Prepared for

ALTIS PROPERTY PARTNERS & FRASERS PROPERTY AUSTRALIA

Traffic Impact Assessment

State Significant Development Application
Mamre South Precinct - Warehouse & Logistics Hub
657-703 Mamre Road, Kemps Creek

Ref: 0584r02v06
13/05/2019

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1 Introduction

1.1 Overview

Ason Group has been commissioned by Altis Property Partners (Altis) and Frasers Property Australia (FPA) to undertake a Traffic Impact Assessment (TIA) in relation to a development at 657 - 753 Mamre Road in Kemps Creek (to be known as the Mamre South Precinct – MSP), within the Penrith City Council (PCC) Local Government Area. As a State Significant Development Application (SSDA), the application – for construction and operation of a warehouse, industrial and logistics hub (refer **Figure 1)** - is to be submitted to NSW Department of Planning & Environment (DP&E). The SSDA comprises two precincts to be located on either side of Bakers Lane as shown in below figure.

Figure 1: MSP SSDA Plan

A Response to the Secretary's Environmental Assessment Requirements is provided in the following section.

1.2 Response to SEARs

The Secretary's Environmental Assessment Planning Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) is included in **Appendix A**.

A summary of relevant SEARs requirements relating to the traffic and transport related aspects is presented in **Table 1**. This also includes reference to the relevant sections of the TIA where each requirement is addressed.

Table 1: Response to SEARs

Requirement	Relevant Section of TIA
A quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines.	This Traffic Impact Assessment (TIA), covers all critical expectations of the Council, Austroads and RMS for traffic reporting and is in line with the TIA structure and checklist suggested by TfNSW (TfNSW, *Draft Guide to Transport Impact Assessments*, 2018).
Details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation.	Daily and peak hour traffic generation figures for the SSDA is provided in Section 5.2 which provides context on the anticipated traffic volumes of the Proposal on the surrounding road network. It is expected that separate Construction Traffic Management(s) would be prepared for each Lot which will discuss the anticipated construction traffic volumes.
Impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development.	SIDRA analysis for relevant modelling scenarios have been undertaken and included in Appendix D. Essentially the SIDRA performance reviews for the "Existing + SSDA" scenario is addressed in Section 5.5.
Demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development.	Relevant parking rates based on Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments*, are included in Section 6.1. These rates are sought for the SSDA and addressed in Section 6.2.
Details and a justification of access to, from and within the site (vehicular and pedestrian).	Details SSDA access arrangements are provided in Section 2.
Details of road upgrades, new roads or access points required for the development, if necessary.	A number of road / intersection upgrades are envisaged in this vicinity. Identified upgrades to support non-development traffic is discussed in Section 4. Additional upgrades (or required connections to the regional road network) are discussed in this section.
Consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS.	Reference should be made to the above Sections with regard to future road upgrades both "with" and "without" development of this Site.

Requirement	Relevant Section of TIA
Consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW.	It is our understanding that some initial consultation has been undertaken with TfNSW and, in response, the Proposal sets aside land along the northern boundary to allow for the possible future freight rail corridor.
Details of how the proposal would allow connection to future land uses to the south of the site.	No connection is deemed necessary due to individual sites developing and having their own access to Mamre Road.

It is anticipated that the construction vehicles will access to/from the Proposal via Mamre Road. However, it is noted that a detail Construction Traffic Management Plan (CTMP) for the Proposal is not part of the scope of this TIA.

It is expected that a CTMP will be prepared for the SSDA development prior to issue of the Construction Certificate (CC). That CTMP will have detailed information regarding the construction work and its associated traffic impact on the surrounding road network.

1.3 Objectives

The key objectives of this TIA are:

- To assess the impact of the proposal on the performance of the road network in the proximity of the Site; and
- Where required, identify necessary upgrades to mitigate any adverse impacts.

1.4 Methodology

To achieve the above objectives, Ason Group has undertaken the following tasks:

- Commissioned and reviewed traffic data for the key intersections in the locality. The existing traffic volumes were surveyed to assist with developing a Base Case.
- Reviewed the planned future road network to establish context for any required road infrastructure improvements.
- Obtained EMME model future traffic volume forecasts from RMS to establish Future (Year 2036) Base Case network volumes.
- Undertaken a detailed assessment of the traffic generation and distribution characteristics of the project.

- Undertaken a detailed review of the mid-block capacity on the surrounding road network under the following scenarios:
  - Existing – May 2018.
  - Future (Year 2036) Base Case based on RMS upgrade plans for the locality.
  - An alternative Future Base Case (Project Case) which is developed based on the outcome of this TIA.
  - Existing Base Case + SSDA. This scenario also considers the traffic generation from Stage 1 of MWP.
  - Project Case + A possible future built form on the MSP.
- Assessed the performance of the key intersections, using SIDRA Network, for the above-mentioned scenarios. In this regard, the key intersections have been identified as those intersection along Mamre Road between Mandalong Close and Bakers Lane (inclusive).

1.5 References

In preparing this report, Ason Group has referenced the following documents:

- *Mamre West Land Investigation Area, Planning Proposal Mamre Road, Western Sydney Priority Growth Area*, prepared by Ason Group (ref: 0124r03v3) and dated 23 February 2016 (MWP TIA).
- *Stage 1 SSDA, Proposed Warehouse and Logistics Hub; 585-649 Mamre Road, Orchard Hills, Western Sydney Priority Growth Area* (the SSD TIA), prepared by Ason Group (ref: 0124r04v2) and dated 5 April 2016. This report was submitted as a State Significant Development (SSD) application for Stage 1 (Lots 7, 8 and internal roads) of the Mamre West Precinct.
- *Mamre Road Upgrades Kerrs Road to M4 Motorway*, prepared by Roads and Maritime Services (RMS) and dated November 2017.

In addition, this TIA also refers to the following general guidelines and Standards:

- Roads and Maritime Services (RMS), *Guide to Traffic Generating Developments*, 2002 (RMS Guide).
- Roads and Maritime Services (RMS), *Guide to Traffic Generating Developments Updated Traffic Surveys*, 2013.

1.6 Report Structure

The remainder of this report is structured as follows:

- Section 2 Provides a detailed overview of the Project.
- Section 3 Describes existing conditions including the road network and accessibility to alternate (non-car transport modes).
- Section 4 Provides the future context for the Site and surrounding area and outlines future traffic volumes and planned upgrades.
- Section 5 Assesses the impacts of the SSDA traffic volumes.
- Section 6 Assesses the car parking demand and supply for the proposed SSDA.
- Section 7 Assesses the impacts of a possible future built form on the entire MSP site and identifies necessary upgrades and relevant controls applicable to subsequent stages of the development such as parking rates and access provisions. It is noteworthy that any further development stages will be subject to separate applications.
- Section 8 Presents the study conclusions.

2 Overview of Proposal

A detailed description of the proposal is provided in the planning submissions prepared by Willowtree Planning. Reference should also be made to the relevant plan included in **Appendix B**. Nevertheless, a summary of the key aspects relevant to this traffic and transport assessment are provided below.

2.1 Proposed Development Characteristics

An overview of the proposed SSDA access strategy is presented in below figure. The SSDA will comprises:

- A total of 163,671m^2 of building floor area, comprising:
  - 155,411m^2 warehouse GFA; and
  - 8,260m^2 of ancillary office.
- Primary access from Bakers Lane (west) to the existing signalised intersection of Mamre Road / Bakers Lane, with appropriate upgrades to the Bakers Lane (west) approach and broader signal operations.
- A secondary LILO access from Mamre Road is also proposed at the southern end of the subject development.

Figure 2: SSDA Access Strategy

2.2 Potential Future Master Plan (not part of this application)

Whilst not part of this application but for the purpose of future traffic assessments included in this TIA, we have been advised for a possible overall built form scheme and future access strategy for the entire Site. The future built form is broadly expected to include:

- A total of 511,871m^2 of warehouse building floor area, comprising:
  - 486,361m^2 warehouse GFA; and
  - 25,510m^2 of ancillary office.
- New internal roads.
- A new connection to the (future) external road network, being a new signalised connection to Southern Link Road, if to be extended west of Mamre Road by RMS / DPE in the future, and

- Upon construction of the Southern Link Road, the Bakers Lane / Mamre Road intersection would be closed, and access would instead be provided by the (signalised) intersection of Southern Link Road / Mamre Road (yet to be determined by the State and Local Government agencies).

It is important to note that this additional scope for modelling associated with this Master Plan does not relate to this SSDA - future stages being subject to subsequent DAs - and is only provided for context to inform the required future upgrades on the surrounding road network.

3 Existing Conditions

3.1 Site Location

The Site is located within the Penrith City Council LGA and is bordered by Mamre Road to the east; the Sydney Water Warragamba Pipeline to the north; South Creek to the west; and rural land to the south. Properties included within the Site are as follows:

- Lot 34 in DP1118173
- Lot X in DP421633
- Lot Y in DP421633
- Lot 1 in DP1018318
- Lot 22 in DP258414

3.2 Existing Site Traffic Generation

The Site does not currently generate any significant traffic volumes. As such, and for the purposes of a conservative assessment, the additional traffic associated with the development is considered as a NET increase in traffic to the surrounding road network.

3.3 Road Network

With reference to **Figure 3**, the key local roads influenced by the application include:

- Mamre Road – an arterial road servicing traffic between the Great Western Highway and M4 to the north and Elizabeth Drive to the south. In the vicinity of the MSP, Mamre Road generally provides 2 lanes for two-way traffic, with additional through movement and turning infrastructure at key intersections, specifically at Erskine Park Road and James Erskine Drive. Mamre Road has a posted speed limit of 80km/h.
- Erskine Park Road – a sub-arterial road servicing traffic between the Great Western Highway and M4 to the north, Mamre Road to the south-west, as well as linking Lenore Drive (Erskine Park Link Road) to the M7 to the east. Erskine Park Road provides 4 lanes for two-way traffic north-east from the intersection of Mamre Road. Erskine Park Road has a posted speed limit of 70km/h.
- James Erskine Drive – a local industrial access road, providing local access for the Erskine Park Industrial Precinct, which lies to the east of Mamre Road, northeast of the Precinct. James Erskine Drive provides 4 lanes for two-way traffic and provides additional turning infrastructure on the approach to Mamre Road. On-street parking is permitted; however, demand for this parking is low and therefore rarely used.

- Bakers Lane (East) – a two lane undivided Local Road which operates under a 60km/hr sign posted speed limit. Bakers Lane (East) provides primary access to a number of local schools and colleges in the area, with School Zone speed limit restrictions (40km/h) in operation during school peak periods. At discussed previously, at present, Bakers Lane (East) forms a Signalised T intersection with Mamre

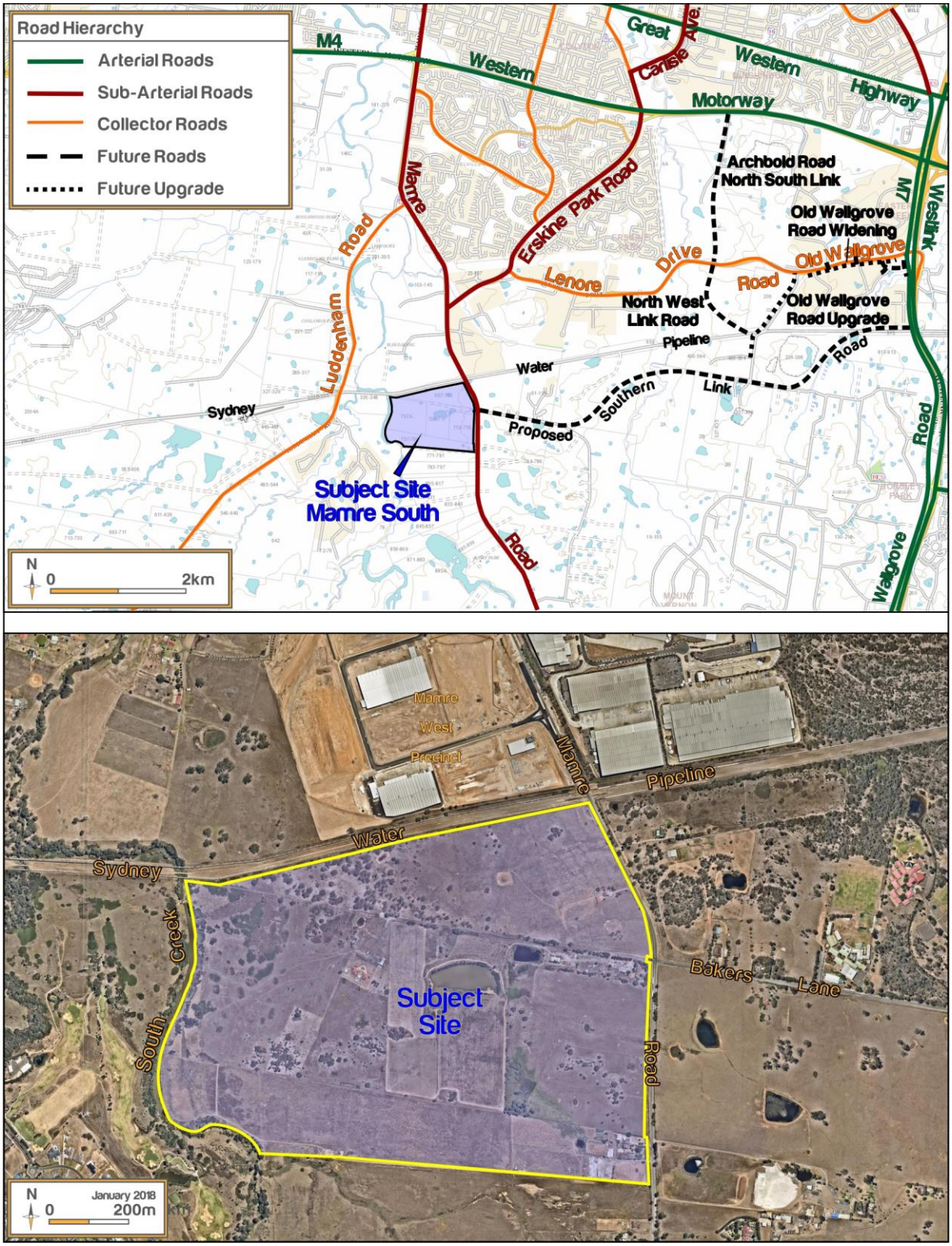

Figure 3: Existing Road Network

3.4 Key Intersections

The key intersection in the vicinity of the MSP is the existing Signalised intersection of Mamre Road / Bakers Lane which is shown in **Figure 4**.

Figure 4: Existing Intersection of Mamre Road / Bakers Lane

At present this intersection effectively operates as a Signalised T intersection, with the Mamre Road and Bakers Lane (East) approaches under signal control, while the minor Bakers Lane (West) approach operates under priority (Stop) control. It is noted that Bakers Lane (West) currently provides for a minimal amount of construction traffic only, with less than 3 veh/hour in both the AM and PM peak periods.

The intersection currently provides the following turning infrastructure: -currently offers:

- A short left-turn lane, Mamre Road to Bakers Lane (East)
- A short right turn lane, Mamre Road to Bakers Lane (East).
- A short-left turn lane, Bakers Lane (East) to Mamre Road.

It Is noted that there are currently no restrictions to movements to or from Bakers Lane (West).

The performance of this intersection during the AM and PM peak periods have been assessed further to on-site observations and using SIDRA Network software.

In general, the on-site observations confirm a significant school traffic demand through the intersection, particularly during the PM peak period. The SIDRA results for the existing scenario will be discussed in further details in Section 3.5.

Other key intersections in this vicinity which have been reviewed as part of this TIA are shown in **Figure 5** and are as follows:

1. T-intersection of Mamre Road / Mandalong Close.
2. Signalised intersection of Mamre Road / Erskine Park Road.
3. Signalised intersection of Mamre Road / James Erskine Drive.
4. Signalised intersection of Mamre Road / Mamre West Precinct.

Figure 5:Key intersections in the vicinity of the Site

3.5 Existing Network Traffic Volumes

The existing traffic volumes at key intersections in this vicinity were surveyed during weekday AM and PM peak periods, on a typical weekday in May 2018. The results of the traffic surveys are detailed in **Appendix C1**.

3.6 Mid-block Traffic Volumes

To get a better appreciation of the average weekday mid-block traffic volumes on Mamre Road (between Bakers Lane and James Erskine Drive) Ason Group undertook a 7-day (tube count) surveys. A summary of the existing 2018 directional mid-block traffic volumes in Mamre Road and Bakers Lane (East) in the immediate vicinity of the Site is provided below. This includes the applicable Level of Service (LoS) for each period, based on the RMS Guide criteria, noting again that Mamre Road is a two-lane undivided road with central line-marking in the vicinity of the Site.

Table 2: Existing Mid-block Traffic Volumes

Road Section	Period	Existing Traffic Volumes (AWT)	LoS
Mamre Road north of Bakers Lane	AM	2,215 NB = 1,094 SB = 1,121	NB = E SB = E
	PM	2,085 NB = 1,114 SB = 971	NB = E SB = E
Mamre Road south of Bakers Lane	AM	1,391 NB = 782 SB = 609	NB = D SB = D
	PM	1,541 NB = 678 SB = 863	NB = D SB = D
Bakers Lane East of Mamre Road	AM	1,085 WB = 413 EB = 672	WB = C EB = D
	PM	734 WB = 536 EB = 198	WB = C EB = A

Note (1): NB = North Bound direction & SB = Southbound direction

Note (2): Mid-block LoS criteria obtained from Table 4.4 of RMS *Guide to Traffic Generating Documents*.

The above table indicates that:

- Mamre Road mid-block traffic volumes during the AM and PM peak hours are essentially already at capacity. This strongly suggests that the (planned) duplication of Mamre Road may need to be investigated sooner than envisaged based on current planning / timing.
- The above analysis of Mamre Road nearing capacity was confirmed by on-site observations during AM and PM peak hours. Extensive queues were observed on Mamre Road in this vicinity of the MSP, particularly during the PM peak period.

3.7 Intersection Performance – Existing Baseline (May 2018)

The performance of the key intersections in the vicinity of the MPS has been analysed using the SIDRA Network Intersection computer program. SIDRA modelling outputs a range of performance measures, in particular:

- Average Vehicle Delay (AVD) – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- Level of Service (LOS) – This is a comparative measure that provides an indication of the operating performance, based on AVD.

The following table provides a recommended baseline for assessment as per the RMS Guide:

Table 3 : Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

The results of the SIDRA Network analysis are summarised in **Table 4**.

Table 4: SIDRA Network Results – Existing Baseline (May 2018)

Intersection	Period	Intersection Delay	Level of Service
Mamre Road / Bakers Lane	AM	29.6	C
	PM	139.5	F
Mamre Road / Mamre West Precinct Access	AM	na	na
	PM	na	na
Mamre Road / James Erskine Drive	AM	10.6	A
	PM	15.1	B
Mamre Road / Erskine Park Road	AM	23.9	B
	PM	29.1	C
Mamre Road / Mandalong Close	AM	2,545.3 (23.7)	F
	PM	283.5 (2.5)	F

Notes 1: The traffic associated with the signalised intersection of Mamre Road / MWP access was not fully settled at the time of preparation of this TIA and as such the existing baseline does not allow for assessment of this intersection.

2: The intersection of Mamre Road / Mandalong Close has is an existing intersection. It is important to note that this intersection is proposed for LI/LO in future and will operate satisfactorily under future scenarios (refer **Table 21**).

3: Figure in brackets () reflects average intersection performance for unsignalised intersection.

It can be seen from above that a number of intersections "fail" under existing conditions, with a LoS F in one or more periods. A number of upgrades have been identified for the road network to address these issues and support further growth, as discussed in Section 4.

3.8 Public Transport

3.8.1 Existing Bus Services

The existing bus services in the vicinity of the MSP are shown in **Figure 6**.

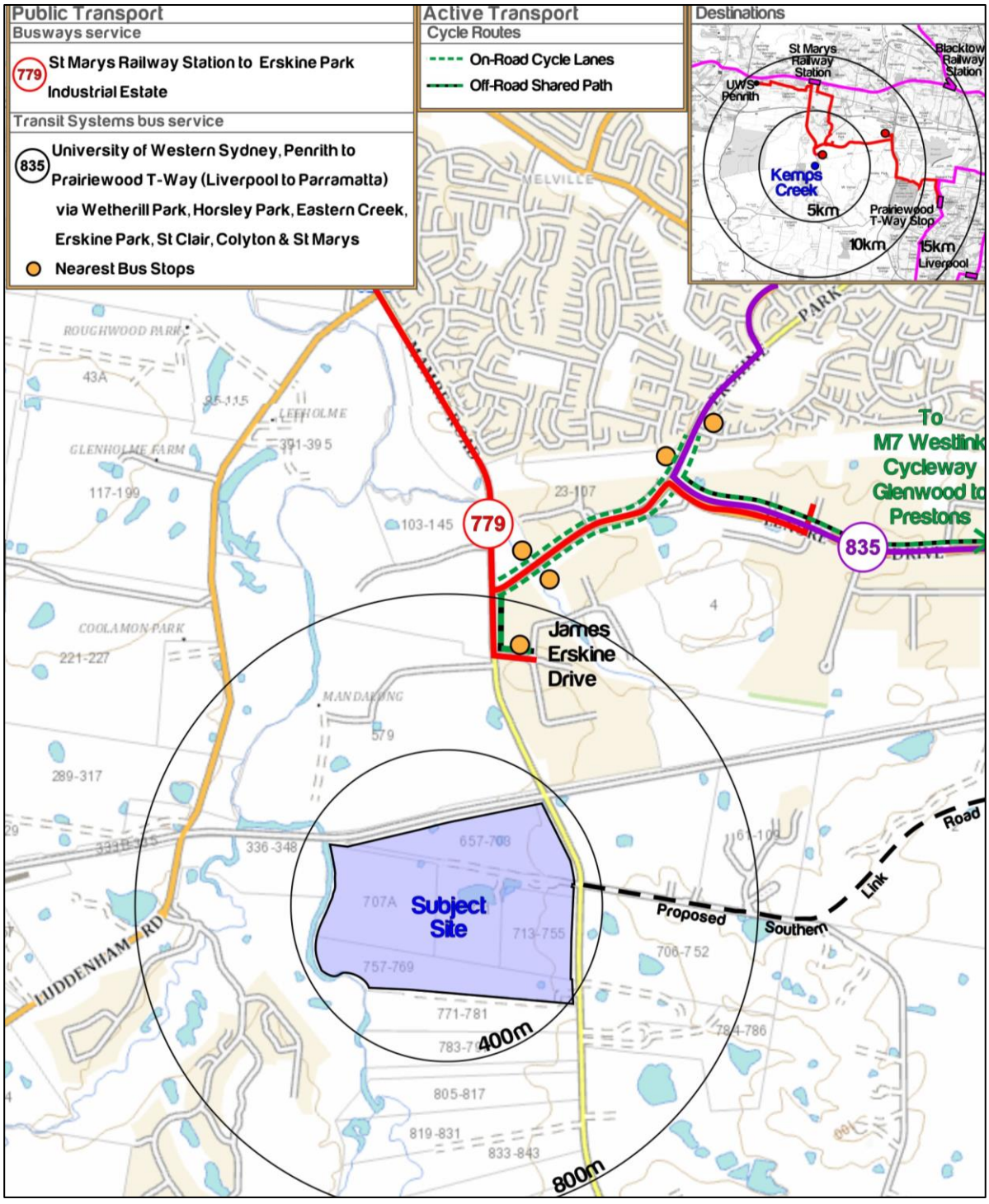

Figure 6: Public Transport Services & Cycling Routes

It is evident that the MSP is not directly serviced by public transport operations at this time. Notwithstanding, opportunities for future connections have been identified and are discussed further below.

3.8.2 Future Bus Service Opportunities

While it is apparent that the MSP will be well served by a future road network, it is nonetheless important that people have the opportunity to use public transport, which requires significantly improved connectivity to the broader area in the first instance. This could be possible through an extension of the 779-bus route to include stops within the future internal road network of the MSP. This route would provide a direct connection to St Mary's railway station and to the broader transport network.

The planning of bus services in Sydney is governed by the *NSW Service Planning Guidelines*[1] which aims to establish Strategic Transport Corridors and a hierarchy of bus route types that:

- link to Regional centres (such as Penrith and Mt Druitt).
- pass through patronage generators such as district centres, TAFE colleges, hospitals and universities.
- connect with other transport modes (trains, ferries and other buses).
- are multifunctional (serving journeys to work, education, shopping and recreation).
- are direct and frequent.
- meet the network planning principles.

It is also the case that the establishment of public transport services as early as possible in the development stages of the area is important to achieve a culture of public transport use from the outset. To make public transport a viable choice in the study area, the services should ideally:

- integrate with existing bus services in the area.
- connect to regional centres of Penrith, Mt Druitt and Blacktown.
- in the long term connect to areas such as Leppington in the South West Growth Centre, Prairiewood and the Liverpool to Parramatta T-Way.

3.9 Cycling

There are existing opportunities and infrastructure for cyclists to access the Site via Mamre Road. Bicycle lanes are provided along Erskine Park Road and sections of Mamre Road, in addition to carriageway shoulders that could also be utilised by cyclists. Notwithstanding, there are opportunities to improve cycling infrastructure through the provision of shared paths along Mamre Road fronting the MSP that could be connected to paths along Erskine Park Road.

4 Future Context (Without Proposal)

4.1 Planned Upgrades

It is known that the road network in the general vicinity of the Site is due to receive significant road upgrades in future as part of the Mamre Road Upgrade strategy. It is therefore crucial to develop a future "Base Case' that includes those planned road and intersection upgrades (and of course the forecast additional traffic flows) so as to appropriately measure the (potential) impacts of the traffic likely to be generated by the potential development yield on the entire site.

Accordingly, the modelling assumptions made for the major proposed road upgrades in the immediate vicinity of the Site are extracted from Mamre Road Upgrade document prepared by RMS in November 2017 and also reference has been made to the RMS website.

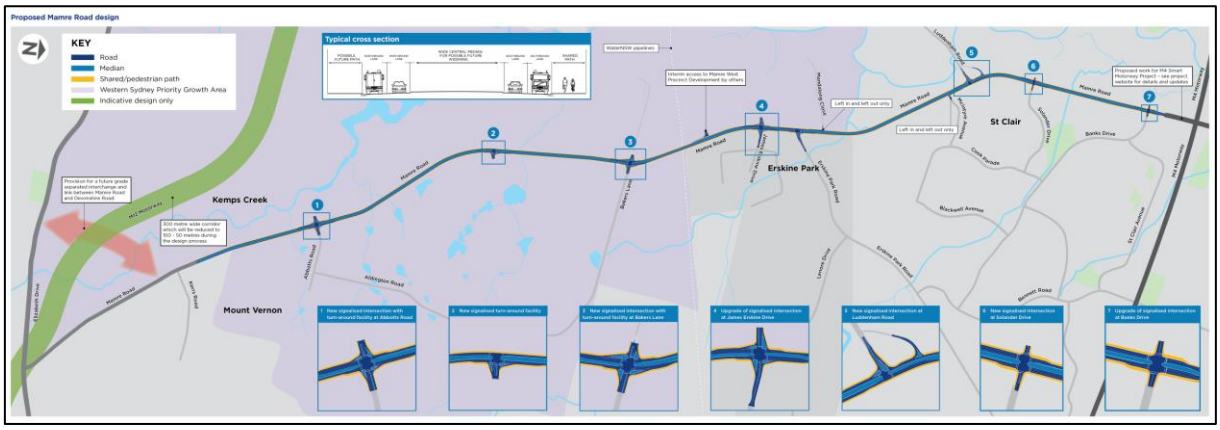

Figure 7: Mamre Road Upgrade Concept Design

In February 2019, the NSW Government announced $220M funding for a 3.8-kilometre section of the Mamre Road Upgrade between M4 Motorway and Erskine Park Road to:

"…transform the existing two-lane undivided road into a four-lane divided road, providing a safer, higher-capacity link. The Mamre Road upgrade will also be future proofed, allowing another two lanes to be added down the track,"

With reference to above, the following figures provide more detail in regard to the RMS future intersection layouts.

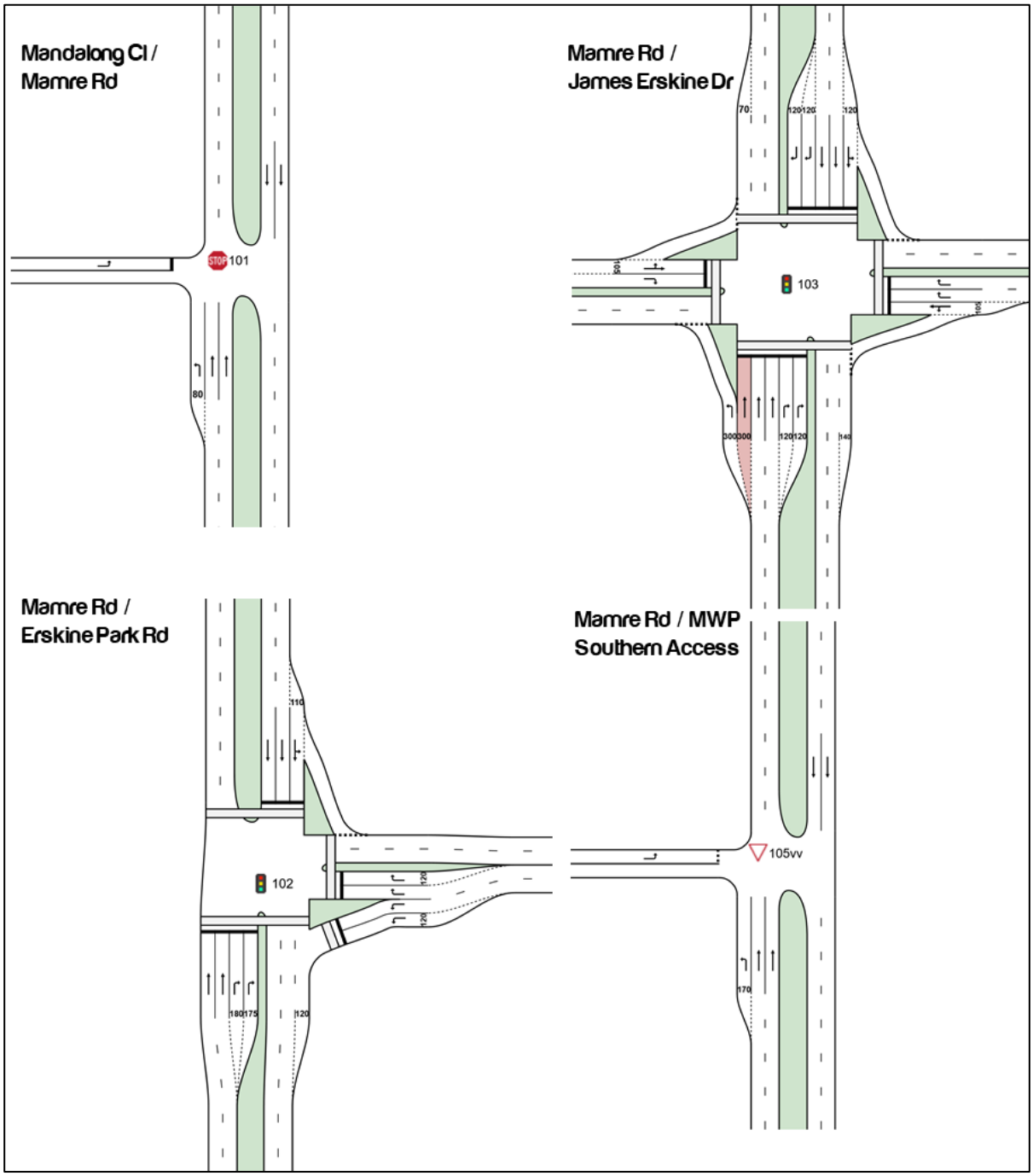

Figure 8: Mamre Road Upgrade - Intersection Configurations

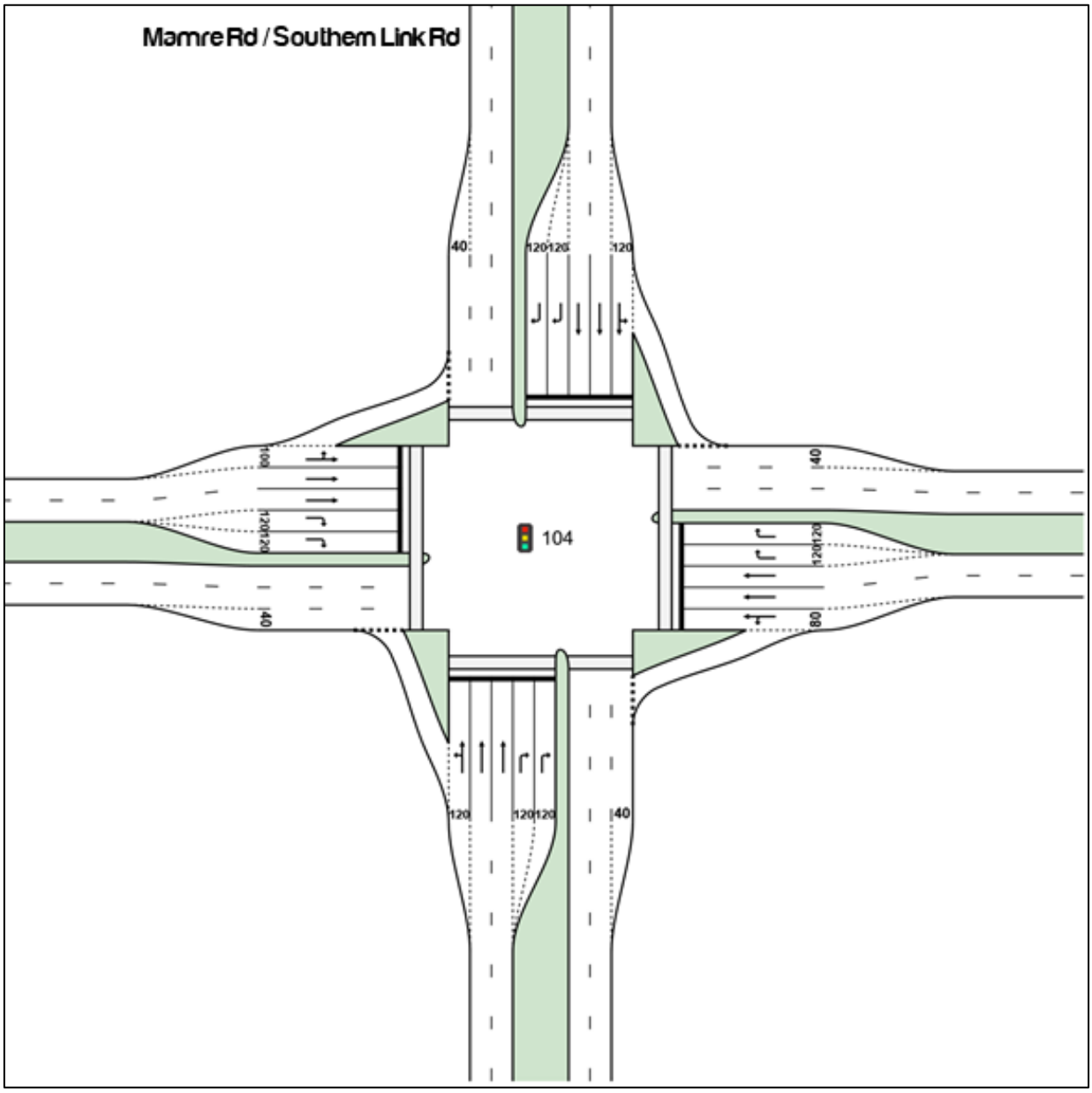

Figure 9: Mamre Road Upgrade - Intersection Configurations

4.2 Background Growth - Future Base Case Traffic Projections

The future base case scenario has considered the year 2036. As such, EMME model traffic volumes for the vicinity of the Site for 2036 were obtained from RMS during the course of this study, with data provided for the following three (3) intersections:

- Mamre Road / Southern Link Road (EMME inputs assume a four-way intersection),
- Mamre Road / James Erskine Drive (EMME inputs assume a T-intersection), and
- Mamre Road / Erskine Park Road (EMME inputs assume a T-intersection).

These volumes form the basis of the Future Base Case scenario. However, to also incorporate the extent of the assumed future road upgrades envisaged in this TIA, further assumptions have been made which are as follows:

- Mamre Road / James Erskine Drive will be a four-way signalised intersection. The traffic volumes on the fourth leg (the western leg) were obtained from MWP TIA prepared by Ason Group.
- The EMME outputs provided by the RMS did not include traffic projections on Mandalong Close. Accordingly, a 5% traffic growth per annum was conservatively assumed for this road in order to provide a robust traffic assessment. It is noted that the intersection of Mamre Road / Mandalong Road is expected to provide Left In/Left Out only by 2036.

Further to the above, a copy of the base case traffic volumes (year 2036) are attached in **Appendix C2**.

4.3 Future Mid-block Capacity Analysis

Future Base Case mid-block capacities and Level of Service have been determined with reference to the 2036 forecast traffic volumes and are summarised in **Table 5**.

Table 5: Future Base Case Mid-block Traffic Volumes

Road Section	Period	Projected 2036 Traffic Volumes	LoS
Mamre Rd (north of SLR)	AM	4,076 NB = 1,908 SB = 2,168	NB = D SB = D
	PM	3,689 NB = 1,582 SB = 2,107	NB = C SB = D
Mamre Rd (south of SLR)	AM	3,961 NB = 2,109 SB = 1,852	NB = D SB = D
	PM	3,598 NB = 1,626 SB = 1,972	NB = C SB = D
Southern Link Rd (East of Mamre Rd)	AM	2,251 WB = 577 EB = 1,674	WB = A EB = C
	PM	2,525 WB = 1,785 EB = 740	WB = C EB = A

Notes 1): NB = North Bound direction & SB = Southbound direction

2): Mid-block LoS criteria is obtained from Table 4.4 of RMS *Guide to Traffic Generating Documents*.

3): Future Base Case allows for two lane traffic flow on Mamre Road and Southern Link Road plus turning lanes.

According to the above table, the following outcomes are noteworthy:

- While the future road upgrades envisaged for Mamre Road – and specifically carriageway widening to provide a 4-lane road – would accommodate the projected traffic flows, there is little if any spare capacity available north of the Southern Link Road (and then through the other key intersections to the north. Notwithstanding, it is noted that a wide-median treatment is proposed for the upgraded Mamre Road, which would facilitate further widening in the future.
- The capacity assessment undertaken for the Southern Link Road confirms that the proposed 4-lane carriageway (two-lanes per direction) can accommodate future demands with significant spare capacity.

4.4 Future Intersection Analysis

The Future Base Case (Year 2036) - with the identified intersection layouts outlined in Section 4 above and EMME traffic volumes obtained from RMS - has been assessed using SIDRA Network software to establish the performance of the future network without the proposed development. Details of the SIDRA outputs are attached in **Appendix D2** and a summary of the results provided in **Table 6**.

Table 6: Network Performance – Future Base Case (with Mamre Road Upgrades)

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Southern Link	Future Baseline	AM	77.1	F
		PM	45.3	D
Mamre Road / Mamre West Precinct Access	Future Baseline	AM	13.7 (0.4)	A
		PM	18.2 (1.0)	B
Mamre Road / James Erskine Drive	Future Baseline	AM	39.0	C
		PM	47.6	D
Mamre Road / Erskine Park Road	Future Baseline	AM	50.0	D
		PM	25.0	B
Mamre Road / Mandalong Close	Future Baseline	AM	10.6 (0.8)	A
		PM	17.2 (0.6)	B

Note 1) All pedestrian crossings at the signals are modelled with 20% pedestrian calls in SIDRA to reflect the low levels of pedestrian activity in the locality.

2) The proposed Mamre Road intersections with the MWP southern access, and with Mandalong Close, will be in the form of LILO intersections.

From the above, the following is noteworthy:

- It is apparent that the future intersection upgrades envisaged for Mamre Road will NOT achieve the RMS desirable design LoS.
- The intersection of Mamre Road / Southern Link Road will operate at a LoS “F and D” during AM and PM peak periods, respectively. A further review of the SIDRA Network Lane summary results confirm that the Mamre Road approaches to the Southern Link Road intersection will operate with excessive delays and queues (refer **Appendix D2** for details).
- The degree of saturation for a number of movements at numerous Mamre Road intersections exceeds 100%, which strongly suggests the potential for future capacity constraints.

4.5 Impact Mitigation

Having regard for above, it is concluded that the recommended road and intersection upgrades envisaged for Mamre Road (at this time) do not adequately accommodate the future demand for this regional corridor.

Accordingly, this TIA has undertaken some 'option testing' to identify further upgrades that could be considered to mitigate these capacity issues. It is emphasised that the 'options' presented in this TIA will require further consultation with RMS prior to adoption.

4.5.1 Alternative Upgrade Option – Project Future Case

An alternative design option examined to resolve the Mamre Road mid-block capacity issues provides for an additional (third) lane in Mamre Road through the study area. As previously stated, the current Mamre Road Upgrade planning provides for a wide central median in Mamre Road to allow for future widening. As such, implementation of this option would primarily be in the form of reducing the central median width.

The results of the intersection performance analysis undertaken for this option (along with the revised intersection layouts) are detailed in **Appendix D3** and summarised in **Table 7** below.

Table 7: Network Performance – Future Base Case with Improvements

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Southern Link	Project Future Case	AM	37.0	C
		PM	36.7	C
Mamre Road / Mamre West Precinct Access	Project Future Case	AM	9.2 (0.3)	A
		PM	10.2 (0.4)	A
Mamre Road / James Erskine Drive	Project Future Case	AM	30.2	C
		PM	35.1	C
Mamre Road / Erskine Park Road	Project Future Case	AM	24.1	B
		PM	24.5	B

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Mandalong Close	Project Future Case	AM	9.7 (0.4)	A
		PM	12.5 (0.5)	A

Note 1) As per Base Case, all pedestrian crossing at the signals are modelled with 20% pedestrian calls in SIDRA to reflect the low levels of pedestrian activity in the locality.

2) The proposed Mamre Road intersections with the southern MWP access and Mandalong Close will be in the form of LILO intersections.

It is evident from comparison between Table 6 and Table 7 that:

- The alternative design option with three (3) lanes in each direction in Mamre Road will significantly improve the performance of all key intersections.
- More importantly, a review of the SIDRA Network Lane Summary results confirms that no approach movements (at any of the Mamre Road intersection) would operate at LoS "F". As such, the operation of Mamre Road - an important future regional corridor - will be improved significantly, with no excessive queues or delays through 2036.

Accordingly, it is expected that Mamre Road should be upgraded to 3 lanes in each direction in the longer term to support the general background growth in traffic volumes, regardless of the MSP proposal. As such, the remainder of TIA relies on this option (Future Base Case with Improvements) as basis to compare the Project Future Case scenario (Future Base Case + Development).

5 Operational Traffic Impacts

5.1 Traffic Generation Rates

The traffic generation rates adopted for this assessment reference Appendix E of the RMS Technical Direction TDT 2013/04a. Specifically, Ason Group has referenced the surveyed rates for vehicle trips during adjacent road AM and PM peak periods for the following three (3) industrial sites:

- Site 1: Erskine Park Industrial Estate, Erskine Park;
- Site 3: Wonderland Business Park, Eastern Creek; and
- Site 4: Riverwood Business Park, Riverwood.

These Sydney sites all exhibit similar attributes to those proposed for this TIA, including land-use and size of development. It is noted that the other Sydney and non-metropolitan sites reported in the RMS Technical Direction TDT 2013/04a are much smaller than the MSP and/or have a significantly higher office component that that proposed for the MSP.

The MWP TIA adopted the trip generation rates surveyed for Site 1 (Erskine Park Industrial Estate) which was entirely reasonable given that the MWP lies directly opposite the Erskine Park Industrial Estate. The rates surveyed at the Erskine Park Industrial Estate (and applied to the MWP) are:

- AM Rate 0.134 trip per 100m^2 of GFA.
- PM Rate 0.139 trip per 100m^2 of GFA.

While it would be equally appropriate to apply these same rates to the MSP assessment, for the purposes of a worst-case assessment, this TIA has adopted rates which reflect the average rate of the 3 Sydney warehouse sites. These (significantly higher) MSP assessment trip rates are as follows:

- AM Rate 0.247 trip per 100m^2 of GFA.
- PM Rate 0.182 trip per 100m^2 of GFA.
- Daily Rate 2.64 trip per 100m^2 of GFA.

Accordingly, the results of the assessments presented in this TIA are more conservative than what was undertaken for MWP. This conservative approach provides flexibility for latter development to reflect minor changes that may occur over the life of the MSP.

5.2 SSDA Traffic Generation

Application of the traffic generation rates discussed in Section 5.1 above to the SSDA yield results in the following AM, PM and daily traffic volumes.

Table 8: SSDA Estimated Traffic Generation

Site	GFA (m2)	AM Peak (veh/hr)	PM Peak (veh/hr)	Daily (veh/day)
Site 1 (North of Bakers lane - Lots 1, 2 and 3)	66,135	164	120	1,746
Site 2 (South of Bakers Lane- Lots 4, 5 and 6)	97,536	241	177	2,576
Total	**163,671**	**405**	**297**	**4,322**

5.3 SSDA Traffic Distribution

The adopted trip distribution for the SSDA is summarised in below **Table 9**:

Table 9: Traffic Distribution – SSDA

Peak Period	Land Use	Total Generation (veh/hr)	%Inbound	%outbound	Inbound Movements (veh/hr)	Outbound Movements (veh/hr)
AM	Warehouse	385	70%	30%	270	115
	Office	20	70%	30%	14	6
PM	Warehouse	282	30%	70%	85	197
	Office	15	30%	70%	4	11

The resultant traffic distribution of the proposed SSDA development on the surrounding road network is shown in **Appendix C3** and the Existing + SSDA traffic is attached in **Appendix C4**.

5.4 SSDA Intersection Traffic Increase

For context, below **Table 10** summarises the total existing traffic volumes at key intersections during the AM and PM peak periods and the additional traffic increase as a result of the proposed SSDA development.

Table 10: SSDA Contribution to the Existing and Future Traffic Volumes

Intersection	Period	Traffic Volumes (% Increase)	
		Existing	SSDA Traffic (%Increase)
Mamre Road / Bakers Lane (Signal Control)	AM	2,365	401 (+16.9%)
	PM	2,202	297 (+13.5%)
Mamre Road / Mamre West Precinct Access (Signal Control)	AM	na	247
	PM	na	178
Mamre Road / James Erskine Drive (Signal Control)	AM	2,557	247 (+9.7%)
	PM	2,349	178 (+7.6%)
Mamre Road / Erskine Park Road (Signal Control)	AM	3,113	247 (+7.9%)
	PM	2,878	178 (+6.2%)
Mamre Road / Mandalong Close (Stop Control)	AM	2,119	92 (+4.3%)
	PM	1,798	100 (+5.6%)

Note: (1) The existing Mamre Road West Precinct traffic has not been settled at the time of preparation of this report and as such the assessment of this intersection for existing scenario is not undertaken.

As indicated in the above table:

- The additional traffic added to Mamre Road / Bakers Lane intersection in the interim scenario are in the order of 13% to 17% during the road network peak hour periods.
- Following construction of the SSDA, the additional AM and PM peak traffic on all other intersections (other than the signalised intersection of Mamre Road / Bakers Lane) is estimated to be in the order of less than 10%.
- Typically, an increase in traffic of less than 10% does not warrant detailed intersection assessment (i.e. SIDRA intersection analysis). Notwithstanding, in order for a robust assessment, the performance of these intersections have been modelled using SIDRA Network for both AM and PM peak hours as part of this assessment, as detailed below Sections.

5.5 SSDA Intersection Analysis

The SIDRA analysis assumes that in the interim, prior to Mamre Road Upgrade works:

- The configuration of the Mamre Road / Bakers Lane is as shown in **Figure 10**. This includes:
  - Provision of a new right turn bay from Mamre Road southbound into the proposed development;
  - Provision of a new left turn bay from Mamre Road northbound into the proposed development;
  - Provision of dedicated short left and right turn lanes from the Bakers Lane (West) approach to Mamre Road, and
  - Provision of full signalised pedestrian crossings in accordance with standard RMS practice for new signalised intersections.
- Other key intersection configurations will be as per the existing network (refer **Figure 5**).

It is again noted that this intersection upgrade will only be temporary and is provided only to facilitate the development traffic. Bakers Lane is proposed to be disconnected from Mamre Road and be realigned with the proposed Southern Link Road in the longer term. It is noteworthy that the traffic modelling (SIDRA analysis) undertaken for "*Existing + SSDA"* refers to an earlier scheme of the project with greater assumed yield of 165,187 m^2. Accordingly, the modelled AM and PM peak hour vehicle trips of 408 and 300 veh/hr respectively modelled in SIDRA are actually higher than assessed above. Whilst these modelled figures 3 veh/hr greater than the estimated peak hour traffic generation of the SSDA - as per the current scheme – the change is not expected to have any material impact on the outcome of the modelling which is more conservative.

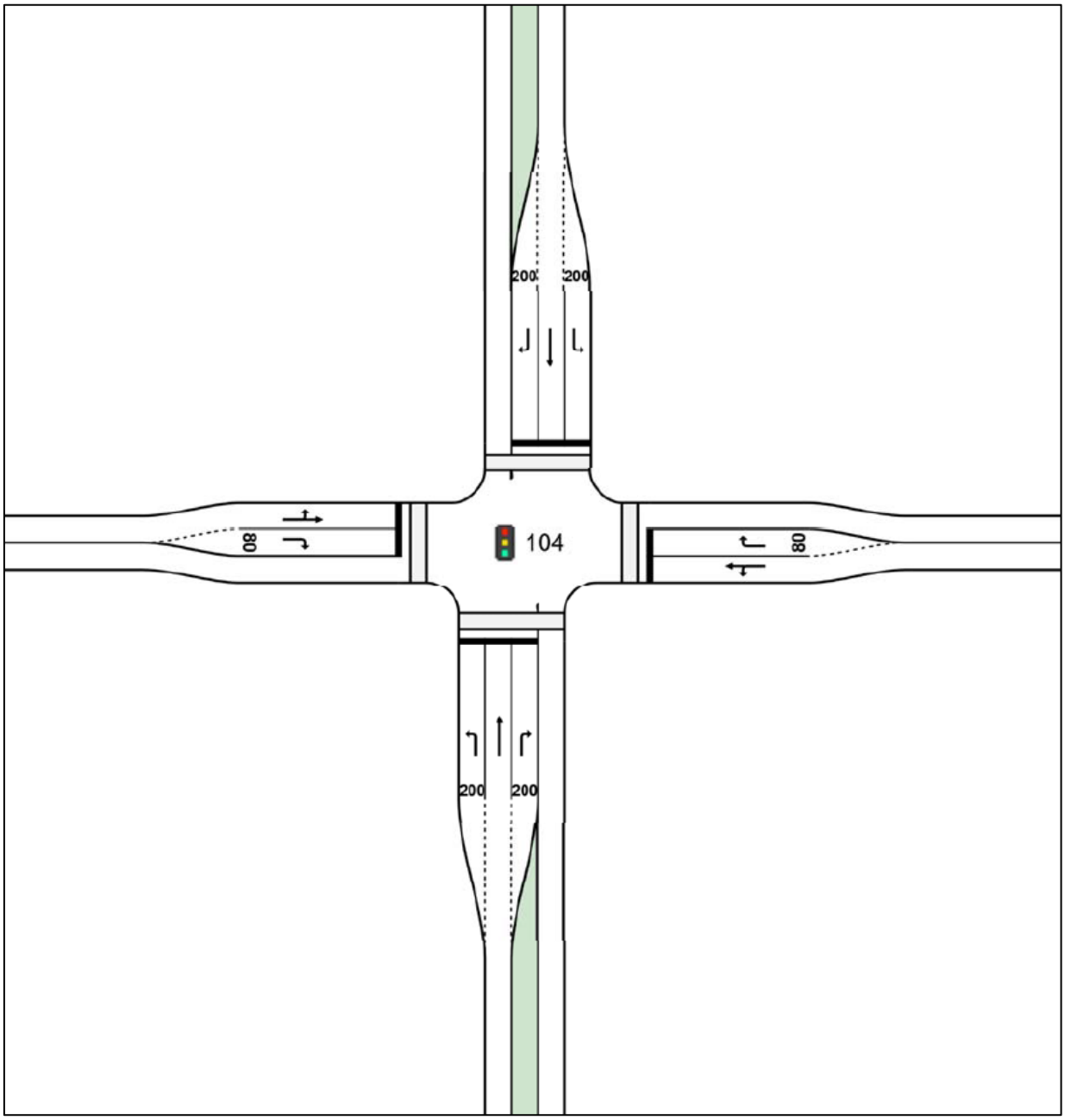

Figure 10: Signalised Intersection of Mamre Road / Bakers Lane – Interim Scenario

The SIDRA results are summarised in below table.

Table 11: Local Network Performance Comparison (Existing and Existing + SSDA)

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Bakers Lane (Signal Control)	Baseline	AM	29.6	C
		PM	139.5	F
	Existing + SSDA	AM	42.0	C
		PM	85	F
Mamre Road / Mamre West Precinct Access (Signal Control)	Baseline	AM	na	na
		PM	na	na
	Existing + SSDA	AM	13.5	A
		PM	16.5	B
Mamre Road / James Erskine Drive (Signal Control)	Baseline	AM	10.6	A
		PM	18.1	B
	Existing + SSDA	AM	13.8	A
		PM	14.9	B
Mamre Road / Erskine Park Road (Signal Control)	Baseline	AM	23.9	B
		PM	29	C
	Existing + SSDA	AM	31.4	C
		PM	30.0	C
Mamre Road / Mandalong Close (Stop Control)	Baseline	AM	1,083 (23.7)	F
		PM	235 (2.2)	F
	Existing + SSDA	AM	2,519.2 (22.4)	F
		PM	629.8 (4.3)	F

Note: 1) Figure in brackets () reflects average intersection performance for unsignalised intersection.

2) Full pedestrian crossing is assumed for the proposed design of Mamre Road / Bakers Lane signal in Existing + SSDA scenario, however, the pedestrian phase call is set at 20% in SIDRA.

3) The intersection of Mamre Road / Mandalong Close is an existing intersection. It is important to note that this intersection is proposed for LI/LO in future and will operate satisfactorily under future scenarios (refer **Table 21**).

According to the SIDRA results:

- The proposed SSDA will not have material impact on the surrounding road network as the average delays and LoS as a result of the "Existing + SSDA" traffic are similar to the existing baseline. In this instance considerations should be given to the significant improvements as a result of the upgraded intersection of Mamre Road / Bakers Lane. This intersection has been reported to operate with significantly less average delay (54.5 seconds) during PM peak hour when compared to the existing baseline. This demonstrates a significant improvement to the existing vehicular traffic operation at this signal.
- With respect to the intersection of Mamre Road / Bakers Lane it is noteworthy that this intersection is currently a signalised intersection with a stop sign control on the western leg and without pedestrian crossing facility. However, the proposal includes significant upgrades to this intersection with appropriate signalised pedestrian crossings. In this regard the upgrades proposed for Mamre Road / Bakers Lane will improve the pedestrian crossing opportunities, which is considered as a significant positive outcome for the locality.
- Furthermore, the existing configuration of this signal does not provide right and left turn bays into the Site to/from Mamre Road of which the proposed upgrades intend to implement these additional upgrades.
- Accordingly, the proposed upgrades at the Mamre Road / Bakers Lane signal can improve the vehicular and pedestrian movements at this signal when compared to the existing baseline.
- Further review of the SIDRA results for the Mamre Road / Bakers Lane signal suggests that the estimated overall queue distance at this intersection will be reduced by approximately 260 metres as a result of the additional improvements.
- Furthermore, SIDRA results confirm that the additional upgrades at the intersection of Mamre Road / Bakers Lane will improve the overall degree of saturation for the post development scenario which is also deemed to be a positive outcome.
- Regardless of the above, it is again emphasised that this arrangement will only be temporarily as the proposed regional upgrades in the vicinity will supersede this arrangement, and Bakers Lane will ultimately be closed off with no connection to Mamre Road.

In summary, the SSDA traffic can be accommodated by the surrounding road network and intersections without any material traffic impact, subject to the localised improvements to the Bakers Lane intersection.

6 SSDA Parking Analysis

6.1 Car Parking Rates

There is evidence that Council's warehouse parking requirement (1 space per 100m^2 GFA) is more than actual parking demands for warehouse developments, specifically as a factor of lower warehouse employee numbers. Amongst other factors, significant technological advances have also resulted in lower employee densities within warehouse developments, with the 2012 Employment Typology Study for the WSEA indicating employment densities of less than 20 employees per hectare across much of western Sydney. Consequently, many warehouse sites now provide car parking significantly in excess of the actual parking requirements of end users.

This position is further supported by the warehouse rates adopted by other controls, all of which return parking requirements significantly less than the numbers required based on the application of Council's DCP rates.

In response to the above, the minimum parking rates sought for the proposal, based on the RMS Guide rates for warehouse car parking, are:

- 1 space per 300 m^2 of warehouse GFA
- 1 space per 40 m^2 of ancillary office GFA

These proposed (minimum) rates would enable the required flexibility in the design of future developments whilst still ensuring sufficient parking to accommodate both the current and future parking requirements of tenants.

6.2 Car Parking Requirements

Having regard for the RMS parking rates suggested above, the required parking spaces for the SSDA and the supply of parking for this development is assessed in the following tables.

Table 12: Car Parking Provisions for Site 1 (to the north of Bakers Lane)

Lot	GFA m^2 (land-Use)	Car Parking Requirement	Total Parking Requirement	Car Parking Provided	Surplus (+) / Shortfall (-)
Lot 1	22,750m^2 (warehouse)	76	103	102[1]	(-) 1
	1,100m^2 (office)	27			
Lot 2	21,995m^2 (warehouse)	73	102	105	(+) 3
	1,150m^2 (office)	29			
Lot 3	18,040m^2 (warehouse)	60	88	86	(-) 2
	1,100m^2 (office)	28			
Total	**62,785m^2 (warehouse)**	**209**	**293**	**293[1]**	**0**
	3,350m^2 (office)	**84**			

Notes (1) Lot 1 provides a total of 93 onsite parking bays + 9 provisional bays at the hardstand area.

According to the above table, the site 1 will provide a total of 284 car parking bays within the proposed car parking areas associated with all Lots plus 9 additional provisional bays for Lot 1 which sum up to a total of 293 car parking provision in total.

Despite minor shortfall of parking in Lots 1 and 3, the above table indicates that the overall parking across site 1 will provide enough car parking spaces to satisfy the RMS requirements.

It is important to note that the RMS parking rate of 1 space per 300m^2 - by itself - assumes a level of contingency for ancillary uses (office use in this instance) of up to 20%. As such, adopting the 1 space per 300m^2 for the warehouse and office uses across site 1, it will result in sufficient number of bays proposed for this site.

A car parking assessment for site 2 is provided below.

Table 13: Car Parking Provisions for Site 2 (to the south of Bakers Lane)

Lot	GFA m2 (land-Use)	Car Parking Requirement	Total Parking Requirement	Car Parking Provided	Surplus (+) / Shortfall (-)
Lot 4	18,480m^2 (warehouse)	62	84	92	(+) 8
	890m^2 (office)	22			
Lot 5	25,805m^2 (warehouse)	86	124	135	(+) 11
	1,520m^2 (office)	38			
Lot 6	48,341m^2 (warehouse)	161	224	234	(+) 10
	2,500m^2 (office)	63			
Total	**92,626m^2 (warehouse)**	**309**	**432**	**461**	**(+) 29**
	4,910m^2 (office)	**123**			

According to the above table the proposed site 2 will provide total of 461 car parking bays.

As indicated above, site 2 will provide more than enough car parking spaces to satisfy the RMS requirements for all three (3) Lots (with an overall surplus of 29 spaces).

6.2.1 Total Car Parking Provision

According to the above, the proposal will provide a total of **745** car parking bays within the car parking areas for all Lots plus 9 provisional bays (provided at Lot 1) which increases the parking provision to a total of **754** car parking bays.

In summary, the car parking provision for the entire Site is deemed sufficient in accordance with RMS requirements.

6.3 Accessible Parking Rates

Council's DCP at Part C10 – Transport, Access and Parking, Table C10.2 – requires accessible parking to be provided in accordance with the *Disability (Access to Premises – Buildings) Standards 2010* from the Building Code of Australia. This standard requires accessible parking for industrial developments to be provided at a rate of:

- 1 space for every 100 car parking spaces or part thereof (rounded up).

The provision of accessible parking in accordance with these Standards would be adopted for the SSDA.

6.3.1 SSDA Accessible Car Parking Requirements

As discussed above, each individual Lot is to provide accessible car parking at a rate of 1% of the total parking provision (rounded up). Applicable accessible parking requirements are summarised in the following tables.

Table 14: Accessible Car Parking Provision for Site 1

Lot	Car Parking Provided	Accessible Car Parking Requirement
Lot 1	102[1]	2
Lot 2	105	2
Lot 3	86	1
Total	**293**	**5**

Notes (1) 93 onsite parking bays + 9 provisional bays at the hardstand area.

Table 15: Accessible Car Parking Provision for Site 2

Lot	Car Parking Provided	Accessible Car Parking Requirement
Lot 4	92	1
Lot 5	135	2
Lot 6	234	3
Total	**465**	**6**

Accessible spaces should ideally be located within close proximity to building entrances.

6.4 SSDA Service Bay Requirement

Separate hardstand areas are proposed for each warehouse development which is expected to accommodate their proposed site-specific demand. However, in the absence of known operational requirements, the RMS Guide suggests the following service bay requirements for industrial land-uses:

- 1 space per 800m^2 for development with a GFA <8,000m^2, and
- 10 spaces +1 space per 1,000m^2 over 8,000m^2.

It is noted that (based on experience on similar projects) the strict application of RMS Guides service bay rates leads to a significant on-site service bay requirement which in most cases is higher than the actual tenant demands for such facilities.

In this regard, a review of the similar site-specific plans for developments within the Mamre West Precinct has been undertaken to review current practice with regard to provision of service bays for such developments.

Details of this analysis are outlined in below table.

Table 16: Service Bay Rates – Subdivision Lots at Mamre West Precinct

Lot	Warehouse GFA (m^2)	Number of service bays provided	Service Bay Rate
Lot 6A	5,000	6	1 space per 833m^2
Lot 6B	4,575	4	1 space per 1,144m^2
Lot 6C	13,950	6	1 space per 2,325m^2
Lot 8A	21,000	25	1 space per 840m^2
Lot 8B1	7,000	9	1 space per 778m^2
Lot 8B2	11,734	13	1 space per 903m^2

From the above Table it can be understood that the actual service bay provision varies within the range of (1 space per 2,325 to 1 space per 778) m^{2}of warehouse GFA.

6.4.1 SSDA Loading Dock Requirements

Application of the recommended rates for the provision of service bays, discussed in above section the minimum and maximum range has been applied to each individual warehouse development at sites 2 and 5. The resultant service bay requirements are outlined in the following two tables:

Table 17: Service Bay Requirements for Site 1

Lot	Warehouse GFA (m^2)	Service Bay Requirement (Lower Rate)	Service Bay Requirement (Upper Rate)
Lot 1	22,750	10	29
Lot 2	21,995	10	28
Lot 3	18,040	8	23
Total	**62,785**	**28**	**80**

Table 18: Service Bay Requirements for Site 2

Lot	Warehouse GFA (m^2)	Service Bay Requirement (Lower Rate)	Service Bay Requirement (Upper Rate)
Lot 4	18,480	8	24
Lot 5	25,805	11	33
Lot 6	48,341	21	62
Total	**92,626**	**40**	**119**

The SSDA site plans currently shows large hardstand areas for each individual Lot. It is can be suggested that the proposed loading dock requirement would be between the upper and lower range of the above table.

It is also important to note that the above service bay requirements are generally more than actual operational requirements of large format industrial uses.

7 Future Scenario with Potential Master Plan

As outlined above, the below is provided for context and the full Master Plan does not form part of this application.

7.1 Traffic Generation

Further to the application of the trip rates described in Section 5.1 to the assumed yield of the entire MSP, below indicative future trip generations have been estimated for the purpose of the modelling:

- AM Peak: 1,266 vph
- PM Peak 931 vph
- Daily: 13,581 vpd

7.2 Traffic Distribution

The adopted trip distribution for the MSP is summarised in the below Table.

Table 19: Traffic Distribution – Potential Future Master Plan

Peak Period	Land Use	Total Generation (veh/hr)	%Inbound	%outbound	Inbound Movements (veh/hr)	Outbound Movements (veh/hr)
AM	Warehouse	1,203	70%	30%	842	361
	Office	63	70%	30%	44	19
PM	Warehouse	883	30%	70%	265	618
	Office	46	30%	70%	14	32

The resultant MSP traffic distribution to the surrounding road network is shown in **Appendix C5** and the 2036 projected background traffic volumes + the assumed future built-form traffic are attached in **Appendix C6**.

7.3 Mid-block Capacity Analysis

The resultant Mid-block capacity analysis is summarised in **Table 20.**

Table 20: Project Future Mid-block Traffic Volumes

Road Section	Period	Project Future Case + Built Form	Approach Capacity (Nominal capacity)	Volume / capacity (VoC)
Mamre Road north of Southern Link Road	AM	4,633 NB = 2,049 SB = 2,584	NB = 3,000 SB = 3,000	NB = 0.68 SB = 0.86
	PM	4,102 NB = 2,344 SB = 1,758	NB = 3,000 SB = 3,000	NB = 0.78 SB = 0.59
Mamre Road south of Southern Link Road	AM	4,333 NB = 2,375 SB = 1,958	NB = 3,000 SB = 3,000	NB = 0.79 SB = 0.65
	PM	3,808 NB = 1,673 SB = 2,135	NB = 3,000 SB = 3,000	NB = 0.56 SB = 0.71
Southern Link Road East of Mamre Road	AM	2,577 WB = 781 EB = 1,796	WB = 2,000 EB = 2,000	WB = 0.39 EB = 0.9
	PM	2,745 WB = 1,841 EB = 905	WB = 2,000 EB = 2,000	WB = 0.92 EB = 0.45

Note (1): NB = Northbound direction & SB = Southbound direction

Note (2): Table 4.4 of RMS Guides does not provide LoS for three lanes. Therefore, VoC has been adopted to assess the capacity.

As reported in above table, the future traffic generated by the assumed development yield at the MSP is well accommodated further to the proposed road upgrades on Mamre Road and Southern Link Road, with spare capacity on all links during both the AM and PM peak periods.

7.4 Traffic Impact

The 'impact' of the MSP under the assumed modelling scenario is best considered by comparing changes in modelled performance between 'Future Base Case with Improvements' and 'Project Future Case' scenarios. A summary of the intersection performance under each of these scenarios is provided in **Table 21** below.

Table 21: Network Performance – Project Future Case

Intersection	Scenario	Period	Intersection Delay	Level of Service
Mamre Road / Southern Link	Future Base Case	AM	37.0	C
		PM	36.7	C
	Project Future Case + the assumed future built form	AM	47.1	D
		PM	51.6	D
Mamre Road / Mamre West Precinct Access	Future Base Case	AM	9.2 (0.3)	A
		PM	10.2 (0.4)	A
	Project Future Case + assumed future built form	AM	10.7 (0.3)	A
		PM	11.7 (0.4)	A
Mamre Road / James Erskine Drive	Future Base Case	AM	30.2	C
		PM	35.1	C
	Project Future Case + assumed future built form	AM	32.4	C
		PM	33.6	C
Mamre Road / Erskine Park Road	Future Base Case	AM	24.1	B
		PM	24.5	B
	Project Future Case + assumed future built form	AM	26.1	B
		PM	31.6	C
Mamre Road / Mandalong Close	Future Base Case	AM	9.7 (0.5)	A
		PM	12.5 (0.5)	A

Intersection	Scenario	Period	Intersection Delay	Level of Service
	Project Future Case + assumed future built form	AM	9.8 (0.4)	A
		PM	12.8 (0.5)	A

Note: 1) Figures in brackets () reflects average intersection performance for unsignalised intersection.

The SIDRA Network results show that:

- With the exception of the Mamre Road / Southern Link Road intersections, the traffic generation of the MSP has no significant impact on the key Mamre Road intersections, each of which report the same Level of Service as determined under the Base Case analysis.
- Although the LoS for the proposed Mamre Road / Southern Link Road will change from “C” to “D” the average delay increases at the intersection is reported to be in the order of 10 to 15 seconds during the AM and PM peak hours respectively.

In summary, our assessment of the road network providing for the assumed MSP ultimate yield has determined that the likely traffic generated by the MSP can be accommodated further to upgrades of the road network in line with the upgrades required to accommodate (future) background traffic flows without any significant changes in Levels of Service at key intersections.

8 Conclusions

8.1 General Notes

- Ason Group has been commissioned by Altis Property Partners (Altis) and Frasers Property Australia (FPA) to undertake a Traffic Impact Assessment (TIA) for a proposed warehouse development at 657 - 753 Mamre Road in Kemps Creek (known as Mamre South Precinct – MSP) within the Penrith City Council Local Government.
- The proposal generally seeks construction of warehouse developments with ancillary office uses as part of a State Significant Development Application for the MSP.

8.2 Existing & Future Conditions (Without Proposal)

- Existing Mamre Road Mid-block traffic volumes during AM and PM peak hours confirm that Mamre Road already operates at capacity; as such, an upgrade of Mamre Road to provide three lanes in each direction may need to be investigated sooner than envisaged based on current planning / timing.
- The SIDRA analysis undertaken for the key intersections in the vicinity of the MSP for the Baseline (May 2018) confirm the intersection of Mamre Road / Bakers Lane currently operate at a LoS ‘F’ during the PM peak hour with a modelled average intersection delay of 139.5 seconds.
- Mamre Road in this vicinity is proposed to be upgraded to two (2) lanes in each direction as part of the RMS Mamre Road Upgrade project.
- The Future Base Case intersection analysis included in this TIA adopts the future intersection upgrades envisaged by the Mamre Road Upgrade document prepared by Road and Maritime Services (RMS).
- Future year (2036) traffic volumes from the strategic EMME model were obtained from RMS during the course of this study.
- The Mid-block capacity assessment and the SIDRA analysis undertaken for the Future Base Case with RMS identified upgrades suggest that Mamre Road will operate at and, in some instances, in excess of capacity in the future, and that key intersections will not achieve the desirable target Level of Services, with resulting capacity constraints and queue distance issues.
- This situation suggests that the identified road and intersection upgrades envisaged by RMS may not be sufficient to accommodate the regional traffic growth regardless of the MSP proposal.
- Notwithstanding, it is noted that the Mamre Road Upgrade includes a wide median treatment to accommodate future widening in the future.

- Accordingly, this TIA has undertaken a review of future network performance on the basis that this additional widening (to 3 lanes in each direction) is required to support future background traffic volumes even without the Project.
- The results of the SIDRA analysis show that the upgrade of Mamre Road to three (3) lanes in each direction will significantly improve network performance and satisfactorily accommodate future traffic demands. Therefore, this scenario has been considered as the Project Future Baseline.

8.3 SSDA Assessments

- It is proposed that SSDA will be accessed via the western leg of the existing Mamre Road / Bakers Lane signalised intersection.
- The SSDA is anticipated to generate approximately 405 veh/hr during the AM and 297 veh/hr during the PM peak hour. The estimated daily traffic generation of the proposed SSDA is 4,322 veh/day.
- With reference to the SIDRA Network results for the proposal, it is concluded that the proposed SSDA traffic volumes can be accommodated through the existing intersections in the locality and that the proposed indicative signal layout envisaged for the Mamre Road / Bakers Lane can cater the additional traffic volumes.
- A review of the parking requirements for the SSDA confirms that each land parcel will generally provide sufficient car parking spaces to satisfy the RMS parking requirements.

8.4 Indicative Future Master Plan (context only - not part of this application)

- To allow for the future modelling assessment we have assumed indicative development yield for the entire MSP site. Accordingly, the traffic generation of the indicative built form has been estimated to be 1,266 and 931 veh/hr during the road network AM and PM peak hours respectively. The likely daily traffic generation of the future possible built form is estimated to be 13,518 veh/day.
- Mid-block capacity analysis for the ‘Project Future Baseline’ was then expanded to consider the impact of this built form. The outcome of the assessment confirmed that the proposed traffic from the built form can be accommodated within the recommended future upgrades.
- The results of the SIDRA analysis confirm that the indicative future built form traffic can be accommodated by the proposed future upgrades of the key Mamre Road intersections.
- In summary, our assessment of the road network providing for the MSP has determined that the traffic generated by the MSP can be accommodated subject to upgrades of the road network in line with the upgrades required to accommodate (future) background traffic flows without any significant changes in Levels of Service at key intersections.

Appendix A

SEARs

NSW GOVERNMENT | Planning & Environment

Planning Services
Industry Assessments
Contact: Bianca Thornton
Phone: 02 8217 2040
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Our Ref: SSD 9522

Mr Andrew Cowan
Director, Willowtree Planning
Suite 4, Level 7, 100 Walker Street
NORTH SYDNEY NSW 2060

Email: acowan@willowtp.com.au

Dear Mr Cowan

State Significant Development – Planning Secretary's Environmental Assessment Requirements
Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Please find attached the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above-mentioned development. **Attachment 1** provides guidelines which may assist in the preparation of the EIS.

The attached SEARs have been prepared in consultation with the relevant government agencies and Penrith City Council (see **Attachment 2**). The SEARs are based on the scoping report prepared by Willowtree Planning, dated 15 August 2018.

Please note the Planning Secretary may alter the SEARs at any time. You must consult further with the Department if you do not lodge a development application (DA) and EIS for the development within two years of the date of issue of these SEARs.

I wish to emphasise the importance of effective and genuine community consultation and the need for the proposal to proactively respond to the community's concerns. A comprehensive, detailed and genuine community consultation and engagement process must be undertaken during the preparation of the EIS. This process must ensure the community is informed of the development and engaged with issues of concern to it. Sufficient information must be provided to the community to enable a good understanding of the development and any potential impacts.

If the proposal is likely to have a significant impact on matters of National Environmental Significance, it may require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary SEARs may need to be issued.

Please contact the Department at least **two weeks** before you lodge the EIS and any associated documentation for the development. This will enable the Department to confirm:

- the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*)
- consultation and public exhibition arrangements.

If you have any enquiries, please contact Bianca Thornton on the details above.

Yours sincerely

C. Ritchie

Chris Ritchie 14/9/18
Director
Industry Assessments
as the delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 9522
Project Name	Kemps Creek Warehouse and Logistics Hub
Development	Establishment of a warehouse and logistics hub, comprising: • site-wide earthworks, infrastructure and internal road network • construction and operation of 11 warehouses comprising 165,186 square metres (m^2) of floor space (152,485 m^2 warehouse and 7,700 m^2 office) • 816 parking spaces • subdivision.
Location	657-769 Mamre Road, Kemps Creek in the Penrith Local Government Area (Lot 34 DP1118173, Lot X DP421633, Lot 1 DP1018318, Lot Y DP421633 and Lot 22 DP258414)
Applicant	Frasers Property Industrial Construction Pty Ltd and Altis Property Partners Pty Ltd
Date of Issue	14 September 2018
General Requirements	The environmental impact statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation). In addition, the EIS must include: • a detailed description of the development, including: – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/ or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and

	prepared on company letterhead and indicate applicable GST component of the CIV • an estimate of jobs that will be created during the construction and operational phases of the proposed development • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – detailed justification that the proposed land use is permissible, taking into consideration the State Environmental Planning Policy (Western Sydney Employment Area) 2009 – details of any proposed consolidation or subdivision of land – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following must be addressed: o State Environmental Planning Policy (Western Sydney Employment Area) 2009 o A Metropolis of Three Cities o Western City District Plan o Western Sydney Aerotropolis – Land Use and Infrastructure Implementation Plan – Stage 1: Initial Precincts o Western Sydney Freight Line corridor. • **Planning Agreement/Development Contributions** – demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure required to support the development. • **Suitability of the Site** – including: – an analysis of site constraints, such as flooding impacts and future road and road corridors – a detailed justification that the site is suitable for the scale of the proposal and any constraints identified, having regard to the site's surrounds and the potential visual impact of the development. • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding land owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Urban Design and Visual** – including: – a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including height, colour, scale, building materials and finishes, signage and lighting, having regard to surrounding residential receivers and clause 23 of the State Environmental Planning Policy (Western Sydney Employment Area) 2009, particularly in terms of potential impacts on: o nearby public and private receivers o significant vantage points in the broader public domain including Mamre Road – consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks

- detailed plans showing suitable landscaping which incorporates endemic species
- a design report that establishes design guidelines and development parameters, and includes diagrams, illustrations and drawings to clarify the design intent of the proposal and which clearly demonstrates how design quality will be achieved in accordance with Clause 31 Design Principles of the State Environmental Planning Policy (Western Sydney Employment Area) 2009

- **Traffic and Transport** – including:
  - a quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines
  - details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation
  - impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development
  - demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development
  - details and a justification of access to, from and within the site (vehicular and pedestrian)
  - details of road upgrades, new roads or access points required for the development, if necessary
  - consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS
  - consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW
  - details of how the proposal would allow connection to future land uses to the south of the site.
- **Flooding** – a detailed hydrological and hydraulic assessment which includes the following:
  - a comprehensive assessment of the impact of flooding on the development for the full range of flood events up to the probable maximum flood. This assessment should address any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity
  - consideration of current flooding behaviour and impacts, including on flood detention areas, how flood behaviour and impacts will change due to the proposal and how these changes will be mitigated
  - assessment of the impact of the development on flood behaviour (i.e., levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas
  - detail proposed floor levels for all proposed habitable structures on the site having considered the full range of flood events up to the probable maximum flood
  - detail an emergency response plan for the site, which includes consideration of a flood-free access to or from the development site in extreme flood events.
- **Soils and Water** – including:
  - a description of how the proposal takes into consideration the South Creek corridor strategy and the land use vision for the South Creek Precinct, in consultation with Infrastructure NSW and the Greater Sydney Commission
  - measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development

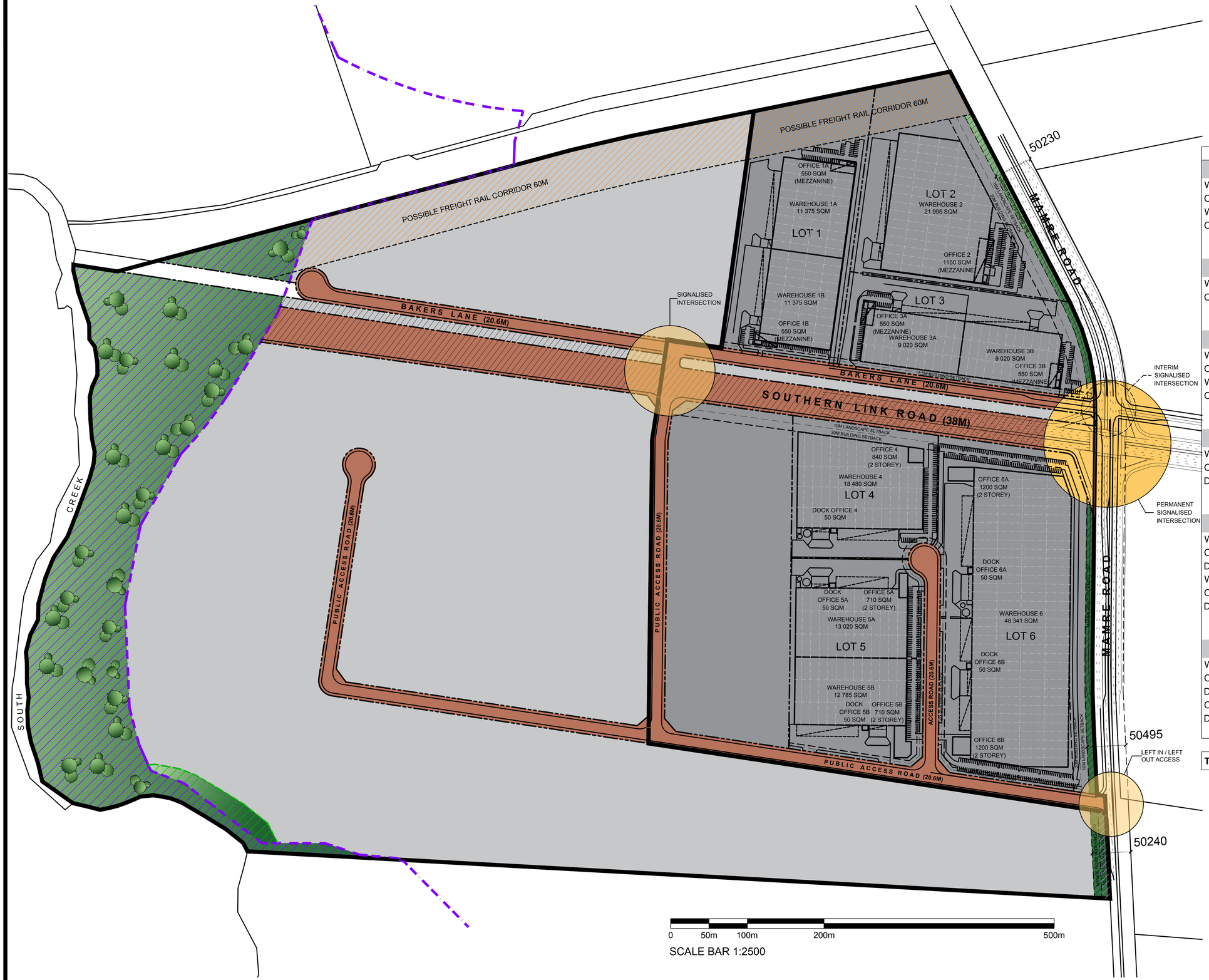
	– details of how access to the Warragamba Piplines corridor would be maintained, in consultation with WaterNSW – a description of the water demands and a breakdown of water supplies, including a detailed site water balance – identification of any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000* – details of proposed erosion and sediment controls during construction – a description of the surface and stormwater management system designed in accordance with Penrith City Council's Water Sensitive Urban Design Policy, including drainage design, on site detention, and measures to treat or re-use water – characterisation of the nature and extent of any contamination on the site and surrounding area – an assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and proposed mitigation, management and monitoring measures. • **Biodiversity** – including: – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted – describe how impacts upon critical vegetation and endangered species on site will be avoided and minimised. • **Infrastructure Requirements** – including: – a detailed written and/or geographical description of infrastructure required on the site – identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained – an infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction – an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site. • **Heritage** – including: – an Aboriginal Cultural Heritage Assessment Report prepared in consultation with Aboriginal people and in accordance with Office of Environment and Heritage guidelines – an assessment of European Heritage including potential impacts on the surrounding site and surrounding area, including any built landscape items, conservation areas, views and settings. • **Noise and Vibration**– including: – a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers – cumulative impacts of other developments – details of proposed mitigation, management and monitoring measures. • **Hazards and Risk** – including: – a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory

	Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • **Bushfire** – including: – details of the storage of any flammable materials – an assessment against the requirements of *Planning for Bushfire Protection 2006*, particularly access and provision of water supply for firefighting purposes – a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during construction and operation – details of waste storage, handling and disposal during construction and operation – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021. • **Air Quality** – including: – an assessment of the air quality impacts (including dust) during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines – details of proposed mitigation, management and monitoring measures. • **Social** – including the preparation of a social impact assessment, which: – identifies and analyses the potential social impacts of the development, from the points of view of the affected community/ies and other relevant stakeholders, i.e. how they expect to experience the project – considers how potential environmental changes in the locality may affect people's: way of life; community; access to and use of infrastructure, services, and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations, as relevant and considering how different groups may be disproportionately affected – assesses the significance of positive, negative, and cumulative social impacts considering likelihood, extent, duration, severity/scale, sensitivity/importance, and level of concern/interest – includes mitigation measures for likely negative social impacts, and any proposed enhancement measures – details how social impacts will be adaptively monitored and managed over time.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. You should provide these as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Penrith City Council • Greater Sydney Commission • Roads and Maritime Services • Transport for NSW • Office of Environment and Heritage • Environment Protection Authority • Fire and Rescue NSW • Rural Fire Service • Department of Industry – Crown Lands and Water • Sydney Water

	• WaterNSW • surrounding local residents and stakeholders • any other public transport or community service providers. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

Appendix B

Reduced Architectural Plan



DEVELOPMENT AREAS		
LOT 1	5.1591 ha	
WAREHOUSE	1A	11375 SQM
OFFICE	1A	550 SQM
WAREHOUSE	1B	11375 SQM
OFFICE	1B	550 SQM
		23850 SQM
LOT 2	5.1304 ha	
WAREHOUSE	2	21995 SQM
OFFICE	2	1150 SQM
		23145 SQM
LOT 3	3.8821 ha	
WAREHOUSE	3A	9020 SQM
OFFICE	3A	550 SQM
WAREHOUSE	3B	9020 SQM
OFFICE	3B	550 SQM
		19140 SQM
LOT 4	3.2245 ha	
WAREHOUSE	4	18480 SQM
OFFICE	4	840 SQM
DOCK OFFICE	4	50 SQM
		19370 SQM
LOT 5	4.4970 ha	
WAREHOUSE	5A	13020 SQM
OFFICE	5A	710 SQM
DOCK OFFICE	5A	50 SQM
WAREHOUSE	5B	12785 SQM
OFFICE	5B	710 SQM
DOCK OFFICE	5B	50 SQM
		27325 SQM
LOT 6	8.7377 ha	
WAREHOUSE	6	48341 SQM
OFFICE	6A	1200 SQM
DOCK OFFICE	6A	50 SQM
OFFICE	6B	1200 SQM
DOCK OFFICE	6B	50 SQM
		50841 SQM
TOTAL	**30.63 ha**	**163671 SQM**

BULK EARTHWORKS STAGE BOUNDARIES

BE STAGE 1

BE STAGE 2

EXISTING FLOODPLAIN

PROPOSED ROADS

01 – STATE SIGNIFICANT DEVELOPMENT APPLICATION PLAN
SCALE - 1:2500 @ A1

ALL LEVELS ARE INDICATIVE AND SHOULD BE READ IN CONJUNCTION WITH CIVIL ENGINEER'S DRAWINGS. FOR FINAL LEVELS OF ALL EARTHWORKS.

ALL LEVELS ARE TO BE +/- 1000mm.

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.

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REVISION	DESCRIPTION	DATE
A	DA ISSUE	04.05.18
B	DA ISSUE	13.06.18
D	DA ISSUE	14.09.18
F	DA ISSUE	05.12.18
G	DA ISSUE	19.12.18
H	DA ISSUE	29.03.19
I	DA ISSUE	08.05.19

ALTIS PROPERTY PARTNERS

FRASERS PROPERTY

COMMERCIAL & INDUSTRIAL DIVISION
1 HOMEBUSH BAY DRIVE
BUILDING C, LEVEL 3
RHODES NSW 2138
PHONE 02 9767 2000
FAX 02 9767 2908

PO BOX 3307
RHODES NSW 2138

PROJECT
STATE SIGNIFICANT DEVELOPMENT APPLICATION PLAN FOR KEMPS CREEK

ADDRESS
MAMRE ROAD & BAKERS LANE
KEMPS CREEK

DRAWING TITLE
STATE BULK EARTHWORKS & BUILDING PLAN

SCALE	1:2500 @ A1
DRAWN	MP
CHECKED	JQ
DATE	08.05.19
JOB NUMBER	0000-00-000

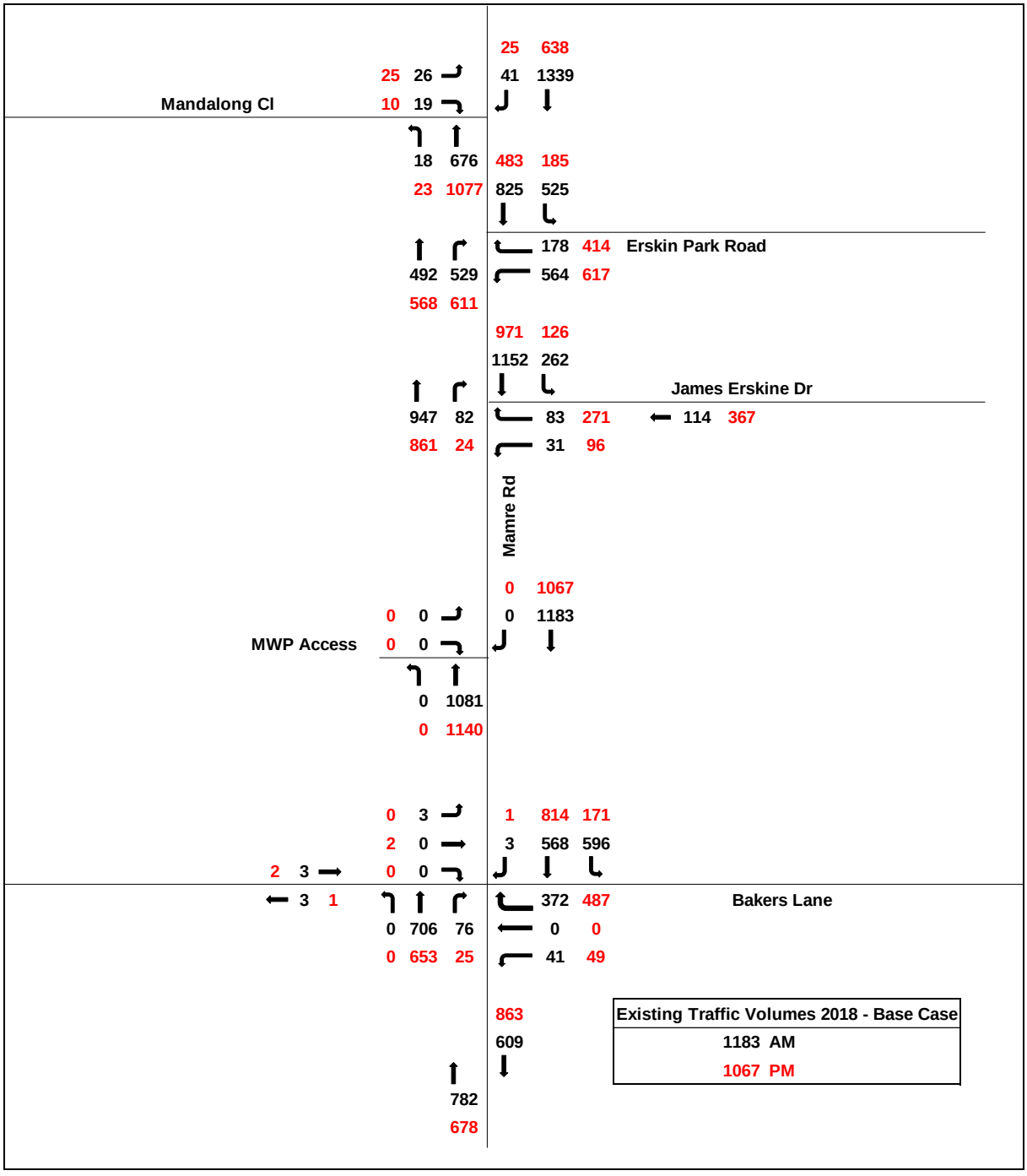
DRAWING NUMBER: SSD-MRM-DA-001
ISSUE: I

Appendix C

Traffic Volumes

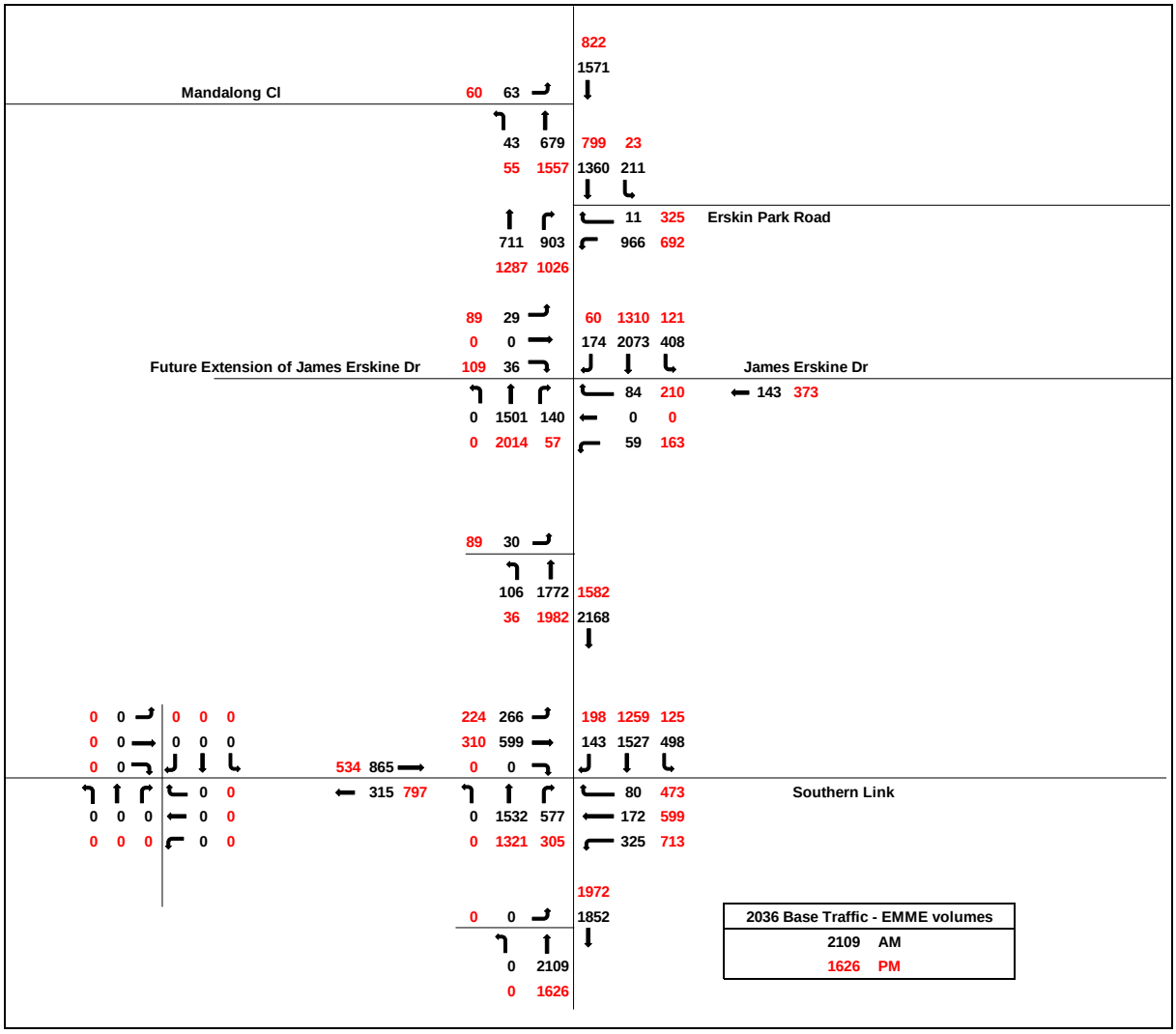
Appendix C1

Existing Traffic Volumes


Mandalong Cl
25 26
10 19
18 676
23 1077
25 638
41 1339
483 185
825 525
Erskin Park Road
178 414
564 617
492 529
568 611
971 126
1152 262
James Erskine Dr
947 82
861 24
83 271
31 96
114 367
Mamre Rd
0 1067
0 1183
MWP Access
0 0
0 0
0 1081
0 1140
0 3
2 0
2 3
0 0
1 814 171
3 568 596
Bakers Lane
3 1
0 706 76
0 653 25
372 487
0 0
41 49
863
609
782
678
Existing Traffic Volumes 2018 - Base Case
1183 AM
1067 PM

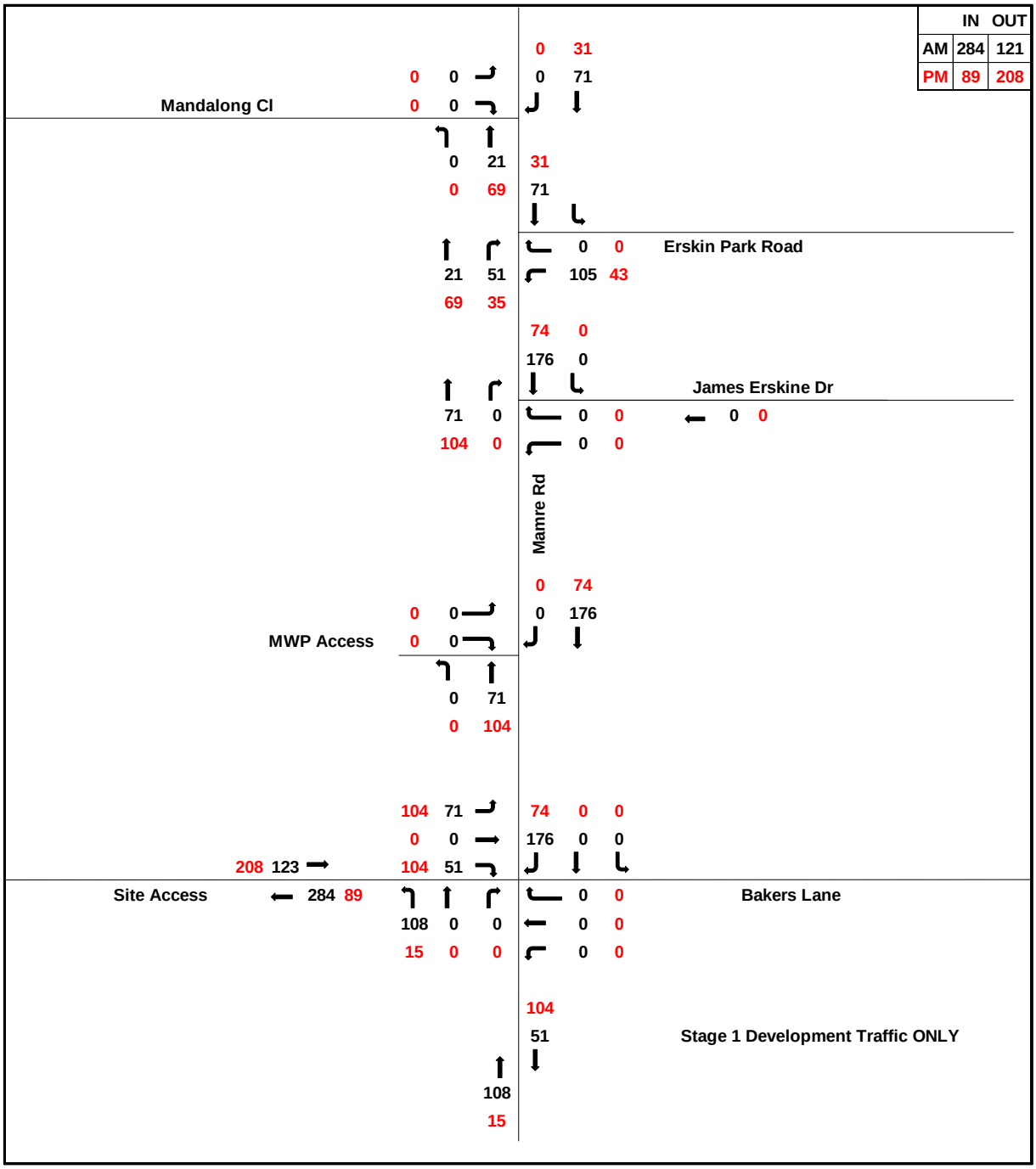
Appendix C2

2036 Projected Background Traffic


Mandalong Cl
Erskin Park Road
Future Extension of James Erskine Dr
James Erskine Dr
Southern Link
822
1571
60 63
43 679 799 23
55 1557 1360 211
11 325
711 903 966 692
1287 1026
89 29 60 1310 121
0 0 174 2073 408
109 36 84 210 143 373
0 1501 140 0 0
0 2014 57 59 163
89 30
106 1772 1582
36 1982 2168
0 0 0 0 0 224 266 198 1259 125
0 0 0 0 0 310 599 143 1527 498
0 0 534 865 0 0
0 0 315 797 80 473
0 0 0 1532 577 172 599
0 0 0 1321 305 325 713
1972
0 0 1852
0 2109
0 1626
2036 Base Traffic - EMME volumes
2109 AM
1626 PM

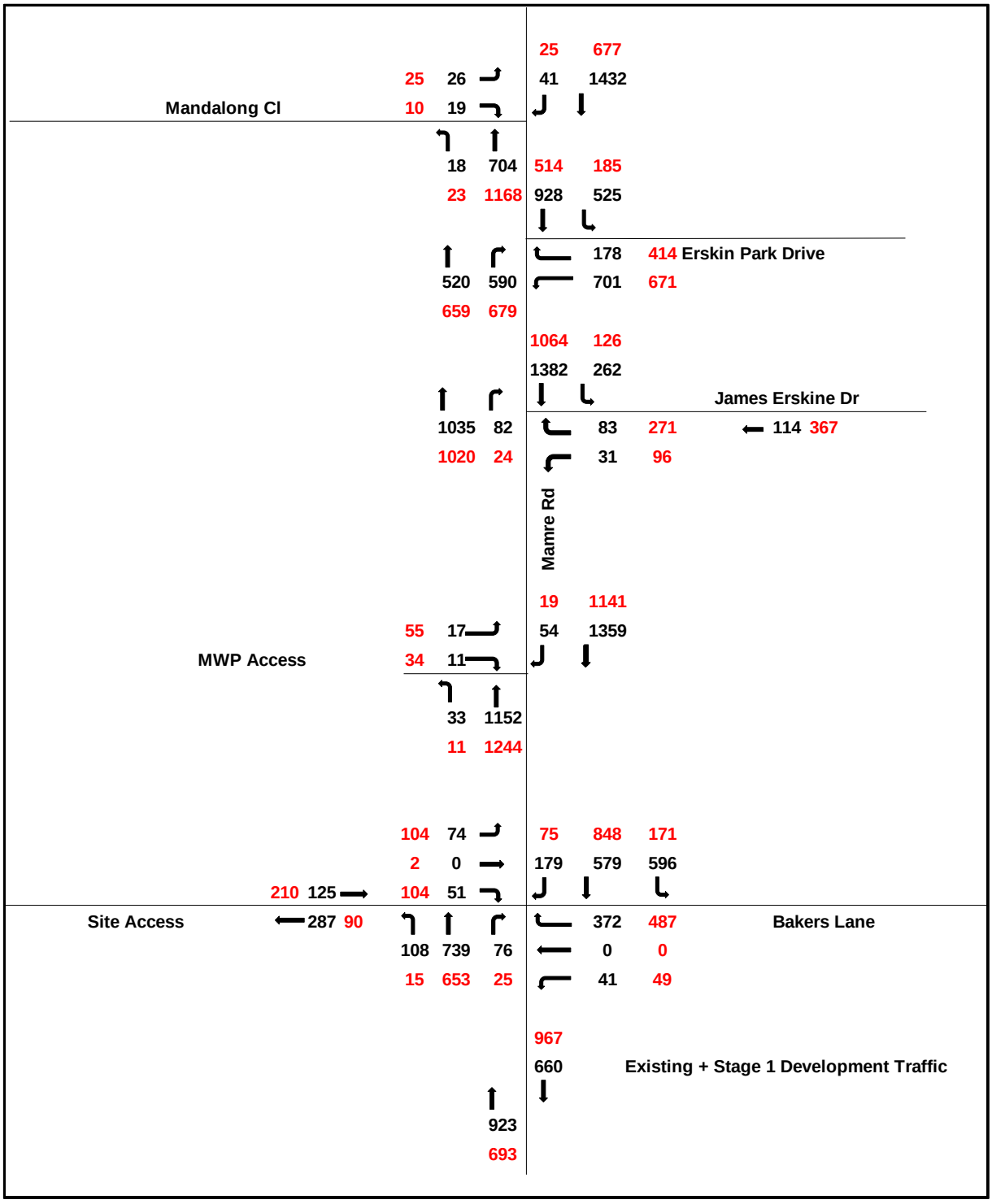
Appendix C3

SSDA Traffic Only


IN OUT
AM 284 121
PM 89 208
Mandalong Cl
Erskin Park Road
James Erskine Dr
Mamre Rd
MWP Access
Site Access
Bakers Lane
Stage 1 Development Traffic ONLY

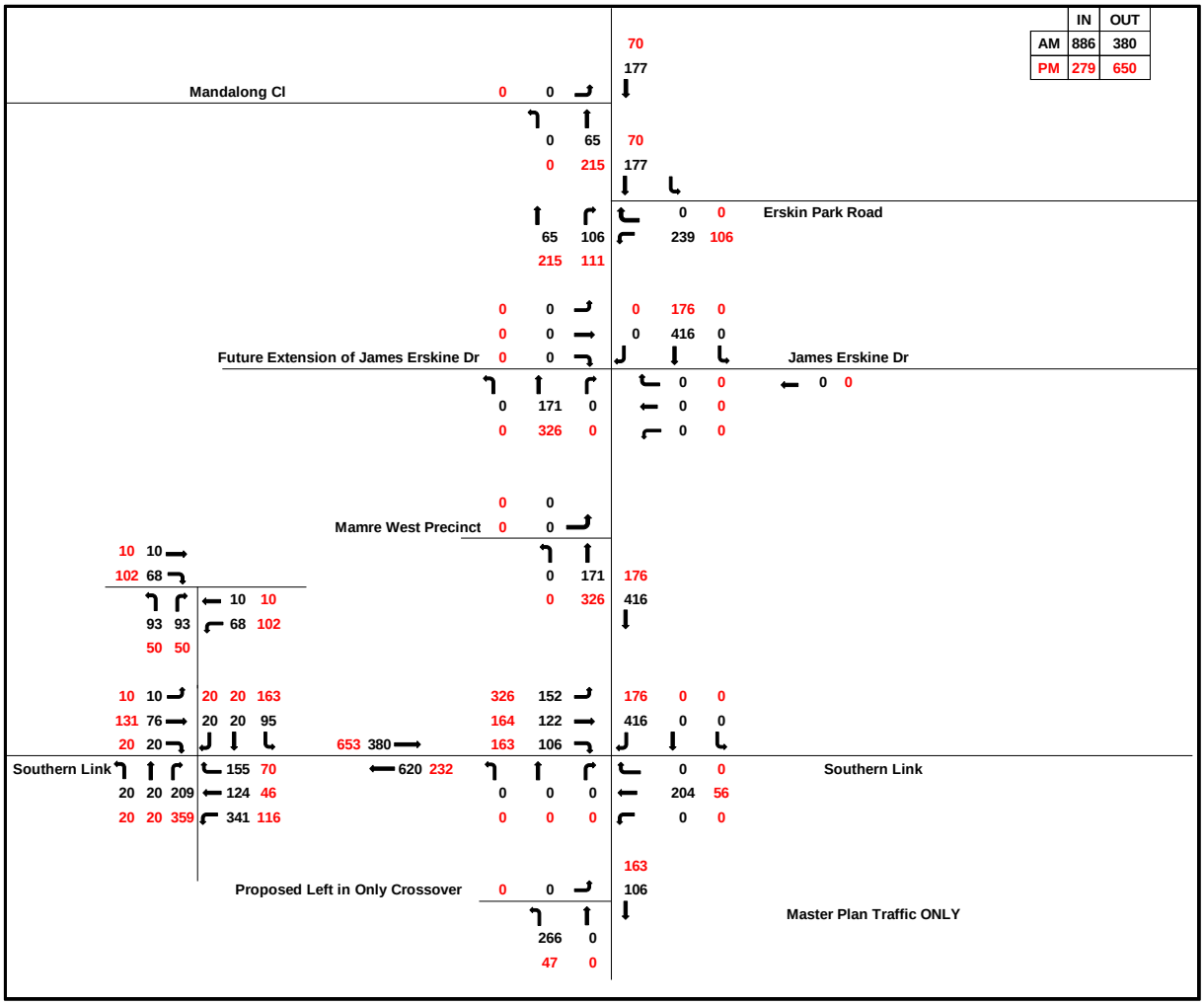
Appendix C4

Existing + SSDA Traffic


Mandalong Cl
MWP Access
Site Access
Mamre Rd
Erskin Park Drive
James Erskine Dr
Bakers Lane
Existing + Stage 1 Development Traffic
25 677
25 26 41 1432
10 19
18 704 514 185
23 1168 928 525
178 414
520 590 701 671
659 679
1064 126
1382 262
1035 82 83 271 114 367
1020 24 31 96
19 1141
55 17 54 1359
34 11
33 1152
11 1244
104 74 75 848 171
2 0 179 579 596
210 125 104 51
287 90 372 487
108 739 76 0 0
15 653 25 41 49
967
660
923
693

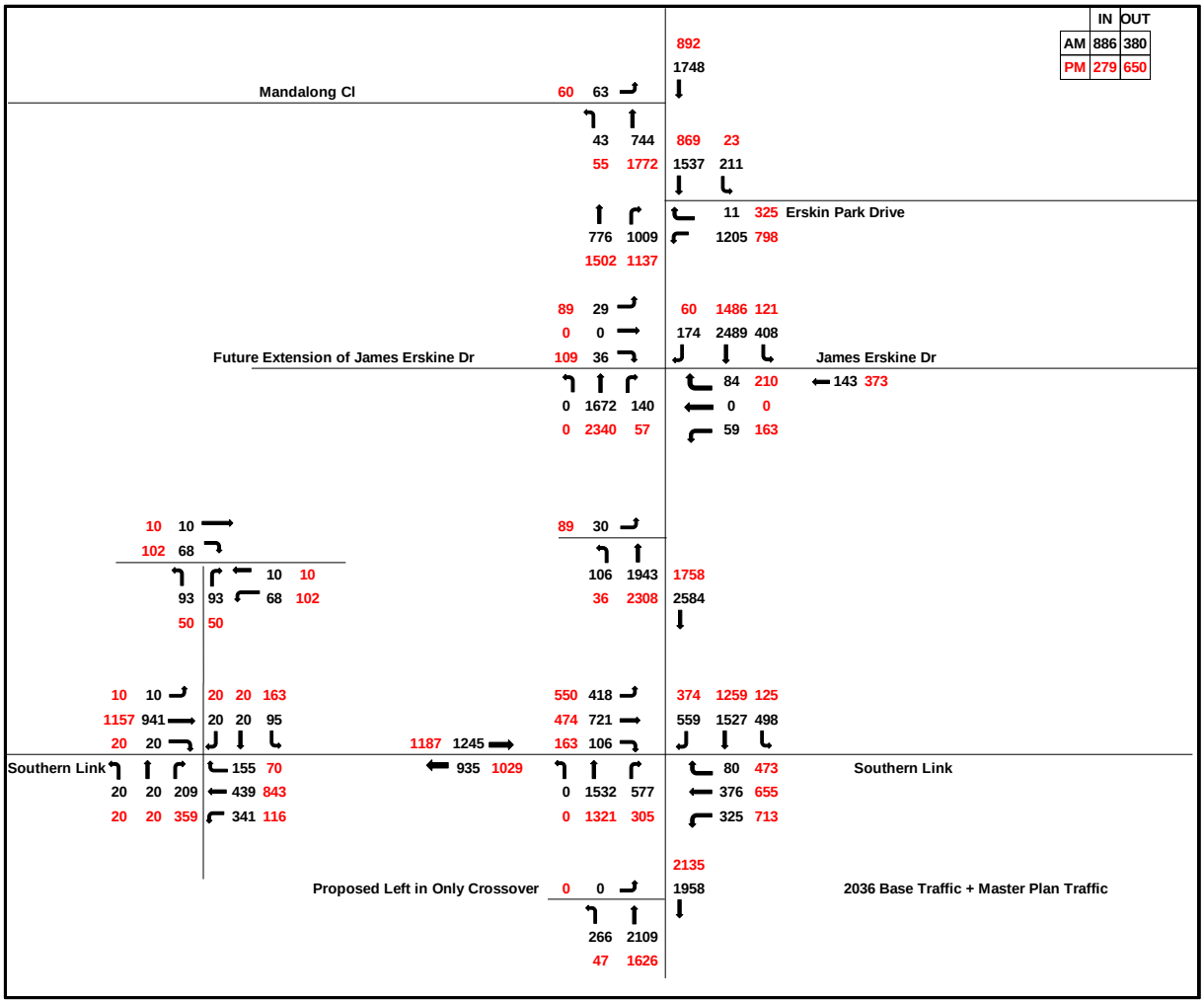
Appendix C5

Future Built Form Traffic Only


IN OUT
AM 886 380
PM 279 650
Mandalong Cl
Erskin Park Road
Future Extension of James Erskine Dr
James Erskine Dr
Mamre West Precinct
Southern Link
Southern Link
Proposed Left in Only Crossover
Master Plan Traffic ONLY

Appendix C6

2036 Background Traffic + Future Built Form


IN OUT
AM 886 380
PM 279 650
Mandalong Cl
Erskin Park Drive
Future Extension of James Erskine Dr
James Erskine Dr
Southern Link
Southern Link
Proposed Left in Only Crossover
2036 Base Traffic + Master Plan Traffic

Appendix D

SIDRA Outputs and Results

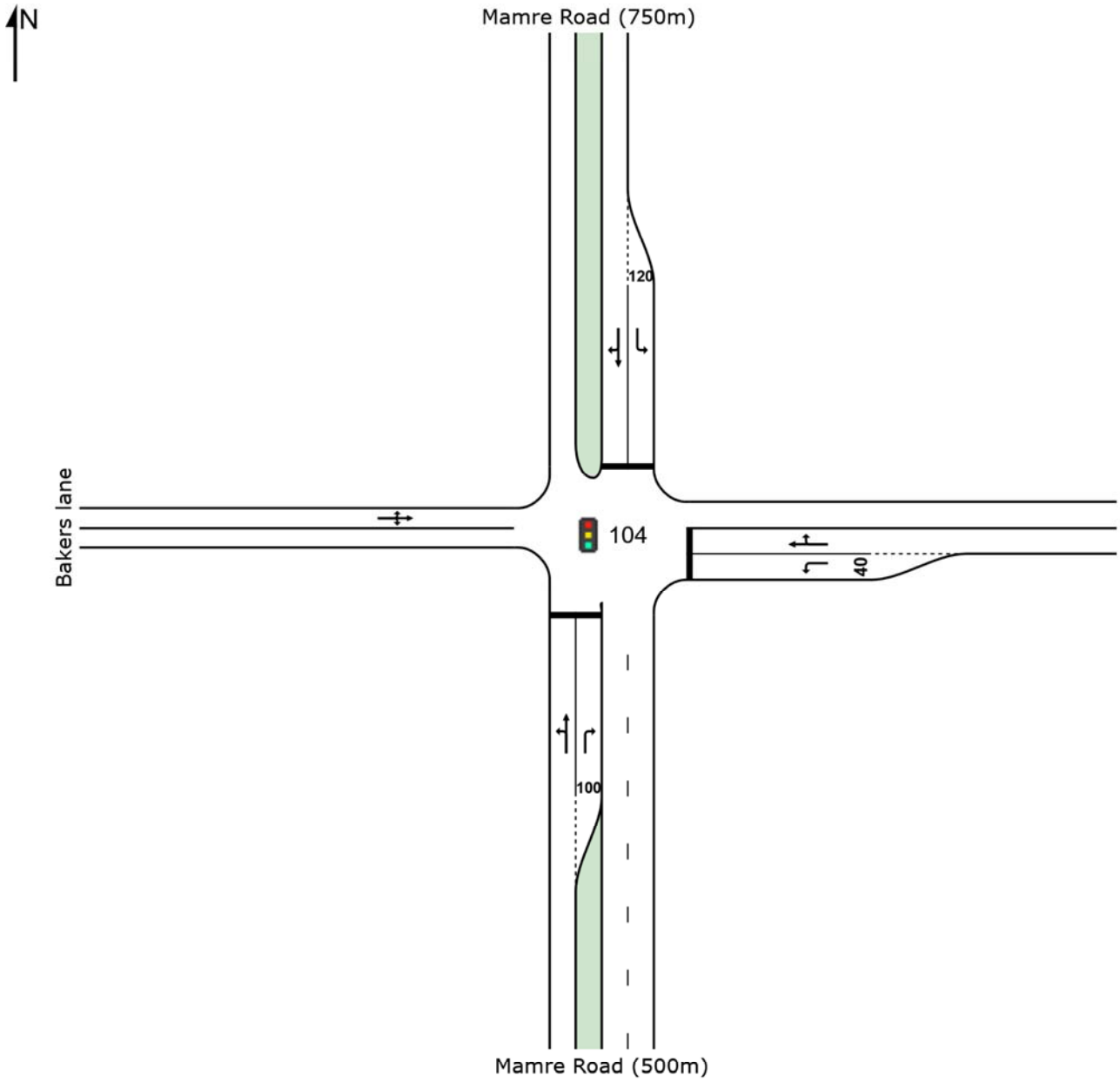
Appendix D1

Existing Baseline SIDRA Output

SITE LAYOUT

Site: 104 [[Existing] Mamre Road x Bakers Lane_AM]

Mamre Road x Bakers Lane
2018 Existing
Signals - Fixed Time Coordinated



MOVEMENT SUMMARY

Site: 104 [[Existing] Mamre Road x Bakers Lane_AM]

Network: N101 [Existing - AM]

Mamre Road x Bakers Lane
2018 Existing
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.707	23.5	LOS B	29.7	229.7	0.70	0.64	51.1
2	T1	743	12.2	743	12.2	0.707	16.6	LOS B	29.7	229.7	0.70	0.64	46.5
3	R2	80	0.0	80	0.0	0.800	80.2	LOS F	5.5	38.8	1.00	0.86	26.2
Approach		824	11.0	824	11.0	0.800	22.8	LOS B	29.7	229.7	0.72	0.66	41.2
East: Bakers Lane (440m)													
4	L2	43	0.0	43	0.0	0.060	32.1	LOS C	1.7	11.8	0.66	0.70	40.4
5	T1	1	0.0	1	0.0	0.789	47.5	LOS D	22.3	156.4	0.92	0.87	31.1
6	R2	392	0.3	392	0.3	0.789	53.0	LOS D	22.3	156.4	0.92	0.87	20.4
Approach		436	0.2	436	0.2	0.789	50.9	LOS D	22.3	156.4	0.90	0.85	22.5
North: Mamre Road (750m)													
7	L2	627	0.2	624	0.2	0.394	9.1	LOS A	8.5	59.4	0.24	0.70	60.5
8	T1	598	18.3	595	18.4	0.909	45.1	LOS D	36.6	296.3	0.79	0.87	44.6
9	R2	3	0.0	3	0.0	0.909	51.7	LOS D	36.6	296.3	0.79	0.87	40.6
Approach		1228	9.0	1222 N1	9.0	0.909	26.7	LOS B	36.6	296.3	0.51	0.78	51.3
West: Bakers lane													
10	L2	3	0.0	3	0.0	0.003	5.5	LOS A	0.0	0.0	0.00	0.47	52.5
11	T1	1	0.0	1	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.47	55.7
12	R2	1	0.0	1	0.0	0.003	5.5	LOS A	0.0	0.0	0.00	0.47	54.2
Approach		5	0.0	5	0.0	0.003	4.4	LOS A	0.0	0.0	0.00	0.47	53.8
All Vehicles		2494	8.1	2487 N1	8.1	0.909	29.6	LOS C	36.6	296.3	0.65	0.75	43.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 104 [[Existing] Mamre Road x Bakers Lane_PM]

Network: N101 [Existing - PM]

Mamre Road x Bakers Lane
2018 Existing
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.792	35.8	LOS C	35.4	274.4	0.89	0.81	43.6
2	T1	687	12.4	687	12.4	0.792	28.8	LOS C	35.4	274.4	0.89	0.81	35.6
3	R2	26	0.0	26	0.0	0.307	75.8	LOS F	1.7	12.1	1.00	0.71	27.1
Approach		715	11.9	715	11.9	0.792	30.6	LOS C	35.4	274.4	0.89	0.80	34.9
East: Bakers Lane (440m)													
4	L2	52	0.0	52	0.0	0.055	22.5	LOS B	1.6	11.3	0.53	0.68	45.5
5	T1	1	0.0	1	0.0	0.897	45.5	LOS D	32.6	229.0	0.91	0.93	31.7
6	R2	513	0.4	513	0.4	0.897	51.0	LOS D	32.6	229.0	0.91	0.93	20.9
Approach		565	0.4	565	0.4	0.897	48.4	LOS D	32.6	229.0	0.88	0.91	23.1
North: Mamre Road (750m)													
7	L2	180	1.2	180	1.2	0.113	8.4	LOS A	1.7	12.0	0.16	0.67	61.1
8	T1	857	12.9	857	12.9	1.287	318.5	LOS F	145.1	1127.5	1.00	2.17	11.8
9	R2	1	0.0	1	0.0	1.287	325.1	LOS F	145.1	1127.5	1.00	2.17	11.5
Approach		1038	10.9	1038	10.9	1.287	264.7	LOS F	145.1	1127.5	0.85	1.91	13.7
West: Bakers lane													
10	L2	1	0.0	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.45	52.9
11	T1	1	0.0	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.45	56.0
12	R2	2	0.0	2	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.45	54.4
Approach		4	0.0	4	0.0	0.002	4.1	LOS A	0.0	0.0	0.00	0.45	54.6
All Vehicles		2322	8.6	2322	8.6	1.287	139.5	LOS F	145.1	1127.5	0.87	1.32	16.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

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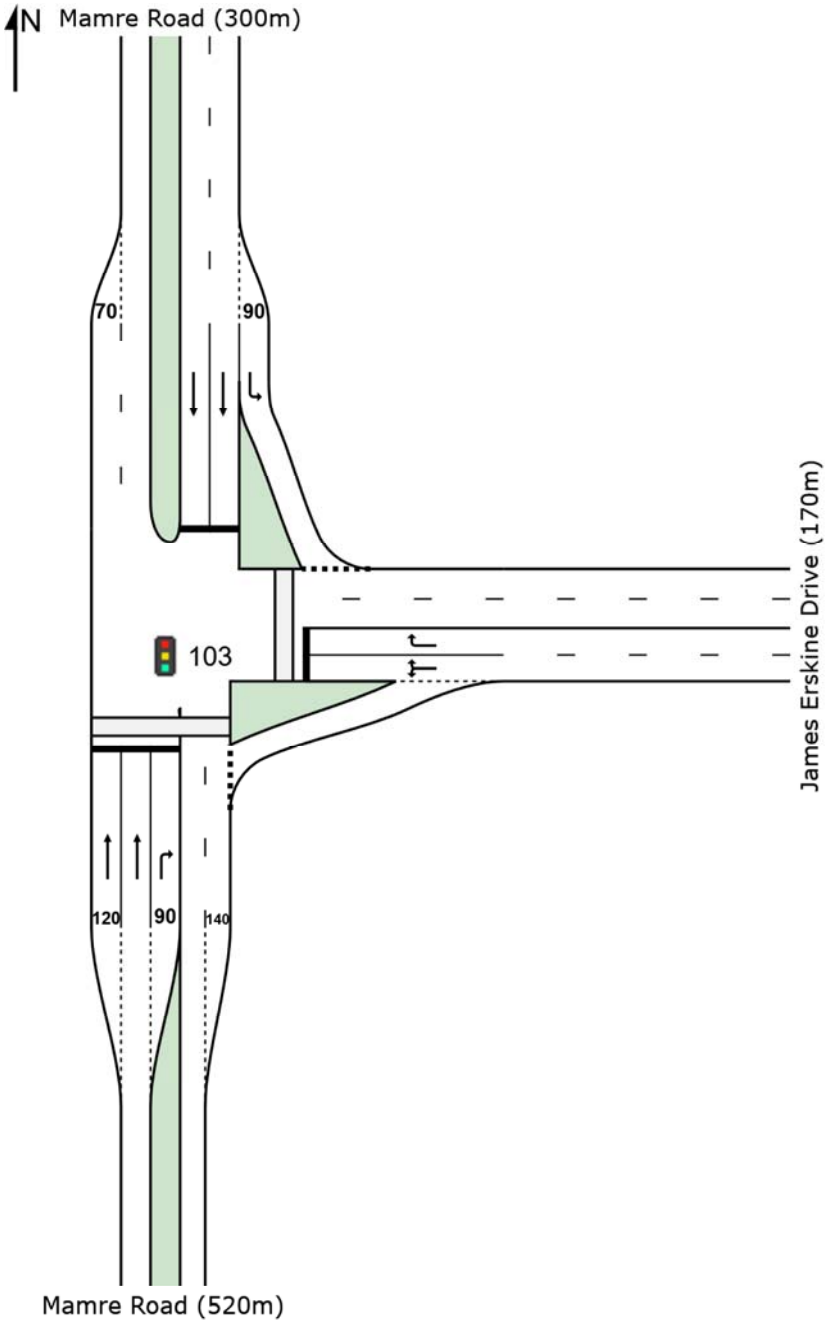
SITE LAYOUT

Site: 103 [[Existing] Mamre Road x James Erskine Drive_AM]

Mamre Road x James Erskine Drive
2018 Existing
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [[Existing] Mamre Road x James Erskine Drive_AM]

Network: N101 [Existing - AM]

Mamre Road x James Erskine Drive
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
2	T1	997	7.1	997	7.1	0.542	4.3	LOS A	10.0	74.3	0.48	0.43	67.8
3	R2	86	22.0	86	22.0	0.538	37.8	LOS C	2.7	22.1	0.99	0.78	33.7
Approach		1083	8.3	1083	8.3	0.542	7.0	LOS A	10.0	74.3	0.52	0.46	61.5
East: James Erskine Drive (170m)													
4	L2	33	54.8	33	54.8	0.183	12.9	LOS A	0.8	8.5	0.71	0.70	26.2
6	R2	87	54.2	87	54.2	0.435	27.7	LOS B	1.8	18.0	0.89	0.73	16.7
Approach		120	54.4	120	54.4	0.435	23.7	LOS B	1.8	18.0	0.84	0.72	18.5
North: Mamre Road (300m)													
7	L2	276	17.9	274	18.0	0.222	8.9	LOS A	1.5	12.2	0.32	0.68	49.7
8	T1	1213	7.4	1206	7.4	0.737	12.9	LOS A	16.8	125.0	0.80	0.73	42.0
Approach		1488	9.3	1480 N1	9.4	0.737	12.1	LOS A	16.8	125.0	0.71	0.72	43.8
All Vehicles		2692	10.9	2683 N1	10.9	0.737	10.6	LOS A	16.8	125.0	0.64	0.61	50.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	24.3	LOS C	0.0	0.0	0.90	0.90
P2	East Full Crossing	1	13.3	LOS B	0.0	0.0	0.67	0.67
All Pedestrians		2	18.8	LOS B			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [[Existing] Mamre Road x James Erskine Drive_PM]

Network: N101 [Existing - PM]

Mamre Road x James Erskine Drive
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
2	T1	906	9.6	906	9.6	0.560	8.6	LOS A	14.4	109.2	0.58	0.51	59.0
3	R2	25	58.3	25	58.3	0.257	49.2	LOS D	1.0	10.7	0.98	0.72	29.2
Approach		932	11.0	932	11.0	0.560	9.7	LOS A	14.4	109.2	0.59	0.52	56.9
East: James Erskine Drive (170m)													
4	L2	101	8.3	101	8.3	0.254	11.8	LOS A	2.7	20.5	0.62	0.70	27.0
6	R2	285	17.3	285	17.3	0.603	30.3	LOS C	8.0	64.4	0.87	0.79	15.5
Approach		386	15.0	386	15.0	0.603	25.5	LOS B	8.0	64.4	0.81	0.77	17.5
North: Mamre Road (300m)													
7	L2	133	56.3	133	56.3	0.121	8.9	LOS A	0.5	5.4	0.19	0.64	49.5
8	T1	1022	15.1	1022	15.1	0.689	16.9	LOS B	17.8	140.9	0.80	0.71	36.5
Approach		1155	19.9	1155	19.9	0.689	16.0	LOS B	17.8	140.9	0.73	0.70	38.2
All Vehicles		2473	15.8	2473	15.8	0.689	15.1	LOS B	17.8	140.9	0.69	0.64	41.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	1	16.9	LOS B	0.0	0.0	0.65	0.65
All Pedestrians		2	25.6	LOS C			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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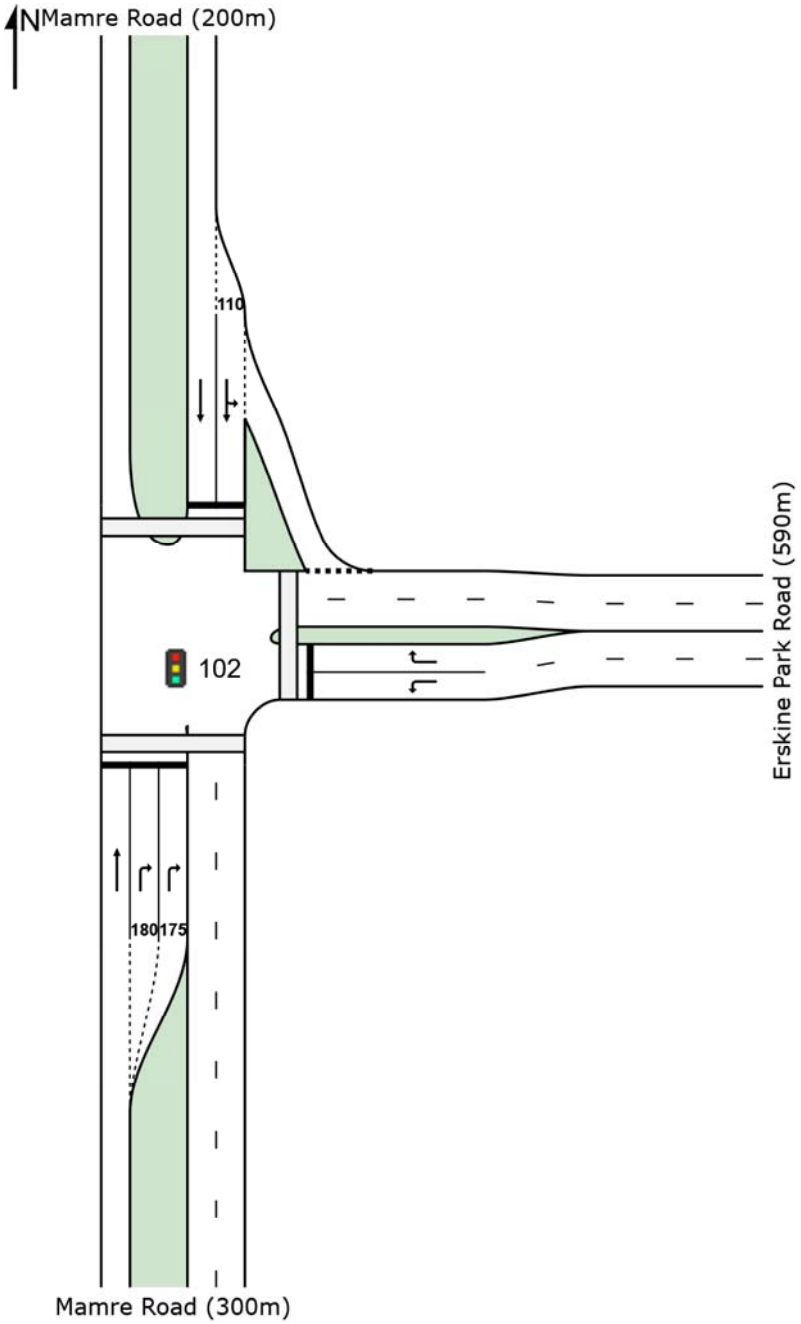
SITE LAYOUT

Site: 102 [[Existing] Mamre Road x Erskine Park Road_AM]

Mamre Road x Erskine Park Road
2018 Existing
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [[Existing] Mamre Road x Erskine Park Road_AM]

Network: N101 [Existing - AM]

Mamre Road x Erskine Park Road
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	518	9.8	518	9.8	0.396	4.9	LOS A	8.0	60.8	0.43	0.38	59.5
3	R2	557	13.4	557	13.4	0.773	43.5	LOS D	11.3	88.4	1.00	0.89	35.5
Approach		1075	11.7	1075	11.7	0.773	24.9	LOS B	11.3	88.4	0.73	0.65	39.4
East: Erskine Park Road (590m)													
4	L2	594	13.1	594	13.1	0.827	35.1	LOS C	23.5	183.3	0.95	0.93	35.1
6	R2	187	14.0	187	14.0	0.811	49.8	LOS D	8.1	63.6	1.00	0.91	28.4
Approach		781	13.3	781	13.3	0.827	38.6	LOS C	23.5	183.3	0.96	0.92	33.2
North: Mamre Road (200m)													
7	L2	553	4.4	547	4.4	0.712	13.6	LOS A	17.6	128.6	0.71	0.77	56.3
8	T1	868	6.4	860	6.4	0.712	15.7	LOS B	18.4	135.8	0.82	0.78	28.8
Approach		1421	5.6	1407 N1	5.6	0.712	14.9	LOS B	18.4	135.8	0.78	0.77	43.9
All Vehicles		3277	9.4	3263 N1	9.5	0.827	23.9	LOS B	23.5	183.3	0.81	0.77	38.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	1	20.3	LOS C	0.0	0.0	0.71	0.71
P3	North Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		3	29.6	LOS C			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 102 [[Existing] Mamre Road x Erskine Park Road_PM]

Network: N101 [Existing - PM]

Mamre Road x Erskine Park Road
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	598	8.5	598	8.5	0.588	16.0	LOS B	19.2	144.4	0.72	0.64	37.7
3	R2	643	11.1	643	11.1	0.748	47.1	LOS D	15.3	117.4	0.98	0.88	34.4
Approach		1241	9.8	1241	9.8	0.748	32.1	LOS C	19.2	144.4	0.85	0.76	35.2
East: Erskine Park Road (590m)													
4	L2	649	24.8	649	24.8	0.646	19.2	LOS B	19.3	164.1	0.66	0.82	47.4
6	R2	436	7.7	436	7.7	0.754	41.1	LOS C	19.8	147.6	0.95	0.88	31.9
Approach		1085	17.9	1085	17.9	0.754	28.0	LOS B	19.8	164.1	0.78	0.84	39.7
North: Mamre Road (200m)													
7	L2	195	10.8	195	10.8	0.653	21.3	LOS B	9.9	76.3	0.87	0.79	48.6
8	T1	508	12.4	508	12.4	0.653	27.0	LOS B	12.7	98.0	0.92	0.80	20.4
Approach		703	12.0	703	12.0	0.653	25.4	LOS B	12.7	98.0	0.90	0.80	31.0
All Vehicles		3029	13.2	3029	13.2	0.754	29.1	LOS C	19.8	164.1	0.84	0.80	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	32.0	LOS D	0.0	0.0	0.80	0.80
P2	East Full Crossing	1	37.8	LOS D	0.0	0.0	0.87	0.87
P3	North Full Crossing	1	32.0	LOS D	0.0	0.0	0.80	0.80
All Pedestrians		3	33.9	LOS D			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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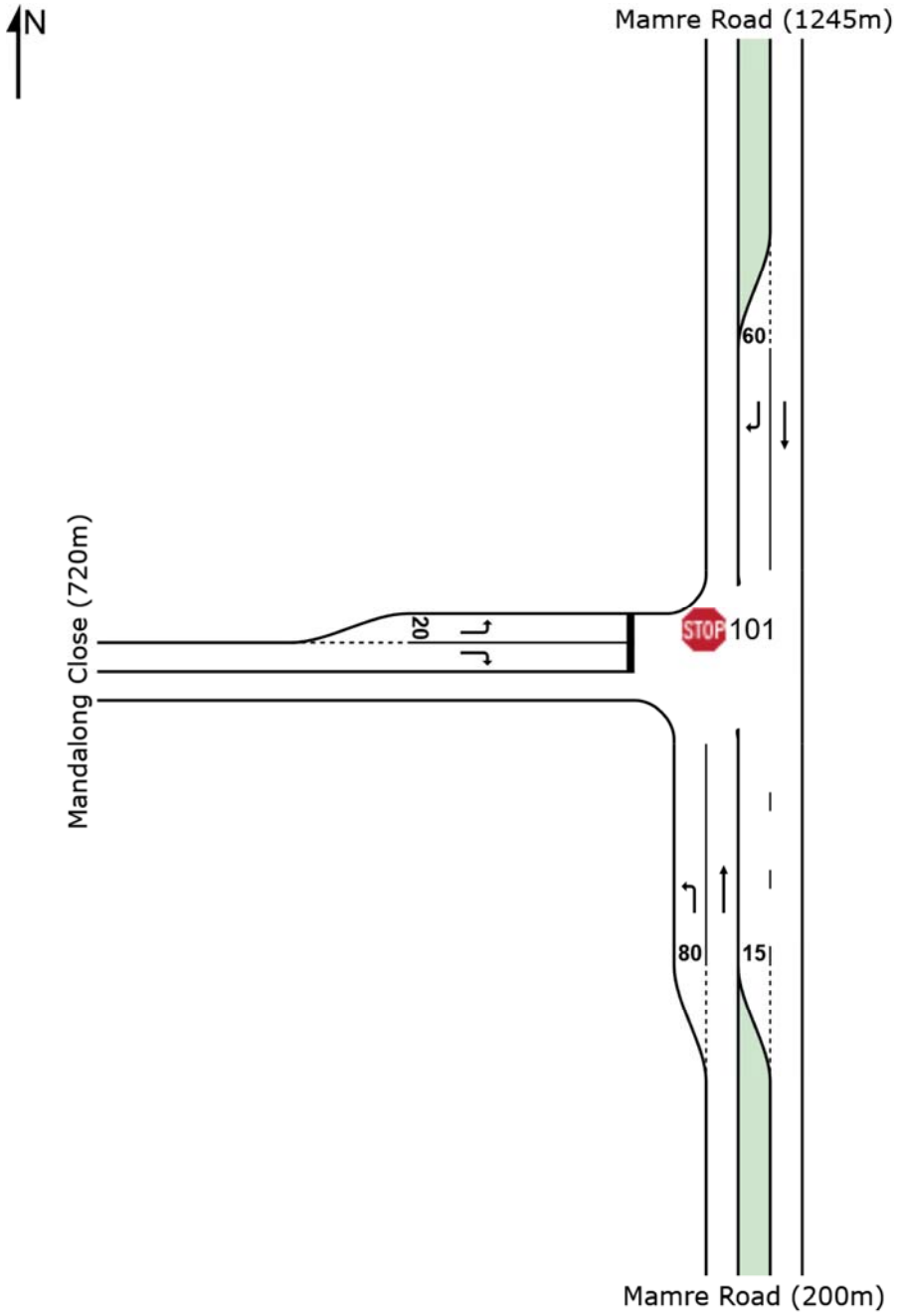
SITE LAYOUT

Site: 101 [[Existing] Mamre Road x Mandalong Close_AM]

Mamre Road x Mandalong Close
2018 Existing
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 101 [[Existing] Mamre Road x Mandalong Close_AM]

Network: N101 [Existing - AM]

Mamre Road x Mandalong Close
2018 Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	19	11.1	19	11.1	0.011	7.1	LOS A	0.0	0.0	0.00	0.63	59.3
2	T1	712	10.5	712	10.5	0.390	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		731	10.5	731	10.5	0.390	0.2	NA	0.0	0.0	0.00	0.02	79.3
North: Mamre Road (1245m)													
8	T1	1409	5.5	1409	5.5	0.749	0.6	LOS A	0.0	0.0	0.00	0.00	79.1
9	R2	43	2.4	43	2.4	0.072	11.6	LOS A	0.3	2.0	0.60	0.82	62.7
Approach		1453	5.4	1453	5.4	0.749	1.0	NA	0.3	2.0	0.02	0.02	78.2
West: Mandalong Close (720m)													
10	L2	27	7.7	27	7.7	0.063	15.0	LOS B	0.2	1.6	0.64	1.00	60.5
12	R2	20	5.3	20	5.3	3.333	2545.3	LOS F	16.3	119.3	1.00	1.29	0.9
Approach		47	6.7	47	6.7	3.333	1083.3	LOS F	16.3	119.3	0.79	1.12	4.0
All Vehicles		2231	7.1	2231	7.1	3.333	23.7	NA	16.3	119.3	0.03	0.05	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 101 [[Existing] Mamre Road x Mandalong Close_PM]

Network: N101 [Existing - PM]

Mamre Road x Mandalong Close
2018 Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	24	8.7	24	8.7	0.014	7.1	LOS A	0.0	0.0	0.00	0.63	60.4
2	T1	1134	7.5	1134	7.5	0.610	0.1	LOS A	0.0	0.0	0.00	0.00	79.5
Approach		1158	7.5	1158	7.5	0.610	0.2	NA	0.0	0.0	0.00	0.01	79.2
North: Mamre Road (1245m)													
8	T1	672	12.4	672	12.4	0.372	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
9	R2	26	0.0	26	0.0	0.098	19.9	LOS B	0.3	2.3	0.83	0.94	58.4
Approach		698	11.9	698	11.9	0.372	0.9	NA	0.3	2.3	0.03	0.04	78.2
West: Mandalong Close (720m)													
10	L2	26	8.0	26	8.0	0.169	31.4	LOS C	0.5	3.9	0.89	1.01	53.3
12	R2	11	0.0	11	0.0	0.551	283.5	LOS F	1.5	10.6	0.99	1.03	8.1
Approach		37	5.7	37	5.7	0.551	103.4	LOS F	1.5	10.6	0.92	1.01	31.0
All Vehicles		1893	9.1	1893	9.1	0.610	2.5	NA	1.5	10.6	0.03	0.04	76.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

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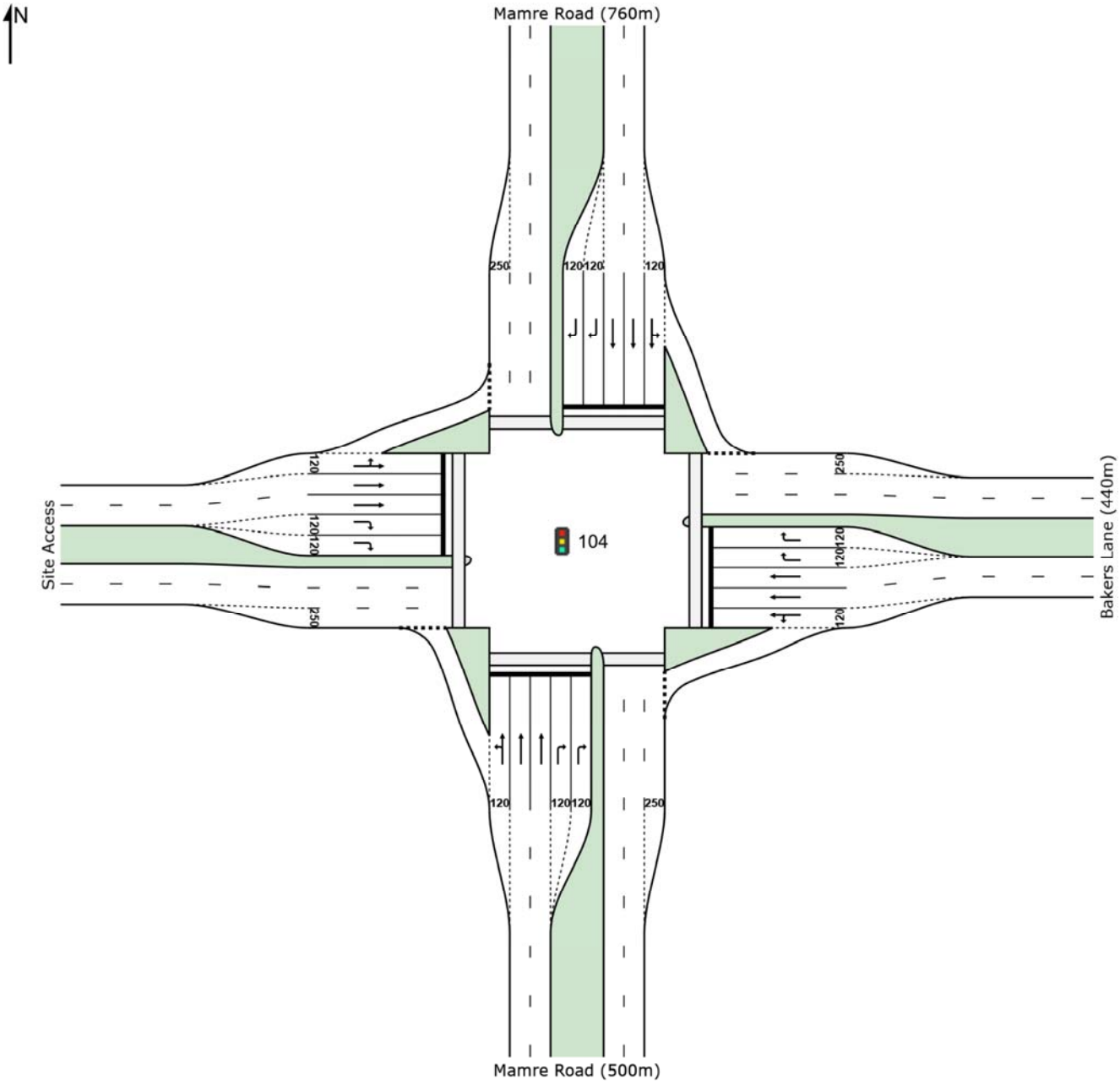
Appendix D2

2036 Baseline SIDRA Output – With RMS identified improvements

SITE LAYOUT

Site: 104 [[2036 Base] Mamre Road x Southern Link_AM]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 104 [[2036 Base] Mamre Road x Southern Link_AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.590	33.7	LOS C	27.7	214.0	0.72	0.66	49.6
2	T1	1613	12.2	1613	12.2	0.590	24.6	LOS B	27.9	215.9	0.71	0.64	39.3
3	R2	607	0.0	607	0.0	1.022	134.1	LOS F	31.9	223.4	1.00	1.09	19.2
Approach		2221	8.8	2221	8.8	1.022	54.6	LOS D	31.9	223.4	0.79	0.76	27.5
East: Bakers Lane (440m)													
4	L2	342	0.0	342	0.0	0.392	33.6	LOS C	15.0	105.1	0.69	0.83	43.6
5	T1	181	0.0	181	0.0	0.240	55.0	LOS D	5.6	39.2	0.89	0.70	35.9
6	R2	84	0.3	84	0.3	0.262	78.2	LOS F	3.0	20.8	0.97	0.74	16.9
Approach		607	0.0	607	0.0	0.392	46.1	LOS D	15.0	105.1	0.79	0.78	36.8
North: Mamre Road (760m)													
7	L2	524	0.2	524	0.2	1.019	81.1	LOS F	69.3	517.2	1.00	1.09	25.7
8	T1	1607	18.3	1607	18.3	1.019	104.6	LOS F	82.4	667.6	1.00	1.24	26.9
9	R2	151	0.0	151	0.0	0.608	84.5	LOS F	5.6	39.5	1.00	0.78	32.3
Approach		2282	12.9	2282	12.9	1.019	97.9	LOS F	82.4	667.6	1.00	1.18	26.9
West: Site Access													
10	L2	280	0.0	280	0.0	0.972	101.9	LOS F	31.4	219.8	1.00	1.10	15.8
11	T1	631	0.0	631	0.0	0.972	100.5	LOS F	31.4	219.8	1.00	1.09	24.5
12	R2	1	0.0	1	0.0	0.007	83.5	LOS F	0.0	0.3	0.97	0.57	28.4
Approach		912	0.0	912	0.0	0.972	100.9	LOS F	31.4	219.8	1.00	1.09	22.1
All Vehicles		6022	8.2	6022	8.2	1.022	77.1	LOS F	82.4	667.6	0.90	0.97	27.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.8 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	69.2	LOS F	0.0	0.0	0.96	0.96
P12	South Stage 2	11	69.2	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	11	37.5	LOS D	0.0	0.0	0.71	0.71
P31	North Stage 1	11	65.4	LOS F	0.0	0.0	0.93	0.93
P32	North Stage 2	11	60.8	LOS F	0.0	0.0	0.90	0.90
P4	West Full Crossing	11	28.2	LOS C	0.0	0.0	0.61	0.61
All Pedestrians		63	55.0	LOS E			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [[2036 Base] Mamre Road x Southern Link_PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 75 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.913	52.3	LOS D	21.8	167.7	1.00	1.10	39.9
2	T1	1391	11.5	1391	11.5	0.913	44.5	LOS D	21.8	167.7	1.00	1.10	27.9
3	R2	321	0.0	321	0.0	0.589	41.4	LOS C	5.8	40.5	0.98	0.81	39.8
Approach		1713	9.3	1713	9.3	0.913	43.9	LOS D	21.8	167.7	1.00	1.04	30.6
East: Bakers Lane (440m)													
4	L2	751	0.0	751	0.0	0.793	29.9	LOS C	20.0	140.1	0.76	0.97	42.1
5	T1	631	0.0	631	0.0	0.793	34.9	LOS C	20.0	140.1	0.96	0.95	41.3
6	R2	498	0.5	498	0.5	0.776	41.9	LOS C	9.7	68.0	1.00	0.92	24.0
Approach		1879	0.1	1879	0.1	0.793	34.8	LOS C	20.0	140.1	0.89	0.95	37.7
North: Mamre Road (760m)													
7	L2	132	0.3	132	0.3	0.980	71.4	LOS F	28.6	223.5	1.00	1.26	35.6
8	T1	1325	18.5	1325	18.5	0.980	65.3	LOS E	28.6	223.5	1.00	1.27	37.4
9	R2	208	0.0	208	0.0	0.383	38.2	LOS C	3.6	25.2	0.95	0.77	42.3
Approach		1665	14.7	1665	14.7	0.980	62.4	LOS E	28.6	224.4	0.99	1.21	37.9
West: Site Access													
10	L2	236	0.0	236	0.0	0.774	29.8	LOS C	8.2	57.4	0.99	0.96	32.3
11	T1	326	0.0	326	0.0	0.774	37.2	LOS C	8.2	57.4	1.00	0.91	39.5
12	R2	1	0.0	1	0.0	0.004	40.6	LOS C	0.0	0.1	0.93	0.56	38.4
Approach		563	0.0	563	0.0	0.774	34.1	LOS C	8.2	57.4	0.99	0.93	37.1
All Vehicles		5820	7.0	5820	7.0	0.980	45.3	LOS D	28.6	224.4	0.96	1.05	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

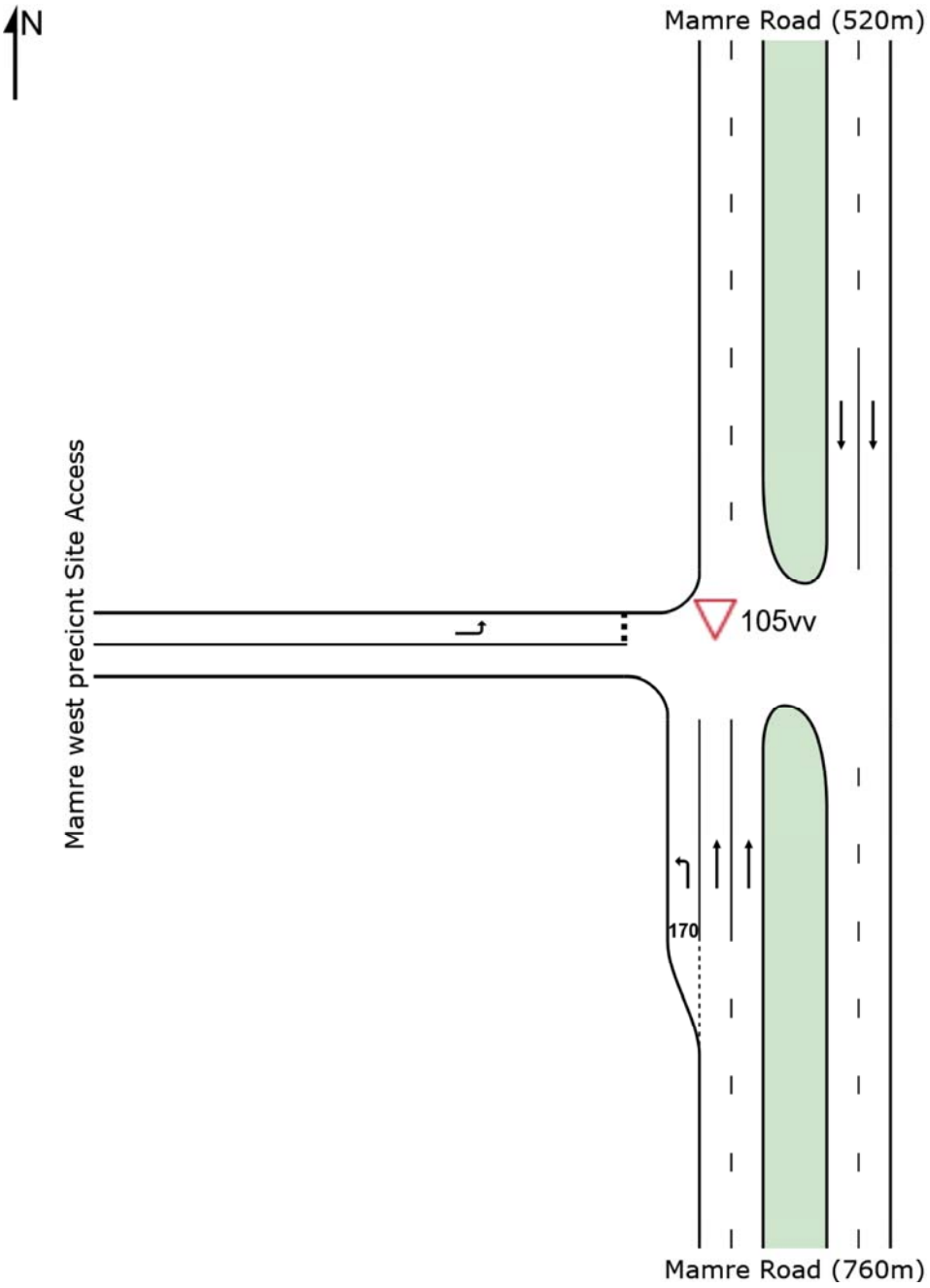
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	31.8	LOS D	0.0	0.0	0.92	0.92
P12	South Stage 2	11	31.8	LOS D	0.0	0.0	0.92	0.92
P2	East Full Crossing	11	31.8	LOS D	0.0	0.0	0.92	0.92
P31	North Stage 1	11	31.8	LOS D	0.0	0.0	0.92	0.92
P32	North Stage 2	11	31.8	LOS D	0.0	0.0	0.92	0.92
P4	West Full Crossing	11	31.8	LOS D	0.0	0.0	0.92	0.92
All Pedestrians		63	31.8	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _AM]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mamre Road (760m)													
1	L2	112	0.0	112	0.0	0.060	7.0	LOS A	0.0	0.0	0.00	0.63	67.9
2	T1	1865	7.6	1865	7.6	0.502	0.1	LOS A	0.0	0.0	0.00	0.00	79.7
Approach		1977	7.2	1977	7.2	0.502	0.5	NA	0.0	0.0	0.00	0.04	78.5
North: Mamre Road (520m)													
8	T1	2282	7.7	2282	7.7	0.614	0.1	LOS A	0.0	0.0	0.00	0.00	79.5
Approach		2282	7.7	2282	7.7	0.614	0.1	NA	0.0	0.0	0.00	0.00	79.5
West: Mamre west precicnt Site Access													
10	L2	32	0.0	32	0.0	0.082	13.7	LOS A	0.3	1.9	0.73	0.88	41.6
Approach		32	0.0	32	0.0	0.082	13.7	LOS A	0.3	1.9	0.73	0.88	41.6
All Vehicles		4291	7.4	4291	7.4	0.614	0.4	NA	0.3	1.9	0.01	0.02	78.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.8 %
Number of Iterations: 10 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mamre Road (760m)													
1	L2	38	0.0	38	0.0	0.020	6.9	LOS A	0.0	0.0	0.00	0.63	67.9
2	T1	2086	6.8	2086	6.8	0.821	0.9	LOS A	0.0	0.0	0.00	0.00	78.0
Approach		2124	6.6	2124	6.6	0.821	1.0	NA	0.0	0.0	0.00	0.01	77.7
North: Mamre Road (520m)													
8	T1	1665	13.7	1665	13.7	0.465	0.1	LOS A	0.0	0.0	0.00	0.00	79.7
Approach		1665	13.7	1665	13.7	0.465	0.1	NA	0.0	0.0	0.00	0.00	79.7
West: Mamre west precicnt Site Access													
10	L2	94	0.0	94	0.0	0.396	18.2	LOS B	1.1	7.6	0.79	0.97	37.7
Approach		94	0.0	94	0.0	0.396	18.2	LOS B	1.1	7.6	0.79	0.97	37.7
All Vehicles		3883	9.5	3883	9.5	0.821	1.0	NA	1.1	7.6	0.02	0.03	76.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

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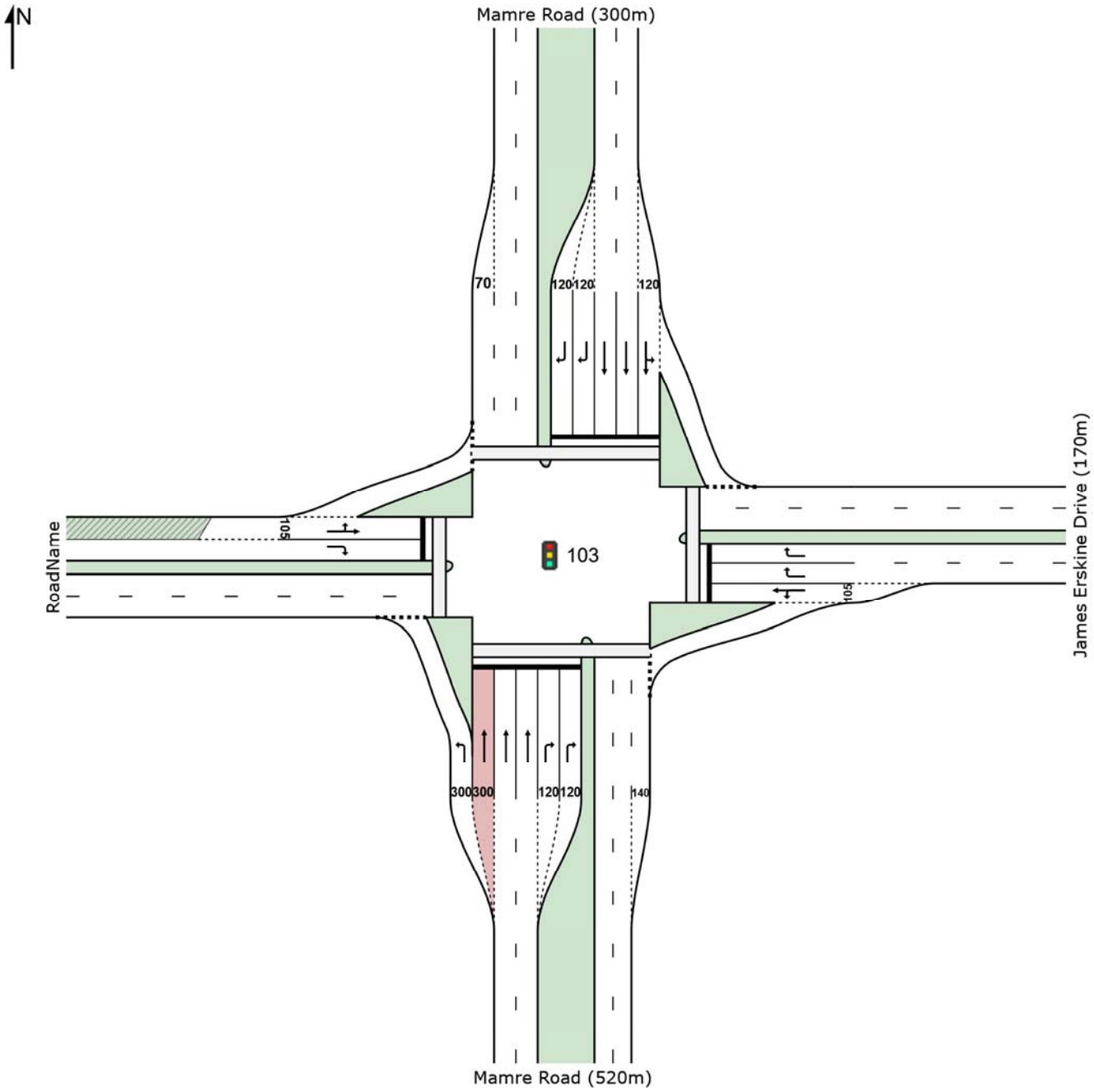
SITE LAYOUT

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_AM]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated



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Organisation: ASON GROUP PTY LTD | Created: Thursday, 24 May 2018 11:57:42 AM
Project: C:\Users\Alireza Rasouli\Ason Group\Ason Group Team Site - 0584\Projects\Modelling\SIDRA\2036 Base Case\2036 Base Case - With 20% ped call\AG0584m05 Mamre_2036 Basecase - Two lanes on Mamre.sip7

MOVEMENT SUMMARY

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	7.7	LOS A	0.0	0.1	0.20	0.56	52.8
2	T1	1580	8.1	1580	8.1	0.693	19.6	LOS B	38.3	284.3	0.70	0.65	44.6
3	R2	147	22.0	147	22.0	0.860	95.3	LOS F	6.0	50.3	1.00	0.90	19.3
Approach		1728	9.3	1728	9.3	0.860	26.1	LOS B	38.3	284.3	0.73	0.67	38.7
East: James Erskine Drive (170m)													
4	L2	62	54.8	62	54.8	0.154	22.0	LOS B	2.2	22.9	0.57	0.67	19.8
5	T1	1	0.0	1	0.0	0.154	17.2	LOS B	2.2	22.9	0.57	0.67	38.2
6	R2	88	54.2	88	54.2	0.838	95.2	LOS F	3.7	37.9	1.00	0.94	6.4
Approach		152	54.1	152	54.1	0.838	64.7	LOS E	3.7	37.9	0.82	0.82	9.1
North: Mamre Road (300m)													
7	L2	429	17.9	429	17.9	0.734	28.0	LOS B	38.2	296.8	0.72	0.81	34.8
8	T1	2182	7.4	2182	7.4	0.949	44.0	LOS D	65.8	489.6	0.80	0.89	19.5
9	R2	183	0.0	183	0.0	0.925	99.1	LOS F	7.8	54.5	1.00	0.99	19.7
Approach		2795	8.5	2795	8.5	0.949	45.1	LOS D	65.8	489.6	0.80	0.88	21.4
West: RoadName													
10	L2	31	0.0	31	0.0	0.046	19.5	LOS B	0.8	5.5	0.61	0.66	37.1
11	T1	1	0.0	1	0.0	0.046	13.9	LOS A	0.8	5.5	0.61	0.66	41.0
12	R2	38	0.0	38	0.0	0.510	87.1	LOS F	2.9	20.4	1.00	0.73	16.0
Approach		69	0.0	69	0.0	0.510	56.3	LOS D	2.9	20.4	0.82	0.70	21.6
All Vehicles		4744	10.1	4744	10.1	0.949	39.0	LOS C	65.8	489.6	0.78	0.80	26.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.8 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	69.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	1	16.3	LOS B	0.0	0.0	0.47	0.47
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	15.4	LOS B	0.1	0.1	0.45	0.45
All Pedestrians		107	42.4	LOS E			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	7.2	LOS A	0.0	0.1	0.18	0.56	53.1
2	T1	2136	10.3	2136	10.3	0.966	58.9	LOS E	94.2	713.6	1.00	1.09	23.3
3	R2	60	58.3	60	58.3	0.264	80.2	LOS F	2.1	22.5	0.97	0.74	21.7
Approach		2197	11.6	2197	11.6	0.966	59.4	LOS E	94.2	713.6	1.00	1.08	23.3
East: James Erskine Drive (170m)													
4	L2	172	8.3	172	8.3	0.225	10.4	LOS A	3.6	27.3	0.39	0.63	28.8
5	T1	1	0.0	1	0.0	0.225	6.0	LOS A	3.6	27.3	0.39	0.63	46.0
6	R2	221	17.3	221	17.3	0.926	98.7	LOS F	9.5	76.5	1.00	1.06	6.2
Approach		394	13.4	394	13.4	0.926	60.0	LOS E	9.5	76.5	0.73	0.87	9.5
North: Mamre Road (300m)													
7	L2	127	56.3	127	56.3	0.432	30.5	LOS C	15.2	131.9	0.60	0.66	34.4
8	T1	1379	15.1	1379	15.1	0.558	22.3	LOS B	25.5	201.5	0.67	0.63	31.1
9	R2	63	0.0	63	0.0	0.425	86.5	LOS F	2.4	16.9	1.00	0.72	21.5
Approach		1569	17.9	1569	17.9	0.558	25.5	LOS B	25.5	201.5	0.68	0.64	30.2
West: RoadName													
10	L2	94	0.0	94	0.0	0.169	37.0	LOS C	4.5	31.2	0.73	0.73	27.6
11	T1	1	0.0	1	0.0	0.169	31.4	LOS C	4.5	31.2	0.73	0.73	31.8
12	R2	115	0.0	115	0.0	0.842	88.6	LOS F	9.1	63.9	1.00	0.93	15.8
Approach		209	0.0	209	0.0	0.842	65.2	LOS E	9.1	63.9	0.88	0.84	19.6
All Vehicles		4369	13.5	4369	13.5	0.966	47.6	LOS D	94.2	713.6	0.85	0.89	23.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	69.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	1	21.3	LOS C	0.0	0.0	0.53	0.53
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		107	68.8	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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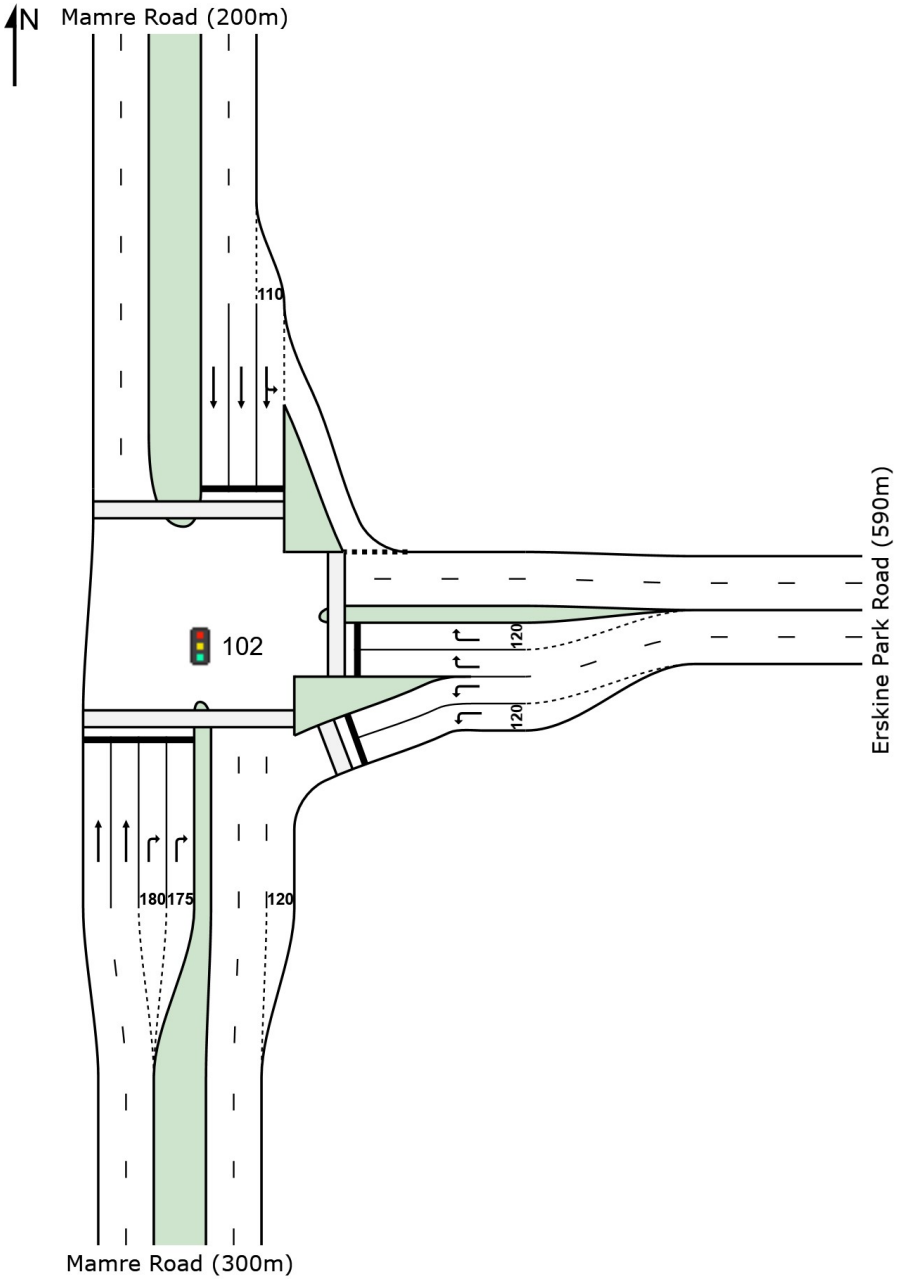
SITE LAYOUT

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_PM - IMPROVED]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_AM - IMPROVED]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	748	9.8	748	9.8	0.249	2.1	LOS A	4.0	30.6	0.24	0.21	69.7
3	R2	951	13.4	951	13.4	0.825	45.9	LOS D	23.6	184.4	0.98	0.92	35.0
Approach		1699	11.8	1699	11.8	0.825	26.6	LOS B	23.6	184.4	0.66	0.61	39.3
East: Erskine Park Road (590m)													
4	L2	1017	13.1	1017	13.1	0.899	41.8	LOS C	31.3	243.6	0.91	0.92	31.9
6	R2	12	14.0	12	14.0	0.057	57.7	LOS E	0.3	2.2	0.97	0.65	25.8
Approach		1028	13.1	1028	13.1	0.899	42.0	LOS C	31.3	243.6	0.91	0.92	31.8
North: Mamre Road (200m)													
7	L2	222	4.4	222	4.4	0.717	25.6	LOS B	18.3	134.2	0.84	0.86	47.6
8	T1	1432	6.4	1432	6.4	1.043	87.4	LOS F	44.2	326.4	0.95	1.26	8.1
Approach		1654	6.1	1654	6.1	1.043	79.1	LOS F	44.2	326.4	0.94	1.21	11.6
All Vehicles		4381	10.0	4381	10.0	1.043	50.0	LOS D	44.2	326.4	0.82	0.91	24.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.8 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	23.8	LOS C	0.0	0.0	0.69	0.69
P2S	East Slip/Bypass Lane Crossing	53	19.3	LOS B	0.1	0.1	0.62	0.62
P3	North Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		56	20.3	LOS C			0.63	0.63

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_PM - IMPROVED]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	1355	8.5	1355	8.5	0.476	4.4	LOS A	11.8	88.5	0.39	0.36	61.3
3	R2	1080	11.1	1080	11.1	0.615	26.2	LOS B	18.7	143.7	0.77	0.83	44.7
Approach		2435	9.6	2435	9.6	0.615	14.1	LOS A	18.7	143.7	0.56	0.57	48.8
East: Erskine Park Road (590m)													
4	L2	728	24.8	728	24.8	0.403	14.9	LOS B	9.2	77.7	0.45	0.73	52.5
6	R2	342	7.7	342	7.7	0.888	66.6	LOS E	9.7	72.7	1.00	0.96	23.3
Approach		1071	19.3	1071	19.3	0.888	31.4	LOS C	9.7	77.7	0.63	0.81	37.6
North: Mamre Road (200m)													
7	L2	24	10.8	24	10.8	0.602	41.0	LOS C	9.1	70.1	0.95	0.83	37.9
8	T1	841	12.4	841	12.4	0.875	47.8	LOS D	17.5	135.6	0.99	0.96	13.8
Approach		865	12.4	865	12.4	0.875	47.6	LOS D	17.5	135.6	0.99	0.96	14.7
All Vehicles		4371	12.6	4371	12.6	0.888	25.0	LOS B	18.7	143.7	0.66	0.70	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

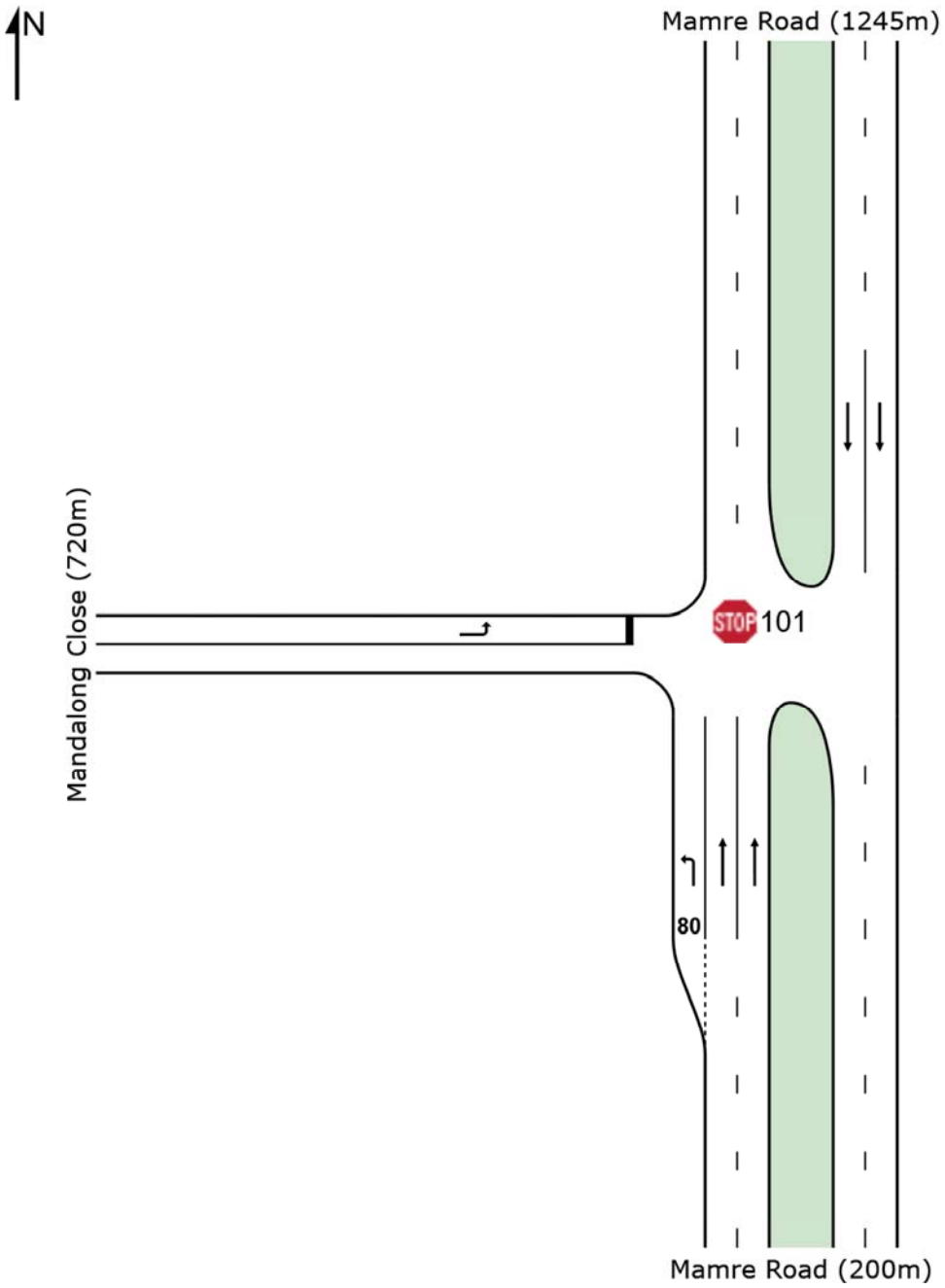
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	41.4	LOS E	0.0	0.0	0.91	0.91
P2S	East Slip/Bypass Lane Crossing	53	35.4	LOS D	0.1	0.1	0.84	0.84
P3	North Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		56	35.8	LOS D			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_AM]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)



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MOVEMENT SUMMARY

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_AM] Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	45	11.1	45	11.1	0.026	7.1	LOS A	0.0	0.0	0.00	0.63	59.3
2	T1	715	10.5	715	10.5	0.196	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		760	10.5	760	10.5	0.196	0.4	NA	0.0	0.0	0.00	0.04	78.9
North: Mamre Road (1245m)													
8	T1	1654	5.5	1654	5.5	0.656	0.6	LOS A	0.0	0.0	0.00	0.00	79.2
Approach		1654	5.5	1654	5.5	0.656	0.6	NA	0.0	0.0	0.00	0.00	79.2
West: Mandalong Close (720m)													
10	L2	66	7.7	66	7.7	0.086	10.6	LOS A	0.3	2.5	0.44	0.90	62.6
Approach		66	7.7	66	7.7	0.086	10.6	LOS A	0.3	2.5	0.44	0.90	62.6
All Vehicles		2480	7.1	2480	7.1	0.656	0.8	NA	0.3	2.5	0.01	0.04	78.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 13.8 %
Number of Iterations: 10 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_PM] Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	58	8.7	58	8.7	0.033	7.1	LOS A	0.0	0.0	0.00	0.63	60.4
2	T1	1639	7.5	1639	7.5	0.441	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		1697	7.6	1697	7.6	0.441	0.3	NA	0.0	0.0	0.00	0.02	79.2
North: Mamre Road (1245m)													
8	T1	865	12.4	865	12.4	0.240	0.1	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		865	12.4	865	12.4	0.240	0.1	NA	0.0	0.0	0.00	0.00	79.9
West: Mandalong Close (720m)													
10	L2	63	8.0	63	8.0	0.170	17.2	LOS B	0.6	4.5	0.72	1.00	59.5
Approach		63	8.0	63	8.0	0.170	17.2	LOS B	0.6	4.5	0.72	1.00	59.5
All Vehicles		2625	9.2	2625	9.2	0.441	0.6	NA	0.6	4.5	0.02	0.04	78.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.0 %
Number of Iterations: 10 (maximum specified: 10)

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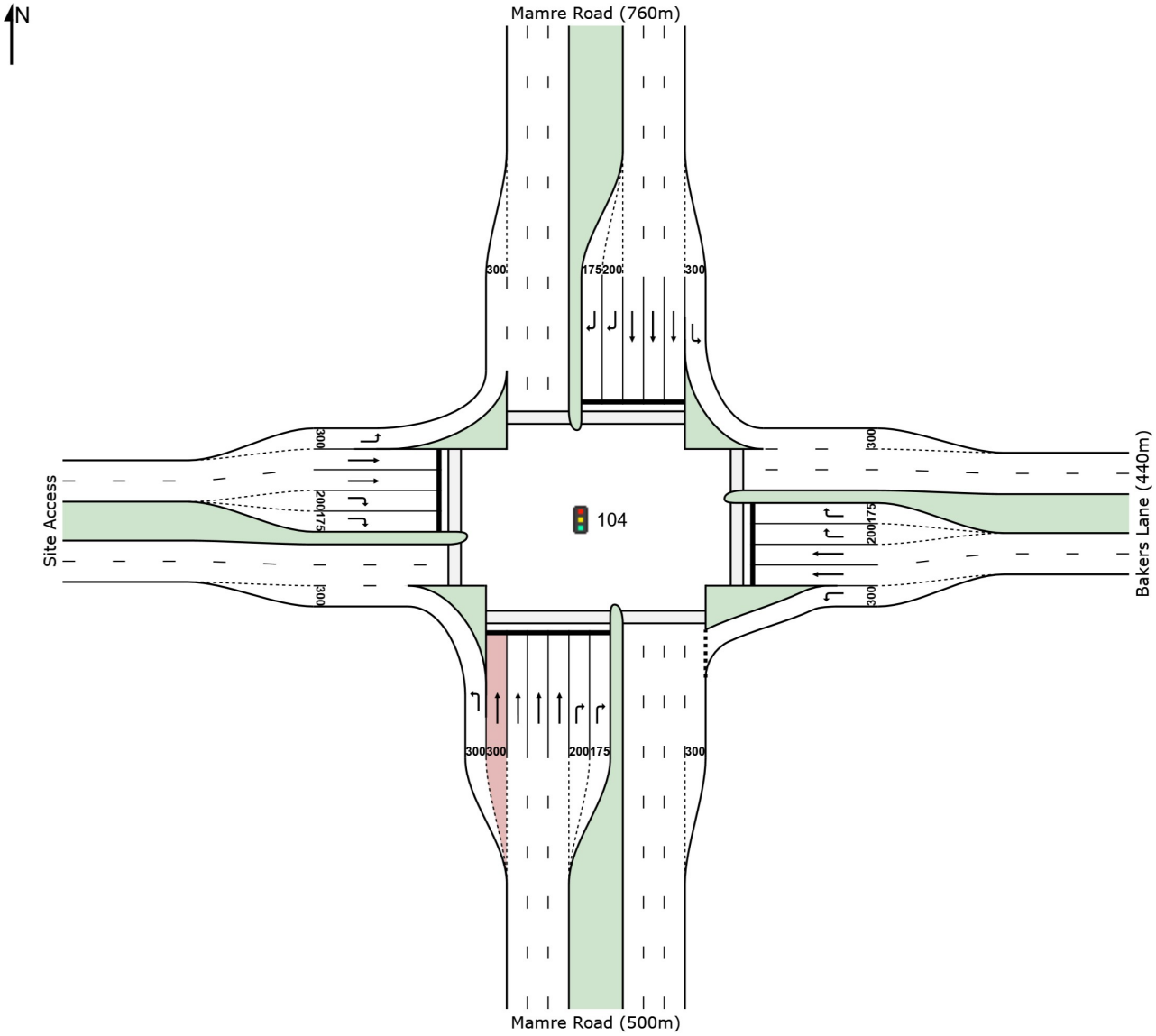
Appendix D3

2036 Project Future Baseline SIDRA Results – Three Lanes on Mamre Road

SITE LAYOUT

Site: 104 [[2036 Base] Mamre Road x Southern Link_AM]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 104 [[2036 Base] Mamre Road x Southern Link_AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 105 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.001	7.6	LOS A	0.0	0.0	0.00	0.60	66.5
2	T1	1623	12.8	1623	12.8	0.637	22.8	LOS B	20.8	160.9	0.82	0.73	40.9
3	R2	607	0.0	607	0.0	0.858	60.6	LOS E	17.2	120.2	1.00	0.95	32.7
Approach		2232	9.3	2232	9.3	0.858	33.1	LOS C	20.8	160.9	0.87	0.79	37.1
East: Bakers Lane (440m)													
4	L2	342	0.0	342	0.0	0.328	16.7	LOS B	8.3	57.9	0.55	0.75	55.2
5	T1	181	0.0	181	0.0	0.257	40.3	LOS C	4.0	28.3	0.90	0.71	42.3
6	R2	84	0.3	84	0.3	0.398	62.7	LOS E	2.2	15.7	1.00	0.73	20.2
Approach		607	0.0	607	0.0	0.398	30.1	LOS C	8.3	57.9	0.72	0.73	45.0
North: Mamre Road (760m)													
7	L2	524	0.2	524	0.2	0.283	7.6	LOS A	0.0	0.0	0.00	0.60	68.0
8	T1	1607	18.3	1607	18.3	0.897	49.3	LOS D	31.7	256.6	1.00	1.05	43.2
9	R2	151	0.0	151	0.0	0.608	62.8	LOS E	4.0	28.3	1.00	0.78	38.1
Approach		2282	12.9	2282	12.9	0.897	40.6	LOS C	31.7	256.6	0.77	0.93	46.6
West: Site Access													
10	L2	280	0.0	280	0.0	0.151	7.6	LOS A	0.0	0.0	0.00	0.60	61.4
11	T1	631	0.0	631	0.0	0.893	57.6	LOS E	18.6	130.4	1.00	1.01	35.2
12	R2	1	0.0	1	0.0	0.005	59.0	LOS E	0.0	0.2	0.96	0.57	35.1
Approach		912	0.0	912	0.0	0.893	42.2	LOS C	18.6	130.4	0.69	0.88	38.4
All Vehicles		6033	8.3	6033	8.3	0.897	37.0	LOS C	31.7	256.6	0.79	0.85	42.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	46.7	LOS E	0.0	0.0	0.94	0.94
P12	South Stage 2	11	43.0	LOS E	0.0	0.0	0.91	0.91
P21	East Stage 1	11	20.8	LOS C	0.0	0.0	0.63	0.63
P22	East Stage 2	11	19.5	LOS B	0.0	0.0	0.61	0.61
P31	North Stage 1	11	35.2	LOS D	0.0	0.0	0.82	0.82
P32	North Stage 2	11	32.8	LOS D	0.0	0.0	0.79	0.79
P41	West Stage 1	11	13.4	LOS B	0.0	0.0	0.50	0.50
P42	West Stage 2	11	12.4	LOS B	0.0	0.0	0.49	0.49

All Pedestrians	84	28.0	LOS C	0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [[2036 Base] Mamre Road x Southern Link_PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 85 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	0.0	1	0.0	0.001	7.6	LOS A	0.0	0.0	0.00	0.60	66.5
2	T1	1401	12.1	1401	12.1	0.804	33.1	LOS C	19.5	149.6	0.98	0.93	33.5
3	R2	321	0.0	321	0.0	0.816	54.1	LOS D	7.4	51.7	1.00	0.91	34.9
Approach		1723	9.9	1723	9.9	0.816	37.0	LOS C	19.5	149.6	0.98	0.92	33.9
East: Bakers Lane (440m)													
4	L2	751	0.0	751	0.0	0.404	5.7	LOS A	0.0	0.0	0.00	0.53	54.6
5	T1	631	0.0	631	0.0	0.916	52.3	LOS D	16.2	113.1	1.00	1.11	34.9
6	R2	498	0.5	498	0.5	0.880	54.2	LOS D	12.1	84.8	1.00	1.03	20.5
Approach		1879	0.1	1879	0.1	0.916	34.2	LOS C	16.2	113.1	0.60	0.86	37.2
North: Mamre Road (760m)													
7	L2	132	0.3	132	0.3	0.071	7.6	LOS A	0.0	0.0	0.00	0.60	68.0
8	T1	1325	18.5	1325	18.5	0.899	45.9	LOS D	22.2	180.1	1.00	1.07	44.7
9	R2	208	0.0	208	0.0	0.795	53.9	LOS D	4.8	33.8	1.00	0.90	37.2
Approach		1665	14.7	1665	14.7	0.899	43.9	LOS D	22.2	180.1	0.92	1.01	44.7
West: Site Access													
10	L2	236	0.0	236	0.0	0.127	5.6	LOS A	0.0	0.0	0.00	0.53	51.4
11	T1	326	0.0	326	0.0	0.474	34.9	LOS C	6.3	43.9	0.95	0.77	41.4
12	R2	1	0.0	1	0.0	0.002	38.2	LOS C	0.0	0.1	0.86	0.57	39.6
Approach		563	0.0	563	0.0	0.474	22.6	LOS B	6.3	43.9	0.55	0.67	43.8
All Vehicles		5831	7.2	5831	7.2	0.916	36.7	LOS C	22.2	180.1	0.80	0.90	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	31.4	LOS D	0.0	0.0	0.86	0.86
P12	South Stage 2	11	26.4	LOS C	0.0	0.0	0.79	0.79
P21	East Stage 1	11	15.3	LOS B	0.0	0.0	0.60	0.60
P22	East Stage 2	11	14.1	LOS B	0.0	0.0	0.58	0.58
P31	North Stage 1	11	23.4	LOS C	0.0	0.0	0.74	0.74
P32	North Stage 2	11	21.2	LOS C	0.0	0.0	0.71	0.71
P41	West Stage 1	11	13.6	LOS B	0.0	0.0	0.56	0.56
P42	West Stage 2	11	12.5	LOS B	0.0	0.0	0.54	0.54

All Pedestrians	84	19.7	LOS B	0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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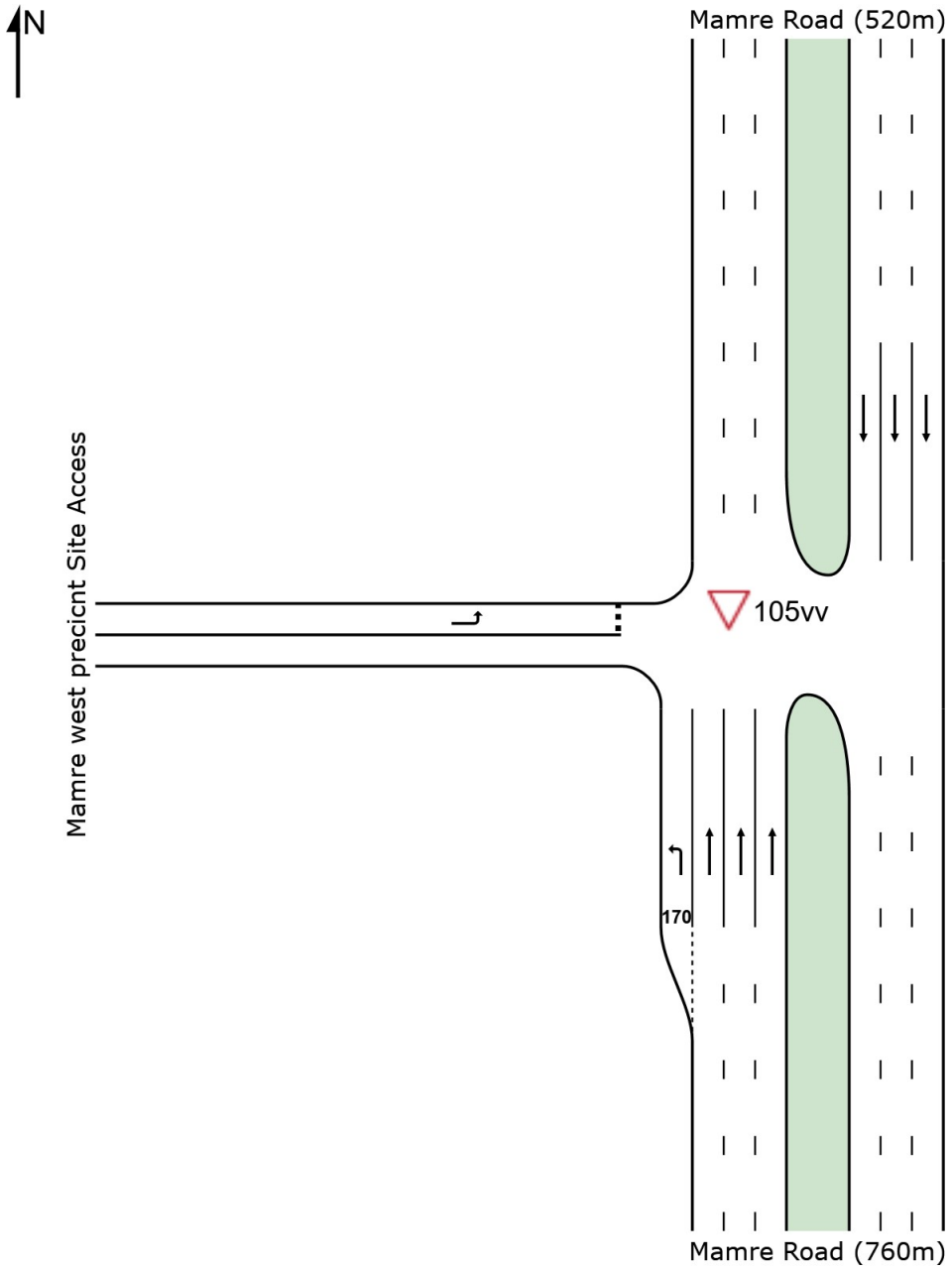
SITE LAYOUT

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _AM]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mamre Road (760m)													
1	L2	112	0.0	112	0.0	0.060	7.0	LOS A	0.0	0.0	0.00	0.63	67.9
2	T1	1865	7.6	1865	7.6	0.335	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		1977	7.2	1977	7.2	0.335	0.5	NA	0.0	0.0	0.00	0.04	78.6
North: Mamre Road (520m)													
8	T1	2282	7.7	2282	7.7	0.410	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		2282	7.7	2282	7.7	0.410	0.1	NA	0.0	0.0	0.00	0.00	79.8
West: Mamre west precicnt Site Access													
10	L2	32	0.0	32	0.0	0.048	9.2	LOS A	0.2	1.2	0.54	0.74	46.3
Approach		32	0.0	32	0.0	0.048	9.2	LOS A	0.2	1.2	0.54	0.74	46.3
All Vehicles		4291	7.4	4291	7.4	0.410	0.3	NA	0.2	1.2	0.00	0.02	78.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 105vv [[2036 Base] Mamre Road x Mamre west precicnt _PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

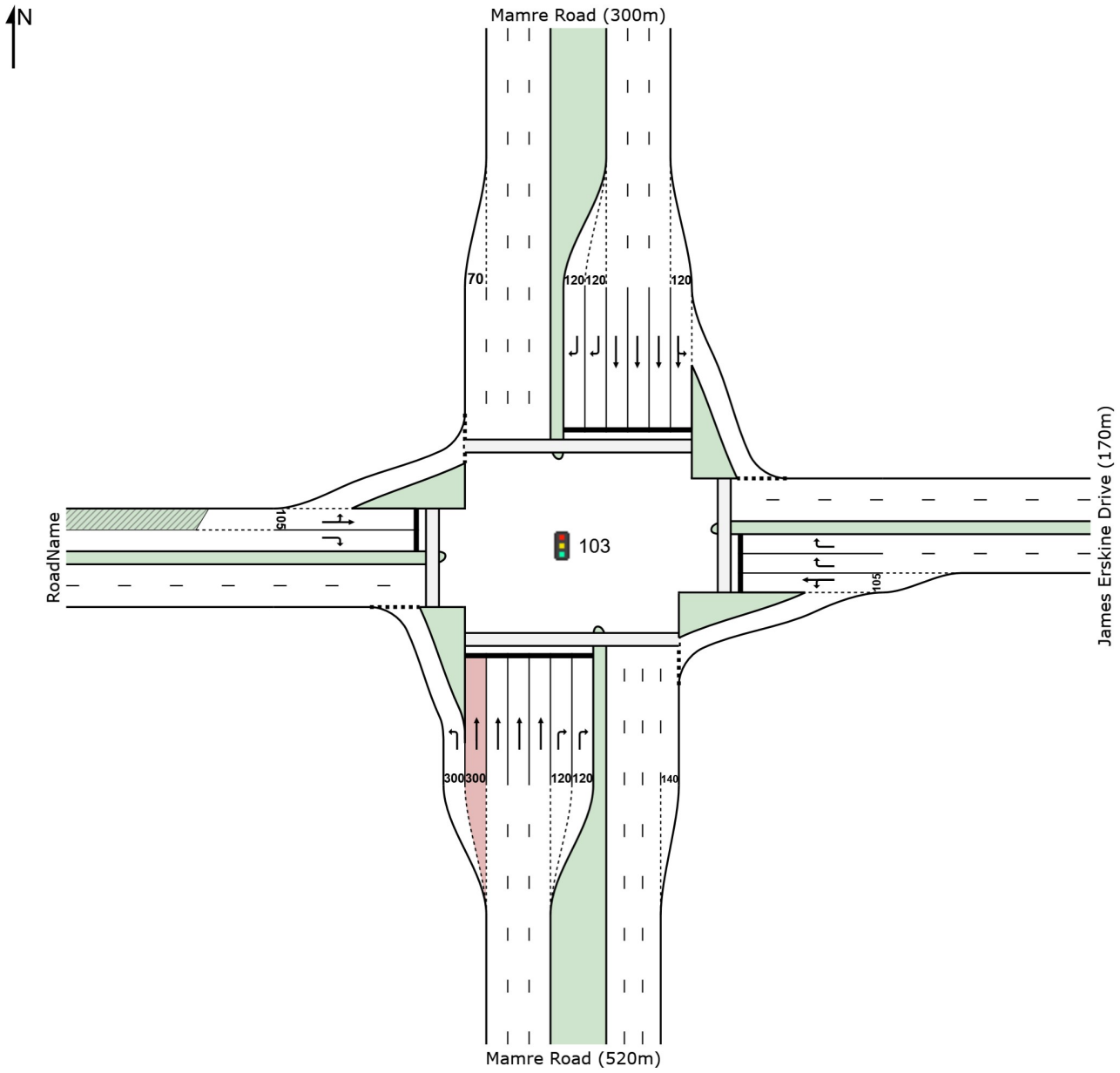
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mamre Road (760m)													
1	L2	38	0.0	38	0.0	0.020	6.9	LOS A	0.0	0.0	0.00	0.63	67.9
2	T1	2086	6.8	2086	6.8	0.372	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		2124	6.6	2124	6.6	0.372	0.2	NA	0.0	0.0	0.00	0.01	79.4
North: Mamre Road (520m)													
8	T1	1665	13.7	1665	13.7	0.310	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1665	13.7	1665	13.7	0.310	0.0	NA	0.0	0.0	0.00	0.00	79.9
West: Mamre west precicnt Site Access													
10	L2	94	0.0	94	0.0	0.155	10.2	LOS A	0.6	4.0	0.59	0.83	45.1
Approach		94	0.0	94	0.0	0.155	10.2	LOS A	0.6	4.0	0.59	0.83	45.1
All Vehicles		3883	9.5	3883	9.5	0.372	0.4	NA	0.6	4.0	0.01	0.03	78.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

SITE LAYOUT

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_AM]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_AM]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	8.7	LOS A	0.0	0.1	0.30	0.56	52.0
2	T1	1580	8.1	1580	8.1	0.648	23.2	LOS B	19.1	141.7	0.85	0.75	40.9
3	R2	147	22.0	147	22.0	0.727	60.7	LOS E	3.8	31.3	1.00	0.84	26.2
Approach		1728	9.3	1728	9.3	0.727	26.4	LOS B	19.1	141.7	0.86	0.76	38.5
East: James Erskine Drive (170m)													
4	L2	62	54.8	62	54.8	0.110	13.4	LOS A	1.2	12.5	0.52	0.64	26.1
5	T1	1	0.0	1	0.0	0.110	8.2	LOS A	1.2	12.5	0.52	0.64	44.0
6	R2	88	54.2	88	54.2	0.531	56.5	LOS D	2.2	22.6	1.00	0.77	10.1
Approach		152	54.1	152	54.1	0.531	38.5	LOS C	2.2	22.6	0.80	0.71	13.7
North: Mamre Road (300m)													
7	L2	429	17.9	429	17.9	0.652	26.4	LOS B	16.9	133.5	0.77	0.87	34.8
8	T1	2182	7.4	2182	7.4	0.843	30.9	LOS C	31.3	233.2	0.95	0.94	25.2
9	R2	183	0.0	183	0.0	0.781	59.3	LOS E	4.7	32.9	1.00	0.88	27.0
Approach		2795	8.5	2795	8.5	0.843	32.0	LOS C	31.3	233.2	0.93	0.92	26.9
West: RoadName													
10	L2	31	0.0	31	0.0	0.040	11.8	LOS A	0.5	3.2	0.49	0.64	43.8
11	T1	1	0.0	1	0.0	0.040	6.2	LOS A	0.5	3.2	0.49	0.64	46.9
12	R2	38	0.0	38	0.0	0.323	54.7	LOS D	1.8	12.6	0.99	0.73	22.1
Approach		69	0.0	69	0.0	0.323	35.1	LOS C	1.8	12.6	0.76	0.69	28.5
All Vehicles		4744	10.1	4744	10.1	0.843	30.2	LOS C	31.3	233.2	0.90	0.85	30.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	41.7	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	24.3	LOS C	0.0	0.0	0.72	0.72
P3	North Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	23.0	LOS C	0.1	0.1	0.70	0.70
All Pedestrians		107	32.4	LOS D			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 103 [[2036 Base] Mamre Road x James Erskine Drive_PM]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.1	0.25	0.56	52.7
2	T1	2136	10.3	2136	10.3	0.880	37.7	LOS C	37.3	282.9	0.98	1.00	31.3
3	R2	60	58.3	60	58.3	0.176	51.8	LOS D	1.4	14.3	0.92	0.73	28.8
Approach		2197	11.6	2197	11.6	0.880	38.1	LOS C	37.3	282.9	0.98	0.99	31.2
East: James Erskine Drive (170m)													
4	L2	172	8.3	172	8.3	0.190	8.6	LOS A	2.4	18.2	0.38	0.62	31.0
5	T1	1	0.0	1	0.0	0.190	3.8	LOS A	2.4	18.2	0.38	0.62	47.6
6	R2	221	17.3	221	17.3	0.849	63.0	LOS E	6.1	49.4	1.00	0.99	9.2
Approach		394	13.4	394	13.4	0.849	39.1	LOS C	6.1	49.4	0.73	0.83	13.3
North: Mamre Road (300m)													
7	L2	127	56.3	127	56.3	0.475	33.3	LOS C	9.3	83.6	0.77	0.79	32.3
8	T1	1379	15.1	1379	15.1	0.613	27.4	LOS B	16.1	127.2	0.86	0.76	27.3
9	R2	63	0.0	63	0.0	0.283	57.3	LOS E	1.6	11.0	0.99	0.72	27.5
Approach		1569	17.9	1569	17.9	0.613	29.1	LOS C	16.1	127.2	0.86	0.76	27.8
West: RoadName													
10	L2	94	0.0	94	0.0	0.124	16.2	LOS B	2.1	14.8	0.55	0.69	39.6
11	T1	1	0.0	1	0.0	0.124	10.6	LOS A	2.1	14.8	0.55	0.69	43.2
12	R2	115	0.0	115	0.0	0.772	59.9	LOS E	6.1	42.5	1.00	0.89	20.8
Approach		209	0.0	209	0.0	0.772	40.1	LOS C	6.1	42.5	0.80	0.80	26.5
All Vehicles		4369	13.5	4369	13.5	0.880	35.1	LOS C	37.3	282.9	0.91	0.89	28.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	29.6	LOS C	0.0	0.0	0.77	0.77
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		107	44.1	LOS E			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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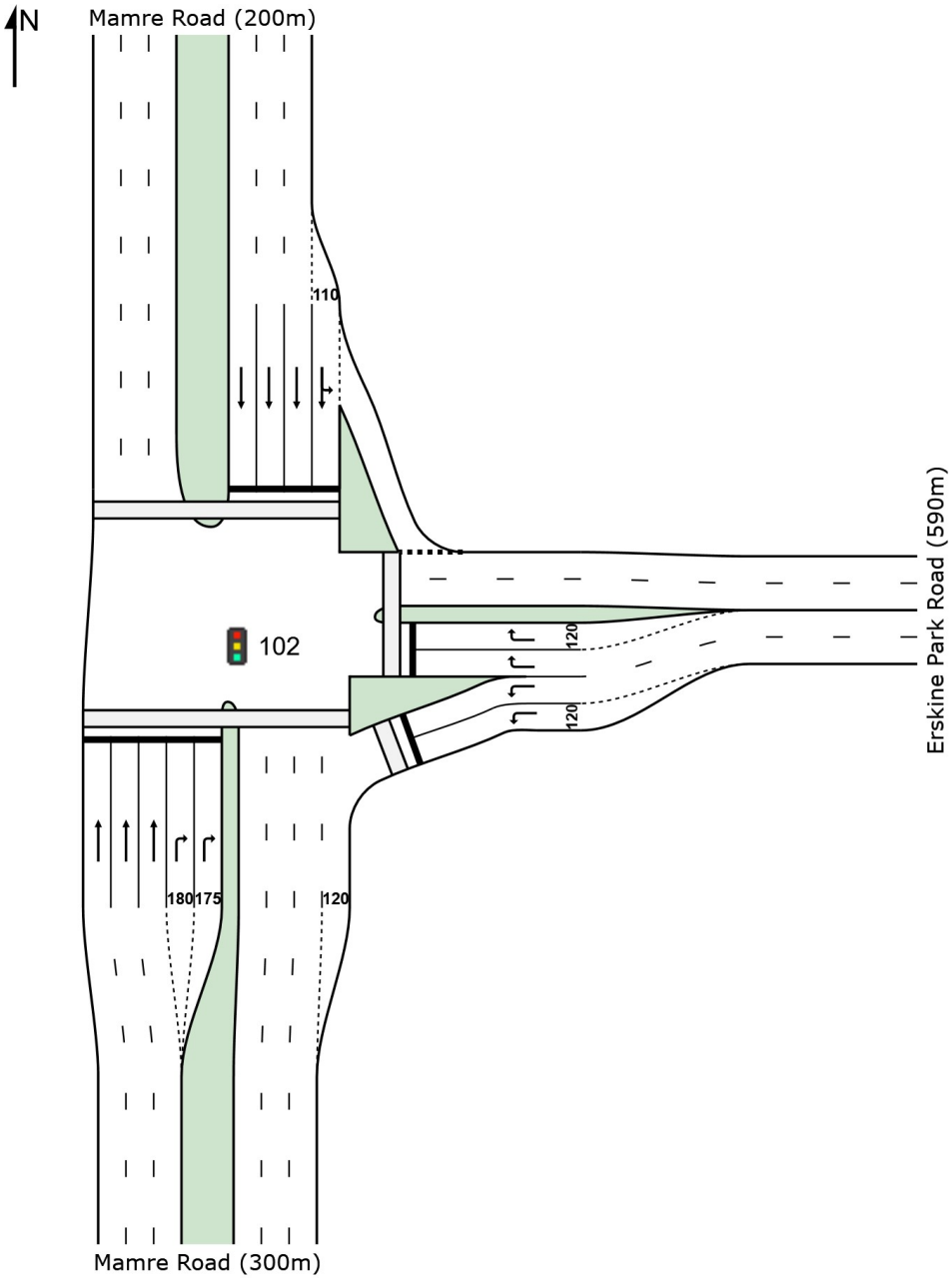
SITE LAYOUT

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_AM - IMPROVED]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_AM - IMPROVED]

Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	748	9.8	748	9.8	0.166	2.0	LOS A	2.5	18.8	0.22	0.19	70.4
3	R2	951	13.4	951	13.4	0.561	26.2	LOS B	16.1	125.3	0.75	0.82	44.5
Approach		1699	11.8	1699	11.8	0.561	15.5	LOS B	16.1	125.3	0.52	0.54	48.3
East: Erskine Park Road (590m)													
4	L2	1017	13.1	1017	13.1	0.573	18.8	LOS B	17.1	133.4	0.60	0.78	47.9
6	R2	12	14.0	12	14.0	0.057	57.8	LOS E	0.3	2.2	0.97	0.65	25.9
Approach		1028	13.1	1028	13.1	0.573	19.2	LOS B	17.1	133.4	0.60	0.78	47.4
North: Mamre Road (200m)													
7	L2	222	4.4	222	4.4	0.575	16.6	LOS B	10.8	79.4	0.78	0.76	54.5
8	T1	1432	6.4	1432	6.4	0.836	39.1	LOS C	21.0	155.0	0.97	0.93	16.1
Approach		1654	6.1	1654	6.1	0.836	36.1	LOS C	21.0	155.0	0.94	0.91	21.6
All Vehicles		4381	10.0	4381	10.0	0.836	24.1	LOS B	21.0	155.0	0.70	0.74	37.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	36.1	LOS D	0.0	0.0	0.85	0.85
P2S	East Slip/Bypass Lane Crossing	53	30.5	LOS D	0.1	0.1	0.78	0.78
P3	North Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		56	31.1	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [[2036 Base] Mamre Road x Erskine Park Road_PM - IMPROVED]

Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	1355	8.5	1355	8.5	0.317	3.7	LOS A	6.6	49.4	0.33	0.29	63.8
3	R2	1080	11.1	1080	11.1	0.551	21.9	LOS B	16.4	125.7	0.68	0.80	47.7
Approach		2435	9.6	2435	9.6	0.551	11.8	LOS A	16.4	125.7	0.48	0.52	51.7
East: Erskine Park Road (590m)													
4	L2	728	24.8	728	24.8	0.370	12.4	LOS A	7.4	63.0	0.37	0.71	55.7
6	R2	342	7.7	342	7.7	0.888	66.7	LOS E	9.7	72.7	1.00	0.97	23.4
Approach		1071	19.3	1071	19.3	0.888	29.8	LOS C	9.7	72.7	0.57	0.79	38.7
North: Mamre Road (200m)													
7	L2	24	10.8	24	10.8	0.621	38.1	LOS C	6.6	50.8	0.98	0.82	39.3
8	T1	841	12.4	841	12.4	0.904	54.3	LOS D	13.2	102.6	1.00	0.98	12.4
Approach		865	12.4	865	12.4	0.904	53.9	LOS D	13.2	102.6	1.00	0.98	13.3
All Vehicles		4371	12.6	4371	12.6	0.904	24.5	LOS B	16.4	125.7	0.61	0.68	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2S	East Slip/Bypass Lane Crossing	53	40.6	LOS E	0.1	0.1	0.90	0.90
P3	North Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		56	40.8	LOS E			0.90	0.90

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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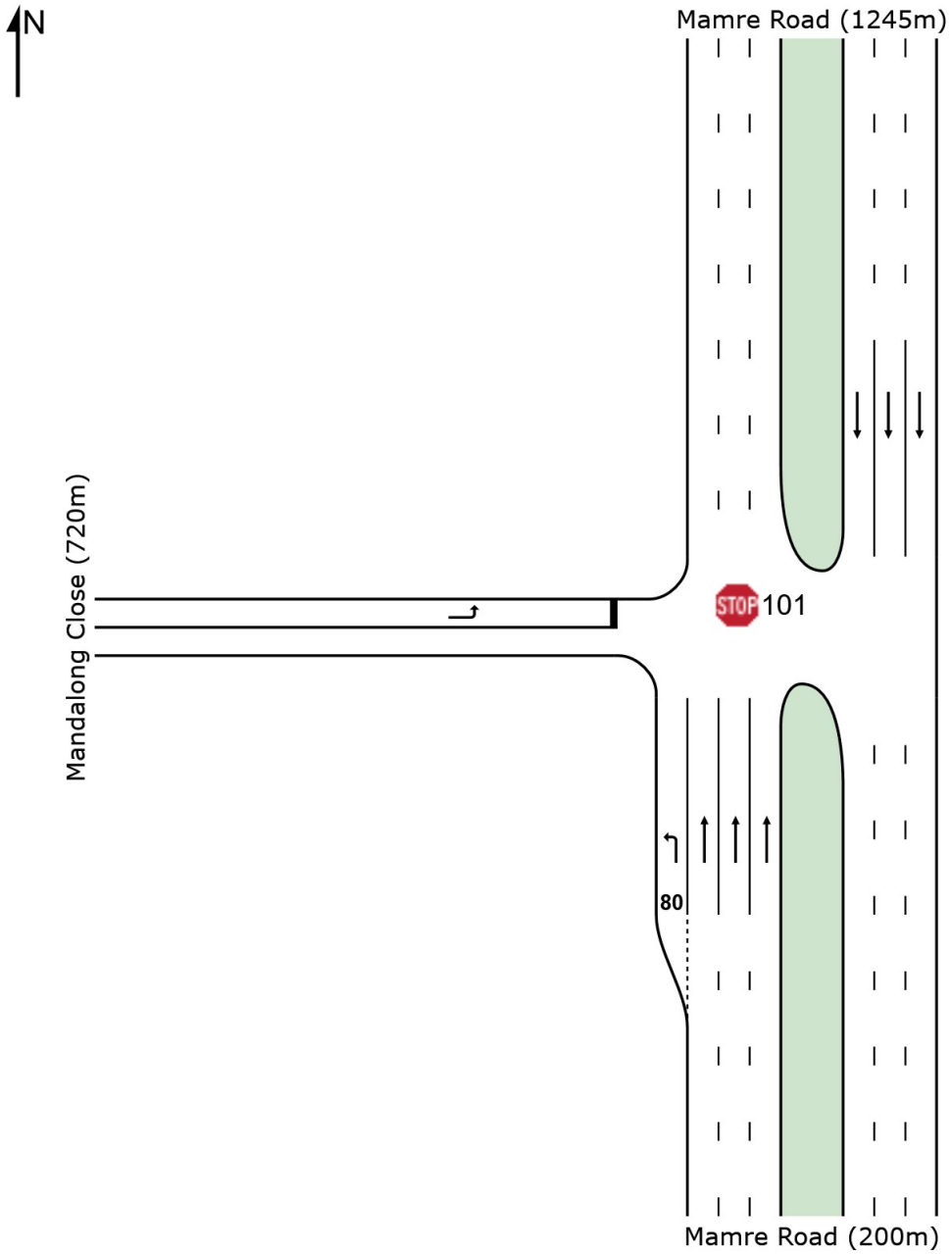
SITE LAYOUT

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_AM]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_AM] Network: N101 [2036 Base Case - AM - IMPORVED EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	45	11.1	45	11.1	0.026	7.1	LOS A	0.0	0.0	0.00	0.63	59.3
2	T1	715	10.5	715	10.5	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		760	10.5	760	10.5	0.131	0.4	NA	0.0	0.0	0.00	0.04	78.9
North: Mamre Road (1245m)													
8	T1	1654	5.5	1654	5.5	0.293	0.1	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1654	5.5	1654	5.5	0.293	0.1	NA	0.0	0.0	0.00	0.00	79.9
West: Mandalong Close (720m)													
10	L2	66	7.7	66	7.7	0.074	9.7	LOS A	0.3	2.2	0.35	0.88	63.0
Approach		66	7.7	66	7.7	0.074	9.7	LOS A	0.3	2.2	0.35	0.88	63.0
All Vehicles		2480	7.1	2480	7.1	0.293	0.4	NA	0.3	2.2	0.01	0.04	78.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 101 [[2036 Base] Mamre Road x Mandalong Close_PM] Network: N101 [2036 Base Case - PM - IMPROVED EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	58	8.7	58	8.7	0.033	7.1	LOS A	0.0	0.0	0.00	0.63	60.4
2	T1	1639	7.5	1639	7.5	0.294	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1697	7.6	1697	7.6	0.294	0.3	NA	0.0	0.0	0.00	0.02	79.3
North: Mamre Road (1245m)													
8	T1	865	12.4	865	12.4	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		865	12.4	865	12.4	0.160	0.0	NA	0.0	0.0	0.00	0.00	79.9
West: Mandalong Close (720m)													
10	L2	63	8.0	63	8.0	0.106	12.5	LOS A	0.4	3.0	0.55	0.96	61.7
Approach		63	8.0	63	8.0	0.106	12.5	LOS A	0.4	3.0	0.55	0.96	61.7
All Vehicles		2625	9.2	2625	9.2	0.294	0.5	NA	0.4	3.0	0.01	0.04	78.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 5 (maximum specified: 10)

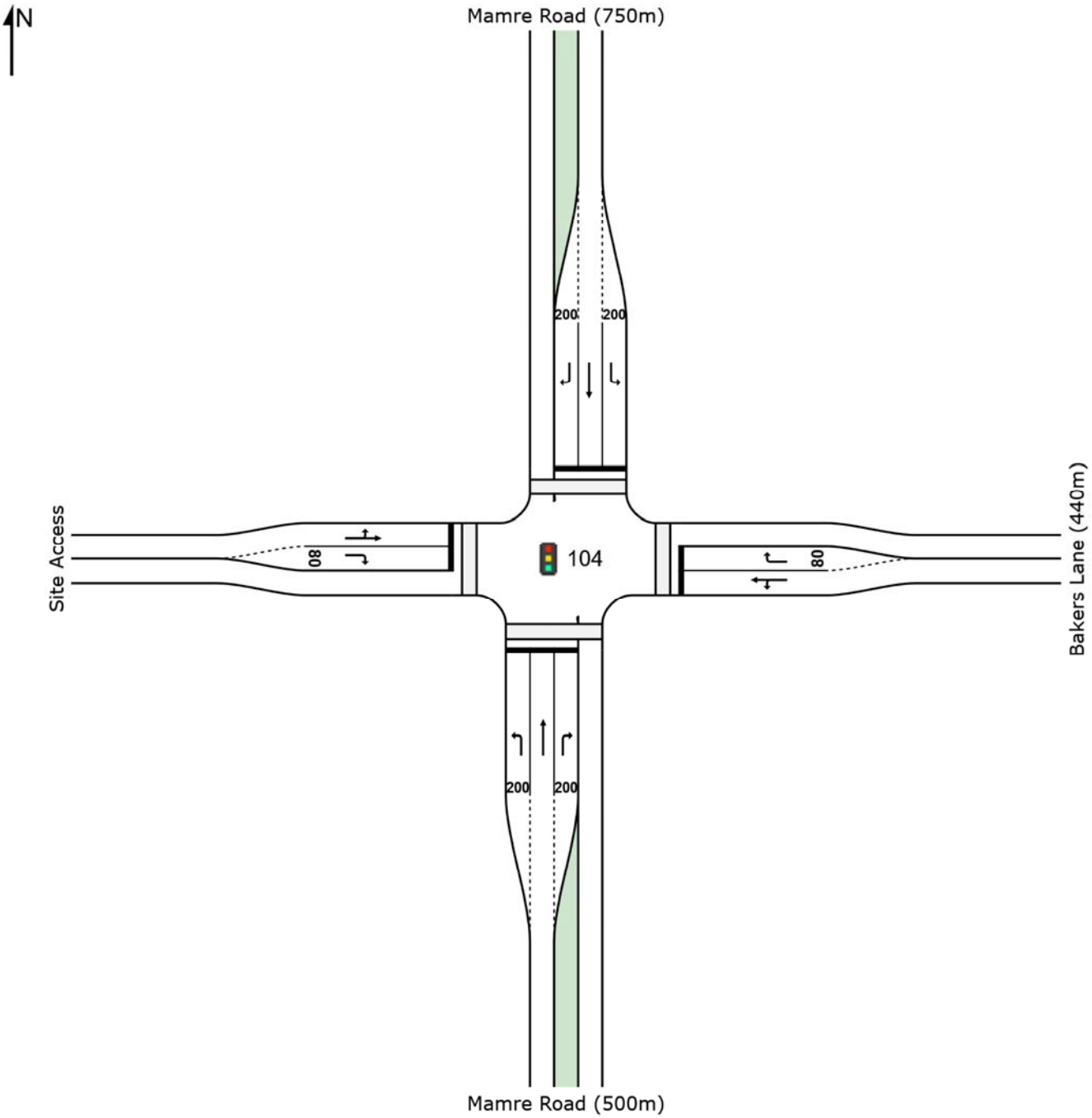
Appendix D4

Existing + SSDA SIDRA Results

SITE LAYOUT

Site: 104 [[Existing+Dev] Mamre Road x Bakers Lane_AM]

Mamre Road x Bakers Lane
2018 Existing + Dev
Signals - Fixed Time Coordinated



Project: C:\Users\Alireza Rasouli\Downloads\AG0584m03 Mamre_Existing+SSDA1 Dev.sip7

MOVEMENT SUMMARY

Site: 104 [[Existing+Dev] Mamre Road x Bakers Lane_AM]

Network: N101 [Existing +Dev - AM]

Mamre Road x Bakers Lane
2018 Existing + Dev
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	115	0.0	115	0.0	0.085	11.3	LOS A	2.2	15.4	0.31	0.65	49.5
2	T1	778	11.6	778	11.6	0.897	36.4	LOS C	49.5	381.3	0.92	0.91	31.1
3	R2	80	0.0	80	0.0	0.431	72.5	LOS F	5.2	36.2	0.96	0.77	27.7
Approach		973	9.3	973	9.3	0.897	36.4	LOS C	49.5	381.3	0.85	0.86	33.0
East: Bakers Lane (440m)													
4	L2	43	0.0	43	0.0	0.142	58.7	LOS E	2.6	18.0	0.89	0.73	30.8
5	T1	1	0.0	1	0.0	0.142	53.2	LOS D	2.6	18.0	0.89	0.73	29.7
6	R2	392	0.3	392	0.3	0.907	69.0	LOS E	28.4	199.2	1.00	0.96	17.0
Approach		436	0.2	436	0.2	0.907	68.0	LOS E	28.4	199.2	0.99	0.94	18.6
North: Mamre Road (750m)													
7	L2	627	0.2	624	0.2	0.462	15.1	LOS B	17.0	119.2	0.44	0.76	55.9
8	T1	609	18.0	607	18.0	0.726	31.0	LOS C	32.7	264.2	0.86	0.78	51.8
9	R2	191	0.0	190	0.0	1.021	127.7	LOS F	18.5	129.4	1.00	1.10	22.0
Approach		1427	7.7	1420[N1]	7.8	1.021	36.9	LOS C	32.7	264.2	0.70	0.81	44.9
West: Bakers lane													
10	L2	78	0.0	78	0.0	0.242	59.0	LOS E	4.7	32.6	0.90	0.76	20.7
11	T1	1	0.0	1	0.0	0.242	53.4	LOS D	4.7	32.6	0.90	0.76	29.6
12	R2	54	0.0	54	0.0	0.121	44.5	LOS D	2.7	18.6	0.82	0.73	34.2
Approach		133	0.0	133	0.0	0.242	53.1	LOS D	4.7	32.6	0.87	0.75	26.8
All Vehicles		2968	6.8	2961[N1]	6.8	1.021	42.0	LOS C	49.5	381.3	0.80	0.85	36.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	11	64.2	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	11	22.9	LOS C	0.0	0.0	0.57	0.57
P3	North Full Crossing	11	64.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	11	22.9	LOS C	0.0	0.0	0.57	0.57

All Pedestrians	42	43.5	LOS E	0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [[Existing+Dev] Mamre Road x Bakers Lane_PM]

Network: N101 [Existing +Dev - PM]

Mamre Road x Bakers Lane
2018 Existing + Dev
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	16	0.0	16	0.0	0.033	46.7	LOS D	0.8	5.6	0.78	0.69	33.4
2	T1	687	12.4	687	12.4	0.784	25.0	LOS B	33.2	257.0	0.78	0.71	38.4
3	R2	26	0.0	26	0.0	0.331	81.5	LOS F	1.8	12.9	0.99	0.71	25.8
Approach		729	11.7	729	11.7	0.784	27.5	LOS B	33.2	257.0	0.78	0.71	37.0
East: Bakers Lane (440m)													
4	L2	52	0.0	52	0.0	0.231	65.5	LOS E	3.3	23.0	0.94	0.75	29.0
5	T1	1	0.0	1	0.0	0.231	60.0	LOS E	3.3	23.0	0.94	0.75	28.0
6	R2	513	0.4	513	0.4	0.947	77.1	LOS F	40.9	287.2	1.00	1.01	15.7
Approach		565	0.4	565	0.4	0.947	76.0	LOS F	40.9	287.2	0.99	0.98	17.1
North: Mamre Road (750m)													
7	L2	180	1.2	180	1.2	0.270	30.3	LOS C	7.8	55.1	0.69	0.78	46.7
8	T1	893	12.4	893	12.4	1.095	157.6	LOS F	112.1	867.7	1.00	1.57	20.9
9	R2	81	0.0	81	0.0	1.018	125.8	LOS F	7.7	53.7	1.00	1.09	22.2
Approach		1154	9.8	1154	9.8	1.095	135.5	LOS F	112.1	867.7	0.95	1.42	22.9
West: Bakers lane													
10	L2	111	0.0	111	0.0	0.493	68.1	LOS E	7.3	51.3	0.98	0.79	18.8
11	T1	2	0.0	2	0.0	0.493	62.5	LOS E	7.3	51.3	0.98	0.79	27.5
12	R2	223	0.0	223	0.0	0.423	42.9	LOS D	11.4	79.6	0.87	0.80	34.7
Approach		336	0.0	336	0.0	0.493	51.3	LOS D	11.4	79.6	0.90	0.80	29.6
All Vehicles		2784	7.2	2784	7.2	1.095	85.0	LOS F	112.1	867.7	0.91	1.07	24.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	64.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	22.3	LOS C	0.1	0.1	0.57	0.57
P3	North Full Crossing	11	64.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	11	22.3	LOS C	0.0	0.0	0.56	0.56
All Pedestrians		126	43.3	LOS E			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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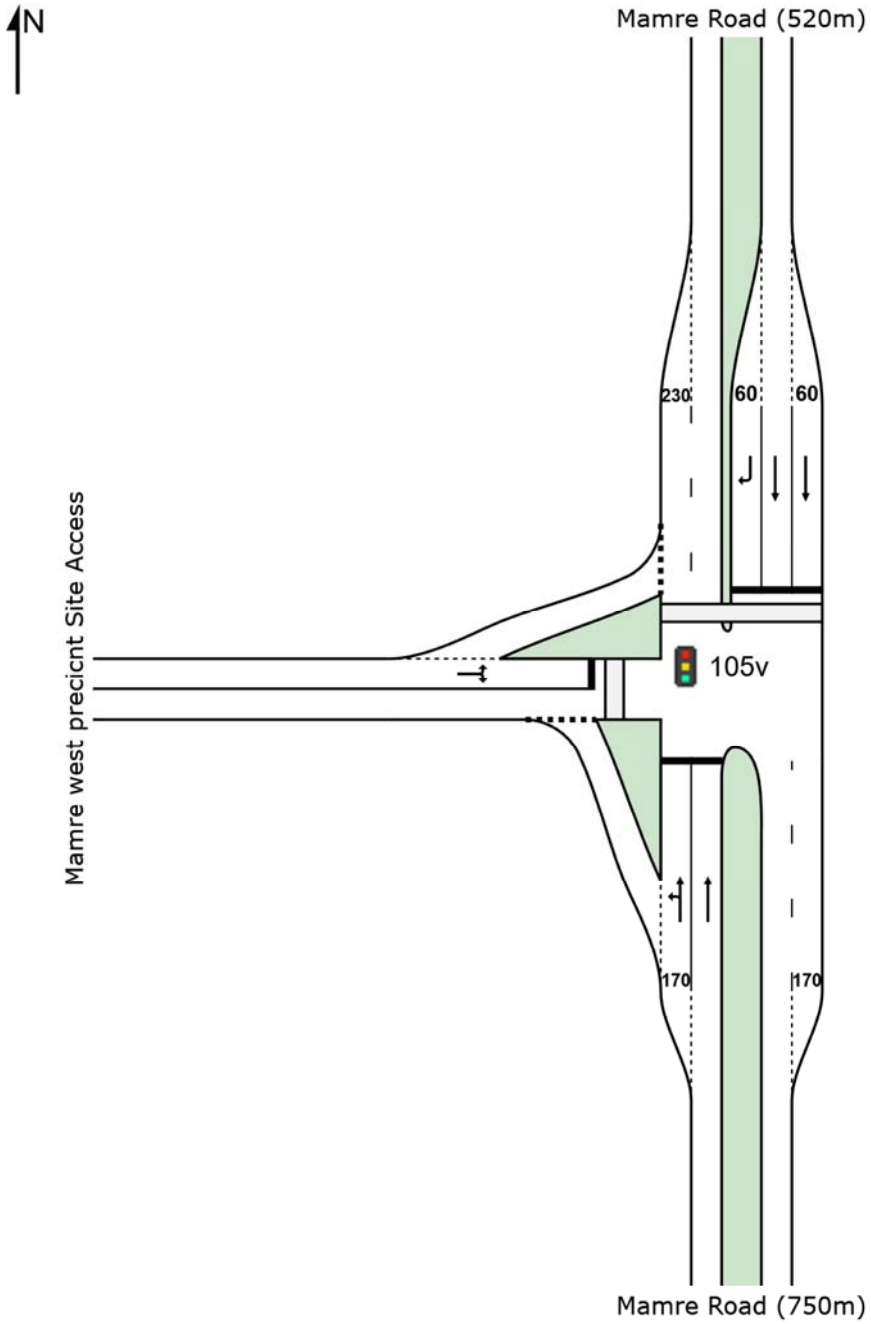
SITE LAYOUT

Site: 105v [[Existing+Dev] Mamre Road x Mamre west precicnt _PM]

Mamre Road x Mamre west precicnt
2018 Existing
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 105v [[Existing+Dev] Mamre Road x Mamre west precicnt _AM]

Network: N101 [Existing +Dev - AM]

Mamre Road x Mamre west precicnt
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (750m)													
1	L2	35	0.0	35	0.0	0.836	28.8	LOS C	17.0	126.6	0.96	0.99	52.1
2	T1	1213	7.6	1213	7.6	0.836	21.3	LOS B	17.0	126.6	0.97	0.99	49.1
Approach		1247	7.3	1247	7.3	0.836	21.5	LOS B	17.0	126.6	0.97	0.99	49.3
North: Mamre Road (520m)													
8	T1	1433	7.5	1425	7.5	0.634	5.7	LOS A	11.3	84.2	0.63	0.57	64.5
9	R2	57	0.0	57	0.0	0.254	30.0	LOS C	1.3	9.4	0.94	0.74	43.3
Approach		1489	7.2	1482 N1	7.2	0.634	6.7	LOS A	11.3	84.2	0.64	0.57	62.3
West: Mamre west precicnt Site Access													
10	L2	18	0.0	18	0.0	0.089	15.3	LOS B	0.4	2.5	0.84	0.70	40.2
12	R2	12	0.0	12	0.0	0.089	15.2	LOS B	0.4	2.5	0.84	0.70	40.2
Approach		29	0.0	29	0.0	0.089	15.3	LOS B	0.4	2.5	0.84	0.70	40.2
All Vehicles		2766	7.2	2759 N1	7.2	0.836	13.5	LOS A	17.0	126.6	0.79	0.76	54.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	11	19.4	LOS B	0.0	0.0	0.88	0.88
P4	West Full Crossing	11	5.3	LOS A	0.0	0.0	0.46	0.46
All Pedestrians		21	12.3	LOS B			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 105v [[Existing+Dev] Mamre Road x Mamre west precicnt _PM]

Network: N101 [Existing +Dev - PM]

Mamre Road x Mamre west precicnt
2018 Existing
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (750m)													
1	L2	12	0.0	12	0.0	0.884	33.9	LOS C	20.5	151.4	0.99	1.08	49.4
2	T1	1311	6.7	1311	6.7	0.884	26.2	LOS B	20.5	151.4	0.99	1.08	45.2
Approach		1322	6.6	1322	6.6	0.884	26.3	LOS B	20.5	151.4	0.99	1.08	45.3
North: Mamre Road (520m)													
8	T1	1203	13.6	1203	13.6	0.615	5.6	LOS A	8.6	66.9	0.62	0.55	64.7
9	R2	20	0.0	20	0.0	0.090	29.2	LOS C	0.5	3.2	0.92	0.70	43.7
Approach		1223	13.3	1223	13.3	0.615	6.0	LOS A	8.6	66.9	0.62	0.55	63.7
West: Mamre west precicnt Site Access													
10	L2	58	0.0	58	0.0	0.303	16.2	LOS B	1.3	8.9	0.89	0.75	39.5
12	R2	36	0.0	36	0.0	0.303	16.1	LOS B	1.3	8.9	0.89	0.75	39.5
Approach		94	0.0	94	0.0	0.303	16.2	LOS B	1.3	8.9	0.89	0.75	39.5
All Vehicles		2639	9.5	2639	9.5	0.884	16.5	LOS B	20.5	151.4	0.82	0.82	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	11	19.4	LOS B	0.0	0.0	0.88	0.88
P4	West Full Crossing	11	5.3	LOS A	0.0	0.0	0.46	0.46
All Pedestrians		21	12.3	LOS B			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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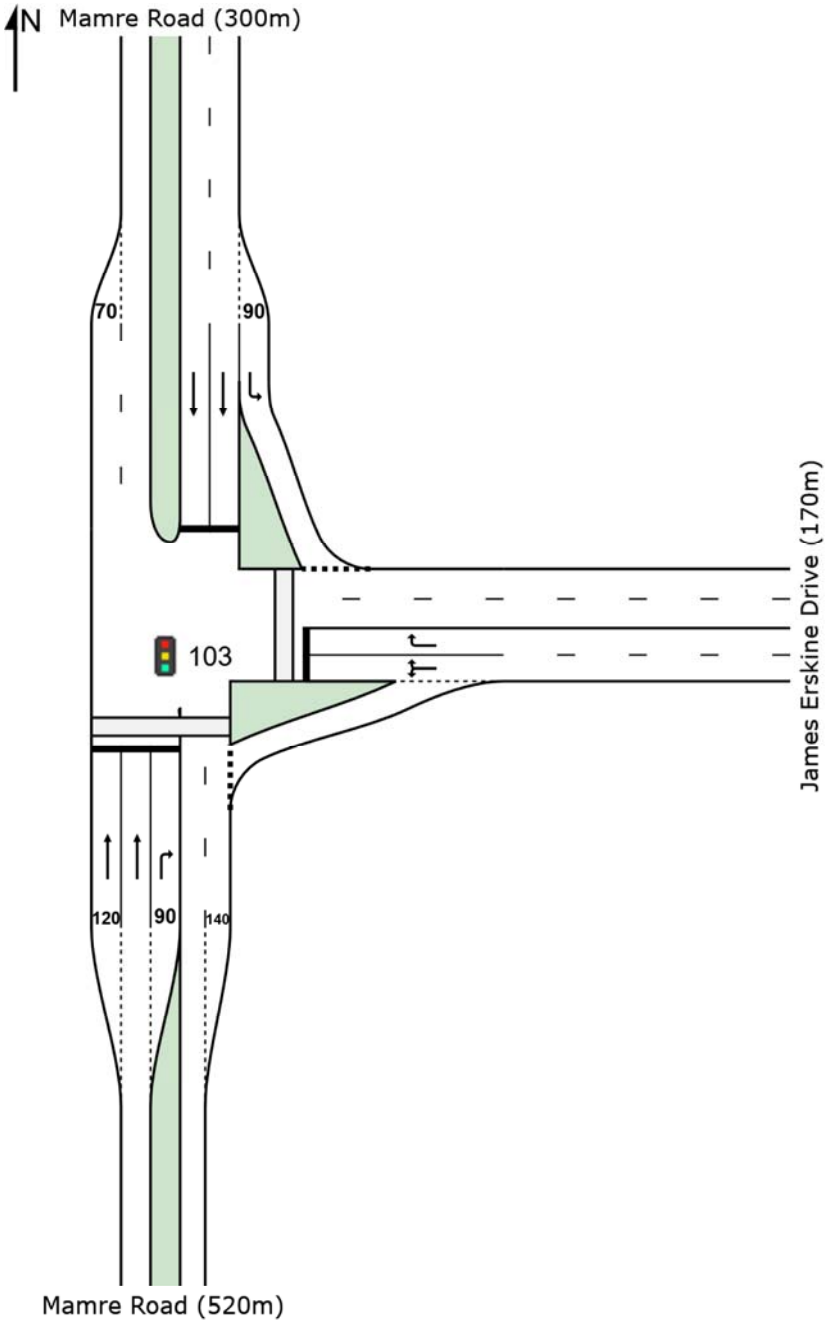
SITE LAYOUT

Site: 103 [[Existing+Dev] Mamre Road x James Erskine Drive_PM]

Mamre Road x James Erskine Drive
2018 Existing + Dev
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [[Existing+Dev] Mamre Road x James Erskine Drive_AM]

Network: N101 [Existing +Dev - AM]

Mamre Road x James Erskine Drive
2018 Existing + Dev
Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
2	T1	1089	6.5	1089	6.5	0.590	4.5	LOS A	11.6	85.5	0.50	0.45	67.4
3	R2	86	22.0	86	22.0	0.538	37.8	LOS C	2.7	22.1	0.99	0.78	33.7
Approach		1176	7.6	1176	7.6	0.590	7.0	LOS A	11.6	85.5	0.54	0.48	61.6
East: James Erskine Drive (170m)													
4	L2	33	54.8	33	54.8	0.181	14.9	LOS B	1.0	10.7	0.74	0.70	24.3
6	R2	87	54.2	87	54.2	0.429	28.2	LOS B	1.7	17.8	0.90	0.73	16.5
Approach		120	54.4	120	54.4	0.429	24.6	LOS B	1.7	17.8	0.85	0.73	18.1
North: Mamre Road (300m)													
7	L2	276	17.9	274	18.0	0.223	8.9	LOS A	1.5	12.3	0.32	0.68	49.7
8	T1	1457	6.1	1449	6.2	0.879	19.5	LOS B	28.2	208.0	0.89	0.89	33.8
Approach		1733	8.0	1724 N1	8.0	0.879	17.8	LOS B	28.2	208.0	0.80	0.86	36.4
All Vehicles		3028	9.7	3019 N1	9.7	0.879	13.8	LOS A	28.2	208.0	0.70	0.71	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	24.3	LOS C	0.0	0.0	0.90	0.90
P2	East Full Crossing	1	13.3	LOS B	0.0	0.0	0.67	0.67
All Pedestrians		2	18.8	LOS B			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 103 [[Existing+Dev] Mamre Road x James Erskine Drive_PM]

Network: N101 [Existing +Dev - PM]

Mamre Road x James Erskine Drive
2018 Existing + Dev
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
2	T1	1075	8.1	1075	8.1	0.645	8.7	LOS A	18.2	136.5	0.61	0.55	58.7
3	R2	25	58.3	25	58.3	0.257	49.2	LOS D	1.0	10.7	0.98	0.72	29.2
Approach		1100	9.3	1100	9.3	0.645	9.7	LOS A	18.2	136.5	0.62	0.55	57.0
East: James Erskine Drive (170m)													
4	L2	101	8.3	101	8.3	0.266	12.5	LOS A	2.9	22.7	0.63	0.71	26.3
6	R2	285	17.3	285	17.3	0.632	31.3	LOS C	8.1	65.3	0.88	0.80	15.2
Approach		386	15.0	386	15.0	0.632	26.4	LOS B	8.1	65.3	0.82	0.78	17.1
North: Mamre Road (300m)													
7	L2	133	56.3	133	56.3	0.121	8.9	LOS A	0.5	5.4	0.19	0.64	49.5
8	T1	1122	13.8	1122	13.8	0.732	16.9	LOS B	20.1	157.2	0.81	0.73	36.6
Approach		1255	18.3	1255	18.3	0.732	16.0	LOS B	20.1	157.2	0.75	0.72	38.1
All Vehicles		2741	14.2	2741	14.2	0.732	14.9	LOS B	20.1	157.2	0.70	0.66	42.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	1	16.3	LOS B	0.0	0.0	0.64	0.64
All Pedestrians		2	25.2	LOS C			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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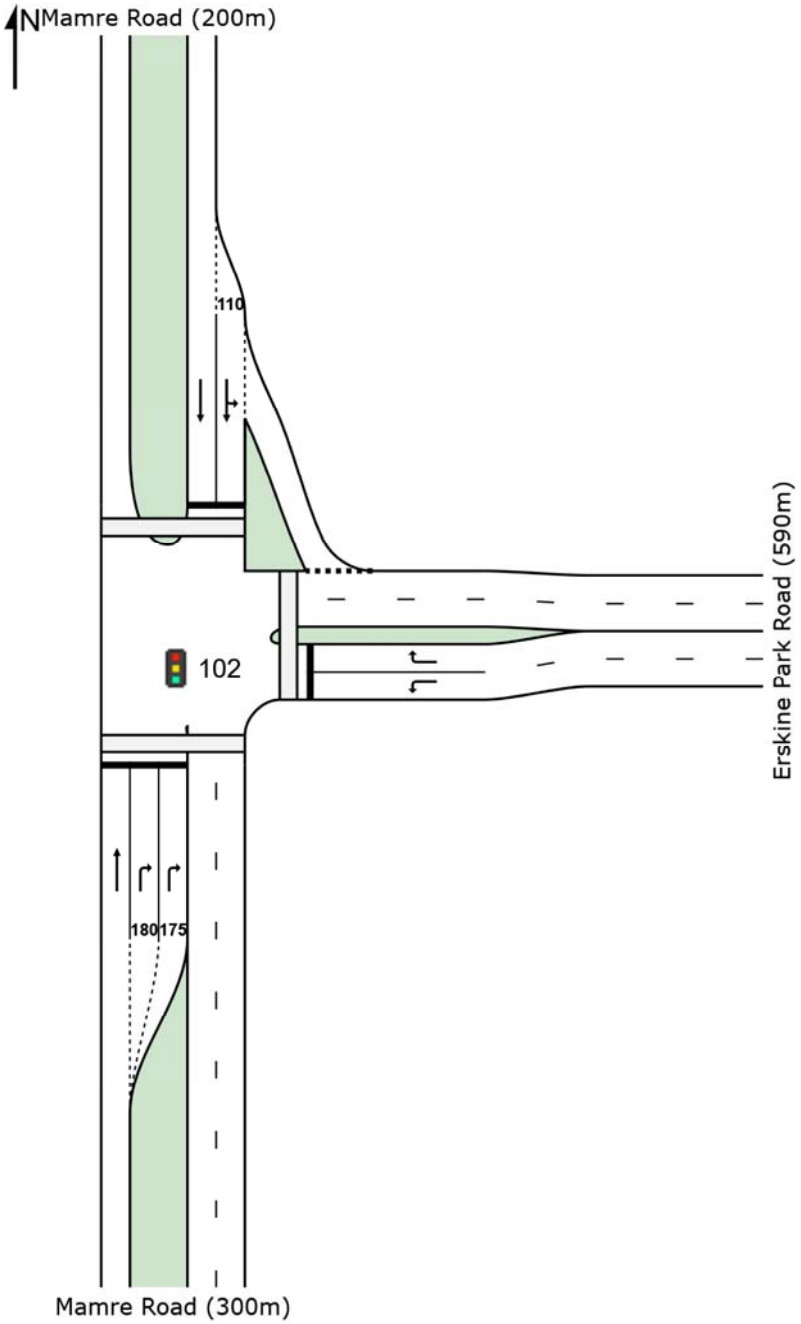
SITE LAYOUT

Site: 102 [[Existing+Dev] Mamre Road x Erskine Park Road_PM]

Mamre Road x Erskine Park Road
2018 Existing + Dev
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [[Existing+Dev] Mamre Road x Erskine Park Road_AM]

Network: N101 [Existing +Dev - AM]

Mamre Road x Erskine Park Road
2018 Existing + Dev
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	547	9.2	547	9.2	0.418	5.0	LOS A	8.7	65.4	0.44	0.39	59.1
3	R2	621	12.0	621	12.0	0.764	41.5	LOS C	12.4	95.6	0.99	0.89	36.4
Approach		1168	10.7	1168	10.7	0.764	24.4	LOS B	12.4	95.6	0.73	0.66	40.1
East: Erskine Park Road (590m)													
4	L2	739	10.5	739	10.5	0.956	60.1	LOS E	42.2	321.8	1.00	1.07	25.0
6	R2	187	14.0	187	14.0	0.811	49.8	LOS D	8.1	63.6	1.00	0.91	28.4
Approach		926	11.3	926	11.3	0.956	58.0	LOS E	42.2	321.8	1.00	1.03	25.6
North: Mamre Road (200m)													
7	L2	553	4.4	548	4.4	0.811	19.1	LOS B	21.3	155.6	0.83	0.89	51.4
8	T1	978	5.7	969	5.7	0.811	21.4	LOS B	23.4	171.6	0.91	0.90	23.9
Approach		1531	5.2	1517 N1	5.2	0.811	20.5	LOS B	23.4	171.6	0.88	0.90	37.5
All Vehicles		3625	8.5	3611 N1	8.6	0.956	31.4	LOS C	42.2	321.8	0.86	0.86	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	1	21.8	LOS C	0.0	0.0	0.74	0.74
P3	North Full Crossing	1	34.2	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		3	30.1	LOS D			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 102 [[Existing+Dev] Mamre Road x Erskine Park Road_PM]

Network: N101 [Existing +Dev - PM]

Mamre Road x Erskine Park Road
2018 Existing + Dev
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	694	7.3	694	7.3	0.654	15.7	LOS B	23.0	171.0	0.74	0.67	38.0
3	R2	716	10.0	716	10.0	0.794	48.7	LOS D	17.7	134.5	0.99	0.90	34.0
Approach		1409	8.7	1409	8.7	0.794	32.5	LOS C	23.0	171.0	0.87	0.79	34.9
East: Erskine Park Road (590m)													
4	L2	707	22.8	707	22.8	0.706	20.6	LOS B	22.9	191.4	0.72	0.84	46.0
6	R2	436	7.7	436	7.7	0.803	45.5	LOS D	21.2	158.4	0.98	0.90	30.0
Approach		1143	17.0	1143	17.0	0.803	30.1	LOS C	22.9	191.4	0.82	0.86	38.2
North: Mamre Road (200m)													
7	L2	195	10.8	195	10.8	0.668	21.3	LOS B	9.7	74.8	0.88	0.80	48.7
8	T1	542	11.7	542	11.7	0.668	26.8	LOS B	13.5	104.2	0.92	0.81	20.6
Approach		737	11.4	737	11.4	0.668	25.3	LOS B	13.5	104.2	0.91	0.81	30.8
All Vehicles		3289	12.2	3289	12.2	0.803	30.0	LOS C	23.0	191.4	0.86	0.82	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	33.6	LOS D	0.0	0.0	0.82	0.82
P2	East Full Crossing	1	37.0	LOS D	0.0	0.0	0.86	0.86
P3	North Full Crossing	1	33.6	LOS D	0.0	0.0	0.82	0.82
All Pedestrians		3	34.7	LOS D			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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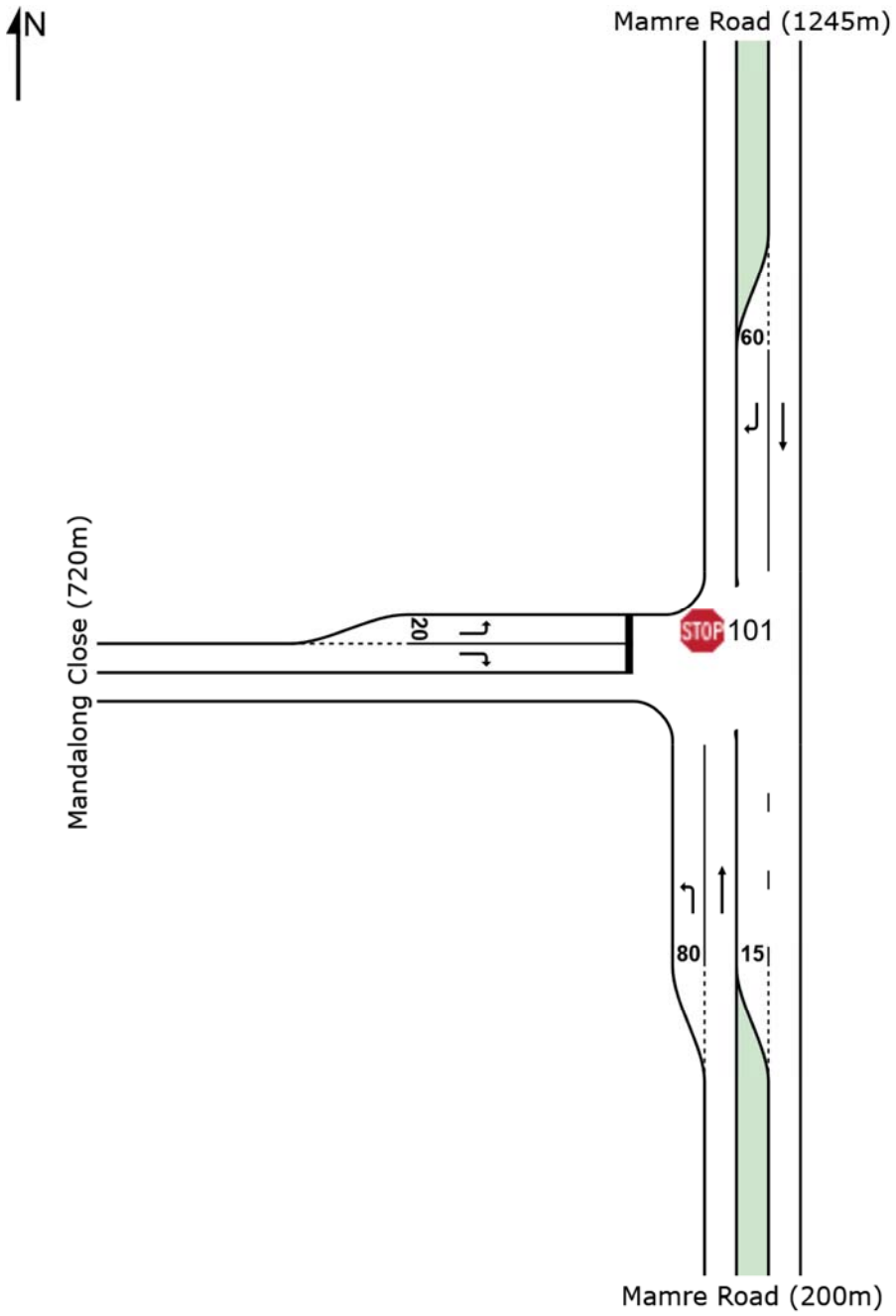
SITE LAYOUT

Site: 101 [[Existing+Dev] Mamre Road x Mandalong Close_PM]

Mamre Road x Mandalong Close
2018 Existing + Dev
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 101 [[Existing+Dev] Mamre Road x Mandalong Close_AM]

Network: N101 [Existing +Dev - AM]

Mamre Road x Mandalong Close
2018 Existing + Dev
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	19	11.1	19	11.1	0.011	7.1	LOS A	0.0	0.0	0.00	0.63	59.3
2	T1	741	10.1	741	10.1	0.405	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		760	10.1	760	10.1	0.405	0.2	NA	0.0	0.0	0.00	0.02	79.4
North: Mamre Road (1245m)													
8	T1	1508	5.2	1508	5.2	0.800	0.8	LOS A	0.0	0.0	0.00	0.00	78.8
9	R2	43	2.4	43	2.4	0.076	12.0	LOS A	0.3	2.0	0.62	0.84	62.5
Approach		1552	5.1	1552	5.1	0.800	1.1	NA	0.3	2.0	0.02	0.02	78.0
West: Mandalong Close (720m)													
10	L2	27	7.7	27	7.7	0.067	15.5	LOS B	0.2	1.7	0.66	1.00	60.3
12	R2	20	5.3	20	5.3	3.333	2519.2	LOS F	16.0	117.3	1.00	1.30	0.9
Approach		47	6.7	47	6.7	3.333	1072.6	LOS F	16.0	117.3	0.80	1.13	4.1
All Vehicles		2359	6.7	2359	6.7	3.333	22.4	NA	16.0	117.3	0.03	0.04	56.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %
Number of Iterations: 7 (maximum specified: 10)

MOVEMENT SUMMARY

Site: 101 [[Existing+Dev] Mamre Road x Mandalong Close_PM]

Network: N101 [Existing +Dev - PM]

Mamre Road x Mandalong Close
2018 Existing + Dev
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	24	8.7	24	8.7	0.014	7.1	LOS A	0.0	0.0	0.00	0.63	60.4
2	T1	1229	6.9	1229	6.9	0.659	0.1	LOS A	0.0	0.0	0.00	0.00	79.4
Approach		1254	7.0	1254	7.0	0.659	0.2	NA	0.0	0.0	0.00	0.01	79.1
North: Mamre Road (1245m)													
8	T1	714	11.7	714	11.7	0.394	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
9	R2	26	0.0	26	0.0	0.125	23.9	LOS B	0.4	2.8	0.87	0.95	56.6
Approach		740	11.2	740	11.2	0.394	1.0	NA	0.4	2.8	0.03	0.03	78.0
West: Mandalong Close (720m)													
10	L2	26	8.0	26	8.0	0.233	42.3	LOS C	0.7	5.3	0.92	1.02	49.3
12	R2	11	0.0	11	0.0	0.911	629.8	LOS F	2.8	19.3	1.00	1.08	3.9
Approach		37	5.7	37	5.7	0.911	210.2	LOS F	2.8	19.3	0.94	1.04	19.8
All Vehicles		2031	8.5	2031	8.5	0.911	4.3	NA	2.8	19.3	0.03	0.04	74.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.9 %
Number of Iterations: 9 (maximum specified: 10)

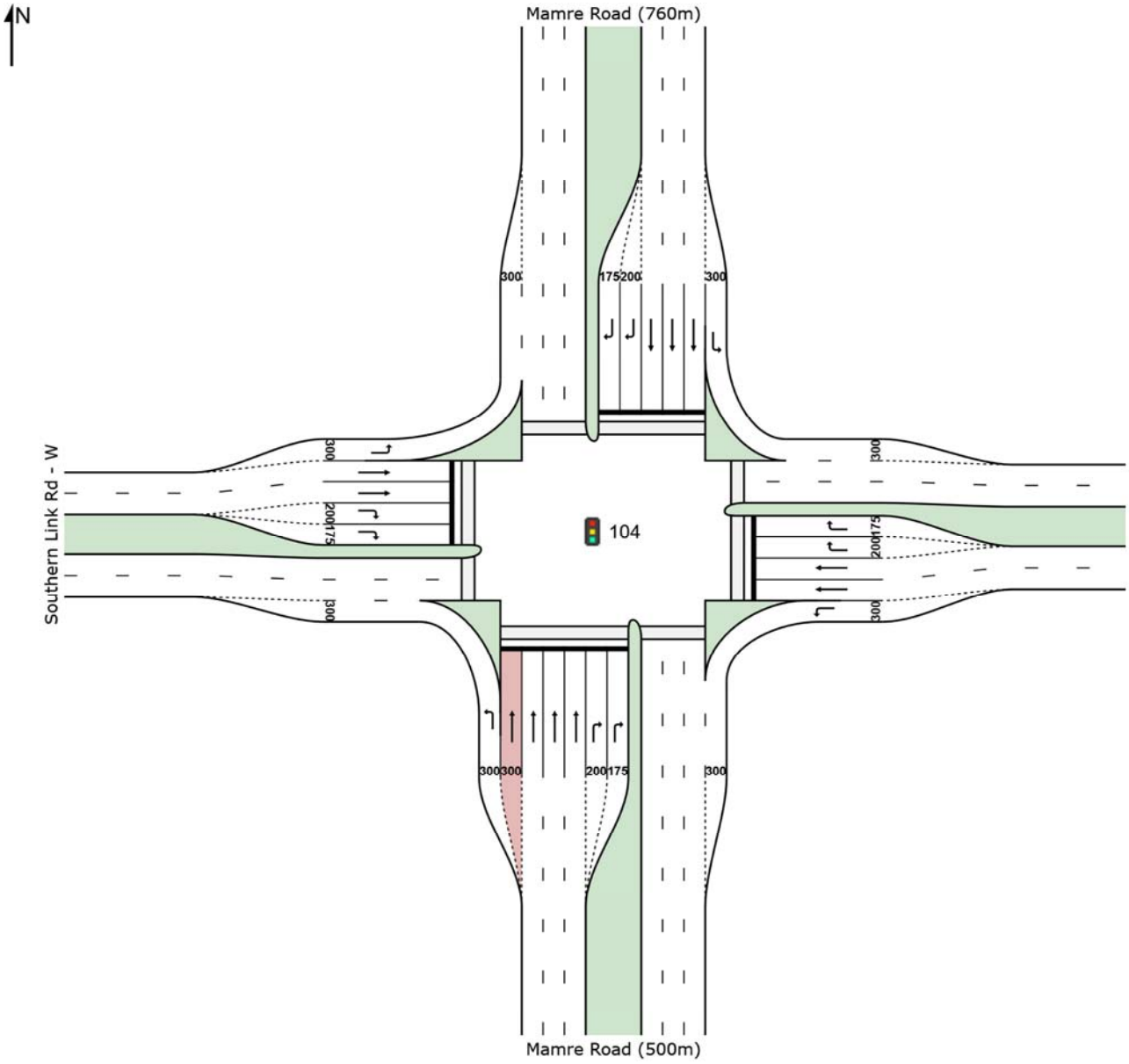
Appendix D5

2036 Project Future Baseline + Future Built Form SIDRA Results

SITE LAYOUT

Site: 104 [[2036 Base + Dev] Mamre Road x Southern Link_AM]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 104 [[2036 Base + Dev] Mamre Road x Southern Link_AM]

Network: N101 [2036 Base Case + Dev - AM - With Imporved EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	10.0	1	10.0	0.001	7.7	LOS A	0.0	0.0	0.00	0.60	60.8
2	T1	1628	12.6	1628	12.6	0.881	49.3	LOS D	33.1	255.9	1.00	1.01	26.1
3	R2	607	10.0	607	10.0	0.876	67.0	LOS E	19.1	145.5	1.00	0.96	30.3
Approach		2237	11.9	2237	11.9	0.881	54.1	LOS D	33.1	255.9	1.00	0.99	27.6
East: Southern Link Rd - E													
4	L2	342	20.0	342	20.0	0.210	7.9	LOS A	0.0	0.0	0.00	0.59	58.9
5	T1	408	20.0	408	20.0	0.619	46.9	LOS D	10.7	88.0	0.97	0.81	25.2
6	R2	84	20.0	84	20.0	0.497	69.8	LOS E	2.5	20.5	1.00	0.74	18.7
Approach		835	20.0	835	20.0	0.619	33.2	LOS C	10.7	88.0	0.58	0.71	31.4
North: Mamre Road (760m)													
7	L2	524	20.0	524	20.0	0.323	7.9	LOS A	0.0	0.0	0.00	0.59	63.4
8	T1	1607	18.3	1607	18.3	0.884	49.7	LOS D	33.1	268.4	1.00	1.02	33.3
9	R2	615	18.3	615	18.3	0.897	70.3	LOS E	20.1	162.9	1.00	0.98	26.9
Approach		2746	18.6	2746	18.6	0.897	46.4	LOS D	33.1	268.4	0.81	0.93	36.2
West: Southern Link Rd - W													
10	L2	448	20.0	339	22.7	0.212	7.9	LOS A	0.0	0.0	0.00	0.59	61.4
11	T1	766	20.0	580	22.7	0.892	62.5	LOS E	18.8	157.0	1.00	1.02	33.6
12	R2	119	20.0	90	22.7	0.540	70.4	LOS E	2.7	22.5	1.00	0.75	21.1
Approach		1334	20.0	1009 N1	22.7	0.892	44.9	LOS D	18.8	157.0	0.66	0.85	36.0
All Vehicles		7152	16.9	6827 N1	17.7	0.897	47.1	LOS D	33.1	268.4	0.82	0.91	32.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.6 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	27.1	LOS C	0.0	0.0	0.69	0.69
P12	South Stage 2	11	23.2	LOS C	0.0	0.0	0.64	0.64
P21	East Stage 1	11	22.5	LOS C	0.0	0.0	0.63	0.63
P22	East Stage 2	11	21.3	LOS C	0.0	0.0	0.61	0.61
P31	North Stage 1	11	48.0	LOS E	0.0	0.0	0.91	0.91
P32	North Stage 2	11	45.3	LOS E	0.0	0.0	0.89	0.89

P41	West Stage 1	11	23.2	LOS C	0.0	0.0	0.64	0.64
P42	West Stage 2	11	21.9	LOS C	0.0	0.0	0.62	0.62
All Pedestrians		84	29.1	LOS C			0.70	0.70

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [[2036 Base + Dev] Mamre Road x Southern Link_PM]

Network: N101 [2036 Base Case + Dev - PM - IMPROVED EPR]

Mamre Road x Bakers Lane
2036 Base
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (500m)													
1	L2	1	20.0	1	20.0	0.001	18.2	LOS B	0.0	0.2	0.44	0.61	45.5
2	T1	1401	12.1	1401	12.1	0.897	61.5	LOS E	33.0	253.4	1.00	1.02	22.3
3	R2	321	11.5	321	11.5	0.810	75.0	LOS F	10.9	83.6	1.00	0.90	28.2
Approach		1723	12.0	1723	12.0	0.897	64.0	LOS E	33.0	253.4	1.00	0.99	23.8
East: Southern Link Rd - E													
4	L2	751	10.0	751	10.0	0.433	5.8	LOS A	0.0	0.0	0.00	0.52	50.0
5	T1	693	20.0	693	20.0	0.902	66.9	LOS E	31.2	256.0	1.00	1.08	18.0
6	R2	498	10.0	498	10.0	0.479	45.7	LOS D	12.9	98.1	0.87	0.81	22.9
Approach		1941	13.6	1941	13.6	0.902	37.8	LOS C	31.2	256.0	0.58	0.80	25.8
North: Mamre Road (760m)													
7	L2	132	20.0	132	20.0	0.081	7.9	LOS A	0.0	0.0	0.00	0.59	63.4
8	T1	1325	18.5	1325	18.5	0.892	61.1	LOS E	31.3	253.4	1.00	1.02	29.4
9	R2	208	18.5	208	18.5	0.864	81.8	LOS F	8.0	65.0	1.00	1.00	22.0
Approach		1665	18.6	1665	18.6	0.892	59.5	LOS E	31.3	253.4	0.92	0.98	30.1
West: Southern Link Rd - W													
10	L2	598	20.0	220	28.8	0.143	5.9	LOS A	0.0	0.0	0.00	0.51	51.3
11	T1	508	20.0	187	28.8	0.493	60.1	LOS E	5.8	50.2	0.98	0.77	32.0
12	R2	181	20.0	67	28.8	0.156	60.1	LOS E	1.9	16.5	0.92	0.72	21.5
Approach		1287	20.0	473[N1]	28.8	0.493	34.9	LOS C	5.8	50.2	0.52	0.65	34.8
All Vehicles		6617	15.7	5802[N1]	17.9	0.902	51.6	LOS D	33.0	256.0	0.80	0.90	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	11	27.8	LOS C	0.0	0.0	0.65	0.65
P12	South Stage 2	11	40.8	LOS E	0.0	0.0	0.79	0.79
P21	East Stage 1	11	25.2	LOS C	0.0	0.0	0.62	0.62

P22	East Stage 2	11	38.5	LOS D	0.0	0.0	0.77	0.77
P31	North Stage 1	11	20.2	LOS C	0.0	0.0	0.77	0.77
P32	North Stage 2	11	40.8	LOS E	0.0	0.0	0.79	0.79
P41	West Stage 1	11	12.5	LOS B	0.0	0.0	0.44	0.44
P42	West Stage 2	11	38.5	LOS D	0.0	0.0	0.77	0.77
All Pedestrians		84	30.5	LOS D			0.70	0.70

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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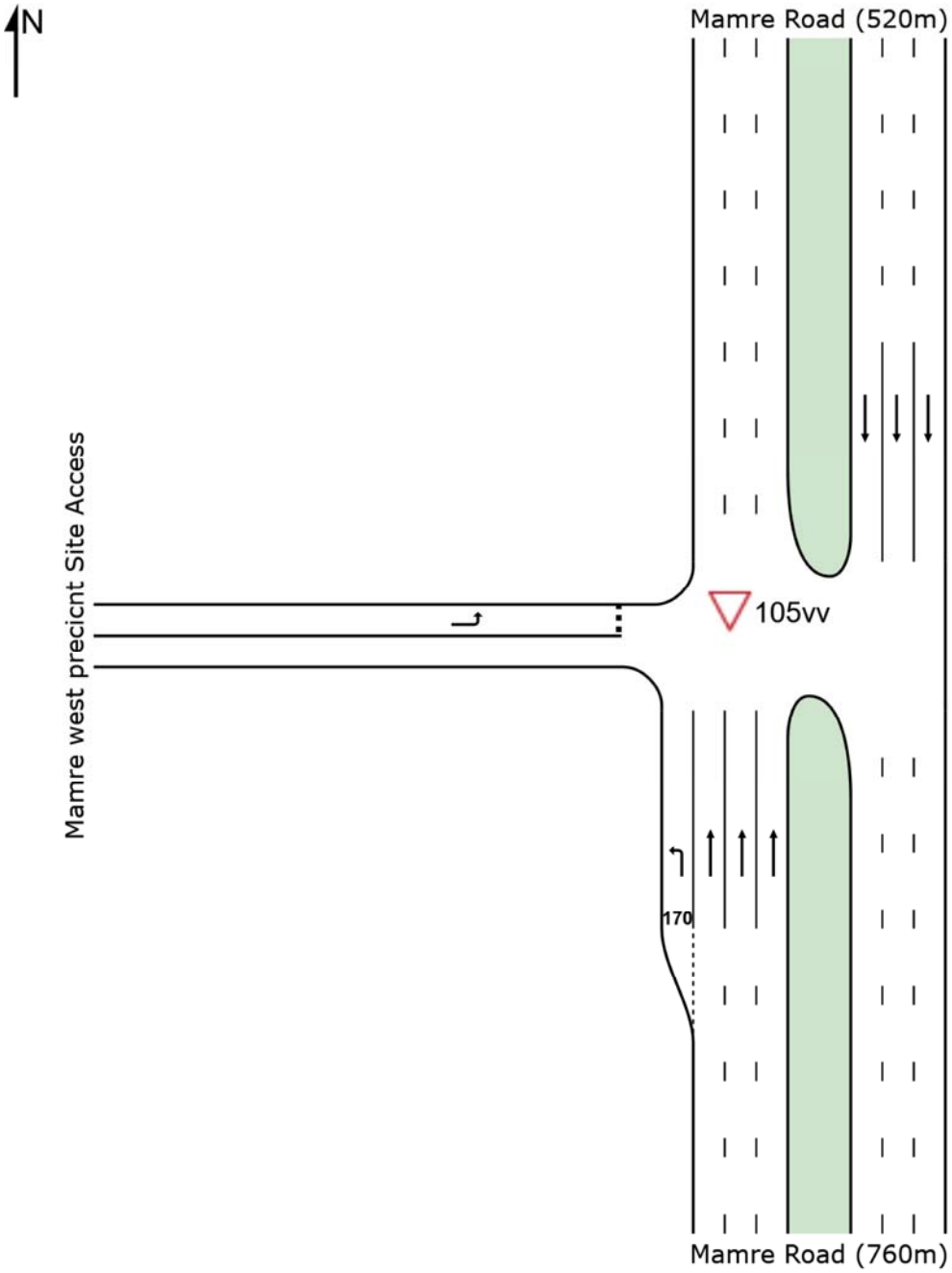
SITE LAYOUT

Site: 105vv [[2036 Base + Dev] Mamre Road x Mamre west precicnt _AM]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 105vv [[2036 Base + Dev] Mamre Road x Mamre west precicnt _AM]

Network: N101 [2036 Base Case + Dev - AM - With Imporved EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (760m)													
1	L2	112	20.0	106	20.1	0.065	7.3	LOS A	0.0	0.0	0.00	0.63	62.4
2	T1	2056	7.6	1957	7.7	0.351	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		2167	8.3	2063 N1	8.3	0.351	0.4	NA	0.0	0.0	0.00	0.03	78.0
North: Mamre Road (520m)													
8	T1	2178	7.7	2178	7.7	0.391	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		2178	7.7	2178	7.7	0.391	0.1	NA	0.0	0.0	0.00	0.00	79.8
West: Mamre west precicnt Site Access													
10	L2	32	20.0	32	20.0	0.059	10.7	LOS A	0.2	1.7	0.57	0.78	44.9
Approach		32	20.0	32	20.0	0.059	10.7	LOS A	0.2	1.7	0.57	0.78	44.9
All Vehicles		4377	8.1	4273 N1	8.3	0.391	0.3	NA	0.2	1.7	0.00	0.02	78.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.6 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 105vv [[2036 Base + Dev] Mamre Road x Mamre west precicnt _PM]

Network: N101 [2036 Base Case + Dev - PM - IMPROVED EPR]

Mamre Road x Mamre west precicnt
2018 Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (760m)													
1	L2	38	20.0	32	19.4	0.020	7.3	LOS A	0.0	0.0	0.00	0.63	62.6
2	T1	2448	6.8	2102	6.5	0.375	0.1	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		2486	7.0	2135 N1	6.7	0.375	0.2	NA	0.0	0.0	0.00	0.01	79.3
North: Mamre Road (520m)													
8	T1	1665	13.7	1665	13.7	0.310	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1665	13.7	1665	13.7	0.310	0.0	NA	0.0	0.0	0.00	0.00	79.9
West: Mamre west precicnt Site Access													
10	L2	94	20.0	94	20.0	0.187	11.7	LOS A	0.7	5.6	0.64	0.84	43.7
Approach		94	20.0	94	20.0	0.187	11.7	LOS A	0.7	5.6	0.64	0.84	43.7
All Vehicles		4245	9.9	3894 N1	10.8	0.375	0.4	NA	0.7	5.6	0.02	0.03	78.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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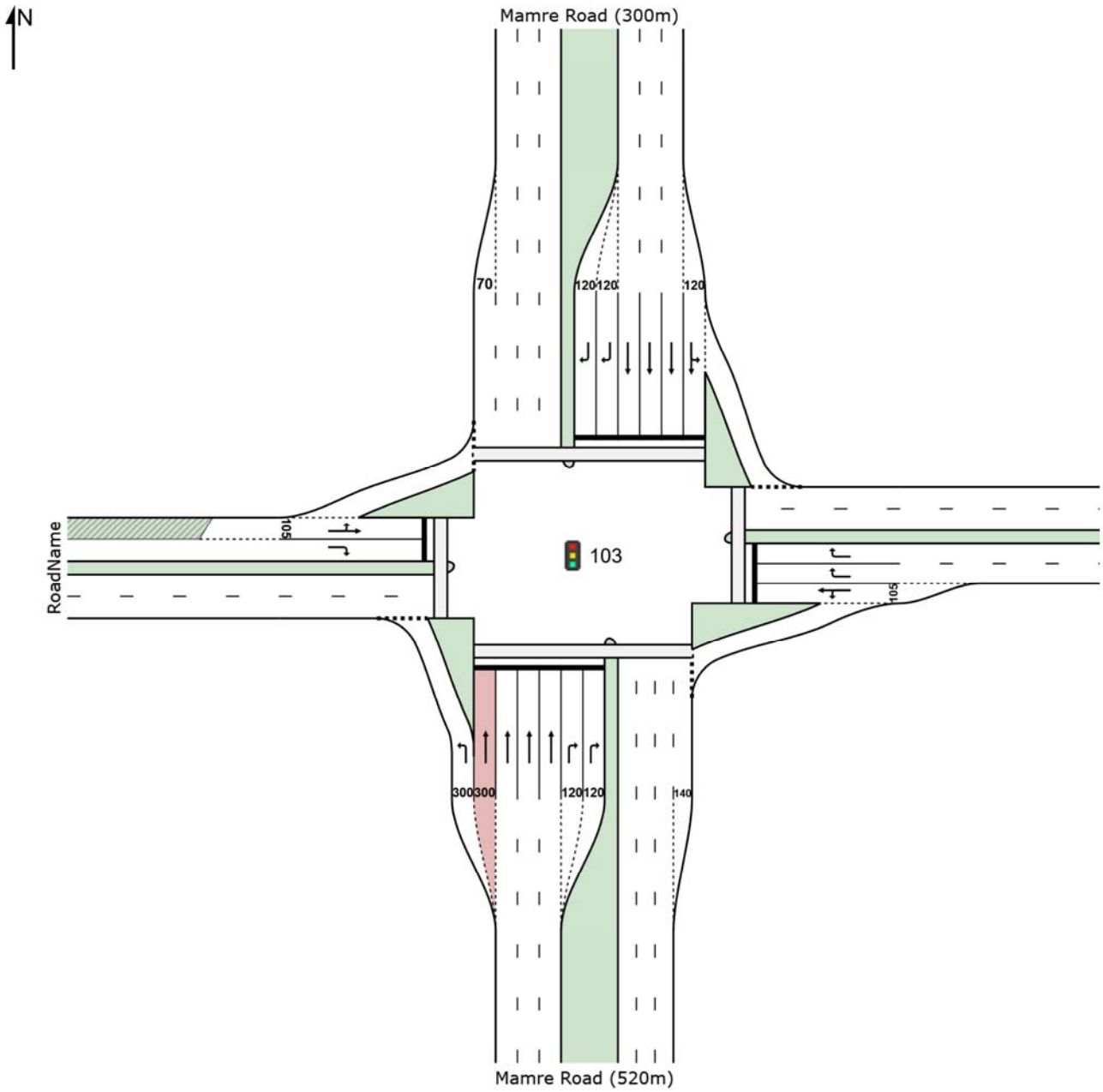
SITE LAYOUT

Site: 103 [[2036 Base + Dev] Mamre Road x James Erskine Drive_AM]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated



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Organisation: ASON GROUP PTY LTD | Created: Friday, 10 August 2018 11:59:50 AM
Project: C:\Users\Alireza Rasouli\Desktop\Mamre South Precinct - Finalising the Report\AG0584m03 Mamre_2036 Basecase + Development (Alternate signal).sip7

MOVEMENT SUMMARY

Site: 103 [[2036 Base + Dev] Mamre Road x James Erskine Drive_AM]

Network: N101 [2036 Base Case + Dev - AM - With Imporved EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	8.2	LOS A	0.0	0.1	0.25	0.56	52.3
2	T1	1898	6.7	1809	6.8	0.597	20.7	LOS B	23.6	173.9	0.74	0.67	43.3
3	R2	180	18.0	171	18.1	0.781	74.2	LOS F	5.5	44.3	1.00	0.86	23.1
Approach		2079	7.7	1981 N1	7.8	0.781	25.4	LOS B	23.6	173.9	0.76	0.68	39.3
East: James Erskine Drive (170m)													
4	L2	62	54.8	62	54.8	0.134	20.3	LOS B	1.9	19.3	0.59	0.67	20.7
5	T1	1	0.0	1	0.0	0.134	15.1	LOS B	1.9	19.3	0.59	0.67	39.2
6	R2	88	54.2	88	54.2	0.671	72.8	LOS F	2.9	29.3	1.00	0.83	8.2
Approach		152	54.1	152	54.1	0.671	50.9	LOS D	2.9	29.3	0.83	0.76	11.1
North: Mamre Road (300m)													
7	L2	429	17.9	429	17.9	0.690	28.2	LOS B	25.9	202.8	0.75	0.85	34.2
8	T1	2646	7.4	2646	7.4	0.891	34.4	LOS C	52.3	389.2	0.88	0.91	23.4
9	R2	183	0.0	183	0.0	0.740	70.4	LOS E	5.7	40.1	1.00	0.85	24.5
Approach		3259	8.4	3259	8.4	0.891	35.6	LOS C	52.3	389.2	0.87	0.90	24.9
West: RoadName													
10	L2	31	0.0	31	0.0	0.045	13.2	LOS A	0.5	3.8	0.50	0.64	42.5
11	T1	1	0.0	1	0.0	0.045	7.6	LOS A	0.5	3.8	0.50	0.64	45.7
12	R2	38	0.0	38	0.0	0.408	69.4	LOS E	2.3	16.1	1.00	0.73	18.9
Approach		69	0.0	69	0.0	0.408	43.8	LOS D	2.3	16.1	0.77	0.69	25.3
All Vehicles		5559	9.3	5461 N1	9.4	0.891	32.4	LOS C	52.3	389.2	0.83	0.81	29.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.6 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	20.4	LOS C	0.0	0.0	0.58	0.58
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	19.3	LOS B	0.1	0.1	0.57	0.57
All Pedestrians		107	36.8	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 103 [[2036 Base + Dev] Mamre Road x James Erskine Drive_PM]

Network: N101 [2036 Base Case + Dev - PM - IMPROVED EPR]

Mamre Road x James Erskine Drive
2036 Base
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (520m)													
1	L2	1	0.0	1	0.0	0.001	7.5	LOS A	0.0	0.1	0.22	0.56	52.9
2	T1	2702	8.1	2368	8.3	0.860	33.1	LOS C	42.6	318.1	0.95	0.92	33.8
3	R2	95	36.8	83	37.0	0.251	60.0	LOS E	2.2	20.5	0.95	0.74	26.4
Approach		2798	9.1	2452 N1	9.2	0.860	34.0	LOS C	42.6	318.1	0.95	0.92	33.4
East: James Erskine Drive (170m)													
4	L2	186	7.7	186	7.7	0.222	9.4	LOS A	3.2	23.7	0.39	0.63	29.9
5	T1	1	0.0	1	0.0	0.222	4.6	LOS A	3.2	23.7	0.39	0.63	46.8
6	R2	259	14.8	259	14.8	0.902	75.1	LOS F	8.5	67.4	1.00	1.06	8.0
Approach		446	11.8	446	11.8	0.902	47.6	LOS D	8.5	67.4	0.75	0.88	11.5
North: Mamre Road (300m)													
7	L2	127	56.3	127	56.3	0.458	33.6	LOS C	11.5	102.0	0.73	0.75	32.3
8	T1	1575	15.1	1575	15.1	0.592	26.3	LOS B	19.4	153.6	0.81	0.73	28.1
9	R2	63	0.0	63	0.0	0.326	66.1	LOS E	1.8	12.8	1.00	0.72	25.4
Approach		1765	17.6	1765	17.6	0.592	28.3	LOS B	19.4	153.6	0.81	0.73	28.2
West: RoadName													
10	L2	94	0.0	94	0.0	0.136	18.7	LOS B	2.5	17.7	0.57	0.70	37.6
11	T1	1	0.0	1	0.0	0.136	13.1	LOS A	2.5	17.7	0.57	0.70	41.4
12	R2	115	0.0	115	0.0	0.710	64.9	LOS E	6.7	47.1	1.00	0.85	19.8
Approach		209	0.0	209	0.0	0.710	44.0	LOS D	6.7	47.1	0.81	0.78	25.1
All Vehicles		5219	11.8	4873 N1	12.7	0.902	33.6	LOS C	42.6	318.1	0.87	0.84	29.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	51.7	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	27.1	LOS C	0.0	0.0	0.69	0.69
P3	North Full Crossing	53	51.8	LOS E	0.2	0.2	0.95	0.95

P4	West Full Crossing	53	51.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		107	51.5	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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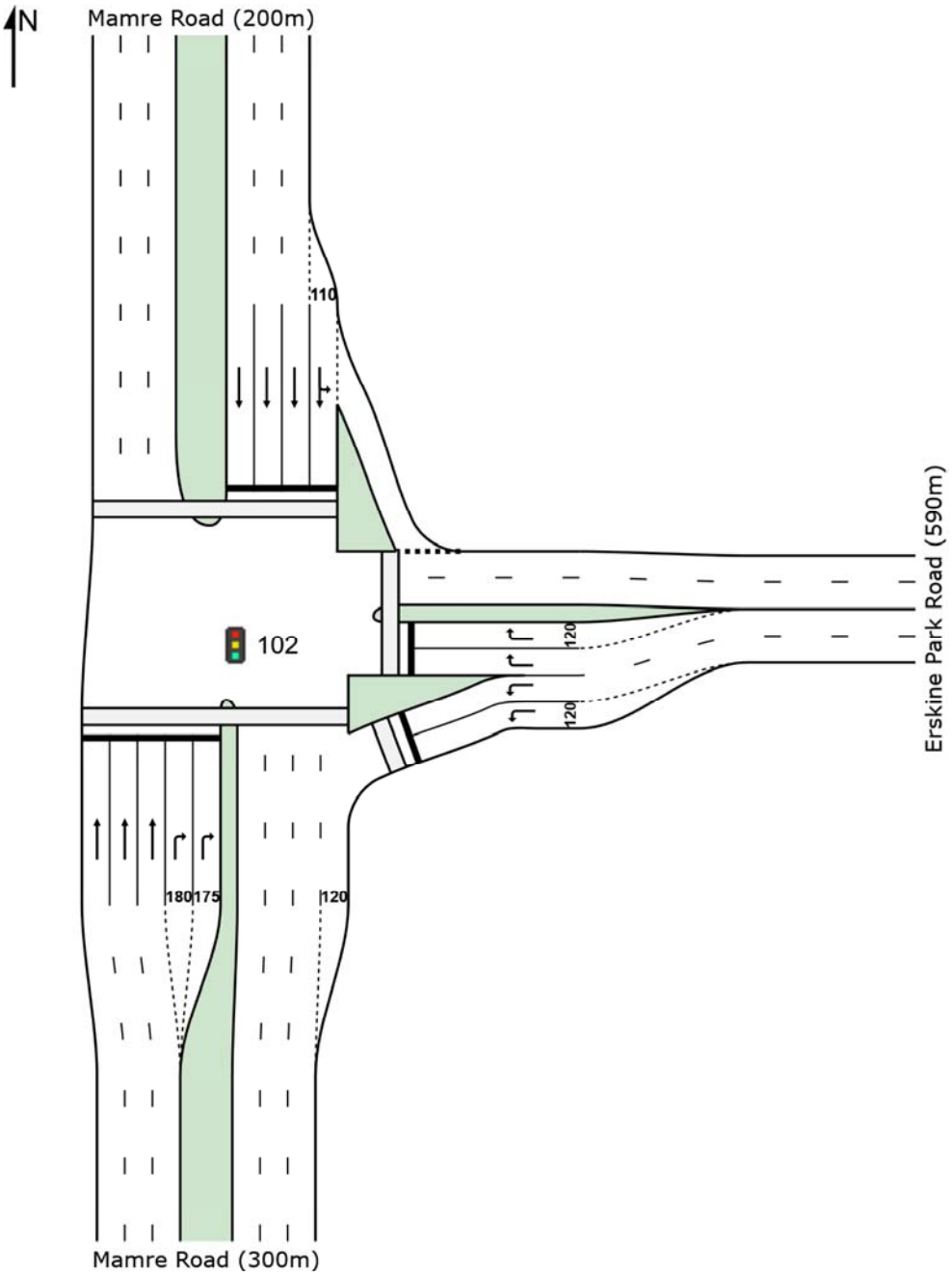
SITE LAYOUT

Site: 102 [[2036 Base + Dev] Mamre Road x Erskine Park Road_AM - IMPROVED]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 102 [[2036 Base + Dev] Mamre Road x Erskine Park Road_AM - IMPROVED]

Network: N101 [2036 Base Case + Dev - AM - With Imporved EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	820	9.8	784	10.0	0.174	2.0	LOS A	2.6	19.9	0.22	0.19	70.4
3	R2	1069	13.4	1024	13.7	0.658	30.1	LOS C	19.3	151.4	0.83	0.84	42.2
Approach		1889	11.8	1808 N1	12.1	0.658	17.9	LOS B	19.3	151.4	0.57	0.56	46.1
East: Erskine Park Road (590m)													
4	L2	1283	13.1	1283	13.1	0.800	24.2	LOS B	28.1	219.1	0.75	0.84	42.8
6	R2	12	14.0	12	14.0	0.057	57.8	LOS E	0.3	2.2	0.97	0.65	25.9
Approach		1295	13.1	1295	13.1	0.800	24.5	LOS B	28.1	219.1	0.75	0.84	42.6
North: Mamre Road (200m)													
7	L2	222	4.4	222	4.4	0.585	19.2	LOS B	12.9	94.5	0.82	0.79	52.1
8	T1	1432	6.4	1432	6.4	0.850	39.1	LOS C	24.8	183.1	0.97	0.95	16.1
Approach		1654	6.1	1654	6.1	0.850	36.4	LOS C	24.8	183.1	0.95	0.93	21.5
All Vehicles		4838	10.2	4757 N1	10.4	0.850	26.1	LOS B	28.1	219.1	0.75	0.77	36.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.6 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
P2	East Full Crossing	1	32.8	LOS D	0.0	0.0	0.81	0.81
P2S	East Slip/Bypass Lane Crossing	53	27.4	LOS C	0.1	0.1	0.74	0.74
P3	North Full Crossing	1	44.2	LOS E	0.0	0.0	0.94	0.94
All Pedestrians		56	28.2	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 102 [[2036 Base + Dev] Mamre Road x Erskine Park Road_PM - IMPROVED]

Network: N101 [2036 Base Case + Dev - PM - IMPROVED EPR]

Mamre Road x Erskine Park Road
2036 Base
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Cycle Time - Program)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (300m)													
2	T1	1594	8.5	1420	8.6	0.318	3.7	LOS A	8.1	61.2	0.28	0.25	63.9
3	R2	1203	11.1	1073	11.4	0.569	28.8	LOS C	23.4	179.5	0.70	0.81	43.3
Approach		2797	9.6	2492[N1]	9.8	0.569	14.5	LOS A	23.4	179.5	0.46	0.49	48.2
East: Erskine Park Road (590m)													
4	L2	846	24.8	846	24.8	0.450	16.5	LOS B	14.4	122.0	0.44	0.73	50.5
6	R2	342	7.7	342	7.7	0.912	90.4	LOS F	13.5	101.0	1.00	0.96	18.7
Approach		1188	19.9	1188	19.9	0.912	37.8	LOS C	14.4	122.0	0.60	0.80	33.9
North: Mamre Road (200m)													
7	L2	24	10.8	24	10.8	0.031	12.1	LOS A	0.4	3.1	0.31	0.66	53.3
8	T1	919	12.4	919	12.4	0.915	70.5	LOS E	27.1	209.6	0.99	0.98	10.0
Approach		943	12.4	943	12.4	0.915	69.0	LOS E	27.1	209.6	0.97	0.97	10.7
All Vehicles		4928	12.6	4624[N1]	13.4	0.915	31.6	LOS C	27.1	209.6	0.60	0.67	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	1	53.2	LOS E	0.0	0.0	0.87	0.87
P2S	East Slip/Bypass Lane Crossing	53	47.3	LOS E	0.2	0.2	0.82	0.82
P3	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		56	48.1	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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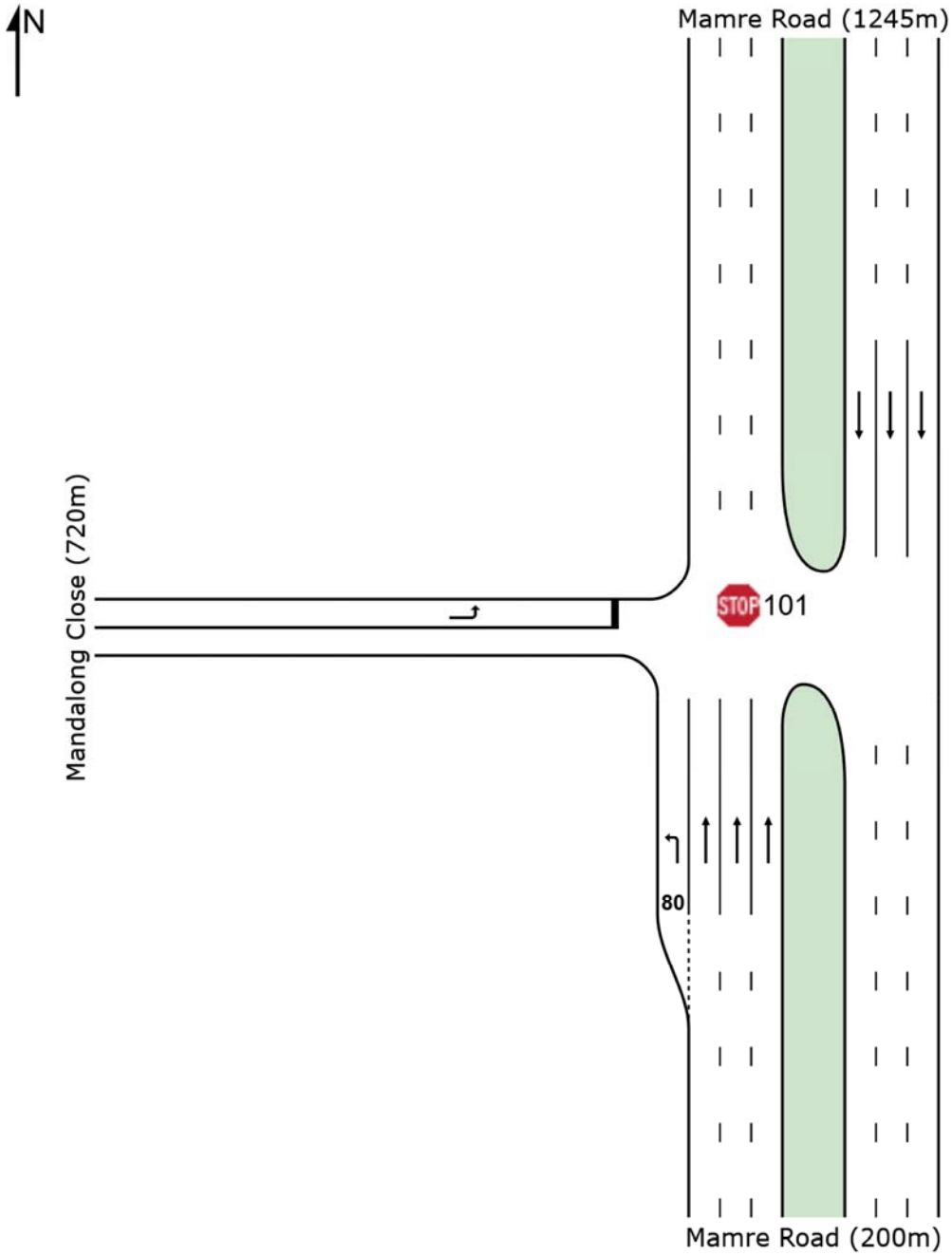
SITE LAYOUT

Site: 101 [[2036 Base + Dev] Mamre Road x Mandalong Close_AM]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)



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MOVEMENT SUMMARY

Site: 101 [[2036 Base + Dev] Mamre Road x Mandalong Close_AM]

Network: N101 [2036 Base Case + Dev - AM - With Imporved EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	45	11.1	43	11.4	0.025	7.1	LOS A	0.0	0.0	0.00	0.63	59.2
2	T1	786	10.5	753	10.8	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		832	10.5	796 N1	10.8	0.138	0.4	NA	0.0	0.0	0.00	0.03	79.0
North: Mamre Road (1245m)													
8	T1	1852	5.5	1852	5.5	0.328	0.1	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1852	5.5	1852	5.5	0.328	0.1	NA	0.0	0.0	0.00	0.00	79.9
West: Mandalong Close (720m)													
10	L2	66	7.7	66	7.7	0.075	9.8	LOS A	0.3	2.2	0.36	0.88	63.0
Approach		66	7.7	66	7.7	0.075	9.8	LOS A	0.3	2.2	0.36	0.88	63.0
All Vehicles		2749	7.1	2714 N1	7.2	0.328	0.4	NA	0.3	2.2	0.01	0.03	78.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.6 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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MOVEMENT SUMMARY

Site: 101 [[2036 Base + Dev] Mamre Road x Mandalong Close_PM]

Network: N101 [2036 Base Case + Dev - PM - IMPROVED EPR]

Mamre Road x Mandalong Close
2036 Base
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mamre Road (200m)													
1	L2	58	8.7	53	8.8	0.030	7.1	LOS A	0.0	0.0	0.00	0.63	60.3
2	T1	1878	7.5	1710	7.6	0.307	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		1936	7.6	1763 N1	7.7	0.307	0.2	NA	0.0	0.0	0.00	0.02	79.4
North: Mamre Road (1245m)													
8	T1	943	12.4	943	12.4	0.186	0.1	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		943	12.4	943	12.4	0.186	0.1	NA	0.0	0.0	0.00	0.00	79.9
West: Mandalong Close (720m)													
10	L2	63	8.0	63	8.0	0.110	12.8	LOS A	0.4	3.1	0.56	0.97	61.6
Approach		63	8.0	63	8.0	0.110	12.8	LOS A	0.4	3.1	0.56	0.97	61.6
All Vehicles		2942	9.1	2769 N1	9.7	0.307	0.5	NA	0.4	3.1	0.01	0.03	78.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 10.2 %
Number of Iterations: 10 (maximum specified: 10)

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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