Eagleton Rock Syndicate

Proposed Hard Rock Quarry at Eagleton

Traffic Impact Assessment

August 2017

Table of contents

1. Introduction 1
   - 1.1 Background 1
   - 1.2 Purpose and scope of this report 2
2. Existing road and traffic conditions 3
   - 2.1 Access roads 3
   - 2.2 Intersection layout and geometry 5
   - 2.3 Current road and intersection usage 7
   - 2.4 Existing traffic volumes 7
   - 2.5 Existing delay survey 8
   - 2.6 Accident history 9
3. Proposed development 10
   - 3.1 Road network access proposals 10
   - 3.2 Site access and internal road layout 10
   - 3.3 Expected traffic generation 11
   - 3.4 Cumulative traffic volumes 12
   - 3.5 Construction traffic impacts 13
4. Intersection capacity and safety assessment 15
   - 4.1 Intersection capacity assessment 15
   - 4.2 Preliminary safety assessment 17
   - 4.3 Road safety audit 20
   - 4.4 Potential safety improvements 21
5. Summary 24

Table index

Table 2-1 Existing daily traffic volumes and peak period flows 8
Table 2-2 Existing peak volumes at Pacific Highway / Italia Road intersection 8
Table 2-3 Summary of truck delay survey April 2017 8
Table 3-1 Projected traffic generation 12
Table 3-2 Cumulative traffic generation 12
Table 3-3 Increased peak hour traffic at highway intersection 13
Table 4-1 Projected intersection performance 15
Table 4-2 Safe sight distance requirements 19
Table 4-3 Road safety audit issues and GHD / Client response 22

Figure index

Figure 2-1 Pacific Highway approach to Italia Road 3
Figure 2-2 Italia Road west of the Pacific Highway intersection 4
Figure 2-3 Schematic of Italia Road intersection with Pacific Highway 5
Figure 2-4 Italia Road intersection looking north to Karuah 6
Figure 2-5 Schematic of access road intersection with Italia Road 6
Figure 3-1 Proposed internal road and car parking layout 11
Figure 4-1 Austroads Table 3.2 Safe intersection sight distance 17
Figure 4-2 Austroads Table 3.4 Gap acceptance criteria 18
Figure 4-3 Sight distance observations across northbound vertical curve 19

Appendices

Appendix A – Roads and Maritime correspondence

Appendix B – Traffic counts (November 2016) and Truck delay survey (April 2017)

Appendix C – Eagleton quarry and access proposals

Appendix D – SIDRA analysis outputs and alternative modelling scenarios

Appendix E – Stage 5 Road Safety Audit

1. Introduction

Eagleton Rock Syndicate Pty Ltd (Eagleton) has engaged GHD to undertake a traffic impact assessment as part of a Development Application and environmental assessment in relation to a new hard rock quarry development on Barleigh Ranch Way, off Italia Road at Eagleton. Central to the traffic impact assessment is a proposed increase in heavy vehicle usage of the Pacific Highway and Italia Road intersection north of Raymond Terrace and the upgrade of existing local roads for access to the proposed development.

1.1 Background

Eagleton and its predecessor, Castle Quarry Products, have been undertaking development planning for a new quarry on Barleigh Ranch Way for a number of years. As part of preliminary development planning, including earlier representations and consultations with Roads and Maritime Services (Roads and Maritime), a number of requirements for a comprehensive assessment of traffic impact were specified, particularly in relation to increased heavy vehicle usage of the Italia Road intersection.

Roads and Maritime correspondence dated 9 November 2012 outlined specific requirements to complement the initial traffic impact assessment. These requirements were further detailed in subsequent correspondence (Roads and Maritime to Department of Planning and Infrastructure) dated 29 October 2015 in relation to the proposed development.

A summary of Roads and Maritime requirements are outlined as follows:

- An assessment of cumulative impacts on road safety and traffic efficiency at the Pacific Highway / Italia Road intersection – consideration of other traffic volumes on Italia Road, including the Boral quarry, in conjunction with expected new traffic generation.
- A road safety / risk assessment of the intersection post development – including identification and evaluation of potential measures to improve road safety in this location.
- The Roads and Maritime correspondence noted concerns of Boral work health and safety representatives in relation to sight distance restrictions at the Italia Road intersection – specifically for the right turn movement to travel south on the Pacific Highway.
- Consideration of the impact of construction traffic arising from the development – including preparation of a Construction Traffic Management Plan.
- Provision of input / output files (assumed to be SIDRA analysis files) for Roads and Maritime review.

Both letters from Roads and Maritime are provided in Appendix A. These requirements have been addressed in this report.

From a historical context, Italia Road has been used as a key access intersection to the Pacific Highway for in excess of 30 years. During this time, Boral has operated a hard rock quarry off Italia Road, including when the highway was a two lane road prior to its reconstruction and duplication between 1999 and 2002.

This new intersection was designed to provide safe access to the highway, particularly for the pre-existing heavy vehicle usage – as demonstrated by the current seagull type arrangement, which incorporates a very long (1.3 km) southbound acceleration lane.

In 2011 Boral successfully sought an application to extend its development consent to increase the life of its quarry. This was approved by Port Stephens Council (Council) and Boral has been

granted a modification to its development approval to increase the life of the quarry, primarily on the premise that there would be no additional traffic generation. This modification was not challenged by Roads and Maritime and no safety issues were raised at the time.

In response to the Roads and Maritime requirements outlined above, and in anticipation of further queries from approval authorities, a number of technical investigations have been undertaken by Eagleton. These have included a survey based approach to the measurement of actual sight distance to the intersection for approaching northbound vehicles and, conversely, from the intersection to approaching vehicles.

1.2 Purpose and scope of this report

The purpose of this report is to provide a traffic impact assessment of existing road and traffic conditions arising from the proposed quarry development. As required by Roads and Maritime this includes traffic counts (November 2016), daily volumes for the existing Pacific Highway and Italia Road, as well as peak hour intersection counts at the junction of these the two roads.

The scope of this report includes a reassessment of proposed traffic generation arising from more recent development planning and further analysis of the capacity and safety of the Italia Road intersection, inclusive of existing (pre-development) and expected post development traffic volumes. The capacity of the intersection is assessed using the SIDRA intersection analysis software which calculates Level of Service (LoS) for individual legs and the intersection as a whole.

Whilst the Pacific Highway has through priority and does not experience delays, the key factor for the intersection capacity is the potential delay and the possibility of queueing on Italia Road. This in turn could lead to driver impatience and additional risk taking in regard to gap acceptance for right turn movements across the northbound carriageway.

A preliminary safety assessment is provided through a review of theoretical sight distance requirements for a typical intersection compared to the measured sight distance at Italia Road. This is assessed for both sight distance requirements to and from the intersection. The report scope also offers a preliminary range of potential improvements to road safety at this location as part of the requirements stipulated by Roads and Maritime.

In order to provide an independent assessment of road safety at the existing Italia Road intersection a separate, independent Road Safety Audit has been undertaken at the Italia Road intersection. This has been prepared by a specialist consultancy with accredited road safety auditors independent of GHD.

The report also assesses access proposals from Italia Road, across a local Right of Way access to Barleigh Ranch Way, the quarry entrance, internal access roads and proposed onsite parking arrangements.

2. Existing road and traffic conditions

This section provides an appraisal of the existing road network and traffic volumes in the vicinity of the proposed quarry development. This provides a baseline from which to consider the projected traffic generation and the capacity of the existing system to safely and efficiently absorb potential increases from the new development.

2.1 Access roads

The key access roads to and from the proposed quarry are the Pacific Highway, the major arterial route through the area, Italia Road - a prominent local road connecting the Seaham area to the highway and the proposed access road between Italia Road and the quarry, incorporating Barleigh Ranch Way.

2.1.1 Pacific Highway

The Pacific Highway is the major arterial route connecting Sydney and Newcastle to northern NSW and south-east Queensland. The section between Raymond Terrace and Karuah was upgraded from a two lane road to a four lane dual carriageway in the period from 1999 to 2002. On the subject section, approximately 12 km north of Raymond Terrace, the highway is in flat to undulating terrain, with large radii horizontal curves and gradients of between 1% and 3%.

The highway is not a full motorway over this length and as such direct access is permissible for local roads and property frontages, mostly restricted to left turns only. Major intersections are provided for more substantial road connections at Italia Road and Medowie Road and there are u-turn facilities for turning traffic. The speed limit of the highway on this section is 100 km/h (was previously 110 km/h), which is in keeping with the access standard of the highway over this length. A photo of the highway looking south from Italia Road is provided as Figure 2-1.

Management responsibility for the highway rests with the NSW Government through Roads and Maritime Services (Roads and Maritime) and new or increased access proposals are to satisfy the requirements of this organisation as part of development approval processes.

Figure 2-1 Pacific Highway approach to Italia Road

2.1.2 Italia Road

Italia Road is a two way, two lane road that connects the rural communities of East Seaham and Seaham to the Pacific Highway over a length of approximately 10 km. On this section it passes through rural and undeveloped land along its southern side and abuts the Wallaroo National Park on the northern side. There are a number of prominent land uses off Italia Road, just west of the Pacific Highway, most notably an existing hard rock quarry operated by Boral.

The speed limit on Italia road is 90 km/h which is generally appropriate for the terrain and usage of this road. However, in the vicinity of the Pacific Highway intersection the speed zone should be limited to 60 km/h but this is not signposted on the approach.

Figure 2-2 below shows the section of Italia Road immediately to the west of the Pacific Highway intersection. Italia Road is classified as a local road under the control of Port Stephens Shire Council (Council).

Figure 2-2 Italia Road west of the Pacific Highway intersection

2.1.3 Access road off Italia Road

Access to the proposed quarry development site is currently available via a formed local access road connecting Italia Road with Barleigh Ranch Way. The local road intersects with Italia Road approximately 500 metres west of the Pacific Highway as a t-intersection, on the left hand side heading toward Seaham.

The existing access road does not have a formal road reserve, it is a Right of Way across private property, and is effectively parallel to the Pacific Highway for approximately 900 metres before connecting to Barleigh Ranch Way to access the proposed quarry site. The existing road formation is two lanes wide but is unsealed. It currently provides access to a number of properties and recreational businesses in the area, including attractions such as MG car club, Hunter Valley Paintball and Hunter MCC raceway.

2.2 Intersection layout and geometry

2.2.1 Pacific Highway / Italia Road

The Italia Road and Pacific Highway intersection is a t-intersection, with Italia Road meeting the Pacific Highway on the western (or northbound) side of the highway. The intersection was constructed as part of the highway upgrade, completed approximately 14 years ago (circa 2002) as a seagull type, at-grade intersection. Access to Italia Road off the highway is through a dedicated left and right turn bays for turning traffic from the south and north respectively.

The intersection allows a two-stage process for southbound right turn access to the highway from Italia Road. This is by way of an initial crossing of the northbound carriageway for the right turn movement into an acceleration lane and then a left hand merge for integration with highway traffic. The acceleration lane is approximately 1.3 km in length, allowing heavy vehicles to attain highway speed prior to merging.

A schematic layout of the Italia Road intersection is shown as Figure 2-3 below.

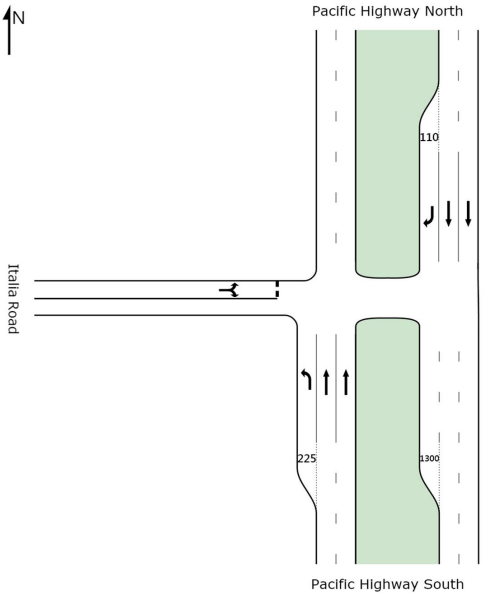


Figure 2-3 Schematic of Italia Road intersection with Pacific Highway

The historical use of Italia Road by quarry vehicles and the length of this acceleration lane confirms that the intersection was designed for heavy vehicle movements turning right from Italia Road.

Figure 2.3 overleaf below shows a photo of the Italia Road and Pacific Highway intersection from the north-west corner looking toward Karuah.

Figure 2-4 Italia Road intersection looking north to Karuah

2.2.2 Italia Road / existing access road

The existing access road forms t-intersection with Italia Road, on the left hand side at a distance of 500 metres from the Pacific Highway. It is on a straight section of Italia Road that is approximately 500 metres long, with a short length of wide shoulder for the left turn movement to the unsealed access road. There is no formal give way control on the access road but Italia Road has priority at the intersection.

A schematic layout of the access road intersection with Italia Road is provided as Figure 2-5.

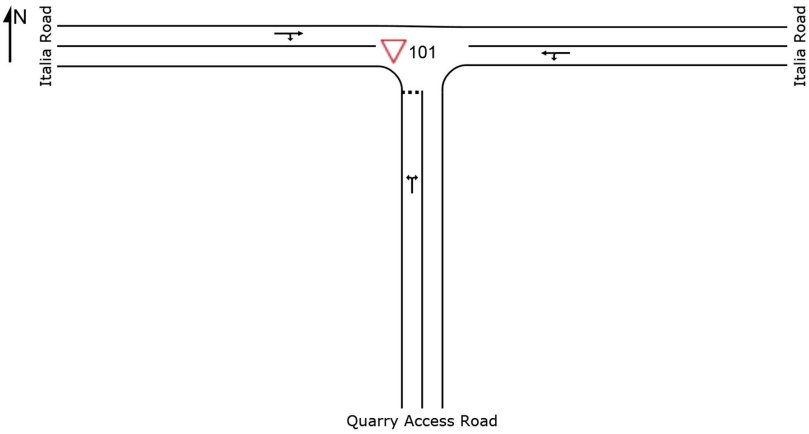


Figure 2-5 Schematic of access road intersection with Italia Road

2.3 Current road and intersection usage

The current usage of the intersection of Pacific Highway and Italia Road is made up of traffic from the Seaham area further west and from several local traffic generators close to the highway. This traffic generation includes:

- Residents of and visitors to Seaham and surrounding areas, directly from the Pacific Highway rather than through Raymond Terrace and New Line Road.
- The MG Car Club – Ringwood Park raceway
- Hunter Valley Paintball
- Hunter MCC raceway and MX central
- Existing hard rock quarry operated by Boral
- Other rural industry

Of these traffic generators, the dominant heavy vehicle generator is the Boral hard rock quarry which has been in operation for up to 30 years. The Boral quarry access on Italia Road is approximately 1.4 km from the Pacific Highway, or about 900 metres from the first access intersection, to be used for the proposed quarry.

As previously outlined, Boral has recently (2011) been granted a modification to its development consent to increase the life of its quarry, primarily on the basis of no additional traffic generation. However, it is understood that the resource in this quarry is limited and that Boral may be reducing output over coming years. Based on known reserves and current extraction rates there is a potential for Boral operations to be limited to 5 – 10 years.

It is noted that the more localised traffic generators, the MG car club, Hunter Valley Paintball and Hunter MCC raceway, all currently use the proposed Eagleton access intersection and that these are mostly weekend based operations, which would have little concurrent traffic generation with the proposed quarry development. Non weekend operations and special weekday events at these locations are canvassed in Section 3.4.

Use of the existing intersection by public transport users, cyclists and pedestrians is effectively negligible. There are no bus routes on Italia Road and there are no bus stops in the vicinity of the intersection. Similarly, there is no regular pedestrian activity in the area, there are no houses or shops nearby and no pedestrians have been observed in any site visit or regular trips to the proposed quarry site. Cycle activity is limited to highway usage by infrequent long distance riders – there is no recreational or social cycling in the area.

2.4 Existing traffic volumes

Daily and peak hour traffic volumes have been extracted from a number of sources including Roads and Maritime, Council and from new, site specific, surveys undertaken by Northern Transport Planning and Engineering in November 2016. Full details of these traffic counts are provided in Appendix B to this report.

Daily traffic volumes for the Pacific Highway and Italia Road are quoted in the form of average weekday traffic, total vehicles with a heavy vehicle content in percentage terms. Daily volume counts quoted in earlier reports are included with the results of recent traffic surveys for comparative purposes. Typical peak hour volumes for the Pacific Highway and Italia Road are provided as a range from intersection counts to demonstrate variability across morning and evening peak periods. Details of daily volume counts and peak traffic flows are provided in Table 2-1 overleaf.

The surveyed peak hour traffic volumes at the Italia Road and Pacific Highway intersection, including through and turning volumes from both counts are as shown in Table 2-2 overleaf.

These figures shown in both of these tables show that there has been little or no growth on Italia Road over the last five years whereas peak volumes on the Pacific Highway, particularly northbound, have increased markedly.

Table 2-1 Existing daily traffic volumes and peak period flows

Road	2011	2016
Pacific Highway – daily volume as weekday average (HV content as %)	15,000 (18%)	21,500 (23%)
Pacific Highway – typical 2 way peak hourly volume	1,150 – 1,250	1,350 – 1,550
Italia Road – daily volume as weekday average (HV content as %)	1,080 (30%)	1,350 (31%)
Italia Road – typical 2 way peak hourly volume	100 - 120	100 - 120

Table 2-2 Existing peak volumes at Pacific Highway / Italia Road intersection

Leg	Movement	AM Peak hour volume		PM Peak hour volume	
		2011 Survey	2016 Survey	2011 Survey	2016 Survey
North (SB)	Through	662	779	553	744
	Right	24	29	38	32
West	Left	22	29	33	28
	Right	32	21	24	30
South (NB)	Through	547	535	698	768
	Left	30	19	19	21

2.5 Existing delay survey

A number of comments were received (at the draft submission phase) from Roads and Maritime and others in relation to existing and potential delays at the Italia Road intersection, as well as concerns for road safety at this location. These comments lead to a perception of risky driver behaviour in relation to gap acceptance and concerns for road safety at the intersection.

In response to these comments and concerns, and in order to further understand the operation of the existing intersection, truck delay surveys have been undertaken at the Italia Road intersection. A detailed survey of truck delays was completed on the morning of 12 April 2017.

The survey measured approximately 30 laden truck movements turning right on to the Pacific Highway from Italia Road over a period of just over 3.5 hours. The survey recorded arrival, waiting and intersection clearance times for each truck, as well as the time to the next northbound vehicle at the intersection to assess gap acceptance parameters.

A spreadsheet containing the results of the delay survey and time based measurement of gaps to the next northbound vehicle is included in Appendix B. A summary of the data collected is provided in Table 2-3 below.

Table 2-3 Summary of truck delay survey April 2017

Survey measure	Minimum	Maximum	Average
Truck waiting time	0 seconds	85 seconds	20 seconds
Intersection clearance time	6 seconds	13 seconds	9 seconds
Measured gap to arrival of next vehicle	9 seconds	27 seconds	14 seconds
Time from truck clearance to next vehicle arrival	0 seconds	15 seconds	5 seconds

These existing delays and gap acceptance times are discussed further in Section 4 in relation to the existing and projected (with development) intersection modelling.

Additional information of note from the survey data is the number of heavy vehicle arrivals at the intersection, over the whole survey period and in an effective peak hour. In the total survey duration, there was 29 truck arrivals in a period of 3 hours 40 minutes between 7.00 am and 11.00 am for an average arrival spacing of 7.5 minutes. In a concentrated (peak) period of 52 minutes between 7.11 am and 8.03 am there were 12 truck arrivals for an average spacing of 4.4 minutes.

These results show that there is ample capacity at the existing intersection, with average and maximum delays well within the average spacing of trucks. Allowing for the use by light vehicles as well as trucks, the number of vehicles per hour in the existing peak period is 50 (see Table 2-2), or one every 1.2 minutes. Capacity issues are further addressed in Section 4.

2.6 Accident history

The most recent accident history available for the Italia Road intersection with the Pacific Highway was provided by Roads and Maritime in January 2016. The data showed that there were three crashes at the intersection over a 5-year period from 2010 to 2014 inclusive. All three crashes had different causes and outcomes. The incidents were:

- A heavy vehicle entering the Pacific Highway from Italia Road collided with a cyclist who was travelling northbound on the highway.
- A light vehicle left the Pacific Highway and collided with a signpost near the Italia Road intersection.
- A four-wheel drive vehicle travelling northbound on the Pacific Highway struck another four-wheel drive vehicle that was completing a left turn manoeuvre onto the highway from Italia Road.

There were two injuries and no fatalities recorded as a result of these incidents. It is apparent from the nature of the incidents that none occurred solely due to the geometric layout of the intersection, with human error likely playing a role in each of the crashes. In general terms the intersection is considered to have a low accident rate.

The outcomes of a separate, independent Road Safety Audit on the existing Italia Road intersection are discussed in Section 4.3. This audit is solely on the geometry and operating characteristics of the existing intersection and does not attempt to identify risks associated with future usage or increased traffic volumes.

3. Proposed development

The development proposal involves the construction and operation of a hard rock quarry and associated transport of quarry products. The Eagleton quarry development would include offices, amenities, maintenance facilities and associated internal road access carparks. The operation of the quarry and transport of quarry materials will generate additional traffic on the existing road network.

3.1 Road network access proposals

Access to the proposed quarry would be from the existing Pacific Highway intersection with Italia Road, an upgraded intersection at the existing Right of Way (RoW) access approximately 500 metres from the highway and then via an upgraded access road connection to Barleigh Ranch Way. Detailed consideration of the primary access intersection at the Pacific Highway is canvassed in Section 4.

In relation to the secondary access point, the proposed development would provide improvements to the access road and its existing intersection with Italia Road. This will be an integral part of detailed design and construction planning.

A preliminary assessment of the location of the existing access road intersection is that it is positioned on a straight, flat section of Italia Road, providing in excess of 200 metres of sight distance in each direction. Sight distance improvements could be made with the removal of trees within the road reserve on the western side of Italia Road, either side of the access intersection.

This proposed intersection upgrade would include pre-construction and post construction road safety audits as part of the design, construction and certification processes. As such a full safety assessment is not warranted at present because the intersection will be fundamentally changes as part of future works.

3.2 Site access and internal road layout

The proposed quarry site will be accessed off Barleigh Ranch Way which in turn is accessed from Italia Road via an existing RoW as described above. The existing RoW has a formed two lane road connecting these two local roads over a distance of about 900 metres. The quarry access point is proposed approximately 300 m north of where it connects to Barleigh Ranch Way.

A plan layout of the proposed quarry and its access arrangements is provided as Appendix C.

The internal access road to the quarry requires a major crossing of Seven Mile Creek immediately prior to the quarry entrance. This is proposed to be a one lane bridge with appropriate Stop / Give Way controls for entering traffic.

The proposed road layout within the quarry is also shown on the access plan in Appendix C, an extract of that plan is provided as Figure 3-1 showing the proposed site office and administration area, as well as the proposed 11 space car parking area for staff (8) and visitors (3). There is also provision for short term truck parking and an overflow area for additional parking if necessary.

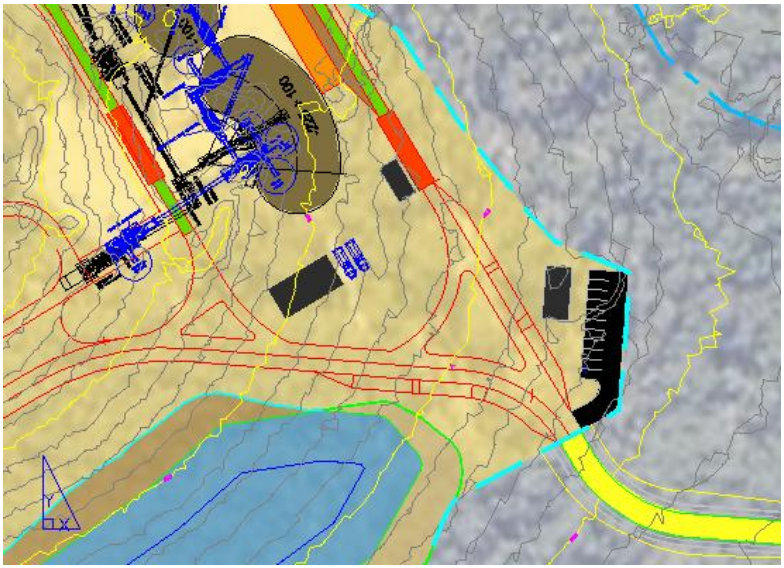


Figure 3-1 Proposed internal road and car parking layout

3.3 Expected traffic generation

The Roads and Maritime *Guide to Traffic Generating Developments* is not specific with regard to traffic generation rates for quarry sites. The operation of quarries have approved annual extraction rates which can generally be used to estimate the typical vehicle trips based on hours of operation but this is not site specific.

Advice from Eagleton in relation to the proposed operation and transport logistics of the proposed quarry has been converted into expected daily and peak hour traffic generation on Italia Road and the highway intersection.

The sales hours for the Eagleton Quarry are proposed as 5 am to 10 pm weekdays and 7 am to 4 pm on Saturdays, with an expected 10 staff on-site at any one time. There would be an operational fleet (contractors and haulage operators) of heavy vehicle truck and trailers hauling from the quarry site, with delivery of product locally across the region and in some instances to supply the Sydney market.

The site would also receive fuel and other supplies, notably bulk lime for pug mill operations, by regular truck deliveries. It is estimated that these would be up to 10 deliveries per week, or two per day on average.

The expected daily and peak hour traffic generation from these figures has been aggregated to provide an overall prediction of increased intersection usage. These predictions as shown in Table 3-1 are considered conservative for both daily and peak hour perspectives because the assumptions have included worst-case scenarios as follows:

- All employees travel individually
- Peak hourly truck movements of 10 in and 10 out per hour over a sales period of 17 hours (5 am to 10 pm).
- Quarry support vehicles (mostly fuel or bulk lime supplies) arrive or leave in peak periods.

Table 3-1 Projected traffic generation

Source	Expected daily total trips (incoming and outgoing)	Peak hour trips (AM / PM)	
		In	Out
Quarry staff	20	10 / 0	0 / 10
Truck movements (from quarry sales)	170	10 / 10	10 / 10
Quarry support / supply vehicles	2	1 / 0	0 / 1
Total	192	21 / 10	10 / 21

The majority (approximately 85%) of daily vehicle trips generated by the proposed quarry development will be from sales and subsequent truck returns after delivery of quarry materials. However, these trips would be spread across a full day of quarry operations.

The interaction of the proposed quarry traffic, estimated at 10 incoming and 10 outgoing trucks per hour, with the existing traffic on Italia Road is expected to be seamless. This number of trucks is very small on a short (500 metre) section of Italia Road; integration with a regular traffic stream of up to 65 vehicles per hour in each direction will involve large gaps and a relatively low-density traffic stream.

3.4 Cumulative traffic volumes

The expected traffic generation as shown in Table 3-1 corresponds to a likely increase of 158 vehicles per day, with a maximum of 21 additional vehicles using the Italia Road and Pacific Highway intersection in the AM and PM peak hours. The daily and peak hour cumulative traffic volumes are shown in Table 3-2.

Table 3-2 Cumulative traffic generation

Source	Expected daily total trips (incoming and outgoing)	Peak hour trips (AM / PM)	
		In	Out
Existing traffic on Italia Road	1,200	54 / 57	57 / 54
Eagleton quarry traffic generation	192	21 / 10	10 / 21
Total	1,392	75 / 67	67 / 75

The cumulative volumes on Italia Road as shown in Table 3-2 are shown as daily two way volumes and respective in / out volumes for the respective AM and PM peak periods. The expected increase represents a 13% increase in daily traffic and up to a 40% increase in peak period volumes, albeit with small absolute numbers – one vehicle every two minutes.

The peak volumes need to split with the likely directional priorities for travel on the Pacific Highway. The additional peak hour volumes have been assumed, for the purposes of this report, to be predominantly to / from the south, that is Raymond Terrace and further afield in the wider Newcastle area. As such, 80% of the traffic generation is assumed to be left in / right out movements at Italia Road.

The increases in turning movements at the intersection are shown in Table 3-3. As expected this shows little minor increases in overall turning traffic with the dominant flows on the Pacific Highway.

Table 3-3 Increased peak hour traffic at highway intersection

Leg	Movement	AM Peak hour volume			PM Peak hour volume		
		Existing	Increase	Total	Existing	Increase	Total
North (SB)	Through	779	0	779	774	0	774
	Right	29	4	33	32	2	34
West	Left	29	2	31	28	4	32
	Right	21	8	29	30	17	47
South (NB)	Through	535	0	535	768	0	768
	Left	19	17	36	21	8	29

It is clear from the figures in Table 3-3 that the expected additional peak period traffic generation is relatively small in relation to existing turning movements at Italia Road and these in turn are minor in relation to through Pacific Highway volumes.

Consideration of other development approvals in the vicinity of the proposed quarry development have the potential to further increase the cumulative traffic impact on the access road intersection with Italia Road and in turn the nearby Pacific Highway intersection. It has been identified that a recent development approval for an upgraded motor racing facility on Lot 2 DP 1158962 may further increase traffic volumes in the area.

However, as outlined previously, this approval and other land uses adjacent the proposed quarry are primarily recreational in nature and generate traffic that is almost exclusively weekend based. The interaction of weekend based recreational traffic with quarry generated truck movements would be limited to Saturdays. Quarry operations are unlikely to be in full swing on Saturdays, with deliveries to construction sites generally ceasing around mid-day. The departure peak from any Saturday event will be mid to late afternoon and as such any overlap of traffic is unlikely to be significant.

The development consent for the motor racing facility also allows for limited weekday use such as private practice by race cars, general use of the track by road registered vehicles, driver training, educational or promotional events and motorkhana. The numbers of vehicles accessing the track for these types of events is not known but it is expected that midweek patronage would not be large compared to weekend usage which would include many race cars and spectator vehicles. This traffic is also less likely to be generated in peak periods, with a more uniform distribution throughout the day. As such, it is proposed that the cumulative traffic impact on the existing road network is minimal.

3.5 Construction traffic impacts

In addition to consideration of cumulative impacts of the expected traffic generation, the Roads and Maritime requirements also included an assessment of construction traffic and the preparation of a construction traffic management plan.

Construction traffic impacts will be limited to the delivery of plant, quarry operation equipment and building materials, including ready mix concrete for infrastructure and site facilities. There will be no construction phase impacts on the existing Pacific Highway other than temporary traffic increases.

It is expected that the construction based traffic generation would be less than the future operational traffic volumes as previously outlined. There may be more light vehicles in peak hour for construction personnel (estimated at 20) but these employees are more likely to travel

in groups. Heavy vehicle arrivals would be more spasmodic across the day as building and construction materials arrive during working hours.

A construction traffic management plan is not necessary for the Italia Road intersection with the Pacific Highway, as it would operate as normal. The proposed quarry access intersection with Italia Road would require some form of interim traffic control during working hours only.

It is proposed that the preparation of a construction traffic management plan would be the domain of the contractor appointed for the establishment of the site access and associated facilities.

4. Intersection capacity and safety assessment

This section provides an assessment of the capacity and safety aspects of the Italia Road intersection with the Pacific Highway. A measure of the intersection performance is the Level of Service (LoS) criteria for intersection delays, a reference to the average delay per vehicle in bands and a general description of relative performance, ranging from A as good operation to F which has major capacity and delay issues.

4.1 Intersection capacity assessment

A capacity assessment of the Italia Road intersection has been undertaken using the SIDRA intersection analysis package. A number of scenarios have been investigated to assess the impact of the traffic to be generated from the quarry development as follows.

- Existing (2016) volumes
- With development (2016) volumes
- No development with future (2026) volumes
- With development (2026) volumes

For each peak period the SIDRA analysis provides results for LoS, average delay (seconds) and maximum queue length in terms of number of vehicles. Full details of the SIDRA analysis is provided in Appendix D, which shows calculated traffic volumes as outlined in Section 3 and the subsequent analysis for the intersection. These volumes include heavy vehicle numbers as per the existing intersection survey plus those projected from the proposed Eagleton quarry. These heavy vehicles were modelled as standard heavy vehicles within the SIDRA model settings.

Table 4-1 provides results for these three criteria for these initial analysis scenarios for the intersection, focussing on the two right turns at Italia Road, right out for the majority (80%) of laden vehicles to the south, and right in for vehicles from the north.

Table 4-1 Projected intersection performance

Situation	Italia Road right turn out			Italia Road left turn out		
	LoS	Delay (secs)	Vehicle queue	LoS	Delay (secs)	Vehicle queue
Existing AM peak	B	20	1	A	13	1
Existing PM peak	B	24	1	B	16	1
With development AM peak 2016	B	23	1	A	13	1
With development PM peak 2016	C	31	1	B	19	1
No development AM peak 2026	B	25	1	B	15	1
No development PM peak 2026	C	36	1	B	22	1
With development AM peak 2026	C	31	1	B	17	1
With development PM peak 2026	D	55	3	C	35	3

The SIDRA results provided in Table 4-1 show that the Italia Road intersection would generally operate satisfactorily in all peak conditions over the ten-year period to 2026. Levels of Service, delays and queue lengths projected during operation of the Eagleton quarry and associated truck movements are typical of a rural t-intersection with a major highway traffic flow and are generally in accordance with observed vehicle behaviour at Italia Road. In particular, the

calculated delays and theoretical queue lengths in the morning peak closely correspond with the survey undertaken in April 2017, as described in Section 2.5, which measured the average waiting time for a right turning truck at the intersection to be 20 seconds.

Of the overall results for right turning vehicles, the PM peak post development in 2026 does show potential issues with delays and queueing (average delays of about 1 minute and resultant queue lengths of up to 3 vehicles) more prominent. However, this 2026 result is contingent on future haulage movements from the existing Boral quarry which also use Italia Road. Further discussion on this relationship and future operations of each quarry is provided in Section 4.1.1.

In addition to the initial modelling for the Italia Road intersection as outlined in Table 4-1, the modelling has been reviewed and tested against a number of other parameters. Following commentary from Roads and Maritime on the assumed modelling parameters, the SIDRA analysis has been revisited to test potential changes to other input assumptions.

These changed input assumptions (primarily the use of large trucks instead of standard heavy vehicles) and the additional modelling results are detailed in Appendix D. However, the baseline modelling for Alternative 1 – the existing AM peak period for 100% large trucks - is substantially higher than the survey results quoted above. The subsequent Alternative 1 modelling scenarios for future years show peak period delays of up to 7 minutes with queue lengths of 19 vehicles for a worst case with development based traffic included. Of the alternative modelling scenarios, Alternative 2 (providing a mixture of heavy vehicles and large trucks) is a more appropriate sensitivity test in relation to the initial modelling results quoted above.

The survey results for the current operation of the intersection show delays generally in accordance with the original baseline modelling results in Table 4-1. Average delays and intersection clearance times are consistent with previous surveys on which modelling assumptions were based. As such, these results are the most appropriate for assessment of the Eagleton quarry development. Using the sensitivity test of Alternative 2 shows that the delays and resultant queues are generally comparable to the baseline modelling with acceptable results across all scenarios other than the 2026 post development scenario highlighted above.

4.1.1 Impact of Boral quarry operations

It is understood that the neighbouring Boral quarry will cease to operate or scale down its operations within the next 10 years. As such, the projected intersection performance results quoted in Table 4-1 for 2026 are worse than is likely to be the case at that time. As the Boral quarry operations are downsized, actual performance is more likely to be reflected by the 2016 results – that is, an average delay of 1 minute and maximum queue length of 2 vehicles.

The basis for this assumption is the known production output from the existing quarry against what industry sources acknowledge are limited reserves at the existing quarry. Estimated reserves at the Boral operation are understood to be in the order of 5 million tonnes, with current extraction, production and haulage in the range of 600,000 – 700,000 tonnes per annum. As such, at current extraction rates, it is estimated there may be 7 – 8 years of remaining reserves, or alternatively if these reserves are to extend to 2026 and beyond, current production rates will be substantially reduced.

If, as expected that is the case, then the impact of Eagleton quarry on the Italia Road intersection will be less – the increase in truck volumes as the new quarry is fully developed and operational will replace existing movements rather than add to them. Conversely, if the Boral quarry continues to operate at full production capacity until 2026 and beyond, the Eagleton quarry has operational flexibility to avoid major PM peak period delays on Italia Road. This could involve split shifts for production and administration staff, or reduction of product haulage in peak periods in favour of more haulage in non-peak times.

4.2 Preliminary safety assessment

Roads and Maritime has previously indicated to Eagleton that it was intending to undertake a review of the intersection layout to assess its overall suitability for highway access in general and for heavy vehicle operations in particular. It is not known if this review has been undertaken as yet.

In the absence of any outcomes from this proposed review, a preliminary safety assessment has been undertaken for the intersection in advance of a Stage 5 Road Safety Audit to be undertaken independently to this report. This is further described in Section 4.3.

An assessment of available sight distance to and from the intersection is considered the primary safety parameter. This has been undertaken from a theoretical basis and, in the absence of geometrical road design plans, from a survey perspective.

4.2.1 Required sight distance

The required sight distance for the intersection can be broken into two cases.

- Safe intersection sight distance (SISD) for approaching vehicles to be able to observe a vehicle at the intersection and take necessary action to avoid a collision, stopping if necessary. This is the minimum sight distance which should be provided on the major road at any intersection.
- Minimum gap sight distance (MGSD) is used to derive the distance corresponding to the critical gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. This is the key decision parameter for the driver entering the major road and then clearing the intersection before the arrival of the next vehicle.

SISD and MGSD have been calculated using Austroads *Guide to Road Design Part 4a: Unsignalised and Signalised Intersections*. Figure 4-1 below shows how the SISD for a car was derived for this intersection, using driver reaction time of 2.5 seconds. A sensitivity test using a less conservative reaction time of 1.5 seconds reaction time is also reported.

Table 3.2: Safe intersection sight distance (SISD) and corresponding minimum crest vertical curve size for sealed roads (S<L)

Design speed (km/h)		Based on safe intersection sight distance for cars[1] h1 = 1.1; h2 = 1.25, d = 0.362; Observation time = 3 s					
		R_T = 1.5s[3]		R_T = 2.0s		R_T = 2.5s	
		SISD (m)	K	SISD (m)	K	SISD (m)	K
40		67	4.9	73	6	-	-
50		90	8.6	97	10	-	-
60		114	14	123	16	-	-
70		141	22	151	25	-	-
80		170	31	181	35	-	-
90		201	43	214	49	226	55
100		234	59	248	66	262	74
110		-	-	285	87	300	97
120		-	-	324	112	341	124
130		-	-	365	143	383	157
Minimum SISD capability provided by the crest vertical curve size[4]	Car at night[5]	d = 0.46, h_1 = 0.65 m, h_2 = 1.25 m, observation time = 2.6 s. d = 0.46, h_1 = 1.1 m, h_2 = 0.75 m, observation time = 2.5 s.					
	Truck	d = 0.24, h_1 = 2.4 m, h_2 = 1.25 m, observation time = 3.0 s.					
	Truck at night[5]	d = 0.29, h_1 = 1.05 m, h_2 = 1.25m, observation time = 1.8 s. d = 0.29, h_1 = 2.4m, h_2 = 0.75m, observation time = 3.0s.					

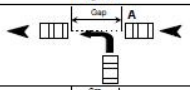
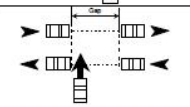
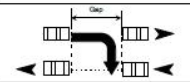
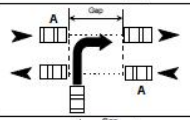
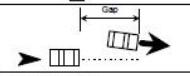
Figure 4-1 Austroads Table 3.2 Safe intersection sight distance

The downhill grade of approximately 3% is factored in as it increases the required distance for a vehicle to stop safely. This is an additional 10 m, increasing the SISD for the intersection to 272 m for car to car observations. This is reduced by 28 m to 244 m using the shorter reaction time of 1.5 seconds. SISD was also calculated for heavy vehicles using empirical formulas. These calculations require SISD of 354 m and 326 m for trucks using the two reaction times, the additional distance is allowance for extra braking requirements of the larger vehicle.

Figure 4-2 below shows how the MGSD is calculated for entering vehicles through a range of turning movement scenarios. The operation of a seagull intersection, where only one carriageway is crossed for safe entry to the opposite carriageway, has been assumed to be a crossing of three lane / one-way road (northbound) as depicted in the first red box.

For the purposes of calculating MGSD at Italia Road it has been assumed that a car would require a perception of a minimum 6 second gap (or 167 m) to an approaching vehicle, with a truck requiring a total of 9 seconds, which equates to a MGSD of 250 m. This represents the average intersection clearance time for trucks in the April 2017 survey as outlined in Table 2.5.

Table 3.4: Critical acceptance gaps and follow-up headways

Movement	Diagram	Description	ta	tf
Left-hand turn		Not interfering with A Requiring A to slow	14-40 sec 5 sec	2-3 sec 2-3 sec
Crossing		Two lane/one way Three lane/one way Four lane/one way Two lane/two way Four lane/two way Six lane/two way	4 sec 6 sec 8 sec 5 sec 8 sec 8 sec	2 sec 3 sec 4 sec 3 sec 5 sec 5 sec
Right-hand turn from major road		Across one lane Across two lanes Across three lanes	4sec 5sec 6sec	2 sec 3 sec 4 sec
Right-hand turn from minor road		Not interfering with A One way Two lane/two way Four lane/two way Six lane/two way	14-40 sec 3 sec 5 sec 8 sec 8 sec	3 sec 3 sec 3 sec 5 sec 5 sec
Merge		Acceleration lane	3 sec	2 sec

Note: t_a = critical acceptance gap and t_f = follow up headway.

Source: Austroads (2005).

Table 3.5: Table of minimum gap sight distances ('D' metres) for various speeds

Critical gap acceptance time (ta) (secs)	85th percentile speed of approaching vehicle (km/h)										
	10	20	30	40	50	60	70	80	90	100	110
4	11	22	33	44	55	67	78	89	100	111	122
5	14	28	42	55	69	83	97	111	125	139	153
6	17	33	50	67	83	100	117	133	150	167	183
7	19	39	58	78	97	117	136	155	175	194	214
8	22	44	67	89	111	133	155	178	200	222	244
9	25	50	75	100	125	150	175	200	225	250	275
10	28	56	83	111	139	167	194	222	250	278	305

Source: Austroads (2005).

Figure 4-2 Austroads Table 3.4 Gap acceptance criteria

The sensitivity test for MGSD is set at the maximum truck clearance time of 13 seconds from the April 2017 delay survey results. This corresponds to a required MGSD of 362 m, based on an extrapolation of the distance table in Figure 4-2. The sensitivity test for a car would be to increase the initial gap acceptance to 10 seconds for northbound carriageway crossing, increasing the required distance to 278 m.

A summary of these theoretical sight distance requirements for the Italia Road and Pacific Highway intersection is provided in Table 4.2 below.

Table 4-2 Safe sight distance requirements

Sight Distance type	Distance required	Sensitivity test
Safe intersection sight distance		
Cars	272 (R_T = 2.5 secs)	244 (R_T = 1.5 secs)
Trucks	354 (R_T = 2.5 secs)	326 (R_T = 1.5 secs)
Minimum gap sight distance		
Cars	167 (6 seconds)	278 (10 seconds)
Trucks	250 (9 seconds)	362 (13 seconds)

4.2.2 Measured sight distance

The northbound approach to the Italia Road intersection is situated on a broad crest vertical curve. Plans for the recent highway upgrade are not readily available to check the design criteria applied to this crest curve. The effect of this curve is demonstrated in the photographs shown as Figure 4-3, looking south from the intersection along the northbound carriageway.

Figure 4-3 Sight distance observations across northbound vertical curve

The actual sight distance at the intersection was measured using survey equipment. The actual sight distance results and interpolations are summarised as follows:

- Car to car (1.1 m driver eye height to 1.1 m vehicle height) 275 m
- Car to truck (1.1 m driver eye height to 2.4 m truck height) 310 m
- Truck to car (2.4 m driver eye height to 1.5 m vehicle height) 335 m (estimated)
- Truck to truck (2.4 m driver eye height to 2.4 m truck height) 385 m

A comparison of these survey results to the theoretical safe intersection and minimum gap sight distance calculations in Table 4-2 shows that the required sight distance is practically achieved in all circumstances. A generalised description of these circumstances is provided as follows

- An approaching car has adequate sight distance for a waiting car or truck at the intersection.
- The calculations show that an approaching truck requires more distance to stop (354 m) than is available (310 m) as measured but the differential is not critical for two reasons
  - a shorter reaction time reduces the distance required to 326 m and the driver would have ample time to slow substantially to avoid a collision.
  - measurement of the sight distance to driver eye height (1.1 m) for a car does not take into the additional height to the roof of a car (say 1.5 m) which would be visible from further away – estimated as 25 m for an increase in sight distance to 335 m.
- The minimum gap sight distance for a car turning right is effectively met (278 m versus 275 m) for the worst case calculation of 10 seconds decision and intersection clearance time. Actual gap acceptance requirement for a car is only 6 seconds.
- The minimum gap sight distance for a loaded truck has been calculated as 362 metres, taking into account a decision and intersection clearance time of 13 seconds. There is 385 metres available.

4.3 Road safety audit

As part of this traffic impact assessment an independent road safety audit on the Italia Road intersection has been undertaken to complement the preliminary analysis in this report. The audit was undertaken as a Stage 5 audit on the situational context, layout and geometry of the existing intersection.

4.3.1 Need for independent safety audit

The need for a road safety audit was driven by Roads and Maritime concerns with the layout and safety aspects of the existing intersection and the perception of approval authorities in regard to the suitability of the intersection for increased heavy vehicle usage.

An independent baseline assessment of the intersection is appropriate to understand any issues as part of any consideration of increased usage, particularly by heavy vehicles which would represent the primary traffic generation from quarry operations.

4.3.2 Audit proposal

A full Stage 5 Road Safety Audit of the existing intersection has been undertaken by accredited road safety firm Alan Samsa Consulting. This firm has successfully worked with GHD on a number of Roads and Maritime project development and detailed design commissions and its auditors are well regarded.

The audit was conducted in early February 2016, coinciding with the end of the school holiday period and a return to normal traffic conditions on the Pacific Highway. The audit was undertaken in accordance with Roads and Maritime guidelines and included a daytime and night time assessment of the intersection layout.

4.3.3 Audit findings and responses to safety issues

The Stage 5 Audit report for the Italia Road intersection and approaches identifies a number of minor road safety issues. A copy of the audit report is provided in Appendix E.

The principal concerns of the audit team relate to the following issues:

- There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction.
- Safe intersection sight distance (SISD) between the northbound highway travel lanes and the Italia Road junction is marginal for a car to car scenario, improved for a car to truck scenario.

A range of potential road safety issues were identified in the audit and are listed in Table 3.1 of the audit report in Appendix E. That table provides for a combined GHD / Client response to the issue raised and the subsequent risk allocation. The road safety issues and the GHD / Client responses are provided in Table 4-3 overleaf.

In consideration of the audit findings in Table 4-3 it is noted that the majority of issues identified are minor in nature and are likely to be a low cost to rectify, as such are referred for Roads and Maritime consideration. Those items which will incur high costs to resolve and have a medium risk as per Figure 3.4 of the audit report require a higher rectification costs, hence the medium risk is considered acceptable.

4.4 Potential safety improvements

The Roads and Maritime requirement for the development proponent to nominate and evaluate a range of safety improvements for the Italia Road intersection has been noted. The preliminary safety assessment based on sight distance calculations and the outcome of the Road Safety Audit have confirmed that there is no major shortcoming in the intersection design.

The intersection was constructed by Roads and Maritime as part of the Pacific Highway upgrade approximately 15 years ago and has operated since in a safe fashion, with three minor accidents in the 5 years from 2010 to 2014 inclusive.

A number of potential improvements have been identified to improve the operation and safety of the intersection. These include provision of a Stop sign to replace the existing Give Way on Italia Road, new line marking for the intersection and replacement of intersection sight boards opposite the intersection on the southbound carriageway of the highway.

Table 4-3 Road safety audit issues and GHD / Client response

No.	Description of road safety issue	Risk rating	Category	GHD / Client response	Action by
1	There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction – refer to *Photos 1 & 2* in *Appendix A*. The adoption of a 'Stop' control (rather than 'Give Way' control) is considered to be prudent due to sight distance restrictions at the junction. Moreover, the location of the intersection sightboard on the far (eastern) side of the highway could be improved because it sits low beyond the higher crested section of highway – refer to *Photo 1* in *Appendix A*. At night, it becomes even less conspicuous because vehicle headlights do not fully extend across highway alignment.	Medium - High	Intersections / Traffic signs / Delineation	It is understood that the proponent is prepared to fund and complete these minor improvements to improve the existing condition of the intersection.	ERS
2	Sight distance to/from the northbound highway right (fast) lane to the Italia Road junction is estimated at approximately 250 m due to the combination of the crest vertical alignment and right curve horizontal alignment – refer to *Photos 3 & 4* in *Appendix A*. This is marginal with respect to safe intersection sight distance (SISD) guidelines, which it is calculated would require approximately 270 m to/from an approaching northbound car along the highway. It is acknowledged that sight distance for truck drivers would be greater due to the higher driver position in the vehicle and that approaching northbound highway vehicles may be able to earlier sight trucks exiting the Italia Road junction due to the truck's larger (taller) size.	Medium	Road alignment	Actual sight distance as measured is 275 m for car to car observations and between 310 m and 385 m for trucks, depending on the vehicle type at the intersection. Rectification works to improve sight distance would involve adjusting the vertical alignment of the northbound lanes which would incur significant cost. In accordance with Figure 3.4 on Page 6, the medium risk and high cost result in acceptable risk without any required rectification works to further reduce risk rating	None
3	For the southbound highway right-turn movement into Italia Road, the deceleration lane length is sub-standard for the 110 km/h highway speed zone. This may result in vehicles slowing down within the highway 'fast' lane.	Low - Medium	Auxiliary lanes	Low / medium risk plus high rectification costs result in unjustifiable	None
4	The northbound highway left-turn movement into Italia Road has adverse cross fall after a downhill approach.	Low - Medium	Road alignment	Low / medium risk plus high rectification costs result in unjustifiable	None
5	There is no acceleration length for vehicles turning left out of Italia Road onto the highway northbound. This may impede (slow down) northbound highway traffic flow especially due to the downhill grade for northbound highway travel and the restricted sight distances to the south from Italia Road.	Low - Medium	Auxiliary lanes	The proposed development traffic generation will be mostly southbound journeys, involving a right turn from Italia Road. There are no other left turn acceleration lanes at other intersections on this section of highway. Traffic volumes do not generate a warrant, lefy turn delays are insignificant.	None

No.	Description of road safety issue	Risk rating	Category	GHD / Client response	Action by
6	For southbound highway traffic approaching the Italia Road junction to turn right, there is no guidance on where to stop, ie. there is no 'hold' line across the 'seagull' layout, which would also act as continuity guidance for northbound highway travel past the junction.	Low	Delineation/ Intersections	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
7	For southbound highway traffic, a 'merging traffic' sign for the acceleration lane merge is located at the Italia Road intersection 'seagull' splitter island – refer to *Photo 5* in *Appendix A*. However, this is approximately 1.2 km prior to the actual merge with no follow-up signage downstream near the merge zone.	Low	Traffic signs	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
8	On the left (northern) side of Italia Road approaching the highway, there is an unprotected power pole within the clear zone – refer to *Photo 1* in *Appendix A*.	Low	Roadside hazards	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration in conjunction with Ausgrid	Referral
9	There are faded pavement markings (particularly pavement turn arrows and edge line) at the intersection including for the highway southbound right-turn lane and northbound left-turn lane into Italia Road – refer to *Photos 5 & 6* in *Appendix A*.	Low	Delineation	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
10	There is no street lighting at the junction, which reduces guidance and delineation at night, especially for the Italia Road approach to the highway. This also reduces the conspicuousness of the junction when approaching along the highway.	Low	Lighting	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
11	For the right-turn movement out of Italia Road onto the highway southbound, the length of the acceleration lane is marginal with respect to heavy vehicles. It is acknowledged that the acceleration of loaded heavy vehicles may be problematic, especially for the initial uphill grade alignment.	Low	Auxiliary lanes	In accordance with Figure 3.4 on Page 6, the low risk and high cost result in acceptable risk without any required rectification works to reduce risk rating.	None
12	For the Italia Road approach to the highway, directional signage has only been provided for directions to the north (left) along the highway.	Low	Traffic signs	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
13	There is inconsistency in the highway speed zoning with 100 km/h for northbound travel and 110 km/h for southbound travel, which may cause confusion for motorists.	Low	Speed zones	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral
14	For southbound highway travel approaching the Italia Road junction, the side road junction signage is partially obstructed by roadside vegetation from the left (slow) lane.	Low	Traffic signs	Beyond the scope of development related impact – issue referred for Roads and Maritime consideration	Referral

5. Summary

This report has been prepared as a traffic impact assessment in respect to the proposed development of a hard rock quarry at Eagleton. This proposed road network access for the quarry is from the Pacific Highway intersection with Italia Road, approximately 12 km north of Raymond Terrace. The proposed additional traffic from the Eagleton quarry between 10 and 21 vehicles per hour, including 10 large trucks) is minor in relation to volumes on the Pacific Highway but is comparable to existing traffic on Italia Road. A number of scenarios have been analysed to assess intersection performance with and without development-based traffic – this provides an assessment of average delays and expected queue lengths in comparison to existing and projected traffic volumes.

Following this analysis it is confirmed that the Eagleton quarry would not have any major adverse impact on the road network in terms of intersection or route capacity. Using a range of input assumptions in relation to composition of heavy vehicle volumes, the future intersection performance is assessed as acceptable, with average delays generally less than one minute and queues limited to one or two vehicles. As such, the expected increase in delays at the intersection are not expected to lead to any substantial congestion or risky driver behaviour.

The potential for any major future delays with the concurrent operation of the Boral and Eagleton quarries in the future is expected to be off-set with the scaling back of the Boral operations as its reserves are diminished. Alternatively, the Eagleton quarry has flexibility in its proposed operations to spread its traffic generation away from peak periods if the Boral quarry continues existing production rates within its current planning consent.

The report has also confirmed that Eagleton proposes to provide a sealed access road from Italia Road, across an existing Right of Way to the proposed quarry entrance and that suitable design parameters have been adopted for the internal access roads, traffic circulation and on-site car parking.

Safety of the Pacific Highway intersection with Italia Road has been assessed geometrically in relation to sight distance and gap acceptance criteria for the intersection. The analysis shows that the intersection meets the required criteria and that sight and stopping distance are satisfactory, as expected from a recently constructed section of the Pacific Highway.

A separate road safety audit has been conducted on the existing intersection by independent auditors from Samsa Consulting. This audit identified a range of mostly low risk issues that should generally be referred to Roads and Maritime as the maintenance authority for the Pacific Highway.

Appendices

Appendix A – Roads and Maritime correspondence

PCU039794

Transport Roads & Maritime Services

9 November 2012

SF2011/001364/1
CR2012/010223
MD

Manager - Industry
Major Projects Assessment
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: Mr Carl Dumpleton

PACIFIC HIGHWAY (HW10): EAGLETON QUARRY PROJECT, LOT 2 DP 1108702, BARLEIGH RANCH WAY, EAGLETON - ADEQUACY OF ENVIRONMENTAL ASSESSMENT (MP 10_0199)

Dear Mr Dumpleton,

I refer to your email dated 18 October 2012 requesting comment from Roads and Maritime Services (RMS) regarding the adequacy of the Environmental Assessment (EA) for the subject project.

Transport NSW and RMS' primary interests are in the road network, traffic and broader transport issues. In particular, the efficiency and safety of the classified road network, the security of property assets and the integration of land use and transport.

RMS has reviewed the information provided and can advise that the Traffic Impact Assessment (TIA) by TPK and Associates dated October 2012 requires significant revision prior to the public exhibition of the Environmental Assessment.

RMS would require the TIA to include:

- An assessment of the cumulative impacts on road safety and traffic efficiency at the intersection of the Pacific Highway and Italia Road as a result of the vehicular movements to/from the proposed quarry, the Boral Quarry, and those land uses identified in the TIA.

- A road safety risk assessment of the Pacific Highway / Italia Road intersection post-development. This assessment should identify and evaluate potential measures to improve road safety at this intersection.

  Comment: RMS is aware of road safety concerns arising from limited sight distance for heavy vehicle operators at the subject intersection. A number of complaints have been received from Boral workplace health and safety representatives regarding the safety of the

right turn out of Italia Road. Additional heavy vehicle movements at this intersection are likely to increase the road safety risks.

- The impact of construction traffic has not been addressed in the TIA. A Construction Traffic Management Plan should address and mitigate construction traffic impacts resulting from developments on-site.

- Electronic input/output data files for RMS review.

RMS will provide further comment / requirements on the subject proposal during the public exhibition stage and receipt of a revised TIA.

Please contact me on 4924 0688 if you require further advice.

Yours sincerely,

Michael Dixon
A/Manager, Land Use Management
Hunter Region

Cc Mr Tim Dewey
Transport for NSW

General Manager
Port Stephens Council

Transport
Roads & Maritime
Services

29 October 2015

CR2015/004934
SF2012/041993
KAP

Manager - Resource Assessments
Planning Services
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Dear Genevieve Seed,

PROPOSAL – EAGLETON HARD ROCK QUARRY PROJECT, BARLEIGH RANCH WAY, EAGLETON (LOT 2 DP 1108702), SEARS INPUT REQUEST SSD 15_7332

Reference is made to Department of Planning and Environment's email dated 15 October 2015, requesting Roads and Maritime Service's (Roads and Maritime) requirements under Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* for the Preliminary Environmental Assessment Report, prepared by JBA Urban Planning Consultants P/L, dated October 2015 for the proposed rock quarry at Barleigh Ranch Way, Eagleton.

Roads and Maritime understands that the current proposal is similar to a request made for Director-Generals Requirements in 2010 under Part 3A of the *Environmental Planning and Assessment Act 1979* where an extraction rate of 750,000tpa was proposed. The current proposal seeks to extract 600,000tpa. Access to the site is still proposed to be from Barleigh Ranch Way via a right-of-carriageway to Italia Road and onto / from the Pacific Highway. Operating hours are proposed between 5:00am to 10:00pm Mondays to Fridays and 6:00am to midday Saturdays.

Roads and Maritime response and requirements

Roads and Maritime has reviewed the information provided, including the Preliminary Environmental Assessment Report, and raises no objection to or requirements for the proposed development, subject to the following requirements:

- The EIS should include reference to Section 2 'Traffic Impact Studies' within RTA's *Guide to Traffic Generating Developments 2000* with regard to the traffic and transport impacts of the proposed development.

- A traffic and transport study shall be prepared in accordance with the RMS *Guide to Traffic Generating Developments 2000* and is to include, but not be limited to, the following:

    - Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject area during the construction and operational phases.

    - Current traffic counts (over 3 days) for all the traffic routes and intersections.

    - Identification and justification of anticipated additional vehicular traffic generated from the proposed development and associated trip distribution on the road network during both the construction and operational phases.

    - The cumulative impacts on road safety and traffic efficiency at the intersection of the Pacific Highway and Italia Road as a result of the vehicular movements to/from the proposed quarry, the Boral Quarry, and other existing / future-known land uses.

      Comment: It is expected that an upgrade of the intersection is likely and that all costs associated with an upgrade will be at the developer's expense.

    - Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network. In this regard, concept drawings shall be submitted with the Environmental Assessment for any identified road infrastructure upgrades. However, it should be noted that any identified road infrastructure upgrades will need to be to the satisfaction of Council and Roads and Maritime.

- A road safety risk assessment of the Pacific Highway / Italia Road intersection post-development. This assessment should identify and evaluate potential measures to improve road safety at this intersection.

Comment: RMS is aware of road safety concerns arising from limited sight distance for heavy vehicle operators at the subject intersection. A number of complaints have been received from Boral workplace health and safety representatives regarding the safety of the right turn out of Italia Road. Additional heavy vehicle movements at this intersection are likely to increase the road safety risks.

- A Construction Traffic Management Plan should be provided addressing construction traffic impacts resulting from development/s on-site.

- Intersection analysis (such as SIDRA) shall be submitted to determine the need for intersection and road capacity upgrades. The intersection analysis shall include (but not limited to) the following:

    - Current traffic counts and 10 year traffic growth projections;
    - 95th percentile back of queue lengths;
    - Delays and level of service on all legs for the relevant intersection/s;
    - Electronic input/output data files for Roads and Maritime to review.

Roads and Maritime will provide further comment / requirements on the subject proposal during the public exhibition stage of a formal application and receipt of the abovementioned documentation.

On determination of this matter, please forward a copy of the SEARs to Roads and Maritime for record and / or action purposes. Should you require further information please contact Kellee McGilvray on 4924 0688 or by email at development.hunter@rms.nsw.gov.au.

Yours sincerely

29/10/15

Kevin Webster
Network and Safety Manager
Hunter

17 March 2017

CR2017/000445
SF2012/041993
KAP

Department of Planning & Environment
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Attention: Michelle Kirkman,

PACIFIC HIGHWAY (A1): STATE SIGNIFICANT DEVELOPMENT SSD 7332 – EIS EXHIBITION, EAGLETON HARD ROCK QUARRY, LOT: 2 DP: 1108702, KILLALOE LANE, EAGLETON

Reference is made to Department of Planning and Environment's ('DPE') email dated 2 February 2017, regarding the abovementioned application which was referred to Roads and Maritime Services (Roads and Maritime) for comment.

Roads and Maritime understands the development involves:

- Constructing and operating a hard rock quarry for up to 30 years;
- Extracting and processing up to 600,000 tonnes per annum of gravel/aggregate;
- Clearing approximately 30 hectares of vegetation;
- Constructing associated on-site infrastructure, including internal roads, a bridge over Six Mile Creek, administration buildings, processing facilities and water management structures;
- Transporting processed material to market by truck;
- Improving public and private roads along the transport route; and,
- Progressively rehabilitating the site.

The Traffic Impact Assessment, prepared by GHD, and dated December 2016, reveals that the quarry is proposed to operate between 5am and 10pm weekdays and 7am and 4pm on Saturdays. Up to 192 trips (incoming and outgoing) are expected including 170 heavy truck movements (from quarry sales). The report identifies that 80% of total truck movements will be left-in from the Pacific Highway and right-out of Italia Road.

Roads and Maritime response

Roads and Maritime understands that in recent years Council and DPE have granted consent for a number of traffic-generating developments in the Eagleton / Balickera area which require access via the Pacific Highway / Italia Road intersection. Known development includes: Boral Quarry; a paintball facility; a motorcycle club and motorcycle raceway; car racing circuit and associated events; and a landscape / composting facility. Both the background growth in traffic volumes on the Pacific Highway and volumes attributable to the traffic-generating developments in the area, particularly the increase in volumes of heavy vehicles, has put greater pressure on the intersection.

The Road Safety Audit has been submitted with the Traffic Assessment. A review of the audit reveals that there are safety deficiencies in the intersection, specifically the right-turn movement by heavy vehicles, including the slow acceleration times from start to clear northbound carriageway and insufficient acceptable gaps in northbound traffic stream. The proposed increase in heavy vehicle movement generated by the subject development will result in additional demand on the intersection, exacerbating the potential safety risk and the potential crash occurrence and severity.

Roads and Maritime has reviewed the information provided and objects to the proposed development as it is considered the proposal will have an adverse impact on the safety and efficiency of the nearby classified (State) road network, specifically, the intersection of Pacific Highway and Italia Road.

Roads and Maritime provides the following further comments in response to the documents submitted for DPE consideration:

- The electronic SIDRA analysis has not identified the design vehicle in the relevant proposed intersection scenario. A standard “heavy vehicle” was used in the model (e.g. 12m long, 15 tonne vehicle), rather than the basic “large truck” being at least 25m long, 38 tonne heavy vehicle. When adjusted to reflect a number of “large trucks” in a sensitivity analysis, the model reveals a delay of between 2500-3600 seconds (i.e. up to 1 hour).

- The results from the analysis suggest that significant delays are likely to increase risky driver behaviour as drivers become frustrated and accept shorter gaps in the traffic stream. This increases the likelihood of crash occurrence and severity. As the background growth on the Pacific Highway increases, fewer acceptable gaps are expected to be available for right-turning vehicles from Italia Road.

- The proposed gap acceptance used for heavy vehicles is considered to be too short to accommodate a safe movement for the design vehicle. The gap acceptance used within the traffic assessment is based on a light vehicle movement rather than that of the design vehicle, being a heavy laden 25m large truck.

- The proposed recommendations within the Safety Audit do not adequately address the risks associated with the traffic generated by the proposed development.

Based on the abovementioned concerns and comments, it is likely that the subject intersection of Pacific Highway and Italia Road will be required to be upgraded to support the proposed quarry operations.

Should you require further information please contact Hunter Land Use on 4908 7688 or by email at development.hunter@rms.nsw.gov.au.

Yours sincerely

Peter Marler
Manager Land Use Assessment
Hunter Region

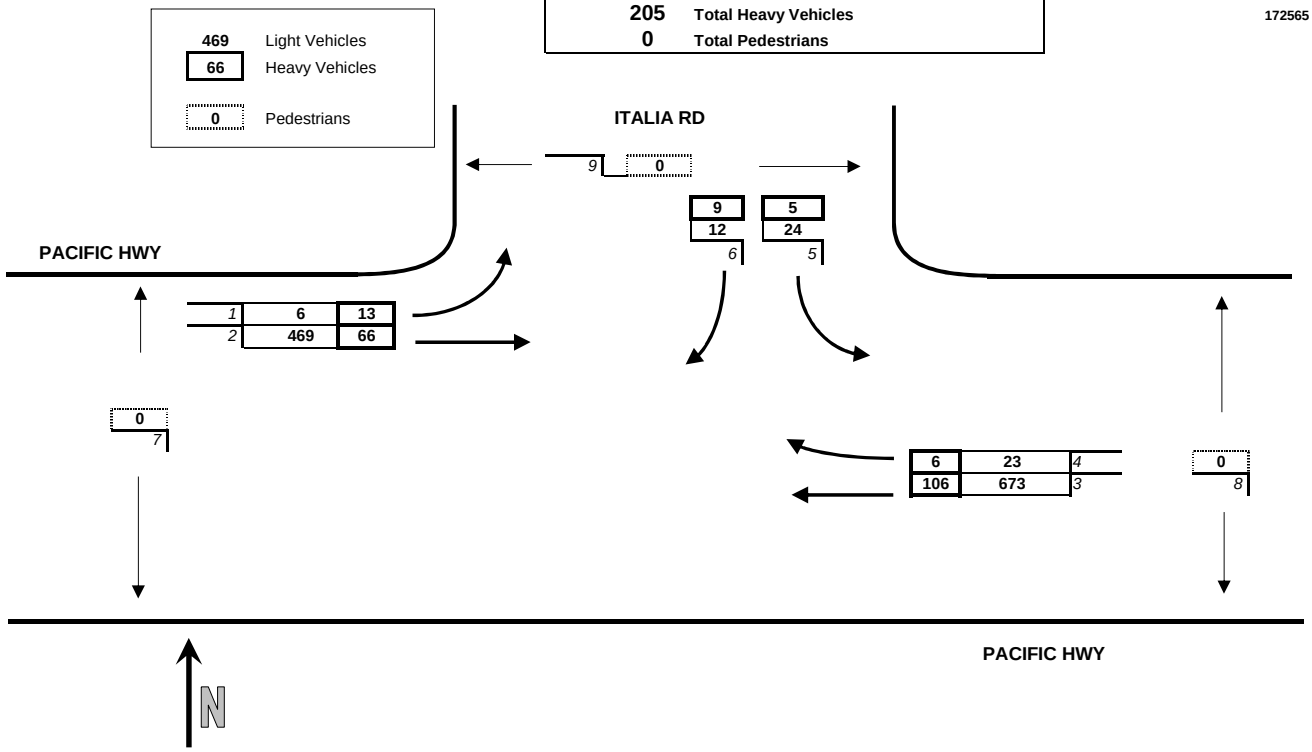
Appendix B – Traffic counts (November 2016) and Truck delay survey (April 2017)

23/11/2016 - PACIFIC HWY / ITALIA RD, BALICKERA

10:00 <<< HOUR ENDING **Wednesday**

Quality Surveys
172565

Summary: PACIFIC HWY / ITALIA RD	
1207	Total Light Vehicles
205	Total Heavy Vehicles
0	Total Pedestrians



23/11/2016 - PACIFIC HWY / ITALIA RD, BALICKERA

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR	Pedestrians 7	8	9
07:15	1	89	103	4	7	6	210		0	0	0
07:30	1	104	130	6	7	3	251		0	0	0
07:45	1	72	144	6	3	5	231		0	0	0
08:00	2	105	140	7	11	4 <	269	961	0	0	0
08:15	1	102	145	10	9	4	271	1022	0	0	0
08:30	0	114	166	7 <	8	3	298	1069	0	0	0
08:45	1	112	137	1	4 <	1	256	1094	0	0	0
09:00	2	140	151	2	6	5	306	1131	0	0	0
09:15	2	121	162	6	2	5	298	1158	0	0	0
09:30	1	118 <	178	9	6	2	314	1174	0	0	0
09:45	2 <	101	183 <	4	8	2	300	1218 <	0	0	0
10:00	1	129	150	4	8	3	295	1207	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR
07:15	2	23	25	1	0	2	53	
07:30	1	31	26	3	0	6	67	
07:45	1	21	20	0	4	0	46	
08:00	1	18 <	37 <	1	3	0	60	226 <
08:15	3	13	24	4 <	0	1	45	218
08:30	3	14	23	2	1 <	3	46	197
08:45	2	14	22	1 <	3	2	44	195
09:00	1	14	19	1 <	1	2	38	173
09:15	4	17	26	3	1	3 <	54	182
09:30	0	17	24	1	0	3 <	45	181
09:45	3	12	28	1	3	2 <	49	186
10:00	6 <	20	28	1	1	1	57	205

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	HOUR
07:15	3	112	128	5	7	8	263	
07:30	2	135	156	9	7	9	318	
07:45	2	93	164	6	7	5	277	
08:00	3	123	177	8	14	4 <	329	1187
08:15	4	115	169	14 <	9	5	316	1240
08:30	3	128	189	9 <	9 <	6	344	1266
08:45	3	126	159	2	7 <	3	300	1289
09:00	3	154	170	3	7	7	344	1304
09:15	6	138	188	9	3	8	352	1340
09:30	1	135 <	202	10	6	5	359	1355
09:45	5	113	211	5	11	4	349	1404
10:00	7 <	149	178 <	5	9	4	352	1412 <

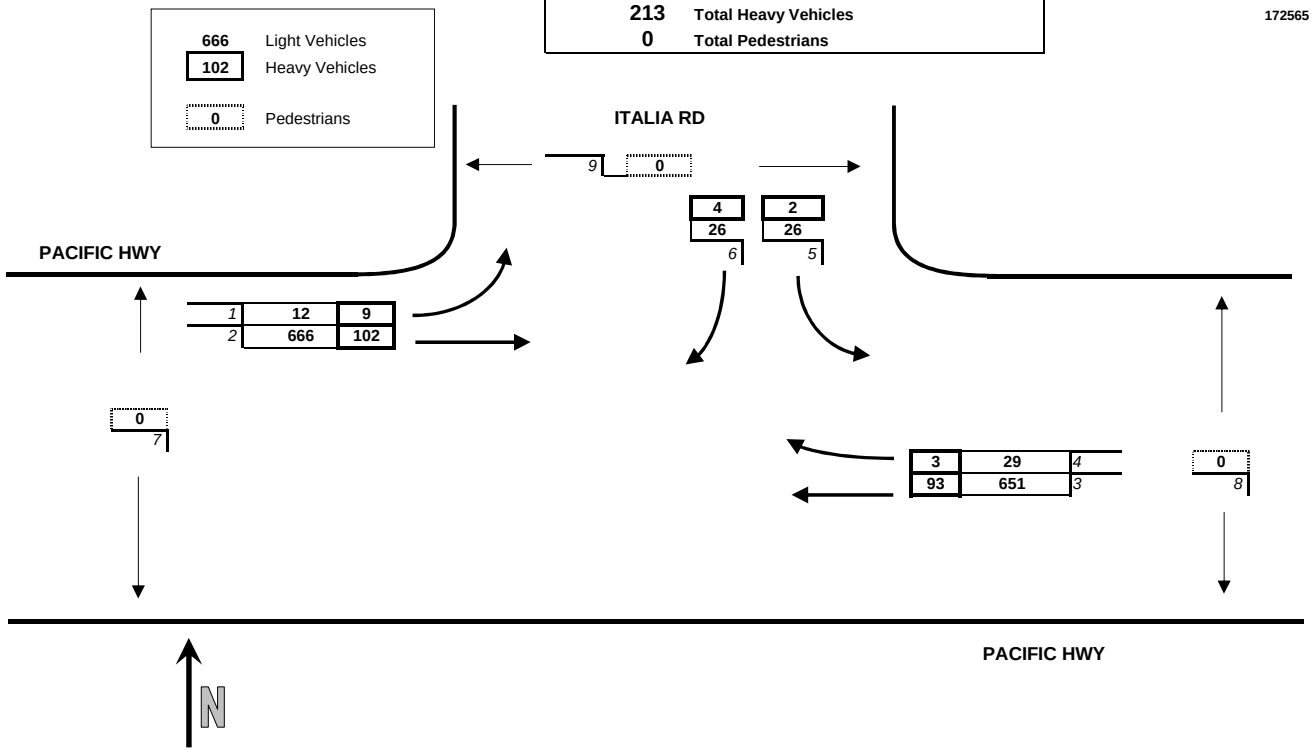
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

23/11/2016 - PACIFIC HWY / ITALIA RD, BALICKERA

16:15 <<< HOUR ENDING **Wednesday**

Summary: PACIFIC HWY / ITALIA RD	
1410	Total Light Vehicles
213	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
172565



23/11/2016 - PACIFIC HWY / ITALIA RD, BALICKERA

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
15:15	4	172	138	4	4	1	323		0	0	0
15:30	4	175	156	8	5	6	354		0	0	0
15:45	2	156	167	7	0	6	338		0	0	0
16:00	3	193 <	173	3	12	7	391	1406	0	0	0
16:15	3	142	155 <	11 <	9	7 <	327	1410 <	0	0	0
16:30	4	150	120	8 <	10	4	296	1352	0	0	0
16:45	6 <	151	112	6	3 <	2	280	1294	0	0	0
17:00	3 <	140	109	4 <	6	3	265	1168	0	0	0
17:15	1	151	120	4	8	4	288	1129	0	0	0
17:30	5	191	112	8	6	3	325	1158	0	0	0
17:45	3	118	99	3	9	1	233	1111	0	0	0
18:00	3	101	89	4	3	3	203	1049	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	2	23	17	1	2	0	45	
15:30	2	22	24	1	0	0	49	
15:45	3	24	22	1	1	0	51	
16:00	1	36	22	1 <	1 <	2	63	208
16:15	3	20	25	0	0	2 <	50	213
16:30	3 <	33 <	25	1	0	0 <	62	226 <
16:45	0	15	24	0	1	0 <	40	215
17:00	1	28	28 <	0	1	2 <	60	212
17:15	0	20	16	0	0	0	36	198
17:30	0	22	15	0	0	0	37	173
17:45	0	13	21	0	0	0	34	167
18:00	0	19	17	0	0	0	36	143

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
15:15	6	195	155	5	6	1	368	
15:30	6	197	180	9	5	6	403	
15:45	5	180	189	8	1	6	389	
16:00	4	229 <	195	4	13	9	454	1614
16:15	6	162	180 <	11 <	9	9 <	377	1623 <
16:30	7	183	145	9 <	10	4	358	1578
16:45	6 <	166	136	6	4 <	2	320	1509
17:00	4 <	168	137	4	7	5	325	1380
17:15	1	171	136	4	8	4	324	1327
17:30	5	213	127	8	6	3	362	1331
17:45	3	131	120	3	9	1	267	1278
18:00	3	120	106	4	3	3	239	1192

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

NTPE Survey of Trucks Turning Right Out Of Italia Rd

12th April 2017

Arrival	Start Crossing	End Crossing	Wait	Clearance time	Next Car	Initial Gap	GAP at Intersection		Clearance
7:10:55	7:10:58	7:11:04	0:00:03	0:00:06	7:11:16	0:00:19	0:00:18	Faster	0:00:12
7:13:47	7:14:08	7:14:20	0:00:21	0:00:12	7:14:35	0:00:27	0:00:27		0:00:15
7:17:35	7:17:35	7:17:42	0:00:00	0:00:07	7:17:47	0:00:12	0:00:12		0:00:05
7:18:32	7:18:38	7:18:47	0:00:06	0:00:09	7:18:55	0:00:18	0:00:17	Faster	0:00:08
7:25:11	7:25:19	7:25:28	0:00:08	0:00:09	7:25:30	0:00:11	0:00:11		0:00:02
7:25:36	7:25:45	7:25:54	0:00:09	0:00:09	7:25:58	0:00:14	0:00:13	Faster	0:00:04
7:26:25	7:26:26	7:26:34	0:00:01	0:00:08	7:26:40	0:00:13	0:00:14	Slowed	0:00:06
7:29:35	7:29:35	7:29:42	0:00:00	0:00:07	7:29:44	0:00:09	0:00:09		0:00:02
7:47:16	7:47:22	7:47:30	0:00:06	0:00:08	7:47:44	0:00:24	0:00:22	Faster	0:00:14
7:51:10	7:51:10	7:51:17	0:00:00	0:00:07	7:51:22	0:00:13	0:00:12	Faster	0:00:05
7:53:10	7:53:16	7:53:27	0:00:06	0:00:11	7:53:38	0:00:23	0:00:22	Faster	0:00:11
8:03:18	8:03:18	8:03:25	0:00:00	0:00:07	8:03:28	0:00:11	0:00:10		0:00:03
8:19:36	8:19:36	8:19:44	0:00:00	0:00:08	8:19:48	0:00:10	0:00:12	Slowed	0:00:04
8:20:03	8:20:15	8:20:24	0:00:12	0:00:09	8:20:26	0:00:09	0:00:11	Slowed	0:00:02
8:27:05	8:27:55	8:28:04	0:00:50	0:00:09	8:28:04	0:00:09	0:00:09		0:00:00
8:29:35	8:29:42	8:29:52	0:00:07	0:00:10	8:29:54	0:00:10	0:00:12	Slowed	0:00:02
8:43:10	8:44:35	8:44:43	0:01:25	0:00:08	8:44:44	0:00:09	0:00:09		0:00:01
9:07:06	9:08:03	9:08:14	0:00:57	0:00:11	9:08:19	0:00:16	0:00:16		0:00:05
9:09:58	9:09:58	9:10:05	0:00:00	0:00:07	9:10:09	0:00:11	0:00:11		0:00:04
9:12:09	9:13:25	9:13:33	0:01:16	0:00:08	9:13:34	0:00:09	0:00:09		0:00:01
9:20:50	9:21:01	9:21:11	0:00:11	0:00:10	9:21:22	0:00:21	0:00:21		0:00:11
9:25:34	9:26:27	9:26:38	0:00:53	0:00:11	9:26:40	0:00:13	0:00:13		0:00:02
9:30:34	9:31:19	9:31:32	0:00:45	0:00:13	9:31:36	0:00:17	0:00:17		0:00:04
9:44:40	9:45:11	9:45:20	0:00:31	0:00:09	9:45:20	0:00:10	0:00:09	Faster	0:00:00
10:03:08	10:04:31	10:04:41	0:01:23	0:00:10	10:04:44	0:00:14	0:00:13	Faster	0:00:03
10:26:22	10:26:22	10:26:33	0:00:00	0:00:11	10:26:35	0:00:11	0:00:13	Slowed	0:00:02
10:31:03	10:31:03	10:31:12	0:00:00	0:00:09	10:31:16	0:00:12	0:00:13		0:00:04
10:47:54	10:48:08	10:48:18	0:00:14	0:00:10	10:48:21	0:00:12	0:00:13	Slowed	0:00:03
10:51:51	10:51:51	10:51:59	0:00:00	0:00:08	10:52:01	0:00:11	0:00:10	Faster	0:00:02

GHD interpretation of data

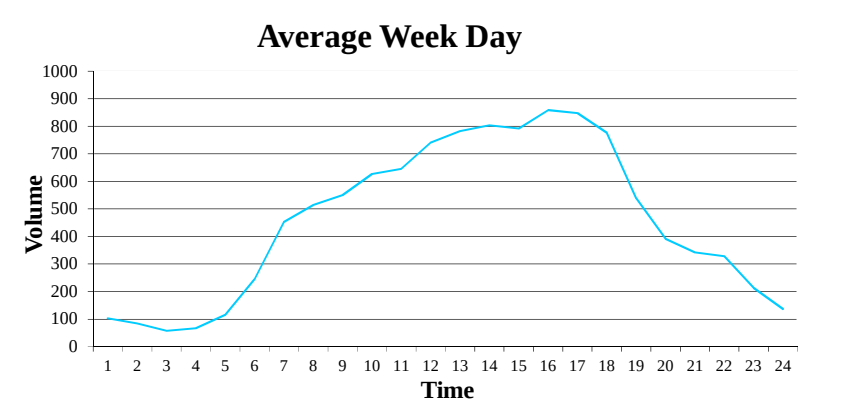
Truck numbers and arrival / spacing	
3:40:56	Total time elapsed
29	Trucks observed
0:07:37	Average arrival spacing
0:52:23	Peak hour
12	Trucks observed
0:04:22	Average arrival spacing

Delays and clearance times		
0:00:20	0:00:09	Ave
0:00:00	0:00:06	Min
0:01:25	0:00:13	Max

Gap acceptance			
0:00:14	0:00:14	Ave	0:00:05
0:00:09	0:00:09	Min	0:00:00
0:00:27	0:00:27	Max	0:00:15

Site 1 Pacific Hwy: Between Six Mile & Italia [110] **Northbound** **Lane 1 + 2**

Day	*Thu*	*Fri*	*Sat*	*Sun*	*Mon*	*Tue*	*Wed*	*W/Day*	*W/End*	*7 Day*
Time	24/11/16	25/11/2016	26/11/2016	27/11/2016	28/11/2016	29/11/2016	30/11/2016	*Ave.*	*Ave.*	*Ave*
0:00	124	136	126	83	47	97	109	103	105	103
1:00	96	115	99	50	45	82	81	84	75	81
2:00	68	80	61	28	23	53	63	57	45	54
3:00	81	73	69	28	54	59	70	67	49	62
4:00	156	124	86	52	102	97	97	115	69	102
5:00	244	273	165	110	266	233	216	246	138	215
6:00	436	472	318	177	495	432	429	453	248	394
7:00	571	548	518	291	525	468	460	514	405	483
8:00	562	645	707	454	587	488	468	550	581	559
9:00	603	765	841	649	677	539	549	627	745	660
10:00	590	825	906	772	714	557	539	645	839	700
11:00	743	933	873	858	836	592	597	740	866	776
12:00	719	1027	796	892	845	624	696	782	844	800
13:00	790	1120	809	874	819	615	675	804	842	815
14:00	734	1120	776	859	713	703	692	792	818	800
15:00	890	1125	720	823	771	743	764	859	772	834
16:00	848	1161	590	764	749	722	759	848	677	799
17:00	738	1183	509	613	670	656	636	777	561	715
18:00	541	849	359	410	418	413	473	539	385	495
19:00	418	656	250	332	285	308	290	391	291	363
20:00	346	591	213	232	249	237	286	342	223	308
21:00	369	536	176	159	226	254	256	328	168	282
22:00	238	328	122	120	171	159	169	213	121	187
23:00	127	196	118	68	119	114	129	137	93	124
Total	**11032**	**14881**	**10207**	**9698**	**10406**	**9245**	**9503**	**11013**	**9953**	**10710**

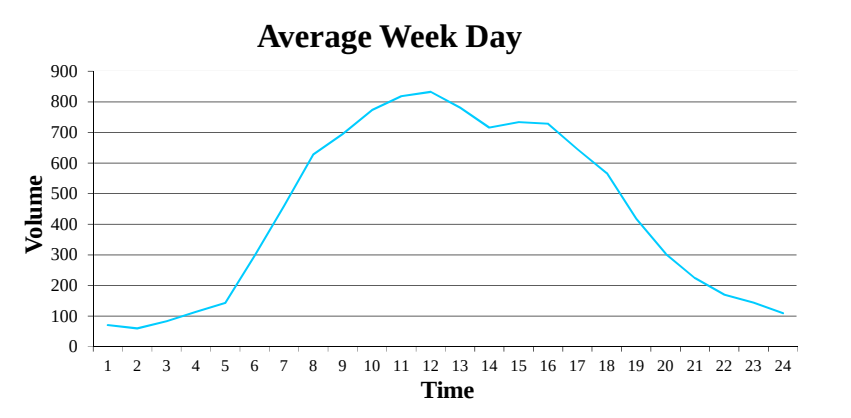


Summary

	from	to	
AM Peak	11:00 AM	12:00 PM	**933**
PM Peak	5:00 PM	6:00 PM	**1183**
		Week Day Average	**11013**
		Weekend Day Average	**9953**
		7 Day Average	**10710**

Site 1 Pacific Hwy: Between Six Mile & Italia [110] **Southbound** **Lane 1 + 2**

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	24/11/16	25/11/2016	26/11/2016	27/11/2016	28/11/2016	29/11/2016	30/11/2016	Ave.	Ave.	Ave
0:00	73	62	70	64	65	79	75	71	67	70
1:00	59	66	51	56	48	71	54	60	54	58
2:00	83	93	52	31	72	89	78	83	42	71
3:00	113	130	67	24	98	118	111	114	46	94
4:00	144	161	96	41	112	152	145	143	69	122
5:00	304	285	151	57	301	297	303	298	104	243
6:00	443	484	217	140	466	448	450	458	179	378
7:00	662	598	425	221	665	595	622	628	323	541
8:00	695	740	624	404	659	715	664	695	514	643
9:00	750	863	876	802	763	741	748	773	839	792
10:00	779	1036	886	1031	829	714	735	819	959	859
11:00	790	1063	861	1245	853	728	728	832	1053	895
12:00	710	987	762	1292	858	669	681	781	1027	851
13:00	674	883	722	1242	757	624	640	716	982	792
14:00	724	852	678	1454	771	643	677	733	1066	828
15:00	706	871	622	1355	724	653	688	728	989	803
16:00	672	794	595	1249	609	559	589	645	922	724
17:00	552	710	485	960	554	537	486	568	723	612
18:00	350	596	348	684	420	336	385	417	516	446
19:00	283	398	250	483	304	267	268	304	367	322
20:00	225	297	195	345	214	196	189	224	270	237
21:00	157	175	188	275	173	165	181	170	232	188
22:00	138	153	143	174	157	150	123	144	159	148
23:00	133	105	94	120	99	110	98	109	107	108
Total	**10219**	**12402**	**9458**	**13749**	**10571**	**9656**	**9718**	**10513**	**11604**	**10825**

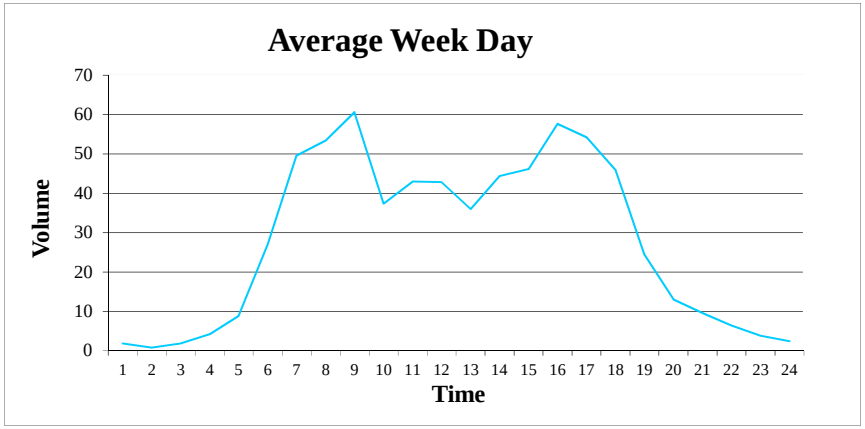


Summary

	from	to	
AM Peak	11:00 AM	12:00 PM	**1063**
PM Peak	12:00 PM	1:00 PM	**987**
		Week Day Average	**10513**
		Weekend Day Average	**11604**
		7 Day Average	**10825**

Site 2 Italia Rd: 300m West of Pacific Hwy [90] Eastbound Lane 0

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	24/11/16	25/11/2016	26/11/2016	27/11/2016	28/11/2016	29/11/2016	30/11/2016	Ave.	Ave.	Ave
0:00	5	1	10	2	1	1	1	2	6	3
1:00	0	2	1	1	0	2	0	1	1	1
2:00	3	0	2	3	3	1	2	2	3	2
3:00	1	4	6	3	5	5	6	4	5	4
4:00	12	7	0	4	11	6	8	9	2	7
5:00	28	24	9	3	29	26	28	27	6	21
6:00	44	54	17	10	47	53	50	50	14	39
7:00	60	50	34	22	52	44	61	53	28	46
8:00	58	67	33	30	58	58	62	61	32	52
9:00	39	48	49	43	37	32	31	37	46	40
10:00	50	62	54	30	45	30	28	43	42	43
11:00	46	48	45	39	33	40	47	43	42	43
12:00	26	53	49	25	34	33	34	36	37	36
13:00	56	43	70	50	52	33	38	44	60	49
14:00	54	43	69	81	47	45	42	46	75	54
15:00	67	61	59	73	44	65	51	58	66	60
16:00	53	53	37	67	44	63	58	54	52	54
17:00	54	49	29	40	42	44	40	46	35	43
18:00	27	37	20	24	16	25	17	24	22	24
19:00	10	22	13	16	12	9	12	13	15	13
20:00	12	16	4	3	6	6	8	10	4	8
21:00	7	15	7	12	3	2	5	6	10	7
22:00	4	6	3	5	4	4	1	4	4	4
23:00	5	4	5	1	1	0	2	2	3	3
Total	**721**	**769**	**625**	**587**	**626**	**627**	**632**	**675**	**606**	**655**

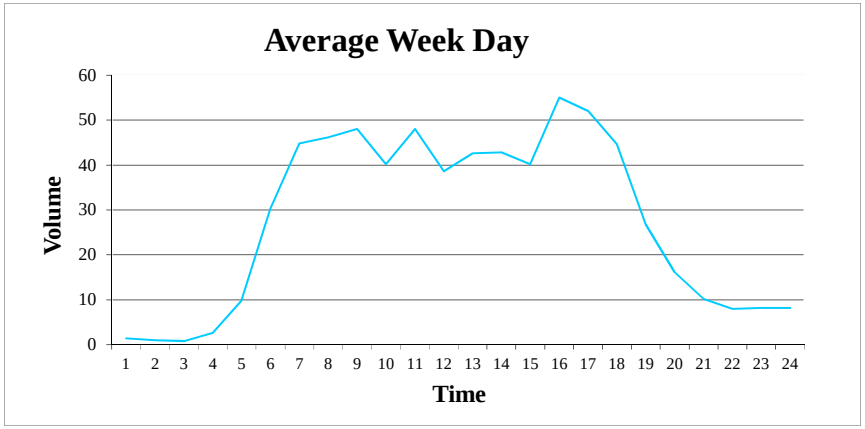


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**67**
PM Peak	3:00 PM	4:00 PM	**67**
		Week Day Average	**675**
		Weekend Day Average	**606**
		7 Day Average	**655**

Site 2 Italia Rd: 300m West of Pacific Hwy [90] Westbound Lane 0

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	W/Day	W/End	7 Day
Time	24/11/16	25/11/2016	26/11/2016	27/11/2016	28/11/2016	29/11/2016	30/11/2016	Ave.	Ave.	Ave
0:00	2	1	1	7	2	1	1	1	4	2
1:00	0	3	3	0	0	1	1	1	2	1
2:00	1	1	0	2	1	0	1	1	1	1
3:00	2	3	0	0	2	4	2	3	0	2
4:00	12	10	6	1	11	8	8	10	4	8
5:00	26	25	8	2	32	31	37	30	5	23
6:00	41	49	25	4	49	44	41	45	15	36
7:00	48	37	43	7	35	62	49	46	25	40
8:00	51	49	30	40	45	52	43	48	35	44
9:00	41	39	57	100	47	33	41	40	79	51
10:00	52	63	68	81	43	40	42	48	75	56
11:00	40	44	49	67	34	34	41	39	58	44
12:00	38	52	41	52	49	35	39	43	47	44
13:00	43	45	38	46	47	40	39	43	42	43
14:00	37	48	36	63	48	43	25	40	50	43
15:00	53	59	25	72	50	64	49	55	49	53
16:00	68	57	34	37	40	47	48	52	36	47
17:00	56	49	32	46	44	31	43	45	39	43
18:00	26	32	19	23	23	26	27	27	21	25
19:00	19	31	15	16	11	11	9	16	16	16
20:00	8	11	9	10	15	10	7	10	10	10
21:00	13	7	6	7	6	9	5	8	7	8
22:00	6	15	9	5	9	6	5	8	7	8
23:00	7	16	8	3	4	8	6	8	6	7
Total	**690**	**746**	**562**	**691**	**647**	**640**	**609**	**666**	**627**	**655**



Summary

	from	to	
AM Peak	10:00 AM	11:00 AM	**63**
PM Peak	4:00 PM	5:00 PM	**68**
		Week Day Average	**666**
		Weekend Day Average	**627**
		7 Day Average	**655**

1 Pacific Hwy: Between Six Mile & Italia [110] Northbound 1 + 2

Thursday, 24 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	124	62	0	9	1	0	2	2	2	10	36	0	0	0	105.63	112.77
1:00	96	33	2	7	5	0	0	1	1	20	27	0	0	0	104.05	111.51
2:00	68	40	0	3	1	0	0	1	1	7	15	0	0	0	105.83	112.17
3:00	81	48	2	5	2	0	0	0	1	7	16	0	0	0	104.05	112.99
4:00	156	107	6	18	4	0	0	0	2	9	10	0	0	0	106.18	114.57
5:00	244	161	6	20	12	1	3	1	8	21	11	0	0	0	107.23	115.41
6:00	436	296	17	63	14	1	7	2	4	20	12	0	0	0	108.33	116.73
7:00	571	405	23	72	11	1	8	7	5	22	17	0	0	0	107.05	113.62
8:00	562	408	37	54	8	2	4	4	1	20	24	0	0	0	106.78	113.62
9:00	603	450	44	52	8	0	6	9	2	17	15	0	0	0	105.90	113.44
10:00	590	431	54	47	4	1	4	5	6	21	17	0	0	0	105.95	113.09
11:00	743	546	47	57	10	1	3	7	2	38	32	0	0	0	106.53	113.22
12:00	719	546	41	49	5	1	5	5	6	31	30	0	0	0	106.33	113.44
13:00	790	577	46	55	14	2	3	6	5	45	37	0	0	0	106.63	113.79
14:00	734	546	31	54	10	1	1	7	3	49	32	0	0	0	106.38	113.22
15:00	890	680	31	69	6	1	9	4	3	45	41	1	0	0	107.45	114.71
16:00	848	665	36	65	2	1	8	3	7	34	27	0	0	0	107.80	115.02
17:00	738	585	23	49	8	0	6	4	2	30	31	0	0	0	108.05	115.27
18:00	541	415	23	30	2	1	4	1	4	29	32	0	0	0	107.93	115.24
19:00	418	296	18	27	2	0	1	1	8	19	45	0	0	1	107.78	115.27
20:00	346	229	10	21	3	0	0	1	1	23	58	0	0	0	106.20	113.00
21:00	369	235	9	24	1	0	5	2	2	24	67	0	0	0	105.53	113.44
22:00	238	138	5	10	3	0	3	0	4	18	57	0	0	0	106.00	114.21
23:00	127	63	0	8	1	0	0	0	1	18	36	0	0	0	104.78	112.81
Total	**11032**	**7962**	**511**	**868**	**137**	**14**	**82**	**73**	**81**	**577**	**725**	**1**	**0**	**1**	**106.43**	**113.86**
	Light	77%	Heavy	23%												

Friday, 25 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	136	74	2	6	1	0	2	0	2	13	36	0	0	0	105.43	113.90
1:00	115	44	3	9	2	0	1	1	3	19	33	0	0	0	103.68	110.20
2:00	80	34	1	5	2	0	0	2	2	15	19	0	0	0	103.95	114.57
3:00	73	35	1	8	3	0	2	0	1	10	12	1	0	0	105.23	113.62
4:00	124	79	3	14	2	3	0	4	2	10	7	0	0	0	106.40	112.52
5:00	273	192	9	22	5	2	2	4	5	8	23	0	0	1	106.83	115.59
6:00	472	320	24	63	13	3	2	6	3	20	17	1	0	0	107.35	115.24
7:00	548	420	25	55	6	0	5	2	8	13	14	0	0	0	106.73	113.97
8:00	645	506	37	49	6	2	7	1	4	18	14	1	0	0	107.13	113.80
9:00	765	610	55	45	7	0	8	5	5	14	13	3	0	0	107.08	113.97
10:00	825	620	70	65	5	2	9	6	3	23	22	0	0	0	106.93	114.50
11:00	933	720	67	63	13	1	9	6	3	26	25	0	0	0	106.45	113.83
12:00	1027	809	67	63	9	1	5	8	7	33	24	1	0	0	106.98	113.62
13:00	1120	887	76	62	8	1	14	2	1	36	32	0	0	1	106.88	113.80
14:00	1120	908	50	73	7	0	8	8	2	43	21	0	0	0	107.33	114.10
15:00	1125	902	59	72	5	1	10	5	3	40	28	0	0	0	107.98	114.93
16:00	1161	947	62	77	6	0	12	4	1	30	21	1	0	0	108.60	115.42
17:00	1183	979	64	72	2	1	16	3	3	21	21	1	0	0	109.08	115.24
18:00	849	717	44	53	2	0	2	3	1	8	19	0	0	0	109.35	116.30
19:00	656	539	34	38	0	0	0	0	0	17	28	0	0	0	109.28	116.12
20:00	591	462	29	33	0	1	4	2	2	22	36	0	0	0	107.23	115.42
21:00	536	393	25	16	1	0	4	3	1	21	72	0	0	0	107.45	114.80
22:00	328	222	16	20	2	0	2	1	0	16	48	1	0	0	107.20	115.27
23:00	196	131	8	7	0	0	2	0	4	7	37	0	0	0	106.08	114.89
Total	**14881**	**11550**	**831**	**990**	**107**	**18**	**126**	**76**	**66**	**483**	**622**	**10**	**0**	**2**	**106.94**	**114.40**
	Light	83%	Heavy	17%												

Saturday, 26 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	126	83	0	5	1	0	0	0	0	17	20	0	0	0	105.98	114.89
1:00	89	48	1	6	1	0	0	1	1	10	21	0	0	0	104.60	113.31
2:00	61	29	2	6	2	0	1	0	1	7	13	0	0	0	105.95	112.98
3:00	69	41	2	5	2	0	0	1	0	6	12	0	0	0	104.70	117.97
4:00	86	59	4	6	1	0	2	1	0	5	8	0	0	0	107.13	118.09
5:00	165	120	13	15	1	2	2	0	0	6	5	0	0	1	106.43	116.15
6:00	318	243	21	26	2	1	2	0	1	12	10	0	0	0	108.63	116.41
7:00	518	394	49	44	1	0	12	4	2	4	7	0	0	1	107.20	114.19
8:00	707	565	51	40	4	0	9	2	0	21	15	0	0	0	107.43	114.71
9:00	841	707	50	49	2	0	10	5	0	5	13	0	0	0	107.33	113.97
10:00	906	770	49	49	4	1	5	6	1	11	9	0	0	1	100.55	113.61
11:00	873	704	69	69	1	0	4	4	0	11	11	0	0	0	106.88	113.40
12:00	796	675	43	41	1	1	6	3	1	13	11	1	0	0	106.15	113.97
13:00	809	685	41	48	0	0	4	1	2	17	11	0	0	0	108.15	115.41
14:00	776	659	42	40	3	0	9	3	2	5	13	0	0	0	107.78	114.71
15:00	720	603	35	49	3	0	2	2	1	13	12	0	0	0	107.93	114.80
16:00	590	512	18	31	0	0	3	2	0	6	18	0	0	0	107.55	113.62
17:00	509	438	18	25	2	0	3	1	3	5	14	0	0	0	108.20	115.02
18:00	359	294	18	21	1	0	2	0	2	1	20	0	0	0	107.93	115.41
19:00	250	207	10	17	0	0	1	0	0	4	11	0	0	0	109.18	116.76
20:00	213	174	8	12	1	0	1	0	1	3	13	0	0	0	107.20	114.49
21:00	176	147	5	11	0	0	1	0	1	1	10	0	0	0	106.68	114.19
22:00	122	97	3	8	2	0	0	0	2	4	6	0	0	0	107.20	117.29
23:00	118	104	3	8	0	0	1	0	0	1	1	0	0	0	108.20	115.79
Total	**10197**	**8358**	**555**	**631**	**35**	**5**	**80**	**36**	**21**	**188**	**284**	**1**	**0**	**3**	**106.87**	**115.04**
	Light	87%	Heavy	13%												

1 Pacific Hwy: Between Six Mile & Italia [110] Northbound 1 + 2

Sunday, 27 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	83	66	1	8	0	0	1	1	0	3	3	0	0	0	107.18	115.99
1:00	50	34	2	5	2	0	0	0	0	2	5	0	0	0	106.75	113.30
2:00	28	21	0	3	1	0	1	0	0	1	1	0	0	0	105.95	109.10
3:00	28	18	2	2	0	0	0	1	0	2	3	0	0	0	105.68	-
4:00	52	37	3	3	0	0	1	0	1	3	4	0	0	0	106.48	114.17
5:00	110	88	12	7	0	0	1	1	0	0	1	0	0	0	107.10	117.79
6:00	177	147	10	13	1	0	3	0	1	1	1	0	0	0	108.35	115.27
7:00	291	231	28	17	2	0	2	1	2	3	5	0	0	0	107.33	115.24
8:00	454	368	21	36	3	1	7	2	1	8	7	0	0	0	107.28	114.19
9:00	649	539	54	35	0	0	5	1	0	5	10	0	0	0	108.05	114.49
10:00	772	648	54	42	1	4	10	1	1	4	7	0	0	0	108.00	115.24
11:00	858	742	40	46	4	0	3	2	0	10	11	0	0	0	107.38	114.19
12:00	892	768	39	41	2	0	5	6	3	8	20	0	0	0	107.78	114.49
13:00	874	732	52	35	1	1	4	6	2	19	21	1	0	0	107.15	114.32
14:00	859	743	35	36	5	0	5	0	2	14	19	0	0	0	107.80	114.19
15:00	823	712	34	35	1	3	5	2	2	12	17	0	0	0	108.40	114.71
16:00	764	657	34	36	0	0	4	0	2	11	20	0	0	0	108.55	114.49
17:00	613	506	27	36	1	0	5	3	6	10	18	0	1	0	108.40	114.80
18:00	410	341	12	27	0	0	3	2	1	9	15	0	0	0	108.30	115.02
19:00	332	257	10	30	0	0	4	2	3	5	21	0	0	0	106.83	115.41
20:00	232	177	14	16	1	0	0	2	0	6	16	0	0	0	107.15	114.96
21:00	159	115	6	12	0	0	3	0	1	10	12	0	0	0	106.33	117.97
22:00	120	85	7	10	2	0	1	0	1	7	7	0	0	0	107.43	115.42
23:00	68	43	1	8	0	0	0	2	0	1	13	0	0	0	105.80	114.49
Total	**9698**	**8075**	**498**	**539**	**27**	**9**	**73**	**35**	**29**	**154**	**257**	**1**	**1**	**0**	**107.31**	**114.75**
	Light	88%	Heavy	12%												

Monday, 28 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	47	19	2	10	0	0	1	0	0	6	9	0	0	0	106.23	111.39
1:00	45	25	2	6	4	0	0	0	0	3	5	0	0	0	107.45	113.67
2:00	23	12	2	4	0	0	0	0	0	3	2	0	0	0	105.78	-
3:00	54	26	1	11	0	0	1	0	3	9	3	0	0	0	106.73	119.75
4:00	102	53	1	23	4	1	2	1	3	10	4	0	0	0	107.68	120.11
5:00	266	179	8	32	3	3	3	4	6	17	11	0	0	0	108.08	116.98
6:00	495	344	18	72	11	3	4	3	6	15	17	2	0	0	108.00	117.81
7:00	525	388	20	67	7	4	4	4	2	19	9	1	0	0	107.08	113.80
8:00	587	449	31	61	6	1	6	4	8	15	6	0	0	0	106.88	113.97
9:00	677	507	43	54	12	0	7	7	0	34	13	0	0	0	105.85	113.13
10:00	714	523	42	70	14	0	6	9	7	23	20	0	0	0	106.45	113.09
11:00	836	665	35	63	10	1	8	4	2	25	23	0	0	0	107.28	113.62
12:00	845	644	41	49	14	0	6	4	3	42	42	0	0	0	105.98	112.87
13:00	819	632	33	60	9	2	10	2	4	35	32	0	0	0	106.83	113.61
14:00	713	535	34	54	3	5	9	4	0	29	40	0	0	0	106.68	113.80
15:00	771	575	34	56	5	0	6	2	2	52	39	0	0	0	106.55	114.19
16:00	749	612	17	46	5	1	2	5	2	35	24	0	0	0	107.63	114.71
17:00	670	520	26	41	4	0	3	2	4	34	36	0	0	0	107.53	114.89
18:00	418	310	12	29	3	0	1	0	4	31	28	0	0	0	107.53	115.42
19:00	285	186	4	20	5	0	3	1	0	24	42	0	0	0	106.28	114.50
20:00	249	155	5	18	1	0	3	2	5	21	39	0	0	0	106.48	115.49
21:00	226	124	4	9	1	0	1	0	1	24	62	0	0	0	105.90	113.62
22:00	171	79	0	8	4	1	2	0	3	20	54	0	0	0	104.38	112.39
23:00	119	44	3	4	0	0	1	0	1	20	46	0	0	0	104.90	112.70
Total	**10406**	**7606**	**418**	**867**	**125**	**22**	**89**	**58**	**66**	**546**	**606**	**3**	**0**	**0**	**106.67**	**114.58**
	Light	77%	Heavy	23%												

Tuesday, 29 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	97	33	3	4	0	1	0	0	1	19	36	0	0	0	103.25	109.87
1:00	82	31	1	4	1	0	0	0	4	12	29	0	0	0	104.40	113.22
2:00	53	23	0	6	1	0	1	1	1	5	15	0	0	0	106.95	113.40
3:00	59	17	3	5	2	1	2	0	3	12	14	0	0	0	104.05	111.08
4:00	97	59	3	9	4	0	1	2	0	7	12	0	0	0	104.98	114.97
5:00	233	145	5	27	5	2	4	3	8	20	13	0	0	1	106.58	114.67
6:00	432	270	17	67	18	1	4	8	4	29	14	0	0	0	107.38	115.99
7:00	468	302	15	83	11	1	8	8	4	22	14	0	0	0	107.05	114.19
8:00	488	359	25	54	6	2	0	8	3	19	12	0	0	0	106.73	113.79
9:00	539	390	20	64	8	1	1	4	2	28	21	0	0	0	105.55	113.44
10:00	557	402	29	54	9	2	4	6	5	23	23	0	0	0	105.68	113.00
11:00	592	423	29	55	6	1	6	6	8	34	24	0	0	0	105.63	112.99
12:00	624	479	17	44	9	0	5	8	2	31	29	0	0	0	106.00	112.69
13:00	615	463	21	37	11	1	4	6	0	34	38	0	0	0	106.25	112.87
14:00	703	523	26	52	10	0	3	3	5	44	37	0	0	0	105.88	113.47
15:00	743	568	17	51	8	1	6	6	3	54	29	0	0	0	107.15	113.97
16:00	722	570	20	53	5	0	4	3	4	30	33	0	0	0	108.08	114.93
17:00	656	508	21	38	4	0	2	5	2	34	42	0	0	0	107.85	115.02
18:00	413	290	9	32	7	1	5	0	1	30	38	0	0	0	107.88	115.77
19:00	308	196	6	30	4	0	2	3	3	20	44	0	0	0	107.48	115.42
20:00	237	138	6	12	1	0	1	2	5	20	51	0	1	0	105.00	113.22
21:00	254	139	5	12	1	0	2	0	3	23	69	0	0	0	105.45	113.00
22:00	159	70	1	6	4	0	1	0	2	20	55	0	0	0	104.18	112.63
23:00	114	39	1	7	2	0	1	1	1	14	48	0	0	0	103.68	111.19
Total	**9245**	**6437**	**300**	**806**	**137**	**15**	**67**	**83**	**74**	**584**	**740**	**0**	**1**	**1**	**105.96**	**113.53**
	Light	73%	Heavy	27%												

1 Pacific Hwy: Between Six Mile & Italia [110] Northbound 1 + 2

Wednesday, 30 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	109	31	0	7	0	0	2	0	3	21	45	0	0	0	103.33	110.86
1:00	81	25	2	8	2	0	0	2	0	13	29	0	0	0	104.10	110.93
2:00	63	20	0	7	0	0	1	1	0	12	22	0	0	0	103.70	112.32
3:00	70	30	1	7	2	3	0	3	1	10	13	0	0	0	104.13	110.89
4:00	97	41	1	17	2	2	4	0	3	14	13	0	0	0	104.58	112.69
5:00	216	139	2	26	5	3	4	4	4	12	17	0	0	0	107.15	115.42
6:00	429	271	11	71	13	4	5	5	3	28	17	0	0	1	106.15	117.59
7:00	460	312	12	73	12	2	5	3	4	24	13	0	0	0	107.10	114.61
8:00	468	333	24	51	11	2	6	6	3	18	12	2	0	0	106.75	113.62
9:00	549	415	22	45	10	3	8	3	1	24	17	0	0	1	106.08	113.80
10:00	539	402	23	43	10	3	4	6	3	14	30	1	0	0	106.03	113.62
11:00	597	441	28	43	12	1	11	3	4	28	26	0	0	0	106.85	113.83
12:00	696	516	21	52	16	1	4	6	4	36	40	0	0	0	106.30	112.70
13:00	675	501	28	42	14	0	4	2	4	44	36	0	0	0	106.15	113.62
14:00	692	501	40	47	9	1	5	10	2	39	38	0	0	0	106.08	113.62
15:00	764	554	27	61	4	0	6	6	6	49	51	0	0	0	106.68	113.40
16:00	759	593	20	65	6	1	6	6	2	30	30	0	0	0	107.80	114.19
17:00	636	499	21	40	4	0	3	0	5	32	32	0	0	0	107.60	114.67
18:00	473	353	13	25	4	0	2	2	3	32	39	0	0	0	107.08	114.19
19:00	290	198	11	20	1	1	1	2	2	19	35	0	0	0	106.90	114.35
20:00	286	169	5	18	2	0	4	3	1	23	61	0	0	0	105.85	113.62
21:00	256	143	8	17	2	0	4	0	2	16	64	0	0	0	105.85	115.59
22:00	169	72	5	10	3	0	1	1	3	18	56	0	0	0	104.05	113.51
23:00	129	53	2	5	1	0	1	0	1	11	55	0	0	0	104.93	111.82
Total	**9503**	**6612**	**327**	**800**	**145**	**27**	**91**	**74**	**64**	**567**	**791**	**3**	**0**	**2**	**105.88**	**113.56**
	Light	73%	Heavy	27%												

1 Pacific Hwy: Between Six Mile & Italia [110] Northbound 1 + 2

Weekday Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	103	44	1	7	0	0	1	0	2	14	32	0	0	0	104.77	111.76
1:00	84	32	2	7	3	0	0	1	2	13	25	0	0	0	104.74	111.90
2:00	57	26	1	5	1	0	0	1	1	8	15	0	0	0	105.24	113.11
3:00	67	31	2	7	2	1	1	1	2	10	12	0	0	0	104.84	113.67
4:00	115	68	3	16	3	1	1	1	2	10	9	0	0	0	105.96	114.97
5:00	246	163	6	25	6	2	3	3	6	16	15	0	0	0	107.17	115.61
6:00	453	300	17	67	14	2	4	5	4	22	15	1	0	0	107.44	116.67
7:00	514	365	19	70	9	2	6	5	5	20	13	0	0	0	107.00	114.04
8:00	550	411	31	54	7	2	5	5	4	18	14	1	0	0	106.85	113.76
9:00	627	474	37	52	9	1	6	6	2	23	16	1	0	0	106.09	113.55
10:00	645	476	44	56	8	2	5	6	5	21	22	0	0	0	106.21	113.46
11:00	740	559	41	56	10	1	7	5	4	30	26	0	0	0	106.55	113.50
12:00	782	599	37	51	11	1	5	6	4	35	33	0	0	0	106.32	113.06
13:00	804	612	41	51	11	1	7	4	3	39	35	0	0	0	106.55	113.54
14:00	792	603	36	56	8	1	5	6	2	41	34	0	0	0	106.47	113.64
15:00	859	656	34	62	6	1	7	5	3	48	38	0	0	0	107.16	114.24
16:00	848	677	31	61	5	1	6	4	3	32	27	0	0	0	107.98	114.85
17:00	777	618	31	48	4	0	6	3	3	30	32	0	0	0	108.02	115.02
18:00	539	417	20	34	4	0	3	1	3	26	31	0	0	0	107.95	115.38
19:00	391	283	15	27	2	0	1	1	3	20	39	0	0	0	107.54	115.13
20:00	342	231	11	20	1	0	2	2	3	22	49	0	0	0	106.15	114.15
21:00	328	207	10	16	1	0	3	1	2	22	67	0	0	0	106.04	114.09
22:00	213	116	5	11	3	0	2	0	2	18	54	0	0	0	105.16	113.60
23:00	137	66	3	6	1	0	1	0	2	14	44	0	0	0	104.87	112.68
Total	**11013**	**8033**	**477**	**866**	**130**	**19**	**91**	**73**	**70**	**551**	**697**	**3**	**0**	**1**	**106.38**	**115.37**
	Light	77%	Heavy	23%												

Weekend Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	105	75	1	7	1	0	1	1	0	10	12	0	0	0	106.58	115.44
1:00	70	41	2	6	2	0	0	1	1	6	13	0	0	0	105.68	113.30
2:00	45	25	1	5	2	0	1	0	1	4	7	0	0	0	105.95	111.04
3:00	49	30	2	4	1	0	0	1	0	4	8	0	0	0	105.19	117.97
4:00	69	48	4	5	1	0	2	1	1	4	6	0	0	0	106.80	116.13
5:00	138	104	13	11	1	1	2	1	0	3	3	0	0	1	106.76	116.97
6:00	248	195	16	20	2	1	3	0	1	7	6	0	0	0	108.49	115.84
7:00	405	313	39	31	2	0	7	3	2	4	6	0	0	1	107.26	114.71
8:00	581	467	36	38	4	1	8	2	1	15	11	0	0	0	107.35	114.45
9:00	745	623	52	42	1	0	8	3	0	5	12	0	0	0	107.69	114.23
10:00	839	709	52	46	3	3	8	4	1	8	8	0	0	1	104.28	114.42
11:00	866	723	55	58	3	0	4	3	0	11	11	0	0	0	107.13	113.79
12:00	844	722	41	41	2	1	6	5	2	11	16	1	0	0	106.96	114.23
13:00	842	709	47	42	1	1	4	4	2	18	16	1	0	0	107.65	114.86
14:00	818	701	39	38	4	0	7	2	2	10	16	0	0	0	107.79	114.45
15:00	772	658	35	42	2	2	4	2	2	13	15	0	0	0	108.16	114.75
16:00	677	585	26	34	0	0	4	1	1	9	19	0	0	0	108.05	114.05
17:00	561	472	23	31	2	0	4	2	5	8	16	0	1	0	108.30	114.91
18:00	385	318	15	24	1	0	3	1	2	5	18	0	0	0	108.11	115.21
19:00	291	232	10	24	0	0	3	1	2	5	16	0	0	0	108.00	116.08
20:00	223	176	11	14	1	0	1	1	1	5	15	0	0	0	107.18	114.72
21:00	168	131	6	12	0	0	2	0	1	6	11	0	0	0	106.50	116.08
22:00	121	91	5	9	2	0	1	0	2	6	7	0	0	0	107.31	116.36
23:00	93	74	2	8	0	0	1	1	0	1	7	0	0	0	107.00	115.14
Total	**9948**	**8217**	**527**	**585**	**31**	**7**	**77**	**36**	**25**	**171**	**271**	**1**	**1**	**2**	**107.09**	**116.01**
	Light	88%	Heavy	12%												

7-Day Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	103	53	1	7	0	0	1	0	1	13	26	0	0	0	105.29	112.81
1:00	80	34	2	6	2	0	0	1	1	11	21	0	0	0	105.00	112.30
2:00	54	26	1	5	1	0	1	1	1	7	12	0	0	0	105.44	112.42
3:00	62	31	2	6	2	1	1	1	1	8	10	0	0	0	104.94	114.38
4:00	102	62	3	13	2	1	1	1	2	8	8	0	0	0	106.20	115.30
5:00	215	146	8	21	4	2	3	2	4	12	12	0	0	0	107.05	116.00
6:00	394	270	17	54	10	2	4	3	3	18	13	0	0	0	107.74	116.43
7:00	483	350	25	59	7	1	6	4	4	15	11	0	0	0	107.08	114.23
8:00	559	427	32	49	6	1	6	4	3	17	13	0	0	0	106.99	113.95
9:00	660	517	41	49	7	1	6	5	1	18	15	0	0	0	106.55	113.75
10:00	700	542	46	53	7	2	6	6	4	17	18	0	0	0	105.65	113.73
11:00	776	606	45	57	8	1	6	5	3	25	22	0	0	0	106.71	113.58
12:00	800	634	38	48	8	1	5	6	4	28	28	0	0	0	106.50	113.39
13:00	815	640	42	48	8	1	6	4	3	33	30	0	0	0	106.86	113.91
14:00	800	631	37	51	7	1	6	5	2	32	29	0	0	0	106.84	113.87
15:00	834	656	34	56	5	1	6	4	3	38	31	0	0	0	107.45	114.38
16:00	799	651	30	53	3	0	6	3	3	25	25	0	0	0	108.00	114.62
17:00	715	576	29	43	4	0	5	3	4	24	28	0	0	0	108.10	114.99
18:00	495	389	19	31	3	0	3	1	2	20	27	0	0	0	108.00	115.33
19:00	363	268	13	26	2	0	2	1	2	15	32	0	0	0	107.67	115.40
20:00	308	215	11	19	1	0	2	2	2	17	39	0	0	0	106.44	114.31
21:00	282	185	9	14	1	0	3	1	2	17	51	0	0	0	106.17	114.66
22:00	187	109	5	10	3	0	1	0	2	15	40	0	0	0	105.78	114.39
23:00	124	68	3	7	1	0	1	0	1	10	34	0	0	0	105.48	113.38
Total	**10709**	**8086**	**491**	**786**	**102**	**16**	**87**	**62**	**57**	**443**	**575**	**3**	**0**	**1**	**106.58**	**115.55**
	Light	80%	Heavy	20%												

1 Pacific Hwy: Between Six Mile & Italia [110] Southbound 1 + 2

Thursday, 24 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	73	25	1	4	0	0	1	1	2	14	25	0	0	0	103.00	110.20
1:00	59	17	1	6	0	0	2	0	1	11	21	0	0	0	104.23	113.16
2:00	83	20	2	8	1	0	1	0	3	19	29	0	0	0	102.75	110.52
3:00	113	30	3	5	3	0	1	0	0	15	56	0	0	0	102.00	112.06
4:00	144	57	2	16	3	0	0	0	3	16	47	0	0	0	103.88	114.79
5:00	304	203	7	14	2	1	2	3	2	35	35	0	0	0	106.35	114.89
6:00	443	311	9	36	8	1	9	1	2	19	45	1	0	1	107.15	114.93
7:00	662	492	19	54	5	0	5	5	2	28	52	0	0	0	106.48	114.10
8:00	695	546	22	43	8	0	3	1	4	36	32	0	0	0	106.03	113.79
9:00	750	592	29	37	6	3	5	3	5	32	38	0	0	0	104.73	112.59
10:00	779	593	45	51	9	4	3	6	5	34	29	0	0	0	104.58	112.00
11:00	790	619	41	50	10	1	3	3	6	29	28	0	0	0	105.03	112.99
12:00	710	523	39	62	7	2	5	9	7	28	26	2	0	0	104.68	112.87
13:00	674	512	32	58	10	1	1	6	4	21	28	0	1	0	105.38	112.17
14:00	724	555	28	57	19	1	7	3	2	31	21	0	0	0	105.60	113.47
15:00	706	560	18	67	4	6	5	0	6	22	18	0	0	0	105.93	113.47
16:00	672	536	27	63	8	1	5	5	2	12	13	0	0	0	106.33	114.39
17:00	552	453	21	40	5	0	1	2	2	11	17	0	0	0	106.80	114.01
18:00	350	260	11	33	1	1	2	2	4	12	24	0	0	0	106.03	112.77
19:00	283	206	10	12	4	0	4	3	1	16	27	0	0	0	106.50	114.01
20:00	225	142	5	13	4	0	2	1	0	32	26	0	0	0	105.50	114.10
21:00	157	85	3	11	3	0	0	0	3	31	21	0	0	0	103.48	112.77
22:00	138	73	2	8	4	1	1	0	1	27	21	0	0	0	104.50	112.41
23:00	133	65	3	6	0	0	0	1	1	24	33	0	0	0	102.53	108.61
Total	**10219**	**7475**	**380**	**754**	**124**	**23**	**68**	**55**	**68**	**555**	**712**	**3**	**1**	**1**	**104.98**	**112.96**
	Light	77%	Heavy	23%												

Friday, 25 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	62	28	1	6	1	0	0	0	0	10	16	0	0	0	103.65	114.48
1:00	66	20	1	5	1	0	0	1	2	16	20	0	0	0	102.75	115.38
2:00	93	34	2	6	0	0	0	0	1	20	30	0	0	0	102.70	109.62
3:00	130	44	1	7	5	1	2	0	0	17	53	0	0	0	103.08	112.66
4:00	161	73	4	6	2	1	1	0	1	14	59	0	0	0	103.95	113.09
5:00	285	188	3	20	4	0	1	2	5	19	41	1	0	1	105.55	114.35
6:00	484	359	23	25	9	1	1	2	7	19	38	0	0	0	107.50	115.77
7:00	598	445	16	51	4	0	5	2	7	29	39	0	0	0	106.90	113.97
8:00	740	562	24	45	13	0	5	1	9	43	38	0	0	0	105.60	112.52
9:00	863	682	36	50	4	4	3	7	3	33	41	0	0	0	105.33	112.52
10:00	1036	861	59	44	6	0	5	4	0	36	21	0	0	0	106.18	113.09
11:00	1063	853	67	56	7	1	7	3	7	32	30	0	0	0	105.83	113.31
12:00	987	755	63	87	15	0	4	4	2	31	26	0	0	0	106.35	113.99
13:00	883	692	60	58	9	4	10	4	1	19	26	0	0	0	106.30	113.62
14:00	852	686	50	60	6	0	4	4	3	18	20	1	0	0	106.58	113.79
15:00	871	701	51	62	8	1	5	6	2	16	19	0	0	0	106.83	113.62
16:00	794	674	33	56	1	0	3	3	3	10	11	0	0	0	107.15	114.49
17:00	710	615	22	48	2	1	2	0	0	9	11	0	0	0	107.88	115.02
18:00	596	505	24	33	6	0	2	2	1	11	12	0	0	0	107.90	115.18
19:00	398	329	22	18	2	0	1	0	0	15	11	0	0	0	107.05	114.49
20:00	297	231	14	16	2	0	3	3	1	10	17	0	0	0	106.35	113.97
21:00	175	132	8	11	2	0	0	0	1	11	10	0	0	0	106.65	115.24
22:00	153	113	10	3	1	0	1	0	1	8	16	0	0	0	104.75	114.71
23:00	105	74	3	4	0	0	1	1	1	8	13	0	0	0	103.40	110.59
Total	**12402**	**9656**	**597**	**777**	**110**	**14**	**66**	**49**	**58**	**454**	**618**	**2**	**0**	**1**	**105.67**	**113.73**
	Light	83%	Heavy	17%												

Saturday, 26 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	70	43	2	6	0	0	0	0	1	10	8	0	0	0	104.38	112.17
1:00	46	26	2	1	0	0	1	0	0	10	6	0	0	0	105.53	116.41
2:00	52	24	1	4	1	0	0	1	1	7	13	0	0	0	103.00	113.16
3:00	67	29	1	6	0	0	0	0	2	7	22	0	0	0	103.33	113.02
4:00	96	54	0	6	1	0	0	0	0	5	30	0	0	0	104.05	110.97
5:00	151	87	13	8	0	0	1	0	3	12	27	0	0	0	105.05	115.29
6:00	217	167	7	8	5	0	1	1	2	5	21	0	0	0	106.90	115.56
7:00	425	346	21	15	0	1	3	0	2	13	24	0	0	0	106.43	113.79
8:00	624	525	27	33	4	0	1	1	2	14	17	0	0	0	104.93	112.52
9:00	876	740	57	35	3	0	3	1	1	16	18	0	0	2	104.53	112.39
10:00	886	761	49	45	2	0	2	2	3	10	12	0	0	0	105.95	112.87
11:00	861	697	78	51	4	0	6	2	0	10	13	0	0	0	105.85	113.22
12:00	762	635	56	40	3	0	5	1	3	5	14	0	0	0	106.38	113.22
13:00	722	615	51	34	5	0	2	2	0	4	9	0	0	0	106.25	113.09
14:00	678	567	49	40	0	0	4	3	2	6	7	0	0	0	106.33	114.49
15:00	622	520	35	47	1	0	3	0	1	4	11	0	0	0	106.73	113.40
16:00	595	499	31	38	2	0	2	2	2	7	11	0	0	1	106.85	113.80
17:00	485	407	23	41	0	1	1	2	2	4	4	0	0	0	107.33	114.17
18:00	348	302	17	13	1	1	0	0	1	6	7	0	0	0	107.58	115.42
19:00	250	204	13	14	0	0	3	1	1	5	9	0	0	0	105.55	112.55
20:00	195	151	12	12	1	0	1	0	3	2	13	0	0	0	106.00	114.01
21:00	188	145	5	9	0	0	1	2	0	13	12	1	0	0	106.00	114.19
22:00	143	100	6	10	1	0	1	2	1	9	13	0	0	0	105.73	113.98
23:00	94	63	3	4	0	0	2	1	3	6	12	0	0	0	104.75	114.30
Total	**9453**	**7707**	**559**	**520**	**34**	**3**	**43**	**24**	**36**	**190**	**333**	**1**	**0**	**3**	**105.64**	**113.66**
	Light	87%	Heavy	13%												

1 Pacific Hwy: Between Six Mile & Italia [110] Southbound 1 + 2

Sunday, 27 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	64	41	4	4	0	0	0	0	0	4	11	0	0	0	105.08	114.49
1:00	56	32	3	2	0	0	0	0	0	3	16	0	0	0	104.23	112.92
2:00	31	16	2	3	1	0	0	0	0	4	5	0	0	0	104.70	-
3:00	24	16	0	3	1	0	1	0	0	0	3	0	0	0	108.23	-
4:00	41	29	4	3	2	0	0	0	0	0	3	0	0	0	102.10	112.27
5:00	57	40	4	6	0	0	1	0	0	3	3	0	0	0	103.15	116.36
6:00	140	107	7	9	2	0	1	2	1	3	8	0	0	0	105.33	114.39
7:00	221	180	20	11	1	0	1	0	0	1	7	0	0	0	106.70	114.89
8:00	404	347	25	17	3	1	1	2	0	2	6	0	0	0	105.90	112.69
9:00	802	672	80	28	1	0	4	4	2	3	8	0	0	0	105.68	113.00
10:00	1031	865	91	55	1	0	1	4	1	7	6	0	0	0	106.20	113.47
11:00	1245	1044	125	45	1	0	7	6	2	5	8	0	0	2	107.05	115.02
12:00	1292	1092	102	68	1	0	8	5	1	9	6	0	0	0	107.30	114.93
13:00	1242	1060	107	54	2	0	8	1	2	6	2	0	0	0	107.03	114.35
14:00	1454	1249	108	66	1	1	10	5	0	3	10	0	0	1	106.98	114.49
15:00	1355	1145	111	68	4	0	7	3	2	7	7	0	0	1	107.38	114.32
16:00	1249	1055	90	69	0	2	6	0	1	14	11	0	0	1	107.73	114.80
17:00	960	811	53	59	1	1	3	3	2	15	12	0	0	0	107.93	114.80
18:00	684	553	44	34	2	0	4	2	0	19	26	0	0	0	107.88	116.12
19:00	483	384	21	26	3	0	1	3	2	23	20	0	0	0	108.28	115.66
20:00	345	246	22	14	0	0	1	1	0	30	31	0	0	0	106.10	113.80
21:00	275	168	10	14	2	0	2	2	3	34	37	3	0	0	104.53	113.31
22:00	174	91	6	6	1	0	1	0	3	20	46	0	0	0	103.75	113.40
23:00	120	53	3	7	1	0	2	1	1	18	34	0	0	0	103.10	111.01
Total	**13749**	**11296**	**1042**	**671**	**31**	**5**	**70**	**44**	**23**	**233**	**326**	**3**	**0**	**5**	**105.93**	**114.11**
	Light	90%	Heavy	10%												

Monday, 28 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	65	32	0	7	1	0	1	1	1	10	12	0	0	0	104.35	125.86
1:00	48	19	0	4	1	0	0	0	0	6	18	0	0	0	103.80	114.28
2:00	72	28	2	6	1	0	1	0	0	6	28	0	0	0	104.08	117.39
3:00	98	57	2	5	1	0	0	1	2	8	22	0	0	0	108.48	119.16
4:00	112	77	3	9	3	0	0	0	0	8	12	0	0	0	108.40	118.71
5:00	301	242	5	22	3	0	1	0	2	9	17	0	0	0	108.15	117.36
6:00	466	369	12	49	5	0	2	2	4	13	10	0	0	0	108.53	117.29
7:00	665	535	23	50	4	0	5	3	2	26	16	0	1	0	107.35	114.32
8:00	659	523	29	41	6	1	2	6	1	30	19	1	0	0	106.00	114.19
9:00	763	610	41	53	8	0	4	3	3	22	18	1	0	0	105.30	112.87
10:00	829	647	65	54	9	1	3	2	4	27	17	0	0	0	105.00	112.00
11:00	853	657	82	44	12	2	6	6	9	19	16	0	0	0	106.15	113.40
12:00	858	651	49	67	13	3	4	5	3	39	24	0	0	0	106.03	113.40
13:00	757	598	45	46	5	1	6	6	3	27	19	1	0	0	106.45	113.61
14:00	771	588	45	65	8	4	10	2	6	27	16	0	0	0	106.73	114.96
15:00	724	593	47	39	2	3	5	3	3	17	12	0	0	0	106.83	113.97
16:00	609	478	23	56	6	3	4	2	3	17	17	0	0	0	107.33	115.41
17:00	554	441	28	36	5	0	3	6	2	15	18	0	0	0	107.80	115.24
18:00	420	316	15	25	6	2	4	4	2	27	19	0	0	0	107.20	114.71
19:00	304	214	9	21	4	1	2	3	3	18	28	1	0	0	105.25	112.00
20:00	214	129	6	11	3	1	0	0	3	31	29	1	0	0	105.95	113.79
21:00	173	100	4	7	4	0	2	1	0	28	26	1	0	0	103.80	112.39
22:00	157	75	5	8	0	0	0	0	3	32	34	0	0	0	103.70	110.90
23:00	99	39	2	5	0	0	1	1	2	18	31	0	0	0	102.93	110.59
Total	**10571**	**8018**	**542**	**730**	**110**	**22**	**66**	**57**	**61**	**480**	**478**	**6**	**1**	**0**	**106.06**	**114.91**
	Light	81%	Heavy	19%												

Tuesday, 29 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	79	33	1	4	0	2	0	0	2	10	27	0	0	0	103.43	113.37
1:00	71	17	2	5	0	0	0	1	2	19	25	0	0	0	102.58	112.88
2:00	89	28	2	8	0	0	2	1	1	15	31	1	0	0	102.85	113.72
3:00	118	31	1	7	2	0	0	0	0	20	56	1	0	0	102.43	110.70
4:00	152	78	3	10	2	0	0	1	3	8	46	1	0	0	104.98	119.95
5:00	297	190	6	17	7	1	2	1	4	24	44	1	0	0	105.70	115.29
6:00	448	313	11	40	5	1	6	2	5	23	42	0	0	0	107.80	116.12
7:00	595	454	18	48	8	0	3	2	6	28	26	2	0	0	106.13	113.62
8:00	715	542	25	43	11	1	4	4	5	39	41	0	0	0	105.05	112.52
9:00	741	551	45	52	8	1	6	2	1	35	40	0	0	0	104.40	112.17
10:00	714	536	50	43	7	1	0	6	7	25	39	0	0	0	104.30	112.00
11:00	728	542	41	48	6	3	3	4	6	44	31	0	0	0	105.15	112.52
12:00	669	485	34	47	11	1	5	7	3	34	42	0	0	0	104.50	112.17
13:00	624	463	35	49	16	0	7	3	4	27	20	0	0	0	104.95	112.52
14:00	643	468	39	54	12	3	4	8	6	26	23	0	0	0	105.45	113.22
15:00	653	507	32	56	7	1	1	3	2	22	22	0	0	0	105.20	113.00
16:00	559	442	17	50	9	1	3	5	4	16	12	0	0	0	106.38	113.40
17:00	537	426	23	42	5	0	1	2	4	16	18	0	0	0	107.00	115.24
18:00	336	258	9	15	4	0	4	4	2	15	25	0	0	0	105.68	114.01
19:00	267	183	5	21	2	0	0	1	3	18	34	0	0	0	105.88	114.17
20:00	196	104	11	10	3	0	1	1	1	31	33	1	0	0	103.90	112.41
21:00	165	84	4	8	2	0	2	3	2	28	31	1	0	0	104.20	113.22
22:00	150	66	1	6	2	0	0	2	1	32	40	0	0	0	103.48	111.29
23:00	110	48	0	8	1	1	0	1	1	27	23	0	0	0	102.90	110.48
Total	**9656**	**6849**	**415**	**691**	**130**	**17**	**54**	**64**	**75**	**582**	**771**	**8**	**0**	**0**	**104.76**	**113.33**
	Light	75%	Heavy	25%												

1 Pacific Hwy: Between Six Mile & Italia [110] Southbound 1 + 2

Wednesday, 30 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	75	28	2	5	0	0	0	0	1	16	21	2	0	0	102.08	111.25
1:00	54	20	0	1	1	0	0	1	2	16	13	0	0	0	102.88	109.98
2:00	78	26	1	4	0	0	2	0	3	15	27	0	0	0	101.55	108.21
3:00	111	33	2	8	2	0	0	0	1	11	50	4	0	0	102.60	108.88
4:00	145	59	5	11	3	0	0	0	0	19	47	1	0	0	102.23	111.51
5:00	303	204	6	20	4	0	3	1	4	17	43	1	0	0	105.98	114.67
6:00	450	310	15	35	9	1	2	1	1	27	47	2	0	0	106.58	116.73
7:00	622	447	16	49	12	1	4	6	6	35	45	0	0	1	105.58	113.31
8:00	664	502	31	49	10	2	1	4	4	20	38	3	0	0	105.08	112.39
9:00	748	570	31	47	9	3	5	4	5	33	39	2	0	0	104.93	112.00
10:00	735	566	46	50	4	1	6	2	2	32	24	1	1	0	104.98	112.69
11:00	728	521	59	57	10	3	3	4	2	38	31	0	0	0	104.68	112.17
12:00	681	501	38	53	12	2	8	6	4	29	28	0	0	0	104.50	111.20
13:00	640	472	37	44	11	2	7	7	7	29	24	0	0	0	105.33	112.70
14:00	677	502	38	55	14	3	3	4	2	25	30	1	0	0	105.48	113.22
15:00	688	542	26	61	5	2	2	4	8	18	20	0	0	0	106.55	114.93
16:00	589	471	23	49	9	4	3	5	2	10	13	0	0	0	104.63	113.44
17:00	486	367	21	42	6	1	6	1	2	16	24	0	0	0	106.18	113.40
18:00	385	286	10	23	4	0	1	2	5	30	23	1	0	0	105.70	114.19
19:00	268	180	8	26	3	0	2	0	2	25	21	1	0	0	105.68	114.46
20:00	189	113	7	8	4	0	2	2	3	25	25	0	0	0	105.25	115.29
21:00	181	90	3	10	3	0	2	0	2	34	36	1	0	0	103.88	112.39
22:00	123	48	3	10	0	0	3	0	3	29	27	0	0	0	103.53	112.87
23:00	98	43	1	7	2	0	1	3	1	15	25	0	0	0	104.33	114.60
Total	**9718**	**6901**	**429**	**724**	**137**	**25**	**66**	**57**	**72**	**564**	**721**	**20**	**1**	**1**	**104.59**	**112.77**
	Light	75%	Heavy	25%												

1 Pacific Hwy: Between Six Mile & Italia [110] Southbound 1 + 2

Weekday Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	71	29	1	5	0	0	0	0	1	12	20	0	0	0	103.30	115.03
1:00	60	19	1	4	1	0	0	1	1	14	19	0	0	0	103.25	113.14
2:00	83	27	2	6	0	0	1	0	2	15	29	0	0	0	102.79	111.89
3:00	114	39	2	6	3	0	1	0	1	14	47	1	0	0	103.72	112.69
4:00	143	69	3	10	3	0	0	0	1	13	42	0	0	0	104.69	115.61
5:00	298	205	5	19	4	0	2	1	3	21	36	1	0	0	106.35	115.31
6:00	458	332	14	37	7	1	4	2	4	20	36	1	0	0	107.51	116.17
7:00	628	475	18	50	7	0	4	4	5	29	36	0	0	0	106.49	113.86
8:00	695	535	26	44	10	1	3	3	5	34	34	1	0	0	105.55	113.08
9:00	773	601	36	48	7	2	5	4	3	31	35	1	0	0	104.94	112.43
10:00	819	641	53	48	7	1	3	4	4	31	26	0	0	0	105.01	112.35
11:00	832	638	58	51	9	2	4	4	6	32	27	0	0	0	105.37	112.88
12:00	781	583	45	63	12	2	5	6	4	32	29	0	0	0	105.21	112.72
13:00	716	547	42	51	10	2	6	5	4	25	23	0	0	0	105.68	112.92
14:00	733	560	40	58	12	2	6	4	4	25	22	0	0	0	105.97	113.73
15:00	728	581	35	57	5	3	4	3	4	19	18	0	0	0	106.27	113.80
16:00	645	520	25	55	7	2	4	4	3	13	13	0	0	0	106.36	114.22
17:00	568	460	23	42	5	0	3	2	2	13	18	0	0	0	107.13	114.58
18:00	417	325	14	26	4	1	3	3	3	19	21	0	0	0	106.50	114.17
19:00	304	222	11	20	3	0	2	1	2	18	24	0	0	0	106.07	113.82
20:00	224	144	9	12	3	0	2	1	2	26	26	0	0	0	105.39	113.91
21:00	170	98	4	9	3	0	1	1	2	26	25	1	0	0	104.40	113.20
22:00	144	75	4	7	1	0	1	0	2	26	28	0	0	0	103.99	112.43
23:00	109	54	2	6	1	0	1	1	1	18	25	0	0	0	103.22	110.97
Total	**10513**	**7780**	**473**	**735**	**122**	**20**	**64**	**56**	**67**	**527**	**660**	**8**	**1**	**1**	**105.21**	**115.23**
	Light	78%	Heavy	22%												

Weekend Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	67	42	3	5	0	0	0	0	1	7	10	0	0	0	104.73	113.33
1:00	51	29	3	2	0	0	1	0	0	7	11	0	0	0	104.88	114.67
2:00	42	20	2	4	1	0	0	1	1	6	9	0	0	0	103.85	113.16
3:00	46	23	1	5	1	0	1	0	1	4	13	0	0	0	105.78	113.02
4:00	69	42	2	5	2	0	0	0	0	3	17	0	0	0	103.08	111.62
5:00	104	64	9	7	0	0	1	0	2	8	15	0	0	0	104.10	115.82
6:00	179	137	7	9	4	0	1	2	2	4	15	0	0	0	106.11	114.98
7:00	323	263	21	13	1	1	2	0	1	7	16	0	0	0	106.56	114.34
8:00	514	436	26	25	4	1	1	2	1	8	12	0	0	0	105.41	112.60
9:00	839	706	69	32	2	0	4	3	2	10	13	0	0	1	105.10	112.69
10:00	959	813	70	50	2	0	2	3	2	9	9	0	0	0	106.08	113.17
11:00	1053	871	102	48	3	0	7	4	1	8	11	0	0	1	106.45	114.12
12:00	1027	864	79	54	2	0	7	3	2	7	10	0	0	0	106.84	114.07
13:00	982	838	79	44	4	0	5	2	1	5	6	0	0	0	106.64	113.72
14:00	1066	908	79	53	1	1	7	4	1	5	9	0	0	1	106.65	114.49
15:00	989	833	73	58	3	0	5	2	2	6	9	0	0	1	107.05	113.86
16:00	922	777	61	54	1	1	4	1	2	11	11	0	0	1	107.29	114.30
17:00	723	609	38	50	1	1	2	3	2	10	8	0	0	0	107.63	114.49
18:00	516	428	31	24	2	1	2	1	1	13	17	0	0	0	107.73	115.77
19:00	367	294	17	20	2	0	2	2	2	14	15	0	0	0	106.91	114.10
20:00	270	199	17	13	1	0	1	1	2	16	22	0	0	0	106.05	113.90
21:00	232	157	8	12	1	0	2	2	2	24	25	2	0	0	105.26	113.75
22:00	159	96	6	8	1	0	1	1	2	15	30	0	0	0	104.74	113.69
23:00	107	58	3	6	1	0	2	1	2	12	23	0	0	0	103.93	112.65
Total	**11601**	**9502**	**801**	**596**	**33**	**4**	**57**	**34**	**30**	**212**	**330**	**2**	**0**	**4**	**105.78**	**114.97**
	Light	89%	Heavy	11%												

7-Day Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	70	33	2	5	0	0	0	0	1	11	17	0	0	0	103.71	114.54
1:00	57	22	1	3	0	0	0	0	1	12	17	0	0	0	103.71	113.57
2:00	71	25	2	6	1	0	1	0	1	12	23	0	0	0	103.09	112.10
3:00	94	34	1	6	2	0	1	0	1	11	37	1	0	0	104.30	112.74
4:00	122	61	3	9	2	0	0	0	1	10	35	0	0	0	104.23	114.47
5:00	243	165	6	15	3	0	2	1	3	17	30	0	0	0	105.70	115.46
6:00	378	277	12	29	6	1	3	2	3	16	30	0	0	0	107.11	115.83
7:00	541	414	19	40	5	0	4	3	4	23	30	0	0	0	106.51	114.00
8:00	643	507	26	39	8	1	2	3	4	26	27	1	0	0	105.51	112.94
9:00	792	631	46	43	6	2	4	3	3	25	29	0	0	0	104.98	112.50
10:00	859	690	58	49	5	1	3	4	3	24	21	0	0	0	105.31	112.59
11:00	895	705	70	50	7	1	5	4	5	25	22	0	0	0	105.68	113.23
12:00	851	663	54	61	9	1	6	5	3	25	24	0	0	0	105.68	113.11
13:00	792	630	52	49	8	1	6	4	3	19	18	0	0	0	105.95	113.15
14:00	828	659	51	57	9	2	6	4	3	19	18	0	0	0	106.16	113.95
15:00	803	653	46	57	4	2	4	3	3	15	16	0	0	0	106.49	113.81
16:00	724	594	35	54	5	2	4	3	2	12	13	0	0	0	106.63	114.25
17:00	612	503	27	44	3	1	2	2	2	12	15	0	0	0	107.27	114.55
18:00	446	354	19	25	3	1	2	2	2	17	19	0	0	0	106.85	114.63
19:00	322	243	13	20	3	0	2	2	2	17	21	0	0	0	106.31	113.90
20:00	237	159	11	12	2	0	1	1	2	23	25	0	0	0	105.58	113.91
21:00	188	115	5	10	2	0	1	1	2	26	25	1	0	0	104.65	113.36
22:00	148	81	5	7	1	0	1	1	2	22	28	0	0	0	104.20	112.79
23:00	108	55	2	6	1	0	1	1	1	17	24	0	0	0	103.42	111.45
Total	**10824**	**8272**	**566**	**695**	**97**	**16**	**62**	**50**	**56**	**437**	**566**	**6**	**0**	**2**	**105.38**	**115.15**
	Light	82%	Heavy	18%												

2 Italia Rd: 300m West of Pacific Hwy [90] Eastbound 0

Thursday, 24 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	5	4	0	1	0	0	0	0	0	0	0	0	0	0	93.13	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	79.60	-
3:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	92.20	-
4:00	12	10	1	0	0	0	0	0	0	0	1	0	0	0	86.10	-
5:00	28	20	0	1	0	0	0	0	0	5	2	0	0	0	88.83	-
6:00	44	21	1	7	2	1	0	1	0	10	1	0	0	0	85.70	103.87
7:00	60	35	3	7	2	0	2	0	0	7	4	0	0	0	89.20	101.30
8:00	58	42	0	2	8	0	0	0	1	4	1	0	0	0	87.03	98.95
9:00	39	20	1	5	2	0	2	0	0	7	2	0	0	0	83.85	88.20
10:00	50	25	1	6	3	0	1	0	1	11	2	0	0	0	85.73	98.59
11:00	46	25	1	1	7	1	0	0	0	9	2	0	0	0	83.00	95.56
12:00	26	9	2	3	3	0	1	0	1	6	1	0	0	0	84.48	92.50
13:00	56	27	4	6	3	1	2	0	0	5	8	0	0	0	79.55	97.40
14:00	54	28	5	4	7	0	0	0	1	6	3	0	0	0	86.28	103.00
15:00	67	55	1	2	1	0	0	1	0	4	3	0	0	0	87.40	95.68
16:00	53	44	3	4	1	0	0	0	1	0	0	0	0	0	90.58	99.23
17:00	54	44	3	6	1	0	0	0	0	0	0	0	0	0	92.20	100.14
18:00	27	23	0	4	0	0	0	0	0	0	0	0	0	0	92.83	-
19:00	10	9	0	1	0	0	0	0	0	0	0	0	0	0	81.95	-
20:00	12	10	0	1	0	0	1	0	0	0	0	0	0	0	96.60	-
21:00	7	7	0	0	0	0	0	0	0	0	0	0	0	0	100.85	-
22:00	4	3	0	0	0	0	0	0	0	0	1	0	0	0	87.73	-
23:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	93.27	-
Total	**721**	**469**	**26**	**62**	**40**	**3**	**9**	**2**	**5**	**74**	**31**	**0**	**0**	**0**	**88.18**	**97.87**
	Light	69%	Heavy	31%												

Friday, 25 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	96.60	-
1:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	100.30	-
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
3:00	4	1	0	2	0	0	0	0	0	1	0	0	0	0	78.45	-
4:00	7	5	0	1	0	0	0	0	0	0	1	0	0	0	91.88	-
5:00	24	14	0	2	2	0	0	0	1	4	1	0	0	0	82.90	-
6:00	54	27	3	5	6	0	0	1	1	7	4	0	0	0	83.68	102.17
7:00	50	32	2	5	3	0	0	1	0	5	2	0	0	0	89.23	105.79
8:00	67	41	2	4	9	0	0	0	0	10	1	0	0	0	84.93	99.61
9:00	48	32	4	5	2	0	1	0	0	2	2	0	0	0	86.95	96.50
10:00	62	37	3	5	7	0	0	0	0	9	1	0	0	0	82.45	99.55
11:00	48	24	3	5	4	0	1	0	0	6	5	0	0	0	81.33	96.32
12:00	53	33	2	4	5	0	0	0	0	6	3	0	0	0	79.55	96.26
13:00	43	20	4	5	3	0	0	1	1	5	4	0	0	0	82.45	101.48
14:00	43	24	1	4	5	0	0	1	0	3	5	0	0	0	87.35	100.74
15:00	61	45	3	8	2	0	0	0	0	3	0	0	0	0	88.68	108.50
16:00	53	43	3	5	1	0	1	0	0	0	0	0	0	0	92.45	100.68
17:00	49	40	4	3	0	0	1	1	0	0	0	0	0	0	91.05	99.16
18:00	37	30	3	4	0	0	0	0	0	0	0	0	0	0	92.63	104.80
19:00	22	20	1	0	0	0	1	0	0	0	0	0	0	0	88.60	-
20:00	16	14	0	2	0	0	0	0	0	0	0	0	0	0	85.90	-
21:00	15	11	2	1	0	0	0	0	0	0	1	0	0	0	88.98	-
22:00	6	5	1	0	0	0	0	0	0	0	0	0	0	0	90.33	-
23:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0	88.53	-
Total	**769**	**504**	**41**	**71**	**49**	**0**	**5**	**5**	**3**	**61**	**30**	**0**	**0**	**0**	**87.62**	**100.89**
	Light	71%	Heavy	29%												

Saturday, 26 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	10	7	2	1	0	0	0	0	0	0	0	0	0	0	92.55	-
1:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	104.75	-
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	102.90	-
3:00	6	3	0	2	0	0	0	0	0	1	0	0	0	0	84.78	-
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
5:00	9	5	0	0	0	0	1	0	0	3	0	0	0	0	88.15	-
6:00	17	10	2	2	0	0	0	0	0	3	0	0	0	0	90.65	-
7:00	34	25	2	3	0	0	0	0	0	4	0	0	0	0	91.15	106.60
8:00	33	23	2	2	1	0	0	0	0	5	0	0	0	0	89.08	98.30
9:00	49	39	2	3	0	0	0	0	0	5	0	0	0	0	81.83	98.54
10:00	54	38	4	8	2	0	0	0	0	1	1	0	0	0	86.60	105.08
11:00	45	36	1	8	0	0	0	0	0	0	0	0	0	0	84.68	96.01
12:00	49	44	1	1	0	0	1	2	0	0	0	0	0	0	80.35	97.15
13:00	70	56	5	7	0	0	2	0	0	0	0	0	0	0	82.83	99.22
14:00	69	50	6	12	0	0	0	1	0	0	0	0	0	0	75.20	100.87
15:00	59	48	5	6	0	0	0	0	0	0	0	0	0	0	79.70	98.55
16:00	37	31	3	2	1	0	0	0	0	0	0	0	0	0	90.25	96.10
17:00	29	27	0	2	0	0	0	0	0	0	0	0	0	0	93.68	97.60
18:00	20	17	2	1	0	0	0	0	0	0	0	0	0	0	90.25	-
19:00	13	9	1	2	0	0	0	1	0	0	0	0	0	0	87.60	-
20:00	4	2	2	0	0	0	0	0	0	0	0	0	0	0	101.90	-
21:00	7	7	0	0	0	0	0	0	0	0	0	0	0	0	94.60	-
22:00	3	3	0	0	0	0	0	0	0	0	0	0	0	0	82.33	-
23:00	5	4	0	1	0	0	0	0	0	0	0	0	0	0	91.15	-
Total	**626**	**488**	**40**	**63**	**4**	**0**	**4**	**4**	**0**	**22**	**1**	**0**	**0**	**0**	**89.00**	**99.46**
	Light	84%	Heavy	16%												

2 Italia Rd: 300m West of Pacific Hwy [90] Eastbound 0

Sunday, 27 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	84.20	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	92.90	-
2:00	3	2	0	0	0	0	0	0	0	1	0	0	0	0	88.10	-
3:00	3	2	0	0	0	0	0	0	0	1	0	0	0	0	91.73	-
4:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0	102.10	-
5:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	100.20	-
6:00	10	8	1	0	0	0	0	0	0	0	1	0	0	0	98.83	-
7:00	22	16	5	0	0	1	0	0	0	0	0	0	0	0	89.38	100.80
8:00	30	26	2	2	0	0	0	0	0	0	0	0	0	0	93.18	-
9:00	43	38	1	3	0	0	0	1	0	0	0	0	0	0	87.38	96.23
10:00	30	27	2	1	0	0	0	0	0	0	0	0	0	0	94.08	-
11:00	39	36	2	1	0	0	0	0	0	0	0	0	0	0	85.30	97.90
12:00	25	22	2	1	0	0	0	0	0	0	0	0	0	0	83.50	-
13:00	50	38	4	7	0	0	0	1	0	0	0	0	0	0	73.93	96.17
14:00	81	59	13	9	0	0	0	0	0	0	0	0	0	0	74.60	105.44
15:00	73	45	13	13	0	0	1	1	0	0	0	0	0	0	71.45	90.28
16:00	67	47	10	8	0	0	2	0	0	0	0	0	0	0	73.75	100.73
17:00	40	31	3	4	2	0	0	0	0	0	0	0	0	0	88.30	103.55
18:00	24	18	1	5	0	0	0	0	0	0	0	0	0	0	89.23	-
19:00	16	14	0	1	1	0	0	0	0	0	0	0	0	0	86.85	-
20:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	111.70	-
21:00	12	10	1	1	0	0	0	0	0	0	0	0	0	0	93.60	-
22:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	86.35	-
23:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	126.80	-
Total	**587**	**456**	**60**	**58**	**3**	**1**	**3**	**3**	**0**	**2**	**1**	**0**	**0**	**0**	**90.31**	**98.89**
	Light	88%	Heavy	12%												

Monday, 28 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	76.10	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	77.75	-
3:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	84.00	-
4:00	11	6	1	0	0	0	0	0	1	2	0	0	0	1	82.20	-
5:00	29	22	1	4	0	0	0	0	0	1	1	0	0	0	93.25	102.60
6:00	47	26	3	4	3	0	0	0	0	7	4	0	0	0	88.10	96.61
7:00	52	34	1	4	3	0	1	2	0	3	4	0	0	0	89.00	101.68
8:00	58	40	1	5	6	0	0	1	1	2	2	0	0	0	86.48	97.69
9:00	37	25	2	1	2	0	0	0	1	3	3	0	0	0	83.20	90.40
10:00	45	26	4	4	3	0	0	0	0	5	3	0	0	0	87.15	102.62
11:00	33	18	0	5	3	0	0	0	0	4	3	0	0	0	85.43	85.30
12:00	34	15	0	7	1	0	0	0	0	7	4	0	0	0	81.95	93.20
13:00	52	27	4	6	1	0	0	1	0	9	4	0	0	0	86.25	98.74
14:00	47	21	4	11	2	1	0	0	1	3	4	0	0	0	79.23	99.77
15:00	44	30	1	9	0	0	0	0	1	1	2	0	0	0	91.68	104.68
16:00	44	39	0	3	0	0	0	0	1	1	0	0	0	0	90.93	103.81
17:00	42	32	0	9	0	0	0	0	0	1	0	0	0	0	91.80	102.97
18:00	16	14	0	2	0	0	0	0	0	0	0	0	0	0	91.93	-
19:00	12	12	0	0	0	0	0	0	0	0	0	0	0	0	90.23	-
20:00	6	5	0	1	0	0	0	0	0	0	0	0	0	0	82.43	-
21:00	3	3	0	0	0	0	0	0	0	0	0	0	0	0	93.20	-
22:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0	82.77	-
23:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	97.50	-
Total	**626**	**407**	**22**	**77**	**24**	**1**	**1**	**4**	**6**	**49**	**34**	**0**	**0**	**1**	**86.63**	**98.47**
	Light	69%	Heavy	31%												

Tuesday, 29 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	92.10	-
1:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	96.80	-
2:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	104.50	-
3:00	5	1	1	2	0	0	0	0	0	0	1	0	0	0	75.50	-
4:00	6	6	0	0	0	0	0	0	0	0	0	0	0	0	96.60	-
5:00	26	19	0	1	0	0	0	0	0	4	2	0	0	0	83.58	100.80
6:00	53	29	2	7	2	0	1	0	0	9	3	0	0	0	87.33	99.34
7:00	44	24	1	2	6	0	0	2	0	5	4	0	0	0	84.58	98.73
8:00	58	38	1	6	3	0	1	0	0	6	3	0	0	0	82.25	98.31
9:00	32	20	3	4	3	0	0	0	0	2	0	0	0	0	88.73	98.60
10:00	30	19	1	1	4	0	0	0	0	2	3	0	0	0	81.00	-
11:00	40	19	2	3	3	0	0	0	0	10	3	0	0	0	87.40	94.00
12:00	33	21	0	3	5	0	0	0	0	2	2	0	0	0	79.53	82.10
13:00	33	17	0	2	5	0	1	0	0	3	5	0	0	0	84.00	95.80
14:00	45	28	3	0	7	0	0	0	0	3	4	0	0	0	81.45	97.87
15:00	65	46	2	9	2	0	0	0	0	2	4	0	0	0	89.45	97.76
16:00	63	42	1	17	0	0	1	1	0	1	0	0	0	0	83.03	95.79
17:00	44	38	0	4	2	0	0	0	0	0	0	0	0	0	87.73	96.17
18:00	25	21	0	1	0	0	1	0	0	1	1	0	0	0	90.35	99.00
19:00	9	8	0	0	0	0	0	1	0	0	0	0	0	0	87.83	-
20:00	6	3	2	1	0	0	0	0	0	0	0	0	0	0	91.10	-
21:00	2	1	0	0	0	0	0	0	0	1	0	0	0	0	98.30	-
22:00	4	3	0	1	0	0	0	0	0	0	0	0	0	0	94.87	-
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
Total	**627**	**406**	**19**	**65**	**42**	**0**	**5**	**4**	**0**	**51**	**35**	**0**	**0**	**0**	**88.17**	**96.48**
	Light	68%	Heavy	32%												

2 Italia Rd: 300m West of Pacific Hwy [90] Eastbound 0

Wednesday, 30 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	99.00	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	100.05	-
3:00	6	4	0	2	0	0	0	0	0	0	0	0	0	0	92.77	-
4:00	8	6	0	1	0	0	0	0	0	1	0	0	0	0	92.00	-
5:00	28	19	1	2	0	0	0	0	2	4	0	0	0	0	93.68	98.30
6:00	50	23	2	5	1	1	2	0	0	10	6	0	0	0	85.38	99.62
7:00	61	37	0	5	10	0	0	0	1	5	3	0	0	0	87.90	101.66
8:00	62	44	5	4	2	0	0	1	0	4	2	0	0	0	87.10	96.24
9:00	31	18	2	1	4	0	1	0	0	4	1	0	0	0	84.78	-
10:00	28	18	0	3	2	0	0	0	0	4	1	0	0	0	85.85	-
11:00	47	23	2	7	3	1	0	0	0	6	5	0	0	0	88.95	93.44
12:00	34	17	1	5	6	0	0	0	0	4	1	0	0	0	87.55	87.80
13:00	38	15	0	4	5	1	1	0	0	8	4	0	0	0	78.35	101.86
14:00	42	25	1	4	5	0	0	0	0	5	2	0	0	0	87.95	96.52
15:00	51	36	2	7	2	0	0	0	0	1	3	0	0	0	84.70	98.25
16:00	58	47	0	7	1	0	2	0	0	1	0	0	0	0	89.70	103.72
17:00	40	34	0	3	1	0	1	1	0	0	0	0	0	0	91.38	101.20
18:00	17	17	0	0	0	0	0	0	0	0	0	0	0	0	98.60	-
19:00	12	8	1	3	0	0	0	0	0	0	0	0	0	0	85.68	-
20:00	8	8	0	0	0	0	0	0	0	0	0	0	0	0	79.70	-
21:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	97.95	-
22:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	88.40	-
23:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	92.90	-
Total	**632**	**409**	**17**	**64**	**42**	**3**	**7**	**2**	**3**	**57**	**28**	**0**	**0**	**0**	**89.58**	**98.05**
	Light	67%	Heavy	33%												

2 Italia Rd: 300m West of Pacific Hwy [90] Eastbound 0

Weekday Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0	91.39	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	98.55	-
2:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0	90.48	-
3:00	4	2	0	1	0	0	0	0	0	0	0	0	0	0	84.58	-
4:00	9	7	0	0	0	0	0	0	0	1	0	0	0	0	89.76	-
5:00	27	19	0	2	0	0	0	0	1	4	1	0	0	0	88.45	100.57
6:00	50	25	2	6	3	0	1	0	0	9	4	0	0	0	86.04	100.32
7:00	53	32	1	5	5	0	1	1	0	5	3	0	0	0	87.98	101.83
8:00	61	41	2	4	6	0	0	0	0	5	2	0	0	0	85.56	98.16
9:00	37	23	2	3	3	0	1	0	0	4	2	0	0	0	85.50	93.43
10:00	43	25	2	4	4	0	0	0	0	6	2	0	0	0	84.44	100.25
11:00	43	22	2	4	4	0	0	0	0	7	4	0	0	0	85.22	92.92
12:00	36	19	1	4	4	0	0	0	0	5	2	0	0	0	82.61	90.37
13:00	44	21	2	5	3	0	1	0	0	6	5	0	0	0	82.12	99.05
14:00	46	25	3	5	5	0	0	0	0	4	4	0	0	0	84.45	99.58
15:00	58	42	2	7	1	0	0	0	0	2	2	0	0	0	88.38	100.97
16:00	54	43	1	7	1	0	1	0	0	1	0	0	0	0	89.34	100.64
17:00	46	38	1	5	1	0	0	0	0	0	0	0	0	0	90.83	99.93
18:00	24	21	1	2	0	0	0	0	0	0	0	0	0	0	93.27	101.90
19:00	13	11	0	1	0	0	0	0	0	0	0	0	0	0	86.86	-
20:00	10	8	0	1	0	0	0	0	0	0	0	0	0	0	87.15	-
21:00	6	5	0	0	0	0	0	0	0	0	0	0	0	0	95.86	-
22:00	4	3	0	0	0	0	0	0	0	0	0	0	0	0	88.82	-
23:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	93.05	-
Total	**675**	**439**	**25**	**68**	**39**	**1**	**5**	**3**	**3**	**58**	**32**	**0**	**0**	**0**	**88.03**	**102.17**
	Light	69%	Heavy	31%												

Weekend Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	6	5	1	1	0	0	0	0	0	0	0	0	0	0	88.38	-
1:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	98.83	-
2:00	3	2	0	0	0	0	0	0	0	1	0	0	0	0	95.50	-
3:00	5	3	0	1	0	0	0	0	0	1	0	0	0	0	88.25	-
4:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	102.10	-
5:00	6	4	0	1	0	0	1	0	0	2	0	0	0	0	94.18	-
6:00	14	9	2	1	0	0	0	0	0	2	1	0	0	0	94.74	-
7:00	28	21	4	2	0	1	0	0	0	2	0	0	0	0	90.26	103.70
8:00	32	25	2	2	1	0	0	0	0	3	0	0	0	0	91.13	98.30
9:00	46	39	2	3	0	0	0	1	0	3	0	0	0	0	84.60	97.38
10:00	42	33	3	5	1	0	0	0	0	1	1	0	0	0	90.34	105.08
11:00	42	36	2	5	0	0	0	0	0	0	0	0	0	0	84.99	96.96
12:00	37	33	2	1	0	0	1	1	0	0	0	0	0	0	81.93	97.15
13:00	60	47	5	7	0	0	1	1	0	0	0	0	0	0	78.38	97.70
14:00	75	55	10	11	0	0	0	1	0	0	0	0	0	0	74.90	103.15
15:00	66	47	9	10	0	0	1	1	0	0	0	0	0	0	75.58	94.42
16:00	52	39	7	5	1	0	1	0	0	0	0	0	0	0	82.00	98.42
17:00	35	29	2	3	1	0	0	0	0	0	0	0	0	0	90.99	100.58
18:00	22	18	2	3	0	0	0	0	0	0	0	0	0	0	89.74	-
19:00	15	12	1	2	1	0	0	1	0	0	0	0	0	0	87.23	-
20:00	4	2	1	1	0	0	0	0	0	0	0	0	0	0	106.80	-
21:00	10	9	1	1	0	0	0	0	0	0	0	0	0	0	94.10	-
22:00	4	4	0	0	0	0	0	0	0	0	0	0	0	0	84.34	-
23:00	3	3	0	1	0	0	0	0	0	0	0	0	0	0	108.98	-
Total	**607**	**472**	**50**	**61**	**4**	**1**	**4**	**4**	**0**	**12**	**1**	**0**	**0**	**0**	**89.65**	**103.19**
	Light	86%	Heavy	14%												

7-Day Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	90.53	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	98.69	-
2:00	2	1	0	0	0	0	0	0	0	0	0	0	0	0	92.15	-
3:00	4	2	0	1	0	0	0	0	0	0	0	0	0	0	85.63	-
4:00	7	5	0	0	0	0	0	0	0	0	0	0	0	0	91.81	-
5:00	21	14	0	2	0	0	0	0	0	3	1	0	0	0	90.08	100.57
6:00	39	21	2	4	2	0	0	0	0	7	3	0	0	0	88.52	100.32
7:00	46	29	2	4	3	0	0	1	0	4	2	0	0	0	88.63	102.36
8:00	52	36	2	4	4	0	0	0	0	4	1	0	0	0	87.15	98.18
9:00	40	27	2	3	2	0	1	0	0	3	1	0	0	0	85.24	94.74
10:00	43	27	2	4	3	0	0	0	0	5	2	0	0	0	86.12	101.46
11:00	43	26	2	4	3	0	0	0	0	5	3	0	0	0	85.15	94.08
12:00	36	23	1	3	3	0	0	0	0	4	2	0	0	0	82.41	91.50
13:00	49	29	3	5	2	0	1	0	0	4	4	0	0	0	81.05	98.67
14:00	54	34	5	6	4	0	0	0	0	3	3	0	0	0	81.72	100.60
15:00	60	44	4	8	1	0	0	0	0	2	2	0	0	0	84.72	99.10
16:00	54	42	3	7	1	0	1	0	0	0	0	0	0	0	87.24	100.01
17:00	43	35	1	4	1	0	0	0	0	0	0	0	0	0	90.88	100.11
18:00	24	20	1	2	0	0	0	0	0	0	0	0	0	0	92.26	101.90
19:00	13	11	0	1	0	0	0	0	0	0	0	0	0	0	86.96	-
20:00	8	6	1	1	0	0	0	0	0	0	0	0	0	0	92.76	-
21:00	7	6	0	0	0	0	0	0	0	0	0	0	0	0	95.35	-
22:00	4	3	0	0	0	0	0	0	0	0	0	0	0	0	87.54	-
23:00	3	2	0	0	0	0	0	0	0	0	0	0	0	0	98.36	-
Total	**655**	**448**	**32**	**66**	**29**	**1**	**5**	**3**	**2**	**45**	**23**	**0**	**0**	**0**	**88.50**	**102.46**
	Light	73%	Heavy	27%												

2 Italia Rd: 300m West of Pacific Hwy [90] Westbound 0

Thursday, 24 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	90.00	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	1	0	0	1	0	0	0	0	0	0	0	0	0	0	81.00	-
3:00	2	0	0	2	0	0	0	0	0	0	0	0	0	0	79.75	-
4:00	12	9	0	3	0	0	0	0	0	0	0	0	0	0	77.53	-
5:00	26	13	0	11	0	0	0	1	0	0	1	0	0	0	91.80	97.60
6:00	41	18	0	10	3	0	0	0	0	9	1	0	0	0	86.75	96.28
7:00	48	26	2	12	2	0	1	0	1	4	0	0	0	0	87.75	98.95
8:00	51	28	1	7	2	0	3	0	0	7	3	0	0	0	83.60	90.77
9:00	41	24	2	6	2	0	0	1	0	6	0	0	0	0	86.23	94.99
10:00	52	25	1	10	3	0	0	0	1	9	3	0	0	0	84.33	98.06
11:00	40	14	3	4	6	0	1	0	0	10	2	0	0	0	82.45	93.94
12:00	38	14	2	6	2	0	1	0	1	6	6	0	0	0	82.20	91.98
13:00	43	11	1	10	5	1	0	0	1	13	1	0	0	0	81.65	97.43
14:00	37	17	1	4	2	0	1	0	0	8	4	0	0	0	83.83	106.60
15:00	53	25	2	15	2	0	0	0	1	3	5	0	0	0	85.75	96.17
16:00	68	44	1	19	0	0	2	0	0	0	2	0	0	0	90.25	102.47
17:00	56	35	1	15	2	0	1	0	0	1	1	0	0	0	91.15	103.35
18:00	26	23	0	1	0	0	1	0	0	1	0	0	0	0	95.55	-
19:00	19	16	0	2	0	0	0	0	0	1	0	0	0	0	91.78	-
20:00	8	4	1	3	0	0	0	0	0	0	0	0	0	0	86.98	-
21:00	13	10	1	2	0	0	0	0	0	0	0	0	0	0	89.05	-
22:00	6	5	0	0	0	0	0	1	0	0	0	0	0	0	86.73	-
23:00	7	4	0	0	0	0	0	0	0	2	1	0	0	0	83.80	-
Total	**690**	**367**	**19**	**143**	**31**	**1**	**11**	**3**	**5**	**80**	**30**	**0**	**0**	**0**	**86.08**	**97.58**
	Light	56%	Heavy	44%												

Friday, 25 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	80.10	-
1:00	3	1	0	1	0	0	0	0	1	0	0	0	0	0	82.10	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	101.40	-
3:00	3	1	0	2	0	0	0	0	0	0	0	0	0	0	85.30	-
4:00	10	9	0	1	0	0	0	0	0	0	0	0	0	0	86.83	-
5:00	25	16	0	8	0	0	0	0	0	0	1	0	0	0	87.73	-
6:00	49	24	0	11	4	0	0	1	0	6	3	0	0	0	85.25	97.64
7:00	37	21	1	5	5	0	1	1	0	2	1	0	0	0	81.23	97.90
8:00	49	27	2	6	2	0	1	0	0	8	3	0	0	0	82.48	96.56
9:00	39	24	2	6	4	0	0	0	0	3	0	0	0	0	87.38	100.06
10:00	63	29	2	15	5	0	0	1	0	7	4	0	0	0	81.78	96.30
11:00	44	22	3	3	7	0	0	0	0	5	4	0	0	0	79.28	93.20
12:00	52	31	0	7	4	0	0	1	1	7	1	0	0	0	86.18	98.53
13:00	45	19	3	7	4	0	1	0	0	4	7	0	0	0	83.18	96.94
14:00	48	23	2	10	2	0	2	1	0	6	2	0	0	0	88.08	100.33
15:00	59	27	2	15	2	0	1	1	0	7	4	0	0	0	87.40	103.55
16:00	57	32	2	19	0	0	0	1	0	2	1	0	0	0	90.75	105.32
17:00	49	35	4	5	3	0	0	1	0	1	0	0	0	0	85.08	102.44
18:00	32	23	2	7	0	0	0	0	0	0	0	0	0	0	93.93	-
19:00	31	20	0	9	0	0	1	0	1	0	0	0	0	0	91.88	101.20
20:00	11	5	0	6	0	0	0	0	0	0	0	0	0	0	95.88	-
21:00	7	5	0	0	0	0	0	1	0	1	0	0	0	0	85.40	-
22:00	15	11	0	4	0	0	0	0	0	0	0	0	0	0	88.80	-
23:00	16	14	0	2	0	0	0	0	0	0	0	0	0	0	88.40	-
Total	**746**	**421**	**25**	**149**	**42**	**0**	**7**	**9**	**3**	**59**	**31**	**0**	**0**	**0**	**86.91**	**99.23**
	Light	60%	Heavy	40%												

Saturday, 26 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	90.40	-
1:00	5	4	0	1	0	0	0	0	0	0	0	0	0	0	93.37	-
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
4:00	6	5	1	0	0	0	0	0	0	0	0	0	0	0	86.87	-
5:00	8	6	1	1	0	0	0	0	0	0	0	0	0	0	86.30	-
6:00	25	12	1	7	0	0	0	0	0	5	0	0	0	0	88.23	-
7:00	43	29	0	10	0	0	0	1	0	3	0	0	0	0	81.93	97.49
8:00	30	14	0	10	0	0	1	0	0	5	0	0	0	0	75.10	-
9:00	57	31	5	15	3	0	1	1	0	1	0	0	0	0	69.35	82.42
10:00	68	38	7	14	3	0	2	0	0	4	0	0	0	0	76.40	93.51
11:00	49	29	5	13	0	0	2	0	0	0	0	0	0	0	84.33	93.44
12:00	41	25	5	7	1	0	1	0	0	2	0	0	0	0	81.75	91.80
13:00	38	25	1	10	0	0	0	0	0	2	0	0	0	0	89.28	101.20
14:00	36	25	1	8	0	0	2	0	0	0	0	0	0	0	90.33	99.00
15:00	25	18	2	5	0	0	0	0	0	0	0	0	0	0	91.23	-
16:00	34	25	0	8	0	0	0	1	0	0	0	0	0	0	88.78	96.24
17:00	32	27	0	4	0	0	0	1	0	0	0	0	0	0	90.10	102.60
18:00	19	16	0	3	0	0	0	0	0	0	0	0	0	0	96.28	-
19:00	15	11	1	2	0	0	0	0	0	0	1	0	0	0	91.80	-
20:00	9	6	0	3	0	0	0	0	0	0	0	0	0	0	97.07	-
21:00	6	5	1	0	0	0	0	0	0	0	0	0	0	0	91.80	-
22:00	9	5	0	3	0	0	0	0	1	0	0	0	0	0	89.28	-
23:00	8	6	0	2	0	0	0	0	0	0	0	0	0	0	87.55	-
Total	**564**	**363**	**31**	**126**	**7**	**0**	**9**	**4**	**1**	**22**	**1**	**0**	**0**	**0**	**87.16**	**95.30**
	Light	70%	Heavy	30%												

2 Italia Rd: 300m West of Pacific Hwy [90] Westbound 0

Sunday, 27 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	7	6	0	1	0	0	0	0	0	0	0	0	0	0	87.40	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	87.30	-
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
4:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	84.80	-
5:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	94.90	-
6:00	4	2	0	2	0	0	0	0	0	0	0	0	0	0	88.70	-
7:00	7	6	1	0	0	0	0	0	0	0	0	0	0	0	86.88	-
8:00	40	21	3	13	0	0	3	0	0	0	0	0	0	0	79.25	87.63
9:00	100	47	14	31	0	0	8	0	0	0	0	0	0	0	73.00	90.36
10:00	81	44	8	22	0	0	5	2	0	0	0	0	0	0	78.98	95.42
11:00	67	48	7	8	0	0	1	2	0	1	0	0	0	0	84.75	105.04
12:00	52	36	6	9	0	0	1	0	0	0	0	0	0	0	88.75	97.96
13:00	46	36	1	9	0	0	0	0	0	0	0	0	0	0	89.58	100.44
14:00	63	46	2	12	0	0	3	0	0	0	0	0	0	0	84.95	95.47
15:00	72	51	6	14	0	0	0	1	0	0	0	0	0	0	88.60	100.20
16:00	37	26	2	8	0	0	1	0	0	0	0	0	0	0	93.48	104.40
17:00	46	35	1	9	0	0	1	0	0	0	0	0	0	0	91.13	103.92
18:00	23	20	0	1	0	0	1	0	0	1	0	0	0	0	94.30	-
19:00	16	13	0	3	0	0	0	0	0	0	0	0	0	0	93.93	-
20:00	10	6	1	3	0	0	0	0	0	0	0	0	0	0	84.60	-
21:00	7	2	0	4	0	0	0	0	0	1	0	0	0	0	86.33	-
22:00	5	5	0	0	0	0	0	0	0	0	0	0	0	0	94.55	-
23:00	3	3	0	0	0	0	0	0	0	0	0	0	0	0	88.75	-
Total	**691**	**458**	**52**	**149**	**0**	**0**	**24**	**5**	**0**	**3**	**0**	**0**	**0**	**0**	**87.49**	**98.08**
	Light	74%	Heavy	26%												

Monday, 28 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	100.50	-
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	56.30	-
3:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0	72.55	-
4:00	11	8	0	2	0	0	1	0	0	0	0	0	0	0	88.95	-
5:00	32	19	0	12	0	0	0	0	0	0	1	0	0	0	92.15	95.80
6:00	49	26	0	16	4	0	1	0	0	0	2	0	0	0	88.18	101.80
7:00	35	21	1	6	0	0	1	1	1	3	1	0	0	0	89.05	95.00
8:00	45	26	1	12	1	0	0	0	2	2	1	0	0	0	82.23	92.39
9:00	47	16	1	14	4	0	1	1	0	8	2	0	0	0	84.80	96.73
10:00	43	21	2	3	2	0	1	1	0	7	6	0	0	0	80.28	94.93
11:00	34	16	1	8	3	1	0	0	0	4	1	0	0	0	83.83	-
12:00	49	25	2	7	2	0	2	0	0	6	5	0	0	0	83.08	91.75
13:00	47	16	3	17	3	1	1	0	0	5	1	0	0	0	81.88	98.68
14:00	48	19	4	14	0	0	0	0	3	3	4	1	0	0	79.95	98.99
15:00	50	20	3	14	1	0	0	0	0	10	2	0	0	0	86.95	103.76
16:00	40	29	1	6	0	0	0	0	1	2	1	0	0	0	88.23	97.63
17:00	44	28	1	12	0	0	0	0	0	1	2	0	0	0	90.80	101.29
18:00	23	18	0	4	0	0	0	1	0	0	0	0	0	0	100.00	101.20
19:00	11	10	0	1	0	0	0	0	0	0	0	0	0	0	90.35	-
20:00	15	10	0	4	1	0	0	0	0	0	0	0	0	0	91.60	-
21:00	6	5	0	1	0	0	0	0	0	0	0	0	0	0	94.30	-
22:00	9	8	0	1	0	0	0	0	0	0	0	0	0	0	89.58	-
23:00	4	1	0	1	0	0	0	0	0	2	0	0	0	0	83.10	-
Total	**647**	**346**	**20**	**156**	**21**	**2**	**8**	**4**	**7**	**53**	**29**	**1**	**0**	**0**	**86.03**	**97.69**
	Light	57%	Heavy	43%												

Tuesday, 29 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	106.60	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	93.40	-
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
3:00	4	2	0	2	0	0	0	0	0	0	0	0	0	0	72.47	-
4:00	8	5	0	3	0	0	0	0	0	0	0	0	0	0	84.70	-
5:00	31	20	1	9	0	0	0	0	0	0	1	0	0	0	92.48	97.05
6:00	44	19	1	17	2	0	1	0	0	2	2	0	0	0	84.30	93.71
7:00	62	34	2	13	3	0	1	1	0	5	3	0	0	0	82.03	96.50
8:00	52	29	0	14	0	0	2	0	0	7	0	0	0	0	84.15	95.84
9:00	33	19	1	5	4	0	0	0	0	1	3	0	0	0	83.78	-
10:00	40	18	1	8	5	0	0	0	0	6	2	0	0	0	82.30	95.41
11:00	34	16	1	8	3	0	0	0	0	4	2	0	0	0	88.13	96.80
12:00	35	15	2	8	3	0	1	0	0	3	3	0	0	0	81.15	91.80
13:00	40	15	2	7	5	0	1	0	1	4	5	0	0	0	82.28	88.90
14:00	43	20	1	9	5	0	1	0	0	5	2	0	0	0	87.43	99.93
15:00	64	30	4	12	4	0	0	1	0	9	4	0	0	0	84.28	99.72
16:00	47	26	3	16	0	0	0	0	0	0	2	0	0	0	93.50	100.00
17:00	31	22	2	6	0	0	0	0	0	1	0	0	0	0	87.55	100.81
18:00	26	18	1	6	0	0	0	1	0	0	0	0	0	0	92.33	-
19:00	11	9	0	2	0	0	0	0	0	0	0	0	0	0	93.15	-
20:00	10	7	0	2	0	0	0	1	0	0	0	0	0	0	96.55	-
21:00	9	7	0	1	0	0	0	1	0	0	0	0	0	0	89.85	-
22:00	6	6	0	0	0	0	0	0	0	0	0	0	0	0	96.53	-
23:00	8	4	0	2	0	0	0	0	0	0	2	0	0	0	86.20	-
Total	**640**	**343**	**22**	**150**	**34**	**0**	**7**	**5**	**1**	**47**	**31**	**0**	**0**	**0**	**88.05**	**96.37**
	Light	57%	Heavy	43%												

2 Italia Rd: 300m West of Pacific Hwy [90] Westbound 0

Wednesday, 30 November 2016

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	103.30	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	102.40	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	86.70	-
3:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	73.90	-
4:00	8	7	0	1	0	0	0	0	0	0	0	0	0	0	88.75	-
5:00	37	21	0	11	0	1	1	0	0	1	2	0	0	0	86.83	102.20
6:00	41	14	1	15	5	0	0	0	1	4	1	0	0	0	83.83	99.00
7:00	49	27	3	8	2	0	0	0	0	8	1	0	0	0	87.98	97.50
8:00	43	23	1	7	4	0	3	0	0	3	2	0	0	0	84.75	93.50
9:00	41	25	0	4	4	0	1	0	0	6	1	0	0	0	85.63	96.39
10:00	42	18	2	10	3	1	0	0	0	3	5	0	0	0	86.30	96.22
11:00	41	23	2	7	2	0	1	0	0	5	1	0	0	0	90.43	99.07
12:00	39	13	2	8	4	0	1	0	0	7	4	0	0	0	80.30	96.65
13:00	39	19	3	3	6	0	0	0	0	7	1	0	0	0	87.23	102.20
14:00	25	8	0	5	2	0	1	0	0	4	5	0	0	0	77.18	-
15:00	49	25	2	10	1	0	2	0	0	5	4	0	0	0	85.38	101.84
16:00	48	29	0	13	1	0	1	0	0	2	1	0	0	1	87.73	100.62
17:00	43	34	2	5	1	0	0	0	0	1	0	0	0	0	91.35	98.70
18:00	27	21	1	5	0	0	0	0	0	0	0	0	0	0	92.73	100.40
19:00	9	9	0	0	0	0	0	0	0	0	0	0	0	0	85.83	-
20:00	7	6	0	1	0	0	0	0	0	0	0	0	0	0	92.07	-
21:00	5	2	0	3	0	0	0	0	0	0	0	0	0	0	96.20	-
22:00	5	4	0	1	0	0	0	0	0	0	0	0	0	0	99.37	-
23:00	6	4	0	2	0	0	0	0	0	0	0	0	0	0	98.70	-
Total	**609**	**337**	**19**	**119**	**35**	**2**	**11**	**0**	**1**	**56**	**28**	**0**	**0**	**1**	**88.95**	**98.79**
	Light	58%	Heavy	42%												

2 Italia Rd: 300m West of Pacific Hwy [90] Westbound 0

Weekday Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	96.10	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	92.63	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	81.35	-
3:00	3	1	0	1	0	0	0	0	0	0	0	0	0	0	76.79	-
4:00	10	8	0	2	0	0	0	0	0	0	0	0	0	0	85.35	-
5:00	30	18	0	10	0	0	0	0	0	0	1	0	0	0	90.20	98.16
6:00	45	20	0	14	4	0	0	0	0	4	2	0	0	0	85.66	97.69
7:00	46	26	2	9	2	0	1	1	0	4	1	0	0	0	85.61	97.17
8:00	48	27	1	9	2	0	2	0	0	5	2	0	0	0	83.44	93.81
9:00	40	22	1	7	4	0	0	0	0	5	1	0	0	0	85.56	97.04
10:00	48	22	2	9	4	0	0	0	0	6	4	0	0	0	83.00	96.18
11:00	39	18	2	6	4	0	0	0	0	6	2	0	0	0	84.82	95.75
12:00	43	20	2	7	3	0	1	0	0	6	4	0	0	0	82.58	94.14
13:00	43	16	2	9	5	0	1	0	0	7	3	0	0	0	83.24	96.83
14:00	40	17	2	8	2	0	1	0	1	5	3	0	0	0	83.29	101.46
15:00	55	25	3	13	2	0	1	0	0	7	4	0	0	0	85.95	101.01
16:00	52	32	1	15	0	0	1	0	0	1	1	0	0	0	90.09	101.21
17:00	45	31	2	9	1	0	0	0	0	1	1	0	0	0	89.19	101.32
18:00	27	21	1	5	0	0	0	0	0	0	0	0	0	0	94.91	100.80
19:00	16	13	0	3	0	0	0	0	0	0	0	0	0	0	90.60	101.20
20:00	10	6	0	3	0	0	0	0	0	0	0	0	0	0	92.61	-
21:00	8	6	0	1	0	0	0	0	0	0	0	0	0	0	90.96	-
22:00	8	7	0	1	0	0	0	0	0	0	0	0	0	0	92.20	-
23:00	8	5	0	1	0	0	0	0	0	1	1	0	0	0	88.04	-
Total	**666**	**363**	**21**	**143**	**33**	**1**	**9**	**4**	**3**	**59**	**30**	**0**	**0**	**0**	**87.20**	**101.71**
	Light	58%	Heavy	42%												

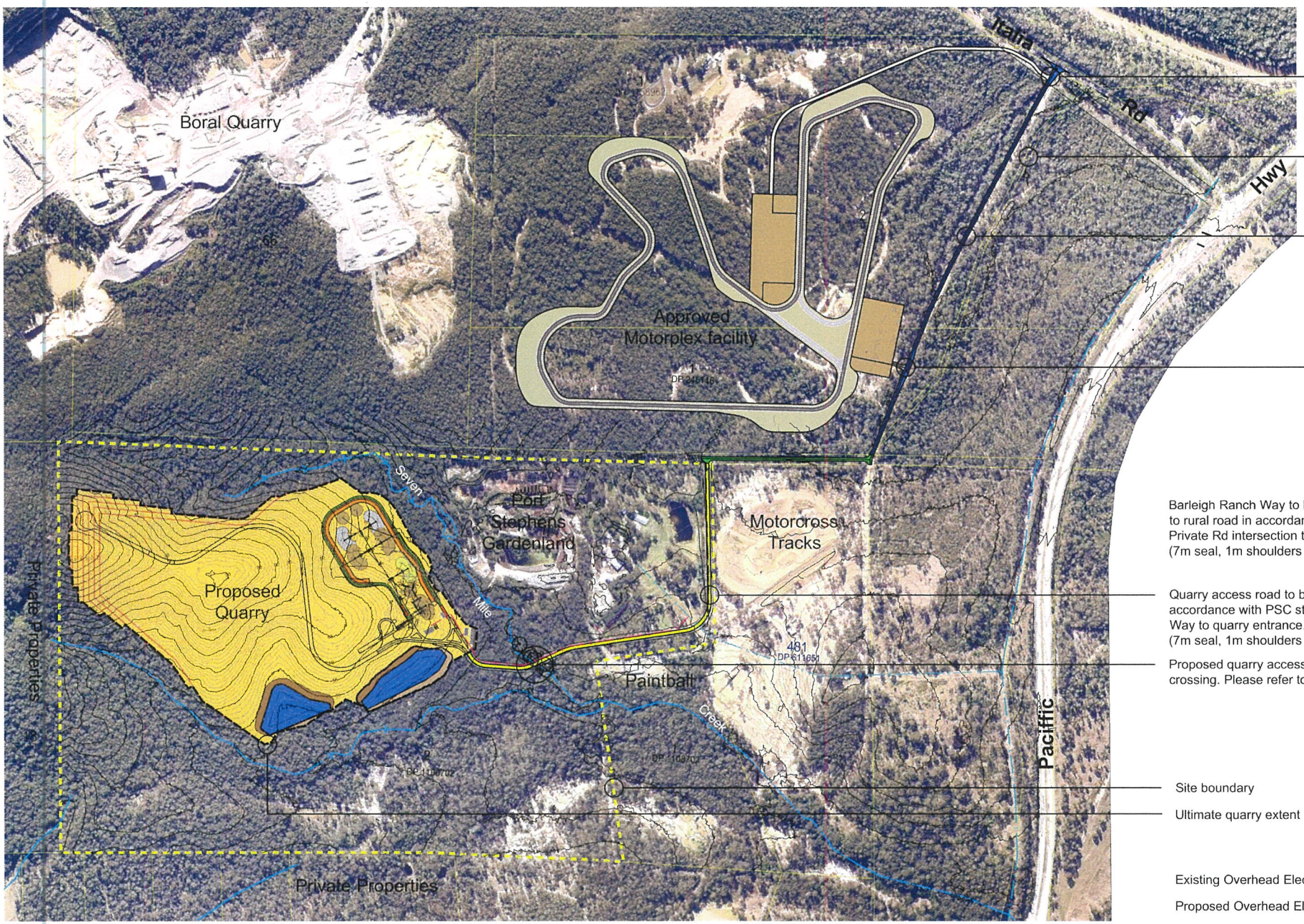
Weekend Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	4	4	0	1	0	0	0	0	0	0	0	0	0	0	88.90	-
1:00	3	2	0	1	0	0	0	0	0	0	0	0	0	0	93.37	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	87.30	-
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
4:00	4	3	1	0	0	0	0	0	0	0	0	0	0	0	85.83	-
5:00	5	4	1	1	0	0	0	0	0	0	0	0	0	0	90.60	-
6:00	15	7	1	5	0	0	0	0	0	3	0	0	0	0	88.46	-
7:00	25	18	1	5	0	0	0	1	0	2	0	0	0	0	84.40	97.49
8:00	35	18	2	12	0	0	2	0	0	3	0	0	0	0	77.18	87.63
9:00	79	39	10	23	2	0	5	1	0	1	0	0	0	0	71.18	86.39
10:00	75	41	8	18	2	0	4	1	0	2	0	0	0	0	77.69	94.46
11:00	58	39	6	11	0	0	2	1	0	1	0	0	0	0	84.54	99.24
12:00	47	31	6	8	1	0	1	0	0	1	0	0	0	0	85.25	94.88
13:00	42	31	1	10	0	0	0	0	0	1	0	0	0	0	89.43	100.82
14:00	50	36	2	10	0	0	3	0	0	0	0	0	0	0	87.64	97.24
15:00	49	35	4	10	0	0	0	1	0	0	0	0	0	0	89.91	100.20
16:00	36	26	1	8	0	0	1	1	0	0	0	0	0	0	91.13	100.32
17:00	39	31	1	7	0	0	1	1	0	0	0	0	0	0	90.61	103.26
18:00	21	18	0	2	0	0	1	0	0	1	0	0	0	0	95.29	-
19:00	16	12	1	3	0	0	0	0	0	0	1	0	0	0	92.86	-
20:00	10	6	1	3	0	0	0	0	0	0	0	0	0	0	90.83	-
21:00	7	4	1	2	0	0	0	0	0	1	0	0	0	0	89.06	-
22:00	7	5	0	2	0	0	0	0	1	0	0	0	0	0	91.91	-
23:00	6	5	0	1	0	0	0	0	0	0	0	0	0	0	88.15	-
Total	**628**	**411**	**42**	**138**	**4**	**0**	**17**	**5**	**1**	**13**	**1**	**0**	**0**	**0**	**87.33**	**102.50**
	Light	72%	Heavy	28%												

7-Day Average

Time	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	Mean	85th Percentile
0:00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	94.04	-
1:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	92.82	-
2:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	82.54	-
3:00	2	1	0	1	0	0	0	0	0	0	0	0	0	0	76.79	-
4:00	8	6	0	1	0	0	0	0	0	0	0	0	0	0	85.49	-
5:00	23	14	0	7	0	0	0	0	0	0	1	0	0	0	90.31	98.16
6:00	36	16	0	11	3	0	0	0	0	4	1	0	0	0	86.46	97.69
7:00	40	23	1	8	2	0	1	1	0	4	1	0	0	0	85.26	97.22
8:00	44	24	1	10	1	0	2	0	0	5	1	0	0	0	81.65	92.78
9:00	51	27	4	12	3	0	2	0	0	4	1	0	0	0	81.45	93.49
10:00	56	28	3	12	3	0	1	1	0	5	3	0	0	0	81.48	95.69
11:00	44	24	3	7	3	0	1	0	0	4	1	0	0	0	84.74	96.91
12:00	44	23	3	7	2	0	1	0	0	4	3	0	0	0	83.34	94.35
13:00	43	20	2	9	3	0	0	0	0	5	2	0	0	0	85.01	97.97
14:00	43	23	2	9	2	0	1	0	0	4	2	0	0	0	84.53	100.05
15:00	53	28	3	12	1	0	0	0	0	5	3	0	0	0	87.08	100.87
16:00	47	30	1	13	0	0	1	0	0	1	1	0	0	0	90.39	100.95
17:00	43	31	2	8	1	0	0	0	0	1	0	0	0	0	89.59	101.87
18:00	25	20	1	4	0	0	0	0	0	0	0	0	0	0	95.01	100.80
19:00	16	13	0	3	0	0	0	0	0	0	0	0	0	0	91.24	101.20
20:00	10	6	0	3	0	0	0	0	0	0	0	0	0	0	92.10	-
21:00	8	5	0	2	0	0	0	0	0	0	0	0	0	0	90.42	-
22:00	8	6	0	1	0	0	0	0	0	0	0	0	0	0	92.12	-
23:00	7	5	0	1	0	0	0	0	0	1	0	0	0	0	88.07	-
Total	**655**	**376**	**27**	**142**	**24**	**1**	**11**	**4**	**3**	**46**	**21**	**0**	**0**	**0**	**87.24**	**101.94**
	Light	62%	Heavy	38%												

Appendix C – Eagleton quarry and access proposals



Proposed Italia Rd intersection and Motorplex entrance
Refer Sheet 13 & 14 Fisher Engineering Plans for details

Existing right of way to be reestablished over existing physical works and proposed works.

Existing right of way to be reconstructed and improved to "private" rural road to PSC standards from Italia Rd to Barleigh Ranch Way intersection.
(7m seal, 1m shoulders plus table drains as required).

Proposed right turn lane to be incorporated into private access road reconstruction to provide secondary access to Motorplex site.

Barleigh Ranch Way to be reconstructed and improved to rural road in accordance with PSC standards from Private Rd intersection to quarry access road.
(7m seal, 1m shoulders plus table drains as required).

Quarry access road to be constructed to rural road in accordance with PSC standards from Barleigh Ranch Way to quarry entrance.
(7m seal, 1m shoulders plus table drains as required).

Proposed quarry access road single lane bridge crossing. Please refer to bridge detail sheet.

Site boundary

Ultimate quarry extent

Existing Overhead Electrical —— E ——

Proposed Overhead Electrical —— E ——

PROJECT NUMBER: Eagleton Quarry				
FILE NAME: Eagleton Plans 20161205.dwg				
DATUM: ____	05/12/2016	DoP Application	MT	A
CONTOUR INTERVAL: ____	DATE	DESCRIPTION	DRAWN	REVISION

0 75 150 225 300 375m

Scale 1:7,500 A3

Project No:	Eagleton Quarry
Suburb:	Eagleton
Street:	13 Barleigh Ranch Way
Lot & DP:	Lot 2 DP1108702

Dwg Title:	Proposed Rock Quarry
Sheet Title:	Proposed Infrastructure
Number of Sheets:	1
Sheet Number:	1

Eagleton
Rock Syndicate Pty ltd

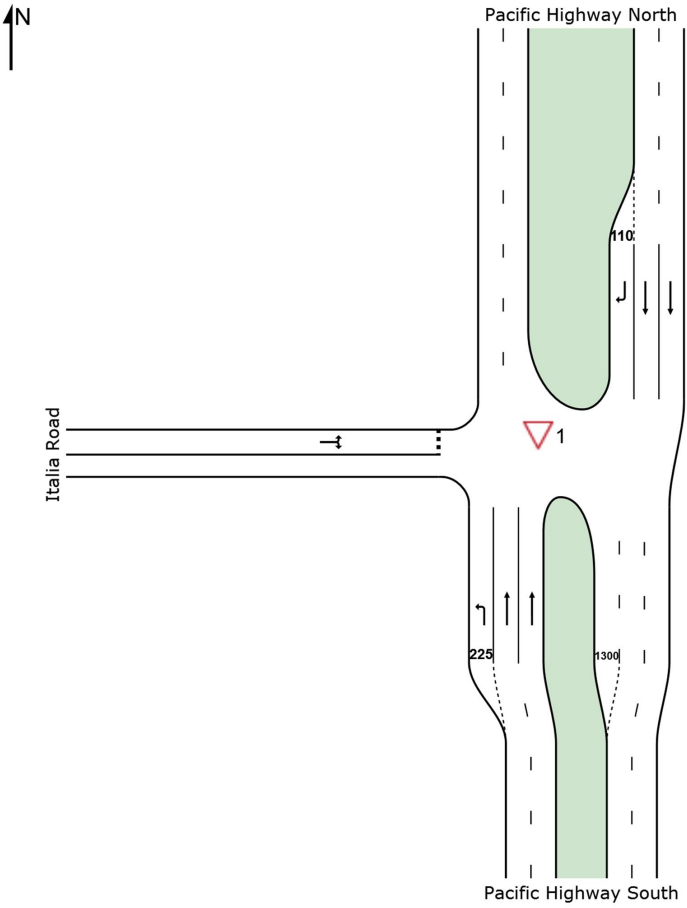
Appendix D – SIDRA analysis outputs and alternative modelling scenarios

- Intersection modelling outputs from SIDRA
- Alternative modelling scenarios and intersection performance comparison
- Alternative 1 modelling outputs from SIDRA
- Alternative 2 modelling outputs from SIDRA

SIDRA Analysis – Baseline modelling
100% Heavy vehicles

Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)



Organisation: GHD SERVICES PTY LTD | Created: Wednesday, 2 August 2017 3:37:20 PM
Project: G:\22\18208\Technical\SIDRA\Italia Road intersection REVB.sip7

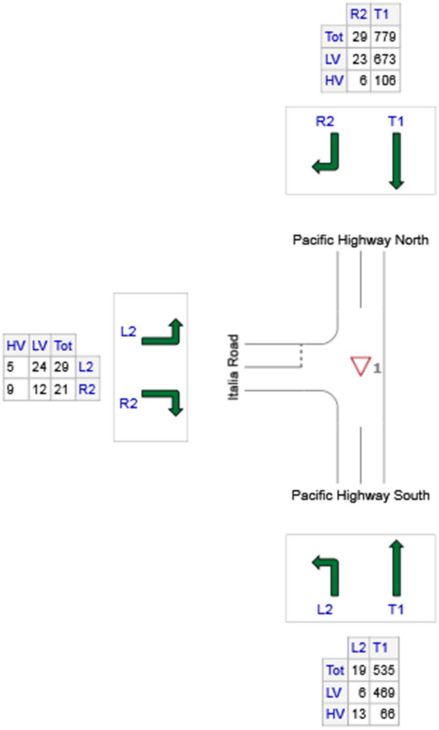
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	554	475	79
N: Pacific Highway North	808	696	112
W: Italia Road	50	36	14
Total	1412	1207	205

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	20	68.4	0.016	10.3	LOS A	0.0	0.0	0.00	0.67	75.3
2	T1	563	12.3	0.153	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		583	14.3	0.153	0.4	NA	0.0	0.0	0.00	0.02	98.8
North: Pacific Highway North											
8	T1	820	13.6	0.224	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	31	20.7	0.048	12.2	LOS A	0.2	1.5	0.55	0.77	61.0
Approach		851	13.9	0.224	0.5	NA	0.2	1.5	0.02	0.03	98.9
West: Italia Road											
10	L2	31	17.2	0.129	12.7	LOS A	0.5	4.2	0.64	0.87	58.4
12	R2	22	42.9	0.129	19.7	LOS B	0.5	4.2	0.64	0.87	75.1
Approach		53	28.0	0.129	15.6	LOS B	0.5	4.2	0.64	0.87	68.1
All Vehicles		1486	14.5	0.224	1.0	NA	0.5	4.2	0.03	0.06	97.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

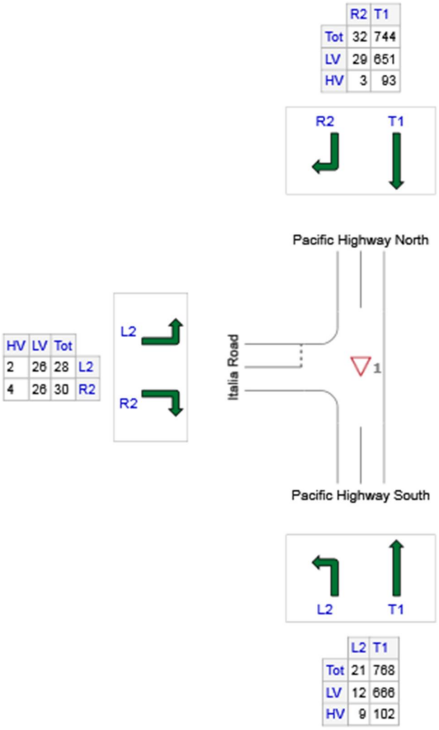
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	789	678	111
N: Pacific Highway North	776	680	96
W: Italia Road	58	52	6
Total	1623	1410	213

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	22	42.9	0.015	9.4	LOS A	0.0	0.0	0.00	0.67	79.6
2	T1	808	13.3	0.221	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		831	14.1	0.221	0.3	NA	0.0	0.0	0.00	0.02	99.2
North: Pacific Highway North											
8	T1	783	12.5	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	34	9.4	0.069	14.1	LOS A	0.2	1.9	0.66	0.88	62.0
Approach		817	12.4	0.213	0.6	NA	0.2	1.9	0.03	0.04	98.8
West: Italia Road											
10	L2	29	7.1	0.203	16.0	LOS B	0.8	5.8	0.78	0.93	56.4
12	R2	32	13.3	0.203	23.7	LOS B	0.8	5.8	0.78	0.93	75.4
Approach		61	10.3	0.203	20.0	LOS B	0.8	5.8	0.78	0.93	69.0
All Vehicles		1708	13.1	0.221	1.2	NA	0.8	5.8	0.04	0.06	97.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

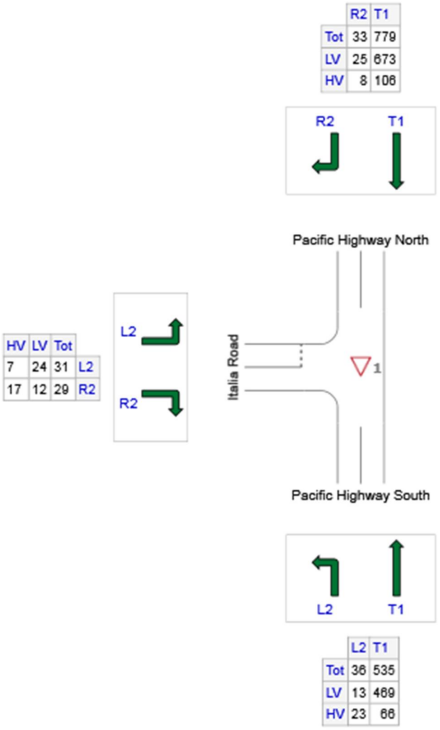
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	571	482	89
N: Pacific Highway North	812	698	114
W: Italia Road	60	36	24
Total	1443	1216	227

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	38	63.9	0.029	10.2	LOS A	0.0	0.0	0.00	0.67	76.0
2	T1	563	12.3	0.153	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		601	15.6	0.153	0.7	NA	0.0	0.0	0.00	0.04	98.0
North: Pacific Highway North											
8	T1	820	13.6	0.224	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	35	24.2	0.058	12.7	LOS A	0.2	1.8	0.57	0.79	59.6
Approach		855	14.0	0.224	0.5	NA	0.2	1.8	0.02	0.03	98.7
West: Italia Road											
10	L2	33	22.6	0.182	13.4	LOS A	0.7	6.5	0.69	0.89	55.4
12	R2	31	58.6	0.182	22.9	LOS B	0.7	6.5	0.69	0.89	72.2
Approach		63	40.0	0.182	18.0	LOS B	0.7	6.5	0.69	0.89	66.1
All Vehicles		1519	15.7	0.224	1.3	NA	0.7	6.5	0.04	0.07	97.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

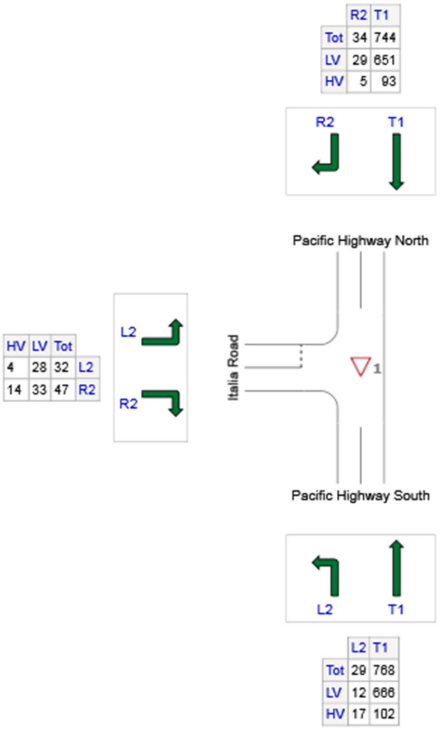
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	797	678	119
N: Pacific Highway North	778	680	98
W: Italia Road	79	61	18
Total	1654	1419	235

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	31	58.6	0.023	10.0	LOS A	0.0	0.0	0.00	0.67	76.9
2	T1	808	13.3	0.221	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		839	14.9	0.221	0.5	NA	0.0	0.0	0.00	0.02	98.8
North: Pacific Highway North											
8	T1	783	12.5	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	36	14.7	0.078	14.9	LOS B	0.3	2.2	0.68	0.89	59.9
Approach		819	12.6	0.213	0.7	NA	0.3	2.2	0.03	0.04	98.7
West: Italia Road											
10	L2	34	12.5	0.339	19.3	LOS B	1.4	11.9	0.83	0.98	50.6
12	R2	49	29.8	0.339	31.2	LOS C	1.4	11.9	0.83	0.98	70.1
Approach		83	22.8	0.339	26.4	LOS B	1.4	11.9	0.83	0.98	64.7
All Vehicles		1741	14.2	0.339	1.8	NA	1.4	11.9	0.05	0.08	96.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

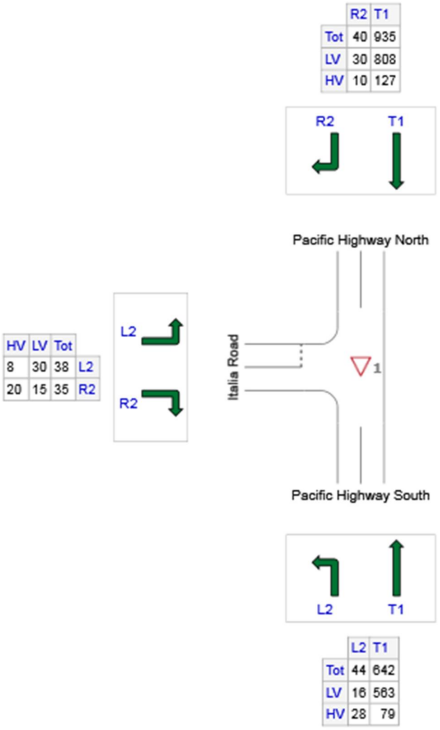
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	686	579	107
N: Pacific Highway North	975	838	137
W: Italia Road	73	45	28
Total	1734	1462	272

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	46	63.6	0.036	10.2	LOS A	0.0	0.0	0.00	0.67	76.1
2	T1	676	12.3	0.183	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		722	15.6	0.183	0.7	NA	0.0	0.0	0.00	0.04	97.9
North: Pacific Highway North											
8	T1	984	13.6	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	42	25.0	0.085	14.3	LOS A	0.3	2.6	0.63	0.87	57.9
Approach		1026	14.1	0.269	0.6	NA	0.3	2.6	0.03	0.04	98.6
West: Italia Road											
10	L2	40	21.1	0.283	16.7	LOS B	1.2	10.8	0.78	0.95	51.4
12	R2	37	57.1	0.283	30.6	LOS C	1.2	10.8	0.78	0.95	69.3
Approach		77	38.4	0.283	23.4	LOS B	1.2	10.8	0.78	0.95	62.7
All Vehicles		1825	15.7	0.283	1.6	NA	1.2	10.8	0.05	0.08	96.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

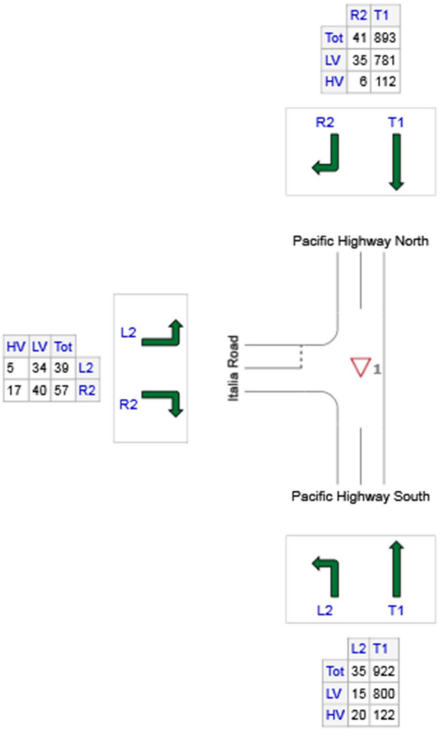
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	957	815	142
N: Pacific Highway North	934	816	118
W: Italia Road	96	74	22
Total	1987	1705	282

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	37	57.1	0.027	9.9	LOS A	0.0	0.0	0.00	0.67	77.1
2	T1	971	13.2	0.265	0.1	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		1007	14.8	0.265	0.5	NA	0.0	0.0	0.00	0.02	98.8
North: Pacific Highway North											
8	T1	940	12.5	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	43	14.6	0.124	17.9	LOS B	0.4	3.4	0.77	0.92	57.1
Approach		983	12.6	0.255	0.8	NA	0.4	3.4	0.03	0.04	98.5
West: Italia Road											
10	L2	41	12.8	0.608	34.7	LOS C	2.9	23.9	0.93	1.09	39.5
12	R2	60	29.8	0.608	54.7	LOS D	2.9	23.9	0.93	1.09	60.6
Approach		101	22.9	0.608	46.5	LOS D	2.9	23.9	0.93	1.09	54.4
All Vehicles		2092	14.2	0.608	2.9	NA	2.9	23.9	0.06	0.08	95.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

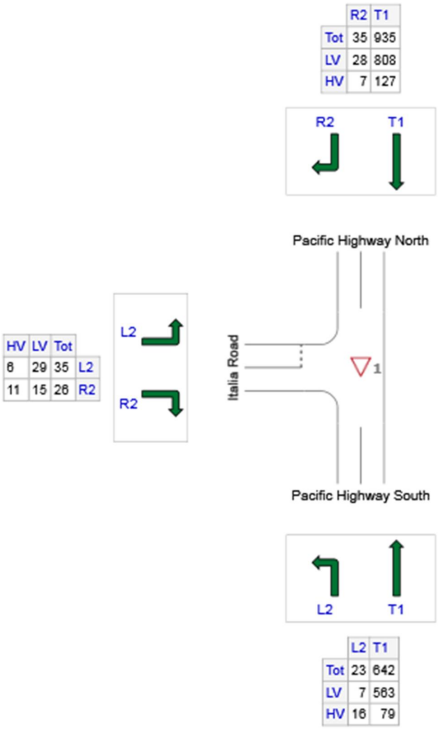
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	665	570	95
N: Pacific Highway North	970	836	134
W: Italia Road	61	44	17
Total	1696	1450	246

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	24	69.6	0.019	10.4	LOS A	0.0	0.0	0.00	0.67	75.1
2	T1	676	12.3	0.183	0.1	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		700	14.3	0.183	0.4	NA	0.0	0.0	0.00	0.02	98.8
North: Pacific Highway North											
8	T1	984	13.6	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	37	20.0	0.068	13.5	LOS A	0.2	2.0	0.60	0.84	59.9
Approach		1021	13.8	0.269	0.5	NA	0.2	2.0	0.02	0.03	98.8
West: Italia Road											
10	L2	37	17.1	0.198	14.6	LOS B	0.7	6.4	0.73	0.91	55.5
12	R2	27	42.3	0.198	24.6	LOS B	0.7	6.4	0.73	0.91	73.2
Approach		64	27.9	0.198	18.9	LOS B	0.7	6.4	0.73	0.91	65.8
All Vehicles		1785	14.5	0.269	1.1	NA	0.7	6.4	0.04	0.06	97.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

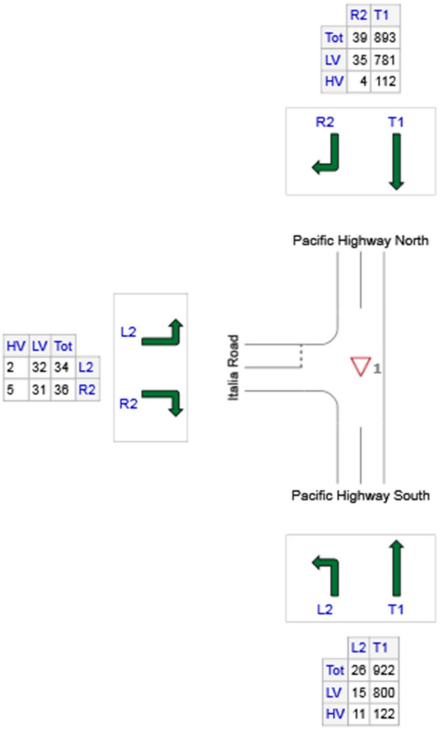
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Pacific Highway South	948	815	133
N: Pacific Highway North	932	816	116
W: Italia Road	70	63	7
Total	1950	1694	256

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	27	42.3	0.019	9.4	LOS A	0.0	0.0	0.00	0.66	79.7
2	T1	971	13.2	0.265	0.1	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		998	14.0	0.265	0.4	NA	0.0	0.0	0.00	0.02	99.1
North: Pacific Highway North											
8	T1	940	12.5	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	41	10.3	0.110	17.0	LOS B	0.4	2.9	0.75	0.92	58.9
Approach		981	12.4	0.255	0.7	NA	0.4	2.9	0.03	0.04	98.6
West: Italia Road											
10	L2	36	5.9	0.347	22.4	LOS B	1.4	10.4	0.87	0.99	49.6
12	R2	38	13.9	0.347	35.6	LOS C	1.4	10.4	0.87	0.99	69.9
Approach		74	10.0	0.347	29.2	LOS C	1.4	10.4	0.87	0.99	62.8
All Vehicles		2053	13.1	0.347	1.6	NA	1.4	10.4	0.05	0.06	97.4

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Alternative modelling scenarios and intersection performance

In addition to the initial modelling for the Italia Road intersection as outlined in Section 4.1 and detailed above, the modelling has been reviewed and tested against a number of other input parameters. Subsequent to interim commentary from Roads and Maritime on the assumed modelling parameters and resultant analysis, the modelling was been revisited to test potential changes as follows:

- Alternative 1: Utilise the 'large vehicle' setting in SIDRA for all heavy vehicles instead of the standard heavy vehicle parameter. Included within this alternative was the provision of a 3% upgrade on the Italia Road approach to the Pacific Highway.
- Alternative 2: Utilise the 'large vehicle' setting in SIDRA for 50% of heavy vehicle numbers (the remaining staying as standard heavy vehicles) and the provision of a 3% upgrade on Italia Road.

Results for these alternative test scenarios, for the right turn out movement only, are shown in Table D1.

Table D1 Intersection modelling – alternative scenarios

Situation	Italia Road right turn out Model Alternative 1			Italia Road right turn out Model Alternative 2		
	LoS	Delay (secs)	Vehicle queue	LoS	Delay (secs)	Vehicle queue
Existing AM peak	D	44	1	B	27	1
Existing PM peak	C	41	1	C	31	1
With development AM peak 2016	F	81	2	C	39	1
With development PM peak 2016	F	128	5	D	53	2
No development AM peak 2026	F	73	2	C	39	1
No development PM peak 2026	F	85	3	D	50	2
With development AM peak 2026	F	235	8	E	64	2
With development PM peak 2026	F	379	19	F	192	9

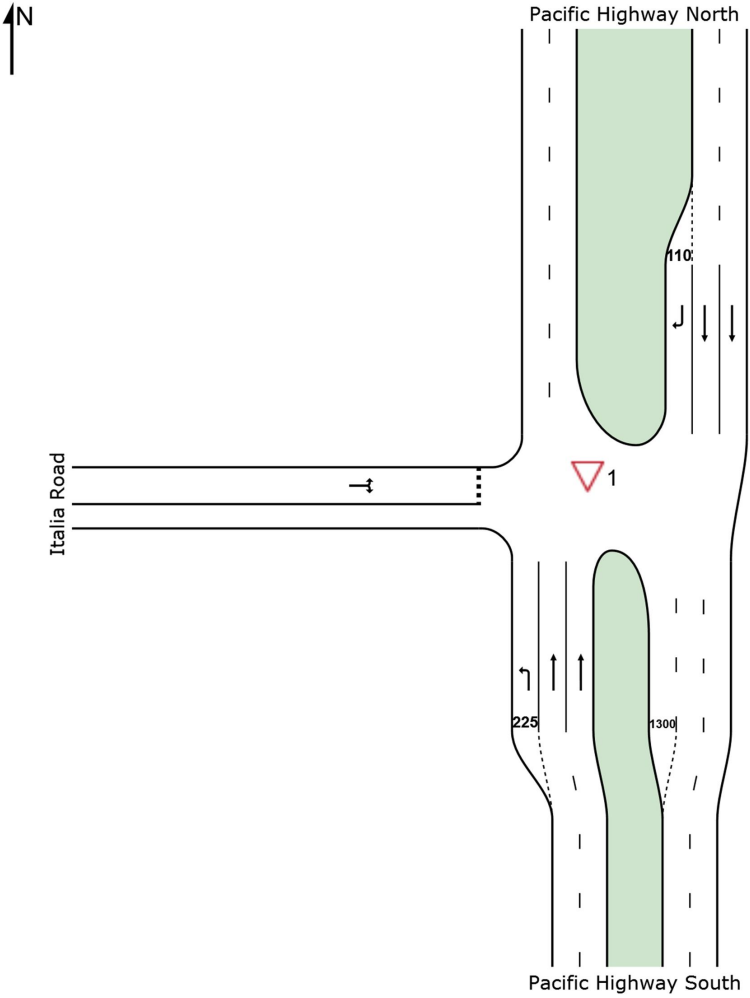
The results provided in Table D1 show a deterioration of the expected intersection performance when using the Alternative 1 modelling parameters – LoS F in all scenarios other than the existing peak periods. Average delays of between 1 and 6 minutes are predicted, with queues of up to 19 vehicles across the modelled future events. The predicted delays and queue lengths are generally reduced using the Alternative 2 setting as expected, with the modelled performance at reasonable LoS for all scenarios other than the PM peak post development 2026 which remains as LoS F with a predicted queue of 9 vehicles.

The results for the Alternative 1 scenarios represent a significant departure from the original modelling outputs in Table 4-1 for the same configuration of Italia Road. It is suggested that the large vehicle setting in SIDRA causes a potential exaggeration of delays and queue lengths. This is best demonstrated in the results for the existing AM peak scenario when compared to actual delay surveys undertaken in April 2017, as shown in Table 2-3. Average delays in the existing AM peak 44 seconds for Alternative 1, compared to 20 seconds in the survey, show that Alternative 1 is the least accurate base from which to model other future scenarios. On the other hand, the original modelling as outlined in Table 4-1 and Alternative 2 above (existing AM peak delays of 20 and 27 seconds respectively) provide a more appropriate basis on which to predict future performance.

SIDRA Analysis – Alternative 1
100% Large trucks

Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)



Organisation: GHD SERVICES PTY LTD | Created: Wednesday, 2 August 2017 4:25:21 PM
Project: G:\22\18208\Technical\SIDRA\LARGE TRUCKS\Italia Road intersection 100% LARGE TRUCKS.sip7

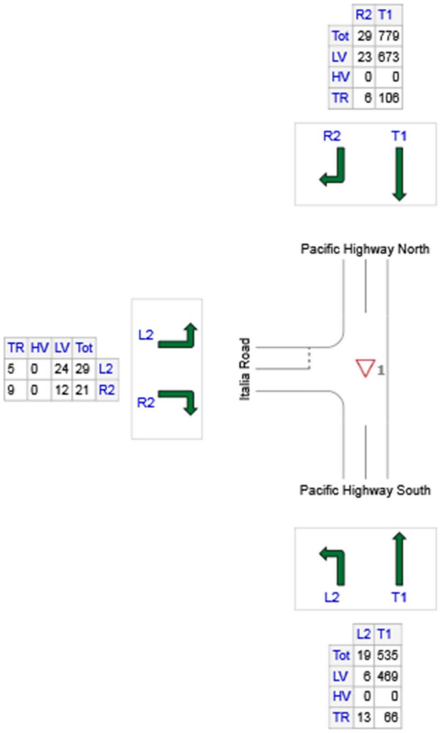
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	554	475	0	79
N: Pacific Highway North	808	696	0	112
W: Italia Road	50	36	0	14
Total	1412	1207	0	205

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	20	68.4	0.022	10.9	LOS A	0.0	0.0	0.00	0.67	54.7
2	T1	563	12.3	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		583	14.3	0.168	0.4	NA	0.0	0.0	0.00	0.02	97.1
North: Pacific Highway North											
8	T1	820	13.6	0.248	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	31	20.7	0.075	15.8	LOS B	0.3	2.9	0.65	0.87	58.1
Approach		851	13.9	0.248	0.6	NA	0.3	2.9	0.02	0.03	97.3
West: Italia Road											
10	L2	31	17.2	0.272	18.4	LOS B	1.1	12.8	0.81	0.96	47.4
12	R2	22	42.9	0.272	44.4	LOS D	1.1	12.8	0.81	0.96	43.5
Approach		53	28.0	0.272	29.3	LOS C	1.1	12.8	0.81	0.96	45.7
All Vehicles		1486	14.5	0.272	1.5	NA	1.1	12.8	0.04	0.06	93.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

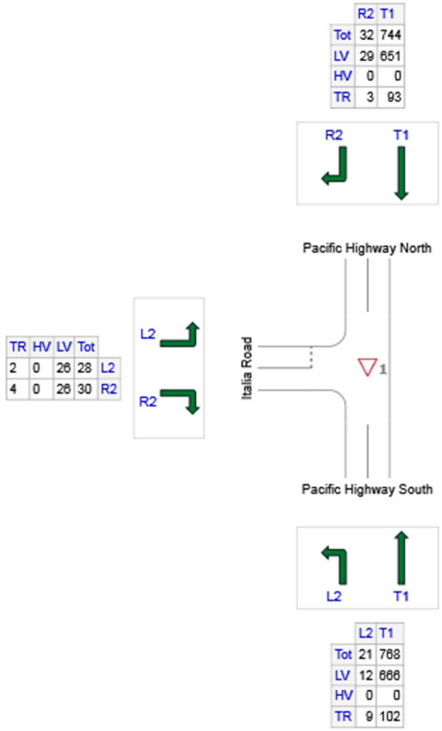
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	789	678	0	111
N: Pacific Highway North	776	680	0	96
W: Italia Road	58	52	0	6
Total	1623	1410	0	213

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	22	42.9	0.020	9.7	LOS A	0.0	0.0	0.00	0.67	59.3
2	T1	808	13.3	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		831	14.1	0.244	0.3	NA	0.0	0.0	0.00	0.02	98.0
North: Pacific Highway North											
8	T1	783	12.5	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	34	9.4	0.099	17.9	LOS B	0.3	3.0	0.75	0.92	58.0
Approach		817	12.4	0.234	0.8	NA	0.3	3.0	0.03	0.04	96.9
West: Italia Road											
10	L2	29	7.1	0.335	23.5	LOS B	1.3	11.5	0.87	0.99	47.0
12	R2	32	13.3	0.335	41.1	LOS C	1.3	11.5	0.87	0.99	45.8
Approach		61	10.3	0.335	32.6	LOS C	1.3	11.5	0.87	0.99	46.4
All Vehicles		1708	13.1	0.335	1.7	NA	1.3	11.5	0.05	0.06	93.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

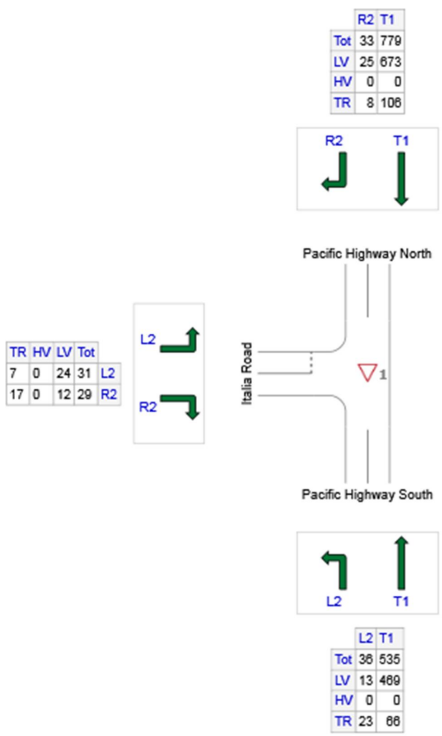
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	571	482	0	89
N: Pacific Highway North	812	698	0	114
W: Italia Road	60	36	0	24
Total	1443	1216	0	227

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	38	63.9	0.041	10.7	LOS A	0.0	0.0	0.00	0.67	53.9
2	T1	563	12.3	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		601	15.6	0.168	0.7	NA	0.0	0.0	0.00	0.04	94.8
North: Pacific Highway North											
8	T1	820	13.6	0.248	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	35	24.2	0.098	17.4	LOS B	0.4	4.0	0.69	0.89	54.7
Approach		855	14.0	0.248	0.7	NA	0.4	4.0	0.03	0.04	96.6
West: Italia Road											
10	L2	33	22.6	0.524	33.0	LOS C	2.4	33.4	0.91	1.08	34.7
12	R2	31	58.6	0.524	81.3	LOS F	2.4	33.4	0.91	1.08	31.8
Approach		63	40.0	0.524	56.4	LOS D	2.4	33.4	0.91	1.08	33.2
All Vehicles		1519	15.7	0.524	3.0	NA	2.4	33.4	0.05	0.08	88.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

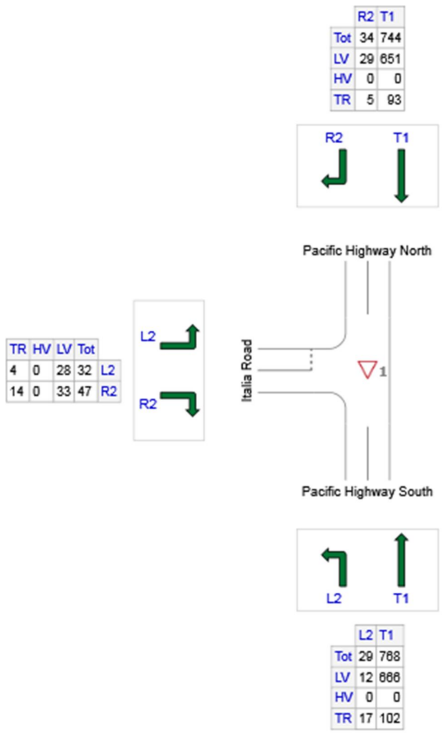
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	797	678	0	119
N: Pacific Highway North	778	680	0	98
W: Italia Road	79	61	0	18
Total	1654	1419	0	235

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	31	58.6	0.031	10.4	LOS A	0.0	0.0	0.00	0.67	55.2
2	T1	808	13.3	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		839	14.9	0.244	0.4	NA	0.0	0.0	0.00	0.02	97.0
North: Pacific Highway North											
8	T1	783	12.5	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	36	14.7	0.129	20.7	LOS B	0.4	4.2	0.79	0.93	54.3
Approach		819	12.6	0.234	0.9	NA	0.4	4.2	0.03	0.04	96.3
West: Italia Road											
10	L2	34	12.5	0.841	82.7	LOS F	4.9	54.2	0.98	1.27	23.4
12	R2	49	29.8	0.841	128.2	LOS F	4.9	54.2	0.98	1.27	22.7
Approach		83	22.8	0.841	109.8	LOS F	4.9	54.2	0.98	1.27	23.0
All Vehicles		1741	14.2	0.841	5.9	NA	4.9	54.2	0.06	0.09	83.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

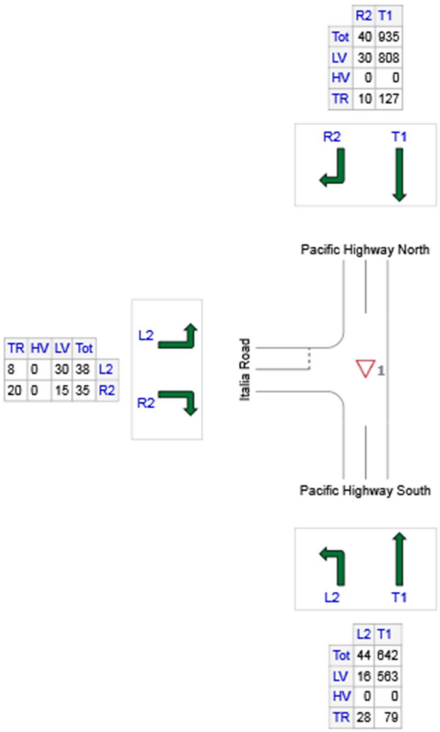
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	686	579	0	107
N: Pacific Highway North	975	838	0	137
W: Italia Road	73	45	0	28
Total	1734	1462	0	272

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	46	63.6	0.049	10.7	LOS A	0.0	0.0	0.00	0.67	54.0
2	T1	676	12.3	0.201	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		722	15.6	0.201	0.7	NA	0.0	0.0	0.00	0.04	94.7
North: Pacific Highway North											
8	T1	984	13.6	0.298	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	42	25.0	0.158	21.5	LOS B	0.6	6.3	0.78	0.93	51.3
Approach		1026	14.1	0.298	0.9	NA	0.6	6.3	0.03	0.04	96.0
West: Italia Road											
10	L2	40	21.1	0.987	151.6	LOS F	7.9	110.1	0.99	1.52	15.2
12	R2	37	57.1	0.987	235.2	LOS F	7.9	110.1	0.99	1.52	14.6
Approach		77	38.4	0.987	191.7	LOS F	7.9	110.1	0.99	1.52	14.9
All Vehicles		1825	15.7	0.987	8.9	NA	7.9	110.1	0.06	0.10	77.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

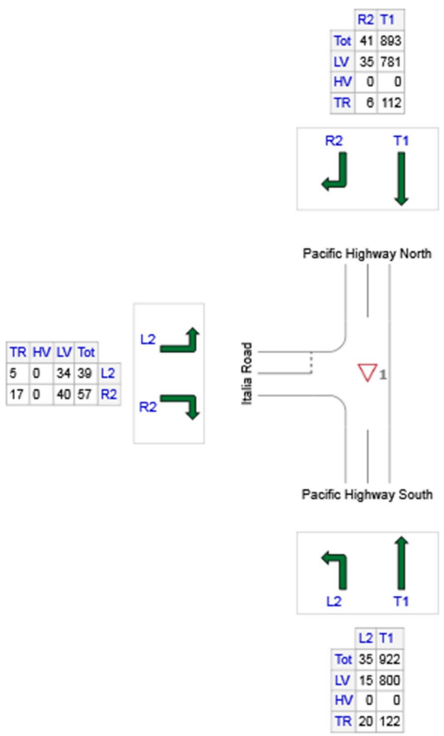
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	957	815	0	142
N: Pacific Highway North	934	816	0	118
W: Italia Road	96	74	0	22
Total	1987	1705	0	282

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	37	57.1	0.037	10.4	LOS A	0.0	0.0	0.00	0.67	55.5
2	T1	971	13.2	0.292	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		1007	14.8	0.292	0.4	NA	0.0	0.0	0.00	0.02	96.9
North: Pacific Highway North											
8	T1	940	12.5	0.281	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	43	14.6	0.226	28.8	LOS C	0.8	7.5	0.87	0.97	48.4
Approach		983	12.6	0.281	1.3	NA	0.8	7.5	0.04	0.04	95.3
West: Italia Road											
10	L2	41	12.8	1.273	337.2	LOS F	19.1	212.5	1.00	2.03	9.0
12	R2	60	29.8	1.273	378.8	LOS F	19.1	212.5	1.00	2.03	8.9
Approach		101	22.9	1.273	361.9	LOS F	19.1	212.5	1.00	2.03	8.9
All Vehicles		2092	14.2	1.273	18.3	NA	19.1	212.5	0.07	0.13	65.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

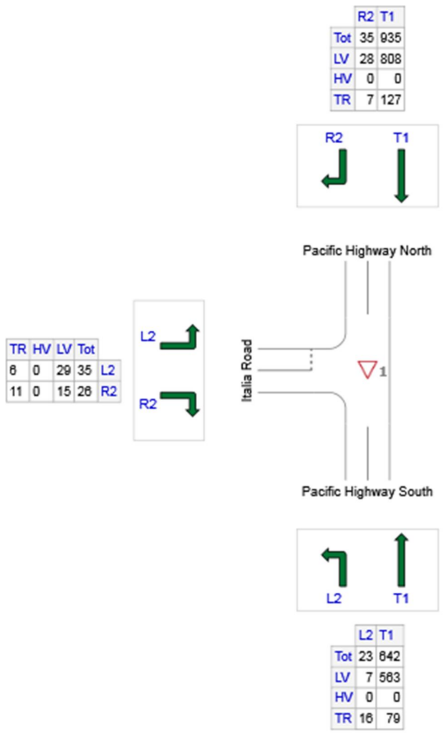
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	665	570	0	95
N: Pacific Highway North	970	836	0	134
W: Italia Road	61	44	0	17
Total	1696	1450	0	246

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	24	69.6	0.027	10.9	LOS A	0.0	0.0	0.00	0.67	52.6
2	T1	676	12.3	0.201	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		700	14.3	0.201	0.4	NA	0.0	0.0	0.00	0.02	96.8
North: Pacific Highway North											
8	T1	984	13.6	0.298	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	37	20.0	0.113	18.5	LOS B	0.4	4.2	0.73	0.91	54.8
Approach		1021	13.8	0.298	0.7	NA	0.4	4.2	0.03	0.03	96.9
West: Italia Road											
10	L2	37	17.1	0.484	30.8	LOS C	2.0	24.6	0.90	1.05	37.8
12	R2	27	42.3	0.484	73.3	LOS F	2.0	24.6	0.90	1.05	35.4
Approach		64	27.9	0.484	48.9	LOS D	2.0	24.6	0.90	1.05	36.7
All Vehicles		1785	14.5	0.484	2.3	NA	2.0	24.6	0.05	0.07	91.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

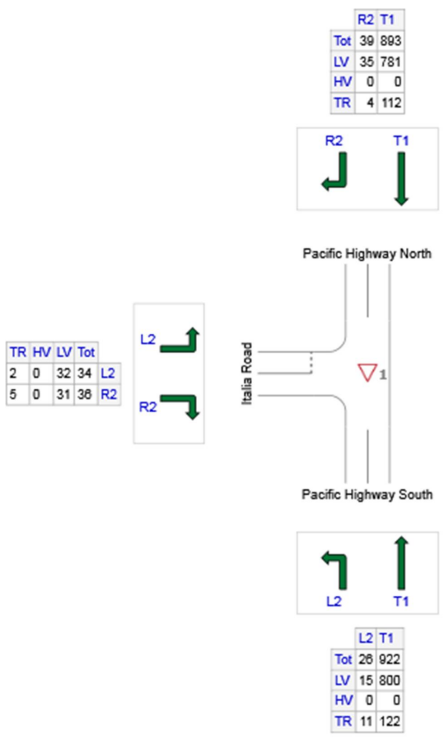
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	948	815	0	133
N: Pacific Highway North	932	816	0	116
W: Italia Road	70	63	0	7
Total	1950	1694	0	256

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

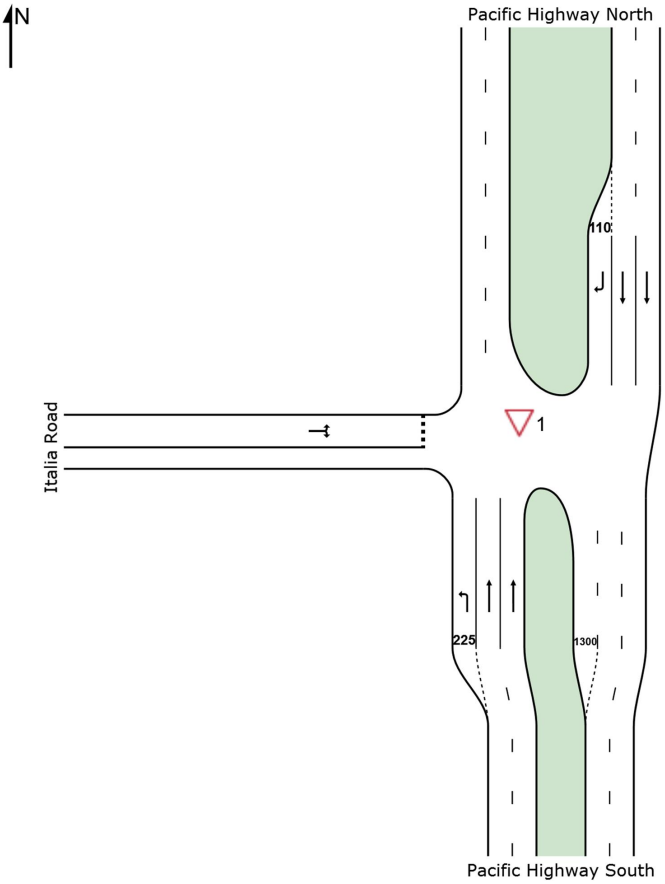
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	27	42.3	0.024	9.7	LOS A	0.0	0.0	0.00	0.67	59.5
2	T1	971	13.2	0.292	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		998	14.0	0.292	0.3	NA	0.0	0.0	0.00	0.02	98.0
North: Pacific Highway North											
8	T1	940	12.5	0.281	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	41	10.3	0.177	23.9	LOS B	0.6	5.3	0.84	0.95	52.8
Approach		981	12.4	0.281	1.0	NA	0.6	5.3	0.04	0.04	96.2
West: Italia Road											
10	L2	36	5.9	0.653	49.6	LOS D	2.8	24.8	0.96	1.10	32.6
12	R2	38	13.9	0.653	84.5	LOS F	2.8	24.8	0.96	1.10	31.8
Approach		74	10.0	0.653	67.6	LOS E	2.8	24.8	0.96	1.10	32.2
All Vehicles		2053	13.1	0.653	3.1	NA	2.8	24.8	0.05	0.07	90.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA Analysis – Alternative 2
50% Heavy vehicles / 50% Large trucks

Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)



Organisation: GHD SERVICES PTY LTD | Created: Wednesday, 2 August 2017 5:07:23 PM
Project: G:\22\18208\Technical\SIDRA\LARGE TRUCKS\Italia Road intersection 50% LARGE TRUCKS.sip7

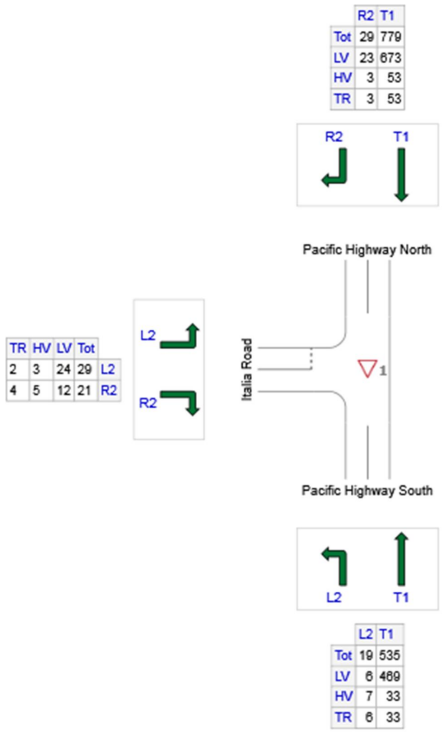
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	554	475	40	39
N: Pacific Highway North	808	696	56	56
W: Italia Road	50	36	8	6
Total	1412	1207	104	101

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - AM Peak]

Italia Road and Pacific Highway - Pre development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	20	68.4	0.019	10.6	LOS A	0.0	0.0	0.00	0.67	54.1
2	T1	563	12.3	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		583	14.3	0.160	0.4	NA	0.0	0.0	0.00	0.02	97.1
North: Pacific Highway North											
8	T1	820	13.6	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	31	20.7	0.060	13.8	LOS A	0.2	2.1	0.59	0.82	59.9
Approach		851	13.9	0.236	0.5	NA	0.2	2.1	0.02	0.03	97.5
West: Italia Road											
10	L2	31	17.2	0.178	14.1	LOS A	0.7	6.7	0.72	0.90	54.5
12	R2	22	42.9	0.178	27.0	LOS B	0.7	6.7	0.72	0.90	49.8
Approach		53	28.0	0.178	19.5	LOS B	0.7	6.7	0.72	0.90	52.4
All Vehicles		1486	14.5	0.236	1.1	NA	0.7	6.7	0.04	0.06	94.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

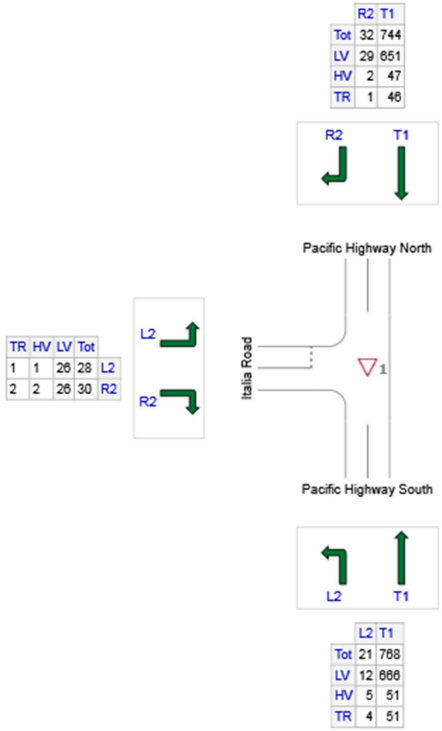
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	789	678	56	55
N: Pacific Highway North	776	680	49	47
W: Italia Road	58	52	3	3
Total	1623	1410	108	105

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Pre development - PM Peak]

Italia Road and Pacific Highway - Pre development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	22	42.9	0.017	9.6	LOS A	0.0	0.0	0.00	0.67	60.1
2	T1	808	13.3	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		831	14.1	0.232	0.3	NA	0.0	0.0	0.00	0.02	98.1
North: Pacific Highway North											
8	T1	783	12.5	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	34	9.4	0.080	15.5	LOS B	0.3	2.2	0.70	0.90	60.5
Approach		817	12.4	0.223	0.7	NA	0.3	2.2	0.03	0.04	97.2
West: Italia Road											
10	L2	29	7.1	0.258	18.9	LOS B	1.0	8.1	0.83	0.96	52.2
12	R2	32	13.3	0.258	30.5	LOS C	1.0	8.1	0.83	0.96	50.7
Approach		61	10.3	0.258	24.9	LOS B	1.0	8.1	0.83	0.96	51.4
All Vehicles		1708	13.1	0.258	1.3	NA	1.0	8.1	0.04	0.06	94.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

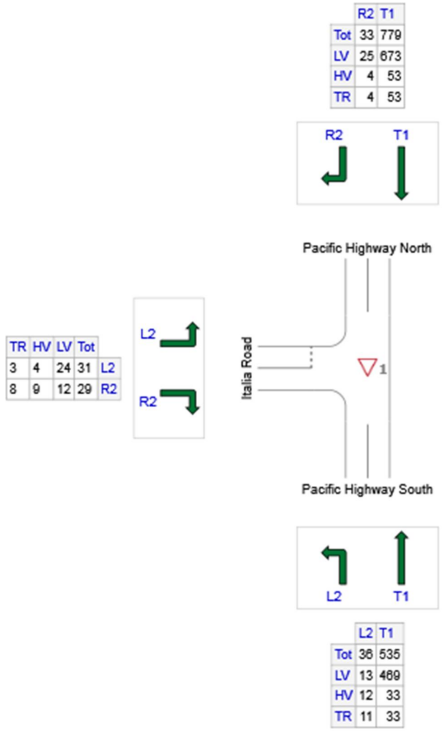
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	571	482	45	44
N: Pacific Highway North	812	698	57	57
W: Italia Road	60	36	13	11
Total	1443	1216	115	112

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - AM Peak]

Italia Road and Pacific Highway - Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	38	63.9	0.035	10.4	LOS A	0.0	0.0	0.00	0.67	54.8
2	T1	563	12.3	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		601	15.6	0.160	0.7	NA	0.0	0.0	0.00	0.04	94.9
North: Pacific Highway North											
8	T1	820	13.6	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	35	24.2	0.075	14.7	LOS B	0.3	2.7	0.62	0.85	57.3
Approach		855	14.0	0.236	0.6	NA	0.3	2.7	0.03	0.03	96.9
West: Italia Road											
10	L2	33	22.6	0.293	17.4	LOS B	1.2	13.9	0.80	0.96	47.8
12	R2	31	58.6	0.293	38.7	LOS C	1.2	13.9	0.80	0.96	42.8
Approach		63	40.0	0.293	27.7	LOS B	1.2	13.9	0.80	0.96	45.3
All Vehicles		1519	15.7	0.293	1.8	NA	1.2	13.9	0.05	0.08	91.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

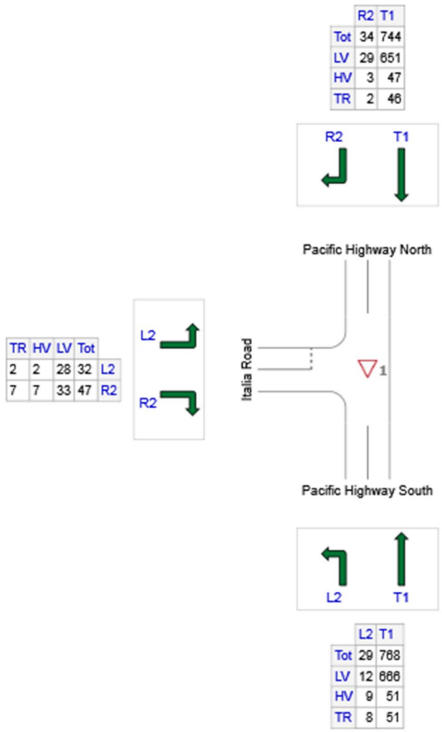
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	797	678	60	59
N: Pacific Highway North	778	680	50	48
W: Italia Road	79	61	9	9
Total	1654	1419	119	116

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Post development - PM Peak]

Italia Road and Pacific Highway - Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	31	58.6	0.027	10.2	LOS A	0.0	0.0	0.00	0.67	56.0
2	T1	808	13.3	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		839	14.9	0.232	0.4	NA	0.0	0.0	0.00	0.02	97.1
North: Pacific Highway North											
8	T1	783	12.5	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
9	R2	36	14.7	0.097	17.0	LOS B	0.3	2.9	0.73	0.91	57.6
Approach		819	12.6	0.223	0.8	NA	0.3	2.9	0.03	0.04	96.7
West: Italia Road											
10	L2	34	12.5	0.522	29.9	LOS C	2.3	22.7	0.91	1.06	40.5
12	R2	49	29.8	0.522	53.4	LOS D	2.3	22.7	0.91	1.06	38.6
Approach		83	22.8	0.522	43.9	LOS D	2.3	22.7	0.91	1.06	39.3
All Vehicles		1741	14.2	0.522	2.6	NA	2.3	22.7	0.06	0.08	90.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

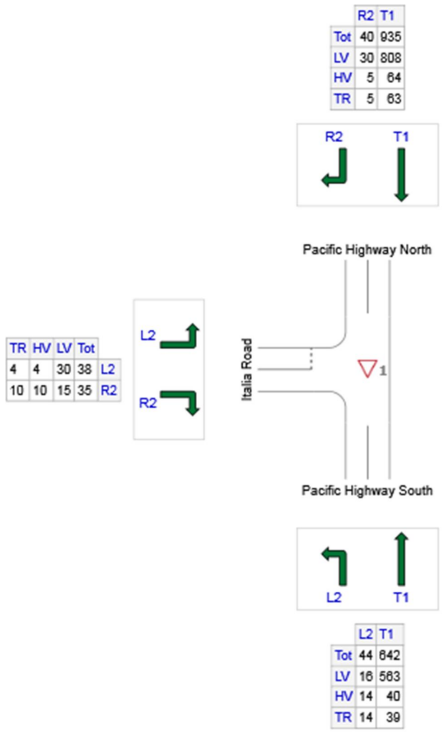
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	686	579	54	53
N: Pacific Highway North	975	838	69	68
W: Italia Road	73	45	14	14
Total	1734	1462	137	135

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - AM Peak]

Italia Road and Pacific Highway - 10 years Post development - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	46	63.6	0.043	10.4	LOS A	0.0	0.0	0.00	0.67	54.8
2	T1	676	12.3	0.192	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		722	15.6	0.192	0.7	NA	0.0	0.0	0.00	0.04	94.8
North: Pacific Highway North											
8	T1	984	13.6	0.283	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	42	25.0	0.115	17.3	LOS B	0.4	4.1	0.71	0.90	54.8
Approach		1026	14.1	0.283	0.7	NA	0.4	4.1	0.03	0.04	96.5
West: Italia Road											
10	L2	40	21.1	0.509	28.7	LOS C	2.3	26.6	0.90	1.06	38.9
12	R2	37	57.1	0.509	63.7	LOS E	2.3	26.6	0.90	1.06	35.5
Approach		77	38.4	0.509	45.5	LOS D	2.3	26.6	0.90	1.06	37.2
All Vehicles		1825	15.7	0.509	2.6	NA	2.3	26.6	0.05	0.08	89.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

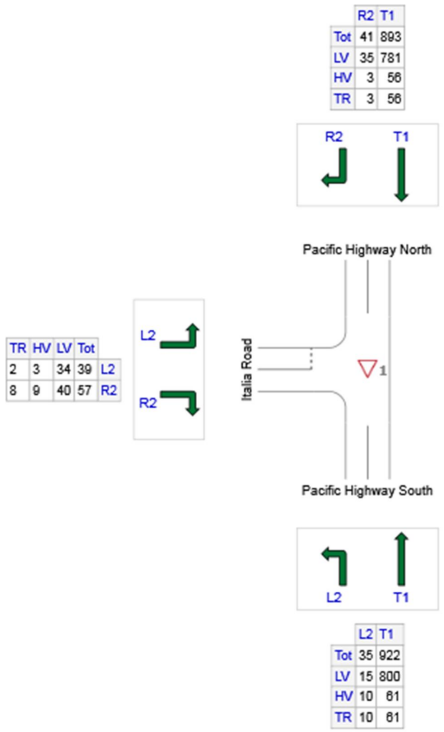
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	957	815	71	71
N: Pacific Highway North	934	816	59	59
W: Italia Road	96	74	12	10
Total	1987	1705	142	140

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - 10 years Post development - PM Peak]

Italia Road and Pacific Highway - 10 years Post development - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	37	57.1	0.032	10.2	LOS A	0.0	0.0	0.00	0.67	56.3
2	T1	971	13.2	0.278	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		1007	14.8	0.278	0.4	NA	0.0	0.0	0.00	0.02	97.0
North: Pacific Highway North											
8	T1	940	12.5	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	43	14.6	0.166	21.9	LOS B	0.6	4.9	0.82	0.94	53.4
Approach		983	12.6	0.268	1.0	NA	0.6	4.9	0.04	0.04	96.1
West: Italia Road											
10	L2	41	12.8	1.013	148.1	LOS F	9.3	89.1	1.00	1.53	16.6
12	R2	60	29.8	1.013	191.6	LOS F	9.3	89.1	1.00	1.53	16.3
Approach		101	22.9	1.013	173.9	LOS F	9.3	89.1	1.00	1.53	16.4
All Vehicles		2092	14.2	1.013	9.1	NA	9.3	89.1	0.07	0.10	78.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

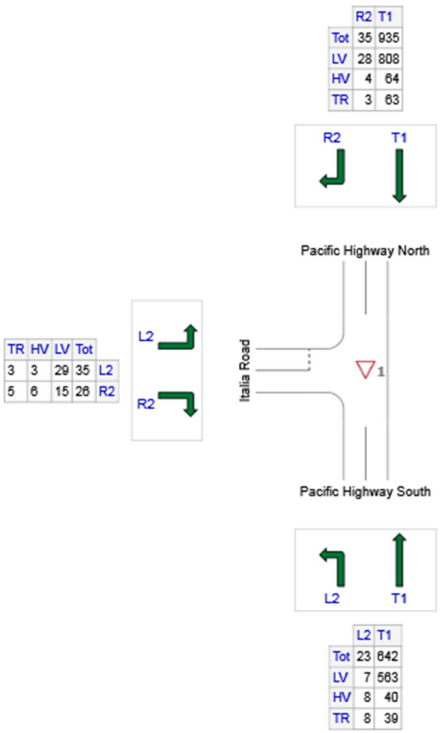
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	665	570	48	47
N: Pacific Highway North	970	836	68	66
W: Italia Road	61	44	9	8
Total	1696	1450	125	121

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - AM Peak]

Italia Road and Pacific Highway - Existing 2026 - AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	24	69.6	0.023	10.7	LOS A	0.0	0.0	0.00	0.67	53.5
2	T1	676	12.3	0.192	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
Approach		700	14.3	0.192	0.4	NA	0.0	0.0	0.00	0.02	97.0
North: Pacific Highway North											
8	T1	984	13.6	0.283	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	37	20.0	0.085	15.4	LOS B	0.3	2.8	0.66	0.89	57.7
Approach		1021	13.8	0.283	0.6	NA	0.3	2.8	0.02	0.03	97.2
West: Italia Road											
10	L2	37	17.1	0.295	19.0	LOS B	1.2	12.0	0.82	0.97	48.8
12	R2	27	42.3	0.295	38.7	LOS C	1.2	12.0	0.82	0.97	45.0
Approach		64	27.9	0.295	27.4	LOS B	1.2	12.0	0.82	0.97	47.1
All Vehicles		1785	14.5	0.295	1.5	NA	1.2	12.0	0.04	0.06	93.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

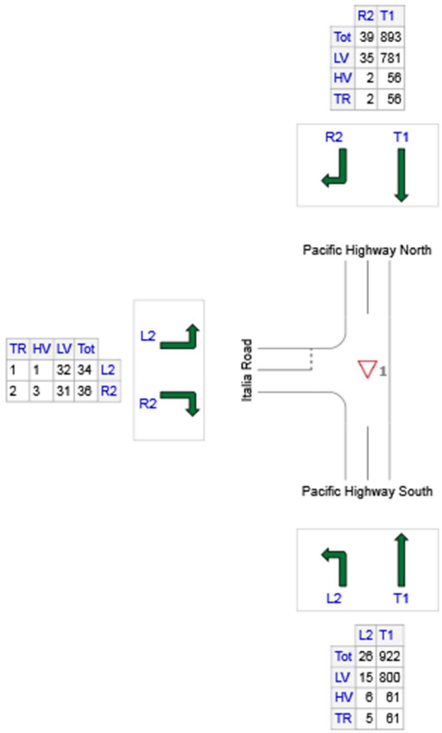
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Large Trucks (TR)
S: Pacific Highway South	948	815	67	66
N: Pacific Highway North	932	816	58	58
W: Italia Road	70	63	4	3
Total	1950	1694	129	127

MOVEMENT SUMMARY

▽Site: 1 [Italia Road and Pacific Highway - Existing 2026 - PM Peak]

Italia Road and Pacific Highway - Existing 2026 - PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Highway South											
1	L2	27	42.3	0.021	9.5	LOS A	0.0	0.0	0.00	0.67	60.2
2	T1	971	13.2	0.278	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		998	14.0	0.278	0.3	NA	0.0	0.0	0.00	0.02	98.0
North: Pacific Highway North											
8	T1	940	12.5	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
9	R2	41	10.3	0.139	19.8	LOS B	0.5	3.9	0.80	0.93	56.1
Approach		981	12.4	0.268	0.9	NA	0.5	3.9	0.03	0.04	96.7
West: Italia Road											
10	L2	36	5.9	0.456	29.6	LOS C	1.8	14.9	0.91	1.03	43.3
12	R2	38	13.9	0.456	49.5	LOS D	1.8	14.9	0.91	1.03	42.0
Approach		74	10.0	0.456	39.8	LOS C	1.8	14.9	0.91	1.03	42.6
All Vehicles		2053	13.1	0.456	2.0	NA	1.8	14.9	0.05	0.06	93.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E – Stage 5 Road Safety Audit

CLIENTS | PEOPLE | PERFORMANCE

GHD Pty Ltd

Pacific Highway / Italia Road Intersection

Existing Conditions (Stage Five) Road Safety Audit

February 2016

SAMSA CONSULTING

TRANSPORT PLANNING & TRAFFIC ENGINEERING

Samsa Consulting Pty Ltd
Transport Planning & Traffic Engineering
ABN: 50 097 299 717
46 Riverside Drive, Sandringham, NSW 2219, AUSTRALIA
Phone: (+61) 414 971 956
E-mail: alansamsa@gmail.com
Skype: alan_samsa
Web: www.samsaconsulting.com

Contents

EXECUTIVE SUMMARY

1. Introduction 1
1.1 Background 1
1.2 Project Details 1
1.3 Report Structure 1

2. Audit Details 3
2.1 Audit Methodology 3
2.2 Audit Administration 3
2.3 References & Documentation Audited 3

3. Identified Safety Issues 5

4. Conclusions 10

5. Formal Audit Statement 11

Appendices

A ***Site Photos of Selected Safety Issues***

EXECUTIVE SUMMARY

This report details an independently undertaken Existing Conditions (Stage Five) road safety audit for the Pacific Highway / Italia Road intersection and approaches north of Raymond Terrace.

While a number of minor road safety issues were identified, the principal concerns of the audit team relate to the following issues:

- There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction.
- Safe intersection sight distance (SISD) between the northbound highway travel lanes and the Italia Road junction is marginal for a car-to-car scenario and improved for a car-to-truck scenario.

1. Introduction

1.1 Background

The Italia Road intersection with Pacific Highway is used by haulage trucks operating out of a quarry located at Eagleton, approximately 10 km north of Raymond Terrace in the NSW Hunter Region. The quarry is located at Lot 2 (DP 1108702), Barleigh Ranch Way (formerly 13 Killaloe Lane), Eagleton.

Due to the potential increase in traffic operating out of the quarry, especially the haulage trucks, meetings were held with NSW Roads & Maritime Services (RMS) in relation to road safety concerns for the intersection. These mainly related to the right-turn movements into and out of Italia Road and the associated intersection sight distance to/from the south along the highway.

At the time, it was understood that RMS would undertake a wider review of the Pacific Highway / Italia Road intersection focussing on road safety and taking into account other potential impacts on the intersection.

This report details an independently undertaken existing conditions road safety audit for the Pacific Highway / Italia Road intersection. The audit was undertaken by *Samsa Consulting Pty Ltd*, Transport Planning & Traffic Engineering Consultants.

1.2 Project Details

The Pacific Highway / Italia Road intersection is a 'seagull' layout with auxiliary lanes for all turn movements except for the Italia Road left-turn movement northbound onto the highway. At the intersection location, Pacific Highway is a four-lane divided road (two-lane carriageways in each direction) with a 100 km/h speed limit for northbound travel and 110 km/h speed limit for southbound travel.

Italia Road is a typical two-lane rural road with a paved width of approximately 8.5 m comprised of some 6.5 m width for the travel lanes and approximately 1.0 m shoulders. It has a 90 km/h speed limit and there is no street lighting at the intersection or in the vicinity.

The surrounding area generally comprises rural land uses with some rural residential lots and some minor recreational land uses nearby. The approximate extent and location of the road safety audit Project area is shown in *Figure 1* following.

1.3 Report Structure

The remainder of this report is presented as follows:

Chapter 2 describes details of the audit undertaken including the methodology, administration and documentation audited.

Chapter 3 details the safety issues identified and audit findings.

Chapter 4 presents conclusions to the audit.

Chapter 5 provides a formal audit statement.

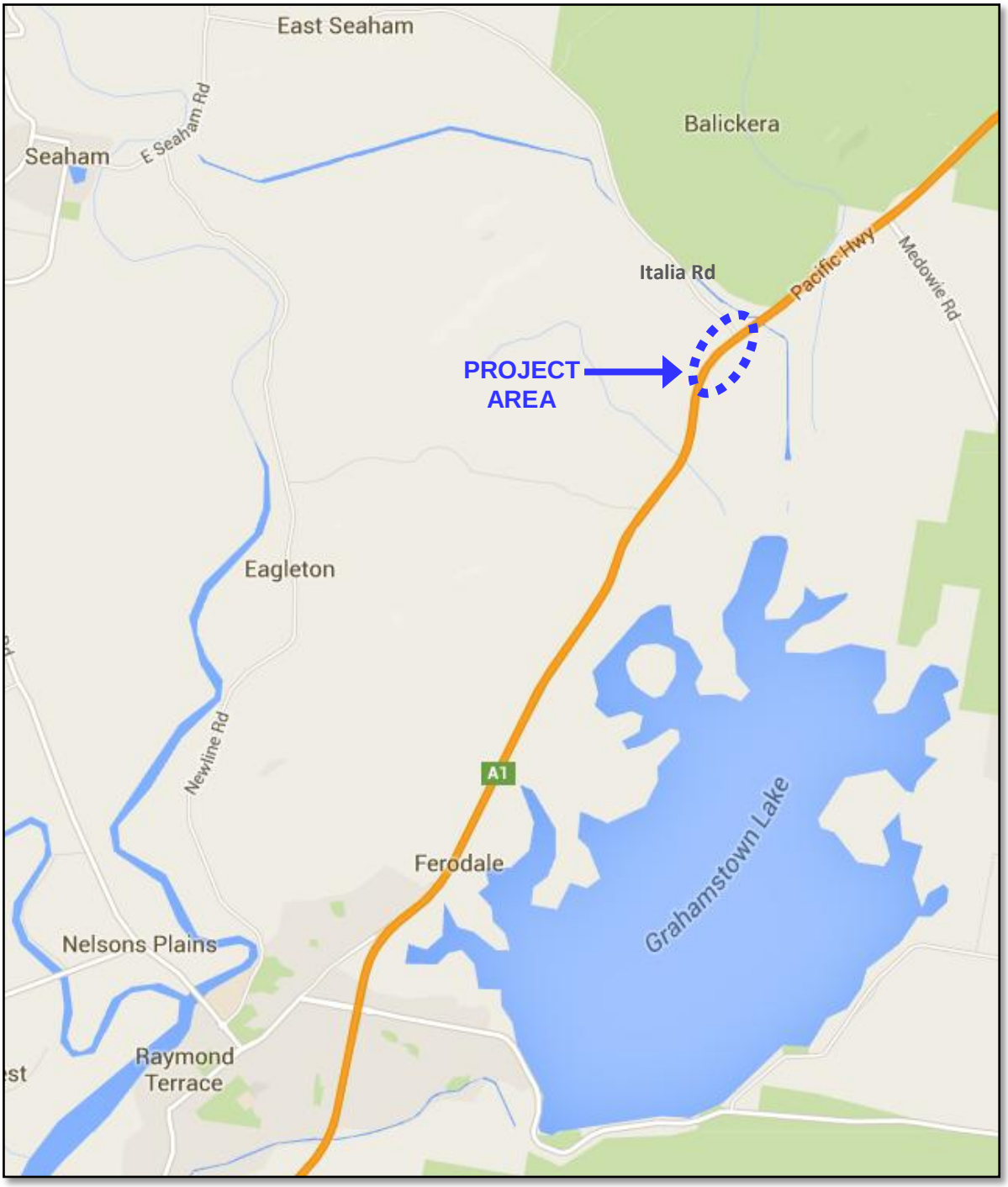


Figure 1: Project Area and Location

2. Audit Details

2.1 Audit Methodology

A road safety audit is "*... a formal examination of a future road or traffic project or an existing road, in which an independent, qualified team reports on the project's crash potential and safety performance*" (Austroads 2009).

This Existing Conditions (Stage 5) audit followed a standard practice in identifying safety related issues of the existing intersection and approaches. It involved identification of issues on site during both day and night site visits.

The road safety audit focussed on safety issues such as signage and linemarking, delineation, intersection layout, road network approach conditions, roadside hazards, lighting and sight distances (amongst other issues).

The audit is structured around a standard checklist provided in Austroads' "*Guide to Road Safety, Part 6: Road Safety Audit*" and RTA's (RMS) "*Accident Reduction Guide – Part 2: Road Safety Audits*".

An audit entry meeting was held with the GHD Project Manager where background information on the audit project area was discussed.

The site audit was undertaken on Wednesday 3rd February 2016 during daylight and night conditions. The weather was generally fine and dry.

An audit exit meeting was held at the completion of the road safety audit report.

2.2 Audit Administration

GHD Project Manager: Barry Hancock

Road Safety Auditors: Alan Samsa (*RMS Accredited Level 3 Lead Road Safety Auditor*)
(Auditor ID: RSA-02-0056, Certification Expiry 13/08/2016)
Carolyn Samsa (*RMS Accredited Level 3 Lead Road Safety Auditor*)
(Auditor ID: RSA-02-0585, Certification Expiry 14/06/2016)

2.3 References & Documentation Audited

- Austroads "*Guide to Road Design Part 3: Geometric Design (2nd Edition)*", October 2010
- Austroads "*Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*", October 2010
- Austroads "*Guide to Road Safety, Part 6: Road Safety Audit*", January 2009
- Austroads "*Rural Road Design: A Guide to the Geometric Design of Rural Roads*", 2003
- Castle Quarry Products "Proposed Quarry Eagleton: Review of Traffic Issues", undated
- RTA "*Guidelines for Road Safety Audit Practices – Part 1: Road Safety Audit"*, July 2011
- RTA "*Accident Reduction Guide – Part 2: Road Safety Audits*", 2005
- RTA "*Delineation Guidelines: Parts 1 to 19 & Appendices A & B*", assorted dates

- Standards Australia "*AS 1742.1 – 2003: Manual of uniform traffic control devices, Part 1: General introduction and index of signs*", 2003
- TPK & Associates "*Proposed Quarry Development, Lot 2 DP 1108702, Barleigh Ranch Way (Formerly 13 Killaloe Lane), Eagleton*", September / October 2012

3. Identified Safety Issues

The audit of the project area focussed on providing an independent identification of potential safety hazards, regardless of current practices, standards and operations, to allow GHD to identify remedial measures as part of the project's design development.

In categorising and prioritising identified safety issues, a risk assessment process was adopted. Risk assessment is the overall process of risk identification, analysis and evaluation. Preliminary risk ratings for each identified issue are assessed based on subjective professional judgement by the Road Safety Audit team with guidance from *Section 4.8 C* of Austroads "*Guide to Road Safety, Part 6: Road Safety Audit*". The Austroads' document provides an indication of the level of risk and what response may be appropriate. The identified road safety issue is first categorised based on its likely frequency of occurrence and severity ('likelihood' and 'consequence' of crash potential) – refer to *Figures 3.1* and *3.2* below (extracted from the Austroads' document).

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Figure 3.1: Likely Frequency of Issue

Severity	Description	Examples
Catastrophic	Likely multiple deaths	High-speed, multi-vehicle crash on a freeway. Car runs into crowded bus stop. Bus and petrol tanker collide. Collapse of a bridge or tunnel.
Serious	Likely death or serious injury	High or medium-speed vehicle/vehicle collision. High or medium-speed collision with a fixed roadside object. Pedestrian or cyclist struck by a car.
Minor	Likely minor injury	Some low-speed vehicle collisions. Cyclist falls from bicycle at low speed. Left-turn rear-end crash in a slip lane.
Limited	Likely trivial injury or property damage only	Some low-speed vehicle collisions. Pedestrian walks into object (no head injury). Car reverses into post.

Figure 3.2: Likely Severity of Issue

An appropriate risk rating is then selected from the risk categories in the risk matrix with a preferred treatment approach for each risk rating (refer to *Figures 3.3* and *3.4* below, both extracted from Austroads).

	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

Figure 3.3: Risk Matrix

Risk	Suggested treatment approach
Intolerable	Must be corrected.
High	Should be corrected or the risk significantly reduced, even if the treatment costs is high.
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.
Low	Should be corrected or the risk reduced, if the treatment cost is low.

Figure 3.4: Treatment Approach

The audit of the project area identified a number of potential road safety issues. The safety audit process requires that the safety issues identified during an audit be acknowledged by the Audit Team and accordingly responded to by GHD. The issues are characterised according to their risk, and detailed in *Table 3.1* following.

It should be noted that not all road safety issues identified may necessarily be within the scope of GHD's project area. This is because while the scope of the audit is generally within the project area described earlier, to complete a full audit of the project, the approaches and transitions to the area were also considered to identify potential safety issues that may affect road safety within the area. Therefore, any road safety issues that have been identified outside the project area may be the responsibility of the relevant controlling road authority.

Table 3.1: Identified Safety Issues

				For completion by GHD	
No.	**Description of Road Safety Issue**	**Risk Rating**	**Category**	**Response**	**Action by**
1.	There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction – refer to *Photos 1 & 2* in *Appendix A*. The adoption of a 'Stop' control (rather than 'Give Way' control) is considered to be prudent due to sight distance restrictions at the junction. Moreover, the location of the intersection sightboard on the far (eastern) side of the highway could be improved because it sits low beyond the higher crested section of highway – refer to *Photo 1* in *Appendix A*. At night, it becomes even less conspicuous because vehicle headlights do not fully extend across highway alignment.	Medium - High	Intersections / Traffic signs / Delineation		
2.	Sight distance to/from the northbound highway right (fast) lane to the Italia Road junction is estimated at approximately 250 m due to the combination of the crest vertical alignment and right curve horizontal alignment – refer to *Photos 3 & 4* in *Appendix A*. This is marginal with respect to safe intersection sight distance (SISD) guidelines, which it is calculated would require approximately 270 m to/from an approaching northbound car along the highway. It is acknowledged that sight distance for truck drivers would be greater due to the higher driver position in the vehicle and that approaching northbound highway vehicles may be able to earlier sight trucks exiting the Italia Road junction due to the truck's larger (taller) size.	Medium	Road alignment		

				For completion by GHD	
No.	**Description of Road Safety Issue**	**Risk Rating**	**Category**	**Response**	**Action by**
3.	For the southbound highway right-turn movement into Italia Road, the deceleration lane length is sub-standard for the 110 km/h highway speed zone. This may result in vehicles slowing down within the highway 'fast' lane.	Low - Medium	Auxiliary lanes		
4.	The northbound highway left-turn movement into Italia Road has adverse crossfall after a downhill approach.	Low - Medium	Road alignment		
5.	There is no acceleration length for vehicles turning left out of Italia Road onto the highway northbound. This may impede (slow down) northbound highway traffic flow especially due to the downhill grade for northbound highway travel and the restricted sight distances to the south from Italia Road.	Low - Medium	Auxiliary lanes		
6.	For southbound highway traffic approaching the Italia Road junction to turn right, there is no guidance on where to stop, ie. there is no 'hold' line across the 'seagull' layout, which would also act as continuity guidance for northbound highway travel past the junction.	Low	Delineation / Intersections		
7.	For southbound highway traffic, a 'merging traffic' sign for the acceleration lane merge is located at the Italia Road intersection 'seagull' splitter island – refer to *Photo 5* in *Appendix A*. However, this is approximately 1.2 km prior to the actual merge with no follow-up signage downstream near the merge zone.	Low	Traffic signs		
8.	On the left (northern) side of Italia Road approaching the highway, there is an unprotected power pole within the clear zone – refer to *Photo 1* in *Appendix A*.	Low	Roadside hazards		

				For completion by GHD	
No.	**Description of Road Safety Issue**	**Risk Rating**	**Category**	**Response**	**Action by**
9.	There are faded pavement markings (particularly pavement turn arrows and edgeline) at the intersection including for the highway southbound right-turn lane and northbound left-turn lane into Italia Road – refer to *Photos 5 & 6* in *Appendix A*.	Low	Delineation		
10.	There is no street lighting at the junction, which reduces guidance and delineation at night, especially for the Italia Road approach to the highway. This also reduces the conspicuousness of the junction when approaching along the highway.	Low	Lighting		
11.	For the right-turn movement out of Italia Road onto the highway southbound, the length of the acceleration lane is marginal with respect to heavy vehicles. It is acknowledged that the acceleration of loaded heavy vehicles may be problematic, especially for the initial uphill grade alignment.	Low	Auxiliary lanes		
12.	For the Italia Road approach to the highway, directional signage has only been provided for directions to the north (left) along the highway.	Low	Traffic signs		
13.	There is inconsistency in the highway speed zoning with 100 km/h for northbound travel and 110 km/h for southbound travel, which may cause confusion for motorists.	Low	Speed zones		
14.	For southbound highway travel approaching the Italia Road junction, the side road junction signage is partially obstructed by roadside vegetation from the left (slow) lane.	Low	Traffic signs		

4. Conclusions

While a number of minor road safety issues were identified, the principal concerns of the audit team relate to the following issues:

- There is no intersection control for Italia Road at the highway, which is exacerbated by faded 'hold' line pavement marking and lack of street lighting at the junction.
- Safe intersection sight distance (SISD) between the northbound highway travel lanes and the Italia Road junction is marginal for a car-to-car scenario and improved for a car-to-truck scenario.

5. Formal Audit Statement

This road safety audit has been undertaken by *Samsa Consulting Pty Ltd*, using the references and documentation detailed previously and site visits of the surrounding and approach road network during daylight and night conditions.

While the road safety audit may provide recommendations about possible remedial measures in response to identified road safety issues, it is ultimately the responsibility of GHD and the relevant road authority to determine how best to respond to each identified safety issue.

The audit has been undertaken for the sole purpose of identifying any safety-deficient features of the project area. Every effort was made to ensure that all relevant road safety issues were considered and the findings are the opinion and judgement of the audit team.

5th February 2016

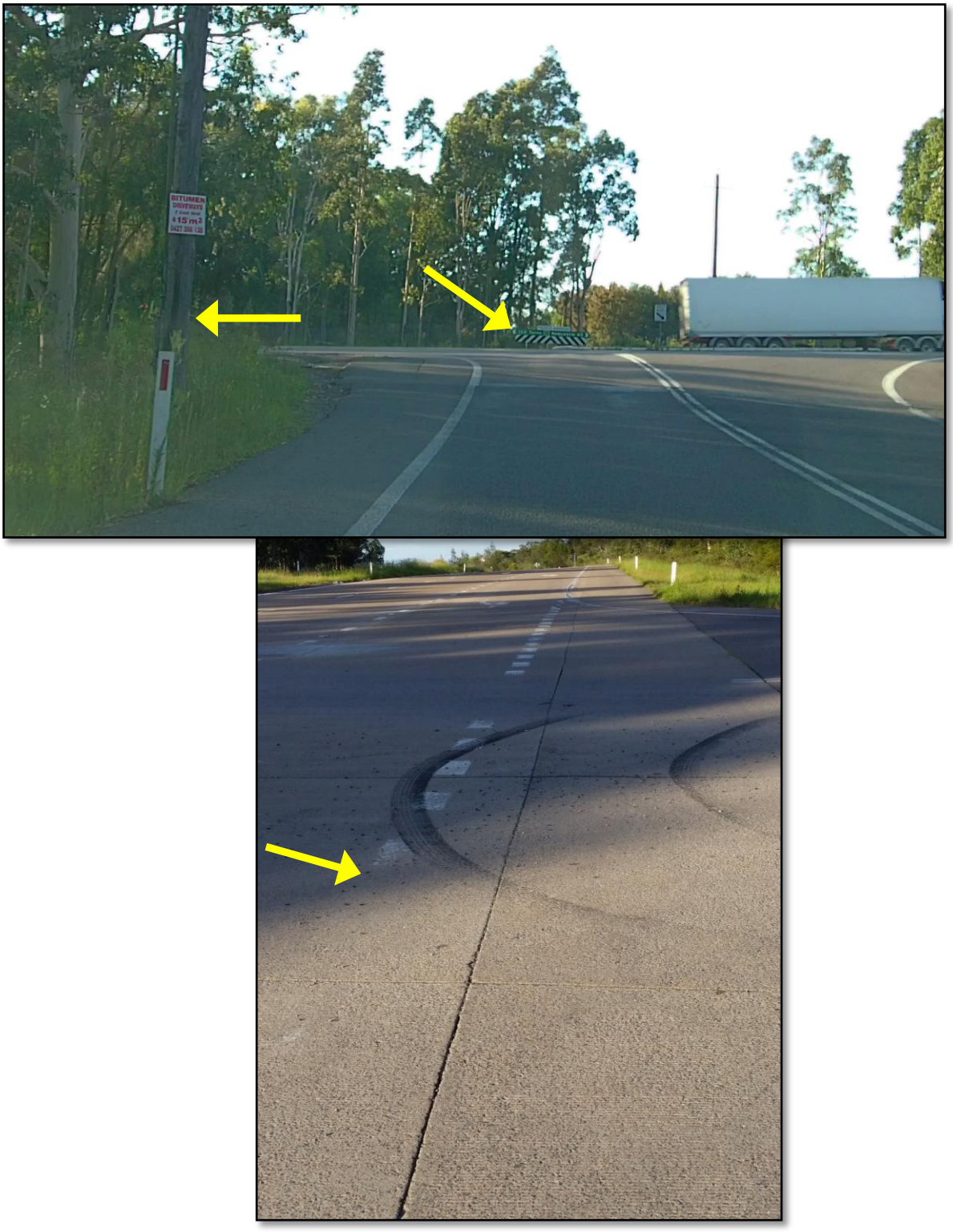
ALAN SAMSA
RMS Accredited Road Safety Auditor: Level 3 Lead Auditor
(Auditor ID: RSA-02-0056, Certification Expiry 13/08/2016)

5th February 2016

CAROLYN SAMSA
RMS Accredited Road Safety Auditor: Level 3 Lead Auditor
(Auditor ID: RSA-02-0585, Certification Expiry 14/06/2016)

Appendix A

Site Photos of Selected Safety Issues



Photos 1 & 2: There is no intersection control for Italia Road at the highway (top photo), which is exacerbated by faded 'hold' line pavement marking (bottom photo). Moreover, the intersection sightboard on the far side of the highway is located beyond the crested section of highway making it less conspicuous, especially at night. Also, note the unprotected power pole within the clear zone on the left side of Italia Road approaching the highway junction (top photo).

Photos 3 & 4: Safe intersection sight distance between the northbound highway travel lanes and the Italia Road junction is marginal (top photo – northbound highway approach to the Italia Road junction, bottom photo – looking south from the Italia Road junction). It is acknowledged that sight distance for truck drivers would be greater due to the higher driver position in the vehicle and that approaching northbound highway vehicles may be able to earlier sight trucks exiting the Italia Road junction due to the truck's larger (taller) size.

Photo 5: For southbound highway traffic, a 'merging traffic' sign is located at the Italia Road intersection 'seagull' splitter island for the acceleration lane merge, which is approximately 1.2 km prior to the actual merge. Also, note the faded pavement markings (pavement turn arrows and edgeline) at the intersection.

Photo 6: There are faded pavement markings (pavement turn arrows and edgeline) at the Italia Road intersection for the highway northbound left-turn lane.

This report: has been prepared by GHD for Eagleton Rock Syndicate and *may only be used and relied on by Eagleton Rock Syndicate for the purpose agreed between GHD and the Eagleton Rock Syndicate as set out in Section 1.2 of this report.*

GHD otherwise disclaims responsibility to any person other than Eagleton Rock Syndicate arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Eagleton Rock Syndicate and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD

133 Castlereagh St Sydney NSW 2000

-

T: +61 2 9239 7100 F: +61 2 9239 7199 E: sydmail@ghd.com.au

N:\AU\Newcastle\Projects\22\18208\WP\111966.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	N Hincks	B Hancock	*B Hancock* *	S Jamieson	*S Jamieson* *	19/09/2016
1	N Hincks	B Hancock	*B Hancock* *	S Jamieson	*S Jamieson* *	16/12/2016
2	N Hincks B Hancock	S Jamieson	*S Jamieson* *	S Jamieson	*S Jamieson* *	04/08/2017

* *Wet signature on file*

www.ghd.com