

Appendix I. Transport Assessment

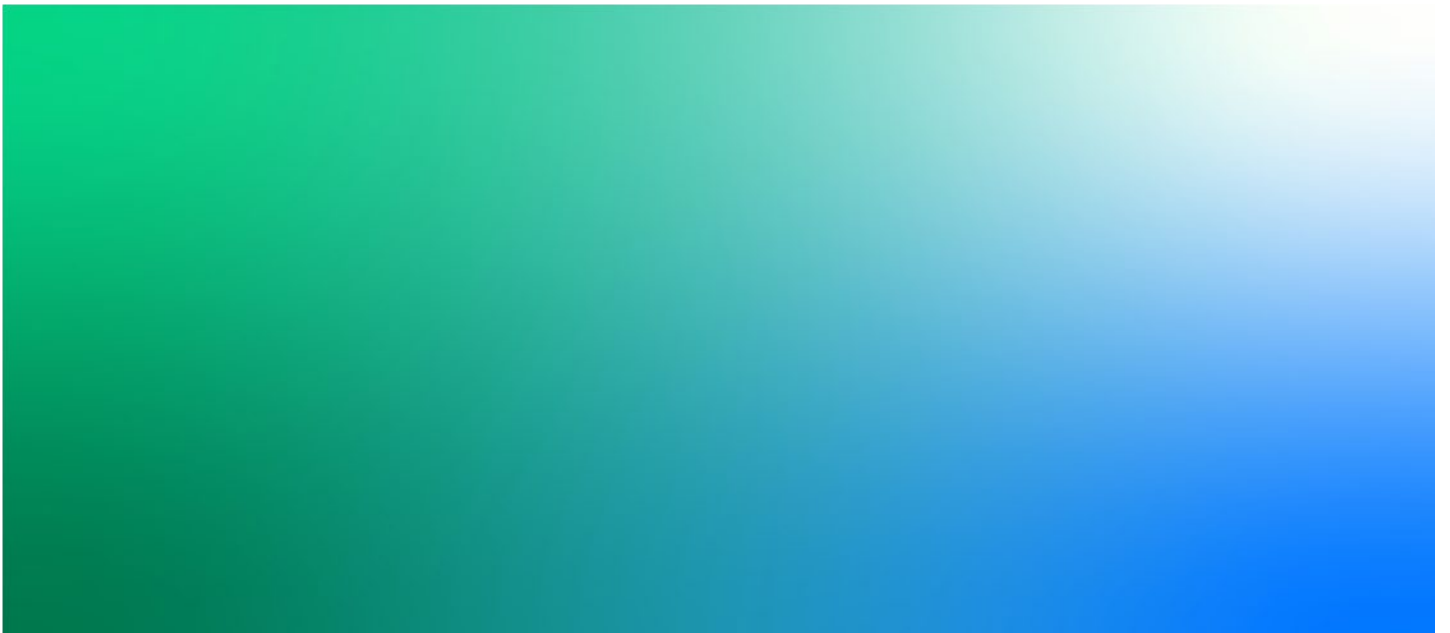


Hume Battery Energy Storage System

Transport Assessment

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Meridian Energy Australia Pty Ltd



Hume Battery Energy Storage System Project

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1. Introduction

1.1 Overview

Meridian Energy Australia Pty Ltd proposes to develop the Hume Battery Energy Storage System (BESS) Project (the Project), to be constructed on WaterNSW land near the pre-existing Hume Dam Hydro Power Station (HPS) in New South Wales (NSW). The project is proposed to be undertaken in the Albury City Council Local Government Area (LGA), with an estimated capex cost of \$32 million.

1.2 Purpose and scope of this report

This technical paper is one of a number of technical papers that form part of the Environmental Impact Statement. The purpose of this technical paper is to identify and assess the potential impacts of the Project in relation to traffic and transport. It responds directly to the Secretary's Environmental Assessment Requirements outlined in Section 1.3. This report includes the following:

- A review of the existing transport network, including a description of transport infrastructure in the study area, public transport service provision, pedestrian and cycle networks, and traffic volumes
- Assessment of the potential transport and traffic impacts during construction and operation of the project
- A suite of measures to mitigate and manage the identified transport and traffic impacts during construction and operation of the project.

1.3 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements were issued for the project on 14 May 2020. The requirements specific to traffic and transport and where these are assessed are outlined in Table 1-1.

Table 1-1 Secretary's environmental assessment requirements – traffic and transport

Requirement	Where addressed
An assessment of the peak and average traffic generation, including over-dimensional vehicles, construction worker transportation and transport of materials by rail;	Section 4.1.2
An assessment of the likely transport impacts to the site access route (including Murray Street and Hume Weir Road), site access point, any Crown land, particularly in relation to the capacity and condition of the roads	Section 4.1.3
A cumulative impact assessment of traffic from nearby developments;	Section 4.1.6
A description of any proposed road upgrades developed in consultation with the relevant road and rail authorities (if required);	Not required
A description of the measures that would be implemented to mitigate any transport impacts during construction	Section 5

1.4 Structure of this report

The remainder of this report is structured as follows:

- **Section 2** provides a description of the project
- **Section 3** provides an overview of the existing traffic and transport environment
- **Section 4** documents the construction and operational impacts of the project
- **Section 5** outlines management measures to be considered to mitigate the traffic and transport impacts of the project.

2. Project description

2.1 Project location

The proposed Project site is located in southern NSW on the border of NSW and Victoria, adjacent to Lake Hume Village, lying within the Albury City Council LGA. Lake Hume Village is located approximately 10 kilometres east of Albury-Wodonga, 19 kilometres south of Bowna and 120 kilometres south-west of Wagga Wagga. The site is adjacent to the Murray River and is about 300 metres north of the existing HPS.

The proposed Project site is on land currently owned by WaterNSW, which also hosts WaterNSW offices, the HPS, and a WaterNSW-owned switchyard already in use by Meridian. Transmission lines extend from the switchyard to Albury in NSW and Wodonga in Victoria. The location of the Project site is shown in Figure 2-1.

2.2 Project footprint

The maximum disturbance area for the project, including temporary construction areas and permanent footprint, is approximately 1.2 hectare. Batteries are expected to be mounted on concrete footings and be containerized or otherwise enclosed. Environmental controls for hazardous substances management would be provided and suitable for the selected technology in accordance with applicable guidelines.

2.3 Construction activities

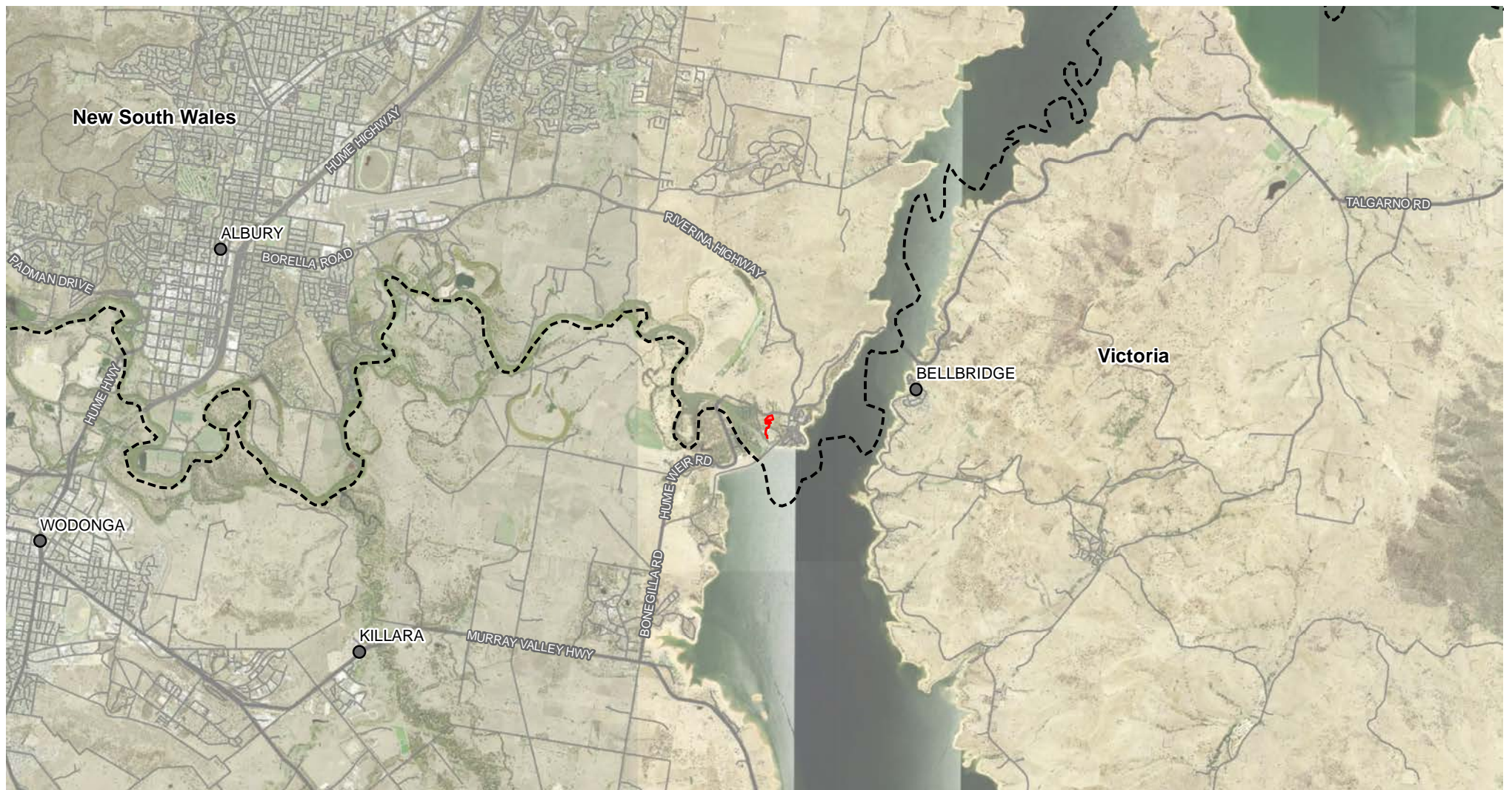
Construction of the Project would include the following elements:

- Installation, commissioning, and operation of a 20MW/40MWh BESS
- Construction and operational access track from existing internal WaterNSW access road
- Ancillary upgrades to the existing substation switchyard to connect the BESS to the National Energy Market
- Underground 11 kV electricity cabling infrastructure from the existing switchyard to the BESS
- Construction of fencing around the perimeter of the BESS compound.

2.4 Operation and maintenance

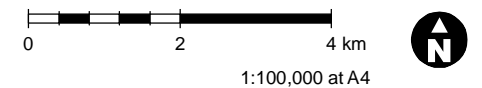
The BESS is intended to have an operational life of 30 years and, depending on the selected technology components, may be replaced and or upgraded to extend this timeframe. Following the end of economic life, above ground components would be removed and land rehabilitated to achieve a safe, stable and non-polluting condition.

The substation would not accommodate full-time staff or contractors.



Legend

- Project footprint
- State boundary



Data sources

Jacobs 2020
 NSW Spatial Services 2019
 Geoscience Australia 2019
 Service Layer Credits:
 © Department of Customer Service 2020

GDA94 MGA55



Figure 2-1 Project location

3. Existing traffic and transport environment

This section describes the existing traffic and transport environment to provide a baseline against which the project's traffic and transport impacts can be assessed.

3.1 Study area

The Project site is bordered by Trout Farm Road and Murray Street, and existing access to the site is via Murray Street in Lake Hume Village. Other roads in the vicinity of the site are Riverina Highway and Bonegilla Road. **Error! Reference source not found.** shows the roads within the study area.



Figure 3-1: Roads surrounding the Project site

Source: Near Map (2020)

3.2 Road network

3.2.1 Key roads

Key roads in the study area are described below.

- The Riverina Highway is a state road that extends between the NSW / Victoria border and Deniliquin via Albury. The road is a two-lane single carriageway with a posted speed limit of 80 kilometres per hour. The upgrade of the Riverina Highway east of Albury was completed in December 2017
- Murray Street is a local road providing access to Lake Hume Village from the Riverina Highway. The road is a two-lane single carriageway with a posted speed limit of 50 kilometres per hour
- Trout Farm Road and Bonegilla Road are regional roads that provide a connection between Lake Hume Village and the Murray Valley Highway. The roads are two-lane single carriageway with a posted speed limit of 80 kilometres per hour.

3.2.2 Road safety

Two crashes were recorded in the study area in the five-year period between 2014 and 2018, including:

- One head-on crash on the Riverina Highway about 900 metres east of Murray Street in 2014, resulting in a serious injury.
- One off-carriageway crash on the Riverina Highway about one kilometre north of Murray Street in 2015, resulting in a moderate injury.

The locations of these crashes are shown in Figure 3-2. No crashes resulting in a casualty were recorded on Murray Street or Trout Farm Road.



Figure 3-2: Crash Map within the project study area

Source: Transport for New South Wales, Centre for Road Safety (2020)

3.2.3 Traffic demand

The average number of vehicles (bi-directional) over a seven-day period in 2016 on the approaches to Lake Hume Village are as follows¹:

- 2,476 vehicles per day from the northern approach (Riverina Highway)
- 1,761 vehicles from the eastern approach (Riverina Highway)
- 1,893 vehicles from the southern approach (Trout Farm Road / Bonegilla Road).

Based on correspondence with Albury City Council²:

- The average percentage of heavy vehicles on the surrounding road network is 18 per cent
- The traffic growth rate on the surrounding road network is two per cent per year.

3.2.4 Road network performance

The performance measure for midblock road links is based on the volume to capacity (V/C) ratio and is based on Level of Service (LoS) criteria defined in the Austroads *Guide to Traffic Management: Traffic Studies and Analysis (Part 3)*.

LoS is defined as a quantitative measure for ranking operating conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience. There are six LoS, from A to F, with LoS A representing the best operating condition and LoS F the worst. A LoS of A implies that vehicles travelling along a particular road section are experiencing free flow conditions. LoS E represents a midblock section at capacity. LoS F describes a breakdown in vehicle flow.

In regional areas, LoS C can be considered a minimum desirable standard; a deterioration of the LoS under this level would imply that remedial measures to maintain the existing LoS would be sought.

Error! Reference source not found. summarises the LoS criteria for midblock sections in relation to the V/C ratio value.

Table 3-1: LoS criteria for midblock sections

LoS	V/C ratio	General description
A	Less than or equal to 0.60	Free Flow
B	>0.60 – 0.70	Stable flow
C	>0.70 – 0.80	Stable flow (acceptable / satisfactory performance)
D	>0.80 – 0.90	Approaching unstable flow (tolerable)
E	>0.90 – 1.00	Unstable flow (intolerable)
F	>1.00	Forced flow (congested)

Source: Highway Capacity Manual (2010)

A summary of existing midblock performance is shown in Table 3-2. All roads currently operate satisfactorily with ample spare capacity.

¹ Riverina Highway (HW20) - Stage 2 Safety Improvement Work Review of Environmental Factors June 2016, <https://www.rms.nsw.gov.au/projects/01documents/riverina-highway/riverina-hwy-stage-2-ref-0616.pdf>

² Correspondence with the Albury City Council via email on June 2nd, 2020

Table 3-2: Existing midblock performance (bi-directional)

Road	Daily traffic volume (2020)*	Peak hour volume**	Capacity (veh / hr)***	V/C ratio	LoS
Riverina Highway (northern approach to Lake Hume Village)	2,680	268	3,400	0.08	A
Riverina Highway (eastern approach to Lake Hume Village)	1,906	191	3,400	0.06	A
Trout Farm Road / Bonegilla Road (southern approach to Lake Hume Village)	2,049	205	3,400	0.06	A

*2020 volumes calculated by applying 2% per annum growth rate to 2016 volumes (compounded)

**Peak hour volume assumed to be 10% of the total daily volume

***Capacity of a two-lane two-way highway: 1,700 vehicles per lane per hour (based on Austroads)

3.3 Public transport

There are no existing public transport services in the study area.

3.4 Active transport

There are no existing pedestrian or cycle facilities in the study area.

4. Traffic and transport impact assessment

This section assesses the traffic and transport impacts associated with the construction and operation of the Project.

4.1 Construction impacts

4.1.1 Construction period

Project construction has been scheduled for completion at the end of September 2021. Construction of the project is scheduled to begin in January 2021 with peak traffic expected to occur between May and June 2021.

4.1.2 Construction traffic generation and haulage routes

The main drivers of construction traffic generation are the delivery of construction materials, equipment, plant components, as well as the construction workforce travelling to and from the site. Table 4-1 shows anticipated light and heavy vehicle volumes during construction.

Table 4-1: Construction traffic generation

Activity	Period	Construction traffic generation		Total
		Light vehicles	Heavy vehicles	
Civil	January 2021 to May 2021	12	4	16
Mechanical / structural	March 2021 to April 2021	12	4	16
Electrical	May to June 2021	12	2	14
Testing and commissioning	July 2021 to Sep 2021	10	0	10
Total		46	10	56

The access and egress route for light and heavy vehicles would be via Murray Street and Riverina Highway (to and from Albury) as shown in Figure 4-1.



Figure 4-1: Access and egress to the Project site

Source: Near Map (2020)

The number of trips generated during the construction phase includes the following assumptions:

- Inbound light vehicle traffic movements are assumed to occur within one hour of construction personnel travelling to work and parking at the compound at the start of their shift, and similarly for outbound light vehicle movements occurring within one hour of workers travelling from the compound at the end of their shift
- Inbound and outbound heavy vehicle traffic movements are assumed to be spread evenly throughout the day during the standard construction work hours (Monday to Friday 7 am to 4 pm, Saturday 8 am to 1 pm and no work on Sunday or public holidays)
- Traffic impact of oversized vehicles on the existing network would be minimal.

4.1.3 Impact on road network

Road safety

There is unlikely to be an impact on road safety during construction due to the low volume of additional traffic movements associated with construction activity.

Road network performance

Midblock performance results under the '2021 without construction' (without construction vehicles associated with the project) and '2021 with construction' (with construction vehicles associated with the project) scenarios are summarised in Table 4-2. The performance results show the Riverina Highway would operate at the same LoS with construction traffic compared to the scenario without construction traffic.

In addition, construction of the project would have minimal impact on local roads within Lake Hume Village including Murray Street and Hume Weir Road given the low volume of additional traffic movements associated with construction activity.

Therefore, the impact of construction vehicles on road network performance would be minimal.

Table 4-2: Midblock performance during construction (bi-directional)

Road and scenario	Daily traffic volume (2021)*	Peak hour volume (without construction traffic)**	Peak hour construction traffic volume	Total peak hour volume	Capacity (veh / hr)***	V/C ratio	LoS
Riverina Highway (northern approach to Lake Hume Village)							
2021 without construction	2,734	273	-	273	3,400	0.08	A
2021 with construction	2,734	273	47 (46 light vehicles + 1 heavy vehicle)	320	3,400	0.09	A

*2021 volumes calculated by applying 2% per annum growth rate to 2016 volumes (compounded)

**Peak hour volume assumed to be 10% of the total daily volume

***Capacity of a two-lane two-way highway: 1,700 vehicles per lane per hour (based on Austroads)

4.1.4 Impact on public transport

Construction activities would not have an impact on the public transport network.

4.1.5 Impact on active transport

Construction activities would not have an impact on the active transport network.

4.1.6 Cumulative impacts

A cumulative construction traffic impact assessment has not been undertaken as there are no major projects occurring near the project site that coincide with the proposed construction period or proposed construction vehicle access and egress route, based on information that is currently available to the public.

4.2 Operational impacts

During the operational phase of the project, there would be maintenance undertaken twice a year by field staff using a light vehicle to access the site. As such, no formal or dedicated parking facilities would be provided within the BESS.

As the operation of the project is expected to generate less traffic than during construction, the operational impacts of the project on the surrounding road network, public transport network, active transport network and to be road safety is likely to be minimal.

5. Environmental management measures

This section provides an overview of the measures to manage the potential traffic and transport impacts of the Project's construction.

Recommended safeguards and mitigation measures to manage traffic and transport impacts of the Project's construction are summarised in Table 5-1. There would be minimal impact on the performance of the road network during construction works. However, an appropriate site-specific Construction Traffic Management Plan (CTMP) would be prepared as part of the Construction Environmental Management Plan (CEMP) for the Project. The requirements of the CTMP are detailed within Table 5-1.

Operational mitigation measures are not proposed as there would be negligible impacts arising from the operation of the Project.

Table 5-1 Summary of environmental management measures

Ref	Impact	Mitigation Measures
Construction		
TT1	Traffic and Transport	<p>A CTMP will be prepared and implemented as part of the CEMP. The CTMP will include:</p> <ul style="list-style-type: none"> Measures to maintain access to local roads and properties, and maintain the capacity of existing roads where possible Site specific traffic control measures (including signage) to manage and regulate traffic movement Requirements and methods to consult and inform the local community of impacts on the local road network due to the development-related activities Consultation with Transport for NSW, Albury City Council and the construction contractor, if needed Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads A response plan for any construction related traffic incident Monitoring, review and amendment mechanisms Individual traffic management requirements at each phase of construction Measures to minimise the number of workers using private vehicles travelling to and from the work site Employment of standard traffic management measures to minimise short-term traffic impacts expected during construction Relevant traffic safety measures, including appropriate signage, driver conduct and safety protocols Identify requirements for, and placement of, traffic barriers <p>Any work that has potential to significantly disrupt traffic on the Riverina Highway must be scheduled to be carried out outside peak holiday periods.</p>
TT2	Traffic control	<p>Where works will affect the free flow of traffic, a Traffic Control Plan will be prepared and a Road Occupancy Licence will be obtained from Transport for NSW.</p>

Ref	Impact	Mitigation Measures
TT3	Local road network	<p>Road maintenance will be managed through the following measures:</p> <ul style="list-style-type: none"> ▪ A Road Dilapidation Report will be prepared and approved prior to and following the construction of the project. Any impacts identified as caused by the project will be rectified as specified with any road maintenance agreements ▪ Routine defect identification and rectification of the access roads and tracks will be managed as part of the project maintenance procedure <p>Access roads and tracks will be designed in accordance with the relevant vehicle loading requirements.</p>
TT4	Access	Affected communities, visitors and emergency services will be notified in advance of any disruptions to traffic and restriction of access impacted by project activities.
Operation		
-	Traffic and transport	Nil