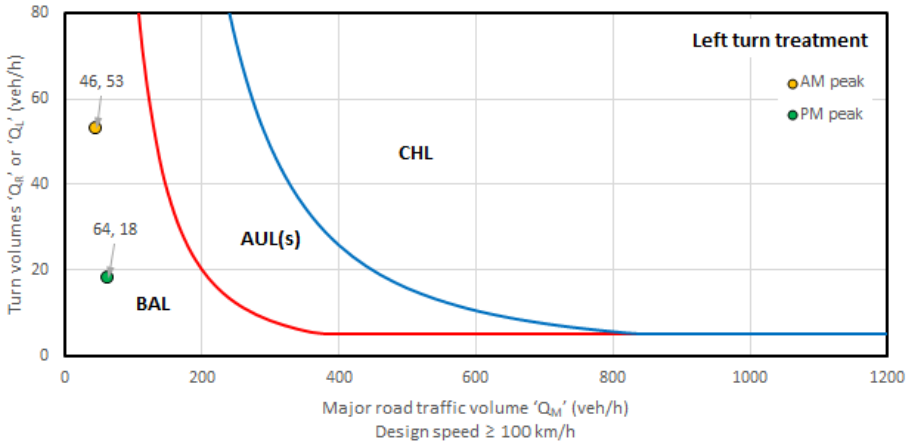
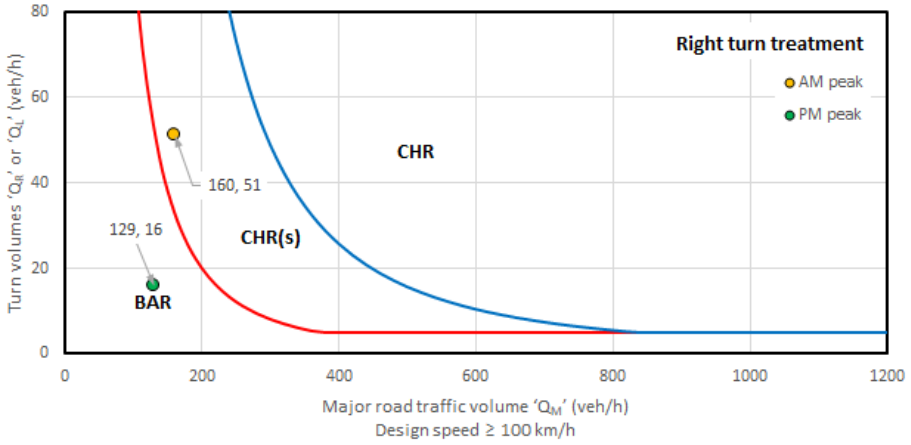


Figure 5.2 2029 Austroads warrant design chart for rural intersection left turning lane to Merotherie Road during the construction period

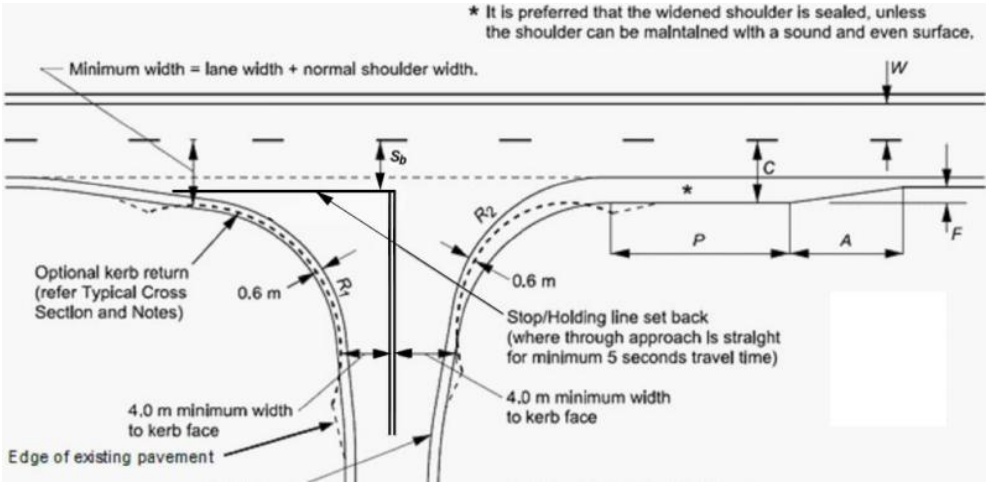


Source: Austroads

Figure 5.3 2029 Austroads warrant design chart for rural intersection right turning lane to Merotherie Road during the construction period

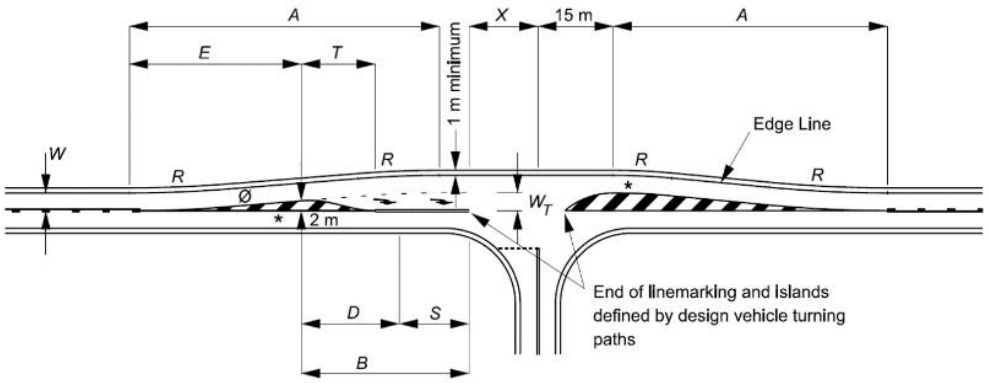
For 53 left turning vehicles and 46 westbound vehicles on Golden Highway during the AM peak hour, a BAL treatment is the minimum requirement. The existing intersection does not meet the minimum requirement. Therefore, shoulder widening will be required, as shown in Figure 5.4 based on the cumulative traffic. This widened shoulder will be 35-m-long plus an additional length for tapering.

For 51 right turning vehicles and 160 major road vehicles on Golden Highway during the AM peak hour, a CHR(s) treatment is the minimum requirement. The existing intersection does not meet the minimum requirement. Therefore, a short turn lane will be required, as shown in Figure 5.5 based on the cumulative traffic. This short turn lane will be 104-m-long.



Source: Austroads

Figure 5.4 BAL turn treatment



Source: Austroads

Figure 5.5 CHR(s) turn treatment

As stated earlier, EnergyCo is upgrading the Golden Highway/Merotherie Road intersection by providing a dedicated left and right turn bays. According to EnergyCo [6]website, this intersection upgrade has commenced on 28 May 2025 and expected to be completed within the next five weeks.

The intersection upgrade plans can be found at their Traffic and Transport Management Plan (refer to page 431 of 515): https://media.caapp.com.au/pdf/TKXHMPOcqyfy/bb3bce0f-a86c-4a18-aebe-7a262271e405/Traffic%20and%20Transport%20Management%20Plan.pdf

5.2.2 Merotherie Road/Birriwa Bus Route South

Merotherie Road near Birriwa Bus Route South has a speed limit of 100 km/h, and therefore a design speed of 110 km/h is considered. All vehicles are assumed to be coming from the north on Merotherie Road. Therefore, an assessment is required for a possible right turn bay from Merotherie Road for the development traffic only as there is no cumulative traffic at this intersection. The right turn treatment warrant design chart is shown in Figure 5.6.

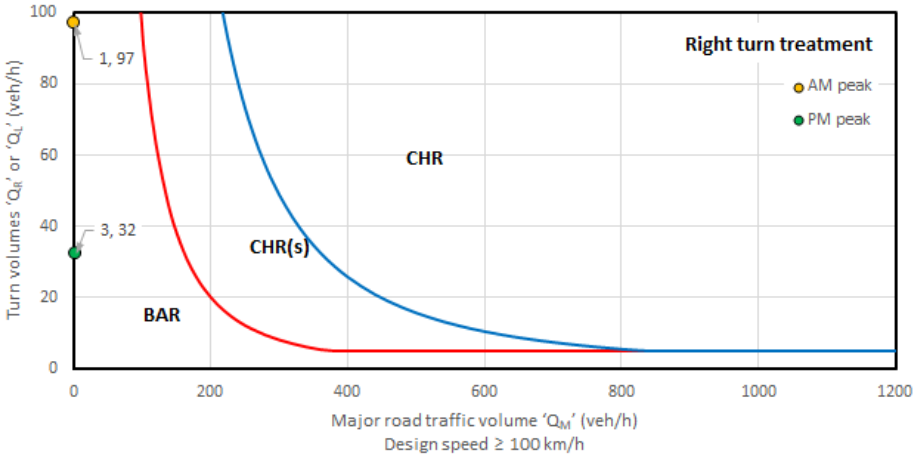
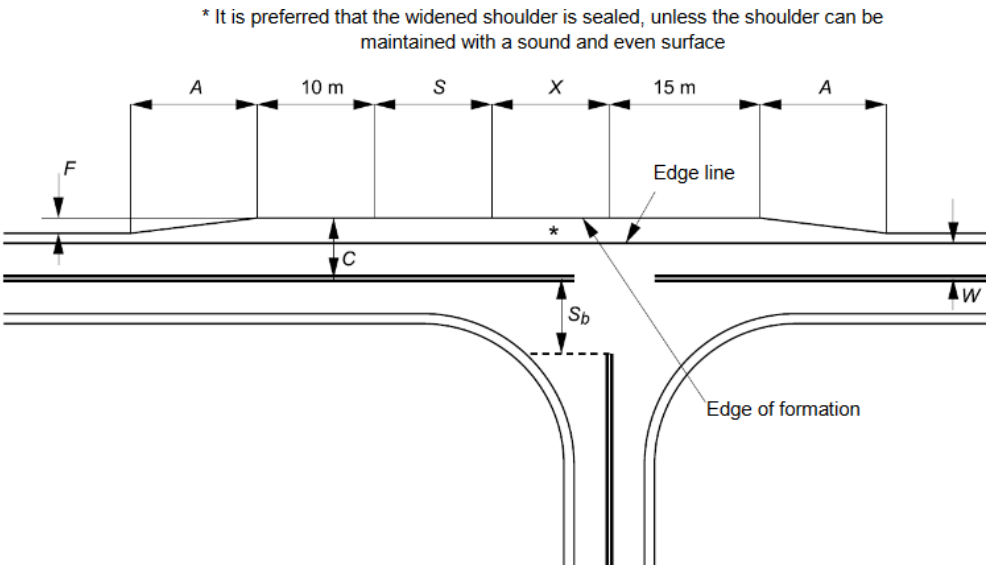


Figure 5.6 2029 Austroads warrant design chart for rural intersection right turning lane from Merotherie Road to Birriwa Bus Route South during the construction period

6 https://media.caapp.com.au/pdf/ybs02e/26c1a182-daa2-44aa-ae89-5cbc9f8349c7/Work%20notification%20-%20%20Merotherie%20Road%20and%20Golden%20Highway%20intersection%20upgrade.pdf

For 97 right turning vehicles and one major road vehicle on Merotherie Road during the AM peak hour, according to Austroads a BAR treatment is the minimum requirement. The existing intersection does not meet the minimum requirement. Therefore, shoulder widening will be required, as shown in Figure 5.7, in consultation with Council. According to Austroads, this widened shoulder should be 56.5-m-long plus an additional length for tapering.



Source: Austroads

Figure 5.7 Required BAR treatment

Given that Merotherie Road and Birriwa Bus Route South are local roads, the proposed intersection upgrade will be undertaken in consultation with Mid Western Regional Council. Correspondance from Mid-Western Regional Council regarding proposed road upgrades is provided in Attachment C.

5.3 Warrant for rural road upgrades

Road width design standards for sealed rural roads are defined by the *Austroads Guide to Road Design Part 3: Geometric Design* (Austroads 2023). These estimates are based on daily traffic volumes.

For the 2024 existing scenario (Figure 3.7), the total peak hour volumes (including AM and PM) are assumed to represent 10% of the daily traffic volumes on these roads. Therefore, the peak hour figures are multiplied by 10 to estimate the corresponding daily volumes. The 2029 baseline scenario is then derived by applying a 1.6% annual growth rate to the 2024 volumes. Additionally, daily construction traffic volumes in Table 4.1 are added to the 2029 baseline scenario to estimate the proposed construction peak scenario for the project.

Table 5.4 Austroads road design for rural road (sealed)

Threshold band (daily traffic volumes)	Design standard
1–150	8.7 m wide total carriage (if unsealed) or minimum 3.7 m wide seal
150–500	Minimum 7.2 m wide seal, consisting of 3.1 m wide traffic lanes and 0.5 m wide sealed shoulders on each side
500–1,000	Minimum 7.2 m, up to 8 m wide seal, consisting of 3.1–3.5 m wide traffic lanes and 0.5 m wide sealed shoulders on each side
1,000–3,000	Minimum 9 m wide seal, consisting of 3.5 m wide traffic lanes and 1.0 m wide sealed shoulders on each side

Threshold band (daily traffic volumes)	Design standard
> 3,000	Minimum 10 m wide seal, consisting of 3.5 m wide traffic lanes and 1.5 m wide sealed shoulders on each side

Source: Austroads Guide to Road Design Part 3: Geometric Design Table 4.5

The existing road width measurements, as well as the 2024 existing, 2029 baseline and 2029 baseline + construction daily traffic volumes of roads in the external road network, are presented in Table 5.5. As there is no other concurrent development traffic along Merotherie Road or Birriwa Bus Route South, there is no cumulative traffic (refer to Section 4.4.1 and Section 4.4.2).

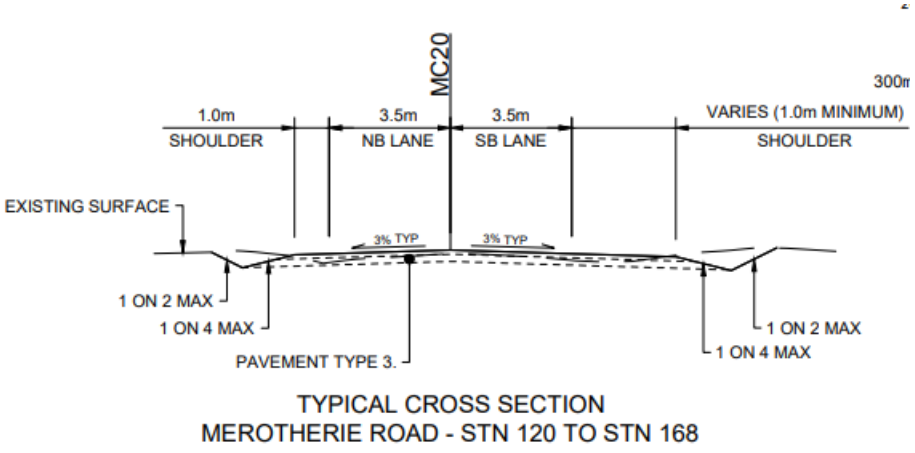
Table 5.5 Existing, baseline, baseline + construction daily traffic volumes and corresponding road design standards

Road	2024 existing daily traffic volume	2029 baseline daily traffic volume	2029 baseline + construction	Existing road width	Relevant design standard in accordance with proposed daily traffic volume	Will existing meet the design standard for proposed traffic?
Merotherie Road (between Golden Highway and Birriwa Bus Route South)	150	162	604	Varies but minimum 8.5 m unsealed	Minimum 7.2 m, up to 8 m wide seal	No
Birriwa Bus Route South (between Merotherie Road and site access)	10	11	453	Varies but minimum 5 m unsealed	Minimum 7.2 m wide seal	No

Note: According to Austroads, a minimum 7.0 m seal should be provided on designated heavy vehicle routes (or where the AADT contains more than 15% heavy vehicles).

5.3.1 Upgrade of Merotherie Road

As stated earlier, the network operator of CWO Renewable Energy Zone Transmission Project (Merotherie Energy Hub) is upgrading the relevant section of Merotherie Road to 9 m seal width 3.5 m wide travel lanes and 1 m sealed shoulders on both sides (Figure 5.8). This road upgrade is expected to be complete before the commencement of the project.



Source: https://media.caapp.com.au/pdf/ZCcsXctIZH5m/e3eab40e-1ab2-4593-a2da-e0af0d631064/Merotherie%20Transport%20Strategy.pdf (see Page 52/100)

Figure 5.8 Typical cross section of Merotherie Road

5.3.2 Upgrade of Birriwa Bus Route South

An upgrade of Birriwa Bus Route South between the intersection of Merotherie Road and the proposed alternative access point will be required to facilitate project related traffic. The proposed upgrades have been carefully designed to avoid significant impacts on both biodiversity and heritage. ACEN has discussed the required upgrades with Mid Western Regional Council who generally support the design solution, which is as follows:

- in relation to to the road desgin, roadside environment is to be considered
- the road design needs to comply with Austroads guideline. Where there is a departure from from the guideline, the road design needs to be supported by a Road Safety Audit (RSA)
- council wishes to reivew the draft desgin, RSA and any requested concessions before endorsing the final design package.

The letter from Council, dated 17 April 2025, is appended in Attachment C.

5.4 Traffic management plan along Birriwa Bus Route South

There are a number of bends along Birriwa Bus Route South between Merotherie Road and the proposed alternative project access point, which will necessitate the use of traffic controls to enable safe and efficient traffic flow.

Traffic controls will therefore be implemented along Birriwa Bus Route South during construction of the project, including but not limited to people control, control lights, signs and variable message boards. The traffic control will take into considerations other concurrent traffic management measures in the area, e.g. CWO REZ Infrastructure or other renewable energy projects, in particular the Network Operator's Traffic and Transport Management Plan (ACEREZ 2025). The Network Operator is currently upgrading the Golden Highway/Merotherie Road intersection and Meroetherie Road to comply with relevant standards and in accordance with the Network Operator's Transport and Traffic Management Plan and the Merotherie Transport Strategy, which were both released in late May 2025.

5.5 Road safety assessment

In accordance with *Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections)* (Austroads, 2023), all unsignalised T-intersections need to have clear visibility between the through traffic travelling on the major road and the turning traffic exiting from the minor road, so that the turning traffic can observe gaps to turn safely to merge with the major road traffic. This visibility measurement is called sight distance.

This is assessed in further detail below, in terms of the safe intersection sight distance (SISD) at the intersection, which varies according to the design speed of the road. Normally a design speed 10 km/h higher than the posted speed limit is used to calculate the SISD.

5.5.1 Golden Highway/Merotherie Road intersection

The Golden Highway has a speed limit of 100 km/h near the Merotherie Road intersection and therefore a presumed design speed of 110 km/hr is considered. In accordance with Austroads (2023), for a road with a design speed of 110 km/h, the minimum SISD required for a general minimum 2.5 second driver reaction time is 300 m.

The sight distances on Golden Highway from Merotherie Road have been estimated based on the line of sight, as shown in Figure 5.9. Based on the sight distance analysis, the sight distances to the left and right both meet the minimum requirement (300 m) as stipulated in Austroads (2023).

Sight distance to the left (300 m+)

Sight distance to the right (300 m+)

Figure 5.9 Sight distance from Merotherie Road to Golden Highway

5.5.2 Merotherie Road/Birriwa Bus Route South intersection

The Merotherie Road has a speed limit of 100 km/h near the Birriwa Bus Route South intersection and therefore a presumed design speed of 110 km/hr is considered. Like the Golden Highway, a minimum SISD required for a general minimum 2.5 second driver reaction time is 300 m.

The sight distances on Merotherie Road from Birriwa Bus Route South have been estimated based on the line of sight, as shown in Figure 5.10. Based on the sight distance analysis, a number of mature trees may require removal on the western side of Merotherie Road as circled in Figure 5.10, as per the final design to the satisfaction of Council.

A 300 m sight distance requirement to the left

A 300 m sight distance requirement to the right

Figure 5.10 Sight distance from Birriwa Bus Route South to Merotherie Road

5.6 Over Size Over Mass assessments

The modification does not propose any changes to the access route for over size over mass (OSOM) vehicles to the project site, which will remain via the Castlereagh Highway/Barneys Reef Road/Birriwa Bus Route South. No further assessment is therefore required.

5.7 Parking assessment

As the construction workforce will be transported to the site by shuttle buses, there will be minimal parking demand due to the construction of the accommodation facility. However, for any site personnel or construction contractors visiting by private vehicles, there will be ample open spaces to park within the project area, hence there will not be any parking impact on Birriwa Bus Route South.

5.8 Traffic management plan

A Traffic Management Plan (TMP) will be prepared in accordance with the approval conditions which will include a Drivers Code of Conduct and will consider the Network Operator's Traffic and Transport Management Plan traffic measures, where relevant (ACEREZ 2025). The plan will include documentation to ensure general traffic, construction workers, school bus, public transport and cyclist safety.

6 Mitigation measures

6.1 Construction phase

The proposed traffic management mitigation measures for the construction phase of the project are outlined in Table 6.1.

Table 6.1 Construction phase mitigation measures

Requirement	Mitigation measure	Timing
Golden Highway/Merotherie Road intersection upgrade	This intersection is being upgraded by the Network Operator as part of EnergyCo CWO Renewable Energy Zone Transmission project (Merotherie Energy Hub). No additional mitigation measures are proposed for the project.	Q3 - 2025
Merotherie Road upgrade between Golden Highway and Birriwa Bus Route South	Merotherie Road will be upgraded as part of EnergyCo CWO Renewable Energy Zone Transmission project (Merotherie Energy Hub). No additional mitigation measures are proposed for the Project.	Q2-Q3 - 2025
Merotherie Road/Birriwa Bus Route South intersection upgrade	ACEN will upgrade the intersection to Mid-Western Regional Council's satisfaction.	Pre-construction
Birriwa Bus Route South road upgrade	ACEN will upgrade the portion of Birriwa Bus Route South between Merotherie Road and the proposed alternative access point to Mid-Western Regional Council's satisfaction, in line with design considerations agreed between ACEN and Council (refer to correspondence in Attachment C).	Pre-construction
Worksite traffic control and confirmation of other management measures	A TMP will be developed in consultation with Mid-Western Regional Council, prior to the commencement of road upgrades and construction of the project. The TMP will include a Driver Code of Conduct addressing: • informing drivers about the school bus routes along Golden Highway, Merotherie Road and Birriwa Bus Route South • direction to avoid compression braking near residential receptors • direction to avoid heavy vehicle trips during school zone times (8.00 am to 9.30 am and 2.30 pm to 4.00 pm), where possible • in consultation with relevant councils and road authorities, install school bus signs at suitable locations along construction routes if necessary to warn heavy vehicle drivers of student drop-off and pick-up areas • responding to local climate conditions that may affect road safety such as fog, dust and wet weather. The TMP will be prepared by suitably qualified persons in accordance with the TfNSW 2022 *Traffic Control at Work Sites Manual*.	Pre-construction

Requirement	Mitigation measure	Timing
Cyclist safety along cycle trail, e.g. Birriwa Bus Route South	Mitigation measures to minimise impacts on the relevant parts of the cycle trail that may be affected by project traffic include: • in consultation with the CWC Trail Inc, a signage plan will be prepared, highlighting the CWCT within and in the vicinity of the project • within the site induction and driver's code of conduct, the CWCT will be highlighted to increase awareness of cyclists' presence in the area • in site-specific circumstances, e.g. peak construction activities, a traffic controller may be required to manage the vehicular traffic and cyclists which is subject to site supervisor's safety assessment and discretion • a dedicated phone number will be provided for CWCT users to call confirm safe passage before using the trail during peak construction periods. This phone number will be listed on a sign approximately 1 km from the start of construction and on the CWCT website • safe pull over bays for bicycles will be identified along the construction route, which would move depending on the construction schedule. • provision of speed management strategies.	Pre-construction
Road maintenance	A road maintenance program will be developed in consultation with the relevant road authorities to be undertaken during construction and will include route inspections of all the affected local roads. Any new road pavement damage which occurs to these roads during the project construction period from construction activities, which represent a potential traffic safety risk to the travelling public, will be restored to their pre-construction condition at the completion of construction.	Pre-construction and during construction

7 Summary and conclusion

It is anticipated that construction of the project will take approximately 28 months. The peak construction workforce will comprise approximately 650 people, most residing in the onsite accommodation facility. Around 10% of this peak workforce has been assumed to be local workers and therefore are assumed to be driving to/from the site during the peak traffic hours.

The modification seeks to increase the total number of daily vehicle movements to and from the site during pre-construction and construction, from 120 to 156 daily heavy vehicle trips, split between the approved access via Barneys Reef Road and the proposed alternative access via Merotherie Road. It is anticipated that up to 90 heavy vehicles of the 156 will access the site per day via the alternative Merotherie Road access during peak periods. These peak movements via the alternative access will not coincide with the peak movements along the approved access route via Barneys Reef Road, such that the combined total heavy vehicles travelling to and from the site on any given day during pre-construction and construction will not exceed 156 (i.e. 312 movements). OSOM vehicles will continue to access the site via the approved access off the Castlereagh Highway and Barneys Reef Road.

The proposed alternative access route will be used primarily for pre-construction and construction access to the accommodation facility and BESS, while the approved access will be primarily used for construction of the solar infrastructure and BESS.

The impact of project-related vehicles on the key intersections—Golden Highway/Merotherie Road, and Merotherie Road/Birriwa Bus Route South—has been assessed. While daily heavy vehicle movements will not exceed 90 trips/180 movements along the alternative access route, this traffic assessment has considered the conservative scenario of all heavy vehicles travelling via the alternative Merotherie Road access route during pre-construction and construction, to ensure full sensitivity testing. Under this scenario, SIDRA modelling indicates that the LOS at these intersections will be either LOS A (existing) or LOS B (with development), with approximately 90% spare capacity available to accommodate additional traffic under the proposed development traffic scenario.

Sight distances for approaching traffic to both the left and right at these intersections currently meet the minimum requirements at Golden Highway/Merotherie Road intersection as outlined in the *Austroads Guide to Road Design*. However, the required sight distance does not meet the minimum requirements at Merotherie Road/Birriwa Bus Route South intersection. To achieve the minimum sight distance, a number of existing trees need to be removed on the western side of Merotherie Road.

Road and intersection upgrades will be required to accommodate the increased traffic associated with the construction phase. These upgrades will be required at the Golden Highway/Merotherie Road and Merotherie Road/Birriwa Bus Route South intersections, as well as along both Merotherie Road and Birriwa Bus Route South.

As part of the EnergyCo CWO REZ Transmission Project (Merotherie Energy Hub), the Golden Highway/Merotherie Road intersection upgrade has commenced and is expected to be completed in Q3 2025. Subsequently, Merotherie Road will be upgraded by part of this project.

As part of this project ACEN will undertake the following:

- Upgrade the Merotherie Road/Birriwa Bus Route South intersection, as per the requirements of Mid-Western Regional Council.
- Upgrade Birriwa Bus Route South between Merotherie Road and the alternative site access, as per the requirements of Mid-Western Regional Council.
- Implement mitigation measures to ensure cyclist safety along Birriwa Bus Route South.
- Prepare and implement a construction TMP including a Driver Code of Conduct in accordance with the project approval conditions.

References

Australian Standard. (2018). *Parking facilities Part 2: Off-street commercial vehicle facilities.*

Austroads. (2016). *Guide to Road Design Part 3: Geometric Design.*

Austroads. (2020). *Guide to Traffic Management Part 3: Transport Study and Analysis Methods.*

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Attachment A

Traffic counts

EMM
creating opportunities

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Golden Hwy and Merotherie Rd, Leadvill

GPS *-32.088044, 149.584431*

Date:	Wed 21/02/24
Weather:	Fine
Suburban:	Leadville
Customer:	N/A

North:	N/A
East:	Golden Hwy
South:	Merotherie Rd
West:	Golden Hwy

Survey Period	AM:	7:00 AM-12:00 PM
	PM:	12:00 PM-6:00 PM
Traffic Peak	AM:	10:30 AM-11:30 AM
	PM:	12:00 PM-1:00 PM

All Vehicles

Time		East Approach Golden Hwy			South Approach Merotherie			West Approach Golden Hwy			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	0	0	0	0	3	0	0	7	43	
7:15	7:30	0	3	0	0	0	0	0	0	4	42	
7:30	7:45	0	3	1	0	0	1	0	1	9	54	
7:45	8:00	0	1	1	0	0	1	0	1	7	54	
8:00	8:15	0	4	0	1	0	0	0	0	4	61	
8:15	8:30	0	9	1	0	0	1	0	1	7	64	
8:30	8:45	0	4	3	0	1	0	0	0	7	63	
8:45	9:00	0	11	3	0	0	1	0	0	3	63	
9:00	9:15	0	3	0	0	0	2	0	0	7	65	
9:15	9:30	0	4	0	0	0	0	0	3	11	74	
9:30	9:45	0	5	0	0	0	0	0	0	10	71	
9:45	10:00	0	6	0	0	1	0	0	0	13	81	
10:00	10:15	0	8	0	0	1	2	0	0	10	82	
10:15	10:30	0	7	0	0	0	0	0	1	7	80	
10:30	10:45	0	10	2	0	0	1	0	0	12	93	Peak
10:45	11:00	0	7	0	0	0	1	0	1	12	84	
11:00	11:15	0	7	1	0	0	0	0	1	10	82	
11:15	11:30	0	10	2	0	0	0	0	0	16		
11:30	11:45	0	4	0	0	0	1	0	1	10		
11:45	12:00	0	5	0	0	1	0	0	0	13		
12:00	12:15	0	15	0	0	0	0	0	0	10	93	Peak
12:15	12:30	0	19	2	0	0	1	0	0	7	83	
12:30	12:45	0	9	0	0	0	2	0	0	11	71	
12:45	13:00	0	9	0	0	0	1	0	0	7	72	
13:00	13:15	0	5	0	0	0	0	0	1	9	80	
13:15	13:30	0	11	0	0	0	0	0	1	5	86	
13:30	13:45	0	14	0	0	0	0	0	1	8	89	
13:45	14:00	0	11	1	0	0	0	0	0	13	83	
14:00	14:15	0	9	0	0	0	1	0	1	10	72	
14:15	14:30	0	12	0	0	1	0	0	0	7	76	
14:30	14:45	0	9	0	0	0	2	0	0	6	67	
14:45	15:00	0	9	0	0	0	0	0	0	5	73	
15:00	15:15	0	15	0	0	0	0	0	0	10	76	
15:15	15:30	0	4	0	0	0	0	0	0	7	67	

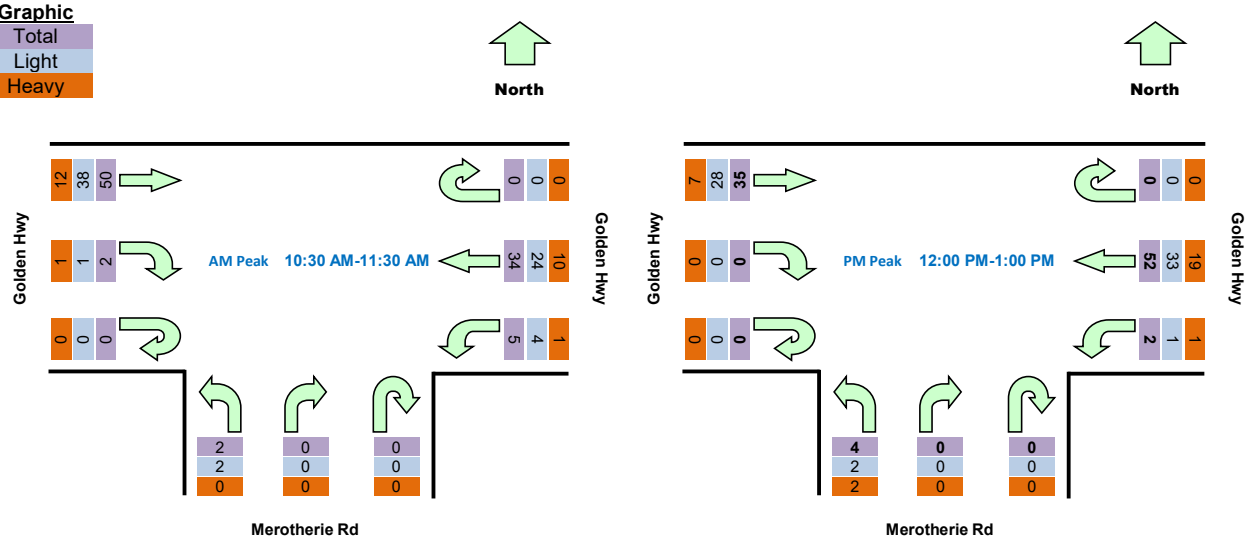
15:30	15:45	0	12	0	0	0	1	0	1	9	73	
15:45	16:00	0	5	0	0	0	2	0	1	9	62	
16:00	16:15	0	6	0	0	0	1	0	0	9	57	
16:15	16:30	0	8	0	0	0	2	0	0	7	53	
16:30	16:45	0	5	0	0	0	0	0	1	6	62	
16:45	17:00	0	4	0	0	0	0	0	1	7	68	
17:00	17:15	0	5	0	0	1	0	0	0	6	64	
17:15	17:30	0	10	0	0	0	1	0	0	15		
17:30	17:45	0	8	0	0	0	0	0	2	8		
17:45	18:00	0	2	0	0	0	1	0	1	4		

Peak Time		East Approach Golden Hwy			South Approach Merotherie			West Approach Golden Hwy			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
10:30	11:30	0	34	5	0	0	2	0	2	50	93
12:00	13:00	0	52	2	0	0	4	0	0	35	93

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Light Vehicles

Time		East Approach Golden Hwy			South Approach Merotherie			West Approach Golden Hwy		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	0	0	0	0	3	0	0	4
7:15	7:30	0	2	0	0	0	0	0	0	2
7:30	7:45	0	3	1	0	0	1	0	1	8
7:45	8:00	0	1	1	0	0	1	0	1	4
8:00	8:15	0	3	0	1	0	0	0	0	3
8:15	8:30	0	7	1	0	0	1	0	1	7
8:30	8:45	0	3	2	0	1	0	0	0	2
8:45	9:00	0	8	1	0	0	1	0	0	2
9:00	9:15	0	3	0	0	0	2	0	0	5
9:15	9:30	0	2	0	0	0	0	0	2	10
9:30	9:45	0	4	0	0	0	0	0	0	8
9:45	10:00	0	4	0	0	1	0	0	0	8

10:00	10:15	0	5	0	0	0	2	0	0	9
10:15	10:30	0	5	0	0	0	0	0	1	7
10:30	10:45	0	7	1	0	0	1	0	0	9
10:45	11:00	0	5	0	0	0	1	0	0	10
11:00	11:15	0	4	1	0	0	0	0	1	6
11:15	11:30	0	8	2	0	0	0	0	0	13
11:30	11:45	0	1	0	0	0	1	0	1	6
11:45	12:00	0	3	0	0	1	0	0	0	11
12:00	12:15	0	8	0	0	0	0	0	0	8
12:15	12:30	0	12	1	0	0	1	0	0	7
12:30	12:45	0	4	0	0	0	1	0	0	10
12:45	13:00	0	9	0	0	0	0	0	0	3
13:00	13:15	0	3	0	0	0	0	0	0	5
13:15	13:30	0	8	0	0	0	0	0	1	2
13:30	13:45	0	11	0	0	0	0	0	1	6
13:45	14:00	0	9	1	0	0	0	0	0	8
14:00	14:15	0	9	0	0	0	0	0	1	6
14:15	14:30	0	10	0	0	1	0	0	0	2
14:30	14:45	0	7	0	0	0	1	0	0	5
14:45	15:00	0	7	0	0	0	0	0	0	3
15:00	15:15	0	13	0	0	0	0	0	0	10
15:15	15:30	0	3	0	0	0	0	0	0	5
15:30	15:45	0	6	0	0	0	0	0	1	6
15:45	16:00	0	4	0	0	0	2	0	1	7
16:00	16:15	0	5	0	0	0	1	0	0	5
16:15	16:30	0	5	0	0	0	2	0	0	4
16:30	16:45	0	3	0	0	0	0	0	1	4
16:45	17:00	0	2	0	0	0	0	0	0	5
17:00	17:15	0	3	0	0	1	0	0	0	6
17:15	17:30	0	6	0	0	0	0	0	0	10
17:30	17:45	0	4	0	0	0	0	0	1	4
17:45	18:00	0	1	0	0	0	1	0	1	2

Peak Time		East Approach Golden Hwy			South Approach Merotherie H			West Approach Golden Hwy			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
10:30	11:30	0	24	4	0	0	2	0	1	38	69
12:00	13:00	0	33	1	0	0	2	0	0	28	64

Heavy Vehicles

Time		East Approach Golden Hwy			South Approach Merotherie H			West Approach Golden Hwy		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:00	7:15	0	0	0	0	0	0	0	0	3
7:15	7:30	0	1	0	0	0	0	0	0	2
7:30	7:45	0	0	0	0	0	0	0	0	1
7:45	8:00	0	0	0	0	0	0	0	0	3
8:00	8:15	0	1	0	0	0	0	0	0	1
8:15	8:30	0	2	0	0	0	0	0	0	0

8:30	8:45	0	1	1	0	0	0	0	0	5
8:45	9:00	0	3	2	0	0	0	0	0	1
9:00	9:15	0	0	0	0	0	0	0	0	2
9:15	9:30	0	2	0	0	0	0	0	1	1
9:30	9:45	0	1	0	0	0	0	0	0	2
9:45	10:00	0	2	0	0	0	0	0	0	5
10:00	10:15	0	3	0	0	1	0	0	0	1
10:15	10:30	0	2	0	0	0	0	0	0	0
10:30	10:45	0	3	1	0	0	0	0	0	3
10:45	11:00	0	2	0	0	0	0	0	1	2
11:00	11:15	0	3	0	0	0	0	0	0	4
11:15	11:30	0	2	0	0	0	0	0	0	3
11:30	11:45	0	3	0	0	0	0	0	0	4
11:45	12:00	0	2	0	0	0	0	0	0	2
12:00	12:15	0	7	0	0	0	0	0	0	2
12:15	12:30	0	7	1	0	0	0	0	0	0
12:30	12:45	0	5	0	0	0	1	0	0	1
12:45	13:00	0	0	0	0	0	1	0	0	4
13:00	13:15	0	2	0	0	0	0	0	1	4
13:15	13:30	0	3	0	0	0	0	0	0	3
13:30	13:45	0	3	0	0	0	0	0	0	2
13:45	14:00	0	2	0	0	0	0	0	0	5
14:00	14:15	0	0	0	0	0	1	0	0	4
14:15	14:30	0	2	0	0	0	0	0	0	5
14:30	14:45	0	2	0	0	0	1	0	0	1
14:45	15:00	0	2	0	0	0	0	0	0	2
15:00	15:15	0	2	0	0	0	0	0	0	0
15:15	15:30	0	1	0	0	0	0	0	0	2
15:30	15:45	0	6	0	0	0	1	0	0	3
15:45	16:00	0	1	0	0	0	0	0	0	2
16:00	16:15	0	1	0	0	0	0	0	0	4
16:15	16:30	0	3	0	0	0	0	0	0	3
16:30	16:45	0	2	0	0	0	0	0	0	2
16:45	17:00	0	2	0	0	0	0	0	1	2
17:00	17:15	0	2	0	0	0	0	0	0	0
17:15	17:30	0	4	0	0	0	1	0	0	5
17:30	17:45	0	4	0	0	0	0	0	1	4
17:45	18:00	0	1	0	0	0	0	0	0	2

Peak Time		**East Approach Golden Hwy**			**South Approach Merotherie H**			**West Approach Golden Hwy**			**Peak**
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB	**total**
10:30	11:30	0	10	1	0	0	0	0	1	12	24
12:00	13:00	0	19	1	0	0	2	0	0	7	29

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Birriwa Bus Rte S and Merotherie Rd, Me

GPS *-32.135505, 149.576007*

Date:	Wed 21/02/24
Weather:	Fine
Suburban:	Merotherie
Customer:	N/A

North:	Merotherie Rd
East:	N/A
South:	Merotherie Rd
West:	Birriwa Bus Rte S

Survey Period	AM:	7:00 AM-12:00 PM
	PM:	12:00 PM-6:00 PM
Traffic Peak	AM:	7:00 AM-8:00 AM
	PM:	3:30 PM-4:30 PM

All Vehicles

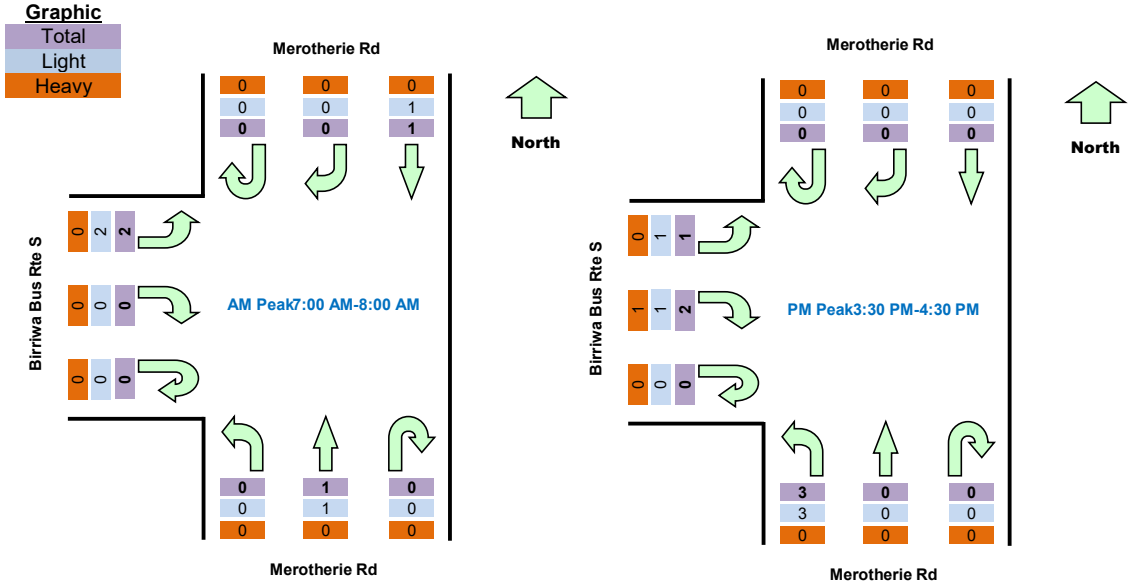
Time		orth Approach Merotherie			outh Approach Merotherie			st Approach Birriwa Bus R			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
7:00	7:15	0	0	0	0	1	0	0	0	1	4	Peak
7:15	7:30	0	0	0	0	0	0	0	0	1	3	
7:30	7:45	0	0	1	0	0	0	0	0	0	2	
7:45	8:00	0	0	0	0	0	0	0	0	0	1	
8:00	8:15	0	0	1	0	0	0	0	0	0	2	
8:15	8:30	0	0	0	0	0	0	0	0	0	1	
8:30	8:45	0	0	0	0	0	0	0	0	0	1	
8:45	9:00	0	0	1	0	0	0	0	0	0	1	
9:00	9:15	0	0	0	0	0	0	0	0	0	1	
9:15	9:30	0	0	0	0	0	0	0	0	0	2	
9:30	9:45	0	0	0	0	0	0	0	0	0	2	
9:45	10:00	0	0	0	0	0	0	0	0	1	2	
10:00	10:15	0	0	0	0	0	0	0	1	0	1	
10:15	10:30	0	0	0	0	0	0	0	0	0	1	
10:30	10:45	0	0	0	0	0	0	0	0	0	1	
10:45	11:00	0	0	0	0	0	0	0	0	0	2	
11:00	11:15	0	0	1	0	0	0	0	0	0	3	
11:15	11:30	0	0	0	0	0	0	0	0	0		
11:30	11:45	0	0	1	0	0	0	0	0	0		
11:45	12:00	0	0	0	0	0	0	0	1	0		
12:00	12:15	0	0	2	0	0	0	0	0	0	3	
12:15	12:30	0	0	0	0	0	0	0	0	0	1	
12:30	12:45	0	0	0	0	0	0	0	0	0	3	
12:45	13:00	0	0	0	0	0	1	0	0	0	5	
13:00	13:15	0	0	0	0	0	0	0	0	0	5	
13:15	13:30	0	1	0	0	0	1	0	0	0	5	
13:30	13:45	0	0	0	0	0	1	0	1	0	4	
13:45	14:00	0	0	0	0	0	1	0	0	0	2	
14:00	14:15	0	0	0	0	0	0	0	0	0	1	
14:15	14:30	0	1	0	0	0	0	0	0	0	1	
14:30	14:45	0	0	0	0	0	0	0	0	0	0	
14:45	15:00	0	0	0	0	0	0	0	0	0	0	
15:00	15:15	0	0	0	0	0	0	0	0	0	3	
15:15	15:30	0	0	0	0	0	0	0	0	0	4	

15:30	15:45	0	0	0	0	0	0	0	0	0	6	Peak
15:45	16:00	0	0	0	0	0	2	0	1	0	6	Peak
16:00	16:15	0	0	0	0	0	1	0	0	0	4	
16:15	16:30	0	0	0	0	0	0	0	1	1	6	Peak
16:30	16:45	0	0	0	0	0	0	0	0	0	5	
16:45	17:00	0	0	0	0	1	0	0	0	0	5	
17:00	17:15	0	0	0	0	0	1	0	1	1	4	
17:15	17:30	0	0	0	0	1	0	0	0	0		
17:30	17:45	0	0	0	0	0	0	0	0	0		
17:45	18:00	0	0	0	0	0	0	0	0	0		

Peak Time		orth Approach Merotherie			outh Approach Merotherie			st Approach Birriwa Bus R			Peak
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	total
7:00	8:00	0	0	1	0	1	0	0	0	2	4
15:30	16:30	0	0	0	0	0	3	0	2	1	6

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic



Light Vehicles

Time		orth Approach Merotherie			outh Approach Merotherie			st Approach Birriwa Bus R		
Period Start	Period End	U	R	SB	U	NB	L	U	R	L
7:00	7:15	0	0	0	0	1	0	0	0	1
7:15	7:30	0	0	0	0	0	0	0	0	1
7:30	7:45	0	0	1	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	1	0	0	0	0	0	0
8:15	8:30	0	0	0	0	0	0	0	0	0
8:30	8:45	0	0	0	0	0	0	0	0	0
8:45	9:00	0	0	1	0	0	0	0	0	0
9:00	9:15	0	0	0	0	0	0	0	0	0
9:15	9:30	0	0	0	0	0	0	0	0	0
9:30	9:45	0	0	0	0	0	0	0	0	0
9:45	10:00	0	0	0	0	0	0	0	0	1

10:00	10:15	0	0	0	0	0	0	0	1	0
10:15	10:30	0	0	0	0	0	0	0	0	0
10:30	10:45	0	0	0	0	0	0	0	0	0
10:45	11:00	0	0	0	0	0	0	0	0	0
11:00	11:15	0	0	1	0	0	0	0	0	0
11:15	11:30	0	0	0	0	0	0	0	0	0
11:30	11:45	0	0	1	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0	1	0
12:00	12:15	0	0	2	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	1	0	0	0
13:00	13:15	0	0	0	0	0	0	0	0	0
13:15	13:30	0	1	0	0	0	1	0	0	0
13:30	13:45	0	0	0	0	0	1	0	1	0
13:45	14:00	0	0	0	0	0	0	0	0	0
14:00	14:15	0	0	0	0	0	0	0	0	0
14:15	14:30	0	1	0	0	0	0	0	0	0
14:30	14:45	0	0	0	0	0	0	0	0	0
14:45	15:00	0	0	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	2	0	0	0
16:00	16:15	0	0	0	0	0	1	0	0	0
16:15	16:30	0	0	0	0	0	0	0	1	1
16:30	16:45	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	1	0	0	0	0
17:00	17:15	0	0	0	0	0	1	0	1	0
17:15	17:30	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0

Peak Time		orth Approach Merotherie R			outh Approach Merotherie R			st Approach Birriwa Bus R			Peak
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	total
7:00	8:00	0	0	1	0	1	0	0	0	2	4
15:30	16:30	0	0	0	0	0	3	0	1	1	5

Heavy Vehicles

Time		orth Approach Merotherie R			outh Approach Merotherie R			st Approach Birriwa Bus R		
Period Start	Period End	U	R	SB	U	NB	L	U	R	L
7:00	7:15	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	0	0	0	0	0	0
8:15	8:30	0	0	0	0	0	0	0	0	0

8:30	8:45	0	0	0	0	0	0	0	0	0
8:45	9:00	0	0	0	0	0	0	0	0	0
9:00	9:15	0	0	0	0	0	0	0	0	0
9:15	9:30	0	0	0	0	0	0	0	0	0
9:30	9:45	0	0	0	0	0	0	0	0	0
9:45	10:00	0	0	0	0	0	0	0	0	0
10:00	10:15	0	0	0	0	0	0	0	0	0
10:15	10:30	0	0	0	0	0	0	0	0	0
10:30	10:45	0	0	0	0	0	0	0	0	0
10:45	11:00	0	0	0	0	0	0	0	0	0
11:00	11:15	0	0	0	0	0	0	0	0	0
11:15	11:30	0	0	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0	0	0
13:30	13:45	0	0	0	0	0	0	0	0	0
13:45	14:00	0	0	0	0	0	1	0	0	0
14:00	14:15	0	0	0	0	0	0	0	0	0
14:15	14:30	0	0	0	0	0	0	0	0	0
14:30	14:45	0	0	0	0	0	0	0	0	0
14:45	15:00	0	0	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	1	0
16:00	16:15	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	1
17:15	17:30	0	0	0	0	1	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0

Peak Time		orth Approach Merotherie			outh Approach Merotherie			st Approach Birriwa Bus R			Peak
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	total
7:00	8:00	0	0	0	0	0	0	0	0	0	0
15:30	16:30	0	0	0	0	0	0	0	1	0	1

Attachment B

SIDRA results

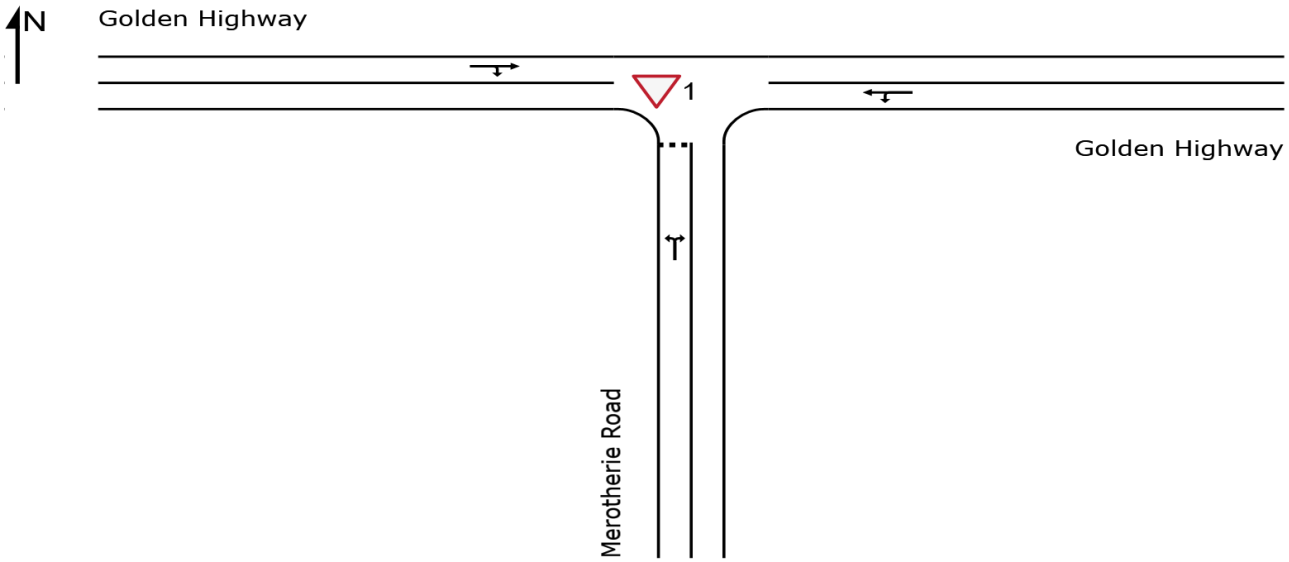
EMM
creating opportunities

SITE LAYOUT

Site: [1] Golden Highway/Merotherie Road (2029 Baseline scenario AM peak)

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



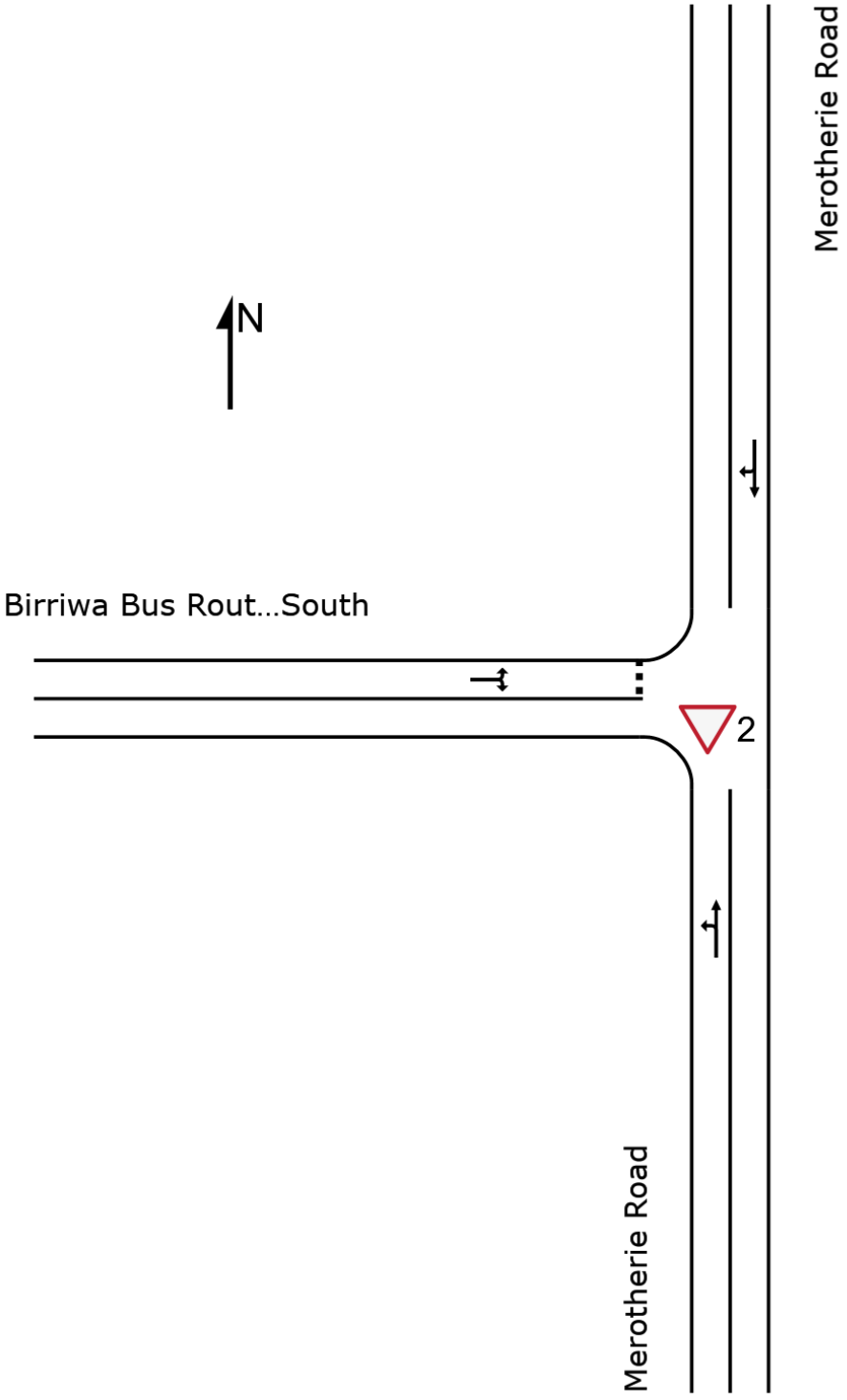
Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Created: Thursday, May 15, 2025 11:46:00 PM
Project: C:\Users\ffang\Desktop\sidra models\Birriwa BESS MOD1\E240117_Birriwa BESS MOD1_v0.1_16 May 2025.sipx

SITE LAYOUT

Site: [2] Merotherie Road/Birriwa Bus Route South (2029 Baseline scenario AM peak)

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: [1] Golden Highway/Merotherie Road (2029 Baseline scenario AM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	2	0.0	2	0.0	0.002	7.9	LOS A	0.0	0.1	0.13	0.61	0.13	73.9
3	R2	All MCs	1	0.0	1	0.0	0.002	7.7	LOS A	0.0	0.1	0.13	0.61	0.13	73.7
Approach			3	0.0	3	0.0	0.002	7.9	LOS A	0.0	0.1	0.13	0.61	0.13	73.8
East: Golden Highway															
4	L2	All MCs	5	20.0	5	20.0	0.027	8.4	LOS A	0.0	0.0	0.00	0.08	0.00	76.3
5	T1	All MCs	39	29.7	39	29.7	0.027	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	97.2
Approach			44	28.6	44	28.6	0.027	1.0	NA	0.0	0.0	0.00	0.08	0.00	94.1
West: Golden Highway															
11	T1	All MCs	57	24.1	57	24.1	0.036	0.0	LOS A	0.0	0.1	0.01	0.03	0.01	99.3
12	R2	All MCs	2	50.0	2	50.0	0.036	8.8	LOS A	0.0	0.1	0.01	0.03	0.01	65.9
Approach			59	25.0	59	25.0	0.036	0.3	NA	0.0	0.1	0.01	0.03	0.01	97.5
All Vehicles			106	25.7	106	25.7	0.036	0.8	NA	0.0	0.1	0.01	0.07	0.01	95.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [2] Merotherie Road/Birriwa Bus Route South (2029 Baseline scenario AM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.34	0.00	80.8
2	T1	All MCs	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	90.3
Approach			2	0.0	2	0.0	0.001	3.9	NA	0.0	0.0	0.00	0.34	0.00	85.3
North: Merotherie Road															
8	T1	All MCs	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.02	0.34	0.02	90.6
9	R2	All MCs	1	0.0	1	0.0	0.001	7.4	LOS A	0.0	0.0	0.02	0.34	0.02	80.8
Approach			2	0.0	2	0.0	0.001	3.7	NA	0.0	0.0	0.02	0.34	0.02	85.4
West: Birriwa Bus Route South															
10	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.01	0.66	0.01	74.6
12	R2	All MCs	1	0.0	1	0.0	0.001	7.4	LOS A	0.0	0.0	0.01	0.66	0.01	74.4
Approach			2	0.0	2	0.0	0.001	7.6	LOS A	0.0	0.0	0.01	0.66	0.01	74.5
All Vehicles			6	0.0	6	0.0	0.001	5.1	NA	0.0	0.0	0.01	0.44	0.01	81.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [1 (2)] Golden Highway/Merotherie Road (2029 Baseline scenario PM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	4	50.0	4	50.0	0.004	9.4	LOS A	0.0	0.2	0.17	0.60	0.17	58.3
3	R2	All MCs	1	0.0	1	0.0	0.004	7.8	LOS A	0.0	0.2	0.17	0.60	0.17	72.8
Approach			5	40.0	5	40.0	0.004	9.1	LOS A	0.0	0.2	0.17	0.60	0.17	60.7
East: Golden Highway															
4	L2	All MCs	2	50.0	2	50.0	0.040	9.1	LOS A	0.0	0.0	0.00	0.02	0.00	66.9
5	T1	All MCs	60	36.8	60	36.8	0.040	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	99.4
Approach			62	37.3	62	37.3	0.040	0.3	NA	0.0	0.0	0.00	0.02	0.00	97.8
West: Golden Highway															
11	T1	All MCs	40	21.1	40	21.1	0.024	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	99.2
12	R2	All MCs	1	0.0	1	0.0	0.024	7.4	LOS A	0.0	0.1	0.01	0.02	0.01	86.8
Approach			41	20.5	41	20.5	0.024	0.2	NA	0.0	0.1	0.01	0.02	0.01	98.8
All Vehicles			108	31.1	108	31.1	0.040	0.7	NA	0.0	0.2	0.01	0.05	0.01	95.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [2 (2)] Merotherie Road/Birriwa Bus Route South (2029 Baseline scenario PM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.34	0.00	80.8
2	T1	All MCs	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	90.3
Approach			2	0.0	2	0.0	0.001	3.9	NA	0.0	0.0	0.00	0.34	0.00	85.3
North: Merotherie Road															
8	T1	All MCs	2	0.0	2	0.0	0.002	0.0	LOS A	0.0	0.0	0.01	0.23	0.01	93.5
9	R2	All MCs	1	0.0	1	0.0	0.002	7.4	LOS A	0.0	0.0	0.01	0.23	0.01	83.1
Approach			3	0.0	3	0.0	0.002	2.5	NA	0.0	0.0	0.01	0.23	0.01	89.8
West: Birriwa Bus Route South															
10	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.02	0.66	0.02	74.6
12	R2	All MCs	1	0.0	1	0.0	0.001	7.4	LOS A	0.0	0.0	0.02	0.66	0.02	74.4
Approach			2	0.0	2	0.0	0.001	7.6	LOS A	0.0	0.0	0.02	0.66	0.02	74.5
All Vehicles			7	0.0	7	0.0	0.002	4.4	NA	0.0	0.0	0.01	0.38	0.01	83.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [1 (3)] Golden Highway/Merotherie Road (2029 Baseline + Construction + Cumulative scenario AM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	19	88.9	19	88.9	0.044	10.5	LOS B	0.2	2.0	0.23	0.63	0.23	48.6
3	R2	All MCs	17	100.0	17	100.0	0.044	12.1	LOS B	0.2	2.0	0.23	0.63	0.23	50.6
Approach			36	94.1	36	94.1	0.044	11.2	LOS B	0.2	2.0	0.23	0.63	0.23	49.5
East: Golden Highway															
4	L2	All MCs	56	32.1	56	32.1	0.068	8.7	LOS A	0.0	0.0	0.00	0.36	0.00	67.3
5	T1	All MCs	48	39.1	48	39.1	0.068	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	89.2
Approach			104	35.4	104	35.4	0.068	4.6	NA	0.0	0.0	0.00	0.36	0.00	76.0
West: Golden Highway															
11	T1	All MCs	64	32.8	64	32.8	0.081	0.4	LOS A	0.3	3.0	0.21	0.34	0.21	89.4
12	R2	All MCs	54	33.3	54	33.3	0.081	8.9	LOS A	0.3	3.0	0.21	0.34	0.21	66.3
Approach			118	33.0	118	33.0	0.081	4.2	NA	0.3	3.0	0.21	0.34	0.21	77.2
All Vehicles			258	42.4	258	42.4	0.081	5.4	NA	0.3	3.0	0.13	0.39	0.13	71.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [2 (3)] Merotherie Road/Birriwa Bus Route South (2029 Baseline + Construction + Cumulative scenario AM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.34	0.00	80.8
2	T1	All MCs	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	90.3
Approach			2	0.0	2	0.0	0.001	3.9	NA	0.0	0.0	0.00	0.34	0.00	85.3
North: Merotherie Road															
8	T1	All MCs	1	0.0	1	0.0	0.067	0.0	LOS A	0.3	2.8	0.02	0.66	0.02	83.2
9	R2	All MCs	102	33.0	102	33.0	0.067	8.3	LOS A	0.3	2.8	0.02	0.66	0.02	62.9
Approach			103	32.7	103	32.7	0.067	8.2	NA	0.3	2.8	0.02	0.66	0.02	63.1
West: Birriwa Bus Route South															
10	L2	All MCs	34	100.0	34	100.0	0.032	10.4	LOS B	0.1	1.6	0.02	0.66	0.02	47.3
12	R2	All MCs	1	0.0	1	0.0	0.032	7.5	LOS A	0.1	1.6	0.02	0.66	0.02	70.0
Approach			35	97.0	35	97.0	0.032	10.3	LOS B	0.1	1.6	0.02	0.66	0.02	47.8
All Vehicles			140	48.1	140	48.1	0.067	8.7	NA	0.3	2.8	0.02	0.66	0.02	58.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [1 (4)] Golden Highway/Merotherie Road (2029 Baseline + Construction + Cumulative scenario PM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	56	34.0	56	34.0	0.099	9.1	LOS A	0.4	3.3	0.22	0.63	0.22	62.1
3	R2	All MCs	51	33.3	51	33.3	0.099	9.3	LOS A	0.4	3.3	0.22	0.63	0.22	61.7
Approach			106	33.7	106	33.7	0.099	9.2	LOS A	0.4	3.3	0.22	0.63	0.22	61.9
East: Golden Highway															
4	L2	All MCs	19	94.4	19	94.4	0.061	10.3	LOS B	0.0	0.0	0.00	0.15	0.00	55.5
5	T1	All MCs	67	43.8	67	43.8	0.061	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	99.4
Approach			86	54.9	86	54.9	0.061	2.3	NA	0.0	0.0	0.00	0.15	0.00	84.7
West: Golden Highway															
11	T1	All MCs	49	31.9	49	31.9	0.051	0.3	LOS A	0.2	1.7	0.16	0.22	0.16	89.6
12	R2	All MCs	17	100.0	17	100.0	0.051	10.9	LOS B	0.2	1.7	0.16	0.22	0.16	55.9
Approach			66	49.2	66	49.2	0.051	3.0	NA	0.2	1.7	0.16	0.22	0.16	77.7
All Vehicles			259	44.7	259	44.7	0.099	5.3	NA	0.4	3.3	0.13	0.37	0.13	72.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [2 (4)] Merotherie Road/Birriwa Bus Route South (2029 Baseline + Construction + Cumulative scenario PM peak)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Merotherie Road															
1	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.34	0.00	80.8
2	T1	All MCs	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	90.3
Approach			2	0.0	2	0.0	0.001	3.9	NA	0.0	0.0	0.00	0.34	0.00	85.3
North: Merotherie Road															
8	T1	All MCs	2	0.0	2	0.0	0.030	0.0	LOS A	0.1	1.7	0.03	0.65	0.03	79.0
9	R2	All MCs	34	100.0	34	100.0	0.030	10.2	LOS B	0.1	1.7	0.03	0.65	0.03	41.1
Approach			36	94.1	36	94.1	0.030	9.6	NA	0.1	1.7	0.03	0.65	0.03	42.3
West: Birriwa Bus Route South															
10	L2	All MCs	102	33.0	102	33.0	0.074	8.7	LOS A	0.3	2.8	0.01	0.65	0.01	63.1
12	R2	All MCs	1	0.0	1	0.0	0.074	7.5	LOS A	0.3	2.8	0.01	0.65	0.01	73.6
Approach			103	32.7	103	32.7	0.074	8.7	LOS A	0.3	2.8	0.01	0.65	0.01	63.2
All Vehicles			141	47.8	141	47.8	0.074	8.8	NA	0.3	2.8	0.02	0.65	0.02	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Attachment C

Mid-Western Regional Council letter

EMM
creating opportunities

MID-WESTERN REGIONAL COUNCIL
PO Box 156, MUDGEE NSW 2850
86 Market Street, Mudgee | 109 Herbert Street, Gulgong | 77 Louee Street, Rylstone
T 1300 765 002 or 02 6378 2850 | F 02 6378 2815
E council@midwestern.nsw.gov.au

LP | LAN900138

17 April 2025

Scott Thomas
ACEN Australia
Via e-mail: scott.thomas@acenrenewables.com.au

Dear Scott,

SUBJECT: Birriwa Solar and BESS - Narragamba Solar – Public Road Upgrades – Commitments

Council's position is to generally support a design solution that will minimise the impact on the roadside environment while providing a road design that suits the short-term construction impacts and longer-term operational use of the road.

In this regard, it is preferable that the design aligns with Austroads guidelines for road geometry, applying an appropriate AADT for the development and considering both cumulative impacts and baseline rural traffic volumes. Where non-conformances occur due to the need to preserve roadside vegetation, exemptions may be considered—provided they are supported by a comprehensive road safety assessment.

It is anticipated that Austroads guidelines will require 3.1m travel lanes, with shoulder widths adjusted as needed to minimise environmental impact. Added safety features, such as guardrails, should also be considered.

The design commitments as outlined in your letter dated 25 March 2025 are generally accepted, however, Council requires the opportunity to review a draft design, road safety audits, and any requested concessions before endorsing the final design package.

If you have any further questions, please contact Council on (02) 6378 2850.

Yours sincerely,

Julian Geddes
Julian Geddes (Apr 24, 2025 11:28 GMT+10)

JULIAN GEDDES
DIRECTOR OPERATIONS

Australia

SYDNEY
Level 10 201 Pacific Highway
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 1 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

CANBERRA
Suite 2.04 Level 2
15 London Circuit
Canberra City ACT 2601

ADELAIDE
Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Suite 9.01 Level 9
454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH
Suite 3.03
111 St Georges Terrace
Perth WA 6000
T 08 6430 4800

Canada

TORONTO
2345 Yonge Street Suite 300
Toronto ON M4P 2E5
T 647 467 1605

VANCOUVER
2015 Main Street
Vancouver BC V5T 3C2
T 604 999 8297

CALGARY
700 2nd Street SW Floor 19
Calgary AB T2P 2W2

linkedin.com/company/emm-consulting-pty-limited

emmconsulting.com.au