APPENDIX D

Traffic Assessment Report

South32 Illawarra Metallurgical Coal
APPIN MINE VENTILATION AND ACCESS PROJECT

MENANGLE

TRAFFIC ASSESSMENT

REPORT

Ref. 20087r2
Assessment

31 May 2021

Prepared By

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EXECUTIVE SUMMARY

1. *This report documents the traffic impacts for the Appin Mine Ventilation and Access Project on Menangle Road, Menangle.*

2. *The Project involves the construction and operation of Ventilation Shafts 7 and 8, together with mine access facilities and associated infrastructure, including car parking and access roads.*

3. *As part of the Project a new Site Entrance intersection will be constructed on Menangle Road north of Finns Road. The intersection will include a left turn auxiliary lane and a right turn bay (CHR treatment) on Menangle Road for left and right turns into the Site. The intersection will be designed and constructed to Austroads Standards.*

4. *Once operational in 2025 the worst case day from a traffic perspective would be when a workforce of up to 308 people will access the Site on a maintenance weekday (1 day per week) over 3 shifts. A significant proportion of this workforce will be existing employees/contractors who currently access the mine via a different mine access facility.*

5. *Heavy vehicles associated with deliveries and maintenance in the operational phase are expected to number 12 trucks per day (i.e. 12 in/12 out) and will typically be rigid trucks and 19 metre articulated vehicles.*

6. *The assessment of the traffic impacts, including the cumulative impacts in the operational phase, has found that the traffic impacts will be satisfactory, with the Site Entrance intersection as well as the adjacent intersections on the road network all operating at a good level of service, with the Project in place.*

7. *The Project will have sufficient car parking to accommodate employees and visitors including at shift change over times.*

8. *The internal roads and car parking will be designed and constructed to AS2890.1, AS2890.2 and AS2890.6 standards as appropriate.*

9. *Construction is expected to commence in July 2022 with the ventilation shafts completed by June 2024. Construction of the mine access infrastructure will take an additional 6-12 months and is planned to commence July 2024.*

10. *Following approval, South32 Illawarra Metallurgical Coal will prepare relevant environmental management plans including a Traffic Management Plan to manage the impacts of the construction of site infrastructure, including the construction of the Site Access Intersection.*

11. *The Project is not expected to have any negative impacts on other road users including pedestrians, cyclists and public transport vehicles (buses) and/or on road safety.*

GLOSSARY

ADT	-	Average Daily Volume (7 day average)
AWT	-	Average Weekday Volume (5 day average)
AUL	-	Auxiliary left turn lane treatment
AUR	-	Auxiliary right turn lane treatment
AVD	-	Average vehicle delay per vehicle in seconds
BAL	-	Basic left turn treatment
BAR	-	Basic right turn treatment
CHR	-	Channelised right treatment/lane
DPIE	-	Department of Planning, Industry and Environment
DS	-	Degree of Saturation, a measure of intersection performance based on the ratio of demand flow to capacity
HMD	-	Highest Movement Delay per Vehicle in Seconds
Light Vehicles	-	Austroads 1 and 2 vehicle classifications and motorbikes
LS	-	Level of Service, a measure of intersection performance based on vehicle delay. There are six levels of service from A to F, where Level of Service A represents very good conditions and spare capacity and Level of Service F represents oversaturated conditions.
Heavy Vehicles	-	Austroads 3-12 vehicle classifications
SIDRA	-	SIDRA Intersection Traffic Model
TfNSW	-	Transport for NSW (previously Roads and Maritime Services NSW)
vpd	-	Vehicles per day
vph	-	Vehicles per hour
95^{th}% queue	-	95^{th} percentile queue length in metres

1.0 INTRODUCTION

1.1 Overview and Background

The Appin Mine (the Mine) is an existing underground coal mine situated in the Southern Coalfield of New South Wales (NSW) approximately 25 kilometres north-west of Wollongong. The Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd, which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

IMC received Project Approval 08_0150 (the Appin Mine approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011 for current and proposed mining of the Bulli Seam Operations (BSO). The Appin Mine approval was gazetted as a State Significant Development for the purposes of future modifications on 23 November 2018.

IMC is seeking to modify the existing Appin Mine approval, pursuant to Section 4.55(2) of the NSW *Environment Planning and Assessment Act 1979* (EP&A Act), to incorporate the construction and operation of infrastructure critical to the ongoing viability of the Mine referred to as the Appin Mine Ventilation and Access Project (hereafter referred to as the Project).

1.2 Structure of Report and Standards Used in Assessment

This report has been prepared to assess the traffic impacts associated with the Project and will inform the preparation of the Modification Application.

The assessment has been undertaken in accordance with the requirements of Roads and Traffic Authority now TfNSW *Guide to Traffic Generating Developments October 2002*.

Other technical standards/publications referenced in this assessment include:

- Austroads Guide to Road Design and RMS supplements.
- Austroads Guide to Traffic Management and RMS supplements.
- Austroads Guide to Traffic Management Part 12. Traffic Impacts of Developments.

The remaining sections of this report address the following;

- Section 2 – describes the Project;
- Section 3 – examines the existing traffic conditions on the road network;
- Section 4 – evaluates the traffic impacts of the Project; and
- Section 5 – presents conclusions.

2.0 PROJECT

2.1 Existing Operations

The Appin Mine approval incorporates the underground longwall mining operations, which extract coal from the Bulli Seam using underground longwall mining methods, and the associated surface activities. The Mine primarily produces hard coking (metallurgical) coal and has an approved operational capacity of up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 2041.

Longwall mining is currently being undertaken in the approved mining areas, Area 9 and Area 7, following completion of longwall mining activities at West Cliff Colliery in early 2016. Key surface facilities at the Mine include the:

- Appin East Colliery (Appin East);
- Appin West Colliery (Appin West);
- Appin North Colliery (Appin North);
- West Cliff Coal Preparation Plant (WCCPP);
- West Cliff Emplacement Area (WCEA);
- Appin East No. 1 and No. 2 ventilation shaft site;
- Appin East No. 3 ventilation shaft site;
- Appin West No. 6 ventilation shaft site; and
- Douglas Park substation site.

ROM coal is extracted from the Appin underground mining operations and delivered directly to the WCCPP by winder and conveyor, or is transported from Appin East via truck along Appin and Wedderburn Roads to the WCCPP. Processed coal (clean coal product) from the WCCPP is transported by road to the Port Kembla Coal Terminal (PKCT) for shipping to domestic and international customers, or to BlueScope Steel or other local customers.

The Mine is accessed via the shaft at Appin West and drifts at Appin North and Appin East. The Mine is ventilated by two distinct ventilation districts; Appin Mine and Appin North. The Appin Mine district is ventilated by two upcast shafts (No. 2 and No. 6), four downcast shafts (No. 1, No. 3, No. 4, and No. 5) and two intake drifts at Appin East. The Appin North district is ventilated by one upcast shaft (No. 1), one downcast shaft (No. 2) and one intake drift at Appin North.

2.2 Proposed Modification

2.2.1 Project Area (the Site)

The Project Area (hereafter referred to as the Site) is approximately 35km northwest of Wollongong and 8km northwest of Appin (**Figure 1**). The township of Menangle is located approximately 1.3km to the northeast of the Site. The Site is located on land owned by IMC, within the Bulli Seam Operations Project Longwall Mining Area and within the South Campbelltown Mine Subsidence District in the Southern Coalfield of NSW.

The Site will incorporate Ventilation Shaft 7, Ventilation Shaft 8, mine access facilities and additional areas for associated works and infrastructure, such as the construction site access and the provision of services to the Site. The boundary of the Site and the extent of the assessment area are shown on **Figure 2**.

Infrastructure that will be developed on the Site will be positioned to align with the approved layout of the underground workings for Appin Area 7 (**Figure 3A**) to be proximal to required

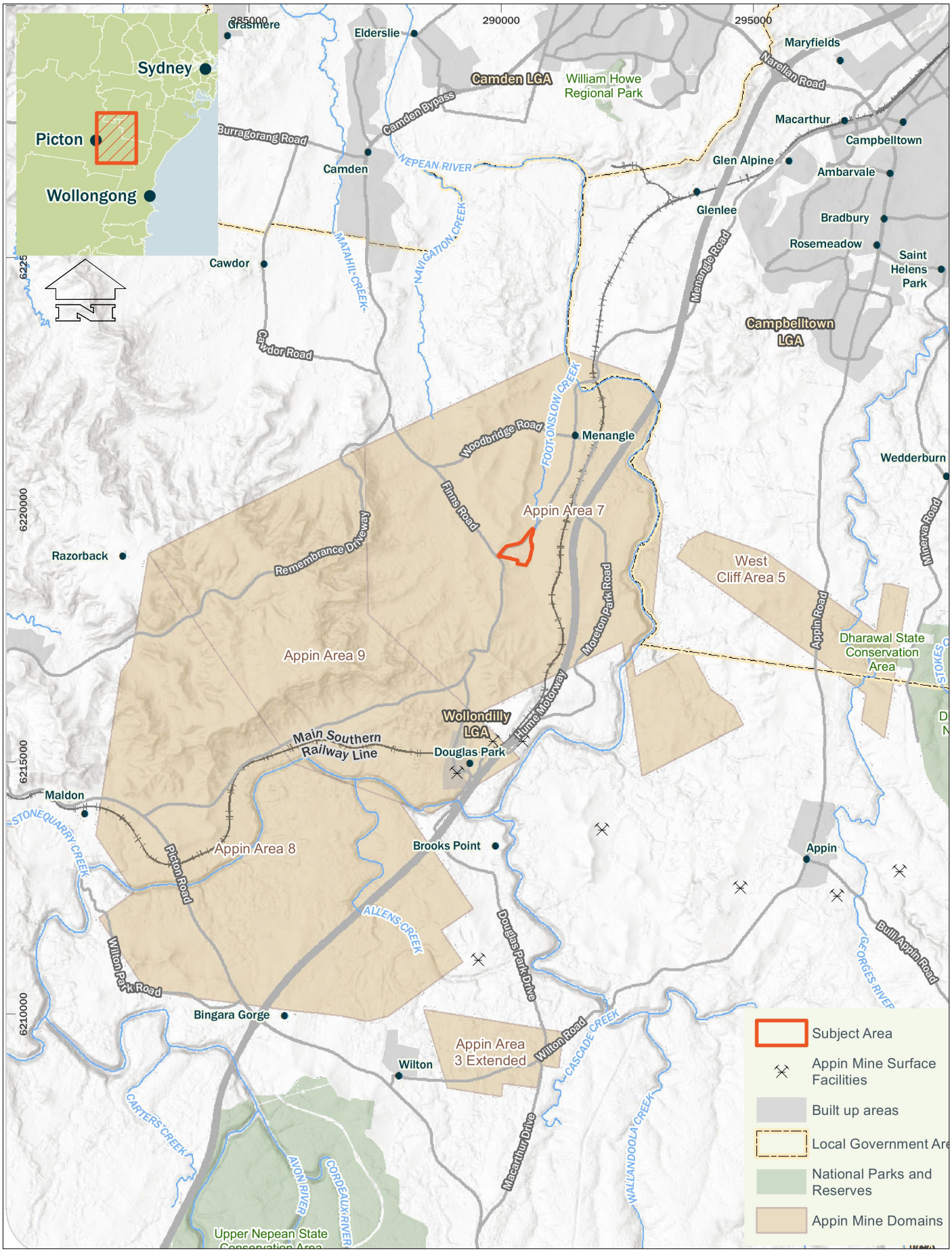

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FIGURE 1

IMC VENT SHAFT
MENANGLE

LOCATION

JOB NO.20087

13.5.21

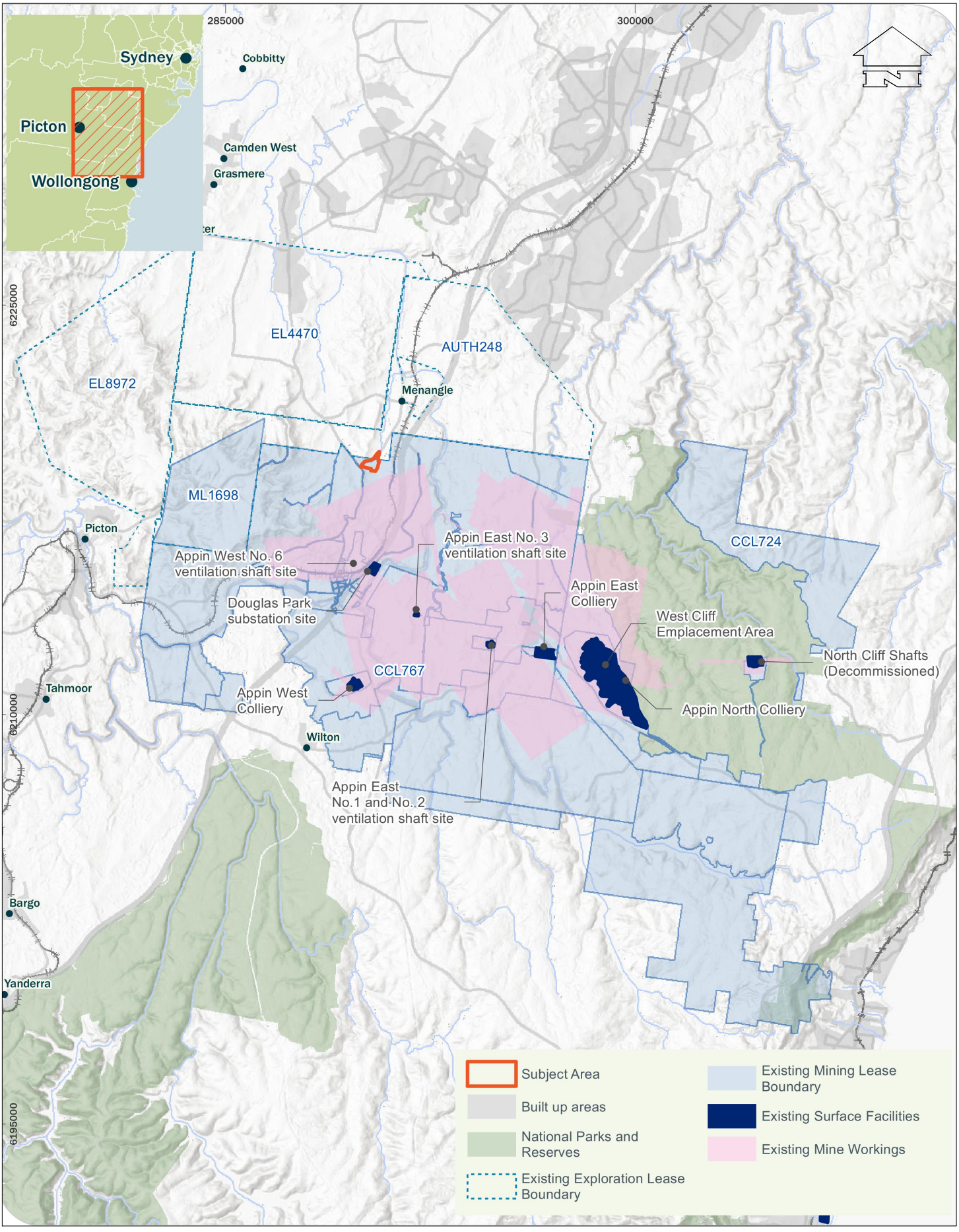

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FIGURE 2

IMC VENT SHAFT
MENANGLE

SITE

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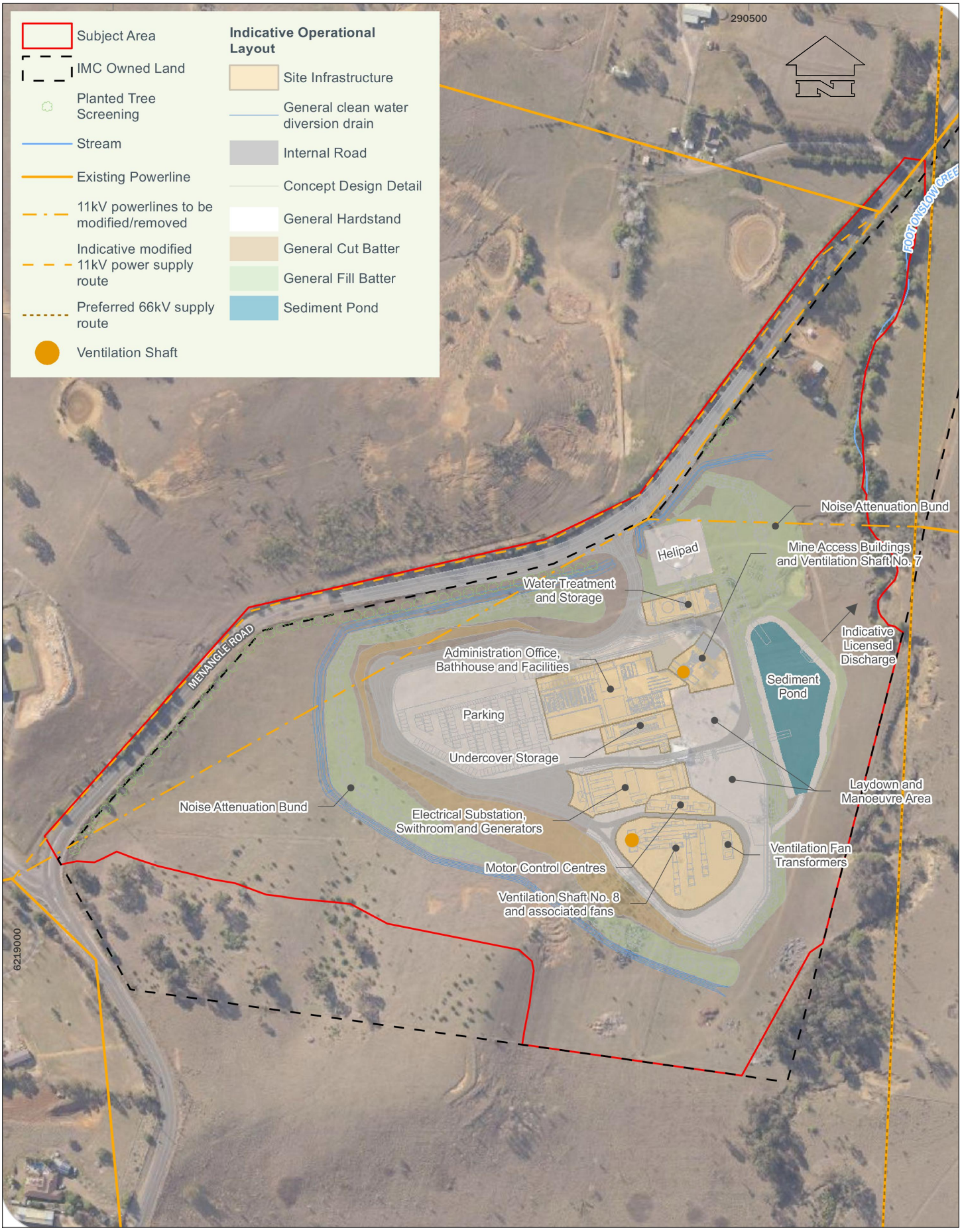

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FIGURE 3A

IMC VENT SHAFT
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PROJECT

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FIGURE 3B

IMC VENT SHAFT
MENANGLE

INDICATIVE SITE ENTRANCE ARRANGEMENTS ON MENANGLE ROAD

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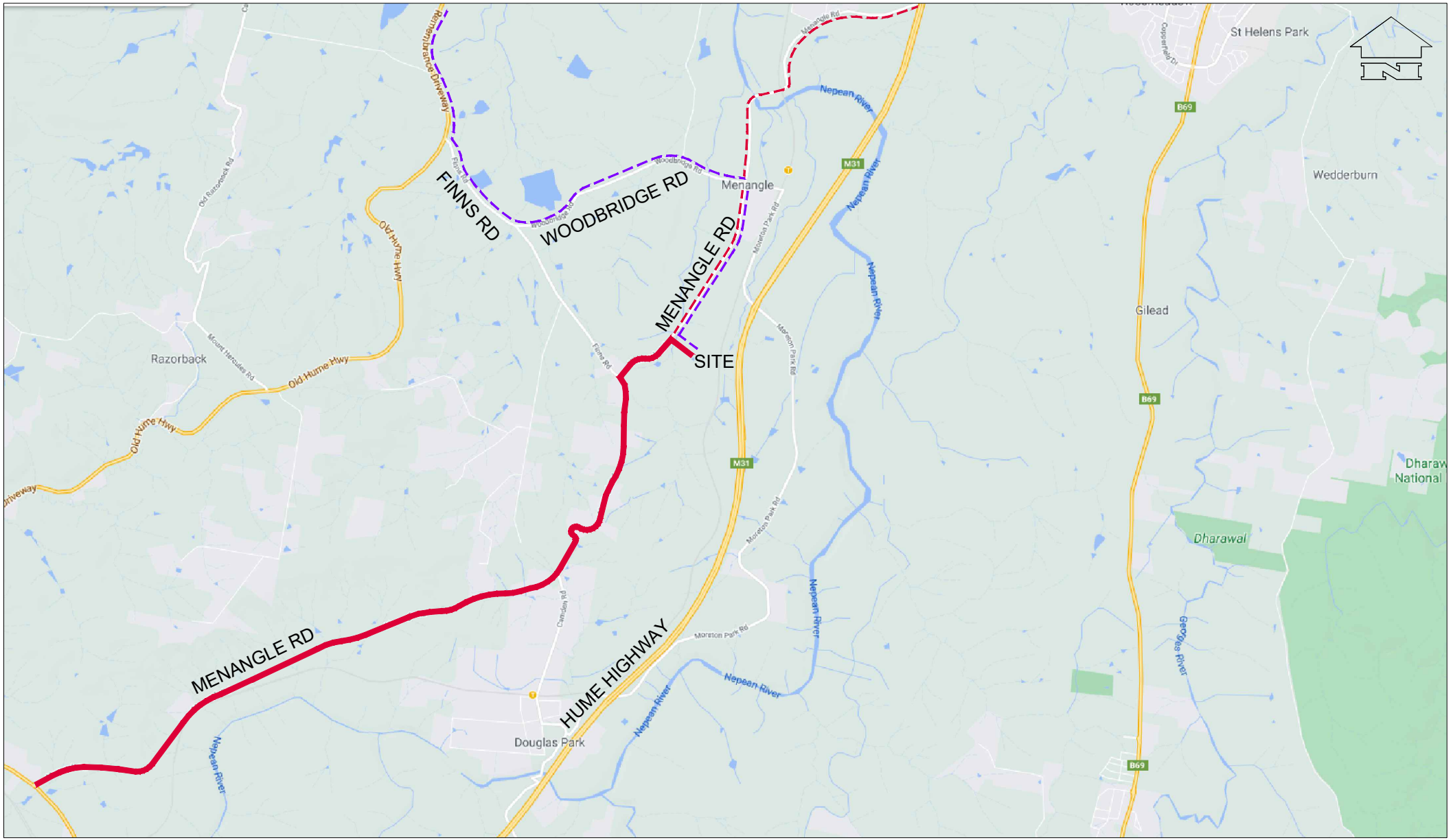

MAIN TRANSPORT ROUTE

OCCASSIONAL / MINOR TRANSPORT ROUTE

NIGHT TIME CONCRETE DELIVERY ROUTE

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FIGURE 4

IMC VENT SHAFT
MENANGLE

TRANSPORT ROUTE

JOB NO.20087

13.5.21

services and to minimise the potential impacts on the environment and communities of Menangle and Douglas Park.

2.2.2 Appin Mine Ventilation and Mine Access Project (the Project)

An integral requirement of underground mining is adequate ventilation infrastructure and mine access facilities to ensure a safe and efficient underground working environment. Appin Mine operations are progressing further away from the existing surface infrastructure located in the Appin and Douglas Park areas, and additional infrastructure is required to support the ongoing operations.

The Project involves the construction and operation of a downcast ventilation shaft (Ventilation Shaft 7), an upcast ventilation shaft (Ventilation Shaft 8), three (3) extraction fans, ducting and evases and associated ancillary infrastructure. Based on the current mining schedule, the additional ventilation shafts are required to be operational prior to 2025.

The Project also involves the development of mine access facilities including a headframe and personnel and materials winder (within Ventilation Shaft 7) and surface facilities consisting of offices, stores, bathhouse facilities and car parking areas. The establishment of these facilities would provide access for personnel and consumable materials to the Mine and will increase the safety and efficiency of transporting personnel and consumable materials underground.

To support the key infrastructure noted above, the Project will also include the following activities:

- installation of temporary and permanent site access arrangements, including upgrade or improvement to the Menangle Road intersection, internal roadways, associated hardstand and car parking areas;
- site preparation, including clearing of vegetation, demolition of existing structures and earthworks;
- installation of appropriate security (e.g. fencing) to prevent unauthorised access to the Site;
- installation of a water supply, power supply and transmission and associated electrical switch rooms, transformers and ancillary infrastructure;
- shaft material/spoil handling and emplacement activities and associated revegetation and landscaping activities to minimise visual impact of the Site;
- installation of personnel amenities such as bathhouses (e.g. changerooms), administration facilities and mines rescue facilities;
- installation of diesel storage tanks and associated pipelines;
- progressive development of sumps, pumps, pipelines, water storages and other water management infrastructure including fire protection and sewerage treatment facilities;
- installation of covered storage areas;
- installation of communications equipment including fibre optic cable and wireless infrastructure;
- installation ofservice boreholes to provide underground services;
- controlled release of excess water and/or re-use of water where practicable;
- progressive rehabilitation of disturbed areas post construction;
- installation of erosion and sediment control infrastructure, where required; and
- other associated minor infrastructure, plant, equipment and activities.

The Project would be similar to previously approved ventilation and mine access infrastructure of the Appin Mine and will not increase the volume of coal produced. Coal handling infrastructure is not proposed as part of the Project.

The shafts would be constructed from the surface down to the underground workings using conventional shaft sinking methods (mechanical excavation, drilling and controlled blasting) with material from the excavation being removed from the top of the shaft. The excavated material resulting from the construction of the shafts would be used as engineered fill and for construction of earth screening bunds and sediment dams. Where practicable, excess material would be stockpiled on-site, revegetated and used for future rehabilitation of the shaft site upon decommissioning. The two shafts would be lined progressively during excavation.

The Project will comprise multiple phases of construction and operation. Construction of the ventilation shafts is critical to the ongoing safe and efficient operation of the Appin Mine, and as such, will take priority for the construction phase. Construction of the downcast shaft will commence first. Once the shaft sinking is complete and the ventilation infrastructure is installed, each shaft will commence commissioning and operation immediately.

The construction phase (12-18 months) for establishing mine access infrastructure would occur subsequent to the ventilation infrastructure. Construction of mine access infrastructure will be influenced by scheduling and timing of longwall operations over the life of the BSO Project and will be developed in parallel with the requirements of the ongoing mining operations.

Activities associated with sinking the shafts would occur 24 hours per day, seven days per week. The remainder of construction activities associated with the facility (e.g. installation of surface infrastructure) would generally be limited to daytime construction hours[1]. Once operational, the site would be required to operate 24 hours per day, seven days per week, consistent with other similar facilities of the Mine.

2.2.3 Timing

Key dates for the construction of the various facilities and commissioning/operation of the ventilation shafts and the mine access are shown in Table 2.1 below. The timeframes are indicative and may be influenced by mining schedules and other factors including approval date and project funding approval. Construction of the ventilation shafts will take priority for the construction phase, being critical to ongoing operations.

[1] Daytime construction hours are defined as Monday to Saturday, 7.00am to 6.00pm.

TABLE 2.1

INDICATIVE TIMELINE FOR CONSTRUCTION AND OPERATION OF PROJECT

Activity	Start	Finish	Duration
Site establishment, bulk earthworks, construction utilities and access upgrades	July 2022	March 2023	7 months
Construction of permanent HV power supply infrastructure	March 2023	May 2024	14 months
VS7 sinking and lining	August 2023	December 2024	17 months
VS8 sinking and lining	June 2023	October 2024	17 months
Construction of fans, evase(s) and ancillary site infrastructure for ventilation shafts	February 2023	December 2024	22 months
Construction of mine access infrastructure: winder, evase, headframe and ancillary site infrastructure	July 2024	2026	12-18 months
Commissioning and operation of ventilation shafts	November 2024	2045	21 years
Commissioning and operation of mine access infrastructure	2025	2045	20 years
De-commissioning and site rehabilitation	2045	2050	5 years

2.2.4 Construction Phase

Construction is expected to commence in July 2022 with the ventilation shafts and fans completed in December 2024. Construction of the mine access infrastructure will take an additional 12-18 months and is planned to commence July 2024.

The upgrade of the Site Access Intersection will be undertaken at the start of the construction phase.

The construction workforce will vary based on the activities being undertaken. During the peak construction period where a number of activities overlap for a period of 6 to 8 weeks, up to 76 construction workers will be on site at the same time.

Heavy vehicle deliveries to the Site are expected to average 11-13 per day. During the peak construction period (6 to 8 weeks) up to 44 heavy vehicles per day could make deliveries to the Site.

Heavy vehicles will consist of rigid trucks and semi-trailers (up to 19 metres). A number of Special Purpose Vehicles and Oversize Vehicles will deliver large equipment to the Site. These vehicles will have the appropriate permits.

Delivery of concrete during the vent shaft construction will occur 24 hours, 7 days a week. Night time concrete deliveries are expected to come from Narellan (see Section 2.26 on Transport Routes).

Deliveries of other materials would occur between 7.00am – 6.00pm Monday to Saturday and the majority will access the Site from the south via Hume Highway, Picton Road and Menangle Road.

2.2.5 Operational Phase

During the operational phase, the Site will be required to operate 24 hours per day, 7 days per week.

The current shift arrangements of the Appin Mine are three (3) shifts on weekdays and two (2) shifts on weekends. Table 2.2 below shows the indicative shift times proposed for the workforce at the Site.

TABLE 2.2

INDICATIVE SHIFT TIMES DURING THE OPERATION OF THE PROJECT

Weekdays (Monday to Thursday)	Shift Times
Shift 1	6.00am – 3.00pm
Shift 2	2.00pm – 11.00pm
Shift 3	10.00pm – 7.00am
Weekends (Friday to Sunday)	
Shift 1	6.00am – 6.00pm
Shift 2	6.00pm – 6.00am

Total employee/contractor numbers on site per day during the operational phase will be approximately 283 people based on 80 people per shift, and 40 support personnel per day, including three people for ventilation infrastructure operation and maintenance.

In addition to the operational personnel, on maintenance day (which occurs one day per week) an additional 25 maintenance personnel will be on site. On a maintenance day total personnel on site will be approximately 308 people. Table 2.3 shows indicative numbers of personnel for the three weekday shifts on a maintenance day.

TABLE 2.3

SHIFT PERSONNEL ON A MAINTENANCE WEEKDAY MONDAY TO THURSDAY

Shift	Vent Shaft and Mine Operational Personnel*	Maintenance Personnel	Total
Shift 1 (6.00am – 3.00pm)	103	25	128
Shift 2 (2.00pm – 11.00pm)	90	-	90
Shift 3 (10.00pm – 7.00am)	90	-	90
TOTAL	**283**	**25**	**308**

**Includes shift personnel plus support staff*

Generally, the Mine workforce will be a redistribution of existing personnel who currently access the Mine from either Appin West, Appin East or Appin North. Additional support personnel will be required as part of Mine operational activities, such as for maintenance, inspections, office work and administration. During the life of the Project, alternative shift configurations may be required to meet operational and industry best practice requirements.

Operation and maintenance of both the ventilation and mine access infrastructure requires 24-hour access for regular inspection and maintenance. Where significant maintenance is required, additional personnel and equipment may be required onsite for short durations. This will generally occur during the daytime hours, unless emergency maintenance is required.

The number of visitors to the Site would vary day to day. Approximately five visitors are expected per day on average.

The Site will receive deliveries during operations. Deliveries are generally by rigid trucks and semi-trailers (up to 19 metres long).

Deliveries associated with the ventilation infrastructure maintenance and inspection would be 1 per day. Generally, the heavy vehicles associated with the mine operations (9 nine per day), will be a redistribution of existing heavy vehicles that currently deliver to the Mine by either Appin West, Appin East or Appin North. In addition, there will be two heavy vehicles associated with the removal of waste water providing a total of 12 heavy vehicles per day.

2.2.6 Transport Routes

Transport routes for heavy vehicles accessing the Site during operations will be generally via Hume Highway, Picton Road and Menangle Road from the south, to and from the Site. An occasional heavy vehicle (estimated as 10% of total) may arrive from and depart to the north via Menangle Road.

During construction the majority of heavy vehicles will access the Site via Hume Highway, Picton Road and Menangle Road (to and from the south).

Night time deliveries of concrete will be from Narellan and will use Remembrance Driveway, Finns Road, Woodbridge Road and Menangle Road, to and from the north (note: the section of Finns Road between Woodbridge Road and Menangle Road has a 15 tonne limit which necessitates the use of Woodbridge Road and Menangle Road between the Site and Woodbridge Road).

The transport routes are shown in **Figure 4**.

2.2.7 Proposed Intersection Upgrade Works and Car Parking

The Site Access Intersection will be provided as part of the Project. The intersection will be designed and constructed to Austroads standards, in consultation with Wollondilly Shire Council, and is planned to include;

- Left turn auxiliary lanes in Menangle Road for left turns to and out of the Site Access Road;
- A right turn bay (CHR treatment) on Menangle Road for right turns into the Site Access Road;
- Eastbound and westbound through lanes on Menangle Road.

Figure 3B shows an indicative Site Entrance Arrangement on Menangle Road.

The internal roads within the Site will be designed and constructed to AS2890.2 standards to accommodate 19 metre semi-trailers as appropriate.

Car parking for 212 cars, including two accessible spaces, will be provided on site, plus provision for future additional parking. The 212 spaces will be sufficient to cater for the maximum parking demand of employees/contractors and visitors at shift changeover times on a maintenance weekday.

3.0 EXISTING CONDITIONS

3.1 Road Network

The principal road network that will serve the Site includes Menangle Road, Picton Road and Hume Highway/Motorway.

Other roads adjacent the Site that may attract some vehicle movements from the Project include Finns Road, Woodbridge Road and Remembrance Driveway.

Menangle Road, Picton Road and the Hume Highway (Motorway) will be the main heavy vehicle route to/from the Site during construction and the operational phase of the Project.

The Hume Motorway, adjacent Picton Road is a two lane dual carriageway state road constructed as a Motorway. At Picton Road an interchange with north and south facing ramps is provided, which allow full access to and from Picton Road.

Picton Road, which is a state road, links the town of Picton to Hume Motorway and further to the east links to Princes Highway, north of Wollongong.

In the section between Menangle Road and Hume Motorway, Picton Road is constructed as a 2-3 lane rural road with wide sealed shoulders, centreline and edgeline road markings and guidepost and reflectors. Auxiliary or turning lanes (CHR and AUL) are provided at intersections including at Menangle Road, Allied Mills Access Road, Wilton Park Road and On and Off Ramps to Hume Motorway.

The speed limit in this section of Picton Road is a mixture of 80km/h and 100km/h.

Menangle Road is generally a two lane road that links between Picton Road and Macarthur near Campbelltown.

It is a regional road between Picton Road and the Nepean River at Menangle and a state road north of the Nepean River. The section between Picton Road and Finns Road and Menangle Road is a two lane rural road with centreline markings, edgelines, Raised Reflective Pavement Markers (RRPMs) and sealed shoulders.

The speed limit is predominantly 100km/h and 80km/h with a short section (approximately 900 metres) of 60km/h speed limit, north of Camden Street, where there is a change in alignment with sharp curves. South and north of Finns Road the speed limit is 80km/h which continues to the village of Menangle where it reduces to 50km/h.

North of Woodbridge Road/Station Street and the Menangle Village, Menangle Road is a two lane road with a speed limit of 80km/h.

Principal intersections between Picton Road and Menangle Village include;

- Wrighton Way which is a priority controlled T junction intersection with an AUL treatment in Menangle Road;
- Camden Road which is a priority controlled T junction intersection with CHR right turn and AUL left turn treatments in Menangle Road;
- The Ventilation Shaft 6 Access Road, which is a Stop Sign controlled T junction intersection with a CHR right turn treatment in Menangle Road;
- Finns Road which is a channelised priority controlled T junction intersection;
- Picton Green Access Road which is a Stop Sign controlled T junction intersection in Menangle Village;
- St James Avenue which is a priority controlled T junction intersection in Menangle Village;

- Woodbridge Road/Station Street which is a Stop Sign controlled cross junction intersection in Menangle Village.

Finns Road is a local two lane rural road that connects between Menangle Road and Remembrance Driveway. Traffic management along its length includes centreline and edgeline roadmarking, RRPMs, guideposts and reflectors, warning signs and sealed shoulders. Finns Road has an 80km/h speed limit.

Intersections along Finns Road include;

- Dawson Road which is a priority controlled minor T junction intersection;
- Woodbridge Road which is a Stop Sign controlled T junction intersection; and
- Carmells Road which is a priority controlled minor T junction intersection.

Finns Road forms a T junction intersection with Remembrance Driveway (Old Hume Highway) under priority control. The traffic management at the intersection includes CHR seagull treatment in Remembrance Driveway to cater for right turns into and out of Finns Road and an AUL left turn treatment in Remembrance Driveway for the left turn into Finns Road. Wollondilly Council is currently upgrading the intersection to a two lane roundabout to improve road safety and increase traffic flow. This will reduce delays for vehicles turning right out of Finns Road and improve overall traffic conditions at the intersection.

Woodbridge Road is a local two lane rural road that connects between Finns Road and Menangle Road in Menangle Village. Traffic management along its length includes centreline and edgeline road marking, RRPMs, guideposts and reflectors, warning signs and sealed shoulders. Woodbridge Road has an 80km/h speed limit between Finns Road and 190m west of Menangle Road and a 60km/h speed limit through Menangle Village. East of Menangle Road, Woodbridge Road becomes Station Street.

Intersections along Woodbridge Road include Camden Park Road which is a Stop Sign controlled minor T-junction intersection.

Remembrance Driveway connects between Picton Road and Camden and is a regional road. In the rural sections of the route, it is a 2-3 lane road, with centreline and edgeline road markings, RRPMs, sealed shoulders and warning signs.

The speed limit varies between 80km/h and 100km/h.

Figure 5 shows the existing traffic controls on the road network near the Project Site.

3.2 Existing Traffic Conditions

3.2.1 Daily Volumes and Vehicle Classifications

Table 3.1 shows the two way average weekday (5 day average) and two way average daily (7 day average) traffic volumes, together with the proportion of heavy vehicles using the road network, adjacent the Project Site.

Heavy vehicles are classified as Austroad Class 3-12 vehicles and include small, medium and articulated trucks and buses.

Reference to Table 3.1 shows that the weekday two way traffic volumes using Menangle Road varies as follows;

- South of Camden Road – 3,940 vehicles per day (vpd)

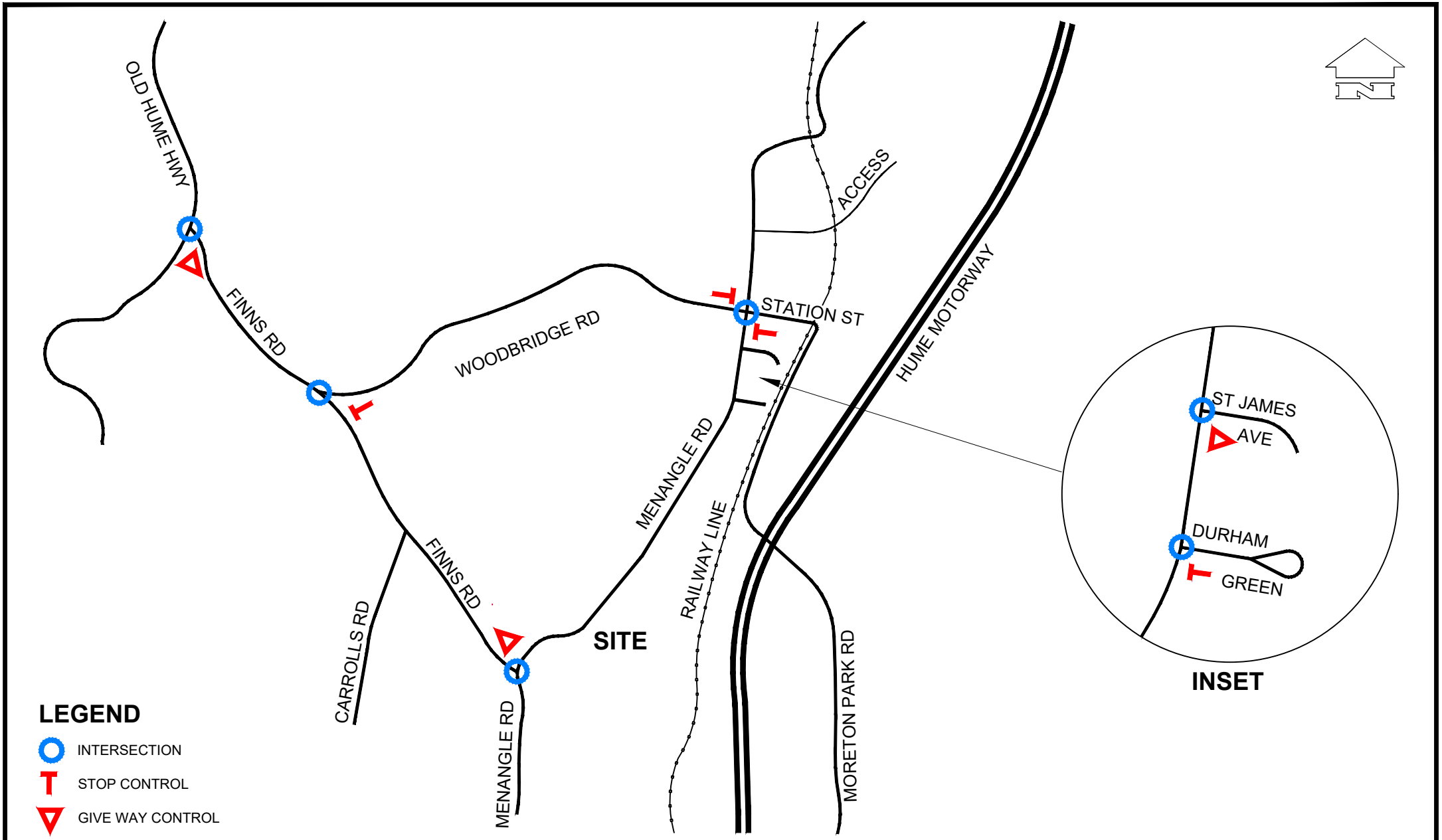

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FIGURE 5

IMC VENT SHAFT
MENANGLE

EXISTING TRAFFIC CONTROLS

JOB NO.20087

13.5.21

- South of Finns Road – 5,760vpd
- North of Finns Road – 3,081vpd (near the Project Site Entrance) Station Street
- North of Woodpark Road – 7,304vpd

Adjacent the Project Site, two way weekday volumes on Menangle Road are 3,081vpd.

Weekday two way traffic volumes using Finns Road vary between 3,532vpd near Menangle Road and 7,579vpd near Remembrance Driveway.

TABLE 3.1

WEEKDAY AND DAILY TWO WAY TRAFFIC VOLUMES AND PROPORTION OF HEAVY VEHICLES

Location	Average Weekday (5 Day)		Average Day (7 Day)	
	Volume (vpd)	% of Heavy Vehicles	Volume (vpd)	% of Heavy Vehicles
Menangle Road 850 metres north of Woodbridge Road	7304	12.5%	6612	11.7%
Menangle Road between Woodbridge Road and St James Avenue	3622	-	3341	-
Menangle Road approx. 700m north of Finns Road	3081	11.2%	2899	9.9%
Menangle Road approx. 600m south of Finns Road	5760	7.4%	5527	6.5%
* Menangle Road south of Camden Road	3940	13.0%	3729	11.7%
Finns Road between Carols Road and Menangle Road	3532	7.8%	3422	7.0%
Finns Road between Remembrance Highway (Old Hume Highway) and Woodbridge Road	7579	11.2%	6862	11.0%
Woodbridge Road between Finns Road and Menangle Road	4092	10.4%	3644	9.9%
* Camden Road east of Menangle Road	3061	13.7%	2858	12.7%

Source: Traffic Counts 20 -26 October and 19-25 November 2020
** Traffic Counts 2-8 December 2019*

Figure 6 shows a summary of the two way weekday and daily volumes using the road network together with the average weekday volumes by direction.

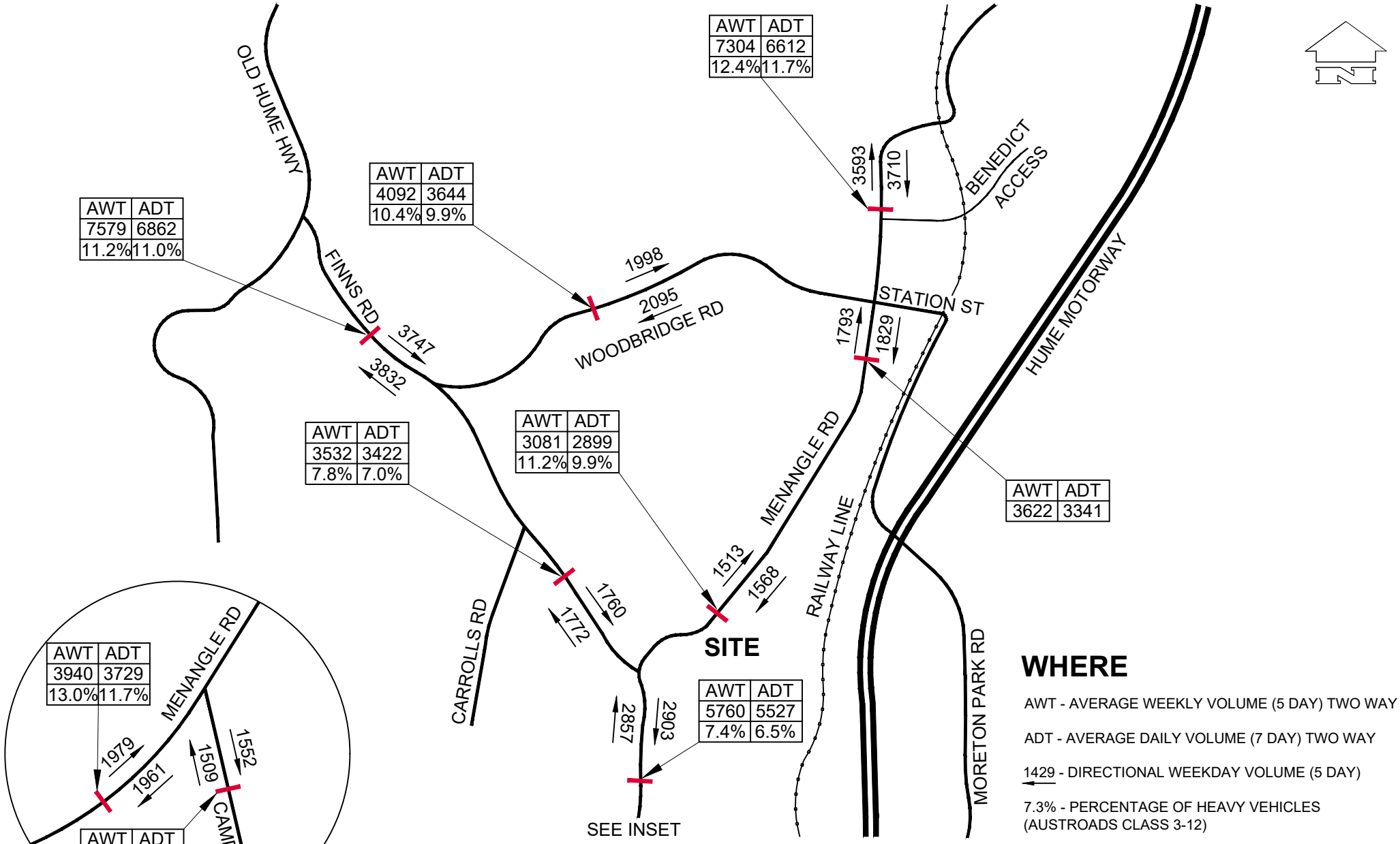
3.2.2 Intersection Traffic Volumes in AM and PM Peak Periods

Intersection traffic counts were undertaken across the road network during the weekday AM and PM peak periods between 6.30am and 9.30am and 3.00pm and 6.30pm. These counts were undertaken on Tuesday 20 October 2020 and Tuesday 3 December 2019.

The AM and PM Peak Hours at intersections generally occurred between 7.45am – 8.45am and 4.45pm - 5.45pm.

However, these times do not match with the mine peak shift time changes (AM and PM Site Peak Hours) which will occur between;

- 7.00am – 8.00am (AM Site Peak Hour); and
- 3.00pm – 4.00pm (PM Site Peak Hour).



WHERE

AWT - AVERAGE WEEKLY VOLUME (5 DAY) TWO WAY

ADT - AVERAGE DAILY VOLUME (7 DAY) TWO WAY

1429 - DIRECTIONAL WEEKDAY VOLUME (5 DAY)

7.3% - PERCENTAGE OF HEAVY VEHICLES (AUSTROADS CLASS 3-12)

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FIGURE 6

IMC VENT SHAFT
MENANGLE

WEEKDAY AND DAILY TRAFFIC VOLUMES

JOB NO.20087

13.5.21

Figures 7 and **8** show the intersection traffic volumes across the road network for the AM Site Peak Hour (**Figure 7**) and PM Site Peak Hour (**Figure 8**).

Site observations and traffic modelling (See Section 4.3) confirm that all intersections operate with a good level of service (Level of Service A operation) and low vehicle delays, during the weekday AM and PM periods.

3.3 Pedestrians

Pedestrian activity across the road network was very low. Small numbers of pedestrians crossed at the Menangle Road/Woodbridge Road/Station Street intersection during the PM period. There was no recorded pedestrian crossing movements at the other intersections during the AM and PM periods.

Pedestrian crossing volumes are shown in **Figures 7** and **8**.

3.4 Bicycles

There are no formal bike routes on the road network adjacent the Project Site. Cyclists are required to use the roads and share the travel lanes with cars/trucks as the road shoulder areas are variable on most roads including Menangle Road.

Cyclist volumes using the road network are also shown in **Figures 7** and **8**. Reference to **Figures 7** and **8** reveal that cyclists volumes using the road network are very low.

3.5 Bus Routes

Bus routes in the area include:

- The 889 bus service between Menangle and Campbelltown via Menangle Park which uses the section of Menangle Road north of Durham Green as well as Station Street; and

- The 49 bus service between Camden and Menangle with Razorback Loop, which uses Menangle Road, Finns Road and Woodbridge Road.

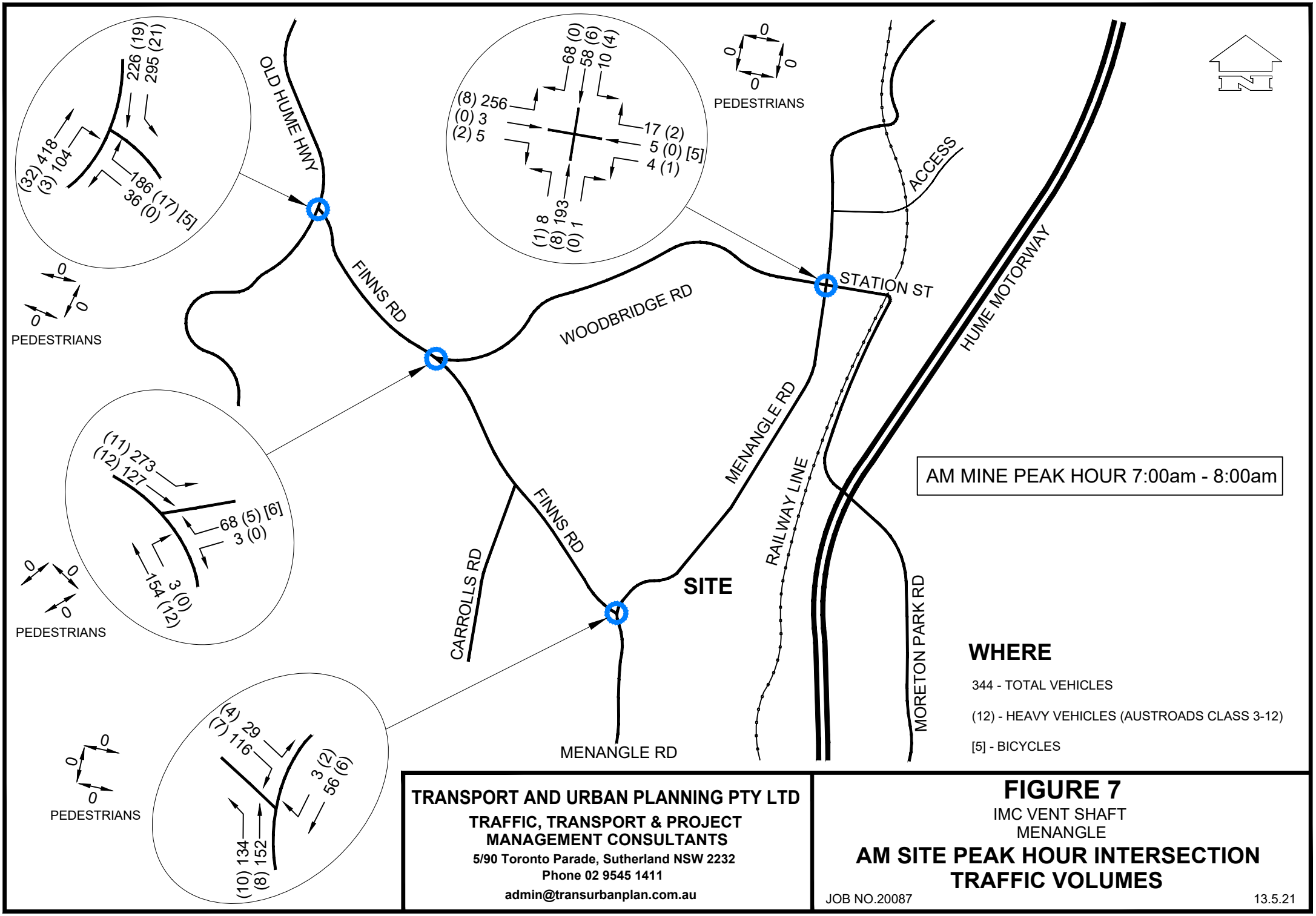

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FIGURE 7

IMC VENT SHAFT
MENANGLE

AM SITE PEAK HOUR INTERSECTION TRAFFIC VOLUMES

JOB NO.20087

13.5.21

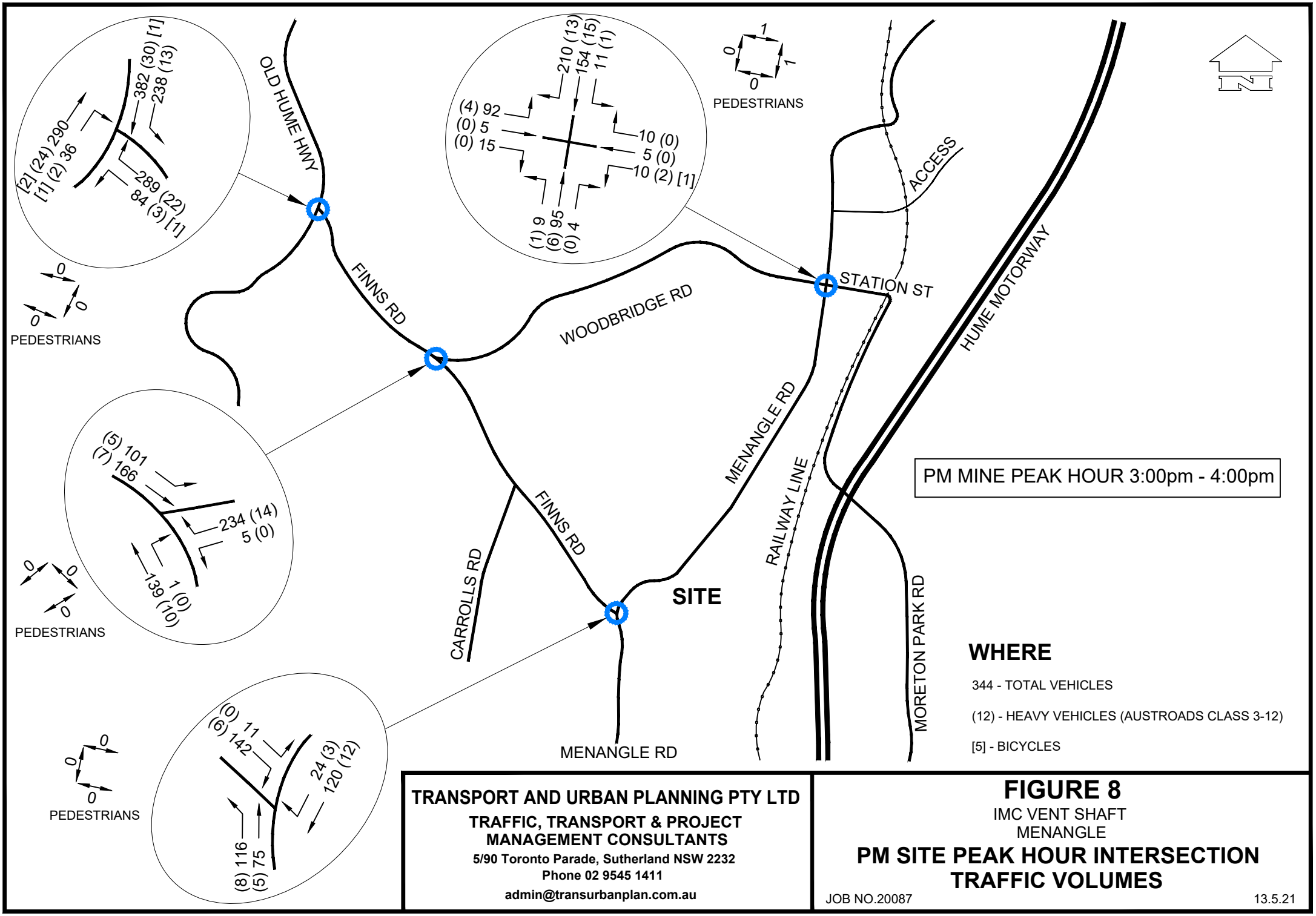

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FIGURE 8

IMC VENT SHAFT
MENANGLE

PM SITE PEAK HOUR INTERSECTION TRAFFIC VOLUMES

JOB NO.20087

13.5.21

4.0 ASSESSMENT OF TRAFFIC IMPACTS OF PROPOSAL

4.1 Proposed Access

Access to the Site will be via a new T junction intersection in Menangle Road, north of Finns Road.

The intersection will be designed and constructed to Austroad standards and will include;

- Eastbound and westbound through lanes on Menangle Road.
- Left turn auxiliary lanes on Menangle for left turns to and out of the Site Access Road; and
- A right turn bay (CHR treatment) on Menangle Road for right turns into the Site Access Road.

Access roads will be constructed within the Site to link the main activity areas and car parking to the Site Access Intersection.

4.2 Traffic Generation During Operational Phase

The highest traffic generation of the Project will occur on weekdays associated with the workforce trips to and from the Site as well as delivery and maintenance vehicles visiting the Site. Based on information provided by IMC, workforce trips to Appin Mine currently have a vehicle occupancy of 1.2 persons per vehicle. For the purpose of this assessment a conservative figure of 1.1 persons per vehicle has been adopted.

Based on a total of 308 personnel on site on a maintenance weekday, (reference Section 2.25) adopting a vehicle occupancy of 1.1 persons per vehicle, the trip generation of the workforce is estimated at 564 two way vehicle trips (282 in/282 out). These would be light vehicle trips. Visitors could add an additional 10 two way light vehicle trips per day (i.e. 5 in/5 out).

Heavy vehicles associated with the mine operations and ventilation shafts are expected to number 24 two way vehicle trips per day (12 in/12 out).

Total vehicles generated by the project on a maintenance weekday will be 598 two way vehicle trips (i.e. 299 in/299 out) which will include 574 two way light vehicle trips and 24 two way heavy vehicle trips.

The peak traffic generation of the mine will occur at the shift time changes for the mine operations which will occur at different times during the day.

Arrival and departure times for the workers on a weekday (Monday to Thursday) will be;

- 5.00am – 6.00am – Shift 1 arrives
- 7.00am – 8.00am – Shift 3 departs
- 1.00pm – 2.00pm – Shift 2 arrives
- 3.00pm – 4.00pm – Shift 1 departs
- 9.00pm – 10.00pm – Shift 3 arrives
- 11.00pm – 12.00pm – Shift 2 departs

Arrival and departure times for the workers on a Friday (weekend shift);

- 5.00am – 6.00am – Shift 1 (weekend) arrives
- 7.00am – 8.00am – Shift 3 departs
- 5.00pm – 6.00pm – Shift 2 (weekend) arrives
- 6.00pm – 7.00pm – Shift 1 (weekend) departs

The 7.00am to 8.00am and 3.00pm to 4.00pm weekday shift changeover times represent the Site AM and PM Peak Hours.

On weekdays that are maintenance days, the traffic generation is estimated to be;

- 7.00am to 8.00am (Shift 3 departs) - a total of 84 vehicles with one (1) heavy vehicle entering the Site and 82 worker light vehicles and one (1) heavy vehicle exiting the Site (1 in/83 out).
- 3.00pm to 4.00pm (Shift 1 departs) - a total of 118 vehicles with one (1) heavy vehicle entering the Site and 116 worker light vehicles and one (1) heavy vehicle exiting the Site (1 in/117 out).

4.3 Assessment of Traffic Impacts

Based on the current records of the existing workforce at Appin Mine, IMC expect the majority of the workforce (93%) to arrive and depart the Site from/to the south via Menangle Road from Picton Road with a smaller proportion (7%) arriving and departing from/to the north.

As previously noted, the majority of heavy vehicles are expected to arrive from and depart to the south via Menangle Road and Picton Road, with the occasional heavy vehicle (estimated as 10% of total) arriving from and departing to the north.

Impact on Road Network

The Project (on a maintenance weekday) will increase weekday traffic volumes using the road network as follows;

- 43 two way vehicle trips per day (vpd) in Menangle Road north of the Project Site Entrance including two heavy vehicles; and
- 555 two way vehicle trips per day (vpd), including 22 heavy vehicle trips in Menangle Road south of the Project Site Entrance.

The weekday volume increases due to the Project represent;

- 1.2% increase in weekday traffic volumes on Menangle Road, south of Woodbridge Road; and
- 9.6% increase in daily volumes on Menangle Road, south of Finns Road.

Table 4.1 shows the increases due to the Project.

TABLE 4.1

WEEKDAY TRAFFIC VOLUME INCREASES IN MENANGLE ROAD DUE TO THE PROJECT ON A MAINTENANCE WEEKDAY

Location	Average Weekday (5 day) (vpd)	Increase	% Increase
Menangle Road between Woodbridge Road and St James Avenue	3622	43	1.2%
Menangle Road south of Finns Road	5760	555	9.6%

Impact on Intersections

The AM (7.00am – 8.00am) and PM (3.00pm – 4.00pm) Site Peak Hours will represent those times when the additional traffic from the Project will have the largest impact on the intersections adjacent the Project site.

Figures 9 and **10** shows the additional traffic from the Project assigned to the road network during the AM Site Peak Hour and PM Site Peak Hour respectively.

To assess the impacts on the adjacent intersections, as well as the proposed Site Entrance/Menangle Road intersection, traffic modelling using the SIDRA Traffic Model has been undertaken.

The intersections modelled include;

- Menangle Road/Woodbridge Road/Station Street;
- Menangle Road/Finns Road; and
- Menangle Road/Site Entrance.

SIDRA is a suitable model to assess the operational performance of intersections. Criteria for interpreting an intersections operation are Level of Service (LS), Degree of Saturation (DS) and Average Vehicle Delay (AVD). For intersections under Priority/Stop Sign control and Roundabout Control, Average Vehicle Delay for Individual Movements (HMD) is relevant.

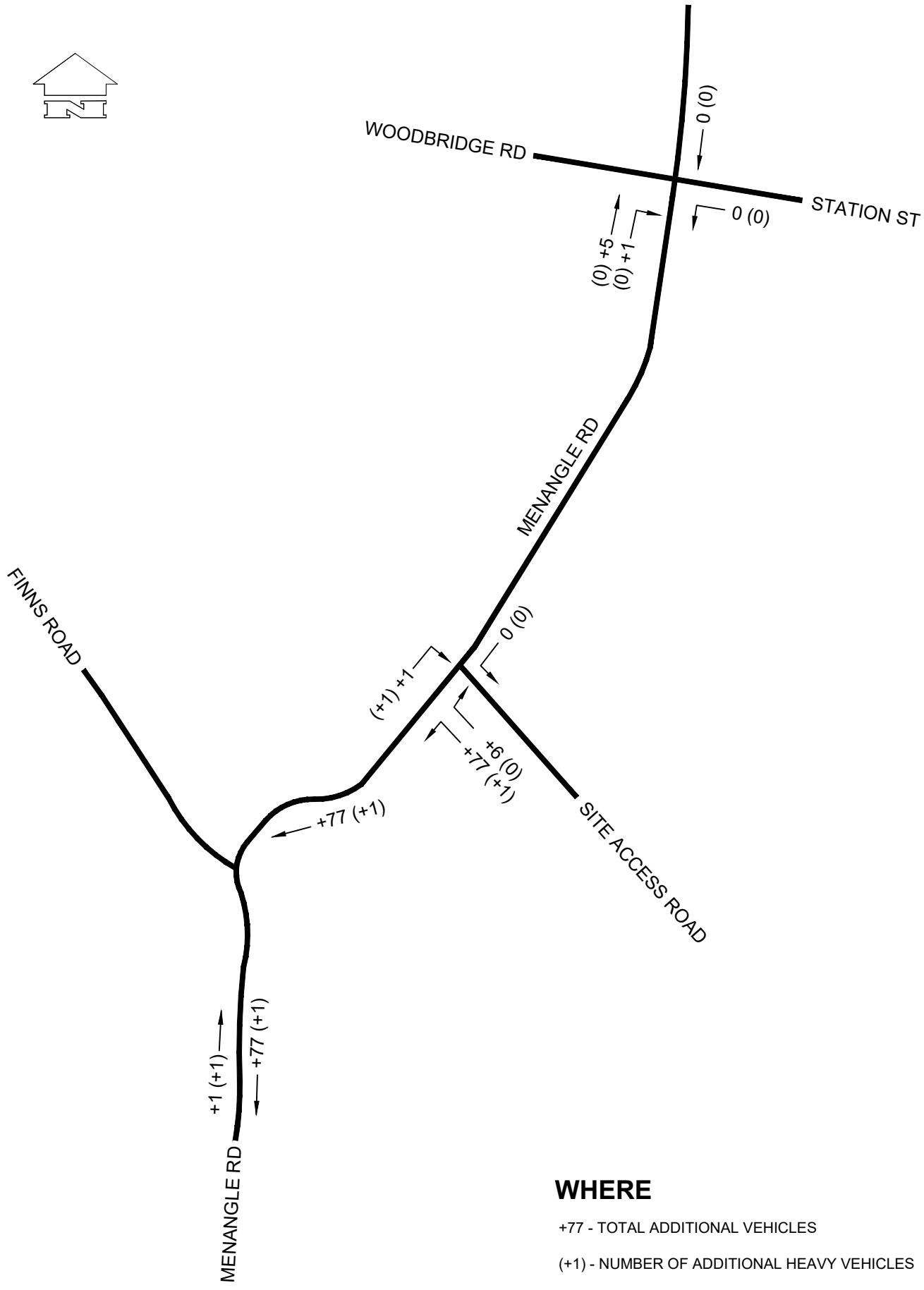
Table 4.2 below is reproduced from the RTA's Guide to Traffic Generation Developments (October 2002) and provides an explanation of the various levels of service for intersections.

A Level of Service D or better (i.e. A, B, C or D) is generally considered to be minimum design requirement for intersections. The level of service for intersections controlled by Give Way/Stop Signs or under Roundabout Control is determined from the movement with highest average vehicle delay (HMD). For intersections controlled by traffic signals the level of service is determined by the Average Vehicle Delay (AVD) for all vehicles using the intersection.

TABLE 4.2

LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Intersection is oversaturated	Oversaturated, requires other control mode



WHERE

+77 - TOTAL ADDITIONAL VEHICLES

(+1) - NUMBER OF ADDITIONAL HEAVY VEHICLES

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FIGURE 9

IMC VENT SHAFT
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ADDITIONAL TRAFFIC FROM PROJECT IN AM SITE PEAK 7am-8am

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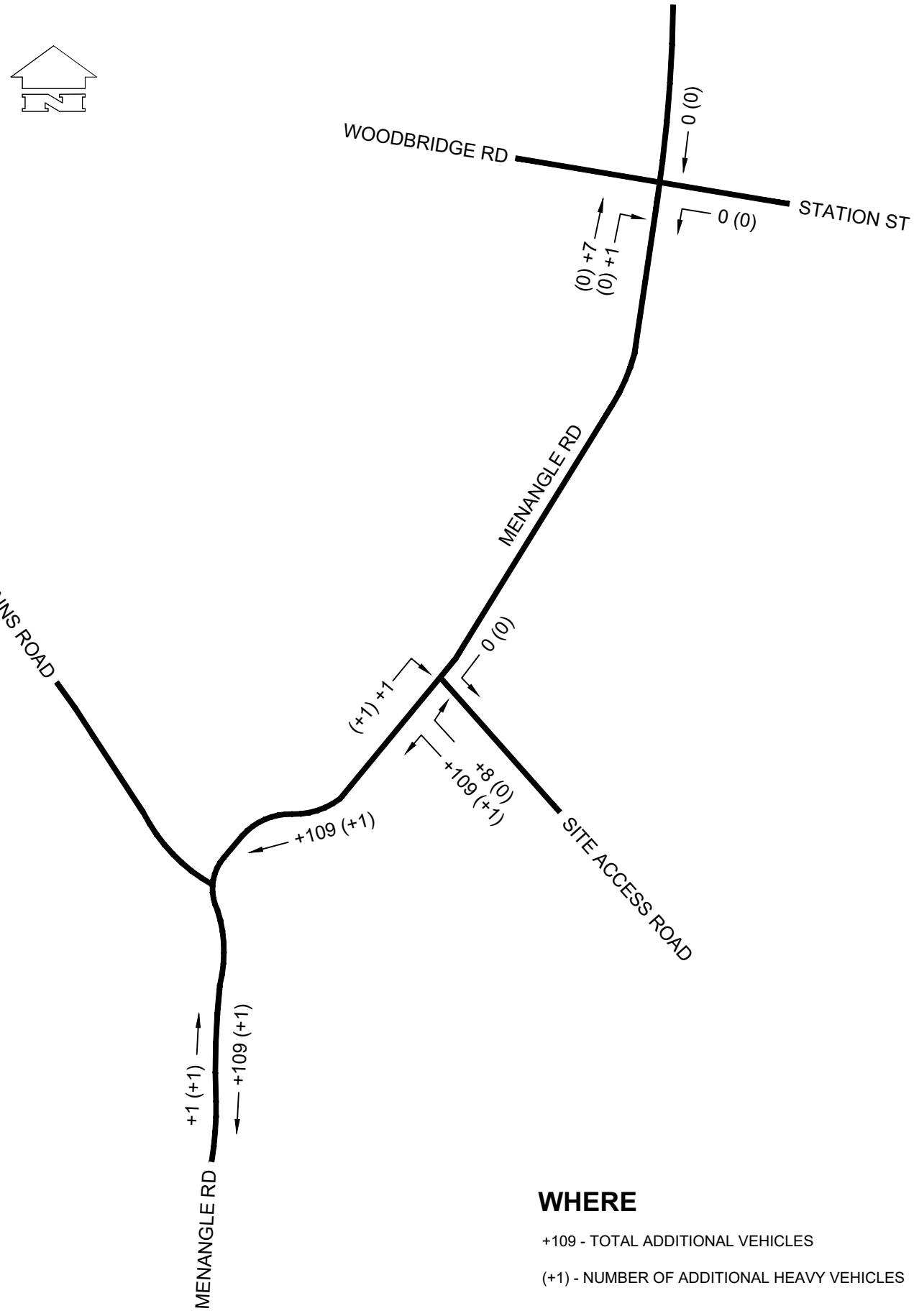

WHERE

+109 - TOTAL ADDITIONAL VEHICLES

(+1) - NUMBER OF ADDITIONAL HEAVY VEHICLES

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FIGURE 10

IMC VENT SHAFT
MENANGLE

ADDITIONAL TRAFFIC FROM PROJECT IN PM SITE PEAK 3pm-4pm

JOB NO.20087

13.5.21

SIDRA models have been developed for the existing 2020 conditions based on traffic management at the existing intersections and the traffic volumes for AM and PM Site Peak Hours as shown in **Figures 7** and **8**.

As the mine operations are expected to operate from 2025, the models with the additional traffic from the Project as shown in **Figures 9** and **10** have adopted 2025 base traffic volumes based on 2% lineal increase per year between 2020 and 2025 (i.e. 10% increase).

The model for the Site Entrance has adopted the proposed traffic management as shown in **Figure 3** which includes the left turn auxiliary lane and right turn bay (CHR) on Menangle Road.

The results of the modelling are shown in Tables 4.3, 4.4 and 4.5.

Reference to Table 4.3 shows that the intersection of Menangle Road/Woodbridge Road/Station Street currently operates at a Level of Service A in both peak hours with low vehicle delays. In 2025 with the Project in place it will operate at a Level of Service B operation in both peak hours which represents a good operation. The increase in vehicle delay due to the Project is very small.

Reference to Table 4.4 shows that the intersection of Menangle Road/Finns Road currently operates at a Level of Service A operation in both peak hours with low vehicle delays. With the Project in 2025 the intersection will continue to operate at a Level of Service A operation in both peak hours with low vehicle delays, which is a good operation.

Table 4.5 shows that the Menangle Road/Site Entrance intersection in 2025 with the Project in place will operate at a Level of Service A operation, with low vehicle delays which is a good operation.

Extracts from the SIDRA modelling are contained in Appendix 1.

TABLE 4.3

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/WOODBRIDGE ROAD AND STATION STREET FOR EXISTING CONDITIONS AND WITH PROJECT IN 2025

CRITERIA	EXISTING (2020)		2025 WITH PROJECT	
	AM	PM	AM	PM
LS	A	A	B	B
DS	0.233	0.217	0.267	0.242
AVD(seconds)	4.9	4.0	5.0	4.1
HMD(seconds)	13.3	14.1	15.0	16.3

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

TABLE 4.4

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/FINNS ROAD FOR EXISTING CONDITIONS AND WITH PROJECT IN 2025

CRITERIA	EXISTING (2020)		2025 WITH PROJECT	
	AM	PM	AM	PM
LS	A	A	A	A
DS	0.144	0.097	0.173	0.139
AVD(seconds)	4.4	3.8	4.0	3.1
HMD(seconds)	10.0	8.4	10.7	9.2

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

TABLE 4.5

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/SITE ENTRANCE ROAD IN 2025 WITH PROJECT

CRITERIA	2025 WITH PROJECT	
	AM	PM
LS	A	A
DS	0.103	0.097
AVD(seconds)	1.2	1.7
HMD(seconds)	9.3	10.2

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

Sensitivity Test of Site Entrance/Menangle Road Intersection

During both the AM and PM Site Peak Hours the right turn volumes into the Site will be very small, as these times do not coincide with a shift arrival period for the workforce.

Even though the AM and PM Site Peak Hours do not coincide with a shift arrival period of the workforce, to demonstrate that the intersection will have sufficient capacity including the length of the right turn bay, sensitivity analysis has been undertaken at the Site Entrance Intersection. This sensitivity analysis assumes that a workforce arrival period occurs during the AM and PM Site Peak Hours and is representative of shift times overlapping and/or a change in shift times in the future. Based on the arrival volumes of Shift 1 on a maintenance weekday, some 118 vehicles per hour (117 light vehicle trips and 1 heavy vehicle trip) would arrive at the Site. The right and left turn volumes into the Site would be 109vph and 8vph.

These volumes have been overlaid onto the AM and PM Site Peak volumes that will use the intersection and additional SIDRA modelling has been undertaken.

The results of this modelling is shown in Table 4.6 and indicates that the Site Entrance intersection will retain a Level of Service A operation with low vehicle delays in both peak hours, with the additional right turn volumes.

This indicates that the intersection will have sufficient spare capacity.

TABLE 4.6

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/SITE ENTRANCE ROAD IN 2025 WITH PROJECT AND INCREASED RIGHT TURN VOLUME INTO SITE

CRITERIA	2025 WITH PROJECT AND INCREASED RIGHT TURN VOLUME INTO SITE	
	AM	PM
LS	A	A
DS	0.104	0.097
AVD(seconds)	2.7	3.1
HMD(seconds)	7.2	7.7

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

Extracts from the SIDRA modelling are contained in Appendix 1.

4.4 Cumulative Impacts

A large proportion of those workers that will access the mine via the Site in 2025 (estimated as 308 people per day on a maintenance weekday) would currently access the mine via Appin West, Appin East or Appin North. There may be a small increase in the workforce associated with the operation of the additional mine access and ventilation shaft infrastructure constructed as part of the Project.

Similarly, a proportion of those heavy vehicles that will service the Mine via the Site in 2025 (estimated at 12 vehicles per day) are already servicing the mine via Appin West, Appin East or Appin North. A small increase in heavy vehicle trips will occur due to the ventilation shaft operation and the Mine access.

Therefore, the majority of the workforce trips associated with the Site's operation, as well as the heavy vehicles generated by the Appin Mine's operation are already using the road network, albeit not the section of Menangle Road adjacent the Project Site.

Notwithstanding this, a conservative approach to the cumulative impacts has been adopted to assess the impact on the intersections based on a 20% increase in background traffic growth for the 10 year period between 2025 and 2035 (i.e. 2% base increase per year for 10 years).

Tables 4.7, 4.8 and 4.9 shows the SIDRA traffic modelling results for the intersection in 2035 with a 20% increase in background traffic from 2025, together with the Project in place.

Reference to Tables 4.7 and 4.8 which show the modelling results for the intersections of Menangle Road with Woodbridge Road/Station Street and Menangle Road with Finns Road. Both intersections will continue to operate at a good Level of Service with a Level of Service B and Level of Service A, respectively, in the Site Peak Hours.

Reference to Table 4.9 which shows the modelling results for the intersection of Menangle Road/Site Entrance intersection shows that this intersection will also operate at a good Level of Service with a Level of Service A in 2035.

Extracts from the SIDRA modelling are in Appendix 1.

TABLE 4.7

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/WOODBRIDGE ROAD AND STATION STREET WITH PROJECT IN 2035

CRITERIA	2035 WITH PROJECT	
	AM	PM
LS	B	B
DS	0.340	0.295
AVD(seconds)	5.3	4.4
HMD(seconds)	18.0	19.8

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

TABLE 4.8

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/FINNS ROAD WITH PROJECT IN 2035

CRITERIA	2035 WITH PROJECT	
	AM	PM
LS	A	A
DS	0.225	0.166
AVD(seconds)	4.2	3.3
HMD(seconds)	11.1	9.9

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

TABLE 4.9

SIDRA MODELLING RESULTS FOR INTERSECTION OF MENANGLE ROAD/SITE ENTRANCE ROAD IN 2035 WITH PROJECT

CRITERIA	2035 WITH PROJECT		2035 WITH PROJECT AND INCREASED RIGHT TURN VOLUME INTO SITE	
	AM	PM	AM	PM
LS	A	A	A	A
DS	0.124	0.110	0.125	0.110
AVD(seconds)	1.1	1.6	2.5	2.9
HMD(seconds)	9.4	10.6	7.9	7.9

Where:
LS *Level of Service*
DS *Degree of Saturation*
AVD *Average Vehicle Delay (in seconds)*
HMD *Highest Movement Delay (in seconds)*

4.5 Construction Impacts

As noted in Section 2.2.4, at peak construction (a period of 6-8 weeks) up to 76 workers could be on site at the same time with up to 44 delivery vehicles per day.

Daily volumes during peak construction are estimated as 240 two way vehicle trips per day i.e. 120 in/120 out.

Outside the peak construction period, heavy vehicle deliveries would number 11-13 vehicles per day (vpd).

The construction of the vent shafts will be undertaken in shifts over 24 hours. Concrete deliveries for the vent shafts will occur 24 hours/7 days per week. Night time concrete deliveries will come from Narellan via Remembrance Driveway, Finns Road, Woodbridge Road and Menangle Road.

Other deliveries will be staggered during the day between 7.00am and 6.00pm Monday to Saturday.

For the peak construction period (6-8 weeks) deliveries will average 4 per hour, with up to 8 per hour during a busy hour.

Other than the night time concrete deliveries, the majority of heavy vehicles will access the Site from the south.

Heavy vehicles will consist of rigid trucks and semi-trailers (up to 19 metres). A number of Special Purpose Vehicles and Oversize Vehicles will deliver equipment to the Site. These vehicles will have the appropriate permits.

The majority of the workforce for the surface construction will arrive between 6.00am and 7.00am and depart between 6.00pm and 7.00pm.

Based on a vehicle occupancy of 1.0 person per vehicle for construction worker trips, the maximum hourly traffic generation during construction is estimated to be;

- 76 inbound workforce trips between 6.00am and 7.00am; and
- 76 outbound workforce trips between 6.00pm and 7.00pm.

The construction workforce trips will not coincide with the commuter AM and PM peak hours on the road network adjacent the Project site and the impacts on the roads and intersections will be less than during the operational phase of the mine.

Should the Project be approved, IMC will prepare a Construction Traffic Management Plan to manage the construction impacts of the Project including the construction of the Site Access Intersection.

4.6 Parking and Internal Roads

Car parking for 212 cars, including two accessible parking spaces, as well as provision for future additional parking will be provided on site. This provision will be adequate for employee/contractor numbers (including at shift change over times) as well as visitors to the Site.

The Wollondilly Development Control Plan does not provide a parking provision rate for mines. Therefore, the assessment has been undertaken based on employee/contractor and visitor numbers to the Site.

The shift changeover times between Shifts 1 and 2 on maintenance weekdays represents the maximum parking demand at the Site. At this time an estimated 198 cars associated with the workforce will be parked on site (116 cars from Shift 1 and 82 cars from Shift 2). Allowing for five visitors, then the total parking demand would be 203 spaces. Therefore, it is concluded that 212 formal car spaces will be adequate car parking for the Site. As noted above, provision for additional future parking will also be made.

Truck parking and loading areas will also be provided on site.

The internal roads, the truck parking and loading areas, as well as the car parking areas will be designed to AS2890.1, AS2890.2 and AS2890.6 standards as appropriate.

4.7 Pedestrians and Cyclists and Public Transport

The Project is not expected to have any negative impacts on pedestrians, cyclists and buses that use the road network adjacent the Project Site.

As noted in Sections 3.3 and 3.4 pedestrian crossing activity as well as the number of cyclists using the road are relatively small.

4.8 Road Safety

The Project is not expected to have any negative impacts on road safety. As part of the Project a channelised Site Entrance intersection will be constructed on Menangle Road. This intersection, as well as the adjacent intersections will all have adequate capacity to cater for the traffic generated by the Project.

The intersections are expected to operate at a good level of service (i.e. Level of Service A or B operation) with low vehicle delays.

5.0 CONCLUSIONS

This report documents the traffic impacts for the Appin Mine Ventilation and Access Project on Menangle Road in Menangle.

The Project involves the construction and operation of Ventilation Shafts 7 and 8, together with mine access facilities and associated infrastructure, including car parking and access roads.

As part of the Project a new Site Entrance intersection will be constructed in Menangle Road north of Finns Road. The intersection will include a left turn auxiliary lane and a right turn bay (CHR treatment) in Menangle Road for left and right turns into the site access. The intersection will be designed and constructed to Austroads Standards.

Once operational in 2025 the worst case day from a traffic perspective would be when up to 308 personnel will access the mine site on a maintenance weekday (1 day per week) over 3 shifts per day. A significant proportion of this workforce will be existing employees/contractors who currently access the mine via a different site.

Heavy vehicles associated with deliveries and maintenance in the operational phase are expected to number 12 trucks per day (12 in/12 out) and will typically be rigid trucks and 19 metre articulated vehicles. A significant proportion of these heavy vehicles associated with the mine operations, are existing heavy vehicles that currently travel to and from a different site.

The assessment of the traffic impacts including the cumulative impacts in the operational phase has found that the traffic impacts will be satisfactory with the Site Entrance intersection as well as the adjacent intersections on the road network all operating at a good level of service, with the Project in place.

The Project will have sufficient car parking to accommodate the maximum parking demand of employees/contractors and visitors at shift changeover times, on maintenance weekdays.

The internal roads and car parking will be designed and constructed to AS2890.1, AS2890.2 and AS2890.6 standards as appropriate.

Following approval, IMC will prepare a Construction Environmental Management Plan (CEMP) including a Traffic Management Plan to manage the impacts of the construction of site infrastructure, including the construction of the Site Access Intersection.

The Project is not expected to have any negative impacts on other road users including pedestrians, cyclists and public transport vehicles (buses) and or on road safety.

APPENDIX 1

SIDRA MODELLING EXTRACTS

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- Ex AM (Site Folder: General)]

Ex AM
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	8	1	8	12.5	0.098	4.7	LOS A	0.0	0.1	0.00	0.02	0.00	49.2
2	T1	193	8	193	4.1	0.098	0.0	LOS A	0.0	0.1	0.00	0.02	0.00	49.9
3	R2	1	0	1	0.0	0.098	4.8	LOS A	0.0	0.1	0.00	0.02	0.00	49.5
Approach		202	9	202	4.5	0.098	0.2	NA	0.0	0.1	0.00	0.02	0.00	49.8
East: Station St														
4	L2	4	1	4	25.0	0.047	8.7	LOS A	0.2	1.2	0.34	0.95	0.34	43.0
5	T1	5	0	5	0.0	0.047	9.1	LOS A	0.2	1.2	0.34	0.95	0.34	43.3
6	R2	17	2	17	11.8	0.047	13.3	LOS A	0.2	1.2	0.34	0.95	0.34	43.3
Approach		26	3	26	11.5	0.047	11.7	LOS A	0.2	1.2	0.34	0.95	0.34	43.2
North: Menangle Rd														
7	L2	10	4	10	40.0	0.080	5.5	LOS A	0.4	2.8	0.29	0.30	0.29	46.5
8	T1	58	6	58	10.3	0.080	0.5	LOS A	0.4	2.8	0.29	0.30	0.29	47.5
9	R2	68	0	68	0.0	0.080	5.2	LOS A	0.4	2.8	0.29	0.30	0.29	47.2
Approach		136	10	136	7.4	0.080	3.2	NA	0.4	2.8	0.29	0.30	0.29	47.2
West: Woodbridge Rd														
10	L2	256	8	256	3.1	0.233	8.5	LOS A	1.0	7.6	0.35	0.88	0.35	44.8
11	T1	3	0	3	0.0	0.233	9.6	LOS A	1.0	7.6	0.35	0.88	0.35	44.7
12	R2	5	2	5	40.0	0.233	13.2	LOS A	1.0	7.6	0.35	0.88	0.35	44.4
Approach		264	10	264	3.8	0.233	8.6	LOS A	1.0	7.6	0.35	0.88	0.35	44.8
All Vehicles		628	32	628	5.1	0.233	4.9	NA	1.0	7.6	0.23	0.48	0.23	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- Ex PM (Site Folder: General)]

Ex PM
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	9	1	9	11.1	0.054	4.8	LOS A	0.0	0.3	0.03	0.06	0.03	48.9
2	T1	95	6	95	6.3	0.054	0.0	LOS A	0.0	0.3	0.03	0.06	0.03	49.5
3	R2	4	0	4	0.0	0.054	5.1	LOS A	0.0	0.3	0.03	0.06	0.03	49.2
Approach		108	7	108	6.5	0.054	0.6	NA	0.0	0.3	0.03	0.06	0.03	49.5
East: Station St														
4	L2	10	2	10	20.0	0.040	8.9	LOS A	0.1	1.1	0.39	0.92	0.39	43.4
5	T1	5	0	5	0.0	0.040	10.3	LOS A	0.1	1.1	0.39	0.92	0.39	43.6
6	R2	10	2	10	20.0	0.040	14.1	LOS A	0.1	1.1	0.39	0.92	0.39	43.5
Approach		25	4	25	16.0	0.040	11.3	LOS A	0.1	1.1	0.39	0.92	0.39	43.5
North: Menangle Rd														
7	L2	11	1	11	9.1	0.217	5.1	LOS A	1.2	8.7	0.23	0.30	0.23	47.0
8	T1	154	15	154	9.7	0.217	0.3	LOS A	1.2	8.7	0.23	0.30	0.23	47.6
9	R2	210	13	210	6.2	0.217	5.0	LOS A	1.2	8.7	0.23	0.30	0.23	47.2
Approach		375	29	375	7.7	0.217	3.1	NA	1.2	8.7	0.23	0.30	0.23	47.3
West: Woodbridge Rd														
10	L2	92	4	92	4.3	0.106	8.0	LOS A	0.4	3.0	0.21	0.91	0.21	44.6
11	T1	5	0	5	0.0	0.106	10.6	LOS A	0.4	3.0	0.21	0.91	0.21	44.6
12	R2	15	0	15	0.0	0.106	11.7	LOS A	0.4	3.0	0.21	0.91	0.21	44.8
Approach		112	4	112	3.6	0.106	8.6	LOS A	0.4	3.0	0.21	0.91	0.21	44.6
All Vehicles		620	44	620	7.1	0.217	4.0	NA	1.2	8.7	0.20	0.39	0.20	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- 2025 AM Proposal (Site Folder: General)]

2025 AM with Proposal
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	10	2	10	20.0	0.112	4.8	LOS A	0.0	0.2	0.01	0.03	0.01	49.0
2	T1	217	9	217	4.1	0.112	0.0	LOS A	0.0	0.2	0.01	0.03	0.01	49.8
3	R2	3	0	3	0.0	0.112	4.8	LOS A	0.0	0.2	0.01	0.03	0.01	49.5
Approach		230	11	230	4.8	0.112	0.3	NA	0.0	0.2	0.01	0.03	0.01	49.8
East: Station St														
4	L2	5	2	5	40.0	0.062	9.3	LOS A	0.2	1.6	0.39	0.97	0.39	42.4
5	T1	6	0	6	0.0	0.062	9.5	LOS A	0.2	1.6	0.39	0.97	0.39	42.8
6	R2	19	3	19	15.8	0.062	15.0	LOS B	0.2	1.6	0.39	0.97	0.39	42.8
Approach		30	5	30	16.7	0.062	13.0	LOS A	0.2	1.6	0.39	0.97	0.39	42.7
North: Menangle Rd														
7	L2	13	6	13	46.2	0.100	5.7	LOS A	0.5	3.6	0.31	0.31	0.31	46.3
8	T1	72	8	72	11.1	0.100	0.6	LOS A	0.5	3.6	0.31	0.31	0.31	47.4
9	R2	83	0	83	0.0	0.100	5.3	LOS A	0.5	3.6	0.31	0.31	0.31	47.1
Approach		168	14	168	8.3	0.100	3.3	NA	0.5	3.6	0.31	0.31	0.31	47.2
West: Woodbridge Rd														
10	L2	282	9	282	3.2	0.267	8.7	LOS A	1.2	8.9	0.39	0.89	0.39	44.7
11	T1	4	0	4	0.0	0.267	10.2	LOS A	1.2	8.9	0.39	0.89	0.39	44.7
12	R2	6	3	6	50.0	0.267	15.3	LOS B	1.2	8.9	0.39	0.89	0.39	44.2
Approach		292	12	292	4.1	0.267	8.9	LOS A	1.2	8.9	0.39	0.89	0.39	44.7
All Vehicles		720	42	720	5.8	0.267	5.0	NA	1.2	8.9	0.25	0.48	0.25	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- 2025 PM Proposal (Site Folder: General)]

2025 PM with Proposal
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	10	2	10	20.0	0.066	5.0	LOS A	0.1	0.4	0.04	0.06	0.04	48.7
2	T1	116	7	116	6.0	0.066	0.0	LOS A	0.1	0.4	0.04	0.06	0.04	49.5
3	R2	6	0	6	0.0	0.066	5.2	LOS A	0.1	0.4	0.04	0.06	0.04	49.2
Approach		132	9	132	6.8	0.066	0.7	NA	0.1	0.4	0.04	0.06	0.04	49.4
East: Station St														
4	L2	11	3	11	27.3	0.052	9.4	LOS A	0.2	1.4	0.43	0.94	0.43	42.9
5	T1	6	0	6	0.0	0.052	10.9	LOS A	0.2	1.4	0.43	0.94	0.43	43.2
6	R2	11	3	11	27.3	0.052	16.3	LOS B	0.2	1.4	0.43	0.94	0.43	43.0
Approach		28	6	28	21.4	0.052	12.4	LOS A	0.2	1.4	0.43	0.94	0.43	43.0
North: Menangle Rd														
7	L2	12	2	12	16.7	0.242	5.2	LOS A	1.3	10.1	0.27	0.31	0.27	46.8
8	T1	170	17	170	10.0	0.242	0.4	LOS A	1.3	10.1	0.27	0.31	0.27	47.5
9	R2	231	15	231	6.5	0.242	5.1	LOS A	1.3	10.1	0.27	0.31	0.27	47.1
Approach		413	34	413	8.2	0.242	3.2	NA	1.3	10.1	0.27	0.31	0.27	47.3
West: Woodbridge Rd														
10	L2	101	5	101	5.0	0.124	8.1	LOS A	0.5	3.5	0.25	0.91	0.25	44.5
11	T1	6	0	6	0.0	0.124	11.3	LOS A	0.5	3.5	0.25	0.91	0.25	44.5
12	R2	17	0	17	0.0	0.124	12.6	LOS A	0.5	3.5	0.25	0.91	0.25	44.7
Approach		124	5	124	4.0	0.124	8.9	LOS A	0.5	3.5	0.25	0.91	0.25	44.5
All Vehicles		697	54	697	7.7	0.242	4.1	NA	1.3	10.1	0.23	0.39	0.23	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- 2035 AM Proposal (Site Folder: General)]

2035 AM with Proposal
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	12	3	12	25.0	0.135	4.9	LOS A	0.0	0.3	0.01	0.03	0.01	48.9
2	T1	260	10	260	3.8	0.135	0.0	LOS A	0.0	0.3	0.01	0.03	0.01	49.8
3	R2	4	0	4	0.0	0.135	4.9	LOS A	0.0	0.3	0.01	0.03	0.01	49.5
Approach		276	13	276	4.7	0.135	0.3	NA	0.0	0.3	0.01	0.03	0.01	49.8
East: Station St														
4	L2	7	3	7	42.9	0.093	9.6	LOS A	0.3	2.5	0.44	0.97	0.44	41.5
5	T1	8	0	8	0.0	0.093	10.2	LOS A	0.3	2.5	0.44	0.97	0.44	42.0
6	R2	23	4	23	17.4	0.093	18.0	LOS B	0.3	2.5	0.44	0.97	0.44	41.9
Approach		38	7	38	18.4	0.093	14.8	LOS B	0.3	2.5	0.44	0.97	0.44	41.9
North: Menangle Rd														
7	L2	16	7	16	43.8	0.124	5.9	LOS A	0.6	4.6	0.35	0.32	0.35	46.2
8	T1	86	9	86	10.5	0.124	0.8	LOS A	0.6	4.6	0.35	0.32	0.35	47.3
9	R2	100	0	100	0.0	0.124	5.6	LOS A	0.6	4.6	0.35	0.32	0.35	47.0
Approach		202	16	202	7.9	0.124	3.6	NA	0.6	4.6	0.35	0.32	0.35	47.1
West: Woodbridge Rd														
10	L2	338	11	338	3.3	0.340	9.1	LOS A	1.6	11.8	0.45	0.90	0.45	44.5
11	T1	5	0	5	0.0	0.340	11.3	LOS A	1.6	11.8	0.45	0.90	0.45	44.5
12	R2	8	4	8	50.0	0.340	17.7	LOS B	1.6	11.8	0.45	0.90	0.45	44.0
Approach		351	15	351	4.3	0.340	9.3	LOS A	1.6	11.8	0.45	0.90	0.45	44.5
All Vehicles		867	51	867	5.9	0.340	5.3	NA	1.6	11.8	0.29	0.49	0.29	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Menangle Rd, Station St, Woodbridge Rd- 2035 PM Proposal (Site Folder: General)]

2035 PM with Proposal
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	12	3	12	25.0	0.080	5.1	LOS A	0.1	0.6	0.05	0.07	0.05	48.6
2	T1	139	8	139	5.8	0.080	0.1	LOS A	0.1	0.6	0.05	0.07	0.05	49.5
3	R2	8	0	8	0.0	0.080	5.3	LOS A	0.1	0.6	0.05	0.07	0.05	49.1
Approach		159	11	159	6.9	0.080	0.7	NA	0.1	0.6	0.05	0.07	0.05	49.4
East: Station St														
4	L2	13	4	13	30.8	0.080	9.7	LOS A	0.3	2.2	0.50	0.95	0.50	42.0
5	T1	8	0	8	0.0	0.080	12.2	LOS A	0.3	2.2	0.50	0.95	0.50	42.3
6	R2	14	4	14	28.6	0.080	19.8	LOS B	0.3	2.2	0.50	0.95	0.50	42.2
Approach		35	8	35	22.9	0.080	14.3	LOS A	0.3	2.2	0.50	0.95	0.50	42.2
North: Menangle Rd														
7	L2	15	3	15	20.0	0.295	5.4	LOS A	1.7	12.9	0.31	0.31	0.31	46.7
8	T1	204	19	204	9.3	0.295	0.6	LOS A	1.7	12.9	0.31	0.31	0.31	47.4
9	R2	277	17	277	6.1	0.295	5.3	LOS A	1.7	12.9	0.31	0.31	0.31	47.0
Approach		496	39	496	7.9	0.295	3.4	NA	1.7	12.9	0.31	0.31	0.31	47.1
West: Woodbridge Rd														
10	L2	121	6	121	5.0	0.159	8.3	LOS A	0.6	4.6	0.29	0.90	0.29	44.3
11	T1	8	0	8	0.0	0.159	12.9	LOS A	0.6	4.6	0.29	0.90	0.29	44.3
12	R2	19	0	19	0.0	0.159	14.5	LOS B	0.6	4.6	0.29	0.90	0.29	44.5
Approach		148	6	148	4.1	0.159	9.3	LOS A	0.6	4.6	0.29	0.90	0.29	44.3
All Vehicles		838	64	838	7.6	0.295	4.4	NA	1.7	12.9	0.27	0.40	0.27	46.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-Ex AM (Site Folder: General)]

Ex AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	134	10	134	7.5	0.144	7.1	LOS A	0.0	0.0	0.00	0.30	0.00	67.2
2	T1	152	8	152	5.3	0.144	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	74.7
Approach		286	18	286	6.3	0.144	3.3	NA	0.0	0.0	0.00	0.30	0.00	71.0
North: Menangle Rd														
8	T1	56	6	56	10.7	0.032	0.2	LOS A	0.0	0.3	0.06	0.03	0.06	79.2
9	R2	3	2	3	66.7	0.032	10.0	LOS A	0.0	0.3	0.06	0.03	0.06	53.1
Approach		59	8	59	13.6	0.032	0.7	NA	0.0	0.3	0.06	0.03	0.06	77.3
West: Finns Rd														
10	L2	29	4	29	13.8	0.142	7.8	LOS A	0.5	3.7	0.32	0.66	0.32	59.7
12	R2	116	5	116	4.3	0.142	8.2	LOS A	0.5	3.7	0.32	0.66	0.32	62.5
Approach		145	9	145	6.2	0.142	8.1	LOS A	0.5	3.7	0.32	0.66	0.32	61.9
All Vehicles		490	35	490	7.1	0.144	4.4	NA	0.5	3.7	0.10	0.38	0.10	68.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-Ex PM (Site Folder: General)]

Ex PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	116	8	116	6.9	0.097	7.1	LOS A	0.0	0.0	0.00	0.39	0.00	66.2
2	T1	75	5	75	6.7	0.097	0.0	LOS A	0.0	0.0	0.00	0.39	0.00	73.2
Approach		191	13	191	6.8	0.097	4.3	NA	0.0	0.0	0.00	0.39	0.00	68.8
North: Menangle Rd														
8	T1	120	12	120	10.0	0.078	0.2	LOS A	0.2	1.4	0.12	0.11	0.12	77.1
9	R2	24	3	24	12.5	0.078	8.0	LOS A	0.2	1.4	0.12	0.11	0.12	67.4
Approach		144	15	144	10.4	0.078	1.5	NA	0.2	1.4	0.12	0.11	0.12	75.3
West: Finns Rd														
10	L2	11	0	11	0.0	0.053	7.2	LOS A	0.2	1.4	0.25	0.63	0.25	64.3
12	R2	42	6	42	14.3	0.053	8.4	LOS A	0.2	1.4	0.25	0.63	0.25	59.7
Approach		53	6	53	11.3	0.053	8.1	LOS A	0.2	1.4	0.25	0.63	0.25	60.6
All Vehicles		388	34	388	8.8	0.097	3.8	NA	0.2	1.4	0.08	0.32	0.08	69.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-2025 AM Proposal (Site Folder: General)]

2025 AM with Proposal
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	148	11	148	7.4	0.160	7.1	LOS A	0.0	0.0	0.00	0.30	0.00	67.2
2	T1	170	10	170	5.9	0.160	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	74.7
Approach		318	21	318	6.6	0.160	3.3	NA	0.0	0.0	0.00	0.30	0.00	71.0
North: Menangle Rd														
8	T1	141	8	141	5.7	0.075	0.1	LOS A	0.1	0.5	0.04	0.02	0.04	79.5
9	R2	4	3	4	75.0	0.075	10.7	LOS A	0.1	0.5	0.04	0.02	0.04	51.5
Approach		145	11	145	7.6	0.075	0.4	NA	0.1	0.5	0.04	0.02	0.04	78.4
West: Finns Rd														
10	L2	32	5	32	15.6	0.173	7.9	LOS A	0.6	4.6	0.38	0.70	0.38	58.8
12	R2	128	6	128	4.7	0.173	8.9	LOS A	0.6	4.6	0.38	0.70	0.38	61.9
Approach		160	11	160	6.9	0.173	8.7	LOS A	0.6	4.6	0.38	0.70	0.38	61.3
All Vehicles		623	43	623	6.9	0.173	4.0	NA	0.6	4.6	0.11	0.34	0.11	69.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-2025 PM Proposal (Site Folder: General)]

2025 PM with Proposal
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	128	9	128	7.0	0.108	7.1	LOS A	0.0	0.0	0.00	0.39	0.00	66.2
2	T1	84	6	84	7.1	0.108	0.0	LOS A	0.0	0.0	0.00	0.39	0.00	73.2
Approach		212	15	212	7.1	0.108	4.3	NA	0.0	0.0	0.00	0.39	0.00	68.8
North: Menangle Rd														
8	T1	241	15	241	6.2	0.139	0.1	LOS A	0.2	1.8	0.09	0.06	0.09	78.1
9	R2	27	4	27	14.8	0.139	8.2	LOS A	0.2	1.8	0.09	0.06	0.09	67.4
Approach		268	19	268	7.1	0.139	1.0	NA	0.2	1.8	0.09	0.06	0.09	76.9
West: Finns Rd														
10	L2	11	0	11	0.0	0.068	7.2	LOS A	0.2	1.7	0.30	0.66	0.30	63.5
12	R2	47	7	47	14.9	0.068	9.2	LOS A	0.2	1.7	0.30	0.66	0.30	58.8
Approach		58	7	58	12.1	0.068	8.9	LOS A	0.2	1.7	0.30	0.66	0.30	59.6
All Vehicles		538	41	538	7.6	0.139	3.1	NA	0.2	1.8	0.08	0.26	0.08	71.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-2035 AM Proposal (Site Folder: General)]

2035 AM with Proposal
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	178	13	178	7.3	0.192	7.1	LOS A	0.0	0.0	0.00	0.30	0.00	67.2
2	T1	204	12	204	5.9	0.192	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	74.6
Approach		382	25	382	6.5	0.192	3.3	NA	0.0	0.0	0.00	0.30	0.00	71.0
North: Menangle Rd														
8	T1	169	10	169	5.9	0.092	0.2	LOS A	0.1	0.8	0.06	0.02	0.06	79.3
9	R2	6	4	6	66.7	0.092	11.1	LOS A	0.1	0.8	0.06	0.02	0.06	53.2
Approach		175	14	175	8.0	0.092	0.6	NA	0.1	0.8	0.06	0.02	0.06	78.0
West: Finns Rd														
10	L2	38	6	38	15.8	0.225	8.1	LOS A	0.8	6.2	0.43	0.74	0.43	58.3
12	R2	154	7	154	4.5	0.225	9.5	LOS A	0.8	6.2	0.43	0.74	0.43	61.4
Approach		192	13	192	6.8	0.225	9.2	LOS A	0.8	6.2	0.43	0.74	0.43	60.8
All Vehicles		749	52	749	6.9	0.225	4.2	NA	0.8	6.2	0.12	0.35	0.12	69.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Menangle Rd & Finns Rd-2035 PM Proposal (Site Folder: General)]

2035 PM with Proposal
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
1	L2	154	11	154	7.1	0.130	7.1	LOS A	0.0	0.0	0.00	0.39	0.00	66.1
2	T1	101	8	101	7.9	0.130	0.0	LOS A	0.0	0.0	0.00	0.39	0.00	73.2
Approach		255	19	255	7.5	0.130	4.3	NA	0.0	0.0	0.00	0.39	0.00	68.7
North: Menangle Rd														
8	T1	283	17	283	6.0	0.166	0.2	LOS A	0.3	2.3	0.11	0.07	0.11	78.0
9	R2	33	5	33	15.2	0.166	8.5	LOS A	0.3	2.3	0.11	0.07	0.11	67.1
Approach		316	22	316	7.0	0.166	1.1	NA	0.3	2.3	0.11	0.07	0.11	76.7
West: Finns Rd														
10	L2	13	0	13	0.0	0.088	7.3	LOS A	0.3	2.3	0.34	0.69	0.34	62.9
12	R2	56	9	56	16.1	0.088	9.9	LOS A	0.3	2.3	0.34	0.69	0.34	58.0
Approach		69	9	69	13.0	0.088	9.4	LOS A	0.3	2.3	0.34	0.69	0.34	58.9
All Vehicles		640	50	640	7.8	0.166	3.3	NA	0.3	2.3	0.09	0.26	0.09	71.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2025 AM (Site Folder: General)]

2025 AM Peak Mine Operations
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	200	14	200	7.0	0.103	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	1	1	1	100.0	0.001	9.3	LOS A	0.0	0.1	0.20	0.57	0.20	50.5
Approach		201	15	201	7.5	0.103	0.1	NA	0.0	0.1	0.00	0.00	0.00	79.7
East: Site Access Rd														
4	L2	77	1	77	1.3	0.062	4.8	LOS A	0.2	1.6	0.16	0.51	0.16	53.4
6	R2	6	0	6	0.0	0.008	6.4	LOS A	0.0	0.2	0.39	0.55	0.39	52.7
Approach		83	1	83	1.2	0.062	5.0	LOS A	0.2	1.6	0.18	0.51	0.18	53.3
North: Menangle Rd														
7	L2	1	0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	66	10	66	15.2	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		67	10	67	14.9	0.037	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.7
All Vehicles		351	26	351	7.4	0.103	1.2	NA	0.2	1.6	0.04	0.12	0.04	71.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2025 PM (Site Folder: General)]

2025 PM Peak Mine Operations
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	94	13	94	13.8	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	1	1	1	100.0	0.001	10.2	LOS A	0.0	0.1	0.34	0.56	0.34	50.0
Approach		95	14	95	14.7	0.051	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.5
East: Site Access Rd														
4	L2	109	1	109	0.9	0.097	5.3	LOS A	0.4	2.5	0.28	0.54	0.28	53.1
6	R2	8	0	8	0.0	0.010	6.4	LOS A	0.0	0.3	0.39	0.56	0.39	52.7
Approach		117	1	117	0.9	0.097	5.4	LOS A	0.4	2.5	0.29	0.54	0.29	53.1
North: Menangle Rd														
7	L2	1	0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	169	18	169	10.7	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		170	18	170	10.6	0.092	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.8
All Vehicles		382	33	382	8.6	0.097	1.7	NA	0.4	2.5	0.09	0.17	0.09	69.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2035 AM (Site Folder: General)]

2035 AM Peak Mine Operations
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	240	16	240	6.7	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	1	1	1	100.0	0.001	9.4	LOS A	0.0	0.1	0.23	0.56	0.23	50.4
Approach		241	17	241	7.1	0.124	0.1	NA	0.0	0.1	0.00	0.00	0.00	79.7
East: Site Access Rd														
4	L2	77	1	77	1.3	0.063	4.9	LOS A	0.2	1.6	0.18	0.51	0.18	53.3
6	R2	6	0	6	0.0	0.008	6.9	LOS A	0.0	0.2	0.43	0.57	0.43	52.3
Approach		83	1	83	1.2	0.063	5.0	LOS A	0.2	1.6	0.20	0.51	0.20	53.3
North: Menangle Rd														
7	L2	1	0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	79	12	79	15.2	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		80	12	80	15.0	0.044	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.8
All Vehicles		404	30	404	7.4	0.124	1.1	NA	0.2	1.6	0.04	0.11	0.04	72.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2035 PM (Site Folder: General)]

2035 PM Peak Mine Operations
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	113	15	113	13.3	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	1	1	1	100.0	0.001	10.6	LOS A	0.0	0.1	0.38	0.57	0.38	49.9
Approach		114	16	114	14.0	0.061	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.5
East: Site Access Rd														
4	L2	109	1	109	0.9	0.101	5.5	LOS A	0.4	2.6	0.31	0.56	0.31	53.0
6	R2	8	0	8	0.0	0.011	6.9	LOS A	0.0	0.3	0.43	0.58	0.43	52.3
Approach		117	1	117	0.9	0.101	5.6	LOS A	0.4	2.6	0.32	0.56	0.32	53.0
North: Menangle Rd														
7	L2	1	0	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	203	20	203	9.9	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		204	20	204	9.8	0.110	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.9
All Vehicles		435	37	435	8.5	0.110	1.6	NA	0.4	2.6	0.09	0.15	0.09	70.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2025 AMRT (Site Folder: General)]

2025 AM Peak Mine Operations with Increased Right Turn Volumes
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	200	14	200	7.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	109	1	109	0.9	0.082	7.2	LOS A	0.3	2.4	0.18	0.59	0.18	54.0
Approach		309	15	309	4.9	0.104	2.6	NA	0.3	2.4	0.06	0.21	0.06	68.4
East: Site Access Rd														
4	L2	77	1	77	1.3	0.062	4.8	LOS A	0.2	1.6	0.16	0.51	0.16	53.4
6	R2	6	0	6	0.0	0.009	7.3	LOS A	0.0	0.2	0.46	0.59	0.46	52.0
Approach		83	1	83	1.2	0.062	5.0	LOS A	0.2	1.6	0.18	0.51	0.18	53.3
North: Menangle Rd														
7	L2	8	0	8	0.0	0.004	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	66	10	66	15.2	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		74	10	74	13.5	0.037	0.8	NA	0.0	0.0	0.00	0.07	0.00	78.1
All Vehicles		466	26	466	5.6	0.104	2.7	NA	0.3	2.4	0.07	0.24	0.07	66.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2025 PMRT (Site Folder: General)]

2025 PM Peak Mine Operations with Increased Right Turn
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	94	13	94	13.8	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	109	1	109	0.9	0.091	7.7	LOS A	0.4	2.6	0.30	0.61	0.30	53.6
Approach		203	14	203	6.9	0.091	4.1	NA	0.4	2.6	0.16	0.33	0.16	63.3
East: Site Access Rd														
4	L2	109	1	109	0.9	0.097	5.3	LOS A	0.4	2.5	0.28	0.54	0.28	53.1
6	R2	8	0	8	0.0	0.012	7.3	LOS A	0.0	0.3	0.46	0.60	0.46	52.0
Approach		117	1	117	0.9	0.097	5.4	LOS A	0.4	2.5	0.29	0.55	0.29	53.0
North: Menangle Rd														
7	L2	8	0	8	0.0	0.004	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	169	18	169	10.7	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		177	18	177	10.2	0.092	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.2
All Vehicles		497	33	497	6.6	0.097	3.1	NA	0.4	2.6	0.13	0.27	0.13	64.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2035 AMRT (Site Folder: General)]

2035 AM Peak Mine Operations with Increased Right Turn Volumes
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	240	16	240	6.7	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	109	1	109	0.9	0.083	7.3	LOS A	0.3	2.4	0.20	0.59	0.20	53.9
Approach		349	17	349	4.9	0.125	2.3	NA	0.3	2.4	0.06	0.18	0.06	69.5
East: Site Access Rd														
4	L2	77	1	77	1.3	0.063	4.9	LOS A	0.2	1.6	0.18	0.51	0.18	53.3
6	R2	6	0	6	0.0	0.010	7.9	LOS A	0.0	0.2	0.50	0.61	0.50	51.6
Approach		83	1	83	1.2	0.063	5.1	LOS A	0.2	1.6	0.20	0.52	0.20	53.2
North: Menangle Rd														
7	L2	8	0	8	0.0	0.004	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	79	12	79	15.2	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		87	12	87	13.8	0.044	0.6	NA	0.0	0.0	0.00	0.06	0.00	78.4
All Vehicles		519	30	519	5.8	0.125	2.5	NA	0.3	2.4	0.07	0.22	0.07	67.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Meanagle Rd & Site Access 2035 PMRT (Site Folder: General)]

2035 PM Peak Mine Operations with Increased Right Turn
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Menangle Rd														
2	T1	113	15	113	13.3	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	109	1	109	0.9	0.094	7.8	LOS A	0.4	2.7	0.33	0.63	0.33	53.5
Approach		222	16	222	7.2	0.094	3.9	NA	0.4	2.7	0.16	0.31	0.16	64.3
East: Site Access Rd														
4	L2	109	1	109	0.9	0.101	5.5	LOS A	0.4	2.6	0.31	0.56	0.31	53.0
6	R2	8	0	8	0.0	0.013	7.9	LOS A	0.0	0.3	0.49	0.62	0.49	51.6
Approach		117	1	117	0.9	0.101	5.6	LOS A	0.4	2.6	0.32	0.56	0.32	52.9
North: Menangle Rd														
7	L2	8	0	8	0.0	0.004	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
8	T1	203	20	203	9.9	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		211	20	211	9.5	0.110	0.3	NA	0.0	0.0	0.00	0.02	0.00	79.3
All Vehicles		550	37	550	6.7	0.110	2.9	NA	0.4	2.7	0.13	0.25	0.13	66.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.