



**Wedgerock Pty Ltd**

ABN: 15 099 038 123

**Karuah South Quarry**

**Traffic and Transport**  
**Assessment**

Prepared by

**The Transport Planning Partnership Pty Ltd**

November 2018

**Specialist Consultant Studies Compendium**  
**Volume 1, Part 3**

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# WedgeRock Pty Ltd

ABN: 15 099 038 123

## Traffic and Transport Assessment

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## **COMMONLY USED ACRONYMS**

TTPP	The Transport Planning Partnership
SEARs	Secretary's Environmental Assessment Requirements
GML	General Mass Limit
SH	State Highway
RRPMs	Retro-Reflective Pavement Markers
RMS	Roads and Maritime Services

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## **EXECUTIVE SUMMARY**

The Transport Planning Partnership Pty Ltd (TPPP) was commissioned by R.W. Corkery & Co. Pty Limited on behalf of Wedgerock Pty. Ltd. to prepare a traffic and transport assessment for the proposed Karuah South Quarry (Project). This assessment is a part of the Environmental Impact Assessment to support an application for the development of the quarry 4km northeast of Karuah, NSW.

This report has been prepared to address requirements specified in the Secretary's Environmental Assessment Requirements (SEARs) and Roads and Maritime Services (Roads and Maritime) letter. The report assesses the traffic conditions of the surrounding area along the transport routes including the Pacific Highway, Tarean Road, The Branch Lane, Andersite Road and Blue Rock Close. This report also assesses the traffic implications of the proposed construction and operations phases of the Project, with consideration given to the operation of surrounding developments. Mitigation measures have been developed to maintain/ improve the road capacity and safety performance to an acceptable level.

### **Study Area**

The Site forms part of Lot 11 DP 1024564 and is located north of Blue Rock Close, Karuah, approximately 4km northeast of Karuah, within the local government area of MidCoast Council.

### **Existing road network**

A description of the roads surrounding the Site is shown as follows:

- Blue Rock Close connects to Andersite Road in an east to west alignment with a general posted speed limit of 50 km/hr. The proposed Site Entrance is off Blue Rock Close with all turning movements permitted. The road was recently upgraded to serve the Karuah East Quarry located near the eastern end of Blue Rock Close.
- Andersite Road is a sealed two-lane two-way road that connects Blue Rock Close to The Branch Lane. The existing Karuah Quarry and the proposed Karuah Red Quarry operated by Hunter Quarries Pty Ltd are accessed off Andersite Road.
- The Branch Lane provides access to the Pacific Highway interchange to the south of the Site and extends to the north to Booral Road. The Branch Lane has a posted speed limit of 60 km/hr in the vicinity of the Site.
- Tarean Road provides a link to Pacific Highway, east and west of Karuah town centre. It has a general posted speed limit of 80 km/hr, decreasing to 60 km/hr in the vicinity of the Pacific Highway interchange.
- Pacific Highway is a state highway that joins with the New England Highway near Hexham, Newcastle and the Pacific Motorway, Brunswick Heads, New South Wales/ Queensland border. The road is configured with two travel lanes in each direction and a posted speed limit of predominantly 100 km/hr or 110 km/hr. Access to the Site for both directions off Pacific Highway is via The Branch Lane.

## **Regional Traffic Growth**

Regional traffic growth was obtained from MidCoast Council with an average annual growth rate of one per cent per annum.

## **Coaches and School Bus Services**

Busways operates three long distance coach services in the Great Lakes Region with the closest stop located in Tarean Road adjacent to Karuah Motor Inn, south west of the Site. Busways also provides school bus services through Karuah, with services conducted between 7am and 8.35am before school and 3pm and 4:15pm after school. Both coaches and school buses traverse the Tarean Road interchange, via the Pacific Highway westbound off-ramp and eastbound on-ramp to and from Karuah town centre.

## **Pedestrian and Cyclist Facilities**

There are limited pedestrian and bicycle facilities provided in close proximity to the Site. Site observations indicate that there are very low pedestrian and cyclist movements in the surrounding area.

## **Traffic Volumes**

The traffic count surveys show that low traffic volumes at the surveyed intersections in the vicinity of the Site on the day of the survey (6 February 2018):

- Andersite Road carried in the order of 40 vehicles (2-way) in the AM peak hour and 20 vehicles (2-way) in the PM peak hour. While heavy vehicles made up 33 per cent of the total traffic in the AM peak hour, there was no heavy vehicles recorded in the PM peak hour, indicating the Karuah Quarry eased product despatch before 4.45pm on the survey day. Majority of quarry workers left the existing Karuah Quarry between 5pm and 6pm however some left earlier between 3pm and 5pm.
- The Branch Lane carried in the order of 50 vehicles (2-way) in the AM peak hour and 35 vehicles (2-way) in the PM peak hour. Heavy vehicles made up 44 per cent of the total traffic in the AM peak hour and reduced to 12 per cent in the PM peak hour.

The surveyed traffic volumes in Blue Rock Close are associated with the construction of Karuah East Quarry which is expected to be operational in 2019.

## **Existing Intersection Operation Conditions**

The performance of key intersections in the vicinity of the Site operate with a high level of service and very minor delays, indicating there is spare capacity for future traffic growth.

## **Crash History**

Crash history data indicate that between January 2012 to December 2016, a total of two crashes have been reported at isolated locations in the vicinity of the Site. The review of the crash data has identified no particular crash pattern or causation factors.



### **Proposed Transport Routes**

Quarry products are to be despatched by road using the existing road network to the Hunter and Greater Sydney Metropolitan Regions via the Pacific Highway.

Quarry trucks involving 19m trucks and trailers would primarily access the Site via either direction of the Pacific Highway, and head north along The Branch Lane, turn right into Andersite Road and proceed along Blue Rock Close towards the Site. The same route would be used for the egress trucks travelling to delivery locations via the Pacific Highway.

The proposed transport routes are designed to minimise impacts to the Karuah town centre and public school.

### **Traffic generation during Operation and Construction Phases**

Based on an average production of 72 loads per day, the Project would generate 144 heavy vehicle two-way trips per day and 50 light vehicle two-way trips per day associated with workers and contractors. In addition, the delivery of consumables and fuel would generate an additional two heavy vehicle two-way trips per day.

Based on a maximum production of 120 loads per day, the Project would generate 240 heavy vehicle two-way trips per day and 60 light vehicle two-way trips per day associated with workers and contractors. In addition, the delivery of consumables and fuel would generate an additional four heavy vehicle two-way trips per day.

Although workers' light vehicle trips would mostly occur outside the commuter peak hours, it has been conservatively included in the traffic modelling for analytical purposes. Assuming the Quarry trucks would distribute evenly across the working hours, it is expected that the Project would generate the following trips:

- Stage 1 extraction
  - 33 two-way vehicle trips per peak hour for average production
  - 46 two-way vehicle trips per peak hour for maximum production
- Stage 2 extraction
  - 46 two-way vehicle trips per peak hour for average production
  - 56 two-way vehicle trips per peak hour for maximum production

During the construction phase, the Project would generate 36 heavy vehicle two-way trips and 26 light vehicle two-way trips per day. These are equivalent to 19 two-way trips per peak hour.

### **Traffic Impacts during Operation and Construction Phases**

Traffic modelling results indicate that traffic impacts during both operation and construction phases of the Project would be insignificant and the key intersections along the proposed transport routes would continue to operate satisfactorily at level of service B or better.

Typically Quarry trucks would not traverse Karuah town (unless products were to be delivered to an address in Karuah). This would virtually eliminate traffic impacts on the local community, tourist attractions and the public school in Karuah. In the event quarry products are to be despatched to locations within Karuah, it is most likely that a rigid delivery truck would be used to reach the destinations via Tarean Road.

### **Proposed Quarry Entrance**

The Quarry entrance and Quarry access road would be constructed to provide a long-term access to the Quarry from Blue Rock Close at a location near the existing vehicular access for Lot 11 DP1024564. The entrance design complies with the AS2890.2 requirements for a commercial driveway. Adequate line of sight is available at the proposed driveway location.

The Quarry access road would be constructed using appropriate road pavement materials and retained with a gravelled unsealed surface until the end of the site establishment and construction stage. Ultimately, the Quarry entrance would be sealed with asphalt.

A wheel wash would be constructed on a level section of the Quarry access road between the Quarry entrance and the Quarry infrastructure area to minimise the off-site dispersal of fine materials collected on vehicle tyres.

### **Road Safety Issues**

Road safety issues have been identified and are recommended to be addressed through MidCoast Council's road maintenance program:

- Sight line to the north from Andersite Road along The Branch Lane appears insufficient as it is impeded by the horizontal curve and the batter.
- Minor road maintenance is sought for repainting pavement marking in The Branch Lane.

### **Conclusions**

Traffic modelling results indicate key intersections would perform satisfactorily, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project and other surrounding quarry sites.

The Project would not impose any adverse impacts on the surrounding road network as a result of the increased traffic associated with construction and operational activities.

Road safety issues to be addressed include inadequate sight distance and insufficient delineation along The Branch Lane.

## **1. INTRODUCTION**

This report has been prepared on behalf of Wedgerock Pty Ltd (“the Applicant”) to present the findings of an assessment of the road transport environment in the vicinity of the Site for the Karuah South Quarry (the southern part of Lot 11 DP 1024564) (the Project) with a planned maximum production of 600,000 tonnes per annum.

The Site is located north of Blue Rock Close, Karuah, approximately four kilometres (km) northeast of the Karuah town centre within the MidCoast Local Government Area (refer to **Figure 1.1**).

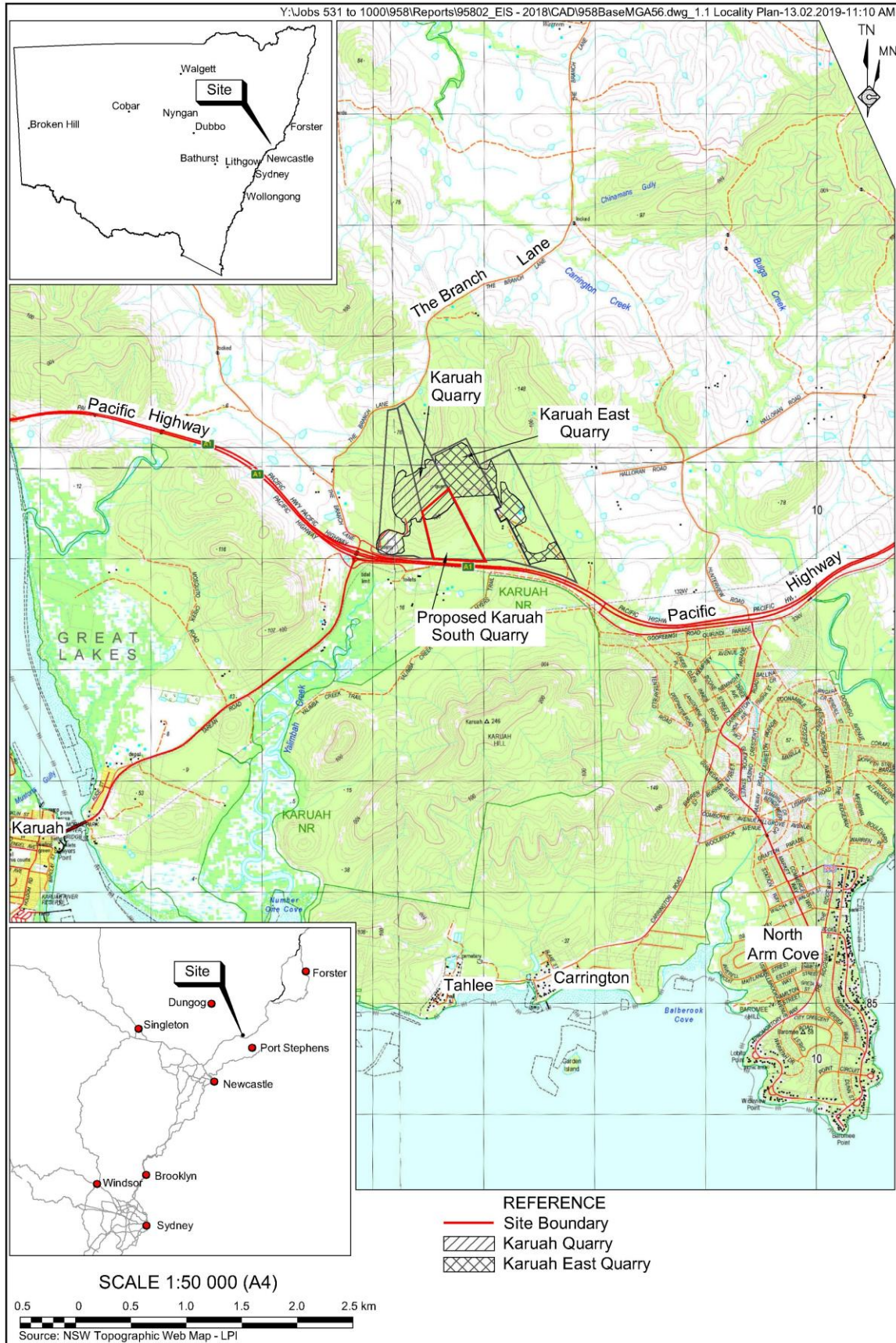
This report presents assessed road transport environment in the vicinity of the proposed Project and identify issues which may influence the proposed vehicular access arrangements for the Project.

In preparing this report, reference has been made to the following.

- Road and Related Facilities within the Department of Planning EIS Guidelines
- Section 2 Traffic Impact Studies of Roads and Maritime’s Guide to Traffic Generating Developments 2002
- Austroads Guide to Road Design Part 3: Geometric Design 2016
- Austroads Guide to Road Design Part 4A: Unsignalised Intersection 2017
- Australian Standard AS2890.2: Parking Facilities–Off Street Commercial Vehicle Facilities
- MidCoast Council Great Lakes Development Control Plan Part 10.

The remainder of this report is set out as follows.

- Section 2 presents an overview of the Project, to provide the context of the Project’s possible impacts on the surrounding road transport environment.
- Section 3 describes the existing road environment conditions in the vicinity of the Site, including the road network, public transport and school bus provisions, surrounding developments, historical growth in traffic, traffic volumes and composition, capacity of the road network and road safety history.
- Section 4 assesses the traffic impacts during the construction and operational phases of the Project.
- Section 5 details other traffic considerations including driveway design, parking provision, road safety issues, interaction with other quarry vehicles and local impacts of the Project.
- Section 6 provides a summary and conclusion of the assessment.
- Section 7 identifies the relevant section(s) of the Traffic and Transport Assessment where the requirements of the Secretary’s Environmental Assessment Requirements (SEARs) 17\_8795 and Roads and Maritime Services letter dated 19 October 2017 are addressed.



Source: RW Corkery & Co Pty Limited

### Figure 1.1 Site Location and its Surrounding Environment



## 2. DESCRIPTIONS OF THE PROJECT

### 2.1 SITE LOCATION

The Site is located in the southern part of Lot 11 DP 1024564 on the northern side of Blue Rock Close, Karuah, approximately 4km northeast of Karuah, within the MidCoast Local Government Area.

The Site is located immediately south of Karuah Quarry, operated by Hunter Quarries Pty Ltd and southwest of a second Hunter Quarry operation, Karuah East Quarry, for which approval was granted to Karuah East Quarry Pty Ltd in July 2014. Further details of the adjacent quarry are provided in Section 3.7.

The proposed entrance to the Site is located near the existing near the existing vehicular access in Blue Rock Close for Lot 11 DP1024564 as shown in **Figure 2.1**.



Figure 2.1 Local Setting

### 2.2 SITE ESTABLISHMENT AND CONSTRUCTION STAGE

During the first six months following Project commencement, a range of site establishment and construction activities would be undertaken within the Quarry infrastructure area to enable processing and product despatch to commence.

The Quarry entrance and Quarry access road would be constructed to provide the long-term access to the Quarry from Blue Rock Close at the location near the existing vehicular access for Lot 11 DP1024564. The Quarry access road would be constructed using appropriate road pavement materials and retained with a gravelled unsealed surface until the end of the site establishment and construction stage. Ultimately, the Quarry entrance would be sealed with asphalt.

A wheel wash would be constructed on a level section of the Quarry access road between the Quarry entrance and the Quarry infrastructure area to minimise the off-site dispersal of fine materials collected on vehicle tyres.

The ancillary components within the Site would involve a workshop area, light vehicle parking, staff amenities and Quarry office located east of the infrastructure area. This area would be configured in a manner that would limit any potential interaction between Quarry internal haul road operations, expedite product transport operations and separate light and heavy vehicle traffic.

## **2.3 EXTRACTION OPERATIONS**

The Applicant is proposing to develop and operate Karuah South Quarry on an 18ha area of land. Development Consent is sought to allow extraction/ processing up to 600,000 tonnes of material per year by drill and blast methods for a duration of approximately 25 years, comprising of five years in Stage 1 and 20 years in the Stage 2.

The Project would be developed in two stages:

- Stage 1 would involve a site establishment and construction stage and the initial period of extraction and processing of the resource on the southern side of the Karuah South Quarry.
- Stage 2 would involve the extraction of the remnant pillar of rock between the Stage 1 extraction area of the Karuah South Quarry and the southern limit of the floor of the Karuah Quarry.

The Stage 1 extraction area covers approximately 4.9ha and is estimated to yield approximately 1.7 million tonnes of saleable products. The Stage 2 extraction area covers a further 5.9ha and would enable 9.6 million tonnes of saleable products to be produced.

It is noted that extraction operations in the Stage 2 extraction area would not commence until the licence held by Hunter Quarries over the northern part of Lot 11 DP 1024564 expires.

The extraction sequence within the Stage 1 and 2 extraction areas would occur in sub-stages, with indicative timing as follows.

- Stage 1A: Year 1
- Stage 1B: Year 2 to Year 3
- Stage 1C: Year 4 to Year 5
- Stage 2A: Year 6 to Year 8
- Stage 2B: Year 9 to Year 15
- Stage 2C: Year 16 onwards

Stages 1C and 2B have been chosen for the cumulative impact assessment based on considerations for noise, air and traffic impacts. Specifically, mobile equipment would be operating with the greatest degree of exposure during these stages which has implications for environmental impacts.

The mobile crushing and screening plant would be capable of producing a nominal maximum 450 tonnes of product per hour. A number of operational constraints are likely to influence the hourly operating capacity. For analytical purposes, it is understood that the maximum production would be up to 300,000tpa in Stage 1 and up to 600,000tpa in Stage 2.

The bulk of the products would be despatched from the Site using truck and dog trailers of various configurations, i.e. with a capacity of between 32.5t and 37.5t, smaller quantities of products would be despatched by semi-trailers (27.5t to 30t capacity) or rigid trucks (12.5t to 18t capacity). For analytical purposes, it has been assumed 19m long heavy vehicles would be used for despatch which have been included in the traffic modelling to be discussed in **Section 4**.

Traffic levels would vary substantially on a daily basis throughout the life of the Project. For the purposes of this assessment, the number of daily loads despatched would vary from 12 to 72 and average 36 loads, i.e. when annual production is typically around 300,000tpa. When annual production levels of 600,000tpa are being achieved, the number of daily loads despatched would vary from approximately 20 to 120 and average approximately 72 loads.

These have formed the basis for traffic generation to be discussed further in **Section 4.1.1**, with consideration given to average and maximum productions in both Stages 1C and 2B.

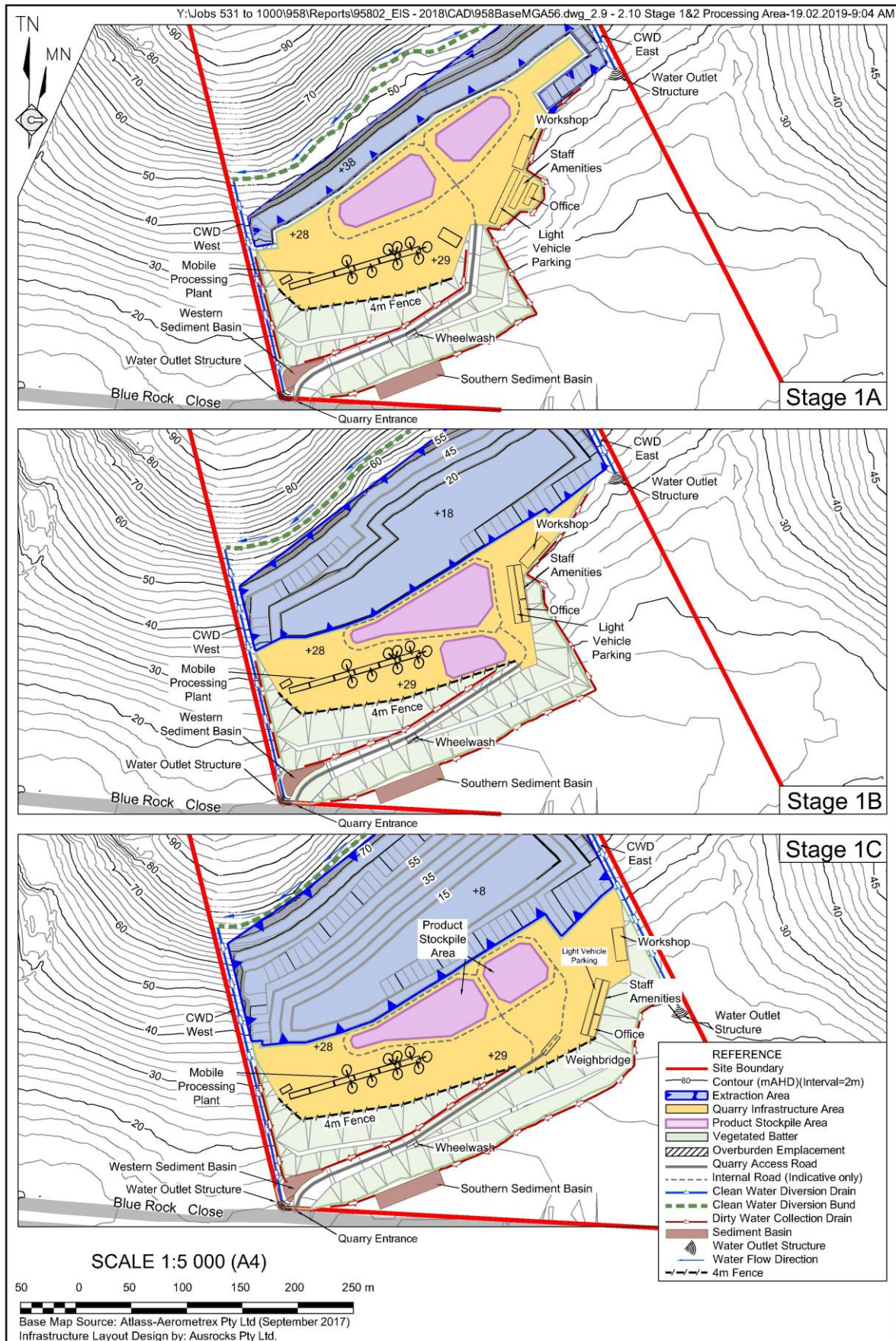
## **2.4 INTERNAL LAYOUT**

### **2.4.1 Stage 1**

During Stage 1, the Project would comprise the following main components as shown in **Figure 2.2**:

- An extraction area (Stage 1) covering approximately 4.9ha.
- Quarry infrastructure area.
- Product stockpiling areas located south of the extraction area.
- A mobile processing plant and related infrastructure located immediately south of the extraction area.
- Ancillary area including a workshop area, light vehicle parking, staff amenities and Quarry office located east of the infrastructure area.
- Internal road to provide access for off-road haul trucks between the extraction and processing area.
- Quarry access road as an inclined road extending from the Quarry entrance to the southern side of the Quarry infrastructure area. The Quarry access road would be sealed prior to any products being transported from the Site and provides access to the Site for light and heavy road registered vehicles.





**Figure 2.2 Stage 1 Indicative Infrastructure Pad Layout**

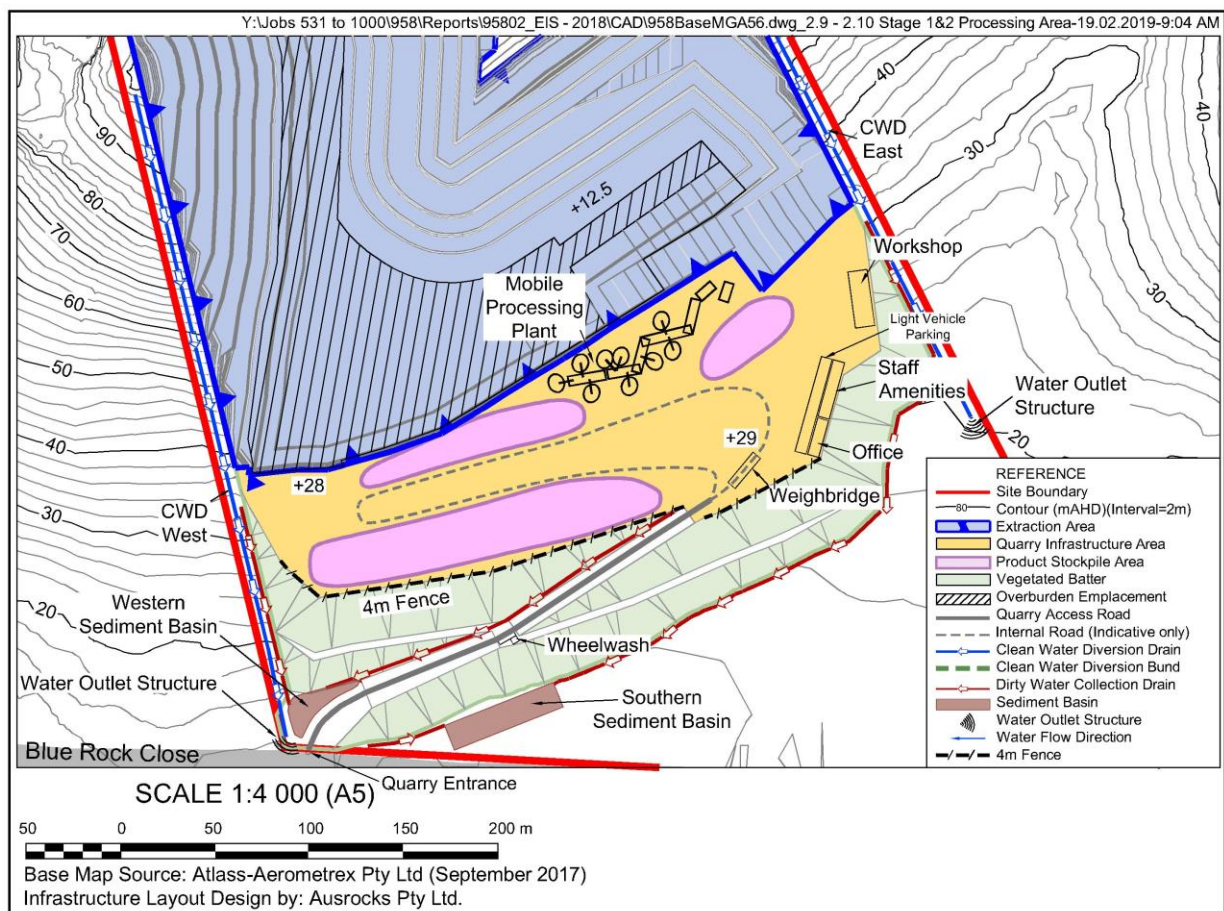


Road-registered trucks would be separated as much as possible from off-road haul trucks on site by restricting road-registered trucks to the product stockpiling area.

All light vehicles arriving on site would be directed to the light vehicle parking near the Quarry office.

## 2.4.2 Stage 2

By the commencement of Stage 2, the layout of the Quarry infrastructure area, including the processing and stockpiling areas, would be reconfigured to minimise haulage distances (see **Figure 2.3**). This reconfiguration would involve the relocation of the mobile processing plant to the eastern section of the Quarry infrastructure area and an extension of product stockpiling areas within the northern and western sections of the Quarry infrastructure area.



**Figure 2.3 Stage 2 Indicative Infrastructure Pad Layout**

## 2.5 QUARRY ENTRANCE

Access for all vehicles to the Site would be via a new entrance to Lot 11 DP 1024564 from Blue Rock Close. The location of the new entrance would be close to the existing entrance to the property. **Figure 2.4** shows the proposed layout of the new entrance to the Site. The Quarry Entrance has been designed in accordance with Australian Standard AS2890.1 and provides for separate entry and exist lanes divided by a median barrier approximately 20m long.

**Figure 2.4** also shows the swept path of a 19m semi-trailer, i.e. the largest vehicle with the widest turning circle to enter the Site. From the Quarry Entrance, vehicles would travel up an inclined section of road for a distance of approximately 250m to the Quarry infrastructure area.

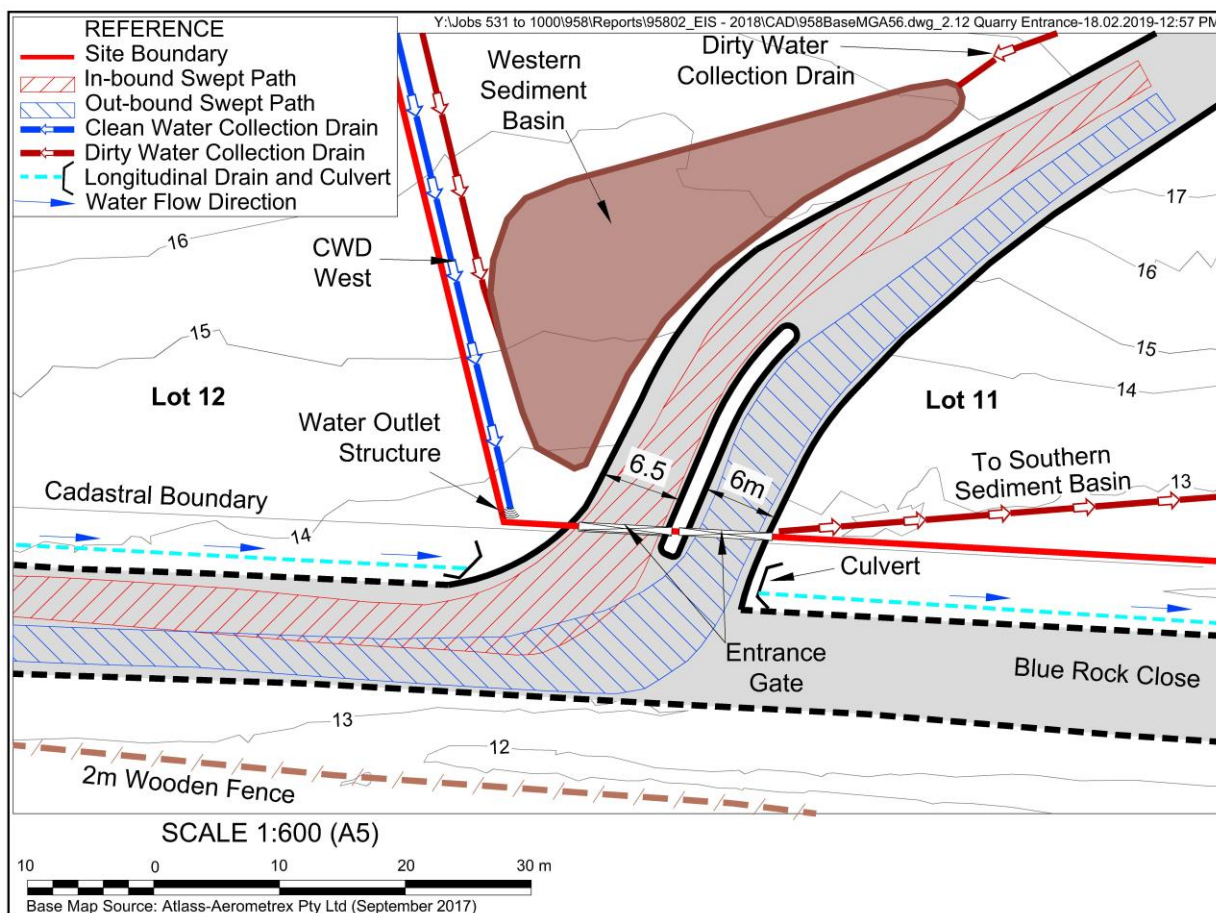


Figure 2.4 Quarry Entrance

## 2.6 PROPOSED TRANSPORT ROUTES

Access to Karuah South Quarry is via Blue Rock Close, Andersite Road and The Branch Lane. Quarry products are to be despatched by road using the existing road network to the Hunter and Greater Sydney Metropolitan Regions via the Pacific Highway. The proposed transport routes as shown in **Figure 2.5** are designed to minimise impacts on the Karuah town centre and public school. The bulk of the trucks to be used for product transportation would be 19m trucks and trailers.

A significant proportion of the proposed transport route has recently been upgraded to accommodate B-Double trucks between the Pacific Highway interchange and the eastern end of Blue Rock Close. The recent upgrade was undertaken as part of the development consent for the Karuah East Quarry development that is located immediately east of the Site.

Based on the swept path diagrams as shown in **Figure 2.6** and **Figure 2.7**, the Andersite Road intersections with Blue Rock Close and The Branch Lane are sufficient to cater for two passing B-Double trucks turning into and out of Andersite Road at the same time.

Site observations indicate that the largest vehicle type accessing the Karuah Quarry and Karuah East Quarry was trucks and trailers, similar to the proposed Quarry truck type that would be using for the Project.



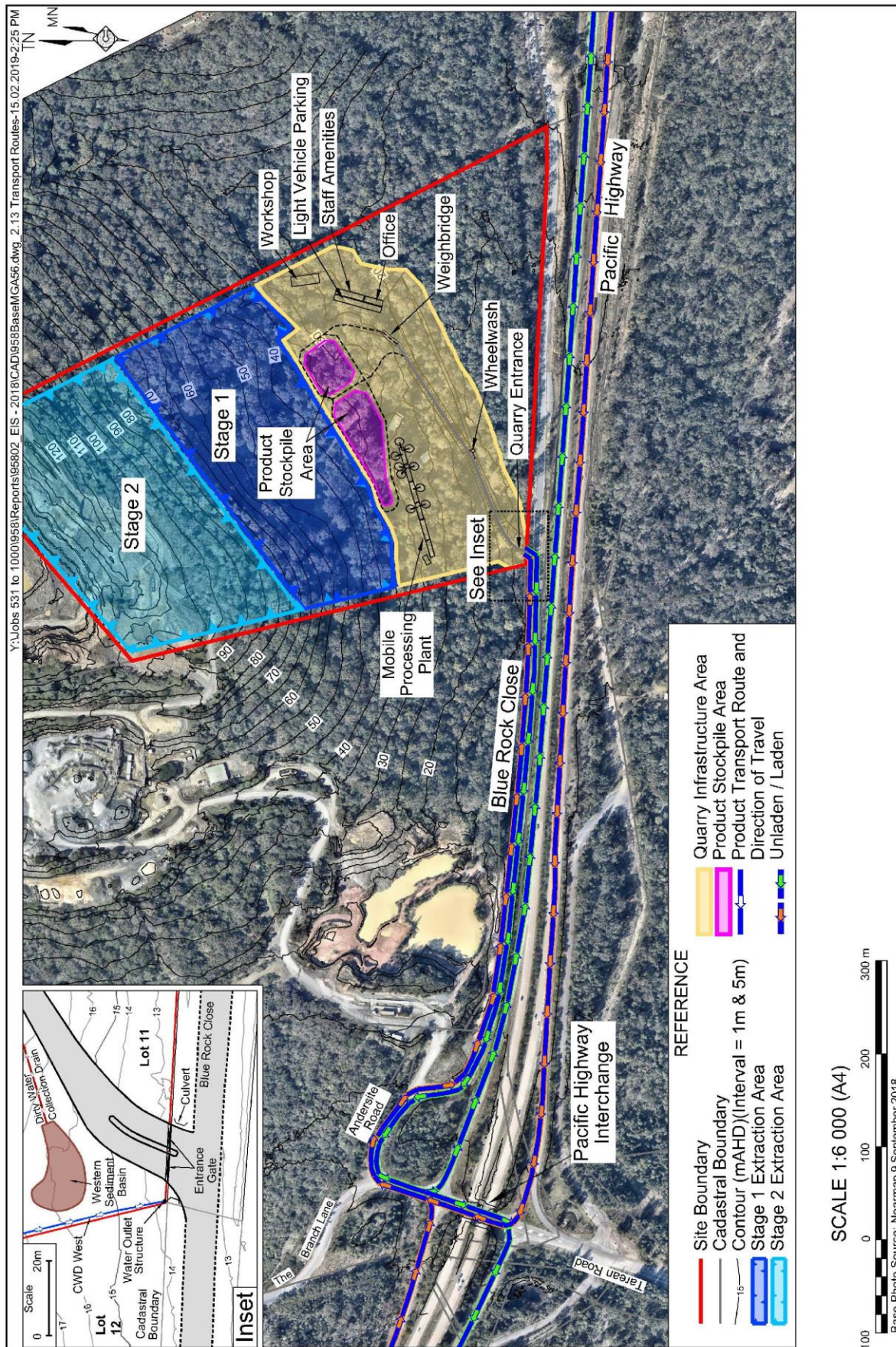
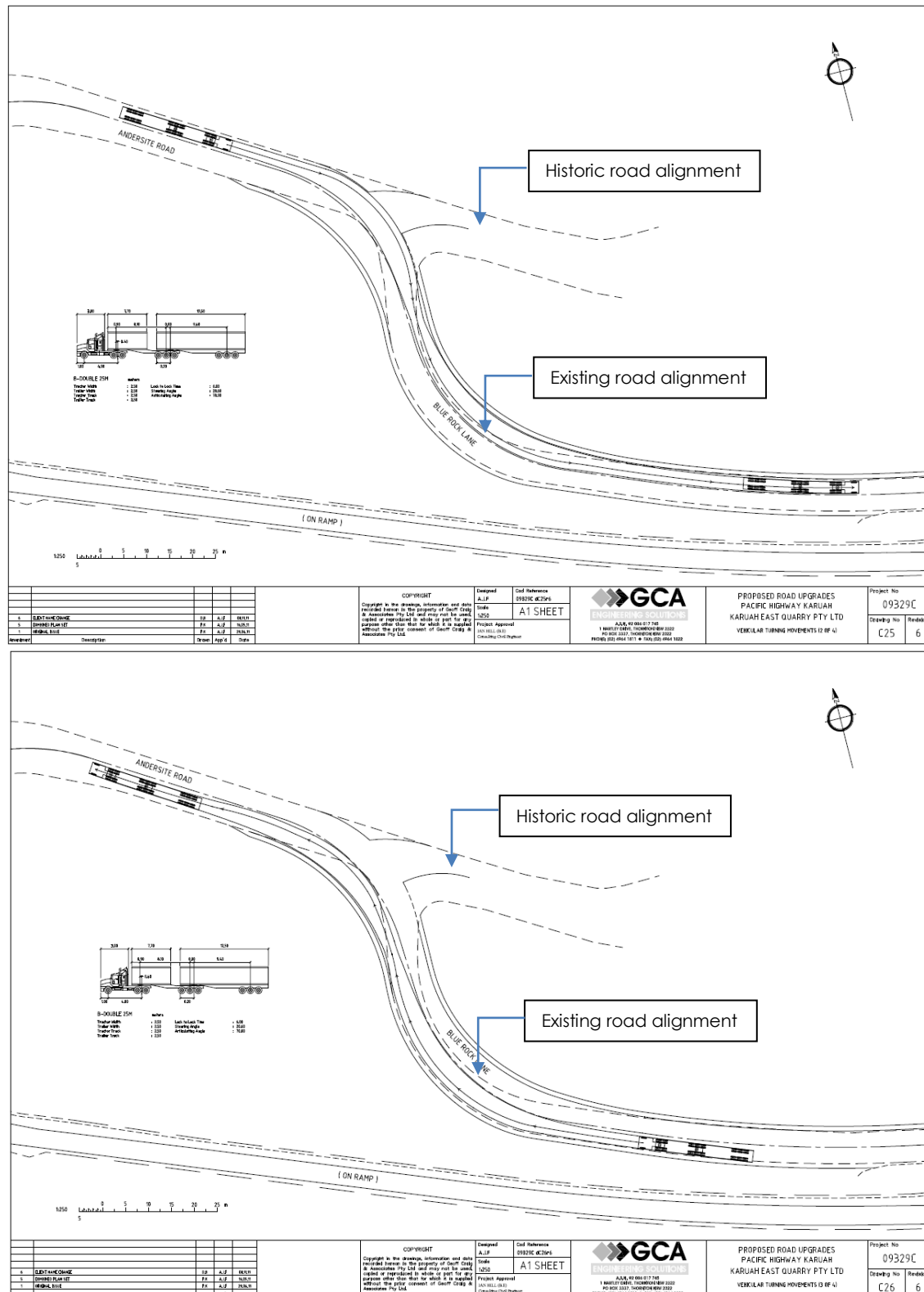


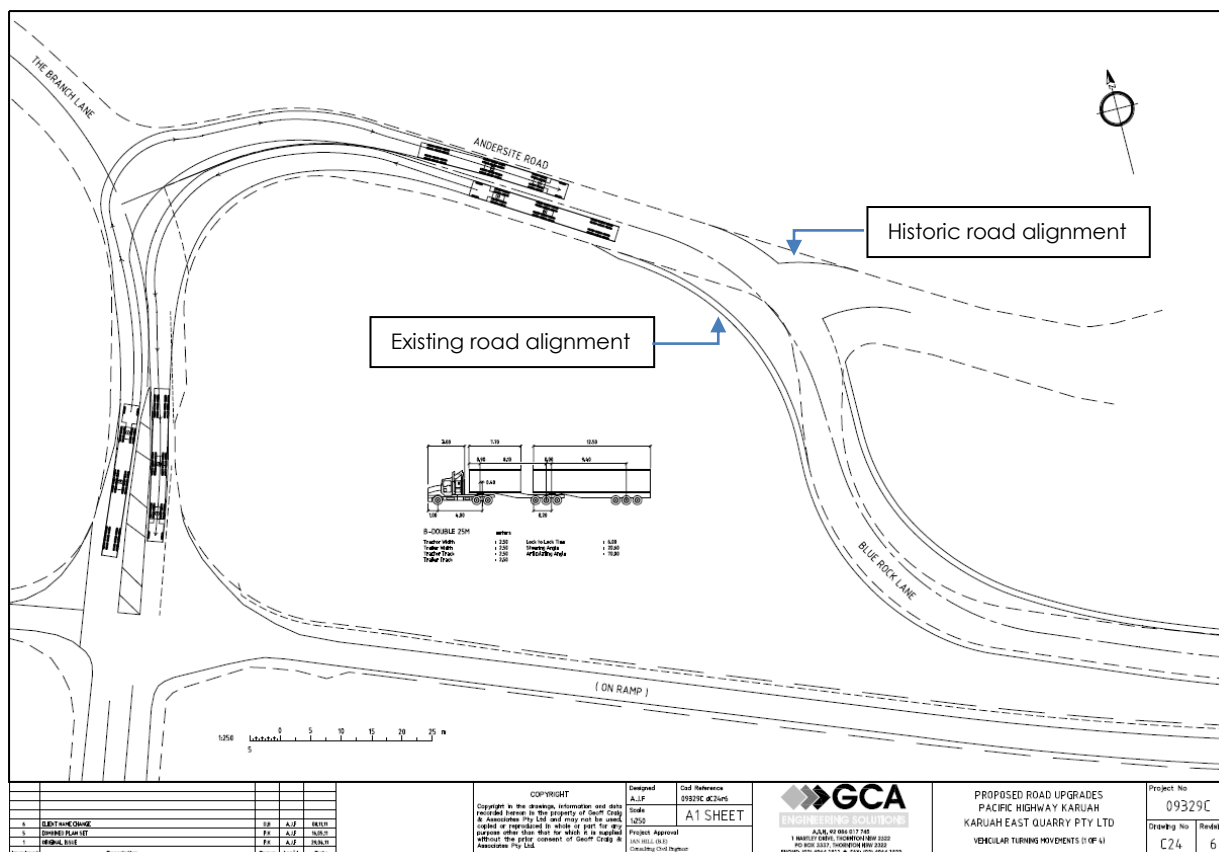
Figure 2.5 Proposed Transport Routes





Source: Karuah East Quarry Proposed Road Upgrade and Extension, GCA (2011)

**Figure 2.6 B-Double Swept Paths at the Andersite Road intersection with Blue Rock Close**



Source: Karuah East Quarry Proposed Road Upgrade and Extension, GCA (2011)

**Figure 2.7 B-Double Swept Paths at the Andersite Road intersection with The Branch Lane**

In light of this, the proposed transport routes are considered appropriate for the 19m truck and trailer which is the largest vehicle type that would access the Site.

## 2.7 WORKFORCE

During the six month site establishment and construction stage, a total of 10 fulltime equivalent positions would be created.

During operations, the Project would employ approximately 14 to 20 full time people. This would increase to 16 to 20 when the Quarry is operating at maximum production levels. A further 8 to 10 contractors and transport sub-contractors would be employed when production levels are approximately 300 000tpa.

## 2.8 HOURS OF OPERATION

The proposed hours of operation for a range of proposed activities are listed as follows:

- Site establishment and construction: 7am-6pm Monday to Friday and 7am-1pm Saturday.
- Extraction and processing operations: 7am-6pm Monday to Friday and 7am-1pm Saturday.

- Blasting operations: 10am-4pm Monday to Friday.
- Processing operations: 7am-6pm Monday to Friday and 7am-1pm Saturday.
- Transport operations: 5am-6pm Monday to Friday and 5am-1pm Saturday<sup>1</sup>.
- Maintenance operations: 24 hours Monday-Saturday.

No activities would be carried out on Sundays and public holidays.

The hours of operation nominated above are those that the activities on site would operate within, not that they would be operating throughout the entire nominated periods. That is, the nominated hours would provide the flexibility needed to undertake all Project-related activities, when required. The flexibility achieved by the proposed operating hours would be important in order that the Operator can respond to large volume or urgent orders from its customers.

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<sup>1</sup> The 5am start for product despatch is subject to Noise Assessment.

### 3. EXISTING ROAD TRANSPORT ENVIRONMENT

This section describes the existing road transport conditions in the vicinity of the and presents the current approved B-Double routes, road descriptions, public transport and school bus services, surrounding developments, historical growth in traffic, traffic volumes and composition and road safety history. The road network analysed includes the key intersections along Blue Rock Close, Andersite Road, The Branch Lane and Tarean Road. The review of the road transport environment focuses on these roads.

#### 3.1 APPROVED B-DOUBLE ROUTE

Both the Pacific Highway and The Branch Lane are approved General Mass Limit (GML) 25m B-Double routes as shown in the green line in the Restricted Access Vehicle Map in **Figure 3.1**. This indicates the proposed trucks and trailers to be used as Quarry trucks are permitted to access the Site via these roads that are approved for B-Double use.

#### 3.2 ROAD NETWORK

The road network near the Site is described below.

##### 3.2.1 Blue Rock Close

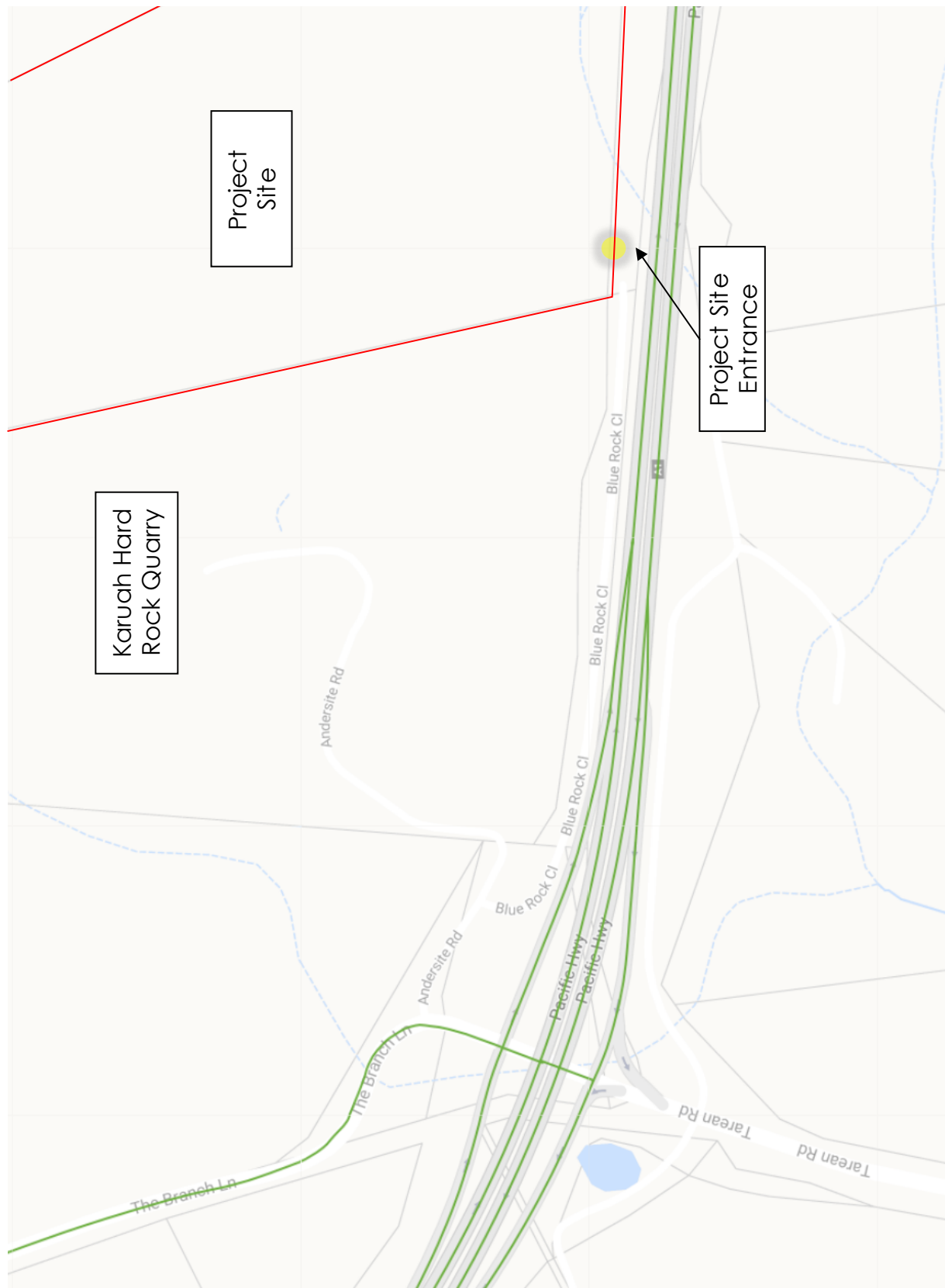
Blue Rock Close is a two-way two-lane local road under the jurisdiction of MidCoast Council that runs east-west parallel to the Pacific Highway. Blue Rock Close has recently been sealed and extended to the east to serve Karuah East Quarry that was granted development consent in 2014.

Blue Rock Close is generally 8m wide between kerbs or sealed shoulder is provided where kerb and gutter are not available. Blue Rock Close connects with Andersite Road to the west at a priority-controlled T-junction that has been realigned to make Blue Rock Close a priority road, with the Karuah Quarry access road reduced to a minor road. The pavement at the intersection has been widened to accommodate simultaneous turning movements of B-Double vehicles. Blue Rock Close has a posted speed limit of 50 km/hr.

The terrain in Blue Rock Close is generally level in the eastern end, albeit more undulating in the section between Andersite Road and the Site Entrance (refer to **Plate 3.1**).

The Site Entrance of the Site is located in Blue Rock Close approximately 600m from Andersite Road. There is a slight crest located west of the Site Entrance, but the minimum gap sight distance requirement is satisfactorily (refer to Section 5.1 for further information).





Source: Roads and Maritime Services, NSW Combined Higher Mass Limits and Restricted Access Vehicle Map

**Figure 3.1 Approved B-Double Routes**



Looking east from Blue Rock Close (south of Andesite Road)

**Plate 3.1 Blue Rock Close**

### **3.2.2 Andersite Road**

Andersite Road is a two-way two-lane local road under the jurisdiction of MidCoast Council. Andersite Road connects with The Branch Lane at its western end and provides access to the Karuah Quarry at its eastern end. The posted speed limit is 50 km/hr along Andersite Road.

### **3.2.3 The Branch Lane**

The Branch Lane is a two-lane two-way local road under the jurisdiction of MidCoast Council. The Branch Lane provides access to the Pacific Highway interchange to the south and extends to the north to Booral Road. The Branch Lane is sealed and has a posted speed limit of 60 km/hr in the vicinity of the Site.

### **3.2.4 Tarean Road**

Tarean Road is a two-lane two-way local road under the jurisdiction of MidCoast Council. Tarean Road is the “Old Pacific Highway” through Karuah town centre and provides access to two interchanges with the Pacific Highway at its eastern and western ends. Tarean Road has a general posted speed limit of 80 km/hr and it reduces to 60 km/h as it passes through Karuah town centre (where there is also a short length of 40km/h school zone).

### **3.2.5 Pacific Highway**

Pacific Highway is a State Highway (SH10) that connects with the New England Highway near Hexham, Newcastle and the Pacific Motorway, Brunswick Heads, New South Wales/Queensland border. In the vicinity of the Site, the Pacific Highway is known as the “Karuah Bypass”, with two travel lanes in each direction and a posted speed limit of 110 km/hr. The closest interchange to enter the Site is via Tarean Road (western end) and The Branch Lane, which allows access to the Site from both directions of the Pacific Highway.

## **3.3 PEDESTRIAN AND CYCLIST ACTIVITIES**

There is limited pedestrian or cyclist activity along the road network in the vicinity of the Site. As such, it is anticipated that there would not be any significant impacts on pedestrians and cyclists as a result of the increased traffic movements associated with the Project.

## **3.4 COACH SERVICES**

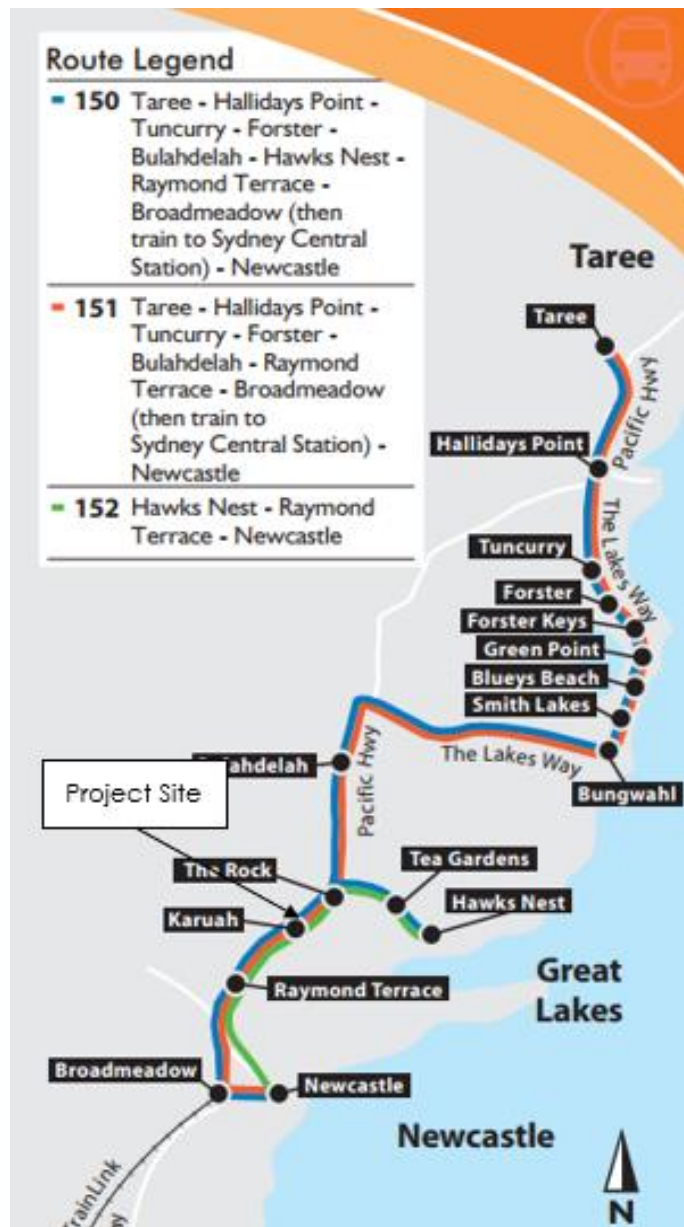
The closest coach stop is provided in Tarean Road adjacent to Karuah Motor Inn, approximately 4km southwest of the Site. The operator, Busways, provides a number of long distance coach services in Great Lakes Region that traverse the Tarean Road interchange (previously referred to as Pacific Highway Interchange), via the Pacific Highway westbound off-ramp in the southern interchange and Tarean Road towards Karuah town in the southbound services; and via Tarean Road and the eastbound on-ramp in the northern interchange towards Pacific Highway in the northbound services.

The bus routes as shown in **Figure 3.2** include:

- Route 150 (Taree to Newcastle via Forster) – two services in each direction on weekdays (one service in each direction on weekends)
- Route 151 (Taree to Newcastle via Forster) – one service in each direction on weekdays and weekends
- Route 152 (Newcastle to Hawks Nest) – one service in each direction on weekdays.

Most of these coach services stop at the Karuah stop during the commuter peak periods (typically 7am to 9.30am and 3.45pm to 6pm), with one northbound service that occurs around midday.

Based on the above information, it is anticipated that there would be some interactions between the coaches and Quarry traffic at the Pacific Highway interchange (i.e. the eastbound on-ramp in the northern interchange and westbound off-ramp in the southern interchange). Any opposing movements would be controlled at the priority-controlled intersections at the interchange.



Source: Busways, Great Lakes Buses

Figure 3.2 Bus Routes

### 3.5 SCHOOL BUS SERVICES

School bus stops are provided at various locations along Tarean Road within Karuah. The school bus operator, Busways, provides a number of school bus services that traverse Tarean Road interchange, via the Pacific Highway westbound off-ramp and Tarean Road towards Karuah town in the southbound services; and via Tarean Road and the eastbound on-ramp towards Pacific Highway in the northbound services.

These bus routes serve a number of schools including Hunter River High School, Medowie Christian School, San Clemente High School, Arrowing High School, Irrawang Public School, Raymond Terrace Public School, St Brigit's Primary School and Karuah Public School.

The morning school bus runs typically occur between 7am and 8:35am before school and between 3pm and 4:15pm after school.

It is noted that no school buses currently travel along The Branch Lane, north of the Tarean Road interchange.

Based on the above school bus routes, it is anticipated that there would be some interactions between coaches, school buses and Quarry traffic at the Pacific Highway interchange (i.e. the eastbound on-ramp and westbound off-ramp). School buses and Quarry trucks generally would not travel in the same route when traversing the interchange. Any opposing movements would be controlled at the priority-controlled intersections at the interchange.

### **3.6 TRAIN SERVICES**

No train services are provided in the vicinity of the Site.

### **3.7 SURROUNDING DEVELOPMENTS**

The following three existing or proposed quarries located adjacent to the Site which are detailed in the following sections:

- Existing quarries:
  - Karuah Quarry – operated by Hunter Quarries Pty Ltd.
  - Karuah East Quarry – operated by Karuah East Quarry Pty Ltd (a fully-owned subsidiary of Hunter Quarries Pty Ltd).
- Proposed quarry:
  - Karuah Red Quarry – proposed by Hunter Quarries Pty Ltd.

Hunter Quarries Pty Ltd is hereafter referred to as “Hunter Quarries”.

**Figure 3.3** shows the location of the existing and proposed quarry sites located adjacent to the Site.

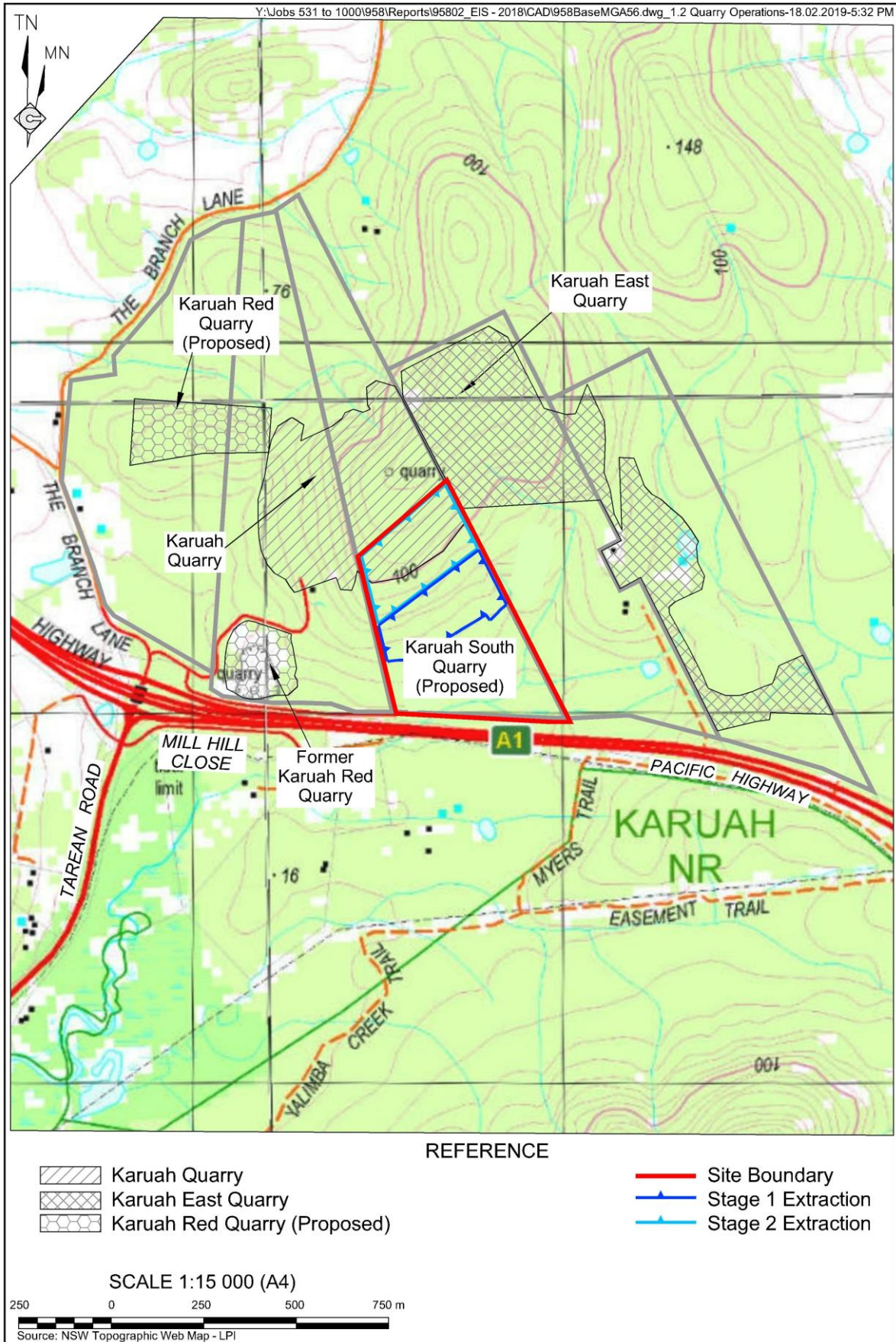
#### **3.7.1 Karuah Quarry**

Karuah Quarry is located immediately north and west of the Site. Access to the Quarry is off Andersite Road. It is understood that the approved maximum yearly extraction is 500,000tpa.

A total of 15 personnel including company truck drivers are employed during maximum production.

It is envisaged that truck movements associated with Karuah Quarry would be 120 to 144 truck movements i.e. average 60 to 72 loads per day. Production at the Quarry is to be scaled down from 2018 as production at the Karuah East Quarry commences and is scaled up.





**Figure 3.3 Existing and Proposed Quarry Sites Located Adjacent to the Site**

The quarry operations are from 7:00am to 6:00pm Monday to Friday and from 7:00am to 1:00pm Saturdays, public holidays excluded. Products are despatched from the Karuah Quarry from Monday to Saturday.

### **3.7.2 Karuah East Quarry**

Karuah East Quarry was granted approval in 2014 and is located east of the Site. The approved maximum annual extraction is 1.5 million tpa and the maximum traffic generation would be 432 truck trips (two-way) per day.

Access to Karuah East Quarry is via the recently upgraded Blue Rock Close. It is expected that the quarry would be fully operational by late 2018 and operate for a period of 20 years.

A total of 21 personnel (at maximum production) are employed during operations in addition to seven company truck drivers.

It is envisaged that truck movements associated with Karuah Quarry would be 432 truck movements per day i.e. a maximum of 216 loads per day.

The quarry operations and product despatch occur from 7:00am to 6:00pm Monday to Friday and from 7:00am to 1:00pm Saturdays, public holidays excluded.

### **3.7.3 Karuah Red Quarry**

Hunter Quarries is intending to develop a further extraction area to recover and produce "Karuah Red" products from its land west of its Karuah Quarry, i.e. on Lot 21 DP 1024341 and Lot 201 DP 1042537. Hunter Quarries has sought Secretary's Environmental Assessment Requirements (SEARs) for an EIS for this further extraction operation with the key components of the Proposal presented as follows.

- The Proposal would involve the extraction of approximately 100 000 tonnes of red rhyodacite material each year for processing at the existing fixed plant within the Karuah Quarry. An estimated resource of 2 000 000 tonnes within the proposed extraction area would result in an expected Project life of up to 20 years.
- Extraction operations would involve drilling, blasting and loading rock within the extraction area prior to haulage to the Karuah Quarry processing area.
- The Proposal would utilise much of the infrastructure already established within the footprint of the Karuah Quarry on Lot 21 DP 1024341 namely the internal road network, administration offices, worker amenities and weighbridge.
- A total of three full-time personnel are expected to be employed during operations in addition to contract labour.
- The hours of operations and product despatch are proposed to be the same as those for the Karuah Quarry, namely from 7:00am to 6:00pm Monday to Friday and from 7:00am to 1:00pm on Saturday. Operations would not be carried out on Sunday or Public Holidays.

It is planned that all processing would be undertaken at the existing Karuah Quarry processing plant, albeit for shorter periods given the plant's current production capacity of 500,000tpa exceeds the proposed 100,000tpa production level from the proposed Karuah Red Quarry.

It is envisaged that truck movements associated with delivery of "Karuah Red" products would vary between 24 and 32 per day, i.e. 12 loads to 16 loads per day.

### **3.7.4 Cumulative Impact Assessment**

Research on the Department of Planning and Environment and MidCoast Council websites indicates there have not been any other approved major projects that may affect the Project.

Notably, traffic generated by the existing quarry has already been accounted for in the intersection movement counts undertaken in February 2018 (refer to Section 3.10) that would be considered for the baseline traffic volumes at the surveyed intersections.

The traffic assessment considers a cumulative impact assessment with consideration given to the following:

- Production at the Karuah Quarry would be solely related to production from the Karuah Red Quarry, as such the associated traffic would still be included in the assessment for the construction year and Stage 1 extraction of the Project, but would be excluded from the assessment for Stage 2 extraction of the Project.
- Construction of Karuah East Quarry would have been completed prior to the site establishment and construction of the Project.
- Commencement of extraction operations at the Karuah Red Quarry with products produced at the Karuah Quarry. It is envisaged that this would commence during Stage 2 extraction of the Project.
- Concurrent operation activities at the Karuah East Quarry, the Site and the Karuah Red Quarry in the Stage 2 extraction of the Project, while Karuah Quarry is eased from operation.

Assessment scenarios have been developed to represent the peak operational activities at the site, namely, Stage 1C (Year 5) and Stage 2B (Year 15) as discussed in **Section 2.3**. The cumulative impact assessment is discussed in detail in **Section 4**.

## **3.8 HISTORIC TRAFFIC GROWTH**

Roads and Maritime Services publishes traffic volume data at selected locations on the roads it manages. However, there is no full traffic volume data available in the classified roads in the vicinity of the Site.

Consultations with an officer from MidCoast Council indicates there is no suitable traffic volume data in the Karuah area to enable establishment of a traffic growth rate of the road network adjacent to the Site. The officer advised that a traffic counter was placed in December 2014 for a period of three weeks on The Branch Lane (300m north of the Andersite Road) where the average daily traffic volume was 148 vehicles with heavy vehicles accounting for 7.3 percent. The officer also suggested that a growth rate of no more than one percent per annum



would be applicable for the roads surrounding the Site including The Branch Lane and Tarean Road.

Therefore, a conservative growth rate of one percent per annum on the background traffic has been adopted in this assessment, plus additional traffic associated with quarry activities of the adjoining sites in different assessment years as discussed in **Section 3.7**.

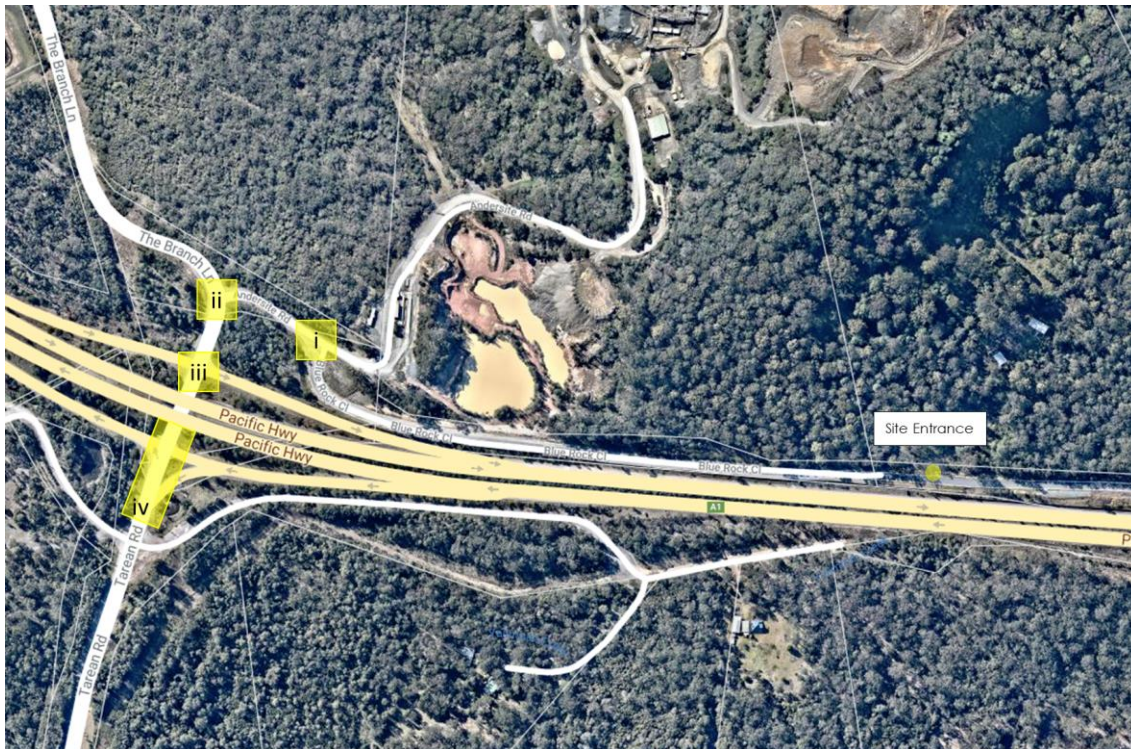
### **3.9 TRAFFIC SURVEY**

To quantify current traffic conditions on the immediate roads serving the Site, a program of traffic surveys was commissioned by TTPP.

Intersection turning movement counts were undertaken on Tuesday, 6 February 2018 from 5:00am to 9:00am, and from 3:00pm to 7:00pm. These periods represent the highest background traffic volumes during the commuter peak periods, and the potential peak traffic volumes that would be generated by the various Quarry sites when employees travel to/from work and during haulage operations. Subsequently, it is considered that these time periods are representative of the typical Site peak traffic volumes that would occur during the proposed Quarry working hours i.e. including the quarry working hours and the commuter peaks at the following intersections (**Figure 3.4**):

- i. Andersite Road intersection with Blue Rock Close (priority controlled)
- ii. The Branch Lane intersection with Andersite Road (priority controlled)
- iii. Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp (priority controlled)
- iv. Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp (priority controlled).

**Appendix A** shows traffic survey data.



Base map: Nearthmap (as of 9 September 2018)

Figure 3.4 Traffic Survey Locations

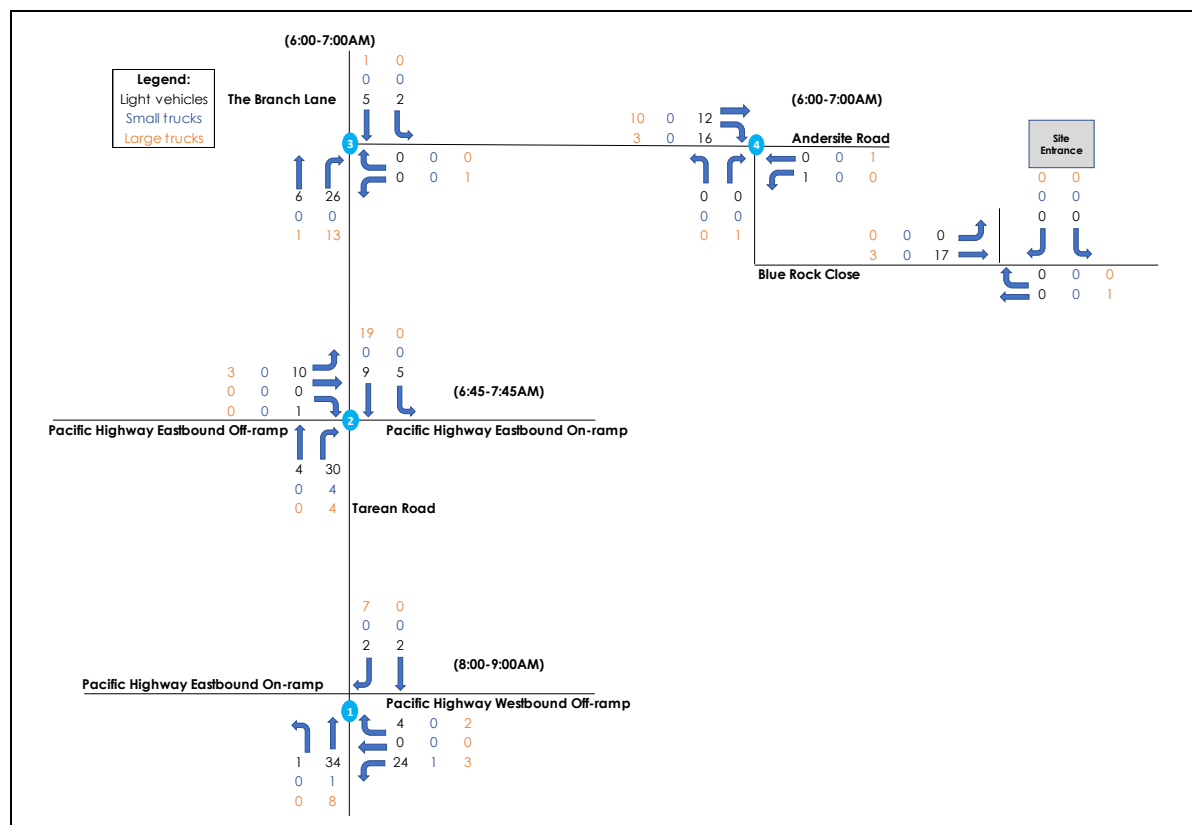
### 3.10 PEAK HOUR TRAFFIC VOLUMES AT SURROUNDING KEY INTERSECTIONS

Figure 3.5 and Figure 3.6 presents the weekday hourly volumes at key intersections during the AM and PM peak hours recorded on Tuesday, 6 February 2018. Notably, the highest hourly traffic volumes occurred at different hours at the key intersections and have been conservatively considered in the traffic assessment as a worst case scenario.

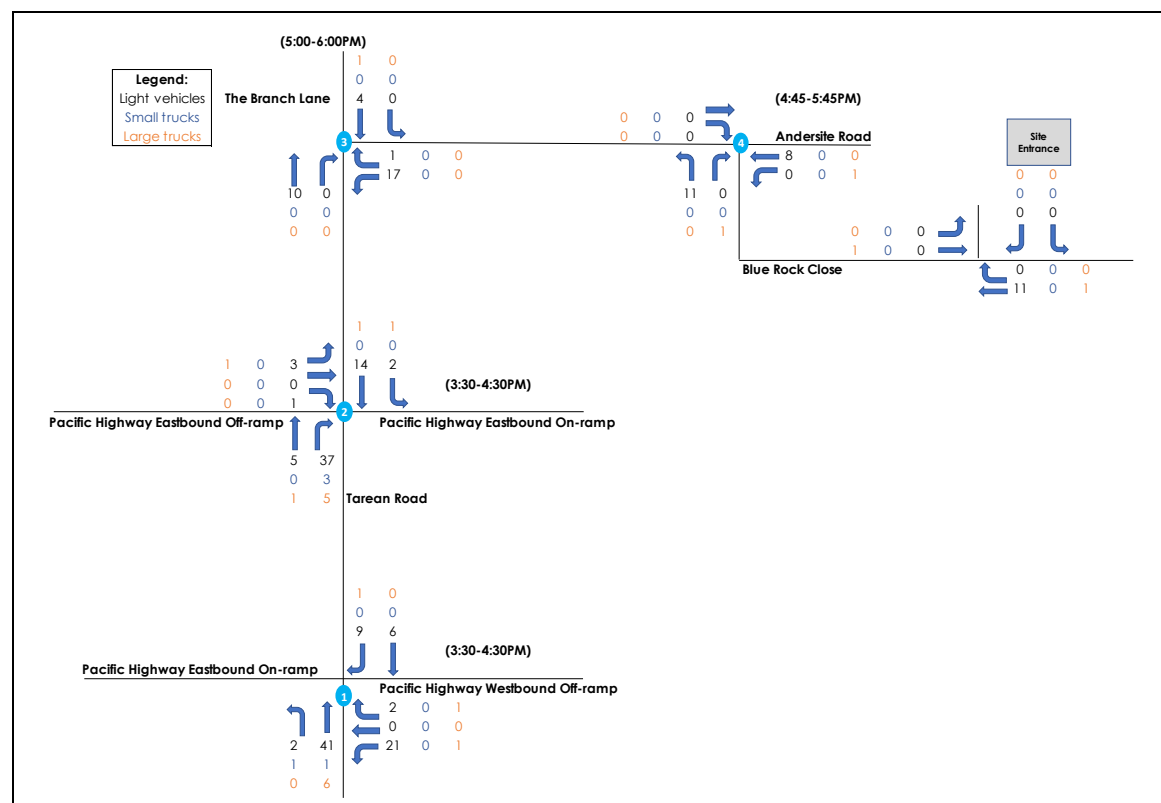
Figure 3.5 and Figure 3.6 indicate that the traffic volumes are low in the vicinity of the Site during the individual peak hours:

- Andersite Road carried in the order of 40 vehicles (2-way) in the AM peak hour and 20 vehicles (2-way) in the PM peak hour. While heavy vehicles made up 33 percent of the total traffic in the AM peak hour, there was no heavy vehicles recorded in the PM peak hour, indicating product despatch from the Karuah Quarry had eased before 4.45pm on the survey day.
- The Branch Lane carried in the order of 50 vehicles (2-way) in the AM peak hour and 35 vehicles (2-way) in the PM peak hour. Heavy vehicles made up 44 percent of the total traffic in the AM peak hour and reduced to 12 percent in the PM peak hour.

It is presumed that most of the commuter traffic from Karuah destined for Newcastle and its suburbs of a morning would travel southwards via Tarean Road to the Southern Tarean Road Interchange. Likewise, of an afternoon, commuter traffic travelling to Karuah would approach Karuah from the Southern Tarean Road Interchange.



**Figure 3.5 Surveyed AM Peak Hour Traffic Volumes (vph)**



**Figure 3.6 Surveyed PM Peak Hour Traffic Volumes (vph)**

Key findings based on the traffic survey include:

- Of the 13 heavy vehicles turning right from The Branch Lane into Andersite Road in the AM peak hour between 6:00am and 7:00am, 12 of them (92 percent) came from the Pacific Highway where they turned left from the eastbound off-ramp into The Branch Lane, and one truck (8 percent) turned right from the Pacific Highway westbound off-ramp into Tarean Road, before they made the northbound right turn movement into Andersite Road.
- Most light vehicles left the existing Karuah Quarry between 5:00pm and 6:00pm (57 percent) however some left earlier between 3:30pm and 4:30pm (36 percent) which is the PM peak hour at the Pacific Highway Interchange. Conservatively, this traffic assessment has assumed 100 percent of the Project traffic would occur during the individual peak hours at the intersections albeit realistically only a proportion of quarry workers would leave work during the commuter peak hours (3:30pm to 4:30pm).

### 3.11 INTERSECTION OPERATING CONDITIONS

The operation of the intersections near the Site has been assessed using SIDRA INTERSECTION version 8, a computer-based modelling package which calculates intersection performance. Intersection configurations were sourced from the road layout diagrams provided by the Roads and Maritime Services.

The SIDRA modelling provides useful indicators to determine the level of intersection performance. Level of Service (LoS) is a basic performance parameter used to describe the operation of an intersection. LoS indicators range from A (indicating good intersection operation) to F (indicating over-saturated conditions with long delays and queues). At signalised intersections, the LoS criteria relate to average intersection delay (seconds per vehicle). At priority controlled (give-way and stop controlled) and roundabout intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement (refer to **Table 3.1**).

**Table 3.1 Level of Service Criteria**

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	good operation	good operation
B	15 to 28	good with acceptable delays and spare capacity	acceptable delays and spare capacity
C	29 to 42	satisfactory	satisfactory, but accident study required
D	43 to 56	operating near capacity	near capacity and accident study required
E	57 to 70	at capacity At signals, incidents will cause excessive delays.	at capacity, requires other control mode
F	Greater than 71	unsatisfactory with excessive queuing	unsatisfactory with excessive queuing; requires other control mode

Source: RMS Guide to Traffic Generating Developments, 2002

**Table 3.2** shows the SIDRA modelling results of the intersections performance under current traffic conditions. All analysed intersections are priority-controlled intersections.

The analysis results indicate that intersections currently operate satisfactorily at level of service A with ample capacity to accommodate future traffic growth. The highest delay (11 seconds) reported in **Table 3.2** occurs at the intersection of Tarean Road with the Pacific Highway and is experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (six vehicles per hour) as well as the afternoon peak hour (three vehicles per hour).

### 3.12 CRASH HISTORY

From January 2012 to December 2016, a total of two crashes have been reported in the vicinity of the Site. The distribution and degree of severity of these crashes is shown in **Figure 3.7**.

The crash diagram reveals that two crashes occurred during the night time at isolated locations, of which one rear end crash occurred on the Pacific Highway and a run-off-road crash occurred in The Branch Lane some 800m north of Andersite Road. These crashes resulted in a total of three injuries. Based on the crash information these crashes do not demonstrate common contributing factors and did not involve any vehicles travelling to or from the Karuah Quarry or Karuah East Quarry.

**Table 3.2 Existing Condition Intersection Modelling Results**

Intersection	Approach	AM Peak Hour			PM Peak Hour		
		Delay (sec/ veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/ veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Andersite Road intersection with Blue Rock Close	Andersite Road East	4	A	0	4	A	0
	Blue Rock Close South	6	A	0	5	A	0
	Andersite Road West	5	A	1	4	A	0
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0
	Andersite Road East	5	A	0	5	A	0
	The Branch Lane South	4	A	2	4	A	0
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	1
	Eastbound off-ramp West	9	A	1	10	A	0
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	5	A	1	5	A	0
	Westbound on-ramp East	11	A	1	11	A	0
	The Branch Lane South	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A

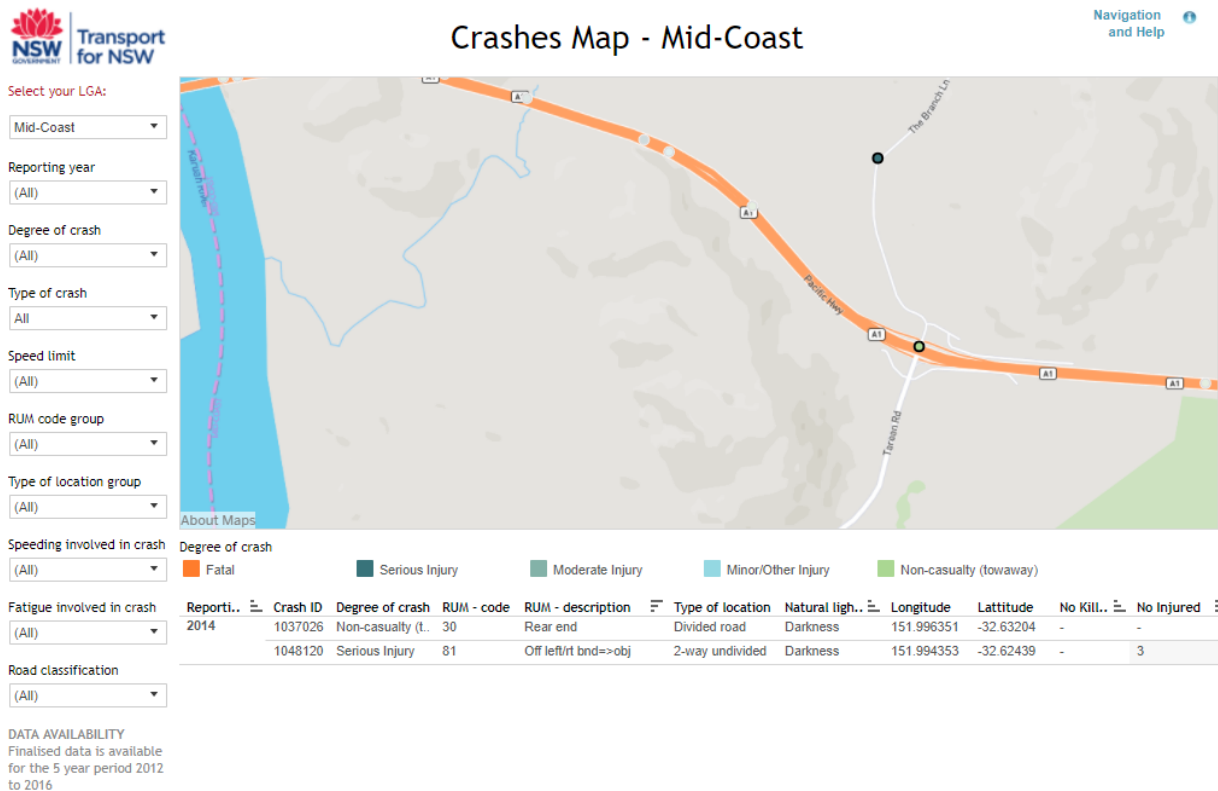


Figure 3.7 Crash Diagram

## 4. ASSESSMENT OF TRAFFIC IMPACTS

### 4.1 ASSESSMENT SCENARIOS

As discussed in **Section 2.3**, cumulative impact assessment has been undertaken for the following stages that represent the greatest environmental impacts as a result of the Project.

- Stage 1C (Year 4 to Year 5)
- Stage 2B (Year 9 to Year 15).

The cumulative impact assessment has been undertaken for the following scenarios taking into account the likely concurrent activities that would occur at the adjoining quarry:

- Construction Phase (Year 0)
  - Karuah South Quarry – Year 0
  - Karuah Quarry – Assume maximum production
  - Karuah East Quarry – Stage 1
  - Karuah Red Quarry – Not Operational yet
- Extraction Stage – Scenario 1:
  - Karuah South Quarry – Stage 1C (Year 5)
  - Karuah Quarry – Assume maximum production
  - Karuah East Quarry – Assume maximum production

- Karuah Red Quarry – Not Operational yet
- Extraction Stage – Scenario 2:
  - Karuah South Quarry – Stage 2B (Year 15)
  - Karuah Quarry – No extraction / processing Karuah Red
  - Karuah East Quarry – Assume maximum production
  - Karuah Red Quarry – Assume maximum production

Both average production and maximum productions have been considered in Stages 1C and 2B.

It has been assumed that construction would occur following the receipt of development consent approval which is estimated to be Year 2020 and extraction activities likely to start in the following year. In this regard, Stage 1C has been assumed to occur in Year 2025 and Stage 2B in Year 2035.

#### 4.1.1 Future Traffic Generation

With regard to the road transport implications of the Project, it is expected that the extraction activities would generate the following vehicle trips in the external road network:

- Heavy vehicle trips associated with Quarry deliveries and maintenance.
- Light vehicle trips associated with workers/ contractors travelling to and from work.

Traffic generation has been estimated for both average production and maximum production in the cumulative impact assessment, in conjunction with the operation of other quarry sites adjacent to the Site.

**Table 4.1** shows the traffic generation for extraction Scenario 1 based on an average daily production at the Karuah South Quarry of 36 loads, and **Table 4.2** shows the traffic generation for extraction Scenario 2 based on an average daily production at the Karuah South Quarry of 72 loads.

**Table 4.3** shows the traffic generation for extraction Scenario 1 based on a maximum production of 72 loads per day, and **Table 4.4** shows the traffic generation for extraction Scenario 2, based on a maximum production at the Karuah South Quarry of 120 loads per day.

**Table 4.1 Extraction Scenario 1 Traffic Generation – Average Production (36 Loads Per Day)**

Location	Phase	Daily Truck Movements (in/out)	Daily Staff Light Vehicle Movements (in/out)	Peak Hour Truck Movements (in/out)	Peak Hour Light Vehicle Movements (one-way only)	Total Peak Hour Movements (in/out)
Karuah South Quarry	Stage 1C (Year 5)	72 (product delivery) and 2 (delivery quarry consumables and fuel)	50	8	25	33

Karuah Quarry	Assume max production	144	40	16	20	36
Karuah East Quarry	Assume max production	432	60	44	30	74
Karuah Red Quarry	Not Operational	-	-	-	-	-
Total		<b>650</b>	<b>150</b>	<b>68</b>	<b>75</b>	<b>143</b>

**Table 4.2 Extraction Scenario 2 Traffic Generation – Average Production (72 Loads Per Day)**

Location	Phase	Daily Truck Movements (in/out)	Daily Staff Light Vehicle Movements (in/out)	Peak Hour Truck Movements (in/out)	Peak Hour Light Vehicle Movements (one-way only)	Total Peak Hour Movements (in/out)
Karuah South Quarry	Stage 2B (Year 15)	144 (product delivery) and 4 (delivery quarry consumables and fuel)	60	16	30	46
Karuah Quarry	No extraction / processing	-	-	-	-	-
Karuah East Quarry	Assume max production	432	60	44	30	74
Karuah Red Quarry	Assume max production	32	10	4	5	9
Total		<b>608</b>	<b>130</b>	<b>64</b>	<b>65</b>	<b>129</b>

**Table 4.3 Extraction Scenario 1 Traffic Generation – Maximum Production (72 Loads Per Day)**

Location	Phase	Daily Truck Movements (in/out)	Daily Staff Light Vehicle Movements (in/out)	Peak Hour Truck Movements (in/out)	Peak Hour Light Vehicle Movements (one-way only)	Total Peak Hour Movements (in/out)
Karuah South Quarry	Stage 1C (Year 5)	144 (product delivery) and 4 (delivery quarry consumables and fuel)	60	16	30	46
Karuah Quarry	Assume max production	144	40	16	20	36
Karuah East Quarry	Assume max production	432	60	44	30	74
Karuah Red Quarry	Not Operational	-	-	-	-	-
Total		<b>724</b>	<b>160</b>	<b>76</b>	<b>80</b>	<b>156</b>



**Table 4.4 Extraction Scenario 2 Traffic Generation – Maximum Production (120 Loads Per Day)**

Location	Phase	Daily Truck Movements (in/out)	Daily Staff Light Vehicle Movements (in/out)	Peak Hour Truck Movements (in/out)	Peak Hour Light Vehicle Movements (one-way only)	Total Peak Hour Movements (in/out)
Karuah South Quarry	Stage 2B (Year 15)	240 (product delivery) and 6 (delivery quarry consumables and fuel)	60	26	30	56
Karuah Quarry	No extraction / processing	-	-	-	-	-
Karuah East Quarry	Assume max production	432	60	44	30	74
Karuah Red Quarry	Assume max production	32	10	4	5	9
Total		<b>710</b>	<b>130</b>	<b>74</b>	<b>65</b>	<b>139</b>

**Table 4.5** shows the traffic generation for construction phase.

#### 4.1.2 Traffic Forecasts

As discussed in **Section 3.8**, a conservative growth rate of one percent per annum has been adopted in this assessment for the growth of background traffic levels.

**Table 4.5 Construction Traffic Generation**

Location	Phase	Daily Truck Movements (in/out)	Daily Staff Light Vehicle Movements (in/out)	Peak Hour Truck Movements (in/out)	Peak Hour Light Vehicle Movements (one-way only)	Total Peak Hour Movements (in/out)
Karuah South Quarry	Construction	36	26	6	13	19
Karuah Quarry	Assume max production	144	30	16	15	31
Karuah East Quarry	Stage 1	432	56	44	28	72
Karuah Red Quarry	Not Operational	-	-	-	-	-
Total		<b>612</b>	<b>112</b>	<b>66</b>	<b>56</b>	<b>122</b>

Forecasts of expected traffic volumes on Tarean Road north of the Pacific Highway Interchange during periods of maximum production are shown in **Table 4.6**, taking account into

the background traffic growth and traffic associated with the Project (average production) and the adjoining quarry. It is noted that from 2029 and beyond, the production generated at the Karuah Quarry would solely be drawn from rock extracted and the Karuah Red Quarry.

**Table 4.6 Traffic Forecasts on Tarean Road (2-Way) – Average Production**

Stage	Year	AM Peak (vehicle/hour) 6am-7am				PM Peak (vehicle/hour) 5pm-6pm			
		Background Traffic	Adjoining Quarry Traffic	Project Traffic	Total	Background Traffic	Adjoining Quarry Traffic	Project Traffic	Total
Existing	2018	13	42	0	55	15	18	0	33
Construction	<b>2020 (Year 0)</b>	<b>13</b>	<b>103</b>	<b>19</b>	<b>135</b>	<b>15</b>	<b>103</b>	<b>19</b>	<b>137</b>
Extraction Stage 1C	2024 (Year 4)	14	110	33	157	16	110	33	159
	<b>2025 (Year 5)</b>	<b>14</b>	<b>110</b>	<b>33</b>	<b>157</b>	<b>16</b>	<b>110</b>	<b>33</b>	<b>159</b>
Extraction Stage 2B	2029 (Year 9)	14	83	46	143	17	83	46	146
	2030 (Year 10)	15	83	46	144	17	83	46	146
	2031 (Year 11)	15	83	46	144	17	83	46	146
	2032 (Year 12)	15	83	46	144	17	83	46	146
	2033 (Year 13)	15	83	46	144	17	83	46	146
	2034 (Year 14)	15	83	46	144	17	83	46	146
	<b>2035 (Year 15)</b>	<b>15</b>	<b>83</b>	<b>46</b>	<b>144</b>	<b>18</b>	<b>83</b>	<b>46</b>	<b>147</b>

Forecasts of expected traffic volumes on Tarean Road north of the Pacific Highway Interchange is shown in **Table 4.7**, taking account into the background traffic growth and traffic associated with the Project (maximum production) and the adjoining quarry.

#### 4.1.3 Future Traffic Distribution

All laden trucks departing the Site would travel westwards on Blue Rock Close from the Quarry Entrance. Laden trucks would then enter Andersite Road which connects Blue Rock Close to The Branch Lane at its western extent. The Branch Lane provides access to the Pacific Highway interchange for all northbound laden trucks.

Southbound laden trucks would continue onto Tarean Road prior to entering the southbound lanes of the Pacific Highway via the Pacific Highway interchange. On average, 95% of laden trucks would travel to the south towards the Sydney and Newcastle markets with fewer trucks (5%) travelling to the north.

Conversely, unladen trucks travelling to the Site from Sydney and Newcastle would approach the Pacific Highway interchange from the south (95%) prior to entering The Branch Lane.

**Table 4.7 Traffic Forecasts on Tarean Road (2-Way) – Maximum Production**

Stage	Year	AM Peak (vehicle/hour) 6am-7am				PM Peak (vehicle/hour) 5pm-6pm			
		Background Traffic	Adjoining Quarry Traffic	Project Traffic	Total	Background Traffic	Adjoining Quarry Traffic	Project Traffic	Total
Existing	2018	13	42	0	55	15	18	0	33
Construction	<b>2020 (Year 0)</b>	<b>13</b>	<b>103</b>	<b>19</b>	<b>135</b>	<b>15</b>	<b>103</b>	<b>19</b>	<b>137</b>
Extraction Stage 1C	2024 (Year 4)	14	110	46	170	16	110	46	172
	<b>2025 (Year 5)</b>	<b>14</b>	<b>110</b>	<b>46</b>	<b>170</b>	<b>16</b>	<b>110</b>	<b>46</b>	<b>172</b>
Extraction Stage 2B	2029 (Year 9)	14	83	56	153	17	83	56	156
	2030 (Year 10)	15	83	56	154	17	83	56	156
	2031 (Year 11)	15	83	56	154	17	83	56	156
	2032 (Year 12)	15	83	56	154	17	83	56	156
	2033 (Year 13)	15	83	56	154	17	83	56	156
	2034 (Year 14)	15	83	56	154	17	83	56	156
	<b>2035 (Year 15)</b>	<b>15</b>	<b>83</b>	<b>56</b>	<b>154</b>	<b>18</b>	<b>83</b>	<b>56</b>	<b>157</b>

Unladen trucks travelling from the north would approach the Pacific Highway interchange from the north (5%) prior to entering Tarean Road.

The assumed traffic distribution (**Figure 4.1**) has been applied to both quarry truck and worker trips associated with the Project and the adjoining quarry sites, as consistent with that identified in the traffic survey as discussed in **Section 3.10**.

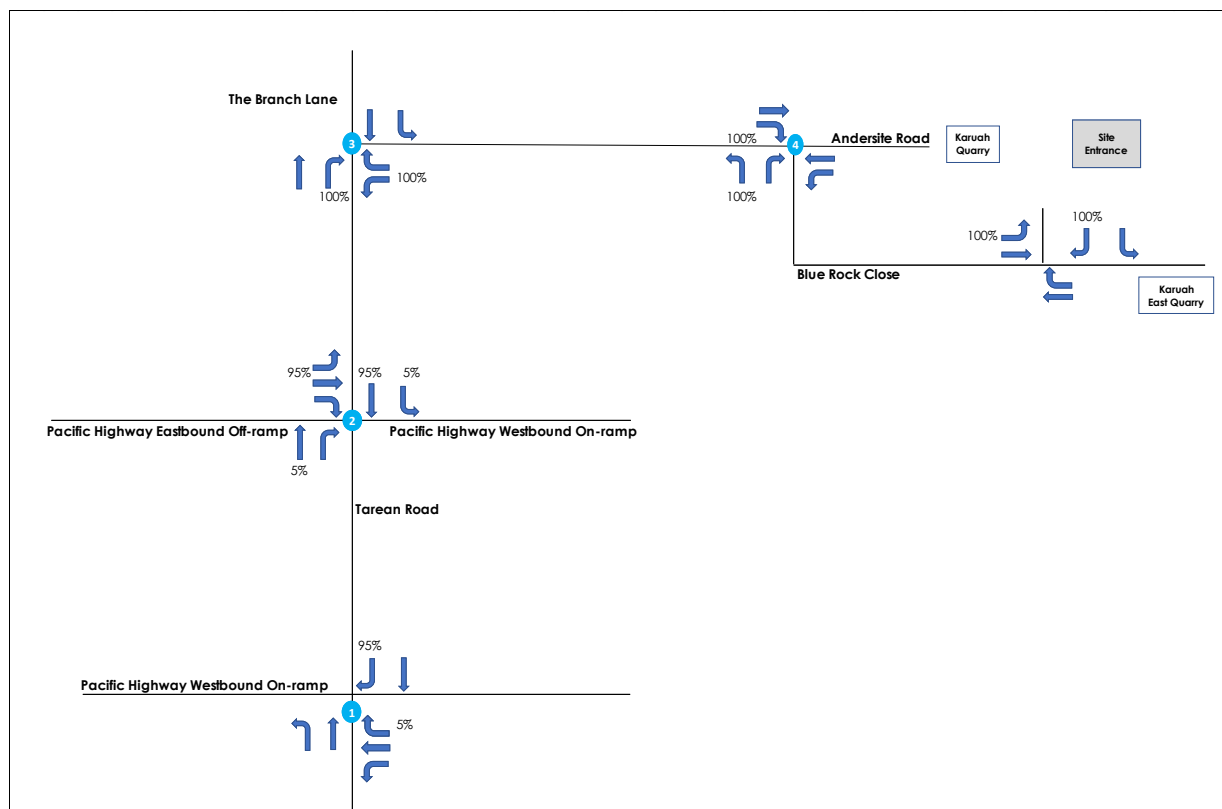


Figure 4.1 Traffic Distribution

## 4.2 ESTIMATED PEAK HOUR TRAFFIC VOLUMES

The road network peak hours were identified in the traffic surveys conducted on Tuesday, 6 February 2018 from 5:00am to 9:00am and from 3:00pm to 7:00pm as mentioned in Section 3.10.

The highest traffic volumes at the Andersite Road and The Branch Lane intersection occurred at 6:00am-7:00am and 5:00pm-6:00pm coinciding with the same period in which quarry workers travel to/from work. These peak hours are expected to remain as per the existing conditions as the working hours (7:00am-6:00pm) are the same for extraction and processing operations across the Site and the adjoining quarry sites. It has assumed that 100 percent of quarry workers would travel to/from work during these peak hours at the Andersite Road and The Branch Lane intersection

The highest traffic volumes at the Tarean Road Interchange occurred at 8:00am-9:00am and 3:30pm-4:30pm during the quarry working hours (7:00am-6:00pm). Although most quarry workers' light vehicle trips are to occur at 6:00am-7:00am and 5:00pm-6:00pm as discussed above, a conservative approach has been taken to assume 100 percent of quarry workers would travel to/from work during these commuter peak hours at the Interchange, albeit realistically only a small proportion of these trips would occur during these commuter peak hours at the Interchange.

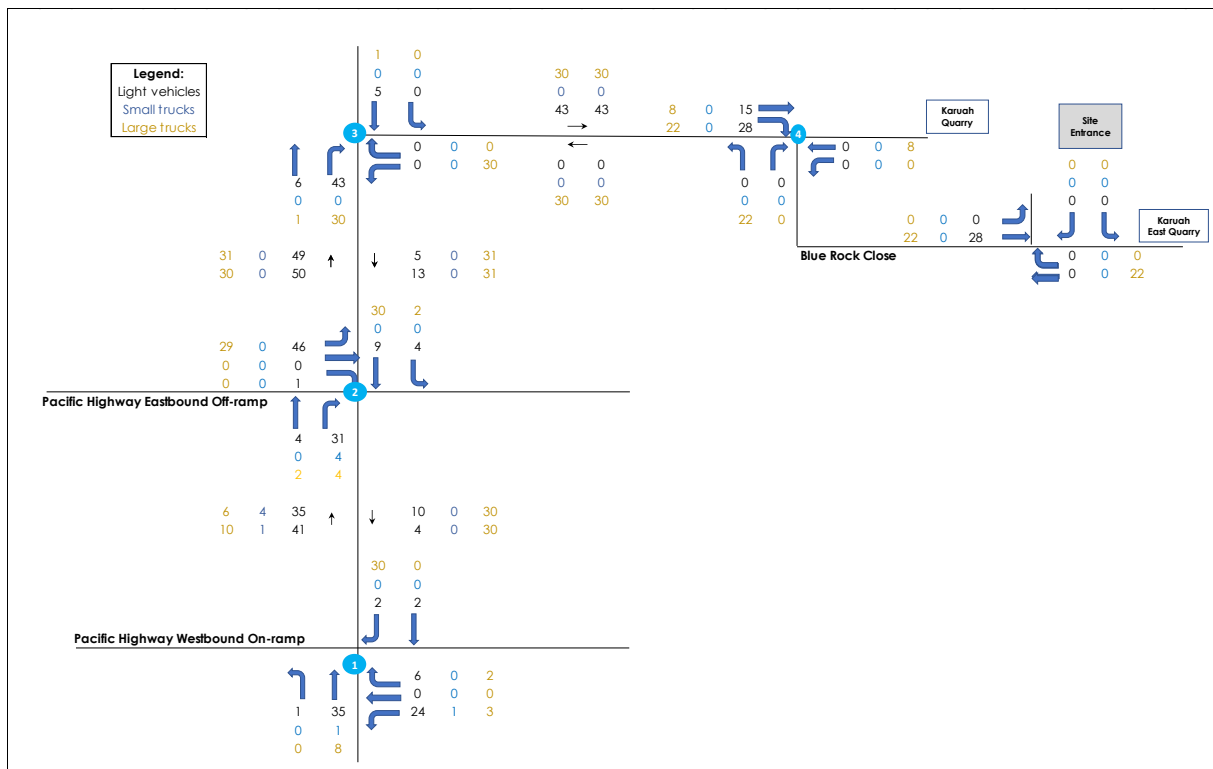
In addition, 100 percent of quarry trucks associated with the Project and the adjoining quarry has been assigned to the key intersections for the individual peak hours.

The estimated future traffic volumes are shown in the following sections.

## 4.2.1 Construction Phase

### 4.2.1.1 Background Traffic and Adjoining Quarry Traffic Only

**Figure 4.2** and **Figure 4.3** show the AM and PM peak hour traffic volumes respectively that considered the growth of background traffic and traffic associated with the adjoining quarry sites, excluding the construction traffic in relation to the Project. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.



**Figure 4.2 AM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only – Construction Phase**

### 4.2.1.2 Construction Phase

**Figure 4.4** and **Figure 4.5** show the AM and PM peak hour traffic volumes respectively for the construction phase of the Project, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project (construction phase) and other surrounding quarry sites. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.

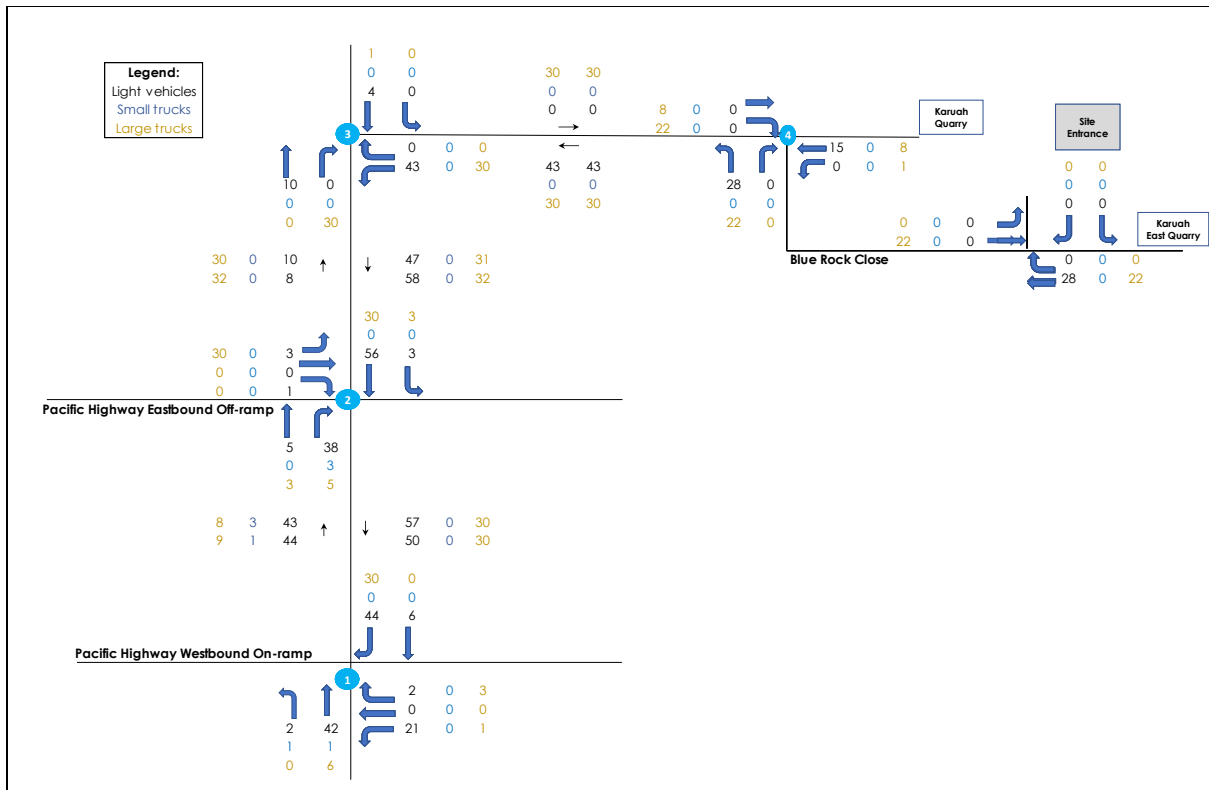


Figure 4.3 PM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only – Construction Phase

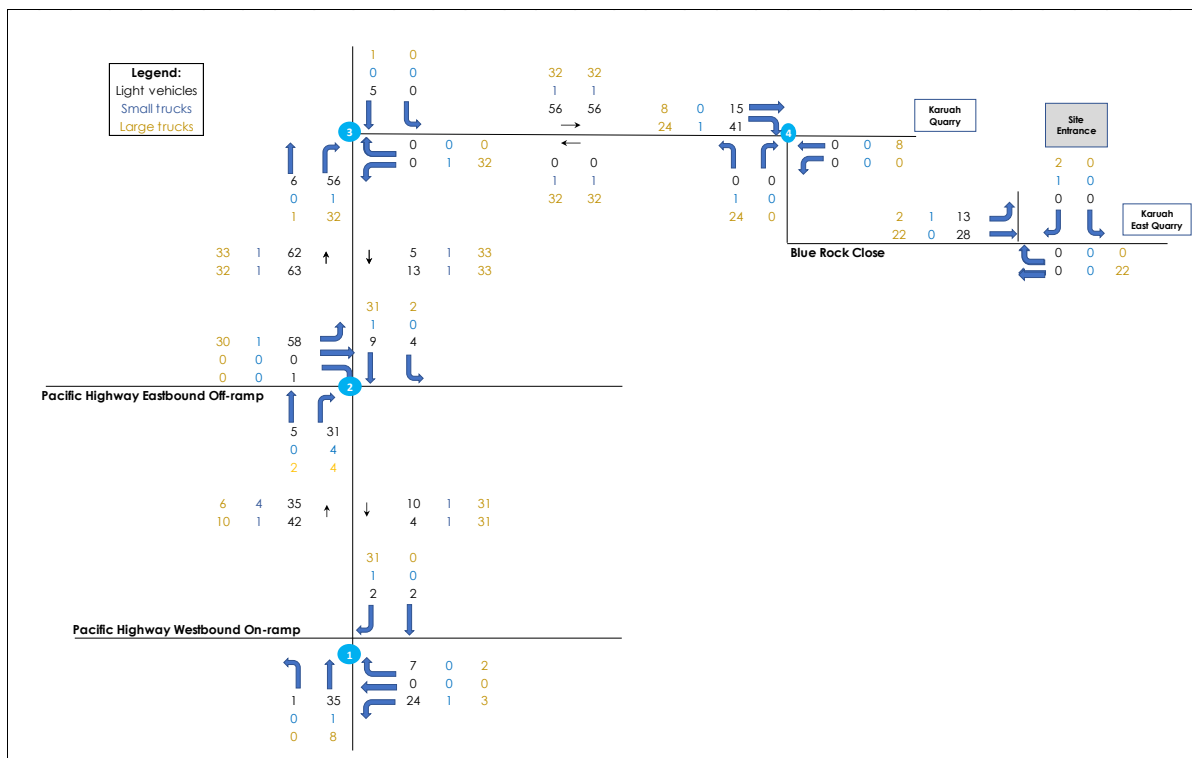
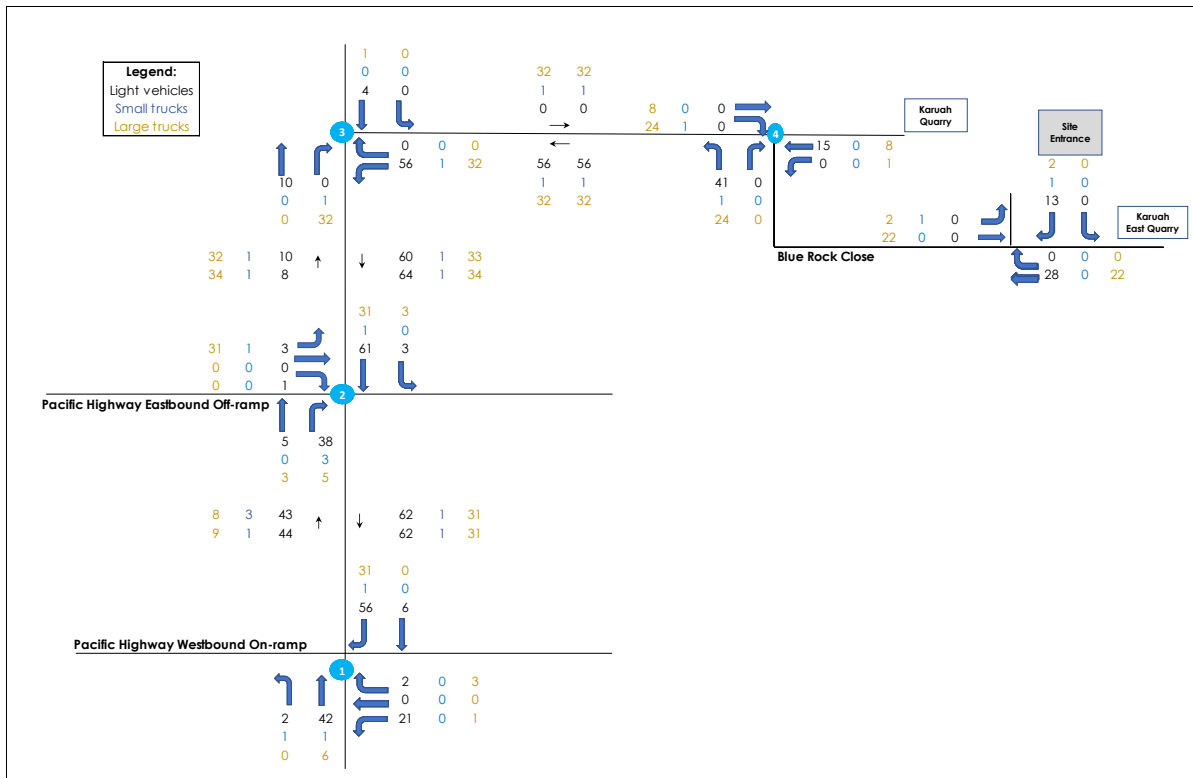


Figure 4.4 AM Peak Hour Traffic Volumes (vph) – Construction Phase





**Figure 4.5 PM Peak Hour Traffic Volumes (vph) – Construction Phase**

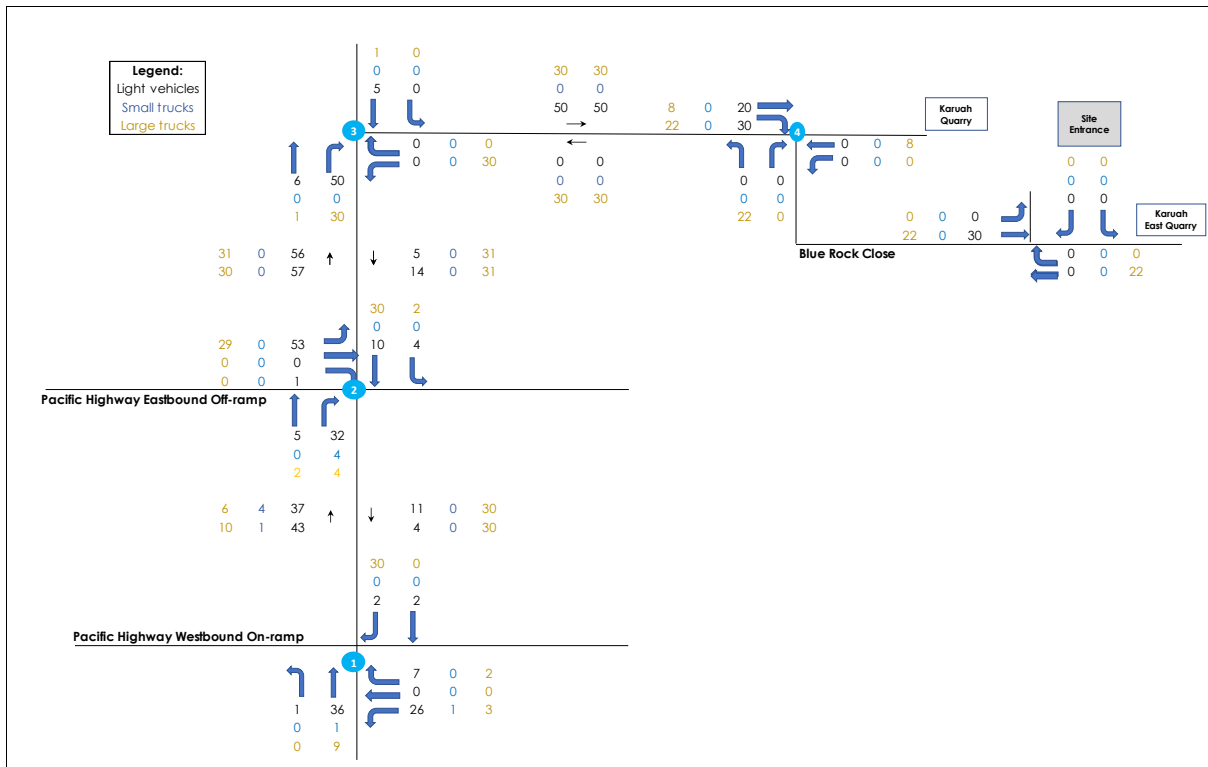
## 4.2.2 Extraction Stage (Stage 1C Year 5)

### 4.2.2.1 Background Traffic and Adjoining Quarry Traffic Only

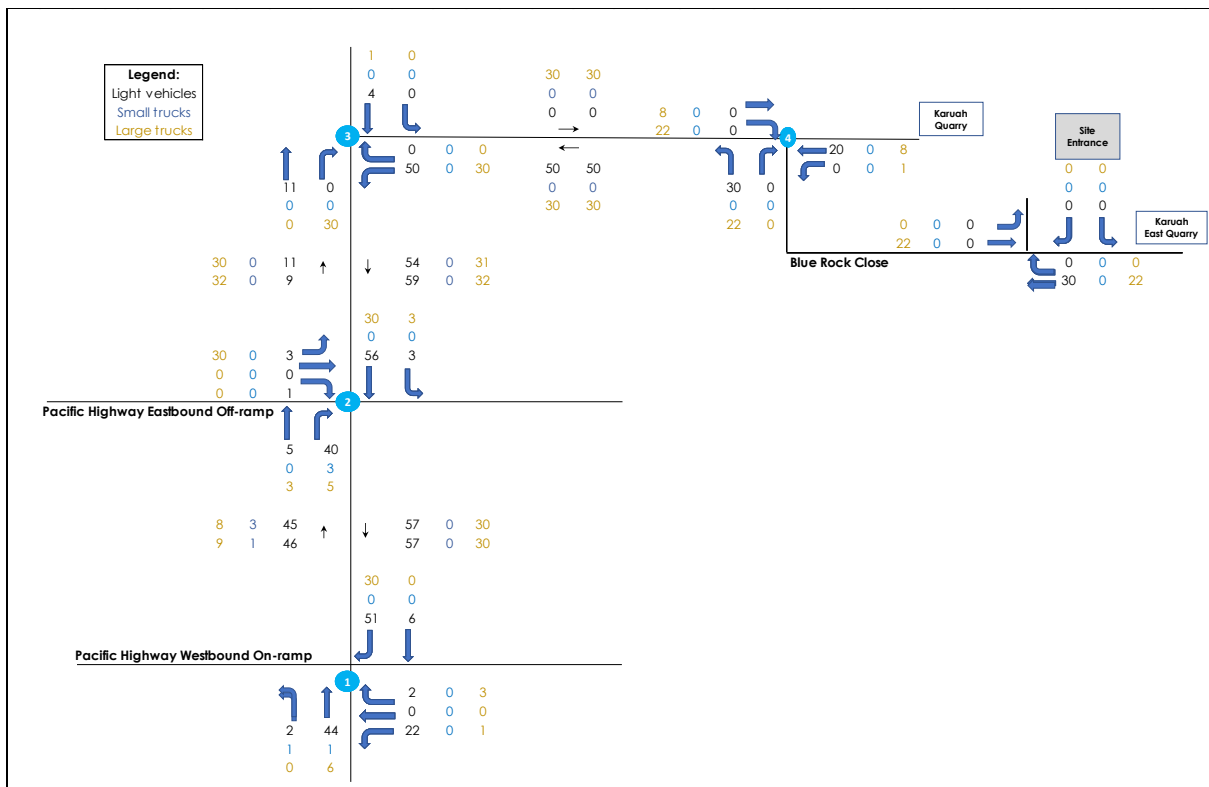
**Figure 4.6** and **Figure 4.7** show the AM and PM peak hour traffic volumes respectively that considered the growth of background traffic and traffic associated with the adjoining quarry sites, but excluding the Project related traffic. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.

### 4.2.2.2 Average Production (36 Loads per Day)

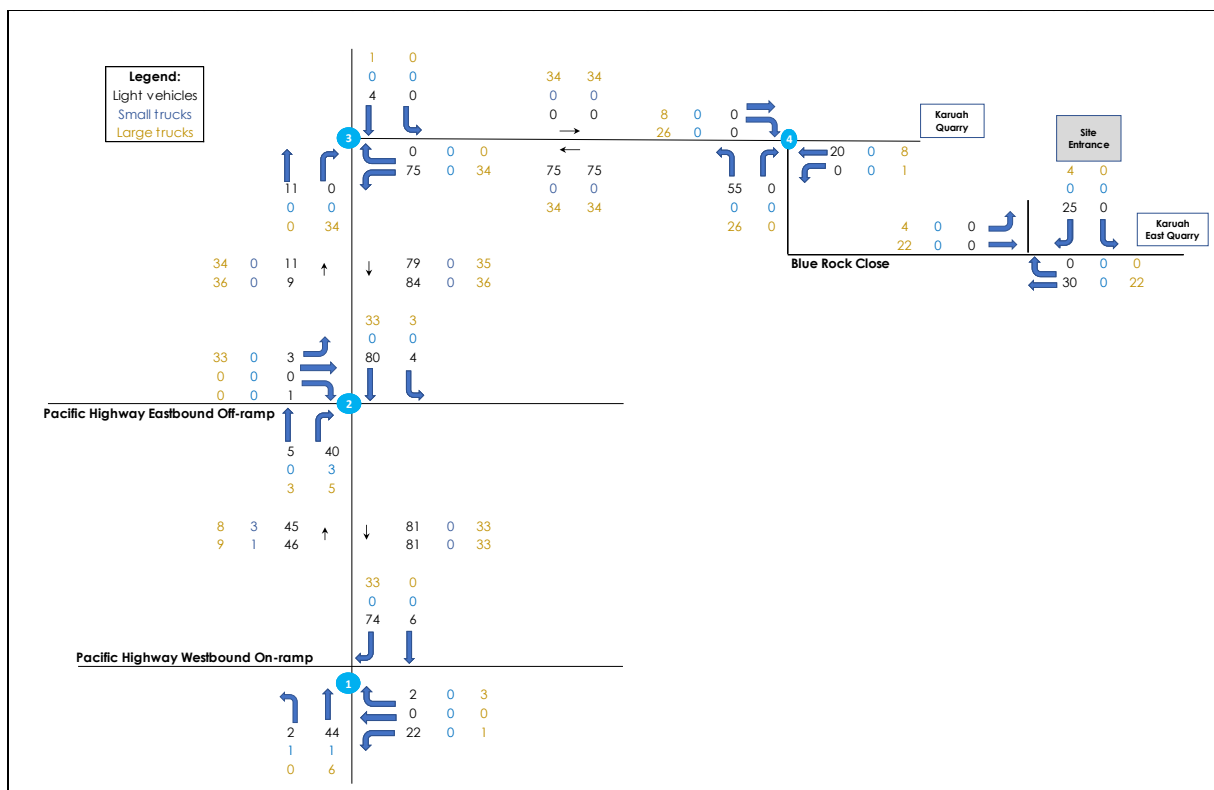
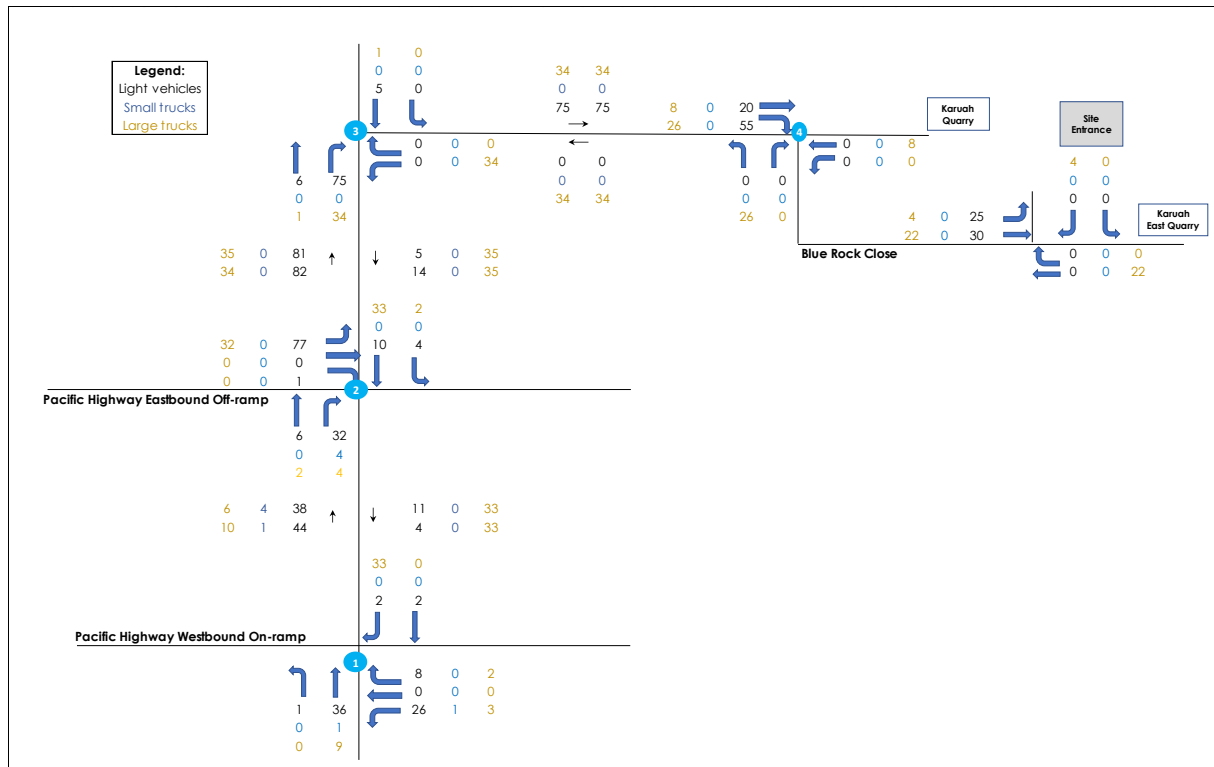
**Figure 4.8** and **Figure 4.9** show the AM and PM peak hour traffic volumes respectively for the Extraction Stage 1C of the Project, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project and other surrounding quarry sites. This is based on the average production of 36 loads per day that would occur during Stage 1C in Year 5. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.



**Figure 4.6 AM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only in Extraction Stage (Stage 1C Year 5)**



**Figure 4.7: PM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only in Extraction Stage (Stage 1C Year 5)**



#### 4.2.2.3 Maximum Production (72 Loads per Day)

**Figure 4.10** and **Figure 4.11** show the AM and PM peak hour traffic volumes respectively for the Extraction Stage 1C of the Project, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project and other surrounding quarry sites. This is based on the maximum production of 72 loads per day that would occur during Stage 1C in Year 5. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.

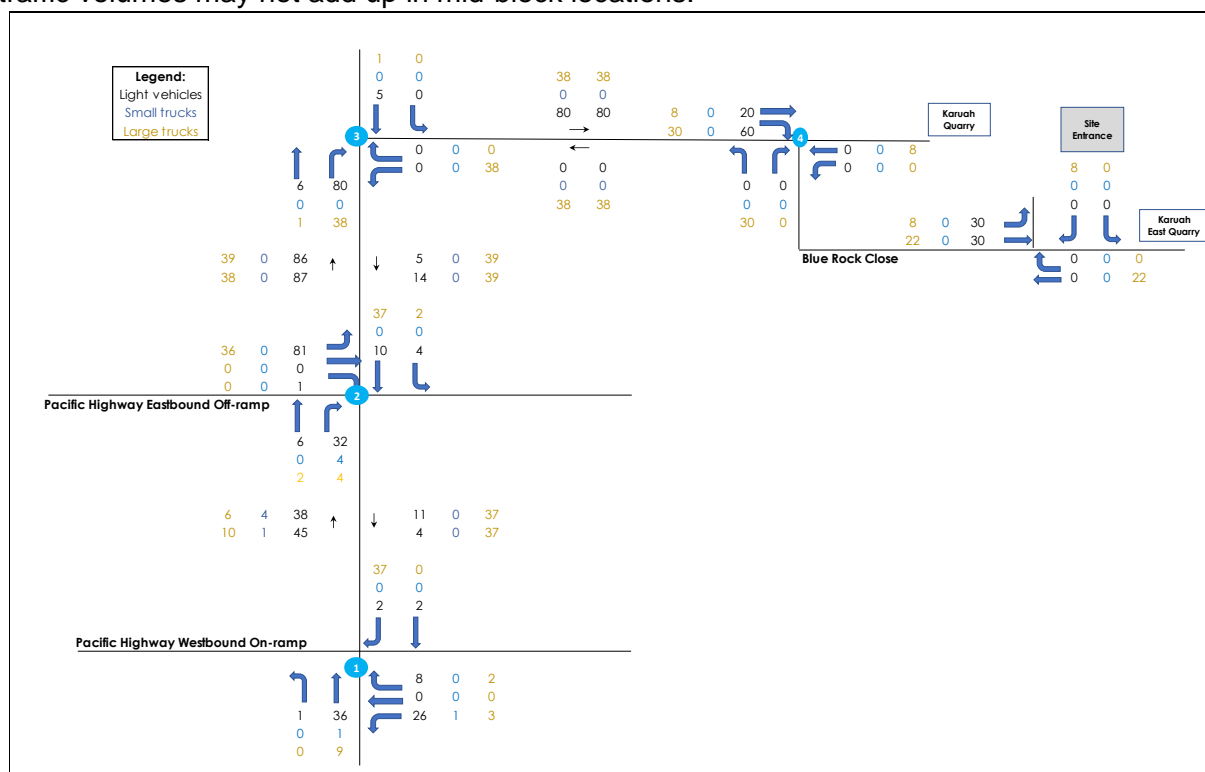
#### 4.2.3 Extraction Stage (Stage 2B Year 15)

##### 4.2.3.1 Background Traffic and Adjoining Quarry Traffic Only

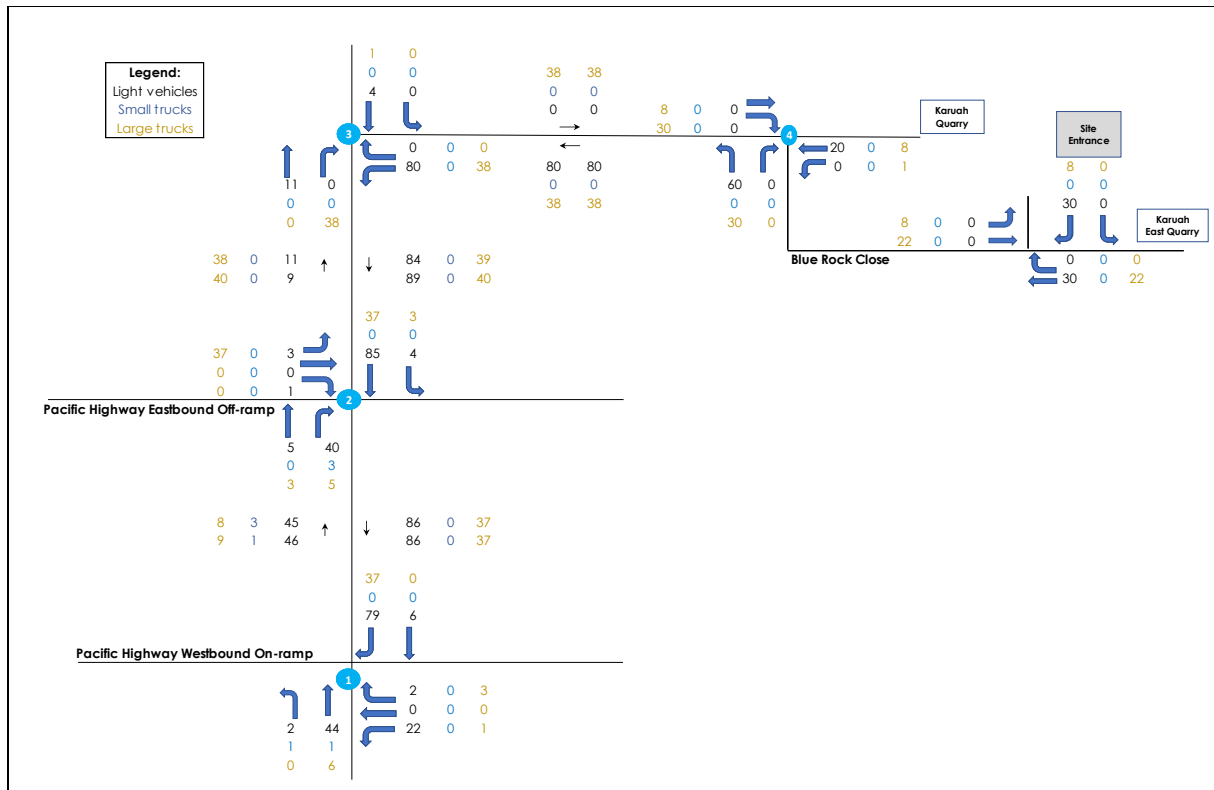
**Figure 4.12** and **Figure 4.13** show the AM and PM peak hour traffic volumes respectively that considered the growth of background traffic and traffic associated with the adjoining quarry sites, but excluding the Project related traffic. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.

##### 4.2.3.2 Average Production (72 Loads per Day)

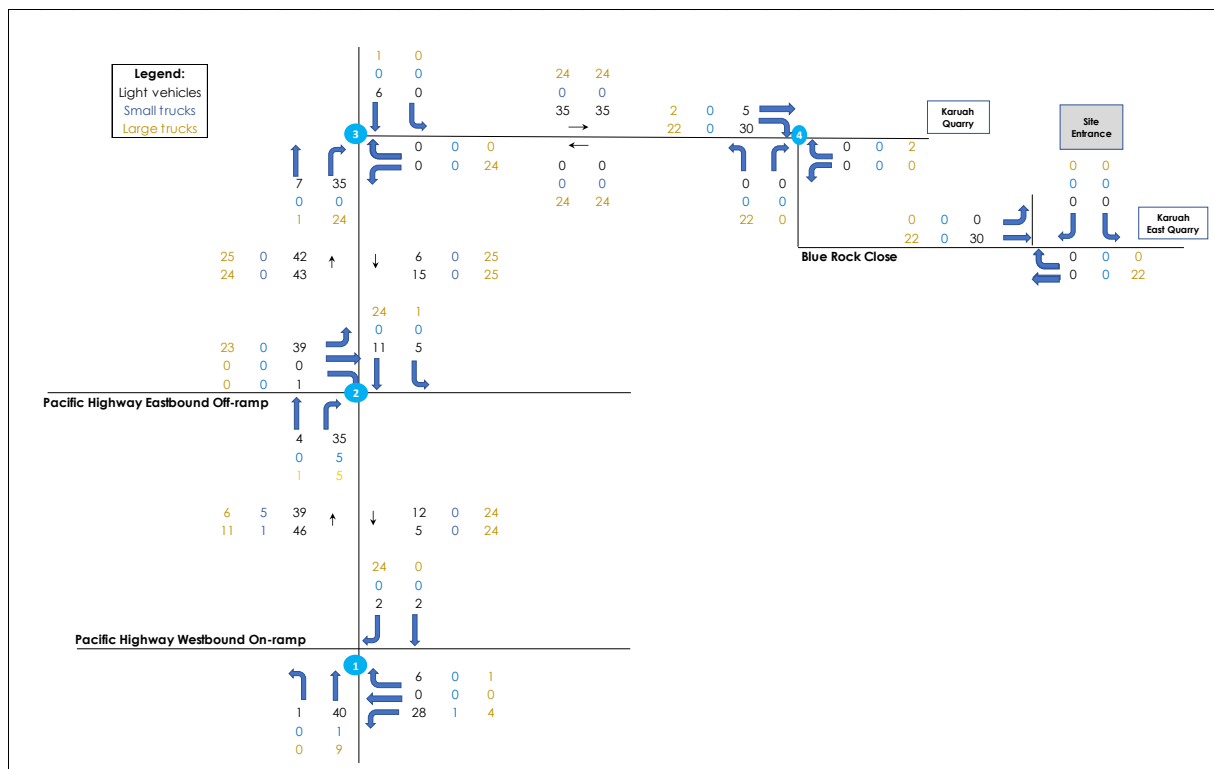
**Figure 4.14** and **Figure 4.15** show the AM and PM peak hour traffic volumes respectively for the Extraction Stage 2B of the Project, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project and other surrounding quarry sites. This is based on the average production of 72 loads per day that would occur during Stage 2B in Year 15. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add up in mid-block locations.



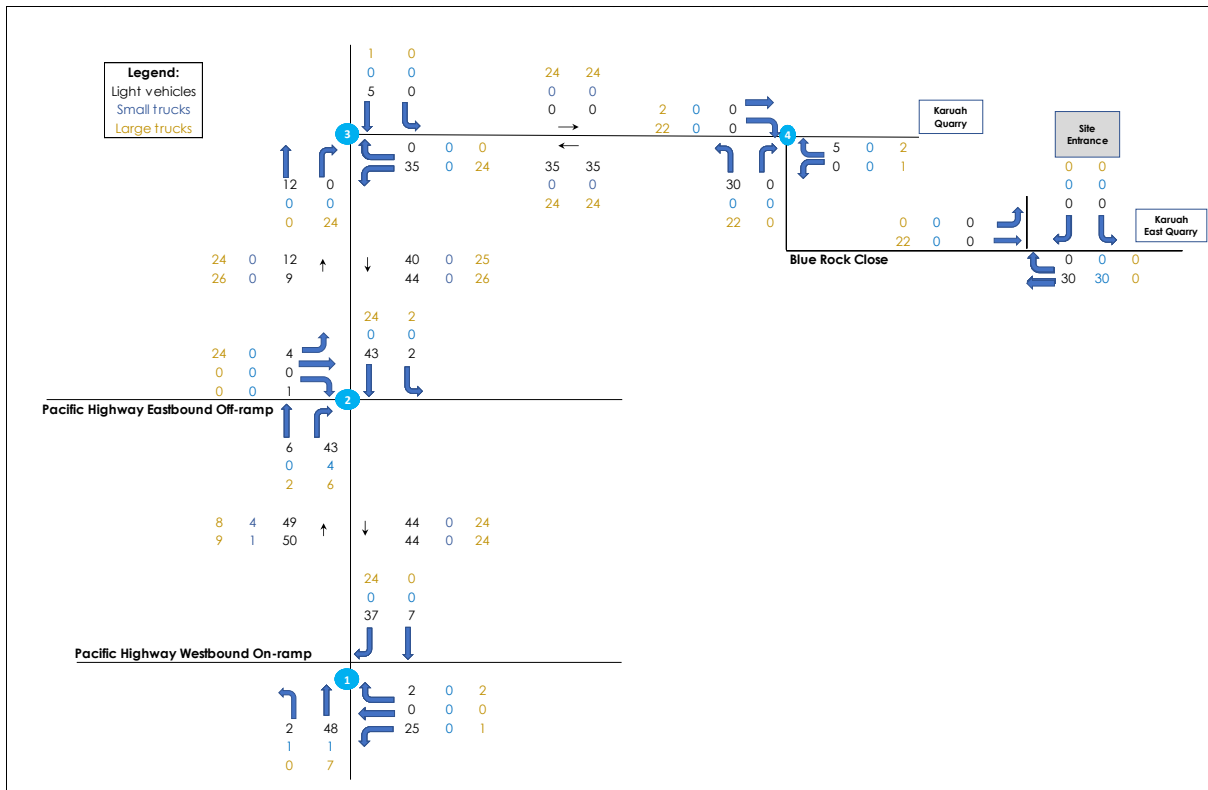
**Figure 4.10 AM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 1C Year 2) with Maximum Production (72 Loads Per Day)**



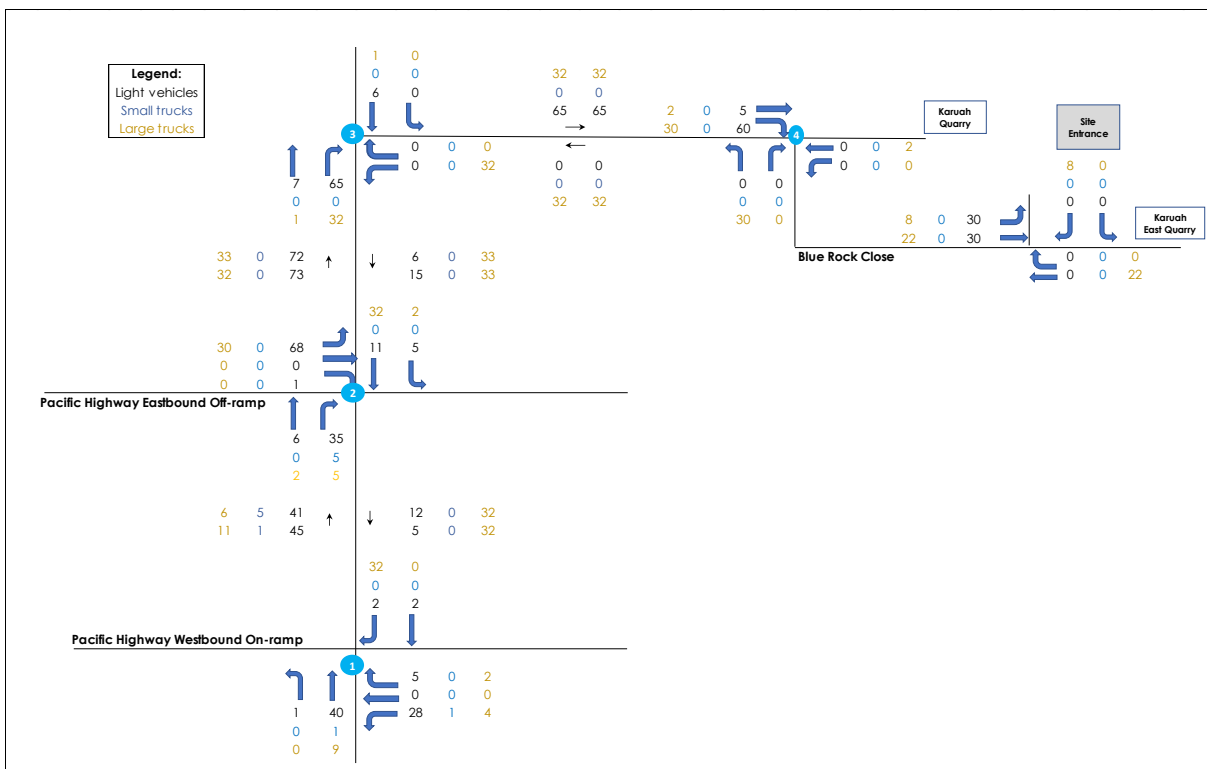
**Figure 4.11 AM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 1C Year 2) with Maximum Production (72 Loads Per Day)**



**Figure 4.12 AM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only in Extraction Stage (Stage 2B Year 15)**

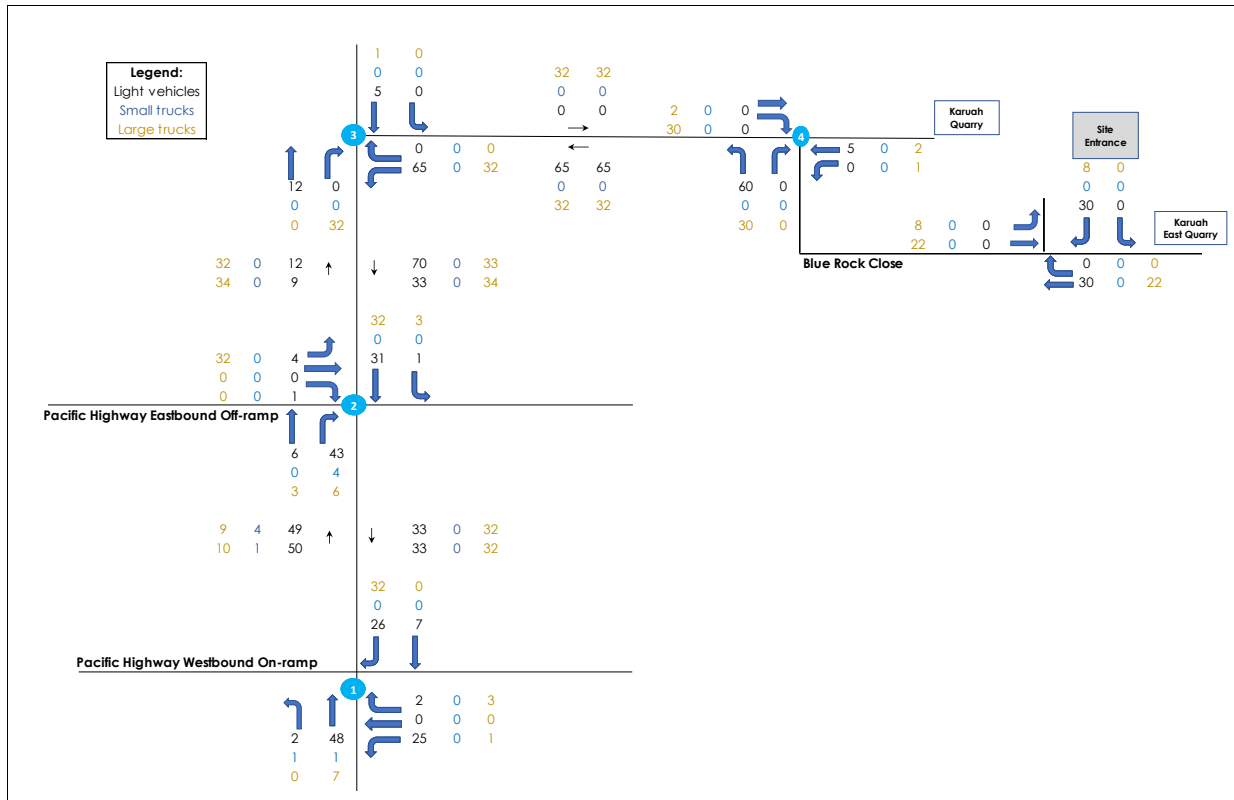


**Figure 4.13 PM Peak Hour Traffic Volumes (vph) – Background Traffic and Adjoining Quarry Traffic Only in Extraction Stage (Stage 2B Year 15)**



**Figure 4.14 AM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 2B Year 15) with Average Production (72 Loads Per Day)**

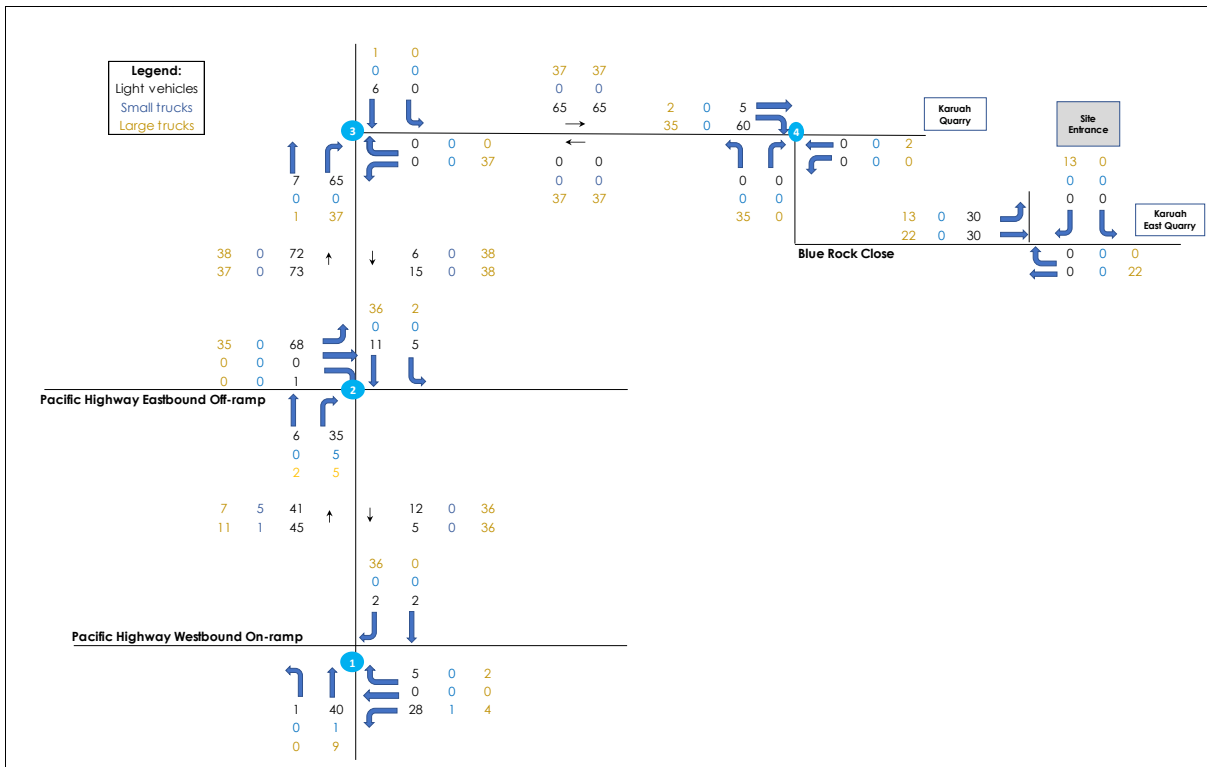




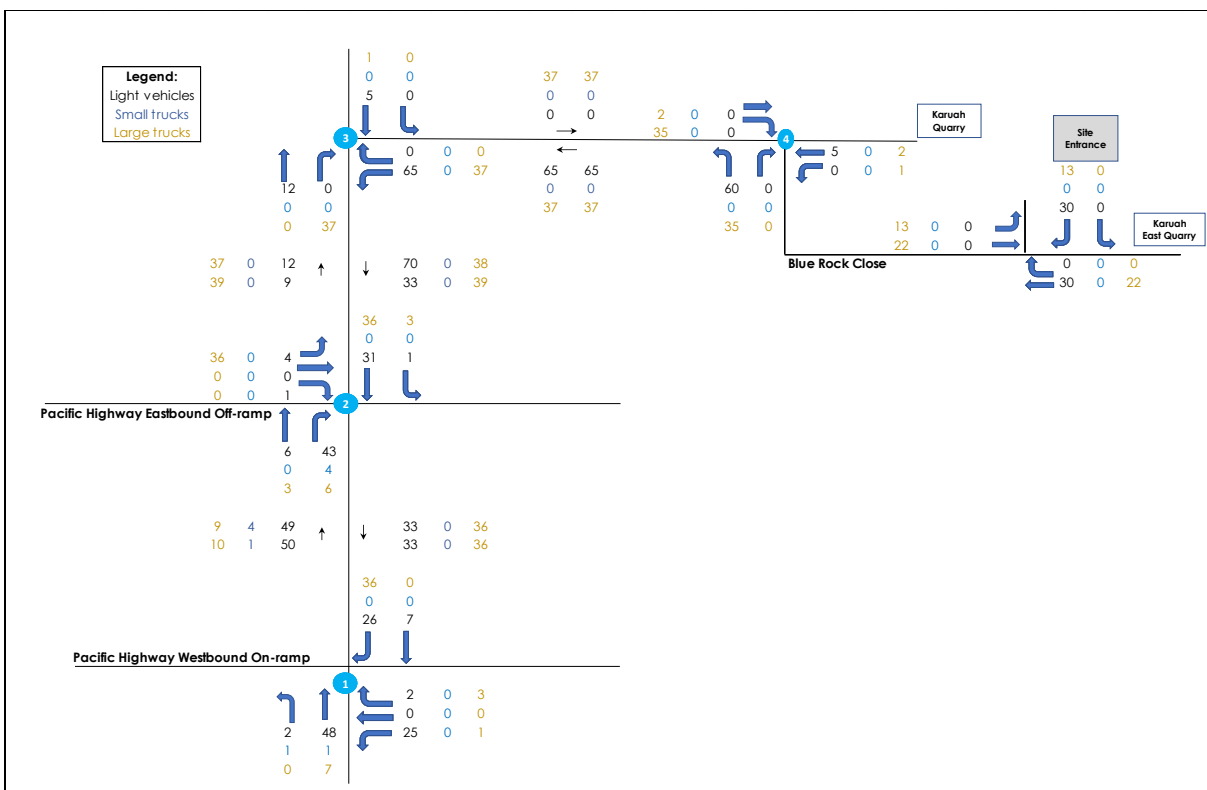
**Figure 4.15 PM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 2B Year 15) with Average Production (72 Loads Per Day)**

#### 4.2.3.3 Maximum Production (120 Loads per Day)

**Figure 4.16** and **Figure 4.17** show the AM and PM peak hour traffic volumes respectively for the Extraction Stage 2B of the Project, taking into consideration the growth of background traffic and the inclusion of the traffic associated with the Project and other surrounding quarry sites. This is based on the maximum production of 120 loads per day that would occur during Stage 2B in Year 15. Note peak hours are not concurrent at the key intersections therefore traffic volumes may not add in mid-block locations.



**Figure 4.16 AM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 2B Year 15) with Maximum Production (120 Loads Per Day)**



**Figure 4.17 PM Peak Hour Traffic Volumes (vph) – Extraction Stage (Stage 2B Year 15) with Maximum Production (120 Loads Per Day)**

### 4.3 INTERSECTION OPERATING CONDITIONS

The weekday peak hour operating characteristics of the surveyed intersections have been reassessed to quantify the future conditions for Extraction Stages 1C and 2B. The results are summarised in **Table 4.8** to **Table 4.12**, and the results by movement are presented in Annexure 2. As noted, the forecast turning movements at the intersections assume that growth in background traffic by 1% per annum. It has been assumed that 95 percent of Quarry trucks travel to/from the Karuah South Quarry via the Pacific Highway, with the remaining 5 percent travel to/from north via the Pacific Highway. The truck composition consists of 100 percent truck and dogs.

#### 4.3.1 Construction Phase

**Table 4.8** shows the SIDRA modelling results of the key intersections, with and without construction traffic associated with the Karuah South Quarry.

The modelling results indicate that key intersections would operate satisfactorily at level of service B or better, regardless of the additional traffic associated with the Project during construction phase. The highest delay (17 seconds) would occur at the intersection of Tarean Road with the Pacific Highway and are experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (nine vehicles per hour) as well as the PM peak hour (five vehicles per hour).

#### 4.3.2 Extraction Stage (Stage 1C Year 5)

##### 4.3.2.1 Average Production (36 Loads per Day)

**Table 4.9** shows the SIDRA modelling results of the key intersections, with and without traffic associated with the extraction activities of the Karuah South Quarry in Stage 1C (Year 5) with an average daily production of 36 loads.

The modelling results indicate that key intersections would operate satisfactorily at level of service B or better, regardless of the additional traffic associated with the Project during Year 5 of the Extraction Stage 1C. The highest delay (17 seconds) would occur at the intersection of Tarean Road with the Pacific Highway and would be experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (11 vehicles per hour) as well as the PM peak hour (five vehicles per hour).

Traffic impact as a result of the operation of the Project is expected to be minimal.

##### 4.3.2.2 Maximum Production (72 Loads per Day)

**Table 4.10** shows the SIDRA modelling results of the key intersections, with and without traffic associated with the extraction activities of the Karuah South Quarry in Stage 1C (Year 5) with a maximum daily production of 72 loads.

Table 4.8 Construction Scenario (with Karuah South Quarry) Intersection Modelling Results

Page 1 of 2

Intersection	Approach	Without Karuah South Quarry						With Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Blue Rock Close with Karuah South Quarry Site Access	Blue Rock Close East	-	-	-	-	-	-	5	A	0	5	A	0
	Site Access North	-	-	-	-	-	-	8	A	0	6	A	1
	Blue Rock Close West	-	-	-	-	-	-	5	A	0	5	A	0
Andersite Road intersection with Blue Rock Close	Andersite Road East	6	A	1	5	A	1	6	A	1	5	A	1
	Blue Rock Close South	5	A	0	6	A	0	5	A	0	6	A	0
	Andersite Road West	5	A	4	5	A	4	5	A	4	5	A	4
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0	6	A	0	6	A	0
	Andersite Road East	5	A	4	5	A	4	5	A	4	5	A	4
	The Branch Lane South	4	A	4	4	A	4	4	A	5	4	A	5

**Table 4.8 Construction Scenario (with Karuah South Quarry) Intersection Modelling Results**

Page 2 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	2	5	A	1	5	A	2
	Eastbound off-ramp West	10	A	4	14	A	4	10	A	5	14	A	5
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	5	A	5	5	A	5	5	A	5	5	A	5
	Westbound on-ramp East	11	A	1	16	B	1	11	A	1	17	B	1
	The Branch Lane South	6	A	0	6	A	0	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 4.9 Intersection Modelling Results – Extraction Phase (Stage 1C Year 5) with Average Production (36 Loads Per Day)**

Page 1 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Blue Rock Close with Karuah South Quarry Site Access	Blue Rock Close East	-	-	-	-	-	-	5	A	0	5	A	0
	Site Access North	-	-	-	-	-	-	9	A	1	6	A	1
	Blue Rock Close West	-	-	-	-	-	-	5	A	0	5	A	0
Andersite Road intersection with Blue Rock Close	Andersite Road East	6	A	1	5	A	1	7	A	1	5	A	2
	Blue Rock Close South	5	A	0	6	A	0	5	A	0	5	A	0
	Andersite Road West	5	A	4	5	A	4	5	A	5	5	A	5
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0	6	A	0	6	A	0
	Andersite Road East	5	A	4	5	A	4	5	A	4	5	A	5
	The Branch Lane South	4	A	4	4	A	5	4	A	5	4	A	5



**Table 4.9 Intersection Modelling Results – Extraction Phase (Stage 1C Year 5) with Average Production (36 Loads Per Day)**

Page 2 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	2	5	A	1	5	A	2
	Eastbound off-ramp West	10	A	5	14	A	4	10	A	5	14	A	5
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	6	A	5	5	A	5	6	A	5	5	A	6
	Westbound on-ramp East	11	A	1	17	B	1	11	A	1	18	B	1
	The Branch Lane South	6	A	0	6	A	0	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 4.10 Intersection Modelling Results – Extraction Phase (Stage 1C Year 5) with Maximum Production (72 Loads Per Day)

Page 1 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Blue Rock Close with Karuah South Quarry Site Access	Blue Rock Close East	-	-	-	-	-	-	5	A	0	5	A	0
	Site Access North	-	-	-	-	-	-	9	A	2	6	A	2
	Blue Rock Close West	-	-	-	-	-	-	5	A	0	6	A	0
Andersite Road intersection with Blue Rock Close	Andersite Road East	6	A	1	5	A	1	8	A	2	5	A	2
	Blue Rock Close South	5	A	0	6	A	0	5	A	0	5	A	0
	Andersite Road West	5	A	4	5	A	4	5	A	5	5	A	5
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0	6	A	0	6	A	0
	Andersite Road East	5	A	4	5	A	4	5	A	5	5	A	6
	The Branch Lane South	4	A	4	4	A	5	4	A	6	4	A	6

**Table 4.10 Intersection Modelling Results – Extraction Phase (Stage 1C Year 5) with Maximum Production (72 Loads Per Day)**

Page 2 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	2	5	A	1	5	A	2
	Eastbound off-ramp West	10	A	5	14	A	4	10	A	6	14	A	6
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	6	A	5	5	A	5	6	A	6	5	A	6
	Westbound on-ramp East	11	A	1	17	B	1	11	A	1	19	B	1
	The Branch Lane South	6	A	0	6	A	0	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

The modelling results indicate that key intersections would operate satisfactorily at level of service B or better, regardless of the additional traffic associated with the Project during Year 5 of the extraction phase. The highest delay (19 seconds) would occur at the intersection of Tarean Road with the Pacific Highway and would be experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (10 vehicles per hour) as well as the PM peak hour (five vehicles per hour).

Traffic impact as a result of the operation of the Project is expected to be minimal.

### **4.3.3 Extraction Phase (Stage 2B Year 15)**

#### **4.3.3.1 Average Production (72 Loads per Day)**

**Table 4.11** shows the SIDRA modelling results of the key intersections, with and without traffic associated with the extraction activities of the Karuah South Quarry in Stage 2B (Year 15).

The modelling results indicate that key intersections would continue to operate satisfactorily at level of service B or better, regardless of the additional traffic associated with the Project during Year 15 of the extraction phase. The highest delay (16 seconds) would occur at the intersection of Tarean Road with the Pacific Highway and would be experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (seven vehicles per hour) as well as the PM peak hour (five vehicles per hour).

Traffic impact as a result of the Project's extraction activities is expected to be minimal.

#### **4.3.3.2 Maximum Production (120 Loads per Day)**

**Table 4.12** shows the SIDRA modelling results of the key intersections, with and without traffic associated with the extraction activities of the Karuah South Quarry in Stage 2B (Year 15) with a maximum daily production of 120 loads.

The modelling results indicate that key intersections would operate satisfactorily at level of service B or better, regardless of the additional traffic associated with the Project during Year 15 of the extraction phase. The highest delay (16 seconds) would occur at the intersection of Tarean Road with the Pacific Highway and are experienced by the drivers of vehicles turning right out of Pacific Highway westbound off-ramp during the AM peak hour (seven vehicles per hour) as well as the PM peak hour (five vehicles per hour).

Traffic impact as a result of the operation of the Project is expected to be minimal.

**Table 4.11 Intersection Modelling Results – Extraction Phase (Stage 2B Year 15) with Average Production (72 Loads per Day)**

Page 1 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Blue Rock Close with Karuah South Quarry Site Access	Blue Rock Close East	-	-	-	-	-	-	5	A	0	5	A	0
	Site Access North	-	-	-	-	-	-	9	A	2	6	A	2
	Blue Rock Close West	-	-	-	-	-	-	5	A	0	6	A	0
Andersite Road intersection with Blue Rock Close	Andersite Road East	6	A	0	5	A	0	7	A	0	5	A	1
	Blue Rock Close South	5	A	0	5	A	0	5	A	0	5	A	0
	Andersite Road West	5	A	3	5	A	3	5	A	5	5	A	4
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0	6	A	0	6	A	0
	Andersite Road East	5	A	3	5	A	3	5	A	4	5	A	5
	The Branch Lane South	4	A	4	4	A	4	4	A	5	4	A	5

Table 4.11 Intersection Modelling Results – Extraction Phase (Stage 2B Year 15) with Average Production (72 Loads per Day)

Page 2 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	2	5	A	2	5	A	2
	Eastbound off-ramp West	10	A	4	13	A	3	10	A	5	13	A	5
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	6	A	4	5	A	4	6	A	5	5	A	5
	Westbound on-ramp East	10	A	0	15	A	1	12	A	1	16	B	1
	The Branch Lane South	6	A	0	6	A	0	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



**Table 4.12 Intersection Modelling Results – Extraction Phase (Stage 2B Year 15) with Maximum Production (120 Loads)**

Page 1 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Blue Rock Close with Karuah South Quarry Site Access	Blue Rock Close East	-	-	-	-	-	-	5	A	0	5	A	0
	Site Access North	-	-	-	-	-	-	10	A	3	6	A	3
	Blue Rock Close West	-	-	-	-	-	-	5	A	0	6	A	0
Andersite Road intersection with Blue Rock Close	Andersite Road East	6	A	0	5	A	0	8	A	0	5	A	1
	Blue Rock Close South	5	A	0	5	A	0	5	A	0	5	A	0
	Andersite Road West	5	A	3	5	A	3	5	A	5	5	A	5
The Branch Lane intersection with Andersite Road	The Branch Lane North	6	A	0	6	A	0	6	A	0	6	A	0
	Andersite Road East	5	A	3	5	A	3	5	A	5	5	A	5
	The Branch Lane South	4	A	4	4	A	4	4	A	6	4	A	6

Table 4.12 Intersection Modelling Results – Extraction Phase (Stage 2B Year 15) with Maximum Production (120 Loads)

Page 2 of 2

Intersection	Approach	<u>Without</u> Karuah South Quarry						<u>With</u> Karuah South Quarry					
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)	Delay (sec/veh)	Level of Service	95 <sup>th</sup> Percentile Queue (m)
Tarean Road intersection with the Pacific Highway eastbound off-ramp and the eastbound on-ramp	The Branch Lane North	4	A	0	4	A	0	4	A	0	4	A	0
	Eastbound on-ramp East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	The Branch Lane South	5	A	1	5	A	2	5	A	2	5	A	2
	Eastbound off-ramp West	10	A	4	13	A	3	10	A	6	14	A	5
Tarean Road intersection with the Pacific Highway westbound on-ramp and the westbound off-ramp	The Branch Lane North	6	A	4	5	A	4	6	A	6	5	A	6
	Westbound on-ramp East	10	A	0	15	A	1	12	A	1	16	B	1
	The Branch Lane South	6	A	0	6	A	0	6	A	0	6	A	0
	Westbound off-ramp West	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## **5. OTHER TRAFFIC CONSIDERATIONS**

This section describes other traffic considerations in relation to driveway design, parking, road safety issues, interaction with other quarry vehicles and local impacts of the Project.

### **5.1 SIGHT DISTANCE AT THE QUARRY ENTRANCE**

The available sight distance from the proposed Quarry Entrance to the west along Blue Rock Close is 75m (at a height of 1.15m) exceeds the required minimum gap sight distance (69m) for a truck exiting into a two-lane road. This is based on a five second gap in a 50 km/h speed zone in accordance with AS2890.2. This indicates there would be adequate inter-visibility between an approaching driver travelling either eastward or westward along the Blue Rock Close and the truck driver exiting the Site. It is noted that the visibility for a truck driver departing from the Site would be greater than 75m as they would be positioned typically approximately 2.4m above the road level.



**Plate 5.1 Sight Line to the East from the Crest Towards the Site Entrance**



**Plate 5.2 Sight Line to the West Towards the Site Entrance**

## **5.2 PARKING PROVISION**

MidCoast DCP 2014 does not include requirements for parking on a quarry site. Given the lack of public transport facilities in the vicinity of the Site, it is expected that all workers would be dependent on private vehicles when travelling to and from the Site. On this basis, sufficient off-street parking would be provided to cater for staff and vehicles external to the Quarry operation, such as contractors and visitors. Based on a conservative parking ratio of one space per staff, it is anticipated that the parking provision of 30 spaces would be required for 20 on-site operational workforce, plus additional for contractors and visitors. This parking provision is considered reasonable based on the peak hour light vehicle movement estimate of 30 vehicles per hour during maximum production.

## **5.3 ROAD SAFETY**

A site inspection was undertaken in January 2018 in the surrounding road network along the proposed transport routes to and from either direction of the Pacific Highway. The following road safety concerns have been identified:

- Sight line from Andersite Road along The Branch Lane to the north is limited by the horizontal curve and the batter. Consideration could be given to trimming the roadside vegetation to maximise the line of sight to the north.
- The pavement marking is faded in The Branch Lane on southbound approach to the Tarean Road interchange (northern intersection). Furthermore, the Retro-Reflective Pavement Markers (RRPMs) are missing/damaged or have low retro-reflectivity which affect delineation of the travel lanes during the night time. Consideration should be given to repainting the traffic island and repair the RRPMs to increase their prominence.



Looking north in Andesite Road towards The Branch Lane.

**Plate 5.3 Insufficient Sight Line from Andersite Road to the North**

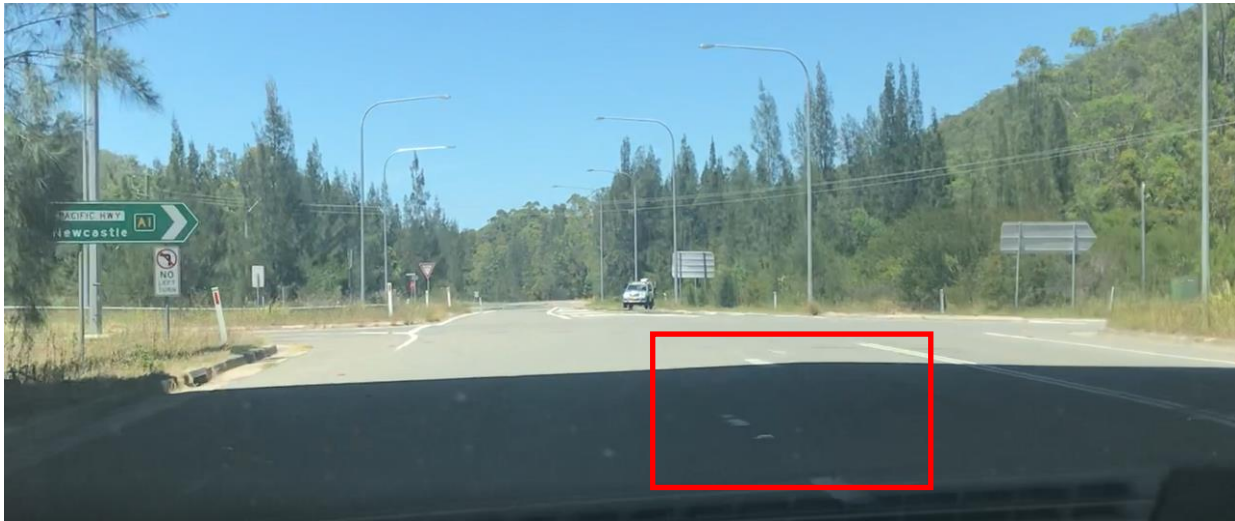


Looking south in The Branch Lane towards the Tarean Road Interchange (northern intersection).

**Plate 5.4 Faded linemarking and Missing RRPMS in The Branch Lane**

- The centreline marking and lane line marking are faded in The Branch Lane on the southbound approach to the Tarean Road interchange (southern intersection). Consideration should be given to extending the centreline to assist with the turning path towards the Pacific Highway westbound on-ramp, and enhancing the line marking and pavement arrow to increase prominence of the right turn bay.





Looking south in The Branch Lane towards the Tarean Road Interchange (northern intersection).

**Plate 5.5 Faded Linemarking and Pavement Arrow Marking in The Branch Lane**

## **5.4 INTERACTION WITH OTHER QUARRY TRUCKS**

The recent upgrade of Andersite Road and Blue Rock Close are suitable for B-Double use through intersection and carriageway widening improvements. The light trafficked Andersite Road and Blue Rock Close with speed limits of 50 km/h shall be strictly maintained to minimise crash risk. The crash history in the vicinity of the Site does not highlight any particular safety concerns with the access intersections for the Karuah Quarry, nor with the intersection of The Branch Lane and the Tarean Road interchange, which are currently being used by quarry trucks travelling to and from the existing Karuah Quarry.

It is recommended that Karuah South Quarry should adopt the following protocols to maximise safety for interaction with other quarry trucks.

- All staff employed on the Site will be required to undertake a site induction. The induction will include a review of approved transport routes to and from the Site for staff and Quarry trucks as well as standard environmental, WH&S, driver protocols and emergency procedures.
- There is to be no overtaking of Project-related product trucks in the transport route between the Pacific Highway and the Site. The double barrier centreline in The Branch Lane, Andersite Road and Blue Rock Close would effectively restrict overtaking manoeuvres.
- If overtaking is required at locations due to a vehicle breakdown then drivers are to make sure they only do so when the situation is safe and adequate line of sight is available.
- Communication between the Project-related product truck drivers and also the adjoining quarry company for responding to any traffic incidents.
- Rapid response to traffic incidents to minimise traffic impacts.

## **5.5 LOCAL IMPACTS OF TRANSPORT ROUTES**

Quarry trucks would travel to/from north and south along the Pacific Highway via the Tarean Road interchange, depending on the location of the customers.

Access to the north and south via the Tarean Road interchange would not require Quarry trucks to travel on Tarean Road within the Karuah town centre unless products were to be delivered to an address in Karuah. This would virtually eliminate traffic impacts on the local community, tourist attractions and the public school in Karuah. In the event quarry products are to be despatched to locations within Karuah, it is most likely that a rigid delivery truck would be used to reach the destinations via Tarean Road.



## 6. SUMMARY AND CONCLUSION

This report documents the assessment of the traffic and transport impacts of the proposed Karuah South Quarry for the extraction/ processing of material up to 600,000tpa for a duration of approximately 25 years.

Key findings of the assessment are as follows.

- The proposed transport routes along The Branch Lane and Pacific Highway are approved B-Double routes. Andersite Road and The Branch Lane have been upgraded suitable for B-Double vehicles. As such, the proposed transport routes are suitable for 19m trucks and trailers that would be used for transportation of quarry products from the Karuah South Quarry
- The affected road sections along the Pacific Highway ramps, Tarean Road, The Branch Lane, Andersite Road and Blue Rock Close currently have low traffic volumes. Existing traffic loads are sufficiently low even with the traffic generated by the existing Karuah Quarry site. The traffic assessment results as discussed in Section 4.3 indicates that moderate increase in traffic associated with the construction and extraction phases of the subject Quarry site would not impose adverse impacts on the road network.
- The Quarry entrance and Quarry access road would be constructed to provide the long-term access to the Quarry from Blue Rock Close at the location near the existing vehicular access for Lot 11 DP1024564. The Quarry access road would be constructed using appropriate road pavement materials and retained with a gravelled unsealed surface until the end of the site establishment and construction stage. Ultimately, the Quarry entrance would be sealed prior to any products being transported from the Site. Adequate line of sight is available at this driveway location.
- The identified road safety issues including insufficient sight line to the north from Andersite Road along The Branch Lane and deficiency in road delineation are to be addressed through MidCoast Council's road maintenance program. Mitigation measures may include trimming of vegetation to improve sight lines and repainting of line marking to improve road lane delineation.

## 7. SEARS REQUIREMENTS

This report has addressed the traffic and transport related issues in response to following requirements specified in the Secretary's Environmental Assessment Requirements (SEARs) 17\_8795 and Roads and Maritime Services letter as shown in **Table 7.1**.

**Table 7.1 Compliance to SEARS Requirements**

Page 1 of 2

<b>Government Agency</b>	<b>Paraphrased Requirement</b>	<b>Relevant Section(s)</b>
Department of Planning and Environment 02/11/17	<ul style="list-style-type: none"> <li>Accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;</li> </ul>	Section 4.1
	<ul style="list-style-type: none"> <li>A detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above); and</li> </ul>	Sections 4.3 and 5.3
	<ul style="list-style-type: none"> <li>A description of the measures that would be implemented to mitigate any impacts, including concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities (if required);</li> </ul>	Sections 5.3 and 5.4
Roads and Maritime Services 19/10/17	The EIS should refer to the following guidelines with regard to the traffic and transport impacts of the proposed development:	
	<ul style="list-style-type: none"> <li>Road and Related Facilities within the Department of Planning EIS Guidelines, and,</li> </ul>	Throughout report
	<ul style="list-style-type: none"> <li>Section 2 Traffic Impact Studies of Roads and Maritime's Guide to Traffic Generating Developments 2002.</li> </ul>	Throughout report
	Furthermore, a traffic and transport study shall be prepared in accordance with the Roads and Maritime's Guide to Traffic Generating Developments 2002 and is to include (but not be limited to) the following:	
	<ul style="list-style-type: none"> <li>Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject property.</li> </ul>	Section 3.11 and 4.1
	<ul style="list-style-type: none"> <li>Current traffic counts for affected traffic routes and intersections.</li> </ul>	Figure 3.5 and Figure 3.6
	<ul style="list-style-type: none"> <li>The anticipated additional vehicular traffic generated from both the construction and operational stages of the project.</li> </ul>	Section 4.1.1
	<ul style="list-style-type: none"> <li>The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.</li> </ul>	Section 4.1.3

**Table 7.1 Compliance to SEARS Requirements**

Page 2 of 2

Government Agency	Paraphrased Requirement	Relevant Section(s)
Roads and Maritime Services 19/10/17 (Cont'd)	<ul style="list-style-type: none"> <li>Consideration of the traffic impacts on existing and proposed intersections, in particular, the first classified road intersection/s encountered following the local road network from the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during both the construction and operational stages. The traffic impact shall also include the cumulative traffic impact of other proposed developments in the area.</li> </ul>	Section 3.11 and 4.3
	<ul style="list-style-type: none"> <li>Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development. In this regard, preliminary concept drawings shall be submitted with the EIS 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 Roads and Maritime and Council.</li> </ul>	Upgrades are not required for intersection capacity. Sections 5.3 and 5.4
	<ul style="list-style-type: none"> <li>Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including: <ul style="list-style-type: none"> <li>Current traffic counts and 10 year traffic growth projections</li> <li>With and without development scenarios</li> <li>95th percentile back of queue lengths</li> <li>Delays and level of service on all legs for the relevant intersections</li> <li>Electronic data for Roads and Maritime review.</li> </ul> </li> </ul>	
		Sections 3.9 and 4.1.2
		Section 4.3
		Section 4.3
		Section 4.3
		As part of submission
Department of Planning and Environment 02/11/17	Environmental Planning Instruments, Policies, Guidelines & Plans	Throughout report
	Guide to Traffic Generating Development (RMS)	Throughout report
	Road Design Guide (RMS) & relevant Austroads Standards	Throughout report

# Annexures

(Total No. of pages including blank pages = 33)

Annexure 1\*      Traffic Survey

Annexure 2\*      Intersection Modelling Results

\* This Appendix is only available on the digital version of this document

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# **Annexure 1**

## **Traffic Survey**

(Total No. of pages including blank pages = 10)

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**TRANS TRAFFIC SURVEY**  
TURNING MOVEMENT SURVEY  
Intersection of Tarean Rd and Pacific Hwy, Karuah

Date:	Tue 08/02/18
Weather:	Overcast
Suburban:	Karuah
Customer:	TPPP

North:	Tarean Rd
East:	Pacific Hwy
South:	Tarean Rd
West:	Pacific Hwy

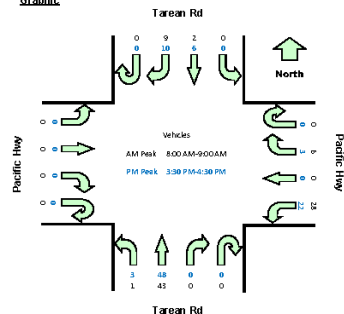
Survey Start:	AM	5:00	PM	15:00
Vehicular Peakhour:	Pedestrians Peakhour			
AM:	8:00 AM-9:00 AM	AM:	N/A	
PM:	3:30 PM-4:30 PM	PM:	N/A	

**All Vehicles**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	20	
5:15	5:30	0	2	1	0	0	0	0	0	0	0	3	0	0	0	0	0	33	
5:30	5:45	0	0	0	0	0	0	1	1	0	0	4	0	0	0	0	0	41	
5:45	6:00	0	0	0	0	0	1	0	2	0	0	4	0	0	0	0	0	46	
6:00	6:15	0	0	0	0	0	1	0	4	0	0	9	0	0	0	0	0	52	
6:15	6:30	0	1	0	0	0	0	0	6	0	0	7	0	0	0	0	0	60	
6:30	6:45	0	0	0	0	0	0	0	4	0	0	6	1	0	0	0	0	66	
6:45	7:00	0	4	0	0	0	1	0	4	0	0	3	1	0	0	0	0	78	
7:00	7:15	0	2	5	0	0	1	0	7	0	0	7	0	0	0	0	0	78	
7:15	7:30	0	8	1	0	0	1	0	3	0	0	7	0	0	0	0	0	74	
7:30	7:45	0	7	2	0	0	0	0	6	0	0	7	1	0	0	0	0	71	
7:45	8:00	0	2	0	0	0	0	0	8	0	0	2	1	0	0	0	0	74	
8:00	8:15	0	1	0	0	0	2	0	3	0	0	12	0	0	0	0	0	89	Peak
8:15	8:30	0	2	0	0	0	1	0	9	0	0	4	1	0	0	0	0		
8:30	8:45	0	4	1	0	0	2	0	7	0	0	12	0	0	0	0	0		
8:45	9:00	0	2	1	0	0	1	0	9	0	0	15	0	0	0	0	0		
15:00	15:15	0	2	0	0	0	0	0	7	0	0	8	0	0	0	0	0	89	
15:15	15:30	0	0	0	0	0	0	0	14	0	0	8	0	0	0	0	0	87	
15:30	15:45	0	2	1	0	0	1	0	7	0	0	14	1	0	0	0	0	92	Peak
15:45	16:00	0	5	2	0	0	0	0	6	0	0	10	1	0	0	0	0	89	
16:00	16:15	0	1	2	0	0	1	0	0	0	0	11	0	0	0	0	0	79	
16:15	16:30	0	2	1	0	0	1	0	9	0	0	13	1	0	0	0	0	90	
16:30	16:45	0	0	0	0	0	1	0	9	0	0	13	0	0	0	0	0	84	
16:45	17:00	0	2	1	0	0	0	0	6	0	0	5	0	0	0	0	0	83	
17:00	17:15	0	7	1	0	0	0	0	11	0	0	7	0	0	0	0	0	90	
17:15	17:30	0	4	1	0	0	1	0	6	0	0	8	1	0	0	0	0	83	
17:30	17:45	0	3	1	0	0	0	0	8	0	0	9	1	0	0	0	0	77	
17:45	18:00	0	3	2	0	0	0	0	11	0	0	5	0	0	0	0	0	68	
18:00	18:15	0	3	0	0	0	0	0	7	0	0	9	0	0	0	0	0	55	
18:15	18:30	0	2	2	0	0	2	0	4	0	0	5	0	0	0	0	0		
18:30	18:45	0	1	0	0	0	1	0	6	0	0	4	1	0	0	0	0		
18:45	19:00	0	0	0	0	0	0	0	7	0	0	1	0	0	0	0	0		

Peak Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Total
8:00	9:00	0	9	2	0	0	6	0	28	0	0	43	1	0	0	0	0	89
15:30	16:30	0	10	6	0	0	3	0	22	0	0	48	3	0	0	0	0	92

**Graphic**



**Light Vehicles**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:15	5:30	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0
5:45	6:00	0	0	0	0	0	1	0	2	0	0	3	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	3	0	0	9	0	0	0	0	0
6:15	6:30	0	1	0	0	0	0	0	6	0	0	6	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	4	0	0	6	1	0	0	0	0
6:45	7:00	0	2	0	0	0	1	0	4	0	0	2	1	0	0	0	0
7:00	7:15	0	1	1	0	0	1	0	5	0	0	6	0	0	0	0	0
7:15	7:30	0	0	1	0	0	1	0	3	0	0	4	0	0	0	0	0
7:30	7:45	0	3	2	0	0	0	0	5	0	0	7	1	0	0	0	0
7:45	8:00	0	2	0	0	0	0	0	6	0	0	2	1	0	0	0	0
8:00	8:15	0	1	0	0	0	0	0	3	0	0	9	0	0	0	0	0
8:15	8:30	0	0	0	0	0	1	0	8	0	0	3	1	0	0	0	0
8:30	8:45	0	1	1	0	0	2	0	5	0	0	11	0	0	0	0	0
8:45	9:00	0	0	1	0	0	1	0	8	0	0	11	0	0	0	0	0
15:00	15:15	0	1	0	0	0	0	0	6	0	0	6	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	13	0	0	8	0	0	0	0	0
15:30	15:45	0	1	1	0	0	0	0	7	0	0	11	1	0	0	0	0
15:45	16:00	0	5	2	0	0	0	0	5	0	0	10	0	0	0	0	0
16:00	16:15	0	1	2	0	0	1	0	0	0	0	9	0	0	0	0	0
16:15	16:30	0	2	1	0	0	1	0	9	0	0	11	1	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	9	0	0	12	0	0	0	0	0
16:45	17:00	0	2	1	0	0	0	0	6	0	0	5	0	0	0	0	0
17:00	17:15	0	6	1	0	0	0	0	10	0	0	7	0	0	0	0	0

17:15	17:30	0	4	1	0	0	1	0	6	0	0	8	1	0	0	0	0
17:30	17:45	0	3	1	0	0	0	0	8	0	0	9	0	0	0	0	0
17:45	18:00	0	3	2	0	0	0	0	11	0	0	4	0	0	0	0	0
18:00	18:15	0	3	0	0	0	0	0	7	0	0	9	0	0	0	0	0
18:15	18:30	0	2	2	0	0	2	0	4	0	0	5	0	0	0	0	0
18:30	18:45	0	1	0	0	0	1	0	5	0	0	4	1	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	6	0	0	1	0	0	0	0	0

**Small Trucks**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	8:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:45	9:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Large Trucks**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
6:00	6:15	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	1	4	0	0	0	0	2	0	0	1	0	0	0	0	0
7:15	7:30	0	8	0	0	0	0	0	0	0	0	3	0	0	0	0	0
7:30	7:45	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0
8:15	8:30	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0
8:30	8:45	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0
8:45	9:00	0	2	0	0	0	0	0	1	0	0	3	0	0	0	0	0
15:00	15:15	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
15:30	15:45	0	1	0	0	0	1	0	0	0	0	3	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
16:30	16:45	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

**TRANS TRAFFIC SURVEY**  
TURNING MOVEMENT SURVEY  
Intersection of Tarean Rd and Pacific Hwy, Karuah

Date: Tue 06/02/19  
Weather: Overcast  
Suburban: Karuah  
Customer: TTPP

North: Tarean Rd  
East: Pacific Hwy  
South: Tarean Rd  
West: Pacific Hwy

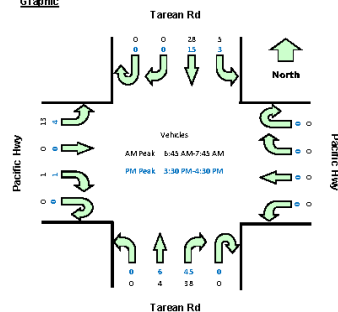
Survey Start AM: 5:00 PM: 15:00  
Vehicular Peakhour Pedestrians Peakhour  
AM: 6:45 AM-7:45 AM AM: N/A  
PM: 3:30 PM-4:30 PM PM: N/A

**All Vehicles**

Time	North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy				Hourly Total	
Period Start/Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
5:00 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	26
5:15 5:30	0	0	2	1	0	0	0	0	0	3	0	0	0	1	0	0	4	45
5:30 5:45	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	59
5:45 6:00	0	0	0	0	0	0	0	0	0	1	4	0	0	0	1	4	67	
6:00 6:15	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	11	75
6:15 6:30	0	0	1	1	0	0	0	0	0	7	0	0	0	0	0	0	12	75
6:30 6:45	0	0	0	1	0	0	0	0	0	6	0	1	0	0	0	0	8	82
6:45 7:00	0	0	3	1	0	0	0	0	0	4	2	0	0	1	0	7	89	Peak
7:00 7:15	0	0	7	1	0	0	0	0	0	9	0	0	0	0	0	0	3	78
7:15 7:30	0	0	9	2	0	0	0	0	0	15	1	0	0	0	0	0	1	77
7:30 7:45	0	0	9	1	0	0	0	0	0	10	1	0	0	0	0	0	2	65
7:45 8:00	0	0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	2	69
8:00 8:15	0	0	1	2	0	0	0	0	0	10	2	0	0	0	0	0	4	88
8:15 8:30	0	0	2	3	0	0	0	0	0	6	1	0	0	0	0	0	4	
8:30 8:45	0	0	5	0	0	0	0	0	0	15	2	0	0	0	0	0	5	
8:45 9:00	0	0	3	1	0	0	0	0	0	15	3	0	0	0	0	0	4	
15:00 15:15	0	0	2	1	0	0	0	0	0	8	4	0	0	0	0	0	1	63
15:15 15:30	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	64
15:30 15:45	0	0	3	0	0	0	0	0	0	14	1	0	0	0	0	0	1	74
15:45 16:00	0	0	7	2	0	0	0	0	0	9	1	0	0	0	0	0	1	73
16:00 16:15	0	0	3	1	0	0	0	0	0	9	3	0	0	0	0	0	1	62
16:15 16:30	0	0	2	0	0	0	0	0	0	13	1	0	0	1	0	0	1	61
16:30 16:45	0	0	0	1	0	0	0	0	0	12	1	0	0	0	0	0	4	59
16:45 17:00	0	0	3	1	0	0	0	0	0	5	0	0	0	0	0	0	0	57
17:00 17:15	0	0	8	0	0	0	0	0	0	7	1	0	0	0	0	0	0	60
17:15 17:30	0	0	5	0	0	0	0	0	0	8	1	0	0	0	0	0	2	59
17:30 17:45	0	0	4	0	0	0	0	0	0	7	2	0	0	0	0	0	3	55
17:45 18:00	0	0	4	1	0	0	0	0	0	5	0	0	0	1	0	1	47	
18:00 18:15	0	0	2	1	0	0	0	0	0	9	0	0	0	1	0	2	36	
18:15 18:30	0	0	4	0	0	0	0	0	0	2	5	0	0	0	0	0	1	
18:30 18:45	0	0	1	2	0	0	0	0	0	5	0	0	0	0	0	0	0	
18:45 19:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	

Peak Time	North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy				Peak total
Period Start/Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
6:45 7:45	0	0	28	5	0	0	0	0	0	38	4	0	0	1	0	13	89
15:30 16:30	0	0	15	3	0	0	0	0	0	45	6	0	0	1	0	4	74

**Graphic**



**Light Vehicles**

Time	North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy				
Period Start/Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
5:00 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 5:30	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0
5:30 5:45	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1
5:45 6:00	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	4
6:00 6:15	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	8
6:15 6:30	0	0	1	1	0	0	0	0	0	6	0	0	0	0	0	0	6
6:30 6:45	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	0	4
6:45 7:00	0	0	1	1	0	0	0	0	0	2	2	0	0	1	0	0	6
7:00 7:15	0	0	2	1	0	0	0	0	0	7	0	0	0	0	0	0	2
7:15 7:30	0	0	1	2	0	0	0	0	0	11	1	0	0	0	0	0	1
7:30 7:45	0	0	5	1	0	0	0	0	0	10	1	0	0	0	0	0	1
7:45 8:00	0	0	2	1	0	0	0	0	0	2	0	0	0	0	0	0	2
8:00 8:15	0	0	1	1	0	0	0	0	0	9	0	0	0	0	0	0	1
8:15 8:30	0	0	0	2	0	0	0	0	0	4	1	0	0	0	0	0	1
8:30 8:45	0	0	2	0	0	0	0	0	0	12	2	0	0	0	0	0	0
8:45 9:00	0	0	1	1	0	0	0	0	0	11	2	0	0	0	0	0	0
15:00 15:15	0	0	1	1	0	0	0	0	0	6	4	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
15:30 15:45	0	0	2	0	0	0	0	0	0	12	0	0	0	0	0	0	1
15:45 16:00	0	0	7	2	0	0	0	0	0	9	1	0	0	0	0	0	1
16:00 16:15	0	0	3	0	0	0	0	0	0	6	3	0	0	0	0	0	1
16:15 16:30	0	0	2	0	0	0	0	0	0	10	1	0	0	1	0	0	0
16:30 16:45	0	0	0	1	0	0	0	0	0	12	0	0	0	0	0	0	3
16:45 17:00	0	0	3	1	0	0	0	0	0	5	0	0	0	0	0	0	0
17:00 17:15	0	0	7	0	0	0	0	0	0	7	1	0	0	0	0	0	0

17:15	17:30	0	0	5	0	0	0	0	0	0	7	1	0	0	0	2
17:30	17:45	0	0	4	0	0	0	0	0	0	7	2	0	0	0	3
17:45	18:00	0	0	4	1	0	0	0	0	0	4	0	0	0	1	1
18:00	18:15	0	0	2	1	0	0	0	0	0	9	0	0	0	1	2
18:15	18:30	0	0	4	0	0	0	0	0	0	0	5	0	0	0	1
18:30	18:45	0	0	1	2	0	0	0	0	0	4	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

**Small Tracks**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	8:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
8:30	8:45	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
8:45	9:00	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Large Tracks**

Time		North Approach Tarean Rd				East Approach Pacific Hwy				South Approach Tarean Rd				West Approach Pacific Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3
5:45	6:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:15	6:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:45	7:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00	7:15	0	0	5	0	0	0	0	0	0	1	0	0	0	0	0	1
7:15	7:30	0	0	8	0	0	0	0	0	0	3	0	0	0	0	0	0
7:30	7:45	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	1	0	0	0	0	0	1	2	0	0	0	0	3
8:15	8:30	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	3
8:30	8:45	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	5
8:45	9:00	0	0	2	0	0	0	0	0	0	2	1	0	0	0	0	4
15:00	15:15	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	1	0	0	0	0	0	0	2	1	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:30	16:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

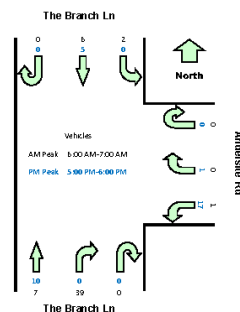
**TRANS TRAFFIC SURVEY**  
TURNING MOVEMENT SURVEY  
Intersection of The Branch Ln and Anderse Rd, Karuah

<b>Date:</b> Tue 09/02/18	<b>North:</b> The Branch Ln	<b>Survey Start</b>
<b>Weather:</b> Overcast	<b>East:</b> Anderse Rd	AM: 6:00 PM: 15:00
<b>Suburban:</b> Karuah	<b>South:</b> The Branch Ln	<b>Vehicular Peakhour Start</b>
<b>Customer:</b> TTPP	<b>West:</b> N/A	AM: 6:00 AM: PM: 5:00 PM: 6:00 PM

Time		North Approach The Branch			East Approach Anderse			South Approach The Branch			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
5:00	5:15	0	0	0	0	0	0	0	1	0	21	
5:15	5:30	0	3	0	0	0	0	0	0	0	37	
5:30	5:45	0	0	0	0	0	0	0	3	5	49	
5:45	6:00	0	0	1	0	0	0	0	5	3	51	
6:00	6:15	0	0	0	0	0	0	0	16	1	55	Peak
6:15	6:30	0	2	1	0	0	0	0	12	0	49	
6:30	6:45	0	1	1	0	0	0	0	6	2	49	
6:45	7:00	0	3	0	0	0	1	0	5	4	52	
7:00	7:15	0	3	0	0	0	5	0	3	0	44	
7:15	7:30	0	2	0	0	2	9	0	0	2	42	
7:30	7:45	0	6	0	0	0	4	0	2	1	37	
7:45	8:00	0	3	0	0	0	0	0	1	1	36	
8:00	8:15	0	3	0	0	0	0	0	6	0	42	
8:15	8:30	0	1	0	0	0	4	0	4	1		
8:30	8:45	0	2	0	0	0	3	0	4	3		
8:45	9:00	0	2	0	0	0	2	0	6	1		
15:00	15:15	0	1	0	0	0	2	0	2	3	24	
15:15	15:30	0	0	0	0	0	0	0	0	0	24	
15:30	15:45	0	2	0	0	0	1	0	0	2	28	
15:45	16:00	0	6	0	0	0	3	0	0	2	29	
16:00	16:15	0	1	0	0	0	3	0	0	4	22	
16:15	16:30	0	0	0	0	0	2	0	0	2	24	
16:30	16:45	0	1	0	0	0	0	0	2	3	28	
16:45	17:00	0	2	0	0	0	2	0	0	0	31	
17:00	17:15	0	1	0	0	1	7	0	0	1	33	Peak
17:15	17:30	0	0	0	0	0	5	0	0	3	28	
17:30	17:45	0	0	0	0	0	4	0	0	5	30	
17:45	18:00	0	4	0	0	0	1	0	0	1	24	
18:00	18:15	0	1	0	0	0	2	0	0	2	18	
18:15	18:30	0	0	0	0	0	4	0	0	6		
18:30	18:45	0	3	0	0	0	0	0	0	0		
18:45	19:00	0	0	0	0	0	0	0	0	0		

Peak Time		North Approach The Branch			East Approach Anderse			South Approach The Branch			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
6:00	7:00	0	6	2	0	0	1	0	39	7	55
17:00	18:00	0	5	0	0	1	17	0	0	10	33

**Graphic**



Time		North Approach The Branch			East Approach Anderse			South Approach The Branch			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
5:00	5:15	0	0	0	0	0	0	0	1	0		
5:15	5:30	0	2	0	0	0	0	0	0	0		
5:30	5:45	0	0	0	0	0	0	0	2	2		
5:45	6:00	0	0	1	0	0	0	0	4	3		
6:00	6:15	0	0	0	0	0	0	0	14	0		
6:15	6:30	0	2	1	0	0	0	0	6	0		
6:30	6:45	0	1	1	0	0	0	0	2	2		
6:45	7:00	0	2	0	0	0	0	0	4	4		
7:00	7:15	0	3	0	0	0	0	0	2	0		
7:15	7:30	0	2	0	0	2	1	0	0	2		
7:30	7:45	0	6	0	0	0	0	0	1	1		
7:45	8:00	0	3	0	0	0	0	0	1	1		
8:00	8:15	0	2	0	0	0	0	0	1	0		
8:15	8:30	0	1	0	0	0	1	0	2	0		
8:30	8:45	0	2	0	0	0	0	0	1	1		
8:45	9:00	0	2	0	0	0	0	0	2	0		
15:00	15:15	0	1	0	0	0	1	0	1	3		
15:15	15:30	0	0	0	0	0	0	0	0	0		
15:30	15:45	0	2	0	0	0	0	0	0	1		
15:45	16:00	0	6	0	0	0	3	0	0	2		
16:00	16:15	0	0	0	0	0	3	0	0	4		
16:15	16:30	0	0	0	0	0	2	0	0	1		
16:30	16:45	0	1	0	0	0	0	0	1	2		
16:45	17:00	0	2	0	0	0	2	0	0	0		
17:00	17:15	0	0	0	0	1	7	0	0	1		

17:15	17:30	0	0	0	0	0	5	0	0	3
17:30	17:45	0	0	0	0	0	4	0	0	5
17:45	18:00	0	4	0	0	0	1	0	0	1
18:00	18:15	0	1	0	0	0	2	0	0	2
18:15	18:30	0	0	0	0	0	4	0	0	6
18:30	18:45	0	3	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0

Time		North Approach		The Branch		East Approach		Under site		Rough Approach		The Branch	
Period Start	Period End	U	SB	L	U	R	L	U	R	L	U	R	NB
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0
8:00	8:15	0	0	0	0	0	0	0	0	0	0	0	0
8:15	8:30	0	0	0	0	0	0	0	0	0	0	0	0
8:30	8:45	0	0	0	0	0	0	0	0	0	0	0	0
8:45	9:00	0	0	0	0	0	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0

Time		North Approach		The Branch		East Approach		Under site		Rough Approach		The Branch	
Period Start	Period End	U	SB	L	U	R	L	U	R	L	U	R	NB
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	1	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	1	3	0	0
5:45	6:00	0	0	0	0	0	0	0	0	1	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	2	1	0	0
6:15	6:30	0	0	0	0	0	0	0	0	6	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	4	0	0	0
6:45	7:00	0	1	0	0	0	0	1	0	1	0	0	0
7:00	7:15	0	0	0	0	0	0	5	0	1	0	0	0
7:15	7:30	0	0	0	0	0	0	8	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	4	0	1	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0
8:00	8:15	0	1	0	0	0	0	0	0	5	0	0	0
8:15	8:30	0	0	0	0	0	0	3	0	2	1	0	0
8:30	8:45	0	0	0	0	0	0	3	0	3	2	0	0
8:45	9:00	0	0	0	0	0	0	2	0	4	1	0	0
15:00	15:15	0	0	0	0	0	0	1	0	1	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	1	0	0	1	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	1	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	1	0	0
16:30	16:45	0	0	0	0	0	0	0	0	1	1	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	1	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0

**TRANS TRAFFIC SURVEY**  
TURNING MOVEMENT SURVEY

Intersection of Blue Rock Cl and Anderse Rd, Karuah



Date:	Tue 06/02/18
Weather:	Overcast
Suburb:	Karuah
Customer:	TTTP

North:	N/A
East:	Anderse Rd
South:	Blue Rock Cl
West:	Anderse Rd

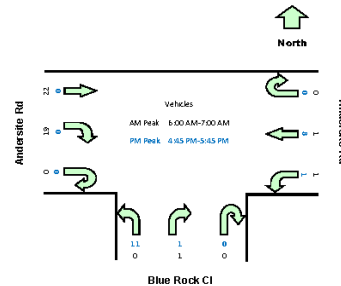
Survey Start	AM: 5:00 PM: 5:00
Vehicular Peak Hour Start	AM: 8:00 AM: PM: 4:45 PM-5:45 PM

**All Vehicles**

Time		Peak										Hourly Total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB		
5:00	5:15	0	0	0	0	0	0	0	0	1	10	Peak
5:15	5:30	0	0	0	0	0	0	0	0	0	25	
5:30	5:45	0	0	0	0	0	0	0	1	2	38	
5:45	6:00	0	0	0	0	0	0	0	3	3	42	
6:00	6:15	0	0	0	0	0	0	0	8	8	44	
6:15	6:30	0	0	0	0	0	0	0	8	5	37	
6:30	6:45	0	0	0	0	0	0	0	0	7	39	
6:45	7:00	0	1	1	0	1	0	0	3	2	38	
7:00	7:15	0	5	0	0	1	0	0	3	0	33	
7:15	7:30	0	9	3	0	1	2	0	0	0	33	
7:30	7:45	0	2	0	0	0	2	0	2	0	28	
7:45	8:00	0	0	0	0	2	0	0	1	0	30	
8:00	8:15	0	0	1	0	2	0	0	2	4	36	
8:15	8:30	0	3	1	0	1	1	0	1	3		
8:30	8:45	0	3	1	0	0	0	0	3	1		
8:45	9:00	0	1	1	0	0	1	0	1	5		
15:00	15:15	0	2	0	0	0	0	0	0	2	10	Peak
15:15	15:30	0	0	0	0	0	0	0	0	0	9	
15:30	15:45	0	1	1	0	1	0	0	0	0	11	
15:45	16:00	0	1	0	0	0	2	0	0	0	11	
16:00	16:15	0	2	0	0	0	1	0	0	0	11	
16:15	16:30	0	2	0	0	0	0	0	0	0	17	
16:30	16:45	0	0	1	0	0	0	0	1	1	20	
16:45	17:00	0	0	0	0	1	2	0	0	0	21	
17:00	17:15	0	6	1	0	0	2	0	0	0	19	
17:15	17:30	0	0	0	0	0	5	0	0	0	12	
17:30	17:45	0	2	0	0	0	2	0	0	0	11	
17:45	18:00	0	0	0	0	0	1	0	0	0	7	
18:00	18:15	0	0	0	0	0	2	0	0	0	6	
18:15	18:30	0	0	0	0	0	4	0	0	0		
18:30	18:45	0	0	0	0	0	0	0	0	0		
18:45	19:00	0	0	0	0	0	0	0	0	0		

Peak Time		East Approach Anderse Rd			South Approach Blue Rock Crest			West Approach Anderse Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
6:00	7:00	0	1	1	0	1	0	0	19	22	44
16:45	17:45	0	8	1	0	1	11	0	0	0	21

**Graphic**



**Light Vehicles**

Time		East Approach				Anderse Rd				South Approach				Blue Rock Crest				West Approach				Anderse Rd	
Period Start	Period End	U	WB	L	U	R	L	U	R	L	U	R	L	U	R	L	U	R	L	EB	LB		
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1		
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	3	2	3	2	3		
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	8	6	8	6	8	6	8		
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	6	1	6	1	6		
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0		
6:45	7:00	0	0	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2		
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2		
7:15	7:30	0	2	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0		
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1		
7:45	8:00	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	1	0	1		
8:00	8:15	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0	1	0	1	0	1		
8:15	8:30	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1		
8:30	8:45	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1		
8:45	9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0		
15:00	15:15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
15:15	15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15:30	15:45	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15:45	16:00	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0		
16:00	16:15	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
16:15	16:30	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16:30	16:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0		
16:45	17:00	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0		
17:00	17:15	0	6	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0		



[illegible][illegible]

Large Tracks											
Time		East Approach Anderse Rd			Rough Approach Blue Rock			West Approach Anderse Rd			
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
5:00	5:15	0	0	0	0	0	0	0	0	0	
5:15	5:30	0	0	0	0	0	0	0	0	0	
5:30	5:45	0	0	0	0	0	0	0	0	0	1
5:45	6:00	0	0	0	0	0	0	0	0	0	1
6:00	6:15	0	0	0	0	0	0	0	0	0	2
6:15	6:30	0	0	0	0	0	0	0	0	2	4
6:30	6:45	0	0	0	0	0	0	0	0	0	4
6:45	7:00	0	1	0	0	1	0	0	1	0	
7:00	7:15	0	5	0	0	1	0	0	1	0	
7:15	7:30	0	7	1	0	0	1	0	0	0	
7:30	7:45	0	2	0	0	0	2	0	1	0	
7:45	8:00	0	0	0	0	1	0	0	0	0	
8:00	8:15	0	0	0	0	0	0	0	0	1	4
8:15	8:30	0	2	1	0	1	1	0	0	0	2
8:30	8:45	0	3	0	0	0	0	0	0	2	1
8:45	9:00	0	1	1	0	0	1	0	0	1	3
15:00	15:15	0	1	0	0	0	0	0	0	0	1
15:15	15:30	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	1	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	1	0	0
16:45	17:00	0	0	0	0	1	0	0	0	0	0
17:00	17:15	0	0	1	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0

# **Annexure 2**

## **Intersection Modelling Results**

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## EXISTING CONDITIONS

### MOVEMENT SUMMARY

▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Ex AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	m				km/h
South: Blue Rock Close												
1a	L1	1	0.0	0.002	4.6	LOS A	0.0	0.2	0.16	0.48	0.16	43.8
3	R2	1	100.0	0.002	5.7	LOS A	0.0	0.2	0.16	0.48	0.16	41.7
Approach		2	50.0	0.002	5.3	NA	0.0	0.2	0.16	0.48	0.16	42.7
East: Andersite Road (east)												
4	L2	1	0.0	0.003	4.1	LOS A	0.0	0.1	0.11	0.48	0.11	44.7
6a	R1	1	100.0	0.003	4.0	LOS A	0.0	0.1	0.11	0.48	0.11	29.9
Approach		2	50.0	0.003	4.0	LOS A	0.0	0.1	0.11	0.48	0.11	40.2
NorthWest: Andersite Road (west)												
27a	L1	23	45.5	0.031	4.8	LOS A	0.1	1.2	0.02	0.52	0.02	14.7
29a	R1	20	15.8	0.031	4.3	LOS A	0.1	1.2	0.02	0.52	0.02	44.0
Approach		43	31.7	0.031	4.5	NA	0.1	1.2	0.02	0.52	0.02	29.8
All Vehicles		47	33.3	0.031	4.5	NA	0.1	1.2	0.03	0.52	0.03	30.8

### MOVEMENT SUMMARY

▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Ex PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Blue Rock Close												
1a	L1	12	0.0	0.008	4.2	LOS A	0.0	0.1	0.01	0.53	0.01	44.4
3	R2	1	100.0	0.008	5.2	LOS A	0.0	0.1	0.01	0.53	0.01	42.3
Approach		13	8.3	0.008	4.4	NA	0.0	0.1	0.01	0.53	0.01	44.2
East: Andersite Road (east)												
4	L2	1	100.0	0.008	4.1	LOS A	0.0	0.2	0.03	0.49	0.03	43.4
6a	R1	8	0.0	0.008	3.4	LOS A	0.0	0.2	0.03	0.49	0.03	36.1
Approach		9	11.1	0.008	3.5	LOS A	0.0	0.2	0.03	0.49	0.03	38.0
NorthWest: Andersite Road (west)												
27a	L1	1	0.0	0.001	4.2	LOS A	0.0	0.0	0.02	0.51	0.02	12.1
29a	R1	1	0.0	0.001	4.1	LOS A	0.0	0.0	0.02	0.51	0.02	44.5
Approach		2	0.0	0.001	4.1	NA	0.0	0.0	0.02	0.51	0.02	28.4
All Vehicles		24	8.7	0.008	4.0	NA	0.0	0.2	0.01	0.51	0.01	41.2

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Ex AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	7	14.3	0.038	0.1	LOS A	0.2	2.0	0.06	0.46	0.06	54.5
3	R2	41	33.3	0.038	4.1	LOS A	0.2	2.0	0.06	0.46	0.06	33.4
Approach		48	30.4	0.038	3.4	NA	0.2	2.0	0.06	0.46	0.06	39.2
East: Andersite Road												
4	L2	2	50.0	0.003	5.2	LOS A	0.0	0.1	0.04	0.52	0.04	30.8
6	R2	1	0.0	0.003	4.8	LOS A	0.0	0.1	0.04	0.52	0.04	49.0
Approach		3	33.3	0.003	5.1	LOS A	0.0	0.1	0.04	0.52	0.04	40.5
North: The Branch Lane (north)												
7	L2	2	0.0	0.005	5.5	LOS A	0.0	0.0	0.00	0.15	0.00	49.8
8	T1	6	16.7	0.005	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	57.3
Approach		8	12.5	0.005	1.4	NA	0.0	0.0	0.00	0.15	0.00	55.1
All Vehicles		60	28.1	0.038	3.2	NA	0.2	2.0	0.05	0.42	0.05	42.8

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Ex PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	11	0.0	0.006	0.0	LOS A	0.0	0.0	0.01	0.05	0.01	59.3
3	R2	1	0.0	0.006	4.1	LOS A	0.0	0.0	0.01	0.05	0.01	46.8
Approach		12	0.0	0.006	0.4	NA	0.0	0.0	0.01	0.05	0.01	58.9
East: Andersite Road												
4	L2	18	0.0	0.012	4.6	LOS A	0.0	0.3	0.04	0.51	0.04	32.7
6	R2	1	0.0	0.012	4.6	LOS A	0.0	0.3	0.04	0.51	0.04	49.0
Approach		19	0.0	0.012	4.6	LOS A	0.0	0.3	0.04	0.51	0.04	34.7
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.10	0.00	50.4
8	T1	5	20.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	58.1
Approach		6	16.7	0.004	0.9	NA	0.0	0.0	0.00	0.10	0.00	56.6
All Vehicles		37	2.9	0.012	2.6	NA	0.0	0.3	0.02	0.30	0.02	49.0

## MOVEMENT SUMMARY

### Site: 101 [3. Pacific Highway/Tarean Road North (Ex AM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	4	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	40	21.1	0.028	4.8	LOS A	0.1	1.2	0.16	0.56	0.16	51.2
Approach		44	19.0	0.028	4.4	NA	0.1	1.2	0.15	0.51	0.15	51.4
North: Tarean Road (north)												
7	L2	5	0.0	0.033	4.1	LOS A	0.0	0.0	0.00	0.09	0.00	54.9
8	T1	29	67.9	0.033	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	50.6
Approach		35	57.6	0.033	0.6	NA	0.0	0.0	0.00	0.09	0.00	52.4
West: Pacific Highway (west)												
10	L2	14	23.1	0.015	9.4	LOS A	0.1	0.6	0.02	1.04	0.02	45.4
11	T1	1	0.0	0.015	8.4	LOS A	0.1	0.6	0.02	1.04	0.02	56.0
12	R2	1	0.0	0.015	8.3	LOS A	0.1	0.6	0.02	1.04	0.02	45.8
Approach		16	20.0	0.015	9.2	LOS A	0.1	0.6	0.02	1.04	0.02	46.5
All Vehicles		95	33.3	0.033	3.8	NA	0.1	1.2	0.07	0.44	0.07	50.3

## MOVEMENT SUMMARY

### Site: 101 [3. Pacific Highway/Tarean Road North (Ex PM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	6	16.7	0.004	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	47	17.8	0.031	4.7	LOS A	0.1	1.3	0.09	0.57	0.09	52.2
Approach		54	17.6	0.031	4.2	NA	0.1	1.3	0.08	0.51	0.08	52.4
North: Tarean Road (north)												
7	L2	3	33.3	0.012	4.1	LOS A	0.0	0.0	0.00	0.09	0.00	52.6
8	T1	16	6.7	0.012	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	56.3
Approach		19	11.1	0.012	0.7	NA	0.0	0.0	0.00	0.09	0.00	54.5
West: Pacific Highway (west)												
10	L2	4	25.0	0.006	9.5	LOS A	0.0	0.2	0.04	1.01	0.04	45.4
11	T1	1	0.0	0.006	8.2	LOS A	0.0	0.2	0.04	1.01	0.04	56.0
12	R2	1	0.0	0.006	8.1	LOS A	0.0	0.2	0.04	1.01	0.04	45.8
Approach		6	16.7	0.006	9.1	LOS A	0.0	0.2	0.04	1.01	0.04	47.9
All Vehicles		79	16.0	0.031	3.7	NA	0.1	1.3	0.06	0.45	0.06	52.1

## MOVEMENT SUMMARY

### Site: 101 [4. Pacific Highway/Tarean Road South (Ex AM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	45	20.9	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		46	20.5	0.030	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
East: Pacific Highway (east)												
4	L2	29	14.3	0.018	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	54.3
5	T1	1	0.0	0.013	8.7	LOS A	0.0	0.5	0.25	0.92	0.25	55.7
6	R2	6	33.3	0.013	10.7	LOS A	0.0	0.5	0.25	0.92	0.25	44.4
Approach		37	17.1	0.018	6.7	LOS A	0.0	0.5	0.05	0.60	0.05	53.1
North: Tarean Road (north)												
8	T1	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	9	77.8	0.014	5.2	LOS A	0.1	1.0	0.21	0.54	0.21	38.9
Approach		12	63.6	0.014	4.2	NA	0.1	1.0	0.17	0.44	0.17	41.5
All Vehicles		95	24.4	0.030	3.2	NA	0.1	1.0	0.04	0.29	0.04	54.0

## MOVEMENT SUMMARY

### Site: 101 [4. Pacific Highway/Tarean Road South (Ex PM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	3	33.3	0.002	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	52.2
2	T1	51	14.6	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		54	15.7	0.031	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.1
East: Pacific Highway (east)												
4	L2	23	4.5	0.013	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
5	T1	1	0.0	0.007	8.7	LOS A	0.0	0.3	0.25	0.91	0.25	55.7
6	R2	3	33.3	0.007	10.7	LOS A	0.0	0.3	0.25	0.91	0.25	44.4
Approach		27	7.7	0.013	6.4	LOS A	0.0	0.3	0.04	0.58	0.04	53.9
North: Tarean Road (north)												
8	T1	6	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	11	10.0	0.009	4.8	LOS A	0.0	0.3	0.16	0.55	0.16	54.1
Approach		17	6.3	0.009	3.0	NA	0.0	0.3	0.10	0.35	0.10	56.2
All Vehicles		98	11.8	0.031	2.5	NA	0.0	0.3	0.03	0.24	0.03	56.6

## EXTRACTION PHASE STAGE 1C MAX PRODUCTION

### MOVEMENT SUMMARY

▽ Site: 101 [Blue Rock Close/ Site Access (Sc 1 Max Production AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	23	100.0	0.030	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	49.8
6	R2	1	0.0	0.030	5.0	LOS A	0.0	0.1	0.02	0.01	0.02	48.8
Approach		24	95.7	0.030	0.1	NA	0.0	0.1	0.02	0.01	0.02	49.8
North: Site Access												
7	L2	1	0.0	0.025	4.8	LOS A	0.1	1.8	0.36	0.60	0.36	44.5
9	R2	8	100.0	0.025	9.3	LOS A	0.1	1.8	0.36	0.60	0.36	43.0
Approach		9	88.9	0.025	8.8	LOS A	0.1	1.8	0.36	0.60	0.36	43.1
West: Blue Rock Close - W												
10	L2	40	21.1	0.075	4.9	LOS A	0.0	0.0	0.00	0.24	0.00	48.1
11	T1	55	42.3	0.075	0.1	LOS A	0.0	0.0	0.00	0.24	0.00	49.7
Approach		95	33.3	0.075	2.1	NA	0.0	0.0	0.00	0.24	0.00	49.0
All Vehicles		128	49.2	0.075	2.3	NA	0.1	1.8	0.03	0.22	0.03	48.7

### MOVEMENT SUMMARY

▽ Site: 101 [Blue Rock Close/ Site Access (Sc 1 Max Production PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	55	42.3	0.046	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
6	R2	1	0.0	0.046	4.8	LOS A	0.0	0.1	0.01	0.01	0.01	48.9
Approach		56	41.5	0.046	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Site Access												
7	L2	1	0.0	0.050	4.7	LOS A	0.2	1.7	0.26	0.56	0.26	46.1
9	R2	40	21.1	0.050	5.8	LOS A	0.2	1.7	0.26	0.56	0.26	45.1
Approach		41	20.5	0.050	5.8	LOS A	0.2	1.7	0.26	0.56	0.26	45.1
West: Blue Rock Close - W												
10	L2	8	100.0	0.041	5.5	LOS A	0.0	0.0	0.00	0.19	0.00	49.2
11	T1	23	100.0	0.041	0.3	LOS A	0.0	0.0	0.00	0.19	0.00	52.0
Approach		32	100.0	0.041	1.7	NA	0.0	0.0	0.00	0.19	0.00	51.2
All Vehicles		128	49.2	0.050	2.3	NA	0.2	1.7	0.09	0.23	0.09	48.5



## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Sc 1 Max Production AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Blue Rock Close												
1a	L1	32	100.0	0.042	4.8	LOS A	0.0	0.1	0.01	0.54	0.01	41.8
3	R2	1	0.0	0.042	4.7	LOS A	0.0	0.1	0.01	0.54	0.01	43.3
Approach		33	96.8	0.042	4.8	NA	0.0	0.1	0.01	0.54	0.01	41.9
East: Andersite Road (east)												
4	L2	1	0.0	0.023	4.4	LOS A	0.1	1.5	0.39	0.58	0.39	41.9
6a	R1	8	100.0	0.023	7.5	LOS A	0.1	1.5	0.39	0.58	0.39	25.8
Approach		9	88.9	0.023	7.1	LOS A	0.1	1.5	0.39	0.58	0.39	29.1
NorthWest: Andersite Road (west)												
27a	L1	29	28.6	0.096	4.6	LOS A	0.5	5.5	0.02	0.52	0.02	14.8
29a	R1	95	33.3	0.096	4.5	LOS A	0.5	5.5	0.02	0.52	0.02	43.4
Approach		124	32.2	0.096	4.5	NA	0.5	5.5	0.02	0.52	0.02	37.7
All Vehicles		166	48.1	0.096	4.7	NA	0.5	5.5	0.04	0.53	0.04	38.3

## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Sc 1 Max Production PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Blue Rock Close												
1a	L1	95	33.3	0.076	4.6	LOS A	0.0	0.1	0.00	0.54	0.00	42.7
3	R2	1	0.0	0.076	4.6	LOS A	0.0	0.1	0.00	0.54	0.00	43.3
Approach		96	33.0	0.076	4.6	NA	0.0	0.1	0.00	0.54	0.00	42.7
East: Andersite Road (east)												
4	L2	1	100.0	0.041	5.0	LOS A	0.1	1.6	0.31	0.54	0.31	42.2
6a	R1	29	28.6	0.041	4.7	LOS A	0.1	1.6	0.31	0.54	0.31	30.6
Approach		31	31.0	0.041	4.8	LOS A	0.1	1.6	0.31	0.54	0.31	31.6
NorthWest: Andersite Road (west)												
27a	L1	8	100.0	0.050	4.8	LOS A	0.2	5.0	0.02	0.52	0.02	14.6
29a	R1	32	100.0	0.050	4.7	LOS A	0.2	5.0	0.02	0.52	0.02	42.8
Approach		40	100.0	0.050	4.7	NA	0.2	5.0	0.02	0.52	0.02	37.9
All Vehicles		166	48.7	0.076	4.7	NA	0.2	5.0	0.06	0.53	0.06	40.5

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Sc 1 Max Production AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	7	14.3	0.102	0.0	LOS A	0.5	5.9	0.06	0.51	0.06	53.8
3	R2	124	32.2	0.102	4.1	LOS A	0.5	5.9	0.06	0.51	0.06	32.7
Approach		132	31.2	0.102	3.8	NA	0.5	5.9	0.06	0.51	0.06	35.0
East: Andersite Road												
4	L2	40	100.0	0.055	5.3	LOS A	0.2	4.9	0.06	0.50	0.06	30.8
6	R2	1	0.0	0.055	5.2	LOS A	0.2	4.9	0.06	0.50	0.06	48.9
Approach		41	97.4	0.055	5.3	LOS A	0.2	4.9	0.06	0.50	0.06	31.8
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.09	0.00	50.6
8	T1	6	16.7	0.004	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	58.4
Approach		7	14.3	0.004	0.8	NA	0.0	0.0	0.00	0.09	0.00	57.1
All Vehicles		180	45.6	0.102	4.0	NA	0.5	5.9	0.06	0.49	0.06	35.9

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Sc 1 Max Production PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	12	0.0	0.063	0.1	LOS A	0.3	5.6	0.07	0.46	0.07	54.6
3	R2	40	100.0	0.063	4.1	LOS A	0.3	5.6	0.07	0.46	0.07	31.8
Approach		52	77.6	0.063	3.6	NA	0.3	5.6	0.07	0.46	0.07	40.1
East: Andersite Road												
4	L2	124	32.2	0.107	5.0	LOS A	0.5	5.5	0.05	0.51	0.05	31.5
6	R2	1	0.0	0.107	5.0	LOS A	0.5	5.5	0.05	0.51	0.05	48.9
Approach		125	31.9	0.107	5.0	LOS A	0.5	5.5	0.05	0.51	0.05	31.8
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.10	0.00	50.4
8	T1	5	20.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	58.1
Approach		6	16.7	0.004	0.9	NA	0.0	0.0	0.00	0.10	0.00	56.6
All Vehicles		183	44.3	0.107	4.3	NA	0.5	5.6	0.05	0.48	0.05	35.8

## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Sc 1 Max Production AM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	8	25.0	0.006	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	42	20.0	0.030	5.0	LOS A	0.1	1.2	0.23	0.56	0.23	51.2
Approach		51	20.8	0.030	4.2	NA	0.1	1.2	0.19	0.47	0.19	51.6
North: Tarean Road (north)												
7	L2	6	33.3	0.061	4.1	LOS A	0.0	0.0	0.00	0.06	0.00	51.7
8	T1	49	78.7	0.061	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	52.2
Approach		56	73.6	0.061	0.5	NA	0.0	0.0	0.00	0.06	0.00	52.0
West: Pacific Highway (west)												
10	L2	123	30.8	0.121	9.9	LOS A	0.5	6.1	0.07	1.03	0.07	45.3
11	T1	1	0.0	0.121	9.0	LOS A	0.5	6.1	0.07	1.03	0.07	56.0
12	R2	1	0.0	0.121	9.0	LOS A	0.5	6.1	0.07	1.03	0.07	45.8
Approach		125	30.3	0.121	9.9	LOS A	0.5	6.1	0.07	1.03	0.07	45.4
All Vehicles		232	38.6	0.121	6.4	NA	0.5	6.1	0.08	0.67	0.08	47.3

## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Sc 1 Max Production PM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	8	37.5	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	51	16.7	0.039	5.4	LOS A	0.2	1.6	0.31	0.58	0.31	51.6
Approach		59	19.6	0.039	4.6	NA	0.2	1.6	0.27	0.50	0.27	51.9
North: Tarean Road (north)												
7	L2	7	42.9	0.102	4.1	LOS A	0.0	0.0	0.00	0.03	0.00	52.0
8	T1	128	30.3	0.102	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	58.6
Approach		136	31.0	0.102	0.2	NA	0.0	0.0	0.00	0.03	0.00	57.1
West: Pacific Highway (west)												
10	L2	42	92.5	0.066	13.6	LOS A	0.3	5.5	0.08	1.14	0.08	44.0
11	T1	1	0.0	0.066	9.7	LOS A	0.3	5.5	0.08	1.14	0.08	56.0
12	R2	1	0.0	0.066	9.8	LOS A	0.3	5.5	0.08	1.14	0.08	45.8
Approach		44	88.1	0.066	13.4	LOS A	0.3	5.5	0.08	1.14	0.08	44.4
All Vehicles		239	38.8	0.102	3.7	NA	0.3	5.5	0.08	0.35	0.08	50.3

## MOVEMENT SUMMARY

**STOP Site: 101 [4. Pacific Highway/Tarean Road South (Sc 1 Max Production AM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	48	21.7	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		49	21.3	0.032	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
East: Pacific Highway (east)												
4	L2	32	13.3	0.019	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	54.3
5	T1	1	0.0	0.020	9.3	LOS A	0.1	0.7	0.35	0.89	0.35	55.2
6	R2	11	20.0	0.020	10.8	LOS A	0.1	0.7	0.35	0.89	0.35	44.2
Approach		43	14.6	0.020	7.1	LOS A	0.1	0.7	0.09	0.62	0.09	52.5
North: Tarean Road (north)												
8	T1	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	41	94.9	0.069	5.5	LOS A	0.3	6.0	0.24	0.55	0.24	36.1
Approach		43	90.2	0.069	5.2	NA	0.3	6.0	0.23	0.53	0.23	36.8
All Vehicles		136	41.1	0.069	4.0	NA	0.3	6.0	0.10	0.37	0.10	48.8

## MOVEMENT SUMMARY

**STOP Site: 101 [4. Pacific Highway/Tarean Road South (Sc 1 Max Production PM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	3	33.3	0.002	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	52.2
2	T1	54	13.7	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		57	14.8	0.033	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.2
East: Pacific Highway (east)												
4	L2	24	4.3	0.013	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
5	T1	1	0.0	0.020	10.1	LOS A	0.1	1.1	0.51	0.92	0.51	51.7
6	R2	5	60.0	0.020	18.6	LOS B	0.1	1.1	0.51	0.92	0.51	39.4
Approach		31	13.8	0.020	8.0	LOS A	0.1	1.1	0.10	0.61	0.10	52.5
North: Tarean Road (north)												
8	T1	6	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	122	31.9	0.128	5.0	LOS A	0.6	6.5	0.20	0.56	0.20	48.0
Approach		128	30.3	0.128	4.8	NA	0.6	6.5	0.19	0.54	0.19	48.4
All Vehicles		216	23.9	0.128	4.1	NA	0.6	6.5	0.13	0.41	0.13	51.6

## EXTRACTION PHASE STAGE 2B MAX PRODUCTION

### MOVEMENT SUMMARY

#### Site: 101 [Blue Rock Close/ Site Access (Sc 2 Max Production AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	23	100.0	0.030	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	49.8
6	R2	1	0.0	0.030	5.0	LOS A	0.0	0.1	0.02	0.01	0.02	48.8
Approach		24	95.7	0.030	0.1	NA	0.0	0.1	0.02	0.01	0.02	49.8
North: Site Access												
7	L2	1	0.0	0.040	4.8	LOS A	0.1	3.1	0.38	0.62	0.38	44.3
9	R2	14	100.0	0.040	9.6	LOS A	0.1	3.1	0.38	0.62	0.38	42.7
Approach		15	92.9	0.040	9.3	LOS A	0.1	3.1	0.38	0.62	0.38	42.8
West: Blue Rock Close - W												
10	L2	46	31.8	0.083	5.1	LOS A	0.0	0.0	0.00	0.26	0.00	48.2
11	T1	55	42.3	0.083	0.2	LOS A	0.0	0.0	0.00	0.26	0.00	50.1
Approach		101	37.5	0.083	2.4	NA	0.0	0.0	0.00	0.26	0.00	49.2
All Vehicles		140	53.4	0.083	2.8	NA	0.1	3.1	0.04	0.26	0.04	48.5

### MOVEMENT SUMMARY

#### Site: 101 [Blue Rock Close/ Site Access (Sc 2 Max Production PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	55	42.3	0.046	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
6	R2	1	0.0	0.046	4.8	LOS A	0.0	0.1	0.01	0.01	0.01	48.9
Approach		56	41.5	0.046	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Site Access												
7	L2	1	0.0	0.063	4.7	LOS A	0.2	2.6	0.28	0.58	0.28	45.9
9	R2	45	30.2	0.063	6.2	LOS A	0.2	2.6	0.28	0.58	0.28	44.7
Approach		46	29.5	0.063	6.2	LOS A	0.2	2.6	0.28	0.58	0.28	44.7
West: Blue Rock Close - W												
10	L2	14	100.0	0.049	5.6	LOS A	0.0	0.0	0.00	0.25	0.00	49.5
11	T1	23	100.0	0.049	0.5	LOS A	0.0	0.0	0.00	0.25	0.00	52.5
Approach		37	100.0	0.049	2.4	NA	0.0	0.0	0.00	0.25	0.00	51.4
All Vehicles		139	53.0	0.063	2.7	NA	0.2	2.6	0.10	0.26	0.10	48.4

## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Sc 2 Max Production AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Blue Rock Close												
1a	L1	37	100.0	0.049	4.8	LOS A	0.0	0.1	0.00	0.54	0.00	41.8
3	R2	1	0.0	0.049	4.6	LOS A	0.0	0.1	0.00	0.54	0.00	43.3
Approach		38	97.2	0.049	4.8	NA	0.0	0.1	0.00	0.54	0.00	41.9
East: Andersite Road (east)												
4	L2	1	0.0	0.006	4.5	LOS A	0.0	0.4	0.36	0.53	0.36	42.5
6a	R1	2	100.0	0.006	7.6	LOS A	0.0	0.4	0.36	0.53	0.36	26.6
Approach		3	66.7	0.006	6.4	LOS A	0.0	0.4	0.36	0.53	0.36	34.8
NorthWest: Andersite Road (west)												
27a	L1	7	28.6	0.086	4.6	LOS A	0.4	5.2	0.02	0.52	0.02	14.8
29a	R1	100	36.8	0.086	4.5	LOS A	0.4	5.2	0.02	0.52	0.02	43.3
Approach		107	36.3	0.086	4.5	NA	0.4	5.2	0.02	0.52	0.02	41.7
All Vehicles		148	52.5	0.086	4.6	NA	0.4	5.2	0.02	0.53	0.02	41.6

## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Sc 2 Max Production PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	m				km/h
South: Blue Rock Close												
1a	L1	100	36.8	0.083	4.7	LOS A	0.0	0.1	0.00	0.54	0.00	42.5
3	R2	1	0.0	0.083	4.6	LOS A	0.0	0.1	0.00	0.54	0.00	43.3
Approach		101	36.5	0.083	4.7	NA	0.0	0.1	0.00	0.54	0.00	42.5
East: Andersite Road (east)												
4	L2	1	100.0	0.012	5.1	LOS A	0.0	0.5	0.30	0.52	0.30	42.2
6a	R1	7	28.6	0.012	4.8	LOS A	0.0	0.5	0.30	0.52	0.30	30.5
Approach		8	37.5	0.012	4.9	LOS A	0.0	0.5	0.30	0.52	0.30	33.5
NorthWest: Andersite Road (west)												
27a	L1	2	100.0	0.048	4.8	LOS A	0.2	4.9	0.02	0.52	0.02	14.6
29a	R1	37	100.0	0.048	4.7	LOS A	0.2	4.9	0.02	0.52	0.02	42.8
Approach		39	100.0	0.048	4.7	NA	0.2	4.9	0.02	0.52	0.02	41.6
All Vehicles		148	53.2	0.083	4.7	NA	0.2	4.9	0.02	0.53	0.02	42.0

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Sc 2 Max Production AM)]

New Site  
Site Category: (None)  
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	8	12.5	0.093	0.1	LOS A	0.5	5.5	0.07	0.50	0.07	53.9
3	R2	107	36.3	0.093	4.1	LOS A	0.5	5.5	0.07	0.50	0.07	32.4
Approach		116	34.5	0.093	3.8	NA	0.5	5.5	0.07	0.50	0.07	35.4
East: Andersite Road												
4	L2	39	100.0	0.054	5.3	LOS A	0.2	4.8	0.07	0.50	0.07	30.8
6	R2	1	0.0	0.054	5.2	LOS A	0.2	4.8	0.07	0.50	0.07	48.8
Approach		40	97.4	0.054	5.3	LOS A	0.2	4.8	0.07	0.50	0.07	31.8
North: The Branch Lane (north)												
7	L2	1	0.0	0.005	5.5	LOS A	0.0	0.0	0.00	0.07	0.00	50.7
8	T1	7	14.3	0.005	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	58.6
Approach		8	12.5	0.005	0.7	NA	0.0	0.0	0.00	0.07	0.00	57.4
All Vehicles		164	48.7	0.093	4.0	NA	0.5	5.5	0.06	0.48	0.06	36.5

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Sc 2 Max Production PM)]

New Site  
Site Category: (None)  
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	13	0.0	0.063	0.1	LOS A	0.3	5.5	0.08	0.46	0.08	54.7
3	R2	39	100.0	0.063	4.1	LOS A	0.3	5.5	0.08	0.46	0.08	31.9
Approach		52	75.5	0.063	3.5	NA	0.3	5.5	0.08	0.46	0.08	40.8
East: Andersite Road												
4	L2	107	36.3	0.096	5.1	LOS A	0.4	5.1	0.05	0.51	0.05	31.3
6	R2	1	0.0	0.096	4.9	LOS A	0.4	5.1	0.05	0.51	0.05	48.9
Approach		108	35.9	0.096	5.1	LOS A	0.4	5.1	0.05	0.51	0.05	31.7
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.09	0.00	50.6
8	T1	6	16.7	0.004	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	58.4
Approach		7	14.3	0.004	0.8	NA	0.0	0.0	0.00	0.09	0.00	57.1
All Vehicles		167	47.2	0.096	4.3	NA	0.4	5.5	0.06	0.47	0.06	36.6



## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Sc 2 Max Production AM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	8	25.0	0.006	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	47	22.2	0.035	5.0	LOS A	0.2	1.5	0.23	0.56	0.23	50.7
Approach		56	22.6	0.035	4.3	NA	0.2	1.5	0.19	0.48	0.19	51.0
North: Tarean Road (north)												
7	L2	7	28.6	0.060	4.1	LOS A	0.0	0.0	0.00	0.07	0.00	52.0
8	T1	49	76.6	0.060	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	51.6
Approach		57	70.4	0.060	0.5	NA	0.0	0.0	0.00	0.07	0.00	51.8
West: Pacific Highway (west)												
10	L2	108	34.0	0.110	10.1	LOS A	0.5	5.7	0.07	1.03	0.07	45.2
11	T1	1	0.0	0.110	9.0	LOS A	0.5	5.7	0.07	1.03	0.07	56.0
12	R2	1	0.0	0.110	9.0	LOS A	0.5	5.7	0.07	1.03	0.07	45.8
Approach		111	33.3	0.110	10.1	LOS A	0.5	5.7	0.07	1.03	0.07	45.4
All Vehicles		223	40.1	0.110	6.2	NA	0.5	5.7	0.08	0.65	0.08	47.4

## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Sc 2 Max Production PM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	9	33.3	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	56	18.9	0.041	5.1	LOS A	0.2	1.7	0.25	0.57	0.25	51.3
Approach		65	21.0	0.041	4.4	NA	0.2	1.7	0.22	0.48	0.22	51.6
North: Tarean Road (north)												
7	L2	4	75.0	0.070	4.1	LOS A	0.0	0.0	0.00	0.03	0.00	48.9
8	T1	71	53.7	0.070	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.0
Approach		75	54.9	0.070	0.2	NA	0.0	0.0	0.00	0.03	0.00	56.6
West: Pacific Highway (west)												
10	L2	42	90.0	0.065	13.5	LOS A	0.3	5.3	0.09	1.13	0.09	44.1
11	T1	1	0.0	0.065	9.2	LOS A	0.3	5.3	0.09	1.13	0.09	56.0
12	R2	1	0.0	0.065	9.2	LOS A	0.3	5.3	0.09	1.13	0.09	45.8
Approach		44	85.7	0.065	13.3	LOS A	0.3	5.3	0.09	1.13	0.09	44.5
All Vehicles		184	50.3	0.070	4.8	NA	0.3	5.3	0.10	0.45	0.10	49.4



## MOVEMENT SUMMARY

### Site: 101 [4. Pacific Highway/Tarean Road South (Sc 2 Max Production AM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	53	20.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		54	19.6	0.035	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
East: Pacific Highway (east)												
4	L2	35	15.2	0.022	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	54.2
5	T1	1	0.0	0.016	9.3	LOS A	0.1	0.6	0.36	0.89	0.36	54.9
6	R2	7	28.6	0.016	11.7	LOS A	0.1	0.6	0.36	0.89	0.36	43.6
Approach		43	17.1	0.022	6.9	LOS A	0.1	0.6	0.07	0.59	0.07	52.9
North: Tarean Road (north)												
8	T1	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	40	94.7	0.068	5.6	LOS A	0.3	5.8	0.25	0.56	0.25	36.1
Approach		42	90.0	0.068	5.3	NA	0.3	5.8	0.24	0.53	0.24	36.8
All Vehicles		139	40.2	0.068	3.8	NA	0.3	5.8	0.09	0.35	0.09	49.3

## MOVEMENT SUMMARY

### Site: 101 [4. Pacific Highway/Tarean Road South (Sc 2 Max Production PM)]

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	3	33.3	0.002	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	52.2
2	T1	59	14.3	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		62	15.3	0.036	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.2
East: Pacific Highway (east)												
4	L2	27	3.8	0.015	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.8
5	T1	1	0.0	0.018	9.6	LOS A	0.1	0.9	0.45	0.91	0.45	53.0
6	R2	5	60.0	0.018	16.4	LOS B	0.1	0.9	0.45	0.91	0.45	40.8
Approach		34	12.5	0.018	7.5	LOS A	0.1	0.9	0.08	0.60	0.08	53.0
North: Tarean Road (north)												
8	T1	7	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	65	58.1	0.086	5.3	LOS A	0.4	5.6	0.23	0.56	0.23	42.2
Approach		73	52.2	0.086	4.7	NA	0.4	5.6	0.21	0.50	0.21	43.5
All Vehicles		168	30.6	0.086	3.7	NA	0.4	5.6	0.11	0.35	0.11	50.6

## CONSTRUCTION PHASE

### MOVEMENT SUMMARY

#### Site: 101 [Blue Rock Close/ Site Access (Construction AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	23	100.0	0.030	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	49.8
6	R2	1	0.0	0.030	4.9	LOS A	0.0	0.1	0.02	0.01	0.02	48.8
Approach		24	95.7	0.030	0.1	NA	0.0	0.1	0.02	0.01	0.02	49.8
North: Site Access												
7	L2	1	0.0	0.008	4.8	LOS A	0.0	0.4	0.29	0.54	0.29	45.5
9	R2	3	100.0	0.008	7.7	LOS A	0.0	0.4	0.29	0.54	0.29	43.9
Approach		4	75.0	0.008	7.0	LOS A	0.0	0.4	0.29	0.54	0.29	44.3
West: Blue Rock Close - W												
10	L2	17	18.8	0.056	4.8	LOS A	0.0	0.0	0.00	0.14	0.00	48.3
11	T1	53	44.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	49.8
Approach		69	37.9	0.056	1.2	NA	0.0	0.0	0.00	0.14	0.00	49.4
All Vehicles		98	53.8	0.056	1.2	NA	0.0	0.4	0.02	0.12	0.02	49.3

### MOVEMENT SUMMARY

#### Site: 101 [Blue Rock Close/ Site Access (Construction PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blue Rock Close - E												
5	T1	53	44.0	0.045	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.9
6	R2	1	0.0	0.045	4.7	LOS A	0.0	0.1	0.01	0.01	0.01	48.9
Approach		54	43.1	0.045	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Site Access												
7	L2	1	0.0	0.019	4.7	LOS A	0.1	0.6	0.23	0.54	0.23	46.1
9	R2	17	18.8	0.019	5.5	LOS A	0.1	0.6	0.23	0.54	0.23	45.3
Approach		18	17.6	0.019	5.5	LOS A	0.1	0.6	0.23	0.54	0.23	45.3
West: Blue Rock Close - W												
10	L2	3	100.0	0.034	5.3	LOS A	0.0	0.0	0.00	0.08	0.00	48.4
11	T1	23	100.0	0.034	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	50.8
Approach		26	100.0	0.034	0.7	NA	0.0	0.0	0.00	0.08	0.00	50.5
All Vehicles		98	53.8	0.045	1.2	NA	0.1	0.6	0.04	0.13	0.04	49.1

## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Construction AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				
South: Blue Rock Close												
1a	L1	26	100.0	0.035	4.8	LOS A	0.0	0.1	0.01	0.54	0.01	41.8
3	R2	1	0.0	0.035	4.7	LOS A	0.0	0.1	0.01	0.54	0.01	43.3
Approach		27	96.2	0.035	4.8	NA	0.0	0.1	0.01	0.54	0.01	41.9
East: Andersite Road (east)												
4	L2	1	0.0	0.021	4.3	LOS A	0.1	1.4	0.34	0.55	0.34	42.7
6a	R1	8	100.0	0.021	6.4	LOS A	0.1	1.4	0.34	0.55	0.34	26.9
Approach		9	88.9	0.021	6.2	LOS A	0.1	1.4	0.34	0.55	0.34	30.2
NorthWest: Andersite Road (west)												
27a	L1	24	34.8	0.075	4.6	LOS A	0.4	4.4	0.02	0.52	0.02	14.7
29a	R1	69	37.9	0.075	4.5	LOS A	0.4	4.4	0.02	0.52	0.02	43.2
Approach		94	37.1	0.075	4.6	NA	0.4	4.4	0.02	0.52	0.02	37.0
All Vehicles		131	53.2	0.075	4.7	NA	0.4	4.4	0.04	0.53	0.04	37.9

## MOVEMENT SUMMARY

### ▽ Site: 101 [1. Andersite Road/ Blue Rock Close (Construction PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	m				km/h
South: Blue Rock Close												
1a	L1	69	37.9	0.058	4.7	LOS A	0.0	0.1	0.00	0.54	0.00	42.4
3	R2	1	0.0	0.058	4.6	LOS A	0.0	0.1	0.00	0.54	0.00	43.3
Approach		71	37.3	0.058	4.7	NA	0.0	0.1	0.00	0.54	0.00	42.4
East: Andersite Road (east)												
4	L2	1	100.0	0.034	4.8	LOS A	0.1	1.4	0.27	0.52	0.27	42.4
6a	R1	24	34.8	0.034	4.5	LOS A	0.1	1.4	0.27	0.52	0.27	30.4
Approach		25	37.5	0.034	4.6	LOS A	0.1	1.4	0.27	0.52	0.27	31.5
NorthWest: Andersite Road (west)												
27a	L1	8	100.0	0.043	4.8	LOS A	0.2	4.2	0.02	0.52	0.02	14.6
29a	R1	26	100.0	0.043	4.7	LOS A	0.2	4.2	0.02	0.52	0.02	42.8
Approach		35	100.0	0.043	4.7	NA	0.2	4.2	0.02	0.52	0.02	37.1
All Vehicles		131	54.0	0.058	4.7	NA	0.2	4.2	0.06	0.53	0.06	39.9

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Construction AM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	7	14.3	0.082	0.1	LOS A	0.4	4.8	0.06	0.50	0.06	53.9
3	R2	94	37.1	0.082	4.0	LOS A	0.4	4.8	0.06	0.50	0.06	32.4
Approach		101	35.4	0.082	3.8	NA	0.4	4.8	0.06	0.50	0.06	35.3
East: Andersite Road												
4	L2	35	100.0	0.048	5.3	LOS A	0.2	4.2	0.06	0.50	0.06	30.8
6	R2	1	0.0	0.048	5.1	LOS A	0.2	4.2	0.06	0.50	0.06	48.9
Approach		36	97.1	0.048	5.3	LOS A	0.2	4.2	0.06	0.50	0.06	32.0
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.09	0.00	50.6
8	T1	6	16.7	0.004	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	58.4
Approach		7	14.3	0.004	0.8	NA	0.0	0.0	0.00	0.09	0.00	57.1
All Vehicles		144	49.6	0.082	4.0	NA	0.4	4.8	0.06	0.48	0.06	36.4

## MOVEMENT SUMMARY

### ▽ Site: 101 [2. The Branch Lane/ Andersite Road (Construction PM)]

New Site  
Site Category: (None)  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: The Branch Lane (south)												
2	T1	11	0.0	0.055	0.1	LOS A	0.3	4.8	0.07	0.46	0.07	54.7
3	R2	35	100.0	0.055	4.1	LOS A	0.3	4.8	0.07	0.46	0.07	31.9
Approach		45	76.7	0.055	3.6	NA	0.3	4.8	0.07	0.46	0.07	40.4
East: Andersite Road												
4	L2	94	37.1	0.084	5.1	LOS A	0.4	4.4	0.05	0.51	0.05	31.3
6	R2	1	0.0	0.084	4.9	LOS A	0.4	4.4	0.05	0.51	0.05	48.9
Approach		95	36.7	0.084	5.1	LOS A	0.4	4.4	0.05	0.51	0.05	31.8
North: The Branch Lane (north)												
7	L2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.10	0.00	50.4
8	T1	5	20.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	58.1
Approach		6	16.7	0.004	0.9	NA	0.0	0.0	0.00	0.10	0.00	56.6
All Vehicles		146	48.2	0.084	4.3	NA	0.4	4.8	0.05	0.48	0.05	36.4

## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Construction AM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	7	28.6	0.005	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	41	20.5	0.029	5.0	LOS A	0.1	1.2	0.21	0.56	0.21	51.2
Approach		48	21.7	0.029	4.2	NA	0.1	1.2	0.18	0.47	0.18	51.5
North: Tarean Road (north)												
7	L2	6	33.3	0.052	4.1	LOS A	0.0	0.0	0.00	0.07	0.00	51.6
8	T1	42	77.5	0.052	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	51.7
Approach		48	71.7	0.052	0.5	NA	0.0	0.0	0.00	0.07	0.00	51.6
West: Pacific Highway (west)												
10	L2	94	34.8	0.095	10.1	LOS A	0.4	4.9	0.06	1.04	0.06	45.2
11	T1	1	0.0	0.095	8.8	LOS A	0.4	4.9	0.06	1.04	0.06	56.0
12	R2	1	0.0	0.095	8.8	LOS A	0.4	4.9	0.06	1.04	0.06	45.8
Approach		96	34.1	0.095	10.1	LOS A	0.4	4.9	0.06	1.04	0.06	45.4
All Vehicles		193	40.4	0.095	6.2	NA	0.4	4.9	0.07	0.65	0.07	47.5

## MOVEMENT SUMMARY

**STOP Site: 101 [3. Pacific Highway/Tarean Road North (Construction PM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
2	T1	8	37.5	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	48	17.4	0.036	5.2	LOS A	0.2	1.5	0.28	0.57	0.28	51.6
Approach		57	20.4	0.036	4.4	NA	0.2	1.5	0.24	0.48	0.24	51.9
North: Tarean Road (north)												
7	L2	6	50.0	0.082	4.1	LOS A	0.0	0.0	0.00	0.03	0.00	51.3
8	T1	98	34.4	0.082	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	58.5
Approach		104	35.4	0.082	0.2	NA	0.0	0.0	0.00	0.03	0.00	56.8
West: Pacific Highway (west)												
10	L2	37	91.4	0.057	13.5	LOS A	0.2	4.6	0.08	1.13	0.08	44.0
11	T1	1	0.0	0.057	9.3	LOS A	0.2	4.6	0.08	1.13	0.08	56.0
12	R2	1	0.0	0.057	9.3	LOS A	0.2	4.6	0.08	1.13	0.08	45.8
Approach		39	86.5	0.057	13.3	LOS A	0.2	4.6	0.08	1.13	0.08	44.5
All Vehicles		200	41.1	0.082	4.0	NA	0.2	4.6	0.08	0.38	0.08	50.2

## MOVEMENT SUMMARY

**STOP Site: 101 [4. Pacific Highway/Tarean Road South (Construction AM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	46	20.5	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		47	20.0	0.031	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
East: Pacific Highway (east)												
4	L2	29	14.3	0.018	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	54.3
5	T1	1	0.0	0.018	9.1	LOS A	0.1	0.7	0.33	0.89	0.33	55.3
6	R2	9	22.2	0.018	10.7	LOS A	0.1	0.7	0.33	0.89	0.33	44.2
Approach		40	15.8	0.018	7.1	LOS A	0.1	0.7	0.09	0.62	0.09	52.5
North: Tarean Road (north)												
8	T1	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	36	94.1	0.059	5.4	LOS A	0.2	5.0	0.23	0.55	0.23	36.3
Approach		38	88.9	0.059	5.1	NA	0.2	5.0	0.22	0.52	0.22	37.2
All Vehicles		125	39.5	0.059	3.8	NA	0.2	5.0	0.09	0.36	0.09	49.3

## MOVEMENT SUMMARY

**STOP Site: 101 [4. Pacific Highway/Tarean Road South (Construction PM)]**

New Site  
Site Category: (None)  
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Tarean Road (south)												
1	L2	3	33.3	0.002	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	52.2
2	T1	52	14.3	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		55	15.4	0.032	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.1
East: Pacific Highway (east)												
4	L2	23	4.5	0.013	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	54.7
5	T1	1	0.0	0.018	9.7	LOS A	0.1	1.0	0.46	0.91	0.46	52.7
6	R2	5	60.0	0.018	16.9	LOS B	0.1	1.0	0.46	0.91	0.46	40.4
Approach		29	14.3	0.018	7.8	LOS A	0.1	1.0	0.10	0.61	0.10	52.6
North: Tarean Road (north)												
8	T1	6	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	93	36.4	0.100	5.0	LOS A	0.4	5.2	0.20	0.56	0.20	47.0
Approach		99	34.0	0.100	4.7	NA	0.4	5.2	0.19	0.53	0.19	47.6
All Vehicles		183	25.3	0.100	3.9	NA	0.4	5.2	0.12	0.39	0.12	51.6