Strategic Transport Modelling Assessment (Ultimate Scenario)

McPherson, Croskell and Minta Farm Precincts

CG141047

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Shaping the Future

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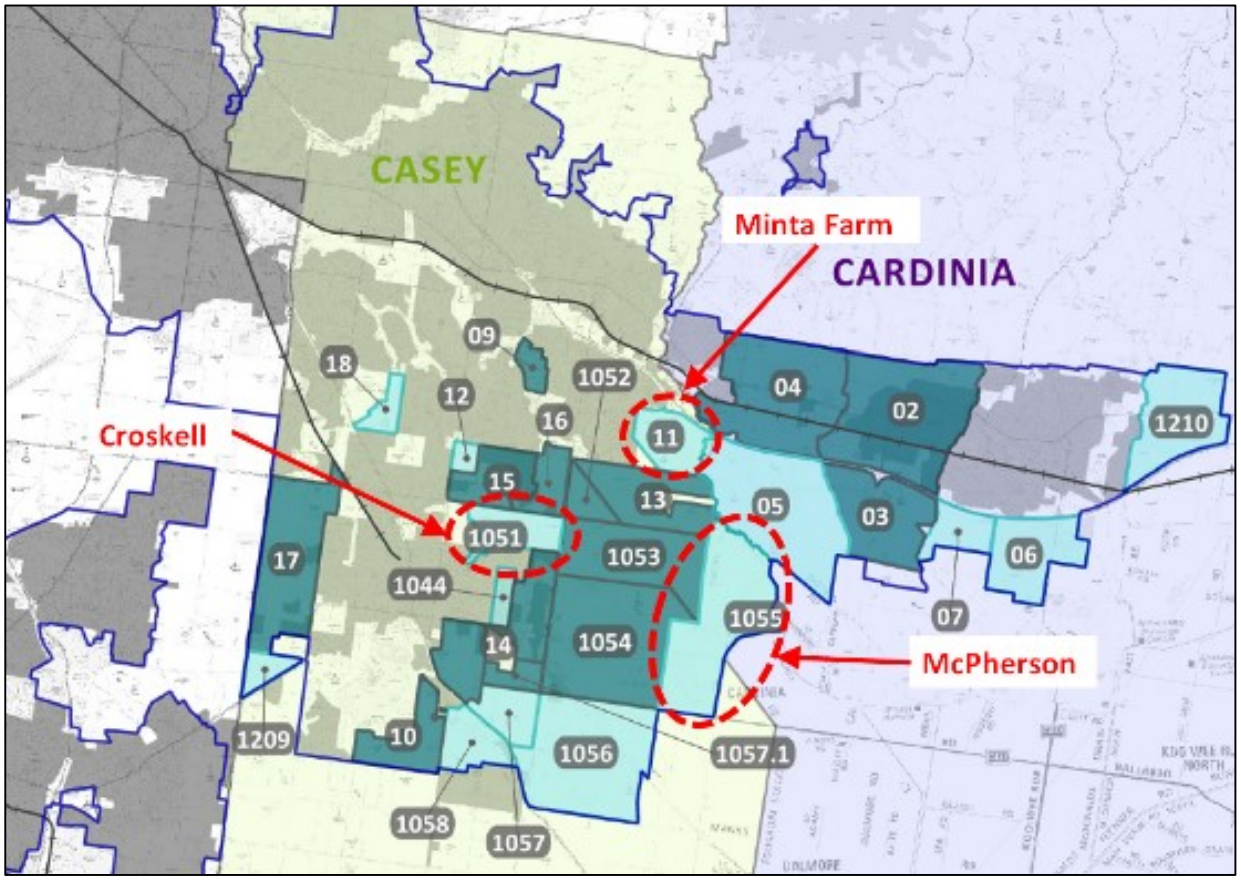
1 Introduction

1.1 Overview

The Metropolitan Planning Authority (MPA) is preparing draft Urban Structures to inform the Precinct Structure Plans (PSPs) of McPherson (PSP 1055), Croskell (PSP 1051) and Minta Farm (PSP 11).

The location of the PSP areas within the context of the South East Growth Corridor is outlined in Figure 1-1.

Figure 1-1 Location of PSPs within the South East Growth Corridor



Source: MPA Website (PSP Status Map dated November 2014)

As part of the preparation of the draft Urban Structures, the MPA commissioned Cardno to undertake strategic transport modelling. The outputs of the strategic modelling will be used as an input into further modelling to determine the road and intersection configurations that will be included in the PSPs and subsequent Development Contributions Plans (DCPs), or similar.

1.2 Key Objectives

The strategic modelling was completed using the MPA's South East Growth Corridor version of the Victorian Integrated Transport Model (VITM) and the key objectives of the study are outlined as follows:

> Review the latest version for the South East Growth Corridor VITM (i.e. the model developed for the Thompsons Road, Clyde Creek and Casey Fields South PSPs), focusing on the PSP areas for McPherson, Croskell and Minta Farm and the road network surrounding the PSP areas.

> Update the VITM to reflect the road network and land uses envisaged for the subject PSPs.

> Run the updated VITM to assess the anticipated interim (2026) and ultimate (2046) traffic volumes on the network.

1.3 Referenced Documents

In preparing this report, the following data sources and reports have been considered:

> Draft Urban Structures for the McPherson (PSP 1055), Croskell (PSP 1051) and Minta Farm (PSP 11) PSPs as provided by the MPA.

> The "*Thompsons Road, Clyde Creek and Casey Fields South (Residential) PSP 53, 54 & 57.1 Traffic Modelling*" report prepared by AECOM, Revision A, dated 14 April 2014.

> MPA's South East Growth Corridor VITM – Version VITM2012_V120423_THOMPSONS_v2.

> Other documents and data sources as nominated throughout this report.

1.4 Interim (2026) vs. Ultimate (2046) Analysis

Both interim and ultimate traffic volumes will eventually be assessed as part of this study. The interim volumes represent the +10 year development scenario (~2026) and the ultimate volumes the +30 year development scenario (~2046). The interim volumes will be refined and used to inform the intersection works up to the interim scenario for inclusion in the DCPs and represent the works that will be used by the future community of the PSP area, whilst the ultimate volumes will be used to validate the ultimate road reservation requirements (including flaring requirements at intersections).

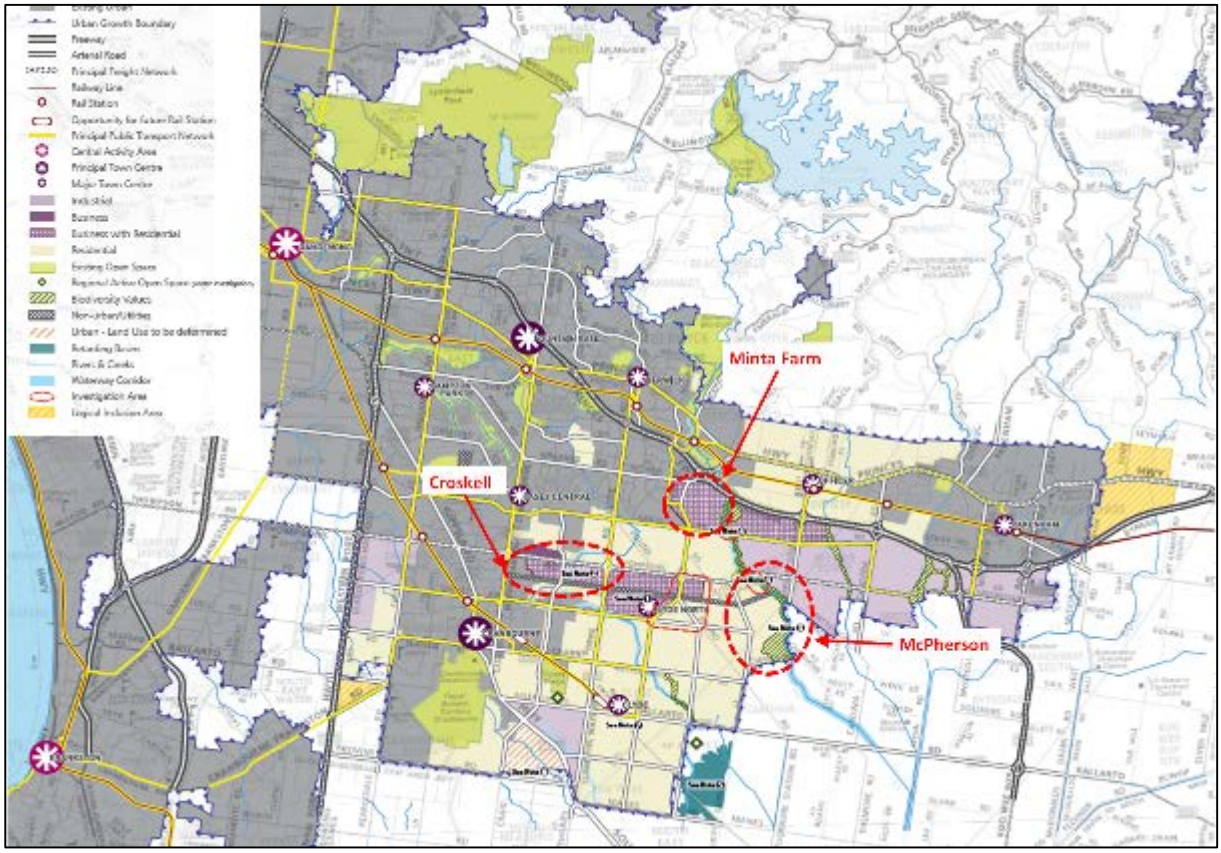
This report focuses on the ultimate VITM analysis, following agreement on the outcomes of the ultimate modelling, the interim modelling will commence in accordance with the study brief.

2 Study Area

2.1 South East Growth Corridor

The South East Growth Corridor Plan and the location of the subject PSPs within the corridor are outlined in Figure 2-1.

Figure 2-1 South East Growth Corridor



Source: MPA Website (South East Growth Corridor Plan)

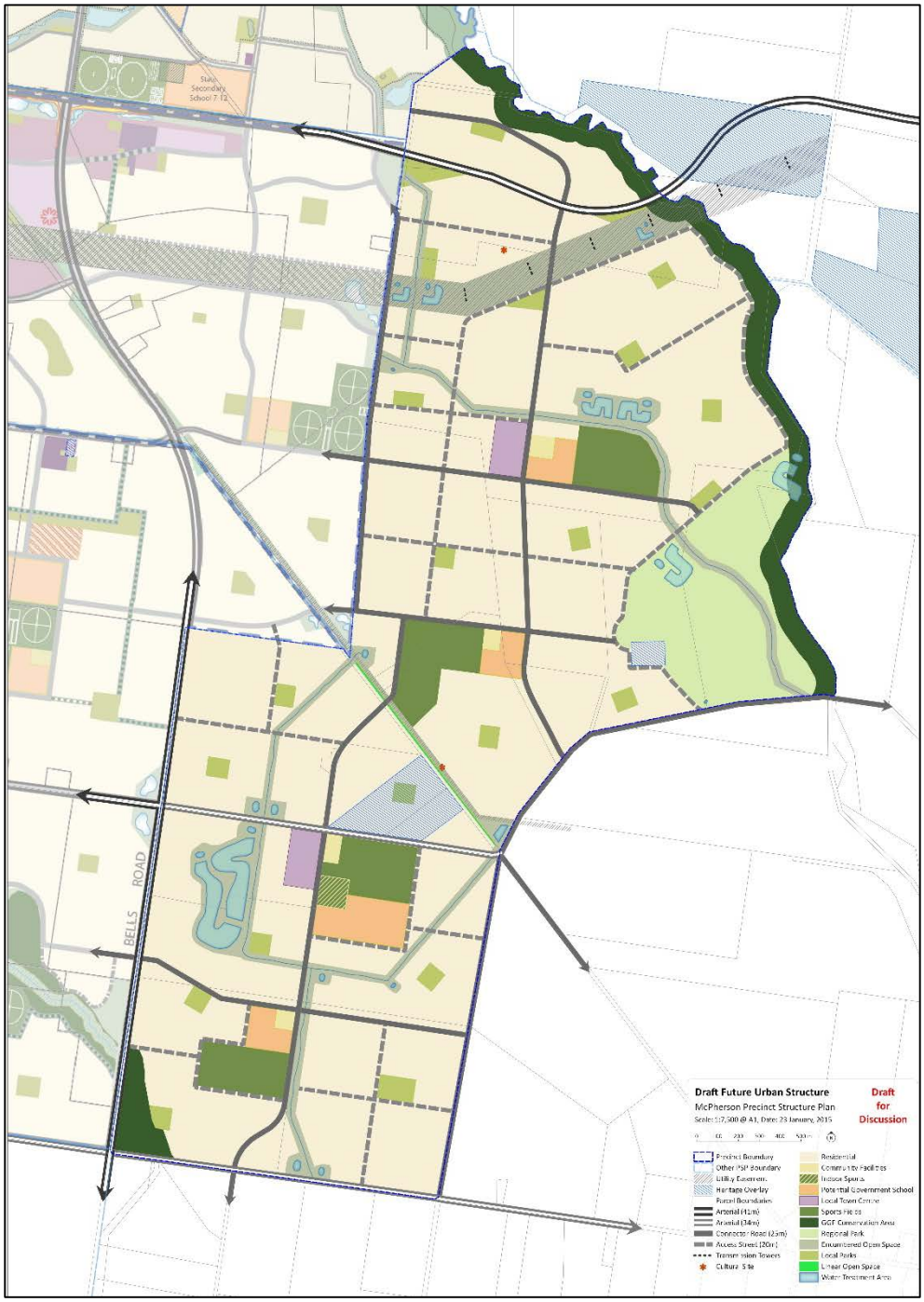
The South East Growth Corridor Plan is an integrated land use and transport plan that provides a strategy for the development of Melbourne's South East Growth Corridor over the coming decades. Further detail on the subject PSPs is provided in the following sub sections.

2.2 McPherson (PSP 1055)

McPherson (PSP 1055) covers an area of approximately 952 hectares and is made up of farming land. It is located to the east of the Thompsons Road (PSP 1053) and Clyde Creek (PSP 1054) PSP areas.

The PSP is generally bounded by Bells Road / Smiths Lane to the west, Thompsons Rd to the north, Cardinia Creek to the east, and Ballarto Road to the south. The draft Urban Structure for the PSP is shown in Figure 2-2 (with an enlarged version included in Appendix A).

Figure 2-2 McPherson (PSP 1055) – Draft Urban Structure



As outlined in Figure 2-2, the draft Urban Structure for McPherson includes residential, Local Town Centre (LTC), and school uses in addition to community and open space uses.

The anticipated development yields envisaged by the draft Urban Structure were provided by the MPA and are outlined in Table 2-1.

Table 2-1 McPherson (PSP 1055) – Anticipated Development Yields

PSP	Population	Households	Enrolment	Retail Jobs	Non-Retail Jobs	Total Jobs
McPherson (PSP 1055)	35,005	12,502	2,453	667	375	1,042

The key features of the road network included in the draft Urban Structure are summarised as follows:

> Smiths Lane along the western precinct boundary which is anticipated to operate as a Connector Street;

> Two north-south Connector Streets, one located east of Bells Rd and the other east of Smiths Lane;

> Three east-west Connector Streets which extend the Connector Streets proposed in the adjacent Thompsons Road and Clyde Creek PSPs.

> The extension of Patterson Road, an east-west Arterial Road through the precinct.

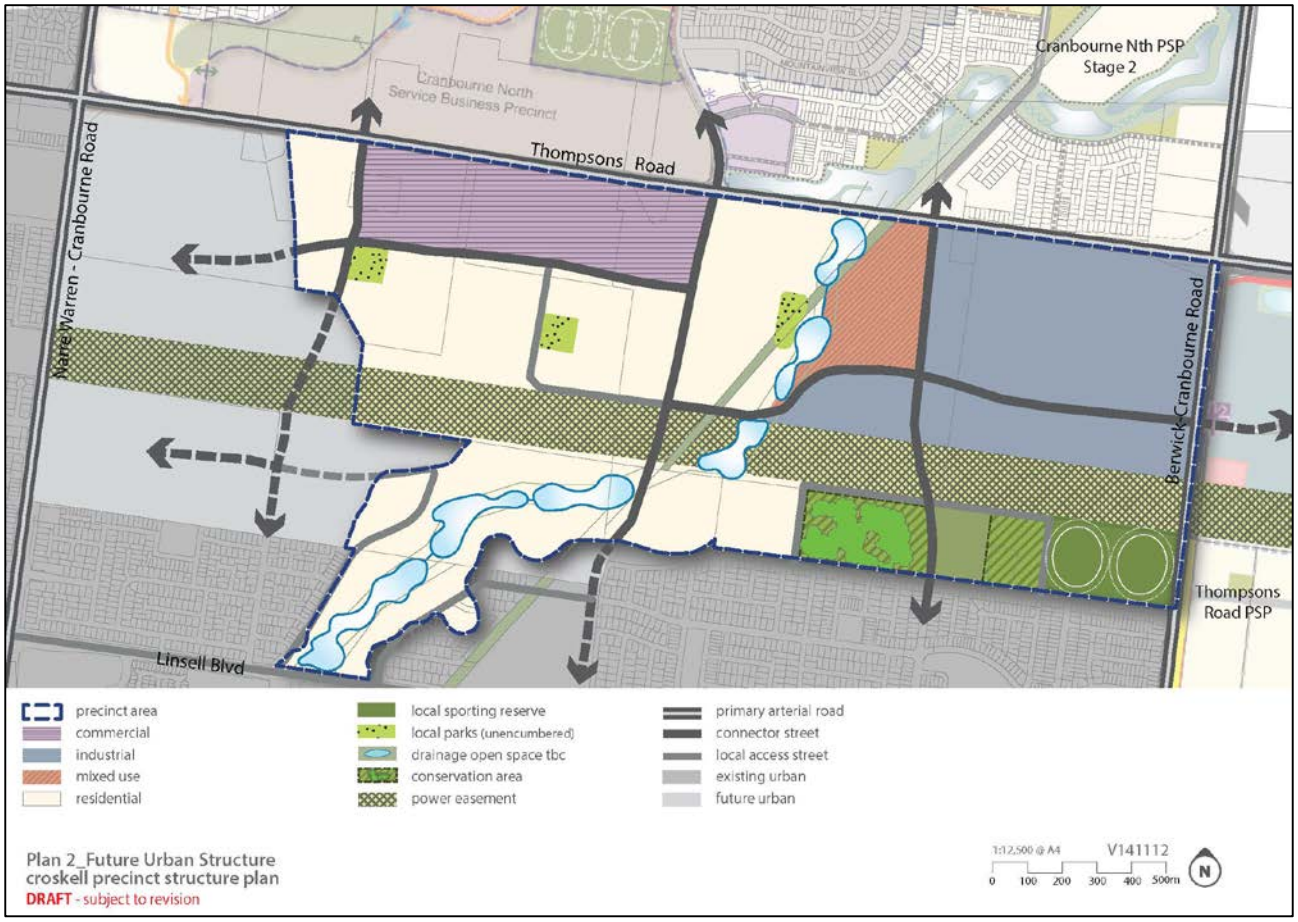
> A number of internal local Access Streets.

2.3 Croskell (PSP 1051)

Croskell (PSP 1051) covers an area of approximately 275 hectares and is located to the south of Cranbourne North Stages 1 and 2 (PSPs 15 and 16), the west of Thompsons Road (PSP 1053), and north of Cranbourne East (PSP 14).

The PSP is generally bound by Thompsons Road to the north, Staunton Walk to the west, Brocker St and Donohue St to the south, and Berwick-Cranbourne Road to the east. The draft Urban Structure for the PSP is shown in Figure 2-3 (with an enlarged version included in Appendix A)

Figure 2-3 Croskell PSP – Draft Urban Structure



As outlined in Figure 2-3, the draft Urban Structure includes employment and residential uses. Industrial and commercial areas are located primarily along Thompsons Road / Berwick-Cranbourne Road with the balance of the land being allocated to mixed use and residential land uses.

The anticipated development yields envisaged by the draft Urban Structure were provided by the MPA and are outlined in Table 2-2.

Table 2-2 Croskell PSP (PSP 1051) – Anticipated Development Yields

PSP	Population	Households	Enrolment	Retail Jobs	Non-Retail Jobs	Total Jobs
Croskell (PSP 1051)	5,353	2,161	0	2,341	2,725	5,066

The key features of the road network included in the draft Urban Structure are summarised as follows:

> Three north-south Connector Streets that connect to Thompsons Road at the intersections with William Thwaites Boulevard and Wheelers Park Drive, and at the Cranbourne North Service Business Park.

> A Connector Street Loop around the proposed commercial use area that fronts Thompsons Road.

> An east-west Connector Street that connects the precinct to Berwick-Cranbourne Road to the south of Thompsons Road.

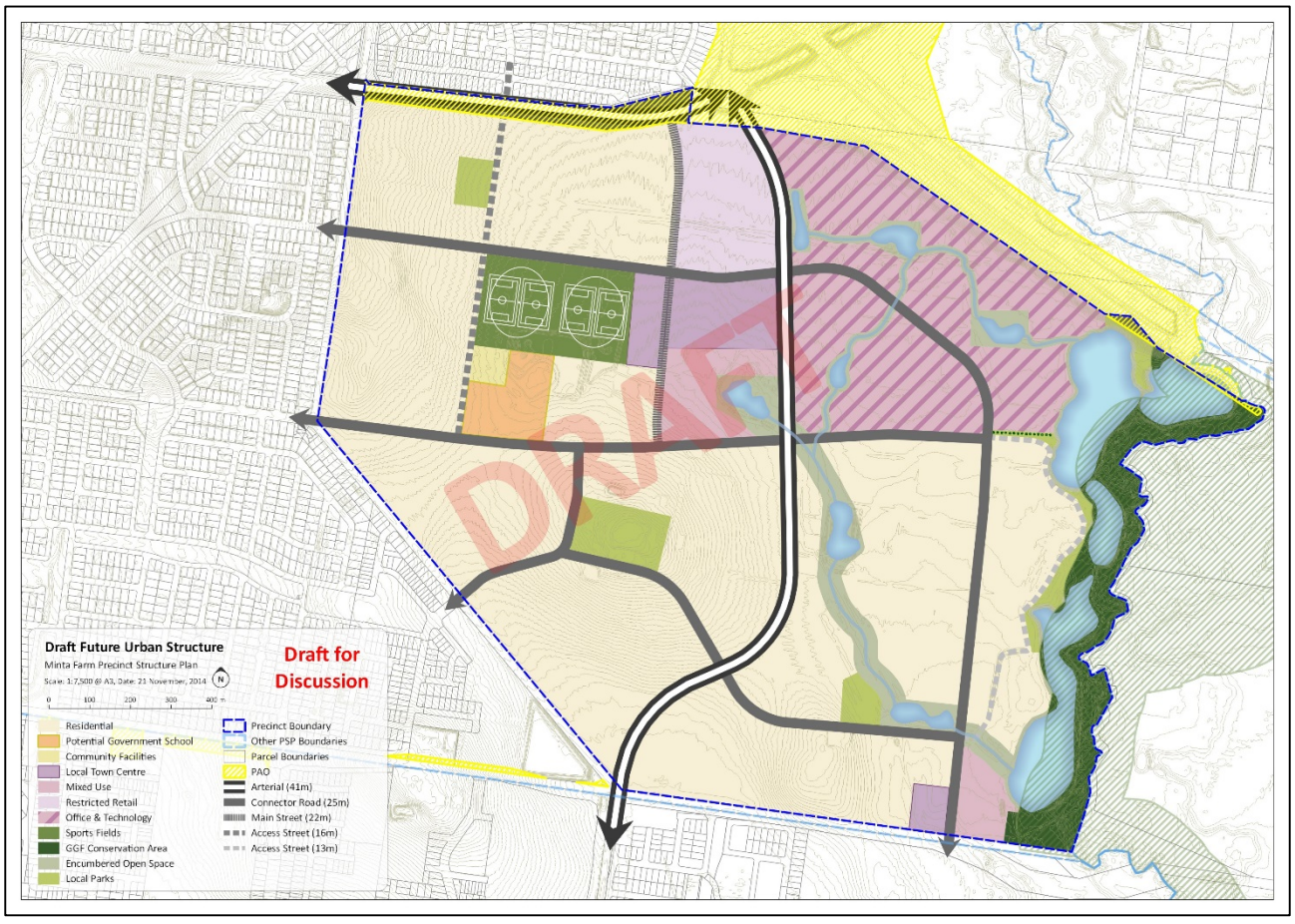
> A number of internal local Access Streets.

2.4 Minta Farm (PSP 11)

Minta Farm PSP 11 covers an area of approximately 285 hectares and is located to the north of Clyde North (PSP 13), to the west of Cardinia Creek and Officer South (PSP 5) and to the south of Officer (PSP 4).

The PSP is generally bound by the Monash Freeway / Beaconsfield interchange to the north, Soldiers Rd to the west, Grices Rd to the south and Cardinia Creek to the east. The draft Urban Structure for the PSP is shown in Figure 2-4 (with an enlarged version included in Appendix A)

Figure 2-4 Minta Farm PSP – Draft Urban Structure



As outlined in Figure 2-4, the draft Urban Structure includes residential, educational, and employment uses (various types).

The anticipated development yields envisaged by the draft Urban Structure were provided by the MPA and are outlined in Table 2-3.

Table 2-3 Minta Farm (PSP 11) – Anticipated Development Yields

PSP	Population	Households	Enrolment	Retail Jobs	Non-Retail Jobs	Total Jobs
Minta Farm (PSP 11)	8,067	2,970	451	1,124	9,105	10,229

The key features of the road network included in the draft Urban Structure are summarised as follows:

> A north-south Arterial Road through the precinct which will provide direct access to the Beaconsfield Interchange. This north-south Arterial will connect into Grices Road to the south of the Minta Farm PSP area (with the termination of Soldiers Road to the north) to create a four-way intersection.

> The extension of O'Shea Road along the northern precinct boundary to connect to the Beaconsfield Interchange.

> A number of internal Connector Streets that connect the precinct to Soldiers Road.

> A number of internal local Access Streets.

3 Victorian Integrated Transport Model (VITM)

3.1 Victorian Integrated Transport Model (VITM)

The Victorian Integrated Transport Model (VITM) has been used as the strategic modelling basis for this study.

The VITM is a tool developed and maintained by the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) to assist in the planning of road and public transport infrastructure in Victoria. It 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. The VITM contains all major freeways, Arterial Roads and key Connector Streets within the Melbourne Statistical Division.

The model is a link-based traffic model which is implemented in the CUBE Voyager software environment.

3.2 South East Growth Corridor VITM

The MPA commissioned the refinement to the VITM for Melbourne's South East Growth Corridor. The purpose of this refinement was to provide a strategic model of the South East Growth Corridor which could be used to understand the transport needs of the MPA, City of Casey, Cardinia Shire Council and VicRoads for projects (such as PSPs) within the corridor. The refinements to VITM included the following:

- disaggregation of the zone system within the growth corridor;
- updates to the future modelled land use yields to reflect the level of growth predicted by the MPA within the corridor;
- updates to the road network within the corridor; and
- updates the centroid connectors.

The latest version of this South East Growth Corridor model was obtained from the DEDJTR (VITM2012_V120423_THOMPSONS_v2) on Dec 2014 and used as the basis for this study.

This version of the South East Growth Corridor VITM was recently updated by AECOM to assess the Thompsons Road (PSP 53), Clyde Creek (PSP 54) and Casey Fields South – Residential (PSP 57.1) PSPs, the details of which are outlined in the "*Thompsons Road, Clyde Creek and Casey Fields South (Residential) PSP 53, 54 & 57.1 Traffic Modelling*" report prepared by AECOM (Final Version, dated 25 July 2014).

3.3 Model Limitations

Strategic modelling is used to understand existing demands and travel patterns across a road network and assess how these change as a result of land use and transport infrastructure changes. The outputs of the modelling provide a guide to understanding the overall performance of a transport network.

A key limitation is that VITM is a link based model which uses speed flow curves to calculate vehicle travel times as a function of the level of traffic. These functions are based on average observed behaviour on various road link types. In reality each section of road will have unique behavioural characterises which are largely determined by the operation of nearby intersections.

VITM does not calculate different factors for different turning movements at an intersection or the impacts of queuing back and blocking back from one intersection to another.

4 Model Review and Development

4.1 Preamble

Cardno reviewed the VITM version VITM2012_V120423_THOMPSONS_v2, referred to as the AECOM model hereafter, for the interim (2026) and ultimate (2046) years and recommended alterations to the models for the purposes of this study.

In addition Cardno has now completed ultimate scenario modelling for the subject PSPs, the findings of which are outlined in the latter sections of this report.

On agreement on the outcomes of the ultimate scenario modelling, Cardno will complete the interim scenario modelling. In this regard the following subsections also include the outcomes of Cardno's review and proposed changes to the 2026 AECOM VITM.

4.2 PSPs as coded in AECOM VITM

The draft Urban Structures for the subject PSPs within the context of the surrounding area are shown in Figure 4-1 and their locations within the AECOM are shown in Figure 4-2.

Figure 4-1 PSP Localities

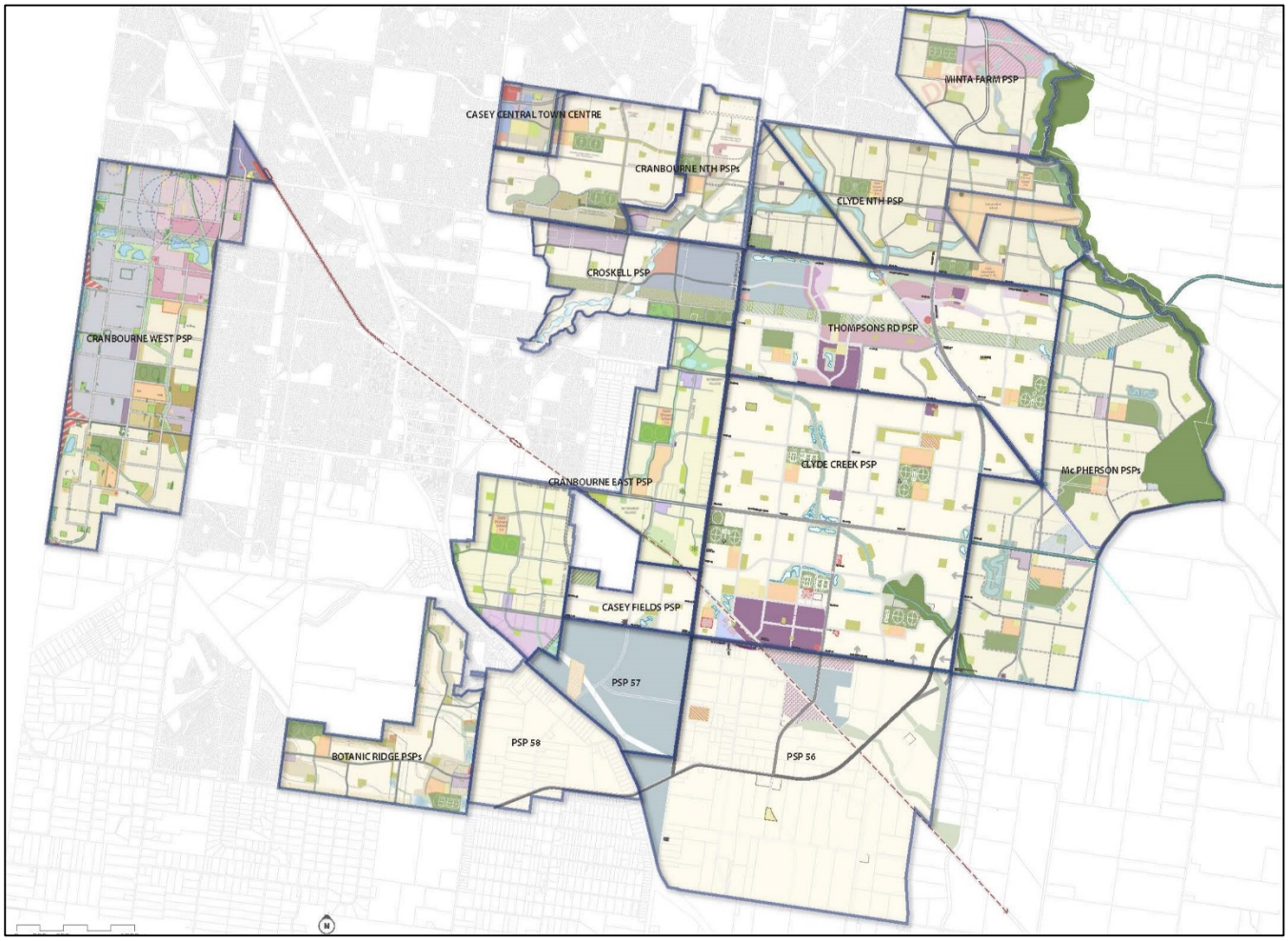
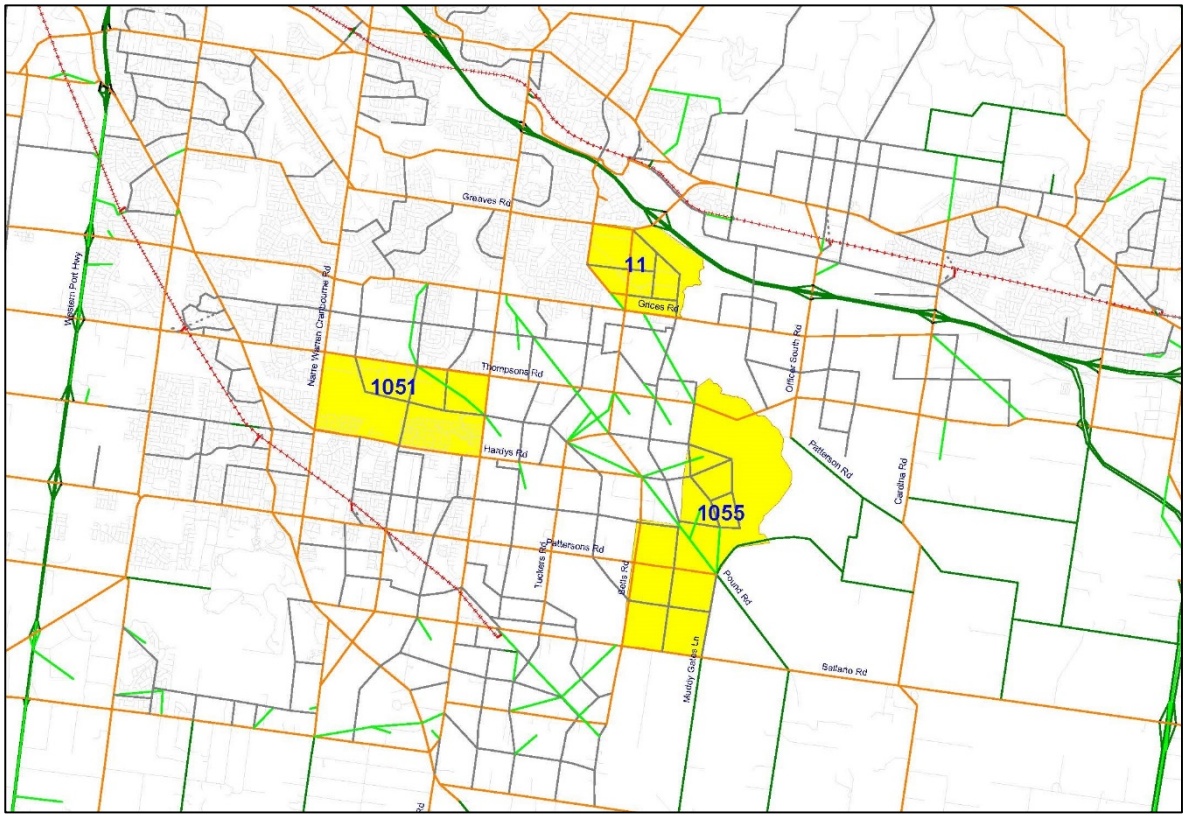


Figure 4-2 PSP Locations in AECOM VITM

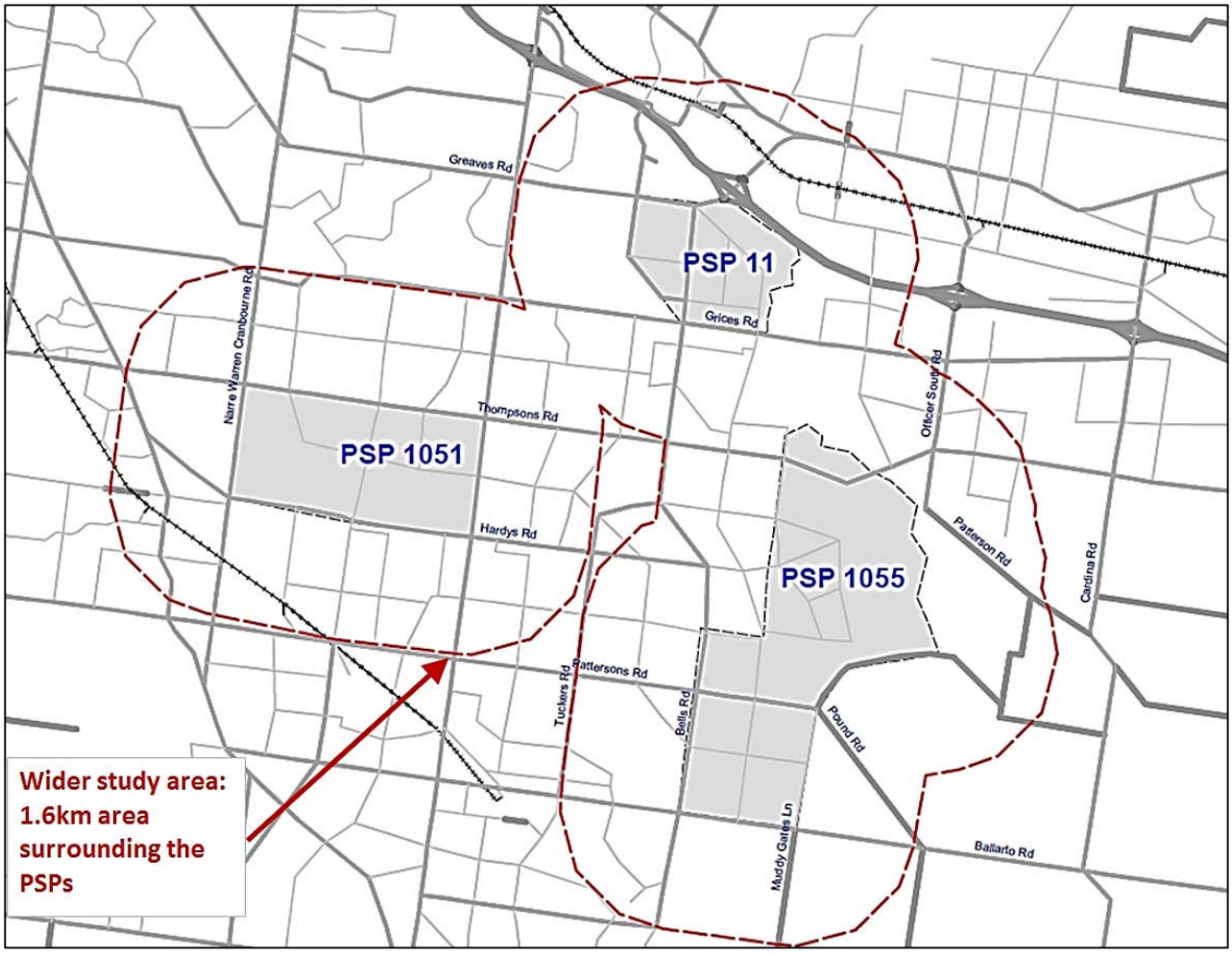


4.3 Road Networks Review

4.3.1 Overview

Cardno reviewed and refined the AECOM VITM for the PSP areas and their surrounds. The extent of the areas reviewed and refined by Cardno are outlined in Figure 4-3.

Figure 4-3 VITM Area Reviewed and Refined by Cardno



4.3.2 Interim Road Network Review

The interim road network included in the AECOM model is shown in Figure 4-4, whilst Figure 4-5 shows the changes proposed by Cardno for the purposes of this study.

Figure 4-4 AECOM Interim (2026) Scenario Road Network Coding

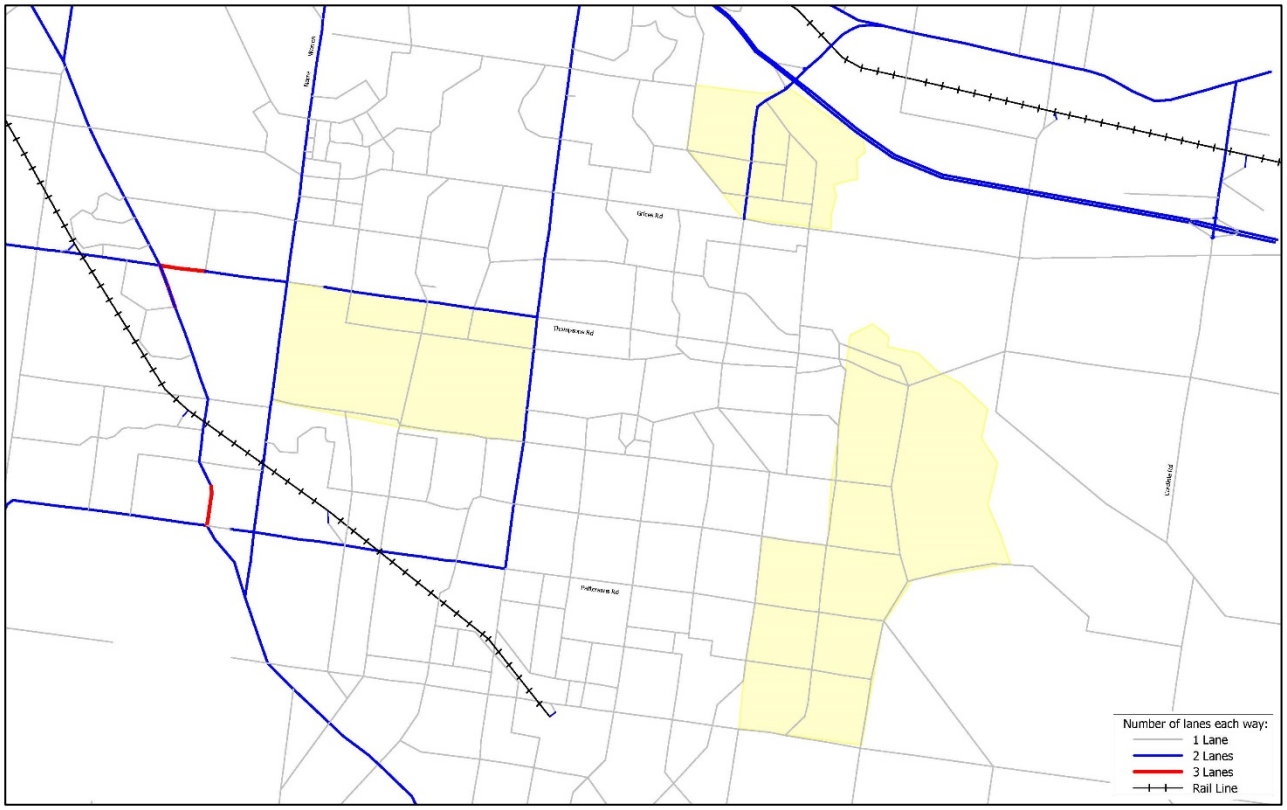
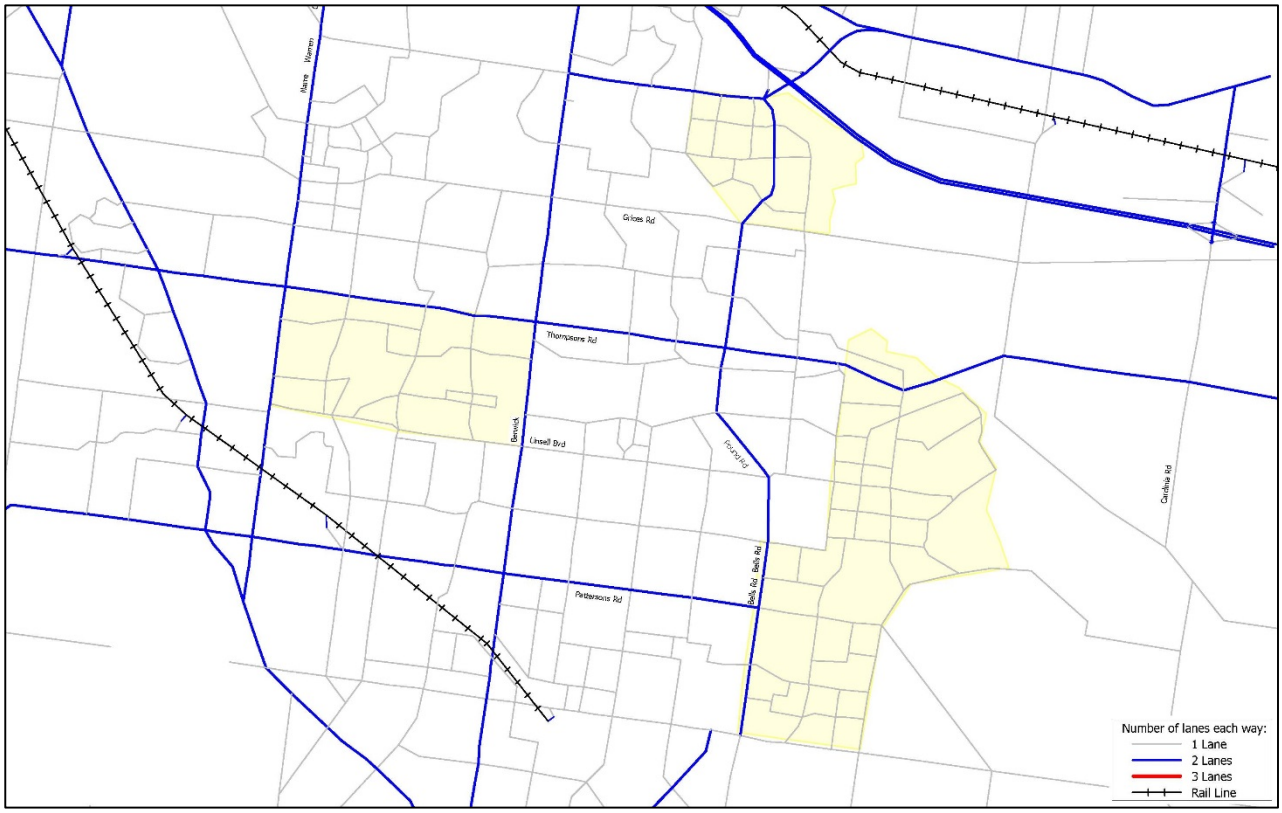


Figure 4-5 Interim (2026) Road Network Coding Changes Proposed by Cardno



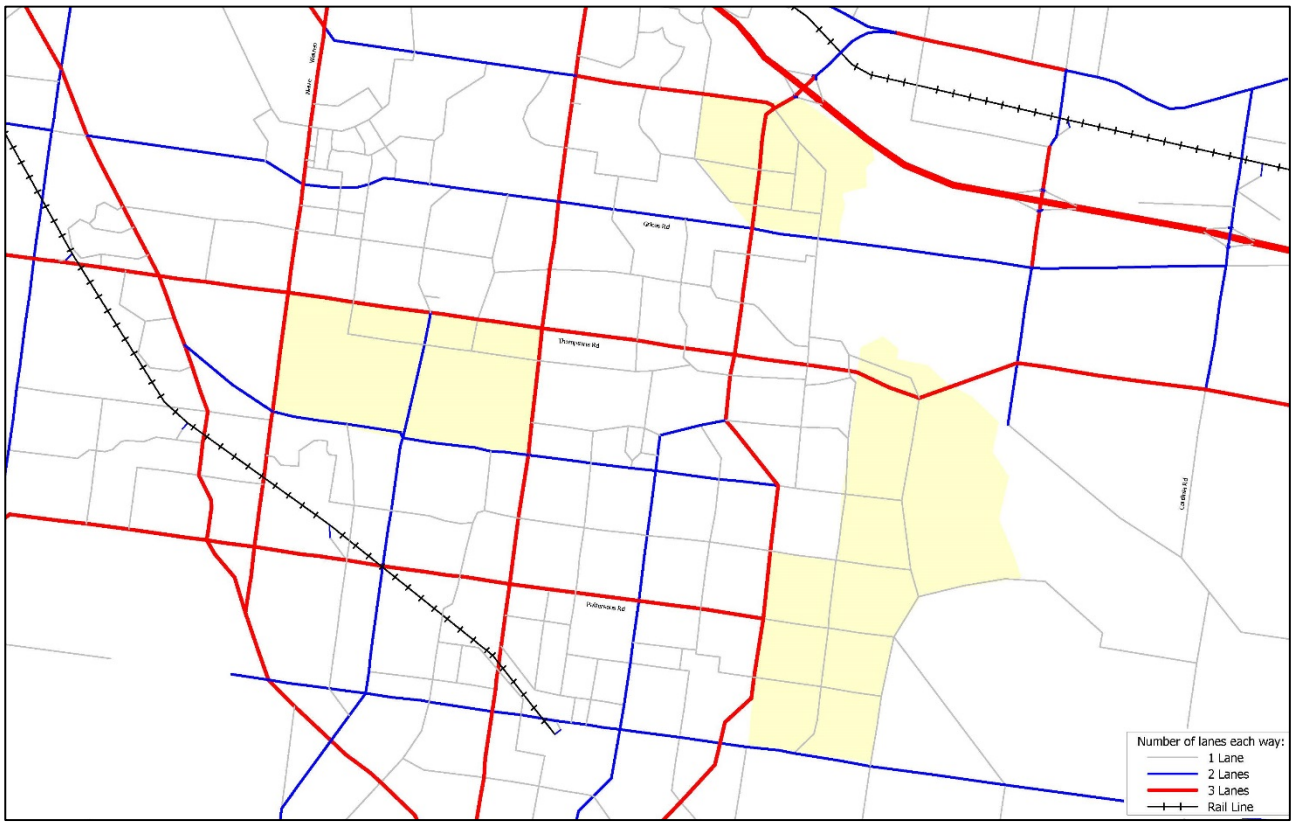
As shown in Figure 4-5, the changes proposed by Cardno generally involve refining the road network for the subject PSP areas to include the proposed Connector Streets. These Connector Streets within the PSP areas were coded with one lane in each direction, with a two-way capacity of 7,000 vehicles per day (vpd).

The AECOM VITM posted speed limit plot and the changes made by Cardno are included in Appendix B. All Connector Streets within the subject PSPs with a posted speed limit of 50km/hr, with a further factor of 0.6 to be modelled to obtain the practical maximum speed on the road.

4.3.3 Ultimate Road Network Review

The ultimate road network included in the AECOM model is shown in Figure 4-6, with enlarged version of the plot included in Appendix B:

Figure 4-6 AECOM Ultimate (2046) Scenario Network Coding



No further changes were undertaken by Cardno to the ultimate road network, other than those previously outlined for the interim scenario.

4.4 Zone System Review

The zone system (interim and ultimate) included in the AECOM model is shown in Figure 4-7, whilst Figure 4-9 to Figure 4-10 show the changes made by Cardno for the purposes of this study. Enlarged versions of these plots, and plots showing the wider study area are included in Appendix E.

The changes made by Cardno include disaggregation of existing zones and refinement to zone centroid connectors so that the centroid connectors connect to midblock sections of the local road network rather than at intersections to better represent “real world” traffic conditions.

Figure 4-7 AECOM Zone System

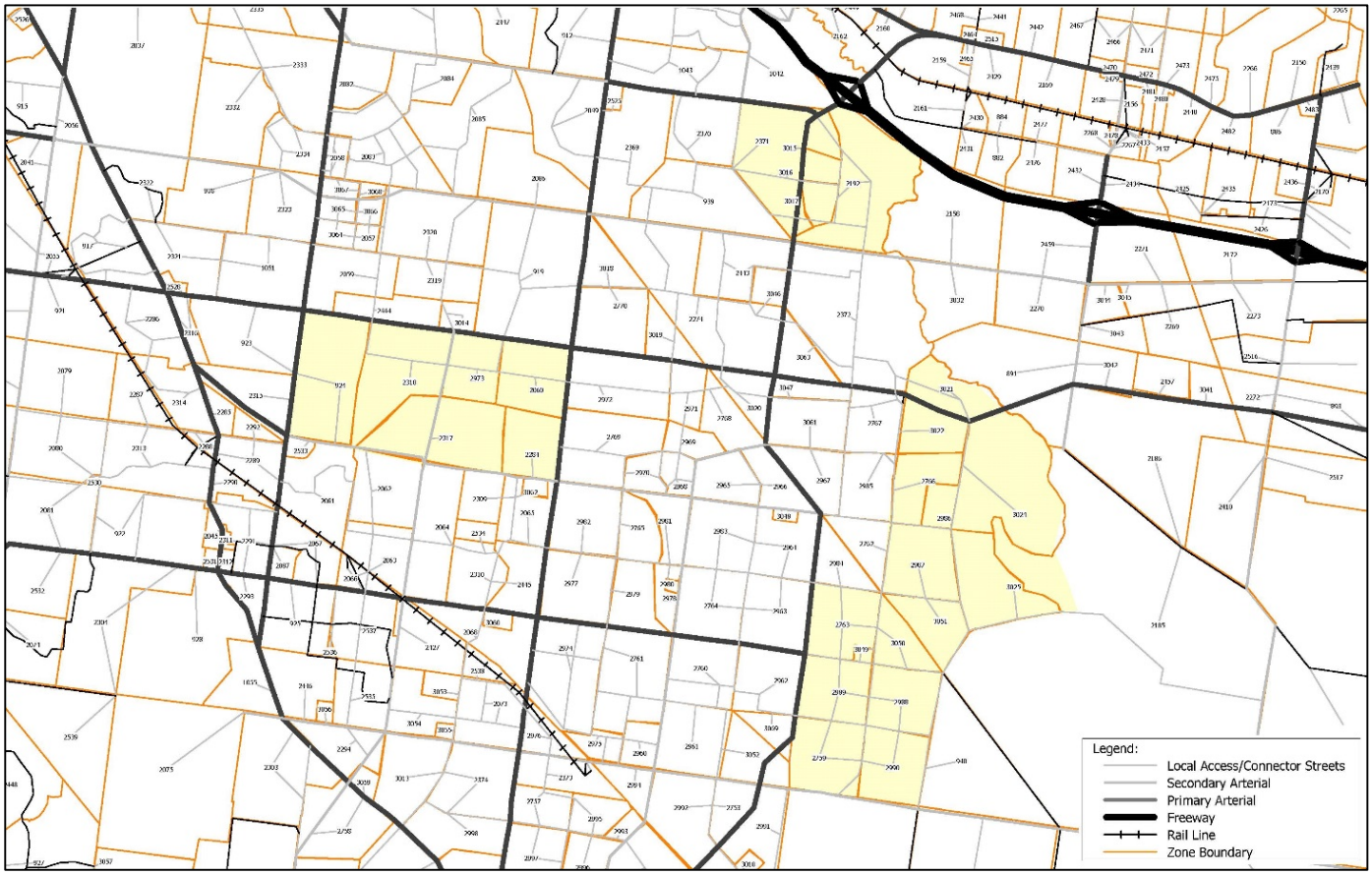
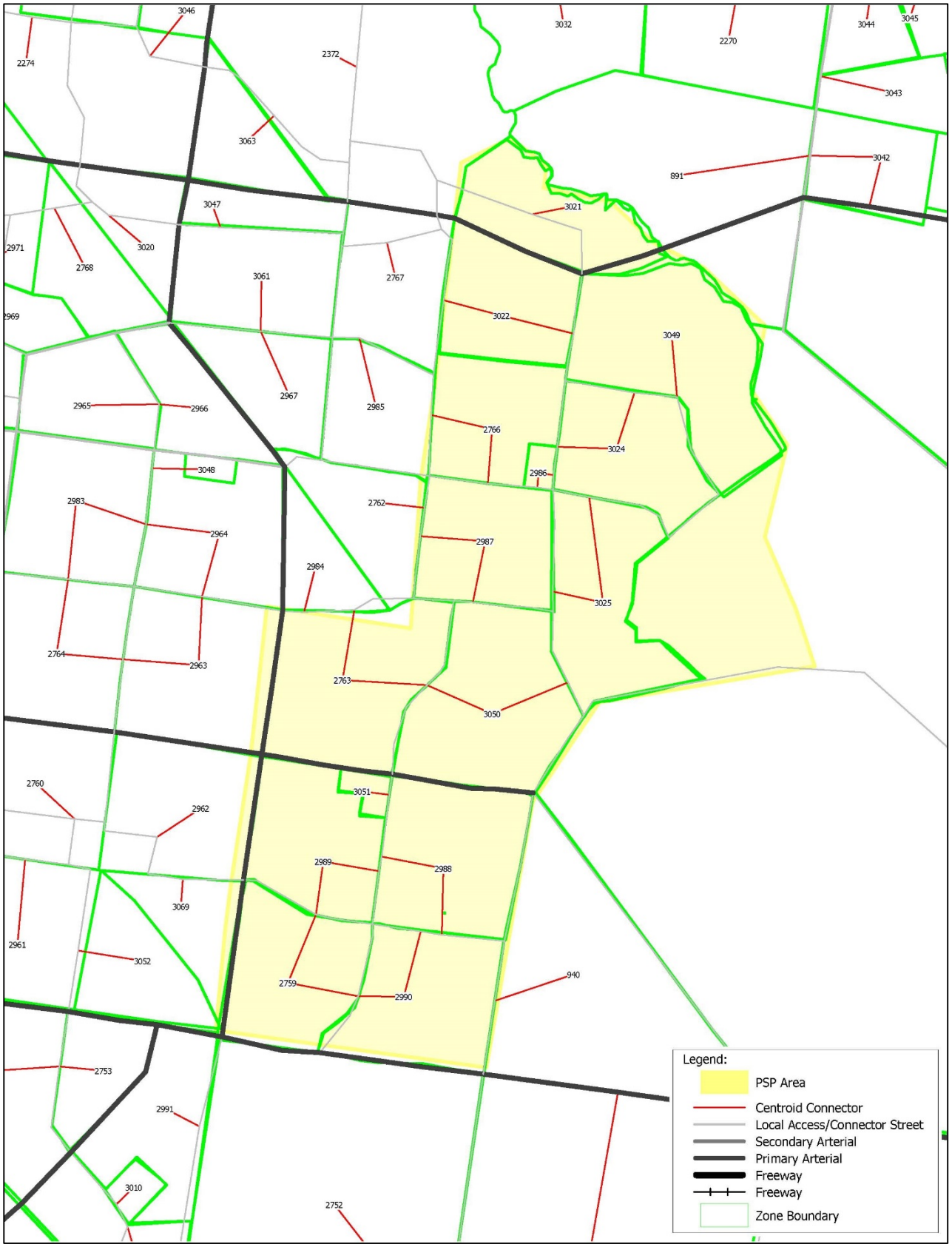
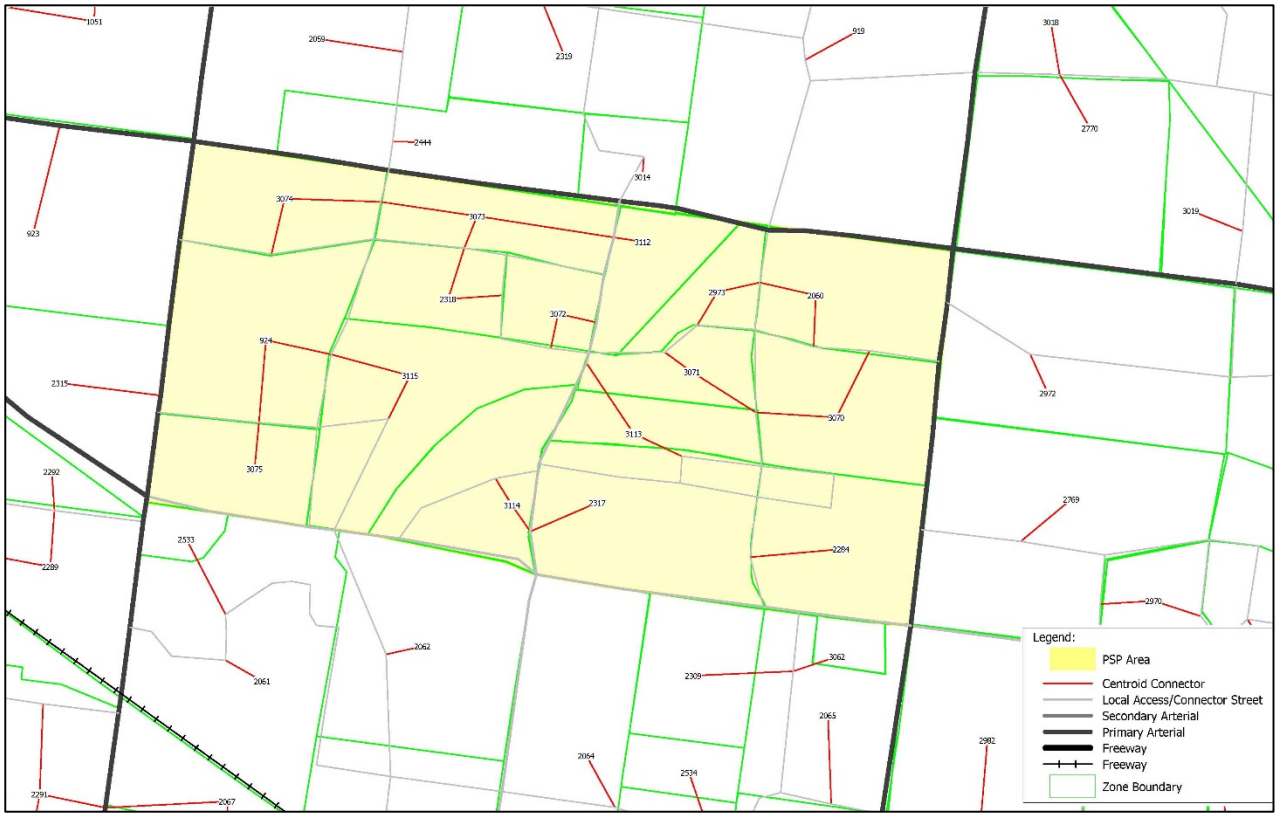


Figure 4-8 Zone System Changes Proposed by Cardno – McPherson (PSP 1055)



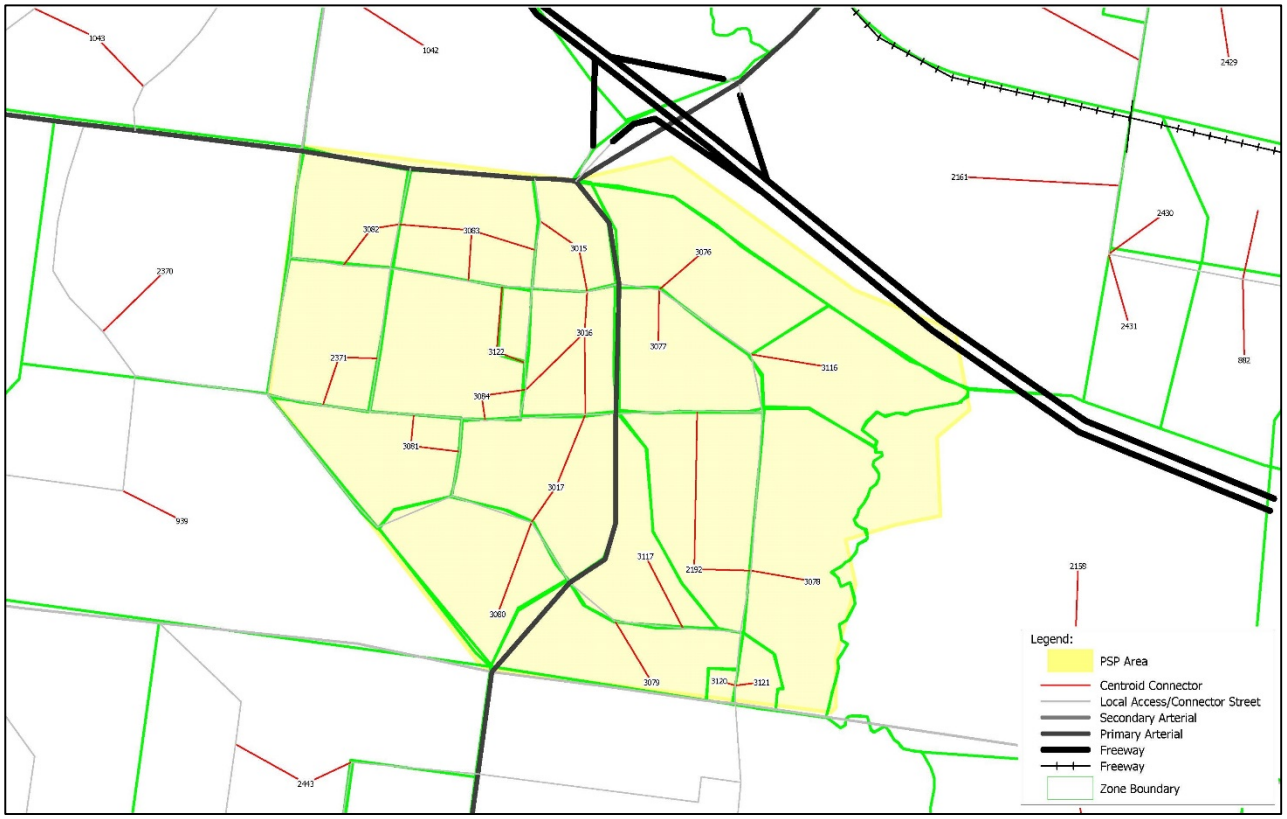
As shown in Figure 4-8, the refinements were made to the zone boundaries McPherson (PSP1055) to better reflect the draft Urban Structure of the PSP, the total number of zones however was not changed.

Figure 4-9 Zone System Changes Completed by Cardno –Croskell (PSP 1051)



As shown in Figure 4-9, Cardno increased the number of zones within the Croskell (PSP 1051) from six zones to sixteen zones to better reflect the draft Urban Structure of the PSP.

Figure 4-10 Zone System Changes Proposed by Cardno – Minta Farm (PSP 11)



As shown in Figure 4-10, Cardno increased the number of zones within the Minta Farm PSP area from five zones to 19 zones to better reflect the draft Urban Structure of the PSP.

4.5 Modelled Land Uses

The anticipated land uses for each of the subject PSPs, as provided by the MPA was previously outlined in Section 2, this data was used as input data into the Cardno VITM. A comparison of the Cardno VITM land use inputs and those included in the AECOM model is shown in Table 4-1. More detail land uses included in the Cardno VITM are included in Appendix D.

Table 4-1 Land Use Refinement

	Population	House Hold	Retail Jobs	Total Jobs	Enrolment
	AECOM Model				
McPherson PSP	26,896	9,766	286	1,678	2,850
Croskell PSP	5,797	2,141	0	3,114	430
Minta Farm PSP	4,823	1,862	442	11,569	0
	Cardno Refinements				
McPherson PSP	35,006	12,502	667	1,042	2,453
Croskell PSP	5,353	2,161	2,341	5,066	0
Minta Farm PSP	8,067	2,970	1,124	10,229	451

5 Ultimate Modelling Results

5.1 Introduction

An assessment of the PSP transport demands and network performance has now been undertaken for the ultimate scenario. The outcomes from modelling are summarised in this section.

5.2 Review of VITM Traffic Generation

In order to confirm that VITM was producing realistic levels of traffic generation for the subject PSP areas, the VITM generations were compared to a first principles assessment of the traffic generation for the PSP areas.

5.2.1 VITM Traffic Generation

Table 5-1 below summarises the land use inputs and resulting traffic generation for the subject PSP area.

Table 5-1 Ultimate Scenario VITM Trip Generation Summary (Year 2046)

PSP	Land Use					AM 1-hr. Trips [1]	PM 1-hr. Trips[1]	Daily Vehicle Trips
	Residential (Households)	Retail (Jobs)	Non - Retail	Employment (Jobs)	School (Enrolments)			
McPherson PSP	12,502	667	375	1,042	2,453	8,446	10,520	101,417
Croskell PSP	2,161	2,341	2,725	5,066	-	2,958	4,494	45,303
Minta Farm PSP	2,970	1,124	9,105	10,229	451	4,232	5,456	54,746

[1] 1- hour peak volumes were derived by applying a 0.55 factor to the VITM 2 hour peak outputs

The results shown in Table 5-1 indicate that the daily VITM trip generation for the Croskell PSP is comparable to the level of the Minta Farm PSP, even though the Minta Farm PSP includes a notably higher level of total jobs. This difference is attributed to the retail area within in the Croskell PSP generating shopping trips throughout the day.

5.2.2 First Principles Generation Rates

A summary of the modelled land uses and the resulting first principles traffic generation is provided in Table 5-2.

Table 5-2 First Principles Traffic Generation - Ultimate Scenario (Year 2046)

PSP	Land Use	Yield	Traffic Generation Rate			Reduction Factor for Internal Trips	Resultant Trips		
			AM (1hr)	PM (1hr)	Daily		AM (1hr)	PM (1hr)	Daily
McPherson PSP	Residential [1]	12,502 dwellings	0.8 trips/household	0.8 trips/household	10.0 trips/household	25% [1]	7,501	7,501	93,765
	Retail (jobs) [2]	667 jobs	1.5 trips/ 3 jobs	4.6 trips / 3 jobs	50 trips / 3 jobs	20% [4]	267	818	8,893
	Other Employment (jobs) [3]	375 jobs	1.0 trips / 5 jobs	2.0 trips / 5 jobs	10 trips / 5 jobs	25% [4]	56	113	563
	School [5]	2,453 students	0.75 trips/ student	0.25 trips/ student	1.5 trips/ student	n/a	1,840	613	3,680
Total							**9,664**	**9,045**	**106,900**
Croskell PSP	Residential	2,161 dwellings	0.8 trips/household	0.8 trips/household	10.0 trips/household	25% [1]	1,297	1,297	16,208
	Retail (jobs)	2,341 jobs	1.5 trips/ 3 jobs	4.6 trips / 3 jobs	50 trips / 3 jobs	20% [4]	936	2,872	31,213
	Other Employment (jobs)	2,725 jobs	1.0 trips / 5 jobs	2.0 trips / 5 jobs	10 trips / 5 jobs	25% [4]	409	818	4,088
	School	0 students	0.75 trips/ student	0.25 trips/ student	1.5 trips/ student	n/a	-	-	-
Total							**2,642**	**4,986**	**51,508**
Minta Farm PSP	Residential	2,970 dwellings	0.8 trips/household	0.8 trips/household	10.0 trips/household	25% [1]	1,782	1,782	22,275
	Retail (jobs)	1,124 jobs	1.5 trips/ 3 jobs	4.6 trips / 3 jobs	50 trips / 3 jobs	20% [4]	450	1,379	14,987
	Other Employment (jobs)	9,105 jobs	1.0 trips / 5 jobs	2.0 trips / 5 jobs	10 trips / 5 jobs	25% [4]	1,366	2,732	13,658
	School	451 students	0.75 trips/ student	0.25 trips/ student	1.5 trips/ student	n/a	338	113	677
Total							**3,936**	**6,005**	**51,596**

1) Daily rate based on VISTA 09 data for the Casey LGA, peak hour rates are based on empirical data for comparable sites. A reduction factor of 25% has been applied to account for inter-zonal trips
2) Retail daily rate sourced from the RTANSW "Guide to Traffic Generating Developments" report (dated October 2002) with PM peak hour rate assumed to be 10% of the daily rate. An AM rate of 0.5 trips/100sqm has been adopted for service vehicle movements given that the LTC will not be fully operational during the AM peak hour. A rate of 3 jobs per 100sqm has been adopted for this assessment.
3) Office and commercial daily rate sourced from the RTANSW "Guide to Traffic Generating Developments" report (dated October 2002) with PM peak hour rate assumed to be 20% of the daily rate. An AM rate equal PM has been adopted given that normal office/commercial should have movement same as PM peak hour. A rate of 5 jobs per 100sqm has been adopted for this assessment.
4) Based on Section 3.3 of the RTANSW "Guide to Traffic Generating Developments" report. It is assumed that 25% of all trips within the PSP will be internal to the zone given that the PSP includes a number of LTC's and schools.
5) Based on a first principles assessment

It is highlighted that the first principles assessment outlined above takes into consideration the results of the Victorian Integrated Survey of Travel and Activity 2009 (VISTA09) undertaken by the former Department Transport Planning and Local Infrastructure (DTPLI). VISTA09 is a comprehensive survey of how, when and why Victorians travel and is both more recent and location-specific than most other available empirical data sources. The average VISTA09 traffic generation rate of 10.0 movements per dwelling for the Casey LGA is higher than other empirical data sources which generally have a daily generation rate in the order of 7-9 vehicle movements per dwelling.

5.2.3 Comparison of VITM and First Principles Volume Analysis

A comparison of VITM trip generation and first principles generation is provided in Table 5-3. This assessment compares the modelled traffic volume outputs from VITM to commonly used generation rates as means of confirming that VITM is generating realistic traffic demands.

Table 5-3 VITM versus First Principles Assessment

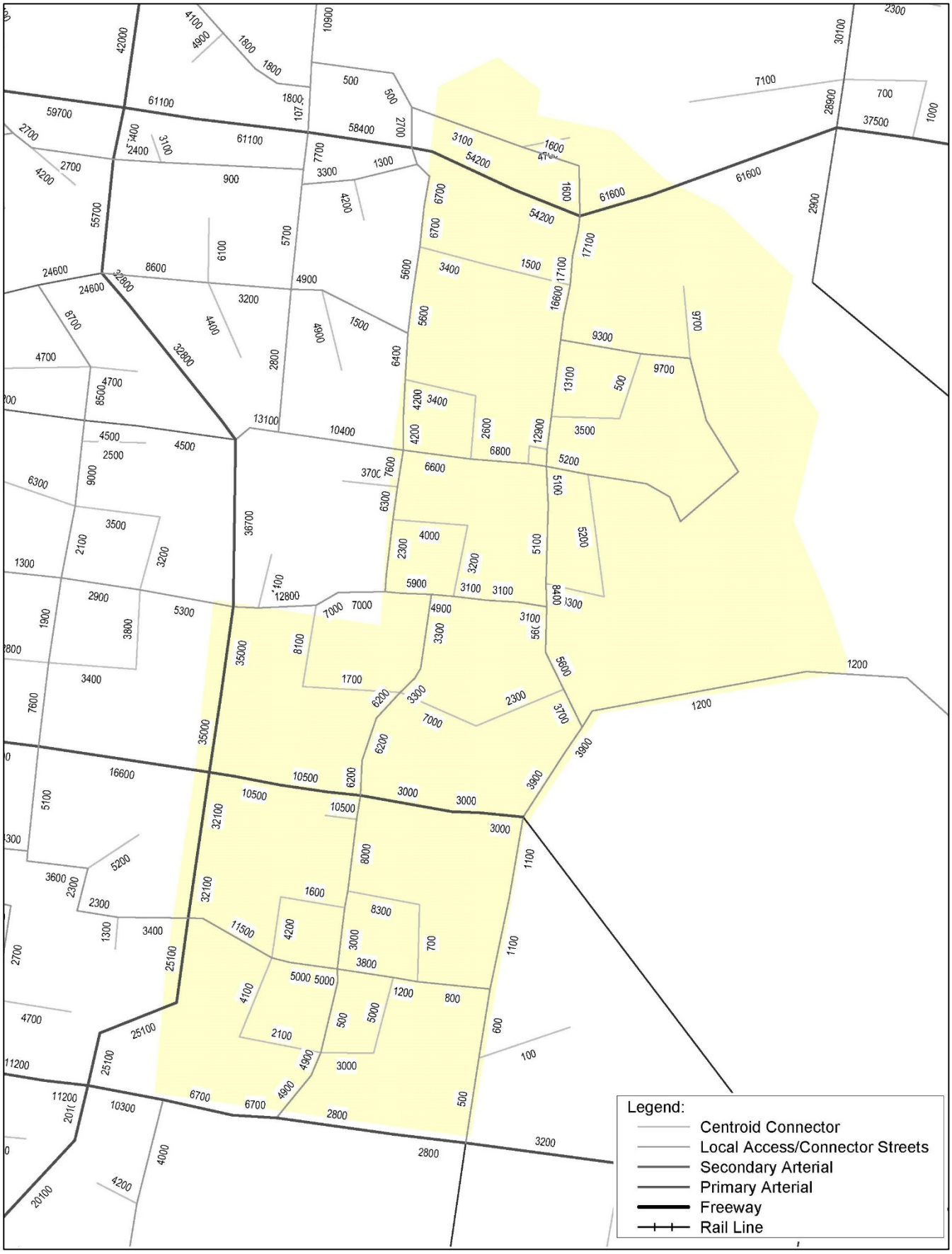
PSP	Traffic Volumes	AM Peak	PM Peak	Daily
McPherson	VITM	8,446	10,520	101,417
	First Principle Assessment	9,664	9,045	106,900
	% Difference	14%	-14%	5%
Croskell	VITM	2,958	4,494	45,303
	First Principle Assessment	2,642	4,986	51,508
	% Difference	-11%	11%	14%
Minta Farm	VITM	4,232	5,456	54,746
	First Principle Assessment	3,936	6,005	51,596
	% Difference	-7%	10%	-6%

Table 5-3 indicates that the VITM road network demands are comparable (within 15%) to those of the first principles assessment for all of the subject PSPs, noting that some land use rates VITM is forecasting traffic demand to an appropriate level given the strategic nature of the model.

5.3 McPherson (PSP 1055)

The daily volume VITM plot for the McPherson (PSP 1055) is outlined in Figure 5-1, with the AM and PM peak outputs included in Appendix E (which also includes a wider-area daily output plot).

Figure 5-1 Daily VITM Plot – McPherson (PSP 1055)



Further discussion on the VITM daily volumes is provided in the following sub sections:

5.3.2 North-south Volumes

Figure 5-1 indicates that the proposed north-south Connector Street provisions within the PSP are generally sufficient, with the modelled daily volumes generally reflective of a Connector Street (i.e. in the order of 3,000 – 7,000 vpd).

It is however noted immediately to the south of Thompsons Road that the north-south Connector Street within the PSP is expected to carry some 17,000vpd, and that to its west Smiths Lane is expected to carry some 6,700vpd.

The volumes on the north-south Connector Street are higher than those on Smiths Lane as a result of it providing a more direct connection to Thompsons Road from the residential area in McPherson that is adjacent to Cardinia Creek. The volumes on this north-south Connector Street, although greater than the upper desirable limit for a Connector Street (i.e. 7,000vpd) are still within the theoretical capacity of a two-way, two-lane road[1].

Additional capacity could be provided on the north-south Connector Street or measures to increase the use of Smiths Lane over the north-south Connector Street (for example, turning or signal phasing restrictions at the intersection of the north-south Connector Street and Thompsons Road) could be implemented to manage and balance the expected north-south vehicle movements.

5.3.3 East-west Volumes

Figure 5-1 indicates that the east-west Connector Streets within the PSP are generally expected to carry volumes reflective of a Connector Street (i.e. in the order of 3,000 – 7,000 vpd).

It is however noted that Figure 5-1 indicates that VITM predicts that the southern-most east-west Connector Street will carry in the order of 11,500vpd near Bells Road. It is however highlighted that the draft Urban Structure for the PSP includes an east-west Access Street to the north of Ballarto Road which is not included in VITM. This Access Street is expected to redistribute up to some 3,000vpd away from the southern-most east-west Connector Street resulting in the daily volumes on this road generally being reflective of a Connector Street, noting that additional capacity will be needed at the intersection with Bells Road.

Figure 5-1 also indicates that VITM predicts that the east-west Connector Street to the north of Patterson Road will carry some 16,100vpd near Bells Road, and that Patterson Road will carry some 10,600 vpd near Bells Road. The distribution of more traffic to east-west Connector Street rather than Patterson Road is attributed to the strategic nature of VITM and the manner in which traffic exiting zones favours centroid connectors closer to their desired destination. In practice the volumes on Patterson Road are expected to be greater than those on the east-west Connector Street. The daily volumes on the east-west Connector Street are therefore expected to be reflective of a Connector Street (i.e. in the order of 7,000vpd) given that the draft Urban Structure for the PSP also includes an east-west Access Street between the two roads which is not included in VITM.

In addition Figure 5-1 indicates that the northern-most east-west Connector Street will carry in the order of 10,300vpd to the west of Smiths Lane as a result of vehicles gravitating towards the Bells Road Arterial Road. Whilst the daily volume is higher than the desirable upper limit for a Connector Street (7,000vpd), the volumes are still within the theoretical capacity of a two-way, two-lane road and do not warrant the need for an Arterial Road connection.

[1] Austroads Standards "Guide to Traffic Management –Part 3 Traffic Studies and Analysis" document which provides guidance on the daily traffic carrying capacity of urban roads. The daily capacity limits set out in this Austroads document are summarised as follows:

Road Type	Theoretical Daily Capacity (vehicles per day)
2-lane road	18,000 vpd
4-lane road	36,000 vpd
6- lane road	54,000 vpd

5.4 Croskell (PSP 1051)

The daily volume VITM plot for the Croskell (PSP 1051) is outlined in Figure 5-2 with the AM and PM peak outputs included in Appendix G (which also includes a wider-area daily output plot)

Figure 5-2 Daily VITM Plot – Croskell (PSP 1051)

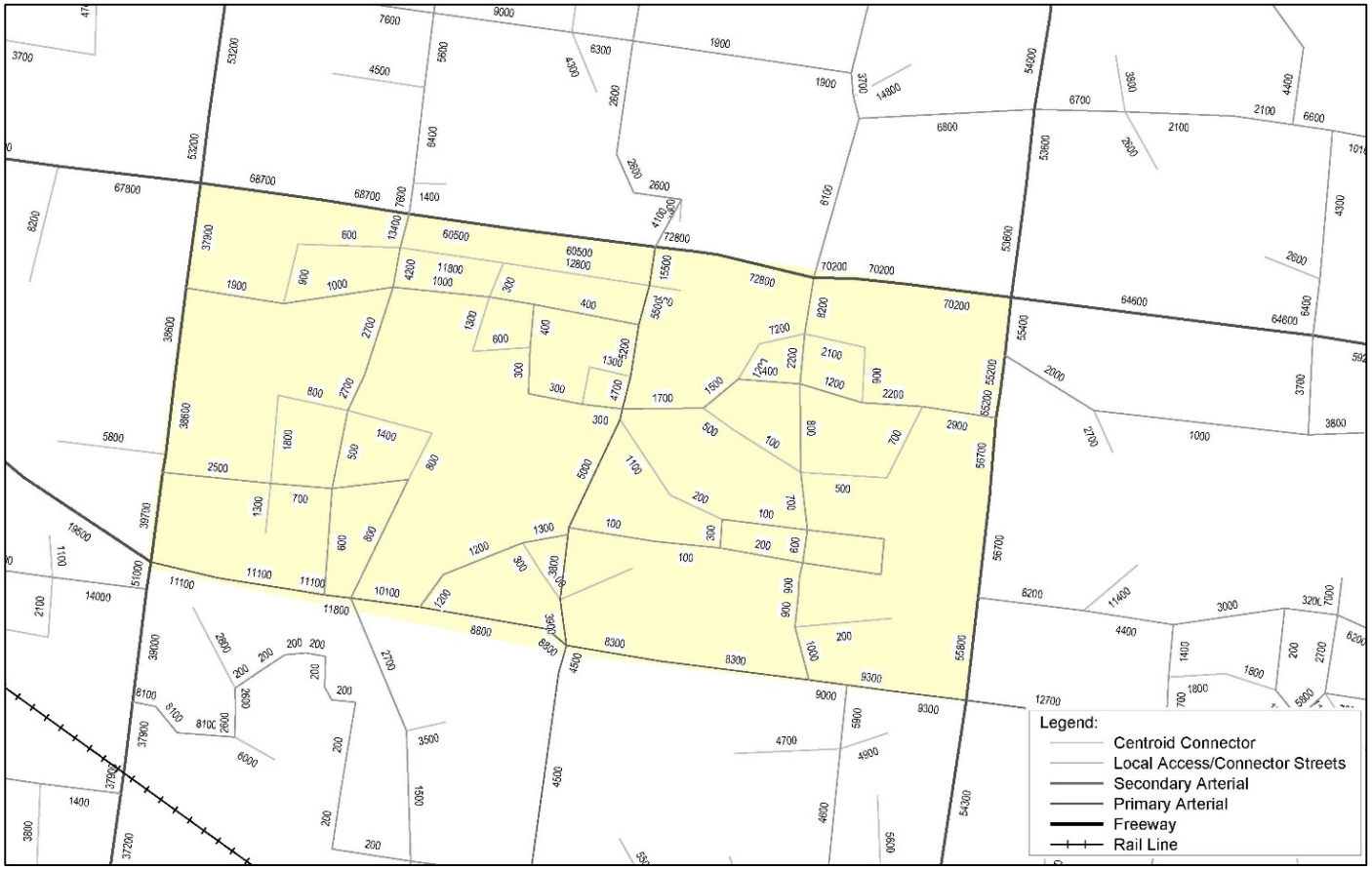


Figure 5-2 indicates that the proposed Connector Street network within the PSP is sufficient to cater for the anticipated traffic volumes. Additional capacity will however be required at the intersections of all three north-south Connector Streets and Thompsons Road to cater for the anticipated traffic volumes.

5.5 Minta Farm (PSP 11)

The daily volume VITM plot for the Minta Farm (PSP 11) is outlined in Figure 5-3, with the AM and PM peak outputs included in Appendix G (which also includes a wider-area daily output plot)

Figure 5-3 Daily VITM Plot – Minta Farm (PSP 11)

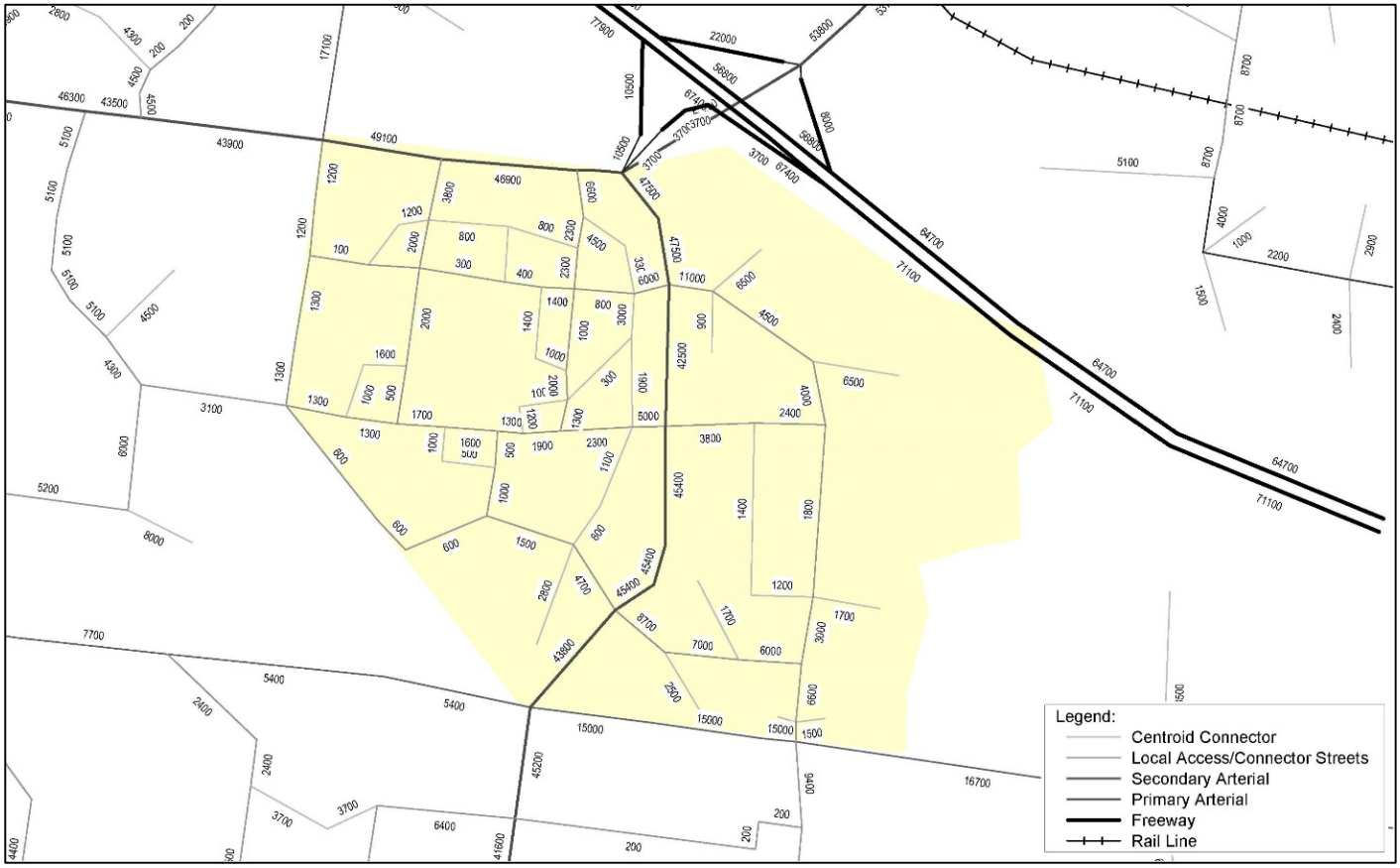


Figure 5-3, indicates that the proposed Arterial Road and Connector Street network within the PSP is sufficient cater for the anticipated traffic volumes.

6 Summary and Conclusions

6.1 Summary

Cardno has now completed ultimate scenario (2046) modelling for the McPherson (PSP 1055), Croskell (PSP 1051) and Minta Farm (PSP 11) precincts.

Having refined the traffic model to reflect the expected land use and network scenarios, Cardno ran the model to provide 2046 ultimate traffic volume outputs. The outputs of the VITM analysis were then compared to a first principles traffic generation demand assessment which showed that VITM was suitably forecasting traffic demand for the subject PSPs.

A summary of the VITM assessments for each PSP is summarised as follows:

McPherson (PSP 1055)

The east-west Connector Streets within the PSP are expected to carry volumes reflective of a Connector Street, with volumes expected to increase near the intersection with Smiths Lane indicating the need for additional capacity at the intersections.

The north-south Connector Street provisions within the PSP are also generally sufficient. It is however noted immediately to the south of Thompsons Road that the north-south Connector Street within the PSP is expected to carry some 17,000vpd and that to its west, Smiths Lane is expected to carry some 6,700vpd.

The volumes on the north-south Connector Street are higher than those on Smiths Lane as a result of it providing a more direct connection to Thompsons Road from the residential area in McPherson that is adjacent to Cardinia Creek. The volumes on this north-south Connector Street, although greater than the upper desirable limit for a Connector Street (i.e. 7,000vpd) are still within the theoretical capacity of a two-way, two-lane road.

Additional capacity could be provided on the north-south Connector Street or measures to increase the use of Smiths Lane over the north-south Connector Street (for example, turning or traffic signal phasing restrictions at the intersection of the north-south Connector Street and Thompsons Road) could be implemented to manage and balance the expected north-south vehicle movements.

Croskell (PSP 1051)

The proposed Connector Street network within the PSP is suffice for catering for the anticipated traffic volumes. Additional capacity will however be required at the intersections of all three north-south Connector Street and Thompsons Road to cater for the anticipated traffic volumes.

Minta Farm (PSP 11)

The proposed Arterial Road and Connector Street network within the PSP is sufficient to cater for the anticipated traffic volumes.

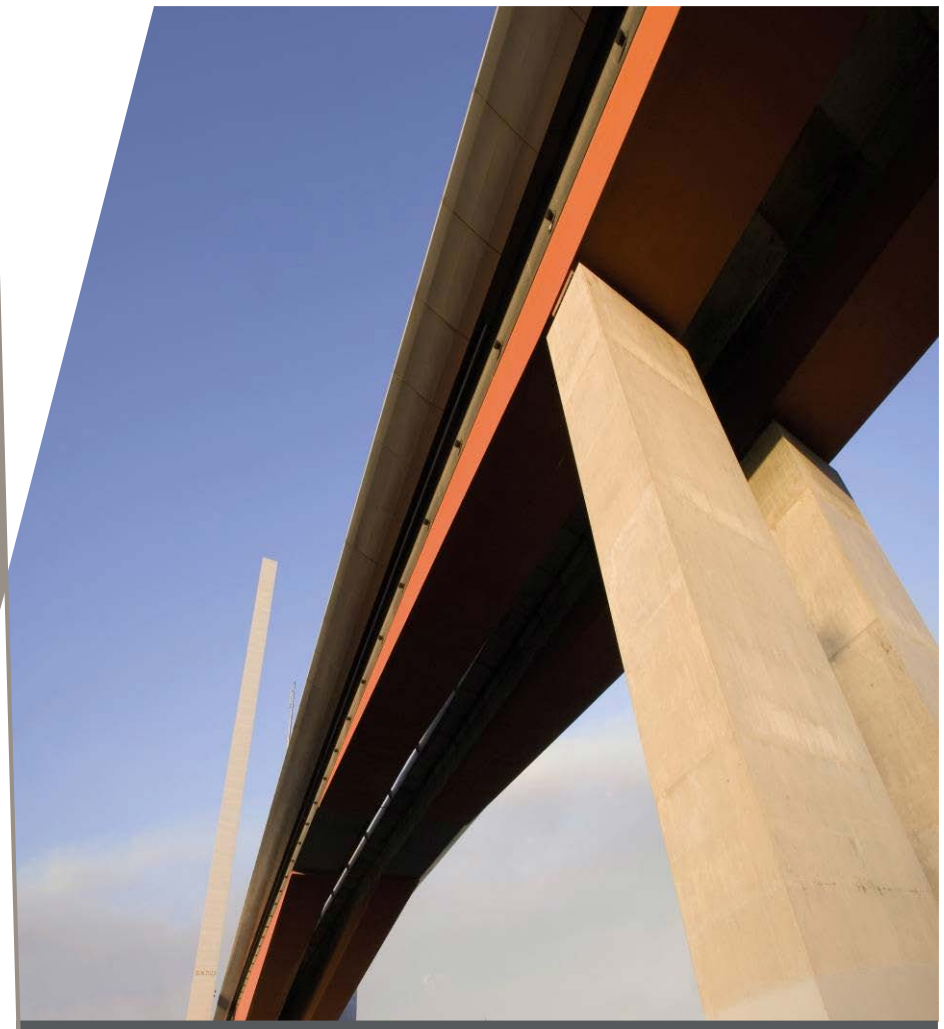
6.2 Conclusions

Consultation on the ultimate scenario modelling outcomes with VicRoads and the City of Casey was undertaken in July 2015. This process considered the need to complete the interim (2026) modelling for the purpose of informing functional layout plans for the required intersections within the PSP areas. Given the current application of template intersections from the Growth Area Road Network Planning Guidance and Policy Principles it was agreed that interim modelling was no longer required.

McPherson, Croskell and Minta Farm Precincts

APPENDIX A

DRAFT URBAN STRUCTURES



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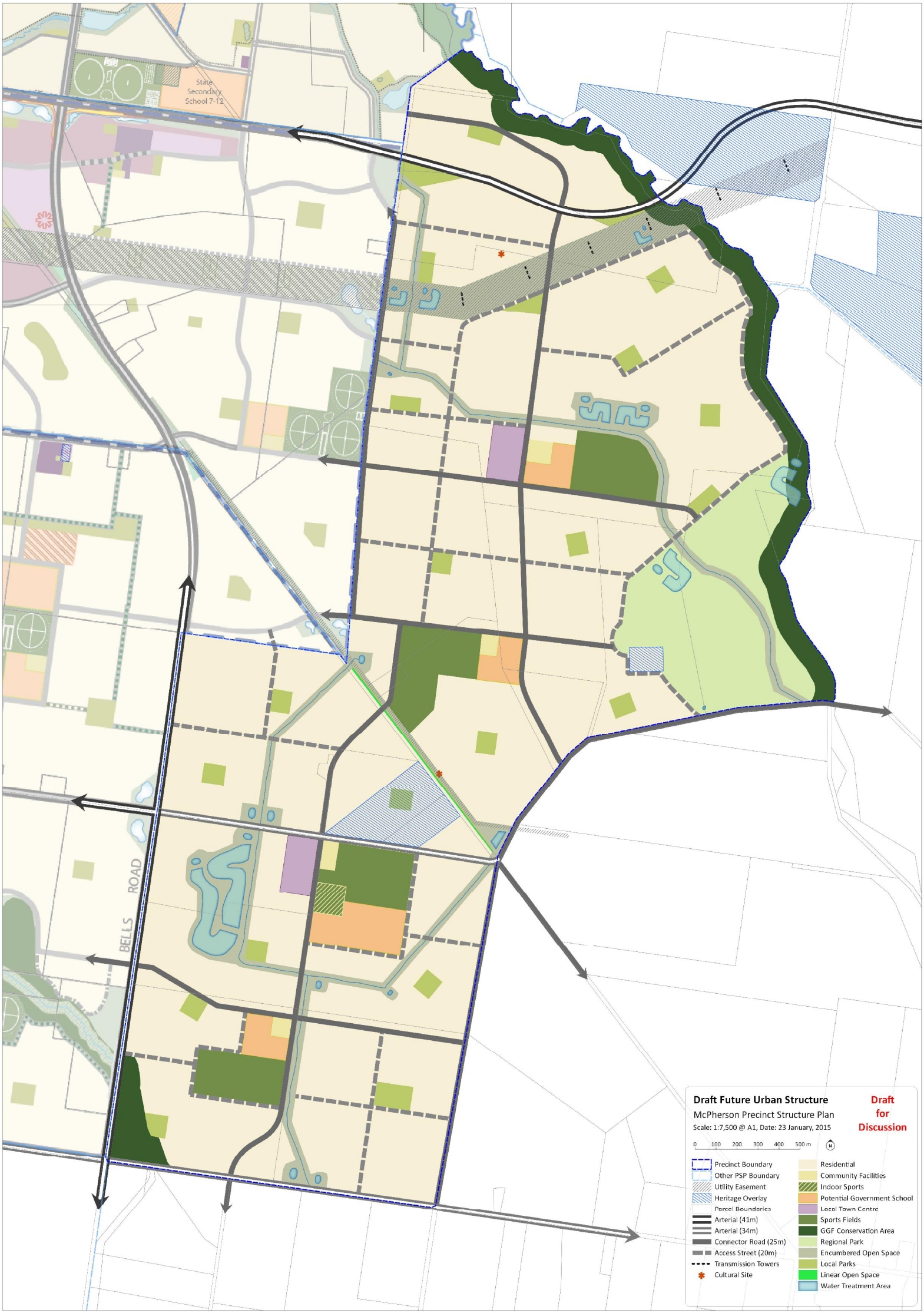
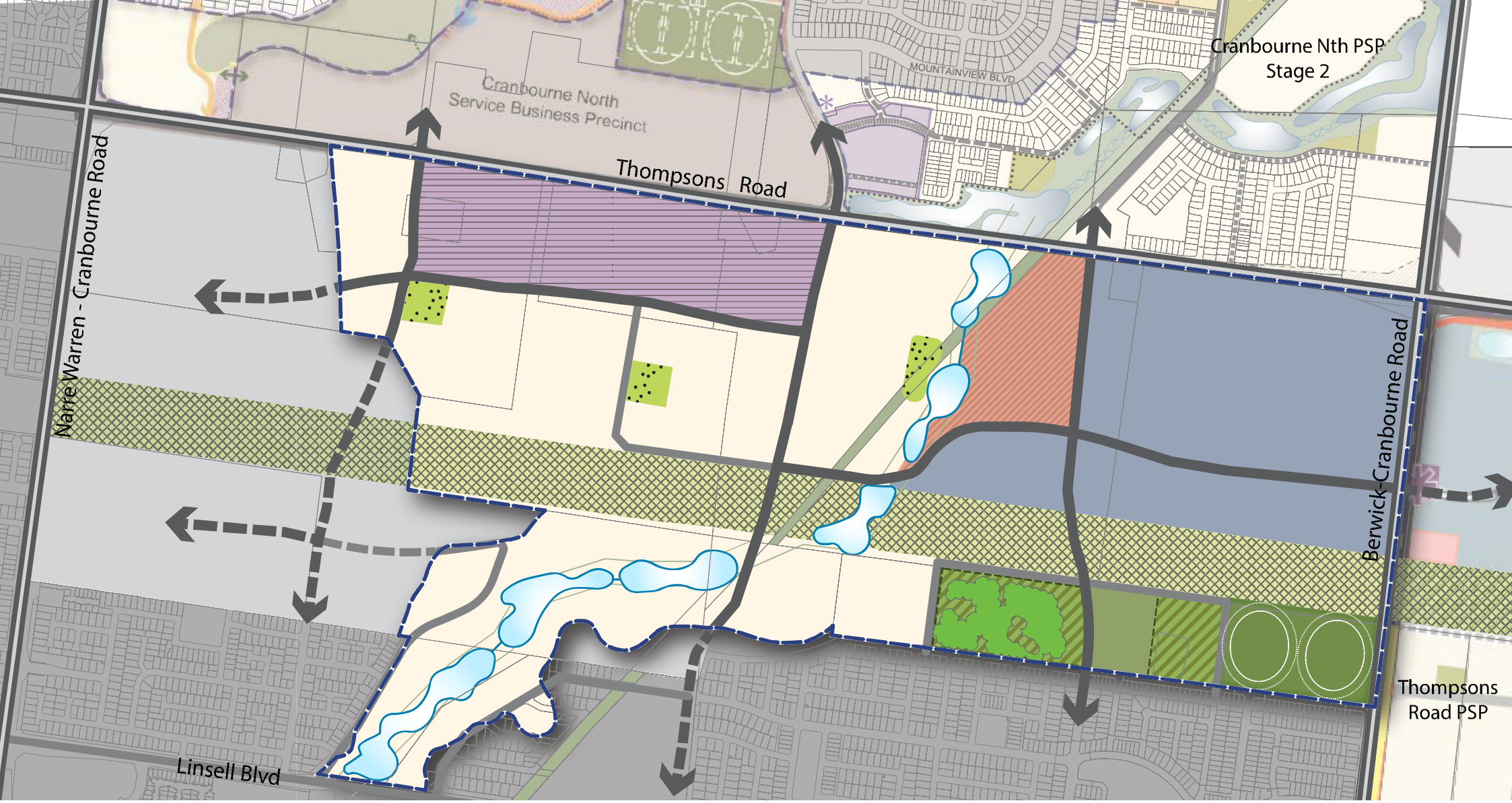

State Secondary School 7-12
BELLS ROAD
Draft Future Urban Structure
McPherson Precinct Structure Plan
Scale: 1:7,500 @ A1, Date: 23 January, 2015
Draft for Discussion
0 100 200 300 400 500 m
Precinct Boundary
Other PSP Boundary
Utility Easement
Heritage Overlay
Parcel Boundaries
Arterial (41m)
Arterial (34m)
Connector Road (25m)
Access Street (20m)
Transmission Towers
Cultural Site
Residential
Community Facilities
Indoor Sports
Potential Government School
Local Town Centre
Sports Fields
GGF Conservation Area
Regional Park
Encumbered Open Space
Local Parks
Linear Open Space
Water Treatment Area



- precinct area
- commercial
- industrial
- mixed use
- residential
- local sporting reserve
- local parks (unencumbered)
- drainage open space tbc
- conservation area
- power easement
- primary arterial road
- connector street
- local access street
- existing urban
- future urban

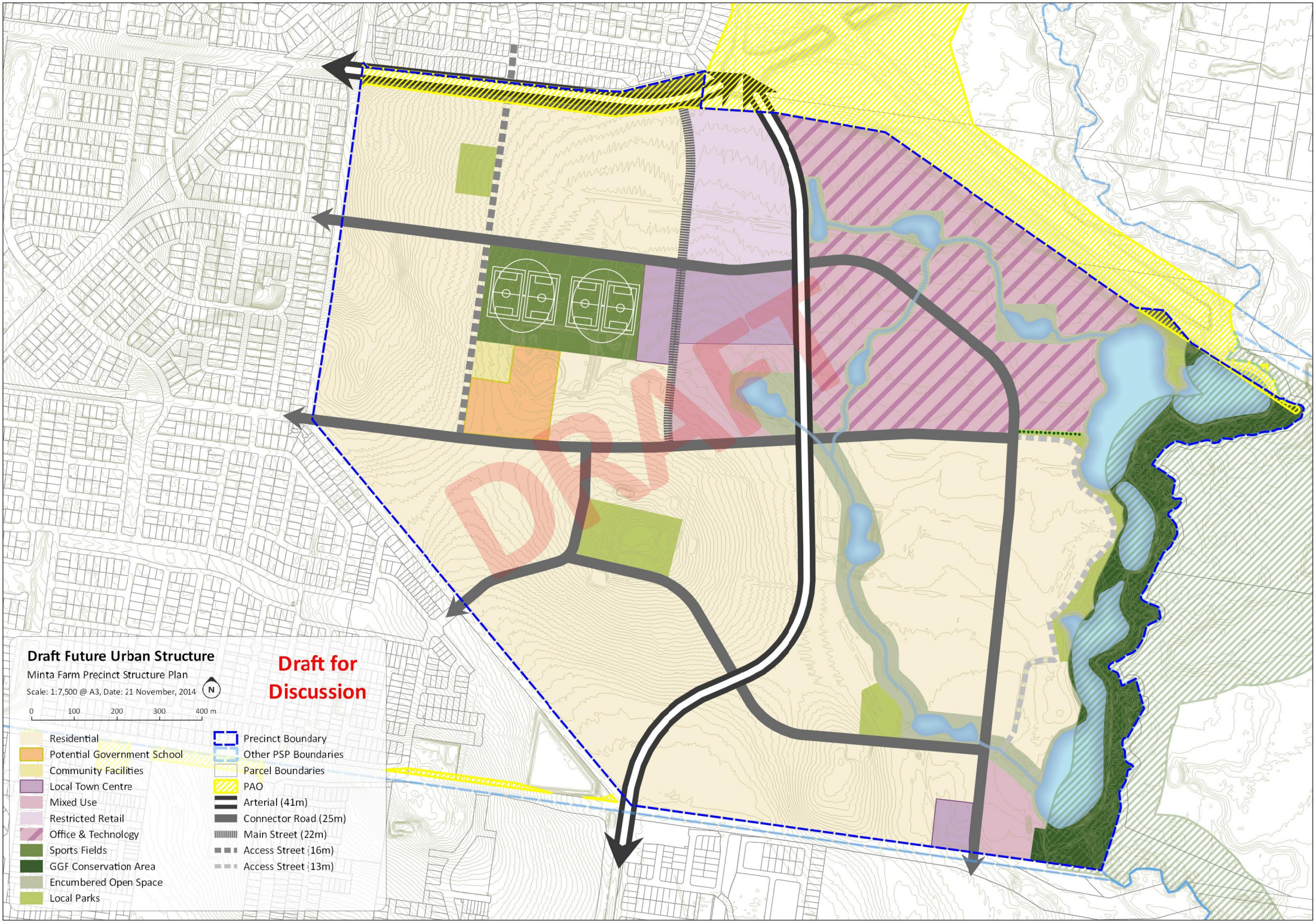
Plan 2_Future Urban Structure
croskell precinct structure plan

DRAFT - subject to revision

1:12,500 @ A4 V141112

0 100 200 300 400 500m

N


Draft Future Urban Structure
Minta Farm Precinct Structure Plan
Scale: 1:7,500 @ A3, Date: 21 November, 2014
N
0
100
200
300
400 m
Draft for Discussion
Residential
Potential Government School
Community Facilities
Local Town Centre
Mixed Use
Restricted Retail
Office & Technology
Sports Fields
GGF Conservation Area
Encumbered Open Space
Local Parks
Precinct Boundary
Other PSP Boundaries
Parcel Boundaries
PAO
Arterial (41m)
Connector Road (25m)
Main Street (22m)
Access Street (16m)
Access Street (13m)
DRAFT

McPherson, Croskell and Minta Farm Precincts

APPENDIX B

VITM ULTIMATE ROAD NETWORK REVIEW

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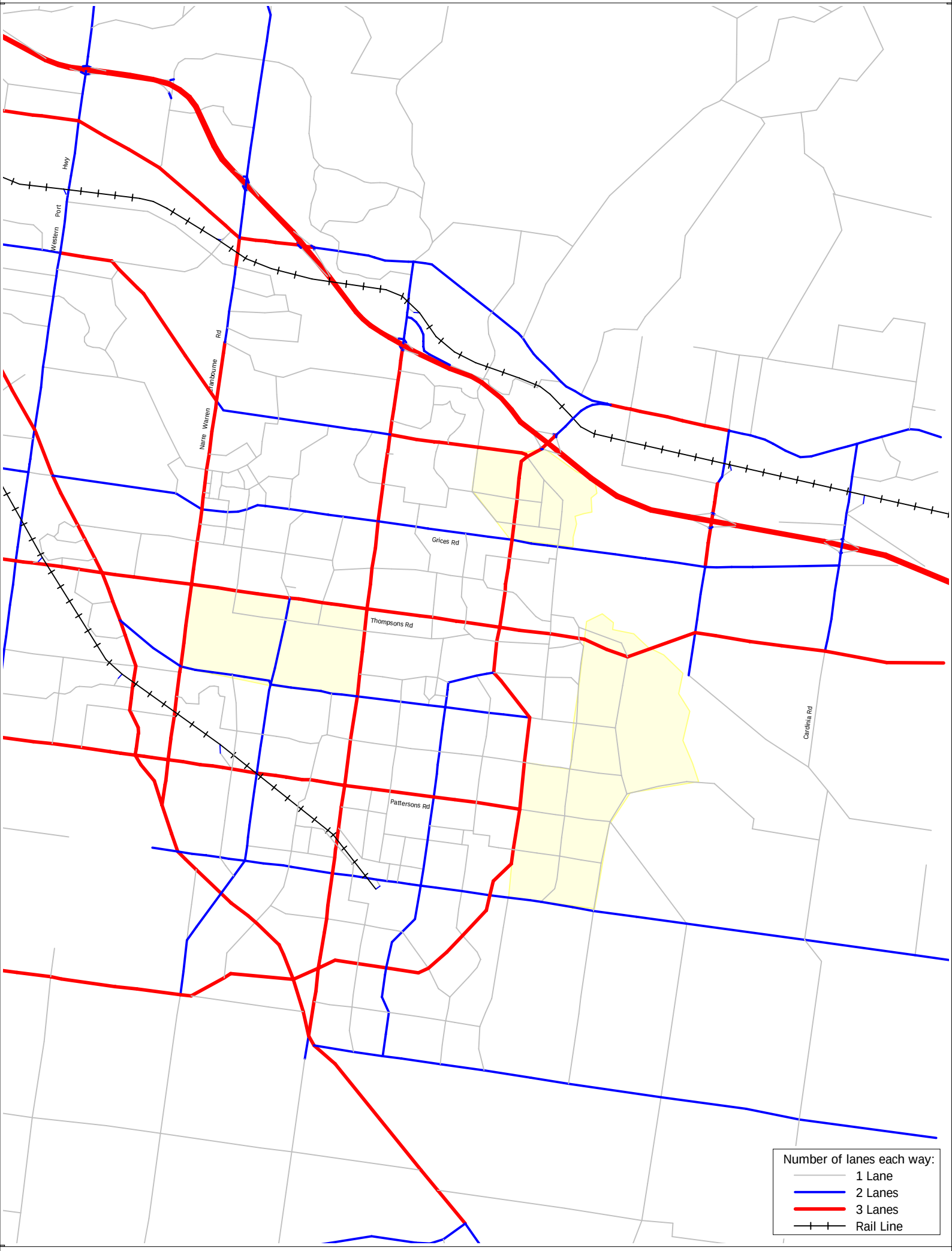
Victorian Integrated Transport Model - South East Growth Corridor Model
2046 AECOM Model - Number of Lanes



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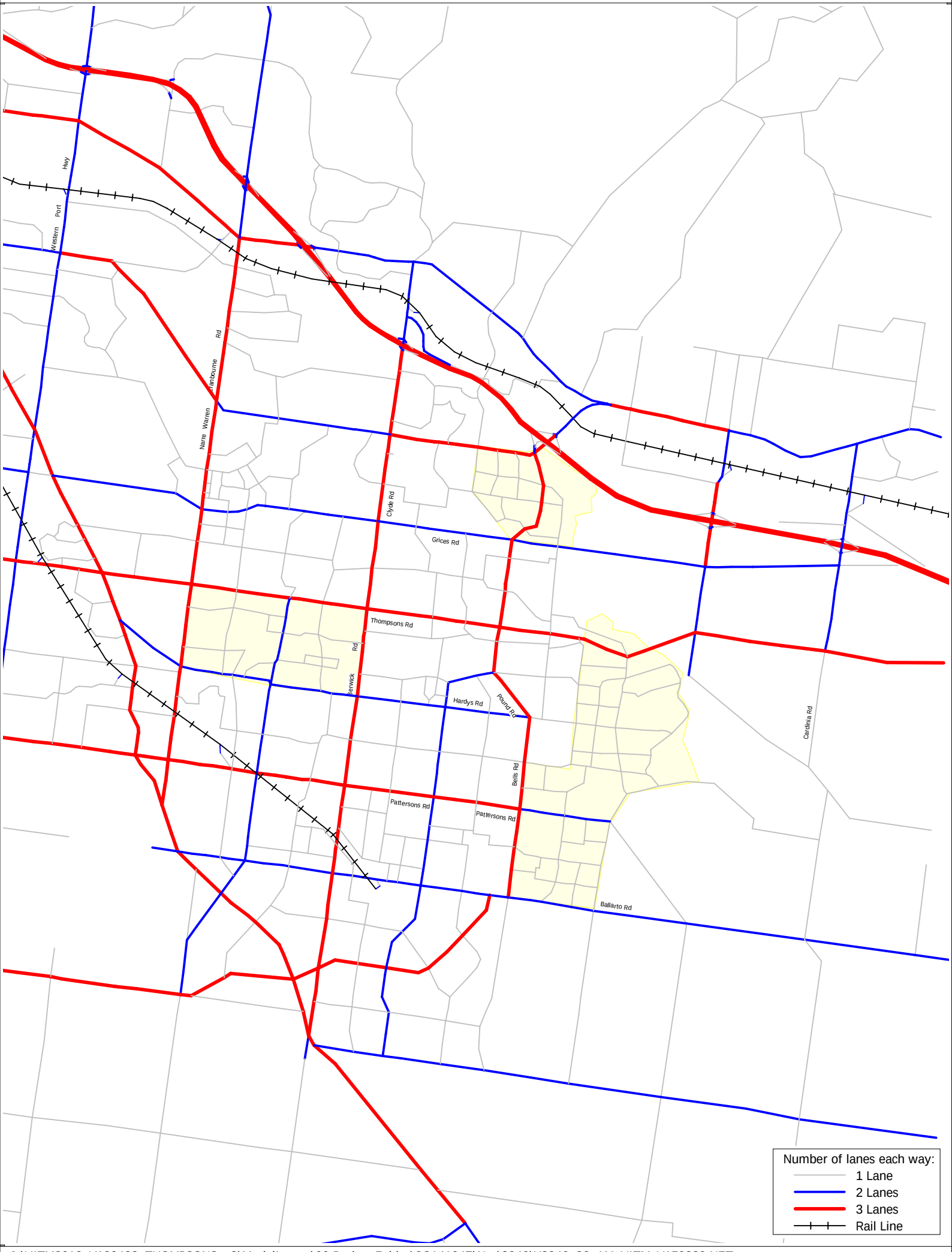
3/02/2015

cube

Victorian Integrated Transport Model - South East Growth Corridor Model
2046 Cardno Model - Number of Lanes



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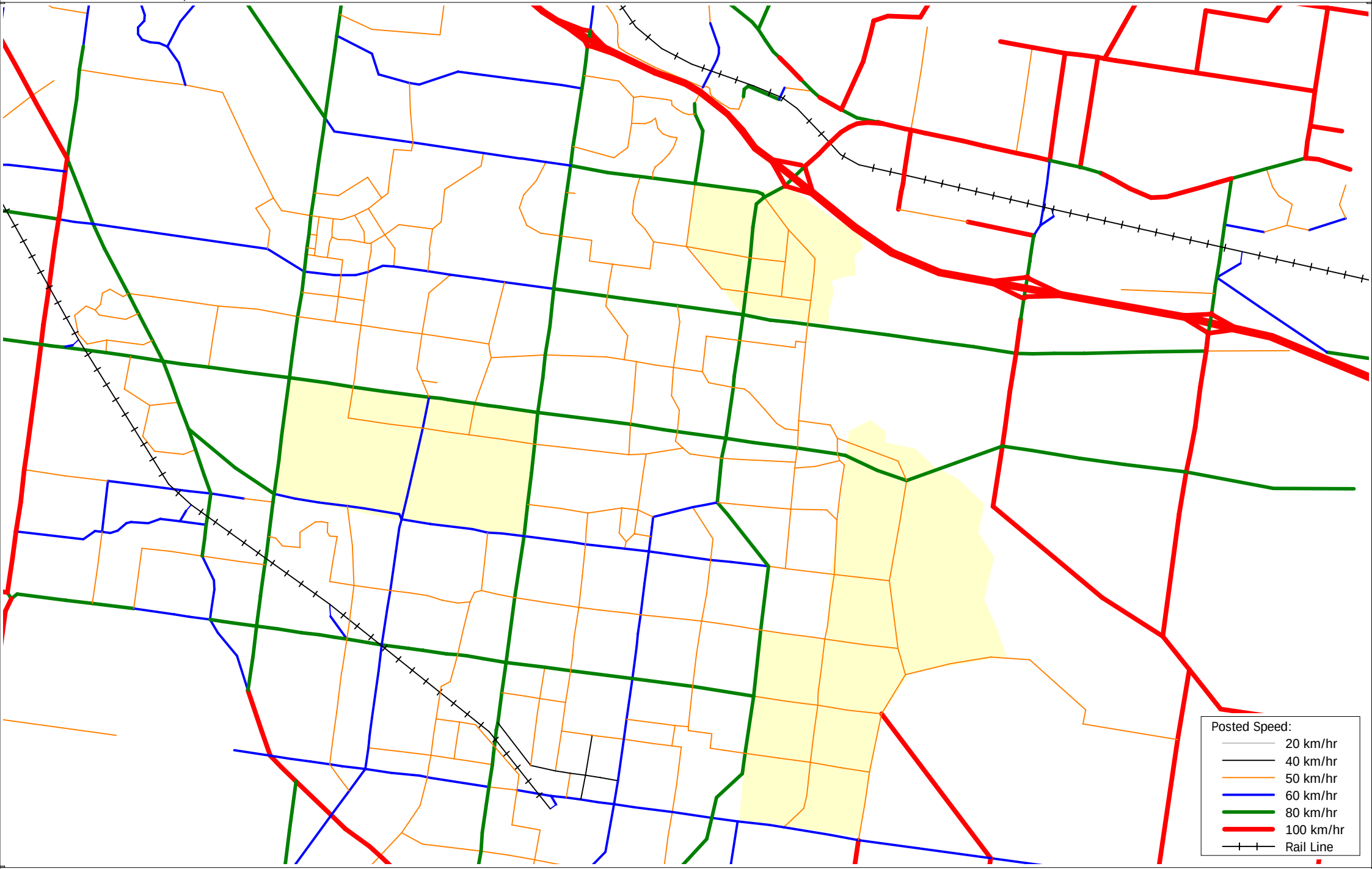
25/02/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
2046 AECOM Model - Posted Speed Limits



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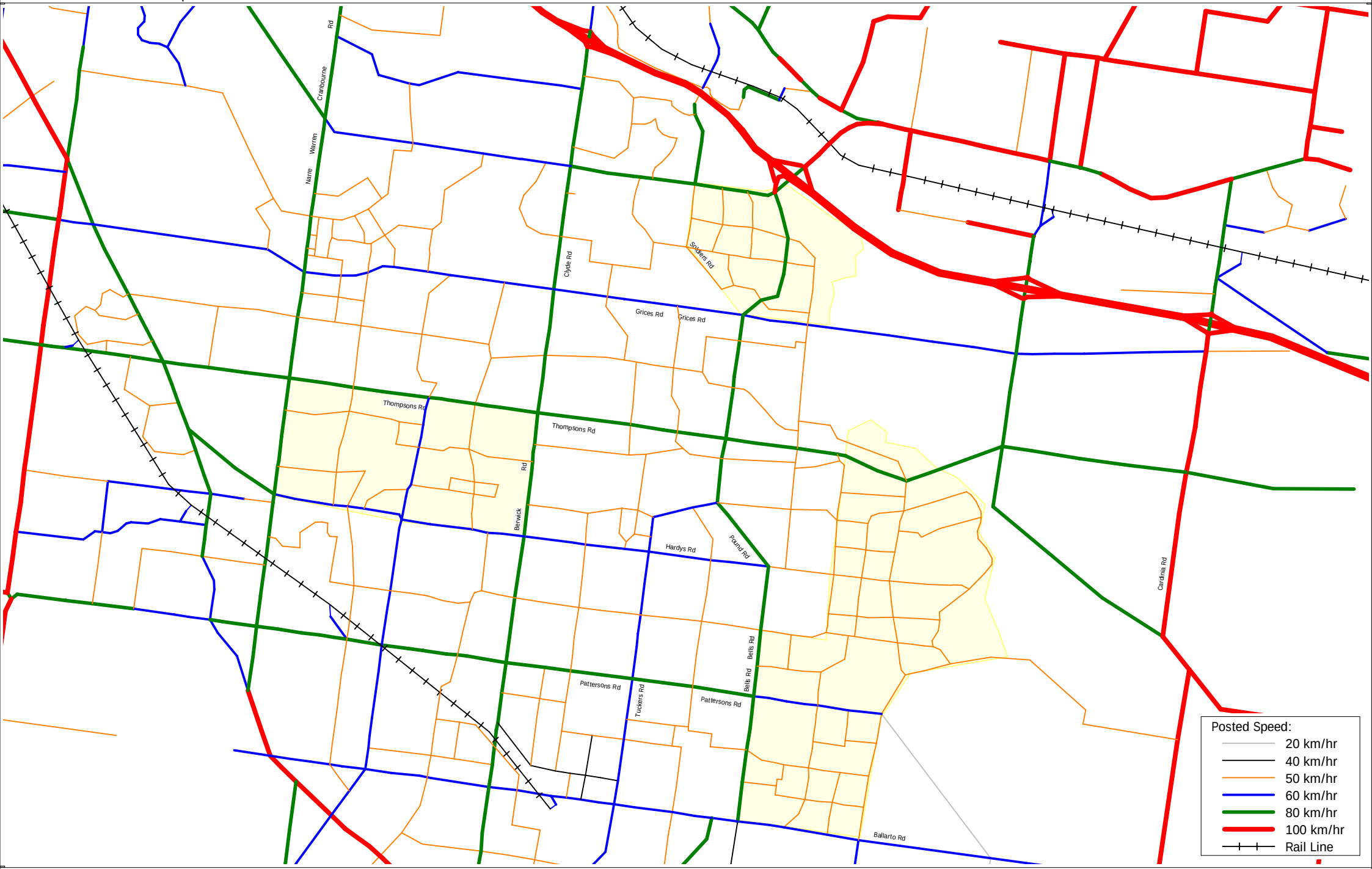
23/02/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
2046 Cardno Model - Posted Speed Limits



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McPherson, Croskell and Minta Farm Precincts

APPENDIX C

ZONE STRUCTURE REFINEMENTS

Cardno
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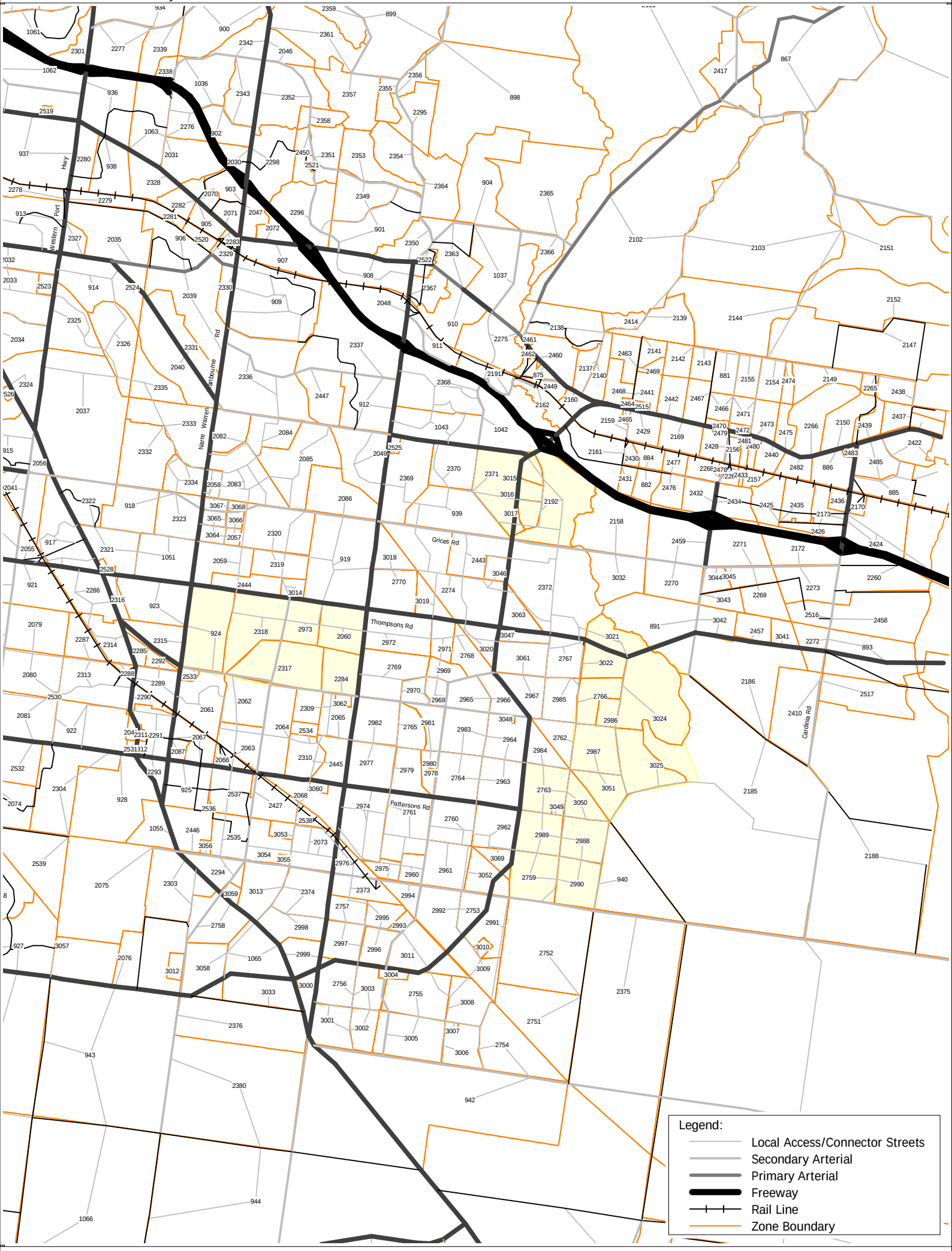
Victorian Integrated Transport Model - South East Growth Corridor Model
AECOM Model Traffic Zone System



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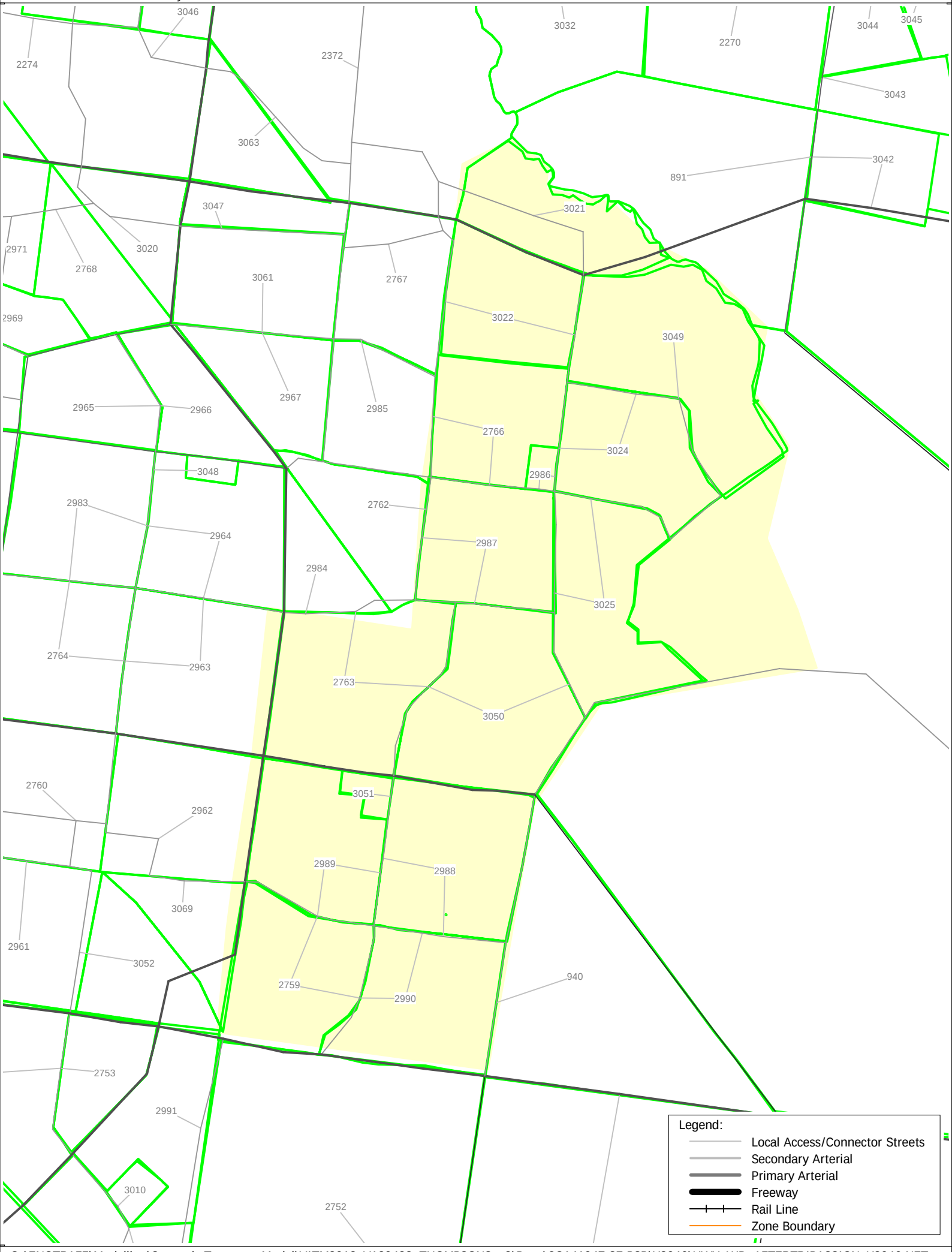
3/02/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
CARDNO Model Traffic Zone System



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22/06/2015

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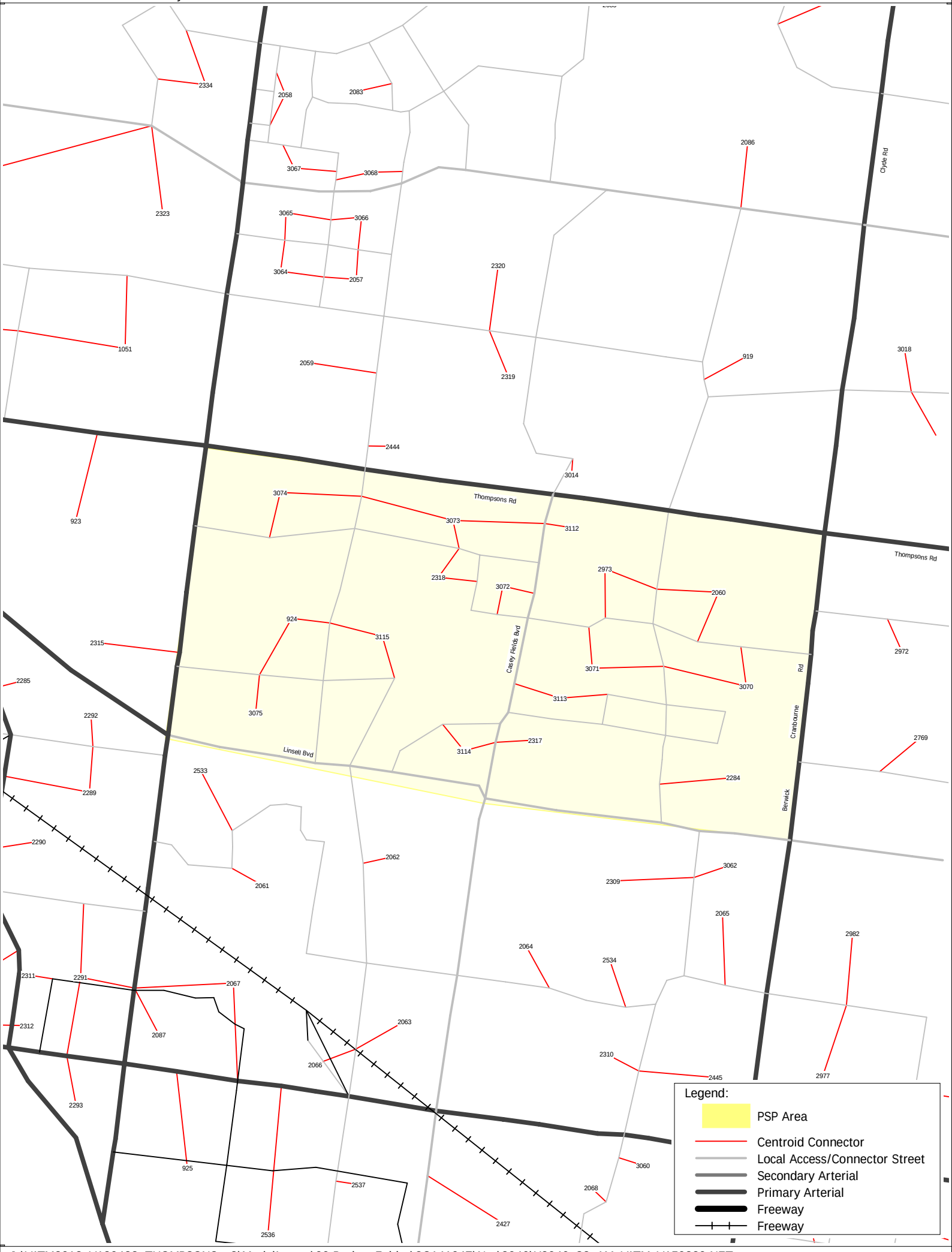
Victorian Integrated Transport Model - South East Growth Corridor Model
CARDNO Model Traffic Zone System - PSP 1051



Legend:
- PSP Area
- Centroid Connector
- Local Access/Connector Street
- Secondary Arterial
- Primary Arterial
- Freeway
- Freeway

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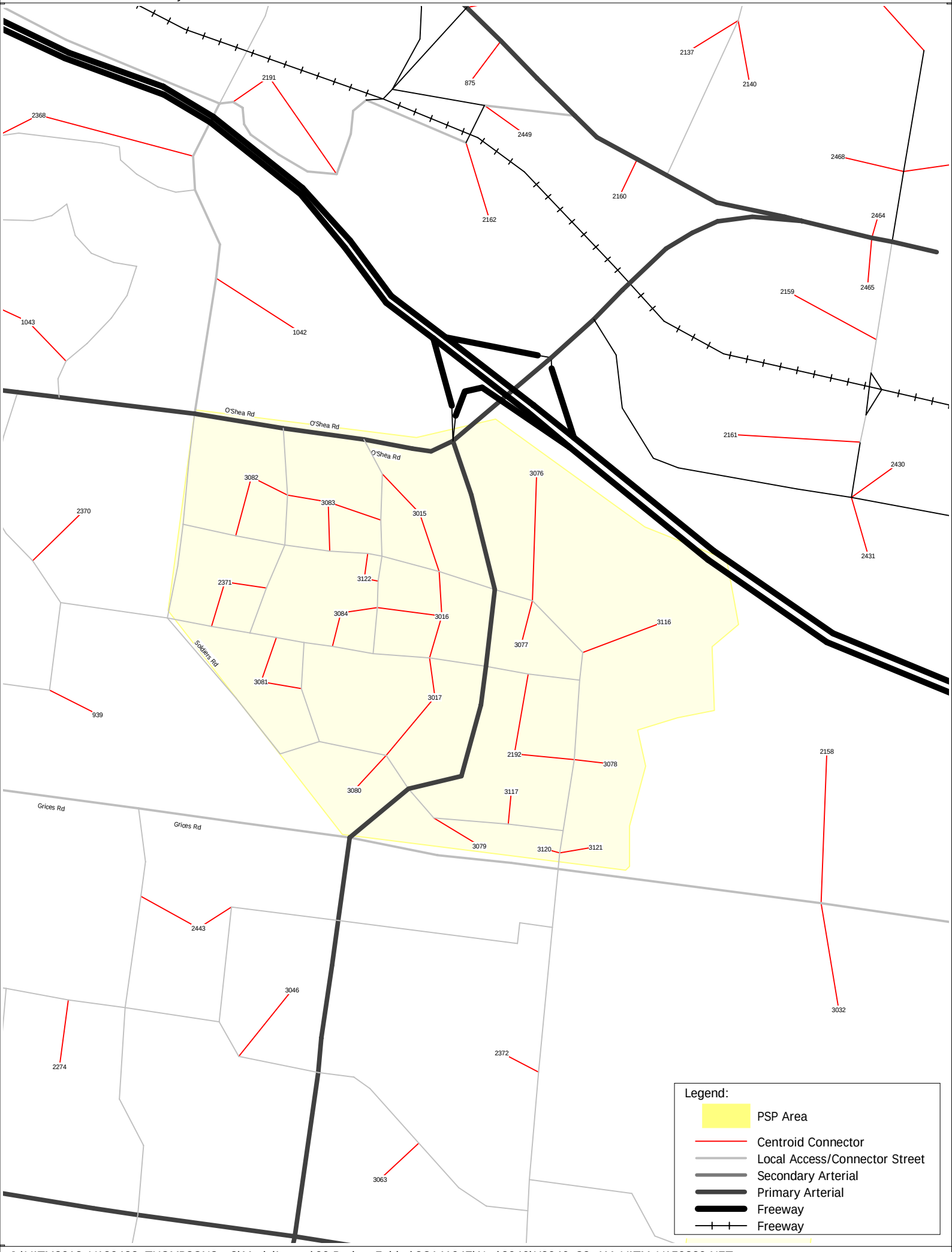
23/02/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
CARDNO Model Traffic Zone System - PSP 11



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23/02/2015

McPherson, Croskell and Minta Farm Precincts

APPENDIX D

MODELLED LAND USES

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Attachment B : Land Use Data

PSP		2046				2026			
	Zone	Population	Dwelling	Employment	Enrolment	Population	Dwelling	Employment	Enrolment
McPherson PSP 1055	2989	2354	841	0	0				
	2988	2384	851	165	1100				
	2759	1981	707	60	451				
	2990	3260	1164	0	0				
	2763	3903	1394	0	0				
	3050	3432	1226	60	451				
	2987	2832	1012	0	0				
	2766	2399	857	0	0				
	2986	0	0	349	0				
	3024	1023	365	60	451				
	3049	4144	1480	0	0				
	3025	3442	1229	0	0				
	3051	0	0	349	0				
	3022	1963	701	0	0				
	3021	1886	674	0	0				
	Total	35005	12502	1042	2453				
Croskell PSP 1051	3073	2566	1166	1,666	0				
	3112	857	306	0	0				
	2973	0	0	675	0				
	2060	0	0	1,845	0				
	3070	0	0	640	0				
	3071	0	0	240	0				
	2284	0	0	0	0				
	3113	504	180	0	0				
	3114	176	63	0	0				
	2318	756	270	0	0				
	3072	494	176	0	0				
	2317	0	0	0	0				
	Total	5353	2161	5066	0				
Minta Farm PSP 11	2192	867	310	31	0				
	2371	759	271	27	0				
	3015	0	0	616	0				
	3016	585	266	435	0				
	3017	529	189	19	0				
	3076	0	0	4,000	0				
	3077	0	0	362	0				
	3078	529	189	19	0				
	3079	837	299	30	0				
	3080	1129	403	40	0				
	3081	567	203	20	0				
	3082	479	171	17	0				
	3083	650	232	23	0				
	3084	302	108	66	451				
	3116	0	0	4,000	0				
	3117	514	184	18	0				
	3120	0	0	100	0				
	3121	320	145	231	0				
	3122	0	0	175	0				
	Total	8067	2970	10229	451				

McPherson, Croskell and Minta Farm Precincts

APPENDIX E

2046 ULTIMATE OUTPUT VOLUMES

Cardno
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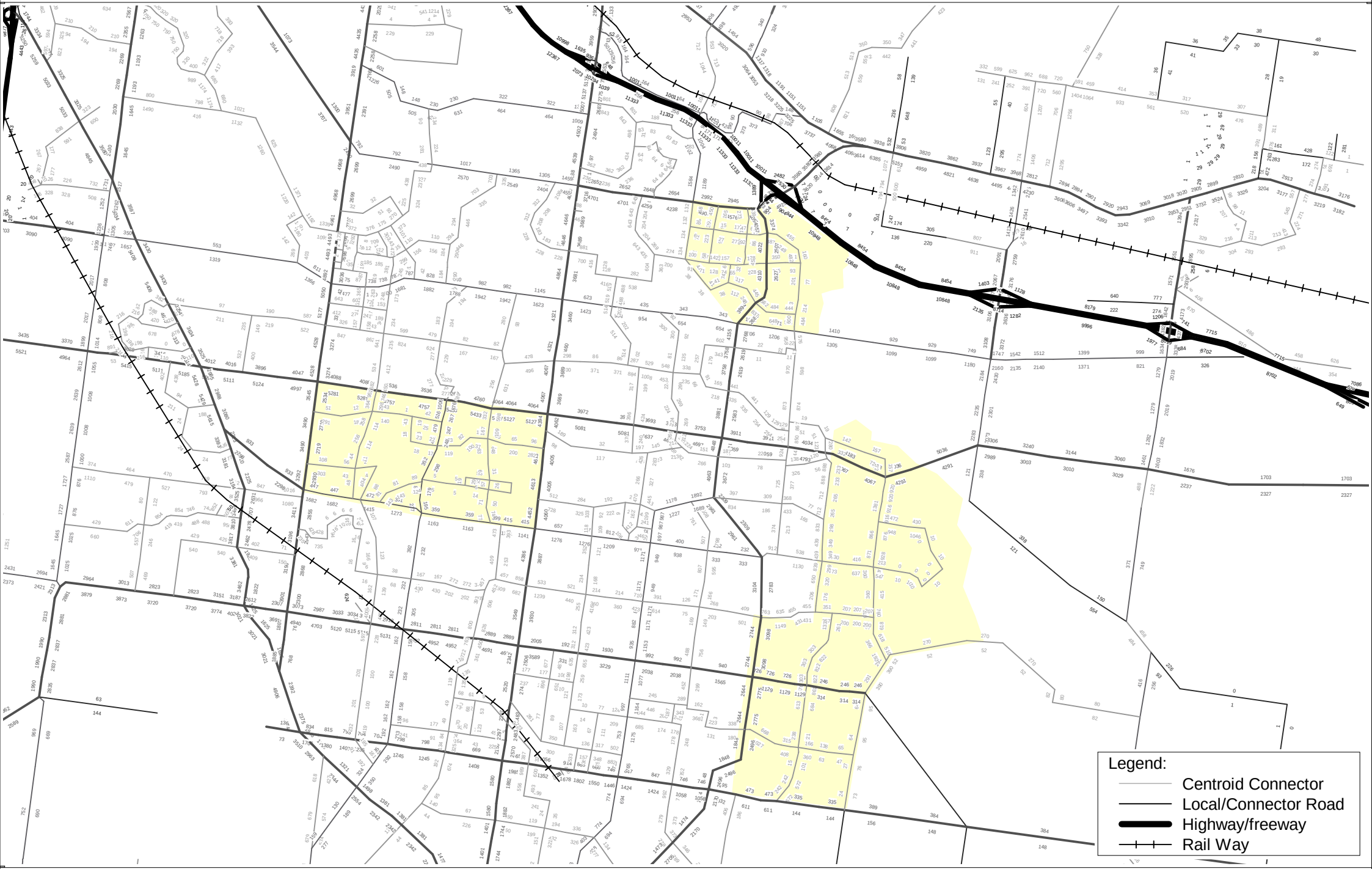
Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs AM Total Volume Year 2046



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3/06/2015

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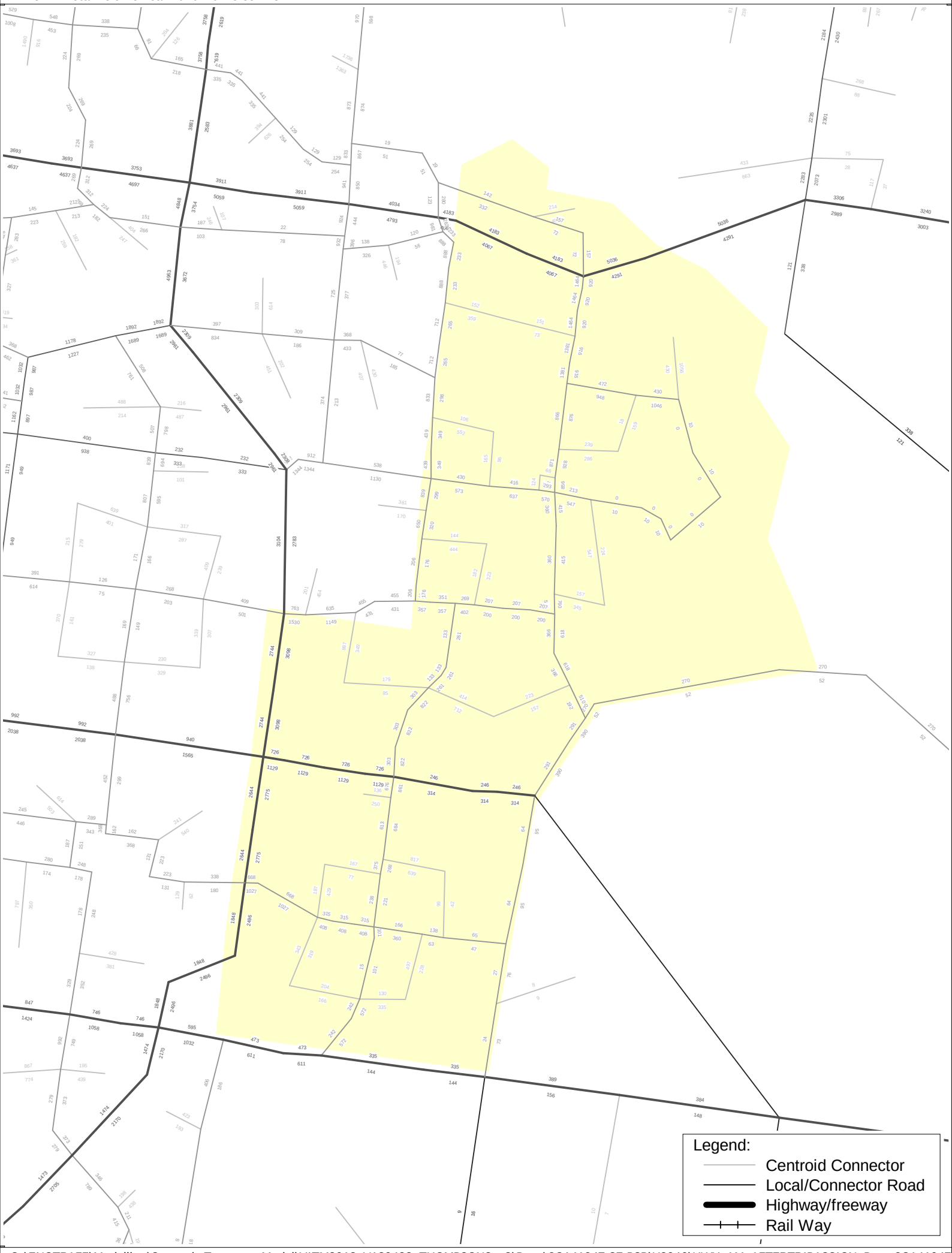
Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs AM Total Volume Year 2046 McPherson PSP



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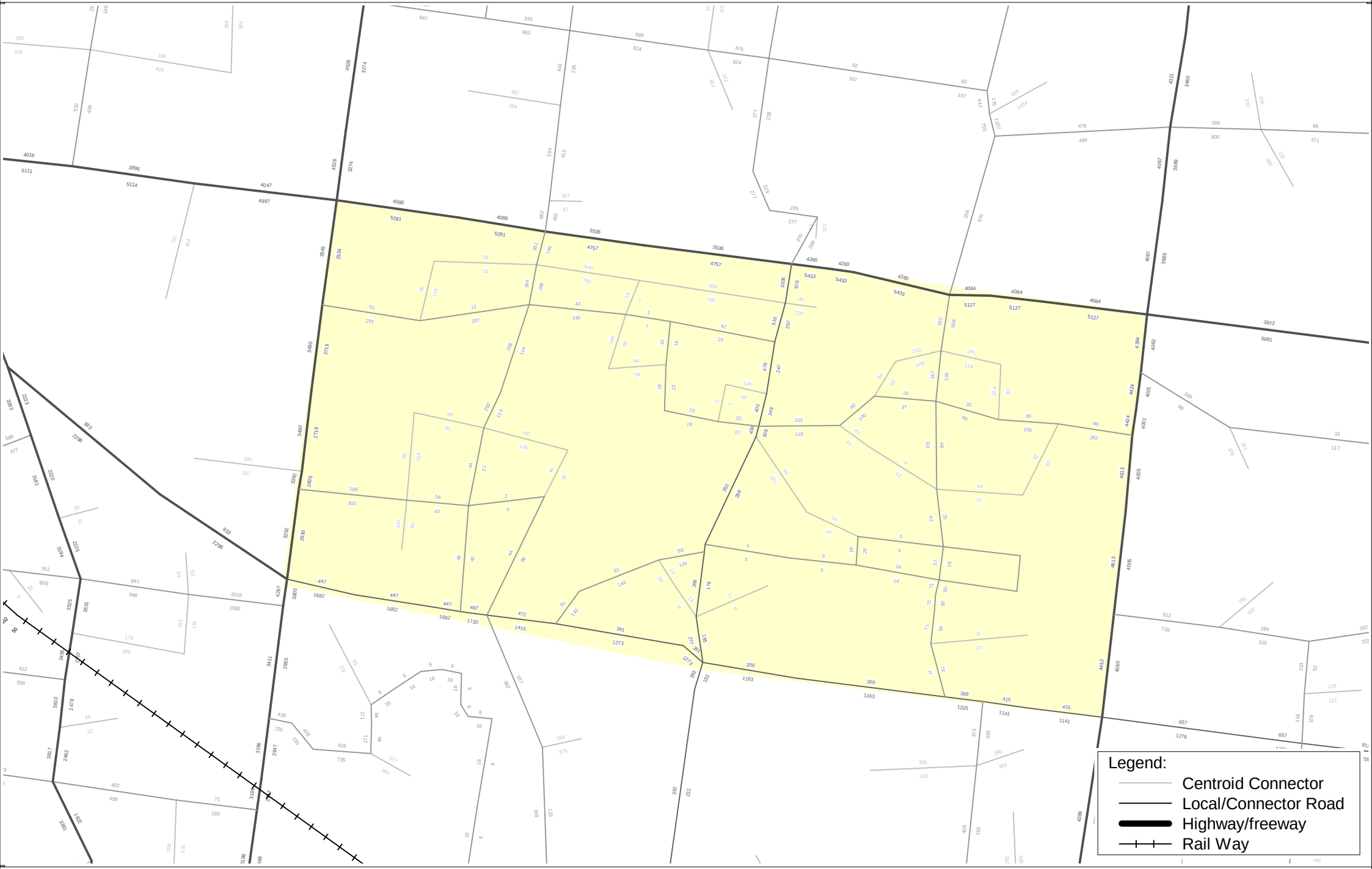
Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs AM Total Volume Year 2046 Croskell PSP



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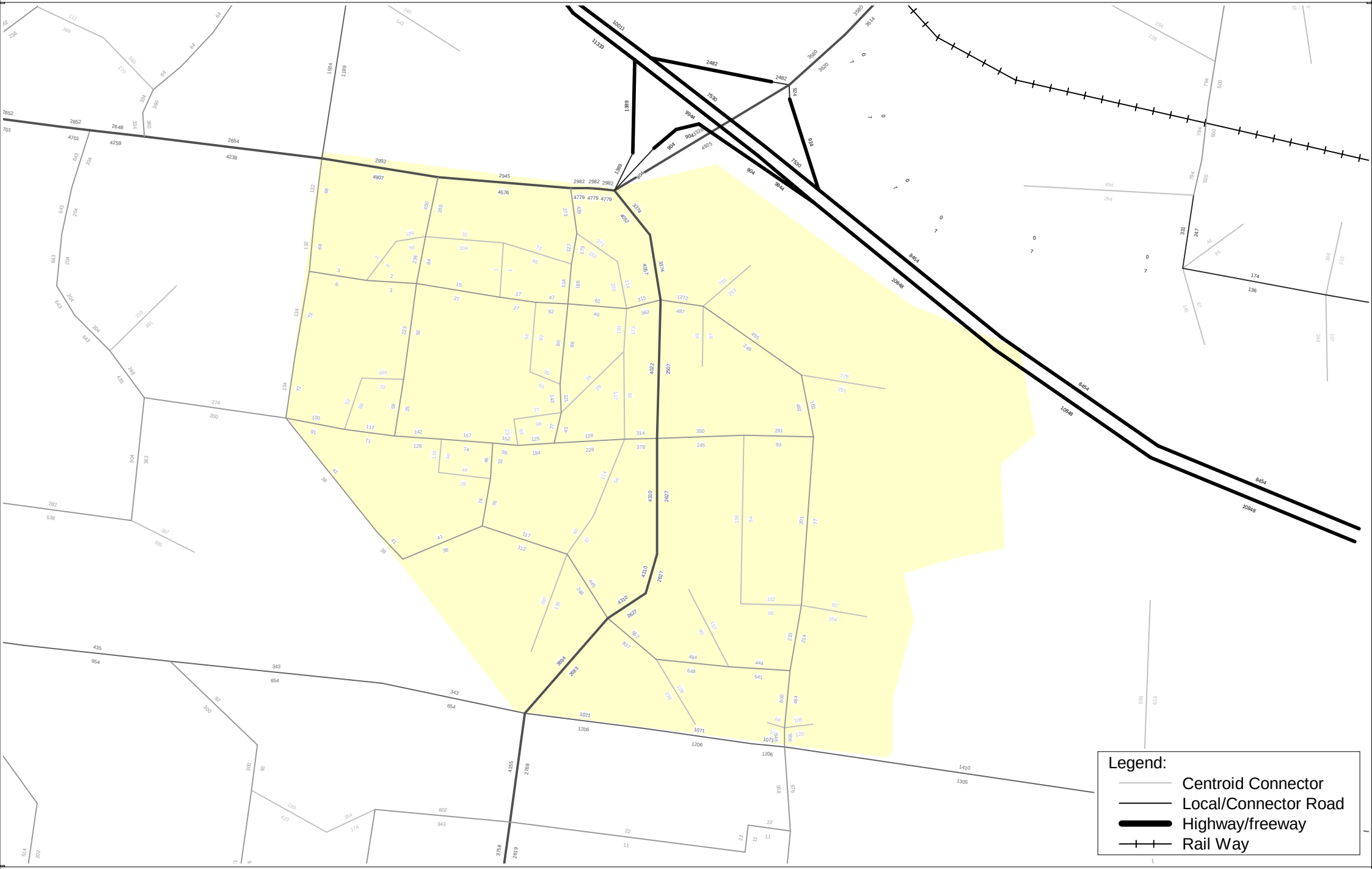
3/06/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs AM Total Volume Year 2046 Minta Farm PSP



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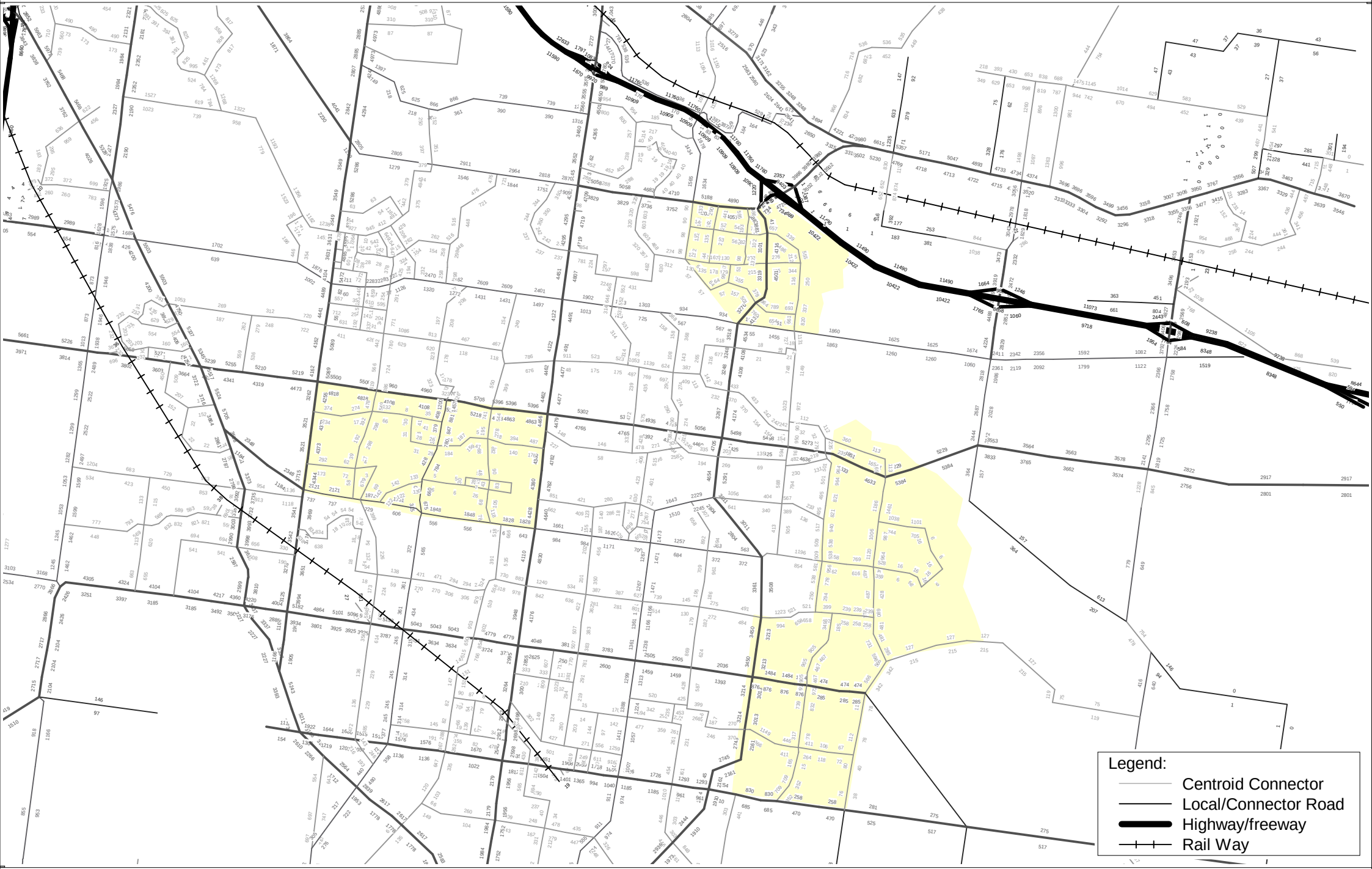
3/06/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs PM Total Volume Year 2046



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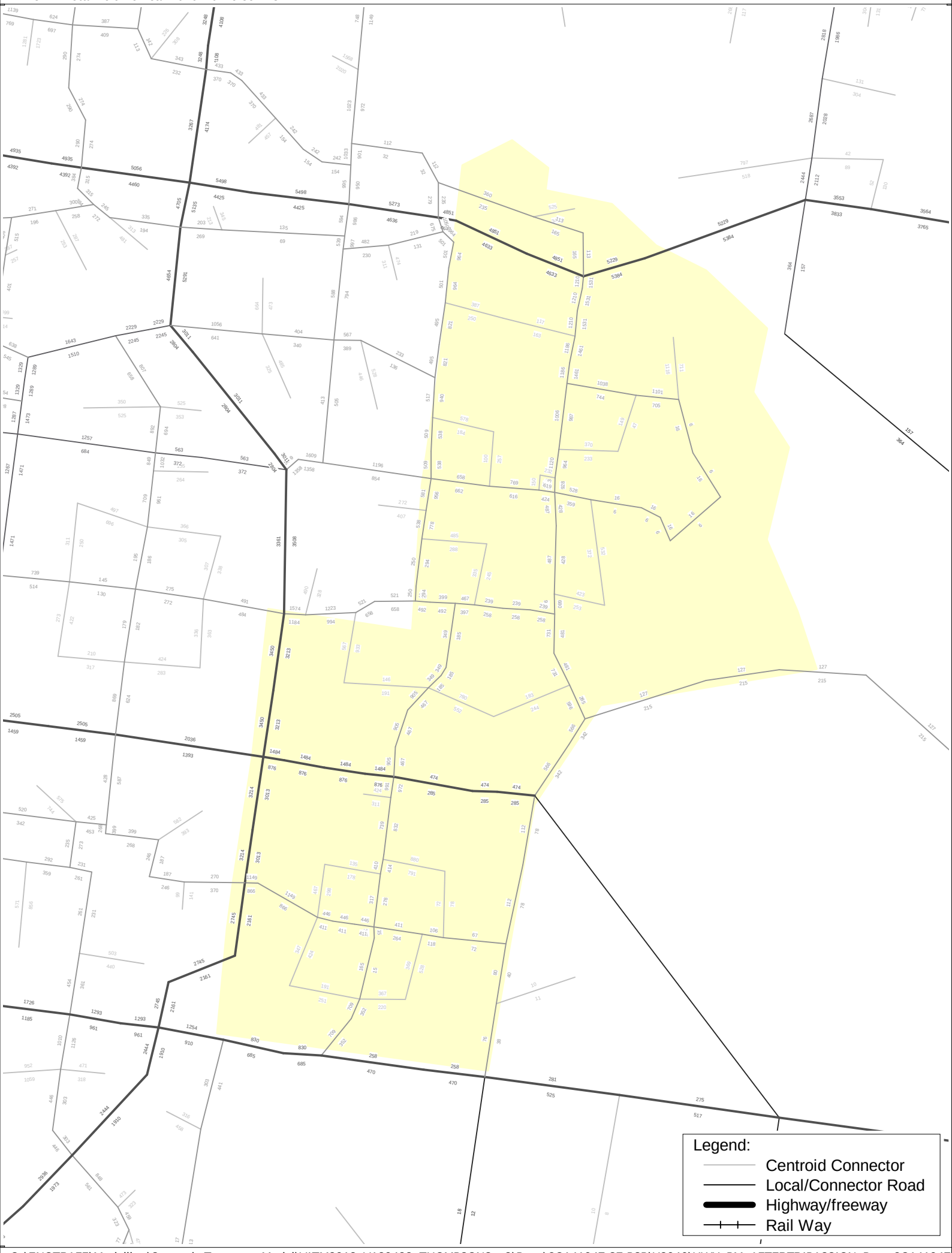
3/06/2015

Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs PM Total Volume Year 2046 McPherson PSP



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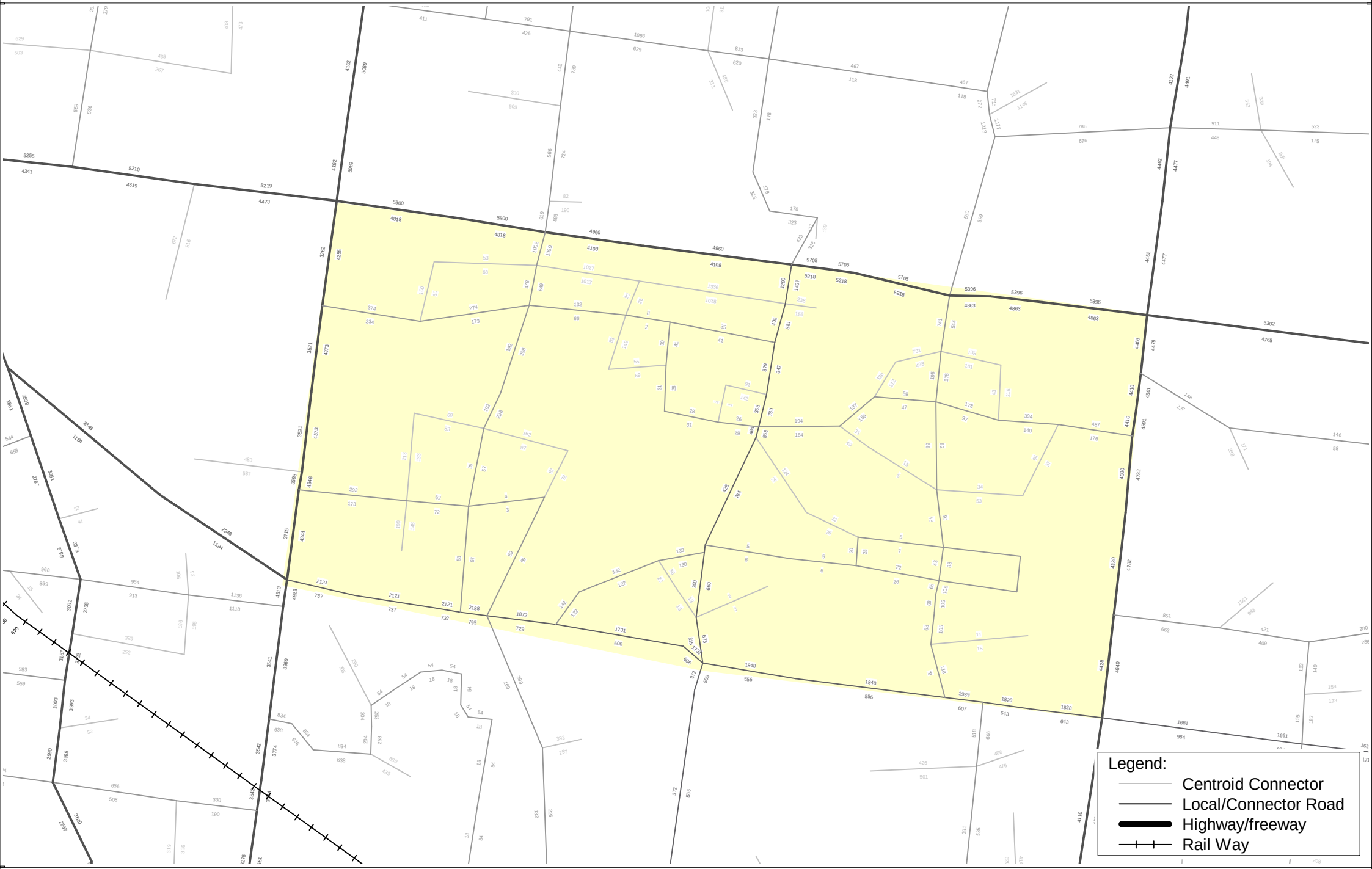
Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs PM Total Volume Year 2046 Croskell PSP



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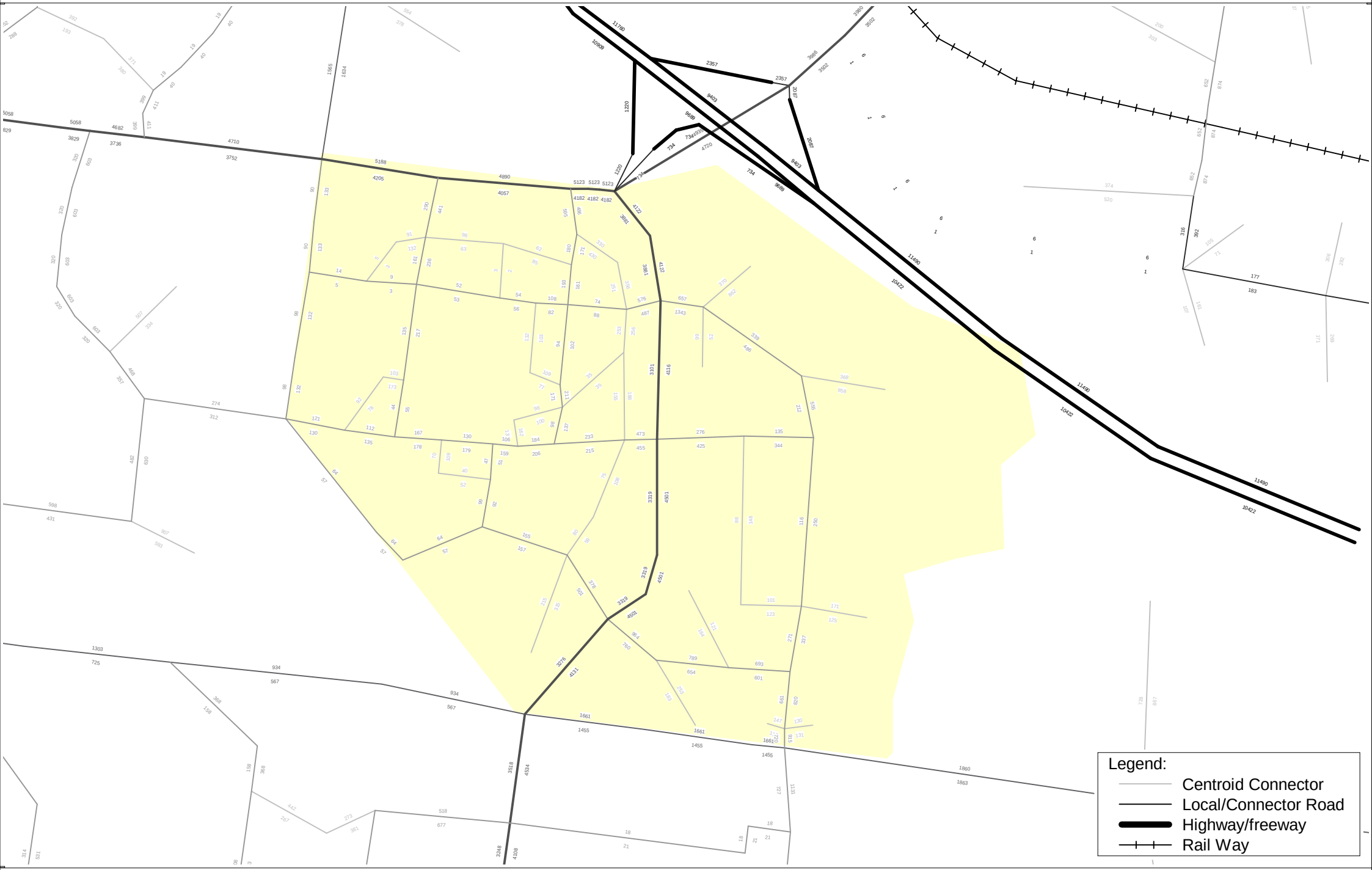
Victorian Integrated Transport Model - South East Growth Corridor Model
2 Hrs PM Total Volume Year 2046 Minta Farm PSP



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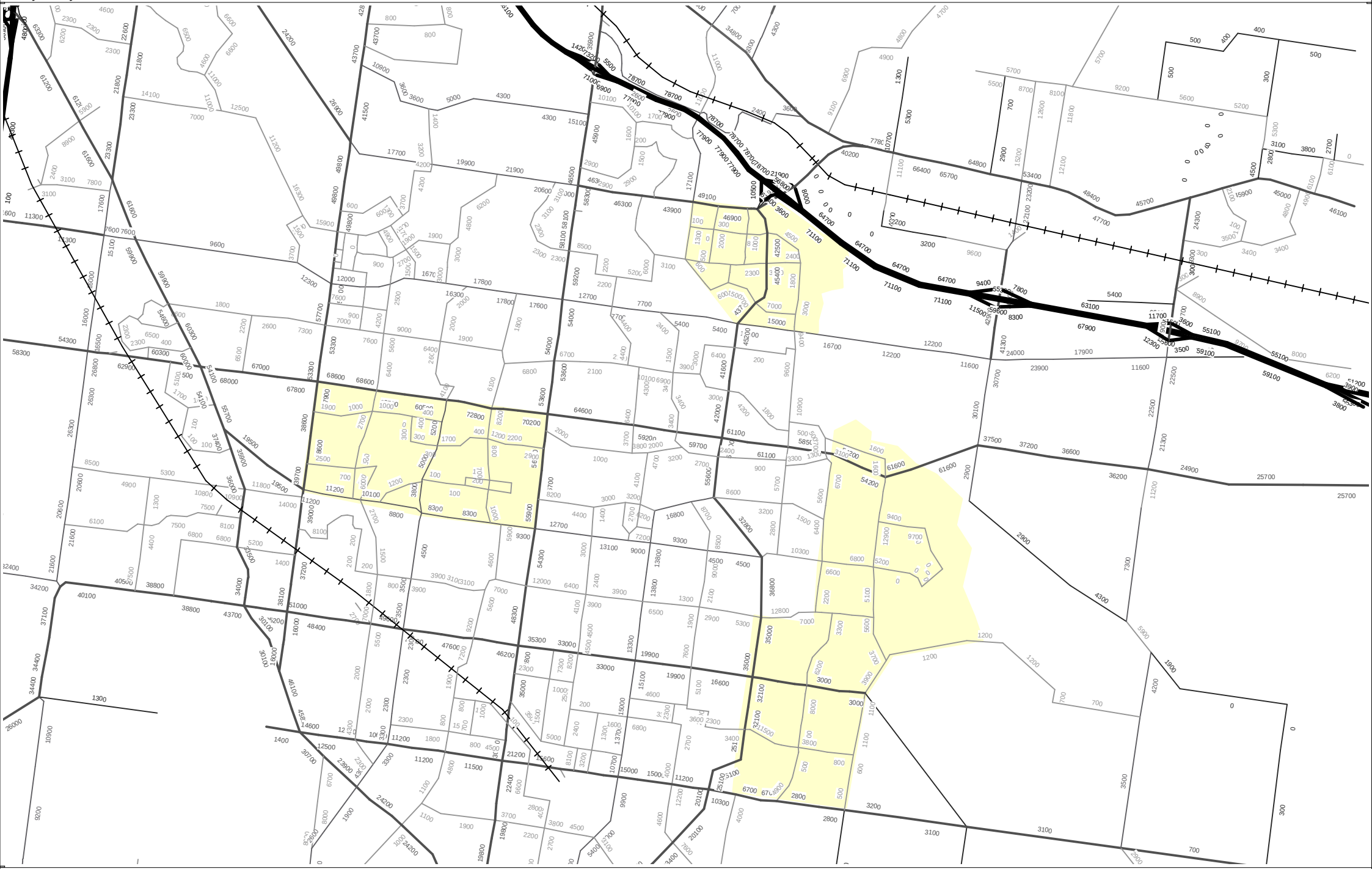
Victorian Integrated Transport Model - South East Growth Corridor Model

Daily 2 way Volume Year 2046



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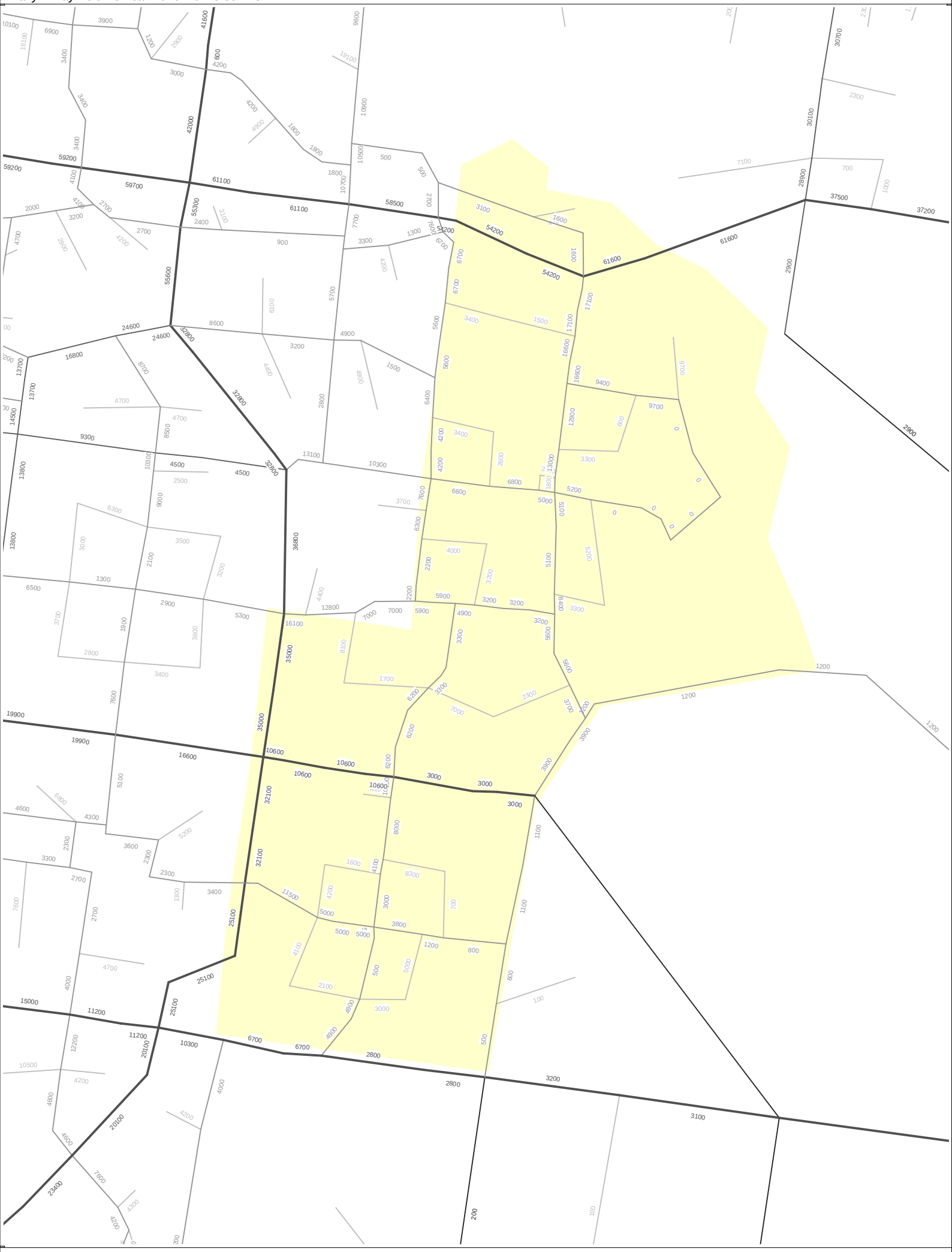
Victorian Integrated Transport Model - South East Growth Corridor Model
Daily 2 way Volume Year 2046 McPherson PSP



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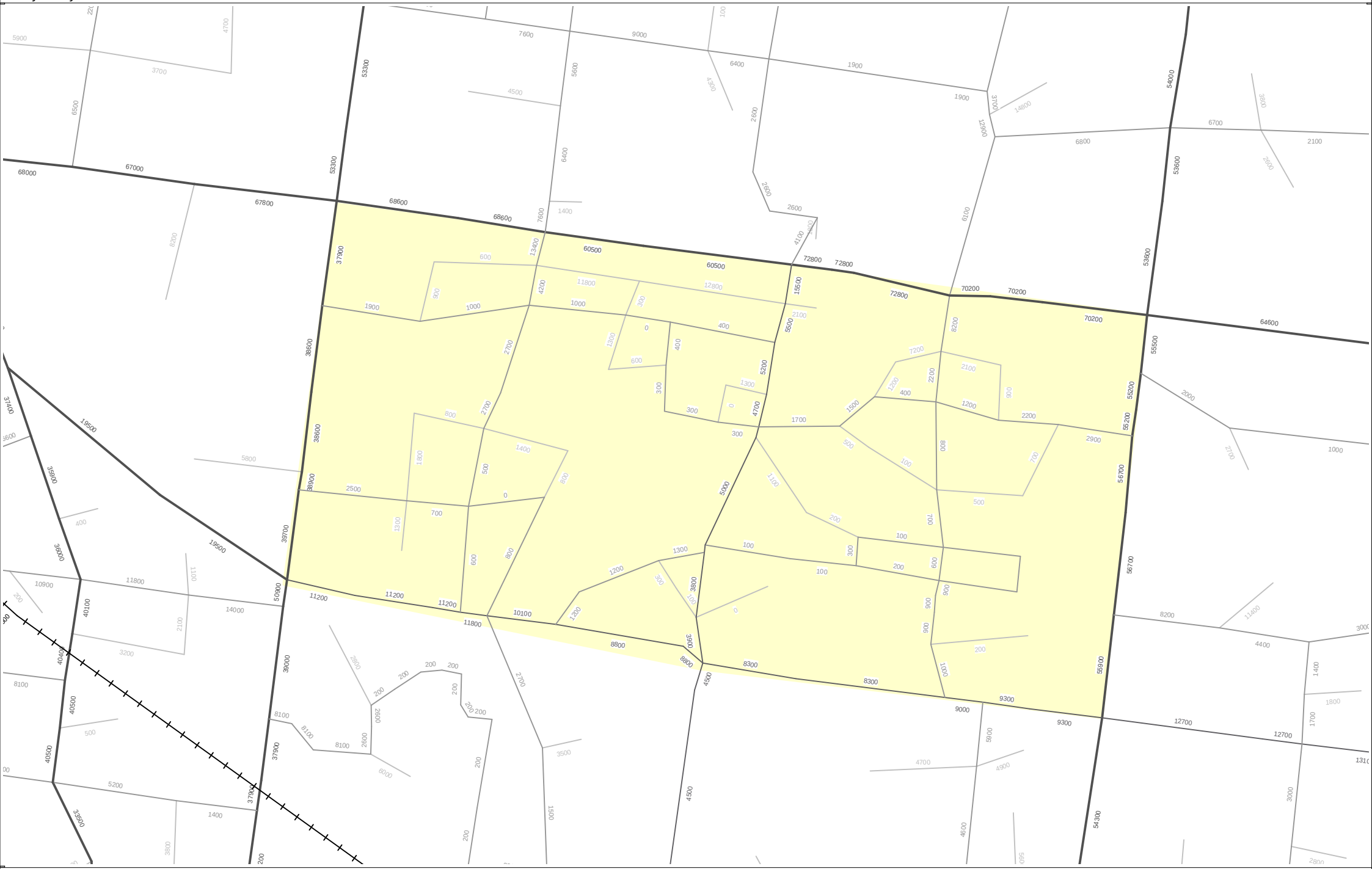
Victorian Integrated Transport Model - South East Growth Corridor Model
Daily 2 way Volume Year 2046 Croskell PSP



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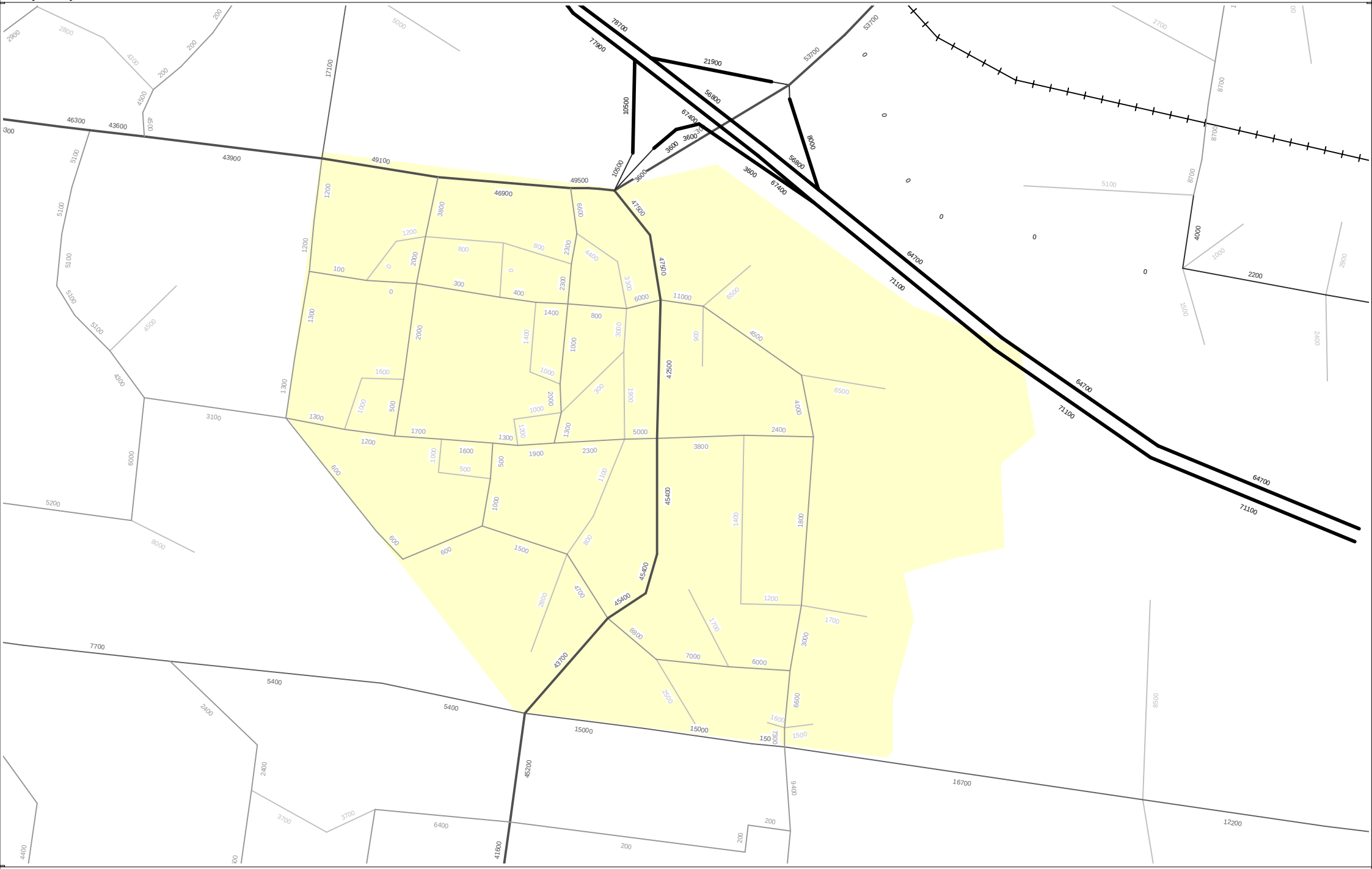
Victorian Integrated Transport Model - South East Growth Corridor Model
Daily 2 way Volume Year 2046 Minta Farm PSP



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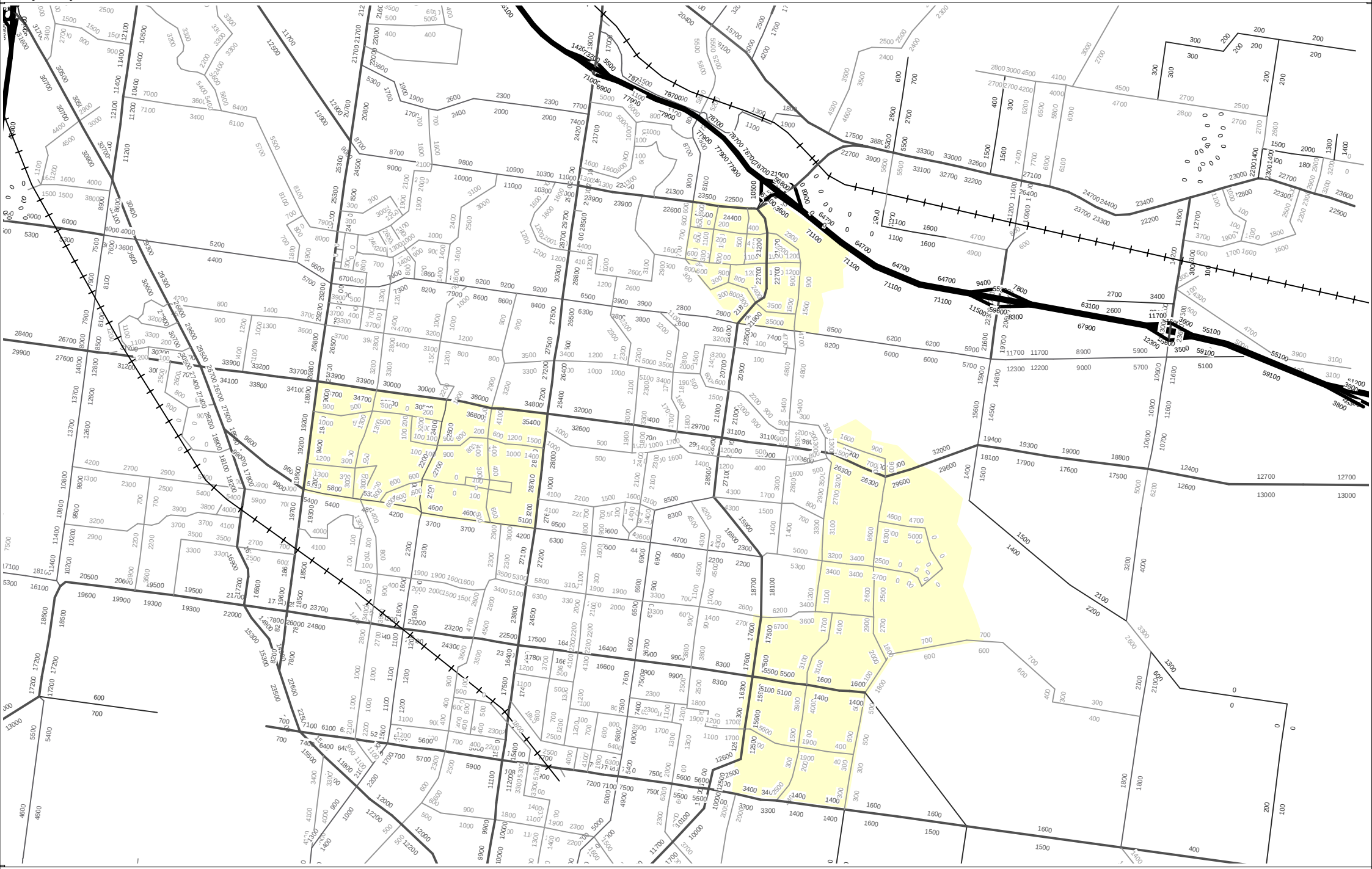
Victorian Integrated Transport Model - South East Growth Corridor Model

Daily 1 way Volume Year 2046



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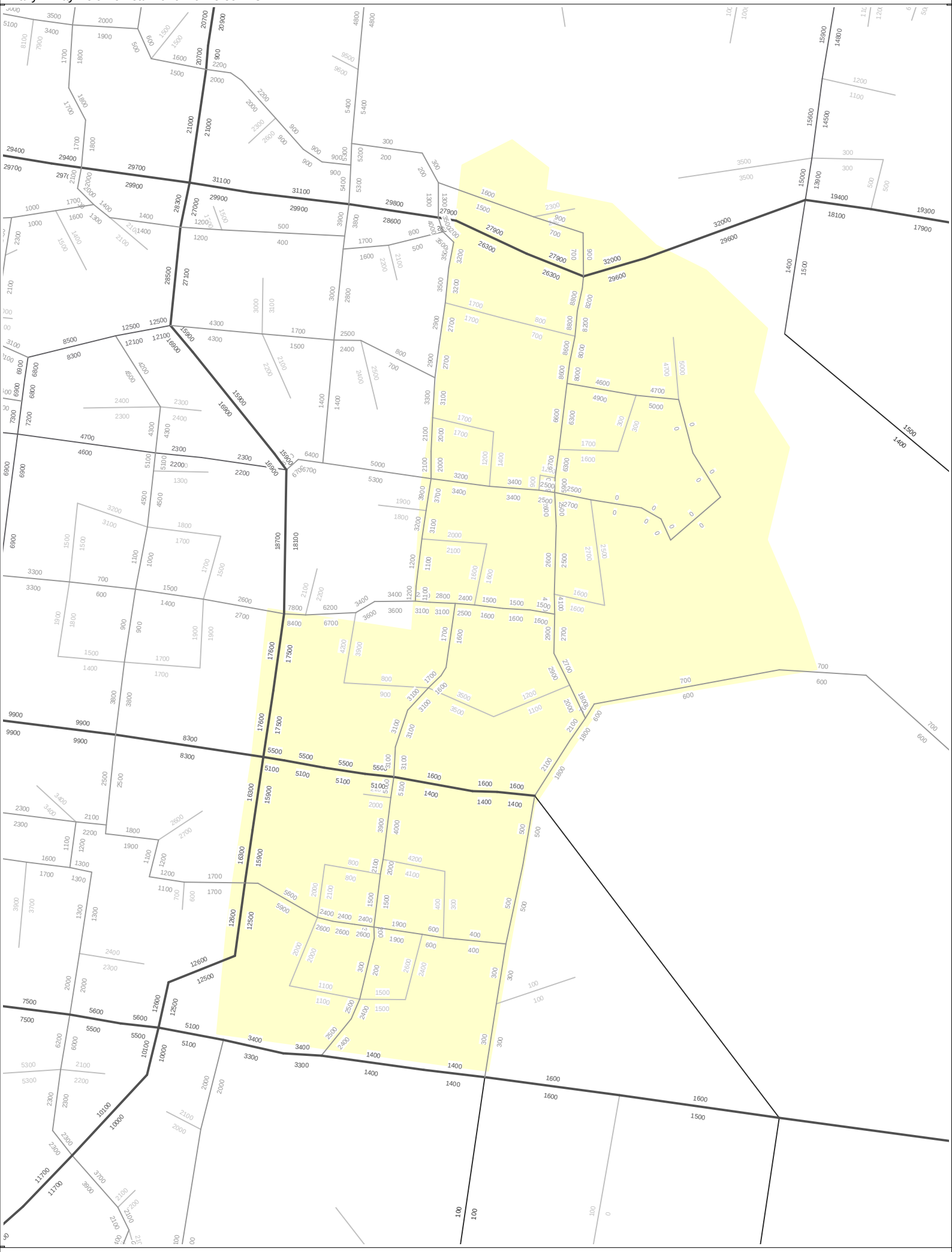
Victorian Integrated Transport Model - South East Growth Corridor Model
Daily 1 way Volume Year 2046 McPherson PSP



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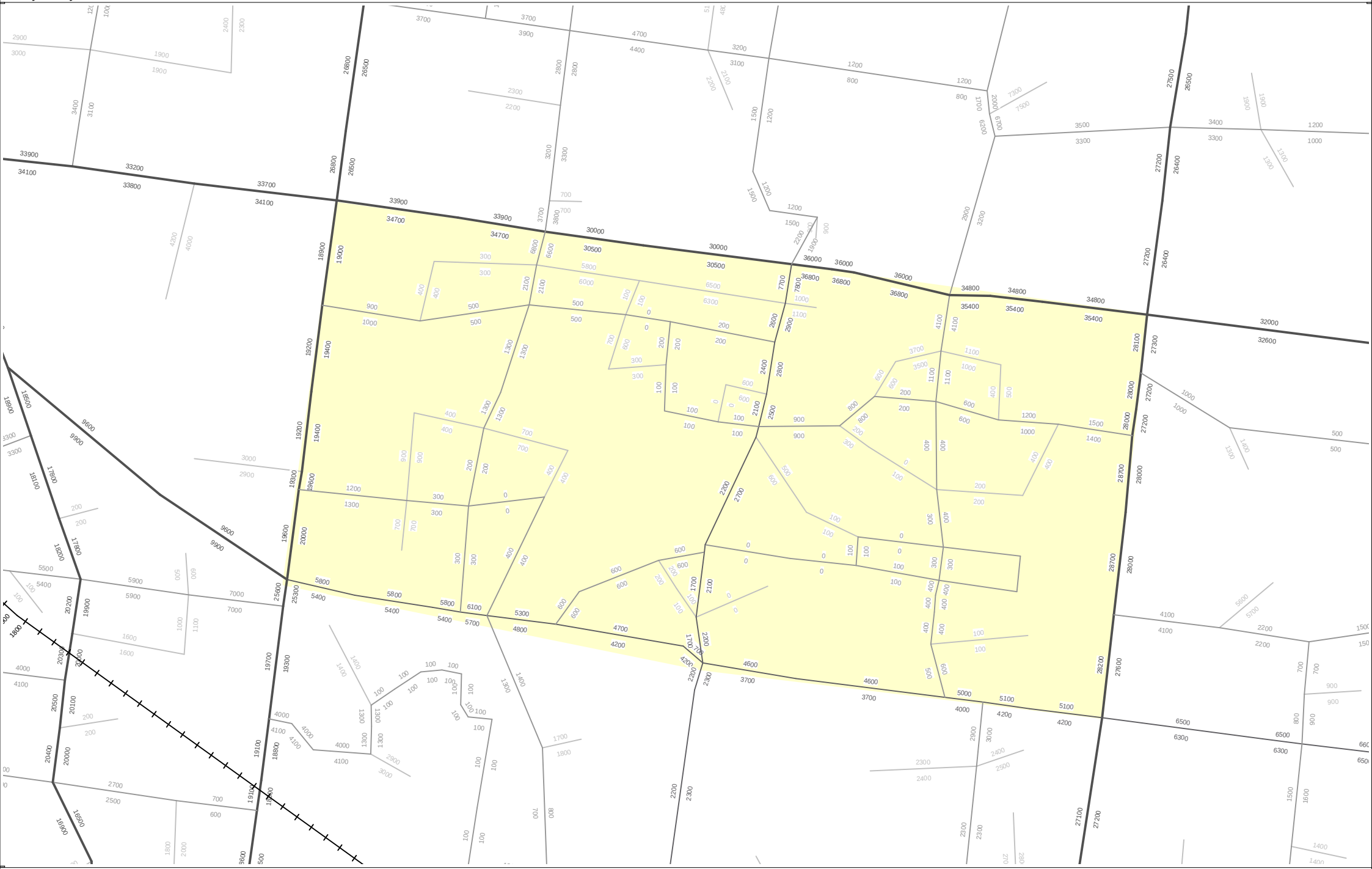
Victorian Integrated Transport Model - South East Growth Corridor Model

Daily 1 way Volume Year 2046 Croskell PSP



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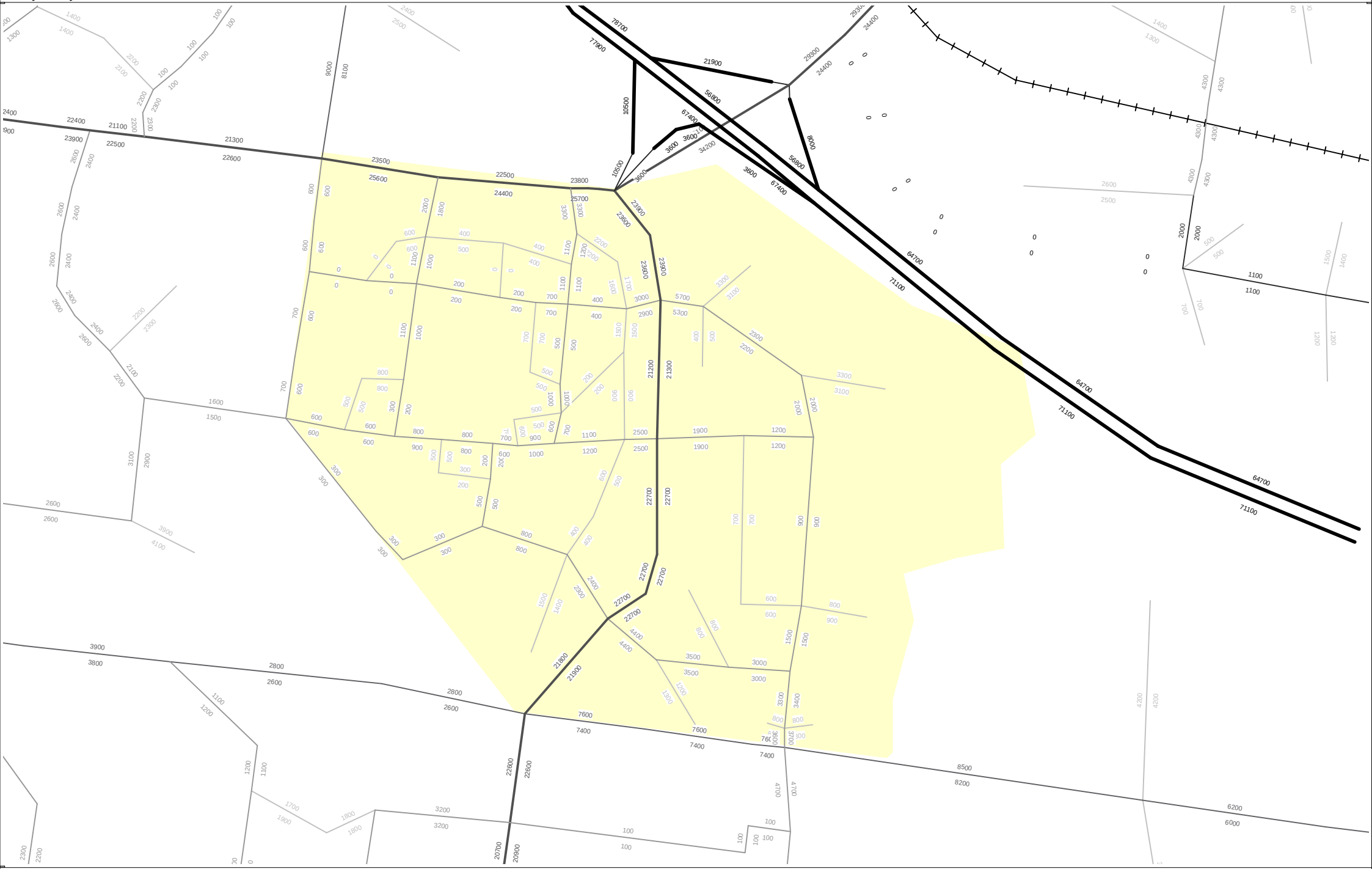
Victorian Integrated Transport Model - South East Growth Corridor Model
Daily 1 way Volume Year 2046 Minta Farm PSP



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