Whitehaven

2025

Maules Creek Continuation Project

Environmental Impact Statement

Appendix N
Road Transport Assessment

Maules Creek Continuation Project
Road Transport Assessment

Prepared for:

Maules Creek Coal Pty Ltd

25 March 2025

The Transport Planning Partnership

Maules Creek Continuation Project
Road Transport Assessment

Client: Maules Creek Coal Pty Ltd

Version: Final

Date: 25 March 2025

TTPP Reference: 23083

Quality Record

Version	Date	Prepared by	Approved by	Signature
Final	25/3/2025	PJD	PJD	

Table of Contents

Tables

Figures

Appendices

A. TRAFFIC SURVEYS

B. RAILWAY LEVEL CROSSINGS

C. CRASH HISTORY REVIEW

References

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1 Introduction

The Maules Creek Coal Mine (MCCM) is an existing open cut coal mine located approximately 17 kilometres (km) north-east of Boggabri, within the Narrabri Shire Local Government Area (LGA) in New South Wales (NSW) (Figure 1.1 and Figure 1.2). The MCCM operates in accordance with Project Approval (PA) 10_0138, which was issued under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2012 and the MCCM was approved under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* in 2013 (approval – EPBC 2010/5566).

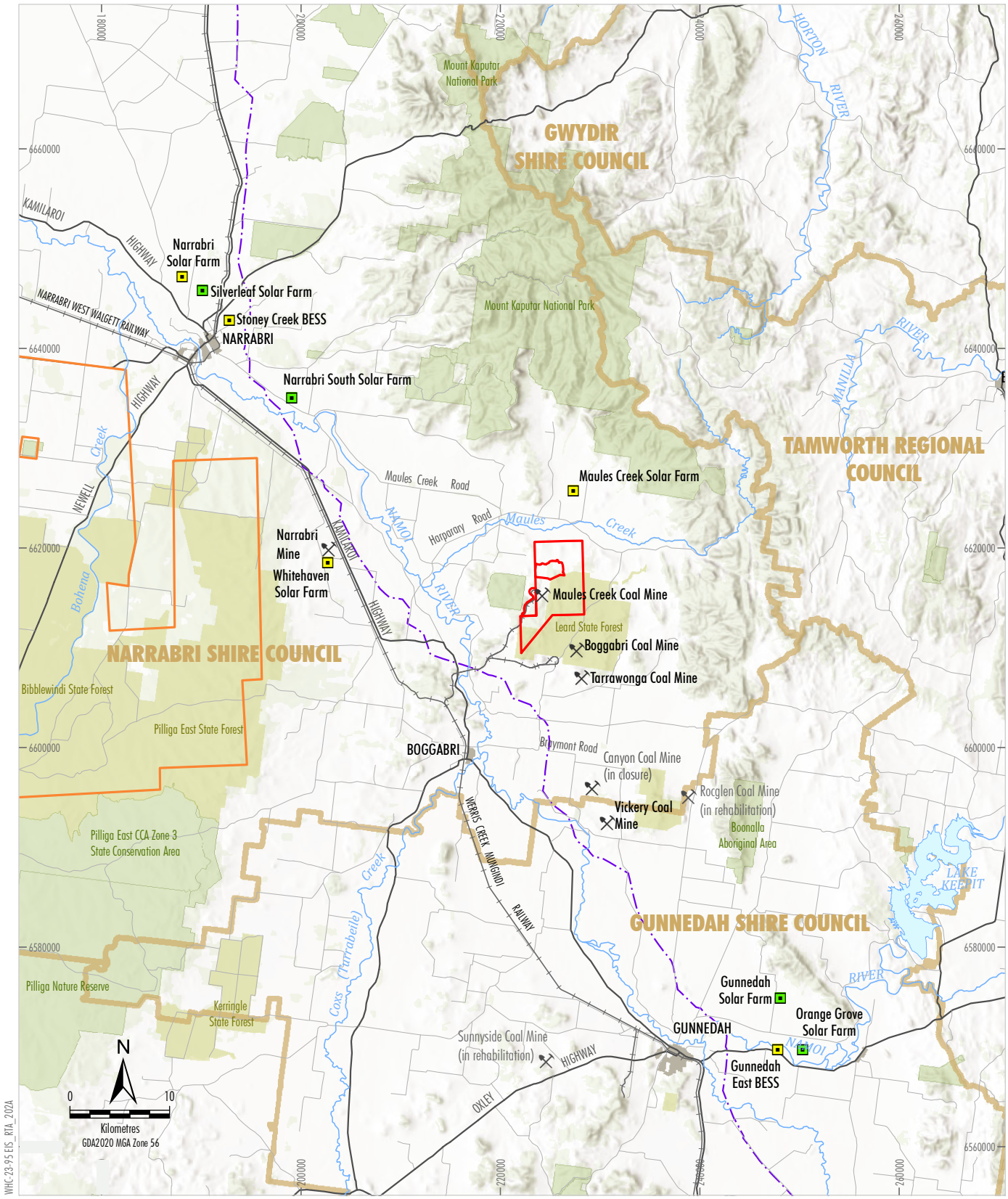
MCCM is a joint venture between Aston Coal 2 Pty Ltd (a wholly owned subsidiary of Whitehaven Coal Limited [Whitehaven]) (75 per cent [%]), ICRA MC Pty Ltd (a wholly owned subsidiary of Itochu Corporation) (15%) and J-Power Australia Pty Ltd (a wholly owned subsidiary of Electric Power Development Co. Ltd) (10%). MCCM is operated by Maules Creek Coal Pty Ltd (MCC).

MCC is seeking approval to continue open cut mining operations within the MCCM mining and exploration tenements for a further 10 years (from 2035 to 2044). Development Consent for the Maules Creek Continuation Project (the Project) is being sought under the State Significant provisions (i.e. Division 4.7) under Part 4 of the EP&A Act.

This Road Transport Assessment forms part of the Environmental Impact Statement (EIS) which has been prepared to accompany the Development Application for the Project, and has been prepared with regard to the Secretary's Environmental Assessment Requirements (SEARs), which state the following requirements in regard to the road transport assessment:

8. Traffic and Transport

- *An assessment of the likely transport impacts of the development on the capacity, condition, safety and efficiency of the surrounding transport network, including cumulative impacts (considering other mining developments in the locality).*
- *A description of the measures that would be implemented to mitigate and/or manage any impacts, including any proposed road and rail upgrades, road and rail maintenance contributions, and other traffic control measures developed in consultation with the relevant road and rail authorities.*



LEGEND

- MCCM Mining Tenement Boundary (CL and ML)
- Mine Site
- Local Government Boundary
- State Forest
- State Conservation Area, Aboriginal Area
- Rail Line
- Approved Narrabri Gas Project
- Approved Queensland Hunter Gas Pipeline
- Approved Energy Generation Site
- Proposed Energy Generation/Storage Site

Source: NSW Spatial Services (2023); Geoscience Australia (2011)

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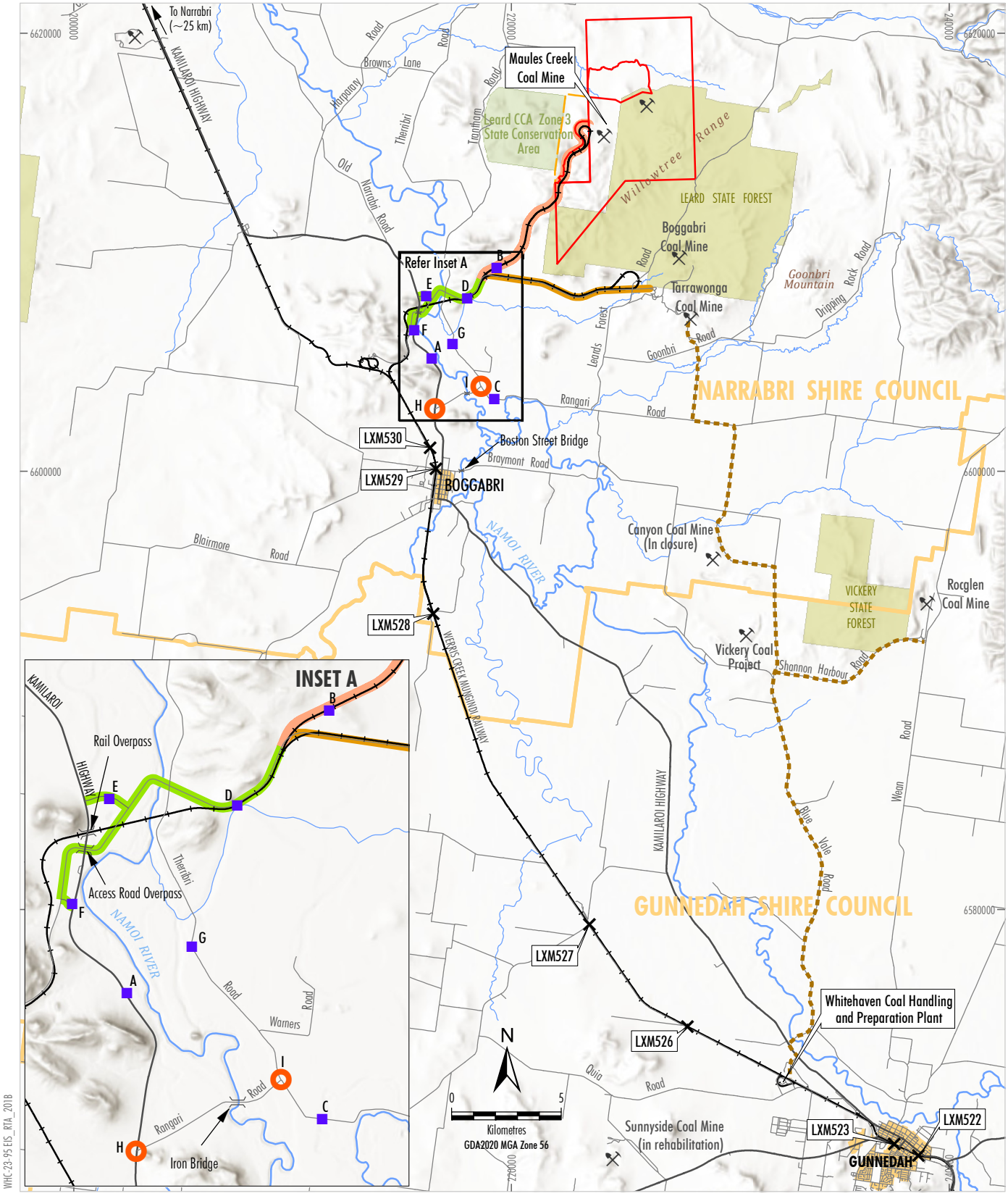
MAULES CREEK CONTINUATION PROJECT

Project Location

Figure 1-1



Source: NSW Spatial Services (2024)

LEGEND

- State Forest
- State Conservation Area, Aboriginal Area
- Railway
- Exploration Licence Boundary (EL)
- Mining Lease Boundary (CL and ML)
- Maules Creek Coal Mine Access Road
- Shared Access Road
- Boggabri Coal Mine Access Road
- Tube Count Location
- Intersection Turning Movements (5am - 7pm One Weekday)
- Whitehaven Approved Transport Route
- Rail Crossing

NOTES

Iron Bridge has a limit of 42.5 t

Boston Street Bridge has a limit of 15 t and 4.0 m clearance.

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MAULES CREEK CONTINUATION PROJECT

Key Project Routes and Traffic Survey Locations

Figure 1-2

WHC 23-95 EIS_RTA_201B

Additionally, the SEARs refer to guidelines relevant to this assessment, including the Transport for NSW (TfNSW) (formerly Roads and Traffic Authority [RTA] and Roads and Maritime Services [RMS]) *Guide to Traffic Generating Developments* (RTA, 2002) and *Road Design Guide* (RMS, n.d.) and relevant Austroads Standards, and *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development and RMS Supplements to Austroads* (Austroads, 2024).

It is noted that TfNSW and other road agencies across Australasia have adopted the Austroads guides to provide a level of consistency and harmonisation across all jurisdictions. The Austroads guides, the Australian Standards which are referenced in them, and TfNSW's supplements to the Austroads guides are therefore the primary technical references for use within TfNSW, rather than the RMS *Road Design Guide* referred to in the SEARs. In November 2024, RTA (2002) was superseded by TfNSW's *Guide to Transport Impact Assessment*. This study has therefore been prepared in accordance with TfNSW (2024) and with reference to the relevant Austroads guides, TfNSW Supplements to the Austroads guides and Australian Standards.

The Transport Planning Partnership Pty Limited (TTPP) was commissioned by MCC to prepare this Road Transport Assessment to address relevant input into the SEARs from TfNSW and Narrabri Shire Council.

2 Maules Creek Coal Mine

2.1 Approved MCCM Operations

The MCCM was approved on 23 October 2012 by the Planning Assessment Commission (as delegate of the NSW Minister for Planning and Infrastructure) (PA 10_0138).

Construction of the MCCM commenced in December 2013 and was substantially completed in 2015. The operations phase of the MCCM commenced in June 2014 and coal was first transported from the MCCM via the rail spur in January 2015.

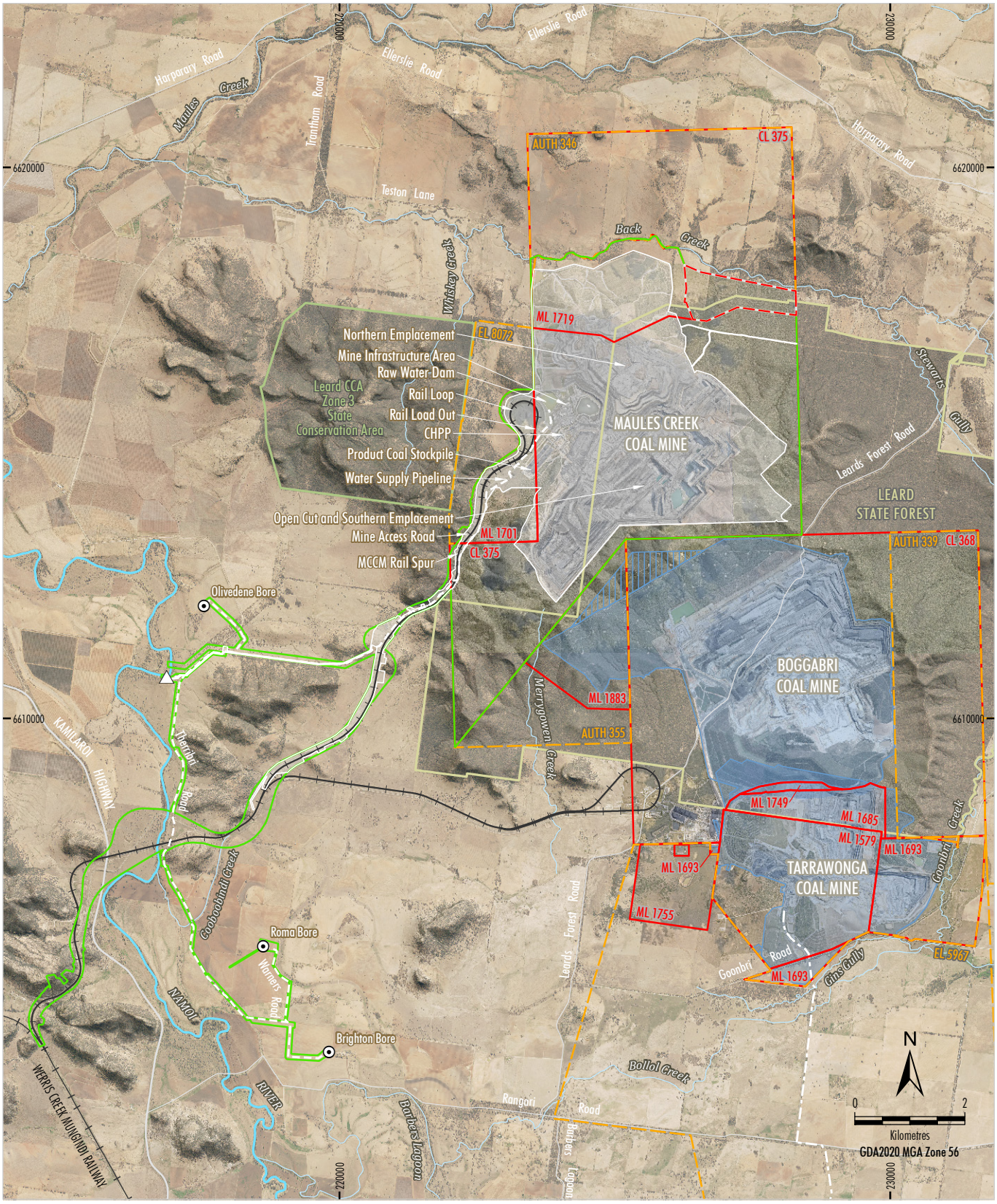
The operational hours of MCCM are 24 hours per day, seven days per week. Since the commencement of coal mining operations in 2014, mining activities have occurred via open cut mining methods using excavators and haul trucks.

The existing MCCM comprises a single open cut pit, Northern Emplacement and Southern Emplacement areas, and Mine Infrastructure Area (MIA). The MIA includes the Coal Handling and Preparation Plant (CHPP), run-of-mine (ROM) coal stockpiles, product coal stockpiles, train load-out infrastructure, workshops and administration buildings, hardstand and laydown areas, car parking, wash bays, and other associated infrastructure. The main site access for MCCM is via a dedicated private access road off the Kamilaroi Highway (Figure 2.1).

2.1.1 Coal Production and Transportation

PA 10_0138 allows for the production and processing of up to 13 million tonnes per annum (Mtpa) of ROM coal until 31 December 2034. No more than 12.4 million tonnes (Mt) of product coal may be transported from the MCCM in any calendar year. Coal is permitted to be transported from the MCCM by rail, via the Maules Creek rail spur line, the shared portion of the Boggabri Coal Mine (BCM) rail spur line, and the Werris Creek to Mungindi Railway Line to the Port of Newcastle for export. PA 10_0138 permits no more than seven laden trains to be dispatched from the MCCM per day averaged over a calendar year, and no more than 10 laden trains to be dispatched on any one day.

Actual production at MCCM over recent years is summarised in Table 2.1, together with the forecast production for 2024.



WHC-23-95 EIS_RTA_203A

Source: NSW Spatial Services (2024)
Orthophoto Mosaic: Whitehaven (2019-2024)

LEGEND

- Rail Line
- State Conservation Area
- State Forest
- Exploration Licence Boundary (AUTH and EL)
- Mining Tenement Boundary (ML and CL)
- Provisional Mining Lease Application Area
- Other Mining Operation *
- Other Mining Operation - Proposed *

Existing/Approved MCCM Development

- Project Boundary (PA 10_0138)
- Approximate Extent of Existing/Approved Surface Development
- MCCM Water Supply Pipeline
- VCM to TCM Water Transfer Pipeline
- MCCM Groundwater Supply Bore
- MCCM Namoi River Pump Station

** BCM boundary digitised from Figure 1 of the BCM Modification 10 Scoping Letter*

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MAULES CREEK CONTINUATION PROJECT

General Arrangement of the Approved Maules Creek Coal Mine

Figure 2-1

Table 2.1: MCCM Production Summary 2020 to 2024

	2020	2021	2022	2023	2024 (forecast)
Waste rock/overburden (cubic metres [m³])	66,329,608	64,955,104	57,864,598	62,178,549	67,000,000
ROM coal (tonnes [t[)	11,746,975	12,379,894	10,204,445	11,653,467	11,700,000
Reject material (t)	2,928,040	2,963,383	2,867,231	2,961,698	3,600,000
Saleable product (t)	8,870,352	9,368,961	8,764,822	7,217,970	8,900,999

2.1.2 Access Routes

Access to and from MCCM is provided by private roads, referred to herein as MCCM Access Road and Shared Access Road, which provide vehicular access between Kamilaroi Highway and MCCM. The Shared Access Road also provides vehicular access for BCM. The roads are shown on Figure 1.2 and are further described in Section 3.1.

The approved routes for general heavy vehicle access for MCCM are:

- Kamilaroi Highway (either northbound or southbound) then the Shared Access Road then onto the MCCM Access Road; or
- Kamilaroi Highway (either northbound or southbound), the Whitehaven Approved Road Transport Route (refer to Section 3.1), then Rangari Road to Therribri Road, the Shared Access Road and the MCCM Access Road.

The Whitehaven Approved Road Transport Route (refer to Figure 1.2 and Section 3.1) is an approved route used for light and heavy vehicle transport between several of Whitehaven's mining operations in the region. Therribri Road is used by Whitehaven as part of the heavy vehicle transport route when transferring equipment between Tarrawonga Coal Mine (TCM) and MCCM.

In the event that the access via the Kamilaroi Highway, Shared Access Road and MCCM Access Road is not available, access to the MCCM is provided via the Kamilaroi Highway, Rangari Road and Therribri Road (MCC, 2024), which was the main access route prior to use of the Shared Access Road. Vehicles under 42.5 t Gross Vehicles Mass (GVM) are permitted to access MCCM from Kamilaroi Highway via Rangari Road and Therribri Road.

Temporary transport of water may occur in the case that MCCM's water pipeline is not serviceable. Water source locations include MCC-owned and privately-owned properties. Routes for temporary water trucking activities (if required) are subject to engagement with Narrabri Shire Council, and are:

- Miscellaneous sources – Kamilaroi Highway to MCCM Access Road via Shared Access Road;
- Therribri Road to MCCM Access Road via Shared Access Road;
- Warners Road to MCCM Access Road; and
- Rangari Road, Therribri Road and MCCM Access Road via Shared Access Road.

2.1.3 Workforce

The annual reviews for the MCCM provide data on the full-time equivalent (FTE) workforce at MCCM in recent years, and the proportion of MCCM employees who reside in the Gunnedah and Narrabri LGAs. That data is summarised in Table 2.2.

Table 2.2: MCCM Full-Time Equivalent Workforce

	31 December 2019	31 December 2020	31 December 2021	31 December 2022	31 December 2023
Whitehaven	-	523	517	528	507
Contractors	-	-	249	251	321
Total	701	-	766	779	828
MCCM employees residing in Gunnedah and Narrabri LGAs	60% (total workforce)	74%	72%	76%	75%

A review of Whitehaven employee data indicates that 71 % of the employees at MCCM reside within approximately 100 km drive of the MCCM, while 22 % reside within NSW but farther than a 100 km drive, and 7 % reside interstate. Of the Whitehaven employees who reside within a 100 km drive of the MCCM, approximately 66 % reside to the south of the MCCM, 29 % reside to the north of the MCCM, and 5 % reside to the east. Non-local employees reside at the Civeo accommodation camps at Boggabri and Narrabri.

2.1.4 Bus Services

Bus services are provided by Whitehaven for the MCCM workforce at no cost to the workers, and operate between the MCCM and Gunnedah, Narrabri, Boggabri, Manilla and Tamworth. The buses are typically Toyota Coasters or similar. Buses are also used by the contractor workforce for travel to and from the MCCM.

Buses from Gunnedah collect workers from town, then from Coates Hire located on Mathias Road, before departing Gunnedah and picking up workers from Boggabri, before travelling to the MCCM. The morning and evening buses start in Gunnedah at approximately 5:00 am and 5:00 pm, respectively, and arrive at MCCM at approximately 6:15 am and 6:15 pm, respectively.

Buses from Narrabri pick up workers from town, then from the Civeo Narrabri Camp before travelling to the MCCM. The morning and evening buses start in Narrabri at approximately 5:00 am and 5:00 pm, respectively, and arrive at MCCM at approximately 6:15 am and 6:15 pm, respectively.

Buses from Boggabri pick up workers from the Civeo Boggabri Camp then travel to the MCCM. The morning and evening buses leave the Civeo Boggabri Camp at approximately 5:45 am and 5:45 pm, respectively, and arrive at MCCM at approximately 6:15 am and 6:15 pm, respectively.

The Gunnedah, Narrabri and Boggabri buses do not follow fixed routes, as the routes may vary depending on the workers being collected. Those buses all enter and exit the MCCM via Kamilaroi Highway, the Shared Access Road and MCCM Access Road.

Dedicated pick-up points for the Manilla and Tamworth services have been identified in conjunction with Tamworth Regional Council. The pick-up points are located at central points off the road, with adequate parking available to reduce congestion for residents.

Whitehaven monitors the level of use of buses, with surveys conducted during 2023 indicating that buses are used by more than 70 % of the workforce, with approximately 80 % of the total workforce arriving by bus in Q2 of 2023, and 86 % of the total workforce arriving by bus in Q4 of 2023.

2.1.5 Oversize Overmass Vehicles

The existing MCCM operations generates infrequent oversize overmass (OSOM) vehicle movements for the transport of mining vehicles and equipment. All oversize loads are transported with the relevant permits from the National Heavy Vehicle Regulator (NHVR) and load declarations obtained in accordance with *Additional Access Conditions Oversize and overmass heavy vehicles and loads* (TfNSW, 2020) and any other licences and escorts as required by regulatory authorities. As part of the permit, the transport contractor develops a Traffic Management Plan (TMP) and determines the suitable route based on the specific requirements of the load and vehicle dimensions and mass.

The TMP for OSOM vehicle movements identifies risks and minimises the impact of the movement on the road network, addressing:

- the route to be used;
- escorts and pilot requirements;
- travel restrictions;
- timing of the movement;
- communication with local authorities, police and emergency services; and
- any minor temporary civil works that may be required to accommodate the vehicle.

2.1.6 Future Operations at MCCM

The expected total FTE workforce at the approved MCCM (inclusive of employees and long-term contractors) and its forecast annual ROM coal production are as presented in Figure 2.2. While mining operations would cease on 31 December 2034, a small workforce would remain present for a period thereafter to undertake rehabilitation activities.

Figure 2.2: MCCM Forecast Workforce and ROM Coal Production

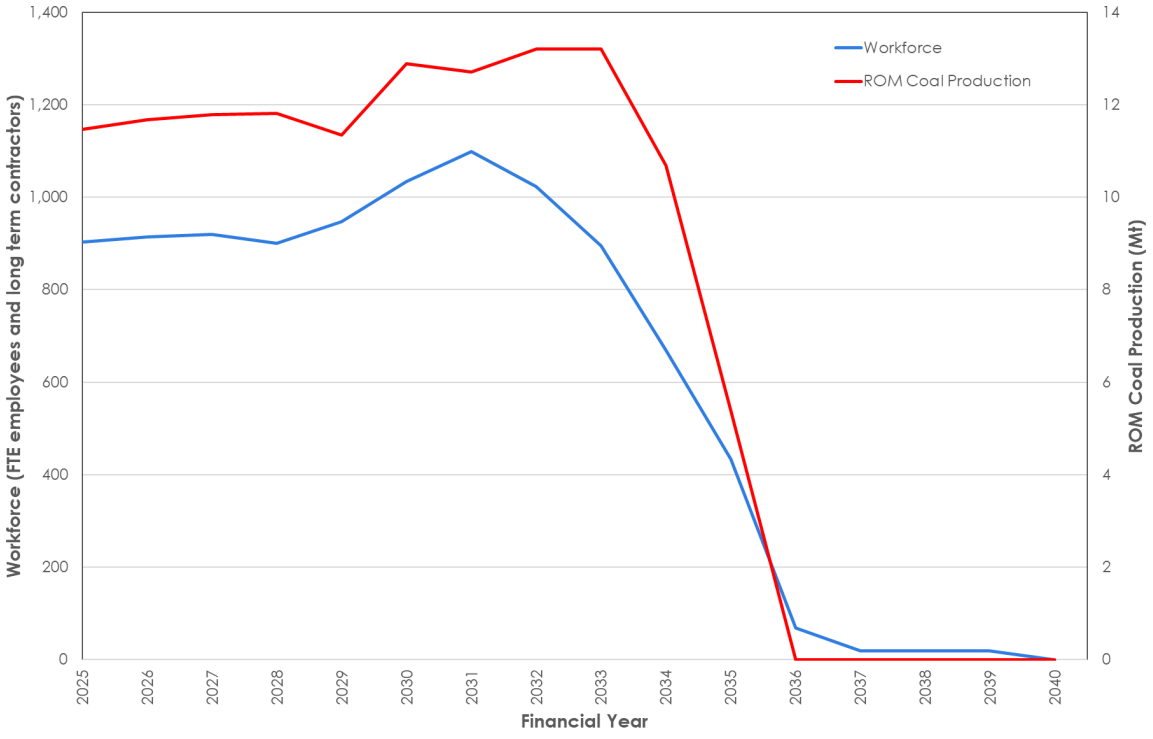


Figure 2.2 indicates that the workforce at MCCM is expected to average 865 personnel and peak at approximately 1,100 personnel during Financial Year (FY) 2031, and ROM coal production would peak at 13.2 Mtpa during FY2032 and FY2033.

2.1.7 Traffic Management Plan

Consistent with Condition 64 Schedule 3 of PA 10_0138, MCC has implemented a TMP (MCC, 2024) for its operations at MCCM, which aims to manage specific traffic impacts associated with the operational phase of the MCCM. The TMP includes:

- traffic management requirements associated with Therribri Road, the MCCM Access Road, and road safety upgrades to the surrounding road network;
- access routes for traffic generated by the MCCM;
- details of traffic management measures to be implemented;
- status of road upgrade works and program for remaining works;
- program to monitor and audit MCCM-related traffic and associated impacts;
- roles and responsibilities for traffic management onsite; and
- reporting requirements in relation to traffic.

The TMP identifies the routes to be used for access to MCCM, and notes the agreement with BCM to utilise the Shared Access Road to/from Kamilaroi Highway for all mine-related vehicular access. The TMP nominates the following routes for heavy vehicles accessing the MCCM:

- Kamilaroi Highway (either northbound or southbound) then the Shared Access Road then onto the MCCM Access Road; or
- Kamilaroi Highway (either northbound or southbound), the Whitehaven Approved Road Transport Route (refer to Section 3.1), then Rangari Road to Therribri Road, the Shared Access Road and the MCCM Access Road.

Mine related traffic under 42.5 t GVM may also use Rangari Road and Iron Bridge to access MCCM via Therribri Road. In the event that access via the Shared Access Road is temporarily unavailable, the TMP nominates that access to MCCM is to be via Rangari Road and Therribri Road (noting the 42.5 t GVM limit on Iron Bridge). Under exceptional circumstances when the Shared Access Road, Rangari Road and Therribri Road are unavailable, the TMP indicates that emergency site access will be made available for non-mining equipment via the surrounding restricted road network. Should the temporary or emergency access arrangements be required, the relevant authorities would be notified.

Traffic management measures identified in the TMP include (but are not limited to):

- all transport of heavy vehicles is undertaken outside of school bus hours to restrict interaction between trucks and the school buses;
- heavy vehicle movements to adhere to the gazetted and signposted load limits;
- education and induction of all personnel regarding requirements to use the nominated access routes and updates to the TMP;
- installation of signage to enforce the access routes and avoid use of nominated restricted access routes (such as Therribri Road north of the Shared Access Road);
- conducting periodic audits of traffic movements on the restricted access routes to monitor use by MCCM vehicles;
- consultation with relevant authorities regarding required OSOM vehicle movements on public roads, including risk assessment and traffic control plans for over-dimensional loads that cannot be broken down;
- education of employees with regard to fatigue management and inclusion of travel time when calculating "hours worked" for the purpose of MCCM's fatigue management policy;
- heavy vehicle drivers to display a high level of courtesy;
- provision of the shuttle bus service to transport workers at no direct cost to the workers, including quarterly monitoring of the level of use of the shuttle buses by employees against nominated performance criteria; and
- minimising interaction with school buses through consultation and consideration of shift change times relative to school bus times.

The TMP includes a Code of Conduct applicable to all drivers of light and heavy vehicles engaged by MCCM. The Code of Conduct outlines requirements for driver behaviour, including the need to fully comply with the TMP, and display courteous and safe driving practices.

2.1.8 Road Upgrades

Schedule 3 of PA 10_0138 includes a number of requirements for road upgrades and maintenance. These are summarised in Table 2.3, which includes a brief description of the current status of the relevant condition.

Table 2.3: PA 10_0138 Road Upgrade and Maintenance Requirements and Status

PA 10_0138 Condition	Status of Upgrade
59. The Applicant must construct, operate and maintain the rail bridge over the Kamilaroi Highway for the shared section of the Boggabri rail spur line to the satisfaction of RMS (now TfNSW)*, and must make all necessary contributions to the costs associated with construction, maintenance and decommissioning of this bridge to the satisfaction of the Planning Secretary.* *Note all costs should be shared on an equitable basis with the Applicant of the Boggabri Coal Project.*	The rail bridge over the Kamilaroi Highway was completed during 2014 (MCC, 2015).
60. The Applicant must meet RMS's requirements for road intersection upgrades for all State roads used by the project, including upgrading the intersection of Manilla Road and the Kamilaroi Highway to provide a channelised right turn in accordance with Austroads guidelines. *Note: Any upgrades should be undertaken on an equitable basis with the Applicant of the Boggabri Coal Project.*	The need for upgrades has not been triggered (ERM, 2018). Rangari Road (Manilla Road) is no longer used as a primary access for Boggabri Coal Mine (BCM) following the approval and construction of its new access road directly to/from Kamilaroi Highway. MCCM has exercised its option to use the BCM access and so also no longer uses Rangari Road (Manilla Road) as its principal access route to/from Kamilaroi Highway. It is understood that RMS (now TfNSW) provided a submission to Modification 3 and did not object to the upgrade not proceeding.
61. The Applicant must upgrade and seal the unsealed section of Manilla Road between its intersections with the Tarrawonga Coal mine access road and Barbers Lagoon Road, to the satisfaction of RMS.	The upgrade and sealing of the unsealed section of Manilla Road was completed during 2014 (MCC, 2015).
62. The Applicant must ensure that there is no substantial access of heavy vehicles for construction activity to the site prior to the upgrade referred to in condition 61 above, to the satisfaction of the Planning Secretary. However, the Planning Secretary may approve heavy vehicle access to the site prior to or during this upgrade, subject to the Applicant demonstrating that dust impacts can be minimised in accordance with an approved Traffic Management Plan.	Compliant (SMEC, 2016) and construction activity now complete.

Table 2.3 indicates that there are no road upgrade requirements that remain outstanding.

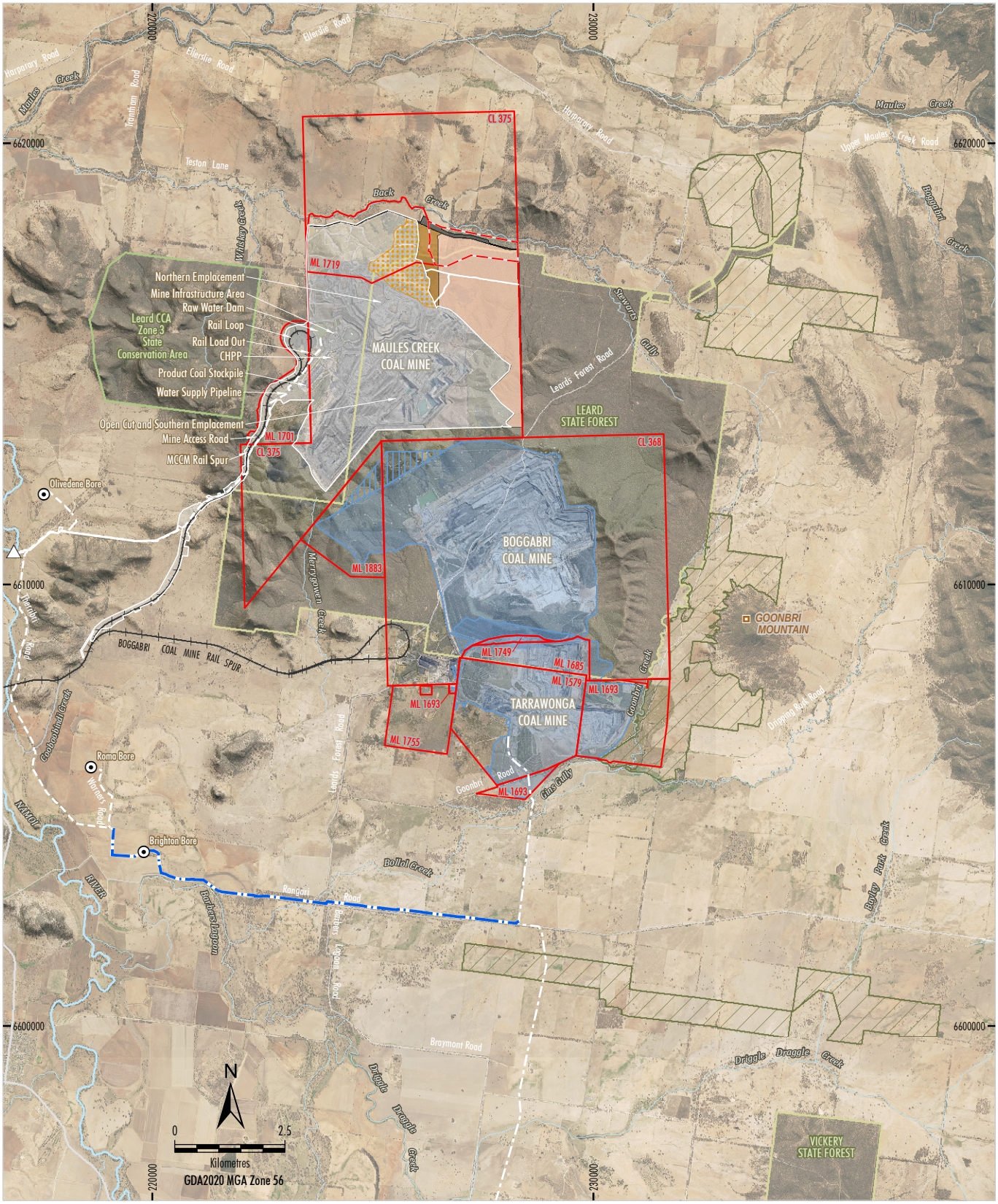
2.2 Maules Creek Continuation Project

2.2.1 Project Description

Compared to the existing approved MCCM, the Project would include the following additional key activities:

- extension of open cut mining operations within Coal Lease 375, Mining Lease 1719 and Authorisation 346 to allow mining and processing of additional coal reserves until approximately 31 December 2044;
- extraction of approximately 117 Mt of ROM coal (in addition to the approved MCCM coal resource of 240 Mt of ROM coal);
- extraction of up to 14 Mtpa of ROM coal (i.e. a 1 Mtpa increase from the currently approved maximum ROM coal mining rate of 13 Mtpa);
- a revegetation program to establish approximately 2,300 ha of native woodland in the vicinity of the MCCM (i.e. in addition to any offset and rehabilitation obligations);
- an increase in the operational workforce to an average of approximately 940 people, with a peak operational workforce of approximately 1,030 people;
- continued operation of the existing CHPP and train load-out and rail spur infrastructure, with upgrades as required;
- continued transport of up to 12.4 Mtpa of product coal via rail (i.e. no change to the currently approved maximum product coal transport rate);
- development of an integrated waste rock emplacement landform that incorporates geomorphic design principles;
- construction and use of a remote go-line, access and infrastructure area;
- continued operation and extension of the MCCM water management system;
- upgrades to workshops, electricity distribution and other ancillary infrastructure;
- continued placement of coal rejects within the mined out voids and the out-of-pit overburden emplacement areas;
- construction and operation of a water transfer pipeline between the MCCM water pipeline network and the approved VCM to TCM pipeline;
- ongoing exploration activities; and
- other associated infrastructure, equipment and activities.

The indicative Project general arrangement is provided on Figure 2.3.



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LEGEND

- Rail Line
- State Conservation Area
- State Forest
- Mining Tenement Boundary (ML and CL)
- Provisional Mining Lease Application Area
- Other Mining Operation *
- Other Mining Operation - Proposed *
- VCM to TCM Water Transfer Pipeline

Existing/Approved MCCM Development

- Approximate Extent of Existing/Approved Surface Development
- MCCM Water Supply Pipeline
- MCCM Groundwater Supply Bore
- MCCM Namoi River Pump Station

Maules Creek Continuation Project

- Indicative Go-line, Access and Infrastructure Area
- Indicative Open Cut Extension Area
- Indicative Overburden Emplacement Extension
- Existing Overburden Rehabilitation to be Disturbed
- Indicative Landscape Revegetation Zones#
- Indicative Water Transfer Pipeline (Proposed)

Source: NSW Spatial Services (2024)
Orthophoto Mosaic: Whitehaven (2019-2024)

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MAULES CREEK CONTINUATION PROJECT

General Arrangement of the Project

** BCM boundary digitised from Figure 1 of the BCM Modification 10 Scoping Letter.*

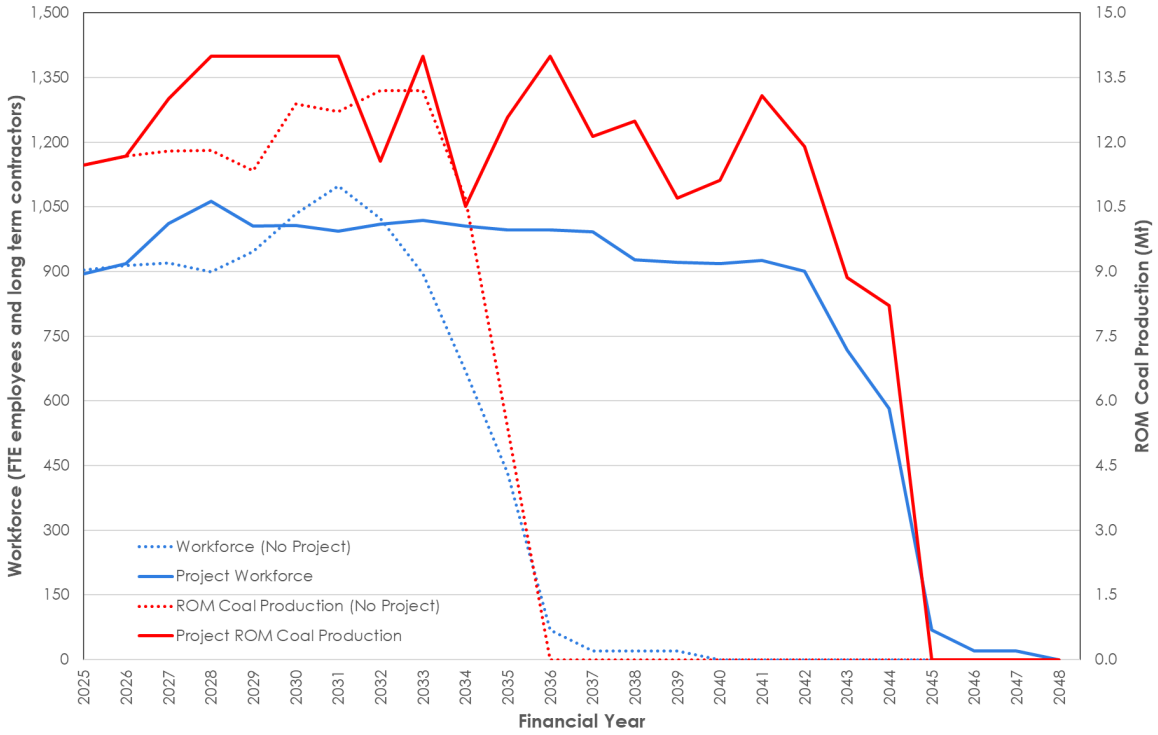
#Landscape Revegetation Zones shown on this figure are approximate extents only.

Figure 2-3

2.2.2 Future Operations with the Project

The expected total FTE workforce associated with the Project (inclusive of employees, long-term contractors and construction personnel) and its forecast annual ROM coal production are as presented in Figure 2.4. This figure also compares the Project forecasts with those expected should the Project not proceed (refer to Figure 2.2). Consistent with the approved MCCM, a small workforce would remain present for a period after cessation of mining activities to undertake rehabilitation activities.

Figure 2.4: Project Forecast Workforce and ROM Coal Production



2.3 Assessment Scenarios

With regard to potential impacts of the Project on the road transport environment, the key features of the Project are:

- increase in ROM coal production from 13 Mtpa to 14 Mtpa;
- continued transport of up to 12.4 Mtpa of product coal via rail with no changes to the train loading hours, average or maximum daily laden train movements, or the rail transport routes;
- continuation of employment of the workforce;
- minor construction activities associated with the remote go-line, access and infrastructure area, water transfer pipeline and revegetation program, and progressive construction activities would occur over the life of the Project consistent with approved operations;
- continued vehicular access to the site primarily via the dedicated private access road off Kamilaroi Highway; and
- continued use of buses to transport part of the workforce to and from MCCM.

For the purpose of this assessment of the impacts of the Project on the road transport environment, and considering the TfNSW input to the SEARs regarding assessment of projected traffic at commencement of operations and a 10-year horizon post-commencement, the following scenarios have been adopted:

- Year 2028 – at this time, the Project would employ its peak workforce of approximately 1,065 FTE personnel) and ROM coal production would be at its peak of 14 Mtpa. This occurs after "commencement" of the Project, however, represents peak Project conditions.
- Year 2036 – approximately 10 years after Project commencement, and represents peak Project conditions during the proposed extended life of the mine. At this time, the Project would employ a workforce of approximately 996 FTE personnel (comprising 676 FTE operational employees and 320 FTE long-term contractors) and ROM coal production would be at its peak of 14 Mtpa.

The above assessment scenarios are expected to encapsulate peak operational traffic impacts associated with the Project, in addition to traffic impacts 10 years post-commencement of mining operations. The above assessment scenarios also consider the potential cumulative impacts from other major developments proximal to the Project (Section 4.1).

3 Background Road Transport Environment

3.1 Road Network

The key roads which serve the MCCM are described below.

Kamilaroi Highway (Route B51) is a State Road which provides a link between New England Highway at Willow Tree and Bourke. Through Boggabri, Kamilaroi Highway is also known as Wee Waa Street and Grantham Street. In the vicinity of the MCCM, Kamilaroi Highway has a sealed surface with a single travel lane in each direction, sealed shoulders and a posted speed limit of 100 kilometres per hour (km/h). Line marking on Kamilaroi Highway comprises single broken dividing lines, double one-way barrier lines, and double two-way barrier lines, with continuous edge lines. Guide posts are provided alongside Kamilaroi Highway, and advisory signs provide guidance to drivers along the route.

In the region, Kamilaroi Highway is an approved route for 25 metre (m) B-doubles, noting there is a designated route through Gunnedah via Bloomfield Street and Warrabungle Street. It is also an approved route for Type 1 A-double, Modular B-triple, B-triple and AB-triple road trains under specified conditions.

A private road, referred to herein as **Shared Access Road** is a two-lane, two-way sealed road that provides vehicular access between Kamilaroi Highway and MCCM and BCM. The Shared Access Road divides to link with Kamilaroi Highway at two intersections, which were constructed to the requirements of TfNSW in accordance with PA 09_0182, which is held by Boggabri Coal Operations Pty Ltd (BCOPL). At the northern intersection, the Shared Access Road lies to the east of Kamilaroi Highway, and at the southern intersection, the Shared Access Road lies to the west of Kamilaroi Highway. Between the two intersections, the Shared Access Road crosses over Kamilaroi Highway at a grade separated crossing. At each intersection with Kamilaroi Highway, only left turn movements are permitted to and from Kamilaroi Highway. This arrangement permits access for MCCM and BCM to and from both the north and south on Kamilaroi Highway, with only left turn diverge and merge movements at the highway.

At each of the intersections of the Shared Access Road with Kamilaroi Highway, an auxiliary left turn lane is provided in Kamilaroi Highway for vehicles entering the Shared Access Road to slow to turn clear of the through traffic. Vehicles entering Kamilaroi Highway are provided with a dedicated lane which allows those vehicles to accelerate prior to merging with the through traffic. The northbound and southbound lanes on Kamilaroi Highway are separated by a wire rope barrier at both intersections.

The Shared Access Road typically has edgelines and double two-way barrier centrelines, as shown in Figure 3.1. It has a signposted speed limit of 80 km/h, with some curves having advisory speeds of 45 km/h and 55 km/h. The Shared Access Road passes under the railway line that serves MCCM and BCM, with a signposted height clearance of 5.0 m.

Figure 3.1: Typical Section of Shared Access Road West of Therribri Road

At its intersection with Therribri Road, vehicles on the Shared Access Road are required to stop, with traffic on Therribri Road having priority. West of Therribri Road, speed humps are located on the Shared Access Road approaching the intersection. East of Therribri Road, the Shared Access Road has gates available to prevent access if required, and has a signposted speed limit of 80 km/h. Gates are also available to prevent access to the Shared Access Road both east and west of Kamilaroi Highway.

A private road, referred to herein as **MCCM Access Road** extends to the north-east from the Shared Access Road to provide access to the MCCM only. A private road, referred to herein as **BCM Access Road** extends westwards from the Shared Access Road to provide access to the BCM only. A reduced speed limit of 50 km/h is signposted on the Shared Access Road approaching the intersection with the MCCM and BCM Access Roads. The MCCM Access Road and BCM Access Road are two-lane, two-way sealed roads. The MCCM Access Road has a signposted speed limit of 50 km/h.

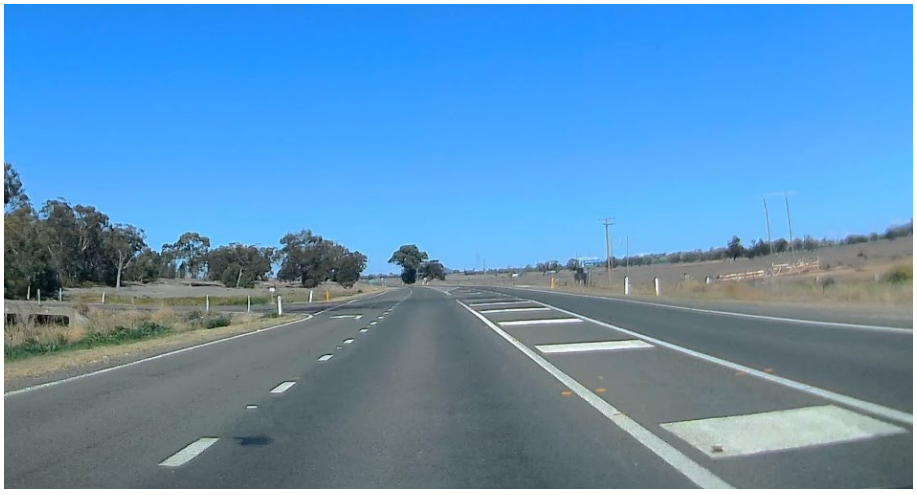
Figure 3.2: Shared Access Road at MCCM and BCM Accesses

Rangari Road is a Regional road (MR357) south of the MCCM, providing east-west access between Kamilaroi Highway and Manilla, including access to local roads in the region of MCCM such as Therribri Road, Leard Forest Road, Barbers Lagoon Road and the Whitehaven Approved Road Transport Route. It is a two-lane, two-way sealed road. In accordance with Condition 61 of Schedule 3 of PA 10_0138, MCC completed the upgrade and sealing works on the formerly unsealed section of Rangari Road between its intersections with the Whitehaven Approved Road Transport Route and Barbers Lagoon Road.

During 2023, Rangari Road was widened and sealed by TfNSW on behalf of the Gunnedah Shire LGA and Tamworth Regional LGA. The work was undertaken over a 19.6 km section of Rangari Road from the boundary of the Gunnedah Shire LGA and Narrabri Shire LGA to 3.8 km east of the boundary of the Gunnedah Shire LGA and Tamworth Regional LGA. During 2024, additional widening and sealing was undertaken near the boundary of the Gunnedah/Narrabri Shire LGA boundary, which included straightening of a sharp bend at that location.

The intersection of Rangari Road with Kamilaroi Highway has an auxiliary left-turn treatment and channelised right-turn treatment in Kamilaroi Highway, with an acceleration lane for vehicles turning left from Rangari Road to Kamilaroi Highway, as shown in Figure 3.3. Rangari Road has a signposted speed limit of 80 km/h, reducing to 10 km/h at the Iron Bridge at Namoi River

Figure 3.3: Kamilaroi Highway at Rangari Road



Therribri Road is a local two-lane, two-way road linking Harparary Road in the north to Rangari Road in the south. It lies to the west of the MCCM and to the east of the Namoi River. Therribri Road intersects with the Shared Access Road between the MCCM Access Road and Kamilaroi Highway. Prior to commissioning of the highway intersections with the Shared Access Road, Therribri Road between its intersections with Rangari Road and the Shared Access Road was used by all MCCM-related traffic travelling to and from Kamilaroi Highway. That part of Therribri Road was upgraded, with funds provided by MCC as part of its Voluntary Planning Agreement with Narrabri Shire Council.

Leard Forest Road is a local rural road with a single travel lane in each direction. Prior to the development of the BCM, it extended northwards from Rangari Road through the Leard State Forest (to the west of the Project) to Harparary Road to the north. The southern section of Leard Forest Road provides a secondary access to the BCM and public access into the BCM area is not available north of the BCM access point. Public access to the section of Leard Forest Road north of the BCM is available via Harparary Road.

The **Whitehaven Approved Road Transport Route** between the TCM, VCM and the Whitehaven CHPP includes:

- Whitehaven Private Haul Road north-south between the TCM and Rangari Road;
- Rangari Road (between the two sections of private haul road);
- Whitehaven Private Haul Road south of Rangari Road, which crosses Hoad Lane and passes through the former Canyon Coal Mine and east-west to Hoad Lane;
- Hoad Lane between the Whitehaven Private Haul Road and Blue Vale Road;
- Shannon Harbour Road between the Rocglen Coal Mine (RCM) Access and Hoad Lane (noting ROM coal is no longer transported from RCM following cessation of mining operations in 2019);
- Braymont Road between the VCM Access and Blue Vale Road;
- Blue Vale Road between Hoad Lane and Kamilaroi Highway;
- Kamilaroi Highway between Blue Vale Road and Whitehaven CHPP access road; and
- the Whitehaven CHPP access road.

3.2 Heavy Vehicle Routes

Heavy vehicle access to and from MCCM is available via Kamilaroi Highway and the Shared Access Road. Kamilaroi Highway is an approved route for General Mass Limit (GML) and Higher Mass Limit (HML) 25/26 m B-doubles. It is also a conditionally approved route for GML and HML Type 1 A-doubles, Modular B-triples, B-triples and AB-triples.

Kamilaroi Highway is an approved route for OSOM vehicles operating under the following Heavy Vehicle National Law Notices:

- Multi-State Class 1 Load Carrying Vehicles Dimension Exemption Notice 2024, which authorises the use of Class 1 Load Carrying Vehicles that are up to 5.5 m wide, 35 m long and 5 m high; and
- Multi-State Class 1 Load Carrying Vehicles Mass Exemption Notice 2023, which authorises the use of Class 1 Load Carrying Vehicles that are up to 115 t.

3.3 Historic Traffic Conditions

TTPP has collated traffic data collected on roads in the vicinity of the MCCM over recent years. That data is presented in Table 3.1, noting that some of this data pre-dates use of the Shared Access Road by BCM and MCCM traffic. Use of the Shared Access Road changed the distribution of traffic in the local area, with reduced use of Rangari Road, Therribri Road and Leard Forest Road, and localised changes to traffic on Kamilaroi Highway between the Shared Access Road north intersection and Rangari Road.

Prior to use of the Shared Access Road, BCM vehicular access was via Rangari Road and Leard Forest Road, and vehicular access to/from MCCM was via Rangari Road and Therribri Road.

Table 3.1: Historic Surveyed Average Daily Traffic (vehicles per day)

Road and Location	2015	2016	2018	2019	2021	2022	2023	Data Type and Source
BCM Access Road East of MCCM Access Road	-	-	557	526	485	566	623	Daily[A] Cardno, 2022 BCOPL, 2023, BCOPL, 2024
Kamilaroi Highway South of Kurrajong Creek Road	-	-	-	2,528	-	-	-	Weekdays TTPP, 2020
Kamilaroi Highway North of Rangari Road	2,200	-	-	-	-	-	-	Weekdays GTA Consultants, 2016[B]
Kamilaroi Highway South of Rangari Road	2,795	-	-	-	-	-	-	Weekday GTA Consultants, 2016[B]
Leard Forest Road south of BCM	-	-	962	160	213	188	129	Daily[A] Cardno, 2022 BCOPL, 2023, BCOPL, 2024
MCCM Access Road East of Therribri Road	395	-	-	-	-	-	-	Weekdays GTA Consultants, 2016[B]
Rangari Road on Whitehaven Approved Road Transport Route	-	-	971	-	-	-	-	Weekdays TTPP, 2019
Rangari Road East of Kamilaroi Highway	-	362	-	-	-	-	-	Unknown Cardno, 2022
Rangari Road East of Kamilaroi Highway	957	-	-	-	-	-	-	Weekdays GTA Consultants, 2016[B]
Rangari Road East of Therribri Road	669	-	-	-	-	-	-	Weekdays GTA Consultants, 2016[B]
Shared Access Road south west of Kamilaroi Highway	-	-	604	435	521	-	-	Daily[A] Cardno, 2022
Shared Access Road north east of Kamilaroi Highway	-	-	682	442	525	-	-	Daily[A] Cardno, 2022
Shared Access Road East of Therribri Road	-	-	-	973	1,159	-	-	Daily[A] Cardno, 2022
Therribri Road North of Rangari Road	446	-	-	-	-	-	-	Weekday GTA Consultants, 2016[B]

[A] *Volumes are reported as Annual Average Daily Traffic (AADT) but are assumed to be Average Daily Traffic (ADT) over each 2-week survey period.*
[B] *Surveyed prior to construction of the Shared Access Road used by BCM and MCCM traffic.*

3.4 Traffic Surveys

To quantify existing traffic conditions in the vicinity of the MCCM, a program of traffic surveys was commissioned in June 2023. Automatic Tube Count (ATC) surveys were conducted over one week from Friday 23 June 2023 to Thursday 29 June 2023 inclusive at:

A. Kamilaroi Highway north of Rangari Road;
B. MCCM Access Road north of the BCM Access Road;
C. Rangari Road south of Therribri Road;
D. Shared Access Road between the MCCM and BCM Access Roads and Therribri Road;
E. Shared Access Road (north) east of Kamilaroi Highway;
F. Shared Access Road (south) west of Kamilaroi Highway; and
G. Therribri Road between Rangari Road and Shared Access Road.

The ATC surveys were supplemented with video surveys of vehicle turning movements between 5:00 am and 7:00 pm on Tuesday 27 June 2023 at the intersections of:

H. Kamilaroi Highway and Rangari Road; and
I. Rangari Road and Therribri Road.

The traffic survey locations are illustrated in Figure 1.2.

3.4.1 Daily Traffic Volumes

Table 3.2 summarises the surveyed two-way traffic volumes recorded at the ATC survey locations.

Table 3.2: Surveyed Daily Traffic by Day of the Week (vehicles per day)

Site[A]	Road and Location	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Day	Average Weekday
A	Kamilaroi Highway North of Rangari Road	3,462	3,645	3,500	3,538	3,411	2,278	2,187	3,146	3,511
B	MCCM Access Road	723	775	815	781	684	389	412	654	756
C	Rangari Road South of Therribri Road	318	346	357	348	304	189	182	292	335
D	Shared Access Road East of Therribri Road	1,429	1,680	1,686	1,548	1,205	772	794	1,302	1,510
E	Shared Access Road East of Kamilaroi Highway	688	798	810	697	573	370	377	616	713
F	Shared Access Road West of Kamilaroi Highway	636	763	766	750	552	344	362	596	693
G	Therribri Road North of Rangari Road	129	127	130	144	105	55	62	107	127

[A] *Refer to Figure 1.2.*

Table 3.2 indicates that at all survey locations, the daily traffic demands on weekdays are notably higher than on weekend days. Weekdays are therefore the more critical with regard to overall daily road capacity.

3.4.2 Traffic Composition

The surveys included classification of the vehicles based on the Austroads-94 Vehicle Classification System. Light vehicles include motorcycles, cars, vans, four-wheel drives, and utilities (including those towing a trailer or caravan). Heavy vehicles include single unit rigid trucks and buses with two, three or four axles and up to 14.5 m long, as well as articulated vehicles (which include semi-trailers and rigid trucks with trailers, B-Doubles and road trains where permitted).

Under the Austroads-94 Vehicle Classification System, vehicles are grouped into 12 classifications based on wheelbase and axle distributions. Class 3 vehicles are two-axle trucks and buses which are classified as heavy vehicles under that system. Due to their longer wheelbase, some four-wheel drives and utilities that are commonly used by workers and contractors in mining environments are identified as Class 3 vehicles under that system. These vehicles (such as Ford Rangers and Dodge RAM 1500 utilities) typically have a GVM below 4.5 t, and so are generally considered as light vehicles. To gauge the extent to which the presence of these larger light vehicles in the Boggabri region may have been classified as heavy vehicles by the ATC surveys, a comparison has been made between the ATC and intersection survey results on Kamilaroi Highway. The intersection survey videos were reviewed over the periods from 5:00 am to 8:00 am, and from 3:00 pm to 7:00 pm to visually identify the contribution of larger utilities and four-wheel drives to the traffic demands. The total two-way traffic on Kamilaroi Highway during the reviewed hours was 1,756 vehicles, equivalent to half of the average weekday demand of 3,511 vehicles, so it considered a good basis for the review.

Over the reviewed seven hours, the ATC results indicate that of the total vehicles on Kamilaroi Highway in Classes 1, 2 and 3, 86 % were light vehicles (Class 1 or 2), and 14 % were heavy vehicles (Class 3). Over the same period, the video survey results indicate that of the total vehicles in Classes 1, 2 and 3, 94 % were light vehicles and 6 % were heavy vehicles. The ATC results therefore over-estimate the number of heavy vehicles, noting the extent to which heavy vehicles were overestimated varies by direction and time of day.

Given the relatively high proportion of Class 3 vehicles and the ambiguity as to whether those vehicles are light or heavy, Table 3.3 presents the average weekday composition of the traffic using the ATC survey results, with Class 3 vehicles separated.

Table 3.3: Average Weekday Traffic by Austroads-94 Vehicle Class 2023

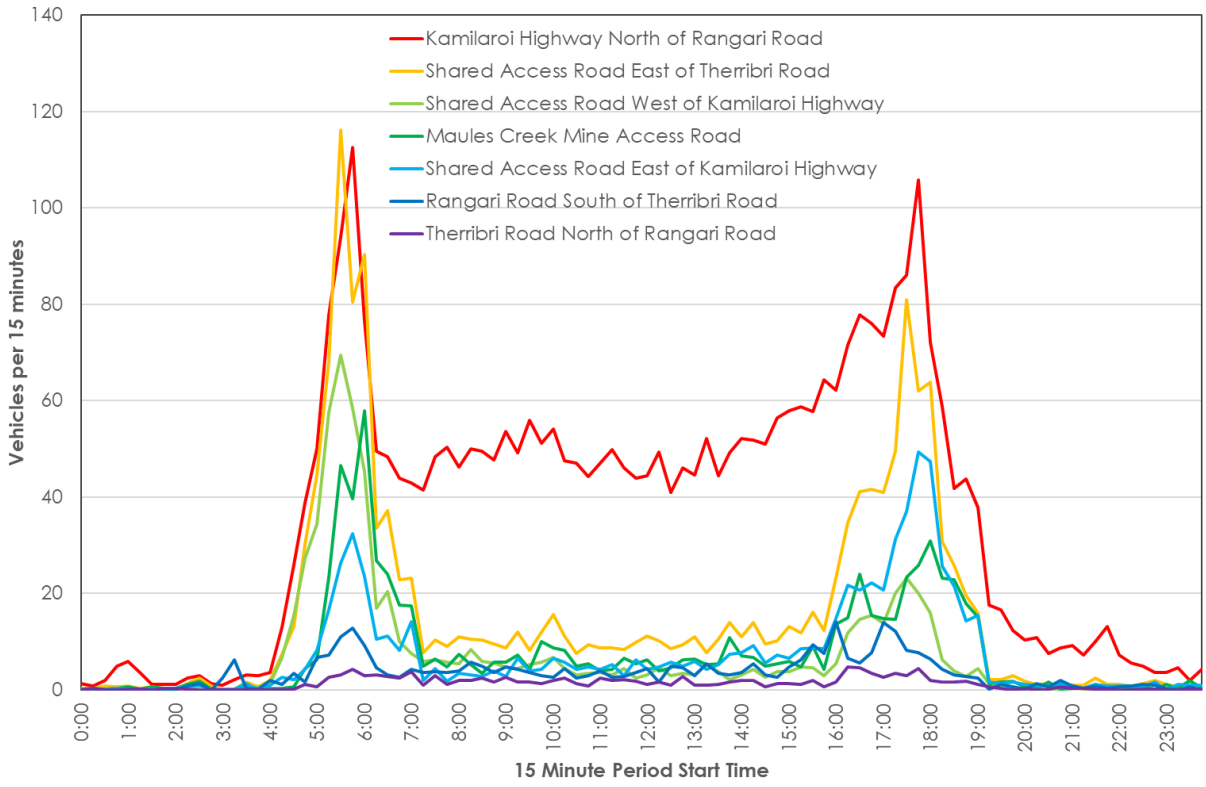
Site[A]	Road and Location	Vehicles per Day				
		Light Class 1-2	Class 3	Rigid Heavy Class 4-5	Heavy Articulated Class 6-12	Total
A	Kamilaroi Highway North of Rangari Road	2,610	441	80	380	3,511
B	MCCM Access Road	413	290	19	34	756
C	Rangari Road South of Therribri Road	283	35	6	11	335
D	Shared Access Road East of Therribri Road	1,110	261	32	107	1,510
E	Shared Access Road East of Kamilaroi Highway	561	83	12	57	713
F	Shared Access Road West of Kamilaroi Highway	393	236	9	55	693
G	Therribri Road North of Rangari Road	107	12	3	5	127

[A] *Refer to Figure 1.2.*

3.4.3 Hourly Traffic Volumes

Figure 3.4 presents the surveyed variation in traffic demands on a 15-minute basis throughout the average weekday. This demonstrates that most of the surveyed roads display distinct peaks in demands during the morning between approximately 5:00 am and 7:00 am, and during the evening between approximately 4:30 pm and 7:00 pm.

Figure 3.4: Surveyed Average Weekday Traffic by Time of Day 2023 (vehicles per 15 minutes)



Consistent with expected conditions with the peak traffic demands moving through the road network over time, the time at which the peak hourly demands occurred was not consistent at all surveyed locations. Table 3.4 presents the surveyed peak hourly volumes at the surveyed locations, and the surveyed volumes during the morning and evening peak hours associated with MCCM-generated traffic (i.e. 5:30 am to 6:30 am and 5:30 pm to 6:30 pm).

Table 3.4: Surveyed Peak Hourly Traffic Volumes (vehicles per hour)

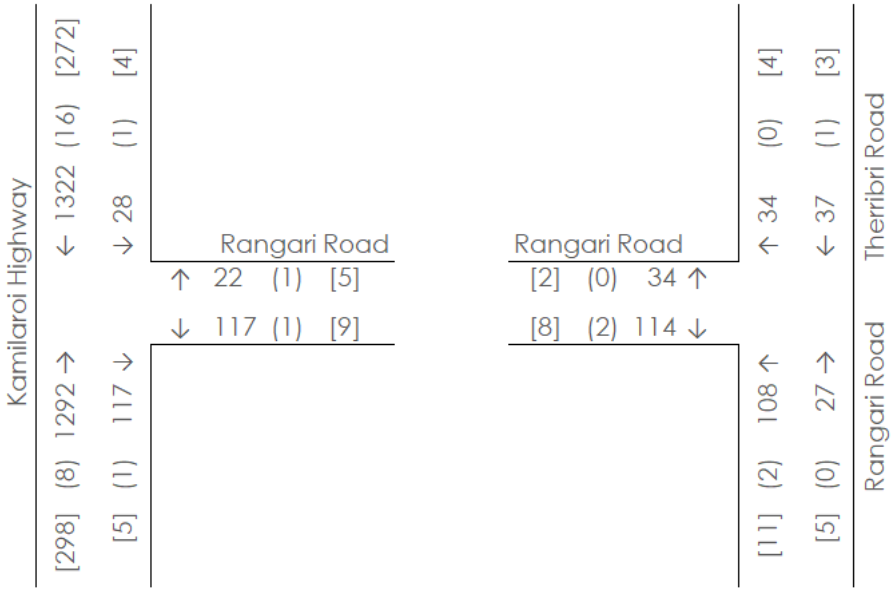
Site[A]	Road and Location	Site AM Peak Hour		Site PM Peak Hour		MCCM Peak Hours	
		Hour Start	Vehicles per Hour	Hour Start	Vehicles per Hour	5:30am-6:30am	5:30pm-6:30pm
A	Kamilaroi Highway North of Rangari Road	5:15	361	17:00	349	334	323
B	MCCM Access Road	5:30	172	17:30	104	172	104
C	Rangari Road South of Therribri Road	5:15	40	16:45	42	37	26
D	Shared Access Road East of Therribri Road	5:15	355	17:15	256	321	237
E	Shared Access Road East of Kamilaroi Highway	5:15	99	17:15	165	94	159
F	Shared Access Road West of Kamilaroi Highway	5:15	231	17:15	79	190	66
G	Therribri Road North of Rangari Road	5:30	14	16:15	15	14	11

[A] *Refer to Figure 1.2.*

3.4.4 Vehicle Turning Movements

The intersection turning movement surveys recorded the number of vehicles travelling through and turning at the intersections, with the vehicles visually classified as being light, heavy (excluding buses) or a bus. The total light and heavy vehicle turning movements recorded during the 14-hour survey period are presented in Figure 3.5.

Figure 3.5: Surveyed Vehicle Turning Movements 5am to 7pm Tuesday 27 June 2023



Total vehicles in 14 hours. 5 = light vehicles, (5) = buses, [5] = heavy vehicles

Figure 3.5 shows that the major movements on Rangari Road are to and from the south on Kamilaroi Highway, and continuing along Rangari Road past Therribri Road. Access to and from MCCM is available via Therribri Road, being the shortest route for those MCCM workers who reside to the east. The results suggest that only a very limited number of trips to and from MCCM are currently using Therribri Road and Rangari Road (east or west of Therribri Road), noting that Therribri Road also provides public access to land to the north of the Shared Access Road and through to Harparary Road.

3.5 Maules Creek Coal Mine Traffic

3.5.1 MCCM Activities During Surveys

Based on the reported FTE workforce at MCCM at the end of 2022 and end of 2023 (Table 2.3), and the reported ROM coal production during 2023 (Table 2.1) activity at MCCM during the traffic surveys in mid-2023 is estimated at approximately:

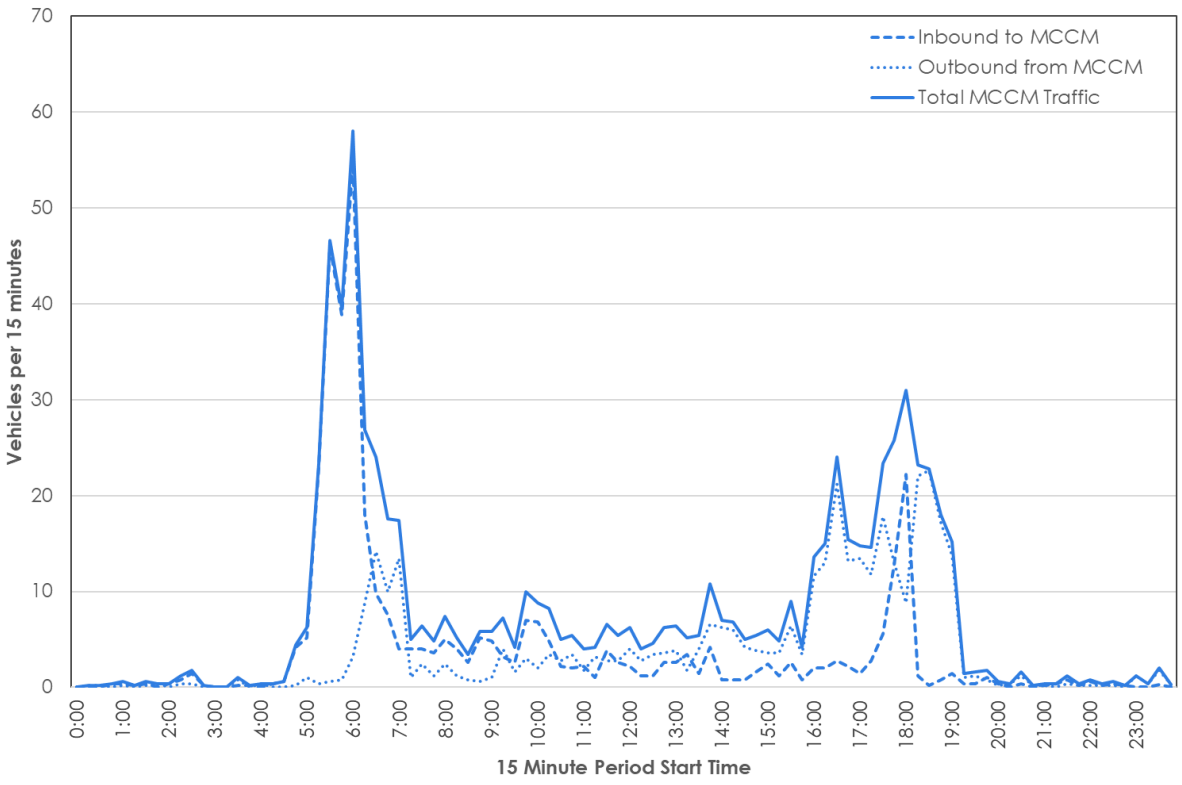
- 804 FTE workers (518 employees and 286 contractors); and
- 11.65 Mtpa ROM coal production.

Whitehaven's records also indicate that the amount of product coal transported each month during 2023 varied significantly, between a minimum of 0.46 Mt during April up to 0.92 Mt during June. It is likely that the ROM coal production rate also varied from month to month.

3.5.2 Traffic Generation

The traffic survey results (refer to Section 3.4) indicate that over the surveyed period, MCCM-generated an average of 756 vehicle trips per weekday (Table 3.2). For clarity, a trip is a one-way movement so one vehicle arriving at MCCM and departing MCCM generates two vehicle trips. Figure 3.6 presents the distribution of those MCCM-generated trips throughout the average weekday. This indicates that inbound traffic to MCCM has a distinct peak in the morning, and a notably lower and longer peak for outbound traffic in the evening. Outbound traffic from MCCM has a low peak in the morning which coincides with the shoulder of the inbound peak, and a higher but more spread peak in the evening. Inbound and outbound volumes through the middle of the day and overnight are low.

Figure 3.6: Average Weekday MCCM Vehicle Trips by Time of Day (vehicles per 15 minutes)



The peak hours for traffic generation of MCCM occurred between 5:30 am and 6:30 am, and between 5:30 pm and 6:30 pm. Table 3.5 summarises the vehicle trips generated by MCCM during those peak hours, and over the average weekday. As discussed in Section 3.4.2, Class 3 vehicles are presented separately, and are assumed to be a combination of light and heavy vehicles.

Table 3.5: Average Weekday MCCM Trip Generation by Vehicle Type 2023

	Light Class 1-2		Class 3		Rigid Heavy Class 4-5		Heavy Articulated Class 6-12	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
AM Peak Hour[A] 5:30 am to 6:30 am	92	8	64	6	1	0	1	0
PM Peak Hour[A] 5:30 pm to 6:30 pm	12	40	29	22	0	0	1	0
Daily[B]	206	206	145	145	10	10	17	17

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

The results in Table 3.5 demonstrate that the traffic generated by MCCM is primarily inbound during the morning peak hour (5:30 am to 6:30 am), with 92 % of the total traffic being inbound and 8 % being outbound. During the evening peak hour (5:30 pm to 6:30 pm), 60 % of MCCM-generated traffic is outbound and 40 % is inbound.

Review of Whitehaven's workforce travel records throughout the week of the surveys indicates that on the average weekday, shuttle buses and vans accounted for approximately:

- nine inbound and one outbound trip between 5:30 am and 6:30 am;
- four inbound and six outbound trips between 5:30 pm and 6:30 pm; and
- 59 inbound and outbound trips per day.

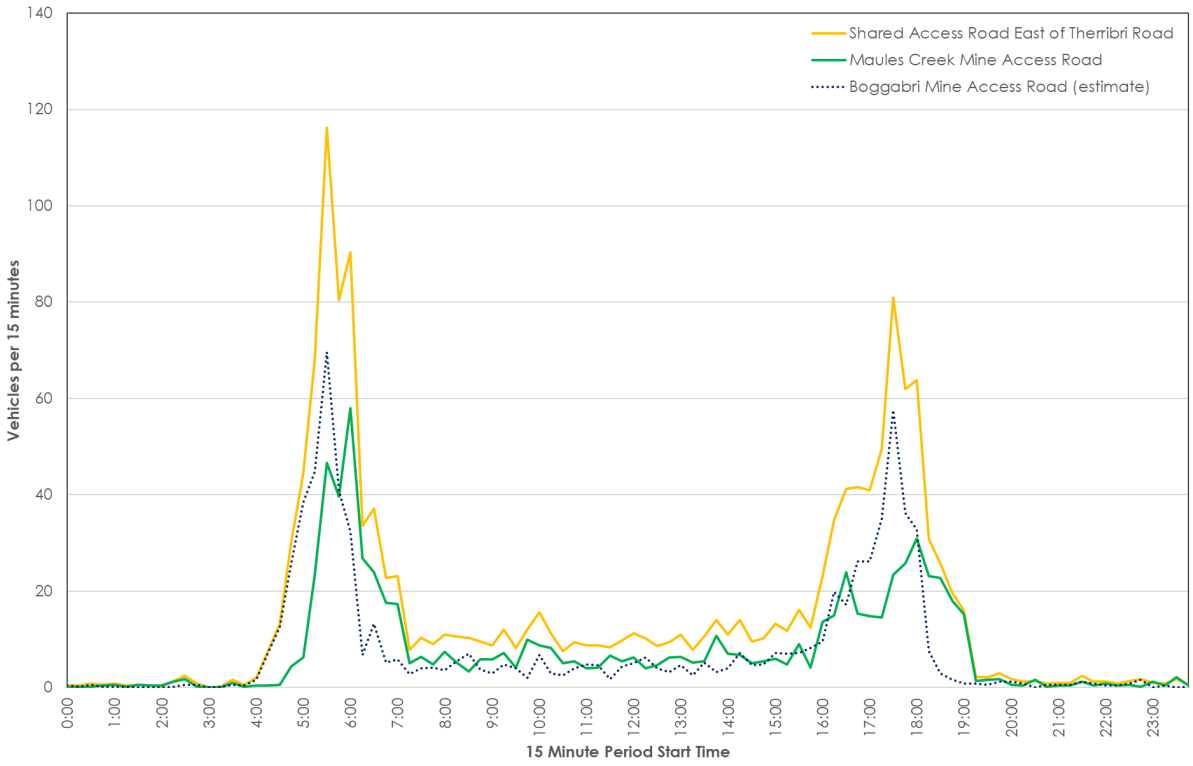
Workforce shuttle buses used by MCCM and contractors are typically Toyota Coasters and similar vehicles, which would be identified as Class 3 vehicles under the Austroads-94 Vehicle Classification System. Toyota Coasters are heavy vehicles, having a GVM greater than 4.5 tonnes.

3.5.3 Traffic Distribution

The results of the traffic survey program have been reviewed to estimate the distribution of traffic generated by MCCM on the road network. Over the average weekday, the Shared Access Road east of Therribri Road carried 1,510 vehicles per day and the MCCM Access Road carried 756 vehicles per day (refer to Table 3.2). As that part of the Shared Access Road is only used by MCCM and BCM traffic, this suggests that the balance of 754 vehicles per day were generated by BCM. Over the average weekday, use of the Shared Access Road is therefore approximately evenly divided between MCCM and BCM traffic.

The contribution of each mine to total traffic during the peak hours varies from the overall daily division, as the peaks for the two mines do not coincide. This is illustrated in Figure 3.7, which estimates the trips generated by BCM as the difference between those recorded on the Shared Access Road east of Therribri Road and those recorded on the MCCM Access Road. On this basis the peak hours for BCM-generated traffic occur between 5:00 am and 6:00 am, and between 5:15 pm and 6:15 pm.

Figure 3.7: Average Weekday MCCM and BCM Vehicle Trips (vehicles per 15 minutes)



Based on the survey data, the distribution of MCCM-generated traffic on the Shared Access Road has been estimated during the peak hours and average weekday, as summarised in Table 3.6.

Table 3.6: Estimated Distribution of MCCM Traffic

Approach or Departure Direction	5:30 am to 6:30 am		5:30 pm to 6:30 pm		Daily	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
North via Kamilaroi Highway	14.7%	14.8%	17.3%	17.5%	17.0%	17.0%
South via Kamilaroi Highway	82.2%	83.3%	77.6%	78.3%	76.1%	76.1%
East via Therribri Road and Rangari Road	3.1%	1.9%	5.1%	4.2%	6.9%	6.9%

Based on the survey data, the indicative distribution of MCCM-generated traffic at the survey locations is summarised in Table 3.7.

Table 3.7: Estimated MCCM Traffic at Surveyed Locations in 2023

Site[A]	Road and Location	5:30 am to 6:30 am (vehicles per hour)	5:30 pm to 6:30 pm (vehicles per hour)	Daily (vehicles per day)
A	Kamilaroi Highway North of Rangari Road	142	82	576
B	MCCM Access Road	172	104	756
C	Rangari Road South of Therribri Road	5	4	52
D	Shared Access Road East of Therribri Road	172	104	756
E	Shared Access Road East of Kamilaroi Highway	35	56	352
F	Shared Access Road West of Kamilaroi Highway	132	44	352
G	Therribri Road North of Rangari Road	5	4	52
-	Kamilaroi Highway North of Shared Access Roads	25	18	128

[A] *Refer to Figure 1.2.*

3.6 Road Safety History

Road crash data for roads of relevance to the Project were obtained from the Transport for NSW Centre for Road Safety for the period of 1 January 2019 to 31 December 2023. Data collected over this period include crashes which conform to the national guidelines for reporting and classifying road vehicles crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public (i.e. does not include the Shared Access Road or MCCM Access Road).
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

The data review included Kamilaroi Highway between the outskirts of Gunnedah and Newell Highway at Narrabri; Rangari Road between Kamilaroi Highway and Manilla; and Therribri Road between Rangari Road and Harparary Road. No crashes were reported on Therribri Road.

Over the five-year period, 47 crashes were reported on the routes investigated, resulting in one fatality, 18 people being seriously injured, and 29 people being moderately injured.

Table 3.8: General Crash Types (1 January 2019 to 31 December 2023)

Route	Route Length (km)	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Kamilaroi Highway	93	-	1	5	4	2	-	3	12	11	**38**
Rangari Road	72	-	-	-	-	-	-	1	2	6	**9**
Therribri Road	25	-	-	-	-	-	-	-	-	-	**-**
Total Crashes by Type		**-**	**-**	**5**	**4**	**2**	**-**	**4**	**14**	**17**	**47**
Number of People Killed		-	-	1	-	-	-	-	-	-	1
Number of People Seriously Injured		-	-	6	1	-	-	-	6	5	18
Number of People Moderately Injured		-	-	2	5	4	-	2	6	10	29

Around two-thirds of crashes on the routes were single vehicle run-off-road crashes. Known causes of run-off-road crashes include:

- driver behaviours such as speed, inattention, avoidance measures, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;
- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, snow, livestock or native fauna.

Two crashes occurred near the northern intersection of Kamilaroi Highway with the Shared Access Road:

- 5.6 km north of Boggabri, on a Wednesday in June 2023, a northbound light truck utility left the carriageway to the right and struck the wire rope barrier, in darkness on a dry road surface and fine weather conditions (Crash ID 1325733). No people were injured. The crash was not directly related to traffic turning in or out of the Shared Access Road, noting that northbound traffic at this location is limited to through movements only.
- 50 m south of the intersection, on a Friday in April 2023, a southbound four-wheel drive performing a u-turn across double painted centre lines struck a southbound light truck, at dawn on a dry road surface and fine weather conditions (Crash ID 1317852). Two people were moderately injured, and one person received minor injuries. It is unknown whether either of the vehicles were associated with MCCM, with the crash being related to an illegal u-turn movement south of the intersection.

Two crashes were reported at the intersection of Kamilaroi Highway with Rangari Road:

- on a Wednesday in June 2022, a southbound car struck a light truck utility that was turning right from Rangari Road, at dusk on a dry road surface and fine weather conditions (Crash ID 1293518). No people were injured.
- On a Sunday in May 2019, a northbound light truck utility turning right left the carriageway to the left and struck a drain/culvert, in darkness on a dry road surface and fine weather conditions (Crash ID 1212373). Speeding was nominated as a contributing factor. One person was moderately injured.

The review of the road crash history does not highlight any notable clustering of crashes or particular causation factors.

3.7 Railway Level Crossings

Coal is transported southwards from the MCCM via the Maules Creek Rail Spur, shared Maules Creek/Boggabri East spur, and the Werris Creek Mungindi Railway before joining the Main Northern Railway from Werris Creek to the Port of Newcastle. The MCCM-generated coal trains travel through the following level crossings on public roads between the MCCM and Gunnedah, noting the distance is the rail distance from Central Station, Sydney (refer to Figure 1.2):

- LXM 530 Stock route road off Vine Lane at Boggabri – passive STOP control (516.780 km);
- LXM 529 Boston Street Boggabri – active boom gate and flashing lights control (515.774 km);
- LXM 528 Binalong Road at Emerald Hill – passive STOP control (509.036 km);
- LXM 527 Goolhi Road at Emerald Hill – active boom gate and flashing lights control (493.063 km);
- LXM 526 Rothsay Road at Emerald Hill – passive STOP control (486.424 km);
- LXM 523 Marquis Street at Gunnedah – active boom gate and flashing lights control with pedestrian paths (475.461 km); and
- LXM 522 Carroll Street at Gunnedah – active flashing lights control with pedestrian path (474.213 km).

The BCM Access Road crosses the Maules Creek Rail Spur and Boggabri East Spur at level crossings, however these are privately owned, and are not used by MCCM traffic.

The existing public level crossings between the Maules Creek Rail Spur and Gunnedah cross a single track only. Signage and road marking requirements associated with railway level crossings are set out in the *Manual of Uniform Traffic Control Devices Part 7: Railway Crossing* (Australian Standard [AS] 1742.7, 2007). AS 1742.7 does not provide guidance on when a crossing should progress from one treatment to another, as such guidance is found in risk assessment models such as the Australian Level Crossing Assessment Model.

Appendix B presents additional observations made of the level crossings with particular regard to road traffic controls such as signage and road markings at level crossings which may be used by MCCM-generated traffic. The observations found that the signage and linemarking across the level crossings is generally consistent with AS 1742.7, with some minor non-conformances. These are minor issues which represent low risks to the safety of the road network.

3.8 School Buses

A number of school bus services operate in the vicinity of the MCCM. The routes and pick up points are subject to change from year to year due to changes in school enrolments and places of residence of students. MCC consults with the bus service providers on a regular basis to stay abreast of the routes and bus stop locations. School bus services currently operating in the area surrounding the MCCM (MCC, 2024) are described below.

- Hopes Bus Service Pty Ltd operates the Willala Bus Service, which commences in Gunnedah, heads north-west along Kamilaroi Highway to Boggabri, then to the Willala Hall, and then returns to Gunnedah, via the Boggabri Township. The morning service commences at 6:10 am and ends at 9:01 am. The afternoon service commences at 2:55 pm and ends at 5:48 pm. The service starts and ends in Gunnedah.
- G.J & S.J Haire Warragrah Bus Service operates three school bus services, two Boggabri Primary Services dropping off at Sacred Heart Primary School and Boggabri State Primary School and a Boggabri to Gunnedah High School Service. The Boggabri to Gunnedah High School Service starts in Boggabri at 7:40 am and ends in Gunnedah at 8:35 am. The return trip starts in Gunnedah at 3:15 pm and ends at Boggabri at 4:15 pm. One Primary School service starts in Boggabri at 7:15 am and ends in Boggabri at 9:02 am, with the afternoon service starting in Boggabri at 2:50 pm and ends in Boggabri at 4:48 pm. This service predominately operates within the township of Boggabri, however also services residences on Kamilaroi Highway out to Baan Baa during this time. The second Primary School Service operates in Boggabri starting at 7:17 am and ends at 9:03 am, with the afternoon service starting at 2:30 pm and finishing at 3:16 pm.
- Keating's Tours operates a school bus service from Gunnedah, which travels along Blue Vale Road, onto the unsealed section of Hoads Lane and return to Gunnedah. The service operates from 7:15 am to 8:30 am and again in the evening from 3:30 pm to 4:30 pm.

- Forest Coach Lines operates two bus services in the surrounding area:
  - the Mountain View to Narrabri School Bus Service (locally known as the Wallah Road Bus Services) runs from Narrabri down to Harparary Road, Maules Creek Road, Browns Lane, Old Gunnedah Road and then back to Narrabri. This service operates out of Narrabri from 7:05 am to 9:10 am and in the afternoon from 3:10 pm to 5:15 pm. The route runs predominantly along roads that are restricted from use by MCCM-related traffic; and
  - the Davis Nursery to Narrabri School Bus Service runs from Narrabri town to Leard Forest Road, Black Mountain Creek Road, Old Gunnedah Road and back to Narrabri. This service operates out of Narrabri from 6:40 am to 9:20 am and in the afternoon from 3:15 pm to 6:00 pm. The route runs predominantly along the roads that are restricted from use by MCCM-related traffic.
- M. Stephenson operates a school bus service from West Manilla and travels along Rangari Road, then onto Pillerine Lane back along Corella Road before returning to Manilla. The service operates from 7:15 am to 8:30 am and again in the evening from 3:30 pm to 4:30 pm.
- GB & SL Howlett operates the Rushes Road service travelling along the Rushes Creek Road to the Bedford Access Road, onto Sherwood Road back to Manilla, before travelling up the Tamworth Road to the Somerton turnoff and back to Manilla. The service operates from 7:15 am to 8:30 am and again in the evening from 3:30 pm to 4:30 pm.
- Wolters Bus and Coach Service operates a school bus service between Narrabri and Gunnedah, travelling via Turrawan, Baan Baa and Boggabri. The service services numerous schools in Gunnedah and Narrabri, and operates from 7:00 am to 9:00 am and from 3:00 pm to 5:00 pm in the evening (excluding travel time between the depot located at Narrabri and the first/last stop at Wolsley Park in Gunnedah).

3.9 Hunter Valley Corridor Capacity Strategy

Australian Rail Track Corporation (ARTC) has released the 2023 Hunter Valley Corridor Capacity Strategy (ARTC, 2023), which identifies future constraints on the coal rail network's capacity, options to resolve those constraints and a proposed course of action to achieve increased coal throughput. The 2024 Hunter Valley Corridor Capacity Strategy (ARTC, 2024) has been issued as a draft for consultation.

The single-track line between the junction for the Narrabri Mine and Muswellbrook is known as the Gunnedah Basin line, and carries coal trains, passenger trains, grain and export container trains. Non-coal traffic is up to seven trains each way per day between Narrabri and Scone, and 10 trains each way per day south of Scone. The Ardglen bank, crossing the Liverpool Range approximately midway between Werris Creek and Muswellbrook, is a notable constraint on this corridor, with grades between Chilcotts Creek and Murrurundi that limit train operations, requiring use of banker locomotives for loaded coal and grain trains on that section.

Aurizon and Pacific National operate coal trains along the Gunnedah Basin line, using trains consisting of three locomotives and 82 wagons with a total length of 1,296 m. Since late 2019, empty coal trains have been permitted to operate at up to 100 km/h on some sections, with upgrading of some level crossings and bridges between Muswellbrook and Narrabri being completed to safely allow higher train speeds for loaded coal trains. Loaded coal trains at 30 t axle loadings are limited to 60 km/h across the Hunter Valley Network with two minor exceptions of approaches to the banks.

ARTC (2023) identifies projects and timing required to address existing and prospective capacity constraints with and without implementation of the Advanced Train Management System (ATMS), as shown in Table 3.9. ATMS is a communications based safeworking system that will allow much of the lineside signalling infrastructure to be removed, allowing trains to safely operate at closer headways. The achievable timeframe for implementation of ATMS across the Hunter Valley Corridor is forecast by ARTC (2023) to be 2027 on the Ulan line and 2028 on the Gunnedah line. The proposed implementation of ATMS has been replaced with pursuit of a nationally interoperable safeworking system. The timing of the new system is currently unknown. The draft 2024 Strategy no longer assumes that ATMS will be implemented across the ARTC network, including the Hunter Valley. Table 3.9 also summarises the projects and timing presented in the 2024 Strategy consultation draft.

Table 3.9: ARTC Project Timings Under Various Volume Scenarios

Project	Most Likely Volume			Prospective Volume		
	2023 Strategy No ATMS	2023 Strategy With ATMS	2024 Draft Strategy No ATMS	2023 Strategy No ATMS	2023 Strategy With ATMS	2024 Draft Strategy No ATMS
South Gunnedah loop	Q1 2026	-	Q1 2027	Q1 2025	Q1 2025	Q1 2027
Werris Creek north loop	Q1 2027	-	-	Q1 2027	-	Q1 2030
Bells Gate south extension	Q1 2028	-	-	Q1 2028	-	-
Wingen loop	Q1 2027	-	-	Q1 2027	-	-
Togar North loop	Q1 2027	-	-	Q1 2027	-	Q1 2030

ARTC (2023) identifies a number of small scale initiatives to incrementally increase capacity between Narrabri and Muswellbrook, with potential options being:

- permitting higher speeds for unloaded trains approaching grades at some specific locations, which may increase capacity, however producers are not currently supportive of this initiative with higher maintenance costs and increased fuel consumption;
- reconfiguration at Werris Creek to increase capacity, due to low train speed requirements, noting the timeframe for the need for this additional capacity has extended due to other factors;
- increased train speed through Scone from 50 km/h to 70 km/h to increase capacity, with additional noise attenuation measures to be provided;
- intermediate signals to increase capacity by allowing a single train to follow another train already in the section, notably Gunnedah to Curlewis and Emerald Hill to Gunnedah, which may be redundant if other measures are implemented such as development of South Gunnedah loop or if ATMS is implemented; and
- increasing speed of loaded trains through Gunnedah above current 40 km/h to 60 km/h or 70 km/h to increase capacity with extension of noise walls, with further work required to assess this option against other potential initiatives.

4 Future Baseline Traffic Conditions

This section describes expected changes to the road transport environment compared with the surveyed traffic conditions, due to approved and planned developments in the region and background growth in traffic demands. These changes can be expected to occur without the Project, and thus their cumulative impacts inform the baseline conditions against which the Project can be assessed.

4.1 Major Developments in the Region

The potential changes to the road transport environment in the vicinity of the Project expected to occur due to approved or proposed developments are discussed in this section.

4.1.1 Maules Creek Coal Mine

Modification 9 to PA 10_0138 was approved on 20 March 2024. This allowed for the construction and use of a 700 m powerline between the Roma Bore pump and existing 11 kilovolt powerline, and changes to the existing biodiversity offset strategy for the MCCM. Modification 9 would have no impact on the road transport environment compared with the conditions captured during the traffic surveys, and has not been considered further in this assessment.

Approved operations at MCCM are further described in Section 2.1. Should the Project not proceed, the workforce and production levels at the MCCM would reduce as shown in Figure 2.2, with mining operations ceasing by the end of 2034. Under these conditions, the volume of traffic generated by MCCM would decrease over the approved life of the mine, then decrease significantly after 2034 when activities would move from mining operations to rehabilitation. Under baseline (i.e. no Project) conditions during the assessment years, MCCM would be expected to operate as following:

- in 2028, the workforce and ROM coal production would be similar to those at the time of the traffic surveys, hence the ongoing operational activity may generate the same traffic as captured during the traffic surveys; and
- in 2036, rehabilitation activities would require a workforce of 69 FTE personnel, which is approximately 8.5 % that present during the traffic survey program in 2023. As the shuttle bus services for employees and contractors are likely to be less efficient with a lower workforce, for the purpose of this assessment, it has been assumed that rehabilitation activities would generate 10 % of the trips generated during the traffic surveys.

4.1.2 Boggabri Coal Mine

BCOPL operates the BCM, which is located approximately 15 km north-east of Boggabri, and immediately south-east of MCCM (Figure 1.1). Development Consent SSD 09_0182 (as modified), permits extraction and transport of up to 8.6 Mtpa of ROM coal from BCM in any calendar year until 31 December 2036. Up to 200 tonnes of coal may also be transported by road for marketing and testing purposes in any calendar year. Development Consent SSD 09_0182 also permits transport of up to 3 Mtpa of product coal from Tarrawonga Coal Mine (subject to commercial agreement) with a combined maximum of 10 Mtpa of product coal transport permitted on the Boggabri Rail Spur.

Vehicular access to BCM for employees, contractors and heavy vehicles is via Kamilaroi Highway, the Shared Access Road and BCM Access Road. Access via Rangari Road (east) and Leard Forest Road is only permitted for employees or contractors who have written consent from the BCOPL Mine Manager, to allow residents to the east of the BCM to access the site. No access to BCM is permitted from Kamilaroi Highway via Rangari Road and Iron Bridge (BCOPL, 2022). During the morning and evening peak periods, 25 % and 30 % respectively of BCM-generated traffic uses Leard Forest Road and the remainder uses the BCM Access Road and Shared Access Road to/from Kamilaroi Highway. Of the vehicles using Kamilaroi Highway, 83 % travel to/from the south (Cardno, 2022).

The workforce at BCM at 31 December 2022 was 723 employees, made up of 467 BCOPL employees and 245 contractors (BCOPL, 2023). The workforce at BCM at 31 December 2023 was 747 employees, made up of 509 BCOPL employees and 238 contractors (BCOPL, 2024).

4.1.2.1 Boggabri Coal Mine Modification 8

Modification 8 to Development Consent SSD 09_0182 was approved under delegation by the Deputy Secretary of NSW Department of Planning, Housing and Infrastructure on 22 January 2024, and permits an increase in the total amount of ROM coal to be extracted over the life of the mine, with no change to the approved annual ROM coal production rate of 8.6 Mtpa, and an increase in peak employees from 500 to a temporary peak of 875 employees.

Cardno (2021 and 2022) assessed the traffic and transport implications of Modification 8 and Modification 8 Amendment, taking into consideration that the traffic assessment of the BCM (Parsons Brinckerhoff, 2010) did not account for contractors working at BCM in addition to the directly employed workforce, so underestimated the number of people travelling to and from the BCM each day. Parsons Brinckerhoff (2010) assumed an operational workforce of 500 FTE, and Cardno (2022) indicates that the workforce at BCM in 2022 was approximately 762 personnel including employees and contract workers. With Modification 8, the BCM workforce is anticipated to be an average of 740 FTEs from 2023 to 2035, with a peak of 875 FTE in 2027.

The traffic surveys conducted by TTPP in June 2023 captured traffic generated by BCM's activities at that time. The workforce at BCM at the time of the traffic surveys was approximately 735 personnel (based on the average of the workforce at 31 December 2022 and 31 December 2023 [BCOPL, 2023 and 2024]). The average BCM workforce of 740 personnel with Modification 8 would therefore be similar to that at the time of traffic surveys. The peak workforce of 875 personnel forecast for 2027 with Modification 8 would increase the BCM workforce by approximately 140 personnel above those present at the time of the TTPP traffic surveys, and so would be expected to generate additional traffic.

Based on the Cardno (2022) forecasts, with the peak workforce of 875 FTE personnel, the additional trips that may be generated above those occurring during the traffic surveys are summarised in Table 4.1.

Table 4.1: Increase in BCM Operational Vehicle Trip Generation Above 2023

	Peak Operational Workforce (+140 FTE personnel)		Operational Consumables and Deliveries		Total	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Hourly Trips (vehicles per hour)						
5:00 am to 6:00 am	28	0	0	0	28	0
5:45 am to 6:45 am	29	0	6	6	35	6
7:00 am to 8:00 am	15	0	0	0	15	0
3:00 pm to 4:00 pm	0	4	0	0	0	4
4:00 pm to 5:00 pm	29	15	0	0	29	15
5:00 pm to 6:00 pm	0	29	0	0	0	29
6:00 pm to 7:00 pm	0	24	0	0	0	24
Daily Trips (vehicles per day)						
24-hours	105	105	6	6	111	111

Cardno (2022) indicates that a short-term workforce for construction of a fauna movement crossing of the existing haul road would require approximately 10 to 15 workers. As that would be a short-term activity that is not likely to coincide with peak operational conditions at BCM or the Project assessment years, it has not been considered further in this assessment.

TTPP has applied the trip distribution information presented in Cardno (2022) to the forecast increased traffic in Table 4.1, with the exception that the inbound heavy vehicle delivery trips are assumed to occur during the morning peak hour and outbound trips during the evening peak hour. On this basis, with its peak workforce of 875 FTE employees, the BCM would be expected to generate the additional peak hourly and daily traffic on the road network as summarised in Table 4.2.

Table 4.2: Additional BCM Traffic with Peak Workforce (Modification 8)

Road and Location	5:45 am to 6:45 am (vehicles per hour)		4:00 pm to 5:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
BCM Access Road East of Shared Access Road	22	6	30	6	152	12
Shared Access Road BCM Access to Shared Access Road North	22	6	30	6	152	12
Shared Access Road North Kamilaroi Highway to Shared Access Road	4	1	11	5	76	6
Shared Access Road South Kamilaroi Highway to Shared Access Road	18	5	19	1	76	6
Kamilaroi Highway North of Shared Access Road North	4	1	5	1	26	2
Kamilaroi Highway Shared Access Road North to Shared Access Road South	0	0	10	6	76	6
Kamilaroi Highway South of Shared Access Road South	18	5	25	5	126	10
Leard Forest Road BCM to Rangari Road	7	0	14	0	58	0
Rangari Road East of Leard Forest Road	7	0	14	0	58	0

4.1.2.2 Boggabri Coal Mine Modification 9

Modification 9 to Development Consent SSD 09_0182 was approved by Department of Planning and Environment (now Department of Planning, Housing and Infrastructure) on 3 March 2023, and permits operation of a mobile rock crushing facility and associated fleet, construction of a new Pre-Shift Infrastructure (PSI) building and car parking, and minor administrative changes to conditions relating to the management of rehabilitation activities.

An assessment completed by James Bailey & Associates (2022) indicates that access to the PSI Site will be via the existing BCM Access Road, the southern portion of Leard Forest Road within BCM and some additional internal access roads within BCM's approved Mine Disturbance Boundary. That section of Leard Forest Road is currently closed to public traffic, and is used intermittently for undertaking routine inspection of work areas, dam infrastructure, accessing environmental monitoring locations and other purposes. It is also used irregularly by BCOPL's blast contractor to escort heavy rigid supply vehicles to their existing compound and material storage area.

During construction of the PSI building and possible road upgrade works, a small increase in the number of vehicle movements is anticipated on Leard Forest Road within BCM, including concrete deliveries and light vehicles associated with general construction activities. During operations, an increase of approximately 50 light vehicle movements is anticipated on the section of Leard Forest Road within BCM, travelling to and from the PSI Site at shift change over in the morning (between around 5:30 am and 6:30 am) and evening shift changes (between around 5:30 pm and 6:30 pm) (i.e. a total of 200 vehicles per day).

The traffic implications of Modification 9 are therefore expected to be primarily contained within the BCM, with a minor short-term increase in traffic on the BCM Access Road during construction of the PSI building. As such, traffic forecasts prepared for Modification 8 to Development Consent SSD 09_0182 have been used to inform this assessment.

4.1.2.3 Boggabri Coal Mine Modification 10

BCOPL has submitted a Scoping Report for Modification 10 to Development Consent SSD 09_0182, which proposes to extend the life of BCM for a further four years to the end of 2040. Modification 10 does not propose any change to the annual maximum ROM coal production rate of 8.6 Mtpa, the coal transport arrangements, nor the peak workforce of 875 FTE employees (as approved by Modification 8).

Modification 10 to Development Consent SSD 09_0182 would therefore be expected to generate similar volumes of traffic as those forecast with Modification 8 (Table 4.2) over the extended life of BCM to the end of 2040. After the end of 2040, BCM would be expected to generate small volumes of traffic as a result of decommissioning and rehabilitation activities.

4.1.3 Tarrawonga Coal Mine

TCM is located approximately 13 km north-east of Boggabri (Figure 1.1), and immediately south of BCM. Mining operations at TCM are conducted in accordance with PA 11_0047, which permits a maximum of 3.5 Mtpa of ROM coal to be transported from the TCM to the Whitehaven CHPP at Gunnedah. Haulage of ROM coal and rejects is permitted via the Whitehaven Approved Road Transport Route (Figure 1.2). Following commissioning of an overpass at Kamilaroi Highway on the Whitehaven Approved Road Transport Route, a maximum of 4.5 Mtpa of ROM coal is permitted to be transported from the TCM to the Whitehaven CHPP via the Whitehaven Approved Road Transport Route. Mining operations at TCM are permitted until 31 December 2030.

Modification 10 to PA 11_0047 was approved on 19 October 2023, and permits extension of the hours during which road haulage of ROM coal and rejects may occur on the Whitehaven Approved Road Transport Route, with no change to the approved tonnages of ROM coal and rejects. Modification 10 will have no impact on traffic conditions on the MCCM access roads, with the exception of haulage occurring over additional hours on that part of Kamilaroi Highway at Gunnedah between the Whitehaven CHPP and Blue Vale Road that may also be used by MCCM traffic to and from Gunnedah, and that part of Rangari Road on the Whitehaven Approved Road Transport Route.

4.1.4 Vickery Coal Mine

The Vickery Coal Project (Figure 1.1) was approved in September 2014 (Development Consent SSD 5000) permitting the extraction and transport of up to 4.5 Mtpa of ROM coal until the end of December 2044. It permits construction of a private overpass over Kamilaroi Highway between Blue Vale Road and the Whitehaven CHPP for use by ROM coal transport trucks. Until that overpass is constructed, SSD 5000 limits haulage of ROM coal from Whitehaven's mines to the Whitehaven CHPP to a maximum of 3.5 Mtpa.

The Vickery Extension Project is an approved open cut mining operation, including development of an on-site CHPP, train load out facility, and a rail spur to connect to the main Werris Creek Mungindi Railway. State Significant Development Approval 7480 (SSD 7480) permits extraction of up to 10 Mtpa of ROM coal, receipt of up to 3.5 Mtpa of ROM coal from other mining operations, and processing of up to 13 Mtpa of ROM coal in any one year. Transport of up to 11.5 Mtpa of product coal is permitted via the Vickery Rail Spur and Werris Creek Mungindi Railway. Prior to commissioning of the Vickery Rail Spur, a maximum of 3.5 Mtpa of ROM coal (cumulative with TCM) may be transported to the Whitehaven CHPP via the Whitehaven Approved Road Transport Route, or up to 4.5 Mtpa following commissioning of an overpass on the Whitehaven Approved Road Transport Route over Kamilaroi Highway. The Vickery Extension Project would also involve realignment of part of Hoad Lane and Blue Vale Road in the vicinity of Shannon Harbour Road. Mining operations at Vickery are approved until August 2045.

Once the on-site CHPP, train load-out facility and rail spur are operating at full capacity, ROM coal from TCM and Vickery Extension Project would be processed at the Vickery CHPP. The transport of ROM coal from TCM to the Vickery CHPP would use the Whitehaven Approved Road Transport Route.

Whitehaven has commenced early mining of the Vickery coal deposit, comprising a low capital project that will utilise surplus coal processing and washing infrastructure at the Whitehaven CHPP, as well as existing road haulage, rail and port capacity. The transport of ROM coal from VCM commenced in April 2024.

GTA Consultants (2018) assessed the road transport implications of construction and operation of the Vickery Extension Project. For the purposes of this assessment, TTPP has assumed that construction of the Vickery Extension Project would be completed before 2028, and that during the Project assessment years, the Vickery Extension Project would be operating, and generating traffic consistent with its expected peak operating conditions. This is considered a conservatively high assumption, noting that GTA Consultants (2018) anticipated that peak operating conditions would occur during Year 12 of that project, and initial early operations of the project commenced in April 2024.

GTA Consultants (2018) indicates that Vickery Extension Project would generate traffic on parts of the road network that are also used by MCCM traffic, notably Kamilaroi Highway between Narrabri and Boggabri, and Rangari Road east of Leard Forest Road. The vehicle trips forecast to be generated by peak operations at Vickery Extension Project are summarised in Table 4.3 for roads used by MCCM traffic.

Table 4.3: Vickery Extension Project Peak Operational Traffic on MCCM Routes

Road and Location	6:00 am to 7:00 am (vehicles per hour)		5:00 pm to 6:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Kamilaroi Highway Narrabri to Rangari Road	22	0	22	0	130	8
Kamilaroi Highway Rangari Road to Boggabri	33	2	34	2	188	8
Rangari Road Kamilaroi Highway to Whitehaven Approved Road Transport Route East	55	2	56	2	318	16
Rangari Road East of Whitehaven Approved Road Transport Route	13	0	12	0	62	0

Source: GTA Consultants (2018).

A modification to the Vickery Extension Project (Modification 1) is currently under assessment. With regard to potential impacts on the road transport environment, Modification 1 proposes coincidence of construction activity for the rail spur and MIA with initial mining activity; construction and use of an on-site temporary concrete batching plant during the rail spur and MIA construction stage; extension of the ROM coal road haulage hours to align with the approved hours of the TCM; transport of up to 90,000 m^3 of gravel in any calendar year from the site by customers; and an alternative alignment of the approved Blue Vale Road realignment. With Modification 1, the rail spur and MIA construction activity is nominally expected to occur in mid-2025. During the Project assessment years, if approved, Modification 1 would be operational.

TTPP (2024a) found that the implications of Modification 1 on trip generation during its operations would be limited to the trips generated as a result of gravel sales to customers, and the extended ROM coal haulage hours. With the maximum transport of 90,000 m^3 of gravel, an average of four trips per hour would be generated (two inbound and two outbound), typically to/from the north via Kamilaroi Highway, Rangari Road and the Approved ROM Coal Transport Route. The extension of ROM coal haulage hours would not impact the total number of vehicle trips required, but would reduce the average hourly trips required, which would be limited to the Approved ROM Coal Transport Route south of the Vickery Extension Project.

Considering that Modification 1 has not been approved, and if approved, would have negligible impact on the routes of relevance to the Project, this assessment has assumed that the forecast trips generated by the approved peak operational activity at Vickery Extension Project (GTA Consultants, 2018) may coincide with the Project assessment years.

4.1.5 Narrabri Mine

The Narrabri Mine (Figure 1.1) is operated by Narrabri Coal Operations Pty Limited (NCOPL). PA 08_0144 allows for the production and processing of up to 11 Mtpa of ROM coal until July 2044 at Narrabri Mine.

Mining operations are permitted to occur 24 hours per day and seven days per week, and construction activity is permitted to occur between 7:00 am and 6:00 pm Monday to Sunday. Product coal is transported by train from the Narrabri Mine, using the Narrabri Mine Balloon Loop and on to the Werris Creek Mungindi Railway. The Narrabri Mine generates an average of four trains per day and a peak of eight trains per day.

4.1.5.1 *Narrabri Mine Modification 7*

Modification 7 to PA 08_0144 was approved in November 2021, and involves the extraction of coal using bord and pillar mining methods, which will occur concurrently with the longwall operations over approximately five years, with the maximum ROM coal production remaining within the previously approved Stage 2 limit of 11 Mtpa.

TTPP (2021) assessed the potential traffic generation of Modification 7 should the additional workforce travel by private vehicles with no car pooling. Conditions 25A and 25B of PA 08_0144 require the use of shuttle buses for the transport of the additional 42 FTE personnel required for Modification 7. With the use of shuttle buses, the additional workforce would be expected to generate 28 light vehicle and six shuttle bus trips per day (TTPP, 2024a). Light vehicles would arrive and depart Narrabri Mine between 6:00 am and 7:00 am, and between 6:00 pm and 7:00 pm. Shuttle buses would arrive and depart Narrabri Mine between 5:45 am and 6:30 am, and between 6:00 pm and 6:30 pm.

For the purposes of this assessment, it is assumed that the additional workforce for Modification 7 would be present at the same time as the peak Project workforce in 2028, and would generate additional trips in addition to those captured by the traffic surveys, as presented in Table 4.4.

Table 4.4: Narrabri Mine Modification 7 Traffic on MCCM Routes

Road and Location	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Kamilaroi Highway Boggabri to Kurrajong Creek Road	5	2	5	0	12	2
Kamilaroi Highway Kurrajong Creek Road to Narrabri	9	2	9	2	16	4

4.1.5.2 *Narrabri Underground Mine Stage 3 Extension Project*

Consent for the Narrabri Underground Mine Stage 3 Extension Project (SSD-10269) was granted on 1 April 2022. The Narrabri Underground Mine Stage 3 Extension Project involves an extension to the south of the approved underground mining area to gain access to additional coal reserves within Mining Lease Applications 1 and 2, and development of supporting surface infrastructure. ROM coal production would occur at a rate of up to 11 Mtpa, with mining operations permitted until 31 December 2044.

The Narrabri Underground Mine Stage 3 Extension Project consent is subject to Condition B67, which requires the upgrade of the intersection of the Narrabri Mine Access Road with Kurrajong Creek Road and Kamilaroi Highway or alternative measures acceptable to the Planning Secretary and TfNSW. Until such time as the intersection upgrade (or approved alternative measures) is completed, Conditions 25A and 25B of PA 08_0144 are to be implemented (i.e., the use of shuttle buses is required for the transport of the additional workforce until the intersection is upgraded).

The Road Transport Assessment undertaken for the Narrabri Underground Mine Stage 3 Extension Project (TTPP, 2020) found that additional traffic would be generated during short periods of construction activity only. For the purpose of this assessment those short-term construction activities are assumed to be complete before the Project peak workforce is present in 2028. No allowance has therefore been made for changes to traffic as a result of the Stage 3 Extension Project during the Project assessment years.

4.1.6 Whitehaven CHPP

The Whitehaven CHPP is located approximately 5 km west of Gunnedah (Figure 1.1) and operates in accordance with Development Consent (DA 0079.2002), which was granted by Gunnedah Shire Council under the delegation from the Minister. DA 0079.2002 permits the processing of up to 3.0 Mtpa of ROM and bypass coal and dispatch of up to 4.1 Mtpa of product coal by rail until 2 October 2026.

Whitehaven has lodged an application for Modification 6 to DA 0079.2002, which proposes to extend the Whitehaven CHPP operational life by four years to 31 December 2030 to align with the approved life of operations at TCM, increase the coal processing rate without increasing the product coal dispatch rate, and allow for the construction and operation of a rejects load out facility.

If approved, the effects of the extension of the life of the CHPP would permit continued transport of ROM coal on the Whitehaven Approved Road Transport Route during the 2028 Project assessment year. It would not alter the volume of traffic generated by Whitehaven's haulage activities, which would potentially overlap with MCCM-generated traffic only on that part of Kamilaroi Highway between the CHPP and Blue Vale Road, a length of approximately 700 m. As the Modification would have negligible effect on roads used by MCCM-generated traffic, it has not been considered further in this assessment.

4.1.7 Narrabri Gas Project

The Narrabri Gas Project involves the development and operation of a gas production field, including installation of gas wells, gas and water gathering systems, and supporting infrastructure, including a central gas processing facility located approximately 20 km south-west of Narrabri. GHD (2016) assessed the traffic impacts of the Narrabri Gas Project and found that the construction and operational traffic would primarily use Newell Highway to access the various facilities, with some limited access via Kamilaroi Highway close to Narrabri. The Narrabri Gas Project is therefore not expected to impact traffic conditions on the Kamilaroi Highway over an extended period in the vicinity of the Project, and it has not been considered further in this assessment.

4.1.8 Queensland Hunter Gas Pipeline

The approved Queensland Hunter Gas Pipeline involves the construction and operation of an approximately 825 km long high-pressure gas transmission pipeline from the Queensland border near Boomi to Newcastle (including a short pipeline lateral to the Maitland area) (Hunter Gas Pipeline Pty Ltd, 2008). The Queensland Hunter Gas Pipeline was approved by the NSW Minister for Planning in February 2009 and construction was yet to commence at the time of writing this document.

The approved pipeline alignment is located to the west of MCCM and would cross the Shared Access Road and Kamilaroi Highway to the west of MCCM (Santos, 2024). During construction, Hunter Gas Pipeline Pty Ltd (2008) indicates that a total construction workforce of approximately 600 personnel would be spread across two main working groups along the pipeline alignment. It is expected that it would take approximately four months for construction activities to move through an area. An operational workforce of approximately 25 personnel would be required.

Transport and Traffic Planning Associates (2008) indicates that where the pipeline crosses Kamilaroi Highway, surface disruption would be minimised by boring beneath the road. On most major roads having one lane in each direction, it anticipates that the carriageway would be temporarily offset within the hard shoulders to coordinate pipe joints near the centreline of the carriageway. On minor roads and on major roads where sufficient width is not available to accommodate an offset arrangement, the road would be narrowed to a single lane with appropriate traffic control measures.

Details of the timing and nature of construction of the Queensland Hunter Gas Pipeline are not known, and would be subject to management to minimise impacts on other road users. As any construction impacts would be of a short-term nature, traffic conditions on the roads around MCCM would not be an extended period in the vicinity of the Project, and it has not been considered further in this assessment.

4.1.9 Whitehaven Solar Farm

Whitehaven Solar Farm Project (SSD-66542218) is a proposed solar farm and battery energy storage system located adjacent to the existing Narrabri Mine (Figure 1.1).

TTPP (2024b) assessed the road transport impacts of the Whitehaven Solar Farm. That assessment indicates that construction of the Whitehaven Solar Farm would generate traffic over a period of approximately nine months, and once operational, traffic generated by the Whitehaven Solar Farm would be very low over its operational period of approximately 50 years. Decommissioning of the Whitehaven Solar Farm would occur in approximately 2075.

For the purpose of this assessment, it has been assumed that construction of the Whitehaven Solar Farm may occur at the same time as the peak Project workforce is present in 2028. Based on TTPP (2024b), the construction activity would generate the following vehicle trips on Kamilaroi Highway between the Whitehaven Solar Farm and Boggabri:

- four shuttle bus trips on an average day, and eight shuttle bus trips on a peak day;
- 10 heavy vehicle trips on an average day and 20 heavy vehicle trips on a peak day;
- buses would arrive and depart between 6:45 am and 7:15 am, and between 5:45 pm and 6:15 pm; and
- heavy vehicles would arrive and depart throughout the day, with 10 % assumed to occur during the same hour as workforce trips.

TTPP (2024b) indicates that construction of the Whitehaven Solar Farm would generate traffic on parts of the road network that are also used by MCCM traffic, notably Kamilaroi Highway between Narrabri and Boggabri. The vehicle trips forecast to be generated on a peak construction day for the Whitehaven Solar Farm are summarised in Table 4.5 for roads used by MCCM traffic. As the construction workforce would all travel by shuttle buses, the generated trips are all heavy vehicle trips.

Table 4.5: Whitehaven Solar Farm Peak Construction Day Traffic on MCCM Routes

Road and Location	AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Kamilaroi Highway Boggabri to Kurrajong Creek Road	0	6	0	4	0	28
Kamilaroi Highway Kurrajong Creek Road to Narrabri	0	6	0	6	0	12

4.1.10 Maules Creek Solar Farm

Maules Creek Solar Farm (SSD-62443723) is a proposed large-scale hybrid solar photovoltaic generation and storage facility located at Maules Creek approximately 10 km north-north-east of MCCM (Figure 1.1). An EIS for the Maules Creek Solar Farm has not yet been prepared.

The Scoping Report for the Maules Creek Solar Farm (Pitt & Sherry, 2023) indicates that vehicular access to the site is still under investigation, and may be from Kamilaroi Highway via Harparary Road, Middle Creek Road and Glencoe Road. An alternative approach may be via Narrabri using Maules Creek Road. It anticipates that works may be required, including upgrading of approaches and turning lanes at intersections (e.g., intersections of Harparary Road with Kamilaroi Highway, Middle Creek Road and Glencoe Road), upgrades to Middle Creek Road and Glencoe Road, and construction of temporary construction access roads within the development site.

Pitt & Sherry (2023) indicates that construction is anticipated to commence in early 2026 and would take 12 to 18 months. Up to 150 construction personnel would be required during the 6-month peak construction period, with the workforce sourced from the local area as far as practicable. Once operational, the Maules Creek Solar Farm would operate 24 hours per day, seven days per week, with a staff of up to four FTE workers undertaking daily operations and maintenance during standard working hour.

While the Scoping Report does not contain forecasts of traffic that would be generated by the Maules Creek Solar Farm, it is evident that once operational, it would generate negligible traffic on a day-to-day basis. During construction, it would be expected to generate traffic on Kamilaroi Highway past the Shared Access Road intersections, and so may interact with MCCM-generated traffic.

As no further details regarding the timing of the Maules Creek Solar Farm or interaction between its traffic and Project-generated traffic is available, this assessment does not consider traffic that may be generated by the Maules Creek Solar Farm during the Project assessment years.

4.1.11 Other Solar Projects in the Region

Several additional proposed and approved solar projects are located proximal to the Project (Figure 1.1). Table 4.6 includes a summary of nearby approved or proposed solar projects, and indicates how the cumulative impacts of those projects have been considered in this assessment.

Table 4.6: Consideration of Other Solar Projects in Project Assessment Years

Development[A]	Approvals Status	Road Transport Impacts
Silverleaf Solar Farm	SSD-9358 Approved, not constructed	The Silverleaf Solar Farm is located north of Narrabri, with access via Kamilaroi Highway and Logans Lane. GHD (2019) indicates that during construction, the contribution of the average daily light vehicles to the Kamilaroi Highway traffic volumes would be negligible, with possible use of buses to transfer workers from Narrabri further reducing generated trips. The Silverleaf Solar Farm would not impact the surrounding road network during operations (GHD, 2019). A traffic management plan would be prepared and implemented as part of the Construction Environmental Management Plan. The road traffic impacts of the Silverleaf Solar Farm have therefore not been considered further in this assessment.
Narrabri South Solar Farm	SSD-8387 Approved, not constructed	The Narrabri South Solar Farm is located on Old Gunnedah Road, south-east of Narrabri. The Narrabri South Solar Farm is expected to generate 76 additional traffic movements per day during its peak construction period, and have negligible traffic impacts on the local road network thereafter (Melotte Consulting, 2018). No timing can be sourced regarding the commencement of construction activities (Melotte Consulting, 2018). As no further details regarding the timing of the Narrabri South Solar Farm or interaction between its traffic and Project-generated traffic is available, this assessment does not consider traffic that may be generated by the Narrabri South Solar Farm during the Project assessment years.
Gunnedah Solar Farm	SSD-8658 Approved, construction completed 2021	The potential road transport impacts of the Gunnedah Solar Farm would be included in the traffic surveys completed in 2023 (refer Section 3.4) and therefore have been considered in this assessment.
Orange Grove Solar Farm	SSD-8882 Approved, construction to be completed mid-2025	The Orange Grove Solar Farm is located 12 km east of Gunnedah with access via Kelvin Road and Orange Grove Road. The predicted additional daily traffic usage of the surrounding roads during the peak stage of project construction will be approximately 116 daily vehicle trips, reducing to approximately 80 daily vehicle trips during the earlier and later (average) stages of project construction (EMM Consulting, 2018). A maximum of 10 daily vehicle trips are anticipated during operation (EMM Consulting, 2018). As construction activities associated with the Orange Grove Solar Farm would be completed prior to the commencement of the Project, and the operational road transport impacts would be negligible, the road traffic impacts of the Orange Grove Solar Farm have therefore not been considered further in this assessment.
Narrabri Solar Farm	SSD-71855714 SEARs Issued	The expected road traffic impacts of these projects are not available for consideration in this assessment at the time of writing. The road traffic impacts of these projects will however be assessed in the relevant Environmental Impact Statement for these projects.
Stoney Creek Battery Energy Storage System	SSD-75680468 SEARs Issued	
Gunnedah East Battery Energy Storage System	SSD-65550471 SEARs Issued	

[A] *Refer to Figure 1.1 for development locations.*

4.1.12 Cumulative Impacts of Major Developments in the Region

Table 4.7 summarises how the activity and traffic generation of the various developments described above has been assumed to vary during the Project assessment years.

Table 4.7: Consideration of Other Developments in Project Assessment Years

Development	Surveyed 2023	Baseline 2028	Baseline 2036
MCCM (no Project)	Operational traffic accounted for in surveyed traffic volumes.		Rehabilitation traffic approximately 10 % of surveyed operational traffic in 2023
BCM	Operational traffic for operation workforce of 735 FTE accounted for in surveyed traffic volumes.	Additional traffic for peak operational workforce of 875 FTE (Table 4.1).	
TCM	Operational traffic accounted for in surveyed traffic volumes.		
VCM	Not operational	Peak operational traffic (Table 4.3)	
Narrabri Mine	Operational traffic accounted for in surveyed traffic volumes.	Additional traffic for Modification 7 (Table 4.4)	Operational traffic accounted for in surveyed traffic volumes.
Whitehaven Solar Farm	Not operational	Additional traffic for construction activity (Table 4.5).	Operational, negligible traffic generation.
Whitehaven CHPP	Operational traffic accounted for in surveyed traffic volumes.		Not operational, no allowance for reduction in traffic generation.
Maules Creek Solar Farm	Not operational	Subject to future assessment and approval, not accounted for in this assessment	
Narrabri Gas Project	Not operational	Possible short-term construction impacts not accounted for in this assessment	
Queensland Hunter Gas Pipeline	Not operational	Possible short-term construction impacts not accounted for in this assessment	

4.2 Background Traffic Growth

Growth in traffic can be expected that is related to general changes in travel behaviour and population, rather than to a specific development as described above. For the purpose of this assessment, an annual growth rate of 1.0 % per year (compound) has been applied to the surveyed traffic on public roads. No growth has been applied to the surveyed traffic on the Shared Access Road or the MCCM Access Road, as future changes in traffic using those roads are considered separately.

4.3 Baseline Traffic in 2028

Applying the expected changes in traffic as a result of the cumulative influence of surrounding developments and growth to 2028 as described in Sections 4.1 and 4.2 yields forecasts of future traffic conditions without the Project. These form the baseline conditions against which the impacts of the Project are assessed. The resulting baseline weekday daily traffic volumes forecast at the surveyed locations are presented in Table 4.8.

Table 4.8: Baseline Daily Traffic in 2028 (vehicles per day)

Site[A]	Road and Location	Surveyed 2023	Growth to 2028	BCM Modification 8	Vickery Extension Project	Whitehaven Solar Farm	Narrabri Mine Modification 7	Total
A	Kamilaroi Highway North of Rangari Road	3,511	179	136	138	28	14	4,006
B	MCCM Access Road	756	0	0	0	0	0	756
C	Rangari Road South of Therribri Road	335	17	0	334	0	0	686
D	Shared Access Road East of Therribri Road	1,510	0	164	0	0	0	1,674
E	Shared Access Road East of Kamilaroi Highway	713	0	82	0	0	0	795
F	Shared Access Road West of Kamilaroi Highway	693	0	82	0	0	0	775
G	Therribri Road North of Rangari Road	127	6	0	0	0	0	133
-	Kamilaroi Highway North of Shared Access Roads	2,619	134	28	138	28	14	2,961

[A] *Refer to Figure 1.2.*

The resulting baseline traffic volumes forecast during the MCCM weekday morning peak hour at the surveyed locations are presented in Table 4.9.

Table 4.9: Baseline AM Peak Hour Traffic in 2028 (vehicles per hour)

Site[A]	Road and Location	Surveyed 2023	Growth to 2028	BCM Modification 8	Vickery Extension Project	Whitehaven Solar Farm	Narrabri Mine Modification 7	Total
A	Kamilaroi Highway North of Rangari Road	334	17	23	22	6	7	409
B	MCCM Access Road	172	0	0	0	0	0	172
C	Rangari Road South of Therribri Road	37	2	0	57	0	0	96
D	Shared Access Road East of Therribri Road	321	0	28	0	0	0	349
E	Shared Access Road East of Kamilaroi Highway	94	0	5	0	0	0	99
F	Shared Access Road West of Kamilaroi Highway	190	0	23	0	0	0	213
G	Therribri Road North of Rangari Road	14	1	0	0	0	0	15
-	Kamilaroi Highway North of Shared Access Roads	136	7	5	22	6	7	183

During MCCM AM peak hour 5:30 am to 6:30 am.
[A] *Refer to Figure 1.2.*

The resulting baseline traffic volumes forecast during the MCCM weekday evening peak hour at the surveyed locations are presented in Table 4.10.

Table 4.10: Baseline PM Peak Hour Traffic in 2028 (vehicles per hour)

Site[A]	Road and Location	Surveyed 2023	Growth to 2028	BCM Modification 8	Vickery Extension Project	Whitehaven Solar Farm	Narrabri Mine Modification 7	Total
A	Kamilaroi Highway North of Rangari Road	323	16	30	22	4	5	400
B	MCCM Access Road	104	0	0	0	0	0	104
C	Rangari Road South of Therribri Road	26	1	0	58	0	0	85
D	Shared Access Road East of Therribri Road	237	0	36	0	0	0	273
E	Shared Access Road East of Kamilaroi Highway	159	0	16	0	0	0	175
F	Shared Access Road West of Kamilaroi Highway	66	0	20	0	0	0	86
G	Therribri Road North of Rangari Road	11	1	0	0	0	0	12
-	Kamilaroi Highway North of Shared Access Roads	180	9	6	22	4	5	226

During MCCM PM peak hour 5:30 pm to 6:30 pm.
[A] Refer to Figure 1.2.

4.4 Baseline Traffic in 2036

Applying the expected changes in traffic as a result of the cumulative influence of surrounding developments and growth to 2036 as described in Sections 4.1 and 4.2 yields forecasts of future traffic conditions without the Project. These form the baseline conditions against which the impacts of the Project in 2036 are assessed. The resulting baseline weekday daily traffic volumes forecast at the surveyed locations are presented in Table 4.11.

Table 4.11: Baseline Daily Traffic in 2036 (vehicles per day)

Site[A]	Road and Location	Surveyed 2023	Growth to 2036	BCM	Vickery Extension Project	MCCM	Total
A	Kamilaroi Highway North of Rangari Road	3,511	485	136	138	-518	3,752
B	MCCM Access Road	756	0	0	0	-680	76
C	Rangari Road South of Therribri Road	335	46	0	334	-46	669
D	Shared Access Road East of Therribri Road	1,510	0	164	0	-680	994
E	Shared Access Road East of Kamilaroi Highway	713	0	82	0	-317	478
F	Shared Access Road West of Kamilaroi Highway	693	0	82	0	-317	458
G	Therribri Road North of Rangari Road	127	18	0	0	-46	99
-	Kamilaroi Highway North of Shared Access Roads	2,619	362	28	138	-116	3,031

[A] *Refer to Figure 1.2.*

The resulting baseline traffic volumes forecast during the MCCM weekday morning peak hour at the surveyed locations in 2036 are presented in Table 4.12.

Table 4.12: Baseline AM Peak Hour Traffic in 2036 (vehicles per hour)

Site[A]	Road and Location	Surveyed 2023	Growth to 2036	BCM	Vickery Extension Project	MCCM	Total
A	Kamilaroi Highway North of Rangari Road	334	46	23	22	-128	297
B	MCCM Access Road	172	0	0	0	-155	17
C	Rangari Road South of Therribri Road	37	5	0	57	-3	96
D	Shared Access Road East of Therribri Road	321	0	28	0	-155	194
E	Shared Access Road East of Kamilaroi Highway	94	0	5	0	-32	67
F	Shared Access Road West of Kamilaroi Highway	190	0	23	0	-119	94
G	Therribri Road North of Rangari Road	14	2	0	0	-5	11
-	Kamilaroi Highway North of Shared Access Roads	136	19	5	22	-23	159

During MCCM AM peak hour 5:30 am to 6:30 am.
[A] *Refer to Figure 1.2.*

The resulting baseline traffic volumes forecast during the MCCM weekday evening peak hour at the surveyed locations are presented in Table 4.13.

Table 4.13: Baseline PM Peak Hour Traffic in 2036 (vehicles per hour)

Site[A]	Road and Location	Surveyed 2023	Growth to 2036	BCM	Vickery Extension Project	MCCM	Total
A	Kamilaroi Highway North of Rangari Road	323	45	30	22	-74	346
B	MCCM Access Road	104	0	0	0	-94	10
C	Rangari Road South of Therribri Road	26	4	0	58	-5	83
D	Shared Access Road East of Therribri Road	237	0	36	0	-94	179
E	Shared Access Road East of Kamilaroi Highway	159	0	16	0	-50	125
F	Shared Access Road West of Kamilaroi Highway	66	0	20	0	-40	46
G	Therribri Road North of Rangari Road	11	2	0	0	-5	8
-	Kamilaroi Highway North of Shared Access Roads	180	25	6	22	-16	217

During MCCM AM peak hour 5:30 am to 6:30 am.
[A] *Refer to Figure 1.2..*

4.5 Midblock Road Capacity

The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Austroads (2020) provides guidelines for the capacity and performance of two-lane, two-way rural roads, which, in turn, refers to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016). The HCM defines three classes of road which relate to drivers' expectations. Class I roads are those on which motorists expect to travel at relatively high speeds. They most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes, or pass through rugged terrain. Class III roads serve moderately developed areas, and may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas, where local traffic mixes with through traffic, and the density of unsignalised roadside access points increases. The Level of Service (LoS) criteria for two-lane roads are as shown in Table 4.14.

Table 4.14: LoS Criteria for Two-Lane Two-Way Roads

Level of Service	Class I		Class II	Class III
	Average Travel Speed (km/h)	Percent Time Spent Following (%)	Percent Time Spent Following (%)	Percent Free-Flow Speed (%)
A (best)	> 90	≤ 35	≤ 40	> 91.7
B	> 80 – 90	> 35 – 50	> 40 – 55	> 83.3 – 91.7
C	> 70 – 80	> 50 – 65	> 55 – 70	> 75.0 – 83.3
D	> 60 – 70	> 65 – 80	> 70 – 85	> 66.7 – 75.0
E (at/near capacity)	≤ 60	≥ 80	≥ 85	≤ 66.7

Source: Austroads (2020)

Kamilaroi Highway may be considered as either a Class I or Class II route, while the other surveyed public roads would be considered as Class II roads. Kamilaroi Highway has been assessed as a Class I road, which has more stringent criteria for LoS, noting that the Percent Time Spent Following (PTSF) results in worse LoS results than Average Travel Speed, hence only PTSF results are presented herein.

As the private access roads cater only for mine-generated traffic, with peak demands that are directly related to shift change times at the mines, drivers' expectations on the Shared Access Road and MCCM Access Road are likely to be different from those of drivers on public roads. It is broadly expected that drivers would have reduced expectations regarding their freedom to manoeuvre in the traffic stream, as all vehicles are travelling to and from the mines, with drivers less likely to wish to overtake. For the purpose of this assessment however the private roads have been indicatively assessed as Class II roads.

The HCM method, which is only applicable for speed limits of approximately 70 km/h and above (45 miles per hour), does not apply to the MCCM Access Road. For the purpose of this review, the MCCM Access Road has been indicatively assessed assuming its posted speed limit is 70 km/h (i.e. at the bottom of the range applicable to the HCM method).

Table 4.15 summarises the results of the assessment of AM peak hour midblock LoS at the surveyed locations as surveyed, and with the forecast baseline demands in 2028 and 2036. These forecasts assume that the surveyed Class 3 vehicles are half light vehicles and half heavy vehicles.

Table 4.15: AM Peak Hour Midblock Level of Service

Site[A]	Road and Location	Surveyed 2023				Baseline 2028				Baseline 2036			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	51.3	C	22.2	A	58.0	C	29.1	A	46.2	B	28.6	A
-	Kamilaroi Highway North of Shared Access Roads	21.8	A	29.4	A	29.3	A	28.5	A	23.1	A	30.2	A
C	Rangari Road South of Therribri Road	9.5	A	29.0	A	7.6	A	42.0	B	5.2	A	42.3	B
G	Therribri Road North of Rangari Road	23.8	A	13.0	A	23.8	A	13.0	A	17.2	A	20.7	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	61.5	C	5.8	A	61.5	C	5.8	A	41.5	B	5.1	A
D	Shared Access Road East of Therribri Road	66.3	C	24.7	A	67.6	C	23.5	A	51.7	B	27.8	A
E	Shared Access Road East of Kamilaroi Highway	22.2	A	43.2	B	24.6	A	41.5	B	13.2	A	45.0	B
F	Shared Access Road West of Kamilaroi Highway	63.8	C	4.7	A	65.7	C	4.5	A	51.7	B	6.2	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM.
[A] *Refer to Figure 1.2.*
[B] *Indicative only.*

The results in Table 4.15 indicate that the midblock levels of service during the MCCM morning peak hour are satisfactory, and would continue to be satisfactory under forecast baseline conditions. Under baseline conditions in 2036, the PTSF and LoS in the inbound direction would be better than in 2028, due to the reduction in traffic generated by MCCM following cessation of mining activities, and activity associated with the Whitehaven Solar Farm and Narrabri Mine Modification 7.

Table 4.16 summarises the results of the assessment of PM peak hour midblock LoS at the surveyed locations as surveyed, and with the forecast baseline demands in 2028 and 2036.

Table 4.16: PM Peak Hour Midblock Level of Service

Site[A]	Road and Location	Surveyed 2023				Baseline 2028				Baseline 2036			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS	PTS F	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	26.8	A	49.0	B	33.9	A	52.0	C	28.6	A	49.9	B
-	Kamilaroi Highway North of Shared Access Roads	25.9	A	30.0	A	29.4	A	34.3	A	29.5	A	32.6	A
C	Rangari Road South of Therribri Road	25.8	A	11.3	A	27.4	A	21.1	A	27.3	A	20.9	A
G	Therribri Road North of Rangari Road	13.4	A	22.8	A	13.4	A	22.8	A	8.5	A	25.3	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	28.8	A	40.2	B	28.8	A	40.2	B	22.8	A	32.3	A
D	Shared Access Road East of Therribri Road	21.0	A	58.2	C	26.2	A	59.1	C	16.9	A	55.7	C
E	Shared Access Road East of Kamilaroi Highway	5.4	A	59.3	C	6.2	A	60.1	C	4.6	A	55.9	C
F	Shared Access Road West of Kamilaroi Highway	35.2	A	26.5	A	39.9	A*	23.3	A	30.0	A	28.0	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM, shaded rows are private roads.
[A] *Refer to Figure 1.2.*
[B] *Indicative only.*

The results in Table 4.16 indicate that the midblock levels of service during the MCCM evening peak hour are satisfactory, and would continue to be satisfactory under forecast baseline conditions.

4.6 Intersection Operating Conditions

At unsignalised intersections with minor roads, where there are relatively low volumes of through and turning vehicles, capacity considerations are usually not significant, and detailed analysis of capacity is not warranted. As a guide, at volumes below the following combinations of maximum hourly volumes at a cross intersection with a two-lane two-way road, capacity analysis is not warranted:

- major road 400 vehicles per hour, minor road 250 vehicles per hour;
- major road 500 vehicles per hour, minor road 200 vehicles per hour; and
- major road 650 vehicles per hour, minor road 100 vehicles per hour.

Many of the intersections relevant to the MCCM are T-intersections with fewer potentially conflicting movements than a cross intersection. Comparison between these threshold volumes and the surveyed and forecast baseline peak hourly volumes on the key roads (Sections 4.3 and 4.4) indicates that the surveyed traffic volumes are below the threshold volumes above, and as such, there is no capacity concerns regarding the operation of the intersections.

Nevertheless, as a baseline against which the Project's impacts can be assessed, the operating characteristics of the intersections on Kamilaroi Highway have been assessed using SIDRA INTERSECTION 9.1, an analysis program which determines characteristics of intersection operating conditions including the degree of saturation, average delays, and levels of service. The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity. The average delay, expressed in seconds per vehicle, is measured over all movements at signalised intersections, and over the movement with the highest average delay at roundabout and priority intersections. Average vehicle delay is the commonly used measure of intersection performance defined by TfNSW (TfNSW, 2024). Table 4.17 shows the criteria adopted by TfNSW for assessing the LoS.

Table 4.17: Intersection Level of Service Criteria

Level of Service (LoS)	Average Delay per vehicle (seconds/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
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	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Adapted from TfNSW (2024)

As turning movements at the intersections of Kamilaroi Highway and the Shared Access Road are constrained to left-turns only, the operation of those intersections is only constrained by the capacity available for outbound vehicles from the Shared Access Road to merge with through traffic on Kamilaroi Highway.

Table 4.18 presents a summary of the operating characteristics of the intersections along Kamilaroi Highway during the peak hours associated with MCCM-generated traffic for the surveyed conditions in 2023, and for the baseline conditions 2028 and 2036. The surveyed intersections are under priority control, thus the reported average delay is for the movement with the highest average delay per vehicle.

Table 4.18: Operating Conditions at Kamilaroi Highway Intersections

Site[A]	Intersection	5:30 am to 6:30 am			5:30 pm to 6:30 pm		
		X-Value	Average Delay[B]	LoS	X-Value	Average Delay[B]	LoS
Surveyed 2023							
H	Kamilaroi Highway and Rangari Road	0.16	8.0	A	0.13	10.6	A
-	Kamilaroi Highway and Shared Access Road (South)	0.04	3.6	A	0.04	3.7	A
-	Kamilaroi Highway and Shared Access Road (North)	0.04	3.6	A	0.09	3.7	A
Baseline 2028							
H	Kamilaroi Highway and Rangari Road	0.18	8.1	A	0.16	11.0	A
-	Kamilaroi Highway and Shared Access Road (South)	0.05	3.7	A	0.05	3.7	A
-	Kamilaroi Highway and Shared Access Road (North)	0.04	3.6	A	0.10	3.7	A
Baseline 2036							
H	Kamilaroi Highway and Rangari Road	0.10	7.9	A	0.11	10.3	A
-	Kamilaroi Highway and Shared Access Road (South)	0.03	3.6	A	0.05	3.7	A
-	Kamilaroi Highway and Shared Access Road (North)	0.06	3.7	A	0.07	3.7	A

[A] *Refer to Figure 1.2.*
[B] *Seconds per vehicle for the movement with highest average delay per vehicle.*

The results demonstrate that during the surveys in 2023, the intersections operated at good levels of service (LoS A), with spare capacity and acceptable delays to drivers. Under baseline conditions in 2028 and 2036, the intersections are expected to operate at LoS A, with spare capacity and acceptable delays to drivers.

5 Impacts of the Project

This assessment considers traffic impacts during 2028 and 2036 as described in Section 2.3, consistent with the requirements of the Project SEARs presented in Section 1, and advice provided by TfNSW and Narrabri Shire Council.

5.1 Project Traffic in 2028

During 2028, the Project would employ its peak workforce of approximately 1,065 FTE personnel and ROM coal production would be at its peak of 14 Mtpa.

5.1.1 Operational Workforce

Excluding construction workers, the operational workforce with the Project in 2028 would be approximately 28 % above those employed at the time of the traffic surveys in 2023. It is therefore reasonable to expect an increase of approximately 28 % in total traffic generated by the operational workforce. This assumes that with the Project, the proportion of the workforce that currently use the shuttle buses to and from MCCM would remain at its current level, noting that practically, to the extent that shuttle buses have spare seating capacity, the number of buses required may not increase in proportion to the workforce.

The operational workforce would remain at approximately two-thirds employees and one-third long-term contractors, and the additional workers would be expected to be spread across the existing crews working on-site. The additional workforce would therefore be expected to follow similar arrival and departure patterns as the existing workforce.

5.1.2 Construction Workforce

Although construction activities may occur 24 hours per day seven days per week, it is expected that the majority of the construction activities would be conducted during daylight hours only, and for the purpose of this assessment, it has been conservatively assumed that construction workers would travel to and from the Project during the same peak hours as the operational workforce (i.e. construction workers would arrive between 5:30 am and 6:30 am, and depart between 5:30 pm and 6:30 pm). While some car-pooling would be expected, it has been conservatively assumed that the 35 construction workers present in 2028 would each travel independently, generating 35 inbound light vehicle trips during the morning peak hour, and 35 outbound light vehicle trips during the evening peak hour.

5.1.3 Heavy Vehicles

The ROM coal production rate is expected to have the greatest impact on the number of heavy vehicle deliveries generated by the MCCM, with deliveries of operational consumables being most directly related to production levels. The annual ROM coal production with the Project in 2028 would be approximately 20 % above that occurring over 2023, when the traffic surveys were undertaken. Noting that the transport of product coal during 2023 varied significantly from month to month, and that short-term construction activity may also generate some additional heavy vehicle trips, this assessment has assumed that in 2028, the heavy vehicle trips associated with the Project would increase by 28 % above those occurring in 2023, consistent with the proportional increase in the operational workforce.

5.1.4 Total Additional Project Traffic

Table 5.1 summarises the additional trips expected to be generated by the Project during 2028 above those captured during the surveys in 2023. This assumes the construction workforce all travel in light vehicles, and the additional operational traffic has a similar composition to that surveyed during 2023.

Table 5.1: Additional Vehicle Trips Generated by the Project in 2028

	Light Class 1-2	Class 3	Rigid Heavy Class 4-5	Heavy Articulated Class 6-12	Total
Operational Workforce and Deliveries					
5:30 am to 6:30 am[A]	28	20	0	0	48
5:30 pm to 6:30 pm[A]	15	14	0	0	29
Daily[B]	116	80	6	10	212
Construction Workforce					
5:30 am to 6:30 am[A]	35	0	0	0	35
5:30 pm to 6:30 pm[A]	35	0	0	0	35
Daily[B]	70	0	0	0	70
Total Additional					
5:30 am to 6:30 am[A]	63	20	0	0	83
5:30 pm to 6:30 pm[A]	50	14	0	0	64
Daily[B]	186	80	6	10	282

Additional above surveyed traffic in 2023.
[A] *Vehicles per hour.*
[B] *Vehicles per day.*

5.1.5 Project Traffic on the Road Network

Taking into account that the distribution of Project-generated traffic would be similar to that currently generated by MCCM, the Table 5.2 summarises the additional trips expected to be generated by the Project at the survey locations during 2028 above those captured during the surveys in 2023. As the baseline generation of MCCM would be consistent with that occurring during the 2023 surveys, the Project-generated traffic in Table 5.2 would be above that expected under baseline conditions.

Table 5.2: Additional Project-Generated Two-Way Traffic at Surveyed Locations in 2028

Site[A]	Road and Location	5:30 am to 6:30 am (vehicles per hour)	5:30 pm to 6:30 pm (vehicles per hour)	Daily (vehicles per day)
A	Kamilaroi Highway North of Rangari Road	68	49	216
B	MCCM Access Road	83	64	282
C	Rangari Road South of Therribri Road	3	4	18
D	Shared Access Road East of Therribri Road	83	64	282
E	Shared Access Road East of Kamilaroi Highway	14	42	132
F	Shared Access Road West of Kamilaroi Highway	66	18	132
G	Therribri Road North of Rangari Road	3	3	18
-	Kamilaroi Highway North of Shared Access Roads	12	11	48

[A] *Refer to Figure 1.2.*

The component of the construction workforce associated with the revegetation program (indicatively five FTE) has been conservatively assumed to travel to and from the MCCM at the beginning and end of each day. As the traffic generated from the MCCM to and from the landscape revegetation zones (Figure 2-3) would be negligible, short-term (revegetation activities are expected to be conducted on a 'campaign' basis), and dispersed across the local road network, these traffic movements have not been included in Table 5.2.

Table 5.2 demonstrates that the additional Project-generated traffic would have its greatest effect on traffic volumes on the Shared Access Road and MCCM Access Road, both of which are private roads used only by BCM and MCCM traffic, not by the general public. On the public roads, the Project-generated traffic would have its greatest effect on traffic volumes on Kamilaroi Highway between Rangari Road and the Shared Access Roads.

5.2 Project Traffic in 2036

During 2036, the Project would employ a workforce of approximately 996 FTE personnel (comprising 676 FTE operational employees and 320 FTE long-term contractors) and ROM coal production would be at its peak of 14 Mtpa.

5.2.1 Operational Workforce

The operational workforce associated with the Project in 2036 would be approximately 24 % above those employed at the time of the traffic surveys in 2023. It is therefore reasonable to expect an increase of approximately 24 % in total traffic generated by the operational workforce. This assumes that with the Project, the proportion of the workforce that currently use the shuttle buses to and from MCCM would remain at its current level, noting that practically, to the extent that shuttle buses have spare seating capacity, the number of buses required may not increase in proportion to the workforce.

The operational workforce would remain at approximately two-thirds employees and one-third long-term contractors, and the additional workers would be expected to be spread across the existing crews working on-site. The additional workforce would therefore be expected to follow similar arrival and departure patterns as the existing workforce.

5.2.2 Heavy Vehicles

The ROM coal production rate is expected to have the greatest impact on the number of heavy vehicle deliveries generated by the MCCM, with deliveries of operational consumables being most directly related to production levels. The annual ROM coal production associated with the Project in 2036 would be approximately 20 % above that occurring over 2023, when the traffic surveys were undertaken. Noting that the transport of product coal during 2023 varied significantly from month to month, this assessment has assumed that in 2036, the heavy vehicle trips associated with the Project would increase by 24 % above those occurring in 2023, consistent with the proportional increase in the operational workforce.

5.2.3 Total Additional Project Traffic

Table 5.3 summarises the additional trips expected to be generated by the Project during 2036 above those captured during the surveys in 2023, and above those forecast under baseline conditions in 2036. This assumes that the additional operational traffic has a similar composition to that surveyed during 2023.

Table 5.3: Additional Vehicle Trips Generated by the Project in 2036

	Light Class 1-2	Class 3	Rigid Heavy Class 4-5	Heavy Articulated Class 6-12	Total
Additional to Surveyed Traffic in 2023					
5:30 am to 6:30 am[A]	24	17	0	0	41
5:30 pm to 6:30 pm[A]	13	12	0	0	25
Daily[B]	100	70	4	8	182
Additional to Baseline 2036 Traffic					
5:30 am to 6:30 am[A]	114	80	1	1	196
5:30 pm to 6:30 pm[A]	60	58	0	1	119
Daily[B]	470	332	22	38	862

[A] *Vehicles per hour.*
[B] *Vehicles per day.*

5.2.4 Project Traffic on the Road Network

Taking into account that the distribution of Project-generated traffic would be similar to that currently generated by MCCM, Table 5.4 summarises the additional trips expected to be generated by the Project at the survey locations during 2036, noting these are presented as both additional trips forecast to be generated above the surveyed conditions in 2023 and trips generated above those forecast to occur under baseline conditions.

Table 5.4: Project-Generated Traffic at Surveyed Locations in 2036

Site[A]	Road and Location	Additional to Surveyed in 2023			Additional to Baseline in 2036		
		AM Peak[B]	PM Peak[B]	Daily[C]	AM Peak[B]	PM Peak[B]	Daily[C]
A	Kamilaroi Highway North of Rangari Road	34	20	140	160	94	658
B	MCCM Access Road	41	25	182	196	119	862
C	Rangari Road South of Therribri Road	1	0	12	6	4	58
D	Shared Access Road East of Therribri Road	41	25	182	195	119	862
E	Shared Access Road East of Kamilaroi Highway	9	14	85	40	64	402
F	Shared Access Road West of Kamilaroi Highway	31	11	85	149	51	402
G	Therribri Road North of Rangari Road	1	0	12	6	4	58
-	Kamilaroi Highway North of Shared Access Roads	6	5	30	29	21	146

[A] *Refer to Figure 1.2.*
[B] *Vehicles per hour, AM Peak 5:30 am to 6:30 am, PM Peak 5:30 pm to 6:30 pm.*
[C] *Vehicles per day.*

5.3 Future Traffic Volumes with the Project in 2028

Table 5.5 summarises the forecast traffic at the surveyed locations with the Project during 2028 under baseline conditions (i.e. including the cumulative impacts of expected changes at the other major developments in the region [Section 4.1], and background traffic growth [Section 4.2]) and with the additional Project-generated traffic.

Table 5.5: Total Two-Way Traffic with the Project in 2028

Site[A]	Road and Location	Baseline 2028			Project			Total		
		AM[B]	PM[B]	Daily[C]	AM[B]	PM[B]	Daily[C]	AM[B]	PM[B]	Daily[C]
A	Kamilaroi Highway North of Rangari Road	409	400	4,006	68	49	216	477	449	4,222
B	MCCM Access Road	172	104	756	83	64	282	255	168	1,038
C	Rangari Road South of Therribri Road	96	85	686	3	3	18	99	88	704
D	Shared Access Road East of Therribri Road	349	273	1,674	83	64	282	432	337	1,956
E	Shared Access Road East of Kamilaroi Highway	99	175	795	14	42	132	113	217	927
F	Shared Access Road West of Kamilaroi Highway	213	86	775	66	18	132	279	104	907
G	Therribri Road North of Rangari Road	15	12	133	3	3	18	18	15	151
-	Kamilaroi Highway North of Shared Access Roads	183	226	2,961	12	11	48	195	237	3,009

[A] *Refer to Figure 1.2.*
[B] *Vehicles per hour, AM Peak 5:30 am to 6:30 am, PM Peak 5:30 pm to 6:30 pm.*
[C] *Vehicles per day.*

5.4 Future Traffic Volumes with the Project in 2036

Table 5.6 summarises the forecast traffic at the surveyed locations with the Project during 2036 under baseline conditions (i.e. including the cumulative impacts of expected changes at the other major developments in the region [Section 4.1], and background traffic growth [Section 4.2]) and with the additional Project-generated traffic.

Table 5.6: Total Two-Way Traffic with the Project in 2036

Site[A]	Road and Location	Baseline 2036			Project			Total		
		AM[B]	PM[B]	Daily[C]	AM[B]	PM[B]	Daily[C]	AM[B]	PM[B]	Daily[C]
A	Kamilaroi Highway North of Rangari Road	299	346	3,752	160	94	658	459	440	4,410
B	MCCM Access Road	17	10	76	196	119	862	213	129	938
C	Rangari Road South of Therribri Road	94	84	669	6	4	58	100	88	727
D	Shared Access Road East of Therribri Road	195	179	994	195	119	862	390	298	1,856
E	Shared Access Road East of Kamilaroi Highway	68	125	478	40	64	402	108	189	880
F	Shared Access Road West of Kamilaroi Highway	95	46	458	149	51	402	244	97	860
G	Therribri Road North of Rangari Road	11	9	99	6	4	58	17	13	157
-	Kamilaroi Highway North of Shared Access Roads	159	217	3,031	29	21	146	188	238	3,177

[A] *Refer to Figure 1.2.*
[B] *Vehicles per hour, AM Peak 5:30 am to 6:30 am, PM Peak 5:30 pm to 6:30 pm.*
[C] *Vehicles per day.*

5.5 Midblock Road Capacity

The future midblock LoS associated with the Project have been re-assessed with the forecast peak hour traffic demands, using the same method and assumptions as described in Section 4.5.

5.5.1 Midblock Levels of Service in 2028

Table 5.7 summarises the results of the assessment of AM peak hour midblock LoS on the surveyed roads, and the effect that the Project can be expected to have on the LoS during 2028 compared with existing and future baseline conditions.

Table 5.7: AM Peak Hour Midblock Level of Service 2023 and 2028

Site[A]	Road and Location	Surveyed 2023				Baseline 2028				Project 2028			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	51.3	C	22.2	A	58.0	C	29.1	A	59.9	C	28.1	A
-	Kamilaroi Highway North of Shared Access Roads	21.8	A	29.4	A	29.3	A	28.5	A	32.2	A	28.4	A
C	Rangari Road South of Therribri Road	9.5	A	29.0	A	7.6	A	42.0	B	9.3	A	42.5	B
G	Therribri Road North of Rangari Road	23.8	A	13.0	A	23.8	A	13.0	A	25.5	A	10.4	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	61.5	C	5.8	A	61.5	C	5.8	A	67.7	C	6.3	A
D	Shared Access Road East of Therribri Road	66.3	C	24.7	A	67.6	C	23.5	A	74.6	D	23.6	A
E	Shared Access Road East of Kamilaroi Highway	22.2	A	43.2	B	24.6	A	41.5	B	29.8	A	40.5	B
F	Shared Access Road West of Kamilaroi Highway	63.8	C	4.7	A	65.7	C	4.5	A	70.0	C	4.5	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM.
[A] Refer to Figure 1.2.
[B] Indicative only due to lower speed limit.

The results in Table 5.7 indicate that the LoS experienced by drivers on the public roads during the morning peak hour would remain satisfactory with the Project, allowing drivers relative freedom to select their travel speed during the peak hours on those roads.

On the private roads, and assuming drivers' expectations are aligned with those of drivers on Class II roads, the LoS experienced by driver would be satisfactory, with LoS "D" reached for inbound travel on the Shared Access Road between Therribri Road and the BCM and MCCM Access Roads. This section of the Shared Access Road has double two-way barrier lines which prevent overtaking, however as noted, drivers on the private roads are expected to be less likely to wish to overtake, and hence less sensitive to following other vehicles. The maximum flow rate of a single lane without overtaking is equivalent to a headway of about two seconds (i.e. an operational capacity of about 1,800 passenger car units per hour [Austroads, 2020]). The inbound demand on that part of the Shared Access Road during the morning peak hour associated with the Project in 2028 is approximately 350 vehicles per hour, or approximately 20 % of capacity, hence there are no concerns raised regarding the operational performance of the Shared Access Road under the forecast conditions.

Table 5.8 summarises the results of the assessment of PM peak hour midblock LoS on the surveyed roads, and the effect that the Project can be expected to have on the LoS during 2028 compared with existing and future baseline conditions.

Table 5.8: PM Peak Hour Midblock Level of Service 2023 and 2028

Site[A]	Road and Location	Surveyed 2023				Baseline 2028				Project 2028			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	26.8	A	49.0	B	33.9	A	52.0	C	35.1	B	56.5	C
-	Kamilaroi Highway North of Shared Access Roads	25.9	A	30.0	A	29.4	A	34.3	A	29.7	A	36.2	B
C	Rangari Road South of Therribri Road	25.8	A	11.3	A	27.4	A	21.1	A	27.3	A	21.6	A
G	Therribri Road North of Rangari Road	13.4	A	22.8	A	13.4	A	22.8	A	13.4	A	23.2	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	28.8	A	40.2	B	28.8	A	40.2	B	25.3	A	49.7	B
D	Shared Access Road East of Therribri Road	21.0	A	58.2	C	26.2	A	59.1	C	28.0	A	65.2	C
E	Shared Access Road East of Kamilaroi Highway	5.4	A	59.3	C	6.2	A	60.1	C	6.2	A	63.2	C
F	Shared Access Road West of Kamilaroi Highway	35.2	A	26.5	A	39.9	A	23.3	A	41.3	B	26.3	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM.
[A] *Refer to Figure 1.2.*
[B] *Indicative only due to lower speed limit.*

The results in Table 5.8 indicate that the LoS experienced by drivers on the public roads would remain satisfactory with the Project, allowing drivers relative freedom to select their travel speed during the peak hours on those roads. On the private roads, and assuming drivers' expectations are aligned with those of drivers on Class II roads, the LoS experienced by drivers would be satisfactory.

5.5.2 Midblock Levels of Service in 2036

Table 5.9 summarises the results of the assessment of AM peak hour midblock LoS on the surveyed roads, and the effect that the Project can be expected to have on the LoS during 2036 compared with baseline conditions.

Table 5.9: AM Peak Hour Midblock Level of Service 2023 and 2036

Site[A]	Road and Location	Surveyed 2023				Baseline 2036				Project 2036			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	51.3	C	22.2	A	46.2	B	28.6	A	58.7	C	28.1	A
-	Kamilaroi Highway North of Shared Access Roads	29.3	A	21.7	A	30.0	A	23.2	A	43.3	B	25.7	A
C	Rangari Road South of Therribri Road	9.5	A	29.0	A	5.2	A	42.3	B	8.3	A	42.0	B
G	Therribri Road North of Rangari Road	23.8	A	13.0	A	17.2	A	20.7	A	24.2	A	13.0	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	61.5	C	5.8	A	41.5	B	5.1	A	64.5	C	6.3	A
D	Shared Access Road East of Therribri Road	66.3	C	24.7	A	51.7	B	27.8	A	71.2	D	23.6	A
E	Shared Access Road East of Kamilaroi Highway	22.2	A	43.2	B	13.2	A	45.0	B	27.7	A	41.8	B
F	Shared Access Road West of Kamilaroi Highway	63.8	C	4.7	A	51.7	B	6.2	A	68.1	C	4.3	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM.
[A] Refer to Figure 1.2.
[B] Indicative only due to lower speed limit.

The results in Table 5.9 indicate that the LoS experienced by drivers on the public roads during the morning peak hour would remain satisfactory with the Project, allowing drivers relative freedom to select their travel speed during the peak hours on those roads.

On the private roads, and assuming drivers' expectations are aligned with those of drivers on Class II roads, the LoS experienced by driver would be satisfactory, with LoS "D" reached for inbound travel on the Shared Access Road between Therribri Road and the BCM and MCCM Access Roads. As described in Section 5.5.1, drivers on the private roads are expected to be less sensitive to following other vehicles. The inbound demand on that part of the Shared Access Road during the morning peak hour associated with the Project in 2036 is approximately 310 vehicles per hour, or less than 20 % of capacity, hence there are no concerns raised regarding the operational performance of the Shared Access Road under the forecast conditions.

Table 5.10 summarises the results of the assessment of PM peak hour midblock LoS on the surveyed roads, and the effect that the Project can be expected to have on the LoS during 2036 compared with baseline conditions.

Table 5.10: PM Peak Hour Midblock Level of Service 2036

Site[A]	Road and Location	Surveyed 2023				Baseline 2036				Project 2036			
		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
		PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS	PTSF	LoS
Public Roads													
A	Kamilaroi Highway North of Rangari Road	26.8	A	49.0	B	28.6	A	49.9	B	35.6	B	55.0	C
-	Kamilaroi Highway North of Shared Access Roads	30.1	A	25.8	A	32.7	A	29.5	A	48.5	B	27.6	A
C	Rangari Road South of Therribri Road	25.8	A	11.3	A	27.3	A	20.9	A	27.5	A	21.3	A
G	Therribri Road North of Rangari Road	13.4	A	22.8	A	8.5	A	25.3	A	12.3	A	24.0	A
Private Roads for Mine Traffic Only													
B	MCCM Access Road[B]	28.8	A	40.2	B	22.8	A	32.3	A	30.2	A	42.2	B
D	Shared Access Road East of Therribri Road	21.0	A	58.2	C	16.9	A	55.7	C	28.4	A	60.2	C
E	Shared Access Road East of Kamilaroi Highway	5.4	A	59.3	C	4.6	A	55.9	C	6.7	A	60.7	C
F	Shared Access Road West of Kamilaroi Highway	35.2	A	26.5	A	30.0	A	28.0	A	41.7	B	23.1	A

AM Peak 5:30 am to 6:30 am, direction of travel as relevant to MCCM.
[A] Refer to Figure 1.2.
[B] Indicative only due to lower speed limit.

The results in Table 5.10 indicate that the LoS experienced by drivers on the public roads would remain satisfactory with the Project, allowing drivers relative freedom to select their travel speed during the peak hours on those roads. On the private roads, and assuming drivers' expectations are aligned with those of drivers on Class II roads, the LoS experienced by drivers would be satisfactory.

5.6 Intersection Operating Conditions

The operating characteristics of the intersections along Kamilaroi Highway have been re-analysed using SIDRA INTERSECTION 9.1 to determine what their future operating conditions with the Project would be. Table 5.11 presents a summary of the forecast operating characteristics of the intersections during the peak hours associated with MCCM-generated traffic with the Project in 2028 and 2036.

Table 5.11: Intersection Operating Conditions

	5:30 am to 6:30 am			5:30 pm to 6:30 pm		
	X-Value	Average Delay[B]	LoS	X-Value	Average Delay[B]	LoS
Kamilaroi Highway and Rangari Road (Location H)[A]						
Project 2028	0.22	8.1	A	0.18	11.4	A
Project 2036	0.21	8.1	A	0.17	11.3	A
Kamilaroi Highway and Shared Access Road Merge (South Intersection)						
Project 2028	0.05	3.7	A	0.05	3.7	A
Project 2036	0.06	3.7	A	0.05	3.7	A
Kamilaroi Highway and Shared Access Road Merge (North Intersection)						
Project 2028	0.04	3.6	A	0.12	3.7	A
Project 2036	0.04	3.6	A	0.11	3.7	A

[A] *Refer to Figure 1.2.*
[B] *Seconds per vehicle for the movement with highest average delay per vehicle.*

The results in Table 5.11 indicate that the existing intersections along Kamilaroi Highway can be expected to operate at good levels of service with only short delays to traffic under the forecast future conditions with the Project.

5.7 Parking

Adequate parking would be provided within the MCCM to accommodate the cumulative demands of the peak operational and construction workforce.

5.8 Oversize Overmass Vehicles

Consistent with the current mining operations at MCCM, infrequent OSOM vehicle movements would be required for transport of oversize mining vehicles and equipment. The proposed movement of OSOM vehicles would continue to be transported with the relevant permits from the NHVR and load declarations and any other licences and escorts as required by regulatory authorities. As part of the permit, the contractor would develop a TMP and determine the suitable route based on the specific requirements of the load and vehicle dimensions and mass. The TMP for OSOM vehicle movements would identify risks and minimise the impact of the movement on the road network as described in Section 2.1.5.

As the loads transported to the MCCM with the Project would be consistent with those historically transported, it is anticipated that OSOM vehicle movements required for the Project would be satisfactorily accommodated by the road network, with no requirement for civil works to accommodate the anticipated largest vehicles. In this regard, a concept-level route analysis is therefore not warranted, with each OSOM vehicle movement being subject to permits that would assess the load and route on a case-by-case basis.

5.9 Road Safety

The review of the road crash history (Section 3.6) does not highlight any notable clustering of crashes or particular causation factors that would be exacerbated by the Project.

Whitehaven's TMP and Driver Code of Conduct (MCC, 2024) would apply to Project drivers, and would continue to be reviewed and updated as required.

5.10 Railway Level Crossings

Consistent with the current operations, MCCM-generated traffic, including the Project-generated traffic, would continue to travel across the level crossings on Boston Street/Caloola Road (LXM 529) at Boggabri to access the Civeo accommodation village, and potentially continue to travel across the level crossings in Gunnedah (LXM 523 and LXM 522).

The review of the level crossings found that the signage and linemarking is generally consistent with AS 1742.7, with some minor non-conformances. These are minor issues which represent low risks to the continued safety of the road network with the Project.

5.11 School Buses

The existing MCCM TMP considers interactions with school buses. MCC would continue to implement the measures described in the existing TMP, including the continued consultation with school bus service providers to stay abreast of the current routes and bus stop locations.

5.12 Mitigation Measures

The assessment indicates that the road network and intersections have adequate capacity to accommodate the Project-generated traffic cumulative with other forecast changes resulting from other developments in the region. As a result, no specific measures would be required to provide capacity for the Project-generated traffic.

TTPP notes that this assessment assumes continuation of the current shift and roster arrangements for the MCCM workforce. While unrelated to the Project, changes to such arrangements may occur over time, which may alter the distribution of MCCM-generated traffic throughout the day, with possible variations to the "peakiness" of travel and times of peaks. This assessment has demonstrated that there is spare capacity within the existing road links and intersections, and as such, no concerns are raised should variations to the shift arrangements occur in the future.

It is recommended that with the continuation of mining operations:

- the TMP and Driver Code of Conduct continue to be reviewed and updated as required; and
- the shuttle bus services continue to be provided for the MCCM workforce throughout the life of the Project.

6 Conclusions

This study has examined the likely road transport implications of the Project (i.e. the extension of mining operations at the MCCM until 31 December 2044). It is concluded that no specific road or intersection upgrades are required to mitigate the impacts of the Project on the capacity, safety and efficiency of the road network. It is recommended that with the continuation of mining operations:

- the TMP and Driver Code of Conduct continue to be reviewed and updated as required; and
- the shuttle bus services continue to be provided for the MCCM workforce throughout the life of the Project.

Appendix A

Traffic Surveys

A Kamilaroi Highway North of Rangari Road [100 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	9	6	0	1	0	0	0	0	0	0	1	0	0	0
1:00	12	10	0	0	0	0	0	0	0	0	0	0	0	0
2:00	8	5	0	2	0	0	0	0	0	0	0	0	0	0
3:00	9	6	0	1	0	0	0	0	0	1	1	0	0	0
4:00	81	60	1	16	2	0	0	0	0	1	1	0	0	0
5:00	334	253	2	65	5	1	1	1	1	2	4	1	0	0
6:00	219	172	2	27	2	2	1	1	0	3	6	2	0	0
7:00	183	120	6	32	4	1	1	2	1	6	7	2	0	0
8:00	194	138	9	18	3	3	1	1	1	6	8	4	0	0
9:00	210	131	12	28	5	4	1	1	1	10	13	4	0	0
10:00	193	110	14	26	6	2	1	3	1	9	16	6	0	0
11:00	187	119	12	19	3	3	1	2	2	8	12	5	0	0
12:00	181	107	14	22	4	2	2	3	1	7	14	5	0	0
13:00	190	115	14	26	4	1	2	3	2	7	10	5	0	0
14:00	211	143	13	24	3	1	2	2	0	8	12	4	0	0
15:00	239	168	13	25	3	1	1	1	1	10	12	3	0	0
16:00	288	223	9	26	4	1	2	2	1	9	9	3	0	0
17:00	349	276	6	39	8	1	0	0	1	7	9	1	0	0
18:00	216	185	3	15	1	0	0	0	0	3	6	3	0	0
19:00	84	52	3	16	1	0	0	1	0	2	7	2	0	0
20:00	38	23	1	4	1	0	0	0	0	2	3	2	0	0
21:00	40	27	1	4	0	0	0	0	0	1	5	1	0	0
22:00	21	13	1	2	0	0	0	0	0	1	3	1	0	0
23:00	14	10	0	2	0	0	0	0	0	0	2	1	0	0
Total	**3511**	**2470**	**138**	**441**	**58**	**22**	**16**	**26**	**14**	**104**	**162**	**58**	**0**	**2**

B Maules Creek Mine Access [20 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0
2:00	4	3	0	0	0	0	0	0	0	0	0	0	0	0
3:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
4:00	6	4	0	1	0	0	0	0	0	0	0	0	0	0
5:00	116	73	0	41	0	0	0	0	0	0	0	0	0	0
6:00	126	66	0	59	0	0	0	0	0	0	0	0	0	0
7:00	34	11	0	20	0	0	0	0	0	1	0	1	0	0
8:00	22	11	0	4	1	2	0	0	0	0	2	1	0	0
9:00	27	11	1	8	2	2	0	0	0	1	1	1	0	1
10:00	27	14	0	6	2	1	0	0	0	1	2	1	0	0
11:00	20	9	0	5	1	2	0	0	0	1	1	0	0	0
12:00	21	12	0	4	1	1	0	0	0	1	1	0	0	0
13:00	28	13	0	8	1	1	0	0	0	2	1	0	0	0
14:00	24	13	0	8	1	0	0	0	0	1	0	0	0	1
15:00	24	15	0	6	0	0	0	0	0	1	1	0	0	1
16:00	68	41	1	24	0	0	0	0	0	0	1	0	0	0
17:00	79	47	1	29	1	0	0	0	0	0	0	0	0	0
18:00	95	42	0	52	0	0	0	0	0	0	0	0	0	0
19:00	20	7	0	12	0	0	0	0	0	0	0	1	0	0
20:00	3	0	0	1	0	0	0	0	0	0	0	1	0	0
21:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0
22:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0
23:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Total	**756**	**402**	**6**	**291**	**10**	**9**	**1**	**2**	**1**	**11**	**11**	**7**	**0**	**5**

C Rangari Road South of Therribri Road [80 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
3:00	9	9	0	0	0	0	0	0	0	0	0	0	0	0
4:00	8	8	0	0	0	0	0	0	0	0	0	0	0	0
5:00	38	37	0	1	0	0	0	0	0	0	0	0	0	0
6:00	20	19	0	1	0	0	0	0	0	0	0	0	0	0
7:00	15	11	1	2	0	0	0	0	0	0	0	0	0	0
8:00	18	13	0	3	1	0	0	0	0	0	1	0	0	0
9:00	16	11	1	3	0	0	0	0	0	0	0	0	0	0
10:00	12	9	1	1	0	0	0	0	0	1	0	0	0	0
11:00	13	7	1	1	1	1	0	0	0	1	1	0	0	0
12:00	16	11	0	2	0	0	0	0	0	1	0	0	0	0
13:00	15	10	1	3	0	0	0	0	0	0	1	0	0	0
14:00	15	11	1	2	0	0	0	0	0	0	0	0	0	0
15:00	28	23	0	4	0	0	0	0	0	0	0	0	0	0
16:00	34	31	1	2	0	0	0	0	0	0	0	0	0	0
17:00	42	36	0	5	0	0	0	0	0	0	0	0	0	0
18:00	17	14	0	2	0	0	0	0	0	0	0	0	0	0
19:00	4	3	0	1	0	0	0	0	0	0	0	0	0	0
20:00	4	3	0	1	0	0	0	0	0	0	0	0	0	0
21:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
22:00	4	2	0	1	0	0	0	0	0	0	0	0	0	0
23:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	**335**	**274**	**8**	**35**	**4**	**2**	**0**	**1**	**2**	**4**	**3**	**0**	**0**	**1**

D Shared Access Road East of Therribri Road [80 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
1:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
2:00	5	4	0	1	0	0	0	0	0	0	0	0	0	0
3:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
4:00	53	46	0	7	0	0	0	0	0	0	0	0	0	0
5:00	309	260	1	46	0	0	0	0	0	0	1	0	0	0
6:00	184	137	0	40	2	2	0	0	0	1	2	0	0	0
7:00	50	24	1	18	1	1	0	0	0	1	4	1	0	0
8:00	42	21	1	3	1	3	0	0	0	2	9	1	0	0
9:00	41	22	1	4	1	2	0	0	0	2	8	1	0	0
10:00	44	23	0	6	2	2	0	0	0	3	7	1	0	0
11:00	36	20	1	3	1	2	0	0	0	2	6	1	0	0
12:00	39	19	0	4	3	1	0	0	0	3	8	1	0	0
13:00	43	24	1	8	2	0	0	0	0	2	6	0	0	0
14:00	45	28	1	5	1	0	0	0	1	4	5	0	0	0
15:00	54	36	0	6	1	0	0	0	0	3	7	0	0	0
16:00	141	115	1	17	1	1	0	0	0	1	3	0	0	0
17:00	234	191	1	38	2	0	0	0	0	0	1	0	0	0
18:00	140	95	0	43	0	0	0	0	0	0	1	0	0	0
19:00	23	11	0	11	0	0	0	0	0	0	1	1	0	0
20:00	5	3	0	1	0	0	0	0	0	0	0	1	0	0
21:00	6	4	0	1	0	0	0	0	0	0	0	0	0	0
22:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0
23:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Total	**1510**	**1098**	**10**	**261**	**18**	**14**	**0**	**2**	**3**	**25**	**67**	**9**	**0**	**2**

E Shared Access Road East of Kamilaroi Highway [60 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
3:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
4:00	10	8	0	1	0	0	0	0	0	0	0	0	0	0
5:00	84	70	0	13	0	0	0	0	0	0	0	0	0	0
6:00	54	44	0	8	0	1	0	0	0	0	1	0	0	0
7:00	22	9	0	10	0	1	0	0	0	1	2	0	0	0
8:00	13	6	0	1	0	1	0	0	0	1	4	0	0	0
9:00	18	9	0	2	0	2	0	0	0	1	3	1	0	0
10:00	21	11	0	1	1	1	0	0	0	1	5	1	0	0
11:00	19	10	0	1	0	1	0	0	0	1	4	0	0	0
12:00	20	12	0	1	1	1	0	0	0	2	3	1	0	0
13:00	23	15	1	3	0	0	0	0	0	1	3	0	0	0
14:00	30	21	0	2	0	0	0	0	0	2	4	0	0	0
15:00	33	24	0	3	0	0	0	0	0	1	3	0	0	0
16:00	80	69	1	4	0	0	0	0	0	1	3	0	0	0
17:00	138	120	1	15	1	0	0	0	0	0	1	0	0	0
18:00	109	98	0	10	0	0	0	0	0	0	1	0	0	0
19:00	20	11	0	8	0	0	0	0	0	0	0	0	0	0
20:00	4	3	0	1	0	0	0	0	0	0	0	0	0	0
21:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0
22:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0
23:00	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Total	**713**	**555**	**5**	**84**	**4**	**8**	**0**	**0**	**1**	**13**	**37**	**5**	**0**	**1**

F Shared Access Road West of Kamilaroi Highway [60 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
3:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
4:00	51	32	0	18	0	0	0	0	0	0	0	0	0	0
5:00	211	132	1	75	0	0	0	1	0	0	1	0	0	0
6:00	83	49	0	30	0	1	0	0	0	1	1	0	0	0
7:00	20	11	1	6	0	0	0	0	0	0	1	0	0	0
8:00	22	12	0	5	0	1	0	0	0	1	2	1	0	0
9:00	17	9	0	4	1	0	0	0	0	1	2	0	0	0
10:00	14	5	0	5	1	1	0	0	0	1	0	0	0	0
11:00	10	5	0	3	0	0	0	0	0	1	1	1	0	0
12:00	9	3	0	3	0	0	0	0	0	1	2	0	0	0
13:00	10	3	0	4	0	0	0	0	0	1	1	0	0	0
14:00	8	3	0	3	0	0	0	0	0	1	1	0	0	0
15:00	11	6	0	2	0	0	0	0	0	1	2	0	0	0
16:00	34	22	0	11	0	0	0	0	0	0	0	0	0	0
17:00	55	31	0	24	0	0	0	0	0	0	0	0	0	0
18:00	11	2	0	8	0	0	0	0	0	0	0	0	0	0
19:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0
20:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	2	1	0	0	0	0	0	0	0	0	0	0	0	0
22:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0
23:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	**577**	**333**	**3**	**202**	**4**	**4**	**0**	**2**	**1**	**9**	**15**	**5**	**0**	**0**

G Therribri Road North of Rangari Road [80 km/h]

Weekday Average **Friday 23 June 2023** **to** **Thursday 29 June 2023**

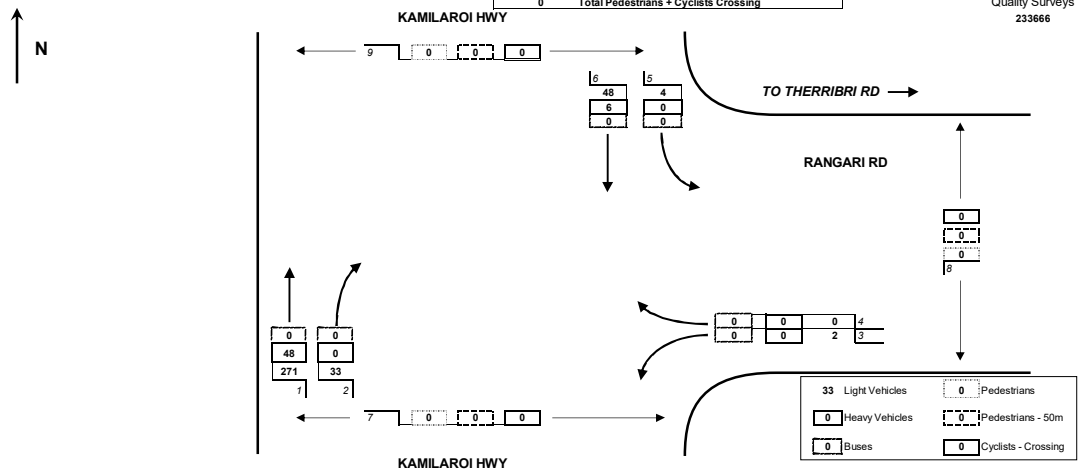
Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
5:00	11	10	0	1	0	0	0	0	0	0	0	0	0	0
6:00	11	10	0	1	0	0	0	0	0	0	0	0	0	0
7:00	9	7	0	1	0	0	0	0	0	0	0	0	0	0
8:00	8	6	0	0	0	0	0	0	0	1	0	0	0	0
9:00	7	5	0	1	0	0	0	0	0	1	0	0	0	0
10:00	7	5	0	1	0	0	0	0	0	0	0	0	0	0
11:00	8	6	0	1	0	0	0	0	0	1	0	0	0	0
12:00	7	5	0	1	0	0	0	0	0	1	0	0	0	0
13:00	5	2	0	1	0	0	0	0	0	1	0	0	0	0
14:00	6	5	0	1	0	0	0	0	0	0	0	0	0	0
15:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0
16:00	14	12	0	1	0	0	0	0	0	0	0	0	0	0
17:00	13	12	0	1	0	0	0	0	0	0	0	0	0	0
18:00	7	6	0	1	0	0	0	0	0	0	0	0	0	0
19:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0
20:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
21:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**127**	**105**	**3**	**12**	**1**	**1**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**0**

27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

6:15 <<< HOUR ENDING **Tuesday**

Summary:	KAMILAROI HWY / RANGARI RD
358	Total Light Vehicles
54	Total Heavy Vehicles
0	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
05:15	50	3	0	1	0	4	58		0	0	0
05:30	74	5	0	0	0	6	85		0	0	0
05:45	87	7	1	0	3	8	106		0	0	0
06:00	69 <	11	0	0	1	18	99	348	0	0	0
06:15	41	10	1	0	0	16	68	358 <	0	0	0
06:30	24	6 <	1	0	0	31	62	335	0	0	0
06:45	39	6	0	0	0	17	62	291	0	0	0
07:00	17	1	0	0	0	19	37	229	0	0	0
07:15	19	0	2	0	0	19	40	201	0	0	0
07:30	20	4	3	0	0	7	34	173	0	0	0
07:45	28	2	2	0	2	15	49	160	0	0	0
08:00	18	2	1	0	1	26	48	171	0	0	0
08:15	21	0	0	0	1	17	39	170	0	0	0
08:30	18	1	1	3 <	1 <	14	38	174	0	0	0
08:45	17	1	2	0 <	0	12	32	157	0	0	0
09:00	21	0	3	0 <	0	18	42	151	0	0	0
09:15	23	0	3	0 <	1	27	54	166	0	0	0
09:30	20	0	2 <	0	0	19	41	169	0	0	0
09:45	28	2	1	1	0	23	55	192	0	0	0
10:00	21	1	0	0	1	22 <	45	195	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
05:15	6	0	0	0	0	0	6		0	0	0
05:30	11	0	0	0	0	1	12		0	0	0
05:45	11	0	0	0	0	2	13		0	0	0
06:00	19	0	0	0	0	2	21	52	0	0	0
06:15	7 <	0	0	0	0	1	8	54 <	0	0	0
06:30	6	0	0	0	0	3	9	51	0	0	0
06:45	5	0	0	0	0	1	6	44	0	0	0
07:00	2	0	0	0	0	3	5	28	0	0	0
07:15	3	0	0	0	0	6	9	29	0	0	0
07:30	8	0	0	0	0	4	12	32	0	0	0
07:45	10	0	0	0	0	4	14	40	0	0	0
08:00	4	0	0	0	0	1	5	40	0	0	0
08:15	7	0	0	0	0	3	10	41	0	0	0
08:30	5	0	0	0	1 <	5	11	40	0	0	0
08:45	9	0	1	0	0 <	6	16	42	0	0	0
09:00	3	0	0	0	0 <	2	5	42	0	0	0
09:15	3	0	0	0	0 <	4	7	39	0	0	0
09:30	2	0	3 <	0	0	10 <	15	43	0	0	0
09:45	10	0	1 <	0	0	2	13	40	0	0	0
10:00	6	0	0 <	1 <	0	4	11	46	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
05:15	0	0	0	0	0	0	0		0	0	0
05:30	0	0	0	0	0	0	0		0	0	0
05:45	0	0	0	0	0	0	0		0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	1	1	1	0	0	0
07:00	0	0	0	0	0	0	0	1	0	0	0
07:15	0	0	0	0	0	2	2	3	0	0	0
07:30	0	0	0	0	0	5 <	5	8	0	0	0
07:45	1	0	0	0	0	0	1	8	0	0	0
08:00	0	0	0	0	0	1 <	1	9	0	0	0
08:15	0	0	0	0	1 <	2 <	3	10 <	0	0	0
08:30	1 <	0	0	0	0 <	0	1	6	0	0	0
08:45	0	0	1 <	0	0 <	0	1	6	0	0	0
09:00	0	0	0 <	0	0 <	0	0	5	0	0	0
09:15	1 <	0	0 <	0	0	1	2	4	0	0	0
09:30	1 <	0	0 <	0	0	1	2	5	0	0	0
09:45	0 <	0	0	0	0	0	0	4	0	0	0
10:00	0 <	0	0	0	0	0	0	4	0	0	0

Light + Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	56	3	0	1	0	4	64	
05:30	85	5	0	0	0	7	97	
05:45	98	7	1	0	3	10	119	
06:00	88 <	11	0	0	1	20	120	400
06:15	48	10	1	0	0	17	76	412 <
06:30	30	6 <	1	0	0	34	71	386
06:45	44	6	0	0	0	18	68	335
07:00	19	1	0	0	0	22	42	257
07:15	22	0	2	0	0	25	49	230
07:30	28	4	3	0	0	11	46	205
07:45	38	2	2	0	2	19	63	200
08:00	22	2	1	0	1	27	53	211
08:15	28	0	0	0	1	20	49	211
08:30	23	1	1	3 <	2 <	19	49	214
08:45	26	1	3	0 <	0	18	48	199
09:00	24	0	3	0 <	0	20	47	193
09:15	26	0	3	0 <	1	31	61	205
09:30	22	0	5 <	0	0	29	56	212
09:45	38	2	2	1	0	25	68	232
10:00	27	1	0	1	1	26 <	56	241

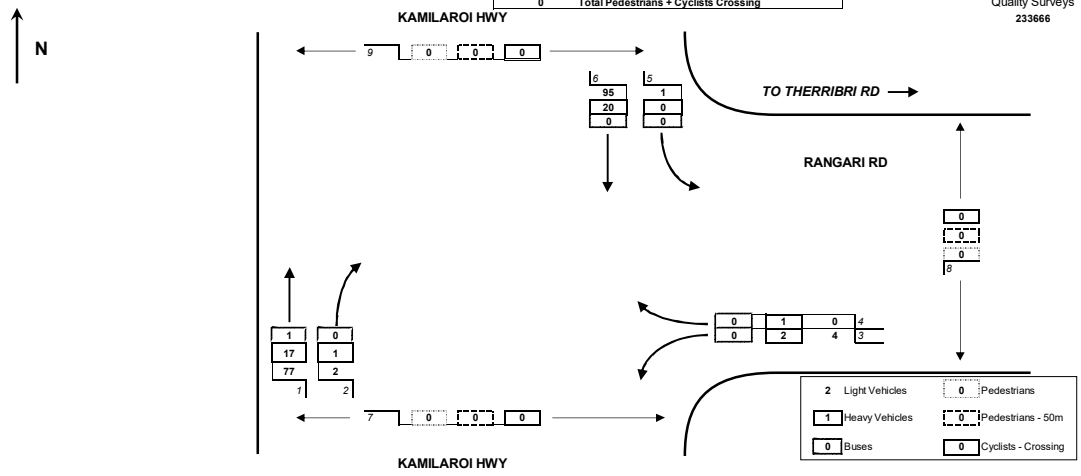
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

15:00 <<< HOUR ENDING **Tuesday**

Summary:	KAMILAROI HWY / RANGARI RD
179	Total Light Vehicles
41	Total Heavy Vehicles
1	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
10:15	22	3	1	0	1	16	43		0	0	0
10:30	18	0	1	0	0	14	33		0	0	0
10:45	15	1	1	1	1	15	34		0	0	0
11:00	13	0	0	0	0	10	23	133	0	0	0
11:15	12	1	1	1 <	1	16	32	122	0	0	0
11:30	22	1	1	0 <	0	20	44	133	0	0	0
11:45	17	2	2	0	0	15	36	135	0	0	0
12:00	11	2 <	2	0	3 <	20	38	150	0	0	0
12:15	12	0	0	1	0	21	34	152	0	0	0
12:30	13	1	0	0	0	23	37	145	0	0	0
12:45	11	2	2	0	1 <	14	30	139	0	0	0
13:00	9	0	1	1 <	0	27	38	139	0	0	0
13:15	15	1	1	0	0	20	37	142	0	0	0
13:30	12	0	1	0	0	15	28	133	0	0	0
13:45	18	0	3	0	1	16	38	141	0	0	0
14:00	21	0	2 <	0	0	17	40	143	0	0	0
14:15	22	1	0	0	0	25	48	154	0	0	0
14:30	19	0	2 <	0	1	15	37	163	0	0	0
14:45	19 <	0	2	0	0	23	44	169	0	0	0
15:00	17	1	0	0	0	32 <	50	179 <	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
10:15	11	0	0	0	0	9	20		0	0	0
10:30	6	1	0	0	0	7	14		0	0	0
10:45	4	0	0	0	0	5	9		0	0	0
11:00	2	0 <	0	0	0	8 <	10	53	0	0	0
11:15	7	0 <	0	0	0	7	14	47	0	0	0
11:30	8	0	1	1 <	0	5	15	48	0	0	0
11:45	10	0	0	0 <	1	3	14	53	0	0	0
12:00	5 <	0	0	0 <	0	6	11	54 <	0	0	0
12:15	4	0	0	0 <	0	6	10	50	0	0	0
12:30	6	0	0	0	1 <	5	12	47	0	0	0
12:45	0	0	0	0	0	4	4	37	0	0	0
13:00	2	0	1	0	1 <	12	16	42	0	0	0
13:15	5	0	0	0	0 <	3	8	40	0	0	0
13:30	3	0	0	0	0	7	10	38	0	0	0
13:45	2	1 <	0	1 <	0	7 <	11	45	0	0	0
14:00	3	0 <	0	0 <	0	8	11	40	0	0	0
14:15	2	0 <	2 <	0 <	0	6	10	42	0	0	0
14:30	4	0 <	0 <	0 <	0	8 <	12	44	0	0	0
14:45	7	0	0 <	0	0	2	9	42	0	0	0
15:00	4	1 <	0 <	1 <	0	4	10	41	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
10:15	0	0	0	0	0	2	2		0	0	0
10:30	0	0	0	0	0	0	0		0	0	0
10:45	0	0	0	0	0	0	0		0	0	0
11:00	0	0	0	0	0	0 <	0	2 <	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0
11:30	1 <	0	0	0	0	0	1	1	0	0	0
11:45	0 <	0	0	0	0	0	0	1	0	0	0
12:00	0 <	0	0	0	0	0	0	1	0	0	0
12:15	0 <	0	0	0	0	0	0	1	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	1	1	1	0	0	0
14:15	1 <	0	0	0	0	0	1	2 <	0	0	0
14:30	0 <	0	0	0	0	0	0	2 <	0	0	0
14:45	0 <	0	0	0	0	0	0	2 <	0	0	0
15:00	0 <	0	0	0	0	0	0	1	0	0	0

Light + Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	33	3	1	0	1	25	63	
10:30	24	1	1	0	0	21	47	
10:45	19	1	1	1	1	20	43	
11:00	15	0	0	0	0	18	33	186
11:15	19	1	1	1	1	23	46	169
11:30	30	1	2	1 <	0	25	59	181
11:45	27	2	2	0	1	18	50	188
12:00	16	2 <	2	0	3 <	26	49	204
12:15	16	0	0	1	0	27	44	202
12:30	19	1	0	0	1 <	28	49	192
12:45	11	2	2	0	1 <	18	34	176
13:00	11	0	2	1	1	39	54	181
13:15	20	1	1	0	0	23	45	182
13:30	15	0	1	0	0	22	38	171
13:45	20	1	3	1	1	23	49	186
14:00	24	0	2	0	0	25	51	183
14:15	24	1	2	0	0	31	58	196
14:30	23	0	2 <	0	1	23	49	207
14:45	26 <	0	2	0	0	25	53	211
15:00	21	2	0	1	0	36 <	60	220 <

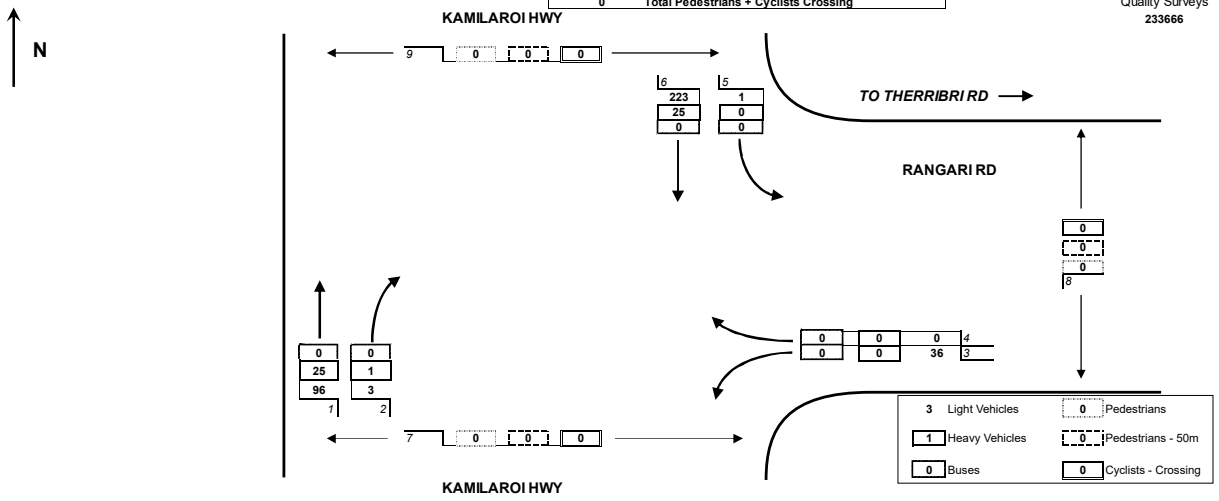
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

18:15 <<< HOUR ENDING **Tuesday**

Summary:	KAMILAROI HWY / RANGARI RD
359	Total Light Vehicles
51	Total Heavy Vehicles
0	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



27/6/2023 - KAMILAROI HWY / RANGARI RD, BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
15:15	17	0	1	0	0	25	43		0	0	0
15:30	27	7	1	1	0	19	55		0	0	0
15:45	14	2	0	1	0	22	39		0	0	0
16:00	25	4	1	0	1	23	54	191	0	0	0
16:15	18	10 <	2	2	2	33	67	215	0	0	0
16:30	18	2	5	1	2	42	70	230	0	0	0
16:45	25	4	4	1	1 <	31	66	257	0	0	0
17:00	34	2	5	4	0	44	89	292	0	0	0
17:15	25	4	9	3 <	1	39	81	306	0	0	0
17:30	32	2	14	0	0	43	91	327	0	0	0
17:45	33 <	0	8	0	0	54	95	356	0	0	0
18:00	19	1	7 <	0	1	56	84	351	0	0	0
18:15	12	0	7	0	0	70 <	89	359 <	0	0	0
18:30	10	0	2	0	0	37	49	317	0	0	0
18:45	5	1	3	0	0	46	55	277	0	0	0
19:00	5	0	2	0	0	26	33	226	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
15:15	8	0	0	0	0	7	15		0	0	0
15:30	2	0	0	0	0	5	7		0	0	0
15:45	3	0	0	0	0	4	7		0	0	0
16:00	4	0	0	0	0	6	10	39	0	0	0
16:15	1	0	0	0	0	10	11	35	0	0	0
16:30	4	1 <	0	0	0	4	9	37	0	0	0
16:45	2	0 <	0	1 <	0	7 <	10	40	0	0	0
17:00	4	0 <	0	0 <	0	2	6	36	0	0	0
17:15	4	0 <	0	0 <	0	6	10	35	0	0	0
17:30	4	0	0	0 <	0	9	13	39	0	0	0
17:45	6	1 <	0	0	0	6	13	42	0	0	0
18:00	15 <	0 <	0	0	0	2	17	53 <	0	0	0
18:15	0	0 <	0	0	0	8	8	51	0	0	0
18:30	4	0 <	0	0	0	3	7	45	0	0	0
18:45	2	0	0	0	0	4	6	38	0	0	0
19:00	3	0	0	0	0	3	6	27	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
15:15	0	0	0	0	0	0	0		0	0	0
15:30	0	1	0	0	0	0	1		0	0	0
15:45	0	0	0	0	0	0	0		0	0	0
16:00	1	0 <	0	1 <	0	0	2	3 <	0	0	0
16:15	0	0 <	0	0 <	0	0	0	3 <	0	0	0
16:30	1 <	0	0	0 <	0	0	1	3 <	0	0	0
16:45	0 <	0	0	0 <	0	0	0	3 <	0	0	0
17:00	0	0	0	0	0	0	0	1	0	0	0
17:15	0	0	0	0	0	0	0	1	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0

Light + Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	25	0	1	0	0	32	58	
15:30	29	7	1	1	0	24	62	
15:45	17	2	0	1	0	26	46	
16:00	29	4	1	0	1	29	64	230
16:15	19	10 <	2	2	2	43	78	250
16:30	22	3	5	1	2	46	79	267
16:45	27	4	4	2	1 <	38	76	297
17:00	38	2	5	4	0	46	95	328
17:15	29	4	9	3 <	1	45	91	341
17:30	36	2	14	0	0	52	104	366
17:45	39 <	1	8	0	0	60	108	398
18:00	34	1	7 <	0	1	58	101	404
18:15	12	0	7	0	0	78 <	97	410 <
18:30	14	0	2	0	0	40	56	362
18:45	7	1	3	0	0	50	61	315
19:00	8	0	2	0	0	29	39	253

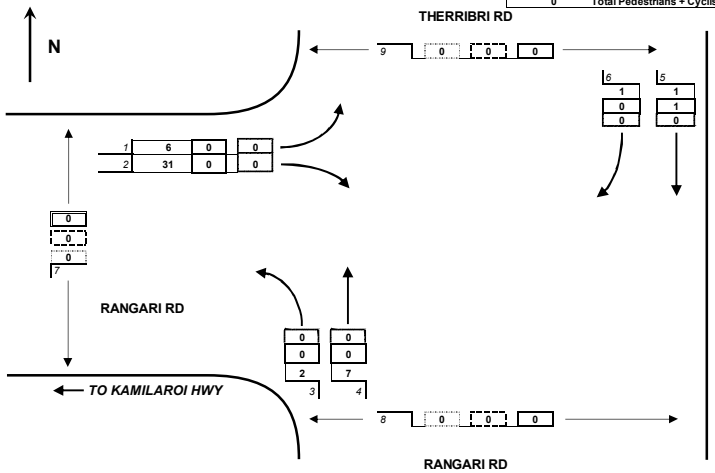
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

27/6/2023 - THERRIBRI RD / , BOGGABRI

6:15 <<< HOUR ENDING **Tuesday**

Summary:	THERRIBRI RD / 0
48	Total Light Vehicles
1	Total Heavy Vehicles
0	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



7 Light Vehicles | 0 Pedestrians
0 Heavy Vehicles | 0 Pedestrians - 50m
0 Buses | 0 Cyclists - Crossing

27/6/2023 - THERRIBRI RD / , BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
05:15	0	4	1	1	0	0	6		0	0	0
05:30	1	4	0	3	0	0	8		0	0	0
05:45	2	8	1	2	0	0	13		0	0	0
06:00	1	10	0	1 <	0	0	12	39	0	0	0
06:15	2	9 <	1	1 <	1	1	15	48 <	0	0	0
06:30	3	3	0	1	1	0	8	48 <	0	0	0
06:45	1	2	0	0	4	0	7	42	0	0	0
07:00	5 <	0	0	0	2 <	0	7	37	0	0	0
07:15	0	0	1	0	0	1	2	24	0	0	0
07:30	3	1	2	0	0	1	7	23	0	0	0
07:45	1	3	2	0	1	0	7	23	0	0	0
08:00	1	2	0	0	1	1 <	5	21	0	0	0
08:15	0	0	0	0	0	0	0	19	0	0	0
08:30	0	3	3	0	1	1	8	20	0	0	0
08:45	1	0	5	0	0	0	6	19	0	0	0
09:00	0	1	2	0	0	1	4	18	0	0	0
09:15	0	0	2 <	2	0	1 <	5	23	0	0	0
09:30	0	1	2	0	0	0	3	18	0	0	0
09:45	1	1	1	0	1	1 <	5	17	0	0	0
10:00	0	2	0	0	0	0	2	15	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
05:15	0	0	0	0	0	0	0		0	0	0
05:30	0	0	0	0	0	0	0		0	0	0
05:45	0	0	0	0	0	0	0		0	0	0
06:00	0	0	0	0	1 <	0	1	1	0	0	0
06:15	0	0	0	0	0 <	0	0	1	0	0	0
06:30	0	0	0	0	0 <	0	0	1	0	0	0
06:45	0	0	0	0	0 <	0	0	1	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0
08:30	0	1 <	1	0	0	1	3	3	0	0	0
08:45	0	0 <	0	0	0	0	0	3	0	0	0
09:00	0	0 <	0	0	0	0	0	3	0	0	0
09:15	0	0 <	0	0	0	0	0	3	0	0	0
09:30	0	0	1	0	0	2 <	3	3	0	0	0
09:45	0	0	1	0	0	0 <	1	4	0	0	0
10:00	0	0	1 <	0	0	0 <	1	5 <	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
05:15	0	0	0	0	0	0	0		0	0	0
05:30	0	0	0	0	0	0	0		0	0	0
05:45	0	0	0	0	0	0	0		0	0	0
06:00	0	0	0	0	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	1 <	0	1	1	0	0	0
07:30	0	0	0	0	0 <	0	0	1	0	0	0
07:45	0	0	0	0	0 <	0	0	1	0	0	0
08:00	0	0	0	0	0 <	0	0	1	0	0	0
08:15	0	1 <	0	0	0	0	1	1	0	0	0
08:30	0	0 <	1 <	0	0	0	1	2 <	0	0	0
08:45	0	0 <	0 <	0	0	0	0	2 <	0	0	0
09:00	0	0 <	0 <	0	0	0	0	2 <	0	0	0
09:15	0	0	0 <	0	0	0	0	1	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0

Light + Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
05:15	0	4	1	1	0	0	6	
05:30	1	4	0	3	0	0	8	
05:45	2	8	1	2	0	0	13	
06:00	1	10	0	1 <	1	0	13	40
06:15	2	9 <	1	1 <	1	1	15	49 <
06:30	3	3	0	1	1	0	8	49 <
06:45	1	2	0	0	4	0	7	43
07:00	5 <	0	0	0	2 <	0	7	37
07:15	0	0	1	0	0	1	2	24
07:30	3	1	2	0	0	1	7	23
07:45	1	3	2	0	1	0	7	23
08:00	1	2	0	0	1	1	5	21
08:15	0	0	0	0	0	0	0	19
08:30	0	4	4	0	1	2	11	23
08:45	1	0	5	0	0	0	6	22
09:00	0	1	2	0	0	1	4	21
09:15	0	0	2 <	2	0	1	5	26
09:30	0	1	3	0	0	2	6	21
09:45	1	1	2	0	1	1 <	6	21
10:00	0	2	1	0	0	0	3	20

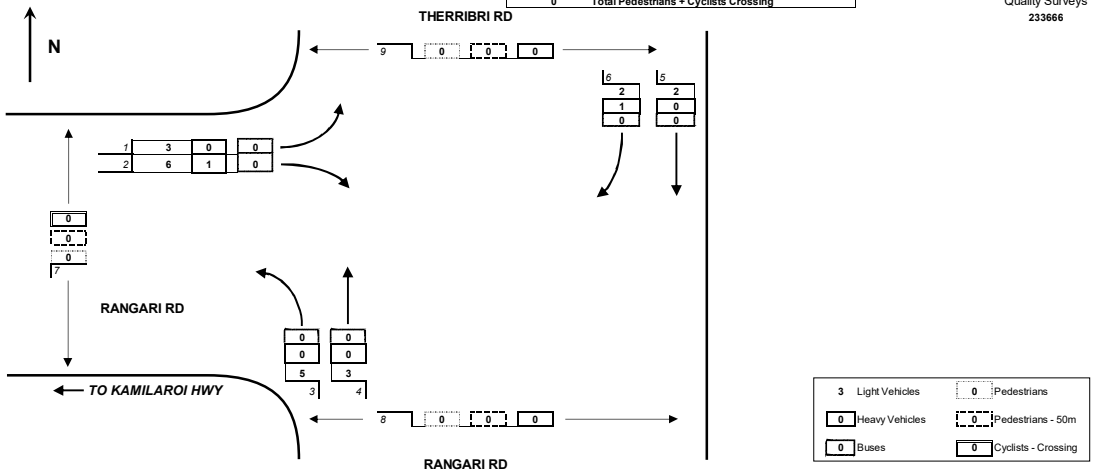
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

27/6/2023 - THERRIBRI RD / , BOGGABRI

11:00 <<< HOUR ENDING **Tuesday**

Summary:	THERRIBRI RD / 0
21	Total Light Vehicles
2	Total Heavy Vehicles
0	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



27/6/2023 - THERRIBRI RD / , BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
10:15	2	3	4	2	0	0	11		0	0	0
10:30	0	2	0	0	2	0	4		0	0	0
10:45	0	0	1	0	0	2	3		0	0	0
11:00	1 <	1	0	1 <	0	0	3	21 <	0	0	0
11:15	0	0	0	1	0	1	2	12	0	0	0
11:30	0	1	1	0	0	1 <	3	11	0	0	0
11:45	2 <	1	0	0	1	1	5	13	0	0	0
12:00	0	2	1	0	0	0	3	13	0	0	0
12:15	0	2	0	1	0	0	3	14	0	0	0
12:30	0	0	0	0	0	0	0	11	0	0	0
12:45	0	4 <	1	0	0	1	6	12	0	0	0
13:00	0	0	2	1	0	0	3	12	0	0	0
13:15	0	1	1	0	1	0	3	12	0	0	0
13:30	0	0	2	0	1	0	3	15	0	0	0
13:45	0	1	2 <	0	0	1	4	13	0	0	0
14:00	0	0	1	1	0	1	3	13	0	0	0
14:15	0	1	0	0	0	0	1	11	0	0	0
14:30	0	1	2	0	2	1	6	14	0	0	0
14:45	0	0	2	0	1 <	0	3	13	0	0	0
15:00	0	1	0	1	0 <	0	2	12	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
10:15	0	1	0	0	0	0	1		0	0	0
10:30	0	0	0	0	0	0	0		0	0	0
10:45	0	0	0	0	0	0	0		0	0	0
11:00	0	0	0	0	0	1 <	1	2	0	0	0
11:15	1 <	0	2	1	0	0 <	4	5	0	0	0
11:30	0 <	0	0	0	0	0 <	0	5	0	0	0
11:45	0 <	1	0	0	1 <	0 <	2	7 <	0	0	0
12:00	0 <	0	0	0	0 <	0	0	6	0	0	0
12:15	0	0	0	0	0 <	0	0	2	0	0	0
12:30	0	0	0	0	0 <	0	0	2	0	0	0
12:45	0	1	0	0	0	0	1	1	0	0	0
13:00	0	0	1	0	0	0	1	2	0	0	0
13:15	0	1 <	0	0	0	0	1	3	0	0	0
13:30	0	0 <	0	1	0	0	1	4	0	0	0
13:45	1 <	0	0	2 <	0	0	3	6	0	0	0
14:00	0 <	0	2	0 <	0	0	2	7 <	0	0	0
14:15	0 <	0	0	0 <	0	0	0	6	0	0	0
14:30	0 <	0	0	0	0	0	0	5	0	0	0
14:45	0	0	1 <	0	0	0	1	3	0	0	0
15:00	0	1	0	0	0	0	1	2	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
10:15	0	0	0	0	0	0	0		0	0	0
10:30	0	0	0	0	0	0	0		0	0	0
10:45	0	0	0	0	0	0	0		0	0	0
11:00	0	0	0	0	0	0	0	0 <	0	0	0
11:15	0	0	0	0	0	0	0	0 <	0	0	0
11:30	0	0	0	0	0	0	0	0 <	0	0	0
11:45	0	0	0	0	0	0	0	0 <	0	0	0
12:00	0	0	0	0	0	0	0	0 <	0	0	0
12:15	0	0	0	0	0	0	0	0 <	0	0	0
12:30	0	0	0	0	0	0	0	0 <	0	0	0
12:45	0	0	0	0	0	0	0	0 <	0	0	0
13:00	0	0	0	0	0	0	0	0 <	0	0	0
13:15	0	0	0	0	0	0	0	0 <	0	0	0
13:30	0	0	0	0	0	0	0	0 <	0	0	0
13:45	0	0	0	0	0	0	0	0 <	0	0	0
14:00	0	0	0	0	0	0	0	0 <	0	0	0
14:15	0	0	0	0	0	0	0	0 <	0	0	0
14:30	0	0	0	0	0	0	0	0 <	0	0	0
14:45	0	0	0	0	0	0	0	0 <	0	0	0
15:00	0	0	0	0	0	0	0	0 <	0	0	0

Light + Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
10:15	2	4	4	2	0	0	12	
10:30	0	2	0	0	2	0	4	
10:45	0	0	1	0	0	2	3	
11:00	1	1	0	1	0	1	4	23 <
11:15	1	0	2	2	0	1	6	17
11:30	0	1	1	0	0	1 <	3	16
11:45	2 <	2	0	0	2	1	7	20
12:00	0	2	1	0	0	0	3	19
12:15	0	2	0	1	0	0	3	16
12:30	0	0	0	0	0	0	0	13
12:45	0	5 <	1	0	0	1	7	13
13:00	0	0	3	1	0	0	4	14
13:15	0	2	1	0	1	0	4	15
13:30	0	0	2	1	1	0	4	19
13:45	1	1	2 <	2 <	0	1	7	19
14:00	0	0	3 <	1 <	0	1	5	20
14:15	0	1	0	0 <	0	0	1	17
14:30	0	1	2	0	2	1	6	19
14:45	0	0	3 <	0	1 <	0	4	16
15:00	0	2	0	1	0 <	0	3	14

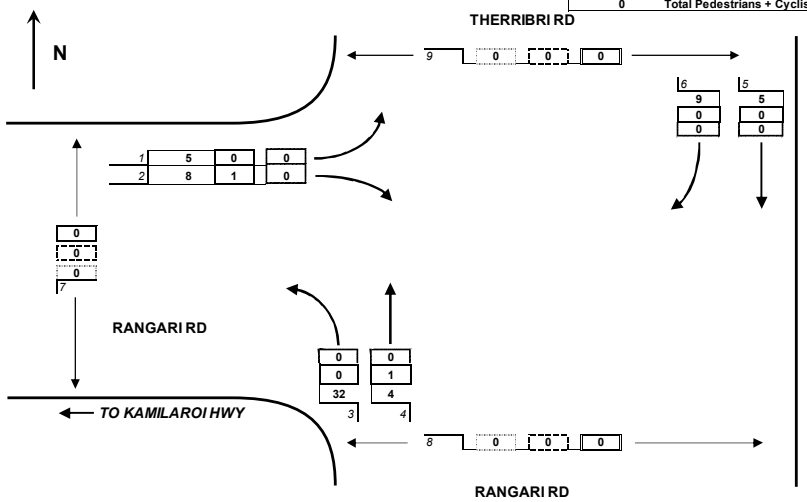
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

27/6/2023 - THERRIBRI RD / , BOGGABRI

18:00 <<< HOUR ENDING **Tuesday**

Summary:	THERRIBRI RD / 0
63	Total Light Vehicles
2	Total Heavy Vehicles
0	Total Buses
0	Total Pedestrians + Cyclists Crossing

Quality Surveys
233666



4	Light Vehicles	0	Pedestrians
1	Heavy Vehicles	0	Pedestrians - 50m
0	Buses	0	Cyclists - Crossing

27/6/2023 - THERRIBRI RD / , BOGGABRI

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians 7	8	9
15:15	0	0	2	0	0	0	2		0	0	0
15:30	1	5	1	1	1	0	9		0	0	0
15:45	0	2	1	0	3	0	6		0	0	0
16:00	0	5	2	0	1 <	0	8	25	0	0	0
16:15	0	12 <	3	0	0 <	0	15	38	0	0	0
16:30	0	2	3	0	0	2	7	36	0	0	0
16:45	1	4	2	0	3	2	12	42	0	0	0
17:00	0	0	6	0	1	3	10	44	0	0	0
17:15	2	5	13	0	1 <	0	21	50	0	0	0
17:30	1	2	11	1	0 <	2	17	60	0	0	0
17:45	1	0	4 <	2	1	3	11	59	0	0	0
18:00	1 <	1	4	1	3 <	4 <	14	63 <	0	0	0
18:15	0	0	6	2 <	0	0 <	8	50	0	0	0
18:30	0	0	3	0	1 <	0	4	37	0	0	0
18:45	0	1	2	0	1 <	0	4	30	0	0	0
19:00	0	0	2	1	1	1	5	21	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Pedestrians - 50m 7	8	9
15:15	0	0	0	0	0	0	0		0	0	0
15:30	0	0	0	0	0	0	0		0	0	0
15:45	0	0	0	0	0	0	0		0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0
16:30	0	1 <	0	0	0	0	1	1	0	0	0
16:45	0	0 <	1 <	0	0	0	1	2 <	0	0	0
17:00	0	0 <	0 <	0	0	0	0	2 <	0	0	0
17:15	0	0 <	0 <	0	0	0	0	2 <	0	0	0
17:30	0	0	0 <	0	0	0	0	1	0	0	0
17:45	0	1 <	0	0	0	0	1	1	0	0	0
18:00	0	0 <	0	1 <	0	0	1	2 <	0	0	0
18:15	0	0 <	0	0 <	0	0	0	2 <	0	0	0
18:30	0	0 <	0	0 <	0	0	0	2 <	0	0	0
18:45	0	0	0	0 <	0	0	0	1	0	0	0
19:00	0	0	0	0	1 <	0	1	1	0	0	0

Buses

	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR	Cyclists - Crossing 7	8	9
15:15	0	0	0	0	0	0	0		0	0	0
15:30	0	1	0	0	0	0	1		0	0	0
15:45	0	0	1	0	0	0	1		0	0	0
16:00	0	0 <	0 <	0	0	0	0	2 <	0	0	0
16:15	0	0 <	0 <	0	0	0	0	2 <	0	0	0
16:30	0	0	0 <	0	0	0	0	1	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0

Light + Heavy Vehicles

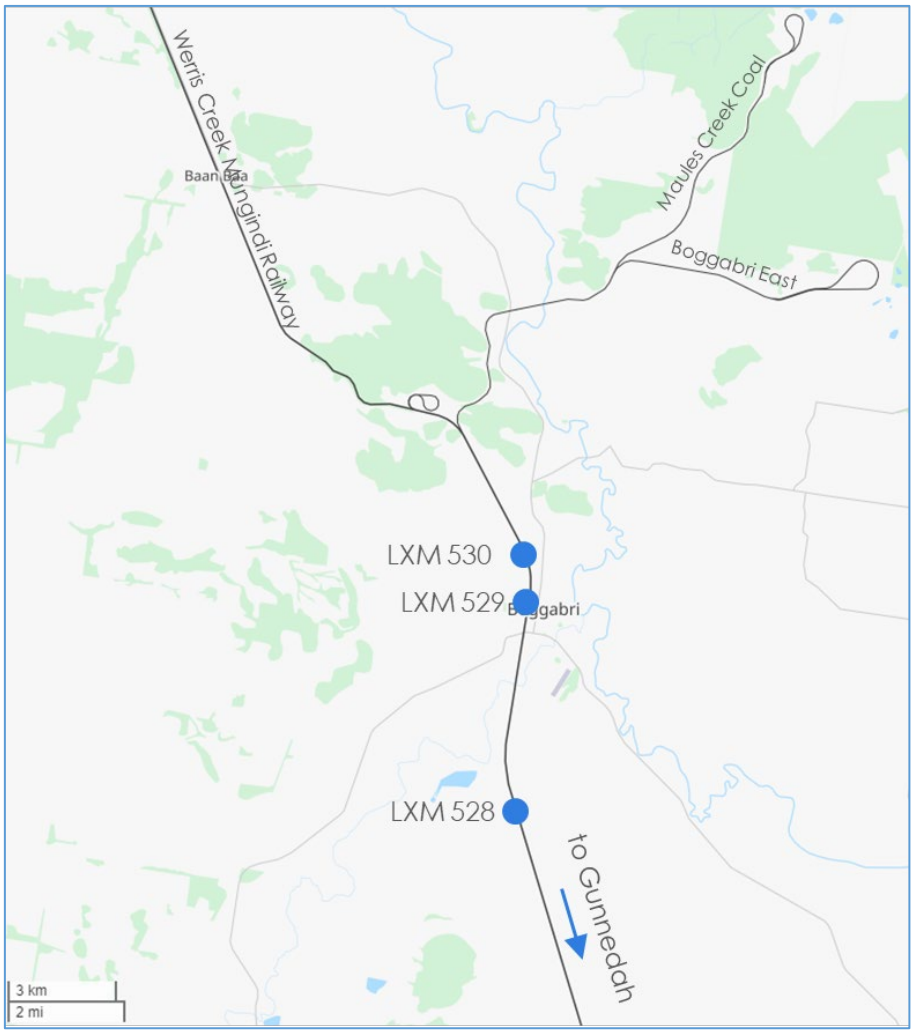
	1	2	3	4	5	6	Total Vehicles 15 MIN	HOUR
15:15	0	0	2	0	0	0	2	
15:30	1	5	1	1	1	0	9	
15:45	0	2	1	0	3	0	6	
16:00	0	5	2	0	1 <	0	8	25
16:15	0	12 <	3	0	0 <	0	15	38
16:30	0	3	3	0	0	2	8	37
16:45	1	4 <	3	0	3	2	13	44
17:00	0	0	6	0	1	3	10	46
17:15	2	5	13	0	1 <	0	21	52
17:30	1	2	11	1	0 <	2	17	61
17:45	1	1	4 <	2	1	3	12	60
18:00	1 <	1	4	2	3 <	4 <	15	65 <
18:15	0	0	6	2 <	0	0 <	8	52
18:30	0	0	3	0	1 <	0	4	39
18:45	0	1	2	0	1 <	0	4	31
19:00	0	0	2	1	2	1	6	22

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

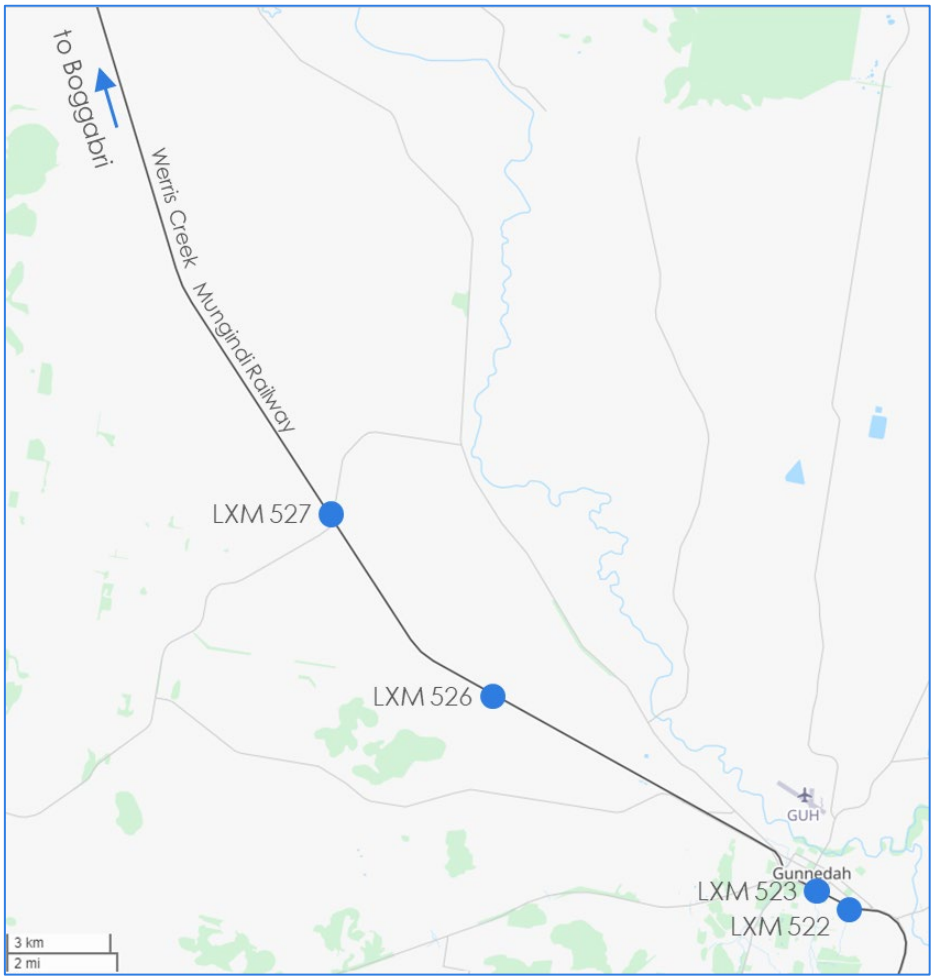
Appendix B

Railway Level Crossings

Public Railway Level Crossings Maules Creek Coal Spur to Boggabri

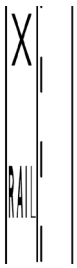


Public Railway Level Crossings Boggabri to Gunnedah

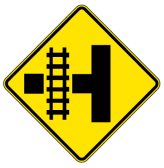
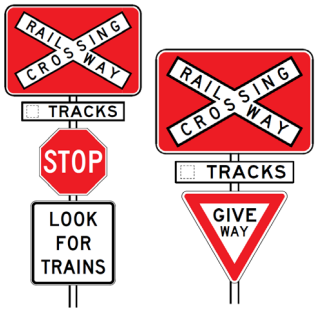
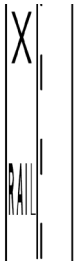


The existing signage and linemarking at the level crossings have been reviewed with regard to their compliance with the requirements of AS 1742.7 (2016). The general signage and linemarking requirements are tabulated below for active and passive controls respectively, noting that local conditions can vary the specific requirements.

Active Level Crossing Signage and Linemarking General Requirements

	Image	Notes
Advance warning		Sign W7-4 on left side of the road, at a distance based on the speed limit. The sign may be repeated on the right side for emphasis on high volume roads, and repeated at long distance (e.g. 500 m) on high volume roads.
		Assembly RX-7 on the main road if the level crossing is located on a side road.
Crossing signage		Assembly RX-5 located minimum 3.5 m from nearest rail. The W7-2-2 TRACKS sign is not required where there is only one track. The RX-5 assembly may be supplemented by boom barriers.
Pavement markings		RAIL X pavement marking on all high-speed approaches of adequate seal width, located 15-20 m beyond the first warning sign
	Centre barrier line	On sealed roads 5.5 m or more wide, no-overtaking lines should extend from the crossing to the advance warning sign W7-4.
	Stop line	On all approaches, located minimum 3 m from signal pedestal.

Passive Level Crossing Signage and Linemarking General Requirements

	Image	Notes
Advance warning		Sign W7-7(R) on left side of the road, at a distance from the crossing which is based on the speed limit. The optional W7-7(L) sign may be used on the right side of the road on busy roads.
		Assembly RX-4 is used on the main road if the level crossing is located on a side road.
		W7-12 if the intersection itself requires an intersection warning sign, used in conjunction with and in advance of the RX-4 assembly.
Intermediate warning signage		W3-1 stop sign ahead used on left side of the road, at a distance based on the speed limit. RX-2-1 assembly used ahead of give way controls, on the left side of the road, with variations where the railway crosses the road at other than at right angles.
Crossing signage		Assembly RX-2 (stop) or RX-1 (give way), located minimum 3.5 m from nearest rail. The W7-2-2 TRACKS sign is not required where there is only one track.
Pavement markings		RAIL X pavement marking on all high-speed approaches of adequate seal width, located 15-20 m beyond the first warning sign
	Centre barrier line	No-overtaking lines should extend from the crossing to the advance warning sign W7-7
	Stop line	On all approaches, located minimum 3.5 m from nearest rail.

Passive or Active Level Crossing Requirements

	Image	Notes
Crossing width marker		RX-9 assembly should be used where the conspicuity of the crossing needs to be enhanced, typically on high speed rural road approaches. It is located immediately in advance of the RX-1, RX-2 or RX-5 assemblies.

LXM 530 Stock Route Road off Vine Lane, Boggabri

The level crossing is located on a stock route track east of Vine Lane. The railway is single track, and the stock route is an unsealed road. While this is a public level crossing, use of the road by the public or MCCM-generated traffic is expected to be negligible. The level crossing is passively controlled with STOP signs.

LXM 529 Boston Street, Boggabri

The level crossing is located on Boston Road – Caloola Road in the north of Boggabri. Caloola Road provides access to the Civeo accommodation camp which is located approximately 2 km to the west of the level crossing. There is potential for MCCM-generated traffic between the MCCM and the accommodation camp to use the level crossing. Boston Road and Caloola Road are sealed two-lane roads, and the railway is single track. The level crossing is actively controlled with boom gate and flashing light assemblies.

LXM 529 Boston Street, Boggabri

	Eastbound	Westbound
Advance warning	W7-7(R) assembled with "CROSSING AHEAD" sign on left side of Caloola Road 160 m ahead of the level crossing. W7-4 on left side of Caloola Road 100 m ahead of level crossing.	W7-7(L) assembled with "CROSSING AHEAD" sign on left side of Boston Street 120 m from level crossing. RX-7 assembly on left side of Oakham Street 75 m from Boston Street. W7-4 sign on left side of Boston Street 70 m from level crossing.
Crossing signage	RX-5 assembly with boom barriers RX-9 assembly.	RX-5 assembly with boom barriers RX-9 assembly.
Pavement markings	RAIL X adjacent to W7-4 sign. Double two-way barrier lines for 25 m. Stop line.	RAIL X immediately west of Oakham Street, adjacent to W7-4 sign. Double two-way barrier line for 35 m. Stop line.
Other	50 km/h area speed limit sign on left side of Caloola Road 600 m from level crossing.	
Notes	W7-7 sign is intended for passive control level crossings. Vehicular access to the communications hut located on the left side of Boston Street adjacent to the level crossing.	

LXM 529 Eastbound on Caloola Road

LXM 529 Westbound on Boston Street

LXM 528 Binalong Road, Emerald Hill

The railway is single track, and Binalong Road is an unsealed two-way road. The level crossing is passively controlled with "STOP" sign control. Binalong Road links to Kamilaroi Highway south-east of Boggabri, and principally provides for access to properties only, with no through road function. The level crossing is unlikely to be used by MCCM-generated traffic.

LXM 527 Goolhi Road, Emerald Hill

The level crossing is located on Goolhi Road approximately 5.6 km west of Kamilaroi Highway. The railway is single track, with a grain silo loop commencing 30 m north of the level crossing. Goolhi Road is a sealed two-way two-lane rural road, with a speed limit of 50 km/h in the vicinity of the level crossing. The crossing is approximately 30 m from the intersection of Goolhi Road with Francis Studdy Road and McDonald Road, both of which are unsealed two-way roads. The crossing is actively controlled with flashing lights and boom barriers. Goolhi Road provides a link between Kamilaroi Highway approximately 15 km north-west of Gunnedah and Oxley Highway approximately 55 km west of Gunnedah. While the level crossing is unlikely to be used by MCCM-generated traffic, there is some potential for workers who reside to the west to use it, and its signage and controls have been reviewed.

LXM 527 Goolhi Road, Emerald Hill

	Northbound	Southbound
Advance warning	Railway crossing ahead of cross road (W7-13, rotated) 250 m ahead of the level crossing. W7-7(L) sign assembled with left-hand curve warning sign (W1-3) 150 m ahead of the level crossing. W7-4 sign on left side of Goolhi Road 100 m from the crossing.	W7-7 sign on left side of Goolhi Road 150 m ahead of the level crossing. W7-4 sign assembled with right-hand curve warning sign (W1-3) 130 m ahead of the level crossing. Stop sign ahead (W3-1) 100 m ahead of the level crossing.
Crossing signage	RX-5 assembly with boom barrier.	RX-5 assembly 30 m ahead of the level crossing, aligned to be visible to drivers approaching the bend. RX-5 assembly with boom barrier and flashing lights at the level crossing.
Pavement markings	RAIL X pavement marking 15 m past advance warning sign W7-4. Double two-way barrier lines for 50 m ahead of level crossing, discontinuous across intersection.	RAIL X pavement marking 50 m in advance of advance warning sign W7-7. Stop line.
Other	Chevron alignment markers (D4-6) on the left-hand bend past the crossing. 50 km/h speed limit signs each side of Goolhi Road 240 m ahead of the level crossing. 50 km/h ahead signs each side of Goolhi Road 320 m ahead of level crossing.	Chevron alignment markers (D4-6) on the right-hand bend approaching the crossing.
Notes	W7-7 warning sign is intended for passive control level crossings. Additional RX-5 assembly provided for visibility due to road alignment.	

LXM 527 Eastbound along Goolhi Road

LXM 527 Westbound along Goolhi Road

LXM 526 Rothsay Road, Emerald Hill

The level crossing is located on a local access road known as Rothsay Road, which extends northwards from McDonald Road at Emerald Hill. The crossing is located approximately 35 m from McDonald Road, which is a sealed two-way road with a default rural speed limit of 100 km/h. Rothsay Road is an unsealed access track which provides access to properties to the north of the railway. The railway is single track, and the level crossing is passively controlled. The level crossing is unlikely to be used by MCCM-generated traffic.

LXM 523 Marquis Street, Gunnedah

The level crossing is located on Marquis Street, approximately 40 m north of its intersection with South Street (Oxley Highway) which is controlled with a roundabout. It is located between two grade-separated crossings of the railway line. The railway is single track, and the level crossing is actively controlled with light and boom barriers. The level crossing may be used by workers at MCCM who reside in Gunnedah.

LXM 523 Marquis Street, Gunnedah

	Northbound	Southbound
Advance warning		
Pavement markings	RAIL X marking immediately north of Short Street. Double two-way barrier lines to roundabout splitter island. Stop line.	RAIL X marking 50 m from level crossing. Double two-way barrier line for less than 5 m. Stop line.
Crossing signage	RX-5 assembly with boom barrier.	RX-5 assembly with boom barrier. Width marker sign (D4-3L) on left side (only) of Marquis Street.
Other	Pedestrian maze on each side of the level crossing, signposted "DO NOT CROSS WHILE LIGHTS ARE DISPLAYED OR ALARM SOUNDING".	

LXM 523 Northbound along Marquis Street

LXM 523 Southbound along Marquis Street

LXM 522 Carroll Street, Gunnedah

The level crossing is located on Carroll Street, towards the eastern end of Gunnedah, and east of the Abbott Street (Oxley Highway) bridge over the railway line. The railway is single track, and the level crossing is actively controlled with lights.

LXM 522 Carroll Street, Gunnedah

	Northbound	Southbound
Advance warning	W7-4 assembled with "CROSSING AHEAD" plate 60 m ahead of the level crossing.	W7-4 assembled with "CROSSING AHEAD" plate 80 m ahead of the level crossing.
Pavement markings	RAIL X marking 20 m past W7-4 warning sign. Edgelines to Kamilaroi Road. Double two-way barrier lines for 30 m. Stop line.	RAIL X marking 20 m past W7-4 warning sign. Edgelines to Little Barber Street. Double two-way barrier lines for 25 m. Stop line.
Crossing signage	RX-5 assembly. Modified RX-9 assembly, "RAILWAY" and "CROSSING" signs both located on left side of Carroll Street.	RX-5 assembly. Modified RX-9 assembly, "RAILWAY" and "CROSSING" signs both located on left side of Carroll Street.
Other	Pedestrian maze on eastern side of the level crossing.	
Notes	RX-9 assemblies are not arranged in accordance with AS1742.7.	

LXM 522 Northbound along Carroll Street

LXM 522 Southbound along Carroll Street

Appendix C

Crash History Review

Kamilaroi Highway Crash Summary (1 January 2019 to 31 December 2023)

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Total Crashes	-	1	5	4	2	-	3	12	11	-	**38**
Crash Location Type											
2-way undivided road	-	-	4	4	2	-	3	6	9	-	**28**
Divided road	-	-	-	-	-	-	-	4	-	-	**4**
Intersection (includes roundabout, T-junction and four-way intersection)	-	1	1	-	-	-	-	2	2	-	**6**
Road Surface Condition											
Dry Road	-	1	5	3	2	-	3	10	10	-	**34**
Wet Road	-	-	-	1	-	-	-	2	1	-	**4**
Weather											
Fine	-	1	5	3	2	-	3	10	9	-	**33**
Overcast	-	-	-	-	-	-	-	1	2	-	**3**
Raining	-	-	-	1	-	-	-	1	-	-	**2**
Natural Lighting											
Dawn	-	-	1	1	1	-	-	1	1	-	**5**
Daylight	-	-	2	2	1	-	1	6	7	-	**19**
Dusk	-	1	-	-	-	-	1	-	-	-	**2**
Darkness	-	-	2	1	-	-	1	5	3	-	**12**
Vehicles Involved											
Motorcycle	-	-	-	-	-	-	1	-	-	-	**1**
Car, 4WD, van, station wagon, utility	-	2	9	7	4	-	2	12	9	-	**45**
Heavy Rigid Truck	-	-	-	1	-	-	-	-	1	-	**2**
Articulated	-	-	-	-	-	-	-	-	1	-	**1**
Unknown/other	-	-	1	-	-	-	-	-	-	-	**1**
Severity of Crash											
Non-casualty	-	1	-	1	-	-	1	3	3	-	**9**
Minor injury	-	-	-	-	-	-	-	1	-	-	**1**
Moderate injury	-	-	-	2	2	-	2	3	7	-	**16**
Serious injury	-	-	4	1	-	-	-	5	1	-	**11**
Fatal	-	-	1	-	-	-	-	-	-	-	**1**

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Speed Limit											
50 km/h	-	-	-	-	1	-	1	-	1	-	**3**
60 km/h	-	-	-	1	-	-	-	-	-	-	**1**
80 km/h	-	-	-	1	-	-	-	2	-	-	**3**
100 km/h	-	1	5	2	1	-	2	10	10	-	**31**
Year											
2019	-	-	1	-	-	-	-	2	4	-	**7**
2020	-	-	1	-	1	-	1	4	4	-	**11**
2021	-	-	1	2	-	-	-	2	2	-	**7**
2022	-	1	1	-	1	-	2	2	-	-	**6**
2023	-	-	1	2	-	-	-	2	1	-	**7**

Rangari Road Crash Summary (1 January 2019 to 31 December 2023)

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Total Crashes	-	-	-	-	-	-	1	7	8	-	**9**
Crash Location Type											
2-way undivided road	-	-	-	-	-	-	1	7	8	-	**9**
Road Surface Condition											
Dry Road	-	-	-	-	-	-	1	7	8	-	**9**
Weather											
Fine	-	-	-	-	-	-	1	7	8	-	**9**
Natural Lighting											
Dawn	-	-	-	-	-	-	1	-	-	-	**1**
Daylight	-	-	-	-	-	-	-	2	3	-	**5**
Darkness	-	-	-	-	-	-	-	-	3	-	**3**
Vehicles Involved											
Car, 4WD, van, station wagon, utility	-	-	-	-	-	-	1	2	6	-	**9**
Severity of Crash											
Non-casualty	-	-	-	-	-	-	1	-	2	-	**3**
Moderate injury	-	-	-	-	-	-	-	2	2	-	**4**
Serious injury	-	-	-	-	-	-	-	-	2	-	**2**
Speed Limit											
100 km/h	-	-	-	-	-	-	1	7	8	-	**9**
Year											
2019	-	-	-	-	-	-	1	-	1	-	**2**
2020	-	-	-	-	-	-	-	1	2	-	**3**
2021	-	-	-	-	-	-	-	-	2	-	**2**
2022	-	-	-	-	-	-	-	-	1	-	**1**
2023	-	-	-	-	-	-	-	1	-	-	**1**

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