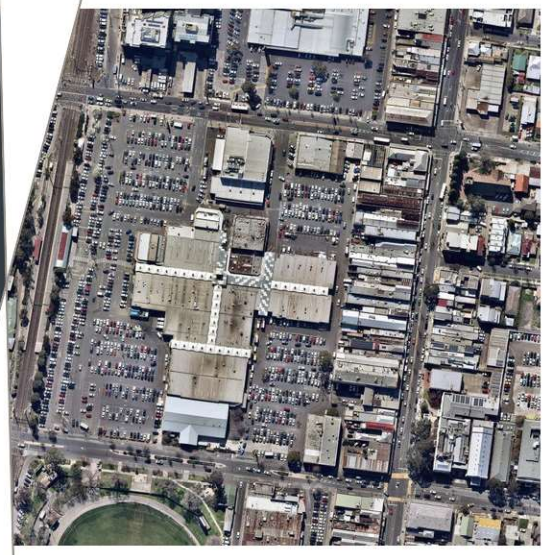
Preston Market Traffic and Transport Assessment

V180439



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1 Introduction

Cardno was engaged by the Victorian Planning Authority (VPA) to undertake a traffic and transport review of the proposed Preston Market redevelopment, for the purpose of supporting the Draft Preston Market Precinct Structure Plan (PSP).

Cardno has been assisting the VPA in developing the Draft Preston Market PSP since 2018, beginning with an Existing Conditions Report for the site in 2018, which reviewed the existing road network, car parking, public transport, bicycle and pedestrian connections.

Cardno subsequently provided input into the Framework Plan for the site, and most recently, a report assessing the Draft Framework Plan to provide relevant principles and guidelines to inform the development of the PSP.

This report entails a high-level review of the proposed development to support the proposed redevelopment of the Preston Market Precinct. More specifically, this report includes the following:

- Existing transport policies influencing the site;
- Existing transport network conditions surrounding the site;
- Existing and future public transport facilities and provisions;
- Existing and future bicycle and walking facilities and provisions;
- Proposed integration with the surrounding transport network;
- Provision of car parking that balances commercial needs with the strategic objective to encourage mode shift away from private vehicles; and
- Impact of the Draft PSP on the surrounding transport network.

In the course of preparing this assessment, the Draft Preston Market PSP has been examined and all relevant traffic and parking data collected and analysed.

2 Background and Existing Conditions

2.1 Location and Land Use

The subject site is located approximately 9km north of Melbourne's CBD, in Preston, and situated within the Preston Central Principal Activity Centre.

The market is generally bound by Murray Road to the north, South Morang Rail Line to the west, Cramer Street to the south and Mary Street to the east. Other internal access aisles are located within the site.

The Preston Market site in the context of the local area is presented below in Figure 2-1, whilst the subject site boundary is provided in Figure 2-2.

Preston Market is situated within the Priority Development Zone (PDZ1), with surrounding land uses including retail to the east along High Street, recreational to the south, and residential zones to the west of St Georges Road.

Figure 2-1 Site Context

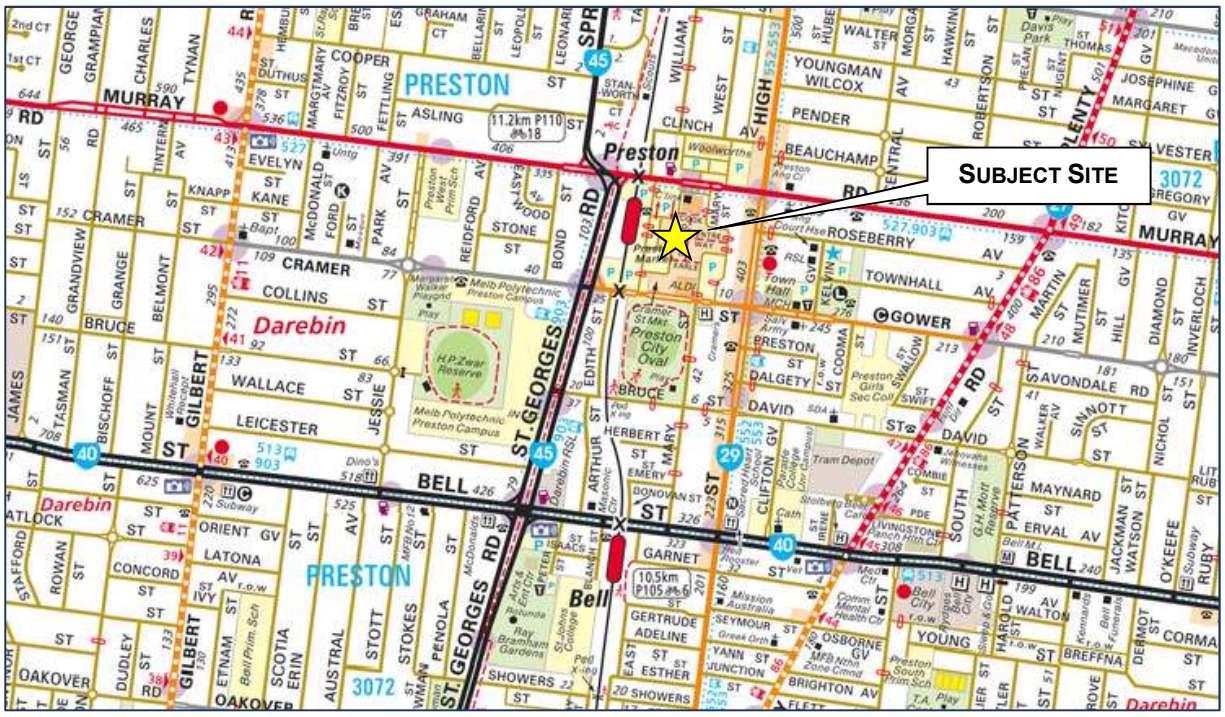


Figure 2-2 Preston Market Site

2.2 Network and Connectivity Changes

Since the Existing Conditions Assessment was prepared in 2018, it should be noted that the following projects have occurred or progressed:

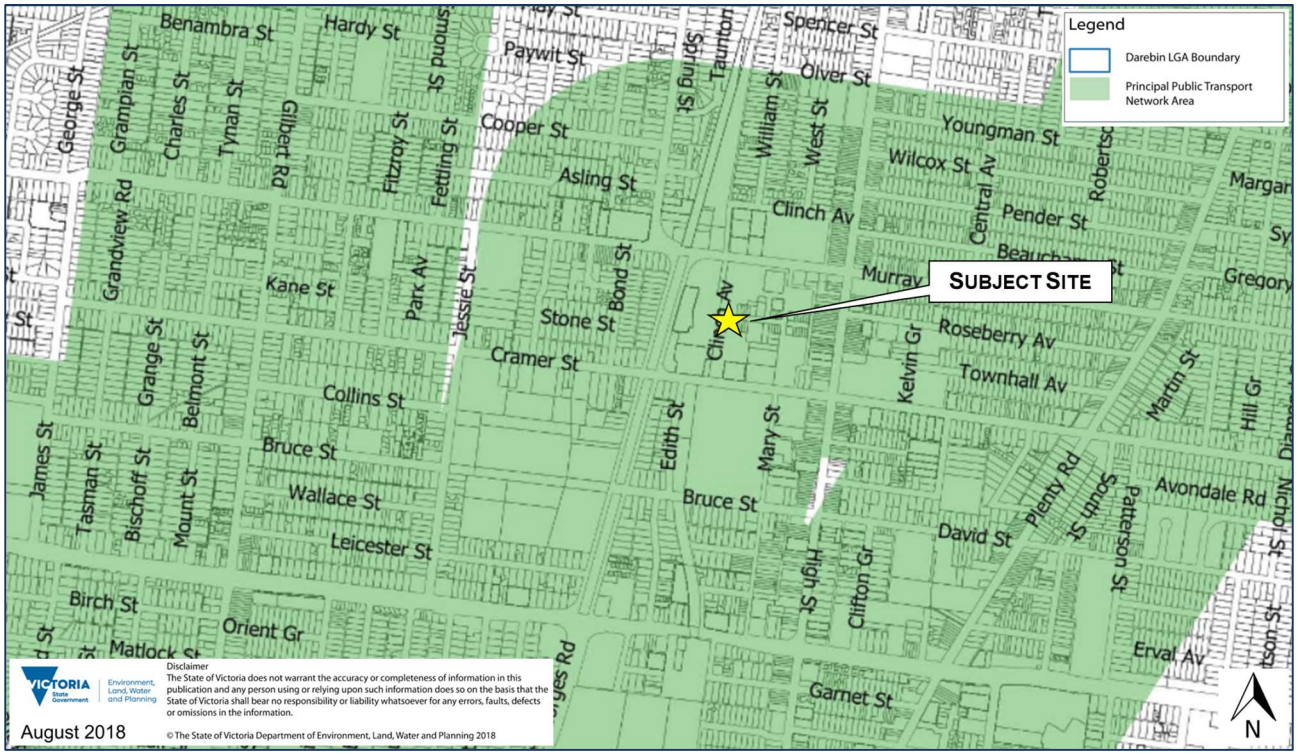
- Level crossing removal project – It has been confirmed that the rail line will be raised over Cramer Street and Murray Road along the Mernda rail corridor, in close proximity to the Preston Market;
- New train station – As part of the level crossing removal, the existing train station will be redeveloped accordingly to match the raised rail line. It is understood that the station's location will remain generally midway between Murray Road and Cramer Street;
- Change to the project boundaries – The extent of the subject site boundaries has been expanded to the west to include land between the rail line and St Georges Road. For the purposes of this report, the focus will remain on the main Preston Market site;
- Site works – It was noted in the Existing Conditions report (May 2018) that the fresh food market building adjacent to the west of Aldi had been recently demolished. Since this time, car parking has been established within the previous building footprint area. As a result, approximately 52 car parking spaces have been gained within the area of the subject site; and

> Streets for People – The City of Darebin has identified Cramer Street for inclusion within its 'streets for people' classification, which includes the re-prioritisation of road safety, reduction of vehicle speeds via traffic calming and development of high-quality places for people walking and riding bikes.

2.3 Sustainable Transport

The subject site has excellent access to public transport, with multiple bus routes and a train station available within convenient walking distance. Accordingly, the subject site is located within the 'Principal Public Transport Network" (PPTN), which is incorporated into the Darebin Planning Scheme under Clause 72.04. Figure 2-3 demonstrates the location of the subject site in relation to the PPTN area.

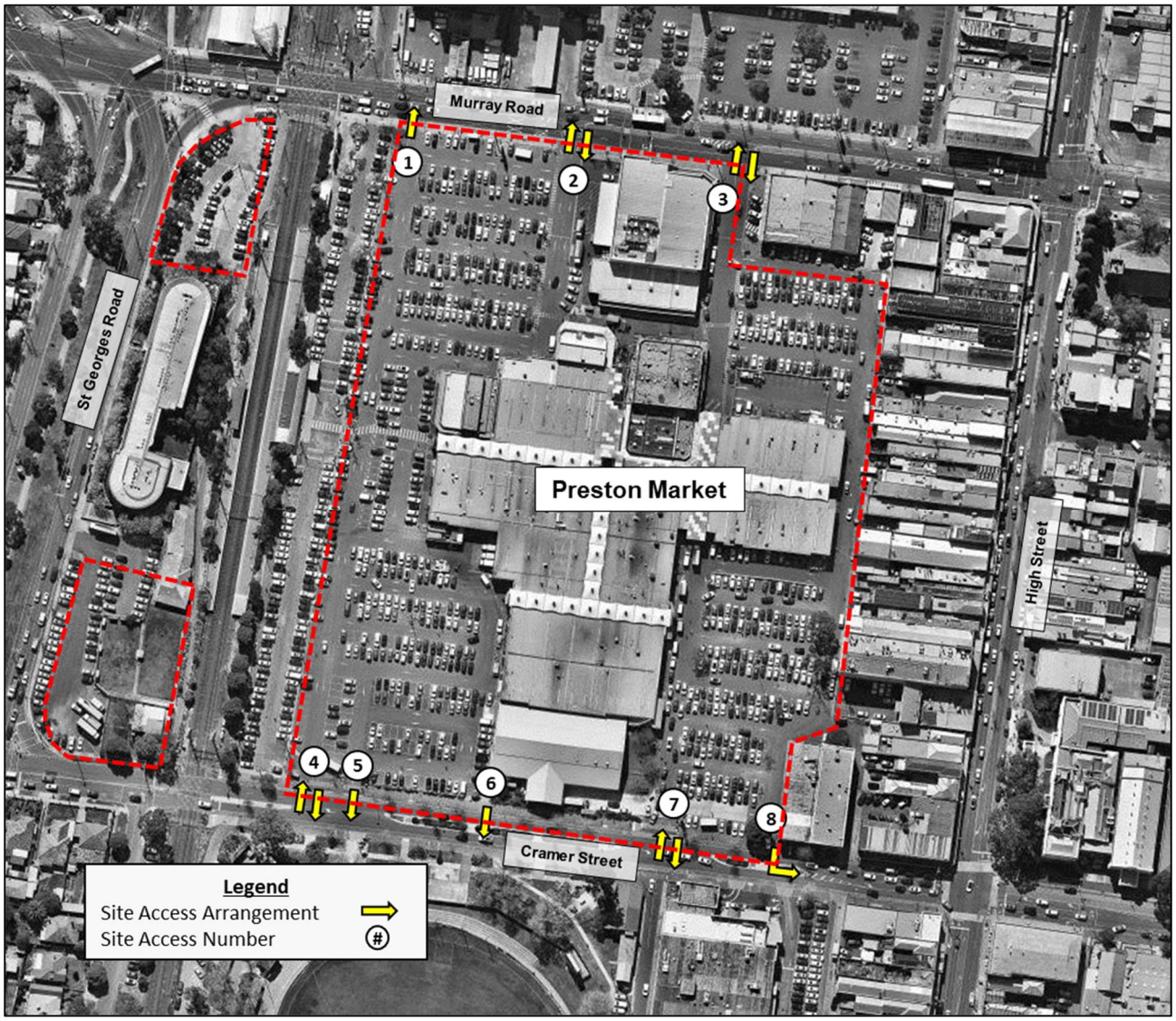
Figure 2-3 PPTN Map



2.4 Summary of Site Access Arrangements

The Preston Market has a total of 8 vehicle access points to the site facilitating both ingress and egress movements, with 3 located along the northern site boundary on Murray Road, and the remaining 5 located on the southern site boundary on Cramer Street (refer to Figure 2-4). All of the market's access points are un-signalised, with priority given to through traffic on the frontage roads.

Figure 2-4 Site Access Points



2.5 Level Crossing Removal Works

Preston train station will be elevated to remove two level crossings (at Murray Road and Cramer Street).

The exact extent of how traffic behaviour will change in this area is unknown once these level crossings are removed without undertaking in-depth analysis or consultation with the level crossing removal authority (LXRA). We do know via the existing conditions report that minimal traffic growth occurred across the surrounding network over the previous 5 year period. Therefore, minimal traffic growth within the network should be considered as a realistic post-crossing removal scenario.

3 Draft Preston Market Precinct Structure Plan

3.1 Purpose

The Draft PSP is a long-term plan that provides the framework to guide future development in the precinct. It sets out the future vision for the precinct and describes how the land is expected to be developed including the layout, built form, transport and public realm.

The intent of the PSP will be implemented through the Darebin Planning Scheme which will be amended to introduce new planning controls that reflect the future vision for the precinct.

Future development applications in the precinct will then be negotiated and assessed by the Council with respect to the PSP and Planning Scheme Provisions.

The PSP will also inform the preparation of policies, guidelines and plans by Council that support the retention and enhancement of precinct qualities that cannot be regulated solely through the Darebin Planning Scheme.

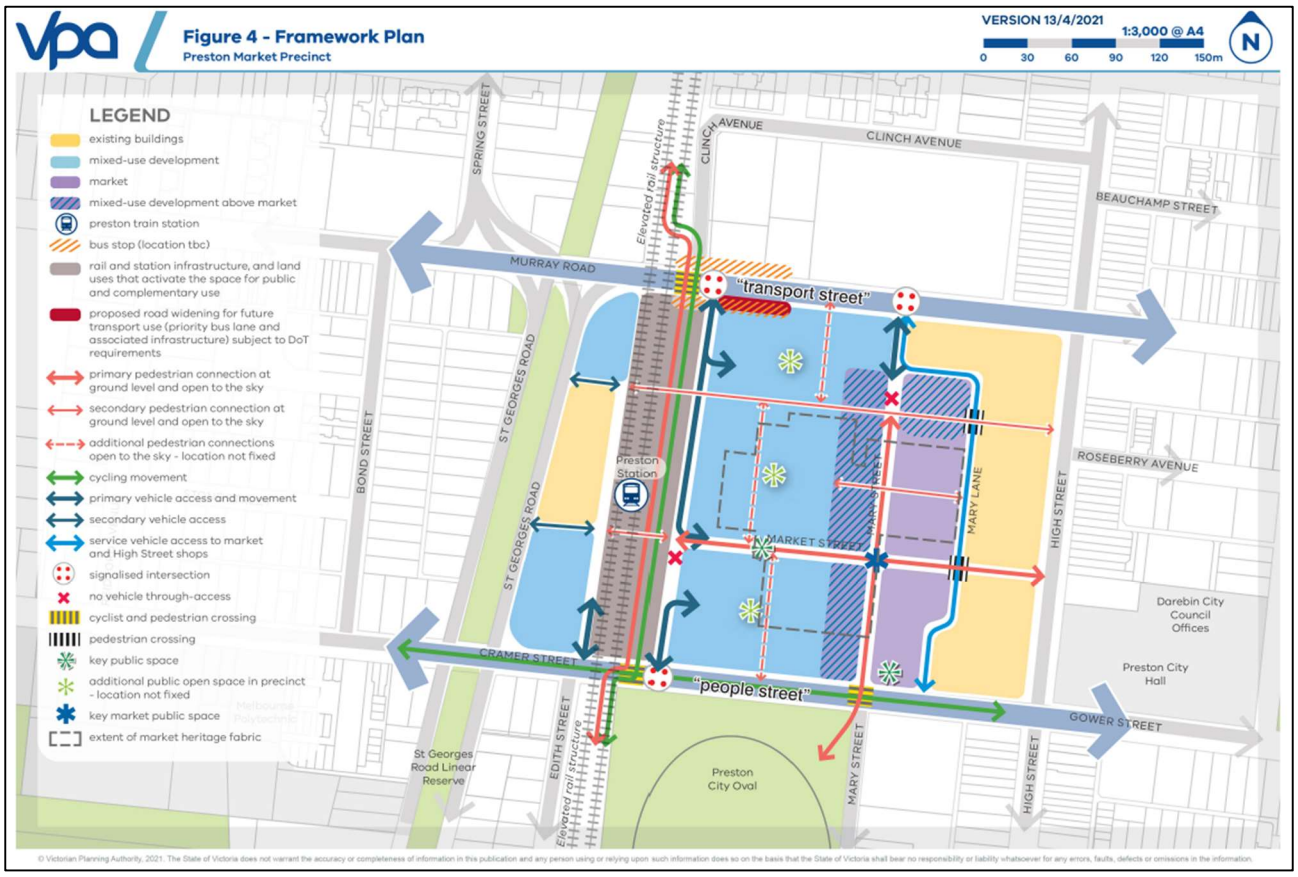
It should be noted that the Preston Market site abuts two Road Zone 1 roads (Murray Road and St Georges Road), so future planning permit applications will be referred to the Department of Transport (DoT, formerly known as VicRoads) under Clause 52.29 and Clause 66.03 of the Planning Scheme.

3.2 Draft Precinct Structure Plan

Figure 3-1 presents the overarching draft Preston Market Framework Plan (13/4/2021), which includes the following key features in relation to movement and access:

- Exclusive market service and delivery vehicle access off Murray Road and Cramer Street via Mary Street, between the market building and the back of the High Street retail premises;
- A vehicle access point to the northern half of the precinct off Murray Road and an access point off Cramer Street to the southern half of the precinct, both immediately east of the rail corridor, anticipated to provide access to the residential component of the site;
- A vehicle access point is also proposed further east along Murray Road providing access for car parking and delivery vehicle purposes. At the eastern end of Cramer Street, a left-in left-out access point is proposed;
- Access to the development opportunities immediately west of the rail line are to be provided directly via St Georges Road;
- Two primary north-south pedestrian links are nominated in the draft PSP: Market Street, and immediately east of the rail line;
- Primary east-west pedestrian access to the precinct is provided at two locations off High Street through the retail blocks, connecting through to St Georges Road under the elevated rail line; and
- The off-road shared trail running along the St Georges Road median will provide a key active transport linkage to the market precinct.

Figure 3-1 Preston Market Draft Precinct Structure Plan (Framework Plan)



Draft Preston Market Precinct Structure Plan, May 2021 (VPA)

3.3 Proposed Land Uses

The following indicative land uses are proposed within the market precinct and summarised within Table 3-1. Yields were provided by the VPA based on the draft PSP:

- Around 2,200 apartments are proposed. The apartments will be comprised of a mix of 1, 2 and 3 or more bedroom dwellings;
- Approximately 27,500 sqm of retail floor space is proposed;
- The relocated market will comprise a gross floor area of approximately 12,700 sqm;
- Approximately 5,000 sqm of office floor area is proposed, generally to be located within the lower floors of the proposed development areas; and
- The total number of car parking spaces to be provided across the subject site is expected to be around 2,000 spaces, which translates to an area of approximately 73,500 sqm.

Table 3-1 Indicative Schedule of Proposed Land Uses

Land Use	Gross Floor Area (sqm)	Number
Residential	181,000	2,200 Dwellings
Retail	27,500	-
Market	12,700	-
Office	5,000	-
Car Parks	73,500	2,000
Open Space	8,000	-

**Note: This table is indicative only and land uses are potentially subject to change at subsequent approval stages, and will be assessed individually as development progresses.*

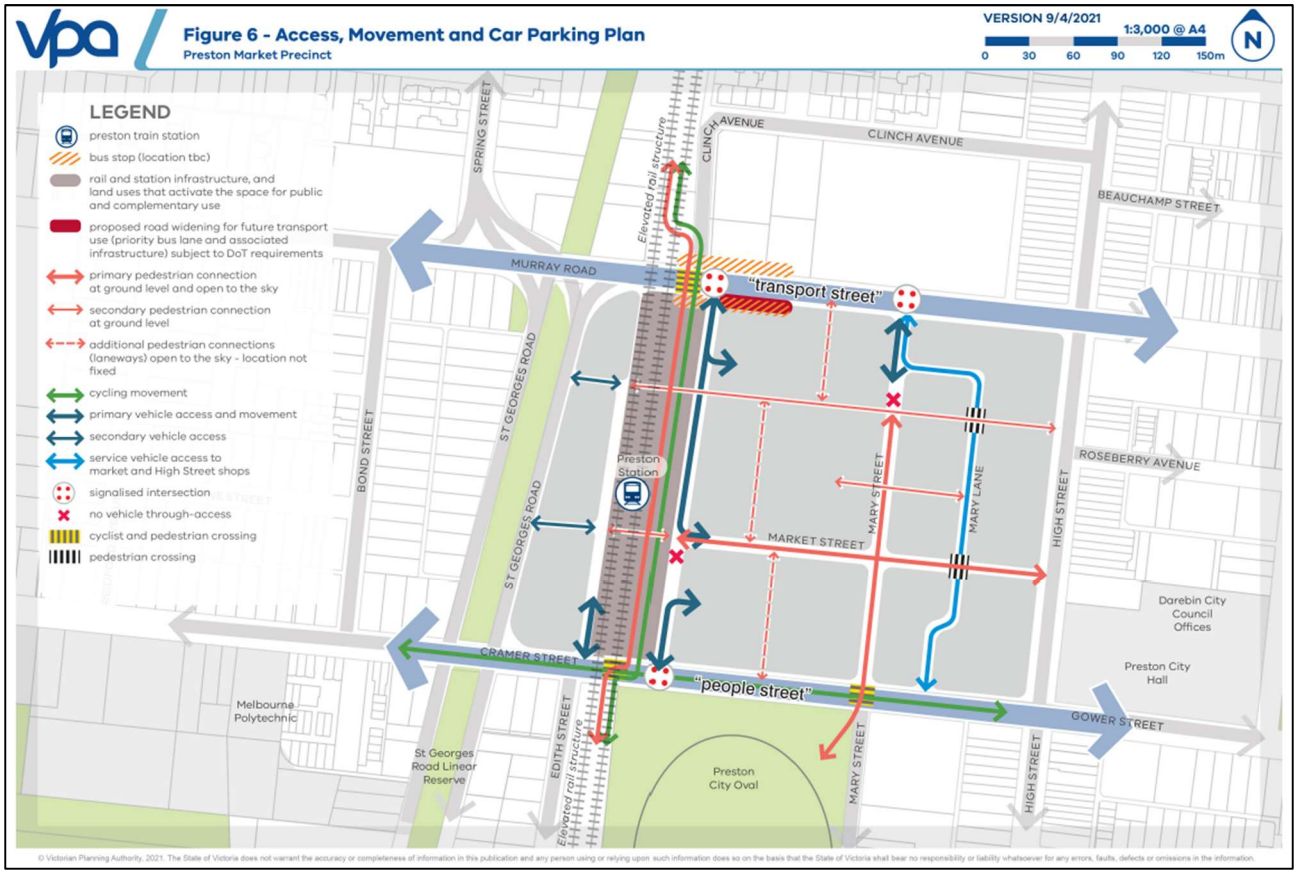
3.4 Access and Movement Plan

Figure 3-2 shows the Movement and Access Plan from the Draft PSP, illustrating the proposed movement network and access points within the context of the immediate transport network.

Key movement and access features in the context of the surrounding street network include:

- The market precinct is bound within the retail premises along High Street to the east, the key north-south St Georges Road arterial link to the west, Murray Road to the north, and Cramer Street to the south;
- The Mernda rail line passes through the western side of the precinct, with the rail line and Preston Station to be elevated as part of the Level Crossing Removal Project;
- Murray Road is to be promoted as the higher order east west 'Transport Street', with the promotion of through vehicle movements, and the provision of bus services; and
- Cramer Street is being promoted by Council as the lower order east-west 'People Street' and has an existing single vehicle and single bicycle lane in each direction with a 3 metre wide central median in proximity to the market precinct. The intention of the 'People Street' is to promote a more inviting pedestrian environment on active frontages combined with pedestrian and cycling infrastructure.

Figure 3-2 Draft Preston Market Precinct Structure Plan (Access, Movement and Car Parking Plan)



Draft Preston Market Precinct Structure Plan, May 2021 (VPA)

The future development of the precinct will require a multi-modal transport approach which prioritises walking, cycling and public transport ahead of cars and minimises car parking provisions as a strategic means to limit traffic generation. This response is typically multi-faceted and includes the following measures to promote improved precinct accessibility:

- Encouraging walking, cycling and public transport use;
- Adopting progressive parking rates and controls; and
- Making the most of the available transport system.

4 Car Parking Assessment

4.1 Planning Scheme Requirements

Clause 52.06 of the Darebin Planning Scheme sets out the car parking requirements for the subject site. In particular, Clause 52.06-5 sets out car parking rates for particular land uses, specifying two rates (Column A and Column B) for each listed land use. Clause 52.06 states that Column B applies if:

- *"any part of the land is identified as being within the Principal Public Transport Network Area as shown on the Principal Public Transport Network Area Maps"; or*
- *"a schedule to the Parking Overlay or another provision of the planning scheme specifies that Column B applies."*

In this instance, Column B is adopted due to the site's location within the PPTN.

The precinct's car parking requirements according to Clause 52.06 of the Darebin Planning Scheme are summarised in Table 4-1, as relevant to the proposed indicative land uses:

Table 4-1 Clause 52.06 Column B Car Parking Rates

Use	Rate	Car parking Measure
Dwelling	1	Space per one or two bedroom dwelling
	2	Spaces per three or more bedroom dwelling (separate studies or studios counted as a bedrooms)
	0	Visitor spaces for every 5 dwellings (developments of 5 or more dwellings)
Market	3.5	Spaces per 100 sqm of site area
Shop	3.5	Spaces per 100 sqm of leasable floor area
Office	3	Spaces to each 100 sqm of net floor area

4.2 Decision Guidelines

Beyond the PSP Planning process, the provision of car parking will be determined as part of future planning permit applications. It is noted however that the precinct is a strategic development site located within a major activity centre and adjoining a major train station. Based on the general approach of prioritising active transport as set out in the PSP, it is recommended that car parking for new development is not over supplied, in order to discourage private car use.

In this regard, the car parking provision rates set out in Clause 52.06 of the Darebin Planning Scheme should be considered maximum rates, and a Car Parking Demand Assessments should be undertaken for each stage/component of the development, as they are proposed.

In accordance with the requirements of Clause 52.06-7 Car Parking Demand Assessments should consider:

> *"The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.*

> *The variation of car parking demand likely to be generated by the proposed use over time.*

> *The short-stay and long-stay car parking demand likely to be generated by the proposed use.*

> *The availability of public transport in the locality of the land.*

> *The convenience of pedestrian and cyclist access to the land.*

> *The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.*

> *The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.*

> *Any empirical assessment or case study."*

4.3 Car Parking Provision

Following on from the statutory car parking context set out above, an assessment of car parking demand has been undertaken for the precinct's intended land uses, given the site's strategic intent to limit private vehicle transport in favour of promoting sustainable transport modes.

It is understood from the draft PSP that the car parking is likely to be provided within each of the building footprints including the residential, retail, and market buildings.

An assessment of the car parking requirements has been undertaken. Given that the market precinct lies within 400 metres of the Principle Public Transport Network (PPTN), the statutory parking requirement can be determined using Table 1 Column B rates under Clause 52.06 of the Planning Scheme.

Furthermore, in order to encourage sustainable transport modes, it is considered appropriate to adopt reduced car parking rates for the site, supported by the surrounding public transport infrastructure.

Table 4-2 illustrates the total parking requirement for the precinct under existing Planning Scheme statutory rates and also a 50% dispensation, which are considered appropriate having regard to:

- The site's excellent access to public transport including:
  - Preston Railway Station;
  - Excellent access to four (4) bus routes that travel along the site boundaries; and
- Very good cycling and pedestrian connectivity including the St Georges Road shared path and on-street bike path on Cramer Street which will be supported throughout the delivery of the PSP.

Table 4-2 Car Parking Requirements

Land Use	Area / No.	Column B Rate	Requirement	50% Rate
1 Bed Apartment	770 No.	1 space per dwelling	770 spaces	385 spaces
2 Bed Apartment	1,210 No.	1 space per dwelling	1,210 spaces	605 spaces
3+ Bed Apartment	220 No.	2 spaces per dwelling	440 spaces	220 spaces
Market / Retail	40,200 m^2	3.5 spaces to each 100m^2	1,407 spaces	703 spaces
Office	5,000 m^2	3.0 spaces per 100m^2 net floor area	150 spaces	75 spaces
Total	-	-	3,977 spaces	1,988 spaces

Notes: - The areas currently specified for retail and office land uses are based on Gross Floor Areas (GFA), not leasable or net floor areas, however for the purposes of this assessment, the GFA has been conservatively adopted.
- Market and retail land uses have been combined for the purpose of this high level assessment.
- The breakdown of the dwelling distribution is indicative for the purposes of this analysis. Future planning applications for individual stages/components of the development will assess the car parking requirements based on more relevant areas.

Based upon a review of the site's location, surrounding public transport infrastructure and strategic intentions, the 50% parking rates are considered achievable and will assist the site to achieve reduced reliance upon private vehicle transport as the main mode of transport for residents, staff and visitors alike.

5 Traffic Assessment

The following section summarises the potential ultimate traffic generated by the Draft PSP (May 2021) within the precinct, and the expected distribution to the connecting road network. The traffic generation rates used in this report are based on data provided by the NSW Roads & Maritime Services (RMS) and first principles assessments based upon reduced car parking rates.

5.1 Methodology

A traffic impact assessment of the road network adjoining the Market Precinct has been undertaken to understand how it is expected to operate when developed under the draft PSP. The road network that has been considered includes:

- Murray Road between High Street and St Georges Road;
- Cramer Street between High Street and St Georges Road;
- St Georges Road between Murray Road and Cramer Street; and
- Mary Street between Murray Road and Cramer Street.

In terms of the impact of the level crossing removal project on Murray Road and Cramer Street, the existing conditions report found that minimal traffic growth occurred over the last five (5) year period. Therefore, minimal traffic growth within the network has been adopted as a realistic post-crossing removal scenario in these areas.

It is noted that the following points are also taken into consideration when applying the proposed traffic generation rates:

- The precinct site boundary is directly adjacent to Preston Railway Station;
- The precinct has four (4) bus routes that travel along the site boundaries; and
- The precinct has great cycling connections including the St Georges Road shared path and an on-street bike path on Cramer Street.

5.2 Traffic Generation

5.2.1 Residential

Traffic generation data was published by the NSW Transport, Roads and Maritime Services in *Technical Direction TDT 2013/04A (August 2013)*. The traffic generation data considers surveys that were undertaken for developments greater than six storey residential buildings with close proximity to public transport.

The average weekday rates, as set out by the RMS document are summarised below:

- *AM peak hour:* *0.15 vehicle trips per car parking space*
- *PM peak hour:* *0.12 vehicle trips per car parking space*

5.2.2 Market/Retail

The traffic generation for the market and retail component of the development has been calculated on the basis of vehicle trips per car parking space. This method has been adopted to compliment the reduced parking provisions for this site.

The traffic generation rates for market and retail uses are summarised below:

- *Friday AM peak hour:* *1 vehicle trip per car parking space*
- *Friday PM peak hour:* *2 vehicle trips per car parking space*
- *Saturday peak hour:* *2 vehicle trips per car parking space*

5.2.3 Office

The traffic generation for the office component of the development has been calculated on the basis of vehicle trips per car parking space. This method has been adopted to compliment the reduced parking provisions for this site and is based on first principles.

The traffic generation rates adopted for the office component of the development are summarised below:

> Friday AM peak hour: 0.5 vehicle trip per car parking space

> Friday PM peak hour: 0.5 vehicle trips per car parking space

> Saturday peak hour: 0 vehicle trips per car parking space

5.2.4 Combined Traffic Generation

Table 5-1 illustrates the peak hour vehicle trips generated that have been determined appropriate considering the abovementioned traffic generation rates. It is noted that the Mary Street / High Street shops refers to the existing strip of shops generally fronting the west side of High Street, to the immediate east of the subject site, and has been based on a rate of 2.0 vehicle movements per hour per shop/dwelling.

Table 5-1 Peak Hour Traffic Generation

Dwelling / Retail	Peak Hour Trips Generated		
	AM Peak	PM Peak	Saturday
Apartment (High Density)	174	139	174
Market/Retail	703	1406	1406
Office	38	38	0
Mary Street / High Street Shops	76	76	76
Total	**991**	**1,659**	**1,656**

5.3 Traffic Distribution

The distribution of traffic onto the surrounding road network is determined by a range of factors, including:

> The directional split in each of the peak hours for each individual land use proposed.

> The internal road network and proximity of the proposed car parks within the precinct to the relevant access points (discussed in subsequent sections of this report);

The assumed peak hour distribution proportions are provided in Table 5-2 below.

Table 5-2 Peak Hour Traffic Split Distribution

Access Intersection	Traffic Distribution Proportion		
	AM Peak	PM Peak	Saturday
Murray Road (West)	15%	15%	15%
Murray Road (East)	60%	60%	60%
Cramer Street (West)	24%	24%	24%
Cramer Street (East)	1%	1%	1%
Total	**100%**	**100%**	**100%**

As the two western-most development blocks in the Draft PSP have direct frontage to St Georges Road, traffic distribution will occur directly onto St Georges Road. It is understood that 13% of the apartments and 15% of the floor area (for retail and office uses) and corresponding car parking will be provided within these two blocks.

The directional flow of traffic generated varies depending on the land use and the peak hour and is shown in Table 5-3 below.

Table 5-3 Peak Hour Precinct Traffic Flows

Access	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Murray Road (West)	72	45	118	101	101	203	101	101	202
Murray Road (East)	287	185	472	406	406	811	406	406	812
Cramer Street (West)	100	74	174	142	162	304	142	162	304
Cramer Street (East)	19	73	22	27	7	34	27	7	34
High Street (North)	30	8	38	8	30	38	19	19	38
High Street (South)	30	8	38	8	30	38	19	19	38
Total	**538**	**393**	**862**	**692**	**736**	**1,428**	**714**	**714**	**1,428**

5.4 Access and Circulation

5.4.1 Vehicle Access Principles

Key movement and access features in the context of the surrounding street network include:

- The market precinct is bound within the retail premises along High Street to the east, the key north-south St Georges Road arterial link to the west, Murray Road to the north, and Cramer Street to the south;
- The Mernda rail line passes through the western side of the precinct, with the rail line and Preston Station to be elevated as part of the Level Crossing Removal Project;
- Murray Road is to be promoted as the higher order east-west 'Transport Street', with the promotion of through vehicle movements and the provision of bus services; and
- Cramer Street is being promoted by Council as the lower order east-west 'People Street', and has a single vehicle and single bicycle lane in each direction with a 3 metre wide central median. It is expected that Cramer street will have a higher emphasis on active frontages, pedestrian and cycling infrastructure.

The key aims for the frontage road interfaces include:

- Providing primary vehicular access to and from Murray Road; and
- Minimising the number of vehicular access points to Cramer Street.

Based on the draft PSP, the ultimate site access points are as follows:

- A new signalised T-intersection at the intersection of Mary Street and Murray Road;
- A new signalised four-way intersection in Murray Road and Clinch Avenue, at the western edge of the market site;
- A new signalised T-intersection in Cramer Street at the western market access point; and
- A new give way controlled left-in left-out intersection at the eastern Cramer Street intersection with Mary Street.

5.4.2 Intersection Turning Movements

In order to assess the access intersection requirements, the future turning movement volumes have been derived for the AM and PM peak and Saturday peak periods. These have been derived under the following assumptions:

- The traffic generation and distribution numbers as outlined in Section 5.3, having regard to *Figure 6 – Access, Movement and Car Parking Plan (Draft Preston Market Precinct Structure Plan, May 2021)*;

The intersection turning movement volumes and analysis has been provided in Appendix B.

6 Traffic Analysis

6.1 Introduction

This section will review the potential traffic impact of the redevelopment of the Preston Market Precinct based on the Draft PSP provided by the VPA. Traffic analysis has been undertaken to inform site characteristics and any potential issues that may arise in the future.

As previously mentioned, no additional traffic relating to the level crossing removal has been accounted for within this assessment. This is due to the uncertainty in how this area will operate post raised rail line in this area. It is worth considering that whilst removing the level crossings is generally expected to improve traffic efficiency, in this instance the proximity to St Georges Road may still cause congestion on Murray Road and St Georges Road during peak traffic periods.

6.2 SIDRA Intersection Analysis

Each of the intersections providing access to the precinct has been assessed using the SIDRA intersection modelling software to determine the performance of the intersection. This provides information about the capacity of an intersection in terms of a range of parameters, as further discussed below.

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 6-1 below. It is noted that the D.O.S rating can be referred to in terms of operating conditions.

Table 6-1 Rating of Degrees of Saturation (operating conditions)

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

It is considered acceptable for some critical movements in an intersection to operate in the range of 0.9 to 1.0 during the high peak periods, reflecting actual conditions in a significant proportion of suburban signalised intersections.

The ***95th Percentile (95%ile) Queue*** represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour; and

Average Delay is the delay time, in seconds, which can be expected over all vehicles making a particular movement in the peak hour.

A summary of the SIDRA results for each intersection is shown in Table 6-2 to Table 6-5, with the implications on each intersection discussed below and the more detailed SIDRA outputs provided in Appendix C. It is further noted that the following intersection naming conventions are to be read in conjunction with the detailed SIDRA outputs.

6.2.1 Murray Road Western Access (Clinch Avenue)

Table 6-2 summarises the SIDRA assessment results for the Murray Road / Clinch Avenue access intersection, controlled by traffic signals. Signals are recommended at this intersection given the opposing traffic from the Clinch Avenue leg.

Table 6-2 Murray Road / Northern Precinct Access Peak Hour SIDRA Intersection Results

Approach	AM Peak			PM Peak			Sat Peak		
	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)
Northern Precinct Access (S)	0.102	33.6	7.5	0.219	34.4	16.6	0.219	34.4	16.6
Murray Road (E)	0.513	21.3	95.4	0.585	22.2	113.1	0.562	21.9	107.4
Clinch Avenue (N)	0.200	46.3	12.2	0.259	46.7	15.8	0.200	46.3	12.2
Murray Road (W)	0.291	14.3	85.6	0.414	15.4	112.8	0.562	15.6	118.9
Intersection	**0.513**	**18.6**	**95.4**	**0.585**	**19.9**	**113.1**	**0.562**	**19.6**	**118.9**

The results shown in Table 6-2 demonstrate that under signalised conditions the site access intersection is expected to operate with moderate queues and delays, and excellent operating conditions in the AM, PM and Saturday peak hour.

It is noted that the intersection has been modelled with a regular cross intersection geometry however the signal phasing reflects that of a staggered T intersection to compliment the DCP concept intersection designs as shown in Appendix D.

6.2.2 Murray Road / Mary Street

Table 6-3 below summarises the SIDRA assessment results for the Murray Road / Mary Street site access intersection, controlled by traffic signals. Signals are recommended at this intersection considering the expected traffic flows and to provide a controlled pedestrian crossing between the market and the commercial precinct to the north (Woolworths site).

Table 6-3 Murray Road / Mary Street Peak Hour SIDRA Intersection Results

Approach	AM Peak			PM Peak			Sat Peak		
	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)
Mary Street (S)	0.451	45.9	33.5	0.513	36.9	66.3	0.537	37.9	67.5
Murray Road (E)	0.865	44.1	155.9	0.352	10.8	63.7	0.356	10.3	64.4
Murray Road (W)	0.840	43.5	111.3	0.525	11.8	52.3	0.529	11.3	50.8
Intersection	**0.865**	**44.1**	**155.9**	**0.525**	**16.5**	**66.3**	**0.537**	**16.2**	**67.5**

The above results demonstrate that under signalised conditions the site access is expected to operate with minimal queues and delays, and excellent service levels in the weekday PM and Saturday peak hours. It is noted that the site access intersection is expected to operate with slightly higher queues and delays, with fair operating conditions in the AM peak hour, however this level of service is acceptable when combined with the morning commuter peak period.

It is noted that whilst the SIDRA assessment results indicate that some queuing may occur back towards the High Street intersection, particularly during the morning peak, signal phasing at this proposed intersection can be optimised through appropriate sequencing to improve operation.

6.2.3 Cramer Street / Mary Street

Table 6-4 below summarises the SIDRA assessment results for the Cramer Street / Mary Street site access intersection, proposed to be controlled by a left-in left-out unsignalised intersection.

Table 6-4 Cramer Street / Mary Street Peak Hour SIDRA Intersection Results

Approach	AM Peak			PM Peak			Sat Peak		
	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)
Mary Street (N)	0.003	7.6	0.1	0.008	7.9	0.2	0.007	7.6	0.2
Cramer Street (E)	0.347	0.1	0.0	0.342	0.1	0.0	0.305	0.1	0.0
Cramer Street (W)	0.274	0.2	0.0	0.300	0.3	0.0	0.270	0.3	0.0
Intersection	**0.347**	**0.2**	**0.1**	**0.342**	**0.3**	**0.2**	**0.305**	**0.3**	**0.2**

The above results demonstrate that under unsignalised conditions the site access intersection is expected to operate with minimal queues and delays, and excellent operating conditions in the AM, PM and Saturday peak hours.

6.2.4 Cramer Street Western Access

Table 6-5 below summarises the SIDRA assessment results for the Cramer Street western access intersection, ultimately to be controlled by traffic signals.

Table 6-5 Cramer Street / Southern Precinct Access Peak Hour SIDRA Intersection Results

Approach	AM Peak			PM Peak			Sat Peak		
	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)	D.O.S.	Delay (secs)	95% Queue (m)
Southern Precinct Access (N)	0.612	52.8	26.4	0.639	46.0	54.0	0.594	44.3	52.6
Cramer Street (E)	0.373	9.8	66.7	0.526	14.5	102.6	0.373	14.7	69.6
Cramer Street (W)	0.654	16.8	147.4	0.659	21.7	138.2	0.617	21.9	124.4
Intersection	**0.654**	**16.3**	**147.4**	**0.659**	**21.7**	**138.2**	**0.617**	**22.5**	**124.4**

The above results demonstrate that under signalised conditions the site access intersection is expected to operate with moderate queues and delays, and very good service levels in the AM, PM and Saturday peak hours. Queues on the western approach will extend back toward St Georges Road, however the queues are considered to be manageable and associated delays and degree of saturation indicate that the approach will operate adequately.

7 Integrated Transportation

It is important that there is a sufficient level of permeability for pedestrians and cyclists through the precinct to provide safe and convenient access from Preston Station, St Georges Road, High Street, Murray Road and Cramer Street.

The Draft PSP indicates one (1) primary east west pedestrian link to connect High Street and St Georges Road through the market building and the wider subject site. This level of pedestrian permeability is supported, given that it will encourage active transport modes and connectivity with the train station. It is recognised that pedestrian safety is paramount at the crossing point on Mary Street, with a formal pedestrian crossing (zebra crossing) provided at Mary Lane. The internal layout of the market should be such that pedestrians are directed to these pedestrian crossings. North-south pedestrian movements across Mary Street should be discouraged to reduce potential conflicts with service vehicles, unless appropriate separation can be provided.

The proposed north-south pedestrian corridors west of Mary Street are supported, with appropriate pedestrian connectivity provided between the Murray Road bus stops, Preston Station, internal public open space and Cramer Street. Pedestrian connectivity is provided between the Preston Market precinct and the commercial precinct to the north (Woolworths supermarket site), with the provision of traffic signals at this intersection to facilitate the safe movement of pedestrians.

Provision is made for pedestrians to safely cross Cramer Street to access walking paths and open space (e.g. Preston Oval) to the south. Facilities are in the form of pedestrian cross walks at traffic signals (at the western end of Cramer Street) and two (2) formal/informal mid-block crossings (one (1) near Preston Station and one (1) at Mary Street).

Connectivity for cyclists is also to be promoted, with adequate access for cyclists provided to the existing on road cycle lanes on Cramer Street, the shared path along the St Georges Road central median and the pedestrian/cycle corridor that will be provided as part of the future elevated rail corridor project. The St Georges Road shared path is a key existing bicycle link which should be maximised in terms of access to the precinct.

8 Conclusions

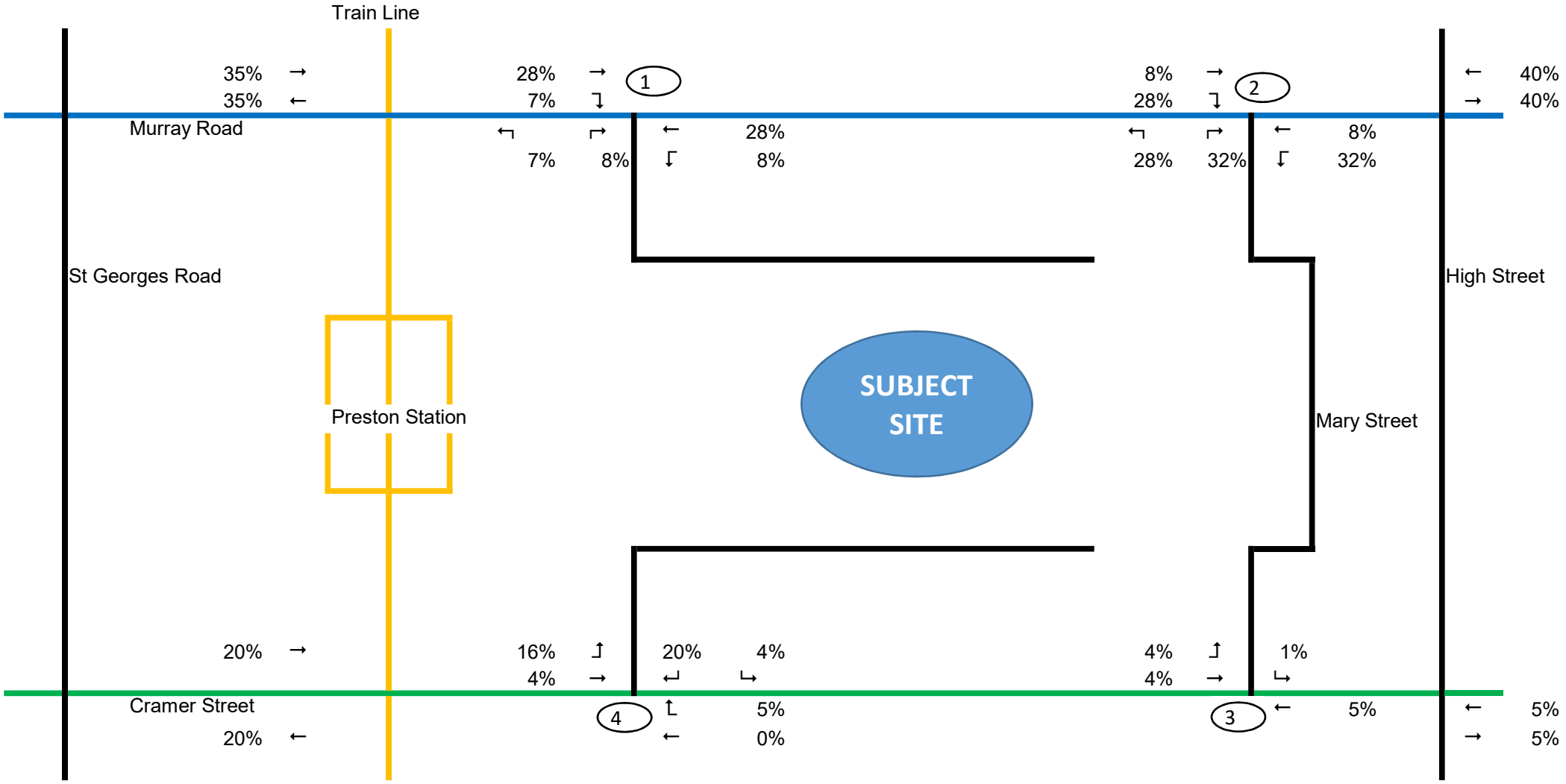
Based upon the preceding assessment, it is concluded that:

- The site's excellent proximity to Preston Railway Station, pedestrian and cycling facilities gives the site a rare opportunity to rely heavily upon sustainable transport modes.
- In order to promote the use of sustainable transport modes, car parking associated with the site is proposed to be provided at rates lower than the statutory requirements.
- The anticipated traffic distribution associated with the site has been derived based upon existing traffic flows associated with the site and surrounding road network.
- Individual stages/components of the development will be subject to Planning Applications which will address the adequacy of car parking, the suitability of specific access arrangements, and their compatibility with the principles and strategies of the Draft PSP.
- Overall, the proposed Draft Framework Plan provides an appropriate access and movement network to support the Preston Market Structure Plan.

APPENDIX

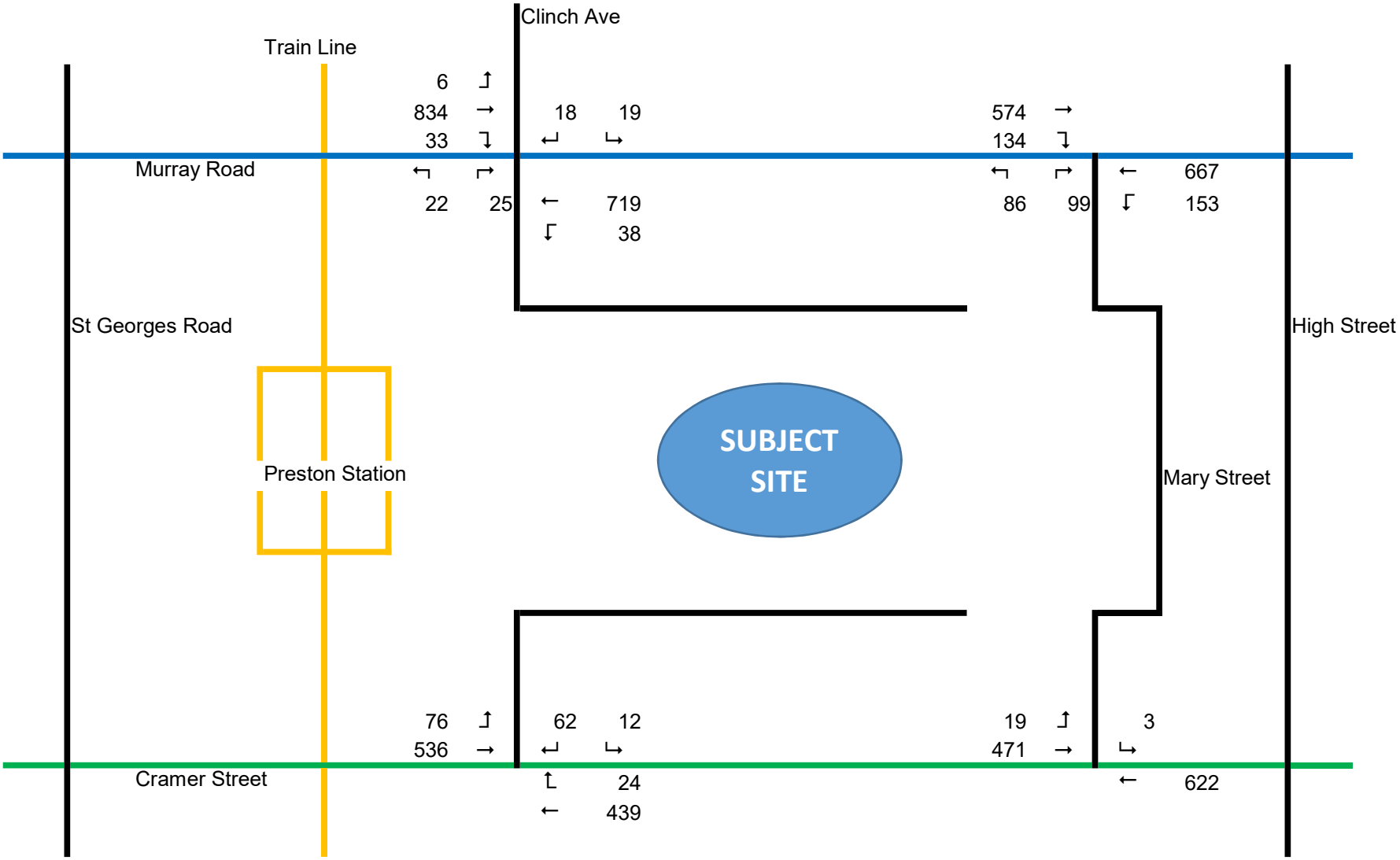
A

INTERNAL DISTRIBUTIONS


Train Line
35%
35%
28%
7%
1
8%
28%
2
40%
40%
Murray Road
7%
8%
28%
8%
28%
32%
8%
32%
St Georges Road
High Street
SUBJECT SITE
Preston Station
Mary Street
20%
20%
16%
4%
20%
4%
4%
4%
1%
Cramer Street
4
5%
0%
3
5%
5%
5%

APPENDIX B

TURNING MOVEMENT SUMMARY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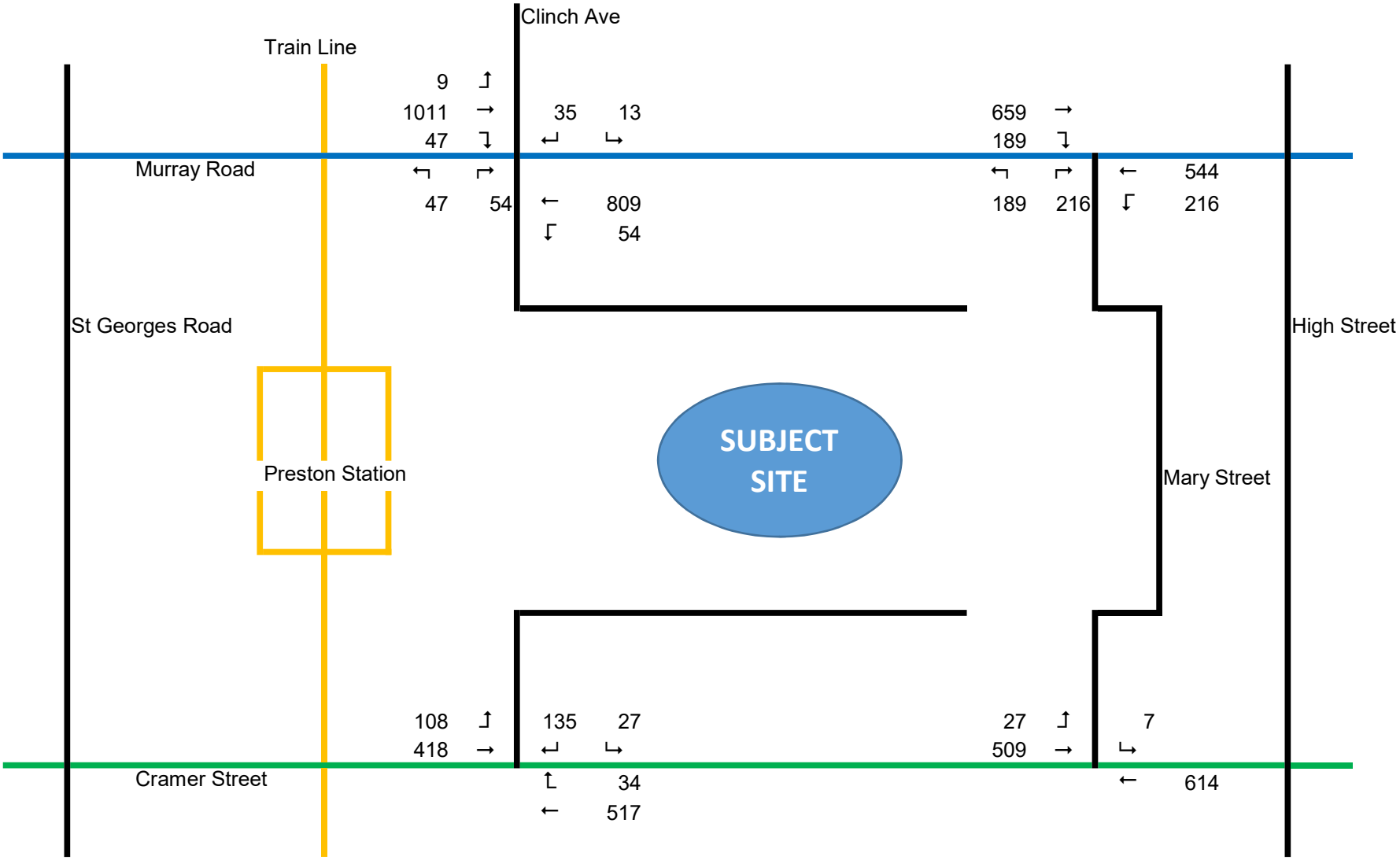
Train Line
6
834
33
18
19
574
134
Murray Road
22
25
719
38
86
99
667
153
St Georges Road
High Street
SUBJECT SITE
Preston Station
Mary Street
76
536
62
12
19
471
3
Cramer Street
24
439
622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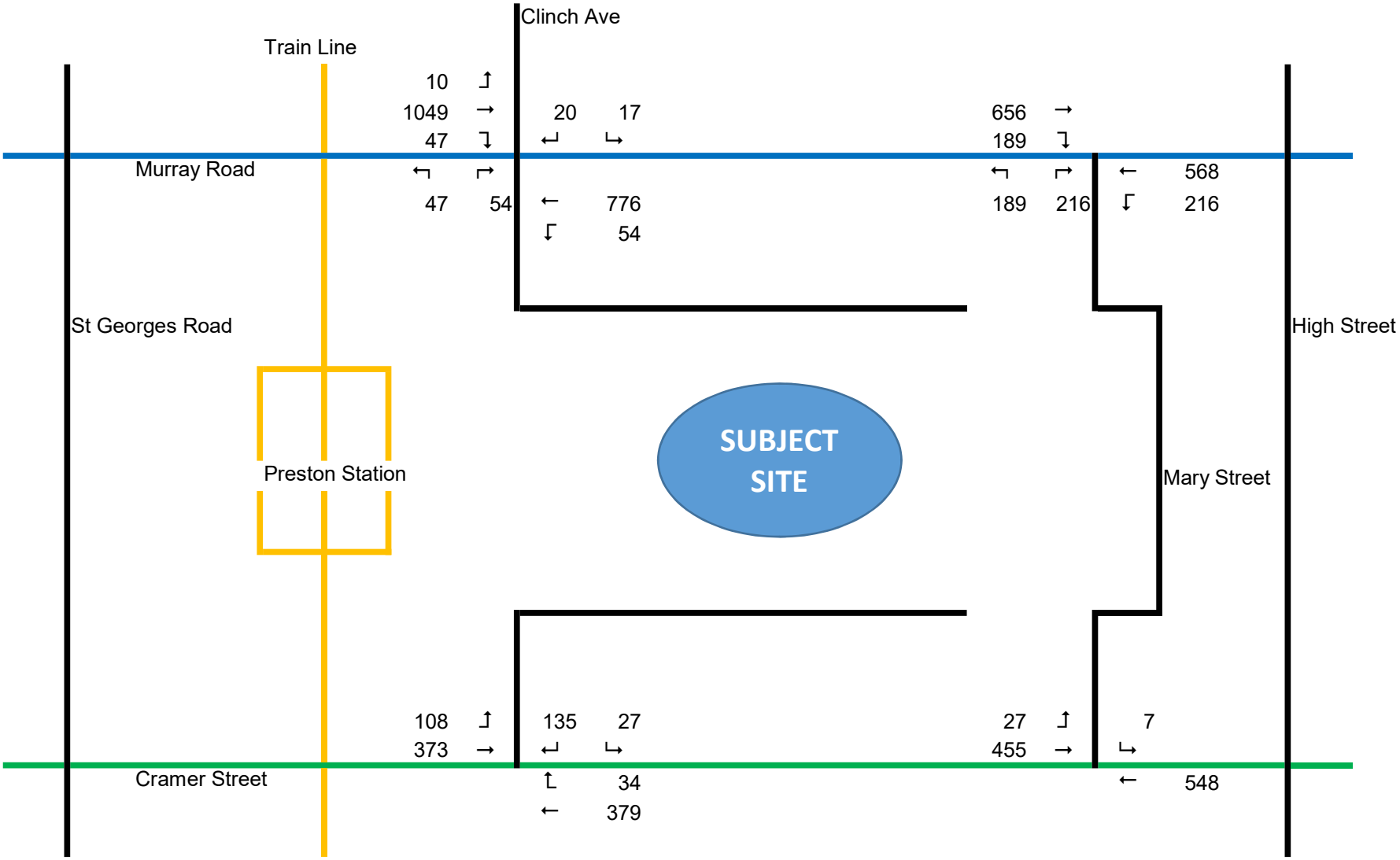
Train Line
9
1011
47
35
13
659
189
Murray Road
47
54
809
54
189
216
544
216
St Georges Road
High Street
SUBJECT SITE
Preston Station
Mary Street
108
418
135
27
27
509
7
Cramer Street
34
517
614


Clinch Ave
Train Line
10
1049
47
20
17
656
189
Murray Road
47
54
776
54
189
216
568
216
St Georges Road
High Street
SUBJECT SITE
Preston Station
Mary Street
108
373
135
27
27
455
7
Cramer Street
34
379
548

APPENDIX C

SIDRA SUMMARY

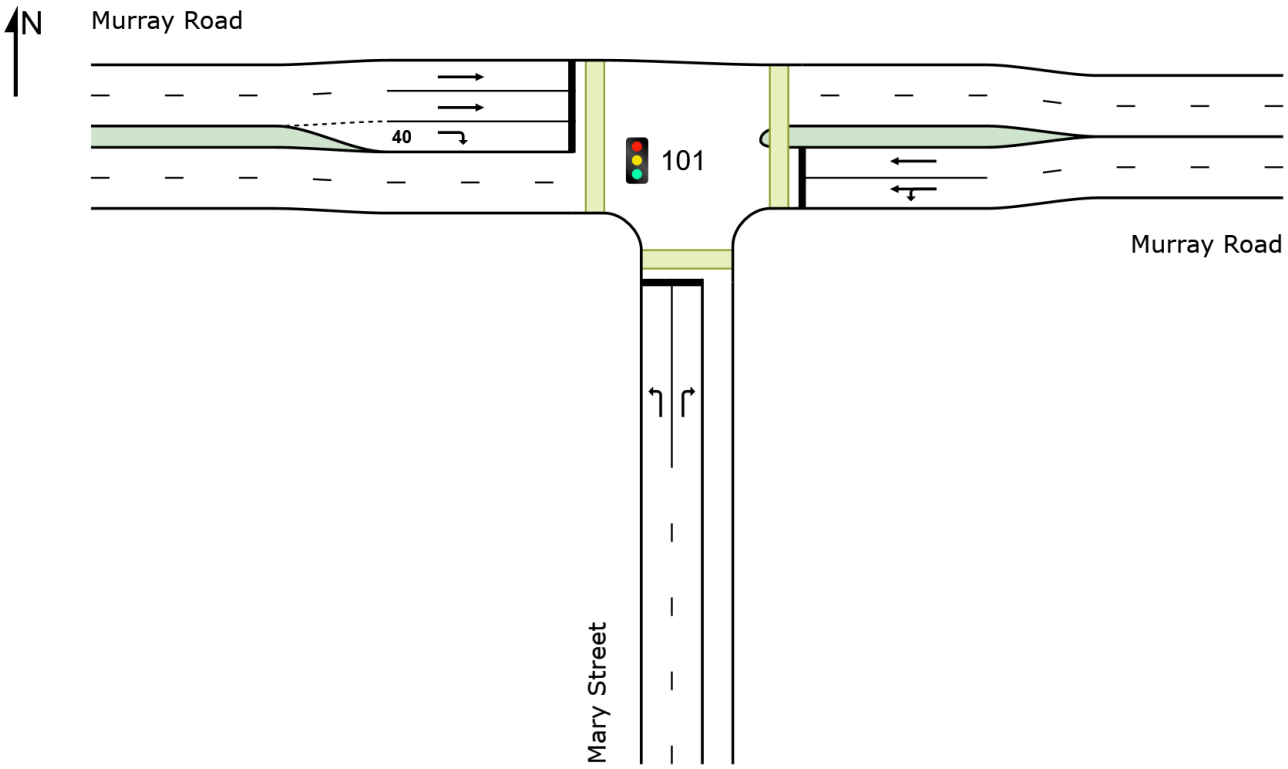
Site: 101 [Murray Road / Mary Street NSI - AM (Site Folder: Report)]

Murray Road / Mary Street NSI - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mary Street														
1	L2	86	10.0	91	10.0	0.392	45.7	LOS D	3.8	28.8	0.96	0.77	0.96	26.6
3	R2	99	10.0	104	10.0	* 0.451	46.1	LOS D	4.4	33.5	0.97	0.78	0.97	26.3
Approach		185	10.0	195	10.0	0.451	45.9	LOS D	4.4	33.5	0.96	0.78	0.96	26.5
East: Murray Road														
4	L2	153	5.0	161	5.0	0.865	48.8	LOS D	21.0	153.3	1.00	1.03	1.25	26.8
5	T1	667	5.0	702	5.0	* 0.865	43.1	LOS D	21.4	155.9	1.00	1.03	1.24	15.4
Approach		820	5.0	863	5.0	0.865	44.1	LOS D	21.4	155.9	1.00	1.03	1.25	18.3
West: Murray Road														
11	T1	574	5.0	604	5.0	* 0.840	44.3	LOS D	15.2	111.3	1.00	0.99	1.25	15.3
12	R2	134	5.0	141	5.0	0.393	40.1	LOS D	5.5	40.3	0.91	0.79	0.91	28.5
Approach		708	5.0	745	5.0	0.840	43.5	LOS D	15.2	111.3	0.98	0.95	1.19	18.5
All Vehicles		1713	5.5	1803	5.5	0.865	44.1	LOS D	21.4	155.9	0.99	0.97	1.19	19.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Mary Street												
P1	Full	50	53	29.7	LOS C	0.1	0.1	0.81	0.81	54.2	31.9	0.59
East: Murray Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	68.1	37.5	0.55
West: Murray Road												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	68.9	38.5	0.56
All Pedestrians		150	158	36.1	LOS D	0.1	0.1	0.89	0.89	63.7	36.0	0.56

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

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	18	36	60
Green Time (sec)	12	13	18	24
Phase Time (sec)	17	19	24	30
Phase Split	19%	21%	27%	33%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

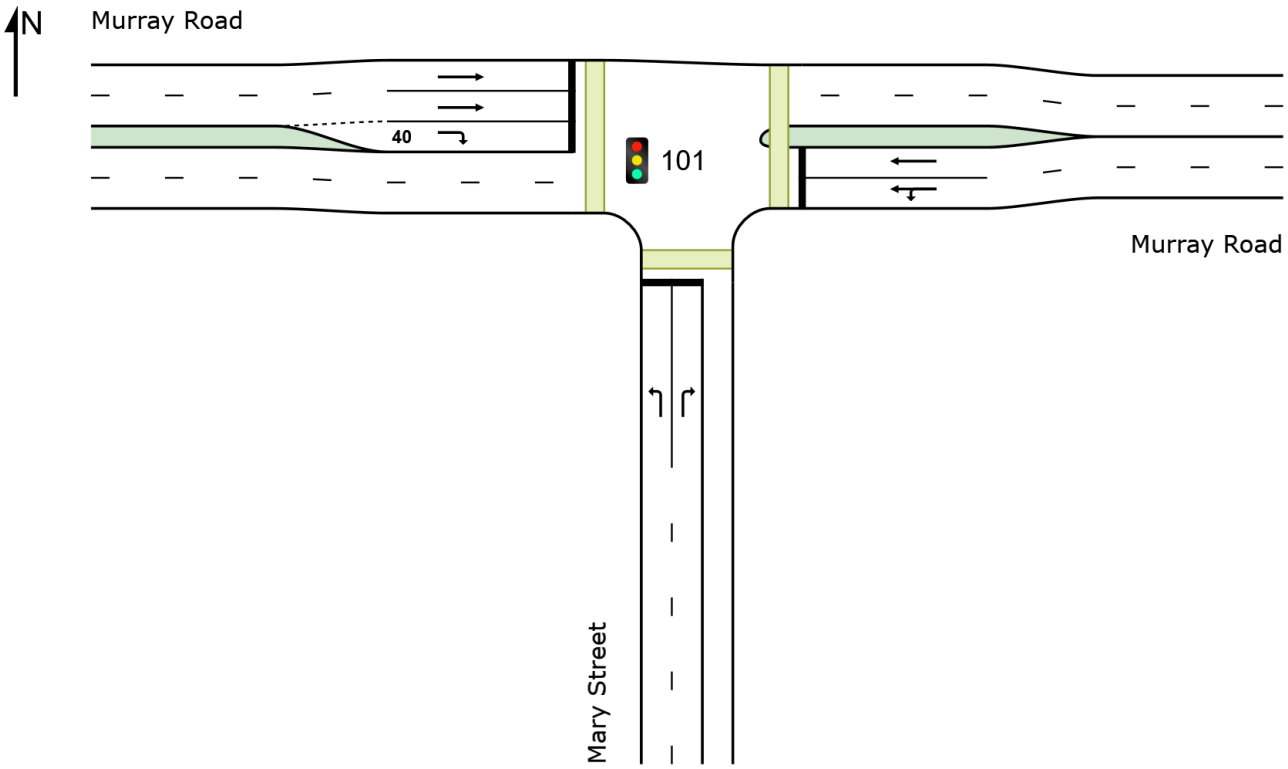
Site: 101 [Murray Road / Mary Street NSI - PM (Site Folder: Report)]

Murray Road / Mary Street NSI - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mary Street														
1	L2	189	10.0	199	10.0	0.449	36.6	LOS D	7.5	56.9	0.89	0.80	0.89	29.8
3	R2	216	10.0	227	10.0	* 0.513	37.1	LOS D	8.7	66.3	0.91	0.81	0.91	29.4
Approach		405	10.0	426	10.0	0.513	36.9	LOS D	8.7	66.3	0.90	0.81	0.90	29.6
East: Murray Road														
4	L2	216	5.0	227	5.0	0.352	14.8	LOS B	8.5	61.9	0.53	0.62	0.53	43.5
5	T1	544	5.0	573	5.0	0.352	9.2	LOS A	8.7	63.7	0.53	0.51	0.53	36.0
Approach		760	5.0	800	5.0	0.352	10.8	LOS B	8.7	63.7	0.53	0.54	0.53	39.4
West: Murray Road														
11	T1	659	5.0	694	5.0	0.301	8.9	LOS A	7.2	52.3	0.51	0.44	0.51	37.9
12	R2	189	5.0	199	5.0	* 0.525	22.0	LOS C	6.0	44.1	0.71	0.79	0.71	36.9
Approach		848	5.0	893	5.0	0.525	11.8	LOS B	7.2	52.3	0.56	0.52	0.56	37.5
All Vehicles		2013	6.0	2119	6.0	0.525	16.5	LOS B	8.7	66.3	0.62	0.59	0.62	35.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Mary Street												
P1	Full	50	53	9.8	LOS A	0.1	0.1	0.47	0.47	34.4	31.9	0.93
East: Murray Road												
P2	Full	50	53	34.7	LOS D	0.1	0.1	0.88	0.88	63.6	37.5	0.59
West: Murray Road												
P4	Full	50	53	35.6	LOS D	0.1	0.1	0.89	0.89	65.2	38.5	0.59
All Pedestrians		150	158	26.7	LOS C	0.1	0.1	0.75	0.75	54.4	36.0	0.66

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

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	29
Green Time (sec)	23	55
Phase Time (sec)	29	61
Phase Split	32%	68%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

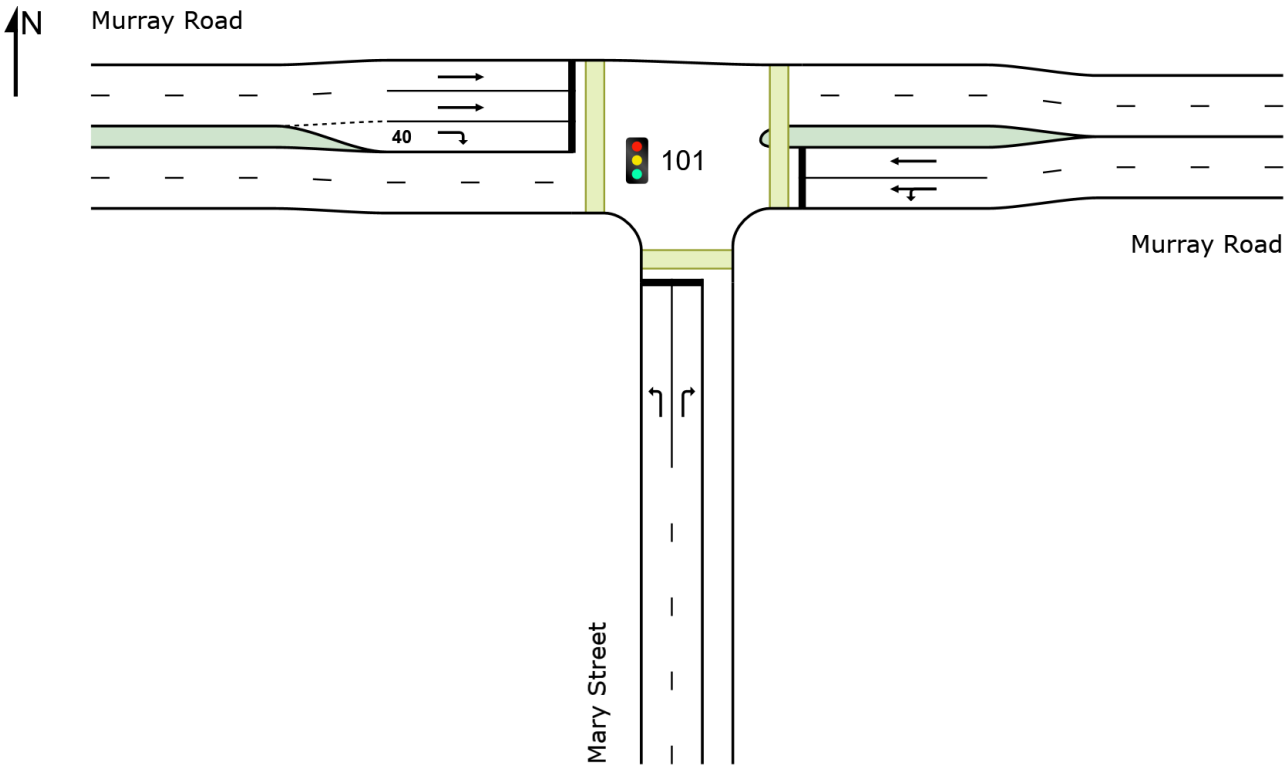
Site: 101 [Murray Road / Mary Street NSI - Sat (Site Folder: Report)]

Murray Road / Mary Street NSI - Sat
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mary Street														
1	L2	189	10.0	199	10.0	0.469	37.5	LOS D	7.6	57.9	0.90	0.80	0.90	29.4
3	R2	216	10.0	227	10.0	* 0.537	38.2	LOS D	8.9	67.5	0.92	0.82	0.92	29.0
Approach		405	10.0	426	10.0	0.537	37.9	LOS D	8.9	67.5	0.91	0.81	0.91	29.2
East: Murray Road														
4	L2	216	5.0	227	5.0	0.356	14.4	LOS B	8.6	62.6	0.52	0.62	0.52	44.0
5	T1	568	5.0	598	5.0	0.356	8.8	LOS A	8.8	64.4	0.52	0.51	0.52	36.6
Approach		784	5.0	825	5.0	0.356	10.3	LOS B	8.8	64.4	0.52	0.54	0.52	39.9
West: Murray Road														
11	T1	659	5.0	694	5.0	0.295	8.4	LOS A	7.0	50.8	0.50	0.43	0.50	38.7
12	R2	189	5.0	199	5.0	* 0.529	21.4	LOS C	6.0	43.6	0.70	0.78	0.70	37.2
Approach		848	5.0	893	5.0	0.529	11.3	LOS B	7.0	50.8	0.54	0.51	0.54	38.1
All Vehicles		2037	6.0	2144	6.0	0.537	16.2	LOS B	8.9	67.5	0.61	0.58	0.61	35.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Mary Street												
P1	Full	50	53	9.4	LOS A	0.1	0.1	0.46	0.46	33.9	31.9	0.94
East: Murray Road												
P2	Full	50	53	35.6	LOS D	0.1	0.1	0.89	0.89	64.5	37.5	0.58
West: Murray Road												
P4	Full	50	53	36.5	LOS D	0.1	0.1	0.90	0.90	66.1	38.5	0.58
All Pedestrians		150	158	27.2	LOS C	0.1	0.1	0.75	0.75	54.8	36.0	0.66

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

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	28
Green Time (sec)	22	56
Phase Time (sec)	28	62
Phase Split	31%	69%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

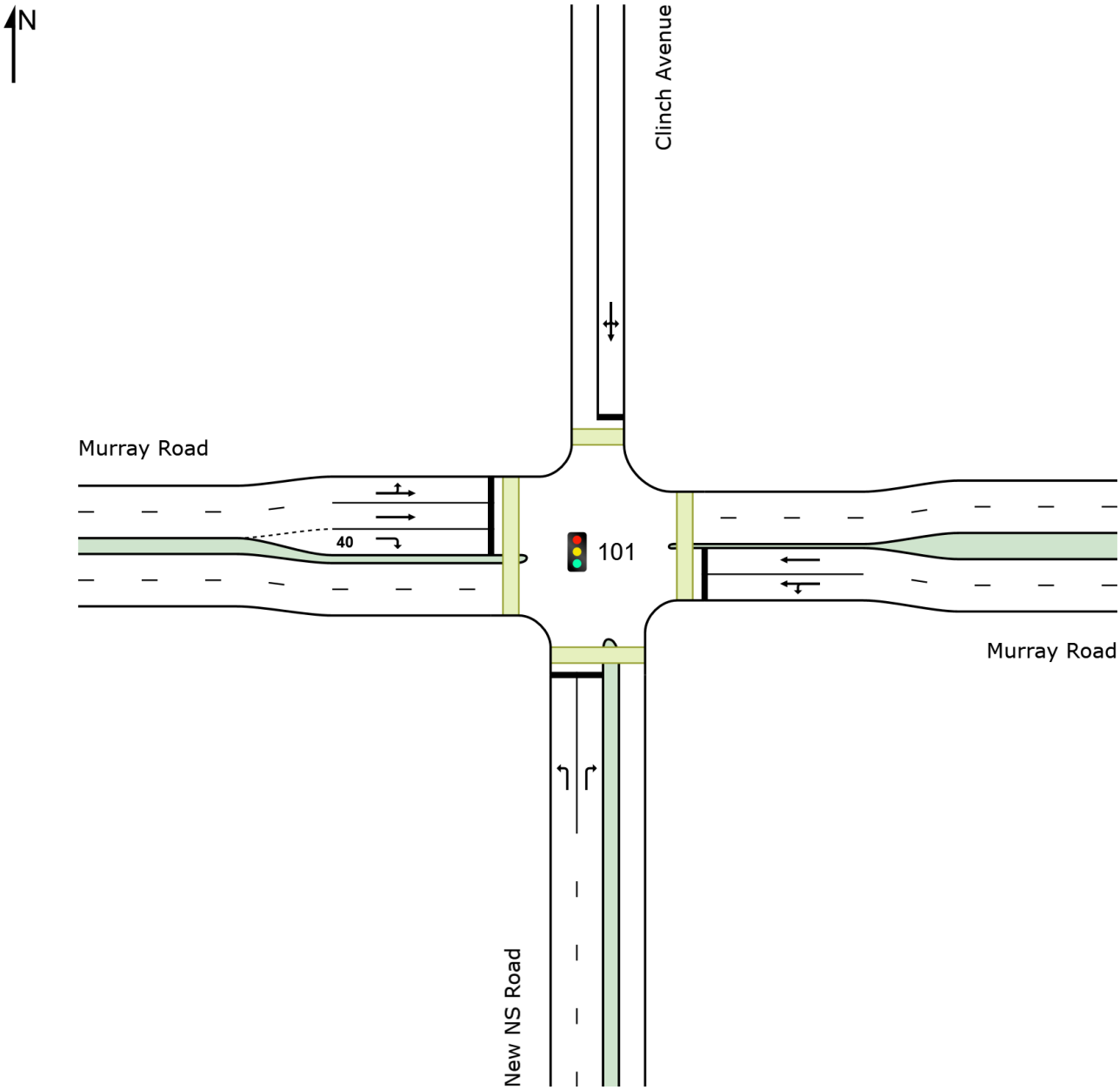
Site: 101 [Murray Road / Clinch Avenue / new NS Road - AM (Site Folder: Report)]

Murray Road / Clinch Avenue / new NS Road - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Split Phasing
Reference Phase: Phase E1
Input Phase Sequence: C, E1, E2, B1
Output Phase Sequence: C, E1, E2, B1

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New NS Road														
1	L2	22	5.0	23	5.0	0.061	23.6	LOS C	0.6	4.2	0.83	0.69	0.83	34.8
3	R2	25	5.0	26	5.0	* 0.102	42.4	LOS D	1.0	7.5	0.90	0.71	0.90	27.8
Approach		47	5.0	49	5.0	0.102	33.6	LOS C	1.0	7.5	0.87	0.70	0.87	30.6
East: Murray Road														
4	L2	38	5.0	40	5.0	0.513	26.3	LOS C	12.9	94.4	0.79	0.70	0.79	37.5
5	T1	719	5.0	757	5.0	* 0.513	21.0	LOS C	13.1	95.4	0.79	0.70	0.79	23.8
Approach		757	5.0	797	5.0	0.513	21.3	LOS C	13.1	95.4	0.79	0.70	0.79	25.0
North: Clinch Avenue														
7	L2	19	5.0	20	5.0	0.200	46.4	LOS D	1.7	12.2	0.94	0.73	0.94	26.7
8	T1	1	5.0	1	5.0	* 0.200	40.8	LOS D	1.7	12.2	0.94	0.73	0.94	34.1
9	R2	18	5.0	19	5.0	0.200	46.4	LOS D	1.7	12.2	0.94	0.73	0.94	25.1
Approach		38	5.0	40	5.0	0.200	46.3	LOS D	1.7	12.2	0.94	0.73	0.94	26.2
West: Murray Road														
10	L2	6	5.0	6	5.0	0.444	18.1	LOS B	11.7	85.6	0.63	0.56	0.63	42.7
11	T1	834	5.0	878	5.0	0.444	12.7	LOS B	11.7	85.6	0.63	0.56	0.63	31.4
12	R2	33	5.0	35	5.0	* 0.291	51.7	LOS D	1.6	11.4	0.99	0.72	0.99	24.2
Approach		873	5.0	919	5.0	0.444	14.3	LOS B	11.7	85.6	0.65	0.56	0.65	30.7
All Vehicles		1715	5.0	1805	5.0	0.513	18.6	LOS B	13.1	95.4	0.72	0.63	0.72	27.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: New NS Road												
P1	Full	50	53	21.4	LOS C	0.1	0.1	0.69	0.69	47.5	33.9	0.71
East: Murray Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	66.5	35.4	0.53
North: Clinch Avenue												
P3	Full	50	53	11.8	LOS B	0.1	0.1	0.51	0.51	33.8	28.6	0.85
West: Murray Road												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	69.7	39.5	0.57
All Pedestrians		200	211	27.9	LOS C	0.1	0.1	0.77	0.77	54.4	34.4	0.63

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

Phase Timing Summary

Phase	C	E1	E2	B1
Phase Change Time (sec)	47	0	19	35
Green Time (sec)	37	13	10	6
Phase Time (sec)	43	19	16	12
Phase Split	48%	21%	18%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

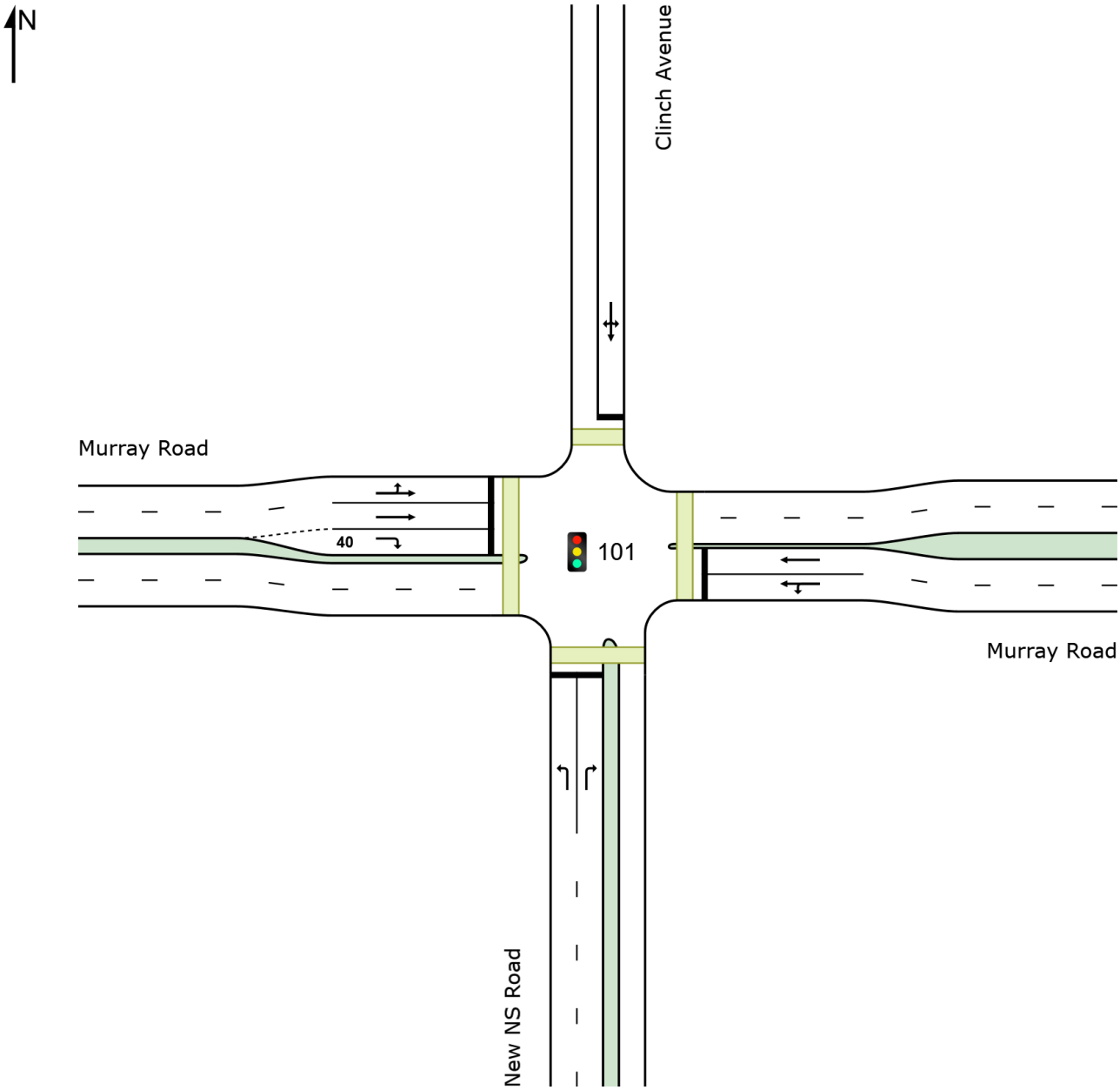
Site: 101 [Murray Road / Clinch Avenue / new NS Road - PM (Site Folder: Report)]

Murray Road / Clinch Avenue / new NS Road - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Split Phasing
Reference Phase: Phase E1
Input Phase Sequence: C, E1, E2, B1
Output Phase Sequence: C, E1, E2, B1

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New NS Road														
1	L2	47	5.0	49	5.0	0.131	24.0	LOS C	1.3	9.2	0.84	0.72	0.84	34.5
3	R2	54	5.0	57	5.0	* 0.219	43.4	LOS D	2.3	16.6	0.92	0.75	0.92	27.5
Approach		101	5.0	106	5.0	0.219	34.4	LOS C	2.3	16.6	0.89	0.73	0.89	30.3
East: Murray Road														
4	L2	54	5.0	57	5.0	0.585	27.1	LOS C	15.3	112.0	0.82	0.73	0.82	36.9
5	T1	809	5.0	852	5.0	* 0.585	21.9	LOS C	15.5	113.1	0.83	0.73	0.83	23.2
Approach		863	5.0	908	5.0	0.585	22.2	LOS C	15.5	113.1	0.83	0.73	0.83	24.6
North: Clinch Avenue														
7	L2	13	5.0	14	5.0	0.259	46.8	LOS D	2.2	15.8	0.95	0.74	0.95	26.6
8	T1	1	5.0	1	5.0	* 0.259	41.2	LOS D	2.2	15.8	0.95	0.74	0.95	34.0
9	R2	35	5.0	37	5.0	0.259	46.8	LOS D	2.2	15.8	0.95	0.74	0.95	25.0
Approach		49	5.0	52	5.0	0.259	46.7	LOS D	2.2	15.8	0.95	0.74	0.95	25.6
West: Murray Road														
10	L2	9	5.0	9	5.0	0.542	19.1	LOS B	15.5	112.8	0.68	0.61	0.68	41.9
11	T1	1011	5.0	1064	5.0	0.542	13.7	LOS B	15.5	112.8	0.68	0.61	0.68	30.3
12	R2	47	5.0	49	5.0	* 0.414	52.4	LOS D	2.3	16.4	1.00	0.74	1.00	24.0
Approach		1067	5.0	1123	5.0	0.542	15.4	LOS B	15.5	112.8	0.69	0.61	0.69	29.6
All Vehicles		2080	5.0	2189	5.0	0.585	19.9	LOS B	15.5	113.1	0.76	0.67	0.76	27.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: New NS Road												
P1	Full	50	53	21.4	LOS C	0.1	0.1	0.69	0.69	47.5	33.9	0.71
East: Murray Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	66.5	35.4	0.53
North: Clinch Avenue												
P3	Full	50	53	11.8	LOS B	0.1	0.1	0.51	0.51	33.8	28.6	0.85
West: Murray Road												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	69.7	39.5	0.57
All Pedestrians		200	211	27.9	LOS C	0.1	0.1	0.77	0.77	54.4	34.4	0.63

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

Phase Timing Summary

Phase	C	E1	E2	B1
Phase Change Time (sec)	47	0	19	35
Green Time (sec)	37	13	10	6
Phase Time (sec)	43	19	16	12
Phase Split	48%	21%	18%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

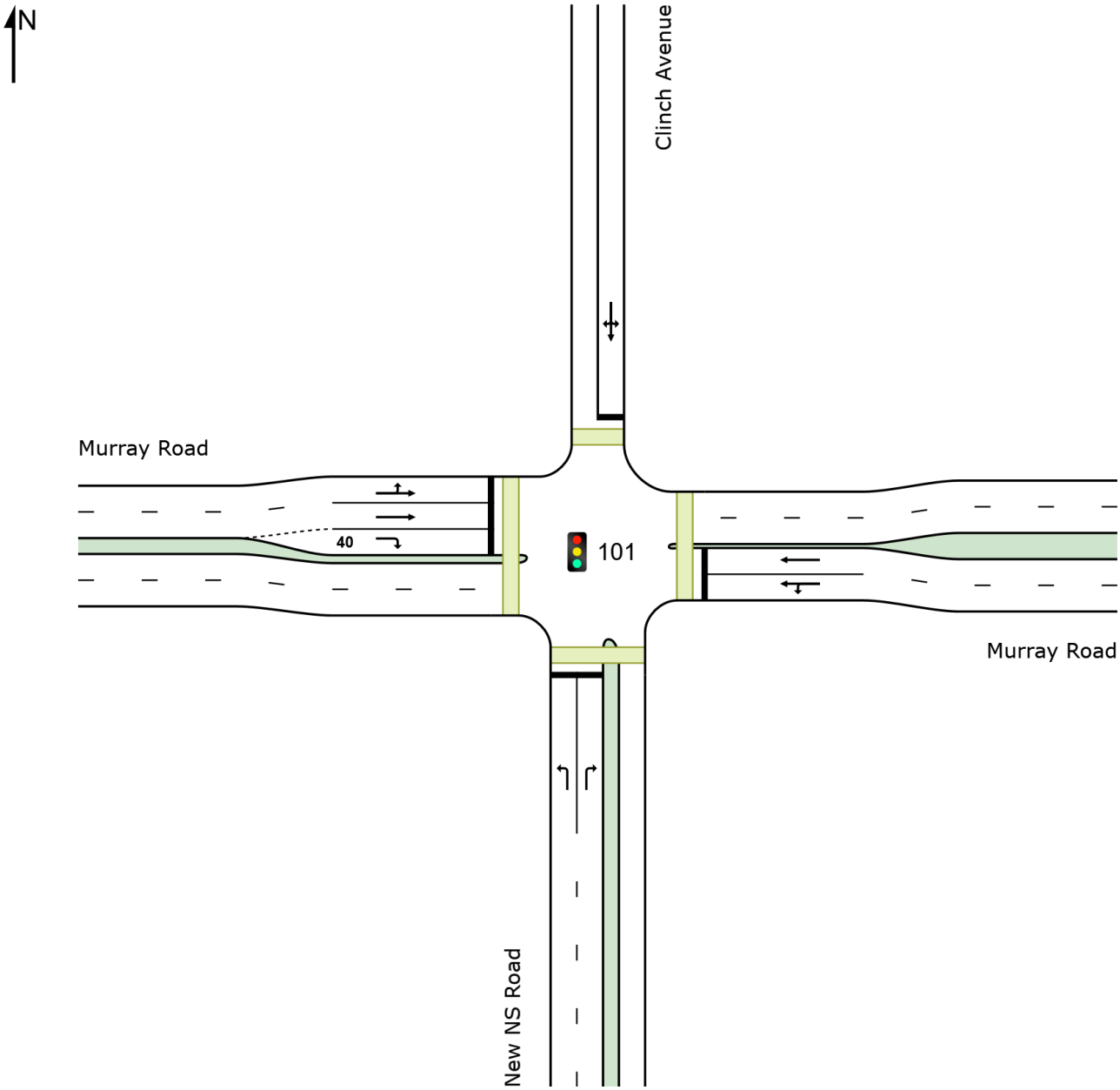
Site: 101 [Murray Road / Clinch Avenue / new NS Road - Sat (Site Folder: Report)]

Murray Road / Clinch Avenue / new NS Road - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Split Phasing
Reference Phase: Phase E1
Input Phase Sequence: C, E1, E2, B1
Output Phase Sequence: C, E1, E2, B1

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New NS Road														
1	L2	47	5.0	49	5.0	0.131	24.0	LOS C	1.3	9.2	0.84	0.72	0.84	34.5
3	R2	54	5.0	57	5.0	* 0.219	43.4	LOS D	2.3	16.6	0.92	0.75	0.92	27.5
Approach		101	5.0	106	5.0	0.219	34.4	LOS C	2.3	16.6	0.89	0.73	0.89	30.3
East: Murray Road														
4	L2	54	5.0	57	5.0	0.562	26.8	LOS C	14.6	106.4	0.81	0.73	0.81	37.0
5	T1	776	5.0	817	5.0	* 0.562	21.6	LOS C	14.7	107.4	0.82	0.72	0.82	23.4
Approach		830	5.0	874	5.0	0.562	21.9	LOS C	14.7	107.4	0.82	0.72	0.82	24.9
North: Clinch Avenue														
7	L2	17	5.0	18	5.0	0.200	46.4	LOS D	1.7	12.2	0.94	0.73	0.94	26.7
8	T1	1	5.0	1	5.0	* 0.200	40.8	LOS D	1.7	12.2	0.94	0.73	0.94	34.1
9	R2	20	5.0	21	5.0	0.200	46.4	LOS D	1.7	12.2	0.94	0.73	0.94	25.1
Approach		38	5.0	40	5.0	0.200	46.3	LOS D	1.7	12.2	0.94	0.73	0.94	26.1
West: Murray Road														
10	L2	10	5.0	11	5.0	0.562	19.4	LOS B	16.3	118.9	0.70	0.63	0.70	41.7
11	T1	1049	5.0	1104	5.0	0.562	13.9	LOS B	16.3	118.9	0.69	0.62	0.69	30.1
12	R2	47	5.0	49	5.0	* 0.414	52.4	LOS D	2.3	16.4	1.00	0.74	1.00	24.0
Approach		1106	5.0	1164	5.0	0.562	15.6	LOS B	16.3	118.9	0.70	0.62	0.70	29.5
All Vehicles		2075	5.0	2184	5.0	0.562	19.6	LOS B	16.3	118.9	0.76	0.67	0.76	27.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: New NS Road												
P1	Full	50	53	21.4	LOS C	0.1	0.1	0.69	0.69	47.5	33.9	0.71
East: Murray Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	66.5	35.4	0.53
North: Clinch Avenue												
P3	Full	50	53	11.8	LOS B	0.1	0.1	0.51	0.51	33.8	28.6	0.85
West: Murray Road												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	69.7	39.5	0.57
All Pedestrians		200	211	27.9	LOS C	0.1	0.1	0.77	0.77	54.4	34.4	0.63

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

Phase Timing Summary

Phase	C	E1	E2	B1
Phase Change Time (sec)	47	0	19	35
Green Time (sec)	37	13	10	6
Phase Time (sec)	43	19	16	12
Phase Split	48%	21%	18%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

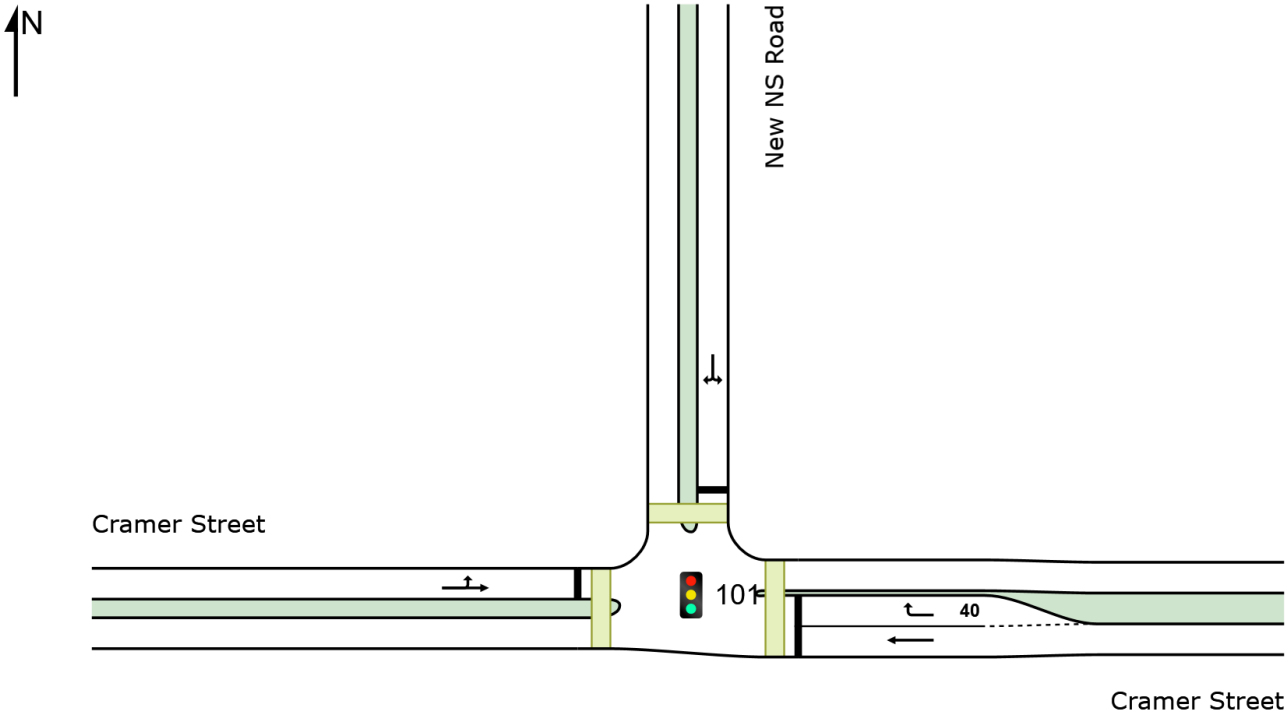
Site: 101 [Cramer Street / New NS Road - AM (Site Folder: Report)]

Cramer Street / New NS Road - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	439	5.0	462	5.0	0.373	7.5	LOS A	9.1	66.7	0.49	0.43	0.49	45.1
6	R2	24	5.0	25	5.0	* 0.211	51.3	LOS D	1.1	8.2	0.98	0.71	0.98	27.9
Approach		463	5.0	487	5.0	0.373	9.8	LOS A	9.1	66.7	0.52	0.45	0.52	42.4
North: New NS Road														
7	L2	12	5.0	13	5.0	0.612	52.9	LOS D	3.6	26.4	1.00	0.80	1.09	27.5
9	R2	62	5.0	65	5.0	* 0.612	52.8	LOS D	3.6	26.4	1.00	0.80	1.09	21.4
Approach		74	5.0	78	5.0	0.612	52.8	LOS D	3.6	26.4	1.00	0.80	1.09	22.4
West: Cramer Street														
10	L2	76	5.0	80	5.0	0.654	21.7	LOS C	20.2	147.4	0.77	0.71	0.77	39.6
11	T1	536	5.0	564	5.0	* 0.654	16.1	LOS B	20.2	147.4	0.77	0.71	0.77	34.5
Approach		612	5.0	644	5.0	0.654	16.8	LOS B	20.2	147.4	0.77	0.71	0.77	35.3
All Vehicles		1149	5.0	1209	5.0	0.654	16.3	LOS B	20.2	147.4	0.68	0.61	0.69	35.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
East: Cramer Street												
P2	Full	50	53	34.7	LOS D	0.1	0.1	0.88	0.88	59.5	32.2	0.54
North: New NS Road												
P3	Full	50	53	13.4	LOS B	0.1	0.1	0.55	0.55	36.9	30.6	0.83
West: Cramer Street												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	62.8	30.6	0.49
All Pedestrians		150	158	29.1	LOS C	0.1	0.1	0.79	0.79	53.1	31.1	0.59

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

Phase Timing Summary

Phase	A	C	D	F
Phase Change Time (sec)	13	25	78	0
Green Time (sec)	6	47	6	8
Phase Time (sec)	12	53	11	14
Phase Split	13%	59%	12%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

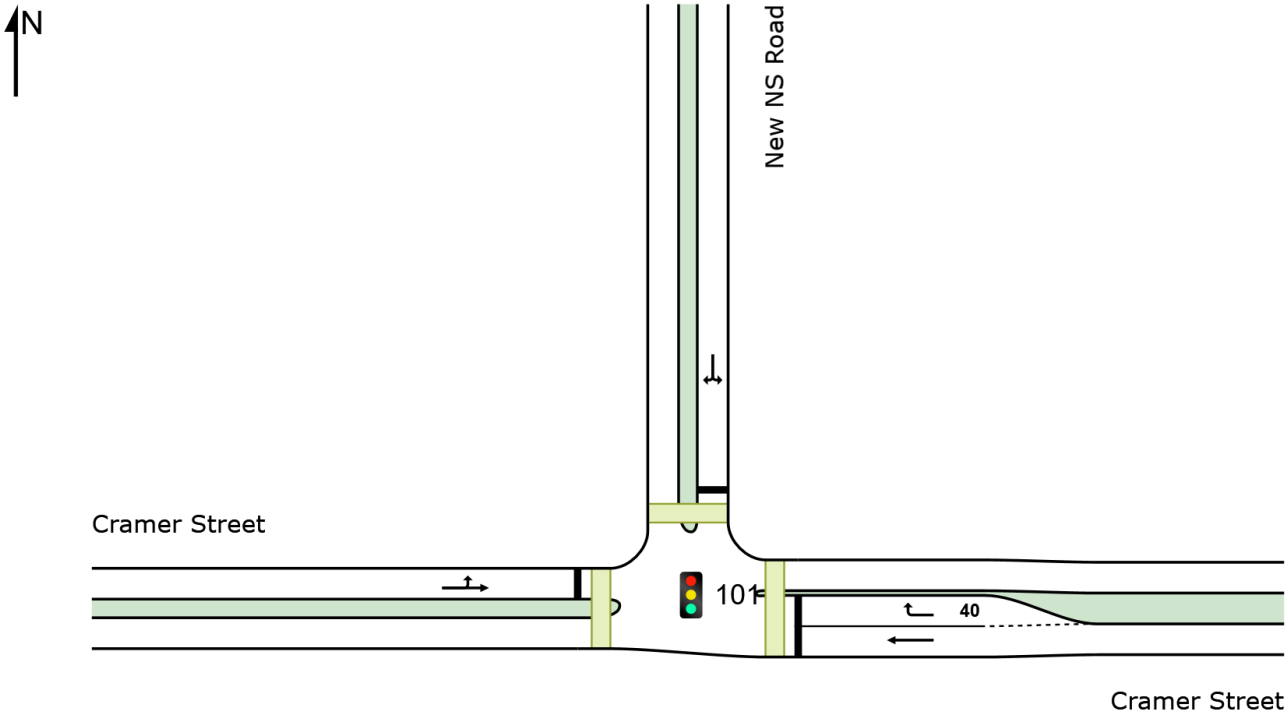
Site: 101 [Cramer Street / New NS Road - PM (Site Folder: Report)]

Cramer Street / New NS Road - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	517	5.0	544	5.0	0.526	12.0	LOS B	14.1	102.6	0.64	0.57	0.64	39.2
6	R2	34	5.0	36	5.0	* 0.299	51.8	LOS D	1.6	11.7	0.99	0.73	0.99	27.8
Approach		551	5.0	580	5.0	0.526	14.5	LOS B	14.1	102.6	0.66	0.58	0.66	37.4
North: New NS Road														
7	L2	27	5.0	28	5.0	0.639	46.1	LOS D	7.4	54.0	0.99	0.83	1.03	29.5
9	R2	135	5.0	142	5.0	* 0.639	46.0	LOS D	7.4	54.0	0.99	0.83	1.03	22.9
Approach		162	5.0	171	5.0	0.639	46.0	LOS D	7.4	54.0	0.99	0.83	1.03	24.0
West: Cramer Street														
10	L2	108	5.0	114	5.0	0.659	26.1	LOS C	18.9	138.2	0.84	0.76	0.84	36.4
11	T1	418	5.0	440	5.0	* 0.659	20.5	LOS C	18.9	138.2	0.84	0.76	0.84	30.7
Approach		526	5.0	554	5.0	0.659	21.7	LOS C	18.9	138.2	0.84	0.76	0.84	32.2
All Vehicles		1239	5.0	1304	5.0	0.659	21.7	LOS C	18.9	138.2	0.78	0.69	0.78	31.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
East: Cramer Street												
P2	Full	50	53	28.9	LOS C	0.1	0.1	0.80	0.80	53.6	32.2	0.60
North: New NS Road												
P3	Full	50	53	17.5	LOS B	0.1	0.1	0.62	0.62	41.0	30.6	0.75
West: Cramer Street												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	62.8	30.6	0.49
All Pedestrians		150	158	28.5	LOS C	0.1	0.1	0.79	0.79	52.5	31.1	0.59

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

Phase Timing Summary

Phase	A	C	D	F
Phase Change Time (sec)	13	25	71	0
Green Time (sec)	6	40	13	8
Phase Time (sec)	12	46	18	14
Phase Split	13%	51%	20%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

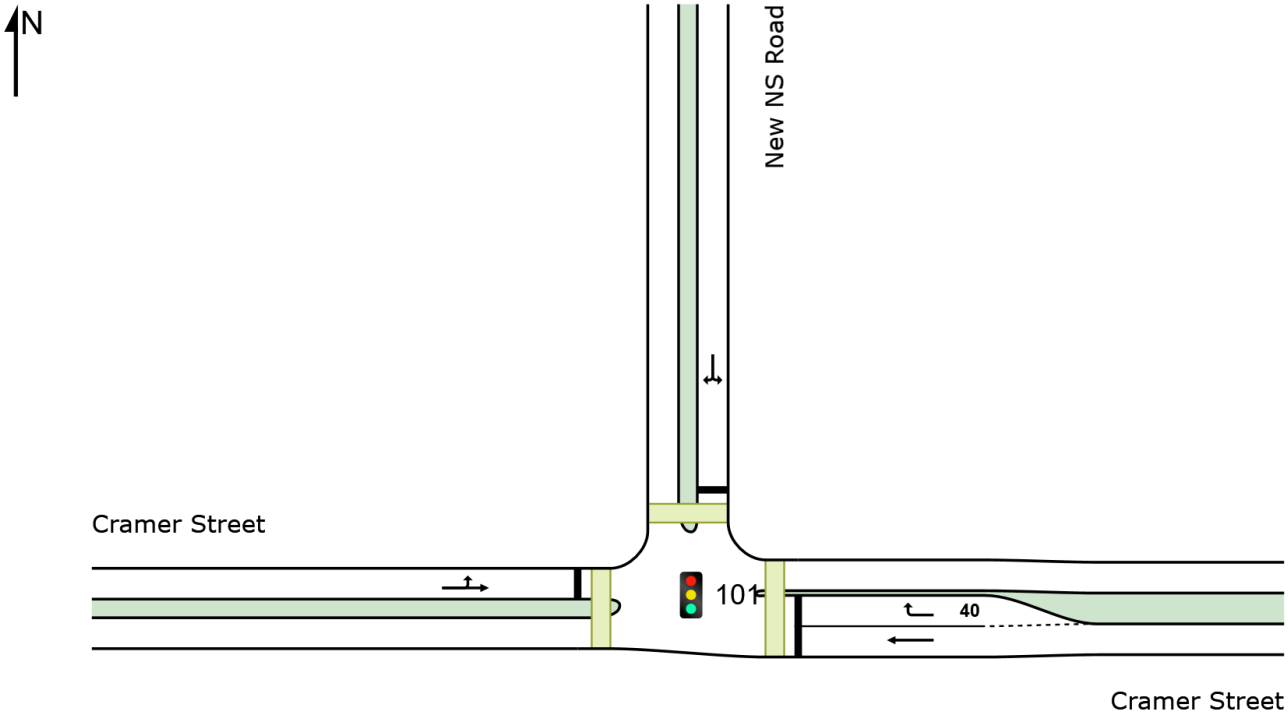
Site: 101 [Cramer Street / New NS Road - Sat (Site Folder: Report)]

Cramer Street / New NS Road - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	379	5.0	399	5.0	0.373	11.4	LOS B	9.5	69.6	0.59	0.52	0.59	39.9
6	R2	34	5.0	36	5.0	* 0.299	51.8	LOS D	1.6	11.7	0.99	0.73	0.99	27.8
Approach		413	5.0	435	5.0	0.373	14.7	LOS B	9.5	69.6	0.62	0.53	0.62	37.4
North: New NS Road														
7	L2	27	5.0	28	5.0	0.594	44.4	LOS D	7.2	52.6	0.97	0.81	0.98	30.0
9	R2	135	5.0	142	5.0	* 0.594	44.3	LOS D	7.2	52.6	0.97	0.81	0.98	23.3
Approach		162	5.0	171	5.0	0.594	44.3	LOS D	7.2	52.6	0.97	0.81	0.98	24.5
West: Cramer Street														
10	L2	108	5.0	114	5.0	0.617	26.2	LOS C	17.0	124.4	0.82	0.75	0.82	36.3
11	T1	373	5.0	393	5.0	* 0.617	20.6	LOS C	17.0	124.4	0.82	0.75	0.82	30.6
Approach		481	5.0	506	5.0	0.617	21.9	LOS C	17.0	124.4	0.82	0.75	0.82	32.2
All Vehicles		1056	5.0	1112	5.0	0.617	22.5	LOS C	17.0	124.4	0.77	0.67	0.77	31.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
East: Cramer Street												
P2	Full	50	53	28.1	LOS C	0.1	0.1	0.79	0.79	52.8	32.2	0.61
North: New NS Road												
P3	Full	50	53	18.1	LOS B	0.1	0.1	0.63	0.63	41.6	30.6	0.74
West: Cramer Street												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	62.8	30.6	0.49
All Pedestrians		150	158	28.5	LOS C	0.1	0.1	0.79	0.79	52.4	31.1	0.59

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

Phase Timing Summary

Phase	A	C	D	F
Phase Change Time (sec)	13	25	70	0
Green Time (sec)	6	39	14	8
Phase Time (sec)	12	45	19	14
Phase Split	13%	50%	21%	16%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

USER REPORT FOR SITE

All Movement Classes

Project: V180439SID001 - Future Conditions_V5 - DCP Intersection Geometry

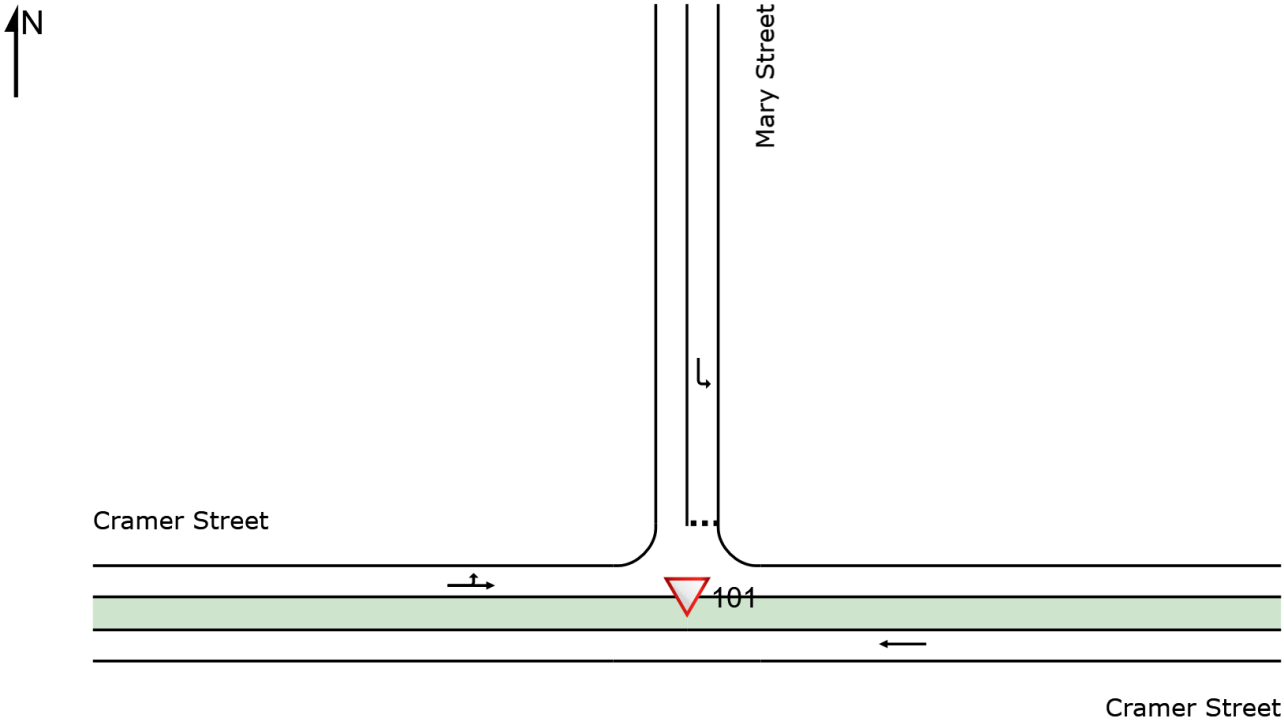
Template: Default Site User Report

Site: 101 [Cramer Street Left in / Left out - AM (Site Folder: Report)]

Cramer Street Left in / Left out - AM
Site Category: (None)
Give-Way (Two-Way)

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	622	5.0	655	5.0	0.347	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		622	5.0	655	5.0	0.347	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
North: Mary Street														
7	L2	3	10.0	3	10.0	0.003	7.6	LOS A	0.0	0.1	0.48	0.57	0.48	51.7
Approach		3	10.0	3	10.0	0.003	7.6	LOS A	0.0	0.1	0.48	0.57	0.48	51.7
West: Cramer Street														
10	L2	19	10.0	20	10.0	0.274	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	56.5
11	T1	471	5.0	496	5.0	0.274	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.5
Approach		490	5.2	516	5.2	0.274	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.4
All Vehicles		1115	5.1	1174	5.1	0.347	0.2	NA	0.0	0.1	0.00	0.01	0.00	59.6

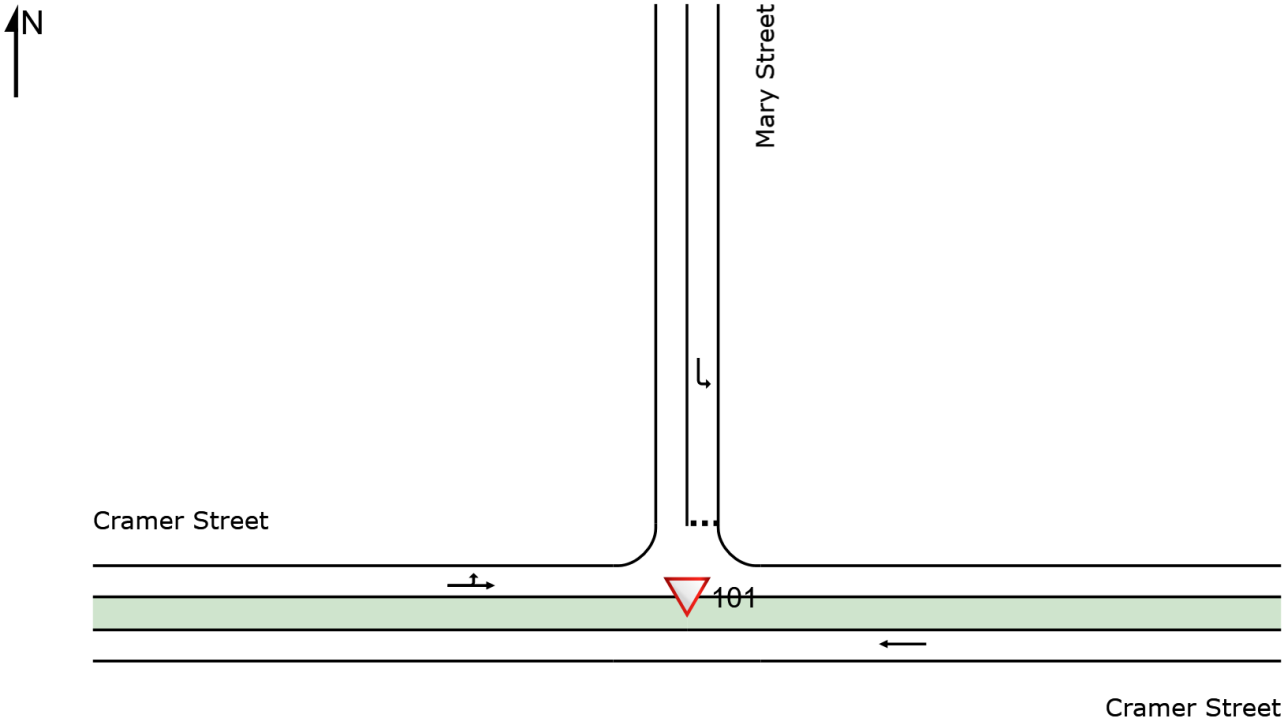
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

Site: 101 [Cramer Street Left in / Left out - PM (Site Folder: Report)]

Cramer Street Left in / Left out - PM
Site Category: (None)
Give-Way (Two-Way)

Site Layout

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



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	614	5.0	646	5.0	0.342	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		614	5.0	646	5.0	0.342	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
North: Mary Street														
7	L2	7	10.0	7	10.0	0.008	7.9	LOS A	0.0	0.2	0.50	0.60	0.50	51.5
Approach		7	10.0	7	10.0	0.008	7.9	LOS A	0.0	0.2	0.50	0.60	0.50	51.5
West: Cramer Street														
10	L2	27	10.0	28	10.0	0.300	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	56.4
11	T1	509	5.0	536	5.0	0.300	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		536	5.3	564	5.3	0.300	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
All Vehicles		1157	5.1	1218	5.1	0.342	0.3	NA	0.0	0.2	0.00	0.02	0.00	59.5

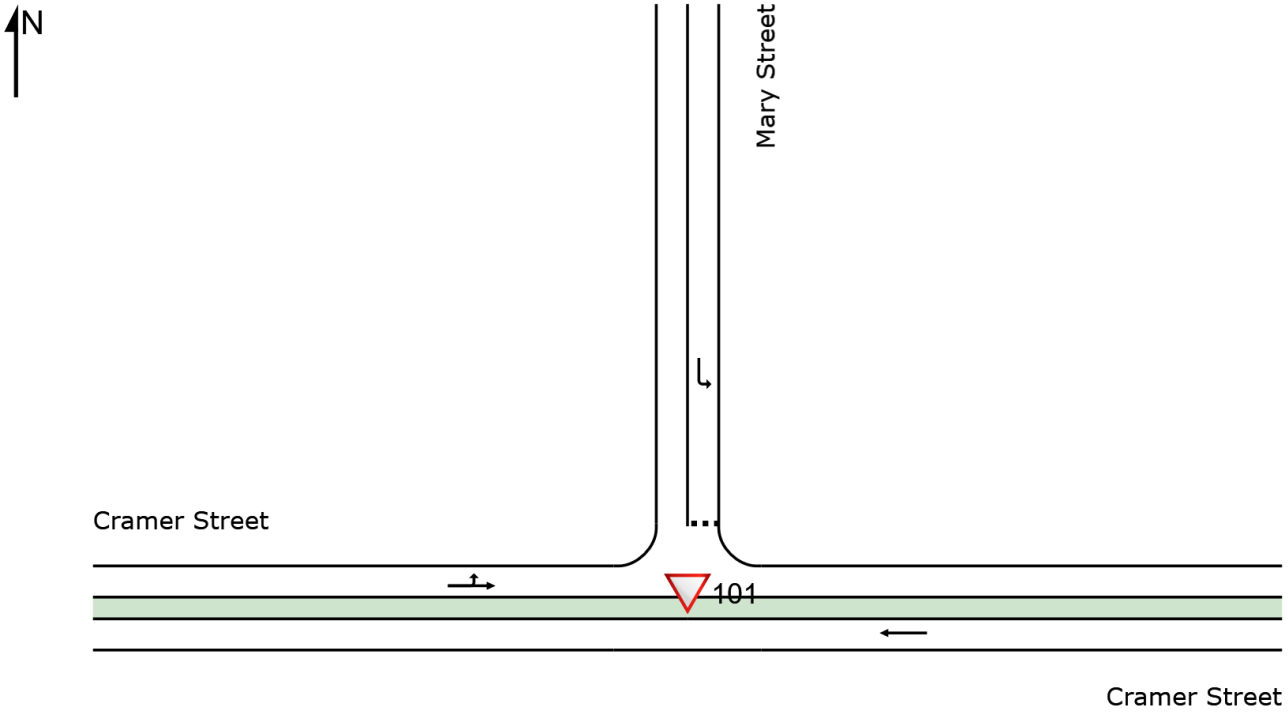
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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.

Site: 101 [Cramer Street Left in / Left out - Sat (Site Folder: Report)]

Cramer Street Left in / Left out - Sat
Site Category: (None)
Give-Way (Two-Way)

Site Layout

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



Vehicle Movement Performance

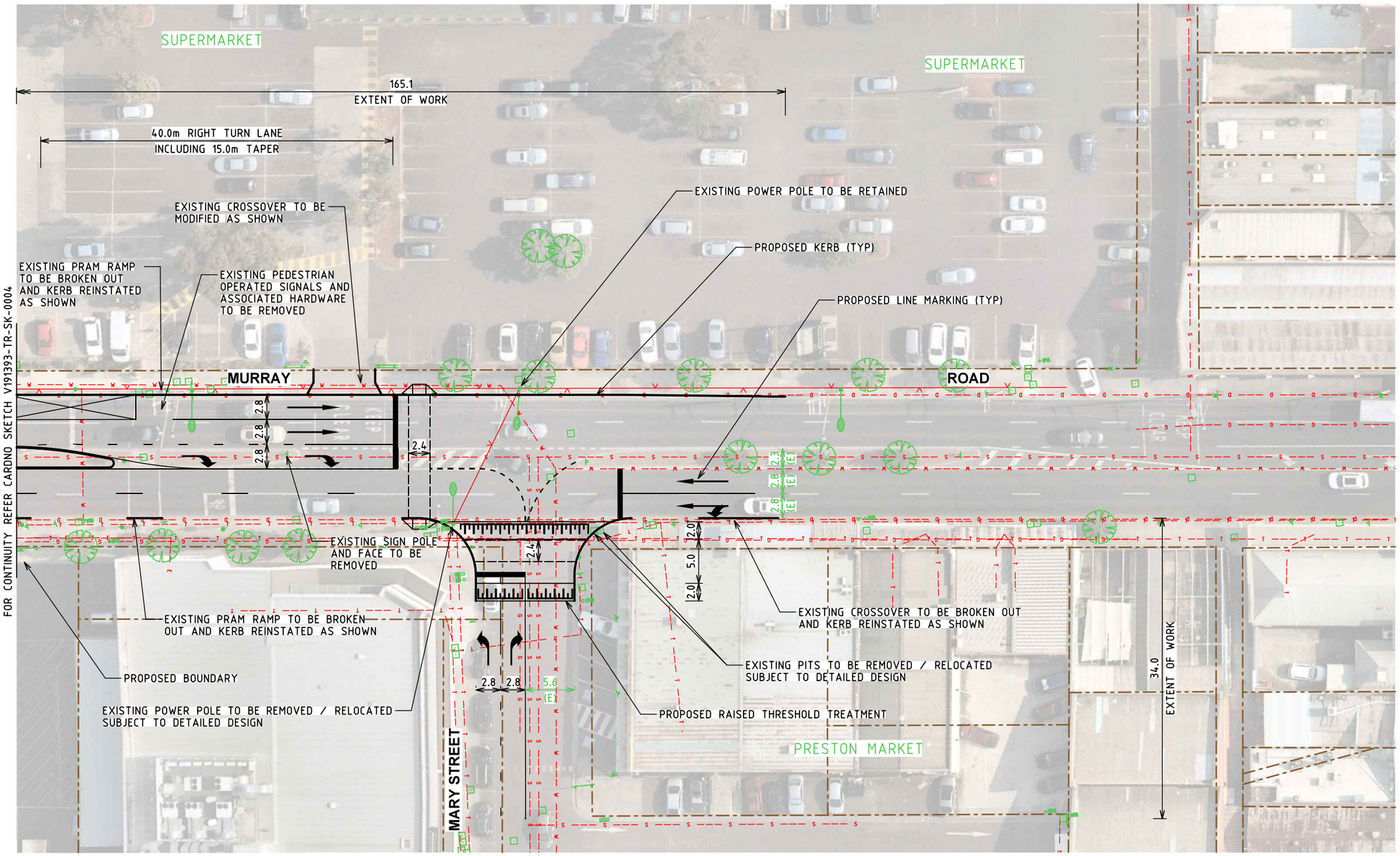
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Cramer Street														
5	T1	548	5.0	577	5.0	0.305	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		548	5.0	577	5.0	0.305	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
North: Mary Street														
7	L2	7	10.0	7	10.0	0.007	7.6	LOS A	0.0	0.2	0.47	0.58	0.47	51.8
Approach		7	10.0	7	10.0	0.007	7.6	LOS A	0.0	0.2	0.47	0.58	0.47	51.8
West: Cramer Street														
10	L2	27	10.0	28	10.0	0.270	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	56.4
11	T1	455	5.0	479	5.0	0.270	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		482	5.3	507	5.3	0.270	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.2
All Vehicles		1037	5.2	1092	5.2	0.305	0.3	NA	0.0	0.2	0.00	0.02	0.00	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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

D

DCP CONCEPT INTERSECTION DESIGNS



N

MELWAY MAP REF 18 F12

NOTE:

1. LOCATION OF TREES AND ALL ABOVE GROUND INFRASTRUCTURE IS INDICATIVE ONLY.

Cardno
Shaping the Future
ABN: 47 106 610 913
501 Swanston Street, Melbourne, VIC Australia 3000
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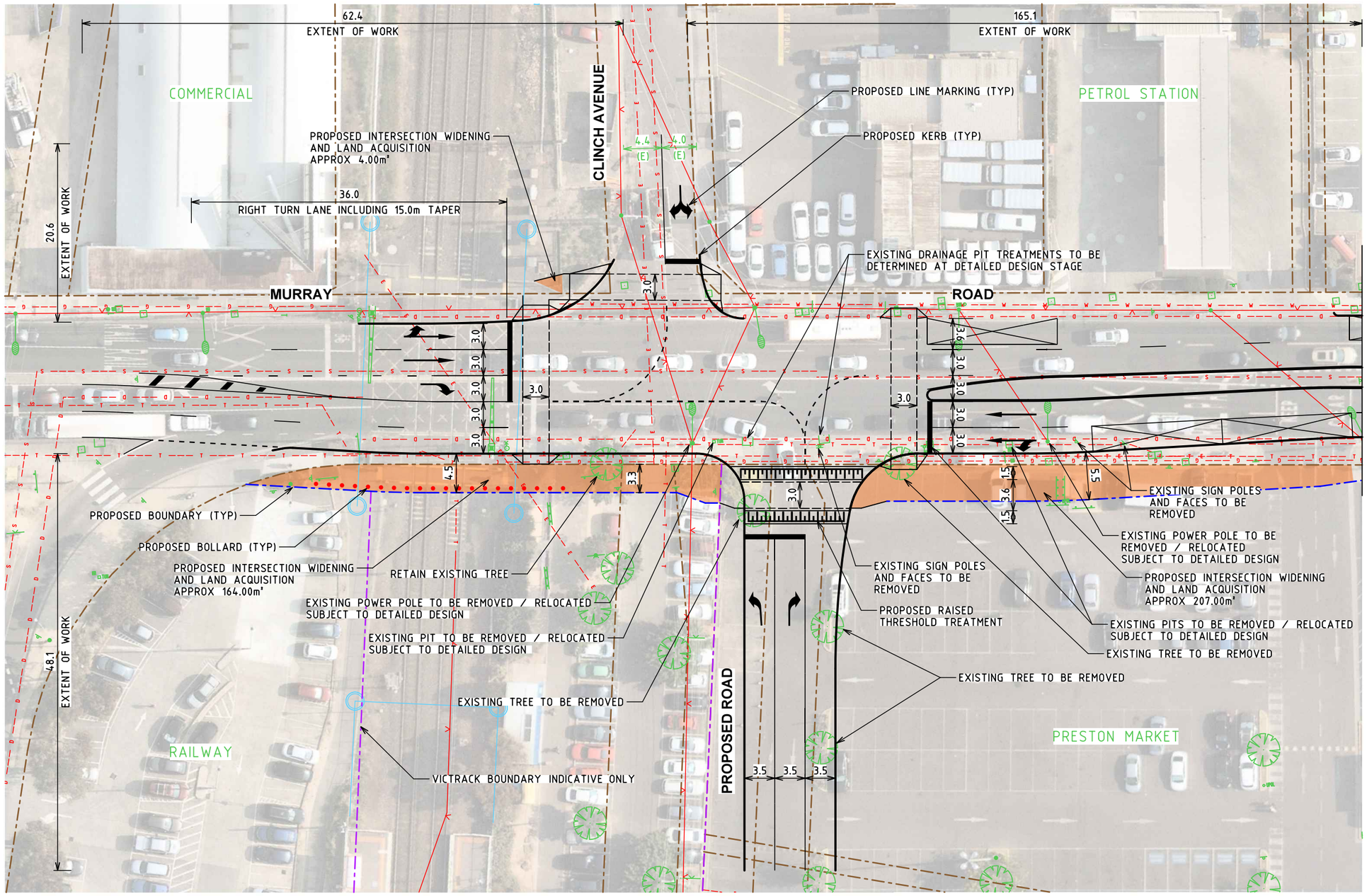
VICTORIAN PLANNING AUTHORITY
VPA PRESTON MARKET PRECINCT
MURRAY ROAD / MARY STREET, PRESTON
SIGNALISED T - INTERSECTION
CONCEPT FUNCTIONAL DESIGN PLAN

Drawn/Check	Date	Scale	Size
NB / SGM	21.01.2020	1:500	A3

Drawing Number: V191393-TR-SK-0003
Revision: 4



N

MELWAY MAP REF 18 F12

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VICTORIAN PLANNING AUTHORITY
VPA PRESTON MARKET PRECINCT
MURRAY ROAD / CLINCH AVENUE, PRESTON
SIGNALISED CROSS - INTERSECTION
CONCEPT FUNCTIONAL DESIGN PLAN

Drawn/Check	Date	Scale	Size
NB / SGM	21.01.2020	1:500	A3

Drawing Number	Revision
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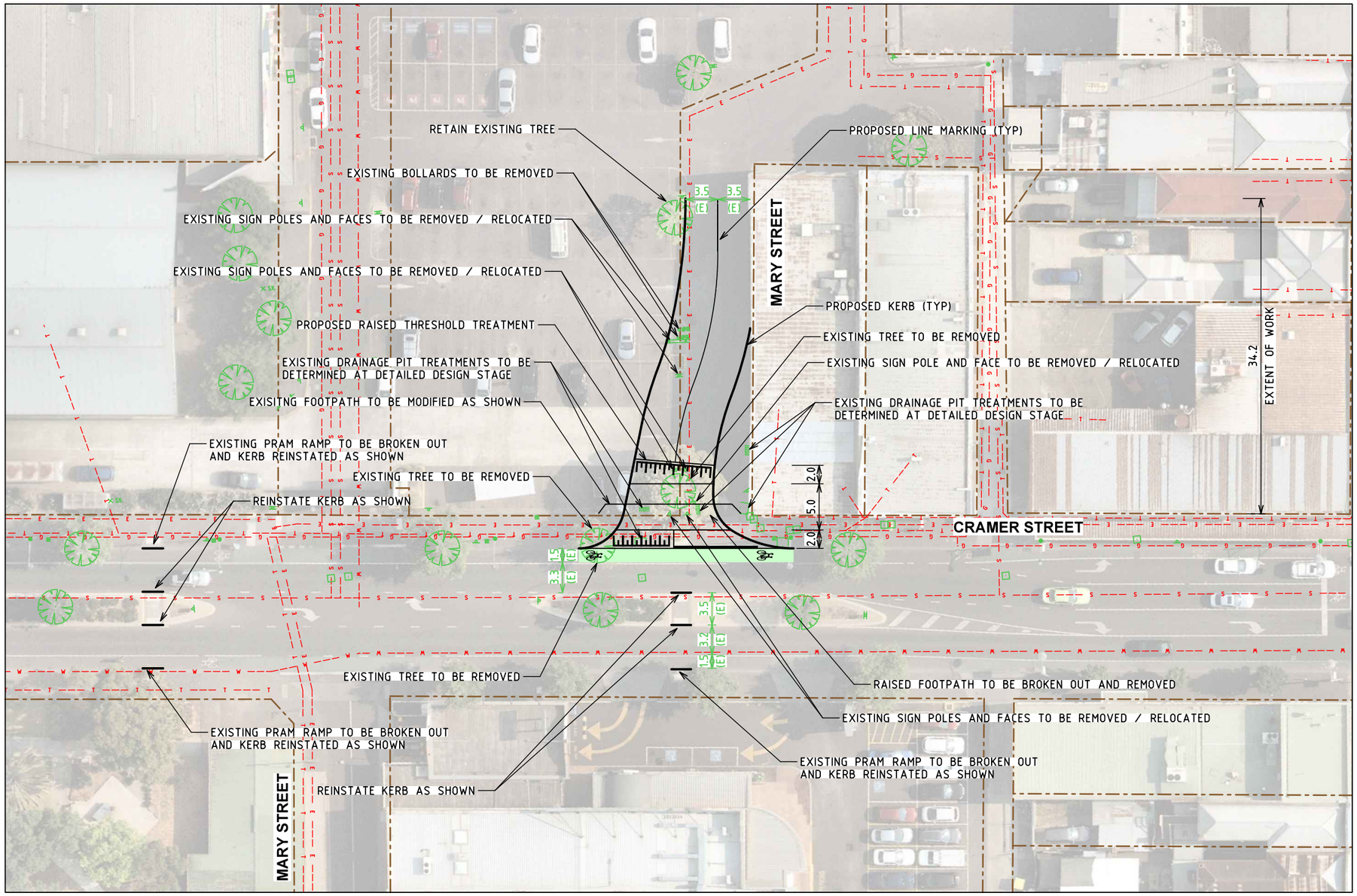

N

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NOTE:

1. LOCATION OF TREES AND ALL ABOVE GROUND INFRASTRUCTURE IS INDICATIVE ONLY.

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VICTORIAN PLANNING AUTHORITY
VPA PRESTON MARKET PRECINCT
CRAMER STREET / MARY STREET, PRESTON
UNSIGNALISED T- INTERSECTION
CONCEPT FUNCTIONAL DESIGN PLAN

Drawn/Check	Date	Scale	Size
NB / SGM	21.01.2020	1:500	A3

Drawing Number	Revision
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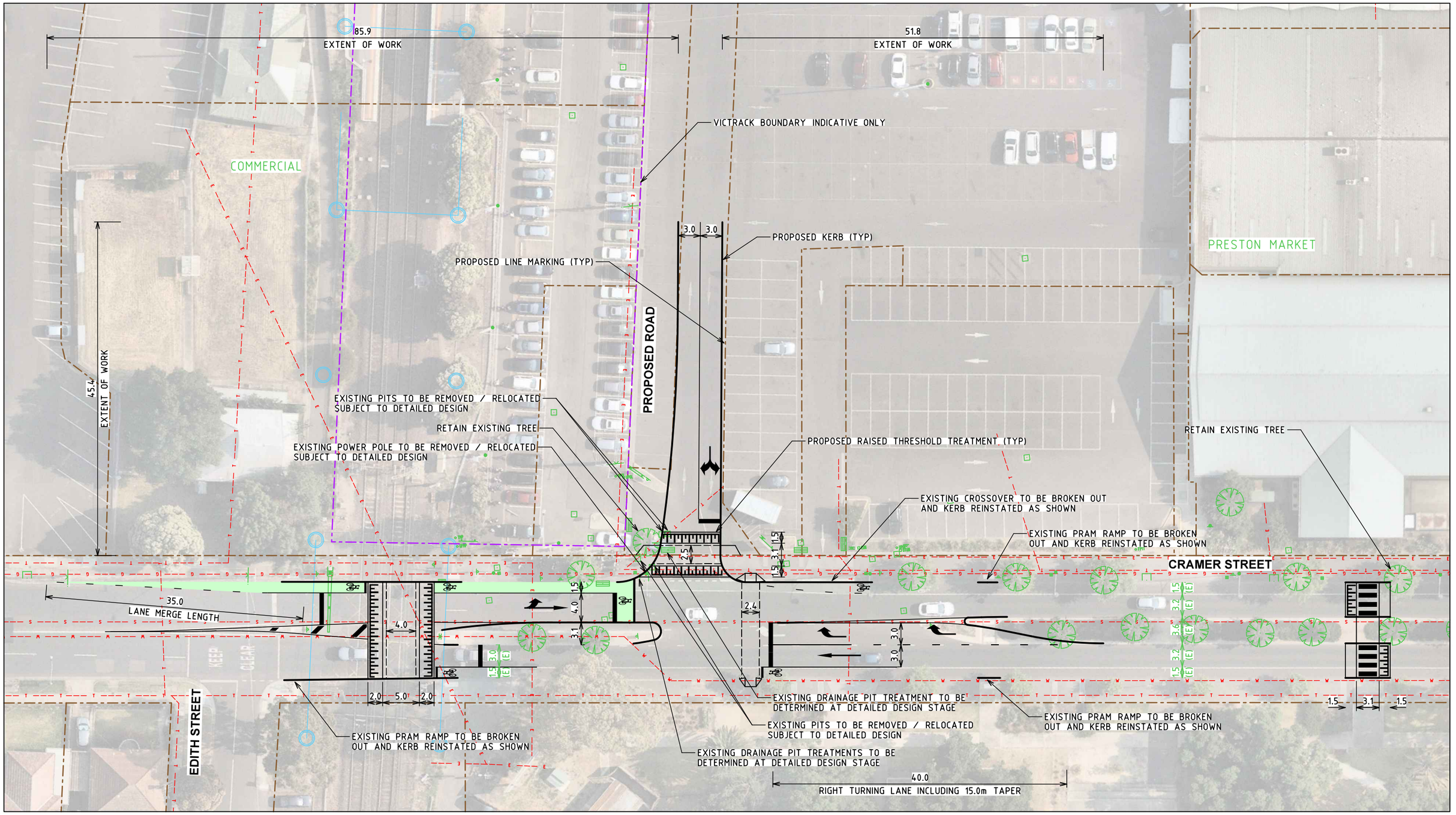

NOTE:

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N

MELWAY MAP REF 18 F12

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VICTORIAN PLANNING AUTHORITY
VPA PRESTON MARKET PRECINCT
CRAMER STREET / PROPOSED ROAD, PRESTON
SIGNALISED T- INTERSECTION / PED CROSSING
CONCEPT FUNCTIONAL DESIGN PLAN

Drawn/Check	Date	Scale	Size
NB / SGM	21.01.2020	1:500	A3

Drawing Number	Revision
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