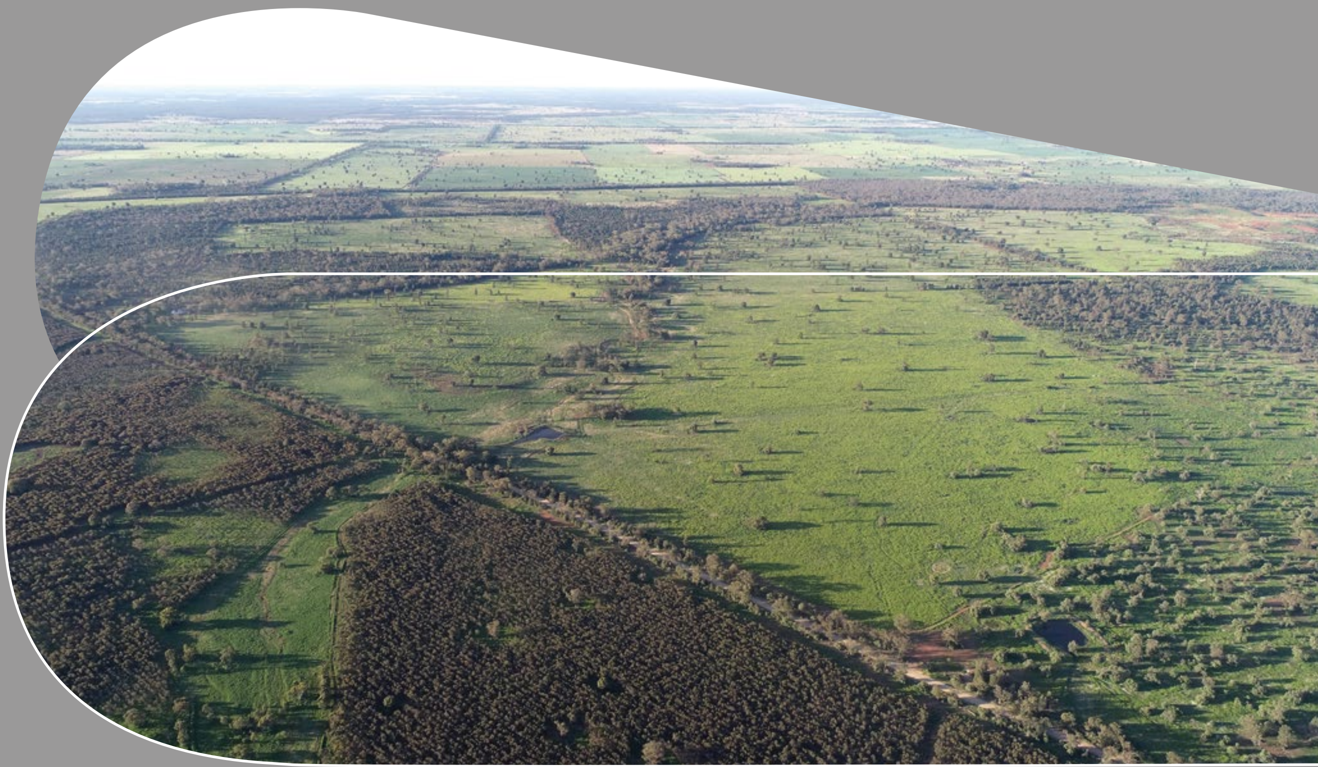
Sunrise Project

Project Execution Plan Modification



Appendiix D

Road Transport Assessment

Sunrise Project
Project Execution Plan Modification

Road Transport Assessment

Prepared for:

Sunrise Energy Metals Limited

29 June 2021

The Transport Planning Partnership

E: info@ttpp.net.au

Sunrise Project
Project Execution Plan Modification
Road Transport Assessment

Client: Sunrise Energy Metals Limited

Version: Final

Date: 29 June 2021

TTPP Reference: 20485

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Version	Date	Prepared by	Approved by	Signature
Final	29/06/2021	PJD	PJD	PDalton

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1 Introduction

The Sunrise Project (the Project) is a nickel, cobalt and scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney, in New South Wales (NSW) (Figure 1.1).

SRL Ops Pty Ltd owns the rights to develop the Project. SRL Ops Pty Ltd is a wholly owned subsidiary of Sunrise Energy Metals Limited[1] (SEM).

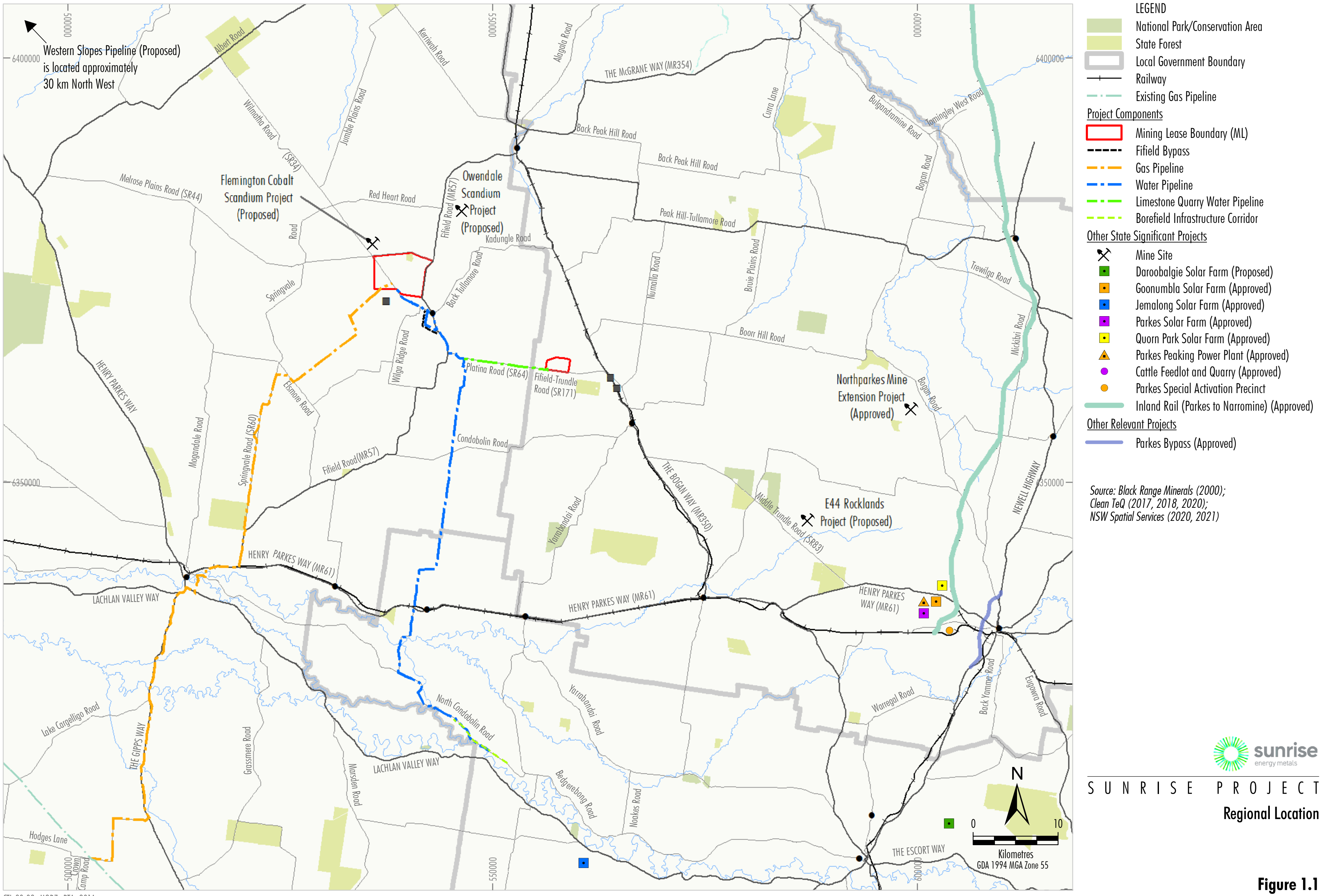
Development Consent (DA 374-11-00) for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Construction of the Project commenced in 2006, which included components of the borefield, however construction of other Project components is yet to commence.

The Project Execution Plan Modification (the Modification) includes the implementation of Project changes identified in the Project Execution Plan to optimise the construction and operation of the Project.

This Road Transport Assessment has been prepared to accompany an application by SEM to modify Development Consent (DA 374-11-00) for the Project, which would be sought under section 4.55(2) of the EP&A Act.

This Road Transport Assessment has been prepared generally in accordance with the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002), relevant Austroads guides and Transport for New South Wales' (TfNSW) supplements to the Austroads guides.

[1] Sunrise Energy Metals Limited was previously Clean TeQ Holdings Limited (Clean TeQ).



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SUNRISE PROJECT

Regional Location

Figure 1.1

2 Approved Project and Modification Overview

2.1 Approved Project

The approved Project includes the establishment and operation of the following (Figure 1.1):

- a mine and processing facility;
- a limestone quarry;
- a rail siding;
- borefield, surface water extraction infrastructure and water pipeline;
- a gas pipeline;
- an accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

The Project is currently approved to:

- undertake mining operations for 21 years from the day upon which mining operations start;
- operate a maximum autoclave feed rate of 2.5 million tonnes (Mt) of ore in any calendar year;
- transport in any one calendar year no more than 40,000 tonnes (t) of nickel and cobalt metal equivalents (as sulphate precipitate products), 180 t of scandium oxide and 100,000 t of ammonium sulphate;
- extract up to 790,000 t of limestone from the limestone quarry in any one calendar year; and
- operate related supporting infrastructure.

A detailed description of the approved road traffic trip generation is provided in Section 4. The approved transport route for the Project is between the mine and processing facility and the rail siding, utilising Fifield-Trundle Road, Platina Road, Fifield Road and Wilmatha Road.

A Voluntary Planning Agreement has been executed with Lachlan Shire Council, Parkes Shire Council and Forbes Shire Council, with a number of road and intersection upgrades to be undertaken as part of the Project in accordance with the Voluntary Planning Agreement and Development Consent (DA 374-11-00) (Section 4.1).

2.2 The Modification

SEM has continued to review and optimise the Project design as part of preparations for the Project execution. The outcomes of this review are outlined in the Project Execution Plan (Clean TeQ, 2020).

The Project Execution Plan identified a number of changes to the approved mine and processing facility, accommodation camp, rail siding and road transport activities. The Modification includes these Project Execution Plan changes to allow for the optimisation of the construction and operation of the Project. The Modification would include:

Mine and Processing Facility

- addition of a temporary construction laydown area inside the approved tailings storage facility surface development area;
- optimised production schedule resulting in an increased mining rate during the initial years of mining and associated changes to mining and waste rock emplacement sequencing;
- revised processing facility area layout, including a revised processing plant layout and two additional vehicle site access points;
- reduced sulphuric acid plant stack height from 80 metres [m] to 40 m;
- revisions to processing plant reagent types, rates and storage volumes;
- revised tailings storage facility cell construction sequence and the addition of a decant transfer pond;
- relocated and resized evaporation pond;
- changes to the water management system to reflect the modified mine and processing facility layout;
- increased number of diesel-powered backup generators (and associated stacks) from one to four;
- addition of exploration activities within Mining Lease (ML) 1770;
- increased construction phase duration from two to three years;
- increased peak construction phase workforce from approximately 1,000 to approximately 1,900 personnel;

Rail Siding

- revised rail siding location and layout;
- addition of an ammonium sulphate storage and distribution facility to the rail siding;
- extension of the Scotson Lane road upgrade;
- addition of a 22 kilovolt (kV) electricity transmission line (ETL) (subject to separate approval) to the rail siding power supply;

- increased peak operational phase workforce from approximately five to approximately 10 personnel;

Accommodation Camp

- increased construction phase capacity from 1,300 to 1,900 personnel;
- increased size of the treated wastewater irrigation area;
- option for an alternative alignment of the last section of the accommodation camp water pipeline along the accommodation camp services corridor rather than along the access road corridor; and
- option to transfer treated wastewater to the mine and processing facility for reuse via a water pipeline located inside the approved services corridor;

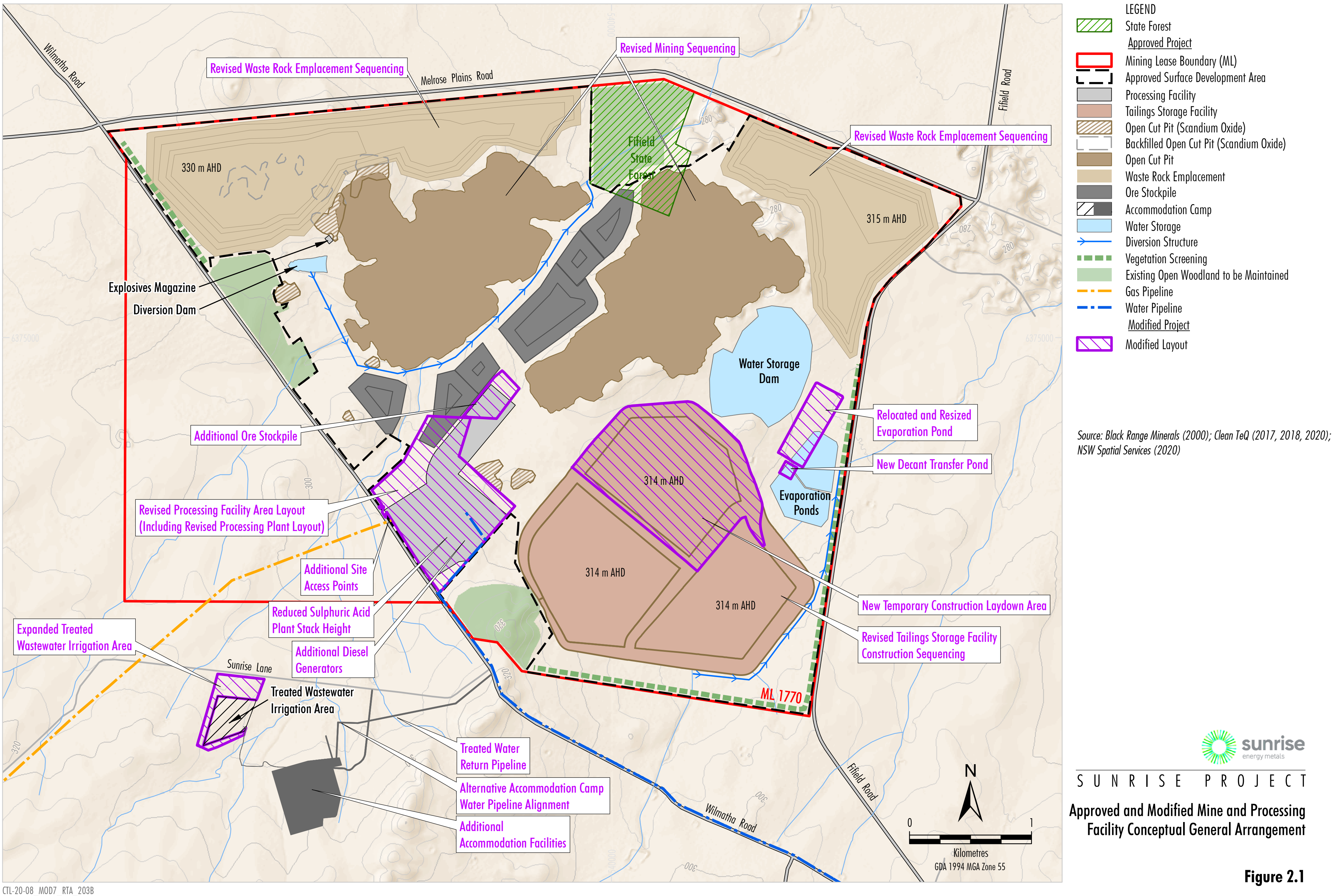
Road Transport Activities

- changes to construction phase vehicle movements associated with the increased construction phase accommodation camp capacity and changes to heavy vehicle delivery requirements;
- changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes; and
- changes to operational phase heavy vehicle movements to and from the rail siding associated with the transport of metal and ammonium sulphate products.

The Modification would not change the following approved components of the Project:

- other mine and processing facility components (e.g. surface development area, mining method, processing method and rate, tailings management and water management concepts);
- other accommodation camp components (e.g. surface development area; operational phase capacity);
- other transport activities and transport infrastructure (e.g. the Fifield Bypass);
- limestone quarry;
- borefield, surface water extraction infrastructure and water pipeline; and/or
- gas pipeline.

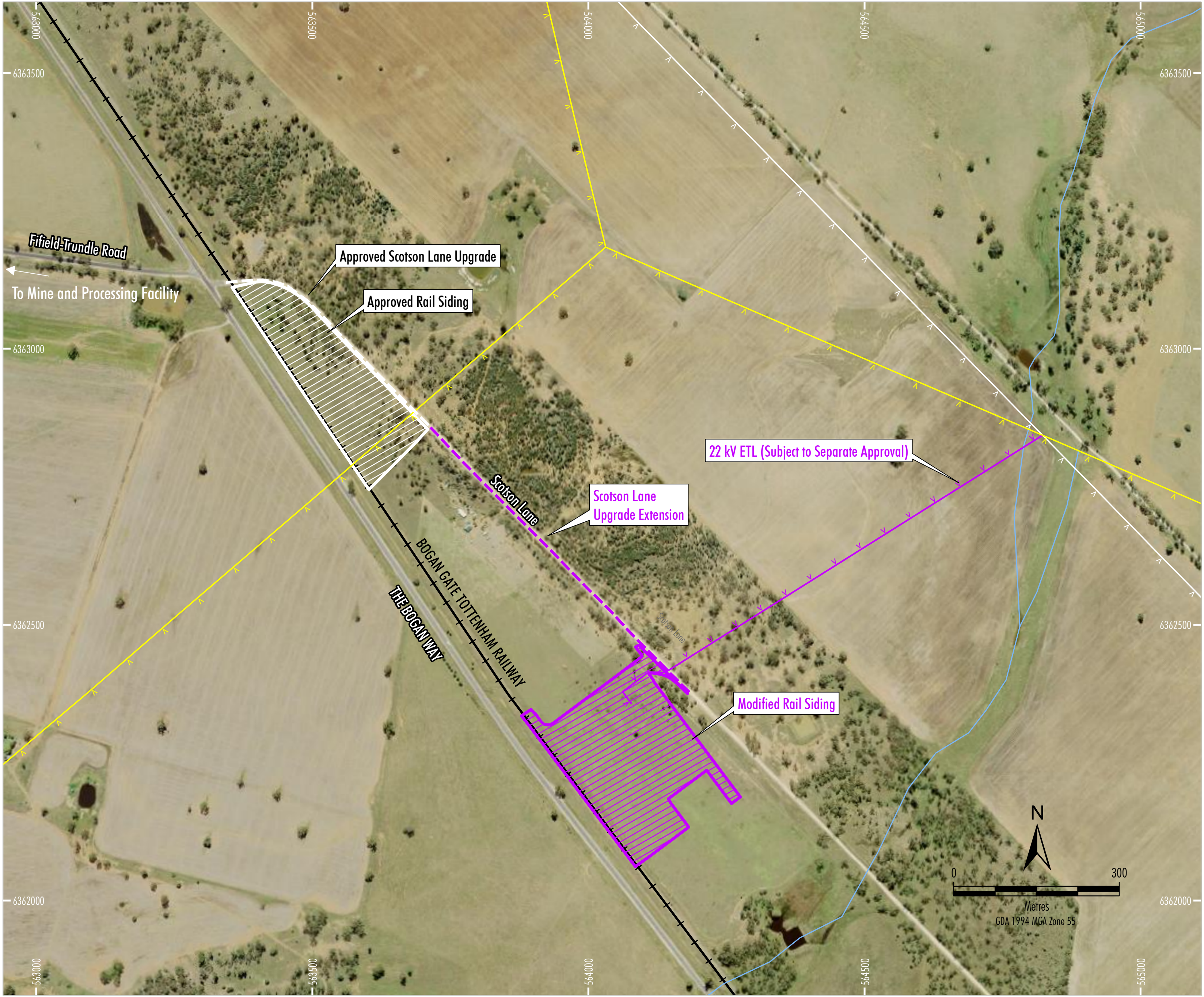
The modified mine and processing facility and the rail siding general arrangements are shown on Figure 2.1 and Figure 2.2. The modified construction schedule and associated workforce schedule is shown on Figure 2.3.



SUNRISE PROJECT

Approved and Modified Mine and Processing Facility Conceptual General Arrangement

Figure 2.1



LEGEND
Railway
Existing 11 kV Electricity Transmission Line
Existing 22 kV Electricity Transmission Line
Drainage Feature

Approved Project

Surface Development Area
Scotson Lane Upgrade

Modified Project

Surface Development Area
Scotson Lane Upgrade Extension
22 kV Electricity Transmission Line (Subject to Separate Approval)

Source: Black Range Minerals (2000); Clean Teq (2020, 2021); NSW Spatial Services (2020, 2021).

Orthophoto: © NSW Department of Finance, Services & Innovation (2021)

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SUNRISE PROJECT

Approved and Modified Rail Siding Location

Figure 2.2

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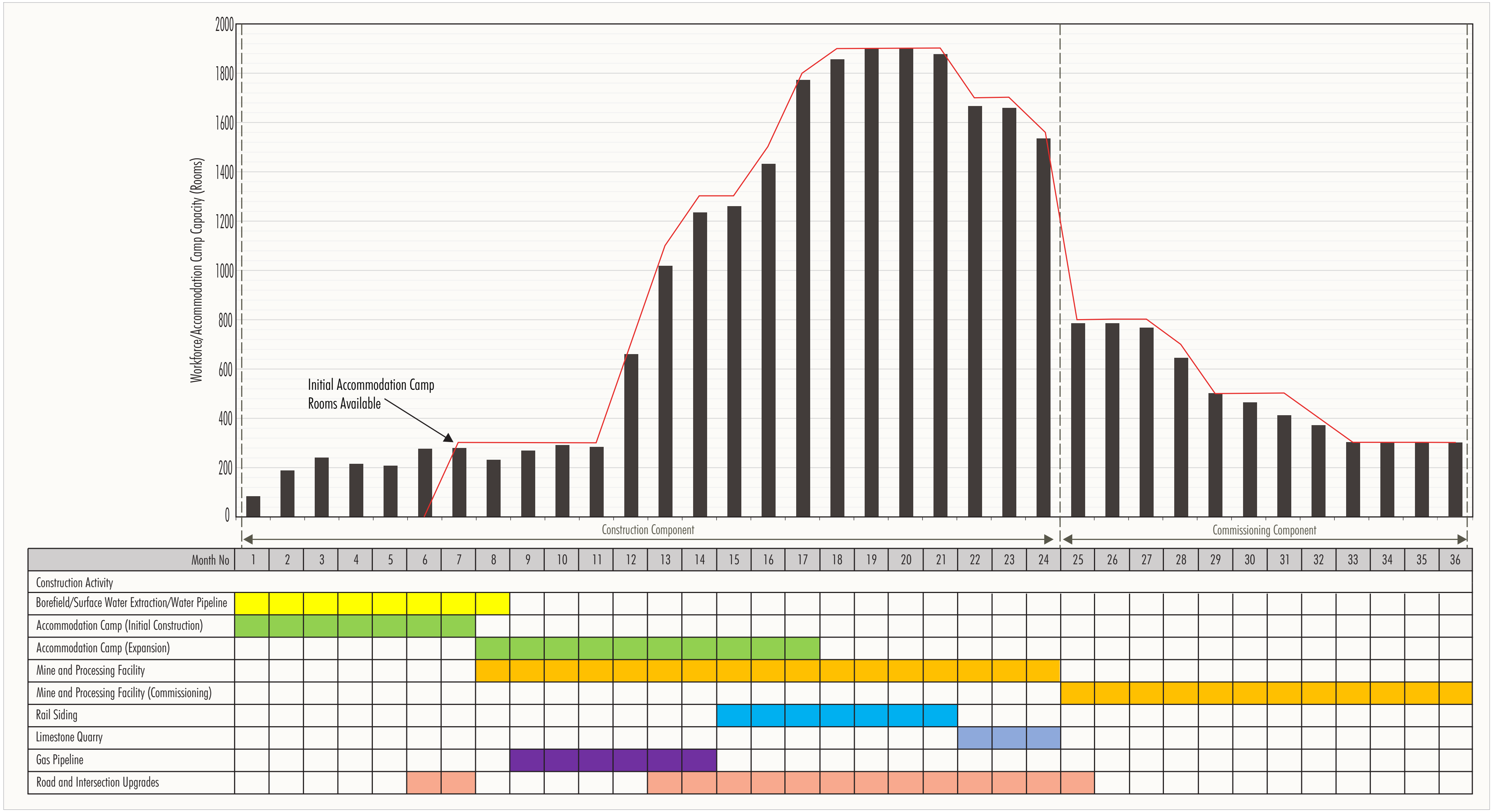

LEGEND

Accommodation Camp Capacity

Indicative Project Construction Workforce

Source: Clean TeQ (2021)

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S U N R I S E   P R O J E C T

Indicative Modified Construction Workforce and Construction Timing

Figure 2.3

Road Transport Implications

The following components of the Modification would result in changes to the approved impacts on the road network:

- increased construction phase duration from two to three years;
- changes to construction phase vehicle movements associated with the increased construction phase accommodation camp capacity and changes to heavy vehicle delivery requirements;
- changes to operational phase heavy vehicle movements associated with revisions to processing plant reagent types, rates and storage volumes; and
- changes to operational phase heavy vehicle movements to and from the rail siding associated with the transport of metal and ammonium sulphate products.
- revised rail siding location and layout; and
- two additional mine and processing facility vehicle site access points on Wilmatha Road.

This assessment considers the implications of the Modification for the following scenarios:

- peak construction activity, which would occur in the second year of construction, nominally in 2023 (Figure 2.3); and
- peak production activity, with unrelated background changes in traffic over a further 10 year period, nominally 2033.

3 Road Transport Environment

3.1 Road Network

The road system in the region is presented in Figure 1.1 and briefly described below. It is noted that the approved Project includes a range of road and intersection upgrades to the road network and these are described in Section 4.1.

Henry Parkes Way (MR61E) forms part of Main Road 61 East, which provides an east-west link between Orange and Condoblin, and connects Parkes and Condobolin through Bogan Gate and Ootha. Henry Parkes Way typically has a single travel lane in each direction with gravel or grassed shoulders, and a speed limit of 100 kilometres per hour (km/h). Through Bogan Gate, the speed limit is reduced to 50 km/h. It has centre and edge line marking and guidance posts. It is crossed by the Bogan Gate Tottenham Railway at a passive level crossing at Bogan Gate. It is crossed by the Orange Broken Hill Railway at an active level crossing approximately 5 km west of Parkes, at which the speed limit on Henry Parkes Way is reduced to 80 km/h. As a Regional Road, TfNSW provides financial assistance to the relevant local councils for its management.

The Bogan Way (MR350) is a Regional Road and forms part of Main Road 350, which extends from the Newell Highway at Forbes to Henry Parkes Way near Bogan Gate then via Trundle and Kadungle to the Peak Hill-Tullamore Road (MR348) near Tullamore, then continues to Nyngan. The Bogan Way has a two lane sealed carriageway, with centre line marking and guidance posts. The road shoulder is unpaved and varies in width from 0 to 2 metres (m), with no edge line marking. The speed limit is generally 100 km/h, with 80 km/h signposted through Gunningbland between Forbes and Henry Parkes Way, and 50 km/h through Trundle, in Bogan Gate and in Forbes. There is a 40 km/h school speed zone at the southern end of Trundle. The Bogan Way is crossed by the Bogan Gate Tottenham Railway at three passive control level crossings between Trundle and Bogan Gate. As a Regional Road, TfNSW provides financial assistance to the relevant Councils for its management.

Middle Trundle Road (SR83) runs northwest from Henry Parkes Way approximately midway between Parkes and Bogan Gate to The Bogan Way approximately 4 km south of Trundle. It is also known as Shire Road 83. The route between Parkes and Trundle along Middle Trundle Road is some 10 km shorter than the alternative route via Bogan Gate. The intersections at each end of Middle Trundle Road are basic rural road T-intersections, without auxiliary lane treatments or channelisation. The intersection of Middle Trundle Road with The Bogan Way was constructed in 2013 and has some turning path deficiences relating to B-doubles and B-triples, but is deemed suitable due to low volumes (Crossroads Civil Design, 2014). Sealing of Middle Trundle Road along its entire length was completed in early 2019 under the NSW Government's Drought Reflief Heavy Vehicle Access Program. The Parkes Shire Council is responsible for the management of Middle Trundle Road.

The McGrane Way (MR354) is a Regional road which extends from the Nyngan-Condobolin Road (MR57) at Tullamore to the Tomingley-Narromine Road (MR89) at Narromine. It is typically a sealed road with a speed limit of 100 km/h, a single travel lane in each direction and centre and edge line marking. As a Regional Road, TfNSW provides financial assistance to the Parkes Shire Council and Narromine Shire Council for its management.

Fifield Road (MR57N) is a Regional Road also known as Main Road 57 North, which runs northwards from Henry Parkes Way approximately 6 km east of Condobolin, through Fifield to Tullamore. In Fifield, it is known as **Slee Street** and Burra Street. It is crossed by the Orange Broken Hill Railway just to the north of its intersection with Henry Parkes Way at an active level crossing, and by the Bogan Gate Tottenham Railway at a passive level crossing at Tullamore. It is a two lane sealed road with centre line marking. The speed limit on Fifield Road is typically 100 km/h, and reduced to 50 km/h at Fifield. This portion of MR57N is a Regional Road, thus TfNSW provides financial assistance to the Lachlan Shire Council for its management.

Fifield-Trundle Road (SR171) and **Platina Road (SR64)** are also known as Shire Road 171 and Shire Road 64 respectively. These roads provide a link between The Bogan Way approximately 6 km north of Trundle and Fifeld Road approximately 5 km south of Fifield. The section of road in the Parkes Shire is known as Fifield-Trundle Road and the section of road in the Lachlan Shire is known as Platina Road. Fifield-Trundle Road typically has a 6.5 m wide formation with 6.0 m wide seal. Platina Road typically has a sealed surface approximately 4 m wide, with 1 m gravel shoulders. There is limited line marking. The intersections at the ends of Fifield-Trundle Road and Platina Road are basic rural T-intersections, without auxiliary lane treatments or channelisation. The Parkes Shire Council and Lachlan Shire Council are responsible for the management of Fifield-Trundle Road and Platina Road, respectively.

Wilmatha Road (SR34), also known as Shire Road 34, runs northwest from Fifield past the mine and processing facility site, and crosses Melrose Plains Road at the northwestern boundary of the mine and processing facility. It has an unsealed surface approximately 8 to 12 m wide and a speed limit of 100 km/h. The Lachlan Shire Council is responsible for the management of Wilmatha Road.

Sunrise Lane is a local unsealed road extending west from Wilmatha Road approximately 4 km from Fifield. It provides access to a limited number of rural properties along its length but does not provide through access to any other roads.

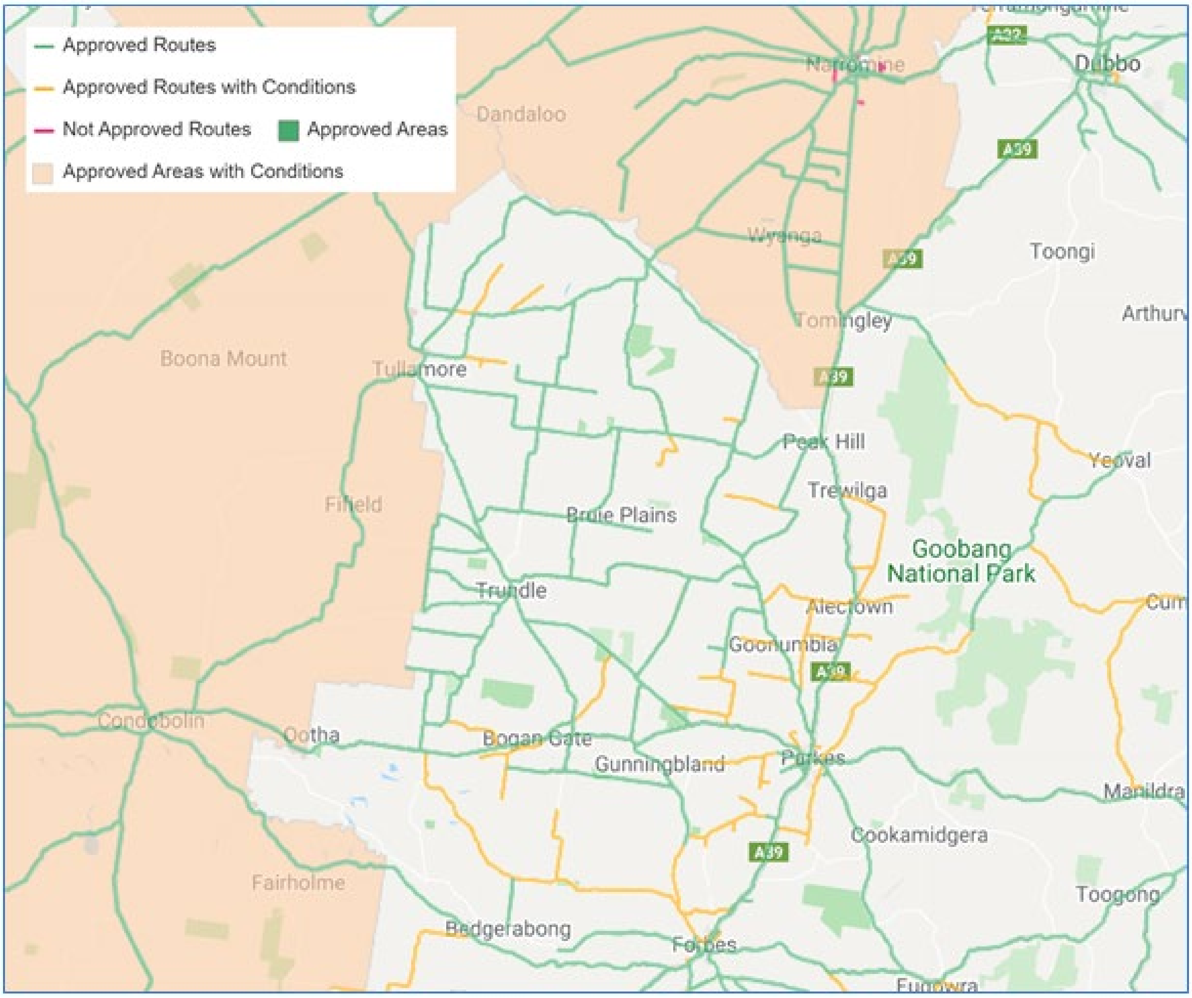
Scotson Lane is a local unsealed road extending between The Bogan Way near Fifield-Trundle Road and Numalla Road, crossing the Bogan Gate Tottenham Railway at a passive level crossing. Its intersection with The Bogan Way is slightly offset to the south from the intersection of Fifield-Trundel Road with The Bogan Way. The Parkes Shire Council is responsible for the management of Scotson Lane.

3.2 Heavy Vehicle Routes

The general approved routes for B-double network access in the region are presented in Figure 3.1. Lachlan and Narromine Shires are approved areas for B-doubles, with travel restrictions as follows within the Lachlan Shire:

- no travel permitted if there is water over the road;
- no travel if the road is closed and no travel on unsealed roads if restricted to light vehicles up to 3 t due to rain or if other temporary restrictions apply;
- maximum 80 km/h speed on all unsealed roads and sealed roads where the seal is so narrow as to require travelling on the unsealed shoulder to pass another vehicle.

Figure 3.1: Approved 25/27m B-Double Network Access

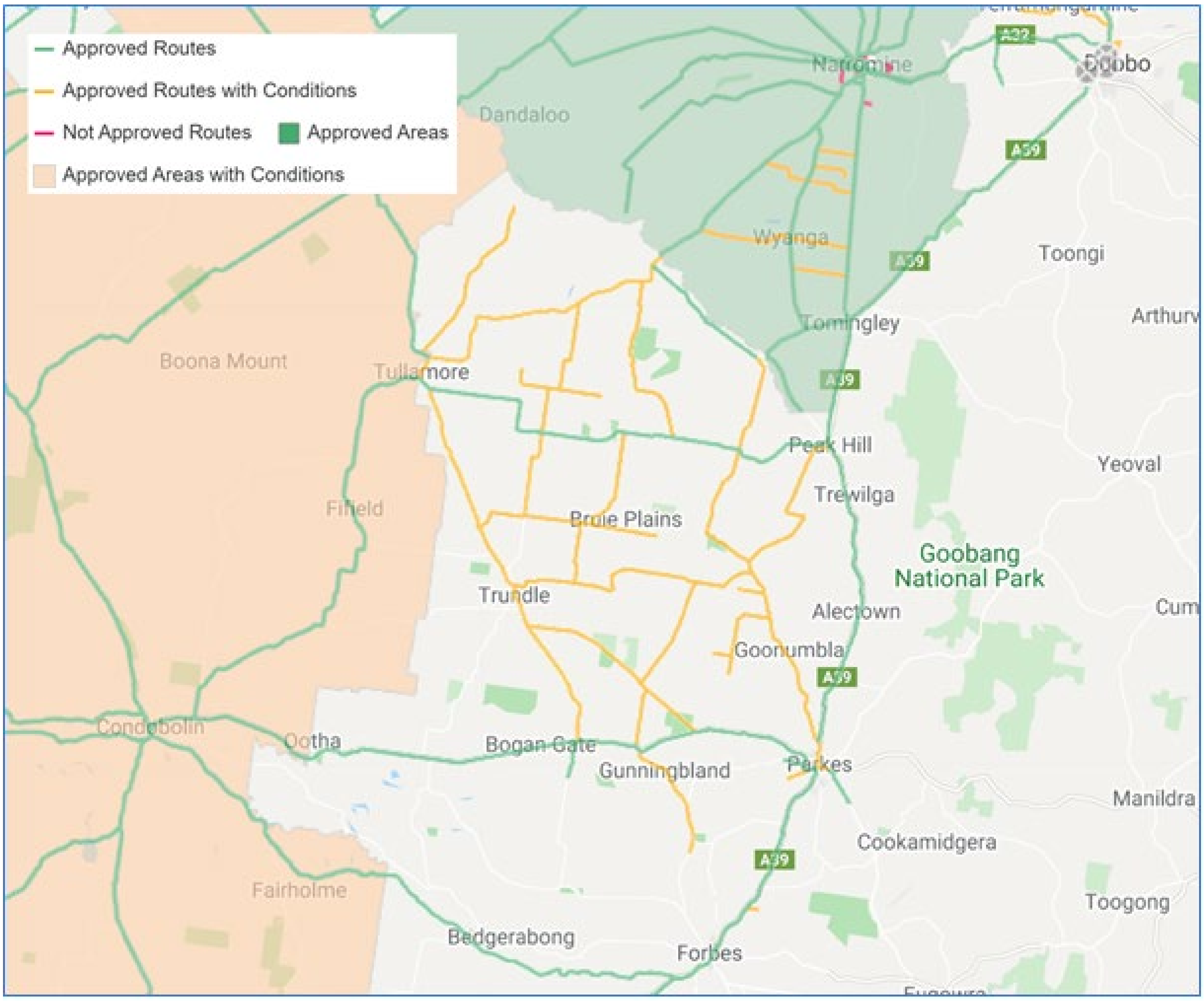


The approved routes for modular B-triple road train network access in the region are presented in Figure 3.2. Lachlan Shire is an approved area for road train access, with travel restriction as follows:

- no travel permitted if there is water over the road;
- no travel if the road is closed and no travel on unsealed roads if restricted to light vehicles up to 3 t due to rain or if other temporary restrictions apply;
- maximum 80 km/h speed on all unsealed roads and sealed roads where the seal is so narrow as to require travelling on the unsealed shoulder to pass another vehicle.

The Bogan Way between Henry Parkes Way and Peak Hill Tullamore Road (south of Tullamore) is an approved route for modular B-triple road trains, subject to a speed limit of 80 km/h. Middle Trundle Road is an approved route for modular B-triple road trains, subject to a speed limit of 80 km/h, with no access permitted between sunset and sunrise, nor between 7:30 am and 9:00 am and between 3:00 pm and 4:30 pm on school days.

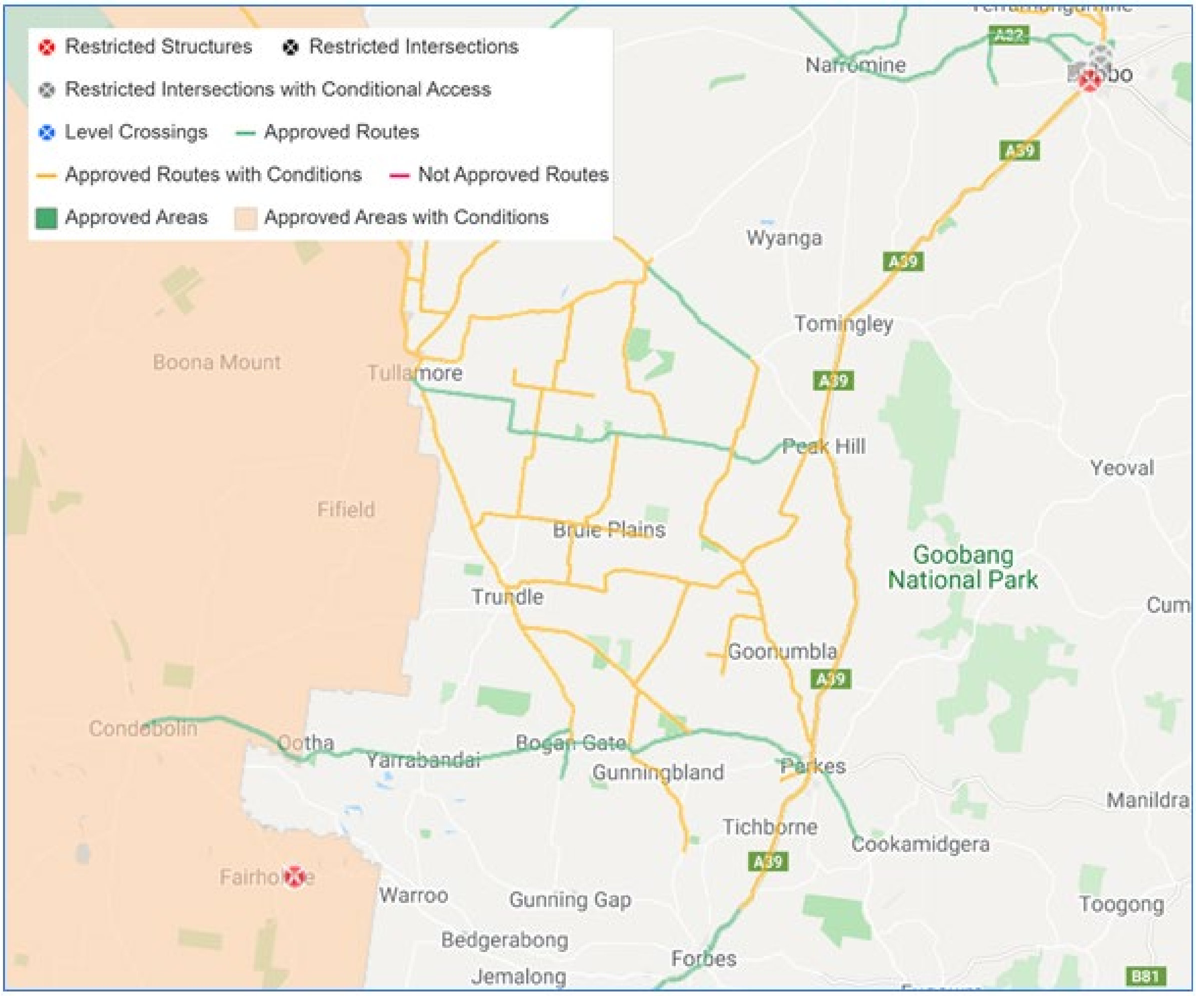
Figure 3.2: Approved Modular B-Triple Network Access



The approved routes for AB-triple road train network access in the region are presented in Figure 3.3. Lachlan Shire is an approved area for AB-triple road train access, with travel restriction as follows:

- no travel permitted if there is water over the road;
- no travel if the road is closed and no travel on unsealed roads if restricted to light vehicles up to 3 t due to rain or if other temporary restrictions apply;
- maximum 80 km/h speed on all unsealed roads and sealed roads where the seal is so narrow as to require travelling on the unsealed shoulder to pass another vehicle.

Figure 3.3: Approved AB-Triple Network Access



Notwithstanding the above, in January 2018, SEM obtained Heavy Vehicle Authorisation Permit 119039 to operate higher capacity vehicles (AB-triples) between the mine and processing facility and Parkes via Wilmatha Road, Slee Street, Fifield Road, Platina Road, Fifield-Trundle Road, The Bogan Way (including Forbes Street, Trundle and Edols Street, Bogan Gate), Henry Parkes Way and roads in Parkes (Brolgan Road and Westlime Road).

3.3 Traffic Volumes

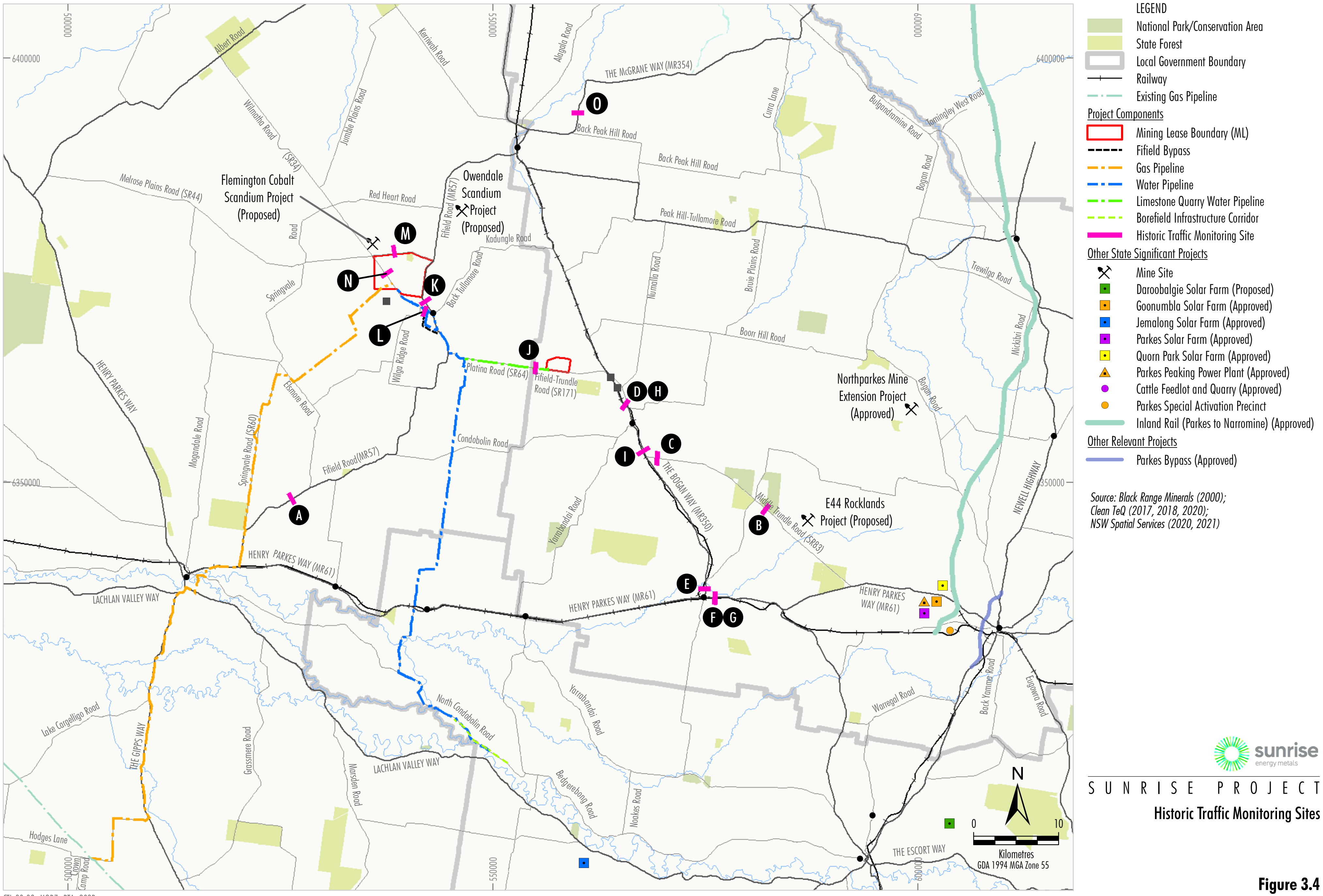
3.3.1 Historic Surveys

Historic traffic survey data has been collated for roads in the region. This includes data collected by Lachlan Shire Council and Parkes Shire Council during 2014 and 2015, and data collected for SEM during November 2016 (GTA Consultants, 2017). The results of those surveys are summarised in Table 3.1 for the average daily vehicles and their classification as surveyed.

Table 3.1: Surveyed Daily Traffic Volumes and Classifications 2014 to 2016 (vehicles per day)

Site[A]	Road and Location	Survey Date	Light Vehicles	Heavy Vehicles	Total Vehicles
		Council Surveys 2014			
A	Fifield Road north of Raynella Road	February to April 2014	143	91	234
B	Middle Trundle Road 13km northwest of Henry Parkes Way	September 2014	85	8	93
C	Middle Trundle Road 500m east of The Bogan Way	October 2014	91	7	98
D	The Bogan Way north of Trundle town	October 2014	321	158	479
E	The Bogan Way north of Henry Parkes Way	November 2014	373	94	467
F	Henry Parkes Way east of Bogan Gate town	November 2014	815	209	1024
G	Henry Parkes Way east of East Street, Bogan Gate	December 2014	789	197	986
H	The Bogan Way south of Numulla Road (north of Trundle)	December 2014	425	81	506
		Council Surveys 2015			
I	The Bogan Way 180m north of Middle Trundle Road	August 2015	322	54	376
J	Fifield-Trundle Road at Parkes Shire boundary	September to November 2015	62	23	85
		Sunrise Energy Metals Surveys 2016			
K	Fifield Road between Tullamore and Fifield	November 2016	130	55	185
L	Slee Street in Fifield	November 2016	176	70	246
M	Melrose Plains Road east of Wilmatha Road	November 2016	7	6	13
N	Wilmatha Road south of Melrose Plains Road	November 2016	13	8	21
O	The McGrane Way north of Back Peak Hill Road (north-east of Tullamore)	November 2016	94	30	124

[A] *Refer to Figure 3.4*



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SUNRISE PROJECT

Historic Traffic Monitoring Sites

Figure 3.4

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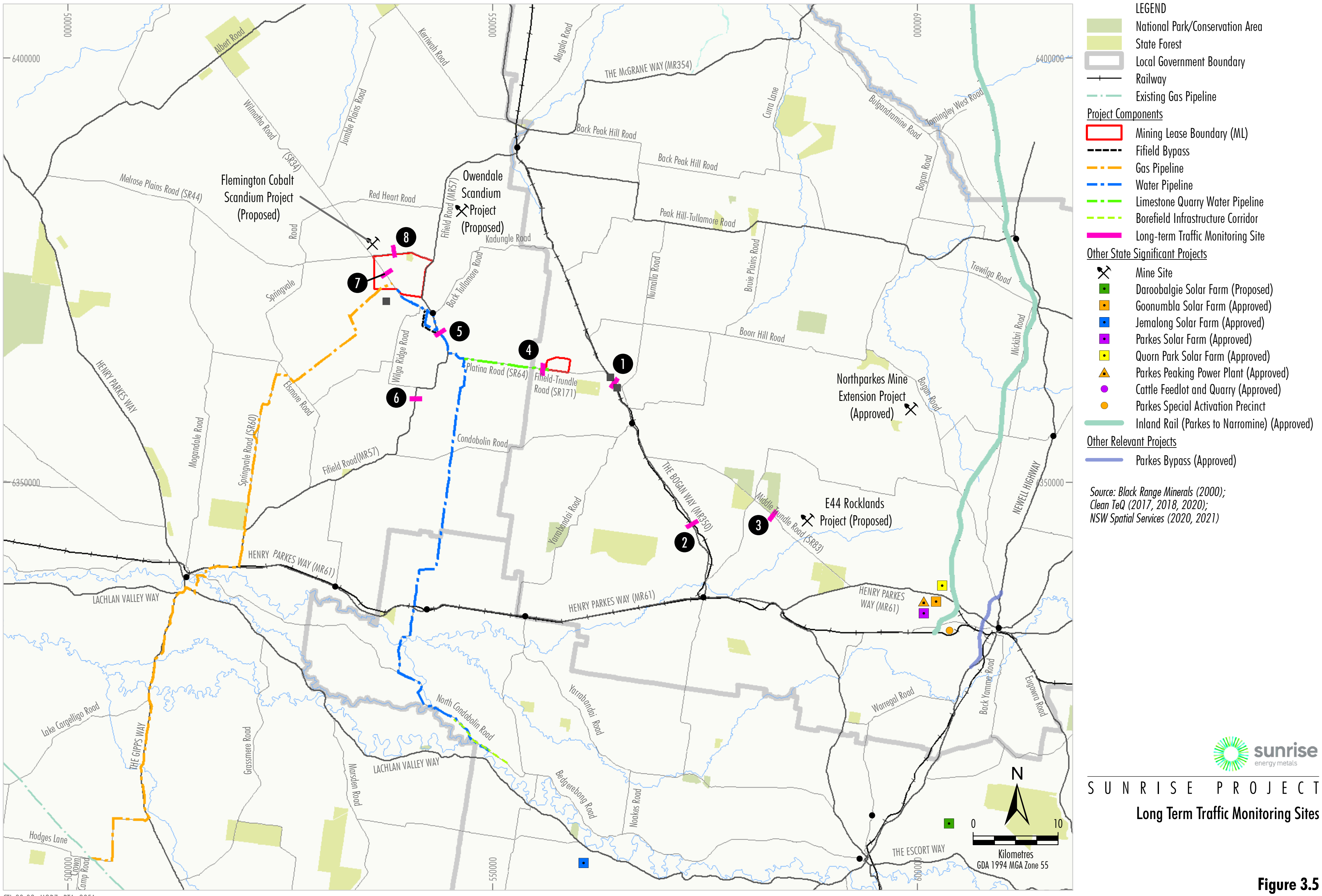
3.3.2 Long Term Traffic Monitoring Program

SEM commissioned a program of traffic surveys that collected traffic volume and classification data on a continuous basis throughout the 2017 and 2018 calendar years at the following eight locations (shown in Figure 3.5):

1. The Bogan Way between Trundle and Fifield-Trundle Road;
2. The Bogan Way between Bogan Gate and Middle Trundle Road;
3. Middle Trundle Road between The Bogan Way and Henry Parkes Way;
4. Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road
5. Fifield Road between Slee Street and Platina Road;
6. Fifield Road between Platina Road and Springvale Road;
7. Wilmatha Road north of Sunrise Lane; and
8. Melrose Plains Road between Fifield Road and Wilmatha Road.

The surveyed traffic volumes collected during the traffic monitoring program are presented in GTA Consultants (2018b) and The Transport Planning Partnership (TTPP) (2019), noting that some data periods were impacted by roadworks and damaged tubes. Notably, during the monitoring program, the bridge on The Bogan Way north of Bogan Gate was closed for over five months between 11 October 2017 and 23 March 2018. A diversion was in place, which increased travel distance by some 4 km. The closure of The Bogan Way north of Bogan Gate appears to have influenced local traffic conditions, with a decrease in the use of The Bogan Way north of Bogan Gate, and an increase in the use of Middle Trundle Road.

Table 3.2 presents the annual average daily traffic at the surveyed locations, excluding data identified as being impacted by roadworks or other issues.



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SUNRISE PROJECT

Long Term Traffic Monitoring Sites

Figure 3.5

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Table 3.2: Annual Average Daily Traffic in 2017 and 2018 (vehicles per day)

Site[A]	Location	2017			2018		
		Light	Heavy	Total	Light	Heavy	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	329	76	405	332	51	383
2	The Bogan Way between Bogan Gate and Middle Trundle Road	291	86	377	285	43	328
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	170	30	200	243	19	262
4	Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road	66	15	81	61	6	67
5	Fifield Road between Slee Street and Platina Road	200	95	295	187	148	335
6	Fifield Road between Platina Road and Springvale Road	139	99	238	147	150	297
7	Wilmatha Road north of Sunrise Lane	14	4	18	15	5	20
8	Melrose Plains Road between Fifield Road and Wilmatha Road	9	4	13	7	2	9

[A] *Refer to Figure 3.5*

As a robust approach to this assessment, the surveyed 85th percentile daily volumes for 2018 have been adopted as being the background volumes experienced on the road network in 2018, rather than the surveyed average volumes. On 85 percent (%) of days in 2018, the daily traffic volume was at or below the 85th percentile level presented in Table 3.3. Adopting this higher demand (rather than average volumes) takes into consideration the variation in demand over the year due to seasonal factors such as harvest activity, but excludes the very busiest days such as during the ABBA Festival held annually in Trundle.

Table 3.3: 85th Percentile Daily Traffic in 2018 (vehicles per day)

Site[A]	Location	Light Vehicles	Heavy Vehicles	Total Vehicles
1	The Bogan Way between Trundle and Fifield-Trundle Road	388	60	448
2	The Bogan Way between Bogan Gate and Middle Trundle Road	332	50	382
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	299	24	323
4	Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road	73	7	80
5	Fifield Road between Slee Street and Platina Road	247	196	443
6	Fifield Road between Platina Road and Springvale Road	195	199	394
7	Wilmatha Road north of Sunrise Lane	21	7	28
8	Melrose Plains Road between Fifield Road and Wilmatha Road	12	4	16

[A] *Refer to Figure 3.5. Note 85th percentile demand excludes those periods of data impacted by roadworks.*

3.4 Background Traffic Growth

The results in Table 3.2 indicate that average traffic volumes on the surveyed roads fluctuated, with some increasing and some decreasing from 2017 to 2018. Significant growth in average daily traffic from 2017 to 2018 was recorded on both Middle Trundle Road and Fifield Road. On Fifield Road, the increase is primarily the result of an increase in heavy vehicles, while on Middle Trundle Road, the increase is primarily the result of an increase in light vehicles. Moderate decreases in average daily traffic were recorded on The Bogan Way, primarily related to an observed decrease in the number of heavy vehicles.

The driving factor behind those observed changes are not known, and may be related to any number of things such as impacts of a specific development, or changes to road management or network conditions (e.g. the progressive sealing of Middle Trundle Road that was completed in early 2019) which have resulted in routes being more or less attractive to certain drivers.

In consideration of the observed fluctuations and seasonal variations in traffic, for the purpose of this assessment, the background traffic (unrelated to the Project or Modification) has been estimated on the basis of the surveyed 2018 daily 85th percentile demands (Table 3.3). An annual growth rate of 2% per annum has been adopted, consistent with GTA Consultants (2017). A higher growth rate of 3% per annum has been adopted for heavy vehicles only on Fifield Road to reflect the higher growth in heavy vehicles observed on that route. The forecast background traffic volumes for the two assessment scenarios (Section 2.2) are provided in Table 3.4.

Table 3.4: Background and Forecast 85th Percentile Daily Traffic (vehicles per day)

Site[A]	Location	2018		2023		2033	
		Light	Heavy	Light	Heavy	Light	Heavy
1	The Bogan Way between Trundle and Fifield-Trundle Road	388	60	427	67	521	81
2	The Bogan Way between Bogan Gate and Middle Trundle Road	332	50	367	55	447	67
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	299	24	330	26	402	32
4	Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road	73	7	81	8	98	9
5	Fifield Road between Slee Street and Platina Road	247	196	273	227	332	305
6	Fifield Road between Platina Road and Springvale Road	195	199	215	231	262	310
7	Wilmatha Road north of Sunrise Lane	21	7	23	8	28	9
8	Melrose Plains Road between Fifield Road and Wilmatha Road	12	4	13	4	16	5

[A] *Refer to Figure 3.5*

Review of the 2018 survey data indicates that the busiest hour occurred at different times of the day at the different survey locations, typically between 9:00 am and 4:00 pm. During the busiest hour at the surveyed locations (excluding Wilmatha Road and Melrose Plains Road), the number of vehicles was typically 9-11% of the daily total traffic. During the hours when Project-generated traffic is expected to peak, the number of vehicles at the surveyed locations was up to 5% of the daily total traffic. As a robust assessment, this study has estimated the peak hourly baseline traffic for the 85th percentile day, assuming that 10% of the daily traffic (85th percentile day) occurs during the Project's peak hours. The resulting peak hourly traffic is presented in Table 3.5.

Table 3.5: Baseline 85th Percentile Day Peak Hourly Traffic (vehicles per hour)

Site[A]	Location	2018		2023		2033	
		Light	Heavy	Light	Heavy	Light	Heavy
1	The Bogan Way between Trundle and Fifield-Trundle Road	39	6	43	7	52	8
2	The Bogan Way between Bogan Gate and Middle Trundle Road	33	5	36	6	44	7
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	30	2	33	2	40	3
4	Platina Road/Fifield-Trundle Road between The Bogan Way and Fifield Road	7	1	8	1	9	1
5	Fifield Road between Slee Street and Platina Road	25	19	28	22	34	30
6	Fifield Road between Platina Road and Springvale Road	19	20	21	23	26	31
7	Wilmatha Road north of Sunrise Lane	2	1	2	1	3	1
8	Melrose Plains Road between Fifield Road and Wilmatha Road	2	0	2	0	3	0

[A] *Refer to Figure 3.5*

3.5 State Significant Projects

Other state significant projects in the region may impact on traffic conditions on those roads serving the Project. Key proposed or approved projects that may potentially interact with, or have potential cumulative impacts with, the modified Project are listed in Table 3.6 and shown on Figure 1.1. Table 3.6 also classifies each of the projects as being relevant (required to be considered in this assessment) or potentially relevant (not required to considered in this assessment) in accordance with the draft *Assessing Cumulative Impacts Guide Guidance for State Significant Projects* (NSW Government, 2020).

Relevant cumulative impacts with the modified Project and the relevant State significant projects have been considered in this Road Transport Assessment in accordance with the draft *Assessing Cumulative Impacts Guide Guidance for State Significant Projects* (NSW Government, 2020).

Table 3.6: Summary of Key Proposed or Approved State Significant Development and Infrastructure Projects in the Region

Project	Overview	Status	Cumulative Impact Assessment[A]
Lachlan Shire Local Government Area			
Cattle Feedlot and Quarry (Department of Infrastructure, Planning and Natural Resources, 2005)	50,000 head cattle feedlot and quarry (providing material to the feedlot for construction and maintenance), located approximately 30 km west of Condobolin. The construction workforce is approximately 85 personnel in the first year of construction and 53 personnel over the following three years of construction. The operational workforce is approximately 50 personnel.	Approved 2005, not constructed	Relevant – required to be considered
Flemington Cobalt Scandium Mine (Australian Mines Limited, 2017)	A proposed nickel, cobalt and scandium open cut mine located to the immediate north-west of the Project. The proposed construction workforce is approximately 150 to 120 personnel for approximately 12 to 18 months. The proposed operational workforce is approximately 75 personnel for 18 years.	Environmental Assessment Requirements (EARs) Issued 2018	Potentially Relevant – not required to be considered
Owendale Scandium Mine (R.W. Corkery & Co. Pty. Limited, 2018)	A proposed nickel, cobalt and scandium open cut mine (immediately north-east of the Project), processing site (located approximately 5 km west of Condobolin) and associated infrastructure. The proposed construction period is approximately two years (no workforce estimate provided). The proposed operational workforce is approximately 121 personnel for 28 years of mining operations.	EARs Issued 2018	Potentially Relevant – not required to be considered
Western Slopes Pipeline (APA, 2017)	A proposed high pressure gas pipeline approximately 450 km in length to connect the Narrabri Gas Project to the NSW gas transmission network, with the alignment located north and west of the Project. The proposed construction workforce is between 250 and 350 personnel for approximately 8 to 10 months. The proposed operational workforce is 4 to 5 personnel until the end of the pipeline's useful life (estimated to be approximately 40 years).	EARs Issued 2019	Potentially Relevant – not required to be considered
Parkes Shire Local Government Area			
Northparkes Mine Extension Project (CMOC Mining Services Pty Ltd, 2018)	A copper-gold mine located approximately 27 km north-west of Parkes. Operational workforce of approximately 700 personnel until end of the mine life in 2032.	Approved 2014 – Operational	Relevant – required to be considered
Inland Rail Parkes to Narromine (ARTC, 2021)	An upgrade of the existing rail line between Parkes and Narromine as part of the Inland Rail Project (including 98.4 km of upgraded track and 5.4 km of new track).	Approved 2018 – Operational	Relevant – required to be considered
Parkes Solar Farm (Neoen Renewing Energy, 2016)	A 65 Megawatt (MW) photovoltaic solar farm located approximately 10 km west of Parkes. The operational workforce on-site is approximately one for the expected 25 to 30 year operational life.	Approved 2016 – Operational	Relevant – required to be considered

Project	Overview	Status	Cumulative Impact Assessment[A]
Goonumbla Solar Farm (Geolyse, 2016)	A 70 MW photovoltaic solar farm located approximately 10 km west of Parkes and immediately north of the Parkes Solar Farm. There are no operational employees stationed on-site at the solar farm.	Approved 2016 – operational	Relevant – required to be considered
Quorn Park Solar Farm (Premise, 2019)	An 80 MW photovoltaic solar farm located approximately 10 km north-west of Parkes. The peak construction workforce is 100 personnel for approximately nine months. The operational workforce is 2 to 3 personnel for the expected 30 year operational life.	Approved 2020 – not constructed	Relevant – required to be considered
Parkes Peaking Power Plant (NSW Department of Planning, 2008)	A gas turbine peaking power plant with a nominal output between 120 MW to 150 MW, located approximately 10 km west of Parkes. The construction workforce is approximately 44 personnel for six to eight months. The operational workforce is approximately four personnel.	Approved 2008 – not constructed	Relevant – required to be considered
Parkes Bypass[B] (RMS, 2019 and TfNSW, 2021)	A 10.5 km Newell Highway bypass approximately 2 km west of Parkes. The main construction workforce is up to approximately 400 personnel for approximately three years.	Approved (2019) – under construction	Relevant – required to be considered
E44 Rocklands Project (MineSoils, 2021)	A proposed open cut mine to supplement existing underground operations at Northparkes Mine, approximately 50 km south-east of the Sunrise Mine.	Site Verification Certificate Application submitted 2020	Potentially Relevant – not required to be considered
Forbes Shire Local Government Area			
Jemalong Solar Farm (NGH Environmental Pty Ltd, 2017)	A 50 MW photovoltaic solar farm undergoing construction, approximately 36 km west of Forbes. The construction workforce is approximately 100 direct jobs and 100 indirect jobs over a construction period of approximately 12 months. The operational workforce is three to four personnel for approximately 30 years.	Approved 2018 – under construction	Relevant – required to be considered
Daroobalgie Solar Farm (Pacific Hydro, 2019)	A 100 MW photovoltaic solar farm located approximately 11 km north-east of Forbes. A proposed peak construction workforce of approximately 160 personnel for approximately 12 to 18 months. A proposed operational workforce of approximately four to six personnel for the expected operational life of approximately 25 years.	EARs Issued 2019	Potentially Relevant – not required to be considered

[A] *In accordance with the draft Assessing Cumulative Impacts Guide Guidance for State Significant Projects (NSW Government, 2020).*
[B] *Approved under Part 5 of the EP&A Act.*

The NSW Government has established the Parkes Special Activation Precinct under the *State Environmental Planning Policy (Activation Precincts) 2020*. The Parkes Special Activation Precinct is a 3,600 hectare (ha) industrial park located approximately 3 km west of Parkes (Figure 1.1). Construction of Stage 1 infrastructure for the industrial park (i.e. road and electricity distribution infrastructure) is expected to commence in June 2021 (Regional Growth NSW, 2021).

The Parkes Solar Farm, Goonumbla Solar Farm and Parkes Peaking Power Plant (Table 3.6) are located in the Parkes Special Activation Precinct. Any future developments associated the Parkes Special Activation Precinct may also potentially interact with, or have potential cumulative impacts with, the modified Project. These potential interactions or cumulative impacts would be assessed as part of separate development applications for these future developments.

The relevant projects to be considered in this assessment (Table 3.6) are each discussed below with respect to their potential for interaction with Project-generated traffic (described in Section 5).

Cattle Feedlot and Quarry

The approved Cattle Feedlot and Quarry was proposed by Rockdale Beef Pty Ltd includes a 50,000 head cattle feedlot and quarry approximately 30 km west of Condobolin (Figure 1.1).

The Cattle Feedlot and Quarry was approved by the NSW Minister for Infrastructure and Planning in April 2005 and construction was yet to commence at the time of writing this document.

In its assessment report for the Cattle Feedlot and Quarry, the Department of Infrastructure, Planning and Natural Resources (2005) indicates that the proponent, Rockdale Beef Pty Ltd (Rockdale) has estimated that during the early stages of construction, the construction workforce is expected to generate approximately 106 two-way traffic movements per day, with an additional four two-way trips for deliveries of aggregate, sand and cement. Once operational, the Cattle Feedlot and Quarry is expected to generate an average of 190 light vehicle trips and 224 heavy vehicle trips per day.

A minimum of 60 % of the generated traffic is expected to be sourced from Condobolin. A minimum 10 % of the daily traffic travelling towards Condobolin would then travel south to the abattoir at Yanco. The proposed transport route from the Cattle Feedlot and Quarry site to the abattoir at Yanco includes Kiacatoo Road south to Lachlan Valley Way, east along Lachlan Valley Way to Condobolin, south along Main Road 57 to West Wyalong, then Newell Highway to Narrandera then Yanco.

A Transport Code of Conduct for the management of traffic associated with construction and operation of the Cattle Feedlot and Quarry is required to be prepared and implemented. In addition, contributions to maintenance and upgrading of roads along the transport route are also required for the Cattle Feedlot and Quarry.

As traffic generated by the Cattle Feedlot and Quarry would generally occur west and south of Condobolin, the potential for interaction with Project-generated traffic would be very minimal should the Cattle Feedlot and Quarry be constructed during the life of the Project.

Northparkes Mine

The approved Northparkes Mine is a copper-gold mine located approximately 27 km northwest of Parkes via the Newell Highway and Bogan Road (Figure 1.1). It has been operating since 1993, and mining operations are approved until 2032.

Modification 4 to Project Approval PA 11_0060 (the most recent approval) was approved in September 2018, which included additional ore processing infrastructure. The Modification did not involve any changes to operating hours, the number of employees, or the processing rate, and so would not result in any impacts to road traffic aspects of the Northparkes Mine (Umwelt, 2018). No changes to future traffic conditions as a result of activity at Northparkes Mine are therefore anticipated.

The ongoing contribution of the Northparkes Mine on traffic conditions in the vicinity of the Project would be negligible, noting that less than 5 % of the workforce is assumed to travel to and from Trundle and Bogan Gate (Transport & Urban Planning, 2013). As the latest Modification would not impact its traffic generation, the traffic survey data (Section 0) is expected to have fully captured the existing and ongoing future contribution of the Northparkes Mine to traffic conditions and therefore have been considered in this assessment.

Inland Rail Parkes to Narromine

Inland Rail is a 1,700 km freight rail line that will connect Melbourne and Brisbane via regional Victoria, NSW and Queensland proposed by the Australian Rail Track Corporation Ltd. It comprises 13 different projects, the first of which is the Parkes to Narromine Section.

The Parkes to Narromine Section of the Inland Rail was commissioned in late September 2020, and is now operational. The Parkes to Narromine Section involved the upgrade of 98.4 km of existing rail track between Parkes and south of Narromine, including a full rebuild of the rail tracks, rail formation and supporting structures. A new 5.3 km length of new rail track, known as the North West Connection, was constructed west of Parkes, which provides a new corridor between the Orange Broken Hill Railway and the Parkes Narromine Railway.

GHD (2017) assessed the traffic and transport aspects of the Parkes to Narromine Section. That assessment found that once operational, minimal traffic generation is expected. The key traffic impacts relate to increased train activity at level crossings, although faster train speeds will be permitted, which will slightly decrease delays associated with individual trains. Traffic activity at most levels crossings in the study area was found to be low, and the number of vehicles likely to be delayed by train activity is not substantial. It also found that there is capacity at each level crossing for delayed traffic to queue clear of adjacent intersections.

With respect to potential interactions with traffic generated by the Project, the Parkes to Narromine Section of the Inland Rail crosses Henry Parkes Way approximately 6 km west of Parkes at an actively controlled level crossing with flashing lights and boom barriers, at which the speed limit on Henry Parkes Way has recently been reduced to 80 km/h.

Project-generated traffic travelling to or from Parkes would pass through that level crossing on Henry Parkes Way, with those drivers experiencing delays at the level crossing as described above. The delays due to trains at that level crossing and the Project's contribution to the road traffic at the level crossing are considered sufficiently small that no further assessment of this interaction between the Project and Parkes to Narromine Section rail traffic is warranted.

Parkes Solar Farm

The approved Parkes Solar Farm involves the development of a 65 million watt (MW) photovoltaic solar farm and associated infrastructure approximately 10 km west of Parkes (Neoen Renewing Energy, 2016) (Figure 1.1). Operations at the Parkes Solar Farm commenced in April 2018.

The number of ongoing operational workers is very low and would generate negligible traffic over the operational life of the Parkes Solar Farm. This assessment therefore does not include any forecasts for traffic to and from the Parkes Solar Farm, as background traffic growth considerations would adequately address the potential traffic generation of the Parkes Solar Farm.

Goonumbla Solar Farm

The approved Goonumbla Solar Farm involves the development of a 70 MW photovoltaic solar farm and associated infrastructure and is located on the southern side of Henry Parkes Way approximately 10 km west of Parkes and immediately to the north of the Parkes Solar Farm (Figure 1.1).

The traffic implications of construction and operation of the Goonumbla Solar Farm were assessed by Geolyse (2016), which found that while construction activity would generate moderate traffic volumes over a short period, once commissioned and operational, it would generate negligible traffic, with no permanent employees to be stationed on-site.

FRV Services Australia is the developer of the Goonumbla Solar Farm, and its website indicates that the Goonumbla Solar Farm has been constructed and was expected to become operational in 2020. There would be no overlap between Project traffic and the construction traffic associated with the Goonumbla Solar Farm. The volume of traffic generated by the Goonumbla Solar Farm when operational would be well within the day-to-day variations in traffic and so has not been considered further in this assessment.

Quorn Park Solar Farm

Quorn Park Solar Farm was approved on 16 July 2020, and involves the development of an 80 MW solar farm approximately 10 km west of Parkes (Figure 1.1), with vehicular access proposed from Back Trundle Road via McGrath Lane and Henry Parkes Way. It is understood that construction of the Quorn Park Solar Farm has not yet commenced.

A number of road upgrades are required for the Quorn Park Solar Farm, including upgrading of the intersections of McGrath Lane with Henry Parkes Way and with Back Trundle Road, and upgrading of McGrath Lane and part of Back Trundle Road. A Traffic Management Plan is required to be developed and implemented, including measures to minimise traffic impacts during construction.

As construction of the Quorn Park Solar Farm has not commenced, there is the potential for the Quorn Park Solar Farm construction to coincide with the construction phase of the Project. Once operational, Geolyse (2018) indicates that the Quorn Park Solar Farm is expected to generate up to four vehicle trips per day, and the Development Consent SSD 9097 limits traffic generation to no more than four heavy vehicle movements[2] per day (eight trips) during operations. The operational phase traffic generation of the Quorn Park Solar Farm traffic would be sufficiently low that no further consideration of the cumulative implications is considered to be warranted.

Premise Australia (2019) and Geolyse (2018) indicate that during its nine month construction period, imported components will be transported by road from Newcastle, Botany Bay and/or Port Kembla. The haulage routes used from those ports to the Quorn Park Solar Farm would all be via Newell Highway to Parkes then Henry Parkes Way, McGrath Lane and Back Trundle Road. Construction workers for the Quorn Park Solar Farm are expected to travel to and from surrounding regional centres, with the majority travelling to and from Parkes via Henry Parkes Way, McGrath Lane and Back Trundle Road.

[2] Development Consent SSD 9097 defines a vehicle movement as one vehicle entering and leaving the site (i.e., equivalent to two vehicle trips used elsewhere in this report).

Development Consent SSD 9097 limits traffic generation during construction to not more than 63 heavy vehicle movements (126 trips) and three over-dimensional heavy vehicle movements (six trips) per day. It may not generate more than 30 vehicle movements an hour (60 trips) at the intersection of Henry Parkes Way and McGrath Lane. Geolyse (2018) indicates that a peak of approximately 30 vehicles per hour will occur at the beginning and end of the work day as crews arrive/leave the site. Site construction hours would be standard construction hours of Monday to Friday 7:00 am to 6:00 pm, and 8:00 am to 1:00 pm on Saturdays. The weekday peaks for traffic generated by the workforce are therefore likely to occur approximately 6:30 am to 7:30 am, and 5:30 pm to 6:30 pm.

Should the construction of the Quorn Park Solar Farm coincide with the Project, there is therefore some potential for Project-generated traffic to interact with up to 30 vehicle trips per hour on Henry Parkes Way between McGrath Lane and Parkes. This assumes that the peak hours for the Quorn Park Solar Farm construction traffic and that of the Project also coincide.

Parkes Peaking Power Plant

The approved Parkes Peaking Power Plant will include construction and operation of three 40 MW gas fired turbines to generate 120 MW; construction and operation of an underground natural gas pipeline connecting to the Central West Pipeline at Parkes; and associated electricity transmission infrastructure.

Although approval was granted for the Parkes Peaking Power Plant on 18 July 2008, the project has not been constructed. As construction of the Parkes Peak Power Plant has not commenced, there is the potential for the Parkes Peaking Power Plant construction to coincide with the construction phase of the Project.

The Parkes Peaking Power Plant will be located approximately 500 m south of Condobolin Road (Henry Parkes Way) approximately 10 km west of Parkes (Figure 1.1). Vehicular access will be via Pat Meredith Drive, an upgrade of a dirt track between the sealed TransGrid access road to the proposed site access. Approval is subject to measures to manage the impacts of construction of the pipeline on roads, including development of a Gas Pipeline Construction Environmental Management Plan.

URS (2007) indicates that construction is expected to occur over six to eight months. During the peak, construction activity is expected to generate 70 light vehicles and eight heavy vehicles per day. Typically construction activity is expected to generate an average of 22 light vehicles and five heavy vehicles per day. A total of 12 deliveries using over-dimension and over-mass vehicles would occur over the construction phase to transport gas turbine, generator and transformer units. Gas pipeline construction is estimated to generate a small amount of vehicular traffic over several weeks.

The construction traffic is expected to peak between 6:00 am and 6:30 am, and between 4:30 pm and 5:00 pm when construction workers arrive and leave the site. URS (2007) does not provide information on the suggested distribution of traffic on the public road network, however it would generally be expected that the majority of traffic would be travelling to and from Parkes, resulting in the traffic occurring on Henry Parkes Way between Pat Meredith Drive and Parkes.

During the operational phase, the traffic generation of the Parkes Peaking Power Plant is expected to be negligible, and would be sufficiently low that no further consideration of the cumulative implications is considered to be warranted.

Newell Highway Upgrade, Parkes Bypass

The Parkes Bypass is a 10.5 km Newell Highway upgrade/bypass on the western outskirts of Parkes to reduce travel time, improve freight productivity and efficiency, improve pedestrian access through Parkes, and provide access to the Parkes Special Activation Precinct. The upgrade involves relocating the Newell Highway between Maguire Road to the north and Barkers Road to the south. The Parkes Bypass is expected to remove up to 1,200 heavy vehicles per day from local streets in the Parkes town centre.

Early construction works commenced in September 2020, with the main construction works expected to occur from the end of 2021 to 2024 (TfNSW, 2020a). There is therefore the potential for construction of the Parkes Bypass to coincide with the construction phase of the Project.

The Parkes Bypass will involve construction of a new roundabout on Henry Parkes Way at the location of the current intersection with Westlime Road west of Parkes, which will be designed for Performance Based Standard 3a vehicles up to 36.5 m in length. A new T-intersection will be constructed on Henry Parkes Way with the Hartigan Avenue Extension, to the west of the new roundabout, at which Henry Parkes Way will be the priority road. Construction work will occur in stages to reduce impacts on operational traffic on the Newell Highway and surrounding local roads. Traffic management and access controls will be implemented under a construction traffic management plan.

The Review of Environmental Factors (REF) (RMS, 2020) and addendum (TfNSW, 2021) indicate that construction would be largely carried out in accordance with standard construction working hours, i.e., from 7:00 am to 6:00 pm Monday to Friday, 8:00 am to 1:00 pm Saturdays, and no work on Sundays or public holidays. The main site compound will be located towards the central portion of the Parkes Bypass footprint. Additional secondary site compounds are proposed, and remain generally in the central portion of the footprint, with one located immediately to the north of Henry Parkes Way.

The construction impacts are identified as being minor, with an average of about 200 vehicles per day, and up to 440 vehicles per day including both light and heavy vehicles. The additional traffic would primarily affect roads such as the Newell Highway, Hartigan Avenue, Westlime Road, Brolgan Road, London Road, Condobolin Road (Henry Parkes Way) and Bogan Road. Excluding the workforce traffic, construction traffic would be spread throughout the day and would enter and leave the site via designated routes, with no more than about 10 to 20 vehicles arriving and leaving per hour on average. The construction workforce would arrive and leave site at the start and end of each work day, resulting in an average of 100 light vehicles and up to 300 light vehicles traveling on local roads during those times.

The REF (RMS, 2020) and addendum (TfNSW, 2021) do not provide details of the distribution of the workforce and delivery trips on the road network beyond the roads identified above as being impacted, nor does it provide details regarding the construction site access locations and designated access routes. Quantitative forecasts of the traffic implications of the Parkes Bypass construction activity cannot be developed, however it is considered reasonable to assume that the majority of construction traffic would be travelling to and from Parkes, and that at any one time, construction traffic will be travelling to and from multiple construction compound sites in the local region. The forecast numbers of construction vehicles would therefore be spread across a number of routes in the region, with peaks in additional traffic occurring during the peaks associated with movement of the workforce each day.

Jemalong Solar Farm

The approved Jemalong Solar Farm involves the development of a 50 MW photovoltaic solar farm and associated infrastructure and is located approximately 36 km west of Forbes (Figure 1.1). It is understood that the Jemalong Solar Farm is currently under construction.

NGH Environmental (2017) found that the potential traffic impacts of the Jemalong Solar Farm will be greatest during its construction and decommissioning stages, with three to 12 cars per day expected during normal operations, and an average of under four heavy vehicle movements and 17 light vehicle movements per day during the peak construction stage.

Vehicles accessing the Jemalong Solar Farm are restricted to travel via Lachlan Valley Way, Wilbertroy Lane, Naroo Lane and the approved site access point. Approval of the Jemalong Solar Farm is subject to requirements to upgrade the intersection of Lachlan Valley Way and Wilbertroy Lane, and upgrade Wilbertroy Lane and Naroo Lane between Lachlan Valley Way and the site access point. A Traffic Management Plan has also been developed and approved (Genex Power, 2020), and includes details of measures to be implemented to minimise traffic safety issues and disruption to other road users during construction, upgrading or decommissioning works, as well as a driver's code of conduct.

As the Jemalong Solar Farm is currently under construction, its construction traffic generation is not expected to coincide with that of the Project. The operational traffic generation of the Jemalong Solar Farm is expected to be sufficiently low that further assessment of its potential interaction with Project-generated traffic is not considered to be warranted.

3.6 Road Safety History

Validated crash data was obtained from TfNSW for the most recent five-year period available, being from 1 July 2015 to 30 June 2020. The data also included preliminary data (which is subject to change) for the period from 1 July 2020 to 7 March 2021. The records include those crashes which conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- the crash was reported to the police;
- the crash occurred on a road open to the public;
- the crash involved at least one moving vehicle; and
- the crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data were reviewed for primary access routes for the Project and relevant to the Modification, including:

- Henry Parkes Way – Fifield Road to Bathurst Street at Condobolin, and Bogan Gate to Westlime Road at Parkes;
- The Bogan Way – Forbes to Henry Parkes Way, and Henry Parkes Way to The McGrane Way;
- Middle Trundle Road;
- Fifield-Trundle Road;
- Platina Road;
- Fifield Road – Henry Parkes Way to Tullamore;
- The McGrane Way – The Bogan Way to Derribong Avenue (MR89) at Narromine;
- Scotson Lane – The Bogan Way to the modified rail siding access location;
- Wilmatha Road – Fifield Road to modified mine and processing facility access locations; and
- Sunrise Lane – Wilmatha Road to accommodation camp access location.

Over the investigation period, no crashes were reported on:

- Fifield-Trundle Road;
- Platina Road;

- Scotson Lane – The Bogan Way to rail siding access location;
- Wilmatha Road – Fifield Road to mine and processing facility access location; and
- Sunrise Lane – Wilmatha Road to accommodation camp access location.

Over the investigation period and routes reviewed, a total of 55 crashes occurred on the remaining routes, resulting in four fatalities, 16 people being seriously injured and 26 people being moderately injured. Table 3.7 demonstrates that over all the roads investigated, the most common types of crashes involved single vehicles leaving the carriageway, known as run-off-road (ROR) crashes (including all "off-path" crashes in Table 3.7), which made up approximately 67% of the total reported crashes on the routes. This is consistent with the TfNSW Centre for Road Safety (2021) crash and casualty statistics, which indicate that over the period 2015 to 2019 inclusive, two-thirds of all crashes in country areas with a speed limit of 100 km/h or more were off path or out of control vehicle crashes. The Australian Road Research Board (ARRB, 2011) states that known causes of ROR crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, 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.

Table 3.7: Crash Types on Project Access Routes (1 July 2015 to 7 March 2021)

Route	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On-Path	Off-Path on Straight	Off-Path on Curve	Miscellaneous	Total
Fifield Road	-	1	1	-	-	-	1	1	-	-	4
Henry Parkes Way	1	1	-	1	1	-	1	7	3	-	15
Middle Trundle Road	-	-	-	-	-	-	1	1	1	-	3
The Bogan Way	-	2	-	2	-	1	1	13	4	-	23
The McGrane Way	-	-	-	-	-	1	1	3	4	1	10
Total	**1**	**4**	**1**	**3**	**1**	**2**	**5**	**25**	**12**	**1**	**55**

A detailed review of the crashes on each route is provided in the following sections, and summary tables of crash characteristics on each route are presented in Appendix A.

Fifield Road: Henry Parkes Way to Tullamore

Four crashes were reported on Fifield Road:

- a motorcycle struck a kangaroo in daylight during fine weather on a dry road surface;
- cross-traffic crash between a light truck in Fifield Road and a light truck in Carlisle Road in daylight during fine weather on a dry road surface. Speeding was nominated as a contributing factor;
- southbound car lost control and struck a tree/bush in daylight during fine weather on a dry road surface. Fatigue was nominated as a contributing factor; and
- southbound B-double on the wrong side of the road on a bend struck a northbound light truck utility head on in darkness, during fine weather and on a dry road surface.

Henry Parkes Way: Condobolin to Fifield Road

Five crashes were reported on that part of Henry Parkes Way between Bathurst Street, Condobolin and Fifield Road. Key features of those five crashes were:

- four of the crashes occurred in the lower speed limit zone in Condobolin (including Denison Street), with speeding nominated as a contributing factor in one of those crashes;
- one rear-end crash occurred between two westbound vehicles in the 100 km/h speed limit zone east of Condobolin;
- one crash involved the sudden illness of the driver; and
- one crash involved a pedestrian in darkness, during rain.

Henry Parkes Way: Bogan Gate to Westlime Road, Parkes

Key features of the ten crashes reported on Henry Parkes Way between Bogan Gate and Parkes were:

- one single-vehicle fatal crash involved loss of control of a car on a straight section of road in daylight, during overcast weather and on a dry road surface. Speeding was nominated as a contributing factor;
- two single-vehicle crashes involved a heavy vehicle (both B-doubles);
- one crash involved a vehicle striking a kangaroo and one involved a driver swerving to avoid an animal;
- one crash involved a distracted driver; and
- fatigue was nominated as a contributing factor in two crashes.

Middle Trundle Road: The Bogan Way to Henry Parkes Way

Three crashes were reported on Middle Trundle Road:

- an eastbound station wagon lost control and struck a tree/bush in daylight during fine weather on a dry road surface;
- a westbound car lost control and struck a drain/culvert in daylight during fine weather on a dry road surface. Speeding was nominated as a contributing factor; and
- an eastbound car struck a kangaroo in daylight during fine weather on a dry road surface.

The Bogan Way: Henry Parkes Way to Forbes

Nine crashes were reported on that part of The Bogan Way between Henry Parkes Way and Forbes. Key features of those nine crashes were:

- one single-vehicle fatal crash that occurred on a bend in the road in darkness on a dry road surface during fine weather, for which speeding was nominated as a contributing factor;
- four of the crashes occurred at intersections in the 50 km/h speed limit zone in Forbes; and
- of the five crashes which occurred in the 80 km/h or 100 km/h speed limit zones along the route, speeding was nominated as a contributing factor in three crashes, and fatigue was nominated as a contributing factor in two crashes.

The Bogan Way: Bogan Gate to The McGrane Way

Key features of those 14 crashes that occurred on The Bogan Way between Bogan Gate and The McGrane Way near Tullamore were:

- one single-vehicle fatal crash that occurred on a straight section of the road in darkness on a dry road surface during fine weather;
- two crashes involved a B-double, one of which involved the vehicle braking hard on a wet road, and the other involved a tyre failure/fault;
- one crash involved a vehicle striking straying stock, and one involved a driver swerving to avoid an animal;
- one crash occurred in the lower speed limit zone in Trundle (Forbes Street), involving the sudden illness of a driver, whose vehicle struck parked cars. Speeding was nominated as a contributing factor;
- two crashes involved asleep or drowsy drivers; and
- three crashes involved distracted drivers (including one fatal crash).

The McGrane Way – The Bogan Way to Narromine

Key features of the ten crashes that were reported on The McGrane Way between Tullamore and Narromine were:

- one fatal crash that occurred at the railway level crossing south of Narromine, in which a B-double stuck a train in daylight during fine weather on a dry road surface. Speeding was nominated as a contributing factor;
- six crashes involved a heavy vehicle (road train, B-double or semitrailer);
- one crash involved a vehicle striking an animal in darkness on a wet road surface, and one involved a B-double driver swerving to avoid an animal; and
- one crash occurred at an intersection in the 50 km/h speed limit zone in Narromine.

Overall, the crash history data do not highlight any specific location on the routes associated with the Project that has a notably poor crash history that may suggest an inherent concern with the road layout at that location.

3.7 Trundle Main Street

A review of the pedestrian environment along Forbes Street (The Bogan Way) through Trundle was undertaken with regard to the existing and forecast traffic conditions expected to occur with the approved Project (GTA Consultants, 2018a). The review included consultation with a range of stakeholders and local community representatives, and with consideration of the TfNSW and Austroads guidelines and Australian standards relating to pedestrians and pedestrian facilities.

That review concluded the existing pedestrian and vehicular environment in Forbes Street is generally satisfactory and no immediate upgrades would be required to meet current standards. With the Project traffic, no significant deterioration in the safety of that environment is anticipated that would require immediate upgrading to meet current standards. Some measures were identified to mitigate the existing issues identified, including:

- a modified kerb extension treatment near 61/63 Forbes Street;
- a modified kerb extension treatment between Croft Street and East Street;
- threshold treatments at the northern and southern entries to Trundle;
- speed reduction warning signs on the northern and southern approaches to Trundle; and
- audit of heavy vehicles and consultation with the Trundle community within 12 months of commencement of operations at the Project.

Parkes Shire Council has developed the Trundle Main Street Plan (King and Campbell, in association with Myrtle Studio, 2021), which addresses Forbes Street between the Trundle Services and Citizens Club (north of Hutton Street) to the north and Croft Street (north of Trundle Central School) to the south.

The Trundle Main Street Plan has been developed in consultation with the local community and incorporates key features recommended in the GTA Consultants (2018a) study, such as the kerb extension treatment near 61/63 Forbes Street (amended in the Plan to include a wide central refuge) and entry signage, which would appropriately be located as part of the threshold treatments and speed reduction signs.

Parkes Shire Council secured a $945,400 grant from the NSW Government through the Your High Street program to assist in implementing components of the Trundle Main Street Plan (including improvements to pedestrian access and safety).

In consultation with Parkes Shire Council and TfNSW, SEM proposes to implement any outstanding Forbes Street improvement works outlined in GTA Consultants (2018a) (Section 4.1).

4 Approved Project

4.1 Road and Intersection Upgrades

Road and intersection upgrades will be undertaken in accordance with Development Consent (DA 374-11-00) and the Voluntary Planning Agreement. A summary of these road and intersection upgrades as outlined in the Road Upgrade and Maintenance Strategy (Clean TeQ, 2019a) is provided below.

Prior to commissioning of the accommodation camp, Sunrise Lane will be upgraded between the accommodation camp vehicle access point and Wilmatha Road to the following:

- all weather unsealed surface for an operating speed standard of 80 km/h; and
- carriageway width of 9 m (equivalent to two 3.5 m lanes and two 1.0 m wide shoulders).

Prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), SEM will pay to complete the following upgrades:

- road pavement (8.0 m sealed pavement and 1.0 m gravel shoulders); and
- all private access roads (3.5 m sealed private access road approach and 3.0 m gravel shoulders along road 30 m either side of all private access roads)

to the following roads:

- Platina Road (between the Lachlan Shire boundary and Fifield Road);
- Fifield Road (between Platina Road and Slee St [in Fifield Village]);
- Wilmatha Road (between Slee St [in Fifield Village] and the mine and processing facility vehicle access point); and
- Fifield Trundle Road (between The Bogan Way and the Parkes Shire boundary).

Prior to the commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), SEM will pay for the following intersection upgrades:

- Platina Road/Fifield Road – upgrade to Austroads standards;
- Fifield Road/Slee Street (in Fifield Village) – signage and line marking to Austroads standards, for the transport route upgrade;
- Slee Street (in Fifield Village)/Wilmatha Road/Fifield Road – signage and line marking to Austroads standards for the transport route upgrade;
- Henry Parkes Way and Middle Trundle Road – a Channelised Right Short (CHR) turn lane, constructed in accordance with Austroads guidelines for basic rural intersection treatments;

- Henry Parkes Way and The Bogan Way – signage and line marking to Austroads standards;
- Sunrise Lane/Wilmatha Road – remove the transition between the gravel and dirt surfaces while Wilmatha Road remains unsealed, then seal a minimum of 30 m of Sunrise Lane on the approach to the intersection once Wilmatha Road is sealed;
- Fifield-Trundle Road and Limestone Quarry access – basic rural intersection treatment; and
- Wilmatha Road and the mine and processing facility vehicle site access point – basic rural intersection treatment with priority between the mine and processing facility access and Wilmatha Road south.

Prior to the commissioning of the rail siding, SEM will pay for the following intersection and road upgrades:

- The Bogan Way/Fifield Trundle Road and Scotson Lane – right-left staggered T-intersections with signage and line marking to Austroads standards; and
- upgrade of Scotson Lane between The Bogan Way and the approved rail siding access.

Based on the outcomes of the Pedestrian Access Review (GTA Consultants, 2018a), in consultation with the Parkes Shire Council and TfNSW, SEM proposes to implement the outstanding recommendations including the following pedestrian access upgrades in Trundle.

- a modified kerb extension treatment near 61/63 Forbes Street;
- a modified kerb extension treatment between Croft Street and East Street;
- threshold treatments at the northern and southern entries to Trundle; and
- speed reduction warning signs on the northern and southern approaches to Trundle.

Prior to the commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), SEM will reach an agreement with the Lachlan Shire Council, Parkes Shire Council and Forbes Shire Council on funding and the timing of works as to any additional, specific road safety matters relevant to the Project as deemed necessary by the road safety audits conducted in accordance with the Voluntary Planning Agreement.

4.2 Road Maintenance Contributions

SEM will make road maintenance contributions in accordance with Development Consent (DA 374-11-00) and the Voluntary Planning Agreement. Maintenance of Project related roads described in the Voluntary Planning Agreement will be completed by the relevant Council.

SEM will however maintain Sunrise Lane (between the accommodation camp site access road and Wilmatha Road), to the satisfaction of Lachlan Shire Council, during the construction and operational phases of the Project.

In addition, the Voluntary Planning Agreement allows for the payment of Major Repair Contributions on the Project transport routes on an as-needs basis during the life of the Project but limited to a maximum of 5 km of construction in any year, unless mutually agreed between SEM and the Councils. These contributions are to address exceptional failure of or damage to roads where NSW and Commonwealth Government grants do not cover the full cost of repairs. The Major Repair Contributions do not substitute for the Road Maintenance Contributions.

4.3 Construction Phase Project Traffic

The approved Project construction phase traffic was quantified by MWT (2000) as summarised in Table 4.1.

Table 4.1: Peak Project Construction Phase Daily Traffic Generation (vehicle trips per day)

	Light Vehicles	Heavy Vehicles	Total
Workforce	212	34 (including 4 bus trips)	246
Major Equipment and Supplies	-	24	24
Other Traffic	200	100	300
Total (rounding)	**420**	**160**	**580**

Source: MWT (2000), assumes 1,000 person accommodation camp is located at the mine and processing facility site.

In addition to the above, MWT (2000) found that off-site construction activities would result in a net increase of about 30 vehicle trips per day to and from either the limestone quarry or rail siding development site.

The relocation of the accommodation camp from the mine and processing facility to the "Sunrise" property off Sunrise Lane was considered in the Road Transport Assessment conducted for the Modification 4 Environmental Assessment (GTA Consultants, 2017). At that time, SEM was considering the use of shuttle buses to transport the construction workforce between the mine and processing facility site and the accommodation camp or local towns, however the Project was assessed by GTA Consultants (2017) on the assumption that no shuttle buses would be used to transport the construction workforce.

TTPP has developed indicative daily and peak hourly forecasts based on the peak construction traffic generation described in MWT (2000) and GTA Consultants (2017) with the likely distribution of that traffic on the surrounding road network consistent with expected sources and routes. The additional 30 off-site trips per day are assumed to occur to and from the rail siding. The resulting traffic generated during the peak construction phase of the Project as approved is presented in Table 4.2.

It is noted that MWT (2000) did not explicitly include road traffic movements associated with the road upgrades in the assessment of the approved Project impacts.

Table 4.2: Approved Project Peak Construction Phase Traffic on Road Network

Road and Location	Daily (vehicles per day)				Peak Hour (vehicles per hour)			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	8	0	6	14	2	0	2	4
Fifield Road Fifield to Platina Road	340	4	112	456	92	2	14	108
Fifield Road Platina Road to Henry Parkes Way	126	0	10	136	52	0	2	54
Fifield-Trundle Road Platina Road to Limestone Quarry	282	4	102	388	84	2	12	98
Fifield-Trundle Road Limestone Quarry to The Bogan Way	258	4	102	364	89	2	12	103
Henry Parkes Way Condobolin to Fifield Road	126	0	10	136	52	0	2	54
Henry Parkes Way Bogan Gate to Gunningbland	24	0	0	24	13	0	0	13
Henry Parkes Way Middle Trundle Road to Parkes	204	4	102	310	77	2	12	91
Middle Trundle Road	204	4	102	310	77	2	12	91
Platina Road	282	4	102	388	84	2	12	98
Scotson Lane The Bogan Way to Rail Siding	98	0	32	130	36	0	4	40
Sunrise Lane Wilmatha Road to Camp Access	580	4	30	614	262	2	4	268
The Bogan Way Fifield-Trundle Road to Trundle	242	4	102	348	94	2	12	108
The Bogan Way Trundle to Middle Trundle Road	230	4	102	336	90	2	12	104
The Bogan Way Middle Trundle Road to Bogan Gate	26	0	0	26	13	0	0	13
The Bogan Way Gunningbland to Forbes	24	0	0	24	10	0	0	10
The McGrane Way Tullamore to Narromine	0	0	6	6	0	0	2	2
Wilmatha Road Fifield Road to Sunrise Lane	348	4	118	470	94	2	16	112
Wilmatha Road Sunrise Lane to Mine and mine and processing facility access	792	0	88	880	344	0	12	356

4.4 Operational Phase Project Traffic

The Road Transport Assessment conducted for the Modification 4 Environmental Assessment (GTA Consultants, 2017) quantified the traffic generation of the Project during its peak operational phase. Those forecasts assumed that all employee travel will be via private vehicles, and that the largest vehicles used for transporting product or materials will be B-doubles.

As part of the Responses to Submissions component of Modification 4, GTA Consultants (2018a) considered the potential impact the use of shuttle buses for operational employee transport, and higher capacity vehicles for the transport of limestone would have on the number of Project-generated vehicle trips on Forbes Street, Trundle (refer to Section 3.7). Applying those same assumptions, TTPP has estimated the number and distribution of the daily and peak hourly Project-generated traffic for the approved Project based on the trip sources and travel routes described in GTA Consultants (2017). The resulting approved Project-generated trips on the road network are summarised in Table 4.3.

It is noted that GTA Consultants (2017) did not explicitly include road traffic movements associated with the limestone quarry and rail siding workforce in the assessment of the impacts of the approved Project, as that assessment assumed the total workforce travelled to and from the mine and processing facility each day.

Table 4.3: Approved Project Operational Phase Traffic on Road Network

Road and Location	Daily (vehicles per day)				Peak Hour (vehicles per hour)			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	24	0	4	28	12	0	2	14
Fifield Road Fifield to Platina Road	92	12	172	276	38	6	24	68
Fifield Road Platina Road to Henry Parkes Way	22	6	8	36	11	3	4	18
Fifield-Trundle Road Platina Road to Limestone Quarry	70	6	164	240	27	3	20	50
Fifield-Trundle Road Limestone Quarry to The Bogan Way	70	6	124	200	27	3	16	46
Henry Parkes Way Condobolin to Fifield Road	14	6	8	28	7	3	4	14
Henry Parkes Way Fifield Road to Ootha	8	0	0	8	4	0	0	4
Henry Parkes Way Bogan Gate to Middle Trundle Road	0	0	62	62	0	0	6	6
Henry Parkes Way Middle Trundle Road to Parkes	34	6	70	110	9	3	10	22
Middle Trundle Road	34	6	8	48	9	3	4	16
Platina Road	70	6	164	240	27	3	20	50
Scotson Lane The Bogan Way to Rail Siding	0	0	54	54	0	0	6	6
The Bogan Way Fifield-Trundle Road to Trundle	70	6	70	146	27	3	10	40
The Bogan Way Trundle to Middle Trundle Road	38	6	70	114	11	3	10	24
The Bogan Way Middle Trundle Road to Bogan Gate	4	0	62	66	2	0	6	8
The McGrane Way Tullamore to Narromine	0	0	4	4	0	0	2	2
Wilmatha Road Fifield Road to Mine and processing facility access	116	12	176	304	50	6	26	82

Note: assumes shuttle buses operate to/from Parkes and Condobolin and AB-triples are used for limestone transport.
[A] Assumes 560,000 tpa limestone sourced from local quarries and 430,000 tpa limestone sourced from the limestone quarry on Fifield-Trundle Road.

5 Modified Project

5.1 Construction Phase Traffic Generation

5.1.1 Assessment Scenario

Figure 2.3 shows the modified construction schedule and associated workforce schedule. The level and nature of construction activity would vary throughout the construction phase of the modified Project, which would occur over approximately three years. For the purpose of this assessment, a scenario has been adopted which reflects the period during which the construction workforce and heavy vehicle movements would be at its peak and therefore result in the peak construction phase road transport impacts.

The peak workforce and heavy vehicle movements would occur in the middle of Year 2 of the construction period, at which time, the construction activity would be occurring at the mine and processing facility, rail siding and on the road and intersection upgrades (Figure 2.3). Construction of the other Project components (accommodation camp, borefield, surface water extraction infrastructure and water pipeline, gas pipeline, limestone quarry) would occur outside of the peak construction period (Figure 2.3). The Modification would not change the approved construction traffic associated with these other Project components.

The adopted assessment scenario with regard to the characteristics of the peak workforce is summarised in Table 5.1, which assumes that approximately 90% of the construction workforce would reside in the accommodation camp.

Table 5.1: Peak Construction Workforce Travel Characteristics on Typical Day

	Accommodation Camp Residents	Local Region Residents	Total Workers
Not Working	190	N/A	190
Rail Siding Construction Site	18	2	20
Road Upgrades	6	14	20
Mine and processing facility Construction Site	1,496	174	1,670
Total	**1,710**	**190**	**1,900**

Consistent with the approved Project, construction activity associated with the external infrastructure (borefield, surface water extraction infrastructure and water pipeline, gas pipeline, rail siding, accommodation camp and road upgrades) would occur only between 7:00 am and 6:00 pm. Similarly, haulage of construction materials along the transport route (between the rail siding and mine and processing facility) would be limited to these hours. All other construction activities would occur 24 hours per day, seven days per week, including construction activity at the mine and processing facility and limestone quarry.

5.1.2 Mine and Processing Facility Construction Traffic

For the adopted peak scenario, approximately 1,670 personnel would work at the mine and processing facility on any day, of which approximately 90% would reside in the accommodation camp, and the remainder would reside in the surrounding towns (Table 5.1). For the purpose of this assessment, it is assumed that of those workers residing in the local area, half would reside in Parkes, one-third would reside in Condobolin, one-tenth would reside in Forbes and the remainder in regional locations including Trundle, Tullamore, Ootha and Bogan Gate. This distribution is consistent with that adopted for the Project operational workforce (Section 5.2.1).

The resulting distribution of the construction workforce residing in the local area and travelling to the various work sites each day is summarised in Table 5.2. Of the total workers at the mine and processing facility, approximately 70% would work during the day shift, and 30% would work during the night shift.

Table 5.2: Daily Mine and Processing Facility Construction Workforce Distribution

Residential Location	Workers	Day Shift	Night Shift
Accommodation Camp	1,496	1,047	449
Parkes	87	61	26
Condobolin	58	41	17
Forbes	17	12	5
Other Local	12	9	3
Total	**1,670**	**1,170**	**500**

SEM would operate shuttle buses for the local resident construction workers to and from Parkes, Condobolin and Forbes, which are expected to carry the majority (93%) of the workers who reside in those towns, and the remainder of workers would travel in light vehicles, with an average car occupancy of 1.4 people per vehicle. These services would typically use large coaches, with an average seating capacity of 50 people. Where demand is lower, such as between Forbes and the mine and processing facility, smaller buses with a seating capacity of 22 people would be used. The buses to and from Parkes would stop in Trundle to pick up and set down workers, and those to and from Forbes would stop in Bogan Gate to pick up and set down workers.

Shuttle buses would also operate for workers travelling between the accommodation camp and mine and processing facility, which would transport approximately 95% of those workers. This service would use large coaches, with an average seating capacity of 50 people. The remaining workers would travel in light vehicles, with an average car occupancy of three people per vehicle.

Table 5.3 summarises the number of vehicles expected to be used for the transport of the mine and processing facility construction workforce.

Table 5.3: Daily Mine and Processing Facility Peak Construction Workforce Travel Vehicles

Residential Location	Day Shift		Night Shift	
	Buses	Cars	Buses	Cars
Accommodation Camp	20	18	9	8
Parkes	2	3	1	1
Condobolin	1	2	1	1
Forbes	1	1	1	0
Other Local	0	3	0	1
Total	**24**	**27**	**12**	**11**

Table 5.4 summarises the number and distribution of vehicle trips generated by the mine and processing facility construction workforce travelling to and from the site during the morning and afternoon peak hours. This assumes all shift change traffic occurs within one hour in the morning and the evening, and that to the extent possible, a bus arriving with workers would also depart with workers.

Table 5.4: Peak Hour Mine and Processing Facility Peak Construction Workforce Trip Generation (vehicle trips per hour)

	AM Peak Hour				PM Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Bus	Car	Bus	Car	Bus	Car	Bus	Car
Accommodation Camp	20	18	9	8	9	8	20	18
Parkes	2	3	1	1	1	1	2	3
Condobolin	1	2	1	1	1	1	1	2
Forbes	1	1	1	0	1	0	1	1
Other Local	0	3	0	1	0	1	0	3
Total	**24**	**27**	**12**	**11**	**12**	**11**	**24**	**27**

Note: a trip is a one way movement, a vehicle arriving and departing the site generates two trips.

The transport of the mine and processing facility construction workforce to and from the site would generate 72 bus trips per day and 76 private car trips per day. Of these, 58 bus trips per day and 52 private car trips per day (74% of the total workforce-generated trips) would occur only on Wilmatha Road and Sunrise Lane between the mine and processing facility site and the accommodation camp. Half of the employee trips would occur during the morning peak shift changeover and half during the evening shift changeover.

Construction activity at the mine and processing facility would also require deliveries of equipment and consumables. This traffic would occur mainly between 7:00 am and 6:00 pm, generating an average of 45 heavy vehicle deliveries or visits per day. Each delivery vehicle would generate one trip when arriving and one when departing the mine and processing facility. The resulting daily and peak hourly vehicle trip generation is summarised in Table 5.5.

Table 5.5: Mine and Processing Facility Construction Heavy Vehicle Delivery Trips

Origin or Destination	Daily (vehicle trips per day)	Peak Hour (vehicle trips per hour)
Parkes	66	6
Condobolin	20	2
Dubbo	4	2
Total	**90**	**10**

5.1.3 Rail Siding Construction Traffic

Construction activity at the rail siding would require a daily workforce of up to 20 people, the majority of whom would reside in the accommodation camp. A shuttle bus would operate between the accommodation camp and the rail siding, utilising a minibus (approximately 20 to 22 person capacity) at the start and end of the day shift. The bus is assumed to return to the accommodation camp during the day.

Assuming approximately 10% of the rail siding workforce would not reside at the accommodation camp, some additional private vehicles trips can be expected to be generated between the rail siding and the local towns. For the purpose of this assessment, it is assumed that these workers would reside in Parkes or Condobolin, and would each drive a light vehicle.

Construction activity at the rail siding would require a peak of eight heavy vehicle deliveries per day, generating 16 vehicle trips per day. During the peak construction period, six of the deliveries would be concrete trucks travelling from the mine and processing facility site, and two of the deliveries would be sourced from Parkes.

Table 5.6 summarises the daily and peak hourly vehicles trips generated by the construction activity at the rail siding.

Table 5.6: Rail Siding Construction Trip Generation

	Daily (vehicle trips per day)			Peak Hour (vehicle trips per hour)		
	Light Vehicles	Bus	Heavy Vehicles	Light Vehicles	Bus	Heavy Vehicles
Mine and Processing Facility	-	-	12	-	-	2
Accommodation Camp	-	4	-	-	2	-
Parkes	2	-	4	1	-	-
Condobolin	2	-	-	1	-	-
Total	**4**	**4**	**16**	**2**	**2**	**2**

5.1.4 Road Upgrades Construction Traffic

Construction activity for the road upgrades would require a daily workforce of up to 20 people, of which approximately 70% would reside in the local area and 30% in the accommodation camp. Workers would travel to the road upgrades construction site in light vehicles. For the purpose of this assessment, it has been assumed that car pooling would occur for these workforce trips, with an average occupancy of three people per vehicle.

Construction activity at the road upgrades would require a peak of five heavy vehicle deliveries per day, which would be primarily sourced from Condobolin and Parkes, generating 10 vehicle trips per day. Table 5.7 summarises the daily and peak hourly vehicle trips generated by the construction activity at the road upgrades.

Table 5.7: Road Upgrades Construction Trip Generation

	Daily (vehicle trips per day)			Peak Hour (vehicle trips per hour)		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
Accommodation Camp	4	-	4	2	-	2
Parkes	6	4	10	3	2	5
Condobolin	4	6	10	2	2	4
Forbes	2	-	2	1	-	1
Total	**16**	**10**	**26**	**8**	**4**	**12**

5.1.5 Accommodation Camp Traffic

In addition to the trips generated transporting workers between the accommodation camp and Project construction sites as described above, the accommodation camp would also be expected to generate additional vehicle trips on the road network as indicated by MWT (2000):

- recreational trips by camp residents when not working;
- travel by camp residents to and from Parkes Airport;
- delivery trips for accommodation camp-related consumables and supplies; and
- miscellaneous visitors.

Camp Resident Recreational Travel

On any one day, up to 190 of the accommodation camp residents would not be working (Table 5.1) and may choose to travel to any of the local towns for recreational purposes. As the main towns of Parkes, Condobolin and Forbes would be serviced by SEM's shuttle bus services, it is anticipated that approximately 10% of the recreational person-trips would also use the buses, which would pick up and set down at the accommodation camp as well as the mine and processing facility. These recreational trips by bus would therefore not generate any additional trips on the road network above those accounted for in travel by employees who do not reside in the accommodation camp. The remaining recreational travel would be by light vehicle, with a high level of car pooling. Consistent with MWT (2000), this assessment assumes an average car occupancy of three people per vehicle.

The recreational trips are likely to occur throughout the day and not necessarily during the same peak hours associated with the movement of workers to and from the accommodation camp. For the purpose of this assessment, it has been assumed that approximately 10% of the recreational trips would occur during those peak hours, with the trips being outbound from the accommodation camp during the morning, and inbound during the evening.

Airport-Camp Bus Travel

Some workers who reside in the accommodation camp during their work periods may choose to fly to and from their usual place of residence at the end or start of their rostered work period. The nearest airport with regular services is at Parkes, and it is expected that buses would be scheduled between the accommodation camp and Parkes Airport to align with scheduled flights.

MWT (2000) found that buses to and from Parkes Airport would generate a peak of four bus trips per day for peak occupation of the camp of approximately 1,000 people. With the increase in the accommodation camp capacity to 1,900 people, it is expected that the demand for bus trips to and from the airport would also increase, and an allowance of up to eight bus trips per day has been assumed at peak occupation of the accommodation camp.

Camp Deliveries

Deliveries of food and consumables for the accommodation camp are anticipated to generate two heavy vehicle deliveries per day when the camp is fully occupied. Such deliveries are likely to be sourced from Parkes and would occur during the day rather than during the peaks when the workforce is travelling.

Camp Visitors

Miscellaneous visitors to the accommodation camp may include design, regulatory or general visitors. At its peak occupancy, up to 15 visitors per day may be expected, primarily drawn from Parkes and Dubbo. Visitor trips would be made in light vehicles, with most occurring during the day rather than during the peaks when the workforce is travelling.

Total Accommodation Camp Trips

Table 5.8 summarises the daily and peak hourly trips expected to be generated by the accommodation camp at its peak occupancy, excluding those trips generated between the accommodation camp and the construction sites (refer to Sections 5.1.2 to 5.1.4).

Table 5.8: Total Accommodation Camp Trip Generation

Destination	Daily (vehicle trips per day)				Peak Hour (vehicle trips per hour)			
	Recreational Light Vehicles	Airport Buses	Deliveries Heavy Vehicles	Visitors Light Vehicles	Recreational Light Vehicles	Airport Buses	Deliveries Heavy Vehicles	Visitors Light Vehicles
Parkes	58	8	4	22	6	2	-	2
Condobolin	38	-	-	-	4	-	-	-
Forbes	12	-	-	-	2	-	-	-
Other	8	-	-	-	1	-	-	-
Dubbo	-	-	-	8	-	-	-	-
Total	**116**	**8**	**4**	**30**	**13**	**2**	**-**	**2**

Excludes trips generated between the accommodation camp and construction worksites.

5.2 Operational Phase Traffic Generation

5.2.1 Employees – Mine and Processing Facility

Consistent with the approved Project, a workforce of approximately 300 employees would be required at the mine and processing facility. Approximately 80% of the workforce (i.e. 240 employees) would be present on site each day, with 180 employees on day shift and 60 employees on night shift. It is anticipated that half the employees would reside in Parkes, one third would reside in Condobolin, one tenth would reside in Forbes and the remainder in regional locations including Trundle, Tullamore, Ootha and Bogan Gate. The resulting distribution of the operational workforce travelling to the mine and processing facility each day is summarised in Table 5.9.

Table 5.9: Daily Mine and Processing Facility Employee Distribution

Location	Percent of Employees (%)	Employees Present at Mine per Day		
		Day Shift	Night Shift	Total
Parkes	50	90	30	120
Condobolin	33	60	20	80
Forbes	10	18	6	24
Other	7	12	4	16
Total	**100**	**180**	**60**	**240**

SEM has determined that it would operate shuttle buses to and from Parkes, Condobolin and Forbes to the mine and processing facility. The buses to and from Forbes would stop in Bogan Gate to pick up and set down employees, and the buses to and from Parkes would stop in Trundle to pick up and set down employees. The shuttle buses are anticipated to transport approximately 90% of the workforce who reside in those towns, while the remaining 10% would travel by private car. TTPP's experience with employee transport to and from regional mining projects is that some level of car pooling occurs, however for the purpose of this assessment and considering the small proportion of employees travelling from any one residential location to the mine by private vehicle, it has been assumed that all employees travelling by private vehicle to the mine and processing facility would travel alone. On this basis, Table 5.10 summarises the number of vehicles required to transport the mine and processing facility operational workforce each day.

Table 5.10: Daily Mine and Processing Facility Employee Travel Vehicles

Location	Day Shift		Night Shift	
	Buses	Cars	Buses	Cars
Parkes	2	9	1	3
Condobolin	2	6	1	2
Forbes	1	2	1	1
Other Local	0	5	0	1
Total	**5**	**22**	**3**	**7**

Note: Bus capacity up to 50 people, car occupancy one person per car.

The transport of the operational workforce to and from the mine and processing facility would generate 16 bus trips per day and 58 private car trips per day. Half of the employee trips would occur during the morning peak shift changeover and half during the evening shift changeover.

Table 5.11 summarises the peak hourly number and distribution of vehicle trips generated by the operational workforce travelling to and from the mine and processing facility each day. This assumes all shift change traffic occurs within one hour in the morning and the evening, and that to the extent possible, a bus arriving with workers would also depart with workers.

Table 5.11: Peak Hour Mine and Processing Facility Employee Trip Generation (vehicle trips per hour)

Location	AM Peak Hour				PM Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Bus	Car	Bus	Car	Bus	Car	Bus	Car
Parkes	2	9	1	3	1	3	2	9
Condobolin	2	6	1	2	1	2	2	6
Forbes	1	2	1	1	1	1	1	2
Other Local	0	5	0	1	0	1	0	5
Total	**5**	**22**	**3**	**7**	**3**	**7**	**5**	**22**

Note: a trip is a one way movement, a vehicle arriving and departing the site generates two trips. Buses stopping in Bogan Gate and Trundle are not considered separately.

5.2.2 Employees – Rail Siding

In addition to the operational workforce at the mine and processing facility, 10 personnel would be employed at the rail siding. These workers would work two 12-hour day shifts (six personnel during the day shift and four personnel during the night shift). For the purpose of this assessment, it has been assumed that the residential distribution of those workers would be similar to that of the mine and processing facility workforce, and that they would all travel by private vehicle with some car pooling, although it is possible that some would use the shuttle buses if shift times align appropriately with those at the mine and processing facility, such that buses to and from Forbes and Parkes could pick up and set down employees at the rail siding. The resulting travel characteristics of the rail siding workforce are summarised in Table 5.12.

Table 5.12: Rail Siding Employee Travel

Location	Employees		Cars		Peak Hour Vehicle Trips			
					AM Peak		PM Peak Outbound	
	Day	Night	Day	Night	Inbound	Outbound	Inbound	Outbound
Parkes	3	2	2	1	2	1	1	2
Condobolin	2	1	1	1	1	1	1	1
Forbes	1	1	1	1	1	1	1	1
Total	**6**	**4**	**4**	**3**	**4**	**3**	**3**	**4**

Based on Table 5.12, the transport of the workforce between the rail siding and local towns would generate up to 14 private car trips per day.

5.2.3 Employees – Limestone Quarry

In addition to the operational workforce at the mine and processing facility, 30 personnel would be employed at the limestone quarry. These workers would work a 12-hour day shift. For the purpose of this assessment, it has been assumed that the residential distribution of those workers would be similar to that of the mine and processing facility workforce, and that they would all travel by private vehicle with some car pooling, although it is possible that some would use the shuttle buses if shift times align appropriately with those at the mine and processing facility, such that buses to and from Forbes and Parkes could pick up and set down employees at the limestone quarry. Excluding use of buses, the estimated travel characteristics of the limestone quarry workforce are summarised in Table 5.13.

Table 5.13: Limestone Quarry Employee Travel

Location	Employees	Cars	Peak Hour Vehicle Trips	
			AM Peak Inbound	PM Peak Outbound
Parkes	15	11	11	11
Condobolin	10	8	8	8
Forbes	3	3	3	3
Other	2	2	2	2
Total	**30**	**24**	**24**	**24**

Based on Table 5.13, the transport of the workforce between the limestone quarry and local towns would generate up to 48 private car trips per day.

5.2.4 Materials and Product

Raw materials would be transported to the Project using a range of vehicle types, including rigid trucks, B-doubles, road tankers, and AB-triple road trains. The typical types of trucks expected to be used and the source for each material or product are summarised in Table 5.14, noting that actual vehicle types used may vary.

Table 5.14: Materials and Product Transport Vehicle Types

Indicative Vehicle Type	Rail Siding	Parkes Newcastle via Parkes Sydney	Quarries	Newcastle via Dubbo
Road tanker (powder)	-	Hydrated lime Sodium Metabisulphite Flocculants	-	-
Road tanker (liquid)	-	Hydrogen peroxide Hydrochloric acid Soda ash Diluent Caustic soda	-	-
Road tanker dual trailer	-	Diesel	-	-
B-double	Sulphur Nickel sulphate Cobalt sulphate Scandium oxide	-	Limestone[A]	-
B-double road tanker	-	Quicklime	-	Ammonia
AB-triple	-	-	Limestone[A]	-
26m short Road Train	Ammonium sulphate[B]	-	-	-
Flatbed/Rigid truck	-	Resin Extractant General loads	-	-

[A] *Approximately 75% of limestone would be transported in AB-triple road trains, and 25% in B-doubles.*
[B] *Ammonium sulphate would be transported to the rail siding, then distributed by both road and rail from the rail siding.*

Table 5.15 summarises the modified Project's average daily deliveries associated with the transport of materials and products, based on the demand for each material, and the anticipated vehicle types and their payloads. The forecasts assume that transport occurs seven days per week and 52 weeks per year. With regard to the transport of limestone, it is anticipated that approximately 75% of the limestone would be transported to the mine and processing facility in AB-triples with a 72.5 t payload, and 25% by B-doubles with a 48 t payload. The overall average load per delivery would therefore be approximately 64.3 t.

Table 5.15: Raw Materials and Product Delivery Summary

Product	Annual Demand (tpa)	Average Payload (t)	Annual Loads	Origin Average Daily Loads			
				Rail Siding	Parkes Newcastle Sydney	Limestone Quarries	Newcastle via Dubbo
Ammonia	24,978	35.0	714	-	-	-	2.0
Hydrochloric Acid	690	20.0	35	-	0.1	-	-
Soda Ash	1,291	20.0	38	-	0.2	-	-
Quicklime	46,424	35.0	1,326	-	3.6	-	-
Hydrated Lime	458	24.0	19	-	0.1	-	-
Sodium Metabisulphite	1,291	19.0	68	-	0.2	-	-
Flocculants	470	20.0	24	-	0.1	-	-
Diluent	254	25.0	10	-	0.0	-	-
Diesel	9,869	50.0	197	-	0.5	-	-
Limestone	990,000	64.3	15,397	-	-	42.3	-
Sulphur	286,226	49.7	5,760	15.8	-	-	-
Caustic Soda	1,033	20.0	52	-	0.1	-	0.1
Nickel and Cobalt Sulphates	150,000	40.0	3,750	10.3	-	-	-
Ammonium Sulphate	100,000	50.0	2,000	5.5	-	-	-
Scandium Oxide	180	40.0	5	0.0	-	-	-
General Loads	1,040	20.0	52	-	0.1	-	0.1
Hydrogen Peroxide	657	20.0	33	-	0.1	-	0.1
Resin	497	20.0	25	-	0.1	-	0.1
Extractant	75	20.0	4	-	0.0	-	0.0
Average Daily Total Loads (rounded)				**32**	**6**	**42**	**2**
Average Daily Trips				**64**	**12**	**84**	**4**

[A] *Ammonium sulphate would be transported to the rail siding, then distributed by both road and rail from the rail siding.*

The transport of raw materials and product associated with the modified Project would generate an average of approximately 82 deliveries per day, or 164 vehicle trips per day to and from the mine and processing facility.

Ammonium sulphate would be transported to the rail siding for distribution. The location of the end market for ammonium sulphate is not yet confirmed, and for the purpose of this assessment it has been estimated that approximately half would be transported by rail from the rail siding, and half transported by road by customers in the local region. The road transport of ammonium sulphate by customers is assumed to occur towards both Parkes and Condobolin, and would generate an average of an additional six vehicle trips per day between the rail siding and Parkes or Condobolin above those trips presented in Table 5.15.

The total of 990,000 tpa of limestone required for the Project would be sourced from a combination of the limestone quarry and other local quarries. Up to 790,000 tpa of limestone may be sourced from the limestone quarry, in which case, the balance of 200,000 tpa would be procured from local quarries. Alternatively, up to 560,000 tpa of limestone may be procured from local quarries, in which case, the balance of 430,000 tpa would be sourced from the limestone quarry.

As the other local limestone supplier has not yet been confirmed, for the purposes of this assessment, it is assumed that third-party limestone deliveries would originate from the Parkes area. These delivery trips would follow a similar route to those vehicles approaching from Parkes, with all limestone transport vehicles travelling via Bogan Gate rather than Middle Trundle Road. Limestone sourced from the limestone quarry would be transported on the transport route between the limestone quarry and the mine and processing facility.

To account for the variations which may occur in the routes used for limestone deliveries, this assessment of the contribution of the modified Project traffic on the wider road network assumes that each part of the transport route carries the maximum amount of limestone permitted, i.e., 560,000 tpa of limestone is transported on that part of the transport route between the limestone quarry and Parkes, and 990,000 limestone is transported on that part of the transport route between the mine and processing facility and the limestone quarry. This represents the conditions under which the transport of limestone would have its greatest impact on each part of the road network.

5.2.5 Other Traffic

Consistent with the approved Project, other traffic visiting the modified Project during its operational phases would include deliveries of daily consumables, locally sourced spare parts and equipment, maintenance contractors, mine and processing facility staff visiting off-site facilities, regulatory inspectors and general visitors. This traffic would occur mainly between 7:00 am and 6:00 pm, generating an average of 16 deliveries or visits per day (GTA Consultants, 2017) as summarised in Table 5.16.

Table 5.16: Other Visitor Traffic Generation

Origin or Destination	Daily (vehicles per day)		AM Peak Hour (vehicles per hour)		PM Peak Hour (vehicles per hour)	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Parkes	20	4	2	2	2	2
Condobolin	4	4	2	2	2	2
Total	**24**	**8**	**4**	**4**	**4**	**4**

5.2.6 Total Operational Phase Generation

Table 5.17 summarises the daily vehicle trips forecast to be generated by the peak operational phase of the modified Project.

Table 5.17: Daily Modified Project Trips – Operational Phase (vehicle trips per day)

Origin or Destination	Employees		Materials and Product	Other		Total		
	Light Vehicles	Buses	Heavy Vehicles	Light Vehicles	Heavy Vehicles	Light Vehicles	Buses	Heavy Vehicles
Parkes Newcastle Sydney	24 (6) [22]	6	12	20	4	44 (6) [22]	6	14
Condobolin	16 (4) [16]	6	-	4	4	20 (4) [16]	6	4
Forbes	6 (4) [6]	4	-	-	-	6 (4) [6]	4	-
Other Local	12 [4]	-	-	-	-	16 [4]	-	-
Rail Siding	-	-	64	-	-	-	-	64
Limestone Quarries	-	-	84	-	-	-	-	84
Newcastle via Dubbo	-	-	4	-	-	-	-	6
Total	**58 (14) [48]**	**16**	**164**	**24**	**8**	**82 (14) [48]**	**16**	**172**

10 = trips to and from the mine and processing facility,
(10) = rail siding employee trips, not to or from the mine and processing facility.
[10] = limestone quarry employee trips, not to or from the mine and processing facility.

Table 5.17 demonstrates that the peak operational phase of the modified Project can be expected to generate 82 light vehicle trips per day, 16 bus trips per day, and 172 heavy vehicle trips per day to and from the mine and processing facility. Up to 14 additional light vehicle trips per day would be generated between the rail siding and local towns, and 48 additional light vehicle trips per day between the limestone quarry and local towns.

Table 5.18 summarises the peak hourly vehicle trips forecast to be generated by the peak operational phase of the modified Project.

Table 5.18: Peak Hourly Trips – Operational Phase (vehicle trips per hour)

Origin or Destination	Employees		Materials and Product	Other		Total		
	Light Vehicles	Buses	Heavy Vehicles	Light Vehicles	Heavy Vehicles	Light Vehicles	Buses	Heavy Vehicles
Parkes Newcastle Sydney	12 (3) [11]	3	2	2	2	14 (3) [11]	3	4
Condobolin	8 (2) [8]	3	-	2	2	10 (2) [8]	3	2
Forbes	3 (2) [3]	2	-	-	-	3 (2) [3]	2	-
Other	6 [2]	-	-	-	-	6 [2]	-	-
Rail Siding	-	-	6	-	-	-	-	6
Limestone Quarries	-	-	8	-	-	-	-	8
Newcastle via Dubbo	-	-	2	-	-	-	-	2
Total	**29 (7) [24]**	**8**	**18**	**4**	**4**	**33 (7) [24]**	**8**	**22**

10 = trips to and from the mine and processing facility,
(10) = rail siding employee trips, not to or from the mine and processing facility.
[10] = limestone quarry employee trips, not to or from the mine and processing facility.

Table 5.18 demonstrates that during the peaks associated with the movement of the workforce to and from the mine and processing facility, the peak operational phase of the modified Project can be expected to generate 33 light vehicle trips per hour, eight bus trips per hour, and 22 heavy vehicle trips per hour to and from the mine and processing facility. Up to seven additional light vehicle trips per hour would be generated between the rail siding and local towns, and 24 additional light vehicle trips per hour between the limestone quarry and local towns.

5.3 Travel Routes

The routes used by vehicles travelling to and from the mine and processing facility would vary according to the origin/destination as follows, using the approved transport route to the extent possible:

- rail siding – on the approved transport route including Scotson Lane, Fifield-Trundle Road, Platina Road, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access;
- limestone quarry – on the approved transport route including limestone quarry access, Fifield-Trundle Road, Platina Road, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access;
- Parkes/Newcastle/Sydney (heavy vehicles) – Henry Parkes Way, The Bogan Way, Fifield-Trundle Road, Platina Road, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access;
- Parkes/Newcastle/Sydney (light vehicles, buses and some small regular deliveries) – Henry Parkes Way, Middle Trundle Road, The Bogan Way, Fifield-Trundle Road, Platina Road, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access;
- Newcastle via Dubbo (ammonia only) – Mitchell Highway, The McGrane Way, The Bogan Way, Fifield Road, Burra Street, Wilmatha Road, and the mine and processing facility access;
- Condobolin and local sources – Henry Parkes Way, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access;
- Trundle and Bogan Gate – The Bogan Way, Fifield-Trundle Road, Platina Road, Fifield Road, Slee Street, Wilmatha Road, and the mine and processing facility access; and
- Tullamore – Fifield Road, Burra Street, Wilmatha Road, and the mine and processing facility access.

Based on consultation with the Parkes Shire Council, SEM proposes to direct the majority of construction phase truck movements from Parkes along Henry Parkes Way and The Bogan Way rather than using Middle Trundle Road as per the approved Project.

Routes between the local towns and the rail siding would be consistent with those above:

- Parkes (light vehicles) – Henry Parkes Way, Middle Trundle Road, The Bogan Way, and Scotson Lane;
- Parkes (heavy vehicles) – Henry Parkes Way, The Bogan Way, and Scotson Lane; and
- Condobolin – Henry Parkes Way, Fifield Road, Platina Road, Fifield-Trundle Road, and Scotson Lane.

The location of the road upgrade works would change as the works progress, and for the purpose of this assessment, the road upgrade works have been assumed to occur along Fifield-Trundle Road in the vicinity of the Limestone Quarry. Routes between the local towns and the limestone quarry and the nominal road upgrades site would be generally consistent with those above:

- Parkes (light vehicles) – Henry Parkes Way, Middle Trundle Road, The Bogan Way, and Fifield-Trundle Road;
- Parkes (heavy vehicles) – Henry Parkes Way, The Bogan Way, and Fifield-Trundle Road;
- Condobolin – Henry Parkes Way, Fifield Road, Platina Road and Fifield-Trundle Road;
- Forbes – The Bogan Way, Henry Parkes Way, The Bogan Way, and Fifield-Trundle Road;
- Trundle – The Bogan Way and Fifield-Trundle Road; and
- Tullamore – The Bogan Way and Fifield-Trundle Road.

5.4 Construction Phase Traffic Distribution

The resulting contribution of the peak construction activity for the modified Project on the roads serving the Project are summarised in Table 5.19 for daily and peak hourly conditions.

Table 5.19: Modified Project Peak Construction Traffic on Road Network

	Daily (vehicles per day)				Peak Hour (vehicles per hour)			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	18	0	6	24	3	0	2	5
Fifield Road Fifield to Platina Road	158	26	100	284	25	13	12	50
Fifield Road Platina Road to Henry Parkes Way	52	4	24	80	11	2	4	17
Fifield-Trundle Road Platina Road to Limestone Quarry	118	22	88	228	20	11	12	43
Fifield-Trundle Road Limestone Quarry to The Bogan Way	118	22	86	226	20	11	10	41
Henry Parkes Way Condobolin to Fifield Road	50	4	24	78	10	2	4	16
Henry Parkes Way Fifield Road to Ootha	2	0	0	2	1	0	0	1
Henry Parkes Way Bogan Gate to Gunningbland	16	4	70	90	4	2	6	12
Henry Parkes Way Middle Trundle Road to Parkes	96	14	78	188	16	5	8	29
Middle Trundle Road	96	14	8	118	16	5	2	23
Platina Road	118	22	88	228	20	11	12	43
Scotson Lane The Bogan Way to Rail Siding	4	4	16	24	2	4	2	8
Sunrise Lane Wilmatha Road to Camp Access	204	70	4	278	42	35	0	77
The Bogan Way Fifield-Trundle Road to Trundle	118	18	78	214	20	7	8	35
The Bogan Way Trundle to Middle Trundle Road	114	18	78	210	20	7	8	35
The Bogan Way Middle Trundle Road to Bogan Gate	18	4	70	92	4	2	6	12
The Bogan Way Henry Parkes Way to Forbes	16	4	0	20	3	2	0	5
The McGrane Way Tullamore to Narromine	8	0	6	14	0	0	2	2
Wilmatha Road Fifield Road to Sunrise Lane	176	26	106	308	28	13	14	55
Wilmatha Road Sunrise Lane to mine and processing facility	76	72	102	250	38	36	14	88

5.5 Operational Phase Traffic Distribution

The resulting contribution of the operational phase activity for the modified Project on the roads serving the Project are summarised in Table 5.20 for daily and peak hourly conditions.

Table 5.20: Modified Project Operational Phase Traffic on Road Network

	Daily (vehicles per day)				Peak Hour (vehicles per hour)			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	10	0	4	14	5	0	2	7
Fifield Road Fifield to Platina Road	72	16	168	256	28	8	22	58
Fifield Road Platina Road to Henry Parkes Way	40	6	6	52	20	3	2	25
Fifield-Trundle Road Platina Road to Limestone Quarry	72	10	166	248	28	5	20	53
Fifield-Trundle Road Limestone Quarry to The Bogan Way	88	10	130	228	36	5	16	57
Henry Parkes Way Condobolin to Fifield Road	40	6	6	52	20	3	2	25
Henry Parkes Way Fifield Road to Ootha	0	0	0	0	0	0	0	0
Henry Parkes Way Bogan Gate to Gunningbland	16	4	60	80	8	2	6	16
Henry Parkes Way Gunningbland to Middle Trundle Road	0	0	60	60	0	0	6	6
Henry Parkes Way Middle Trundle Road to Parkes	72	6	68	146	28	3	10	41
Middle Trundle Road	72	6	8	86	28	3	4	35
Platina Road	72	10	166	248	28	5	20	53
Scotson Lane The Bogan Way to Rail Siding access	14	0	70	84	7	0	6	13
The Bogan Way Fifield-Trundle Road to Trundle	92	10	68	170	38	5	10	53
The Bogan Way Trundle to Middle Trundle Road	88	10	68	166	36	5	10	51
The Bogan Way Middle Trundle Road to Bogan Gate	16	4	60	80	8	2	6	16
The Bogan Way Henry Parkes Way to Forbes	16	4	0	20	8	2	0	10
The McGrane Way Tullamore to Narromine	2	0	4	6	1	0	2	3
Wilmatha Road Fifield Road to mine and processing facility	82	16	172	270	33	8	24	65

6 Impacts of the Modification

6.1 Impacts on Construction Phase Traffic

Table 6.1 and Table 6.2 compare the daily and peak hourly Project-generated traffic during the peak construction phase as approved and with the Modification. This comparison demonstrates that considering the daily trips generated during the peak construction phase, the Modification would be expected to result in a significant decrease in the number of light vehicle trips generated, an increase in the number of bus trips generated and generally a decrease in the number of heavy vehicle trips generated.

Comparing the approved and modified Project traffic expected at key locations on the road network, Table 6.1 indicates that compared with the approved Project, during the peak construction phase, the modified Project would result in:

- Fifield (Fifield Road/Slee Street) – 182 fewer light vehicle trips per day, 22 additional bus trips per day, and 12 fewer other heavy vehicle trips per day; and
- Trundle (The Bogan Way/Forbes Street) – 124 fewer light vehicle trips per day, 14 additional bus trips per day, and 24 fewer other heavy vehicle trips per day.

Comparing the approved and modified Project traffic expected at key locations on the road network, Table 6.2 indicates that compared with the approved Project, during the peak construction phase, the modified Project would result in the following changes to peak hour movements:

- Fifield (Fifield Road/Slee Street) – 67 fewer light vehicle trips per peak hour, 11 additional bus trips per peak hour, and two fewer other heavy vehicle trips per peak hour; and
- Trundle (The Bogan Way/Forbes Street) – 74 fewer light vehicle trips per peak hour, five additional bus trips per peak hour, and four fewer other heavy vehicle trips per peak hour.

Table 6.1: Approved and Modified Project Peak Construction Daily Traffic (vehicles per day)

	Approved Project				Modified Project			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	8	0	6	14	18	0	6	24
Fifield Road Fifield to Platina Road	340	4	112	456	158	26	100	284
Fifield Road Platina Road to Henry Parkes Way	126	0	10	136	52	4	24	80
Fifield-Trundle Road Platina Road to Limestone Quarry	282	4	102	388	118	22	88	228
Fifield-Trundle Road Limestone Quarry to The Bogan Way	258	4	102	364	118	22	86	226
Henry Parkes Way Condobolin to Fifield Road	126	0	10	136	50	4	24	78
Henry Parkes Way Fifield Road to Ootha	0	0	0	0	2	0	0	2
Henry Parkes Way Bogan Gate to Gunningbland	24	0	0	24	16	4	70	90
Henry Parkes Way Middle Trundle Road to Parkes	204	4	102	310	96	14	78	188
Middle Trundle Road	204	4	102	310	96	14	8	118
Platina Road	282	4	102	388	118	22	88	228
Scotson Lane The Bogan Way to Rail Siding	98	0	32	130	4	4	16	24
Sunrise Lane Wilmatha Road to Camp Access	580	4	30	614	204	70	4	278
The Bogan Way Fifield-Trundle Road to Trundle	242	4	102	348	118	18	78	214
The Bogan Way Trundle to Middle Trundle Road	230	4	102	336	114	18	78	210
The Bogan Way Middle Trundle Road to Bogan Gate	26	0	0	26	18	4	70	92
The Bogan Way Gunningbland to Forbes	24	0	0	24	16	4	0	20
The McGrane Way Tullamore to Narromine	0	0	6	6	8	0	6	14
Wilmatha Road Fifield Road to Sunrise Lane	348	4	118	470	176	26	106	308
Wilmatha Road Sunrise Lane to mine and processing facility access	792	0	88	880	76	72	102	250

Table 6.2: Approved and Modified Project Construction Peak Hour Traffic (vehicles per hour)

	Approved Project				Modified Project			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	2	0	2	4	3	0	2	5
Fifield Road Fifield to Platina Road	92	2	14	108	25	13	12	50
Fifield Road Platina Road to Henry Parkes Way	52	0	2	54	11	2	4	17
Fifield-Trundle Road Platina Road to Limestone Quarry	84	2	12	98	20	11	12	43
Fifield-Trundle Road Limestone Quarry to The Bogan Way	89	2	12	103	20	11	10	41
Henry Parkes Way Condobolin to Fifield Road	52	0	2	54	10	2	4	16
Henry Parkes Way Fifield Road to Ootha	0	0	0	0	1	0	0	1
Henry Parkes Way Bogan Gate to Gunningbland	13	0	0	13	4	2	6	12
Henry Parkes Way Middle Trundle Road to Parkes	77	2	12	91	16	5	8	29
Middle Trundle Road	77	2	12	91	16	5	2	23
Platina Road	84	2	12	98	20	11	12	43
Scotson Lane The Bogan Way to Rail Siding	36	0	4	40	2	4	2	8
Sunrise Lane Wilmatha Road to Camp Access	262	2	4	268	42	35	0	77
The Bogan Way Fifield-Trundle Road to Trundle	94	2	12	108	20	7	8	35
The Bogan Way Trundle to Middle Trundle Road	90	2	12	104	20	7	8	35
The Bogan Way Middle Trundle Road to Bogan Gate	13	0	0	13	4	2	6	12
The Bogan Way Gunningbland to Forbes	10	0	0	10	3	2	0	5
The McGrane Way Tullamore to Narromine	0	0	2	2	0	0	2	2
Wilmatha Road Fifield Road to Sunrise Lane	94	2	16	112	28	13	14	55
Wilmatha Road Sunrise Lane to mine and processing facility access	344	0	12	356	38	36	14	88

6.2 Impacts on Operational Phase Traffic

Table 6.4 and Table 6.5 compare the daily and peak-hourly Project-traffic generated during the operational phase as approved and with the Modification. These forecasts for both the approved and modified Project assume that the maximum amount of limestone is sourced from local quarries, i.e., representing conditions when the maximum number of truck movements would occur through Trundle. Should the maximum amount of limestone be sourced from the limestone quarry instead, the number of trucks travelling through Trundle would be reduced as shown in Table 6.3.

Table 6.3: Effect of Limestone Source on Modified Project Traffic on Forbes Street, Trundle

	Maximum Limestone Transported from Local Quarries		Maximum Limestone Transported from Limestone Quarry	
	Daily (vehicles per day)	Peak Hour (vehicles per hour)	Daily (vehicles per day)	Peak Hour (vehicles per hour)
Light Vehicles	92	38	92	38
Buses	10	5	10	5
Heavy Vehicles	68	10	38	6
Total Vehicles	**170**	**53**	**140**	**49**

Comparing the approved and modified daily Project traffic expected at key locations on the road network, the forecasts (Table 6.4) indicate that compared with the approved Project, during the operational phase, the modified Project would result in:

- Fifield (Fifield Road/Slee Street) – 20 fewer light vehicle trips per day, four additional bus trips per day and four fewer other heavy vehicle trips per day.
- Trundle (The Bogan Way/Forbes Street) – 22 additional light vehicle trips per day, four additional bus trips per day and two fewer heavy vehicle trips per day.

Comparing the approved and modified peak hourly Project traffic expected at key locations on the road network, the forecasts (Table 6.5) indicate that compared with the approved Project, during the operational phase, the modified Project would result in the following changes to peak hour movements:

- Fifield (Fifield Road/Slee Street) – 10 fewer light vehicle trips per peak hour, two additional bus trips per peak hour and two fewer other heavy vehicle trips per peak hour.
- Trundle (The Bogan Way/Forbes Street) – 11 additional light vehicle trips per peak hour, two additional bus trips per peak hour, and no change to other heavy vehicle trips.

Table 6.4: Approved and Modified Project Operational Daily Traffic (vehicles per day)

	Approved Project				Modified Project			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	24	0	4	28	10	0	4	14
Fifield Road Fifield to Platina Road	92	12	172	276	72	16	168	256
Fifield Road Platina Road to Henry Parkes Way	22	6	8	36	40	6	6	52
Fifield-Trundle Road Platina Road to Limestone Quarry	70	6	164	240	72	10	166	248
Fifield-Trundle Road Limestone Quarry to The Bogan Way	70	6	124	200	88	10	130	228
Henry Parkes Way Condobolin to Fifield Road	14	6	8	28	40	6	6	52
Henry Parkes Way Fifield Road to Ootha	8	0	0	8	0	0	0	0
Henry Parkes Way Bogan Gate to Gunningbland	0	0	62	62	16	4	60	80
Henry Parkes Way Gunningbland to Middle Trundle Road	0	0	62	62	0	0	60	60
Henry Parkes Way Middle Trundle Road to Parkes	34	6	70	110	72	6	68	146
Middle Trundle Road	34	6	8	48	72	6	8	86
Platina Road	70	6	164	240	72	10	166	248
Scotson Lane The Bogan Way to Rail Siding	0	0	54	54	14	0	70	84
The Bogan Way Fifield-Trundle Road to Trundle	70	6	70	146	92	10	68	170
The Bogan Way Trundle to Middle Trundle Road	38	6	70	114	88	10	68	166
The Bogan Way Middle Trundle Road to Bogan Gate	4	0	62	66	16	4	60	80
The Bogan Way Henry Parkes Way to Forbes	0	0	0	0	16	4	0	20
The McGrane Way Tullamore to Narromine	0	0	4	4	2	0	4	6
Wilmatha Road Fifield Road to mine and processing facility access	116	12	176	304	82	16	172	270

Table 6.5: Approved and Modified Project Operational Peak Hour Traffic (vehicles per hour)

	Approved Project				Modified Project			
	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles	Light Vehicles	Buses	Heavy Vehicles	Total Vehicles
Fifield Road Fifield to Tullamore	12	0	2	14	5	0	2	7
Fifield Road Fifield to Platina Road	38	6	24	68	28	8	22	58
Fifield Road Platina Road to Henry Parkes Way	11	3	4	18	20	3	2	25
Fifield-Trundle Road Platina Road to Limestone Quarry	27	3	20	50	28	5	20	53
Fifield-Trundle Road Limestone Quarry to The Bogan Way	27	3	16	46	36	5	16	57
Henry Parkes Way Condobolin to Fifield Road	7	3	4	14	20	3	2	25
Henry Parkes Way Fifield Road to Ootha	4	0	0	4	0	0	0	0
Henry Parkes Way Bogan Gate to Gunningbland	0	0	6	6	8	2	6	16
Henry Parkes Way Gunningbland to Middle Trundle Road	16	4	60	80	0	0	6	6
Henry Parkes Way Middle Trundle Road to Parkes	9	3	10	22	28	3	10	41
Middle Trundle Road	9	3	4	16	28	3	4	35
Platina Road	27	3	20	50	28	5	20	53
Scotson Lane The Bogan Way to Rail Siding	0	0	6	6	7	0	6	13
The Bogan Way Fifield-Trundle Road to Trundle/	27	3	10	40	38	5	10	53
The Bogan Way Trundle to Middle Trundle Road	11	3	10	24	36	5	10	51
The Bogan Way Middle Trundle Road to Bogan Gate	2	0	6	8	8	2	6	16
The Bogan Way Henry Parkes Way to Forbes	0	0	0	0	8	2	0	10
The McGrane Way Tullamore to Narromine	0	0	2	2	1	0	2	3
Wilmatha Road Fifield Road to mine and processing facility access	50	6	26	82	33	8	24	65

6.3 Future Traffic Volumes – Peak Construction

Based on the baseline daily and peak hour traffic volumes with background growth (Section 3.4), future traffic volumes at the surveyed locations have been forecast during the peak construction phase in 2023. The resulting daily volumes are summarised in Table 6.6 and peak hourly volumes in Table 6.7, noting that the peak hour results assume that the Project peak coincides with background peak. As that is unlikely, the peak hourly forecasts are considered to overestimate future conditions.

Table 6.6: Total Daily Traffic 2023 (vehicles per day)

Site[A]	Location	Approved Project				Modified Project			
		Light Vehicles	Buses[B]	Heavy Vehicles	Total	Light Vehicles	Buses[B]	Heavy Vehicles	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	669	10	163	842	545	24	139	708
2	The Bogan Way between Bogan Gate and Middle Trundle Road	393	6	49	448	385	10	119	514
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	534	6	126	666	426	16	32	474
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	363	4	110	477	199	22	96	317
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	339	4	110	453	199	22	94	315
5	Fifield Road between Slee Street and Platina Road	613	26	317	956	431	48	305	784
6	Fifield Road between Platina Road and Springvale Road	341	24	217	582	267	28	231	526
7	Wilmatha Road between Sunrise Lane and Project access	815	0	96	911	99	72	110	281
7	Wilmatha Road between Fifield Road and Sunrise Lane	371	4	126	501	199	26	114	339
8	Melrose Plains Road between Fifield Road and Wilmatha Road	13	0	4	17	13	0	4	17

[A] *Refer to Figure 3.5*
[B] *Includes allowance for non-Project buses in surveyed background heavy vehicles.*

Table 6.7: Total Peak Hour Traffic 2023 (vehicles per hour)

Site[A]	Location	Approved Project				Modified Project			
		Light Vehicles	Buses[B]	Heavy Vehicles	Total	Light Vehicles	Buses[B]	Heavy Vehicles	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	137	2	19	158	63	7	15	85
2	The Bogan Way between Bogan Gate and Middle Trundle Road	49	0	6	55	40	2	12	54
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	110	2	14	126	49	5	4	58
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	92	2	13	107	28	11	13	52
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	97	2	13	112	28	11	11	50
5	Fifield Road between Slee Street and Platina Road	120	4	34	158	53	15	32	100
6	Fifield Road between Platina Road and Springvale Road	73	2	23	98	32	4	25	61
7	Wilmatha Road between Sunrise Lane and Project access	346	0	13	359	40	36	15	91
7	Wilmatha Road between Fifield Road and Sunrise Lane	96	2	17	115	30	13	15	58
8	Melrose Plains Road between Fifield Road and Wilmatha Road	2	0	0	2	2	0	0	2

[A] *Refer to Figure 3.5*
[B] *Includes allowance for non-Project buses in surveyed background heavy vehicles.*

6.4 Future Traffic Volumes – Operational

Based on the baseline daily and peak hour traffic volumes with background growth (Section 3.4), future traffic volumes at the surveyed locations have been forecast during operational conditions in 2033. The resulting daily volumes are summarised in Table 6.8 and peak hourly volumes in Table 6.9, noting that the peak hour results assume that the Project peak coincides with background peak. As that is unlikely, the peak hourly forecasts are considered to overestimate future conditions.

Table 6.8: Total Daily Traffic 2033 (vehicles per day)

Site[A]	Location	Approved Project				Modified Project			
		Light Vehicles	Buses[B]	Heavy Vehicles	Total	Light Vehicles	Buses[B]	Heavy Vehicles	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	591	14	143	748	613	18	141	772
2	The Bogan Way between Bogan Gate and Middle Trundle Road	451	6	123	580	463	10	121	594
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	436	10	36	482	474	10	36	520
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	168	6	173	347	170	10	175	355
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	168	6	133	307	186	10	139	335
5	Fifield Road between Slee Street and Platina Road	424	42	447	913	404	46	443	893
6	Fifield Road between Platina Road and Springvale Road	284	38	286	608	302	38	284	624
7	Wilmatha Road between Fifield Road and Project access	144	12	185	341	110	16	181	307
8	Melrose Plains Road between Fifield Road and Wilmatha Road	13	0	4	17	13	0	4	17

[A] *Refer to Figure 3.5*
[B] *Includes allowance for non-Project buses in surveyed background heavy vehicles.*

Table 6.9: Total Peak Hour Traffic 2033 (vehicles per hour)

Site[A]	Location	Approved Project				Modified Project			
		Light Vehicles	Buses[B]	Heavy Vehicles	Total	Light Vehicles	Buses[B]	Heavy Vehicles	Total
1	The Bogan Way between Trundle and Fifield-Trundle Road	63	4	17	84	88	6	17	111
2	The Bogan Way between Bogan Gate and Middle Trundle Road	44	0	7	51	52	2	7	61
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	49	3	7	59	68	3	7	78
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	36	3	21	60	37	5	21	63
4	Platina Road/Fifield-Trundle Road between Road Upgrades and The Bogan Way	36	3	17	56	45	5	17	67
5	Fifield Road between Slee Street and Platina Road	72	9	51	132	62	11	49	122
6	Fifield Road between Platina Road and Springvale Road	37	6	32	75	46	6	30	82
7	Wilmatha Road between Fifield Road and Project access	53	6	27	86	36	8	25	69
8	Melrose Plains Road between Fifield Road and Wilmatha Road	2	0	0	2	2	0	0	2

[A] *Refer to Figure 3.5*

6.5 Intersection Performance

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.

The majority of intersections that would be used by traffic generated by the modified Project are T-intersections and so have fewer potentially conflicting movements than a cross intersection. Comparison between these threshold volumes and the peak hourly volumes on the key roads (Table 6.7 and Table 6.9) indicates that the forecast traffic volumes on all roads are well below the threshold volumes above, and as such, there is no capacity concerns regarding the operation of the intersections.

6.6 Road Operational Performance

The capacity of a road is the number of vehicles that can be accommodated on the road infrastructure before it fails to function as it was intended. Austroads (2020a) defines capacity as the maximum sustainable 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 is affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Austroads (2020a) provides guidelines for the assessment of the capacity and performance of two-lane, two-way rural roads that, in turn, refer to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016). Level of Service (LoS) represents road users' perceptions of the quality of service provided by a road link, and describes operational conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. Levels of Service are designated A through F, with LoS A providing the best traffic conditions, with no restriction on desired travel speed or overtaking. LoS B to D describes progressively worse traffic conditions. LoS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LoS E is taken as the capacity of a lane or roadway. In rural situations, LoS C is generally considered to be acceptable. At LoS C, most vehicles are travelling in platoons, and travel speeds are curtailed. At LoS D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low.

The LoS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road, and three classes of road are defined in the HCM. Class I roads are those on which motorists expect to travel at relatively high speeds, and 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.

On Class I roads, LoS is defined in terms of Percent Time Spent Following (PTSF) and Average Travel Speed (ATS), with the worst of these criteria being adopted as the LoS. On Class II roads, LoS is defined only in terms of PTSF. The PTSF is a measure of the level of opportunities to overtake, and is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. On Class III roads, LoS is defined in terms of Percent of Free-Flow Speed (PFFS), which is the ratio of ATS to the free-flow speed, representing the ability of vehicles to travel at or near the posted speed limit. The LoS criteria for two-lane roads are as shown in Table 6.10.

Table 6.10: Level of Service Criteria for Two-Lane, Two-Way Roads

Level of Service	Class I		Class II	Class III
	Average Travel Speed (km/h)	PTSF (percent)	PTSF (percent)	PFFS (percent)
A	> 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	≤ 60	≥ 80	≥ 85	≤ 66.7

Source: Austroads (2020a).

For the purpose of this review, the surveyed access routes have been considered as Class II routes, and based on the forecast traffic and assuming background traffic is typically 60% in the peak direction and 40% in the contrapeak direction. As a robust assessment, a higher than standard adjustment factor has been applied to all heavy vehicles in the traffic stream, to account for the use of larger heavy vehicles. The PTSF and resulting LoS at key locations have been determined and are summarised in Table 6.11 for the peak direction of travel, noting the PTSF in the contrapeak direction is lower than in the peak direction. The upgrades to the transport route are assumed to occur after the peak construction period.

Table 6.11: Project Peak Hour Midblock Levels of Service in Peak Direction

Site[A]	Location	Construction Phase (2023)		Operations Phase (2033)	
		PTSF	LoS	PTSF	LoS
1	The Bogan Way between Trundle and Fifield-Trundle Road	29.3	A	34.4	A
2	The Bogan Way between Bogan Gate and Middle Trundle Road	24.8	A	27.2	A
3	Middle Trundle Road between The Bogan Way and Henry Parkes Way	26.3	A	29.4	A
4	Platina Road/Fifield-Trundle Road between Fifield Road and Road Upgrades	32.5	A	24.3	A
4	Fifield-Trundle Road between Road Upgrades and The Bogan Way	24.6	A	30.2	A
5	Fifield Road between Slee Street and Platina Road	31.6	A	37.7	A
6	Fifield Road between Platina Road and Springvale Road	27.4	A	31.2	A
7	Wilmatha Road between Sunrise Lane and Project access	34.7	A	29.1	A
7	Wilmatha Road between Fifield Road and Sunrise Lane	24.8	A	29.1	A
8	Melrose Plains Road between Fifield Road and Wilmatha Road	14.8	A	14.8	A

[A] *Refer to Figure 3.5*

Table 6.11 demonstrates that the midblock LoS would be good at the key locations with the modified Project traffic during both the peak construction phase and longer term operational phase. Drivers would experience negligible restriction on their desired travel speed or overtaking.

As discussed (Section 3.5), there is potential for the Project construction traffic to coincide with traffic associated with construction of:

- the Quorn Park Solar Farm, generating up to 186 vehicle trips per day (30 vehicle trips during peak hours) on Henry Parkes Way between McGrath Lane and Parkes; and
- the Parkes Peaking Power Plant, generating up to 70 light and eight heavy vehicle trips per day on Henry Parkes Way between Pat Meredith Drive and Parkes during the peak construction period.

During construction, the modified Project would generate up to 188 vehicles per day and 29 vehicles per hour on that part of Henry Parkes Way on which the above projects may also generate traffic (Table 5.19).

Geolyse (2018) indicates that during 2017, Henry Parkes Way west of Moulden Street (approximately 2 km west of the Parkes CBD) carried approximately 1,400 vehicles per day, 137 vehicles per hour during the morning peak hour, and 156 vehicles per hour during the evening peak hour (all two way traffic). Assuming the same background growth rate described in Section 3.4, this could be expected to grow to approximately 1,577 vehicles per day and 176 vehicles per hour by 2023.

In the unlikely event that the peak construction activity of the Project coincided with that of the Quorn Park Solar Farm and Parkes Peaking Power Plant, the cumulative impact on Henry Parkes Way between Pat Meredith Drive and Parkes would be in the order of 452 vehicles per day. In the very unlikely event that not only do the peak construction phases coincide, but the peak hourly traffic generation of the three peak construction activities also coincide, the cumulative impact on Henry Parkes Way between Pat Meredith Drive and Parkes would be in the order of up to 94 vehicles per hour. On this basis, Henry Parkes Way would carry in the order of up to 270 vehicles per hour during the evening peak hour in 2023.

As noted, detailed forecasts of traffic associated with construction of the Parkes Bypass are not available, however if the above activities also coincided with construction of the Parkes Bypass, it could be expected that additional traffic may also occur on Henry Parkes Way between Parkes and the western extent of the Parkes Bypass works, near the Hartigan Avenue Extension. If the average 100 construction vehicles per day associated with the Parkes Bypass workforce all used Henry Parkes Way to and from Parkes during the same hour as the other construction traffic above, Henry Parkes Way would carry in the order of 370 vehicles per hour between the Hartigan Avenue Extension and Parkes. This remains well below the capacity of the road, and no potential issues regarding road performance are raised, noting that a traffic management plan will be implemented for the Parkes Bypass construction activities to minimise impacts to other traffic.

Considering the short term nature of each of the construction phases, and that each project would be subject to a Traffic Management Plan or a Construction Environmental Management Plan, the potential cumulative impacts should construction of the three projects coincide do not raise any concerns with regard to the operation of the road network.

6.7 Railway Level Crossings

There are two railway lines that operate in the vicinity of the Project, the Orange Broken Hill Railway operated by the Australian Rail Track Corporation (ARTC) and the Bogan Gate Tottenham Railway operated by John Holland Group Pty Ltd (John Holland).

There are railway level crossings at the following locations that will be used by Project-related vehicles:

- Henry Parkes Way approximately 5 km west of Parkes on the Orange Broken Hill Railway (active level crossing);

- Fifield Road just to the north of its intersection with Henry Parkes Way on the Orange Broken Hill Railway (active level crossing);
- Henry Parkes Way in Bogan Gate on the Bogan Gate Tottenham Railway (Give Way signs on the approach from both directions);
- The Bogan Way in three locations between Bogan Gate and Trundle on the Bogan Gate Tottenham Railway (Give Way signs on the approach from both directions);
- The Bogan Way south of Henry Parkes Way at Gunningbland on the Orange Broken Hill Railway (active level crossing);
- Fifield Road in Tullamore on the Bogan Gate Tottenham Railway (Give Way signs on the approach from both directions); and
- Scotson Lane near The Bogan Way on the Bogan Gate Tottenham Railway (Give Way signs on the approach from both directions).

The Modification would not significantly increase Project-related vehicles at these level crossings (Sections 6.1 and 6.2).

In addition, the Modification would not change the rail movements associated with the approved rail siding (i.e. an average of three trains per week, with a maximum of two trains per day).

Given the above, the Modification is therefore not expected to have a perceptible impact on the operation of these level crossings.

6.8 School Buses

A range of school bus services operate in the vicinity of the Project (Clean TeQ, 2019b).

SEM has developed a Traffic Management Plan (Clean TeQ, 2019b) for the Project in accordance with Condition 45, Schedule 3 of Development Consent (DA 374-11-00) that includes measures to minimise disruption to school bus services including radio communication between heavy vehicle and school bus operators.

It is recommended that the Traffic Management Plan be updated to incorporate the Modification.

6.9 Transport of Hazardous Goods

Prior to commissioning of the mine and processing facility a Transport of Hazardous Materials Study will be prepared in accordance with Condition 53(a), Schedule 3 of Development Consent (DA 374-11-00). The study will cover the transport of hazardous materials, including details of the routes to be used.

In addition, a Safety Management System will be prepared for the Project by SEM in accordance with Condition 53(c), Schedule 3 of Development Consent (DA 374-11-00). The Safety Management System will cover Project transport activities involving hazardous materials and include safety-related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to procedures.

6.10 Oversize Vehicles

A number of oversize vehicle movements may be generated on an occasional basis during the life of the modified Project. The proposed movement for any oversize vehicles would be negotiated with TfNSW and relevant local councils on a case-by-case basis.

All oversize loads would be transported with the relevant permits and load declarations obtained in accordance with *Additional Access Conditions Oversize and overmass heavy vehicles and loads* (TfNSW, 2020b), and any other licences and escorts as required by regulatory authorities.

6.11 Road Safety Impacts

The review of the road crash history of the routes that would be used by the modified Project traffic (Section 0) does not highlight any specific concerns regarding the safety of those routes or any specific location with a poor crash history.

Consistent with the Voluntary Planning Agreement for the approved Project, Road Safety Audits will be conducted on key Project routes.

The road and intersection upgrades for the approved Project will be designed and constructed in accordance with Austroads requirements to provide a safe road environment for all road users. Those upgrades would be revised as required for the modified Project, discussed in Section 7.

7 Mitigation Measures

A number of mitigation measures will be undertaken for the approved Project. The suitability of each of those measures to the forecast conditions with the modified Project have been reviewed to determine if any changes would be appropriate, and the findings are discussed in this section. Any relevant changes to the road or intersection upgrades noted in this section would be incorporated into a revision to the Road Upgrade and Maintenance Strategy (Clean TeQ, 2019a).

7.1 Road and Intersection Upgrades

7.1.1 Sunrise Lane Upgrade

For the approved Project, prior to commissioning of the accommodation camp, Sunrise Lane will be upgraded between the accommodation camp access road and Wilmatha Road to the following:

- all weather unsealed surface for an operating speed standard of 80 km/h; and
- carriageway width of 9 m (equivalent to two 3.5 m lanes and two 1.0 m wide shoulders).

This upgrade standard is consistent with a Class 4A unsealed road standard (ARRB, 2009), which is the highest road standard in the unsealed roads hierarchy. Class 4A unsealed roads carry an average of more than 150 vehicles per day, including large vehicles. Table 6.1 indicates that the approved Project would generate 614 vehicles per day on Sunrise Lane, while the modified Project would generate 278 vehicles per day on Sunrise Lane. The nominated upgrade for the approved Project is appropriate for the modified Project.

7.1.2 Transport Route Upgrade

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), a number of roads will be upgraded to the following standard:

- road pavement (8.0 m sealed pavement and 1.0 m gravel shoulders); and
- all private access roads (3.5 m sealed private access road approach and 3.0 m gravel shoulders along the road 30 m either side of all private access roads)

The roads to be upgraded include:

- Platina Road (between the Lachlan Shire boundary and Fifield Road);
- Fifield Road (between Platina Road and Slee St [in Fifield Village]);

- Wilmatha Road (between Slee St [in Fifield Village] and the mine and processing facility access); and
- Fifield Trundle Road (between The Bogan Way and the Parkes Shire boundary).

The upgraded general road standard allows for 3.5 m wide travel lanes, with a sealed shoulder 0.5 m wide and a gravel shoulder 1.0 m wide on each side of the road. This is consistent with the Austroads (2016) desirable carriageway widths for rural roads carrying more than 3,000 vehicles per day, and exceeds the minimum requirements for a designated heavy vehicle route.

Table 6.8 indicates that with both the approved and modified Project and with unrelated background changes in traffic conditions, traffic volumes on these roads would be at their greatest on Fifield Road between Slee Street and Platina Road. With the approved Project and background traffic changes, in 2033 this road is forecast to carry 913 vehicles per day, and the modified Project would carry 893 vehicles per day. Table 6.4 indicates that the modified Project would generate fewer bus and heavy vehicle movements per day on this part of the road than the approved Project.

The widened shoulders adjacent to private access roads will provide for school buses to stop clear of the travel lanes to allow children to board and disembark school buses when required. No change to this requirement is warranted by the modified Project.

The upgrade to the transport route nominated to be completed for the approved Project is therefore also considered to be appropriate for the modified Project.

7.1.3 Platina Road and Fifield Road Intersection Upgrade

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Platina Road and Fifield Road will be upgraded to Austroads standards.

For the modified Project, application of the Austroads (2020b) warrants for the major road treatments at rural road intersections indicates that the intersection would require the minimum Basic Left-Turn (BAL) and Basic Right-Turn (BAR) treatments. The rural BAL treatment on the major road has a widened shoulder, which assists turning vehicles to move further off the through carriageway, making it easier for through vehicles to pass. The rural BAR treatment features a widened shoulder on the major road that allows through vehicles, having slowed, to pass to the left of turning vehicles. The BAL treatment on the minor road allows turning movements to occur from a single lane, with a shoulder that is too narrow to be used by left-turning vehicles, so as to prevent vehicles from standing two abreast at the holding line. These design features are preferred to safely manage the movement of vehicles in the high-speed rural environment.

It is noted that GTA Consultants (2017) found that the highest demands may warrant consideration of altering the priority at that intersection, such that the southern approach of Fifield Road becomes the minor leg of the intersection. That assessment did not however allow for use of shuttle buses to transport the workforce. The modified Project would reduce the Project-generated traffic at the intersection to below that described in GTA Consultants (2017), and the distribution of vehicle movements would not warrant altering the priority at the intersection.

With the modified Project, it would be appropriate to upgrade the intersection to BAL and BAR standards, in accordance with Austroads guidelines, allowing for the swept paths of the Project-generated heavy vehicles, and upgrades to signage and linemarking as required to meet Austroads guidelines.

7.1.4 Fifield Road and Slee Street Intersection Upgrade

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Fifield Road and Slee Street (at the eastern end of Fifield Village) will be upgraded to Austroads standards for the transport route. This would generally be expected to require consideration of the swept paths of heavy vehicles turning between Slee Street and Fifield Road as part of the upgrade of the transport route described in Section 0.

The approved Project intersection upgrade is appropriate for the modified Project.

7.1.5 Slee Street, Wilmatha Road and Fifield Road Intersection Upgrade

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Slee Street, Wilmatha Road and Fifield Road (at the western end of Fifield Village) will be upgraded to Austroads standards as part of the upgrade of the transport route (Section 0). This is expected to include installation of advance warning signs on Slee Street, Fifield Road and Wilmatha Road approaches and appropriate signage and linemarking at the intersection to clarify priority.

The modified Project would contribute slightly lower volumes of traffic through this intersection compared with the approved Project, with most of the Project-generated traffic continuing to be moving between Wilmatha Road and Slee Street. The upgrades for the approved Project would remain appropriate for the modified Project.

7.1.6 Henry Parkes Way and Middle Trundle Road

With the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Henry Parkes Way and Middle Trundle Road will be upgraded, with a Channelised Right Short (CHR(S)) turn lane to be constructed in accordance with Austroads guidelines for basic rural intersection treatments.

Channelised treatments separate conflicting vehicle paths by raised or painted medians and/or islands, and often use auxiliary lanes in conjunction with channelisation. The CHR(S) treatment on the major road provides a continuous lane for through vehicles only, and a short auxiliary turn lane for right-turning vehicles only.

Application of the Austroads (2020b) warrants for the major road treatments at rural road intersections indicates that with the modified Project, the CHR(S) treatment would be appropriate for the intersection. No change to the upgrade for the approved Project would be required for the modified Project.

7.1.7 Henry Parkes Way and The Bogan Way Intersection Upgrade

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), signage and linemarking at the intersection of Henry Parkes Way and The Bogan Way at Bogan Gate will be upgraded in accordance with Austroads guidelines. The existing intersection has wide sealed and unsealed shoulders on Henry Parkes Way which allow for vehicles to pass a vehicle which has slowed to turn into The Bogan Way.

Project-generated traffic at that intersection will primarily consist of trucks transporting limestone between local quarries and the mine and processing facility, and buses and cars transporting workers between Forbes and the mine and processing facility. The upgrades to signage and linemarking to meet Austroads guidelines is appropriate for the modified Project.

7.1.8 Sunrise Lane and Wilmatha Road Intersection Upgrade

For the approved Project, the transition between the gravel and dirt surfaces will be removed while Wilmatha Road remains unsealed, then a minimum of 30 m of Sunrise Lane will be sealed on the approach to the intersection once Wilmatha Road is sealed prior to commissioning of the mine and processing facility (Section 7.1.2). This upgrade is appropriate for the modified Project traffic demands.

7.1.9 Fifield-Trundle Road and Limestone Quarry Access Intersection

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Fifield-Trundle Road and the Limestone Quarry Access will be constructed with a basic rural intersection treatment.

For both the approved and modified Project, the limestone would be sourced from a combination of the limestone quarry and other local quarries. The distribution of Project-generated traffic at this intersection will therefore change according to where limestone is being sourced. Trucks transporting limestone from local quarries near Parkes would travel along Fifield-Trundle Road through the intersection. Trucks transporting limestone from the limestone quarry would turn left into and right out of the limestone quarry access. The warranted major road treatment for both options has therefore been considered.

Application of the Austroads (2020b) warrants for the major road treatments at rural road intersections indicates that for the modified Project with the maximum of 560,000 tpa being sourced from local limestone quarries, and the balance of 430,000 tpa being sourced from the limestone quarry, the BAL and BAR treatments in Fifield-Trundle Road would be appropriate.

Application of the Austroads (2020b) warrants for the major road treatments at rural road intersections indicates that for the modified Project with the maximum of 790,000 tpa being sourced from the limestone quarry, and the balance of 200,000 tpa being sourced from the local quarries, the BAL and BAR treatments in Fifield-Trundle Road would be appropriate.

No change to this intersection upgrade for the approved Project would be required for the modified Project. As for the approved Project, the modified Project upgrade would take into account the swept paths of the heavy vehicles turning into and out of the limestone quarry in accordance with Austroads guidelines.

7.1.10 Wilmatha Road and Mine and Processing Facility Access Intersection

For the approved Project, prior to commissioning of the mine and processing facility (as defined in the Voluntary Planning Agreement), the intersection of Wilmatha Road with the access for the mine and processing facility will be constructed with a basic rural intersection treatment, with priority being between the mine and processing facility access and Wilmatha Road south.

The modified Project proposes that separate accesses be provided to separate the heavy vehicle movements from those of the light vehicles. A combined entry and exit access would be used by light vehicles and the shuttle buses transporting the workforce. Separate entry and exit accesses would be provided for the heavy vehicles transporting materials to and from the mine and processing facility. The general plant layout indicates that the heavy vehicle entry would be located approximately 50 m south of the light vehicle entry/exit, with heavy vehicles turning right from Wilmatha Road into the entry. The entry access would be angled at approximately 45 degrees to Wilmatha Road with sufficient width for five heavy vehicles to wait abreast before entering the weighbridge. The heavy vehicle exit would be located approximately 650 m south of the heavy vehicle entry, and would be aligned at 90 degrees to Wilmatha Road.

The combined entry/exit access would carry 82 light vehicles and 16 shuttle bus movements per day, with half being inbound and half outbound. The heavy vehicle entry access would carry 86 inbound heavy vehicles per day, and the heavy vehicle exit would carry 86 outbound heavy vehicles per day. Through traffic along Wilmatha Road unrelated to the modified Project is expected to remain low at approximately 37 vehicle trips per day (Table 3.4).

It is recommended that the intersection of Wilmatha Road with the heavy vehicle entry access be constructed with priority being for the movements between Wilmatha Road (south) and the heavy vehicle entry road. This would give priority to the laden trucks entering the mine and processing facility, so they would not need or slow or stop and restart just prior to entering the site if there is a southbound vehicle on Wilmatha Road. To achieve this, it is recommended that at the intersection, Wilmatha Road be aligned as a modified T-intersection such that southbound vehicles on Wilmatha Road perform a right turn (only) at the intersection, giving way to any heavy vehicle entering the mine site. Northbound vehicles along Wilmatha Road would perform a left turn at the intersection, however this may appropriately be designed as a through movement lane.

Similarly, it is recommended that the intersection of Wilmatha Road with the combined entry/exit access for light vehicles and shuttle buses be constructed with priority being for the movements between Wilmatha Road (south) and the mine and processing facility access. As for the heavy vehicle entry intersection, a modified T-intersection is recommended, which clearly defines the priority, with southbound vehicles along Wilmatha Road performing a right turn movement at the intersection and northbound vehicles along Wilmatha Road performing a left turn.

The heavy vehicle exit road intersection with Wilmatha Road would be appropriately constructed as a standard T-intersection, with the exit roadway being at 90 degrees to Wilmatha Road. The intersection design would take into consideration the swept path requirements of the exiting heavy vehicles turning from the exit onto Wilmatha Road.

Notwithstanding the above, it is noted that there are alternative intersection layouts that could be adopted. SEM would finalise the design of these intersections in consultation with the Lachlan Shire Council.

7.1.11 The Bogan Way, Fifield-Trundle Road and Scotson Lane Intersection

For the approved Project, prior to the commissioning of the rail siding, the intersection of The Bogan Way, Fifield-Trundle Road and Scotson Lane will be upgraded to a right-left staggered T-intersection layout with signage and line marking to Austroads standards.

The modified Project would generate a demand for 70 vehicles per day travelling between Scotson Lane and Fifield-Trundle Road compared with 54 vehicles per day for the approved Project. As intersection capacity is not a concern (Section 6.5), the right-left stagger intersection is suitable, noting that the stagger distance needs to be small enough to enable an efficient crossing manoeuvre across The Bogan Way, yet great enough to eliminate the possibility of high speed manoeuvres from the minor roads.

No change to the upgrade for the approved Project would be required for the modified Project. As for the approved Project, the upgrade would take into account the swept paths of the heavy vehicles turning between The Bogan Way and Fifield-Trundle Road, and between Scotson Lane and Fifield-Trundle Road in accordance with Austroads guidelines. Signage and linemarking will be in accordance with Austroads guidelines.

7.1.12 Scotson Lane Upgrade

Consistent with the upgrading of the transport route described in Section 7.1.2, it is appropriate to upgrade Scotson Lane between The Bogan Way and the modified rail siding access. The recommended upgraded general road standard allows for 3.5 m wide travel lanes, with a sealed shoulder 0.5 m wide and a gravel shoulder 1.0 m wide on each side of the road. This is consistent with the upgrade of the transport route (Section 7.1.2) and satisfies the Austroads (2016) requirements for a designated heavy vehicle route.

7.2 Road Maintenance Contributions

SEM will make road maintenance contributions in accordance with Development Consent (DA 374-11-00) and the Voluntary Planning Agreement.

SEM will also maintain Sunrise Lane (between the accommodation camp site access road and Wilmatha Road), to the satisfaction of Lachlan Shire Council, during the construction and operational phase of the Project.

No change to the above would be required by the modified Project.

7.3 Trundle Main Street

The review of the pedestrian environment along Forbes Street (The Bogan Way) through Trundle was undertaken with regard to the forecast conditions with the approved Project (GTA Consultants, 2018a). The recommendations from that study have been considered in the development of the Trundle Main Street Plan (King and Campbell, 2021).

For guidance, Table 7.1 compares the forecast Project-generated traffic on Forbes Street for the approved and modified Project for both the construction and ongoing operational stages. It should be noted that peak hours for Project-generated traffic (for both the approved and modified Project) would occur at the shift changeover times, so would occur earlier in the morning and later in the evening than the peaks associated with school and general local traffic in Trundle.

Table 7.1: Project-Generated Traffic on Forbes Street, Trundle

	Approved Project		Modified Project	
	Daily (vehicles per day)	Peak Hour (vehicles per hour)	Daily (vehicles per day)	Peak Hour (vehicles per hour)
Peak Construction Stage				
Light Vehicles	242	94	118	20
Buses	4	2	18	7
Heavy Vehicles	102	12	78	8
Total Vehicles	348	108	214	35
Operational Stage				
Light Vehicles	70	27	92	38
Buses	6	3	10	5
Heavy Vehicles	70	10	68	10
Total Vehicles	146	40	170	53

The change in traffic expected to use Forbes Street for the modified Project compared with the approved Project does not raise any issues with the recommendations of the Pedestrian Access Review (GTA Consultants, 2018a) or the development of the Trundle Main Street Plan (King and Campbell, 2021). In consultation with the Parkes Shire Council and TfNSW, SEM will implement any outstanding Forbes Street improvement works outlined in GTA Consultants (2018a) (Section 4.1).

7.4 Traffic Management Plan

In accordance with Condition 45, Schedule 3 of Development Consent (DA 374-11-00), a Traffic Management Plan has been developed for the approved Project and includes (Clean TeQ, 2019b):

- details of all transport routes and traffic types to be used for development-related traffic;
- a program to monitor and report on the amount of metal sulphate precipitate, scandium oxide and ammonium sulphate transported from the mine;
- a program to monitor and report on the amount of limestone transported from the limestone quarry and third party suppliers;
- the measures that would be implemented to:
  - minimise traffic safety issues and disruption to local users of the transport route/s during construction and decommissioning of the development, including:
    - temporary traffic controls, including detours and signage;
    - notifying the local community about development-related traffic impacts; and
    - a traffic management system for managing over-dimensional vehicles; and
  - operate shuttle bus services to transport employees to and from Parkes, Forbes and Condobolin;
  - operate high capacity trucks to transport limestone and other materials and products to and from the mine and processing facility;
- a Road Transport Protocol for all drivers transporting materials to and from the site with measures to:
  - ensure drivers adhere to the designated transport routes and prioritise the use of national, state and regional roads over local roads;
  - verify that these heavy vehicles are completely covered whilst in transit;
  - co-ordinate the staggering of heavy vehicle departures to minimise impacts on the road network, where practicable;
  - minimise disruption to school bus timetables and rail services;
  - ensure travelling stock access and right of way to the adjacent travelling stock route;
  - maintain radio communications between all school buses and heavy vehicle operators operating on the transport route between the rail siding and mine and processing facility, limestone quarry or third party limestone quarries and the mine and processing facility;

- manage worker fatigue during trips to and from the site;
- manage appropriate driver behaviour including adherence to speed limits, safe overtaking and maintaining appropriate distances between vehicles (i.e. a Driver Code of Conduct);
- inform drivers of relevant drug and alcohol policies;
- regularly inspect vehicles maintenance and safety records;
- implement contingency procedures when the transport route is disrupted;
- respond to emergencies;
- transport processing reagents safely;
- minimise disruption to community events and festivals, in consultation with event organisers;
- implement reasonable and feasible measures to minimise amenity impacts to local communities, including minimising night time truck movements and compression braking in urban areas as far as practicable; and
- ensure compliance with and enforcement of the protocol.

It is recommended that the Traffic Management Plan be updated to incorporate the Modification.

7.5 Road Upgrade and Maintenance Strategy

In accordance with Condition 43, Schedule 3 of Development Consent (DA 374-11-00), a Road Upgrade and Maintenance Strategy has been developed for the approved Project (Clean TeQ, 2019a) (Sections 4.1 and 4.2).

It is recommended that the Road Upgrade and Maintenance Strategy be updated to incorporate the Modification (Sections 7.1 and 7.2).

8 Conclusions

This study has found that the modified Project would have acceptable impacts on the operation of the road system. Implementation of the various mitigation measures for the approved Project, with some refinements for the modified Project, would result in no significant impacts to road performance, capacity, efficiency or safety arising as a result of the traffic associated with the modified Project.

The road and intersection upgrades required by Development Consent (DA 374-11-00) and the Voluntary Planning Agreement (including the Trundle main street pedestrian access upgrades) are appropriate for the modified Project noting that the approved Scotson Lane upgrade would be extended to the modififed rail siding access.

SEM will reach an agreement with the Lachlan Shire Council, Parkes Shire Council and Forbes Shire Council on funding and the timing of works as to any additional, specific road safety matters relevant to the Project as deemed necessary by the road safety audits conducted in accordance with the Voluntary Planning Agreement.

The road maintenance contributions required by Development Consent (DA 374-11-00) and the Voluntary Planning Agreement are also considered appropriate for the modified Project.

It is recommended that the Traffic Management Plan and the Road Upgrade and Maintenance Strategy be updated to incorporate the Modification.

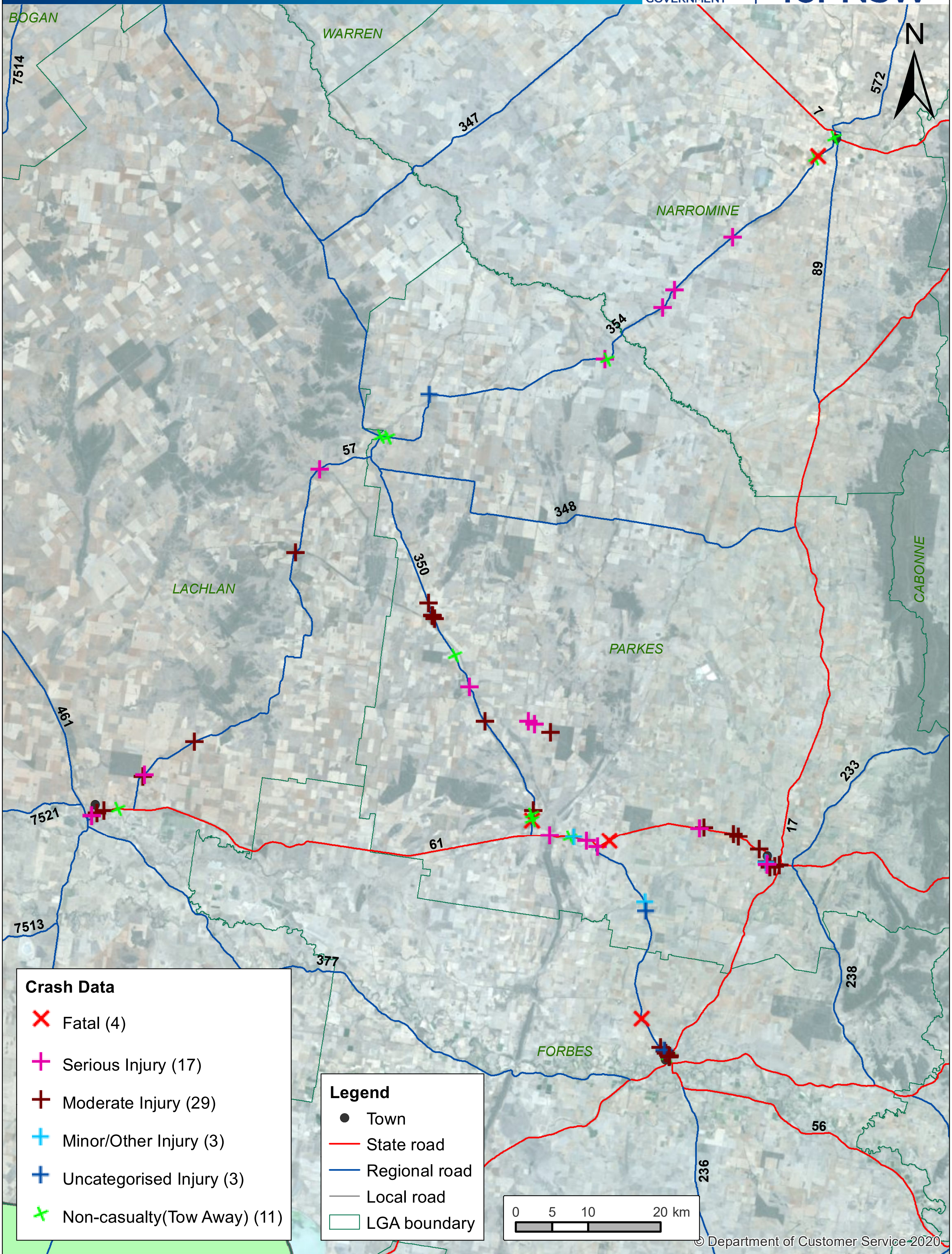
Appendix A

Road Crash History Summary

Title

All crashes 01.07.2014 to 31.07.2020p

Transport for NSW



Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
West Region																								
Forbes LGA																								
Forbes																								
Bogan Gate Rd																								
1224203	P	22/01/2020	Wed	15:00	80 m E	CHURCHILL ST	2WY	STR	Fine	Dry	80	1	4WD	M64	W in BOGAN GATE RD	60	Proceeding in lane	MC	0	0	2	0	0	F
E73629938							RUM:	71	Off rd left => obj				Drain/culvert											
Dowling St																								
1221511	P	31/10/2019	Thu	20:50	at	JOHNSON ST	XJN	STR	Fine	Dry	50	1	UTE	M44	E in JOHNSON ST	50	Proceeding in lane	MC	0	0	1	0	0	F
E72867438							RUM:	73	Off rd rght => obj				Signpost											
Johnson St																								
1224742	S	11/12/2019	Wed	07:50	at	BARTON ST	XJN	STR	Fine	Dry	50	2	4WD	M87	W in BARTON ST	Unk	Proceeding in lane	MC	0	0	1	0	0	
E611752191							RUM:	10	Cross traffic				4WD	F36	S in JOHNSON ST	Unk	Proceeding in lane							
1177114	S	25/07/2018	Wed	20:45	at	BLACK ST	TJN	STR	Fine	Dry	50	2	TKU	M22	W in JOHNSON ST	Unk	Proceeding in lane	MC	0	0	2	0	0	
E70106780							RUM:	32	Right rear				CAR	F73	W in JOHNSON ST	0	Wait turn right							
1249384	P	23/09/2020	Wed	16:00	at	FARNELL ST	XJN	STR	Fine	Dry	50	2	CAR	F34	E in FARNELL ST	10	Proceeding in lane	UC	0	0	0	0	1	
E75812432							RUM:	10	Cross traffic				M/C	M58	S in JOHNSON ST	50	Proceeding in lane							
1117279	S	07/09/2016	Wed	12:20	at	FARRAND ST	XJN	STR	Fine	Dry	50	2	CAR	M29	W in JOHNSON ST	Unk	Proceeding in lane	NC	0	0	0	0	0	
E60923560							RUM:	32	Right rear				CAR	F54	W in JOHNSON ST	Unk	Turning right							
Newell Hwy																								
1095740	P	28/02/2016	Sun	20:30	at	DOWLING ST	TJN	CRV	Fine	Dry	50	3	TRK	M25	S in NEWELL HWY	25	Proceeding in lane	MC	0	0	4	0	0	
E60334732							RUM:	30	Rear end				VAN	F20	S in NEWELL HWY	0	Stationary							
													BDBL	U U	S in NEWELL HWY	0	Stationary							
1114936	P	10/09/2016	Sat	20:25	at	DOWLING ST	TJN	STR	Fine	Dry	50	2	CAR	M25	S in NEWELL HWY	10	Turning right	MC	0	0	1	0	0	
E62644862							RUM:	21	Right through				CAR	F25	N in NEWELL HWY	10	Proceeding in lane							
1156469	P	17/11/2017	Fri	20:44	at	SHERRIFF ST	TJN	STR	Raining	Wet	50	2	CAR	M21	S in NEWELL HWY	10	Turning right	MC	0	0	1	0	0	
E68986367							RUM:	21	Right through				CAR	F71	N in NEWELL HWY	15	Proceeding in lane							
1184902	P	24/10/2018	Wed	11:05	at	SHERRIFF ST	TJN	STR	Fine	Dry	50	2	TKU	F21	S in NEWELL HWY	20	Turning right	MC	0	0	1	0	0	
E68594170							RUM:	21	Right through				TKU	M67	N in NEWELL HWY	20	Proceeding in lane							
The Bogan Way																								
1161876	P	18/02/2018	Sun	04:20	300 m S	YARRABANDAI RD	2WY	CRV	Fine	Dry	100	1	UTE	M19	N in THE BOGAN WAY	180	Proceeding in lane	FC	1	0	0	0	0	S
E67704241							RUM:	83	Off rt/rt bnd=>obj				Fence											
Lachlan LGA																								
Condobolin																								
Denison St																								

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S	Factors F
1187119	P	12/10/2018	Fri	19:12	at	BP SERVICE STATION ENT	2WY	CRV	Raining	Wet	50	2	WAG	M54	E in DENISON ST	15	Forward from drive	SC	0	1	0	0	0		
E69356972							RUM:	47	Emerging from drive				LOR	M23	N in DENISON ST	40	Proceeding in lane								
1120380	P	17/11/2016	Thu	06:45	at	MOLONG ST	XJN	STR	Fine	Dry	50	2	TRK	M19	E in MOLONG ST	900	Proceeding in lane	MC	0	0	2	0	0	S	
E65224884							RUM:	10	Cross traffic				4WD	M56	N in DENISON ST	50	Proceeding in lane								
1172430	P	04/05/2018	Fri	07:50	30 m S	MOLONG ST	2WY	STR	Fine	Wet	50	2	TKU	M42	E in DENISON ST	5	Reverse from drive	SC	0	1	0	0	0		
E66821009							RUM:	0	Ped nearside				PED	M55	W in DENISON ST		Walk across carriageway								
Fifield Rd																									
1158302	P	29/10/2017	Sun	12:00	at	CARLISLE RD	XJN	STR	Fine	Dry	100	2	TRK	M76	S in CARLISLE RD	60	Proceeding in lane	MC	0	0	2	0	0	S	
E66143664							RUM:	10	Cross traffic				TRK	F25	W in FIFIELD RD	95	Proceeding in lane								
1197107	P	15/03/2019	Fri	12:50	850 m N	SPRINGVALE RD	2WY	STR	Fine	Dry	100	1	CAR	M23	S in FIFIELD RD	100	Proceeding in lane	SC	0	1	0	0	0		F
E70343345							RUM:	71	Off rd left => obj				Tree/bush												
1207370	P	04/07/2019	Thu	21:00	20 km S	TRUNDLE RD	2WY	CRV	Fine	Dry	100	2	BDBL	U U	S in FIFIELD RD	Unk	Incorrect side	MC	0	0	1	0	0		
E70733009							RUM:	20	Head on				TKU	F39	N in FIFIELD RD	80	Proceeding in lane								
Henry Parkes Way																									
1170704	P	23/03/2018	Fri	15:00	300 m E	AERODROME RD	2WY	STR	Fine	Dry	100	2	CAR	U U	W in HENRY PARKES WAY	Unk	Proceeding in lane	NC	0	0	0	0	0		
E67392248							RUM:	30	Rear end				TKU	M51	W in HENRY PARKES WAY	90	Proceeding in lane								
1163842	P	18/01/2018	Thu	16:45	at	NUMBER 42 HN	2WY	STR	Fine	Dry	60	1	SEM	M70	E in HENRY PARKES WAY	40	Proceeding in lane	MC	0	0	1	0	0		
E66495845							RUM:	73	Off rd rght => obj				Tree/bush												
Jones Lane																									
1151947	P	01/09/2017	Fri	15:15	30 m S	MAITLAND ST	2WY	STR	Fine	Dry	50	2	SEM	M49	S in JONES LANE	30	Proceeding in lane	MC	0	0	1	0	0		
E65688266							RUM:	92	Struck train				TRN	M50	W in JONES LANE		Other manoeuvre								
Fifield																									
Fifield Rd																									
1156166	P	12/08/2017	Sat	10:30	20 km W	TULLAMORE TN	2WY	STR	Fine	Dry	100	1	M/C	M20	E in FIFIELD RD	90	Proceeding in lane	MC	0	0	1	0	0		
E65489966							RUM:	67	Struck animal				Kangaroo												
Tullamore																									
The Bogan Way																									
1086519	P	19/10/2015	Mon	15:40	7.6 km W	CARDIGAN ST	2WY	STR	Fine	Dry	100	1	BDBL	M58	W in THE BOGAN WAY	80	Proceeding in lane	SC	0	1	0	0	0		
E58675370							RUM:	71	Off rd left => obj				Tree/bush												

Narromine LGA

Narromine

Dandaloo St

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S	Factors F
1178261	S	13/08/2018	Mon	13:15		at DERRIBONG AVE	XJN	STR	Fine	Dry	50	1	RDTR	M27	N in DERRIBONG AVE	Unk	Turning right	NC	0	0	0	0	0	S	
E68853733							RUM:	88	Out of cont on bend																
The Mcgrane Way																									
1217023	P	26/10/2019	Sat	10:16	10 m	S BELMONT RD	TJN	STR	Fine	Dry	110	1	BDBL	M64	N in THE MCGRANE WAY	80	Proceeding in lane	SC	0	1	0	0	0		
E73020162							RUM:	70	Off road to left																
1206929	P	27/05/2019	Mon	17:15	30 km	S NARROMINE TN	2WY	STR	Fine	Dry	110	1	UTE	M19	S in THE MCGRANE WAY	100	Proceeding in lane	SC	0	1	0	0	0		F
E71485264							RUM:	71	Off rd left => obj				Tree/bush												
1187465	P	20/11/2018	Tue	16:10	33 km	S NARROMINE TN	2WY	CRV	Overcast	Dry	100	1	BDBL	M53	S in THE MCGRANE WAY	75	Proceeding in lane	SC	0	1	0	0	0	S	
E135629402							RUM:	88	Out of cont on bend																
1079894	P	23/09/2015	Wed	17:15		at RAILWAY LX	2WY	CRV	Fine	Dry	100	2	BDBL	M46	E in THE MCGRANE WAY	100	Proceeding in lane	FC	1	0	1	0	0	S	
E58966145							RUM:	92	Struck train				TRN	M36	S in THE MCGRANE WAY		Other manoeuvre								
1155037	S	16/11/2017	Thu	22:00	100 m	S WILSONS LANE	2WY	STR	Overcast	Wet	100	1	TRK	M43	S in THE MCGRANE WAY	Unk	Proceeding in lane	NC	0	0	0	0	0		
E65875813							RUM:	67	Struck animal				Straying stock												
Parkes LGA																									
Bogan Gate																									
Henry Parkes Way																									
1116776	S	27/09/2016	Tue	15:15	5 km	E BOGAN GATE TN	2WY	STR	Fine	Dry	100	1	BDBL	F34	E in HENRY PARKES WAY	Unk	Proceeding in lane	NC	0	0	0	0	0		
E62019337							RUM:	72	Off road to right																
1076103	S	12/08/2015	Wed	14:15	1 km	W PARKES TN	2WY	STR	Raining	Wet	100	1	CAR	M33	E in HENRY PARKES WAY	Unk	Proceeding in lane	OC	0	0	0	1	0		
E58902561							RUM:	71	Off rd left => obj				Tree/bush												
1164775	P	03/02/2018	Sat	05:30	40 m	W RAWSON RD	2WY	CRV	Fine	Dry	100	1	CAR	M42	E in HENRY PARKES WAY	100	Proceeding in lane	SC	0	1	0	0	0	S	
E66618640							RUM:	80	Off left/right bend																
Middle Trundle Rd																									
1198780	P	22/01/2019	Tue	06:00	10 km	E THE BOGAN WAY	2WY	STR	Fine	Dry	100	1	CAR	F20	E in MIDDLE TRUNDLE RD	100	Proceeding in lane	MC	0	0	1	0	0		
E72514084							RUM:	67	Struck animal				Kangaroo												
The Bogan Way																									
1115044	P	09/09/2016	Fri	21:00	2 km	N BLACK RANGE RD	2WY	STR	Raining	Wet	100	1	TRK	M48	S in THE BOGAN WAY	Unk	Proceeding in lane	NC	0	0	0	0	0		F
E62824267							RUM:	73	Off rd rght => obj				Tree/bush												
1123954	P	12/01/2017	Thu	21:50	1 km	N RAWSON RD	2WY	STR	Fine	Dry	100	1	TRK	M29	N in THE BOGAN WAY	Unk	Proceeding in lane	FC	1	1	0	0	0		
E63253440							RUM:	74	On road-out of cont.																
1119023	S	30/10/2016	Sun	17:00	3 km	N STATION ST	2WY	STR	Overcast	Dry	100	1	UTE	M26	S in THE BOGAN WAY	Unk	Proceeding in lane	NC	0	0	0	0	0		
E62495923							RUM:	72	Off road to right																
1146049	P	06/08/2017	Sun	15:15	55 km	S TULLAMORE TN	2WY	STR	Unk	Dry	100	1	4WD	M80	N in THE BOGAN WAY	100	Proceeding in lane	MC	0	0	1	0	0		F
E65372176							RUM:	72	Off road to right																

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
Gunningbland																								
Henry Parkes Way																								
1138991	P	20/04/2017	Thu	20:40	1.8 km W	BOGAN GATE RD	2WY	CRV	Fine	Dry	100	1	UTE	M52	W in HENRY PARKES WAY	100	Proceeding in lane	SC	0	1	0	0	0	S
E63127260							RUM:	83	Off rt/rt bnd=>obj				Tree/bush											
1190741	P	23/01/2019	Wed	19:00	1.6 km W	LYNTON LANE	2WY	STR	Overcast	Dry	100	1	CAR	F47	W in HENRY PARKES WAY	100	Proceeding in lane	FC	1	0	0	0	0	S
E136839102							RUM:	71	Off rd left => obj				Drain/culvert											
The Bogan Way																								
1209830	P	10/08/2019	Sat	15:30	140 m S	HENRY PARKES WAY	2WY	CRV	Raining	Wet	100	1	M/C	M53	N in THE BOGAN WAY	60	Proceeding in lane	SC	0	1	0	0	0	S
E72380115							RUM:	85	Off rt/lft bnd=>obj				Tree/bush											
Nelungaloo																								
The Bogan Way																								
1246379	P	06/10/2020	Tue	14:30	20 km N	FORBES TN	2WY	STR	Fine	Dry	100	1	4WD	F66	N in THE BOGAN WAY	90	Proceeding in lane	UC	0	0	0	0	1	F
E75770012							RUM:	71	Off rd left => obj				Tree/bush											
1147091	P	23/08/2017	Wed	08:00	100 m S	NELUNGALOO RD	2WY	STR	Fine	Dry	80	1	4WD	M39	S in THE BOGAN WAY	90	Pull out opposite	OC	0	0	0	1	0	S
E65343407							RUM:	51	Out of control otake															
Parkes																								
Hartigan Ave																								
1112804	P	18/08/2016	Thu	16:15	at	BEST ST	TJN	STR	Fine	Dry	50	2	CAR	F69	W in HARTIGAN AVE	20	Turning right	MC	0	0	1	0	0	
E61119120							RUM:	13	Right near				CAR	F32	S in BEST ST	0	Stationary							
1224069	P	11/01/2020	Sat	08:00	at	BILLY MAC PL	TJN	CRV	Fine	Dry	50	1	ATKR	M29	N in HARTIGAN AVE	Unk	Proceeding in lane	OC	0	0	0	1	0	S
E286840996							RUM:	81	Off left/rt bnd=>obj				Embankment											
1235094	P	03/06/2020	Wed	19:19	100 m S	BILLY MAC PL	2WY	CRV	Fine	Dry	50	1	TKU	M26	S in HARTIGAN AVE	100	Proceeding in lane	SC	0	1	0	0	0	S
E73554160							RUM:	84	Off right/left bend															
1169177	S	27/04/2018	Fri	17:22	at	LONDON RD	TJN	CRV	Fine	Dry	50	2	WAG	M32	N in LONDON RD	Unk	Proceeding in lane	MC	0	0	1	0	0	
E238954098							RUM:	30	Rear end				4WD	M60	N in LONDON RD	0	Stationary							
1220316	P	22/10/2019	Tue	16:00	500 m W	LONDON RD	2WY	STR	Fine	Dry	50	1	CAR	F19	W in HARTIGAN AVE	Unk	Proceeding in lane	SC	0	1	0	0	0	
E72835472							RUM:	71	Off rd left => obj				Tree/bush											
Henry Parkes Way																								
1233695	P	29/04/2020	Wed	10:00	2.1 km W	MCGRATH LANE	2WY	CRV	Raining	Wet	100	1	WAG	M74	W in HENRY PARKES WAY	80	Proceeding in lane	SC	0	1	0	0	0	S
E73521309							RUM:	80	Off left/right bend															
1185444	P	28/10/2018	Sun	04:00	100 m W	MILLERS LOOKOUT RD	2WY	STR	Fine	Dry	100	1	4WD	M19	E in HENRY PARKES WAY	100	Proceeding in lane	MC	0	0	1	0	0	F
E69667728							RUM:	74	On road-out of cont.															
1155716	P	10/10/2017	Tue	23:45	1 km W	MOULDEN ST	2WY	STR	Fine	Dry	100	1	BDBL	M40	W in HENRY PARKES WAY	95	Proceeding in lane	MC	0	0	1	0	0	
E65364644							RUM:	70	Off road to left															

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S	F
1205117	P	30/04/2019	Tue	18:00	10 km W	PARKES TN	2WY	CRV	Fine	Dry	100	1	4WD	F22	E in HENRY PARKES WAY	100	Proceeding in lane	MC	0	0	1	0	0		
E71677557							RUM:	67	Struck animal				Kangaroo												
1197860	P	08/02/2019	Fri	19:30	Unk Unk	UNKNOWN UK	2WY	STR	Overcast	Dry	100	1	CAR	F25	E in HENRY PARKES WAY	100	Proceeding in lane	MC	0	0	1	0	0		F
E72066187							RUM:	74	On road-out of cont.																
Newell Hwy																									
1145981	P	09/08/2017	Wed	20:20	at	HARTIGAN AVE	XJN	CRV	Fine	Dry	50	2	CAR	F68	E in HARTIGAN AVE	15	Turning right	MC	0	0	1	0	0		
E284360594							RUM:	21	Right through				MSC	M22	W in HARTIGAN AVE	30	Proceeding in lane								
Westlime Rd																									
1200450	S	22/02/2019	Fri	10:05	at	BROLGAN RD	XJN	STR	Fine	Dry	50	2	TKU	F60	E in BROLGAN RD	Unk	Proceeding in lane	MC	0	0	1	0	0		
E427090892							RUM:	10	Cross traffic				TKU	M28	S in WESTLIME RD	Unk	Proceeding in lane								
Trundle																									
Forbes St																									
1125630	P	15/12/2016	Thu	15:00	20 m N	PARKES ST	2WY	STR	Fine	Dry	50	4	CAR	F85	S in FORBES ST	75	Proceeding in lane	SC	0	1	1	2	0	S	
E63669879							RUM:	71	Off rd left => obj				CAR	M69	W in FORBES ST	0	Parked								
													TRK		W in FORBES ST	0	Stationary								
													4WD		W in FORBES ST	0	Parked								
Middle Trundle Rd																									
1193288	P	28/10/2018	Sun	11:50	1.05 km E	DOREENS LANE	2WY	CRV	Fine	Dry	100	1	CAR	F69	W in MIDDLE TRUNDLE RD	Unk	Proceeding in lane	SC	0	1	0	0	0	S	
E70016665							RUM:	87	Off lft/lft bnd=>obj				Drain/culvert												
1165332	P	02/03/2018	Fri	14:21	2 km E	DOREENS LANE	2WY	STR	Fine	Dry	100	1	WAG	F48	E in MIDDLE TRUNDLE RD	80	Proceeding in lane	SC	0	1	0	0	0		
E67387421							RUM:	71	Off rd left => obj				Tree/bush												
The Bogan Way																									
1211481	P	05/08/2019	Mon	19:00	2 km N	CAPELL RD	2WY	STR	Fine	Dry	100	1	TKU	M33	S in THE BOGAN WAY	80	Proceeding in lane	MC	0	0	1	0	0		F
E71385805							RUM:	73	Off rd rght => obj				Drain/culvert												
1108031	P	28/05/2016	Sat	11:14	1 km S	MIDDLETRUNDLE RD	2WY	STR	Overcast	Wet	100	1	4WD	F21	S in THE BOGAN WAY	90	Proceeding in lane	MC	0	0	1	0	0		
E60895037							RUM:	73	Off rd rght => obj				Tree/bush												
1165166	P	26/02/2018	Mon	11:05	3.2 km N	NUMULLA RD	2WY	CRV	Fine	Dry	100	1	LOR	M28	S in THE BOGAN WAY	100	Proceeding in lane	NC	0	0	0	0	0		
E1020791390							RUM:	80	Off left/right bend																
1204127	P	11/04/2019	Thu	09:30	1 km S	ROCKLEA RD	2WY	CRV	Fine	Dry	100	1	CAR	F32	N in THE BOGAN WAY	100	Proceeding in lane	MC	0	0	1	0	0	S	
E137087601							RUM:	85	Off rt/lft bnd=>obj				Tree/bush												
1111718	P	18/07/2016	Mon	18:36	9 km N	TRUNDLE TN	2WY	STR	Fine	Dry	100	1	TRK	M20	S in THE BOGAN WAY	80	Proceeding in lane	MC	0	0	1	0	0		
E61672913							RUM:	67	Struck animal				Straying stock												
1186045	P	26/09/2018	Wed	07:00	10 km N	TRUNDLE TN	2WY	STR	Fine	Dry	100	1	CAR	F32	N in THE BOGAN WAY	Unk	Proceeding in lane	MC	0	0	1	0	0		
E133389301							RUM:	73	Off rd rght => obj				Drain/culvert												

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
Tullamore																									
The Bogan Way																									
1074654	P	15/07/2015	Wed	06:00		at	THE MCGRANE WAY	TJN	STR	Overcast	Wet	100	1	BDBL	M39	N in THE BOGAN WAY	90	Proceeding in lane	NC	0	0	0	0	0	
E58390647								RUM:	75	Off end of road				Signpost											
The Mcgrane Way																									
1160139	S	07/01/2018	Sun	21:53	3 km	W	BULGANDRAMINE RD	2WY	STR	Overcast	Wet	100	1	BDBL	M49	E in THE MCGRANE WAY	Unk	Proceeding in lane	NC	0	0	0	0	0	
E66272304								RUM:	70	Off road to left															
1212366	P	08/09/2019	Sun	02:15	1 km	E	CARDIGAN ST	2WY	STR	Fine	Dry	100	2	CAR	M57	E in THE MCGRANE WAY	Unk	Pull out opposite	NC	0	0	0	0	0	
E73261368								RUM:	53	Overtake turning				4WD	M70	E in THE MCGRANE WAY	5	Turning right							
1219021	P	31/10/2019	Thu	08:50	250 m	E	CURRA LANE	2WY	CRV	Fine	Dry	100	1	SEM	M59	E in THE MCGRANE WAY	Unk	Proceeding in lane	SC	0	1	0	0	0	S F
E72290024								RUM:	80	Off left/right bend															
1252533	P	01/11/2020	Sun	13:30	150 m	S	NEW PARK LANE	2WY	CRV	Fine	Dry	100	1	SEM	M30	S in THE MCGRANE WAY	60	Proceeding in lane	UC	0	0	0	0	1	S
E76433832								RUM:	87	Off lft/lft bnd=>obj				Signpost											

Report Totals: Crashes: 67 Fatal Crashes(FC): 4 Serious Injury Crashes(SC): 17 Moderate Injury Crashes(MC): 29 Minor/Other Injury Crashes(OC): 3 Uncategorised Injury Crashes(UC): 3 Non-Casualty Crashes(NC): 11

Killed(K): 4 Seriously Injured(S): 18 Moderately Injured(M): 38 Minor/Other Injured(O): 5 Uncategorised Injured(U): 3

Crashid dataset Fifield Area Crashes 01.07.2015 to 07.03.2021p

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 & 2020 Q3 onwards contain uncategorised inj crashes.

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