

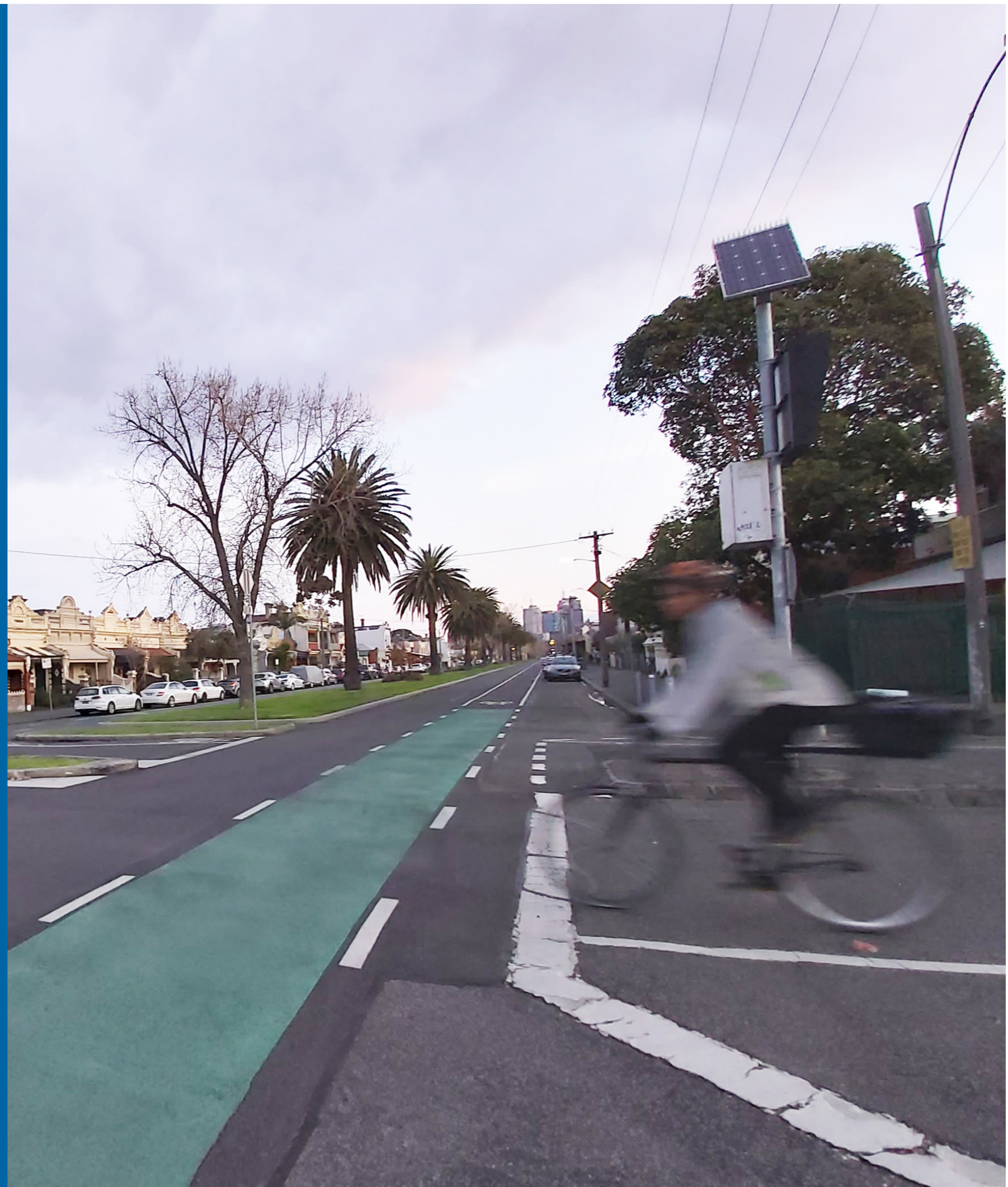
Carlton North Local Area Place Making Scheme Final Report

April 2020



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01 Introduction

1.1 Background

GHD were engaged by the City of Yarra (CoY) to prepare a Local Area and Place Making (LAPM) scheme for Carlton North. The scheme will assist in determining how road space can be used to activate and improve street amenity, connectivity and address road safety concerns raised by the community. It marks a departure from a traditional Local Area Traffic Management (LATM) scheme, reflecting CoY's desire to create local places on local streets.

Figure 1 shows how community and stakeholder input is being integrated through the project. This includes input from a Local Area Study Group, made up of nominated community members.

1.2 Purpose of this report

The purpose of this report is to analyse existing traffic conditions and safety issues within Carlton North, to review and integrate community feedback, and to outline key recommendations and treatments. This includes high level costings and concepts

1.3 Scope and limitations

This report has been prepared by GHD for City of Yarra and may only be used and relied on by City of Yarra for the purpose agreed between GHD and the City of Yarra as set out in this report. GHD otherwise disclaims responsibility to any person other than City of Yarra arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by City of Yarra and others who provided information (including Government authorities) whom GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Assumptions

This report has been prepared on the basis of assumptions made by GHD including, but not limited to, traffic data provided by the City of Yarra being relevant and reflective of current traffic conditions within the project area of Carlton North.

1.5 Referenced materials

Several sources and reference materials have been used to inform the preparation of this report including the following:

- Local Area Place Making Policy 2017 – City of Yarra
- Assorted traffic data provided by the City of Yarra (refer to Section 3 for breakdown)
- Community feedback from:
 - Community Information Session #1
 - The City of Yarra's "Have Your Say" webpage
 - City of Yarra LAPM Scheme Proposal – GHD Pty Ltd
- AustRoads Guide to Traffic Management Part 8, Local Area Traffic Management
- Crash data from VicRoads Open Data
- VicRoads' Movement and Place maps

1.6 Why place making?

Place making takes a people-centred approach to the planning and design of the public spaces and the built environment. It draws on the social constructions of place; the elements that support social and cultural life, community infrastructure and amenities, systems for citizens' engagement and space for people and places to evolve.

The LAPM process and this scheme draw on the Department of Transport's *Movement and Place Framework* (2019) which re-frames traditional engineering approaches to traffic management and transport engineering to understand streets beyond solely movement and transit, to the creation of places to live, work and enjoy. The framework states:

"Fundamental to movement and place thinking is recognising that streets perform multiple functions. Transport links not only move people from A to B, they also serve as key places and destinations in their own right."

As an area of high place value, Carlton North street network needs to account for the diversity of community needs and aspirations. This scheme takes into account opportunities to reclaim streets as places (for example extending footpaths) and to enhance place making opportunities.

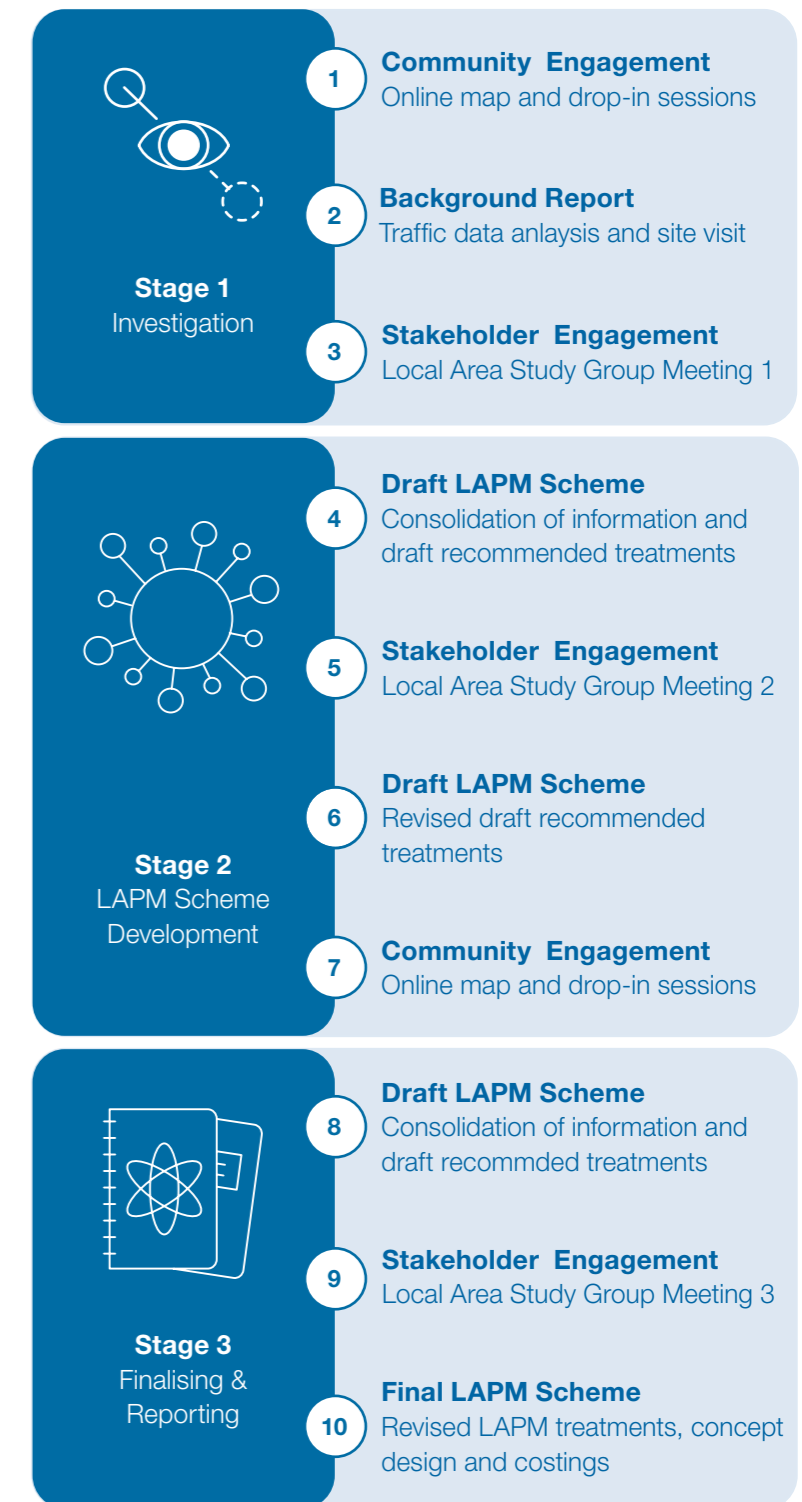


Figure 1 Carlton North LAPM Process



02 Existing Conditions



Figure 2 Project area
Carlton North is bound by Nicholson Street, Princes Street, Lygon Street and Park Street.

2.1 Carlton North

Carlton North is located within the municipality of Yarra City Council and is one of twenty-one Local Precincts identified within the Yarra Local Government Area. The inner city precinct is located approximately 2.5km from Melbourne's CBD and is bounded by Park Street and the Capital City Trail to the north, Nicholson Street to the east, Alexandra Parade to the south and Lygon Street to the west.

The precinct primarily consists of residential and commercial uses with a local neighbourhood character and unique local identity. The built form features an array of periodic features and is evidence of the area's rich history stretching back to the middle of the 19th Century. The historic street layout is characterised by generously wide streets and green centre verges, combined with a predominance of terrace architecture, which has created memorable heritage streetscapes particularly along Drummond, Rathdowne and Canning Streets. Furthermore, this layout has enabled the creation of a network of designated bike lanes, connecting cyclist commuters with the off-road paths along Park Street. The commercial centres along Rathdowne and Nicholson Street, provide alfresco spaces extending from shop fronts onto footpaths and create a vibrant public realm.

2.2 Transport network

The transport network is comprised of arterial and local roads as well as an active transport and public transport network. A number of key collector roads run through Carlton North, between outer areas and Melbourne Central Business District.

2.2.1 Key roads

The key roads within Carlton North will be discussed in the following sections. They consist of the arterial roads as well as some of the local roads that also experience major traffic movements.

Nicholson Street

Nicholson Street is an arterial road which runs in north and south directions between Park Street and Princes Street within the project boundary. It has two lanes travelling in each direction on either side of dedicated tram lanes. Land use along the road frontage is a mix of residential and commercial.

Parking is permitted on either side of the street within designated areas. Pedestrian/bicycle crossings are provided south of Curtain Street to the tram stops, and north of Park Street. No dedicated bicycle lanes are provided.

The corridor features a number of signalised intersections located at Pigdon Street, Richardson Street and Princes Street. The speed limit is predominantly 60 km/hr, except between Princes Street and Lees Street which is school time based 40 km/hr.

Princes Street

Princes Street is a major arterial road which runs an east direction, between Nicholson Street and Lygon Street in the context of this project. It has three lanes travelling in each direction on either side of a narrow median containing trees planted at short intervals.

Princes Street provides access to and from Alexandra Parade and the Eastern Highway and carries significant volumes of vehicle traffic. There are signalised intersections at Nicholson Street, Canning Street, Rathdowne Street and Lygon Street. An informal bicycle crossing is provided at the intersection of Princes Street and Drummond Street. The speed limit along Princes Street is 60 km/hr.

Lygon Street

Lygon Street is a local distributor road, which runs in a north south direction between Park Street and Princes Street. It is set as the western boundary of the project area. Land use along the eastern side of the road frontage is a mix of residential and commercial. It has two lanes travelling in both directions on either side of dedicated tram lanes. Route 1 and Route 6 trams pass through Lygon Street.

The corridor features a signalised intersection at Lygon Street/Pigdon Street and pedestrian and/or bicycle crossings adjacent to Park Street and Richardson Street.

Restricted paralleling parking is available on either side of the corridor. A shared access way is provided between Melbourne General Cemetery and the northbound corridor of Lygon Street. The speed limit along Lygon Street is 60 km/hr.

Park Street

Park Street is a local distributor road, which runs in an east west direction between Lygon Street and Nicholson Street, and forms the northern boundary of the project area. It has one lane travelling in each direction and dedicated bicycle lanes on either side of the road.

The Inner City Rail Trail runs parallel to the eastbound lane on Park Street and experiences high cycling volumes. Restricted street parking is provided on either side of the road. The speed limit is 40 km/hr.

Canning Street

Canning Street is a local road, which runs in north and west directions between Park Street and Princes Street within the project area. It has one lane traveling in each direction on either side of a wide, green median. Dedicated bike lanes and street parking are provided on either side of the road.

There are permanent road closures adjacent to the intersections of Canning Street/Lee Street and Canning Street/Curtain St, which facilitate through movements on Canning Street only for pedestrians and cyclists.

Additional restrictions are placed on southbound traffic whereby left turn movements are mandatory at the intersections of Macpherson Street/Canning Street and Princes Street/Canning Street. The speed limit along Canning Street is 40 km/hr.

Rathdowne Street

Rathdowne Street is a local road that runs in a north south direction between Park Street and Princes Street within the project boundary. Land use along the road frontage is a mix of residential and commercial. It has one lane travelling in each direction on either side of a wide, median used for angled parking or greenery. Dedicated bicycle lanes are provided in both northbound and southbound directions. Street parking is available on either side of the corridor.

The corridor features a pedestrian crossing north of Newry Street near Curtain Square, and a signalised intersection at Pigdon Street. Two bus routes travel via Rathdowne Street and they are accompanied by simple bus amenities along the road corridor.

A number of right-turn bans are in effect from Rathdowne Street onto side-streets, including a 24 hour ban at the intersection of Rathdowne Street and Lee Street. The speed limit is 40 km/hr.

Road Name	Road Characteristics
Drummond Street	Dedicated bicycle lanes
	Wide, green median
	Compulsory diversion onto Fenwick Street
Station Street	Roundabout at Fenwick Street and Richardson St
	Northbound dedicated bicycle lane south of Newry St
	Speed humps at intervals
Pigdon Street	Narrow median with lofty trees planted at small intervals
	Signalised intersection at Rathdowne St
	Roundabouts at Canning St and Drummond St
	Dedicated bicycle lanes
Richardson Street	Bus route
	Dedicated bicycle lanes
	Roundabouts at Station St and Amess St
	Speed humps
Lee Street	One-way (westbound) street except:
	<ul style="list-style-type: none"> Between Drummond St and Rathdowne Street Between Canning St and Station St
	Dedicated bicycle lanes provided in certain sections
	Carlton North Primary School is located on this road
	Speed humps located near Primary School

Table 1 Additional roads and their characteristics



Figure 3 Bicycle priority routes in Carlton North

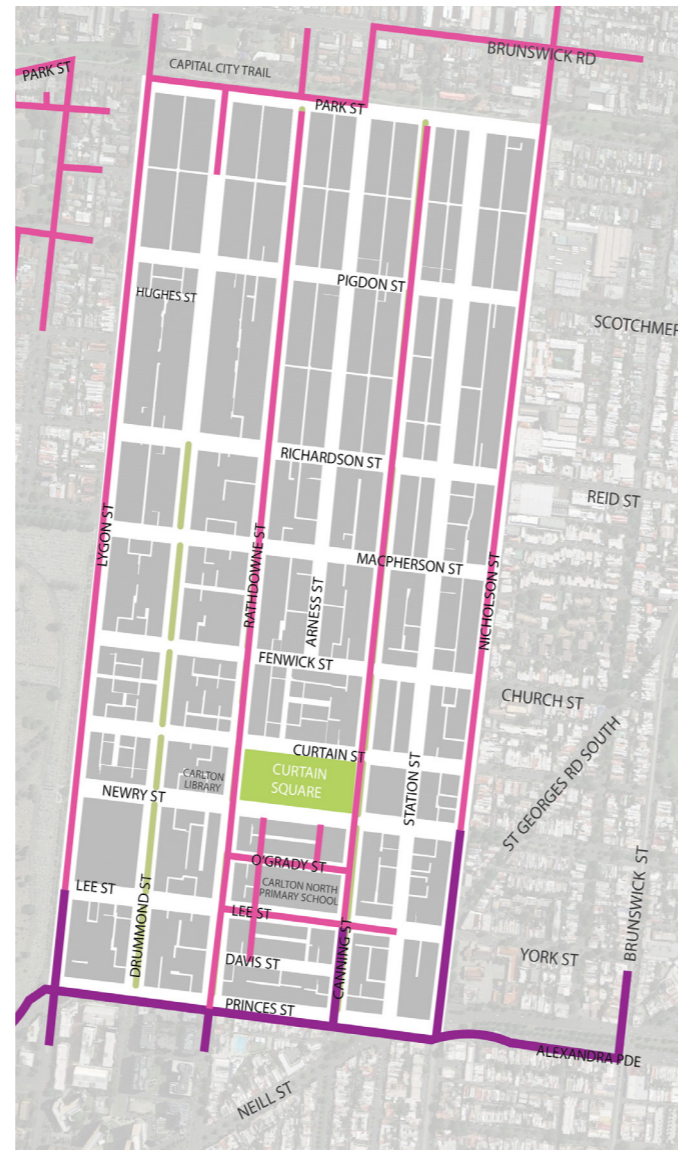


Figure 4 Pedestrian priority routes in Carlton North

2.2.2 Additional roads

Some additional roads within Carlton North’s local road network are also of significance and will be described briefly. They are listed in Table 1 along with some of their road characteristics.

2.2.3 Bicycle network

A number of key bicycle routes run through Carlton North, facilitating both local demand and cyclists travelling from outer areas to Melbourne Central Business District. The Movement and Place map in Figure 2 shows that bicycle priority routes are featured on Canning Street and adjacent to Park Street.

Canning Street features an assortment of traffic calming measures and cycling amenities that collectively create a safe, desirable environment for cyclists to ride in. Some of the traffic calming measures implemented along Canning Street include narrowed road corridors and road closures such as at the intersection of Lee Street and Curtain Street (see Figure 3). Delineation on Canning Street is of high quality and shows clear separation between bicycle movements and general traffic movements.

Park Street features dedicated bicycle lanes on either side of the road, however, the prioritisation of bicycle movements in the vicinity is also attributed to the Inner City Rail Trail which runs parallel to the road corridor. A representation of Park Street and its provisions for cyclists is shown in Figure 4.

2.2.4 Pedestrian network

Carlton North contains a comprehensive pedestrian network which is highlighted in Figure 5. The Movement & Place map shows that pedestrian priority routes are featured along a number of the north-southbound roads including Lygon Street, Rathdowne Street, Canning Street and Nicholson Street. In the east-west direction, pedestrian priority routes can be seen on Princes Street, O’Grady Street and sections of Park Street and Lee Street.

Footpaths and street amenities

To create the foundation of the walking network, sealed footpaths are provided on either side of the road within Carlton North. Where there are pedestrian priority routes, this can be partly attributed to the place making value of the road. Rathdowne Street, for example, features wide footpaths with good separation from live traffic. In addition, a range of street amenities are provided such as benches, green medians and wide canopies for shading.

Pedestrian crossings and refuges

The movement of pedestrians across a primary road corridor is provided at the signalised intersections within Carlton North. A number of formal pedestrian crossings are located throughout the Local Precinct to support these movements. They are largely located adjacent to commercial strips and/or green open spaces. On Lygon Street and Nicholson Street, formal pedestrian crossings are also available to and from select tram stops.

Pedestrian refuges are provided at a number of intersections, and at some of the formal and informal pedestrian crossings. These refuges provide a safe area for pedestrians to stop mid-crossing, especially during peak periods.

2.2.5 Tram network

Tram routes run through Carlton North along Lygon Street and Nicholson Street, both of which are tram priority routes and provide tram lanes separated from regular traffic. The tram routes and their peak hour frequencies are summarised in Table 2. Morning peak is defined as between 8 am and 9 am, and afternoon peak is defined as between 5 pm and 6 pm.

Route	Inbound		Outbound	
	AM Peak	PM Peak	AM Peak	PM Peak
Lygon Street				
Route 1, East Coburg - South Melbourne Beach	7 services per hour	8 services per hour	7 services per hour	8 services per hour
Route 6, Moreland - Glen Iris	7 services per hour	12 services per hour	8 services per hour	8 services per hour
Nicholson Street				
Route 96, East Brunswick - St Kilda Beach	9 services per hour	9 services per hour	11 services per hour	9 services per hour

Table 2 Tram service frequencies within Carlton North
Source: Public Transport Victoria

2.2.6 Bus network

A number of bus routes run through Carlton North between the outer suburbs and the Melbourne Central Business District. The bus priority routes are on Richardson Street and Rathdowne Street, within the local roads network, as well as on Princes Street which lies within VicRoads' jurisdiction. These routes are shown in Figure 6 which was taken from the VicRoads' Movement and Place map.

Three bus routes operate within the project boundary and they are summarised in Table 3. Some of the bus stops include additional amenities such as shelter and benches, whilst others are only indicated with a flag.

Route	Inbound		Outbound	
	AM Peak	PM Peak	AM Peak	PM Peak
Rathdowne Street				
Route 504, Moonee Ponds - Clifton Hill via East Brunswick Between Park St and Richardson St	2 services per hour	2 services per hour	2 services per hour	2 services per hour
Route 250, City (Queen St) - La Trobe University Between Park St and Princes St	3 services per hour	3 services per hour	3 services per hour	4 services per hour
Route 251, City (Queen St) - Northland Shopping Centre Between Park St and Princes St	3-4 services per hour	3-4 services per hour	3 services per hour	3 services per hour
Richardson Street				
Route 504, Moonee Ponds - Clifton Hill via East Brunswick Between Rathdowne St and Nicholson St	2 services per hour	2 services per hour	2 services per hour	2 services per hour

Table 3 Bus service frequencies within Carlton North
Source: Public Transport Victoria

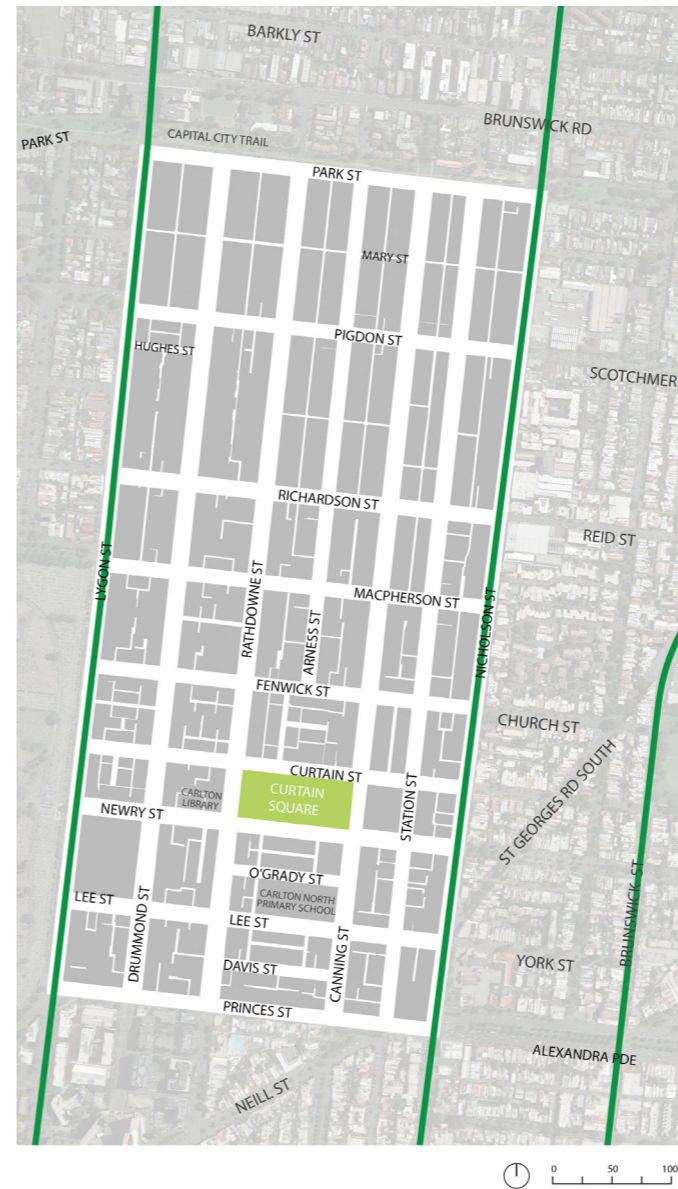


Figure 5 Tram priority routes in Carlton North



Figure 6 Bus priority routes in Carlton North



03 Traffic Data

The City of Yarra has provided GHD the following traffic data sets:

- User crash data, June 2014 to June 2019;
- User crash data without arterials, June 2014 to June 2019;
- Crash summary by location, 2014 to 2019;
- Crash summary without arterials, 2014 to 2019;
- Traffic speed and volume data, 2014 to 2019; and
- Carlton North Origin Destination Survey undertaken by Austraffic from 7:00 am to 7:00 pm on Wednesday, 13th February 2019.

An analysis of these data sets will be undertaken in the following sections to identify key movement patterns, themes and safety issues on local streets in Carlton North. It will be supplemented by data and knowledge sourced from online sources including VicRoads Open Data and the Movement & Place Framework.

3.1 Traffic volumes and speed

The City of Yarra has provided data for traffic volumes and speeds obtained from 49 surveys performed between 2014 and 2019. Where there is an overlap in survey location, the more recent survey has been considered. In total, data from 37 surveys have been considered and they correspond to 37 unique survey locations. It is assumed that the provided data is reflective of existing traffic conditions.

3.1.1 Traffic volume

Traffic volumes provided for the local roads in Carlton North are represented in Figure 7. The highest traffic volumes in Carlton North were recorded on Rathdowne Street and Pigdon Street. Daily volumes on Rathdowne Street are approximately 11,950 vehicles/day between Newry Street and O'Grady Street, and the volumes on Pigdon Street are 6,500 vehicles/day between Drummond Street and Rathdowne Street. Traffic volumes are high on these routes due to corridor connections to adjacent areas, and accessibility with signalised intersections into the study area.

The traffic volume for any given traffic flow on a road corridor was compared against its opposing flow. Where there was an imbalance, for example there is significantly more traffic in one direction than in the opposing direction, this was recorded in Table 4. The findings in Table 4 are also illustrated in Figure 7, and demonstrate where there is dominant traffic flow in a particular direction.

Street	Dominant movement
Amess Street	Southbound traffic volume between Park St and Pigdon St
Canning Street	Southbound traffic volume between Davis St and Princes St
Davis Street	Eastbound traffic volume between Rathdowne St and Canning St
Drummond Street	Southbound traffic volume between Richardson St and Lee St
Lee Street	Westbound traffic volume between Station St and Drummond St
MacPherson Street	Eastbound traffic volume between Rathdowne St and Amess St
Station Street	Southbound traffic volume between Newry St and Princes St

Table 4 Local roads with imbalanced traffic volumes
Data sourced from the City of Yarra



Figure 7 Traffic volumes in Carlton North
Data sourced from the City of Yarra

3.1.2 Traffic speed

Under current regulations, the speed limit for all local streets in Carlton North, excluding Lygon Street, is 40 km/hr. The 85th percentile traffic speeds provided for local streets in Carlton North are represented in Figure 8.

From the map, it is clear that speeding is apparent on a number of the streets, particularly those running in a north south direction. Excessive speeding is defined as +6 km/hr above the posted speed limit, and undesirable speeding is defined as +3 km/hr. Traffic calming will be a consideration to reduce the operating speed on these corridors particularly on routes where there is high pedestrian and cyclist activity.

Excessive speeding occurs along the following road segments:

- Drummond Street, between Park Street and Richardson Street, and between Newry Street and Lee Street
- Amess Street, between Park Street and Fenwick Street
- Station Street, between Park Street and Richardson Street
- Davis Street, between Rathdowne Street and Canning Street

Undesirable speeding occurs along the following road segments:

- Rathdowne Street, between Park Street and Richardson Street
- Drummond Street, between Fenwick Street and Curtain Street

Overall, significant speeding was found to occur between Park Street and Richardson Street along a number of the north and southbound streets. Traffic calming measures are strongly recommended for consideration on Drummond Street, Amess Street and Station Street within this segment. No data was provided for Canning Street

and Rathdowne Street within this segment and prompts further investigation. The speeding incurred on Davis Street is also of significance and considered abnormal on a side-street.

3.1.3 Gaps

There are some noticeable gaps in the traffic volume and speed data provided. They are at the following locations:

- Drummond Street, between Lee Street and Princes Street
- Rathdowne Street, between Lee Street and Princes Street, and between Park Street and Pigdon Street
- Station Street, between Richardson Street and Newry Street
- Canning Street, north of Curtain Street
- Curtain Street, between Lygon Street and Rathdowne Street
- Newry Street, between Lygon Street and Rathdowne Street

Access to traffic data for the listed locations would allow for a complete understanding of driver behaviour within Carlton North's local street network, and for a connection to be made between problematic road segments. The provision of this additional data may be required to support treatment recommendations.

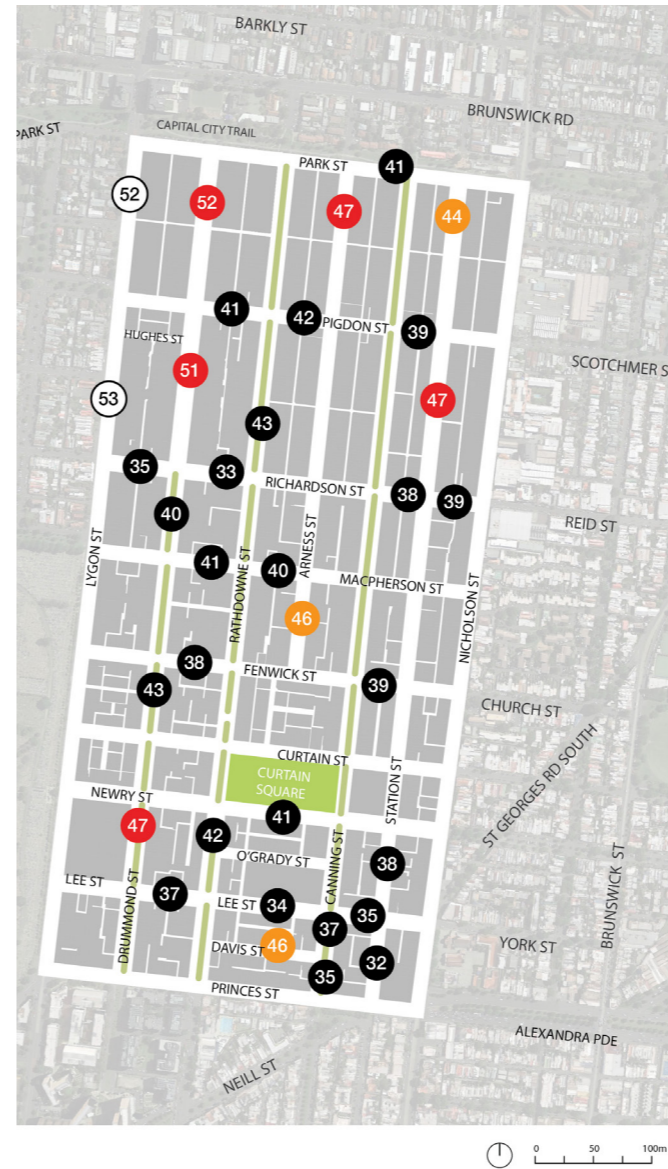


Figure 8 Speeds in Carlton North (85th percentile)
Data sourced from the City of Yarra



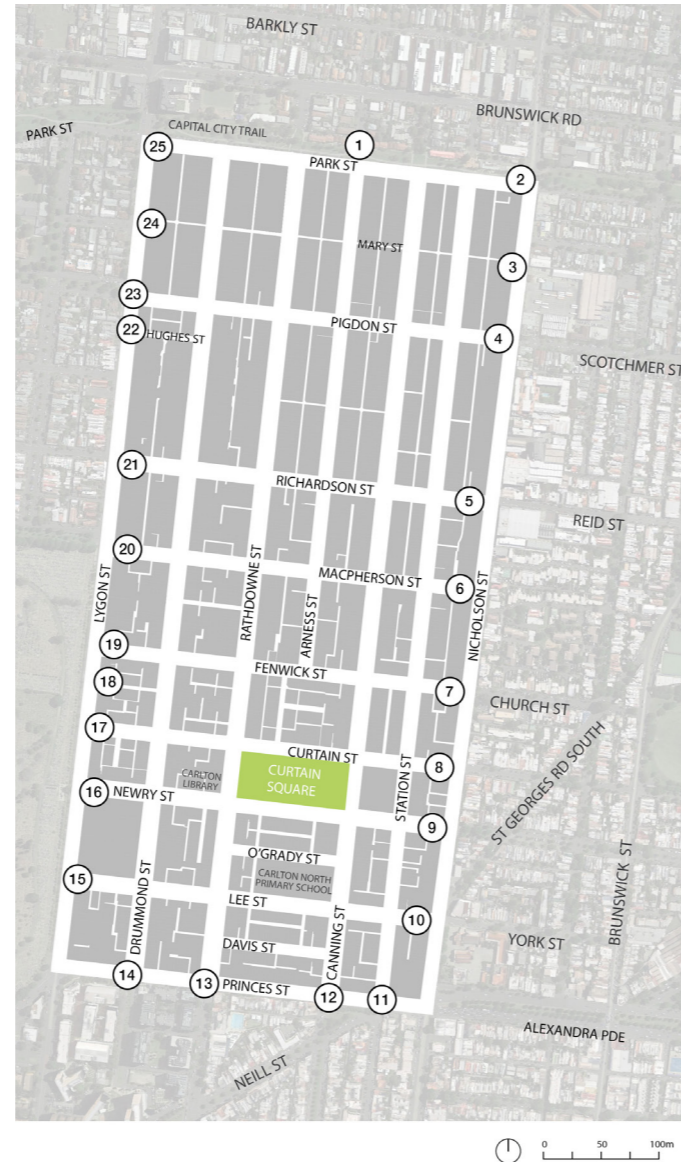


Figure 9 Origin Destination Survey

3.2 Origin and destination surveys

An Origin Destination (OD) survey was undertaken by Austraffic Wednesday 13 February 2019. The survey was undertaken from 7:00 am to 7:00 pm, and collected data at the stations shown in the Figure 9.

From the survey results, key findings are:

- 26% (3035) of all vehicles entering the survey area, enter via Rathdowne Street at Princes Street.
- 17% (1946) of all vehicles entering the survey area, enter via Pigdon Street at Lygon Street.
- 24% (2709) of all vehicles exit the survey area, enter via Rathdowne Street at Princes Street.
- 18% (2038) of all vehicles exit the survey area, enter via Pigdon Street at Lygon Street.
- 9% (1036) of vehicles travelling through the survey area enter via Pigdon Street at Lygon Street and continue east bound and exit at Nicolson Street
- 9% (981) of vehicles travelling through the survey area enter via Pigdon Street at Nicolson Street and continue west bound and exit at Pigdon Street
- Rathdowne Street at Princes Street has the most matched vehicle movements of vehicles entering and exiting the survey area, with vehicles either dispersing or originating from other local streets.

AM Peak Hour

The morning peak hour occurs from 8:00 am to 9:00 am, with 1704 vehicles recorded entering and 1782 vehicles exiting the survey area. Of these vehicles, 964 were matched as through moving traffic, and the remaining trips local destination (740) or local origin (818) trips.

The most dominate through movement is along Pigdon Street, with 13% (124) of vehicles entering and exiting the survey area by travelling west along Pigdon Street.

Pigdon Street at Nicolson Street is the most used route for vehicles entering the study area, with 303 vehicles entering, 92 of which were local origin.

Rathdowne Street at Princes Street is the most used route for vehicles exiting the study area, with 461 vehicles exiting, 194 of which were local origin.

PM Peak Hour

The evening peak hour occurs from 5:00 pm to 6:00 pm, with 2436 vehicles recorded entering and 2386 vehicles exiting the survey area. Of these vehicles, 1577 were matched as through moving traffic, and the remaining trips local destination (840) or local origin (790) trips.

The most dominate through movement is along Pigdon Street, with 10% (153) of vehicles entering and exiting the survey area by travelling west along Pigdon Street.

Rathdowne Street at Princes Street is the most used route for vehicles entering the study area, with 688 vehicles entering, 198 of which were local origin.

Rathdowne Street at Princes Street is the most used route for vehicles exiting the study area, with 4480 vehicles exiting, 170 of which were local origin.

3.3 Rat Running

As per City of Yarra LAPM Policy, rat running is considered to be occurring when hourly traffic volumes exceed 14% of daily volumes.

The Austraffic OD survey was a 12-hour survey, and is assumed to represent 90 percent of vehicle traffic. The data collected was uplifted by 10 percent to represent 24-hour data. Using the revised data, the OD survey was assessed to determine which OD stations collected excessive traffic volumes across the survey period. Table 5 shows:

- The result of vehicle numbers per OD station with both directions combined,
- The ratio of hourly volumes to assumed 24 hour volumes (shown in parentheses).

OD stations with ratios above 14% have been highlighted in the table.

Mary Street has high ratios, but very low volumes, and therefore is not considered as a rat running route.

From the results, morning peak traffic is over the nominal 14 percent threshold on Station Street and Drummond Street, at Princes Street. The afternoon peak traffic is above the threshold on Canning Street, at Princes Street.

OD Station	Survey time										
	7am - 8am	8am - 9am	10am - 11am	11am - 12pm	12pm - 1pm	1pm - 2pm	2pm - 3pm	3pm - 4pm	4pm - 5pm	5pm - 6pm	6pm - 7pm
1	227 (7%)	298 (9%)	185 (6%)	163 (5%)	134 (4%)	171 (5%)	166 (5%)	176 (5%)	299 (9%)	346 (11%)	336 (10%)
2	190 (7%)	228 (9%)	175 (7%)	148 (6%)	125 (5%)	149 (6%)	171 (7%)	156 (6%)	247 (10%)	236 (9%)	221 (9%)
3	0 (0%)	1 (4%)	2 (7%)	3 (11%)	0 (0%)	4 (14%)	1 (4%)	2 (7%)	0 (0%)	6 (22%)	3 (11%)
4	350 (6%)	491 (9%)	395 (7%)	370 (7%)	315 (6%)	380 (7%)	347 (6%)	363 (7%)	443 (8%)	473 (9%)	483 (9%)
5	171 (5%)	179 (5%)	132 (4%)	111 (3%)	133 (4%)	141 (4%)	184 (6%)	227 (7%)	369 (11%)	399 (12%)	453 (14%)
6	26 (5%)	59 (14%)	36 (9%)	27 (7%)	50 (12%)	33 (8%)	20 (5%)	19 (5%)	23 (6%)	32 (8%)	19 (5%)
7	36 (7%)	72 (13%)	5 (1%)	2 (0%)	3 (1%)	47 (9%)	39 (7%)	31 (6%)	64 (12%)	53 (10%)	64 (12%)
8	5 (2%)	19 (9%)	21 (9%)	22 (10%)	13 (6%)	15 (7%)	15 (7%)	3 (1%)	15 (7%)	27 (12%)	18 (8%)
9	30 (6%)	49 (10%)	50 (10%)	54 (11%)	37 (7%)	28 (6%)	27 (5%)	33 (7%)	30 (6%)	32 (6%)	33 (7%)
10	11 (6%)	11 (6%)	15 (8%)	15 (8%)	17 (9%)	20 (10%)	12 (6%)	12 (6%)	14 (7%)	15 (8%)	17 (9%)
11	90 (13%)	141 (20%)	45 (6%)	17 (2%)	25 (4%)	16 (2%)	22 (3%)	22 (3%)	85 (12%)	42 (6%)	38 (5%)
12	30 (6%)	36 (7%)	17 (3%)	16 (3%)	18 (4%)	24 (5%)	27 (6%)	19 (4%)	61 (13%)	86 (18%)	50 (10%)
13	652 (6%)	656 (6%)	660 (6%)	692 (6%)	713 (6%)	712 (6%)	710 (6%)	843 (7%)	995 (9%)	1157 (10%)	1162 (10%)
14	140 (17%)	161 (19%)	59 (7%)	33 (4%)	42 (5%)	35 (4%)	34 (4%)	45 (5%)	43 (5%)	52 (6%)	59 (7%)
15	67 (7%)	84 (9%)	75 (8%)	41 (4%)	70 (7%)	49 (5%)	71 (7%)	59 (6%)	78 (8%)	106 (11%)	92 (9%)
16	45 (5%)	61 (7%)	63 (7%)	50 (6%)	66 (8%)	55 (6%)	46 (5%)	72 (8%)	79 (9%)	89 (10%)	84 (10%)
17	21 (9%)	22 (9%)	22 (9%)	15 (6%)	15 (6%)	18 (8%)	17 (7%)	12 (5%)	15 (6%)	20 (9%)	20 (9%)
18	20 (10%)	25 (13%)	10 (5%)	13 (7%)	12 (6%)	13 (7%)	20 (10%)	8 (4%)	24 (12%)	9 (5%)	10 (5%)
19	32 (5%)	52 (7%)	35 (5%)	43 (6%)	53 (8%)	54 (8%)	45 (6%)	48 (7%)	65 (9%)	61 (9%)	75 (11%)
20	73 (5%)	97 (7%)	78 (5%)	66 (4%)	77 (5%)	87 (6%)	76 (5%)	89 (6%)	160 (11%)	194 (13%)	123 (8%)
21	257 (7%)	311 (8%)	254 (7%)	199 (5%)	205 (5%)	202 (5%)	199 (5%)	229 (6%)	364 (10%)	390 (10%)	358 (10%)
22	13 (13%)	7 (7%)	13 (13%)	4 (4%)	8 (8%)	9 (9%)	8 (8%)	7 (7%)	6 (6%)	3 (3%)	8 (8%)
23	248 (5%)	359 (7%)	340 (7%)	282 (6%)	291 (6%)	284 (6%)	289 (6%)	323 (7%)	470 (10%)	485 (10%)	454 (9%)
24	0 (0%)	0 (0%)	2 (23%)	1 (11%)	0 (0%)	0 (0%)	0 (0%)	2 (23%)	2 (23%)	0 (0%)	1 (11%)
25	52 (4%)	67 (5%)	87 (7%)	82 (6%)	71 (6%)	73 (6%)	71 (6%)	83 (7%)	128 (10%)	127 (10%)	146 (12%)

Table 5 Origin Destination Summary



3.4 Crashes

The five year crash history 1 July 2014 to 30 June 2019 there was 236 recorded injuries for road related incidents. Of these, 90 injuries were recorded on local roads, and 146 on arterial roads. Table 6 the number and severity of road user injuries in the Carlton North area.

The most common crash type for all roads is vehicles from adjacent direction, with 69 injury crashes, 14 of which are serious injury. All 14 serious injury crash are 'cross traffic' crashes, with 12 occurring on local roads. Of these local road serious crashes, 10 involved a cyclist. Figure 10 shows crashes that occurred throughout the Carlton North Area.

During this crash period, there were 32 pedestrian related crashes, 11 of which were classified as serious injury. One of these crashes occurred on a local road, and all others on arterial roads. The most common crash type was pedestrians stepping onto traffic lanes on the side of road; 'near side' and 'far side'.

From the pedestrian crash map in Figure 13, pedestrian crashes occur across the Carlton North region, with crashes predominately occurring:

- On Nicholson Street towards the Pigdon Street intersection.
- On Rathdowne Street near Newry Street.
- At Princes Street and Lygon Street.

There were a total of 95 cyclist crashes, 21 of which were serious crashes. 13 of these serious injury crashes occurred on local roads. The most common crash type is intersection crashes (vehicle from 'adjacent direction'), predominately 'cross traffic' incidents. The next most common crash type was vehicles from 'same direction', most predominate crash 'rear' end' crash.

From the cyclist crash map in Figure 14, cyclist crashes occur across the Carlton North region. From the crash map, it can be seen:

- There is a pattern of 'cross traffic' crashes along Richardson Street.
- There is a pattern of 'cross traffic' and 'dooring' crashes along Rathdowne Street.
- There is a pattern of 'cross traffic' crashes throughout the whole study area.

	Fatal	Seriously injured	Other injury	Total persons
Local roads	0	20	70	90
Arterial roads	0	37	109	146
All roads	0	57	179	236

Table 6 User Crash Summary

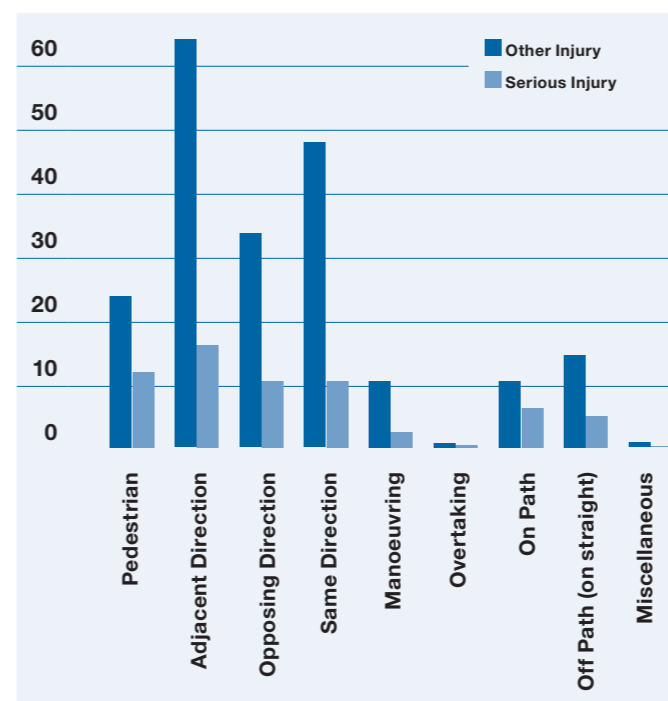


Figure 10 Crashes by classification

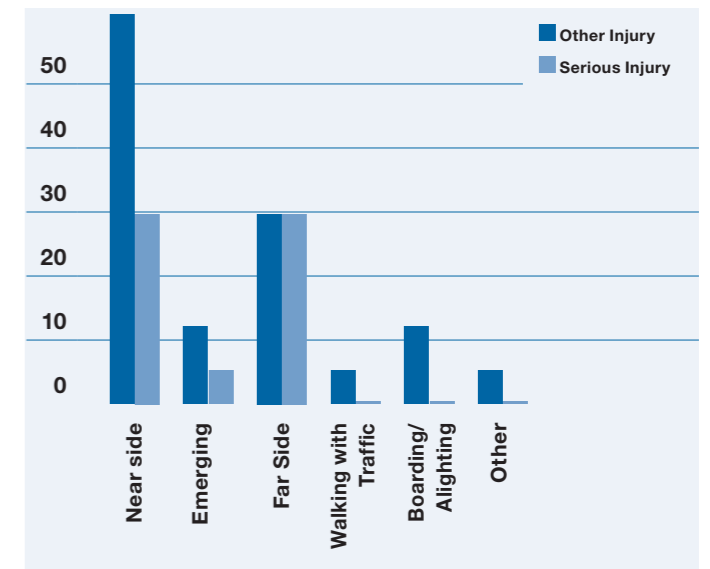


Figure 11 Pedestrian Crashes

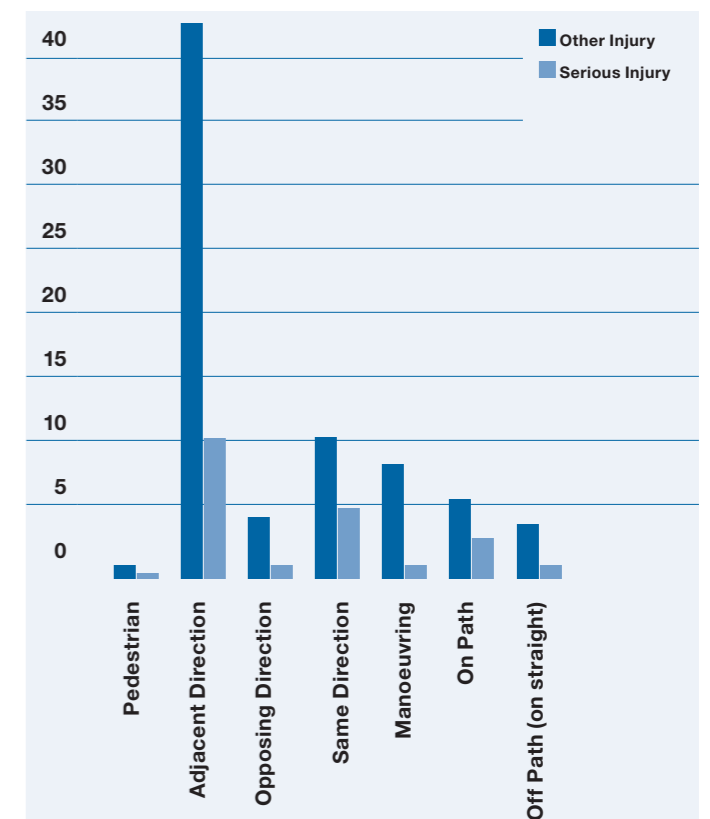


Figure 12 Cyclist Crashes

3.5 Pedestrians and cyclists

There was no specific pedestrian and cyclist data provided as part of background information. Data collection may be required to support LAPM treatment recommendations.

3.6 Conclusions

The Carlton North Precinct is a diverse and vibrant area, with a wide range of local activity. There is an extensive pedestrian and cycling network, which attract locals and visitors to the area.

However, the area is impacted by the prevalence of speeding behaviour on local roads throughout the study precinct. This behaviour is prominent on north-south routes, particularly towards the northern portion of the precinct. Routes with excessive speeding are Drummond Street, Amess Street, Station Street and Davis Street.

Pigdon Street and Rathdowne Street has the highest traffic volumes, with vehicles travelling along these routes throughout the day. Pigdon Street has a strong east-west and west-east travel demand. There are a large portion of traffic entering and exiting Rathdowne Street, and using other side streets to complete the route, including Pigdon Street, Park Street and Amess Street.

Station Street, Drummond Street and Canning Street have the highest peak hour traffic volumes to all day traffic volume ratios. This indicates that there is rat running along these corridors

There was 236 'serious' and 'other' injury crashes in the five year crash history within the study area. Of these, 57 were 'serious' injury crashes. The most common crash type is 'vehicles from adjacent direction', with the most serious injuries at cross intersections. There was 32 pedestrian related crashes within the survey area, with crashes predominately on Nicholson Street, Rathdowne Street and at Princes Street/Lygon Street intersection. There were 89 cyclist crashes, with most common crash type 'cross traffic and 'rear end' crashes.

Additional traffic data may be required to create a complete picture of traffic behaviour within the study area. The existing traffic treatments preclude from interpolation of existing data.

The provision of cycle and pedestrian data will support treatment identification.



Figure 13 Pedestrian Crash Map



Figure 14 Cyclist Crashes





04 Site Inspection

A site visit to Carlton North was undertaken by GHD on Tuesday 10th of September 2019 between 4:50 pm and 6:20 pm. The following observations were made:

- The intersection of Princes Street and Lygon Street is busy with a variety of intermingling road users. The number of cyclists using the signalised crossings and traffic islands across Cemetery Road/Princes Street was high. A group of pedestrians were observed to “jaywalk” across Lygon Street after alighting a northbound tram.
- There is heavy northbound cycling movements on Drummond Street, Rathdowne Street and Canning Street, and crossing Park Street.
 - Cyclists were observed to diverge from cycling lanes into main traffic lanes in order to overtake other cyclists.
 - The informal bicycle crossing across Princes Street between Drummond Street is populated with cyclists.
 - A near miss was sighted at the intersection of Rathdowne Street and Princes between a northbound cyclist and a southbound right-turning car. This was at the end of a phase.
- Queuing of Princes Street traffic across intersections is common during peak period.
- Public open spaces such as Curtain Square are “alive” and well utilised by the community.
- Public transport is well utilised. Most tram stops and bus stops had either people boarding or alighting.
- The roundabout at the junction of Pigdon Street and Canning Street was observed to be difficult for drivers to manoeuvre around, partially due to the abnormal central island. It was noted that delineation encourages cyclists to occupy the entire width of approaches to roundabouts, however, vehicles were still observed to be attempting to overtake these cyclists.
- Parallel parking with poor parking discipline was observed on a number of occasions on Canning Street, north of Pigdon Street, whereby vehicles are parking more than 300 mm (in some instances 600 mm) away from the kerb, thereby reducing available width in the cycling lane. The parking lane were also noted to be of generous width.



Heritage footpath canopy
Canning Street at Pigdon Street



Dedicated cycling lanes and infrastructure
Canning Street



Busy surrounding roads
Princes Street at Drummond Street



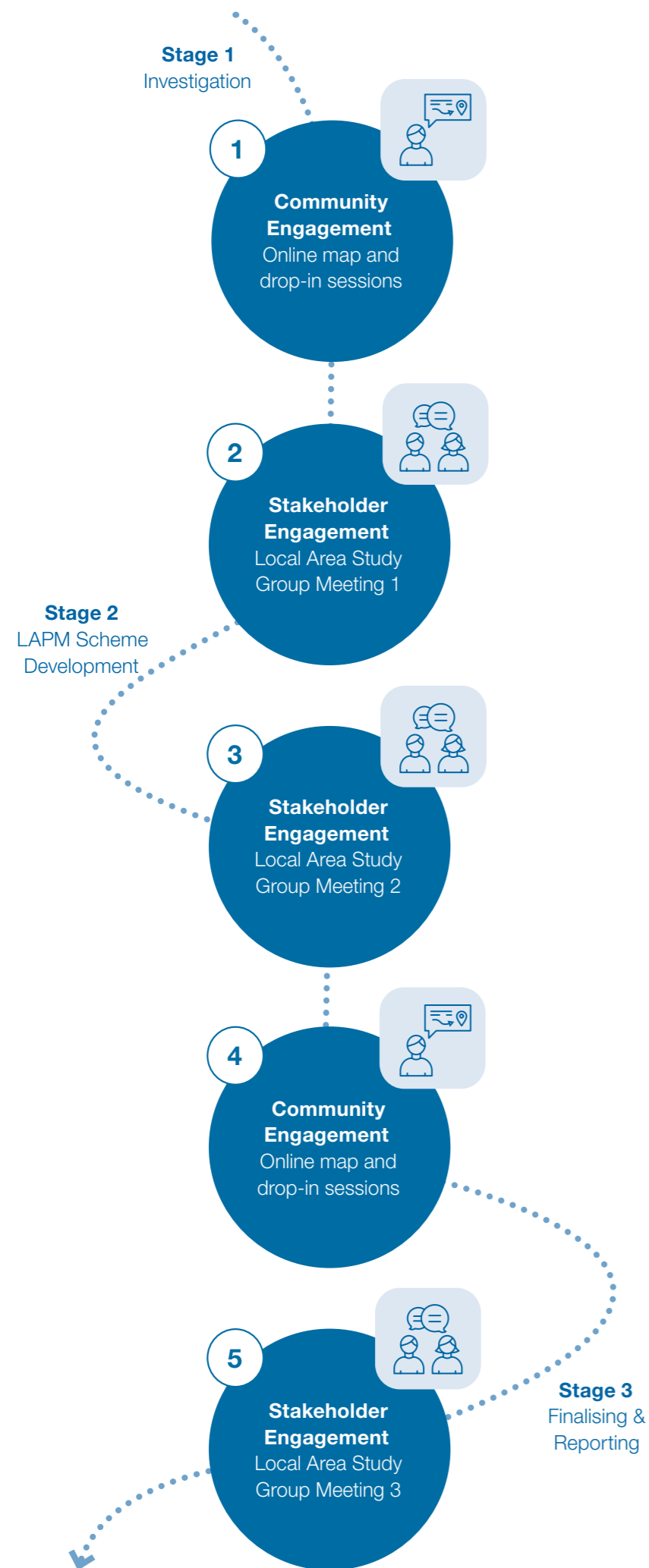
Footpath extension
Rathdowne Street and Curtain Street



Well serviced by trams and buses
Nicholson Street



Green spaces and open space amenity
Curtain Square



05 Community Engagement

5.1 Overview

Engagement with community has played an important role in developing and refining the LAPM recommendations. In December 2019 and January 2020, Council spoke to the community about the draft LAPM plan. The draft LAPM was guided by conversations with community in August and September 2019 as well as independent traffic advice. Community feedback is considered one aspect in the decision making and data has also been a requirement in reaching conclusions.

The figure adjacent shows the engagement process throughout the project and the integration with project stages.

5.2 Local Area Study Group

The project has also been guided by the contribution of a local area study group, who nominated to participate and were selected based on where they reside/work/visit within or around Carlton North and their demographic representation to ensure a diverse sample of participation. The study group participated in three meetings between September 2019 and March 2020.

The purpose of the three meetings were to:

- Introduce the project and role of the study group, share background research and community feedback, and identify priority locations for intervention.
- Present the draft LAPM scheme, discuss recommendations and seek feedback on priority locations and interventions.
- Update study group members on the second round of community engagement feedback on the draft LAPM scheme recommendations and seek feedback on final recommendations.

5.3 Community Engagement

These two rounds of feedback have helped to create better streets and spaces for the community. This information, along with advice from traffic data and the guidance of the local area study group, to come up with some potential solutions.

Ideas and concerns received have been incorporated into this revised plan. Feedback overall has been very mixed, with more than 300 people participating. Channels for participation included:

- Two interactive online maps through Council's *Have Your Say* platform, each run at both stages of engagement.
- Four drop-in sessions (3 hours each), two each were run at both stages of engagement.

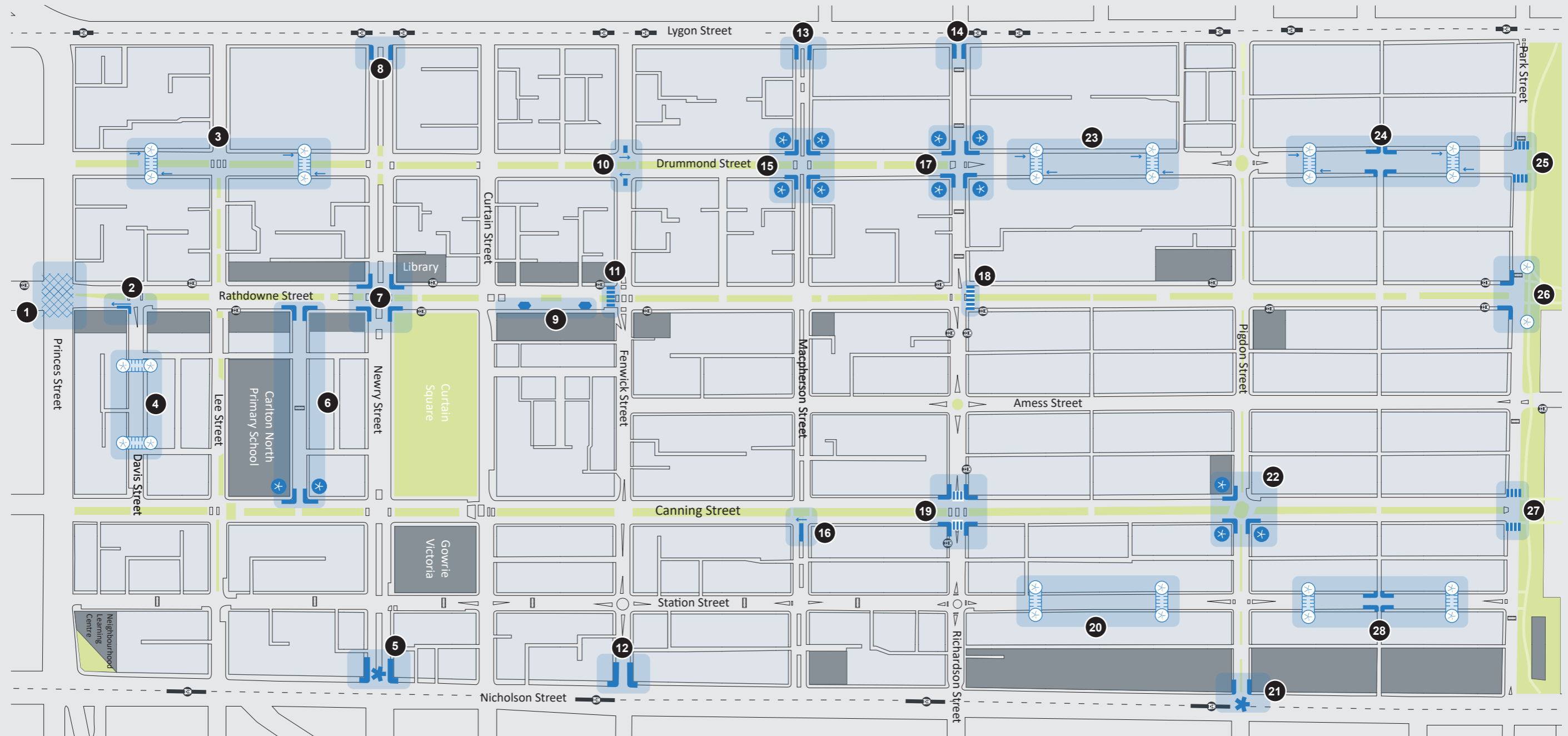
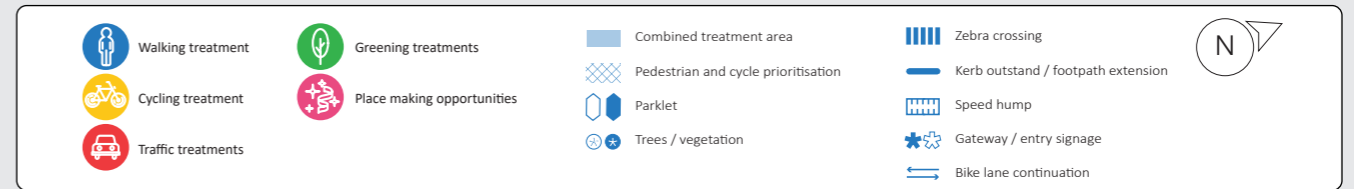
The final plan balances the many complex needs of people who live, work and spend time in Carlton North. It will make sure that these streets remain a nice to live in, while also making sure all kinds of transport users can easily and safely get around.

Some recommended treatments have been removed, included or amended following feedback, and internal Council review. These are detailed in the following section. As summary table of comments made on original testaments has also been included to demonstrate the level of response and support for or against each treatment. In the first round of engagement, the following key issues were raised:

- **Walking**
 - Improve access for all abilities, including elderly and pram access
 - Difficult crossing points with multi modes
 - Better lighting to feel safer
- **Cycling**
 - Dangerous intersections
 - Good network of bike lanes and cycling infrastructure
- **Driving**
 - Rat-running at peak hours
 - Increase in through traffic to Eastern Freeway
 - Increased traffic in school zones
 - Dangerous intersections
- **Greening**
 - Taking care of existing trees
 - Planting new trees
 - Improving under-used street spaces

5.4 Draft Recommendations Presented During Engagement

The map lists draft treatment recommendations that were created based on community feedback and traffic data. The draft recommendations were presented to the community during engagement in December 2019 and January 2020.



- | | | | | | |
|--|--|---|--|---|--|
| <p>1 Improve signal timing at Rathdowne Street to be calibrated to suit slower pedestrians and provide a head start for cyclists.
Princes Street and Rathdowne Street</p> | | <p>11 New raised zebra crossing to promote pedestrian prioritisation.
Rathdowne Street at Fenwick Street</p> | | <p>21 Improve arrival experience by enhancing greenery, providing areas for seating.
Nicholson Street at Pigdon Street</p> | |
| <p>2 Kerb extension to aligns with the existing kerb extension on the North side and realignment of the bike lane to suit.
Rathdowne Street and Davis Street (south-eastern side)</p> | | <p>12 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Fenwick Street and Nicholson Street</p> | | <p>22 Kerb extensions to reduce size of intersection and provide space for pedestrians with opportunity to introduce greenery .
Canning Street and Pigdon Street</p> | |
| <p>3 Calming treatments with combination of speed humps, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Drummond Street between Princes and Newry Street</p> | | <p>13 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Macpherson Street and Lygon Street</p> | | <p>23 Calming treatments with combination of speed humps, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Drummond Street between Richardson and Pigdon Street</p> | |
| <p>4 Calming treatments with combination of speed humps, road narrowings, and integrated with plantings.
Davis Street</p> | | <p>14 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Richardson Street and Lygon Street</p> | | <p>24 Calming treatments with combination of speed humps, mid block kerb extensions, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Drummond Street between Pidgon and Park Street</p> | |
| <p>5 Improve arrival experience by enhancing greenery, providing areas for seating and discuss with other Council department the possibility of integrating artwork.
Nicholson Street at Newry Street</p> | | <p>15 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Macpherson Street</p> | | <p>25 New raised zebra crossing to promote pedestrian and cyclist prioritisation, widened to provide separation of use.
Park Street at Drummond Street</p> | |
| <p>6 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
O'Grady Street between Rathdowne and Canning Street</p> | | <p>16 Reconfigure the median strip by deleting current extension and creating centre refuges on Macpherson Street for pedestrians to cross safely.
Macpherson Street at Canning Street</p> | | <p>26 Kerb extensions to reduce crossing widths, improve pedestrian visibility, and opportunity to introduce greenery, tree planting and passive irrigation.
Park Street and Rathdowne Street</p> | |
| <p>7 Kerb extensions to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Rathdowne Street and Newry Street</p> | | <p>17 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Richardson Street</p> | | <p>27 New raised zebra crossing to promote pedestrian and cyclist prioritisation, widened to provide separation of use.
Park Street at Canning Street</p> | |
| <p>8 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation..
Newry Street and Lygon Street</p> | | <p>18 Raise existing zebra crossing to promote pedestrian prioritisation.
Rathdowne Street at Richardson Street</p> | | <p>28 Calming treatments with combination of speed humps, mid block kerb extensions, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Station Street between Pidgon and Park Street</p> | |
| <p>9 Footpath extended using parklets and kerb extensions to increase space for alfresco dining.
Rathdowne Street between Curtain and Fenwick Street</p> | | <p>19 Kerb extensions and zebra crossings to improve pedestrian safety (Blackspot planned project).
Canning Street and Richardson Street</p> | | | |
| <p>10 Simplify intersection by removing the median on the inbound side of Canning Street and replacing with a median on Fenwick Street (East)
Drummond Street and Fenwick St</p> | | <p>20 Calming treatments with combination of speed humps, road narrowings, integrated with plantings.
Station Street between Richardson and Pigdon Street</p> | | | |

5.5 Changes Following Engagement

Some recommended treatments have been removed, included or amended following feedback, and internal Council review. These are detailed in the following section. A summary table of comments made on original treatments has also been included to demonstrate the level of response and support for or against each treatment.

The following LAPM draft recommendations were with removed or added:

Overall recommendations added

A number of overall considerations were raised through community feedback. While not specific to one treatment type, they will be considered as overarching approaches.

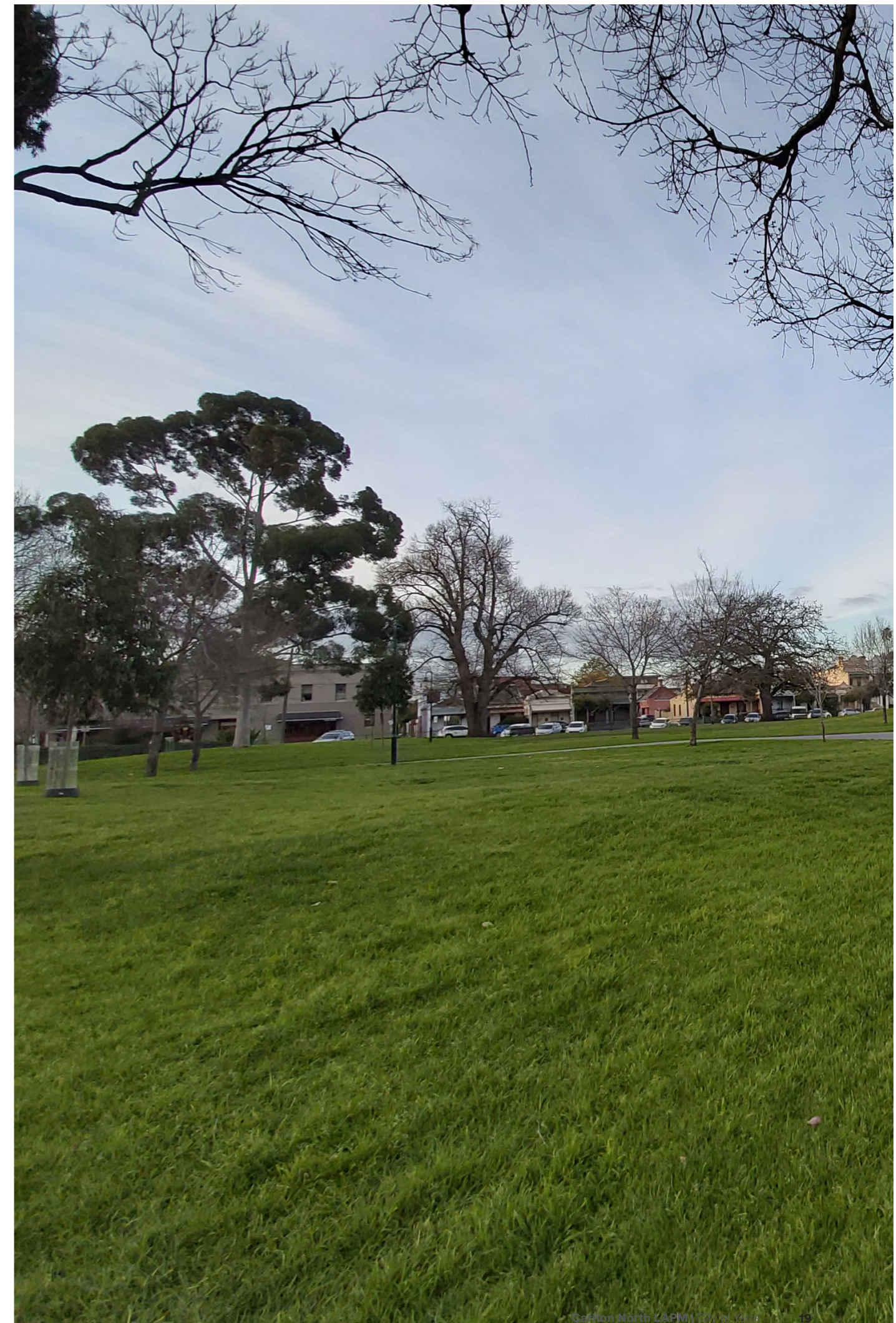
- Include additional Department of Transport advocacy recommendations for Drummond Street and Canning Street, although not to be considered in this LAPM.
- Lygon Street crossing points have been noted, however they remain out of the boundary of this LAPM.
- Speed hump treatments would be designed to account for bicycle movement.
- Minor road only treatments off Nicholson Street, accounting for new tram stops with adjusted street and footpath treatments along Nicholson Street.

Treatments removed

A number of treatments have been removed due to community feedback. They have also been assessed from a technical aspect to ensure they address existing data and best practice.

- **Newry Street and Lygon Street - Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.**
Limited interest in this treatment with suggestion that this would be low priority.
- **Drummond Street and Fenwick Street - Simplify intersection by removing the median on the inbound side and replacing with a median on Fenwick Street (East)**
Strong public opposition this treatment type, noting the potential to increase vehicle access.
- **Macpherson Street at Canning Street - Reconfigure the median strip by deleting current extension and creating centre refuges on Macpherson Street for pedestrians to cross safely.**
Strong public opposition this treatment type, noting the potential to increase vehicle access.
- **Park Street at Canning Street - New raised zebra crossing to promote pedestrian and cyclist prioritisation, widened to provide separation of use.**
Excluded due to offline technical assessment currently undertaken by City of Yarra to assess safe and best practice crossing point for cyclists and pedestrians. To be resolved outside of the LAPM as part of a separate Council project.

“ **Shade (leafy trees) means more walking in summer. Better for businesses (local), fitness, communication, relationships** ”



5.6 Community Feedback on Draft Recommendations

The table below includes reference to community sentiment on individual treatments proposed in the draft LAPM (November 2019). The proportion of positive, negative or neutral sentiment has been captured in the scale bar next to each treatment. Neutral refers to instances where there was both strong agreement and disagreement with no clear consensus.

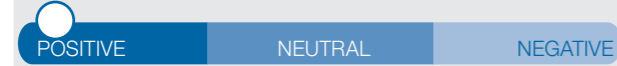
<p>1 Improve signal timing at Rathdowne Street to be calibrated to suit slower pedestrians and provide a head start for cyclists. Princes Street and Rathdowne Street</p> <p>Community Sentiment:</p> <p>Comments note the need to replicate at Drummond Street (signalised crossing) and Canning Street (crossing timing) based on community feedback in September 2019.</p>	<p>5 Improve arrival experience by enhancing greenery, providing areas for seating and discuss with other Council department the possibility of integrating artwork. Nicholson Street at Newry Street</p> <p>Community Sentiment:</p> <p>Comments note suggestion that Curtain Street would be more appropriate.</p>	<p>10 Simplify intersection by removing the median on the inbound side of Canning Street and replacing with a median on Fenwick Street (East) Drummond Street and Fenwick St</p> <p>Community Sentiment:</p> <p>Comments note strong response with comments reflecting strong disagreement, relating to concern with any recommendation that increases vehicle movement.</p>
<p>2 Kerb extension to aligns with the existing kerb extension on the North side and realignment of the bike lane to suit. Rathdowne Street and Davis Street (south-eastern side)</p> <p>Community Sentiment:</p>	<p>6 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation. O'Grady Street between Rathdowne and Canning Street</p> <p>Community Sentiment:</p>	<p>11 New raised zebra crossing to promote pedestrian prioritisation. Rathdowne Street at Fenwick Street</p> <p>Community Sentiment:</p>
<p>3 Calming treatments with combination of speed humps, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane. Drummond Street between Princes and Newry Street</p> <p>Community Sentiment:</p> <p>Comments note preference for no speed humps, although traffic calming welcomed to address speeding and rat-running.</p>	<p>7 Kerb extensions to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Rathdowne Street and Newry Street</p> <p>Community Sentiment:</p>	<p>12 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Fenwick Street and Nicholson Street</p> <p>Community Sentiment:</p>
<p>4 Calming treatments with combination of speed humps, road narrowings, and integrated with plantings. Davis Street</p> <p>Community Sentiment:</p> <p>Comments note some preference for no speed hump with use of 'left hand turn', although traffic calming welcomed to address speeding and rat-running.</p>	<p>8 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.. Newry Street and Lygon Street</p> <p>Community Sentiment:</p>	<p>13 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Macpherson Street and Lygon Street</p> <p>Community Sentiment:</p>
	<p>9 Footpath extended using parklets and kerb extensions to increase space for alfresco dining. Rathdowne Street between Curtain and Fenwick Street</p> <p>Community Sentiment:</p> <p>Comments note concern around loss of parking and consultation with traders. Suggestions to consider scaling up approach by starting with kerb extensions at side streets before removing parking.</p>	<p>14 Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Richardson Street and Lygon Street</p> <p>Community Sentiment:</p>

“ I really like the Rathdowne St bike paths with the painted buffer car door zone, and between the cyclist and traffic. I feel safe cycling in that lane ”

15 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Macpherson Street



Community Sentiment:



16 Reconfigure the median strip by deleting current extension and creating centre refuges on Macpherson Street for pedestrians to cross safely.
Macpherson Street at Canning Street



Community Sentiment:



Comments note preference to not change current state if it were to increase traffic.

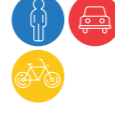
17 Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Richardson Street



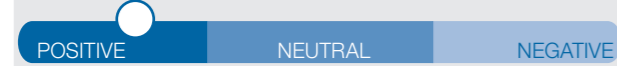
Community Sentiment:



18 Raise existing zebra crossing to promote pedestrian prioritisation.
Rathdowne Street at Richardson Street



Community Sentiment:

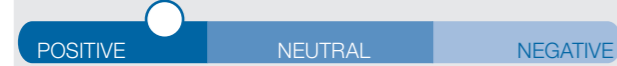


Comments note people would be supportive provided cycle movement is considered.

19 Kerb extensions and zebra crossings to improve pedestrian safety (Blackspot planned project).
Canning Street and Richardson Street



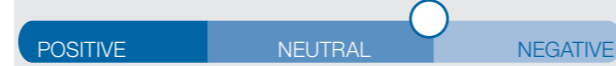
Community Sentiment:



20 Calming treatments with combination of speed humps, road narrowings, integrated with plantings.
Station Street between Richardson and Pigdon Street



Community Sentiment:



Comments reflect some opposition to the use of speed humps, with preference for warning signage.

21 Improve arrival experience by enhancing greenery, providing areas for seating.
Nicholson Street at Pigdon Street



Community Sentiment:



Comments note mixed response with preference to ensure narrowings do not force bikes and cars into the same lane.

22 Kerb extensions to reduce size of intersection and provide space for pedestrians with opportunity to introduce greenery.
Canning Street and Pigdon Street



Community Sentiment:



23 Calming treatments with combination of speed humps, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Drummond Street between Richardson and Pigdon Street



Community Sentiment:

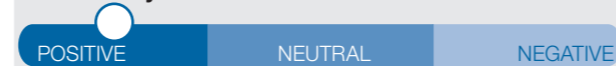


Comments noted preference for centre median and improved canopy coverage in lieu of recommendations that remove parking.

24 Calming treatments with combination of speed humps, mid block kerb extensions, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Drummond Street between Pigdon and Park Street



Community Sentiment:

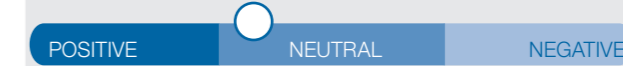


Comments noted preference for centre median and improved canopy coverage in lieu of recommendations that remove parking.

25 New raised zebra crossing to promote pedestrian and cyclist prioritisation, widened to provide separation of use.
Park Street at Drummond Street



Community Sentiment:



Comments note preference to create a widened combined pedestrian and bike crossing.

26 Kerb extensions to reduce crossing widths, improve pedestrian visibility, and opportunity to introduce greenery, tree planting and passive irrigation.
Park Street and Rathdowne Street



Community Sentiment:



27 New raised zebra crossing to promote pedestrian and cyclist prioritisation, widened to provide separation of use.
Park Street at Canning Street



Community Sentiment:



Comments note preference to create a widened combined pedestrian and bike crossing.

28 Calming treatments with combination of speed humps, mid block kerb extensions, road narrowings, integrated with plantings and cycle cut throughs for continuation of cycle lane.
Station Street between Pigdon and Park Street



Community Sentiment:



Comments note opposition to the use of speed humps, with preference for warning signage.



06 Recommendations

6.1 Overview

This section details treatment recommendations, drawing on both traffic data and community feedback.

Recommendations are intended to complement existing treatments. The internal road network already has a series of traffic calming treatments to assist local amenity and calm traffic behaviour. Treatments include:

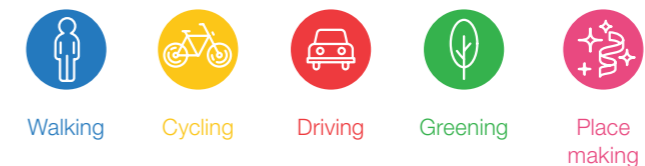
- Kerb outstands for road narrowing, allowing for activation such as alfresco dining
- Speed humps to discourage non local traffic and to moderate traffic speeds
- Pedestrian crossings to improve local connections
- Road closures to create bike and pedestrian-friendly streets

In addition to the LAPM project, various City of Yarra departments are overseeing planned works relating to the precinct. A number of these projects are being funded through the Blackspot Program. Many of these projects confirm issues and opportunities raised through background research and community and stakeholder engagement. On this basis, they have been excluded from the recommendations in the following section given they are existing planned works.

These key projects are captured in a map later in this section. They have been categorised in terms of the five categories used throughout this project: driving, walking, cycling, greening and place making. Park Street treatments are nominal and conditions along Park Street are likely to change following Yarra Trams Nicholson Street transport upgrades.

6.2 Categorisations

Recommendations have been divided into five categories, in line with categorisations referenced during community engagement. Categories include:



Each category highlights specific reference to a treatment that improves the experience for locals, visitors and commuters using the street network. A number of treatments overlap, which is demonstrated in the consolidated map at the end of the section.

The following paragraphs give an overview of how the categorisations are applied in the LAPM recommendations.

Walking treatments

Walking treatments refer to the introduction of traffic calming measures on non-thoroughfare routes to promote high local amenity for residents and visitors with additional opportunity to introduce planting and trees. Kerb outstands in key pedestrian areas to reduce crossing widths, reduce traffic manoeuvring speeds with the additional option to introduce water sensitive urban design features.

Cycling treatments

Cycle-friendly treatments integrate cycle lane with calming measures and speed humps will encourage slower vehicle speeds. Kerbs outstands will reinforce the bike lane arrangement, and provide a physical and vertical sense of road narrowing. Treatments recommended throughout the LAPM are designed to enhance the existing cycle lane network.

Driving treatments

Traffic calming refer to the introduction of measures on non-through routes to promote high quality local amenity for residents and visitors. Kerb outstands in key pedestrian areas will reduce crossing widths and reduce traffic manoeuvring speeds. Recommendations have accounted for the minimisation of parking supply.

Greening treatments

Greening treatments refer to the introduction of traffic calming measures on non-through routes to promote high quality local amenity for residents and visitors. Kerb outstands in key pedestrian areas provide opportunity for planting and the introduction of water sensitive urban design features and passive irrigation. Green treatments will need to account for other Council strategies including the Urban Forest Strategy (2017). Consideration has been given to an existing gas main along the centre of the northern section of Drummond Street which limits tree planting to the street edge.

Place making opportunities

Place making measures include opportunities to extend footpaths to provide spaces for additional amenities and programming. Place making opportunities outlined in this section reflect places suitable for enhancing community and social infrastructure.

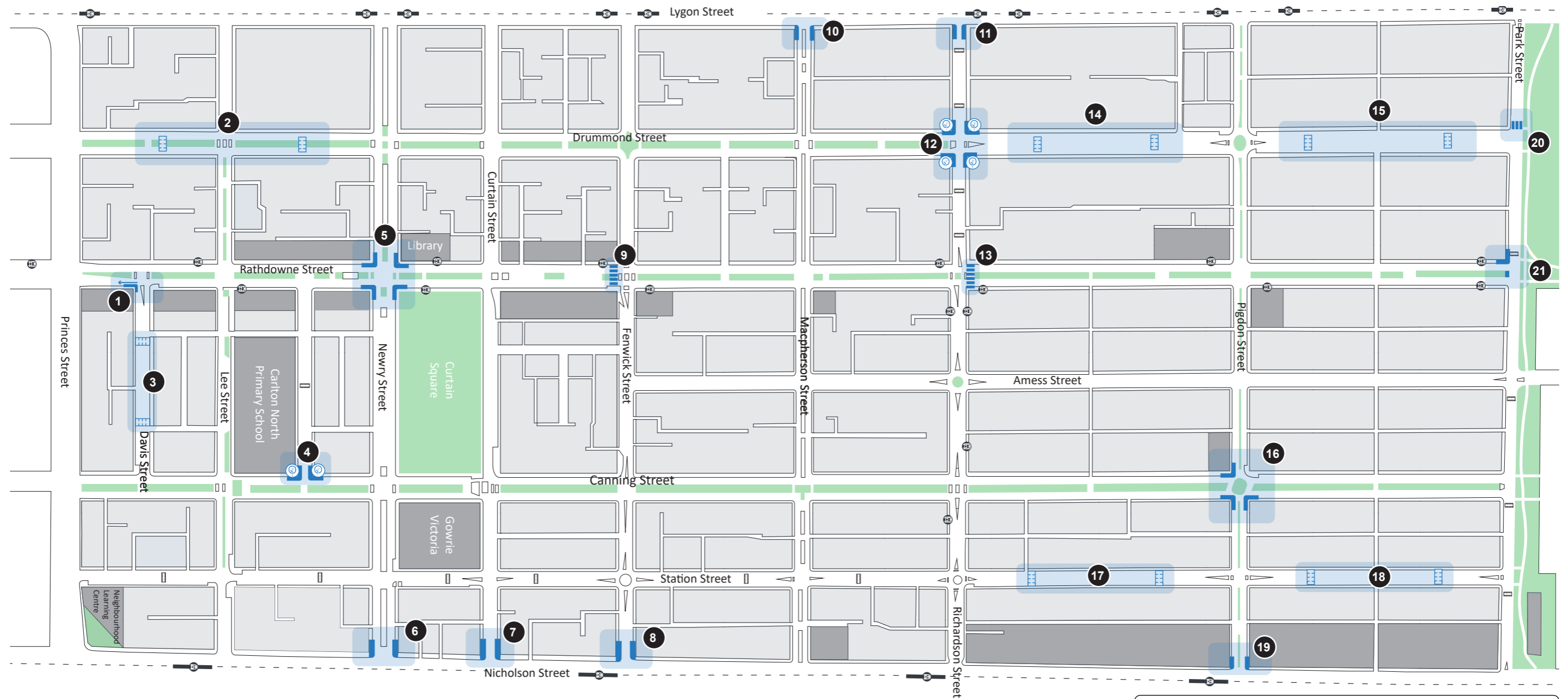


Images: examples of treatments including safer pedestrians measures, passive irrigation, and cycling infrastructure

6.3 Treatment Recommendations Map

This section captures projects that sit within the LAPM scope. The projects have been refined based on community feedback to ensure the intent of projects selection is suitable for the local community. The projects identified are based on:

- Traffic analysis – understanding how the road network is used and by whom, including pedestrian and bike riders, rat-running, and local trips.
- Road safety investigation – improving infrastructure to uplift road safety for the whole community.
- Land use and built form – to support the way people interact with the road space, for example around schools and shops.
- Site inspections – to ensure that treatments identified are appropriate for the nominated sites and fit in with the existing street conditions.
- Support existing works programs – to ensure the treatments align with projects identified through other project teams within City of Yarra.



Legend



Treatment area	Kerb outstand / footpath extension
Trees / vegetation	Speed hump
Zebra crossing	Cycle lane continuity

SUBJECT TO AMENDMENTS AT THE DETAILED DESIGN PHASE ONCE/IF ADOPTED BY COUNCIL



Legend

-  Driving treatments
-  Greening treatments
-  Walking treatments
-  Place making treatments
-  Cycling treatments



- 1** Kerb extension to aligns with the existing kerb extension on the North side and realignment of the bike lane to suit.
Rathdowne Street and Davis Street (south-eastern side)



- 2** Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Drummond Street between Princes and Newry Street



- 3** Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Davis Street




- 4** Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
O'Grady Street and Canning Street




- 5** Kerb extensions to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Include kerb extension and raise median strip to improve pedestrian safety.
Rathdowne Street and Newry Street



- 6** Kerb extensions on minor road (Newry Street) to decrease pedestrian crossing distance. Enhance with greenery, seating, bike parking and discuss with other Council department the possibility of integrating artwork.
Nicholson Street at Newry Street



- 7** Kerb extensions on minor road (Curtain Street) to decrease pedestrian crossing distance. Enhance with greenery, seating, bike parking and discuss with other Council department the possibility of integrating artwork.
Nicholson Street at Curtain Street


- 8** Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation. Incorporate bike parking.
Nicholson Street at Fenwick Street



- 9** New raised zebra crossing to promote pedestrian prioritisation. Include flashing warning lights it meets the warrants (addressed as part of design process).
Rathdowne Street at Fenwick Street


- 10** Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Macpherson Street and Lygon Street



- 11** Kerb extensions on minor road to reduce size of intersection and opportunity to introduce greenery, tree planting and passive irrigation.
Richardson Street and Lygon Street


- 12** Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Richardson Street



- 13** Raise existing zebra crossing to promote pedestrian prioritisation. Include flashing warning lights it meets the warrants (addressed as part of design process).
Rathdowne Street at Richardson Street



- 14** Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Drummond Street between Richardson and Pigdon Street



- 15** Calming treatments with combination of speed humps, road narrowings, integrated with plantings. Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Drummond Street between Pigdon and Park Street



- 16** Kerb extensions to reduce size of intersection and provide space for pedestrians with opportunity to introduce greenery and passive irrigation.
Canning Street and Pigdon Street




- 17** Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Station Street between Richardson and Pigdon Street




- 18** Speed humps located adjacent to trees (or trees planted where needed) to minimise loss of parking. Subject to Australian Standard spacing requirements.
Station Street between Pigdon and Park Street




- 19** Kerb extensions on minor road (Newry Street) to decrease pedestrian crossing distance. Enhance with greenery, seating, and bike parking. Treatment may take up one parking bay width only in Pigdon and will not encroach on bike or traffic lane.
Nicholson Street at Pigdon Street

- 20** New raised zebra crossing integrated with speed hump (west side only) to promote pedestrian and cyclist prioritisation, widened to provide separation of use. Include flashing warning lights it meets the warrants (addressed as part of design process).
Park Street at Drummond Street

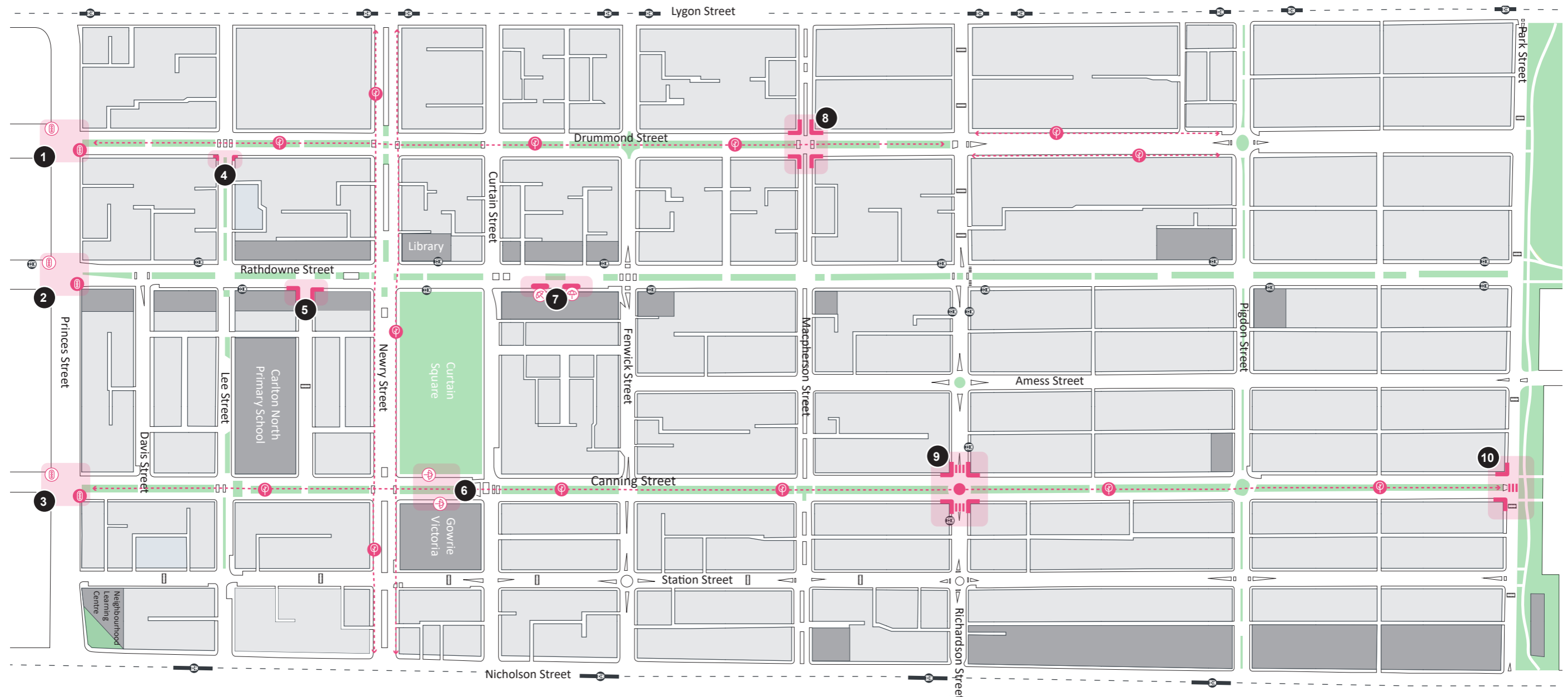
- 21** Kerb extension on west side of intersection and raised centre median on Rathdowne Street to reduce crossing widths, improve pedestrian visibility, and opportunity to introduce greenery, tree planting and passive irrigation. Kerb extension on east side not possible due to requirements of bus turning circle.
Park Street and Rathdowne Street

6.4 Planned or Potential Projects Map

This section captures projects that sit out of the scope of this LAPM. They include both planned and potential projects. Many of these projects draw on the analysis of traffic data and concerns and opportunities raised during community engagement.

Planned projects refer to Council or State Government capital works projects with existing approval and funding to proceed. A number of these projects are being funded through the Blackspot Program. Potential projects reference treatments that require further advocacy as they sit within Department of Transport jurisdiction, sit within the responsibility of an alternate Council department, or require further detailed engagement and design considerations.
















Legend	
Treatment area	Zebra crossing
Pedestrian and cycle prioritisation	Kerb outstand / footpath extension
Trees / vegetation	Amenities (seating / water fountain)

SUBJECT TO AMENDMENTS AT THE DETAILED DESIGN PHASE ONCE/IF ADOPTED BY COUNCIL

Legend

-  Driving treatments
-  Walking treatments
-  Cycling treatments
-  Greening treatments
-  Place making treatments

- 1** Potential Project:  Advocate to Department of Transport (DoT) to create a safe crossing for cyclists and pedestrians.
Princes Street and Drummond Street
- 2** Potential Project:  Advocate to Department of Transport (DoT) to improve signal timing to be calibrated to suit slower pedestrians and provide a head start for cyclists.
Princes Street and Rathdowne Street
- 3** Potential Project:  Advocate to Department of Transport (DoT) to improve signal timing to be calibrated to suit slower pedestrians and provide a head start for cyclists.
Princes Street and Canning Street
- 4** Potential Project:  Reinstate raised kerbs to protect pedestrians from vehicle movements.
Lee Street at Drummond Street
- 5** Blackspot project:  Kerb extensions to reduce size of intersection and provide space for pedestrians to cross safely.
O'Grady Street and Rathdowne Street
- 6** Funded project (City West Water reinstatement):  Amenity projects including water fountain, seating and cycle parking.
Canning Street between Gowrie Centre and Curtain Square
- 7** Potential project:  Footpath extended to increase space for alfresco dining, bike parking or greenery. Location and specific use will be developed in project-specific consultation with traders and community to understand specific treatment and any loss of carparking.
Rathdowne Street between Curtain and Fenwick Street

- 8** Blackspot project:  Kerb extensions to reduce size of intersection and provide space for pedestrians and opportunity to introduce greenery, tree planting and passive irrigation.
Drummond Street and Macpherson Street
- 9** Blackspot project:  Roundabout treatment with kerb extensions and zebra crossings to improve pedestrian safety.
Canning Street and Richardson Street
- 10** Potential project:  Council exploring safe crossing points across Park Street from the Capital City trail for pedestrians and cyclists. Further detailed considerations to improving Canning Street crossing through kerb extensions and raised zebra.
Park Street and Canning Street
- N/A Funded project (Council and City West Water):  Tree planting along central median from Princes Street to Park Street.
Canning Street
- N/A Funded project (Council):  Tree planting along central median and footpaths along full length of Newry Street.
Newry Street
- N/A Funded project (Council):  Tree planting along central median and footpaths between Princes Street and Pigdon Street.
Drummond Street



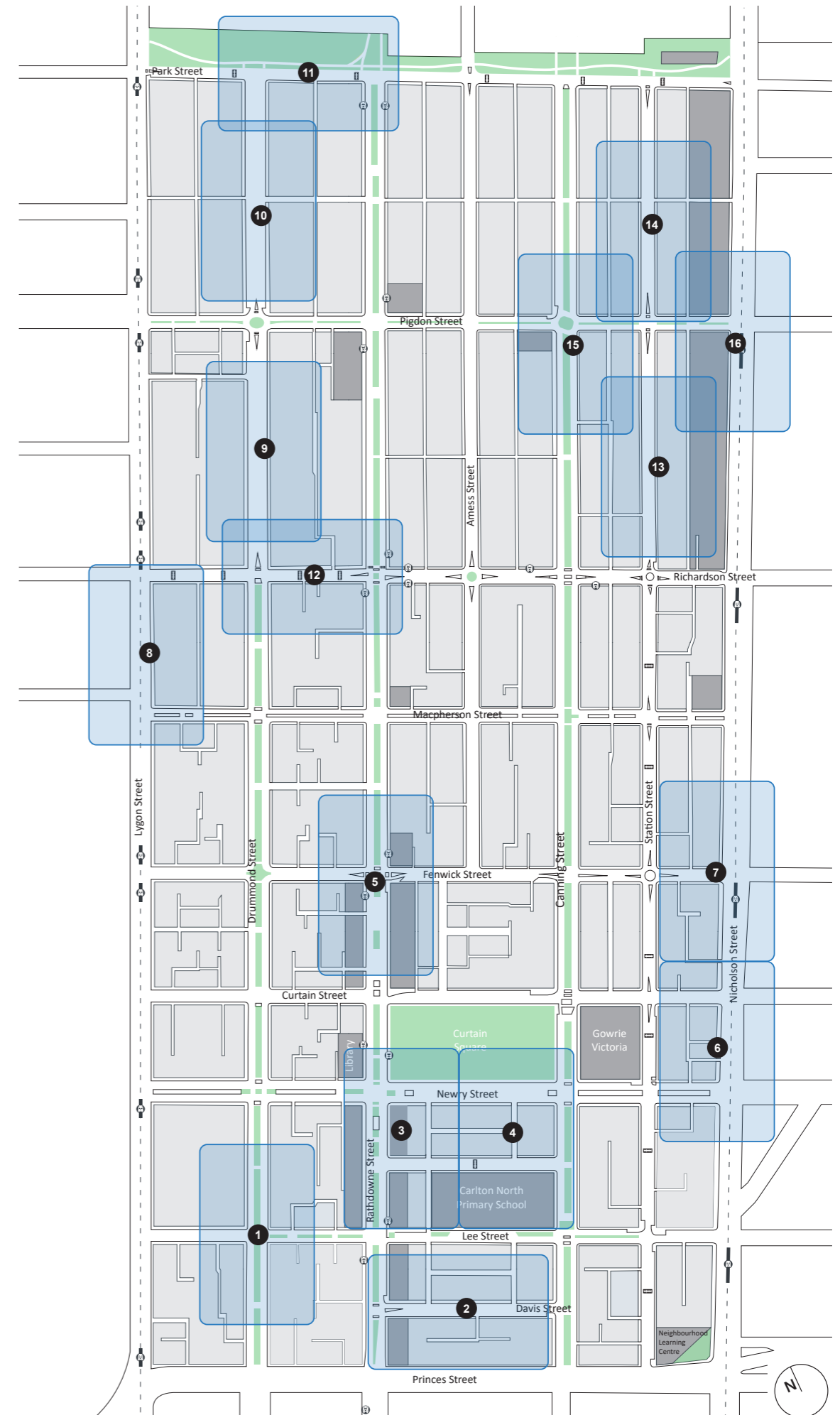


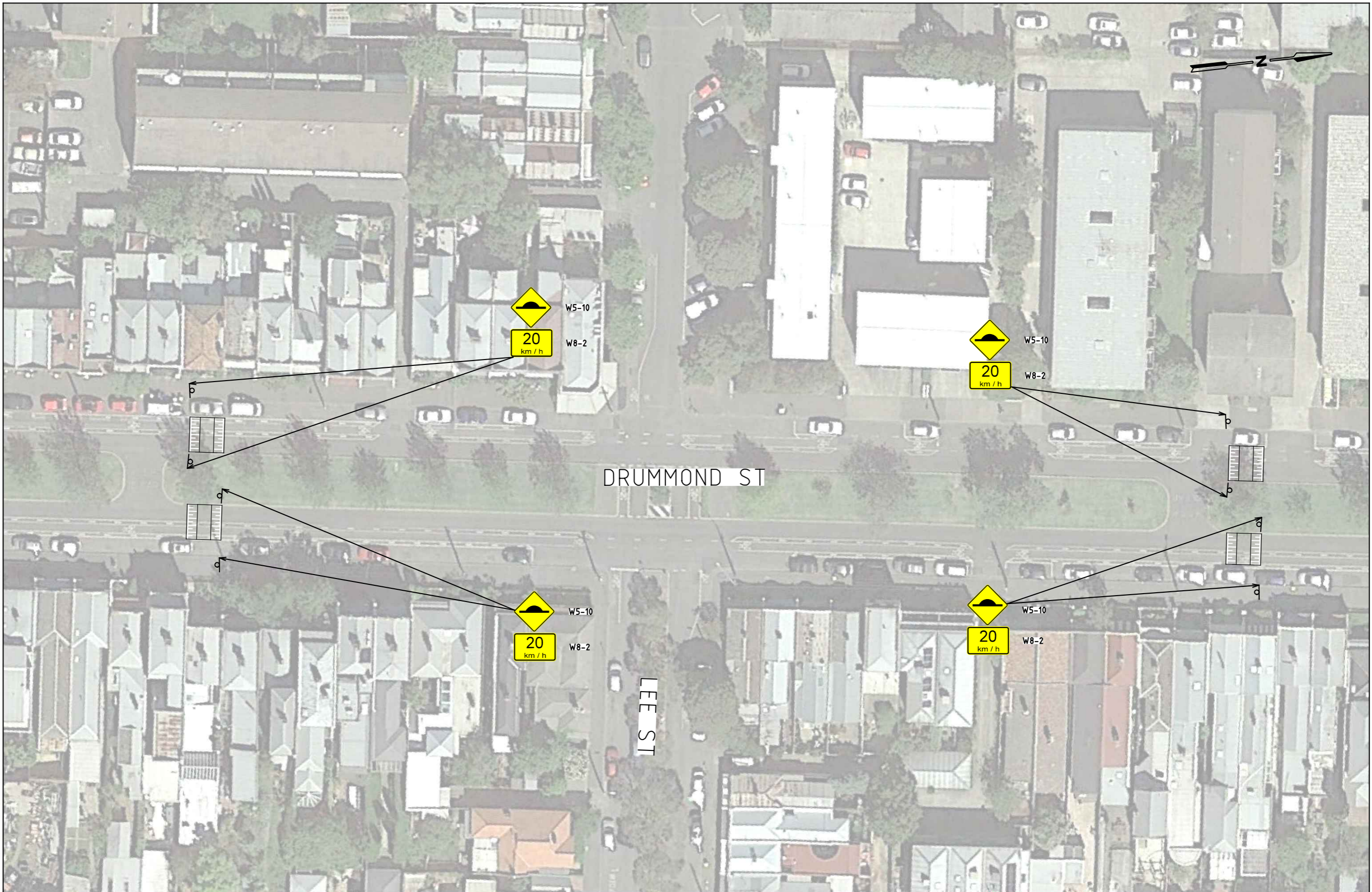


April 2020

07 Concept Designs

The concept plans in this section demonstrate how the nominated projects would be positioned for each project. The concept plans have been developed for each project shown on the Treatment Recommendation Map in Section 6.3. Each project has been prepared inline with Australian Standards and relevant guidelines and have been customised to reflect the community feedback, to ensure projects are the best outcome for the community. Concept designs are subject to change or amendment at the detailed design phase one/if adopted by Council.





4/21/2020 Carlton North
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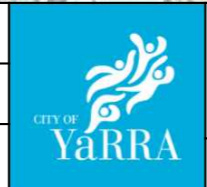
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M. ALKONGA
APRIL 2020

APPROVED
A. WESCOMBE
APRIL 2020

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PROJ:
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CARLTON NORTH LAPM
 CONCEPT DESIGN
 TREATMENT LAYOUT OPTIONS

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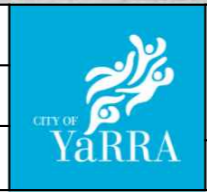
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CARLTON NORTH LAPM
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 TREATMENT LAYOUT OPTIONS

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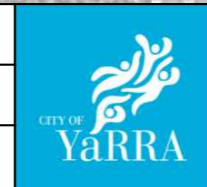
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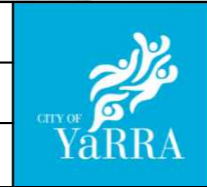
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CARLTON NORTH LAPM
 CONCEPT DESIGN
 TREATMENT LAYOUT OPTIONS

FILE NO. GHD 31	CONTRACT NO. 12511233	SHEET NO. 4	DRAWING NO. C000	ISSUE 1
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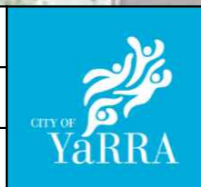


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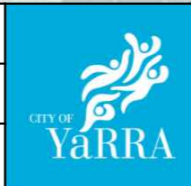


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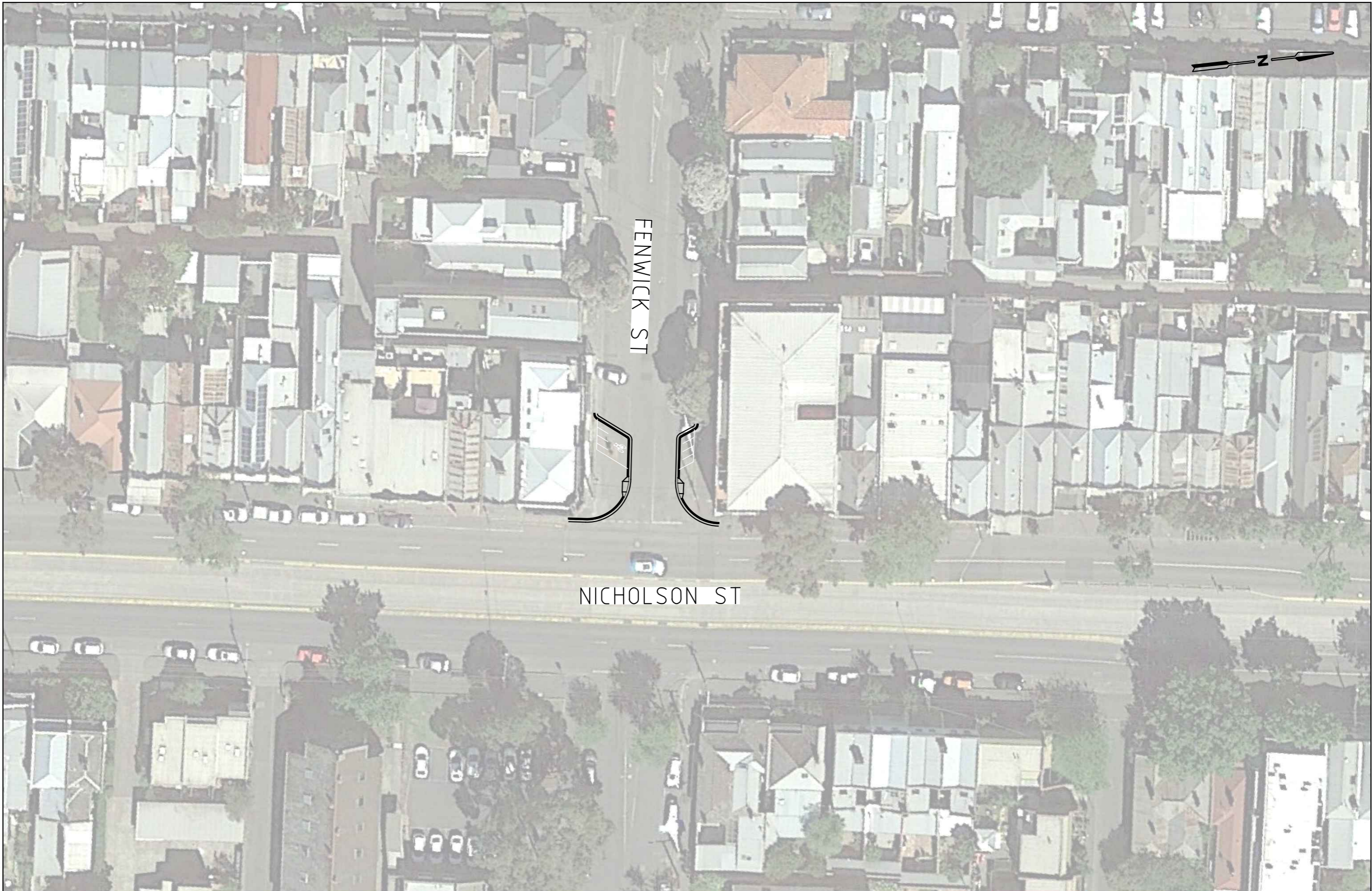
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NICHOLSON ST

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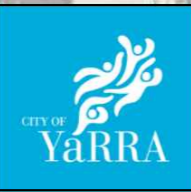


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A. WESCOMBE
APRIL 2020

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LYGON ST

MACPHERSON ST

RICHARDSON ST

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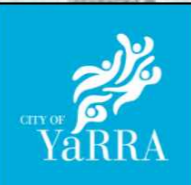


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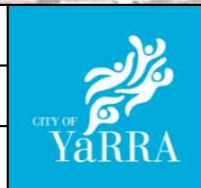
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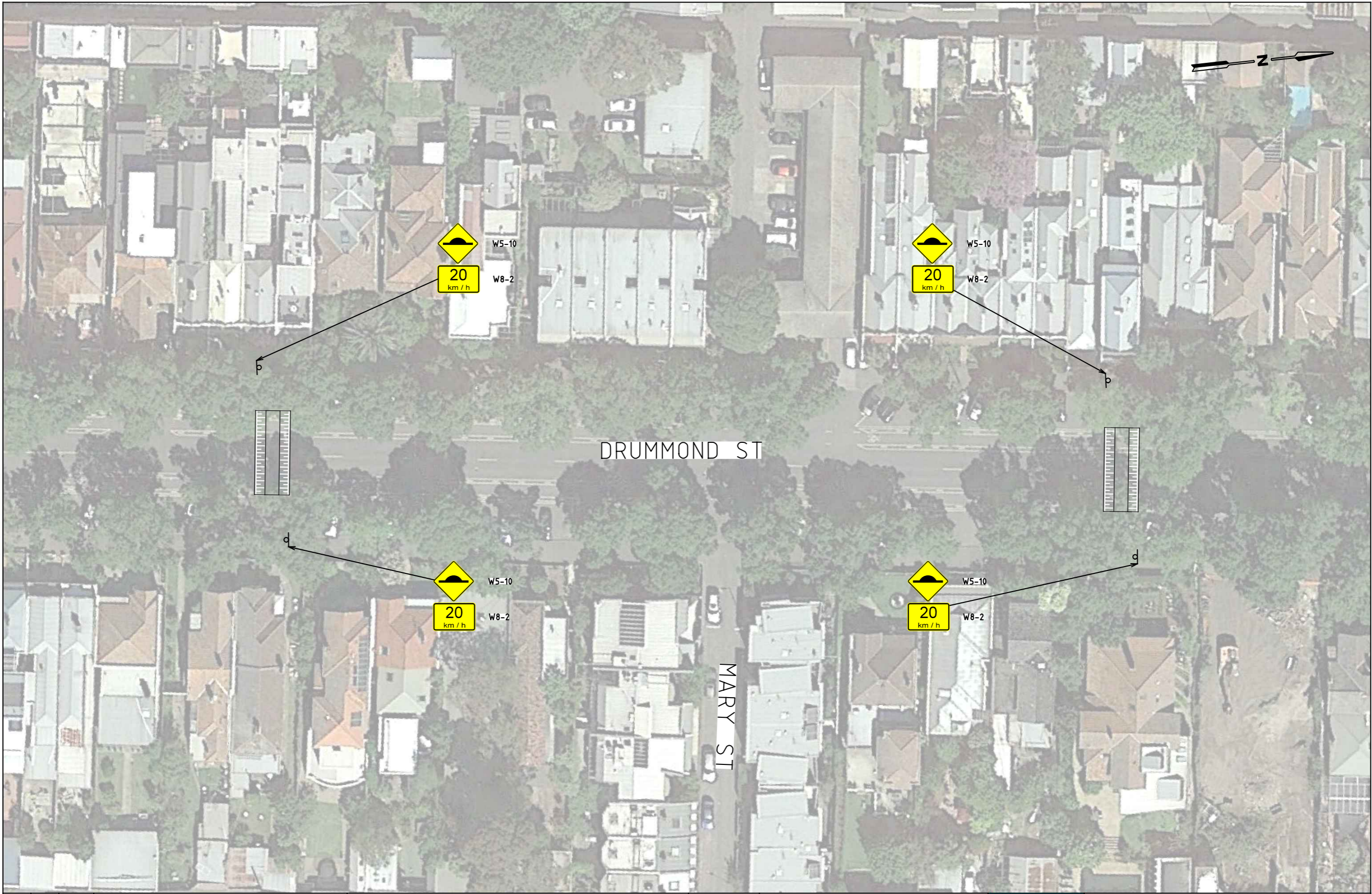
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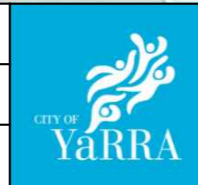


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APRIL 2020

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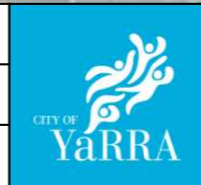


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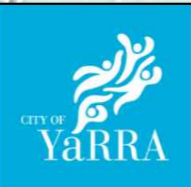


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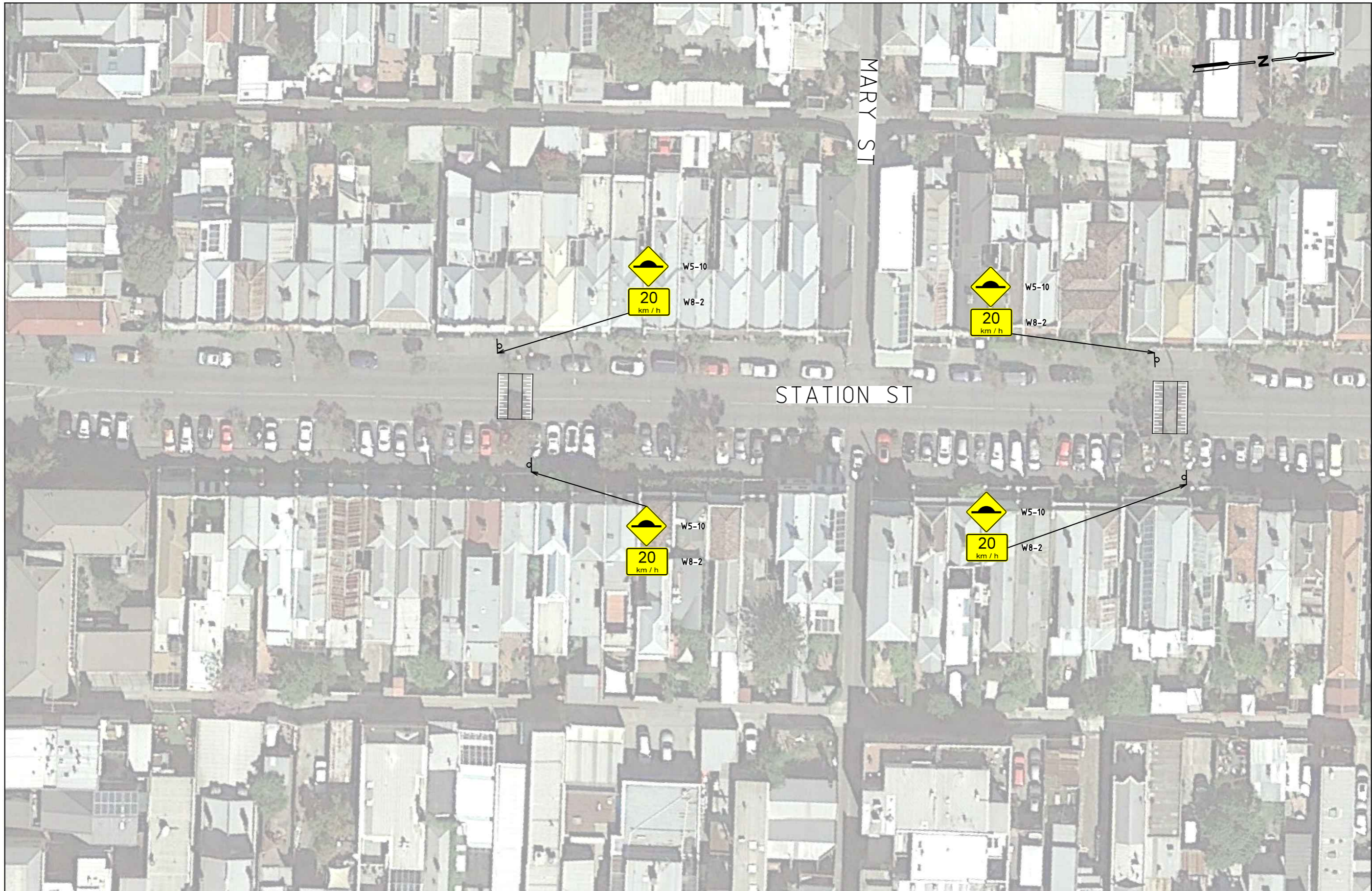
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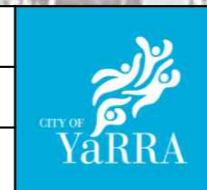
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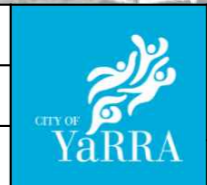


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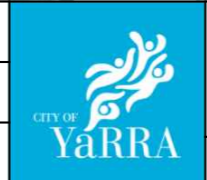
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08 Cost Estimates

The high level cost estimates have been developed on the basis of previous LAPM studies undertaken by CoY. The estimates are based on concept designs and have not may not reflect alteration to services or required traffic management. Dial before you dig and further investigations are to be undertaken to finalise designs and cost estimates.

Treatment	Type	Location	High level estimate
1	Kerb Extension	Rathdowne Street and Davis Street (south-eastern side)	\$50,000.00
2	Calming treatments	Drummond Street between Princes and Newry Street	\$20,000.00
3	Calming treatments	Davis Street	\$20,000.00
4	Kerb Extension	O'Grady Street between Rathdowne and Canning Street	\$50,000.00
5	Kerb Extension	Rathdowne Street and Newry Street	\$115,000.00
6	Kerb Extension	Nicholson Street at Newry Street	\$55,000.00
7	Kerb Extension	Nicholson Street at Curtain Street	\$55,000.00
8	Kerb Extension	Fenwick Street and Nicholson Street	\$50,000.00
9	Raised Zebra Crossing	Rathdowne Street at Fenwick Street	\$45,000.00
10	Kerb Extension	Macpherson Street and Lygon Street	\$45,000.00
11	Kerb Extension	Richardson Street and Lygon Street	\$45,000.00
12	Kerb Extension	Drummond Street and Richardson Street	\$100,000.00
13	Raised Zebra Crossing	Rathdowne Street at Richardson Street	\$95,000.00
14	Calming treatments	Drummond Street between Richardson and Pigdon Street	\$20,000.00
15	Calming treatments	Drummond Street between Pigdon and Park Street	\$45,000.00
16	Kerb Extension	Canning Street and Pigdon Street	\$70,000.00
17	Calming treatments	Station Street between Richardson and Pigdon Street	\$20,000.00
18	Calming treatments	Station Street between Pigdon and Park Street	\$20,000.00
19	Kerb Extension	Nicholson Street at Pigdon Street	\$55,000.00
20	Raised Zebra Crossing	Park Street at Drummond Street	\$95,000.00
21	Kerb Extension	Park Street and Rathdowne Street	\$45,000.00

Conclusion

The Carlton North Precinct is a diverse and vibrant area, with a wide range of local activity. The precinct is close to Melbourne CBD and has high frequency bus and tram connections. There is an extensive pedestrian and cycling network, which attract locals and visitors to the area. However, the area is impacted by the prevalence of speeding behaviour on local roads throughout the study precinct. This behaviour is prominent on north-south routes, particularly towards the northern portion of the precinct. Routes with excessive speeding are Drummond Street, Station Street and Davis Street. Pigdon Street and Rathdowne Street has the highest traffic volumes, with vehicles travelling along these routes throughout the day. Pigdon Street has a strong east-west and west-east travel demand. There are a large portion of traffic entering and exiting Rathdowne Street, and using other side streets to complete the route, including Pigdon Street, Park Street and Amess Street. Station Street, Drummond Street and Canning Street have the highest peak hour traffic volumes to all day traffic volume ratios. This indicates that there is rat running along these corridors.

There was 236 'serious' and 'other' injury crashes in the five year crash history within the study area. Fortunately there were no fatal crashes within this precinct. Of the crashes that did occur, 57 were 'serious' injury crashes. The most common crash type is 'vehicles from adjacent direction', with the most serious injuries at cross intersections. There was 32 pedestrian related crashes within the survey area, with crashes predominately on Nicholson Street, Rathdowne Street and at Princes Street/Lygon Street intersection. There were 89 cyclist crashes, with most common crash type 'cross traffic and 'rear end' crashes.

The LAPM study has developed an extensive project list to address that will provide an uplift in road safety, improve accessibility for pedestrians and address non-desirable road behaviour, including rat running. The projects were developed to complement the Carlton North study area street network and local activity. The projects have been refined based on community feedback received from the engagement sessions across August 2019 to March 2020.



