

Appendix J

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Fraser Drive Residential Development

*Prepared for
Villa World Ltd*

December 2006

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1.0 INTRODUCTION

Cardno Eppell Olsen has been commissioned by Villaworld Ltd to prepare a traffic assessment for a proposed residential development on Frasier Drive at Tweed Heads South (New South Wales). It is understood that this assessment will form part of an application to Tweed Shire Council seeking a permit for development of the subject site. The development site is depicted on Figure 1.1 of this report and is described as Lot 9 on DP1039569 and part lot 2 DP1000385. The site is bound by Frasier Drive to the east, Hillcrest Avenue to the west, Acacia Street to the north, and existing residential development known as Vintage Lakes to the south.

The development proposal involves construction of residential dwelling of varying densities across the site.

This report addresses the traffic and transport matters relevant to the development site and includes:

- existing traffic operations;
- future traffic operations with and without development of the site;
- required transport infrastructure upgrades attributable to the development;
- parking demand and provisions;
- pedestrian and cycle connectivity and facilities; and
- public transport.

2.0 EXISTING SITUATION

2.1 Development Site

As discussed earlier herein and presented in Figure 1.1, the development site consists of currently undeveloped land which is surrounded by existing low to medium density residential lands. It is understood that the site is one of the last remaining undeveloped land parcels in the area.

2.2 Existing Road Network

Fraser Drive, immediately east of the proposed development, provides a north-south connection within the Tweed Heads South area. According to the road hierarchy prescribed by Tweed Shire Council planning documents, Fraser Drive has an Urban Distributor function. This definition provides guidance on the intended function of Fraser Drive, which is principally a traffic carrying route. Along the development site frontage, this road has a rural cross section comprising two trafficable lanes (approximate width 3.5m) plus 1m wide unsealed shoulders on both sides. Fraser Drive, in this section is currently posted at a speed of 80kph. Existing daily traffic volumes (AADT) are in order of 5,000 vehicles per day.

West of the site, Hillcrest Avenue is defined as Urban Local Road and has a principal function of providing property access. Volumes on Hillcrest Avenue are currently in the order of 1,000 vehicles per day.

The following surrounding intersections have been determined to be within the scope of influence of the subject development traffic and therefore have been assessed herein:

- | | |
|---------------------------------------|------------------------------|
| • Fraser Drive/Acacia Street | unsignalised t-intersection; |
| • Fraser Drive/Pioneer Country Access | unsignalised t-intersection; |
| • Fraser Drive/Vintage Lakes Drive | four way roundabout; |
| • Vintage Lakes Drive/Merlot Drive | four way roundabout; and |
| • Hillcrest Avenue/Ocean Avenue | unsignalised t-intersection. |

2.3 Existing Traffic Demands

Existing traffic demands on the affected parts of the road and street network have been determined based upon manual turning movement surveys undertaken at the following intersection locations:

- Fraser Drive/Acacia Street;
- Fraser Drive/Pioneer Country Access;
- Fraser Drive/Vintage Lakes Drive;

- Vintage Lakes Drive/Merlot Drive; and
- Hillcrest Avenue/Ocean Avenue.

The above surveys were conducted by Australasian Traffic Surveys on 22 November 2006 during the AM period (6:30am to 9:30am) and the PM peak period (3:00pm to 6:00pm). In addition, an automatic traffic count was conducted on Fraser Drive from 21 November 2006 to 27 November 2006 at a location approximately 60m south of the Pioneer Country Access. Complete copies of the traffic counts are provided at Appendix A and are summarised on Figure 2.1.

It is important to note that the surveyed traffic demands include trips that are currently being generated by existing development on the subject site.

2.4 Existing Traffic Operations

The operating performance of the subject intersections has been analysed using the computer software package aaSIDRA. This analysis bases its performance evaluation on the degree of saturation (DOS) during the measured traffic peak hour. The intersection DOS represents a ratio of the measured traffic demand over the theoretical capacity for the intersection. The accepted practical DOS thresholds vary depending upon the intersection type or form. When the reported DOS is lower than the threshold limits, the intersection is considered to be operating within capacity and no upgrading works are needed. However, a DOS result that is above the identified threshold suggests that intersection upgrading may be required.

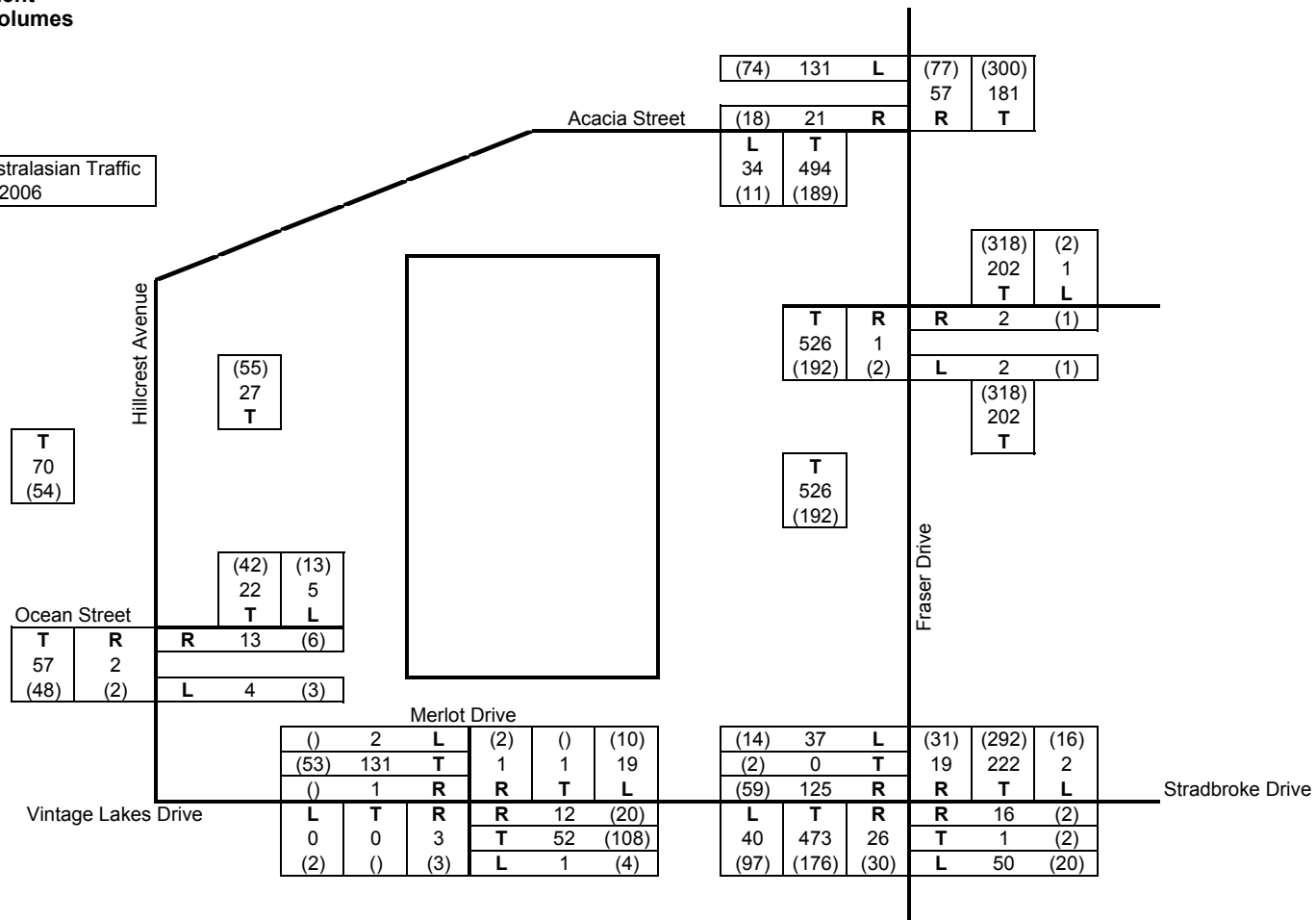
The accepted DOS thresholds for each intersection form (type) adopted for this study are as follows:

- | | |
|-----------------------------|-------------|
| • unsignalised intersection | 0.80 (80%); |
| • roundabout | 0.85 (85%); |
| • signalised Intersection | 0.95 (95%). |

**Fraser Drive Development
2006 Existing Traffic Volumes**

Data taken from Australasian Traffic
Surveys on 22 Nov 2006

AM	#
PM	(#)



2006
Existing Traffic
Volumes

FIGURE No:
2.1
PROJECT No:
721429
DATE:
6/12/2006

Table 2.1 below presents the results of the existing year (2006) performance analysis.

Table 2.1 *Existing Intersection Performance (DOS)*

Intersection	Intersection Type	DOS Benchmark	AM DOS	PM DOS
Fraser Drive/ Acacia Road	Unsignalised	80%	30%	23%
Fraser Drive/ Vintage Lakes Drive	Roundabout	85%	19%	13%
Vintage Lakes Drive/ Merlot Drive	Roundabout	85%	10%	8%
Hillcrest Avenue/ Ocean Avenue	Unsignalised	80%	4%	3%

As shown in the table above, all intersections within the study area currently operate within desirable capacity limits. A summary of the existing condition aaSIDRA results, (Table S.14 extracted from aaSIDRA) and intersection geometry are presented at Appendix B.

3.0 FRASER DRIVE DEVELOPMENT

3.1 Development Masterplan

The proposed development layout is depicted on PMM Plan Number 20934-4. The development will incorporate a range of dwelling densities including:

- 50 medium density dwellings;
- 136 detached residential allotments; and
- 32 duplex houses.

3.2 Development Access

The development layout plan illustrates a total of five road/street connections between the development and the surrounding network which are described below.

- Access A – will be the major all movement access located on Fraser Drive at the north-eastern corner of this site;
- Access B – accesses Fraser Drive via a left in left out arrangement;
- Access C – local street connection to Ocean Avenue;
- Access D – local street connection to Hillcrest Avenue on the western periphery of the development ;
- Access E – local street connection as an extension to Merlot Drive at the southern end of the development.

3.2.1 Fraser Drive Northern Access (Access A)

The northern access on Fraser Drive will, it is understood, provide the principal access and connection point between the development and the external road network. The access will be located directly opposite the existing Pioneer Homestead access driveway. Fraser Drive, at this location, comprises a two lane road cross section with each lane being approximately 3.5m wide plus a 1m unsealed shoulder on both sides. Fraser Drive is posted at 60kph north of this point and 80kph south of this point. The available sight distances at this location in terms of both vertical and horizontal distance are adequate for an 80kph design speed, however minor works will be required to ensure that vegetation and earthwork obstructions do not affect the sight lines north and south on Fraser Drive.

It is understood that Tweed Shire Council has indicated a preference to align this access with the Pioneer Homestead access to create a four way signalised intersection.

3.2.2 Fraser Drive (Access B)

This access provides a secondary connection to Fraser Drive to alleviate traffic demands at the main entry point and to allow improved accessibility for the northern section of the development. It is recommended that this access be located approximately 300m south of the main Fraser Drive access (Access A) which positions it just north and opposite an existing residential property access.

Fraser Drive, in this section, again comprises a two lane cross section with 3.5m width lanes and 1m unsealed shoulders. The available sight distance to both northbound and southbound traffic is approximately 200m, which for an 80kph posted speed meets the required standards.

It is considered that this access should be limited to left in/left out movements only as a result of the proximity of this intersection to the main access intersection on Fraser Drive. It is noted that Council officers have confirmed that an intersection in this location would have to be signalised should an all movement's access be pursued. Local widening is required in the vicinity of this access to accommodate both left turn deceleration and acceleration lanes.

3.2.3 Ocean Avenue Connection (Access C)

This access would join to the existing termination of Ocean Avenue. No formal intersection is therefore required however consideration regarding any upgrading of affected adjacent intersections would be required to ensure safe traffic movements onto the surrounding road network.

Sight distance constraints exist at the Hillcrest Avenue/Ocean Avenue intersection, particularly for movements into and out of Ocean Avenue where the available sight distance is about 40m. Amelioratory works will need to be considered for this intersection prior to the imposition of additional development traffic demands.

3.2.4 Hillcrest Avenue (Access D)

This access would be located on the western side of the development where grades for both the development and the existing road network are relatively steep. It is understood that this access would connect to Hillcrest Avenue via an undeveloped piece of land intersecting just south of Lakeview Parade. The speed environment is 50km/h along Hillcrest Avenue.

Again the major constraint to this access location is the road geometry. To the south there is limited sight distance for vehicles turning right into or out of the site. The sight distance to the north is adequate therefore a left turn in and out of the development can be achieved.

It is noted on site investigations it was found that there are no driveways located on both sides of the road within 25m north and 30m south of this proposed access location.

3.2.5 Merlot Court Connection (Access E)

The fifth access provides a connection between the southern sections of the development and Merlot Drive, which is an existing residential access street. Merlot Street is defined by Tweed Shire Council as an Access Street and has an existing road width of around 8.0m. The dwelling catchment capacity for Access Streets is normally accepted as being a maximum of approximately 75 allotments. Existing development within Merlot Drive amounts to around 50 allotments and therefore, should a connection be pursued to this development, the design should encourage use by no more than approximately 25 allotments from the proposed subdivision.

3.3 Traffic Generation and Distribution

Traffic generation for this proposed development has been estimated generally in accordance with rates documented in the RTA Guide to Traffic Generating Developments. The traffic directional splits have been based upon commonly used best practice assumptions. The characteristics adopted are presented in Table 3.1.

Table 3.1 **Weekday Traffic Generation Rates**

Land Use	Trip Basis	Traffic Generation Rates		AM Split		PM Split	
		AM Peak Hour	PM Peak Hour	% IN	% OUT	% IN	% OUT
Detached residential allotments	trips per dwelling	1.0	1.0	25%	75%	67%	33%
Duplex housing	trips per dwelling	0.8	0.8	25%	75%	67%	33%

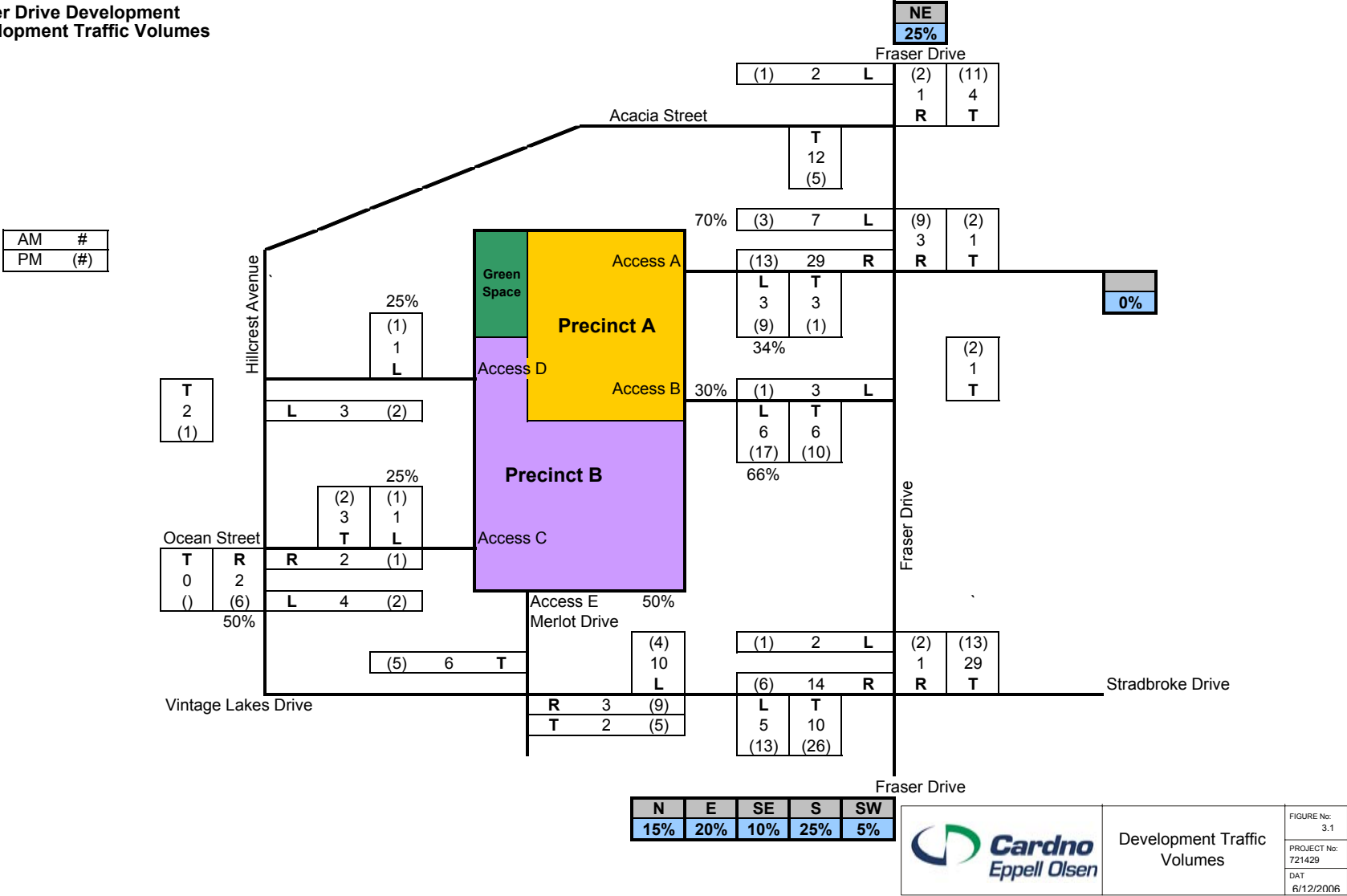
Based on the trip rates shown above and the previously discussed development yields, the Fraser Drive development is estimated to generate approximately 208 trips (52 in/156 out) during the weekday AM peak hour and 208 trips (139 in/69 out) during the weekday PM peak hour.

The trip distribution adopted for the assignment of the development generated traffic is as follows:

- 15% North to Gold Coast, M1 – via Leisure Drive;
- 25% North East to Coolangatta and Tweed Heads – via Dry Dock Road;
- 20% East to local streets within Tweed Heads South – via Leisure Drive;
- 10% South East to Kingscliff, via Leisure Drive;
- 25% South to Ballina, Pacific Hwy – via Leisure Drive;
- 5% South West to Terranora local streets - via Fraser Drive;

From the traffic generation and trip distribution assumptions above total traffic volumes by this development are calculated and shown on Figure 3.1.

Fraser Drive Development
Development Traffic Volumes



4.0 FUTURE TRAFFIC CONDITIONS

Future traffic conditions have been analysed for year 2008 which is the anticipated development completion (year that traffic is loaded on the surrounding road network) year and for the year 2018 being the ten year design horizon (assessment of 2018 is a requirement of the RTA). For each of the two design years, analysis of with and without development scenarios has been undertaken.

4.1 Background Traffic

The background traffic volumes in this area utilise the existing traffic count surveys and apply a growth rate to project volumes for the two design years.

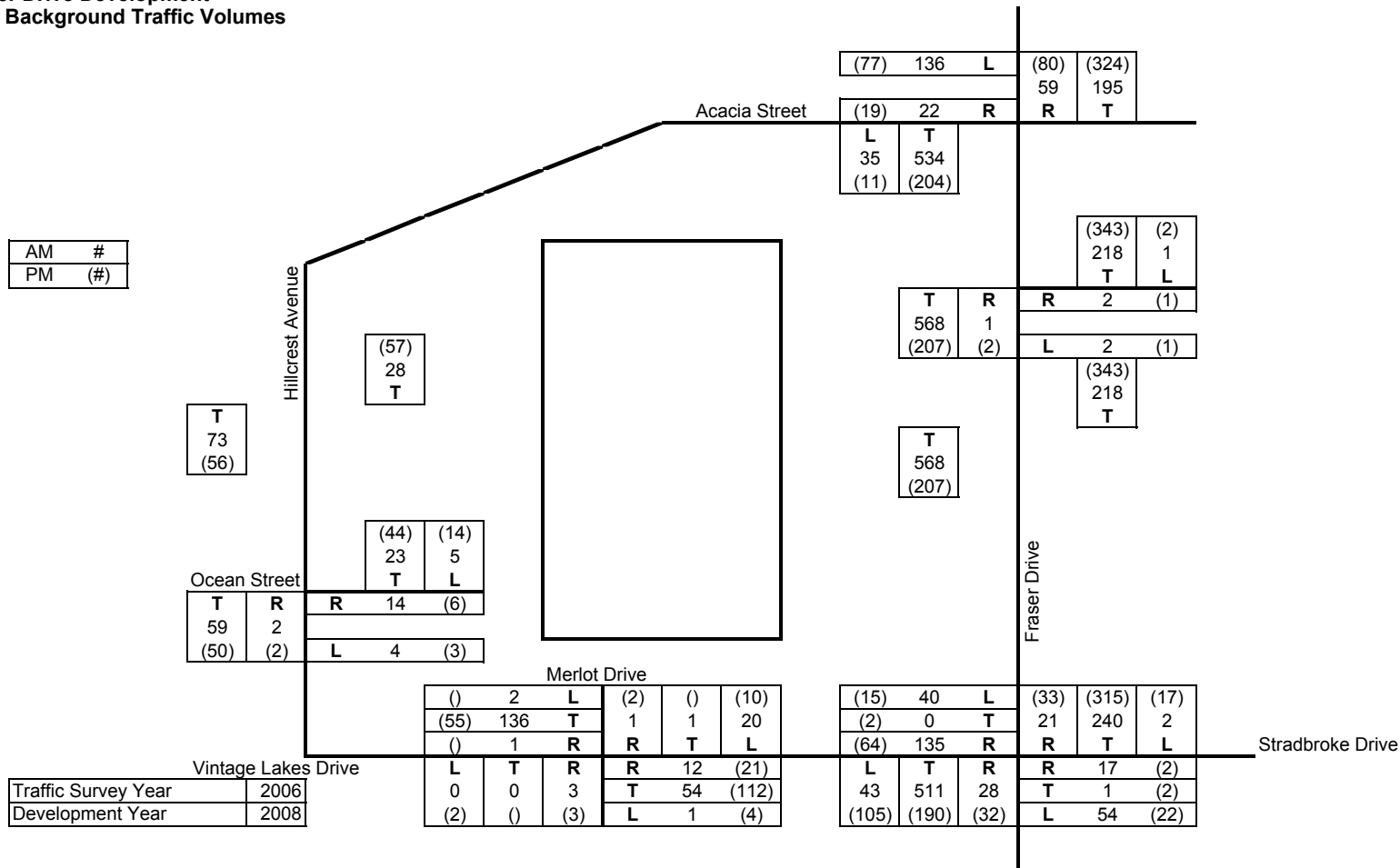
The general growth rate in this area has been based on a review of the available developable land in this area. It is noted that for Fraser Drive the background traffic growth is assumed at four percent (linear growth), is due to this road providing a suburban connector role. For all other roads, a two percent per annum linear growth rate has been assumed on the basis of the limited development potential within the catchment. The background traffic volumes for are summarised for both the years 2008 and 2018 on Figures 4.1 and 4.2 respectively.

4.2 Forecast Traffic Operations

The traffic impacts associated with the proposed development on the surrounding road network have been assessed utilising the background traffic volumes for years 2008 and 2018 to which the development traffic presented at Figure 3.1 has then been added. The volumes presented on Figure 4.3 and 4.4 show the with and without development scenarios. The operations assessment has been performed using aaSIDRA analysis software.

Table 4.1 below provides results of the peak hour intersection analysis for each design year scenario with and without the development generated traffic situation. The aaSidra outputs (Table S.14), are detailed in Appendix B.

**Fraser Drive Development
2008 Background Traffic Volumes**



Side Streets Growth	
Growth Factor	1.04
Growth Years	2
Growth Rate	2%

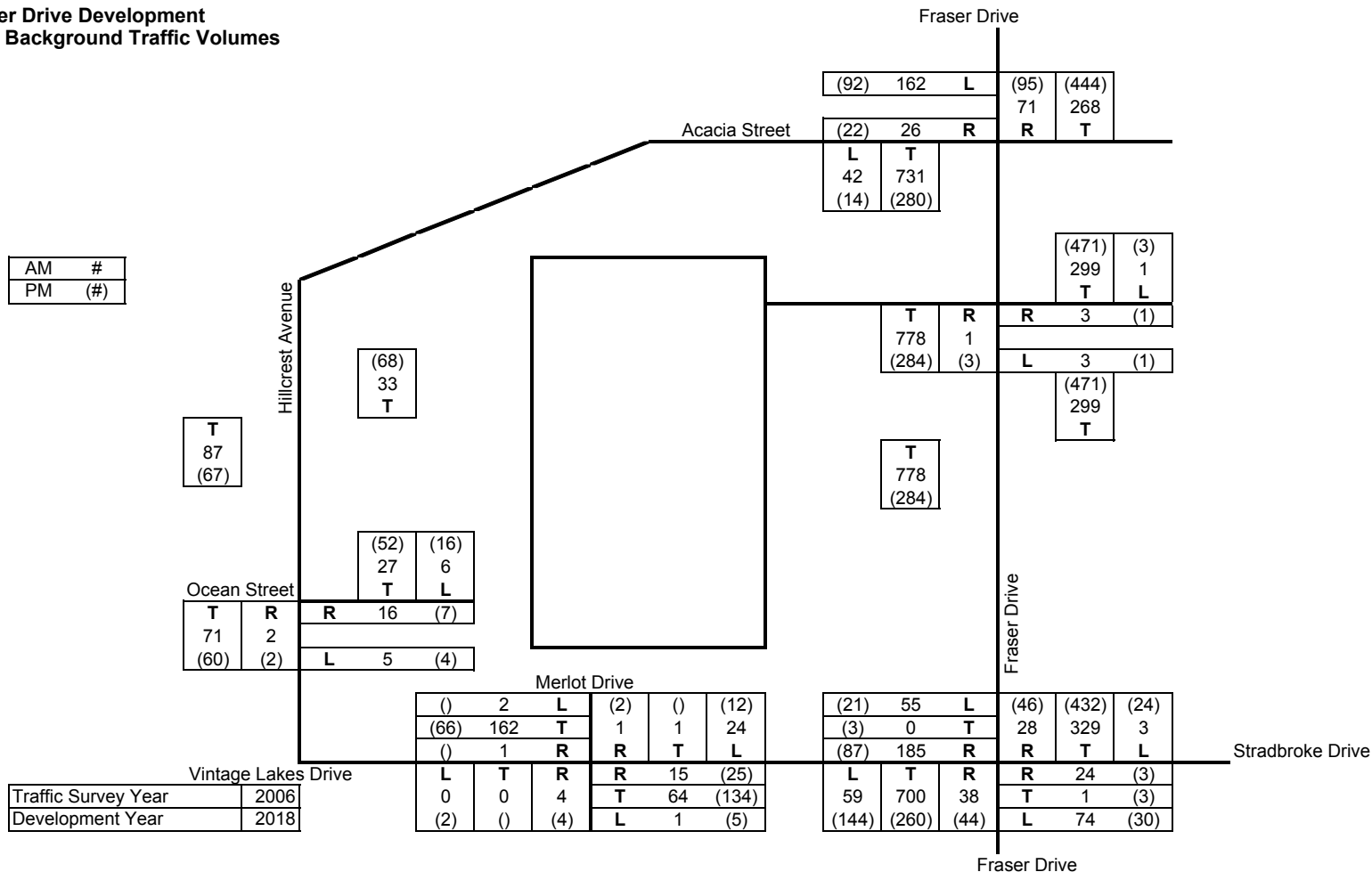
Fraser Drive Growth	
Growth Factor	1.08
Growth Years	2
Growth Rate	4%



2008 Background
Traffic Volumes

FIGURE No:	4.1
PROJECT No:	721429
DATE:	6/12/2008

**Fraser Drive Development
2018 Background Traffic Volumes**



Traffic Survey Year	2006
Development Year	2018

Side Streets Growth	
Growth Factor	1.24
Growth Years	12
Growth Rate	2%

Fraser Drive Growth	
Growth Factor	1.48
Growth Years	12
Growth Rate	4%

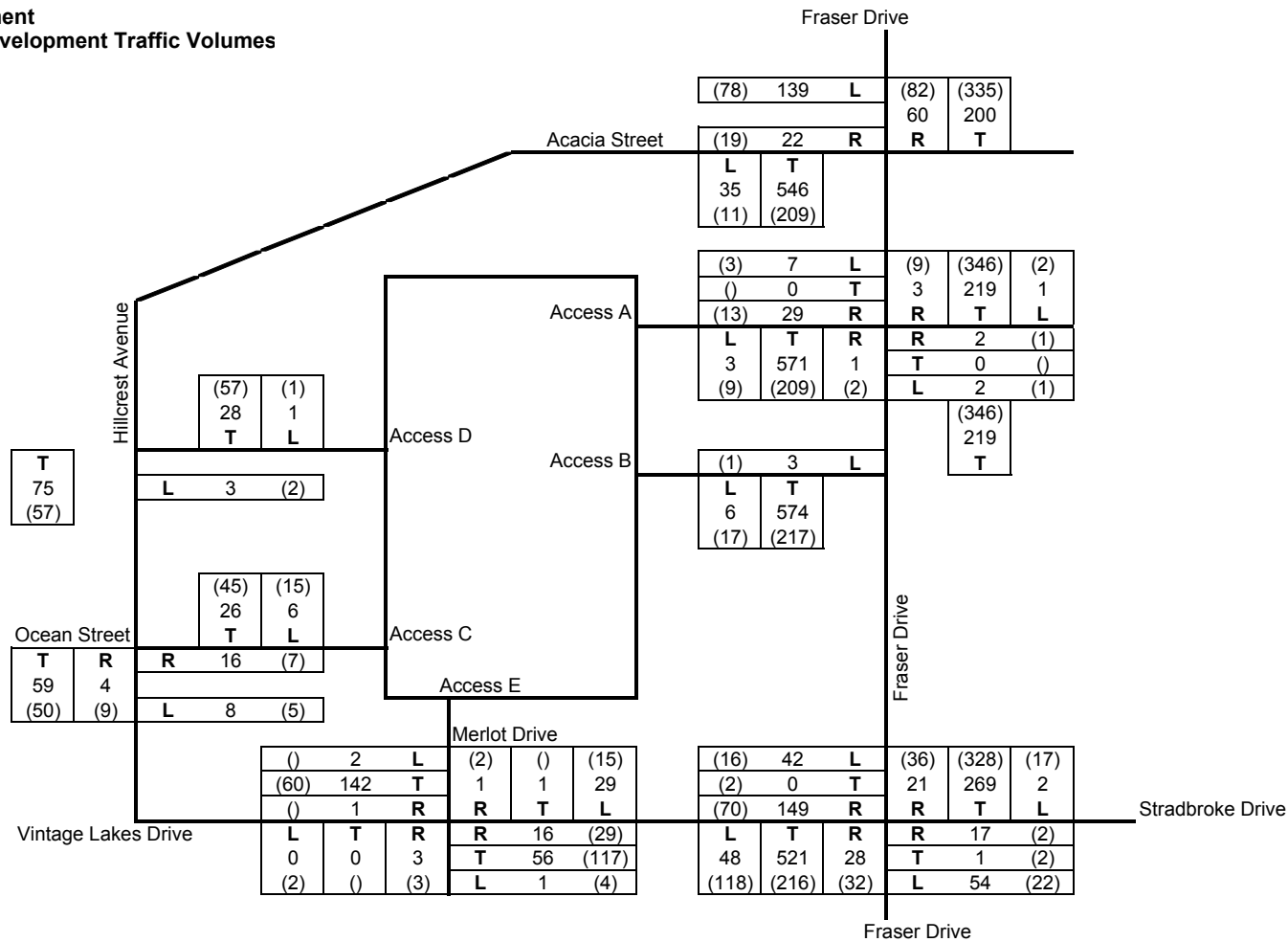


2018 Background
Traffic Volumes

FIGURE No:	4.2
PROJECT No:	721429
DATE:	6/12/2008

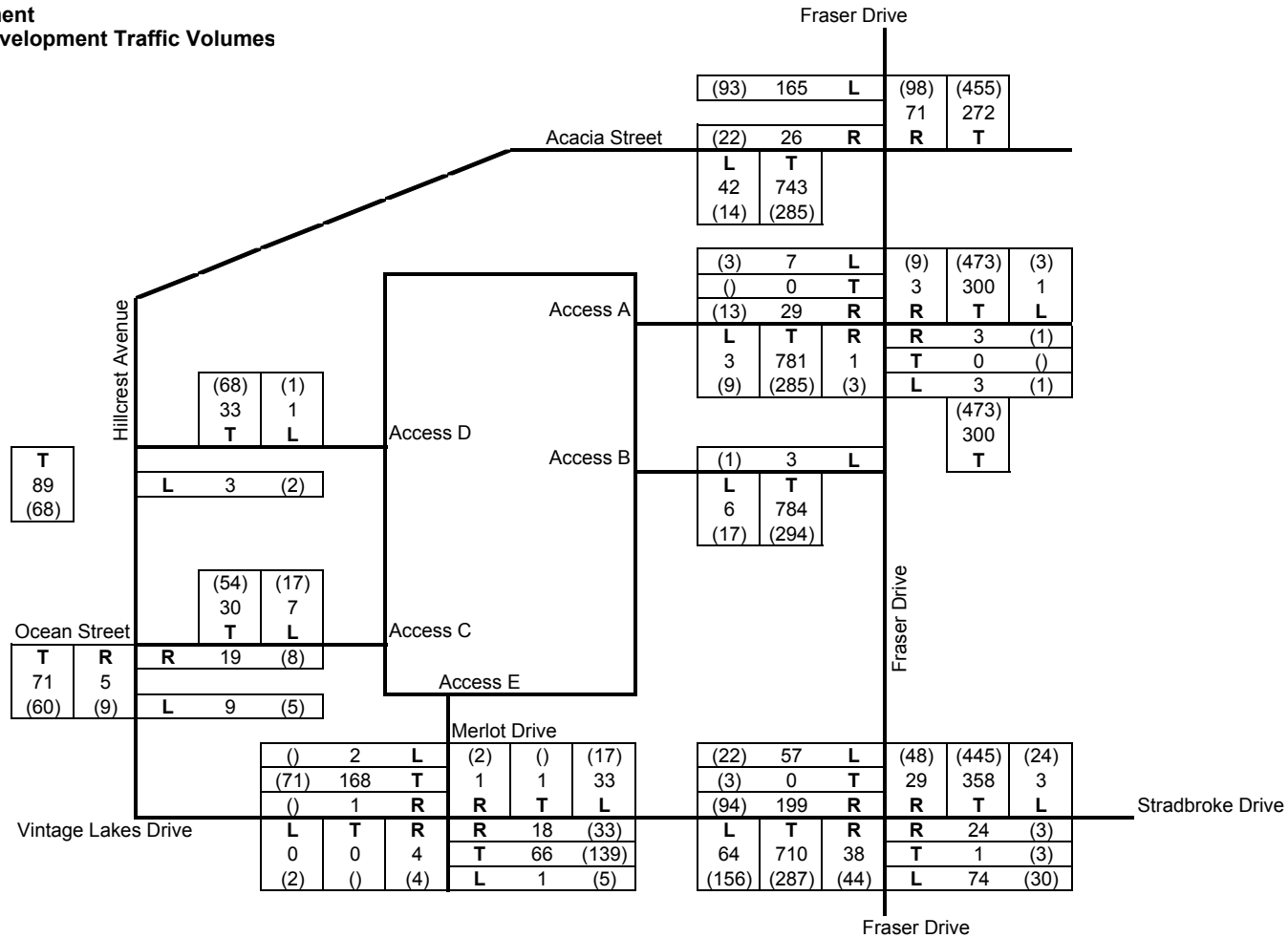
**Fraser Drive Development
2008 Background + Development Traffic Volumes**

AM	#
PM	(#)



**Fraser Drive Development
2018 Background + Development Traffic Volumes**

AM	#
PM	(#)



2018 Background +
Development Traffic
Volumes

FIGURE No: 4.4
PROJECT No: 721429
DATE: 6/12/2006

Table 4.1 **Forecast Intersection Performance (DOS)**

Intersection	Opening Year 2008				Horizon Year 2018			
	Without Development		With Fraser Drive Development		Without Development		With Fraser Drive Development	
	AM	PM	AM	PM	AM	PM	AM	PM
Fraser Drive/Acacia Street (unsignalised t-intersection)	33%	25%	35%	26%	64%	34%	67%	35%
Fraser Drive/ Development Access A (signalized intersection)	n/a	n/a	58%	29%	n/a	n/a	83%	40%
Fraser Drive/ Access B (left in left out)	n/a	n/a	4%	3%	n/a	n/a	5%	4%
Fraser Drive/Vintage Lakes Drive (four way roundabout)	20%	14%	21%	15%	28%	20%	28%	20%
Vintage Lakes Drive/ Merlot Drive (four way roundabout)	10%	9%	10%	10%	12%	10%	12%	11%
Hillcrest Avenue/ Ocean Avenue (unsignalised t-intersection)	4%	3%	4%	4%	4%	4%	5%	4%
Hillcrest Avenue/ Access D (left in left out)	n/a	n/a	33%	19%	n/a	n/a	5%	4%

Note: n/a indicates analysis was not required for that scenario.

Table 4.1 illustrates that all intersections, with the exception of the main access on Fraser Drive will operate within capacity limits for the extent of the design horizon. Operation of Development Access A is discussed in more detail below.

4.2.1 Fraser Drive/Development Access A

Provisions have been made within the development application to upgrade the current intersection of Fraser Drive and the Pioneer Village Access from an unsignalised t-intersection to a four-way signalised control. To ensure that this intersection operates according to the capacities of the above traffic scenarios a number of intersection elements require installation. A left turn lane is required to separate the development ingress movement with the through (along Fraser Drive) and the right turn (into the Pioneer development) manoeuvres. This left turn lane shall be a minimum of 20m in length. The intersection configuration on the northern side of this intersection shall provide a 20m right turn lane to allow for a dedicated ingress into the Fraser Drive development. Also incorporated within the traffic signals will be a pedestrian crossing facility to provide a safe and managed pedestrian movement across Fraser Drive.

5.0 PUBLIC TRANSPORT, PEDESTRIAN & CYCLE INFRASTRUCTURE

Bus route number 604 operated by Surfside Buslines services Tweed Head South, in the vicinity of this development. This route services (in a one way direction Fraser Drive, Vintage Lakes Drive, Hillcrest Avenue and Acacia Street before connecting to both Tweed City and Tweed Heads Central). At current there is no bus stop facilities located on Fraser Drive near the main development access. It is therefore recommended, so as to encourage public transport utilisation, that a bus stop be provide on the eastern side of Fraser Drive immediately adjacent to the main access intersection.

By analysing the proposed development layout, it was found that by using a 400m radial area (centred at each bus stop location), the potential catchments encompass approximately 89% of the total dwellings. This is under the assumption that a bus stop facility will be located at the main access of this development.

Both pedestrians and cyclists are able to access the surrounding road network via the internal road layout. Provisions for both cyclists and pedestrians will be provided to ensure safe travel.

6.0 CONCLUSIONS

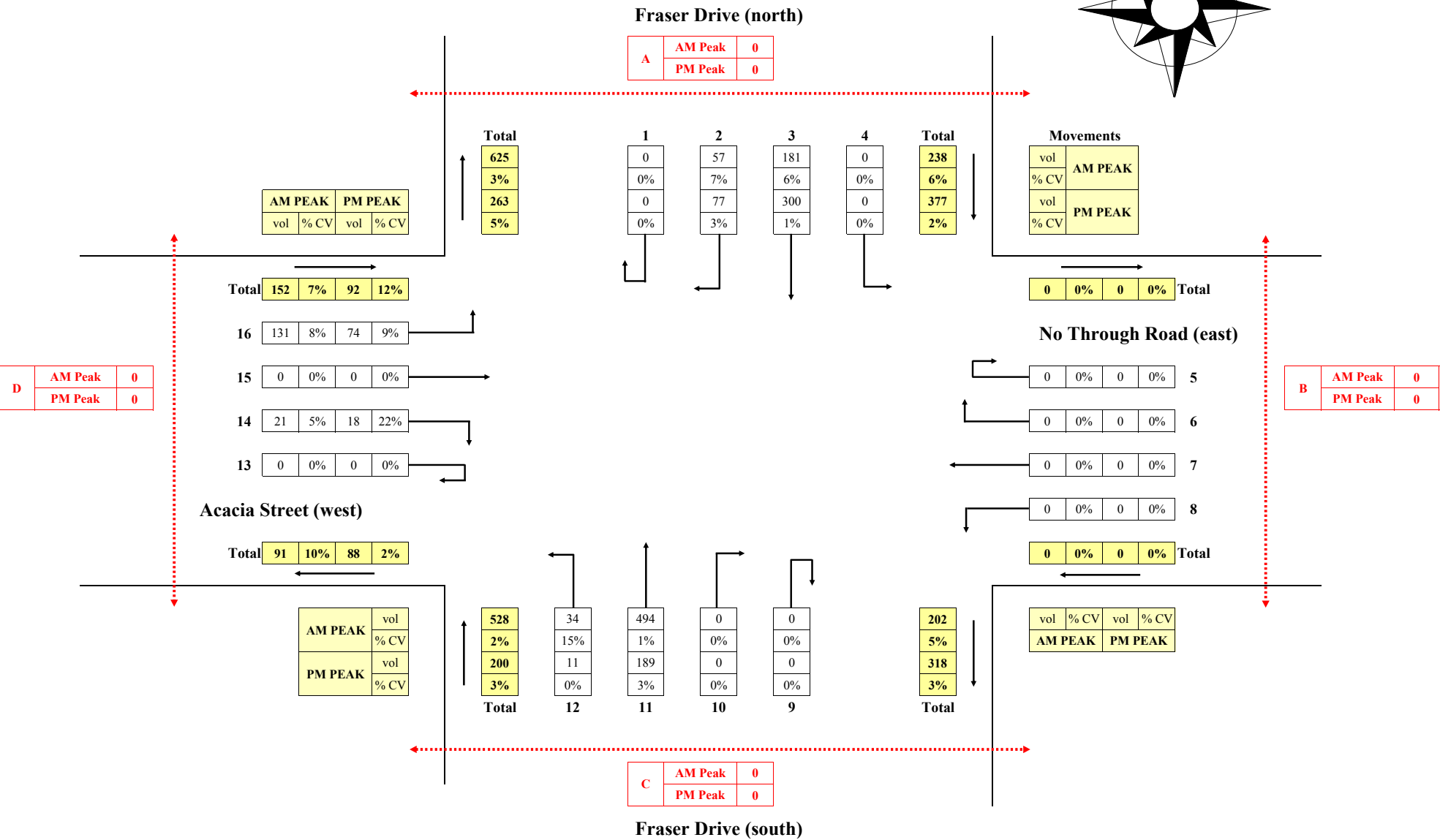
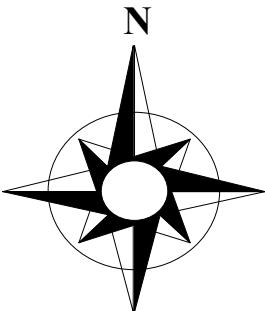
The following conclusions are made regarding traffic matters associated with the proposed Fraser Drive development:

- background traffic conditions have been evaluated considering a four percent per annum growth rate on Fraser Drive and a two percent per annum growth rate on all remaining side streets;
- this development is estimated to generate 208 trips (52 in/156 out) during the weekday AM peak hour and 208 trips (139 in/69 out) during the weekday PM peak hour;
- accounting for future growth and development generated traffic, all design intersections will perform within current industry standards;
- in order to provide proper site access and ensure traffic flow does not reach saturation levels, provisions have been made for the upgrading of the current Fraser Drive/Pioneer Country Access intersection to a four-leg, signalized intersection;
- a bus stop and shelter is recommended at the main development access to allow for increased patron utilisation;

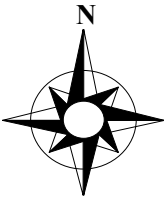
Appendix A
Traffic Count Surveys

AUSTRALASIAN TRAFFIC SURVEYS MANUAL INTERSECTION COUNT

Site No.: 1
Location: Acacia Street/Fraser Drive/No Through Road, Tweed Heads South
Day/Date: Wednesday 22 November 2006
Summary: AM Peak : Hour ending - 9:00 AM
PM Peak : Hour ending - 4:00 PM



The diagram illustrates the Fraser Drive intersection. Fraser Drive (north) is at the top, Fraser Drive (south) is at the bottom, Acacia Street (west) is on the left, and No Through Road (east) is on the right. Fraser Drive (north) has four lanes labeled 1, 2, 3, and 4. Fraser Drive (south) has four lanes labeled 9, 10, 11, and 12. Acacia Street (west) has four lanes labeled 13, 14, 15, and 16. No Through Road (east) has four lanes labeled 5, 6, 7, and 8. Count locations are marked with letters A, B, C, and D. A, B, C, and D are located at the intersections of Fraser Drive (north) and Fraser Drive (south) with Acacia Street (west) and No Through Road (east) respectively. Arrows indicate the direction of traffic flow for each lane.

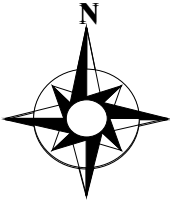
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The diagram illustrates the intersection of Fraser Drive (north-south) and Acacia Street (west-east). Fraser Drive is a two-lane road with traffic flowing in both directions. Acacia Street is a one-way road flowing from west to east. The intersection is marked with a 'Yield' sign on the west side of Acacia Street. The diagram shows the following traffic flow and vehicle counts:

- Fraser Drive (north):**
 - Vehicle 1: Moving north on Fraser Drive, turning left onto Acacia Street.
 - Vehicle 2: Moving north on Fraser Drive, turning right onto Acacia Street.
 - Vehicle 3: Moving north on Fraser Drive, continuing straight.
 - Vehicle 4: Moving north on Fraser Drive, turning right onto Acacia Street.
- Fraser Drive (south):**
 - Vehicle 5: Moving south on Fraser Drive, turning left onto Acacia Street.
 - Vehicle 6: Moving south on Fraser Drive, turning right onto Acacia Street.
 - Vehicle 7: Moving south on Fraser Drive, continuing straight.
 - Vehicle 8: Moving south on Fraser Drive, turning right onto Acacia Street.
- Acacia Street (west):**
 - Vehicle 9: Moving west on Acacia Street, turning right onto Fraser Drive (south).
 - Vehicle 10: Moving west on Acacia Street, turning left onto Fraser Drive (north).
 - Vehicle 11: Moving west on Acacia Street, continuing straight.
 - Vehicle 12: Moving west on Acacia Street, turning right onto Fraser Drive (south).
- Acacia Street (east):**
 - Vehicle 13: Moving east on Acacia Street, turning left onto Fraser Drive (north).
 - Vehicle 14: Moving east on Acacia Street, turning right onto Fraser Drive (south).
 - Vehicle 15: Moving east on Acacia Street, continuing straight.
 - Vehicle 16: Moving east on Acacia Street, turning left onto Fraser Drive (north).

The diagram also shows the following traffic flow and vehicle counts:

- Fraser Drive (north):**
 - Vehicle 1: Moving north on Fraser Drive, turning left onto Acacia Street.
 - Vehicle 2: Moving north on Fraser Drive, turning right onto Acacia Street.
 - Vehicle 3: Moving north on Fraser Drive, continuing straight.
 - Vehicle 4: Moving north on Fraser Drive, turning right onto Acacia Street.
- Fraser Drive (south):**
 - Vehicle 5: Moving south on Fraser Drive, turning left onto Acacia Street.
 - Vehicle 6: Moving south on Fraser Drive, turning right onto Acacia Street.
 - Vehicle 7: Moving south on Fraser Drive, continuing straight.
 - Vehicle 8: Moving south on Fraser Drive, turning right onto Acacia Street.
- Acacia Street (west):**
 - Vehicle 9: Moving west on Acacia Street, turning right onto Fraser Drive (south).
 - Vehicle 10: Moving west on Acacia Street, turning left onto Fraser Drive (north).
 - Vehicle 11: Moving west on Acacia Street, continuing straight.
 - Vehicle 12: Moving west on Acacia Street, turning right onto Fraser Drive (south).
- Acacia Street (east):**
 - Vehicle 13: Moving east on Acacia Street, turning left onto Fraser Drive (north).
 - Vehicle 14: Moving east on Acacia Street, turning right onto Fraser Drive (south).
 - Vehicle 15: Moving east on Acacia Street, continuing straight.
 - Vehicle 16: Moving east on Acacia Street, turning left onto Fraser Drive (north).

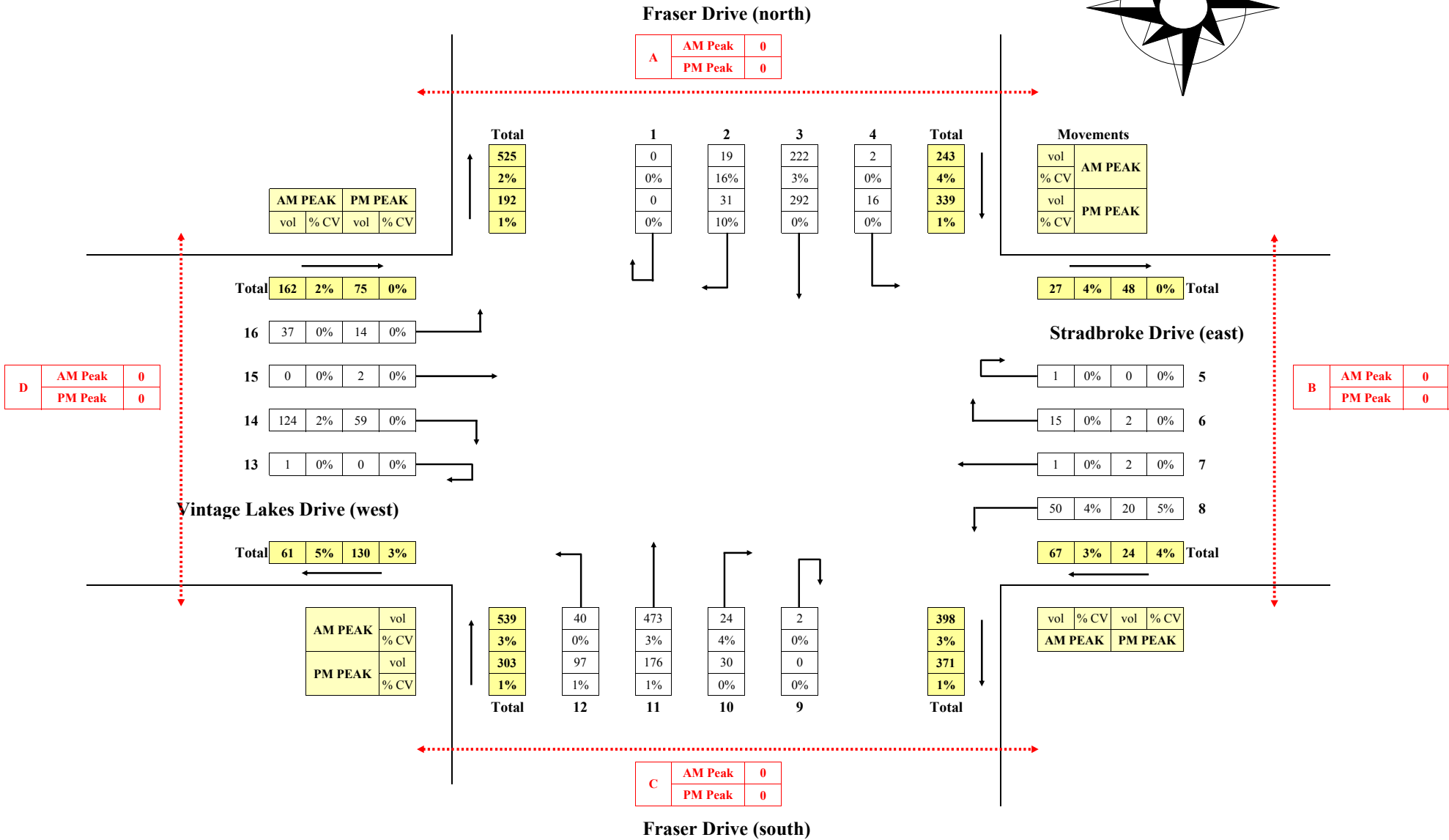
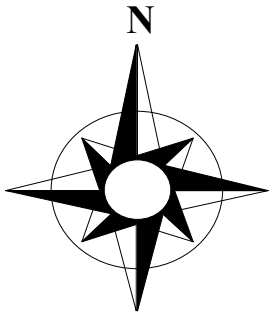


TIME (1/4 hr end)	Movement 9					Movement 10					Movement 11					Movement 12					Movement 13					Movement 14					Movement 15					Movement 16					Pedestrian Movements			
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	A	B	C	D					
6:45 AM	0	0	0	0	0	0	0	0	0	0	27	0	0	27	2	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	20	0	0	20	0	0	0	0	0		
7:00 AM	0	0	0	0	0	0	0	0	0	0	23	0	0	23	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	32	0	0	32	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	10	1	0	11	0	0	0	0	0			
7:30 AM	0	0	0	0	0	0	0	0	0	0	47	2	0	49	0	2	0	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	20	3	0	23	0	0	0	0	0			
7:45 AM	0	0	0	0	0	0	0	0	0	0	51	1	0	52	0	7	0	0	7	0	0	0	0	0	9	0	0	9	0	0	0	0	20	2	0	22	0	0	0	0	0			
8:00 AM	0	0	0	0	0	0	0	0	0	0	69	1	0	70	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0			
8:15 AM	0	0	0	0	0	0	0	0	0	0	102	3	0	105	1	13	0	0	13	0	0	0	0	0	3	0	0	3	0	0	0	0	19	1	0	20	1	0	0	0	0			
8:30 AM	0	0	0	0	0	0	0	0	0	0	134	2	0	136	1	3	3	0	6	0	0	0	0	0	2	0	0	2	0	0	0	0	34	3	0	37	0	0	0	0	0			
8:45 AM	0	0	0	0	0	0	0	0	0	0	149	2	0	151	1	11	1	0	12	0	0	0	0	0	11	0	0	11	0	0	0	0	39	4	0	43	0	0	0	0	0			
9:00 AM	0	0	0	0	0	0	0	0	0	0	102	0	0	102	2	2	1	0	3	0	0	0	0	0	4	1	0	5	0	0	0	0	29	2	0	31	0	0	0	0	0			
9:15 AM	0	0	0	0	0	0	0	0	0	0	52	0	0	52	0	4	0	0	4	0	0	0	0	0	3	0	0	3	0	0	0	0	27	0	0	27	0	0	0	0	0			
9:30 AM	0	0	0	0	0	0	0	0	0	0	62	0	0	62	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	12	2	0	14	0	0	0	0	0				
3 hr Total	0	0	0	0	0	0	0	0	0	0	850	11	0	861	8	46	5	0	51	0	0	0	0	0	37	1	0	38	0	0	0	0	251	18	0	269	1	0	0	0	0			
AM Peak	0	0	0	0	0	0	0	0	0	0	487	7	0	494	5	29	5	0	34	0	0	0	0	0	20	1	0	21	0	0	0	0	121	10	0	131	1	0	0	0	0			

TIME (1/4 hr end)	Movement 9					Movement 10					Movement 11					Movement 12					Movement 13					Movement 14					Movement 15					Movement 16					Pedestrian Movements			
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	A	B	C	D					
3:15 PM	0	0	0	0	0	0	0	0	0	0	36	0	0	36	0	2	0	0	2	0	0	0	0	0	0	5	0	0	0	0	22	3	0	25	0	0	0	0	0	0				
3:30 PM	0	0	0	0	0	0	0	0	0	0	46	2	0	48	1	3	0	0	3	0	0	0	0	0	0	5	0	0	0	0	11	2	0	13	0	0	0	0	0	0				
3:45 PM	0	0	0	0	0	0	0	0	0	0	52	1	0	53	0	1	0	0	1	0	0	0	0	0	0	5	0	0	0	0	17	1	0	18	0	0	0	0	0	0				
4:00 PM	0	0	0	0	0	0	0	0	0	0	50	2	0	52	0	5	0	0	5	0	0	0	0	0	0	3	0	0	0	0	17	1	0	18	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	38	3	0	41	0	1	0	0	1	0	0	0	0	0	0	4	0	0	0	0	14	4	0	18	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	60	1	0	61	0	2	0	0	2	0	0	0	0	0	0	4	0	0	0	0	7	1	0	8	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	54	1	0	55	0	4	0	0	4	0	0	0	0	0	0	3	0	0	0	0	8	0	0	8	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	42	0	0	42	0	2	0	0	2	0	0	0	0	0	0	3	0	0	0	0	10	2	0	12	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	34	0	0	34	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	7	0	0	7	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	40	0	0	40	0	4	0	0	4	0	0	0	0	0	0	3	0	0	0	0	12	1	0	13	2	0	0	0	0	0				
5:45 PM	0	0	0	0	0	0	0	0	0	0	34	2	0	36	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0				
6:00 PM	0	0	0	0	0	0	0	0	0	0	37	1	0	38	0	2	0	0	2	0	0	0	0	0	0	2	0	0	0	0	9	1	0	10	0	0	0	0	0	0				
3 hr Total	0	0	0	0	0	0	0	0	0	0	523	13	0	536	1	28	0	0	28	0	0	0	0	0	0	34	4	0	38	0	0	145	16	0	161	2	0	0	0	0	0			
PM Peak	0	0	0	0	0	0	0	0	0	0	184	5	0	189	1	11	0	0	11	0	0	0	0	0	14	4	0	18	0	0	67	7	0	74	0	0	0	0	0	0				

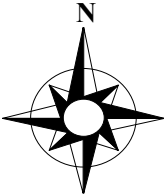
AUSTRALASIAN TRAFFIC SURVEYS MANUAL INTERSECTION COUNT

Site No.: 2
Location: Vintage Lakes Drive/Fraser Drive/Stradbroke Drive, Tweed Heads South
Day/Date: Wednesday 22 November 2006
Summary: AM Peak : Hour ending - 9:00 AM
PM Peak : Hour ending - 5:15 PM



Legend
vol = total vehicle volume
% CV = percentage of commercial vehicles (trucks and buses)

Vintage Lakes Drive (west)

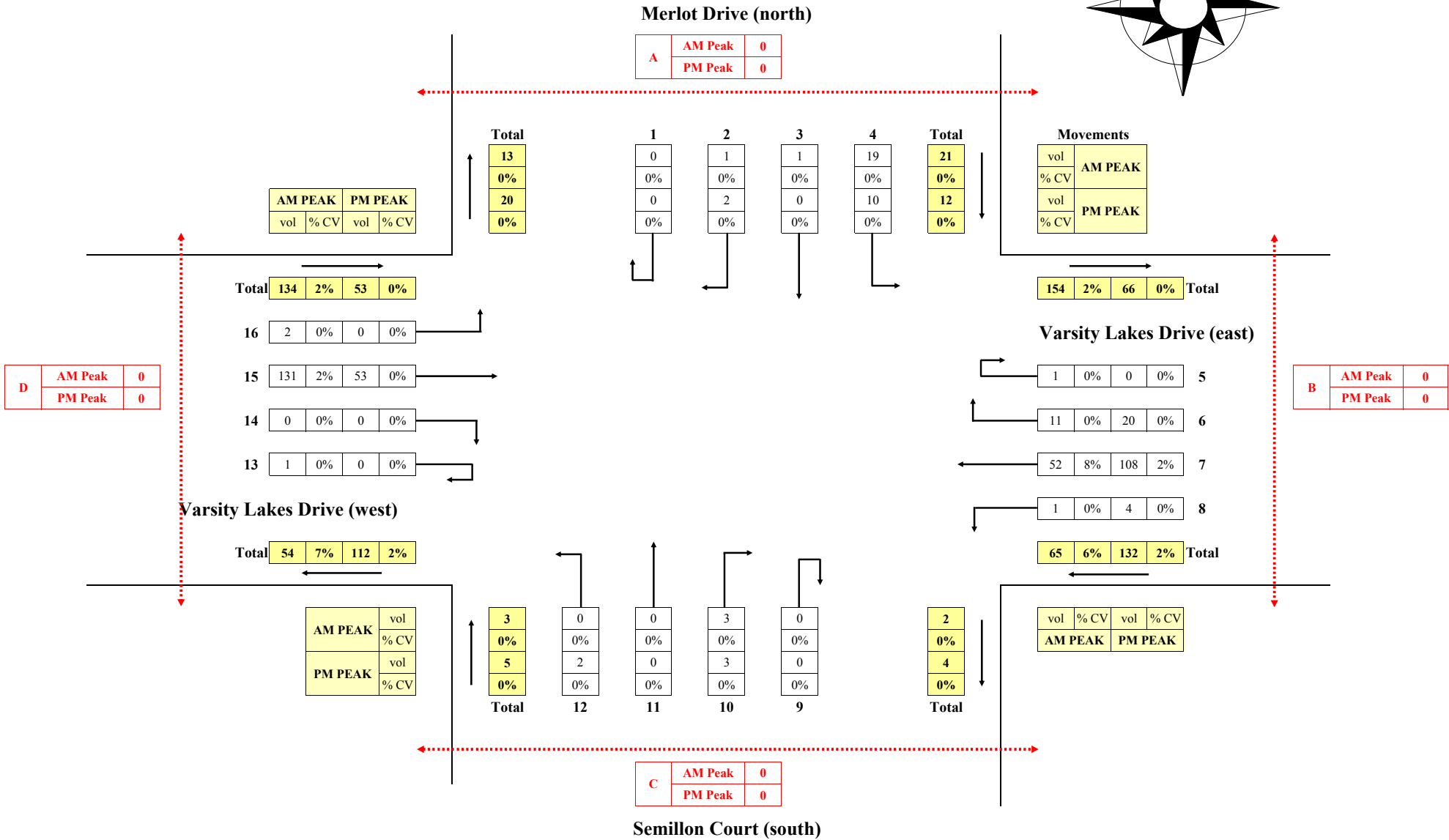
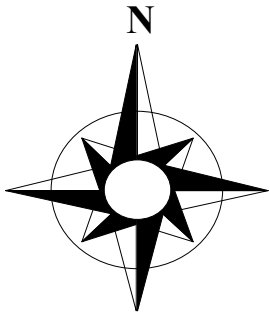


TIME (1/4 hr end)	Movement 1					Movement 2					Movement 3					Movement 4					Movement 5					Movement 6					Movement 7					Movement 8				
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable					
6:45 AM	0	0	0	0	0	0	0	0	0	0	14	1	0	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0					
7:00 AM	0	0	0	0	0	1	0	0	1	0	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0						
7:15 AM	0	0	0	0	0	0	0	0	0	0	10	1	0	11	0	1	0	0	1	0	0	0	0	3	0	0	3	0	0	4	0	0	4	0						
7:30 AM	0	0	0	0	0	0	0	0	0	0	19	1	0	20	0	1	0	0	1	0	0	0	1	0	0	1	0	0	9	0	0	9	1							
7:45 AM	0	0	0	0	0	0	2	0	2	0	34	2	0	36	2	0	0	0	0	0	0	0	1	0	0	1	0	0	6	0	0	6	0							
8:00 AM	0	0	0	0	0	0	0	0	0	0	39	0	0	39	0	0	0	0	0	0	0	0	2	0	0	2	0	0	9	0	0	9	1							
8:15 AM	0	0	0	0	0	4	0	0	4	0	51	1	0	52	1	0	0	0	0	0	1	0	0	2	0	0	2	0	0	18	2	0	20	2						
8:30 AM	0	0	0	0	0	3	2	0	5	0	56	2	0	58	1	0	0	0	0	0	0	0	4	0	0	4	0	1	10	0	0	10	1							
8:45 AM	0	0	0	0	0	8	0	0	8	0	47	3	0	50	1	1	0	0	1	0	0	5	0	0	5	0	0	0	13	0	0	13	0							
9:00 AM	0	0	0	0	0	1	1	0	2	0	61	1	0	62	1	1	0	0	1	0	0	4	0	0	4	0	0	0	7	0	0	7	0							
9:15 AM	0	0	0	0	0	1	0	0	1	0	56	3	0	59	0	0	0	0	0	0	1	0	0	1	0	1	0	0	2	0	0	2	0							
9:30 AM	0	0	0	0	0	3	1	0	4	0	22	0	0	22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1							
3 hr Total	0	0	0	0	0	21	6	0	27	0	422	15	0	437	8	4	0	0	4	0	2	0	0	23	0	0	23	0	1	88	2	0	90	6						
AM Peak	0	0	0	0	0	16	3	0	19	0	215	7	0	222	4	2	0	0	2	0	1	0	0	15	0	0	15	0	1	48	2	0	50	3						

TIME (1/4 hr end)	Movement 1					Movement 2					Movement 3					Movement 4					Movement 5					Movement 6					Movement 7					Movement 8				
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable					
3:15 PM	1	0	0	1	0	14	1	0	15	0	76	4	0	80	0	2	0	0	2	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4	0	0	4	0		
3:30 PM	0	0	0	0	0	6	0	0	6	0	97	3	0	100	0	3	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	2	5	0	0	5	0		
3:45 PM	0	0	0	0	0	3	1	0	4	0	51	1	0	52	0	3	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	7	0	0	7	0	
4:00 PM	0	0	0	0	0	2	0	0	2	0	56	0	0	56	0	4	0	0	4	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	0	0	3	0		
4:15 PM	0	0	0	0	0	9	1	0	10	0	71	0	0	71	1	4	1	0	5	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	1			
4:30 PM	0	0	0	0	0	8	0	0	8	0	77	1	0	78	1	4	0	0	4	0	0	0	0	0	1	0	0	1	0	0	0	0	1	4	0	0	4	3		
4:45 PM	0	0	0	0	0	8	2	0	10	0	53	0	0	53	0	4	0	0	4	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	5	0			
5:00 PM	0	0	0	0	0	6	0	0	6	0	78	0	0	78	1	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	3		
5:15 PM	0	0	0	0	0	6	1	0	7	0	83	0	0	83	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	7	0	0	7	6
5:30 PM	1	0	0	1	0	16	0	0	16	0	77	1	0	78	1	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	5	0	0	5	5
5:45 PM	0	0	0	0	0	7	1	0	8	0	67	1	0	68	1	3	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	3	0	0	3	1	
6:00 PM	0	0	0	0	0	6	0	0	6	0	61	0	0	61	0	2	0	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	1	4	0	0	4	0		
3 hr Total	2	0	0	2	0	91	7	0	98	0	847	11	0	858	5	43	1	0	44	0	0	0	0	0	1	12	0	0	12	0	4	0	0	4	7	51	1	0	52	19
PM Peak	0	0	0	0	0	28	3	0	31	0	291	1	0	292	2	16	0	0	16	0	0	0	0	0	1	2	0	0	2	0	2	0	2	19	1	0	20	12		

AUSTRALASIAN TRAFFIC SURVEYS MANUAL INTERSECTION COUNT

Site No.: 3
Location: Varsity Lakes Drive/Merlot Drive/Semillon Court, Tweed Heads South
Day/Date: Wednesday 22 November 2006
Summary: AM Peak : Hour ending - 9:00 AM
PM Peak : Hour ending - 5:15 PM

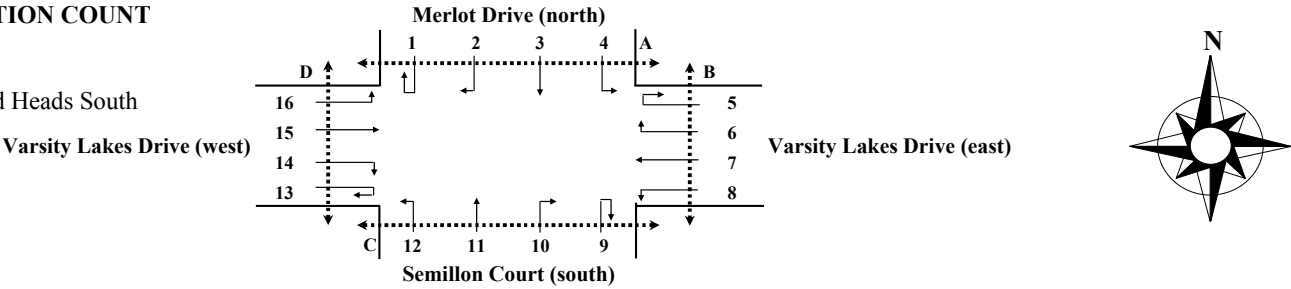


Legend

vol = total vehicle volume
% CV = percentage of commercial vehicles (trucks and buses)

AUSTRALASIAN TRAFFIC SURVEYS MANUAL INTERSECTION COUNT

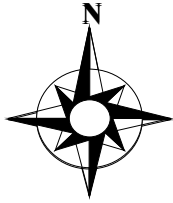
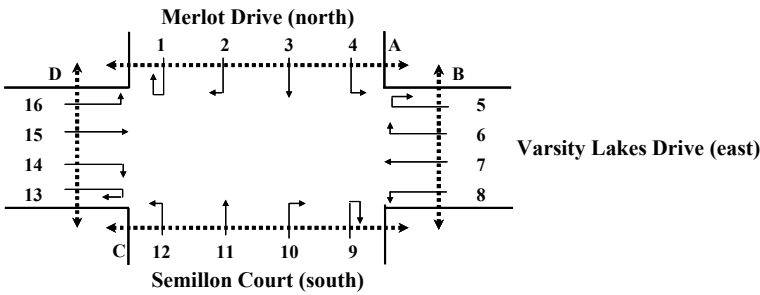
Site No.: 3 Weather: Fine
Location: Varsity Lakes Drive/Merlot Drive/Semillon Court, Tweed Heads South
Day/Date: Wednesday 22 November 2006
AM Peak: Hour ending - 9:00 AM
PM Peak: Hour ending - 5:15 PM



TIME (1/4 hr end)	Movement 1					Movement 2					Movement 3					Movement 4					Movement 5					Movement 6					Movement 7					Movement 8				
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable					
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0			
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	6	1	0	7	0	0	0	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	3	0	0	3	0	0	0	0	0			
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0			
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	2	2	0	4	0	0	0	0	0			
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	1	0	0	1	0	0	0	0	7	2	0	9	0	1	0	0	0			
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	2	0	0	0	0	0	4	0	0	3	0	0	3	0	0	0	0	0			
8:30 AM	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	7	0	0	7	0	0	0	0	0	0	4	0	0	19	2	0	21	0	0	0	0	0			
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	1	0	0	15	1	0	16	0	0	0	0	0			
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	0	2	0	0	11	1	0	12	0	1	0	1	1			
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0			
9:30 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	2	0	0	0	0	0	0	0	0	8	1	0	9	0	0	0	0	0			
3 hr Total	0	0	0	0	0	2	0	0	2	0	1	0	0	1	0	45	0	0	45	2	2	0	0	2	0	13	0	0	93	10	0	103	0	2	0	0	2	1		
AM Peak	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	19	0	0	19	2	1	0	0	1	0	11	0	0	48	4	0	52	0	1	0	0	1			

TIME (1/4 hr end)	Movement 1					Movement 2					Movement 3					Movement 4					Movement 5					Movement 6					Movement 7					Movement 8					
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable						
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	7	0	0	7	0	23	2	0	25	0	0	0	1				
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	1	1	0	0	1	0	6	0	0	6	1	27	0	0	27	0	1	0	0			
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	2	0	0	2	1	24	0	0	24	4	2	0	0	0			
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	0	3	0	0	3	0	14	0	0	14	2	0	0	0	2		
4:15 PM	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	3	0	0	3	0	1	1	0	2	0	5	0	0	5	0	19	0	0	19	2	1	0	0	1	0	
4:30 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	7	0	0	7	0	25	0	0	25	0	1	0	0	1	0		
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6	0	0	6	0	28	2	0	30	1	0	0	0	0	0		
5:00 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3	0	0	3	0	21	0	0	21	1	1	0	0	1	0		
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	32	0	0	32	3	2	0	0	2	0		
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	0	0	3	0	17	0	0	17	0	3	0	0	3	0		
5:45 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	0	9	0	0	9	0	28	0	0	28	3	1	0	0	1	0	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	2	0	0	2	0	25	0	0	25	1	0	0	0	0	0		
3 hr Total	0	0	0	0	0	4	0	0	4	1	1	0	0	1	0	34	0	0	34	1	4	1	0	5	0	57	0	0	57	2	283	4	0	287	17	12	0	0	0	12	3
PM Peak	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	20	0	0	20	0	106	2	0	108	5	4	0	0	0	4	0	

Varsity Lakes Drive (west)



TIME (1/4 hr end)	Movement 9					Movement 10					Movement 11					Movement 12					Movement 13					Movement 14					Movement 15					Movement 16					Pedestrian Movements			
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	A	B	C	D					
6:45 AM	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	0	0	0	0	0			
7:00 AM	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	15	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0			
7:15 AM	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	12	1	0	13	2	0	0	0	0	0	0	0	0	0	0	0			
7:30 AM	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	11	2	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:45 AM	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	14	1	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:00 AM	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	27	2	0	29	2	0	0	0	0	0	0	0	0	0	0	0	0		
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	1	0	33	3	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:30 AM	0	0	0	0	0	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	31	1	0	32	2	0	0	0	0	0	0	0	0	0	0	0		
8:45 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	32	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	1	0	34	0	2	0	0	2	0	0	0	0	0	0	0	0	0		
9:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3 hr Total	0	0	0	0	0	8	0	0	8	3	1	0	0	1	0	1	0	0	1	0	1	0	0	2	0	0	271	9	0	280	10	2	0	2	0	0	0	0	0	0	0	0	0	
AM Peak	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	0	131	6	2	0	2	0	0	0	0	0	0	0	0	0	0	

TIME (1/4 hr end)	Movement 9					Movement 10					Movement 11					Movement 12					Movement 13					Movement 14					Movement 15					Movement 16					Pedestrian Movements			
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	A	B	C	D					
3:15 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	15	1	1	0	0	1	0	0	0	0	0				
3:30 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0				
3:45 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	3	0	20	0	1	0	0	1	2	0	0	0	0	0					
4:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	0	1	0	0	0	0					
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0					
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	20	2	0	0	0	0	0	0	0	0	0	0					
4:45 PM	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	15	0	2	0	0	2	0	0	0	0	0	0	0					
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0				
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0				
3 hr Total	0	0	0	0	0	6	0	0	6	2	0	0	0	0	1	2	0	0	2	0	0	0	0	1	164	3	0	167	3	4	0	0	4	3	0	0	0	0	0	0				
PM Peak	0	0	0	0	0	3	0	0	3	0	0	0	0	0	2	0	0	0	2	0	0	0	0	53	0	0	53	2	0	0	0	0	0	0	0	0	0	0	0					

AUSTRALASIAN TRAFFIC SURVEYS MANUAL INTERSECTION COUNT

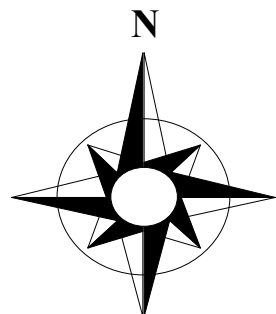
Site No.: 4

Location: Hillcrest Avenue/Ocean Avenue, Tweed Heads South

Day/Date: Wednesday 22 November 2006

Summary: AM Peak : Hour ending - 9:15 AM

PM Peak : Hour ending - 4:30 PM



Hillcrest Avenue (north)

A	AM Peak	0
	PM Peak	0

AM PEAK	vol
	% CV
PM PEAK	vol
	% CV

Total
70
4%
55
9%

1
0
0%
1
0%

2
22
9%
41
0%

3
5
0%
13
8%

Total
27
7%
55
2%

AM PEAK		PM PEAK	
vol	% CV	vol	% CV

7	0%	15	7%	Total
---	----	----	----	-------

Ocean Avenue (east)

B	AM Peak	0
	PM Peak	0

AM PEAK	vol
	% CV
PM PEAK	vol
	% CV

59
3%
50
10%
Total

57
4%
48
10%
8

2
0%
2
0%
7

0
0%
0
0%
6

26
8%
44
0%
Total

13	8%	6	0%	4
4	0%	3	0%	5
17	6%	9	0%	Total

Hillcrest Avenue (south)

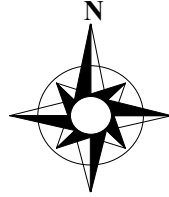
C	AM Peak	0
	PM Peak	0

Legend

vol = total vehicle volume

% CV = percentage of commercial vehicles (trucks and buses)

Site No.: 4 **Weather:** Fine
Location: Hillcrest Avenue/Ocean Avenue, Tweed Heads South
Day/Date: Wednesday 22 November 2006
AM Peak: Hour ending - 9:15 AM
PM Peak: Hour ending - 4:30 PM



TIME (1/4 hr end)	Movement 1					Movement 2					Movement 3					Movement 4					Movement 5					Movement 6					Movement 7					Movement 8					Pedestrian Movements		
	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	Light Vehicles	Heavy Vehicles	Not Applicable	Total	Not Applicable	A	B	C					
3:15 PM	0	0	0	0	0	7	0	0	7	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	7	1	0	8	0	0	0	0					
3:30 PM	0	0	0	0	0	8	0	0	8	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	1	0	0	1	0	9	1	0	10	0	0	0	0				
3:45 PM	0	0	0	0	0	10	0	0	10	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0					
4:00 PM	0	0	0	0	0	8	0	0	8	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	11	2	0	13	0	0	0	0					
4:15 PM	0	0	0	0	0	10	0	0	10	0	3	0	0	3	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	11	3	0	14	0	0	0	0					
4:30 PM	1	0	0	1	0	13	0	0	13	0	4	0	0	4	0	3	0	0	3	0	1	0	0	1	0	0	1	0	0	1	0	8	0	0	8	0	0	0	0				
4:45 PM	0	0	0	0	0	9	0	0	9	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	4	0	0	4	1	0	5	0	0	0	0				
5:00 PM	0	0	0	0	0	10	0	0	10	0	2	0	0	2	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	6	0	0	6	0	0	0	0				
5:15 PM	0	0	0	0	0	10	0	0	10	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	8	1	0	9	0	0	0	0					
5:30 PM	0	0	0	0	0	11	0	0	11	0	4	0	0	4	0	1	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	7	0	0	7	0	0	0	0				
5:45 PM	0	0	0	0	0	6	1	0	7	0	2	0	0	2	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0					
6:00 PM	0	0	0	0	0	7	0	0	7	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	1	0	0	1	0	5	1	0	6	0	0	0	0				
3 hr Total	1	0	0	1	0	109	1	0	110	0	36	1	0	37	1	19	0	0	19	0	6	0	0	6	0	0	10	0	0	10	0	102	10	0	112	0	0	0	0				
PM Peak	1	0	0	1	0	41	0	0	41	0	12	1	0	13	0	6	0	0	6	0	3	0	0	3	0	0	2	0	0	2	0	43	5	0	48	0	0	0	0				

Summary Statistics



JOB NUMBER 6134 - 1

Suburb Tweed Heads South

CLIENT CEO

SITE Fraser Drive, 60m South of Pioneer Country Homestead Access

SURVEY DATE Tue, 21 Nov 06 Until Mon, 27 Nov 06

		DIRECTION OF TRAVEL			
		TWO-WAY	Northbound	Southbound	
TRAFFIC VOLUME: [VEH/DAY]	Weeks Days Only	6,507	3,118	3,389	
	7 Days Average	6,175	2,942	3,233	
PEAK HOUR	AM	8:00	744	502	242
VOLUME:	PM	15:00	573	222	351
TOTAL SPEEDS: Km/Hr	85th Percentile	83.6	72.2	94.1	
	Average	76.0	66.6	84.8	
PACE SPEED	15Km/h Upper Limit		74.5	90.5	
% COMM. VEHICLES:	CLASS 3> %	22.4%	2.5%	40.6%	
NOTES : (OBSERVATIONS)					

AUSTRALASIAN TRAFFIC SURVEYS

Road	Fraser Drive	AADT	6,553
Location	60m South of Pioneer Country Homestead Access	Ave Speed	76.8
Site No.	1	85%ile	84
Direction	Combined	% Heavy's	23.2%
Day	Thursday	AM Peak	8:00 719
Date	23/11/2006	PM Peak	15:00 594
Start Date	Tuesday 21/11/2006		

Choose Direction

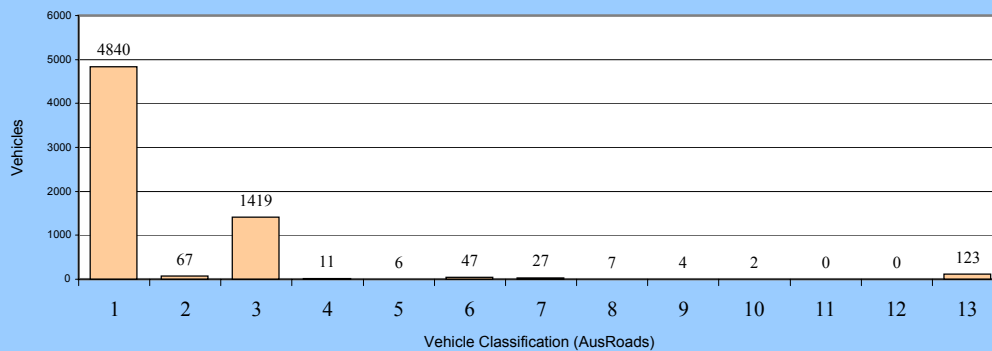
Combined

Choose Day

Thursday

Time Starting	Vehicle Classification													Hour Total	Speed	
	1	2	3	4	5	6	7	8	9	10	11	12	13		Ave.	85%ile
0:00	11	0	5	0	0	0	0	0	0	0	0	0	0	16	90.8	101
1:00	4	0	3	0	0	0	0	0	0	0	0	0	0	7	83.3	93
2:00	4	0	2	0	0	0	0	0	0	0	0	0	0	6	92.3	103
3:00	6	0	0	0	0	0	0	0	0	0	0	0	0	6	72.8	79
4:00	8	0	2	0	0	0	0	0	0	0	0	0	0	10	79.9	87
5:00	33	0	11	0	0	0	0	0	0	0	0	0	0	44	77.8	91
6:00	123	1	30	2	0	0	0	0	1	0	0	0	0	157	73.8	81
7:00	233	10	41	0	0	1	3	1	0	0	0	0	0	295	72.7	81
8:00	572	7	103	1	1	9	3	0	1	0	0	0	0	719	73.3	79
9:00	382	1	82	3	0	2	0	1	0	0	0	0	0	483	72.5	79
10:00	277	8	81	1	0	4	2	1	0	0	0	0	0	383	74.8	82
11:00	247	8	75	0	0	4	2	0	0	0	0	0	0	339	76.1	85
12:00	267	3	88	2	0	2	2	0	1	0	0	0	0	370	75.1	83
13:00	264	5	83	1	1	2	0	0	0	0	0	0	0	363	77.4	84
14:00	363	7	122	0	3	6	1	0	0	0	0	0	0	515	76.1	83
15:00	409	3	153	0	0	4	2	2	0	0	0	0	0	594	77.7	85
16:00	381	6	119	0	0	4	2	1	0	2	0	0	0	525	79.3	87
17:00	364	0	121	0	0	2	5	0	0	0	0	0	0	495	81.1	89
18:00	329	4	106	0	1	6	2	0	0	0	0	0	0	454	77.5	85
19:00	196	2	60	1	0	0	2	1	1	0	0	0	0	264	78.7	88
20:00	137	1	58	0	0	1	1	0	0	0	0	0	0	203	81.7	90
21:00	124	1	39	0	0	0	0	0	0	0	0	0	0	164	81.2	88
22:00	67	0	25	0	0	0	0	0	0	0	0	0	0	92	83.5	92
23:00	39	0	10	0	0	0	0	0	0	0	0	0	0	49	84.1	91
Total	4840	67	1419	11	6	47	27	7	4	2	0	0	0	6553	76.8	84
%Class	74	1	22	0	0	1	0	0	0	0	0	0	0			

Daily Vehicle Classification



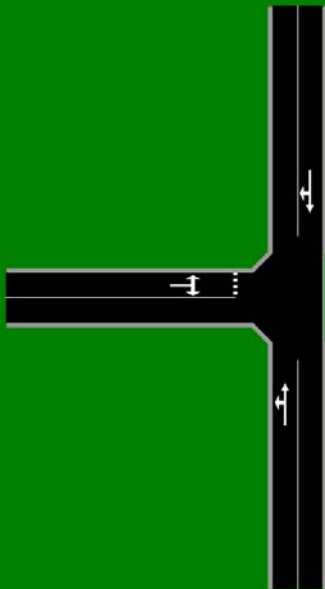
Appendix B

aaSIDRA Analysis Summaries

Fraser Drive - North

Acacia Street - West

Fraser Drive - South



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721429 Fraser Drive
2006 AM Existing Unsignalized Intersection
Intersection ID:      1
                    Give-Way Sign Controlled Intersection

```

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	34	494		528	5			0.296	0.5	0	
	34	494	0	528	5			0.296	0.5		
North: Fraser Drive - North											
1 TR		181	57	238	5			0.174	5.3	12	
	0	181	57	238	5			0.174	5.3	12	
West: Acacia Street - West											
1 LR	131		21	152	5			0.294	13.6	11	
	131	0	21	152	5			0.294	13.6	11	
ALL VEHICLES											
				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				918	5			0.296	3.9	12	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	11	189		200	5				0.112	0.4	0	
	11	189	0	200	5				0.112	0.4		
North: Fraser Drive - North												
1 TR		300	77	377	5				0.233	2.7	14	
	0	300	77	377	5				0.233	2.7	14	
West: Acacia Street - West												
1 LR	74		18	92	5				0.129	10.0	4	
	74	0	18	92	5				0.129	10.0	4	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				669	5				0.233	3.0	14	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	35	534		569	5				0.319	0.5	0	
	35	534	0	569	5				0.319	0.5		
North: Fraser Drive - North												
1 TR		195	59	254	5				0.189	5.8	14	
	0	195	59	254	5				0.189	5.8	14	
West: Acacia Street - West												
1 LR	136		22	158	5				0.332	14.8	13	
	136	0	22	158	5				0.332	14.8	13	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				981	5				0.333	4.2	14	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	11	204		215	5				0.120	0.4	0	
	11	204	0	215	5				0.120	0.4		
North: Fraser Drive - North												
1 TR		324	80	404	5				0.250	2.7	16	
	0	324	80	404	5				0.250	2.7	16	
West: Acacia Street - West												
1 LR	77		19	96	5				0.140	10.3	5	
	77	0	19	96	5				0.140	10.3	5	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				715	5				0.250	3.0	16	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	35	546		581	5				0.325	0.5	0	
	35	546	0	581	5				0.325	0.5		
North: Fraser Drive - North												
1 TR		200	60	260	5				0.194	6.0	14	
	0	200	60	260	5				0.194	6.0	14	
West: Acacia Street - West												
1 LR	139		22	161	5				0.345	15.2	14	
	139	0	22	161	5				0.345	15.2	14	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				1002	5				0.346	4.2	14	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	11	209		220	5				0.123	0.4	0	
	11	209	0	220	5				0.123	0.4		
North: Fraser Drive - North												
1 TR		335	82	417	5				0.258	2.8	16	
	0	335	82	417	5				0.258	2.8	16	
West: Acacia Street - West												
1 LR	78		19	97	5				0.144	10.4	5	
	78	0	19	97	5				0.144	10.4	5	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				734	5				0.258	3.1	16	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	42	731		773	5				0.433	0.4	0	
	42	731	0	773	5				0.433	0.4		
North: Fraser Drive - North												
1 TR		268	71	339	5				0.286	10.1	30	
	0	268	71	339	5				0.286	10.1	30	
West: Acacia Street - West												
1 LR	162		26	188	5				0.635	27.4	30	
	162	0	26	188	5				0.635	27.4	30	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				1300	5				0.635	6.8	30	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	14	280		294	5				0.165	0.4	0	
	14	280	0	294	5				0.165	0.4		
North: Fraser Drive - North												
1 TR		444	95	539	5				0.337	3.4	25	
	0	444	95	539	5				0.337	3.4	25	
West: Acacia Street - West												
1 LR	92		22	114	5				0.214	12.4	7	
	92	0	22	114	5				0.214	12.4	7	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				947	5				0.338	3.5	25	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	42	743		785	5				0.439	0.4	0	
	42	743	0	785	5				0.439	0.4		
North: Fraser Drive - North												
1 TR		272	71	343	5				0.292	10.4	31	
	0	272	71	343	5				0.292	10.4	31	
West: Acacia Street - West												
1 LR	165		26	191	5				0.662	28.9	32	
	165	0	26	191	5				0.662	28.9	32	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				1319	5				0.667	7.1	32	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	14	285		299	5				0.167	0.4	0	
	14	285	0	299	5				0.167	0.4		
North: Fraser Drive - North												
1 TR		455	98	553	5				0.347	3.5	26	
	0	455	98	553	5				0.347	3.5	26	
West: Acacia Street - West												
1 LR	93		22	115	5				0.220	12.6	7	
	93	0	22	115	5				0.220	12.6	7	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				967	5				0.347	3.6	26	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Access A - West

Fraser Drive - North

Pioneer Country Access -E

Fraser Drive - South

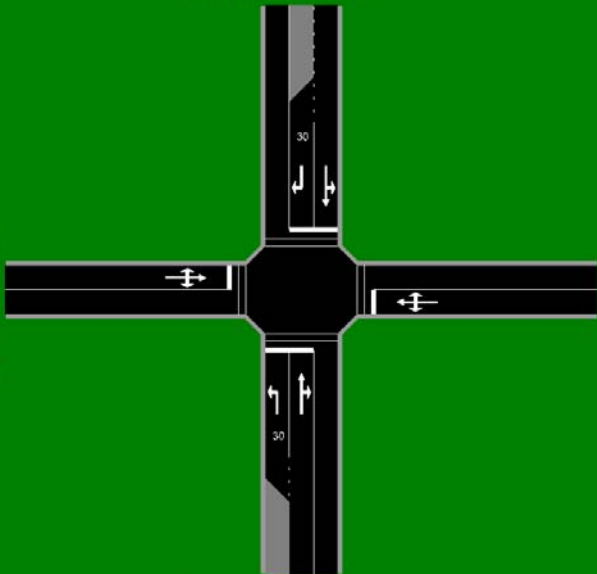


Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 L	4			4	25	1869	82		0.025	24.4	2	30
2 TR		571	2	573	5	1869	82		0.583	23.9	201	
	4	571	2	577	5				0.583	23.9	201	
East: Pioneer Country Access -E												
1 LTR	3	2	3	8	38	1869	16		0.052	72.4	8	
	3	2	3	8	38				0.052	72.4	8	
North: Fraser Drive - North												
1 LT	2	219		221	5	1869	100		0.184	10.0	56	
2 R			4	4	25	1869	12		0.050	78.5	4	30
	2	219	4	225	6				0.184	11.2	56	
West: Access A - West												
1 LTR	8	2	29	39	8	1869	16		0.216	75.6	28	
	8	2	29	39	8				0.216	75.6	28	
Pedestrians												
Across S approach				50			6	7	0.048	62.6	0.2	
Across E approach				50			79		0.008	16.8	0.1	
Across N approach				50			6		0.104	69.1	0.2	
Across W approach				50			79	7	0.007	13.7	0.1	
ALL VEHICLES												
				Total Flow	% HV		Cycle Time		Max X	Aver. Delay	Max Queue	
				849	6		150		0.583	23.4	201	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 L	10			10	10	1869	82		0.056	24.5	4	30
2 TR		209	3	212	5	1869	82		0.220	18.5	69	
	10	209	3	222	5				0.220	18.8	69	
East: Pioneer Country Access -E												
1 LTR	2	2	2	6	50	1869	16		0.042	71.3	6	
	2	2	2	6	50				0.042	71.3	6	
North: Fraser Drive - North												
1 LT	3	346		349	5	1869	100		0.290	10.9	87	
2 R			10	10	10	1869	12		0.113	79.0	8	30
	3	346	10	359	5				0.290	12.8	87	
West: Access A - West												
1 LTR	4	2	13	19	16	1869	16		0.110	74.3	15	
	4	2	13	19	16				0.110	74.3	15	
Pedestrians												
Across S approach				50			6	7	0.048	62.6	0.2	
Across E approach				50			79		0.008	16.8	0.1	
Across N approach				50			6		0.104	69.1	0.2	
Across W approach				50			79	7	0.007	13.7	0.1	
ALL VEHICLES												
				Total Flow	% HV	Cycle Time			Max X	Aver. Delay	Max Queue	
				606	6	150			0.290	17.5	87	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st 2nd				
South: Fraser Drive - South											
1 L	4			4	25	1869	82	0.025	24.4	2	30
2 TR		781	2	783	5	1869	82	0.795	28.9	324	
	4	781	2	787	5			0.795	28.8	324	
East: Pioneer Country Access -E											
1 LTR	4	2	4	10	30	1869	16	0.063	73.1	9	
	4	2	4	10	30			0.063	73.1	9	
North: Fraser Drive - North											
1 LT	2	300		302	5	1869	100	0.251	10.5	75	
2 R			4	4	25	1869	12	0.050	78.5	4	30
	2	300	4	306	6			0.251	11.4	75	
West: Access A - West											
1 LTR	8	2	29	39	8	1869	16	0.216	75.6	28	
	8	2	29	39	8			0.216	75.6	28	
Pedestrians											
Across S approach				50			6 7	0.048	62.6	0.2	
Across E approach				50			79	0.008	16.8	0.1	
Across N approach				50			6	0.104	69.1	0.2	
Across W approach				50			79 7	0.007	13.7	0.1	
ALL VEHICLES											
				Total Flow	% HV	Cycle Time		Max X	Aver. Delay	Max Queue	
				1142	6	150		0.833	26.2	324	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

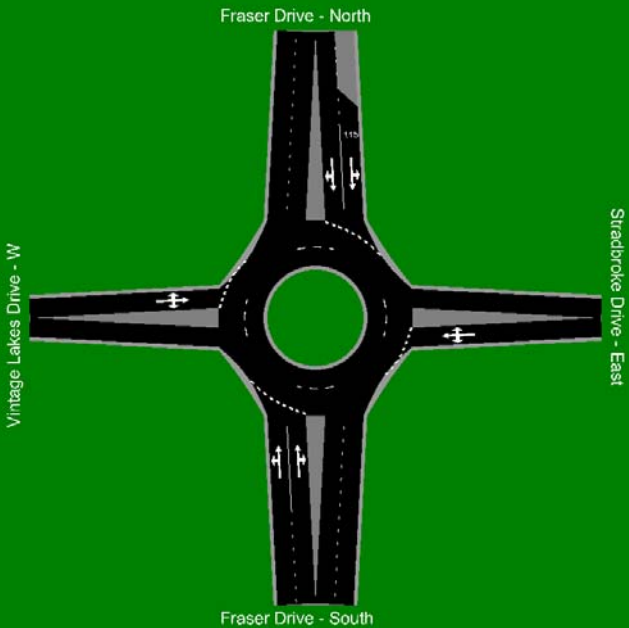
Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 L	10			10	10	1869	82		0.056	24.5	4	30
2 TR		285	4	289	5	1869	81		0.302	20.1	94	
	10	285	4	299	5				0.302	20.2	94	
East: Pioneer Country Access -E												
1 LTR	2	2	2	6	50	1869	16		0.042	71.3	6	
	2	2	2	6	50				0.042	71.3	6	
North: Fraser Drive - North												
1 LT	4	473		477	5	1869	100		0.396	12.0	121	
2 R			10	10	10	1869	12		0.113	79.0	8	30
	4	473	10	487	5				0.396	13.3	121	
West: Access A - West												
1 LTR	4	2	13	19	16	1869	16		0.110	74.3	15	
	4	2	13	19	16				0.110	74.3	15	
Pedestrians												
Across S approach				50			6	7	0.048	62.6	0.2	
Across E approach				50			79		0.008	16.8	0.1	
Across N approach				50			6		0.104	69.1	0.2	
Across W approach				50			79	7	0.007	13.7	0.1	
ALL VEHICLES												
				Total Flow	% HV		Cycle Time		Max X	Aver. Delay	Max Queue	
				811	6		150		0.400	17.7	121	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.



721429 Fraser Drive
2006 AM Existing Roundabout
Intersection ID: 3
Roundabout

FV06AXR

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	40	240		280	5			0.185	5.3	8	
2 TR		233	26	259	5			0.185	5.8	8	
	40	473	26	539	5			0.185	5.5	8	
East: Stradbroke Drive - East											
1 LTR	20	2	16	38	8			0.038	8.2	1	
	20	2	16	38	8			0.038	8.2	1	
North: Fraser Drive - North											
1 LT	3	121		124	6			0.098	5.7	4	115
2 TR		101	19	120	5			0.098	6.5	4	
	3	222	19	244	5			0.098	6.1	4	
West: Vintage Lakes Drive - W											
1 LTR	37	2	125	164	5			0.166	10.3	5	
	37	2	125	164	5			0.166	10.3	5	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				985	5			0.185	6.6	8	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

FV06PXR

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Fraser Drive - South											
1 LT	97	60		157	5			0.107	5.6	4	
2 TR		116	31	147	5			0.107	6.3	4	
	97	176	31	304	5			0.107	5.9	4	
East: Stradbroke Drive - East											
1 LTR	20	3	3	26	12			0.027	6.3	1	
	20	3	3	26	12			0.027	6.3	1	
North: Fraser Drive - North											
1 LT	16	155		171	5			0.129	5.5	5	115
2 TR		137	31	168	5			0.129	6.4	5	
	16	292	31	339	5			0.129	5.9	5	
West: Vintage Lakes Drive - W											
1 LTR	14	3	59	76	7			0.070	9.6	2	
	14	3	59	76	7			0.070	9.6	2	
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				745	6			0.129	6.3	5	

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd			
South: Fraser Drive - South											
1 LT	43	260		303	5			0.200	5.4	8	
2 TR		251	28	279	5			0.200	5.8	8	
	43	511	28	582	5			0.200	5.6	8	
East: Stradbroke Drive - East											
1 LTR	54	2	17	73	7			0.073	7.3	2	
	54	2	17	73	7			0.073	7.3	2	
North: Fraser Drive - North											
1 LT	3	126		129	6			0.107	5.8	4	115
2 TR		114	21	135	5			0.107	6.5	4	
	3	240	21	264	5			0.107	6.1	4	
West: Vintage Lakes Drive - W											
1 LTR	40	2	135	177	6			0.182	10.4	5	
	40	2	135	177	6			0.182	10.4	5	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1096	5			0.200	6.6	8	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

721429 Fraser Drive
2008 PM Existing Roundabout
Intersection ID: 3
Roundabout

FV08PXR

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd			
South: Fraser Drive - South											
1 LT	105	65		170	5			0.115	5.6	5	
2 TR		126	32	158	5			0.115	6.3	5	
	105	191	32	328	5			0.115	5.9	5	
East: Stradbroke Drive - East											
1 LTR	22	3	3	28	11			0.030	6.3	1	
	22	3	3	28	11			0.030	6.3	1	
North: Fraser Drive - North											
1 LT	17	168		185	5			0.139	5.5	6	115
2 TR		147	33	180	5			0.139	6.4	6	
	17	315	33	365	5			0.139	6.0	6	
West: Vintage Lakes Drive - W											
1 LTR	15	3	64	82	6			0.075	9.7	2	
	15	3	64	82	6			0.075	9.7	2	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				803	5			0.139	6.3	6	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	48	263		311	5			0.205	5.4	9	
2 TR		258	28	286	5			0.205	5.8	9	
	48	521	28	597	5			0.205	5.6	9	
East: Stradbroke Drive - East											
1 LTR	54	2	17	73	7			0.074	7.4	2	
	54	2	17	73	7			0.074	7.4	2	
North: Fraser Drive - North											
1 LT	3	140		143	5			0.120	5.8	5	115
2 TR		129	21	150	5			0.120	6.5	5	
	3	269	21	293	5			0.120	6.2	5	
West: Vintage Lakes Drive - W											
1 LTR	42	2	149	193	5			0.198	10.4	6	
	42	2	149	193	5			0.198	10.4	6	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1156	5			0.205	6.6	9	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	118	71		189	5			0.128	5.6	5	
2 TR		145	32	177	5			0.128	6.2	5	
	118	216	32	366	5			0.128	5.9	5	
East: Stradbroke Drive - East											
1 LTR	22	3	3	28	11			0.030	6.4	1	
	22	3	3	28	11			0.030	6.4	1	
North: Fraser Drive - North											
1 LT	17	178		195	5			0.145	5.6	6	115
2 TR		150	36	186	5			0.145	6.5	6	
	17	328	36	381	5			0.145	6.0	6	
West: Vintage Lakes Drive - W											
1 LTR	16	3	71	90	7			0.084	9.8	2	
	16	3	71	90	7			0.084	9.8	2	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				865	5			0.145	6.4	6	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	59	356		415	5			0.277	5.4	13	
2 TR		344	38	382	5			0.277	5.9	13	
	59	700	38	797	5			0.277	5.6	13	
East: Stradbroke Drive - East											
1 LTR	74	2	24	100	6			0.106	7.7	3	
	74	2	24	100	6			0.106	7.7	3	
North: Fraser Drive - North											
1 LT	4	172		176	5			0.154	6.1	7	115
2 TR		157	28	185	5			0.154	6.7	7	
	4	329	28	361	5			0.154	6.4	7	
West: Vintage Lakes Drive - W											
1 LTR	55	2	185	242	5			0.264	10.9	8	
	55	2	185	242	5			0.264	10.9	8	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1500	5			0.277	6.8	13	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

721429 Fraser Drive
2018 PM Existing Roundabout
Intersection ID: 3
Roundabout

FV18PXR

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	144	87		231	5			0.159	5.7	7	
2 TR		173	44	217	5			0.159	6.3	7	
	144	260	44	448	5			0.159	6.0	7	
East: Stradbroke Drive - East											
1 LTR	31	4	4	39	10			0.043	6.7	1	
	31	4	4	39	10			0.043	6.7	1	
North: Fraser Drive - North											
1 LT	24	233		257	5			0.195	5.7	8	115
2 TR		199	46	245	5			0.195	6.6	8	
	24	432	46	502	5			0.195	6.1	8	
West: Vintage Lakes Drive - W											
1 LTR	21	4	87	112	5			0.106	9.9	3	
	21	4	87	112	5			0.106	9.9	3	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1101	5			0.195	6.5	8	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd			
South: Fraser Drive - South											
1 LT	64	360		424	5			0.283	5.4	13	
2 TR		351	38	389	5			0.283	5.9	13	
	64	711	38	813	5			0.283	5.6	13	
East: Stradbroke Drive - East											
1 LTR	74	2	24	100	6			0.108	7.8	3	
	74	2	24	100	6			0.108	7.8	3	
North: Fraser Drive - North											
1 LT	4	186		190	5			0.168	6.1	7	115
2 TR		172	29	201	5			0.168	6.7	8	
	4	358	29	391	5			0.168	6.4	8	
West: Vintage Lakes Drive - W											
1 LTR	57	2	199	258	5			0.283	10.9	9	
	57	2	199	258	5			0.283	10.9	9	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1562	5			0.283	6.9	13	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Fraser Drive - South											
1 LT	156	96		252	5			0.173	5.7	7	
2 TR		191	44	235	5			0.173	6.3	7	
	156	287	44	487	5			0.173	6.0	7	
East: Stradbroke Drive - East											
1 LTR	31	4	4	39	10			0.044	6.7	1	
	31	4	4	39	10			0.044	6.7	1	
North: Fraser Drive - North											
1 LT	24	241		265	5			0.202	5.7	9	115
2 TR		204	48	252	5			0.202	6.6	9	
	24	445	48	517	5			0.202	6.2	9	
West: Vintage Lakes Drive - W											
1 LTR	22	4	94	120	6			0.115	10.0	3	
	22	4	94	120	6			0.115	10.0	3	
ALL VEHICLES											
				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				1163	5			0.202	6.5	9	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Vintage Lakes Drive - N

Merlot Drive - West

Merlot Drive - East

Vintage Lakes Drive - S

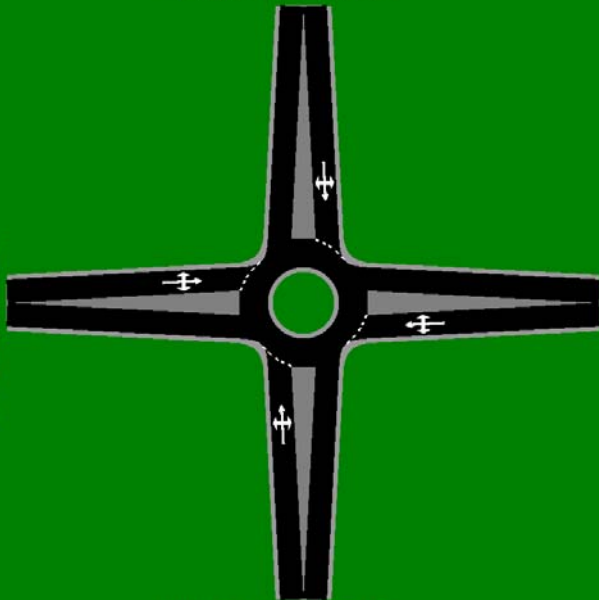


Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Vintage Lakes Drive - S											
1 LTR	2	2	4	8	38			0.009	7.9	0	
	2	2	4	8	38			0.009	7.9	0	
East: Merlot Drive - East											
1 LTR	2	52	12	66	8			0.043	5.3	2	
	2	52	12	66	8			0.043	5.3	2	
North: Vintage Lakes Drive - N											
1 LTR	19	2	2	23	13			0.022	6.3	1	
	19	2	2	23	13			0.022	6.3	1	
West: Merlot Drive - West											
1 LTR	3	131	2	136	7			0.095	4.6	4	
	3	131	2	136	7			0.095	4.6	4	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				233	9			0.095	5.1	4	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st 2nd				

South: Vintage Lakes Drive - S											
1 LTR	3	2	4	9	33			0.010	8.0	1	

	3	2	4	9	33			0.010	8.0	1	

East: Merlot Drive - East											
1 LTR	5	108	20	133	5			0.084	5.2	4	

	5	108	20	133	5			0.084	5.2	4	

North: Vintage Lakes Drive - N											
1 LTR	11	2	3	16	19			0.015	6.2	1	

	11	2	3	16	19			0.015	6.2	1	

West: Merlot Drive - West											
1 LTR	2	53	2	57	9			0.044	4.7	2	

	2	53	2	57	9			0.044	4.7	2	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				215	8			0.084	5.3	4	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st 2nd				
South: Vintage Lakes Drive - S											
1 LTR	2	2	4	8	38			0.009	7.9	0	
	2	2	4	8	38			0.009	7.9	0	
East: Merlot Drive - East											
1 LTR	2	54	12	68	7			0.044	5.3	2	
	2	54	12	68	7			0.044	5.3	2	
North: Vintage Lakes Drive - N											
1 LTR	20	2	2	24	13			0.023	6.3	1	
	20	2	2	24	13			0.023	6.3	1	
West: Merlot Drive - West											
1 LTR	3	136	2	141	6			0.098	4.6	4	
	3	136	2	141	6			0.098	4.6	4	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				241	8			0.098	5.1	4	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							

South: 1 LTR	Vintage 3	Lakes 2	Drive 4	- S 9							
	3	2	4	9	33			0.010	8.1	1	

	3	2	4	9	33			0.010	8.1	1	

East: 1 LTR	Merlot 5	Drive 112	- East 21								
	5	112	21	138	6			0.087	5.2	4	

	5	112	21	138	6			0.087	5.2	4	

North: 1 LTR	Vintage 11	Lakes 2	Drive 3	- N 16							
	11	2	3	16	19			0.015	6.2	1	

	11	2	3	16	19			0.015	6.2	1	

West: 1 LTR	Merlot 2	Drive 55	- West 2								
	2	55	2	59	8			0.046	4.7	2	

	2	55	2	59	8			0.046	4.7	2	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				222	9			0.087	5.3	4	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							

South: Vintage Lakes Drive - S											
1 LTR	2	2	4	8	38			0.009	8.0	0	

	2	2	4	8	38			0.009	8.0	0	

East: Merlot Drive - East											
1 LTR	2	56	16	74	7			0.048	5.5	2	

	2	56	16	74	7			0.048	5.5	2	

North: Vintage Lakes Drive - N											
1 LTR	29	2	2	33	9			0.031	6.3	1	

	29	2	2	33	9			0.031	6.3	1	

West: Merlot Drive - West											
1 LTR	3	142	2	147	6			0.103	4.6	5	

	3	142	2	147	6			0.103	4.6	5	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				262	8			0.103	5.2	5	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Vintage Lakes Drive - S											
1 LTR	3	2	4	9	33			0.010	8.2	1	
	3	2	4	9	33			0.010	8.2	1	
East: Merlot Drive - East											
1 LTR	5	117	29	151	5			0.095	5.4	4	
	5	117	29	151	5			0.095	5.4	4	
North: Vintage Lakes Drive - N											
1 LTR	15	2	3	20	15			0.018	6.1	1	
	15	2	3	20	15			0.018	6.1	1	
West: Merlot Drive - West											
1 LTR	2	60	2	64	8			0.050	4.7	2	
	2	60	2	64	8			0.050	4.7	2	
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				244	8			0.095	5.4	4	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd			

South: Vintage Lakes Drive - S											
1 LTR	2	2	5	9	33			0.010	8.3	0	
	2	2	5	9	33			0.010	8.3	0	

East: Merlot Drive - East											
1 LTR	2	64	15	81	6			0.052	5.4	2	
	2	64	15	81	6			0.052	5.4	2	

North: Vintage Lakes Drive - N											
1 LTR	24	2	2	28	11			0.027	6.4	1	
	24	2	2	28	11			0.027	6.4	1	

West: Merlot Drive - West											
1 LTR	3	162	2	167	6			0.116	4.6	5	
	3	162	2	167	6			0.116	4.6	5	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				285	7			0.116	5.1	5	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd			
South: Vintage Lakes Drive - S											
1 LTR	2	66	2	70	7			0.064	5.4	3	
	2	66	2	70	7			0.064	5.4	3	
East: Merlot Drive - East											
1 LTR	6	134	25	165	5			0.103	5.2	5	
	6	134	25	165	5			0.103	5.2	5	
North: Vintage Lakes Drive - N											
1 LTR	12	2	3	17	18			0.016	6.2	1	
	12	2	3	17	18			0.016	6.2	1	
West: Merlot Drive - West											
1 LTR	2	66	2	70	7			0.060	5.0	3	
	2	66	2	70	7			0.060	5.0	3	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				322	7			0.103	5.3	5	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot							
South: Vintage Lakes Drive - S											
1 LTR	2	2	5	9	33			0.010	8.3	0	
	2	2	5	9	33			0.010	8.3	0	
East: Merlot Drive - East											
1 LTR	2	66	18	86	6			0.055	5.5	3	
	2	66	18	86	6			0.055	5.5	3	
North: Vintage Lakes Drive - N											
1 LTR	33	2	2	37	11			0.035	6.5	2	
	33	2	2	37	11			0.035	6.5	2	
West: Merlot Drive - West											
1 LTR	3	168	2	173	6			0.122	4.6	6	
	3	168	2	173	6			0.122	4.6	6	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				305	7			0.121	5.2	6	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

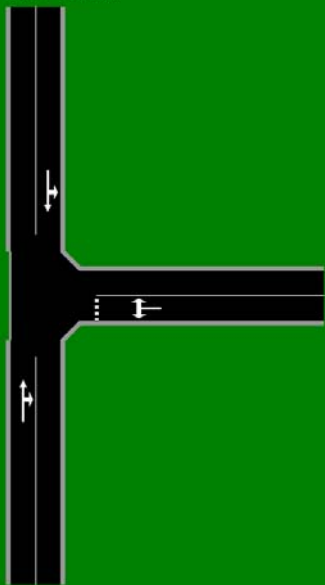
Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st 2nd				
South: Vintage Lakes Drive - S											
1 LTR	3	2	5	10	30			0.012	8.6	1	
	3	2	5	10	30			0.012	8.6	1	
East: Merlot Drive - East											
1 LTR	6	139	33	178	6			0.111	5.4	5	
	6	139	33	178	6			0.111	5.4	5	
North: Vintage Lakes Drive - N											
1 LTR	17	2	3	22	14			0.020	6.1	1	
	17	2	3	22	14			0.020	6.1	1	
West: Merlot Drive - West											
1 LTR	2	71	2	75	8			0.059	4.7	3	
	2	71	2	75	8			0.059	4.7	3	
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				285	8			0.111	5.4	5	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Hillcrest Avenue - North



Ocean Avenue - East

Hillcrest Avenue - South

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR		57	3	60	7				0.035	0.4	2	
	0	57	3	60	7				0.035	0.4	2	
East: Ocean Avenue - East												
1 LR	5		13	18	11				0.022	7.4	1	
	5	0	13	18	11				0.022	7.4	1	
North: Hillcrest Avenue - North												
1 LT	6	22		28	7				0.016	1.4	0	
	6	22	0	28	7				0.016	1.4		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				106	8				0.035	1.8	2	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR		48	3	51	6				0.030	0.6	2	
	0	48	3	51	6				0.030	0.6	2	
East: Ocean Avenue - East												
1 LR	4		7	11	18				0.014	7.5	1	
	4	0	7	11	18				0.014	7.5	1	
North: Hillcrest Avenue - North												
1 LT	13	42		55	5				0.031	1.5	0	
	13	42	0	55	5				0.031	1.5		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				117	7				0.031	1.7	2	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR	59	3	62	6					0.036	0.4	2	
	0	59	3	62	6				0.036	0.4	2	
East: Ocean Avenue - East												
1 LR	5		14	19	11				0.023	7.4	1	
	5	0	14	19	11				0.023	7.4	1	
North: Hillcrest Avenue - North												
1 LT	6	23		29	7				0.017	1.4	0	
	6	23	0	29	7				0.017	1.4		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				110	7				0.036	1.8	2	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR		51	3	54	7				0.031	0.6	2	
	0	51	3	54	7				0.031	0.6	2	
East: Ocean Avenue - East												
1 LR	4		7	11	18				0.014	7.5	1	
	4	0	7	11	18				0.014	7.5	1	
North: Hillcrest Avenue - North												
1 LT	14	44		58	5				0.033	1.6	0	
	14	44	0	58	5				0.033	1.6		
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				123	7				0.033	1.7	2	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR		59	5	64	6				0.037	0.6	2	
	0	59	5	64	6				0.037	0.6	2	
East: Ocean Avenue - East												
1 LR	9		16	25	8				0.029	7.3	1	
	9	0	16	25	8				0.029	7.3	1	
North: Hillcrest Avenue - North												
1 LT	7	26		33	6				0.019	1.4	0	
	7	26	0	33	6				0.019	1.4		
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				122	7				0.037	2.2	2	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)					Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot	%HV						
South: Hillcrest Avenue - South											
1 TR	51	10		61	7			0.036	1.3	2	
	0	51	10	61	7			0.036	1.3	2	
East: Ocean Avenue - East											
1 LR	6		8	14	14			0.017	7.5	1	
	6	0	8	14	14			0.017	7.5	1	
North: Hillcrest Avenue - North											
1 LT	15	45		60	5			0.034	1.6	0	
	15	45	0	60	5			0.034	1.6		
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				135	7			0.036	2.1	2	
=====											

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR	71	3	74	7					0.043	0.4	3	
	0	71	3	74	7				0.043	0.4	3	
East: Ocean Avenue - East												
1 LR	6		16	22	9				0.027	7.5	1	
	6	0	16	22	9				0.027	7.5	1	
North: Hillcrest Avenue - North												
1 LT	7	27		34	6				0.019	1.3	0	
	7	27	0	34	6				0.019	1.3		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				130	7				0.043	1.8	3	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR	67	3	70	6					0.040	0.6	3	
	0	67	3	70	6				0.040	0.6	3	
East: Ocean Avenue - East												
1 LR	5		8	13	15				0.017	7.7	1	
	5	0	8	13	15				0.017	7.7	1	
North: Hillcrest Avenue - North												
1 LT	16	52		68	6				0.039	1.5	0	
	16	52	0	68	6				0.039	1.5		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				151	7				0.040	1.6	3	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR	71	6	77	6					0.045	0.6	2	
	0	71	6	77	6				0.045	0.6	2	
East: Ocean Avenue - East												
1 LR	10		19	29	7				0.034	7.5	1	
	10	0	19	29	7				0.034	7.5	1	
North: Hillcrest Avenue - North												
1 LT	8	31		39	8				0.022	1.3	0	
	8	31	0	39	8				0.022	1.3		
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				145	7				0.045	2.2	2	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

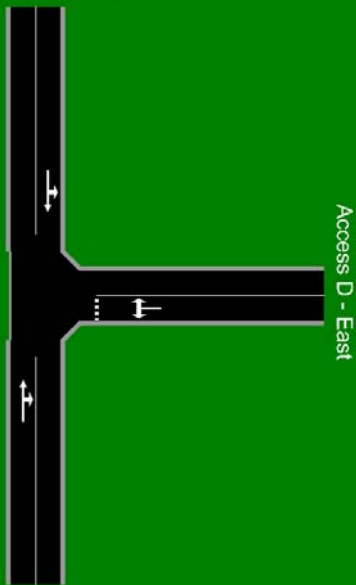
Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 TR	60	10	70	6					0.041	1.2	2	
	0	60	10	70	6				0.041	1.2	2	
East: Ocean Avenue - East												
1 LR	6		9	15	13				0.019	7.7	1	
	6	0	9	15	13				0.019	7.7	1	
North: Hillcrest Avenue - North												
1 LT	17	54		71	6				0.040	1.6	0	
	17	54	0	71	6				0.040	1.6		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				156	6				0.041	2.0	2	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Hillcrest Avenue - North



Hillcrest Avenue - South

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	7	574		581	5				0.325	0.1	0	
	7	574	0	581	5				0.325	0.1		
North: Fraser Drive - North												
1 T		219		219	5				0.122	0.0	0	
	0	219	0	219	5				0.122	0.0		
West: Development Access B - W												
1 L	4			4	25				0.010	13.5	0	
	4	0	0	4	25				0.010	13.5	0	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				804	5				0.325	0.1	0	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	17	217		234	5				0.131	0.6	0	
	17	217	0	234	5				0.131	0.6		
North: Fraser Drive - North												
1 T		346		346	5				0.193	0.0	0	
	0	346	0	346	5				0.193	0.0		
West: Development Access B - W												
1 L	2			2	50				0.003	9.5	0	
	2	0	0	2	50				0.003	9.5	0	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				582	5				0.193	0.3	0	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	7	784		791	5				0.442	0.1	0	
	7	784	0	791	5				0.442	0.1		
North: Fraser Drive - North												
1 T		300		300	5				0.167	0.0	0	
	0	300	0	300	5				0.167	0.0		
West: Development Access B - W												
1 L	4			4	25				0.016	19.4	1	
	4	0	0	4	25				0.016	19.4	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				1095	5				0.442	0.1	1	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Fraser Drive - South												
1 LT	17	294		311	5				0.174	0.4	0	
	17	294	0	311	5				0.174	0.4		
North: Fraser Drive - North												
1 T		473		473	5				0.264	0.0	0	
	0	473	0	473	5				0.264	0.0		
West: Development Access B - W												
1 L	2			2	50				0.004	10.6	0	
	2	0	0	2	50				0.004	10.6	0	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				786	5				0.264	0.2	0	

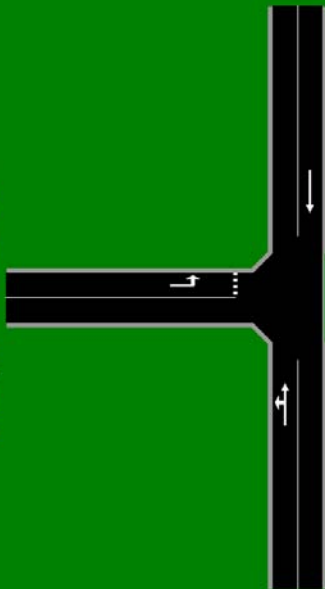
Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Fraser Drive - North

Development Access B - W



Fraser Drive - South

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 T	75			75	5				0.042	0.0	0	
	0	75	0	75	5				0.042	0.0		
East: Access D - East												
1 L	4			4	25				0.004	6.7	0	
	4	0	0	4	25				0.004	6.7	0	
North: Hillcrest Avenue - North												
1 LT	2	28		30	7				0.017	0.4	0	
	2	28	0	30	7				0.017	0.4		
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				109	6				0.042	0.4	0	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 T		57		57	5				0.032	0.0	0	
	0	57	0	57	5				0.032	0.0		
East: Access D - East												
1 L	3			3	33				0.003	6.8	0	
	3	0	0	3	33				0.003	6.8	0	
North: Hillcrest Avenue - North												
1 LT	2	57		59	7				0.033	0.2	0	
	2	57	0	59	7				0.033	0.2		
=====												
ALL VEHICLES				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				119	7				0.033	0.3	0	
=====												

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 T	89			89	4				0.050	0.0	0	
	0	89	0	89	4				0.050	0.0		
East: Access D - East												
1 L	4			4	25				0.004	6.7	0	
	4	0	0	4	25				0.004	6.7	0	
North: Hillcrest Avenue - North												
1 LT	2	33		35	9				0.020	0.4	0	
	2	33	0	35	9				0.020	0.4		
ALL VEHICLES												
	Total Flow				% HV				Max X	Aver. Delay	Max Queue	
	128				6				0.050	0.3	0	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

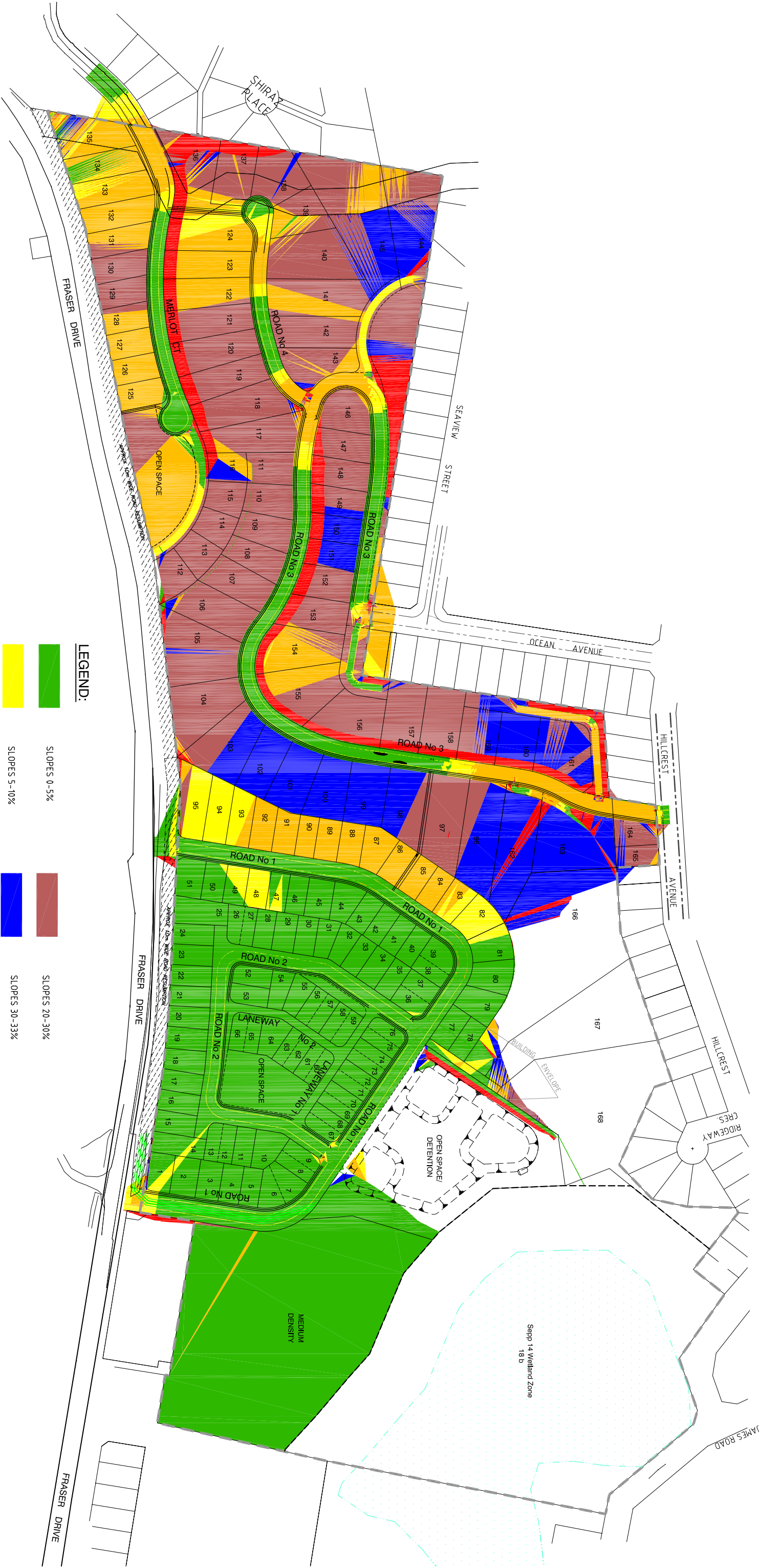
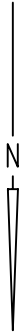
Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
	L	T	R	Tot			1st	2nd				
South: Hillcrest Avenue - South												
1 T	68			68	4				0.038	0.0	0	
	0	68	0	68	4				0.038	0.0		
East: Access D - East												
1 L	3			3	33				0.004	6.9	0	
	3	0	0	3	33				0.004	6.9	0	
North: Hillcrest Avenue - North												
1 LT	2	68		70	6				0.039	0.2	0	
	2	68	0	70	6				0.039	0.2		
ALL VEHICLES												
	Total Flow				% HV				Max X	Aver. Delay	Max Queue	
	141				6				0.039	0.2	0	

Total flow period = 60 minutes. Peak flow period = 60 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.



LEGEND:

- | | | | |
|--|---------------|--|----------------|
| | SLOPES 0-5% | | SLOPES 20-30% |
| | SLOPES 5-10% | | SLOPES 30-33% |
| | SLOPES 10-20% | | SLOPES OVER 33 |

NOTE:

DESIGN CONTOUR INTERVAL 5.0m



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VILLA WORLD LIMITED

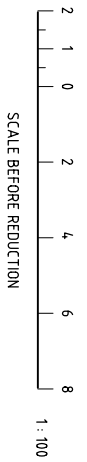
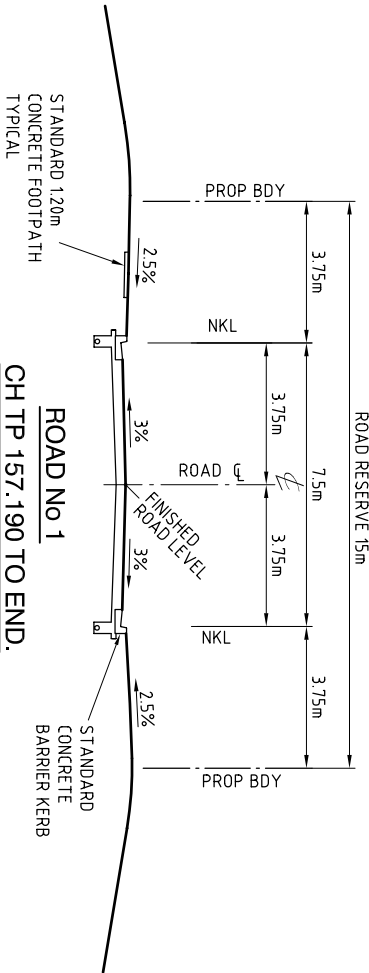
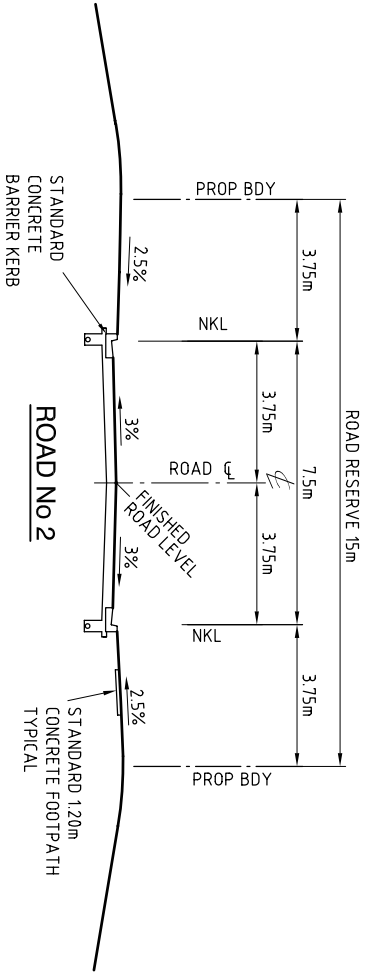
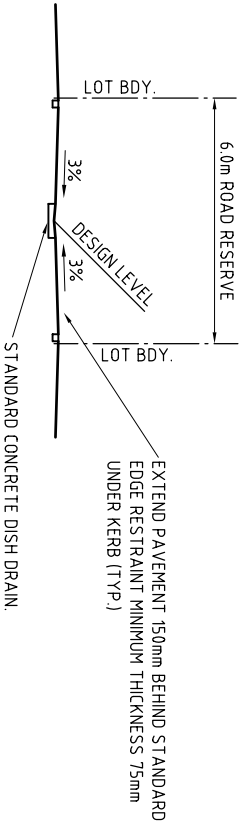
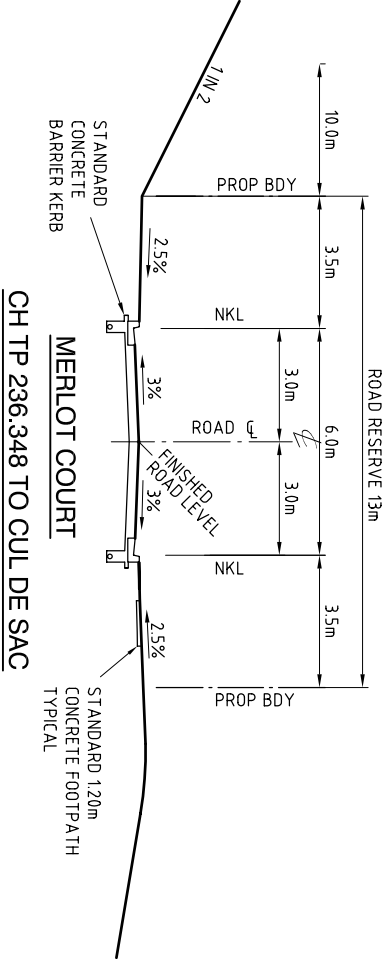
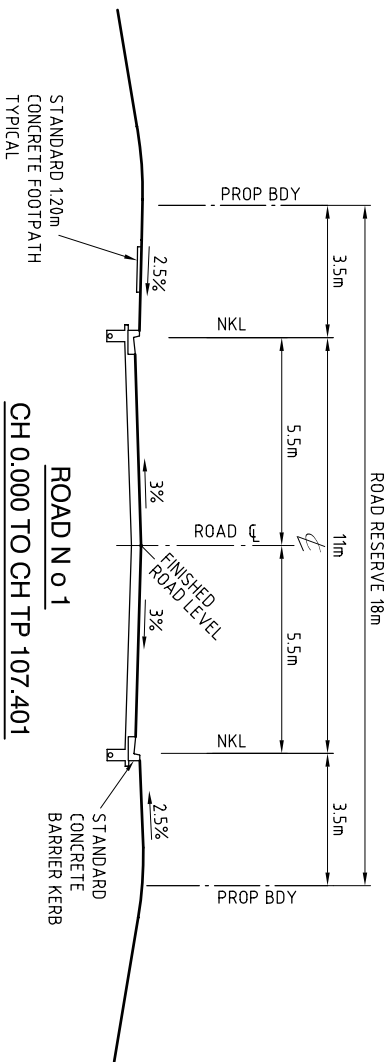
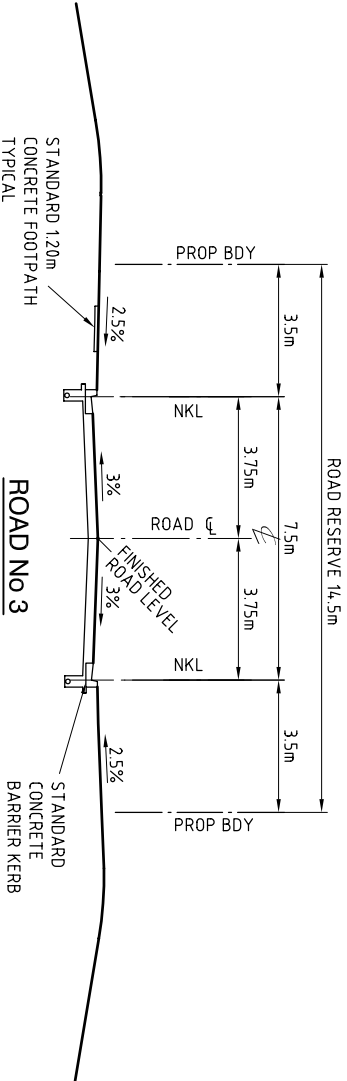
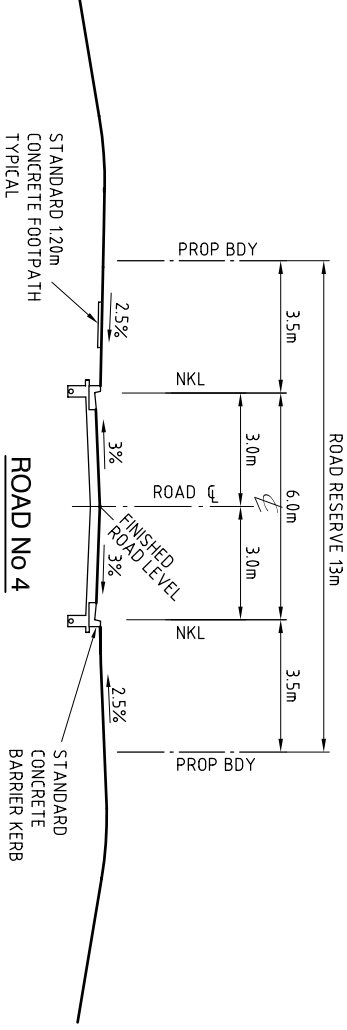
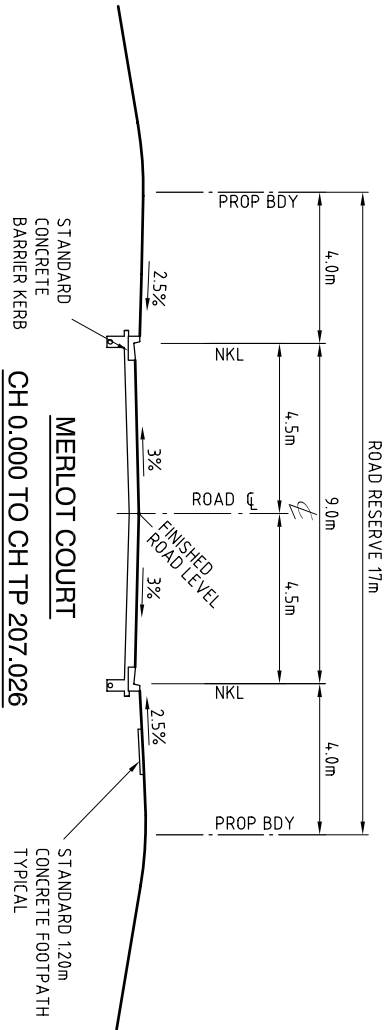
LOT 9 DP 1039569 & Part LOT 2 DP 1000385
FRASER DRIVE, SOUTH TWEED HEADS
FRASER DRIVE, SOUTH TWEED HEADS
ENGINEERING REPORT

SCALE - 1 : 1500	A1
DATE - 8 DECEMBER 2006	Rev. A
DRAWING No.	

7214/29/01-DA08

FIGURE No.DA08A (17/12/07)

SLOPE ANALYSIS LAYOUT PLAN



CAD FILE NAME: G:\7214\29\01\DA_Figure\72142901_DA18.dwg

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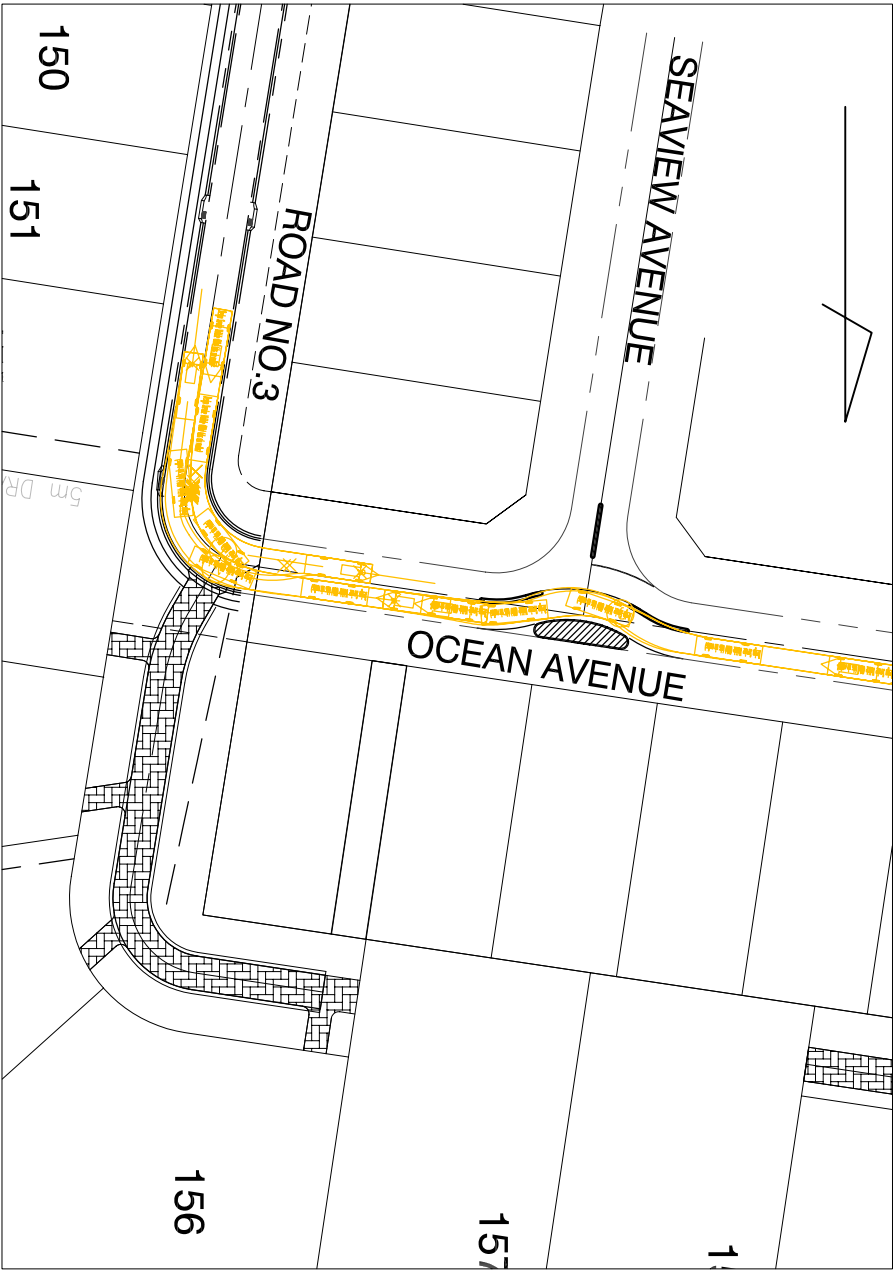


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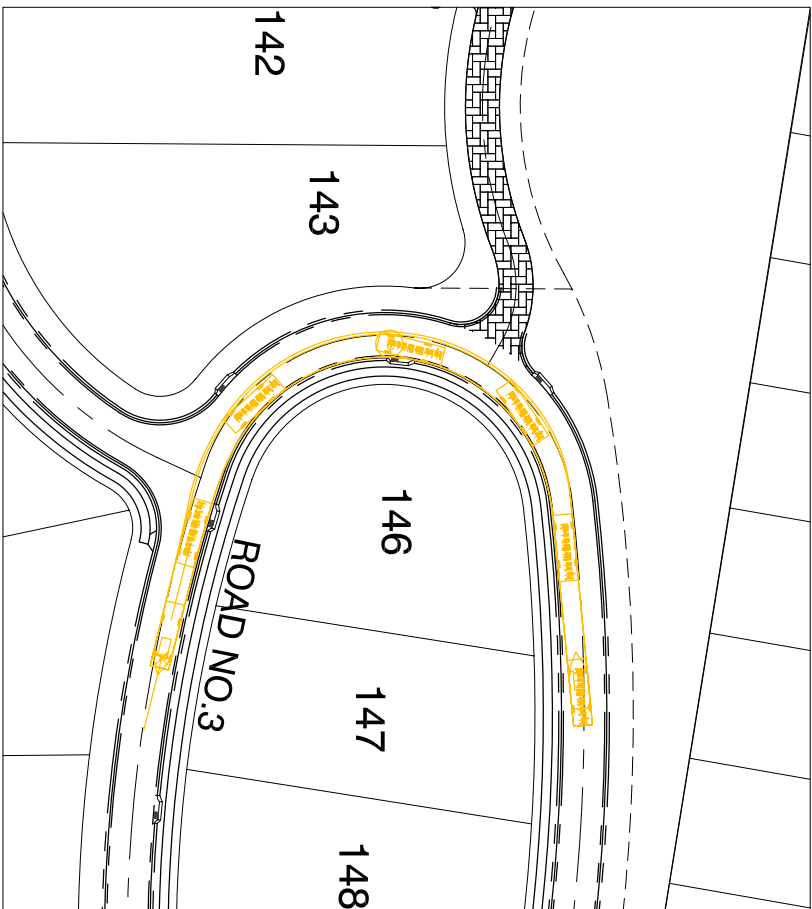
MFS DIVERSIFIED GROUP		
FRASER DRIVE		
INFORMATION REQUEST		
SCALE :-	1 : 100	A1
DATE :-	8 DECEMBER 2006	Rev. A
DRAWING No.	7214/29/01-DA18	

FIGURE No.DA18A (17-12-07)

TYPICAL ROAD CROSS SECTIONS

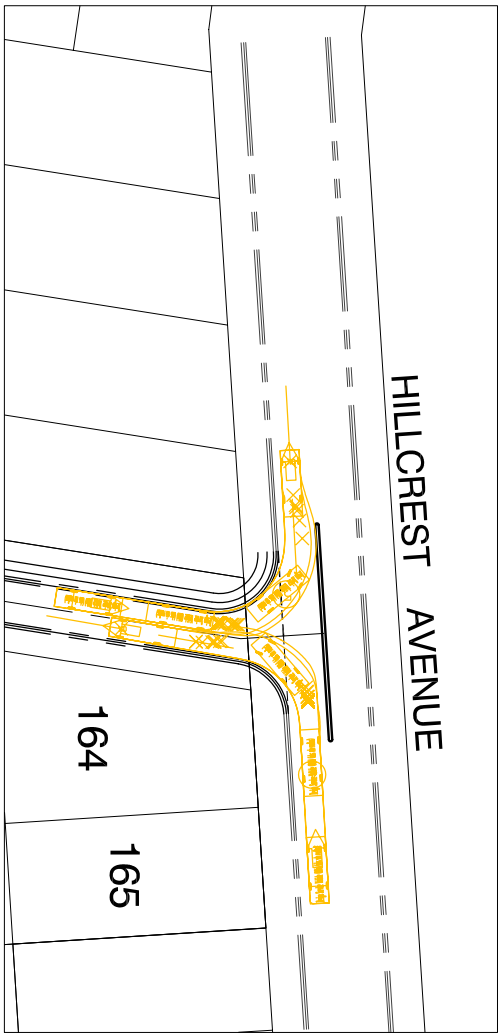


DETAIL A
SCALE 1:500
SK14



DETAIL C
SCALE 1:500
SK14

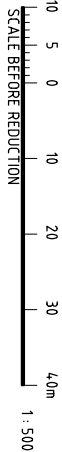
NOTE:
THIS DRAWING SHOWS TURNING
PATHS FOR A SERVICE VEHICLE
(REFUSE TRUCK) USING AUTO
TURN COMPUTER TRACKING



DETAIL B
SCALE 1:500
SK14

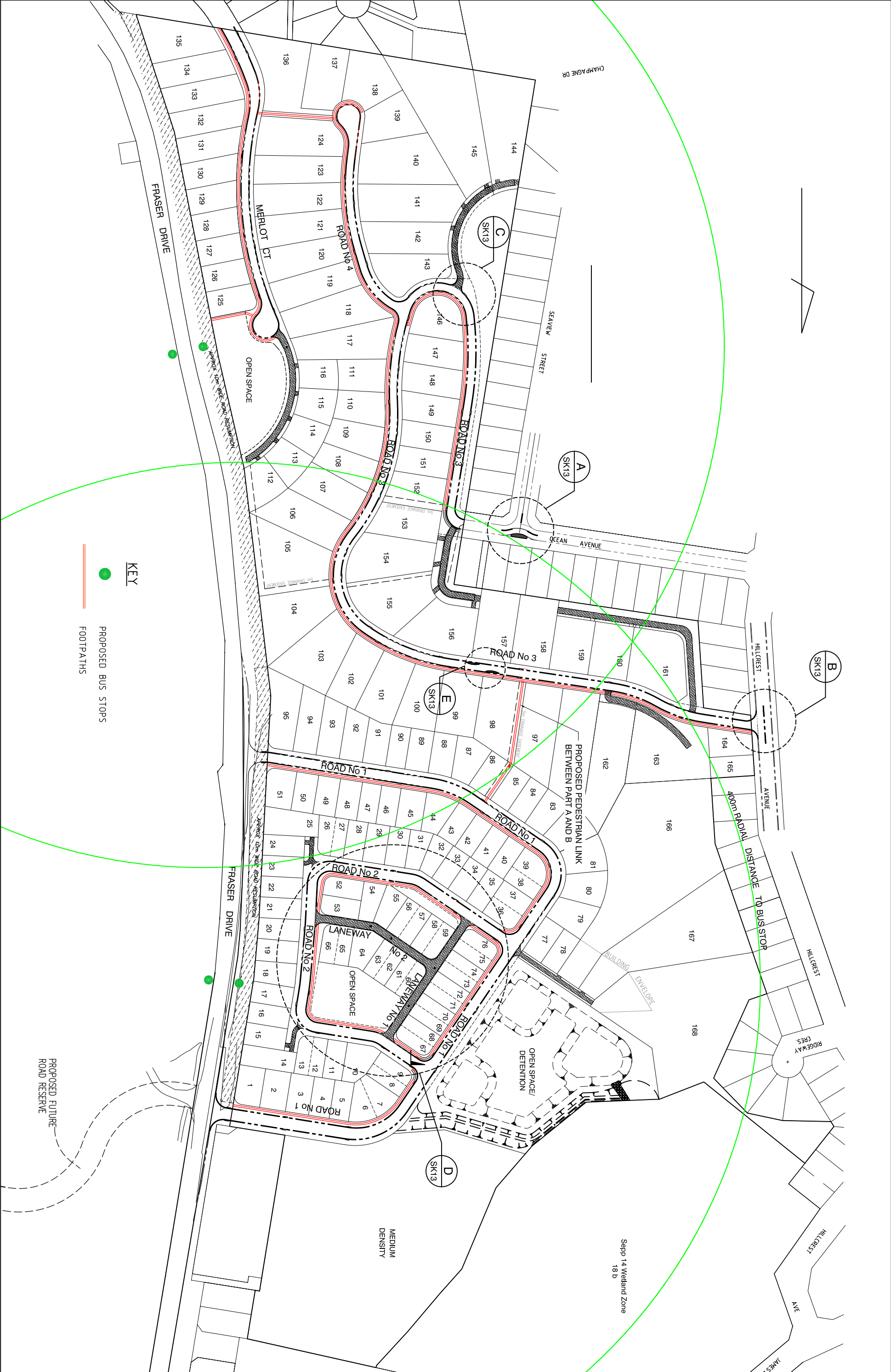


DETAIL D
SCALE 1:500
SK14



MFS DIVERSIFIED GROUP			
FRASER DRIVE			
INFORMATION REQUEST			
SCALE :- AS SHOWN		A1	
DATE :- AUGUST 2004		Rev. A	
JOB No.		7214/29/01	

SKETCH No. 013 (05/12/07)
SERVICE VEHICLE TURN PATHS



XREF'S FILE NAME: G:\214\29\01\Sketches\SK-014.dwg

SCALE BEFORE REDUCTION



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MFS DIVERSIFIED GROUP		
FRASER DRIVE		
INFORMATION REQUEST		
SCALE :- AS SHOWN	A1	
DATE :- DEC 2007	Rev. A	
JOB No.	7214/29/01	

SKETCH NO. 014 (05/12/07)

PROPOSED PEDESTRIAN LINKAGE
FOOTPATH AND BUS STOP LOCATIONS

18 December 2007

NSW Government
Department of Planning
PO Box 39
SYDNEY NSW 2001

Attention: Ms Sally Laing

Dear Sally,

RE: PROPOSED DEVELOPMENT FRASER DRIVE MP06- 0243

Further to your summary of submissions letter dated 20 August 2007, we comment on the issues you raise in terms of water quality as follows:

DEPARTMENT OF PLANNING COMMENTS

Roads, Public Transport and Connections

Proposed Laneways

7. **Two laneways are proposed within the development. The cross sections show a 4.5m wide pavement width within a 6.5m wide road reserve. Neither of these laneways comply with Council's Development Design Specifications (contained within the Subdivision Manual - Section 5A of the DCP). Council's minimum laneway standards require a 6m wide pavement width within a 6m wide road reserve. Laneway No. 1 is to be amended to comply with the minimum standard, please see below for comments in relation to Laneway No.2.**

Response:

Cardno Figure drawing No DA 18 –Typical Cross sections has been amended to correctly show the laneway section in accordance with the DCP, with a 6 m road pavement and 6 m road reserve.

8. **Laneway No 2 does not provide adequate access to street frontage for proposed Lots 56-59 and Lots 60-65, only laneway frontage. Council's Development Design Specifications stipulates that laneways are only to provide access to the side and rear of lots principally for access to garages. Proposed laneway No.2 is to be designed as an access road with a pavement width of 6m within a 13m road reserve.**

Refer to correspondence by PMM.

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Proposed Access Easements

9. Five 'access easements' are proposed within the subdivision. Tweed Shire Council's Development Design Specifications do not address 'access easements'. The 'access easements' are to be amended to serve as either a right of carriageway or a local access road under Council's design standards. An urban access road is maintained by Council and a right of carriageway is maintained by all allotments accessing the right of carriageway. Council will not accept substandard roads to maintain.

Response:

The access easements/ laneways have been incorrectly identified in the submission documents. They are now correctly proposed as RIGHT OF WAY ACCESS. The Right of Way Access complies with min standards of access in accordance with TSC Road Design Spec D1 – Clause D1.22. Up to 5 properties can be served with a 4.5m wide formed pavement.

A number of other issues associated with the proposed access easements have not been addressed (which are usually accounted for within an urban subdivision when providing a local access street). These issues include:

- No on street car parking is provided.
- No turnaround is located at end for the provision of a garbage truck. The current design requires future residents to walk up to 140m to place a wheelie bin within a suitable position for collection by a garbage truck.
- Two of the proposed parks are located on 'access easements'. The parks are to be accessible by all residents with the park frontage accessible via a local access street.

Response: If rows are converted to access streets with cul-de-sacs this will not comply with geotechnical constraints established for site ie by forming the culdesac head will make site grades too steep or introduce additional retaining walls.

Also Refer to additional information by PMM.

10. The following proposed 'access easements' are to be upgraded to conform with Council's minimum local access street standards;
- a. The road providing access to proposed lots 112 - 116 is to be upgraded to a local access street with a minimum pavement width of 6m within a 13m road reserve in accordance with Council's Development Design Specifications. A cul-de-sac is to be provided at the end of the local access street.

Response: The access easements/ laneways have been incorrectly identified in the submission documents. They are now correctly proposed as RIGHT OF WAY ACCESS. The Right of Way Access complies with min standards of access in accordance with TSC Road Design Spec D1 – Clause D1.22. Up to 5 properties can be served with a 4.5m wide formed pavement.

If rows are converted to access streets with cul-de-sacs this will not comply with geotechnical constraints established for site ie by forming the culdesac head will make site grades too steep or introduce additional retaining walls.

- b. The roads termed 'access easement' providing access to proposed lots 141-145, lots 166 - 168 and lot 78 are to be upgraded to a local access street with a minimum pavement width of 6m within a 13m road reserve in accordance with Council's Development Design Specifications. A cul-de-sac is to be provided at the end of the local access street.

Response: The access easements/ laneways have been incorrectly identified in the submission documents. They are now correctly proposed as RIGHT OF WAY ACCESS. The Right of Way Access complies with min standards of access in accordance with TSC Road Design Spec D1 – Clause D1.22. Up to 5 properties can be served with a 4.5m wide formed pavement.

If rows are converted to access streets with cul-de-sacs this will not comply with geotechnical constraints established for site ie by forming the culdesac head will make site grades too steep or introduce additional retaining walls.

- c. The remaining 'access easements' not upgraded to comply with Council's Development Design Specifications for an urban local access road are to be amended to serve as a right of carriageway. Lot boundaries are to be extended to facilitate a right of carriageway traversing through the lots. The 88B instrument required at the subdivision certificate stage will be required to reflect the right of carriageway burdening and benefiting appropriate lots. Future maintenance is burdened by all allotments using the right of carriageway.

Response: Refer to updated plan by PMM.

Proposed Roads

11. Road No.3 will be required to be upgraded to a wider access street. A 6m wide pavement within a 13m road reserve is proposed for the full length of Road No. 3 which is approximately 820m in length. Council's Development Design Specifications stipulate a 6m wide pavement within a 13m road reserve is only applicable for the first 200m before a wider access street is required. Wider access streets specify a 7.5m wide pavement within a 14.5m road reserve. Amended plans are to be provided to demonstrate compliance.

Response: The road width has been upgraded to 7.5 m pavement within a 14m wide road reserve.

Unnamed Roads located within the Integrated housing area located at the northern end of the site

12. The layout plans show a 10m wide road. No typical cross sections for these roads are provided with the standard cross section drawing no. 7214/29/01DA18 prepared by Cardno dated 8 December 2006.

The same standards apply to roads in the area designated 'Integrated Housing' for as for an urban subdivision. The roads are to comply with Council's Development Design Specifications - D1 Road Design for an urban local access street. The minimum width for a local access street is a 6m wide pavement within a 13m road reserve. The plans are to be amended to reflect these requirements.

Response: Refer to response by PMM.

Sight Distance

- 13. Please specify the ameliorative measures to be under taken at the intersection of Ocean Avenue and Road No.3 to achieve adequate sight distance.**

Response: Refer to Cardno Sketch No 13 which shows Road 3 being a continuation of Ocean Avenue. Road No 3 will be the priority road over Seaview Avenue. Traffic calming including deflector islands as shown on the Sketch will installed at the intersection of Road 3 and Ocean Avenue. Stop signage will be installed on the Ocean Avenue intersection.

- 14. The intersection of Hillcrest Avenue and Road No.3 has inadequate sight distance for vehicles turning right into or out of the site. Specify ameliorative measures should be undertaken to achieve adequate sight distance at this intersection. The recommendation for a no right turn sign at this intersection is not considered adequate.**

Response: Refer to Cardno Sketch No 13 which shows Road 3/ Hill crest Avenue being restricted to Left in and Left out traffic turning movements only. A median island in addition to signage will be installed on Hillcrest Avenue to prevent illegal turning.

Road Radius

- 15. Please provide details which demonstrate that the horizontal alignment (radius) for the intersections of Road No.3 / Ocean Avenue and Road No.3 / Hillcrest Avenue is in accordance with Australian standards and can accommodate a garage truck. Turning templates are to be provided to demonstrate compliance. Traffic Restriction**

Response: Refer to Cardno Sketch No 13 which shows the computer Auto turn turning path movements for a garbage truck /service vehicle. All turning movements are satisfactory based on this analysis.

- 16. Provide detail of how traffic from the proposed development can be restricted from using Merlot Drive. The traffic report recommends only 25 allotments are to access Merlot Drive.**

Response: Traffic cannot be restricted from using Merlot Court in the current layout. In order to reduce the development demand on Merlot Court Road No 4 will be terminated in a culdesac adjacent to lot 138/ 124 as shown on Sketch No 14. A pedestrian link will be made from Merlot Court to Road No 4.

Slow Points

- 17. Slow points or speed control devices are to be provided on Road No.3 which has gradients varying from 16% to 0.5% and is 820m in length.**

Response: A traffic slow point has been introduced on Road No 3 adjacent to lots 157 / 98. The slow point will have small islands and signage indicating a narrowing of the carriageway and slowing traffic.

Footpaths

18. A 1.2m wide footpath is to be provided on all roads as per Council's Development Design Specifications. The layout plan and cross sections are to be amended to provide for a 1.2m wide footpath on all roads as per Council's Development Design Specifications and Standard Drawings.

Response: A 1.2m wide footpath has been shown on the amended cross section. The footpath is also shown Sketch No 14.

Pedestrian Connectivity

19. Pedestrian connectivity is not proposed between proposed Roads No. 1 and 3, therefore effectively separating the subdivision into two separate sections. A pedestrian link is to be provided between proposed Road No.1 and Road No.3 to provide connectivity throughout the subdivision and to allow residents to access public transport. The layout plan is to be amended to provide a pedestrian link.

Response: A 1.2m wide footpath / stairway within the proposed 5 m wide drainage reserve will be constructed between lots 97/98 and 85/86. A single handrail will be placed on the stair sections. Full details of the pathway and stairs will be submitted as part of the Construction Certificate application for Part B.

Public Transport

20. Public transport has not been adequately addressed within the development.

A bus stop and shelter is recommended to be located on Fraser Drive near the intersection of Road No.1. This recommendation was based on using a 400m radial area the traffic report stating that the potential catchments encompass approximately 89% of the total dwellings. This assumption is inappropriate due to the fact that no pedestrian link is shown between part A and part B of the development, therefore not allowing future residents within Part B of the subdivision to access the proposed bus stop on Fraser Drive.

Council's standards also require that 90% of residents are able to walk not more than 400m to a bus stop, therefore the use of a radial distance to address public transport is incorrect. Further information is required to adequately address Council's criteria in regards to public transport.

Response: Refer to Sketch No 14. Two bus stops are now proposed along Fraser Drive to ensure all residents are within 400 m of a bus stop. A 1.2m wide footpath will be built through the open space adjacent to lot 125 to link to the bus stop for the Part B development. Full details of the pathway and stairs will be submitted as part of the Construction Certificate application for Part B.

Rear Access to be provided to Lot 2 DP 1000385

21. Access to adjoining allotment Lot 2 DP 1000385 is to be provided from Road No.1. Rear access is to be provided to Lot 2 DP 1000385. by deletion of one of the proposed allotments adjoining Lot 2 DP 1000385.

Response: We are unclear what is meant by this statement.

Parking

22. As previously addressed under access easements, the proposed access easements do not address on-street parking as required by Council's development design specifications for an urban local access road.

Response: The access easements/ laneways have been incorrectly identified in the submission documents. They are now correctly proposed as RIGHT OF WAY ACCESS. The Right of Way Access complies with min standards of access in accordance with TSC Road Design Spec D1 – Clause D1.22. Up to 5 properties can be served with a 4.5m wide formed pavement. The allotments in Part B are all large allotments, therefore adequate parking can be accommodated on each lot.

Manoeuvring

23. As previously addressed under access easements, the proposed easements do not address the manoeuvrability for a garbage truck.

Response: Refer to Cardno Sketch No 13 which shows the computer Auto turn turning path movements for a garbage truck /service vehicle. All turning movements are satisfactory based on this analysis.

Road Widening

24. As indicated on the plan, it is essential that road widening be dedicated for the sites full frontage to Fraser Drive to future widening to a 4 lanes.

Response: Noted.

Fraser Drive Access

25. The main access road to the site needs to access Fraser Drive through an intersection that can cater for a '4th leg' opposite the proposed access to enable efficient access to the development site on the east side of Fraser drive (there may be some conflict with the major drainage system proposed at this intersection). A detailed intersection design is required for this intersection and when approved, it must be constructed prior to release of the subdivision allotments.

Response: Noted.

26. The southern intersection is to be restricted to left in/left out only and is to be designed in such a way that this restriction is controlled by physical means such as concrete islands.

Response: Noted.

Following the changes outlined above, we have also reproduced an updated the grading plan for your information.

Should you have any questions or matters for discussion please contact the undersigned.

Yours faithfully



Alaister Macrae
for Cardno

encl:

Sketch No 13 Service Vehicle Turn Paths
Sketch No 14 Proposed Pedestrian Linkage Footpath & Bus Stop Locations
Sketch No 15 Proposed Traffic Calming for Road 3
Figure No DA18A Typical Road Cross –Sections
Figure No DA08A Slope Analysis Layout Plan

