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WALKER CORPORATION

WILTON SOUTH EAST PRECINCT STAGE 1 RESIDENTIAL SUBDIVISION

TRAFFIC REPORT



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#### Wilton South East Precinct Stage 1 Residential Subdivision Traffic Report

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REV	DATE	DETAILS
A	18/05/2018	Draft
В	12/06/2018	Final

	NAME	DATE	SIGNATURE
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## 1 INTRODUCTION

#### 1.1 REPORT OVERVIEW

This Traffic Report investigates the transport network related impacts associated with Stage 1 of the proposed Wilton South East Precinct project on behalf of Walker Corporation. This report is required to support a Development Application for the Stage 1 development.

#### 1.2 PROJECT CONTEXT

Wilton South East Precinct is located adjacent to the Hume Motorway southwest of Sydney and northwest of Wollongong, as shown in Figure 1.1, within the jurisdiction of the Wollondilly Shire Council (WSC). Urban development has commenced in the area, primarily in the 'Bingara Gorge' estate to the north of Picton Road which has been developed by Lend Lease. A second major land holder in the area is Walker Corporation whose interests are primarily in land located to the south of Picton Road. A Transport Management and Access Plan (TMAP) was delivered for a master planned community in the area in 2014 on behalf of the Wilton Land Owners Group.



Figure 1.1 Wilton South East Precinct locality plan

The overall staging plan for the Wilton South East Precinct development is shown in Figure 1.2.

The Wilton South East Precinct 1 plan is shown in Figure 1.3. Stage 1 comprises:

- 701 dwellings
- A balance lot to enable the future development of 13,000 m<sup>2</sup> GFA employment uses (not part of this application).

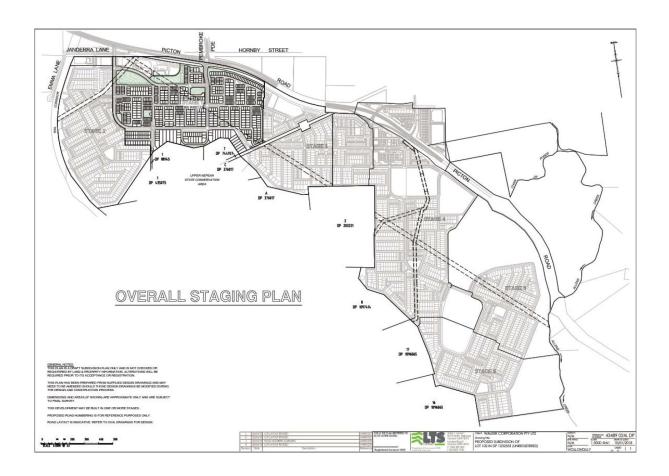


Figure 1.2 Wilton South East Precinct staging plan

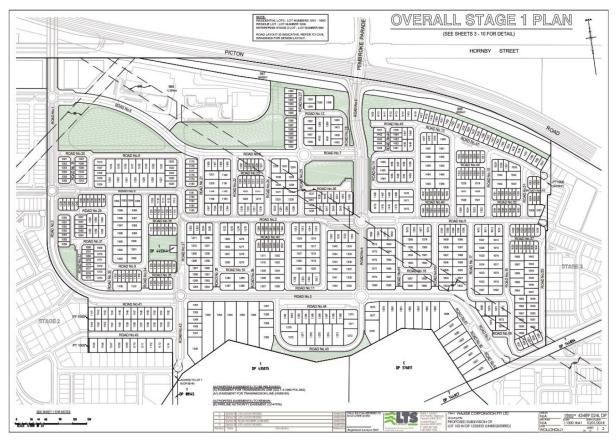


Figure 1.3 Wilton South East Precinct Stage 1 plan

## **2 EXISTING TRANSPORT NETWORK**

#### 2.1 ROAD NETWORK

Key road links in the vicinity of the Wilton South East Precinct Stage 1 site are shown in Figure 2.1.

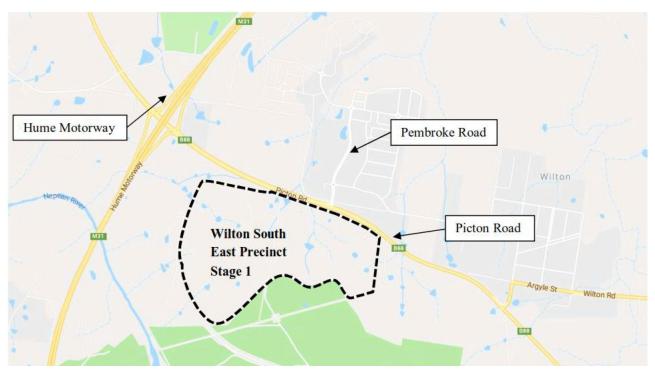


Figure 2.1 Road network in the vicinity of Wilton South East Precinct Stage 1

#### 2.1.1 PICTON ROAD

Direct access to the Wilton South East Precinct Stage 1 development site is provided from Picton Road. Picton Road (B88) is a State controlled road travelling between Picton and Mount Ousley Road (M1). It serves as a freight route (designated as a B-double route between Maldon and Mount Ousley Road) as well as a commuter traffic route on weekdays. In the vicinity of the Wilton South East Precinct Stage 1 development site, it is a four-lane cross section between Pembroke Parade and the Hume Motorway, which reduces back to a 2-lane cross section to the east of Pembroke Parade. It has a posted speed limit of 80 km/hr in the westbound direction (in the vicinity of Pembroke Parade), and 100 km/hr eastbound on the approach to the Pembroke Parade intersection (dropping to 90 km/hr after the intersection).

#### 2.1.2 PEMBROKE PARADE

Pembroke Parade is a WSC owned road, which provides primary access to the Bingara Gorge development area from Picton Road. It comprises a single lane in each direction, separated by a planted median. It has a posted speed limit of 50 km/hr.

At its intersection with Picton Road a seagull configuration is provided (give-way control).

Wilton South East Precinct Stage 1 will be accessed via an upgraded intersection with Picton Road and Pembroke Parade (creating a 4-way signalised intersection). The proposed intersection configuration is discussed further in Section 3 of this traffic report, where the suitability of this intersection to cater for the Wilton South East Precinct Stage 1 generated traffic volumes will be tested.

#### 2.1.3 HUME MOTORWAY

The Hume Motorway (M31) is part of the major interstate highway linking Sydney and Melbourne. In the vicinity of Wilton, it has two lanes in each direction, and has a posted speed limit of 110 km/hr. The Picton Road / Hume Motorway intersection is a grade separated interchange (Picton Road passing over the Hume Motorway), with signalised control.

#### 2.2 PUBLIC TRANSPORT NETWORK

Existing public transport services (and networks) in the Wilton South East Precinct area are limited, which is reflective of the small population currently residing and working within the area, as well as the dispersed nature of the settlement. A summary of the public transport network and services in the surrounding area is provided below.

#### 2.2.1 RAIL

The closest rail stations are the Picton Railway Station and Douglas Park Railway Station, both of which are located approximately 10km (by road) to the northwest and north respectively. Both stations are on the Southern Highlands Line, as shown in Figure 2.2. For travel towards the Sydney CBD, passengers are required to change to the Airport & South Line (T8) at either Macarthur or Campbelltown station.

The service frequency for the Southern Highlands Line is:

AM Peak: 1-2 services in each direction

PM peak: 1-2 services in each direction

Off-peak: 1 service in each direction.

Travel between Douglas Park Station or Picton Station to Central Station in the Sydney CBD takes approximately 80-90 minutes.

More frequent services towards the CBD are available from either Macarthur or Campbelltown stations, which are located approximately 30 km from Wilton South East Precinct Stage 1.



Figure 2.2 Sydney Trains Intercity Network (2018)

#### 2.2.2 BUS

Bus services to Wilton township are currently limited to route 901, operated by Picton Buslines, which runs between Douglas Park, Wilton, Maldon and Picton (including the Picton Railway Station) as loop service (as shown in Figure 2.4). Four services per day operate Monday to Friday, with this reducing to two services per day outside of school term. There are no services on weekends.

There are also school bus services that operate to schools outside the Wilton South East Precinct area.

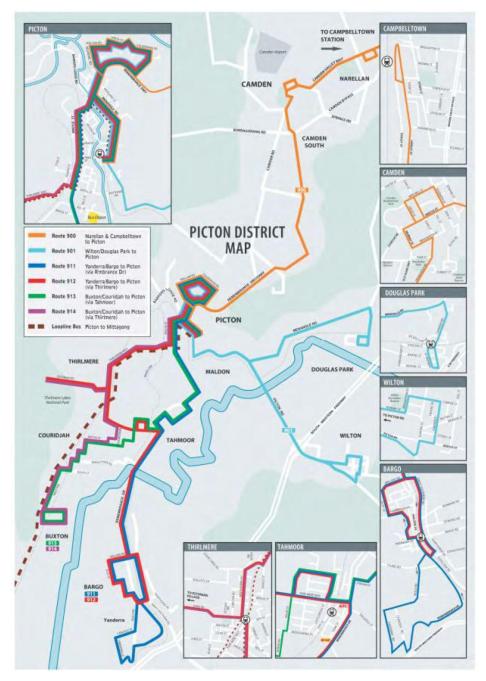


Figure 2.3 Picton Busline services (2013)

#### 2.3 ACTIVE TRANSPORT NETWORK

Pedestrian and cyclist facilities are generally limited in the Wilton township and surrounding area. However, the progressive delivery of the Bingara Gorge development site is providing a network of connected footpaths and associated crossing facilities. Footpaths are provided on both sides of Pembroke Parade, although they do not currently connect through to Picton Road.

WSC has recently adopted a Shared Cycleway Plan for the whole Shire.

The principles for developing the WSC shared cycleway routes include:

- Connecting logical start and end points (e.g. schools to residential areas, towns to each other etc.).
- Maximising/using off road routes wherever feasible.
- On road routes along major connecting roads may be considered in rural areas to reduce construction costs and increase useability.
- Target known future land release areas for off road routes.
- Link tourist and other places of interest to encourage visitors and residents into recreational cycling.

A copy of the intended network in the vicinity of the Wilton South East Precinct Stage 1 site is shown in Figure 2.4.

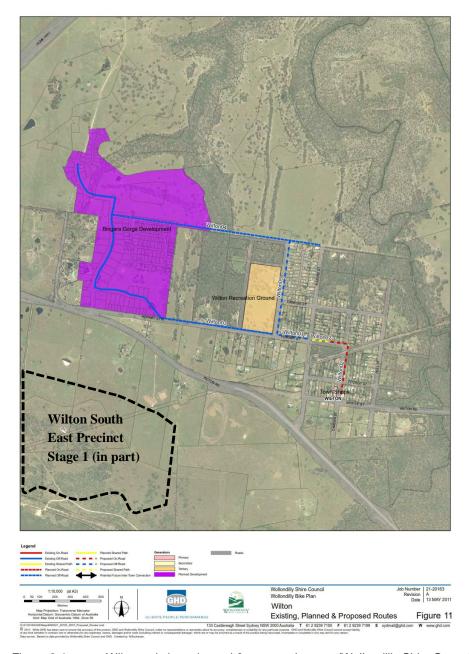


Figure 2.4 Wilton existing, planned & proposed routes (Wollondilly Shire Council, 2011)

#### 2.4 COMMITTED TRANSPORT NETWORK UPGRADES

There are no committed or funded road network upgrades in the locality of the site at the time of preparation of this document. However, the proponent has entered into a Voluntary Planning Agreement to fund the following works:

- 1 \$10.6 million to upgrade the Hume Motorway / Picton Road interchange
- 2 \$2.7 million towards public transport
- 3 \$4.75 million to construct signals at the Picton Road / Pembroke Parade intersection
- 4 \$30.8 million to construct a grade separated interchange at the Almond Street / Picton Road intersection and the Janderra Lane / Picton Road intersection.

The proponent from the Wilton North development has entered into a Voluntary Planning Agreement to fund the following projects:

- 1 \$7.8 million to upgrade the Hume Motorway / Picton Road interchange
- 2 \$4.78 million towards public transport.

### 3 IMPACT ASSESSMENT

#### 3.1 TRAFFIC

A traffic impact assessment for the Wilton South East Precinct Stage 1 project has been undertaken, with a focus on the performance of the following intersections:

- Picton Road / Pembroke Parade intersection
- Hume Motorway / Picton Road interchange.

#### 3.1.1 INFORMATION RECEIVED

WSP was provided with input data and models from previous studies. These included:

- AIMSUN macroscopic models from the TMAP studies for 2013, 2024 and 2036
- Spreadsheet-based trip generation model from the TMAP studies.

For this investigation, additional information supplied included:

- Maps of staging plans for the Walker Corporation land:
  - Lodgement plans (v6) (Appendix A)
- Proposed Picton Road / Pembroke Parade intersection layout
  - MR95 Picton Rd Wilton Corridor Investigations Strategic Almond St to Hume Hwy Interim 2 Lane A1 x
     4 Roll (Appendix A)
  - MR95 Picton Rd Wilton Corridor Investigations Strategic Almond St to Hume Hwy Interim 2 Lane A3 -15 Sheets (Appendix A)
- Data of anticipated dwelling and jobs growth for the area:
  - Estimated Dwellings (Bingara Gorge) (Appendix B)
  - Estimated Dwellings (Walker Corporation land) (Appendix B)

#### 3.1.2 METHODOLOGY

An assessment has been undertaken to understand whether a proposed upgrade to the intersection of Picton Road / Pembroke Parade is adequate to support the expected Stage 1 development at the Walker Corporation owned property and the existing rezoned areas of Bingara Gorge. The following methodology has been followed for this assessment:

- 1 Four scenarios were identified to be tested. The development build-out assumptions are summarised in Table 3.1.
  - Scenario A: Year of opening (2020) with Bingara Gorge only
  - Scenario B: Year of opening (2020) with Bingara Gorge + Wilton South East Precinct Stage 1
  - Scenario C: 10-year horizon (2030) with Bingara Gorge only
  - Scenario D: 10-year horizon (2030) with Bingara Gorge + Wilton South East Precinct Stage 1
- 2 AIMSUN macroscopic models were obtained from the TMAP studies for 2013, 2024 and 2036 Base scenarios that included no network upgrades. Matrices of background traffic demands for 2020 (year of opening) and 2030 (10-year horizon) were obtained by interpolating between these years. This gives an appropriate background growth rate along Picton Road.

- 3 A trip generation spreadsheet model was obtained from the TMAP studies with the updated development projections for the Bingara Gorge and Walker Corporation sites. Previous development assumptions and trip generation factors were reviewed and amended as detailed in Section 3.1.4.
- 4 The new development assumptions and trip generation spreadsheet were used to obtain new traffic demand matrices for 2020 and 2030 to analyse in AIMSUN and to obtain peak hour turning flows.
- 5 The proposed network infrastructure upgrades (for this development) for 2020 and 2030 have then been identified for assessment in the SIDRA intersection analysis software. The extent of this study includes the following intersections/interchanges:
  - Picton Road / Pembroke Parade intersection
  - Hume Motorway / Picton Road interchange
- 6 An analysis of the performance was undertaken using the turning flows from the AIMSUN macroscopic assessment (Appendix C). SIDRA has then been used to identify the trigger points for the various network upgrades.

Testing of the staging of intersection performance was undertaken using static testing of the Picton Road / Pembroke Parade intersection and Hume Motorway interchange using SIDRA 7.0 software. This approach was deemed appropriate as the early stages of development would be isolated with limited internal route choice, and thus microsimulation of each stage would not be necessary.

It should be noted that this is analysis is purely an assessment of the performance of the Picton Road intersection and Hume Motorway interchange as a result of the predicted additional traffic generated from the proposed developments in Bingara Gorge and the Walker Corporation site. It does not consider any potential future upgrades to the road network that would likely provide further improvements in performance of the network for traffic accessing the developments.

#### 3.1.3 DEVELOPMENT STAGING

Testing was conducted for four scenarios in accordance with the data provided by Walker Corporation and indicative staging maps. This data is summarised in Table 3.1 below which shows the cumulative development at the end of each stage.

Table 3.1 Input data by stage (cumulative)

SCENARIO	CURRENT	SCENARIO A (2020)	SCENARIO B (2020)				SCENARIO C (2030)		ARIO D 30)
DEVELOPME NT	BINGARA GORGE	BINGARA GORGE	BINGARA WALKER GORGE (STAGE 1)		BINGARA GORGE	BINGARA GORGE	WALKER (STAGE 1)		
Dwellings	450	1,100	1,100	701	1,800	1,800	701		
Employment (GFA, m <sup>2</sup> )	3,675	3,675	3,675	13,000*	3,675	3,675	13,000*		
Retail (GFA, m <sup>2</sup> )	3,675	3,675	3,675	0	3,675	3,675	0		

<sup>\* -</sup> Employment not part of this application, but an indicative 130 jobs was added to the model to maintain trip characteristics Source: data supplied by Walker Corporation and Wilton Junction TMAP document.

#### 3.1.4 ASSUMPTIONS

The development of the scenario testing adopted the same assumptions as the TMAP traffic modelling process. These are described in Table 3.2. It is acknowledged that the residential dwelling trip rate of 0.7 trips per dwelling is based on surveys taken for the Bingara Gorge development site. This aligns well with the latest technical direction provided by NSW Roads & Maritime Services (August 2013) which indicates a peak hour trip rate of 0.71-0.78 per dwelling for regional areas.

Table 3.2 Vehicle trip generation rates

LAND USE	WEEKDAY PEAK HR
Residential	0.7 (per dwelling)
Commercial (Employment)	0.6 (per 100 m <sup>2</sup> )
Business Park (Retail)	0.05 (per 100 m <sup>2</sup> )

Source: TMAP and RMS Guide to Traffic Generating Developments

An internalisation factor of 22% was maintained for Bingara Gorge and Wilton South East Precinct as per the TMAP, but traffic connecting between the two developments, crossing Picton Road was added to account for links between Stage 1 and the retail and school uses in Bingara Gorge. This approach was adopted for both the AM and PM peaks, and both in and out directions. This was calculated by estimating the percentage of returning trips using the estimated number of jobs in the Stage 1 and Bingara Gorge developments, and number of school enrolments based on a nearby public school (Bingara Gorge). This is detailed in Appendix D. A peak hour factor of 55% was used for both peak hours.

The AIMSUN models obtained from the TMAP studies were used as a guide for the distribution of trips. External trips into and out of zones gw9900 (Pembroke Parade north, Bingara Gorge) and gw9907 (Pembroke Parade south, Walker Corporation land) were distributed based on the existing distribution of trips into and out of zone gw9900 from the obtained AIMSUN models. Maintaining these assumptions aligns with the TMAP modelling approach.

#### 3.1.5 ASSESSMENT OUTCOMES

#### 3.1.5.1 PICTON ROAD / PEMBROKE PARADE INTERSECTION

The existing layout (three-arm priority control) was adopted for Scenarios A and C. The proposed intersection configuration for the Picton Road / Pembroke Parade intersection for Scenarios B and D includes full signalisation, providing two through and two right turn lanes for approximately 130-150 metres in each direction along Picton Road. This is shown schematically in Figure 3.1.

#### SCENARIO A AND C (BINGARA GORGE ONLY)

The SIDRA assessment indicated that the existing access for Bingara Gorge (Pembroke Parade) will likely fail in its current unsignalised configuration by the opening year (2020) without any development at the Wilton South East Precinct Stage 1 site due to the ongoing build-out of the Bingara Gorge development and the continued high level of background traffic growth along Picton Road. This is reflected in the current consent which requires the Bingara Gorge proponent to construct signals by the time 1,100 lots are created.

#### SCENARIO B AND D (BINGARA GORGE + WILTON SOUTH EAST PRECINCT STAGE 1)

The SIDRA assessment indicated that the proposed configuration is predicted to perform satisfactorily (LOS D or better) during both the AM and PM peak hours for the opening year (2020). However, it is predicted to fail (LOS F) during the AM peak hour by 2030. A failure assessment in SIDRA was conducted to estimate the year at which the proposed configuration intersection is to fail between 2020 and 2030 using a traffic growth rate of 3% p.a. This showed that the intersection is predicted to fail (LOS E) by 2024 during the AM peak and by 2030 during the PM peak, highlighting that the proposal extends the life of the current intersection even with the Stage 1 development in place.

It is noted that the future staging of the entire Walker Corporation site includes additional grade separated interchanges along Picton Road for access which would reduce pressure on the Picton Road / Pembroke Parade intersection and allow it to continue to function at an acceptable level of service.

#### ALTERNATE INTERSECTION LAYOUT

An alternative layout for the intersection was tested that included full signalisation, providing two full length through lanes, one short through lane for approximately 120 meters, and one right turn lane for approximately 50 meters in each

direction along Picton Road. This is shown schematically in Figure 3.2. The results indicated that this configuration is predicted to perform satisfactorily (LOS D) by 2030.

The detailed SIDRA results are included in Appendix E.

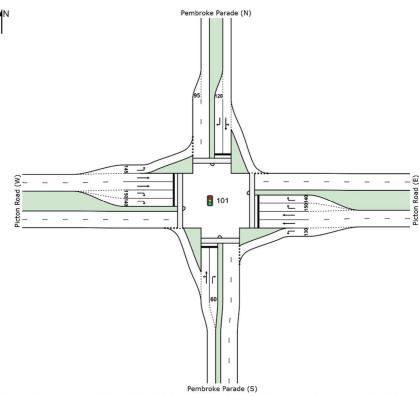


Figure 3.1 Picton Road / Pembroke Parade intersection conceptual layout

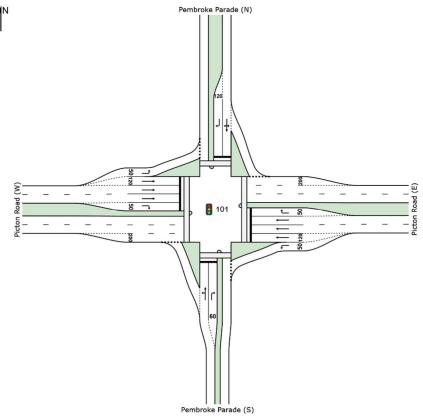


Figure 3.2 Picton Road / Pembroke Parade intersection, alternate layout

#### 3.1.5.2 HUME MOTORWAY INTERCHANGE

The Hume Motorway / Picton Road interchange was modelled using the Network Assessment component of SIDRA Intersection 7.0 for each of the four scenarios. The interchange was tested with the existing configuration as shown in Figure 3.3.

#### SCENARIO A AND C (BINGARA GORGE ONLY)

Under the existing configuration, the results showed that the Hume Motorway will perform satisfactorily (LOS D) during the AM peak by the opening year, but fail (LOS F) during the AM peak by the 10-year horizon, without any development at the Walker Corporation owned property. This is due to the ongoing build-out of the Bingara Gorge development and background traffic growth. Results show unsatisfactory queues on both northbound and southbound off-ramps, northbound on-ramp, and westbound traffic along Picton Road. A failure assessment in SIDRA was conducted to estimate the year at which the proposed configuration intersection is to fail between 2020 and 2030 using a traffic growth rate of 3% p.a. This showed that the intersection is predicted to fail (LOS E) by 2023 during the AM peak hour.

#### SCENARIO B AND D (BINGARA GORGE + WILTON SOUTH EAST PRECINCT STAGE 1)

Under this general configuration, the interchange is predicted to approach failure (LOS E) in the AM peak. This is due to unsatisfactory queues on both northbound and southbound off-ramps, and westbound traffic along Picton Road.

#### ALTERNATE INTERCHANGE LAYOUT

An alternative layout for the interchange was tested that maintains the width of the bridge / overpass at Hume Highway but provides an additional short lane on Picton Road at the approach to the intersections, as well as an additional short lane on the NB ramps, and the SB off-ramp. This is shown schematically in Figure 3.4.

The SIDRA assessment indicated that the proposed configuration is predicted to perform satisfactorily (LOS D or better) during both the AM and PM peak hours for the opening year (2020). However, in 2030 it is predicted to fail (Scenario D) during the AM and PM peak periods.

An assessment of the expected failure year was undertaken to determine the implication of the upgrade. It was found that the inclusion of the upgrade with the Wilton Road Stage 1 development meant that the interchange would operate satisfactorily until 2026. This indicates that the proposed interim amendment to the interchange, in combination with the construction of Stage 1 of Wilton South East Precinct, would provide a longer design life than the current situation.

The detailed SIDRA results are included in Appendix E.

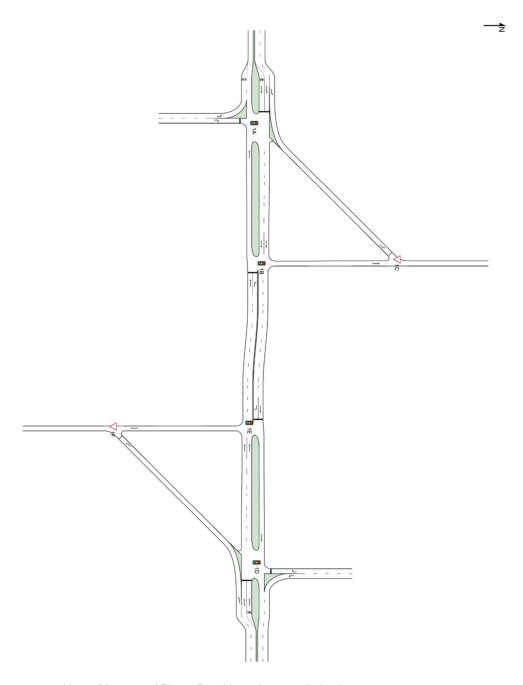


Figure 3.3 Hume Motorway / Picton Road interchange existing layout

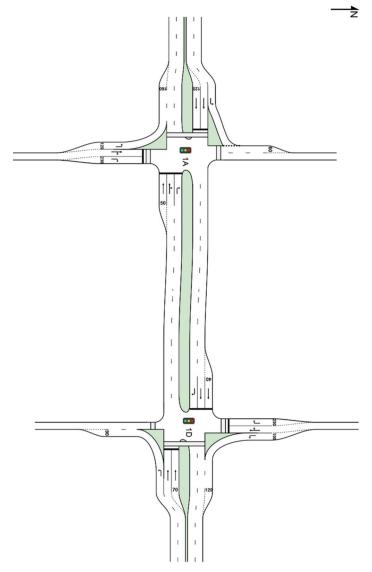


Figure 3.4 Picton Road / Hume Highway intersection alternate layout

#### 3.1.6 CONCLUSIONS

Based on the information supplied and the assumptions made, the following conclusions are reached:

#### PICTON ROAD / PEMBROKE PARADE INTERSECTION:

- Scenario A and C (Bingara Gorge only): The intersection, in its current unsignalised configuration, is predicted to fail by the opening year (2020) during both peaks even without the Walker Corporation development traffic.
- Scenario B and D (Bingara Gorge + Wilton South East Precinct Stage 1): The intersection with the proposed upgrades is predicted to perform satisfactorily with the Walker Corporation development traffic in the opening year during both peak periods, but fail by the 10-year horizon (2030) during the AM peak.
- An alternate layout to the intersection was tested and is predicted to perform satisfactorily under Scenario B and D traffic, accommodating all development traffic related to Stage 1.

#### HUME MOTORWAY / PICTON ROAD INTERCHANGE:

- Scenario A and C (Bingara Gorge only): The interchange is predicted to perform satisfactorily by the opening year but fail by the 10-year horizon during the AM peak period, without the Walker Corporation development traffic.
- Scenario B and D (Bingara Gorge + Wilton South East Precinct Stage 1): The interchange is predicted to fail with the Walker Corporation development traffic by the opening year during the AM peak.
- Alternate layout: An alternate layout to the interchange was tested for each of the four scenarios. The assessment confirmed that with or without the proposed upgrade, the interchange would fail by 2030. However, the upgrade means that the interchange performs satisfactorily (at worse, a LOS C) with the Walker Corporation development in the opening year (2020). The upgrade also means that the interchange would be able to operate for an additional three years before failure in 2027, whereas it would have otherwise failed in 2024.

#### 3.2 PUBLIC TRANSPORT IMPACT ASSESSMENT

The proposed Stage 1 development will not result in an impact to the existing public transport network. With the progressing development of both the Bingara Gorge and the Wilton South East Precinct sites, there may be opportunity to review the current bus services to/from Wilton both in terms of service frequency and route coverage. Stage 1 is being designed to allow buses to traverse the site, and bus stops to be installed.

#### 3.3 ACTIVE TRANSPORT IMPACT ASSESSMENT

The proposed Stage 1 development will not result in an impact to the existing active transport network. As part of the Wilton South East Precinct Stage 1 development, a quality pedestrian network will be delivered that provides for connections through the Stage 1 site (and allows for onward connections to future stages). In particular, the provision of pedestrian and cycle links to the Picton Road / Pembroke Parade signalised intersection will allow onward connection to the existing/proposed network in the Bingara Gorge and Wilton areas as shown in Figure 2.4.

### 4 INTERNAL ROAD HIERARCHY

The Wollondilly Shire Council (WSC) specifies the road hierarchy requirements within the WSC Design Specifications (Table D.1.5 Characteristics of Urban Roads in Wollondilly Shire Council Road Networks) and are reproduced for ease of reference in Table 4.1. The extract from the Design Specification, along with the applicable cross sections, is provided in Appendix F.

Table 4.1 Council Road Hierarchy

ROAD CATEGORY	ROAD FUNCTION	ROAD RESERVE WIDTH (M)	CARRIAGEWAY WIDTH (M)	VERGE WIDTH (M) L/R	FOOTPATH PROVISION (M) L/R	MAXIMUM SPEED (KM PER HOUR)	MAXIMUM NUMBER OF LOTS
Cat F	Commercial / Industrial	21.0 (22.0 with 2.5m shared path)	13.0	4.0 / 4.0	1.5 footpath / 2.5 shared path	60/80	N/A
Cat. E	Major Collector / Bus Route	21.0 (22.0 with 2.5m shared path)	13.0	4.0 / 4.0	1.5 footpath / 2.5 shared path	60	>800
Cat. D3	Major Collector Urban Residential	18.0 (19.0 with 2.5m shared path)	11.0	3.5 / 3.5	1.5 footpath / 2.5 shared path	50	800
Cat. D2	Minor Collector and Urban Residential	18.0 (19.0 with 2.5m shared path)	10.0	4.0 / 4.0	1.5 footpath / 2.5 shared path	50	400
Cat D1	Urban Residential	15.0	8.0	3.5 / 3.5	1.5 footpath / 2.5 shared path	50	100
Cat C	Urban Residential Cul-de-Sac	15.0	8.0	3.5 / 3.5	1.5 footpath / 2.5 shared path	40	30
Cat B	Urban Residential Cul-de-Sac	13.0	6.0	3.5 / 3.5	No	30	10

Note. A 2.5m shared path/cycleway requires a verge width of 4.5m. If required, this shall be provided by increasing the road reserve.

The road hierarchy proposed by Walker Corporation for the Wilton South East Precinct development site has been summarised in Table 4.2. The corresponding council road hierarchy category has also been included for each Wilton South East Precinct road category. The proposed road hierarchy aligns with the WSC design requirements.

Table 4.2 Wilton Road Hierarchy

ROAD CATEGORY	ROAD FUNCTION	ROAD RESERVE WIDTH (M)	CARRIAGEWAY WIDTH (M)	VERGE WIDTH (M) L/R	FOOTPATH PROVISION (M) L/R
Collector Street Type 1	Collector Street - Limited Access	22.0	13.0	4.5 / 4.5	2.5 / 2.5
Collector Street Type 2	Collector Street – Main Street	28.5	14.0 + 2.5m median	6.0 / 6.0	6.0 / 6.0
Collector Street Type 3	Collector Street – Feature Entrance	32.0	12.0 + 7.0m median	6.5 / 6.5	1.5 / 1.5
Collector Street Type 4	Collector Street – Local	20.0	12.0	4.5 / 3.5	2.5 / 1.5
Local Street Type 1	Local Street	15.0	8.0	3.5 / 3.5	1.5 / 1.5
Local Street Type 2	Local Street – Key Pedestrian Route – shared path 1 side	16.0	8.0	4.5 / 3.5	2.5 / 1.5
Local Street Type 3	Local Street – Adjacent Open Space	13.0	7.0	2.0 (adjacent open space) / 3.5	0.0 / 1.5  Footpath on left in open space, not road reserve.
Local Street Type 4	Local Street – Adjacent Collector Road	12.0	6.0	2.5 / 2.0	0.0 / 1.5
Laneway	Access Street	10.0	5.0	2.5 / 2.5	0.0 / 0.0

The indicative application of this road hierarchy to the key links within the Stage 1 development has been shown in Figure 4.1.

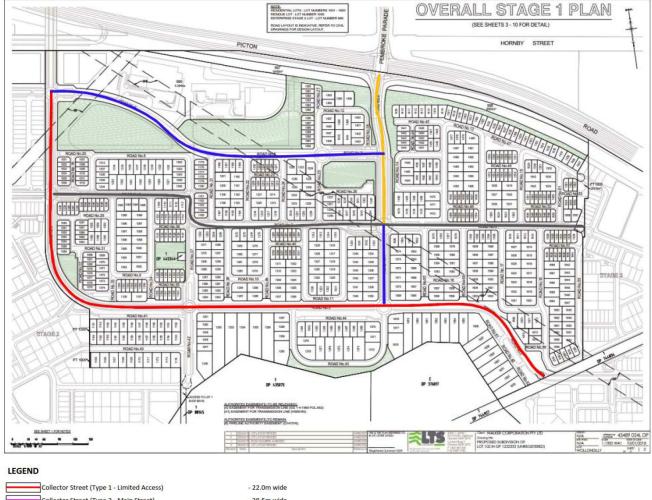




Figure 4.1 Indicative road hierarchy (key links) for Stage 1

In terms of the overall road layout for the Wilton South East Precinct development (as shown in Figure 1.2), the following is noted:

- The general form for intersections along collector streets is to be a conventional 90 degree angle between approaches, however where this is not achievable, consideration of sight lines across potential verge/lot obstacles will be given.
- Spacing of staggered T-intersections will be a minimum of 40m (to ensure queuing cars do not obstruct each other or sight lines)
- To discourage 'rat running' on local streets, entry treatments or speed reduction devices may be implemented or alternatively application of a road closure to sever the through route

In relation to the Stage 1 road layout (Figure 1.3), the following is noted:

- Road 4 / / Road 7 intersection:
  - For the initial stages of the Wilton South East Precinct development, this intersection will operate satisfactorily (LOS A) as a left in-left out priority controlled intersection (subject to Austroads sight distance requirements being met) (forecast peak hour intersection volumes no greater than 350 vehicles per hour). The provision of a centre median along Road 4 will prevent right turns in and out of Road 7, which will also address any potential rat-run activity along Road 7 and Road 6.
- Road 4 / Road 3 / Road 43 intersection:
  - For Stage 1 of the Wilton South East Precinct development this intersection will operate satisfactorily (LOS A) as a priority controlled roundabout (forecast peak hour intersection volumes no greater than 200 vehicles per hour), however will be upgraded to a signalised intersection to support later development stages (timing not yet confirmed).
- Left in/left out control (with median treatment) will be provided at the following locations due to their proximity to adjacent intersections:
  - Eastern end of Road 35 and Road 36
  - Southern end of Road 19
  - Southern end of Road 28
  - Eastern end of Road 41.
- Entrance and Collector Street Type 4 Local) and Road 3 (Collector Street Type 1 Limited Access) has been undertaken to confirm each road is able to accommodate the forecast daily traffic volumes for the full Wilton Junction South East Precinct development. Peak hour link volumes for Road 4 and Road 3 have been extracted from the TMAP Aimsun model, and have been converted to daily traffic flows through the application of an industry accepted forecasting approach (AM + PM x 5 = Daily Volume). The resultant volumes indicated daily volumes in the order of up to 6,300 vehicles per day for Road 4 and up to 8,000 vehicles per day for Road 3. While the WSC Design Specifications do not specify volume requirements for the road hierarchy, our experience with working on similar projects for other councils suggests that the designation as Collector Street Type 3 and 1 is appropriate for the higher trafficked portions of Road 4 and Road 3. The designation of the portion of Road 4 located south of Road 2/5 as a Collector Type 4 is also considered appropriate (as the volumes will decrease with traffic being routed between Road 4 and Road 2/5).

### 5 CONCLUSIONS

This Traffic Report has investigated the transport network related impacts associated with Stage 1 of the proposed Wilton South East Precinct project on behalf of Walker Corporation.

The traffic assessment investigated the potential impacts of the development on the Picton Road / Pembroke Parade intersection and the Hume Motorway / Picton Road interchange. The outcomes are summarised below:

#### PICTON ROAD / PEMBROKE PARADE INTERSECTION:

- Scenario A and C (Bingara Gorge only): The intersection, in its current unsignalised configuration, is predicted to fail by the opening year (2020) during both peaks even without the Walker Corporation development traffic.
- Scenario B and D (Bingara Gorge + Wilton South East Precinct Stage 1): The intersection with the proposed upgrades is predicted to perform satisfactorily with the Walker Corporation development traffic in the opening year during both peak periods, but fail by the 10-year horizon (2030) during the AM peak.
- An alternate layout to the intersection was tested and is predicted to perform satisfactorily under Scenario B and D traffic, accommodating all development traffic related to Stage 1.

#### HUME MOTORWAY / PICTON ROAD INTERCHANGE:

- Scenario A and C (Bingara Gorge only): The interchange is predicted to perform satisfactorily by the opening year but fail by the 10-year horizon during the AM peak period, without the Walker Corporation development traffic.
- Scenario B and D (Bingara Gorge + Wilton South East Precinct Stage 1): The interchange is predicted to fail with the Walker Corporation development traffic by the opening year during the AM peak.
- Alternate layout: An alternate layout to the interchange was tested for each of the four scenarios. The assessment confirmed that with or without the proposed upgrade, the interchange would fail by 2030. However, the upgrade means that the interchange performs satisfactorily (at worse, a LOS C) with the Walker Corporation development in the opening year (2020). The upgrade also means that the interchange would be able to operate for an additional three years before failure in 2027, whereas it would have otherwise failed in 2024.

It is acknowledged that the proponent has entered into a Voluntary Planning Agreement to fund a number of transport network upgrades and improvements in the Wilton area, which will assist in addressing the above network performance issues.

The Stage 1 development will have no adverse impact on the public transport or active transport network. The development of the Wilton South East Precinct area presents the opportunity to improve public transport services to the Wilton area (through service/route changes) as well as enhance the active transport network.

The proposed road hierarchy for the Wilton South East Precinct development (including Stage 1) aligns with the WSC Design Specifications. A review of the suitability of the proposed hierarchy classification of Road 4 (Collector Street Type 3 Feature Entrance and Collector Street Type 4 Local) and Road 3 (Collector Street Type 1 Limited Access) has been undertaken to confirm each road is able to accommodate the forecast daily traffic volumes for the full Wilton Junction South East Precinct development. Peak hour link volumes are forecast to be in the order of up to 6,300 vehicles per day for Road 4 and up to 8,000 vehicles per day for Road 3. The designation as Collector Street Type 3 and 1 is appropriate for the higher trafficked portions of Road 4 and Road 3. The designation of the portion of Road 4 located south of Road 2/5 as a Collector Type 4 is also considered appropriate (as the volumes will decrease with traffic being routed between Road 4 and Road 2/5).

### 6 LIMITATIONS

#### 6.1 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

#### 6.2 REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the client and no other party. WSP assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of WSP or for any loss or damage suffered by any other party in relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

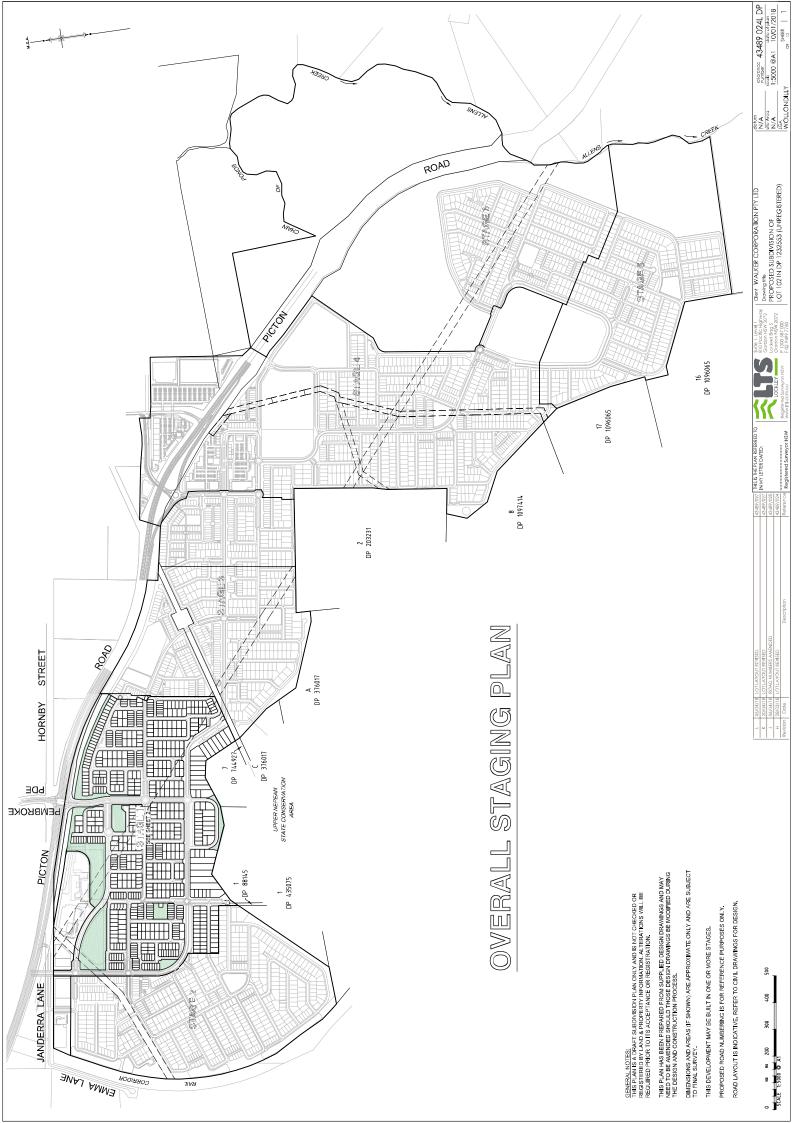
#### 6.3 OTHER LIMITATIONS

WSP will not be liable to update or revise the report to take into account any events, emergent circumstances or facts occurring or becoming apparent after the date of the report.

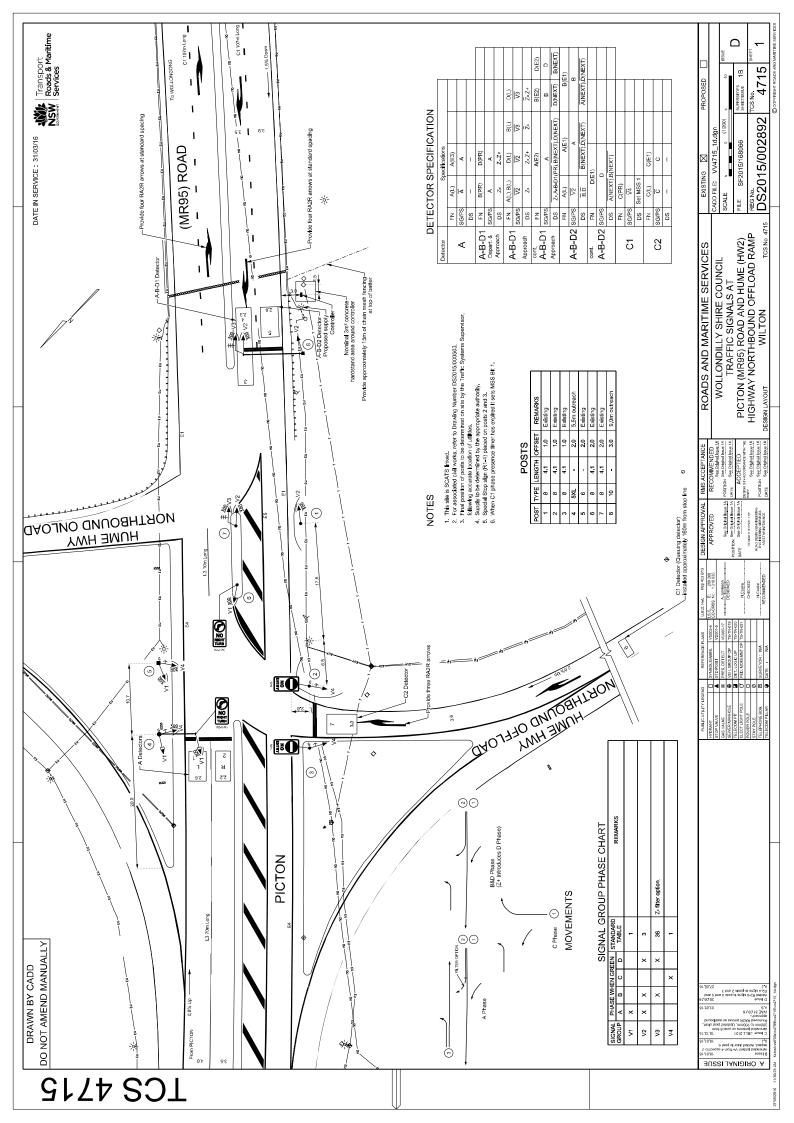
The scope of services did not include any assessment of the title to nor ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

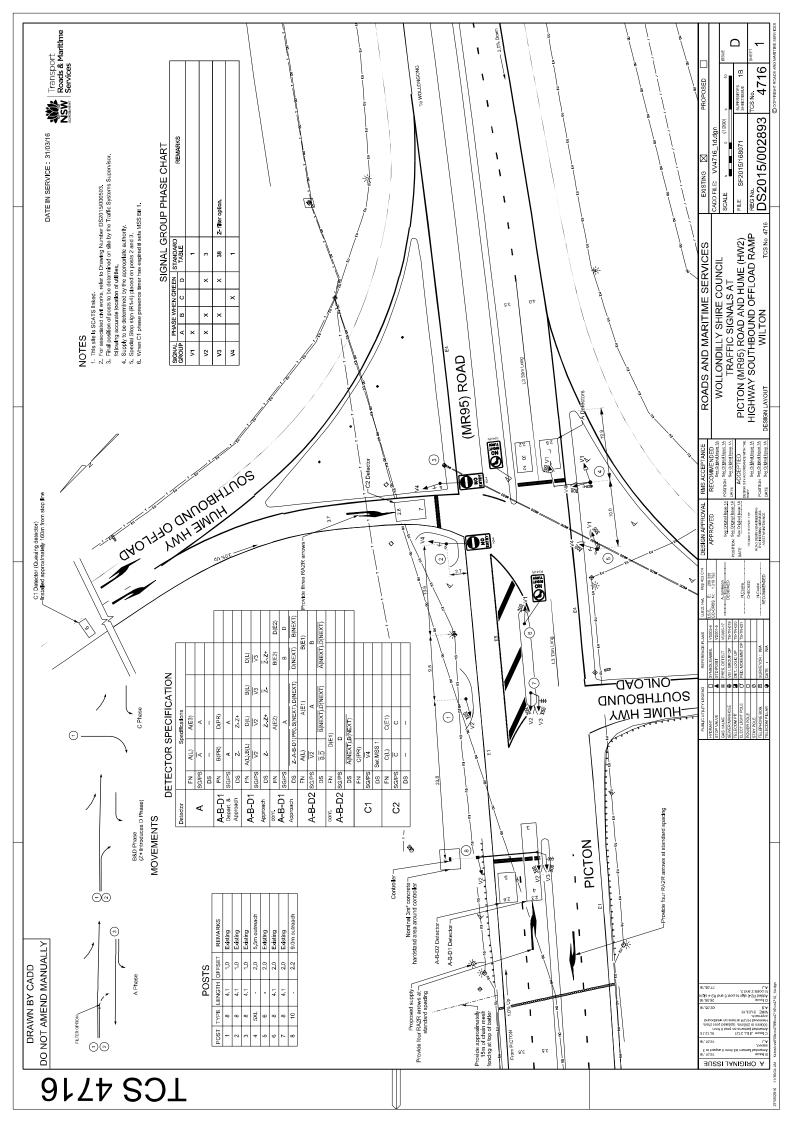
# APPENDIX A SUPPLIED INFORMATION











# APPENDIX B DEVELOPMENT STAGING



# B1 ESTIMATED DWELLINGS (BINGARA GORGE)

Table 3.1																	
Wilton - estimated dwelling take-up  Estimate dwelling take up																	
Development	Total lots Est.	complete	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Wilton village	300	300															
Bingara Gorge	1,800	450	150	150	150	200	200	200	200	100	0	0	0	0	0	0	C
Bradcorp	5,250	0	0	0	0	100	100	150	200	200	200	200	200	200	250	250	250
Governors Hill	1,000	0	0	0	0	100	100	100	100	100	100	100	150	150	0	0	(
Other owners	1,835	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C
Additional	4,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C
Total	17,585	750															
Population *Assumed 3 persons   Source: MacroPlan Di			450	750	825	1,350 Wilton		1,620 e 3.1 d dwellin	1,500	1,500	1,500	1,500	1,650	1,650	1,350	1,350	1,350
						Est	imate dw	elling tak	e up								
Development	Total lots Est.	complete	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Wilton village	300	300															
Bingara Goorge	1,800	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C
Bradcorp	5,250	0	250	250	250	250	250	250	250	250	300	300	200	150	0	0	C
	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	(
Governors Hill						404	404	184	184	184	184	184	184	0	0	0	C
Governors Hill Other owners	1,835	0	0	184	184	184	184	184	184	104	104	104	10-	U	U	U	·
	1,835 4,000	0	0	184 0	184 0	184 0	184	184	184	0	0	0	0	230	230	230	230

1,301

1,451

1,451

1,151

1,140

Project No 2197003A Wilton South East Precinct Stage 1 Residential Subdivision Traffic Report Walker Corporation

1,200

1,301

1,301

1,301

1,301

1,301

1,301

Population

690

690

690

# B2 ESTIMATED DWELLINGS (WALKER CORPORATION)

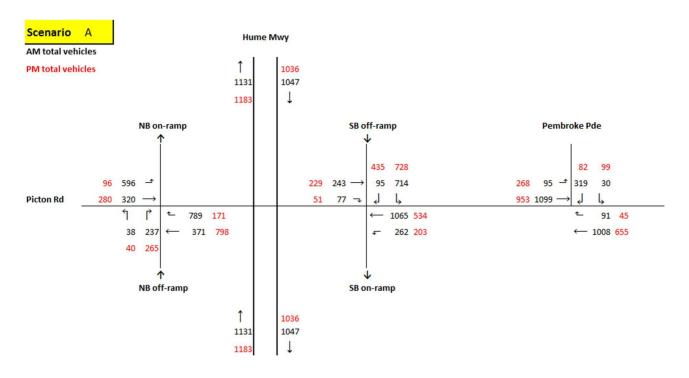
Allotment Type	Area	Stage 1
Terrace Small	180 m2	87
Terrace Large	200 m2	106
Villa Small	275 m2	47
Villa Medium	315 m2	65
Villa Large	350 m2	75
Courtyard Small	400 m2	48
Courtyard Hillside	435 m2	19
Courtyard Large	450 m2	9
Traditional Small	480 m2	132
Traditional Medium	540 m2	71
Traditional Large	600 m2	34
Total		693

Envisaged floor area of proposed employment area – 13,000 m<sup>2</sup>

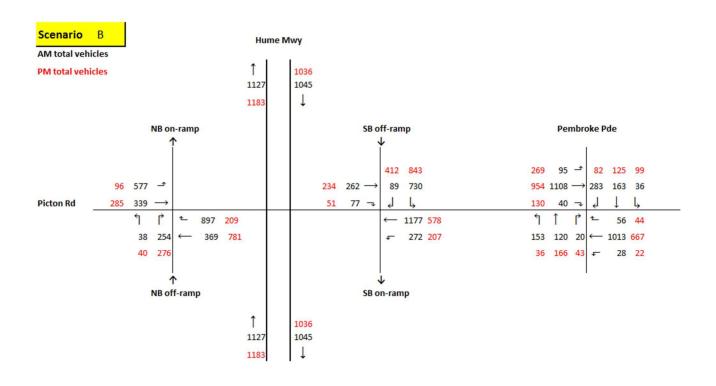
# APPENDIX C PROJECTED TRAFFIC VOLUMES



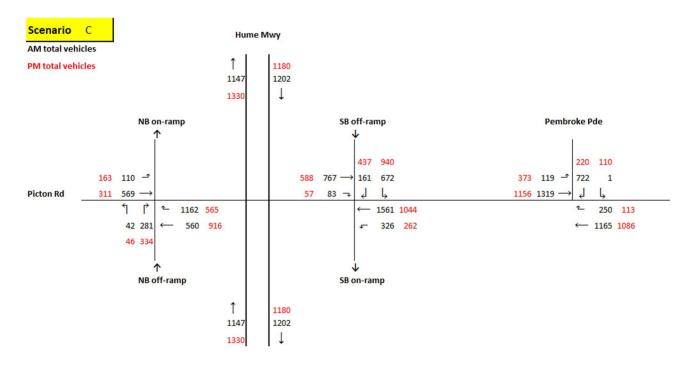
# C1 SCENARIO A



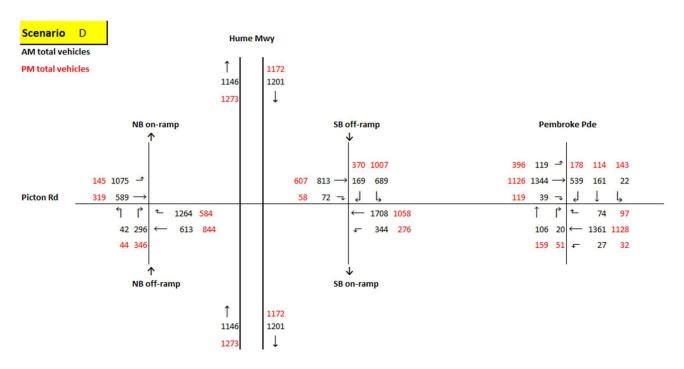
# C2 SCENARIO B



# C3 SCENARIO C



# C4 SCENARIO D



# **APPENDIX D**

TRIP INTERNALISATION CALCULATIONS



# **D1 TRIP INTERNALISATION**

## SCHOOL TRIPS

- School enrolments: 330 (estimated based on Wilton Public School)
- Students per car: 1.5
- Trips:  $300 \times 1.5 = 220$
- Percentage of trips returning home: 50%
- Total trips:  $220 + (220 \times 50\%) = 330$

# JOB TRIPS

- Jobs in Walker Corporation land: 80
- Jobs in Bingara Gorge: 160
- School jobs: 25
- Total jobs: 80 + 160 + 25 = 265
- Percentage of employees living in Wilton: 20%
- Total trips:  $265 \times 20\% = 53$

## TOTAL TRIPS

- Homes in Walker Corporation land: 1800
- Homes in Bingara Gorge: 701
- Trip rate: 0.7
- Total trips:  $(1800 + 701) \times 0.7 = 1751$

**Internalisation** = (School trips + Job trips) / (Total trips) = (330 + 53) / 1751 = 22%

# **APPENDIX E**

SIDRA RESULTS



# E1 PICTON ROAD / PEMBROKE PARADE

The AM peak period was shown to be the critical peak, therefore only these results are included.

# E1.1 SCENARIO A

# LANE LEVEL OF SERVICE

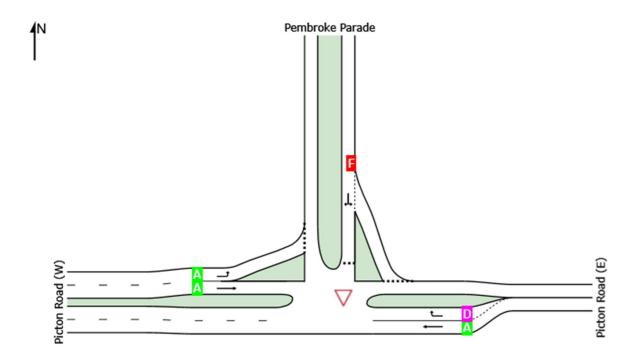
#### Lane Level of Service

Site: 101 [2020 1100 - AM 7.00-8.00]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

#### **All Movement Classes**

	East	North	West	Intersection
LOS	NA	F	Α	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY

Site: 101 [2020 1100 - AM 7.00-8.00]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

Giveway / Tie	eia ( i wo-vv	ay)											
Lane Use an	d Perform	ance											
	Demand Total veh/h	HV	Cap.	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back Veh	of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Picton R	Road (E)												
Lane 1	1061	17.0	1756	0.604	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	96	30.0	140	0.682	100	55.3	LOS D	2.8	24.6	Short	200	0.0	NA
Approach	1157	18.1		0.682		4.7	NA	2.8	24.6				
North: Pembro	oke Parade												
Lane 1	367	9.3	51	7.142	100	5559.0	LOS F	217.1	1641.1	Full	500	0.0	100.0
Approach	367	9.3		7.142		5559.0	LOS F	217.1	1641.1				
West: Picton I	Road (W)												
Lane 1	100	16.7	1366	0.073	100	6.2	LOS A	0.3	2.4	Full	500	0.0	0.0
Lane 2	1157	19.4	1731	0.668	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1257	19.2		0.668		0.7	LOS A	0.3	2.4				
Intersection	2781	17.4		7.142		736.6	NA	217.1	1641.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

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.

# LANE LEVEL OF SERVICE

#### Lane Level of Service

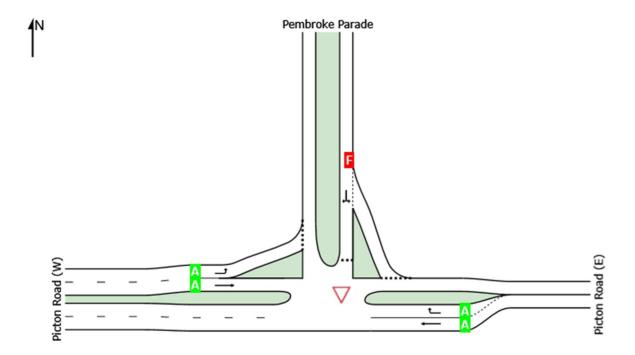


▽Site: 101 [2020 1100 - PM 3.45-4.45]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

#### **All Movement Classes**

	East	North	West	Intersection
LOS	NA	F	Α	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY

Site: 101 [2020 1100 - PM 3.45-4.45]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

Giveway / Tie	zia ( i wo-vv	ay)											
Lane Use an	d Perform	ance											
	Demand Total veh/h	HV	Cap.	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back Veh	of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Picton R	load (E)												
Lane 1	689	14.8	1778	0.388	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	47	0.0	414	0.115	100	13.9	LOS A	0.4	2.8	Short	200	0.0	NA
Approach	737	13.9		0.388		0.9	NA	0.4	2.8				
North: Pembro	oke Parade												
Lane 1	191	30.2	114	1.669	100	650.1	LOS F	53.9	475.1	Full	500	0.0	<mark>3.5</mark>
Approach	191	30.2		1.669		650.1	LOS F	53.9	475.1				
West: Picton F	Road (W)												
Lane 1	282	7.4	1516	0.186	100	5.9	LOS A	0.9	6.4	Full	500	0.0	0.0
Lane 2	1003	11.7	1813	0.553	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1285	10.7		0.553		1.4	LOS A	0.9	6.4				
Intersection	2213	13.4		1.669		57.1	NA	53.9	475.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

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.

# E1.2 SCENARIO B

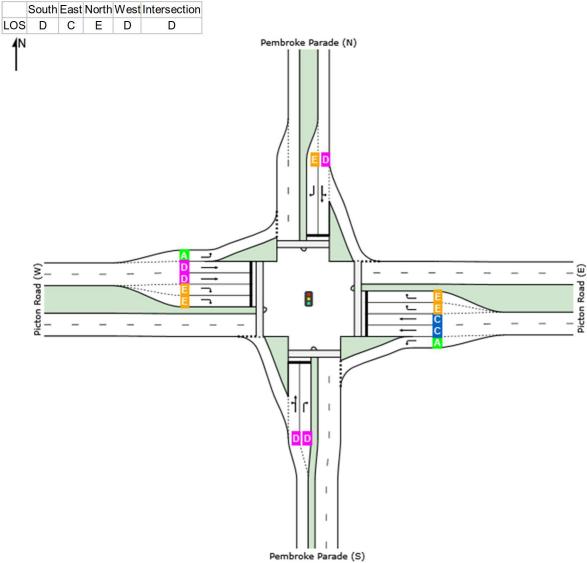
# LANE LEVEL OF SERVICE

Site: 101 [2020 1100+701 - AM 7.00-8.00 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

#### **All Movement Classes**



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab) . Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

## **LANE SUMMARY**

# Site: 101 [2020 1100+701 - AM 7.00-8.00 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

				010 111	10 – 1	10 0000110	o (Optiii	Tarri Oyolo	11110 101	ii iii ii ii dii	1 Dolay)		
Lane Use	and Perf	orman	се										
	Demand	Flows		Deg.	Lane	Average	I evel of	95% Back	of Queue	Lane	I ane	Can	Prob.
	Total	HV	Cap.	Satn	Util.		Service	Veh			Length		
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Pen	nbroke Pai	rade (S	5)										
Lane 1	287	0.0	375	0.766	100	51.5	LOS D	13.3	93.1	Full	500	0.0	0.0
Lane 2	21	0.0	287	0.073	100	48.8	LOS D	1.0	6.8	Short	60	0.0	NA
Approach	308	0.0		0.766		51.3	LOS D	13.3	93.1				
East: Picto	n Road (E	)											
Lane 1	27	0.0	1469	0.019	100	6.9	LOS A	0.2	1.4	Short	130	0.0	NA
Lane 2	533	17.0	670	0.795	100	35.2	LOS C	26.7	214.2	Full	500	0.0	0.0
Lane 3	533	17.0	670	0.795	100	35.2	LOS C	26.7	214.2	Full	500	0.0	0.0
Lane 4	20	30.0	83	0.244	53 <sub>6</sub>	63.8	LOS E	1.1	9.9	Short	150	0.0	NA
Lane 5	39	30.0	83	0.463	100	65.1	LOS E	2.2	19.3	Short	140	0.0	NA
Approach	1153	17.3		0.795		36.0	LOS C	26.7	214.2				
North: Per	nbroke Par	ade (N	)										
Lane 1	209	2.3	370	0.566	100	48.4	LOS D	10.0	71.1	Full	500	0.0	0.0
Lane 2	298	9.0	333	0.894	100	66.1	LOS E	18.6	140.1	Short	120	0.0	NA
Approach	507	6.2		0.894		58.8	LOS E	18.6	140.1				
West: Picto	on Road (V	V)											
Lane 1	100	16.7	1321	0.076	100	7.0	LOS A	0.7	5.8	Short	145	0.0	NA
Lane 2	583	19.4	661	0.882	100	45.5	LOS D	34.3	280.2	Full	500	0.0	0.0
Lane 3	583	19.4	661	0.882	100	45.5	LOS D	34.3	280.2	Full	500	0.0	0.0
Lane 4	21	0.0	101	0.208	100	62.5	LOS E	1.1	8.0	Short	150	0.0	NA
Lane 5	21	0.0	101	0.208	100	62.5	LOS E	1.1	8.0	Short	140	0.0	NA
Approach	1308	18.6		0.882		43.1	LOS D	34.3	280.2				
Intersection	3277	14.5		0.894		43.8	LOS D	34.3	280.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

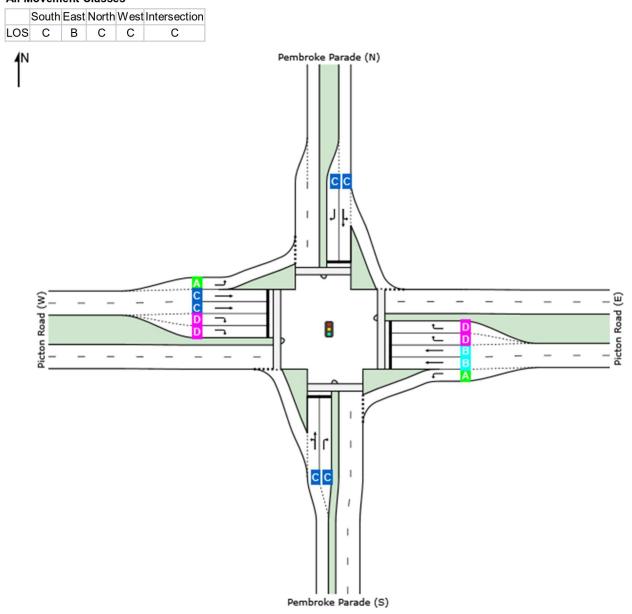
6 Lane under-utilisation due to downstream effects

# LANE LEVEL OF SERVICE

# Site: 101 [2020 1100+701 - PM 3.45-4.45 +school]

Picton Road / Pembroke Parade upgrade Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

#### **All Movement Classes**



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

## **LANE SUMMARY**



# Site: 101 [2020 1100+701 - PM 3.45-4.45 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

	100 111110 10		- ,			(-1-							
Lane Use a	nd Perforn	nance											
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back	of Queue	Lane	Lane	Can	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Pemb	roke Parado	e (S)											
Lane 1	213	0.0	339	0.626	100	41.8	LOS C	8.5	59.7	Full	500	0.0	0.0
Lane 2	45	0.0	310	0.146	100	40.8	LOS C	1.7	12.1	Short	60	0.0	NA
Approach	258	0.0		0.626		41.6	LOS C	8.5	59.7				
East: Picton	Road (E)												
Lane 1	23	0.0	1426	0.016	100	6.8	LOS A	0.1	1.0	Short	125	0.0	NA
Lane 2	351	14.8	593	0.592	100	27.1	LOS B	12.9	102.2	Full	500	0.0	0.0
Lane 3	351	14.8	593	0.592	100	27.1	LOS B	12.9	102.2	Full	500	0.0	0.0
Lane 4	13	0.0	124	0.109	416	50.5	LOS D	0.6	4.1	Short	140	0.0	NA
Lane 5	33	0.0	124	0.265	100	51.5	LOS D	1.5	10.3	Short	135	0.0	NA
Approach	772	13.5		0.592		28.0	LOS B	12.9	102.2				
North: Pemb	roke Parade	e (N)											
Lane 1	236	22.1	305	0.772	100	40.4	LOS C	9.5	78.9	Full	500	0.0	0.0
Lane 2	86	6.3	296	0.291	100	42.1	LOS C	3.4	25.2	Short	110	0.0	NA
Approach	322	17.9		0.772		40.9	LOS C	9.5	78.9				
West: Picton	Road (W)												
Lane 1	283	7.4	1331	0.213	100	7.4	LOS A	2.3	17.4	Short	130	0.0	NA
Lane 2	502	11.7	604	0.831	100	35.8	LOS C	22.9	176.2	Full	500	0.0	0.0
Lane 3	502	11.7	604	0.831	100	35.8	LOS C	22.9	176.2	Full	500	0.0	0.0
Lane 4	68	0.0	124	0.553	100	53.0	LOS D	3.2	22.1	Short	145	0.0	NA
Lane 5	68	0.0	124	0.553	100	53.0	LOS D	3.2	22.1	Short	135	0.0	NA
Approach	1424	9.7		0.831		31.8	LOS C	22.9	176.2				
Intersection	2776	10.8		0.831		32.7	LOS C	22.9	176.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Lane under-utilisation due to downstream effects

#### E1.3 SCENARIO C

# LANE LEVEL OF SERVICE

#### Lane Level of Service

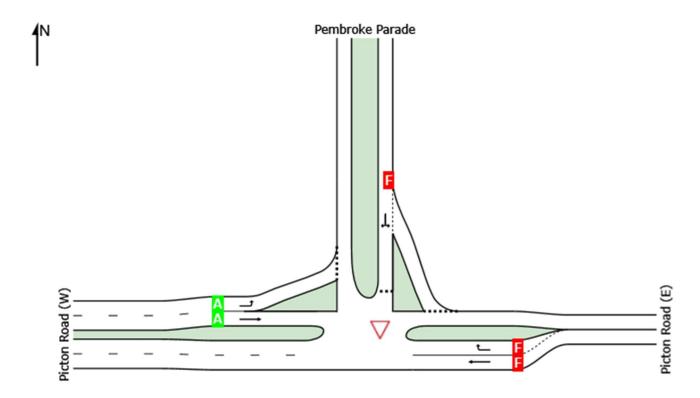


Site: 101 [2030 1800 - AM 7.00-8.00]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

#### **All Movement Classes**

	East	North	West	Intersection
LOS	NA	F	Α	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY

Site: 101 [2030 1800 - AM 7.00-8.00]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

Giveway / 11	eia ( i wo-vi	ray)											
Lane Use ar	nd Perform	nance											
	Demand Total veh/h	HV	Cap.	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back Veh	of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Picton F	Road (E)												
Lane 1	1226	17.0	254	4.829	100	NaN	LOS F	683.9	5486.1	Full	500	0.0	100.0
Lane 2	263	30.0	40	6.515	100	5008.5	LOS F	156.3	1375.5	Short	200	0.0	NA
Approach	1489	19.3		6.515		NaN	NA	683.9	5486.1				
North: Pembr	oke Parade												
Lane 1	761	9.0	9	85.140	100	75775.9	LOS F	670.4	5055.1	Full	500	0.0	100.0
Approach	761	9.0		85.140		75775.9	LOS F	670.4	5055.1				
West: Picton	Road (W)												
Lane 1	125	16.7	1121	0.112	100	7.1	LOS A	0.5	3.6	Full	500	0.0	0.0
Lane 2	1388	19.4	1731	0.802	100	0.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1514	19.2		0.802		0.9	LOS A	0.5	3.6				
Intersection	3764	17.2		85.140		NaN	NA	683.9	5486.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

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.

# LANE LEVEL OF SERVICE

#### Lane Level of Service

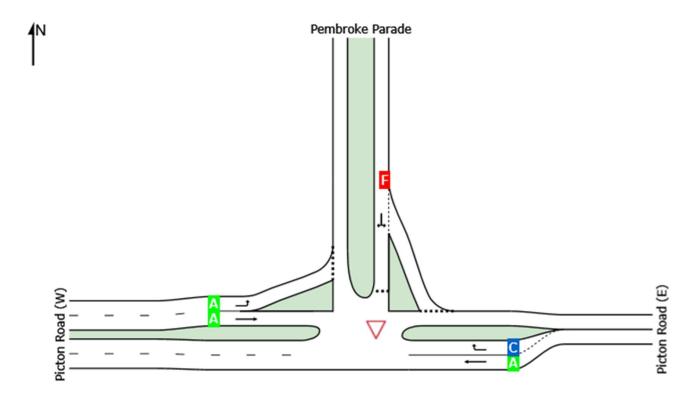


▽Site: 101 [2030 1800 - PM 3.45-4.45]

Picton Road / Pembroke Parade Existing Giveway / Yield (Two-Way)

#### **All Movement Classes**

	East	North	West	Intersection
LOS	NA	F	Α	NA



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY

Site: 101 [2030 1800 - PM 3.45-4.45]

Picton Road / Pembroke Parade Existing Giveway / Vield (Two-Way)

Giveway / Yie	eia (Two-vv	ay)											
Lane Use an	d Perform	ance											
	Demand Total veh/h	HV	Cap.	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back Veh	of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Picton R	load (E)												
Lane 1	1143	14.8	1778	0.643	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	119	0.0	220	0.541	100	30.8	LOS C	2.1	14.9	Short	200	0.0	NA
Approach	1262	13.4		0.643		3.1	NA	2.1	14.9				
North: Pembro	oke Parade												
Lane 1	347	20.9	38	9.124	100	7346.5	LOS F	217.2	1793.0	Full	500	0.0	100.0
Approach	347	20.9		9.124		7346.5	LOS F	217.2	1793.0				
West: Picton F	Road (W)												
Lane 1	393	7.4	1423	0.276	100	6.2	LOS A	1.4	10.2	Full	500	0.0	0.0
Lane 2	1217	11.7	1813	0.671	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1609	10.6		0.671		1.6	LOS A	1.4	10.2				
Intersection	3219	12.8		9.124		794.8	NA	217.2	1793.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

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.

#### E1.4 SCENARIO D

# LANE LEVEL OF SERVICE

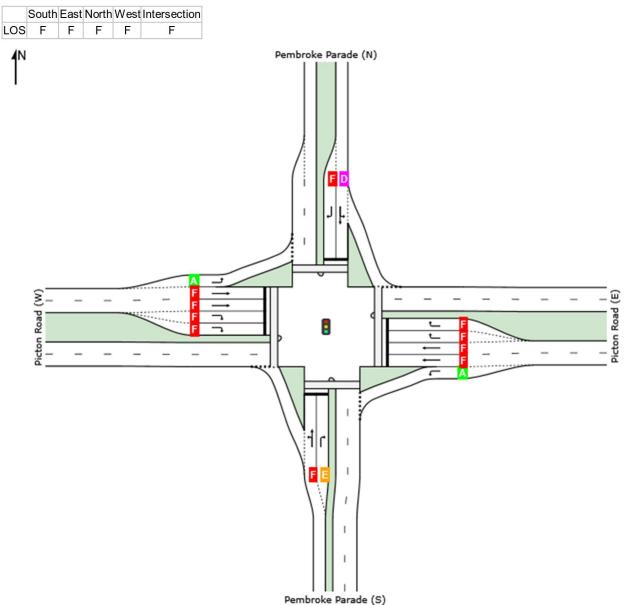


Site: 101 [2030 1800+701 - AM 7.00-8.00 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

#### **All Movement Classes**



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

## **LANE SUMMARY**

# Site: 101 [2030 1800+701 - AM 7.00-8.00 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

						· · ·				•			
Lane Use a	ind Perforn	nance											
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back	of Ougus	Lane	Lane	Con	Prob.
	Total	HV	Сар.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Caρ. Adj.	Block.
•	veh/h		veh/h	v/c	%	sec	CCIVICC	Ven	m	Coming	m	%	%
South: Pemb			VCII/II	V/C	70	300						/0	70
Lane 1	325	0.0	298	1.090	100	120.6	LOS F	38.1	266.4	Full	500	0.0	0.0
Lane 2	21	0.0	248	0.085	100	67.1	LOS E	1.4	9.5	Short	60	0.0	NA
Approach	346	0.0	240	1.090	100	117.3	LOS F	38.1	266.4	Onort	- 00	0.0	14/1
Арргоасп	340	0.0		1.000		117.5	2001	30.1	200.4				
East: Picton	Road (E)												
Lane 1	28	0.0	1479	0.019	100	7.0	LOS A	0.3	1.8	Short	130	0.0	NA
Lane 2	716	17.0	6351	1.128	100	192.9	LOS F	99.1	794.8	Full	500	0.0	<mark>47.5</mark>
Lane 3	717	17.0	6361	1.128	100	192.8	LOS F	99.3	796.2	Full	500	0.0	<mark>47.7</mark>
Lane 4	27	30.0	61	0.439	53 <sub>6</sub>	88.0	LOS F	2.1	18.3	Short	150	0.0	NA
Lane 5	51	30.0	61	0.834	100	94.6	LOS F	4.2	37.0	Short	140	0.0	NA
Approach	1539	17.4		1.128		184.3	LOS F	99.3	796.2				
North: Pemb	roke Parade	(N)											
Lane 1	220	1.3	579	0.380	100	54.3	LOS D	12.4	87.6	Full	500	0.0	<mark>26.5</mark> 8
Lane 2	567	9.0	487 <sub>1</sub>	1.166	100	233.2	LOS F	84.0	633.5	Short	120	0.0	NA
Approach	787	6.9		1.166		183.2	LOS F	84.0	633.5				
West: Picton	Road (W)												
Lane 1	125	16.7	1344	0.093	100	7.6	LOS A	1.4	10.9	Short	145	0.0	NA
Lane 2	691	19.4	6021	1.149	100	210.6	LOS F	99.9	816.0	Full	500	0.0	<mark>50.0</mark>
Lane 3	724	19.4	630 <sub>1</sub>	1.149	100	209.8	LOS F	104.4	852.3	Full	500	0.0	<b>54.1</b>
Lane 4	21	0.0	74	0.276	100	85.6	LOS F	1.6	10.9	Short	150	0.0	NA
Lane 5	21	0.0	74	0.276	100	85.6	LOS F	1.6	10.9	Short	140	0.0	NA
Approach	1581	18.7		1.149		190.9	LOS F	104.4	852.3				
Intersection	4254	14.5		1.166		181.1	LOS F	104.4	852.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

<sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

<sup>6</sup> Lane under-utilisation due to downstream effects

<sup>8</sup> Probability of Blockage has been set on the basis of a queue that overflows from a short lane.

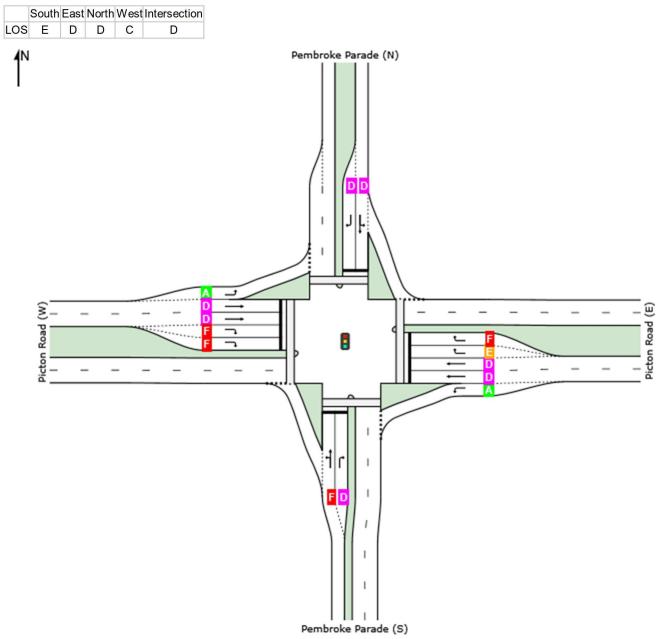
## LANE LEVEL OF SERVICE

# Site: 101 [2030 1800+701 - PM 3.45-4.45 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

#### **All Movement Classes**



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

## **LANE SUMMARY**



# Site: 101 [2030 1800+701 - PM 3.45-4.45 +school]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

	ixed Tillie ic		Cyolc I		. 20 300	orido (Opti	mann Oyo	,	minimo	oldy)			
Lane Use	and Perforr	nance											
	Demand Total	Flows HV	Сар.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back Veh	of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Per	broke Parad	e (S)											
Lane 1	251	0.0	299	0.838	100	73.6	LOS F	15.5	108.8	Full	500	0.0	0.0
Lane 2	54	0.0	279	0.193	100	54.4	LOS D	2.8	19.5	Short	60	0.0	NA
Approach	304	0.0		0.838		70.2	LOS E	15.5	108.8				
East: Pictor	n Road (E)												
Lane 1	34	0.0	1462	0.023	100	7.1	LOS A	0.3	2.0	Short	130	0.0	NA
Lane 2	592	14.8	678 1	0.873	100	46.1	LOS D	36.4	287.5	Full	500	0.0	0.0
Lane 3	595	14.8	682	0.873	100	46.2	LOS D	36.7	289.5	Full	500	0.0	0.0
Lane 4	35	0.0	93	0.379	53 <b>6</b>	69.2	LOS E	2.1	15.0	Short	150	0.0	NA
Lane 5	67	0.0	93	0.720	100	72.3	LOS F	4.2	29.7	Short	140	0.0	NA
Approach	1323	13.3		0.873		47.1	LOS D	36.7	289.5				
North: Pem	broke Parado	e (N)											
Lane 1	298	25.3	379	0.787	100	51.4	LOS D	15.9	135.0	Full	500	0.0	0.0
Lane 2	187	6.3	385	0.487	100	50.5	LOS D	9.7	71.8	Short	120	0.0	NA
Approach	485	18.0		0.787		51.0	LOS D	15.9	135.0				
West: Picto	n Road (W)												
Lane 1	388	7.4	1325	0.293	100	8.9	LOS A	5.6	41.7	Short	145	0.0	NA
Lane 2	593	11.7	695	0.853	100	43.0	LOS D	35.0	269.1	Full	500	0.0	0.0
Lane 3	593	11.7	695	0.853	100	43.0	LOS D	35.0	269.1	Full	500	0.0	0.0
Lane 4	63	0.0	93	0.674	100	71.5	LOS F	3.9	27.6	Short	150	0.0	NA
Lane 5	63	0.0	93	0.674	100	71.5	LOS F	3.9	27.6	Short	140	0.0	NA
Approach	1699	9.8		0.853		37.3	LOS C	35.0	269.1				
Intersection	3812	11.3		0.873		45.1	LOS D	36.7	289.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

<sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

<sup>6</sup> Lane under-utilisation due to downstream effects

#### E1.5 YEAR OF FAILURE (INTERSECTION LOS E)

# LANE LEVEL OF SERVICE

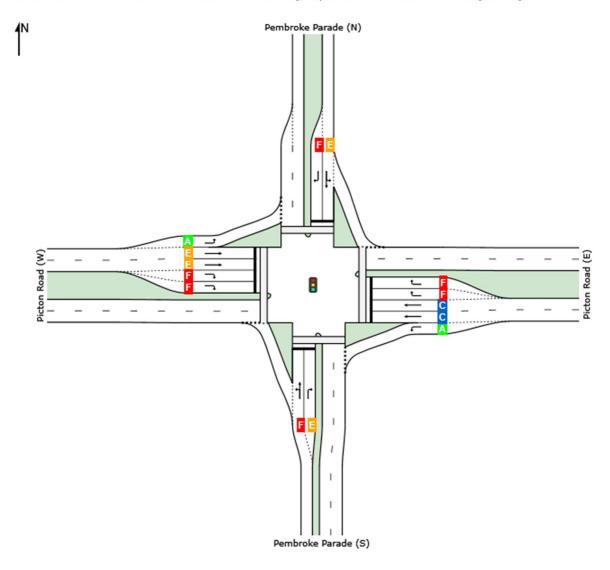
# Site: 101 [2020 1100+701 - AM 7.00-8.00 +school - Failure]

Picton Road / Pembroke Parade upgrade Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time) Design Life Analysis (Final Year): Results for 4 years

#### **All Movement Classes**

	South	East	North	West	Intersection
LOS	<b>F</b> 11	D	<b>F</b> 11	Е	E

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY



# Site: 101 [2020 1100+701 - AM 7.00-8.00 +school - Failure]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Design Life Analysis (Final Year): Results for 4 years

Lane Use a	nd Perforr	nance											
	Demand	Flows		Dea.	Lane	Average	Level of	95% Back	of Queue	Lane	Lane	Cap.	Prob.
	Total	HV	Сар.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Pemb	roke Parad	e (S)											
Lane 1	323	0.0	376	0.859	100	77.5	LOS F 11	23.0	160.7	Full	500	0.0	0.0
Lane 2	24	0.0	310	0.077	100	62.2	LOS E	1.5	10.2	Short	60	0.0	NA
Approach	347	0.0		0.859		76.4	LOS F11	23.0	160.7				
East: Picton	Road (E)												
Lane 1	31	0.0	1495	0.021	100	7.2	LOS A	0.3	2.1	Short	130	0.0	NA
Lane 2	601	17.0	740 1	0.813	100	41.1	LOS C	38.6	309.9	Full	500	0.0	0.0
Lane 3	599	17.0	736 <sub>1</sub>	0.813	100	41.1	LOS C	38.4	308.1	Full	500	0.0	0.0
Lane 4	23	30.0	61	0.374	53 <sub>6</sub>	87.6	LOS F 11	1.8	15.5	Short	150	0.0	NA
Lane 5	43	30.0	61	0.710	100	91.0	LOS F 11	3.5	30.6	Short	140	0.0	NA
Approach	1297	17.3		0.813		42.8	LOS D	38.6	309.9				
North: Pemb	roke Parade	e (N)											
Lane 1	236	2.3	398	0.592	100	66.1	LOS E	15.2	108.7	Full	500	0.0	0.0
Lane 2	335	9.0	361	0.930	100	90.1	LOS F 11	29.0	218.9	Short	120	0.0	NA
Approach	571	6.2		0.930		80.2	LOS F11	29.0	218.9				
West: Picton	Road (W)												
Lane 1	113	16.7	1343	0.084	100	7.3	LOS A	1.1	8.9	Short	145	0.0	NA
Lane 2	643	19.4	701 <sub>1</sub>	0.918	100	59.8	LOS E	51.2	417.7	Full	500	0.0	0.0
Lane 3	669	19.4	729 <sub>1</sub>	0.918	100	60.0	LOS E	54.0	440.6	Full	500	0.0	0.0
Lane 4	24	0.0	74	0.319	100	85.8	LOS F 11	1.8	12.6	Short	150	0.0	NA
Lane 5	24	0.0	74	0.319	100	85.8	LOS F 11	1.8	12.6	Short	140	0.0	NA
Approach	1473	18.6		0.918		56.7	LOS E	54.0	440.6				
Intersection	3688	14.5		0.930		57.3	LOS E	54.0	440.6				

Site Level of Service (LOS) Method: Delay (RTA NSW), Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
- 6 Lane under-utilisation due to downstream effects
- 11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

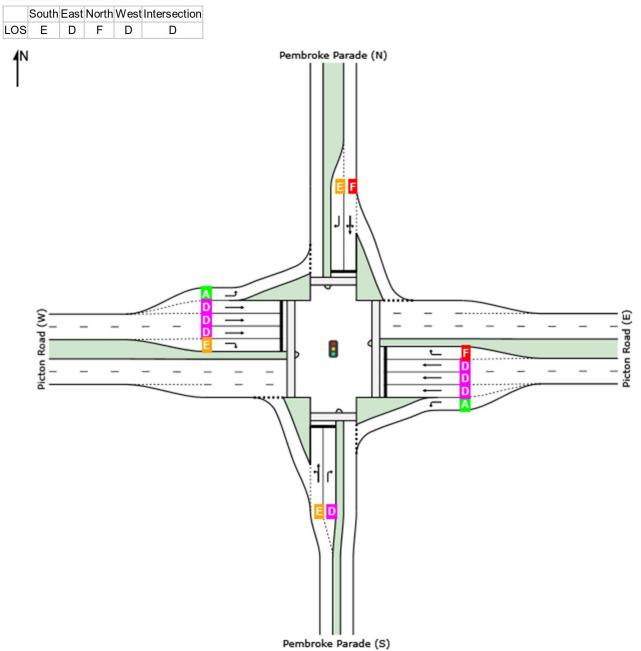
# E1.6 ALTERNATE LAYOUT

# LANE LEVEL OF SERVICE



Picton Road / Pembroke Parade upgrade Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

#### **All Movement Classes**



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# LANE SUMMARY

# Site: 101 [2030 1800+701 - AM\_Changed]

Picton Road / Pembroke Parade upgrade

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

	ixed Tillie ie		-,			(-)				,			
Lane Use	and Perforn	nance											
	Demand Total	Flows HV	Сар.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Bac Veh	k of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Pem	broke Parade	e (S)											
Lane 1	325	0.0	391	0.833	100	62.9	LOS E	18.4	128.7	Full	500	0.0	0.0
Lane 2	21	0.0	325	0.065	100	50.1	LOS D	1.0	7.2	Short	60	0.0	NA
Approach	346	0.0		0.833		62.1	LOS E	18.4	128.7				
East: Pictor	Road (E)												
Lane 1	28	0.0	1419	0.020	100	7.5	LOS A	0.3	1.9	Short	50	0.0	NA
Lane 2	481	17.0	559 1	0.861	100	48.4	LOS D	29.3	235.0	Short	120	0.0	NA
Lane 3	504	17.0	585	0.861	100	48.6	LOS D	31.0	248.5	Full	500	0.0	0.0
Lane 4	447	17.0	520 1	0.861	100	48.1	LOS D	26.8	215.1	Full	500	0.0	0.0
Lane 5	78	30.0	89	0.873	100	78.7	LOS F	5.3	46.3	Short	50	0.0	NA
Approach	1539	17.4		0.873		49.2	LOS D	31.0	248.5				
North: Peml	broke Parade	e (N)											
Lane 1	405	4.8	446	0.908	100	71.6	LOS F	27.6	201.0	Full	500	0.0	0.0
Lane 2	383	9.0	422	0.908	100	69.6	LOS E	26.3	198.0	Short	120	0.0	NA
Approach	787	6.9		0.908		70.6	LOS F	27.6	201.0				
West: Pictor	n Road (W)												
Lane 1	125	16.7	1264	0.099	100	7.9	LOS A	1.3	10.5	Short	50	0.0	NA
Lane 2	431	19.4	482 <sub>1</sub>	0.895	100	54.9	LOS D	27.7	225.9	Short	120	0.0	NA
Lane 3	504	19.4	563	0.895	100	55.3	LOS D	33.3	272.0	Full	500	0.0	0.0
Lane 4	480	19.4	536 1	0.895	100	55.1	LOS D	31.4	256.0	Full	500	0.0	0.0
Lane 5	41	0.0	93	0.442	100	69.5	LOS E	2.5	17.5	Short	50	0.0	NA
Approach	1581	18.7		0.895		51.8	LOS D	33.3	272.0				
Intersection	4254	14.5		0.908		55.2	LOS D	33.3	272.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

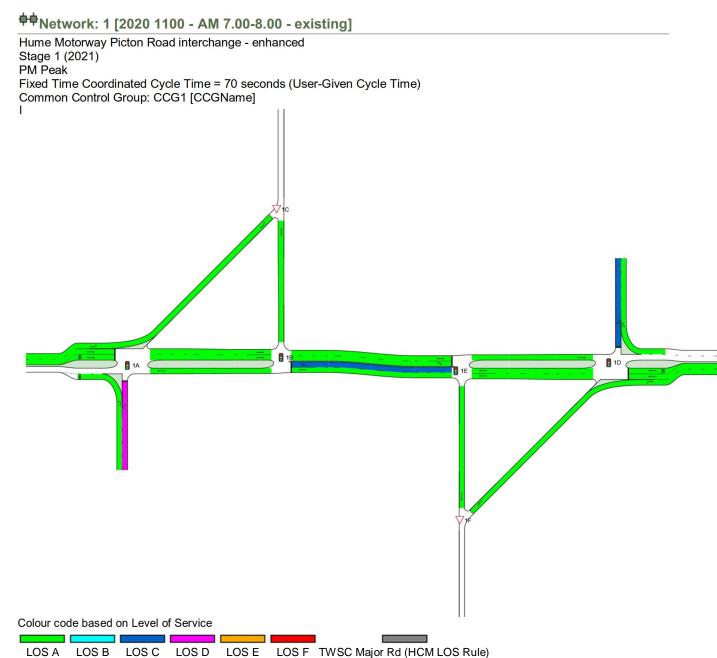
<sup>1</sup> Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

# **E2 HUME MOTORWAY INTERCHANGE**

The AM peak period was shown to be the critical peak, therefore only these results are included.

# E2.1 SCENARIO A

# LANE LEVEL OF SERVICE



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

## **NETWORK SUMMARY**

# ффNetwork: 1 [2020 1100 - АМ 7.00-8.00 - existing]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 70 seconds (User-Given Cycle Time)
Common Control Group: CCG1 [CCGName]

Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS D		
Travel Time Index	6.00		
Speed Efficiency	0.64		
Congestion Coefficient	1.56		
Travel Speed (Average)	51.2 km/h		51.2 km/h
Travel Distance (Total)	4177.7 veh-km/h		5013.2 pers-km/h
Travel Time (Total)	81.6 veh-h/h		97.9 pers-h/h
Desired Speed	80.0 km/h		
Demand Flows (Total for all Sites)	9770 veh/h		11724 pers/h
Arrival Flows (Total for all Sites)	9770 veh/h		11724 pers/h
Demand Flows (Entry Total)	3446 veh/h		
Midblock Inflows (Total)	718 veh/h		
Midblock Outflows (Total)	-662 veh/h		
Percent Heavy Vehicles (Demand)	9.8%		
Percent Heavy Vehicles (Arrival)	9.8%		
Degree of Saturation	0.910		
Control Delay (Total)	18.96 veh-h/h		22.76 pers-h/h
Control Delay (Average)	7.0 sec		7.0 sec
Control Delay (Worst Lane)	51.2 sec		
Control Delay (Worst Movement)	51.2 sec		51.2 sec
Geometric Delay (Average)	2.0 sec		
Stop-Line Delay (Average)	5.0 sec		
Queue Storage Ratio (Worst Lane)	0.95		
Total Effective Stops	4038 veh/h		4846 pers/h
Effective Stop Rate	0.41 per veh	1.0 per km	0.41 per pers
Proportion Queued	0.25		0.25
Performance Index	201.5		201.5
Cost (Total)	3279.23 \$/h	0.78 \$/km	3279.23 \$/h
Fuel Consumption (Total)	619.4 L/h	148.3 mL/km	
Fuel Economy	14.8 L/100km		
Carbon Dioxide (Total)	1483.5 kg/h	355.1 g/km	
Hydrocarbons (Total)	0.140 kg/h	0.033 g/km	
Carbon Monoxide (Total)	2.089 kg/h	0.500 g/km	
NOx (Total)	4.693 kg/h	1.123 g/km	

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 3.9 %

Number of Iterations: 10 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

# LANE LEVEL OF SERVICE

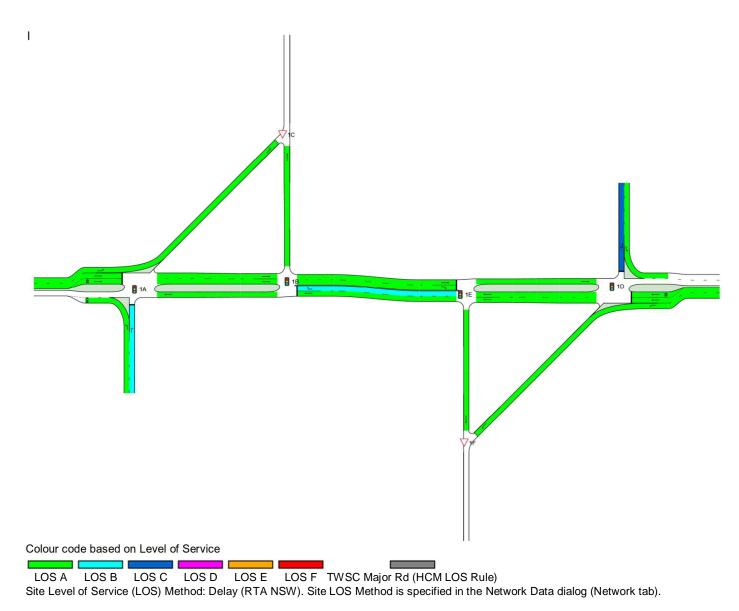
# ф Network: 1 [2020 1100 - РМ 3.45-4.45 - existing]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 40 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]



Delay model settings are specified for individual Sites forming the Network.

## **NETWORK SUMMARY**

ффNetwork: 1 [2020 1100 - РМ 3.45-4.45 - existing]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 40 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]

Common Control Group. CCG i [CCGName]			
Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS D		
Travel Time Index	5.05		
Speed Efficiency	0.55		
Congestion Coefficient	1.80		
Travel Speed (Average)	44.4 km/h		44.4 km/h
Travel Distance (Total)	2833.2 veh-km/h		3399.8 pers-km/h
Travel Time (Total)	63.8 veh-h/h		76.6 pers-h/h
Desired Speed	80.0 km/h		
Demand Flows (Total for all Sites)	7788 veh/h		9346 pers/h
Arrival Flows (Total for all Sites)	7788 veh/h		9346 pers/h
Demand Flows (Entry Total)	2699 veh/h		
Midblock Inflows (Total)	394 veh/h		
Midblock Outflows (Total)	-378 veh/h		
Percent Heavy Vehicles (Demand)	9.8%		
Percent Heavy Vehicles (Arrival)	9.8%		
Degree of Saturation	0.881		
Control Delay (Total)	13.64 veh-h/h		16.37 pers-h/h
Control Delay (Average)	6.3 sec		6.3 sec
Control Delay (Worst Lane)	30.2 sec		
Control Delay (Worst Movement)	30.2 sec		30.2 sec
Geometric Delay (Average)	1.9 sec		
Stop-Line Delay (Average)	4.4 sec		
Queue Storage Ratio (Worst Lane)	0.28		
Total Effective Stops	3259 veh/h		3910 pers/h
Effective Stop Rate	0.42 per veh	1.2 per km	0.42 per pers
Proportion Queued	0.33		0.33
Performance Index	139.3		139.3
Cost (Total)	2424.66 \$/h	0.86 \$/km	2424.66 \$/h
Fuel Consumption (Total)	395.3 L/h	139.5 mL/km	
Fuel Economy	14.0 L/100km		
Carbon Dioxide (Total)	945.9 kg/h	333.9 g/km	
Hydrocarbons (Total)	0.084 kg/h	0.030 g/km	
Carbon Monoxide (Total)	1.057 kg/h	0.373 g/km	
NOx (Total)	2.948 kg/h	1.040 g/km	

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

# E2.2 SCENARIO B

# LANE LEVEL OF SERVICE

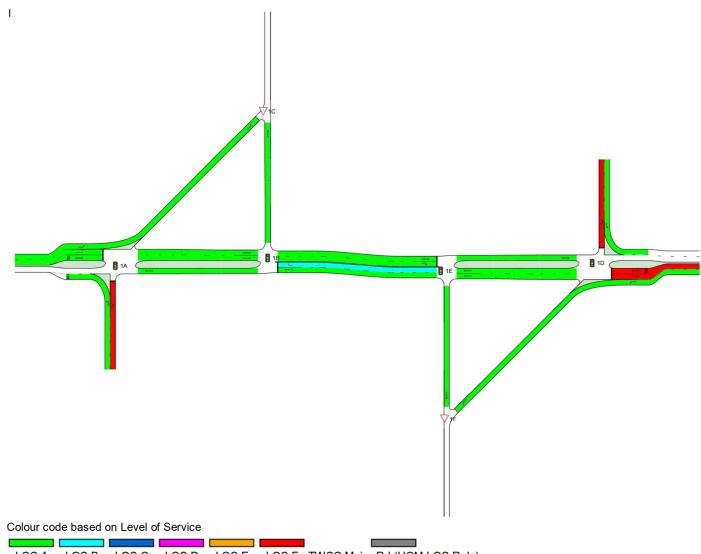
ффNetwork: 1 [2020 1100+701 - AM 7.00-8.00 - existing]

Hume Motorway Picton Road interchange - enhanced Stage 1 (2021)

PM Peak

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]



LOS A LOS B LOS C LOS D LOS E LOS F TWSC Major Rd (HCM LOS Rule)

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

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Organisation: PARSONS BRINCKERHOFF AUSTRALIA | Processed: Wednesday, 14 March 2018 9:30:31 PM Project:

\\APBNEFIL03\proj\\W\Walker\_Corp\2197003C\_WILTON\_JUNCTION\_2017\_TPT\05\_WrkPapers\\WP\Draft\001\_Modelling\02\_Models\SIDRA\01\_OpeningYear(2020)\\WiltonMwyInter\_2020\_(1100+701).sip7

# **NETWORK SUMMARY**

фф Network: 1 [2020 1100+701 - AM 7.00-8.00 - existing]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021)

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]

editition edition creap: ede i [edertaine]			
Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS E		
Travel Time Index	3.45		
Speed Efficiency	0.41		
Congestion Coefficient	2.44		

Travel Speed (Average)	32.8 km/h		32.8 km/h
Travel Distance (Total)	4378.4 veh-km/h		5254.0 pers-km/h
Travel Time (Total)	133.3 veh-h/h		160.0 pers-h/h
Desired Speed	80.0 km/h		
Demand Flows (Total for all Sites)	10354 veh/h		12425 pers/h
Arrival Flows (Total for all Sites)	10354 veh/h		12425 pers/h
Demand Flows (Entry Total)	3599 veh/h		
Midblock Inflows (Total)	814 veh/h		
Midblock Outflows (Total)	-758 veh/h		
Percent Heavy Vehicles (Demand)	9.8 %		
Percent Heavy Vehicles (Arrival)	9.8 %		
Degree of Saturation	1.045		
Control Delay (Total)	67.40 veh-h/h		80.88 pers-h/h
Control Delay (Average)	23.4 sec		23.4 sec
Control Delay (Worst Lane)	147.9 sec		
Control Delay (Worst Movement)	147.9 sec		147.9 sec
Geometric Delay (Average)	2.0 sec		
Stop-Line Delay (Average)	21.4 sec		
Queue Storage Ratio (Worst Lane)	1.38		
Total Effective Stops	5376 veh/h		6451 pers/h
Effective Stop Rate	0.52 per veh	1.2 per km	0.52 per pers
Proportion Queued	0.31		0.31
Performance Index	483.8		483.8
Cost (Total)	5122.06 \$/h	1.17 \$/km	5122.06 \$/h
Fuel Consumption (Total)	731.2 L/h	167.0 mL/km	
Fuel Economy	16.7 L/100km		
Carbon Dioxide (Total)	1749.9 kg/h	399.7 g/km	
Hydrocarbons (Total)	0.181 kg/h	0.041 g/km	
Carbon Monoxide (Total)	2.426 kg/h	0.554 g/km	
NOx (Total)	5.342 kg/h	1.220 g/km	

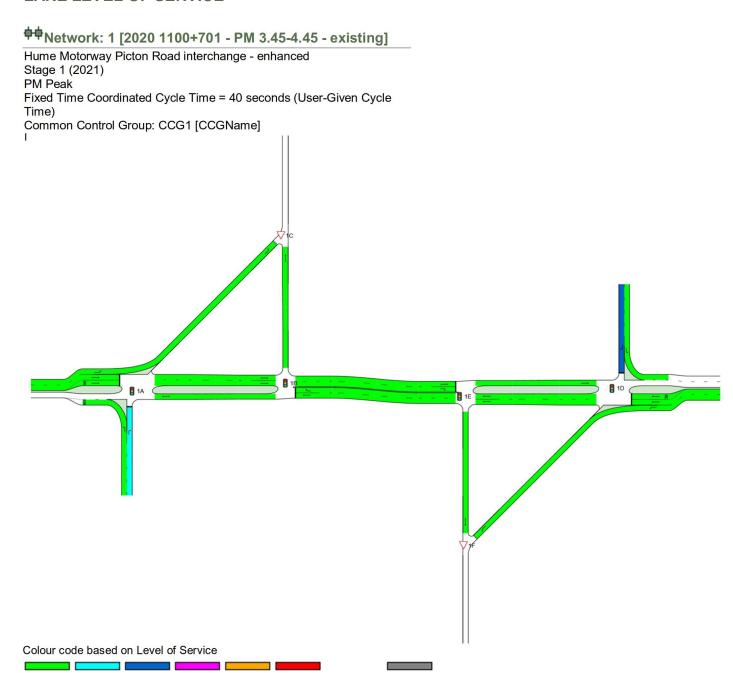
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 28.7 %

Number of Iterations: 10 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

#### LANE LEVEL OF SERVICE



LOS A LOS B LOS C LOS D LOS E LOS F TWSC Major Rd (HCM LOS Rule)
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

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Organisation: PARSONS BRINCKERHOFF AUSTRALIA | Processed: Wednesday, 14 March 2018 9:27:57 PM Project:

\\APBNEFIL03\proj\\W\Walker\_Corp\2197003C\_WILTON\_JUNCTION\_2017\_TPT\\05\_WrkPapers\\WP\Draft\\001\_Modelling\\02\_Models\\SIDRA\\01\_OpeningYear(2020)\\WiltonMwyInter\_2020\_(1100+701).sip7

## **NETWORK SUMMARY**



ффNetwork: 1 [2020 1100+701 - РМ 3.45-4.45 - existing]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021)

Fixed Time Coordinated Cycle Time = 40 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]

Naturals Barfarmanas Harris Values			
Network Performance - Hourly Values			
Performance Measure	Vehicles	Per Unit Distance	Persons
Network Level of Service (LOS)	LOS D		
Travel Time Index	5.13		
Speed Efficiency	0.56		
Congestion Coefficient	1.78		
Travel Speed (Average)	44.9 km/h		44.9 km/h
Travel Distance (Total)	2994.0 veh-km/h		3592.8 pers-km/h
Travel Time (Total)	66.6 veh-h/h		79.9 pers-h/h
Desired Speed	80.0 km/h		
Demand Flows (Total for all Sites)	8076 veh/h		9691 pers/h
Arrival Flows (Total for all Sites)	8076 veh/h		9691 pers/h
Demand Flows (Entry Total)	2862 veh/h		•
Midblock Inflows (Total)	265 veh/h		
Midblock Outflows (Total)	-247 veh/h		
Percent Heavy Vehicles (Demand)	9.9 %		
Percent Heavy Vehicles (Arrival)	9.9 %		
Degree of Saturation	0.910		
Control Delay (Total)	14.01 veh-h/h		16.82 pers-h/h
Control Delay (Average)	6.2 sec		6.2 sec
Control Delay (Worst Lane)	34.3 sec		
Control Delay (Worst Movement)	34.3 sec		34.3 sec
Geometric Delay (Average)	1.9 sec		
Stop-Line Delay (Average)	4.3 sec		
Queue Storage Ratio (Worst Lane)	0.23		
Total Effective Stops	3278 veh/h		3934 pers/h
Effective Stop Rate	0.41 per veh	1.1 per km	0.41 per pers
Proportion Queued	0.31	'	0.31
Performance Index	141.4		141.4
Cost (Total)	2522.51 \$/h	0.84 \$/km	2522.51 \$/h
Fuel Consumption (Total)	416.9 L/h	139.3 mL/km	<del></del>
Fuel Economy	13.9 L/100km		
Carbon Dioxide (Total)	998.6 kg/h	333.5 g/km	
Hydrocarbons (Total)	0.088 kg/h	0.029 g/km	
Carbon Monoxide (Total)	1.114 kg/h	0.372 g/km	
NOx (Total)	3.166 kg/h	1.057 g/km	

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 6 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

#### E2.3 SCENARIO C

# LANE LEVEL OF SERVICE

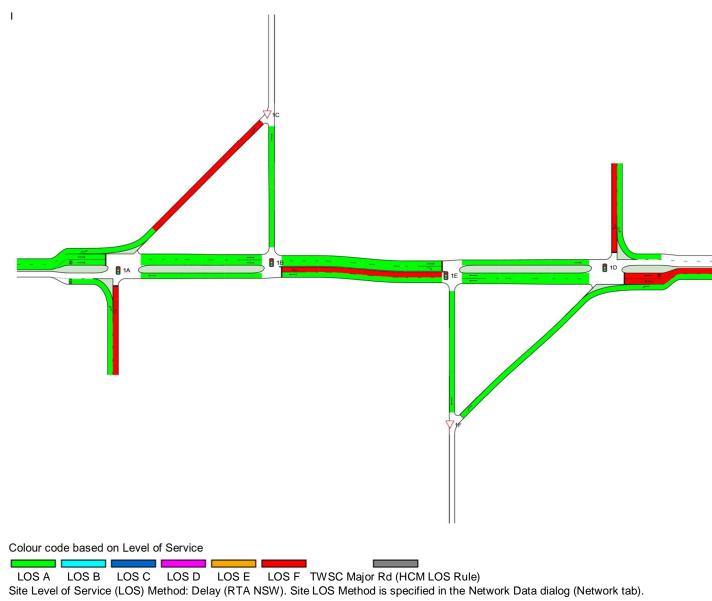


Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]



Delay model settings are specified for individual Sites forming the Network.

## **NETWORK SUMMARY**

ффNetwork: 1 [2030 1800 - АМ 7.00-8.00]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)
Common Control Group: CCG1 [CCGName]

Network Performance - Hourly Values	J					
Performance Measure	Ve	hicles	Per II	nit Distance		ersons
Network Level of Service (LOS)	LOS F	1110100		Int Distance		J-90113-
Travel Time Index	0.70					
Speed Efficiency	0.16					
Congestion Coefficient	6.13					
Travel Speed (Average)	13.0	km/h			13.0	km/h
Travel Distance (Total)	5429.2	veh-km/h			6515.0	pers-km/h
Travel Time (Total)	416.1	veh-h/h			499.3	pers-h/h
Desired Speed	80.0	km/h				
Demand Flows (Total for all Sites)	13499	veh/h			16199	pers/h
Arrival Flows (Total for all Sites)	12821	veh/h			15385	pers/h
Demand Flows (Entry Total)	3874	veh/h				
Midblock Inflows (Total)	1952	veh/h				
Midblock Outflows (Total)	-864	veh/h				
Percent Heavy Vehicles (Demand)	9.7	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	1.466					
Control Delay (Total)	333.72	veh-h/h			400.46	pers-h/h
Control Delay (Average)	93.7	sec			93.7	sec
Control Delay (Worst Lane)	427.0	sec				
Control Delay (Worst Movement)	427.0	sec			427.0	sec
Geometric Delay (Average)	1.7	sec				
Stop-Line Delay (Average)	92.0	sec				
Queue Storage Ratio (Worst Lane)	2.37					
Total Effective Stops	18286	veh/h			21943	pers/h
Effective Stop Rate	1.43	per veh	3.4	per km	1.43	per pers
Proportion Queued	0.40				0.42	
Performance Index	1216.5				1216.5	
Cost (Total)	15093.29	\$/h	2.78	\$/km	15093.29	\$/h
Fuel Consumption (Total)	1414.0	L/h	260.5	mL/km		
Fuel Economy	26.0	L/100km				
Carbon Dioxide (Total)	3376.0	kg/h	621.8	g/km		
Hydrocarbons (Total)	0.412	kg/h	0.076	g/km		
Carbon Monoxide (Total)	4.315	kg/h	0.795	g/km		
NOx (Total)	9.968	kg/h	1.836	g/km		

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.9 %

Number of Iterations: 10 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

# LANE LEVEL OF SERVICE

# Hume Motorway Picton Road interchange - enhanced Stage 1 (2021) PM Peak Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Cycle Time) Common Control Group: CCG1 [CCGName]

Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F TWSC Major Rd (HCM LOS Rule)
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

## **NETWORK SUMMARY**

ффNetwork: 1 [2030 1800 - РМ 3.45-4.45]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Cycle Time)
Common Control Group: CCG1 [CCGName]

Common Control Group: CCG1 [CCGNa	mej					
Network Performance - Hourly Values						
Performance Measure		ehicles	Per	Unit Distance	F	Persons
Network Level of Service (LOS)	LOS D					
Travel Time Index	5.06					
Speed Efficiency	0.56					
Congestion Coefficient	1.80					
Travel Speed (Average)	44.4	km/h			44.4	km/h
Travel Distance (Total)	4069.7	veh-km/h			4883.7	pers-km/h
Travel Time (Total)	91.6	veh-h/h			110.0	pers-h/h
Desired Speed	80.0	km/h				
Demand Flows (Total for all Sites)	10857	veh/h			13028	pers/h
Arrival Flows (Total for all Sites)	10857	veh/h			13028	pers/h
Demand Flows (Entry Total)	3691	veh/h				
Midblock Inflows (Total)	262	veh/h				
Midblock Outflows (Total)	-228	veh/h				
Percent Heavy Vehicles (Demand)	9.9	%				
Percent Heavy Vehicles (Arrival)	9.9	%				
Degree of Saturation	0.852					
Control Delay (Total)	23.14	veh-h/h			27.77	pers-h/h
Control Delay (Average)	7.7	sec			7.7	sec
Control Delay (Worst Lane)	33.5	sec				
Control Delay (Worst Movement)	33.5	sec			33.5	sec
Geometric Delay (Average)	1.9	sec				
Stop-Line Delay (Average)	5.8	sec				
Queue Storage Ratio (Worst Lane)	0.51					
Total Effective Stops	4637	veh/h			5564	pers/h
Effective Stop Rate	0.43	per veh	1.1	per km	0.43	per pers
Proportion Queued	0.33				0.33	
Performance Index	237.8				237.8	
Cost (Total)	3513.96	\$/h	0.86	\$/km	3513.96	\$/h
Fuel Consumption (Total)	584.3	L/h	143.6	mL/km		
Fuel Economy	14.4	L/100km				
Carbon Dioxide (Total)	1399.6	kg/h	343.9	g/km		
Hydrocarbons (Total)	0.128	kg/h	0.032	g/km		
Carbon Monoxide (Total)	1.703	kg/h	0.419	g/km		
NOx (Total)	4.396	kg/h	1.080	g/km		
	1.000	9/	1.000	9/1111		

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.3 %

Number of Iterations: 6 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

#### E2.4 SCENARIO D

#### LANE LEVEL OF SERVICE



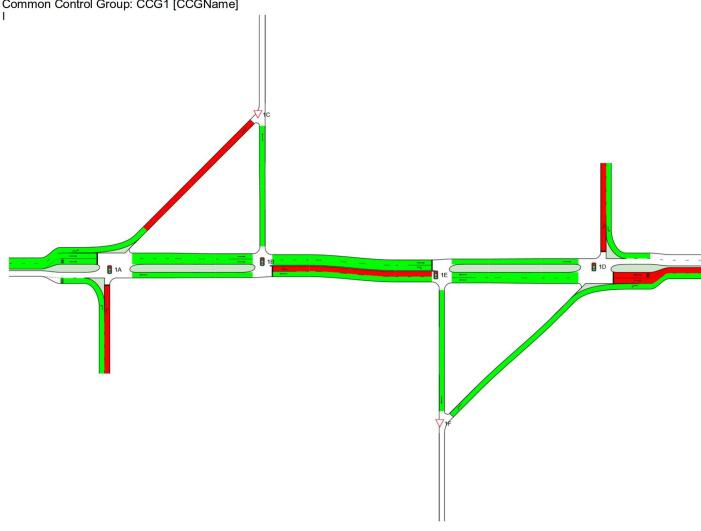
Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021)

PM Peak

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F TWSC Major Rd (HCM LOS Rule)

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

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## **NETWORK SUMMARY**



фф Network: 1 [2030 1800+701 - АМ 7.00-8.00]

Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021)

Fixed Time Coordinated Cycle Time = 150 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]

Natural Partamenta Havely Value	· · · · · · · · · · · · · · · · · · ·					
Network Performance - Hourly Values		Interior .		luit Distance		
Performance Measure		hicles	Per U	Jnit Distance		Persons
Network Level of Service (LOS)	LOS F					
Travel Time Index	0.56					
Speed Efficiency	0.15					
Congestion Coefficient	6.66					
Travel Speed (Average)	12.0	km/h			12.0	km/h
Travel Distance (Total)	5563.9	veh-km/h			6676.7	pers-km/h
Travel Time (Total)	463.5	veh-h/h			556.1	pers-h/h
Desired Speed	80.0	km/h				
Demand Flows (Total for all Sites)	14328	veh/h			17193	pers/h
Arrival Flows (Total for all Sites)	13417	veh/h			16101	pers/h
Demand Flows (Entry Total)	4109	veh/h				
Midblock Inflows (Total)	2018	veh/h				
Midblock Outflows (Total)	-955	veh/h				
Percent Heavy Vehicles (Demand)	9.7	%				
Percent Heavy Vehicles (Arrival)	10.4	%				
Degree of Saturation	1.436					
Control Delay (Total)	377.11	veh-h/h			452.53	pers-h/h
Control Delay (Average)	101.2	sec			101.2	sec
Control Delay (Worst Lane)	400.4	sec				
Control Delay (Worst Movement)	400.4	sec			400.4	sec
Geometric Delay (Average)	1.7	sec				
Stop-Line Delay (Average)	99.5	sec				
Queue Storage Ratio (Worst Lane)	2.67					
Total Effective Stops	18738	veh/h			22485	pers/h
Effective Stop Rate	1.40	per veh	3.4	per km	1.40	per pers
Proportion Queued	0.40				0.43	
Performance Index	1311.4				1311.4	
Cost (Total)	16753.69	\$/h	3.01	\$/km	16753.69	\$/h
Fuel Consumption (Total)	1509.5	L/h	271.3	mL/km		
Fuel Economy	27.1	L/100km				
Carbon Dioxide (Total)	3603.1	kg/h	647.6	g/km		
Hydrocarbons (Total)	0.447	kg/h	0.080	g/km		
Carbon Monoxide (Total)	4.568	kg/h	0.821	g/km		
NOx (Total)	10.561	kg/h	1.898	g/km		

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 12.9 %

Number of Iterations: 10 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

# LANE LEVEL OF SERVICE

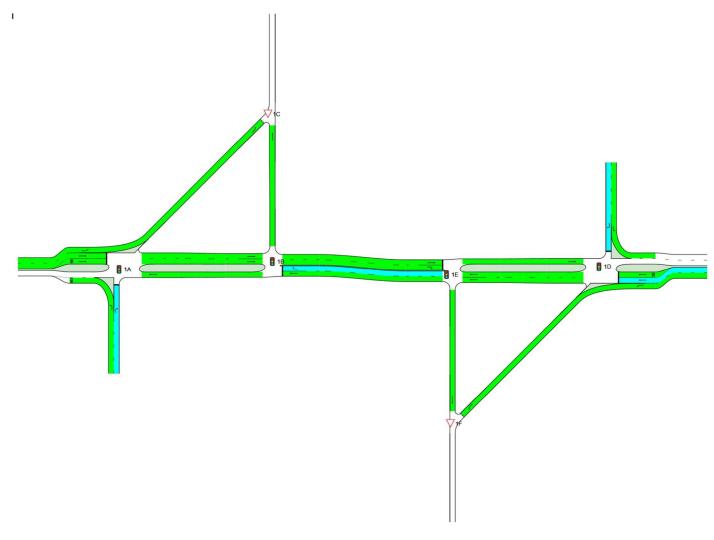


Hume Motorway Picton Road interchange - enhanced

Stage 1 (2021) PM Peak

Fixed Time Coordinated Cycle Time = 50 seconds (User-Given Cycle Time)

Common Control Group: CCG1 [CCGName]



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F TWSC Major Rd (HCM LOS Rule)

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Delay model settings are specified for individual Sites forming the Network.

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## **NETWORK SUMMARY**



Hume Motorway Picton Road interchange - enhanced Stage 1 (2021)

Fixed Time Coordinated Cycle Time = 50 seconds (User-Given Cycle Time)
Common Control Group: CCG1 [CCGName]

Network Performance - Hourly Values						
Performance Measure	Ve	hicles	Per Un	nit Distance	Pe	ersons
Network Level of Service (LOS)	LOS D					
Travel Time Index	5.20					
Speed Efficiency	0.57					
Congestion Coefficient	1.76					
Travel Speed (Average)	45.5	km/h			45.5	km/h
Travel Distance (Total)	4044.8	veh-km/h			4853.7	pers-km/h
Travel Time (Total)	89.0	veh-h/h			106.7	pers-h/h
Desired Speed	80.0	km/h				
Demand Flows (Total for all Sites)	10774	veh/h			12929	pers/h
Arrival Flows (Total for all Sites)	10774	veh/h			12929	pers/h
Demand Flows (Entry Total)	3721	veh/h				
Midblock Inflows (Total)	234	veh/h				
Midblock Outflows (Total)	-203	veh/h				
Percent Heavy Vehicles (Demand)	9.9	%				
Percent Heavy Vehicles (Arrival)	9.9	%				
Degree of Saturation	0.848					
Control Delay (Total)	20.75	veh-h/h			24.91	pers-h/h
Control Delay (Average)	6.9	sec			6.9	sec
Control Delay (Worst Lane)	25.9	sec				
Control Delay (Worst Movement)	25.9	sec			25.9	sec
Geometric Delay (Average)	1.9	sec				
Stop-Line Delay (Average)	5.1	sec				
Queue Storage Ratio (Worst Lane)	0.43					
Total Effective Stops	4715	veh/h			5658	pers/h
Effective Stop Rate	0.44	per veh	1.2	per km	0.44	per pers
Proportion Queued	0.33				0.33	
Performance Index	216.9				216.9	
Cost (Total)	3438.07	\$/h	0.85	\$/km	3438.07	\$/h
Fuel Consumption (Total)	580.9	L/h	143.6	mL/km		
Fuel Economy	14.4	L/100km				
Carbon Dioxide (Total)	1391.4	kg/h	344.0	g/km		
Hydrocarbons (Total)	0.126	kg/h	0.031	g/km		
Carbon Monoxide (Total)	1.678	kg/h	0.415	g/km		
NOx (Total)	4.406	kg/h	1.089	g/km		

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.7 %

Number of Iterations: 6 (maximum specified: 10)

Network Level of Service (LOS) Method: SIDRA Speed Efficiency.

Software Setup used: Standard Left.

# **APPENDIX F**

WSC DESIGN SPECIFICATION



## **WSC DESIGN SPECIFICATION** F1

GEOMETRIC ROAD DESIGN

Table D.1.5 Characteristics of Urban Roads in Wollondilly Shire Council Road Networks

Specific Parking Provisions	9	9	Š	S.	2	2	£
1.5 m wide Concrete Footpaving/ 2.5 m Cyclepath	2	Yes ®	×88 ⊗	Yes	Yes ®	Yes	Yes
Kerb Type	Roll	Rai	Rail	Rail	Standard K & G	Standard K & G	Slandard K & G
Verge Width (m) Left/Right	35/35	35/35@	35/35®	4.0/4.0%	35/35@	4.0 / 4.0 (2)	4.0/4.0@
Carriageway width (m)	6.0	8.0	8.0	10.0	11.0	13.0	13.0
Road Reserve Width (m	13	15	15	18	18	21	21
Maximum Speed ® (kph)	8	40	99	99	82	09	08/09
Maximum Number of Lots	Ot.	8	100	400	800	∞800	N/A
Road Category & Type	Cat B Urban Residential Cul-de-Sac	Cat C Urban Residentibal Oul-de-Sac	Cat D1 Urban Residential	Cat. D2 Minor Colector and Utban Residential	Cat. D3 Mapr Collector Urban Residential	Cat. E Major Colector / Bus Route	Cat. F Commercial / Industrial

Normally required by Council for newly created roads only. For existing roads or needs being upgraded, paths may only be required where a future pathway network been previously identified or the change in land use will increase pedestrian traffic.

A 2.5m shared path cycleway requires a verge width of 4.5m. If required, this shall be provided by increasing the road reserve. - E ~

Project No 2197003A

Traffic Report Walker Corporation

