GTAconsultants

Cranbourne East
Precinct Structure Plan (PSP)
Transport Modelling and Assessment

Growth Areas Authority
31 March 2009
HM10750

Document Issue

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1. Introduction

1.1 Background

The Cranbourne East Precinct Structure Plan (the PSP) is in the process of being developed for subsequent adoption into the planning scheme via an amendment process. It covers an irregularly-shaped area of approximately 780 ha in the City of Casey generally bound by Cameron Street, South Gippsland Highway, Clyde Five-Ways Road, Linsell Boulevard and Casey Fields Boulevard.

A Development Plan was adopted by the City of Casey (Council) on 20 May 2008 with the Precinct Structure Plan (PSP) currently being prepared by the Growth Areas Authority (GAA) in conjunction with Council and VicRoads and other agencies, authorities and major stakeholders.

1.2 Purpose

GTA Consultants has been engaged to model the road network and translate the outputs into road cross sections, functional intersection design requirements and traffic composition estimates for input to a Development Contribution Plan (DCP). This report does not cover public transport or pedestrian and cyclist networks.

1.3 References

In preparing this report, reference has been made to a number of background documents, including:

- *Cranbourne East Development Plan* report prepared by City of Casey 20 May 2008; and
- *Cranbourne East Precinct Structure Plan Integrated Neighbourhoods Plan* prepared by the Growth Areas Authority Plan 5 Revision I dated 30 March 2009.

1.4 Consultation

The report has been prepared in conjunction with Council, VicRoads and incorporates the outcomes of various meetings with major stakeholders.

1.5 The South-East Growth Corridor

The location of the Cranbourne East Precinct in relation to the wider south-east growth corridor is shown in Figure 1.1 with an aerial photograph of the area with existing roads labelled shown in Figure 1.2.

Figure 1.1: South East Growth Corridor and Cranbourne East Precinct (extract from Growth Areas Authority Plan 2008)

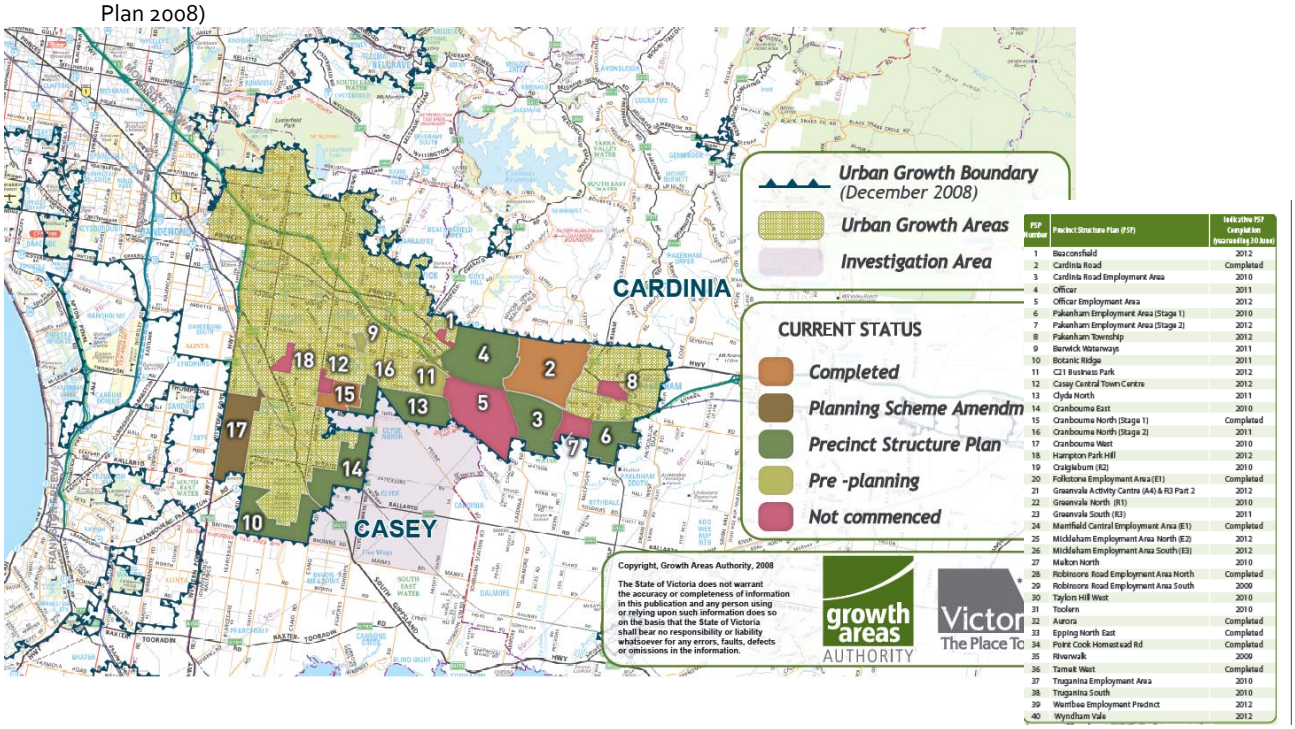


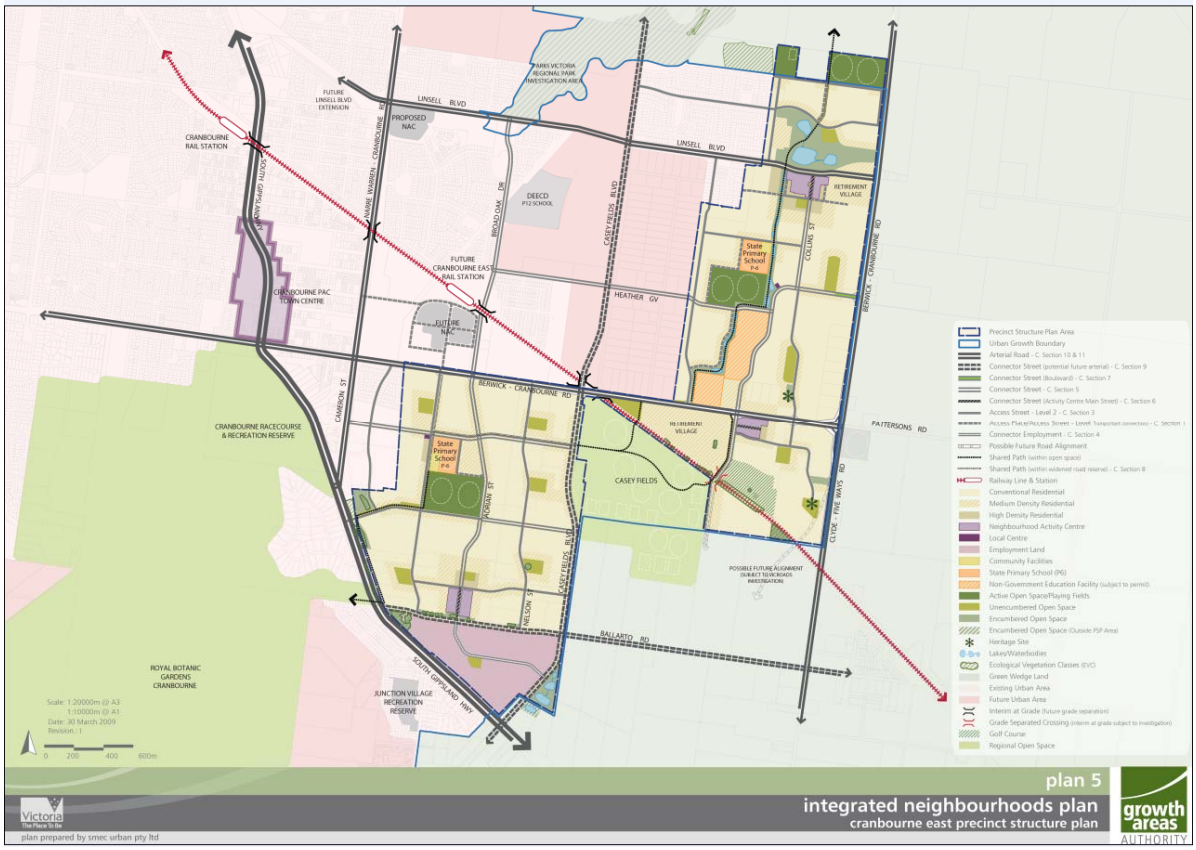
Figure 1.2: Cranbourne East Aerial Photograph (Source: Google)

2. Cranbourne East PSP

2.1 The Area

The structure plan area in terms of the major land use patterns and indicative road network is shown in Figure 2.1.

Figure 2.1: Cranbourne East PSP (Source: GAA)



3. Land Use

3.1 Approach

GAA has undertaken investigation of land use futures within the local government area of Casey and as such formed an agreed basis for input to modelling outside the structure plan areas of Cranbourne North, East and West. The land uses for each structure plan area above have been progressively developed by each separate structure planning process.

The forecasts for residential households are developed from net developable areas and an overall target of 15 dwellings per net hectare. The employment estimate is confined to one zone at the south end of the area and adopts a job density equivalent to a business park development. The school enrolments are based on typical school sizes with the retail floor-space based on typical neighbourhood centres and totalling 14,500sqm across three activity centres. All forecasts are for the year 2031 and assume complete build out of the PSP and surrounding areas.

3.2 Forecasts for Casey LGA

The land use inputs to the modelling have been compared to previously agreed land uses for all areas other than the structure plan areas[1]. The areas adopted for the purposes of this comparison are set out in Figure 3.1.

This comparison is contained in Table 3.1 and shows the following:

- Areas other than the structure plan areas are effectively equal with differences less than 1%; and
- The MITM[2] modelled land use for the structure plan areas is higher for dwellings but lower for jobs and enrolments leaving a net difference less than 4%, which is not of significance for the purpose of long term road network planning, and reflects current planning.

[1] Refer to modeling undertaken by Nigel Ashton for Council

[2] Melbourne Integrated Transport model used for the road network modelling

Figure 3.1: Casey LGA Land Use Comparison Areas

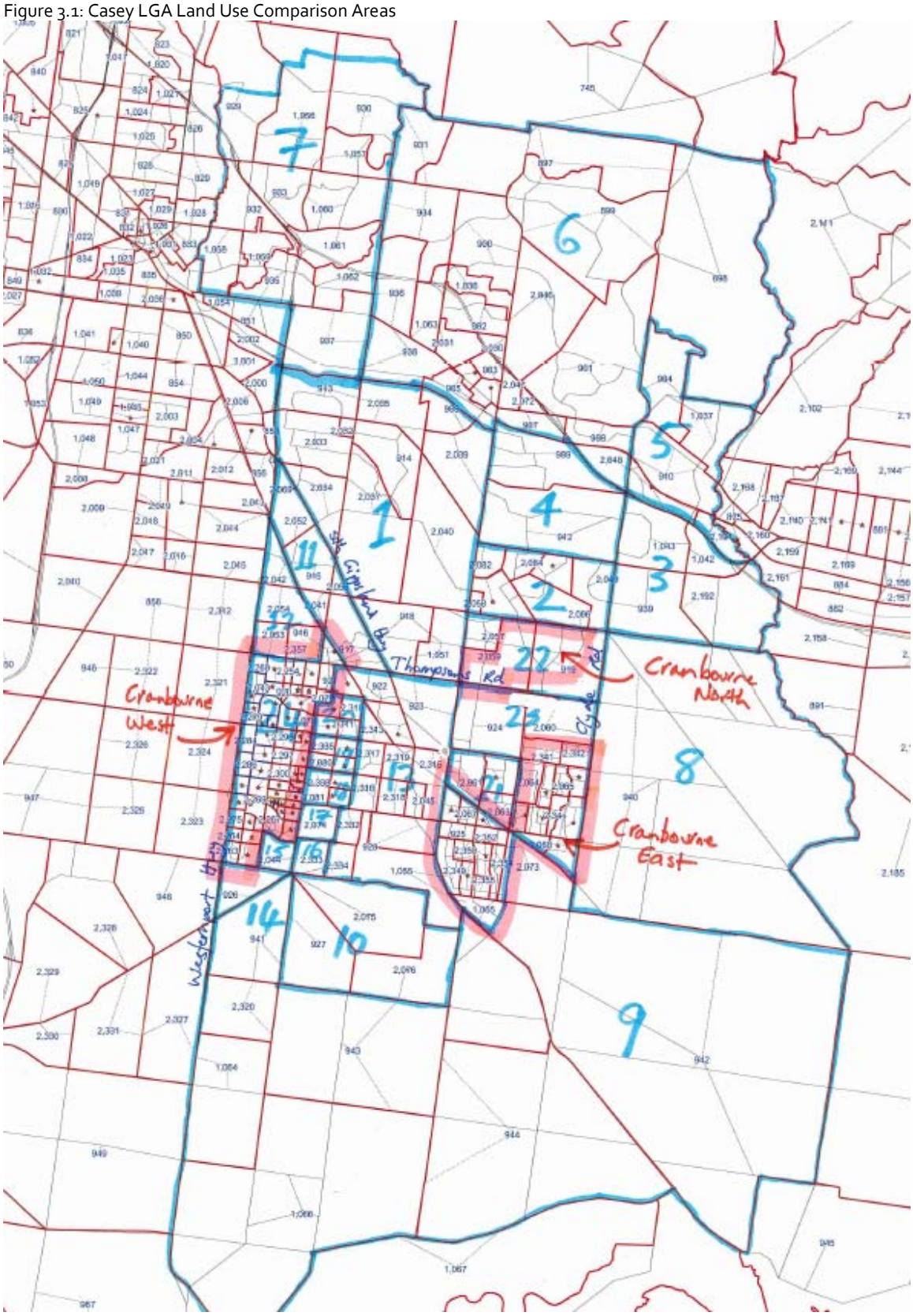


Table 3.1: Casey LGA Land Use Forecasts for 2031 – Comparison of MITM against Previous Modelling

		2031 Ultimate Ashton Land Use				2031 Ultimate MITM Land Use			Difference (MITM - Ashton)		
Area	Area Description	Dwellings	Total Jobs	Total Enrolments	Retail Floor Area (sqm)	Dwellings	Total Jobs	Total Enrolments	Dwellings	Total Jobs	Total Enrolments
1	Hampton Park	16741	4707	10500	43150	16718	4710	9868	-0.1%	0.1%	-6.0%
2	Narre-Warren South	4337	1361	1200	32000	4422	1362	1213	2.0%	0.1%	1.1%
3	Berwick	7496	11196	5600	17000	7504	11224	6098	0.1%	0.3%	8.9%
4	Narre-Warren	7275	1139	1800	0	7322	1131	1799	0.6%	-0.7%	-0.1%
5	Berwick-North	5045	5449	11500	50000	5058	5445	11499	0.3%	-0.1%	0.0%
6	Narre-Warren North	17150	26075	17400	305500	17169	26088	17047	0.1%	0.0%	-2.0%
7	Hallam	14313	14449	8720	64000	14339	14455	8720	0.2%	0.0%	0.0%
8	Clyde-North	4296	1080	1470	7000	4260	1092	1470	-0.8%	1.1%	0.0%
9	Clyde	2392	2381	1670	5000	2549	2382	1700	6.6%	0.0%	1.8%
10	Cranbourne-South	3586	114	500	0	3601	109	500	0.4%	-4.5%	0.0%
11	Lynbrook	3260	2178	2100	17000	3240	2193	2001	-0.6%	0.7%	-4.7%
12	Lyndhurst	2372	358	700	17500	2364	358	700	-0.3%	0.0%	0.0%
13	Cranbourne	10031	7439	4850	149145	10077	7468	4850	0.5%	0.4%	0.0%
14	Cranbourne A	10	57	0	0	12	52	0	23.0%	-8.8%	0.0%
15	Cranbourne B	0	20	0	0	120	30	0	0.0%	50.0%	0.0%
16	Cranbourne C	306	0	0	0	309	0	0	0.9%	0.0%	0.0%
17	Cranbourne D	0	187	0	0	0	188	0	0.0%	0.6%	0.0%
18	Cranbourne E	788	109	1000	0	861	105	1000	9.2%	-3.5%	0.0%
19	Cranbourne F	981	232	0	3500	978	233	0	-0.3%	0.5%	0.0%
20	Cranbourne G	772	76	0	0	779	67	0	0.9%	-12.4%	0.0%
21	Cranbourne H	2304	424	1500	10000	2311	424	1500	0.3%	-0.1%	0.0%
22	Cranbourne North PSP	6153	4367	2100	47000	6154	4357	2100	0.0%	-0.2%	0.0%
23	Cranbourne East PSP	8067	1905	2600	12000	8754	1920	2500	8.5%	0.8%	-3.8%
24	Cranbourne West PSP	2335	17707	4100	10000	5218	18163	2000	123.5%	2.6%	-51.2%
	Total (Without Cranbourne East & West PSP)	**109608**	**83398**	**72610**	**767795**	**110146**	**83474**	**72065**	**0.5%**	**0.1%**	**-0.8%**
	Total (Cranbourne East & West PSP)	**10402**	**19612**	**6700**	**22000**	**13972**	**20083**	**4500**	**34.3%**	**2.4%**	**-32.8%**
	Total (With Cranbourne East & West PSP)	**120010**	**103010**	**79310**	**789795**	**124118**	**103557**	**76565**	**3.4%**	**0.5%**	**-3.5%**

Note: The retail floor space is accounted for differently in the two models with MITM including the Ashton retail space within the jobs input.

3.3 Forecasts for PSP

A complete listing of individual land uses at zone level[3] for Cranbourne East is contained in Table 3.2 showing a total of 8,754 households, 1,920 jobs and 2,500 enrolments. The residential density is 14.1 dwellings per hectare with the employment density being 42.5 jobs per hectare.

[3] MITM zone structure described in Section 4

Table 3.2: Cranbourne East PSP Land Use Forecasts for 2031

					MITM Inputs & Outputs		
	MITM Zone	Gross Area (ha)	Net Dev Area (ha)	Density/ ha	Land Use - hh	Land Use - emp	Land Use - enrol
Emp Zone	1065	30.4	19.3	42.5	0	820	0
Residential	2341	50.2	43.5	17.2	750	0	0
	2342	40.3	34.9	10.7	375	0	0
	2345	58.1	50.4	16.3	820	0	0
	2065	26.8	23.2	11.2	260	0	0
	2347	25.9	22.5	12.2	275	0	0
	2064	57.8	50.1	12.1	605	0	0
	2346	32.4	28.1	10.7	300	0	0
	925	31.2	27.1	16.6	450	0	0
	2352	29.4	25.5	14.7	375	0	0
	2354	34.6	30.0	15.0	450	0	0
	2350	23.3	20.2	14.8	300	0	0
	2349	55.5	48.1	15.6	750	0	0
		465.5	**403.6**	**14.1**	**5710**	**0**	**0**
Mixed Use	2343	30.7	19.5	33.4	250	400	0
	2344	23.8	15.1	134.0	74	300	1650
	2348	34	21.6	40.6	375	100	400
	2068	23.9	15.2	27.7	420	0	0
	2351	24.6	15.6	32.0	350	150	0
	2355	22.5	14.3	48.7	645	50	0
	2353	31.3	19.9	34.2	180	50	450
	2356	52.4	33.2	24.1	750	50	0
		243.2	**154.3**		**3044**	**1100**	**2500**
		708.7	**449.7**		**8754**	**1920**	**2500**

4. Modelling

4.1 MITM

The Melbourne Integrated Transport Model (MITM) is a multi-modal strategic model developed by The Department of Infrastructure (DoI)[4] in 2001. It is a travel demand model incorporating a link-based network model with an integrated public transport model. The model is implemented in the TRIPS software environment.

Separate models have been prepared for 2008 to represent existing conditions and 2031 to represent future conditions at completion of development within the PSP area. Each model incorporates road network and public transport improvements in line with DOT and VicRoads expectations.

The MITM networks contain all major freeways, main arterials and connector roads covering the entire Melbourne Statistical Division (MSD). There are now 2381 zones (including external zones) in the model which are based on Census Collector Districts (CCD) and disaggregated where necessary. This includes the additional zones added for Cranbourne West and Cranbourne East.

The model is run for an AM Peak period being a two hour model representing typical travel for the 7:00am to 9:00am period. Daily volumes are then arrived at by factoring the peak period models by 6.838. The peak period to daily factor is derived from approximately 550 traffic counts in an area covering the Casey LGA plus Dandenong and Frankston to the north and south respectively.

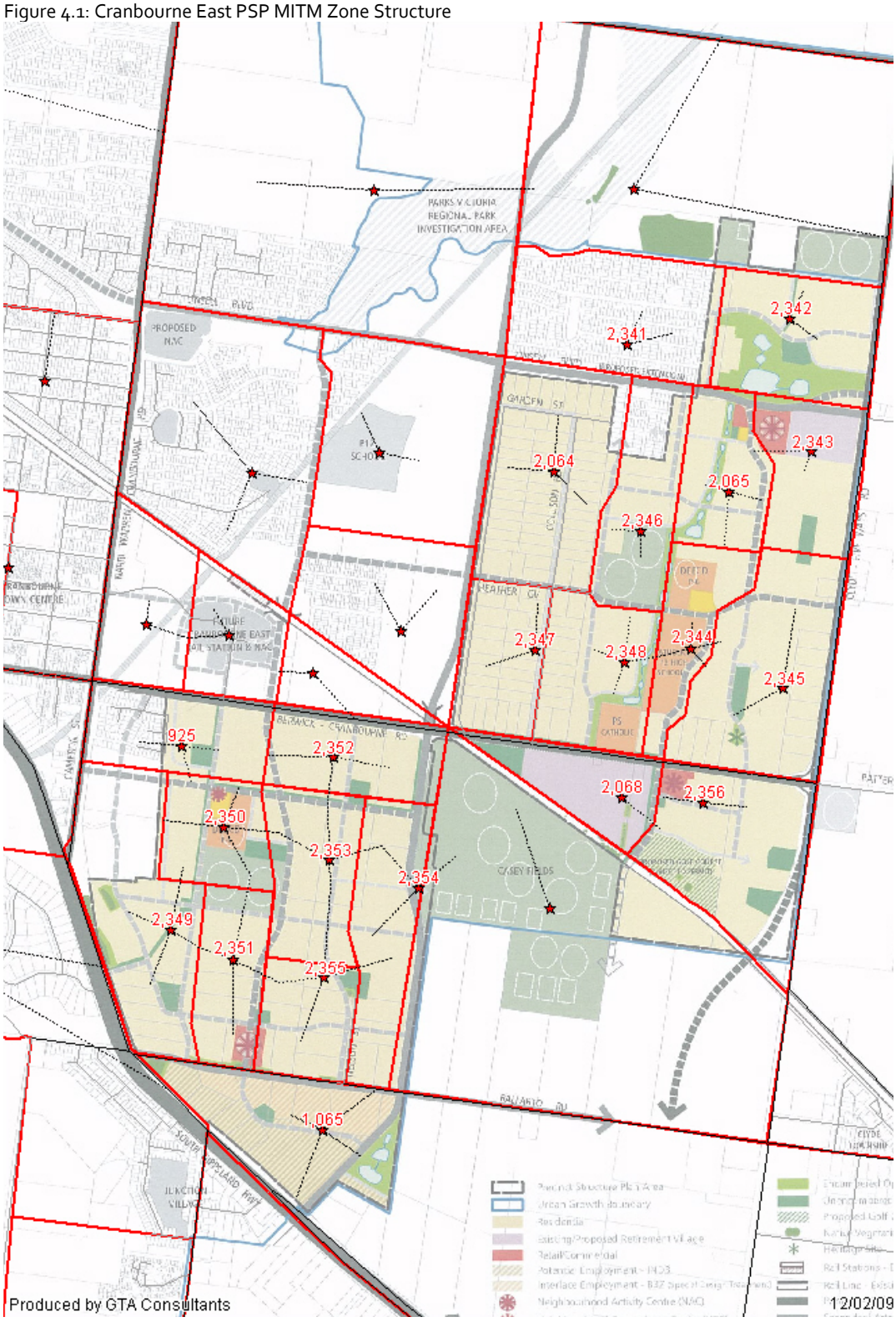
The modelled results should be viewed as a series of travel demands within the study area. They can be used for estimating vehicle demands on road cross-sections to plan the internal road network in the PSP area. Travel demands within Cranbourne East are dependent on the internal road network and its corresponding land use and changes to either of these may yield different results. In other words, the strategic modelling has been used to set and confirm road reserves and functionality and generic intersections types. Actual road and intersection designs will be prepared at a later date as part of the approvals process for development applications.

4.2 Zone Structure

The zone structure adopted for the analysis is set out in Figure 4.1 with the MITM zones described in Table 3.2. It relates to the PSP land uses in Figure 2.1 and the land use discussion in Section 3.3. Note that the three zones north of Berwick-Cranbourne Road around the station have not been included within the PSP area although the traffic demands are in the model and hence factored into the road and intersection analysis. This area contains a NAC, 615 households, 350 jobs and 2050 enrolments.

[4] Now Department of Transport

Figure 4.1: Cranbourne East PSP MITM Zone Structure

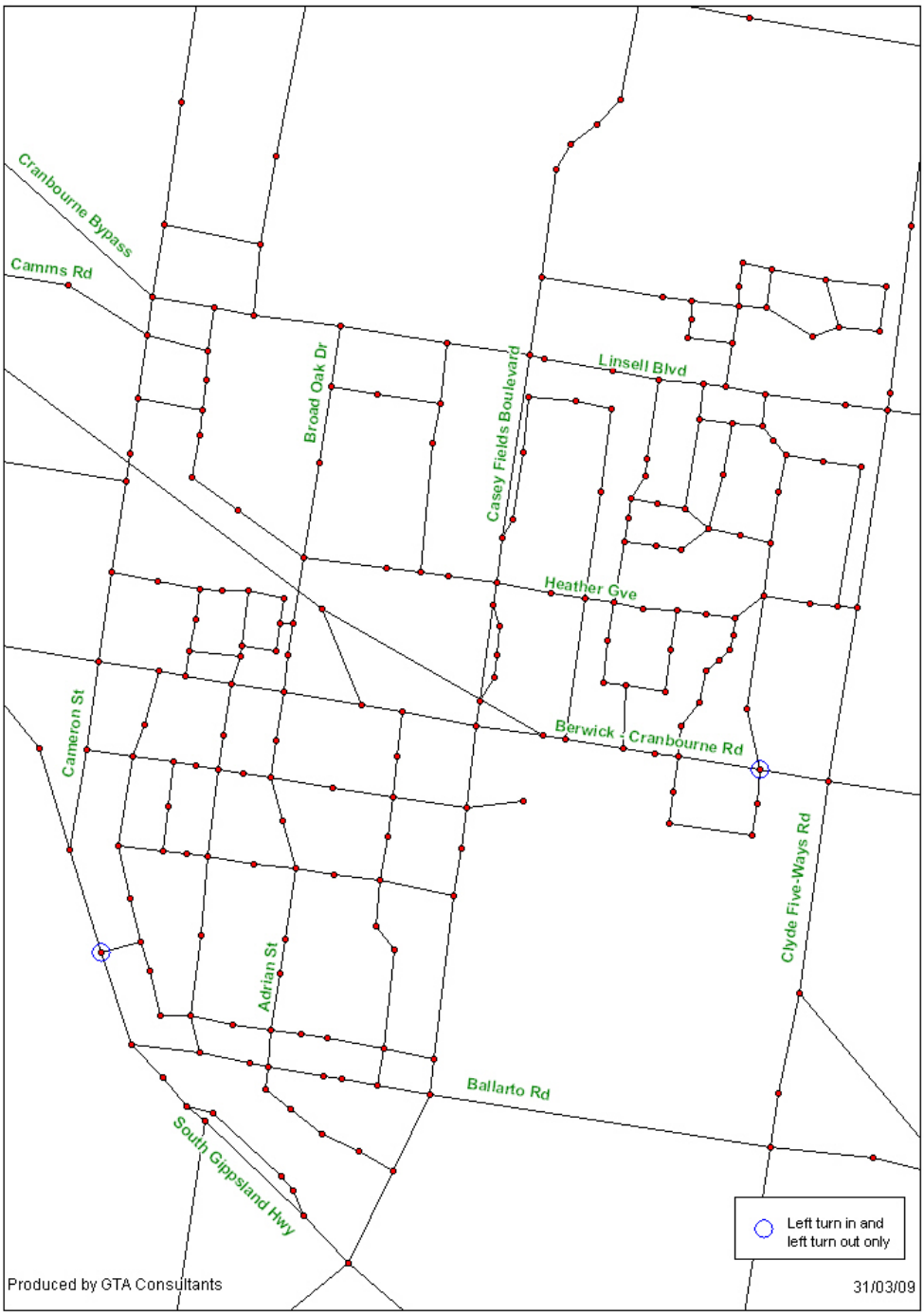


Note that the Collison Estate (part of Zones 2064 and 2347) has been included in the modelling for the sake of simplicity although it does not generate a significant amount of traffic.

4.3 Road Network (Links and Nodes)

The resulting road network as represented by links and nodes is set out in Figure 4.2 for the Base Case. The Option Case adds a link to Cameron Street as per the results in Appendices A and B. Note that zone connectors are not shown in this figure for clarity, but are included in the model. These connectors are shown in Figure 4.1. The road network is slightly different to that shown in the latest PSP in Figure 2.1, although the differences are of a relatively minor nature in terms of road network volumes.

Figure 4.2: Cranbourne East PSP MITM Road Network Links and Nodes (Base Case excludes Cameron St link)



4.4 Model Calibration

In order to model future conditions on the road network, an existing conditions model is run and compared against existing traffic data such as traffic counts. When the model results match the existing traffic flows in an acceptable fashion, the model is calibrated and therefore suitable for use as the base to prepare future model runs. Strategic network models are generally calibrated to reflect existing traffic counts across a wide corridor or regional area. Strategic network models are not expected to accurately match traffic counts at individual locations, instead model validation is measured by comparing counts across a number of screenlines and across the entire modelled area. All future model run results can then be interpreted against the calibrated existing conditions model.

For this study a 2008 model run was undertaken and compared against the VicRoads document *"Guidelines on the Validation Process and Criteria for Strategic Transport Modelling (October 2006)"*. The Percent Root Mean Square Error (%RMSE) statistic and Coefficient of Determination (R^2) statistic are used to measure the level of calibration where the targets are R^2 of greater than 0.90 and %RMSE of less than 30% for the study area. A total of 173 counts have been used to calibrate the model across the Casey LGA.

The model calibration results for the AM peak period are shown in Figure 4.3 with the plot depicting modelled volumes versus counts.

Figure 4.3: Cranbourne East AM Peak Model - Modelled versus Count Volumes for Links within Casey LGA

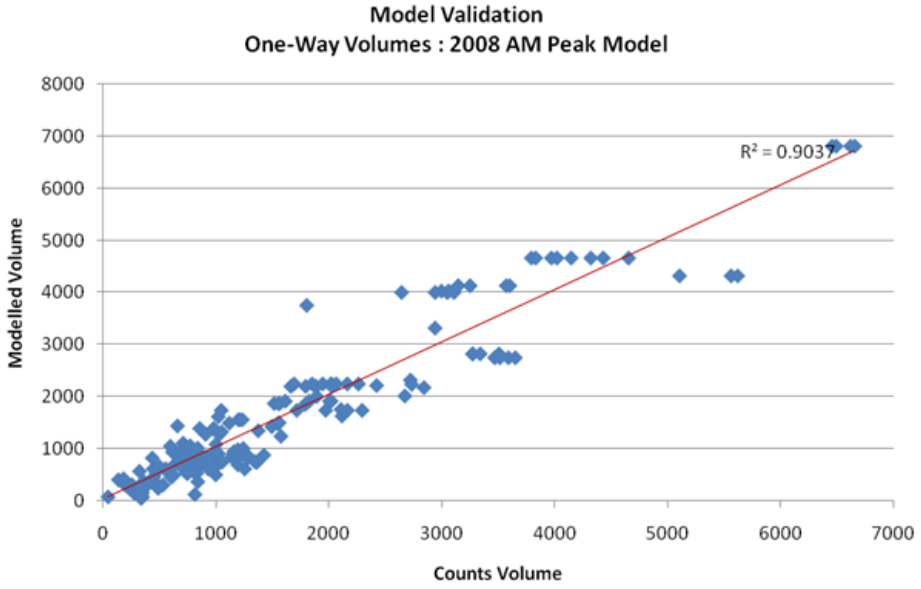


Figure 4.3 confirms that the AM peak model meets the R^2 statistic of greater than 0.90 and is very close to the %RMSE of less than 30% as required in the VicRoads model calibration guidelines. It should be noted that the lack of recent (2008) counts contributes to the modelled results being consistently higher than the counts which in turn affects the %RSME. The 2008 existing conditions model run is therefore suitable for use in the future modelling of the area. The plot of the existing conditions 2008 model run is contained at Appendix A.

5. Traffic Volumes

5.1 Traffic Generation Rates

A summary of the individual land uses and the resulting MITM traffic generation versus a first principles assessment is contained in Table 5.1. This compares the model traffic volume output to commonly used generation rates as confirmation that MITM is using realistic traffic demands.

Table 5.1: PSP MITM Traffic Generation versus First Principles Traffic Generation

Area	Land Use	Area (net developable ha)	MITM		First Principles		
			MITM Daily Trip Rate	MITM Daily Trips	Yield	Traffic Gen Rate trips/day	Daily Traffic Gen
Employment Zone	820 jobs	19.3	5.5/job	4,548	96,500 sqm [2]	5/100 sqm	4,825
Residential	5,710 dwellings	403.6	6.8/ dwelling	38,751	5,710	7/dwelling [3]	39,970
Mixed Use (residential)	3,044 dwellings	154.3	various	34,370	3,044	7/dwelling [3]	21,308
Mixed Use (retail)	(1,100 jobs [1]) 12,000sqm				12,000 sqm	80/100sqm	9,600
Mixed Use (enrolments)	(1,110 jobs [1]) 2,500 enrol.				2,500	1.5/ enrolment	3,750
Total		**449.7**		**77,670**			**79,453**

[1] Jobs are spread across retail floor space and enrolments (schools)

[2] Assuming 50% site coverage for employment zone

[3] Compares to Cardno GR surveyed rate of 7.1 vpd/dwelling for residential development in Werribee with similar access to public transport

The results show that MITM road network demands are similar to those of a first principles assessment differing by approximately 2% across the range of various assumptions and variables involved. Note that many of the rates such as retail and residential uses can vary by a significant degree. In any event the purpose of the modelling is to develop a set of demands to design the road network and as such the outputs are suitable.

Table 5.2 lists the inputs and outputs of the MITM model noting that the employment figure includes the retail floorspace in the activity centres. It shows AM peak 2 hour and daily traffic generation at the individual zone level along with land use, areas and densities. It separates the PSP area into the employment zone to the south, residential elsewhere and mixed use around the activity centres.

Table 5.2: First Principles Traffic Generation Check: MITM versus Typical Generation Rates

							Daily Factor	6.838	
					MITM Inputs & Outputs				
	MITM Zone	Gross Area (ha)	Net Dev Area (ha)	Density/ ha	Land Use - hh	Land Use - emp	Land Use - enrol	AM 2 Hr Trips	Daily Vehicle Trips	Daily Trip Rate
Emp Zone	1065	30.4	19.3	42.5	0	820	0	665	4548	5.5
Residential	2341	50.2	43.5	17.2	750	0	0	658	4501	
	2342	40.3	34.9	10.7	375	0	0	406	2778	
	2345	58.1	50.4	16.3	820	0	0	729	4984	
	2065	26.8	23.2	11.2	260	0	0	530	3623	
	2347	25.9	22.5	12.2	275	0	0	236	1613	
	2064	57.8	50.1	12.1	605	0	0	598	4087	
	2346	32.4	28.1	10.7	300	0	0	298	2038	
	925	31.2	27.1	16.6	450	0	0	737	5040	
	2352	29.4	25.5	14.7	375	0	0	336	2298	
	2354	34.6	30.0	15.0	450	0	0	343	2349	
	2350	23.3	20.2	14.8	300	0	0	230	1570	
	2349	55.5	48.1	15.6	750	0	0	566	3871	
		465.5	**403.6**	**14.1**	**5710**	**0**	**0**	**5667**	**38751**	6.8
Mixed Use	2343	30.7	19.5	33.4	250	400	0	517	3533	
	2344	23.8	15.1	134.0	74	300	1650	911	6229	
	2348	34	21.6	40.6	375	100	400	794	5429	
	2068	23.9	15.2	27.7	420	0	0	250	1712	
	2351	24.6	15.6	32.0	350	150	0	458	3133	
	2355	22.5	14.3	48.7	645	50	0	845	5780	
	2353	31.3	19.9	34.2	180	50	450	589	4025	
	2356	52.4	33.2	24.1	750	50	0	663	4531	
		243.2	**154.3**		**3044**	**1100**	**2500**	**5026**	**34370**	
		708.7	**449.7**		**8754**	**1920**	**2500**	**11359**	**77670**	

Note that as discussed earlier the Collison Estate (part of Zones 2064 and 2347) has been included in the modelling for the sake of simplicity although it does not generate a significant amount of traffic.

5.2 Daily Modelled Flows

The results for the daily traffic flows are derived by factoring the AM Peak 2 hour flows by 6.838 (refer Section 4.1) and are contained in Appendix B for the Base and Option runs. A discussion of key issues is set out below.

Berwick – Cranbourne Road

Berwick – Cranbourne Road is the main east-west route dividing the PSP approximately in half. It will function as a key arterial road providing for through movements, as well as access to the proposed new station at Cranbourne East, activity centres and adjacent residential areas. Its expected daily volume varies from approximately 17,00vpd at the east end near Clyde-Five Ways Road to 36,000vpd at the west end near Cameron Street. The volume at the west end drops to 32,000vpd with the Cameron Street Link in. Its ultimate cross-section is to be a four lane divided road with localised flaring at intersections to accommodate turn lanes. Access control should be limited along its length with activity centre access typically via signals. The section east of Casey Fields Boulevard will require a service road or similar on the north side to provide for residential and school access in a manner that is safe and provides for a good degree of amenity.

Casey Fields Boulevard

Casey Fields Boulevard is the central north-south road travelling between South Gippsland Highway in the south and Thompsons Road in the north and is expected to carry up to 7,400vpd south of Thompsons Road and 10,400vpd north of it. An important design issue is the extent to which it attracts through or sub-regional traffic as opposed to performing a purely local role. In order to determine this, a number of model runs were undertaken varying the capacity and speed of the route such that a constrained and unconstrained condition was tested. The results show that when constrained (low capacity and speed) it carries 1,500vpd at the southern end to 7,000vpd at the northern end. When unconstrained (ie 4 lane road) the equivalent volumes increase to 2,400vpd at the southern end and 8,900vpd at the northern end. These differences are not significant and confirm that Casey Fields Boulevard should be a two lane road designed for a local function.

Cameron Street Link

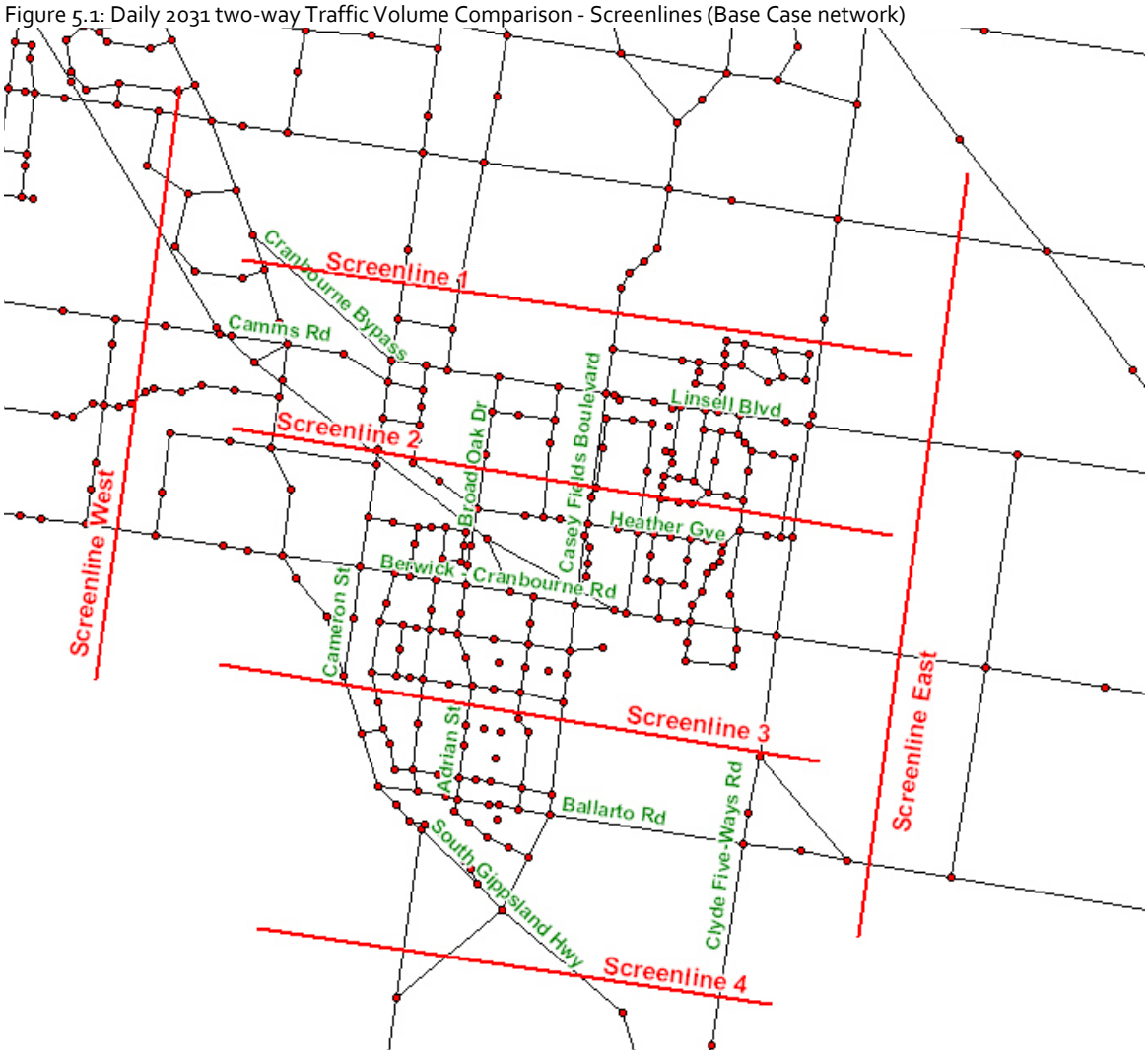
The addition of the Cameron Street link as shown in the Option Case has the effect of reducing access demands onto Berwick Cranbourne Road, and hence volumes at its west end adjacent to Cameron Street by approximately 3,000vpd. This will be offset by an additional intersection and volumes on Cameron Street. The link is not likely to alter the location and/or treatment of other intersections along Berwick Cranbourne Road or Cameron Street, nor will it affect their road cross-sections. The inclusion of the link will improve local accessibility to the residential area west of Cameron Street and south of Berwick-Cranbourne Road for both private vehicle and bus services. On balance the Cameron Street link is therefore proposed to be included in the PSP and the remainder of the report deals with Option Case outputs.

5.3 Screenline Assessment

An assessment of the MITM model outputs against previously undertaken modelling in the area[5] has been undertaken by developing a set of screenlines for the comparison of daily volumes on main roads. These screenlines are shown in Figure 5.1 with the results in Table 5.3.

The results show that the MITM modelling has higher demands than the previous modelling in the area in and around the PSP reflecting the more up to date land use assumptions. In general terms there is consistency with the two modelling results in terms of the arterial road flows, with the MITM modelling being in the order of 3% higher across both east-west and north-south screenlines.

Figure 5.1: Daily 2031 two-way Traffic Volume Comparison - Screenlines (Base Case network)



[5] Daily modeling undertaken by Nigel Ashton for the City of Casey in 2008

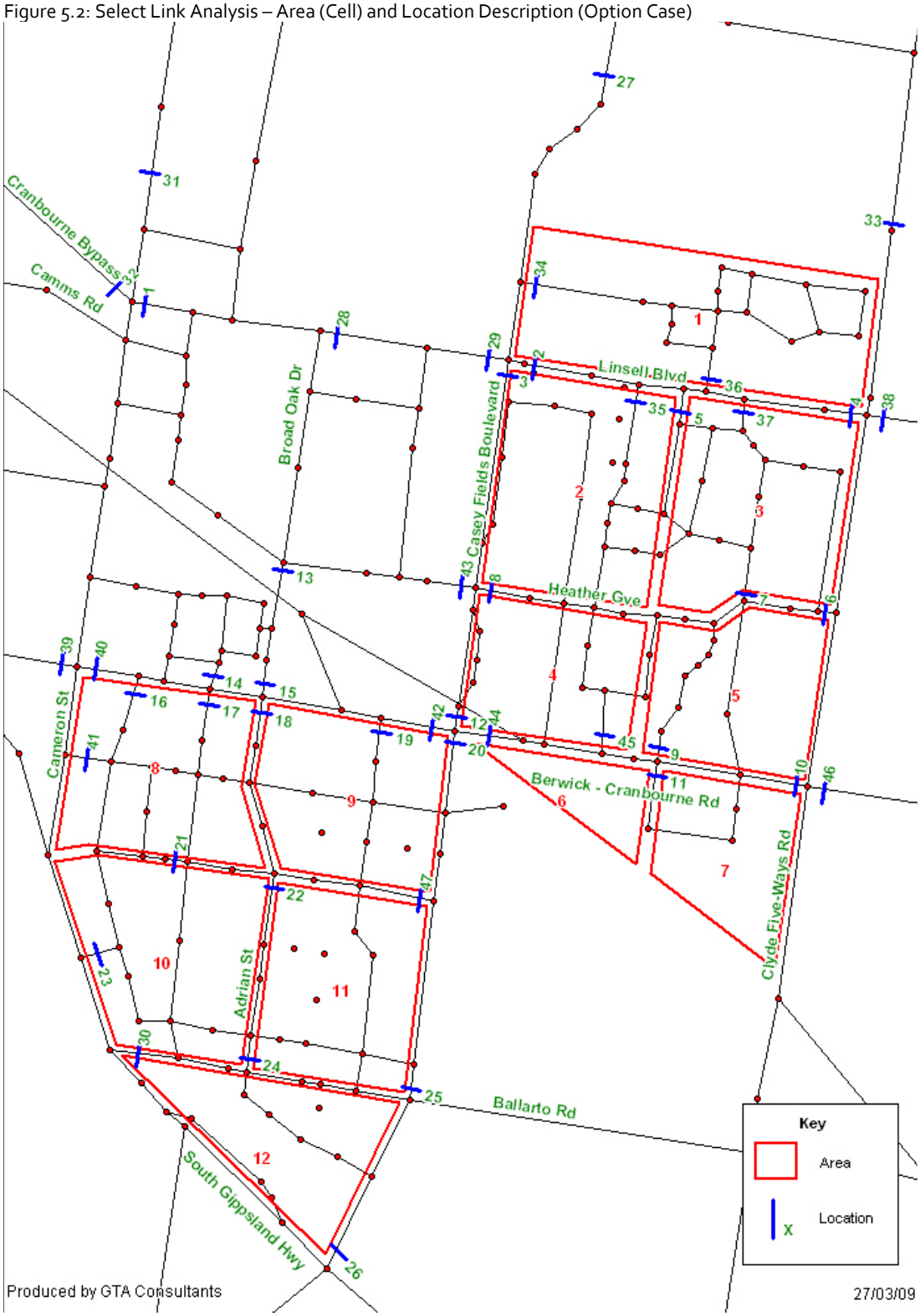
Table 5.3: Daily 2031 two-way Traffic Volume Comparison – Screenline MITM versus Previous Modelling

	MITM (vpd)	Previous Modelling 09/08 (vpd)	Difference MITM-Prev (vpd)	% Diff
Screenline 1	139900	127300	12600	10%
Screenline 2	108400	112800	-4400	-4%
Screenline 3	57100	53800	3300	6%
Screenline 4	40100	40500	-400	-1%
Total (East -West Screenlines)	345500	334400	11100	3%
Screenline West	100300	105600	-5300	-5%
Screenline East	54600	45500	9100	20%
Total (North-South Screenlines)	154900	151100	3800	3%
All Sreenlines	500400	485500	14900	3%

5.4 Select Link Analysis

A select link analysis has been undertaken for key road links to estimate the contribution of each area to traffic on each of the road links. The ultimate land use has been used along with the ultimate road layout as per the Option Case with the Cameron Street Link constructed. The result of this process is included in Appendix C noting that through traffic refers to all traffic with an origin or destination outside the areas (or cells) shown in Figure 5.2.

Figure 5.2: Select Link Analysis – Area (Cell) and Location Description (Option Case)

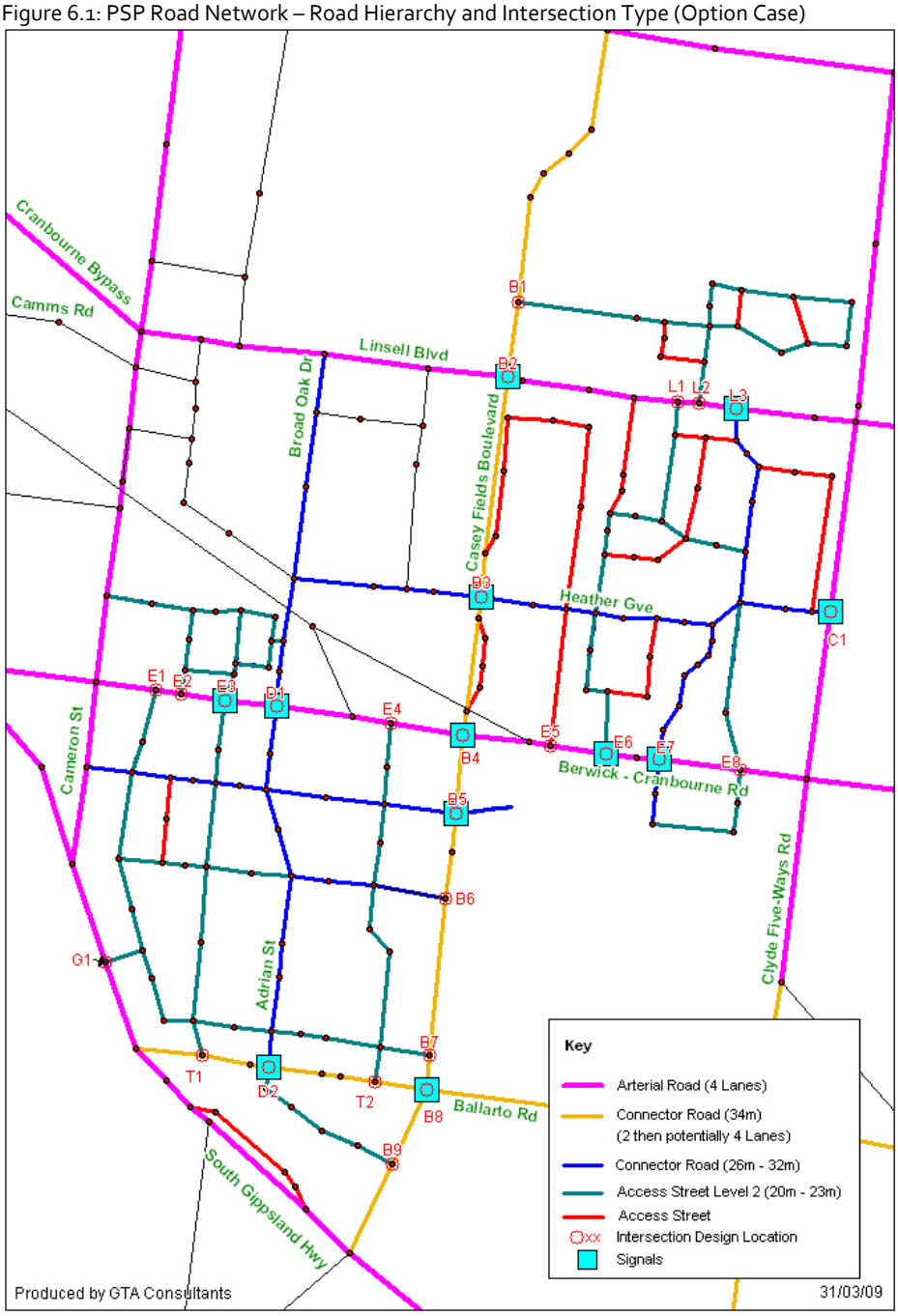


6. Road Network

6.1 Road Hierarchy and Layout

Section 5 contains the forecast traffic volumes. The road hierarchy and classification and locations at which intersections have been discussed are shown in Figure 6.1.

Figure 6.1: PSP Road Network – Road Hierarchy and Intersection Type (Option Case)



The PSP proposes a road hierarchy with existing arterial roads being the main road network controlled by VicRoads generally on a 1 mile (1,600m) grid for north-south and east-west roads. A new north-south connector road link called Casey Fields Boulevard will be created through the middle of the PSP area on the 1 mile grid. In addition, a local road network will be created to link to this main road network.

The road network therefore adopts commonly accepted design principles such as the 1,600m spacing for arterial roads and 400m spacing for intersections along arterial roads supported by connector roads. It also establishes a grid pattern providing a good level of accessibility and integration across arterial roads between adjacent communities within the PSP.

6.2 Road Cross Sections

Table 6.1 sets out the proposed road reserve widths by road type and cross-section name to link the GAA road cross section terminology with the appropriate planning scheme reference. These road reserve widths may require further widening at intersections to accommodate flaring for extra lanes according to the VicRoads standard drawings in Table 6.2.

Table 6.1: PSP Road Cross Sections (Refer to Figure 6.1)

GAA Road Cross-Section Title	Cross Section	Planning Scheme Cl56.06 Table C1 Reference
Arterial Road - 4 lanes	34m plus local frontage roads each side as per GAA drawing dated 27/3/09.	Arterial Road
Connector Road - 2 lanes interim and potentially 4 lanes ultimate (Casey Fields Boulevard and Ballarto Road)	34m as per GAA drawing dated 27/3/09.	Connector Street
Boulevard Connector Road	32m as per GAA drawing dated 27/3/09.	Connector Street
Connector Road - Residential	26m as per GAA drawing dated 27/3/09.	Connector Street
Access Street Level 2	20m or 23m with dedicated bike lane as per GAA drawing dated 27/3/09	Access Street Level 2
Access Street Level 1	16m as per GAA drawing	Access Street Level 1

Notes:

1. Refer GAA drawing dated 27/3/09 for a shared landscaped trail within a widened road reserve being a 6m wide standard addition to the adjoining road reserve;
2. Separate cross sections exist for the industrial area being a 26m industrial connector road and a 22m industrial access street; and
3. Separate cross section exists for NAC's being a 22m connector road for NAC's.

The following points should be noted with respect to the references to standard VicRoads drawings that appear in Tables 6.1 and 6.2:

- Arterial road cross sections show indicative treatments for certain users such as cyclists and buses with any alterations to be accommodated within the 34m reserve noting the proposed GAA road cross-section;
- Arterial road signalised cross intersections with connector roads do not have a standard VicRoads Drawing at this time although it is understood that one is in the process of being developed; and
- Detailed layouts and resulting road reserve widths are the subject of more detailed traffic analysis and design work to suit each specific site and its associated issues and requirements. The standard treatments should be viewed as indicative only and the maximum road reserve widths required. They do not show the actual intersection layouts to be constructed.

6.3 Intersections

The assessment of intersections has been undertaken for those locations where a street within the PSP intersects with an arterial road. At this time the focus has been on ultimate layouts rather than interim layouts so as to check the adequacy of road reserve widths. Arterial road to arterial road intersections are not included as they will be designed by VicRoads, generally in accordance with VicRoads Drawing No. 136820. Residential street intersections within the PSP are not included because they are more detailed than that required at the structure planning stage. The assessed locations are as described in Figure 6.1.

The general approach adopted is to locate traffic signals at intersections between arterial roads and connector roads, particularly where they service an adjacent activity centre, school or station precinct. Intersections on arterial roads may include allowance for deceleration and slip lanes for left turns on the arterial road approaches and slip lanes on the minor road approaches.

Intersections within residential areas between lower order roads typically have roundabouts or stop/give way control. Note that the PSP is currently the subject of refinement and consultation and as such the location and type of intersections may change.

Table 6.2 summarises the typical generic treatment types and resulting road reserve widths noting again that they do not necessarily show the actual intersection layouts to be constructed. The discussion of funding is contained within a separate Development Contributions Plan.

The construction of arterial roads is likely to be staged such that they continue as two lane rural roads with subsequent duplication to four lane divided cross-sections. The staging, timing and nature of the arterial road network works is a VicRoads responsibility, inclusive of the intersections of arterial roads with arterial roads.

It is noted that separate traffic assessments and reports will be required as part of the planning scheme process for design response areas and subsequent planning permit applications. Those separate reports will finalise intersection layouts on the basis of final land uses and yields, staging, traffic conditions, access arrangements and the like.

Table 6.2: PSP Intersection Assessment - Indicative Road Reserve Requirements (Refer Figure 6.1)

Intersection	Description	Indicative Layout (VicRoads Standard Drawing No.)
B1	Casey Fields Boulevard – Donohue Street (Unsignalised)	Council road, design to be prepared.
B2	Casey Fields Boulevard – Linsell Boulevard (Signalised)	Standard drawing being developed by VicRoads. [1]
B3	Casey Fields Boulevard – Heather Grove (Interim Unsignalised)	Council road, design to be prepared.
B3	Casey Fields Boulevard – Heather Grove (Ultimate Signalised)	Council road, design to be prepared.
B4	Casey Fields Boulevard – Cranbourne Road (Signalised)	Standard drawing being developed by VicRoads. [1]
B5	Casey Fields Boulevard – Local Road (Signalised)	Council road, design to be prepared.
B6	Casey Fields Boulevard – Local Road (Unsignalised)	Council road, design to be prepared.
B7	Casey Fields Boulevard – Local Road (Unsignalised)	Council road, design to be prepared.
B8	Casey Fields Boulevard – Ballarto Road (Signalised)	Standard drawing being developed by VicRoads. [1]
B9	Casey Fields Boulevard – Local Road (Unsignalised)	Council road, design to be prepared.
L1	Linsell Boulevard – Local Road (Unsignalised)	463743
L2	Linsell Boulevard – Local Road (Unsignalised)	463743
L3	Linsell Boulevard – Collins Street (Signalised)	463744
C1	Clyde Five Ways Road – Heather Grove (Interim Unsignalised)	463743
C1	Clyde Five Ways Road – Heather Grove (Ultimate Signalised)	463744
E1	Berwick-Cranbourne Road – Local Road (Unsignalised)	463743
E2	Berwick-Cranbourne Road – Local Road (Unsignalised)	463743
E3	Berwick-Cranbourne Road – Local Road (Signalised)	Standard drawing being developed by VicRoads. [1]
E4	Berwick-Cranbourne Road – Local Road (Unsignalised)	463743
E5	Berwick-Cranbourne Road – Collins Road (Unsignalised)	463743
E6	Berwick-Cranbourne Road – Local Road (Signalised)	463744
E7	Berwick-Cranbourne Road – Local Road (Signalised)	Standard drawing being developed by VicRoads. [1]
E8	Berwick-Cranbourne Road – Local Road (Unsignalised)	Specific design to be prepared in conjunction with VicRoads
D1	Berwick-Cranbourne Road – Broad Oak Drive (Signalised)	Standard drawing being developed by VicRoads. [1]
D2	Ballarto Road – Adrian Street (Interim Unsignalised)	Specific design to be prepared in conjunction with VicRoads

Intersection	Description	Indicative Layout (VicRoads Standard Drawing No.)
D2	Ballarto Road – Adrian Street (Ultimate Signalised)	Standard drawing being developed by VicRoads. [1]
T1	Ballarto Road – Local Road (Unsignalised)	463743
T2	Ballarto Road – Nelson Street (Unsignalised)	463743
G1	South Gippsland Highway – Local Road (Unsignalised)	463745

[1] VicRoads is currently in the process of developing a standard drawing but advise that it requires up to a 50m road reserve width on the arterial road approaches and up to 36m on the minor road approaches. It is expected that these details will be available prior to the amendment process being completed.

7. Conclusions

The transport modelling in support of the Cranbourne East PSP is documented in this report for the most recent land use and transport network assumptions.

This report sets out the land use forecasts and associated modelling and traffic volume forecasts at completion of the PSP for the road network design. It then goes on to assess the proposed road cross–sections based on typical intersection layouts. A select link analysis has also been undertaken to estimate the composition of traffic on key road links as input to a DCP.

It should be noted that arterial road staging and duplication timeframes are dependent on VicRoads decisions and planning, while intersection layouts and approvals will be the subject of subsequent planning permit applications when details on lot yields, access arrangements and the like are known.

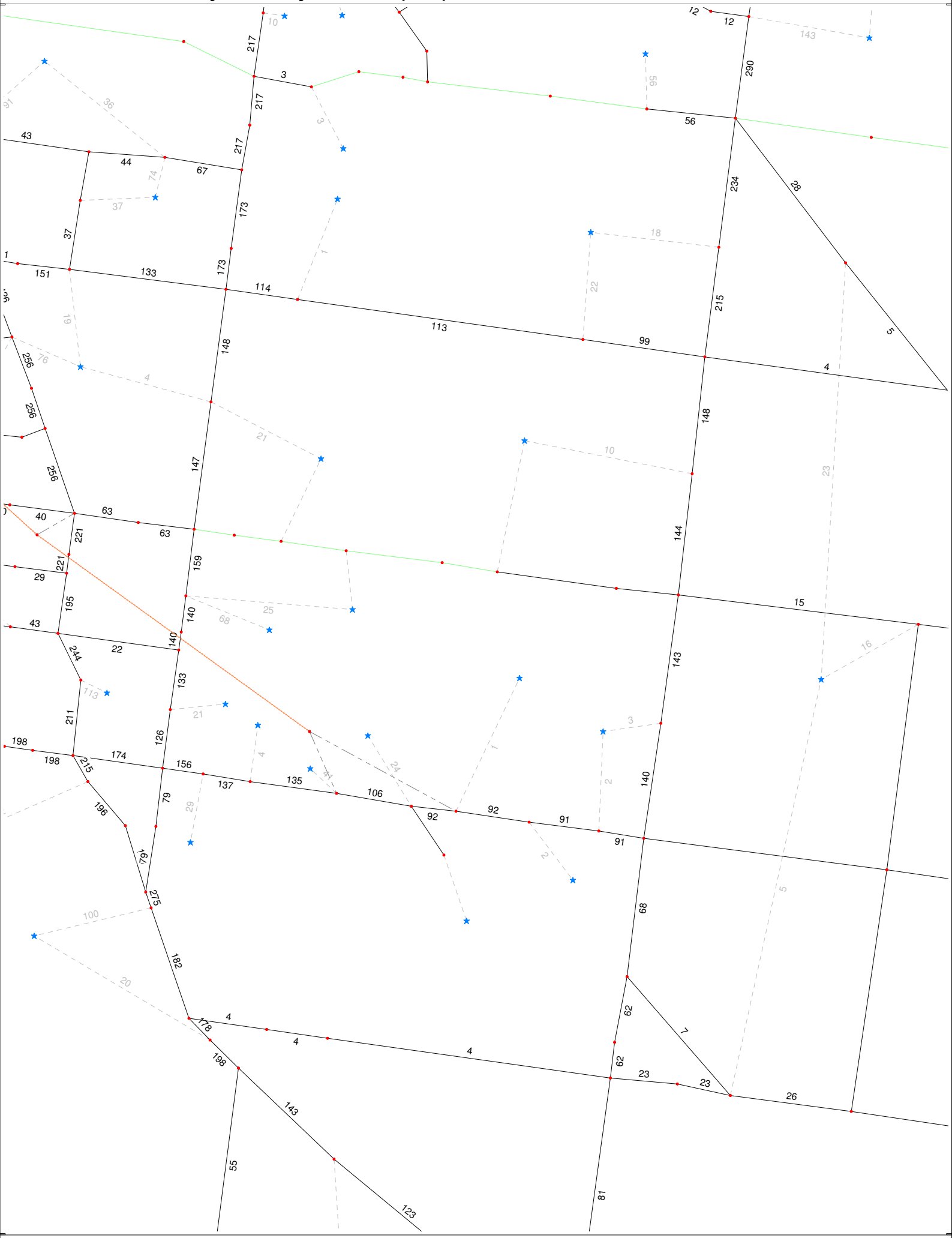
It is noted that the PSP process is underway and therefore subject to further refinement and stakeholder agreement.

Appendix A

appendix a

MITM Existing 2008 Daily Model Run

Cranbourne East
2008 Base Case - Daily Two Way Volumes (00's)

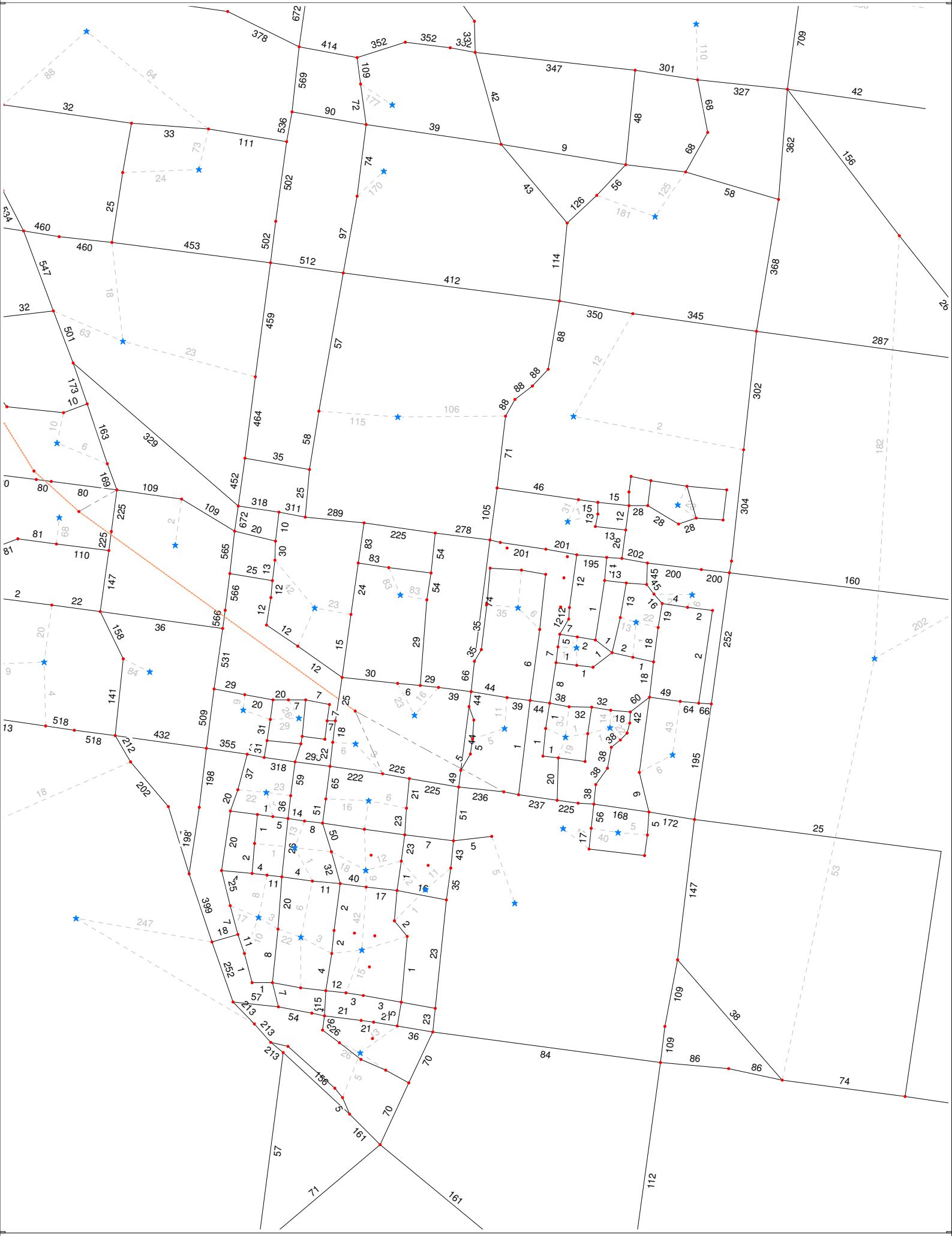


M:\Melbourne Model (GTA)\Base\Base2008AM_GTA\HY_LOAD_Base2008AM_GTA.NET
27/03/2009

Appendix B

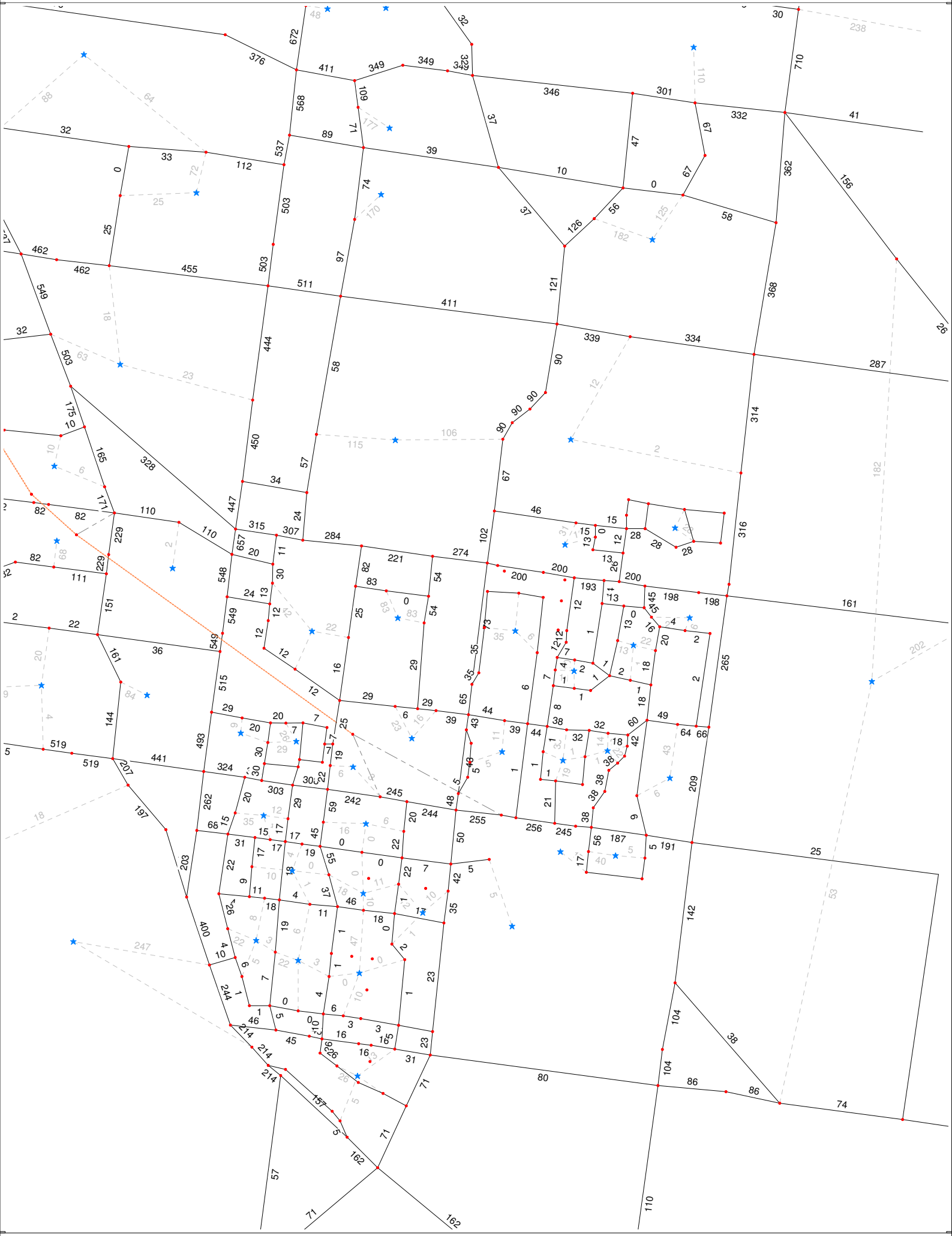
MITM Future Daily Model Runs (Base and Option)

Cranbourne East
Run11 - 2031 Ultimate Base Case - Daily Two Way Volumes (00's)



M:\Melbourne Model (GTA)\Base\Base2031AM_GTA\HM10750_CranEastandWest\Run08\Run09\Run11\HY_LOAD_AM_Peak_Extra_Run11.NET
9/02/2009

Cranbourne East
Run11 - 2031 Ultimate Option Case - Daily Two Way Volumes (00's)



M:\Melbourne Model (GTA)\Base\Base2031AM_GTA\HM10750_CranEastandWest\Run08\Run09\Run11\CEOption\HY_LOAD_AM_Peak_Extra_CEOption.NET
13/02/2009

Appendix C

Select Link Analysis

Appendix C
Cranbourne East: 2031 Ultimate Scenario - Option Case
Select Link Analysis - 2 Hour AM Peak Period Volumes

	Trip Share (%) at Location															
Area	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Cell1	13%	2%	4%	11%	4%	1%	14%	0%	1%	0%	0%	4%	1%	0%	0%	0%
Cell2	7%	9%	29%	5%	94%	1%	2%	12%	0%	1%	1%	26%	1%	0%	0%	0%
Cell3	9%	19%	0%	13%	0%	4%	46%	1%	15%	0%	1%	0%	0%	0%	0%	0%
Cell4	6%	0%	27%	0%	3%	18%	9%	56%	0%	1%	2%	10%	0%	0%	0%	0%
Cell5	5%	6%	12%	6%	0%	75%	17%	29%	61%	3%	3%	0%	0%	0%	0%	0%
Cell6	0%	0%	0%	0%	0%	0%	1%	0%	2%	2%	26%	2%	0%	0%	0%	0%
Cell7	0%	0%	1%	0%	0%	0%	3%	0%	4%	5%	61%	3%	1%	0%	1%	0%
Cell8	0%	0%	2%	0%	0%	0%	1%	0%	2%	3%	1%	4%	7%	0%	9%	100%
Cell9	0%	0%	4%	0%	0%	0%	3%	1%	6%	5%	2%	13%	4%	0%	5%	0%
Cell10	0%	0%	1%	0%	0%	0%	1%	0%	3%	2%	1%	3%	5%	0%	6%	0%
Cell11	0%	0%	1%	0%	0%	0%	1%	0%	4%	2%	1%	5%	1%	0%	1%	0%
Cell12	0%	0%	2%	0%	0%	0%	1%	0%	1%	0%	1%	5%	1%	0%	1%	0%
Through	60%	64%	17%	64%	0%	0%	0%	0%	0%	75%	0%	24%	79%	0%	78%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	Trip Share (%) at Location															
Area	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
Cell1	0%	0%	2%	3%	1%	0%	0%	0%	4%	2%	2%	22%	18%	0%	1%	2%
Cell2	0%	0%	2%	4%	1%	0%	0%	0%	6%	2%	1%	12%	10%	0%	1%	2%
Cell3	1%	0%	1%	3%	1%	0%	0%	0%	3%	1%	1%	15%	12%	0%	1%	4%
Cell4	1%	1%	3%	9%	4%	0%	0%	0%	6%	2%	1%	9%	7%	0%	1%	2%
Cell5	1%	1%	4%	9%	5%	0%	0%	0%	5%	2%	0%	9%	7%	1%	1%	4%
Cell6	0%	0%	0%	1%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Cell7	1%	0%	2%	4%	2%	0%	0%	0%	5%	2%	0%	0%	0%	0%	1%	1%
Cell8	17%	9%	0%	0%	1%	20%	9%	3%	0%	0%	1%	0%	0%	0%	2%	4%
Cell9	9%	70%	84%	29%	30%	51%	31%	7%	17%	5%	1%	0%	0%	3%	2%	3%
Cell10	30%	2%	0%	8%	54%	0%	59%	23%	0%	0%	0%	0%	0%	6%	2%	3%
Cell11	38%	15%	0%	19%	0%	0%	0%	48%	0%	2%	0%	0%	0%	10%	2%	1%
Cell12	0%	1%	0%	6%	0%	29%	0%	18%	14%	0%	1%	0%	0%	51%	1%	6%
Through	0%	0%	0%	3%	0%	0%	0%	0%	38%	80%	92%	32%	46%	29%	84%	68%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	Trip Share (%) at Location															
Area	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	
Cell1	3%	97%	4%	80%	10%	3%	2%	0%	0%	0%	1%	0%	0%	0%	2%	
Cell2	2%	0%	94%	1%	0%	2%	2%	2%	0%	4%	16%	0%	5%	0%	1%	
Cell3	5%	0%	0%	3%	82%	3%	2%	1%	0%	2%	1%	2%	0%	0%	2%	
Cell4	3%	0%	3%	5%	3%	3%	3%	3%	0%	6%	14%	6%	73%	0%	8%	
Cell5	10%	0%	0%	8%	4%	6%	4%	5%	0%	9%	11%	10%	0%	0%	10%	
Cell6	1%	0%	0%	0%	0%	0%	1%	2%	0%	3%	2%	4%	3%	1%	1%	
Cell7	2%	0%	0%	1%	0%	1%	2%	6%	0%	10%	2%	11%	4%	3%	2%	
Cell8	2%	0%	0%	0%	0%	1%	3%	6%	50%	4%	0%	3%	2%	3%	0%	
Cell9	2%	1%	0%	1%	0%	1%	4%	11%	1%	5%	5%	6%	6%	7%	8%	
Cell10	1%	0%	0%	0%	0%	0%	3%	5%	50%	2%	0%	3%	4%	0%	20%	
Cell11	1%	0%	0%	0%	0%	0%	2%	9%	0%	0%	3%	3%	4%	0%	46%	
Cell12	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	
Through	65%	0%	0%	0%	0%	81%	74%	49%	0%	55%	43%	52%	0%	86%	0%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	