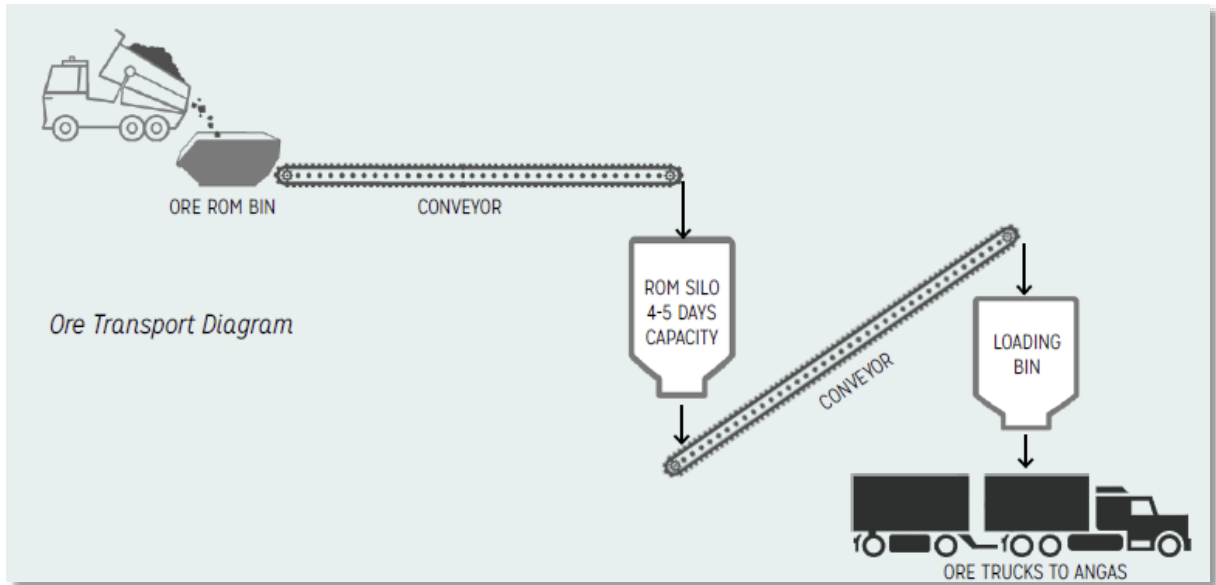


CHAPTER 8

TRAFFIC



BIRD IN HAND GOLD PROJECT

MINING LEASE PROPOSAL



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8 TRAFFIC

8.1 APPLICABLE LEGISLATION AND STANDARDS

The relevant legislation relating to traffic at the proposed project site includes:

- *Road Traffic Act 1961 (SA)*
- *Local Government Act 1999 (SA)*
- *Highways Act 1926 (SA)*
- *Road Traffic (Miscellaneous) Regulations 2014 (SA)*

Guidelines which are applicable to the project include:

- Austroads Guide to Traffic Management

8.2 ASSESSMENT METHOD

The traffic assessments (see Appendix F1) have been undertaken by Tonkin Consulting Pty Ltd (Tonkin) in accordance with procedures outlined in the Department of Planning, Transport and Infrastructure (DPTI) Restricted Access Vehicle Route Assessment document.

The key objectives of the Traffic Impact Assessment were as follows:

- Conduct a preliminary route assessment to review three haulage routes from the proposed mine site to the Angas Zinc Mine site at Strathalbyn. This will include potential treatment options and costs for identified infrastructure upgrades required to facilitate safe haulage;
- Visit the site and determine the suitability of the proposed access point in regards to sight distances and other developments. In particular, the mine access location relative to the Adelaide Polo Club development access location opposite the subject site on Pfeiffer Road will be considered;
- Collect and review existing traffic data (volumes and crash statistics) around the site and key roads part of the haulage routes;
- Determine the preferred haulage vehicle for the movement of ore from the mine site to the processing plant;
- Review and estimate trip generation for all traffic associated with the mine based on the anticipated production rates for the mine by Terramin;

Analyse traffic distribution and assess impacts of additional vehicle traffic as a result of the mining operations.

8.3 EXISTING ENVIRONMENT

Terramin explored various routes as part of the traffic impact assessment during 2016 and 2017. Figure 8-1 outlines the existing transport network in the study area. The road network in the vicinity of the study area is primarily under the care and control of DPTI, Adelaide Hills Council, Mount Barker District Council, Alexandrina Council and Murray Bridge Council.

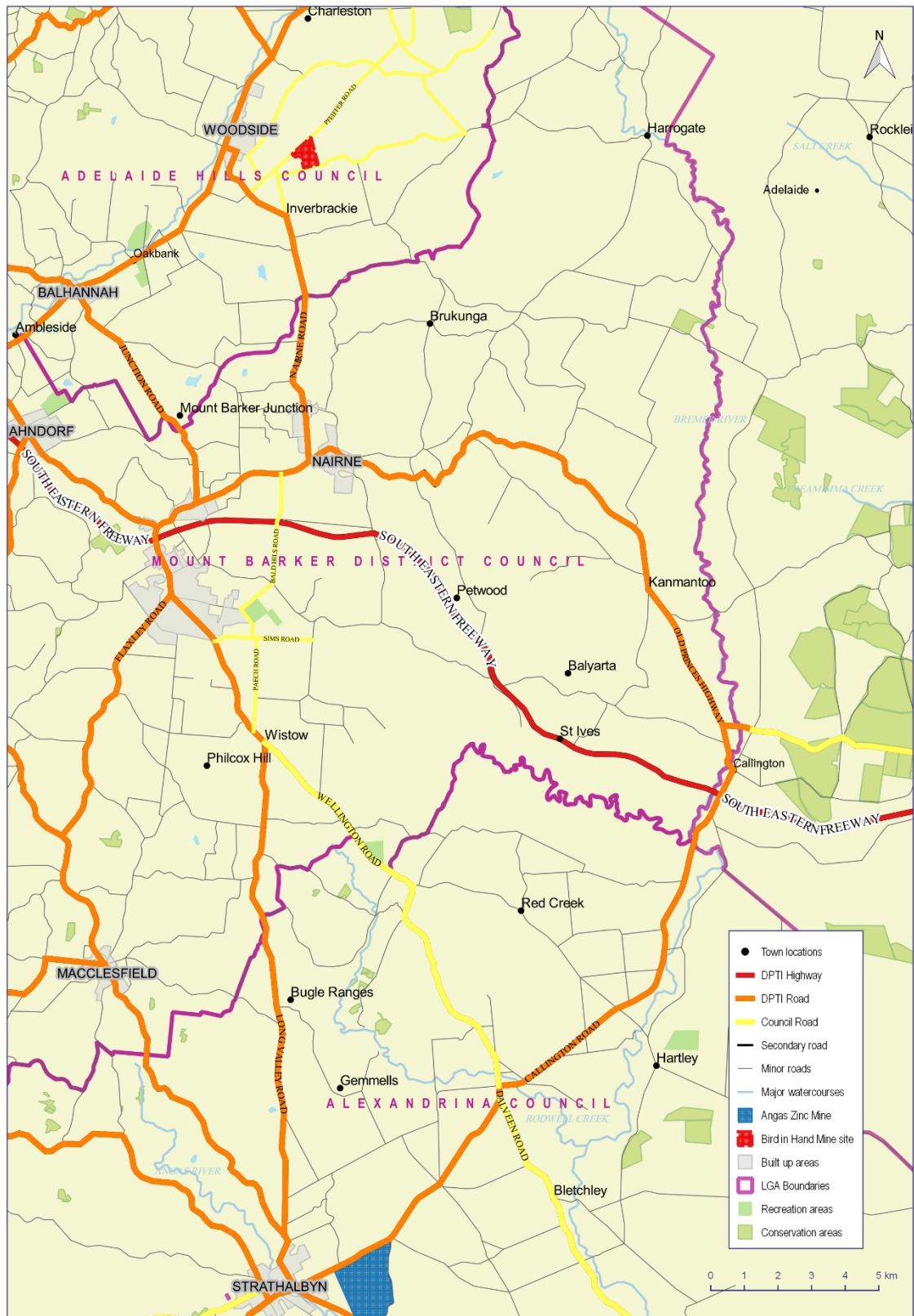


FIGURE 8-1 | EXISTING ROAD TRANSPORT NETWORK (TONKIN, 2017)

8.3.1 EXISTING ARTERIAL ROADS IN STUDY AREA

The characteristics of the arterial roads which form major accesses to the proposed and Angas Zinc Mine sites as part of the haulage routes, are detailed in

Table 8-1. The roads shown in Table 8-2 are under the care and control of DPTI.

TABLE 8-1 | ARTERIAL ROAD NETWORK SUMMARY

Table 2.1 Arterial road network summary

Road Name	Sealed	Single Carriageway	Lanes
Nairne Road	✓	✓	2
Old Princes Highway	✓	✓	2
South Eastern Freeway	✓		4

The Annual Average Daily Traffic (AADT) of each of the above roads varies between towns and segments. Table 8-2 outlines the existing AADT for the above roads as provided by DPTI's traffic volumes (2015). The heavy vehicle daily traffic (HVDT), and its percentage of AADT, is also shown.

TABLE 8-2 | EXISTING AADT

Table 2.3 Existing AADT

Road Name	Segment	AADT (2015)	HVDT (%)
Nairne Road	Pfeiffer Road to Military Road	3,400	200 (6%)
	Military Road to Nairne entrance	5,000	230 (4.5%)
	Nairne entrance to Old Princes Highway	6,300	250 (5%)
Old Princes Highway	Old Princes Highway through Nairne Township	7,600	260 (3.5%)
	Nairne Township to Callington Road	1,300	75 (6%)
South Eastern Freeway	Bald Hills Road Interchange to Callington Road	12,600	2,100 (16.5%)

8.3.2 LOCAL ROAD NETWORK

The local road network surrounding the proposed mine site consists of Pfeiffer Road as the main access road to the proposed mine site (Figure 8-2).

Pfeiffer Road is a local road that forms a connection between Nairne Road and Teakles Road, with a sign posted speed limit of 80km/h. Pfeiffer Road is aligned in a north-east to south-west direction, and has a painted centreline that varies between a broken and continuous line due to a number of crests. The road is sealed and has a width of approximately 6m with unsealed shoulders. There are a number of access points along Pfeiffer Road, including junctions, wineries and private properties.

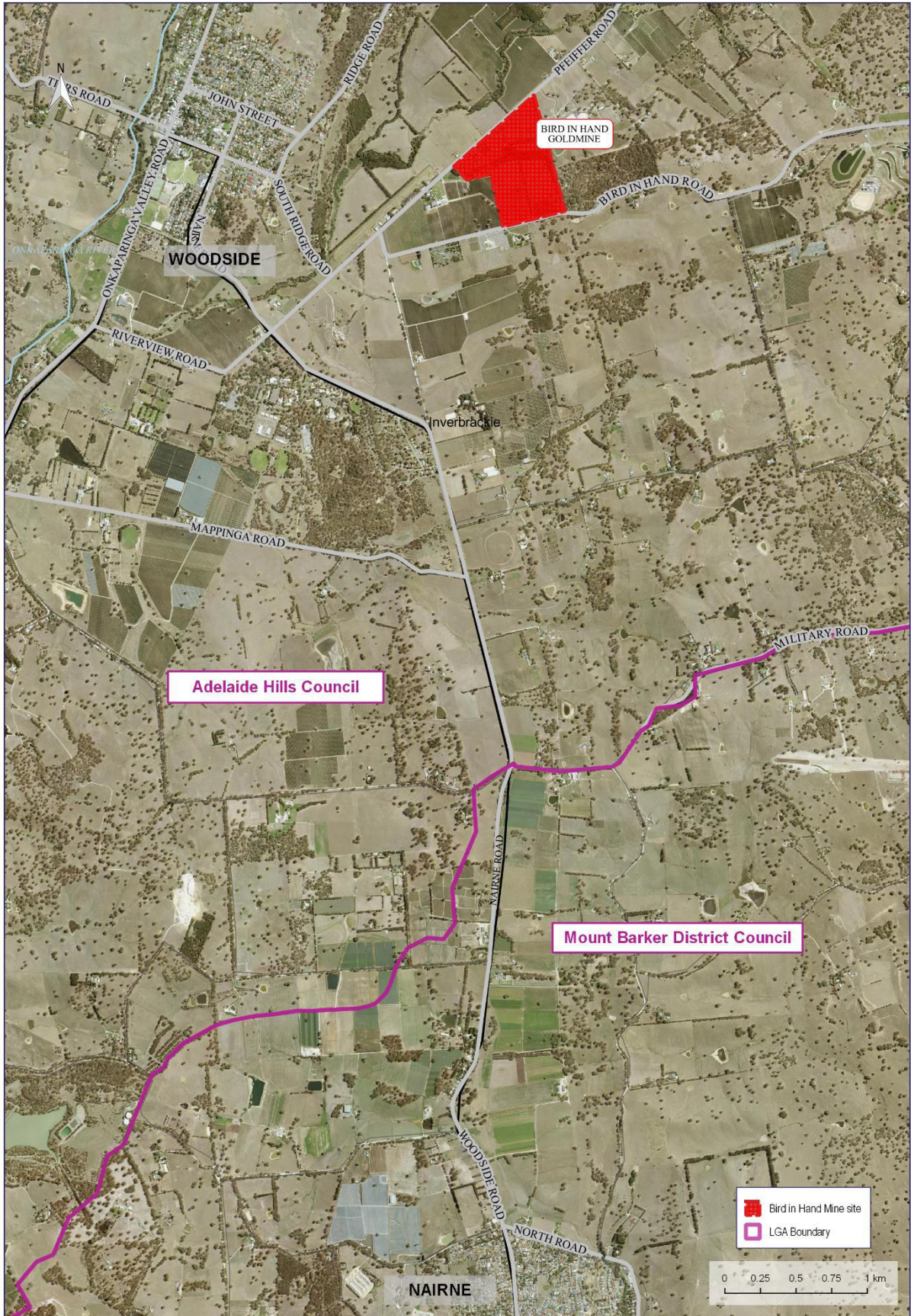


FIGURE 8-2 | LOCAL ROAD NETWORK SURROUNDING THE PROJECT SITE

Local roads are not controlled by DPTI or the subject of their traffic surveys. They are generally not surveyed for traffic volume by the controlling Council, and so there is a lack of traffic data for the local roads within the study area. However, as Pfeiffer Road provides the main point of access to the proposed mine site, four traffic surveys were undertaken on Pfeiffer Road, during April 2014, November 2014, February 2015 and November 2017 by HDS. The average two-way daily traffic volumes (calculated over 7 days of the survey period) of each of the four surveys is shown in Table 8-3 including percentage of heavy vehicles, with a full breakdown of the surveys shown in Appendix A of the Traffic Impact Assessment, located in Appendix T1.

Terramin acknowledge that the April 2014 baseline data was collected through the construction of the winery facility at Petaluma, and there is an increase in cars along Pfeiffer Road during this period, however, now in operation, Terramin expect that Petaluma employee, suppliers and visitor numbers onsite are similar.

What the traffic data has demonstrated is that the traffic volumes along Pfeiffer Road are highly variable, with many activities in the region, including wine production, hay, grape harvest (vintage), polo and cellar door events, business' establishment and expansions, through traffic avoiding Onkaparinga Valley Road, and cattle movements amongst other things.

TABLE 8-3 | TRAFFIC SURVEY DATA ON PFEIFFER ROAD

Existing Traffic Volumes on Pfeiffer Road	April '14	November '14	February '15	November-December '17
24 Hours	1036	953	955	944
Cars	867	762	857	879
Heavy vehicles	170	190	99	64
AM Peak (hour)	86	72	68	78
PM Peak (hour)	92	90	79	94

8.3.3 RAIL NETWORK

There is an existing rail line network across South Australia owned and operated by the Australian Rail Track Corporation (ARTC). The track forms part of the east – west corridor network, and connects Adelaide to Melbourne. Part of this track crosses Nairne Road and Old Princes Highway.

8.3.4 AIR TRAFFIC

A small private airfield is located to the north-west of the proposed ML. The area isn't known for utilising aeronautical crop dusting, however, was the home of fire bombers until 2016. Private helicopters are most commonly used in the area.

8.3.5 ROAD SAFETY

Crash data obtained from LocationSA (2011 – 2015) was collected for areas where safety was considered critical along the access to the proposed mine site and potential haulage routes. These locations are shown on Figure 8-3.

Where Figure 8-3 shows a pie graph joined to a dashed line along a section of road, this indicates the crashes were collected along the dashed section of road. For example, the Old Princes Highway crash data was collected from Nairne to Callington as indicated by the dashed line.

Specific crash points of interest include:



- Nairne Road / Pfeiffer Road intersection;
- Nairne Road from North Road to Old Princes Highway;
- Old Princes Highway from Nairne Road to Callington Road; and,
- Wellington Road from Paech Road to Callington Road.

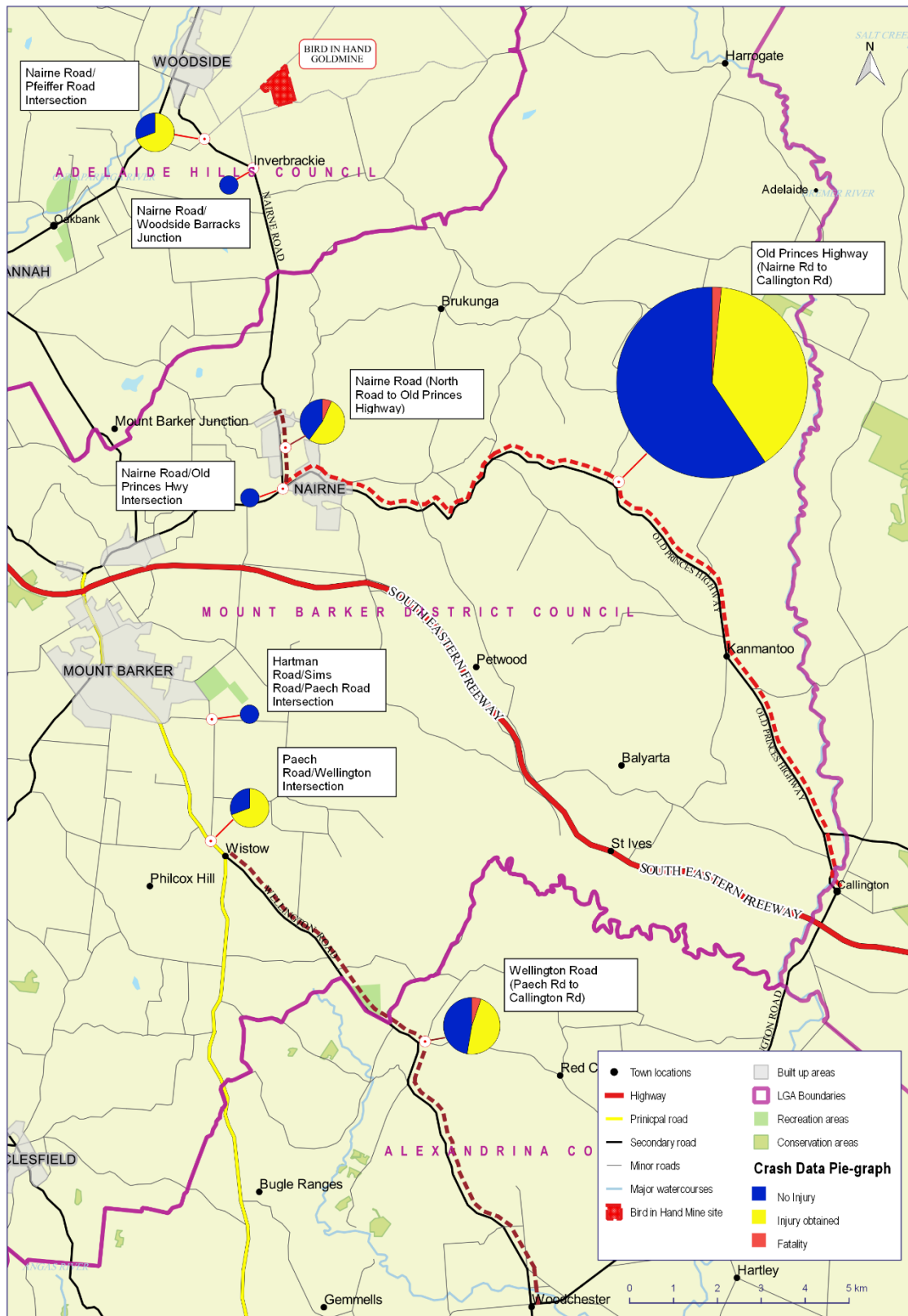


FIGURE 8-3 | CRASH SUMMARY WITHIN THE STUDY AREA

TABLE 8-4 | CRASH DATA ON ROAD NETWORK WITHIN THE STUDY AREA

Road Section	Total Crashes	No. of fatalities	No. of injuries
Nairne Road / Pfeiffer Road intersection	13	none	9
Nairne Road / Woodside Barracks junction	1	none	none
Nairne Road, from North Road to Old Princes Highway	15	1	8
Nairne Road / Old Princes Highway junction	4	none	none
Old Princes Highway, from Nairne Road to Callington Road	64	1	25
Hartman Road / Simms Road / Paech Road intersection	2	none	none
Paech Road / Wellington Road junction	13	none	9
Wellington Road, from Paech Road to Callington Road	19	1	9

8.3.6 PUBLIC TRANSPORT

The Adelaide metropolitan bus service (Adelaide Metro) operates from Woodside main street (Onkaparinga Valley Road), through the Nairne Road / Pfeiffer Road intersection, and then along Riverview Road towards the South Eastern Freeway, as well as along Nairne Road into Nairne and then through Mount Barker approximately 20-30 times on week days, with both routes eventuating into the Adelaide Central Business District. The service reduces on weekends to around 4-5 return trips.

8.3.7 SCHOOL BUS ROUTE

School buses for Oakbank Area School, Heathfield High School, and Lobethal Lutheran School frequent Bird in Hand Road on weekdays between 7.30am and 8.30am, and between 3.45pm and 4.30pm, as well as Nairne Road.

Many private schools located in the city operate bus services along Onkaparinga Valley Road, however, this road is outside the study area and proposed transport routes.

8.4 SENSITIVE RECEPTORS

Sensitive receptors are summarised in Table 8-5 below

TABLE 8-5 | SENSITIVE RECEPTORS FOR TRAFFIC

Sensitive Receptor	Summary	Impact ID
Social values of school community	This includes school bus routes and the potential for interactions between traffic and students	PIE_8_08
Road asphalts (Pfeiffer Road)	This includes the condition of the asphalt on Pfeiffer Road	PIE_8_06
Road asphalts	This includes the condition of the asphalt of all roads along the proposed haulage route	PIE_8_02
Public road traffic/users	This includes all other road users who may interact with traffic associated with the project (construction deliveries and ore haulage trucks)	PIE_8_01 PIE_8_05 PIE_8_07
Pedestrians	This includes pedestrians along Pfeiffer Road who may cross the proposed access to the Site.	PIE_8_03



FIGURE 8-4 | LOCATION OF SITE ACCESS AND PFEIFFER ROAD

8.5 POTENTIALLY IMPACTING EVENTS

Potentially impacting events (PIEs) related to traffic impacts are largely related to the perception of a significant increase in heavy traffic along Pfeiffer Road, in terms of safety, condition and level of service.

Other potentially impacting events include potential impacts to school bus routes and pedestrians accessing Pfeiffer Road.

TABLE 8-6 | POTENTIALLY IMPACTING EVENTS: TRAFFIC

Potentially Impacting Events	Mine Life Phase	Source	Potential Pathway	Sensitive Receptors	Confirmation of S-P-R	Impact ID
Dragout from mine traffic results in a safety hazard for local traffic	Construction, Operation, Closure	Mining material carried on vehicles exiting the mine	Deposition of mining material	Public road traffic/users	Yes	PIE_8_01
Deterioration of roads and increased road maintenance requirements as a result of mine traffic during operation	Operation, Closure	Mine traffic	Traffic movement on public roads	Road asphalts	Yes	PIE_8_02
Mine traffic entering and exiting access road on Pfeiffer Road has the potential to cause injury/fatality to pedestrians	Construction, Operation, Closure	Mine traffic	Vehicle collision	Pedestrians	Yes	PIE_8_03
Mine traffic increases road safety risk for local residents and other road users	Construction, Operation, Closure	Mine traffic	Vehicle collision	Public road traffic/users	Yes	PIE_8_04
Spillage of material from haulage trucks causing road accident to other road users	Operation	Mine traffic (haulage trucks)	Spillage of material on public roads	Public road traffic/users	Yes	PIE_8_05
Deterioration of roads and increased road maintenance requirements as a result of mine traffic during construction	Construction	Mine construction traffic	Traffic movement on public roads	Road asphalts (Pfeiffer Road)	No	PIE_8_06
Transport of mine modules results in traffic delays for road users in the region	Construction	Mine construction traffic (transport of mine modules)	Traffic movement on public roads	Public road traffic/users	No	PIE_8_07
Delay to the operation of school bus routes as a result of increased traffic	Operation, Closure	Mine traffic	Traffic movement on public roads	Social values of school community	No	PIE_8_08

8.6 CONTROL MEASURES TO PROTECT TRAFFIC SENSITIVE RECEPTORS

8.6.1 DESIGN MEASURES

The transport route has been assessed by expert consultants for volume and their overall efficiency for ore haulage and relative impact on the surrounding environment. This includes looking at the suitability of the truck type selected, the safety and suitability of the proposed access point to the operating Site in regards to sight distances and other developments.

A preferred vehicle will be determined in consideration of:

- The number of vehicles required to transport the ore each day (noting that some larger vehicles can carry more load with less trips);
- The ability of the road geometry to cater for the proposed vehicle type; and
- Vehicle operating costs.

It has been recommended by Tonkin (2017), that the most suitable ore haulage truck against these objectives is a 19m truck and dog (see Appendix F1 for Transport Assessment report).

In regards to the proposed site access, the preferred location has been selected having sight lines to the north-east and south-west along Pfeiffer Road which are unrestricted, and is also situated at an existing access point.

Haulage vehicles will be predominantly conducting right turns from Pfeiffer Road into the mine site. In order to improve safety on Pfeiffer Road, and the site access has been designed as a basic right-turn treatment (BAR), which is adopted in accordance with the Austroads Guidelines. A BAR treatment features a widened shoulder on a major road which assists turning vehicles to move further off the through carriageway making it easier for through vehicles to pass. Figure 8-5 shows the proposed BAR treatment layout for the site access on Pfeiffer Road.

Terramin are concerned that the Pfeiffer Road/Nairne Road intersection is currently not fit for purpose, even for General Access Vehicles (GAVs), and along with the community, would like to see it upgraded in a collaborative approach from DPTI, Adelaide Hills Council and Terramin, as well as other large users of the intersection. Terramin will continue discussions with all stakeholders (including DPTI, Adelaide Hills Council and other large commercial users, and the developers of a large residential property development on the existing Detention Centre site) through the assessment of the ML and PEPR in order to come to an acceptable result for all stakeholders.

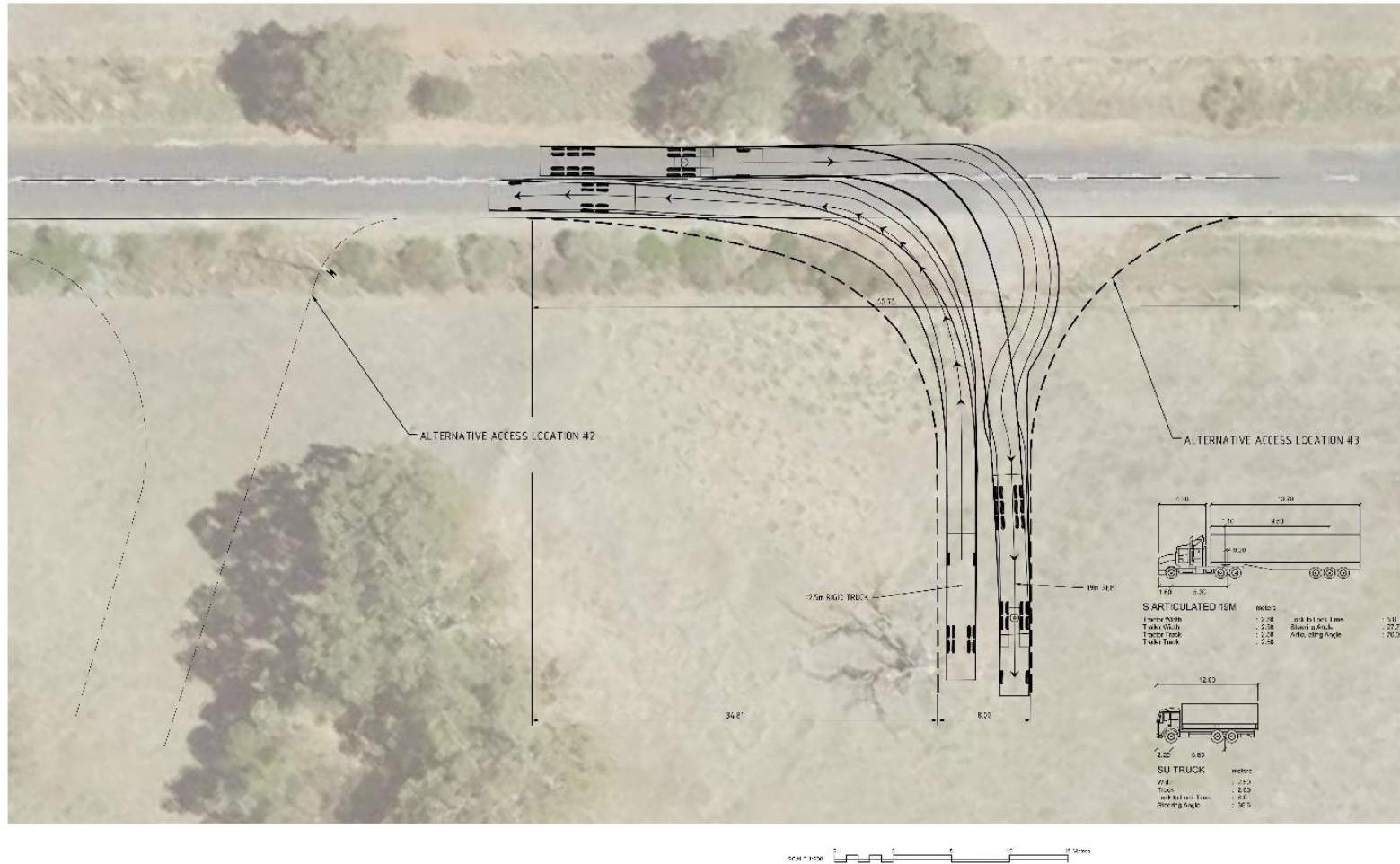


FIGURE 8-5 | BASIC RIGHT (BAR) TURN TREATMENT ON A TWO-LANE RURAL ROAD PROPOSED FOR THE SITE ACCESS ON PFEIFFER ROAD

The proposed site is also bounded by the Bird-in-Hand Road to the south. Access to the site from this road was also a possibility, however the direct path to Nairne Road via Pfeiffer Road was deemed as having less of an impact on the road network (line of site for other users, school bus routes, additional intersection etc.). Access from Bird-in-Hand Road will be designed as an emergency access to the site for emergency vehicles, should Pfeiffer Road access be inaccessible.

The proposed haulage route utilises the South Eastern Freeway (currently gazetted for B-Double and Rigid Truck and Dog access) for travel to Strathalbyn from the Bird in Hand Mine site. The extent of this assessment initiates at the intersection of Nairne Road and Old Princes Highway, and utilises the new Bald Hills Road Interchange to access the South Eastern Freeway and ultimately end at the Angas Processing Facility at Strathalbyn. The proposed route is included in Figure 8-6.

This is not the most direct route to Strathalbyn of the three assessed routes, however the ability for haulage vehicles to utilise existing gazetted roads such as the South Eastern Freeway and Callington Road is considered advantageous for the overall project. Adverse impacts on the road network south of the South Eastern Freeway are avoided, minimal disturbance to residential areas, the prevention of haulage vehicles causing damage to the existing road infrastructure and reducing Terramin's overall start-up costs in order to improve the existing road conditions.

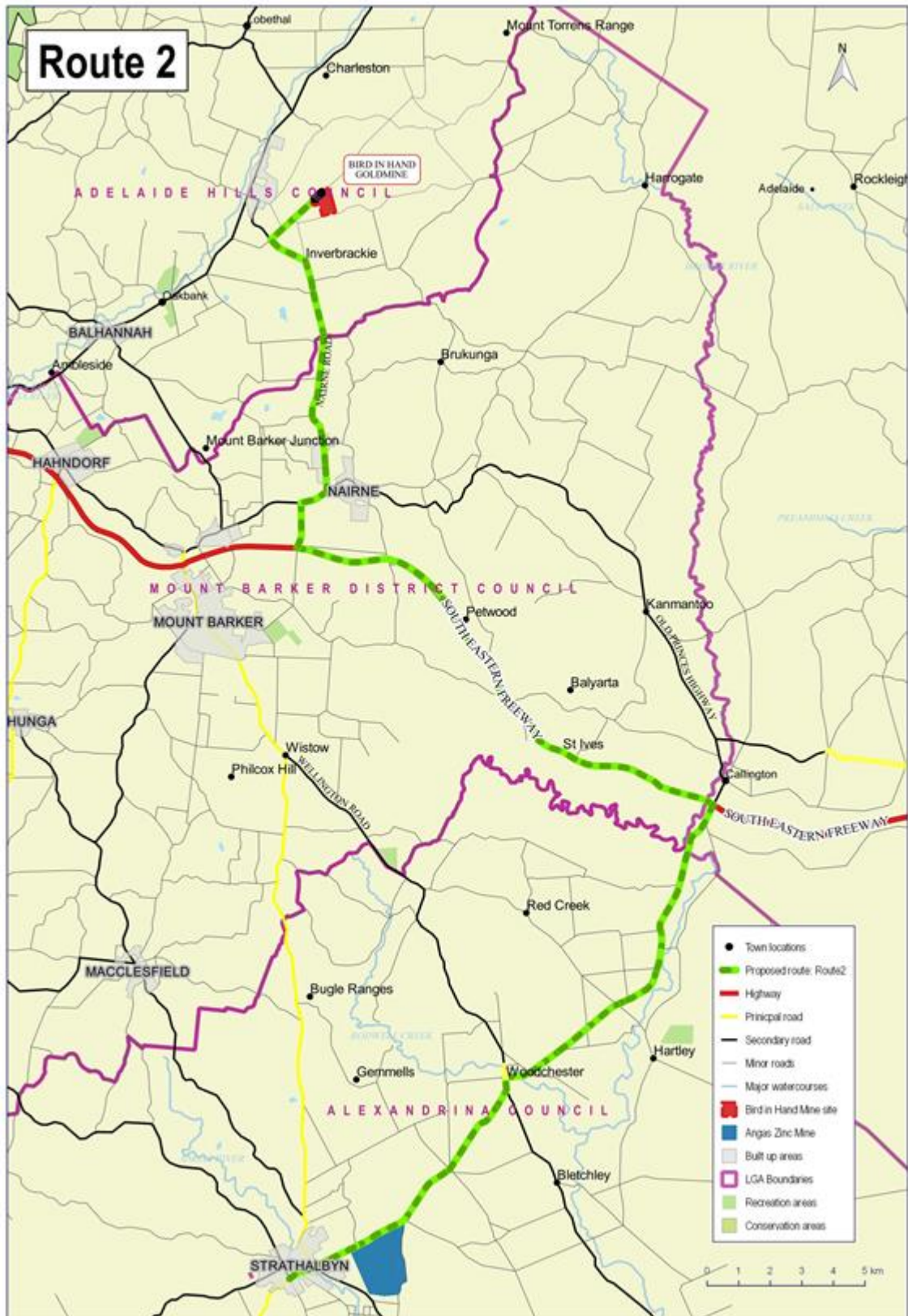


FIGURE 8-6 | PROPOSED HAULAGE ROUTE

TABLE 8-7 | DESIGN MEASURES: TRAFFIC

Design Measures	Impact ID
Location of site access chosen which has suitable sightlines (DPTI standard)	PIE_8_03 PIE_8_04
Upgrade site access through construction	PIE_8_03
Modify timing of deliveries which have the potential to cause traffic delays (construction)	PIE_8_07
Upgrade of Pfeiffer/Nairne Road intersection in partnership with DPTI and AH Council	PIE_8_02
Sealed roads onsite (excluding fire access and between underground and IML)	PIE_8_01 PIE_8_05
Maintenance of internal roads	PIE_8_01 PIE_8_05
Underground haul road not connected to ore bin road (Site design)	PIE_8_01 PIE_8_05
Wheel wash and wash-down area	PIE_8_01 PIE_8_05
Defined crossing point for pedestrians marked on access driveway	PIE_8_03
Truck warning signage to be provided along Pfeiffer Road	PIE_8_04
Video cameras in trucks	PIE_8_04
Loads covered on haulage trucks between BIH and AZM	PIE_8_04

8.6.2 MANAGEMENT STRATEGIES

Management strategies for vehicle movements related to the BIHGP are largely based around the management and monitoring of infrastructure onsite to ensure impacts such as dragout are limited through construction and prevented through operations, as well as more specific management measures for the ore haulage trucks which traverse between the BIHGP and APF. Selection of suitable, fit for purpose vehicles and their maintenance programs are included in these measures

Management measures proposed for the ore haulage trucks includes limiting their operating hours to outside of commuter and school drop off time (6am – 9am) and school pick up and school bus time (3pm – 4.30pm), as well as no overnight haulage to Strathalbyn (10pm – 6am). Ore haulage to APF will also be limited on occasions when community events are planned.

Terramin propose to install truck warning signs along Pfeiffer Road and in the vicinity of the site access point.

As discussed, Terramin will continue discussions with the relevant stakeholders regarding the Pfeiffer Road/Nairne Road intersection, however, as an additional management strategy will include this intersection and other road sections considered higher risk in the driver training and awareness as part of the induction process for truck drivers, for precautionary safety measures.

No road closures are predicted to occur as a result of construction or operations. Deliveries through the construction phase will be timed to avoid peak traffic times to reduce disruption to surrounding businesses.

Control and management measures to assist in the avoidance or mitigation of traffic impacts and risks during the construction, operation and closure of the mine will be incorporated into the PEPR and implemented for relevant project phases. Key control and management strategies are outlined in Table 8-8.

In the event of an increase in ore or mullock as a result of design updates through Feasibility Studies, the constraints proposed regarding IML height and visibility, and Ore Silo will continue to be

implemented and options to store mullock from decline development at APF will be investigated. Any additional ore or mullock offsite will be controlled by the proposed haulage control measures and not increase daily average truck movements of 12 trips over the life of the project.

TABLE 8-8 | MANAGEMENT STRATEGIES: TRAFFIC

Management Strategies	Impact ID
Modify timing of deliveries which have the potential to cause traffic delays (construction) – avoid peak traffic periods	PIE_8_07
Maintenance of internal roads	PIE_8_01 PIE_8_05
Daily check on dragout (part of security round check)	PIE_8_01
Driver training and awareness as part of induction	PIE_8_04
Haulage trucks limited to 60km/hour on Pfeiffer Road	PIE_8_04
Trucking schedule to avoid school drop off/pick up hours (6am – 9am and 3 – 4.30pm)	PIE_8_08
Trucking schedule (ore haulage to APF) not to operate between 10pm and 6am	PIE_8_04
Trucking schedules to avoid public events.	PIE_8_04
Truck warning signage to be installed along Pfeiffer Road.	PIE_8_04
Video cameras in trucks.	PIE_8_04
Driver alcohol limit to be controlled and enforced in accordance with South Australian legislation (onsite alcohol testing).	PIE_8_04
Implementation of incident reporting system for the management of and implementation of traffic improvement measures.	PIE_8_04
Selection of fit for purpose, well maintained vehicles	PIE_8_04

8.7 IMPACT ASSESSMENT

This section identifies and assesses impacts and risks associated with traffic as a result of the construction, operation and closure of the project.

Impact events (confirmed by presence of a source, pathway and receptor) are those considered possible to occur as a result of the project. Although the risks may or may not eventuate, the purpose of the risk assessment process is to identify management and mitigation measures required to reduce the identified risks to a level that is As Low As Reasonably Practicable (ALARP). This assessment has been undertaken in accordance with the methodology outlined in Chapter 6, with impacts classified in accordance with the criteria for categorising residual project economic and social impacts and the consequences of identified risks classified in accordance with either the public safety or social criteria as relevant.

Impacts and potential risks were identified through technical studies and stakeholder consultation.

Similar potentially impacting events can have multiple sources, pathways or receptors and where practical have been grouped together to minimise duplication of information. Risks are events that would not be expected as part of the normal operation of the project, but could occur as a result of either uncertainties with the impact assessment, or as a result of faults, failures and unplanned events.

Terramin will monitor a complaints hotline and will investigate all complaints to determine if the damage originated from BIH vehicles.

A summary of impact and risk events relating to traffic and transport is presented in Table 8-10 above in section 8.5. A complete register of impact and risk events by source, pathway and receptor is provided in Appendix E1.

Impacts and risks are assessed following the application of the design and control measures outlined in Section 8.6. Where required, management measures are proposed (Section 8.6) to reduce the impact to a level that is considered ALARP. Through the adoption of design modification or specific mitigation measures, all identified impacts and risks were considered ALARP. The key environmental risks would be monitored through the environmental management framework through construction, operation and closure of the project.

8.7.1 DELAY TO THE OPERATION OF SCHOOL BUS ROUTES AS A RESULT OF INCREASED TRAFFIC

In order to reduce the potential consequence of this PIE (Potentially Impacting Event), Terramin have proposed to schedule ore haulage trucks outside of commuter and school drop off time (6am – 9am) and school pick up and school bus time (3pm – 4.30pm). This removes the pathway and is thus not a credible PIE. Even if ore haulage was conducted through school drop-off and pick up time, the transport assessment demonstrates the distribution of traffic is not expected to have an adverse impact on existing traffic flow, and as such the likelihood would be **unlikely**, the consequence **minor** and resultantly would be considered **low**.

The Transport Assessment is included in Appendix F1.

8.7.2 DETERIORATION OF ROADS AND INCREASED ROAD MAINTENANCE REQUIREMENTS AS A RESULT OF MINE TRAFFIC DURING CONSTRUCTION AND OPERATION

Through construction and closure, impacts to the condition/level of service are not expected to result, as no large modules are being constructed onsite (e.g. processing plant, SAG mill, etc.). Limited/no source exists to cause significant damage. There are currently on average 153 heavy vehicles accessing Pfeiffer Road, and Terramin will be proposing on average, an additional 24 Truck and Dog movements (12 return loads), and an estimated 4 heavy vehicle delivery movements (2 deliveries) per day. This is based on the current production estimated (Scoping Study, 2018).

Traffic impact assessment shows that without management, mine traffic is likely to result in an accelerated deterioration of Pfeiffer Road and increased maintenance. However, Terramin's management strategies include lowering the speed limit to reduce the likelihood and severity of the potential for deterioration, as well as reducing and/or limiting heavy vehicle access to and from the site during weather which is more likely to accelerate road deterioration (such as in hot or stormy weather). We expect the impact to Pfeiffer Road to be **low** with management strategies employed, however, this could be reduced to **negligible** with the cooperation of DPTI, the Adelaide Hills Council and other commercial heavy vehicle road users.

Access to the site has been designed to AustRoads Guidelines and will be approved to DPTI standards prior to construction.

The percentage increase of commercial vehicles on Nairne Road, Bald Hills Road and South Eastern Freeway (between 1% and 10%) is not expected to have a significant adverse impact on the road condition over the lifetime of the mine.

8.7.3 DRAGOUT FROM MINE TRAFFIC RESULTS IN A SAFETY HAZARD FOR LOCAL TRAFFIC
Dragout from mine traffic can be managed effectively through both design and management measures. The design and management measures to be utilised are as follows -

- Wheel wash for LVs and HVs;
- Maintenance of mine roads;
- Separation of underground haulage roads and delivery/ore haulage from ROM silo;
 - Underground haul road not connected to ore bin road (Site design); and
- Sealed roads onsite for vehicles which access external;
- Daily check on dragout (part of security round check).
- Adequately designed stormwater management system to prevent washouts from polluting roadways and becoming sources for dragout

The expected impact from dragout to the local traffic is **negligible**, however Terramin propose to have an outcome criterion developed to allow the appropriate monitoring and reporting of dragout.

Through construction, a portable wheel wash will be utilised and a street sweeper will be contracted as required to reduce the likelihood of dragout impacting local road users.

8.7.4 MINE TRAFFIC ENTERING AND EXITING ACCESS ROAD ON PFEIFFER ROAD RISK HAS THE POTENTIAL TO CAUSE INJURY/FATALITY TO PEDESTRIANS.

In regards to the site access, the preferred location has been selected having sight lines to the north-east and south-west along Pfeiffer Road which are unrestricted, and is also situated at an existing access point, as shown in Figure 8-4.

Haulage vehicles will be predominantly conducting right turns from Pfeiffer Road into the mine site. In order to improve safety on Pfeiffer Road, and the site access has been designed as a basic right-turn treatment (BAR), which is adopted in accordance with the Austroads Guidelines. A BAR treatment features a widened shoulder on a major road which assists turning vehicles to move further off the through carriageway making it easier for through vehicles to pass. Figure 8-5 shows the proposed BAR treatment layout for the site access on Pfeiffer Road.

The minimum length from the edge of the BAR treatment to the centreline of the side road as required by Austroads Guidelines for an 80km/h road and with shoulder widening of 1-2m, is approximately 60m to 75m. This would have no impact on operation of the Polo Club access point.

Both “pedestrians crossing” and “trucks entering” signage would be installed over the proposed access way, as well as a stop sign to ensure all traffic exiting the site halts prior to entering Pfeiffer Road. Terramin consider the likelihood of injury/fatality of a pedestrian extremely rare, however, as the consequence is so severe, have implemented control strategies to ensure the risk is ALARP.

8.7.5 MINE TRAFFIC INCREASES ROAD SAFETY RISK FOR LOCAL RESIDENTS AND OTHER ROAD USERS

Traffic Impact Assessment analyses the proposed traffic associated with the project and concluded that the distribution of traffic is not expected to have an adverse impact on existing traffic flow, however, traffic management strategies will reduce any potential, however unlikely, further. All systems proposed to reduce risk to as low as reasonably practical (ALARP). Control measures including

design and management strategies have been outlined in section 8.6. Terramin expect the increase in road safety risk to be **negligible**.

8.7.6 TRANSPORT OF MINE MODULES RESULTS IN TRAFFIC DELAYS FOR ROAD USERS IN THE REGION

As no large modules are being constructed onsite (e.g. processing plant, SAG mill, etc.), there is limited infrastructure which has the potential to create traffic delays. Deliveries to site during construction include prefabricated modules (such as the BEBO structure for the portal), and underground equipment (such as dump trucks, jumbos and loaders) which will arrive to site via truck. Deliveries of large equipment and infrastructure to site will be timed to avoid peak traffic periods, and as such, pose no greater imposition than harvest and agricultural machinery used by local vineyards and cattle/beef producers. Traffic management will be utilised if required to transport large infrastructure. No known road closures will be required for construction. The impact is considered **negligible**.

8.7.7 SPILLAGE OF MATERIAL FROM HAULAGE TRUCKS CAUSING ROAD ACCIDENT TO OTHER ROAD USERS.

All ore haulage loads leaving the site for APF will be covered, thus removing the potential for spillage from ore haulage trucks and thus causing a road accident to other road users. It will be a requirement for all drivers prior to leaving site to check their loads are safe, secure and covered.

Other management strategies to reduce this risk include appropriate improvements to known hazard locations, education for drivers of vehicles (road sections considered higher risk included in the driver training and awareness as part of the induction process for truck drivers as a precautionary safety measures), and the installation of signage on Pfeiffer Road indicating trucks present.

The impact for this identified risk is considered **negligible** with the proposed design and management strategies.

8.8 DRAFT OUTCOME(S) AND MEASUREMENT CRITERIA

In accordance with the methodology presented in Chapter 6, outcomes have been developed for traffic impact events with a confirmed link between a source, pathway and receptor (S-P-R linkage), see Table 8-9.

All outcomes are supported by draft measurement criteria which will be used to assess compliance against the draft outcomes during the relevant phases (construction, operation and closure), and where relevant draft leading indicator criteria. These measurement criteria and leading indicators are indicative only and will be developed further through the PEPR.

All Outcomes for the entire project are presented in Appendix D1.

TABLE 8-9 | DRAFT OUTCOMES AND MEASUREMENT CRITERIA

Draft Outcome	Draft Measurement Criteria	Draft Leading Indicator Criteria
No impact to third party infrastructure caused by mining activities	Investigation of all public infrastructure related complaints demonstrates that the Mine Operator did not cause or could not reasonably have prevented the incident from occurring; and all public infrastructure related complaints were acknowledged within 48 hours and closed out within 14 days to the satisfaction of the complainant or as agreed with the Chief Inspector of Mines.	None proposed
No traffic accidents occur involving the public and mine traffic that could have been reasonably prevented	Independent investigation of all traffic accidents involving the public are completed in 14 days, or as agreed with the Director of Mines, and demonstrate that the mine operator could not have reasonably prevented the accident from occurring.	None proposed
	Truck driver check sheets will be completed for all ore trucks leaving site to demonstrate loads are covered and in compliance with agreed hours of operation ¹ .	
	Daily inspection of entry/exit points demonstrates no build-up of dragout material at the site entrance on Pfeiffer Road is occurring. Reported by exception.	

8.9 FINDINGS AND CONCLUSIONS

Predominantly negligible impacts are expected as a result of traffic and transport associated with the BIHGP. Impacts to traffic movement, level of service, the safety of both local road users and Terramin employees, are all negligible impacts with the utilisation of the proposed control measures, or as low as reasonably practical. The deterioration of Pfeiffer Road was the only identified risk considered low, rather than negligible.

Overall, with the implementation of all control measures, through both design and management strategies, all risks associated with traffic have been considered ALARP.

¹ Final agreed hours as defined by approved PEPR