

# Great Keppel Island Resort EIS

## Traffic Impacts Report

20 October 2011

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## Executive Summary

Opus International Consultants (Opus) have been commissioned by GKI Resort Pty Ltd to undertake the Traffic and Transportation section of an Environmental Impact Statement for the Great Keppel Island Resort Revitalisation Plan. The purpose of this report is to evaluate the effects of proposed Great Keppel Island Resort Revitalisation Plan on the transport network and to recommend mitigation measures as appropriate.

The Great Keppel Island (GKI) Resort Revitalisation Plan proposes to upgrade the existing resort and airstrip and to create a low rise, eco-tourism resort on GKI. The whole Resort Revitalisation Plan will be built over a 12 year period and when completed will include 300 tourist villas, 75 tourist apartments, a golf course, 250-unit hotel, new Marina and relocated air strip.

The result of this analysis shows that the traffic and pavement impacts on the mainland road and Marina network will be negligible and require relatively little mitigation. The Resort Revitalisation Plan increases the number of total vehicle trips from Rockhampton airport and in the vicinity Rosslyn Bay, but neither additional construction nor operations traffic will create traffic increases greater than 5% of forecast background totals. Economic forecasts show fewer average, daily visitors than during peak operations in the 1990's.

There will be some necessary expansion of the existing track network on the Island to accommodate both construction traffic and future service vehicle operation. The majority of the Island's track network will consist of new, private roads which will not impact access to the few private residences on the Island. Furthermore, the primary transportation modes used on the Island in the completed Resort Revitalisation Plan scenario will be electric cart, bicycle and foot and the operation of minimum service and maintenance vehicles will not constitute a significant traffic impact.

Marine traffic impacts will also be negligible upon operations and capacity of Keppel Bay Marina and channel traffic between Roslyn Bay and the Island. At peak construction (2013), the resort will require only run 2 barges per day from the Marina from a construction staging area within the Marina. An average of 14 construction vehicles will be required to load the materials for each barge on an average daily basis. The resulting 28 truck trips per day will comprise fewer than 5% of total traffic along the State Controlled Road network.

The increase in parking demand as a result of additional staff during and after construction to the Island will require mitigation in the form of a staff car park to be acquired or leased outside Keppel Bay Marina with 150-200 spaces and a direct shuttle service to and from the ferry. This location can double as a construction pre-staging area for the movement of materials to the Marina and Island. The most likely situation is to utilise the private car park that is presently underutilised.

While there are no significant traffic effects as a result of the Resort Revitalisation Plan, the impacts from the construction of the GKI Resort Revitalisation Plan on the traffic operation and pavement quality can be mitigated with the preparation of a Transport Management Plan (TMP). The TMP can be developed as required when the contractor is appointed and prior to construction. The TMP should cover the construction period and how the contractor will maintain safety, efficiency and the condition of infrastructure.

Separate Traffic, Parking and Barging Operations management plans will also help to minimise impacts and identify efficiencies for construction movements at Rosslyn Bay and on Great Keppel Island.

# 1 Introduction

This Report has been prepared by Opus International Consultants ('Opus') on behalf of GKI Resort Pty Ltd to provide an assessment of potential traffic and transportation-related impacts on the proposed Great Keppel Island (GKI) Revitalisation Plan and mitigation measures to address potential impacts. The contents of this Report are to be included as part of the overall Environmental Impact Statement (EIS) prepared for the GKI Revitalisation Plan.

## 1.1 Project Overview

The GKI Revitalisation Plan (refer to **Appendix A – GKI Revitalisation Plan**) proposes to create a low rise, eco-tourism resort on Great Keppel Island.

The project involves:

- Demolition of the old resort and construction of a new 4 or 5 star resort hotel at Fisherman's Beach comprising 250 suites and day spa;
- Dredging activities for construction of the Marina and re-nourishment of Putney Beach using dredge spoil;
- A new all-weather safe access Marina facility at Putney Beach comprising 250 berths, a ferry terminal, emergency services facilities, yacht club, and dry dock storage;
- A retail village with a mix of cafes, restaurants and clothing shops around the Marina;
- An 18-hole golf course, designed by Greg Norman Golf Course Design and including club house, integrated with essential habitats and ecological corridors, and located on previously disturbed grazing lands;
- New runway and airport terminal;
- 750 eco-tourism villas incorporating sustainable building design, rooftop solar panels and water tanks;
- 300 eco-tourism apartments incorporating sustainable building design, rooftop solar panels and water tanks;
- Installation of submarine connection of power, water, telecommunications and possibly wastewater and gas line between the Island and mainland;
- Associated service facilities and utilities (waste collection area, fire-fighting and emergency services hub, fuel, solar, wastewater treatment plant etc), including 200 bed staff accommodation facilities;
- Establishment of the GKI Research Centre and Biodiversity Conservation Fund (BCF) which will aim to deliver a better understanding of the surrounding marine and terrestrial environments and to actively undertake conservation works to enhance the natural environment;
- A new sports oval which can be used by resort guests and other GKI residents and visitors; and
- Restoration of the original Leeke's Homestead.

It is envisaged that approximately 685 full time, part time and casual staff will be required once the resort is fully operational. Most operational staff will work standard shift hours and will be sourced from the Capricorn Region.

The majority of staff will travel to the Island via ferry for each shift, before returning home to the mainland after their shifts. Up to approximately 200 staff may be accommodated in the new staff accommodation to be provided on the Island as part of the GKI Revitalisation Plan.

The GKI Revitalisation Plan will be constructed in stages, with Stage 1 involving construction of the Fishermans Beach hotel and day spa, the Marina facility including retail precinct, one hundred (100) apartments and internal infrastructure (power, water, sewerage, roads). It is expected that Stage 1 will take approximately 18 months to construct. Completion of the GKI Revitalisation Plan is expected to take 12 years.

Construction workers will be ferried to and from the Island where possible and practical. It is envisaged that rooms at the old resort as well as other accommodation options on the Island will be utilised to provide accommodation on the Island for some construction workers.

## **1.2 Locality Overview**

Great Keppel Island is located approximately 12 km off the coast of Yeppoon on the Central Queensland coast. GKI is included within the Rockhampton Regional Council local government area.

GKI is the largest Island in the Keppel Island Group, which comprises a group of sixteen Islands, including North Keppel Island, Corroboree Island, Pumpkin Island, Miall Island, Middle Island, Barren Island, Halfway Island, and Humpy Island. Apart from GKI and Pumpkin Island, all of the other Keppel Islands are designated National Parks.

The proposed Revitalisation Plan applies to the areas of GKI that are leased by GKI Resort Pty Ltd, which covers an area of approximately 900 hectares consisting of multiple land tenures. The GKI Revitalisation Plan also includes Unallocated State Land to be developed for the Marina and areas to accommodate submarine connections between GKI and the mainland.

There are seventeen beaches on GKI and its natural environment offers a wide range of activities including swimming, diving, snorkelling and bushwalking.

## **1.3 Current & Previous Development**

Until recently the Island has been occupied by a number of different commercial accommodation facilities ranging from camping ground style accommodation to resort level accommodation. The original GKI Resort was the main tourism resort located on the Island and comprised 190 guest rooms. These facilities were closed in early 2008.

The Island is currently occupied by two backpackers' facilities, ten residential properties and ten commercial premises. Access to the Island is currently via ferry and cruise ship services from the Rosslyn Bay / Keppel Bay Marina on the mainland.

In the 1990s, the average daily population on the Island (staff, residents, overnight and day visitors) was approximately 765 persons while the maximum possible daily population was approximately 2,600 persons (Foresight Partners, 2011). The peak daily population for the Island during operation of the former resort (ie. 2,600 persons) is therefore comparable with the anticipated average daily population projected for the revitalised resort (ie. 2,274 persons) (Foresight Partners, 2011).

## 1.4 Abbreviations

The following abbreviations are used within this Traffic Impact Assessment:

ADT.....Average Daily Traffic

DTMR.....Department of Transport and Main Roads

EIS .....Environmental Impact Statement

GKI.....Great Keppel Island

SCR.....State Controlled Roads

TIA.....Traffic Impact Assessment

## 1.5 Scope & Objectives

This Report has been prepared to address sections 2.5 and 3.10 of the *Terms of Reference for EIS – Great Keppel Island Resort Project* issued by the Queensland Coordinator-General, which requires the following issues to be considered in the Environmental Impact Statement (EIS):

### **2.5 Associated infrastructure**

This section should detail, with concept and layout plans, requirements for new infrastructure or the upgrading/relocating of existing infrastructure to service the project. Matters to be considered include such infrastructure as transportation (marine and terrestrial), water supply, energy supply, telecommunications, stormwater, waste disposal and sewerage. Provision of the scheduled times for any shipping/waterborne transportation for when movements may occur, should be provided.

#### **2.5.1 Shipping/waterborne transport**

Provide details of the infrastructure requirements for the transport of fill or other materials to the site by coastal barge and details of any marine transport infrastructure, whether temporary or permanent, that is required for construction and ongoing use of the development, or likely to be demanded as a result of the development.

#### **2.5.2 Road transport**

Provide information on road transportation requirements on public roads (both state and local) for both construction and operations phases, including:

- any proposed new roads or proposed upgrades to roads on Great Keppel Island
- construction traffic on Great Keppel Island and the mainland
- method of movement (including vehicle types and number of vehicles likely to be used)
- anticipated times at which movements may occur
- the proposed transport routes (including waterway crossings)
- need for increased road (and waterway crossing) maintenance and upgrading
- need for increased road maintenance
- communication of these issues to the public
- description of methodology for capture of oils and fuel spills on Island roads in order to prevent transport into aquatic and marine environments
- description of methodologies to be employed to prevent/minimise introduction and/or spread of weeds on construction vehicles.

### **3.10 Transport**

#### **3.10.1 Existing Infrastructure**

These assessment reports should provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level during both construction and operation of the project. They should also include all base data assumptions, including current condition of the affected network Great Keppel Island Resort Revitalisation Plan.

#### **3.10.2 Transport tasks and routes**

This section should describe:

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products for all phases of the project
- how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing and routes)
- traffic generated by construction and operation workforce personnel including visitors (volume, composition, timing and routes)
- likely heavy and oversize/indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.

#### **3.10.3 Potential impacts and mitigation measures**

Impact assessment reports should include:

- details of the adopted assessment methodology (for impacts on roads: The Road Impact Assessment Report (RIA) in general accordance with Department of Transport and Main Roads Guidelines for Assessment of Road Impacts of Development 2006
- description of input data and assumptions, and justification of assumptions made
- a summary of consultation undertaken with transport authorities regarding scope of impact assessment and methodology.

#### **3.10.4 Infrastructure alterations**

The EIS should detail:

- any proposed alterations or new transport-related infrastructure and services required by the project (as distinct from impact mitigation works)
- construction of any project-related plant and utilities, within or impacting on the
- jurisdiction of any transport authority.

#### **3.10.5 Transport impact management strategies**

The proponent is to discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. These mitigation strategies are to be prepared by the proponent in close consultation with relevant transport authorities and include consideration of that authority's works program and forward planning.



## **1.6 Report Structure**

As stipulated in the Terms of Reference, the structure of the remainder of the report is:

- Section 2 – Existing Infrastructure
- Section 3 – Transport Tasks and Routes
- Section 4 – Potential Impacts
- Section 5 – Potential Mitigation
- Section 6 – Summary
- Section 7 – References

## 2 Existing Infrastructure

This section describes the current state of access routes to the Island from Rockhampton and the existing transport infrastructure; including road, ship, and air facilities between Rockhampton and Great Keppel Island. Parking and marine facilities at Rosslyn Bay and the current infrastructure and transport facilities that are provided on the Island are also described. Existing network volumes are also discussed.

### 2.1 Overview

The Island is only accessible by aircraft and watercraft. The GKI Resort Revitalisation Plan will include a new, relocated air strip to allow a greater number and proportion of visitors to fly directly to and from the Island. The majority of day and overnight visitors (including resort staff) will continue to take the ferry from the Rosslyn Bay / Keppel Bay Marina.

For day-trippers and overnight visitors, most car trips will originate either from Rockhampton Airport or Bruce Highway (A1) and travel along the Scenic Highway (SH) 4 to Keppel Bay Marina. Most car trips for non-resident staff will also arrive from Scenic Highway north of the Marina. However, as staff will be drawn from the local labour, some trips will also arrive from Scenic Highway south of the Marina.

Figure 2-1 shows the location of GKI, Rosslyn Bay and Rockhampton in relation to other key destinations in the area, including the Rockhampton Airport, Cairns to the North, Brisbane to the South and Western Queensland to the West.

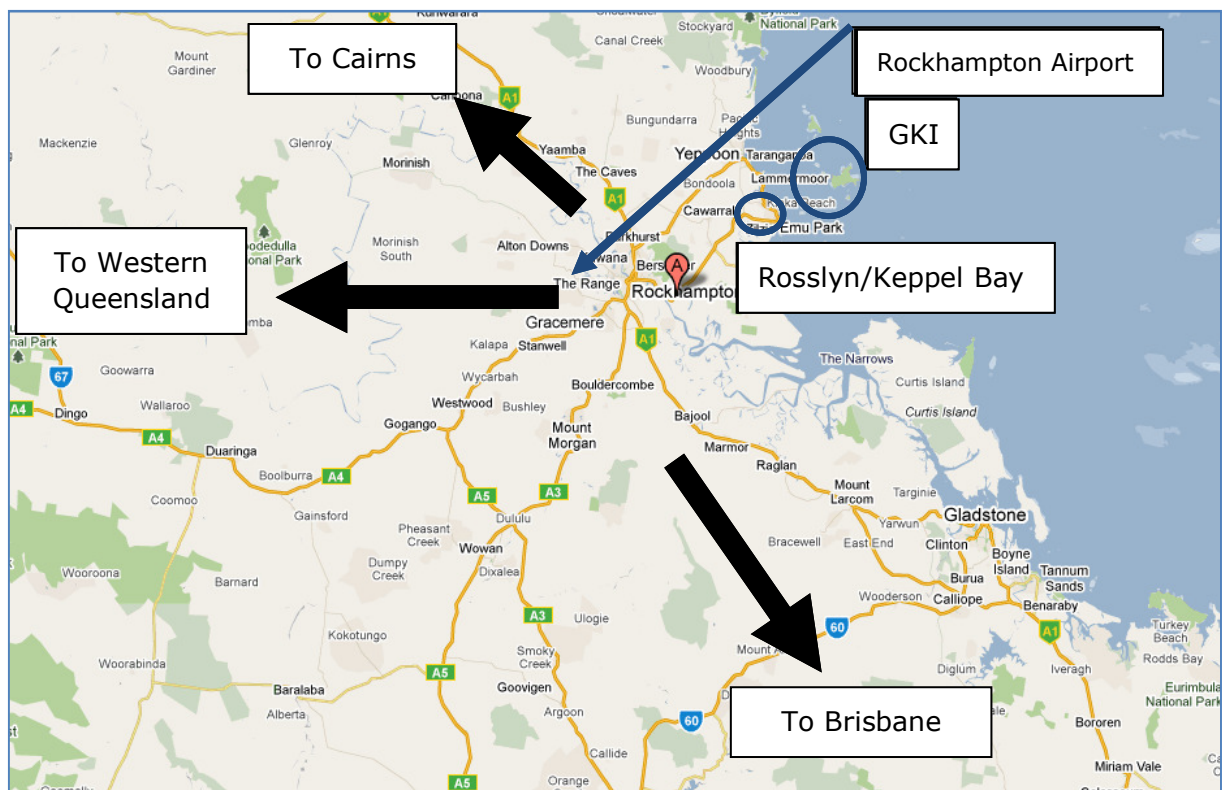


Figure 2-1: Key Transport Movements (Source: Google Maps)

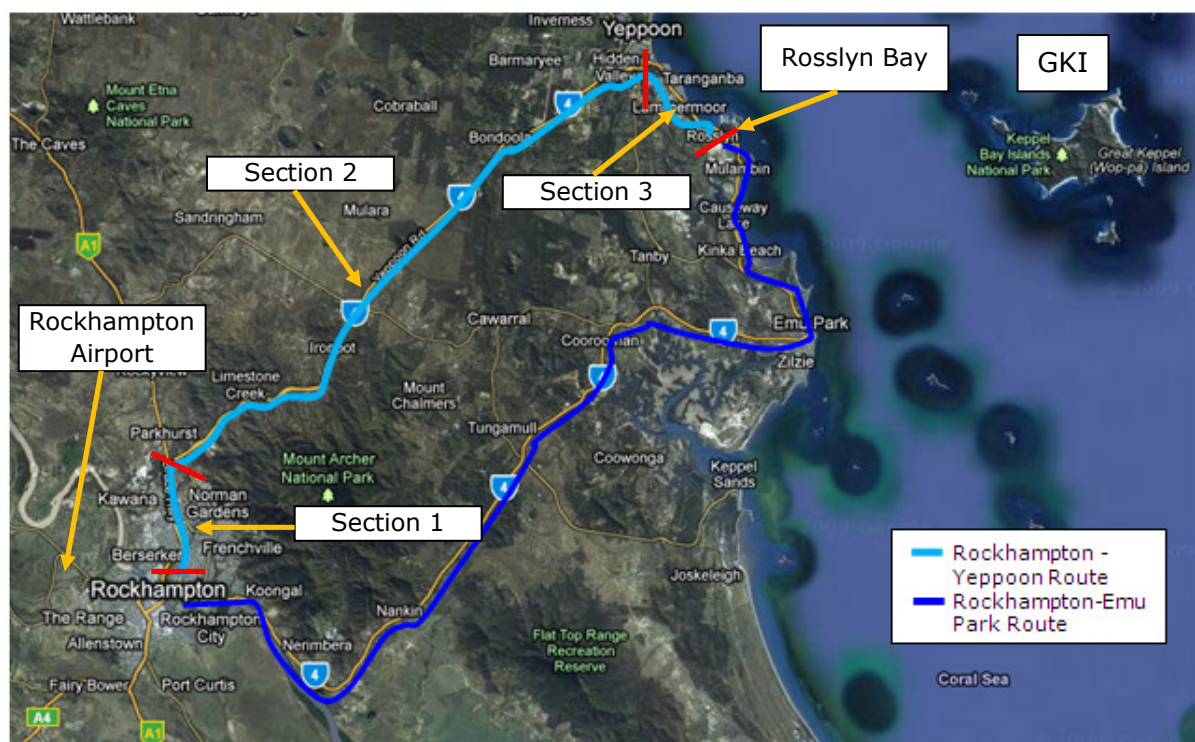
## 2.2 Road Network and Traffic Volumes

The road network to and from Rosslyn Bay / Keppel Bay Marina is relatively limited. Figure 2-2 shows the two most direct access routes to the Marina from Rockhampton. From Brisbane and Cairns, the Rockhampton Region is accessible via the A1 and from Central Queensland via the Capricorn Highway (A4).

From Rockhampton, the Marina can be accessed via Scenic Highway 4 (SH4) which loops through Yeppoon, Rosslyn Bay and Emu Park back to Rockhampton. The most direct route to the Marina is the northerly route from Rockhampton along Rockhampton-Yeppoon Road, which then makes a right at Yeppoon and continues on Scenic Highway. This is approximately a 40km trip. An alternative route is the southerly SH4 route along the Rockhampton-Emu Park Road to the Scenic Highway. This is approximately 55km.

The Bruce Highway, Rockhampton-Yeppoon Road and Rockhampton-Emu Park Road are all State-controlled arterial roads providing access between Rockhampton and the coast. The Bruce Highway also provides an inter-regional link for medium and long-haul passenger and freight traffic.

Rockhampton-Emu Park Road and Tanby Road both have two vehicle lanes in each direction and there are no signalised intersections between Rockhampton and Rosslyn Bay along this alternative route. The road infrastructure and traffic volumes along these two routes are detailed within the following section.



**Figure 2-2: Routes to Rosslyn Bay from Rockhampton (Source: Google Maps)**

For closer analysis, the road access to Rosslyn Bay along the Rockhampton - Yeppoon Road Route can be divided into the following three key sections (Figure 2-2):

- Section 1: Rockhampton and airport along Bruce Highway (A1) to Rockhampton-Yeppoon Road (SH4), approximately 8km's;
- Section 2: Rockhampton-Yeppoon Road/ Yeppoon Road to Yeppoon, approximately 30km's
- Section 3: Yeppoon-Emu Park Road / Scenic Highway to Keppel Bay Marina, approximately 6km's

### Section 1 – Rockhampton, Bruce Highway to Rockhampton-Yeppoon Road

This section of the route is the most heavily urbanised. It serves Rockhampton City Centre and experiences more traffic than the two other route sections. As shown in Figure 2-3, Bruce Highway (A1) is Rockhampton's principle north-south route. The A1 receives most vehicles travelling east on A4 from the Rockhampton Airport and from the south via the Burnett Highway (A3), and Leichardt Highway (A5).

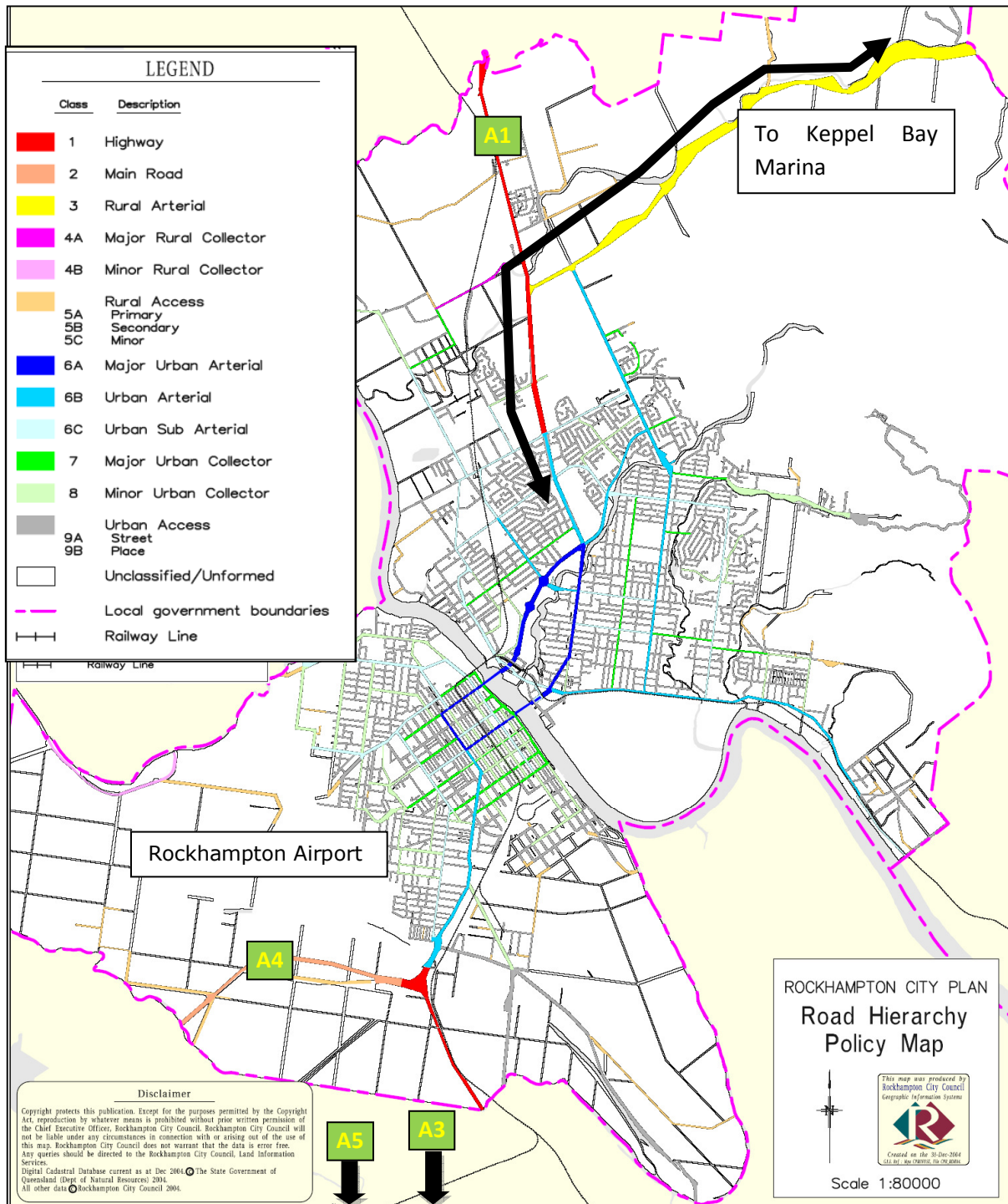


Figure 2-3: Rockhampton Road Hierarchy (Source: Rockhampton City Plan)



The road hierarchy for Rockhampton is included with Figure 2-3 and descriptions of the main routes through Rockhampton, including the Highways A1, SH4 and A4, are detailed in Table 2-1.

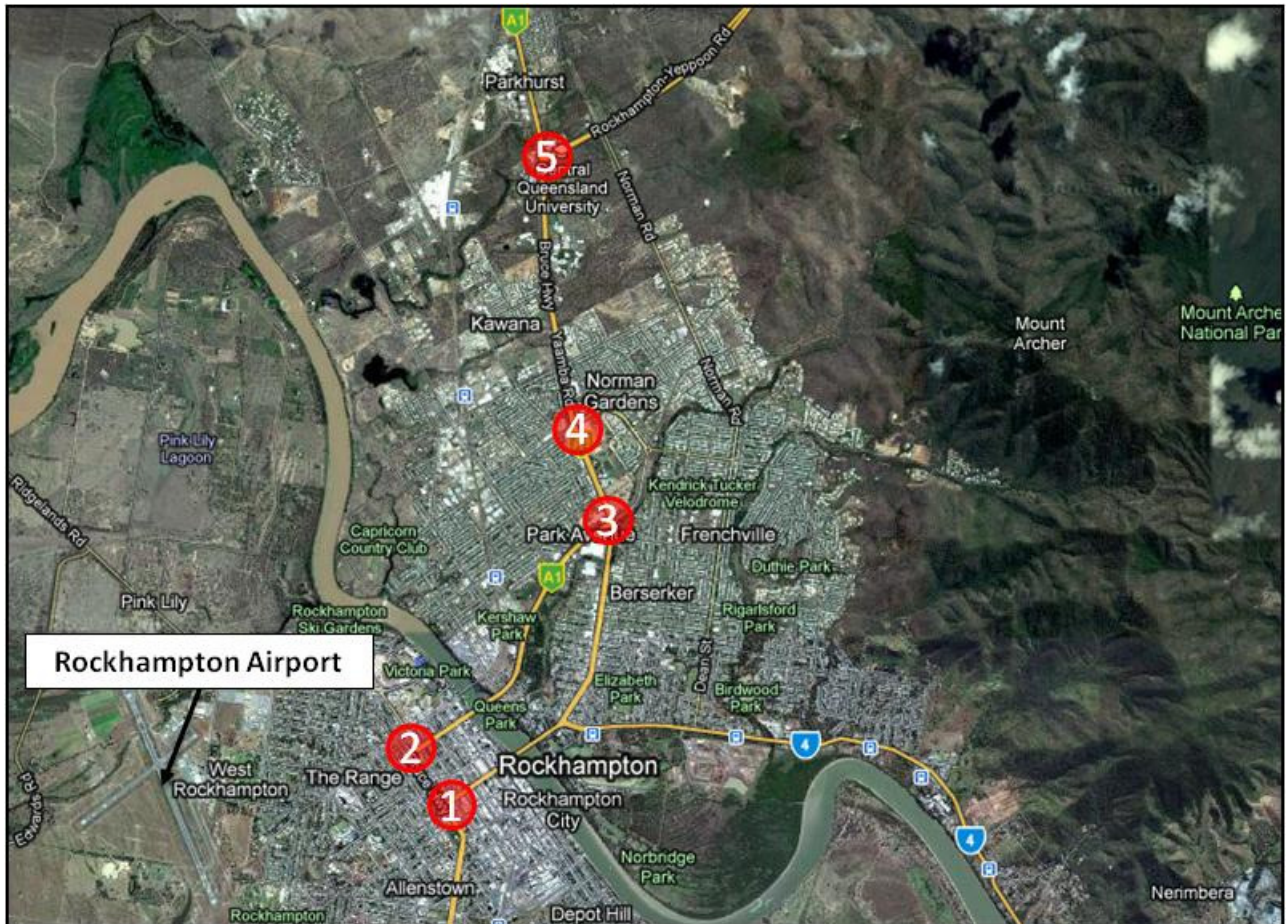
**Table 2-1: Rockhampton Road Hierarchy**

Class	Section	Description and Volumes	Function Description
1	A1 between Farm St and SH4 (shown in red on Figure 2-3)	Highway	Principal avenue of communication between and through, major regions of Australia
3	SH4 – Yeppoon Rd (yellow)	Rural Arterial	<p>Main function is to form the principal or alternative avenue of communication for movements:</p> <ul style="list-style-type: none"> <li>• Between a state capital city and key towns which have a state of national significance or which have significant national or state economic/social interaction; or</li> <li>• Between a state capital city and adjoining states and their capital cities; or</li> <li>• Between key towns which have significant regional economic/social interaction</li> </ul>
6	<ul style="list-style-type: none"> <li>- A1 from A4 to Fitzroy St</li> <li>- A1 from Musgrave St to Farm St (light blue)</li> </ul>	Urban Arterial	Main function is to perform as the principal arteries for through traffic and freight movements across urban areas. Provides access to major freight terminals, freight movement and access to major transport terminal, or which are extensions into urban areas of Class 2 [Main Road] or Class 3 [Rural Arterial] roads.
6A	- A1 between Fitzroy St and Musgrave St (dark blue)	Major Urban Arterial	

There are 5 major intersections along Bruce Highway between Rockhampton city centre and the junction of Bruce Highway / Rockhampton – Yeppoon Road south of Parkhurst, as shown in Figure 2-4. These intersections include:

- 1) Fitzroy Street;
- 2) George Street;
- 3) Moores Creek Road;
- 4) Richardson Road; and
- 5) Bruce Highway and Rockhampton-Yeppoon Road.

Through Rockhampton, the Bruce Highway (A1) is classified as a major urban arterial and operates with a minimum of two lanes and raised medians for most of its length. Total vehicle volumes peak along Bruce Highway in the regional centres of Rockhampton at 30,000 vehicles a day<sup>1</sup>. Traffic along the Bruce highway is dominated by passenger and light commercial vehicles, with about 10 per cent of traffic consisting of heavy vehicles on the high traffic volume sections and 20 per cent on the lower volume rural sections<sup>2</sup>.



**Figure 2-4: Section 1 – Rockhampton, Bruce Highway to Rockhampton-Yeppoon Road**  
(Source: Google Maps)

South of the Fitzroy River, the road passes through a mix of commercial and residential areas with individual driveway access directly to the street. North of the river, property access to and from the highway is more managed. There are fewer driveways, access lanes and businesses with direct frontage to the highway.

<sup>1</sup> Building our National Transport Future, Brisbane –Cairns Corridor Strategy 2007 and Rockhampton Traffic Study, 2008

<sup>2</sup> Building our National Transport Future, Brisbane –Cairns Corridor Strategy 2007



## Section 2 – Rockhampton-Yeppoon Road to Yeppoon

The 30km stretch of road connecting Rockhampton and Yeppoon is a rural arterial with very few volume generating land uses or individual property accesses. It passes through the areas of Limepot Creek, Ironpot, Mulara and Bondoola before arriving at the western edge of Yeppoon near the Keppel Park Racecourse and Yeppoon Golf and Country Club, as shown in Figure 2-5.

The first 8km's of SH4, from the intersection of A1 in Rockhampton to Ironpot Creek, is a 4-lane road with eastbound and westbound lanes separated by a median swale. The centre section, from Ironpot Creek to the intersection of Neils Road at the west end of Yeppoon, merges and narrows into a single, 2-lane carriageway. East of Neils Road into Yeppoon, the road initially widens again to 4 lanes but then narrows again as it enters town.

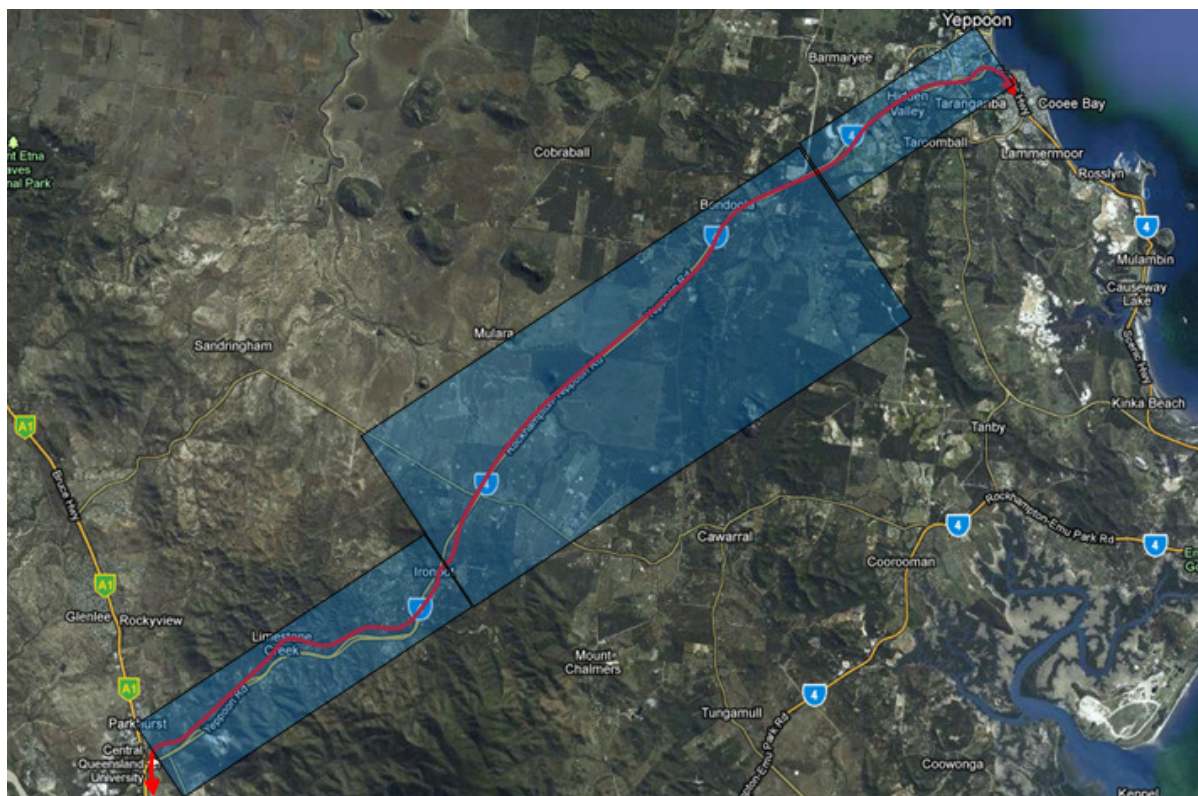


Figure 2-5: Section 2 – Rockhampton-Yeppoon Road to Yeppoon (Source: Google Maps)

### Section 3 – Yeppoon-Emu Park Road / Scenic Highway to Rosslyn Bay

The final 6km's of the SH4 Rockhampton to Rosslyn Bay northern route is a 2-lane road servicing residential and recreational land uses through the town of Cooee Bay, as shown in Figure 2-6.

Through the town of Cooee Bay, there are few residential property accesses directly onto the road. Most residential accesses are served by local roads that intersect with Scenic Highway at four separate locations along the section. All of these intersections are give way-controlled with Scenic Highway being the dominant movement. South of Cooee Bay there is several beachfront properties with direct driveway access to Scenic Highway.

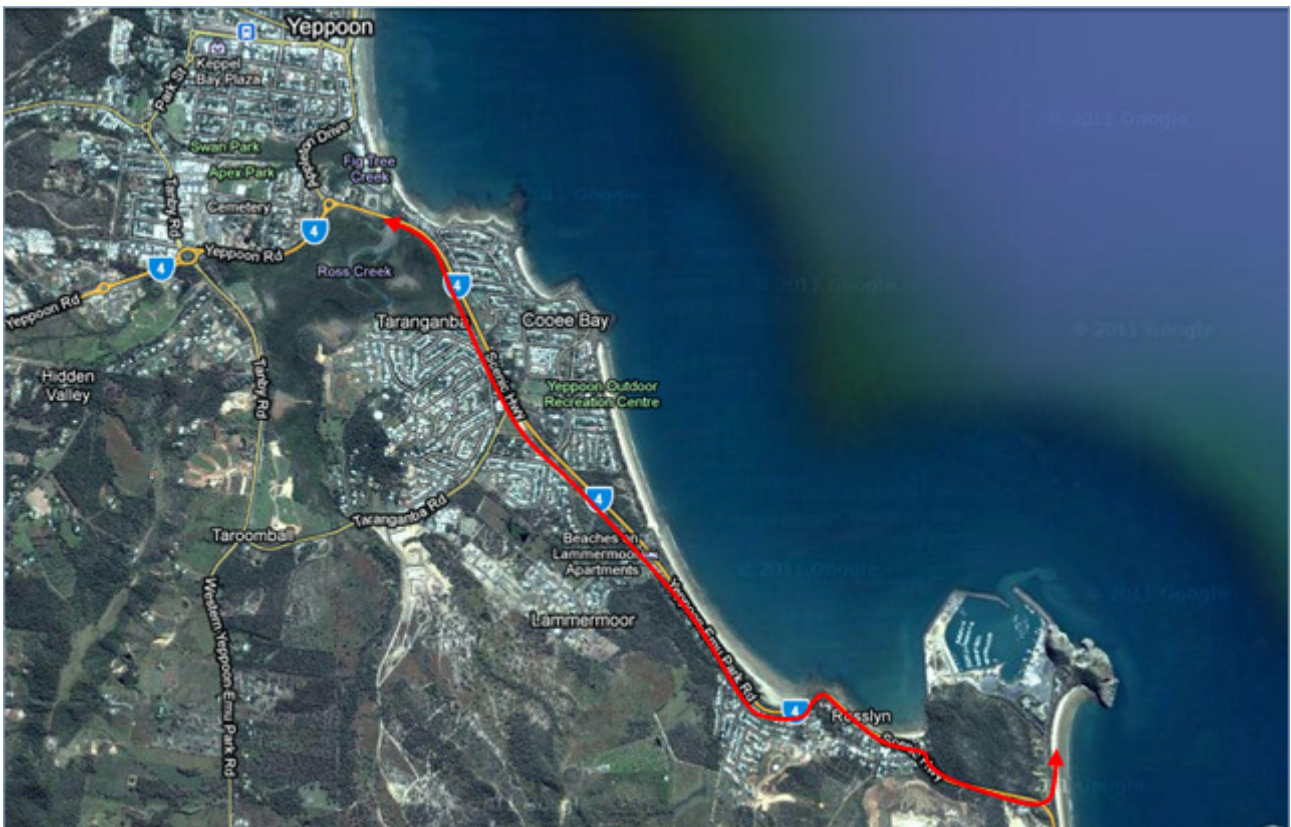


Figure 2-6: Section 3 – Yeppoon to Rosslyn Bay (Source: Google Maps)



### 2.2.1 Traffic Volumes

To determine the background against which any future traffic impacts may be measured, existing traffic volumes were assembled from a combination of intersection and segment volume locations approved by DTMR. These volumes show a traditional commuter pattern, with greater westbound AM and eastbound PM flows.

The sites where traffic volumes have been recorded over the past five years between Rockhampton and Rosslyn Bay are shown in Figure 2-7, and include:

- 1) Bruce Highway and Rockhampton-Yeppoon Road intersection;
- 2) Yeppoon Road and Western Yeppoon-Emu Park Road Intersection;
- 3) Yeppoon-Emu Park Road and Vin E Jones Memorial Drive Intersection;
- 4) Vin E Jones Memorial Drive and Breakwater Drive Intersection;
- 5) Hidden Valley to Tanby Road segment;
- 6) Tanby Road to Yeppoon- Emu Park Road segment;
- 7) Rockhampton- Emu Park Road (north) segment; and
- 8) Rockhampton- Emu Park Road (south) segment.

The data was provided by Queensland Government and onsite surveys and is included in Appendix B of this report.

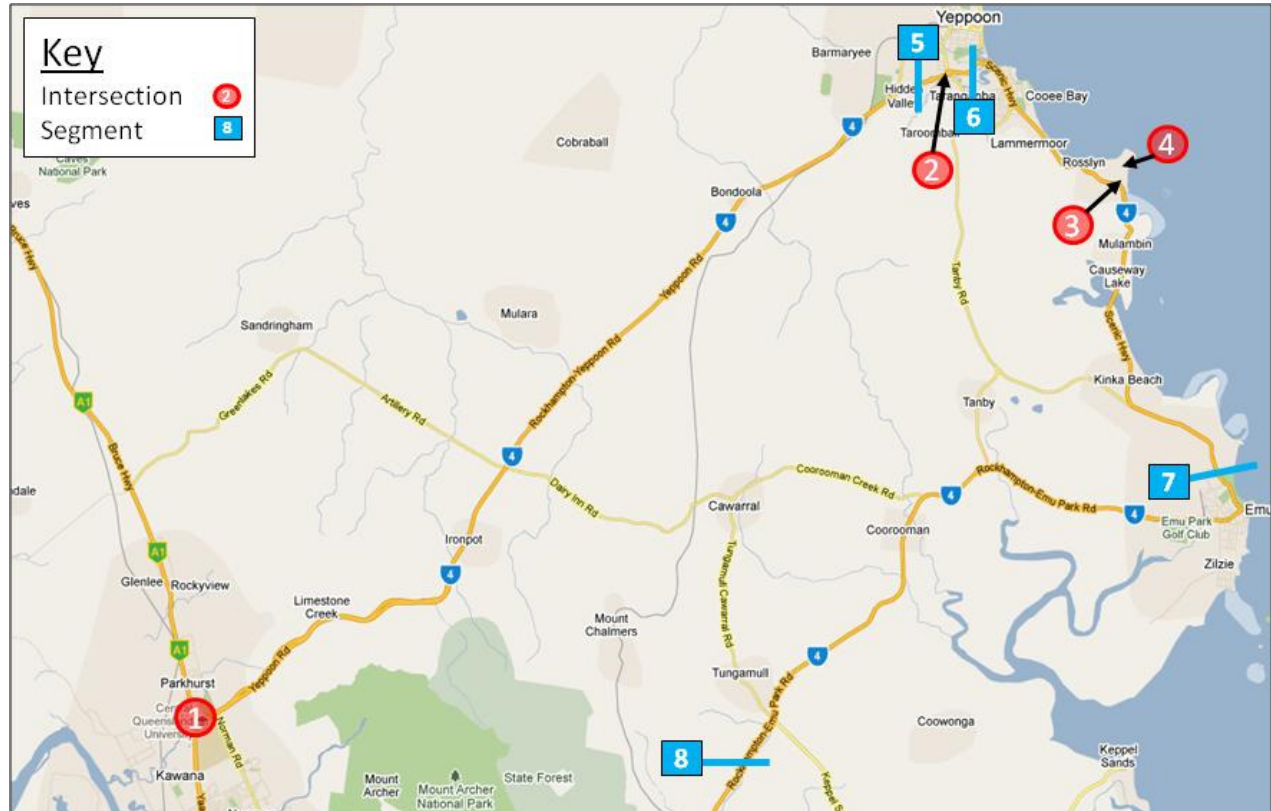


Figure 2-7: Traffic Data Collection Sites - Segment Locations Numbered (Source: Google Maps)

### Bruce Highway and Rockhampton-Yeppoon Road intersection

The intersection of Bruce Highway and Rockhampton-Yeppoon Road is the first analysed intersection on the route to Keppel Bay Marina, as vehicles will be travelling through the intersection to Keppel Bay from A1 in the North and from Bruce Highway in the South.

The predominant movement is from Bruce Highway (Leg 3) due to Rockhampton City and the Airport being located in the South, with 60% of vehicles turning into the Rockhampton-Yeppoon Road (Leg 2). Figure 2-8 shows the traffic movements at the intersection and volumes for each approach and Table 2-2 includes the total daily traffic and peak traffic volumes and times per intersection approach.

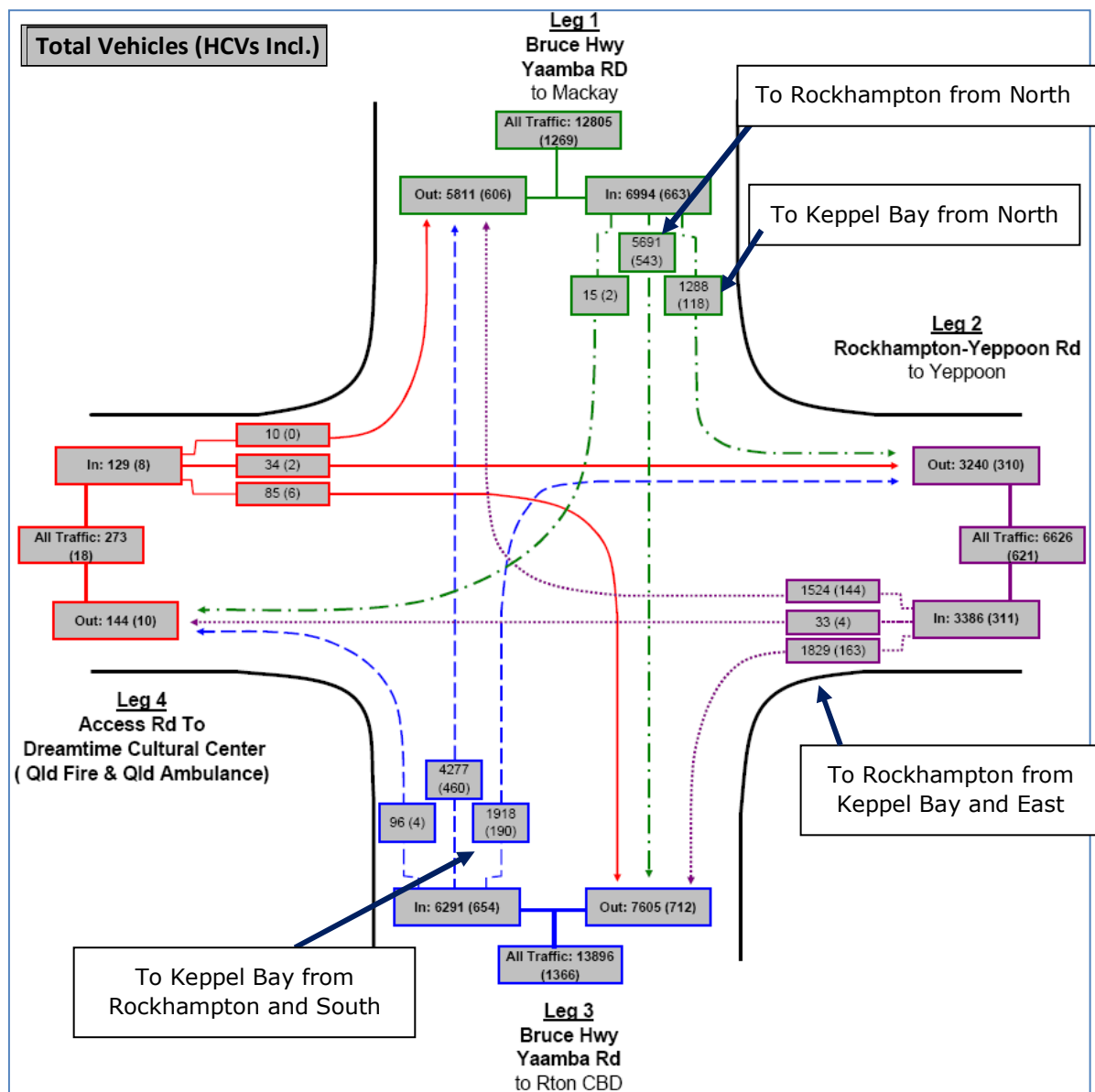


Figure 2-8: Bruce Highway and Rockhampton-Yeppoon Road – Traffic Counts (source: DTMR)<sup>3</sup>

<sup>3</sup> Data collection was between 0600 and 1800 on 10<sup>th</sup> December 2009 by DTMR

The intersection shows typical commuting patterns. Volumes into Rockhampton are heavier in the AM peak and back toward Keppel Bay and Yeppoon are greater in the PM. There were 1,918 vehicles turning right into the Rockhampton-Yeppoon Road from the Bruce Highway during the 12-hour count. This included 190 heavy vehicles (blue right turning line). Conversely, there were 1,829 vehicles turning left onto the Bruce Highway (purple left turning line).

Turning left into the Rockhampton-Yeppoon Road from the A1 (Leg 1) Highway there were 1,288 daily vehicles; which included 118 heavy vehicles (green left turning line). Conversely, there were 1,524 vehicles turning right onto A1 Highway (purple right turning line).

**Table 2-2: Bruce Highway and Rockhampton-Yeppoon Road – Count Summary**

Approach	Movement	12-hr Total	Peak Time	Peak Count
Leg 1 Rockhampton- Yeppoon Road	Left	1,288	1600-1700	209
	Through	5,691	0745-0845	746
	Right	15	1030-1130	5
	All	6,994	0745-0845	881
Leg 2 A1(Bruce Highway) North	Left	1,829	0715-0815	275
	Through	33	0800-0900	12
	Right	1,524	0630-0730	232
	All	3,386	0715-0815	449
Leg 3 Bruce Highway South	Left	96	1045-1145	15
	Through	4,277	1630-1730	670
	Right	1,918	1615-1715	328
	All	6,291	1630-1730	1,001
Leg 4 Access Road	Left	10	0800-0900	2
	Through	34	0800-0900	9
	Right	85	1200-1300	13
	All	129	0800-0900	22

### Yeppoon Road and Western Yeppoon- Emu Park Road Intersection

The Yeppoon Road and Western Yeppoon- Emu Park Road intersection is a key intersection within section 2 of the route to Rosslyn Bay. The predominant movement at this intersection is straight across Rockhampton-Yeppoon Road. There were 2,095 vehicles towards Yeppoon (Leg 2), of which 131 were heavy vehicles and 2,574 towards Rockhampton (Leg 4) of which 144 were heavy vehicles.

Figure 2-9 shows the traffic volumes for each approach and Table 2-3 includes the total daily and peak traffic volumes and times per intersection approach.

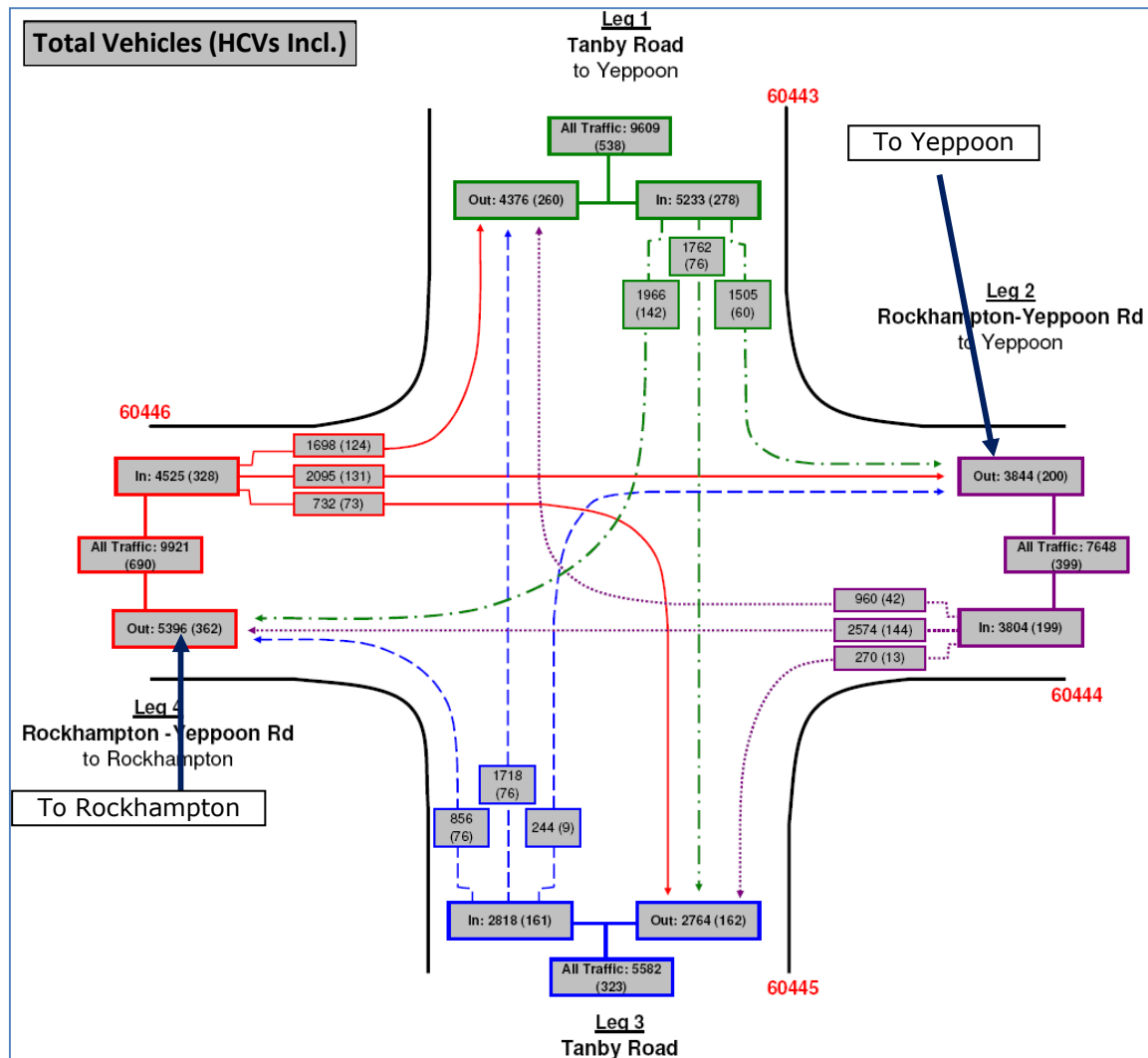


Figure 2-9: Yeppoon Road and Western Yeppoon - Emu Park Road – Counts (Source: DTMR)<sup>4</sup>

<sup>4</sup> Data collection was between 0600 and 1800 on 19<sup>th</sup> August 2010

**Table 2-3: Yeppoon Road and Western Yeppoon- Emu Park Road Intersection–Summary**

Approach	Movement	Daily Total	Peak Time	Peak Count
Leg 1 Tanby Road (N)	Left	1,505	1515-1615	239
	Through	1,762	1445-1545	239
	Right	1,966	0745-0845	249
	All	5,233	1515-1615	671
Leg 2 Rockhampton- Yeppoon Road (E)	Left	270	1700-1800	52
	Through	2,574	0715-0815	428
	Right	960	0800-0900	171
	All	3,804	0730-0830	570
Leg 3 Tanby Road (S)	Left	856	0700-0800	122
	Through	1,718	0815-0915	320
	Right	244	0745-0845	39
	All	2,818	0815-0915	443
Leg 4 Rockhampton- Yeppoon Road (W)	Left	1,698	1445-1545	199
	Through	2,095	1630-1730	341
	Right	732	1700-1800	110
	All	4,525	1600-1700	608

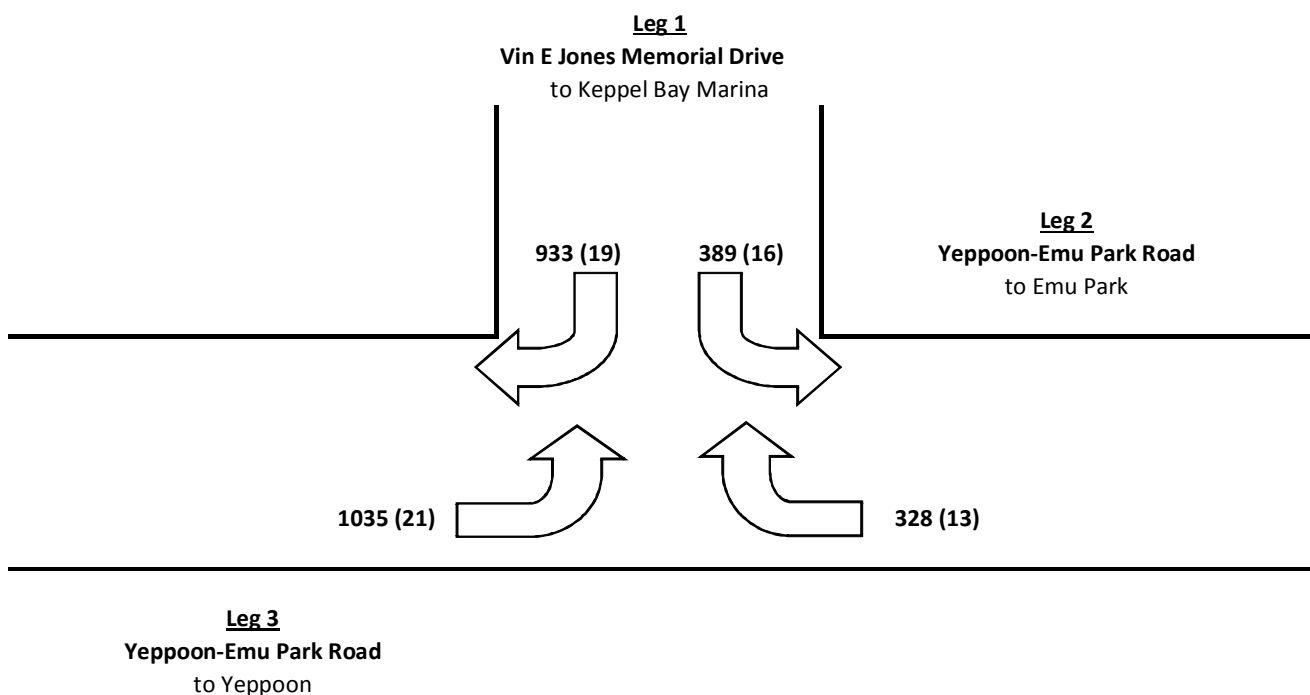
### Yeppoon-Emu Park Road and Vin E Jones Memorial Drive Intersection

The Yeppoon-Emu Park Road and Vin E Jones Memorial Drive intersection is the entrance into Keppel Bay Marina from Yeppoon-Emu Park Road (see Figure 2-10). From the west (eastbound from Yeppoon), the ratio of vehicles turning into Vin E Jones and those proceeding through were nearly equal. From the east (westbound from Emu Park) there were nearly three times as many vehicles proceeding straight through to Yeppoon as turning right.

The 12-hour turning movements at this intersection were relatively low and averaged between 27 and 87 vehicles per hour entering the Keppel Bay and / or Rosslyn Bay area. Vehicle access peaks into the Marina were also outside traditional AM and PM peak periods.

Table 2-4 includes the total daily and peak traffic volumes and times per intersection approach.

There are also greater volumes accessing the Marina from the west (Yeppoon and Rockhampton). The heaviest movement at this intersection is the eastbound to northbound left turn from Yeppoon-Emu Park Road to Vin E Jones Memorial Drive. There were 1,035 vehicles towards Vin E Jones Memorial Drive (Leg 1), of which 2% were heavy vehicles, and 933 vehicles making the right turn exit onto Yeppoon-Emu Park Road; 2% of which were also heavy vehicles.



**Figure 2-10: Yeppoon-Emu Park Road and Vin E Jones Memorial Drive Intersection –Counts<sup>5</sup>**

<sup>5</sup> Data collection was between 0600 and 1800 on Saturday 23 April 2011 and Wednesday 20 April 2011

**Table 2-4: Yeppoon-Emu Park Road and Vin E Jones Memorial Drive Intersection–Summary**

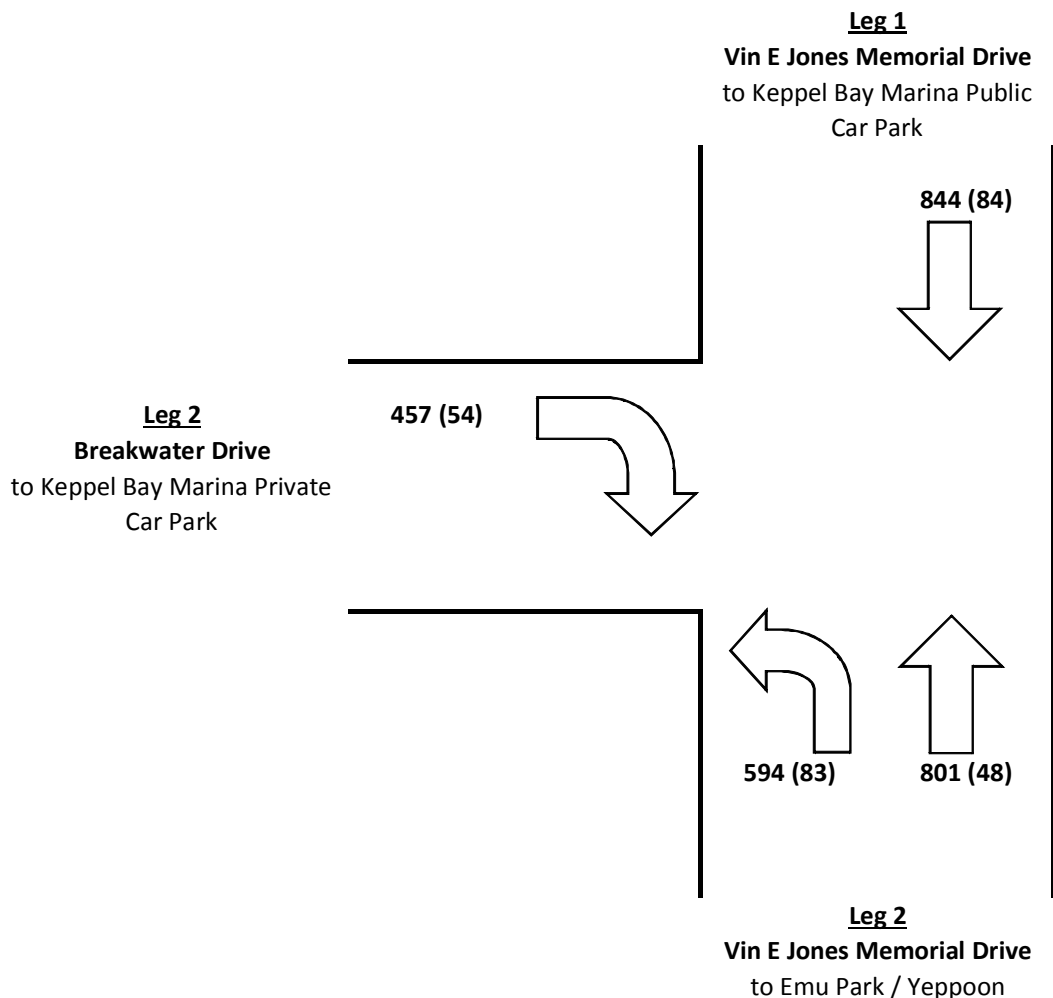
Approach	Movement	Daily Total	Peak Time	Peak Count
Leg 1 Vin E Jones Memorial Drive (N)	Left	389	1130-1230	59
	Right	933	1045-1145	105
Leg 2 Yeppoon-Emu Park Road (E)	Right	328	1045-1145	40
	Through (wb)	923		111
Leg 3 Yeppoon-Emu Park Road (W)	Left	1035	1045-1145	134
	Through (eb)	1006		118

### Vin E Jones Memorial Drive and Breakwater Drive Intersection

The Vin E Jones Memorial Drive and Breakwater Drive intersection was assessed to determine what number and proportion of vehicles accessed the public Marina. The intersection marks the point at which vehicles either turn left towards Keppel Bay Marina private car park facilities or proceed straight to the public facilities.

As shown in Figure 2-11 and Table 2-5, approximately 60% of the 'daily' 1,400 vehicles on Vin E Jones Drive access the public Marina at Keppel Bay. The predominant movement is north-south along Vin E Jones Memorial Drive to Keppel Bay Marina and this movement accounted for 56% of the total volume of vehicles moving through the intersection from 0630 to 1830.

A greater proportion of heavy vehicles accessed the private Keppel Bay Marina on Breakwater Drive than the public facilities. This could be due to ongoing construction of residential facilities at the end of the drive. However, a significant proportion of vehicles (10%) from the public car park were also heavy vehicles. These included medium-sized trucks to service small business and distribution facilities on the Marina.



**Figure 2-11: Vin E Jones Memorial Drive and Breakwater Drive Intersection – Counts<sup>6</sup>**

<sup>6</sup> Data collection was between 0630 and 1830 on Wednesday 20 April and Saturday 23 April 2011



**Table 2-5: Vin E Jones Memorial Drive and Breakwater Drive Intersection–Summary**

Approach	Movement	Daily Total	Peak Time	Peak Count
Leg 1 Vin E Jones Memorial Drive (N)	Through	844	1045-1145	117
Leg 2 Vin E Jones Memorial Drive (S)	Left	594	1115-1215	66
	Through	801	1045-1145	115
Leg 3 Breakwater Drive (W)	Right	457	1115-1215	53

### 2.2.2 Road Segment Volumes

In addition to separate intersection turning movements, road segment counts were also gathered from information provided by DTMR. These counts are summarised in Table 2-6 and Annual Average Daily Traffic (AADT). Counts from 2009 for the following road segments can be located on the earlier Figure 2-7:

- Hidden Valley to Tanby Road;
- Tanby Road to Yeppoon- Emu Park Road;
- Rockhampton- Emu Park Road North (north of Emu Park Golf Course); and
- Rockhampton- Emu Park Road South.

Heavy vehicles AADT counts are included in the Table in brackets after the all vehicle AADT, for example 123 (4).

**Table 2-6: Road Segment AADT Counts**

Location	Direction	AADT	Total
1 Hidden Valley to Tanby Road	Eastbound	5,234 (308)	10,839 (660)
	Westbound	5,605 (353)	
2 Tanby Road to Yeppoon-Emu Park Road	Northbound	4,091 (280)	7,921 (398)
	Southbound	3,830 (190)	
3 Rockhampton-Emu Park Road North	Northbound	1,361 (98)	2,804 (158)
	Southbound	1,443 (61)	
4 Rockhampton-Emu Park Road South	Northbound	1,552 (109)	3,168 (219)
	Southbound	1,616 (110)	

The road segment volume information is useful because it captures much of the volume from smaller developments outside of Yeppoon and Rockhampton. It also highlights volume conditions on the southern portion of SH4. This supplemental stretch of road is not considered the primary access route between Rockhampton and the Marina, but determining base volumes may be helpful in providing alternative route mitigation, should it be required.

Predictably, AADT's show that volumes are heaviest around Yeppoon and relatively low between Emu Park and Rockhampton along the southern portion of SH4. Also notable are the number of vehicles travelling between Yeppoon and the Marina (Location 2 – Tanby Road to Yeppoon-Emu Park Rd). These volumes are only 70% of the 5,234 vehicles travelling east toward Yeppoon from Rockhampton. Approximately half of the vehicles travelling in this direction turn into Vin E Jones Drive. These figures match roughly to the intersection movement figures at Rockhampton-Emu Park Road / Vin E Jones Drive and Vin E Jones Drive / Breakwater Drive.

## 2.3 Public and Active Transport Infrastructure

The area has a relatively low utilisation of public and active transport commuting. The area is served only by long-distance trains between Brisbane and Cairns, local bus services are available but infrequent and there is no infrastructure for cyclists or pedestrians between Rockhampton and Yeppoon.

Rockhampton Regional Council's *Rockhampton 2050* policy document does state an aspirational figure of 50% of all trips to be by public or active modes (i.e. walking and cycling) by 2050, but Rockhampton Regional Council has not developed internal targets to achieve that goal.

### 2.3.1 Bus System

There is a variety of private coaches and public bus services which operate between Rockhampton and Rosslyn Bay. Keppel Tourist Services, Young's Coaches and Rothery's Coaches provide a daily bus service from Rockhampton and Yeppoon to the ferry at Rosslyn Bay, picking up from the airport or accommodation by arrangement. The bus transfer to Rosslyn Bay from Rockhampton takes approximately 45 minutes.

Three bus stops are located within close proximity to the Keppel Bay Marina, including one in front of the Keppel offices, one in front of the Rosslyn Bay Inn and one in front of DTMR offices at north end.

The Young's Coaches bus routes for the Capricorn Coast are shown in Figure 2-12. Young's Buses runs a suburban route (Route 20) between Rockhampton and Zilzie with 3 stops at Keppel / Rosslyn Bay. This service operates 12 times each way weekdays, 6 times Saturday and 5 times Sunday.

Additional Route 20 buses start at Yeppoon and run to Zilzie via Rosslyn Bay 17 times each way on weekdays, 6 times on Saturdays and 6 times on Sundays. All buses stop at Emu Park and the service operates from 5:30AM to 7:30PM.

Phillip Young of Young's Bus management claims that Route 20 is one of the most heavily patronised routes in the system. He estimated that Route 20 carried 25,000 passengers per month.<sup>7</sup> Furthermore, though Young's Bus does aspire to annual patronage increases of 6%; actual patronage was up 19% across the entire system from 2008/09 to 2009/10.

<sup>7</sup> Personal Communication; February 2011

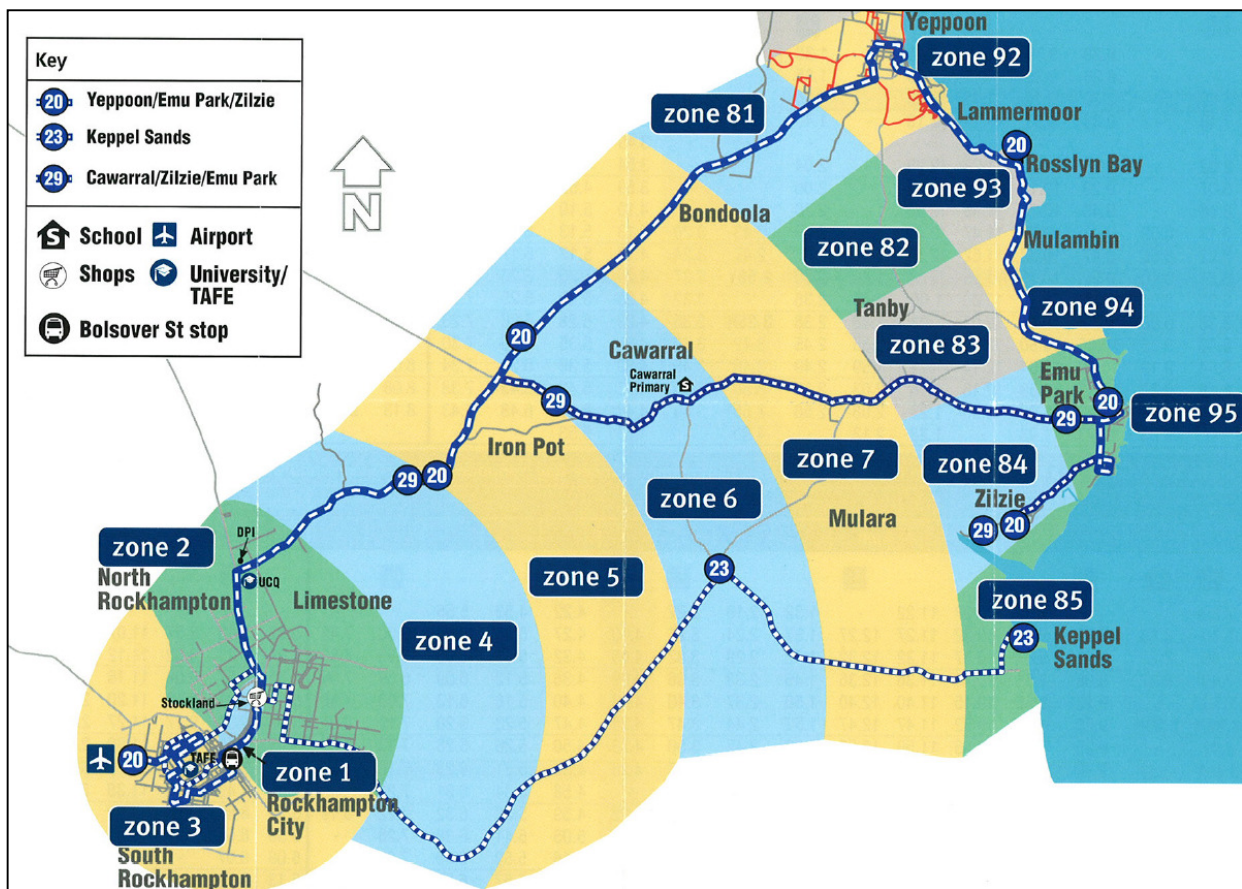


Figure 2-12: Bus Routes from Rockhampton to Rosslyn Bay (Source: DTMR)

The bus to and from the airport and the scheduled ferry times currently are not connected and there are several instances where the bus and ferry times do not coincide.

Several early buses are available from Rockhampton to the Marina in time to catch the AM ferry to GKI. However, no bus service is available from the airport to Rosslyn Bay in time to catch the 9:30AM ferry from Wednesday to Sunday. On Mondays and Tuesdays, when the ferry departs at 10:15, the 8:20AM bus from the airport arrives at the ferry in time at 10:05.

Bus services from the airport are available for the extra ferry that departs on Friday afternoons at 3PM. The last bus from Rosslyn Bay to the airport departs the Marina at 3:55; approximately 10 minutes after the GKI ferry is scheduled to return in the afternoon. Only two buses service the airport and Marina on Saturdays (none on Sunday), but these are not coordinated to accommodate the ferry schedule.

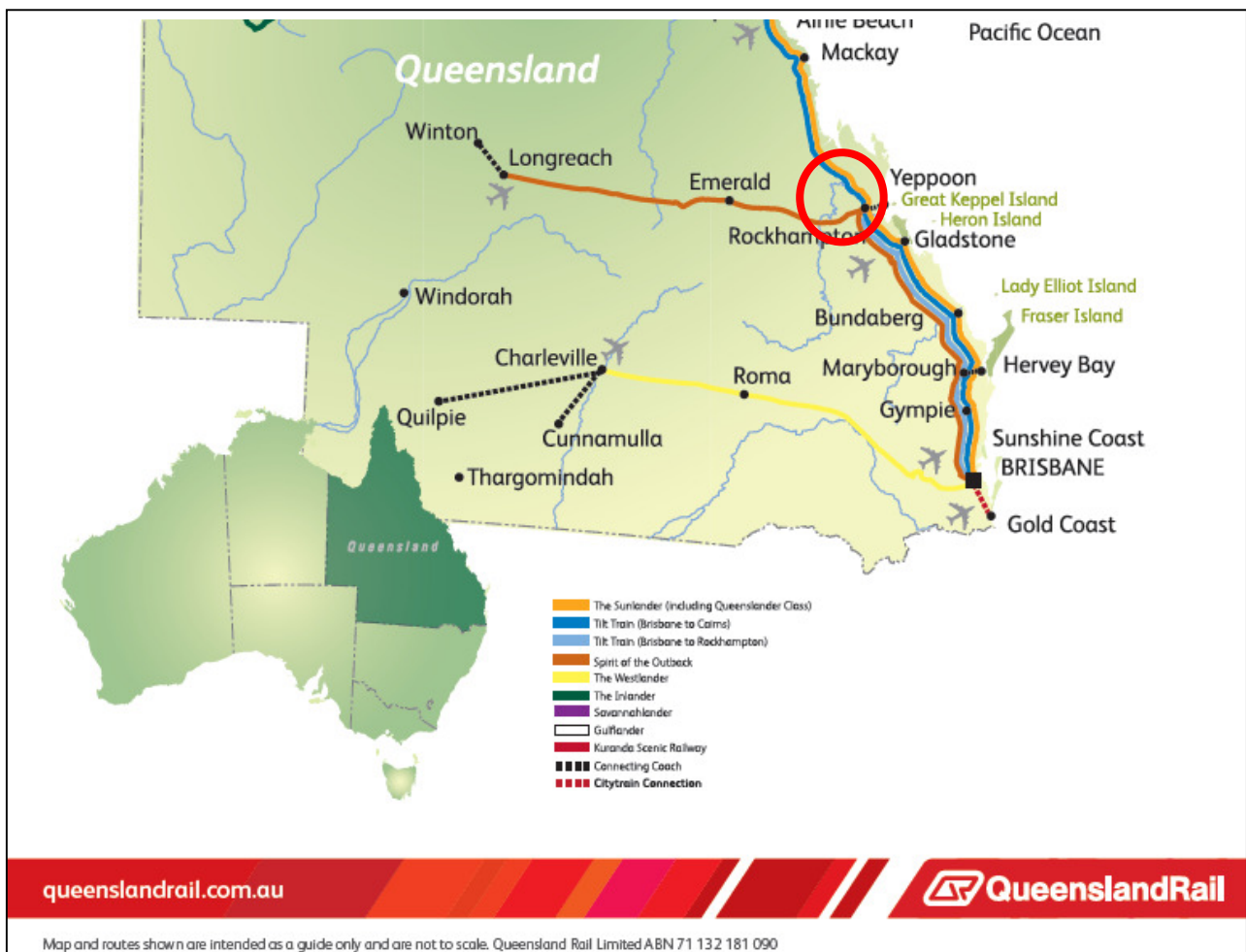
### 2.3.2 Rail Network and Services

The Queensland Rail travels runs 29 passenger service trains per week to Rockhampton. Fifteen of these services run northbound from Brisbane and 14 run southbound from Cairns or Longreach to Brisbane. Table 2-7 shows the posted time table service times at Rockhampton station from the Queensland Rail website. The southern portion of the Queensland rail map is shown in Figure 2-13 and identifies four separate rail services to Rockhampton. The most frequent service is the Rockhampton Tilt Train, which travels between Rockhampton and Brisbane 15 times per week.

Queensland Rail Link coach service provides a daily connection between Rockhampton rail station and Rosslyn Bay via the Yeppoon bus interchange leaving Rosslyn Bay at 5:30AM and Rockhampton Interchange at 18:40.

**Table 2-7: Rail Service to Rockhampton**

Service	Frequency	Service To/from	Rockhampton Service	
			From Brisbane	To Brisbane
Spirit of the Outback	4 times / week	Brisbane – Longreach	Saturday 23:05 Wednesday 04:15	Monday 20:45 Thursday 20:45
The Sunlander	6 times / week	Brisbane – Cairns	Sun and Tue 20:30 Thu 23:55	Wed, Fri and Sunday 05:10
Rockhampton Tilt Train	15 times / week	Brisbane – Rockhampton	Sun – Fri 18:25 Sun and Fri 00:30	Daily 07:15
Brisbane to Cairns Tilt Train	4 times / week	Brisbane – Cairns	Tue and Sat 02:15	Mon and Thu 01:05



**Figure 2-13: South Queensland Rail map (Source: Queensland Rail)<sup>8</sup>**

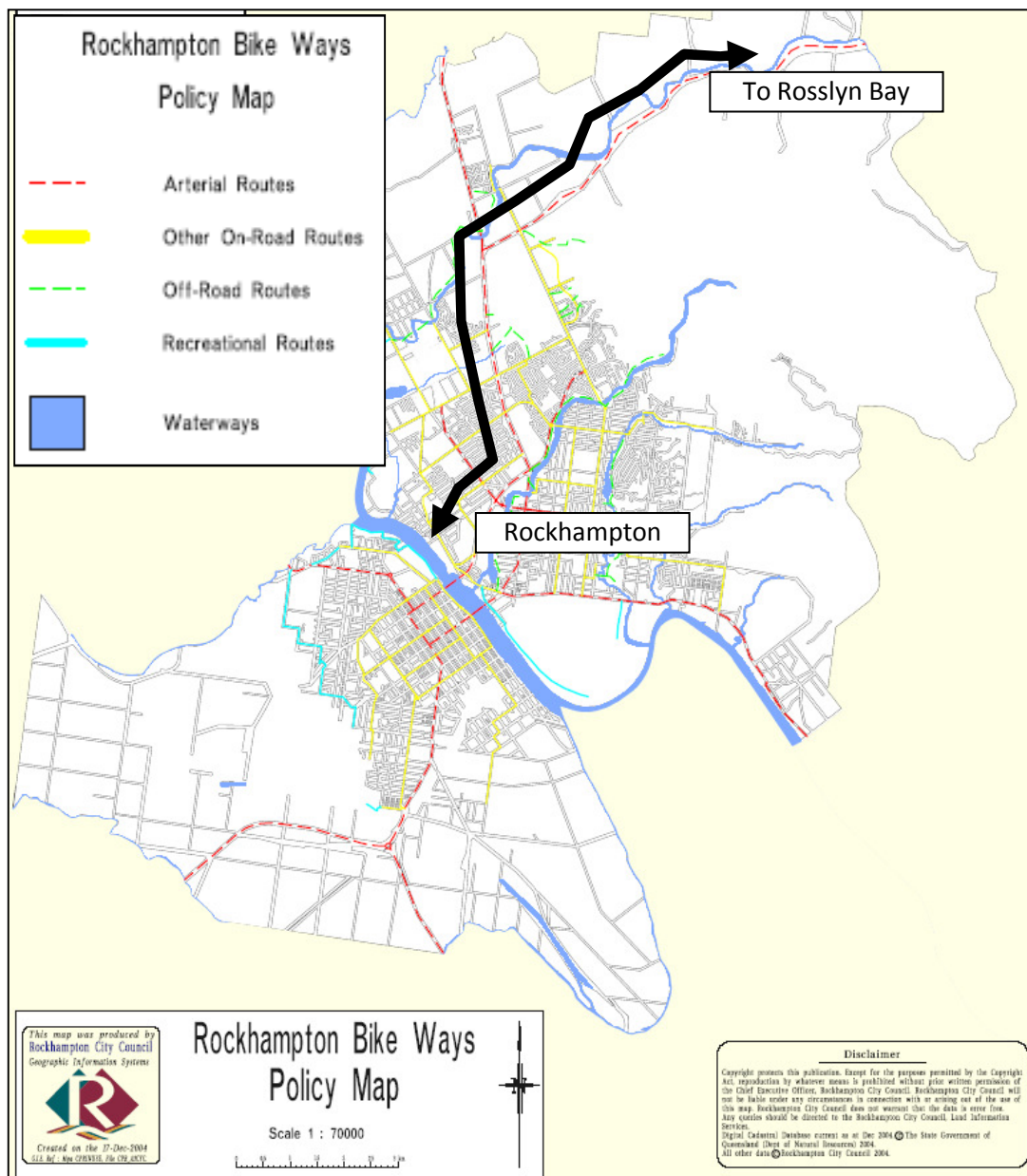
Few Queensland Rail trains service Rockhampton at times that permit ready travel and transfer to GKI-bound ferries. Of the trains travelling from Brisbane (northbound), only the Sunday-Friday Rockhampton Tilt Train arrives at an hour (06:25PM) relatively convenient for visitors to locate a hotel room or rental car. More trains travelling to Brisbane (southbound) leave Rockhampton nearer to normal business hours. The daily Rockhampton Tilt Train departs at 7:05AM and the Monday and Thursday Spirit of the Outback service departs at 8:45PM – sufficient time to catch the GKI ferry and return to Rockhampton.

### 2.3.3 Bicycle and Pedestrian Network

The Rockhampton to Rosslyn route has no formally-treated bicycle lanes, but several identified Bike Ways showing preferred and strategic cycling routes are shown in Figure 2-14. Key arterial routes from Rockhampton towards Yeppoon include along the Bruce Highway and the Rockhampton-Yeppoon Road toward Yeppoon.

<sup>8</sup> Source: Rail Australia Website: [http://www.railaustralia.com.au/pdf/200901-Traveltrain-Holidays\\_Tilt-Train-Route\\_Brisbane-Cairns.pdf](http://www.railaustralia.com.au/pdf/200901-Traveltrain-Holidays_Tilt-Train-Route_Brisbane-Cairns.pdf)





**Figure 2-14: Rockhampton Bike Ways (Source: Rockhampton City Council)**

DTMR have not identified any major bicycle infrastructure proposals in the Rockhampton – Yeppoon area, but does as a matter of policy attempt to make major strategic routes more amenable to cycling; including the widening of shoulders and / or designation and painting of cycle lanes where appropriate.

The majority of the 44km route provides only a 1.0m – 1.5m wide shoulder for on-road cycling, but this narrows considerably on Scenic Highway between Cooe Bay and Rosslyn Bay.

The majority of the affected route is rural and does not provide pedestrian footpaths. Only sections within Rockhampton and a 4km stretch of Scenic Highway in Cooe Bay have footpaths. There are no footpaths connecting Rosslyn Bay to either Yeppoon to the north or Emu Park to the south.

## 2.4 Parking Facilities at Rosslyn Bay and Keppel Bay Marina

The Marina's car parks operate with significant spare capacity and in addition, a predominantly unutilised private car park, GKI Security Car Park, exists just outside the Marina property.

### 2.4.1 Background

There are a total of 928 car park spaces available within and in the immediate vicinity of the Marina. This total includes 406 publicly-available spaces, 252 spaces for the private Keppel Bay Marina and 270 spaces at the Great Keppel Island Security Car Park at 422 Scenic Highway just outside of the Marina property.

Within the Marina, there are four car parking lots, as shown in Figure 2-15, which provide a variety of general, disabled, trailer, loading, coach and reserved spaces, as detailed in Table 2-8. Private businesses within the Marina are allocated their own spaces for management and employees. For example, Rosslyn Bay Fisherman's Market has eight spaces and Fast Cats Ferry Operators are allocated 14 spaces.

**Table 2-8: Marina Parking Spaces**

	Total Spaces	Parking Spaces			
		General	Disabled	Vehicle Trailer and	Coach
Car park 1	191	187			4
Car park 2	109			109	
Car park 3	93	15		78	
Car park 4	253	252	1		
<b>Total</b>	<b>646</b>	<b>454</b>	<b>1</b>	<b>187</b>	<b>4</b>

### 2.4.2 Occupancy

Car parking occupancy surveys were undertaken by Austraffic on Wednesday the 20<sup>th</sup> April and Saturday the 23<sup>rd</sup> April 2011 between 0600 and 1800. The surveys were undertaken during the Easter holidays to observe peak tourist parking demand during a long, holiday weekend during school holidays, compared with a typical weekday (albeit during school holidays).

Within the Marina, 646 car park spaces operated at only a maximum 18% capacity during a typical weekday in April and at a maximum 70% on a fine-weather Easter Saturday. Maximum occupancy rates for these two days were 23% and 69%, respectively, for the car park anticipated to be utilised by GKI guests.

The parking results are further described below and attached in Appendix C. On the Wednesday survey day the weather was overcast with intermittent light rain in afternoon, while on the Saturday survey day the weather was sunny.



**Figure 2-15: Parking Facilities at Rosslyn Bay (Source: Google Maps)**

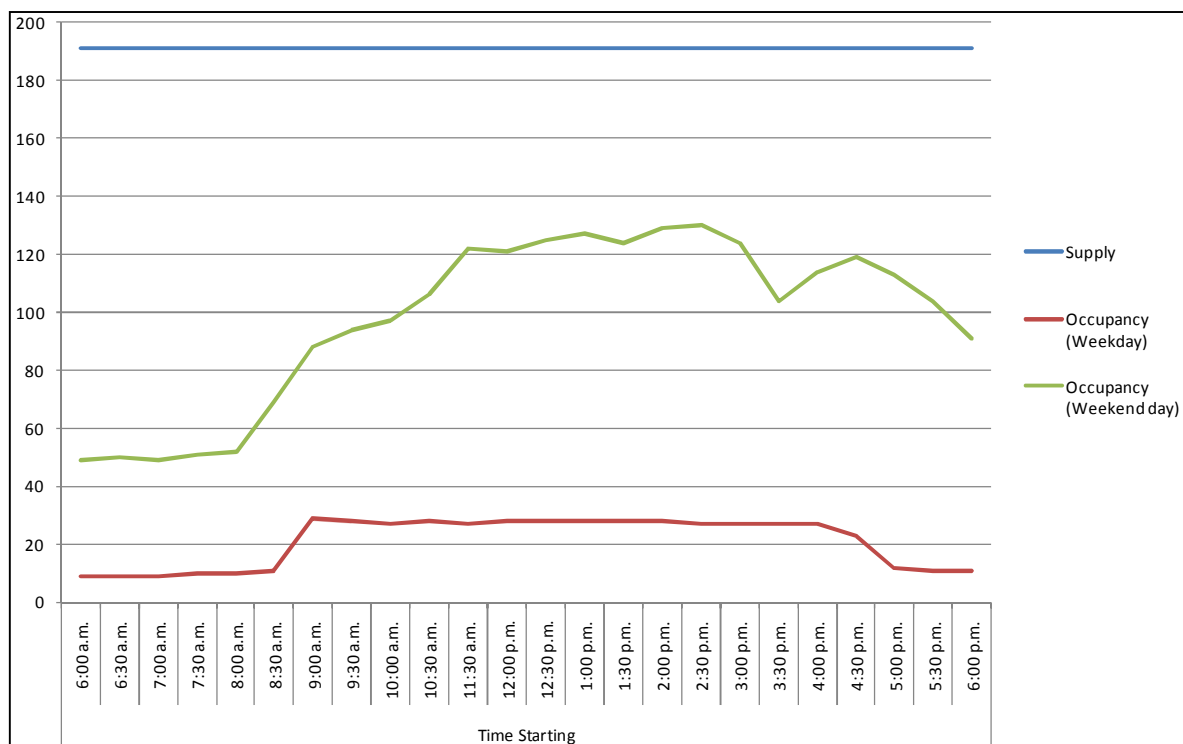


### Car Park 1 Supply and Demand

Car Park 1, at the northeast corner of the Marina, is the nearest lot to the Freedom Fast Cats ferry operator for general vehicles (without trailers) and the most likely to be utilised by GKI guests and commuting employees. It also services several of the adjacent businesses.

The survey results revealed that no coaches and no heavy vehicles with boat trailers parked at in car park 1 on either survey day (Figure 2-16). For both survey days only 5% of vehicles parked had boat trailers.

The maximum occupancy of the general spaces on the Wednesday was at 09:00 AM and 11:00AM with only 15% occupancy with 29 spaces utilised, compared with 69% occupancy on Saturday at 2:15PM with 132 spaces utilised. The average weekday occupancy of the general spaces is 21 spaces utilised (11%) and the average weekend day is 99 spaces utilised (52%).



**Figure 2-16: Car Park 1 Supply and Demand**

The survey results suggest that a greater proportion of weekday vehicles utilising Car Park 1 were ferry customers than weekend vehicles. The GKI ferry leaves at 09:15AM on both Wednesday and Saturday and returns at approximately 4:30PM. The pattern of weekday occupancy coincides with the scheduled departure and arrival of the ferry, whereas the weekend pattern shows a similar overall pattern but with more variation throughout the day.

This pattern also suggests a relatively low rate of utilisation and parking requirement for the commercial properties adjacent to the ferry operator.

### Car park 2 Supply and Demand

Car Park 2 contains spaces primarily for vehicles with trailer boats attached. There are a total of 109 spaces, each approximately 6m long. It is the public car park / trailer lot furthest from the boat launches next to Car Park 3.

Car Park 2 was largely unutilised on weekdays but approached a maximum 62% occupancy on the long holiday weekend (Figure 2-17). The maximum occupancy of the vehicle and trailer spaces on the Wednesday was at 08:15 AM with only 2% occupancy with 2 spaces utilised, compared with 62% occupancy on Saturday at 11:15 AM with 68 spaces utilised. On average there were no spaces occupied during the weekday and 44 spaces utilised (40%) on the weekend day.

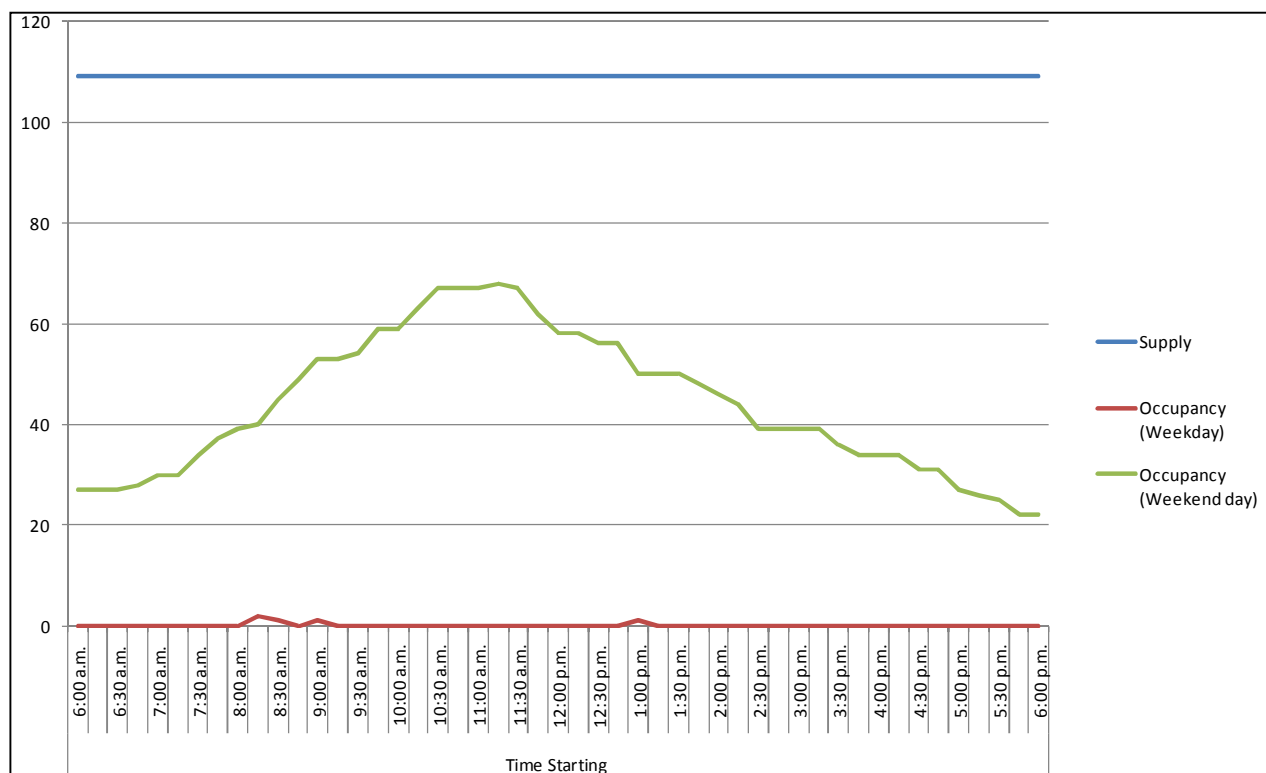


Figure 2-17: Car park 2 Supply and Demand

### Car park 3 Supply and Demand

Car Park 3 (Figure 2-18) is nearest to the Marina's two public boat launches and experienced the highest average and maximum occupancy levels during both survey periods. The results partially confirmed anecdotal evidence from the Harbour Master who stated that this car park often filled up during peak hours. The spaces in Car Park 3 are approximately 6m long and designed for vehicles with boat trailers. It is also the smallest car park in the Marina, with only 93 spaces; 15 for general vehicles and 78 for vehicles with trailers.

Weekday occupancy remained relatively stable throughout the day at between 16 and 24 parked vehicles. The maximum occupancy of the vehicle and trailer parks on the Wednesday was at 08:30 AM until 11:30 AM with 23% occupancy and 23 spaces utilised. The average weekday occupancy was 18%.

Car Park 3 exceeded its capacity at times during an approximate 3-hour period on the weekend morning; at 101% occupancy at 09:30 AM with 100 spaces utilised. After 11:00AM, capacity ranged from 82% - 42% by 18:00 and averaged at 78% for the weekend day.

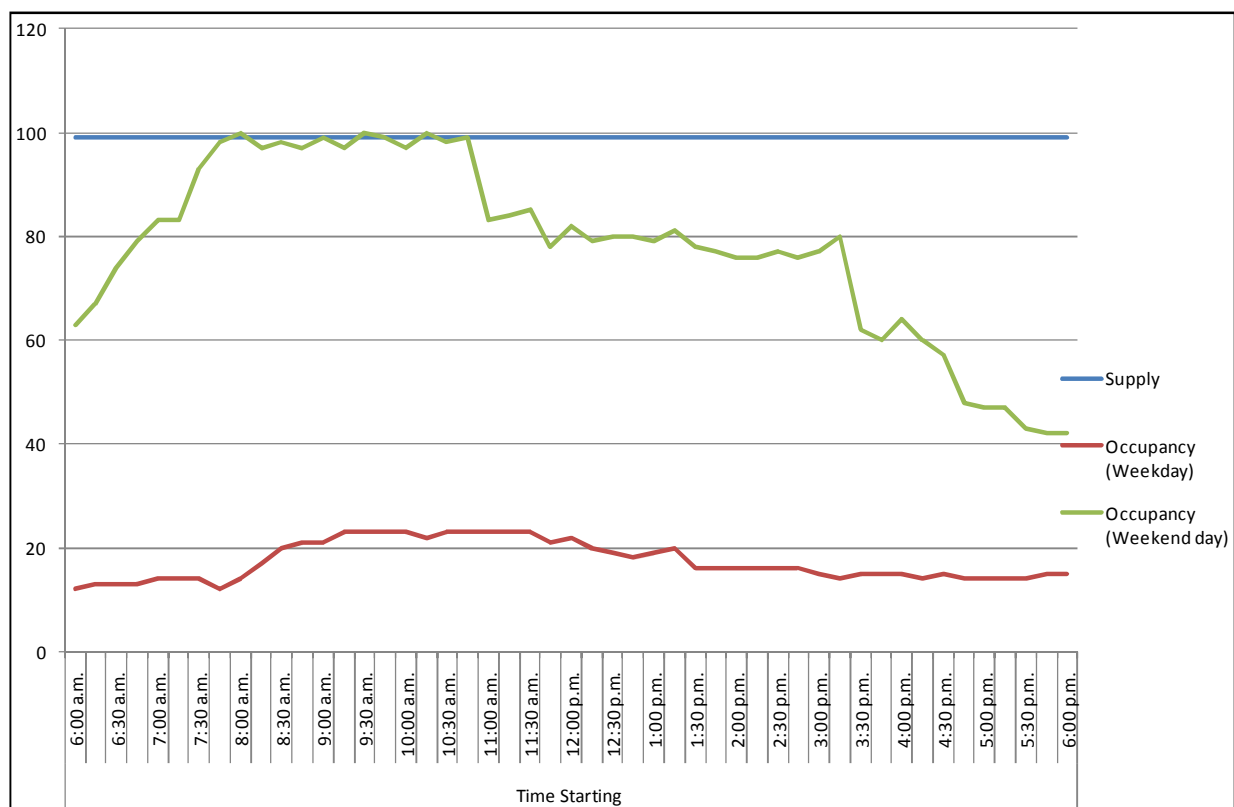


Figure 2-18: Car Park 3 Supply and Demand

### Car park 4 Supply and Demand

Car Park 4 (Figure 2-19) is reserved located in the far west of the Marina for the private Keppel Bay Marina members. This car park is restricted to Marina members and a minimum 500m walk to the ferry operator. It is the least likeliest to be utilised by either resort guests or commuting staff utilising the ferry.

The maximum occupancy of spaces on the Wednesday was at 12:15 PM with 32% occupancy and 82 spaces utilised, compared with 57% occupancy on Saturday at 11:30 am with 68 spaces utilised. On average there was 60 spaces (23%) occupied during the weekday and 148 spaces utilised (57%) on the weekend day.

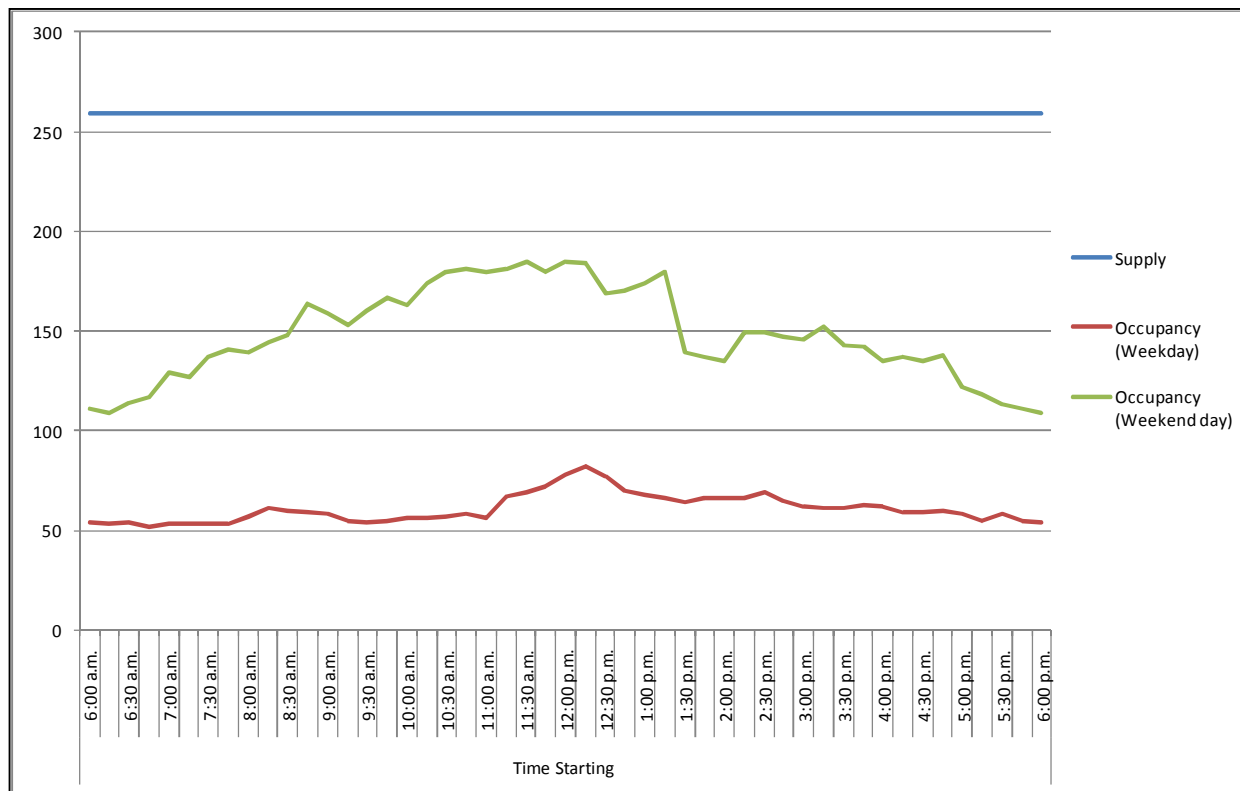


Figure 2-19: Car Park 4 Supply and Demand

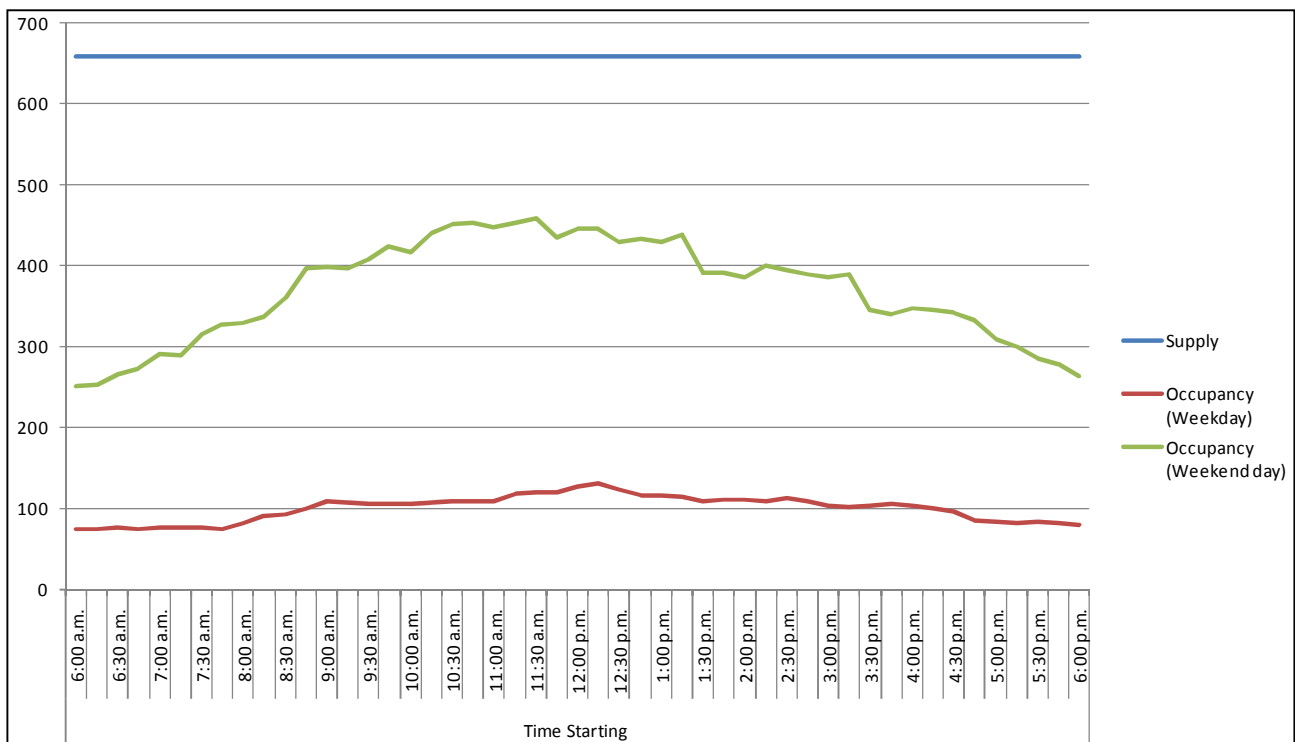
### Summary Supply and Demand

Supplemental to the previous graphs, the summary graphs (Figure 2-20 and Figure 2-21) confirm that there is significant excess capacity for parking space at both Keppel Bay and Keppel Bay Marinas; especially during weekdays. Maximum utilisation rates for car parks 1-3 (excluding the private Rosslyn Bay car park, Figure 2-20) was 70% for weekend and 13% for weekdays. The heaviest utilisation was at car park 3, which was under capacity for several hours during the weekend peaks due to heavy demand for its vehicle and boat trailer spaces.

Including the private Rosslyn Bay car park (Figure 2-21), the total maximum utilisation rates remain relatively the same, at 70% and 18% weekend and weekday, respectively.

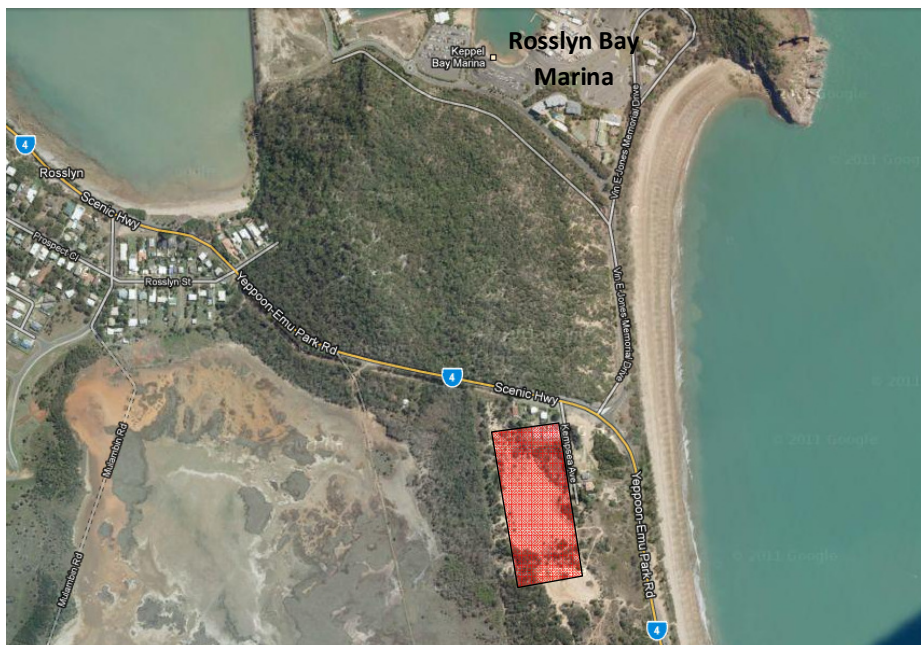


Figure 2-20: Summary Car park Supply and Demand – Excluding Car Park 4



**Figure 2-21: Summary Car park Supply and Demand – Including Car Park 4**

In addition to these relatively underutilised car parks on the Marina, the Great Keppel Island Security Car Park (Figure 2-22) is located on Rockhampton-Emu Park Road just outside the entrance to Vin E Jones Drive. This private car park has 250 spaces available and since the closing of GKI resort, has been unutilised.<sup>9</sup>



**Figure 2-22: Great Keppel Island Security Car Park, shaded (Source: Google Maps)**

<sup>9</sup> Personal Communication with car park operator, December 2010

At 2010 prices varied by season between \$10 and \$12 per night. During its peak capacity, the car park operator estimated that approximately 95% of their business was directly from the resort and consisted mostly of staff and visitors staying more than 1 night. Single day visitors were more likely to use the Council-owned car parks on Keppel Bay Marina.

## 2.5 Ferry Services, Harbour Restrictions and Marina Facilities

This section discusses the operations of the ferry and Marina services at Rosslyn Bay and Keppel Bay Marina. It includes information on the ferry services between Rosslyn Bay and GKI, Harbour restrictions, the Keppel Bay Marina facilities and capacity and the GKI Marina facilities.

There is a Freedom Fast Cats ferry service to the Island which leaves daily from Rosslyn Bay. The ferry takes approximately 30 minutes one way.

Freedom Fast Cats is the principal ferry service provider to the Island. They operate from Pier One on Keppel Bay Marina and run a daily ferry to and from the Island; twice on Fridays. Pier One is located adjacent to car park 1 on the east end of the Marina and that car park is normally used by ferry patrons. Timetable and fare information is shown in Figure 2-23.

The ferry used for GKI service is 20m with a capacity of 200 crew and passengers and disembarks passengers at Fisherman's Beach on the Island's west end. The ferry operator confirms he also has several, larger vessels available, but no longer needs them to run out to GKI due to the sharp decrease in visitors.<sup>10</sup> The number of average daily passengers has fallen to fewer than 40 from a peak of approximately 250 when the resort was operating.

  						
FARE TYPE	TRANSFERS	CORAL CRUISE	COMBO CRUISE MONDAY ONLY	CORAL/LUNCH CRUISE TUESDAY ONLY	DAY CRUISE NO WET ACTIVITIES	FULL DAY CRUISE INCLUDES WET ACTIVITIES
ADULTS	\$49	\$72	\$99	\$81	\$115	\$135
SENIOR/STUDENTS	\$41	\$60	\$89	\$71	\$105	\$120
CHILD (4-14)	\$29	\$44	\$68	\$59	\$79	\$89
FAMILY (2A+2C)	\$127	\$189	\$265	\$255	\$315	\$365
INFANTS	NO COST	-	-	-	-	-
<b>Ferry Departure Times</b>  						
Monday				10:30am	3:45pm	combo/ transfer cruise/transfer cruises/transfer cruises/transfer transfers only cruises/transfer cruises/transfer
Tuesday				10:30am	2:00pm	
Wednesday				9:15am	3:45pm	
Thursday				9:15am	3:45pm	
Friday				9:15am & 3:00pm	10:00am & 3:45pm	
Saturday				9:15am	3:45pm	
Sunday				9:15am	3:45pm	
Valid from 1 <sup>st</sup> April 2010 Rates + Times can change without notice Fuel surcharge may apply  ROSSLYN BAY BOAT HARBOUR, YEPPPOON Ph: (07) 49 336 888 Fax: (07) 4933 6811 Website: <a href="http://www.freedomfastcats.com">www.freedomfastcats.com</a> Email: <a href="mailto:info@freedomfastcats.com">info@freedomfastcats.com</a>						

Figure 2-23: Freedom Fast Cats Timetable and Fares to GKI (Source: Freedom Fast Cats)<sup>11</sup>

<sup>10</sup> Personal Communication; October 2010

<sup>11</sup> Timetable as at April 2011. Source: Freedom Fast Cats Website: [FreedomFastCats.com](http://FreedomFastCats.com)



## 2.6 Keppel Bay Channel and Harbour

In addition to a separate apartment complex and hotel, there are two separate Marinas operating on the same general site: Rosslyn Bay Marina and Keppel Bay Marina. Rosslyn Bay is a private Marina that operates on the west side of the harbour and Keppel Bay is the publicly-accessible Marina on the east side (see Figure 2-24).

The Channel and Harbour are leased to GKI Resort Pty Ltd, Queensland Transport, and Keppel Bay Marina from the Department of Employment, Economic Development and Innovation (DEEDI). TMR then sub-leases to different occupants at each Marina.

As at the time of the release of this report, the Rosslyn Bay and Keppel Bay Marinas were leased to:

- Rosslyn Bay Fisherman's Market;
- Fast Cats Ferry Operators;
- Marina Police;
- Boating and Fisheries;
- Rosslyn Bay Coast Guard;
- Harbour Heights Apartments at 12-14 Breakwater Drive (with 21 units); and
- Rosslyn Bay Inn.

Restrictions within the 50 metre wide Channel include a 30 metre horizontal clearance of the mooring poles. Silting of the Harbour is also an ongoing issue and the harbour was last dredged in 2008. The average Marina navigation channel depth is ranges 2.4 metres to 1.8 metres, depending on the tide.

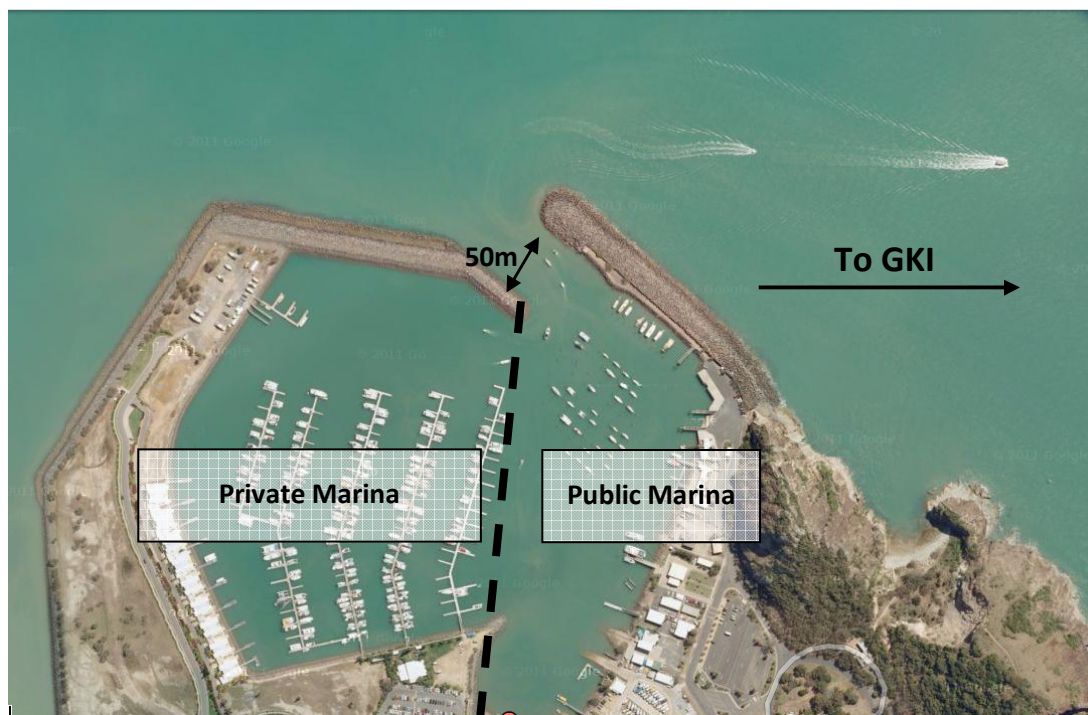


Figure 2-24: Keppel Bay and channel (Source: Google Maps)



### 2.6.1 Private Marina

Located on the west half of the harbour is a privately-owned and operated Marina primarily accessed by recreational vessels. There are a total of 100 short term and 150 long term berths available. In addition, the private Marina also operates: <sup>12</sup>

- 64 moorings for boats between 7m and 16m;
- 56 Townhouses;
- 130 Apartments (some shown in Figure 2-26);
- 100 Condominiums;
- Marina Restaurant;
- Chandlery and Boatyard; and
- 260 car park spaces (car park 4 – see Section 2.4).

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<sup>12</sup> Based on 2004 Development Plans

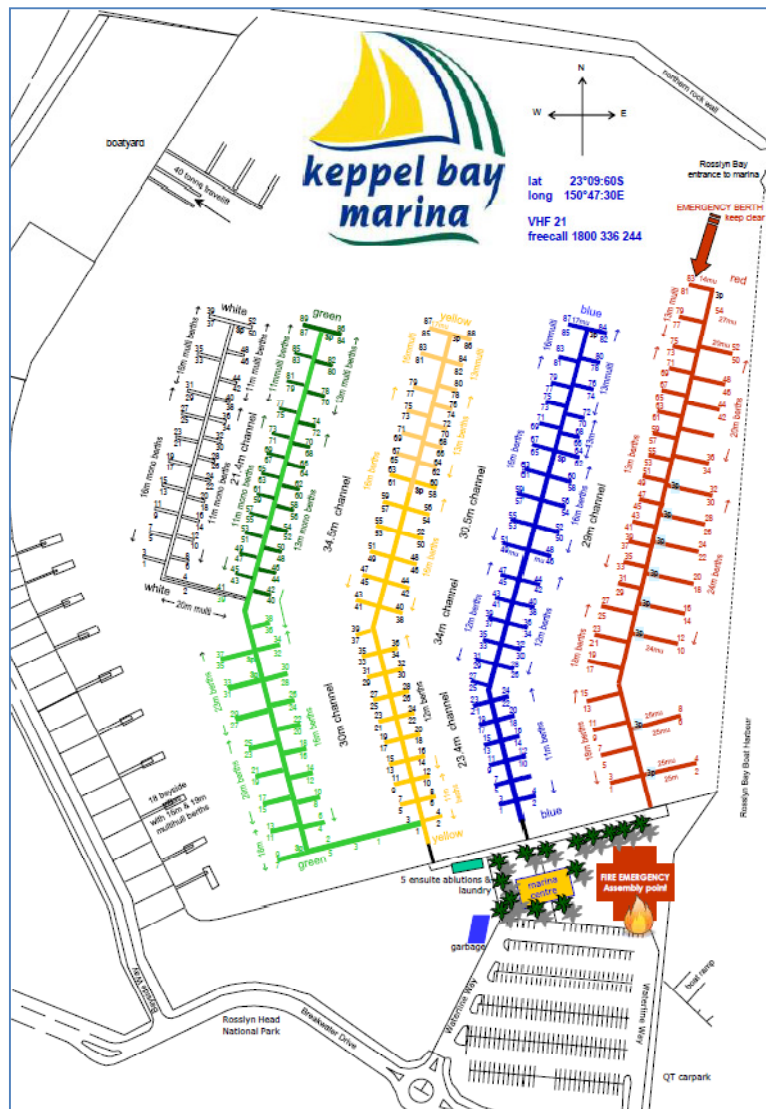


Figure 2-25: Private Marina Berth Plan (Source: Keppel Bay Marina)



Figure 2-26: Keppel Bay Apartments at West End of Marina

## 2.6.2 Public Marina

The public Marina operates from the east side of the harbour and includes a greater number of independent sub-leased land uses; including the Marina police, Freedom Fast Cats ferry operators, and Harbour Master office, among others. It also provides car parks 1-3 (see Section 2.4).

The Marina has maximum berth restrictions including 30 metre length and 10 metre width boat restrictions without special permission. There are two main boat ramps and boat ramp-servicing lots with 15-min rigging zones and a securing zone. There are also three jetties located at the north end of the Marina, including two for commercial vessels and one for commercial vessel servicing. The jetties have crane hoists for pallet-loading.

As also noted in Section 2.4, two public boat ramps operated at the southern end of the public Marina; adjacent to car parks 2 and 3. In addition to the car park utilisation figures presented in that section, a separate study commissioned in 2006 confirms high utilisation of these ramps during peak times.<sup>13</sup> The study was considered to rationalise the construction of a separate, floating pontoon to increase the capacity of small boat and trailer usage at the Marina.

Based on the data collected by the Queensland Transport, Capricorn Sunfish and CapReef for the Rosslyn Bay Floating Pontoon Report, in 2005/06 there were approximately 97 days of high usage of the boat ramps with over 50 trailers per day and 30 days when the number of trailers exceeded 200.

Figure 2-27 shows the vehicle / trailer count for the two ramps over the survey day and that the highest utilisation of the ramps occurs at midday. Figure 2-28 shows that the wharf is significantly busier on the weekend, followed by public holidays. These figures corroborate the 2011 car park utilisation surveys that showed a weekend, morning to-early afternoon peak for boat ramp utilisation.

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<sup>13</sup> Rosslyn Bay Floating Pontoon: Survey of Support for Floating Pontoon and Boat Ramp Usage; InfoFish (2006)

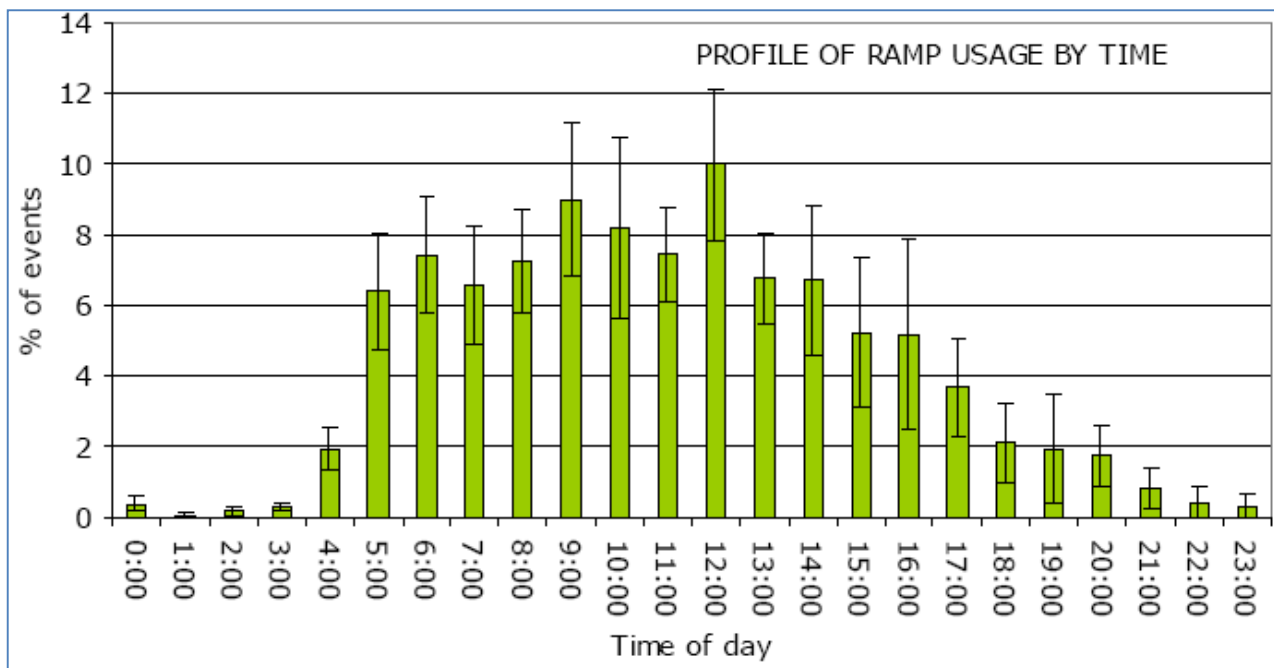


Figure 2-27: Vehicle / Trailer Counts over Time (Source: Infofish)

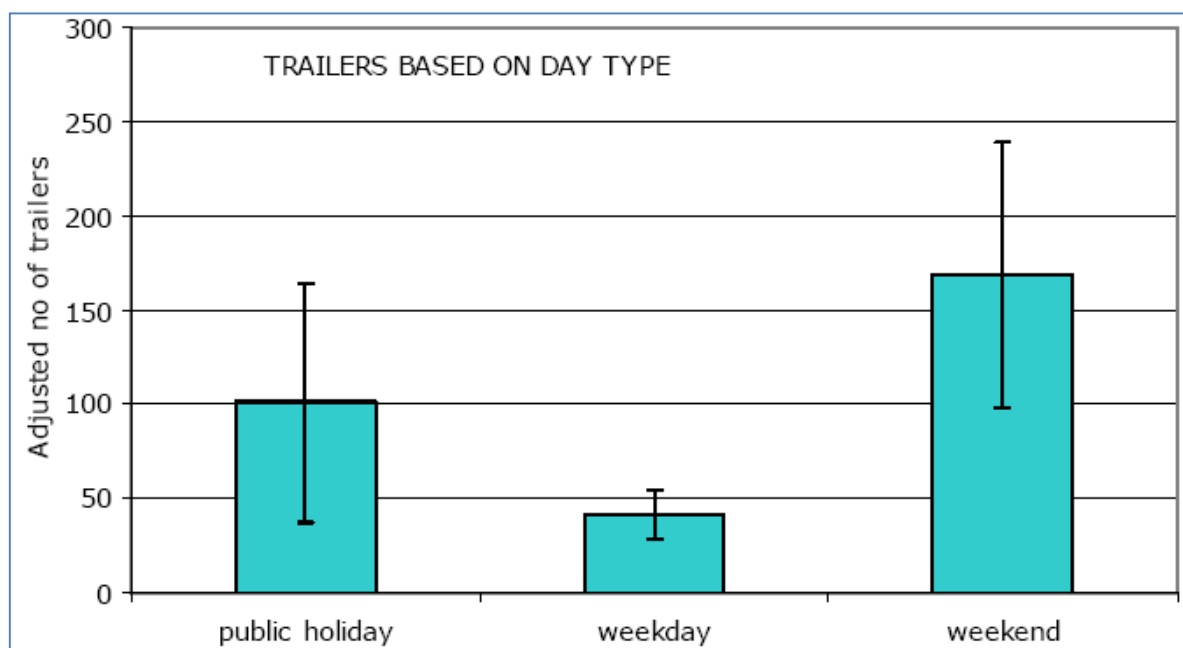


Figure 2-28: Vehicle / Trailer Counts based on Type of Day (Source: Infofish)

The 2006 study concluded:

“It was estimated that the total usage of the boat ramps in 2005/06 was at least 20,000 trailers. This estimate was based on limited data but was considered to be conservative and more likely to be an underestimate rather than an overestimate. Based on the data collected the following conclusions are drawn in relation to a loading pontoon as the Rosslyn Bay Boat Harbour.”

As at the date of the release of this report, no third pontoon has been constructed and the small boat capacity of the public Marina has remained unchanged. Since the release of this report, the actual situation for the peak usage of small boats at the Marina has likely worsened. Information released from the Regional Rockhampton Council showed an annual increase in the total number of boats registered within the Rockhampton Council Region of Queensland (Table 2-9).

**Table 2-9: Vehicle / Trailer Counts based on Type of Day**

	Class Type	Rockhampton						Queensland					
		<3m	3.1m - 6m	6.1m-12m	12.1m-18m	>18.1m	Total	<3m	3.1m - 6m	6.1m-12m	12.1m-18m	>18.1m	Total
2008	With Sails	0	22	160	29	0	211	30	948	4,954	1,361	40	7,333
	No Sails	218	6,661	707	52	4	7,642	9,994	188,844	18,886	2,239	282	220,245
	Personal Water Craft						193						12,267
	All Vessels	218	6,683	867	81	4	8,046	10,024	189,792	23,840	3,600	322	239,845
2009	With Sails	1	25	160	27	1	214	29	950	4,870	1,357	38	7,244
	No Sails	226	6,841	770	58	4	7,899	9,819	194,262	19,388	2,227	284	225,980
	Personal Water Craft						236						13,770
	All Vessels	227	6,866	930	85	5	8,349	9,848	195,212	24,258	3,584	322	246,994
2010	With Sails	1	29	156	27	1	214	26	954	4,810	1,348	38	7,176
	No Sails	238	6,958	810	64	4	8,074	9,533	198,032	20,054	2,239	285	230,143
	Personal Water Craft						285						15,947
	All Vessels	239	6,987	966	91	5	8,573	9,559	198,986	24,864	3,587	323	253,266

Though boats owners do not need to register their vehicles with the Marina from whose ramp they access, they do need to register with the State. While these vessels are able to launch at various locations, such as off local beaches, the Keppel Bay Marina boat ramps are the only registered boat ramps within the region and the numbers in Table 2-9 provide a reasonable picture of the number of vessels registered to use Keppel Bay boat ramp facilities.

Between 2008 and 2010, there was an approximate 4% increase in the total number of boats registered to owners within the Regional Rockhampton Council region. Applied to 2005 / 2006 figures, that represents an approximate 12% increase in the number of boats using the Keppel Bay boat ramps.

## 2.7 Great Keppel Island Internal Network

Transport on and around the Island consists mainly of a series of unsealed bush tracks and trails linking a limited number of residential and tourist facilities. Two notable exceptions are the boardwalk linking several residents and businesses near Fisherman's Beach to Putney Point (see Figure 2-29) and several short stretches of sealed but poorly maintained road in the vicinity of the former GKI resort, also at the western end of the Island.

The GKI Resort Revitalisation Plan will require the construction of serviceable, sealed roads both within sections of the resort and to the proposed Marina prescient. Currently, paths leading to the remainder of the Island are traversable only by foot, bicycle, 4WD or similar, all-terrain vehicle.



Figure 2-29: Existing network over the proposed GKI Resort Revitalisation Plan (Source: WATG)

Most visitors access the Island via the Freedom Fast Cats ferry, which makes one round trip per day (twice on Fridays) from Fisherman's Beach. Disembarked passengers precede north along the beachfront path to the tourist accommodation locations on the Island along either Fisherman's or Putney beaches.

### 2.7.1 Existing Land Uses

The Island currently hosts approximately a dozen, full-time residences and several businesses; all of which cater to Island tourists (see Figure 2-30 for example). With the exception of Svendsen's Beach resort, the majority of Island resort and guest accommodations are located on the western end of the Island at Fisherman's and Putney beaches.





**Figure 2-30: Main Island footpath / service road (left) and tourist accommodation (right)**

### 2.7.2 Keppel Island Resort

The entrance to the former GKI Resort is located approximately 200m from the ferry berth site on Fisherman's Beach. It also sits adjacent to the south of the Island's airstrip runway. The resort buildings are currently fenced off from publicly-accessible Island paths and in a state of disrepair.



**Figure 2-31: Current state of the Former GKI Resort**

### 2.7.3 Road and Path Network

There is very little sealed road on the Island and none at all away from the western end of the Island. The alternating brick and wooden path that runs along Fisherman's and Putney beaches is used both by pedestrians and smaller 4WD and service trucks at slow speeds.

A brief network of asphalt-sealed paths run from Fisherman's Beach to points around the former GKI Resort and extend half a kilometre to the northeast before converting to bush and a series of tracks (see Figure 2-32) that extend to the north, east and south ends of the Island.





**Figure 2-32: Most of Island is accessible via unsealed road (left) or bush path (right)**

The largest existing bush path to the southern and eastern ends of the Island (Figure 2-32) requires biannual bush clearance with a tractor and is quickly overgrown and unidentifiable without regular motorised trips to keep track marks fresh.

#### **2.7.4 Airstrip**

The Great Keppel Island airstrip is located adjacent to the former GKI Resort at the southwest corner of the Island. It spans approximately 800m from northwest to southeast and formed the northern boundary of the resort. The current airstrip and arrival gate is shown in Figure 2-33.



**Figure 2-33: Air Strip runway facing southeast (left) and arrival gate (left)**

The airstrip is connected to Fisherman's Beach by the Island's only network of sealed roads. These roads are between 3.5m and 4.5m wide and are currently in poor condition. Lack of channel and drainage have washed away much of the edges of the seal and large potholes have eroded many large areas in the centre.

#### **Air Services**

During the operation of the former GKI Resort, Air Capricorn, Rockhampton Aero Club and Horizon Air operated flights to the Island from Rockhampton, which were approximately 20 minutes in duration.



### **2.7.5 New Marina**

The area of the proposed GKI Marina, Ferry Terminal and Yacht Club is in the northwest corner of the Island, north of Putney Beach (see Figure 2-30). This area is currently undeveloped with no existing infrastructure or path network.



**Figure 2-34: Site of Future GKI Marina, Ferry Terminal and Yacht Club**

### 3 Transport Tasks and Routes

This section details the anticipated future road network and the proposed transport network on GKI as well as the general transportation profile for the construction and operation of the resort. The profile includes the assumed construction methodology and resulting heavy construction vehicle volumes and movements. It also includes the operational profile for the resort, includes the predicted number of staff and visitors and their travel behaviour.

The GKI Resort Revitalisation Plan will not create any significant impacts upon the capacity of the mainland road network or the Rosslyn Bay Marina. However, the Project will affect the existing infrastructure and path network upon the Island. The resort will require a sealed road network to DTMR and / or local authority standards for the future movement of construction and resort maintenance vehicles.

#### 3.1 Future Road Network

##### 3.1.1 Infrastructure Projects around Rockhampton and Yeppoon

There are three relevant future road projects in the study area, including:

- Widening Rockhampton - Emu Park between Keppel Sands Road and Tanby Road
- Proposed upgrade of Bruce Highway/A1 (3 options which are currently with community for consultation)
  1. Existing alignment with increased capacity
  2. Partial realignment through east
  3. Full realignment through west, around airport (Council's preferred option)
- Rockhampton bypass, which is a long term plan

However, due to the recent flooding in Queensland the planning of these projects has been delayed and no anticipated dates of completion were available as at the release of this report. Therefore, the future road network considered within this assessment conservatively assumes they will remain as per the Existing Transportation Conditions described in Section 2.

##### 3.1.2 Future GKI Road Network

To allow a safe and efficient movement of all vehicle users, provide a buffer for public utilities and streetscape the GKI Resort Revitalisation Plan road network proposes three different road hierarchies on GKI, as detailed in Table 3-1 and Figure 3-1.

The proposed road network will need to be developed to a sufficiency to permit the ongoing Construction operations over the life of the programme. It will also need to be developed to insure that as some portions of the resort are completed, portions of the network will need to be shared between Operations / Maintenance and Construction vehicles.

This includes the location of the proposed cement batching plant which GKI Resort Pty Ltd have confirmed for redevelopment construction. The mobile plant will be situated close enough to the Marina for easy transport of materials but far enough to ensure a minimum of environmental and operational conflicts. The contractor's Traffic Management Plan will need to address these issues to Council and DTMR approval.

Table 3-1: Road Classification on GKI

Roadway Classification	Carriageway Width	Max Design Speed (km/h)	Location
GKI access place	5.5m	30	Roads serving majority of villas and apartments In Fisherman's Beach Hotel and Clam Bay Resort Precincts
GKI access street	5.5m	40	<ul style="list-style-type: none"> <li>Roads in Marina Precinct</li> <li>Roads connecting Marine Services Precinct and Fisherman's Beach Hotel Precinct</li> <li>Main entry roads serving villas and apartments in Fisherman's Beach Hotel Precinct</li> <li>Main entry roads serving villas in Clam Bay Resort Precinct</li> </ul>
Clam Bay Precinct access road	5.5m	60 (reduced where road curvature or grade warrant)	Road connecting Fisherman's Beach Precinct and Clam Bay Resort Precinct.

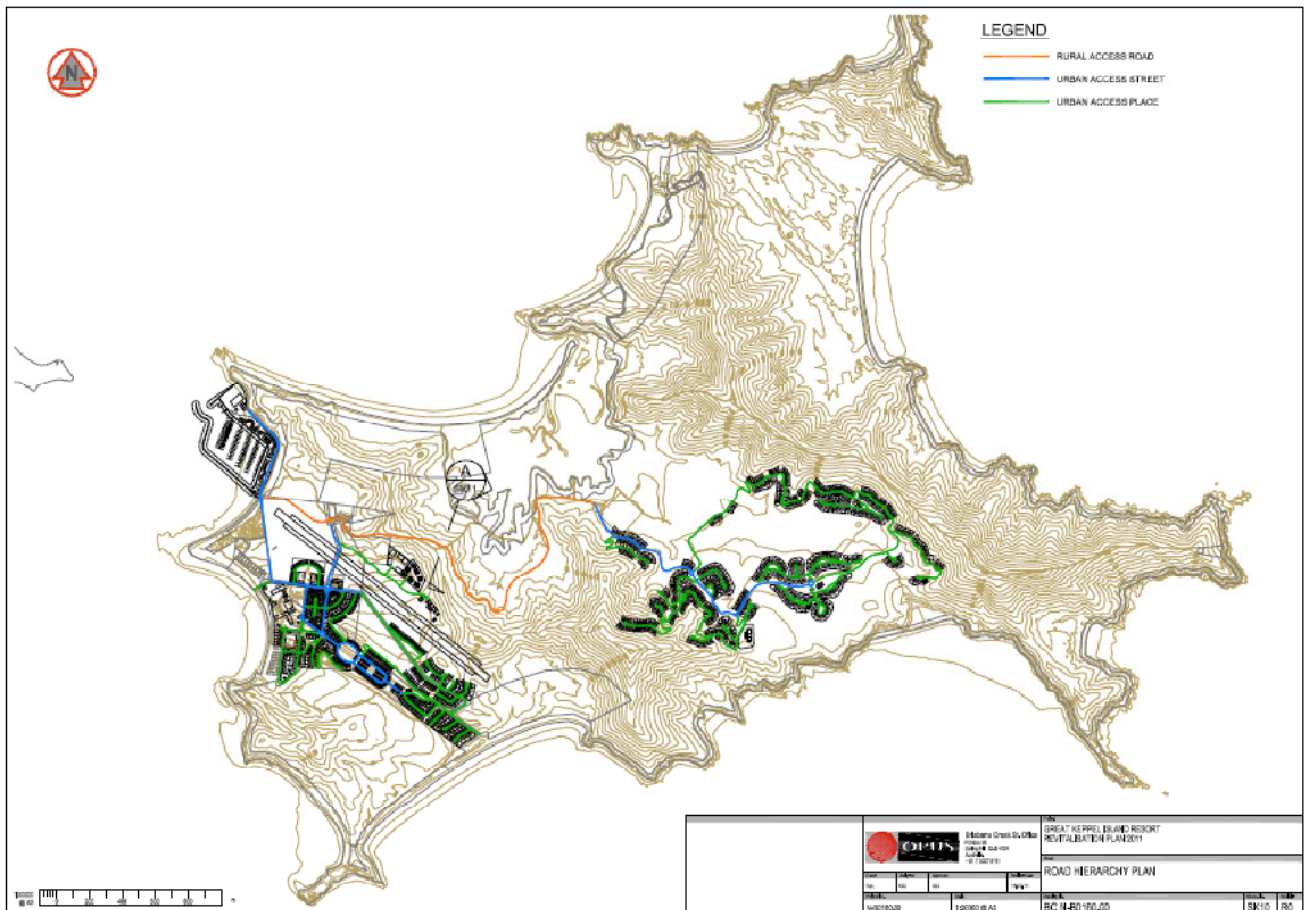


Figure 3-1: Proposed Road Classification on GKI

### 3.2 Forecasted Construction Conditions

The GKI Resort Revitalisation Plan is to be constructed over a 12 year period and involve the demolition of the former resort and the construction of a new resort. An Indicative Great Keppel Island Resort Revitalisation Plan Schedule is attached as Appendix D. More specific Construction-related impacts may be found in the EIS Appendix *Construction* and *Climate Change* reports; including tentative site establishment, temporary traffic management and mitigating potential environmental impacts of construction.

Forecast years have been established to provide a realistic snapshot of traffic impacts of both Construction and Operations-related trips. Because these two periods will overlap, one forecast year will discuss impacts of both sets of vehicle trips. The forecast years are:

- 2013 – Construction trips only
- 2017 – Ongoing Construction + Early Resort Operations
- 2033 – Full Resort Operations only + 10 years

The majority of construction materials will be transported to the Keppel Bay Marina from distribution centres or quarries and then barged to GKI. GKI Resort Pty Ltd has indicated that they will barge materials to GKI via a lot sub-leased on the east side of the public Marina which can accommodate truck loading, unloading and barging operations. The barges will then dock at the newly constructed GKI Marina, which is to be built within the first phase of construction.

#### 3.2.1 Forecasted Construction Traffic Generation

##### **Methodology**

Construction-generated truck and barge volumes were quantified by matching volumes from Turner and Townsend's *Volumes of Materials Movements for Proposed Developments Great Keppel Island* report with the tentative construction programme and Foresight Partners' *Response to Selected Terms of Reference – Environmental Impact Statement, Revision B* (July 2011). These reports calculated the required volume of building materials that would be removed and brought on to Great Keppel Island for the revitalisation; including, but not limited to; glass, timber, roofing metal and concrete.

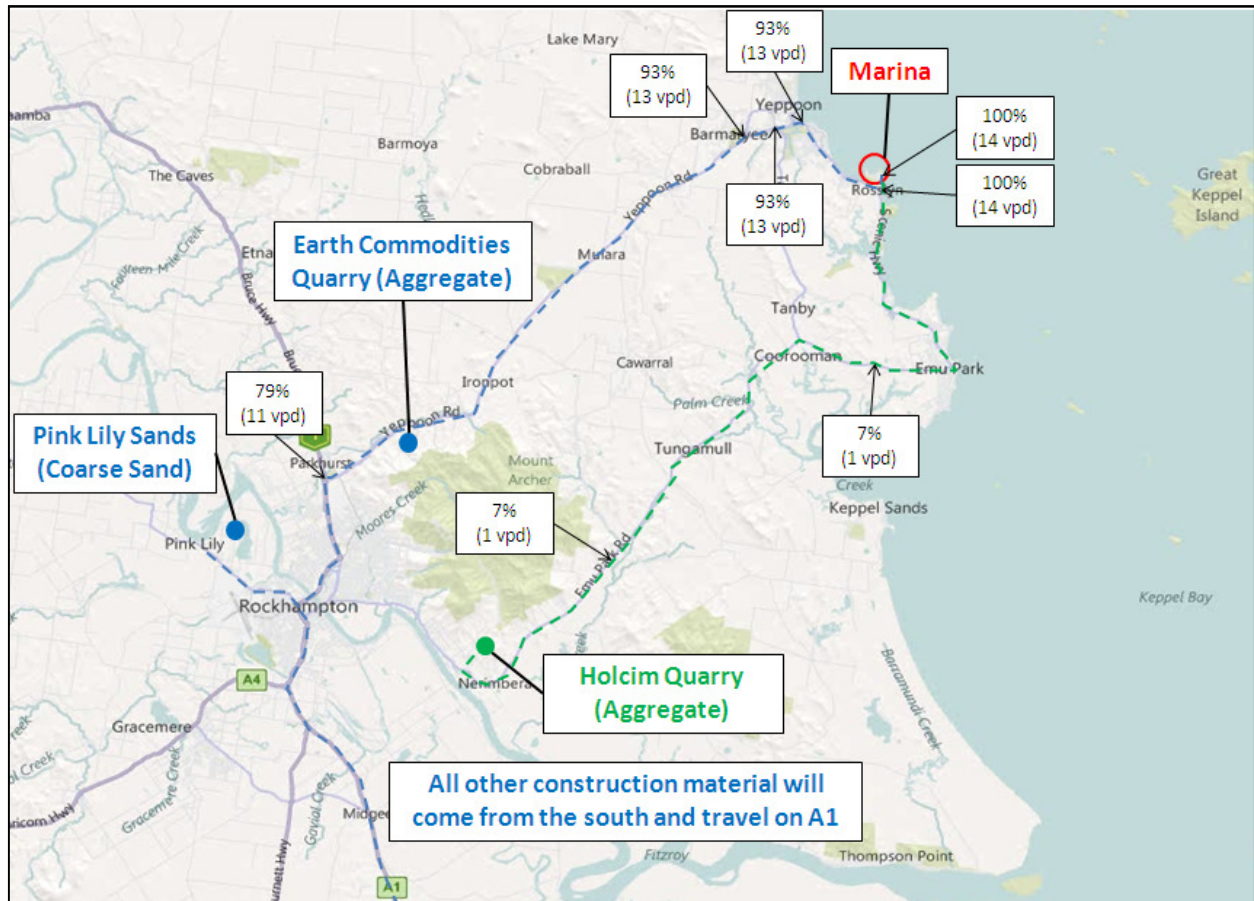
The required number of heavy vehicles movements required to transport the total volume of materials was also calculated based on the total cubic metres of the material and the likely payload of the vehicles. The Turner and Townsend Report is attached as Appendix E and the resulting construction traffic calculations are included in the Project Schedule and Material Supply Programme in Appendix F.

To determine the average daily construction heavy construction vehicle volumes the average monthly movements were divided by twenty-four working days, as per the intended six day working week. For the purposes of this analysis, fractional loads of materials have been rounded up so that they do not distort the number of heavy vehicle trips required to transport the materials.

Unlike Operational traffic assumptions, for Peak hour volumes it was assumed that truck movements would be consistent over a twelve hour working day rather than be coordinated with any particular barging schedule. This was partially due to the fact that it is currently not plausible to tell when loading and tidal constraints will affect barging departures. They may leave or arrive any time over the course of the day. Additionally, though it is preferable, it may not be essential that materials arrive and depart in conjunction with barging schedules. Some materials may be stored on site until a barge is ready to receive them.



Once the volume of traffic per construction year was determined, the origin of the construction material was identified in order to estimate the trip distribution of heavy vehicles across the road network, as shown in Figure 3-2.



**Figure 3-2: Origin of Construction Materials; one way movement – 2013 (Source: Google Maps)**

Furthermore, a number of assumptions were made about the origins of materials needed for the construction of GKI based on the locations of existing quarries and distribution centres. All of the manufactured or pre-fabricated materials (such as glass, furniture and hardware) were assumed to come from the industrial heartland of Queensland to the south. As a result these materials were presumed to travel along the A1 Highway (also known as Bruce Highway) through Rockhampton and along Yeppoon Road to the Keppel Bay Marina.

Concrete required further calculation because it cannot be pre-fabricated and transported to the Island. Instead the constituent elements of concrete will be transported to the Island and mixed on-site. Figure 3-2 shows the assumed origins of the material and the route they will take to reach Rosslyn Bay. The coarse sand and aggregate can be sourced locally from quarries around Rockhampton, including Pink Lily Sands (coarse sand), Holcim Quarry Nerimbera (aggregate) and Earth Commodities (aggregate).

The total amount of aggregate was assumed to be sourced evenly between the two quarries. The route for aggregate from the Holcim Quarry was predicted to travel north-east along Rockhampton-Emu Park Road and then north along Yeppoon-Emu Park Road to the Keppel Bay Marina. Cement and chemical admixtures are presumed to originate in the south and follow the same route as the manufactured materials.

The heavy vehicle movements from Pink Lily Sands and Earth Commodities would be added to the network according to their location along the route.

GKI Resort Pty Ltd have confirmed that all construction materials will be transported to the Keppel Bay Marina to be barged to GKI, with the exceptions of:

- Rock armour, which may be sourced from a suitable quarry near Nerimbera and shipped to GKI via a public boat ramp on the Fitzroy River near Nerimbera. See International Marina Consultants Pty Ltd's *Great Keppel Island Resort Revitalisation Plan – Marina and Vessel Management Aspects* report for more information on marine transport resourcing for Construction.
- Reclamation Volumes – Approximately 185,000m<sup>3</sup> to come from Marina basin dredging, balance needs to come from over dredging or other sources
- Marine Revetment Core – Source entirely from the Marina basin dredging
- Western Breakwater Core – Sourced entirely from the Marina basin dredging

Therefore, no vehicle movements associated with the transport of rock armour have been included on the road network for these Marina materials between Holcim Quarry Nerimbera and Keppel Bay Marina.

The Turner and Townsend report did not include asphalt among its volume of construction materials; either for the estimated 4 kilometres of new sealed roadway or atop the new air strip surface on GKI; and these materials have not been included in this assessment. Despite this omission, it is worth considering if the relative costs of either barging fresh asphalt or shipping aggregate and batching on GKI are worth the benefit; especially considering the existence of a concrete mixing plant on GKI.

According to the Turner Townsend report, there will be approximately 80,000m<sup>2</sup> of surface for the air strip and another 16,000m<sup>2</sup> of surface for new GKI roads. At an average of 100mm thick, this is 9,600m<sup>3</sup> of asphalt required to surface these areas. At 2.67 tonne per cubic metre and a 13-tonne restriction on vehicles, this is 277 truck trips to transport a sufficient amount of asphalt – 230 for the air strip and 47 for the private road network.

The restricted use of concrete for the air strip and road network should be carefully considered as a more cost effective alternative to asphalt. These truck trips would likely need to be made in the first four construction years, but still represent a very small proportion of vehicles during that time. Fresh asphalt must be laid within 2-3 hours of its batching and coordinating the trip from the mainland batching plant to the GKI construction location within that time will be difficult. The economic benefit and environmental mitigation costs of building a new batching plant on GKI – solely for asphalt – must also be considered.

## Results

The analysis results in a total of 15,310 trips to Rosslyn Bay over the course of the 12-year construction programme. This averages to 16 truck trips per day over the life of the GKI Resort Revitalisation Plan programme and 28 heavy construction vehicle return movements for an average day in the heaviest construction year – 2013. By 2017, the average number of movements will be reduced to 14. These movements will involve a variety of sized construction vehicles dependant on the material load, but as will be discussed in Section 4, the capacity of the Rosslyn Bay barging area is currently limited to 12.5m trucks.



The assumed origins of Construction material, including concrete, are shown in Figure 3-1. The average daily construction vehicle movements for all materials (including cement and aggregates) for 2013 and 2017 are shown in Tables 3-2 and 3-3. The construction vehicle movements have been applied to the existing road network, as discussed in Section 2, to determine the construction traffic impact in Section 4.

**Table 3-2: Construction Vehicle Movements per day – 2013**

	2013 HCVS			Aggregate (Holciam Quarry)	Total	Return Trip
	All material (incl cement but excl sand and aggregate)	Pink Lily Sands	Earth Com. Arg.			
Vin E Jones Memorial Drive / Breakwater Drive (internal accessway)	11	1	1	1	14	28
Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	11	1	1	1	14	28
Tanby Road - Yeppoon-Emu Park Road Segment	11	1	1	0	13	26
Yeppoon Rd / Western Yeppoon - Emu Park Rd / Tanby Rd Intersection	11	1	1	0	13	26
Hidden Valley Road -Tanby Road Segment	11	1	1	0	13	26
Bruce Highway / Rockhampton - Yeppoon Road Intersection	11	1	0	0	12	24
Rockhampton - Emu Park Road North Segment	0	0	0	1	1	2
Rockhampton - Emu Park Road South Segment	0	0	0	1	1	2

**Table 3-3: Construction Vehicle Movements per day – 2017**

	Materials (incl cement/ excl sand & aggregate)	Pink Lily Sands	Earth Com. Arg.	Aggregate (Holciam Quarry)	Total	Return Trip
Vin E Jones Memorial Drive / Breakwater Drive (internal accessway)	4	1	1	1	7	14
Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	4	1	1	1	7	14
Tanby Road - Yeppoon-Emu Park Road Segment	4	1	1	0	6	12
Yeppoon Rd / Western Yeppoon - Emu Park Rd / Tanby Rd Intersection	4	1	1	0	6	12
Hidden Valley Road -Tanby Road Segment	4	1	1	0	6	12
Bruce Highway / Rockhampton - Yeppoon Road Intersection	4	1	0	0	5	10
Rockhampton - Emu Park Road North Segment	0	0	0	1	1	2
Rockhampton - Emu Park Road South Segment	0	0	0	1	1	2

### 3.2.2 Forecasted Construction Workforce Travel Behaviour

The number of jobs created by construction is expected to vary across the Project lifespan with an expected peak at around 350 full time equivalent (FTE) positions per year, reducing to 150 in the latter stages of the Project<sup>14</sup>. The construction staff will be based on GKI<sup>15</sup> during the week and therefore will not add vehicle trips to the road network during peak times.

The intended hours of work for construction are:

- Monday to Friday: 06:00AM to 06:00PM
- Saturday: 06:00AM to 14:00PM
- Sundays and public holidays: No work

These vehicles will not be on the road network, but the Construction and Traffic management plans will need to address the suitable provision of parking spaces for tradesmen's personal vehicles while they are working

<sup>14</sup> Foresight Partners, *Proposed Revitalisation of Great Keppel Island*, 06039/11A Rev 3, 29 March 2011

<sup>15</sup> Based on discussions with JM Kelly Builder, who have constructed many buildings on GKI

on GKI. The number of required spaces can be reduced with appropriate shift management and shuttle bus service to locations outside Rosslyn Bay. The exact number of these spaces will be determined as part of the Construction and Traffic plans. Based on present utilisation of the existing carparks at Rosslyn Bay and the under-utilised private carpark, sufficient carparks could be isolated for use by construction personnel. Having designated carparks will assist in minimising disruption for the general public.

### 3.2.3 Shipping / Waterborne Transport

GKI Resort Pty Ltd has indicated that they will barge materials from Keppel Bay Marina to GKI and the majority of construction equipment will stay on GKI for the duration of the construction period. The construction vehicle, material volumes, weight and barge capacity has been analysed to determine the number of required barges from Keppel Bay Marina over the construction period.

The volumes of barges per day are restricted by channel depth, ramp design, barge dimensions and capacity, displacement due to the density of the materials and tides. In addition, each type of material will have its own loading capacity. The assumptions and barge volumes per year over the construction programme are included as Appendix G.

Key, conservative assumptions include:

- Maximum navigable depth is 1.8m at low tide;
- Beam wind area is 84m<sup>2</sup> with head wind area as 27m<sup>2</sup>;
- Displacement of the barge is 450 tonne and based on a 176m<sup>2</sup> hull area this will result in a 2.55m waterline change from un-loaded to loaded;
- Two barge ramps have been approved and based on the IMC Barge Ramp Design a barge size of 22m long x 8m wide will be accommodated;
- With internal dimensions of 21m x 7m and a 2.55m side the barge will have 375m<sup>3</sup> capacity per barge trip, and
- Materials are loaded separately as per their weight / volume capacities. No Barging Plan has been considered for loading optimisation.

Table 3-4 includes the relative densities of the identified construction materials to determine the volume of material per barge load.

**Table 3-4: Relative Densities of Construction Materials**

Material	Density (kg/m3)	Density (kg/m3)	Density (kg/m3)
Sand	1600		
Aggregate	2000-3000		
Cement	1500		
Timber (Radiata Pine)	480		
Fibreboard	950		
Glass (window)	2580		
Roof Metal (galvanised iron)	7850		
Pipes (concrete)	2400		
Tiles (porcelain)	2400		
Carpet (average)	100		
Soil	Sand	Silt	Clay
	2630	2700	2900

Over the entire 12-year construction period, the 15,310 truck trips to Rosslyn Bay results in a forecasted 3,811 barge trips to GKI to deliver the identified construction material from Keppel Bay Marina. This averages to approximately 350 round trip barge trips per year throughout the entire construction period, though the volume of Construction-related materials (and therefore trips) will be greater during the first half of the programme (2012 – 2017) than the second (2018 – 2023). Forecast barge trips are included in Appendix G.

Approximately 50% of all barge trips will be required within the first 4 years (2012 – 2015) of construction and the number of required barges will be 2 per day during this peak and during the individual peak Construction year of 2013 (forecast 505 barge trips). After this period, the average yearly number of trips is forecast to be between 235 and 275 and require 1 barge per day. These numbers are well within the existing capacity of the barging area, Rosslyn Bay harbour and the channel, and do not represent a significant marine impact.

### 3.2.4 Barging Staging Area

The materials are proposed to be barged from and to GKI via a lot sub-leased on the east side of the public Marina, identified as Lot 1 / LN803409, as shown in Figure 3-3 and Figure 3-4. The area provides approximately 2,300m<sup>2</sup> to accommodate truck loading, unloading and barging operations.

The barging permit and staging area has been provided for Lot 1 only. Currently only Lot 1 has an easement for access to the barging area. Lot 2 is leased by another party and extends (and includes) to the existing ramp at the west end of the fenced-in area, its approach is on the south side of the site.

GKI Resort Pty Ltd have approval for the operation of two barges from this site as well as the installation of ramps and pontoons to access those barges from the staging area. Each barge will be approximately 25m in length. Barging approvals documentation is included in Appendix J of this report.



Figure 3-3: Lot 1 – Likely Barging Access Area at Keppel Bay area shaded (Source: Google Maps)



Figure 3-4: Barging Access Area Lot (Source: Google Maps)



### Access Constraints

A preliminary tracking analysis shows that access to Rosslyn Bay and the Barging site is currently limited to heavy vehicles fewer than 13m in length. Until vehicle movements can be confirmed through GKI Resort Pty Ltd's Traffic Management Plan (TMP), this precludes semi-trailers from accessing the site, reduces the average truck's loading capacity and therefore increases the number of overall heavy vehicles required to transport materials. This report notes that measures can be taken to confirm, and if necessary, provide access to larger vehicles.

The first major geometric constraint is the roundabout at the intersection of Vin E Jones Drive and Breakwater Drive. The roundabout at the intersection has a diameter of approximately 20m, no mountable kerb, approach lane widths of 4m each and a severe angle of reflection. A tracking analysis demonstrates that there is insufficient turning width around the east and west sides of the circle for large semi-trailers to make this turn and access the barging area, as is also shown in Figure 3-5.

Though computer tracking simulations are useful tools to demonstrate road and vehicle movement constraints, this report notes that they are not always definitive. Experience has shown that truck drivers are often able to accomplish manoeuvres not permissible in the simulation software. As part of the TMP, this report recommends a more detailed analysis to specify the manoeuvrability of larger vehicle types into the barging area.



**Figure 3-5: Tracking Semi-Trailer over Roundabout (Source: Google Maps)**

If the refined Construction Plan requires larger semi trailers to transport barging materials, and if the TMP confirms that they cannot complete this movement across the roundabout, GKI Resort Pty Ltd will need to seek permission from Council and DTMR to alter the geometry of the intersection roundabout.

In addition to the constraints at the roundabout, the entrance to Lot 1 does also not currently permit large vehicle turns and access from either forward or reverse movements. The size of the entrance to the Lot 1, off Vin E Jones Memorial Drive (see Figure 3-6), is a 10m wide road with a single moving lane in each direction. The lot itself currently has 1 available gate that opens approximately 4.0m. The gate entrance is a 90 degree turn from a street of relatively narrow lane width.



Figure 3-6: Turning Movement for Large Vehicles into Site



Figure 3-7: Tracking into Lot 1



As shown in Figure 3-7, there is insufficient space for a semi trailer to clear the space between the property lot fence to the north and the existing building on the east of the lot (proposed to remain), even if the entire gate were removed. Large vehicles will need to begin their turns from the oncoming travel lane in order to enter the gate width. Due to these access limitations it is likely that the maximum heavy construction vehicle size that can enter the site will be a 13m truck.

Similarly to the roundabout, the movements in the tracking simulation will need to be confirmed through the TMP. The contractor may also exercise the option of widening the entry to the barging site, either through partial removal of the existing chain link fence around the property, acquiring the right to access via Lot 2 (also shown in Figure 3-4), or obtaining permission to demolish the structure on Lot 2.

Lastly, in order to permit the necessary manoeuvring of trucks and smaller loading vehicles internal to Lot 1, the unoccupied shed structure in the centre of Lot 1 (see Figure 3-8) will need to be demolished.



**Figure 3-8: Structure Requiring Demolition for Barging Activities**

### 3.2.5 Marina Channel Restrictions

The maximum barge length permissible in the harbour is 30m. GKI Resort Pty Ltd barging approval is for the use of a 22m long X 12m wide ramp extending from Lot 1 to the barge (Appendix J). With a maximum advisable grade of 10%, the length of the ramp will necessarily cut down on both the available length of the barge in the channel and the length of the useable portion of the lot available for direct truck loading.

Additional information on Marina and channel operations may be found in International Marine Consultants' *Marine and Vessel Management Aspects report* (2011).

### 3.3 Operational Conditions

The Great Keppel Island Resort Revitalisation Plan is a staged construction process and sections of the Island are anticipated to open in 2013 as per the Project Schedule with the completion of the hotel, 150 apartments, Airport terminal, Marine Services Precinct. The Revitalisation Plan is scheduled to be 100% complete in 2023.

The impacts of guests and staff trips upon the forecast road network will be negligible. The resort will accommodate a greater proportion of guests flying directly to the Island (estimated 70% of overnight guests) and a significant number of staff will be housed on the Island and make weekly trips to the mainland. The largest number of trips will be from commuting staff.

#### 3.3.1 Forecasted Employee and Visitor Numbers

The figures and assumptions for the future operation of the resort were taken from four sources:

- Foresight Partners report – *Proposed Revitalisation of Great Keppel Island* (March 2011);
- Foresight Partners report – *Response to Selected Terms of Reference – Environmental Impact Statement, Revision B* (July 2011);
- Foresight Partners report – *Indicative Average Daily Trips and Resulting Car Parking requirements at Yeppoon Marina* (March 2011), and
- Correspondence with both Foresight and GKI Resort Pty Ltd

Permanent jobs will be created on GKI to support the operation of the hotel, Marina, residential, leisure activity, golf, airport, retail and associated facilities. It is estimated that the GKI Resort Revitalisation Plan will result in an average base of 485 FTE employees per annum once complete<sup>16</sup>. Due to the tourism sector's high reliance on casual and part-time workers indicative estimates are that approximately 685 persons per annum will be employed on the Island in full time, part time and casual jobs.

As a result of a combination of overnight and day visitors to the Island, staff, residents and visitors to the Marina, it is estimated that the GKI Resort Revitalisation Plan will generate nearly 800,000 annual person days, as shown in Table 3-5. As is also discussed in the Foresight reports, these figures assume average length of stay of 4.2 days and 7.0 days for overnight guests and 'resident' staff, respectively.

Therefore, the average forecasted departures per day are shown in Figure 3-6.

**Table 3-5: Great Keppel Island - Average Forecasted Departures per Day (Source: Foresight)<sup>17</sup>**

	Units	Occupancy Rate	Persons/ Occupied Unit	Average Length Stay	Annual Person Days	Departures per year	Average Departures per month	Average Departures per day
Hotel rooms	250	65%	2.2	4.2	130,488	31,068	2,589	85
Villas and Apartments	1,050	50%	2.5	5.0	479,063	95,813	7,984	263
Day visitors	N/A	N/A	N/A	N/A	36,500	36,500	3,042	100
Staff accommodation	200	95%	1.5	7.0	95,760	13,680	1,140	37
Staff commuting	N/A	N/A	N/A	N/A	48,000	48,000	4,000	132
<b>Total</b>					<b>789,810</b>	<b>225,061</b>	<b>18,755</b>	<b>617</b>

<sup>16</sup> Foresight Partners, *Proposed Revitalisation of Great Keppel Island*, 06039/11A Rev 3, 29 March 2011

<sup>17</sup> Foresight Partners, *Indicative Average Daily Trips to GKI and Resulting Car Parking requirements at Yeppoon Marina*, March 2011

To demonstrate the heaviest turnover and traffic impacts, this report's assessment utilises the daily trip / turnover figures from GKI Resort Revitalisation Plan's forecast peak month (October, see Table 3-6). During this month, staff and guests volumes are approximately 27% higher than the average.

**Table 3-6: GKI – Forecast Departures to Great Keppel Island by Month (Source: Foresight)<sup>18</sup>**

	<i>Average Departures per month</i>	<i>Average Departures per day</i>		
		<i>Departures - Hotel rooms and villa and apartment occupants only</i>	<i>Departures - Day visitors, staff accommodation and staff commuting only</i>	<i>Total</i>
January	20,453	379	293	672
February	14,350	266	206	472
March	16,441	305	236	541
April	17,417	323	250	573
May	15,807	293	227	520
June	14,568	270	209	479
July	20,216	375	290	665
August	19,604	363	281	645
September	21,654	401	311	712
October	23,806	441	341	783
November	21,417	397	307	704
December	19,330	358	277	635
<b>Average</b>	<b>18,755</b>	<b>348</b>	<b>269</b>	<b>617</b>

### 3.3.2 Forecasted Staff and Visitor Travel Behaviour and Volumes

This section details the potential trip behaviour of staff and visitors to GKI, based on the Foresight Partners March 2011 reports and specialist assessment. The total daily movements are based on doubling the departure figures shown in Table 3-6 for the month of October by individual trip type (staff, day trip, overnight guest, etc.). Taken from the Foresight reports and follow up correspondence with GKI Resort Pty Ltd, the following assumptions are employed with respect to mode split:

- 70% of overnight guests will arrive / depart by plane
- 90% of the remaining overnight guests will take shuttle buses to / from the airport
- 15% of day visitors and daily commuting staff will arrive to the ferry by means other than private car and 85% by private car.
- 80% of resident staff will arrive / depart Rosslyn Bay by shuttle bus
- Shuttle bus occupancy is conservatively estimated at 505 – 1 coach / bus per 20 visitors and commuting staff
- The average person per vehicle (ppv) for commuting staff is 1.13.
- The average ppv for day visitors is 1.3.

<sup>18</sup> Foresight Partners, Indicative Average Daily Trips to GKI and Resulting Car Parking requirements at Yeppoon Marina, March 2011

Table 3-7 identifies the mode split percentage of staff and visitors per day using air travel or ferry to access the Island. The new air strip allows 70% of overnight visitors to arrive by plane, with the remaining 30% to arrive by ferry. Those who use the ferry will use either a shuttle or personal car/taxi to the ferry, as shown in Table 3-8. It is assumed that resident staff (who will stay on GKI) will take the ferry only once per week and reside on the Island for the duration of their shifts. They will then be able to use shuttle vans and / or buses provided by the GKI or private operators.

The number of private, recreational watercraft berths at Rosslyn Bay is currently fixed. Each of these vessels must already venture into the channel to leave the Marina and the resort revitalisation will not increase these numbers. Therefore, the assessment does not include increased numbers of recreational craft visitors to GKI.

It is anticipated that a high proportion of visitors and staff will travel to Rosslyn Bay by coach due to the nature of their trip, being overnight travel, and especially for visitors in an unknown location where parking sites and restrictions are unknown.

**Table 3-7: Average Travel Mode Split Percentages**

	Air Travel	Ferry	Bus shuttles	Personal Cars /Taxis
Staff – resident	0%	100%	80%	20%
Staff – commuting	0%	100%	15%	85%
Visitors - Overnight	70%	30%	90%	10%
Visitors – Day trips	0%	100%	15%	85%

Table 3-8 includes the mode split volumes of commuters applied to the Foresight Partners forecasted Peak month, October. This results in, for example 90% of overnight visitors are able to use bus shuttle services, as identified in Table 3-7, which results in 238 visitors using this mode.

**Table 3-8: Travel Mode Split Volumes for Peak Resort Month (October)**

	Peak Trips per day	Air Travel	Ferry	Bus shuttles	Personal Cars /Taxis
Staff – resident	94	0	94	75	19
Staff – commuting	336	0	336	50	286
Visitors - Overnight	882	617	265	238	26
Visitors – Day trips	254	0	254	38	216
<b>Total</b>	<b>1,566</b>	<b>617</b>	<b>949</b>	<b>402</b>	<b>547</b>

Table 3-9 then applies capacity information to the number of visitors to identify the number of vehicles required to cater for the forecasted volumes. As noted above, shuttle bus / coaches are conservatively assumed to have 50% occupancy, so 1 bus or coach is utilised for every 20 commuting or guest patron. Person per vehicle occupancy rates are conservatively estimated at 1.13 for staff and higher at 1.3 for visitors.

**Table 3-9: Vehicle Volumes**

	<b>Bus shuttles (20 person/vehicle)</b>	<b>Personal Cars /Taxis (1.13 staff/vehicle &amp; 1.3 visitor/vehicle)</b>	<b>Total</b>
Staff – resident	4	17	21
Staff – commuting	3	253	256
Visitors – Overnight	12	20	32
Visitors – Day trips	2	166	168
<b>Total</b>	<b>20</b>	<b>456</b>	<b>477</b>

The assessment identifies a forecast total of 477 vehicle trips / day created by the GKI Resort Revitalisation Plan in its future peak month of operations (October). Approximately 53% of these trips will be from daily commuting staff and another 35% from day visitors. This averages 40 additional vehicle trips per hour over a 12-hour day and does represent a significant increase to the local traffic network.

#### *Trip Assignment to Network*

This assessment assumes all visitors taking a coach or a personal vehicle will originate from Rockhampton and travel to Keppel Bay Marina via Rockhampton by the northern option along the A1, Rockhampton-Yeppoon Road and SH4.

Commuting staff travel behaviour can be further detailed by determining the commuter travel origins, including north or south of the Marina, as detailed in Table 3-10 and shown in Figures 3-7. Figure 3-7 shows the numbers and percentages of 'employable' residents within 50km radius of the Marina applied to gauge the commuter splits out of the Marina and main intersection in Yeppoon.

The data analysis reveals that approximately 93% of commuters live to the North of the Keppel Bay Marina, and 7% live to the south. Of the 93% living to the North of the Marina; 8% live North of the Yeppoon roundabout, 68% live west of the Yeppoon roundabout towards Rockhampton and 24% live between Keppel Bay Marina and Yeppoon. To determine commuting staff vehicle volumes this data can be further expanded to provide forecasted vehicle volumes per intersection and road segment, shown in Figure 3-6. These percentages have been applied to the overall traffic forecasts shown in Section 4.3.



Table 3-10: Staff Commuter Travel Origins

Staff – commuting	Percentage
North from Keppel Bay Marina	93%
North towards Yeppoon	8%
West towards Rockhampton	68%
Between Keppel Bay Marina and Yeppoon	24%
South from Keppel Bay Marina	7%

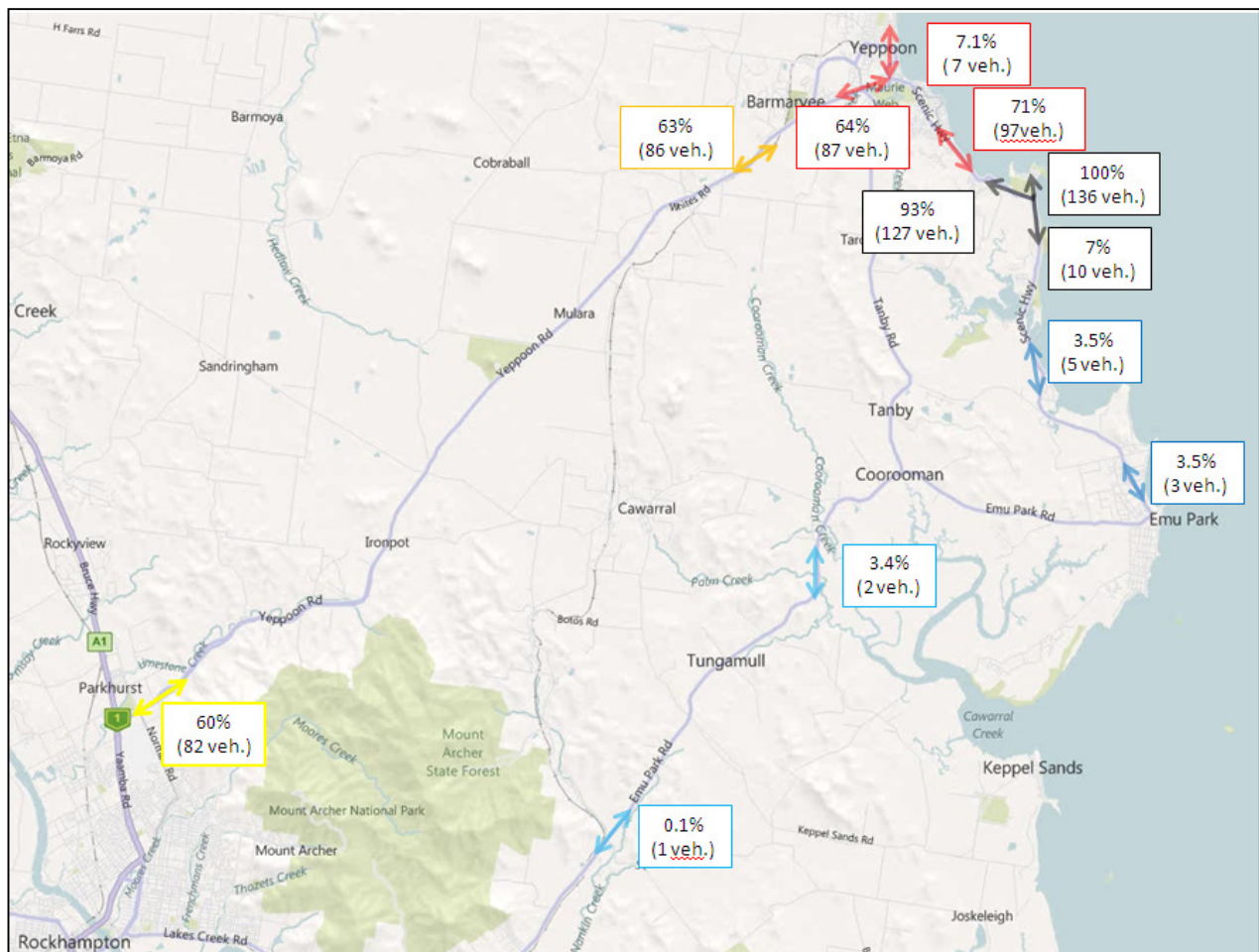


Figure 3-9: Daily Staff Commuting Vehicle Volumes (Source: Google Maps)



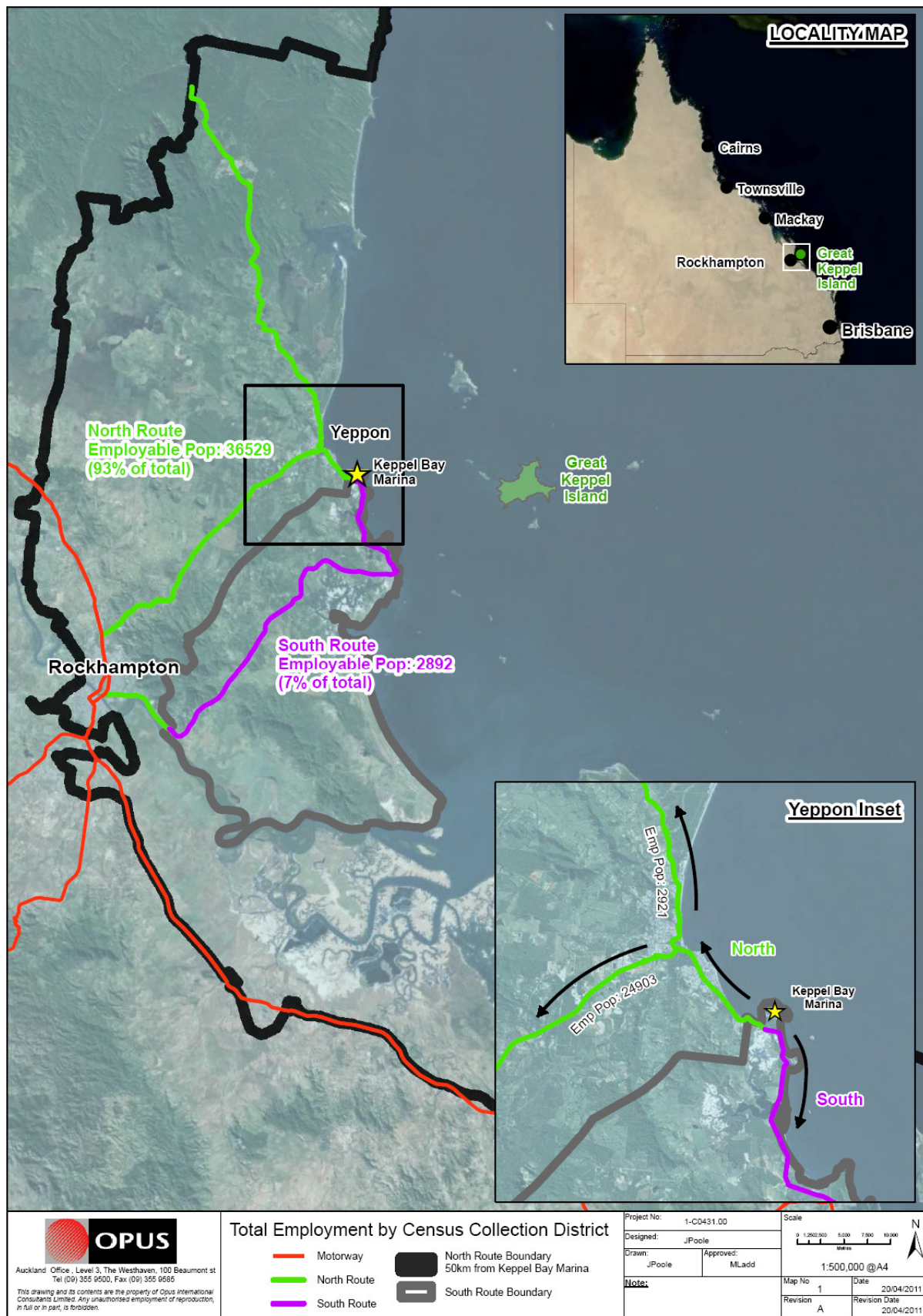


Figure 3-10: Commuter Travel Origins

For the workforce commuters and visitors travelling to GKI by ferry their arrival to Rosslyn Bay by coach service and private vehicle will have to coincide with the ferry crossings. While there are no confirmed additional ferry services proposed it is acknowledged that more services will be required. Table 3-11 includes that to cater for the workforce commuters and visitors (per Table 3-9) 3 return ferry services are required over a weekday. This is based on a 200 capacity ferry for the majority of services and 250 capacity ferry for peak services.

Table 3-11 also shows the commuting staff and visitors likely trip patterns, for instance the majority of commuting staff will have to be at GKI early to start their shifts so will be on the ferry before or at 0800 and returning after 1700. Visitors are more likely to travel after the morning commuter peak and before the evening peak.

**Table 3-11: Ferry Services and Capacity**

TO GKI	STAFF	VISITORS	Total		RETURN	STAFF	VISITORS	Total
07:30	108	0	108		10:15	0	130	130
08:30	108	130	237		16:30	108	0	108
09:30	0	130	130		17:30	108	130	237
<b>Total</b>	<b>215</b>	<b>259</b>	<b>474</b>		<b>Total</b>	<b>215</b>	<b>259</b>	<b>474</b>

To determine the travel movements during peak times Table 3-12 further analyses the vehicle volumes in relation to likely trip patterns by applying the mode split and occupancy rates to the ferry passengers. The analysis reveals that 136 vehicles are generated as a result of the GKI Resort Revitalisation Plan during the AM (0800-0900) and PM (1700-1800) peaks.

**Table 3-12: Vehicle Volumes in relation to likely trip patterns**

	STAFF		VISITORS				STAFF		VISITORS		
TO GKI	Bus shuttles	Personal Cars /Taxis	Bus shuttles	Personal Cars /Taxis	Total	RETURN	Bus shuttles	Personal Cars /Taxis	Bus shuttles	Personal Cars /Taxis	Total
07:30	2	67	0	0	69	10:15	3	0	2	47	52
08:30	4	67	2	47	119	16:30	2	67	0	0	69
09:30	3	0	2	47	52	17:30	4	67	2	47	119
<b>Total</b>	<b>9</b>	<b>135</b>	<b>3</b>	<b>93</b>	<b>240</b>	<b>Total</b>	<b>9</b>	<b>135</b>	<b>3</b>	<b>93</b>	<b>240</b>

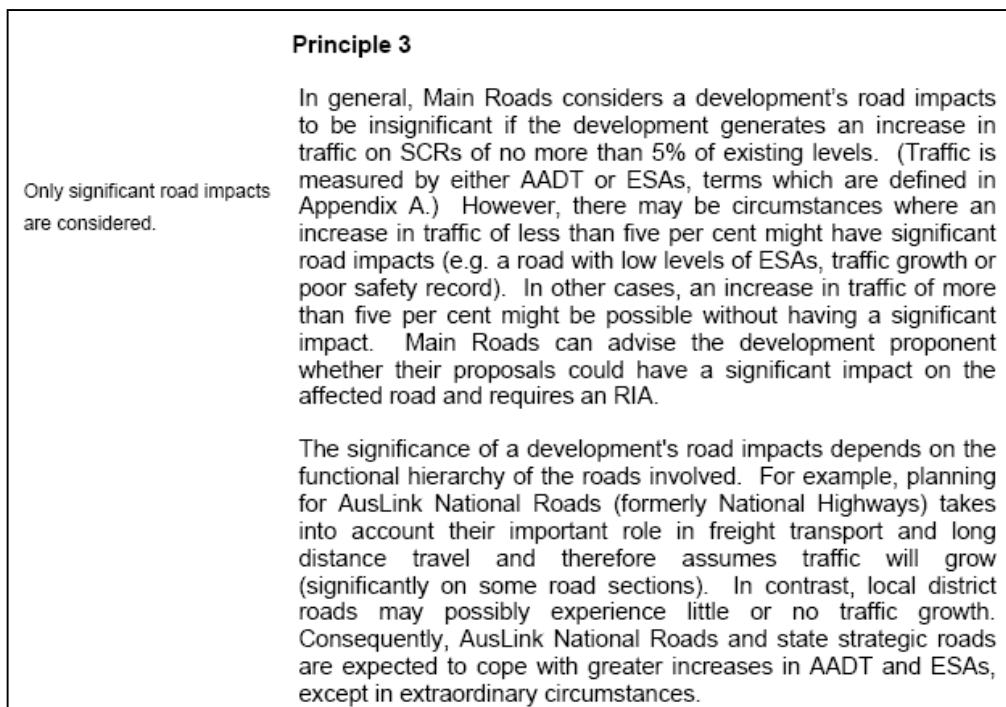
The visitor and staff vehicle volumes and movements are applied to the existing road network and traffic volumes (as per Section 2), and are detailed in Section 4.

## 4 Potential Impacts

This section focuses on the potential traffic and access impacts that may arise from the construction and operation of the GKI Resort Revitalisation Plan. In order to determine the construction and operational impacts the existing and forecasted traffic conditions have been assessed. The Traffic Impact Assessment is included as Appendix H.

### 4.1 Methodology

Opus has undertaken discussions with DTMR regarding the Project and the methodology undertaken and DTMR have indicated that impacts of less than a 5% increase of traffic is desirable as per Principle 3 of the DTMR Guidelines for Assessment of Road Impacts of Development (QMR), included as Figure 4-1.



**Figure 4-1: DTMR Guidelines for Assessment of Road Impacts of Development (Source: DTMR)**

In order to identify whether the impact of the GKI Resort Revitalisation Plan generating traffic on the State Controlled Roads (SCR) will increase the traffic volumes by 5%, the following mid-week traffic scenarios have been developed and assessed:

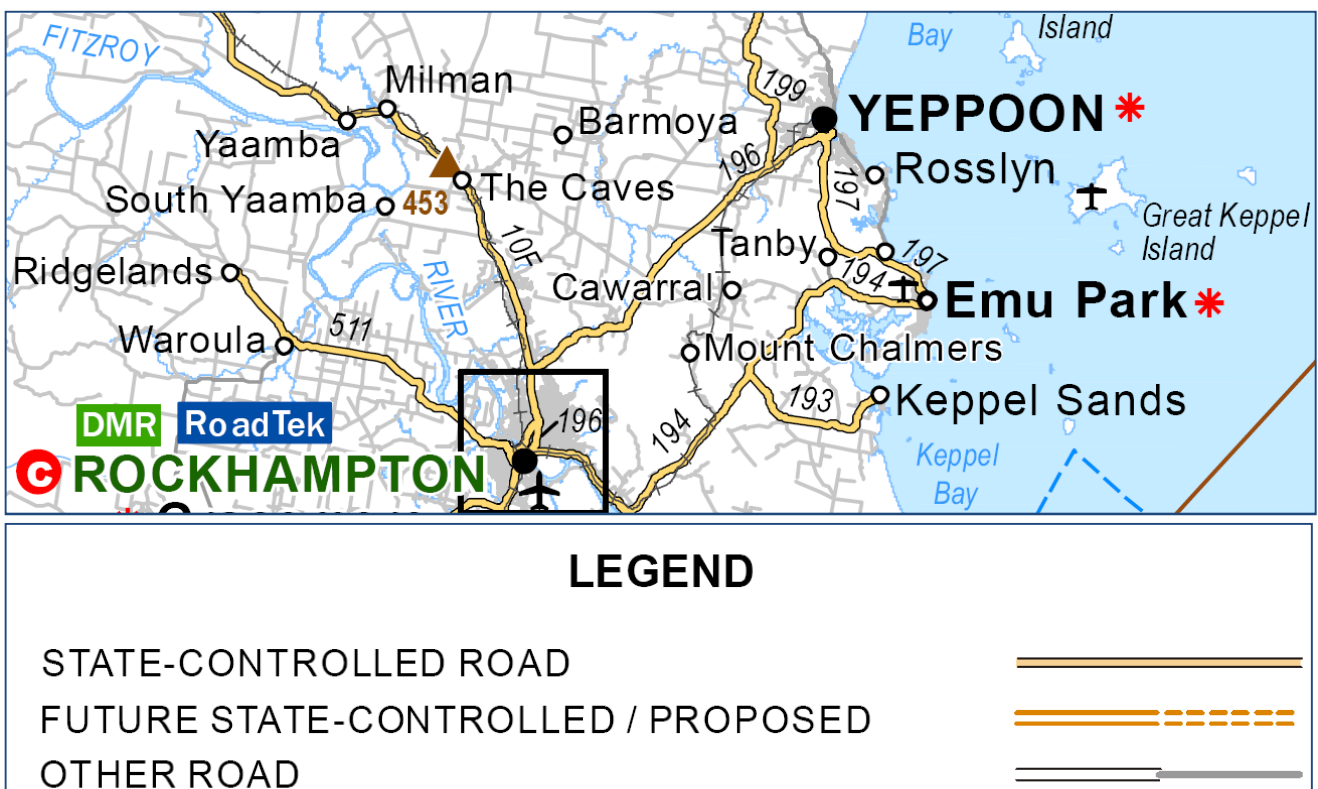
- **Base Traffic:** Forecasted future traffic with no development
- **Scenario 1 - 2013:** 6 months after start of construction;
- **Scenario 2- 2017:** 5 years after start of construction; and
- **Scenario 3 - 2033:** 10 years after construction (as per DTMR Guidelines).

These future year scenarios have been developed based on the assumptions described in Section 4.2. For each scenario five State Controlled Roads (SCR) have been assessed, as shown in Figure 4-2 and listed in Table 4-1, along with the local road sections Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection and Tanby Road - Yeppoon-Emu Park Road Segment.

Once the future year scenarios were developed the traffic impact assessment analysed the daily flows of the SCR and local road sections. Further interpretation of the traffic impact results for the AM and PM peaks is undertaken where intersection movement volumes are over 5%.

**Table 4-1: State Controlled Roads (SCR)**

Section
Yeppoon Road / Western Yeppoon - Emu Park Rd/ Tanby Rd Intersection
Hidden Valley Road -Tanby Road Segment
Bruce Highway / Rockhampton - Yeppoon Road Intersection
Rockhampton - Emu Park Road North Segment
Rockhampton - Emu Park Road South Segment



**Figure 4-2: State Controlled Roads (Source: DTMR)**



## 4.2 Forecasted Traffic Scenarios Assumptions

The base traffic forecast and future year scenarios for each SCR and local road segment are included as Appendix H. The base traffic scenario is based on the 2009 traffic counts included in Section 2 with a rate of increase applied to determine the traffic growth for the future years. Each section has a different growth rate, which was provided by DTMR and shown in Table 4-2.

**Table 4-2: Agreed Rate of Growth increase**

Section	Rate of Growth Increase
Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	4%
Tanby Road - Yeppoon-Emu Park Road Segment	3%
Yeppoon Road / Western Yeppoon - Emu Park Rd/ Tanby Rd Intersection	3%
Hidden Valley Road -Tanby Road Segment	3%
Bruce Highway / Rockhampton - Yeppoon Road Intersection	3%
Rockhampton - Emu Park Road North Segment	5%
Rockhampton - Emu Park Road South Segment	5%

The 2013 scenario includes the forecast construction (HVC) traffic volumes for a typical day in 2013, as determined by the assumptions detailed in Section 3.

The 2017 scenario includes construction (HVC) traffic volumes and 61% of the total forecasted visitor vehicle volumes and 180 commuter staff for a typical day in 2017. The 61% of visitor volumes is based on the GKI Resort Revitalisation Plan schedule which identifies that by January 2017, 250 rooms of the Fishermans Beach Hotel, 300 apartments and 225 villas will be built.

Using the number of persons per occupied unit and the average annual occupancy rate described in Table 3.1, this equates to approximately 1014 visitors staying overnight on GKI by 2017. This represents 61% of the total number of visitors that will be able to stay overnight on GKI once this proportion of GKI Resort Revitalisation Plan is completed.

In 2017, it is forecast that 180 operational staff will be working at the resort; this represents 37% of the total number of staff employed at the completion of the Resort.

For both 2013 and 2017 scenarios no construction staff traffic was included as the staff are proposed to live on GKI and travel on weekends. While the 2033 Scenario includes total forecasted commuter staff and visitor vehicle volumes, as described in Section 3.

These additional forecasted vehicle volumes for each year have been added to traffic growth projections provided by DTMR for the 2013, 2017 and 2033 years and compared to the base growth traffic (section 2) to determine the scale of the traffic impacts per intersection and segment. The volumes to apply to each segment were determined by the travel origins, mode split, occupancy rates and travel behaviour assumptions detailed in Section 3. Further Assumptions are listed with the results in Appendix H.



#### 4.1 Scenario 1 – 2013

The following subsections detail the daily flow results of the traffic modelling per intersection and segment for each future year model. Appendix H includes a more detailed breakdown per intersection of the base flows, the forecasted traffic volumes and the resulting impact and includes a breakdown of the AM (0800-0900) and PM (1700-1800) peaks.

Throughout the entire road network in 2013 the increase in forecasted daily volumes, as a result of the GKI Resort Revitalisation Plan construction traffic, is no more than 5%.

**Table 4-3: Percentage Increase in Daily Forecasted Vehicle Volumes - 2013<sup>19</sup>**

2013	Section	Daily Flow	AM Peak	PM Peak
		Total	Total	Total
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	0.9%	0.3%	0.3%
2	Tanby Road - Yeppoon-Emu Park Road Segment	0.3%	0.3%	0.3%
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.1%	0.1%	0.1%
4	Hidden Valley Road -Tanby Road Segment	0.2%	0.3%	0.0%
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.1%	0.1%	0.1%
6	Rockhampton - Emu Park Road North Segment	0.1%	0.0%	0.0%
7	Rockhampton - Emu Park Road South Segment	0.0%	0.0%	0.0%

#### 4.2 Scenario 2 – 2017

As a result of the additional forecasted construction, staff and visitor traffic in 2017 the increase in forecasted daily volumes on the State Controlled Roads (SCR) is no more than 5%.

While Yeppoon-Emu Park Road and Vin E Jones Memorial Drive the intersection scenario has a total increase of fewer than 5%, the daily flows for the intersection movements 1 and 3 increased by 10% and 9% respectively. In particular movement 1, the right turn out of Vin E Jones Memorial Drive in the PM Peak and the movement 3, the left turn into Vin E Jones Memorial Drive in the AM Peak have notable increases in volumes compared to without the Resort Revitalisation Plan.

There are no significant nearby accesses to other land uses that could be negatively impacted on from the increase in vehicle volumes at this intersection and as the intersection is not a SCR the level of impact is considered to be negligible.

**Table 4-4: Percentage Increase in Daily Forecasted Vehicle Volumes-2017**

2017	Section	Daily Flow	AM Peak	PM Peak
		Total	Total	Total
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	3.7%	3.3%	3.6%
2	Tanby Road - Yeppoon-Emu Park Road Segment	2.1%	2.4%	2.2%
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.6%	0.8%	0.8%
4	Hidden Valley Road -Tanby Road Segment	1.4%	1.8%	0.0%
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.4%	0.8%	0.7%
6	Rockhampton - Emu Park Road North Segment	0.1%	0.3%	0.0%
7	Rockhampton - Emu Park Road South Segment	0.1%	0.1%	0.0%

<sup>19</sup> Refer to Appendix G for diagrams of the intersection movements

### 4.3 Scenario 3 – 2033

As a result of the additional forecasted staff and visitor traffic in 2033 the increase in forecasted daily volumes on the State Controlled Roads (SCR) is no more than 5%.

The Yeppoon-Emu Park Road / Vin E Jones Memorial Drive intersection scenario has a total increase of less than 5%, the intersection movements 1 and 3 daily flows increased by 10% and 9% respectively. As per the 2017 scenario results this intersection is not a SCR and the level of impact is considered to be negligible.

**Table 4-5: Percentage Increase in Daily Forecasted Vehicle Volumes-2033**

		Daily Flow	AM Peak	PM Peak
2033	Section	Total	Total	Total
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	3.7%	4.5%	4.9%
2	Tanby Road - Yeppoon-Emu Park Road Segment	2.5%	3.9%	3.5%
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.3%	1.1%	1.2%
4	Hidden Valley Road - Tanby Road Segment	1.7%	2.9%	2.6%
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.5%	1.3%	1.0%
6	Rockhampton - Emu Park Road North Segment	0.1%	0.4%	0.0%
7	Rockhampton - Emu Park Road South Segment	0.0%	0.1%	0.0%

### 4.4 Vin E Jones Memorial Drive / Breakwater Drive (internal accessway to Marina)

The Vin E Jones Memorial Drive / Breakwater Drive is an internal road within the Keppel Bay Marina and therefore is not a SCR. For this intersection, the level of impact will be highly dependent on the future background growth within the site and planned land use growth and land development.

As the Marina has been consulted with, and are in agreement with, the Resort Revitalisation Plan and the ferry operators are planning for increased patronage as a result of the Resort Revitalisation Plan, it is determined that the impacts of the increased vehicle volumes on this intersection will be able to be mitigated and addressed by agreement between the parties as the traffic growth necessitates it.

### 4.5 Harbour Impacts and Management

Impacts upon the operations of Rosslyn Bay Marina and Keppel Channel will be minimal. The affects and proposed management of additional ferry and barging operations are detailed in the *Marina and Vessel Management Aspects* report prepared by International Marina Consultants Pty Ltd (2011). During peak construction years (2012 – 2014), GKI Resort Revitalisation Plan will result in 2 additional barge trips per day, on average. When fully operational, the 2 barge trips will be replaced with 2 additional ferry services.

### 4.6 Great Keppel Island Road Network

There will be some necessary expansion of the existing track network on the Island to accommodate both construction traffic and future service vehicle operation. The majority of the Island's track network consists of private roads which will not impact access to the few private residences on the Island. As noted previously in this report, more specific Construction-related information may be found in the Construction and Climate Change appendix reports to the EIS.

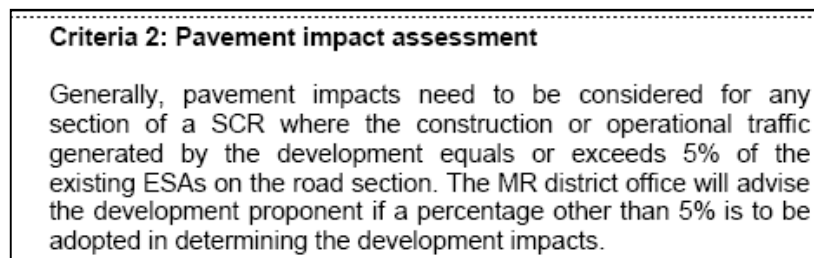
Furthermore, upon reopening, the primary transportation modes used on the Island in the completed Resort Revitalisation Plan scenario will be electric cart, bicycle and foot and the operation of minimum service and maintenance vehicles will not constitute a significant traffic impact.

## 4.7 Pavement Impact Assessment

This section details the pavement impact results of the assessment to determine the impact of the construction of the GKI Resort Revitalisation Plan. The Pavement Assessment is included as Appendix I. The Construction phase of the Resort Revitalisation Plan will contribute to the premature deterioration of the sealed surface in the vicinity of Yeppoon and Tanby Road and a total maintenance contribution of \$25,690 will be required. These impacts can be reduced if a greater proportion of vehicles are run via SH4 South (Rockhampton-Emu Park Road) or if larger semi-trailers are permitted into the Rosslyn Bay barging site. Later Construction and eventual Operations traffic will have no impacts requiring pavement contributions.

### 4.7.1 Methodology

Opus has undertaken discussions with DTMR regarding the Project and the methodology undertaken and DTMR have indicated that impacts of less than a 5% increase of ESAs on the road section is desirable as per Criteria 2 of the DTMR Guidelines for Assessment of Road Impacts of Development (QMR), included as Figure 4-3.



**Figure 4-3: DTMR Guidelines for Assessment of Road Impacts of Development (Source: DTMR)**

The pavement impact assessment spreadsheet has been provided by DTMR to determine the pavement impact of the construction and operation traffic of the GKI Resort Revitalisation Plan, along with the road widths, traffic count data and road roughness. The pavement assessment calculates road impact by the increase in tonnage transported over the existing (and forecast) condition of the road seal rather than traffic volume impacts upon the performance of the network.

The Pavement Impact Assessment covers all portions of the network for which length, width, and roughness data were available from either DTMR or RRC. No data were available for Vin E Jones Memorial Drive, Breakwater Drive and the small bridges on Scenic Drive (Council-owned).

### 4.7.2 Assumptions

The forecasted future base and construction and operation traffic as a result of the GKI Resort Revitalisation Plan have been applied to the pavement impact assessment spreadsheet, along with the current road condition information provided by DTMR.

### 4.7.3 Results

The following subsections detail the pavement impact results of the assessment. Appendix I includes the pavement impact assessment results. Construction-related increases in heavy vehicle traffic will contribute to the wear of the forecast road surface in the vicinity of Rockhampton-Yeppoon Road near Tanby Road in the 2013 and 2014 forecast years.

According to DTMR Guidelines and pavement impact assumptions, a total of \$25,690 in maintenance contributions will be required for the following three sections of Rockhampton-Yeppoon Road:

- From George/Fitzroy St to Hidden Valley Rd - \$19,300
- From Hidden Valley Rd to Emu Park Rd - \$1,495
- From Scenic Hwy / Byfield Rd to the intersection of Vin E Jones Dr - \$4,895

Over the course of the pavement assessment profile (2012 – 2033), the Resort is anticipated to reduce the overall functioning life of affected network roads from 0.1% - 1.1% and transport 683,564 tonnes. This averages out to approximately \$3.67 per tonne of transported material over the life of the revitalisation forecast period (Construction and Operations). No other segments of roadway will be relatively affected by the forecast increase in either tonnage or vehicle volumes and no other contributions are required.

#### **4.7.4 Other Options**

The impacts that require contributions can be weighed against potential changes to construction operations in the eventual Traffic Management Plan. The largest area of potential pavement impact is near Tanby Road, under the assumption that the majority of heavy vehicles would access Rosslyn Bay via SH4 North (Rockhampton-Yeppoon Road). Though these volumes do not significantly affect the local network performance, the resort owner may wish to reduce pavement impacts by increasing the percentage of heavy vehicles accessing Rosslyn Bay via SH4 South (Rockhampton-Emu Park Rd). The potential increase in operating costs for this longer route must be considered against the cost of required contributions.

In addition, the number of vehicle movements was based on the existing operation constraint assumption noted in sections 3 and 4 that large, semi-trailers would not be utilised for construction. The greater volume of heavy vehicles required to transport the same amount of required construction materials increases the overall wear and impact upon network pavement. The use of 15m – 18m semi trailers to access the Rosslyn Bay can reduce the overall number of trucks by half and decrease the likelihood of pavement impact and required contribution by approximately 50%. Again, this needs to be weighed against the costs of mitigating access requirements at the Marina.

## 5 Potential Mitigation Measures

This section recommends mitigation measures to reduce the identified impacts as a result of the GKI Resort Revitalisation Plan. As noted throughout this report, neither the Construction nor Operations-related traffic of will have a significant impact on local road or marine traffic in Rockhampton, Yeppoon or Rosslyn Bay. However, there are some steps that can be taken to further minimise local road conditions. Impacts will be most greatly evident on Great Keppel Island, where most infrastructure (including the road network) will be newly introduced.

### 5.1 Road Transport

#### 5.1.1 Traffic Impact

This assessment notes that no additional traffic control will be required as a result of the Resort Revitalisation Plan. Volumes introduced as a result of the Project will not result in either daily or peak hour increases of 5% or greater over the background totals. This assessment concludes that intersection-performance mitigation is not required.

In an effort to further reduce the likelihood of impacts from 2013, 2017 and 2033 travel forecast years, this assessment does recommend the implementation of Travel Demand Management (TDM) plans to either reduce or redistribute traffic volumes to and from the Marina. TDM measures may include a host of measures on behalf of the resort operators, such as:

- Increased percentage of guests flying directly to Island
- Increased car-sharing or car pooling incentives for staff
- Increased shuttle bus service for staff and guests
- Improved coordination of staff scheduling and transport provision
- Improved efficiency of parking management

#### 5.1.2 Rosslyn Bay and Barging Area

As noted within this report, a Traffic Management Plan will need to be implemented to minimise impacts of trucks to, from and within Rosslyn Bay barging area. Furthermore, any barging programme will carefully consider the constraints identified within the *Climate Change* report. The TMP will necessarily address specific constraints and respond to the requirements of other Marina tenants. This report also recommends a more detailed tracking assessment to confirm the maximum size of truck capable of accessing the Marina network and barging area at Lot 1.

In the event that the TMP determines that trucks of the required size are incapable of manoeuvring into Lot 1, the resort operator may seek to make the following measures noted in Section 3 in coordination with DTMR, Council and the leasers of lots 1 and 2. In addition, to accommodate the necessary manoeuvring of trucks on the staging site, the unoccupied shed structure in the centre of Lot 1 (see Figure 3-8) will need to be demolished.

Lastly, the contractors responsible for the barging will need to issue a Barging Plan to clearly define the protocol for the lawful transport of goods across from the Marina. The Plan will need to demonstrate that all appropriate safety requirements are met and that operations are aligned with the overall TMP and Harbour Master requirements.



### 5.1.3 Pavement Quality

As noted in Section 5, the Resort Revitalisation Plan will have relatively little impact upon the functional life of the majority of the road network. With the exception of approximately \$26K of mitigable contributions to the maintenance of the network in the vicinity of Rockhampton-Yeppoon Road and Tanby Road, pavement impact will be negligible.

These minimal impacts may be reduced by routing a greater proportion of Construction vehicles along SH4 South rather than SH4 North or by ensuring semi-trailer vehicle access to the Rosslyn Bay barging area.

### 5.1.4 Rosslyn Bay Parking Demand

It is estimated an average of 265 full time equivalent construction related job is created each year over a 12 construction period (Foresight Partners, 2011). However, the construction staff will stay over on GKI and a maximum of an additional 228 visitor and staff vehicles to the Keppel Bay Marina, as detailed in Section 3.

At peak occupancy the current 406 car parking at Keppel Bay Marina has 30% capacity; resulting in 121 available car parks. An increase in parking demand as a result of construction staff commuting from the Marina will require mitigation. There are a number of mitigation options including:

- A staff car park, acquired or leased outside Keppel Bay Marina with 150-200 spaces in addition to the existing Marina car parks and may be required at certain times during construction. Utilisation of the existing private carpark is recommended to accommodate peak demand. These parking spaces should be supported by a direct shuttle service to and from the ferry. This location can double as a construction pre-staging area for the movement of materials to the Marina and Island and be used by resort staff during its operation;
- The Implementation of a Parking Management Plan, with similar measures as noted in Section 6.1.1;
- Provide staff bus service between staff premises and ferry.

Mitigation will be confirmed and further detailed in a Parking Management Plan, to be developed in conjunction with Council and DTMR.

## 5.2 Shipping / Waterborne Transport

### 5.2.1 Marine Traffic Impacts

The construction of the development will result in an additional 2 return barge trips per day and another 2 ferry trips per day when completed. In the overlap forecast year of 2017, this will result in an additional 2 barge + 1 ferry trip per day – a total of 3 additional round trips from Rosslyn Bay each day. This number does not constitute a significant impact upon Marina operations, but any additional trips will require coordination and oversight from the Harbour Master and the issuing of a Marina Management Plan.

### 5.2.2 Environmental Impacts

The resort operator will also be required to provide assurance that transport operations meet all local, state and federal environmental regulations. These may include spill mitigation, seed contamination and marine and fire safety protocols. It will also be vital to consider the findings of the *Climate Change* report, which identifies potential background impacts of soil / beach erosion, rising coastal levels and the increased risk of severe weather.

### **5.3 Great Keppel Island Transport**

The construction and operation of the resort will require extensive mitigation assurances for impacts upon the Island. The majority of infrastructure being introduced is new and will need to comply with all Council and DTMR standards. This report notes that when the road system is more clearly defined, the resort owner's and contractor's construction plan will include assurances which include, but are not limited to:

- Appropriate roading engineering standards
- All environmental compliance measures
- Emergency Management, Rescue and Safety contingency plans

### **5.4 Management Plans**

While there are no undue effects as a result of the Resort Revitalisation Plan the impacts from the construction of the GKI Resort Revitalisation Plan on the traffic operation and pavement quality can be mitigated with the preparation of a Transport Management Plan (TMP). The TMP can be developed as required when the contractor is appointed and prior to construction. The TMP should cover the construction period and how the contractor will maintain safety, efficiency and the condition of infrastructure.

The TMP should be developed with DTMR and the Harbour Master and include details of the transport operations, local authorities work programmes and mitigation strategies, including:

- The construction traffic management required when a truck and trailer unit turns left into Lot 1, off Vin E Jones Drive across the oncoming travel lane;
- The onsite restrictions and requirements for truck manoeuvring on Lot 1;
- Location of staff car park outside Keppel Bay Marina and associated operation details;
- Information regarding the shuttle service between the staff car park and ferry service, including hours of operation and service times;
- Identification of designated areas for construction vehicles to avoid hindrance for local vehicles; and
- Any other mitigation strategies to maintain the safety, efficiency and the condition of the road network and transport modes.

It appears that a Waterway Transport Management Plan as per section 475A of the Transport Infrastructure Act 1995 has yet to be developed for Rosslyn Bay. The Transport Infrastructure (Yeppoon Waterways) Management Plan 2000 applies to Ross Creek and Fig Tree Creek in Yeppoon. The Plan regulates anchoring, mooring or living on watercraft in these creeks. The GKI Resort Revitalisation Plan will not be mooring or anchoring any vessels in either of these creeks so there is no conflict with the plan.

## **6 Summary**

Opus International Consultants Ltd (Opus) have been commissioned by GKI Resort Pty Ltd to undertake the Traffic and Transportation section of an Environmental Impact Statement for the GKI Resort Revitalisation Plan. The purpose of this report is to evaluate the effects of the proposed Resort Revitalisation Plan on the transport network and to recommend mitigation measures as appropriate.

The GKI Resort Revitalisation Plan proposes to upgrade the existing resort and airstrip and to create a low rise, eco-tourism resort on GKI. The whole Resort Revitalisation Plan will be built over a 12 year period and when completed will include 300 tourist villas, 75 tourist apartments, a golf course, 250-unit hotel, new Marina and relocated air strip.

This assessment has concluded that neither the construction nor operation of the resort will have significant adverse impact on the mainland road network. However, operations will significantly increase the number of vehicular movements on Great Keppel Island, mainly in the form of construction, and eventually, maintenance / service vehicles. At present, Island traffic volumes are near zero. GKI Resort Pty Ltd is mitigating these impacts by constructing all required infrastructure (including the road network) to appropriate and approved design standards.

The assessment also demonstrated that marine traffic impacts will be negligible, as only 2 barges per day will be required in the maximum Construction-traffic year (2013) and another 2 ferries per day when the resort is fully operational by 2023. The construction programme is spread out over 12 years and further services to reduce the average number of construction vehicles required to service these barges.

The increase in parking demand as a result of additional staff and construction commuting trips to the Marina which services the Island will require mitigation in the form of a staff car park, acquired or leased outside Keppel Bay Marina with 150-200 spaces and a direct shuttle service to and from the ferry. This location can double as a construction pre-staging area for the movement of materials to the Marina and Island.

While there are no undue effects as a result of the Resort Revitalisation Plan the impacts from the construction of the GKI Resort Revitalisation Plan on the traffic operation and pavement quality can be mitigated with the preparation of a Transport Management Plan (TMP). The TMP can be developed as required when the contractor is appointed and prior to construction. The TMP should cover the construction period and how the contractor will maintain safety, efficiency and the condition of infrastructure.

## 7 References

- Foresight Partners Pty Ltd (2011). *Forecast Economic Impacts – Proposed Revitalisation of Great Keppel Island*, Foresight Partners Pty Ltd, Brisbane.
- Foresight Partners Pty Ltd (2011). *Indicative Average Daily Trips and Resulting Car Parking requirements at Yeppoon Marina*, Foresight Partners Pty Ltd, Brisbane.
- Foresight Partners Pty Ltd (2011). *Response to Selected Terms of Reference – Environmental Impact Statement* [for Great Keppel Island Resort Revitalisation], Foresight Partners Pty Ltd, Brisbane.
- Great Barrier Marine Park Authority (1994). *Environmental Guidelines for Marinas in the Great Barrier Reef Marina Park*. Commonwealth of Australia, Canberra.
- Infofish Consultants (2006). *Rosslyn Bay Floating Pontoon: Survey of Support for Floating Pontoon and Boat Ramp Usage*. Infofish, Rockhampton QLD.
- International Marina Consultants Pty Ltd (2011). *Great Keppel Island Resort Revitalisation Plan – Marina and Vessel Management Aspects*. International Marina Consultants, Brisbane.
- Livingston Shire Council (1993). *Great Keppel Island Development Control Plan, Part A*
- Livingston Shire Council (2005). *Planning Scheme Policy No. 10 – Rural Road Access Standards*.
- Livingston Shire Council (2005). *Planning Scheme Policy No. 18 – Strategic Road Network*.
- Opus International Consultants Ltd (2011). *Great Keppel Island Resort EIS – Construction Report*; Opus International Consultants Ltd, Brisbane.
- Opus International Consultants Ltd (2011). *Great Keppel Island Resort EIS – Climate Change Report*; Opus International Consultants Ltd, Brisbane.
- Queensland Transport and Main Roads (2007). *Brisbane-Cairns Corridor Strategy: Building Our National Transport Future*. In conjunction with AusLink and the Australian Government, Canberra.
- Queensland Transport and Main Roads (2009). *Fitzroy Region 5-Year Plan*.
- Queensland Transport and Main Roads (2006). *Guidelines for Assessment of Road Impacts of Development*.
- Rockhampton Regional Council (2008). *Rockhampton Traffic Study*.
- Rockhampton Regional Council (2008). *Bruce Highway Deviation – Rockhampton*
- Turner and Townsend (2011). *Volumes of Materials Movements for Proposed Developments Great Keppel Island*; Turner and Townsend, Brisbane.

## **Appendix A:**

# **Great Keppel Island Revitalisation Plan**



- ① FISHERMAN'S BEACH HOTEL & SPA
- ② ECO - TOURISM VILLAS
- ③ ECO - TOURISM APARTMENTS
- ④ PARK
- ⑤ RUNWAY
- ⑥ AIRPORT TERMINAL
- ⑦ RUNWAY VILLAS
- ⑧ FERRY TERMINAL
- ⑨ RESEARCH & HISTORIC CENTRE
- ⑩ RETAIL SHOPS & TOURISM APARTMENTS
- ⑪ BARGE TERMINAL
- ⑫ GOLF COURSE
- ⑬ GOLF RESORT FACILITY
- ⑭ LEEKE'S HOMESTEAD
- ⑮ STAFF ACCOMODATION
- ⑯ INDUSTRIAL COMPOUND
- PUBLIC ACCESS TRACKS



## **Appendix B:**

# **Traffic Data Provided by Queensland Government**

# Count Tally Sheet

Time	Leg 1											Leg 2										
	Left			Thru			Right			Leg Total	Left			Thru			Right			U-turn		
	2	2H Heavy	3	3H Heavy	4	4H Heavy	3	3H Heavy	4		4H Heavy	1	1H Heavy	All								
6:00 - 6:15	6	1	8	0	13	0	0	0	28	2	0	45	0	4	1	0	52					
6:15 - 6:30	7	0	3	4	20	1	0	0	35	3	0	56	5	5	0	0	69					
6:30 - 6:45	7	0	6	1	29	2	0	0	45	9	0	47	3	8	0	0	67					
6:45 - 7:00	5	0	11	2	30	5	0	0	53	2	0	52	2	12	0	0	68					
7:00 - 7:15	9	2	7	4	35	5	0	0	62	1	1	64	3	13	1	0	83					
7:15 - 7:30	9	0	12	1	42	4	0	0	68	3	1	102	4	14	1	0	125					
7:30 - 7:45	12	4	19	1	39	2	0	0	77	3	0	110	4	15	2	0	134					
7:45 - 8:00	16	0	23	0	49	4	0	0	92	4	0	99	6	25	2	0	136					
8:00 - 8:15	23	2	36	3	64	2	0	0	130	4	0	101	2	47	2	0	156					
8:15 - 8:30	38	0	47	0	58	6	0	0	149	1	0	98	4	38	3	0	144					
8:30 - 8:45	29	2	59	2	61	5	0	0	158	2	1	63	5	39	2	0	112					
8:45 - 9:00	24	1	42	0	43	5	0	0	115	8	1	67	3	40	0	0	119					
9:00 - 9:15	21	1	31	0	39	3	0	0	95	6	0	45	3	31	0	0	85					
9:15 - 9:30	24	0	26	0	44	2	0	0	96	2	0	57	4	28	0	0	91					
9:30 - 9:45	31	3	36	0	44	4	0	0	118	6	0	54	6	8	1	0	75					
9:45 - 10:00	26	0	21	2	31	4	0	0	84	6	0	40	5	17	0	0	68					
10:00 - 10:15	38	0	29	1	42	3	0	0	113	7	0	51	2	19	0	0	79					
10:15 - 10:30	26	2	33	4	37	4	0	0	106	1	0	55	6	24	0	0	86					
10:30 - 10:45	22	1	38	6	40	6	0	0	113	5	0	29	1	15	2	0	52					
10:45 - 11:00	20	1	15	1	23	0	0	0	60	4	2	40	2	18	0	0	66					
11:00 - 11:15	37	0	27	1	27	4	0	0	96	3	0	47	2	14	1	0	67					
11:15 - 11:30	38	3	25	3	30	1	0	0	100	6	1	43	4	17	2	0	73					
11:30 - 11:45	25	1	37	1	38	3	0	0	105	3	0	32	1	17	1	0	54					
11:45 - 12:00	24	0	37	0	33	1	0	0	95	5	1	35	3	17	0	0	61					

# Count Tally Sheet

Time	Leg 1										Leg 2									
	Left		Thru		Right		U-turn		Leg Total	Left		Thru		Right		U-turn		Leg Total		
	2	2H Heavy	3	3H Heavy	4	4H Heavy	All	3		3H Heavy	4	4H Heavy	1	1H Heavy	All					
12:00 - 12:15	38	2	42	2	40	1	0	125		5	0	20	3	6	3	0	37			
12:15 - 12:30	51	2	30	1	36	5	0	125		3	0	32	0	20	1	0	56			
12:30 - 12:45	38	3	26	1	33	2	0	103		8	0	24	7	21	2	0	62			
12:45 - 13:00	27	1	34	2	35	4	0	103		4	1	32	7	23	0	0	67			
13:00 - 13:15	24	1	40	2	26	3	0	96		5	1	46	1	17	2	0	72			
13:15 - 13:30	28	1	27	1	29	2	0	88		1	0	40	4	14	1	0	60			
13:30 - 13:45	24	2	38	3	44	4	0	115		5	0	47	3	31	1	0	87			
13:45 - 14:00	32	6	28	4	42	3	0	115		2	0	36	4	14	1	0	57			
14:00 - 14:15	30	2	35	1	22	1	0	91		6	0	38	4	16	1	0	65			
14:15 - 14:30	34	1	27	2	32	3	0	99		5	0	28	3	17	1	0	54			
14:30 - 14:45	39	1	45	3	37	2	0	127		5	0	35	0	15	1	0	56			
14:45 - 15:00	32	1	53	2	40	4	0	132		9	0	48	7	15	2	0	81			
15:00 - 15:15	36	2	51	4	34	3	0	130		6	0	59	2	37	1	0	105			
15:15 - 15:30	88	3	67	1	58	7	0	224		12	0	85	2	35	0	0	134			
15:30 - 15:45	48	1	58	3	58	4	0	172		8	0	47	4	20	0	0	79			
15:45 - 16:00	44	3	45	0	40	4	0	136		4	2	39	2	12	0	0	59			
16:00 - 16:15	51	1	46	1	40	0	0	139		2	0	45	1	21	1	0	70			
16:15 - 16:30	49	0	46	0	28	2	0	125		6	0	50	1	19	0	0	76			
16:30 - 16:45	37	0	57	1	48	2	0	145		11	0	57	3	22	1	0	94			
16:45 - 17:00	43	0	44	1	36	2	0	126		3	0	44	0	14	1	0	62			
17:00 - 17:15	41	1	51	2	38	4	0	137		10	1	33	0	15	1	0	60			
17:15 - 17:30	33	0	57	2	45	3	0	140		18	0	41	3	12	0	0	74			
17:30 - 17:45	44	2	66	0	30	1	0	143		16	0	41	2	8	0	0	67			
17:45 - 18:00	17	0	45	0	42	0	0	104		7	0	31	1	9	0	0	48			
Total:	1445	60	1686	76	1824	142	0	5233		257	13	2430	144	918	42	0	3804			
Peak Count:	239		239		249		0	671		52		428		171		0	570			
Peak Hour:	15:15 to 16:15		14:45 to 15:45		07:45 to 08:45		06:00 to 07:00	15:15 to 16:15		17:00 to 18:00		07:15 to 08:15		08:00 to 09:00		06:00 to 07:00	07:30 to 08:30			

# Count Tally Sheet

Time	Leg 3											Leg 4											Leg Total
	Left			Thru			Right			U-turn	Leg Total	Left			Thru			Right			U-turn		
	4	4H		1	1H		2	2H				1	1H		2	2H		3	3H				
		Light	Heavy		Light	Heavy		Light	Heavy				Light	Heavy		Light	Heavy		Light	Heavy		Light	
6:00 - 6:15	9	1		7	1		0	0		0	18	5	0		16	2		2	2		0	27	
6:15 - 6:30	16	1		19	1		3	0		0	40	19	1		14	4		1	2		0	41	
6:30 - 6:45	22	0		18	1		2	0		0	43	14	4		16	2		4	2		0	42	
6:45 - 7:00	24	2		31	4		4	1		0	66	21	3		28	1		13	0		0	66	
7:00 - 7:15	34	1		20	0		5	1		0	61	13	3		18	5		4	5		0	48	
7:15 - 7:30	24	1		27	1		1	0		0	54	8	4		15	8		6	1		0	42	
7:30 - 7:45	25	2		26	0		5	0		0	58	19	4		25	6		8	2		0	64	
7:45 - 8:00	33	2		50	0		9	0		0	94	34	5		30	8		10	2		0	89	
8:00 - 8:15	18	1		65	4		11	1		0	100	43	8		35	6		14	3		0	109	
8:15 - 8:30	29	0		67	0		11	1		0	108	29	3		54	1		20	1		0	108	
8:30 - 8:45	16	2		84	0		6	0		0	108	23	3		36	1		25	1		0	89	
8:45 - 9:00	23	0		91	1		5	0		0	120	24	4		39	1		18	4		0	90	
9:00 - 9:15	20	3		74	3		7	0		0	107	27	2		36	7		5	2		0	79	
9:15 - 9:30	10	1		39	5		8	1		0	64	29	2		19	0		10	0		0	60	
9:30 - 9:45	14	3		38	0		3	0		0	58	32	0		17	2		10	3		0	64	
9:45 - 10:00	19	2		35	1		5	0		0	62	39	0		27	2		9	3		0	80	
10:00 - 10:15	6	2		31	2		7	0		0	48	28	7		28	2		12	0		0	77	
10:15 - 10:30	15	2		37	1		3	0		0	58	32	2		29	5		13	3		0	84	
10:30 - 10:45	18	1		26	4		4	0		0	53	27	1		26	1		13	0		0	68	
10:45 - 11:00	14	2		31	3		4	0		0	54	30	3		25	4		9	2		0	73	
11:00 - 11:15	12	2		34	1		4	0		0	53	36	5		29	2		13	1		0	86	
11:15 - 11:30	10	3		34	1		4	0		0	52	27	1		26	2		8	2		0	66	
11:30 - 11:45	14	2		36	4		6	0		0	62	43	6		33	3		15	1		0	101	
11:45 - 12:00	19	1		28	3		4	2		0	57	42	3		37	2		8	2		0	94	



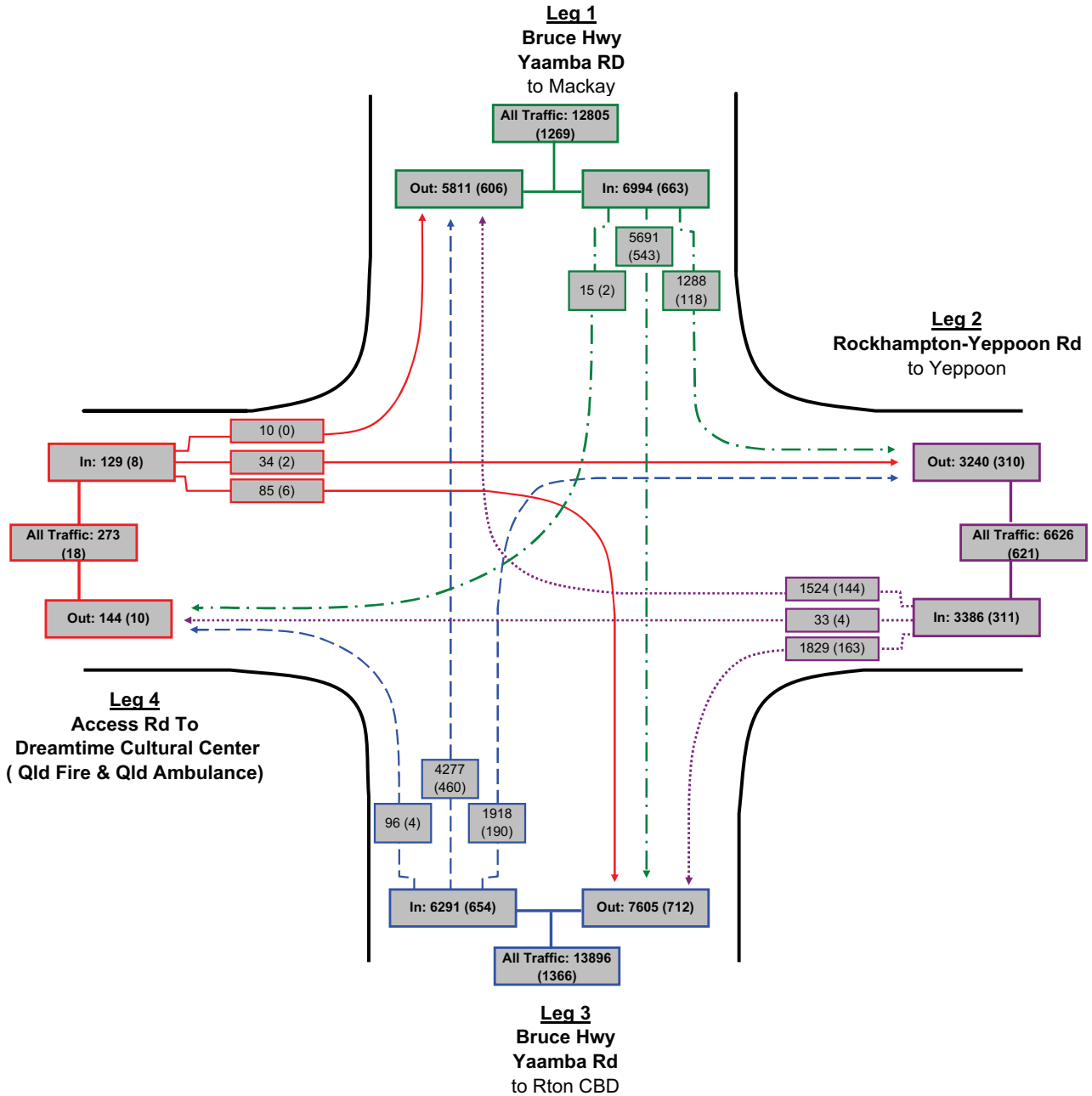
# Count Tally Sheet

Time	Leg 3										Leg 4									
	Left		Thru		Right		U-turn	Leg Total	Left		Thru		Right		U-turn	Leg Total				
	4	4H	1	1H	2	2H			1	1H	2	2H	3	3H						
																	Light	Heavy	Light	Heavy
12:00 - 12:15	9	5	26	2	5	0	0	47	35	3	32	5	12	3	0	90				
12:15 - 12:30	8	2	22	3	7	0	0	42	34	4	33	4	12	1	0	88				
12:30 - 12:45	10	4	31	0	5	0	0	50	43	2	36	6	4	1	0	92				
12:45 - 13:00	18	1	21	0	2	0	0	42	42	4	30	1	11	2	0	90				
13:00 - 13:15	16	0	13	1	5	0	0	35	35	2	28	5	15	3	0	88				
13:15 - 13:30	12	3	29	1	3	1	0	49	34	4	28	1	13	0	0	80				
13:30 - 13:45	13	2	15	0	6	0	0	36	30	0	35	1	7	1	0	74				
13:45 - 14:00	8	0	30	2	4	0	0	44	28	2	49	2	16	1	0	98				
14:00 - 14:15	12	3	23	0	6	0	0	44	31	7	37	1	7	3	0	86				
14:15 - 14:30	17	3	36	3	6	0	0	65	33	2	45	2	5	1	0	88				
14:30 - 14:45	9	1	26	3	5	0	0	44	31	1	53	2	19	4	0	110				
14:45 - 15:00	8	4	31	1	4	1	0	49	46	3	63	4	25	0	0	141				
15:00 - 15:15	28	2	52	1	6	0	0	89	50	4	53	3	20	2	0	132				
15:15 - 15:30	26	0	58	5	6	0	0	95	45	2	61	1	16	2	0	127				
15:30 - 15:45	17	2	36	3	2	0	0	60	47	2	37	3	15	1	0	105				
15:45 - 16:00	19	2	37	2	5	0	0	65	38	2	63	1	14	1	0	119				
16:00 - 16:15	16	0	28	2	7	0	0	53	55	1	76	0	24	1	0	157				
16:15 - 16:30	16	0	34	2	6	0	0	58	48	2	76	1	22	0	0	149				
16:30 - 16:45	16	1	29	1	2	0	0	49	43	3	94	1	19	0	0	160				
16:45 - 17:00	9	2	27	2	5	0	0	45	44	0	71	2	25	0	0	142				
17:00 - 17:15	13	1	20	0	7	0	0	41	42	0	68	7	26	2	0	145				
17:15 - 17:30	12	1	25	0	6	0	0	44	29	0	97	1	22	0	0	149				
17:30 - 17:45	13	0	28	1	3	0	0	45	37	0	78	0	28	0	0	143				
17:45 - 18:00	11	0	17	0	1	0	0	29	30	0	63	0	32	0	0	125				
Total:	780	76	1642	76	235	9	0	2818	1574	124	1964	131	659	73	0	4525				
Peak Count:	122		320		39		0	443	199		341		110		0	608				
Peak Hour:	07:00 to 08:00		08:15 to 09:15		07:45 to 08:45		06:00 to 07:00	08:15 to 09:15	14:45 to 15:45		16:30 to 17:30		17:00 to 18:00		06:00 to 07:00	16:00 to 17:00				

# Count Tally Sheet



**LOCATION:** Intersection Of Bruce Hwy & Rton-Yeppoon Rd  
**ROAD No:** 10F ( Int 827 @ Tdist 8.5501km )  
**DATE:** Thu, 10/12/09  
**TIME:** 06:00 - 18:00



Count Tally Sheet  
Int of Bruce Hwy Rton-Yeppoon Rd (Int 827 @ Tdist 8.550km)  
Thursday 10 Dec 2009



Time	Leg 1										Leg 2									
	Left		Thru		Right		U-turn		Leg Total	Left		Thru		Right		U-turn		Leg Total		
	2	2H	3	3H	4	4H				3	3H	4	4H	1	1H					
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	All	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	All		
6:00 - 6:15	7	1	54	6	0	0			68	39	4	0	0	33	1			77		
6:15 - 6:30	17	3	71	8	0	0			99	34	3	0	0	40	3			80		
6:30 - 6:45	12	3	115	7	1	0			138	30	4	0	0	77	1			112		
6:45 - 7:00	12	4	87	14	0	0			117	36	2	0	0	61	3			102		
7:00 - 7:15	23	2	70	8	0	0			103	42	1	1	1	40	3			88		
7:15 - 7:30	15	3	119	10	0	0			147	64	4	1	0	46	1			116		
7:30 - 7:45	43	3	155	10	0	0			211	67	5	3	0	42	1			118		
7:45 - 8:00	27	2	169	13	2	0			213	70	4	1	0	39	3			117		
8:00 - 8:15	39	2	179	7	0	0			227	59	2	1	0	28	8			98		
8:15 - 8:30	35	1	182	6	0	0			224	66	2	0	0	27	2			97		
8:30 - 8:45	27	0	182	8	0	0			217	60	3	5	0	27	3			98		
8:45 - 9:00	25	3	150	11	0	0			189	51	3	5	1	22	4			86		
9:00 - 9:15	22	4	122	12	0	0			160	46	2	0	0	20	3			71		
9:15 - 9:30	16	5	98	10	0	0			129	44	4	0	0	18	1			67		
9:30 - 9:45	18	4	91	11	0	0			124	42	2	1	0	32	3			80		
9:45 - 10:00	19	3	89	6	1	0			118	40	6	0	0	15	4			65		
10:00 - 10:15	10	1	96	6	0	0			113	33	5	4	1	11	3			57		
10:15 - 10:30	14	3	87	10	1	0			115	30	4	0	0	12	0			46		
10:30 - 10:45	14	4	66	7	1	1			93	33	4	1	1	18	1			58		
10:45 - 11:00	12	2	70	11	0	0			95	28	2	0	0	17	5			52		
11:00 - 11:15	21	4	85	13	0	0			123	32	3	1	0	17	2			55		
11:15 - 11:30	12	0	84	12	3	0			111	29	3	0	0	18	2			52		
11:30 - 11:45	11	0	74	15	0	0			100	32	1	0	0	24	3			60		
11:45 - 12:00	11	3	101	14	0	1			130	30	3	3	0	30	7			73		

**Count Tally Sheet**  
**Int of Bruce Hwy Rton-Yeppoon Rd (Int 827 @ Tdist 8.550km)**  
**Thursday 10 Dec 2009**



Time	Leg 1										Leg 2										Leg Total
	Left		Thru		Right		U-turn		Leg Total	Left		Thru		Right		U-turn					
	2	2H Heavy	3	3H Heavy	4	4H Heavy	All	3		3H Heavy	4	4H Heavy	1	1H Heavy	All						
																Light	Heavy	Light	Heavy	Light	
12:00 - 12:15	19	4	85	17	0	0		125	24	7	0	0	9	2		42					
12:15 - 12:30	14	5	93	6	0	0		118	19	4	1	0	15	3		42					
12:30 - 12:45	14	5	79	13	0	0		111	31	4	0	0	25	1		61					
12:45 - 13:00	15	0	92	3	0	0		110	21	1	0	0	16	0		38					
13:00 - 13:15	16	4	78	10	0	0		108	30	5	0	0	16	5		56					
13:15 - 13:30	17	4	87	14	0	0		122	25	2	0	0	13	1		41					
13:30 - 13:45	14	3	89	15	0	0		121	30	4	0	0	12	5		51					
13:45 - 14:00	11	4	128	4	1	0		148	30	5	0	0	18	2		55					
14:00 - 14:15	20	3	83	12	0	0		118	24	8	0	0	18	3		53					
14:15 - 14:30	21	0	94	11	0	0		126	25	3	0	0	21	7		56					
14:30 - 14:45	17	3	105	12	0	0		137	29	10	0	0	32	6		77					
14:45 - 15:00	30	1	101	15	0	0		147	19	0	0	0	46	4		69					
15:00 - 15:15	44	4	123	17	1	0		189	22	3	0	0	32	5		62					
15:15 - 15:30	22	1	115	25	0	0		163	21	5	0	0	29	2		57					
15:30 - 15:45	35	1	112	12	0	0		160	35	4	1	0	25	4		69					
15:45 - 16:00	38	4	120	15	0	0		177	28	5	0	0	22	3		58					
16:00 - 16:15	59	2	138	18	0	0		217	39	1	0	0	37	8		85					
16:15 - 16:30	40	2	114	26	0	0		182	26	6	0	0	27	1		60					
16:30 - 16:45	44	1	127	9	0	0		181	36	2	0	0	36	4		78					
16:45 - 17:00	60	1	131	7	1	0		200	23	2	0	0	32	4		61					
17:00 - 17:15	55	1	124	16	0	0		196	24	1	0	0	62	1		88					
17:15 - 17:30	36	3	131	12	1	0		183	19	2	0	0	53	2		76					
17:30 - 17:45	43	2	116	8	0	0		169	30	2	0	0	45	4		81					
17:45 - 18:00	24	0	87	11	0	0		122	19	1	0	0	25	0		45					
Total:	1170	118	5148	543	13	2	0	6994	1666	163	29	4	1380	144	0	3386					
Peak Count:	209		746		5		0	881	275		12		232		0	449					
Peak Hour:	16:00 to 17:00		07:45 to 08:45		10:30 to 11:30		06:00 to 07:00	07:45 to 08:45	07:15 to 08:15		08:00 to 09:00		06:30 to 07:30		06:00 to 07:00	07:15 to 08:15					

Count Tally Sheet  
Int of Bruce Hwy Rton-Yeppoon Rd (Int 827 @ Tdist 8.550km)  
Thursday 10 Dec 2009



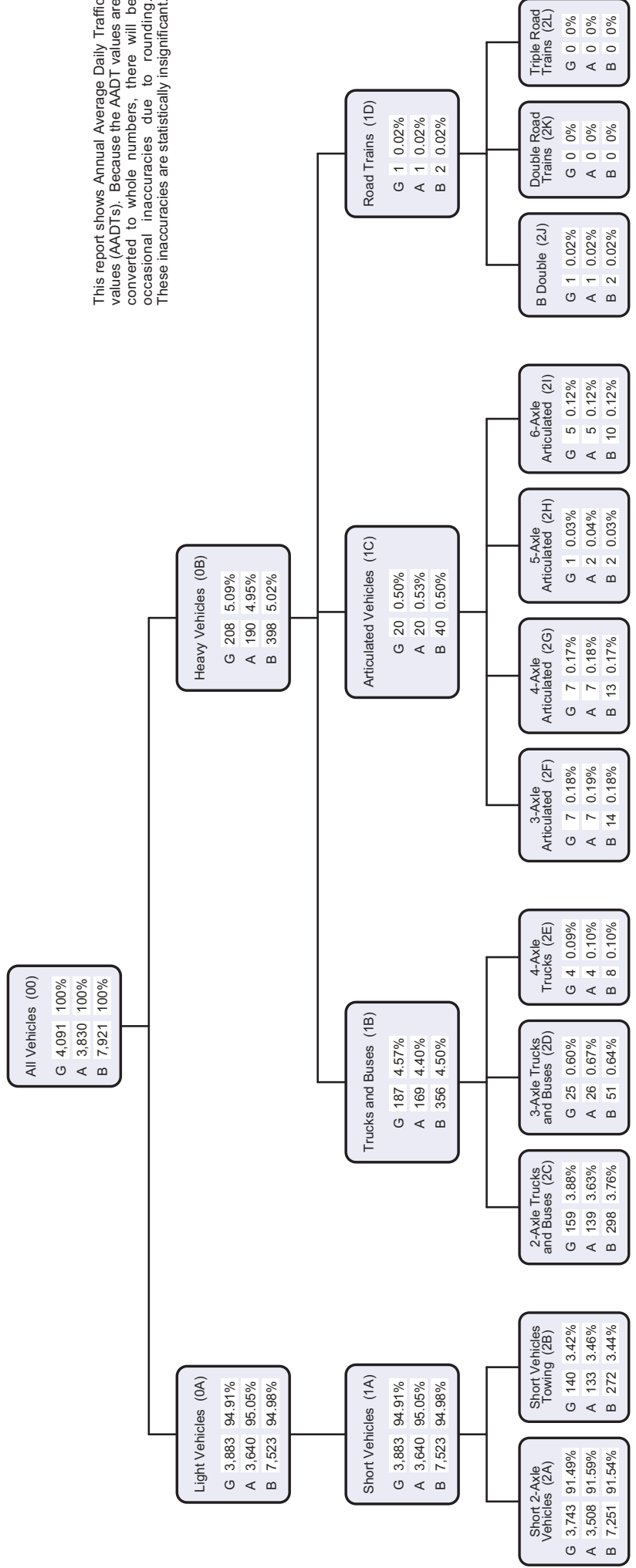
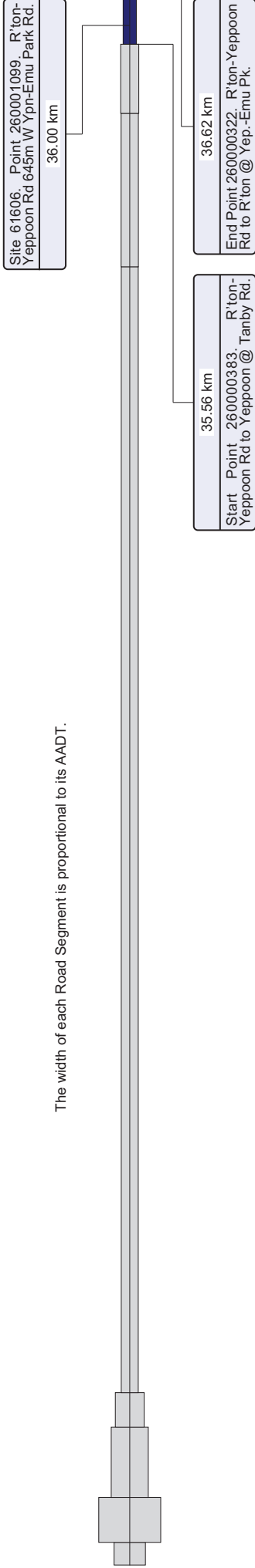
Time	Leg 3										Leg 4									
	Left		Thru		Right		U-turn	Leg Total	Left		Thru		Right		U-turn	Leg Total				
	4	4H	1	1H	2	2H	All		1	1H	2	2H	3	3H	All					
																	Light	Heavy	Light	Heavy
6:00 - 6:15	1	0	26	8	22	6		63	0	0	0	0	0	0		0				
6:15 - 6:30	0	0	36	12	16	7		71	0	0	0	0	0	0		0				
6:30 - 6:45	2	0	66	13	10	4		95	0	0	0	0	0	0		0				
6:45 - 7:00	4	0	54	8	8	1		75	0	0	0	0	1	0		1				
7:00 - 7:15	4	0	49	14	9	5		81	0	0	0	0	0	0		0				
7:15 - 7:30	2	0	56	6	23	3		90	0	0	0	0	2	0		2				
7:30 - 7:45	1	1	65	5	17	5		94	1	0	1	0	2	0		4				
7:45 - 8:00	1	0	65	13	28	3		110	0	0	0	0	1	1		2				
8:00 - 8:15	2	1	50	11	30	7		101	0	0	0	0	3	1		4				
8:15 - 8:30	0	0	62	13	14	3		92	0	0	1	0	1	0		2				
8:30 - 8:45	2	0	71	9	27	6		115	1	0	1	0	1	0		3				
8:45 - 9:00	1	0	47	9	26	2		85	1	0	6	1	4	1		13				
9:00 - 9:15	0	0	49	14	20	4		87	0	0	0	0	0	0		0				
9:15 - 9:30	2	0	66	14	32	7		121	0	0	0	0	0	0		0				
9:30 - 9:45	4	0	59	8	18	5		94	0	0	1	0	5	0		6				
9:45 - 10:00	2	0	63	15	25	0		105	1	0	0	0	0	2		3				
10:00 - 10:15	3	0	56	16	27	5		107	1	0	1	0	1	0		3				
10:15 - 10:30	2	0	63	4	29	4		102	0	0	0	0	2	0		2				
10:30 - 10:45	2	0	68	11	37	3		121	0	0	0	0	2	0		2				
10:45 - 11:00	4	0	47	7	27	6		91	1	0	1	0	2	0		4				
11:00 - 11:15	2	0	73	7	30	5		117	0	0	2	0	3	0		5				
11:15 - 11:30	6	0	63	15	43	3		130	1	0	0	0	3	0		4				
11:30 - 11:45	3	0	85	9	23	4		124	0	0	0	0	3	0		3				
11:45 - 12:00	1	0	58	11	30	9		109	0	0	1	1	0	0		2				



**Count Tally Sheet**  
**Int of Bruce Hwy Rton-Yeppoon Rd (Int 827 @ Tdist 8.550km)**  
**Thursday 10 Dec 2009**



Time	Leg 3										Leg 4									
	Left		Thru		Right		U-turn		Leg Total	Left		Thru		Right		U-turn		Leg Total		
	4	4H	1	1H	2	2H	All	1		1H	2	2H	3	3H	All					
12:00 - 12:15	2	0	81	11	35	1		130	0	0	2	0	1	0				3		
12:15 - 12:30	1	0	66	6	35	6		114	1	0	3	0	4	0				8		
12:30 - 12:45	0	0	61	8	19	6		94	0	0	1	0	5	0				6		
12:45 - 13:00	2	0	71	10	27	4		114	1	0	0	0	2	1				4		
13:00 - 13:15	0	0	91	9	26	2		128	0	0	1	0	0	0				1		
13:15 - 13:30	0	0	66	13	47	4		130	0	0	0	0	0	0				0		
13:30 - 13:45	0	0	90	4	38	3		135	0	0	2	0	2	0				4		
13:45 - 14:00	1	0	78	7	21	0		107	0	0	0	0	0	0				0		
14:00 - 14:15	2	0	77	9	31	4		123	0	0	0	0	0	0				0		
14:15 - 14:30	4	0	76	11	42	4		137	0	0	1	0	2	0				3		
14:30 - 14:45	0	0	76	12	49	4		141	0	0	0	0	1	0				1		
14:45 - 15:00	3	0	99	14	42	0		158	0	0	0	0	5	0				5		
15:00 - 15:15	1	0	90	12	34	5		142	0	0	2	0	5	0				7		
15:15 - 15:30	2	0	74	6	55	3		140	0	0	0	0	1	0				1		
15:30 - 15:45	1	1	115	14	52	3		186	0	0	1	0	0	0				1		
15:45 - 16:00	5	0	97	12	45	8		167	0	0	1	0	1	0				2		
16:00 - 16:15	3	0	124	6	63	2		198	0	0	0	0	2	0				2		
16:15 - 16:30	1	1	106	12	56	6		182	0	0	2	0	1	0				3		
16:30 - 16:45	3	0	156	8	90	1		258	0	0	0	0	3	0				3		
16:45 - 17:00	1	0	137	6	60	3		207	0	0	1	0	1	0				2		
17:00 - 17:15	0	0	184	8	103	9		304	0	0	0	0	1	0				1		
17:15 - 17:30	2	0	169	2	56	3		232	0	0	0	0	0	0				0		
17:30 - 17:45	4	0	120	3	68	1		196	1	0	0	0	4	0				5		
17:45 - 18:00	3	0	116	5	63	1		188	0	0	0	0	2	0				2		
Total:	92	4	3817	460	1728	190	0	6291	10	0	32	2	79	6	0			129		
Peak Count:	15		670		328		0	1001	2		9		13		0			22		
Peak Hour:	10:45 to 11:45		16:30 to 17:30		16:15 to 17:15		06:00 to 07:00	16:30 to 17:30	08:00 to 09:00		08:00 to 09:00		12:00 to 13:00		06:00 to 07:00			08:00 to 09:00		

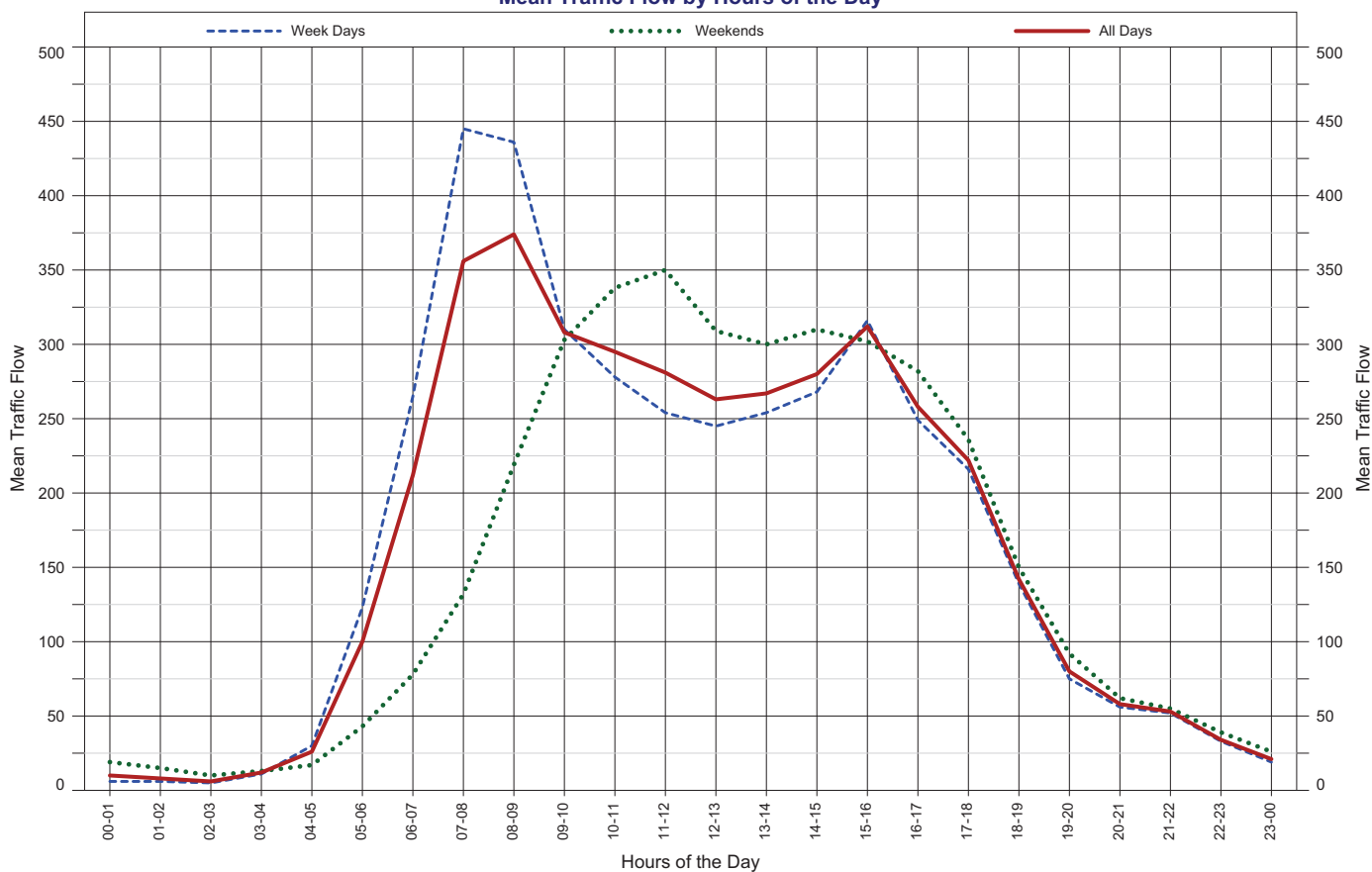


District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61606 - R'ton-Yeppoon Rd 645m W Ypn-Emu Park Rd  
Thru Dist 36.0  
Type C - Coverage  
Stream TA - Thru traffic -against gazettal  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	3	2	3	3	3	3	3
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



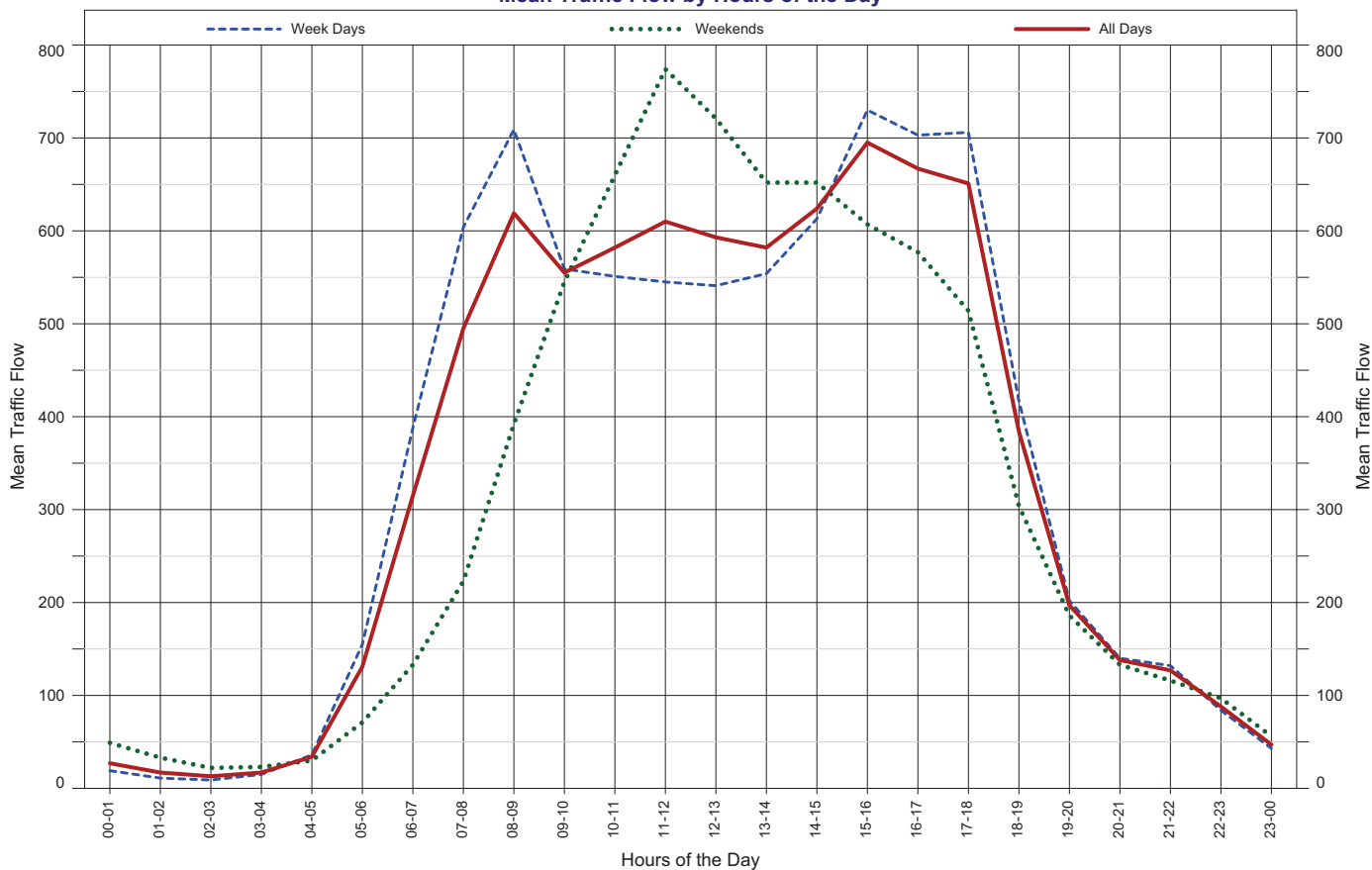
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	4 0.1%	5 0.1%	9 0.2%	6 0.1%	6 0.1%	17 0.5%	21 0.6%	6 0.1%	19 0.5%	10 0.3%
01-02	6 0.2%	7 0.2%	6 0.1%	3 0.1%	7 0.2%	14 0.4%	15 0.4%	6 0.1%	15 0.4%	8 0.2%
02-03	7 0.2%	3 0.1%	6 0.1%	5 0.1%	4 0.1%	7 0.2%	13 0.4%	5 0.1%	10 0.3%	6 0.2%
03-04	19 0.5%	8 0.2%	9 0.2%	9 0.2%	10 0.2%	16 0.4%	10 0.3%	11 0.3%	13 0.4%	12 0.3%
04-05	37 0.9%	33 0.8%	28 0.7%	26 0.6%	26 0.6%	17 0.5%	16 0.4%	30 0.7%	17 0.5%	26 0.7%
05-06	133 3.3%	118 2.9%	128 3.2%	122 3.0%	114 2.7%	54 1.4%	31 0.9%	123 3.0%	43 1.2%	100 2.5%
06-07	275 6.9%	279 6.9%	277 6.8%	259 6.3%	236 5.6%	102 2.7%	54 1.5%	265 6.5%	78 2.1%	212 5.3%
07-08	463 11.6%	466 11.5%	451 11.1%	440 10.7%	407 9.6%	169 4.5%	94 2.6%	445 10.9%	132 3.6%	356 8.9%
08-09	429 10.7%	481 11.8%	415 10.2%	449 11.0%	404 9.5%	260 6.9%	178 4.9%	436 10.7%	219 5.9%	374 9.4%
09-10	295 7.4%	304 7.5%	309 7.6%	328 8.0%	312 7.4%	320 8.5%	285 7.9%	310 7.6%	303 8.2%	308 7.7%
10-11	275 6.9%	248 6.1%	295 7.3%	261 6.4%	310 7.3%	349 9.3%	326 9.0%	278 6.8%	338 9.1%	295 7.4%
11-12	227 5.7%	234 5.8%	257 6.3%	267 6.5%	283 6.7%	340 9.0%	359 9.9%	254 6.2%	350 9.5%	281 7.1%
12-13	233 5.8%	240 5.9%	251 6.2%	242 5.9%	258 6.1%	286 7.6%	332 9.2%	245 6.0%	309 8.4%	263 6.6%
13-14	234 5.9%	252 6.2%	252 6.2%	256 6.2%	275 6.5%	279 7.4%	321 8.9%	254 6.2%	300 8.1%	267 6.7%
14-15	254 6.4%	259 6.4%	255 6.3%	262 6.4%	310 7.3%	271 7.2%	348 9.6%	268 6.6%	310 8.4%	280 7.0%
15-16	335 8.4%	307 7.6%	299 7.4%	321 7.8%	319 7.5%	271 7.2%	332 9.2%	316 7.7%	302 8.2%	312 7.8%
16-17	239 6.0%	272 6.7%	247 6.1%	248 6.1%	238 5.6%	269 7.1%	295 8.2%	249 6.1%	282 7.6%	258 6.5%
17-18	205 5.1%	201 5.0%	210 5.2%	226 5.5%	239 5.6%	232 6.2%	239 6.6%	216 5.3%	236 6.4%	222 5.6%
18-19	127 3.2%	129 3.2%	130 3.2%	135 3.3%	175 4.1%	166 4.4%	134 3.7%	139 3.4%	150 4.1%	142 3.6%
19-20	71 1.8%	64 1.6%	68 1.7%	85 2.1%	89 2.1%	99 2.6%	85 2.3%	75 1.8%	92 2.5%	80 2.0%
20-21	47 1.2%	53 1.3%	51 1.3%	55 1.3%	75 1.8%	63 1.7%	61 1.7%	56 1.4%	62 1.7%	58 1.5%
21-22	45 1.1%	57 1.4%	52 1.3%	50 1.2%	56 1.3%	69 1.8%	40 1.1%	52 1.3%	55 1.5%	53 1.3%
22-23	24 0.6%	26 0.6%	36 0.9%	25 0.6%	52 1.2%	57 1.5%	20 0.6%	33 0.8%	39 1.1%	34 0.9%
23-24	14 0.4%	14 0.3%	15 0.4%	17 0.4%	36 0.8%	42 1.1%	10 0.3%	19 0.5%	26 0.7%	21 0.5%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 463	09:00 481	08:00 451	09:00 449	08:00 407	11:00 349	12:00 359	08:00 445	12:00 349	09:00 373
PM	16:00 335	16:00 307	16:00 299	16:00 321	16:00 319	13:00 286	15:00 348	16:00 316	13:00 309	16:00 312
12-Hour	3,316 82.9%	3,393 83.6%	3,371 83.1%	3,435 83.8%	3,530 83.2%	3,212 85.2%	3,243 89.6%	3,410 83.4%	3,231 87.3%	3,358 84.4%
16-Hour	3,754 93.9%	3,846 94.7%	3,819 94.2%	3,884 94.8%	3,986 94.0%	3,545 94.1%	3,483 96.2%	3,858 94.3%	3,518 95.1%	3,761 94.5%
18-Hour	3,792 94.8%	3,886 95.7%	3,870 95.4%	3,926 95.8%	4,074 96.1%	3,644 96.7%	3,513 97.1%	3,910 95.6%	3,583 96.8%	3,816 95.9%
24-Hour	3,998 100.0%	4,060 100.0%	4,056 100.0%	4,097 100.0%	4,241 100.0%	3,769 100.0%	3,619 100.0%	4,091 100.0%	3,700 100.0%	3,978 100.0%
Avg Week Day	97.7%	99.2%	99.1%	100.1%	103.7%			100.0%	90.4%	97.2%
Avg Weekend Day						101.9%	97.8%	110.6%	100.0%	107.5%
Avg Day	100.5%	102.1%	102.0%	103.0%	106.6%	94.7%	91.0%	102.8%	93.0%	100.0%

District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61606 - R'ton-Yeppoon Rd 645m W Ypn-Emu Park Rd  
Thru Dist 36.0  
Type C - Coverage  
Stream TB - Bi-directional traffic flow  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	3	2	3	3	3	3	3
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day





Traffic Analysis and Reporting System  
Weekly Volume Report

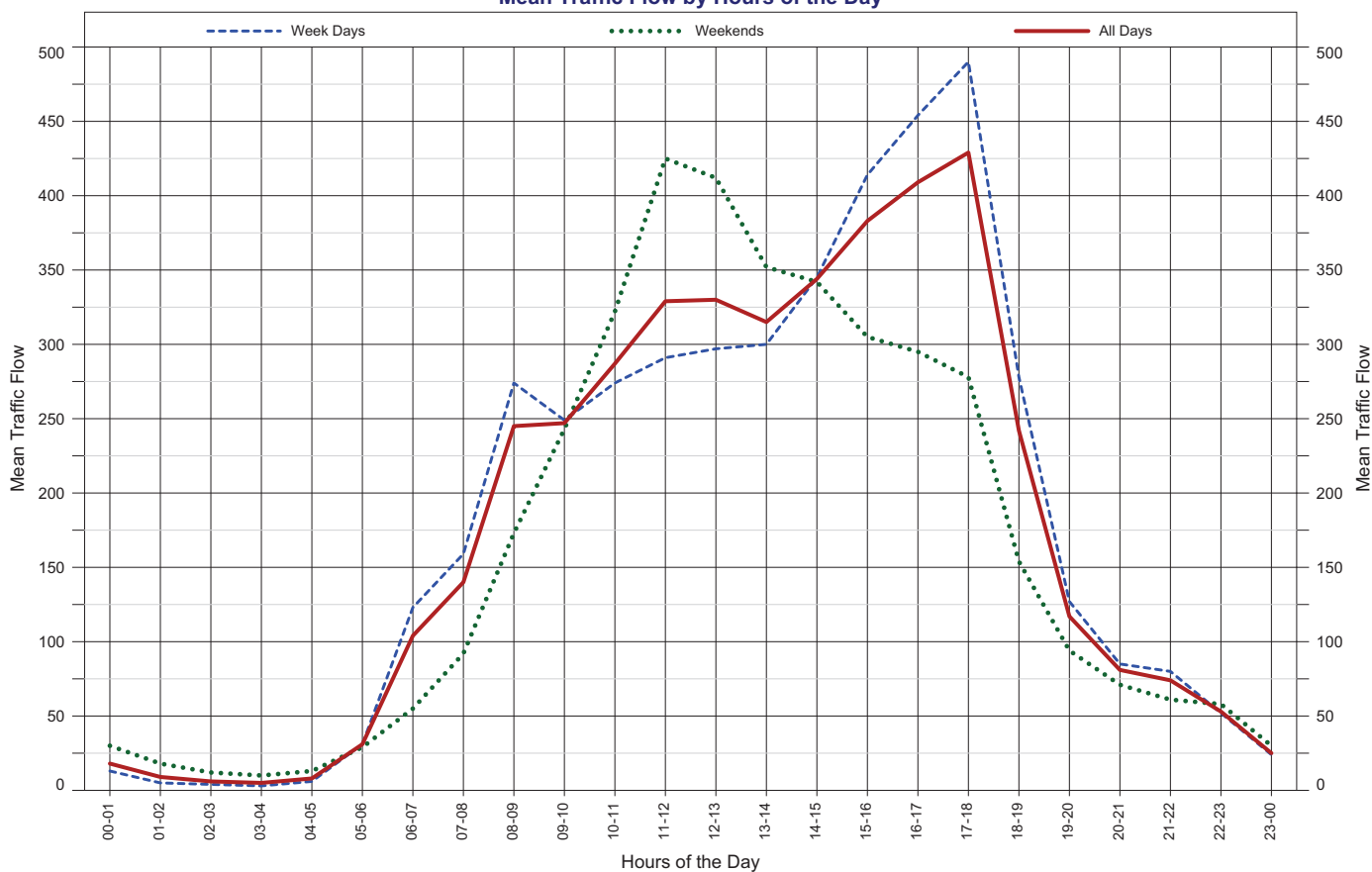
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	10 0.1%	17 0.2%	28 0.3%	20 0.2%	20 0.2%	50 0.6%	47 0.6%	19 0.2%	49 0.6%	27 0.3%
01-02	9 0.1%	12 0.1%	12 0.1%	6 0.1%	16 0.2%	31 0.4%	34 0.5%	11 0.1%	33 0.4%	17 0.2%
02-03	13 0.2%	6 0.1%	12 0.1%	8 0.1%	7 0.1%	20 0.3%	24 0.3%	9 0.1%	22 0.3%	13 0.2%
03-04	22 0.3%	12 0.1%	12 0.1%	15 0.2%	12 0.1%	27 0.3%	19 0.3%	15 0.2%	23 0.3%	17 0.2%
04-05	45 0.5%	37 0.4%	32 0.4%	36 0.4%	30 0.3%	29 0.4%	30 0.4%	36 0.4%	30 0.4%	34 0.4%
05-06	165 2.0%	152 1.8%	159 1.9%	152 1.8%	145 1.6%	80 1.0%	61 0.8%	155 1.8%	71 0.9%	131 1.6%
06-07	396 4.8%	404 4.8%	407 4.9%	385 4.6%	349 3.9%	170 2.2%	96 1.3%	388 4.6%	133 1.8%	315 3.8%
07-08	627 7.6%	628 7.4%	617 7.4%	589 7.0%	560 6.3%	278 3.6%	168 2.3%	604 7.1%	223 2.9%	495 6.0%
08-09	691 8.4%	772 9.1%	694 8.3%	715 8.5%	674 7.6%	454 5.8%	330 4.5%	709 8.4%	392 5.2%	619 7.5%
09-10	544 6.6%	573 6.8%	547 6.5%	580 6.9%	549 6.2%	582 7.4%	508 6.9%	559 6.6%	545 7.2%	555 6.8%
10-11	541 6.6%	510 6.0%	572 6.8%	536 6.4%	598 6.7%	675 8.6%	644 8.8%	551 6.5%	660 8.7%	582 7.1%
11-12	518 6.3%	513 6.1%	556 6.6%	544 6.5%	592 6.7%	748 9.6%	799 10.9%	545 6.4%	774 10.2%	610 7.4%
12-13	524 6.4%	519 6.1%	546 6.5%	534 6.3%	584 6.6%	680 8.7%	762 10.4%	541 6.4%	721 9.5%	593 7.2%
13-14	523 6.4%	550 6.5%	533 6.4%	559 6.6%	604 6.8%	624 8.0%	679 9.3%	554 6.5%	652 8.6%	582 7.1%
14-15	593 7.2%	620 7.3%	570 6.8%	603 7.2%	681 7.7%	616 7.9%	688 9.4%	613 7.2%	652 8.6%	624 7.6%
15-16	732 8.9%	724 8.6%	705 8.4%	714 8.5%	776 8.8%	564 7.2%	650 8.9%	730 8.6%	607 8.0%	695 8.5%
16-17	700 8.5%	729 8.6%	699 8.4%	676 8.0%	709 8.0%	570 7.3%	583 8.0%	703 8.3%	577 7.6%	667 8.1%
17-18	699 8.5%	699 8.3%	711 8.5%	700 8.3%	721 8.1%	536 6.9%	491 6.7%	706 8.3%	514 6.8%	651 7.9%
18-19	369 4.5%	411 4.9%	399 4.8%	422 5.0%	483 5.4%	347 4.4%	260 3.6%	417 4.9%	304 4.0%	384 4.7%
19-20	184 2.2%	185 2.2%	174 2.1%	231 2.7%	235 2.7%	209 2.7%	163 2.2%	202 2.4%	186 2.5%	197 2.4%
20-21	127 1.5%	130 1.5%	136 1.6%	139 1.6%	170 1.9%	147 1.9%	119 1.6%	140 1.7%	133 1.8%	138 1.7%
21-22	110 1.3%	138 1.6%	123 1.5%	145 1.7%	142 1.6%	150 1.9%	81 1.1%	132 1.6%	116 1.5%	127 1.5%
22-23	56 0.7%	66 0.8%	90 1.1%	78 0.9%	131 1.5%	140 1.8%	53 0.7%	84 1.0%	97 1.3%	88 1.1%
23-24	25 0.3%	35 0.4%	36 0.4%	39 0.5%	79 0.9%	86 1.1%	26 0.4%	43 0.5%	56 0.7%	47 0.6%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	09:00 691	09:00 772	09:00 694	09:00 715	09:00 674	12:00 748	12:00 799	09:00 709	12:00 773	09:00 618
PM	16:00 732	17:00 729	18:00 711	16:00 714	16:00 776	13:00 680	13:00 762	16:00 730	13:00 721	16:00 695
12-Hour	7,061 85.9%	7,248 85.9%	7,149 85.4%	7,172 85.1%	7,531 84.9%	6,674 85.4%	6,562 89.7%	7,232 85.4%	6,621 87.5%	7,057 86.0%
16-Hour	7,878 95.8%	8,105 96.0%	7,989 95.4%	8,072 95.8%	8,427 95.0%	7,350 94.1%	7,021 96.0%	8,094 95.6%	7,189 95.0%	7,834 95.4%
18-Hour	7,959 96.8%	8,206 97.2%	8,115 97.0%	8,189 97.2%	8,637 97.4%	7,576 97.0%	7,100 97.1%	8,221 97.1%	7,342 97.0%	7,969 97.1%
24-Hour	8,223 100.0%	8,442 100.0%	8,370 100.0%	8,426 100.0%	8,867 100.0%	7,813 100.0%	7,315 100.0%	8,466 100.0%	7,570 100.0%	8,208 100.0%
Avg Week Day	97.1%	99.7%	98.9%	99.5%	104.7%			100.0%	89.4%	97.0%
Avg Weekend Day						103.2%	96.6%	111.8%	100.0%	108.4%
Avg Day	100.2%	102.9%	102.0%	102.7%	108.0%	95.2%	89.1%	103.1%	92.2%	100.0%

District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61606 - R'ton-Yeppoon Rd 645m W Ypn-Emu Park Rd  
Thru Dist 36.0  
Type C - Coverage  
Stream TG - Thru traffic -in gazettal dirn  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

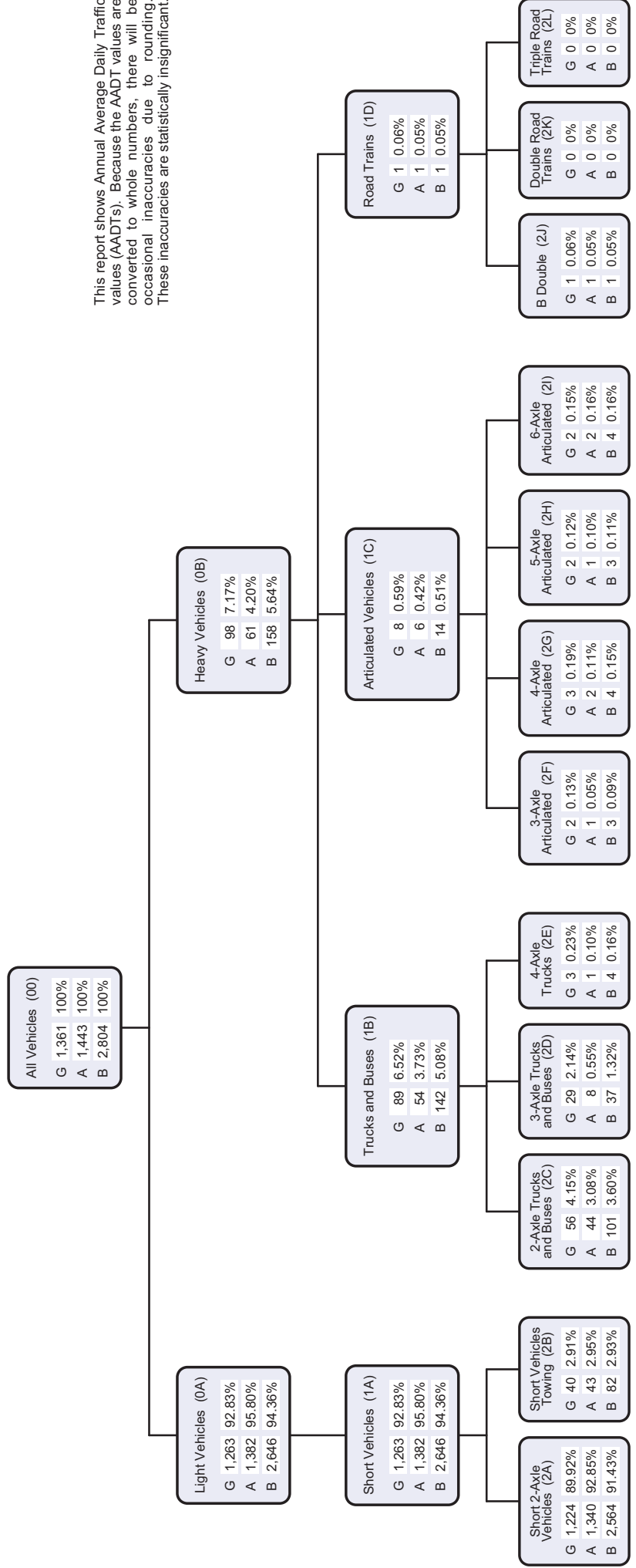
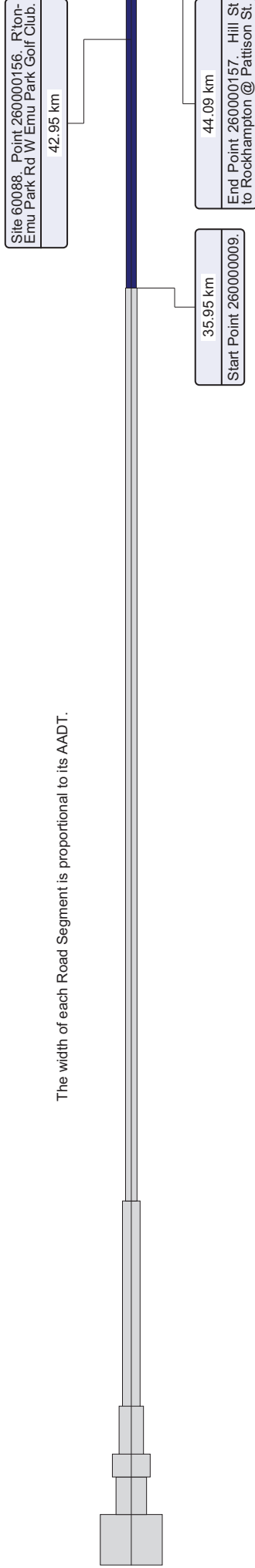
### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	3	2	3	3	3	3	3
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	6 0.1%	13 0.3%	19 0.4%	13 0.3%	14 0.3%	33 0.8%	26 0.7%	13 0.3%	30 0.8%	18 0.4%
01-02	3 0.1%	5 0.1%	6 0.1%	3 0.1%	9 0.2%	17 0.4%	19 0.5%	5 0.1%	18 0.5%	9 0.2%
02-03	6 0.1%	3 0.1%	6 0.1%	3 0.1%	2 0.0%	13 0.3%	11 0.3%	4 0.1%	12 0.3%	6 0.1%
03-04	3 0.1%	4 0.1%	3 0.1%	5 0.1%	2 0.0%	11 0.3%	9 0.2%	3 0.1%	10 0.3%	5 0.1%
04-05	8 0.2%	5 0.1%	4 0.1%	10 0.2%	4 0.1%	12 0.3%	14 0.4%	6 0.1%	13 0.3%	8 0.2%
05-06	32 0.8%	34 0.8%	31 0.7%	29 0.7%	31 0.7%	27 0.7%	30 0.8%	31 0.7%	29 0.7%	31 0.7%
06-07	121 2.9%	125 2.8%	131 3.0%	126 2.9%	114 2.5%	68 1.7%	42 1.1%	123 2.8%	55 1.4%	104 2.5%
07-08	164 3.9%	163 3.7%	167 3.9%	149 3.4%	153 3.3%	109 2.7%	75 2.0%	159 3.6%	92 2.4%	140 3.3%
08-09	261 6.2%	291 6.6%	280 6.5%	266 6.1%	270 5.8%	194 4.8%	152 4.1%	274 6.3%	173 4.5%	245 5.8%
09-10	250 5.9%	269 6.1%	238 5.5%	252 5.8%	237 5.1%	262 6.5%	223 6.0%	249 5.7%	243 6.3%	247 5.8%
10-11	266 6.3%	262 6.0%	277 6.4%	275 6.4%	288 6.2%	326 8.1%	318 8.6%	274 6.3%	322 8.3%	287 6.8%
11-12	291 6.9%	279 6.4%	299 6.9%	277 6.4%	309 6.7%	408 10.1%	441 11.9%	291 6.6%	425 11.0%	329 7.8%
12-13	292 6.9%	280 6.4%	295 6.8%	293 6.8%	326 7.0%	394 9.7%	430 11.6%	297 6.8%	412 10.6%	330 7.8%
13-14	289 6.8%	298 6.8%	280 6.5%	303 7.0%	329 7.1%	346 8.6%	358 9.7%	300 6.9%	352 9.1%	315 7.4%
14-15	339 8.0%	361 8.2%	315 7.3%	341 7.9%	371 8.0%	345 8.5%	339 9.2%	345 7.9%	342 8.8%	344 8.1%
15-16	398 9.4%	418 9.5%	406 9.4%	393 9.1%	457 9.9%	293 7.2%	317 8.6%	414 9.5%	305 7.9%	383 9.1%
16-17	461 10.9%	457 10.4%	453 10.5%	428 9.9%	471 10.2%	301 7.4%	289 7.8%	454 10.4%	295 7.6%	409 9.7%
17-18	494 11.7%	498 11.3%	501 11.6%	474 10.9%	483 10.4%	304 7.5%	252 6.8%	490 11.2%	278 7.2%	429 10.1%
18-19	242 5.7%	283 6.4%	269 6.2%	287 6.6%	308 6.7%	181 4.5%	126 3.4%	278 6.3%	154 4.0%	242 5.7%
19-20	114 2.7%	122 2.8%	106 2.5%	146 3.4%	146 3.2%	109 2.7%	78 2.1%	127 2.9%	94 2.4%	117 2.8%
20-21	80 1.9%	78 1.8%	85 2.0%	85 2.0%	95 2.1%	84 2.1%	58 1.6%	85 1.9%	71 1.8%	81 1.9%
21-22	65 1.5%	81 1.8%	71 1.6%	95 2.2%	86 1.9%	81 2.0%	41 1.1%	80 1.8%	61 1.6%	74 1.7%
22-23	32 0.8%	40 0.9%	54 1.3%	54 1.2%	79 1.7%	83 2.1%	32 0.9%	52 1.2%	58 1.5%	53 1.3%
23-24	12 0.3%	21 0.5%	20 0.5%	22 0.5%	43 0.9%	44 1.1%	16 0.4%	24 0.5%	30 0.8%	25 0.6%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	12:00 291	09:00 291	12:00 299	12:00 277	12:00 309	12:00 408	12:00 441	12:00 291	12:00 424	12:00 329
PM	18:00 494	18:00 498	18:00 501	18:00 474	18:00 483	13:00 394	13:00 430	18:00 490	13:00 412	18:00 429
12-Hour	3,747 88.6%	3,859 87.9%	3,780 87.6%	3,738 86.3%	4,002 86.5%	3,463 85.6%	3,320 89.8%	3,825 87.4%	3,393 87.6%	3,700 87.4%
16-Hour	4,127 97.6%	4,265 97.2%	4,173 96.7%	4,190 96.8%	4,443 96.0%	3,805 94.1%	3,539 95.8%	4,240 96.8%	3,674 94.8%	4,076 96.3%
18-Hour	4,171 98.6%	4,326 98.5%	4,247 98.4%	4,266 98.5%	4,565 98.7%	3,932 97.2%	3,587 97.1%	4,316 98.6%	3,762 97.1%	4,154 98.2%
24-Hour	4,229 100.0%	4,390 100.0%	4,316 100.0%	4,329 100.0%	4,627 100.0%	4,045 100.0%	3,696 100.0%	4,378 100.0%	3,874 100.0%	4,231 100.0%
Avg Week Day	96.6%	100.3%	98.6%	98.9%	105.7%			100.0%	88.5%	96.6%
Avg Weekend Day						104.4%	95.4%	113.0%	100.0%	109.2%
Avg Day	100.0%	103.8%	102.0%	102.3%	109.4%	95.6%	87.4%	103.5%	91.6%	100.0%

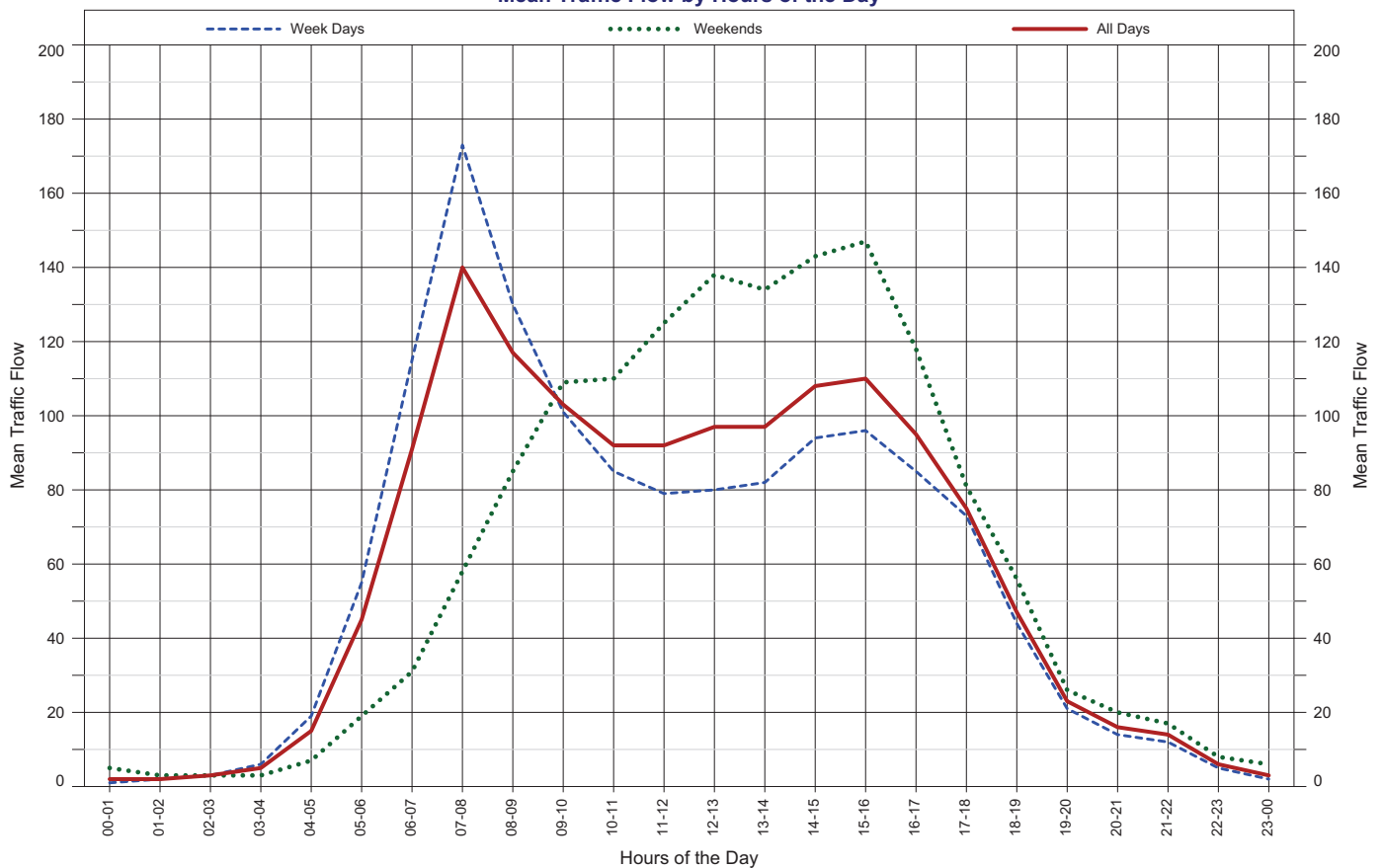


District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60088 - R'ton-Emu Park Rd W Emu Park Golf Club  
Thru Dist 42.95  
Type C - Coverage  
Stream TA - Thru traffic -against gazettal  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	6	6	6	5	6	7	7
Calendar Events	5	0	0	1	3	4	2

### Mean Traffic Flow by Hours of the Day



Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	2 0.1%	1 0.1%	1 0.1%	1 0.1%	2 0.1%	3 0.2%	6 0.4%	1 0.1%	5 0.3%	2 0.1%
01-02	2 0.1%	3 0.2%	3 0.2%	2 0.1%	1 0.1%	3 0.2%	3 0.2%	2 0.1%	3 0.2%	2 0.1%
02-03	3 0.2%	2 0.1%	2 0.2%	3 0.2%	3 0.2%	3 0.2%	3 0.2%	3 0.2%	3 0.2%	3 0.2%
03-04	8 0.6%	7 0.5%	5 0.4%	4 0.3%	6 0.4%	3 0.2%	2 0.1%	6 0.4%	3 0.2%	5 0.4%
04-05	21 1.5%	21 1.5%	18 1.4%	16 1.2%	18 1.2%	10 0.8%	4 0.3%	19 1.4%	7 0.5%	15 1.1%
05-06	51 3.8%	61 4.4%	61 4.6%	53 3.9%	51 3.5%	25 1.9%	12 0.8%	55 4.0%	19 1.3%	45 3.2%
06-07	105 7.7%	126 9.1%	107 8.0%	121 8.9%	114 7.8%	38 2.9%	24 1.5%	115 8.4%	31 2.1%	91 6.5%
07-08	157 11.6%	188 13.6%	168 12.6%	185 13.6%	169 11.5%	68 5.1%	48 3.1%	173 12.6%	58 4.0%	140 10.0%
08-09	122 9.0%	136 9.8%	121 9.1%	132 9.7%	140 9.6%	89 6.7%	80 5.1%	130 9.4%	85 5.9%	117 8.4%
09-10	102 7.5%	97 7.0%	97 7.3%	99 7.3%	108 7.4%	117 8.8%	101 6.5%	101 7.3%	109 7.5%	103 7.4%
10-11	89 6.6%	84 6.1%	86 6.5%	74 5.4%	90 6.1%	106 8.0%	114 7.3%	85 6.2%	110 7.6%	92 6.6%
11-12	82 6.1%	75 5.4%	74 5.6%	76 5.6%	90 6.1%	104 7.8%	145 9.3%	79 5.7%	125 8.6%	92 6.6%
12-13	87 6.4%	74 5.3%	71 5.3%	75 5.5%	94 6.4%	104 7.8%	171 10.9%	80 5.8%	138 9.5%	97 6.9%
13-14	89 6.6%	86 6.2%	77 5.8%	77 5.7%	81 5.5%	100 7.5%	168 10.7%	82 6.0%	134 9.2%	97 6.9%
14-15	95 7.0%	90 6.5%	94 7.1%	93 6.8%	99 6.8%	107 8.1%	178 11.4%	94 6.8%	143 9.8%	108 7.7%
15-16	104 7.7%	92 6.6%	93 7.0%	91 6.7%	99 6.8%	113 8.5%	180 11.5%	96 7.0%	147 10.1%	110 7.9%
16-17	88 6.5%	79 5.7%	86 6.5%	87 6.4%	87 5.9%	99 7.5%	136 8.7%	85 6.2%	118 8.1%	95 6.8%
17-18	69 5.1%	68 4.9%	76 5.7%	75 5.5%	77 5.3%	78 5.9%	84 5.4%	73 5.3%	81 5.6%	75 5.4%
18-19	36 2.7%	45 3.2%	43 3.2%	45 3.3%	51 3.5%	61 4.6%	50 3.2%	44 3.2%	56 3.9%	47 3.4%
19-20	17 1.3%	22 1.6%	19 1.4%	20 1.5%	29 2.0%	28 2.1%	24 1.5%	21 1.5%	26 1.8%	23 1.6%
20-21	11 0.8%	15 1.1%	16 1.2%	11 0.8%	19 1.3%	25 1.9%	14 0.9%	14 1.0%	20 1.4%	16 1.1%
21-22	11 0.8%	9 0.6%	8 0.6%	12 0.9%	22 1.5%	23 1.7%	10 0.6%	12 0.9%	17 1.2%	14 1.0%
22-23	3 0.2%	4 0.3%	4 0.3%	5 0.4%	11 0.8%	11 0.8%	5 0.3%	5 0.4%	8 0.6%	6 0.4%
23-24	1 0.1%	2 0.1%	2 0.2%	2 0.1%	4 0.3%	9 0.7%	3 0.2%	2 0.1%	6 0.4%	3 0.2%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 157	08:00 188	08:00 168	08:00 185	08:00 169	10:00 117	12:00 145	08:00 173	12:00 124	08:00 140
PM	16:00 104	16:00 92	15:00 94	15:00 93	15:00 99	16:00 113	16:00 180	16:00 96	16:00 146	16:00 110
12-Hour	1,120 82.7%	1,114 80.3%	1,086 81.5%	1,109 81.6%	1,185 80.9%	1,146 86.4%	1,455 93.0%	1,122 81.5%	1,304 89.8%	1,173 83.9%
16-Hour	1,264 93.3%	1,286 92.7%	1,236 92.8%	1,273 93.7%	1,369 93.4%	1,260 95.0%	1,527 97.6%	1,284 93.2%	1,398 96.3%	1,317 94.2%
18-Hour	1,268 93.6%	1,292 93.2%	1,242 93.2%	1,280 94.2%	1,384 94.5%	1,280 96.5%	1,535 98.1%	1,291 93.8%	1,412 97.2%	1,326 94.8%
24-Hour	1,355 100.0%	1,387 100.0%	1,332 100.0%	1,359 100.0%	1,465 100.0%	1,327 100.0%	1,565 100.0%	1,377 100.0%	1,452 100.0%	1,398 100.0%
Avg Week Day	98.4%	100.7%	96.7%	98.7%	106.4%			100.0%	105.4%	101.5%
Avg Weekend Day						91.4%	107.8%	94.8%	100.0%	96.3%
Avg Day	96.9%	99.2%	95.3%	97.2%	104.8%	94.9%	111.9%	98.5%	103.9%	100.0%

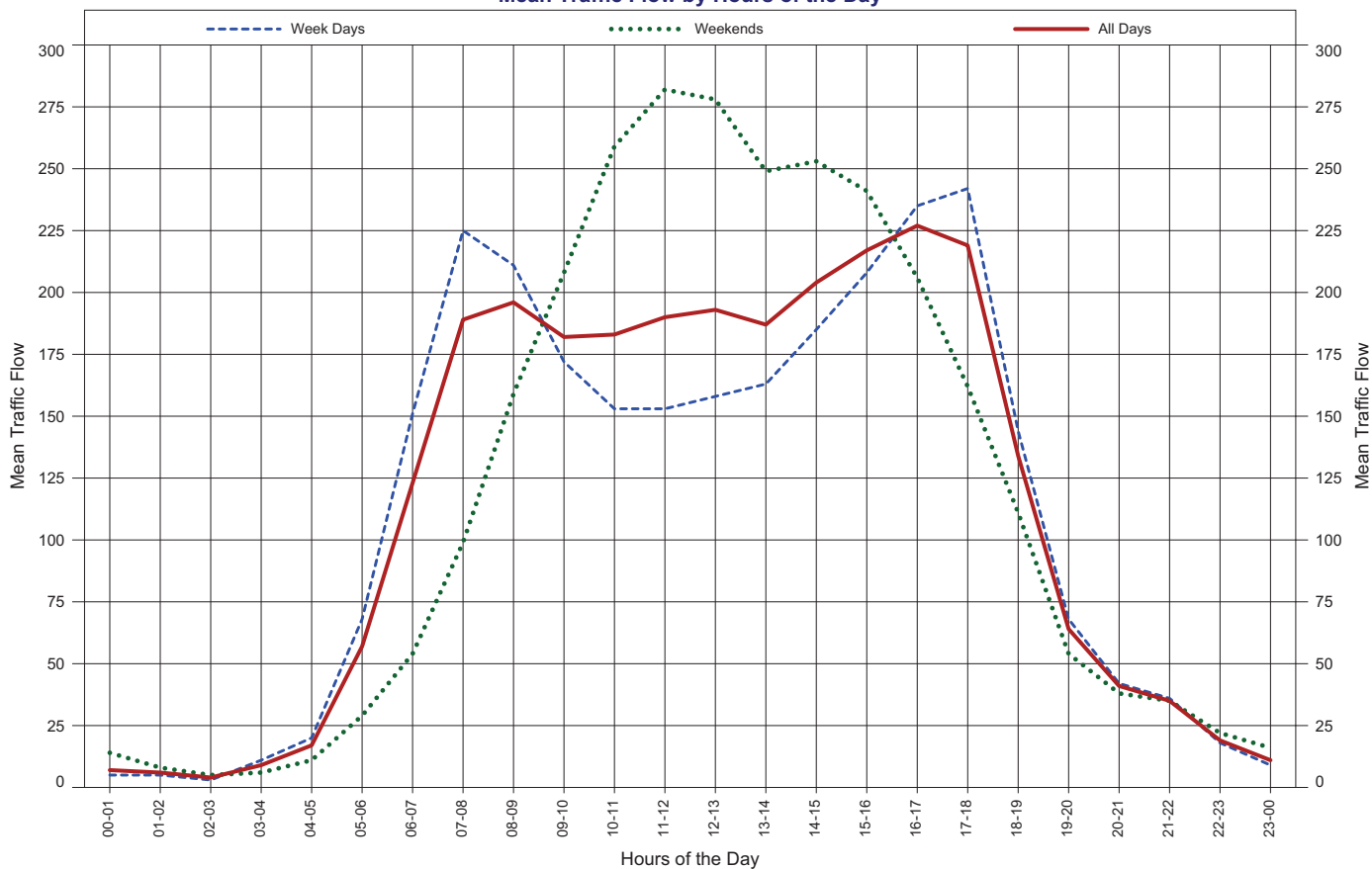


District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60088 - R'ton-Emu Park Rd W Emu Park Golf Club  
Thru Dist 42.95  
Type C - Coverage  
Stream TB - Bi-directional traffic flow  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	6	6	6	5	6	7	7
Calendar Events	5	0	0	1	3	4	2

### Mean Traffic Flow by Hours of the Day



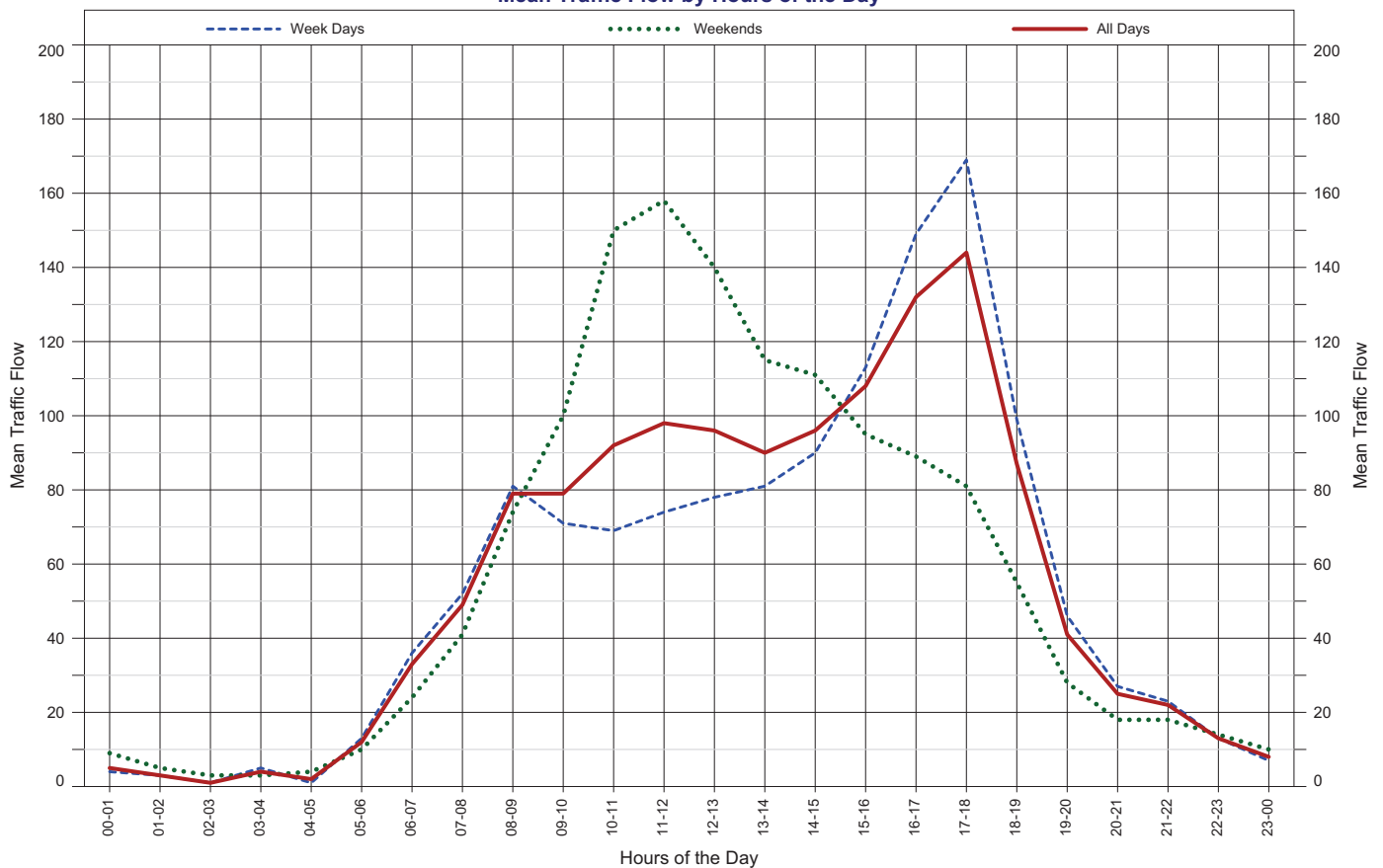
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	5 0.2%	3 0.1%	5 0.2%	5 0.2%	6 0.2%	11 0.4%	16 0.5%	5 0.2%	14 0.5%	7 0.3%
01-02	3 0.1%	5 0.2%	7 0.3%	4 0.2%	5 0.2%	9 0.3%	7 0.2%	5 0.2%	8 0.3%	6 0.2%
02-03	4 0.2%	2 0.1%	4 0.2%	3 0.1%	4 0.1%	5 0.2%	5 0.2%	3 0.1%	5 0.2%	4 0.1%
03-04	10 0.4%	12 0.4%	9 0.3%	10 0.4%	12 0.4%	7 0.3%	4 0.1%	11 0.4%	6 0.2%	9 0.3%
04-05	22 0.9%	21 0.8%	20 0.8%	17 0.6%	20 0.7%	14 0.5%	8 0.3%	20 0.7%	11 0.4%	17 0.6%
05-06	66 2.6%	74 2.8%	75 2.9%	65 2.4%	62 2.1%	36 1.4%	22 0.7%	68 2.5%	29 1.0%	57 2.1%
06-07	138 5.4%	165 6.2%	145 5.6%	156 5.9%	150 5.1%	61 2.4%	47 1.6%	151 5.6%	54 1.9%	123 4.5%
07-08	206 8.0%	241 9.0%	214 8.2%	237 8.9%	225 7.7%	111 4.3%	87 2.9%	225 8.4%	99 3.5%	189 7.0%
08-09	198 7.7%	220 8.2%	200 7.7%	209 7.9%	229 7.8%	145 5.6%	172 5.7%	211 7.9%	159 5.7%	196 7.2%
09-10	173 6.7%	163 6.1%	167 6.4%	172 6.5%	185 6.3%	195 7.5%	221 7.4%	172 6.4%	208 7.4%	182 6.7%
10-11	158 6.2%	149 5.6%	156 6.0%	140 5.3%	163 5.6%	203 7.8%	315 10.5%	153 5.7%	259 9.3%	183 6.7%
11-12	162 6.3%	142 5.3%	149 5.7%	142 5.3%	170 5.8%	215 8.3%	349 11.6%	153 5.7%	282 10.1%	190 7.0%
12-13	172 6.7%	144 5.4%	148 5.7%	146 5.5%	182 6.2%	222 8.6%	334 11.1%	158 5.9%	278 9.9%	193 7.1%
13-14	171 6.7%	164 6.1%	153 5.9%	153 5.8%	173 5.9%	211 8.1%	287 9.6%	163 6.1%	249 8.9%	187 6.9%
14-15	180 7.0%	179 6.7%	177 6.8%	185 7.0%	203 6.9%	224 8.6%	282 9.4%	185 6.9%	253 9.0%	204 7.5%
15-16	212 8.3%	201 7.5%	205 7.9%	196 7.4%	226 7.7%	215 8.3%	267 8.9%	208 7.7%	241 8.6%	217 8.0%
16-17	219 8.5%	235 8.8%	233 8.9%	241 9.1%	246 8.4%	195 7.5%	217 7.2%	235 8.8%	206 7.4%	227 8.4%
17-18	220 8.6%	241 9.0%	248 9.5%	245 9.2%	256 8.7%	174 6.7%	149 5.0%	242 9.0%	162 5.8%	219 8.1%
18-19	117 4.6%	149 5.6%	137 5.3%	148 5.6%	167 5.7%	132 5.1%	89 3.0%	144 5.4%	111 4.0%	134 4.9%
19-20	54 2.1%	60 2.2%	59 2.3%	72 2.7%	94 3.2%	58 2.2%	49 1.6%	68 2.5%	54 1.9%	64 2.4%
20-21	31 1.2%	44 1.6%	43 1.7%	43 1.6%	51 1.7%	45 1.7%	30 1.0%	42 1.6%	38 1.4%	41 1.5%
21-22	28 1.1%	31 1.2%	26 1.0%	42 1.6%	51 1.7%	48 1.9%	21 0.7%	36 1.3%	35 1.3%	35 1.3%
22-23	10 0.4%	16 0.6%	16 0.6%	19 0.7%	31 1.1%	33 1.3%	11 0.4%	18 0.7%	22 0.8%	19 0.7%
23-24	6 0.2%	7 0.3%	9 0.3%	8 0.3%	16 0.5%	24 0.9%	7 0.2%	9 0.3%	16 0.6%	11 0.4%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 206	08:00 241	08:00 214	08:00 237	09:00 229	12:00 215	12:00 349	08:00 225	12:00 282	09:00 196
PM	18:00 220	18:00 241	18:00 248	18:00 245	18:00 256	15:00 224	13:00 334	18:00 242	13:00 278	17:00 226
12-Hour	2,188 85.3%	2,228 83.5%	2,187 84.0%	2,214 83.3%	2,425 82.8%	2,242 86.5%	2,769 92.4%	2,249 83.8%	2,507 89.6%	2,321 85.5%
16-Hour	2,439 95.1%	2,528 94.8%	2,460 94.4%	2,527 95.1%	2,771 94.7%	2,454 94.6%	2,916 97.3%	2,546 94.8%	2,688 96.0%	2,584 95.2%
18-Hour	2,455 95.7%	2,551 95.6%	2,485 95.4%	2,554 96.1%	2,818 96.3%	2,511 96.8%	2,934 97.9%	2,573 95.8%	2,726 97.4%	2,614 96.3%
24-Hour	2,565 100.0%	2,668 100.0%	2,605 100.0%	2,658 100.0%	2,927 100.0%	2,593 100.0%	2,996 100.0%	2,685 100.0%	2,799 100.0%	2,714 100.0%
Avg Week Day	95.5%	99.4%	97.0%	99.0%	109.0%			100.0%	104.2%	101.1%
Avg Weekend Day			96.0%	97.9%	107.8%	92.6%	107.0%	95.9%	100.0%	97.0%
Avg Day	94.5%	98.3%	96.0%	97.9%	107.8%	95.5%	110.4%	98.9%	103.1%	100.0%

District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60088 - R'ton-Emu Park Rd W Emu Park Golf Club  
Thru Dist 42.95  
Type C - Coverage  
Stream TG - Thru traffic -in gazettal dirn  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	6	6	6	5	6	7	7
Calendar Events	5	0	0	1	3	4	2

### Mean Traffic Flow by Hours of the Day



Traffic Analysis and Reporting System  
Weekly Volume Report

Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	3 0.2%	2 0.2%	4 0.3%	4 0.3%	5 0.3%	7 0.6%	10 0.7%	4 0.3%	9 0.7%	5 0.4%
01-02	1 0.1%	2 0.2%	4 0.3%	2 0.2%	4 0.3%	6 0.5%	4 0.3%	3 0.2%	5 0.4%	3 0.2%
02-03	1 0.1%	1 0.1%	2 0.2%		1 0.1%	3 0.2%	2 0.1%	1 0.1%	3 0.2%	1 0.1%
03-04	3 0.2%	5 0.4%	4 0.3%	6 0.5%	6 0.4%	4 0.3%	2 0.1%	5 0.4%	3 0.2%	4 0.3%
04-05	1 0.1%	1 0.1%	2 0.2%	1 0.1%	2 0.1%	4 0.3%	4 0.3%	1 0.1%	4 0.3%	2 0.2%
05-06	15 1.2%	13 1.0%	14 1.1%	12 0.9%	12 0.8%	10 0.8%	10 0.7%	13 1.0%	10 0.7%	12 0.9%
06-07	33 2.7%	39 3.0%	37 2.9%	36 2.8%	36 2.5%	23 1.8%	24 1.7%	36 2.8%	24 1.8%	33 2.5%
07-08	50 4.1%	53 4.1%	47 3.7%	52 4.0%	56 3.8%	43 3.4%	39 2.7%	52 4.0%	41 3.0%	49 3.7%
08-09	76 6.3%	84 6.5%	78 6.1%	77 5.9%	90 6.2%	56 4.4%	92 6.4%	81 6.2%	74 5.5%	79 6.0%
09-10	71 5.9%	66 5.1%	70 5.5%	73 5.6%	76 5.2%	78 6.2%	121 8.4%	71 5.4%	100 7.4%	79 6.0%
10-11	69 5.7%	66 5.1%	70 5.5%	66 5.1%	73 5.0%	97 7.7%	202 14.1%	69 5.3%	150 11.1%	92 7.0%
11-12	80 6.6%	67 5.2%	75 5.9%	66 5.1%	80 5.5%	111 8.8%	204 14.2%	74 5.7%	158 11.7%	98 7.4%
12-13	85 7.0%	71 5.5%	77 6.1%	71 5.5%	88 6.0%	118 9.3%	162 11.3%	78 6.0%	140 10.3%	96 7.3%
13-14	81 6.7%	78 6.1%	76 6.0%	76 5.9%	92 6.3%	111 8.8%	119 8.3%	81 6.2%	115 8.5%	90 6.8%
14-15	85 7.0%	89 6.9%	82 6.4%	92 7.1%	104 7.1%	117 9.2%	104 7.3%	90 6.9%	111 8.2%	96 7.3%
15-16	108 8.9%	109 8.5%	112 8.8%	106 8.2%	128 8.8%	103 8.1%	87 6.1%	113 8.7%	95 7.0%	108 8.2%
16-17	130 10.7%	156 12.2%	147 11.6%	155 11.9%	159 10.9%	96 7.6%	81 5.6%	149 11.4%	89 6.6%	132 10.0%
17-18	152 12.6%	173 13.5%	172 13.5%	169 13.0%	179 12.2%	95 7.5%	66 4.6%	169 13.0%	81 6.0%	144 10.9%
18-19	81 6.7%	104 8.1%	94 7.4%	103 7.9%	115 7.9%	71 5.6%	39 2.7%	99 7.6%	55 4.1%	87 6.6%
19-20	37 3.1%	38 3.0%	40 3.1%	51 3.9%	65 4.4%	30 2.4%	25 1.7%	46 3.5%	28 2.1%	41 3.1%
20-21	20 1.7%	28 2.2%	27 2.1%	31 2.4%	31 2.1%	20 1.6%	16 1.1%	27 2.1%	18 1.3%	25 1.9%
21-22	17 1.4%	22 1.7%	19 1.5%	30 2.3%	29 2.0%	25 2.0%	11 0.8%	23 1.8%	18 1.3%	22 1.7%
22-23	7 0.6%	11 0.9%	12 0.9%	13 1.0%	20 1.4%	22 1.7%	6 0.4%	13 1.0%	14 1.0%	13 1.0%
23-24	5 0.4%	5 0.4%	7 0.6%	7 0.5%	11 0.8%	15 1.2%	4 0.3%	7 0.5%	10 0.7%	8 0.6%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	12:00 80	09:00 84	09:00 78	09:00 77	09:00 90	12:00 111	12:00 204	09:00 81	12:00 157	12:00 97
PM	18:00 152	18:00 173	18:00 172	18:00 169	18:00 179	13:00 118	13:00 162	18:00 169	13:00 140	18:00 143
12-Hour	1,068 88.2%	1,116 87.0%	1,100 86.5%	1,106 85.1%	1,240 84.8%	1,096 86.6%	1,316 91.8%	1,126 86.3%	1,209 89.2%	1,150 87.2%
16-Hour	1,175 97.0%	1,243 96.9%	1,223 96.1%	1,254 96.5%	1,401 95.8%	1,194 94.4%	1,392 97.1%	1,258 96.4%	1,297 95.7%	1,271 96.4%
18-Hour	1,187 98.0%	1,259 98.1%	1,242 97.6%	1,274 98.1%	1,432 97.9%	1,231 97.3%	1,402 97.8%	1,278 97.9%	1,321 97.5%	1,292 98.0%
24-Hour	1,211 100.0%	1,283 100.0%	1,272 100.0%	1,299 100.0%	1,462 100.0%	1,265 100.0%	1,434 100.0%	1,305 100.0%	1,355 100.0%	1,319 100.0%
Avg Week Day	92.8%	98.3%	97.5%	99.5%	112.0%			100.0%	103.8%	101.1%
Avg Weekend Day						93.4%	105.8%	96.3%	100.0%	97.3%
Avg Day	91.8%	97.3%	96.4%	98.5%	110.8%	95.9%	108.7%	98.9%	102.7%	100.0%

Site 60004.	Point 2600000007.
R'ton-Emu Park Rd at Nankin Creek.	20.40 km

The width of each Road Segment is proportional to its AADT.



All Vehicles (00)
G 1,552 100%
A 1,616 100%
B 3,168 100%

Light Vehicles (0A)
G 1,443 93.00%
A 1,506 93.21%
B 2,949 93.10%

Short Vehicles (1A)
G 1,443 93.00%
A 1,506 93.21%
B 2,949 93.10%

Short 2-Axle Vehicles (2A)
G 1,400 90.22%
A 1,462 90.44%
B 2,862 90.33%

Short Vehicles Towing (2B)
G 43 2.78%
A 45 2.77%
B 88 2.77%

2-Axle Trucks and Buses (2C)
G 76 4.87%
A 80 4.98%
B 156 4.93%

3-Axle Trucks and Buses (2D)
G 14 0.88%
A 9 0.53%
B 22 0.70%

4-Axle Trucks (2E)
G 1 0.09%
A 1 0.07%
B 3 0.08%

3-Axle Articulated (2F)
G 2 0.15%
A 2 0.15%
B 5 0.15%

4-Axle Articulated (2G)
G 5 0.30%
A 4 0.22%
B 8 0.26%

5-Axle Articulated (2H)
G 1 0.05%
A 1 0.07%
B 2 0.06%

6-Axle Articulated (2I)
G 7 0.45%
A 10 0.60%
B 16 0.52%

B Double (2J)
G 3 0.18%
A 3 0.16%
B 5 0.17%

Double Road Trains (2K)
G 0 0.02%
A 0 0.01%
B 1 0.02%

Triple Road Trains (2L)
G 0 0.01%
A 0 0.00%
B 0 0.01%

Heavy Vehicles (0B)
G 109 7.00%
A 110 6.79%
B 219 6.90%

Articulated Vehicles (1C)
G 15 0.95%
A 17 1.04%
B 31 0.99%

Road Trains (1D)
G 3 0.21%
A 3 0.17%
B 6 0.20%

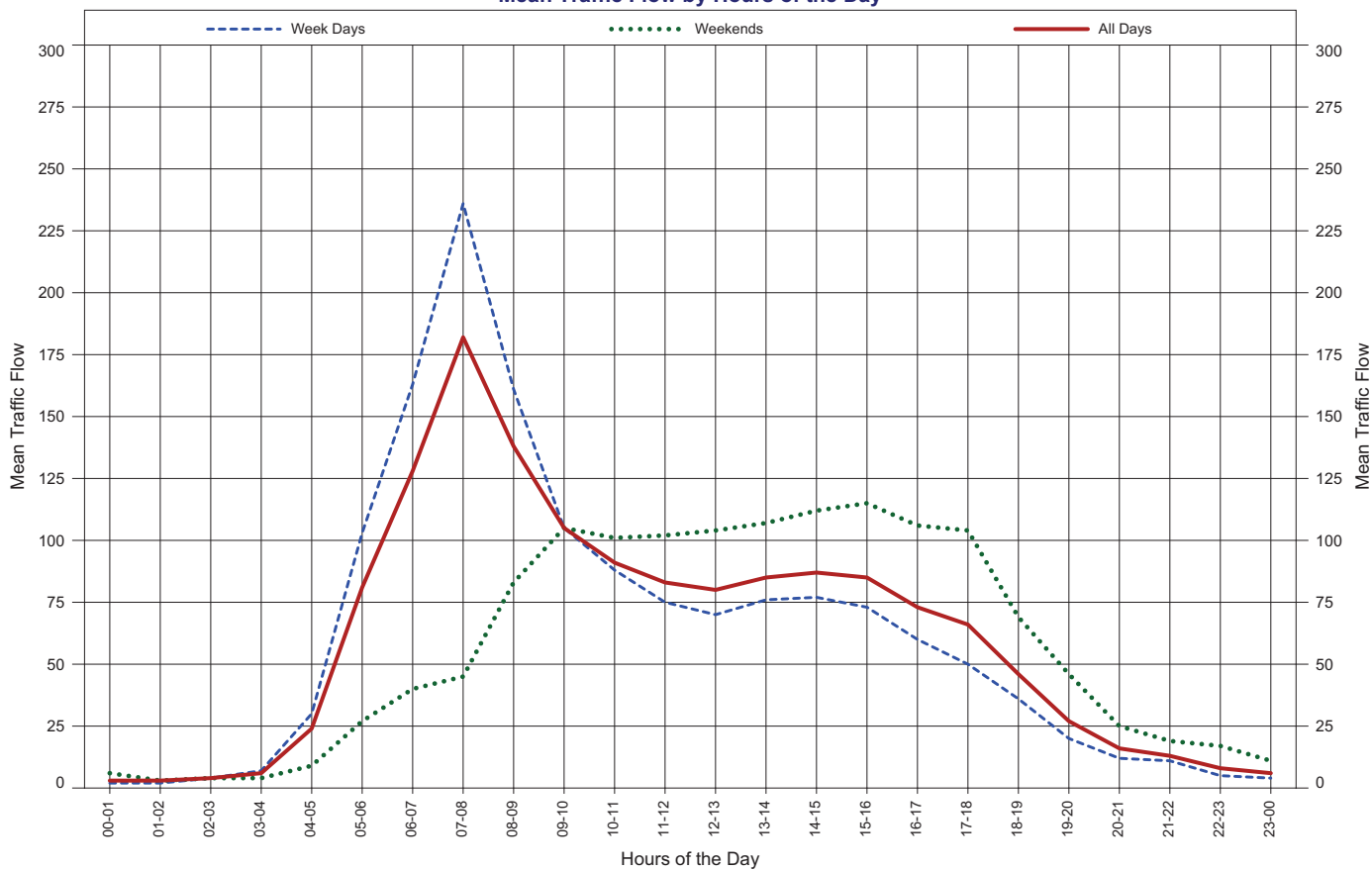
This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60004 - R'ton-Emu Park Rd at Nankin Creek  
Thru Dist 20.4  
Type C - Coverage  
Stream TA - Thru traffic -against gazettal  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	2	2	2	2	2	2	2
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day





Traffic Analysis and Reporting System  
Weekly Volume Report

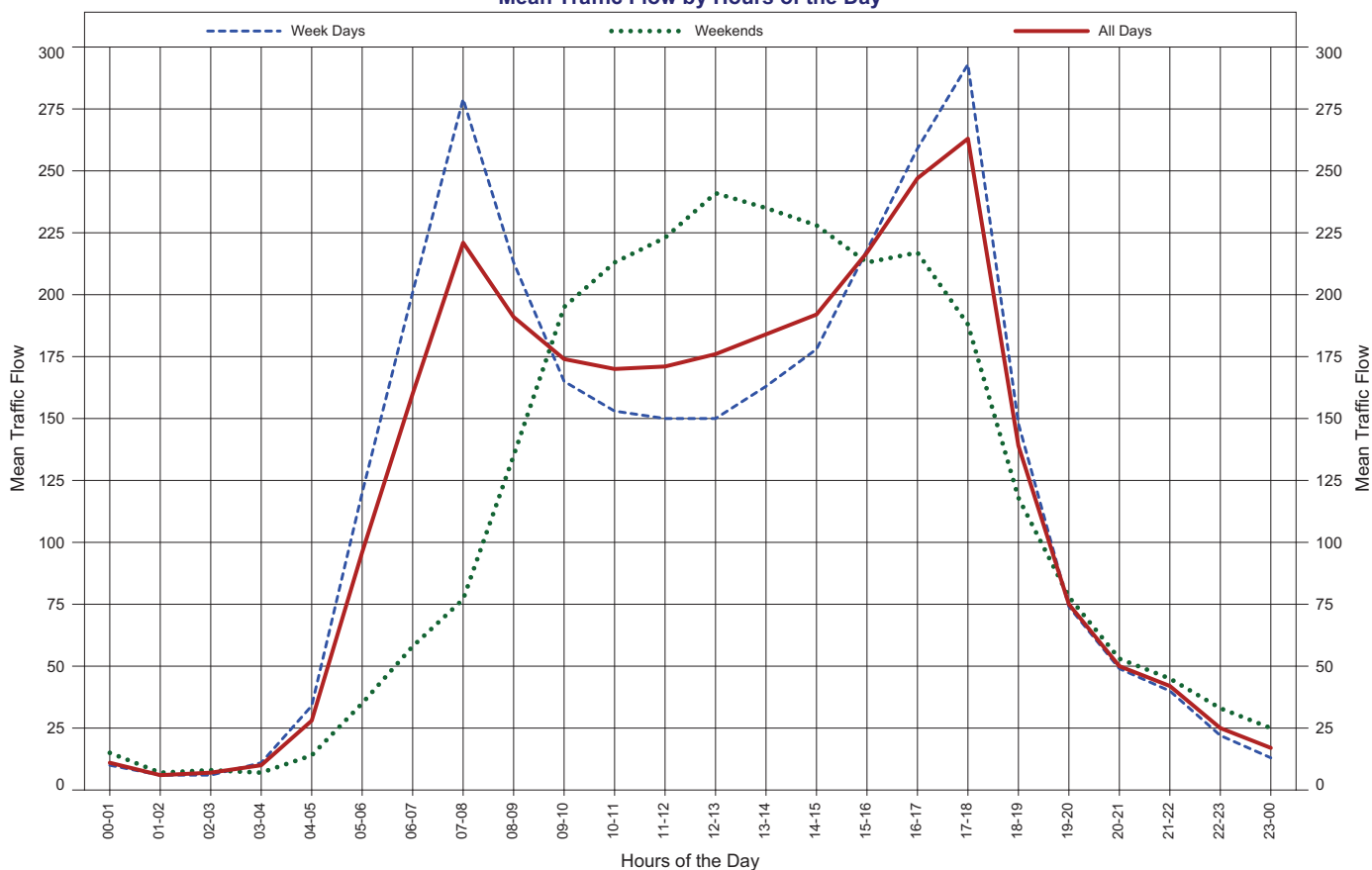
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	3 0.2%	1 0.1%	2 0.1%	4 0.3%	2 0.1%	5 0.4%	6 0.4%	2 0.1%	6 0.4%	3 0.2%
01-02	2 0.1%	2 0.1%	2 0.1%	2 0.1%	4 0.3%	2 0.2%	4 0.3%	2 0.1%	3 0.2%	3 0.2%
02-03	8 0.5%	2 0.1%	3 0.2%	4 0.3%	3 0.2%	2 0.2%	6 0.4%	4 0.3%	4 0.3%	4 0.3%
03-04	8 0.5%	7 0.5%	4 0.3%	8 0.5%	9 0.6%	4 0.3%	3 0.2%	7 0.5%	4 0.3%	6 0.4%
04-05	35 2.3%	30 2.1%	35 2.3%	25 1.7%	26 1.8%	11 0.9%	6 0.4%	30 2.0%	9 0.7%	24 1.7%
05-06	112 7.4%	103 7.1%	100 6.7%	105 7.2%	97 6.7%	41 3.2%	12 0.8%	103 7.0%	27 2.0%	81 5.6%
06-07	180 11.9%	169 11.7%	164 11.0%	161 11.1%	140 9.7%	50 3.9%	30 2.1%	163 11.1%	40 2.9%	128 8.9%
07-08	244 16.2%	247 17.0%	241 16.1%	236 16.2%	213 14.7%	62 4.9%	28 1.9%	236 16.1%	45 3.3%	182 12.6%
08-09	157 10.4%	164 11.3%	182 12.2%	149 10.2%	152 10.5%	103 8.1%	62 4.3%	161 11.0%	83 6.1%	138 9.6%
09-10	105 7.0%	111 7.7%	108 7.2%	98 6.7%	101 7.0%	119 9.4%	91 6.3%	105 7.1%	105 7.7%	105 7.3%
10-11	85 5.6%	80 5.5%	94 6.3%	85 5.8%	95 6.6%	99 7.8%	102 7.1%	88 6.0%	101 7.4%	91 6.3%
11-12	67 4.4%	74 5.1%	78 5.2%	76 5.2%	80 5.5%	91 7.2%	113 7.8%	75 5.1%	102 7.5%	83 5.8%
12-13	73 4.8%	69 4.8%	75 5.0%	71 4.9%	62 4.3%	83 6.5%	125 8.7%	70 4.8%	104 7.6%	80 5.6%
13-14	80 5.3%	70 4.8%	74 5.0%	78 5.4%	78 5.4%	86 6.8%	128 8.9%	76 5.2%	107 7.8%	85 5.9%
14-15	80 5.3%	76 5.2%	77 5.2%	70 4.8%	83 5.7%	83 6.5%	141 9.8%	77 5.2%	112 8.2%	87 6.0%
15-16	77 5.1%	58 4.0%	64 4.3%	83 5.7%	82 5.7%	71 5.6%	158 10.9%	73 5.0%	115 8.4%	85 5.9%
16-17	63 4.2%	64 4.4%	57 3.8%	55 3.8%	60 4.1%	85 6.7%	127 8.8%	60 4.1%	106 7.8%	73 5.1%
17-18	48 3.2%	48 3.3%	55 3.7%	48 3.3%	52 3.6%	87 6.8%	121 8.4%	50 3.4%	104 7.6%	66 4.6%
18-19	33 2.2%	29 2.0%	36 2.4%	39 2.7%	44 3.0%	62 4.9%	76 5.3%	36 2.4%	69 5.1%	46 3.2%
19-20	19 1.3%	21 1.4%	12 0.8%	23 1.6%	25 1.7%	36 2.8%	56 3.9%	20 1.4%	46 3.4%	27 1.9%
20-21	9 0.6%	10 0.7%	14 0.9%	13 0.9%	14 1.0%	26 2.0%	23 1.6%	12 0.8%	25 1.8%	16 1.1%
21-22	11 0.7%	9 0.6%	7 0.5%	15 1.0%	12 0.8%	25 2.0%	12 0.8%	11 0.7%	19 1.4%	13 0.9%
22-23	5 0.3%	4 0.3%	7 0.5%	3 0.2%	7 0.5%	23 1.8%	10 0.7%	5 0.3%	17 1.2%	8 0.6%
23-24	3 0.2%	2 0.1%	2 0.1%	4 0.3%	9 0.6%	16 1.3%	5 0.3%	4 0.3%	11 0.8%	6 0.4%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 244	08:00 247	08:00 241	08:00 236	08:00 213	10:00 119	12:00 113	08:00 236	10:00 105	08:00 181
PM	14:00 80	15:00 76	15:00 77	16:00 83	15:00 83	18:00 87	16:00 158	15:00 77	16:00 114	15:00 87
12-Hour	1,112 73.8%	1,090 75.2%	1,141 76.4%	1,088 74.8%	1,102 76.0%	1,031 81.1%	1,272 88.0%	1,107 75.3%	1,153 84.5%	1,121 77.8%
16-Hour	1,331 88.3%	1,299 89.6%	1,338 89.6%	1,300 89.3%	1,293 89.2%	1,168 91.8%	1,393 96.4%	1,313 89.3%	1,283 94.1%	1,305 90.6%
18-Hour	1,339 88.9%	1,305 90.0%	1,347 90.2%	1,307 89.8%	1,309 90.3%	1,207 94.9%	1,408 97.4%	1,322 89.9%	1,311 96.1%	1,319 91.6%
24-Hour	1,507 100.0%	1,450 100.0%	1,493 100.0%	1,455 100.0%	1,450 100.0%	1,272 100.0%	1,445 100.0%	1,470 100.0%	1,364 100.0%	1,440 100.0%
Avg Week Day	102.5%	98.6%	101.6%	99.0%	98.6%	93.3%	105.9%	100.0%	92.8%	98.0%
Avg Weekend Day						93.3%	105.9%	107.8%	100.0%	105.6%
Avg Day	104.7%	100.7%	103.7%	101.0%	100.7%	88.3%	100.3%	102.1%	94.7%	100.0%

District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60004 - R'ton-Emu Park Rd at Nankin Creek  
Thru Dist 20.4  
Type C - Coverage  
Stream TB - Bi-directional traffic flow  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	2	2	2	2	2	2	2
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



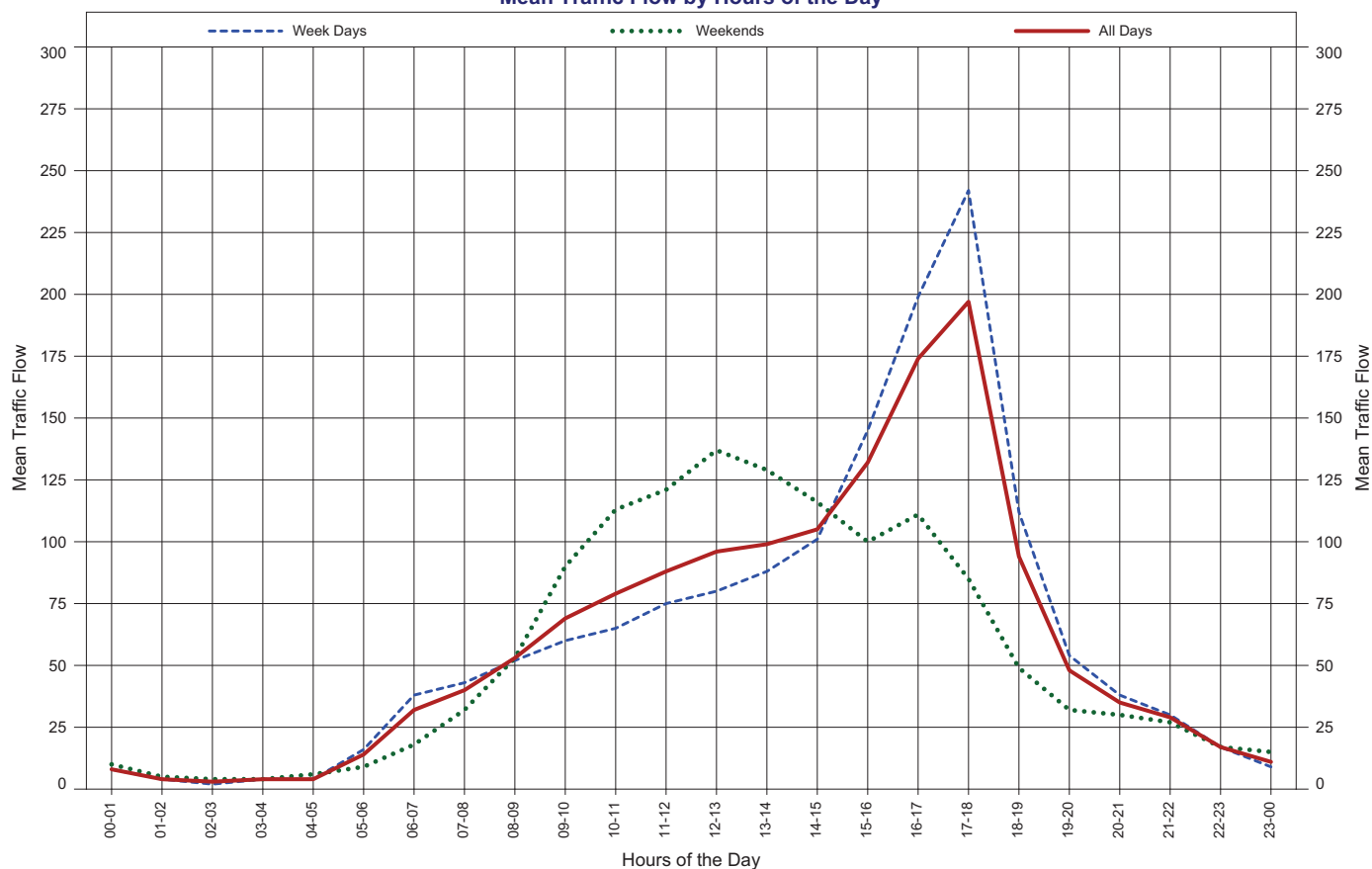
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	8 0.3%	5 0.2%	10 0.3%	14 0.5%	13 0.4%	12 0.5%	18 0.7%	10 0.3%	15 0.6%	11 0.4%
01-02	3 0.1%	7 0.2%	7 0.2%	9 0.3%	6 0.2%	5 0.2%	8 0.3%	6 0.2%	7 0.3%	6 0.2%
02-03	10 0.3%	4 0.1%	7 0.2%	5 0.2%	5 0.2%	8 0.3%	8 0.3%	6 0.2%	8 0.3%	7 0.2%
03-04	11 0.4%	10 0.3%	8 0.3%	13 0.4%	13 0.4%	8 0.3%	6 0.2%	11 0.4%	7 0.3%	10 0.3%
04-05	41 1.4%	32 1.1%	40 1.4%	29 1.0%	29 0.9%	16 0.6%	11 0.4%	34 1.2%	14 0.5%	28 1.0%
05-06	130 4.4%	123 4.2%	114 3.9%	120 4.1%	112 3.6%	50 1.9%	20 0.7%	120 4.1%	35 1.3%	96 3.3%
06-07	222 7.6%	210 7.3%	197 6.8%	202 6.9%	172 5.6%	68 2.6%	47 1.7%	201 6.8%	58 2.2%	160 5.6%
07-08	282 9.6%	290 10.0%	287 9.9%	278 9.5%	257 8.3%	92 3.5%	61 2.2%	279 9.4%	77 2.9%	221 7.7%
08-09	208 7.1%	224 7.7%	231 7.9%	202 6.9%	201 6.5%	139 5.3%	131 4.8%	213 7.2%	135 5.1%	191 6.7%
09-10	162 5.5%	172 5.9%	170 5.8%	159 5.4%	162 5.2%	193 7.4%	197 7.3%	165 5.6%	195 7.3%	174 6.1%
10-11	147 5.0%	143 4.9%	158 5.4%	156 5.3%	161 5.2%	195 7.5%	231 8.5%	153 5.2%	213 8.0%	170 5.9%
11-12	151 5.1%	147 5.1%	149 5.1%	151 5.1%	153 4.9%	199 7.7%	246 9.1%	150 5.1%	223 8.4%	171 6.0%
12-13	150 5.1%	152 5.3%	149 5.1%	148 5.0%	153 4.9%	218 8.4%	263 9.7%	150 5.1%	241 9.1%	176 6.1%
13-14	158 5.4%	158 5.5%	158 5.4%	159 5.4%	183 5.9%	215 8.3%	255 9.4%	163 5.5%	235 8.8%	184 6.4%
14-15	181 6.2%	172 5.9%	162 5.6%	166 5.6%	209 6.8%	203 7.8%	253 9.3%	178 6.0%	228 8.6%	192 6.7%
15-16	218 7.4%	200 6.9%	208 7.1%	220 7.5%	244 7.9%	177 6.8%	249 9.2%	218 7.4%	213 8.0%	217 7.6%
16-17	259 8.8%	257 8.9%	234 8.0%	267 9.1%	277 9.0%	224 8.6%	209 7.7%	259 8.8%	217 8.2%	247 8.6%
17-18	296 10.1%	283 9.8%	306 10.5%	266 9.0%	312 10.1%	182 7.0%	194 7.1%	293 9.9%	188 7.1%	263 9.2%
18-19	137 4.7%	128 4.4%	144 4.9%	159 5.4%	172 5.6%	122 4.7%	113 4.2%	148 5.0%	118 4.4%	139 4.8%
19-20	70 2.4%	71 2.5%	49 1.7%	84 2.9%	94 3.0%	72 2.8%	84 3.1%	74 2.5%	78 2.9%	75 2.6%
20-21	31 1.1%	47 1.6%	55 1.9%	61 2.1%	53 1.7%	60 2.3%	46 1.7%	49 1.7%	53 2.0%	50 1.7%
21-22	36 1.2%	35 1.2%	37 1.3%	44 1.5%	50 1.6%	59 2.3%	31 1.1%	40 1.4%	45 1.7%	42 1.5%
22-23	16 0.5%	17 0.6%	20 0.7%	19 0.6%	37 1.2%	46 1.8%	20 0.7%	22 0.7%	33 1.2%	25 0.9%
23-24	11 0.4%	8 0.3%	12 0.4%	10 0.3%	25 0.8%	36 1.4%	14 0.5%	13 0.4%	25 0.9%	17 0.6%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 282	08:00 290	08:00 287	08:00 278	08:00 257	12:00 199	12:00 246	08:00 279	12:00 222	08:00 221
PM	18:00 296	18:00 283	18:00 306	17:00 267	18:00 312	17:00 224	13:00 263	18:00 293	13:00 240	18:00 262
12-Hour	2,349 80.0%	2,326 80.3%	2,356 80.9%	2,331 79.3%	2,484 80.3%	2,159 83.1%	2,402 88.5%	2,369 80.2%	2,283 85.8%	2,345 81.7%
16-Hour	2,708 92.2%	2,689 92.9%	2,694 92.5%	2,722 92.6%	2,853 92.2%	2,418 93.0%	2,610 96.1%	2,733 92.5%	2,517 94.6%	2,672 93.0%
18-Hour	2,735 93.1%	2,714 93.7%	2,726 93.6%	2,751 93.5%	2,915 94.2%	2,500 96.2%	2,644 97.4%	2,768 93.7%	2,575 96.8%	2,714 94.5%
24-Hour	2,938 100.0%	2,895 100.0%	2,912 100.0%	2,941 100.0%	3,093 100.0%	2,599 100.0%	2,715 100.0%	2,955 100.0%	2,661 100.0%	2,872 100.0%
Avg Week Day	99.4%	98.0%	98.5%	99.5%	104.7%			100.0%	90.1%	97.2%
Avg Weekend Day						97.7%	102.0%	111.0%	100.0%	107.9%
Avg Day	102.3%	100.8%	101.4%	102.4%	107.7%	90.5%	94.5%	102.9%	92.7%	100.0%

District 6 - Central District  
Road Section 194 - Rockhampton - Emu Park Road  
Site 60004 - R'ton-Emu Park Rd at Nankin Creek  
Thru Dist 20.4  
Type C - Coverage  
Stream TG - Thru traffic -in gazettal dirn  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

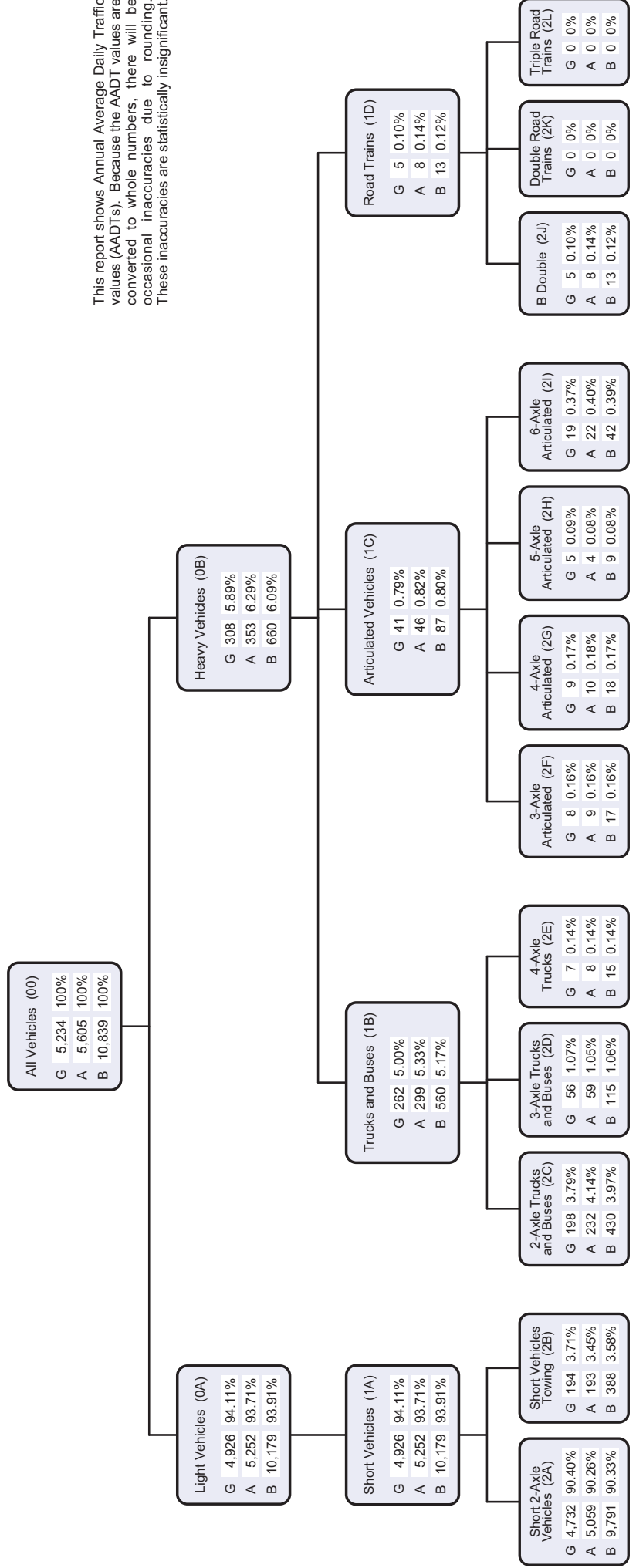
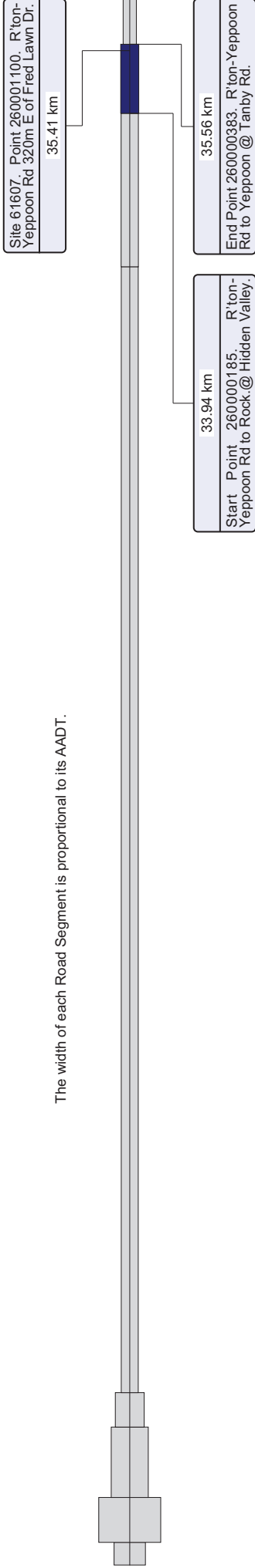
	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	2	2	2	2	2	2	2
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



Traffic Analysis and Reporting System  
**Weekly Volume Report**

Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	5 0.3%	4 0.3%	8 0.6%	10 0.7%	12 0.7%	7 0.5%	12 0.9%	8 0.5%	10 0.8%	8 0.6%
01-02	2 0.1%	5 0.3%	5 0.4%	7 0.5%	2 0.1%	4 0.3%	5 0.4%	4 0.3%	5 0.4%	4 0.3%
02-03	2 0.1%	2 0.1%	4 0.3%	1 0.1%	3 0.2%	6 0.4%	2 0.2%	2 0.1%	4 0.3%	3 0.2%
03-04	3 0.2%	3 0.2%	5 0.4%	5 0.3%	4 0.2%	5 0.4%	3 0.2%	4 0.3%	4 0.3%	4 0.3%
04-05	6 0.4%	2 0.1%	5 0.4%	4 0.3%	3 0.2%	6 0.4%	5 0.4%	4 0.3%	6 0.5%	4 0.3%
05-06	18 1.3%	20 1.4%	14 1.0%	15 1.0%	15 0.9%	9 0.7%	8 0.6%	16 1.1%	9 0.7%	14 1.0%
06-07	42 2.9%	42 2.9%	33 2.3%	41 2.8%	32 1.9%	19 1.4%	17 1.3%	38 2.6%	18 1.4%	32 2.2%
07-08	38 2.6%	44 3.0%	46 3.2%	42 2.8%	44 2.7%	31 2.3%	33 2.6%	43 2.9%	32 2.4%	40 2.8%
08-09	51 3.6%	60 4.1%	49 3.4%	53 3.6%	49 3.0%	36 2.7%	70 5.5%	52 3.5%	53 4.0%	53 3.7%
09-10	57 4.0%	61 4.2%	62 4.4%	61 4.1%	61 3.7%	74 5.5%	106 8.3%	60 4.0%	90 6.9%	69 4.8%
10-11	62 4.3%	63 4.3%	64 4.5%	71 4.8%	66 4.0%	96 7.2%	129 10.1%	65 4.4%	113 8.6%	79 5.5%
11-12	84 5.9%	73 5.0%	71 5.0%	75 5.0%	73 4.4%	108 8.1%	133 10.4%	75 5.0%	121 9.2%	88 6.1%
12-13	77 5.4%	83 5.7%	74 5.2%	77 5.2%	91 5.5%	135 10.1%	138 10.8%	80 5.4%	137 10.4%	96 6.7%
13-14	78 5.4%	89 6.1%	85 6.0%	81 5.4%	106 6.4%	129 9.7%	128 10.0%	88 5.9%	129 9.8%	99 6.9%
14-15	101 7.0%	96 6.6%	86 6.0%	96 6.5%	126 7.7%	120 9.0%	112 8.8%	101 6.8%	116 8.8%	105 7.3%
15-16	141 9.8%	142 9.8%	144 10.1%	137 9.2%	163 9.9%	107 8.0%	92 7.2%	145 9.8%	100 7.6%	132 9.2%
16-17	196 13.7%	194 13.4%	177 12.4%	213 14.3%	217 13.2%	139 10.4%	82 6.4%	199 13.4%	111 8.5%	174 12.1%
17-18	248 17.3%	235 16.2%	251 17.6%	218 14.7%	260 15.8%	96 7.2%	73 5.7%	242 16.3%	85 6.5%	197 13.7%
18-19	104 7.2%	99 6.8%	108 7.6%	120 8.1%	128 7.8%	61 4.6%	37 2.9%	112 7.5%	49 3.7%	94 6.6%
19-20	52 3.6%	50 3.4%	38 2.7%	61 4.1%	69 4.2%	36 2.7%	28 2.2%	54 3.6%	32 2.4%	48 3.3%
20-21	23 1.6%	37 2.6%	41 2.9%	48 3.2%	39 2.4%	35 2.6%	24 1.9%	38 2.6%	30 2.3%	35 2.4%
21-22	26 1.8%	26 1.8%	30 2.1%	30 2.0%	38 2.3%	34 2.5%	19 1.5%	30 2.0%	27 2.1%	29 2.0%
22-23	11 0.8%	14 1.0%	13 0.9%	16 1.1%	30 1.8%	23 1.7%	11 0.9%	17 1.1%	17 1.3%	17 1.2%
23-24	8 0.6%	6 0.4%	10 0.7%	6 0.4%	16 1.0%	20 1.5%	10 0.8%	9 0.6%	15 1.1%	11 0.8%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	12:00 84	12:00 73	12:00 71	12:00 75	12:00 73	12:00 108	12:00 133	12:00 75	12:00 120	12:00 88
PM	18:00 248	18:00 235	18:00 251	18:00 218	18:00 260	17:00 139	13:00 138	18:00 242	13:00 136	18:00 197
12-Hour	1,237 86.2%	1,239 85.4%	1,217 85.5%	1,244 83.6%	1,384 84.0%	1,132 84.7%	1,133 88.7%	1,262 84.9%	1,136 86.5%	1,226 85.4%
16-Hour	1,380 96.2%	1,394 96.1%	1,359 95.5%	1,424 95.7%	1,562 94.8%	1,256 94.0%	1,221 95.6%	1,422 95.7%	1,243 94.7%	1,370 95.5%
18-Hour	1,399 97.5%	1,414 97.5%	1,382 97.1%	1,446 97.2%	1,608 97.6%	1,299 97.2%	1,242 97.3%	1,448 97.4%	1,275 97.1%	1,398 97.4%
24-Hour	1,435 100.0%	1,450 100.0%	1,423 100.0%	1,488 100.0%	1,647 100.0%	1,336 100.0%	1,277 100.0%	1,486 100.0%	1,313 100.0%	1,435 100.0%
Avg Week Day	96.6%	97.6%	95.8%	100.1%	110.8%	101.8%	97.3%	100.0%	88.4%	96.6%
Avg Weekend Day										
Avg Day	100.0%	101.0%	99.2%	103.7%	114.8%	93.1%	89.0%	103.6%	91.5%	100.0%



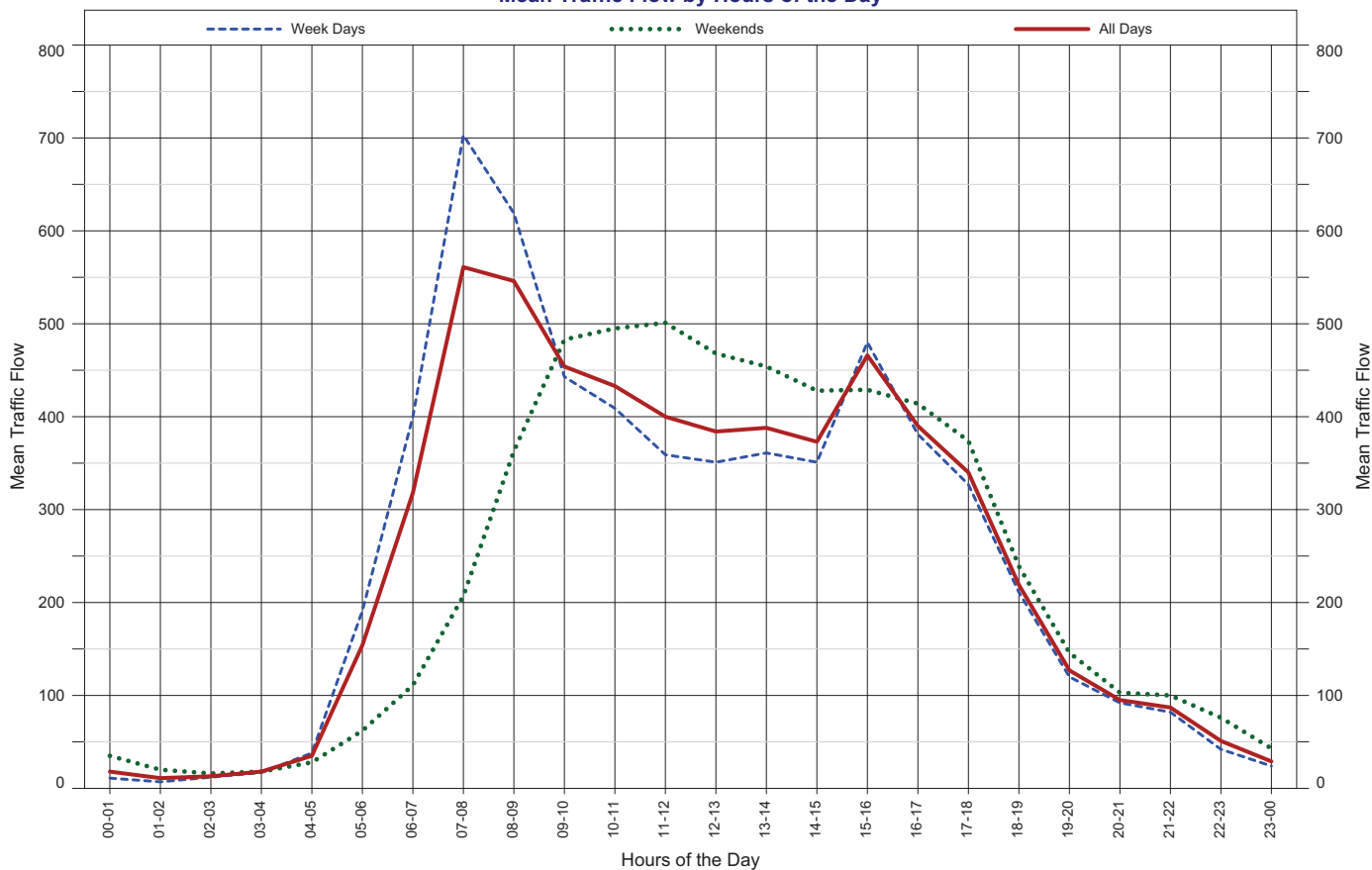


District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61607 - R'ton-Yeppoon Rd 320m E of Fred Lawn Dr  
Thru Dist 35.41  
Type C - Coverage  
Stream TA - Thru traffic -against gazettal  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	4	4	2	3	4	4	4
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



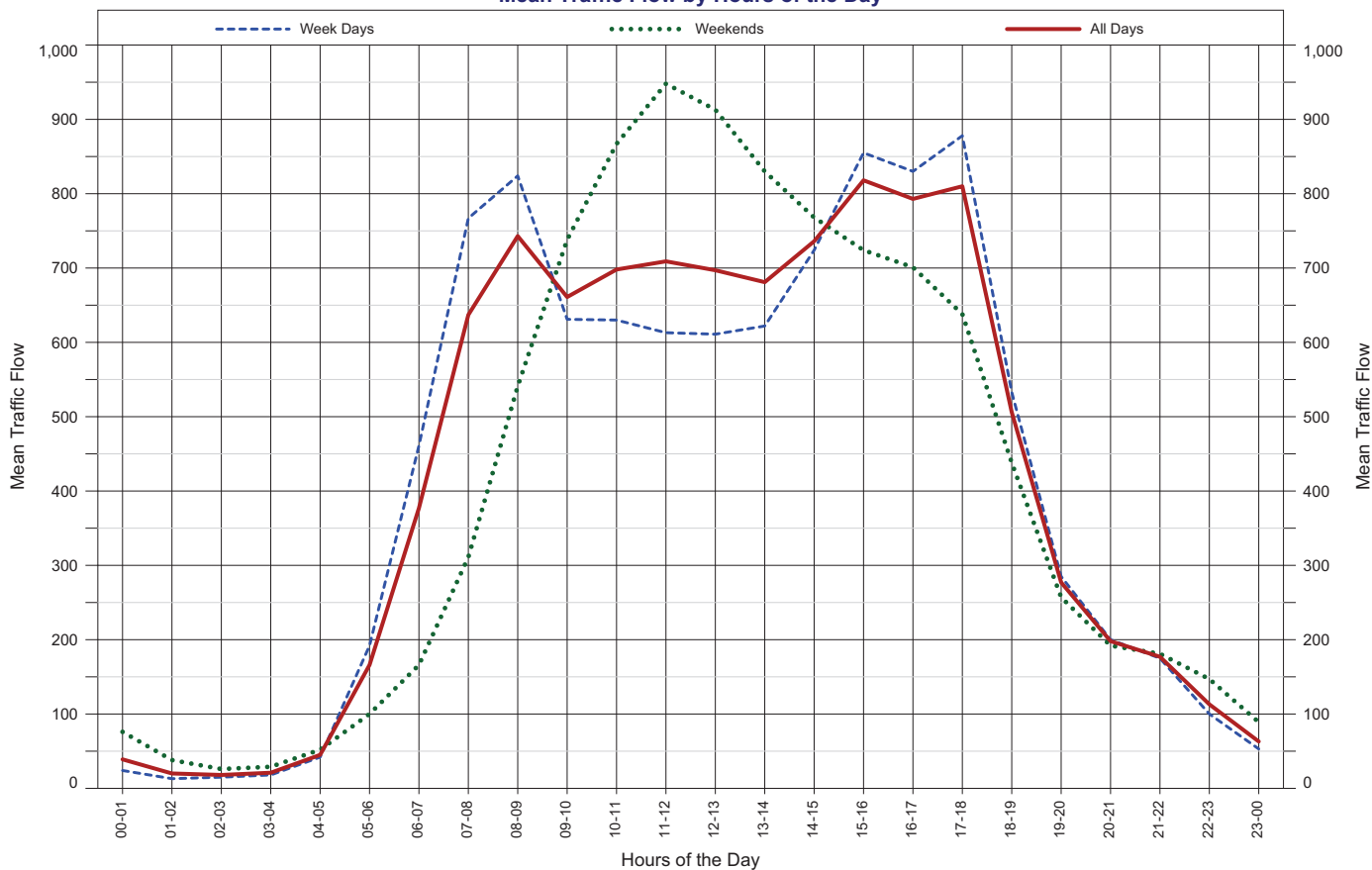
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	8 0.1%	12 0.2%	12 0.2%	12 0.2%	13 0.2%	34 0.6%	36 0.7%	11 0.2%	35 0.6%	18 0.3%
01-02	7 0.1%	6 0.1%	6 0.1%	6 0.1%	10 0.2%	18 0.3%	21 0.4%	7 0.1%	20 0.4%	11 0.2%
02-03	13 0.2%	13 0.2%	9 0.2%	10 0.2%	13 0.2%	16 0.3%	15 0.3%	12 0.2%	16 0.3%	13 0.2%
03-04	25 0.4%	13 0.2%	16 0.3%	13 0.2%	20 0.3%	18 0.3%	18 0.3%	17 0.3%	18 0.3%	18 0.3%
04-05	46 0.8%	35 0.6%	36 0.6%	42 0.7%	33 0.5%	29 0.5%	27 0.5%	38 0.6%	28 0.5%	35 0.6%
05-06	197 3.4%	193 3.3%	188 3.1%	187 3.0%	192 3.0%	77 1.3%	46 0.8%	191 3.2%	62 1.1%	154 2.6%
06-07	403 7.0%	418 7.2%	412 6.9%	387 6.3%	382 5.9%	142 2.5%	80 1.5%	400 6.6%	111 2.0%	318 5.4%
07-08	712 12.4%	704 12.1%	729 12.2%	695 11.3%	674 10.5%	261 4.6%	152 2.8%	703 11.7%	207 3.7%	561 9.5%
08-09	603 10.5%	641 11.0%	609 10.2%	636 10.3%	608 9.4%	431 7.5%	295 5.4%	619 10.3%	363 6.5%	546 9.2%
09-10	445 7.7%	421 7.2%	411 6.9%	450 7.3%	486 7.5%	497 8.7%	468 8.5%	443 7.3%	483 8.6%	454 7.7%
10-11	427 7.4%	371 6.4%	414 6.9%	388 6.3%	444 6.9%	518 9.1%	472 8.6%	409 6.8%	495 8.8%	433 7.3%
11-12	332 5.8%	346 5.9%	355 5.9%	385 6.3%	377 5.8%	511 8.9%	491 8.9%	359 6.0%	501 8.9%	400 6.8%
12-13	336 5.8%	335 5.7%	348 5.8%	348 5.7%	388 6.0%	471 8.2%	465 8.5%	351 5.8%	468 8.3%	384 6.5%
13-14	326 5.7%	342 5.9%	348 5.8%	382 6.2%	408 6.3%	429 7.5%	479 8.7%	361 6.0%	454 8.1%	388 6.6%
14-15	346 6.0%	336 5.8%	333 5.6%	355 5.8%	387 6.0%	372 6.5%	484 8.8%	351 5.8%	428 7.6%	373 6.3%
15-16	459 8.0%	460 7.9%	488 8.2%	484 7.9%	510 7.9%	351 6.1%	507 9.2%	480 8.0%	429 7.6%	466 7.9%
16-17	352 6.1%	380 6.5%	389 6.5%	415 6.7%	369 5.7%	335 5.9%	492 9.0%	381 6.3%	414 7.4%	390 6.6%
17-18	305 5.3%	305 5.2%	315 5.3%	350 5.7%	361 5.6%	369 6.5%	378 6.9%	327 5.4%	374 6.7%	340 5.8%
18-19	166 2.9%	175 3.0%	216 3.6%	229 3.7%	269 4.2%	246 4.3%	231 4.2%	211 3.5%	239 4.3%	219 3.7%
19-20	83 1.4%	117 2.0%	110 1.8%	139 2.3%	150 2.3%	160 2.8%	132 2.4%	120 2.0%	146 2.6%	127 2.1%
20-21	65 1.1%	84 1.4%	94 1.6%	94 1.5%	121 1.9%	116 2.0%	89 1.6%	92 1.5%	103 1.8%	95 1.6%
21-22	61 1.1%	73 1.3%	83 1.4%	87 1.4%	106 1.6%	133 2.3%	66 1.2%	82 1.4%	100 1.8%	87 1.5%
22-23	27 0.5%	33 0.6%	31 0.5%	37 0.6%	81 1.3%	116 2.0%	35 0.6%	42 0.7%	76 1.4%	51 0.9%
23-24	14 0.2%	16 0.3%	20 0.3%	23 0.4%	46 0.7%	68 1.2%	18 0.3%	24 0.4%	43 0.8%	29 0.5%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	08:00 712	08:00 704	08:00 729	08:00 695	08:00 674	11:00 518	12:00 491	08:00 703	12:00 501	08:00 561
PM	16:00 459	16:00 460	16:00 488	16:00 484	16:00 510	13:00 471	16:00 507	16:00 480	13:00 468	16:00 465
12-Hour	4,809 83.5%	4,816 82.6%	4,955 83.0%	5,117 83.1%	5,281 81.9%	4,791 83.8%	4,914 89.4%	4,995 82.8%	4,855 86.5%	4,954 83.8%
16-Hour	5,421 94.1%	5,508 94.5%	5,654 94.7%	5,824 94.6%	6,040 93.7%	5,342 93.4%	5,281 96.1%	5,689 94.3%	5,315 94.7%	5,581 94.4%
18-Hour	5,462 94.9%	5,557 95.3%	5,705 95.5%	5,884 95.6%	6,167 95.6%	5,526 96.6%	5,334 97.0%	5,755 95.4%	5,434 96.8%	5,661 95.8%
24-Hour	5,758 100.0%	5,829 100.0%	5,972 100.0%	6,154 100.0%	6,448 100.0%	5,718 100.0%	5,497 100.0%	6,031 100.0%	5,613 100.0%	5,910 100.0%
Avg Week Day	95.5%	96.7%	99.0%	102.0%	106.9%			100.0%	93.1%	98.0%
Avg Weekend Day						101.9%	97.9%	107.4%	100.0%	105.3%
Avg Day	97.4%	98.6%	101.0%	104.1%	109.1%	96.8%	93.0%	102.0%	95.0%	100.0%

District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61607 - R'ton-Yeppoon Rd 320m E of Fred Lawn Dr  
Thru Dist 35.41  
Type C - Coverage  
Stream TB - Bi-directional traffic flow  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	5	5	4	4	5	5	5
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



Traffic Analysis and Reporting System  
Weekly Volume Report

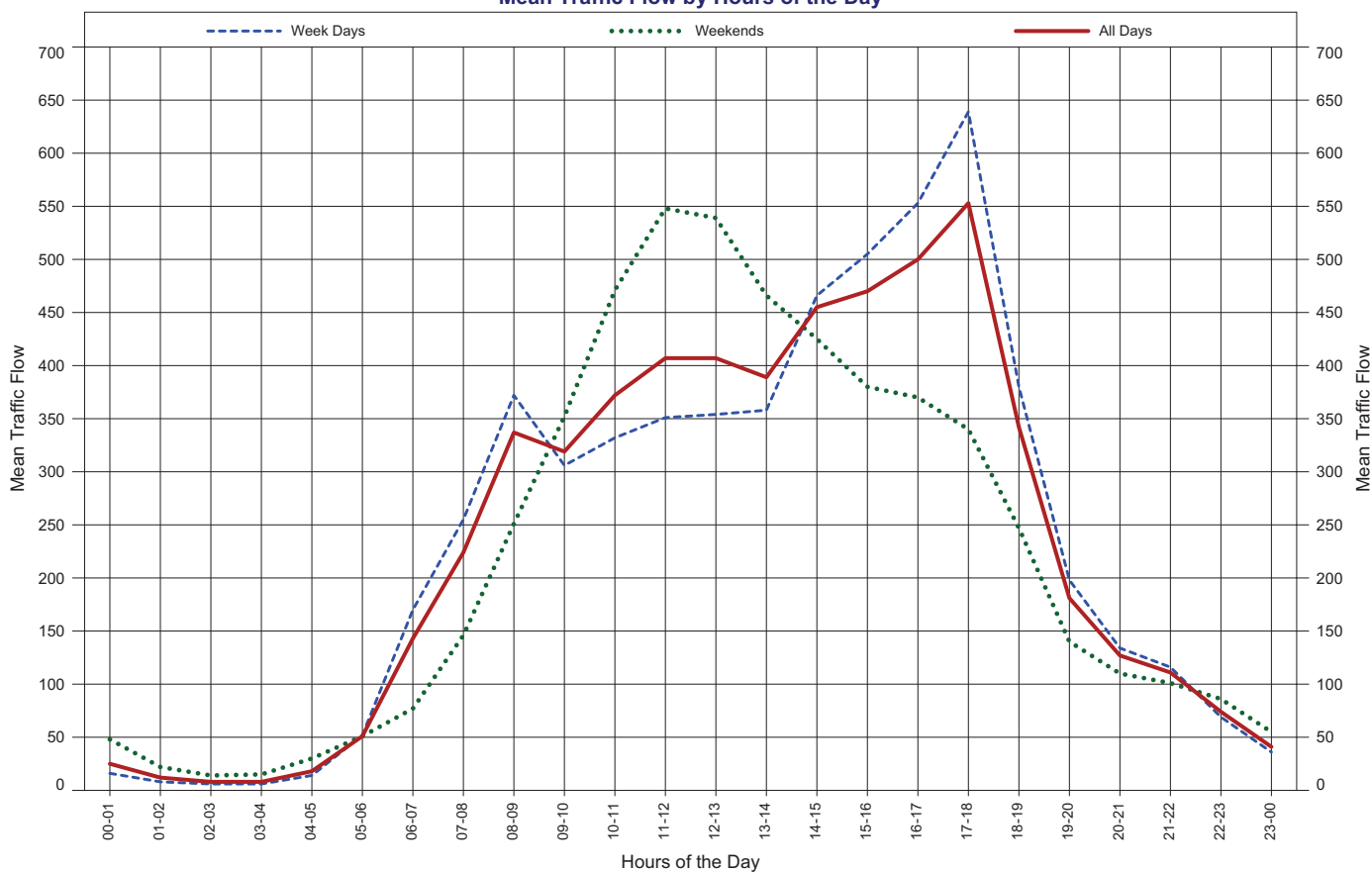
Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	19 0.2%	23 0.2%	22 0.3%	29 0.3%	29 0.3%	70 0.7%	82 0.9%	24 0.2%	76 0.8%	39 0.4%
01-02	11 0.1%	12 0.1%	11 0.1%	12 0.1%	17 0.1%	37 0.4%	39 0.4%	13 0.1%	38 0.4%	20 0.2%
02-03	15 0.2%	16 0.2%	9 0.1%	14 0.1%	21 0.2%	26 0.3%	26 0.3%	15 0.1%	26 0.3%	18 0.2%
03-04	24 0.2%	14 0.1%	14 0.2%	15 0.1%	25 0.2%	31 0.3%	27 0.3%	18 0.2%	29 0.3%	21 0.2%
04-05	49 0.5%	40 0.4%	28 0.3%	45 0.4%	47 0.4%	59 0.6%	45 0.5%	42 0.4%	52 0.5%	45 0.4%
05-06	211 2.1%	207 2.1%	145 1.7%	181 1.7%	215 1.9%	126 1.2%	74 0.8%	192 1.9%	100 1.0%	166 1.7%
06-07	489 5.0%	498 4.9%	380 4.4%	467 4.5%	471 4.1%	206 2.0%	125 1.3%	461 4.6%	166 1.7%	377 3.8%
07-08	820 8.3%	816 8.1%	627 7.3%	776 7.4%	798 6.9%	379 3.7%	242 2.6%	767 7.6%	311 3.2%	637 6.4%
08-09	824 8.4%	883 8.8%	694 8.1%	860 8.2%	861 7.5%	620 6.1%	462 5.0%	824 8.2%	541 5.5%	743 7.4%
09-10	641 6.5%	644 6.4%	509 5.9%	644 6.1%	716 6.2%	764 7.5%	712 7.6%	631 6.2%	738 7.6%	661 6.6%
10-11	657 6.7%	615 6.1%	549 6.4%	620 5.9%	711 6.2%	860 8.4%	874 9.4%	630 6.2%	867 8.9%	698 7.0%
11-12	593 6.0%	611 6.1%	510 5.9%	655 6.3%	696 6.0%	925 9.1%	970 10.4%	613 6.1%	948 9.7%	709 7.1%
12-13	599 6.1%	596 5.9%	525 6.1%	623 5.9%	710 6.2%	895 8.8%	931 10.0%	611 6.1%	913 9.3%	697 7.0%
13-14	597 6.1%	590 5.9%	519 6.0%	652 6.2%	753 6.5%	815 8.0%	844 9.0%	622 6.2%	830 8.5%	681 6.8%
14-15	723 7.4%	721 7.2%	593 6.9%	752 7.2%	831 7.2%	734 7.2%	801 8.6%	724 7.2%	768 7.9%	736 7.4%
15-16	860 8.7%	839 8.3%	734 8.5%	868 8.3%	976 8.5%	690 6.8%	757 8.1%	855 8.5%	724 7.4%	818 8.2%
16-17	804 8.2%	850 8.4%	746 8.7%	876 8.4%	873 7.6%	676 6.6%	726 7.8%	830 8.2%	701 7.2%	793 7.9%
17-18	861 8.8%	870 8.6%	816 9.5%	927 8.8%	918 8.0%	691 6.8%	585 6.3%	878 8.7%	638 6.5%	810 8.1%
18-19	452 4.6%	515 5.1%	468 5.4%	568 5.4%	664 5.8%	480 4.7%	396 4.2%	533 5.3%	438 4.5%	506 5.1%
19-20	217 2.2%	266 2.6%	250 2.9%	312 3.0%	382 3.3%	290 2.8%	223 2.4%	285 2.8%	257 2.6%	277 2.8%
20-21	146 1.5%	177 1.8%	185 2.2%	233 2.2%	259 2.3%	221 2.2%	162 1.7%	200 2.0%	192 2.0%	198 2.0%
21-22	127 1.3%	152 1.5%	155 1.8%	194 1.9%	248 2.2%	240 2.4%	121 1.3%	175 1.7%	181 1.9%	177 1.8%
22-23	67 0.7%	75 0.7%	72 0.8%	99 0.9%	186 1.6%	225 2.2%	68 0.7%	100 1.0%	147 1.5%	113 1.1%
23-24	30 0.3%	37 0.4%	42 0.5%	54 0.5%	103 0.9%	140 1.4%	38 0.4%	53 0.5%	89 0.9%	63 0.6%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	09:00 824	09:00 883	09:00 694	09:00 860	09:00 861	12:00 925	12:00 970	09:00 824	12:00 947	09:00 743
PM	18:00 861	18:00 870	18:00 816	18:00 927	16:00 976	13:00 895	13:00 931	18:00 878	13:00 913	16:00 817
12-Hour	8,431 85.7%	8,550 84.9%	7,290 84.7%	8,821 84.2%	9,507 82.6%	8,529 83.6%	8,300 89.0%	8,518 84.4%	8,417 86.2%	8,489 84.9%
16-Hour	9,410 95.7%	9,643 95.8%	8,260 96.0%	10,027 95.7%	10,867 94.4%	9,486 93.0%	8,931 95.7%	9,639 95.5%	9,213 94.3%	9,518 95.2%
18-Hour	9,507 96.7%	9,755 96.9%	8,374 97.3%	10,180 97.2%	11,156 96.9%	9,851 96.6%	9,037 96.9%	9,792 97.0%	9,449 96.7%	9,694 96.9%
24-Hour	9,836 100.0%	10,067 100.0%	8,603 100.0%	10,476 100.0%	11,510 100.0%	10,200 100.0%	9,330 100.0%	10,096 100.0%	9,770 100.0%	10,003 100.0%
Avg Week Day	97.4%	99.7%	85.2%	103.8%	114.0%			100.0%	96.8%	99.1%
Avg Weekend Day						104.4%	95.5%	103.3%	100.0%	102.4%
Avg Day	98.3%	100.6%	86.0%	104.7%	115.1%	102.0%	93.3%	100.9%	97.7%	100.0%

District 6 - Central District  
Road Section 196 - Rockhampton - Yeppoon Road  
Site 61607 - R'ton-Yeppoon Rd 320m E of Fred Lawn Dr  
Thru Dist 35.41  
Type C - Coverage  
Stream TG - Thru traffic -in gazettal dirn  
Traffic Class 00 - All Vehicles  
Date Range Monday 29-Dec-2008 - Sunday 03-Jan-2010

### Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	53	53	53	53	53	53	53
Days Included	5	5	4	4	5	5	5
Calendar Events	5	0	0	1	3	3	1

### Mean Traffic Flow by Hours of the Day



Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Week Day	Average Weekend Day	Average Day
00-01	13 0.2%	14 0.3%	16 0.3%	20 0.3%	19 0.3%	43 0.8%	53 1.1%	16 0.3%	48 0.9%	25 0.4%
01-02	6 0.1%	7 0.1%	8 0.1%	8 0.1%	9 0.1%	22 0.4%	22 0.4%	8 0.1%	22 0.4%	12 0.2%
02-03	5 0.1%	6 0.1%	4 0.1%	6 0.1%	10 0.2%	13 0.2%	14 0.3%	6 0.1%	14 0.3%	8 0.1%
03-04	4 0.1%	4 0.1%	6 0.1%	5 0.1%	10 0.2%	17 0.3%	13 0.3%	6 0.1%	15 0.3%	8 0.1%
04-05	12 0.2%	13 0.2%	10 0.2%	13 0.2%	21 0.3%	36 0.6%	23 0.5%	14 0.2%	30 0.6%	18 0.3%
05-06	54 1.0%	52 1.0%	51 0.9%	41 0.7%	61 1.0%	64 1.1%	37 0.7%	52 0.9%	51 1.0%	51 0.9%
06-07	167 3.2%	164 3.0%	175 3.1%	177 3.0%	165 2.6%	93 1.7%	61 1.2%	170 3.0%	77 1.5%	143 2.6%
07-08	250 4.8%	252 4.7%	262 4.7%	254 4.3%	259 4.1%	170 3.0%	121 2.5%	255 4.5%	146 2.8%	224 4.0%
08-09	342 6.5%	370 6.8%	390 6.9%	383 6.5%	375 5.9%	275 4.9%	226 4.6%	372 6.5%	251 4.8%	337 6.0%
09-10	286 5.5%	307 5.7%	304 5.4%	307 5.2%	327 5.1%	366 6.5%	338 6.9%	306 5.4%	352 6.7%	319 5.7%
10-11	316 6.0%	319 5.9%	342 6.1%	329 5.6%	356 5.6%	445 7.9%	497 10.1%	332 5.8%	471 8.9%	372 6.7%
11-12	327 6.2%	335 6.2%	333 5.9%	366 6.2%	395 6.2%	517 9.2%	578 11.7%	351 6.2%	548 10.4%	407 7.3%
12-13	331 6.3%	328 6.1%	351 6.2%	362 6.2%	400 6.3%	518 9.2%	560 11.3%	354 6.2%	539 10.2%	407 7.3%
13-14	337 6.4%	316 5.8%	345 6.1%	365 6.2%	427 6.7%	471 8.4%	461 9.3%	358 6.3%	466 8.8%	389 7.0%
14-15	446 8.5%	453 8.4%	426 7.6%	485 8.3%	522 8.2%	436 7.8%	414 8.4%	466 8.2%	425 8.0%	455 8.2%
15-16	493 9.4%	471 8.7%	490 8.7%	505 8.6%	568 8.9%	409 7.3%	351 7.1%	505 8.9%	380 7.2%	470 8.4%
16-17	523 10.0%	546 10.1%	551 9.8%	565 9.6%	578 9.1%	408 7.3%	332 6.7%	553 9.7%	370 7.0%	500 9.0%
17-18	617 11.8%	626 11.6%	658 11.7%	664 11.3%	629 9.9%	396 7.0%	283 5.7%	639 11.2%	340 6.4%	553 9.9%
18-19	319 6.1%	375 6.9%	360 6.4%	396 6.8%	450 7.1%	283 5.0%	211 4.3%	380 6.7%	247 4.7%	342 6.1%
19-20	151 2.9%	172 3.2%	195 3.5%	208 3.6%	262 4.1%	162 2.9%	117 2.4%	198 3.5%	140 2.6%	181 3.2%
20-21	94 1.8%	110 2.0%	138 2.5%	163 2.8%	163 2.6%	128 2.3%	91 1.8%	134 2.4%	110 2.1%	127 2.3%
21-22	78 1.5%	94 1.7%	113 2.0%	129 2.2%	164 2.6%	134 2.4%	68 1.4%	116 2.0%	101 1.9%	111 2.0%
22-23	45 0.9%	49 0.9%	57 1.0%	71 1.2%	121 1.9%	133 2.4%	39 0.8%	69 1.2%	86 1.6%	74 1.3%
23-24	19 0.4%	24 0.4%	33 0.6%	37 0.6%	66 1.0%	86 1.5%	24 0.5%	36 0.6%	55 1.0%	41 0.7%
Peaks	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count	Hour End & Count
AM	09:00 342	09:00 370	09:00 390	09:00 383	12:00 395	12:00 517	12:00 578	09:00 372	12:00 547	12:00 407
PM	18:00 617	18:00 626	18:00 658	18:00 664	18:00 629	13:00 518	13:00 560	18:00 639	13:00 539	18:00 553
12-Hour	4,587 87.6%	4,698 86.9%	4,812 85.7%	4,981 85.0%	5,286 83.2%	4,694 83.4%	4,372 88.6%	4,871 85.5%	4,535 85.8%	4,775 85.7%
16-Hour	5,077 97.0%	5,238 96.9%	5,433 96.7%	5,658 96.6%	6,040 95.0%	5,211 92.6%	4,709 95.4%	5,489 96.4%	4,963 93.9%	5,337 95.7%
18-Hour	5,141 98.2%	5,311 98.2%	5,523 98.3%	5,766 98.4%	6,227 98.0%	5,430 96.5%	4,772 96.7%	5,594 98.2%	5,104 96.6%	5,452 97.8%
24-Hour	5,235 100.0%	5,407 100.0%	5,618 100.0%	5,859 100.0%	6,357 100.0%	5,625 100.0%	4,934 100.0%	5,696 100.0%	5,284 100.0%	5,574 100.0%
Avg Week Day	91.9%	94.9%	98.6%	102.9%	111.6%			100.0%	92.8%	97.9%
Avg Weekend Day			100.8%	105.1%	114.0%	106.5%	93.4%	107.8%	100.0%	105.5%
Avg Day	93.9%	97.0%				100.9%	88.5%	102.2%	94.8%	100.0%



## **Appendix C:**

# **Car Park Occupancy Surveys**

**Weather:** Overcast with intermittent light rain in afternoon

[illegible]

## SUMMARY - CAR PARK 1

Summary - Car Park 1	Parking Results		Time Starting (in 15 minute intervals)																							
	#####	#####	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.	4:00 p.m.	4:15 p.m.	4:30 p.m.	4:45 p.m.	5:00 p.m.	5:15 p.m.	5:30 p.m.	5:45 p.m.	6:00 p.m.			
	Supply	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191		
	Occupancy (number)	28	28	28	28	28	29	28	27	27	28	27	27	27	27	27	23	12	12	12	11	11	11	11		
	Occupancy (%)	15%	15%	15%	15%	15%	15%	14%	14%	14%	14%	14%	14%	14%	14%	14%	12%	6%	6%	6%	9%	6%	6%	6%		

Summary - Car Park 1	6:00am - 6:00pm	
	Maximum Occupancy (number) per 15 mins	29
	Average Occupancy	11%

**Location:** Car Park 2, Keppel Bay Marina, Rosslyn Bay  
**Day/Date:** Wednesday 20 April 2011  
**Weather:** Overcast with intermittent light rain in afternoon

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
Vehicle & Trailer	109	Light vehicles without boat trailer	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0
		Light vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			#####	#####	#####	#####	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.
Vehicle & Trailer	109	Light vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Light vehicles with boat trailer	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SUMMARY - CAR PARK 2

Summary - Car Park 2	Parking Results	Time Starting (in 15 minute intervals)															
		6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
		109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
		0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0
		0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	0%	1%	0%	0%	0%

Summary - Car Park 2	Parking Results	Time Starting (in 15 minute intervals)															
		#####	#####	#####	#####	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.
		109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Summary - Car Park 2	Supply	6:00am - 6:00pm
	Maximum Occupancy (number) per 15 mins	2
	Average Occupancy	0%

**Location:** Car Park 3, Keppel Bay Marina, R  
**Day/Date:** Wednesday 20 April 2011  
**Weather:** Overcast with intermittent light rain

Parking Type	Supply (number of parking spaces)	Parking Classification	(in 15 min #####)
General	15	Light vehicles without boat trailer	5
		Heavy vehicles without boat trailer	0
		Light vehicles without boat trailer	0
Vehicle & Trailer	78	Light vehicles with boat trailer	17
		Heavy vehicles without boat trailer	0
		Heavy vehicles with boat trailer	0
		Light vehicles with boat trailer	0
Secure Zone	3	Light vehicles with boat trailer	0
		Heavy vehicles with boat trailer	0
Rigging Zone	3	Light vehicles with boat trailer	0
		Heavy vehicles with boat trailer	0

Parking Type	Supply (number of parking spaces)	Parking Classification
General	15	Light vehicles without boat trailer
		Heavy vehicles without boat trailer
		Light vehicles without boat trailer
Vehicle & Trailer	78	Light vehicles without boat trailer
		Light vehicles with boat trailer
		Heavy vehicles without boat trailer
		Heavy vehicles with boat trailer
Secure Zone	3	Light vehicles with boat trailer
		Heavy vehicles with boat trailer
Rigging Zone	3	Light vehicles with boat trailer
		Heavy vehicles with boat trailer

SUMMARY - CAR PARK 3

SUMMARY - CAR PARK 3	Parking Results	(in 15 min #####)
	Supply	99
	Occupancy (number)	22
	Occupancy (%)	22%

SUMMARY - CAR PARK 3	Parking Results
	Supply
	Occupancy (number)
	Occupancy (%)

SUMMARY - CAR PARK 3	Supply
	Maximum Occupancy (number) per 15 mins
	Average Occupancy

**Location:** Car Park 4, Keppel Bay Marina, Rosslyn Bay

**Day/Date:** Wednesday 20 April 2011

**Weather:** Overcast with intermittent light rain in afternoon

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
General	252	Light vehicles without boat trailer	54	53	54	52	53	53	53	53	57	61	60	59	58	55	52	53
		Light vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disabled Access	1	Disabled Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reserved	3	Reserved	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loading Zone	3	Loading Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			12:15 p.m.	#####	#####	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.	4:00 p.m.
General	252	Light vehicles without boat trailer	80	75	68	66	64	63	65	65	65	68	64	61	60	60	62	61
		Light vehicles with boat trailer	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disabled Access	1	Disabled Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reserved	3	Reserved	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loading Zone	3	Loading Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SUMMARY - CAR PARK 4

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		54	53	54	52	53	53	53	53	57	61	60	59	58	55	54	55
	Occupancy (%)		21%	20%	21%	20%	20%	20%	20%	20%	22%	24%	23%	23%	22%	21%	21%	21%

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		82	77	70	68	66	64	66	66	66	69	65	62	61	63	60	55
	Occupancy (%)		32%	30%	27%	26%	25%	25%	25%	25%	25%	27%	25%	24%	24%	23%	23%	21%

SUMMARY - CAR PARK 4	Supply		6:00am - 6:00pm	
	Maximum Occupancy (number) per 15 mins		82	
	Average Occupancy		23%	

**Location:** Car Park 1, Keppel Bay Marina, Rosslyn Bay  
**Day/Date:** Saturday 23rd April 2011  
**Weather:** Fine

Trailer  
Non-t

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)																								
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.									
General	187	Light vehicles without boat trailer	41	42	42	41	41	42	43	44	45	48	62	78	80	85	86	91	89	95	98	98	109	112	114	108	114
		Light vehicles with boat trailer	7	7	7	7	7	7	7	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7
		Heavy vehicles without boat trailer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coach	4	Coach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)																							
			12:15 p.m.	12:30 p.m.	12:45 p.m.	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.	4:00 p.m.	4:15 p.m.	4:30 p.m.	4:45 p.m.	5:00 p.m.	5:15 p.m.	5:30 p.m.	5:45 p.m.	6:00 p.m.
General	187	Light vehicles without boat trailer	117	118	120	120	120	120	125	125	128	126	124	120	115	100	100	110	110	115	112	109	105	100	100	87
		Light vehicles with boat trailer	7	7	7	7	7	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
		Heavy vehicles without boat trailer	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coach	4	Coach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

2726

92

19

0

0

SUMMARY - CAR PARK 1

Summary - Car Park 1	Parking Results	Time Starting (in 15 minute intervals)																								
		6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.									
		191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191		191							
		49	50	49	50	49	50	51	51	52	55	69	86	88	93	94	99		106							
		26%	26%	26%	26%	26%	26%	27%	27%	27%	29%	36%	45%	46%	49%	49%	52%		51%							
	Occupancy (%)	26%	26%	26%	26%	26%	26%	27%	27%	27%	29%	36%	45%	46%	49%	49%	52%	51%	54%	55%	55%	61%	63%	64%	60%	63%

Summary - Car Park 1	Parking Results	Time Starting (in 15 minute intervals)																							
		12:15 p.m.	12:30 p.m.	12:45 p.m.	1:00 p.m.	1:15 p.m.	1:30 p.m.	1:45 p.m.	2:00 p.m.	2:15 p.m.	2:30 p.m.	2:45 p.m.	3:00 p.m.	3:15 p.m.	3:30 p.m.	3:45 p.m.	4:00 p.m.	4:15 p.m.	4:30 p.m.	4:45 p.m.	5:00 p.m.	5:15 p.m.	5:30 p.m.	5:45 p.m.	6:00 p.m.
		191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191
		124	125	127	127	127	124	129	129	132	130	128	124	119	104	104	114	114	119	116	113	109	104	104	91
		65%	65%	66%	66%	66%	65%	66%	68%	69%	68%	67%	65%	62%	54%	54%	60%	60%	62%	61%	59%	57%	54%	54%	48%
	Occupancy (%)	65%	65%	66%	66%	66%	65%	66%	68%	69%	68%	67%	65%	62%	54%	54%	60%	60%	62%	61%	59%	57%	54%	54%	48%

Summary - Car Park 1	Supply	6:00am - 6:00pm	
		Maximum Occupancy (number) per 15 mins	132
		Average Occupancy	52%



**Location:** Car Park 2, Keppel Bay Marina, F  
**Day/Date:** Saturday 23rd April 2011  
**Weather:** Fine

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)
			12:00 p.m.
Vehicle & Trailer	109	Light vehicles without boat trailer	5
		Light vehicles with boat trailer	53
		Heavy vehicles without boat trailer	0
		Heavy vehicles with boat trailer	0

Parking Type	Supply (number of parking spaces)	Parking Classification
Vehicle & Trailer	109	Light vehicles without boat trailer
		Light vehicles with boat trailer
		Heavy vehicles without boat trailer
		Heavy vehicles with boat trailer

**SUMMARY - CAR PARK 2**

Summary - Car Park 2	Parking Results	Time Starting (in 15 minute intervals)
		12:00 p.m.
	Supply	109
	Occupancy (number)	58
	Occupancy (%)	53%

Summary - Car Park 2	Parking Results
	Supply
	Occupancy (number)
	Occupancy (%)

Summary - Car Park 2	Supply
	Maximum Occupancy (number) per 15 mins
	Average Occupancy

**Location:** Car Park 3, Keppel Bay Marina, Rosslyn Bay

**Day/Date:** Saturday 23rd April 2011

**Weather:** Fine

**Comment:** over-supply for General' parking as parked on footpath or other available space

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)																							
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.	10:00 a.m.	10:15 a.m.	10:30 a.m.	10:45 a.m.	11:00 a.m.	11:15 a.m.	11:30 a.m.	11:45 a.m.
General	15	Light vehicles without boat trailer	15	16	16	22	21	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle & Trailer	76	Light vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Light vehicles with boat trailer	48	51	58	56	61	62	72	76	76	76	76	76	76	76	77	77	77	77	77	61	61	60	58	61
Secure Zone	3	Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rigging Zone	3	Light vehicles with boat trailer	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	1	1	0	0	1	2	0	1	0	2	0	3	2	2	0	2	0	1	0	3	0

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)																							
			##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
General	15	Light vehicles without boat trailer	17	17	17	17	17	17	15	15	15	15	15	15	15	12	11	11	11	10	10	10	10	10	11	10
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle & Trailer	76	Light vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Light vehicles with boat trailer	61	61	61	61	61	61	61	61	61	61	61	61	61	50	49	49	48	47	36	33	32	31	28	27
Secure Zone	3	Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rigging Zone	3	Light vehicles with boat trailer	0	2	1	1	2	0	1	0	0	1	0	1	2	0	0	2	1	0	2	3	3	1	2	3
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SUMMARY - CAR PARK 3

SUMMARY - CAR PARK 3	Parking Results	Time Standing (in 15 minute intervals)																									
		6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.	10:00 a.m.	10:15 a.m.	10:30 a.m.	10:45 a.m.	11:00 a.m.	11:15 a.m.	11:30 a.m.	11:45 a.m.		
	Supply	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99		
	Occupancy (number)	63	67	74	79	83	83	93	98	100	97	98	97	99	97	100	99	99	100	98	99	83	84	85	78	82	
	Occupancy (%)	64%	68%	75%	80%	84%	84%	94%	99%	101%	98%	99%	98%	100%	98%	101%	100%	99%	101%	98%	101%	99%	94%	85%	86%	79%	83%

SUMMARY - CAR PARK 3	Parking Results	Time Starting (in 15 minute intervals)																								
		##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##	##
	Supply	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	Occupancy (number)	79	80	80	79	81	78	77	76	76	77	76	77	80	82	60	64	60	57	48	47	47	43	42	42	42
	Occupancy (%)	80%	81%	80%	79%	82%	79%	78%	77%	77%	78%	77%	76%	78%	81%	63%	65%	61%	58%	48%	47%	47%	43%	42%	42%	42%

SUMMARY - CAR PARK 3	Supply	6:00am - 6:00pm
	Maximum Occupancy (number) per 15 mins	100
	Average Occupancy	79%

**Location:** Car Park 4, Keppel Bay Marina, Rosslyn Bay  
**Day/Date:** Saturday 23rd April 2011  
**Weather:** Fine

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
General	252	Light vehicles without boat trailer	110	108	111	113	125	122	134	137	135	140	143	160	156	150	155	162
		Light vehicles with boat trailer	1	1	3	4	4	5	3	4	4	4	5	4	3	3	4	5
		Heavy vehicles without boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disabled Access	1	Disabled Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reserved	3	Reserved	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loading Zone	3	Loading Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Parking Type	Supply (number of parking spaces)	Parking Classification	Time Starting (in 15 minute intervals)															
			#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
General	252	Light vehicles without boat trailer	179	160	162	167	173	134	132	130	144	144	143	142	147	138	137	130
		Light vehicles with boat trailer	5	7	7	7	7	5	5	5	5	5	4	4	5	5	5	5
		Heavy vehicles without boat trailer	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		Heavy vehicles with boat trailer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disabled Access	1	Disabled Access	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reserved	3	Reserved	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loading Zone	3	Loading Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SUMMARY - CAR PARK 4

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			6:00 a.m.	6:15 a.m.	6:30 a.m.	6:45 a.m.	7:00 a.m.	7:15 a.m.	7:30 a.m.	7:45 a.m.	8:00 a.m.	8:15 a.m.	8:30 a.m.	8:45 a.m.	9:00 a.m.	9:15 a.m.	9:30 a.m.	9:45 a.m.
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		111	109	114	117	129	127	137	141	139	144	148	164	159	153	160	167
	Occupancy (%)		43%	42%	44%	45%	50%	49%	53%	54%	54%	56%	57%	63%	61%	59%	62%	64%

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		184	169	170	174	180	139	137	135	149	149	147	146	152	143	142	135
	Occupancy (%)		71%	65%	66%	67%	69%	54%	53%	52%	58%	58%	57%	56%	59%	55%	55%	52%

SUMMARY - CAR PARK 4	Supply		6:00am - 6:00pm	
	Maximum Occupancy (number) per 15 mins		185	
	Average Occupancy		57%	

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		184	169	170	174	180	139	137	135	149	149	147	146	152	143	142	135
	Occupancy (%)		71%	65%	66%	67%	69%	54%	53%	52%	58%	58%	57%	56%	59%	55%	55%	52%

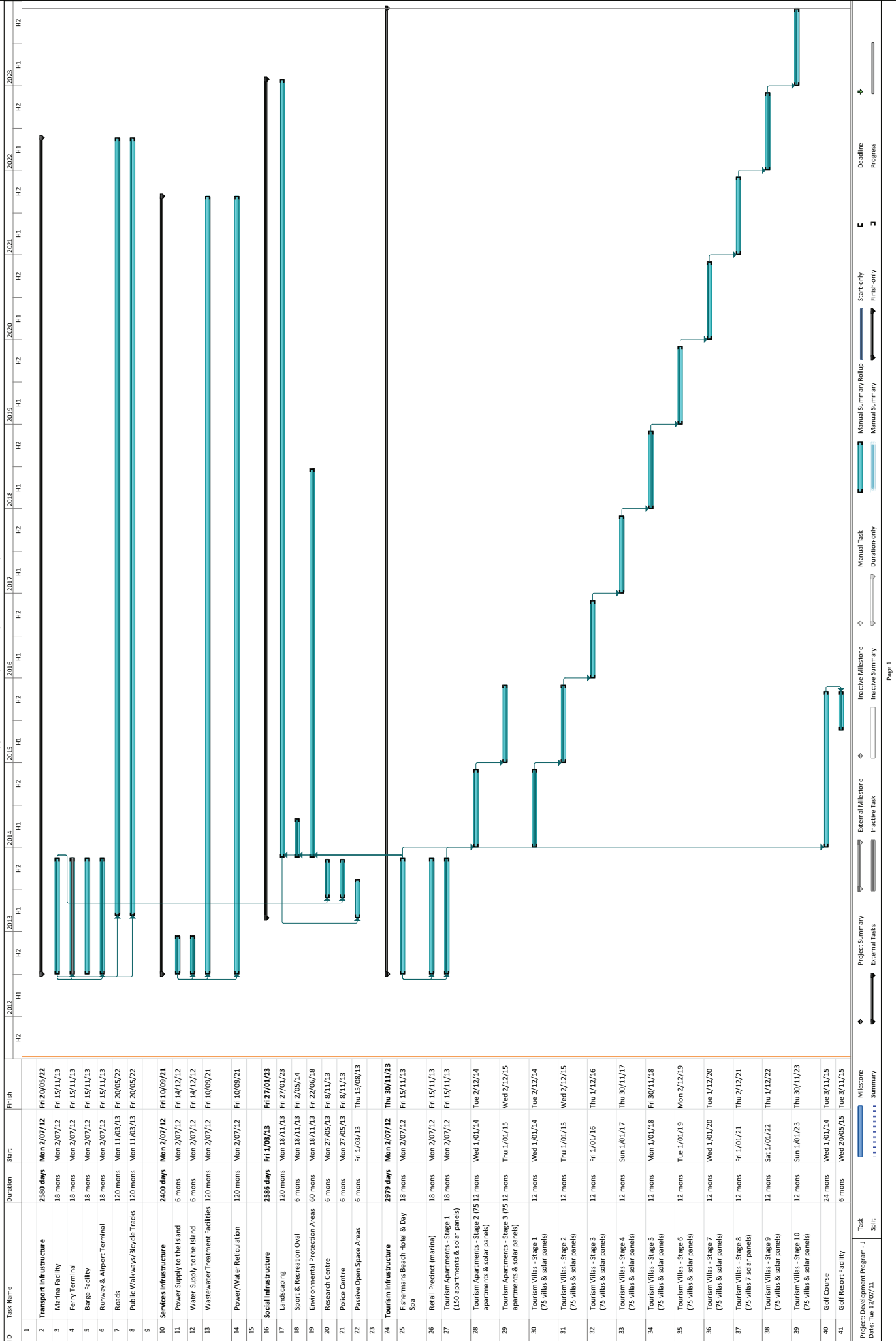
SUMMARY - CAR PARK 4	Supply		6:00am - 6:00pm	
	Maximum Occupancy (number) per 15 mins		185	
	Average Occupancy		57%	

SUMMARY - CAR PARK 4	Parking Results		Time Starting (in 15 minute intervals)															
			#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	Supply		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Occupancy (number)		184	169	170	174	180	139	137	135	149	149	147	146	152	143	142	135
	Occupancy (%)		71%	65%	66%	67%	69%	54%	53%	52%	58%	58%	57%	56%	59%	55%	55%	52%

## **Appendix D:**

# **Great Keppel Island Resort Construction Programme**

Draft Great Keppel Island Development Project Schedule July 2011



**Appendix E:**  
**Turner and Townsend:**  
**Volumes of Materials Movements for Proposed**  
**Developments - Great Keppel Island,**  
**June 2011**





Turner & Townsend

**Report**  
For  
Opus International  
Consultants

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Volumes of materials  
movements for  
proposed developments  
Great Keppel Island

June 11

1	Introduction	1
2	Methodology	1
3	Overview of Findings	2

Rev	Originator	Approved	Date
1 <sup>st</sup> draft	Gary Emmett	Mark Rogers	07/06/2011
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DOCUMENT2			

## 1 Introduction

Turner & Townsend have been commissioned by Opus International Consultants to provide details on the volumes of building materials that would be removed and brought on to Great Keppel Island for the proposed redevelopment for the island.

This would involve removal of existing resort villas, apartments, industrial sheds, function centre, staff quarters, restaurant, shop, and associated water and sewerage infrastructure, paths and roads. The existing airstrip would be removed but the concrete would be crushed and recycled for the new proposed airstrip.

A new development with villas, hotel, apartments, staff quarters, golf course, golf clubhouse, airport, commercial and industrial structures is proposed covering three locations at Clam Bay, Fishermans Beach and the Marina. Details of the proposed developments with areas and numbers of each type were supplied to Turner & Townsend by Opus International Consultants.

The information will be used to determine indicative truck movements between Great Keppel Island and the mainland of Australia together with the requirement for landfill disposal of the existing resort. This information will form part of the Environmental Impact Assessment as part of the development application.

## 2 Methodology

Turner & Townsend is a global firm of construction cost consultants with many years experience of measuring quantities of construction inputs to buildings. Our extensive knowledge of building designs and measurement of quantities enabled us to supply details of volumes of materials embedded in the existing structures to be removed, and likely volumes of materials in the new proposed structures.

In this exercise Turner & Townsend were assisted by their Cost Web database which provides quantities of materials by building type for many typical buildings of the kind proposed. Using CostWeb, Turner & Townsend has estimated the volumes of materials to be removed and to be brought in based on typical buildings sizes and construction methods and materials of the developments proposed.

Turner & Townsend has used the provided built areas in m<sup>2</sup> and number of apartments, units hotel rooms etc, and then using CostWeb has calculated the typical floor, wall roof and window areas and typical material inputs converted to cubic metres, together with a small material waste allowance.

The volume of concrete required to be removed and bought in is a key factor and it may be economical to crush and reuse the majority of concrete already in structures on the island. This

could be used in paths, roads and the new airstrip and may have an impact on the volumes of materials movements.

A number of specific allowances have been made and these are shown in the spreadsheets.

These include allowances for :-

- Topsoil for the golf courses greens ( 10 X 2500m<sup>2</sup> x 250mm thick)
- Landscaping, trees, roads and paths ( 4000m of new road/path average 4m wide)
- Sewer removal and reinstatement ( remove 2000m sewer and bring in 4000m sewer)
- Size of the proposed airstrip (1600m x 50m)
- Furniture volumes for hotels and apartments. ( typically 10m<sup>3</sup> furniture package plus benches and plumbing ( baths)).
- Distances for connection to services (typically 50m connection but depends on building)

We believe that these are reasonable but suggest that you review the allowances in the spreadsheets to validate that they are applicable and that no more up to date information is available

### 3 Overview of Findings

We estimate that the following number of truck movements will be required to construct the proposed development:

	<b>Nr</b>
1. Materials being removed	1,339
2. Materials being bought in	28,488
	<hr/> 29,827
say	<hr/> <hr/> 30,000

We advise that the above estimate is indicative only, based on the current outline development plans. Factors which may impact the actual volume of materials and truck movements will include:

- 1 Actual built form and specification differs from assumptions in this report.
- 2 Program and staging of the works.

- 3 Builders construction methodology.
- 4 Maximising full truck loads – efficiency of material call-offs to site.
- 5 Level of prefabrication/modularisation and standardisation of design.

The above truck movement total is therefore indicative and the actual volume may be more or less depending on the outcome of the above points. The total should be viewed as a guide for informing the associated requirements of the Environmental Impact Assessment.

Details of how the assessment has been made are included in Appendix A and B of this report. We have relied on the information given to us by Opus International Consultants, as detailed in Appendix C.

Appendix A

Materials to be removed

Assignment:	Assessment of materials volumes for removal from Great Keppel Island									
prepared for	Opus									
Contact	Cary Nagler cary.nagler@opus.com									
This assessment done by	Gary Emmett, Turner & Townsend gary.emmett@turntown.com									
Date	2/06/2011									
	Total Materials m3	of which	concrete	timber and fibreboard	glass	roof metal	hardware and pipes	furniture and whitegoods		
Great Keppel Island										
Villas	1925		657	526	15	348	91	290		
Garden Units	1997		855	512	6	100	125	400		
Beachfront Units	2043		855	506	3	75	144	460		
Staff Units	1094		0	735	2	160	86	110		
Industrial	374		180	10	0	140	5	40		
Central Facilities and Reception	766		375	219	7	125	21	20		
Function Centre and Wreck Bar	416		150	138	4	75	30	20		
Water and Sewer Trunk Infrastructure	1685		1675			10				
Totals	10301		4747	2645	37	1033	500	1340		
allowance for empty packing space on removal %										
30%	13391	0	6171	3438	48	1343	650	1742		
Truckloads										
tipper truck capacity assumption m3										
10										
No of Trucks Required	1339		617	344	5	134	65	174		





Appendix C  
Information Used

Great Keppel Island  
Land Use Schedule - 20 May 2011

LAND USE SCHEDULE	Land Area		No. lots/keys	Max Built Area per unit/key (sq m)	Max Total Built Area (sq m)	Max no. Storey's
	(Ha)	(sq m)				
<b>Fisherman's Beach Precinct</b>						
Villas	22.1	220,800	383	350	134,050	2
Apartments - Town homes	6.4	64,343	150	250	37,500	3
Hotel	5.5	54,802	250	160	40,000	3
Staff accommodation	2.3	22,642	200	80	16,000	3
<b>Sub-Total</b>	<b>36.3</b>	<b>362,587</b>	<b>983</b>		<b>227,550</b>	
<b>Giam Bay Precinct</b>						
Villas	23.0	229,800	367	350	128,450	2
Golf Course	68.3	682,532				
Golf Clubhouse	1.1	11,136		2,500	2,500	2
<b>Sub-Total</b>	<b>92.3</b>	<b>923,468</b>	<b>367</b>		<b>130,950</b>	
<b>Marina Precinct</b>						
Marina Village Apartments	6.0	59,944	150	150	22,500	3
Marina Village Commercial*					7,000	
<b>Sub-Total</b>	<b>6.0</b>	<b>59,944</b>	<b>150</b>		<b>22,500</b>	
<b>Others</b>						
Commercial	0.4	3,731			2,000	3
Airport	31.5	314,500			3,500	3
<b>Sub-Total</b>	<b>31.8</b>	<b>318,231</b>			<b>5,500</b>	
<b>Total</b>	<b>166.4</b>	<b>1,664,230</b>	<b>1,500</b>		<b>386,500</b>	

\* Land area included in Marina Village Apartments

## **Appendix F:**

# **Material Supply Programme**

Great Keppel Island Development

Project Schedule and Material Supply Programme

Development Stage		2012		2013		2014		2015		2016		2017	
ID		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
<u>Demolition and Establishment Phase</u>													
Demolition of Existing Buildings (and Concrete)													
Establishment													
Machinery and Equipment													
<u>Transport Infrastructure</u>													
2	Marina Facility												
3	Ferry Terminal												
4	Barge Facility												
5	Marina Facility												
6	Marina Facility												
7-8	Roads / Walkways / Bike Tracks												
<u>Services Infrastructure</u>													
10	Power Supply												
11	Water Supply												
12	Wastewater Treatment Facilities												
13	Power / Water Retention Systems												
14	Landscaping												
16	Sport & Recreation Oval												
17	Environmental Protection Areas												
18	Research Centre												
19	Police Centre												
20	Passive Open Space Areas												
21													
22													
<u>Tourism Infrastructure</u>													
24	Fishermans Beach Hotel / Spa												
25	Retail Precinct (Marina)												
26	Tourism Apartments - Stage 1 (100 Apts)												
27	Tourism Apartments - Stage 2 (100 Apts)												
28	Tourism Apartments - Stage 3 (100 Apts)												
29	Tourism Villas - Stage 1 (75 Villas)												
30	Tourism Villas - Stage 2 (75 Villas)												
31	Tourism Villas - Stage 3 (75 Villas)												
32	Tourism Villas - Stage 4 (75 Villas)												
33	Tourism Villas - Stage 5 (75 Villas)												
34	Tourism Villas - Stage 6 (75 Villas)												
35	Tourism Villas - Stage 7 (75 Villas)												
36	Tourism Villas - Stage 8 (75 Villas)												
37	Tourism Villas - Stage 9 (75 Villas)												
38	Tourism Villas - Stage 10 (75 Villas)												
39	Golf Course												
40	Golf Course												
41	Golf Course												
<b>Total Vehicle Trips Per Month - One Way</b>													

Notes :

- Assumption 1
  - Assumption 2
  - Assumption 3
  - Assumption 4
  - Assumption 5
- Demolition and Removal Phase is expected to be undertaken as the first Phase of the Development after Establishment of resources on GKI, over a period of 3 months.
- Demolition and Removal Phase will include all concrete material, but no concrete will be removed from GKI to the Mainland. All concrete will be crushed and re-used on GKI.
- All concrete materials will be barged to the island from Rosslyn Bay Marina, i.e. Aggregate, Sand and Cement. Water for Concrete Production will be sourced on GKI.
- Sources for Concrete materials are expected to be :
- Aggregate - Holcim (via Brnu Park Rd) or Earth Commodities (via Yeppoon Rd). Cement from Gladstone (via A1 & Yeppoon Rd).
- Marina Development materials will be sourced by dredging or barging from Port Alma.
- The only Marina Development Material to be barged to GKI from Port Alma will be the Primary Armour. There will be a transport effect on the A1 (Emu Park) and Bruce Highway Routes from the Holcim (Merimbora) Quarry for this Material.



### Great Keppel Island Development

**Project Schedule and Material Supply Programme - Concrete Only**

[illegible]





## **Appendix G:**

# **Barge Transport Movement Programme**

Great Keppel Island Development

Project Schedule and Barge Transport Programme

Development Stage		2012		2013		2014		2015		2016		2017	
ID		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
Demolition and Establishment Phase	Demolition of Existing Buildings (excl Concrete)	5.0 5.0 5.0											
	Establishment												
	Machinery and Equipment	6.2											
	Transport Infrastructure												
	Marina Facility												
	Ferry Terminal												
	Barge Facility												
	Airport Runway	13.4 13.4 13.4 13.4 13.4 13.4 13.4 13.4 13.4											
	Roads / Walkways / Bike Tracks			0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3		0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3		0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3		0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3			
	Services Infrastructure												
Power Supply	2.0 2.0 2.0 2.0 2.0												
Water Supply													
Wastewater Treatment Facilities													
Power / Water Reticulation Systems	0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4		
Social Infrastructure													
Landscaping													
Sport & Recreation Oval													
Environmental Protection Areas													
Research Centre			4.5 4.5 4.5 4.5										
Police Centre													
Passive Open Space Areas													
Tourism Infrastructure													
Fishermans Beach Hotel / Spa	21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7 21.7	3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9 3.9	16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5 16.5	11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7 11.7	28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9	1.5 1.5	28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9 28.9	1.5 1.5					
Resort Precinct (Marina)	3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2 3.2	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1											
Tourism Apartments - Stage 1 (100 Apts)	14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0											
Tourism Apartments - Stage 2 (100 Apts)													
Tourism Apartments - Stage 3 (100 Apts)													
Tourism Villas - Stage 1 (75 Villas)													
Tourism Villas - Stage 2 (75 Villas)													
Tourism Villas - Stage 3 (75 Villas)													
Tourism Villas - Stage 4 (75 Villas)													
Tourism Villas - Stage 5 (75 Villas)													
Tourism Villas - Stage 6 (75 Villas)													
Tourism Villas - Stage 7 (75 Villas)													
Tourism Villas - Stage 8 (75 Villas)													
Tourism Villas - Stage 9 (75 Villas)													
Tourism Villas - Stage 10 (75 Villas)													
Golf Course													
Golf Resort Facility													
Total Barge Trips Per Month - One Way		66 60 60 55 55 55		53 53 53 53 53 53 53 53 53 53 53 53 53		25 25 20 1	50 50 50 50 50 50 50 50 50 50 50 50 50	8 8 5	46 46 46 46 46 46 46 46 46 46 46 46 46	51 51 51 51 51 51 51 51 51 51 51 51 51	8 3 1	30 30 30 30 30 30 30 30 30 30 30 30 30	2 2 1

Notes :

Demolition and Removal Phase is expected to be undertaken as the first Phase of the Development, after Establishment of resources on GKI, over a period of 3 months.

Demolition and Removal Phase will include all concrete material, but no concrete will be removed from GKI to the Mainland - All concrete will be crushed and re-used on GKI.

All Concrete materials will be barged to the island from Rosslyn Bay Marina, i.e. Aggregate, Sand and Cement. Water for Concrete Production will be sourced on GKI.

Sources for Concrete materials are expected to be :

Aggregate - Holdim (via Emu Park Rd) or Earth Commodities (via Yeppoon Rd). Sand - Pink Lily Sands (via Yeppoon Rd). Cement from Gladstone (via A1 & Yeppoon Rd).



## **Appendix H:**

# **Forecasted Traffic Volumes**

## **Assumptions**

### **General**

- x Rate of increase applied to as provided by Main Roads
- x Average weekday assessment

### **2013**

- x Construction staff will live on GKI and travel on weekends therefore no trips on weekdays have been included in this assessment
- x Construction (HVC) traffic a was determined by analysis of programme, truck volumes and origin of materials

### **2017**

- x Construction staff will live on GKI and travel on weekends therefore no trips on weekdays have been included in this assessment
- x Construction (HVC) traffic a was determined by analysis of programme, truck volumes and origin of materials
- x 61% of the island will be operational in 2017 according to the July Programme so 61% of visitor vehicle trips have been applied
- x 180 operational staff in 2017, results in 37% of FTE in 2033
- x 100% of Visitor bus and vehicles from Rockhampton via northern route
- x 97% staff use northern route / 7% use southern
- x Commuting staff and visitors travel will coincide with ferry services

### **2033**

- x 100% operational - all operational commuting staff and visitors assessed
- x 100% of Visitor bus and vehicles from Rockhampton via northern route
- x 97% staff use northern route / 7% use southern
- x Commuting staff and visitors travel will coincide with ferry services

**REFER to Report for further text regarding assumptions**





Traffic Forecast SUMMARY RESULTS

2013	Section	Daily Flow		AM Peak		PM Peak	
		Total		Total		Total	
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	0.9%		0.3%		0.3%	
2	Tanby Road - Yeppoon-Emu Park Road Segment	0.3%		0.3%		0.3%	
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.1%		0.1%		0.1%	
4	Hidden Valley Road - Tanby Road Segment	0.2%		0.3%		0.0%	
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.1%		0.1%		0.1%	
6	Rockhampton - Emu Park Road North Segment	0.1%		0.0%		0.0%	
7	Rockhampton - Emu Park Road South Segment	0.0%		0.0%		0.0%	

2017	Section	Daily Flow		AM Peak		PM Peak	
		Total		Total		Total	
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	3.7%		3.3%		3.6%	
2	Tanby Road - Yeppoon-Emu Park Road Segment	2.1%		2.4%		2.2%	
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.6%		0.8%		0.8%	
4	Hidden Valley Road - Tanby Road Segment	1.4%		1.8%		0.0%	
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.4%		0.8%		0.7%	
6	Rockhampton - Emu Park Road North Segment	0.1%		0.3%		0.0%	
7	Rockhampton - Emu Park Road South Segment	0.1%		0.1%		0.0%	

2033	Section	Daily Flow		AM Peak		PM Peak	
		Total		Total		Total	
1	Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection	3.7%		4.5%		4.9%	
2	Tanby Road - Yeppoon-Emu Park Road Segment	2.5%		3.9%		3.5%	
3	Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection	0.3%		1.1%		1.2%	
4	Hidden Valley Road - Tanby Road Segment	1.7%		2.9%		2.6%	
5	Bruce Highway / Rockhampton - Yeppoon Road Intersection	0.5%		1.3%		1.0%	
6	Rockhampton - Emu Park Road North Segment	0.1%		0.4%		0.0%	
7	Rockhampton - Emu Park Road South Segment	0.0%		0.1%		0.0%	

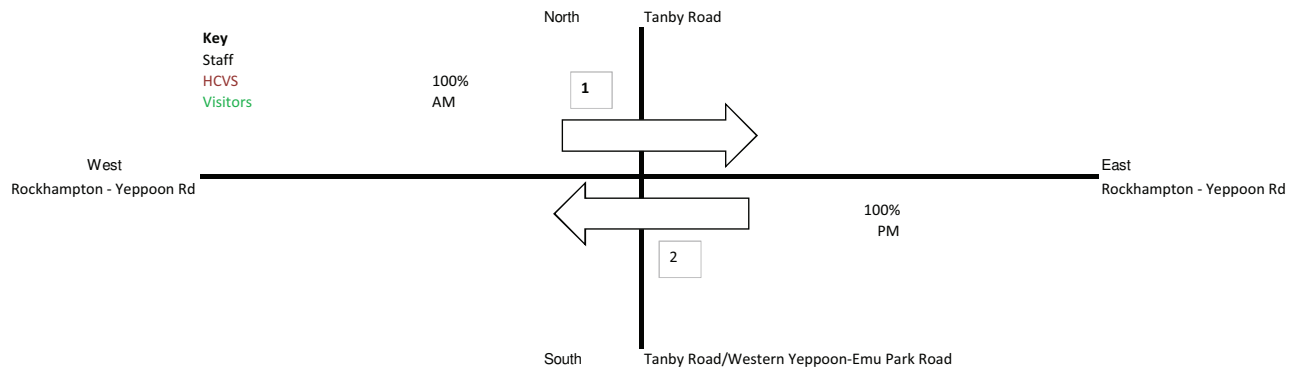
# Yeppoon Road / Western Yeppoon - Emu Park Road / Tanby Road Intersection

Year Period	2009					
	Daily		AM Peak		PM Peak	
	Total (0600-1800)	Proportion of Total	Total (0800-0900)	Proportion of Total	Total (1445-1545)	Proportion of Total
All Movements	24947	100%	1915	100%	1855	100%
Movement 1 	2226	9%	173	9%	225	12%
Movement 2 	2574	10%	343	18%	254	14%

Rate of Increase  
Annual Growth  
Base Flows

103%

Year	Daily Flow			AM Peak			PM Peak		
	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2009	24947	2226	2574	1915	173	343	1855	225	254
2010	25695	2293	2651	1972	178	353	1911	232	262
2011	26466	2362	2731	2032	184	364	1968	239	269
2012	27260	2432	2813	2093	189	375	2027	246	278
2013	28078	2505	2897	2155	195	386	2088	253	286
2014	28920	2581	2984	2220	201	398	2150	261	294
2015	29788	2658	3073	2287	207	410	2215	269	303
2016	30682	2738	3166	2355	213	422	2281	277	312
2017	31602	2820	3261	2426	219	435	2350	285	322
2018	32550	2904	3358	2499	226	448	2420	294	331
2019	33527	2992	3459	2574	232	461	2493	302	341
2020	34532	3081	3563	2651	239	475	2568	311	352
2021	35568	3174	3670	2730	247	489	2645	321	362
2022	36636	3269	3780	2812	254	504	2724	330	373
2023	37735	3367	3893	2897	262	519	2806	340	384
2024	38867	3468	4010	2984	270	534	2890	351	396
2025	40033	3572	4131	3073	278	550	2977	361	408
2026	41234	3679	4254	3165	286	567	3066	372	420
2027	42471	3790	4382	3260	295	584	3158	383	432
2028	43745	3903	4514	3358	303	601	3253	395	445
2029	45057	4020	4649	3459	312	619	3350	406	459
2030	46409	4141	4788	3562	322	638	3451	419	473
2031	47801	4265	4932	3669	331	657	3554	431	487
2032	49235	4393	5080	3779	341	677	3661	444	501
2033	50712	4525	5232	3893	352	697	3771	457	516



ADDITIONAL FORECASTED VOLUMES	Daily			AM Peak			PM Peak		
	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013 Construction Staff - 2013	0	0	0	0	0	0	0	0	0
2013 HCVS - 2013	25	13	13	2	1	1	2	1	1
2017 Construction Staff - 2017	0	0	0	0	0	0	0	0	0
2017 HCVS - 2017	12	6	6	2	0	0	2	0	0
2017 Operational Staff - 2017	66	33	33	16	16	0	16	0	16
2017 Visitors - 2017	122	61	61	0	0	0	0	0	0
2033 Operational Staff - 2033	177	89	89	44	44	0	44	0	44
2033 Visitors - 2033	200	100	100	0	0	0	0	0	0

GKI Forecast	Daily Flow			AM Peak			PM Peak		
	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	28103	2518	2910	2157	196	387	2090	254	287
2017	31802	2920	3360	2444	236	435	2368	286	339
2033	50889	4614	5321	3937	396	697	3815	457	560

% Increase in Traffic	Daily Flow			AM Peak			PM Peak		
	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	0%	1%	0%	0%	1%	0%	0%	0%	0%
2017	1%	4%	3%	1%	8%	0%	1%	0%	5%
2033	0%	2%	2%	1%	13%	0%	1%	0%	9%

## Hidden Valley Road -Tanby Road Segment

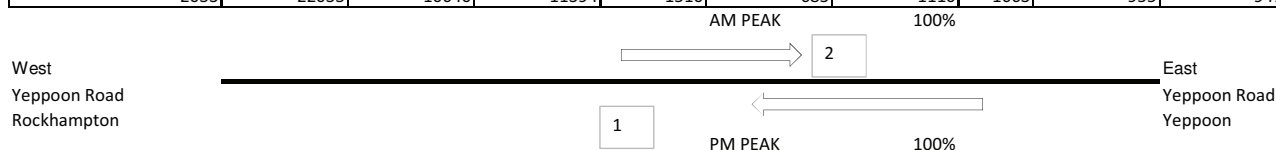
Year	2009					
Period	Daily		AM Peak		PM Peak	
	Total	Proportion	AM Peak (0800-0900)	Proportion	PM Peak (1500-1600)	Proportion
All Movements	10839	100%	743	100%	818	100%
Eastbound (G)	5234	48%	337	45%	470	57%
Westbound (A)	5605	52%	546	73%	466	57%

**Note:** Flows do not balance but are consistent with QTMR AADT Segment Report

Rate of Increase 103%

Annual Growth

Base Flows		Daily Flow			AM Peak			PM Peak		
Year	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	
2009	10839	5234	5605	743	337	546	818	470	466	
2010	11164	5391	5773	765	347	562	843	484	480	
2011	11499	5553	5946	788	358	579	868	499	494	
2012	11844	5719	6125	812	368	597	894	514	509	
2013	12199	5891	6308	836	379	615	921	529	524	
2014	12565	6068	6498	861	391	633	948	545	540	
2015	12942	6250	6693	887	402	652	977	561	556	
2016	13331	6437	6893	914	414	672	1006	578	573	
2017	13731	6630	7100	941	427	692	1036	595	590	
2018	14142	6829	7313	969	440	712	1067	613	608	
2019	14567	7034	7533	999	453	734	1099	632	626	
2020	15004	7245	7759	1028	466	756	1132	651	645	
2021	15454	7462	7991	1059	480	778	1166	670	664	
2022	15917	7686	8231	1091	495	802	1201	690	684	
2023	16395	7917	8478	1124	510	826	1237	711	705	
2024	16887	8154	8732	1158	525	851	1274	732	726	
2025	17393	8399	8994	1192	541	876	1313	754	748	
2026	17915	8651	9264	1228	557	902	1352	777	770	
2027	18453	8911	9542	1265	574	930	1393	800	793	
2028	19006	9178	9828	1303	591	957	1434	824	817	
2029	19576	9453	10123	1342	609	986	1477	849	842	
2030	20164	9737	10427	1382	627	1016	1522	874	867	
2031	20769	10029	10740	1424	646	1046	1567	901	893	
2032	21392	10330	11062	1466	665	1078	1614	928	920	
2033	22033	10640	11394	1510	685	1110	1663	955	947	



### ADDITIONAL FORECASTED VOLUMES

		Daily Flow			AM Peak			PM Peak		
		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	Construction Staff - 2013	0	0	0	0	0	0	0	0	0
	HCVS - 2013	25	13	13	2	1	1	3	1	1
2017	Construction Staff - 2017	0	0	0	0	0	0	0	0	0
	HCVs -2017	12	6	6	1	0	0	1	0	0
	Operational Staff -2017	65	32	32	16	0	16	16	16	0
2017	Visitors -2017	122	61	61	0	0	0	0	0	0
	Operational Staff -2033	175	87	87	43	0	43	43	43	0
2033	Visitors -2033	200	100	100	0	0	0	0	0	0

GKI Forecast		Daily Flow			AM Peak			PM Peak		
Year	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	
2013	12225	5904	6321	838	380	616	923	530	526	
2017	13929	6730	7200	958	427	708	1053	612	591	
2033	22408	10827	11581	1554	685	1153	1706	999	947	

% Increase in Traffic		Daily Flow			AM Peak			PM Peak		
Year		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2012		0%	0%	0%	0%	0%	0%	0%	0%	0%
2016		1%	1%	1%	2%	0%	2%	2%	3%	0%
2033		2%	2%	2%	3%	0%	4%	3%	5%	0%

Bruce Rockhampton Road / Western Yeppoon - Emu Park Road

Year Period	Daily		2009 AM Peak		PM Peak	
	Total (0600-1800)	Proportion of Total	Total (0800-0900)	Proportion of Total	Total (1405-1545)	Proportion of Total
All Movements	38874	100%	1718	100%	2070	100%
Movement 1	1838	4%	148	9%	145	7%
Movement 2	1492	4%	246	14%	134	6%
Movement 3	1406	4%	133	8%	79	4%
Movement 4	1668	5%	137	8%	107	5%

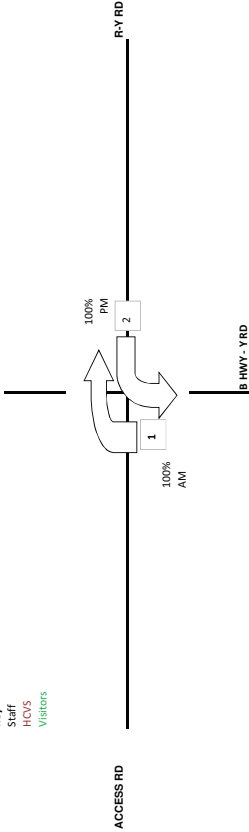
Rate of Increase 103%

Annual Growth

Base Flows

Year	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Total	Movement 1	Movement 2	Movement 3	Total	Movement 1	Movement 2	Movement 3			
2011	36874	2108	1992	1406	1668	1720	118	266	133	137	2070	155	134	79	107
2012	37980	2171	2052	1448	1718	1772	122	274	137	141	2132	160	138	81	110
2013	39120	2236	2113	1492	1770	1825	125	282	141	145	2196	164	142	84	114
2014	40293	2303	2177	1536	1823	1879	129	291	145	150	2262	169	146	86	117
2015	41502	2373	2242	1582	1877	1936	133	299	150	154	2330	174	151	89	120
2016	42747	2444	2309	1630	1934	1994	137	308	154	159	2400	180	155	92	124
2017	44029	2517	2379	1679	1992	2054	141	318	159	164	2472	185	160	94	128
2018	45350	2593	2450	1729	2051	2115	145	327	164	168	2546	191	165	97	132
2019	46711	2670	2523	1781	2113	2179	149	337	168	174	2622	196	170	100	136
2020	48112	2750	2599	1835	2176	2244	154	347	174	179	2701	202	175	103	140
2021	49596	2833	2677	1890	2242	2312	159	357	179	184	2782	208	180	106	144
2022	51042	2918	2757	1946	2309	2381	163	368	184	190	2865	215	185	109	148
2023	52574	3006	2840	2005	2378	2452	168	379	190	195	2951	221	191	113	153
2024	54151	3096	2925	2065	2450	2526	173	391	195	201	3040	228	197	116	157
2025	55775	3189	3013	2127	2523	2602	178	402	201	207	3131	234	203	119	162
2026	57448	3284	3103	2191	2599	2680	184	414	207	213	3225	241	209	123	167
2027	59172	3383	3197	2256	2677	2760	189	427	213	220	3322	249	215	127	172
2028	60947	3484	3292	2324	2757	2843	195	440	220	226	3421	256	221	131	177
2029	62776	3589	3391	2394	2840	2928	201	453	226	233	3524	264	228	134	182
2030	64659	3696	3493	2465	2925	3016	207	466	233	240	3630	272	235	139	188
2031	66597	3807	3598	2539	3013	3107	213	480	240	247	3739	280	242	143	193
2032	68597	3922	3706	2616	3103	3200	220	495	247	255	3851	288	249	147	199
2033	70654	4059	3817	2694	3196	3296	226	510	255	263	3966	297	257	151	205

Key  
Staff  
HCVs  
Visitors



ADDITIONAL FORECASTED

ADDITIONAL FORECASTED															
	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013	Construction Staff - 2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HCVs - 2013	22	11	11	0	0	2	1	1	0	2	1	1	0	0
	Construction Staff - 2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCVs - 2017	10	5	5	0	0	3	2	1	1	0	2	1	1	0	0
	Operational Staff - 2017	61	31	31	0	0	15	15	0	0	15	0	15	0	0
2017	Visitors - 2017	122	61	61	0	0	0	0	0	0	0	0	0	0	0
	Operational Staff - 2033	166	83	83	0	0	41	41	0	0	41	0	41	0	0
2033	Visitors - 2033	200	100	100	0	0	0	0	0	0	0	0	0	0	0

GLI Forecast

Year	Daily Flow					AM Peak					PM Peak				
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013	39142	2248	2125	1492	1770	1827	126	283	141	145	2198	165	143	84	114
2017	44223	2614	2475	1679	1995	2489	157	319	164	2489	186	176	94	128	
2033	71021	4222	4000	2694	3196	3337	267	510	255	263	4008	297	298	151	205

% Increase in Traffic

Year	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013	0%	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	0%
2017	0%	4%	4%	0%	0%	1%	12%	0%	0%	0%	1%	1%	10%	0%	0%
2033	1%	5%	5%	0%	0%	1%	18%	0%	0%	0%	1%	0%	16%	0%	0%

## Tanby Road - Yeppoon-Emu Park Road Segment

Year	2009					
Period	Daily		AM Peak		PM Peak	
	Total	Proportion	Total (0800-0900)	Proportion	Total (1500-1600)	Proportion
All Movements	7921	100%	618	100%	695	100%
Eastbound (G)	4091	52%	245	40%	383	55%
Westbound (A)	3830	48%	373	60%	312	45%

Rate of Increase 103%

Annual Growth

Base Flows

		Daily Flow			AM Peak			PM Peak		
Year		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2009		7921	4091	3830	618	245	373	695	383	312
2010		8159	4214	3945	637	252	384	716	394	321
2011		8403	4340	4063	656	260	396	737	406	331
2012		8655	4470	4185	675	268	408	759	419	341
2013		8915	4604	4311	696	276	420	782	431	351
2014		9183	4743	4440	716	284	432	806	444	362
2015		9458	4885	4573	738	293	445	830	457	373
2016		9742	5031	4710	760	301	459	855	471	384
2017		10034	5182	4852	783	310	473	880	485	395
2018		10335	5338	4997	806	320	487	907	500	407
2019		10645	5498	5147	831	329	501	934	515	419
2020		10965	5663	5302	855	339	516	962	530	432
2021		11293	5833	5461	881	349	532	991	546	445
2022		11632	6008	5624	908	360	548	1021	562	458
2023		11981	6188	5793	935	371	564	1051	579	472
2024		12341	6374	5967	963	382	581	1083	597	486
2025		12711	6565	6146	992	393	599	1115	615	501
2026		13092	6762	6330	1021	405	617	1149	633	516
2027		13485	6965	6520	1052	417	635	1183	652	531
2028		13890	7174	6716	1084	430	654	1219	672	547
2029		14306	7389	6917	1116	442	674	1255	692	564
2030		14735	7610	7125	1150	456	694	1293	712	580
2031		15177	7839	7339	1184	469	715	1332	734	598
2032		15633	8074	7559	1220	484	736	1372	756	616
2033		16102	8316	7786	1256	498	758	1413	779	634

AM PEAK 100%

West

Yeppoon Road

Rockhampton



East

Yeppoon Road

Yeppoon

### ADDITIONAL FORECASTED VOLUMES

		Daily Flow			AM Peak			PM Peak		
		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	Construction Staff - 2013	0	0	0	0	0	0	0	0	0
	HCVS - 2013	25	13	13	2	1	1	2	1	1
	Construction Staff - 2017	0	0	0	0	0	0	0	0	0
	HCVs -2017	12	6	6	1	0	0	1	0	0
2017	Operational Staff -2017	73	36	36	18	0	18	18	18	0
	Visitors -2017	122	61	61	0	0	0	0	0	0
	Operational Staff -2033	197	98	98	49	0	49	49	49	0
2033	Visitors -2033	200	100	100	0	0	0	0	0	0

		Daily Flow			AM Peak			PM Peak		
Year		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013		8940	4617	4323	698	277	421	784	432	352
2017		10241	5286	4955	802	311	491	899	504	396
2033		16499	8515	7984	1305	498	807	1462	827	634

### % Increase in Traffic

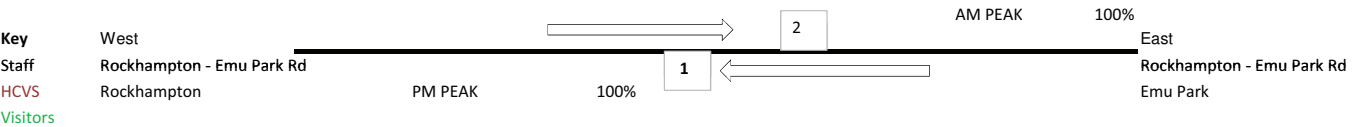
		Daily Flow			AM Peak			PM Peak		
Year		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2012		0%	0%	0%	0%	0%	0%	0%	0%	0%
2016		2%	2%	2%	2%	0%	4%	2%	4%	0%
2033		2%	2%	3%	4%	0%	6%	3%	6%	0%

Rockhampton - Emu Park Road North Segment

Year	2009					
Period	Daily		AM Peak		PM Peak	
	Total	Proportion	Total (0800-0900)	Proportion	PM Peak (1600-1700)	Proportion
All Movements	2804	100%	196	100%	227	100%
Eastbound (G)	1361	49%	79	40%	132	58%
Westbound (A)	1443	51%	117	60%	95	42%

Rate of Increase Annual Growth 105%

Base Flows		Daily Flow			AM Peak			PM Peak		
Year		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2009		2804	1361	1443	196	79	117	227	132	95
2010		2944	1429	1515	206	83	123	238	139	100
2011		3091	1501	1591	216	87	129	250	146	105
2012		3246	1576	1670	227	91	135	263	153	110
2013		3408	1654	1754	238	96	142	276	160	115
2014		3579	1737	1842	250	101	149	290	168	121
2015		3758	1824	1934	263	106	157	304	177	127
2016		3946	1915	2030	276	111	165	319	186	134
2017		4143	2011	2132	290	117	173	335	195	140
2018		4350	2111	2239	304	123	182	352	205	147
2019		4567	2217	2350	319	129	191	370	215	155
2020		4796	2328	2468	335	135	200	388	226	162
2021		5036	2444	2591	352	142	210	408	237	171
2022		5287	2566	2721	370	149	221	428	249	179
2023		5552	2695	2857	388	156	232	449	261	188
2024		5829	2829	3000	407	164	243	472	274	197
2025		6121	2971	3150	428	172	255	496	288	207
2026		6427	3119	3307	449	181	268	520	303	218
2027		6748	3275	3473	472	190	282	546	318	229
2028		7086	3439	3646	495	200	296	574	334	240
2029		7440	3611	3829	520	210	310	602	350	252
2030		7812	3792	4020	546	220	326	632	368	265
2031		8202	3981	4221	573	231	342	664	386	278
2032		8613	4180	4432	602	243	359	697	405	292
2033		9043	4389	4654	632	255	377	732	426	306



ADDITIONAL FORECASTED VOLUMES

		Daily Flow			AM Peak			PM Peak		
		Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	Construction Staff - 2013	0	0	0	0	0	0	0	0	0
	HCVS - 2013	2	1	1	0	0	0	0	0	0
2017	Construction Staff - 2017	0	0	0	0	0	0	0	0	0
	HCVS -2017	2	1	1	0	0	0	0	0	0
	Operational Staff -2017	4	2	2	1	0	1	1	1	0
2017	Visitors -2017	0	0	0	0	0	0	0	0	0
	Operational Staff -2033	10	5	5	2	0	2	2	2	0
2033	Visitors -2033	0	0	0	0	0	0	0	0	0

GKI Forecast	Daily Flow			AM Peak			PM Peak		
Year	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	3410	1655	1755	238	96	142	276	160	115
2017	4148	2014	2135	290	117	174	336	196	140
2033	9053	4394	4659	635	255	380	735	428	306

% Increase in Traffic	Daily Flow			AM Peak			PM Peak		
Year	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2	Total	Movement 1	Movement 2
2013	0%	0%	0%	0%	0%	0%	0%	0%	0%
2017	0%	0%	0%	0%	0%	1%	0%	0%	0%
2033	0%	0%	0%	0%	0%	1%	0%	1%	0%



Rate of Increase	105%
Annual Growth	

Diagram illustrating the road layout and traffic flow for the Rockhampton - Emu Park road during the AM and PM peaks.

The road is shown as a horizontal line with a center line. The left side is labeled "- Emu Park Rd" and the right side is labeled "East".

The road is divided into two sections: "Rockhampton - Emu Park" (left) and "Emu Park" (right).

The AM PEAK shows 100% traffic flow from Rockhampton to Emu Park, indicated by a long arrow pointing right.

The PM PEAK shows 100% traffic flow from Emu Park to Rockhampton, indicated by a long arrow pointing left.

The road is numbered 1 and 2 at the intersection.

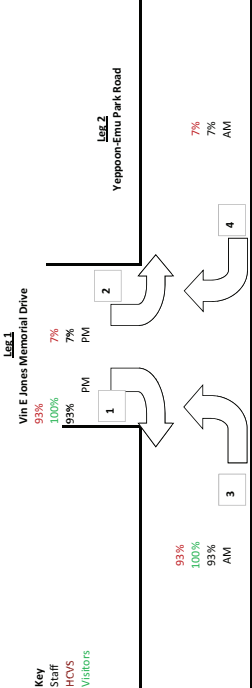
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Yeppoon-Emu Park Road / Vin E Jones Memorial Drive Intersection

Year Period	2011			
	Total (6600 - 1800)	Daily Total	AM Peak (1045-1145) Total	PM Peak (1330 - 1230) Total
All Movements	5414	933	644	589
Movement 1	5414	100%	644	100%
Movement 2	933	17%	105	104
Movement 3	389	7%	53	59
Movement 4	1035	19%	134	176
	328	6%	40	39

NOTE: Traffic flows are the average of surveys taken on a Wednesday and a Saturday  
Rate of Increase Annual Growth 104%

Base Flows		Daily Flow				AM Peak				PM Peak												
		Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4						
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
5414	5630	5855	6089	6333	6586	6850	7124	7409	7705	8013	8334	8667	9014	9374	9749	10139	10545	10967	11405	11862	12336	12830
970	993	1009	1049	1091	1135	1181	1228	1277	1328	1381	1436	1494	1554	1616	1680	1747	1817	1890	1966	2044	2126	2211
389	405	421	438	455	473	492	512	532	554	576	598	623	648	674	701	729	758	788	820	852	886	922
1035	1076	1119	1164	1210	1259	1309	1361	1416	1472	1531	1593	1658	1728	1791	1863	1938	2015	2096	2180	2267	2357	2452
328	341	355	369	384	399	415	432	449	467	486	505	525	546	568	591	614	639	664	691	719	747	777
644	669	696	724	753	783	814	847	881	916	953	991	1030	1071	1114	1159	1205	1253	1304	1356	1410	1466	1525
105	109	113	118	122	127	132	138	143	149	155	161	167	174	181	188	196	204	212	220	229	238	248
53	55	57	58	59	60	62	63	64	66	67	69	70	72	73	75	76	78	80	81	83	85	87
134	139	145	151	157	163	168	176	183	191	198	206	215	223	232	241	251	261	271	282	294	305	318
40	41	43	44	46	48	50	52	54	56	58	61	63	66	68	71	74	77	80	83	87	90	94
589	613	637	663	689	717	745	775	806	838	872	907	943	981	1020	1061	1103	1147	1193	1241	1291	1342	1396
104	108	112	116	121	126	131	136	142	147	153	159	166	172	179	186	194	202	210	218	227	236	245
59	61	63	65	68	71	74	77	80	83	87	90	94	97	101	105	109	114	119	123	128	133	139
101	105	109	114	118	123	128	133	138	144	150	156	162	168	175	182	189	197	205	213	221	230	239
29	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52



Yeppoon-Emu Park Road

	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013 Construction Staff - 2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013 HCVRs - 2013	54	25	2	25	2	1	0	1	0	2	1	0	1	0	1
2013 Construction Staff - 2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCVRs - 2017	28	13	1	13	1	1	0	1	0	1	1	0	1	0	1
Operational Staff - 2017	102	48	4	48	4	25	0	24	2	25	24	2	0	0	0
2017 Visitors - 2017	122	61	0	61	0	0	0	0	0	0	0	0	0	0	0
Operational Staff - 2033	277	129	10	129	10	69	0	64	5	69	64	5	0	0	0
2033 Visitors - 2033	200	100	0	100	0	0	0	0	0	0	0	0	0	0	0
ADDITIONAL FORECASTED VOLUMES															

ADDITIONAL FORECASTED VOLUMES

Year	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013	5909	1034	423	1144	357	698	114	57	146	43	639	113	63	110	42
2017	7102	1302	497	1431	420	841	133	66	194	52	772	155	76	128	49
2033	13307	2440	932	2681	787	1594	248	124	382	98	1465	309	143	239	92

% Increase in Traffic

Year	Daily Flow				AM Peak				PM Peak						
	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4	Total	Movement 1	Movement 2	Movement 3	Movement 4
2013	1%	2%	0%	2%	1%	0%	1%	0%	1%	0%	0%	1%	0%	1%	0%
2017	4%	10%	1%	9%	1%	5%	0%	4%	14%	19%	4%	19%	2%	0%	0%
2033	4%	10%	1%	9%	1%	5%	0%	0%	20%	5%	5%	26%	3%	0%	0%

# **Appendix I:**

## **Pavement Impact Assessment**

Developer Contribution Summary

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Dev. Contribution (@ the PV Base Yr.)						
					Reduced Pvt Life		Rehab (\$)		Mtce (\$)		Total (\$)
					To	From	To	From	To	From	
1	196	Rockhampton - Yeppoon Rd	Int George/Fitzroy St to Int Hidden Valley Rd	33.9	0.6%	0.1%			\$19,300	\$0	\$19,300
2	196	Rockhampton - Yeppoon Rd	Int Hidden Valley Rd to Int W Yeppoon - Emu Park Rd	1.62	1.1%	0.2%			\$1,495	\$0	\$1,495
3	196	Rockhampton - Yeppoon Rd	Int W Yeppoon - Emu Park Rd to Int Scenic Hwy/Byfield Rd	1.06	1.3%	0.2%			\$1,636	\$0	\$1,636
4											
5	194	Rockhampton-Emu Park Rd	Nankin Creek to Emu Park Golf Club		0.2%	0.0%				\$0	\$0
6	194	Rockhampton-Emu Park Rd	Emu Park Golf Club to Int Pattison / Hill St		0.4%	0.1%				\$0	\$0
7											
8	197	Scenic Highway	Int Scenic Hwy/Byfield Rd to Int VE Jones Mem Dr	6.1	0.6%	0.1%			\$3,259	\$0	\$3,259
9	197	Scenic Highway	ttison / Hill St to Int VE Jones M		0.4%	0.1%				\$0	\$0
10											
11	194	Rockhampton-Emu Park Rd	Drive/Bridge St to Int Nerimbera		0.2%	0.0%				\$0	\$0
12				0							
13				0							
14				0							
15				0							
16				0							
17				0							
18				0							
19				0							
20				0							
21				0							
22				0							
23				0							
24											
25											
Totals [1] =				42.7			\$0	\$0	\$25,690	\$0	\$25,690

Start of Development Traffic = 2012

ESA Increase Trigger = 5.0%

Development Duration 12 years

Total Tonnage = 683,564 tonnes

Developer Contribution expressed as a Cost per Tonne (@ the PV Base Yr.)

cents / tonne = 3.76

cents / tonne / km = 0.09

Protection Passord for all worksheets = mrd

Assumptions

MRDInputData

1 For the four intersections, the AADT represents the dominant flow through the intersection

2 No road number was provided by Austraffic for the survey counts for Yeppoon-Emu Park Rd / Vin E Jones Intersection and Breakwater Drive / Vin E Jones Drive Intersection – as a result the numbers 1000 and 2000 have been put in

3 The chainage was used where provided however for the Austraffic counts no chainage was provided. As a result the chainage was estimated based on the distance from the nearest intersection.

Materials

4 Materials volume travelling to the island includes 10% wastage and 20% empty packing space

5 Materials volume travelling from the island includes 30% empty packing space

All Development Materials towards Rosslyn Marina incl Sand and Aggregate for Concrete. Demolition Materials from GKI to dis

"

"

Only Aggregate for Concrete from Holcim Quarry.

"

All Development Materials towards Rosslyn Marina incl Sand and Aggregate for Concrete.

"

Rock Armour southwards from Holcim Quarry to Port Alma

5.0%

### Routine Mtce Contribution Calculation

Link Data				Mtce Costs at PV Base Year ( 2012 )			TO(WARDS) Development - PV of Increases in Mtce Costs (year by year)								Discount Rate = 6.0%			FROM Development - PV of Increases in Mtce Costs (year by year)								Discount Rate = 6.0%						
Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce \$/lane-km/yr	Unit Cost \$/ESA/km/yr	1 2012	2 2013	3 2014	4 2015	5 2016	6 2017	7 2018	8 2019	9 2020	10 2021	PV Total	1 2012	2 2013	3 2014	4 2015	5 2016	6 2017	7 2018	8 2019	9 2020	10 2021	PV Total				
1	196	orge/Fitzroy St to Int Hidden Va	33.9	6.73E+05	\$9,888	\$0.0147		\$19,300									\$19,300											\$0				
2	196	Valley Rd to Int W Yeppoon - E	1.62	4.15E+05	\$9,888	\$0.0238		\$1,495									\$1,495											\$0				
3	196	n - Emu Park Rd to Int Scenic H	1.06	3.03E+05	\$8,801	\$0.0290		\$1,191	\$445								\$1,636											\$0				
4																																
5	194	W Park Rd at Nankin Creek to E	25.7	1.71E+05	\$9,888	\$0.0577																						\$0				
6	194	W Park Golf Club to Int Pattison /	8.15	1.52E+05	\$9,467	\$0.0624																						\$0				
7																																
8	197	W Hwy/Byfield Rd to Int VE Jones	6.1	4.15E+05	\$9,046	\$0.0218		\$3,259									\$3,259											\$0				
9	197	W tison / Hill St to Int VE Jones M	11.8	1.14E+05	\$9,046	\$0.0795																						\$0				
10																																
11	194	W Drive/Bridge St to Int Nerimbera	8.6	1.79E+05	\$9,467	\$0.0528																						\$0				
12																																
13																																
14																																
15																																
16																																
17																																
18																																
19																																
20																																
21																																
22																																
23																																
24																																
25																																
Total =			96.9																	\$25,690												\$0

Rehabilitation Contribution Calculation

					Rehab Design Life =		20		PVT. Life <b>WITHOUT</b> Dev. Traffic (Dev. Start to Rehab. Year)			To(wards) Development				Discount Rate =		6.0%		From Development				Discount Rate =		6.0%		
					Rehab. Year <b>WITHOUT</b> Dev Traffic. Based on 2010 Roughness Data				Rehab. Year for Contrib Calc				Reduced PVT. Life <b>WITH</b> Dev. Traffic - (Dev. Start to Rehab. Year)				PV - Rehab.				Reduced PVT. Life <b>WITH</b> Dev. Traffic - (Dev. Start to Rehab. Year)				PV - Rehab.			
Sect No.	Road No.	Road Name	Road Sections	Length (km)	Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)		Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2012)	Cumul.B'gr ESA (Dev Start to Rehab)	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Bring Forward Factor	Dev. Contrib.	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Bring Forward factor	Dev. Contrib.				
1	196	hampton - Yeppoon	orge/Fitzroy St to Int Hidden V	33.9	69	120	17.0	2027	2027	15.0	6.73E+05	1.29E+07	135,555	1.28E+07	14.9	0.13	0.0031	\$28,891	18,963	1.29E+07	15.0	0.02	0.0004	\$4,022				
2	196	hampton - Yeppoon	alley Rd to Int W Yeppoon - E	1.62	79	120	13.7	2024	2024	11.7	4.15E+05	5.87E+06	135,555	5.73E+06	11.4	0.23	0.0068	\$3,012	18,963	5.85E+06	11.6	0.03	0.0009	\$418				
3	196	hampton - Yeppoon	- Emu Park Rd to Int Scenic	1.06	63	120	19.0	2029	2029	17.0	3.03E+05	6.80E+06	135,555	6.66E+06	16.7	0.27	0.0058	\$1,485	18,963	6.78E+06	17.0	0.04	0.0008	\$206				
4																												
5	194	hampton-Emu Park	Park Rd at Nankin Creek to B	25.7	57	120	21.0	2031	2031	19.0	1.71E+05	5.49E+06	18,784	5.48E+06	19.0	0.04	0.0008	\$5,745	2,628	5.49E+06	19.0	0.01	0.0001	\$802				
6	194	hampton-Emu Park	Park Golf Club to Int Pattison /	8.15	89	120	10.3	2020	2020	8.3	1.52E+05	1.60E+06	18,784	1.58E+06	8.3	0.08	0.0029	\$6,213	2,628	1.60E+06	8.3	0.01	0.0004	\$866				
7																												
8	197	Scenic Highway	Hwy/Byfield Rd to Int VE Jones	6.1	62	120	19.3	2029	2029	17.3	4.15E+05	9.54E+06	85,776	9.45E+06	17.2	0.12	0.0026	\$4,009	11,999	9.52E+06	17.3	0.02	0.0004	\$558				
9	197	Scenic Highway	ison / Hill St to Int VE Jones M	11.8	69	120	17.0	2027	2027	15.0	1.14E+05	2.58E+06	18,784	2.56E+06	14.9	0.08	0.0019	\$5,639	2,628	2.57E+06	15.0	0.01	0.0003	\$786				
10																												
11	194	hampton-Emu Park	rive/Bridge St to Int Nerimber	8.6	67	120	17.7	2028	2028	15.7	1.79E+05	4.32E+06	13,546	4.31E+06	15.6	0.03	0.0008	\$1,819	1,135	4.32E+06	15.7	0.00	0.0001	\$152				
12																												
13																												
14																												
15																												
16																												
17																												
18																												
19																												
20																												
21																												
22																												
23																												
24																												
25																												
																		\$56,815							\$7,810			





# MRD INPUT COSTS

## BITUMEN ROADS REHAB. & MTCE (incl. RESEAL) COSTS

INPUT COSTS		
Seal Width	Rehabilitation Costs	Annual Routine Mtce.
m	\$ / km	\$ / km
3.6	\$115,000	\$4,700
4	\$127,860	\$5,070
4.5	\$150,360	\$5,720
5	\$160,000	\$6,000
5.5	\$177,500	\$7,900
6	\$195,000	\$9,800
6.5	\$212,500	\$9,450
7	\$230,000	\$9,100
7.5	\$245,000	\$9,700
8	\$260,000	\$10,300
8.5	\$277,500	\$10,650
9	\$295,000	\$11,000
9.5	\$310,000	\$11,600
10	\$325,000	\$12,200
10.5	\$342,500	\$12,550
11	\$360,000	\$12,900
11.5	\$375,000	\$13,500
12	\$390,000	\$14,100
Base year for the above costs =		2007

## OTHER INPUT DATA

- (a) ESA's / HV = 2.9 ESA's/HV (Bruce Hwy)  
= 3.2 ESA's/HV (All Other Roads)
- (b) Roughness Increase = 3 counts per year
- (c) Terminal Roughness\* = 110 NRM (Bruce Hwy)  
= 120 NRM (All other Roads)
- (d) Inflation Rate = 7%
- (e) Discount Rate = 6%
- (f) HV Growth Rate = adopt a constant 3% for all road sections, unless  
(background traffic) agreed otherwise by Central District.

\*Note :- Terminal Roughness is considered to be a more realistic indicator of rehabilitation timing than pavement age or other methods of estimating the life of the existing pavement.

## **APPENDIX 3**

### Estimated Background Traffic ESA'S at Development Start Date ( 2012 )

Pavement Design Life =

20

yrs

Sect. No.	Link	Road Section	Length (km)
1	196	Int George/Fitzroy St to Int Hidden Valley Rd	33.9
2	196	Int Hidden Valley Rd to Int W Yeppoon - Emu Park Rd	1.62
3	196	Int W Yeppoon - Emu Park Rd to Int Scenic Hwy/Byfield Rd	1.06
4			
5	194	Nankin Creek to Emu Park Golf Club	25.7
6	194	Emu Park Golf Club to Int Pattison / Hill St	8.15
7			
8	197	Scenic Hwy/Byfield Rd to Int VE Jones Mem	6.1
9	197	Pattison / Hill St to Int VE Jones Mem	11.8
10			
11	194	E Drive/Bridge St to Int Nerimbera Sd	8.6
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

# Vehicle Combination / ESA Calculation 1

Bus / Truck										O O	
Axles Tyres		Single Single	Single Dual						Totals		
Legal Loading (t)		6	9						15.00	tonne	
Base Load / ESA		5.4	8.2								
Unloaded	Axle Group Load (t)	4.5	4						8.5	tonne	
	ESA's	0.482	0.057						0.54	ESA	
Loaded	Axle Group Load (t)	6.00	9.00						15.00	tonne	
	ESA's [1]	1.524	1.451						2.98	ESA	
Payload =		6.5	tonne					ESA/t Payload =	0.0829	unloaded	
Max Legal Payload =		6.5	tonne [2]					ESA/t Payload =	0.4577	loaded	

Tandem Truck										O OO	
Axles Tyres		Single Single	Tandem Dual						Totals		
Legal Loading (t)		6	16.5						22.50	tonne	
Base Load / ESA		5.4	13.8								
Unloaded	Axle Group Load (t)	4.5	5						9.5	tonne	
	ESA's	0.482	0.017						0.50	ESA	
Loaded	Axle Group Load (t)	6.00	16.50						22.50	tonne	
	ESA's [1]	1.524	2.044						3.57	ESA	
Payload =		13.0	tonne					ESA/t Payload =	0.0384	unloaded	
Max Legal Payload =		13.0	tonne [2]					ESA/t Payload =	0.2745	loaded	

Semi-Trailer										O OO OOO		
Axles Tyres		Single Single	Tandem Dual	Tri Dual					Totals			
Legal Loading (t)		6	16.5	20.00					42.50	tonne		
Base Load / ESA		5.4	13.8	18.5								
Unloaded	Axle Group Load (t)	4.5	5	6.5					16	tonne		
	ESA's	0.482	0.017	0.015					0.51	ESA		
Loaded	Axle Group Load (t)	6.00	16.50	20.00					42.50	tonne		
	ESA's [1]	1.524	2.044	1.366					4.93	ESA		
Payload =		26.5	tonne					ESA/t Payload =	0.0194	unloaded		
Max Legal Payload =		26.5	tonne [2]					ESA/t Payload =	0.1862	loaded		

B-Double										O OO OOO OOO			
Axles Tyres		Single Single	Tandem Dual	Tri Dual	Tri Dual				Totals				
Legal Loading (t)		6	16.5	20.00	20.00				62.50	tonne			
Base Load / ESA		5.4	13.8	18.5	18.5								
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5				22.5	tonne			
	ESA's	0.482	0.017	0.015	0.015				0.53	ESA			
Loaded	Axle Group Load (t)	6.00	16.50	20.00	20.00				62.50	tonne			
	ESA's [1]	1.524	2.044	1.366	1.366				6.30	ESA			
Payload =		40.0	tonne					ESA/t Payload =	0.0132	unloaded			
Max Legal Payload =		40.0	tonne [2]					ESA/t Payload =	0.1575	loaded			

Road Train 1										O OO OOO OOO OOO				
Axles Tyres		Single Single	Tandem Dual	Tri Dual	Tri Dual	Tri Dual			Totals					
Legal Loading (t)		6	16.5	20.00	20.00	20.00			82.50	tonne				
Base Load / ESA		5.4	13.8	18.5	18.5	18.5								
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5	6.5			29	tonne				
	ESA's	0.482	0.017	0.015	0.015	0.015			0.55	ESA				
Loaded	Axle Group Load (t)	6.00	16.50	20.00	20.00	20.00			82.50	tonne				
	ESA's [1]	1.524	2.044	1.366	1.366	1.366			7.67	ESA				
Payload =		53.5	tonne					ESA/t Payload =	0.0102	unloaded				
Max Legal Payload =		53.5	tonne [2]					ESA/t Payload =	0.1433	loaded				

[1] If the "payload" is more or less than legal, "axle group loadings" are proportioned based on the legal and the unloaded tonnages.

[2] Calculated from the max legal loads & generic unloaded (tare) weights for each axle group of the HV.

# Vehicle Combination / ESA Calculation 2

Truck + 4 Dog								
		O	OO	OO	OO			
Axles		Single	Tandem	Tandem	Tandem			Totals
Tyres		Single	Dual	Dual	Dual			
Legal Loading (t)		6	16.5	16.50	16.50			55.50 tonne
Base Load / ESA		5.4	13.8	13.8	13.8			
Unloaded	Axle Group Load (t)	4.5	5	5	5			19.5 tonne
	ESA's	0.482	0.017	0.017	0.017			0.53 ESA
Loaded	Axle Group Load (t)	6.00	16.50	16.50	16.50			55.50 tonne
	ESA's [1]	1.524	2.044	2.044	2.044			7.66 ESA
Payload =		36.0	tonne				ESA/t Payload =	0.0148 unloaded
Max Legal Payload =		36.0	tonne [2]				ESA/t Payload =	0.2126 loaded

		O	OO					
Axles		Single	Tandem					Totals
Tyres		Single	Dual					
Legal Loading (t)		6	16.5					22.50 tonne
Base Load / ESA		5.4	13.8					
Unloaded	Axle Group Load (t)	4.5	5					9.5 tonne
	ESA's	0.482	0.017					0.50 ESA
Loaded	Axle Group Load (t)	6.00	16.50					22.50 tonne
	ESA's [1]	1.524	2.044					3.57 ESA
Payload =		13	tonne				ESA/t Payload =	0.0384 unloaded
Max Legal Payload =		13.0	tonne [2]				ESA/t Payload =	0.2745 loaded

		O	OO					
Axles		Single	Tandem					Totals
Tyres		Single	Dual					
Legal Loading (t)		6	16.5					22.50 tonne
Base Load / ESA		5.4	13.8					
Unloaded	Axle Group Load (t)							0 tonne
	ESA's	0.000	0.000					0.00 ESA
Loaded	Axle Group Load (t)	0.00	0.00					0.00 tonne
	ESA's [1]	0.000	0.000					0.00 ESA
Payload =			tonne				ESA/t Payload =	#DIV/0! unloaded
Max Legal Payload =		22.5	tonne [2]				ESA/t Payload =	#DIV/0! loaded

Unloaded Vehicles			
HV Type	ESA / t (payload)	% of HV fleet	Weighed Average
Bus / Truck	0.0829	0.0%	0.0000
Tandem Truck	0.0384		
Semi-Trailer	0.0194	0.0%	0.0000
B-Double	0.0132	0.0%	0.0000
Road Train 1	0.0102	0.0%	0.0000
Truck + 4 Dog	0.0148	0.0%	0.0000
0			
0			
		0.0%	0.0000

ESAs / tonne of product "out the gate"

Loaded Vehicles			
HV Type	ESA / t (payload)	% of HV fleet	Weighed Average
Bus / Truck	0.4577	0.0%	0.0000
Tandem Truck	0.2745		
Semi-Trailer	0.1862	0.0%	0.0000
B-Double	0.1575	0.0%	0.0000
Road Train 1	0.1433	0.0%	0.0000
Truck + 4 Dog	0.2126	0.0%	0.0000
0			
0			
		0.0%	0.0000

ESAs / tonne of product "out the gate"





No.	Road No.	Road Name	Road Section
1	196	Rockhampton - Yeppoon Rd	Int George/Fitzroy St to Int Hidden Valley Rd
2	196	Rockhampton - Yeppoon Rd	Int Hidden Valley Rd to Int W Yeppoon - Emu Park Rd
3	196	Rockhampton - Yeppoon Rd	Int W Yeppoon - Emu Park Rd to Int Scenic Hwy/Byfield Rd
4			
5	194	Rockhampton-Emu Park Rd	Nankin Creek to Emu Park Golf Club
6	194	Rockhampton-Emu Park Rd	Emu Park Golf Club to Int Pattison / Hill St
7			
8	197	Scenic Highway	Int Scenic Hwy/Byfield Rd to Int VE Jones Mem Dr
9	197	Scenic Highway	Int Pattison / Hill St to Int VE Jones Mem Dr
10			
11	194	Rockhampton-Emu Park Rd	Int QE Drive/Bridge St to Int Nerimbera Sch Rd
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

[illegible][illegible]

Total Tonnes In	Total Tonnes Out
-----------------	------------------

143,216	Tonnes	=	11017	Truckloads
64,447	Tonnes	=	4957	Truckloads
118,153	Tonnes	=	9089	Truckloads
143	Tonnes	=	11	Truckloads
			<u>25,074</u>	Truckloads

OTHER MATERIALS									
Timber / F-Board	3,438	m <sup>3</sup> X	0.72	T/m <sup>3</sup> =	2,458	Tonnes	=	189	Truckloads
Glass	48	m <sup>3</sup> X	2.58	T/m <sup>3</sup> =	124	Tonnes	=	10	Truckloads
Roof Metal	124	m <sup>3</sup> X	7.85	T/m <sup>3</sup> =	973	Tonnes	=	75	Truckloads
H/Ware & Pipes	650	m <sup>3</sup> X	2.40	T/m <sup>3</sup> =	1,560	Tonnes	=	120	Truckloads
Furniture & W/Goods	1,742	m <sup>3</sup> X	0.05	T/m <sup>3</sup> =	87	Tonnes	=	7	Truckloads
								<b>400</b>	<b>Truckloads</b>

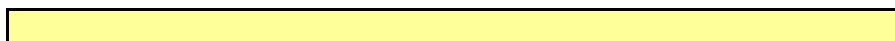
<b><u>HV Assumptions for Vehicle Type for Materials</u></b>			
Timber / F-Board	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Glass	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Roof Metal	Based on Tandem Truck Unit of	13	tonne legal payload capacity
H/ware & Pipes	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Furniture & W/Goods	Based on Tandem Truck Unit of	13	tonne legal payload capacity

<b><u>HV Assumptions for Vehicle Type for Materials</u></b>			
Timber / F-Board	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Glass	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Roof Metal	Based on Tandem Truck Unit of	13	tonne legal payload capacity
H/ware & Pipes	Based on Tandem Truck Unit of	13	tonne legal payload capacity
Furniture & W/Goods	Based on Tandem Truck Unit of	13	tonne legal payload capacity



HV	Bus/truck	Tandem	Semi	B-Double	Rd Train1
payload (t)	3.7	13	26.5	40	51.5
ESA/HV(loaded)	2.98	3.57	4.93	6.30	8.30
ESA/HV (un-loaded)	0.54	0.50	0.51	0.53	0.55

	LOADED										Total No Trucks	Development Generated ESA's per Year - <b>LOADED</b>					Total ESA's	
	Tonnes Transported/Year per HV Type:-					Total Tonnes	No. of HV - <b>LOADED</b>					Bus/truck	Tandem	Semi	B-Double	Rd Train1		
	Bus/truck	Tandem	Semi	B-Double	Rd Train1		Bus/truck	Tandem	Semi	B-Double								Rd Train1
1		46,977				46,977	0	3,614	0	0		3614	0	12,901	0	0		12,901
2		46,977				46,977	0	3,614	0	0		3614	0	12,901	0	0		12,901
3		46,977				46,977	0	3,614	0	0		3614	0	12,901	0	0		12,901
4						0	0	0	0	0		0	0	0	0	0		0
5		6,510				6,510	0	501	0	0		501	0	1,788	0	0		1,788
6		6,510				6,510	0	501	0	0		501	0	1,788	0	0		1,788
7						0	0	0	0	0		0	0	0	0	0		0
8		46,977				46,977	0	3,614	0	0		3614	0	12,901	0	0		12,901
9		6,510				6,510	0	501	0	0		501	0	1,788	0	0		1,788
10						0	0	0	0	0		0	0	0	0	0		0
11				90,000		90,000	0	0	0	2,250		2250	0	0	0	14,175		14,175
12						0	0	0	0	0		0	0	0	0	0		0
13						0	0	0	0	0		0	0	0	0	0		0
14						0	0	0	0	0		0	0	0	0	0		0
15						0	0	0	0	0		0	0	0	0	0		0
16						0	0	0	0	0		0	0	0	0	0		0
17						0	0	0	0	0		0	0	0	0	0		0
18						0	0	0	0	0		0	0	0	0	0		0
19						0	0	0	0	0		0	0	0	0	0		0
20						0	0	0	0	0		0	0	0	0	0		0
21						0	0	0	0	0		0	0	0	0	0		0
22						0	0	0	0	0		0	0	0	0	0		0
23						0	0	0	0	0		0	0	0	0	0		0
24						0	0	0	0	0		0	0	0	0	0		0
25						0	0	0	0	0		0	0	0	0	0		0



	Construction Period - HV per Day								Production Period - HV per Day						Construction and Production	TOTAL Cumulative ESA
	Bus/Truck		Tandem		Semi		B-Double		Semi		B-Double		Other			
	Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded		
ESA's / veh.	0.54	2.98	0.50	3.57	0.51	4.93	0.53	6.30	0.51	4.93	0.53	6.30	0.54	2.98	ESA	
Year	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(veh/d)	(per year)	(each year)
1			90	90			9	9							156136	156136
2			33	33											49023	205159
3			24	24											35653	240812
4			22	22											32682	273495
5			11	11											16341	289836
6			11	11											16341	306177
7			11	11											16341	322518
8			10	10											14856	337373
9			10	10											14856	352229
10			10	10											14856	367084
11			10	10											14856	381940
12			9	9											13370	395310
13															0	395310
14															0	395310
15															0	395310
16															0	395310
17															0	395310
18															0	395310
19															0	395310
20															0	395310

#### HV Assumptions for Vehicle Type for Materials

Aggregate	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Cement	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Sand	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Timber / F-Board	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Glass	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Roof Metal	Based on Tandem Truck Unit of 13 tonne legal payload capacity
H/ware & Pipes	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Furniture & W/Goods	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Tiles & Carpets	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Landscaping / Soils	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Machinery / Equipment	Based on Tandem Truck Unit of 13 tonne legal payload capacity
Rock Armour	Based on B-Double Truck Unit of 40 tonne legal payload capacity

## **Appendix J:**

# **Barging Approvals and Plans**

# Notice of Decision – Development Approval

*This notice is issued by the Environmental Protection Agency pursuant to Section 3.5.15 of the Integrated Planning Act 1997 to advise of a decision or action.*

GKI Resort Pty Ltd  
C/- Humphreys Reynolds Perkins Planning  
Consultants  
Level 20, 344 Queen Street  
BRISBANE QLD 4000

CC: Queensland Transport  
Maritime Safety Queensland  
PO Box 123  
GLADSTONE QLD 4680  
Attention: Regional Harbour Master

Attention: David Perkins

Dear Sir or Madam:

**Re: Application for Development Approval**

The Environmental Protection Agency, acting as assessment manager, wishes to advise that your application for development approval, received on 7 December 2007, has been assessed, and approved.

**1. Property/Location:**

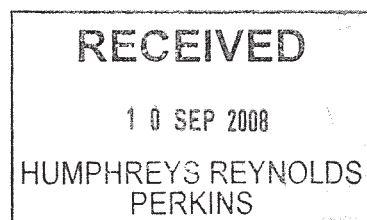
Street address - Vin E Jones Memorial Drive ROSSLYN QLD 4703  
Lot/Plan - Lot 1 on LN803409  
Waterbody - Rosslyn Bay

**2. Details of the decision**

Aspect of development  
- Development Approval for operational work  
- Tidal work

Recommendation  
- Granted in full with conditions

EPA Reference Number  
- IPDC00809307



**3. Effectiveness and currency periods**

This development approval takes effect -

- ° From the time the decision notice is given, if there is no submitter and the applicant does not appeal the decision to the court; or
- ° When the submitter's appeal period ends, if there is a submitter and the applicant does not

- appeal the decision to the court; or
- ° Subject to the decision of the court, when the appeal is finally decided, if an appeal is made to the court.

[refer to sections 3.5.19 and 3.5.20 of the *Integrated Planning Act 1997* for further details]

This approval will lapse unless substantially started within the standard currency periods stated in section 3.5.21 of the *Integrated Planning Act 1997* applying to each aspect of development in this approval.

#### 4. The approved plan(s)

The approved plan(s) and/or document(s) for this approval:

Plan/Document No.	Plan/Document Name	Date
3356-100	General Notes	20/04/2007
3356-101	General Arrangement	20/04/2007
3356-102	Pile Layout, Profile and Schedule	20/04/2007
3356-103	Pontoon and Ramp Setout	20/04/2007
3356-104	1.2m x 22m Aluminium Gangway	20/04/2007
3356-105	External Pile Guide Details	20/04/2007
3356-105	Ramp Slab Details	20/04/2007
3233-106	Standard Float Drawings	6/09/2006
	Statutory Declaration: Certification of design of tidal works	20/08/2007

#### 5. Other necessary development permits

This approval pursuant to the *Integrated Planning Act 1997* does not remove the need to obtain any further approval for this development, required by this or other State and/or Commonwealth legislation. Applicants are advised to check with all relevant statutory authorities for such approvals as may be required. Applicants should also comply with all relevant legislation.

#### 6. Codes for self-assessable development

Any self-assessable development for an environmentally relevant activity conducted in conjunction with this approval, must comply with the relevant code of environmental compliance.

#### 7. IDAS referral agencies

The IDAS referral agencies and their response to each approval type required for this application are:

Concurrence Agencies: Nil (please remove table)

Concurrence Agency	Aspect of Development	Decision	Ref Number
Queensland Transport Maritime Safety Queensland	Operational Works  Tidal Works	Approved (Attachment 1)	710/85 P14707

Advice Agencies: Nil

**8. Submissions**

This application did not trigger Public Notification.

**9. Appeal rights**

An attached extract from the *Integrated Planning Act 1997* details your appeal rights regarding this decision. You should seek independent advice to confirm all your available avenues.

If you require more information, please contact Tracy Richards, the Project Manager, on the telephone number listed below.

Yours sincerely



Damian Pearson  
**Delegate**  
**Environmental Protection Agency**

Date: 8 September 2008

**Enquiries:**

EPA Central Region (Rockhampton)  
PO Box 3130, Redhill,  
ROCKHAMPTON QLD 4701  
Phone: (07) 4936 0544  
Fax: (07) 4936 0508

**Attachment – Appeal Rights (extract from the *Integrated Planning Act 1997*)**

## **APPEAL RIGHTS - Extract from the *Integrated Planning Act 1997***

### **Division 8—Appeals to court relating to development applications**

#### **4.1.27 Appeals by applicants**

- (1) An applicant for a development application may appeal to the court against any of the following -
  - (a) the refusal, or the refusal in part, of a development application;
  - (b) a matter stated in a development approval, including any condition applying to the development, and the identification of a code under section 3.1.6;
  - (c) the decision to give a preliminary approval when a development permit was applied for;
  - (d) the length of a currency period;
  - (e) a deemed refusal.
- (2) An appeal under subsection (1)(a) to (d) must be started within 20 business days (the “**applicant’s appeal period**”) after the day the decision notice or negotiated decision notice is given to the applicant.
- (3) An appeal under subsection (1)(e) may be started at any time after the last day a decision on the matter should have been made.

#### **4.1.28 Appeals by submitters**

- (1) A submitter for a development application may appeal to the court only against -
  - (a) the part of the approval relating to the assessment manager’s decision under section 3.5.14 or 3.5.14A; or
  - (b) for an application processed under section 6.1.28(2) – the part of the approval about the aspects of the development that would have required public notification under the repealed Act.
- (2) To the extent an appeal may be made under subsection (1), the appeal may be against 1 or more of the following-
  - (a) the giving of a development approval;
  - (b) any provision of the approval including-
    - (i) a condition of, or lack of condition for, the approval; or
    - (ii) the length of a currency period for the approval.
- (3) However, a submitter may not appeal if the submitter-
  - (a) withdraws the submission before the application is decided; or
  - (b) has given the assessment manager a notice under section 3.5.19(1)(b)(ii).
- (4) The appeal must be started within 20 business days (the “**submitter’s appeal period**”) after the decision notice or negotiated decision notice is given to the submitter.

#### **4.1.29 Appeals by advice agency submitters**

- (1) Subsection (1A) applies if an advice agency, in its response for an application, told the assessment manager to treat the response as a properly made submission.
- (1A) The advice agency may, within the limits of its jurisdiction, appeal to the court about any part of the approval relating to the assessment manager’s decision under section 3.5.14 or 3.5.14A.
- (3) The appeal must be started within 20 business days after the day the decision notice or negotiated notice is given to the advice agency as a submitter.
- (4) However, if the advice agency has given the assessment manager a notice under section 3.5.19(1)(b)(ii), the advice agency may not appeal the decision.

#### **4.1.30 Appeals for matters arising after approval given (co-respondents)**

- (1) For a development approval given for a development application, a person to whom any of the following notices have been given may appeal to the court against the decision in the notice -
  - (a) a notice giving a decision on a request for an extension of the currency period for an approval;
  - (b) a notice giving a decision on a request to make a minor change to an approval.
- (2) The appeal must be started within 20 business days after the day the notice of the decision is given to the person.
- (3) Subsection (1)(a) does not apply if the approval resulted from a development application (superseded planning scheme) that was assessed as if it were an application made under a superseded planning scheme.



## **Division 9 - Appeals to court about other matters**

### **4.1.31 Appeals for matters arising after approval given (no co-respondents)**

- (1) A person to whom any of the following notices have been given may appeal to the court against the decision in the notice -
  - (a) a notice giving a decision on a request to change or cancel a condition of a development approval;
  - (b) a notice under section 3.5.33A(9)(b) or 6.1.44 giving a decision to change or cancel a condition of a development approval.
- (2) The appeal must be started within 20 business days after the day the notice of the decision is given to the person.

### **4.1.32 Appeals against enforcement notices**

- (1) A person who is given an enforcement notice may appeal to the court against the giving of the notice.
- (2) The appeal must be started within 20 business days after the day notice is given to the person.

### **4.1.33 Stay of operation of enforcement notice**

- (1) The lodging of a notice of appeal about an enforcement notice stays the operation of the enforcement notice until -
  - (a) the court, on the application of the entity issuing the notice, decides otherwise; or
  - (b) the appeal is withdrawn; or
  - (c) the appeal is dismissed.
- (2) However, subsection (1) does not apply if the enforcement notice is about -
  - (a) a work, if the enforcement notice states the entity believes the work is a danger to persons or a risk to public health; or
  - (b) carrying out development that is the demolition of a work.

### **4.1.34 Appeals against decisions on compensation claims**

- (1) A person who is dissatisfied with a decision under section 5.4.8 or 5.5.3 for the payment of compensation may appeal to the court against -
  - (a) the decision; or
  - (b) a deemed refusal of the claim.
- (2) An appeal under subsection (1)(a) must be started with 20 business days after the day notice of the decision is given to the person.
- (3) An appeal under subsection (1)(b) may be started at any time after the last day a decision on the matter should have been made.

### **4.1.35 Appeals against decisions on requests to acquire designated land under hardship**

- (1) A person who is dissatisfied with a designator's decision to refuse a request made by the person under section 2.6.19, may appeal to the court against -
  - (a) the decision; or
  - (b) a deemed refusal of the request.
- (2) An appeal under subsection (1)(a) must be started within 20 business days after the day notice of the decision is given to the person.
- (3) An appeal under subsection (1)(b) may be started at any time after the last day a decision on the matter should have been made.

### **4.1.37 Appeals from tribunals**

- (1) A party to a proceeding decided by a tribunal may appeal to the court against the tribunal's decision, but only on the ground -
  - (a) of error or mistake in law on the part of the tribunal; or
  - (b) that the tribunal had no jurisdiction to make the decision or exceeded its jurisdiction in making the decision.
- (2) An appeal against a tribunal's decision must be started within 20 business days after the day notice of the tribunal's decision is given to the party.

### **4.1.38 Court may remit matter to tribunal**

If an appeal includes a matter within the jurisdiction of a tribunal and the court is satisfied the matter should be dealt with by a tribunal, the court must remit the matter to the tribunal for decision.

## **Division 10 - Making an appeal to court**

### **4.1.39 How appeals to the court are started**

- (1) An appeal is started by lodging written notice of appeal with the registrar of the court.
- (2) The notice of appeal must state the grounds of the appeal.
- (3) The person starting the appeal must also comply with the rules of the court applying to the appeal.
- (4) However, the court may hear and decide an appeal even if the person has not complied with subsection (3).

### **4.1.41 Notice of appeal to other parties (div 8)**

- (1) An appellant under division 8 must give written notice of the appeal to-
  - (a) if the appellant is an applicant-
    - (i) the chief executive; and
    - (ii) the assessment manager; and
    - (iii) any concurrence agency; and
    - (iv) any principal submitter whose submission has not been withdrawn; and
    - (v) any advice agency treated as a submitter whose submission has not been withdrawn; or
  - (b) if the appellant is a submitter or an advice agency whose response to the development application is treated as a submission for an appeal-
    - (i) the chief executive; and
    - (ii) the assessment manager; and
    - (iii) any referral agency; and
    - (iv) the applicant; or
  - (c) if the appellant is a person to whom a notice mentioned in section 4.1.30 has been given-
    - (i) the chief executive; and
    - (ii) the deciding entity; and
    - (iii) any entity that was a concurrence agency or building referral agency for the development application to which the notice relates.
- (2) The notice must be given within-
  - (a) if paragraph (b) does not apply-10 business days after the appeal is started; or
  - (b) if the appellant is a submitter or advice agency whose response to the development application is treated as a submission for an appeal-2 business days after the appeal is started.
- (3) The notice must state-
  - (a) the grounds of the appeal; and
  - (b) if the person given the notice is not the respondent or a co-respondent under section 4.1.43 -
  - (c) that the person may, within 10 business days after the day the notice is given, elect to become a co-respondent to the appeal by filing in the court a notice of election in the approved form.

### **4.1.42 Notice of appeal to other parties (div 9)**

- (1) An appellant under division 9 must, within 10 business days after the day the appeal is started give written notice of the appeal to -
  - (a) if the appellant is a person to whom a notice mentioned in section 4.1.31<sup>73</sup> has been given - the entity that gave the notice; or
  - (b) if the appellant is a person to whom an enforcement notice is given - the entity that gave the notice and if the entity is not the local government, the local government; or
  - (c) if the appellant is a person dissatisfied with a decision about compensation - the local government that decided the claim; or
  - (d) if the appellant is a person dissatisfied with a decision about acquiring designated land - the designator; or
  - (e) if the appellant is a person who is disqualified as a private certifier - the entity disqualifying the person and if the entity disqualifying the person is not the accrediting body, the accrediting body; or
  - (f) if the appellant is a party to a proceeding decided by a tribunal - the other party to the proceeding.
- (2) The notice must state the grounds of the appeal.

**4.1.43 Respondent and co-respondents for appeals under div 8**

- (1) Subsections (2) to (8) apply for appeals under section 4.1.27 to 4.1.29.
- (2) The assessment manager is the respondent for the appeal.
- (3) If the appeal is started by a submitter, the applicant is a co-respondent for the appeal.
- (4) Any submitter may elect to become a co-respondent to the appeal.
- (5) If the appeal is about a concurrence agency response, the concurrence agency is a co-respondent for the appeal.
- (6) If the appeal is only about a concurrence agency response, the assessment manager may apply to the court to withdraw from the appeal.
- (7) The respondent and any co-respondents for an appeal are entitled to be heard in the appeal as a party to the appeal.
- (8) A person to whom a notice of appeal is required to be given under section 4.1.41 and who is not the respondent or a co-respondent for the appeal may elect to be a co-respondent.
- (9) For an appeal under section 4.1.30-
  - (a) the assessment manager is the respondent; and
  - (b) any entity that was a concurrence agency or a building referral agency for the development application to which a notice under section 3.6.3 relates may elect to become a co-respondent.

**4.1.44 Respondent and co-respondents for appeals under div 9**

- (1) This section applies if an entity is required under section 4.1.42 to be given a notice of an appeal.
- (2) The entity given written notice is the respondent for the appeal.
- (3) However, if under a provision of the section more than 1 entity is required to be given notice, only the first entity mentioned in the provision is the respondent.
- (4) The second entity mentioned in the provision may elect to be a co-respondent.

**4.1.45 How an entity may elect to be a co-respondent**

An entity that is entitled to elect to be a co-respondent to the appeal may do so, within 10 business days after notice of the appeal is given to the entity, by following the rules of court for the election.

**4.1.46 Minister entitled to be represented in an appeal involving a State interest**

If the Minister is satisfied that an appeal involves a State interest, the Minister is entitled to be represented in the appeal.

**4.1.47 Lodging appeal stops certain actions**

- (1) If an appeal (other than an appeal under section 4.1.30) is started under division 8, the development must not be started until the appeal is decided or withdrawn.
- (2) Despite subsection (1), if the court is satisfied the outcome of the appeal would not be affected if the development or part of the development is started before the appeal is decided, the court may allow the development or part of the development to start before the appeal is decided.

# Development Approval

## Section 3.5.15 of the *Integrated Planning Act 1997*

<b>EPA Permit number:</b>	IPDC00809307
<b>Assessment Manager reference:</b>	222493
<b>Date application received by EPA:</b>	7 December 2007
<b>Permit Type:</b>	Assessment Manager Response for operational work
<b>Relevant Laws and Policies:</b>	<i>Coastal Protection and Management Act 1995</i> and any subordinate legislation
<b>Jurisdiction:</b>	Item 6 of Table 3 of Schedule 8A of the <i>Integrated Planning Act 1997</i>

This response attaches to the land described below, which either connects to or receives the benefits of the structure or activity that is the tidal work.

### Development Description

<b>Applicant</b>	GKI Resort Pty Ltd
<b>Property/Location</b>	Vin E Jones Memorial Drive ROSSLYN QLD 4703
<b>Lot/Plan</b>	Lot 1 on LN803409
<b>Waterway</b>	Roslyn Bay
<b>Details of development</b>	Construction of a barging facility (2 barge ramps and a pontoon)

### Reasons for inclusion of development conditions

In accordance with section 3.3.18(7) of the *Integrated Planning Act 1997* and section 27B of the *Acts Interpretation Act 1954*, the reasons for the inclusion of development conditions are:

The Environmental Protection Agency is recognised as the assessment manager under the *Integrated Planning Amendment Regulation 1998* for coastal management under the *Coastal Protection and Management Act 1995*.

In accordance with section 108 of the *Coastal Protection and Management Act 1995*, the assessment manager conditions included in this approval only apply to that part of the development located within the coastal management district.

### Additional information for applicants

#### Other approvals

This concurrence response pursuant to Section 104 of the *Coastal Protection and Management Act 1995* does not remove the need to obtain any further approval for this development which may be required pursuant to this or other legislation, both State and Commonwealth. Applicants are advised to check with all relevant statutory authorities for such approvals as may be required.



Contaminated Land

It is a requirement of the *Environmental Protection Act 1994* that if an owner or occupier of land becomes aware a Notifiable Activity (as defined by Schedule 2 of the *Environmental Protection Act 1994*) is being carried out on the land or that the land has been affected by a hazardous contaminant, they must, within 30 days after becoming so aware, give notice to the Environmental Protection Agency.

## CONDITIONS OF APPROVAL

1. All works are to be constructed in accordance with the attached approved drawings and the specifications as detailed on these drawings.
2. All reasonable and practicable measures must be taken to prevent pollution of the waterway as a result of silt run-off, oil and grease spills from machinery, concrete truck washout and alike. Wastewater from cleaning equipment must not be discharged directly or in-directly to any watercourses or stormwater systems.
3. The disturbance to the bed and banks of the waterway is to be kept to a minimum.
4. Any material or any debris that falls or is deposited outside of the alignment of the works shown on the approved plans must be removed prior to the practical completion of the works.
5. Construction of the works are to be carried out only by means of suitable plant and equipment and measures are to be taken to limit turbidity in tidal waters as a result of the construction.
6. All temporary works associated with the construction of the works are to be removed from the site at the completion of the works.
7. All wastes shall be collected and disposed of at an appropriate lawful facility.



Damian Pearson  
**Delegate**  
**Environmental Protection Agency**

Date: 8 September 2008

**DEFINITIONS**

Words and phrases used throughout this permit<sup>1</sup> are defined below. Where a definition for a term used in this permit<sup>1</sup> is sought and the term is not defined within this permit<sup>1</sup> the definitions provided in the relevant legislation shall be used.

**"administering authority"** means the Environmental Protection Agency or its successor.

**"approval"** means 'notice of development application decision' or 'notice of concurrence agency response' under the *Integrated Planning Act 1997*.

**"approved plans"** means the plans and documents listed in the approved plans section in the notice attached to this concurrence response.

**"artificial waterway"** means an artificial channel, lake or other body of water. Artificial waterway includes –

- an artificial channel that is formed because the land has been reclaimed from tidal water and is intended to allow boating access to allotments on subdivided land;
- other artificial channels subject to the ebb and flow of the tide; and
- any additions or alterations to an artificial waterway.

**"canal"** means an artificial waterway surrendered to the State. A canal is an artificial waterway connected, or intended to be connected, to tidal water; and from which boating access to the tidal water is not hindered by a lock, weir or similar structure.

**"coastal dune"** means a ridge or hillock of sand or other material on the coast and built up by the wind.

**"commercial place"** means a place used as an office or for business or commercial purposes.

**"development"** is any of the following— (a) carrying out building work; (b) carrying out plumbing or drainage work; (c) carrying out operational work; (d) reconfiguring a lot; (e) making a material change of use of premises. (refer to section 1.3.2 of the *Integrated Planning Act 1997*).

**"dredge spoil"** means material taken from the bed or banks of waters by using dredging equipment or other equipment designed for use in extraction of earthen material.

**"dwelling"** means any of the following structures or vehicles that is principally used as a residence –

- a house, unit, motel, nursing home or other building or part of a building;
- a caravan, mobile home or other vehicle or structure on land;
- a water craft in a marina.

**"Environmental Protection Agency"** means the department or agency (whatever called) administering the *Coastal Protection and Management Act 1995* or the *Environmental Protection Act 1994*.

**"erosion prone area"** means an area declared to be an erosion prone area under section 70(1) of the *Coastal Protection and Management Act 1995*.

**"high water mark"** means the ordinary high water mark at spring tides.

**"land"** in the "land schedule" of this document means land excluding waters and the atmosphere.

**"permit"** includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation administered by the Environmental Protection Agency and the Queensland Parks and Wildlife Service.

**"ponded pasture"** means a permanent or periodic pondage of water in which the dominant plant species are pasture species used for grazing or harvesting.

**"protected area"** means –

- a protected area under the *Nature Conservation Act 1992*; or
- a marine park under the *Marine Parks Act 1992*; or
- a World Heritage Area.

**"quarry material"** means material on State coastal land, other than a mineral within the meaning of any Act relating to mining. Material includes for example stone, gravel, sand, rock, clay, mud, silt and soil, unless it is removed from a culvert, stormwater drain or other drainage infrastructure as waste material.

**"site"** means land or tidal waters on or in which it is proposed to carry out the development approved under this development approval.

**"tidal water"** means the sea and any part of a harbour or watercourse ordinarily within the ebb and flow of the tide at spring tides.

**"watercourse"** means a river, creek or stream in which water flows permanently or intermittently-

- in a natural channel, whether artificially improved or not; or
- in an artificial channel that has changed the course of the watercourse.

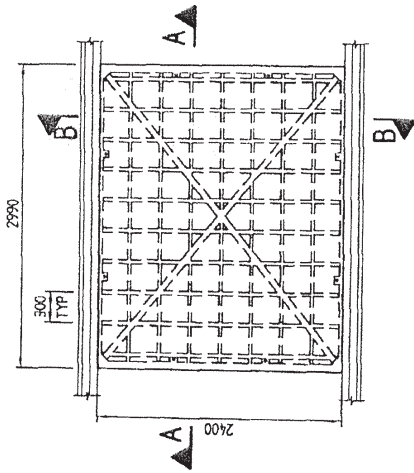
**"waters"** includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

**"works" or "operation"** means the development approved under this development approval.

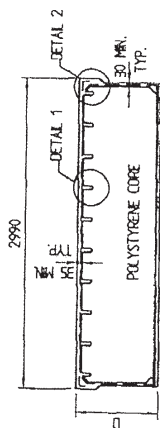
**"you"** means the holder of this development approval or owner / occupier of the land which is the subject of this development approval.

## END OF CONDITIONS

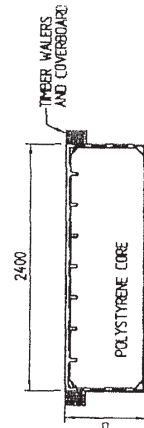




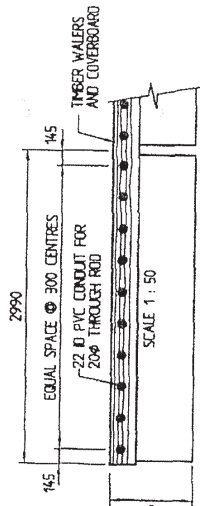
**PLAN - TYPICAL WALKWAY PONTOON**  
**(3000 WIDE)**  
SCALE 1 : 50



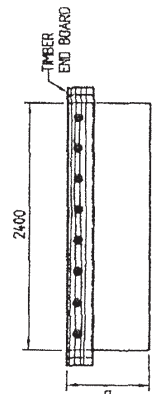
**SECTION A - A**  
SCALE 1 : 50



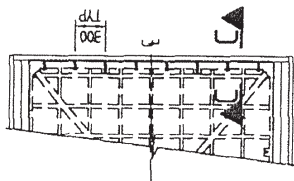
**SECTION B - B**  
SCALE 1 : 50



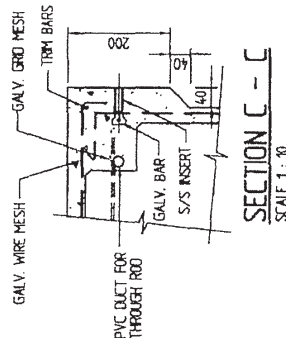
**ELEVATION**



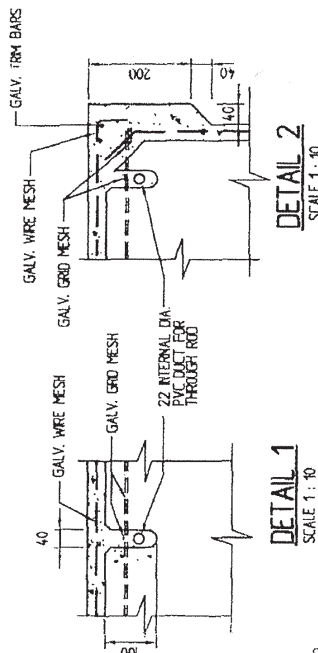
**END ELEVATION**  
SCALE 1 : 50



**PART PLAN SHOWING**  
**INSERT AT ONE END**  
SCALE 1 : 50



**SECTION C - C**  
SCALE 1 : 10



**DETAIL 2**  
SCALE 1 : 10

**DETAIL 1**  
SCALE 1 : 10

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. PROVIDE STAINLESS STEEL INSERTS AS REQUIRED TO END OF LAST PONTOON ONLY TO WALKWAYS AND FINGERS.
3. CONCRETE STRENGTH  $f_c = 40\text{MPa}$ .
4. ALL REINFORCEMENT TO BE HOT DIP GALVANIZED.
5. MATERIAL SIZES MAY BE VARIED BY THE MANUFACTURER WITHOUT NOTICE TO COMPLY WITH SPECIFIC APPLICATIONS.
6. DIMENSION 'D' VARIES TO SUIT FREEBOARD REQUIREMENTS.
7. ALL GALV. WIRE MESH TO BE 50 x 50 x 20mm.
8. ALL GALV. GRID MESH TO BE 300 x 300 x 50mm.

**APPROVED**

**Revisions**

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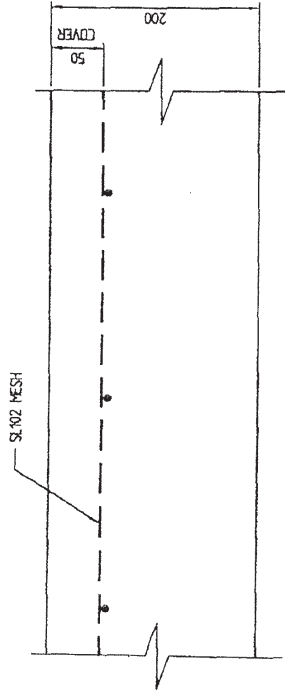
**CLIENT:**  
**BELLINGHAM MARINE AUSTRALIA PTY. LTD.**

**PROJECT:**  
**CALYPSO BAY UNLOADING PONTOON**

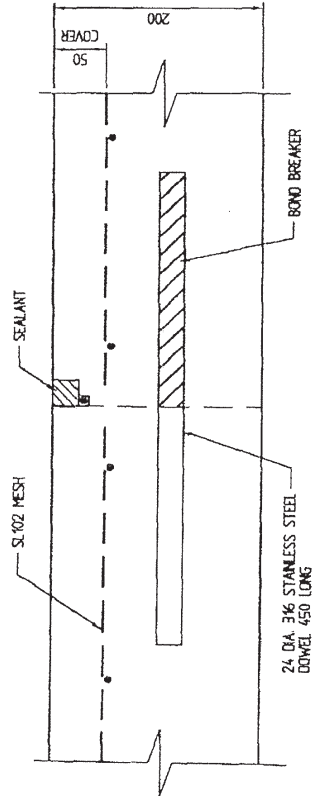
**TITLE:**  
**STANDARD FLOAT DRAWING**

**Date:** 6/09/2006  
**Drawing No.:** 3233-106  
**Scale:** AS SHOWN  
**Drawn By:** J.C. **Designed By:** Approved By:

**J. M. LEMAN**  
REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938



**TYPICAL RAMP SLAB DETAILS**  
SCALE 1:5



**TYPICAL RAMP SLAB JOINT DETAILS**  
SCALE 1:5

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CLIENT:  
**TOWER HOLDING**

PROJECT:  
**GREAT KEPPEL BARGE RAMP**

TITLE:  
**RAMP SLAB DETAILS**

Date: 20/04/2007  
Drawing No.: 3356-105  
Scale: AS SHOWN  
Drawn By: J.C. Designed By:  
Approved By:

*J. M. LEMAN*

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REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938

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CLIENT:  
**TOWER HOLDING**

PROJECT:  
**GREAT KEPPEL BARGE RAMP**

TITLE:  
**12m x 22m ALUMINIUM GANGWAY**

Date: 20/04/2007

Drawing No.: 3356-104

Scale: AS SHOWN

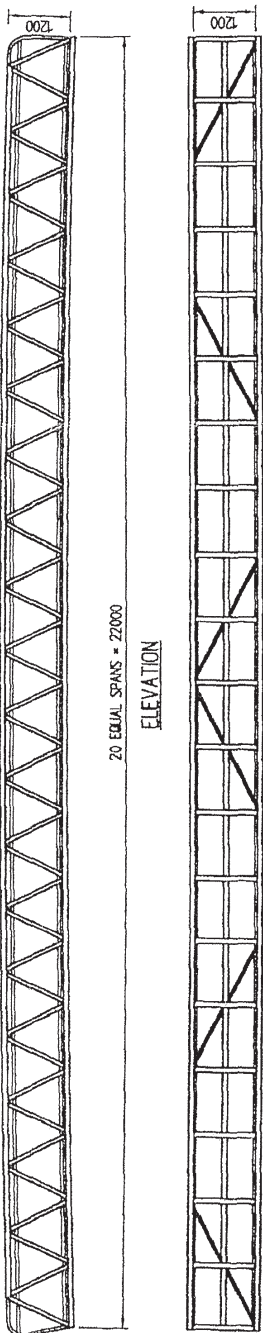
Drawn By: J.C. Designed By:

Approved By:

**NOTES :**

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS1664.
3. ALUMINIUM EXTRUSIONS SHALL BE 6061-T6 JR 6082-T5 UNO.
4. ALUMINIUM PLATES SHALL BE TYPE 5083 TEPER H21.
5. ALL WELDS SHALL BE MERT GAS WELD USING PULSE MIG OR TIG FUSION WELDING PROCESS.
6. ALL WORK SHALL BE NEATLY FINISHED WITH ALL SHARP EDGES GROUND SMOOTH.
7. ALL WELDS TO BE COMPLETE PENETRATION BUTT WELD.
8. DESIGN LIVE LOADS  
DELT 4.0kPa  
CONCENTRATED LOAD 4.5KN  
HANDRAIL 0.75kN/m
9. TIMBER PLANKS TO BE TIED TOGETHER WITH ONE 25 x 25 x 3 ANGLE @ CENTRE.
10. SPICE JOINT IN TOP CHORD TO BE LOCATED OUTSIDE THE CENTRAL GIR.

ITEM	DESCRIPTION	REMARKS
6	ANGLE 50 x 25 x 3	6060-T5
5	CHS 603 x 3.6	6082-T5
4	SHS 508 x 50.8 x 3.2	6082-T5
3	RHS 100 x 50 x 3	6082-T5
2	SHS 762 x 762 x 6.35	6082-T5
1	SHS 1016 x 1016 x 6.35	6082-T5



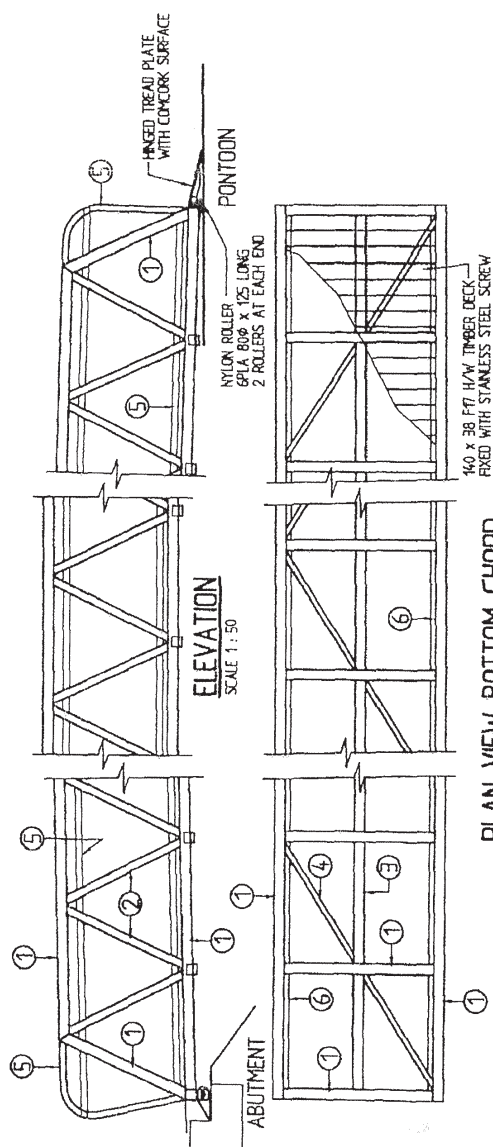
20 EQUAL SPANS = 22000

ELEVATION

PLAN

**GENERAL ARRANGEMENT**

SCALE 1:100

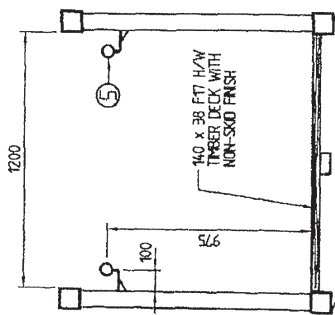


ELEVATION

SCALE 1:50

**PLAN VIEW BOTTOM CHORD**

SCALE 1:50



**TYPICAL SECTION**

SCALE 1:25

*J. M. LEMAN*

**J. M. LEMAN**

REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938

# NOTES

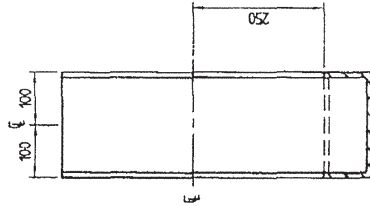
1. ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS1664.
2. ALUMINIUM EXTRUSIONS SHALL BE 6061-T6 OR 6082-T5 UNO.
3. ALUMINIUM PLATES SHALL BE TYPE 5083 TEMPER H21.
4. ALL WELDS SHALL BE MET GAS WELD USING PULSE MIG OR TIG FUSION WELDING PROCESS.
5. ALL WORK SHALL BE NEATLY FINISHED WITH ALL SHARP EDGES GROUNDED SMOOTH.
6. ALL WELDS TO BE COMPLETE PENETRATION BUTT WELD.

# LEGEND

- (X) 200 x 90 x 8 x 10 ALUMINIUM CHANNEL  
(Y) 10mm THICK ALUMINIUM PLATE

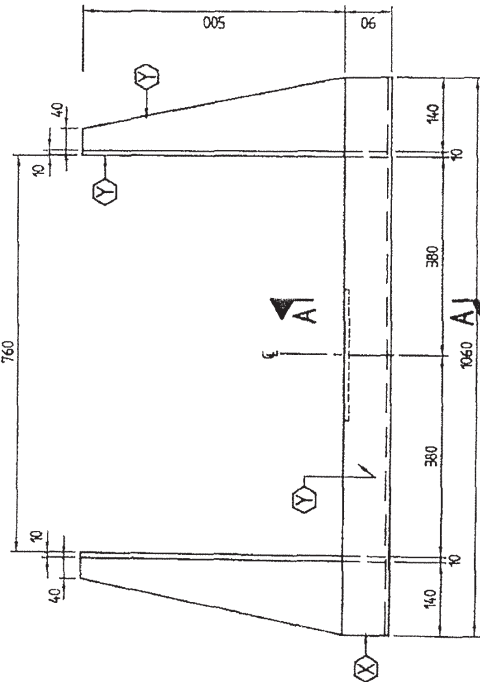
# SIDE ELEVATION

SCALE 1: 10

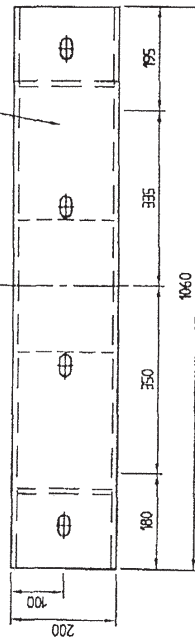


# PLAN

SCALE 1: 10

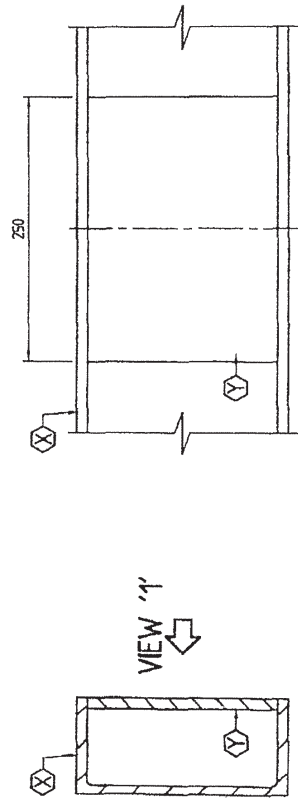


22φ x 40  
SLOTTED HOLE TYP.



# END ELEVATION

SCALE 1: 10



# VIEW 1

SCALE 1: 5

# SECTION A - A

SCALE 1: 5

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# Revisions

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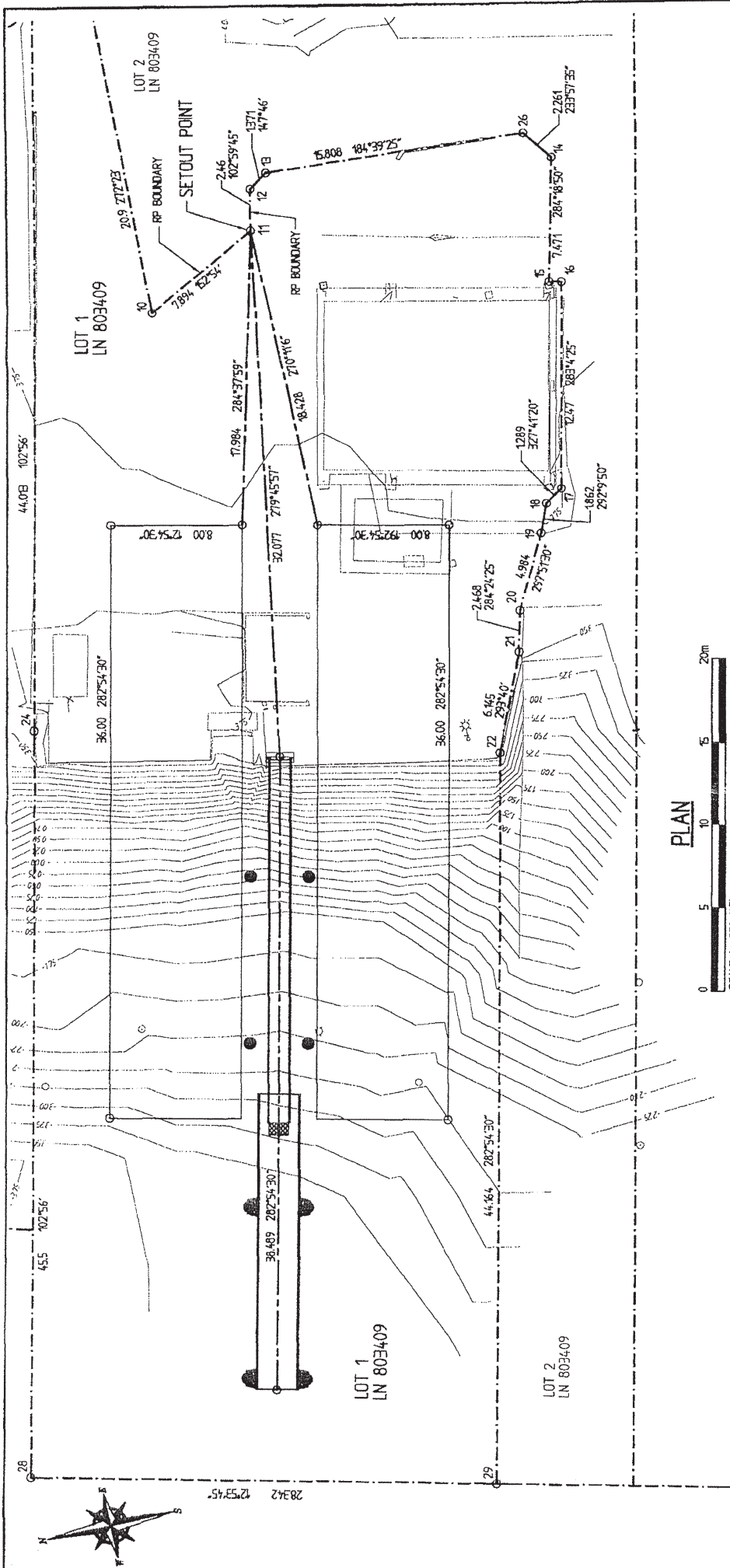
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CLIENT:  
TOWER HOLDING

PROJECT:  
GREAT KEPPEL BARGE  
RAMP

TITLE:  
EXTERNAL PILE GUIDE  
DETAILS

Date: 20/04/2007  
Drawing No.: 3356-105  
Scale: AS SHOWN  
Drawn By: J.C. Designed By:  
Approved By:



J. M. LEMAN

<p><b>International Marina Consultants</b></p> <p>Consultants to the Marina Industry.</p> <p>473 Ararat Road ANERLEY QLD 4405 AUSTRALIA Phone (07)38925711 Fax (07)38925611 Email : info@imc-marinas.com</p>	<p><b>Client:</b> TOWER HOLDING</p>	<p><b>Title:</b> PONTON &amp; RAMP SETOUT</p>	<p><b>Revision:</b></p>	<p><b>Date:</b> 20/04/2007</p>
<p><b>Project:</b> GREAT KEPPEL BARGE RAMP</p>	<p><b>Scale:</b> 1 : 250 (A3)</p>	<p><b>Drawn By:</b> J.C.</p>	<p><b>Designed By:</b></p>	<p><b>Approved By:</b></p>
<p><b>Drawn No.:</b> 3356-103</p>	<p><b>Scale:</b> 1 : 250 (A3)</p>	<p><b>Drawn By:</b> J.C.</p>	<p><b>Designed By:</b></p>	<p><b>Approved By:</b></p>
<p><b>Drawn No.:</b> 3356-103</p>	<p><b>Scale:</b> 1 : 250 (A3)</p>	<p><b>Drawn By:</b> J.C.</p>	<p><b>Designed By:</b></p>	<p><b>Approved By:</b></p>
<p><b>Drawn No.:</b> 3356-103</p>	<p><b>Scale:</b> 1 : 250 (A3)</p>	<p><b>Drawn By:</b> J.C.</p>	<p><b>Designed By:</b></p>	<p><b>Approved By:</b></p>
<p><b>Drawn No.:</b> 3356-103</p>	<p><b>Scale:</b> 1 : 250 (A3)</p>	<p><b>Drawn By:</b> J.C.</p>	<p><b>Designed By:</b></p>	<p><b>Approved By:</b></p>



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Revisions

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CLIENT:

TOWER HOLDING

PROJECT:

GREAT KEPPEL BARGE RAMP

TITLE:

PILE LAYOUT, PROFILE AND SCHEDULE

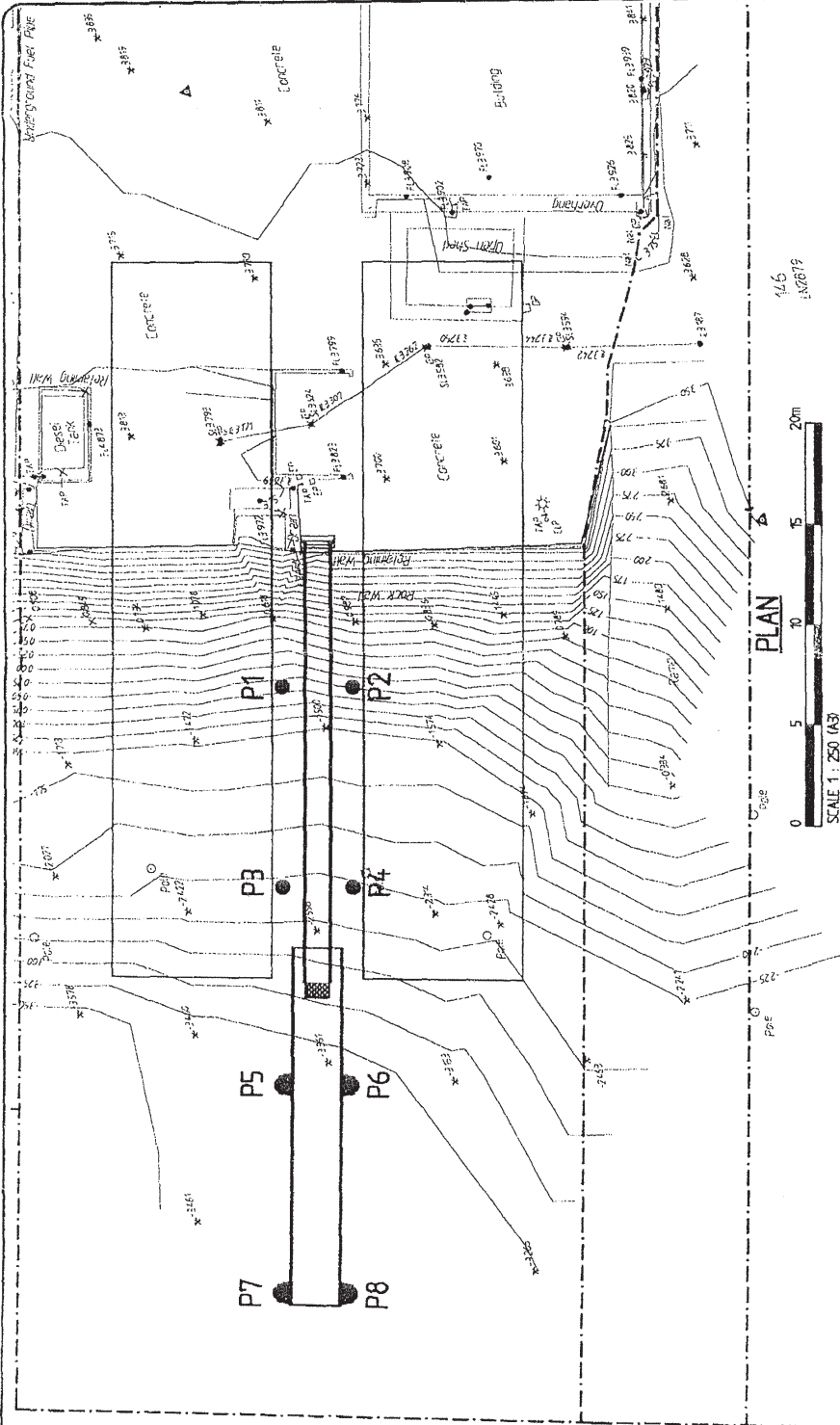
Date: 20/04/2007

Drawing No.: 3356-102

Scale: AS SHOWN

Drawn By: J.C. Designed By:

Approved By:



PLAN

14.6

14.679

SCALE 1:250 (A3)

NOTES:

- FOR GENERAL NOTES REFER TO DRAWING NO. 3356-102
- PILES
  - TOLERANCE FOR DRIVING IN PLAN  $\pm 50$  mm, MEASURED AS THE WORST COMBINATION OF PLAN DEVIATION AND OUT OF PLUMB OVER FULL TOTAL RAISE.
  - VERTICAL  $\pm 1$  IN 200 MAX OUT OF PLUMB
  - CONTRACTOR TO ADVISE ENGINEER IF BED LEVEL DIFFERS FROM DESIGN LEVEL BY MORE THAN 300mm.
- ALL STEEL PILES SHALL BE CORROSION PROTECTED WITH HOPE SLEEVES. THE SLEEVE TO BE APPLIED FROM TOP OF PILE TO 15m BELOW BED LEVEL AND SEALED AT THE TOP AFTER INSTALLATION

TOP OF PILE +4.50m  
1 IN 100 YEAR +3.30m

M.H.V.S. +1.74m

M.H.V.S. -1.70m

PILE REFER SCHEDULE FOR DETAILS

BED LEVEL VARIATION

EMBANKMENT

PILE PROFILE

SCALE 1:200

J. M. LEMAN

REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938

PILE SCHEDULE				
PILE No.	DESIGN BED LEVEL (m AHD)	PILE SIZE	MINIMUM EMBEDMENT (m)	OVERALL PILE LENGTH (m)
P1	-0.6	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	7.0	12.5
P2	-0.5	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	7.0	12.5
P3	-2.3	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	15.0
P4	-2.3	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	15.0
P5	-3.4	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	16.0
P6	-3.4	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	16.0
P7	-3.5	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	16.0
P8	-3.5	650 DIA. x 77.5 WALL GRADE 350 CORROSION PROTECTED STEEL PILE	8.0	16.0

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CLIENT:

TOWER HOLDING

PROJECT:

GREAT KEPPEL BARGE RAMP

TITLE:

GENERAL ARRANGEMENT

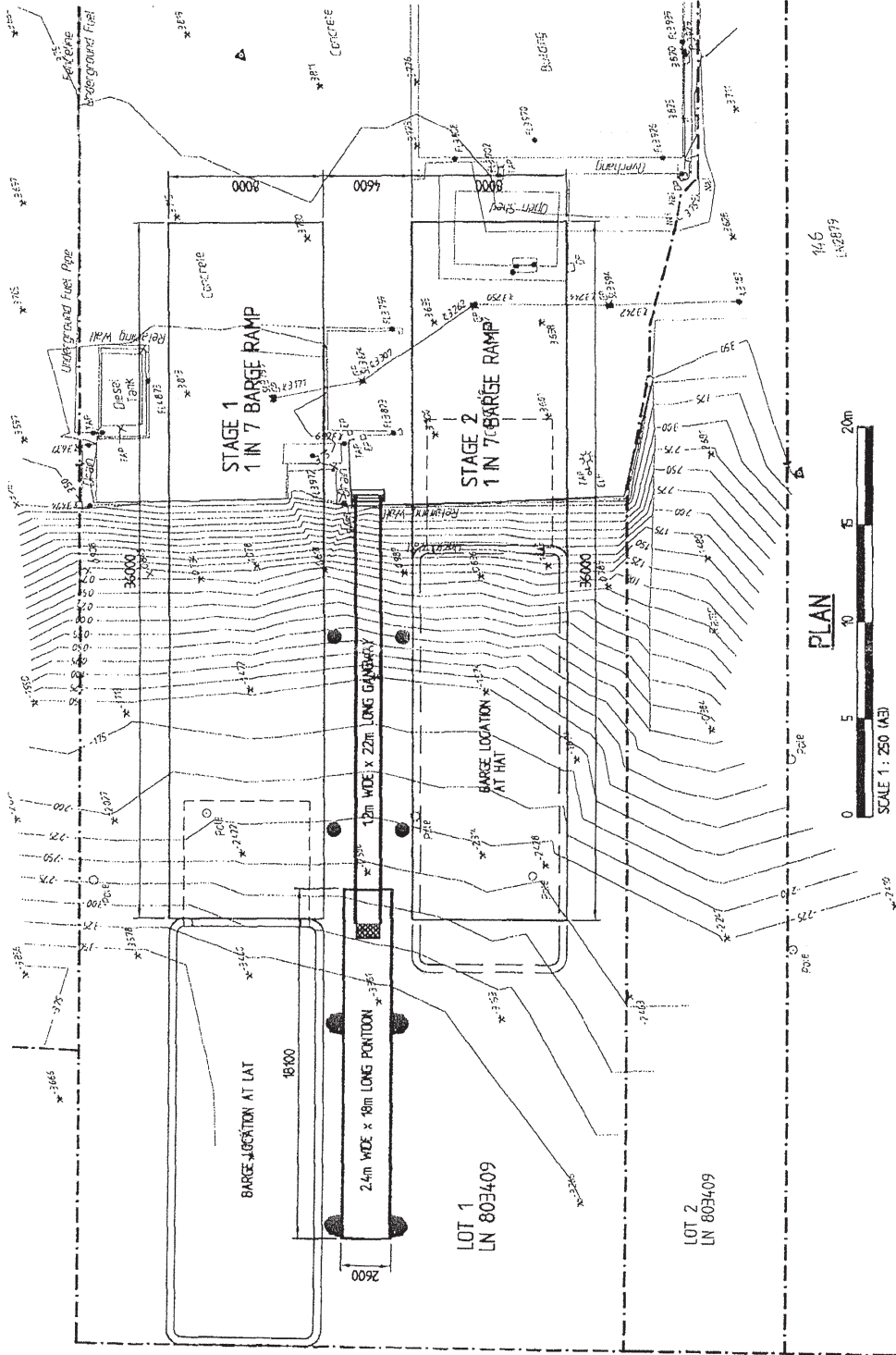
Date: 20/04/2007

Drawing No.: 3356-101

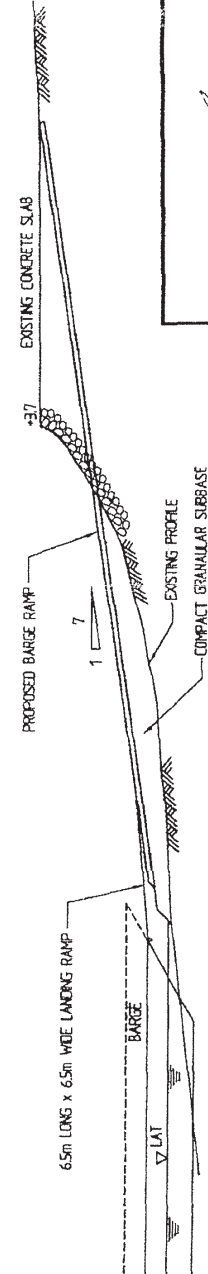
Scale: 1 : 250 (A3)

Drawn By: J.C. Designed By:

Approved By:



PLAN



TYPICAL SECTION AT LAT

SCALE 1 : 250

J. M. LEMAN

REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938



## GENERAL NOTES :

- 10 ALL DIMENSIONS AND LEVELS ARE TO BE VERIFIED ON SITE
- 20 WHEN IN DOUBT 'ASK' DO NOT SCALE
- 30 ALL DIMENSIONS ARE SHOWN IN METRES
- 40 ALL LEVELS ARE SHOWN IN METRES AND ARE REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD).
- 50 PILES
  - TOLERANCE FOR DRIVING IN PLAN  $\pm 50$  mm, MEASURED AS THE WORST COMBINATION OF PLAN DEVIATION AND CUT OF PILE OVER FULL TIDAL RANGE
  - VERTICAL  $\pm 1$  IN 200 MAX OUT OF PLUMB
  - CONTRACTOR TO ADVISE ENGINEER IF BED LEVEL DIFFERS FROM DESIGN LEVEL BY MORE THAN 300mm.
- 60 PONTON DIMENSIONS ARE NOMINAL
  - DIMENSIONS ARE MEASURED TIMBER TO TIMBER
- 70 PONTONS ARE TO BE CONNECTED TOGETHER WITH TIMBER WALKERS.
- 80 ALL THRU-RODS ARE TO BE M20 NOMINAL ROLL THREADED ROD (GALV) EX 185mm DIA. SPACING TO VARY WITH LOCATION.
- 90 ALL TIMBER DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH AS 1720.1
  - WALKER SECTIONS
    - 2/50 x 200 GRADE FB SOFTWOOD TIMBER
    - 40 x 200 GRADE FB COVER BOARD
  - ALL TIMBER TO BE SEASONED AND TREATED IN ACCORDANCE WITH AS 1604.
  - STRUCTURAL TIMBER MUST NOT BE CUT OR DRILLED FOR ANY REASON OTHER THAN SHOWN ON THESE DRAWINGS.
- 100 ALL STEEL SECTIONS TO BE GRADE 300 PLUS MINIMUM UNDO. ALL STEEL PLATE TO BE GRADE 250 MINIMUM UNDO.
- 110 ALL WELDS TO BE COMPLETE PENETRATION BUTT WELD OR 6mm FILLET WELD AS REQUIRED UNDO.
  - 120 PROTECTIVE COATINGS TO STEEL COMPONENTS :
    - a. COOL DRY AND HOT DIP GALVANIZE IN ACCORDANCE WITH AS 4680.
    - b. AVERAGE COATING 750g/m<sup>2</sup>
      - EQUIVALENT THICKNESS 100 MICRONS.
  - 130 ALL ALUMINUM WORK TO BE IN ACCORDANCE WITH AS 1664.
    - ALL EXTRUSIONS TO BE TYPE 6061-T6 OR 6082-T5 UNDO.
    - PLATES TO BE TYPE 5083-H321 UNDO.
  - 140 ALL STEEL AND ALUMINUM WORK SHALL BE NEATLY FINISHED WITH ALL SHARP EDGES GROUND SMOOTH.
  - 150 PILE GUIDE BLOCKS ARE TO BE ADJUSTED AS REQUIRED TO SUIT PILE SIZE AND POSITION ON SITE.
    - CLEARANCE MUST BE PROVIDED BETWEEN PILE AND GUIDE TO PREVENT "HANGING" OF PONTON UNDER FULL TIDAL RANGE.
  - 160 CONCRETE
    - ALL CONCRETE WORKS SHALL COMPLY WITH AS 3600
    - PONTON MINIMUM CONCRETE STRENGTH  $f_c = 40MPa$
    - ALL REINFORCEMENT TO BE HOT DIP GALVANIZED
    - MINIMUM COVER TO REINFORCEMENT = 25mm
    - RAMPS
      - MINIMUM CONCRETE STRENGTH  $f_c = 50MPa$
      - MINIMUM COVER TO REINFORCEMENT = 50mm

## INSULATION

BOLTED MATERIAL	INSULATING MATERIAL
ALUMINUM / GALV. STEEL	BARIUM CHROMATE JUNKING COMPOUND OR EQUIVALENT
ALUMINUM / CONCRETE	3mm NEOPRENE
STEEL / CONCRETE	3mm NEOPRENE

## DESIGN PARAMETERS

- WIND
- BASIC WIND SPEED  $V_0 = 55$  m/s
  - TERRAIN CATEGORY TC = 2
  - GUST DURATION = 30sec

## WAVE

- WIND GENERATED WAVE  $H_s = 0.7m$   $T = 2.4s$
- BOAT WAKE  $H_{wake} = 0.8m$

## LIVE LOAD ON PONTON

- MAX. UNIFORMLY DISTRIBUTED LOAD 30 kPa
- FREEBOARD UNDER DEAD LOAD 600mm APPROX.

## LIVE LOAD ON GANGWAY

- UNIFORMLY DISTRIBUTED LOAD 4.0kPa
- CONCENTRATED LOAD 4.5kN
- HANDRAIL LOAD 0.75kN/m

## BERTHING IMPACT

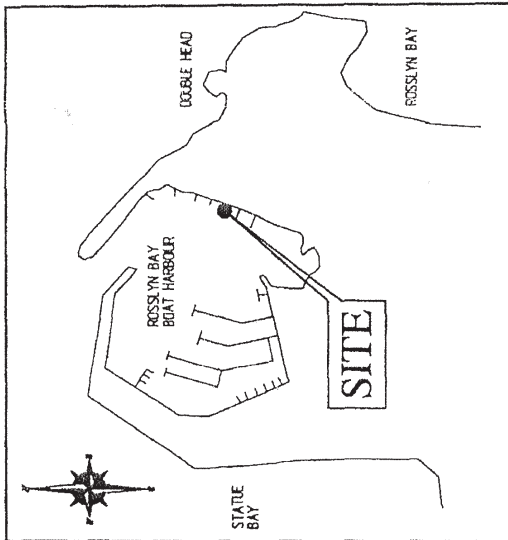
- $v = 0.3m/s$

## DESIGN VESSEL (MAXIMUM)

VESSEL LENGTH (m)	WIND PROFILE AREA (m <sup>2</sup> )	DISPLACEMENT (t)
	BEAM	HEAD
22	84	27
		450

190 THE WORKS DEPICTED WILL BE STRUCTURALLY ADEQUATE FOR THE ANTICIPATED USAGE AND COMPLY WITH ALL RELEVANT CODES INCLUDING BRAS BUILDING AND ENGINEERING STANDARDS FOR TOL WORKS

THE PONTON IS DESIGNED FOR TEMPORARY MOORING ONLY. ALL VESSELS SHALL BE REMOVED WHEN THE 3s GUST WIND SPEED EXCEEDS 50 KNOTS



## LOCALITY MAP

LOT 1  
LN 803/409  
PARISH : HEWITTVILLE  
COUNTY : LIVINGSTONE  
LOCALITY : ROSSLYN

J. M. LEMAN  
REGISTERED PROFESSIONAL ENGINEER  
OF QUEENSLAND NUMBER : 2938

APPROVED

## Revisions

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## CLIENT:

TOWER HOLDING

## PROJECT:

GREAT KEPPEL BARGE RAMP

## TITLE:

GENERAL NOTES

Date: 20/04/2007

Drawing No.: 3356-100

Scale: NL

Drawn By: J.C. Designed By:

Approved By: