

Cranbourne Movement and Access Study

Strategic Modelling

Calibration and Validation Report


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1. Introduction

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1.1 Background

Casey City Council has engaged GTA Consultants (GTA) to develop a Movement and Access strategy of the Cranbourne Town Centre. The aims of this strategy are:

- Establish a better understanding of traffic patterns, parking supply and demand as well as opportunities for a more pedestrian friendly movement strategy within the study area.
- Improve mobility and accessibility within the town centre in accordance with the sustainable transport hierarchy of pedestrians/cyclists as first priority, public transport second followed by private vehicles.
- Create a well-connected pedestrian orientated activity centre that can provide safe and clear connectivity to all key destinations.
- Review and improve the quality of public transport access with regards to the existing rail station and bus interchange, and create better linkages to access these public transport facilities.
- Assess the existing road network and intersections within the study area and enhance their functions without compromising on the pedestrian and public transport connectivity.
- Manage congestion and parking demand through appropriate parking controls for future density increase of housing and retail/commercial developments within the study area.
- Promote local area traffic management plans and traffic calming strategies that will enhance traffic safety and support active transport.

The Cranbourne Town Centre has a range of services that provides a range of transport choices for travellers, with good rail and bus provision. Internally, the challenge for the growth and viability of the Cranbourne Town Centre is being able to encourage and promote the movement of people rather than vehicles to maintain strong growth into the future.

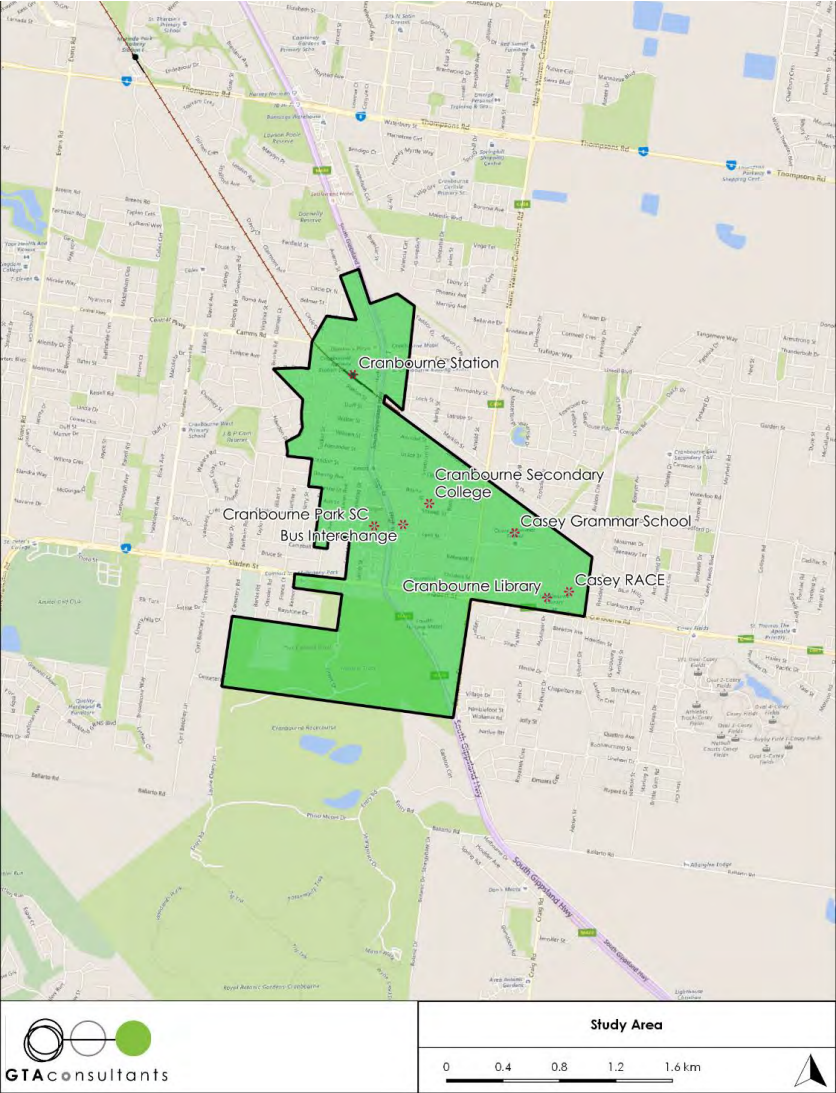
Significant transformation has occurred in Cranbourne, from a local town centre to a major activity centre servicing the growing population and employment demands of the City of Casey. This growth has resulted in a significant transformation of the precinct and its surrounding areas.

From a transport perspective, these changes have resulted in an increase in the number of trips for people wishing to travel to the retail and commercial core. The land use mix enables some trips purposes to be contained within the town centre, whilst more broadly encourage more trips from locally based catchments.

We recognise the importance of understanding the travel patterns both broadly and locally, and have undertaken transport modelling using the Victorian Integrated Transport Model (VITM) to understand the existing travel behaviour and to predict future changes in travel patterns.

The Study area for the movement and access strategy is illustrated in Figure 1.1.

Figure 1.1: Study Area



This report has been prepared to provide a summary of the existing conditions VITM modelling approach, and to document the outcomes of the model validation. Further, this report will eventually form a part of the overall VITM modelling assessment providing more detail of option testing of the future scenarios.

1.2 Overview Calibration and Validation Process

Model calibration is a process in which the model inputs are refined to reflect observed conditions. It allows the model to produce travel demands in line with actual measured traffic conditions and public transport usage.

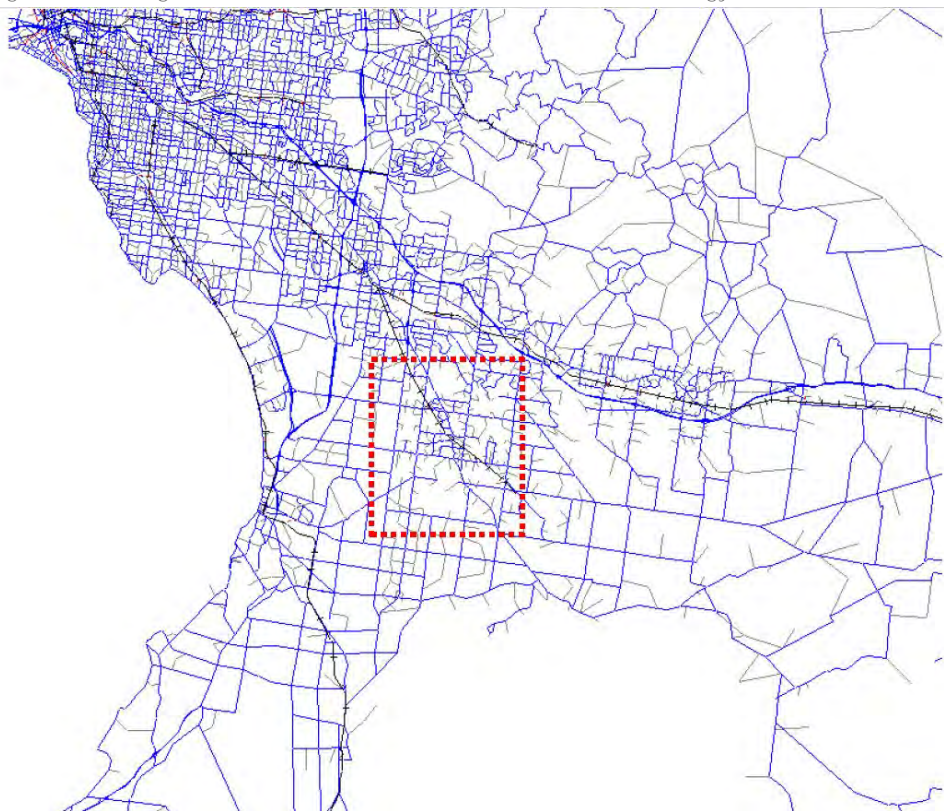
Existing traffic counts are compared to the corresponding modelled link volumes for a current year. Following any model adjustments, the model is rerun and modelled results compared to the traffic counts. This process is repeated until the model results come to a point where they meet a number of calibration criteria (called convergence).

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 calibration is typically measured by comparing counts across a number of locations such as a screenline, and/or a group of counts at a regional level.

Model Calibration and Validation guidelines have been developed by VicRoads for use in strategic modelling work. The document entitled 'Transport Modelling Guidelines, Volume 2: Strategic Modelling (April 2012)' has been used as a reference in this case. This document outlines the model calibration targets for VITM modelled traffic volumes.

These guidelines have been retrofitted to suit the purpose and intention of the study for Cranbourne Movement and Access study. The study area used in the model is shown in Figure 1.2.

Figure 1.2: Strategic Model Area for Cranbourne Movement & Access Strategy



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1.3 VITM Overview and Version

The model version that used for this project was obtained from Department of Economic Development, Jobs, Transport and Resources (DEDJTR) in June 2016, version VITM2016_160317_V1_2. This is the latest release of the model from the DEDJTR.

The land use projections incorporated in this model are based on the Victoria in Future 2014 (VIF) projections. The assessment scenarios that will be used in this are as follows:

- 2011 base case, which coincides with the most recent census data available and has been used to validate the model across the entire Melbourne metropolitan area using a comprehensive dataset including link volumes, public transport patronage, household travel survey data and census data. This scenario uses VIF land use and population data for 2011.
- 2016 reference case, this has been used to validate the model in the local area based upon surveys undertaken for the purposes of this project. This scenario uses VIF land use and population data for 2016.
- 2021, 2031 and 2046 future year reference case scenarios, with major highway projects as per the DEDJTR reference case scenarios, and land use and population projections based on VIF2014. These scenarios use VIF land use and population data for the relevant future year.

2. Model Structure

2

2.1 Methodology

2.1.1 Preamble

Our approach to delivering the strategic model for this study has regard for the technical inputs and broader requirements of the Movement & Access Strategy. It is recognised that an up to date and accurate model of the Cranbourne Town Centre and surrounding area is critical to understand the existing transport conditions. The purpose of the model is to understand the broad level impacts of the forecast land use and development at Cranbourne Town Centre on both the local and arterial road network.

2.1.2 Victorian Integrated Transport Model

The Victorian Integrated Transport Model (VITM) is a tool developed by the Department of Transport (DoT) (now Department of Economic Development Jobs, Transport and Resources (DEDJTR)) to assist in the planning of road and public transport infrastructure in Victoria. VITM is a multimodal strategic model that uses future population, employment and land use data projections to forecast travel behaviour and the impacts of changes to the road and public transport networks. VITM contains all major freeways, main arterials and connector roads within the Melbourne Statistical Division.

The model is a link-based traffic model which is implemented in the CUBE Voyager software environment (developed by Citilabs).

The extent of the VITM network is shown graphically in Figure 2.1

Figure 2.1: VITM Network Extent



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2.2 Zone System Refinement

The VITM zone system contains a total of 3098 zones (excluding external zones) which have been developed based on Census Collector Districts (CCD), aggregated or disaggregated where necessary. The zone system for the strategic model study area in the content of the entire VITM extent is shown in Figure 2.2.

Figure 2.2: VITM Zone Structure



For the purpose of this study, zone refinements were undertaken to provide a finer level of detail in the traffic movements within the study precinct.

The zone refinements allow for an improved definition of land use within the study area, and therefore result in a more precise distribution of trips. A detailed map of zone refinements is shown in Figure 2.3 and Figure 2.4.

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Figure 2.3: Existing VITM Zone Structure



Figure 2.4: VITM Zone Structure Refinements



The resultant changes to the zone structure are an additional three zones in the study area.

2.3 Road Network Refinement

For the purpose of this study, a full review of all links and zone connectors within the study area was conducted to ensure that they reflect existing road conditions in terms of number of lanes, speeds etc.

This review found that in general the existing network structure within the study area is suitable for the purposes of this study. However, some additional links have been coded to provide a more detailed representation of the highway network within the study area.

The existing and refined VITM highway networks are illustrated in the figures below.

Figure 2.5: Existing VITM road network and connectors



Figure 2.6: Refined VITM road network and connectors



Figure 2.7: Existing VITM Link Classes

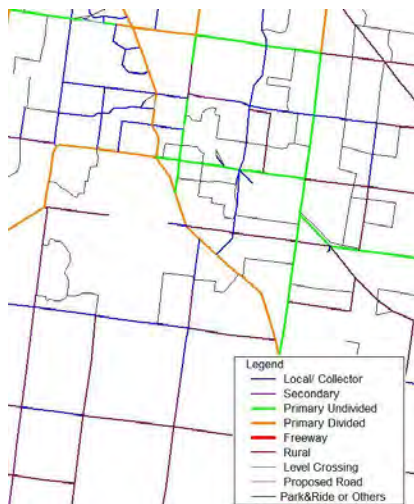
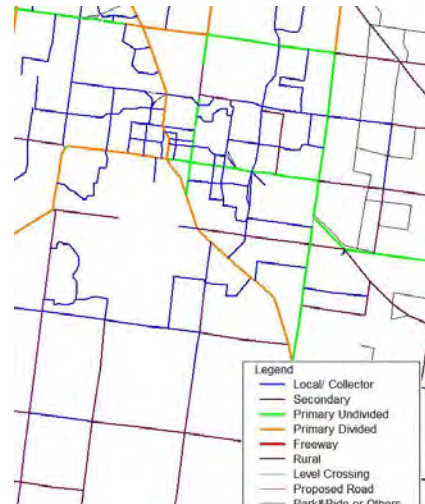


Figure 2.8: VITM Link Classes Refinements



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Figure 2.9: Existing VITM: Number of Road Lanes



Figure 2.10: Refined VITM: Number of Road Lanes

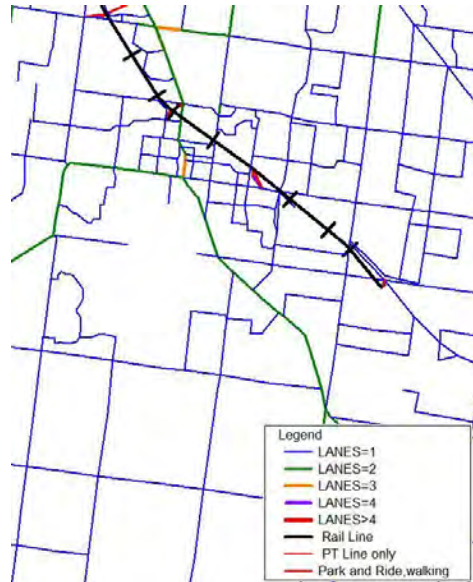


Figure 2.11: Existing VITM: Posted Speeds

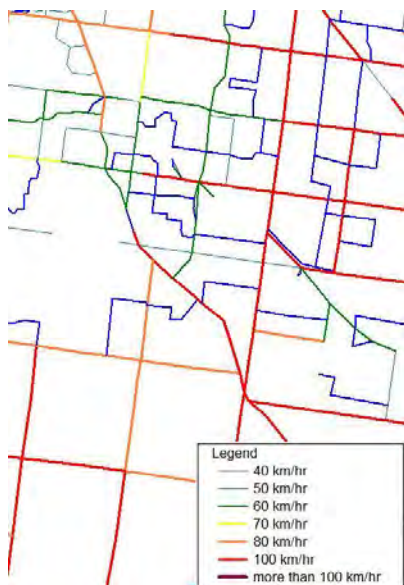


Figure 2.12: Refined VITM: Posted Speeds



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2.4 Model Calibration and Validation

Model calibration is a process in which the model inputs are refined to reflect observed conditions. It allows the model to produce travel demands in line with actual measured traffic conditions.

Existing traffic counts are compared to the corresponding modelled link volumes after each model assignment. Following any link adjustments, the model demands are once again assigned and modelled results compared to the traffic counts. This process is repeated until the model results converge to a point where they meet a number of calibration criteria.

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 calibration is typically measured by comparing counts across a number of locations such as a screen line, and/or a group of counts at a regional level.

For the purposes of this study a two-stage calibration and validation process has been undertaken:

- The validation of the full model is checked for the 2011 VITM base year to confirm the suitability of the model as a tool to assess travel behaviour across the whole Melbourne Statistical District, this year has been selected as it is the most recent year that there is a consolidated set of traffic volumes available across the full modelled area and is the most recent year for which Census data is available; and
- A local validation has been carried out for the study area using the 2016 reference case model to ensure that the model accurately reflects the existing travel behaviour as observed in the surveys undertaken for this project.

3. Transport Data Collection

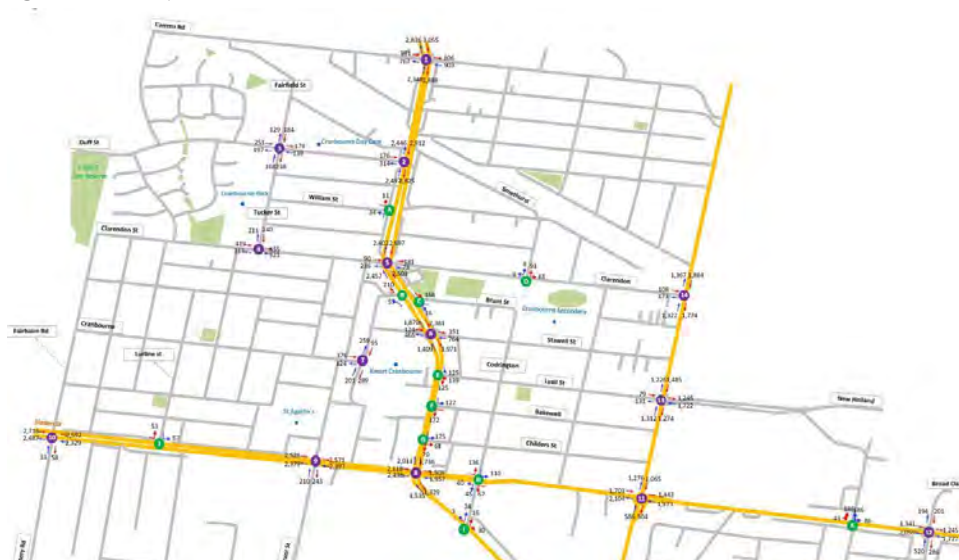
3.1 Data Sources

Extensive transport data collection has been undertaken to help with the existing conditions models prepared as part of this study accurately reflects the current operation of the road network. Table 3.1 summarises the transport data collected with the locations of the traffic counts illustrated in Figure 3.1 and Figure 3.2.

Table 3.1: Transport Data Collection Summary

Data Type	Source	Survey Date(s)	Survey Times	Description
Classified Turn Counts	MATRIX	Fri 17 and Sat 18 March 2017	Peak Periods	Surveys at key locations shown in Figure 3.1 and 3.2.
SCATS Traffic Volumes	VicRoads	Mon 13 to Sat 18 February 2017	24 hours data	SCATS traffic volume data requested at all signalised intersections within the wider study area. It is noted that some data is missing as a result of faults at some sites.
Car parking demand surveys	MATRIX	Fri 24 and Saturday 25 March	AM Peak, PM Peak. Interpeak and Saturday Peak periods	Car parking demand surveys (broken up into various zones) and development of an existing car parking demand model for each dominant land use specified in the SGS Economic Assessment.
Site Inspection	GTA	February 2017	AM Peak, PM Peak. Interpeak and Saturday Peak periods	Site inspection to get an enhanced understanding of existing traffic and transport travel behaviours and any exiting issues

Figure 3.1: Transport Data Collection Locations – AM Traffic Volumes (Two-Hours)



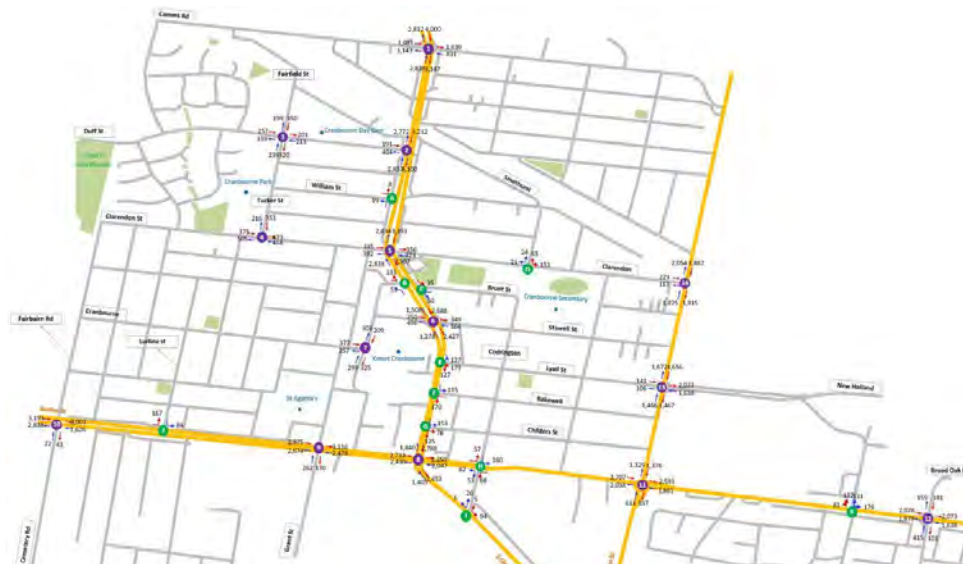
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Figure 3.2: Transport Data Collection Locations – PM Traffic Volumes (Two-Hours)



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4. Full VITM 2011 Base Case Calibration and Validation

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4.1 2011 Base Case Calibration and Validation

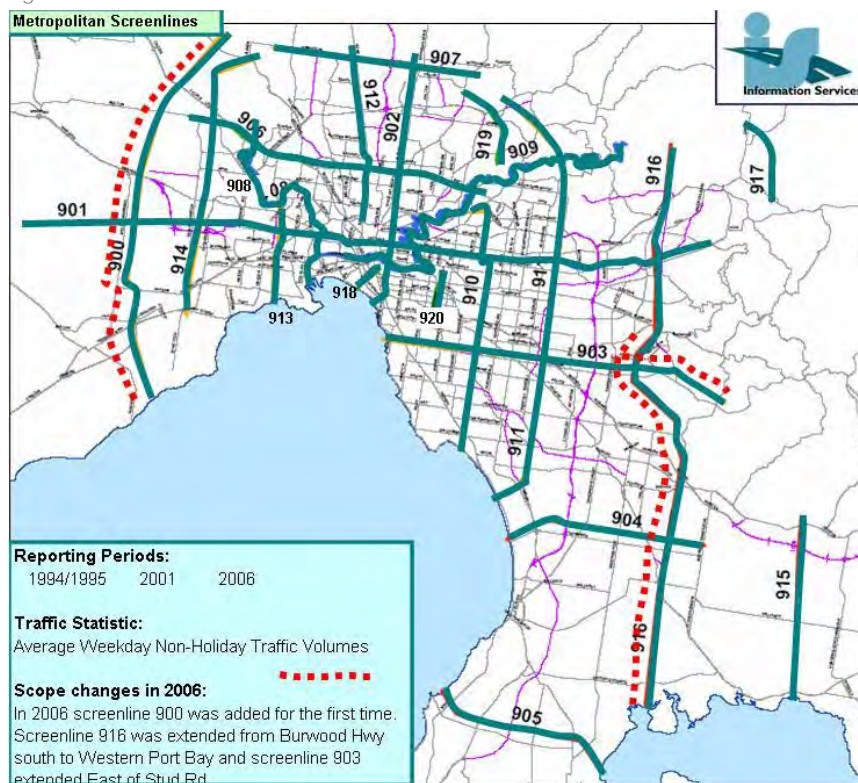
This section of the report describes the model validation results which are used to assess whether the model can satisfactorily represent the observed traffic patterns for 2011. The criteria and checks adopted have been based on those recommended in the VicRoads guidelines titled the **VicRoads Guidelines: 'Transport Modelling Guidelines- Strategic Modelling – Volume 2'**. The model validation checks that have been undertaken included comparisons of surveyed and modelled Screenline traffic volumes, assignment convergence, trip length distribution and Traffic volumes for individual road links. This base case validation has been carried out for the full Melbourne Statistical District (MSD) using historical 2011 consolidated traffic count data set for the purposes of validation and calibration of the model, historic traffic count data was obtained from VicRoads.

This section has been included as the VITM model used is the full metropolitan model, that is no sub area model had been developed for this project. This approach reflects that based on Census data and household travel surveys, a significant number of people travel beyond the Council boundaries each day for work. Therefore, the model is needed to be suitable for planning and assessing potential transport options to get residents to their destination. However, as this is outside the project's immediate study area and project scope, there has not been a review of the network outside Cranbourne.

4.2 Screenline validation

VicRoads have previously developed a number of Screenlines within the MSD that have been used to validate the 2011 Base Case. These Screenlines are illustrated in Figure 4.1.

Figure 4.1: VicRoads Screenline Locations



The VicRoads screenline traffic volumes have been compared to the modelled traffic volumes in VITM. A comparison of the observed volumes and the VITM 2011 base case modelled volumes are summarised in Table 4.1.

Table 4.1: Surveyed Traffic Count Data and Modelled Data Summary

Assessment Measure	Observed Screenline Volume	VITM Modelled Screenline Volume	Difference
Screenlines Volumes (all Screenlines) 2hr AM peak	1,561,149	1,559,301	-0.1%
Screenlines Volumes (all Screenlines) 2hr Interpeak period	3,546,025	3,403,407	-4.0%
Screenlines Volumes (all Screenlines) 2hr PM peak	2,479,653	2,462,356	-0.7%
Screenlines Volumes (all Screenlines) 2hr Off-peak period peak	3,140,731	2,902,478	-7.6%

This demonstrates that all peak periods in the 2016 VITM version compare well to the surveyed screenline volumes for the 2011 base year.

The screen line volumes for the AM peak period and the Scatter plots for the observed and modelled link volumes are presented in Table 4.2 and Figure 4.2 respectively.

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Table 4.2: AM Peak Period Screenline Volume Analysis

Screenline	Observed inbound	Basecase inbound	Difference	Observed outbound	Basecase outbound	Difference
899	6,942	8,201	18%	3,689	5,460	48%
900	32,865	33,838	3%	16,616	20,890	26%
901	93,596	92,524	-1%	66,547	76,104	14%
902	80,632	80,161	-1%	50,526	53,872	7%
903	64,525	59,612	-8%	48,820	46,461	-5%
904	25,402	21,354	-16%	14,751	15,878	8%
905	9,493	8,212	-13%	6,704	5,544	-17%
906	73,765	75,908	3%	55,146	56,952	3%
907	23,007	22,606	-2%	18,412	17,247	-6%
908	41,965	49,279	17%	28,836	31,704	10%
909	70,364	80,240	14%	63,682	58,095	-9%
910	70,408	62,083	-12%	44,336	40,584	-8%
911	98,491	86,130	-13%	54,650	54,947	1%
912	29,777	23,584	-21%	25,828	24,240	-6%
913	29,320	33,127	13%	19,444	18,246	-6%
914	49,770	54,587	10%	24,691	28,236	14%
915	11,004	10,990	0%	6,971	8,473	22%
916	56,964	51,113	-10%	30,563	33,070	8%
917	2,773	2,209	-20%	1,361	1,296	-5%
918	22,161	18,798	-15%	12,246	13,782	13%
919	19,055	15,323	-20%	7,838	8,758	12%
920	29,741	24,825	-17%	17,472	15,888	-9%
Total	942,020	914,706	-3%	619,129	635,726	3%

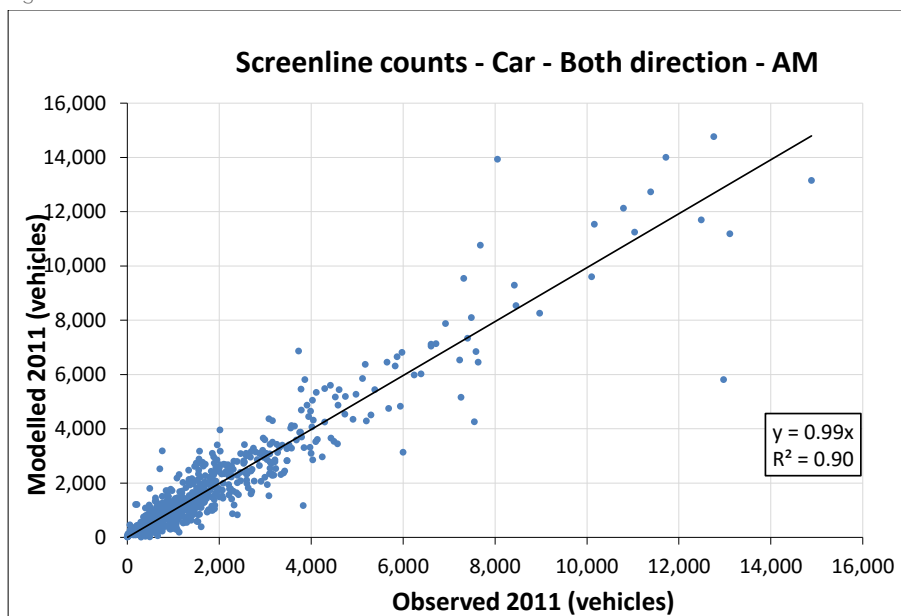
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Figure 4.2: AM Scatter Plot



These indicate that there is good correlation between the observed and modelled data during the AM peak period.

The screen line volumes for the PM peak period and the scatter plot for the observed and modelled link volumes are presented in Table 4.3 Table 4.2 and Figure 4.3 respectively.

Table 4.3: PM Peak Period Screenline Volume Analysis

Screenline	Observed inbound	Basecase inbound	Difference	Observed outbound	Basecase outbound	Difference
899	6,608	8,252	25%	11,325	12,878	14%
900	29,111	35,229	21%	53,477	52,256	-2%
901	119,153	123,250	3%	144,507	144,274	0%
902	81,385	87,596	8%	116,059	120,127	4%
903	80,901	77,878	-4%	93,674	89,915	-4%
904	25,315	26,384	4%	40,869	33,546	-18%
905	12,856	10,468	-19%	15,752	13,333	-15%
906	90,528	92,377	2%	114,737	114,274	0%
907	32,743	27,969	-15%	37,970	37,552	-1%
908	46,692	51,917	11%	70,683	76,212	8%
909	95,939	96,657	1%	105,054	114,531	9%
910	76,556	71,464	-7%	97,987	91,177	-7%

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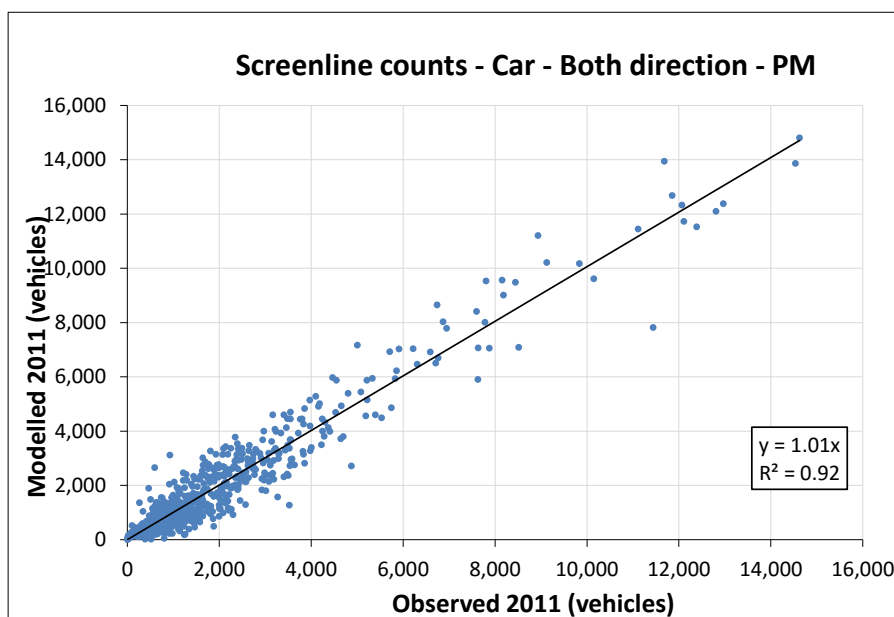
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Screenline	Observed inbound	Basecase inbound	Difference	Observed outbound	Basecase outbound	Difference
911	94,121	95,010	1%	144,633	132,644	-8%
912	41,317	37,942	-8%	47,761	38,513	-19%
913	36,056	31,311	-13%	46,783	47,472	1%
914	44,316	50,756	15%	78,964	80,660	2%
915	13,274	14,588	10%	18,615	18,580	0%
916	60,097	59,222	-1%	90,459	79,965	-12%
917	2,868	2,392	-17%	4,402	3,400	-23%
918	20,026	21,869	9%	27,337	27,145	-1%
919	17,080	17,307	1%	22,765	18,220	-20%
920	29,497	27,559	-7%	39,401	34,926	-11%
Total	1,056,439	1,067,397	1%	1,423,214	1,381,599	-3%

Figure 4.3: PM Scatter Plot



These demonstrate that there is a strong correlation between the observed and modelled traffic volumes.

The results of the screenline counts regression analysis against the targets set in the guidelines are shown in Table 4.4, and demonstrate that the criteria are met for the AM and PM peak periods

Table 4.4: AM & PM Peak Validation Summary – Scatter Plots

No	Parameter	GTA Model		Requirement	Within Criteria
		AM	PM		
1	The Slope of Best-Fit Regression Line	0.99	1.01	0.9 to 1.1	✓
2	Coefficient of Determination (R^2)	0.90	0.92	Greater than 0.9	✓

4.3 Assignment Convergence

The following criteria are required to be satisfied under the VicRoads guidelines:

- RGAP: Relative difference between the costs along the chosen routes and those along the minimum cost routes, summed across the whole network, and expressed as a **percentage of the minimum costs (also referred to as 'Delta' or the Duality Gap)**.
- Average absolute difference in link flows between successive iterations.
- Relative average absolute difference in link flows between successive iteration.
- Pdiff: Percentage of links whose change in volumes between iterations is less than a set value.

The results of the assignment convergence validation against the targets set out in the guidelines are shown on Table 4.5, indicating that the criteria are met.

Table 4.5: AM & PM Peak Validation Summary - Assignment Convergence

No	Parameter	GTA Model		Requirement	Within Criteria
		AM	PM		
1	RGAP	1%	1%	<1%	✓
	<i>And one of the following (stability)</i>				
2	RAAD	0.5%	0.5%	<1%	✓
3	AAD	0.5	0.5	<1 Veh/h	✓
4	Pdiff	1	1	>95%	✓

4.4 Feedback Convergence

The VicRoads guidelines recommended either of the following two statistics to be used to test for feedback convergence:

- the percent root mean square error for travel time or link flow, or
- the maximum GEH for link flows.

Given that the guidelines do not require stopping criteria to be adhered to, Figure 4.4 illustrates the results of the convergence feedback process between assignment and distribution of the maximum GEH for link flows.

Figure 4.4: Test Convergence - Change of Max GEH with Feedback Cycle

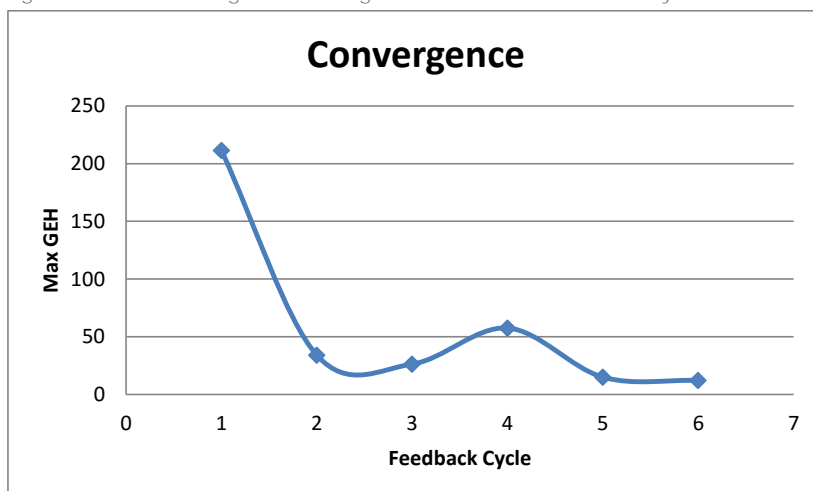


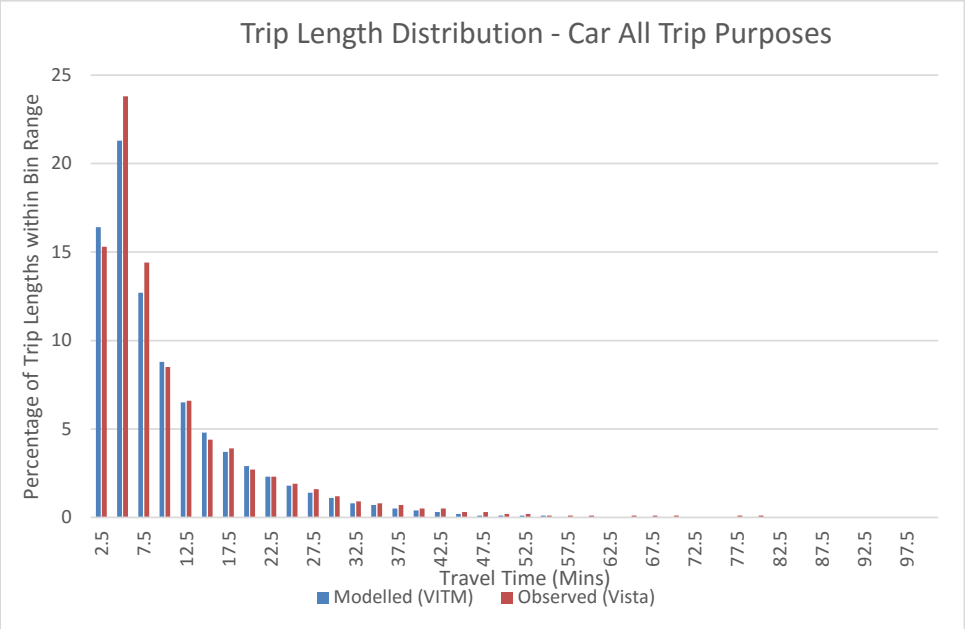
Figure 5.1 illustrates that the maximum GEH for link flows stabilises after the fourth feedback cycle and continues to reduce to the acceptable criteria.

The acceptance target in this criterion as stated in the transport modelling guidelines from VicRoads, page 4 *“Previous work has shown that convergence is very slow to achieve using these stopping criteria. Therefore VicRoads, at present requires no stopping criteria to be adhered to. However, a convergent feedback process between assignment and distribution is required, and reporting on one of the above convergence measures for each feedback cycle is required”*.

4.5 Trip Length Distribution

The trip length distribution produced by VITM2016 have been extracted for car trips and compared to the Trip Length Distribution from the VISTA surveys. These are presented in Figure 4.5.

Figure 4.5: Trip Length Distribution – All Trip Purposes - Car



This figure demonstrates that there is a good correlation between the observed and modelled trip lengths.

4.6 Summary

The VITM model has been calibrated and validated satisfactorily across the network. The outcomes of the GTA calibration and validation checks show that VITM has been satisfactorily calibrated and validated at a network wide level and hence is suitable for use as the basis to proceed with a local validation for Cranbourne Town Centre.

5. Local Area Validation

5.1 Introduction

Whilst the model shows strong correlation at a regional level, it is important that the within the Cranbourne town centre the model has a strong correlation to the observed conditions. This section sets out the level of correlation (validation) for the study area for the 2016 reference case model to the observed conditions in the study area¹. This validation assesses the peak periods and private vehicles, **reflecting the project's focus**.

5.2 VicRoads Validation Criteria

The VicRoads guidelines for the validation of strategic models require three main criteria to be met as follows:

- Percent Root Mean Square Error (%RMSE),
- Coefficient of Determination (R²),
- The Slope of Best-Fit Regression Line.

Further discussion on the criteria is set out in the following sub-sections

5.3 Local Screenlines

Screenlines represent imaginary lines which cross a number of roads in a traffic corridor. Two north-south screenlines and two east-west Screenlines, in addition to a screenline following the alignment of the Rail line were adopted for the purposes of model validation. The locations of the screenlines are shown in Figure 5.1.

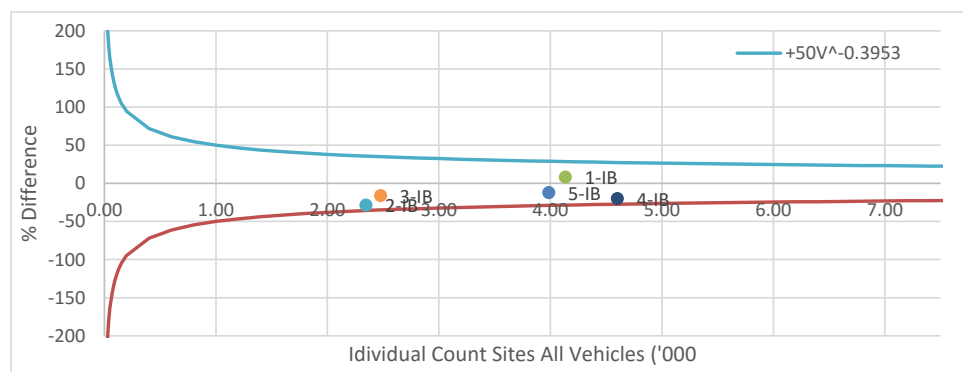
¹ The road and PT network of 2016 reference case model has been updated to reflect current conditions.

Figure 5.1: Local Area Screenline Locations



A comparison of the AM and PM peak surveyed and modelled screenline traffic Inbound and Outbound volumes is shown in Figure 5.2 to Figure 5.5 respectively.

Figure 5.2: AM Peak Period Screenline Validation (Inbound Direction)



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Figure 5.3: AM Peak Period Screenline Validation (Outbound Direction)

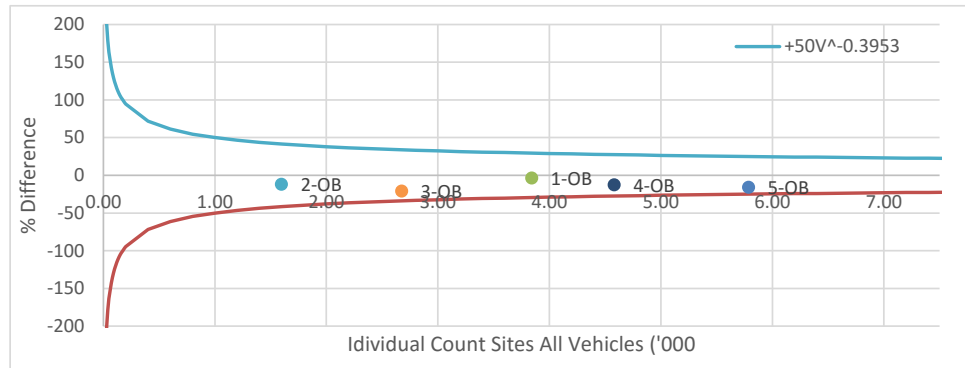


Figure 5.4: PM Peak Period Screenline Validation (Inbound Direction)

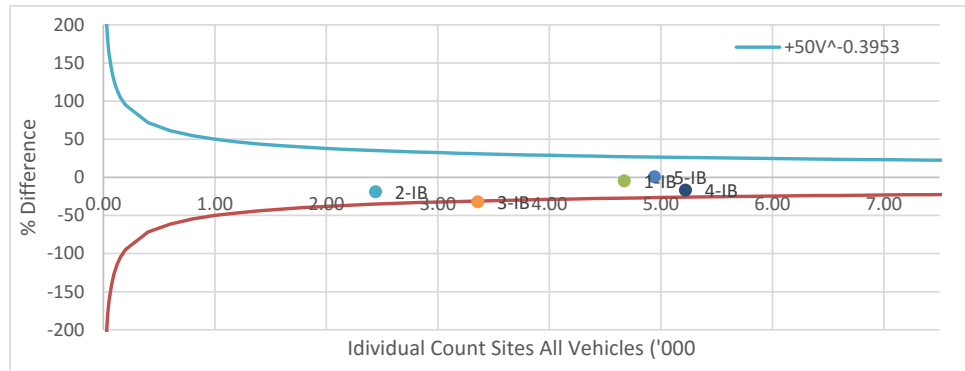
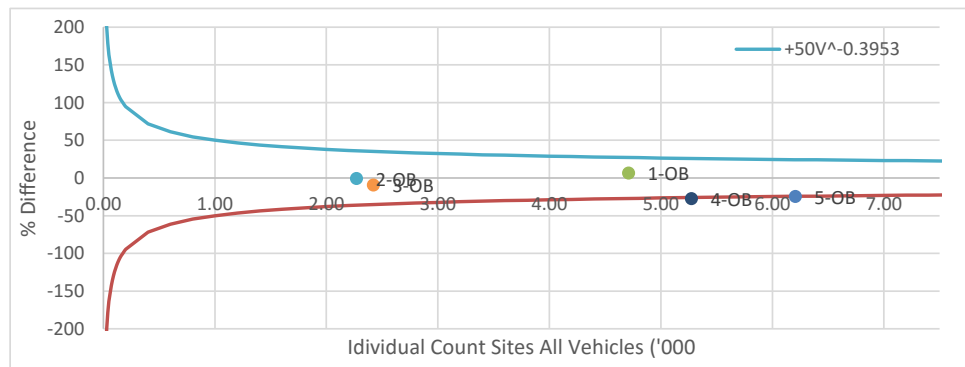


Figure 5.5: PM Peak Period Screenline Validation (Outbound Direction)



The transport modelling guidelines stipulate that the acceptable performance criteria for the two-hour peak periods should be within $\pm 1 * 50 V^{-0.3959}$ of the observed volume on all screenlines. Where V is the two-hour volume crossing the screenline expressed in thousands. Figure 5.2 to Figure 5.5 demonstrate that the inbound and outbound flows for all of the screenlines are within the Power function parameters. Table 5.1 summarises the performance of the model against the power function criteria.

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Table 5.1: AM & PM Peak Validation Summary - Assignment Convergence

No	Parameter	GTA Model		Requirement	Within Criteria
		AM	PM		
1	Inbound Screenlines	5 of 5	5 of 5	All Screenlines within Powerfunction	✓
2	Outbound Screenlines	5 of 5	5 of 5	All Screenlines within Power function	✓

5.4 Individual Count Locations

5.4.1 Coefficient of Determination (R²)

The Coefficient of Determination (R-Squared) is used in the validation process as it is a measure of the correlation between modelled flows and count volumes in the form of a linear trend line. Although the R-Squared value is an efficient means of expressing correlation between two sets of data, it is not sufficient to use the R-Squared as the only method of validation as it is possible for the modelled flows to be well above or below measured counts and still produce a strong linear correlation. The R-Squared value is defined as:

$$r = \frac{\sum(C - \bar{C})(M - \bar{M})}{\sqrt{\sum(C - \bar{C})^2 \sum(M - \bar{M})^2}}$$

Where:

r is the Coefficient of Determination (R-Squared)

M is the modelled one-way link volume (peak period)

C is the observed one-way link volume (peak period)

Although the industry standard R-squared target for strategic models is a value above 0.88, the VicRoads guideline states that models should be validated to have an R-Squared value above 0.90.

5.4.2 Scatter Plots

Figure 5.6 and Figure 5.7 present AM and PM comparison between surveyed and modelled traffic volumes for all local traffic counts. Each plot shows the best fit regression line and the coefficient of determination (RSQ). The VicRoads guidelines set out targets for slope of the best fit regression line between 0.9 and 1.1 and greater than or equal to 0.90 for RSQ.

Figure 5.6: Modelled vs. Observed Traffic for all Traffic Counts (AM 2 hours)

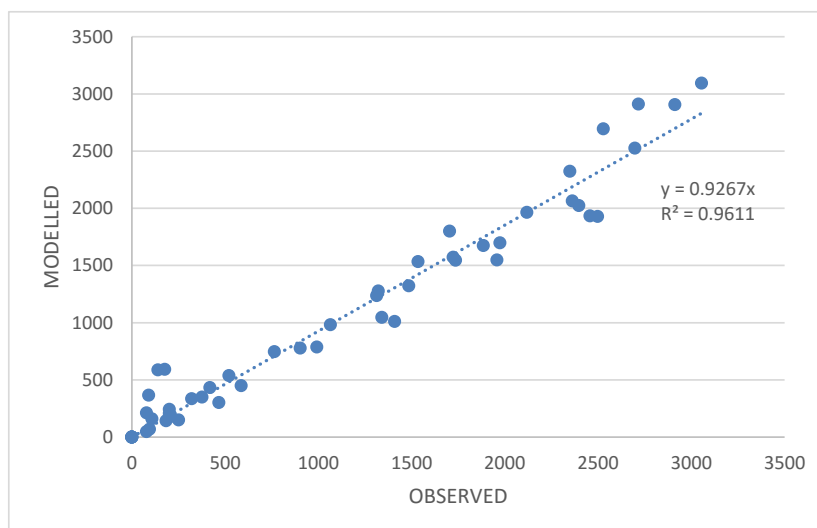
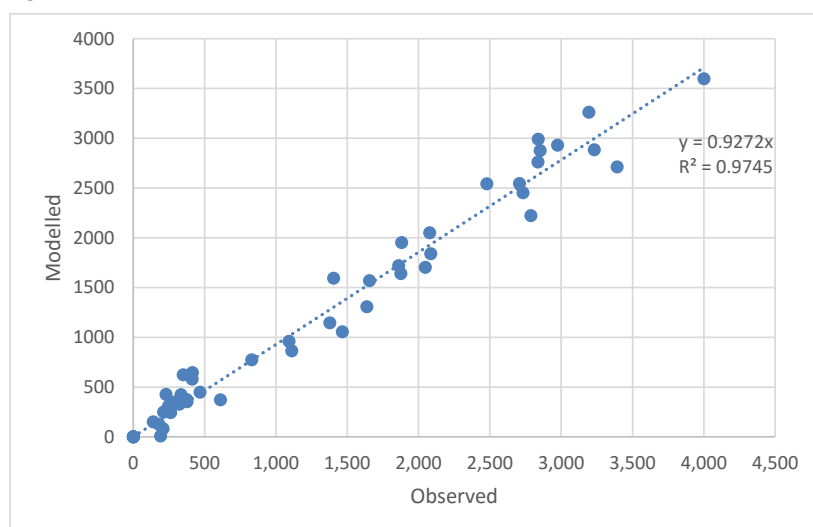


Figure 5.7: Modelled vs. Observed Traffic for all Traffic Counts (PM 2 hours)



The results presented in Figure 5.6 and Figure 5.7 illustrate that modelled traffic volumes meet the slope of best-fit regression criteria and the coefficient of determination (R-Squared) for both the AM and PM peak periods. This is summarised in Table 5.2.

Table 5.2: AM & PM Peak Validation Summary – Scatter Plots

No	Parameter	GTA Model		Requirement	Within Criteria
		AM	PM		
1	The Slope of Best-Fit Regression Line	1.003	0.972	0.9 to 1.1	✓
2	Coefficient of Determination (R²)	0.970	0.983	Greater than 0.9	✓

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5.5 Road Travel Times

For this project, no observed travel times were collected. Therefore, travel times from Google Maps were collected, over the time periods of the AM and PM Peak to reflect the multiple sampling required in the VicRoads guidelines. Reflecting this method, we have provided an observed range and made a value judgement on its fitness for purpose.

Table 5.3 shows the AM and PM Peak travel times observed and the modelled. For Berwick-Cranbourne Rd, the modelled travel times are within the range of observed travel times for all time periods and directions are. At Narre Warren - Cranbourne Rd three out of four are within the range observed travel time range. However, at South Gippsland Hwy one out of four are within the range observed travel time range. This potential reflects the pedestrian signals, parking bays and other road network features.

Table 5.3: AM & PM Peak Validation – Road Travel Times

Road	Start / End Point	Peak	Observed (mins) (by Direction)		Modelled (mins) (by Direction)	
			NB	SB	NB	SB
South Gippsland HWY	Sladen St to Thompsons Rd					
		AM	4-8	4-6	4.3	4.3
		PM	4-9	4-9	5.0	4.8
Narre Warren - Cranbourne Rd	Sladen St to Linsell Blvd		NB	SB	NB	SB
		AM	3	3-7	2.7	3.0
		PM	3-4	4	3.1	2.9
Narre Warren - Cranbourne Rd	Sladen St to Thompsons Rd		NB	SB	NB	SB
		AM	4-7	4-8	5.2	5.3
		PM	4-9	4-8	5.9	5.7
Berwick-Cranbourne Rd / Cranbourne-Frankston Rd	Casey Fields Blvd, to Monahans Rd		EB	WB	EB	WB
		AM	4-10	6-12	5.1	6.8
		PM	4-8	6-12	7.1	5.7

Note: NB: Northbound, SB: Southbound, EB: Eastbound, WB: Westbound

The results show that the modelled travel times match the observed and meet the requirements of the guidelines.

5.6 The Need For Further Refinements

As the results of the validation at a strategic and local level were reasonable, further refinements of the network were not required for the modelled demand flows, a process that is called matrix estimation. The outcome of not undertaking matrix estimation means that it allows the model to be used for future scenario testing without a step of refining the demand flows.

6. Summary of VITM Validation Results

6

6.1 Conclusions

The VITM model for the Cranbourne Movement and Access Study has been refined in an attempt to meet the VicRoads requirements. Indeed, the model has been calibrated and validated using sound modelling practice and process outlines within this report. The data used to validate the model was thoroughly analysed to ensure the quality of model inputs, however it is noted that there are some limitations on the sample size of data available.

The information presented in this report aims to inform the study team that the existing conditions model is considered to be suitable for use in testing future land use and network options for the study area.

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Appendix B

Car Parking Demand Per Zone – Friday

Appendix B



Figure B1: Zone 1 Parking Demand

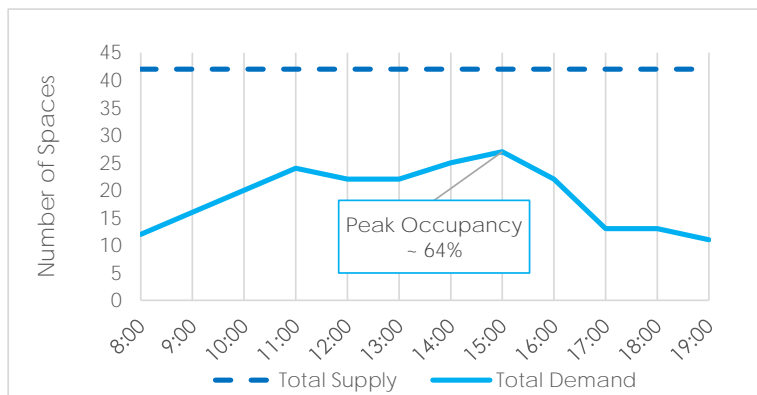


Figure B2: Zone 2 Parking Demand

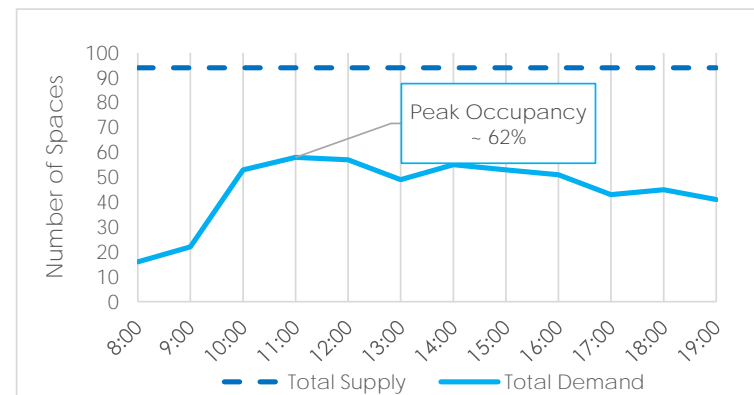


Figure B3: Zone 3 Parking Demand

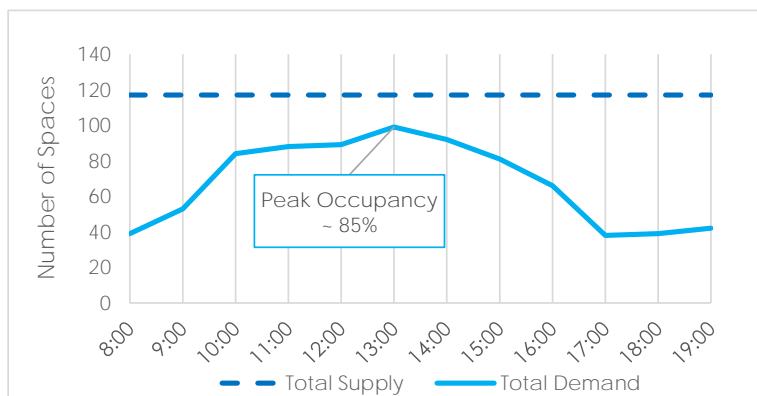


Figure B4: Zone 4 Parking Demand

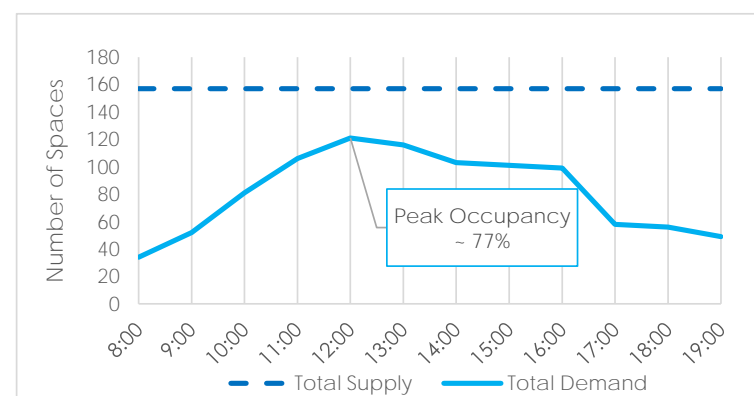


Figure B5: Zone 5 Parking Demand

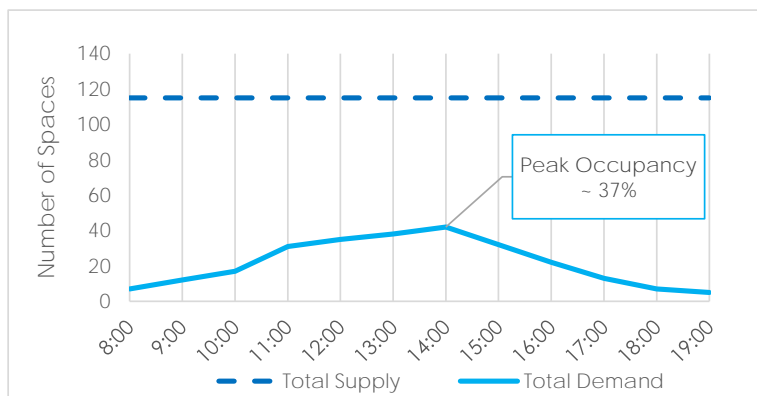


Figure B6: Zone 6 Parking Demand

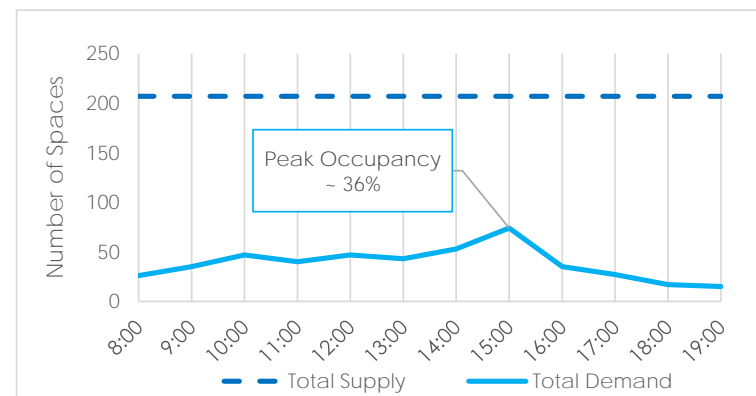


Figure B7: Zone 7 Parking Demand

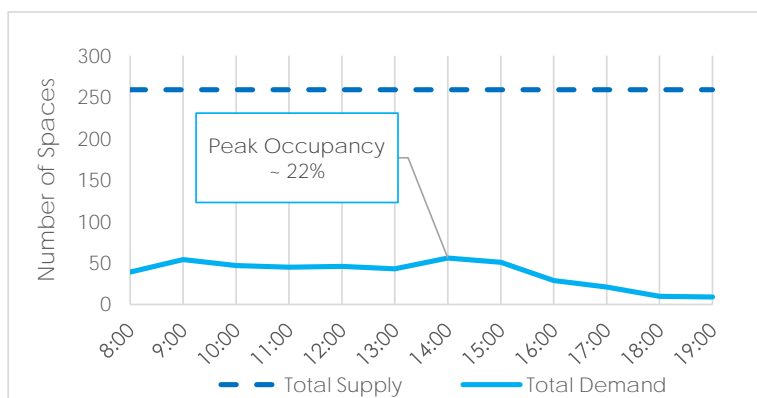


Figure B8: Zone 8 Parking Demand

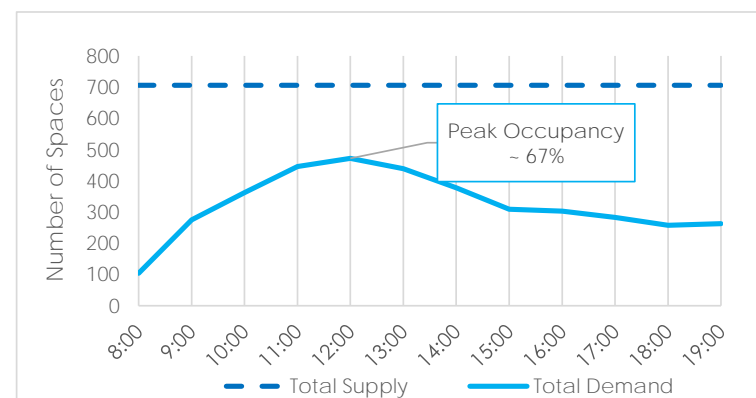


Figure B9: Zone 9 Parking Demand

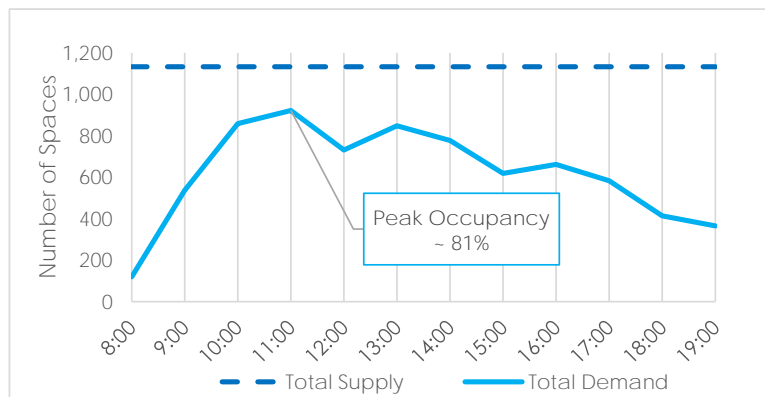


Figure B10: Zone 10 Parking Demand

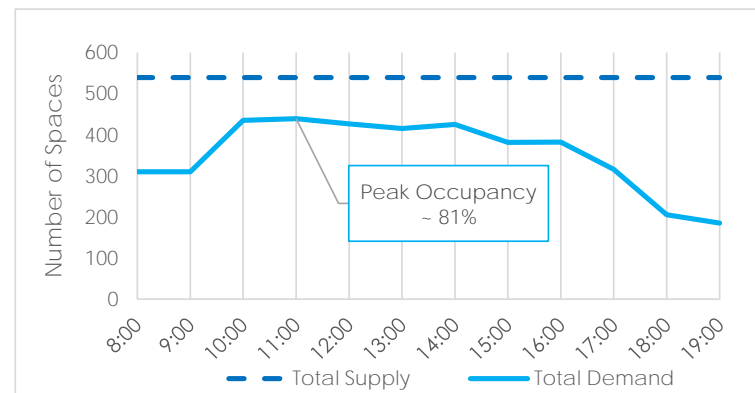


Figure B11: Zone 11 Parking Demand

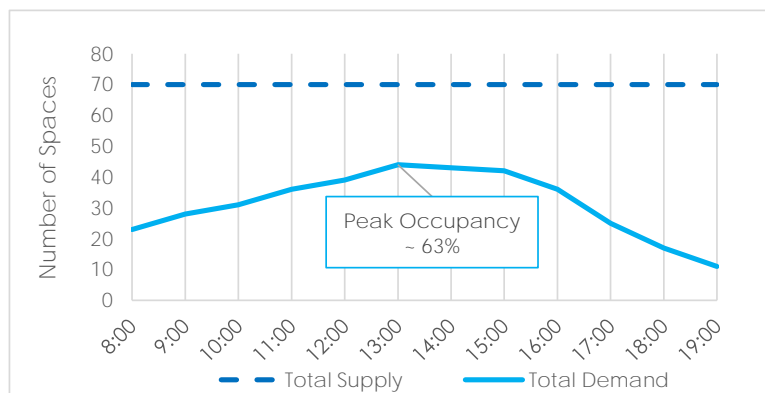


Figure B12: Zone 12 Parking Demand

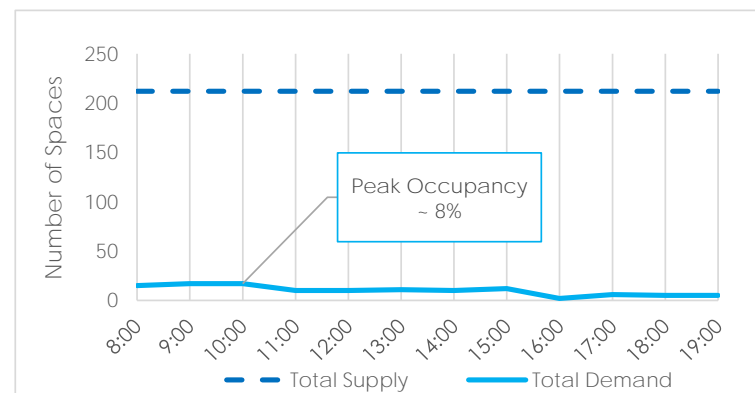


Figure B13: Zone 13 Parking Demand

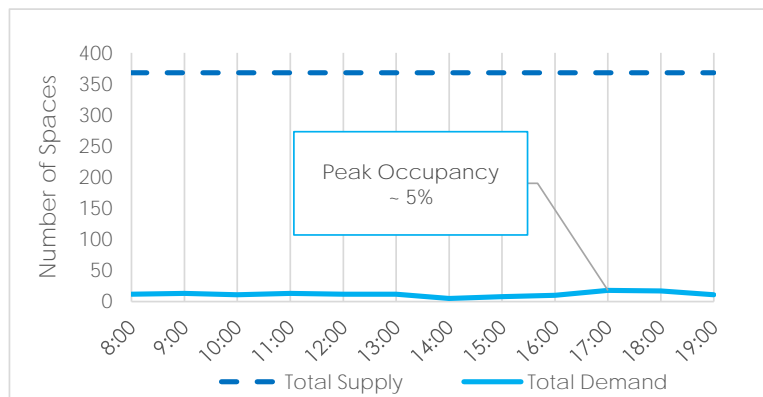


Figure B14: Zone 14 Parking Demand

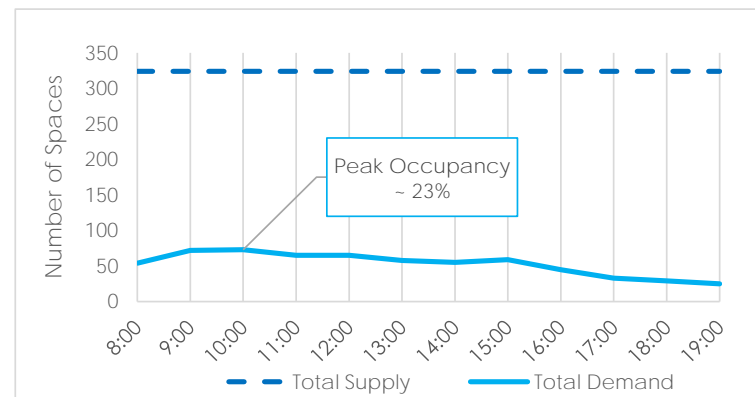


Figure B15: Zone 15 Parking Demand

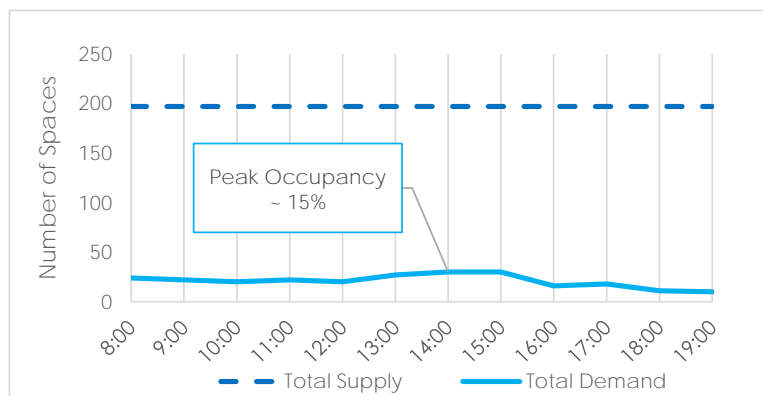


Figure B16: Zone 16 Parking Demand

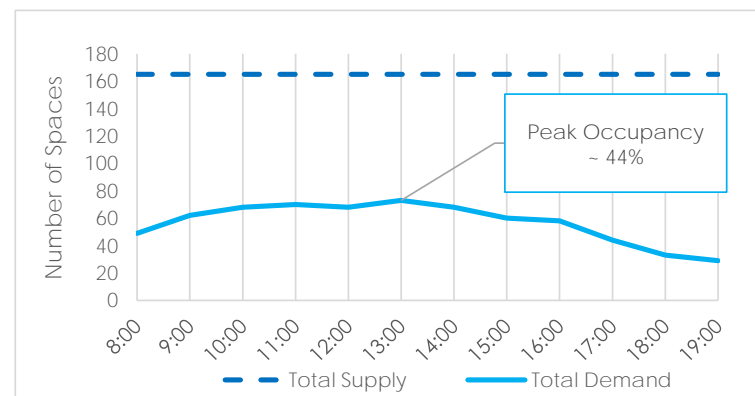


Figure B17: Zone 17 Parking Demand

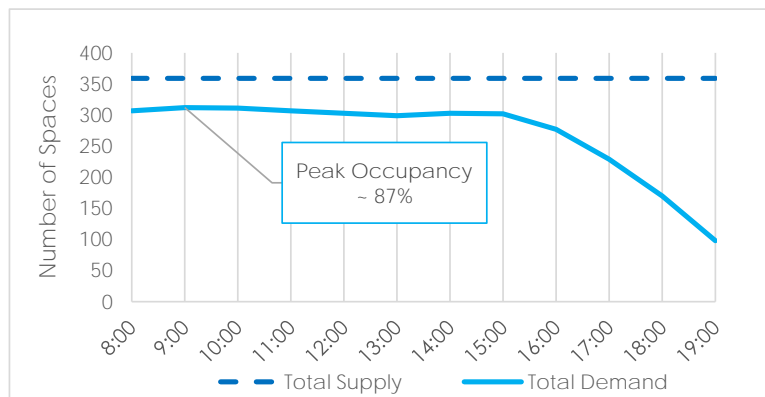
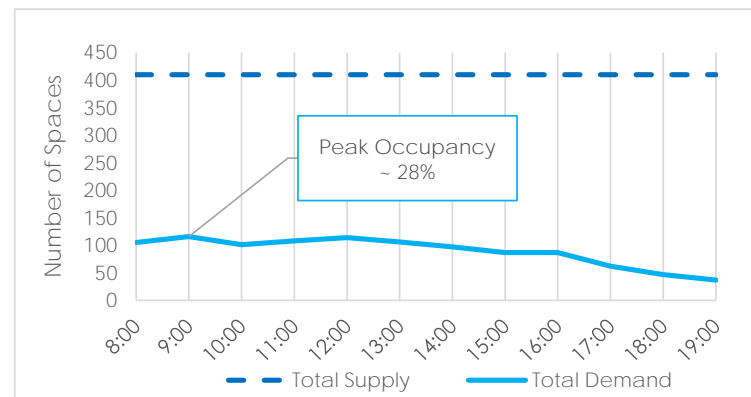


Figure B18: Zone 18 Parking Demand



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Appendix C

Option Testing

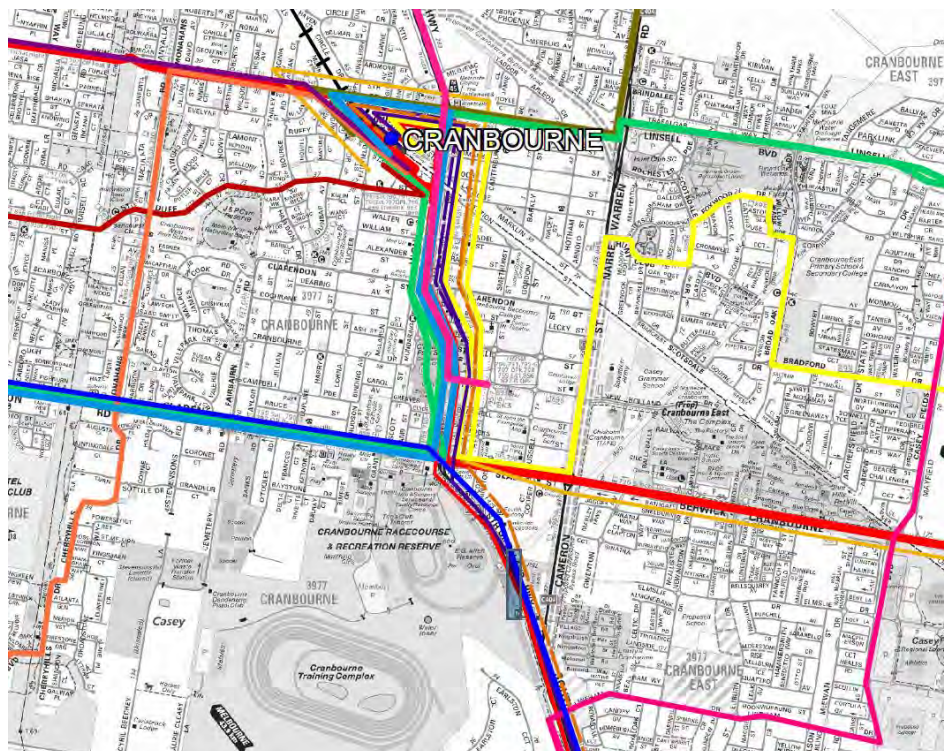
Appendix C

Option	Name	Description	Response to	2021		2031		2046	
				Existing density	Enhanced density	Existing density	Enhanced density	Existing density	Enhanced density
1. Business as usual									
A	Business as usual	Departmental land uses	n/a	X	N/A	X	X	X	X
2. Basic Interventions									
D*	Regional PT connections Lite	Implement several regional bus routes along primary arterials to connect railway stations, activity centres and regions with higher job rates. The routes are proposed to be high frequency, supported by dedicated bus lanes. The proposed routes are as per Figure C1. The 'life' version of this option includes the installation of new routes at high frequency, but without the support of bus lanes.	ABS data indicates that residents of Casey work to the west and north-west of Cranbourne, including Frankston and Dandenong.	X	N/A	X	X	X	X
B	New / revised parking controls	As detailed in Section 4.6 of this report.	To facilitate a mode shift away from the private car it is recommended to adopt revised parking controls to reduce the number of spaces available.	X		X	X	X	
G	Northern road bypass	The northern road bypass alignment is proposed to start north of Camms Road and utilise Narre Warren – Cranbourne Road and reconnect with the South Gippsland Highway south of Sladen Street. Under this option, the South Gippsland Highway could contain a modified configuration as detailed in Figure 6.5 of this report. Refer Figure C3.	Land has been set aside (including being covered by a public acquisition overlay) along Narre Warren Road for a bypass of the Cranbourne Town Centre.	X		X	X	X	
I*	Strategic pedestrian network Lite	Develop a strategic pedestrian network. The network should be supported through footpaths, pram ramps, street furniture, wayfinding and street lighting. The 'life' version of this option would be to install wayfinding signage without the support of upgraded infrastructure.	VicRoads' SmartRoads Road Use Hierarchy identifies a small network of pedestrian priority routes within the study area. However, a more fine-grained area would be identified through the development of a strategic pedestrian network. This would also assist in creating a mode shift away from the private car.	X		X	X	X	
3. Connected Cranbourne									
B	New / revised parking controls	As detailed in Section 4.6 of this report.	To facilitate a mode shift away from the private car it is recommended to adopt revised parking controls to reduce the number of spaces available.	-	N/A	X	X	X	X
C	Rail extension to Cranbourne East and Clyde	Extend the railway line along the existing disused railway corridor and construct two new stations at Cranbourne East and Clyde.	Infrastructure Victoria Report indicating rail line should be extended to Cranbourne East and Clyde in 10-15 years.	X		X	X	X	
D	Regional PT connections	Implement several regional bus routes along primary arterials to connect railway stations, activity centres and regions with higher job rates. The routes are proposed to be high frequency, supported by dedicated bus lanes. The proposed routes are as per Figure C1.	ABS data indicates that residents of Casey work to the west and north-west of Cranbourne, including Frankston and Dandenong.	-		X	X	X	
D*	Regional PT connections Lite	Implement several regional bus routes along primary arterials to connect railway stations, activity centres and regions with higher job rates. The routes are proposed to be high frequency, supported by dedicated bus lanes. The proposed routes are as per Figure C1. The 'life' version of this option includes the installation of new routes at high frequency, but without the support of bus lanes.	ABS data indicates that residents of Casey work to the west and north-west of Cranbourne, including Frankston and Dandenong.	X		-	-	-	
E	Local PT connections	Implement several local bus routes within the Cranbourne activity centre to support local movements between the railway station and other trip generators (e.g. schools, retail, residential). The proposed routes are as per PTV's future plan and shown in Figure C2.	There are significant gaps in public transport coverage in key parts of Cranbourne. The provision of new local bus routes connects these areas to trip generators and encourages mode shift away from the private car.	X		X	X	X	
F	Southern road bypass	An alternative bypass alignment is proposed to the south of the Cranbourne Town Centre. The alignment would follow Western Port Highway, and Browns Road, as per Figure C3.	Given Narre Warren Road is located within the Cranbourne Town Centre boundary, an alternative bypass option has been provided, which completely bypasses the town centre.	-		X	X	X	
H	Strategic cycling network	Develop a strategic cycling network. The network should be supported through cycling infrastructure like cycling lanes, head start boxes and lights, end of trip facilities at key destinations. Figure C4 provides an outline of potential strategic bicycle network upgrades.	VicRoads' SmartRoads Road Use Hierarchy and Principal Bicycle Network both identify key bicycle priority routes throughout the study area. There are gaps in this network, which would be filled by a strategic cycling network for the area. Additional cycling routes would also assist in creating a mode shift away from the private car.	X		X	X	X	
I	Strategic pedestrian network	Develop a strategic pedestrian network. The network should be supported through footpaths, pram ramps, street furniture, wayfinding and street lighting. Figure C5 provides an outline of potential strategic pedestrian network upgrades.	VicRoads' SmartRoads Road Use Hierarchy identifies a small network of pedestrian priority routes within the study area. However, a more fine-grained area would be identified through the development of a strategic pedestrian network. This would also assist in creating a mode shift away from the private car.	-		X	X	X	
J	Policy incentives	There are a range of policy measures that City of Casey could implement to incentivise Cranbourne residents and workers to utilise active and sustainable modes of transport. Refer Table C2.	There is a lack of existing municipal policy to encourage mode shift.	X		X	X	X	

Figure C1: Possible Strategic Bus Network (Regional)



Figure C2: Future Local Area Bus Network (2022)



Source: Transport for Victoria

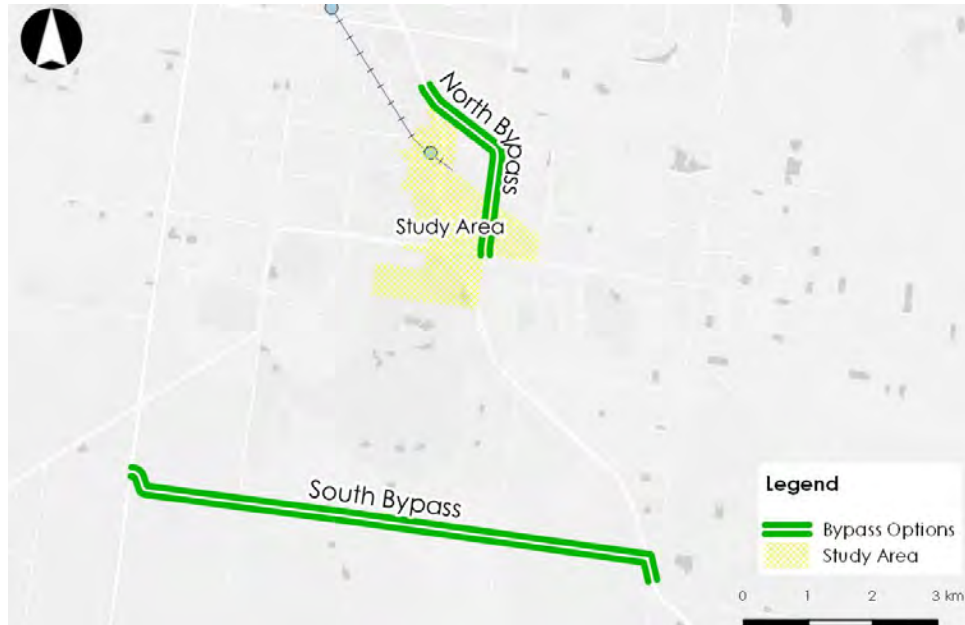
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Figure C3: Possible Cranbourne Bypass Options



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Figure C5: Potential Strategic Pedestrian Network Upgrades

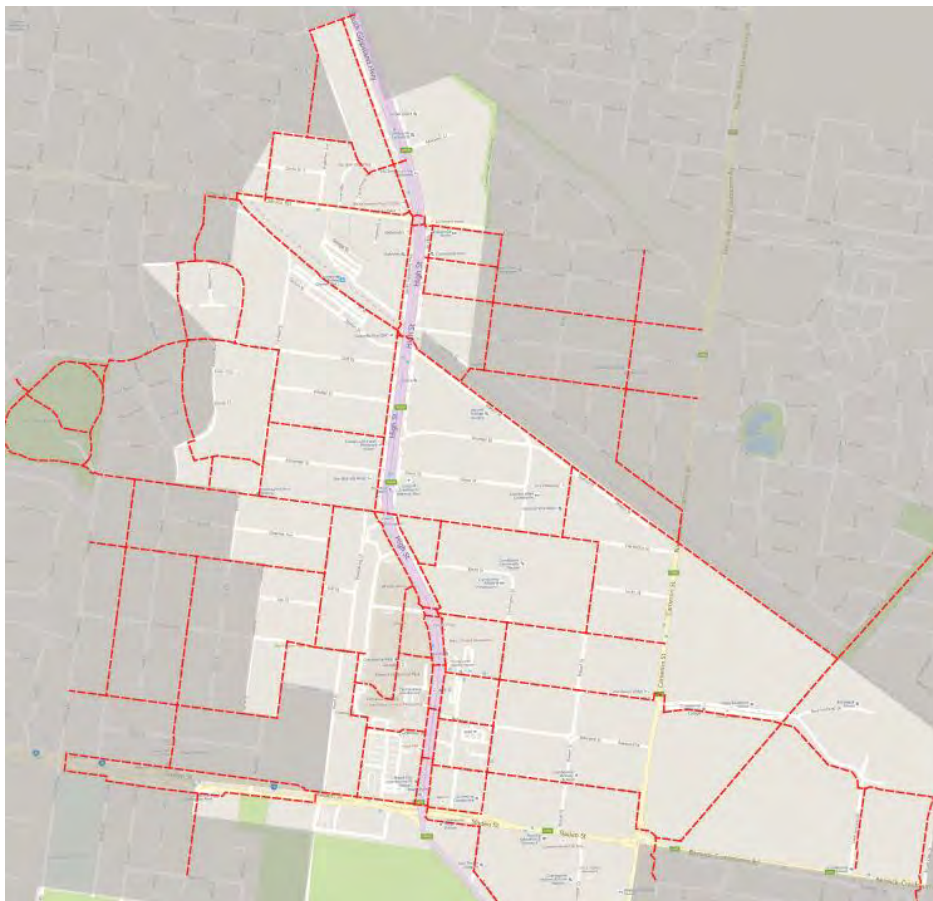



Table C1: Policy Measures

Mode	Description
General	Commence a 'commuter club' to enable Cranbourne residents to access discounted Myki tickets paid through their rates payments
	Provide new residents with a welcome pack outlining active and sustainable transport networks
Bus	Review the locations of bus stops and commit capital funding to construct footpaths to all stop locations
	Reallocate road space to implement bus lanes and jump starts
	Provide real time travel information at bus stops
	Implement a DCPO to provide a telebus service
Car	Implement parking permit schemes to limit the number of vehicles
	Support car share schemes through parking restrictions
Train	Advocate for extension of services and track duplication
	Advocate for increased frequency
	Improve pedestrian and cycling connectivity to the station through path upgrades, end of trip facilities and lighting
	Restrict the Cranbourne Station off-street car park to public transport users. Options could include installing a boom gate and linking access to Myki card
Cycling	Install end of trip facilities for bikes at Council facilities
	Support cycling training programs in schools and the wider community

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Appendix D

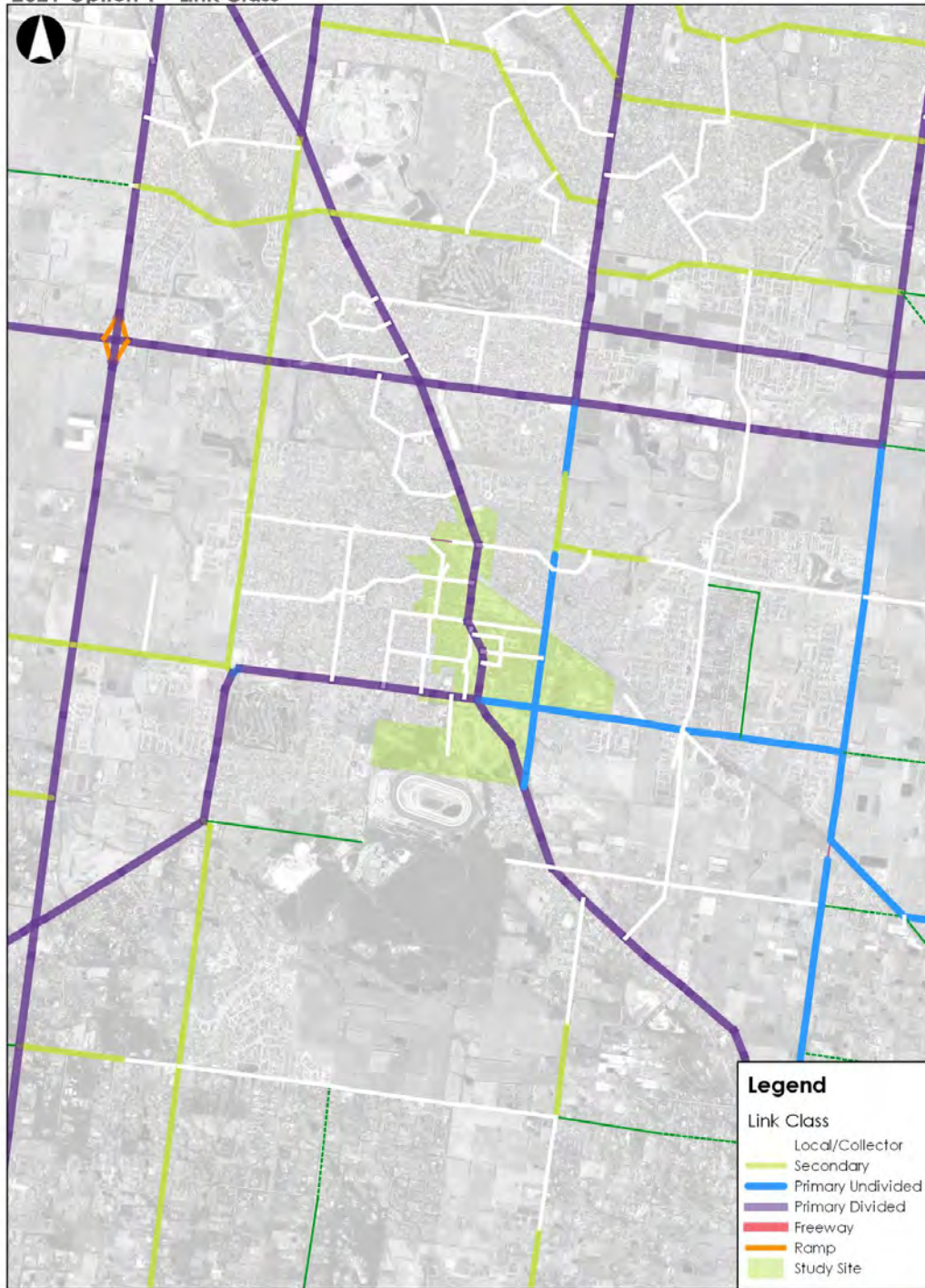
Model Option Outputs

Appendix D



Model Inputs

Cranbourne Town Centre Access
2021 Option 1 - Link Class



Legend

Link Class

- Local/Collector
- Secondary
- Primary Undivided
- Primary Divided
- Freeway
- Ramp
- Study Site

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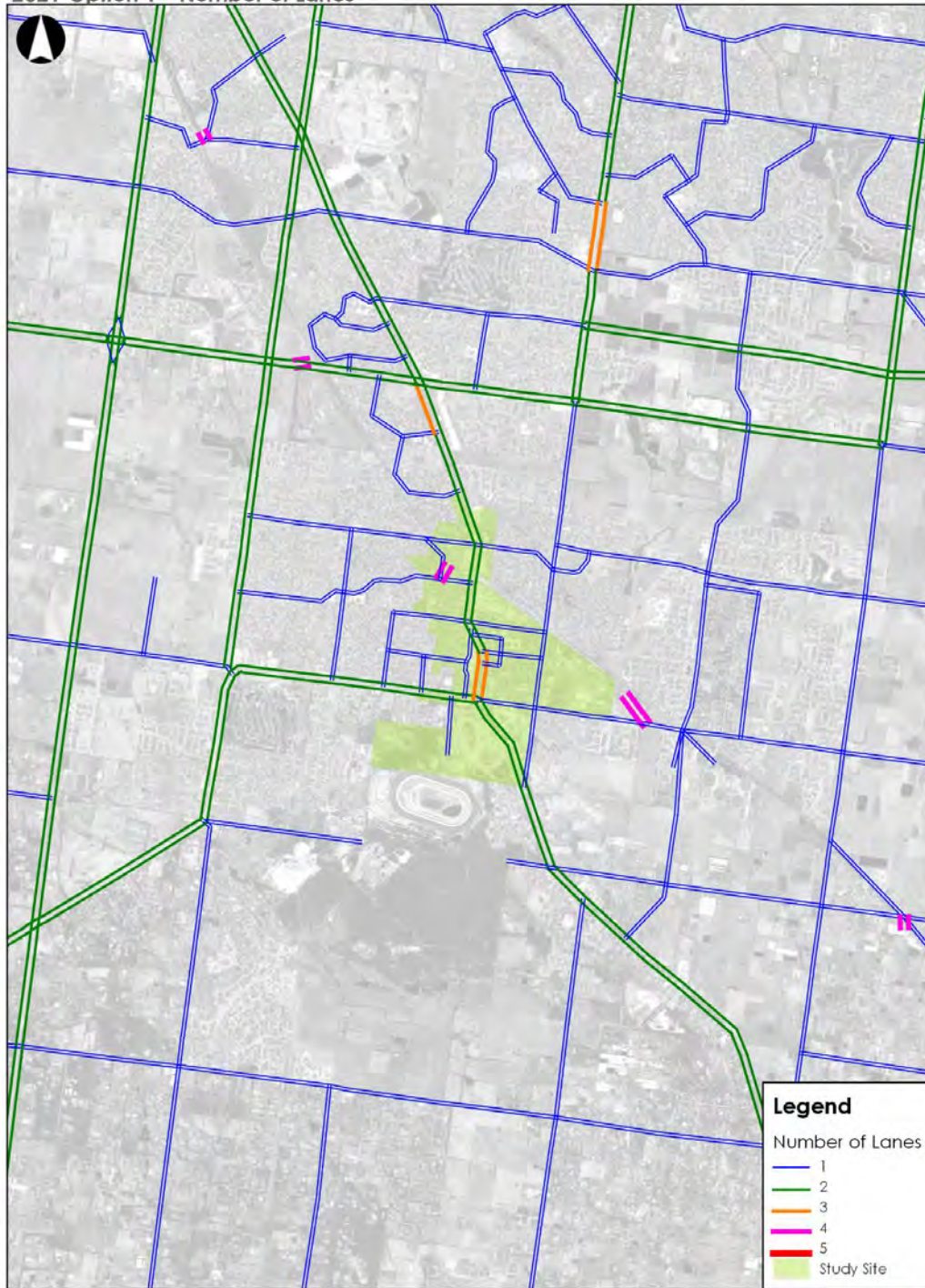
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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2021 Option 1 - Number of Lanes



Legend

Number of Lanes

- 1
- 2
- 3
- 4
- 5
- Study Site

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V118270 - VITM2016_160317_V1_2

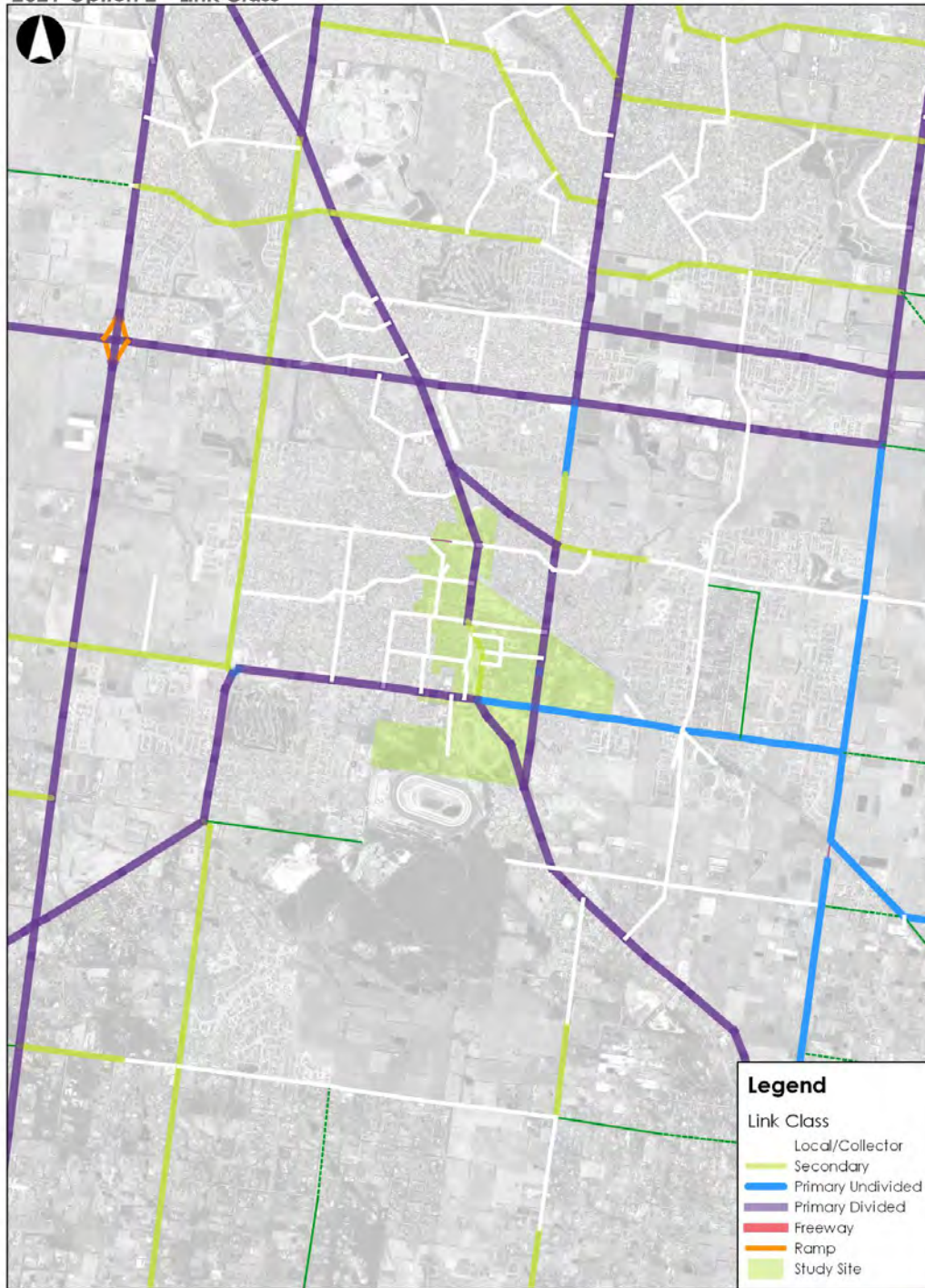


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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2021 Option 2 - Link Class



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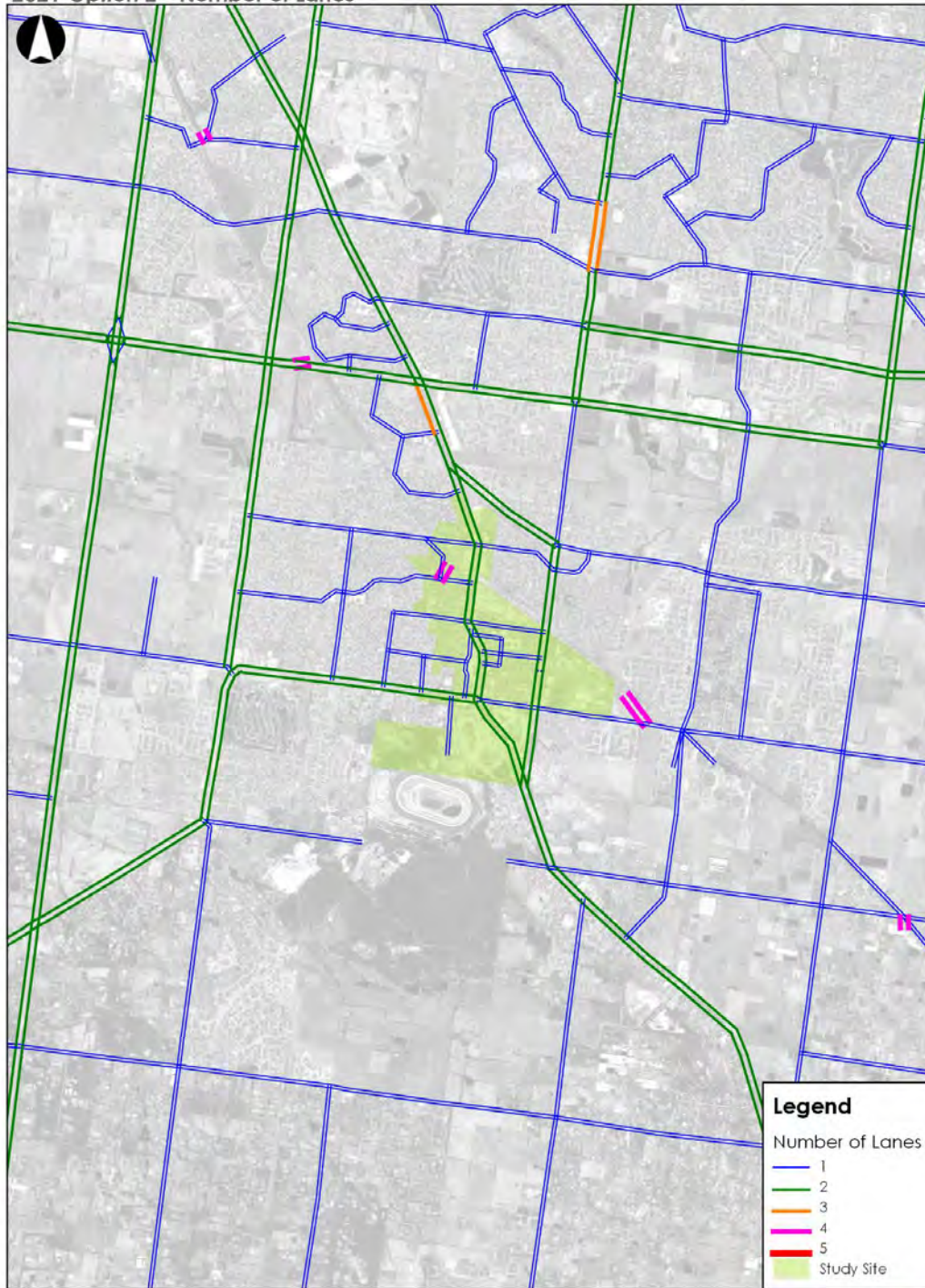
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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2021 Option 2 - Number of Lanes



Legend

Number of Lanes

- 1
- 2
- 3
- 4
- 5
- Study Site

01/12/2017
Issue: A
V118270 - VITM2016_160317_V1_2

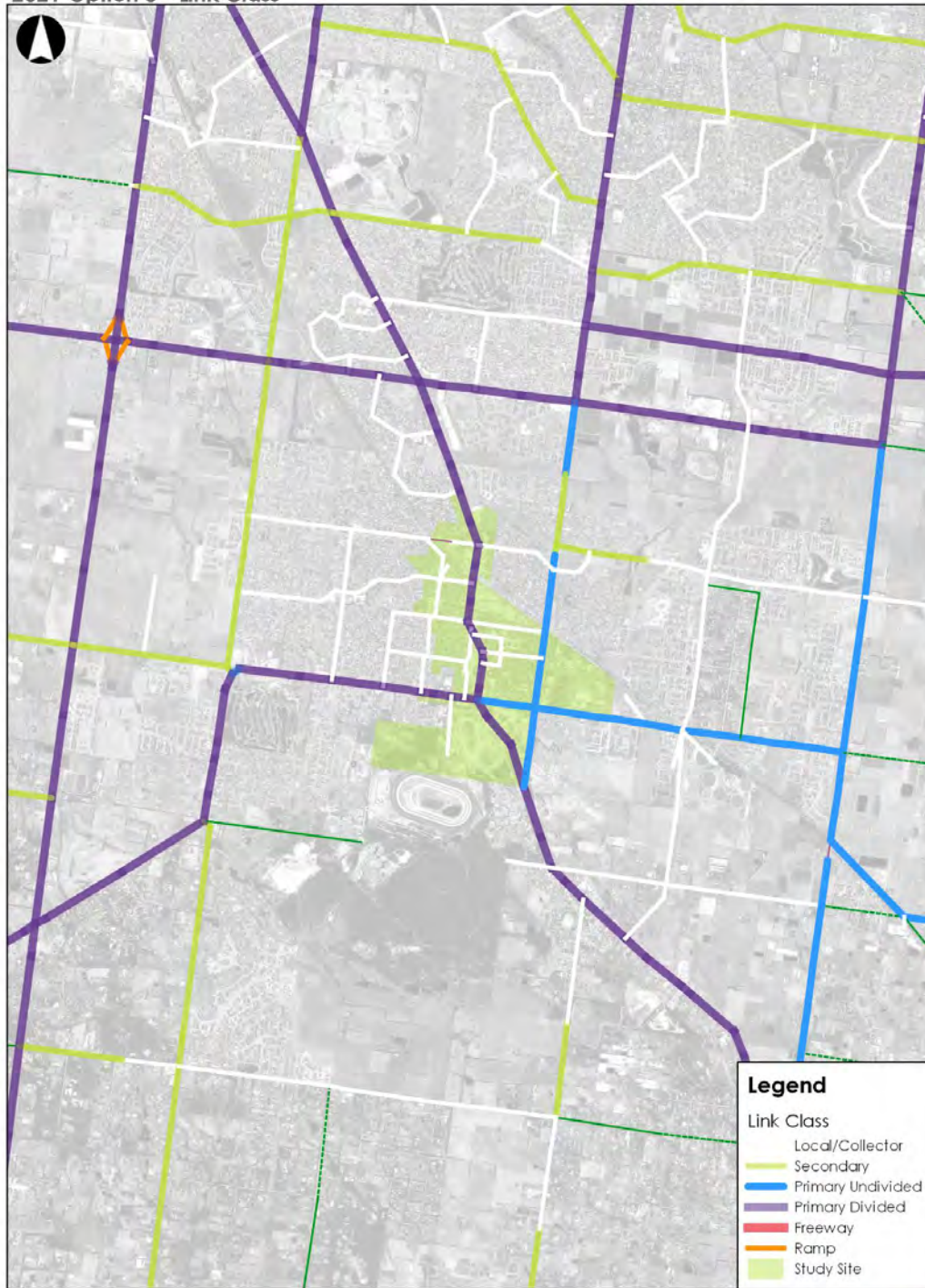


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Cranbourne Town Centre Access
2021 Option 3 - Link Class



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V118270 // 01/12/17

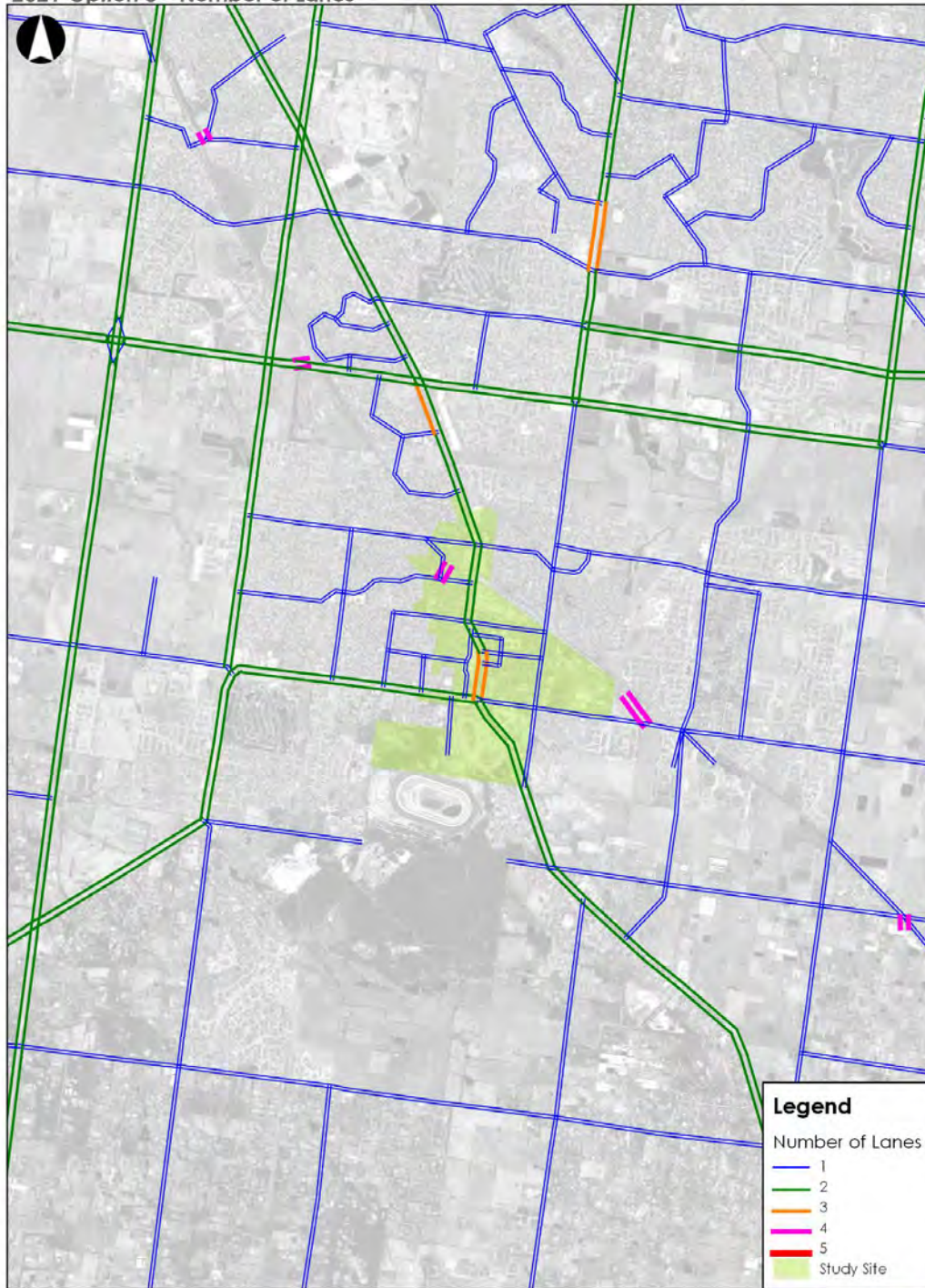
Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Option 3 - Number of Lanes



Legend

Number of Lanes

- 1
- 2
- 3
- 4
- 5
- Study Site

01/12/2017
Issue: A
V118270 - VITM2016_160317_V1_2

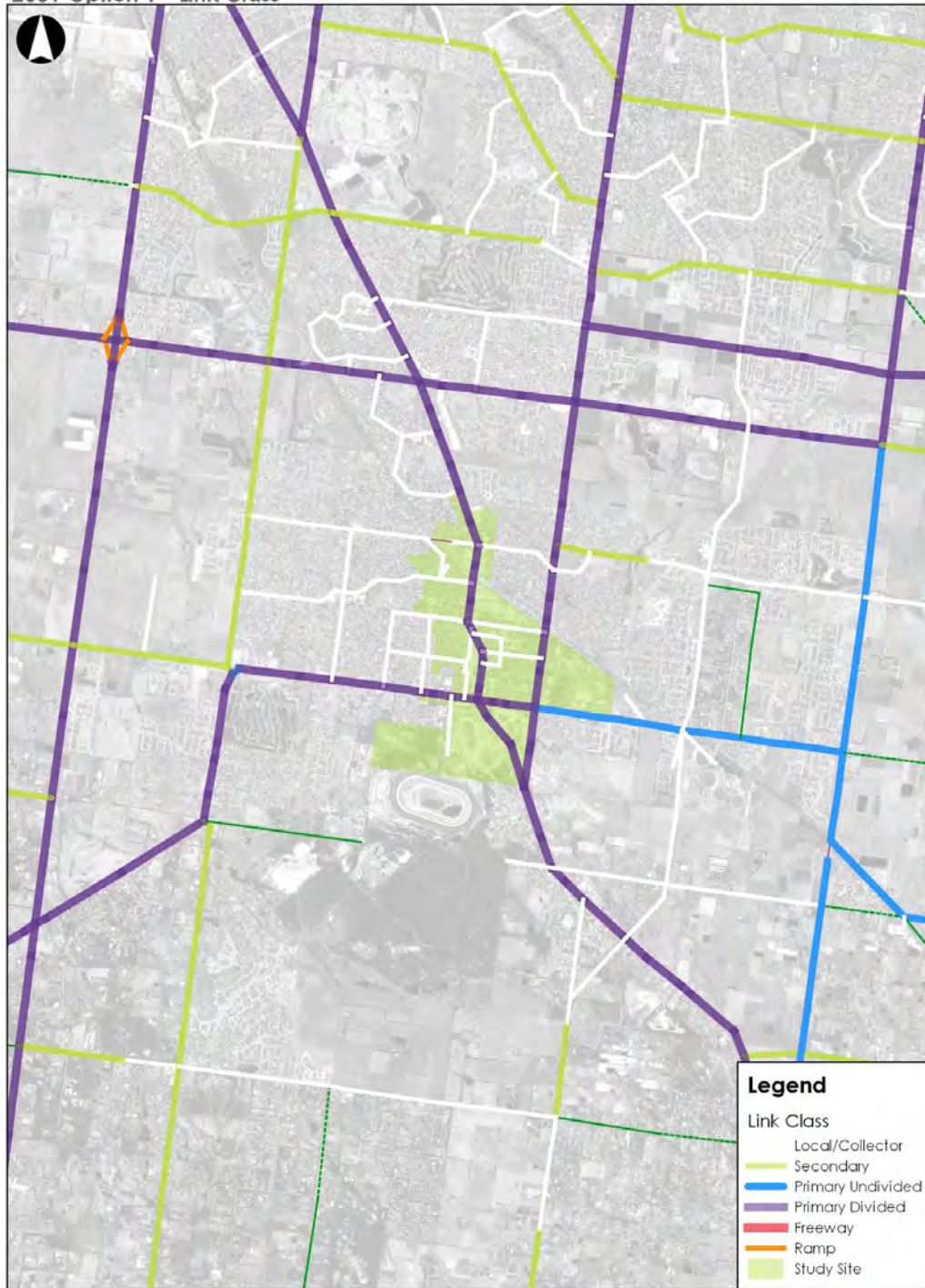


V118270 // 01/12/17
Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Option 1 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

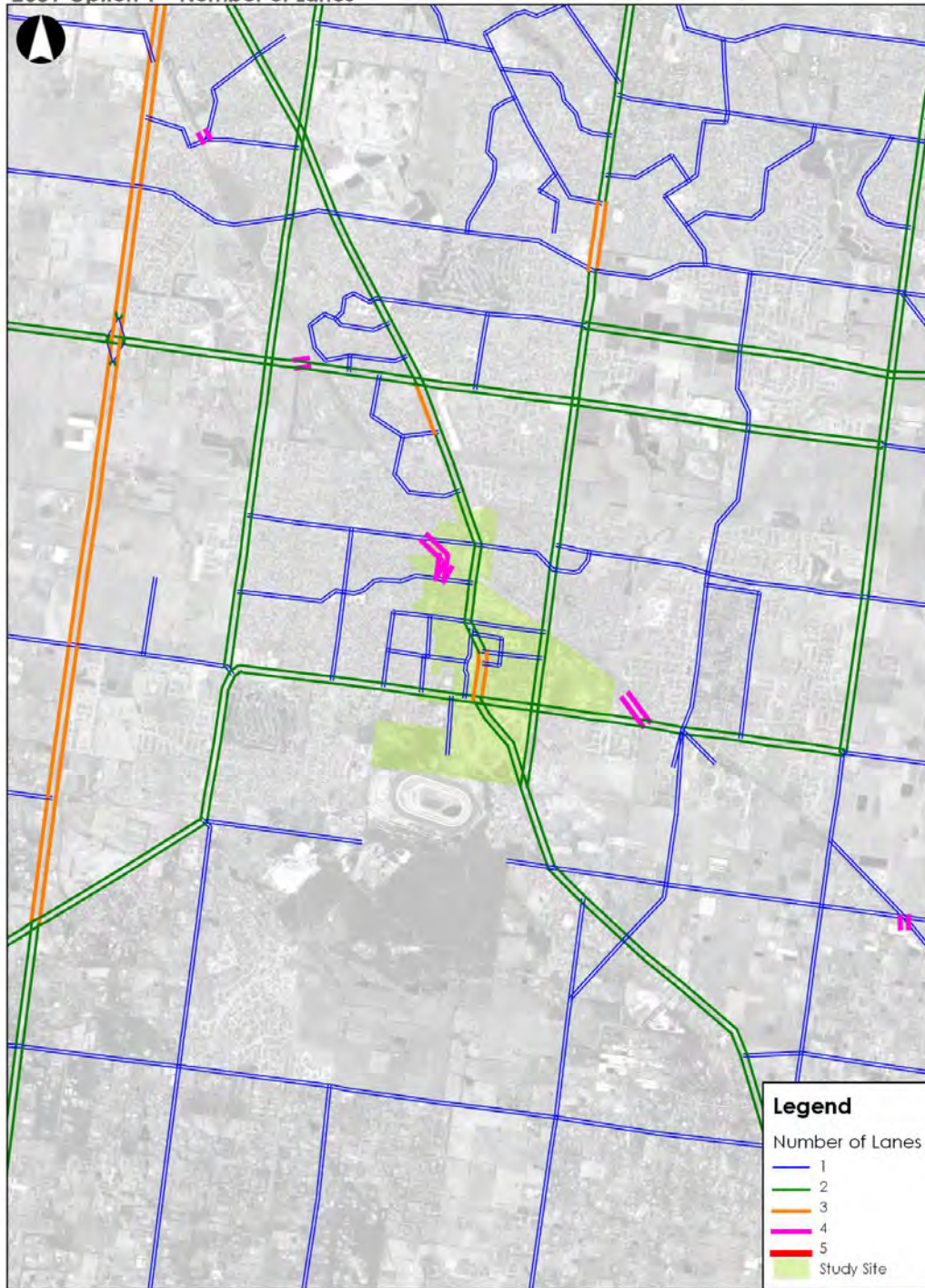
Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



Document Set ID: 12331517
Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2031 Option 1 - Number of Lanes



Legend

Number of Lanes

1

2

3

4

5

Study Site

01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



GTA consultants

V118270 // 01/12/17

Movement and Access Strategy // Issue: A-Dr2

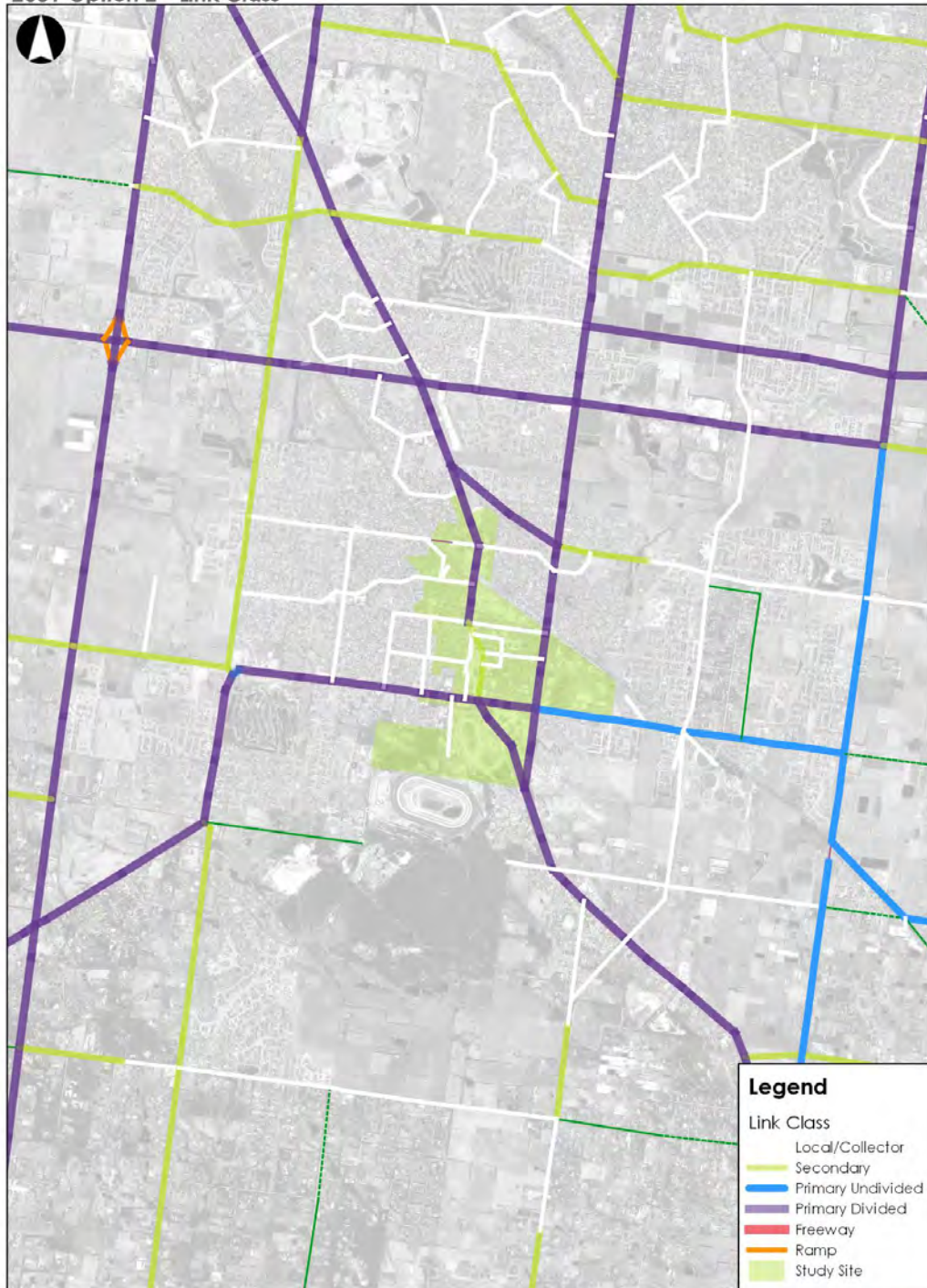
Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2031 Option 2 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

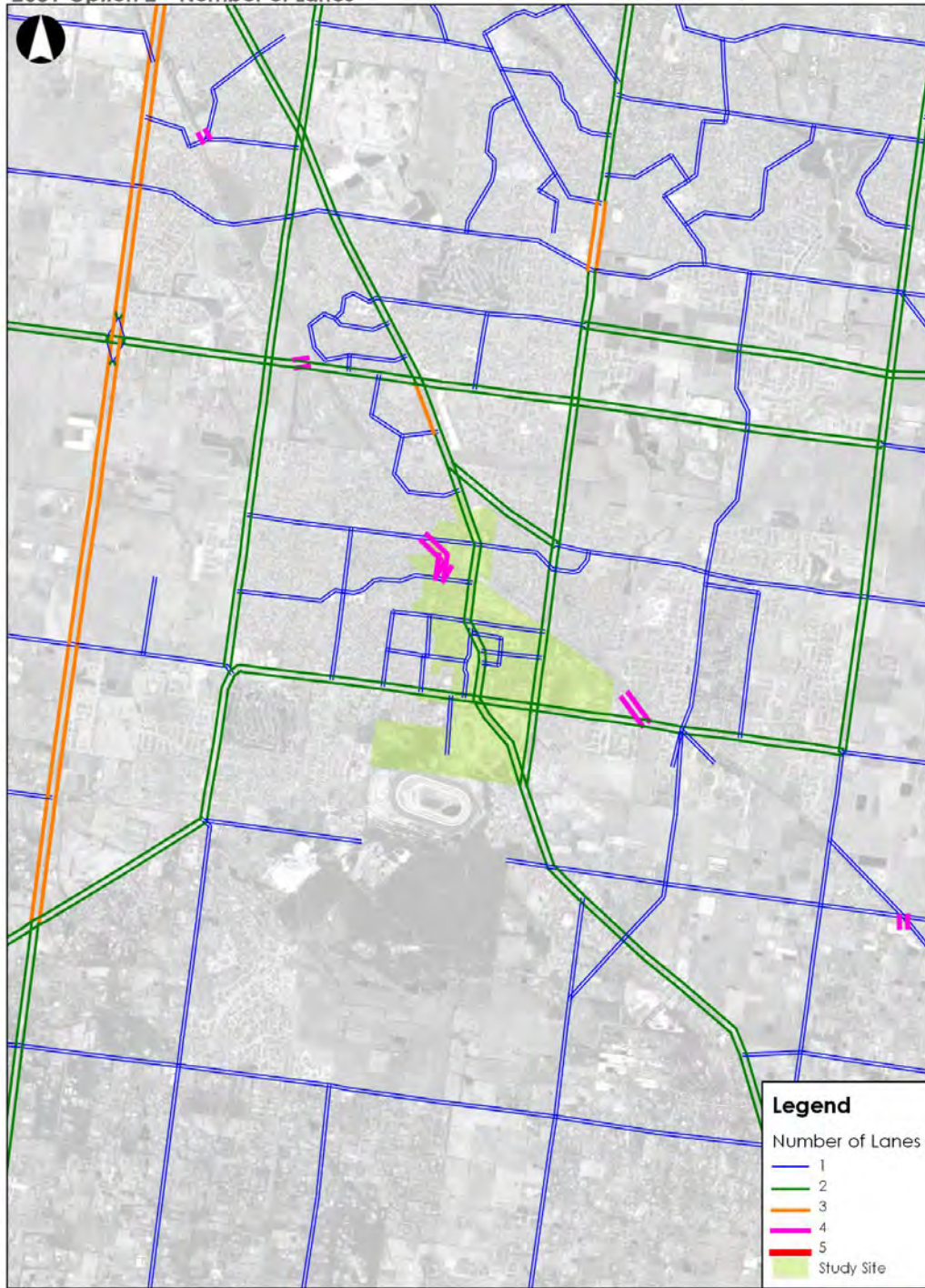
Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



Document Set ID: 12331517
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Cranbourne Town Centre Access
2031 Option 2 - Number of Lanes



Legend
Number of Lanes
1
2
3
4
5
Study Site

01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

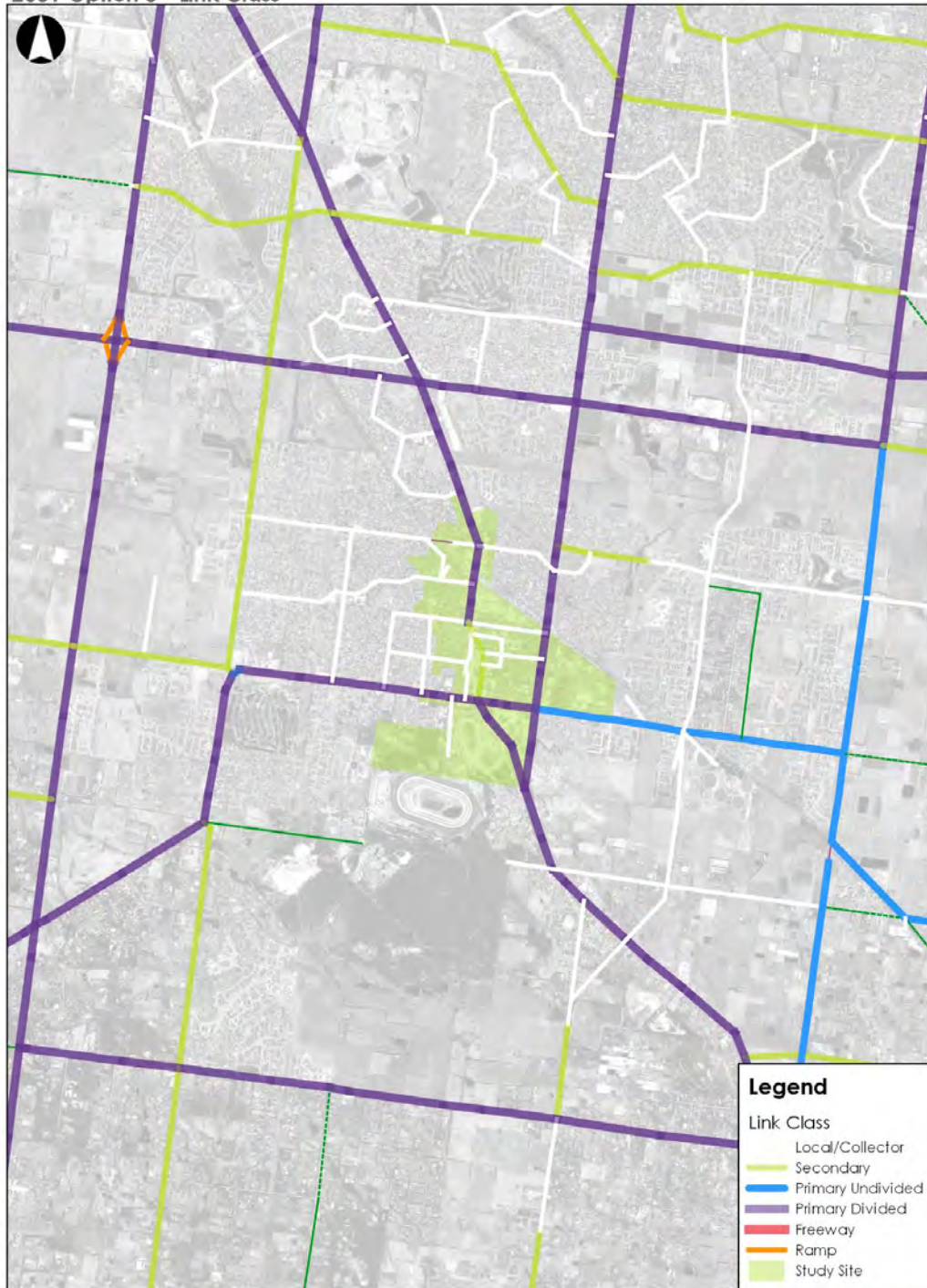
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Option 3 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

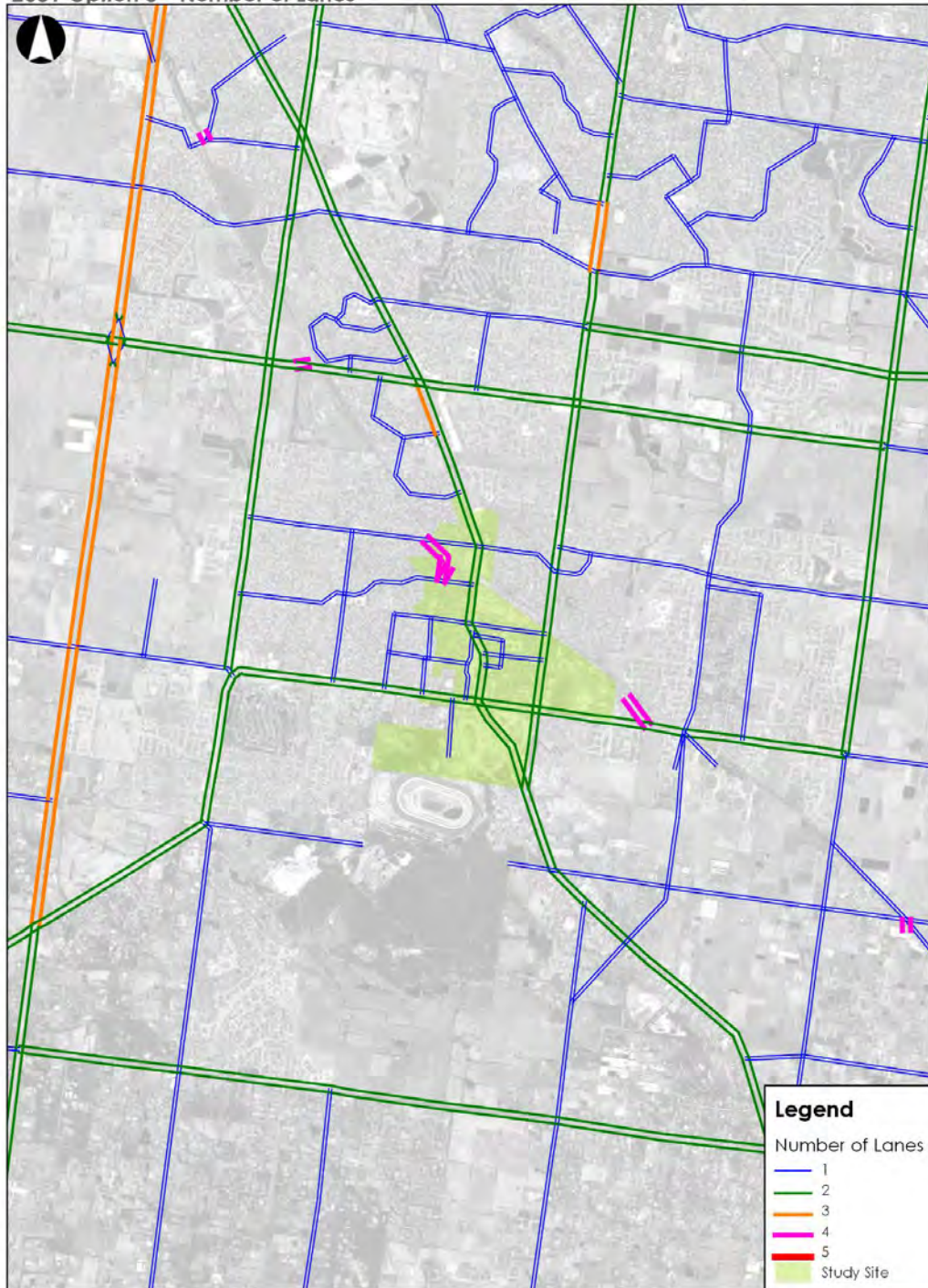
Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Option 3 - Number of Lanes



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

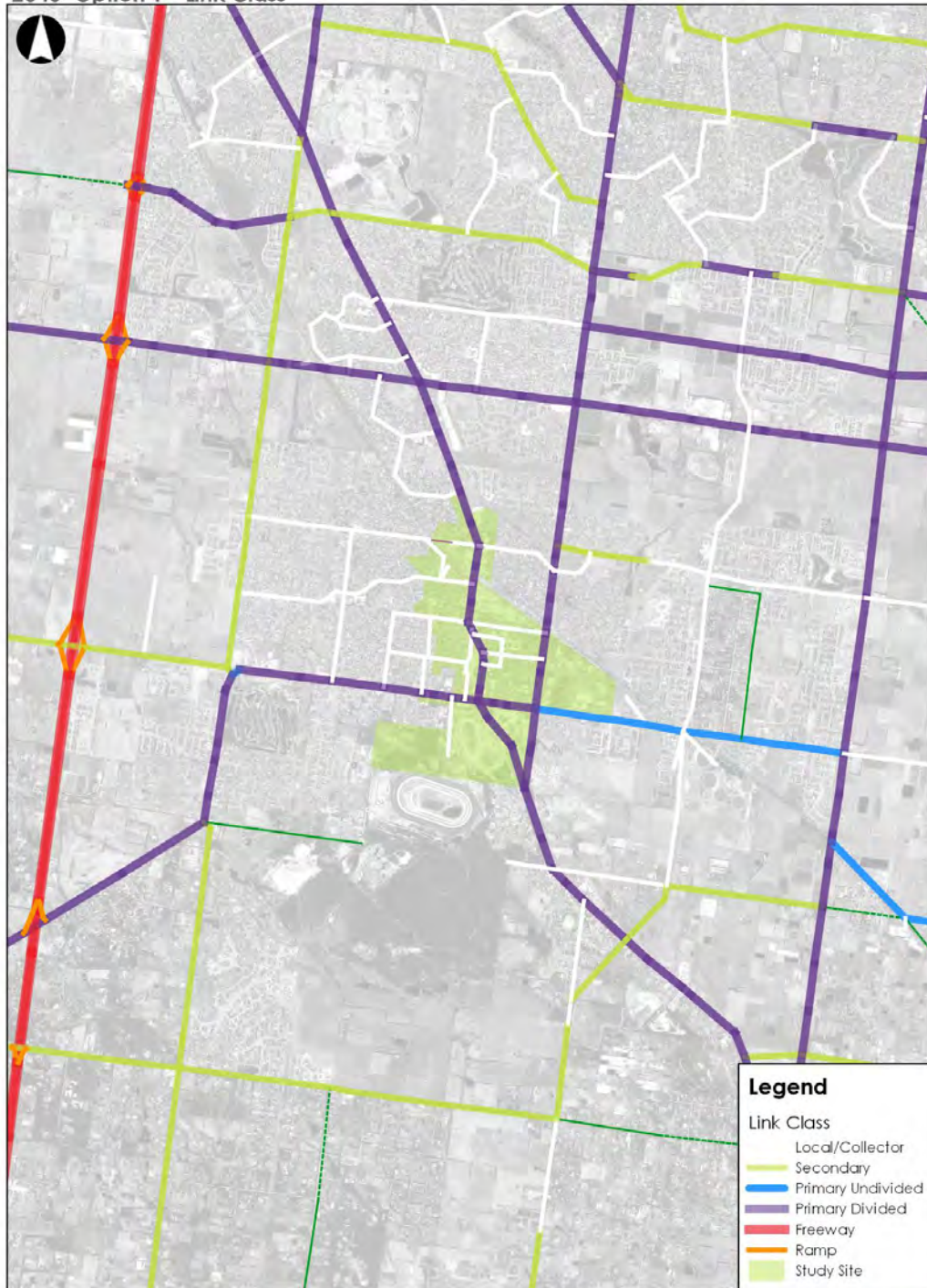
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 1 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

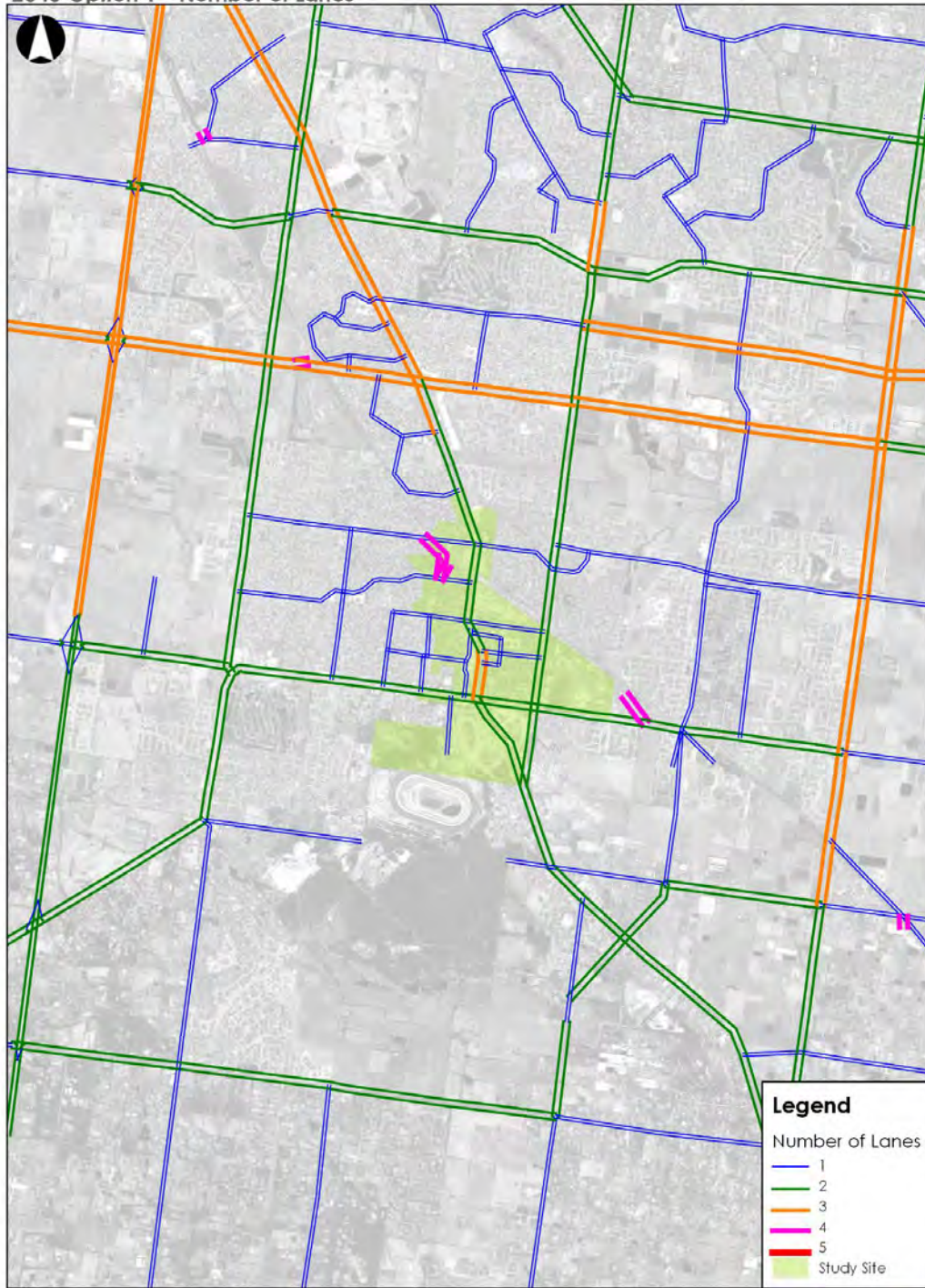
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 1 - Number of Lanes



01/12/2017
Issue: A

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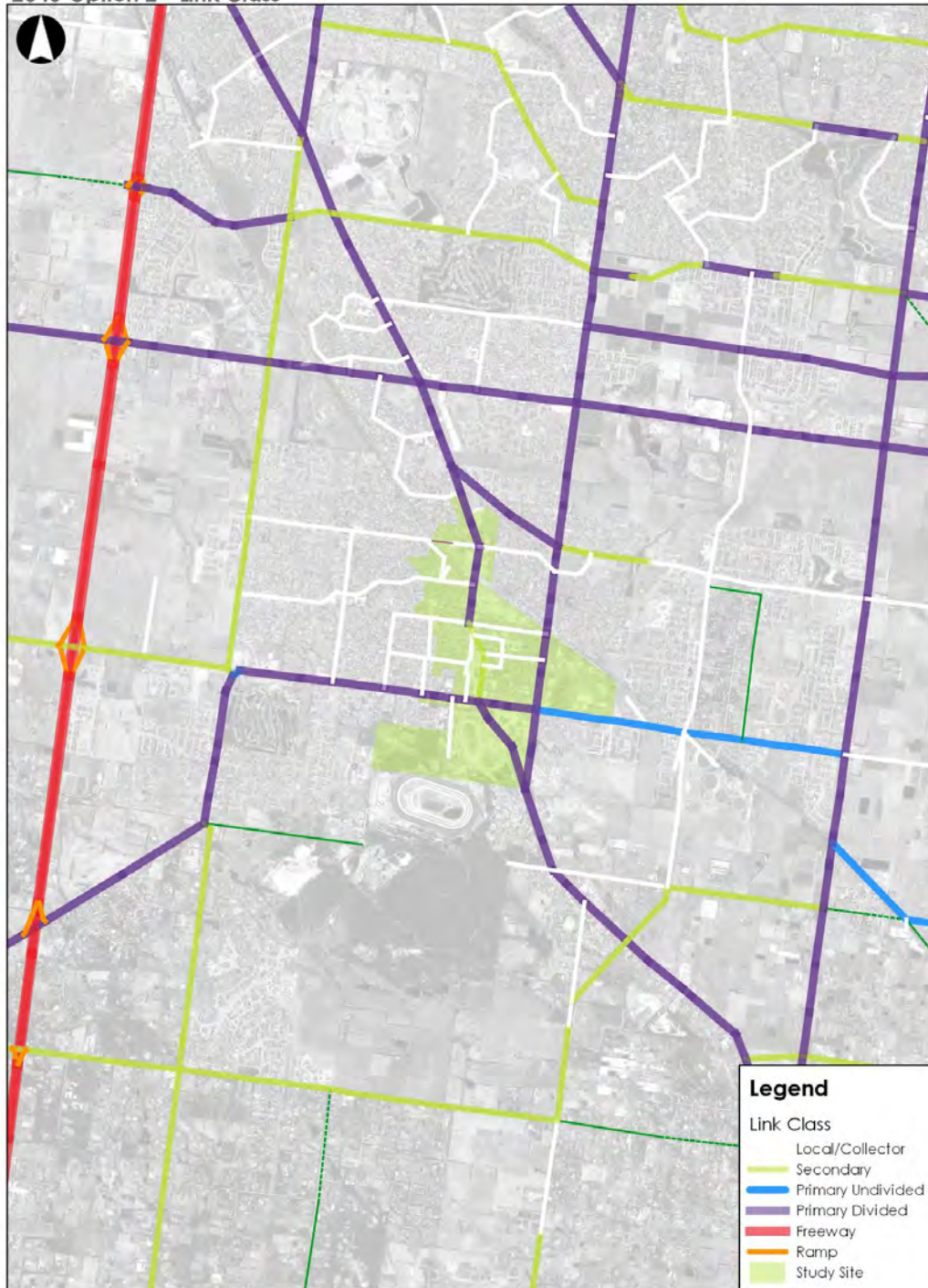
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 2 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



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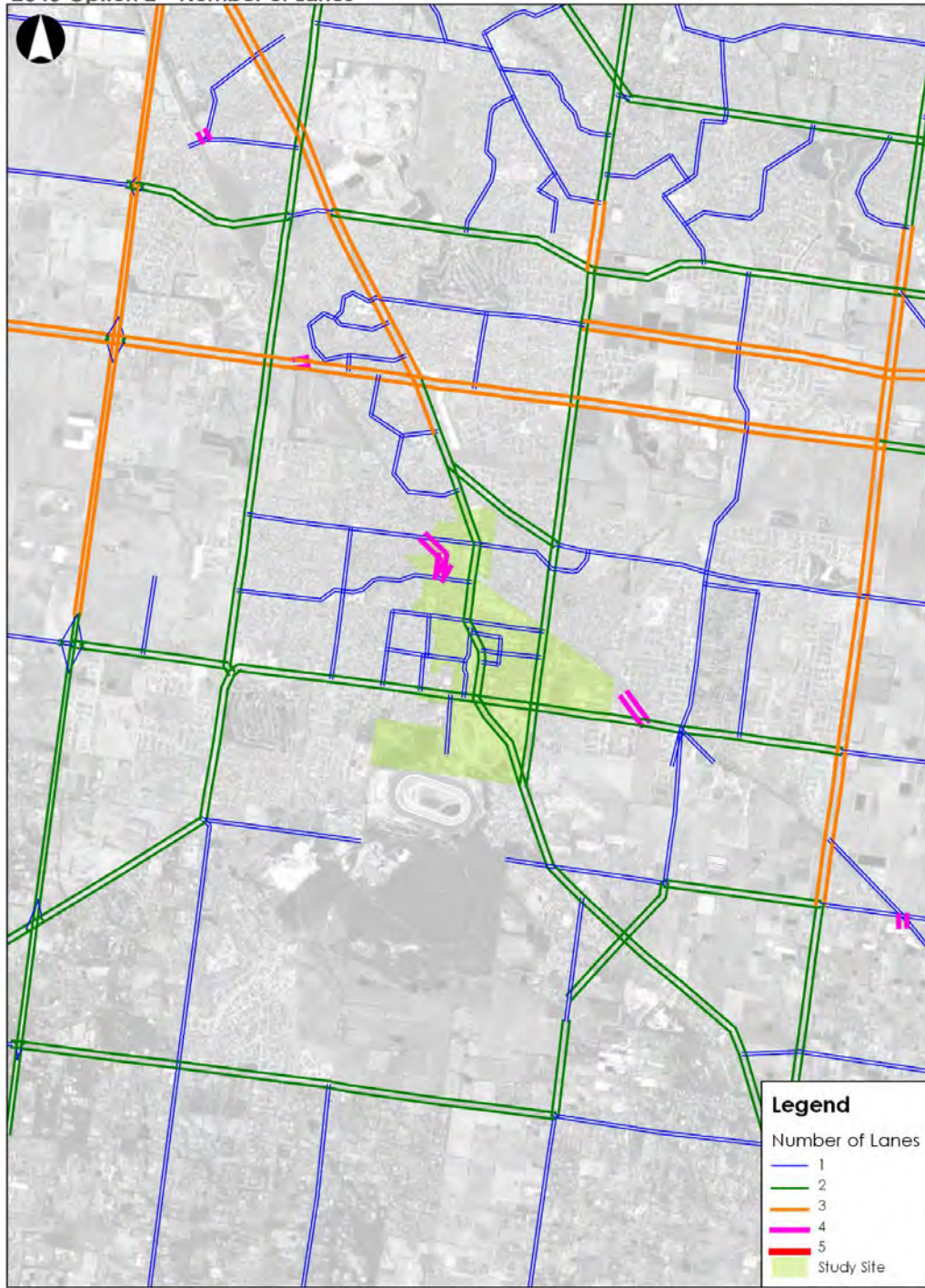
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 2 - Number of Lanes



01/12/2017

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V118270 // 01/12/17

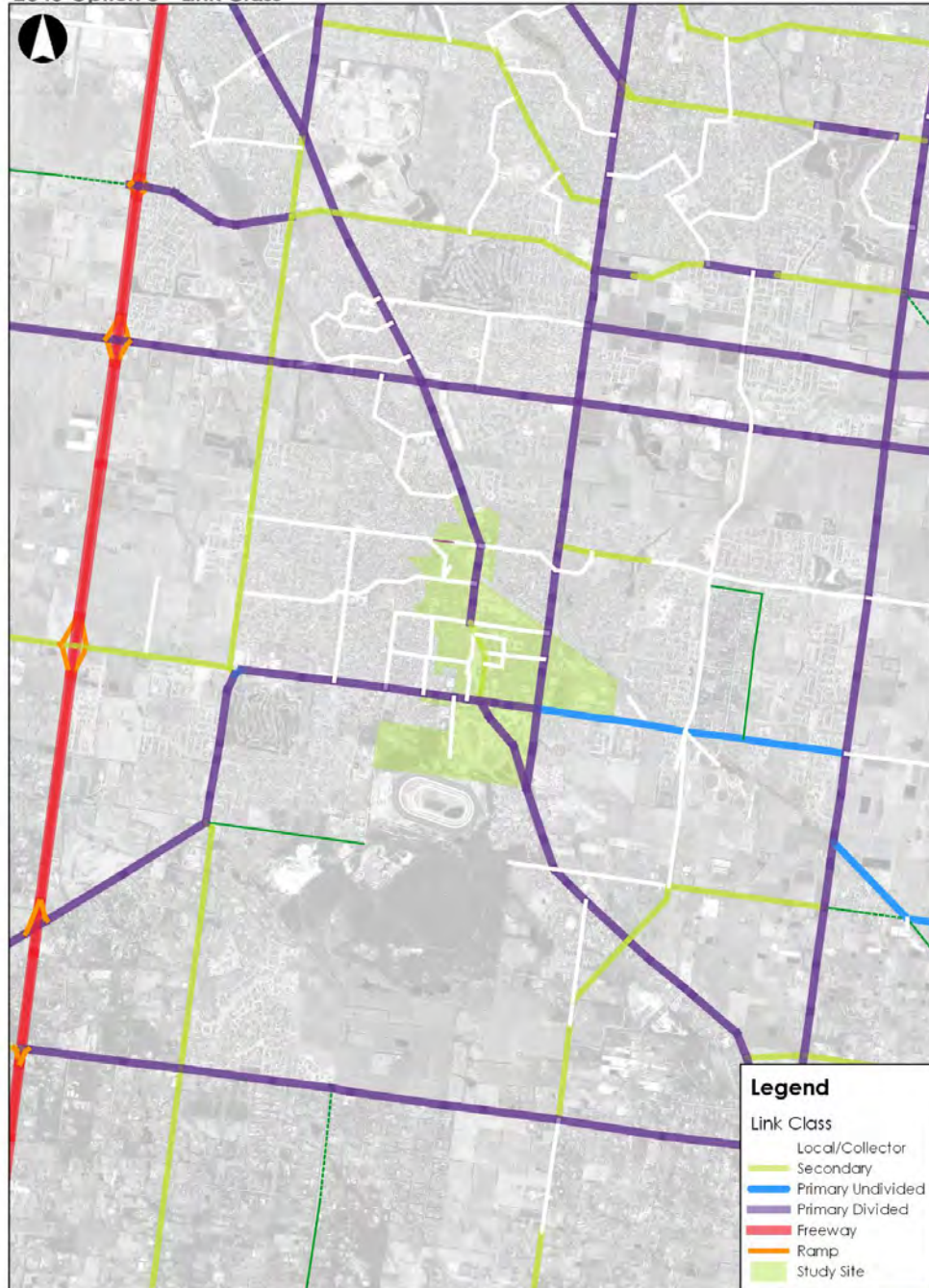
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 3 - Link Class



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

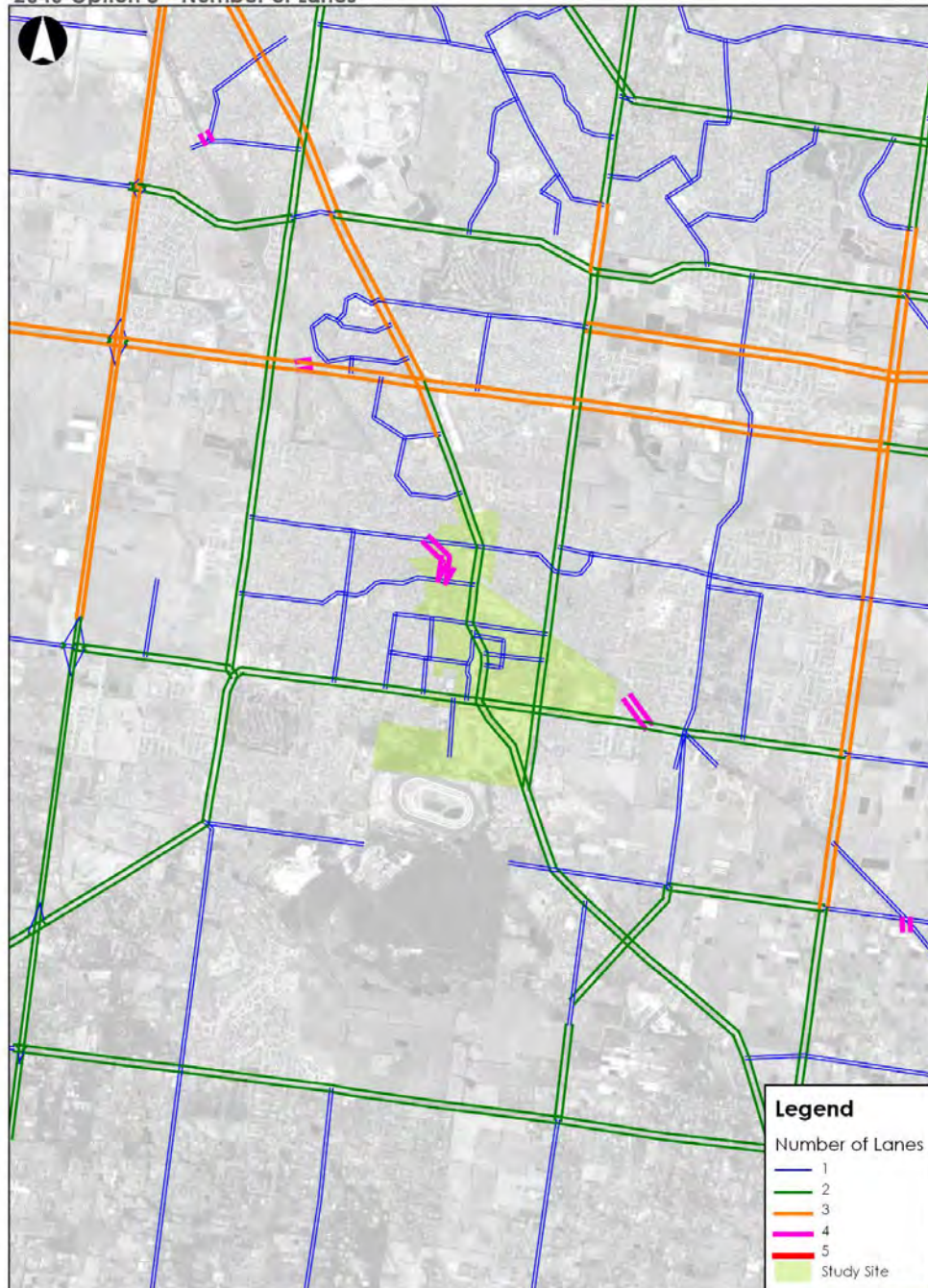
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2046 Option 3 - Number of Lanes



01/12/2017
Issue: A
V118270 - VITM2016_160317_V1_2 **GTAconsultants**

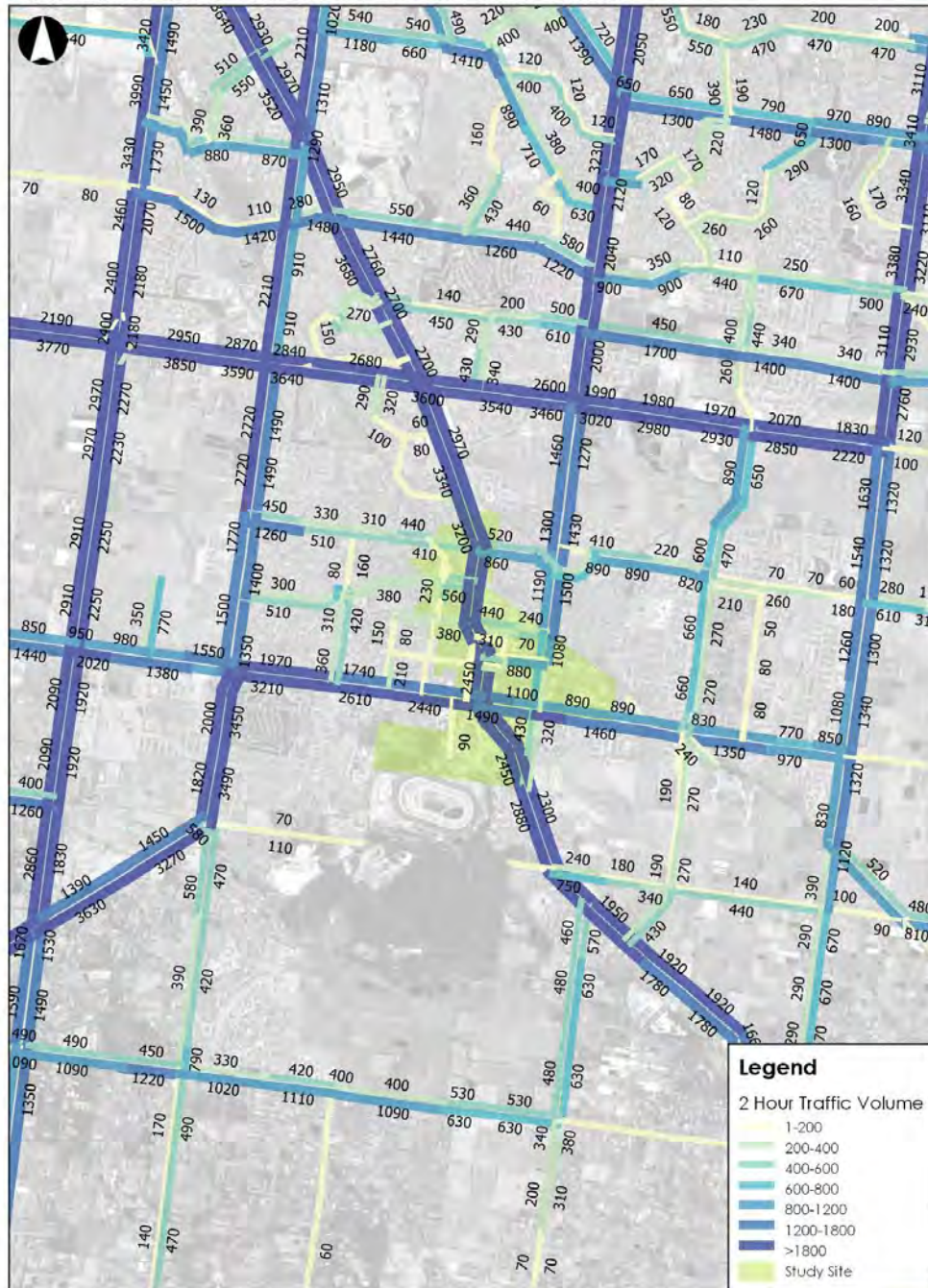
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Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Model Outputs

Cranbourne Town Centre Access
2021 Existing Density - Option 1 - AM 2 Hour Traffic Volume



01/12/2017

Issue: A

V135240 - VITM2012 NGC



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Movement and Access Strategy // Issue: A-Dr2

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Cranbourne Town Centre Access

2021 Existing Density - Option 1 - PM 2 Hour Traffic Volume



01/12/2017

Issue: A

V118270 - V11M2016_160317_V1_2



V118270 // 01/12/17

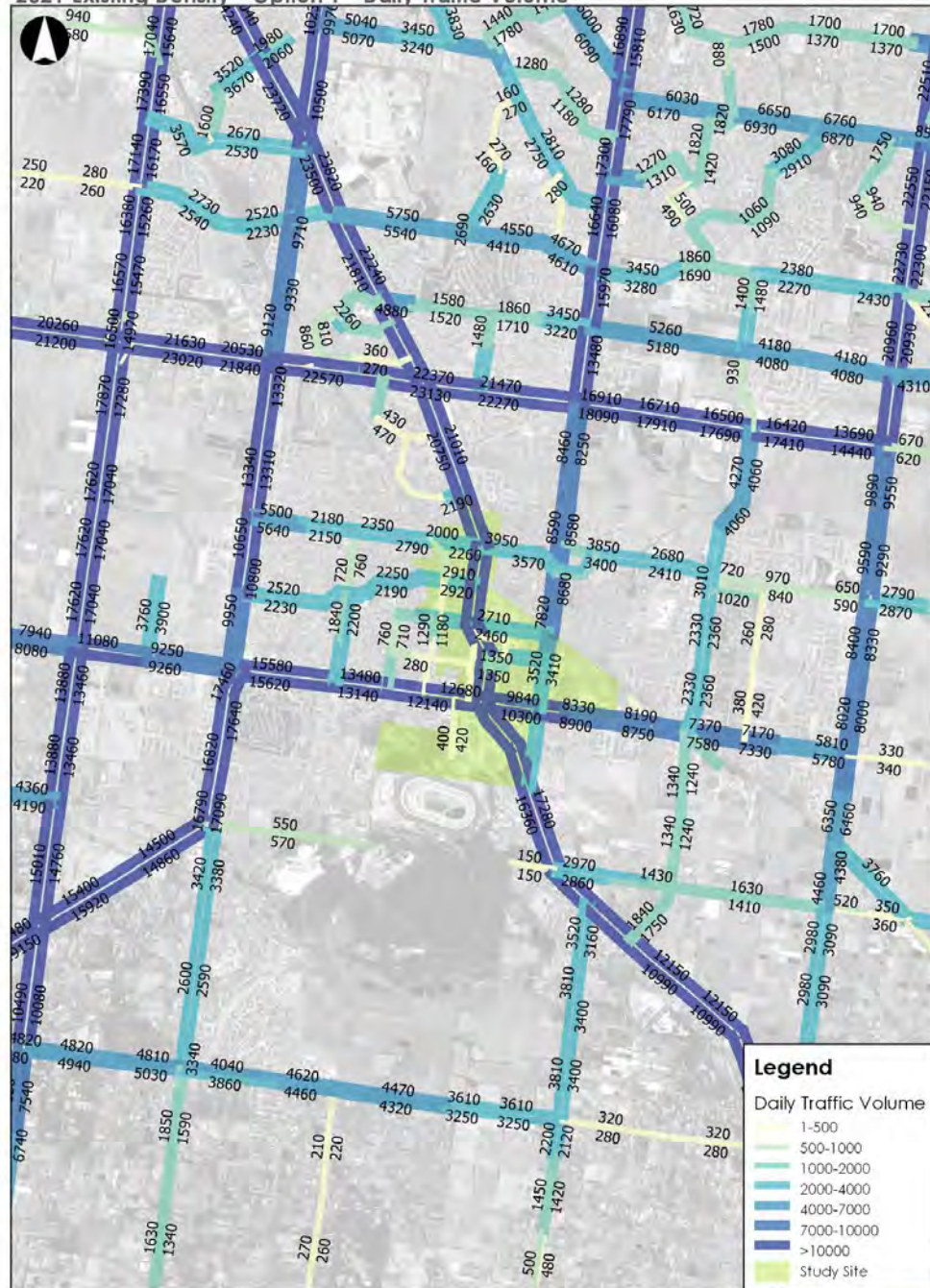
Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 1 - Daily Traffic Volume



01/12/2017

Issue: A

V118270 - V118270_160317_V1_2



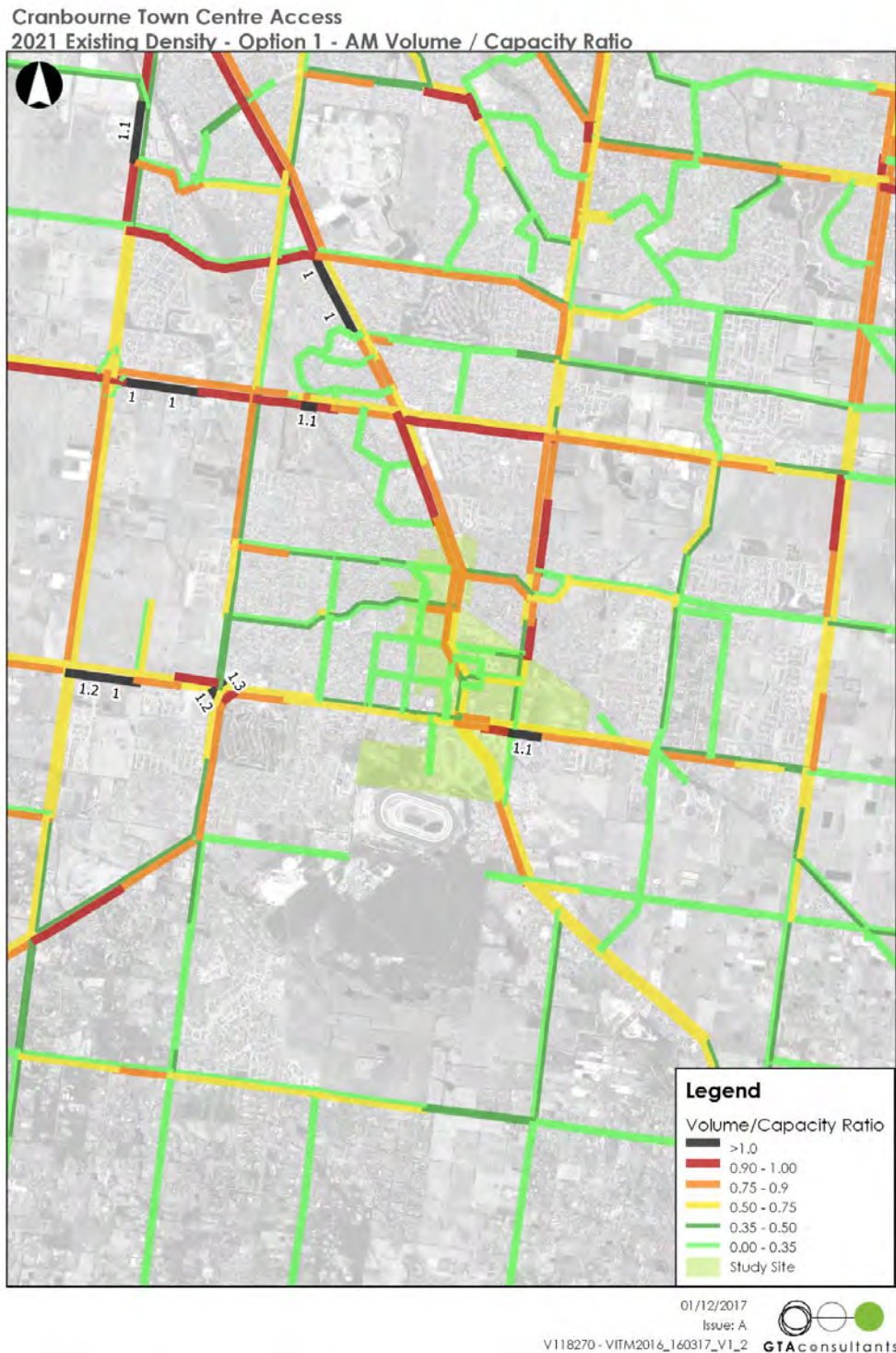
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Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



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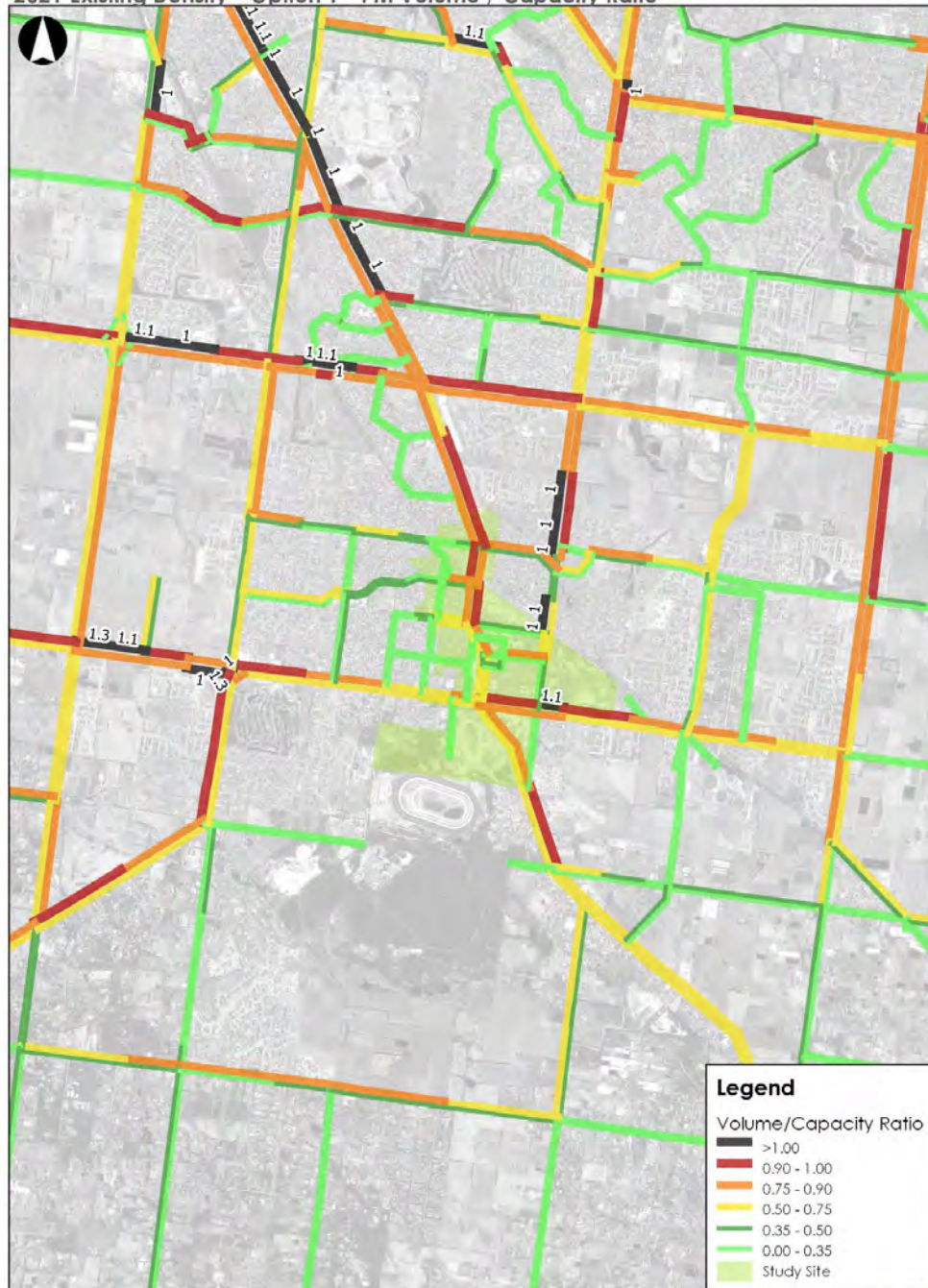


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 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 1 - PM Volume / Capacity Ratio



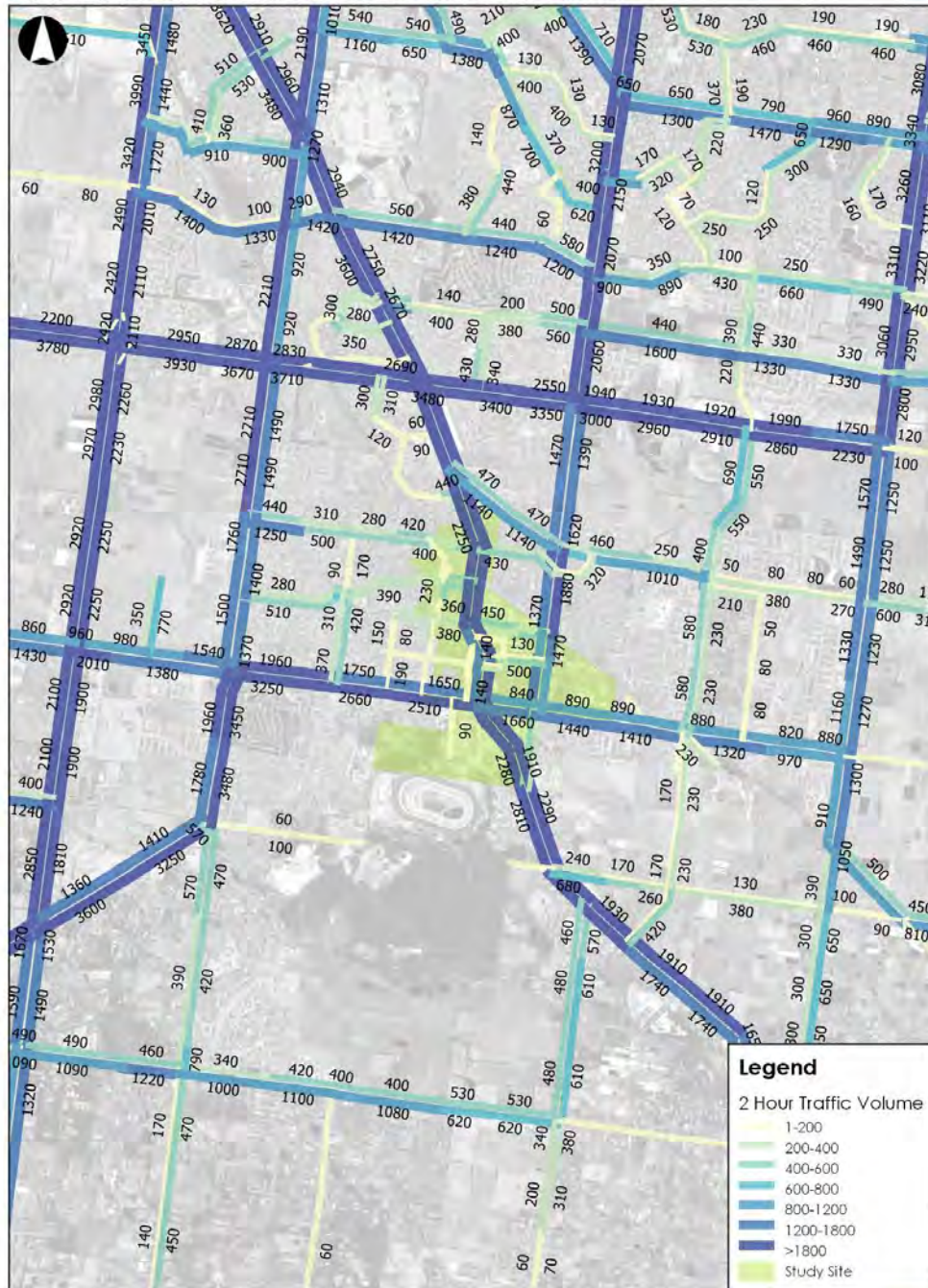
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V118270 // 01/12/17
Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 2 - AM 2 Hour Traffic Volume



01/12/2017

Issue: A

V135240 - VITM2012 NGC



V118270 // 01/12/17

Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



Document Set ID: 12331517
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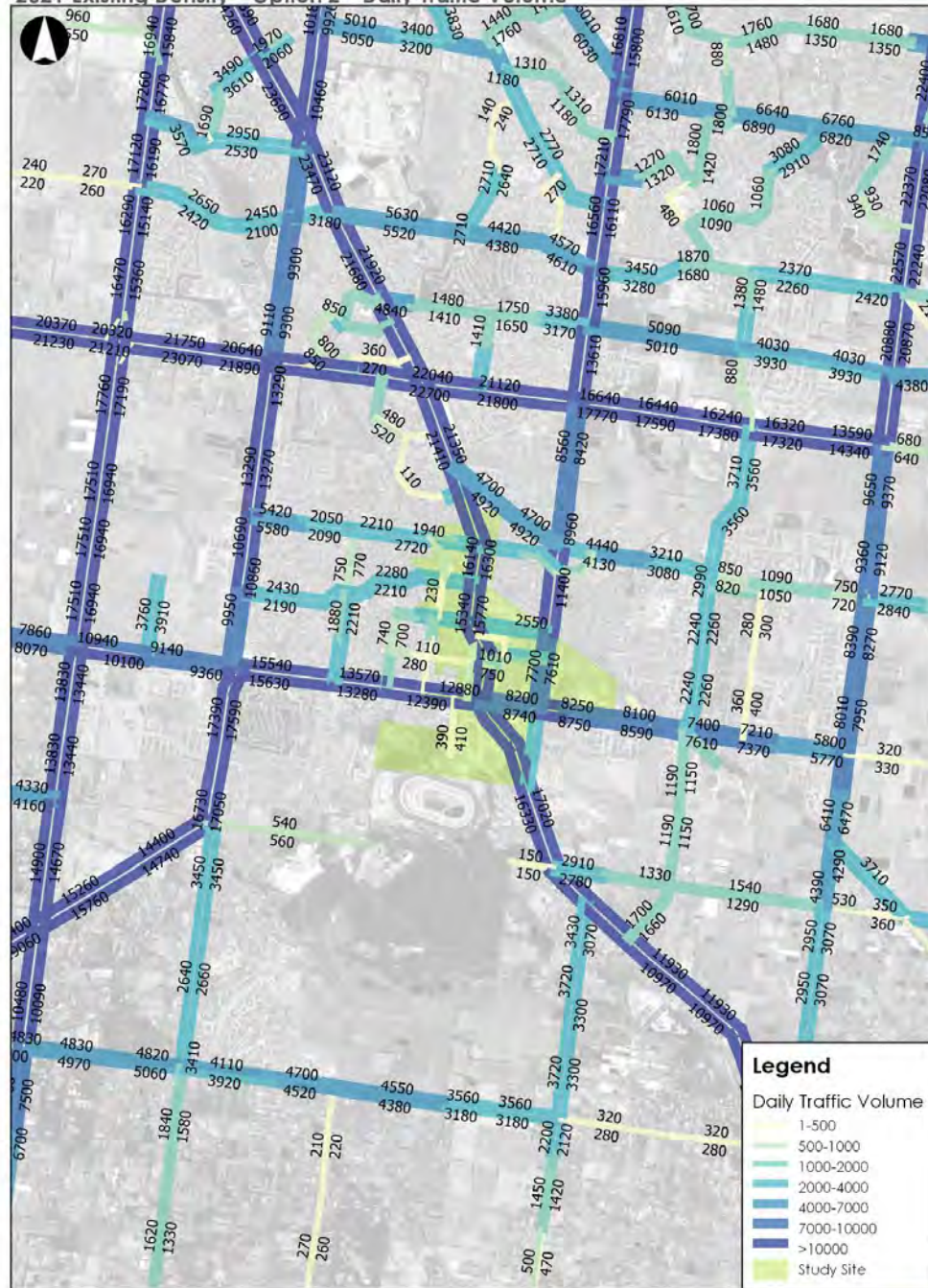


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 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



Document Set ID: 12331517
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Cranbourne Town Centre Access
2021 Existing Density - Option 2 - Daily Traffic Volume



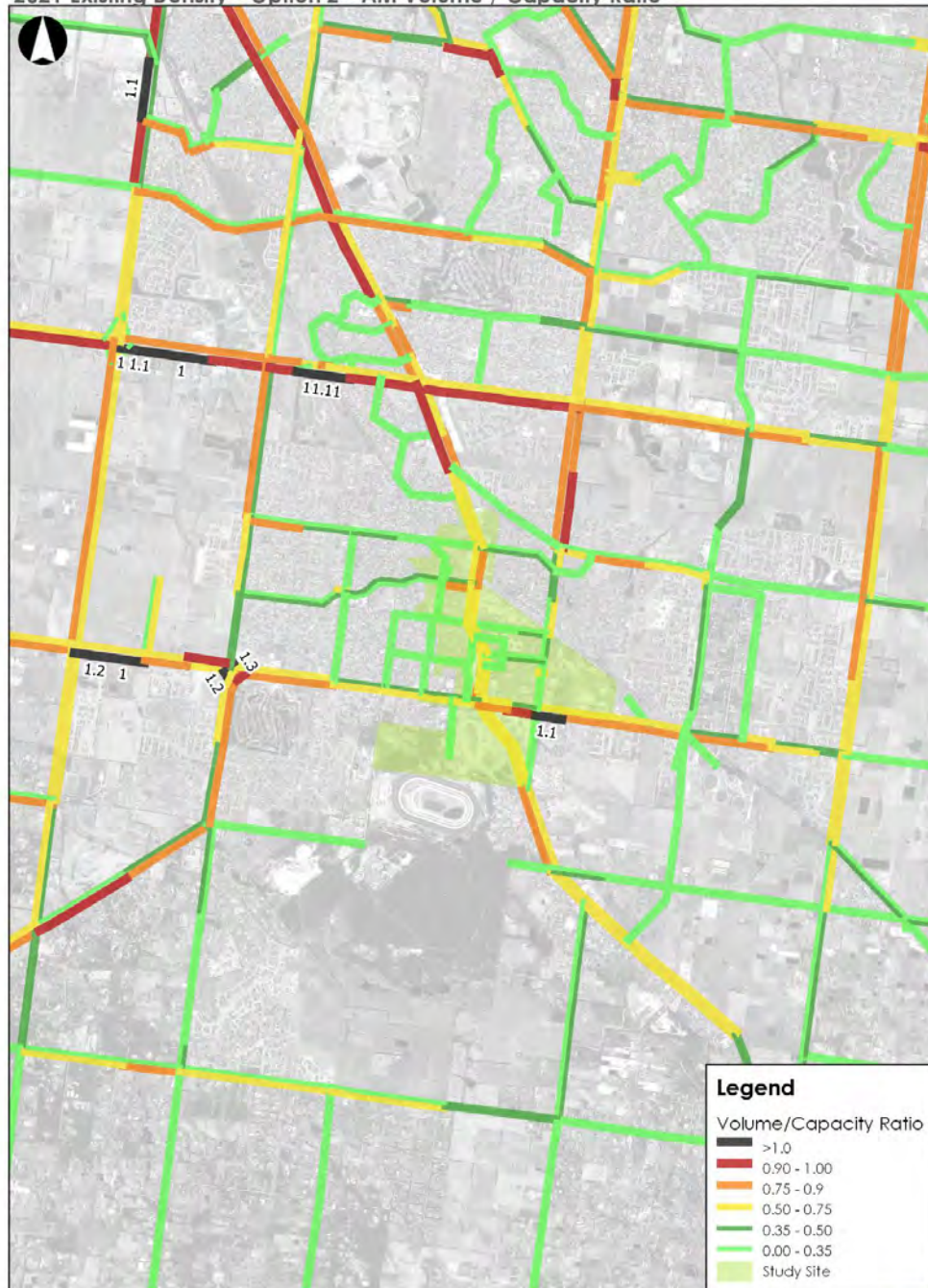
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V118270 // 01/12/17
Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 2 - AM Volume / Capacity Ratio



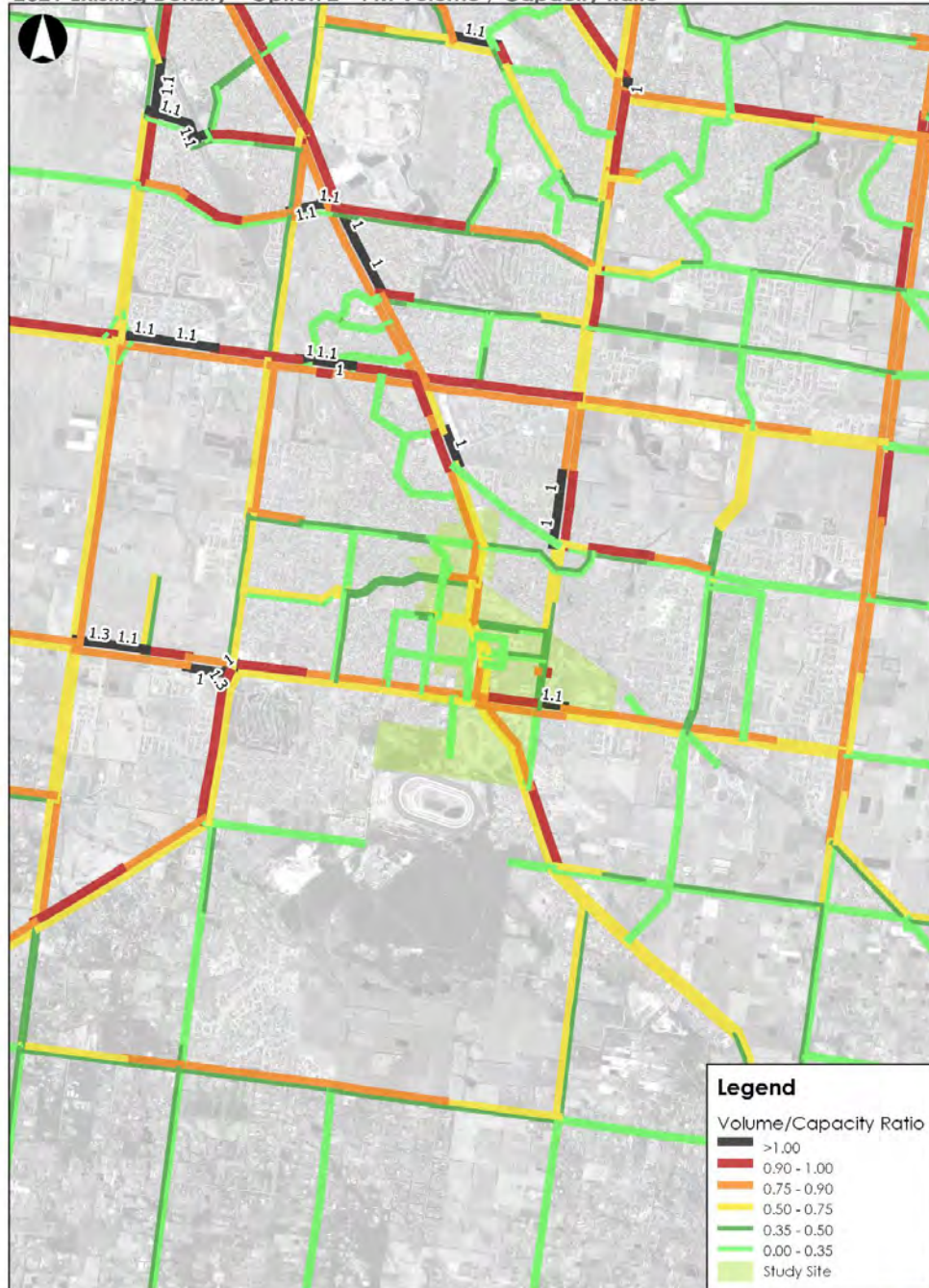
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 2 - PM Volume / Capacity Ratio



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Issue: A

V118270 - VITM2016_160317_V1_2



V118270 // 01/12/17

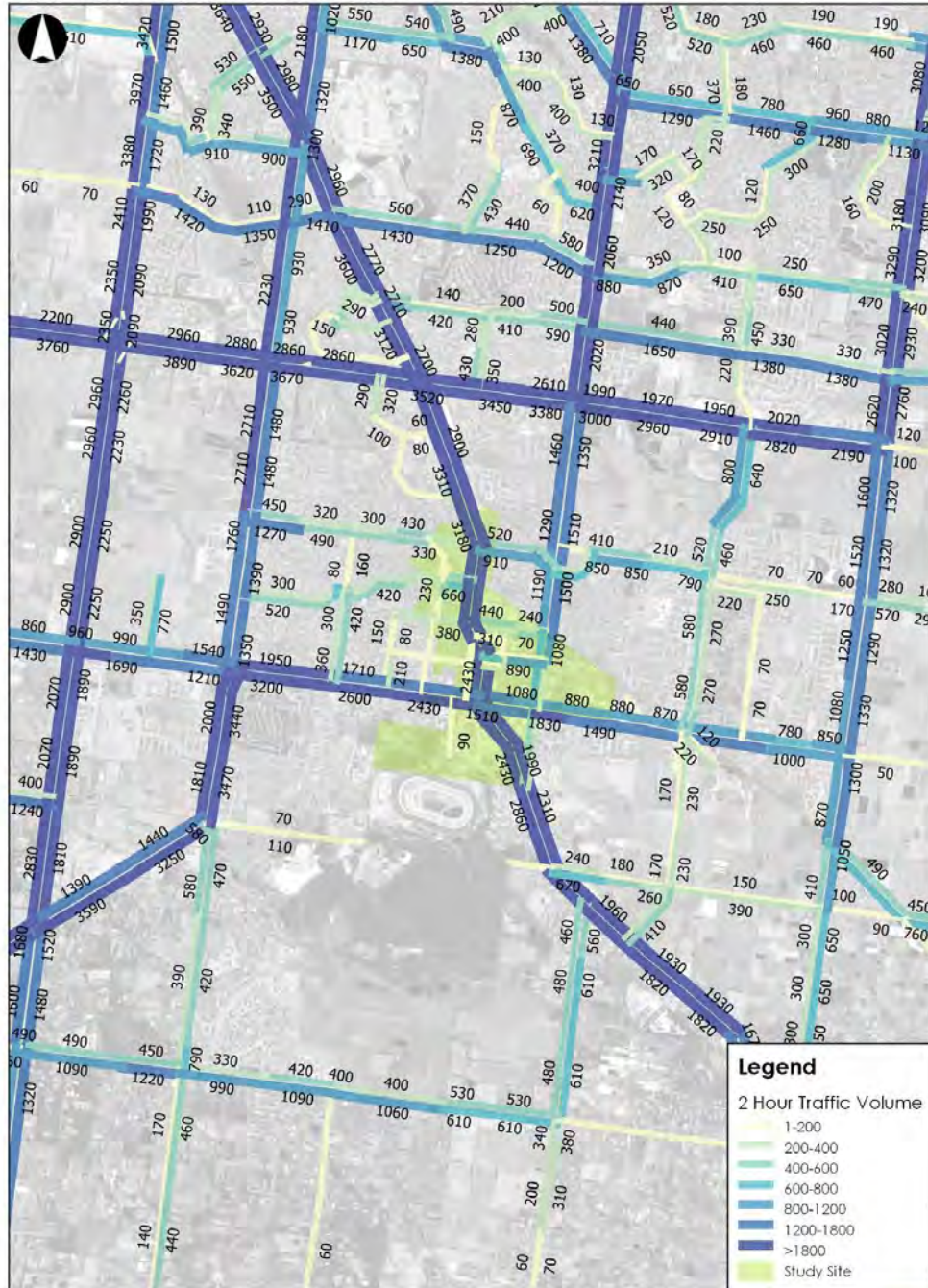
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2021 Existing Density - Option 3 - AM 2 Hour Traffic Volume



01/12/2017
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 V135240 - VITM2012 NGC
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Cranbourne Town Centre Access

2021 Existing Density - Option 3 - PM 2 Hour Traffic Volume



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



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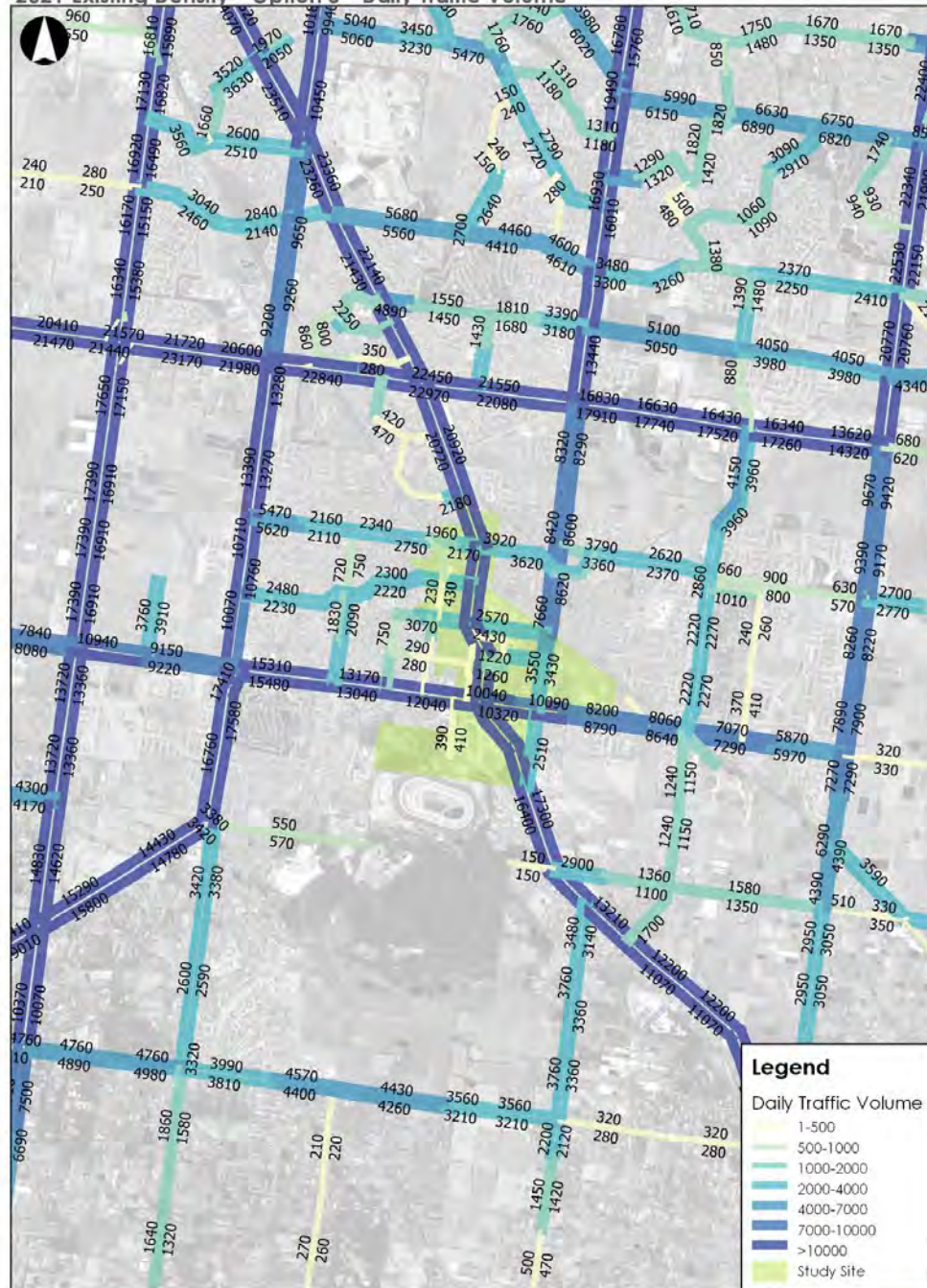
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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2021 Existing Density - Option 3 - Daily Traffic Volume



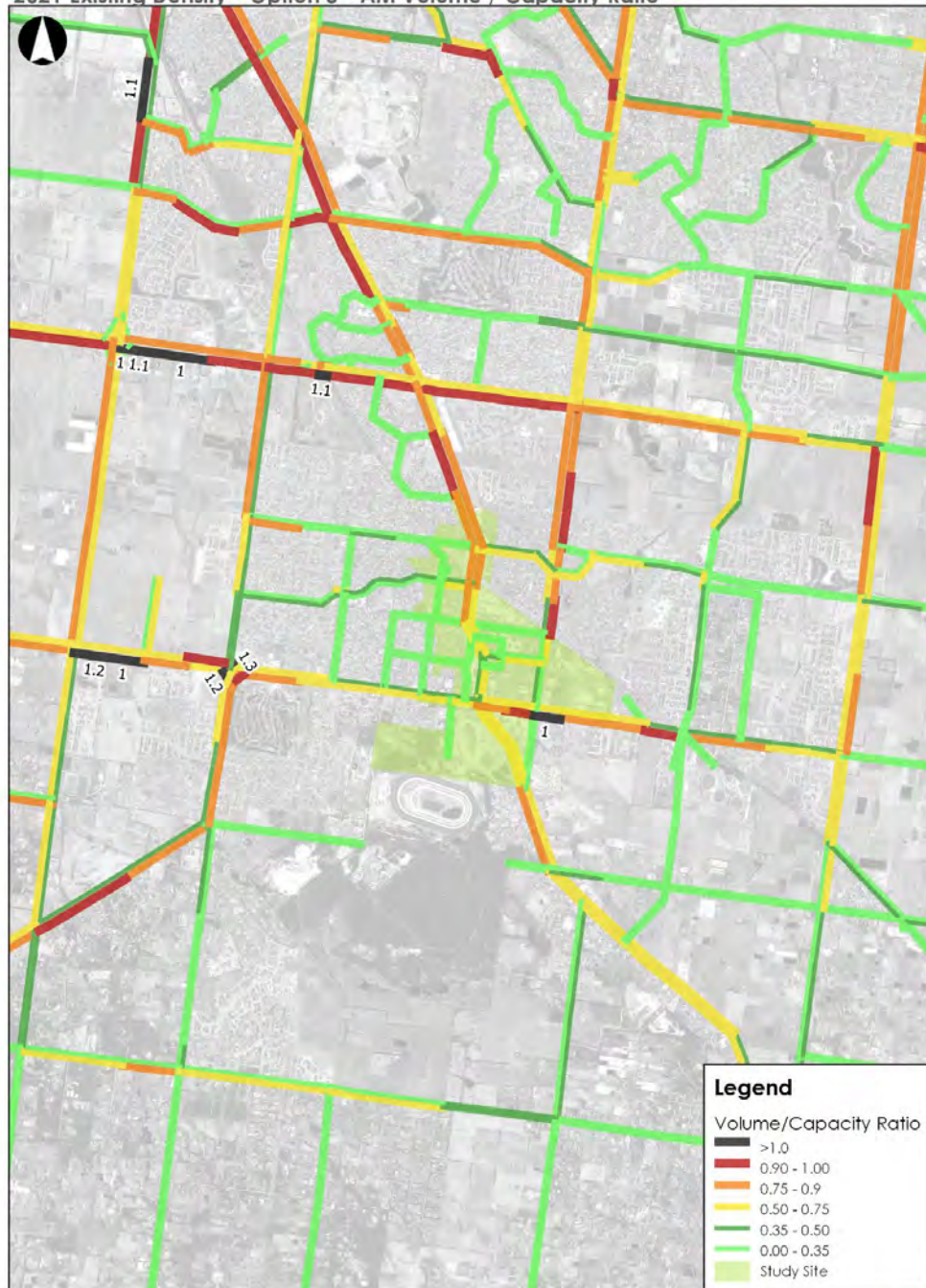
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GTA consultants

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Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



Document Set ID: 12331517
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Cranbourne Town Centre Access
2021 Existing Density - Option 3 - AM Volume / Capacity Ratio

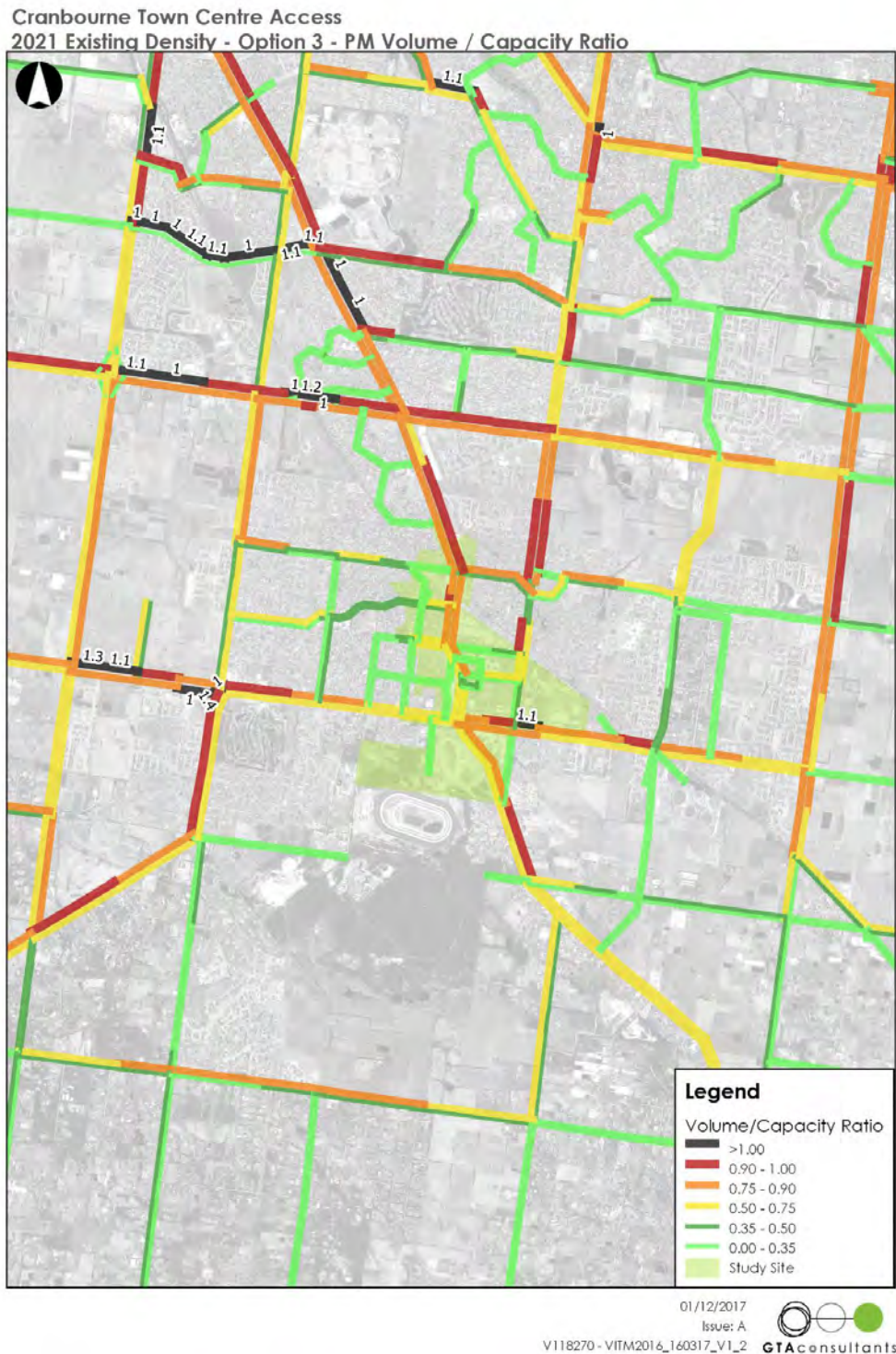


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V118270 - VITM2016_160317_V1_2
GTAconsultants

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Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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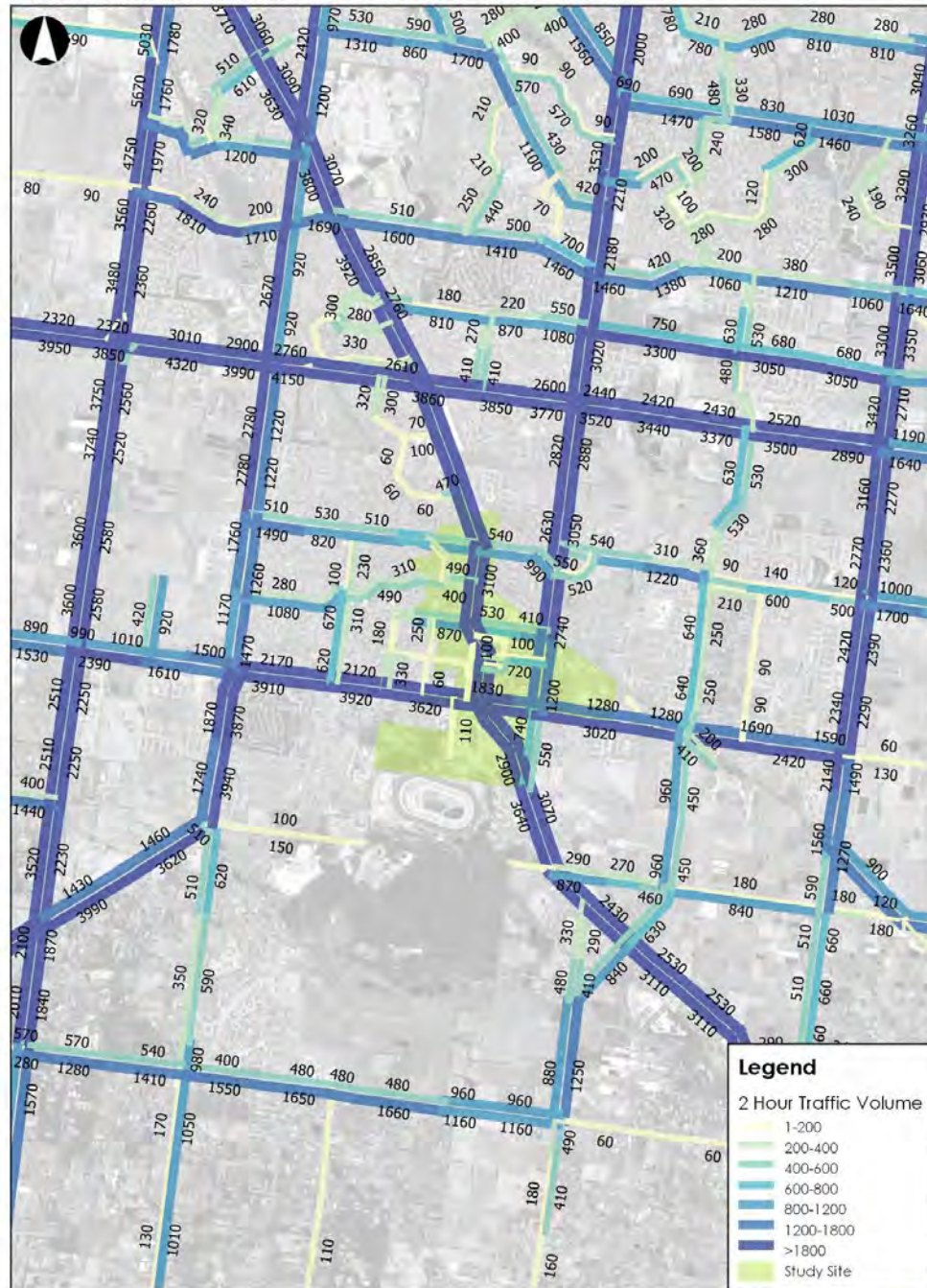


V118270 // 01/12/17
 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



Document Set ID: 12331517
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Cranbourne Town Centre Access
2031 Existing Density - Option 1 - AM 2 Hour Traffic Volume



01/12/2017

Issue: A

V135240 - VITM2012 NGC



V118270 // 01/12/17

Movement and Access Strategy // Issue: A-Dr2

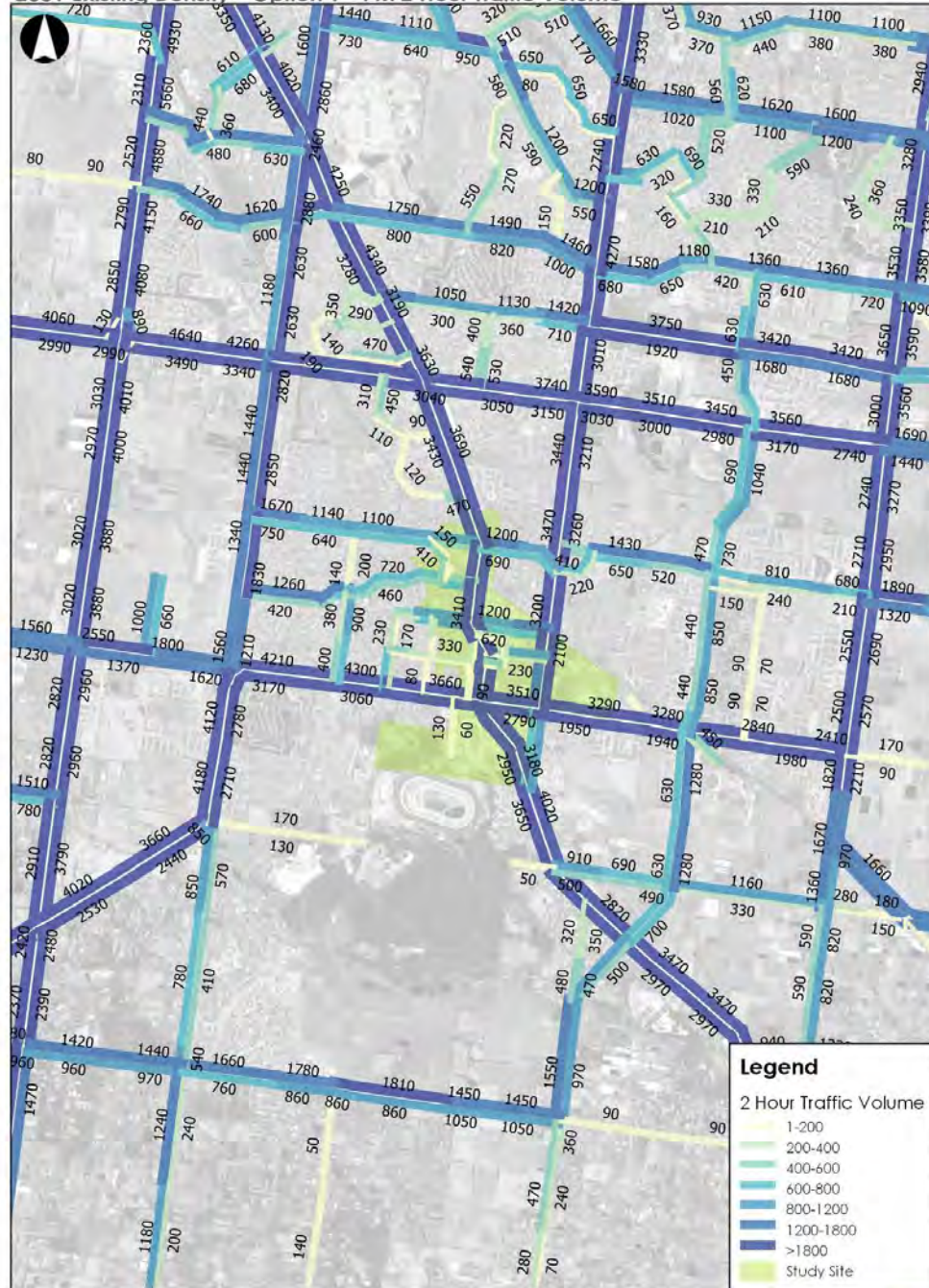
Cranbourne Town Centre



Document Set ID: 12331517
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Cranbourne Town Centre Access

2031 Existing Density - Option 1 - PM 2 Hour Traffic Volume



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Issue: A

V118270 - VITM2016_160317_V1_2



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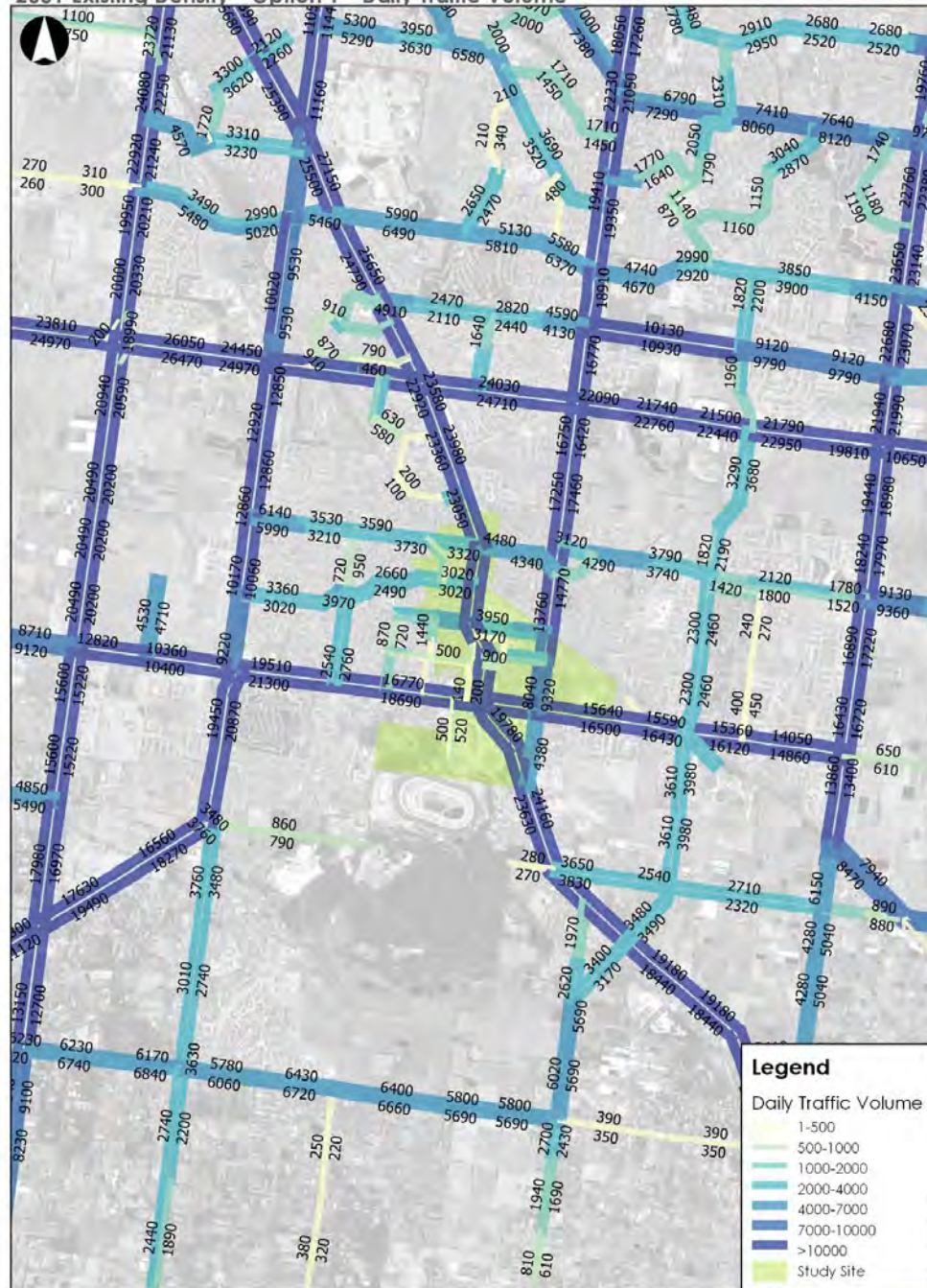
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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2031 Existing Density - Option 1 - Daily Traffic Volume



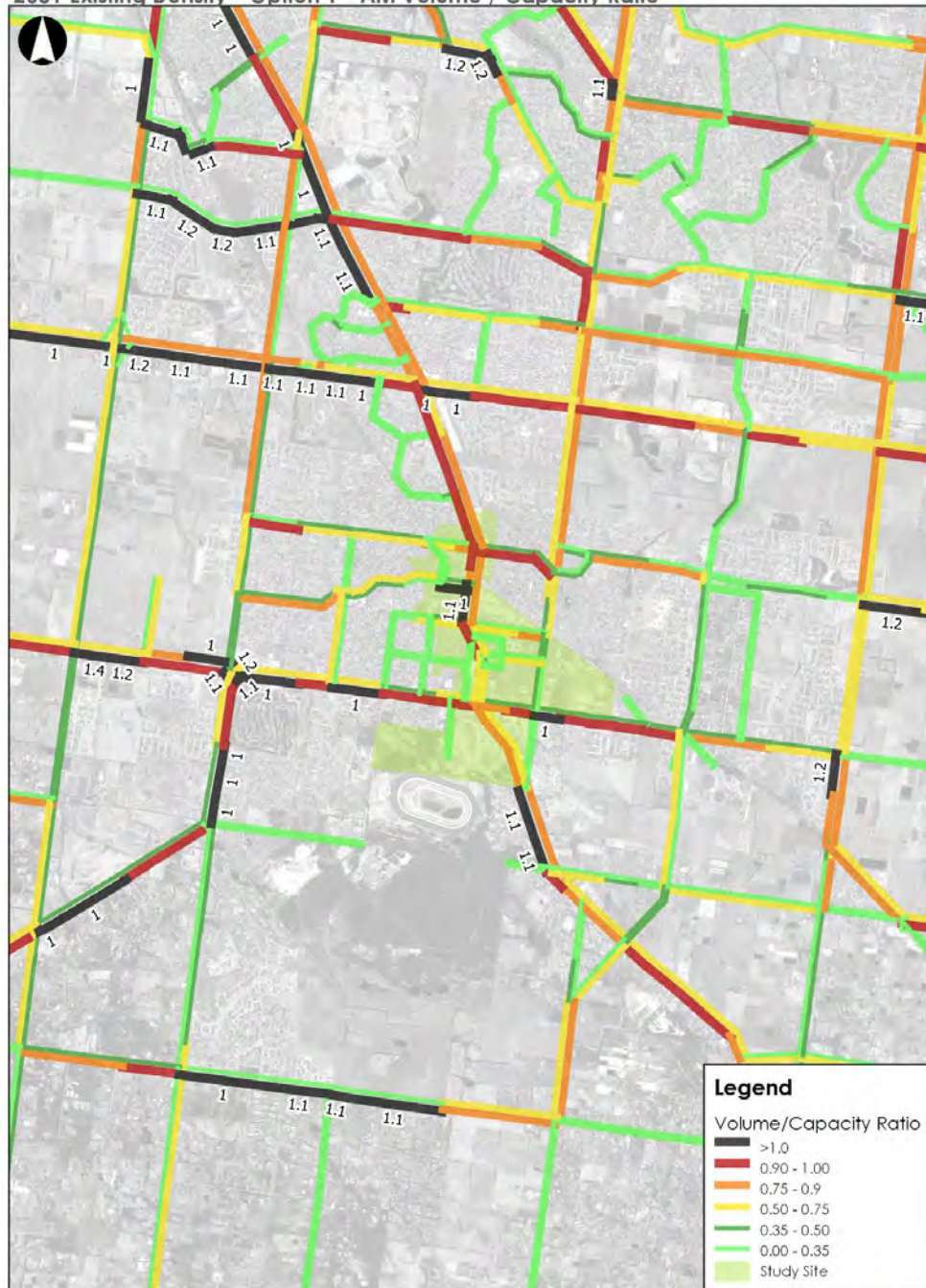
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GTA consultants

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Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Existing Density - Option 1 - AM Volume / Capacity Ratio



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



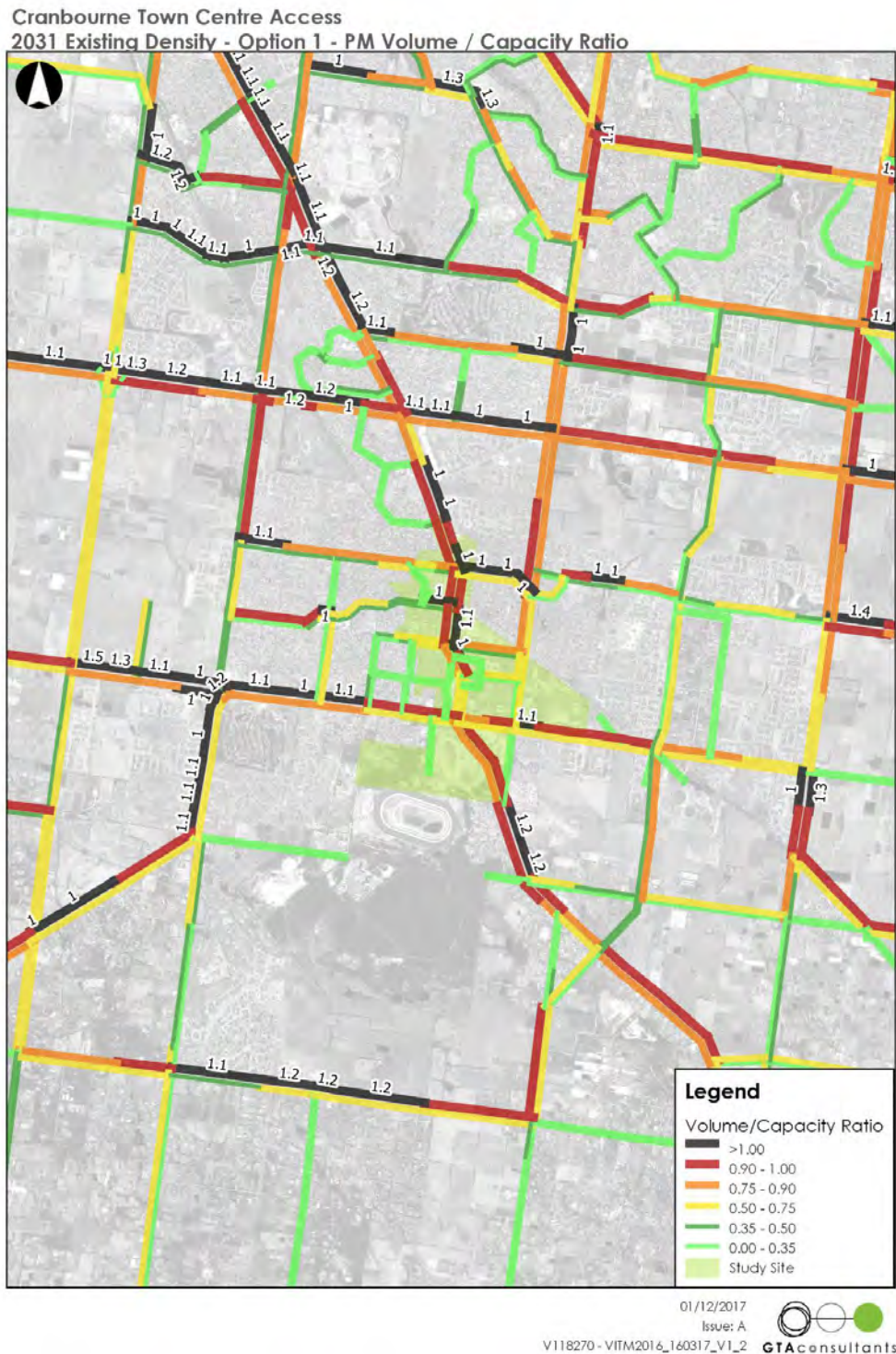
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Movement and Access Strategy // Issue: A-Dr2

Cranbourne Town Centre



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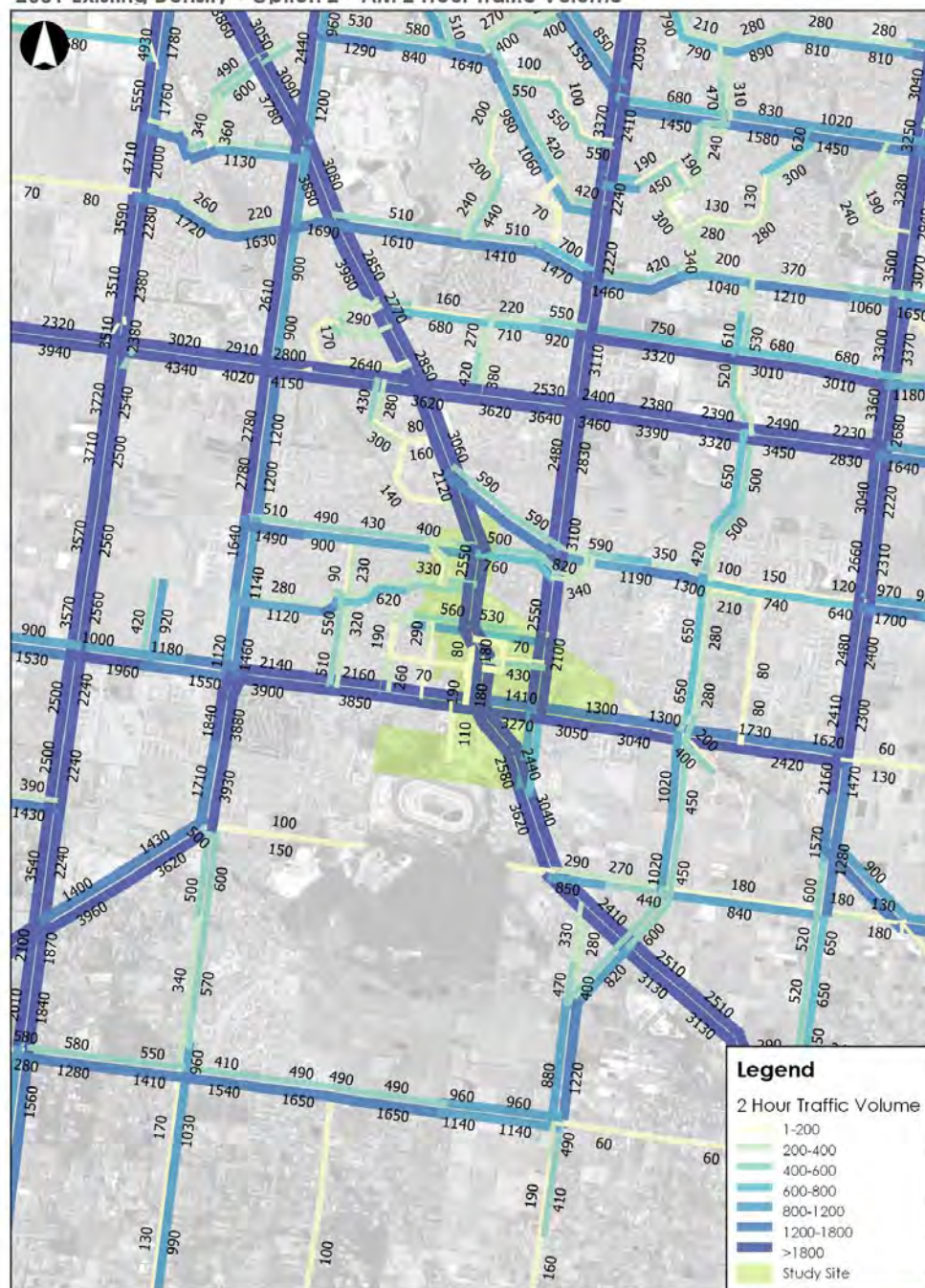


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 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Existing Density - Option 2 - AM 2 Hour Traffic Volume



01/12/2017

Issue: A

V135240 - VITM2012 NGC



V118270 // 01/12/17

Movement and Access Strategy // Issue: A-Dr2

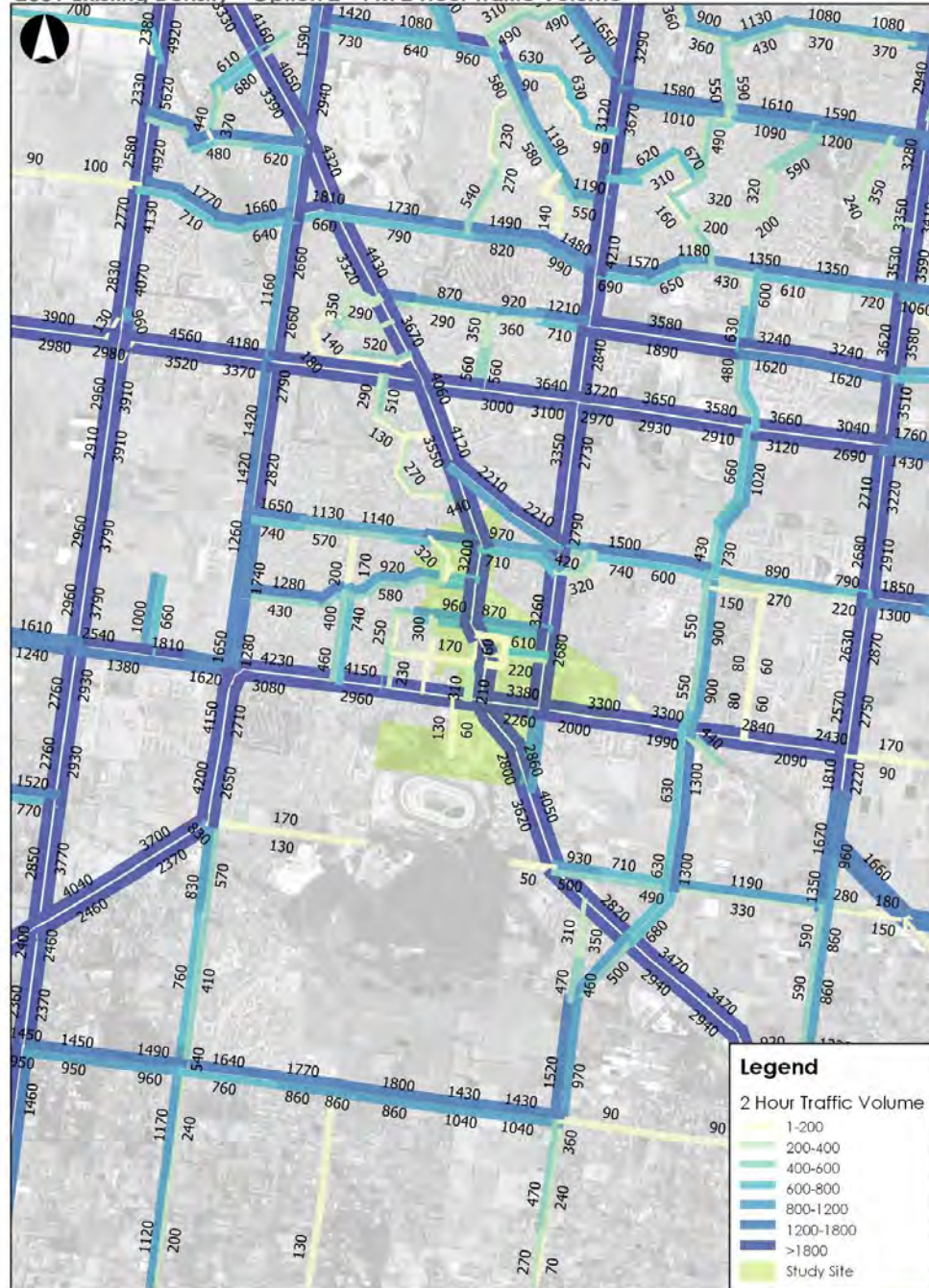
Cranbourne Town Centre



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Cranbourne Town Centre Access

2031 Existing Density - Option 2 - PM 2 Hour Traffic Volume



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Issue: A

V118270 - VITM2016_160317_V1_2



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V118270 // 01/12/17

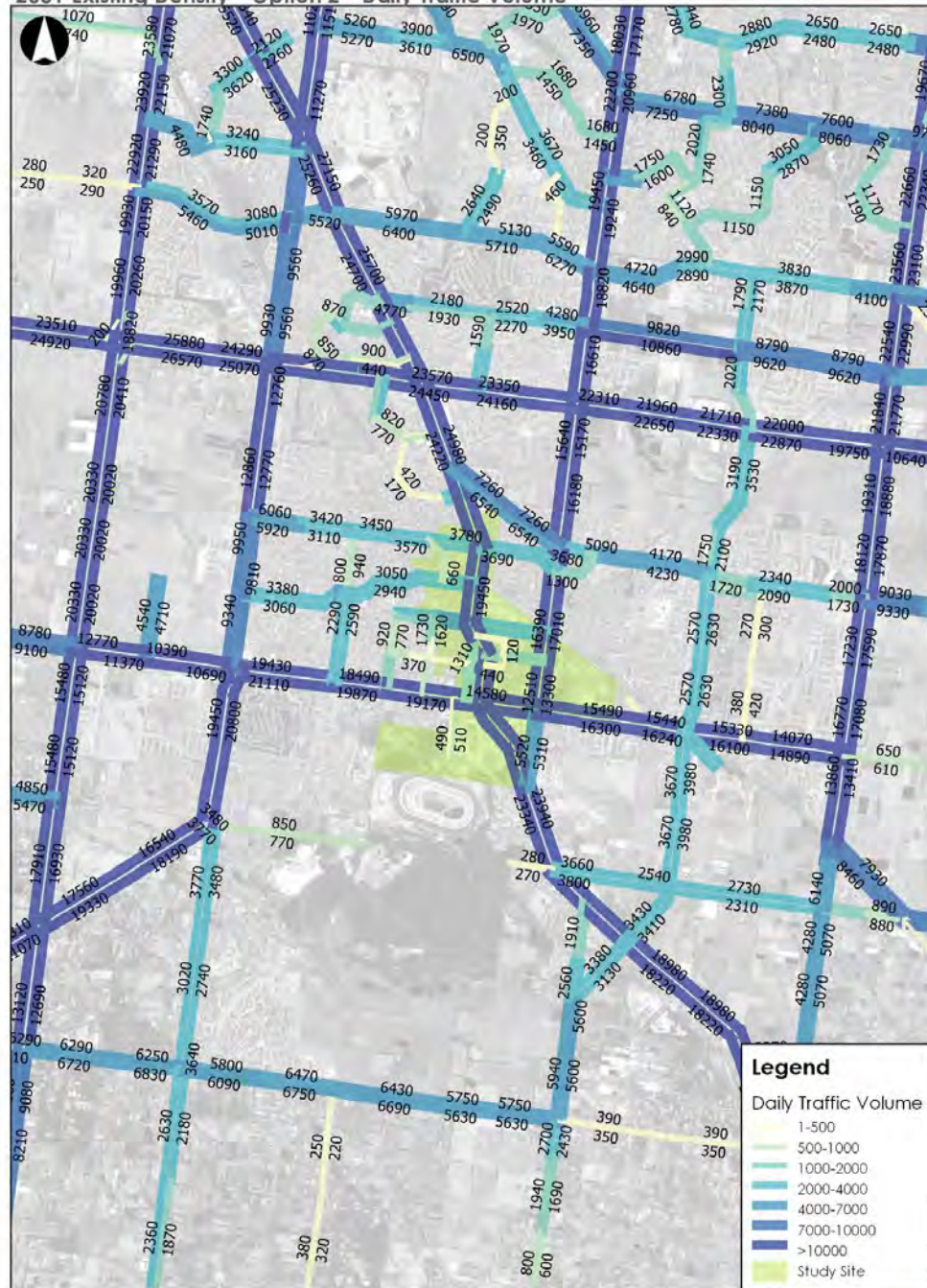
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Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Existing Density - Option 2 - Daily Traffic Volume



01/12/2017

Issue: A

V118270 - VITM2016_160317_V1_2



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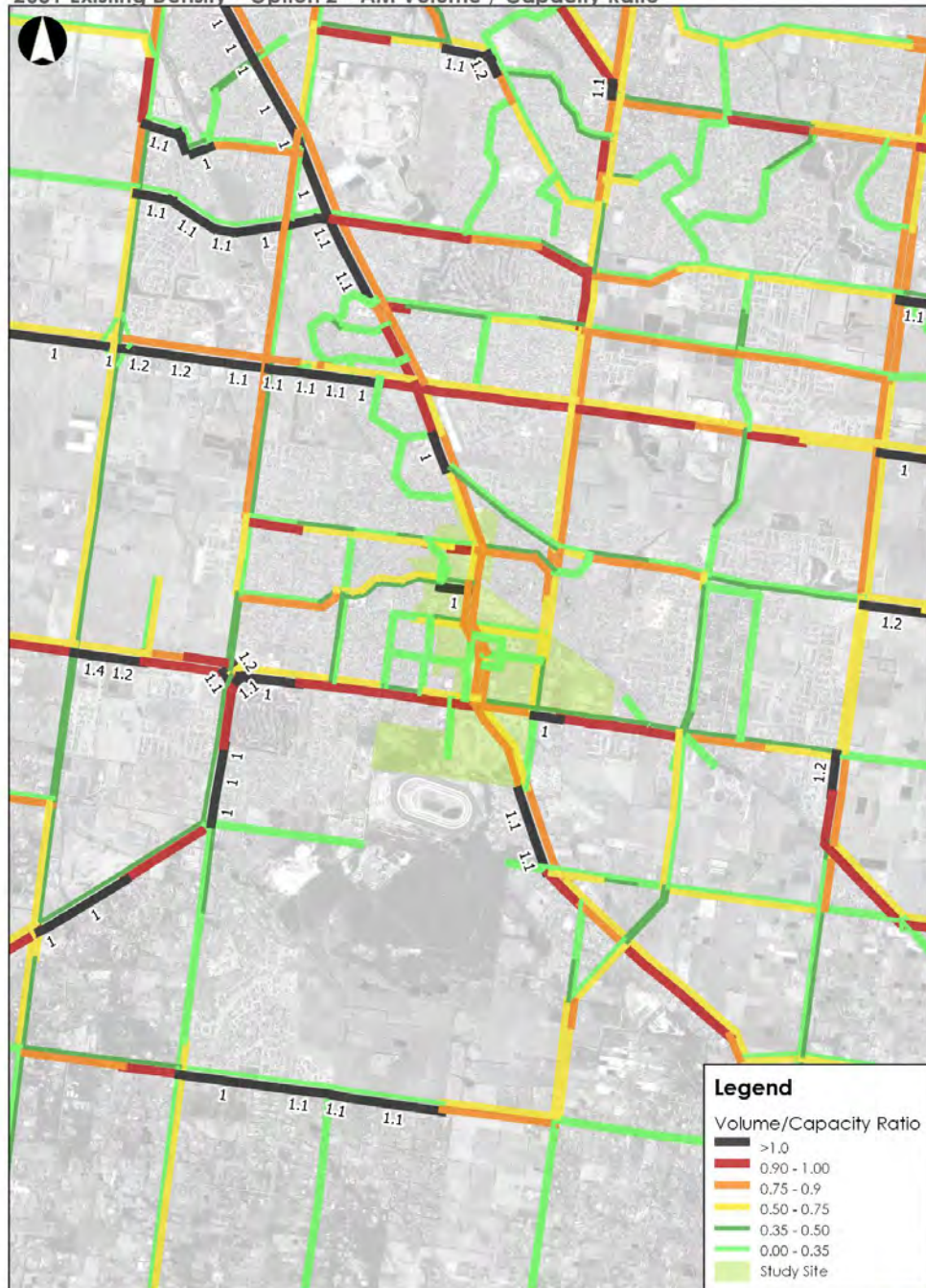
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Cranbourne Town Centre Access
2031 Existing Density - Option 2 - AM Volume / Capacity Ratio

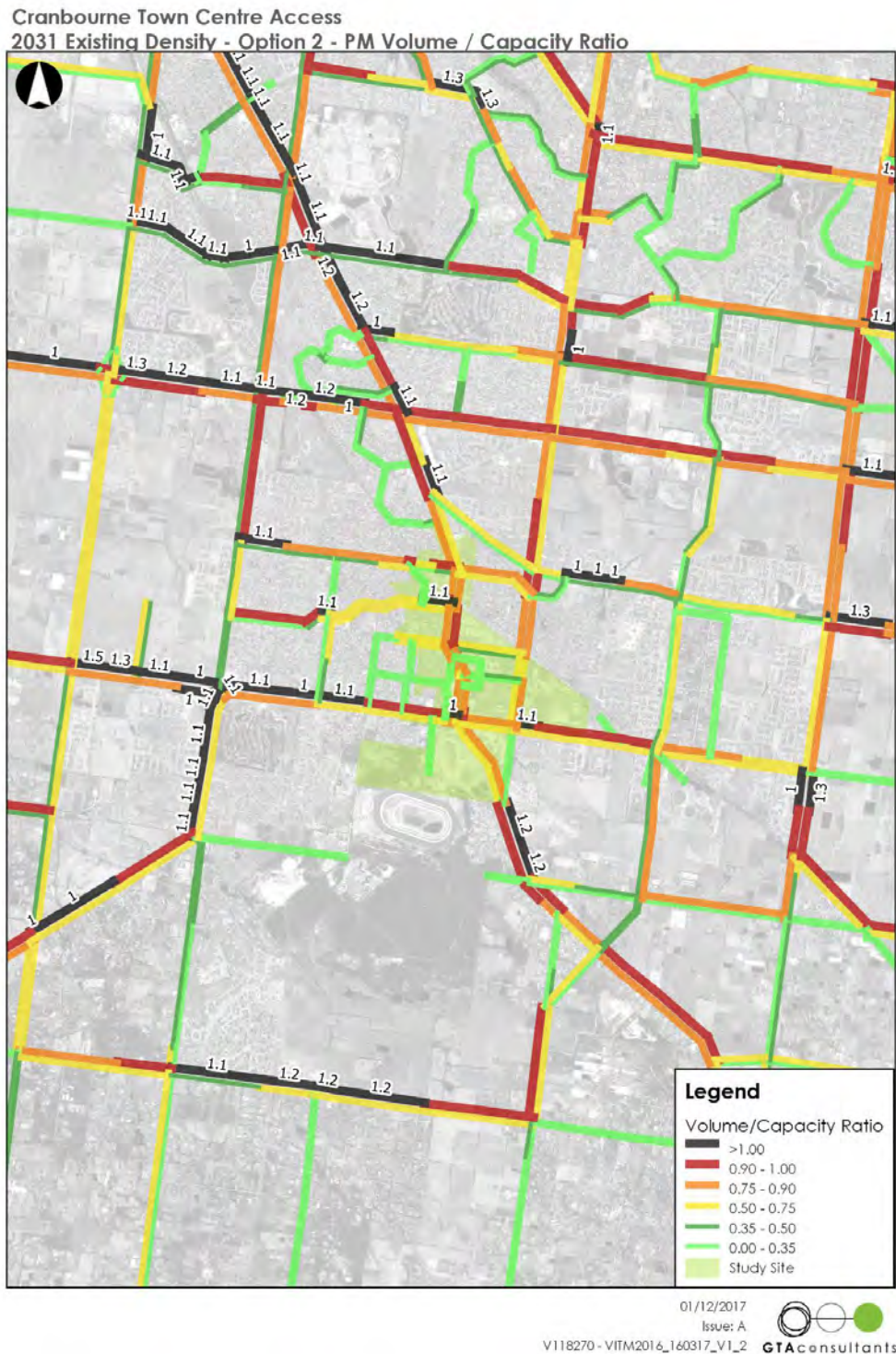


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GTAconsultants

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Cranbourne Town Centre



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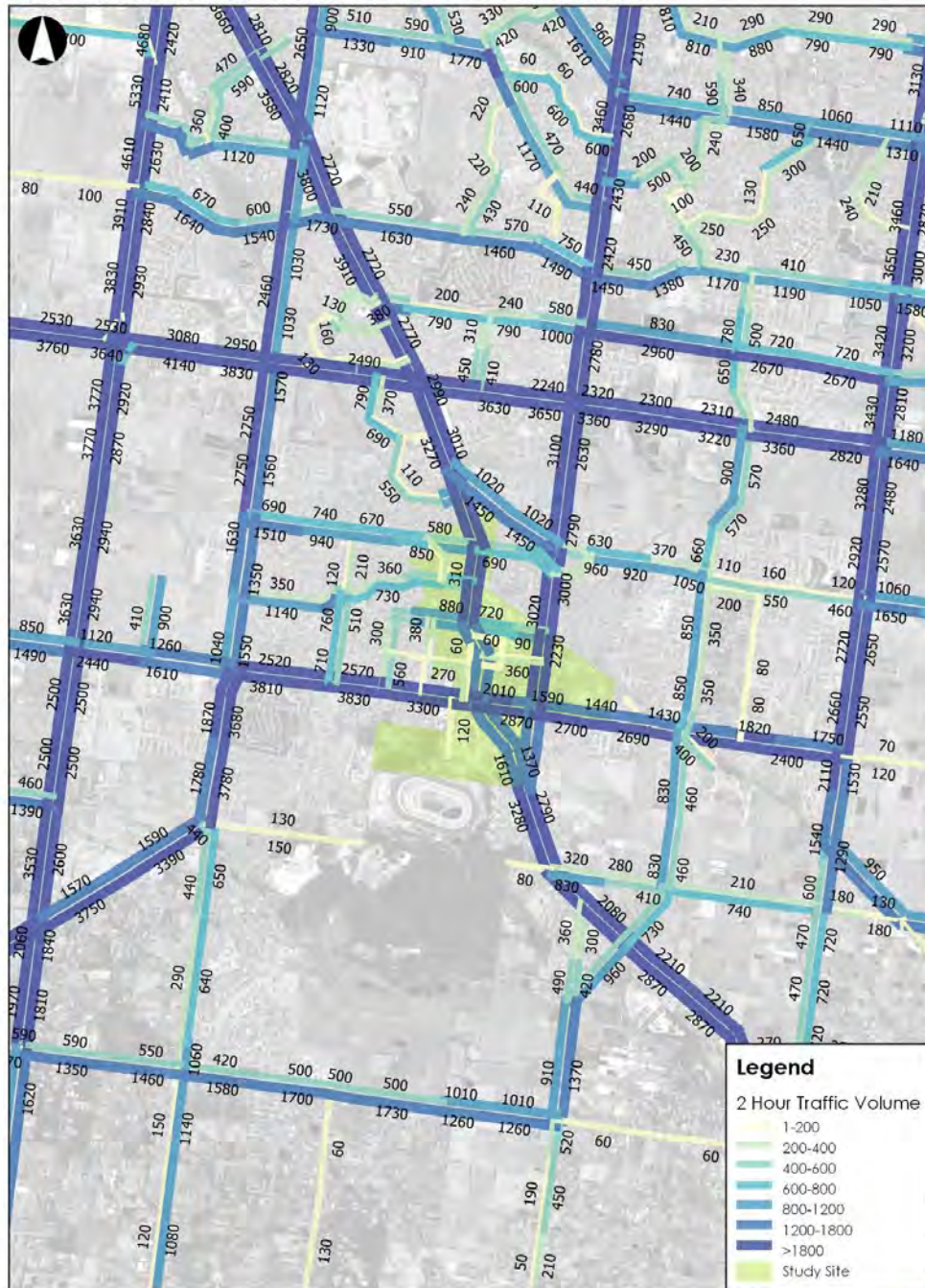


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 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Enhanced Density - Option 2 - AM 2 Hour Traffic Volume



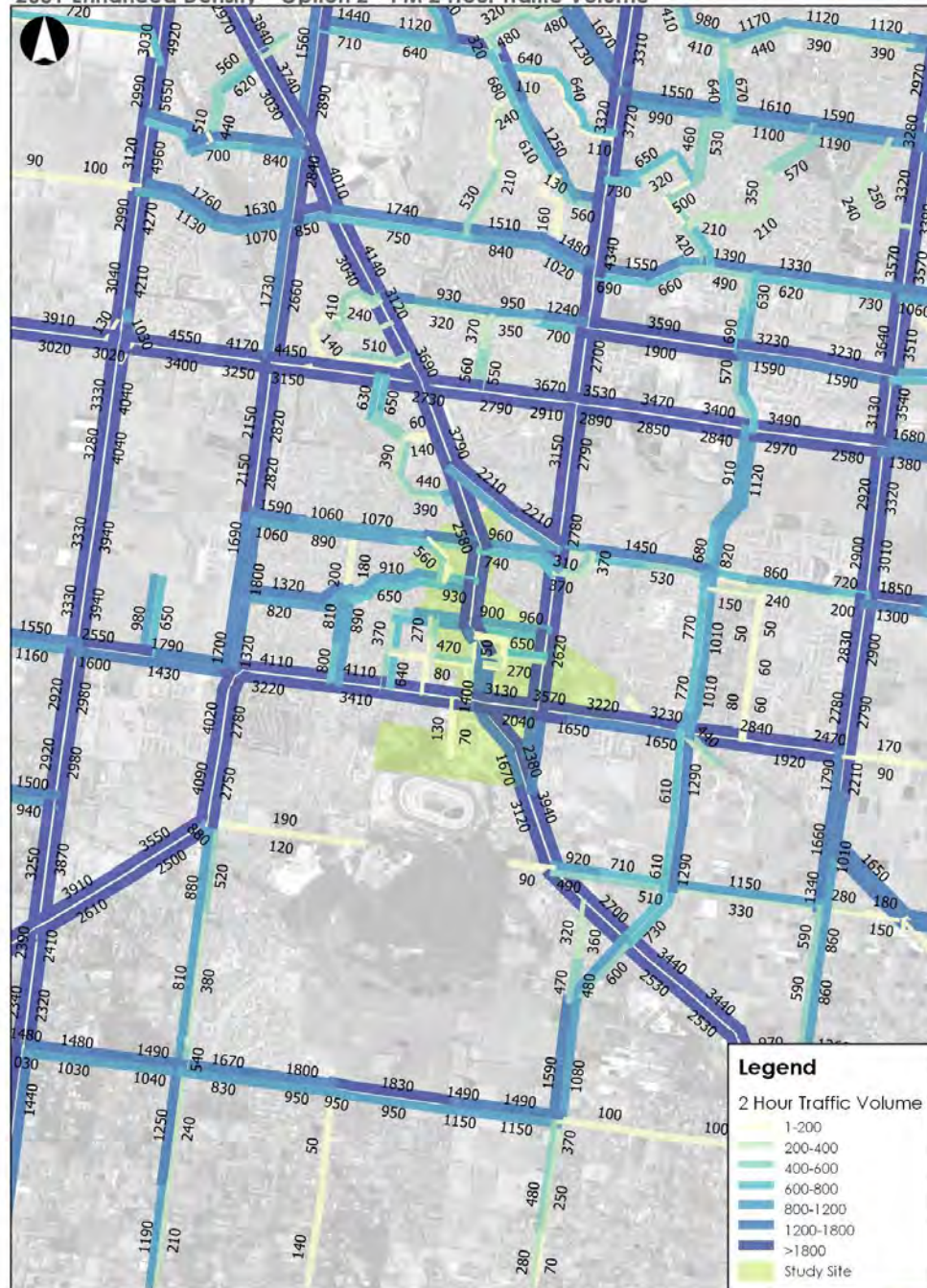
01/12/2017
Issue: A
V135240 - VITM2012 NGC
GTA consultants

V118270 // 01/12/17
Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Enhanced Density - Option 2 - PM 2 Hour Traffic Volume



01/12/2017

Issue: A

V118270 - V118270_160317_V1_2



V118270 // 01/12/17

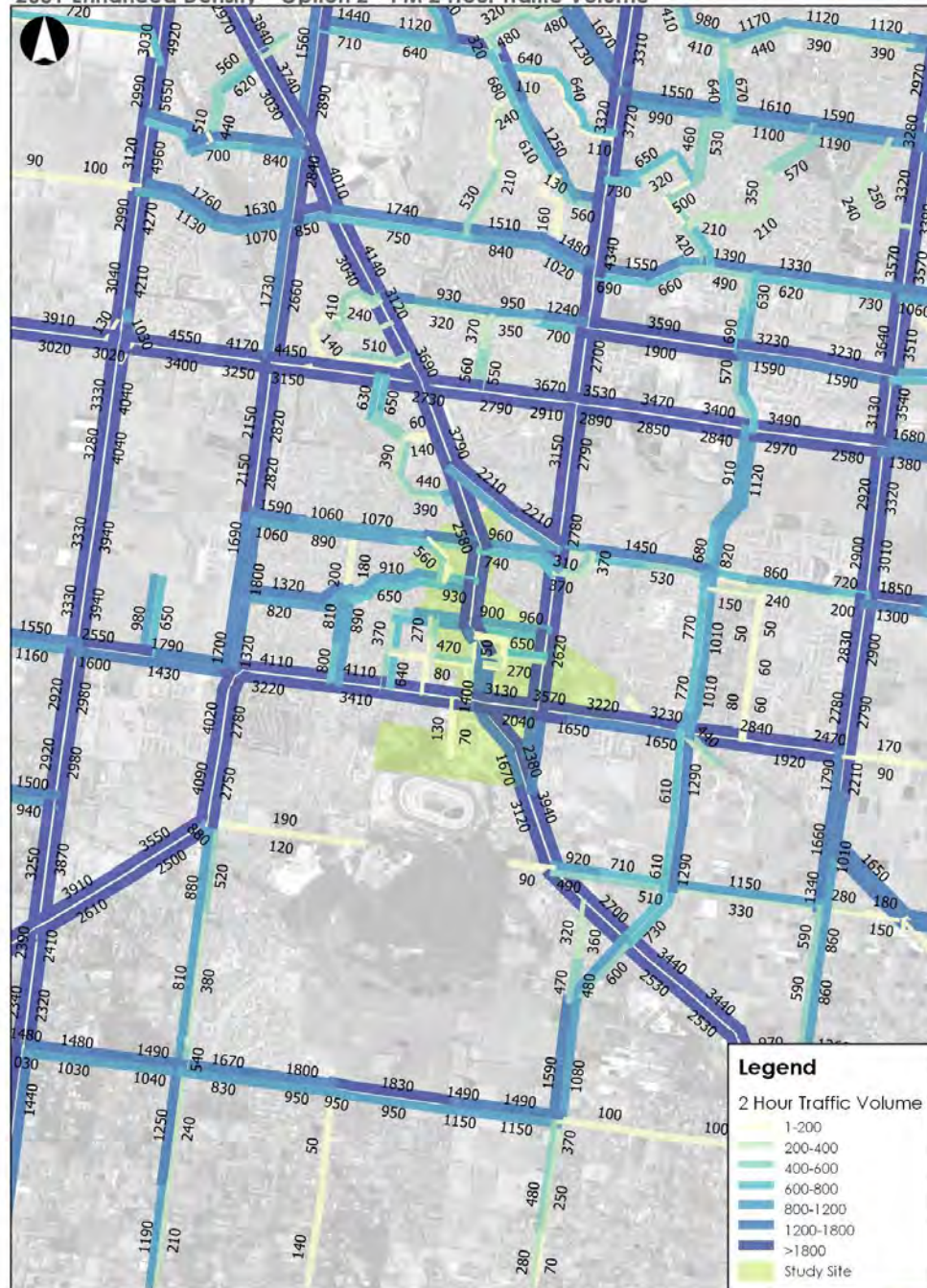
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Cranbourne Town Centre



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Version: 1, Version Date: 19/12/2017

Cranbourne Town Centre Access
2031 Enhanced Density - Option 2 - PM 2 Hour Traffic Volume



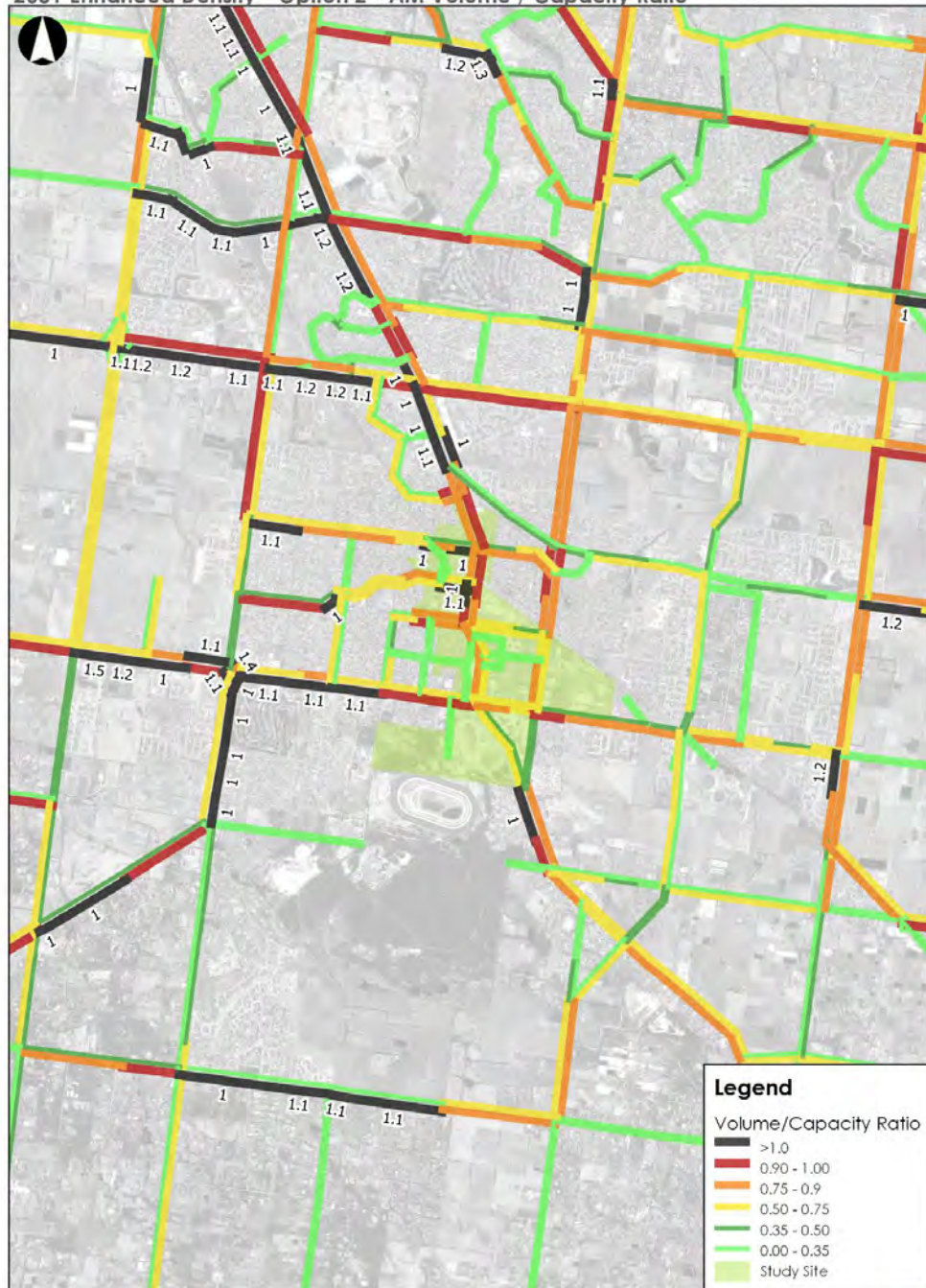
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V118270 - V118270_160317_V1_2
GTA consultants

V118270 // 01/12/17
Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Enhanced Density - Option 2 - AM Volume / Capacity Ratio

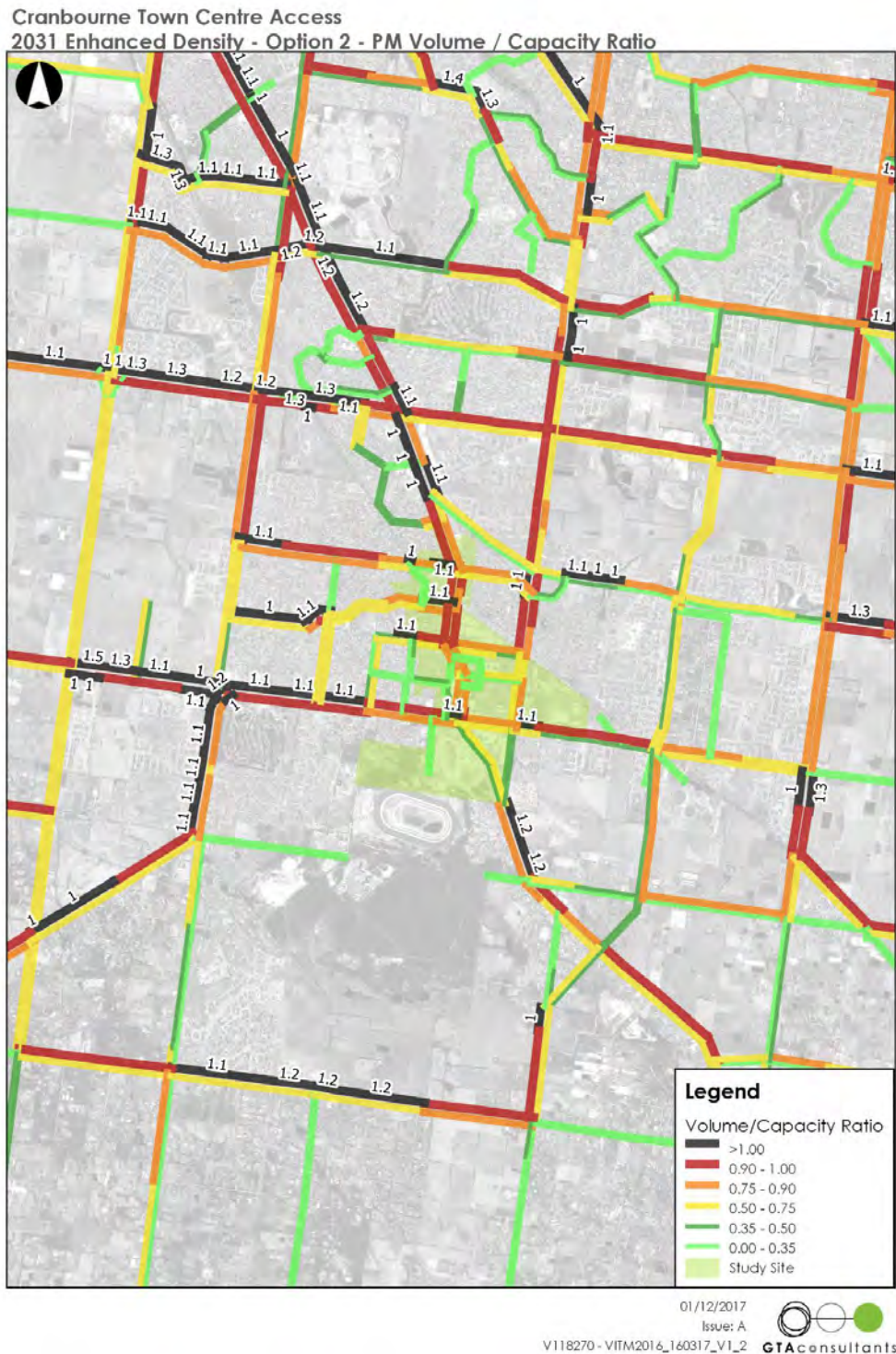


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Issue: A
V118270 - VITM2016_160317_V1_2
GTAconsultants

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Movement and Access Strategy // Issue: A-Dr2
Cranbourne Town Centre



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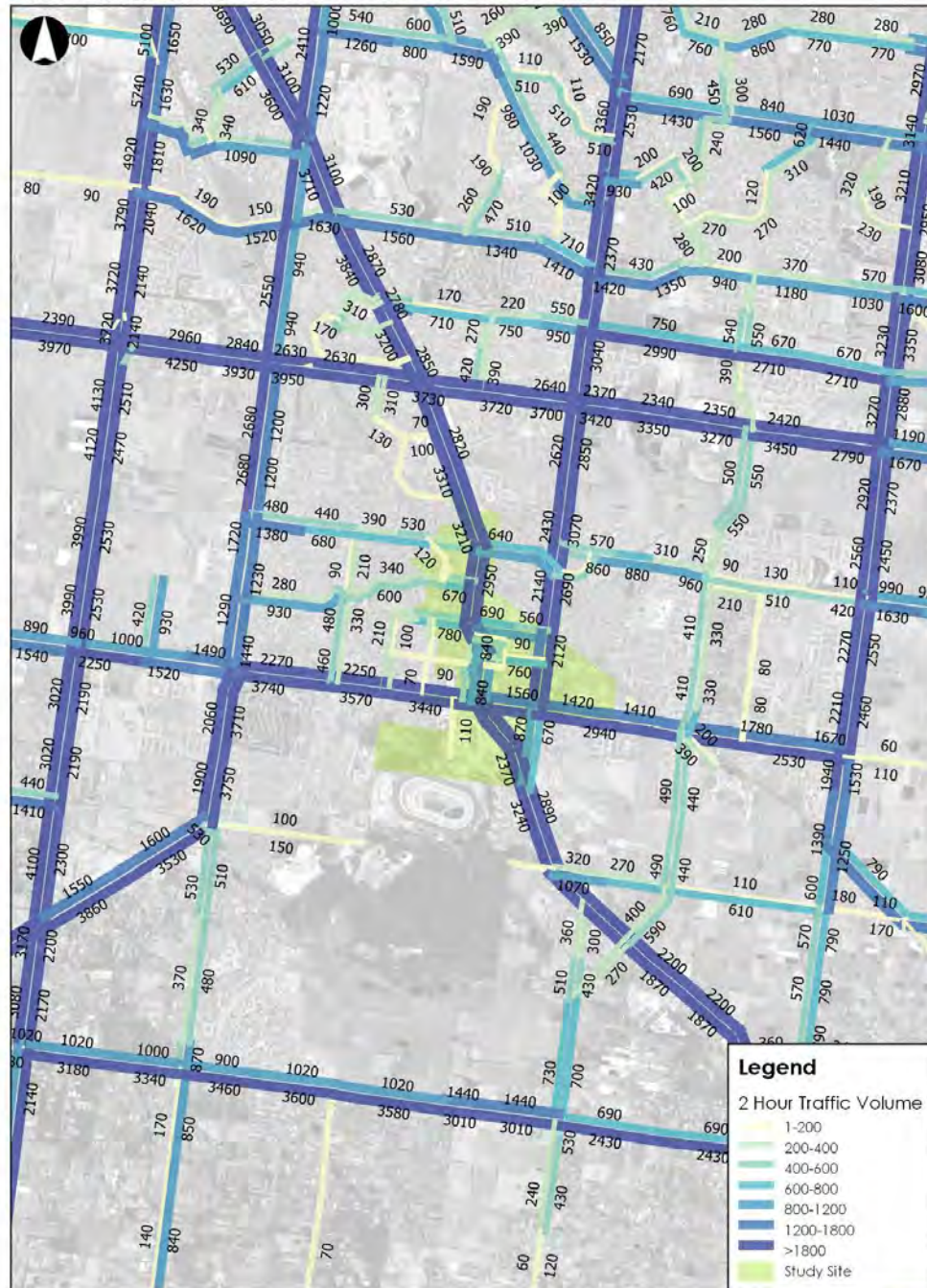


V118270 // 01/12/17
 Movement and Access Strategy // Issue: A-Dr2
 Cranbourne Town Centre



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Cranbourne Town Centre Access
2031 Existing Density - Option 3 - AM 2 Hour Traffic Volume



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V135240 - VITM2012 NGC
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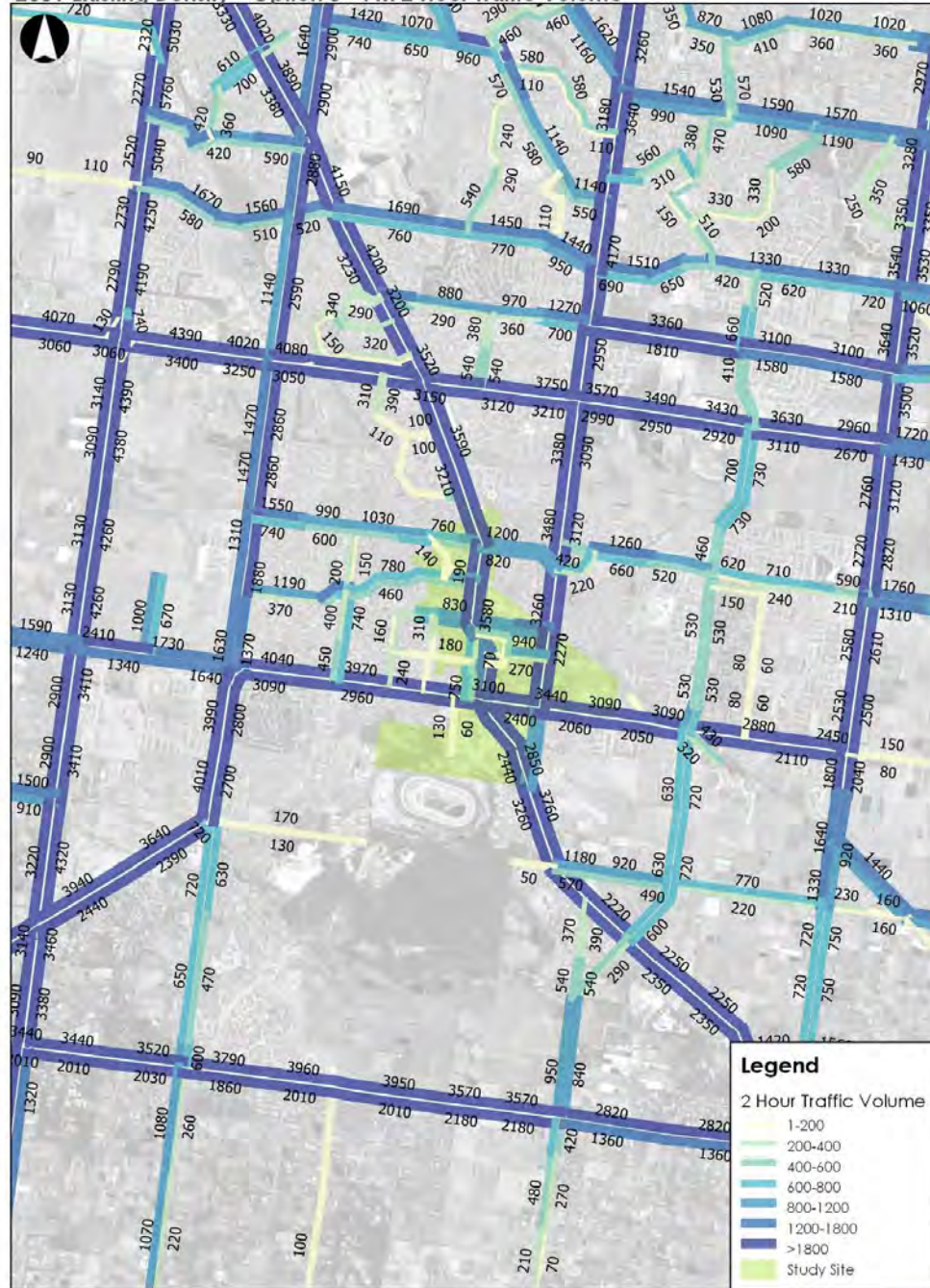
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Cranbourne Town Centre



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Cranbourne Town Centre Access

2031 Existing Density - Option 3 - PM 2 Hour Traffic Volume



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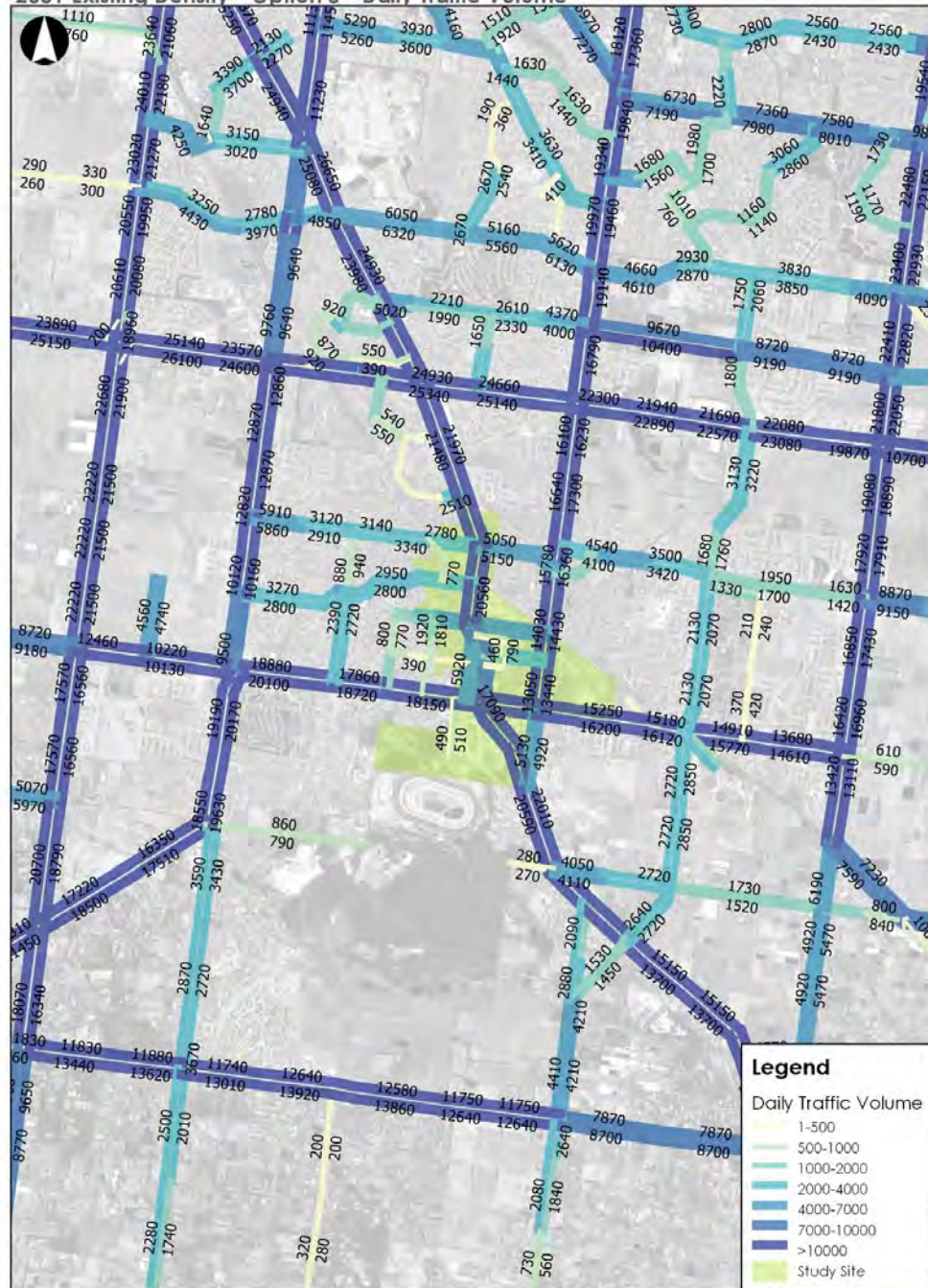
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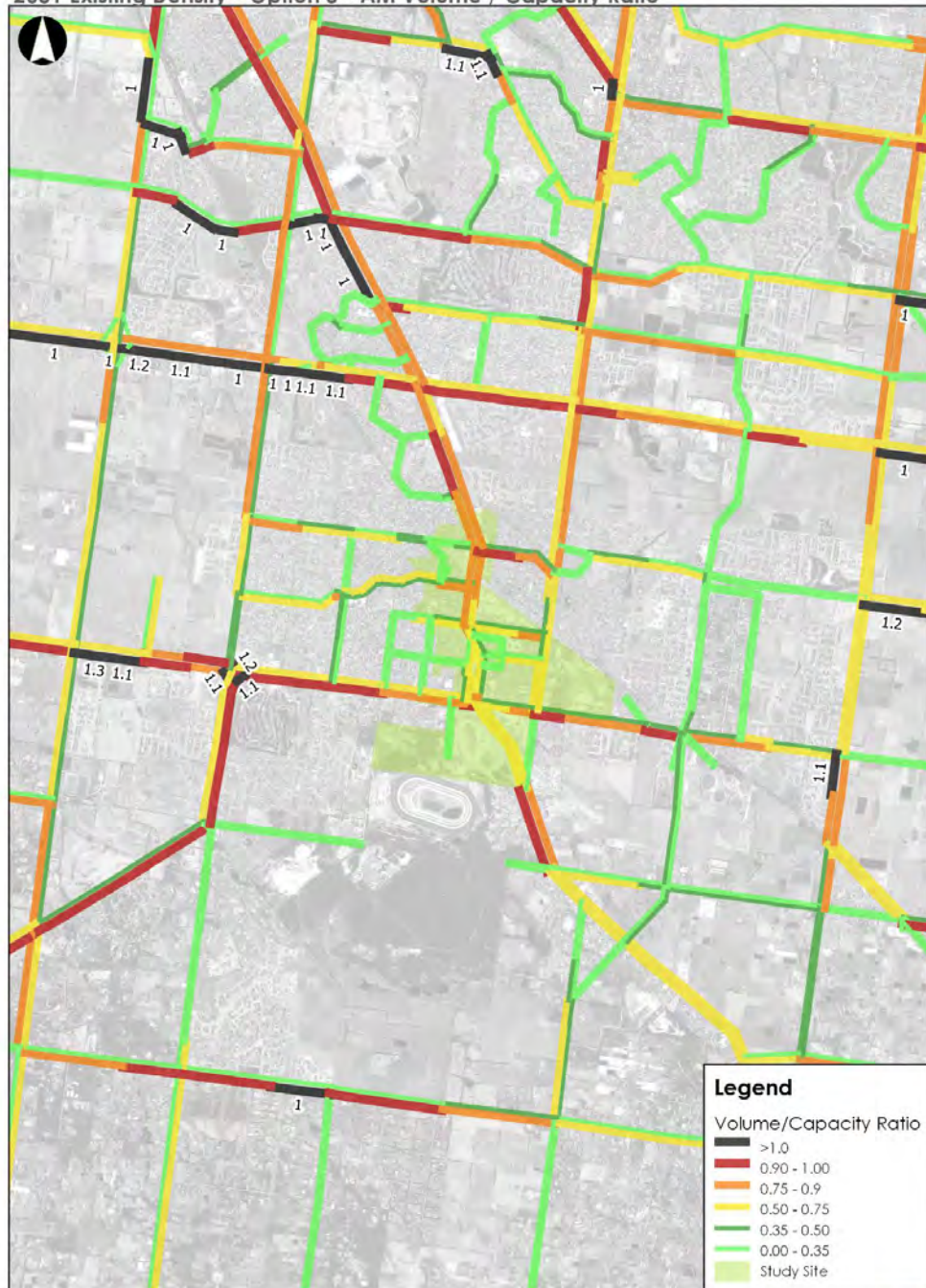
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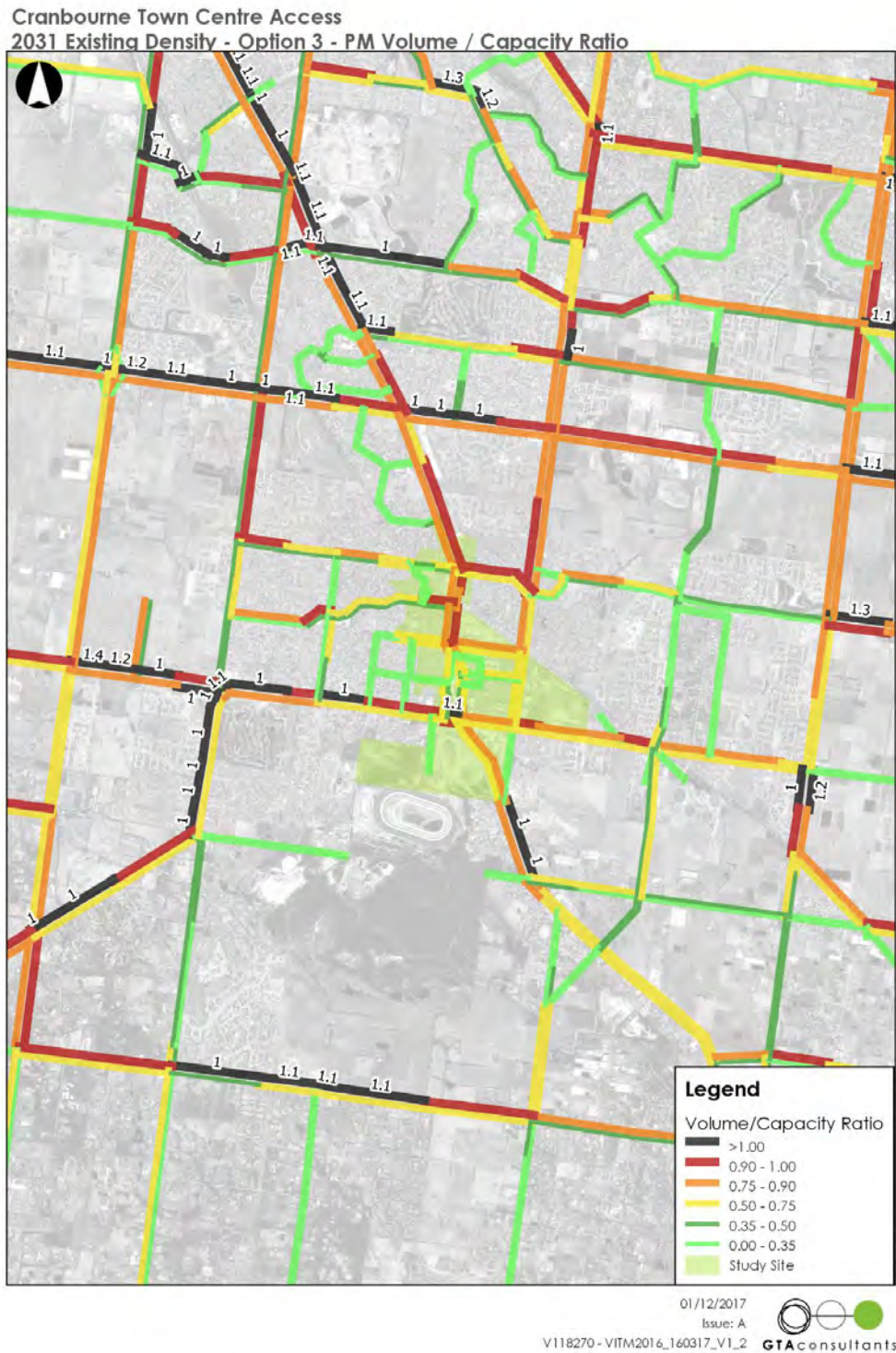
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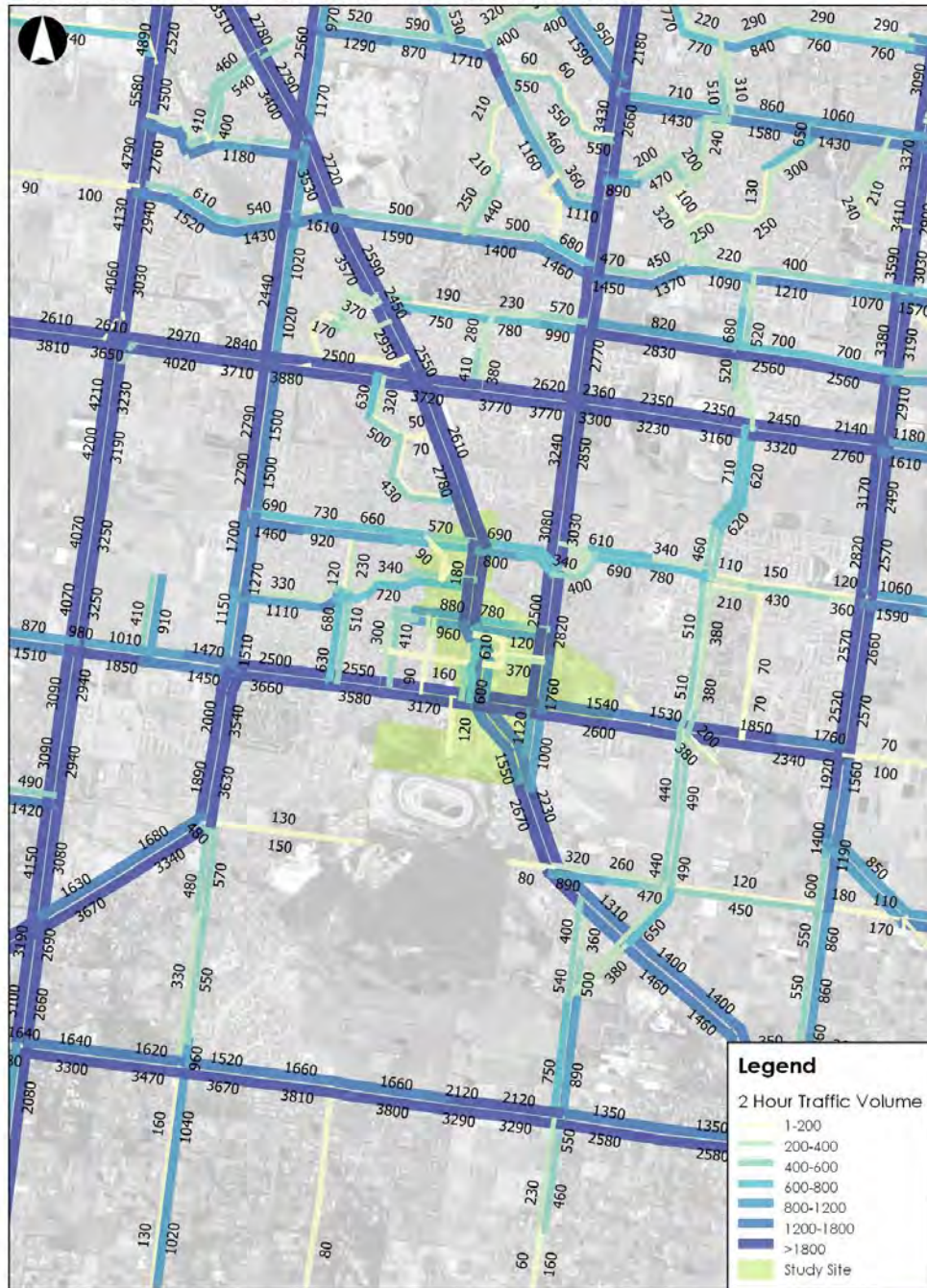


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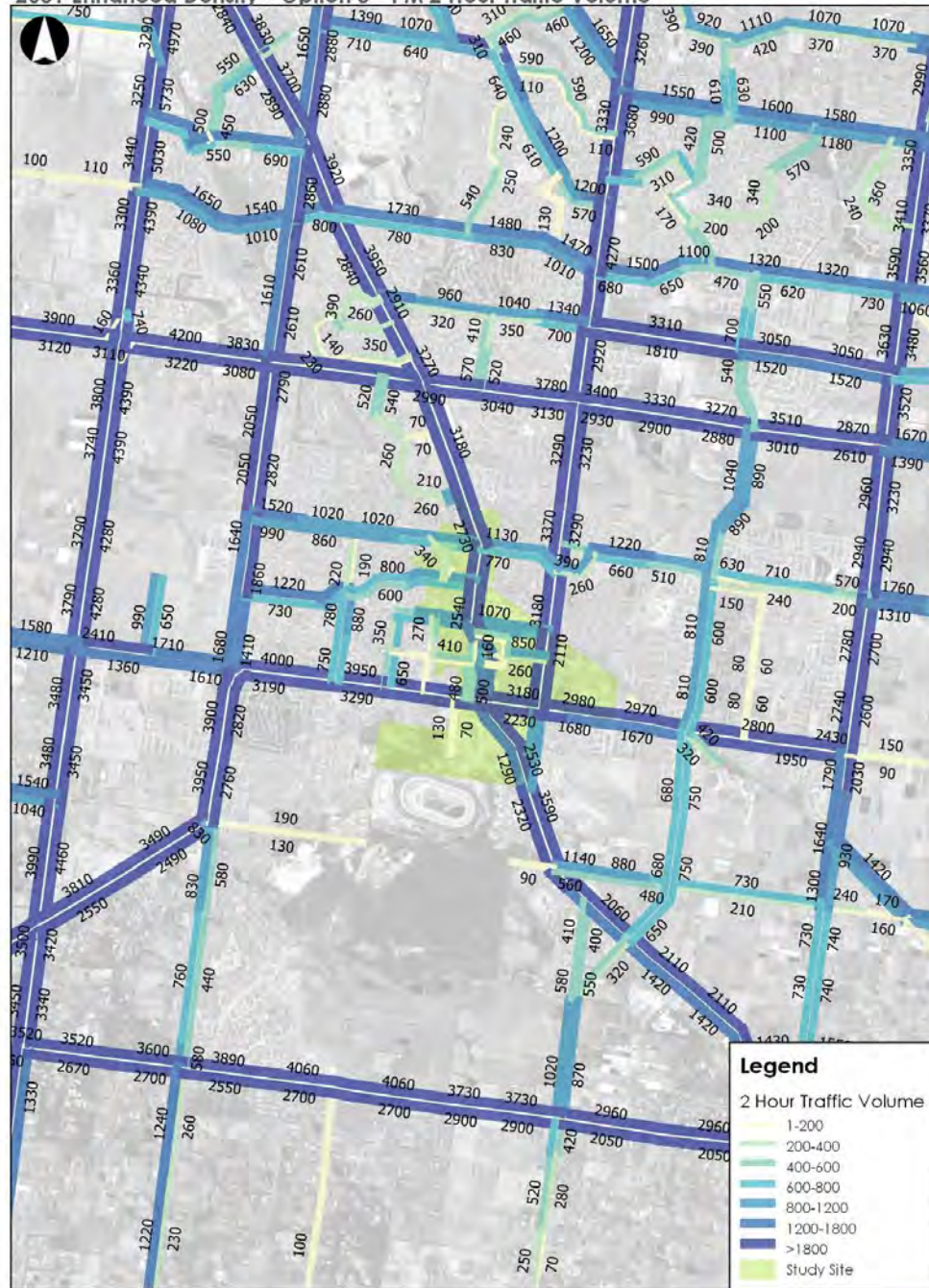
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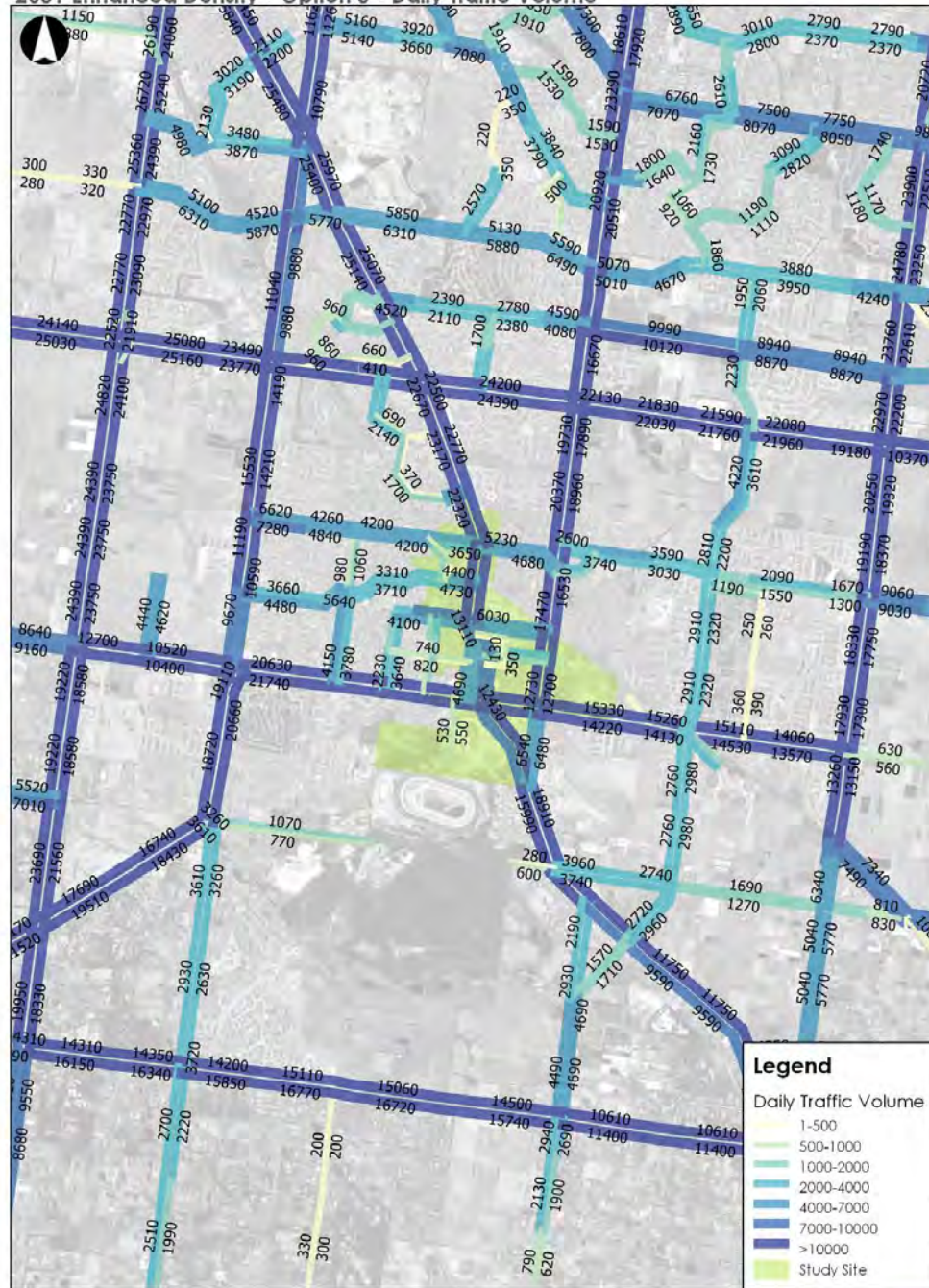
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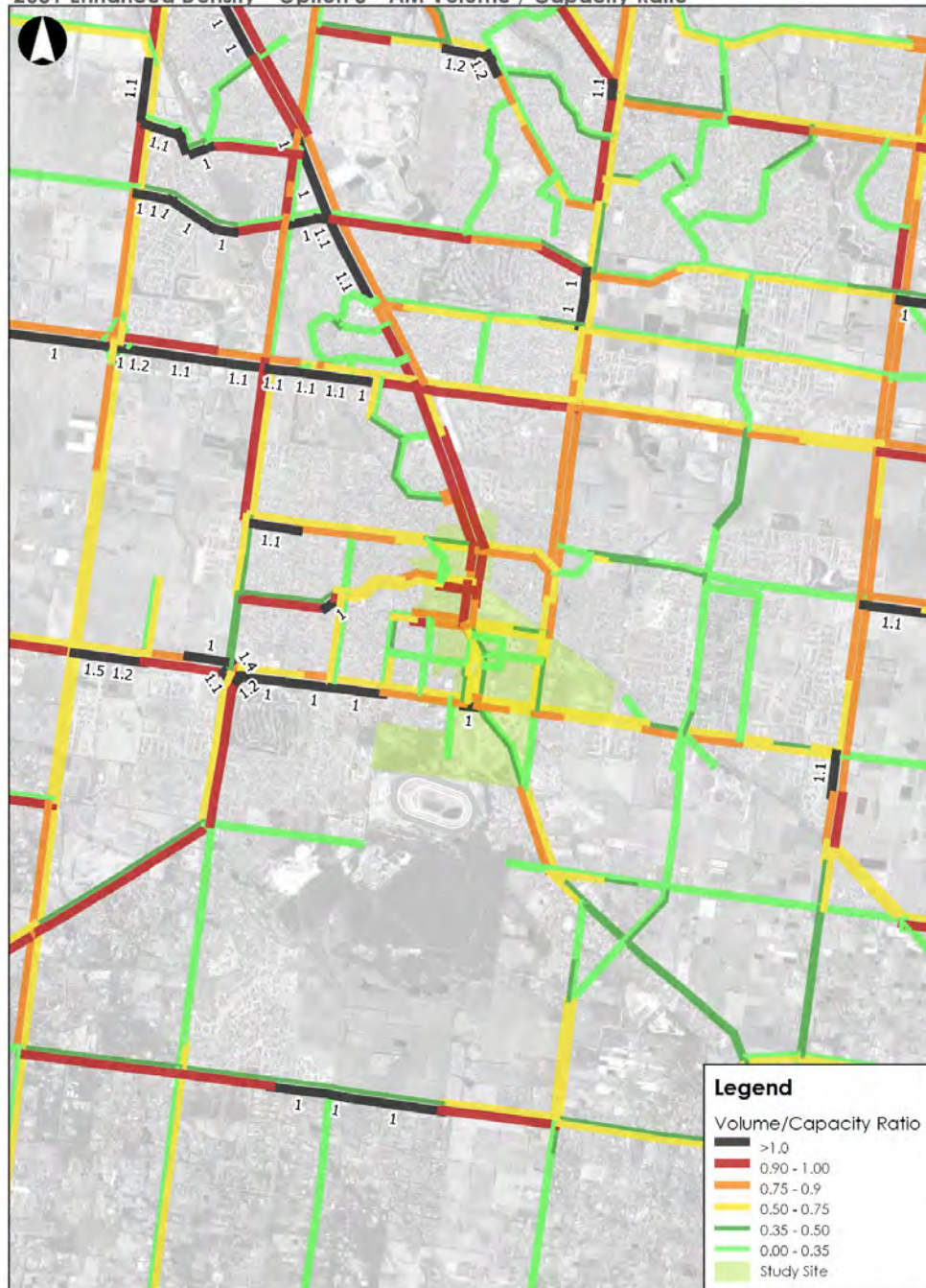
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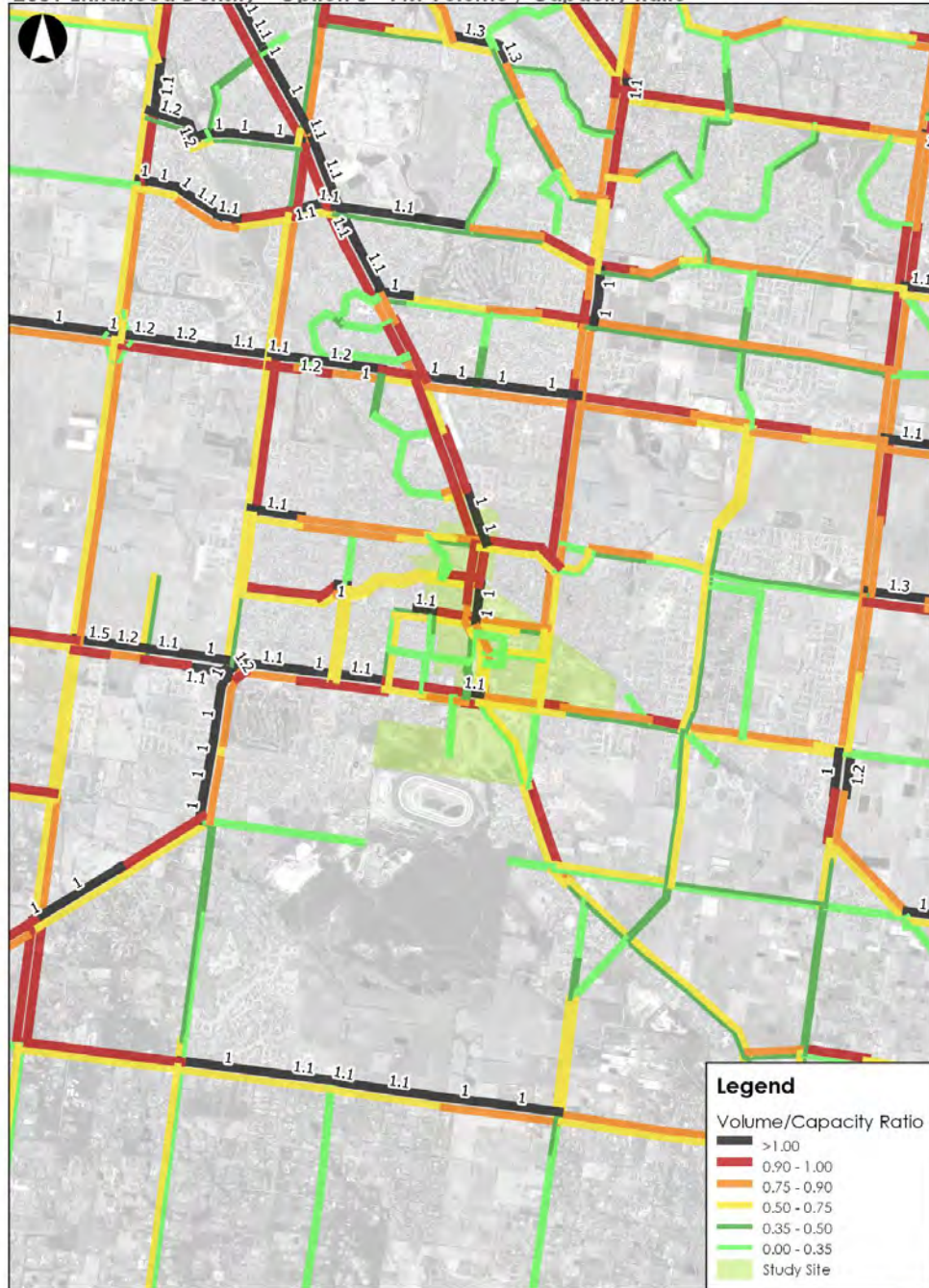
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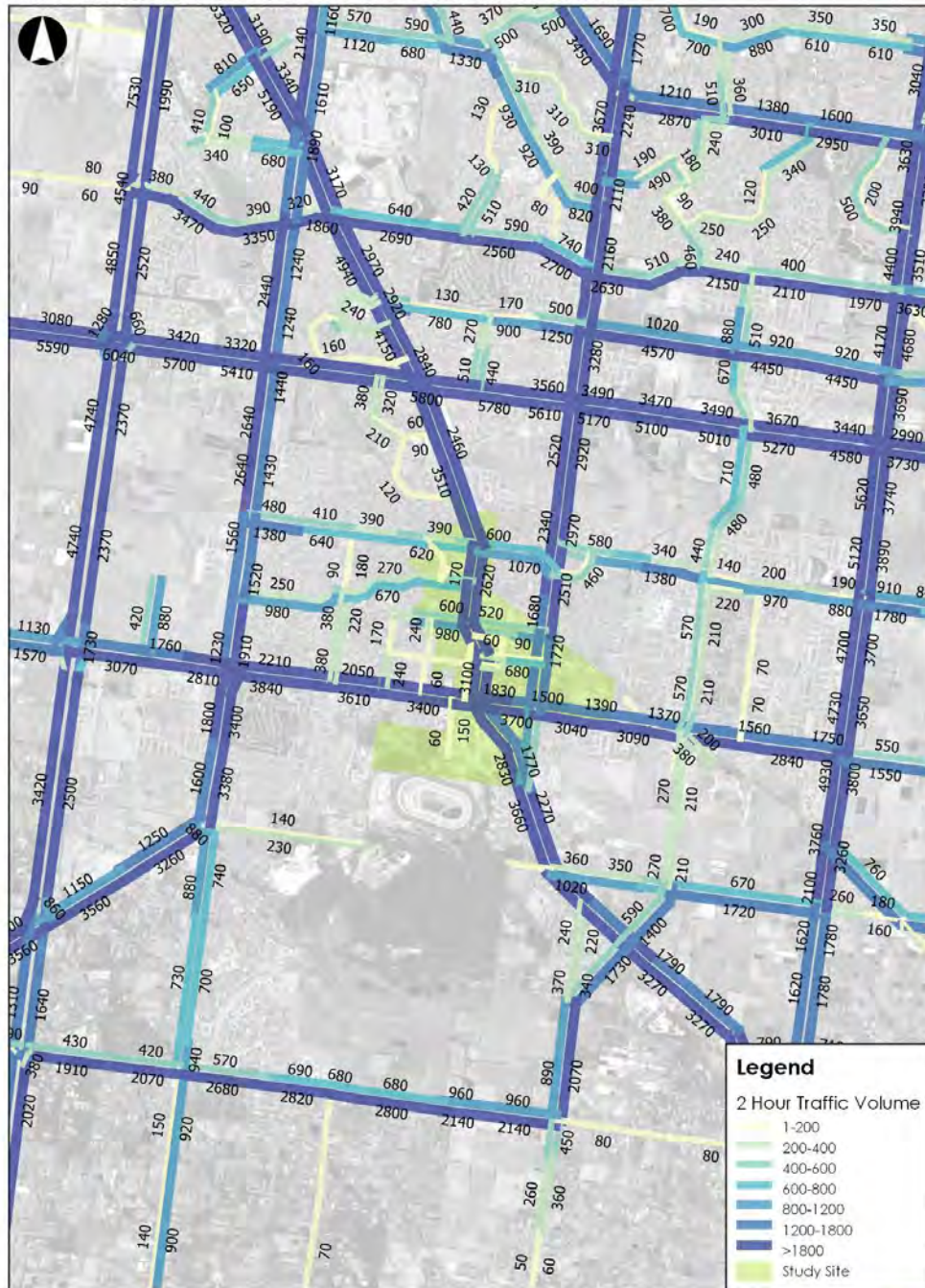
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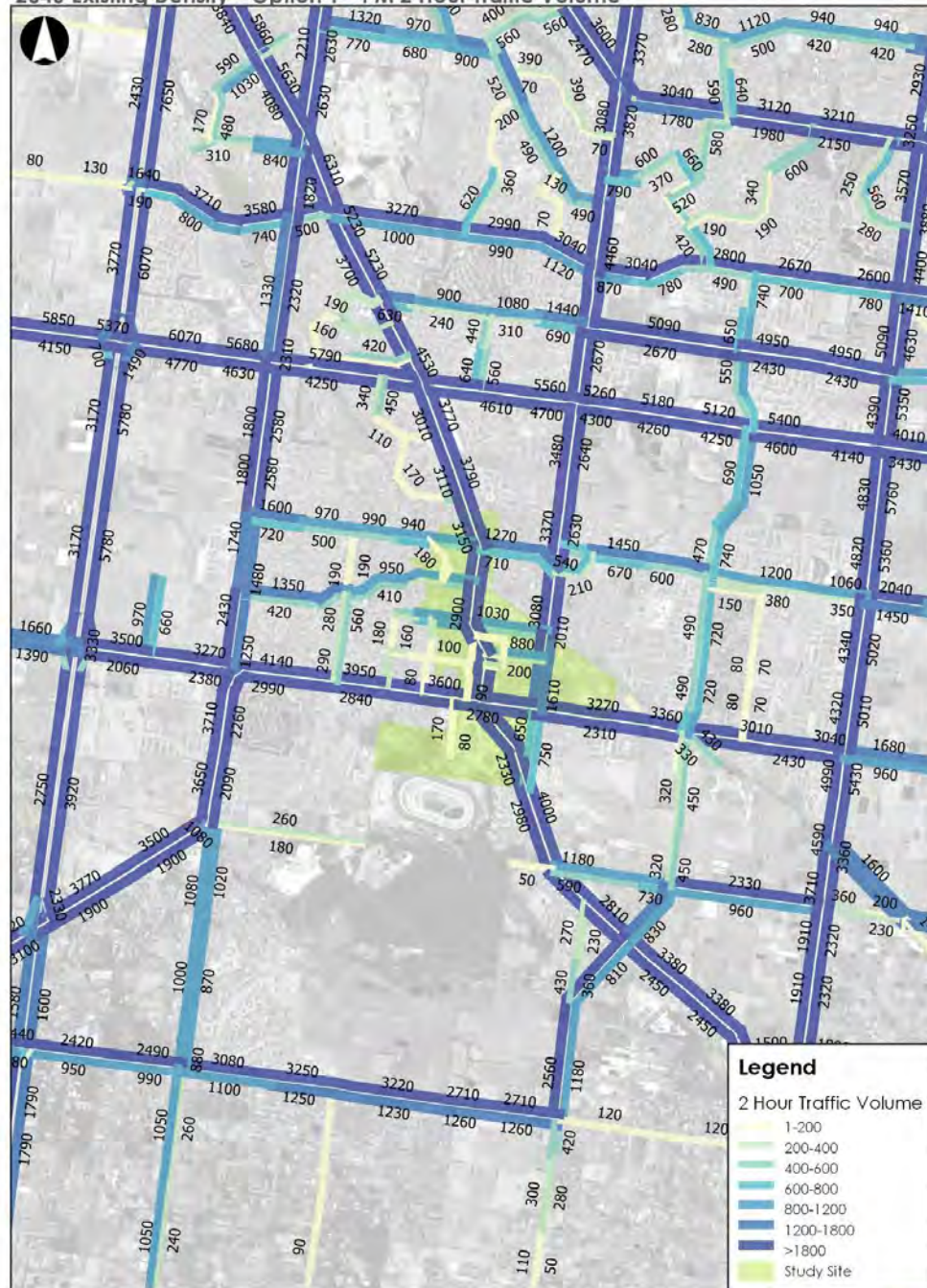
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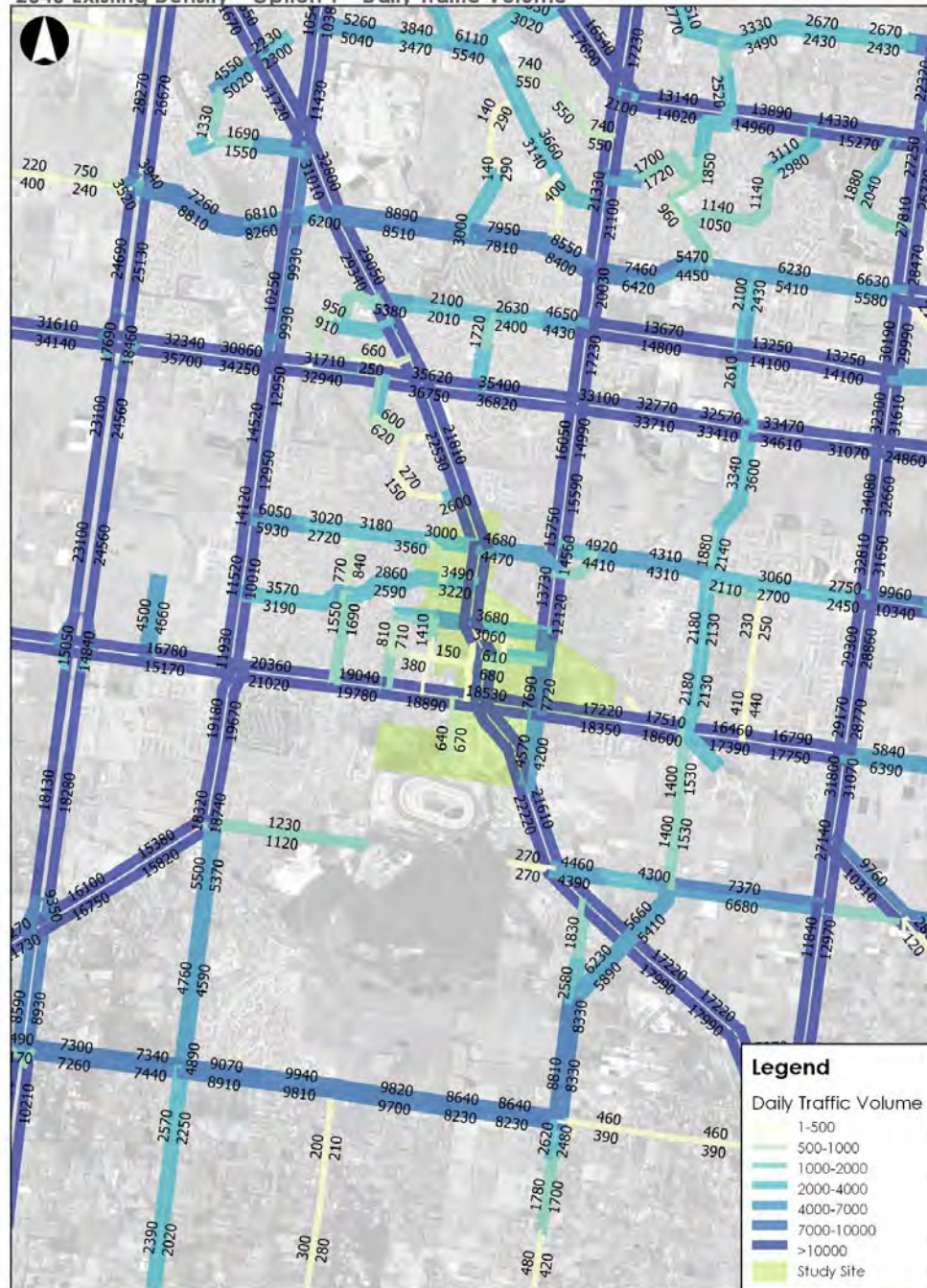
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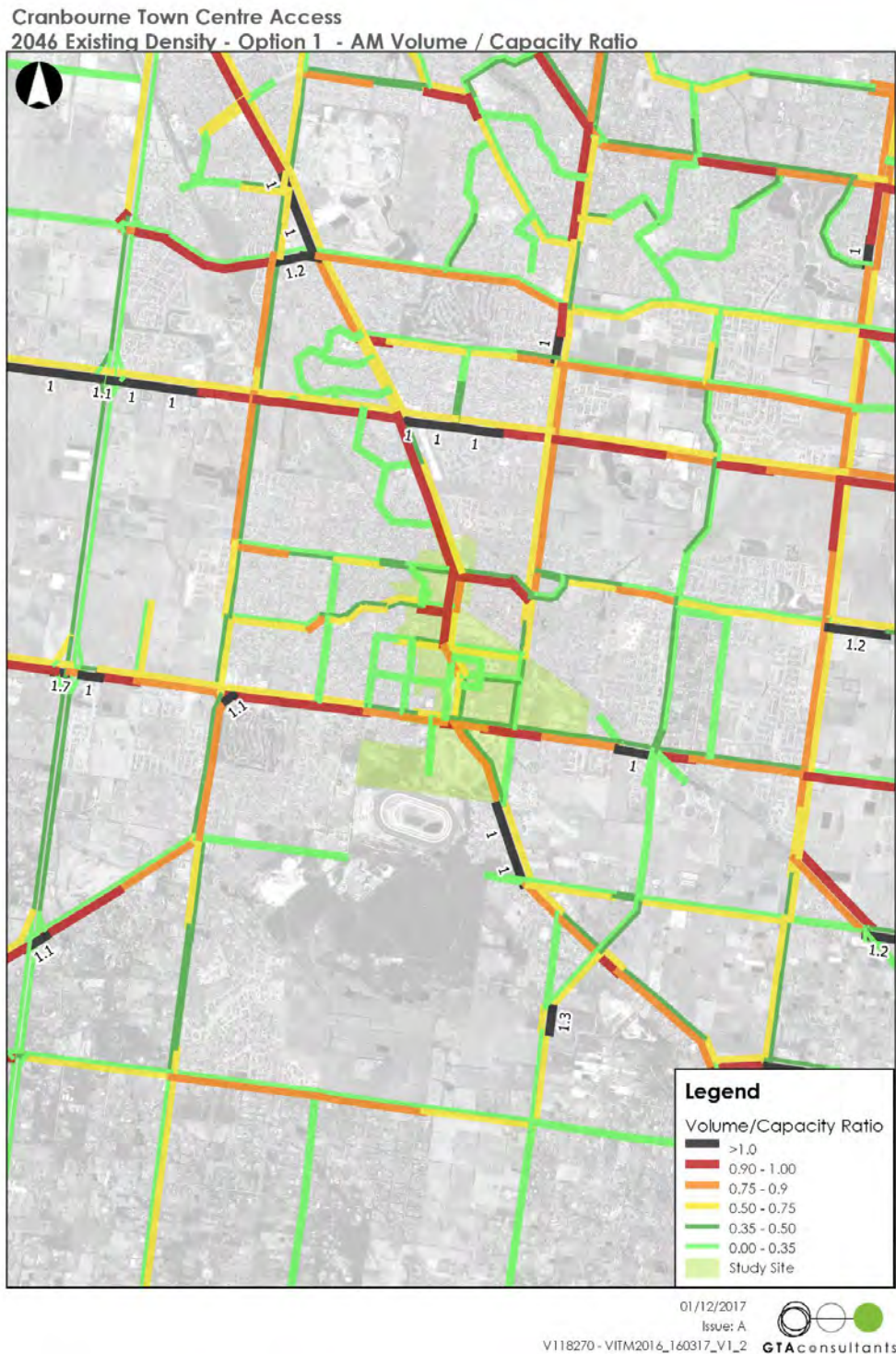
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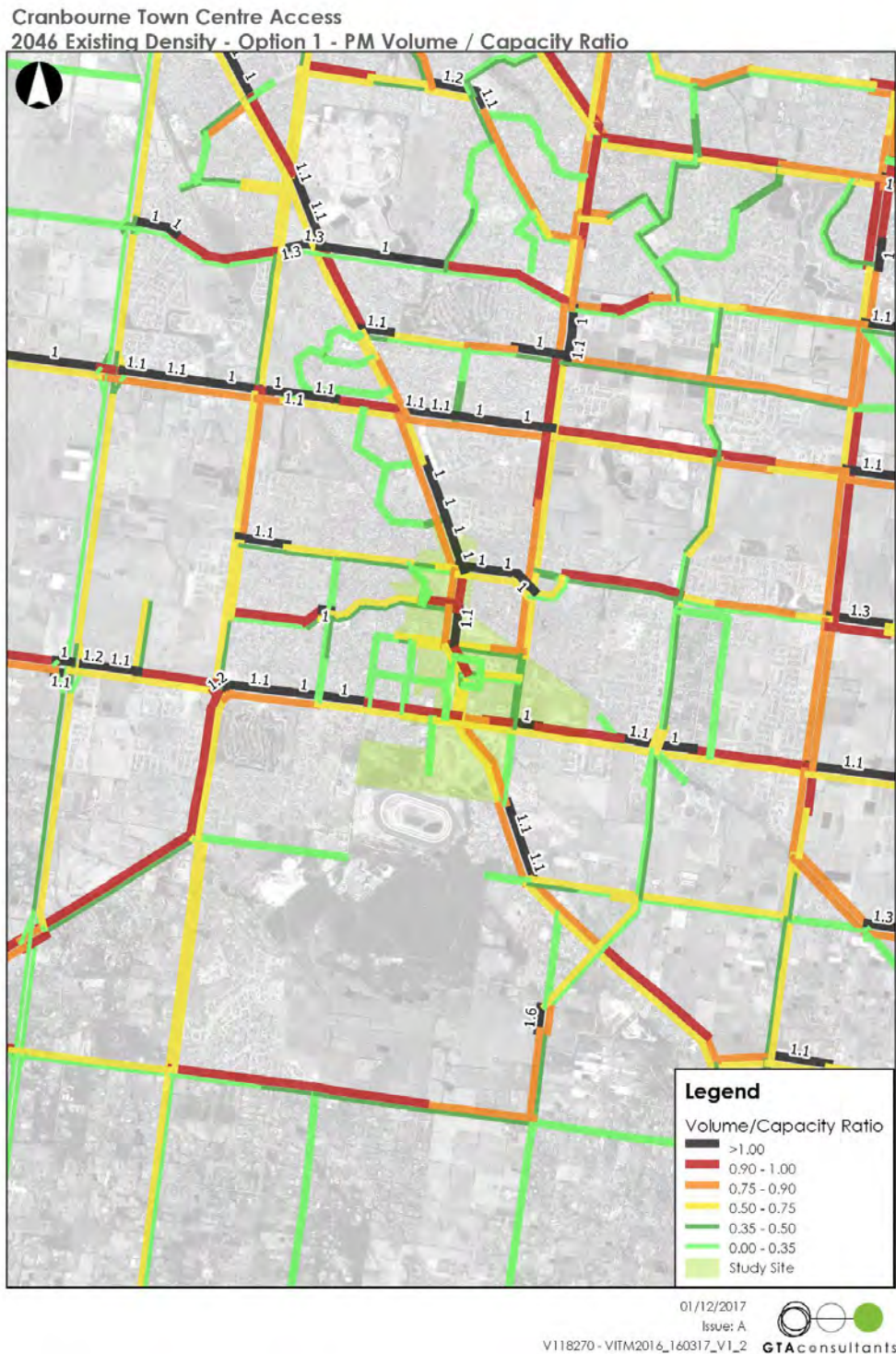
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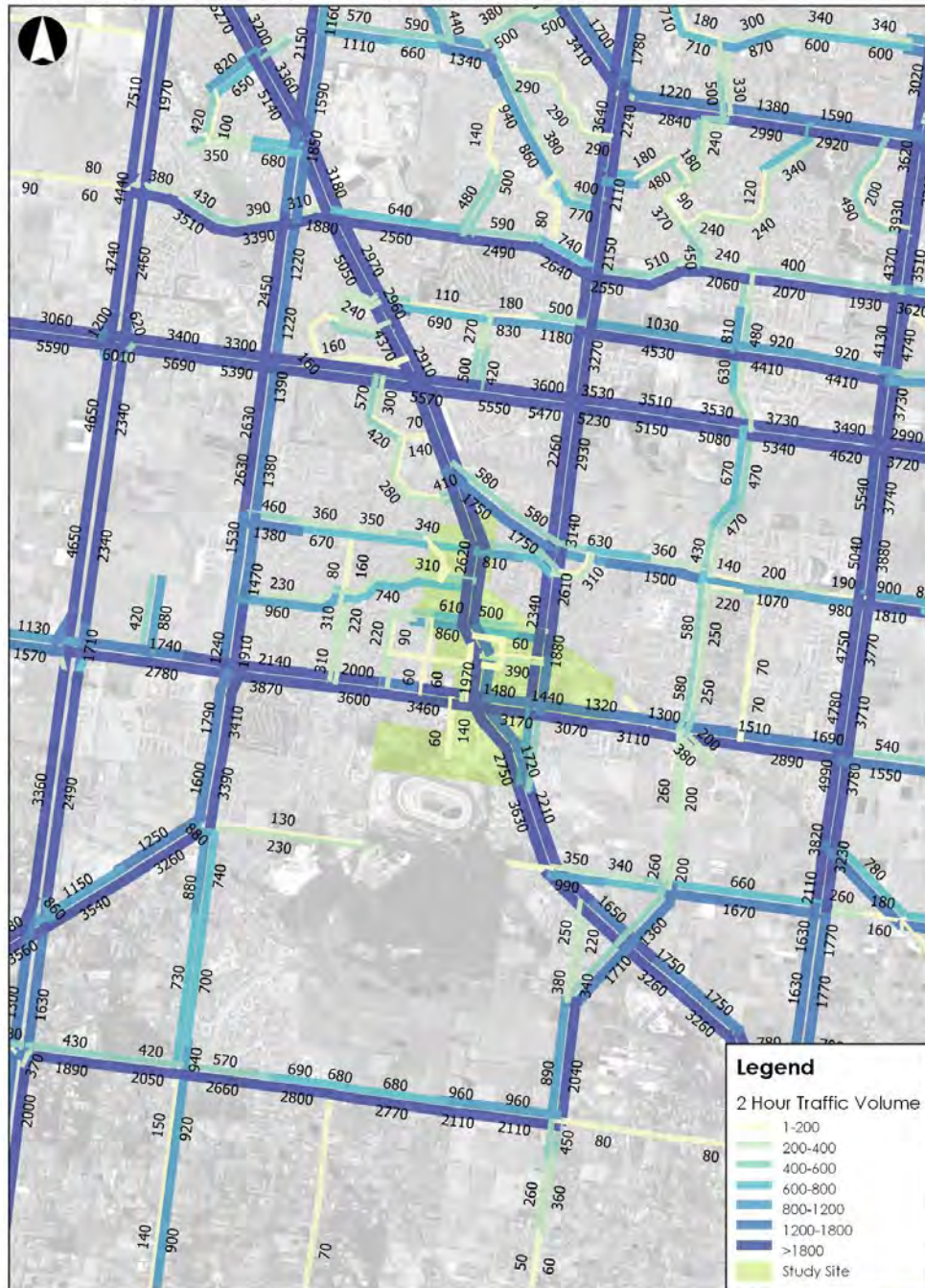


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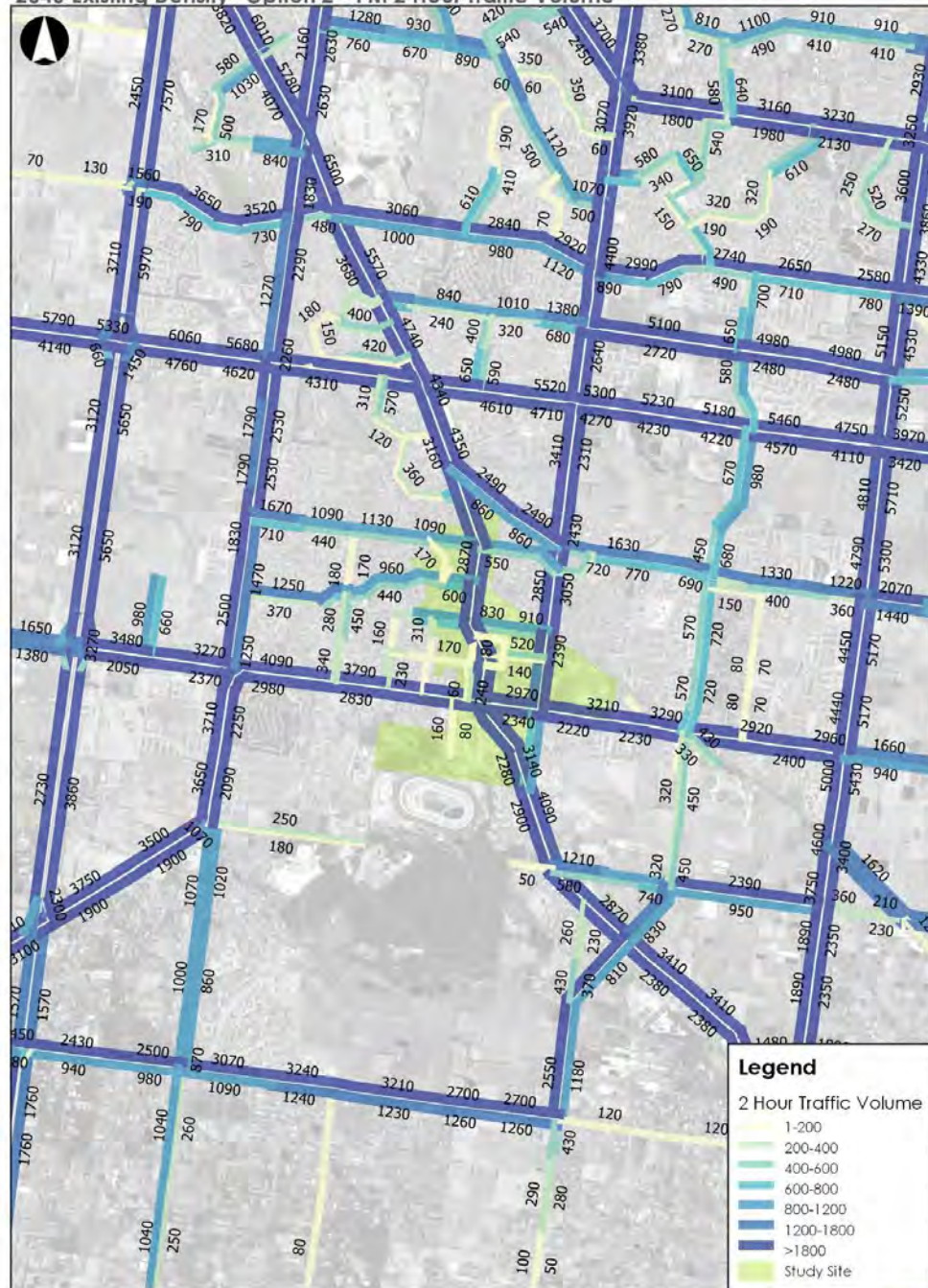
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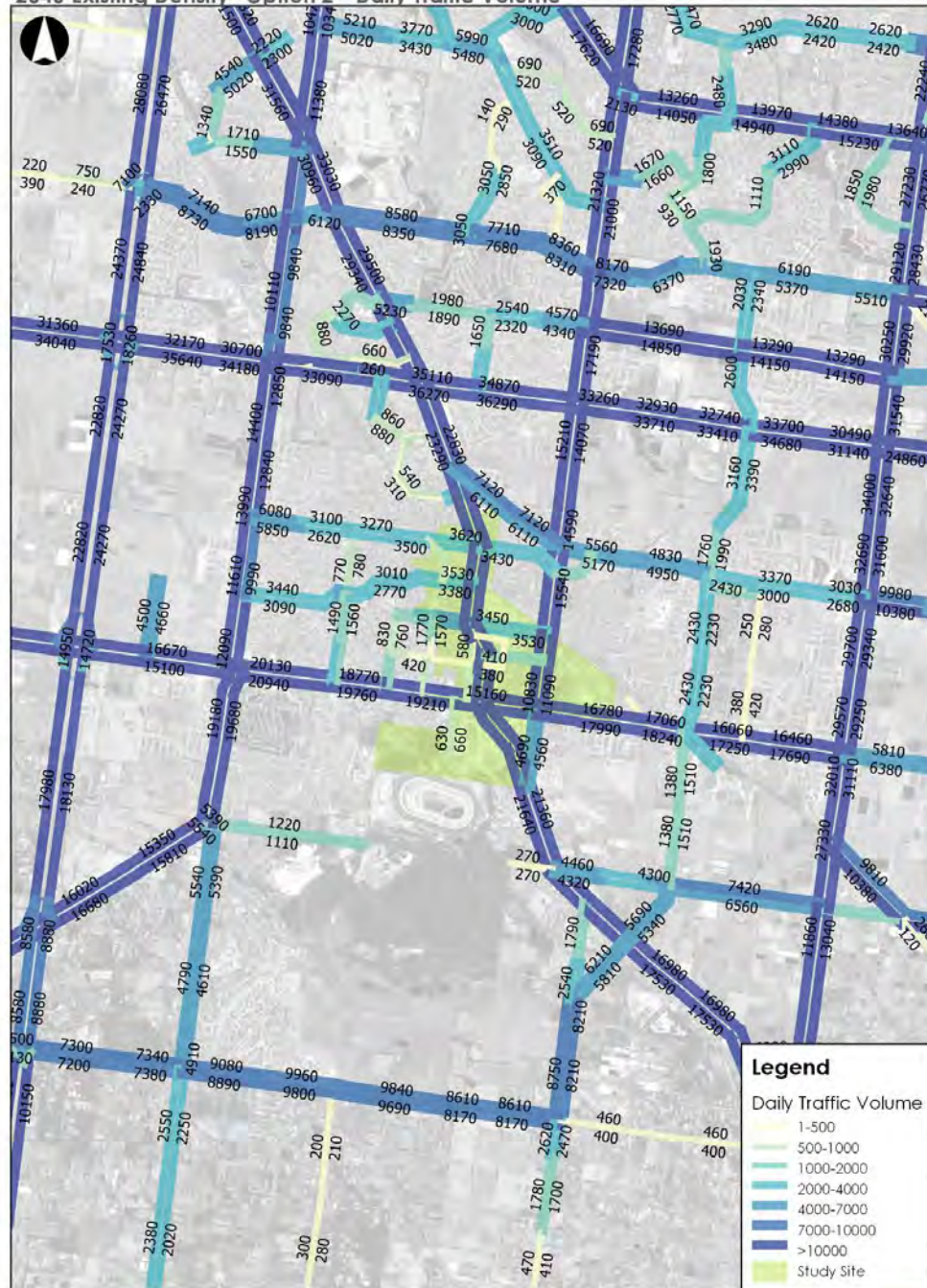
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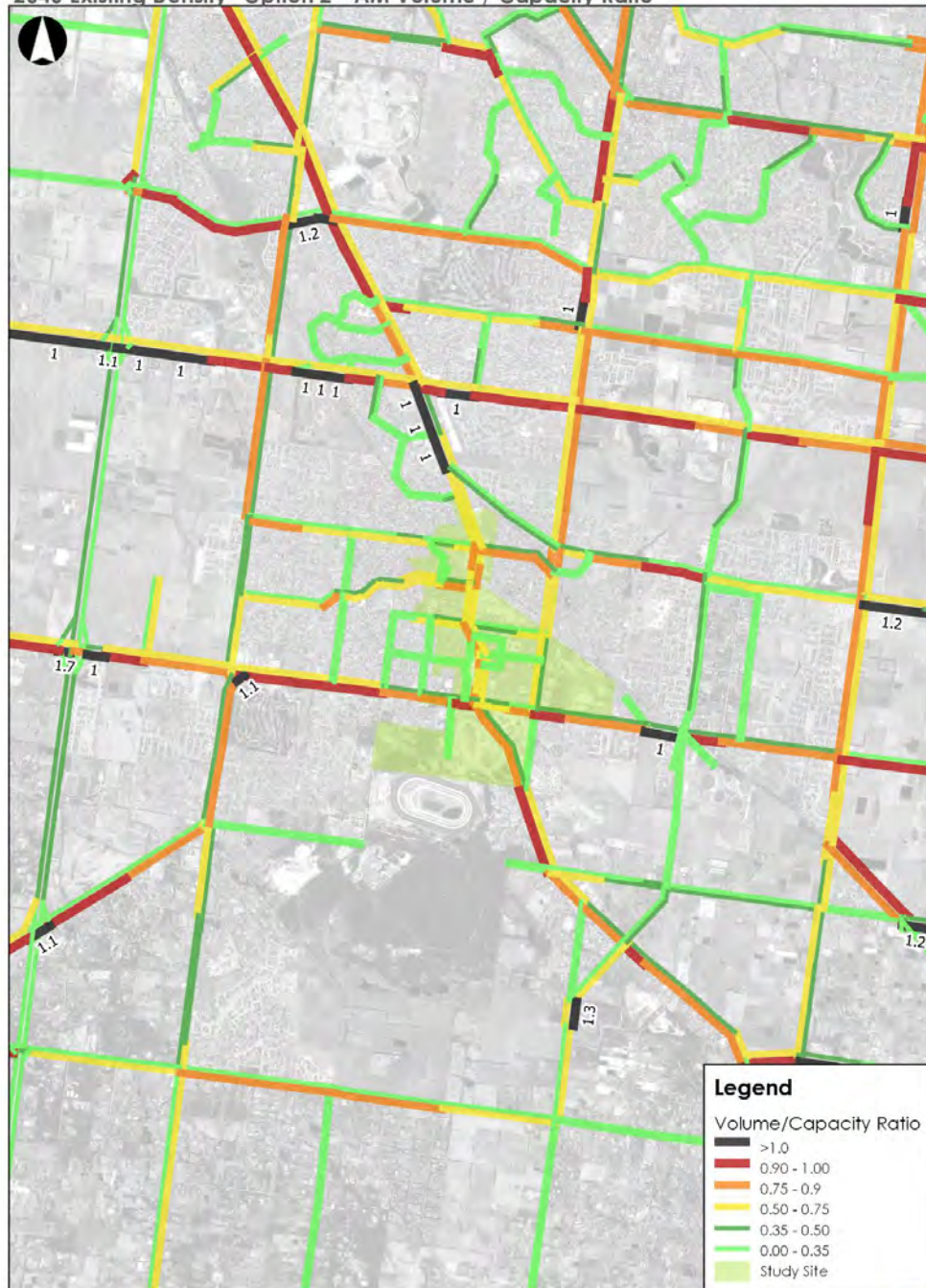
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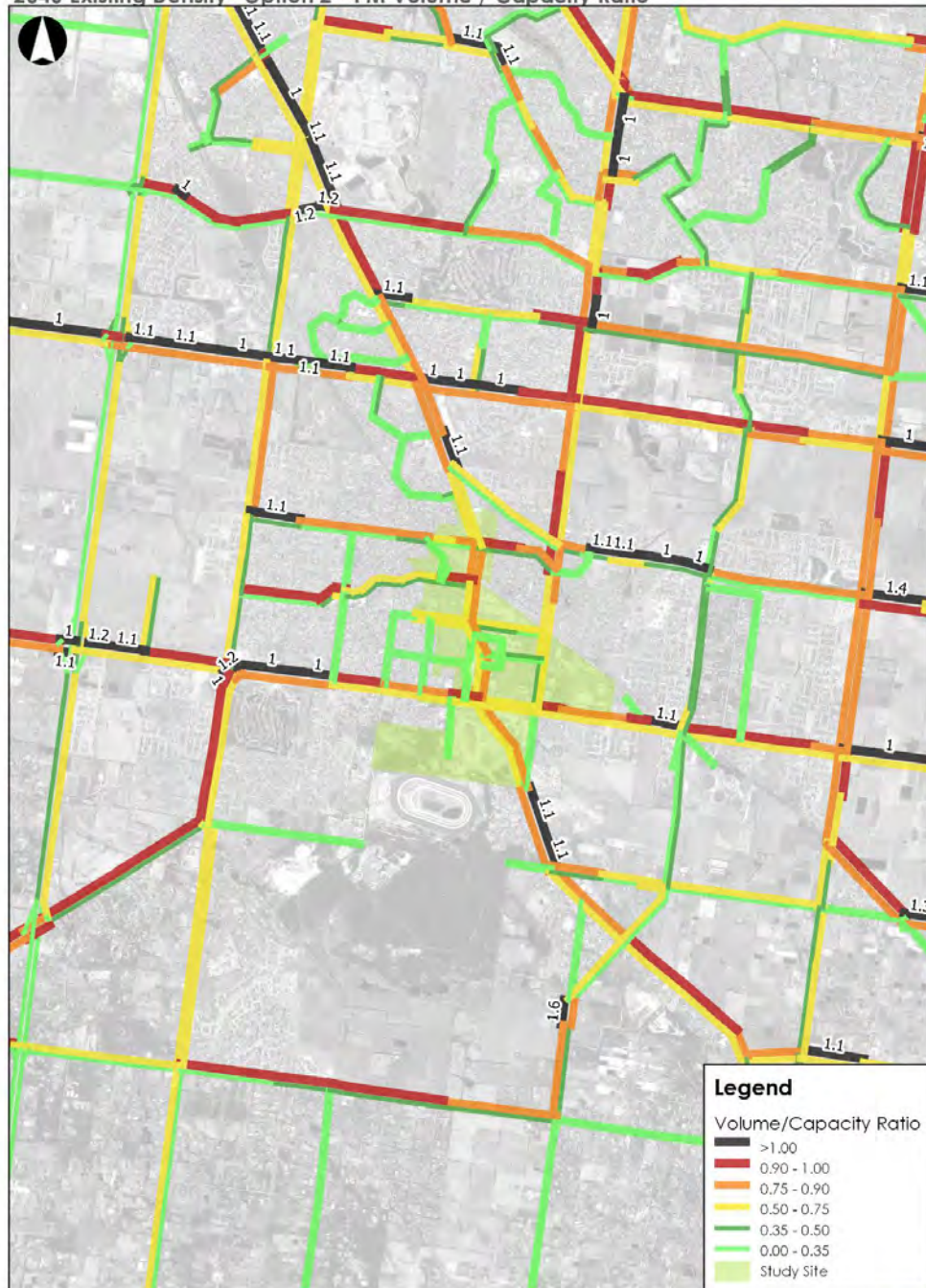
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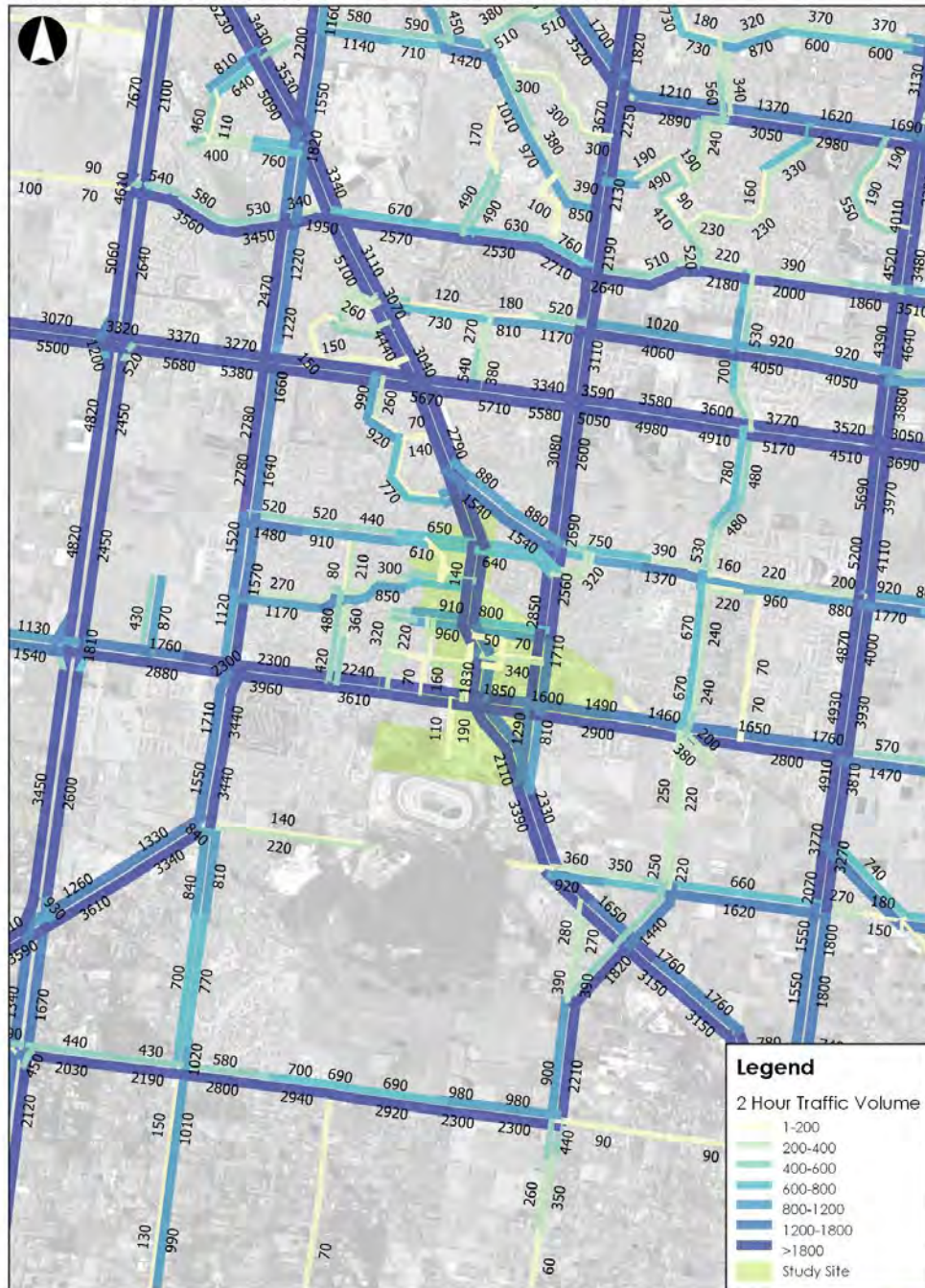
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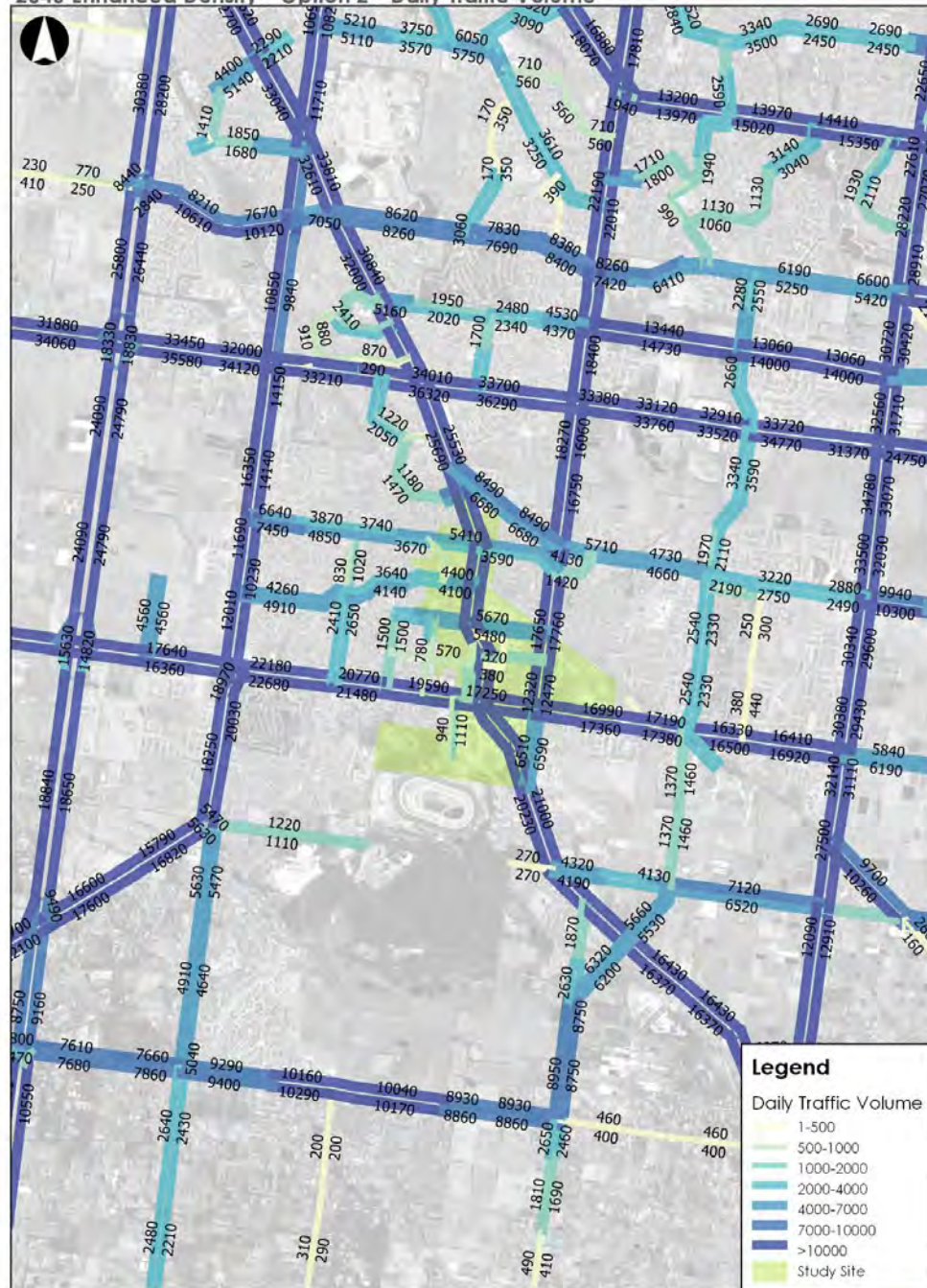
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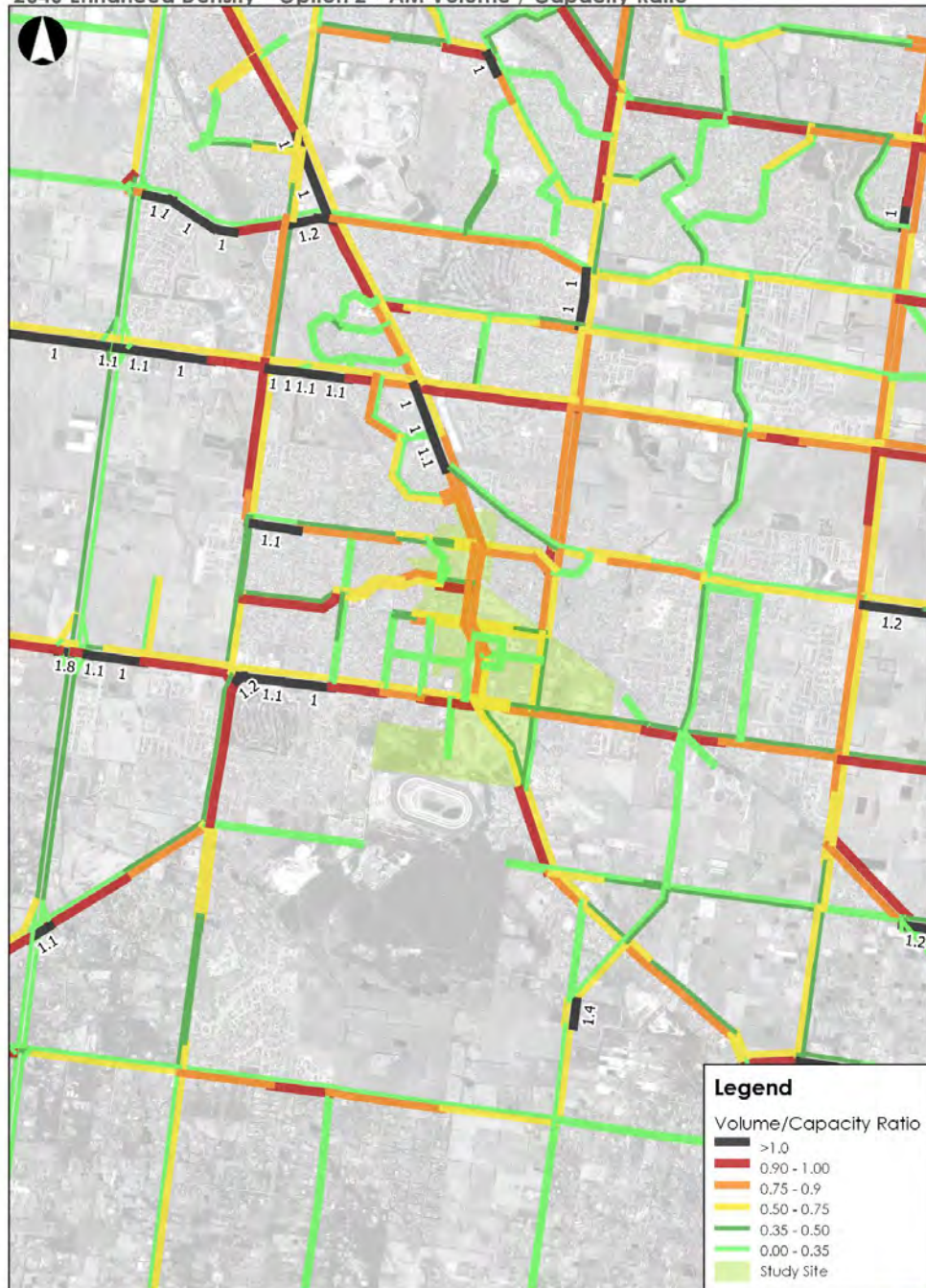
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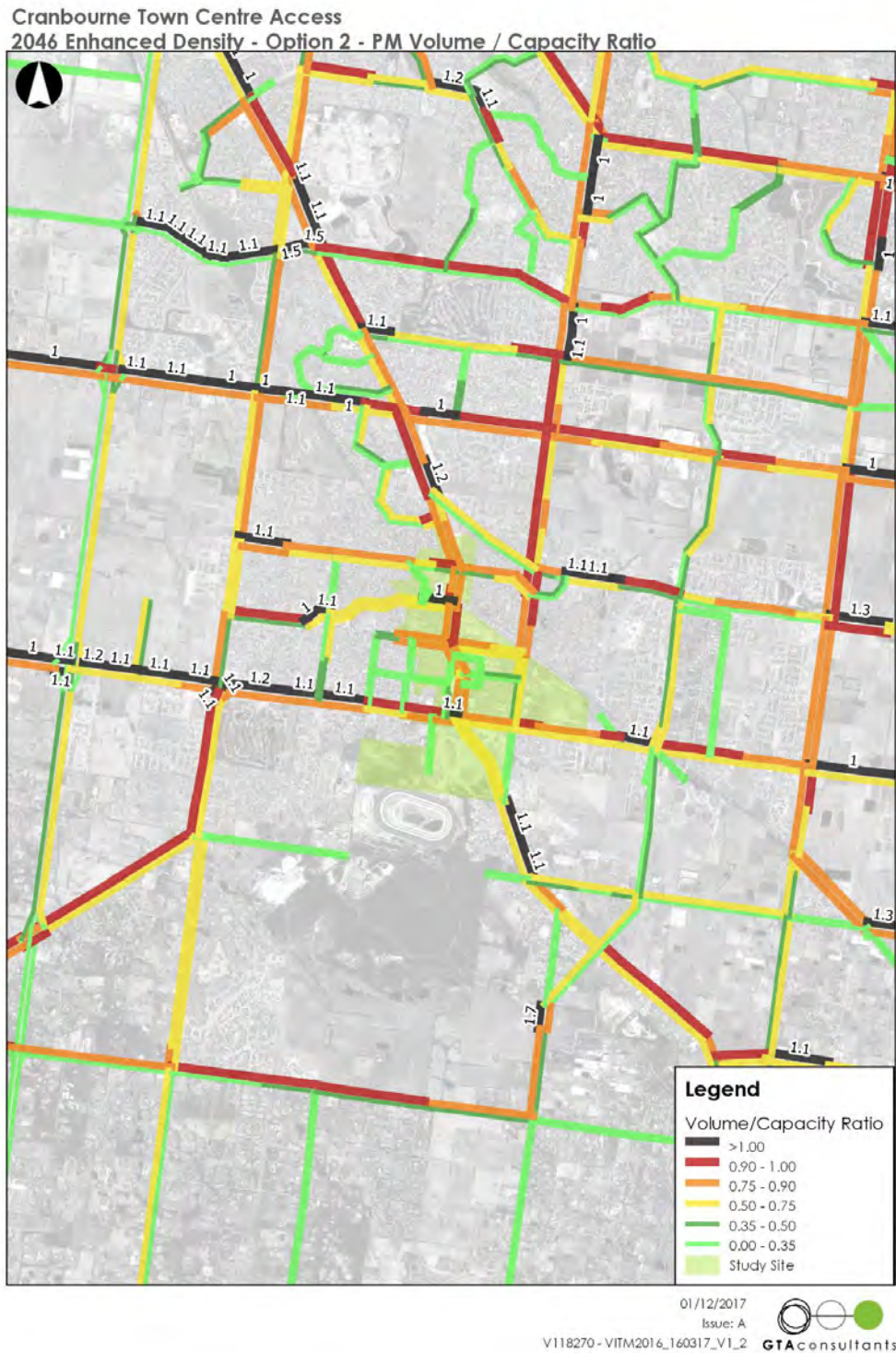


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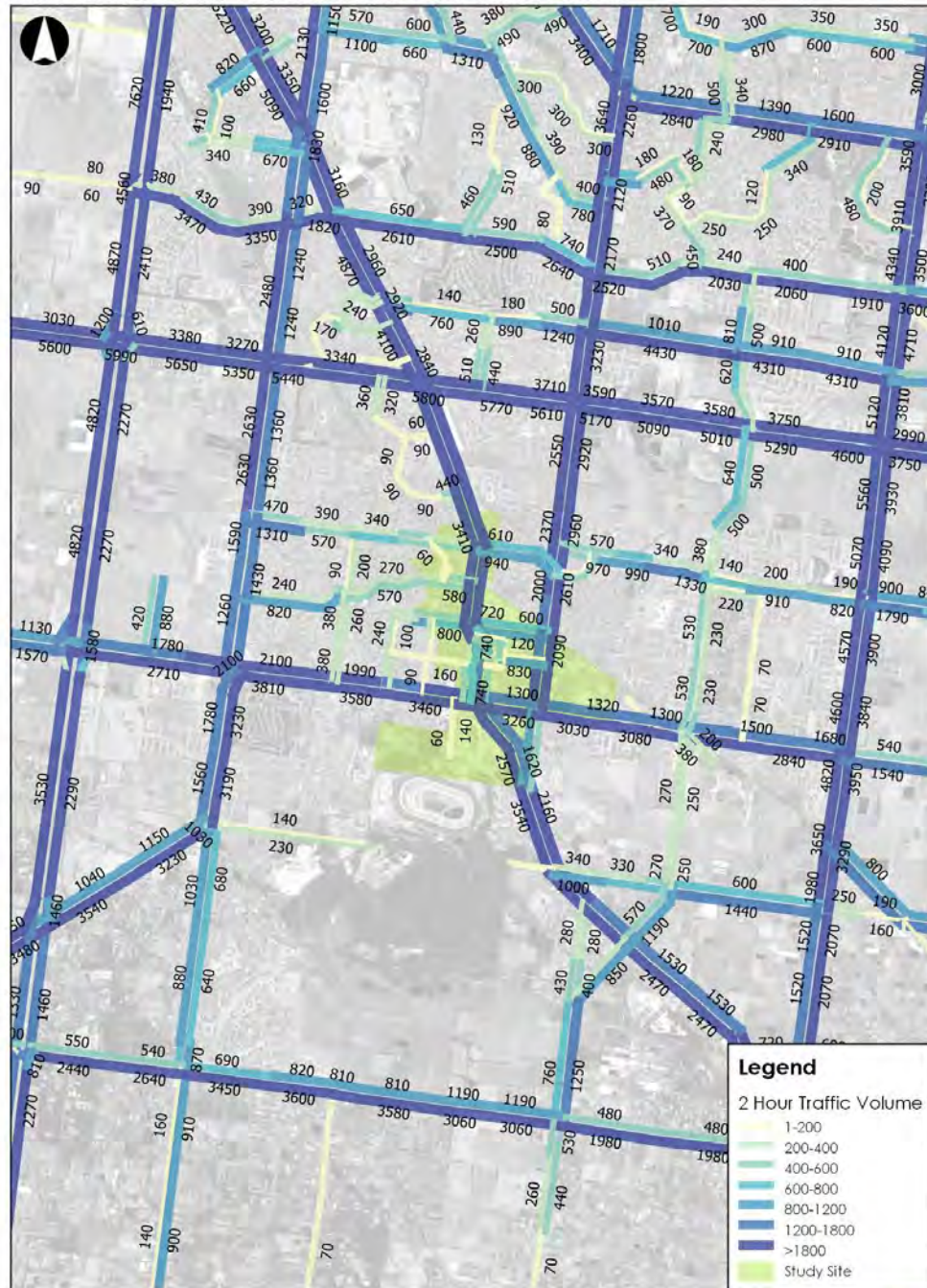


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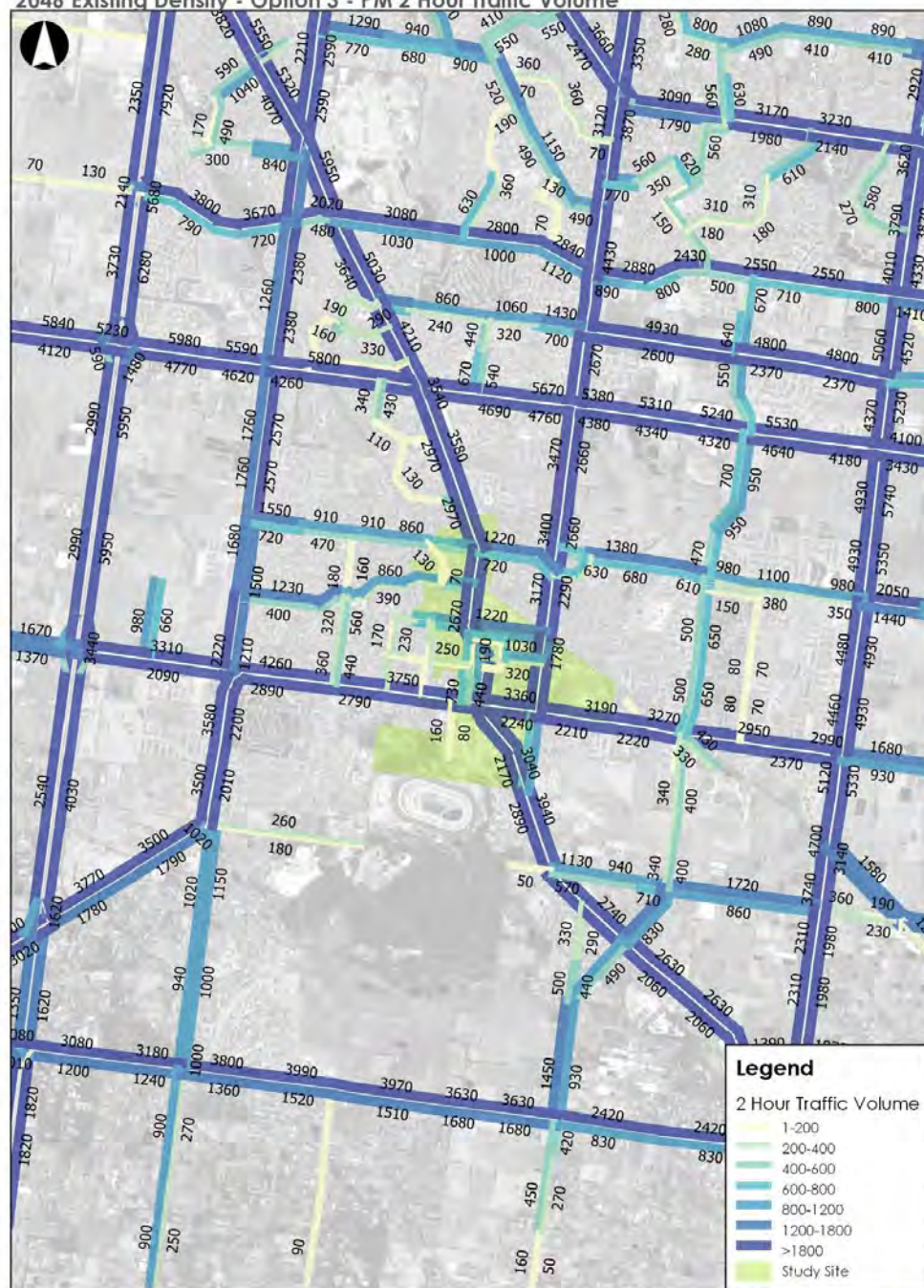
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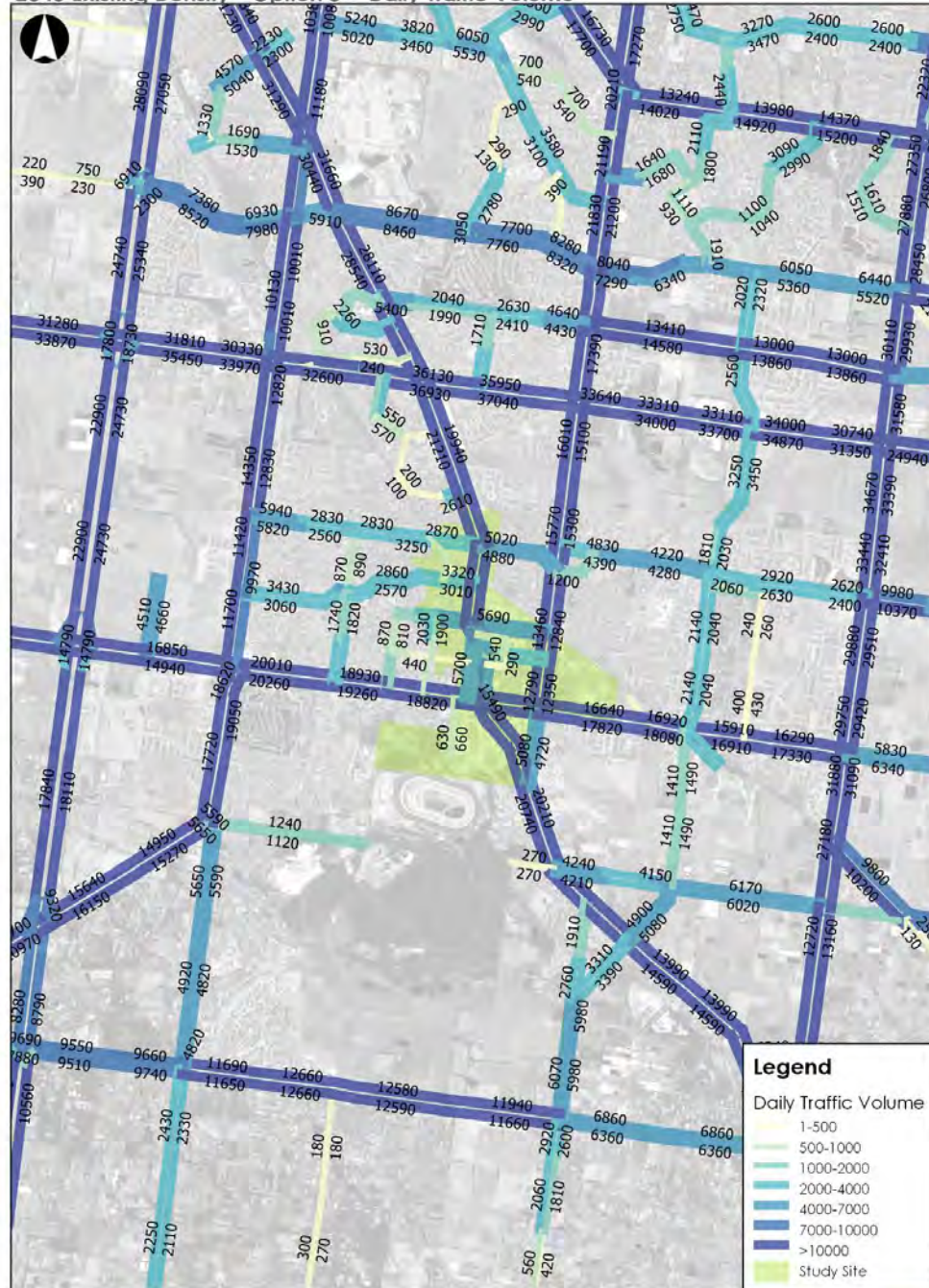
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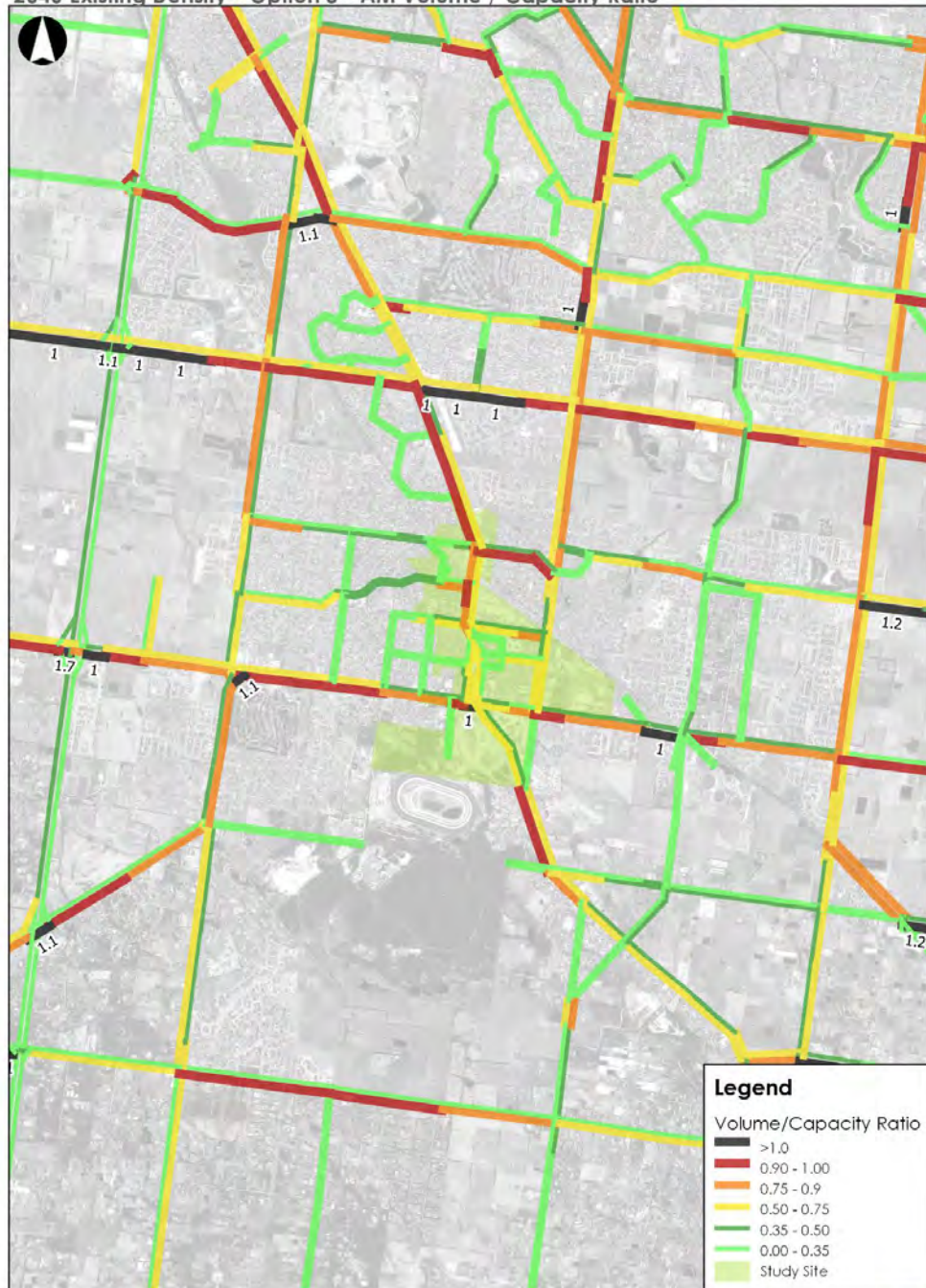
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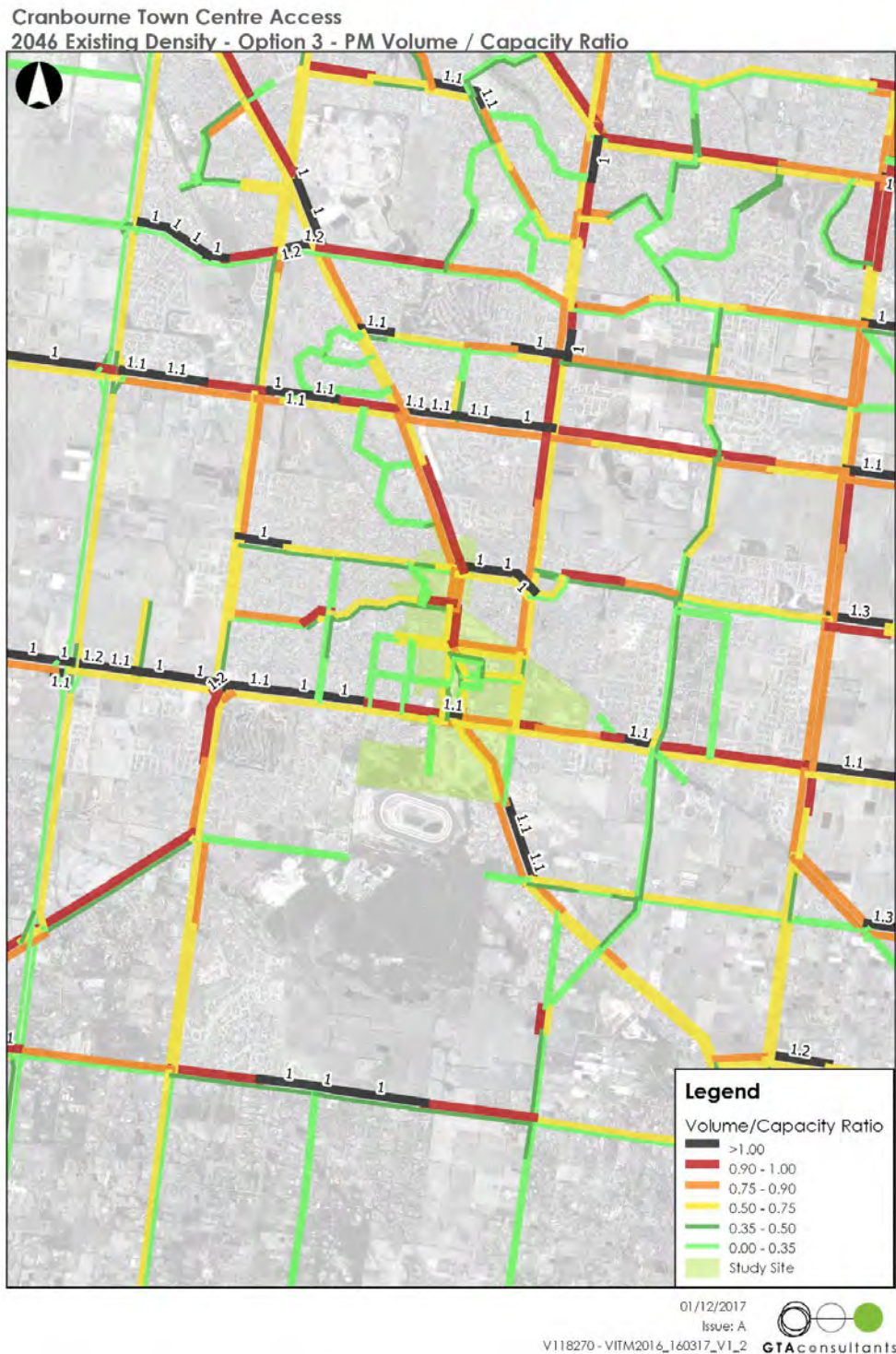


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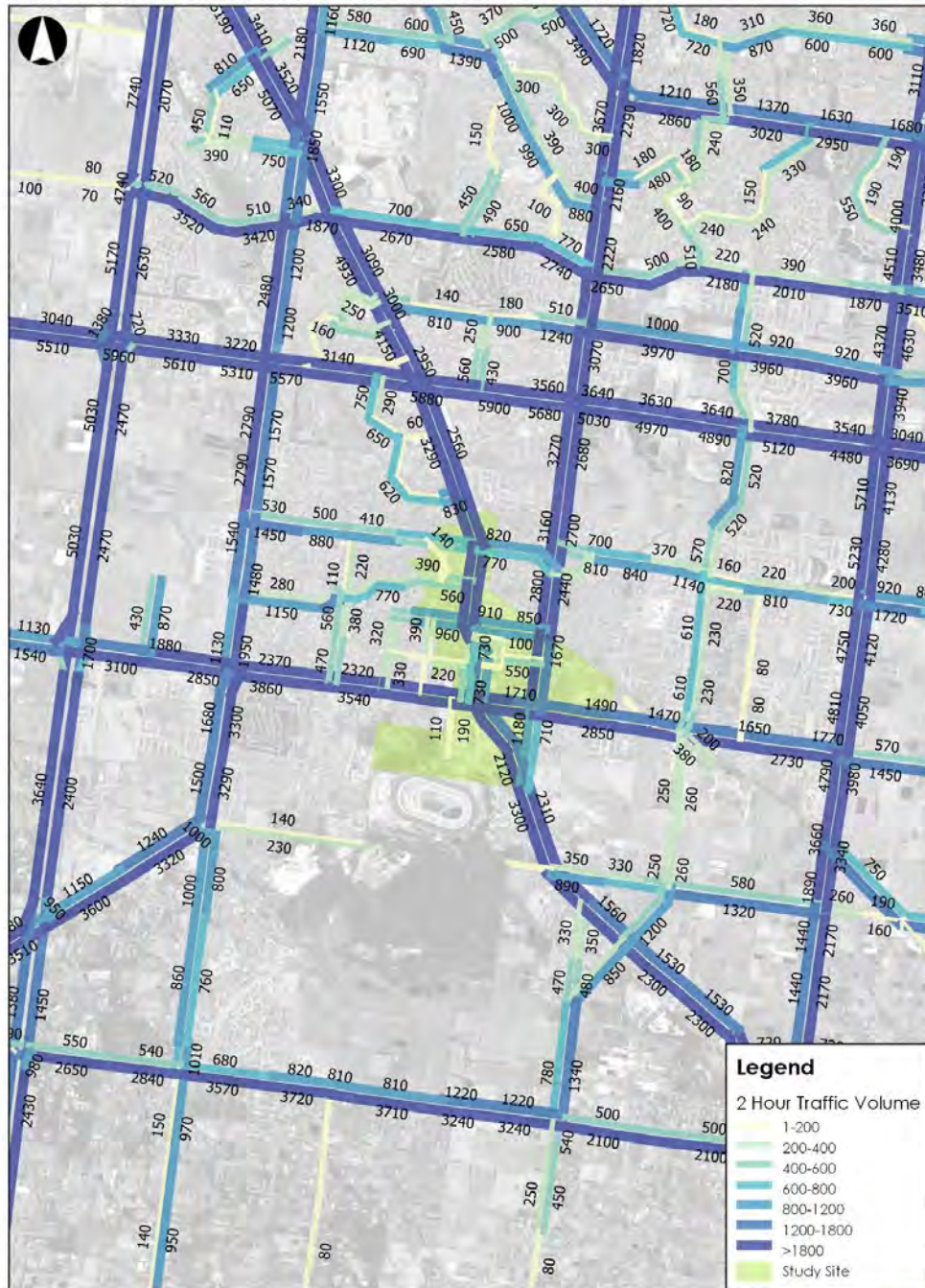


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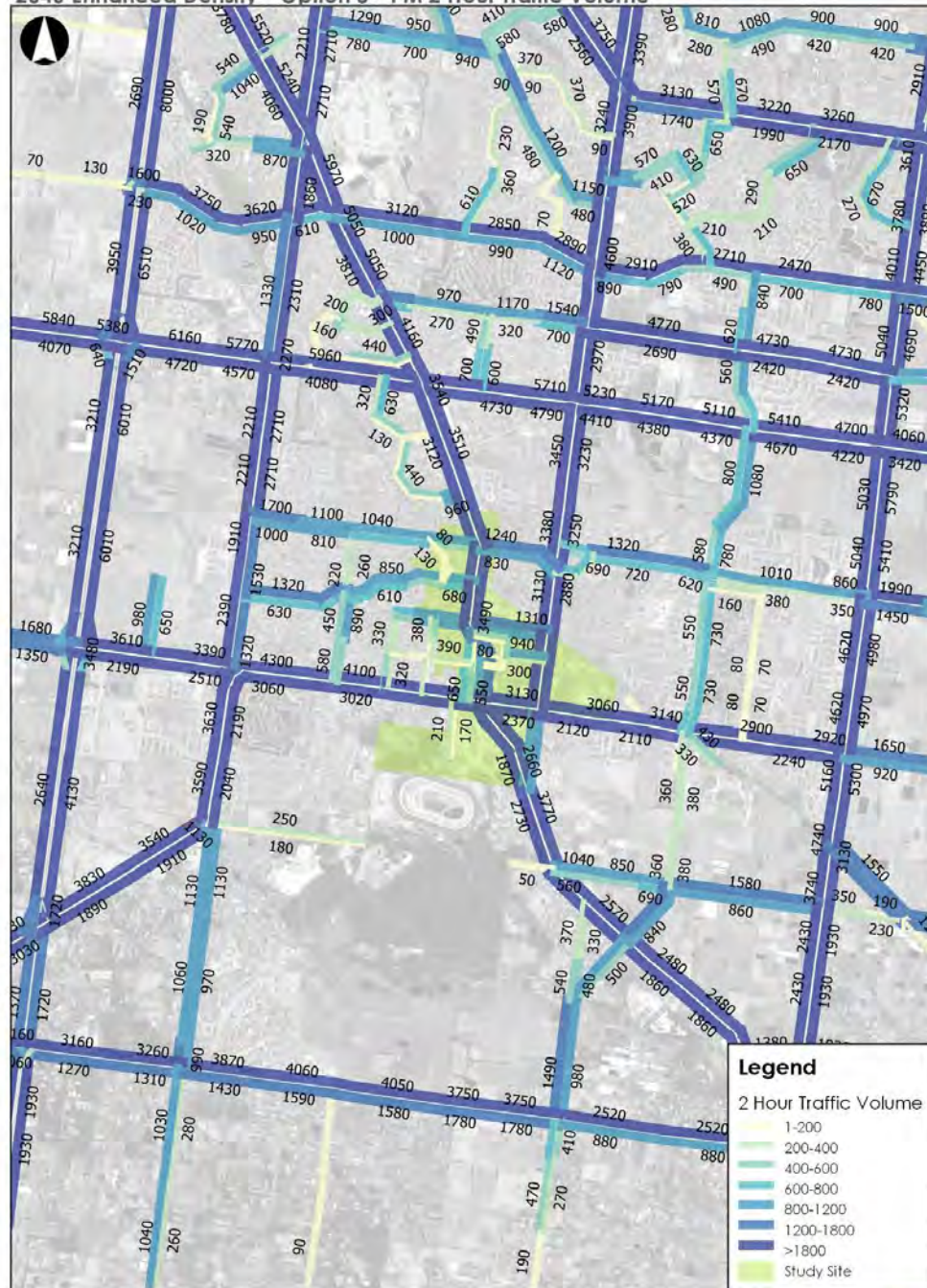
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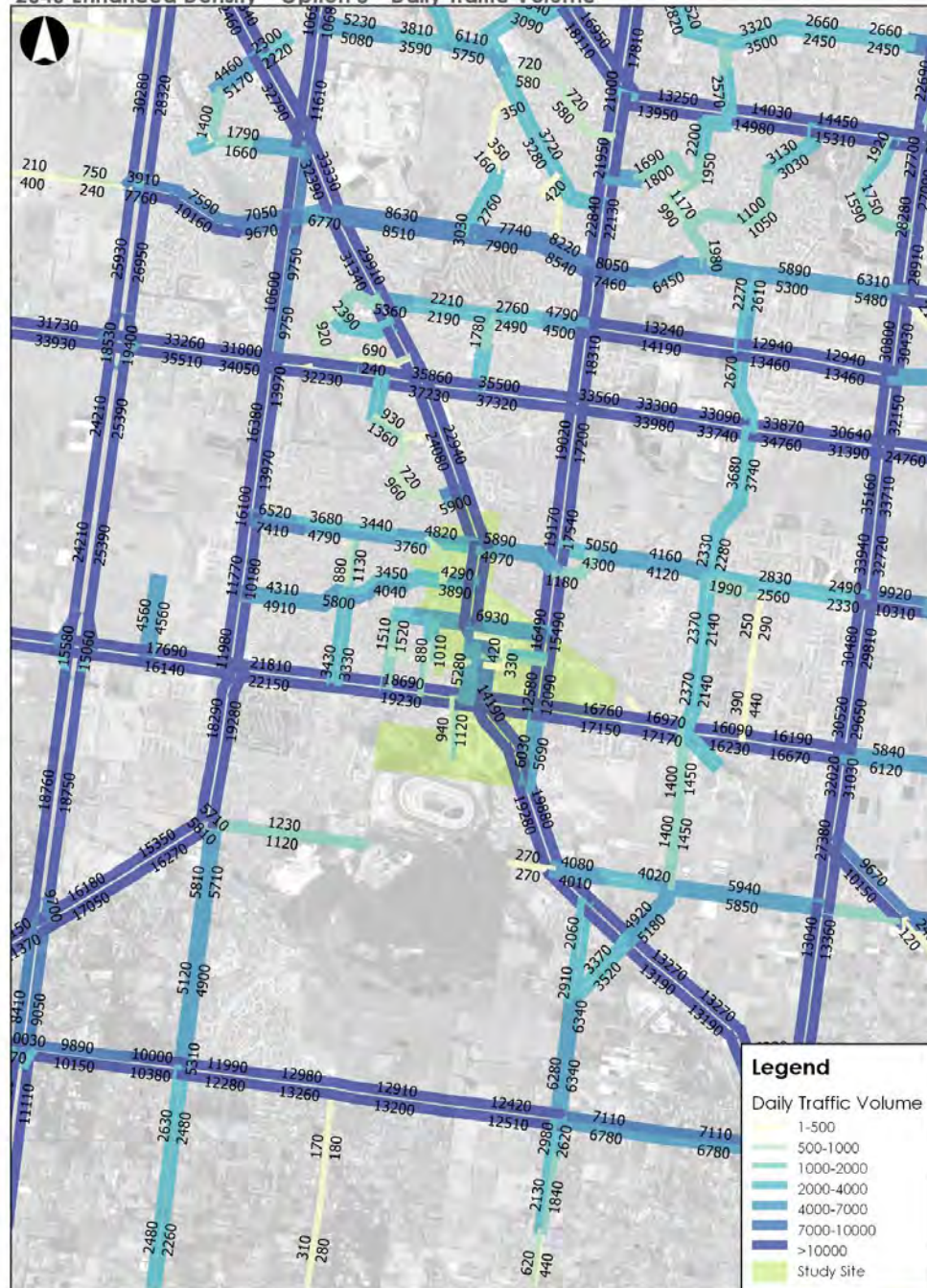
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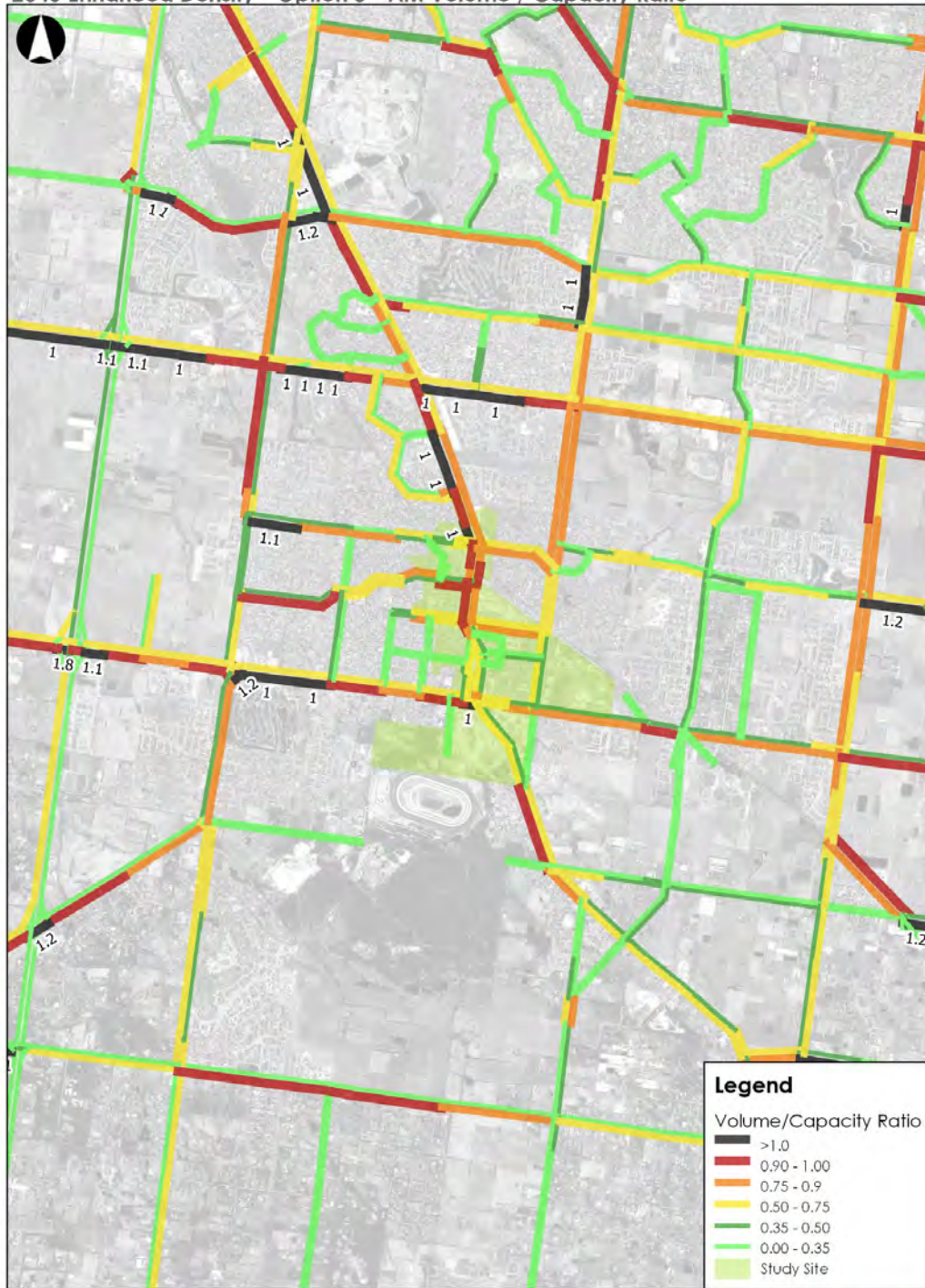
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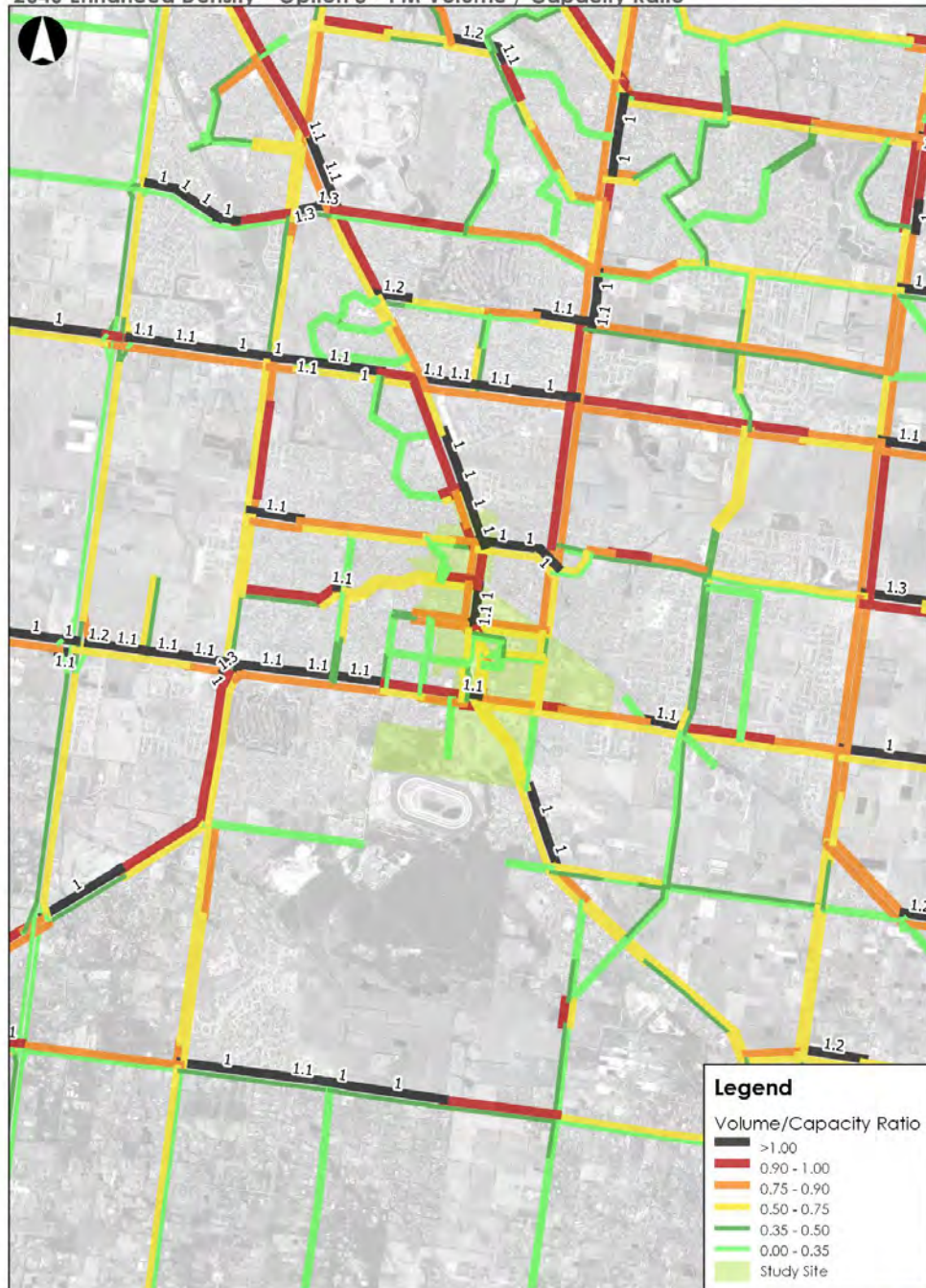
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Cranbourne Town Centre Open Space Assessment



Prepared for the City of Casey



Updated January 2018

Date	Revision	Amendment
28.09.17	Draft V1	For internal Council officer comment only
31.01.18	Updated – Final	Council officer comments incorporated

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Appendices

A	Existing open space hierarchy and function in Cranbourne Town Centre
B	Community Consultation Report – Open space community survey for Cranbourne Town Centre

Drawings (A3 size drawings)

CTOSA-01	Existing Open Space
CTOSA-02	Gap Analysis
CTOSA-03	Sub-precinct boundaries
CTOSA-04	Future Change

1. Introduction

1.1 Project scope

Thompson Berrill Landscape Design Pty Ltd (TBLD) was requested by Council to undertake an open space needs assessment for the Cranbourne Town Centre to provide recommendations for open space provision, design and management in the context of forecast change. The assessment relies on a range of other strategic documents that are currently being prepared by Council to inform the future Structure Plan for the Cranbourne Town Centre.

The open space needs assessment has referred to the *City of Casey Open Space Strategy (Adopted April 2015)* as a key reference regarding the hierarchy and function of open space. TBLD has made some refinements to the walking catchments and the Functions to assist the assessment work. The refinements are described in Section 2.1.2 of this report.

TBLD has prepared a spatial plan of all existing open space in Cranbourne Town Centre with follow up site visits to assess the existing open space. TBLD incorporated the site assessment work into the Existing Open Space Plan and prepared the gap analysis by applying the travel and walking catchments to all existing open space, referred to as the Gap Analysis Plan. These two plans, along with the database of existing open space, the site assessments and the review of background documents have informed the open space needs assessment.

TBLD prepared an open space survey for distribution to the community (residents, workers and visitors) by Council. The purpose of this survey was to understand the community's existing patterns of use and values of open space and any suggested improvements they would like to the open space network. A combination of the community survey outcomes, the site assessment and background research forms the basis of understanding the open space needs of the existing community. This allows TBLD to differentiate between the needs of the existing and forecast population regarding open space.

1.2 Value of open space

As noted in the *City of Casey Open Space Strategy (2015)* (referred to as OSS in the remainder of this report), open space contributes to liveability and community health and wellbeing. This includes:

- Participation in structured sport and recreation.
- Exercising informally.
- Being outside in the fresh air, sunlight and in contact with nature.
- Places to relax and unwind.
- Social and physical development in children.
- Social contact with the local community and friends.
- Places for holding community events and festivals.
- Protecting and improving biodiversity including remnant vegetation and opportunities to reintroduce indigenous vegetation and native fauna.
- Protecting cultural heritage.
- Mitigating effects of climate change and urban heat.

2. Strategic context

2.1 City of Casey open space framework

2.1.1 Summary of the City of Casey Open Space Strategy

Overall

The OSS sets the overall direction and framework for open space in the City of Casey. This articulates four 'pillars' including:

- A planned city – provides direction for the for the planning, design and decision making regarding open space
- A green city – a greater diversity of experiences and environmental experience
- City of trails – a regional network of trails connecting to neighbouring municipalities
- Active city – the importance of open space to facilitate physical activity

Open space hierarchy

The OSS includes an open space hierarchy which designates the role and catchment that each open space has within the open space network. The OSS defines three types which are quoted below from page 19 of the OSS:

<i>Hierarchy</i>	<i>Description</i>
<i>Local open space</i>	<i>Predominantly provided to serve an immediate local catchment ie. relatively small in size, servicing daily and weekly neighbourhood, generally accessed by bicycle or foot from the surrounding catchment.</i>
<i>District open space</i>	<i>Generally larger areas of a greater complexity (perhaps with support facilities) that serve a group of suburbs or a precinct, with significance for the precinct as a whole or a substantial part of it (due to the size, function or diversity in the space), where there may also be local significance (conservation, cultural value, or for large social gatherings) and where residents might be expected to drive for access.</i>
<i>Regional open space</i>	<i>Areas that serve regional catchments (whole of, or broader than the municipality) that they may host significant sites, including of flora and fauna species, or, by virtue of their size, that offer diversity of opportunities or levels of development that would not necessarily be available for all primary functions and in every municipality, and that may attract high numbers of people, including tourists.</i>

Open space functions

Open space functions are described on page 18 of the OSS. The following table has is assembled from Table 5 in the OSS.

<i>Function</i>	<i>Description</i>
<i>Nature</i>	<i>Areas dedicated for environmental values promoting flora and fauna sustainability and connecting residents with nature. These include stand-alone sites of significant vegetation as well as nodes of vegetation incorporated into parks and reserves, consisting of remnant and newly created vegetation. These sites will promote environmental sustainability, provide habitat corridors, reduce the heat effect across the City and connect people with nature. Where appropriate these sites will be accessible to the community through dedicated formed pathways which will seek to restrict damage.</i>
<i>Trails and waterways</i>	<i>Land which is set aside or has a secondary function to accommodate trail linkages or open space corridors/walkways. These include walkways between streets and neighbourhoods, open space corridors, waterways, tree reserves, wetland areas and transmission line easements which accommodate service infrastructure. Melbourne Water acknowledges that it is committed to supporting multiple use of its waterways to contribute to liveability outcomes. However, restriction may be in place to allow for flooding, drainage and transfer of water supply and sewerage.</i>
<i>Local parks / social – family recreation</i>	<i>Local parks service the local catchment and will be distributed throughout the City to provide all residents with access to quality open space. These parks are smaller in their size and have fewer facilities than the social - family recreation sites. Social - family recreation sites service a district and regional catchment and are destination places in their own right. These sites provide opportunities for a range of age groups typically catering for play, picnics, casual ball games, trail activities and environmental qualities. Social - family recreation sites will replace single purpose play function parks over time.</i>
<i>Sport</i>	<i>Land set aside to provide for organised sport. These open spaces should also provide for non-organised recreational uses and at the district and regional level act as community hubs.</i>

Attachment 2 – Open Space Planning Framework

This framework has been developed as a key tool for Council staff to inform their planning of open space advice to developers on Casey's requirements for open space. In summary, the framework provides a four step process summarised as follows:

<i>Step</i>	<i>Description</i>
<i>Step 1: Settlement type</i>	<i>Consider the settlement type of the area i.e. urban or rural.</i>
<i>Step 2: Supply/Demand Assessment</i>	<i>Consider the open space supply and demands for the area and any opportunities to provide complementary open spaces from other sources which may include school sites, Parks Victoria, Melbourne Water, utility or private land.</i>

Step	Description
Step 3: Open Space Network	<i>Determine the layout, distribution, function and hierarchy of open spaces for the area investigated.</i>
Step 4: Site Context	<i>Consider the context in which the site is situated to influence the location, dimensions and design of a particular open space parcel. Context may include a town centre, waterway, utility easement, existence of heritage, topography, community hub or school.</i>

2.1.2 Implications for Cranbourne Town Centre open space assessment

Open Space Hierarchy

The hierarchy has been applied to all open space in Cranbourne Town Centre and the adjoining area that is within a reasonable walking catchment of the Town Centre. For this report, 'reasonable walking catchment' is the defined walking distance for each type of open space including allowance for barriers to physical access to open space such as crossing busy roads, railways and waterways. In order to prepare the gap analysis, walking catchments are applied for the purposes of this analysis. These walking catchments are based on the OSS and have been adjusted to also meet TBLD's method of assessment. In summary, the walking catchments recognise that major roads, freeways and railways are barriers to safe and easy walking catchments. TBLD also calibrates the catchment based on the size and role of the open space.

Open Space Planning Framework

This open space assessment for Cranbourne Town Centre is in an established urban area and therefore, while the four steps have been addressed, this assessment and recommendations are made within the context of what is feasible in an existing established urban area rather than a greenfield site.

Open Space Function

In applying the functions from the Strategy to open space in Cranbourne Town Centre, it was found that some open space did not fit within the functions defined above. The following additional functions were added:

Function	Description
Undeveloped	No defined facilities or function for the reserve.
Service easement	Where the open space function is encumbered by an easement.
Cultural	Where the function includes protecting and interpreting historical or cultural heritage features and values.
Play	This was added as a secondary function, given that this information was collected on site and provides some more information on their size - i.e. Local, District, Regional.
Urban plaza	Functions as a destination for a catchment of users and visitors within an urban town centre. The design and facilities respond to the sites urban context.

Acquisition and disposal of open space

Thompson Berrill Landscape Design Pty Ltd has been asked to undertake an open space assessment of Cranbourne Town Centre within the context of the existing and forecast population needs for open space. This may include recommendations for acquisition of new and/or disposal of existing open space.

2.2 Summary of other background information

2.2.1 Cranbourne Town Centre: Economic Assessment

Prepared by SGS Economics and Planning for the City of Casey, June 2017

The Cranbourne Town Centre is a Principal Activity Centre and accommodates a diversity of uses including retail, commercial, institutional and residential activity. The assessment has been prepared to inform the City of Casey's review of the Cranbourne Town Centre Plan (Structure Plan). The assessment defines 14 Precincts within the Cranbourne Town Centre and provides key objectives and directions for each of the precincts. The recommendations in this Economic Assessment are consistent with the Cranbourne Town Centre Residential Demand Study (June 2017).

The Economic Assessment identifies that as a result of the broader demand assessment at a regional scale, 103,100 square metres of additional floor space growth is needed at the Cranbourne Town Centre over the next two decades, and that over 50 per cent of the demand is in the non-retail sectors, primarily commercial floor space. The assessment confirms that Cranbourne Town Centre has significant additional capacity to accommodate this growth.

Implications for the Cranbourne Town Centre open space assessment

The assessment identifies some key issues regarding the economic viability and attractiveness of the Town Centre that are relevant to existing and future open space. This includes

- The sprawling nature of the town centre makes it difficult to easily and safely move around it by foot or by bicycle.
- The poor amenity particularly in relation to the presence of the 6 lane South Gippsland Highway through the middle of the Centre, with traffic noise, speed and pollution impacting on the amenity of the outdoor environment.
- Cranbourne Train Station is located at the northern extent of the Town Centre, and more than 20 minutes walk from the key retail centre and more than 30 minutes walk to the Casey Fields education/recreation complex.
- The low amenity of the centre makes it difficult to attract new business and educational facilities in the precinct, as business owners and employees are attracted to quality urban environments with a high level of service provision.

2.2.2 Cranbourne Town Centre: Residential Demand Study Final Report

Prepared by SGS Economics and Planning for the City of Casey, June 2017

Currently there are 1,275 dwellings located within the Cranbourne Town Centre study area boundary with an estimated demand for up to 400 additional dwellings by 2036.

The capacity assessment identifies that there is a total capacity for 10,970 dwellings based on the existing planning controls, however this is a theoretical capacity and is not required in the short to medium term. Instead the Residential Demand Study has identified some key strategic sites in locations that would be suitable for higher density development. One of the key issues in the short term is to ensure that interim development scenarios do not limit the longer-term capacity for these strategic sites to redevelop.

Implications for the Cranbourne Town Centre open space assessment

The open space assessment will be based on the assumptions of an additional 400 dwellings within the Town Centre by 2036 and medium to longer term redevelopment of the key strategic sites identified in this study.

2.2.3 Cranbourne Racing Complex and Surrounds Investment and Development Plan

City of Casey Strategic Development Department, Updated January 2015

This is the approved Incorporated Document for the affected land under Clause 81 (Schedule 2) of the Casey Planning Scheme pursuant to Section 6(2) (j) of the Planning and Environment Act. As noted in the Panel Report for Amendment C166 to the Casey Planning Scheme, this document provides a framework for the fair, orderly, economic and sustainable development of the Cranbourne Racing Complex and surrounds in a way that protects the existing cultural, recreational and ecological values along with the public and private interest of the site. The framework guides the redevelopment and ongoing use of the Cranbourne Racing Complex and surrounds for a racecourse, equine training centre, horse stabling, recreation reserve and other community benefits. Of specific relevance to this open space assessment are:

- To support the continued use of the site for soccer and other passive recreation opportunities in Precinct 5 – Soccer and Passive Recreation. This includes exploring opportunities to enhance and formalise pedestrian connectivity from this precinct through Precinct 7 to the main Cranbourne Racing Complex.
- To develop a conservation reserve that protects and enhances existing ecological and biodiversity values while allowing public access, interpretation and education in Precinct 7 – Ecological, Native Flora and Fauna. This includes protecting the habitat and the flora and fauna protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). This includes the potential habitat for the endangered Southern Brown Bandicoot.

Implications for the Cranbourne Town Centre open space assessment

The future successful redevelopment of the Cranbourne Racing Complex and improvement to the quality and accessibility of the Cranbourne Recreation Reserve from the Town Centre and adjoining residential area will contribute to the future character and desirability of Cranbourne.

2.2.4 Cranbourne Town Centre Community Facilities Analysis

Prepared for the City of Casey by K2 Planning Pty Ltd, June 2017

This is an assessment of the current provision and future need for Council owned community facilities in the Cranbourne Town Centre area and combines the suburbs of Cranbourne and Cranbourne East. Currently the combined population of both suburbs is in the order of 40,000. The strategy forecasts that an additional 30,220 people will be living in the Cranbourne and Cranbourne East by 2031, being an approximate 75 per cent increase. By 2041, this increases to an additional 36,859 people, which is an approximate 91 per cent increase.

The suburb of Cranbourne is one of the most disadvantaged areas in the City of Casey. This includes a high proportion of:

- recent arrivals from non-English speaking backgrounds
- unemployment
- low income
- defaulting on mortgage repayments
- children who are developmentally vulnerable
- Aboriginal or Torres Strait Islander
- incidents of domestic violence and reported crimes
- levels of disability.

The report recommends five new community facilities be developed including:

- two Integrated Community Centres
- three new or expanded Family and Community Centres.

The report recommends that the council owned land, currently used for car parking adjacent to Greg Clydesdale Square has been identified as the most significant opportunity in the study area to create a fully activated, safe, secure and attractive central meeting point in the centre.

Implications for the Cranbourne Town Centre open space assessment

There is potential for appropriate upgrades and re-design of public open space to assist with addressing some of the social issues. This includes providing attractive and nurturing public open spaces that encourage people outdoors including children and improve social connectedness along with physical and mental fitness and wellbeing. While the report is focussed on the provision of community facilities and support services, well-designed public open space and public realm can complement the community facilities and support services.

2.2.5 Cranbourne Town Centre Public Realm Analysis

Prepared for the City of Casey by Alexander Urbanism, June 2017

The aim of this analysis was to quantify the existing levels of pedestrian activity in the Cranbourne Town Centre. The purpose is to establish a benchmark for comparison with similar town centres and for future quantification of this centre as it changes. The study area included High Street (South Gippsland Highway) between Lyall Street and Childers Street, including Greg Clydesdale Square.

High Street provides good north south connectivity, with destinations such as the Cranbourne Station to the north and the Cranbourne Racecourse and the Royal Botanic Gardens Cranbourne to the south. Due to the speed and volume of vehicles, including the high proportion of trucks, conditions on the footpaths are noisy and the street is

dangerous to cross except at formal crossing points. Lyall, Clakewell and Childers Streets provide good connections to the east including to the Casey Complex, however connectivity to the west is more difficult, with Clydesdale Avenue providing the only link.

Pedestrian activity was measured and found to be relatively low, with about two people per minute for most of the day. The busiest time between 2 and 3pm saw pedestrian volumes rise to around 5 people per minute. The report concludes that Cranbourne has the capacity to be much busier. The report notes that for more people to be attracted to the centre may require a combination of:

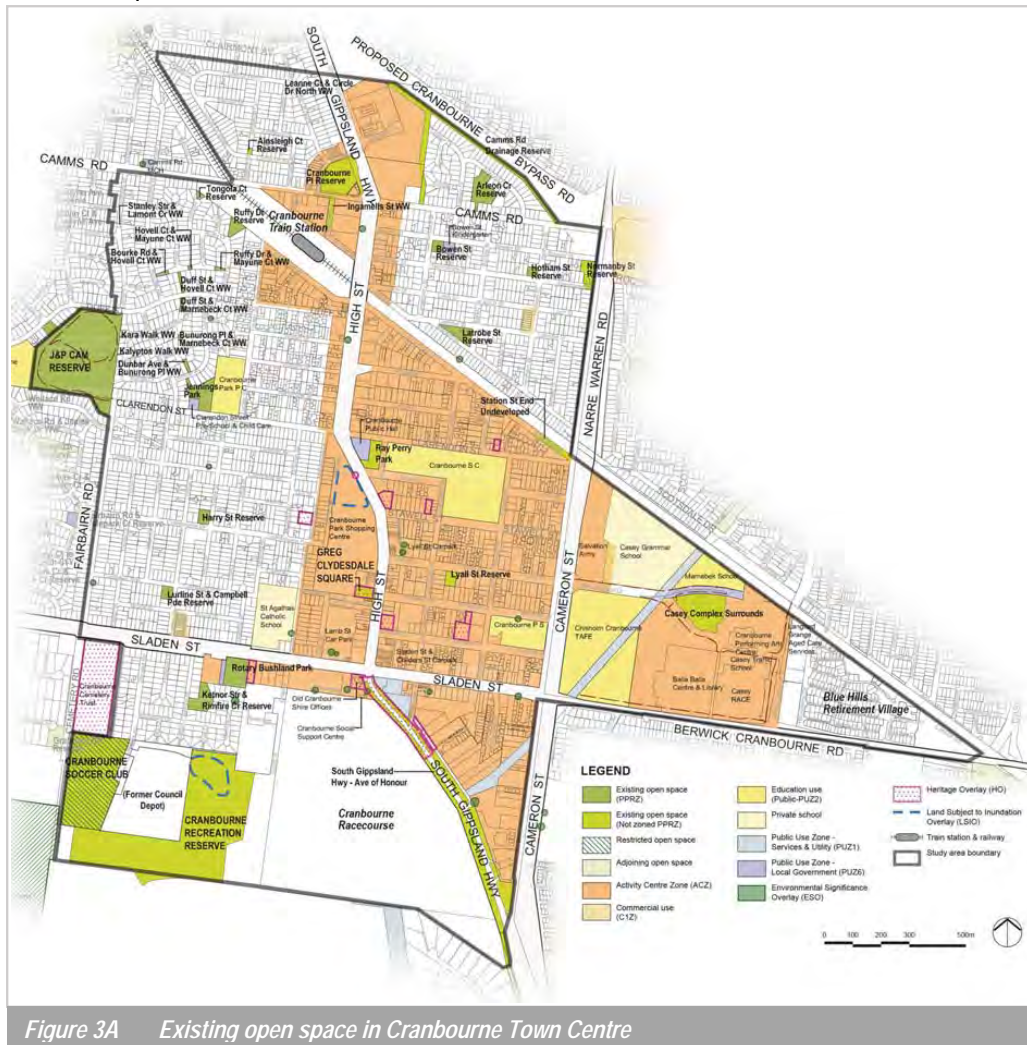
- redevelopment of the spaces
- a changed retail offering
- active management of the High Street retail centre.

Implications for the Cranbourne Town Centre open space assessment

The future redevelopment of the High Street core retail area including Greg Clydesdale Square will influence the future recommendation for open space provision, design, and management in the Cranbourne Town Centre. This includes improving the pedestrian amenity and safety to encourage walking access the full length of the street connecting the core retail area with the railway station and also south to the Racecourse Precinct.

3. Existing conditions

3.1 Existing open space



3.1.1 Extent of the study area

The Cranbourne Town Centre study area is defined by the Activity Centre Zone shown on the attached plans. This open space assessment has included the 400 to 500 metre safe walking catchment of the Activity Centre Zone, or extents as defined by major roads.

3.1.2 Summary of the land use types in the study area

The central core spine of the study area is predominantly commercial and business use on both sides of the South Gippsland Highway and High Street which runs in a generally north south alignment through the study area. The land use changes to predominantly residential use away from the non-residential spine, north of Sladen Street. South of Sladen Street the land use is a combination of commercial and industrial use east of the South Gippsland Highway and residential combined with public use including the Cranbourne Racecourse and public open space west of the highway. East of Cameron Street the land use is predominantly education, community use and retirement living.

The majority of the residential land use in the study area is either predominantly single detached dwellings constructed from the late 1940s onwards. There are also unit developments in the following areas:

- west of High Street between Cranbourne Station and Clarendon Street (in open space sub-precinct CTC5, as shown in Figure 3D); and
- east of High Street, between Clarendon and Sladen Streets (in open space sub-precinct CTC6).

The street layout to the east of High Street is a predominantly east west and north south grid and provides good pedestrian accessibility. West of High Street is a combination of curvilinear and gridded street layout with only limited east west connectivity from High Street. The railway forms a north south barrier to pedestrian access within the study area, along with Camms Road and Sladen Street. East west barriers to pedestrian access include High Street/South Gippsland Highway and Cameron Street.

The southern and central extent of the core retail area is approximately 800 metres south of the train station with a 10 to 20 minute walk along a busy 6 lane highway. This impacts on the overall pedestrian connectivity and accessibility in and around the High Street precinct.

3.1.3 Summary of the existing open space network

The largest areas of open space in close proximity to the Cranbourne Town Centre are located to its south-west. This includes the Cranbourne Recreation Reserve, Cranbourne Soccer Club and further south beyond the study area is the Royal Botanic Gardens Cranbourne. J&P Camm Reserve is the main community sporting reserve to the west of High Street. Outside the study area to the south east is the regional sporting and recreational precinct known as Casey Fields.

The Royal Botanic Gardens Cranbourne is the most frequently visited public open space in the resident survey, followed by Casey Fields, both of which are outside the study area. Within the study area, the most frequently visited open space is Greg Clydesdale Square, followed by Ray Perry Park and Cranbourne Recreation Reserve. Greg Clydesdale Square and Ray Perry Park are located on High Street in the core of the town centre. They have quite different characters and roles, with Greg Clydesdale Square being an urban civic square framed by the cenotaph, with seating, the established mature trees, formal garden beds and the rotunda, while Ray Perry Park is a green open space with family style facilities and is enjoyed for its peaceful and natural qualities. Cranbourne Place Reserve adjoins the South Gippsland Highway in the northern extent of the town centre and is adjacent to food outlets with a predominantly informal native parkland character.

The South Gippsland Highway Avenue of Honour contributes the unique character and sense of place to Cranbourne reflecting the rural history and qualities. Improving the connection between this avenue and the established trees in Greg Clydesdale Square as part of future town centre upgrades has the potential to improve the visual quality and prominence of Greg Clydesdale Square and the sense of entry to the town centre.

The Cranbourne Recreation Reserve includes a large informal open grassed area that is framed by natural indigenous bushland, and appears to be well used for informal activities including dog walking and informal ball sports. The indigenous bushland extends south to form part of the Royal Botanic Gardens Cranbourne and provides habitat for a range of threatened fauna including the Southern Brown Bandicoot. The natural biodiversity values of this area contrast to the exotic character of the Avenue of Honour and the established open character of Racecourse. The Cranbourne Soccer Club is located adjacent to the Cranbourne Recreation Reserve and caters to organised sport and is fenced so there is no informal access and use of the sports fields outside of the club based use.

Away from the core central spine of the South Gippsland Highway and High Street there is a diverse range of open spaces. Some have received recent upgrades and facilities while others remain largely undeveloped. From the site assessments and the resident survey outcomes it is evident that parks with facilities in them are more frequently used. This includes Lyall Street Reserve, Ketnor Street and Rimfire Crescent Reserve, J&P Cam Reserve, Arieon Crescent Reserve and Jennings Park. The site assessment and the resident survey outcomes confirmed that many of the parks have either tired and outdated facilities or no facilities and this, along with a concern for personal safety, are key reasons the community give as to why they don't visit open space in Cranbourne. There were specific comments in relation to concerns about unsavoury activities occurring in Greg Clydesdale Square, and the presence of security and surveillance inside the Cranbourne Park Shopping Plaza being a reason they spend time in the centre rather than in public open space. The resident survey outcomes confirmed the Cranbourne Shopping Centre as the most visited open space.

There is great potential to improve the connectivity into and between the existing open space network. Many of the parks have no or limited paths through them and there is no sense of connectivity between them. There is also great potential to improve quality, diversity and character of the public open space within and adjoining Cranbourne Town Centre so that it positively contributes to community health and wellbeing, the sense of place and economic viability of Cranbourne.

The unique combination of the exotic and indigenous character of the Avenue of Honour and the Royal Botanic Gardens Cranbourne have the potential to be used as key generators for the character, design and quality of future upgrades to the open space, streetscapes and public realm in Cranbourne Town Centre.

For more information about the existing open space, refer to the sub-precinct descriptions in Section 3.4 of this report.

Ancillary open space

The Cranbourne Racecourse contributes to the natural and unbuilt character of the southern extent of the Cranbourne Town Centre, along with the adjoining Cranbourne Training Complex. East of Cameron Street ancillary open space includes the schools, Chisholm Cranbourne TAFE Complex and the regionally significant Casey Complex, a hub for indoor sporting, recreational and community facilities including Casey RACE, Casey Stadium, The Shed, The Factory, Cranbourne Library and Balla Balla Centre. A

future public open space is recommended in this precinct to improve the function and character of this significant health and wellbeing hub for visitors, workers and residents.

Cranbourne Secondary College and Cranbourne Primary School both contribute to the open space character in the central Cranbourne Town Centre area.

3.1.4 Quantity of open space in Cranbourne Town Centre

Currently, open space represents approximately 5.6 per cent of the total Cranbourne Town Centre study area shown on Figure 3A in this report. Some of the existing open space included in the total is encumbered by service easements or flooding and these have been excluded from the 5.6 per cent total described in Table 3-1.

Table 3-1 Quantity of open space in Cranbourne Town Centre

Quantity	Description
44.56	hectares of open space
5.6%	of the total precinct area is open space
133.3	square metres of open space per person
3,345	estimated population in the Town Centre**
27%	of the open space is encumbered*
73%	of the open space is unencumbered

* *Note, encumbered open space includes wetlands, service easement and noise generated by major roads where no sound walls are present.*

** *The indicative population in the Town Centre has been calculated based on the total number of existing dwellings (1,275 as per the Cranbourne Town Centre Residential Demand Study prepared by SGS) and applying the average number of people per dwelling calculated based on the total number of dwellings and 2016 population for Cranbourne listed on the .id Consulting website.*

The existing total area of open space in Cranbourne primarily comprises Regional and District open space in terms of land area. Local parks and Local Links are more numerous, however they occupy substantially less area of open space. The analysis and recommendations in this Strategy include adding to the Local open space network to improve accessibility to open space for the existing and forecast population in the future as described in Section 3.4 of this report.

Table 3-2 Number, size and type of open space in Cranbourne Town Centre

No.	Hierarchy	Area (ha)
2	Regional open space	17.91
6	District open space	17.75
17	Local open space	08.16
11	Local Link	00.74
36	Total	44.56

For a complete list of the existing open space reserves shown in Drawing No. CTOSA-01, refer to the Appendix A. This list includes the hierarchy and function for each open space.

3.1.5 Distribution of open space in Cranbourne Town Centre

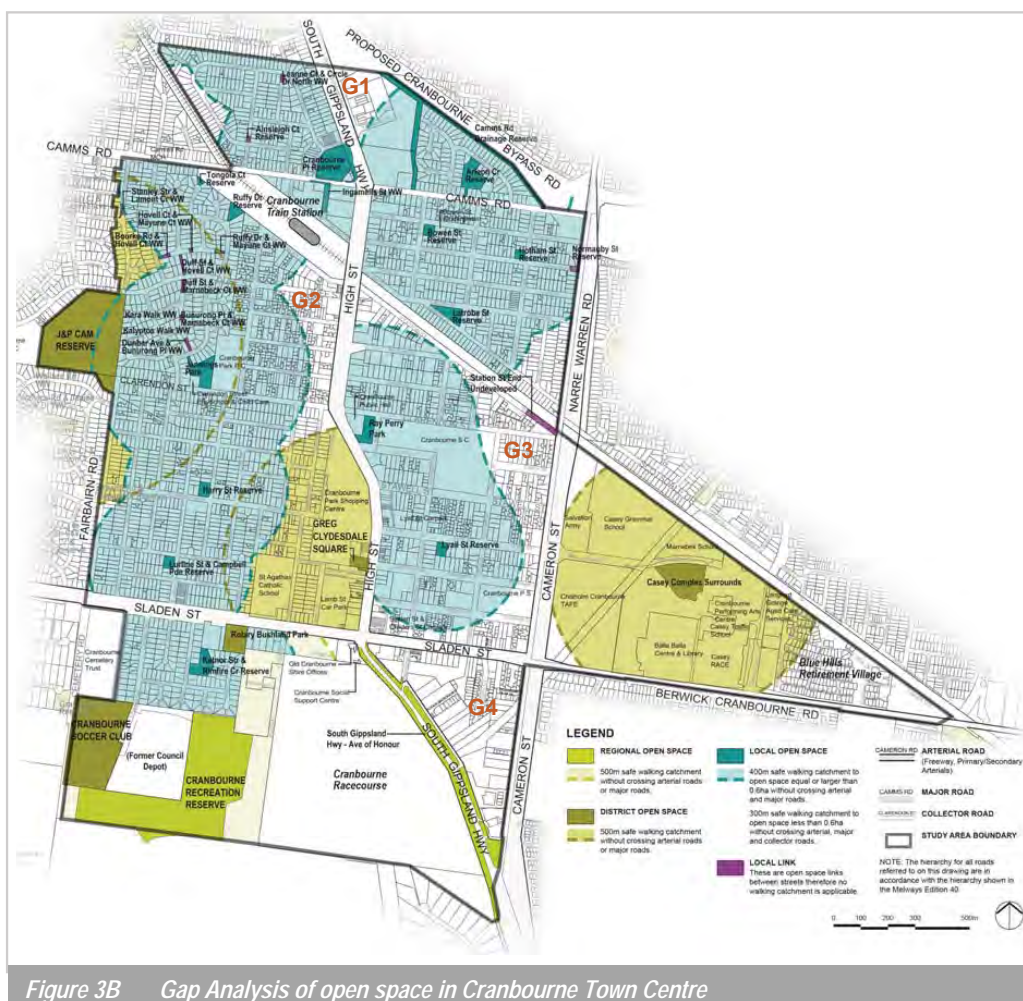


Figure 3B Gap Analysis of open space in Cranbourne Town Centre

Overall the existing open space is reasonably well distributed, however, there are gaps in its distribution which are shown as the white areas in Figure 3B above.

Travel/walking catchments have been applied to all the open space in the study area to identify if there are any locations where people are living or working without any open space within reasonable (safe and easy) walking distance of them. The travel catchments used for the open space is described in Table 3-3 below. The gap analysis is illustrated on Drawing No. CTOSA-02, an extract of which is shown in Figure 3B.

Table 3-3 Travel/walking catchments to open space

Open space	Travel/walking catchment
Regional	No specific catchment is nominated for Regional open space given this is provided for the entire Melbourne-wide population. A 500 metre walking catchment has been applied for the local residents and their use of local facilities without the need to cross arterial or major roads. Please note, that a travel catchment has not been applied to the Avenue of Honour, as this is not a destination open space.
District	District open space is generally provided for the entire area and within a 1 to 2 kilometre catchment of all dwellings. As for Regional open space, a 500 metre walking catchment is applied for the local community to use the facilities at a local level. For example, unstructured use of the sports fields, or visiting the playground. Barriers to access include arterial and major roads.
Local (linear)	Local open space that provides a linear link without destination facilities that would encourage people to visit the reserve for a length of time has been assigned a 300 metre safe walking catchment. Barriers to access include the arterial and major roads. This does not apply to the existing open space in Cranbourne Town Centre.
Local (greater than 0.6 hectares)	Local open space that is greater than 0.6 hectares in size and has the capacity to cater to a range of activities has a 400 metre safe walking catchment applied. Barriers to access include arterial and major roads.
Local (less than 0.6 hectares)	Local open space that is less than 0.6 hectares in size has a 300 metre safe walking catchment via the local street network. This means that barriers to this catchment include the arterial, major and collector roads.
Local Link	No walking catchments are applicable to these open spaces as they are not destinations in their own right, and provide connectivity between streets and open space only.

The open space distribution analysis also identifies there are some gaps in open space distribution including:

- G1** East of South Gippsland Highway, north of Camms Road.
- G2** West of High Street, south of the Cranbourne Railway Station in the vicinity of Duff Street.
- G3** East of High Street, south of the former Cranbourne Railway Line.
- G4** South of Sladen Street and east of the South Gippsland Highway.

Table 3-4 Open space gap area descriptions

Gap area	Description
G1	Located at the northern entry to the Cranbourne Town Centre in open space sub-precinct CTC2, there is potential for this existing open space gap area to be addressed as part of the future redevelopment of this precinct. A new Local open space will be required and designed and positioned so that it is a useable, social meeting place for people working and visiting this area. This

Gap area	Description
	may be combined with the future gateway marker, however the open space is not to be encumbered by traffic noise.
G2	Located in the open space sub-precinct CTC5, the street layout in this gap area is predominantly east west alignment, and includes a combination of single storey multi unit developments. Fronting High Street, the properties are a combination of commercial uses consistent with the Activity Centre Zone. There is forecast to be an increase in urban densities in the vicinity of this gap area, and therefore a new Local open space will be required to address this gap area for the existing and predominantly for the forecast population.
G3	This gap area is located south of the railway in the vicinity of Clareondon Street in sub-precinct CTC7 (refer to Figure D). Ray Perry Park and the Lyall Street Reserve are existing Local open spaces that are further than 400 metres however are still accessible via the local street network. There is also some ancillary open space available with the Cranbourne Secondary College located within the gap area. Improving the streetscape amenity and upgrading both open spaces may adequately address this gap area, without the need for additional open space.
G4	Located south of Sladen Street in sub-precinct CTC9 (refer to Figure D) and between the South Gippsland Highway and Cameron Street there is no useable open space within safe and easy walking distance of the workers and residents in this sub-precinct. The South Gippsland Highway Avenue of Honour is within the precinct, however this open space is not suitable a recreational and destination open space in itself. A new Local open space will be required in this sub-precinct for the existing and forecast population.

3.2 Community characteristics

3.2.1 Demographics and summary of existing forecast trends

The following summary is taken from the profile for the whole of the Cranbourne suburb, as specific demographics for the study area are not available. The study area is largely within the suburb of Cranbourne, with the eastern extent (east of Cameron Street) in Cranbourne East. Given there is only a small existing population east of Cameron Street, the majority of residents fall within the suburb of Cranbourne.

Age structure

Summary based on the .id community profile

The most populous age group is the 35 to 49 age group, followed by the 25 to 34 age range. While the population forecasts have not yet been updated with the 2016 census results, the trends from 2011 to 2016 indicate that the population is ageing, with a slight decrease in all age groups less than 49 years of age and an increase in the 50+ age range.

Implications for the open space in Cranbourne Town Centre

Open space provision and design will need to cater for all age groups including the older age groups. The resident surveys completed for this project have a high proportion of people from the 25 to 34 age range and the results will need to balance with the needs of other age groups.

Language spoken at home

Summary based on the .id community profile

In Cranbourne 24 per cent of the population speaks a language other than English at home. The two main groups are Punjabi and Persian/Dari, both of which have increased in number since the 2011 census.

Implications for the open space in Cranbourne Town Centre

The increasing cultural diversity of population will add diversity to the future open space design. Consultation with the local community as part of the design and major upgrades to future open space in Cranbourne Town Centre is to be inclusive of people for diverse cultural backgrounds to maximise equity of access and community health and wellbeing.

Household type

Summary based on the .id community profile

Compared with the municipal average there is a lower proportion of couples with children (33% compared with 45%), a higher proportion of one parent families (15% compared with 12%) and a higher proportion of lone person households (21% compared with 15%).

Implications for the open space in Cranbourne Town Centre

The higher proportion of lone person households combined and one parent families increases the importance of public open space design that appeals to a diversity of users, is safe and with facilities and planting designs that encourage people to spend time in the open space.

Dwelling type

Summary based on the .id community profile

Compared with the municipal average there is a higher percentage of people living in medium density housing in Cranbourne (22% compared with 11%), and correspondingly a lower proportion of people living in separate dwellings (78% compared with 89%). There are no people currently living in high density dwellings in Cranbourne.

Implications for the open space in Cranbourne Town Centre

The higher proportion of people living in medium density housing means they rely on public open space for a greater diversity of needs - for example, they may be more likely to have a family celebration in the local park because of lack of private open space.

3.2.2 Summary of community survey outcomes for Cranbourne Town Centre

A total of 139 resident on-line open space surveys were received for Cranbourne Town Centre. Below is a summary of the key outcomes from the survey, with further detailed information provided in Appendix B.

The project also included a worker and visitor survey as well, however the numbers of surveys returned were low and therefore there is a brief summary of the results included in Appendix B.

3.2.2a Resident Survey Summary

The most frequently visited open space within the Cranbourne Town Centre

The following table includes a summary of comments made by more than one survey.

No.	Open space	Reason to visit	Improvements
17	Royal Botanic Gardens Cranbourne	<ul style="list-style-type: none"> Peaceful Ambience, beauty Free Large Relaxation Diverse activities 	<ul style="list-style-type: none"> More paths
13	Casey Fields	<ul style="list-style-type: none"> Dog walking Ambience, beauty Large open space Variety of play spaces Play Sport 	<ul style="list-style-type: none"> More dog off lead areas required Regular maintenance and cleaning required
13	Greg Clydesdale Square	<ul style="list-style-type: none"> Walk through/link Visit while shopping Peaceful 	<ul style="list-style-type: none"> Safety including more security, increase surveillance, address drug related issues.
8	Lawson Poole Reserve	<ul style="list-style-type: none"> Dog walking 	
6	Not specified	<ul style="list-style-type: none"> Relaxation 	<ul style="list-style-type: none"> Provide more open space
3	Ray Perry Park		
3	Cranbourne Recreation Reserve		

Values of open space:

64%	Being outdoors in the fresh air
55%	Trees
53%	Place for children to play
48%	Place to relax and unwind
37%	Meeting people/friends
37%	Habitat for native plants and animals
35%	Fitness and exercise
35%	Flowers/garden beds
33%	Accessible
32%	Health and wellbeing
29%	Spacious
28%	Escape from traffic noise

Reasons for not visiting open space

30% of respondents stated that they don't visit open space in Cranbourne Town Centre, with 70% of them stating that they don't use any of the open spaces, while 30% nominated specific open spaces. The main reasons for not visiting open space in descending order are:

- The facilities in open space don't appeal
- Personal safety concerns
- Lack of maintenance
- Uninviting.

Activities and facilities in open space that they either use or would like to see:

74%	Walking paths
57%	Kiosk/Cafe in or adjoining the open space
54%	Picnic tables
52%	Open grassed areas for informal use
50%	Playgrounds
49%	Fitness equipment/outdoor gym
49%	Shade/rain shelters

General comments:

- More facilities in open space are required
- Improve sense of safety and security in open space.
- Concern regarding drug related activities and lack of enforcement.
- Improve the condition and provision of cycle paths
- Improve path links to and through open space.
- Additional seating required.

3.3 Future change in Cranbourne Town Centre

3.3.1 Summary of future change

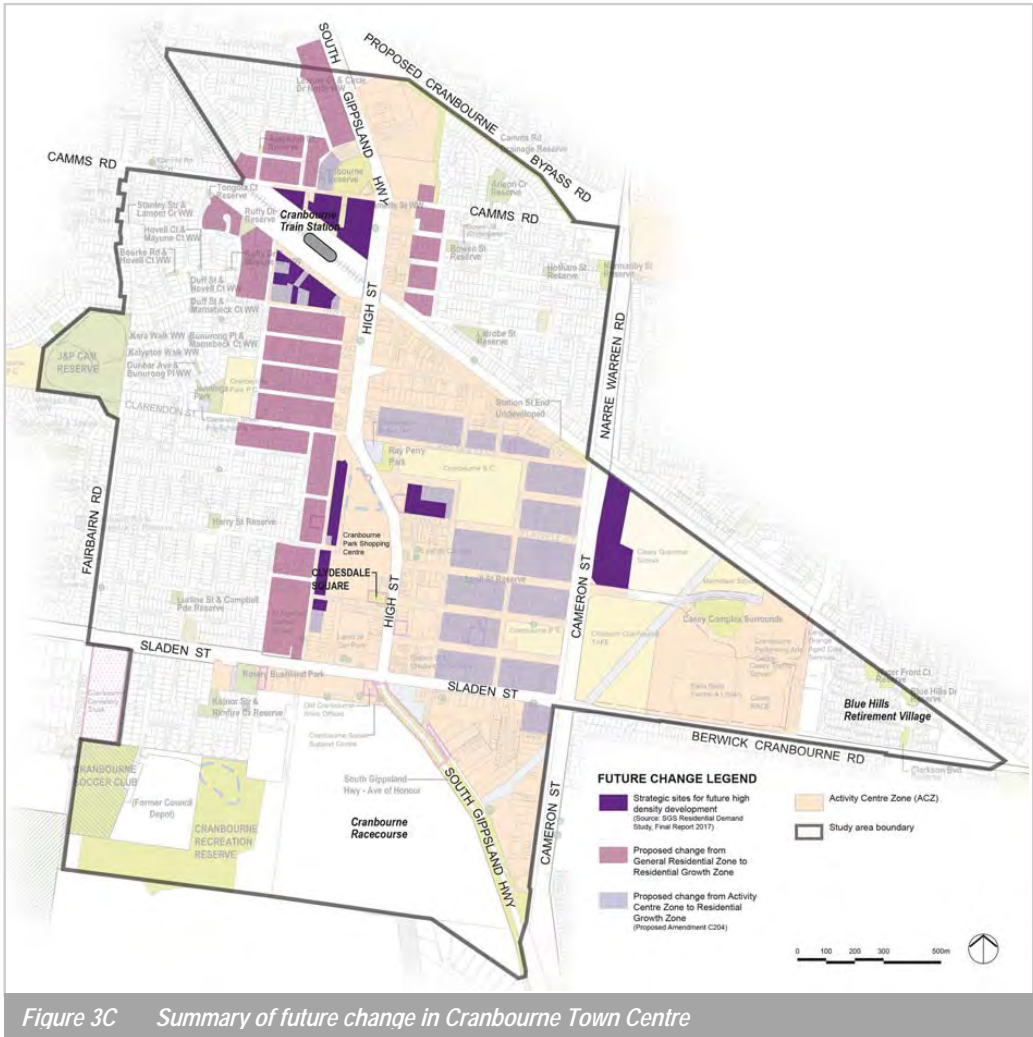


Figure 3C Summary of future change in Cranbourne Town Centre

The Cranbourne Town Centre Residential Demand Study and the Cranbourne Town Centre Economic Assessment have been used to inform the summary of future change relevant to open space.

Residential population change

The demand for the overall quantity and type of housing is shaped by population growth, household size, household type and preference. Population forecasts provide a good basis for understanding future population and household growth and used to determine likely household types. Demand over a 20 year time horizon will range between 360 and

410 additional dwellings. This growth will largely occur after 2031 as the greenfield supply in Casey absorbs regional demand in the short term. The additional dwellings will be predominantly detached dwellings, and it is assumed these will be distributed through the existing Activity Centre Zone areas. The Housing Demand Study identifies a number of Strategic Sites that have the potential for high density development, which is anticipated to possibly occur in the longer term, post 2036. The presence of future high density residential development means that opportunities for future open space need to be identified now for the longer term.

The housing demand study does not provide a population growth estimate within the town centre, however it does provide an estimate of 1,275 existing dwellings. In order to gain an understanding, the quantum of residents being planned for, the average household size of 2.62 persons per dwelling for Cranbourne has been used to calculate an indicative existing population of 3,340.

If the same average household size of 2.62 is applied to the additional forecast dwellings, then the additional residents forecast to live in the study area by 2036 would be between 943 and 1,074 by 2036. The locations of where the forecast residential growth is likely to occur is disbursed through the residential area in the locations highlighted in the pink and mauve colours in Figure 3C.

Employment population change

Cranbourne Town Centre currently has approximately 360,000 square metres of floorspace. As a result of the overall demand for retail and commercial activity identified for Casey, an additional 103,100 square metres of floor space growth is needed in the Cranbourne Town Centre by 2036. Over 50% of the future floorspace demand is in the non-retail sectors, primarily commercial floorspace. There is also strong demand for small scale retail, namely speciality stores and hospitality.

The analysis shows that Cranbourne has significant additional capacity that is not required over the next 20 years given the municipal wide objectives. The sprawling nature of the town centre and low level of pedestrian amenity along with the low level of amenity impacts on its economic activity, vibrancy and sense of place.

The future business and employment opportunities for the Cranbourne Town Centre are to build on the Cranbourne's training and racing complex and its cluster of professional and recreational horse activities to create opportunities for business development. The Royal Botanic Gardens Cranbourne are also highlighted as a natural asset presenting strong tourism and commercial opportunity. The Cranbourne Campus of the Chisholm Institute is also noted as the centre of an emerging knowledge precinct in the municipality.

The SGS Economic Assessment does not include existing or forecast employment population numbers for the Cranbourne Town Centre.

3.3.2 Implications of future change on open space planning in the Cranbourne Town Centre

The quality of the existing public open space and public realm in the Cranbourne Town Centre will have an influence of the rate of change and the future economic viability of the centre.

The unique features of the Cranbourne Town Centre are its proximity to the Royal Botanic Gardens Cranbourne and the Cranbourne Racecourse and Training Complex. There is a unique opportunity for the future public open space and public realm to have a role in strengthening the character and promoting the desirability of the centre, particularly in encouraging visitors to the Royal Botanic Gardens Cranbourne to stop in the centre on their way too and from the gardens and to improve the connectivity between the town centre and the Cranbourne Racecourse and Training Centre so that people working at the site also visit and spend time in the town centre.

Currently there is a disconnect between High Street and the South Gippsland Highway south of Sladen Street. The combination of the Avenue of Honour and the established trees in Cranbourne Racecourse needs to be reflected back into High Street. There is an opportunity to undertake a major redesign of Greg Clydesdale Square in combination with the High Street streetscape works and a re-set of the built form interface and character in this part of the Town Centre. We note that the Community Facilities Analysis (2017) identifies a need for a central meeting place/community in proximity to Greg Clydesdale Square. The future change and upgrades to this part of the Town Centre have the potential to create a greener, more liveable, sustainable and attractive place to live and work.

3.4 Sub-precinct analysis of open space

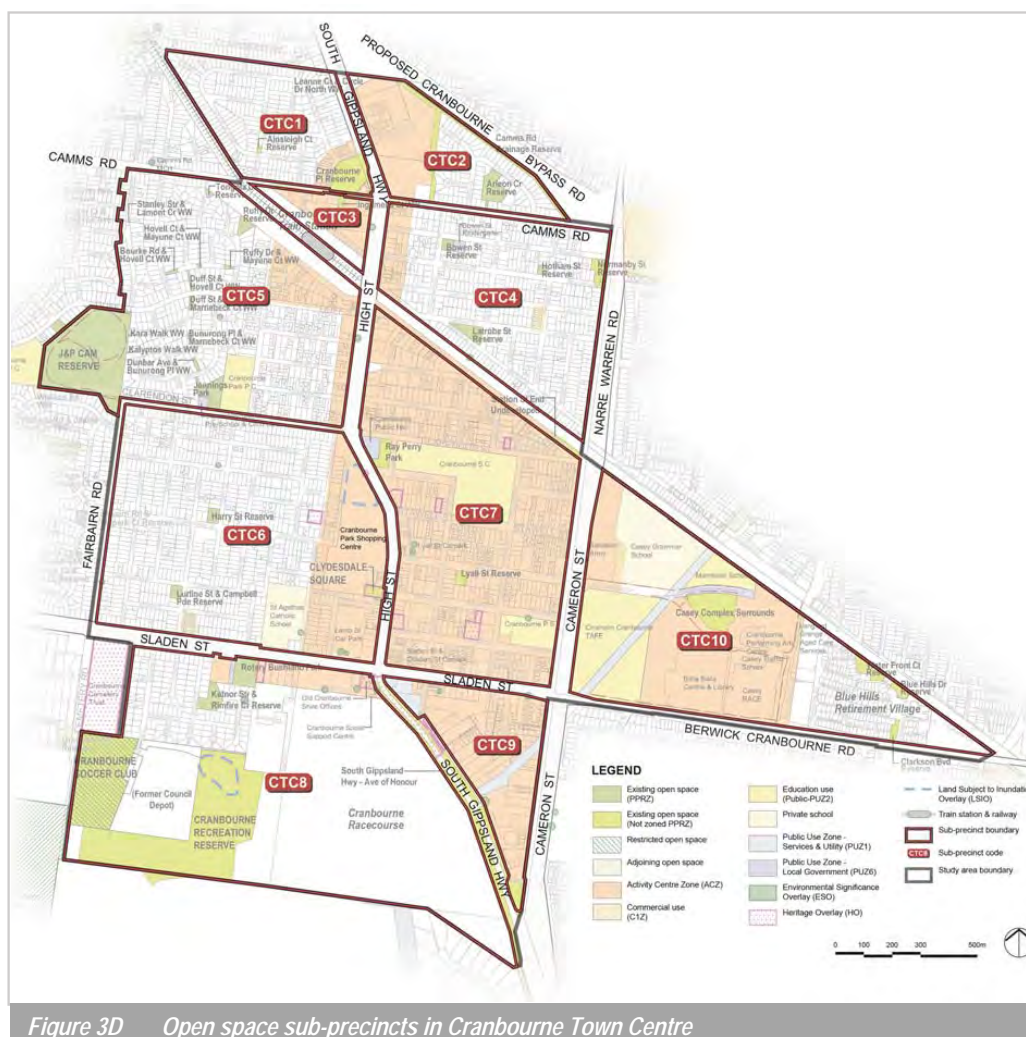


Table 3-5 Sub-precinct Analysis description and conclusions

Sub-precinct	Description	Conclusion
CTC1	<ul style="list-style-type: none"> Located at the northern extent of the Cranbourne Town Centre, west of the South Gippsland Highway, between Clairmont Avenue and Camms Road. A residential precinct with predominantly single detached dwellings built in the late 1960s and 1970s. The area is likely to receive increased residential densities in the future. 	<ul style="list-style-type: none"> Cranbourne Place Reserve is the key area of open space in this sub-precinct. Located on the South Gippsland Highway, and adjacent to existing commercial precinct, there is potential to further activate the southern boundary of this open space and improve its condition and design to improve its appeal and use. Given the forecast growth and change, it is

Sub-precinct	Description	Conclusion
	<ul style="list-style-type: none"> Cranbourne Place Reserve directly adjoins the South Gippsland Highway and is the only Local open space for this sub-precinct. Commercial land use adjoins the southern boundary of the reserve. There are two small road closure/walk ways which provide pedestrian connectivity. 	<p>recommended that a major upgrade to this open space be undertaken to better meet the needs of the existing and forecast community.</p> <ul style="list-style-type: none"> Retain the road closures to encourage pedestrian access and connectivity.
CTC2	<ul style="list-style-type: none"> Located at the northern entry on the east side of the South Gippsland Highway between the Proposed Cranbourne Bypass Road and Camms Road. West of the Camms Road Drainage Reserve, the land use is predominantly commercial use with large format showrooms, along with The Settlement Hotel on the corner of Camms Road. East of the drainage reserve, is predominantly residential land use with single detached dwellings. Arleon Crescent Reserve is located central to the residential area of and provides a range of facilities including tennis wall, basketball half court, playground and open grassed area for informal ball sports. Between the South Gippsland Highway and the drainage reserve is an open space gap area – Gap Area G1. 	<ul style="list-style-type: none"> There is potential for a future new Local open space preferably 0.8 hectares in size (mid point between 0.6 to 1.0 hectares) that functions jointly to celebrate the Gateway entry to the Cranbourne Town Centre precinct, and provide a new Local open space for the existing and future employment population in this precinct to address the Gap Area G1. In the short to medium term maintain Arleon Crescent Reserve as a Local open space for the local residential community. This reserve currently has diverse range of facilities and in the longer term, undertake minor upgrades to improve the condition, quality and character of the open space.
CTC3	<ul style="list-style-type: none"> Located north of the station, this sub-precinct is west of High Street, between Camms Road and the railway. The Housing Demand Study (SGS, 2017) designates this as a future strategic site for high density housing, due to its proximity to Cranbourne Railway Station. Currently, the land use is a mix of large format commercial sites, industrial and retail. The existing open space is Ingamells Street Walkway is undeveloped, however it provides a green link between Camms Road and Cranbourne Station. 	<ul style="list-style-type: none"> In the future, a Local open space preferably 0.8 hectares in size (mid point between 0.6 to 1.0 hectares) will be required in this sub-precinct as part of any future redevelopment for residential use. The final size and configuration of the open space will depend on the future land use, urban form, density and building height. In the short term construct a path link through Ingamells Street Reserve to improve pedestrian connectivity between Camms Road and Cranbourne Station.
CTC4	<ul style="list-style-type: none"> Located east of High Street, between the railway and Camms Road. The existing land use changes from commercial and business use adjacent to High Street to predominantly residential use east of High Street. The housing is predominantly single detached dwellings from the late 1960s to the 1970s. Forecast change identifies increased urban densities are likely in the western extent of the precinct close to High Street. Bowen Street Reserve, Hotham Street 	<ul style="list-style-type: none"> With increased urban densities, the three Local open spaces require upgrade to better meet the local open space needs of the existing and forecast community. There is potential for each of the three reserves to complement each other in terms of character and facilities to provide a diversity of spaces within the local catchment for the community. This includes: <ul style="list-style-type: none"> Bowen Street Reserve is located nearest the employment population on High

Sub-precinct	Description	Conclusion
	Reserve and Latrobe Street Reserve are three existing Local open spaces distributed across the precinct. Of these three reserves, only Latrobe Street Reserve is developed with facilities, while the other two are open grass with some trees to the perimeter of them. Normanby Street Reserve directly adjoins Narre Warren Road, is undeveloped and forms a linking space.	<p>Street, and can potentially cater to the future use of the space by workers during their breaks.</p> <ul style="list-style-type: none"> – Minor upgrade to improve the condition and quality of Latrobe Street Reserve. – Major upgrade to Hotham Street Reserve to cater for the existing and forecast residential population. – Review the need to retain the Normanby Street Reserve given its proximity to the major road and lack of amenity.
CTC5	<ul style="list-style-type: none"> • Located west of High Street and between the railway and Clarendon Street. • Land use is predominantly residential with a combination of unit developments to the east and single detached dwellings to the west. The urban fabric changes from grid layout with good accessibility set out pre-1960s. The western extent of this precinct changes to the curvilinear road layout of the late 1960s and 1970s with predominantly single detached dwellings. • Urban densities are forecast to increase in proximity to the Station, with strategic sites located south of the railway where there is potential for high density development. The eastern portion of this sub-precinct is proposed to change to Urban Growth Zone with an anticipated increase in the medium density and unit development. • J&P Cam Reserve is the major area of open space in the precinct and is a District sporting reserve with two main ovals. Three other Local open spaces, two which have play facilities in them are located in the precinct. Jennings Park is near the Primary School and Ruffy Crescent Reserve near the Cranbourne Station. The smaller Tongol Court Reserve includes tree planting only. There are a series of small walkways that provide pedestrian connectivity between the curvilinear street layout. • The eastern area of the sub-precinct towards High Street forms Gap Area G2, and this coincides with the area where increased high and medium density development is proposed. 	<ul style="list-style-type: none"> • Provide an additional Local open space, preferably 0.8 hectares in size (mid point between 0.6 to 1.0 hectares) in Gap Area G2 to cater primarily to the forecast residential and employment population. The future location of the new Local open space will need to consider improvements to north south pedestrian connectivity to ensure that the future open space is accessible, and forms a key central feature in this sub-precinct with excellent passive surveillance. • J&P Cam Reserve to continue to function as the key District open space for this area with a combination of structured sporting and unstructured recreational use. In the medium term, a major upgrade is required including to the path condition, picnic facilities, play and the landscape character to create a destination space for people of all ages. • Minor upgrades to Jennings Park to include seating and path links to the play facility. Continue to maintain Ruffy Drive Reserve. • Retain the local links for pedestrian connectivity through the sub-precinct.

Sub-precinct	Description	Conclusion
CTC6	<ul style="list-style-type: none"> Located east of High Street and between the Railway and Sladen Street, this precinct includes the Cranbourne Secondary College and Cranbourne Primary School as ancillary open space. The land use is predominantly residential with a combination of unit developments and single detached dwellings, some dating from earlier periods including the 1940s/1950s. Currently this sub-precinct is in the Activity Centre Zone, with the proposed rezoning to Residential Growth Zone in the eastern part of it, strengthening the residential land use of medium urban densities along with one strategic site for future high density development south of the Cranbourne Secondary College. Ray Perry Park provides a green open space contrasting to the urban Greg Clydesdale Square on High Street and in the commercial heart of the town centre. Lyall Street Reserve is located central to the residential neighbourhood, but has limited accessibility within only one side of the reserve fronting Lyall Street. 	<ul style="list-style-type: none"> Ray Perry Park has the potential to be significantly improved and expanded to meet the open space needs of the forecast employment and resident population. There is potential to expand its size to incorporate the Cranbourne Public Hall including investigating the removal of the building and car park and converting it to open space. Investigate options to improve accessibility to and expand Lyall Street Reserve so that there is space to provide a greater diversity of facilities in the reserve to improve its role and function as a core Local open space in the height of this precinct. It will cater primarily to the existing and forecast resident population along with the worker population. The Gap Area G3 will be addressed by improving the condition of the streetscapes and expanding both the existing open spaces to improve their appeal, accessibility and use. The presence of the Cranbourne Secondary College in Gap Area G3 provides some ancillary open space. If in the future, the Cranbourne Secondary College was to close, then additional Local open space may be required to provided as part of the redevelopment of that site.
CTC7	<ul style="list-style-type: none"> West of High Street and between Clarendon and Sladen Streets, this is the central retail precinct within the Cranbourne Town Centre. This sub-precinct includes Cranbourne Park Shopping Centre. The land use is commercial, business and retail adjoining High Street and changing to residential west of High Street along with the St Agathas Catholic School. The residential housing is predominantly single detached dwellings from the 1960s and 1970s. Increased residential density is planned in proximity to High Street including strategic sites for high density residential. Located on High Street, Greg Clydesdale Square is the key District open space in this sub-precinct and is one of the most visited open spaces in Cranbourne. Within the residential area Harry Street Reserve is a dog off-lead park and Lurline Street & Campbell Pde Reserve is a Local open spaces that caters primarily for the residential population. 	<ul style="list-style-type: none"> Greg Clydesdale Square has great potential to be redeveloped as a key central civic meeting place the Cranbourne Town Centre. The framework of the existing mature canopy trees and the Cenotaph are key features to incorporated into an upgraded open space. Other key issues to be addressed in the redesign is the activation of the edges to the space with cafes and restaurants that enliven the space during both the daytime and in the evening, and its presentation and interface to High Street to improve its visual prominence and presence in the streetscape so that people are encouraged to stop on the way through Cranbourne. Other improvements include the slowing of vehicles through High Street to improve the pedestrian amenity and safety in the streetscape, and increase the greening of the streetscape in response to Cranbourne being the gateway to the Royal Botanic Gardens Cranbourne and the Cranbourne Racecourse. Ensure the size of this reserve is not reduced.

Sub-precinct	Description	Conclusion
	<ul style="list-style-type: none"> The existing predominantly gridded street layout provides good connectivity in the residential area, however the Cranbourne Shopping Centre interrupts the east-west connectivity through to High Street. 	<ul style="list-style-type: none"> Major upgrade and expand Harry Street Reserve to a minimum of 0.6 hectares in size (currently 0.25 hectares), to improve its use by the existing and forecast community, including the future high density development on the strategic sites in the longer term. There is potential to upgrade the existing open space, and in the longer term seek to expand the open space to increase its role and function for a diversity of open space needs. Alternatively, a new Local open space would be required in proximity to the future high density housing. Upgrade Lurline Street & Campbell Parade Reserve to address its urban context including options to slow or change vehicle priority and speed in the adjoining streets.
CTC8	<ul style="list-style-type: none"> West of the South Gippsland Highway and south of Sladen Street, this sub-precinct incorporates the Cranbourne Racecourse. The land use includes business and commercial use adjacent to Sladen Street, open space, public use (Cranbourne Racecourse and the former Depot Site), and residential use. <i>The Cranbourne Racing Complex and Surrounds Investment and Development Plan</i> guides the future use of this large site. The residential use is predominantly single detached dwellings predominantly from the 1970s. Cranbourne Recreation Reserve is the largest open space in this precinct and provides a large open grassed area surrounded by bushland with nature conservation values. Cranbourne Soccer Club is a restricted open space (currently fenced preventing public access) and is available for club-based structured sporting use only. Ketnor Street and Rimfire Crescent Reserve is the main Local open space for this community to use and includes a playground. The Rotary Bushland Park includes native vegetation and more information on the natural and biodiversity values of this open space is required. The South Gippsland Highway Avenue of Honour provides a key historical landscape feature directly adjoining this precinct. 	<ul style="list-style-type: none"> Consistent with the <i>Cranbourne Racing Complex and Surrounds Investment and Development Plan</i>, major upgrade to the Cranbourne Recreation Reserve is recommended to provide a clear pedestrian path connection between O'Tooles Road and the residential area and the recreation reserve and the Cranbourne Racecourse. Minor upgrade to the Ketnor St & Rimfire Crescent Reserve to create a level open grassed area, provide a pedestrian path link and seating area within the reserve to complement the playground. Continue to maintain the Rotary Bushland Park.
CTC9	<ul style="list-style-type: none"> East of the South Gippsland Highway and south of Sladen Street this predominantly 	<ul style="list-style-type: none"> A new Local open space, preferably 1.0 hectare in size, will be required in this sub-

Sub-precinct	Description	Conclusion
	<p>non residential precinct has no useable open space within safe and easy walking distance of the workers and residents. The South Gippsland Highway Avenue of Honour adjoins the precinct, however this open space is not suitable for recreational use.</p> <ul style="list-style-type: none"> Land use is predominantly large format commercial/business along with some industrial and a small pocket of residential use near the Cameron Street/Sladen Street intersection. 	<p>precinct for the existing and forecast population.</p> <ul style="list-style-type: none"> The preferred location is central within the sub-precinct, away from the major roads, within a minimum of 3 sides adjoining public roads for excellent accessibility. There is potential to integrate the existing drainage easement into a future open space. Given the urban context of the non-residential land use, preference will be for a green open space that provides a respite and contrast to built environment. The open space will need to cater to a diverse age range, including the 60+ age group.
CTC10	<ul style="list-style-type: none"> East of Cameron Street and between the railway and Berwick Cranbourne Road, this sub-precinct is predominantly education and community use, combined with the Blue Hills Retirement Village. This sub-precinct is located in the suburb of Cranbourne East, whereas the remainder of the study area is in Cranbourne. A future strategic site for high density housing has been identified in this sub precinct on the Salvation Army land. The Economic assessment identifies there is potential for expansion of the Chisholm Cranbourne TAFE site into a technology precinct. For this project, we have identified the need for a future public open space that is available for people who work and future residents in the precinct to use. The existing large open grassed area adjoining New Holland Drive is shown as District open space. An Urban Design Framework is currently in preparation for the Casey Complex, and this will inform the most suitable location for the future District open space in the context of future urban form and layout along with pedestrian and cycle links. Within the Blue Hills Retirement Village, there are three open spaces, however these are on private land and are not accessible to the general public.. 	<ul style="list-style-type: none"> A new District open space is required, preferably 4 hectares in size if an additional sports field is required or a between 1.0 and 3.0 hectares if no sports field is required, in this sub-precinct for the employment community and also for the future residential community if this occurs. The plans illustrate a District open space on the large flat open grassed area, with potential to be used as a sports training facility if this was required. Additionally, the District open space has the potential to become a destination for visitors and workers to use, and has potential to include facilities that appeal to a diverse range of users. There is potential to improve the character, sustainability and greening of this precinct with tree-lined boulevards, pedestrian and cycle connectivity via a future open space link along the drainage reserve and connections to the future train station.

4. Conclusions and recommendations

4.1 Precinct conclusions

Overall there is reasonable provision and distribution of open space in the Cranbourne Town Centre study area. The key issues identified in this assessment is the poor quality of the design, facilities and condition of many of the spaces. After review of the other documents that have been prepared for the future Cranbourne Town Centre Structure Plan, we understand there is forecast to be substantial change occur in the Cranbourne Town Centre in the future. The Economic Assessment Report discusses the need to improve the quality of the urban fabric and centre in order to attract investment and promote economic viability of the centre.

There is an exciting opportunity for substantial improvements to the quality and design of the public realm and public open space in Cranbourne Town Centre. Being the gateway to the Royal Botanic Gardens Cranbourne and the Cranbourne Racing Complex, there is a unique opportunity for the town centre to become a popular visitor point on the way to and from the Royal Botanic Gardens Cranbourne, and for the local community to celebrate this in their local place and centre. The community survey undertaken identifies the Royal Botanic Gardens Cranbourne as the most frequently visited open space in Cranbourne.

A key opportunity is to improve the quality and character of the existing open space network, and the pedestrian connectivity between them. Many of the existing open spaces have no paths into them, discouraging access to the facilities located there. The central spine of the Cranbourne Town Centre along High Street contains significant traffic volumes and that impacts on the amenity of the streetscape and the adjoining public open spaces. The community survey outcomes identified that 30 per cent of respondents don't visit open space in Cranbourne, mainly due to the poor quality or lack of facilities and personal safety concerns. There is potential for the open space and public realm including High Street to become attractive, sustainable and well used community spaces that meet the community health and wellbeing needs and contribute to the economic viability, liveability and sense of place in Cranbourne. This will require a clear vision and commitment to significant change to the urban fabric to achieve this.

For the Local open spaces in the residential areas there is potential to:

- Increase the quality and diversity of facilities in open space.
- Provide paths into parks with existing to improve all ability access.
- Differentiate between the Local open spaces within each sub-precinct so that combined the network within a sub-precinct provide a range of different park types and facilities.
- Where possible increase opportunities for passive surveillance of public open space, as many of the existing reserves have only limited frontages to the street network.

4.2 Precinct recommendations

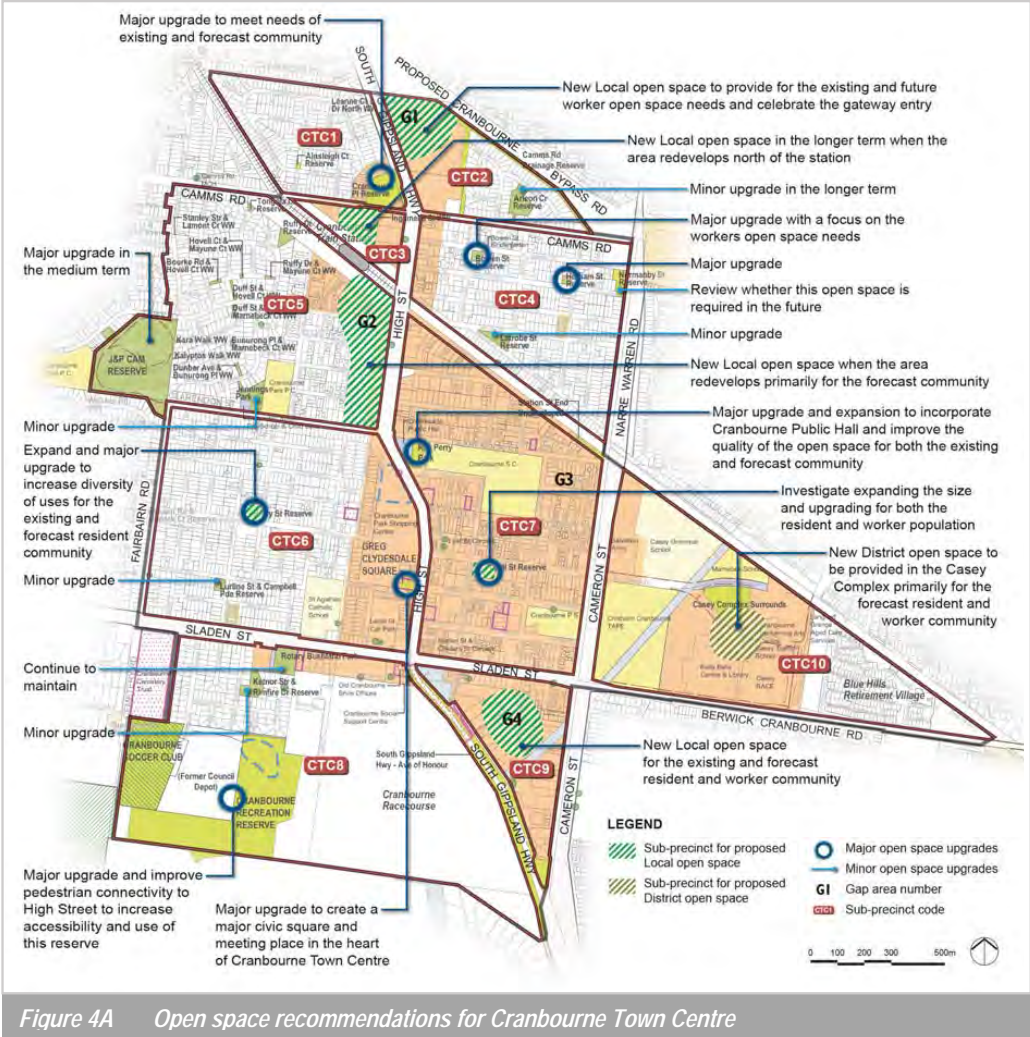


Figure 4A Open space recommendations for Cranbourne Town Centre

4.2.1 Open space provision

Cranbourne Town Centre is forecast to grow and change in the future. This includes increasing the capacity for both residential use and commercial/business use. A range of improvements will be required to the open space system to achieve this along with the need for some additional open space and expansion to existing open space reserves. For upgrades and expansion to existing open space, refer to Section 4.2.2.

No.	Recommendation	Priority
4.2a	New Local open space in sub-precinct CTC2 to address Gap Area G1 Provide a new Local open space to address the Gap Area G1 and jointly function to celebrate the gateway/entry to Cranbourne Town Centre and provide a Local open space for the existing and forecast employment community. This new Local open space is to be at least 0.8 hectares in size (mid point between 0.6 to 1.0 hectares).	Medium
4.2b	New Local open space in sub-precinct CTC3 Provide a new Local open space in this sub-precinct adjacent to Cranbourne Station to cater to the forecast future population on this strategic site identified for future high density housing. This new Local open space is to be at least 0.8 hectare in size (mid point between 0.6 to 1.0 hectares)	Low
4.2c	New Local open space in sub-precinct CTC5 to address Gap Area G2 Provide a new Local open space as part of the forecast future medium and high density residential development south of Cranbourne Station primarily for the forecast resident and worker population. The Local open space will preferably be located where it improves north south pedestrian connectivity and has excellent passive surveillance. This new Local open space is to be at least 0.8 hectares in size (mid point between 0.6 to 1.0 hectare)	Low
4.2d	New Local open space in sub-precinct CTC9 to address Gap Area G4 Provide a new Local open space in Gap Area 4 primarily for the existing employment and resident population. This new Local open space will need to be at least 1.0 hectare in size given there is no other useable open space in the sub-precinct.	High
4.2e	New District open space in sub-precinct CTC10 Provide a new District open space in the Casey Complex that is well integrated with the future urban context and layout being determined in the Urban Design Framework. This is for both the existing and forecast resident, worker and visitor population. This open space will need to be at least 4 hectare in size if an additional sports field is required, or a between 1.0 and 3.0 hectares if no sports field is required.	High

4.2.2 Individual reserves

The recommendations aim to improve the design quality, aesthetics, character and condition of the open space reserves, with a focus on encouraging people outdoors to socialise and exercise in open space. No assessment of the suitability, condition and provision of structured sport and recreation facilities has been included in the scope of this report.

The open space reserves are listed in alphabetical order in the following table:

No.	Recommendation	Priority
4.2.1	Ainsleigh Court Reserve Walkway Continue to maintain.	Ongoing
4.2.2	Arleon Crescent Reserve In the short to medium term, retain. In the longer term undertake minor upgrades to improve the character and condition of the reserve for the existing and forecast new population.	Low
4.2.3	Bourke Road & Hovell Court Walkway Continue to maintain.	Ongoing
4.2.4	Bowen Street Reserve Undertake a major upgrade to this Local open space to cater to both the existing and forecast resident and employment population. The design and facilities are to complement those provided in the other nearby open space reserves including Hotham Street Reserve and Latrobe Street Reserve.	Medium
4.2.5	Bunurong PI and Marnebeck Court Walkway Continue to maintain	Ongoing
4.2.6	Camms Road Drainage Reserve Liaise with relevant management agencies to identify if the construction of a future shared trail in the north south alignment of the drainage reserve is feasible. This has the potential to provide an off-road link between a future Local open space near South Gippsland Highway to address Gap Area G1.	Low
4.2.7	Casey Complex Surrounds Further information is required from Council officers to determine an appropriate future use. The two options are described in Table 3-5, sub-precinct CTC10.	Low
4.2.8	Greg Clydesdale Square Undertake a major upgrade to this civic urban public open space. This includes a major redesign of the space to respond to potential change to the extent and future urban form and layout including activating edge treatments, extending and opening up perimeter to public streets, redesigning High Street so that the square is visually prominent from High Street including a review of the traffic flow and priority in the vicinity of the core retail section High Street. The Cenotaph and the mature established trees are key features to retain and celebrate in the future design. Refer also to Section 3.3.2 and Table 3-5 of this report for further discussion of the future role of this open space in the Cranbourne Town Centre. In the future redesign, Greg Clydesdale Square will need to be at least it's current size with suitable depth to the reserve to provide a sizeable and useable part of the reserve to be located away from the direct impact of traffic noise in High Street.	Very High
4.2.9	Cranbourne Place Reserve Undertake a major upgrade to improve the quality, character and diversity of facilities in this open space to cater to the existing and forecast employment and resident community. This includes activating the interface between the commercial land use to the south and the reserve.	High
4.2.10	Cranbourne Soccer Club Review the potential for this reserve to include unstructured recreational use including informal use of the sports grounds, a potential circuit walking path that links to the adjoining Cranbourne Recreation Reserve.	Medium
4.2.11	Duff Street & Hovell Court Walkway Continue to maintain.	Ongoing

No.	Recommendation	Priority
4.2.12	Duff Street & Marnebeck Court Walkway Continue to maintain.	Ongoing
4.2.13	Harry Street Reserve Currently, this reserve is set-aside as a dog off-lead park, which combined with the drainage reserve function, makes it a single use park for this local precinct. It is therefore recommended that the reserve be increased in size to approximately 0.6 hectares in size to provide for a diverse range of local open space needs in addition to a dog off-lead area. Therefore a major upgrade will be required to this reserve once additional land is secured to create an attractive Local park for both the existing population and in the longer term, the future population in the proposed higher density precincts.	High and Ongoing
4.2.14	Hotham Street Reserve Undertake a major upgrade to this Local open space to cater to both the existing and forecast resident population. The design and facilities are to complement those provided in the other nearby open space reserves including Bowen Street and Latrobe Street Reserves.	Medium
4.2.15	Hovell Court & Mayune Court Walkway Continue to maintain.	Ongoing
4.2.16	Ingamells Street In the short term, provide a pedestrian path link to improve access to Cranbourne Station. In the longer term review the size and location of this open space in the context of the future redevelopment of the CTC3 precinct for higher density housing north of the railway. It may be more appropriate to reconfigure the shape and location of the Local open space in the response to the proposed new urban layout. Please note that a future Local open space will be required to cater to the local open space needs of the forecast population without needing to cross Cams Road, which is a major road, to reach Cranbourne Place Reserve to the north.	High and Ongoing
4.2.17	J&P Cam Reserve Major upgrade to this open space to improve the landscape character and condition and provision of facilities for unstructured recreation including the circuit path, picnic areas, multi-use court/space, potential exercise equipment and play facility as required.	Medium
4.2.18	Jennings Park Minor upgrade including additional path access to the recently constructed play facility along with additional trees and seating.	High
4.2.19	Kalyptos Walk Walkway Continue to maintain.	Ongoing
4.2.20	Kara Walk Walkway Continue to maintain.	Ongoing
4.2.21	Ketnor Street & Rimfire Crescent Reserve Minor upgrade to include a path link between the streets and to the recently constructed play facility, seating and selective relocation of some recently planted trees to the perimeter of the reserve to establish a larger open grassed area for informal games.	Very High
4.2.22	Latrobe Street Reserve Undertake a minor upgrade to provide path access into the reserve, and update the seating and picnic tables.	Medium
4.2.23	Leanne Court & Circle Drive North Walkway Continue to maintain	Ongoing
4.2.24	Lurline Street & Campbell Pde Walkway Continue to maintain	Ongoing

No.	Recommendation	Priority
4.2.25	Lyll Street Reserve Investigate options to increase the size and accessibility of this Local open space by potential purchase of additional land. This will allow for an increased diversity of facilities, additional trees to increase the appeal and level of use by the existing and forecast future population. This will assist to address the existing gap in open space provision in Gap Area G3.	High and Ongoing
4.2.26	Normanby Street Reserve Review the need to retain this reserve in its current form. If it is confirmed to be retained, then minor upgrade to include path connections and trees.	High
4.2.27	Ray Perry Park Investigate the potential opportunity to expand Ray Perry Park into the Cranbourne Public Hall site. This would potentially increase the visual prominence of this park as a contrast to the Cranbourne Park Shopping Centre, given it is directly opposite it on High Street. Ray Perry Park provides a green oasis in the Cranbourne Town Centre and there is potential to strengthen this character and undertake a major upgrade to the infrastructure in the park which is outdated and in fair to poor condition. This will assist to address the existing gap area in open space provision in Gap Area G3.	Medium
4.2.28	Ruffy Drive & Mayune Court Walkway Continue to maintain	Ongoing
4.2.29	Ruffy Drive Reserve Continue to maintain, as this reserve has already had a recent upgrade.	Ongoing
4.2.30	South Gippsland Highway Avenue of Honour The Avenue of Honour contributes to the unique character and sense of place in Cranbourne, being a physical reminder of the history and its rural qualities. Improving the connection between the Avenue of Honour, Greg Clydesdale Square and High Street will strengthen the character of the town centre. Continue to protect, manage and maintain in accordance with the relevant heritage controls and values.	Ongoing
4.2.31	Stanley Street & Lamont Crescent Walkway Continue to maintain	Ongoing
4.2.32	Station Street End Undeveloped Construct a pedestrian path link between Station and Cameron Streets.	Medium
4.2.33	Tongala Court Reserve Construct a pedestrian path link between the Tongala Court and Cranbourne Station/Camms Road to improve pedestrian connectivity.	Medium

Appendix A

Existing open space hierarchy and function in Cranbourne Town Centre

The following table lists the existing open space alphabetically and includes the total area, hierarchy and the primary and secondary function for each open space.

Open space	Total Area Ha	Encumbered O/S	Unencumbered O/S	Existing Hierarchy	Primary Function	Secondary Function
Ainsleigh Court Reserve Walkway	0.04		0.04	Local open space	Trails and waterways	Linking space
Arleon Crescent Reserve	0.75		0.75	Local open space	Local Park / Social – family recreation	Play
Bourke Road and Hovell Court Walkway	0.09		0.09	Local Link	Trails and waterways	Linking space
Bowen Street Reserve	0.22		0.22	Local open space	Undeveloped	
Bunurong Place and Marnebeck Court Walkway	0.08		0.08	Local Link	Trails and waterways	Linking space
Cammis Road Drainage Reserve	1.74	1.74		Local open space	Service easement	Undeveloped
Casey Complex surrounds	1.72		1.72	District open space	Undeveloped	
Cranbourne Place Reserve	1.52		1.52	Local open space	Local Park / Social – family recreation	Play
Cranbourne Recreation Reserve	13.99		13.99	Regional open space	Nature	Social – family recreation
Cranbourne Soccer Club	6.14	6.14		District open space	Sport	Nature
Duff Street and Hovell Court Walkway	0.08		0.08	Local Link	Trails and waterways	Linking space
Duff Street and Marnebeck Court Walkway	0.14		0.14	Local Link	Trails and waterways	Linking space
Dunbar Avenue and Bunurong Place Walkway	0.10		0.10	Local Link	Trails and waterways	Linking space
Greg Clydesdale Square	0.31		0.31	District open space	Social – family recreation	Cultural, Urban Plaza
Harry Street Reserve	0.25		0.25	Local open space	Local Park / Social – family recreation	Dog Friendly Space
Hotham Street Reserve	0.18		0.18	Local open space	Undeveloped	
Hovell Court and Mayune Court Walkway	0.07		0.07	Local Link	Trails and waterways	Linking space
Ingamells Street	0.25		0.25	Local open space	Undeveloped	
J&P Cam Reserve	8.30		8.30	District open space	Sport	Service easement, Social – family recreation
Jennings Park	0.54		0.54	Local open space	Local Park / Social – family recreation	Play
Kalyptos Walk Walkway	0.01		0.01	Local Link	Trails and waterways	Linking space
Kara Walk Walkway	0.01		0.01	Local Link	Trails and waterways	Linking space
Ketnor Street and Rimfire Crescent Reserve	0.56		0.56	Local open space	Local Park / Social – family recreation	Linking space, Play
Latrobe Street Reserve	0.59		0.59	Local open space	Local Park / Social – family recreation	
Leanne Court and Circle Drive North Walkway	0.05		0.05	Local Link	Trails and waterways	Linking space
Lurline Street and Campbell Parade Reserve	0.22		0.22	Local open space	Local Park / Social – family recreation	Play
Lyall Street Reserve	0.19		0.19	Local open space	Local Park / Social – family recreation	
Normanby Street Reserve	0.11	0.11		Local open space	Trails and waterways	Linking space
Ray Perry Park	0.74		0.74	Local open space	Local Park / Social – family recreation	

continued on next page

Open space	Total Area Ha	Encumbered O/S	Unencumbered O/S	Existing Hierarchy	Primary Function	Secondary Function
Rotary Bushland Park	1.02		1.02	District open space	Nature	
Ruffy Drive and Mayune Court Walkway	0.08		0.08	Local Link	Trails and waterways	Linking space
Ruffy Drive Reserve	0.23		0.23	Local open space	Local Park / Social – family recreation	Linking space
South Gippsland Avenue of Honour	3.92	3.92		Regional open space	Nature	Trail and waterways, Cultural
Stanley Street and Lamont Crescent Walkway	0.04		0.04	Local Link	Trails and waterways	Linking space
Station Street End Undeveloped	0.27		0.27	District open space	Undeveloped	
Tongola Court Reserve	0.05		0.05	Local open space	Trails and waterways	Undeveloped, Linking space
Total area	44.56	11.91	32.65			

Appendix B

Community Consultation Report Open space community survey for the Cranbourne Town Centre

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Community Consultation Report Open space community survey for Cranbourne Town Centre

Prepared by

Thompson Berrill Landscape Design Pty Ltd

November 2017, updated January 2018

1. Introduction

1.1 Purpose of the open space survey

This survey was undertaken during the research phase of the Cranbourne Town Centre Open Space Assessment project, which informs the Cranbourne Town Centre Structure Plan. Given the mixed land use nature of the existing and future town centre, three different surveys were available for residents, workers and visitors to complete.

The purpose of the survey was to identify what the community currently value about open space, which open spaces they use, why they visit them and what improvements they would like to see to the open space network in the future. The results have informed the open space assessment to assist with recommendations to improve open space network to better meet the community's open space needs.

1.2 Survey method

The survey consisted of eight questions about open space and were a combination of multiple choice and open ended questions. The surveys were available for people to complete on-line between August and October 2017 and the publicity for the survey was run by the City of Casey's Community Engagement Team.

We received 139 responses to the resident survey, and the results of this have been analysed and summarised. We received 38 responses to the visitor and 13 to the worker surveys. Given there are less than 50 responses to each of these surveys, we have provided a brief overall summary of these survey outcomes. less than 50 responses to each and have not been summarised in this report due to the low number of responses.

1.3 Overall summary of the resident survey outcomes

A total of 139 responses were received and key overall outcomes from the survey include:

- Cranbourne Park Shopping Centre was nominated as the most frequently visited open space. Reasons for this included the presence of security and sense of safety. This reflects poorly on the quality of existing open space in the Cranbourne Town Centre, particularly the perception of personal safety. The Open Space Assessment Report recommends a range of the improvements including enhancing the landscape character of the open space, the diversity of facilities in it and where possible, the passive surveillance so that people feel safer visiting it.
- The Cranbourne Gardens was identified as the second most visited open space, followed by Casey Fields. These are both outside the study area.
- Greg Clydesdale Square was the most visited open space within the Cranbourne Town Centre study area, and also received many suggested improvements and comments about why people don't visit it. The Open Space Assessment Report recommends a major upgrade to this open space as a high priority.
- The top three values of open space identified in the survey are being outdoors in the fresh air, the trees and a place for children to play.

- A high proportion of 24 to 39 year olds completed the survey compared with the census data. There was a under representation of people from the 60+ age range and lone person households. The Open Space Assessment Report has taken this bias in the survey results into consideration, recommending that a diversity of facilities are provided in open space to meet the needs of different age groups, including the 60+ age range.

Please refer to Section 2 of this report for a full summary of the resident survey.

1.3 Overall summary of the visitor survey outcomes

A total of 38 responses were received for this survey, with more than 80% of the respondents noting they live and work outside the town centre. The most visited open spaces are outside the study area including Cranbourne Gardens and Casey Fields. The Greg Clydesdale Square is the most frequently visited open space within the study area. The main suggestions for improvement include:

- provide new open space
- significantly improve the quality and character of open space
- add walking paths, playgrounds and cafe/kiosk adjacent to open space to improve their use and appeal.

Please refer to Section 3 of this report for a brief summary of the visitor survey.

1.4 Overall summary of the worker survey outcomes

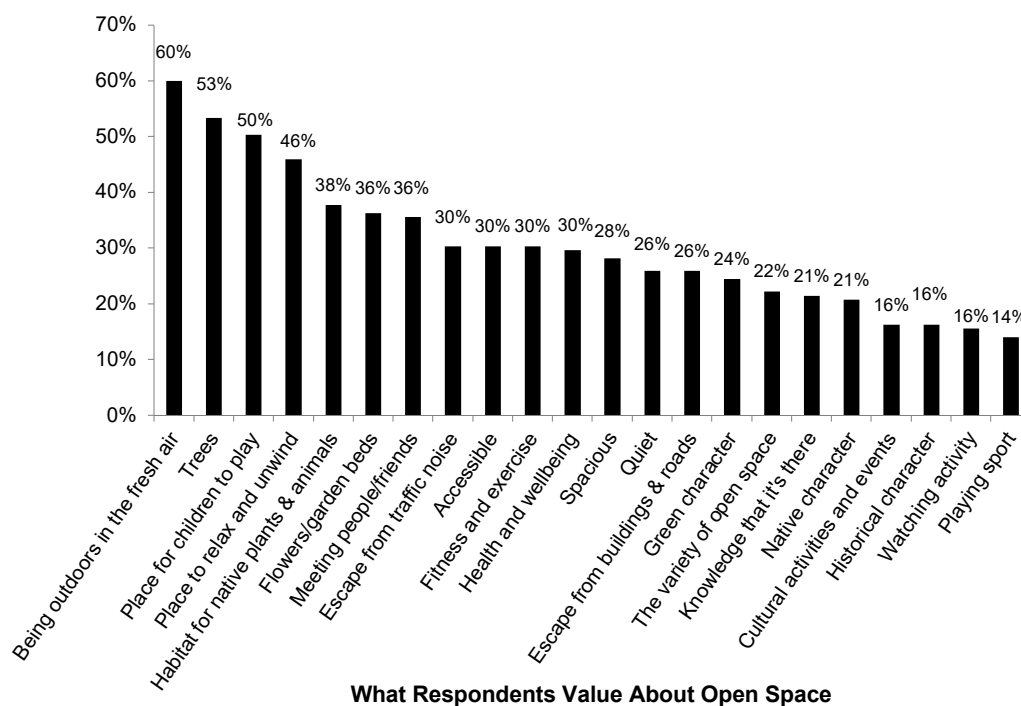
A total of 13 responses were received for this survey. Just over half those surveyed do not use open space in the town centre with the key reasons being either the lack of open space nearby or the poor condition/quality of the existing spaces. The key reason people visit open space is to be outdoors and for fitness and exercise.

2. Resident survey outcomes

2.1 Values of open space

Respondents were asked to indicate what they valued about the open spaces in the Cranbourne Town Centre and close to where they live.

The percentage column is calculated on the basis of the total number of returned surveys of 139.



The following table list the values in priority order

%	Value
60%	Being outdoors in the fresh air
53%	Trees
50%	Place for children to play
46%	Place to relax and unwind
38%	Habitat for native plants & animals
36%	Flowers/garden beds
36%	Meeting people/friends
30%	Escape from traffic noise
30%	Accessible
30%	Fitness and exercise
30%	Health and wellbeing
28%	Spacious

%	Value
26%	Quiet
26%	Escape from buildings & roads
24%	Green character
22%	The variety of open space
21%	Knowledge that it's there
21%	Native character
16%	Cultural activities and events
16%	Historical character
16%	Watching activity
14%	Playing sport
11%	Other
10%	Playing casual games

2.2 Open space in Cranbourne Town Centre

2.2.1 Most frequently visited open spaces in the Cranbourne Town Centre

No.	Open space within Cranbourne Town Centre
22	Cranbourne Park Shopping Centre
17	Cranbourne Gardens
13	Casey Fields
13	Clydesdale Square
5	Lawson Poole Reserve
4	Open space outside the study area
3	Cranbourne Racecourse and Recreation Reserve
3	Ray Perry Park
2	Cascades on Clyde Park
1	Balla Balla Community Centre
1	Brooklands Green Reserve
1	Brooklyn Greens Nature Reserve
1	Central Parkway Reserve
1	Courtenay Avenue Reserve
1	Cranbourne Drive Reserve
1	Cranbourne Place Reserve
1	Hunt Club Park
1	Junction Village Park
1	Monaghan Reserve
1	Princeton Park
1	Sarno Court Reserve

2.2.2 Reasons for visiting and suggested improvements to open space in Cranbourne Town Centre

The following table lists the reasons why people visit the specific open spaces within the town centre and suggested improvements to them. The open spaces are listed in priority order. The numbers underneath the park names are the total number of respondents who reported visiting that specific park.

Open Space	No.	Reason to Visit	No.	Suggested Improvement
Cranbourne Park Shopping Centre 22	16	Shopping	7	Shopping - more shops
	3	Meeting people/friends	3	Security - Clean up loiterers/drug addicts
	1	Activities - diverse	2	Access - improvements required
	1	Café and kiosk facilities	2	Maintenance - regular maintenance & cleaning required
	1	Family friendly	2	Open space - provide additional
	1	Free	1	Cafe/kiosk facilities - more required
	1	Links - provides a link	1	Landscape design - improvement/upgrade needed
	1	Recreation	1	Open space - needs upgrading
	1	Shopping - close to	1	Open Space - No Smoking
			1	Paths - maintenance required
			1	Playgrounds - provide more
			1	Seating - provide more in shaded areas
			1	Vegetation - provide more
Cranbourne Gardens 17	5	Peaceful	1	Building - no more in open space
	2	Ambience, beauty	1	Cycle paths - more required
	2	Free	1	Open space - adjoining development impacts on open space
	2	Open space - large	1	Opening hours - to be extended
	2	Relaxation	1	Paths - more required
	1	Activities - diverse	1	Picnic tables - provide more
	1	BBQs	1	Playgrounds - provide more
	1	Clean	1	Trees - additional required
	1	Close to home	1	Trees - plant more exotic/deciduous trees
	1	Cycling		
	1	Exercising		
	1	Fresh air		
	1	Native vegetation		
	1	Natural bushland environment		
	1	Playground and equipment		
	1	Playing with children		
	1	Walking		
Casey Fields 13	3	Dog walking	2	Dog - off-lead areas, additional required
	2	Ambience, beauty	2	Maintenance - regular maintenance & cleaning required
	2	Open space - large	1	Cafe/kiosk facilities - more required
	2	Play spaces - variety	1	Drainage - improvement needed
	2	Playing with children	1	Lighting - additional required
	2	Sport - playing	1	Paths - maintenance required
	1	Exercising	1	Playgrounds - provide more
	1	Playground and equipment	1	Trees - additional required
	1	Walking		

Open Space	No.	Reason to Visit	No.	Suggested Improvement
Greg Clydesdale Square 13	8	Walk through/Link	4	Safety improvements including more security, increased surveillance and to address drug related issues.
	4	Visit while shopping	2	Open Space - No Smoking
	2	Peaceful	1	Art works & sculpture - provide more
	1	Events	1	Carpark - additional required
	1	Fresh air	1	Nightlife - improve
	1	Gardens	1	Bare/uninviting/neglected, improvements required
			1	Seating - provide more
			1	Signage - informative, instructional and navigational signage required
			1	Traffic - bypass
			1	Traffic - improve flow
			1	Trees - additional required
			1	Vegetation - provide more
Lawson Poole Reserve 5	2	Dog walking	1	Events - improve organisation
	1	Close to home	1	Paths - more required
	1	Open space - large		
	1	Playing with children		
	1	Sport - spectating		
	1	Walking		
Outside Study Area 4			1	Seating - provide more
Cranbourne Racecourse & Recreation Reserve 3	1	Dog walking	1	Access - provide safer places to cross major roads
	1	Family friendly	1	Fencing - more required
	1	Open space - large		
	1	Walking		
	1	Watch horses		
Ray Perry Park 3	1	Playing with children	1	BBQs - regular maintenance required
	1	Open space - being outdoors	1	Rubbish bins - more required
	1	Peaceful	1	Toilets - provide more
	1	Walking		
Cascades on Clyde Park 2	1	Exercising	1	Playgrounds - provide more
	1	Playground and equipment	1	Rubbish bins - more required
	1	Playing with children		
	1	Walking		
Balla Balla Community Centre 1	1	Work	1	Security - provide more
Brooklands Green Reserve 1	1	Open space - large		
	1	Walking		
Brooklyn Greens Nature Reserve 1	1	Exercising		
	1	Open space - green		
	1	Peaceful		
Central Parkway Reserve 1	1	Dog walking		
Courtenay Avenue Reserve 1	1	Activities - diverse	1	Playgrounds - increase diversity of equipment for a range of age groups
	1	Open space - large		
Cranbourne Drive Reserve 1	1	Dog off-lead area		
Cranbourne Place Reserve 1	1	Maintenance - good		
	1	Playground and equipment		

Open Space	No.	Reason to Visit	No.	Suggested Improvement
Hunt Club Park 1	1	Close to home		
Junction Village Park 1	1	Close to home	1	Picnic tables - upgrade/maintenance required
Monaghan Reserve 1	1	Close to home	1	Lighting - additional required
Princeton Park 1	1	Playing with children	1	Maintenance - regular maintenance & cleaning required
Sarno Court Reserve 1	1	Walking	1	Open space - needs upgrading
	2	Close to home	1	Playgrounds - provide shade

2.3 Open space visited within walking distance of home

2.3.1 List of open space visited within walking distance of home

No.	Open space within walking distance of home
8	Casey Fields
5	Outside the study area catchment
3	Cranbourne Park Shopping Centre
3	Lineham Drive North & South Reserve
2	Cascades on Clyde Park
2	Monaghan Reserve
2	Sarno Court Reserve
1	Brooklands Green Reserve
1	Carlisle Park
1	Cherry Hills Drive Reserve
1	Greg Clydesdale Square
1	Cranbourne PS Oval
1	Duck Pond Park
1	Duff Street and Marnebeck Court Walkway
1	J&P Cam Reserve
1	Lawson Poole Reserve
1	Newington Drive Reserve
1	Park Cnr Everlasting Blvd & Spearwood Rise
1	Quarters Reserve
1	Ray Perry Park
1	Scarborough Avenue Reserve

2.3.2 Reasons for visiting and suggested improvements

Open Space	No.	Reasons to Visit	No.	Suggested Improvement
Casey Fields 8	3	Dogs - walking	1	Cafe/kiosk facilities - more required
	2	Exercising	1	Dog - drinking facilities, more required
	1	Birdlife watching	1	Indigenous vegetation - provide more
	1	Open space - large space	1	Paths - maintenance required
	1	Playground	1	Paths - surface needs improvements
	1	Pond/lake	1	Playgrounds - more creative/diverse character
	1	Sport - participate		
	1	Toilets provided		
Outside Study Area 5	1	Walking	1	Access - provide more entry points to open space

Open Space	No.	Reasons to Visit	No.	Suggested Improvement
			1	Paths - connecting path/s required
Cranbourne Park Shopping Centre 3	3	Shopping	2	Shopping - more shops
Lineham Drive North & South Reserve 3	1	Birdlife watching	1	Paths - connecting path/s required
	1	Facilities	1	Security - provide more
	1	Open space - green place		
	1	Open space - well maintained		
	1	Play - safe for children		
	1	Trees - native		
Cascades on Clyde Park 2	2	Walking	1	BBQs - more required
	1	Playground	1	Rubbish bins - more required
			1	Shelters - with BBQs required
Monaghan Reserve 2	3	Access - close to home	1	Maintenance - regular maintenance & cleaning required
	1	Dogs - walking	1	Rubbish - regular removal required
	1	Playground	1	Toilets - provide more
			1	Trees - additional required
			1	Water - more ponds/lakes
Sarno Court Reserve 2	4	Access - close to home	1	Fencing - around playground for safety
			1	Open space - needs upgrading
			1	Paths - more direct paths required
			1	Shade - provide more
Brooklands Green Reserve 1	1	Open space - beautiful		
Carlisle Park 1	1	Open space - provision	1	Skate parks - provide more
	1	Playground		
Cherry Hills Drive Reserve 1	1	Dogs - walking	1	Dog - drinking facilities, more required
	1	Exercising	1	Rubbish bins - more required
Greg Clydesdale Square 1	1	Entertainment/events	1	Cafe/kiosk facilities - more required
Cranbourne PS Oval 1	1	Cycling		
	1	Play - safe for children		
Duck Pond Park 1	1	Natural character - environmental values		
Duff Street and Marnebeck Court Walkway 1	1	Access - close to shops/cafes		
J&P Cam Reserve 1	1	Walking	1	Carpark - additional required
Lawson Poole Reserve 1	1	Dogs - friendly		
Newington Drive Reserve 1	1	Access - close to home	1	Lighting - additional required
Park Cnr Everlasting Blvd & Spearwood Rise 1	1	Access - close to home		
Quarters Reserve 1	1	Access - close to home		
Ray Perry Park 1	2	Access - convenient (on the way)	1	Open space - needs upgrading
			1	Seating - provide more
Scarborough Avenue Reserve 1	1	Access - close to home	1	Lighting - additional required

2.4 How frequently you use each type of open space

The results below indicate that the local streets and open space close to home are used regularly, i.e. daily and 2 to 3 times per week by the respondents. The high response rate to the visiting local streets for exercise suggests that the majority of respondents walk for exercise and supports the need to improve the provision of walking paths through and around open space to increase their levels of use.

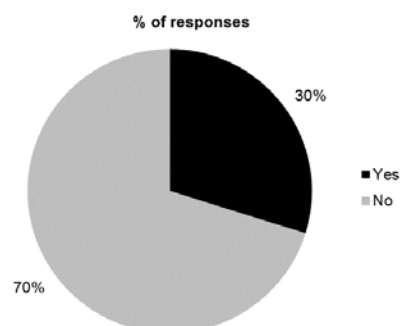
Total	Type of Open Space	Daily	2-3 times a week	Weekly	Monthly	1-2 times a year	Never	NC
88%	Local streets for exercise/fitness near home	21%	20%	14%	9%	5%	9%	1%
87%	Open space within walking distance of home	15%	21%	18%	7%	7%	9%	1%
80%	Open space in the Cranbourne Town Centre	5%	14%	21%	14%	9%	15%	1%
54%	Cranbourne Racecourse and Recreation Reserve	1%	1%	4%	8%	28%	36%	1%
50%	Local streets for exercise in Cranbourne Town Centre	6%	9%	8%	12%	6%	38%	1%

2.5 Open space not visited

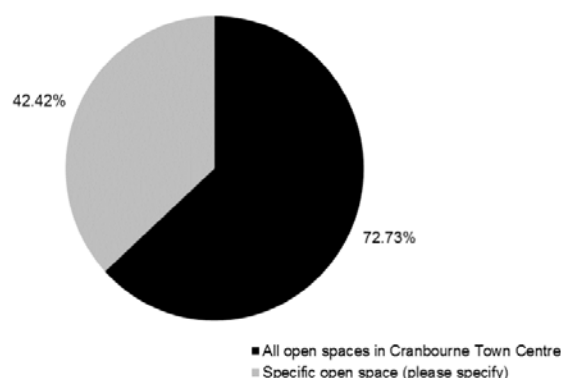
This question was asked to find out what issues currently limit the use of existing open space. The question included some of the common reasons why people may not use open space. The reasons can apply either to a specific open space or more broadly to open space in the Cranbourne Town Centre.

The question has been analysed below in 2 parts:
 Part One – whether there is open space that they don't visit.
 Part Two – the reasons they don't visit open space.

2.5.1 Is there open space in Cranbourne Town Centre that you don't visit but would like to?



2.5.2 Which Open spaces in Cranbourne Town Centre you don't visit



2.5.3 Reasons why you don't visit open space:

The percentage is calculated based on the number of people who answered yes in 2.4.1.

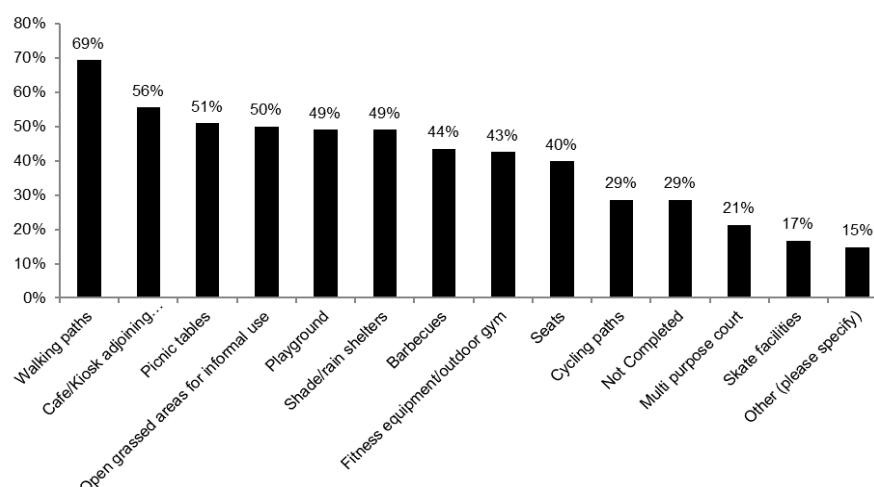
No.	Reasons why you don't visit open space	%
16	Facilities do not appeal to me	48%
14	Personal safety	42%
13	Uninviting	39%
11	Lack of maintenance	33%
11	Other	33%
9	Too difficult to get there with busy traffic/crossing roads	27%
4	Lack of time	12%

2.6 Activities and facilities in open space

2.6.1 Facilities either currently or that people would use if they were provided in open space in the Cranbourne Town Centre

The following graph shows the various types of facilities in open space that are either currently used by the residents, or facilities that they would like to use. Percentages are calculated on the basis of the number of respondents who use the open space facility as a proportion of the total number of returned surveys. 30 per cent of respondents did not answer this question.

Of the respondents that completed this question, walking paths, followed by cafe/kiosk and picnic tables are the most popular facilities to be provided or requested.



2.7 General comments about open space

Respondents were provided a section where they were able to write any additional comments about the open space in the Cranbourne Town Centre. The following is a summary of these comments which have been grouped together into nine topics and assembled in priority order. The total number of people making a comment on each topic is included as the bolded number in each topic heading.

The majority of comments related to the need to improve the quality of facilities and overall condition and character of open space. There are specific concerns expressed regarding the perception of personal safety in open space, and the need for improved passive surveillance and enforcement of inappropriate behaviour in open space. There were a number of comments relating to poor maintenance, although sometimes this can be as a result of poor design or poor quality of facilities.

No.	General Comments List
23	Facilities/Infrastructure
9	Cafe/kiosk facilities - more required
3	Seating - provide more
2	Lighting - additional required
2	Water Features - add
1	BBQs - more required
1	Carpark - additional required
1	Fencing - around playground for safety
1	Shade - provide more
1	Skate parks - no more required
1	Skate parks - provide more
1	Events - provide more
23	Maintenance
6	Concern regarding drug related activities occurring in open space and lack of enforcement presence

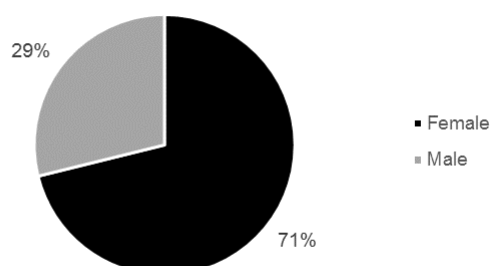
No.	General Comments List
3	Public Safety
4	Security - provide more
2	Improve maintenance
2	Maintenance - regular maintenance and cleaning required
2	Open Space - No Smoking
1	Ensure open space is well maintained
1	Maintenance - regular maintenance and cleaning required
1	Rubbish - remove litter in open space
1	Security - improve surveillance
10	Paths
3	Cycle paths - improvements required
3	Paths - surface needs improvements
1	Cycle paths - connecting paths required
1	Cycle paths - more required
1	Paths - maintenance required
1	Paths - more required
8	Open Space
2	Important for relaxation
2	Additional open space required as density increases
1	Improve open space design and layout
1	Natural character important
1	Provide for a variety of needs in open space
1	Value the close proximity of open space to home
8	Trees and Vegetation
3	Trees - additional required
2	Vegetation - provide more
1	Gardens - more colourful plantings
1	Trees - more natives required
1	Vegetation - increase native vegetation
6	Recreation Facilities
2	Sporting facilities - provide more
1	Access - provide safer places to cross major roads
1	Playgrounds - increase diversity of equipment for a range of age groups
1	Playgrounds - provide more
1	Playgrounds - upgrade/maintenance required
4	Ambience/Character
1	Indigenous heritage - consider values
1	Overall ambience needs improvement
1	Traffic - noise intrusive

No.	General Comments List
1	Make more user friendly
5	Other
4	Would like to have a Cinema in Cranbourne
1	More facilities in the Activity Centre in general
6	Access
3	Links - improve links so open space is en route
2	Roads - manage traffic volume to make it easier to access open space and reduce impact on the quality of it.
1	Pedestrian crossings - more required

2.8 Information about who completed the survey

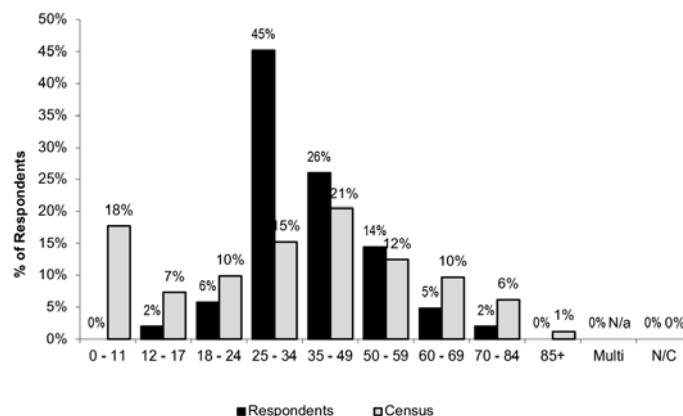
2.8.1 Gender

A total of 139 surveys were completed on-line. 71% of these were recorded as female, compared to 29% as male.



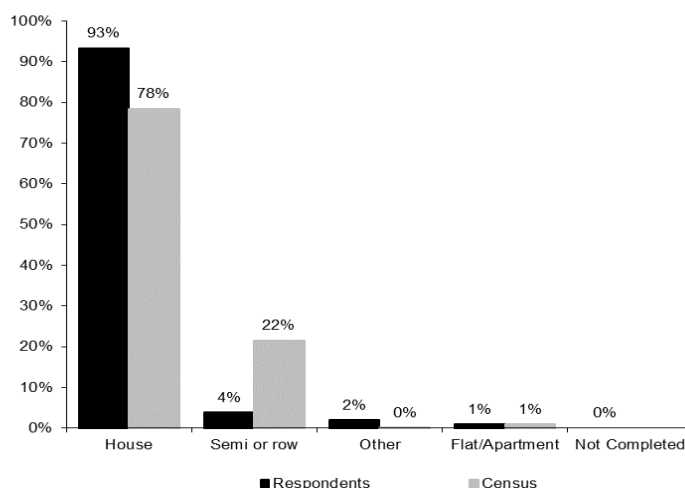
2.8.2 Age range

The largest group of survey respondents is from the 25-34 age range, followed by the 35-49 age range, which are over-represented when compared to census data, while the 60+ age group are under-represented in the survey.



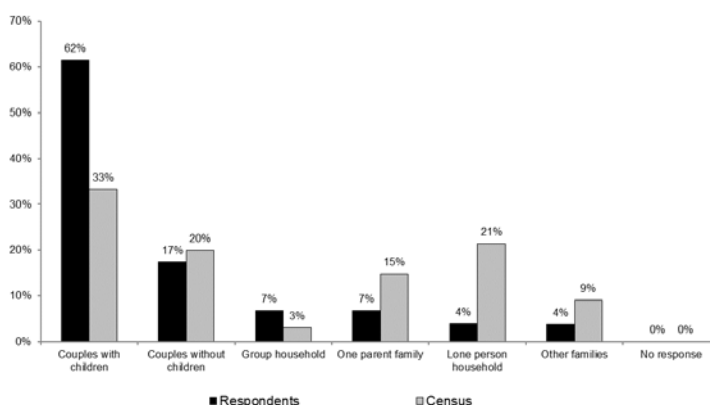
2.8.3 Dwelling type

The quantity of private open space available to residents can influence their use of open space. Generally detached dwellings have more private open space available than semi-detached dwellings or apartments, and changes in this can influence the usage patterns and level of demand for public open space.



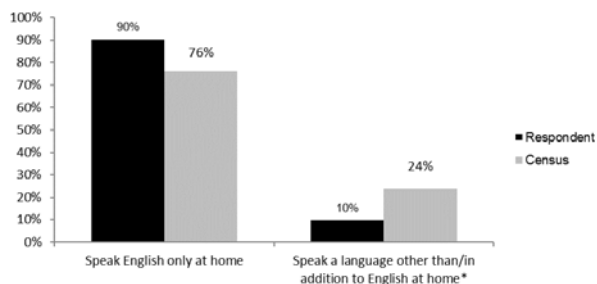
2.8.4 Household type

There is a slight over-representation of couples with children in the survey and an under-representation of lone person households compared with the census data for Cranbourne.

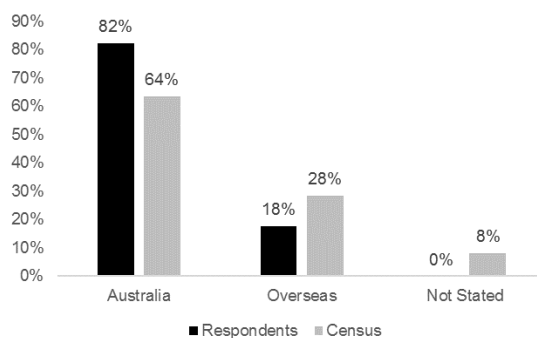


2.8.5 Language spoken at home

The survey has a slight over-representation of speaking English at home only compared with the census data as shown below. The percentage shown is relative to the number of respondents who completed the survey. Just over 68 per cent of the survey respondents completed this question.



2.8.6 Country of birth



Overseas country of birth (top 4)

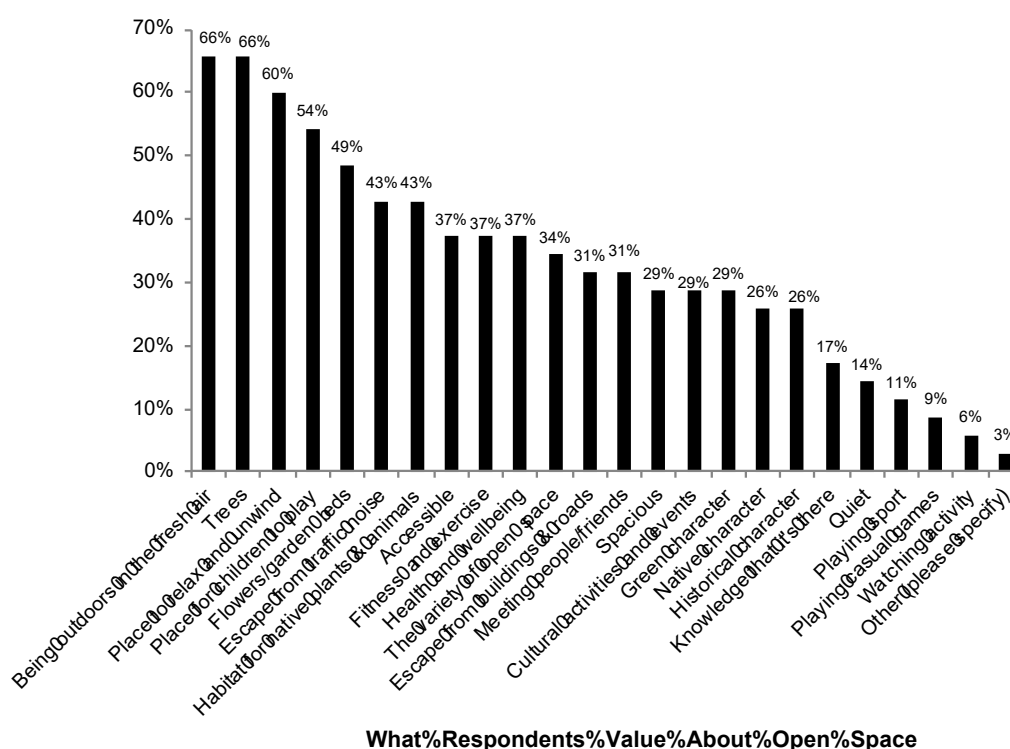
- 41% United Kingdom
- 24% India
- 24% New Zealand
- 12% Sri Lanka

3. Visitor survey outcomes

3.1 Values of open space

Respondents were asked to indicate what they valued about the open spaces in the Cranbourne Town Centre and close to where they live. The following table is a list of these values in priority order.

The percentage column is calculated on the basis of the total number of returned surveys of 38.



The following table list the values in priority order

%	Value
66%	Being outdoors in the fresh air
66%	Trees
60%	Place to relax and unwind
54%	Place for children to play
49%	Flowers/garden beds
43%	Escape from traffic noise
43%	Habitat for native plants & animals
37%	Accessible
37%	Fitness and exercise

%	Value
37%	Health and wellbeing
34%	The variety of open space
31%	Escape from buildings & roads
31%	Meeting people/friends
29%	Spacious
29%	Cultural activities and events
29%	Green character
26%	Native character
26%	Historical character
17%	Knowledge that it's there
14%	Quiet
11%	Playing sport
9%	Playing casual games
6%	Watching activity

3.2 Main open space that you regularly visit in the Cranbourne Town Centre?

No	Open space
5	None
3	Casey Fields
3	Cranbourne Gardens
3	Greg Clydesdale Square
2	Other open space in the City of Casey
1	Ray Perry Park
1	Cranbourne Library
1	High Street

3.3 Key reasons for visiting open space in the Cranbourne Town Centre

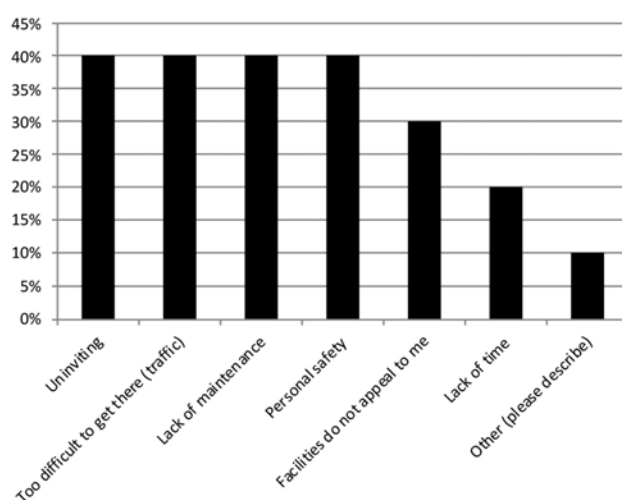
No.	Reasons
3	To relax and unwind as a break from shopping
2	Enjoy nature
2	Play
2	Walk/pass through
1	Watch sport
1	Read a book
1	There are none that appeal
1	Fresh clean air
1	High Street for shopping and relaxing
1	Being outdoors with the family

No.	Reasons
1	Not enough open space in the town centre
1	Social contact

3.4 Is there open space in Cranbourne Town Centre that you don't visit but would like to?

65% No
35% Yes

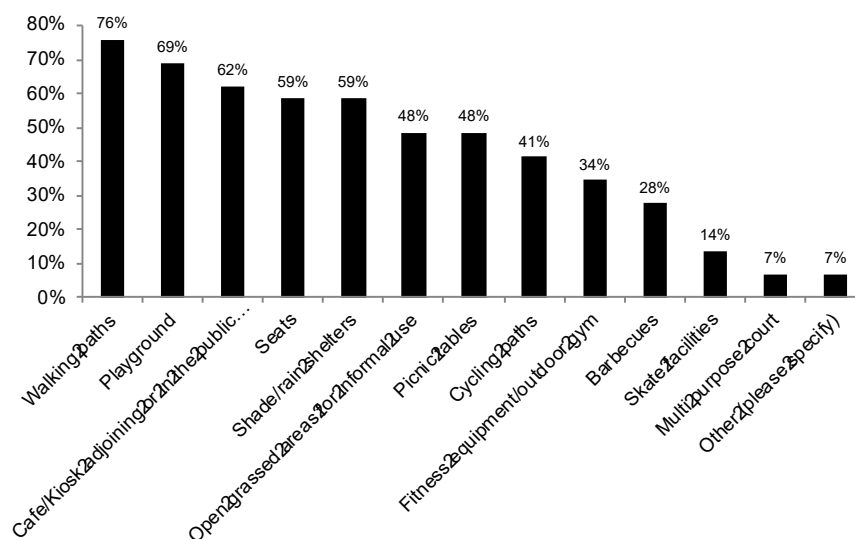
The reasons that people don't visit open space are (9 people answered this question):



3.5 Activities and facilities in open space

3.5.1 Which facilities you either do or would like to use if they were provided in open space in the Town Centre?

Of the respondents that completed this question, walking paths, followed by playground and cafe/kiosk are the most popular facilities to be provided or requested.



Cranbourne Major Activity Centre: Open Space Paper June 2020



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Purpose

The purpose of this paper is to review the findings of the *Cranbourne Town Centre Open Space Assessment 2018*¹ prepared by Thompson Beryl Landscape Design (the TBLD assessment) and provide recommendations for an appropriate planning policy implementation response to inform the preparation of Amendment C275 to the Casey Planning Scheme.

This paper was prepared by the Placemaking and Revitalisation Team in consultation with Recreation and Open Space Planning Team.

Executive Summary

The Cranbourne Major Activity Centre (Cranbourne MAC) is located approximately 50km south east of the Melbourne CBD and is positioned centrally within the South-East Growth Corridor towards the south of the City of Casey. The Cranbourne MAC is a key strategic centre within one of the fastest growing regions in Australia and plays a significant role as an established activity centre within a rapidly growing and changing surrounding context. With extensive population growth in the catchment area commercial and retail floorspace demand is projected to increase, as is residential development within the activity centre. A larger resident and worker population places increased demand on existing and creates demand for new public open spaces.

In 2017 the City of Casey commissioned Thompson Beryl Landscape Design to conduct an open space assessment for the Cranbourne MAC and surrounding catchment areas in the suburb of Cranbourne. The assessment was informed by other technical reports supporting a review of the strategic framework for the Cranbourne MAC, including the Economic Assessment and Residential Demand Assessment prepared by SGS consultants in 2017. The TBLD assessment recommended that there is demand for six new public open spaces, seven major upgrades to existing public open spaces and ongoing maintenance, expansions and minor upgrades to 12 other public open spaces.

Amendment C157, which originally applied schedule 1 to clause 37.08 Activity Centre Zone (ACZ1) to the Cranbourne MAC, inadvertently *turned-off* the 8% public open space contribution rate at clause 53.01 Public Open Space Development Contributions and Subdivision because of an existing exemption in the Casey Planning Scheme.

While a comprehensive review of Council's Open Space Strategy (and in turn the rates in schedule 1 to Clause 53.01) is expected to commence in the coming years it is recommended in the interim that the previous 8% rate is *turned-on* so it applies within mapped areas of the Cranbourne MAC. Contributions should be collected through the Subdivisions Act 1988 where they cannot be collected through mechanisms in the Casey Planning Scheme.

It is recommended that the findings of the TBLD assessment are incorporated into Council's capital works program.

¹ The Cranbourne Major Activity Centre was formally referred to as the "Cranbourne Town Centre". At the request of the Department of Environment, Land, Water and Planning (DELWP) strategic documents are being updated to use the official naming reference from Plan Melbourne. Any reference to the "Cranbourne Town Centre" in technical reports and supporting documents should be taken as referring to the Cranbourne Major Activity Centre.

The TBLD Report

Study Area

The study area generally comprised a 400-500m safe walkable catchment from the Cranbourne MAC or extents as defined by any significant pedestrian barriers, such as arterial or major roads or railway corridors.



Figure 1: Existing Open Space

Methodology

The TBLD Assessment comprised:

- » a review of existing Council strategies, policies and documents, including technical reports which were being prepared to inform the review of the Cranbourne MAC strategic framework.

- » a desktop assessment of existing open space within the study area, including travel and walking catchment analysis.
- » site assessments of the open spaces being reviewed and their surrounding areas.
- » a community survey to help better understand the open space needs of the existing community (visitors, residents and employees).

The study area was broken down into sub-precincts for localised analysis as part of the TBLD Assessment.



Figure 2: Open Space Sub-Precincts

Findings

Four open space gap areas were identified in the study area in the TBLD Assessment. A description of them is provided below.

Table 1: Extract from TBLD Assessment – Table 3-4 Open Space Gap Area Descriptions

Gap area	Description
G1	Located at the northern entry to the Cranbourne Town Centre in open space sub-precinct CTC2, there is potential for this existing open space gap area to be addressed as part of the future redevelopment of this precinct. A new Local open space will be required and designed and positioned so that it is a useable, social meeting place for people working and visiting this area. This may be combined with the future gateway marker, however the open space is not to be encumbered by traffic noise.
G2	Located in the open space sub-precinct CTC5, the street layout in this gap area is predominantly east west alignment, and includes a combination of single storey multi unit developments. Fronting High Street, the properties are a combination of commercial uses consistent with the Activity Centre Zone. There is forecast to be an increase in urban densities in the vicinity of this gap area, and therefore a new Local open space will be required to address this gap area for the existing and predominantly for the forecast population.
G3	This gap area is located south of the railway in the vicinity of Clarendon Street in sub-precinct CTC7 (refer to Figure D). Ray Perry Park and the Lyall Street Reserve are existing Local open spaces that are further than 400 metres however are still accessible via the local street network. There is also some ancillary open space available with the Cranbourne Secondary College located within the gap area. Improving the streetscape amenity and upgrading both open spaces may adequately address this gap area, without the need for additional open space.
G4	Located south of Sladen Street in sub-precinct CTC9 (refer to Figure D) and between the South Gippsland Highway and Cameron Street there is no useable open space within safe and easy walking distance of the workers and residents in this sub-precinct. The South Gippsland Highway Avenue of Honour is within the precinct, however this open space is not suitable a recreational and destination open space in itself. A new Local open space will be required in this sub-precinct for the existing and forecast population

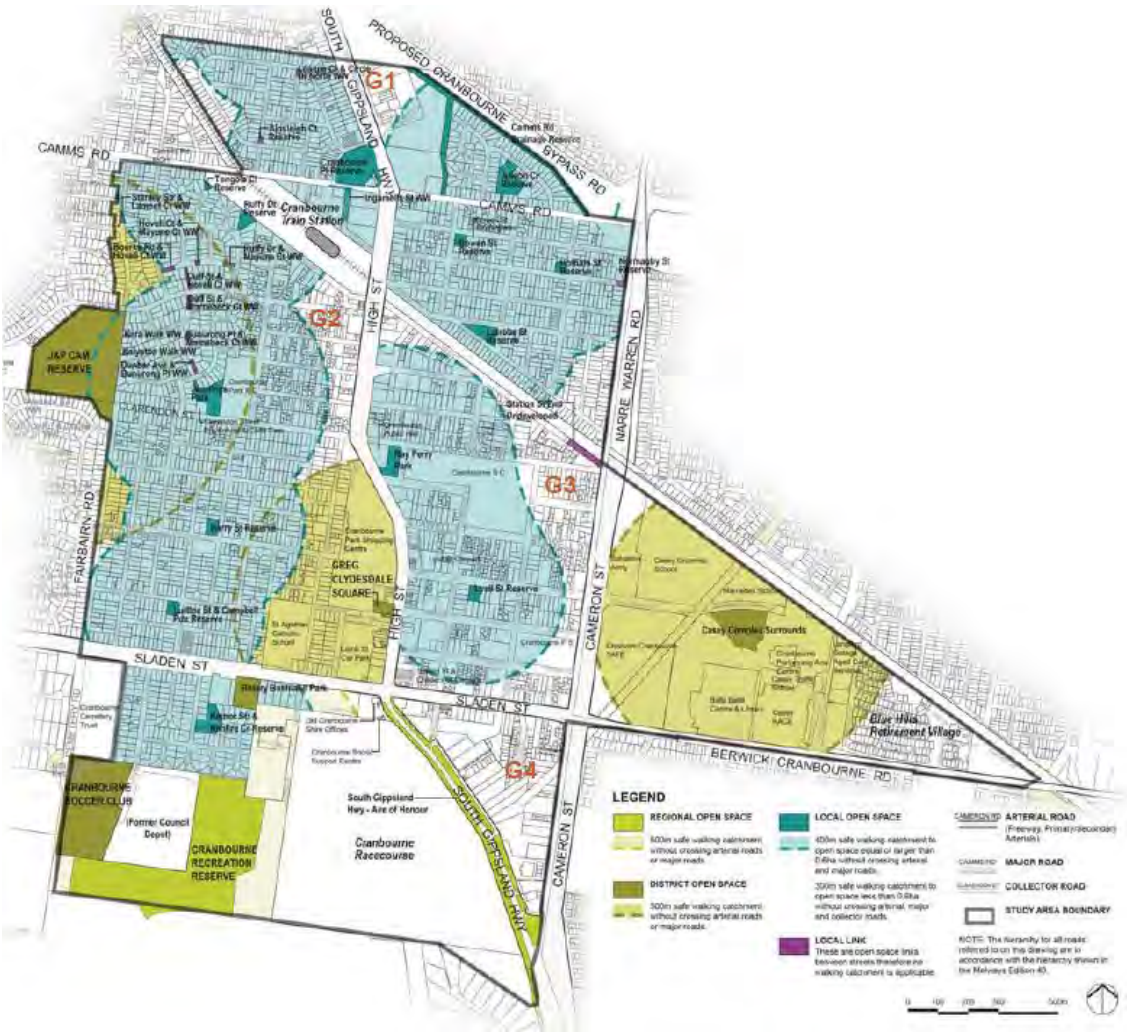


Figure 3: Open Space Gap Areas

The recommendations of the TBLD assessment for open space provision and individual open spaces are provided below. Shaded rows identify recommendations within the Cranbourne MAC.

Table 2: TBLD Assessment recommendation and deliverability assessment					
TBLD Recommendation number	Recommendation	Priority (TBLD Assessment)	New, significant renewal, maintenance	In Capital Works Program?	Deliverability
4.2a	New local open space in CTC2 to address gap area 1. At least 0.8ha in size	Medium	New	No No land has been identified for acquisition and therefore no capital works project can be created.	New open space will be considered if a suitable property is for sale, not high enough priority for PAO. Large parcels of undeveloped land provide opportunities for land or combined land/cash contributions to add to open space quantity and accessibility.
4.2b	New local open space in CTC3 to meet future demand generated by adjoining site. At least 0.8ha in size	Low	New	No No land has been identified for acquisition and therefore no capital works project can be created.	New open space will be considered if a suitable property is for sale, not high enough priority for PAO. Large parcels of undeveloped land provide opportunities for land or combined land/cash contributions to add to open space quantity and accessibility
4.2c	New local open space in CTC4 to address gap area 2	Low	New	No No land has been identified for acquisition and therefore no capital works project can be created.	New open space will be considered if a suitable property is for sale, not high enough priority for PAO.
4.2d	New local open space in CTC9 to address gap area 9. At least 1ha	High	New	No No land has been identified for acquisition and therefore no capital works project can be created.	New open space will be considered if a suitable property is for sale, not high enough priority for PAO. Large parcels of employment land provide opportunities for land or combined land/cash contributions to add to open space quantity and accessibility.
4.2e	New district open space in CTC10 - to be integrated into layout as determined by Casey Complex UDF. To address existing and forecast	High	New	No No land has been identified for acquisition and therefore no capital works project can be created.	Majority of the land is in Council ownership. New open space will be considered as part of the delivery of new and renewed community facilities taking into consideration the implementation

	resident and worker population 1-3ha.				priorities of the Casey Complex Urban Design Framework.
4.2.1	Ainsleigh Court walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.2	Arleon Crescent Reserve	low	Retain and maintain, minor upgrades in long term	Yes – (Project 135)	Captured through Councils Playground Renewal Program
4.2.3	Bourke Road and Hovell Court walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.4	Bowen Street Reserve - major upgrade to cater for forecast resident and employment population. Design facilities to complement those provided in nearby Hotham Street and Latrobe Street reserve.	Medium	Major upgrade	No	Capital Works nomination required
4.2.5	Bunurong Court and Marnebek Place walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.6	Camms Road drainage reserve - liaise with management authority to discuss feasibility of north-south SUP	Low	Addition/upgrade	No	Capital Works nomination required
4.2.7	Casey Complex surrounds	Low	New	No This forms part of the Casey Complex Urban Design Framework.	Majority of the land is in Council ownership. New open space will be considered as part of the delivery of new and renewed community facilities taking into consideration the implementation priorities of the Casey Complex Urban Design Framework.

4.2.8	Greg Clydesdale Square	Very High	Major upgrade	Yes (Project 983 – minor upgrade design)	Major upgrade is subject to ongoing discussions and grant opportunities currently being pursued.
4.2.9	Cranbourne Place reserve	High	Major upgrade	Yes but needs review and update (Project 287 and 985)	Capital Works nomination update required
4.2.10	Cranbourne soccer club	Medium	Review unstructured recreational use opportunities i.e. circuit walking path	No	Crown Land – Council is in discussions with a range of relevant stakeholders about the future of this site.
4.2.11/4.2.12	Duff Street and Hovell Court walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.13	Harry Street reserve - review whether expansion is possible to 0.6ha (currently off-lead dog park and drainage function) to cater to growing resident population in higher density area	High/ongoing	Major upgrade	Yes – Minor upgrade a flood mitigation (Project 1317) No – project for expansion in Capital Works program	Expansion will be considered if an adjoining suitable property is for sale, not high enough priority for PAO.
4.2.14	Hotham Street reserve - Major upgrade to cater for forecasted resident and employment population. Design facilities to complement those provided in nearby Bowen Street and Latrobe Street reserve.	Medium	Major upgrade	No	Capital Works nomination required.
4.2.15	Hovell Court and Mayune Court walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.16	Ingamells Street - provide pedestrian path link in the short term, longer term a new open space would be required	High/ongoing	New/major upgrade - note this reserve is currently	No	CW nomination required Privately owned, acquisition will be considered, however not high enough priority for PAO. Large

	here to cater for growing resident population. Camms Road too much of a barrier to cross to reach Cranbourne Place reserve.		privately owned, further investigation required to determine if there is any status of it as a road or a reserve		parcels of undeveloped land provide opportunities for land or combined land/cash contributions to add to open space quantity and accessibility
4.2.17	J&P Cam Reserve - provide for unstructured recreation and other facilities	Medium	Major upgrade	No	Capital Works nomination required
4.2.18	Jennings Park - additional path link to play facility, more trees and seating	High	Minor upgrade	No	Capital Works nomination required and to consider improved CTPED for playground.
4.2.19	Kalypton Walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.20	Kara Walk Walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.21	Ketnor Street and Rimfire Crescent Reserve - path link to play facility,	Very High	Minor upgrades	No	Capital Works nomination required
4.2.22	Latrobe Street Reserve – path link, upgrade seating and picnic facilities.	Medium	Minor upgrades	Yes – Project 290	Captured through Councils Playground Renewal Program
4.2.23	Leanne Court and Circle Drive North walkway	Ongoing	Continue to maintain	No Maintenance to occur as per Councils regular Parks Maintenance Program.	N/A
4.2.24	Lurline Street and Campbell Parade walkway	Ongoing	Continue to maintain	No	N/A