

Shenstone Park PSP

Strategic Transport Modelling Assessment Report



Prepared by: GTA Consultants (Vic) Pty Ltd for Whittlesea City Council

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EXECUTIVE SUMMARY

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GTA Consultants has been engaged by Whittlesea City Council in association with the Victorian Planning Authority (VPA) to undertake strategic transport modelling for the Shenstone Park Precinct Structure Plan.

Shenstone Park is located within the City of Whittlesea in the Northern Growth Corridor and comprises a total of 630 hectares of which 415 ha is developable. It is bound by Donnybrook Road to the north, the Melbourne-Seymour Rail Line to the west and the Wollert suburb boundary to the south. The eastern side of the PSP abuts by the Urban Growth Boundary.

An assessment of the transport network has been undertaken using the Victorian Integrated Transport Model (VITM) for the Northern Growth Corridor. The work included undertaking refinements to the existing Northern Growth Corridor model to reflect up to land use and transport planning in the Shenstone Park precinct.

The modelling was used to test, among other things, the suitability of Koukoura Drive to function as a 4-lane two-way road with the full development of Shenstone Park, noting that the network outside of the PSP has been assessed as part of broader network planning for the Northern Growth Corridor.

The results indicate that the duplication of Koukoura Drive to four lanes at full development will benefit the network with minimal traffic congestion along that road. The analysis showed that Donnybrook Road and Koukoura Drive will both operate at acceptable level of service not exceeding C, and not greater than a volume capacity ratio of 0.6 during AM and PM peak periods at full development.

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Acronyms and Definitions

AM	AM Peak – 7am to 9am
DEDJTR	Department of Economic Development, Jobs, Transport and Resources (note former organisation)
DoT	Department of Transport
EB	East bound
FUS	Future Urban Structure
HV	Heavy Vehicle
HGV	Heavy Goods Vehicle
IP	Inter-peak – 9am to 3pm
GTA	GTA Consultants
NB	North bound
NGC	Northern Growth Corridor
OP	Off Peak – Overnight - 6pm to 7am
PCU	Passenger Car Unit
Peak hour	55% of the respective AM Peak or PM Peak period
PM	PM Peak – 3pm to 6pm. For 2-hour volumes of the PM a 2/3 ratio has been applied
PSP	Precinct Structure Plan
SB	South bound
VCR	Volume to Capacity Ratio
VITM	Victorian Integrated Transport Model
VPA	Victorian Planning Authority
WB	West bound

1. INTRODUCTION

1.1. Background

The Shenstone Park Precinct Structure Plan (PSP) is located within the City of Whittlesea in the Northern Growth Corridor (NGC), and is bound by Donnybrook Road to the north, the Wollert suburb boundary to the south, the Urban Growth Boundary to the east and the Melbourne-Seymour railway corridor to the west. The site currently is comprised mainly of farmland spanning a total of 630 hectares, of which 415 ha is developable. Also located within Shenstone Park is the Woody Hill Quarry, a 45-ha rock and sand quarry owned by Barro Group Pty Ltd.

At full development, Shenstone park will be a mix of residential and commercial land uses with approximately 3,100 dwellings to be built and 4,600 employment opportunities.

1.2. Purpose of this Report

GTA Consultants (GTA) has been engaged by Whittlesea City Council in association with the Victorian Planning Authority (VPA) to undertake strategic transport modelling for the Shenstone Park PSP. The outputs will be used to:

- Inform the extent of road infrastructure required to be constructed to support the Shenstone PSP at full development, and
- Assess the function of Koukoura Drive as a 4-lane two-way road at full development.

For the purposes of this report, the 'full development' scenario is assumed to be 2046 which represents the period where the land uses for the Northern Corridor have been delivered as well as the arterial network depicted in the Growth Corridor Plan.

This report sets out the methodology and assumptions for the assessment.

1.3. References

In preparing this report, reference has been made to several background documents, including:

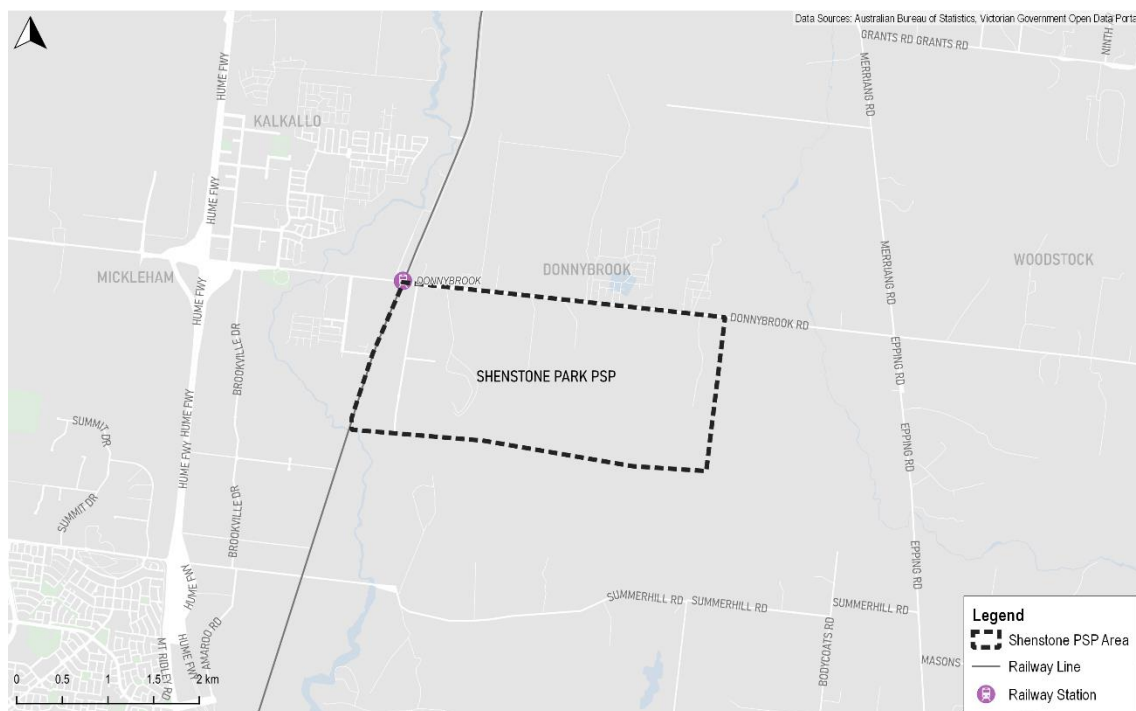
- Draft Future Urban Structure (FUS) Plan for the PSP prepared by Victorian Planning Authority (Dated: 03/04/2019)
- The Victorian Integrated Transport Model (VITM) Northern Growth Corridor Model Version 2012 and subsequent updates
- Various technical data as referenced in this report.

2. PSP CONTEXT

2.1. Subject Site and Proposed Future Urban Structure Plan

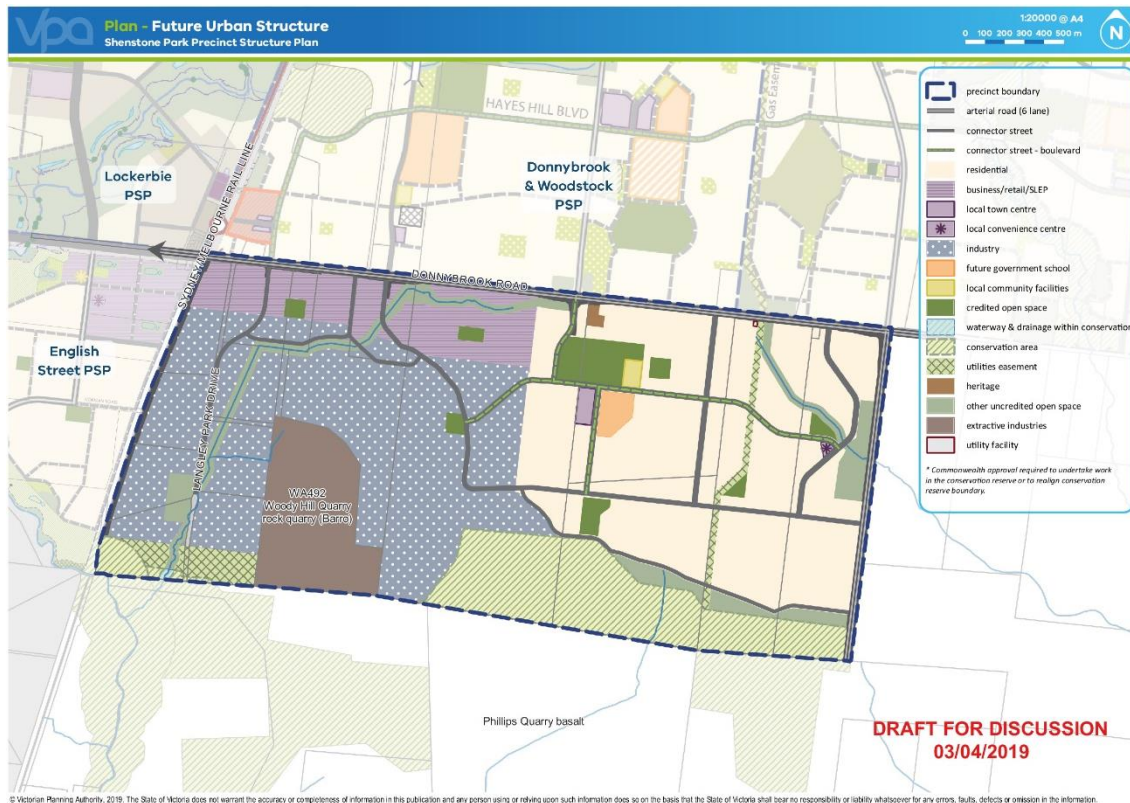
The Shenstone Park PSP is located in Donnybrook and is bound by Donnybrook Rd to the North, the Melbourne-Seymour Rail Line to the West. The PSP Boundary is shown below in Figure 2.1.

Figure 2.1: Shenstone Park PSP Boundary and Broader Study Area



The indicative FUS Plan (draft) for the Shenstone Park PSP is shown in Figure 2.2. The plan was developed by VPA as part of the structure planning process.

Figure 2.2: Shenstone Park PSP Draft Future Urban Structure



The draft urban structure indicates that the majority of residential development is expected to occur in the north east portion of the site, with industrial and retail precincts marking up the western portions of the site. The southern boundary of the PSP is predominantly conservation with the Woody Hill Quarry also abutting the boundary.

2.2. Existing and Proposed Arterial Roads

The precinct will be serviced by two arterial roads, Donnybrook Road travelling along the northern boundary and the proposed Koukoura Drive along the eastern boundary. Via Donnybrook Road, the Shenstone Park PSP is proximate to the Hume Freeway (to the west) and the future Outer Metropolitan Ring Road to the east.

Internal to the PSP is a network of connector and boulevard streets linking the land uses to the broader arterial network. The network predominantly is a staggered grid which is guided by the topography of the land. There are six connections to Donnybrook Road and two connections to Koukoura Drive. These are a mix of full turn movements and left-in left-out intersections.

2.2.1. Donnybrook Road

Donnybrook Road is located on the northern boundary of the PSP and serves as one of the major east-west arterial roads in the region stretching from Plenty Road in the east to Mickleham Rd in the west with access to and from the Hume Freeway. Currently Donnybrook Road is a two-way road with one lane in each direction. As the region is expected to experience considerable growth into the future, Donnybrook Rd is planned to undergo a triplication by 2046.

2.2.2. Koukoura Drive

Koukoura Drive is a planned arterial road running north-south from O'Herns Road (Epping) in the south to Gunns Gully Road (Donnybrook) in the north as outlined in VPA's Northern Growth Corridor Plan. The construction dates for this road have not been confirmed, however it has been assumed that full development of Shenstone Park has occurred. It has been proposed that this road will be a 4-lane two-way road to serve as an arterial road for the region.

2.2.3. Proposed Internal Road Network

The internal road network comprised of connector and connector boulevard street types which are serviced mostly via Donnybrook Road. These streets provide connection to the local streets that future residents will live on and provide local connectivity to the area.

The refined road network as depicted in the VITM model is shown in Figure 2.3 and Figure 2.4. Larger maps are available in Appendix A.

Figure 2.3: Shenstone Park PSP VITM Road Network Link Class (Full Development)

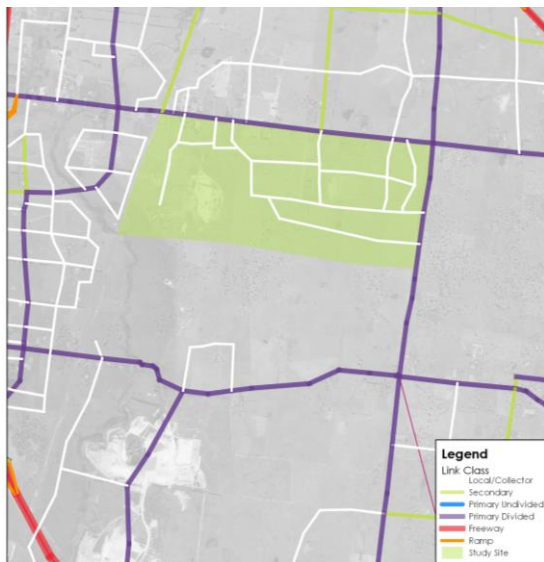
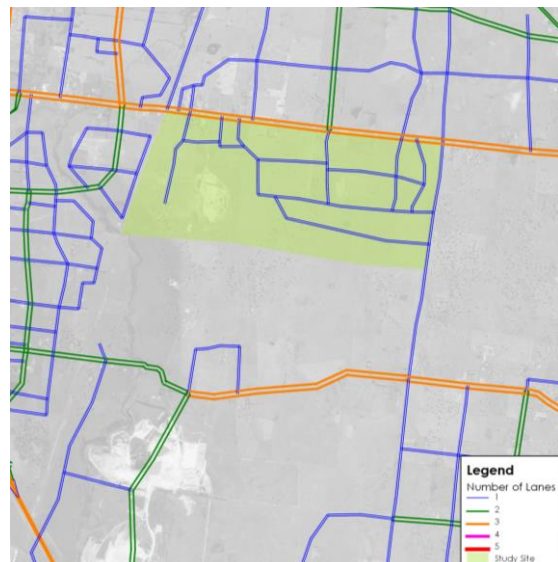


Figure 2.4: Shenstone Park PSP VITM Road Number of Lanes (Full Development)

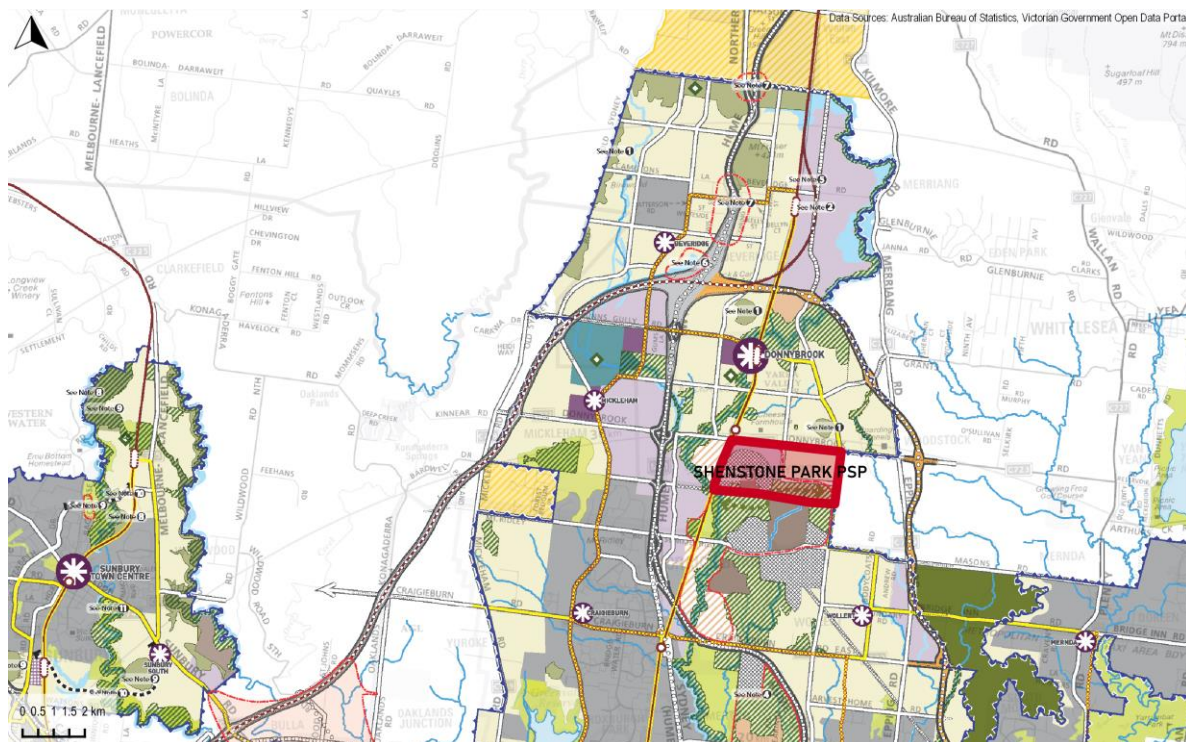


3. STUDY AREA CONTEXT

3.1. Study Area

The Shenstone Park PSP is located within the NGC. The NGC creates new town centres and employment areas that contribute to the ongoing diversification and growth of the northern region's economy. To the north of Shenstone Park PSP is the Donnybrook & Woodstock PSP, to the west is the English Street PSP and the north-west is the Lockeriebie PSP – all of which have been completed. The location of Shenstone Park PSP in relation to the wider NGC is shown in Figure 3.1.

Figure 3.1: Shenstone Park PSP in the context of the Northern Growth Corridor¹



¹ Northern Growth Corridor Plan, Victorian Planning Authority

4. TRANSPORT MODELLING

4.1. Background

The Victorian Department of Transport (DoT) (formally Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR)) developed VITM to assist in the planning of road and public transport infrastructure in Victoria. It is a multi-modal strategic model that uses projections of future population, employment and land use data to forecast travel costs, travel behaviour and the impacts of changes in 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 NGC Model was developed in 2012 to understand the transport infrastructure requirements for the developments of PSPs. Input into the development of the model have been provided from a range of stakeholders including the VPA, Whittlesea City Council and VicRoads.

The model that is used for this project was the VITM2012 GAA NGC which was obtained from DEDJTR. This model has had various updates as part of NGC PSP between 2012 and 2018. As agreed with the client, on the basis this model was the most refined for the NGC and would as used for other NGS PSP transport assessments, it formed the basis for the VITM modelling undertaken as part of this package of work.

4.2. Design Year – Full Development

The analysis has been undertaken for the full development of Shenstone Park, which also assumes that all land uses depicted in the Northern Growth Corridor Plan have been delivered, as well as the corresponding arterial road network. The traffic volumes as a result of the full development are used to assess and validate the provision of road infrastructure within and around the PSP.

4.3. Design Scenarios

One scenario has been considered in the ultimate case which consider the impacts of a duplication made to Koukoura Drive. The scenario modelled is PC01: Project Case 01 – Koukoura Drive has two lanes in each direction.

4.4. Model Inputs

Both the road network and land use inputs have been refined to represent Shenstone Park PSP's FUS before running the strategic model.

4.4.1. GTA Road and Network Refinements

GTA has refined a copy of the Northern Growth Corridor version of VITM (herein referred to as the NGC VITM) and has used it in the assessment of the design scenarios for Shenstone Park PSP. For the purposes of this assessment the following network refinements were made to the NGC VITM:

- Additional road links added to reflect Shenstone Park PSP FUS. It has been assumed that new intersections with arterial roads provide unrestricted access
- Refinement of zone centroid connection locations for Shenstone Park PSP
- Refinement of transport zones.

These refinements were made to enhance how the NGC VITM reflected the likely access arrangements for Shenstone Park PSP. It is highlighted that the changes performed did not result in any noteworthy changes to the 2046 VITM network beyond the bound of the study area.

Plots of the road network characteristics (i.e. link class, lanes etc.) are included in Appendix A.

4.4.2. Public Transport Network

Several refinements were made to the public transport network for this project. The NGC VITM assumes an electrified rail service to Wallan as per the Network Development Plan – Metropolitan Rail (2012). The peak frequency is every five minutes. Bus routes were altered to represent suitable cases for bus access through Shenstone Park PSP and through the Woodstock and Donnybrook PSP to the north. The bus headways were also altered to reflect likely headways in 2046, as agreed with stakeholders, are depicted in Table 4-1.

Figure 4.1: Shenstone Park PSP Refined Bus PT Lines

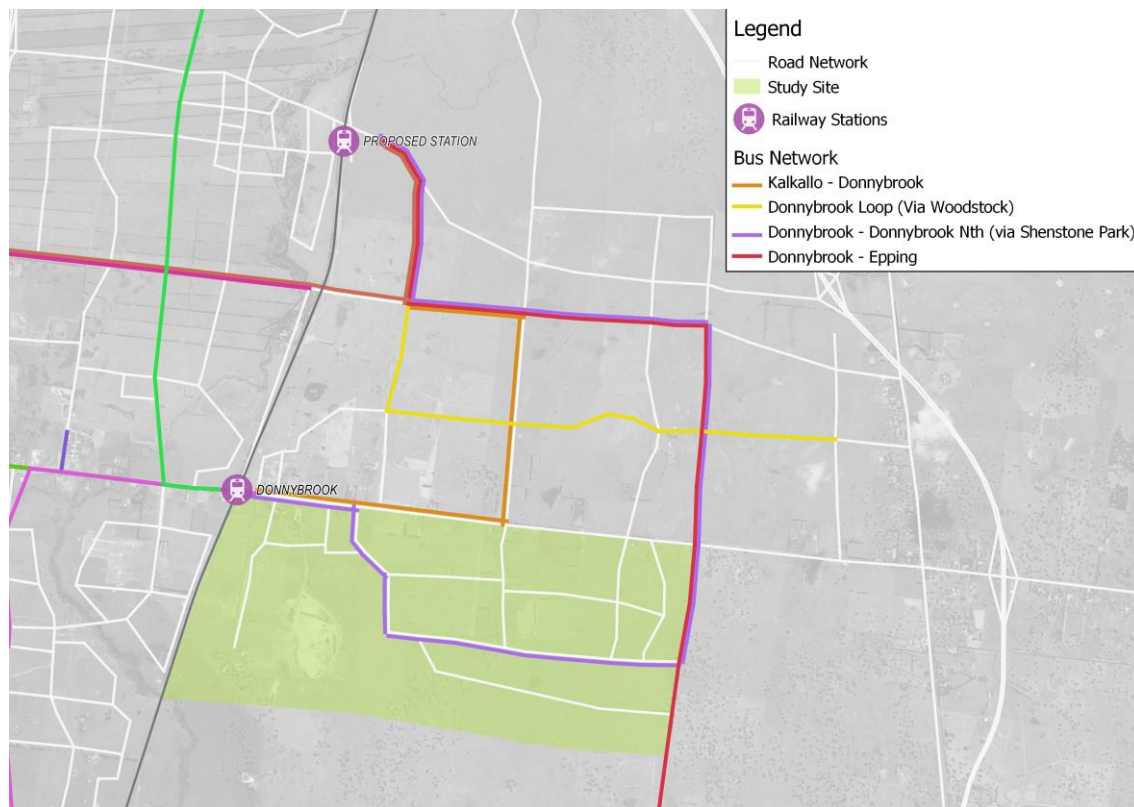


Table 4-1: Bus headway refinements

BUS ROUTE	Headway AM (Minutes)		Headway IP (Minutes)		Headway PM (Minutes)		Headway OP (Minutes)	
	Base	Modified	Base	Modified	Base	Modified	Base	Modified
Kalkallo - Donnybrook	40	20	40	20	40	20	40	20
Donnybrook Loop (Via Woodstock)	40	20	40	30	40	20	40	30
Donnybrook - Epping	15	15	15	15	15	15	15	15
Donnybrook North (via Shenstone Park) - Donnybrook	40	20	40	20	40	20	40	20

4.4.3. Land Use Refinements

In addition to the network and PT refinements, the land use demographic were updated to represent the expected population, employment and educational enrolments for each zone, as shown in Figure 4.2 and Table 4-2.

Figure 4.2: Shenstone Park PSP Land Use Yields by Zone (Full Development)



Table 4-2: Shenstone Park Land Use Summary (Full Development)

Year	Population (No. of People)	Household (No. of Dwellings)	Employment (No. of jobs)	Enrolment (No. of Students)
Full development	8,730	3,120	4,610	480

By full development, it is assumed that Shenstone Park PSP will be completed. Concerning the composition of land use, VPA has an aspiration for one job per household in the growth areas². Shenstone Park PSP meets this aspiration with 1.5 jobs per household.

4.4.4. Woody Hill Quarry

As previously mentioned, the Woody Hill Quarry is located within the Shenstone Park PSP. The quarry is an open-cut style mine with an open area of 45 ha. A first principles assessment of the quarry was conducted to gain an appreciation of the transport impact that the quarry would have in the immediate region (in terms of its industrial traffic nature). A first principles assessment is required as VITM typically doesn't model quarry traffic movements.

Analysis of Traffic Impact Assessments was conducted for two quarries within Australia, Lynwood Quarry (Marulan, NSW) and Maude-Shea Oaks Quarry (She Oaks, VIC). A ratio of daily Heavy Vehicle (HV) trip generation to total quarry area was calculated which found that both quarries had similar generation rates as shown in Table 4-3.

² VPA Strategic Plan 2017-2020, <https://vpa.vic.gov.au/about/vpa-strategic-plan-2017-2020/>

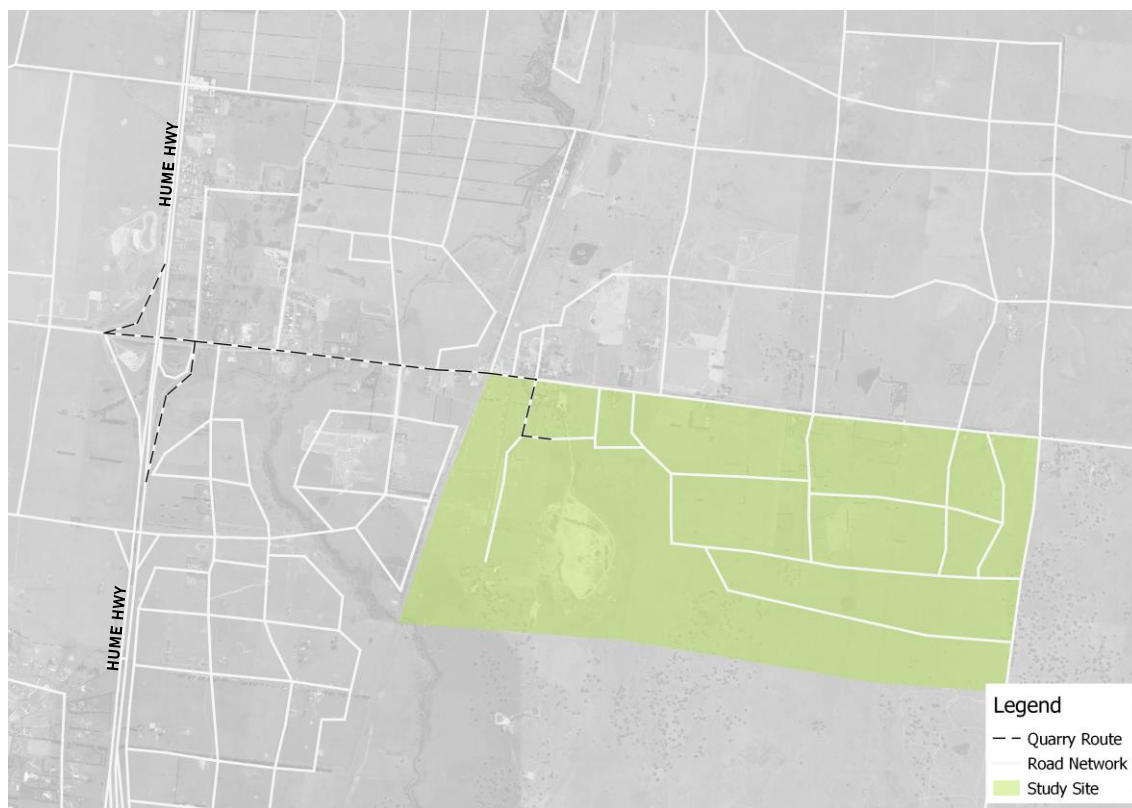
Table 4-3: First principles quarry assessment

	Total HV trips (veh/ha)
Lynwood Quarry	0.32
She Oaks Quarry	0.31

Using the higher of the two site from Table 4-3 (a ratio of 0.32 HV/ha) which will generate slightly more trips, it is estimated that the Woody Hill Quarry produces 15 HV trips daily (to and from quarry). Applying a Passenger Car Unit (PCU) of 2.3³, as standard within the NGC VITM, this equates to 35 daily car trips.

For the purposes of modelling, these vehicles have been assumed to travel from the quarry to the Hume Freeway / Donnybrook Road Freeway Entrance, to access metropolitan Melbourne is the quickest time.

Figure 4.3: Quarry route to and from Shenstone Park PSP



³ VicRoads Transport Modelling Guidelines Volume 3: Mesoscopic Modelling.

4.5. Model Outputs

Model outputs in terms of travel demand and network performance are analysed in this section to inform the road network requirements at full development.

4.5.1. Travel Demand Analysis

Trip Generation

Based on the land use inputs listed in Table 4-2, the Shenstone PSP will generate and attract approximately 41,000 daily vehicle trips at full development which is 20,900 trips generated and 20,400 trips attracted to the PSP. Table 4-4 summarises the peak one hour and daily trips generated by the Shenstone PSP.

Table 4-4: Shenstone PSP Vehicle Trip

Traffic Volumes	AM Peak (1 hour)	PM Peak (1 hour)	Daily
Generation	2,200	2,200	20,900
Attraction	1,700	2,400	20,400
Total	3,900	4,600	41,300

Shenstone Park attracts 700 more trips in PM peak due to retail and other business located in the precinct being open for customers in this period.

4.5.2. Validation of VITM Traffic Generation Rates

First Principles Generation Rates

A summary of the first principles traffic generation based on the anticipated land uses within the study area is provided in Table 4-5.

Table 4-5: First Principals Traffic Generation Assessment – Full Development

Land Use	Yield	Traffic Generation Rate			Reduction Factor for Internal Trips	Resultant Trips		
		AM (1hr)	PM (1hr)	Daily		AM (1hr)	PM (1hr)	Daily
Residential [1]	3,120 dwellings	0.6 trips/hh	0.6 trips/hh	6.0 trips/hh	n/a	1,870	1,870	18,720
Retail Employment (jobs)	200 jobs 6,000 sqm	0.55 trips/ job [2]	12.3 trips/ sqm [2]	121 trips/ sqm [2]	25% [3]	80	550	5,450
Non-Retail Employment (jobs)	4,380 jobs 131,000 sqm	0.52 trips/ GFA 100 sqm [4]	0.56 trips/ GFA 100 sqm [2]	4.6 trips/ GFA 100 sqm [4]	0% [3]	680	740	6,040
School	2,402 enrolments	0.8 trips/ enrol [5]	0 trips/ enrol [5]	1.6 trips/ enrol [5]	n/a	420	30	830
Total						3,050	3,190	31,040

[1] Daily rate based on VISTA data for the Whittlesea LGA, with the peak hour rates assumed to be 10% of the daily rate.

[2] Daily rate sourced from the RTANSW "Guide to Traffic Generating Developments" report (dated October 2002) with PM peak hour rate sourced from RTANSW "Guide to Traffic Generating Developments" report (dated August 2013). An AM rate of 0.55 trips per job has been adopted for vehicle movements given that the retail will not be fully operational during the AM peak hour.

[3] 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 retail, industrial and schools. Given the non-retail employment is different zones to the residential, no reduction was applied.

[4] Daily and peak rates sourced from the RTANSW "Guide to Traffic Generating Developments" report (dated August 2013) for Business parks and industrial estates.

[5] Based on a VISTA12-13 outer suburban primary school mode share for students, and a 2 trips per staff member per day, both in the peak

The assessment indicates that the site is expected to generate in the order of 3,000 trips/hr in the AM peak, 3,200 trips/hr in the PM peak and more than 31,000 trips across the day. It is important to note that the assessment is for trip generation and does not consider attraction. Generally, first principles assessments provide a higher estimate than strategic models which are due to the different purposes for each set of analysis (strategic versus localised).

It is noted that the first principles assessment outlined in Table 4-5 takes into consideration the results of the Victorian Integrated Survey of Travel and Activity undertaken by DoT. VISTA is a comprehensive survey of how, when and why Victorians travel and is both more recent and locality specific than most other available empirical data sources.

A direct comparison of the GTA VITM generation and first principles generation assessment is provided in Table 4-6.

Table 4-6: VITM versus First Principles Assessment (Full Development) - Base Scenario

Traffic Volumes	AM Peak	PM Peak	Daily
VITM	2,200	2,200	20,900
First Principle Assessment	3,050	3,190	31,040
% Difference	139%	145%	149%

Table 4-6 show that the forecast GTA VTIM traffic demands are generally within 50% to those of a first principles assessment. As discussed previously, some of the land use rates and yields can vary depending on the ultimate mix and density of development, and the strategic nature of VITM. It is noted that the VITM generally produces low traffic demands when compared with the first principles assessment due to short trips (trips within zones) being excluded from the model.

Mode Share

The proportion of mode share for trips generated by the PSP for car and public transport at full development is predicted to be 91% (car) and 9% (public transport) respectively. This equates to a generation of around 2,200 PT trips per day from Shenstone Park PSP. These results show that the modal distribution is favoured towards car-based trips.

4.5.3. Network Performance Analysis

Donnybrook Road and Koukoura Drive are two key arterial roads within the PSP which have been identified to report on a range of outputs including volumes and capacity information.

Degree of Saturation for Peak Period

The volume to capacity ratio (degree of saturation) is a good indicator as to the operation of the network at specific link locations. The volume to capacity ration (VCR) is also able to be correlated with the Level of Service definition as defined by Austroads outlined in Table 4-7.

Table 4-7: Peak Period (two hour) Volume to Capacity Outputs and Level of Service

LOS	Definition	Volume to Capacity Ratio
A	Conditions of free flow, speed is controlled by driver's desires, speed limits or physical Roadway conditions	0.0-0.35
B	Conditions of stable flow, operating speeds begin to be restricted, little or no restrictions on manoeuvrability from other vehicles	0.35-0.50
C	Conditions of stable flow, speeds and manoeuvrability more closely restricted, occasional backups behind left-turning vehicles at intersections	0.50-0.75
D	Conditions approach unstable flow, tolerable speeds can be maintained but temporary restrictions may cause extensive delays, little freedom to manoeuvre	0.75-0.90
E	Conditions approach capacity, unstable flow with stoppages of momentary duration, manoeuvrability severely limited	0.90-1.00
F	Forced flow conditions, stoppages for long periods, low operating speeds	1.00 or >1.00

The VCR outputs for the two key arterials have been extracted from the model and are summarised in Table 4-8. These represent the worst performing section of the roadways. Detailed diagrams showing V/C ratios are shown in Figure 4.4 and Figure 4.5 and larger map extents shown in Appendix B.

Table 4-8: Peak Period (two hour) Volume to Capacity Outputs and Level of Service

No	Road Name	Full Development	
		AM	PM
1	Donnybrook Road east of Melbourne-Seymour Railway Line (EB)	A	C
	Donnybrook Road east of Melbourne-Seymour Railway Line (WB)	B	A
2	Koukoura Drive south of Donnybrook Road (NB)	B	C
	Koukoura Drive south of Donnybrook Road (SB)	A	B

This indicated that the arterials roads that border Shenstone Park PSP will experience very low levels of congestion during the AM peak with congestion increasing during the PM peak in at full development, but not to any concerning levels. The proposed roadways are operating at acceptable levels of service during both peak periods.

Figure 4.4: Shenstone Park PSP Volume / Capacity Ratio (AM)

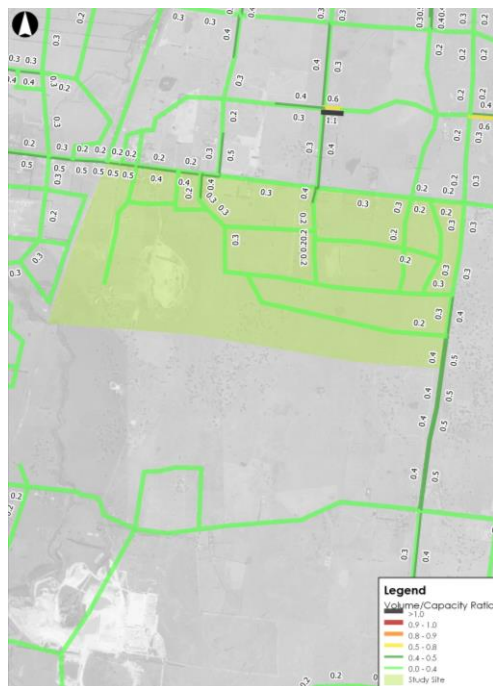


Figure 4.5: Shenstone Park PSP Volume / Capacity Ratio (PM)

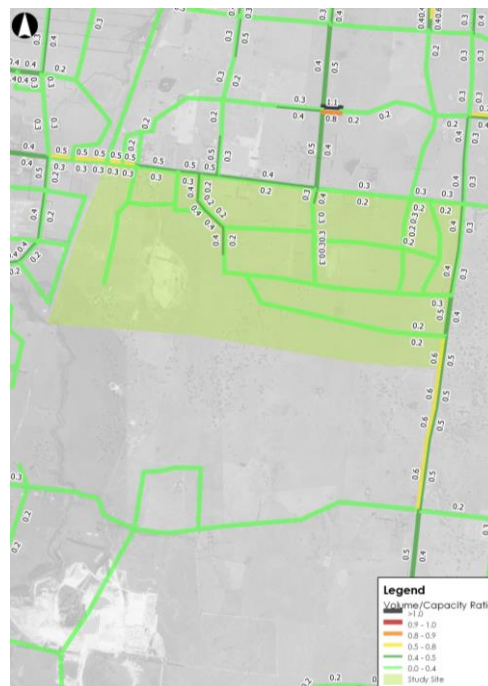


Figure 4.4 and Figure 4.5 show that the highest volume to capacity (VC) ratios occur on the southern end of Koukoura Drive, beyond the boundaries of Shenstone Park PSP and a 4-lane roadway is well suited for the modelled scenario. Directly adjacent to Shenstone Park PSP the VC ratio falls to between 0.3 and 0.4, it is possible that a 2-lane roadway may appropriately service this stretch however further investigation should be considered to confirm this.

Daily Volume vs Capacity Limit

Based on the outcomes of the VITM modelling, the expected two-way peak hourly traffic volumes on key roads for Full Development are summarised in Table 4-9.

Table 4-9: Summary of Peak Hourly Traffic Volumes on Key Roads (full development)

No.	Road Name	Expected AM Peak Hourly Traffic Volume[1]	Expected PM Peak Hourly Traffic Volume[1]	Proposed Classification and No. lanes	HCM Capacity Limit (based on No. lanes) (veh/h) [2]	Proposed Classification is Considered Appropriate?
1	Donnybrook Road	2,000	2,450	Arterial (4 lanes)	3080	Yes
2	Koukoura Drive	1,750	2,100	Arterial (4 lanes)	3080	Yes

[1] The peak hour volumes were assumed to be 55% of the 2-hourly volumes obtained from VITM.

[2] Capacity limits sourced from Highway Capacity Manual 2010, Exhibit 10-7 for Class III Urban Arterial Roads.

As shown, the volumes experienced are lower than the theoretical capacities provided, further indicating that the proposed road network will perform at acceptable levels at full development.

4.6. Model Plots

A range of outputs have been extracted from the model to assist in the understanding of travel demand for the ultimate development scenario. These outputs are located within Appendix A and Appendix B, and include the following;

- 2 Hour Vehicle Volumes for the AM and PM Peak
- Volume Capacity Ratio for the AM and PM peak
- Heavy Vehicle Volumes for the AM and PM peak
- Daily Volume Plots.

The volume plots show that there are large proportions of traffic travelling along the major arterial roads, especially Donnybrook Road which connects to the Hume Freeway. The western proportion of Shenstone Park PSP is largely commercial and thus generates AM peak trip attraction and PM peak trip generation which is reflected in the higher volumes on the connector roads linked to the commercial areas. By in large, the road network is performing at acceptable levels in both the AM and PM peak period.

Figure 4.6: Shenstone Park PSP Peak Hourly Volume (AM)



Figure 4.7: Shenstone Park PSP Peak Hourly Volume (PM)



Figure 4.6 and Figure 4.7 show that the area will experience generally higher traffic flows during the PM peak. Highest traffic volumes are experienced northbound on Kourkoura Drive and eastbound on Donnybrook Road in the PM peak.

Figure 4.8 below reveals that the daily vehicle trips exceed 11,000 in each direction on Kourkoura Drive south of Shenstone Park PSP and 12,000 in each direction along Donnybrook Road in the north-west corner of the PSP.

Figure 4.8: Shenstone Park PSP Daily Traffic Volumes



5. CONCLUSION

Strategic Transport Modelling of Shenstone PSP has been undertaken using the Victorian Integrated Transport Model (VITM) – Northern Corridor at full development. The information presented within this report documents the land use inputs, assumptions and resultant transport demand for the proposed network.

Key considerations of the assessment are as follows:

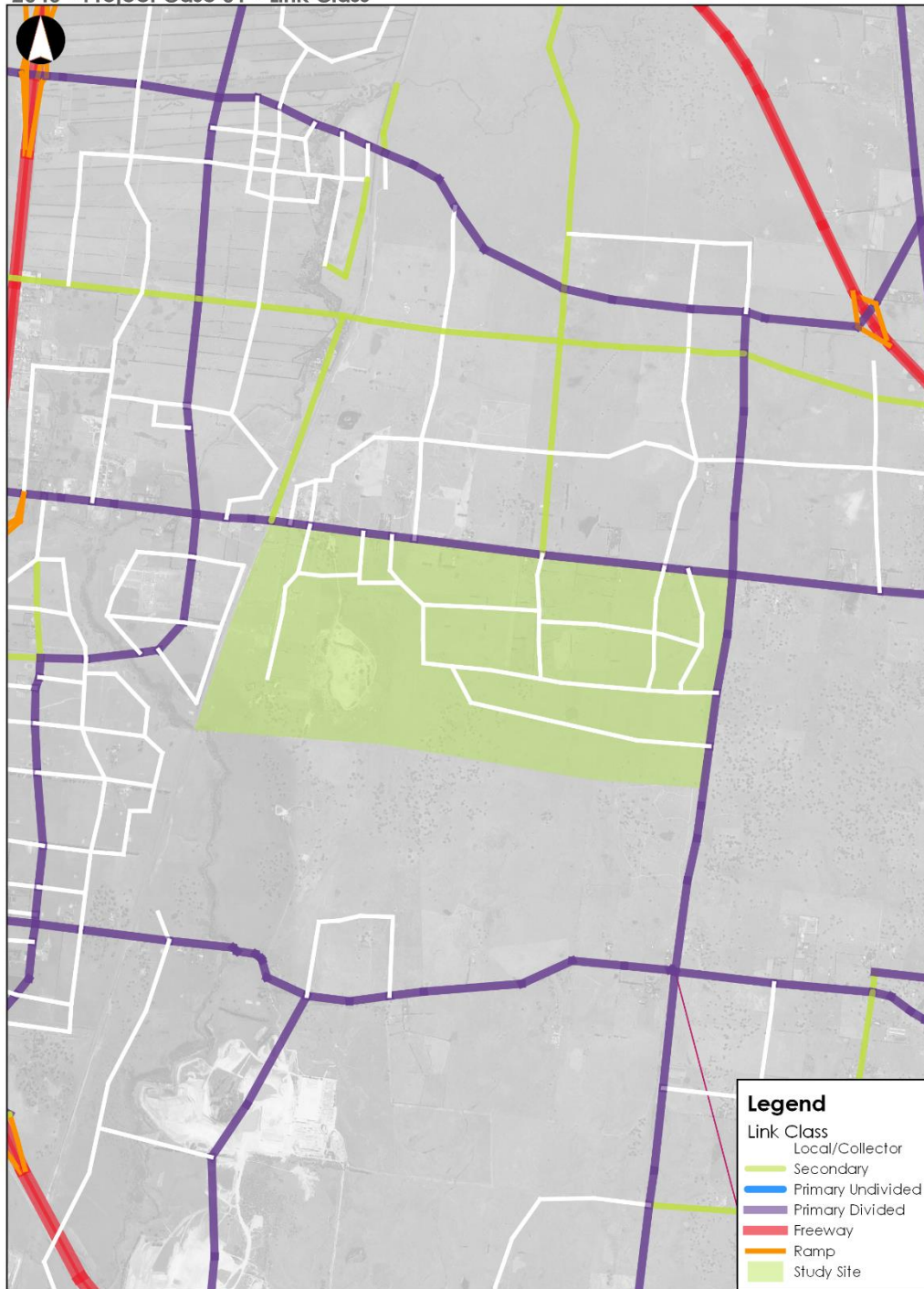
- Shenstone Park PSP meets and exceeds VPA's aspirations for one job per household for Melbourne's Growth Areas, with almost 4,610 jobs estimated to be provided.
- The modelling assumes that the Northern Growth Corridor will be fully developed, and the road network delivered by 2046.
- The majority of the employment opportunities are situated in the western half of the Shenstone Park PSP; this results in localised AM trip attractions and PM trip generations.
- The proposed Shenstone Park PSP's internal road network is minimally impacted by the trip generation of Woody Hill Quarry.
- Duplication of Koukoura Drive at full development ensures that traffic congestion along that road is minimised.
- Donnybrook Road and Koukoura Drive both operate at acceptable level of services during peak periods at full development.

Overall, the proposed future (ultimate) road network within Shenstone Park PSP will perform at an acceptable level depicted in the Urban Structure Plan.

A. MODEL INPUTS



Shenstone Park PSP - Modelling
2046 - Project Case 01 - Link Class



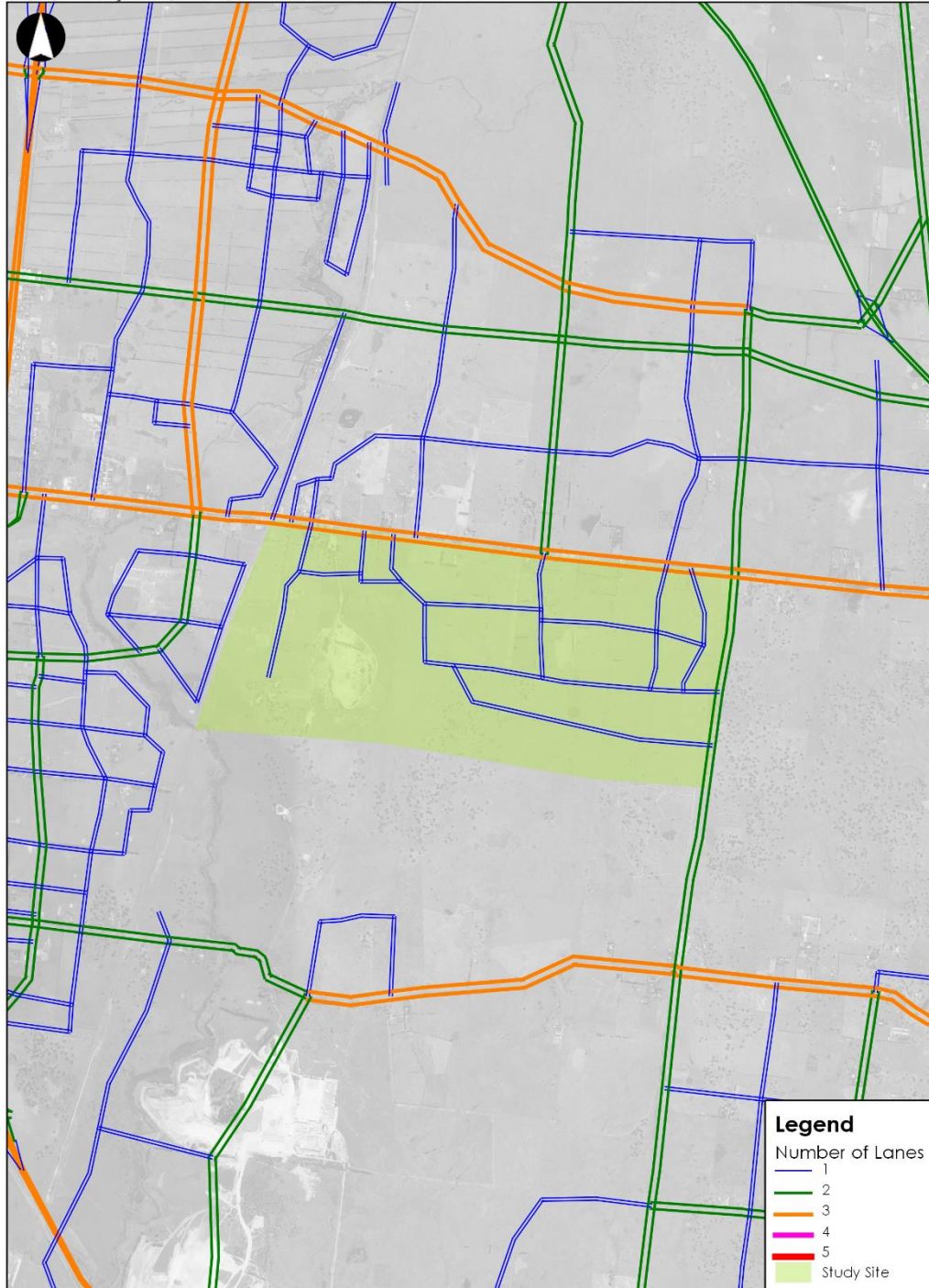
04/07/2019

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V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling
2046 - Project Case 01 - Number of Lanes

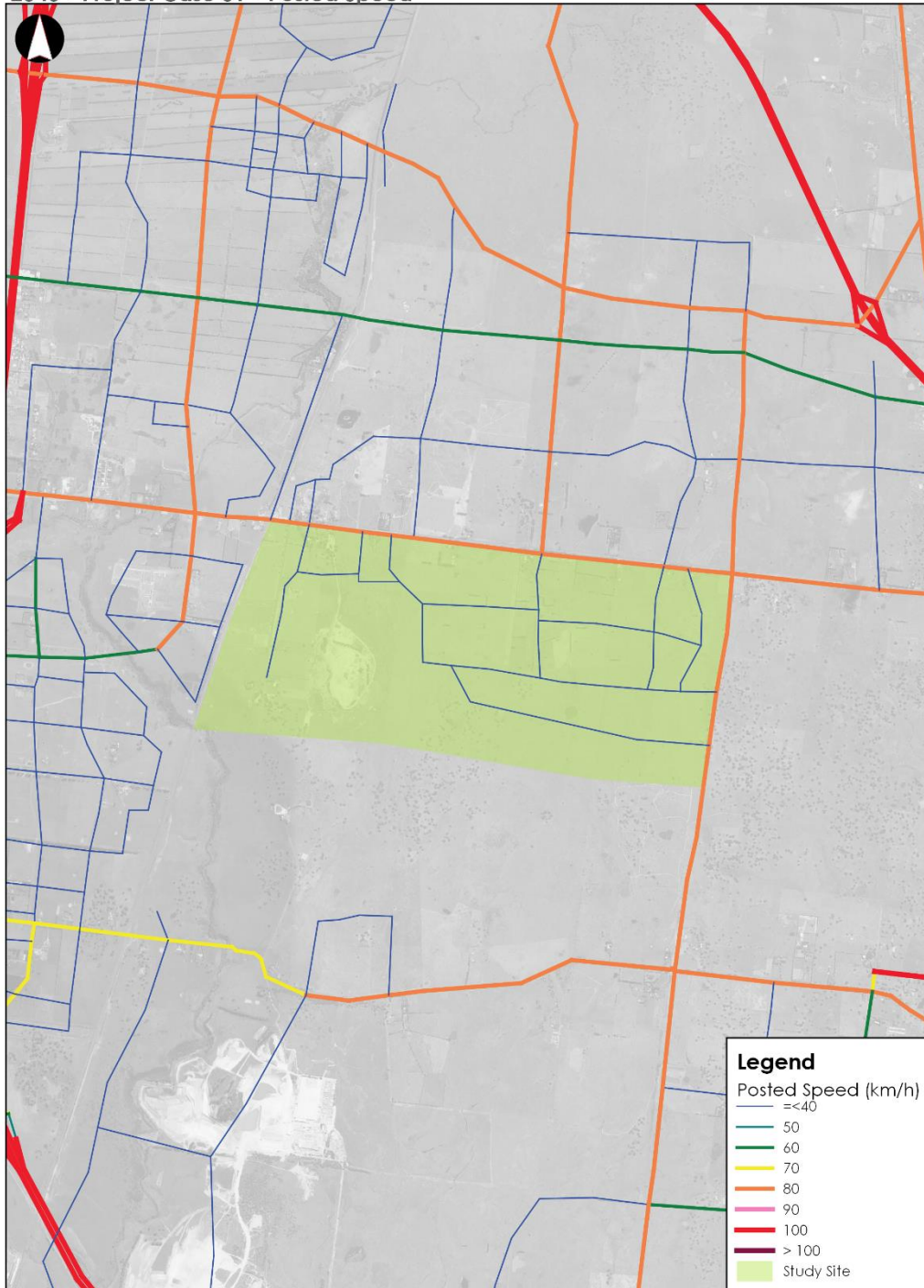


04/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC

Shenstone Park PSP - Modelling
2046 - Project Case 01 - Posted Speed



04/07/2019

Issue: A

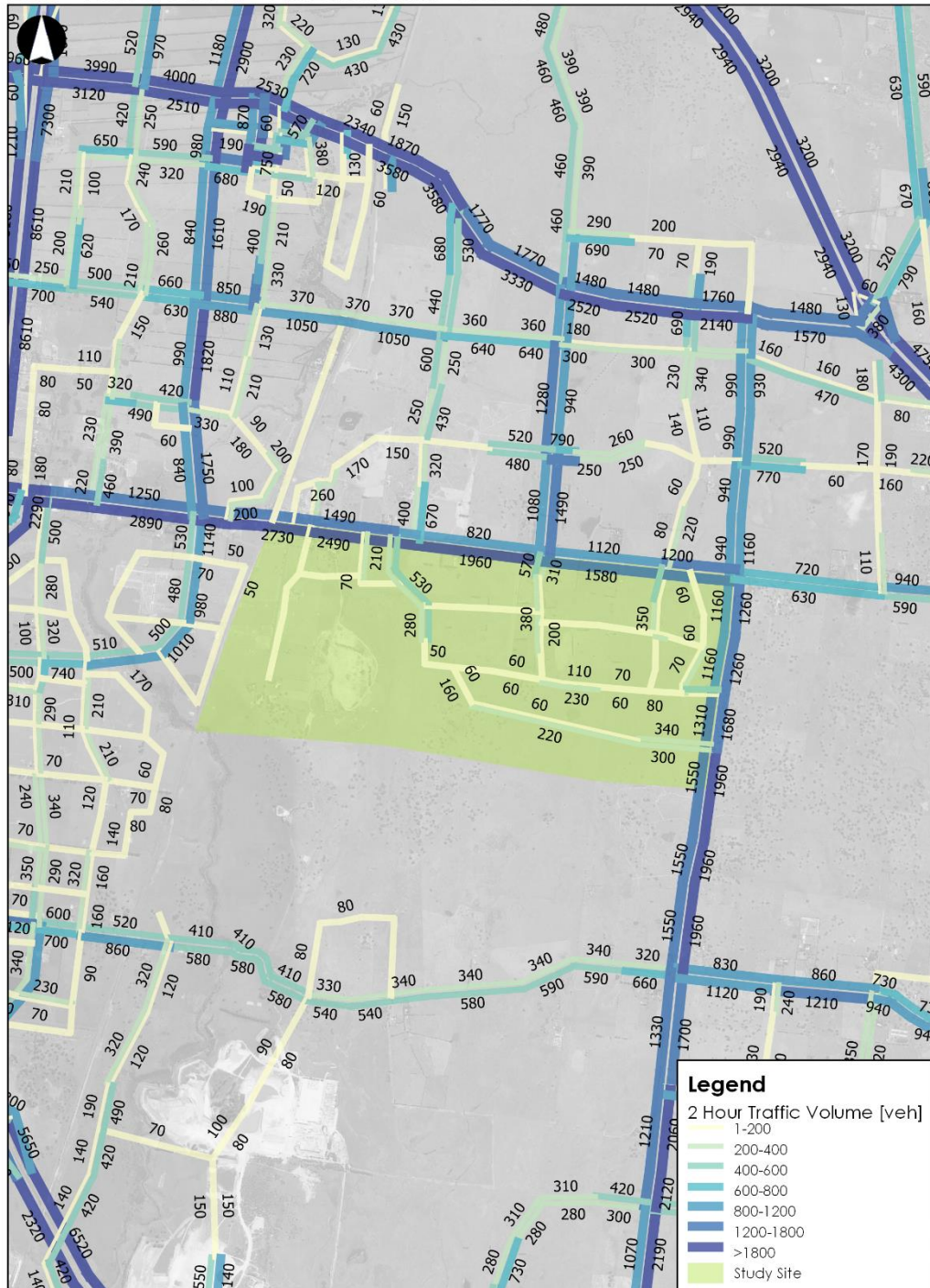
V133520 - VITM2012_V120110 GAA NGC



B. MODEL OUTPUTS

B

Shenstone Park PSP - Modelling
2046 - Project Case 01 - AM 2 Hour Traffic Volume



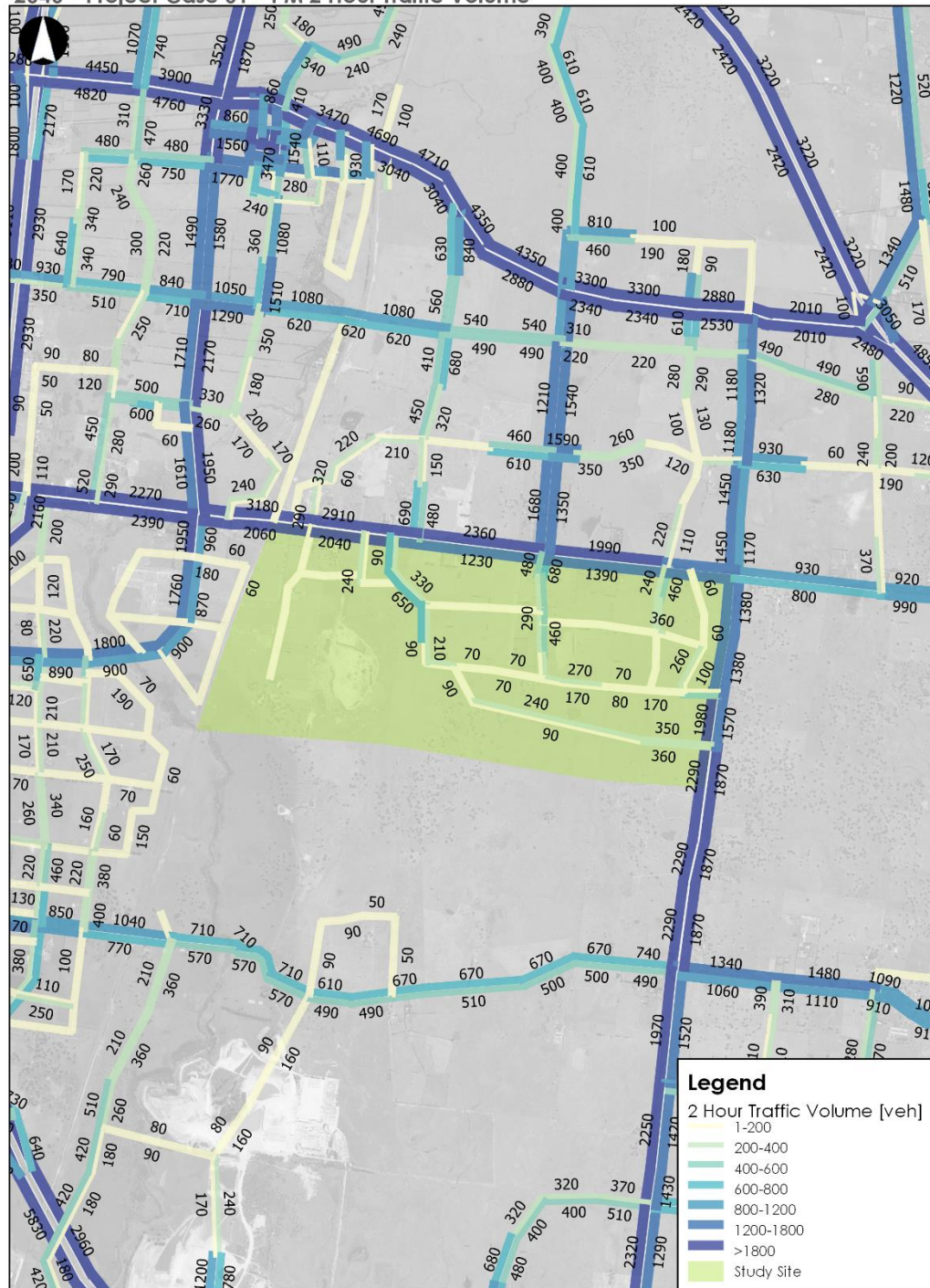
04/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling
2046 - Project Case 01 - PM 2 Hour Traffic Volume



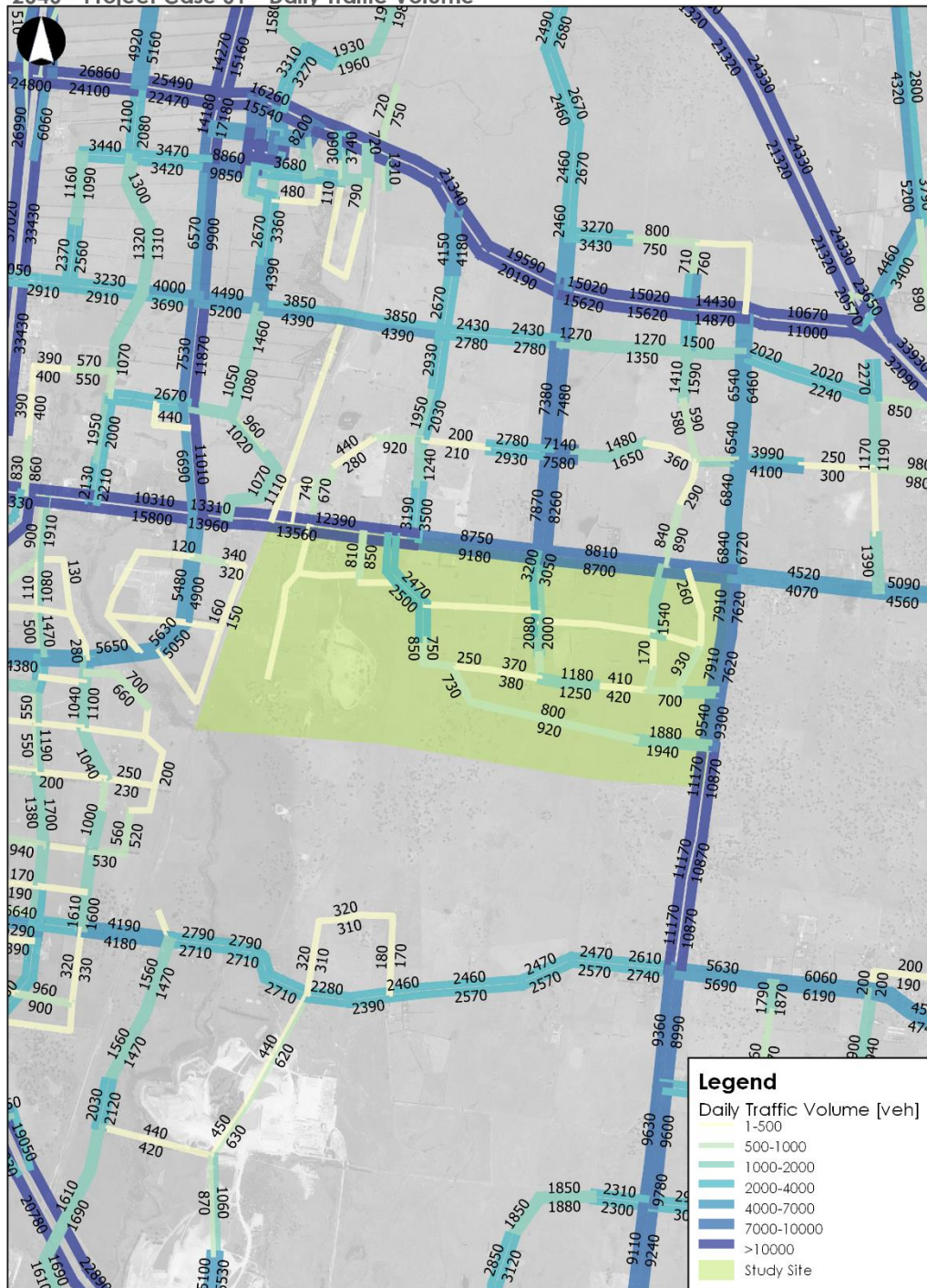
04/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling 2046 - Project Case 01 - Daily Traffic Volume

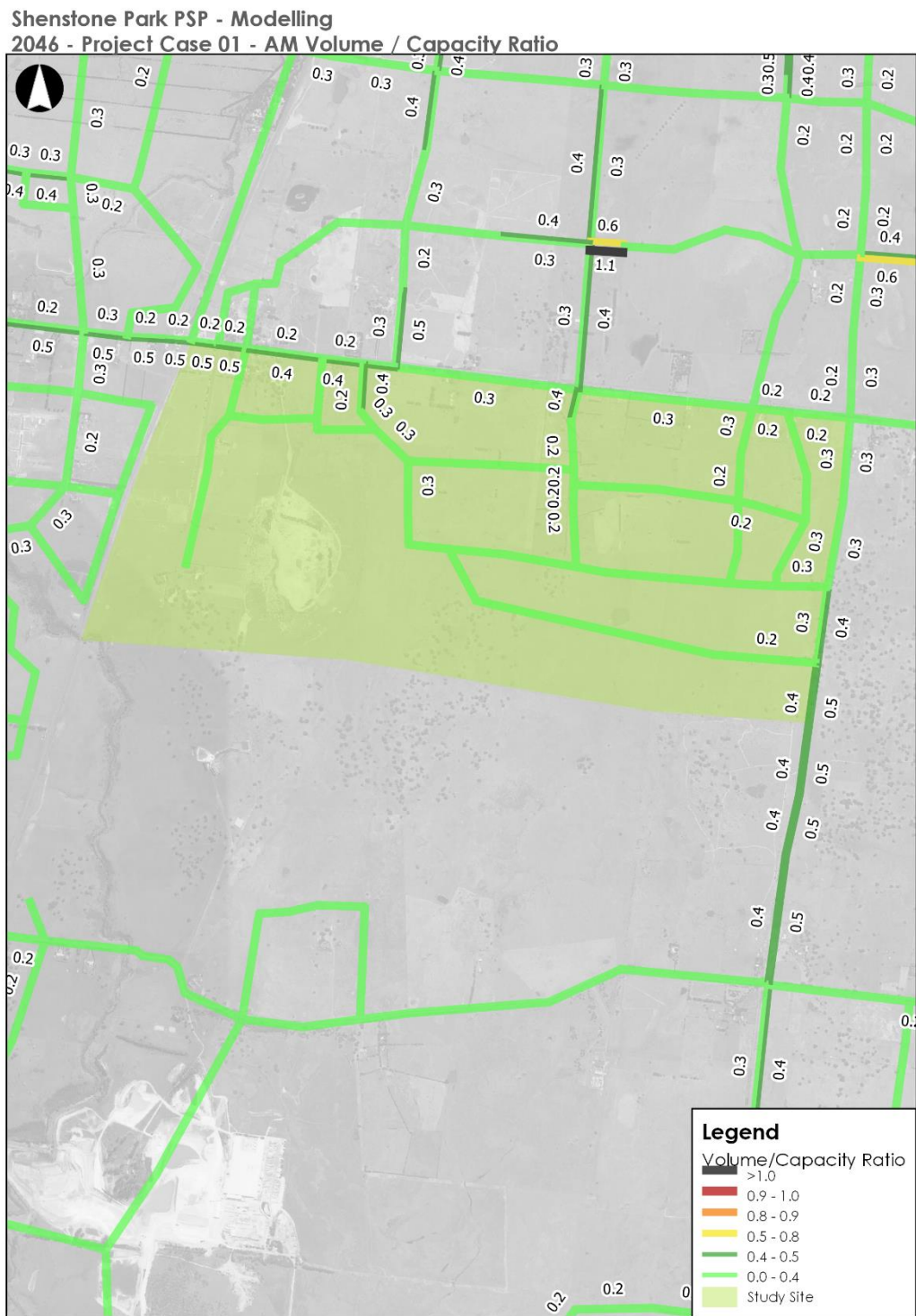


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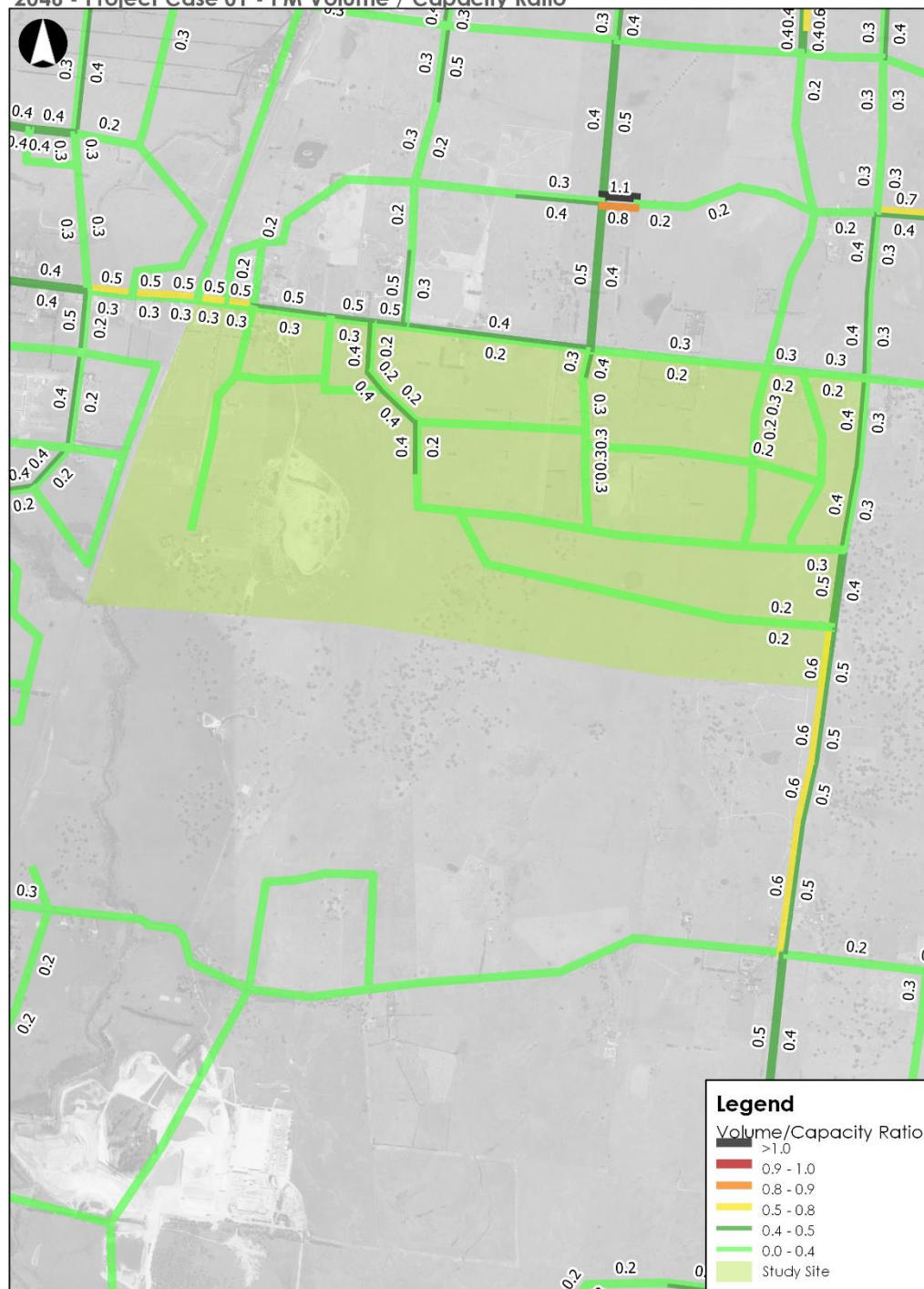
10/07/2019

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V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling
2046 - Project Case 01 - PM Volume / Capacity Ratio



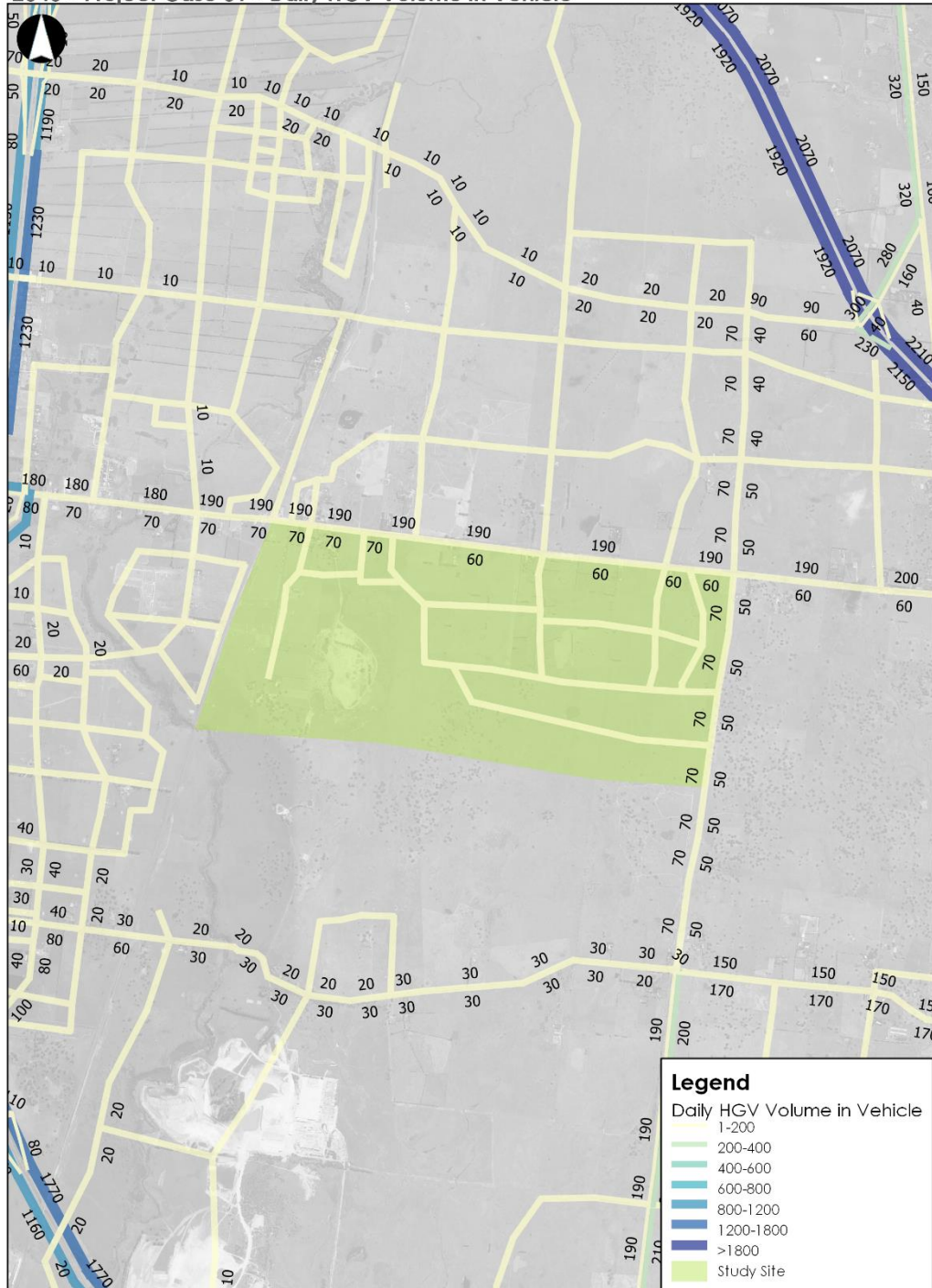
10/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling
2046 - Project Case 01 - Daily HGV Volume in Vehicle



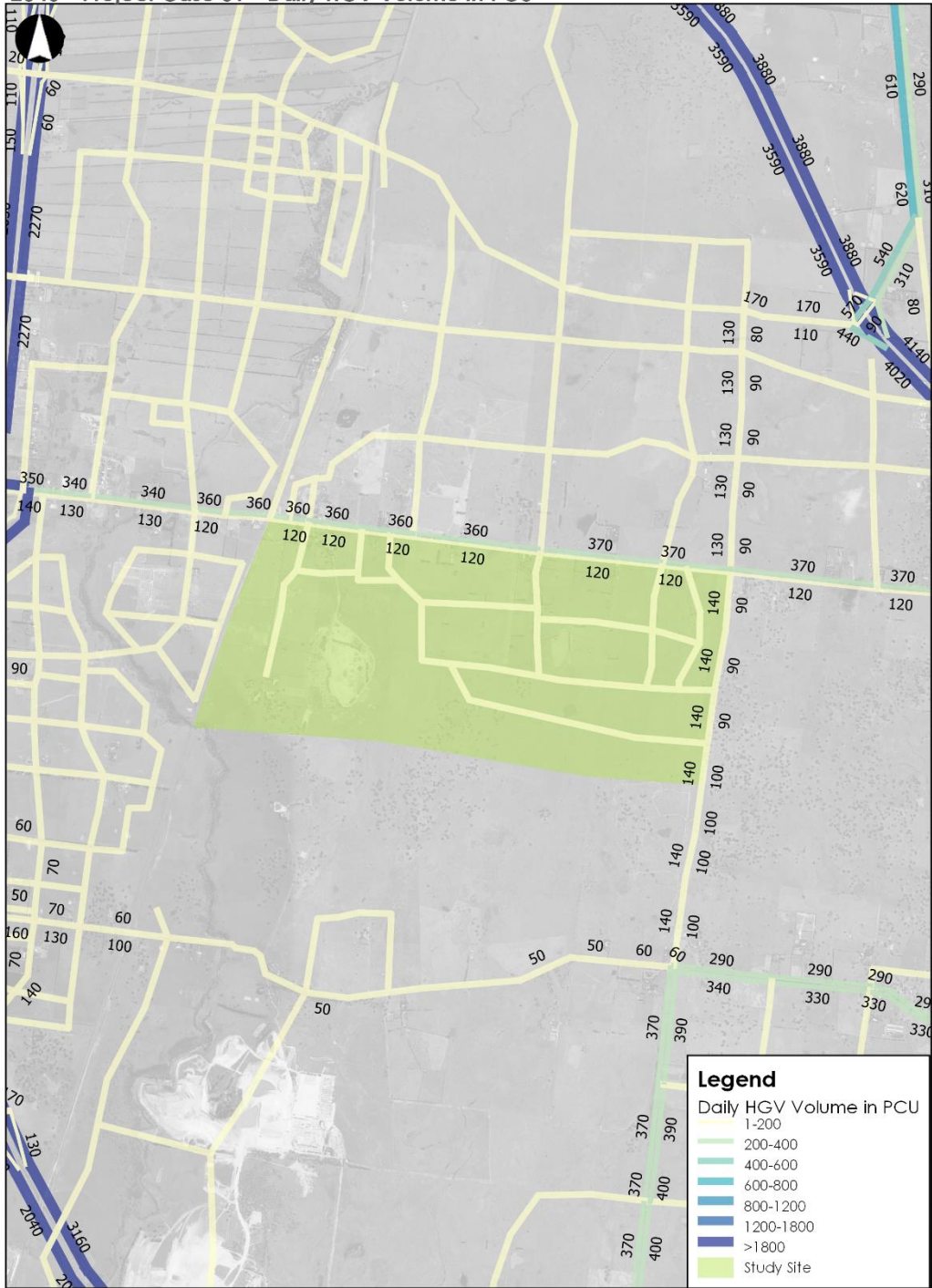
04/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC



Shenstone Park PSP - Modelling
2046 - Project Case 01 - Daily HGV Volume in PCU



04/07/2019

Issue: A

V133520 - VITM2012_V120110 GAA NGC



