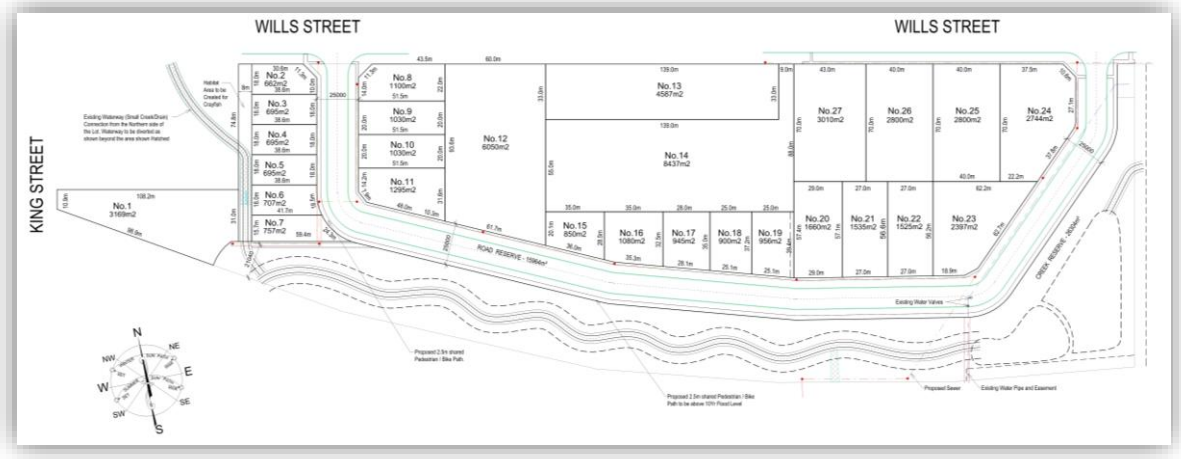
T&TS TRANSPORT & TRAFFIC SOLUTIONS

# Traffic Impact Assessment Report

## Freeway Business Park

## 14-40 & 42-60 Wills Street, Warragul




**Advantage All Consulting**

**May 2022**

## Document Issue Record

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# TABLE OF CONTENTS

# LIST OF FIGURES



# LIST OF TABLES

# 1 INTRODUCTION

## 1.1 Background

Transport & Traffic Solutions (T&TS) has been engaged by Advantage All Consulting Pty Ltd to prepare a Traffic Impact Assessment Report (TIAR) in support of a planning permit application to develop 14-40 & 42-60 Wills Street, Warragul (herein after referred to as “the site”) into a 27 lot business park.

The site is located on the south side of Wills Street between Spring Street and King Street and will be developed in one stage.

## 1.2 Aim of this Report

The aim of this report is to assess what impact the proposed development will have on the existing road network adjacent to the site including the intersections of Howitt Street (C425)/ Burke Street and Burke Street Spring Street. A review of the site access arrangements including controls and the internal road network will also be completed.

## 1.3 References

The following references were used to assist in the preparation of this report:

- The Baw Baw Planning Scheme and VicPlan, Department of Environment, Land, Water and Planning, Victoria State Government, Accessed August 2021.
- Australian Standards, Austroads Guide to Traffic Management, Austroads Guide to Road Design and the VicRoads Supplement to these guides.
- Infrastructure Design Manual v5.30, Local Government Infrastructure Design Association, 24 March 2020.
- Baw Baw Shire Council Road Management Plan 24 May 2017 and Public Road Register 1 July 2021.
- Baw Baw Shire Council 10 Year Infrastructure Plan 2017-2027, Baw Baw Shire Council, April 2017.
- Warragul & Drouin Traffic Model, Ultimate Development Two Way Daily Volumes (CBD Traffic Volumes), Baw Baw Shire Council, 11 March 2014.
- Wills Street Industrial Estate, Proposed Development Plan, Drawing No. 19027-01-02, Rev E, Taylor Miller Consulting, 9 August 2021.

# 2 EXISTING CONDITIONS ASSESSMENT

## 2.1 Site Location & Land Use

The site is located at 14-40 & 42-60 Wills Street, Warragul, on the south side of Wills Street, approximately 800 metres south-west of the Warragul town centre. The site is rectangular in shape and is bounded by Wills Street to the north, vacant land and a water authority pump station easement to the east, the Princes Freeway (M1) to the south, and existing industrial lots and King Street to the west. Hazel Creek runs in a west to east alignment through the middle of the 42-60 Wills Street site.

The Community Church Warragul, Warragul Regional College, and the Baw Baw Skills Centre are located on the north side of Wills Street. Access to these sites is obtained from Wills Street.

An existing 1,250 square metre and 3,000 square metre warehouse is located on the 14-40 & 42-60 Wills Street sites respectively. Access to both warehouses is provided from Wills Street via a gravel driveway. Access to the 42-60 Wills Street site is also provided from King Street via a concrete lay back and grass verge. The 14-40 Wills Street site is currently used for self-storage, where-as the 42-60 Wills Street site is currently under renovation however was occupied by a concrete building contractor.

The site is strategically located with easy access provided to the Princes Freeway (M1) via the Howitt Street (C425) diamond interchange.

Refer Figure 2.1 for the site location.

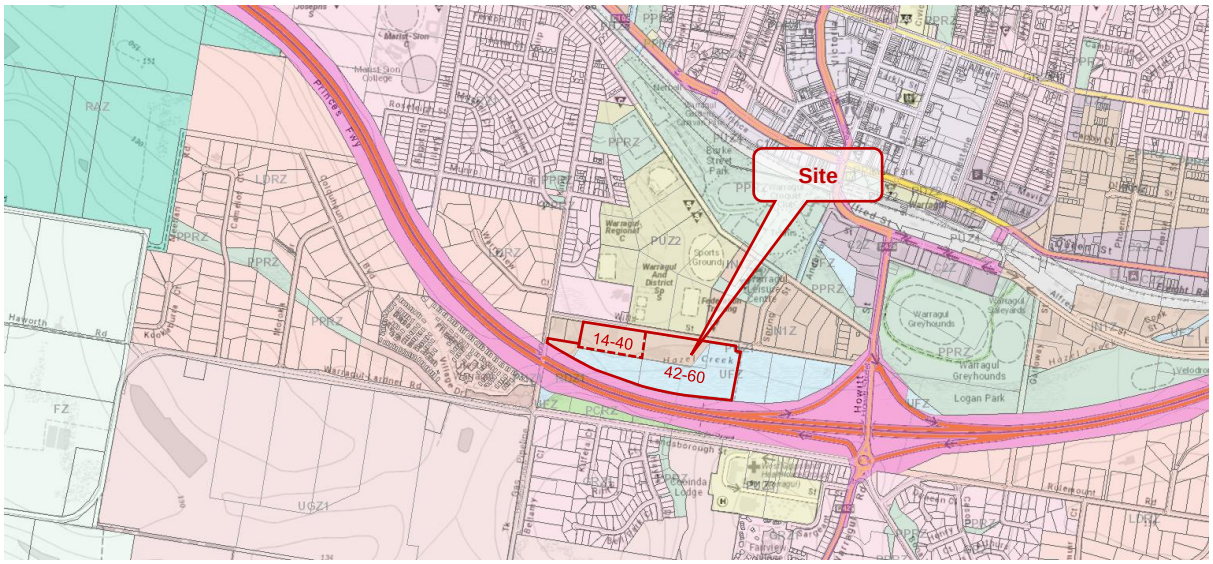



**Figure 2.1: Locality Plan[1]**

The site is located part within a within an Industrial 1 Zone (IN1Z) and part within an Urban Floodway Zone (UFZ). The water authority pump station easement to the north-east of the site is designated as a Public Use Zone – Service and Utility Zone (PUZ1), where-as the Princes Freeway to the south of the site is designated as a Road Zone Category 1 (RDZ1).

## 2.2 Existing Road Network Characteristics

### 2.2.1 Wills Street

Wills Street is a sealed two lane, two-way road managed by the Baw Baw Shire Council. It is aligned in an east-west direction connecting Spring Street in the east to King Street in the west. To the east of Spring Street, Wills Street is a no through road.

Referring to the Baw Baw Shire Public Road Register, Wills Street is classified as a “Local Urban” road which provides access to the community facilities and industrial warehouses located on the north and south sides of Wills Street respectively.

[1] https://mapshare.vic.gov.au/vicplan/, August 2021

Wills Street has a carriageway width of approximately 6.0 metres. A grass verge and open drain are provided on either side of the carriageway. Barrier kerb and channel is provided on the north side of Wills Street between King Street and opposite the access point to No. 10. A concrete footpath is provided on the north side of Wills Street between King Street and the Warragul Regional College vehicle access point.

Refer to Figure 2.2 and Figure 2.3 for the cross-sectional profile of Wills Street.

The Wills Street vertical grade is generally flat in the east of the site. It then rises to a crest opposite the Warragul Regional College vehicle access point, then dips to a point opposite the access point to No. 10, and then rises again to King Street.

A 70km/h posted speed limit applies to Wills Street. A time-based 40 km/h school speed zone applies to a 300 metre section of Wills Street adjacent to the Community Church Warragul and Warragul Regional College.

The Wills Street/ Spring Street intersection is a modified T-intersection with the Wills Street west leg and Spring Street leg forming the major road leg and the Wills Street east leg forming the minor road leg controlled by a Give Way sign. Refer to Figure 2.2.

**Figure 2.2: Wills Street, looking east**

**Figure 2.3: Wills Street, looking west**

### 2.2.2 Spring Street

Spring Street is a sealed two lane, two-way road managed by Baw Baw Shire Council. It is aligned in a north-south direction connecting Burke Street in the north and Wills Street in the south.

Referring to the Baw Baw Shire Public Road Register, Spring Street is classified as a “Local Urban” road which provides access to industrial warehouses located on the east side of Spring Street.

Spring Street has a carriageway width of approximately 9.2 metres (on street parking and through traffic lanes). Barrier kerb and channel and a grass nature strip are provided on both sides of Spring Street.

Refer to Figure 2.4 for the cross-sectional profile of Spring Street north of Wills Street.

Speed limit signs are not provided on Spring Street. Therefore, the 50km/h default speed limit applies to Spring Street.

The Spring Street/ Burke Street intersection is a standard T-intersection controlled by a Give Way sign. Refer to Figure 2.5.

**Figure 2.4: Spring Street, looking north**

**Figure 2.5: Spring Street/ Burke Street Intersection, looking north**

### 2.2.3 King Street

King Street is a sealed two lane, two-way road managed by Baw Baw Shire Council. It is aligned in a north-south direction connecting Burke Street in the north and Landsborough Street in the south.

Referring to the Baw Baw Shire Public Road Register, King Street is classified as a "Collector Urban" road which provides access to the adjacent residential and industrial lots and connecting local urban roads.

King Street has a carriageway width of approximately 7.0 metres. Barrier kerb and channel and a grass verge including open drain are provided on the east and west side of King Street respectively.

Refer to Figure 2.6 for the cross-sectional profile of King Street adjacent to the site.

A 60km/h posted speed limit applies to King Street.

The Wills Street/ King Street intersection is a standard T-intersection controlled by a Give Way sign. Refer to Figure 2.7.

**Figure 2.6: King Street, looking south**

**Figure 2.7: Wills Street/ King Street Intersection, looking west**

### 2.2.4 Burke Street

Burke Street is a sealed two lane, two-way road managed by Baw Baw Shire Council. It is aligned in a north-west to south-east direction connecting Lardners Track in the north-west to Howitt Street (C425) in the south-east.

Referring to the Baw Baw Shire Public Road Register, Burke Street is classified as a "Collector Urban" road which provides access to the adjacent residential and industrial lots and connecting local urban roads.

Burke Street adjacent to Spring Street consists of two through traffic lanes, an indented parking lane on the north side and on-street parking on the south side. Barrier kerb and channel and grass nature strip are provided on both sides of Burke Street, and a footpath and shared path are provided on the south and north side of Burke Street respectively.

Refer to Figure 2.8 and Figure 2.9 for the cross-sectional profile of Burke Street adjacent to Spring Street.

A 60km/h posted speed limit applies to Burke Street.

**Figure 2.8: Burke Street, looking east**

**Figure 2.9: Burke Street, looking west**

## 2.3 Existing Road Network Traffic Volumes

### 2.3.1 Wills Street & Spring Street

Baw Baw Shire Council provided traffic volume data for both Wills Street and Spring Street for the period between Thursday 27 February 2020 and Wednesday 4 March 2020. A summary of the traffic volumes for all vehicles is detailed in Table 2.1.

**Table 2.1: Weekday Traffic Volume Data**

| | Direction | | Combined | Commercial Vehicles (%) | 85th Percentile Speed |
|---|---|---|---|---|---|
| | East/ North | West/ South | | | |
| **Wills Street (100 metres west of Spring Street)** | | | | | |
| Weekday Average (Monday-Friday) | 315 vph | 475 vph | 792 vpd | 13.6 | 69.8 |
| Weekday AM Peak (8:00 to 9:00) | 62 vph | 67 vph | 129 vph | | 64.8 |
| Weekday PM Peak (15:00 to 16:00) | 42 vph | 68 vph | 109 vph | | 64.4 |
| **Spring Street (50 metres north of Wills Street)** | | | | | |
| Weekday Average (Monday-Friday) | 379 vph | 523 vph | 903 vpd | 12.1 | 52.2 |
| Weekday AM Peak (8:00 to 9:00) | 65 vph | 75 vph | 140 vph | - | 49.6 |
| Weekday PM Peak (15:00 to 16:00) | 52 vph | 62 vph | 114 vph | - | 50.7 |

Referring to Section 2.2.1and Section 2.2.2both Wills Street & Spring Street are classified as a Local Urban Road (Access Street). A local urban road is expected to carry up to 3,000 vehicles per day. Therefore, the existing traffic volumes on both Wills Street & Spring Street are well below their expected capacity.

### 2.3.2 Howitt Street (C425)/ Burke Street & Burke Street/ Spring Street Intersections

A manual intersection turning movement count was undertaken by Nationwide Traffic Surveys Pty Ltd at the Howitt Street (C425)/ Burke Street & Burke Street/ Spring Street intersections on Wednesday 24 November 2021 during the AM and PM Peak periods. Figure 2.10 and Figure 2.11 provides a summary of the AM & PM peak hour intersection turning movement volume recorded at both intersection between 8:30am and 9:30am 3:00pm and 4:00pm for all vehicles.

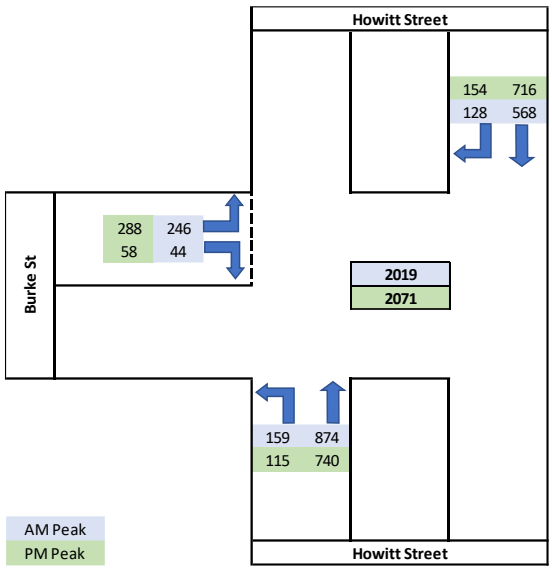



**Figure 2.10: Howitt St (C425)/ Burke St Intersection – Ex. Peak Hour Turning Movement Volumes**

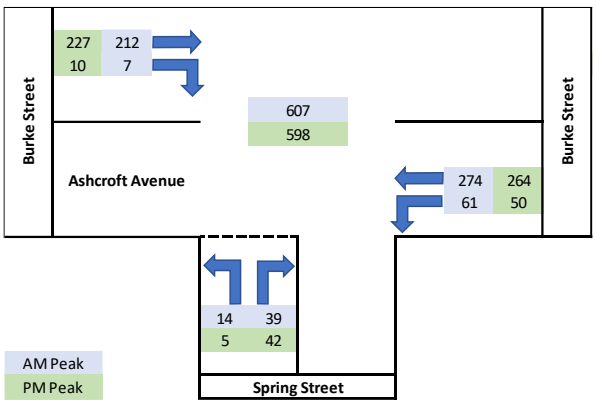



**Figure 2.11: Burke St/ Spring St Intersection – Ex. Peak Hour Turning Movement Volumes**

To understand what impact the proposed development traffic will have on the existing Howitt Street (C425)/ Burke Street & Burke Street/ Spring Street intersections, a check of the operational performance of the intersections was completed using SIDRA Intersection software. The Degree of Saturation, Average Delay, Level of Service, and 95% Back of Queue Distance results of the analysis for the "total approach" are provided in Table 2.2 and Table 2.3 for both intersections respectively. Full results are provided in Appendix A.

It is noted that the Howitt Street (C425)/ Burke Street intersection has been modelled as a network (staged movement) to allow a vehicle to queue within the Howitt Street central median when turning right out of Burke Street.

**Table 2.2: SIDRA Summary Results – Existing Howitt St (C425)/ Burke St Intersection with current traffic volumes**

| Approach Leg | Howitt Street (South) | Median (Westbound) | Burke Street (East) | Howitt Street (North) | Median (Eastbound) |
|---|---|---|---|---|---|
| **AM Peak** | | | | | |
| Degree of Saturation | 0.263 | 0.288 | 0.216 | 0.152 | 0.079 |
| Average Delay (sec) | 0.9 | 9.5 | 7.6 | 1.1 | 6.8 |
| Level of Service | - | A | A | - | A |
| 95% Queue Distance (m) | 0 | 8.4 | 6.7 | 0 | 2.1 |
| **PM Peak** | | | | | |
| Degree of Saturation | 0.219 | 0.255 | 0.250 | 0.185 | 0.124 |
| Average Delay (sec) | 0.8 | 6.6 | 7.3 | 1.1 | 8.6 |
| Level of Service | - | A | A | - | A |
| 95% Queue Distance (m) | 0 | 7.1 | 8.3 | 0 | 3.2 |

As detailed in Table 2.2, the Howitt Street approach legs have a Degree of Saturation less than 0.3, Average Delay less than 2 seconds, and no Queues during the AM & PM peak periods. The Burke Street and Central Median approach legs have a Level of Service A, Degree of Saturation less than 0.3, Average Delay less than 10 seconds, and Queues less than 8.5 metre long during the AM & PM peak periods.

These results indicate that the existing Howitt Street (C425)/ Burke Street intersection is operating well below its expected capacity.

**Table 2.3: SIDRA Summary Results – Existing Burke St/ Spring St Intersection with current traffic volumes**

| Period | AM Peak | | | PM Peak | | |
|---|---|---|---|---|---|---|
| Approach Leg | Spring St (South) | Burke Street (East) | Burke Street (West) | Spring St (South) | Burke Street (East) | Burke Street (West) |
| Degree of Saturation | 0.063 | 0.168 | 0.107 | 0.060 | 0.153 | 0.121 |
| Average Delay (sec) | 7.6 | 0.5 | 0.3 | 7.9 | 0.4 | 0.4 |
| Level of Service | A | - | - | A | - | - |
| 95% Queue Distance (m) | 1.5 | 0 | 0.5 | 1.4 | 0 | 0.8 |

As detailed in Table 2.2, the Burke Street approach legs have a Degree of Saturation less than 0.2, Average Delay less than 1 second, and Queues less than 1 meter long during the AM and PM peak periods. The Spring Street approach leg has a Level of Service A, Degree of Saturation below 0.1, Average Delay less than 8 seconds, and Queues less than 2 metres long during the AM and PM peak periods.

These results indicate that the existing Burke Street/ Spring Street intersection is operating well below its expected capacity.

## 2.4 Casualty Crash Statistics

The casualty crash statistics of Wills Street, Spring Street and King Street was sourced from the VicRoads' CrashStats database for the period between January 2014 and July 2019. The database indicates that no casualty accidents were recorded on the road network adjacent to the site.

## 2.5 Public Transport & Path Network

### 2.5.1 Public Transport

Bus Route 80 – Warragul Station to Warragul South via West Gippsland Hospital runs along Burke Street and King Street, to the north and west of the site, respectively. The nearest bus stops are located on Burke Street (south-east bound) approximately a 400 metre walk distance from the site and on King Street (northbound) approximately a 320 metre walk distance from the site. Buses service these stops approximately every 45 minutes to 1 hour between 6:00am and 5:00pm weekdays.

Warragul Railway Station is located approximately 700 metres north-east of the site.

### 2.5.2 Bicycle & Pedestrian Facilities

As detailed in section 2.2the following bicycle and pedestrian facilities are provided adjacent to the site:

- A footpath on the north side of Wills Street between King Street and the Warragul Regional College vehicle access point.
- A footpath and a shared path on the south and north side of Burke Street respectively.

An off-road shared path is also provided within the Burke Street Recreational Park.

Refer Figure 2.12 for the location of the existing bicycle facilities located adjacent to the site as taken from the Warragul Municipal Bicycle Network Map (Map E8).

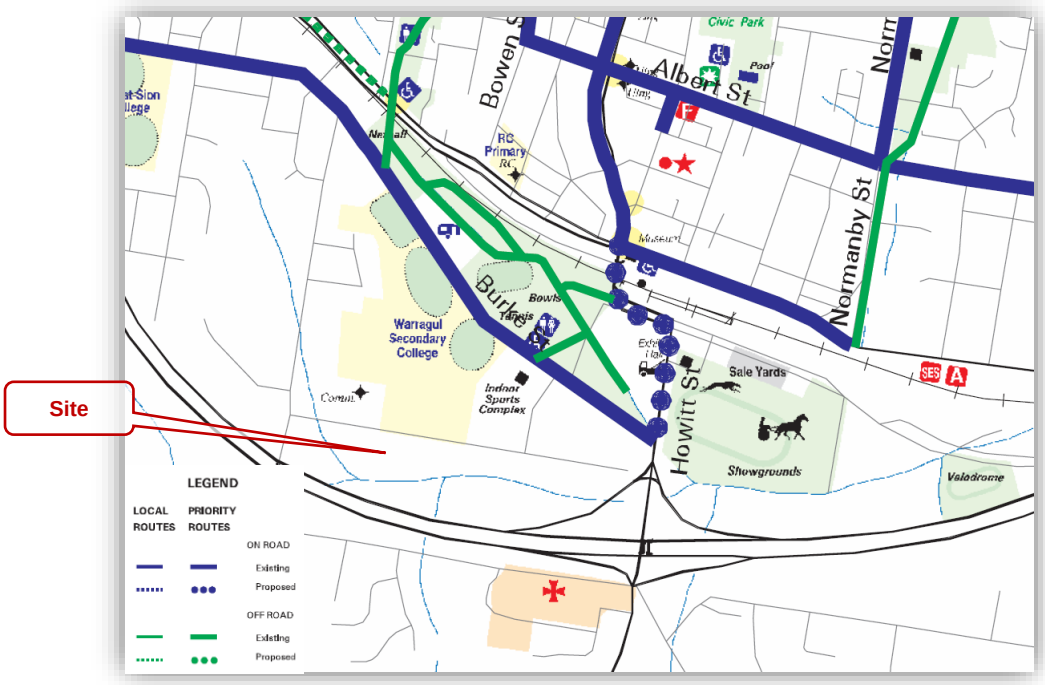



**Figure 2.12: Warragul Municipal Bicycle Network Map**

# 3 BACKGROUND TRANSPORT REVIEW

## 3.1 Warragul Traffic Model Outputs

An Ultimate Development Traffic Model covering the Warragul PSP and CBD areas was completed by transport consultant Nigel Ashton for Baw Baw Shire Council to determine the future year two-way daily traffic volumes on the existing and proposed road network within and adjacent to the PSP and CBD areas.

The ultimate year two-way daily traffic volume on the local road network adjacent to the site are provided in Figure 3.1.

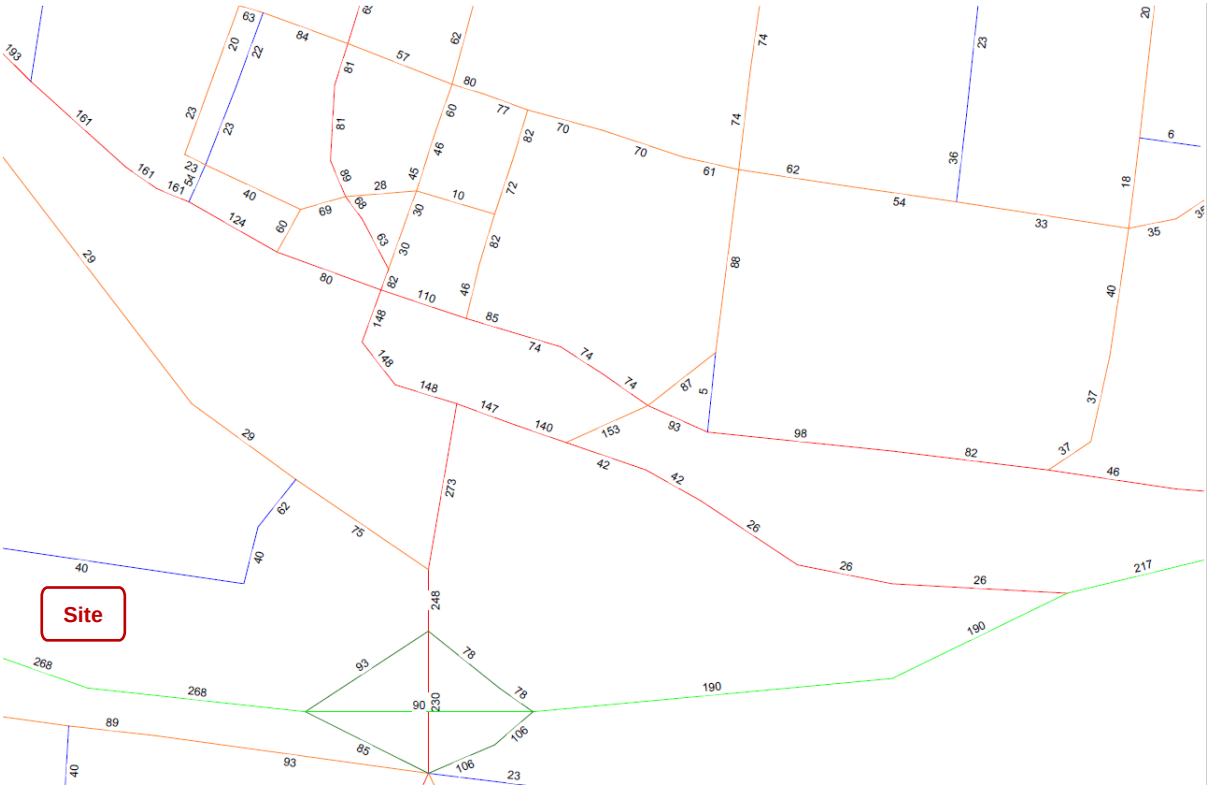



**Figure 3.1: Warragal CBD - Ultimate Development Two Way Daily Volumes ('00s vpd)**

As illustrated in Figure 3.1, Wills Street adjacent to the site is expected to carry approximately 4,000 vehicles per day two-way. As this volume of traffic exceeds the Wills Street capacity, it is expected that once this volume is reached, Council will upgrade Wills Street to a collector urban road standard.

## 3.2 Baw Baw Shire Council Draft Paths and Trails Strategy

Baw Baw Shire Council's "Draft Paths and Trails Strategy" provides a plan on how Council will invest in the construction of paths and trails within Baw Baw Shire. Refer Figure 3.2 for a copy of the Warragul Paths and Trails Map as taken from Council's strategy.

As illustrated in Figure 3.2, the existing path on Wills Street is identified as a secondary network, where-as the existing paths on Burke Street and within the Burke Street Recreational Park are identified as a primary and secondary network respectively.

The Warragul Paths and Trails Map also identifies the missing paths and trails to be constructed by Council. As illustrated in Figure 3.2, the existing footpath on the north side of Wills Street is proposed to be extended to Burke Street and north of Burke Street along Anderson Street and potentially converted into a shared path. This new path will connect into the existing footpath and off-road shared path along Burke Street and within the Burke Street Recreational Park. It is noted that the proposed missing path network is also illustrated in Plan 8 – Public Transport & Path Network of the Warragul PSP.

Missing Paths are also identified on King Street north of Wills Street.

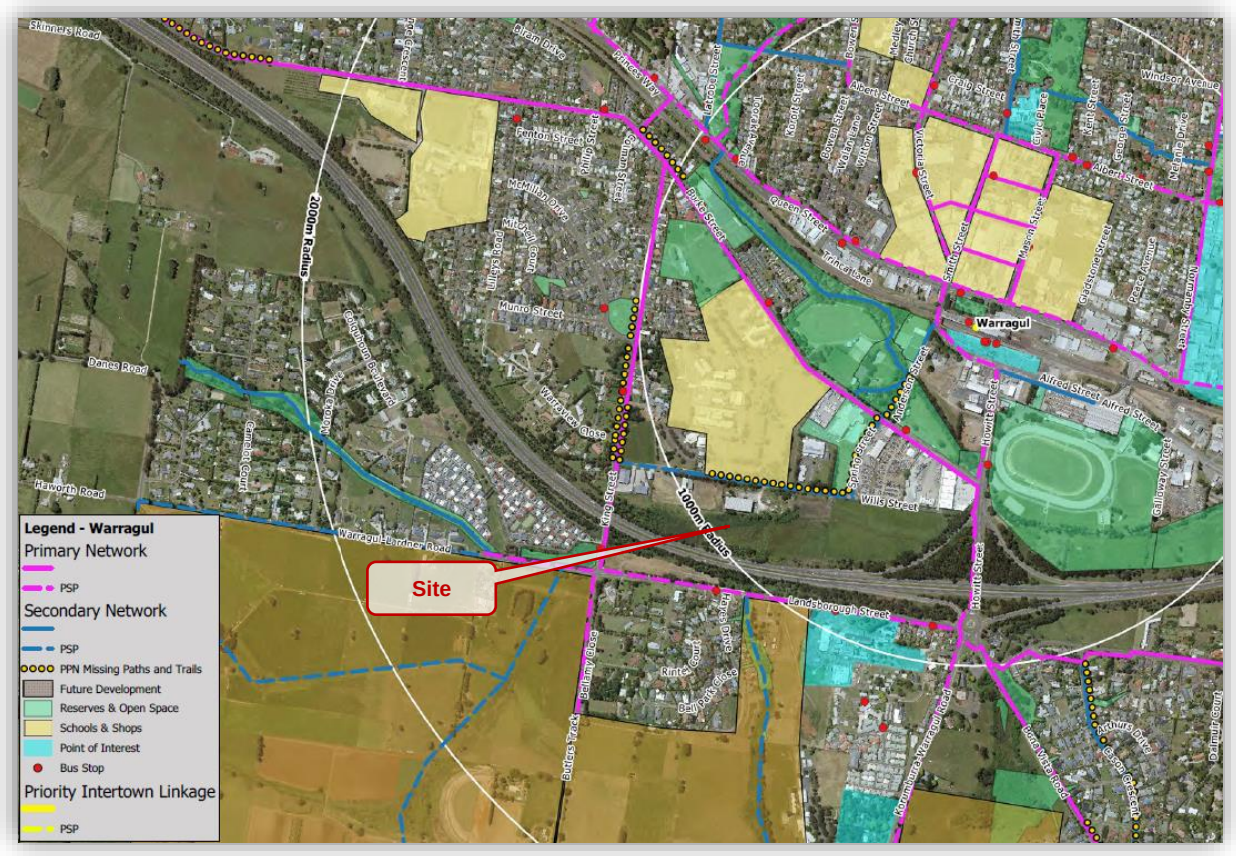



**Figure 3.2: Warragul Paths and Trails Map**

# 4 PROPOSED DEVELOPMENT

## 4.1 Proposed Use

The proposed development consists of subdividing 14-40 & 42-60 Wills Street, into a 27 lot Business Park. The existing warehouse located on 42-60 Wills Street will remain and be located on Lot 2 of the proposed development, where-as the existing warehouse located on 14-40 Wills Street will be removed.

Access to the site is provided from Wills Street via the construction of two T-intersections. The T-intersections are located approximately 75 metres west of Spring Street and 170 metres east of King Street. An industrial street (25 metre wide road reserve with a 12.5 metre wide carriageway) runs through the site connecting both intersections. The industrial street provides access to 21 lots.

Direct access is provided to Lots 25, 26 & 27 from Wills Street via the construction of a sealed industrial vehicle crossing. Direct access is provided to Lot 13 and Lot 14 (existing warehouse) from the existing Wills Street unsealed vehicle crossing which will be upgraded to a sealed industrial vehicle crossing. Direct access is provided to Lot 1 from the existing King Street concrete lay back and grass verge which will be upgraded to a sealed industrial vehicle crossing.

The existing unsealed vehicle crossing servicing the existing warehouse at 14-40 Wills Street will be removed and re-instated with a grass verge.

The existing section of Hazel Creek within the 42-60 Wills Street site will be re-aligned and located to the south of the industrial street.

A 2.5 metre wide shared path is proposed on the south side of the industrial street connecting the two ends of Wills Street.

Refer to Figure 4.1 and Appendix A for the Proposed Development Plan.

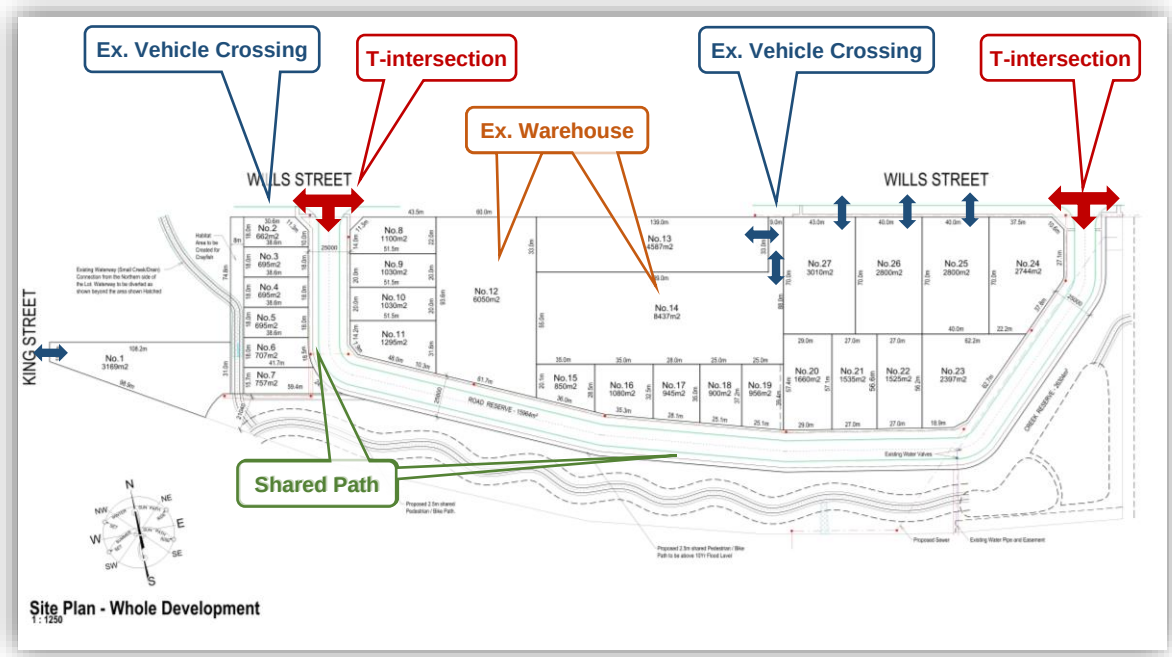



**Figure 4.1: Proposed Development Plan**

# 5 TRAFFIC ASSESSMENT

This section of the report will review what impact traffic generated from the proposed development of the site into a business park will have on the existing road network adjacent to the site (Wills Street & Spring Street) including the intersections of Howitt Street (C425)/ Burke Street and Burke Street Spring Street.

Due to the proposed small lot sizes (average 1,870m$^2$) within the Business Park, it is expected that each lot will be developed with a warehouse, similar to the existing warehouse's located within the site and to the west of the site.

## 5.1 Traffic Generation

The Roads and Maritime Service (RMS) of New South Wales (formerly known as RTA) released an update to the Guide to Traffic Generating Developments (October 2002) in August 2013, Technical Direction, TDT 2013/04a. This update is based on new survey data conducted in 2010. Referring to "*Appendix E – Business Parks & Industrial Estates – Site Details and Trip Generation*" of this update, the peak hour and daily trip generation rate for a warehouse similar to the proposal can be determined. Based on the RTA Guide, it is estimated that a warehouse with a Gross Floor Area (GFA) between 350 – 2,000 sq.m will generate approximately 0.8 peak hour vehicle trips per 100m$^2$ GFA and 8 daily vehicle trips per 100m$^2$ GFA.

Applying this traffic generation rate to the proposed increase in the business park warehouse GFA 17,750 sq.m$^2$, it is expected that the proposed business park will generate an extra 142 vehicle trips during the peak hour and 1,420 vehicle trips per day.

## 5.2 Traffic Distribution

Based on the location of the site within Warragul, it is estimated that 80% of all trips generated by the site will have an origin/ destination from/ to the west (Burke Street) and approximately 20% of all trips will have an origin/ destination from/ to the east (King Street). Further, the 80% of all trips with an origin/ destination from/ to the west will be distributed at the existing intersections as per the existing intersection turning movement volume summary results.

A peak hour directional split of traffic 50% inbound and 50% outbound (as per the existing intersection turning movement volume summary results) will also be adopted.

## 5.3 External Traffic Growth Rate

Baw Baw Shire Council predicts that its population will grow at an annual rate of 2.3% by 2026 and 1.7% from 2027 to 2036[3]. Therefore, for assessment purposes, an average annual percentage growth rate equivalent to 2.3% between 2020 and 2026 and 1.7% between 2027 and 2031 will be added to the existing daily and peak hour traffic volumes to obtain a future year 2032 traffic volume (forecast 10 year time frame).

## 5.4 Traffic Assignment

A spreadsheet transport model was created to assign traffic generated by the proposed the site to the existing road network adjacent to the site. The transport model is based on the traffic generation, traffic distribution, peak hour directional split assumptions, and external traffic growth rate as outlined in Sections 5.1 to 5.3.

## 5.5 Future Year 2032 Daily Traffic Volumes

It is expected that both Wills Street & Spring Street will carry approximately 2,130 and 2,270 vehicles per day after development of the site.

[2] Warehouse gross floor area (GFA) = 17,755m$^2$ [i.e. 35% of the total site area (54,300m$^2$) of 27 industrial lots, less 1,250m$^2$ GFA of the existing warehouse on 14-40 Wills Street]. 35% is the existing average GFA to site area ratio of the existing warehouse lots located to the west of the site.
[3] Baw Baw Shire Council 10 Year Infrastructure Plan 2017-2027, dated April 2017, accessed August 2021

This volume of traffic is well below the expected capacity of both Wills Street and Spring Street (Access Street < 3,000 vehicles per day).

## 5.6 Future Year 2032 Intersection Turning Movement Volumes

Refer Figure 5.1 and Figure 5.2 for the future year 2032 AM and PM peak hour turning movement volumes at the existing Howitt Street (C425)/ Burke Street and Burke Street/ Spring Street intersections as taken from the spreadsheet transport model.

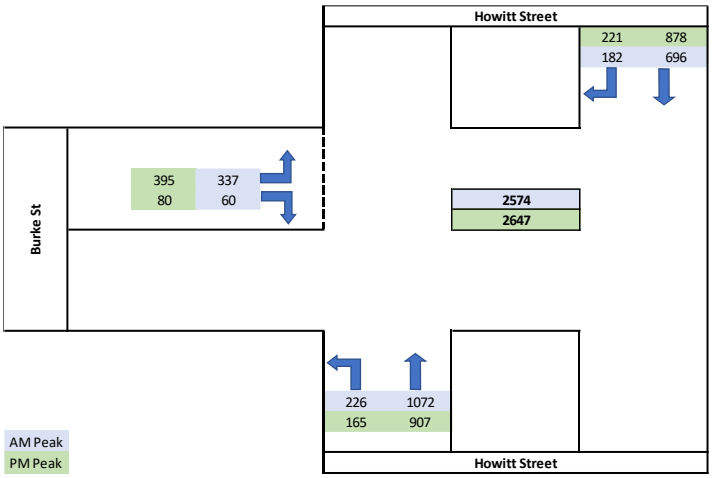



**Figure 5.1: Howitt St (C425)/ Burke St Intersection – Future Peak Hour Turning Movement Volume**

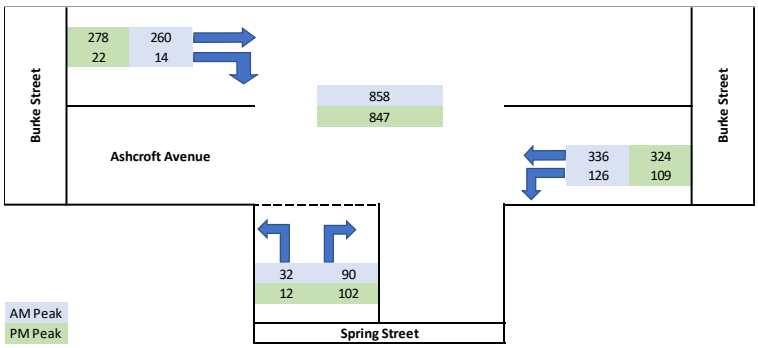



**Figure 5.2: Burke St/ Spring St Intersection – Future Peak Hour Turning Movement Volume**

## 5.7 Intersection Performance Assessment

SIDRA Intersection was used to analyse the operational performance of the existing intersections, with the future year 2032 AM and PM peak hour turning movement volumes as indicated in Figure 5.1 and Figure 5.2. Degree of Saturation, Average Delay, Level of Service, and 95% Back of Queue Distance results of the analysis for the "total approach" of the intersections are provided in Table 5.1 and Table 5.2. Full results can be found in Appendix C.

**Table 5.1: SIDRA Summary Results – Existing Howitt St (C425)/ Burke St Intersection with current traffic volumes**

| Approach Leg | Howitt Street (South) | Median (Westbound) | Burke Street (East) | Howitt Street (North) | Median (Eastbound) |
|---|---|---|---|---|---|
| **AM Peak** | | | | | |
| Degree of Saturation | 0.330 | 0.629 | 0.320 | 0.186 | 0.140 |
| Average Delay (sec) | 1.1 | 21.3 | 8.7 | 1.2 | 9.3 |
| Level of Service | - | C | A | - | A |

| | | | | | |
|---|---|---|---|---|---|
| 95% Queue Distance (m) | 0 | 14.9 | 11.2 | 7.2 | 3.7 |
| **PM Peak** | | | | | |
| Degree of Saturation | 0.275 | 0.495 | 0.367 | 0.227 | 0.239 |
| Average Delay (sec) | 0.9 | 11.8 | 8.4 | 1.2 | 13.2 |
| Level of Service | - | B | A | - | B |
| 95% Queue Distance (m) | 0 | 14.9 | 15 | 1.6 | 6.4 |

As detailed in Table 5.1, the Howitt Street approach legs have a Degree of Saturation less than 0.4, Average Delay less than 2 seconds, and Queues less than 8 metres long (right turn lane) during the AM & PM peak periods. Similar to existing conditions.

The Burke Street approach leg has a Level of Service A, Degree of Saturation less than 0.4, Average Delay less than 9 seconds, and Queues less than 15 metres long during the AM & PM peak periods. Similar to existing conditions.

The Central Median eastbound and westbound approach has a Level of Service A & C respectively, during the AM peak period and Level of Service B during the PM peak period, and a Degree of Saturation less than 0.65, Average Delay less than 22 seconds, and Queues less than 15 metres long (extends into the Howitt Street right turn lane) during the AM & PM peak periods. These results are an increase to the existing conditions, however well within acceptable limits.

These above results indicate that the existing Howitt Street (C425)/ Burke Street intersection will continue to operate below its expected capacity after development of the site.

**Table 5.2: SIDRA Summary Results – Existing Burke St/ Spring St Intersection with current traffic volumes**

| Period | AM Peak | | | PM Peak | | |
|---|---|---|---|---|---|---|
| Approach Leg | Spring St (South) | Burke Street (East) | Burke Street (West) | Spring St (South) | Burke Street (East) | Burke Street (West) |
| Degree of Saturation | 0.170 | 0.233 | 0.137 | 0.175 | 0.212 | 0.160 |
| Average Delay (sec) | 8.8 | 0.7 | 0.6 | 9.3 | 0.7 | 0.9 |
| Level of Service | A | - | - | A | - | - |
| 95% Queue Distance (m) | 4.3 | 0 | 1.1 | 4.3 | 0 | 2 |

As detailed in Table 5.2, the Burke Street approach leg has a Degree of Saturation below 0.25, Average Delay less than 1 second, and Queues less than 2 meters long during the AM and PM peak periods. The Spring Street approach legs have a Level of Service A, Degree of Saturation below 0.3, Average Delay less than 10 seconds, and Queues less than 5 metres long during the AM and PM peak periods.

These results indicate that the existing Burke Street/ Spring Street intersection will continue to operate well below its expected capacity after development of the site.

Therefore, the proposed development of the site into a 27 lot Business Park does not warrant an upgrade of the existing Howitt Street (C425)/ Burke Street and Burke Street/ Spring Street intersections.

## 5.8 Speed Limit Review

Due to the proposed development of the site into a business park and the existing community facilities located to the north of Wills Street, it is recommended that the existing Wills Street 70km/h speed limit be reduced to 60km/h. This speed limit matches the existing posted speed limit on both Burke Street and King Street.

The change in speed limit is the responsibility of the road authorities and the process to lower the speed limit should be commenced once the planning permit is issued and where possible implemented prior to occupation of the first warehouse.

# 6 SITE ACCESS & INTERNAL ROAD NETWORK REVIEW

## 6.1 Internal Road Cross Section

The proposed cross section of the internal access street, refer Figure 6.1, is in accordance with the requirements of the Infrastructure Design Manual for an industrial street.

The proposed carriageway width caters for the traffic generated by the proposed 23 lots that obtain access from this street.

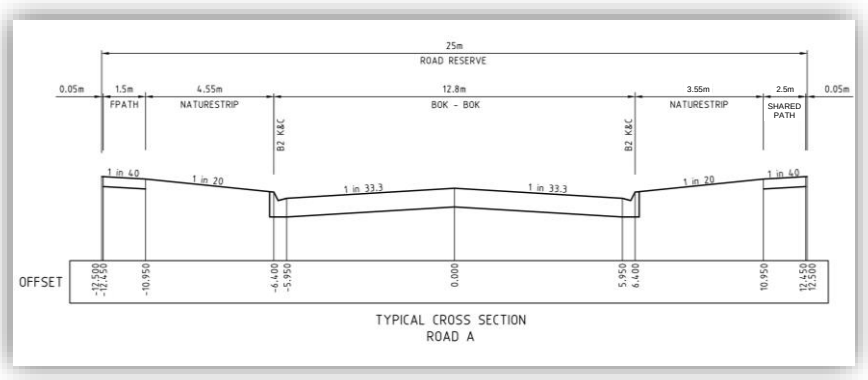



**Figure 6.1: Industrial Street (25m)**

## 6.2 Intersection Layout

The proposed new Wills Street intersections are to be constructed as standard T-intersections allowing all movements. A check of the available sight distance at each intersection was completed during the site visit. The available sight distance to the east and west of both intersections were measured as follows:

- East Intersection
  - East = 88 metres (immediately north of the Wills Street/ Spring Street intersection)
  - West = > 300 metres
- West Intersection
  - East = 150 metres
  - West = 170 metres (Wills Street/ King Street Intersection)

Based on a manoeuvre speed equivalent to 20km/h around the Wills Street/ Spring Street intersection, and an upgrade of 0.5% on the eastern approach to the East Intersection, and a proposed posted speed limit equivalent to 60km/h and a down grade of 1.8% on the western approach to the East Intersection, the required safe intersection sight distance[4] (SISD) to the east and west of the intersection is 45 metres and 125 metres respectively.

Based on a proposed posted speed limit equivalent to 60km/h and downgrade of 1.5% on the eastern and western approach to the West Intersection, the required SISD to the east and west of the intersection is 125 metres. Therefore, the available sight distance at both proposed intersections is greater than the SISD requirement as detailed in the Austroads Guide.

It is noted that, if the existing 70km/h speed limit was to be maintained on Wills Street, then the required SISD will increase to 155 metres on the west approach to the East intersection and both approaches to the West Intersection. Therefore, the available sight distance to the west of both intersections is greater than the SISD requirement, however to the east of the West intersection it is 5 metres short of this requirement. Considering that the available sight distance is only 5 metres short of the SISD requirement, but greater than the stopping sight distance[5] requirement of an approaching vehicle on

[4] Section 3.2.2 of the Austroads Guide to Road Design Part 4a: Unsignalised and Signalised Intersections.
[5] Section 5.3 of the Austroads Guide to Road Design Part 3: Geometric Design.

Wills Street (95 metres), it is considered that the proposed location of the West intersection is acceptable.

## 6.3 Wills Street & King Street Lot Access

It recommended that the proposed driveways providing access to the lots fronting Wills Street and King Street be constructed in accordance with the Infrastructure Design Manual, Standard Drawing No. 250. Further, a turning area should be provided within each of these lots to ensure that vehicles exiting the lots do so in a forward direction.

In accordance with Section 3.4.5 Sight Distance Requirements of the AS 2890.2:2018 Parking Facilities, Part 2: Off-street commercial vehicle facilities, an available sight distance equivalent to 83 metres for a 60km/h posted speed limit or 97 metres for a 70km/h posted speed limit is required in each direction of the proposed lot access points.

A check of the available sight distance during the site visit confirmed that the available sight distance at each lot access point is greater than 100 metres. However, it is recommended that the lower branches of the existing tree located to the west of the existing Lot 13 & 14 access point be trimmed back to ensure a clear view is obtained to and from west of this access point. Refer Figure 6.2.


**Figure 6.2: Lot 13 & 14 Access Point, looking west**

## 6.4 Bicycle & Pedestrian Facilities

As per the Industrial Street cross section refer Figure 6.1, a 2.5 metre wide shared path is provided on the east and south side of the Industrial Street (adjacent to creek reserve) and adjacent to Lots 2 to 7, where-as a 1.5 metre wide footpath is provided on the north side of the Industrial Street.

As illustrated in Figure 6.3, it is recommended that a pedestrian crossing be provided at the western intersection across Wills Street and the Industrial Street to connect the internal street footpath network to the existing Wills Street footpath (future potential shared path). It is also recommended that the 2.5 metre shared path located adjacent to Lots 2 to 7 be offset minimum 1.0 metre from the road reserve boundary.

As illustrated in Figure 6.4, it is recommended that a pedestrian crossing be provided at the eastern intersection across the industrial street and a shared path stub be provided on the south side of Wills Street to connect the internal shared path network to the potential shared path on the north side of Wills Street once constructed by Council.

The proposed internal footpath network connects users of the business park to the existing Wills Street footpath network. Also, once the Wills Street footpath is extended to Burke Street, users of the business park will have a direct connection to the existing footpath and shared path on the south and north side of Burke Street respectively and the off-road shared path within the Burke Street Recreational Park.

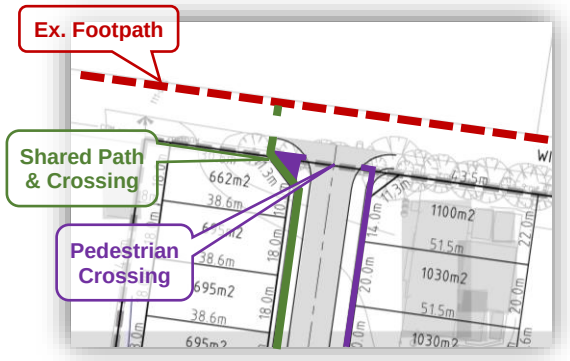



**Figure 6.3: West Intersection Crossing**

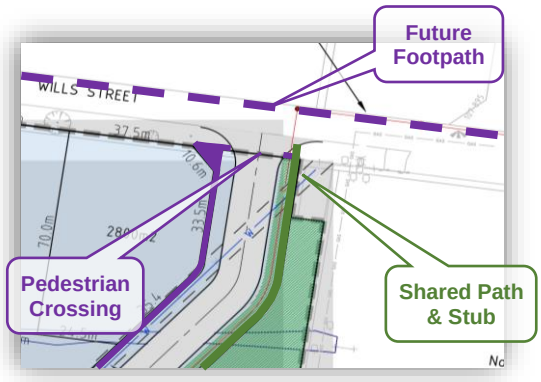



**Figure 6.4: East Intersection Crossing**

# 7 SUMMARY & CONCLUSION

Based on the above review, the proposal to develop 14-40 & 42-60 Wills Street, Warragul into a 27 lot Business Park is adequate from a traffic engineering perspective because it does not have a detrimental impact on the existing road network adjacent to the site including the intersections of Howitt Street (C425)/ Burke Street and Burke Street Spring Street.

Therefore, if the subject site is developed in accordance with the proposed Development Plan as illustrated in Figure 4.1 and the below recommendations as detailed in this report, then it is of our opinion that there are no transport and traffic engineering reasons as to why the proposal should not be approved by the responsible authority.

Traffic Impact Assessment Recommendations:

- The existing Wills Street 70km/h speed limit be reduced to 60km/h to match the existing posted speed limit on both Burke Street and King Street.
- The proposed driveways providing access to the lots fronting Wills Street and King Street be constructed in accordance with the Infrastructure Design Manual, Standard Drawing No. 250.
- The lower branches of the existing tree located to the west of the existing Lot 13 & 14 access point be trimmed back to ensure a clear view is obtained to and from the west of this access point.
- A pedestrian crossing be provided at the western intersection across Wills Street and the Industrial Street to connect the internal street footpath network to the existing Wills Street footpath (future potential shared path).
- The 2.5 metre shared path located adjacent to Lots 2 to 7 be constructed at a 1.0 metre offset from the road reserve boundary.
- A pedestrian crossing be provided at the eastern intersection across the industrial street including a shared path stub on the south side of Wills Street.

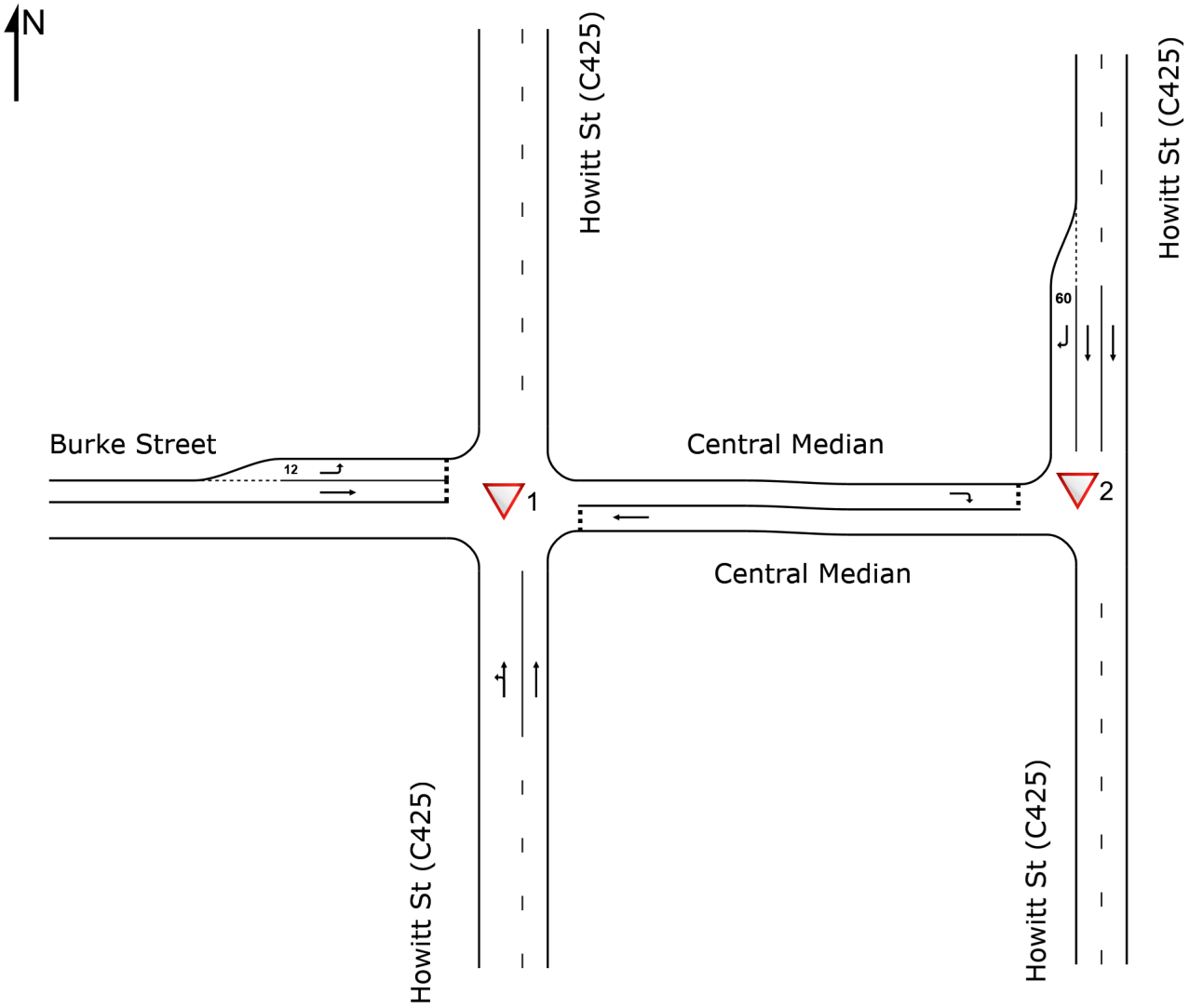
# APPENDIX A – EXISTING SIDRA ASSESSMENT RESULTS

# NETWORK LAYOUT

## Network: 1 & 2 [AM Peak - Existing Howitt Burke Intersection (Network Folder: Existing Year)]

Existing Unsignalised T-Intersection
Network Category: Existing Design

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




| SITES IN NETWORK | | |
|---|---|---|
| **Site ID** | **CCG ID** | **Site Name** |
| ▽1 | NA | AM_Howitt St (C425)/ Burke St - West |
| ▽2 | NA | AM_Howitt St (C425)/ Burke St - East |

# LANE SUMMARY

## Site: 1 [AM_Howitt St (C425)/ Burke St - West (Site Folder: Existing Year)]

## Network: 1 & 2 [AM Peak - Existing Howitt Burke Intersection (Network Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 529 | 5.5 | 529 | 5.5 | 2015 | 0.263 | 100 | 1.8 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 504 | 4.0 | 504 | 4.0 | 1920 | 0.263 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Approach | 1033 | 4.8 | 1033 | 4.8 | | 0.263 | | 0.9 | NA | 0.0 | 0.0 | | | | |
| East: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 128 | 11.0 | 128 | 11.0 | 444 | 0.288 | 100 | 9.5 | LOS A | 1.1 | 8.4 | Full | 6 | 0.0 | 16.0 |
| Approach | 128 | 11.0 | 128 | 11.0 | | 0.288 | | 9.5 | LOS A | 1.1 | 8.4 | | | | |
| West: Burke Street | | | | | | | | | | | | | | | |
| Lane 1 | 246 | 2.0 | 246 | 2.0 | 1138 | 0.216 | 100 | 7.2 | LOS A | 0.9 | 6.7 | Short | 13 | 0.0 | NA |
| Lane 2 | 44 | 7.0 | 44 | 7.0 | 518 | 0.085 | 100 | 10.0 | LOS B | 0.3 | 2.1 | Full | 305 | 0.0 | 0.0 |
| Approach | 290 | 2.8 | 290 | 2.8 | | 0.216 | | 7.6 | LOS A | 0.9 | 6.7 | | | | |
| Intersection | 1451 | 4.9 | 1451 | 4.9 | | 0.288 | | 3.0 | NA | 1.1 | 8.4 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE SUMMARY

## Site: 2 [AM_Howitt St (C425)/ Burke St - East (Site Folder: Existing Year)]

## Network: 1 & 2 [AM Peak - Existing Howitt Burke Intersection (Network Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 284 | 8.0 | 284 | 8.0 | 1873 | 0.152 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 284 | 8.0 | 284 | 8.0 | 1873 | 0.152 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 3 | 128 | 11.0 | 128 | 11.0 | 1462 | 0.088 | 100 | 5.8 | LOS A | 0.0 | 0.0 | Short | 60 | -16.0 N3 | NA |
| Approach | 696 | 8.6 | 696 | 8.6 | | 0.152 | | 1.1 | NA | 0.0 | 0.0 | | | | |
| West: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 44 | 7.0 | 44 | 7.0 | 557 | 0.079 | 100 | 6.8 | LOS A | 0.3 | 2.1 | Full | 6 | 0.0 | 0.0 |
| Approach | 44 | 7.0 | 44 | 7.0 | | 0.079 | | 6.8 | LOS A | 0.3 | 2.1 | | | | |
| Intersection | 740 | 8.5 | 740 | 8.5 | | 0.152 | | 1.4 | NA | 0.3 | 2.1 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

# LANE SUMMARY

## Site: 1 [PM_Howitt St (C425)/ Burke St - West (Site Folder: Existing Year)]

## Network: 1 & 2 [PM Peak - Existing Howitt Burke Intersection (Network Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 439 | 6.8 | 439 | 6.8 | 2003 | 0.219 | 100 | 1.5 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 416 | 6.0 | 416 | 6.0 | 1896 | 0.219 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Approach | 855 | 6.4 | 855 | 6.4 | | 0.219 | | 0.8 | NA | 0.0 | 0.0 | | | | |
| East: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 154 | 4.0 | 154 | 4.0 | 605 | 0.255 | 100 | 6.6 | LOS A | 1.0 | 7.1 | Full | 6 | 0.0 | 10.3 |
| Approach | 154 | 4.0 | 154 | 4.0 | | 0.255 | | 6.6 | LOS A | 1.0 | 7.1 | | | | |
| West: Burke Street | | | | | | | | | | | | | | | |
| Lane 1 | 288 | 7.0 | 288 | 7.0 | 1153 | 0.250 | 100 | 7.1 | LOS A | 1.1 | 8.3 | Short | 13 | 0.0 | NA |
| Lane 2 | 58 | 3.0 | 58 | 3.0 | 657 | 0.088 | 100 | 8.4 | LOS A | 0.3 | 2.2 | Full | 305 | 0.0 | 0.0 |
| Approach | 346 | 6.3 | 346 | 6.3 | | 0.250 | | 7.3 | LOS A | 1.1 | 8.3 | | | | |
| Intersection | 1355 | 6.1 | 1355 | 6.1 | | 0.255 | | 3.1 | NA | 1.1 | 8.3 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE SUMMARY

## Site: 2 [PM_Howitt St (C425)/ Burke St - East (Site Folder: Existing Year)]

## Network: 1 & 2 [PM Peak - Existing Howitt Burke Intersection (Network Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 358 | 3.0 | 358 | 3.0 | 1933 | 0.185 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 358 | 3.0 | 358 | 3.0 | 1933 | 0.185 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 3 | 154 | 4.0 | 154 | 4.0 | 1637 | 0.094 | 100 | 5.7 | LOS A | 0.0 | 0.0 | Short | 60 | -10.3 N3 | NA |
| Approach | 870 | 3.2 | 870 | 3.2 | | 0.185 | | 1.1 | NA | 0.0 | 0.0 | | | | |
| West: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 58 | 3.0 | 58 | 3.0 | 466 | 0.124 | 100 | 8.6 | LOS A | 0.4 | 3.2 | Full | 6 | 0.0 | 0.0 |
| Approach | 58 | 3.0 | 58 | 3.0 | | 0.124 | | 8.6 | LOS A | 0.4 | 3.2 | | | | |
| Intersection | 928 | 3.2 | 928 | 3.2 | | 0.185 | | 1.5 | NA | 0.4 | 3.2 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

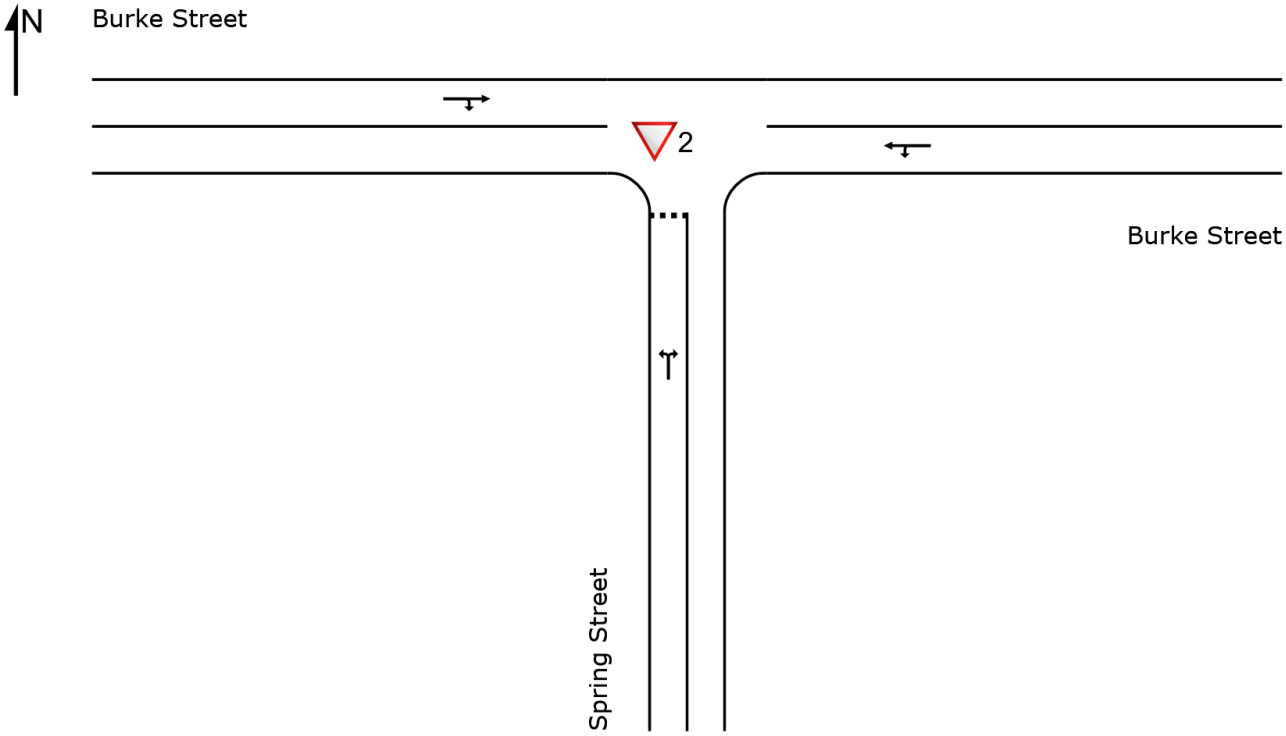
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

# SITE LAYOUT

## Site: 2 [AM_Burke St/ Spring St (Site Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





Organisation: TRANSPORT & TRAFFIC SOLUTIONS PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 21 December 2021 10:54:50 AM
Project: C:\Users\MichaelMarsicovetere\Box Sync\Projects\21029_Wills St, Warragul\Modelling\SIDRA\Wills St Intersection Assessment.sip9

# LANE SUMMARY

## Site: 2 [AM_Burke St/ Spring St (Site Folder: Existing Year)]

Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Spring Street | | | | | | | | | | | | | |
| Lane 1 | 53 | 4.0 | 845 | 0.063 | 100 | 7.6 | LOS A | 0.2 | 1.5 | Full | 500 | 0.0 | 0.0 |
| Approach | 53 | 4.0 | | 0.063 | | 7.6 | LOS A | 0.2 | 1.5 | | | | |
| East: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 335 | 8.6 | 1990 | 0.168 | 100 | 0.5 | LOS A | 0.0 | 0.0 | Full | 20 | 0.0 | 0.0 |
| Approach | 335 | 8.6 | | 0.168 | | 0.5 | NA | 0.0 | 0.0 | | | | |
| West: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 219 | 1.9 | 2052 | 0.107 | 100 | 0.3 | LOS A | 0.1 | 0.5 | Full | 500 | 0.0 | 0.0 |
| Approach | 219 | 1.9 | | 0.107 | | 0.3 | NA | 0.1 | 0.5 | | | | |
| Intersection | 607 | 5.8 | | 0.168 | | 1.0 | NA | 0.2 | 1.5 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE SUMMARY

## Site: 2 [PM_Burke St/ Spring St (Site Folder: Existing Year)]

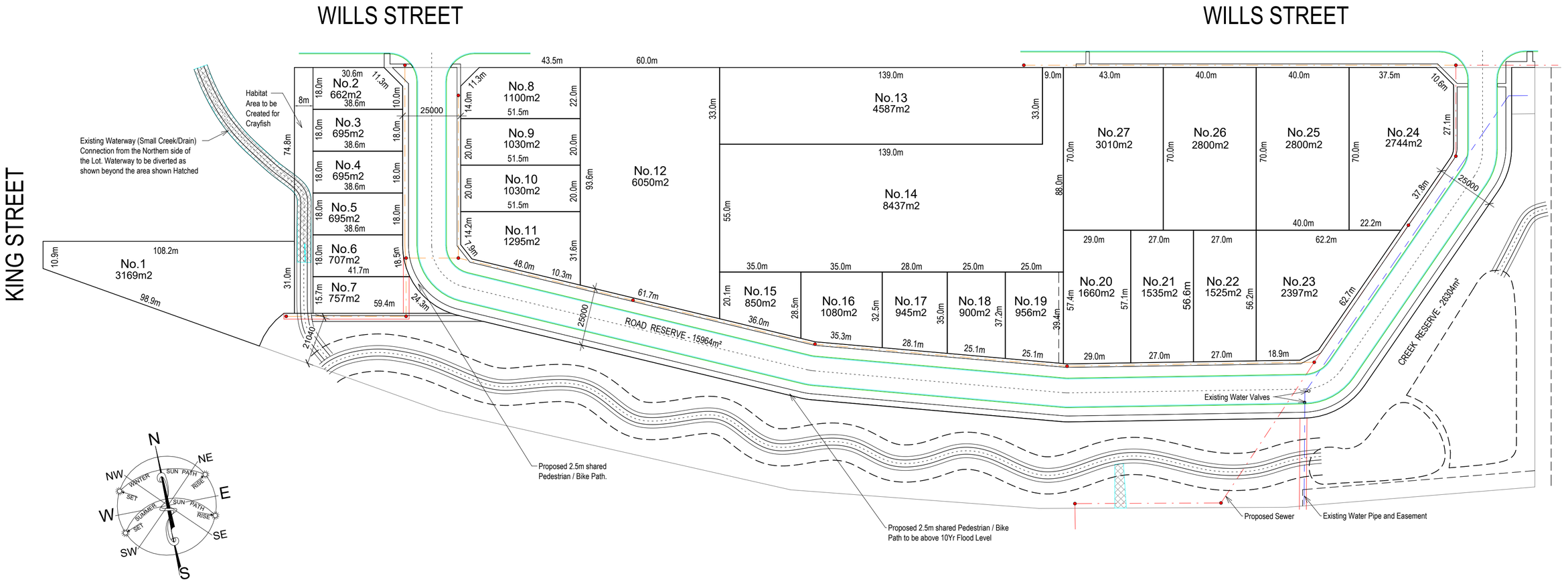
Existing Unsignalised T-Intersection
Site Category: Existing Design
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Spring Street | | | | | | | | | | | | | |
| Lane 1 | 47 | 4.5 | 779 | 0.060 | 100 | 7.9 | LOS A | 0.2 | 1.4 | Full | 500 | 0.0 | 0.0 |
| Approach | 47 | 4.5 | | 0.060 | | 7.9 | LOS A | 0.2 | 1.4 | | | | |
| East: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 314 | 3.5 | 2058 | 0.153 | 100 | 0.4 | LOS A | 0.0 | 0.0 | Full | 20 | 0.0 | 0.0 |
| Approach | 314 | 3.5 | | 0.153 | | 0.4 | NA | 0.0 | 0.0 | | | | |
| West: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 237 | 8.3 | 1954 | 0.121 | 100 | 0.4 | LOS A | 0.1 | 0.8 | Full | 500 | 0.0 | 0.0 |
| Approach | 237 | 8.3 | | 0.121 | | 0.4 | NA | 0.1 | 0.8 | | | | |
| Intersection | 598 | 5.5 | | 0.153 | | 1.0 | NA | 0.2 | 1.4 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# APPENDIX B – PROPOSED DEVELOPMENT PLAN




# Site Plan - Whole Development

1 : 1250

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | ADVANTAGE ALL DEVELOPMENT GROUP EST. 2019 | Advantage All Consulting P/L<br>Ph: 03 5625 5294<br>Email: info@advantageall.com.au<br>ABN: 16 587 630 031 ACN: 631 617 699<br>CCB-L-71635 CDP-AD72766 | CONTRACTOR MUST VERIFY ALL DIMENSIONS AND LEVELS AT THE JOB PRIOR TO COMMENCING ANY WORK OR MAKING ANY SHOP DRAWINGS.<br>DO NOT SCALE DRAWINGS. ALWAYS USE WRITTEN DIMENSIONS. | <br>Date:_____<br>Builders Signature:_____<br>Signature 1:_____<br>Signature 2:_____ | JOB ADDRESS: Wills Street, Warragul, 3820<br>CLIENT: Freeway Business Park P/L | JOB No: 01001<br>DRAWN: Lincoln<br>10/05/2022 10:37:23 AM SHEET (A2): 01<br>REVISION: Planning SCALE: 1 : 1250 | DESIGN TYPE: Proposed Development<br>Drawing: Subdivision Concept Plan |

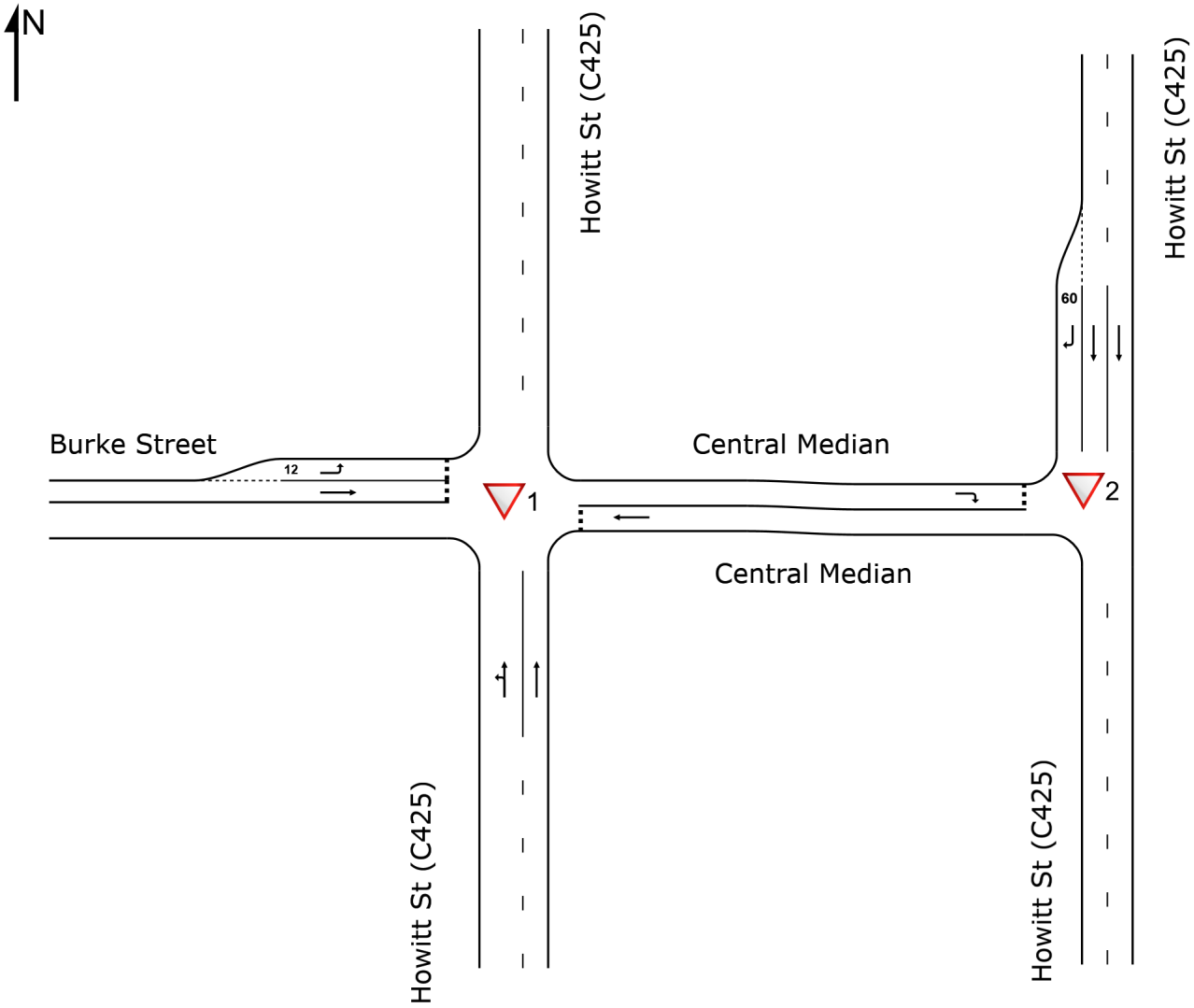
# APPENDIX C – FUTURE YEAR 2032 SIDRA ASSESSMENT RESULTS

# NETWORK LAYOUT

## Network: N101 [AM Peak - Existing Howitt Burke Int Future Volume (Network Folder: Future Year)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




| SITES IN NETWORK | | |
|---|---|---|
| **Site ID** | **CCG ID** | **Site Name** |
| ▽1 | NA | AM_Howitt St (C425)/ Burke St - West |
| ▽2 | NA | AM_Howitt St (C425)/ Burke St - East |


Organisation: TRANSPORT & TRAFFIC SOLUTIONS PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 21 December 2021 10:54:15 AM
Project: C:\Users\MichaelMarsicovetere\Box Sync\Projects\21029_Wills St, Warragul\Modelling\SIDRA\Wills St Intersection Assessment.sip9

# LANE SUMMARY

## Site: 1 [AM_Howitt St (C425)/ Burke St - West (Site Folder: Future Year)]

## Network: N101 [AM Peak - Existing Howitt Burke Int Future Volume (Network Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 663 | 5.7 | 663 | 5.7 | 2008 | 0.330 | 100 | 2.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 635 | 4.0 | 635 | 4.0 | 1920 | 0.330 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Approach | 1298 | 4.9 | 1298 | 4.9 | | 0.330 | | 1.1 | NA | 0.0 | 0.0 | | | | |
| East: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 182 | 11.0 | 182 | 11.0 | 289 | 0.629 | 100 | 21.3 | LOS C | 1.9[N4] | 14.9[N4] | Full | 6 | 0.0 | 49.9 |
| Approach | 182 | 11.0 | 182 | 11.0 | | 0.629 | | 21.3 | LOS C | 1.9 | 14.9 | | | | |
| West: Burke Street | | | | | | | | | | | | | | | |
| Lane 1 | 337 | 2.0 | 337 | 2.0 | 1054 | 0.320 | 100 | 7.9 | LOS A | 1.6 | 11.2 | Short | 13 | 0.0 | NA |
| Lane 2 | 60 | 7.0 | 60 | 7.0 | 364 | 0.165 | 100 | 13.5 | LOS B | 0.5 | 3.9 | Full | 305 | 0.0 | 0.0 |
| Approach | 397 | 2.8 | 397 | 2.8 | | 0.320 | | 8.7 | LOS A | 1.6 | 11.2 | | | | |
| Intersection | 1877 | 5.0 | 1877 | 5.0 | | 0.629 | | 4.7 | NA | 1.9 | 14.9 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N4 Average back of queue has been restricted to the available queue storage space.

# LANE SUMMARY

## Site: 2 [AM_Howitt St (C425)/ Burke St - East (Site Folder: Future Year)]

## Network: N101 [AM Peak - Existing Howitt Burke Int Future Volume (Network Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 348 | 8.0 | 348 | 8.0 | 1873 | 0.186 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 348 | 8.0 | 348 | 8.0 | 1873 | 0.186 | 100 | 0.0 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 3 | 182 | 11.0 | 182 | 11.0 | 1740 | 0.105 | 100 | 5.8 | LOS A | 0.9 N5 | 7.2 N5 | Short | 60 | 0.0 | NA |
| Approach | 878 | 8.6 | 878 | 8.6 | | 0.186 | | 1.2 | NA | 0.9 | 7.2 | | | | |
| West: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 60 | 7.0 | 60 | 7.0 | 430 | 0.140 | 100 | 9.3 | LOS A | 0.5 | 3.7 | Full | 6 | 0.0 | 0.0 |
| Approach | 60 | 7.0 | 60 | 7.0 | | 0.140 | | 9.3 | LOS A | 0.5 | 3.7 | | | | |
| Intersection | 938 | 8.5 | 938 | 8.5 | | 0.186 | | 1.8 | NA | 0.9 | 7.2 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

# LANE SUMMARY

## Site: 1 [PM_Howitt St (C425)/ Burke St - West (Site Folder: Future Year)]

## Network: N101 [PM Peak - Existing Howitt Burke Int Future Volume (Network Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 550 | 6.9 | 550 | 6.9 | 1998 | 0.275 | 100 | 1.8 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 522 | 6.0 | 522 | 6.0 | 1896 | 0.275 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Approach | 1072 | 6.5 | 1072 | 6.5 | | 0.275 | | 0.9 | NA | 0.0 | 0.0 | | | | |
| East: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 221 | 4.0 | 221 | 4.0 | 447 | 0.495 | 100 | 11.8 | LOS B | 2.1 N4 | 14.9 N4 | Full | 6 | 0.0 | 49.9 |
| Approach | 221 | 4.0 | 221 | 4.0 | | 0.495 | | 11.8 | LOS B | 2.1 | 14.9 | | | | |
| West: Burke Street | | | | | | | | | | | | | | | |
| Lane 1 | 395 | 7.0 | 395 | 7.0 | 1077 | 0.367 | 100 | 8.0 | LOS A | 2.0 | 15.0 | Short | 13 | 0.0 | NA |
| Lane 2 | 80 | 3.0 | 80 | 3.0 | 472 | 0.169 | 100 | 10.4 | LOS B | 0.5 | 3.8 | Full | 305 | -6.9 N3 | 0.0 |
| Approach | 475 | 6.3 | 475 | 6.3 | | 0.367 | | 8.4 | LOS A | 2.0 | 15.0 | | | | |
| Intersection | 1768 | 6.1 | 1768 | 6.1 | | 0.495 | | 4.3 | NA | 2.1 | 15.0 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

# LANE SUMMARY

## Site: 2 [PM_Howitt St (C425)/ Burke St - East (Site Folder: Future Year)]

## Network: N101 [PM Peak - Existing Howitt Burke Int Future Volume (Network Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | ARRIVAL FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North: Howitt St (C425) | | | | | | | | | | | | | | | |
| Lane 1 | 439 | 3.0 | 439 | 3.0 | 1933 | 0.227 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 2 | 439 | 3.0 | 439 | 3.0 | 1933 | 0.227 | 100 | 0.1 | LOS A | 0.0 | 0.0 | Full | 500 | 0.0 | 0.0 |
| Lane 3 | 221 | 4.0 | 221 | 4.0 | 1824 | 0.121 | 100 | 5.7 | LOS A | 0.2[N5] | 1.6[N5] | Short | 60 | 0.0 | NA |
| Approach | 1099 | 3.2 | 1099 | 3.2 | | 0.227 | | 1.2 | NA | 0.2 | 1.6 | | | | |
| West: Central Median | | | | | | | | | | | | | | | |
| Lane 1 | 80 | 3.0 | 80 | 3.0 | 334 | 0.239 | 100 | 13.2 | LOS B | 0.9 | 6.4 | Full | 6 | 0.0 | 6.9 |
| Approach | 80 | 3.0 | 80 | 3.0 | | 0.239 | | 13.2 | LOS B | 0.9 | 6.4 | | | | |
| Intersection | 1179 | 3.2 | 1179 | 3.2 | | 0.239 | | 2.0 | NA | 0.9 | 6.4 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

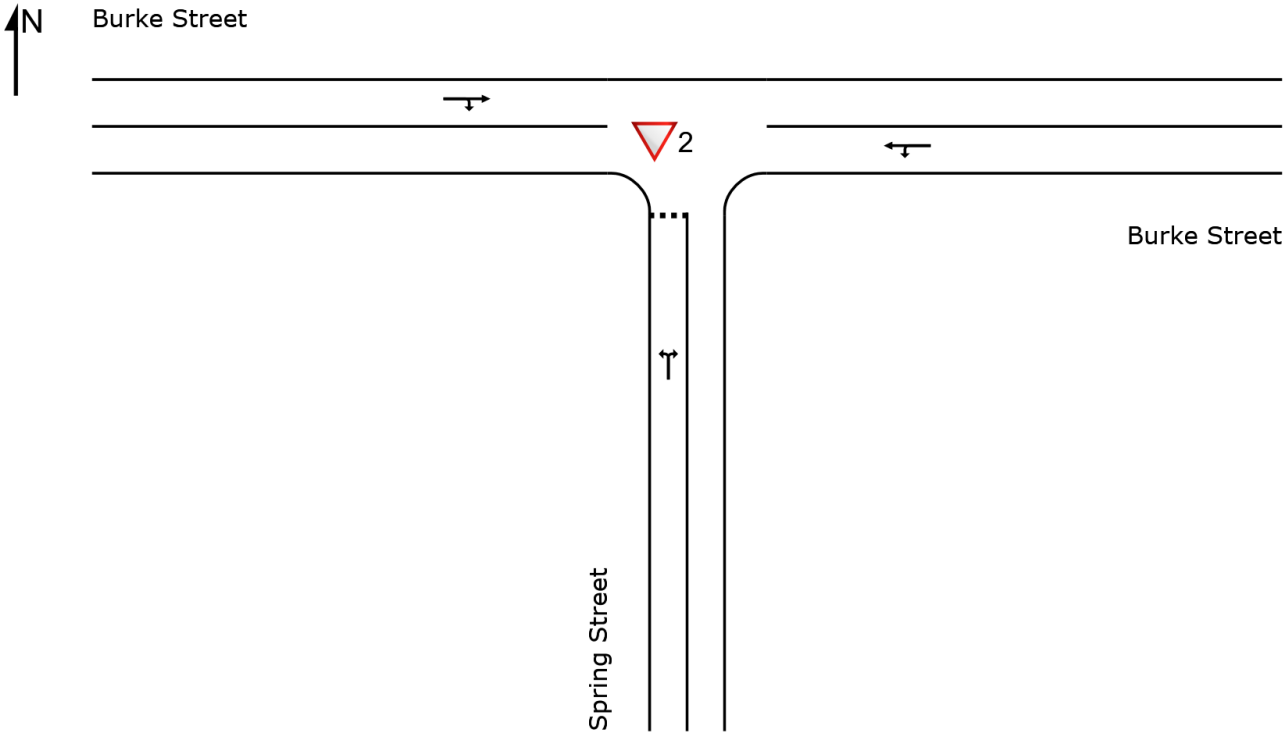
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

# SITE LAYOUT

## Site: 2 [AM_Burke St/ Spring St (Site Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.





Organisation: TRANSPORT & TRAFFIC SOLUTIONS PTY LTD | Licence: NETWORK / 1PC | Created: Tuesday, 21 December 2021 10:55:34 AM
Project: C:\Users\MichaelMarsicovetere\Box Sync\Projects\21029_Wills St, Warragul\Modelling\SIDRA\Wills St Intersection Assessment.sip9

# LANE SUMMARY

## Site: 2 [AM_Burke St/ Spring St (Site Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Spring Street | | | | | | | | | | | | | |
| Lane 1 | 122 | 3.9 | 719 | 0.170 | 100 | 8.8 | LOS A | 0.6 | 4.3 | Full | 500 | 0.0 | 0.0 |
| Approach | 122 | 3.9 | | 0.170 | | 8.8 | LOS A | 0.6 | 4.3 | | | | |
| East: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 462 | 8.5 | 1983 | 0.233 | 100 | 0.7 | LOS A | 0.0 | 0.0 | Full | 20 | 0.0 | 0.0 |
| Approach | 462 | 8.5 | | 0.233 | | 0.7 | NA | 0.0 | 0.0 | | | | |
| West: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 274 | 1.9 | 2000 | 0.137 | 100 | 0.6 | LOS A | 0.2 | 1.1 | Full | 500 | 0.0 | 0.0 |
| Approach | 274 | 1.9 | | 0.137 | | 0.6 | NA | 0.2 | 1.1 | | | | |
| Intersection | 858 | 5.7 | | 0.233 | | 1.8 | NA | 0.6 | 4.3 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# LANE SUMMARY

## Site: 2 [PM_Burke St/ Spring St (Site Folder: Future Year)]

Existing Unsignalised T-Intersection
Site Category: Future Conditions 1
Give-Way (Two-Way)

**Lane Use and Performance**

| | DEMAND FLOWS [ Total veh/h | HV ] % | Cap. veh/h | Deg. Satn v/c | Lane Util. % | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh | Dist ] m | Lane Config | Lane Length m | Cap. Adj. % | Prob. Block. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Spring Street | | | | | | | | | | | | | |
| Lane 1 | 114 | 4.5 | 651 | 0.175 | 100 | 9.3 | LOS A | 0.6 | 4.3 | Full | 500 | 0.0 | 0.0 |
| Approach | 114 | 4.5 | | 0.175 | | 9.3 | LOS A | 0.6 | 4.3 | | | | |
| East: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 433 | 3.8 | 2044 | 0.212 | 100 | 0.7 | LOS A | 0.0 | 0.0 | Full | 20 | 0.0 | 0.0 |
| Approach | 433 | 3.8 | | 0.212 | | 0.7 | NA | 0.0 | 0.0 | | | | |
| West: Burke Street | | | | | | | | | | | | | |
| Lane 1 | 300 | 8.5 | 1876 | 0.160 | 100 | 0.9 | LOS A | 0.3 | 2.0 | Full | 500 | 0.0 | 0.0 |
| Approach | 300 | 8.5 | | 0.160 | | 0.9 | NA | 0.3 | 2.0 | | | | |
| Intersection | 847 | 5.5 | | 0.212 | | 1.9 | NA | 0.6 | 4.3 | | | | |

Site Level of Service (LOS) Method: Delay (SIDRA). 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.